



STOP TB CANADA REPORT

**THE IMPACT OF COVID-19 ON
TUBERCULOSIS PROGRAMS IN
CANADA**

OCTOBER 2021

ACKNOWLEDGEMENTS

This initiative and report would not have been possible without the time and commitment of members of the Stop TB Canada steering committee: Lena Faust (McGill International TB Centre), Alexandra J. Zimmer (McGill International TB Centre), Leigh Raithby (Results Canada), Dr Elizabeth Rea (Toronto Public Health), Dr Courtney Heffernan (University of Alberta), Petra Heitkamp (TB PPM Learning Network), Adam Houston (University of Ottawa), Trevor Stratton (Canadian Aboriginal AIDS Network), Tina Campbell (Northern Inter-Tribal Health Authority), Dr Wendy Wobeser, Ben Geboe (Queens University), Hilmi Qureshi (ZMQ Global), Adam Graham (Plan International Canada), Dr Dina Fisher (University of Calgary), and Dr Robyn Waite (Results Canada). The Stop TB Canada steering committee is grateful to Dr Richard Long (University of Alberta) and the Canadian TB Elimination Network for their invaluable input. Sincere thanks, gratitude and appreciation go to all anonymous respondents who took the time to fill out our survey. May we now all continue to work together to maximize the impact of this collaborative initiative to maintain a focus on eliminating TB in Canada.



TABLE OF CONTENTS

Executive Summary	4
Introduction	4
Key Findings	4
Calls to Action	9
1. Background	11
2. Methods	12
3. Results	13
<u>3.1 Overview of respondents by province/territory</u>	13
<u>3.2 Experiences of TB services during the COVID-19 pandemic</u>	14
3.2.1 Diagnostic delays & presentation with more advanced disease	14
3.2.2 Diversion of resources & staff	17
3.2.3 Infection prevention and control	18
3.2.4 The shift to virtual care	20
3.2.5 Quality of TB care	22
3.2.6 Management of latent TB infection (LTBI)	25
3.2.7 Active case finding & contact tracing	27
3.2.8 Evaluation of referrals from Immigration, Refugees & Citizenship Canada	30
<u>3.3 Leveraging lessons learned from COVID-19 to improve TB care</u>	31
3.3.1 How TB programs have adapted to the COVID-19 pandemic	31
3.3.2 Resource needs & opportunities for providing quality TB care	33
<u>3.4 Quantitative findings:</u>	35
3.4.1: Active TB case notifications in 2019 vs. 2020.....	35
3.4.2: Mode of delivery of directly observed therapy (DOT) 2019 vs. 2020.....	37
3.4.3: Management of Latent TB Infection (LTBI).....	37
3.4.4 Scarcity of data.....	37
<u>3.5 Implementation of TST & IGRAs in the context of COVID-19 vaccination</u>	38
4. Conclusion	39
5. Appendix	41

EXECUTIVE SUMMARY

INTRODUCTION:

[Tuberculosis](#) (TB) killed more people worldwide than any other infectious disease prior to COVID-19. Alarming, the COVID-19 pandemic has significantly [disrupted TB services worldwide](#), with the diversion of TB staff and barriers to care-seeking leading to reductions and delays in TB diagnosis and treatment, thus threatening global progress on ending TB. For the first time in over a decade TB deaths have increased, according to the World Health Organization's [2021 Global TB Report](#).

Although the general prevalence of TB in Canada is low, its burden is unequally distributed, with [newcomer, First Nations, and Inuit](#) communities experiencing a TB burden considerably higher than that in the overall population. The Canadian government has committed to ending TB across [Inuit Nunangat by 2030](#), but progress has been slow, and COVID-19-related disruptions now further jeopardize efforts to end TB in Canada. A further concern is that up-to-date data is crucial to identifying and mitigating the impact of the COVID-19 pandemic on TB care, yet the latest national [TB data available for Canada are from 2017](#) and are thus entirely inadequate for informing the current TB response.

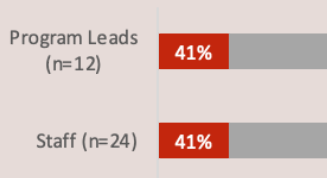
To better understand the impacts of COVID-19-related disruptions on TB in Canada, the [Stop TB Canada](#) steering committee therefore conducted a survey of Canadian TB program leads, TB staff, and those affected by TB. We present key findings and calls to action in this executive summary, and further details in the full report. For privacy reasons, provincial/territorial affiliations of respondents are not shown.

KEY FINDINGS:

Survey respondents reported diagnostic delays and individuals presenting with more advanced disease, large-scale diversions of TB staff to COVID-19 work, significant disruptions to active case finding, contact tracing and LTBI management, and declines in quality of TB care during the COVID-19 pandemic. These findings suggest alarming setbacks for efforts to end TB in Canada. Key findings are summarized below, along with examples of respondents' experiences.

1. DIAGNOSTIC DELAYS:

41% of TB program leads and TB staff reported that **TB diagnoses were significantly delayed.**



"...Classic case of pulmonary TB in an Elder who presented numerous times with pleurisy and cough over months and had three COVID-19 tests and no TB assessment or testing. [They were] finally picked up to have smear positive TB. [They] died during treatment."

~ TB program Lead

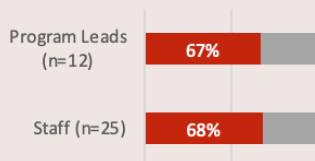
"Fewer screening opportunities are occurring; many [people] are coming to us when a person is seeing a significant decline in health."

~ TB staff

Quantitative data on TB case counts in 2019 vs 2020 (see full report) also show declines, which, given the reduced diagnostic capacity for TB during COVID-19, is concerning as it suggests that a large number of TB cases in Canada may have gone undiagnosed during the pandemic.

2. DIVERSION OF TB STAFF:

Approximately **two thirds** of program leads and TB staff acknowledged that they or their colleagues had been **diverted away from TB to COVID-19-related work.**



"All health resources have been shifted towards COVID, resulting in a lack of awareness of TB among health workers, a lack of diagnostic services, [a] lack of health workers to give [directly observed therapy (DOT)], [and a] lack of follow-up".

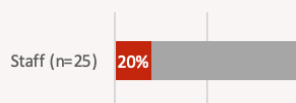
~ TB staff

"75% of our workforce [was] diverted to [the] COVID-19 response team and they continue to remain..."

~ TB staff

3. PERSONAL PROTECTIVE EQUIPMENT (PPE) SUPPLY:

20% of TB staff indicated that they experienced **significant PPE shortages.** Although some staff reported a lack of PPE early in the pandemic, this did not persist.



"In the first wave, we had a lack of PPE. Not in the second or third waves."

~ TB staff

4. SHIFT TO VIRTUAL TB CARE:

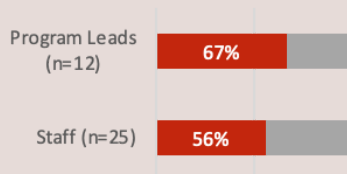
Two thirds of TB program leads and **56%** of TB staff reported that the **majority of TB services have gone virtual** during the COVID-19 pandemic. Although some TB staff saw this as a positive change, others, including those affected by TB, highlighted important limitations of virtual care.

"Because of virtual care, [the] doctor [may] not know what the patient's issue [is] and may delay in treatment".

