



Health Canada and the Public
Health Agency of Canada

Santé Canada et l'Agence
de la santé publique du Canada

Canada

Evaluation of the Public Health Agency of Canada's Tuberculosis Activities 2015-16 to 2020-21

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

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List of Acronyms

CCDIC	Centre for Communicable Diseases and Infection Control
CDC	Centers for Disease Control and Prevention
CID-SC	Communicable and Infectious Disease Steering Committee
CIHR	Canadian Institutes of Health Research
CPHO	Chief Public Health Officer
CTBEN	Canadian Tuberculosis Elimination Network
EMB	Emergency Management Branch
GAC	Global Affairs Canada
IDPB	Infectious Diseases Programs Branch (as of 2020)
IDPC	Infectious Disease Prevention and Control Branch (before 2020)
IGRA	Interferon-Gamma Release Assay
IRCC	Immigration, Refugees and Citizenship Canada
IRHWG	Immigration and Refugee Health Working Group
ISC	Indigenous Services Canada
ITK	Inuit Tapiriit Kanatami
LTBI	Latent Tuberculosis Infection
NMLB	National Microbiology Laboratory Branch
OCPHO	Office of Chief Public Health Officer
OIA	Office of International Affairs
PAHO	Pan American Health Organization
PHAC	Public Health Agency of Canada
PHN	Public Health Network
TB	Tuberculosis
UN	United Nations
WHO	World Health Organization

Executive summary

This report presents findings from the evaluation of the Public Health Agency of Canada's (PHAC) tuberculosis (TB) activities from April 2015 to March 2021.

TB is a social disease with a medical aspect influenced by determinants of health, such as poverty, food insecurity, and inadequate housing. This infectious disease disproportionately affects the poorest and most vulnerable segments of the world's population. In Canada, rates of TB are among the lowest in the world, yet two populations - Indigenous peoples, especially Inuit, and foreign-born individuals from high-incidence countries - are disproportionately affected by persistently higher rates.

PHAC's TB activities are led by the Infectious Diseases Program Branch (IDPB), and supported by the National Microbiology Laboratory Branch (NMLB). These activities include surveillance, policy orientation, funding for community-based projects, convening stakeholders, outbreak response support, laboratory proficiency, testing and diagnostic services and training, and contributing to international TB forums.

Between 2015-16 and 2020-21, PHAC's annual budget for TB activities was approximately \$2.5 million a year, with almost half of spending going to laboratory activities, a fifth to policy work, another fifth to surveillance, and over a tenth to project funding.

Key findings

The Government of Canada committed, in 2014 and 2018, to eliminate TB by 2035 across the country, and by 2030 across Inuit Nunangat. Elimination is defined as less than 1 case per 100,000 people. After a significant decrease in the 1990s and early 2000s, active TB incidence stagnated for a decade, but has slightly increased since 2014. Underdiagnosed cases during the COVID-19 pandemic will likely contribute to accelerating the upward trend in the coming years. Considering the rate of TB in 2020, Canada's commitments would require a 10% decrease of infections per year to meet the elimination targets.

PHAC has initiated a variety of useful small-scale TB initiatives in recent years to address the needs of at-risk populations. They have helped increase TB awareness and testing among Indigenous populations and migrants in high-risk communities, as well as screening for latent TB infection (LTBI) among certain categories of migrants during their immigration selection process. PHAC also documented the most effective LTBI treatments among at-risk populations. Moreover, the National Microbiology Laboratory Branch (NMLB), field epidemiologists, and public health officers' services have significantly supported laboratories and communities across the country in addressing TB outbreaks.

Nonetheless, coordination, communication, and clarity of roles and responsibilities remain ongoing challenges, both internally and among external stakeholders, including on the international stage. Achieving TB elimination domestically calls for a centralized and shared coordination role between IDPB and NMLB. Furthermore, at the national level, there are opportunities for PHAC to lead a country-wide approach and generate synergies through pan-Canadian strategic planning, enhanced intelligence gathering, and strengthened science-based decision making.

Finally, TB-specific and broader PHAC-level challenges related to the timeliness and usefulness of surveillance of infectious diseases must be addressed to better understand and respond to at-risk population needs, to effectively monitor infectious disease trends, and to guide decision making internally and across the country. A performance measurement framework is not yet available to support decision making.

Recommendations

The findings discussed in this report have led to the identification of four recommendations to help ensure that PHAC's activities effectively contribute to TB elimination in Canada.

Recommendation 1: The Infectious Diseases Programs Branch should clearly articulate and communicate PHAC's TB roles, responsibilities, and priorities.

Limited communication and coordination between teams working on TB within PHAC, and a lack of clarity on roles and responsibilities, are challenges for an effective collaborative approach within PHAC, and limit interaction with external stakeholders. PHAC should therefore clarify and communicate roles and responsibilities internally and externally, and adopt a more coordinated approach to TB with partners and stakeholders. Doing so would allow the various teams within PHAC dedicated to TB elimination to better coordinate their efforts. This includes not only IDPB and NMLB activities, but also other teams who support the TB response outside these branches, such as field epidemiologists and public health officers. In addition, external stakeholders would more easily identify their relevant counterparts within PHAC, know what to expect from them, and better coordinate their efforts across Canada.

Recommendation 2: Once PHAC's roles, responsibilities and priorities are clearly articulated, the Infectious Diseases Programs Branch should establish the necessary governance structures:

- a. internally to ensure TB activities are better coordinated within the Agency and,**
- b. externally to ensure TB activities are better coordinated across Canada to achieve elimination goals.**

PHAC disbanded the pan-Canadian TB convening and decision-making mechanisms in place a decade ago, and efforts against TB have continued in a less coordinated fashion within the Agency and across Canada. PHAC should therefore work to establish dedicated governance structures, both internally and with other jurisdictions. This may result in continuous information gathering and sharing with TB stakeholders to guide decision making and practices across the country. In doing so, relevant TB stakeholders would be more directly connected, better informed, and able to work together more closely to achieve the goals of TB elimination in Canada.

Recommendation 3: The Infectious Diseases Programs Branch should update the TB surveillance approach to improve timeliness and utility, as well as consider how LTBI could be monitored going forward.

Over the period in scope, TB surveillance data has not been timely. Despite the recent publication of 2020 data to coincide with World Tuberculosis Day on March 24, 2022, the TB surveillance system had published TB rates with significant delays, even before the COVID-19 period. Moreover, data sharing and collection mechanisms are not currently adequate for monitoring at-risk populations effectively.

In addition, although most active TB cases are successfully treated every year, rates have not decreased, partly due to LTBI reactivation. The WHO considers the systematic testing and treatment of LTBI among at-risk populations a critical factor in TB elimination. Currently, LTBI data is limited in Canada and worldwide. PHAC could therefore consider options to collect and report LTBI data to support the activities to eliminate TB in Canada.

Recommendation 4: The Infectious Diseases Programs Branch should revise current performance measurement practices to effectively measure the impact of PHAC's TB activities, including LTBI.

Despite commitments made to eliminate TB in Canada in the coming years, relevant monitoring mechanisms are not in place to ensure progress is being made. PHAC should therefore finalize and implement a performance measurement framework, in consultation with other jurisdictions, to monitor progress and achievement of internal TB activities for continuous improvement, including for LTBI.

Management Response and Action Plan

Evaluation of the tuberculosis activities, 2015-16 to 2020-21

Tuberculosis remains a serious global illness. According to the WHO, approximately 10 million people develop this disease each year and despite being preventable, about 1.5 million people die from TB each year. While Canada is considered a low incidence country, TB continues to affect certain populations disproportionately including Indigenous peoples, especially Inuit, and individuals from high-incidence countries.

PHAC has contributed to TB prevention and control through conducting surveillance (monitoring rates nationally and by jurisdiction), working with partners to develop TB prevention and control standards and enhancing knowledge and skills, providing outbreak support and participating in international engagement efforts towards TB elimination. The National Microbiology Laboratory Branch (NMLB) also provides reference, and diagnostic services, and supports public health partners with testing.

PHAC has contributed to a number of recent initiatives to advance TB prevention and control in Canada. For example, the national TB surveillance reports (Tuberculosis in Canada: 2020 Infographic <https://www.canada.ca/en/public-health/services/publications/science-research-data/tuberculosis-canada-2020-infographic.html>), TB in Canada 2010-2020 Summary Report <https://open.canada.ca/data/en/dataset/17ee0902-055e-415e-b7aa-d9bee1734d35>, TB in Canada 2008-2018 report <https://open.canada.ca/data/en/dataset/4dbb9bff-022d-4aab-a11d-0a2e1b0afaad>), hosted a national webinar for public health professionals as part of World TB Day in 2022, contributed to the Canadian TB Standards 8th Edition, promoted TB awareness and testing among Indigenous populations and migrants in high-risk communities, as well as screening for latent TB infection (LTBI) among certain categories of migrants during their immigration selection process. The National Microbiology Laboratory Branch (NMLB), field epidemiologists, and public health officers have also supported laboratories and communities across the country in addressing TB outbreaks.

These initiatives provide examples of federal contributions towards TB control. However, solutions to managing this complex disease will require commitment and ongoing multisectoral engagement at many levels which are driven by jurisdictions and communities themselves, including governments, academics, experts, and other stakeholders taking into account cultural competencies and the social determinants of health. To promote a national approach to TB elimination, PHAC will further strengthen its partnerships with key stakeholders including provincial and territorial public health representatives and other key organizations to assess the requirements to enhance prevention and control activities across jurisdictions.

TB elimination requires coordinated efforts across jurisdictions and is highly dependent on prevention and control activities taking place at local, regional and P/T levels. In 2012, the Public Health Network Council (PHNC) streamlined its FPT structure which resulted in the creation of the Communicable and Infectious Disease Steering Committee (CIDSC), the sole FPT committee mandated to address infectious diseases, in a coordinated way, with the ability to strike time limited issue/disease specific committees to inform its deliberations. Given the impact of the COVID-19 pandemic and other emerging pathogens on P/T resources and priorities, PHAC will explore with P/T public health partners their interest in establishing a more formal partnership that would focus on strengthening TB elimination efforts and supporting horizontal linkages across jurisdictions in Canada under the CIDSC umbrella.