~ Person affected by TB

"It is very difficult to implement virtual care in isolated communities due to poor internet connectivity"

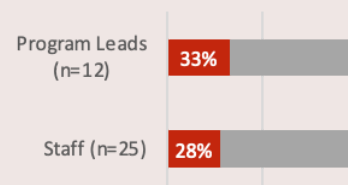
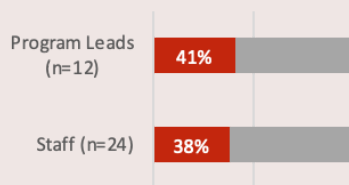
~ TB program lead



5. QUALITY OF TB CARE:

41% of TB program leads and **38%** of TB staff felt that there was a **significant decrease in the quality of TB care** provided during COVID-19.

A third of TB program leads and **28%** of TB staff reported **significant delays in the delivery of TB medication** during COVID-19.



"...I have also seen some of the worst cases of active TB during the pandemic, which is distressing. Oftentimes I coordinate care with First Nation partners and within some of the communities hit hard by COVID, TB care definitely suffered, and I can only do so much from a distance."

~ TB Staff

"[Delayed] TB medication deliveries to remote northern communities during lockdowns when numbers of flights into communities were significantly decreased"

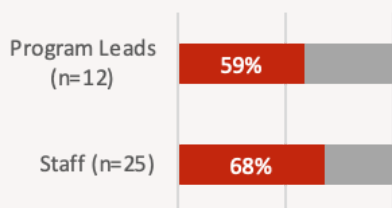
~ TB program lead

6. LATENT TB INFECTION MANAGEMENT:

LTBI care was deprioritized in the majority of provinces throughout the pandemic. Nearly **60%** of TB program leads and **68%** of TB staff reported that **LTBI treatment was significantly scaled-back** during the COVID-19 pandemic.

"TB elimination projects have completely stalled over the past 15 months due to COVID-19 reallocation of resources and people. Public Health Units have not been able to start people on LTBI prophylaxis because of lack of resources. TSTs are not being done unless 'urgent' because of the same reasons."

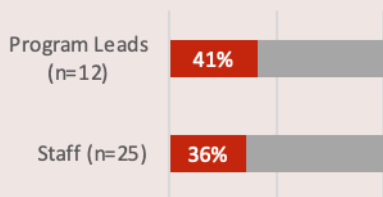
~ TB Program lead



7. ACTIVE CASE FINDING (ACF) AND CONTACT TRACING:

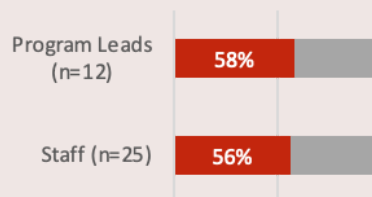
41% of TB program leads and **36%** of TB staff reported that **ACF activities were significantly hindered** during the pandemic.

58% of TB program leads and **56%** TB staff reported that **contact tracing activities were significantly hindered**.



"We are no longer doing ACF."

~ TB Program lead



"In attempting to limit exposure, we have reduced the number of face to face visits with our patients which likely hampered the number of contacts we obtained."

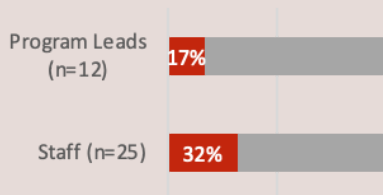
~ TB staff

8. EVALUATION OF REFERRALS FROM IMMIGRATION:

17% of program leads and **32%** of TB staff agreed that **evaluation of referrals from immigration were significantly hindered** during the pandemic.

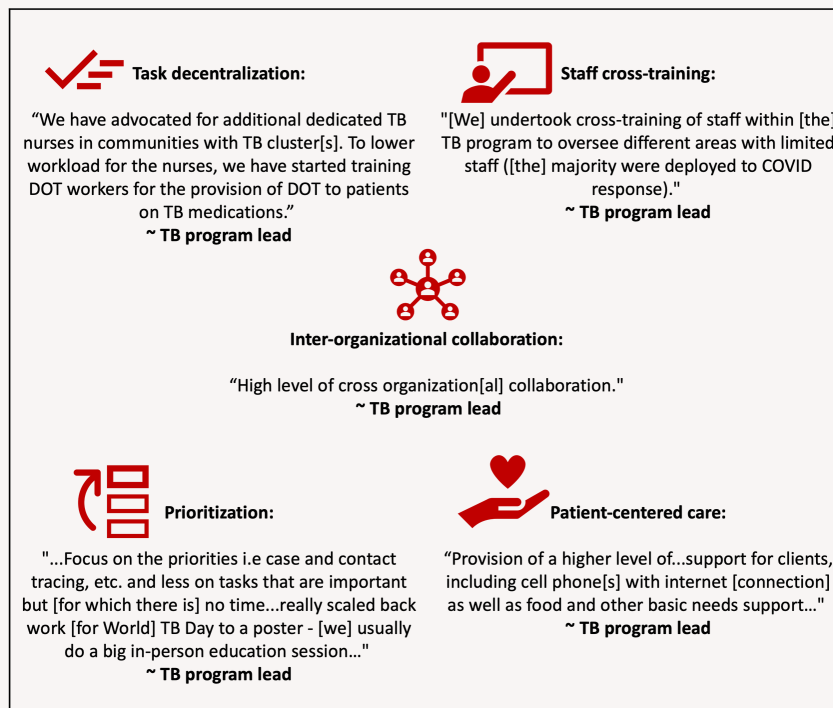
"Currently, we are only able to manage/process urgent/high risk referrals."

~ TB staff



9. WAYS IN WHICH TB PROGRAMS HAVE ADAPTED TO THE COVID-19 PANDEMIC:

Apart from having to scale back services, shift to virtual care and prioritize cases and high-risk contacts, programs also found other ways to adapt to the pandemic (box on the right), including making changes that can be leveraged to improve TB care even after the pandemic. One positive adaptation was forging new partnerships and collaborations between organizations, to provide services more efficiently at reduced capacity.



10. OPPORTUNITIES AND NEEDS FOR PROVIDING QUALITY TB CARE DURING AND POST-PANDEMIC:

Operating at reduced capacity and within COVID-19-related restrictions has laid bare shortcomings in TB care delivery in Canada. Respondents mentioned the following opportunities for improving TB care tools and systems, as well as resource needs for continuing to provide quality TB care during and after the pandemic:

- **Data:** Making available prompt and comprehensive TB data from the federal government.
- **Technologies:** Improving access to technologies and tools such as electronic charting and asynchronous DOT.
- **Approaches to care:** Transitioning the Indigenous-led COVID response into an Indigenous-led TB response, and providing patient-centred care.
- **Staffing:** Increasing staff for both COVID-19 and TB in First Nations communities.
- **Public outreach:** Generating public awareness to continue to seek care for non-COVID concerns, especially among risk groups.
- **Funding:** Increasing funding dedicated to TB, and specifically to the provision of non-medical supports to those affected by TB.
- **Social determinants of health:** Expanding coverage of healthcare services to everyone, regardless of whether they hold a provincial health card.
- **Organization/Structure:** Increasing oversight of provincial TB activities, and improving the efficiency of contact tracing.

CALLS TO ACTION:

Based on the experiences of TB program leads and staff presented in this report, there is a critical need to mitigate the impacts of COVID-19-related disruptions to TB services in Canada. There is also the opportunity to apply lessons learned from COVID-19 to the TB response. In this context, we make the following urgent calls to action:



Updating TB data & measuring progress towards TB elimination targets.

We call on the Public Health Agency of Canada to take appropriate action to make available updated and detailed Canadian TB data. We also ask that TB be part of the [Pan-Canadian Health Data Strategy](#). The scarcity of data and the lack of standardized reporting made evident by this report underlines the [urgent need for consistent and timely national TB data](#), which is crucial for:

- Transparently tracking progress towards the [TB elimination goals](#) that the Canadian government has set
- Evaluating and addressing the impact of COVID-19 on Canadian TB services



Balancing the COVID-19 response with the maintenance of TB services.

- Given the serious consequences of diagnostic delays for TB, as illustrated by this report, the COVID-19 response must be balanced with the ongoing need to provide quality, timely care for TB.
- Delays in TB diagnoses indicate an urgent need for updated clinical guidelines for respiratory screening in the context of a negative COVID-19 test and persistent respiratory symptoms, particularly in communities at high risk for TB.
- Although virtual care may increase access to care in certain contexts, it should be implemented only with careful consideration of its limitations, including limited internet connectivity in remote communities, and the continued need for in-person evaluations in many cases.
- The backlog regarding LTBI management should be urgently addressed, given that LTBI testing and treatment is an important element of TB elimination in Canada, and the disruptions described in this report threaten to jeopardize progress on ending TB in the country.
- Additional human resources for TB programs should be ensured
- COVID-19 response mechanisms (tools/systems) and lessons learned should be applied to TB (and other relevant health conditions)



Increasing non-medical support for those affected by TB.

- The pandemic has highlighted the importance of non-medical supports such as paid sick days, nutritional support, income support and mental health services. We call for these to be integrated into TB care, creating a model of care that is patient-centered and comprehensive.



Renewing political and financial commitment to TB elimination.

- As a respondent noted: "...The biggest loss has been losing momentum on any LTBI/TB elimination work that was scheduled to be completed...Tons of TB priorities have [been put on the] back burner..." If Canada hopes to honour its [global](#) and [domestic commitments to TB elimination](#), resources to support TB services as well as renewed political will and [increased financial investment in R&D for TB](#) are necessary, especially in light of COVID-19-related setbacks.



Taking action on health inequities in Canada.

- Survey respondents underlined that the pandemic has served as a reminder of the role of social determinants in creating vulnerability to disease. This affirmation should be leveraged to finally address the longstanding inequities in health that allow TB to persist in Canada today, where it continues to disproportionately affect newcomer, Inuit and First Nations communities.
- Specifically, we call for TB care and prevention to be integrated into budgets and plans for addressing Indigenous and newcomer health (e.g., integration into housing budgets to ensure ventilation and reduced spread of respiratory infections)

1. BACKGROUND

Tuberculosis (TB) killed more people worldwide than any other infectious disease prior to COVID-19, despite TB being a treatable, curable and preventable disease. In 2016, tuberculosis (TB) overtook HIV/AIDS as the number one infectious source of mortality globally, and in 2020, TB caused [1.5 million deaths](#). In 2020, COVID-19 was implicated in [1.8 million reported deaths](#), but as COVID-19 now becomes vaccine-preventable, TB is bound to reassume its grim distinction as top infectious disease killer post-COVID-19. (1) Deaths from TB, and indeed the disease itself, are relatively uncommon phenomena in Canada, but are experienced unequally by [newcomer, First Nations, and Inuit](#) communities. In fact, the incidence of active TB was over [400 times higher](#) among Inuit than among non-Indigenous Canadians in 2017.

The COVID-19 pandemic has significantly [disrupted TB services worldwide](#), overwhelming healthcare systems, presenting healthcare access barriers for people with TB, diverting staff from TB programs to COVID-19-related work, and jeopardizing global progress towards TB elimination. The recently published [2021 Global TB Report](#) by the World Health Organization (WHO) reveals how devastating COVID-19 has been to TB during the first year of the pandemic. In 2020, global TB deaths increased relative to 2019, representing the first year-on-year increase in deaths since 2005. TB case notifications have fallen significantly, with approximately 1.3 million fewer people accessing TB care in 2020 compared to 2019. Moreover, given that the presence of TB is largely influenced by the [social determinants of health](#), inequities in access to healthcare, food, and safe housing have been [exacerbated by the pandemic and threaten to worsen TB](#). Given the widespread disruptions caused by COVID-19, it is estimated that progress towards TB elimination has been [set back by at least a decade](#).

Despite being a low-TB incidence country, Canada was not immune to these setbacks, and Canada's [commitments to TB elimination](#) are threatened by COVID-19-related disruptions. An [analysis of treatment registrations for active TB disease and latent TB infection](#) (LTBI) at a tertiary care centre in Montreal, Quebec found reductions of 59% and 24% for LTBI and active TB treatment registrations, respectively, compared to prior to the COVID-19 pandemic. This indicates considerable disruptions to Canadian TB programs during the pandemic that need to be evaluated and addressed.

1. Heffernan C, Rowe BH, Long R. Engaging frontline providers: an important key to eliminating tuberculosis in Canada, and other high-income countries. CJPB 2021 (forthcoming).

Unfortunately, given the outdated nature of national TB data in Canada (with the most 'recent' [report presenting data from 2017](#)), we lack the information necessary to assess and mitigate the disruptive impacts of COVID-19 on TB programs in Canada, and the [ability to appropriately track progress on ending TB](#) in the country. Based on anecdotal information from Canadian TB program staff, it became evident that COVID-19 was severely disrupting program capacity and that particularly severe cases of TB were increasingly being observed. The lack of up-to-date national TB data in the face of such worrying reports prompted [Stop TB Canada](#) to develop surveys and collect data in order to produce a more comprehensive picture of the impact of COVID-19 on TB in Canada. In this report, we summarize the findings of the surveys by providing a qualitative account of the experiences of TB program leads, TB care staff, and people affected by TB regarding the impact of the COVID-19 pandemic on TB care and service delivery across Canada. In addition, we present quantitative data on active TB case notifications and LTBI management prior to and during the pandemic.

2. METHODS

We conducted surveys of TB program leads, TB staff, and people affected by TB across Canada, where respondents were asked to describe their experiences of the impact of the COVID-19 pandemic on TB care and services using likert scale questions as well as openended responses. TB program leads were also asked to provide aggregate data on active TB case notifications and LTBI management for their province/territory. The surveys were hosted on the [QuestionPro](#) platform and distributed via email to the Canadian TB community via [Stop TB Canada](#), a network of TB advocates, researchers and practitioners committed to ending TB in Canada and abroad. The surveys were available in English and French.

Ethics approval: As the report is intended for advocacy purposes only, ethics approval was not required at this stage. If any secondary analyses will be conducted with these data, the appropriate permissions / approvals will first be obtained.

Informed consent: On the start page of the survey, participants were informed about its purpose, that their participation is entirely voluntary, and that they may choose to discontinue the survey at any point.