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
The Infectious Diseases Programs Branch should clearly articulate and communicate PHAC's TB role, responsibilities and priorities	Agree	<p>1. Develop a summary of PHAC's current roles, responsibilities and priorities</p> <p>2. Monitor TB rates across jurisdictions to assess progress towards TB elimination (<1case/million population)</p>	<p>Identify contact leads in the seven internal branches and offices</p> <p>Review and update internal roles on PHAC TB webpage.</p> <p>Summary report published on Canada.ca and disseminated to TB stakeholders</p> <p>Annual surveillance reports:</p> <ul style="list-style-type: none"> Infographic 	<p>31 October 2022</p> <p>31 December 2023</p> <p>31 March 2022</p>	<p>Director General, Centre for Communicable Diseases and Infection Control</p> <p>Vice President, Infectious Diseases Program Branch</p> <p>(DG, CCDIC VP, IDPB)</p>	Complete with existing resources

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
		3. Continue to support P/Ts and partners in TB elimination through providing materials, guidelines and awareness activities	<ul style="list-style-type: none"> • Summary • Expanded • Continue activities to promote World TB Day 	30 September 2022 31 August 2023 24 March 2023		

<p>Once PHAC's roles, responsibilities and priorities are clearly articulated, the Infectious Diseases Programs Branch should establish the necessary governance structures:</p> <p>a. internally to ensure TB activities are better coordinated within the Agency and,</p> <p>b. externally to ensure TB activities are better coordinated across Canada to achieve elimination goals.</p>	<p>Agree</p>	<p>1. PHAC to develop an internal TB logic model to map activities with Agency roles, responsibilities and priorities</p> <p>2. PHAC to convene a scientific forum on TB to discuss key issues for Canada.</p> <p>3. PHAC to establish an internal TB collaborative group to strengthen coordination within the Agency.</p> <p>4. PHAC to initiate consultations with federal and provincial/territorial (PT) TB surveillance representatives to inform national TB surveillance.</p>	<p>PHAC TB program logic model completed and summarized in a report</p> <p>Scientific Forum completed</p> <p>PHAC internal TB collaborative group established</p> <p>PHAC FPT consultation completed</p>	<p>30 June 2023</p> <p>31 March 2024</p> <p>30 April 2023</p> <p>31 December 2023</p>	<p>DG, CCDIC VP, IDPB</p> <p>NMLB (DG and VP)</p> <p>DG, CCDIC VP, IDPB</p> <p>NMLB (DG and VP)</p>	<p>Complete with existing resources</p>
<p>The Infectious Diseases Programs Branch should update the TB surveillance approach to improve timeliness and utility as well as to consider how LTBI could be monitored going forward.</p>	<p>Agree</p>	<p>1. PHAC to assess current internal surveillance activities and identify opportunities for enhanced surveillance</p> <p>2. Consider actions to address latent TB</p>	<p>Assessment of current surveillance activities completed with recommendations for enhanced surveillance - summarized in a final report</p> <p>Assessment of an LTBI pilot study to enhance</p>	<p>31 December 2023</p> <p>31 October 2022</p>	<p>DG, CCDIC VP, IDPB NMLB (DG and VP)</p> <p>DG, CCDIC VP, IDPB</p>	<p>Complete with existing resources</p>

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
		infection in collaboration with affected populations.	screening and monitoring for LTBI		NMLB (DG and VP)	
The Infectious Diseases Programs Branch should revise current performance measurement practices to effectively measure the impact of PHAC's TB activities.	Agree	1.PHAC to develop an internal TB performance measurement framework with indicators and set schedule for reporting	Internal TB performance measurement framework with indicators developed	30 June 2023	DG, CCDIC VP, IDPB NMLB (DG and VP)	Complete with existing resources

1. Evaluation scope and methodology

This report presents findings from the evaluation of the Public Health Agency of Canada's (PHAC) tuberculosis (TB) activities from April 2015 to March 2021. The evaluation focused on the extent to which PHAC's current approach is appropriate to address the needs of each at-risk population, how scientific and performance information, as well as stakeholders' perspectives, are guiding TB activities and the contribution of PHAC activities to reducing TB rates in Canada. PHAC's TB activities were previously evaluated in 2015.

To address these questions, data was collected from a review of literature, internal documents, financial, performance, and scientific data, as well as a comparison of TB strategies and practices with other low-incidence countries, and a case study on the difference in US-Canada incidence rates.

Data was analyzed by triangulating information gathered from the different lines of evidence listed above, to increase the reliability and credibility of evaluation findings and conclusions. See Appendix A for further details on the evaluation scope and methodology.

2. Program profile

2.1 TB activities across the Agency

Tuberculosis (TB) is an infectious disease that disproportionately affects the poorest and most vulnerable segments of the world's population. In Canada, TB rates are among the lowest in the world, yet two populations are disproportionately affected by persistently higher rates: Indigenous people, especially Inuit, and foreign-born individuals from high-incidence countries.

The overall objective of PHAC's TB-related activities is to reduce TB rates in Canada. To this end, PHAC takes an integrated, function-based approach to TB prevention and control that aligns with its strategic objectives and targets for the ultimate goal of TB elimination.

Within PHAC, activities to reduce TB rates in Canada are led by the Infectious Diseases Program Branch (IDPB), which is responsible for the following functions:

- **Surveillance:** monitors and reports on TB trends at the national level, and shares its findings with domestic and international partners to help inform public health action.
- **Convenor:** brings together actors from across multiple jurisdictions to engage in constructive dialogue on TB control issues.
- **Knowledge brokering:** works with multiple partners, including the National Collaborating Centres for public health, to translate new knowledge and scientific evidence into public health guidance, policy, and practice.
- **Capacity building:** serves as a focal point for developing knowledge, skills, tools, and partnerships that serve the needs

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of at-risk groups, and for providing the financial support, when available, to meet those needs.

- **International engagement:** supports Canada's participation in international forums dedicated to TB elimination on a global scale.
- **Outbreak support:** provides epidemiological, scientific, and operational support by request to provinces and territories responding to TB outbreaks.

The work is also supported by the National Microbiology Laboratory (NMLB), which provides:

- **On site support:** Laboratory leadership, reference, and diagnostic services, and support to public health partners for TB surveillance and control.
- **Support in the field:** Testing support, training, and capacity building solutions directly to northern, remote, and isolated communities affected by TB.

In addition, other teams within PHAC are involved in TB activities:

- The Emergency Management Branch (EMB) mobilizes field epidemiologists and public health officers to support outbreak response and complement efforts in the field.
- The Office of the Chief Public Health Officer (OCPHO) contributes to raising awareness on specific topics in the CPHO annual report, covering TB in 2018 and stigma in 2019.
- The Office of International Affairs (OIA) plays a negotiating role in critical international TB commitments made by Canada.

Between 2015-16 and 2020-21, PHAC's annual budget for TB activities was approximately \$2.5 million a year, as presented in Figure 11 in Appendix C.

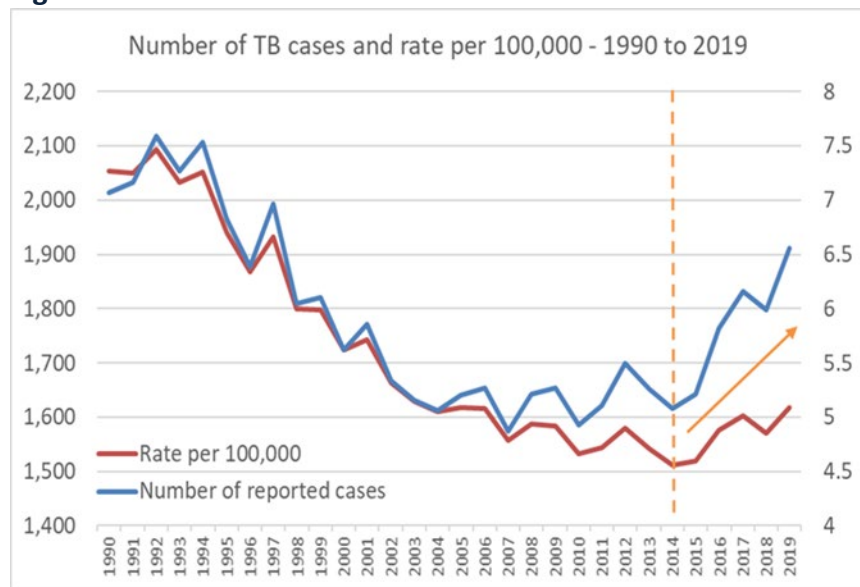
3. Current TB status

After a significant decrease and then stagnation, Canada's TB rate is increasing again. This may increase further due to limited access to care during the COVID-19 pandemic. TB rates among Inuit remain almost 500 times that of the Canadian-born non-Indigenous population, while a significant proportion of cases are found among the foreign-born population.