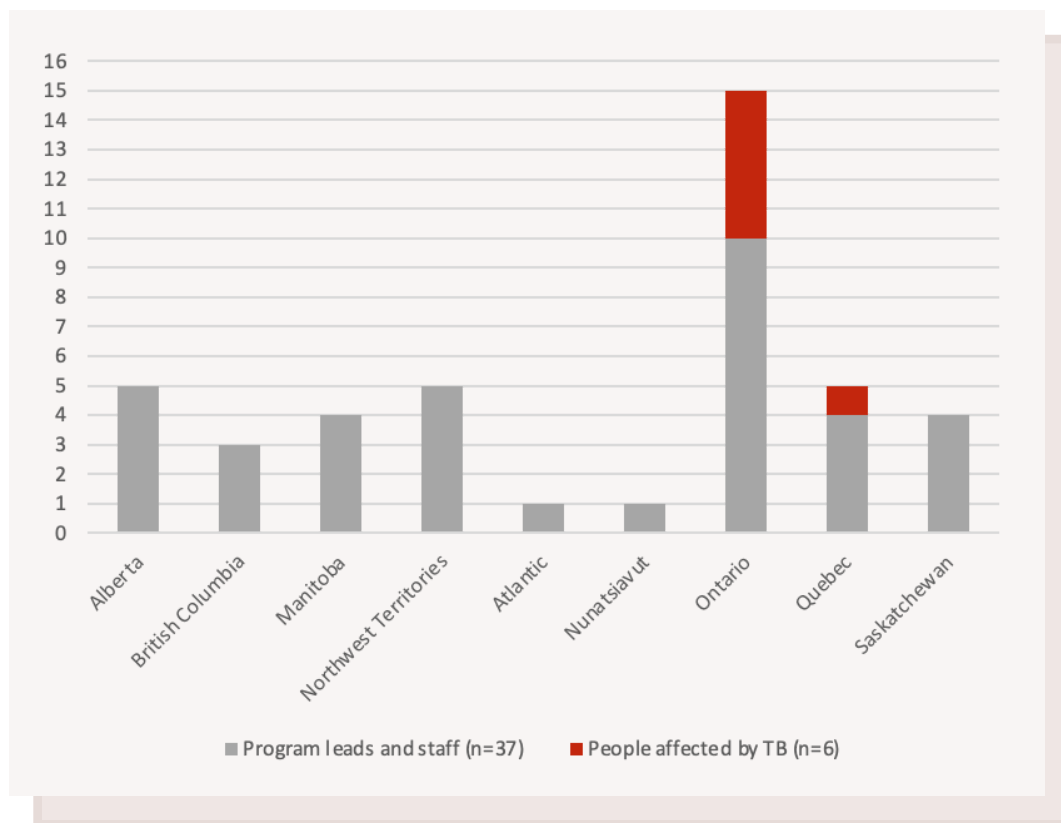
Confidentiality: No individual identifying information was collected. Provincial/territorial affiliations of respondents are not shown in responses presented in the report.

3. RESULTS

3.1 OVERVIEW OF RESPONDENTS BY PROVINCE/TERRITORY

From March to June 2021, a total of 43 responses were received; 12 from TB program leads, 25 from TB program staff, and 6 from people affected by TB. **Figure 1** shows the number of responses by province/territory.

Figure 1. Number of respondents by province/territory



3.2 EXPERIENCES OF TB SERVICES DURING THE COVID-19 PANDEMIC, FROM THE PERSPECTIVES OF TB PROGRAM LEADS, STAFF AND THOSE AFFECTED BY TB

The following subsections qualitatively describe the experiences of TB program leads, staff, and those affected by TB regarding TB services and care during the COVID-19 pandemic. Likert scale responses are shown graphically for TB program leads and staff only, and not for people affected by TB, due to the low number of respondents for this category (n=6), although their experiences are still presented descriptively. An overview of responses to all likert questions is provided **Appendix Figures A1** and **A2**.

3.2.1 DIAGNOSTIC DELAYS AND PRESENTATION WITH MORE ADVANCED DISEASE

TB diagnosis and notification are critical for understanding the epidemiological, spatial and temporal dynamics of TB. [TB case notification reflects programmatic national surveillance capacity](#) while TB diagnoses provide insight on the burden of disease within the population (although often an underestimate due to unidentified cases). Drops in TB notification and delayed diagnoses are indicative of healthcare disruptions and shifting social behaviour factors that prevent individuals from seeking care. In Canada, 41% of TB program leads agreed that there was a significant decrease in TB notifications and that TB diagnoses were significantly delayed. Among the TB staff, 20% agreed that there was a significant decrease in TB notifications while 41% agreed that TB diagnostics were significantly delayed (**Figure 2**). The impact of COVID-19 on notification and diagnostics was not uniform across Canada, with some provinces reporting no change in case notification or diagnostic delays.

While the diversion of resources and staff has contributed to this drop in TB notifications and diagnoses, COVID-19 has also directly impacted the care-seeking behaviour of many people with TB, with people delaying presentation to health facilities due to fear of contracting COVID-19. As a TB staff member notes, ***“Patients tend to delay going to their healthcare providers unless [their TB] symptoms have gone from bad to worse, for fear of COVID-19.”*** This aligns with responses from people affected by TB, as 3 of the 6 people surveyed reported being hesitant to seek TB care during the pandemic due to fear of possible exposure to COVID-19 at health facilities.

Moreover, the overlapping symptoms between COVID-19 and TB, such as cough, has also impacted clinical decision-making, as noted by one TB staff member: ***“[...] I think [TB diagnosis is] delayed because everyone keeps thinking it's COVID for a long while”***. This poses barriers to timely TB diagnosis, with symptomatic individuals being referred for repeat COVID-19 testing instead of TB screening, sometimes with disastrous consequences, as illustrated by the following accounts:

"...Classic case of pulmonary TB in an Elder who presented numerous times with pleurisy and cough over months and had three COVID-19 tests and no TB assessment or testing. [They were] finally picked up to have smear positive TB. [They] died during treatment."

(TB program Lead)

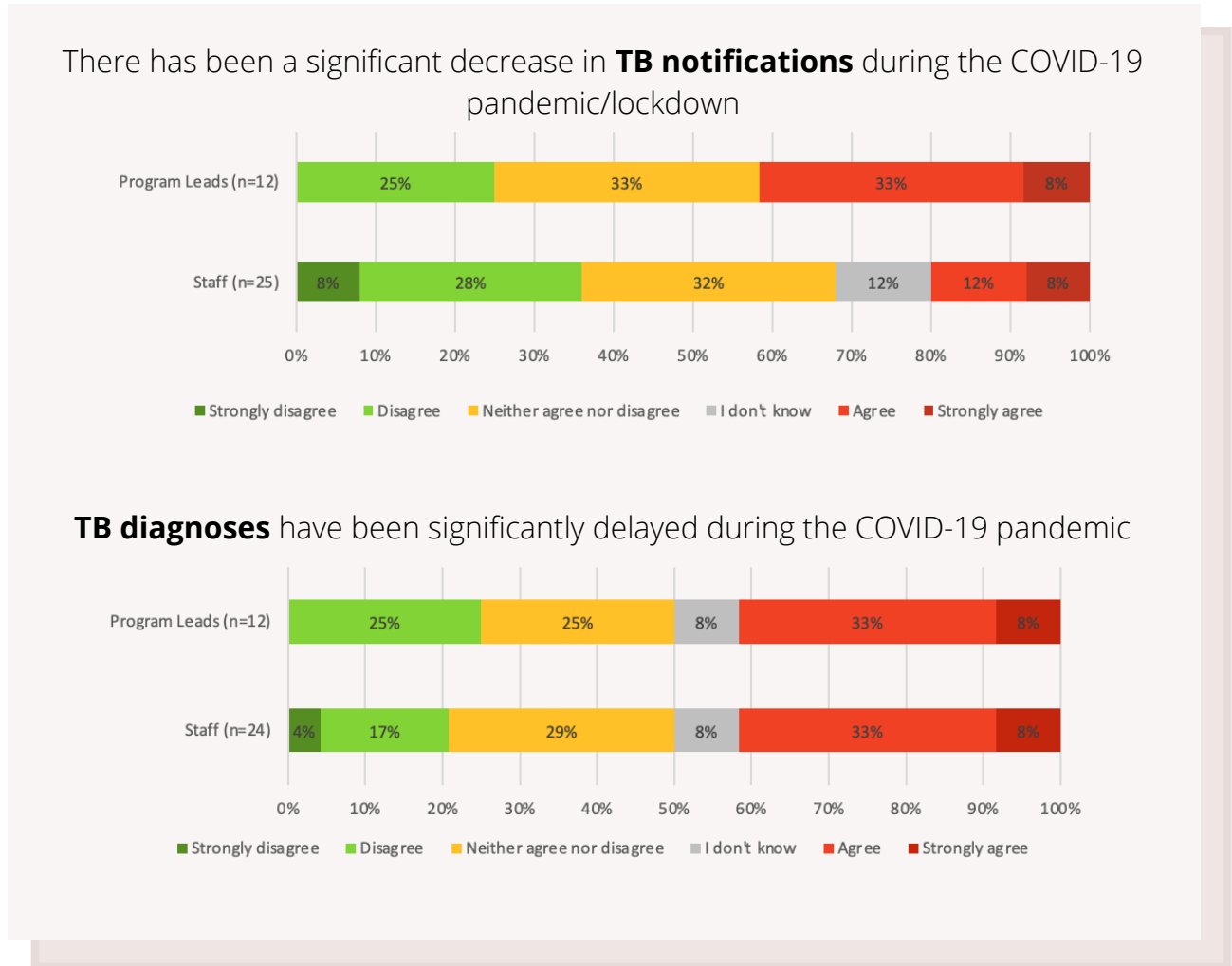
"Clinical presentation at time of diagnosis and degree of morbidity and mortality including advanced CNS [central nervous system] TB in young persons with significant irreversible sequelae."