3.1 Overall trends

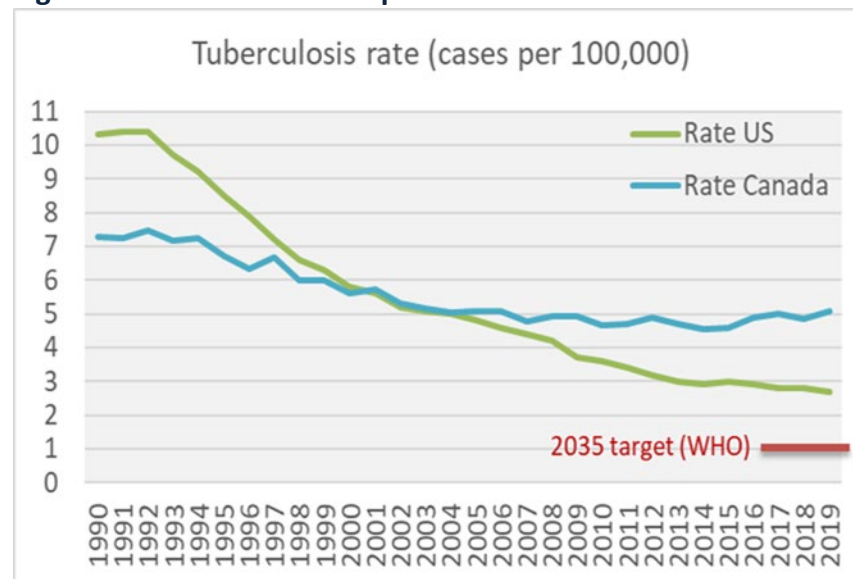
Despite Canada's international and national commitments to eliminate TB, evidence shows that overall TB cases in Canada have been increasing over the last decade.

Figure 1: Number of TB cases and rate since the 1990s



As shown in Figure 1, after a significant decrease in the 1990s and early 2000s, active TB rate stagnated in Canada, then have moderately increased since 2014. At its lowest point (2014), the TB rate was 4.56 per 100,000, which increased to 5.09 per 100,000 in 2019, the same rate as in 2005. To reach the WHO target of one case per 100,000 in 2035, TB incidence in Canada would have to decrease at an annual rate of 10% per year.

Figure 2: U.S. – Canada comparison of TB rate since the 1990s



In comparison, the U.S. TB rate has been decreasing continuously since the early 1990s, passing below Canada's rate in the mid-2000s, and below three cases per 100,000 in the mid-2010s (see Figure 2). Similar to Canada, around 70% of TB cases are foreign-born.

It should be noted that the demographic make-up of the U.S. and Canadian populations may account for a significant part of the U.S.-Canada TB rate gap,¹ with Canada having higher proportions of foreign-born and Indigenous populations between 2005 and 2015 in Canada.

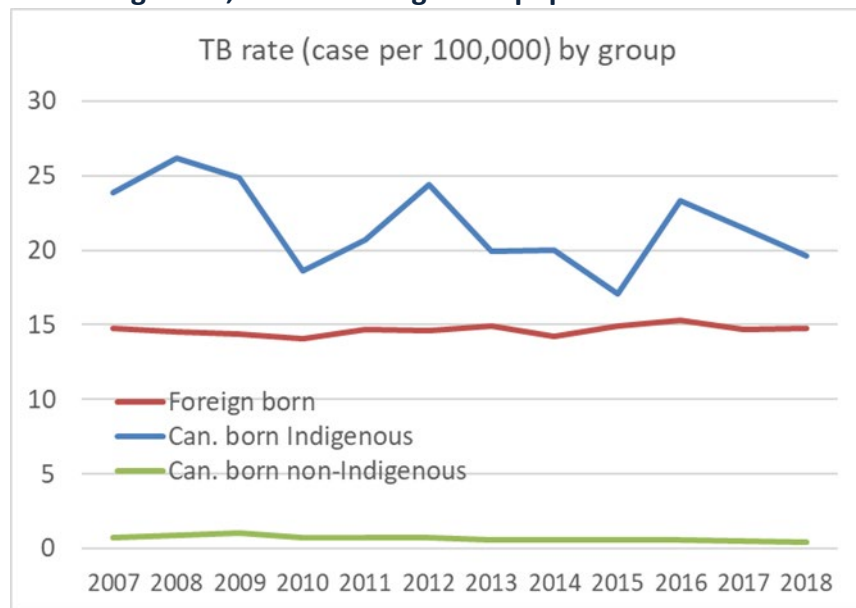
A decrease in newly diagnosed cases worldwide was reported in 2020 and the first half of 2021. Under-diagnosis trends have been observed in both the U.S.² and in Canada, including British Columbia, Manitoba, Ontario,³ Saskatchewan, and Nunavut.^{4,5} TB elimination is particularly dependent on the continuity of efforts in

testing and treatment. Several key informants expressed concern that care disruption during the pandemic might have consequences on TB incidence and Canada's ability to fulfill its international and national commitments in the coming years.

3.2 The TB situation in Canada

With 1,313 active cases out of 1,797 in 2018, the foreign-born population had the highest case count in Canada. As shown in Figure 3, they also have a high incidence rate when compared to Canadian-born non-Indigenous people, around 15 cases per 100,000 for the last decade, but a lower rate than Canadian-born Indigenous people, especially Inuit.

Figure 3: Evolution of the TB rate among foreign-born, Canadian-born Indigenous, and non-Indigenous populations



Inuit had the highest incidence rate at 194.3 cases per 100,000 in 2018, about 40 times that of the Canadian population (4.8) and 485 times that of the Canadian-born non-Indigenous population (0.4). With 19.8 and 11.6 cases per 100,000 in 2018, First Nations people, on- and off-reserve, respectively, also remain disproportionately affected, although trends indicate a decrease for both in recent years.

Since 2008, around 85% of TB cases have been successfully treated every year, while 7 to 8% of active TB cases have resulted in death. All remaining cases (7 to 8%) relate either to ongoing treatments or to those who did not complete their treatment.

TB can also remain dormant for long periods of time or never reactivate. This dormant phase is called latent tuberculosis infection (LTBI). Although poorly documented, LTBI is an important factor in Canada's persistent TB rates. Given present and potential future immigration patterns in Canada, LTBI could lead to a substantial increase in TB cases.⁶

There is a lack of evidence outlining how social determinants of health such as poverty, food insecurity, and inadequate housing interact with TB. Housing issues are the most often cited TB-related social determinant of health to be addressed.⁷ TB issues faced by hard-to reach populations such as those experiencing homelessness or living in poor or inadequate housing are not well documented, as they are not systematically categorized in the surveillance system (although several outbreaks are documented among these populations in major cities). Furthermore, stigma and lack of access to healthcare have also been identified as barriers to diagnosis and treatment.⁸

Investments have been made by the federal government to improve housing in Inuit communities, and a social housing

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strategy was put in place in 2018.⁹ Still, key informants identified the need for PHAC to adopt a more holistic approach by engaging with other organizations, such as the Canadian Mortgage and Housing Corporation, to improve housing for off-reserve communities, Inuit, and migrants, as well as a need to consider the mental health issues that are frequently combined with housing issues.

4. PHAC's approach and contribution

PHAC's TB activities cover a broad range of areas, including surveillance, policy, convening partners, funding projects, outbreak response support, laboratory support and expertise, and international commitment. Section 4 examines PHAC's approach and contribution to those areas except surveillance, which is addressed in section 5.

4.1 Canada's national and international commitments

PHAC has contributed to Canada's national and international TB commitments.

Since 2014, the Government of Canada has made important international and national commitments related to TB elimination, including:

- In 2014, Canada endorsed the World Health Organization's (WHO) End TB strategy and TB elimination framework for low-incidence countries, including a target of less than 1 case per 100,000 by 2035, and 0.1 cases per 100,000 by 2050. In 2020 and 2021, the WHO executive board and the Pan American Health Organization (PAHO) held meetings of experts on

Accelerating the Pace towards Tuberculosis Elimination in the Region of the Americas that reiterated the importance of taking actions toward TB elimination.

- In 2018, Canada adopted the UN resolution to end the TB epidemic by 2030.
- In 2018, the Government of Canada, jointly with Inuit Tapiriit Kanatami (ITK), committed to the elimination of TB across Inuit Nunangat by 2030, with an intermediate target of reducing active TB by 50% by 2025. The federal government invested \$109 million over 10 years to fulfill this commitment, with an additional \$27.5 million over five years to support ITK's pursuit of the same goal. These funds are managed by ISC. This commitment was reaffirmed in 2021.
- In 2019, the Prime Minister offered an official apology for the federal government's management of TB in the Arctic from the 1940s to the 1960s, and pledged to renew the relationship with Inuit. The Government of Canada also invested \$640 million for housing in Inuit Nunangat.
- In 2018 and 2019, the CPHO released reports on TB and on stigma, which were deemed very useful by the TB community in shedding light on recurring TB issues.

PHAC contributed to the negotiation of international TB commitments at the UN General Assembly and with the WHO. The 2014 and 2018 commitments set the stage for TB elimination and provided clear targets specific to low-incidence countries. Canada's contribution to the Global Fund to fight HIV, TB and Malaria (more than \$200 million a year invested since 2014) is done through Global Affairs Canada (GAC). Given the proportion of TB cases among migrants, this investment is relevant for TB elimination, not only abroad, but in Canada as well.

On the national stage, the main TB commitment was related to TB elimination in Inuit Nunangat by 2030. This commitment was

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announced in 2018 and related federal funding was administered by Indigenous Services Canada (ISC). This funding contributed to building the Inuit Tuberculosis Elimination Framework and action plans in each of the four regions of Inuit Nunangat, as well as recruiting regional coordinators in three regions under the leadership of ITK. Although PHAC was not the lead on this initiative, it contributed through the provision of background information and technical advice. Internal and external key informants working with Inuit see this commitment as a great achievement.

4.2 Outbreak support

Laboratory and field support from NMLB, field epidemiologists, and public health officers are considered a great asset for outbreak response and longer-term detection when requested by jurisdictions.

TB outbreak response aims to interrupt ongoing TB transmission in a community. Provinces and territories can request epidemiological, scientific, and operational support from PHAC when responding to TB outbreaks, according to their needs and capacities. NMLB provides support through the laboratory, as well as through large-scale TB testing in communities where needed. Since 2017, a mobile laboratory was deployed in several communities across northern areas, in collaboration with field epidemiologists and local leadership. Although fieldwork is not part of the core mandate of NMLB, external key informants indicated that this support effectively addressed their needs and they hope it will be maintained.