(TB Program Lead)

Responses to our survey for those affected by TB also reflect barriers to accessing testing and care, with two of the six respondents affected by TB stating that they had experienced barriers to getting tested for TB during the pandemic. The same two respondents also noted experiencing difficulties accessing TB care as early or frequently as needed. Three also agreed that COVID-19-related travel restrictions made it difficult for them to access TB care during the pandemic. The remaining three noted that they could not compare their current level of access to TB diagnostic services to before the pandemic, as all of their TB care has taken place during the pandemic.

This is concerning, as delays in care seeking, compounded by higher rates of clinical misdiagnosis, allow for TB disease to progress. By the time people with TB receive the appropriate diagnosis, their TB may be advanced, making it more difficult to treat and increasing the likelihood of poor health outcomes and mortality: ***"Fewer screening opportunities are occurring; many [people] are coming to us when a person is seeing a significant decline in health."*** (TB staff). It is therefore crucial that testing and evaluation for other diseases is maintained during the pandemic (and future pandemics) and that possible diagnoses other than COVID-19 continue to be adequately considered, particularly in communities with high TB incidence.

Figure 2. TB program lead and staff responses to likert questions relating to TB case notifications and delays in TB diagnoses during the COVID-19 pandemic.

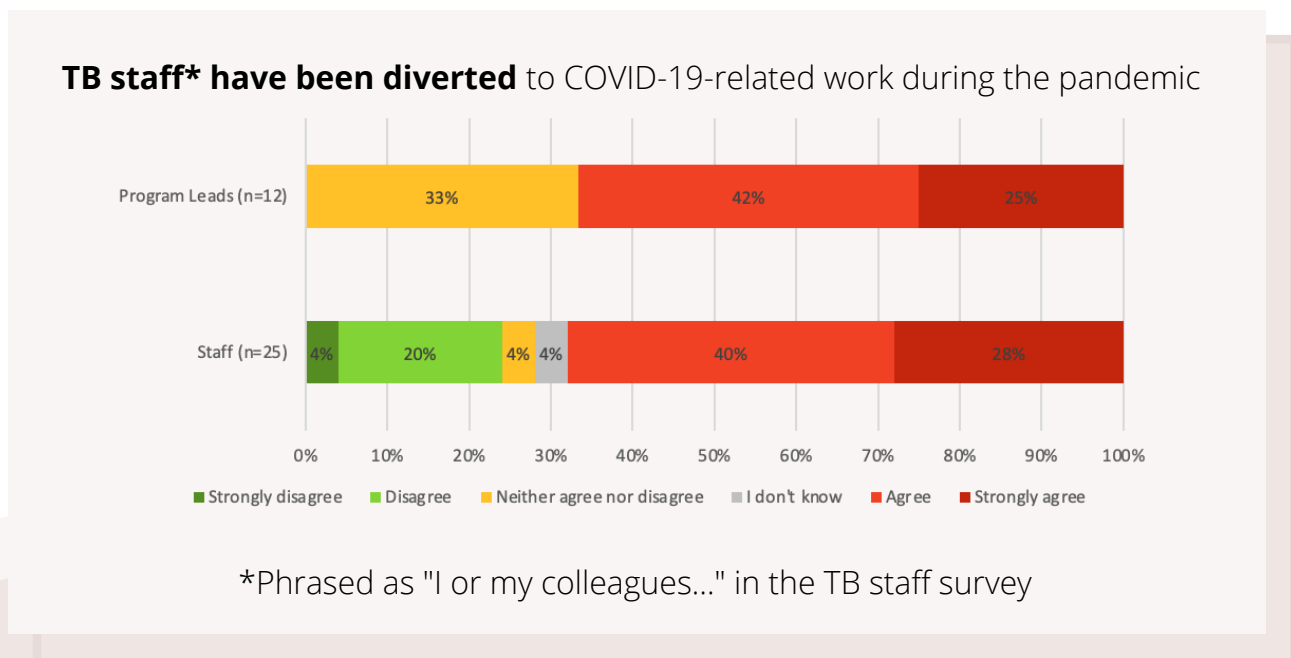


3.2.2 DIVERSION OF RESOURCES AND STAFF

The immensity of the COVID-19 pandemic resulted in the diversion of health resources and staff from other services, such as TB, towards COVID-19. Approximately two thirds of program leads and TB staff acknowledged that they or their colleagues had been diverted away from TB to COVID-19-related work (**Figure 3**). One staff member quantified the decreased time they were able to allocate to TB: ***"[I] am only able to perform about half of my usual TB activities during the COVID pandemic."*** Another staff member reported that 75% of their TB workforce had been diverted to COVID-19 work (**Box 1**).

This significant diversion of staff is concerning, as the consequent decrease in capacity affects the entire TB care continuum, including diagnosis, treatment, and post-care follow-up: ***"All health resources have been shifted towards COVID, resulting in a lack of awareness of TB among health workers, a lack of diagnostic services, [a] lack of health workers to give [directly observed therapy (DOT)], [and a] lack of follow-up"*** (TB staff). The fact that the diversion of attention away from TB has also reduced health care workers' awareness of TB is alarming, [as this is likely to increase the risk of mismanagement](#), and in turn lead to unfavourable outcomes in the long term.

Figure 3. TB program lead and staff responses to the following likert question relating to the diversion of TB staff to COVID-19 work during the COVID-19 pandemic.



Box 1. Additional experiences regarding the diversion of Canadian TB program staff to COVID-19 work during the COVID-19 pandemic

"Many of the TB workers I work with in First Nations communities were diverted for COVID work or asked to do COVID work on top of their TB responsibilities."

~ TB Staff

"75% of our workforce [was] diverted to [the] COVID-19 response team and they continue to remain there...I myself was also deployed to [the] COVID-19 response team for 4 months in 2020."

~ TB Staff

3.2.3 INFECTION PREVENTION AND CONTROL

Specific infection prevention and control (IPC) protocols are required when caring for individuals who may have COVID-19. The [WHO recommends](#) that droplet and contact precautions in addition to airborne precautions be taken when caring for COVID-19 patients. It is therefore expected that IPC practices in TB programs may have changed during the COVID-19 pandemic.

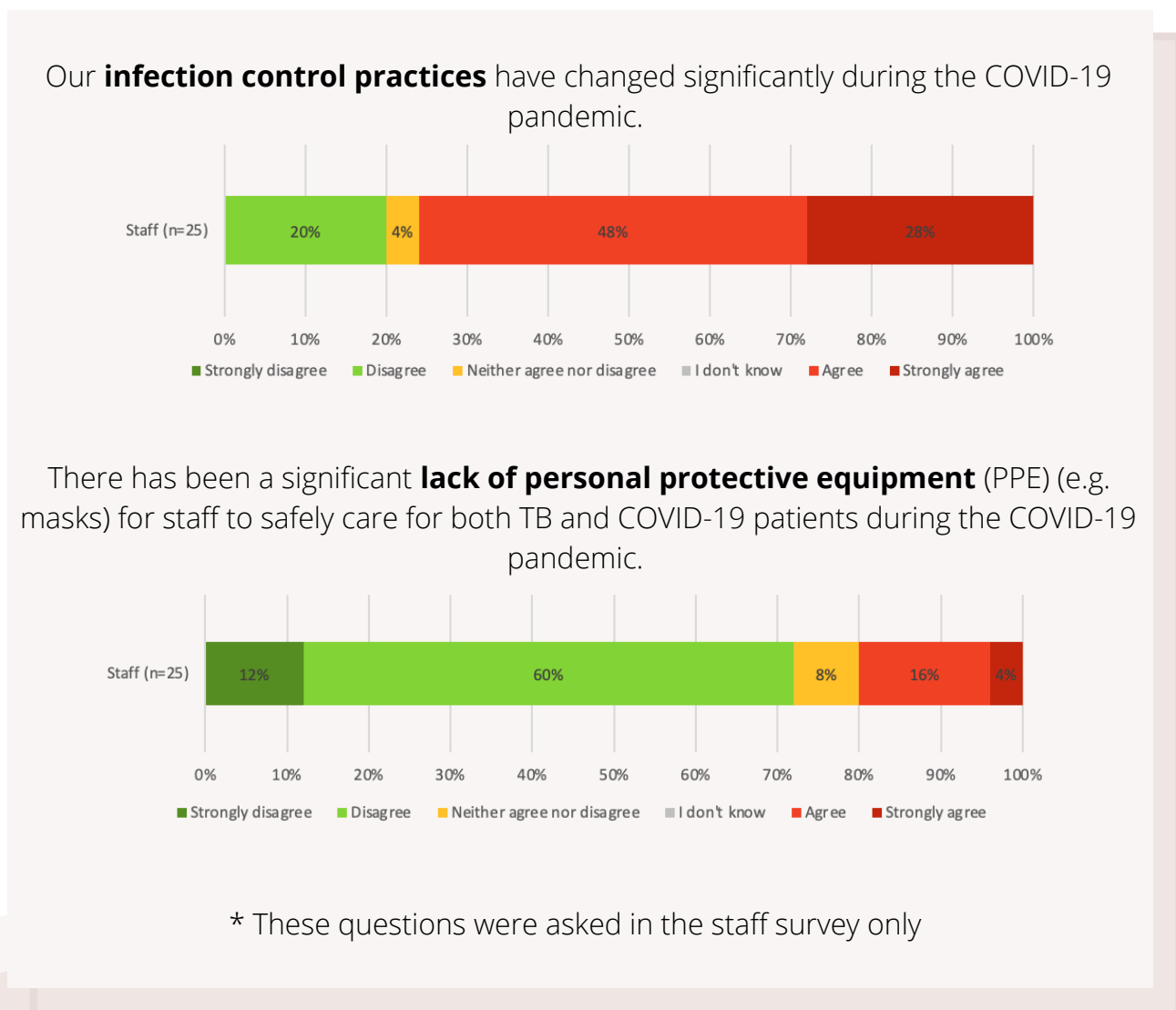
As expected, most TB staff (76%) in our survey agreed that IPC practices had changed (**Figure 4**) including that face shields, gloves and gowns were now required in some contexts, and that in-person interactions with patients were reduced, where possible.

Appropriate personal protective equipment (PPE) for healthcare workers (such as masks, face shields, etc.) is an important component of IPC. As large amounts of PPE supplies were needed for the COVID-19 response, there was a [global shortage](#) of these supplies early on in the pandemic, which presents challenges for the care of other respiratory diseases such as TB.

Fortunately, most TB staff in our survey (72%) indicated that they did not experience significant PPE shortages (**Figure 4**). Although some staff reported that there was a lack of PPE in their programs in the early phases of the pandemic, this did not persist. As a TB staff member noted; ***"Minor lack of PPE supplies in community based services early on in the pandemic, but [this is] no longer an issue."*** It is also of interest to note that one respondent reported challenges in accessing PPE for TB researchers (**Box 2**), indicating that beyond direct TB care, the pandemic has also impacted TB research (although this is not the focus of this report). Findings from [a community-based global survey on the impact of COVID-19 on TB](#) highlight research-related disruptions. Among the eight researchers conducting research in Canada who responded to the global survey, five (63%) found that their research (either human subjects and/or laboratory-based) was significantly interrupted and/or delayed due to COVID-19. Two respondents disagreed and the last respondent said it was not applicable to their research.

Respondents also highlighted the increased public acceptance and uptake of personal IPC measures as a result of the pandemic: **“One positive note is that more people [are] isolating, [...] wearing masks, coughing into arm etc.”** (TB program lead). This broader acceptance of IPC measures may help [alleviate some of the stigmatization](#) surrounding TB and could possibly also result in a [reduced transmission of TB](#), however, further research will be needed.

Figure 4. TB staff* responses to likert questions relating to changes of infection prevention and control (IPC) practices and availability of personal protective equipment (PPE) during the COVID-19 pandemic.



Box 2. Additional experiences of Canadian TB staff regarding availability of personal protective equipment (PPE) during the COVID-19 pandemic.

"We have enough supply of PPE for staff to safely care for both TB COVID-19 patients during [the] COVID-19 pandemic.

Management made sure from the very beginning that we are protected and that we have adequate provision of PPE."

~ TB staff

"In the first wave, we had a lack of PPE. Not in the second or third waves."

~ TB staff

"I have not experienced a lack of PPE for care. N95 masks were difficult to obtain for researchers though."

~ TB staff

3.2.4 THE SHIFT TO VIRTUAL CARE:

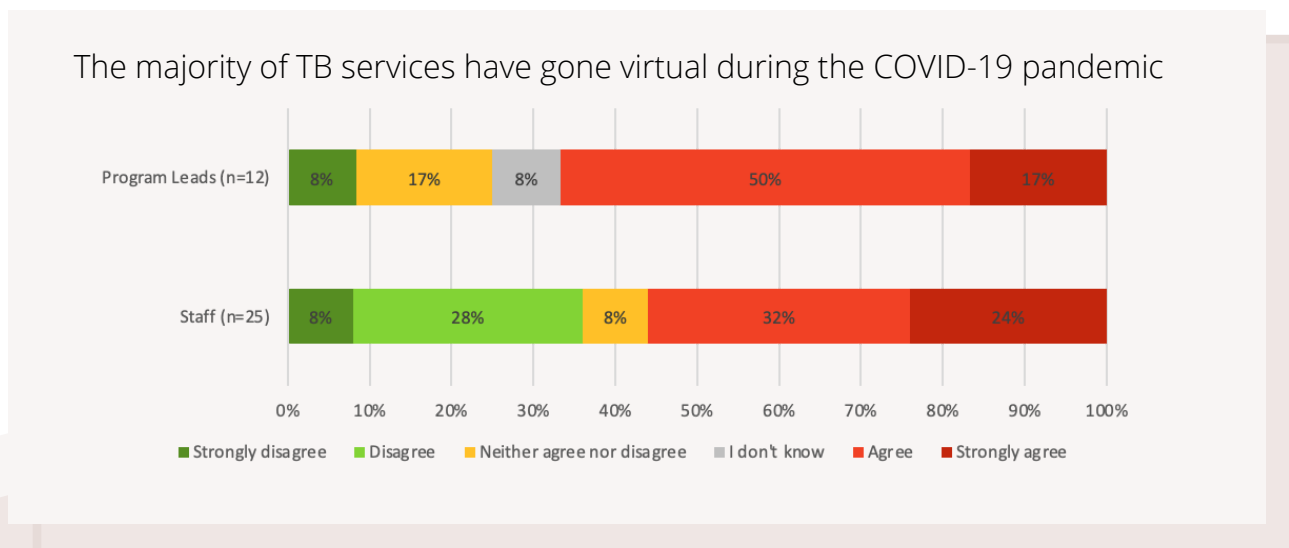
Throughout the pandemic, public health measures (such as social distancing, curfews and stay-at-home orders) of varying degrees were enforced throughout Canada to prevent the spread of COVID-19, although [policies varied widely between provinces/territories](#). While these measures were necessary to help mitigate the spread of the virus, they also presented barriers to healthcare access for TB affected communities. In response to these challenges, many TB programs shifted some of their TB services to an online format. Among the survey respondents, two thirds of TB program leads and 56% of TB staff reported that the majority of TB services have gone virtual during the COVID-19 pandemic (**Figure 5**). Of the six respondents affected by TB, four agreed that a large proportion of their TB care had gone virtual during the pandemic (one strongly disagreed and the last neither agreed nor disagreed).