In addition, provinces and territories that requested field epidemiologist support during outbreaks found it complemented

local resources. The mandate of field epidemiologists may include the following:

- contact tracing;
- prioritization of investigations;
- provision of recommendations on future epidemiological work;
- development or enhancement of data collection tools and manuals;
- development of indicators to monitor outbreak response progress,
- reporting;
- tracking dissemination within the community; and
- co-authoring publications.

Since the last evaluation, support was provided at least once a year in Nunavut, Nunavik, Nunatsiavut, and in northern Manitoba and Saskatchewan. ISC also supported TB outbreak response and screening in the north through funding and joint interventions, especially since the Inuit TB Elimination Framework was developed in 2018. While tools developed for one location were occasionally provided to another community, no systematic process was put in place at this point for broader information sharing. This type of process could be helpful to provide general information sharing when outbreak support is needed.

In addition, public health officers have provided longer-term support for data collection and reporting, which helped improve data quality and availability in Nunatsiavut. The scope of the support provided by public health officers is determined in advance, and the time period allotted was sometimes considered too limited (three to six weeks) according to beneficiaries. This lack of flexibility has sometimes left jurisdictions with gaps after support has ended, such as continued contact tracing. In addition, confidentiality agreements might prevent these public health

officers from providing information for PHAC's surveillance system, as they share collected data through the jurisdiction with which they are working, rather than directly with the national surveillance team.

4.3 Capacity building and laboratory support

NMLB provides efficient and valuable technical support and training to provincial laboratories, as well as screening and training in communities in the north upon request.

On average, from 2015-16 to 2020-2021, NML received 1,630 TB samples and performed 3,650 tests per year. From 2016-17 to 2018-19, this included 435 GeneXpert© diagnostic tests (molecular TB test which detects DNA in TB bacteria) per year. NMLB has also adopted online training support and proficiency testing to address restrictions they faced during the COVID-19 pandemic. A majority of internal and external key informants considered the support provided by NMLB as efficient and valuable on several fronts, including the technical support and training provided to provincial laboratories.

Some provinces are already collaborating with NMLB on the deployment of the whole genome sequencing method and a few specific communities are already benefiting from the deployment of the GeneXpert© system. This process is as fast as two hours for results, compared to six weeks for a TB culture test. This is particularly useful for settings like the hospitals in the North serving Indigenous populations, as it allows for rapid decisions in TB treatment and isolation.

Since 2015, NMLB has offered training to build capacity in northern communities to complement outbreak response support (see previous section) in Nunavut and Nunavik, which is combined

with the training offered at the Laboratory. Before 2015, training was exclusively delivered at the NMLB in Winnipeg. This additional support has helped implement GeneXpert© and Interferon-Gamma Release Assays (IGRA) technologies in communities in the North upon request. Key informants noted that GeneXpert© helps accelerate diagnosis in remote areas where access to laboratory services is a challenge, as well as detect, treat active TB, and reduce its transmission in the North.¹⁰

4.4 Awareness of TB and stigma

PHAC funded projects have advanced local awareness of TB and stigma in targeted communities. Experience sharing and more consistent approaches to address these issues are needed countrywide.

PHAC funded Community Mobilization Initiatives from 2016 to 2019 that have advanced both TB awareness and proactive screening and treatment of active TB and LTBI in northern communities. This was done via three projects in Nunavik, Saskatchewan, and the Northwest Territories, in collaboration with local leadership. The first phase involved a general awareness campaign and community-based education targeting all community residents. Educational TB messaging was developed in conjunction with community members. Several outreach strategies, including social media, were used to raise TB awareness.

The second phase of the project focused on community-based education (door-to-door), screening, and treatment of eligible participants. Community involvement occurred at the design, implementation, and delivery stages of the project. The success of the project was due in large part to community involvement in

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prevention activities and a high level of trust between health care providers and community members. For example, in the community served in Nunavik, 95% of all eligible people accepted to be screened, while only 3% refused to be screened (the remaining 2% were already treated). Although the number of communities covered by this funding was limited, some jurisdictions used this experience to replicate the approach in other communities as part of the TB elimination plan put in place across Inuit Nunangat.¹¹

In addition to raising awareness, stigma associated with TB is an important challenge for testing and treating Indigenous populations, especially Inuit, as well as migrant populations. According to the 2019 CPHO report *Addressing Stigma: Towards a More Inclusive Health System*, stigma begins with the labeling of differences and negative stereotyping of people, creating a separation between "us" and "them." Those who are stigmatized are devalued and subject to discrimination, which can lead to disadvantages and inequitable social and health outcomes. Fear is a significant driver of stigma relating to infectious diseases. Quarantine-related policies, mandatory immigration screening, and notifiable disease frameworks can have unintended stigmatizing effects. Stigma-related issues and reluctance to be treated are often associated with historical traumas (e.g., sanatoriums) among Indigenous populations,¹² as well as community-specific perceptions and fear of being expelled among migrants.

In 2019-20, PHAC funded two community-based initiatives in Ontario and British Columbia to address stigma among newcomers, with the goal of enhancing testing and treatment. These initiatives included training community health professionals and engaging with members of communities with high TB rates. Educational resources customized for these at-risk populations

and health care workers were created to fill knowledge gaps on sources of stigma and how stigma hinders TB testing and treatment.¹³ A thorough report on TB stigma was released as part of the project in Ontario at the very end of the period in scope, although it is too early to measure the project's impact.¹⁴

Several approaches have been adopted in other (mainly low-income) countries to provide information to and build capacity among practitioners or involve more actively stigmatized groups in building interventions.¹⁵ Nonetheless, most external key informants highlighted that efforts in Canada are localized, and good practices are not shared due to limited knowledge-sharing mechanisms.

4.5 Strengthen the pan-Canadian approach

There is a need for pan-Canadian TB strategic planning, and for strengthening intelligence gathering activities to inform TB stakeholders on emerging issues and opportunities, such as innovative tools and technology, or new treatment options. Current structures were not seen as the right mechanisms to effectively bring together TB stakeholders.

Engaging stakeholders more effectively was a key recommendation of the previous evaluation (2015). In response, PHAC drafted an implementation plan in 2016, which identified priority issues and populations and has guided PHAC work undertaken to address TB since 2016. However, the plan was never formally approved, nor shared so that TB stakeholders could better understand their role vis-à-vis PHAC to better coordinate actions.

Nonetheless, ad hoc funding became available to support projects aligned with this plan, such as a treatment optimization study,

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community mobilization initiatives, migrant community prevention projects, and a pilot of pre-immigration LTBI screening and follow-ups. Key informants considered these projects to be beneficial for advancing awareness (see section 4.4), LTBI testing or treatment adherence (see section 5.2), and efficiency (see section 5.3), depending on the purpose of the funded project, although they were limited in time and scale.

Convening relevant stakeholders and collaborative strategic planning

A vast majority of TB stakeholders consider that PHAC, due to its federal public health mandate, would be the best positioned to strengthen a pan-Canadian approach by:

- building and implementing collaborative strategic planning;
- leveraging and complementing TB evidence through a continuous information-gathering effort to guide decision making and practices across the country (see next section); and
- convening relevant stakeholders to make evidence-based coordinated decisions.

One interviewee summarized well what most other key informants expressed: *“so many people doing TB work across the country would be thrilled if PHAC took the leadership. It is difficult to make it work without PHAC. Set the table and people will come.”*

There are several convening mechanisms currently in place where TB-related issues are discussed:

- The Public Health Network (PHN) Communicable and Infectious Diseases Steering Committee (CID-SC) and the PHN Council brings together federal, provincial, and territorial representatives to discuss public health issues in general, including TB.

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- The Interdepartmental Collaboration on TB Prevention and Control in Canada was put in place by PHAC in 2017 to discuss TB-related issues with other federal departments.
- The Canadian TB Elimination Network (CTBEN) was put in place by the TB community in 2016 to convene a broader set of TB stakeholders across Canada. This network is currently led and housed by ISC and provides some opportunities for PHAC to engage with TB experts.
- On the NMLB side, the community of practice on laboratory work was maintained on a virtual basis to discuss how to adopt standardized methods in areas such as molecular testing.
- The Inuit Public Health Task Group (IPHTG), led by ITK, convenes Inuit groups across the four Inuit Nunangat regions.

Even with these various groups, all external key informants highlighted the need for PHAC to play a much stronger convening role in the TB ecosystem. The disbandment of the Canadian TB committee (CTC) and subcommittees in 2011 left the TB community without an effective overall information-sharing and decision-making mechanism specific to TB. Current governance structures (mentioned above) either cover multiple issues and therefore have minimal coverage on TB issues, or do not include all relevant TB partner and stakeholders, such as TB specialists, provincial and territorial representatives, or community organizations, such as ITK (to relay Inuit perspectives and concerns).

Many key informants also expressed the need for pan-Canadian strategic planning to prioritize efforts across Canada that would be grounded in recurring rather than ad hoc discussions with stakeholders (e.g., other jurisdictions, at-risk populations' groups), and maintain stable communication channels despite staff turnover. Many highlighted that efforts currently deployed would

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find synergies if a concerted national TB strategic plan was put in place to coordinate actions,¹⁶ including Indigenous perspectives based on a nation-to-nation principle.

Continuous access to effective treatments needed

Access to effective drugs to treat both active and latent TB seems to be a recurring issue. Temporary solutions to address drug supply shortages¹⁷ only applied to specific populations or provinces, such as stockpiles held by ISC. Some external key informants suggested that PHAC should lead a national stockpile or inventory to ensure a supply exists to address the needs of all Canadians, especially other at-risk populations, such as foreign-born individuals.