While virtual TB care may help overcome some of the barriers associated with COVID-19 restrictions, survey respondents expressed mixed reactions to this mode of care. On the one hand, virtual platforms promote a more person-centered model of care by allowing people with TB to receive care in the comfort of their own homes, and provides greater accessibility and flexibility, by removing potential costs and time associated with traveling to health facilities. As a TB staff member noted, **"I think the introduction of digital and virtual DOT has been a major improvement toward patient-centered care."**

On the other hand, respondents expressed concern for people living in remote areas, particularly Indigenous and northern communities, that may have limited access to internet and data services: **"It is very difficult to implement virtual care in isolated communities due to poor internet connectivity"** (TB program lead). This was echoed by TB staff (**Box 3**). One person with TB also noted that virtual care was not compatible with their individual needs, highlighting that in the virtual format, providers may have more difficulty recognizing important health issues that need to be addressed: **"Because of virtual care, [the] doctor [may] not know what the patient's issue [is] and may delay in treatment"**. Another person affected by TB highlighted both advantages and disadvantages of virtual care, stating that it offers more safety, particularly during COVID-19, but also noted that it may lead to miscommunication between healthcare providers and those affected by TB (**Box 3**).

Thus, while virtual care has allowed for some people to access care that would otherwise have been difficult for them to access during the pandemic, it may not be suited for all individuals and communities affected by TB. This is of particular importance for many Indigenous communities that have the highest rates of TB incidence in Canada and yet are more likely to lack resources for virtual care. In order for care to be truly person-centered, it is important to acknowledge the context within which care is being provided and [allow for flexible models of care](#) with options.

Figure 5. TB program lead and staff responses to the following likert question relating to virtual TB care during the COVID-19 pandemic.



Box 3. Additional experiences of Canadian TB program staff and those affected by TB regarding virtual TB care during the COVID-19 pandemic

“Especially [in] COVID time[,] virtual care is really good for safety[,] personal and social one (both side[s]). There may be some communication gap[s] for both side[s]. Apart from that[,] everything [is] good.”

~ person affected by TB

“[Internet] connectivity in our northern communities is not fully available.”

~ TB Staff

3.2.5 QUALITY OF TB CARE

[Good TB care is a function of both service utilization and quality of care provided](#), and ensuring not just coverage but also quality of services is essential to ending TB. While service utilization is often measured in terms of coverage, quality of care is assessed through [processes of care](#) at the person, healthcare provider and systems level. Many of the metrics already examined suggest that COVID-19 has brought about a significant decrease in quality of TB care: diagnostic delays, drops in TB notifications, reassignment of TB staff towards COVID-19, etc. This overall drop in quality of TB care was highlighted by a TB program lead: **“Although we are trying our best, we have had to reduce our services significantly. Community [and] clinical support [were] also reduced (e.g., bloodwork, radiology, procedures, specialist appointments)”**. 41% of TB program leads and 38% of TB staff agreed that there was a significant decrease in quality of TB care provided during COVID-19 (**Figure 6**).

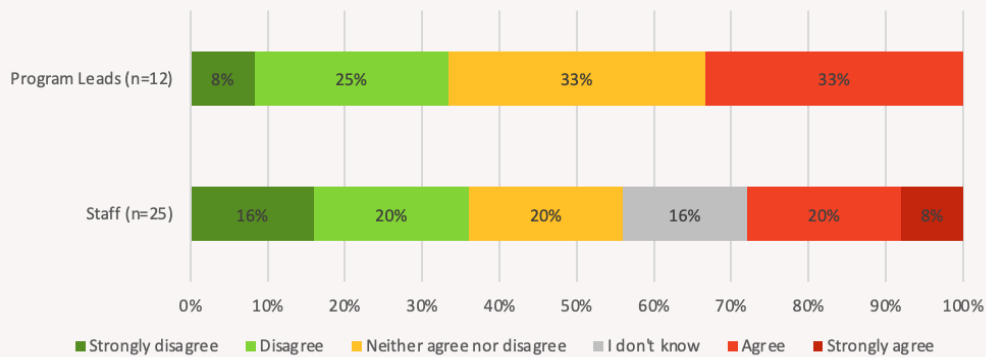
Regarding the perspectives of those affected by TB on quality of care, one respondent stated that they found the quality of TB care during the pandemic to be unsatisfactory, but none reported it to be inferior to prior to the pandemic (although four respondents indicated that they could not compare the quality to prior to the pandemic given that all of their TB care had occurred during the pandemic). Unfortunately, even strategies to recover some of the quality of care, such as virtual platforms, actually created challenges for quality of care for some individuals: **“[The] transition to virtual care has presented significant challenges in quality of care for marginalized and non-English speaking patients”** (TB staff).

While quality of care affects every step of the cascade of care, it is often examined in the context of treatment and management of TB disease. In our surveys, no TB program leads reported a significant decrease in the number of people receiving TB treatment among those diagnosed, while 17% of TB staff reported a significant decrease (**Figure 6**): ***“once diagnosed, our clients have still been able to access TB [treatment]”*** (TB program lead). Although people with TB continue to receive their treatment during COVID-19, one program lead highlighted that it has become much more logistically challenging to coordinate: ***“My experience is that all cases with active TB and those on window [prophylaxis] or LTBI treatment get their treatment, however there [are] a lot more barriers and hoops to figure out, i.e. how will [treatment] be delivered safely [through] DOT to a house with COVID restrictions”***.

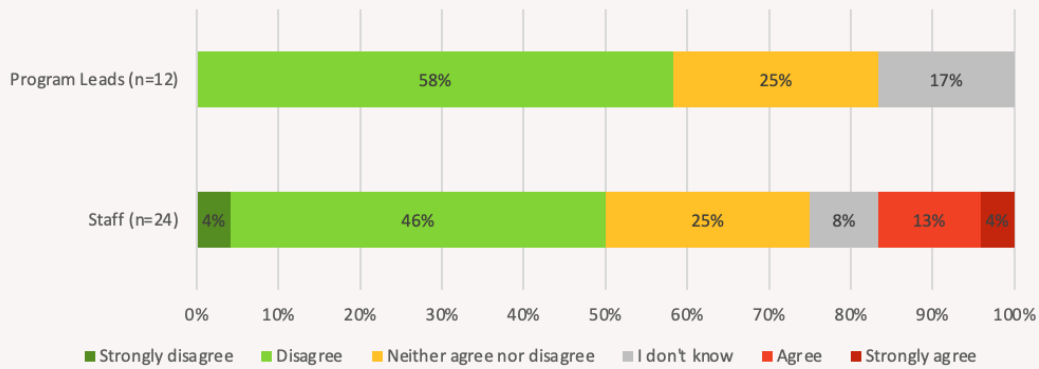
These logistic constraints were amplified in some provinces by shortages and/or delays in TB medicine delivery. A third of TB program leads and 28% of TB staff reported significant delays in the delivery of TB medication during COVID-19 (**Figure 6**). Many of the remote Indigenous and northern communities were unable to access treatment due to restrictions in flights transporting goods and medication: ***“[Delayed] TB medication deliveries to remote northern communities during lockdowns when numbers of flights into communities were significantly decreased”*** (TB program lead). One person affected by TB (of the six surveyed) stated that it was difficult for them to access their medications during the COVID-19 pandemic. Additional responses regarding quality of care for TB during the pandemic are shown in **Box 4**.