Rifapentine, identified as the most efficient drug for LTBI treatment, was approved by the U.S. FDA in 1998. A recent U.S. study demonstrated its effectiveness in shortening active TB treatment.¹⁸ Based on scientific evidence, the 8th edition of the TB standards, published in March 2022, also recommends this drug for both LTBI and active TB treatments.¹⁹ However, no submission has been made by the pharmaceutical industry for regulatory approval in Canada. According to some external key informants, the pharmaceutical industry might have low incentive to apply for drug approval due to administrative and profitability issues due to the small market size in Canada.

The support provided by the policy team on an ad hoc basis to address shortages of approved drugs and to ensure access to Rifapentine under exceptional circumstances was appreciated. Nonetheless, although Health Canada is the regulator, they feel that PHAC should lead discussions with the industry to normalize access to Rifapentine and other drugs, as well as implement a more proactive drug supply strategy for approved drugs.²⁰

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Collaboration with the Research Sector

Evidence also highlighted the need to partner more with the scientific community. Researchers could help the TB community stay up-to-date on the most recent innovations, build new knowledge to support decision making, and contribute to the evaluation of promising interventions. Closer collaboration with the Canadian Institutes of Health Research (CIHR), which fund TB-related research, could help align intervention and evaluation funding to better inform decision makers, as suggested by a few interviewees. Manitoba has an interesting model of integration between the public health authority and the University of Manitoba, where the province shares public data with researchers and leverages their expertise to build an enhanced TB monitoring system.²¹

5. Information to guide action

5.1 TB surveillance system

Although it covers all provinces, the surveillance data available online is not timely due to IT issues, information not being shared in a timely manner, and length of time for internal approvals. This data also does not allow for disaggregation across at-risk populations, nor is LTBI monitored at a national level. PHAC-wide, surveillance IT systems enhancement and data-sharing protocols are in development, as part of a system-wide renewal.

The TB surveillance system has been registering active cases since 1924 and covers all provinces. It is comprised of the Canadian Tuberculosis Reporting System (CTBRS) and the Canadian Tuberculosis Laboratory Surveillance System (CTBLSS). CTBRS

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records TB cases and enables them to be linked to treatment information. Merging these two data sources would not be possible if the system was based on aggregated counts only. CTBLSS records laboratory data and drug resistance trends.

The previous 2015 TB evaluation report indicated that jurisdictions were using TB surveillance data to compare their situation with others in Canada, for teaching purposes, to inform policies, to develop programs, or to address media requests, for example. All provinces and territories referenced the Agency's TB reports in their TB-related documents.

Evidence collected revealed that current national data have limited value for monitoring trends, supporting outbreak response and supporting TB elimination overall, for the following reasons:

- Published data is obsolete (though steps have been taken to publish more current data): In mid-2021, 2018 data related to the overall number of TB cases and TB rates per 100,000 was posted online and the 2019 data was added in late 2021. The latest TB report released in April 2022 presents more comprehensive data ranging from 2008 to 2018. Delays of publication have increased since the last evaluation report, to exceed those of most low-incidence countries (see Figure 4 below), due to different data collection methods and lack of comparability across or sometimes within jurisdictions, as well as aging data-sharing mechanisms and long approval processes.
- Collected data is fragmented: Epidemiologic, laboratory, and migrant screening data is disconnected. This creates important limitations to understanding the real history of exposure of migrants, rather than just their country of origin, or to connecting laboratory analysis information

with sociodemographic information to draw a better picture of at-risk populations.

- Collected data is insufficient to identify the needs of at-risk populations, such as First Nation populations in urban centres or foreign-born individuals after they enter Canada.²² Furthermore, very little is known about hard-to-reach populations, such as people experiencing homelessness, due to lack of data on TB outbreaks in shelters.²³ As a result, reported data is not specific enough for understanding at-risk populations' needs. Although some specific requests are addressed by the surveillance team, such as the update of TB rates in the four Inuit Nunangat regions, an automated, customized reporting system would be helpful for specific groups.

In comparison, states in the U.S. commit to submitting TB surveillance data by a certain date every year through cooperative agreements with the U.S. Centers for Disease Control (CDC) and validate data jointly with the CDC. States receive counterpart funding once the data is complete and accurate. Through this mechanism, the CDC confirmed that data publication has been timely and disaggregated by at-risk populations.

Figure 4: Evolution of data time lag in publishing TB reports in low-incidence countries

Data Time Lag Found in National Published TB Reports in 2014 and 2021			
	1-Year Time Lag in 2014	2-Year Time Lag in 2014	3-Year+ Time Lag in 2014
1-Year Time Lag in 2021	Japan, USA		
2-Year Time Lag in 2021	UK, Germany	France	Australia
3+Year Time Lag in 2021		Canada, New Zealand	

In order to improve data timeliness, a few key informants suggested that the TB surveillance system might also consider releasing data as soon as they receive it from the most affected provinces (Ontario, British Columbia, Alberta, and Quebec) and refine nationwide estimates once all data is received.

Some aspects of renewal apply to other surveillance systems across PHAC, such as improving IT systems, human resource capacity and training, as well as coordination and data-sharing protocols with jurisdictions. These have been highlighted in PHAC's 2020 Audit of Surveillance Activities for the pre-pandemic period and by the Office of the Auditor General of Canada's Pandemic Preparedness, Surveillance, and Border Control Measures, audit report²⁴ for the pre- and pandemic periods. Other issues are specific to the TB surveillance system, such as improving at-risk populations' coverage and monitoring LTBI at the national level.

There is movement at the Agency to address some of the challenges faced by the TB surveillance system, and surveillance in general. The Pan-Canadian Health Data Strategy aims to address IT infrastructure issues, as well as data-sharing negotiations with jurisdictions. The Inuit Public Health Data Working Group

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(IPHDWG) is led by ITK, with the participation of PHAC's Strategic Policy Branch, and is developing an Inuit data strategy with a specific focus on TB. Data sharing and ownership principles (OCAP™)²⁵ are important considerations for Indigenous groups, recognizing that Inuit groups may have different views and needs in terms of data management than First Nations. In addition, the format of the PHAC TB report has been modified to better cover at-risk populations. Information such as the place of birth and Indigenous status have been included in the TB report, based on available data.

5.2 Monitoring LTBI

Although LTBI is not included in the pan-Canadian TB surveillance system, important steps have been put in place for screening LTBI among migrants, before and after their arrival to Canada.

By nature, the lack of symptoms during the dormant phase of TB (LTBI) is a challenge for awareness, detection, and patients accepting to be treated. Currently, surveillance data on LTBI is limited worldwide. For instance, the 2021 WHO TB global report²⁶ provides LTBI rates among children aged under 5 years only. In the U.S., the CDC²⁷ uses research studies on a limited number of participants to generate national-level projections. Nonetheless, the WHO considers that systemic testing and treatment of LTBI among at-risk populations a critical factor in TB elimination.²⁸

In Canada, LTBI is not currently monitored through the surveillance system. Some jurisdictions are collecting this information, but an adjustment would be needed to include LTBI in the national reporting system, which was raised by most internal and external key informants and noted in the literature.²⁹ This would include the LTBI cascade of care, from prevention and testing to treatment and ongoing care.

The lack of LTBI testing is considered by health system advisors and planners as a major barrier to achieving TB elimination.³⁰ Recent literature also advocated for improving immigration screening methods to better target high-risk individuals³¹ by considering migration history,³² or by using genotypic drug susceptibility testing.³³ Finally, LTBI testing in Canada uses different methods for immigration screening (Interferon-Gamma Release Assays - IGRA) and northern community testing (tuberculin skin test - TST). More diverse methods might be needed going forward for consistent LTBI monitoring, according to TB testing experts.

Based on the recommendations of the TB and Migrants Working Group delivered in 2016, a partnership with Immigration, Refugees and Citizenship Canada (IRCC) was approved in 2017. The project started in May 2019 and involves pre-migration LTBI screening among candidates from high-prevalence regions and a post-landing follow-up in the four provinces with the largest number of migrants (British Columbia, Alberta, Ontario, and Quebec).³⁴ Although only one province is reporting on the number of cases, as well as cascade of care and health outcomes for the moment, due to administrative issues and the COVID-19 pandemic, this project is a promising building block to implement an integrated LTBI surveillance system. In addition, supported by IRCC, the Immigration and Refugee Health Working Group (IRHWG) is a collaboration to harmonize pre-migration screening programs for TB and improve laboratory and treatment capacity across low-incidence countries, including Canada.³⁵

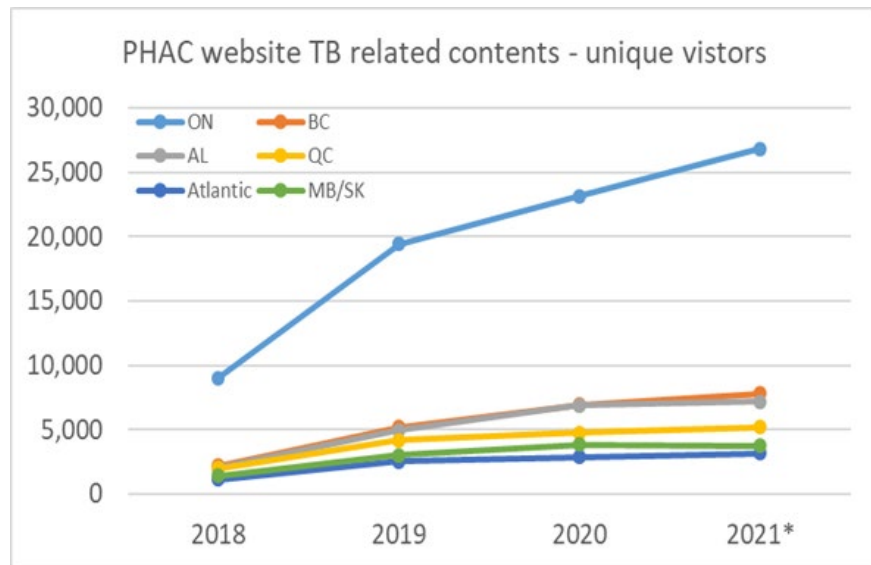
5.3 Intelligence gathering and knowledge brokering

PHAC contributed to documenting more effective LTBI treatments among at-risk populations and provided scientific and strategic presentations on TB. Nonetheless, PHAC could complement existing intelligence-gathering activities to identify innovations, promising initiatives, and emerging questions in order to inform stakeholders and support decision making, both externally and internally.

Patients are more likely to follow treatments until full recovery if they are shorter and less demanding.³⁶ PHAC contributed to better understanding this issue by funding a study to optimize LTBI treatment among at-risk populations in Ottawa and Iqaluit. The TAIMA project in Nunavut has demonstrated improved completion rates with shorter-course regimens while maintaining treatment efficiency. The project found that more people completed the three-month treatment than those following the nine-month historical treatment, while only mild discomfort was occasionally observed.³⁷ The project also included TB awareness and a door-to-door screening campaign in Iqaluit, Nunavut, with a focus on high-risk residential areas. An increase in requests for TB testing was observed during the awareness campaign but was not maintained afterwards. During the screening campaign, 19% of participants were found with LTBI and those cases had not been detected by regular screening in the community.³⁸

Updates on TB epidemiology and efforts deployed to control and prevent TB have been delivered by the Deputy CPHO through presentations to the PHN on a regular basis, except during the COVID-19 pandemic, and through some scientific communications.³⁹ The National Collaborating Centre for Indigenous Health⁴⁰, which is funded by PHAC, offers thorough and up-to-date resources on TB among Inuit.

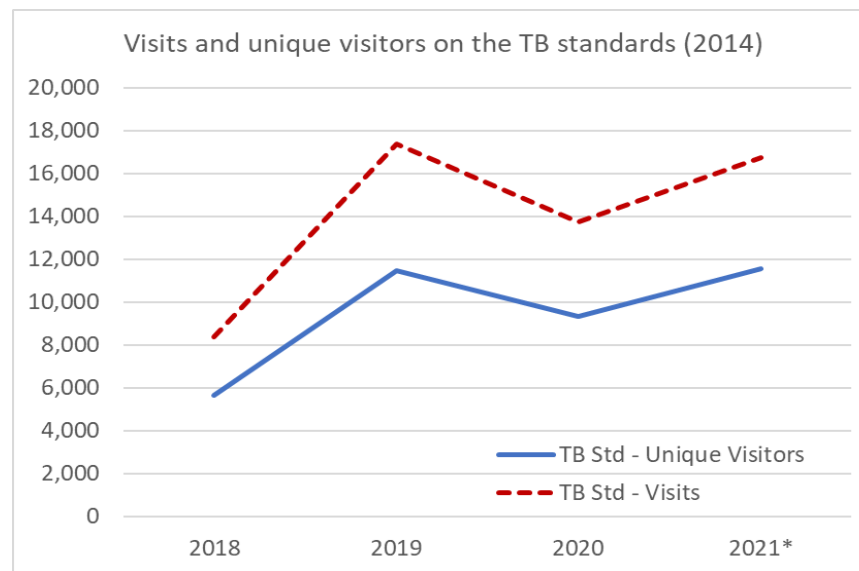
Figure 5: Number of unique visitors of TB-related contents on the PHAC website



As shown in Figure 5, PHAC’s website remains a reference for TB-related content and traffic has been increasing from 2018 to 2021. Half of unique visitors to TB-related content on the PHAC website are from Ontario, and the 2018 CPHO report on TB was viewed more than 5,500 times by Canadians until mid-2021. Citation searches show, for example, that until 2021, the TB standards were cited over 200 times in formal and grey literature.

Nonetheless, many external key informants expect PHAC to be monitoring innovations and promising initiatives nationally and internationally to provide jurisdictions with up-to-date information found in the recent literature and practices, as well as proactively addressing emerging questions, such as interactions between TB and COVID-19. Instead, they felt that they were more often sharing this type of information with PHAC.

Figure 6: PHAC website annual visits and unique visitors –TB content and TB standards



The Canadian Tuberculosis Standards (2014) remains a key reference document, with a high volume of visits and unique visitors on the PHAC website, as shown in Figure 6. The diversity of perspectives included in the ongoing revisions to the TB Standards, led by the Canadian Thoracic Society, is viewed as an improvement to be maintained in future editions. Although several PHAC members are contributing to chapters, many external key informants consider that the overall coordination, publication, and dissemination of future updates to the TB Standards should be a PHAC responsibility. To provide more timely and relevant content to practitioners, they felt that those updates should also be more frequent and focused on specific aspects. PHAC heard stakeholders’ concerns about the financial burden and provided funding a few weeks before the 8th edition was published in April 2022.

6. TB activities' structure and funding

6.1 TB activities' structure

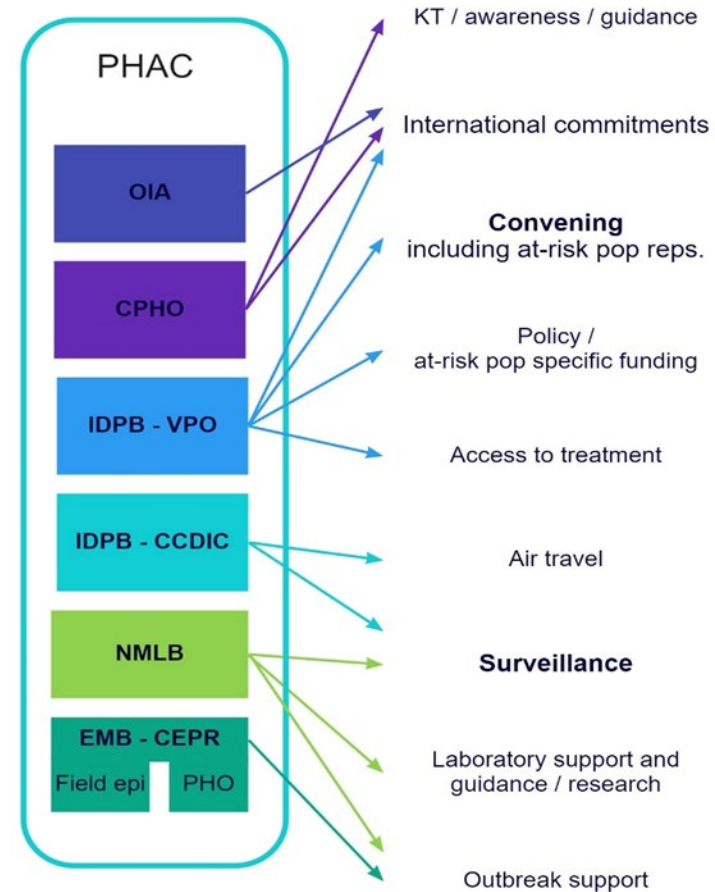
Many teams are involved in TB-related activities across the Agency. There is no formal definition of roles and responsibilities for each group, nor how they should interact with each other and coordinate their efforts. Reporting lines are not always clearly delineated. As a result, teams are working in silos and communication occurs on an ad hoc and limited basis. Roles and responsibilities with other jurisdictions and federal departments also remain unclear.

As noted earlier, PHAC undertakes multiple activities to address TB in Canada, including the following:

- surveillance;
- laboratory expertise and support;
- outbreak support;
- policy and convening activities;
- project funding; and
- international engagement.

Responsibilities for these areas are divided into seven teams across three branches and two offices, including two teams in the Emergency Management Branch, as illustrated in Figure 7. Arrows show the contributions of each team. To better understand the TB landscape and areas where TB stakeholders interact or would be expected to do so, thorough mapping is presented in Appendix B.

Figure 7: Involvement of PHAC branches and offices in TB areas of work



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The 2015 TB evaluation highlighted the need for the Agency to focus on defining how activities are articulated in order to efficiently address TB. Since then, TB activities remain scattered across the Agency and misunderstood by external stakeholders. Many external key informants felt that a consistent architecture of TB activities across PHAC is needed, as well as a clear definition of roles and responsibilities within PHAC, and with other jurisdictions and federal departments. Although internal documents describe activities undertaken on an ad hoc basis, there is no formal definition of roles and responsibilities for each group, nor how they should interact with each other and combine their efforts. A majority of internal interviewees identified that reporting lines are not always clearly delineated. As a result, teams are working in silos and communication occurs on an ad hoc and limited basis.

From 2015 to the beginning of the COVID-19 pandemic, a tiger team was put in place to bring surveillance, the NMLB, regional offices, and policy functions together internally. Nonetheless, coordination and communications remain issues. For example, surveillance data is not systematically shared to guide policy work and the surveillance team is not included in discussions with the Corporate Data and Surveillance Branch (CDSB).

6.2 TB activities funding

PHAC's budget has been relatively stable, at a modest level, with some increase in project funding in 2018 (when the commitment to eliminate TB across Inuit Nunangat by 2030 was announced), followed by a decrease during the COVID-19 pandemic.

On average, PHAC budgeted \$2.5M and spent \$2.25M a year over the 2015-16 to 2020-21 period, including almost half of spending going to laboratory activities, a fifth to policy work, another fifth to surveillance, and over a tenth to project funding. As shown in

Figure 8, at IDPB, around 90% of the budget was spent on average per year, except in 2018-19, when the variance was much higher (66%). This was due to delays in the solicitation and review process that resulted in postponing the Mosaic and the Access Alliance projects, both related to addressing stigma, to the following year. Furthermore, the budget related to project funding increased in the fiscal year 2018-19 when major announcements were made related to TB elimination in Inuit Nunangat, and the CPHO released her report on TB. A decrease in the IDPB budget in 2020-was due to TB staff assigned to support the COVID-19 response. At NMLB, salary expenditures increased from \$640K in 2015-16 to \$995K in 2020-21 to provide additional support for TB-related activities.

Figure 8: IDPB and NMLB Budget and Expenditures (\$M)

Year	IDPB - Budget	IDPB – Actual	IDPB - % spent
2015-2016	\$ 1,203,796	\$ 1,149,453	95.5%
2016-2017	\$ 1,091,347	\$ 918,608	84.2%
2017-2018	\$ 1,258,465	\$ 1,104,964	87.8%
2018-2019	\$ 2,190,673	\$ 1,451,578	66.3%
2019-2020	\$ 1,947,661	\$ 1,751,104	89.9%
2020-2021	\$ 846,435	\$ 748,885	88.5%
Total	\$ 8,538,377	\$ 7,124,592	83.4%
Year	NMLB – Budget	NMLB – Actual	NMLB – % spent
2015-2016	\$ 1,097,114	\$ 972,553	88.6%
2016-2017	\$ 998,665	\$ 847,959	84.9%
2017-2018	\$ 1,032,688	\$ 1,082,539	104.8%
2018-2019	\$ 1,225,060	\$ 1,081,349	88.3%
2019-2020	\$ 1,111,420	\$ 1,154,990	103.9%
2020-2021	\$ 1,122,915	\$ 1,213,923	108.1%
Total	\$ 6,587,862	\$ 6,353,314	96.4%

Source: PHAC Office of the Chief Financial Officer

7. Performance Measurement for Decision-making

An internal performance measurement strategy and logic model have been drafted for the IDPB activities only but was never approved or implemented to guide decision making. Moreover, after a decade of discussions on a pan-Canadian performance framework, this remains a gap to consistently monitoring progress toward TB elimination across Canada.

7.1 A pan-Canadian TB performance framework

Before its disbandment, the Canadian TB Committee had worked on a pan-Canadian performance framework and some elements had been included in the guidelines published in 2012. Some discussions about pan-Canadian performance indicators occurred in 2014 at the PHN. In 2018, a dialogue on the same issue led by the National Collaborating Centre for Infectious Diseases (NCCID) reached the consensus that a core set of indicators was needed. No concrete outcomes emerged from these discussions.

Some jurisdictions have collected additional TB data covering other aspects than those included in the national surveillance system (e.g., early detection, HIV testing, paediatric TB, retreatment, contact elicitation). In the absence of a national consensus, these unique datasets cannot be compared or aggregated to provide a national picture. Thus, some key informants have encouraged jurisdictions to monitor outcomes related to both active TB and LTBI in a more consistent way and to accommodate specific populations or provinces. ITK is putting in place, with the four Inuit Nunangat regions, a data strategy that

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includes indicators that could be supported by PHAC and integrated into a pan-Canadian performance system.

Several sets of indicators could help launch a potential pan-Canadian TB performance framework, similar to the current US CDC TB indicator framework, the Manitoba performance data on TB programs,⁴¹ and the set of 12 indicators included in the performance chapter of the 8th edition of the TB standards.⁴²

7.2 PHAC TB activities performance measurement

Internally, the Management Response and Action Plan (MRAP) of the 2015 TB evaluation included building a PHAC TB performance framework and logic model. While the development of the framework shifted to a broader Communicable Disease and Infection Control program information profile, this profile did not provide the level of detail required to help monitor tuberculosis activities. Recent attempts have been made to draft a logic model and performance measurement strategy, but this has not been approved and is primarily focused on IDPB policy work. Surveillance is less represented and laboratory and field work are not included.

A careful analysis of the draft strategy, in line with the requirements of the *Policy on Results* (2016), has led to the following observations:

- Overall, the TB rate is an aspirational indicator, for which the trends come from too many factors to be the only performance indicator to be monitored.
- With a clearer definition of PHAC roles and responsibilities, as well as more precise and measurable objectives related to community-level support vs. pan-Canadian leadership aspects,

it would be easier to finalize the logic model and associated indicators.

- Short-, medium- and long-term outcomes are generally well identified for activities currently undertaken by IDPB although more limited for surveillance, with NMLB and EMB activities not being covered. Nonetheless, indicators are mainly covering short-term aspects and sometimes indicators cover inputs (resources) rather than actual outcomes.

To monitor activities undertaken by PHAC, internal and external key informants also suggest:

- For **surveillance** data: beyond data completeness, timeliness could be monitored throughout data collection and publication steps to identify bottlenecks. Specific population coverage and cascade of care need to be monitored as well.
- For **policy and funding** activities: performance indicators would have to be set according to clear roles and objectives. Stable indicators covering activities should be developed.
- For **laboratory** support: the 2016 satisfaction survey at NMLB could be conducted more frequently although qualitative data collected in the current evaluation demonstrate a high level of satisfaction.
- For **knowledge** mobilization: understand what attendees have learned in webinars, and using web analytics, citations, and satisfaction surveys for online publications to provide insight on access and use of these documents.

8. Conclusions and Recommendations

The Government of Canada committed to eliminate TB by 2035 across the country, and by 2030 across Inuit Nunangat. Elimination is defined as less than 1 case per 100,000 people. After a significant decrease in the 1990s and early 2000s, active TB incidence stagnated for a decade, but has slightly increased since 2014. Underdiagnosed cases during the COVID-19 pandemic will likely contribute to accelerating the upward trend in the coming years. Considering the rate of TB in 2020, Canada's commitments would require a 10% decrease of infections per year to meet the elimination targets.

PHAC has initiated a variety of useful small-scale TB initiatives in recent years to address the needs of at-risk populations. They have helped increase TB awareness and testing among Indigenous populations and migrants in high-risk communities, as well as screening for latent TB infection (LTBI) among certain categories of migrants during their selection. PHAC also documented the most effective LTBI treatments among at-risk populations. Moreover, the National Microbiology Laboratory Branch (NMLB), field epidemiologists, and public health officers' services have significantly supported laboratories and communities across the country in addressing TB outbreaks.

Nonetheless, coordination, communication, and clarity of roles and responsibilities remain ongoing challenges, both internally and among external stakeholders, including on the international stage. Achieving TB elimination domestically calls for a centralized and shared coordination role between IDPB and NMLB. Furthermore, at the national level, there are opportunities for PHAC to lead a country-wide approach and generate synergies through pan-Canadian strategic planning, enhanced intelligence gathering, and strengthened science-based decision making.

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Finally, TB-specific and broader PHAC-level challenges related to the timeliness and usefulness of surveillance of infectious diseases must be addressed to better understand and respond to at-risk population needs, to effectively monitor infectious disease trends, and to guide decision making internally and across the country. A performance measurement framework is not yet available to support decision making.

Recommendations

The findings discussed in this report have led to the identification of four recommendations to help ensure that PHAC's activities effectively contribute to TB elimination in Canada.

Recommendation 1: The Infectious Diseases Programs Branch should clearly articulate and communicate PHAC's TB roles, responsibilities, and priorities.

Limited communication and coordination between teams working on TB within PHAC, and a lack of clarity on roles and responsibilities, are challenges for an effective collaborative approach within PHAC, and limit interaction with external stakeholders. PHAC should therefore clarify and communicate roles and responsibilities internally and externally, and adopt a more coordinated approach to TB with partners and stakeholders. Doing so would allow the various teams within PHAC dedicated to TB elimination to better coordinate their efforts. This includes not only IDPB and NMLB activities, but also other teams who support the TB response outside these branches, such as field epidemiologists and public health officers. In addition, external stakeholders would more easily identify their relevant counterparts within PHAC, know what to expect from them, and better coordinate their efforts across Canada.

Recommendation 2: Once PHAC's roles, responsibilities and priorities are clearly articulated, the Infectious Diseases Programs Branch should establish the necessary governance structures:

- a) internally to ensure TB activities are better coordinated within the Agency and,**
- b) externally to ensure TB activities are better coordinated across Canada to achieve elimination goals.**

PHAC disbanded the pan-Canadian TB convening and decision-making mechanisms in place a decade ago, and efforts against TB have continued in a less coordinated fashion within the Agency and across Canada. PHAC should therefore work to establish dedicated governance structures, both internally and with other jurisdictions. This may result in continuous information gathering and sharing with TB stakeholders to guide decision making and practices across the country. In doing so, relevant TB stakeholders would be more directly connected, better informed, and able to work together more closely to achieve the goals of TB elimination in Canada.

Recommendation 3: The Infectious Diseases Programs Branch should update the TB surveillance approach to improve timeliness and utility, as well as consider how LTBI could be monitored going forward.

Over the period in scope, TB surveillance data has not been timely. Despite the recent publication of 2020 data to coincide with World Tuberculosis Day on March 24, 2022, the TB surveillance system had published TB rates with significant delays even before the COVID-19 period. Moreover, data sharing and collection mechanisms are not currently adequate for monitoring at-risk populations effectively.

In addition, although most active TB cases are successfully treated every year, rates have not decreased, partly due to LTBI reactivation. The WHO considers the systemic testing and treatment of LTBI among at-risk populations a critical factor in TB elimination. Currently, LTBI data is limited in Canada and worldwide. PHAC could therefore consider options to collect and report LTBI data to support the activities to eliminate TB in Canada.

Recommendation 4: The Infectious Diseases Programs Branch should revise current performance measurement practices to effectively measure the impact of PHAC's TB activities, including LTBI.

Despite commitments made to eliminate TB in Canada in the coming years, relevant monitoring mechanisms are not in place to ensure continued progress. PHAC should therefore finalize and implement a performance measurement framework, in consultation with other jurisdictions, to monitor progress and achievement of internal TB activities for continuous improvement, including LTBI.

Appendix A – Evaluation Scope and Methodology

This evaluation was carried out by the Public Health Agency of Canada's Office of Audit and Evaluation and explored the appropriateness of PHAC's current approach, the extent to which relevant information, including surveillance and performance data, is guiding public health action, and the contribution of PHAC's TB activities to eliminating TB in Canada. PHAC's TB activities were previously evaluated in 2014-15.

The evaluation examined the following key questions:

1. How appropriate was PHAC's current approach to address the needs of each at-risk population?
2. How effectively was scientific and surveillance information used to guide public health action?
3. Did PHAC have the appropriate performance measures in place to monitor progress made toward reducing TB in Canada? Were there any gaps?
4. What has been the contribution of PHAC's activities in reducing the rate of tuberculosis in Canada, especially for each at-risk population?

Methodology

Data for this engagement was collected using the following methods:

INTERVIEWS

With 46 key informants, including:

- 14 PHAC staff involved with TB activities;
- 8 representatives from another federal government department;
- 14 provincial or territorial representatives; and
- 10 other stakeholders from the community-based organizations, TB-specific organizations, academia, and international stakeholders.



DOCUMENT REVIEW

Included program reports, research, policies, guidelines, etc. The evaluation also leveraged information collected from other Office of Audit and Evaluation reviews, including the 2019 Evaluation Readiness Assessment of TB activities.



COMPARATIVE ANALYSIS AND U.S.-CANADA CASE STUDY

Reviewed the program delivery model of TB activities as well as data collection and publication in five countries (the United States, Australia, United Kingdom, New Zealand, and France).

Examined in detail the strategies, resources, governance, surveillance data, and data collection mechanisms to understand the gap between TB rates in the U.S. and Canada.





DATA ANALYSIS

Examined program performance data collected for TB activities, including web analytics and citation data, published and unpublished surveillance data, and funded projects reports.



FINANCIAL DATA REVIEW

Examined the financial costs of delivering TB activities at IDPB and NMLB. Costs from other branches and offices involved in TB activities (EMB, OIA, CPHO) were not collected.



PROVINCIAL AND TERRITORIAL COMPARISON

Reviewed program delivery and data available in each jurisdiction and other federal departments to understand the complexity of the TB landscape and the differences in data collection.



LITERATURE REVIEW

Examined the needs of target populations in Canada, and emerging innovations and trends in the TB-related area in Canada and abroad. An SGBA+ analysis was also conducted to understand differences between segments of the population.

Limitations and Mitigation Strategies

The following table outlines the limitations encountered during the implementation of the data collection methods selected for this evaluation. Also noted are the mitigation strategies implemented to ensure that evaluation findings could be used with confidence in guiding program planning and decision making.

Figure 9: TB evaluation limitations and mitigation strategies

Limitation	Impact	Mitigation strategy
There is no formal description of roles and responsibilities across different teams working on TB across PHAC and beyond.	The assessment of TB activities cannot be done against official benchmarks or targets.	In the absence of a formal description, the program profile was built on ad hoc descriptions of TB activities found in internal and unapproved documents, and validated by the program area.
External key informant interviews were not possible with representatives of Nunavut due to ongoing outbreaks during data collection.	Nunavut is the only area significantly affected by TB in Canada where we could not interview official representatives.	Other key informants aware of the local TB situation were interviewed and the information they provided was triangulated with other sources of data (e.g., documentation, program data) where possible.

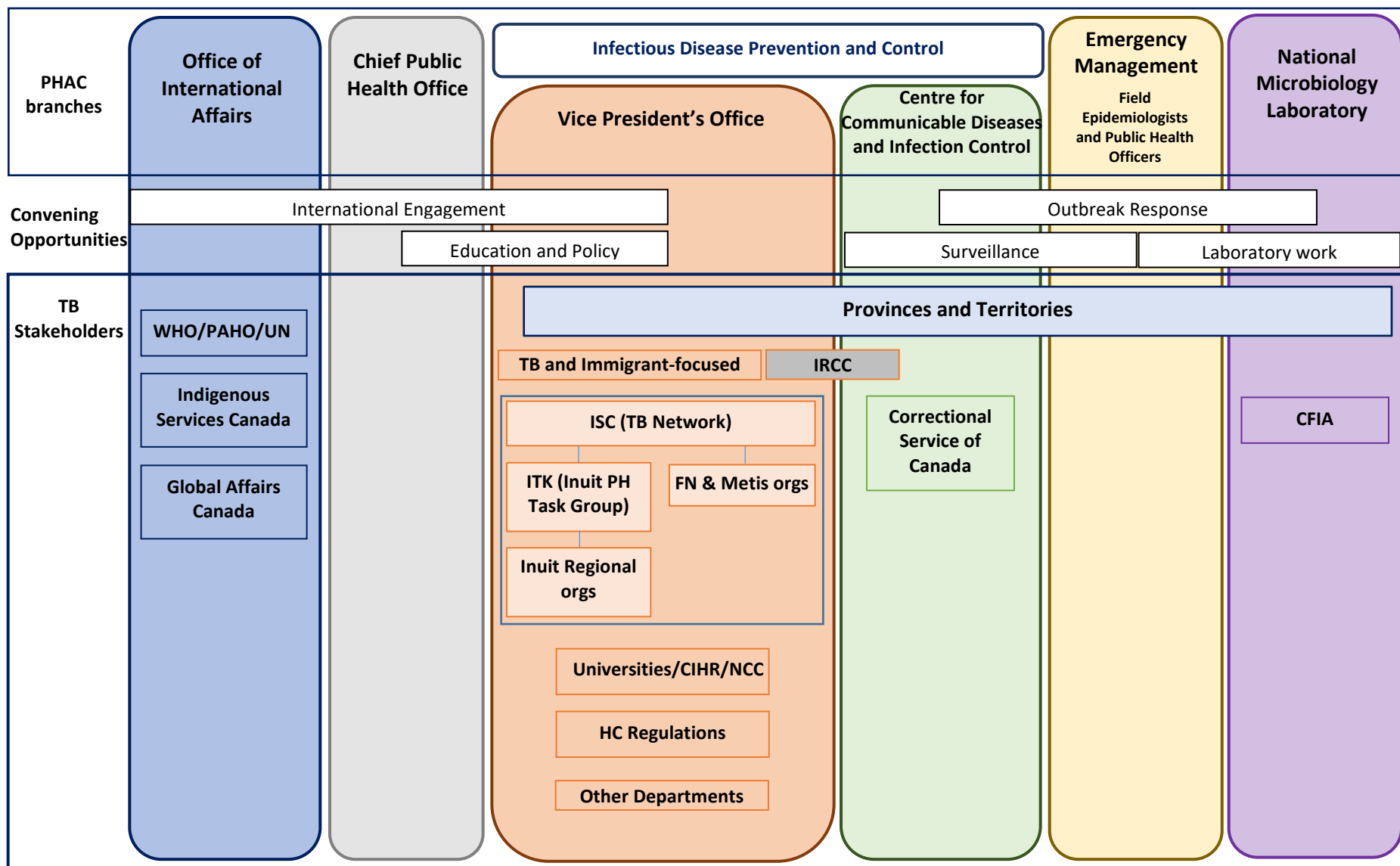
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<p>Very little performance data is available at IDPB and only data aggregated with other activities is available at NMLB. In addition, no formal TB performance measurement framework has been approved to date.</p>	<p>This limits the opportunity for a comprehensive understanding of knowledge transfer, funding outreach, and other policy activities, for example.</p>	<p>Interviews were conducted with internal and external key informants across jurisdictions to understand their views and levels of satisfaction regarding PHAC support. Web analytics and citation data (number of times PHAC documents are cited in the published and grey literature) were also collected to enhance understanding of the impact of PHAC's activities in this area.</p>
<p>In the absence of a formal TB program, financial data is not tagged to TB-related activities. For example, TB surveillance activities are grouped with HIV activities.</p>	<p>Financial data obtained for each set of activities was built based on discussions with the program area and the PHAC's Chief Financial Officer and Corporate Management Branch for the purpose of this evaluation and are not entirely reliable.</p>	<p>Although reported figures might not be completely accurate, program managers responsible for each set of activities have reviewed them and are comfortable with this information.</p>
<p>TB-related articles published in the CCDIC journal cannot be assessed, as this journal is not indexed in Scopus.</p>	<p>It was not possible to assess the extent to which most of the TB-related academic papers produced by PHAC are cited by others as a proxy of use of these articles.</p>	<p>Web analytics were collected on each PHAC web page related to TB, including CCDIC journal webpages, as a proxy to accessing these articles.</p>

Appendix B – Tuberculosis activities landscape

Figure 10: TB landscape and convening opportunities



Appendix C – PHAC Tuberculosis Budget

Figure 11: PHAC Tuberculosis Detailed Budget between 2015-16 and 2020-21

Year	IDPB - G&Cs	IDPB – Salary	NMLB – Salary	IDPB – O&M	NMLB – O&M & capital	IDPB and NMLB – Total Budget
2015-2016	\$ 0	\$926,821	\$762,439	\$334,675	\$331,185	\$2,300,910
2016-2017	\$114,000	\$890,335	\$793,058	\$205,607	\$207,950	\$2,090,012
2017-2018	\$112,000	\$901,465	\$883,348	\$149,340	\$166,152	\$2,291,153
2018-2019	\$600,000	\$1,045,673	\$960,162	\$264,898	\$259,283	\$3,415,733
2019-2020	\$748,198	\$1,043,488	\$918,359	\$193,061	\$195,794	\$3,059,081
2020-2021	\$30,000	\$771,102	\$894,118	\$228,797	\$219,053	\$1,969,350
Total	\$1,604,198	\$5,578,884	\$5,211,484	\$1,376,378	\$1,379,417	\$15,126,239

Source: PHAC Office of the Chief Financial Officer. Note that during the period in scope for this evaluation, the Infectious Disease Prevention and Control (IDPC) Branch, which included the National Microbiology Laboratory was renamed Infectious Disease Programs Branch (IDPB) and the National Microbiology Laboratory Branch (NMLB) became a separated branch. NMLB budget and IDPB salaries are covered under A-based funding. Data excludes resources mobilized from the field epidemiologist and public health officer programs, the OCPHO and the OIA.

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