Figure 6. TB program lead and staff responses to likert questions relating to quality of TB care during the COVID-19 pandemic.

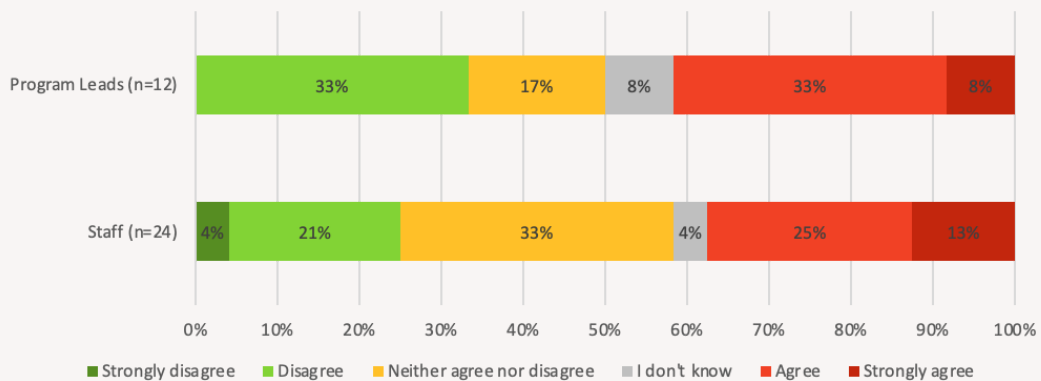
There has been a significant increase in **shortages and/or delays in the delivery of TB medicines** during the COVID-19 pandemic/lockdown



The number of people [diagnosed] with TB **receiving TB treatment** has significantly decreased during the COVID-19 pandemic



Quality of care for those affected by TB has significantly reduced during the COVID-19 pandemic



Box 4. Additional experiences of Canadian TB program leads and staff regarding quality of TB care during the COVID-19 pandemic

"I certainly have felt very ineffective and helpless as a TB nurse clinician throughout the past year. I have also seen some of the worst cases of active TB during the pandemic, which is distressing. Oftentimes I coordinate care with First Nation partners and within some of the communities hit hard by COVID, TB care definitely suffered, and I can only do so much from a distance."

~ TB Staff

"I think we have worked extremely hard to ensure that the quality of care provided is equal to that provided pre-pandemic, just in a modified format."

~ TB Program Lead

3.2.6 MANAGEMENT OF LATENT TB INFECTION (LTBI)

In low TB incidence settings, such as Canada, most active TB cases are due to the [re-activation of latent TB infection](#) (LTBI). Thus, preventing the progression of LTBI to active TB is an essential component of TB elimination efforts in Canada. [Efficient LTBI screening and treatment strategies](#) are central to LTBI management particularly in high-incidence communities in otherwise low-burden countries.

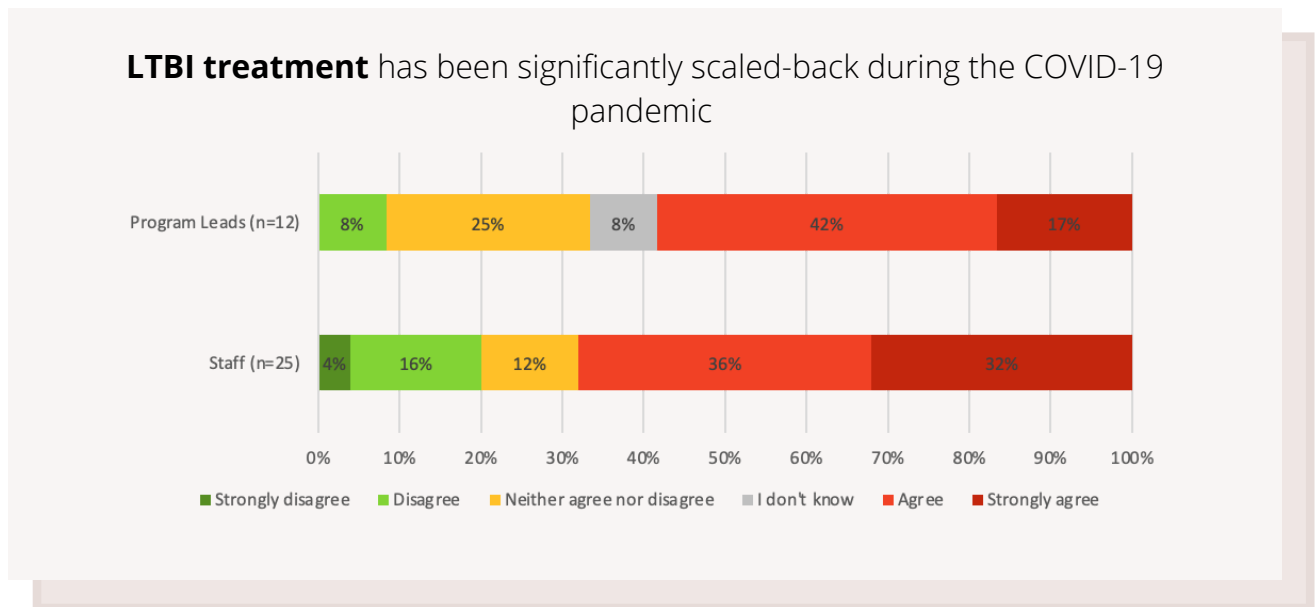
Unfortunately, based on survey responses, LTBI care was deprioritized in the majority of provinces throughout the pandemic. Nearly 60% of TB program leads and 68% of TB staff reported that LTBI treatment was significantly scaled-back during the COVID-19 pandemic (**Figure 7**). A TB program lead quantified the drop in LTBI treatment initiations between 2019 and 2020: **"Based on pharmacy dispensing data, LTBI treatment starts in [city] decreased by 62% from 2019 to 2020, and in [region] First Nations communities, LTBI treatment starts decreased by 33%."** Additional responses regarding disruptions in LTBI management during the pandemic are shown in **Box 5**.

Reasons for this decline in LTBI management varied across respondents. Disruptions to rifapentine supply chains, lack of human resources, and deprioritization of LTBI as a less urgent medical service were all cited. A program lead noted that the decrease was primarily attributed to the decline in referrals, but among people who were referred, there were no delays in LTBI treatment initiation.

While people with LTBI are not at an immediate risk of poor health outcomes and do not transmit the disease, they may develop active TB, and the continued burden of latent TB threatens progress towards achieving TB elimination in Canada. It is therefore essential that LTBI screening, prophylaxis supply chains, and contact tracing initiatives receive the necessary support and funding to identify and treat individuals with LTBI who are considered at high risk of progression to active TB disease.

Although the staff and program lead surveys also included a question regarding the supply of Bacille Calmette-Guérin (BCG) vaccine during the COVID-19 pandemic, many respondents noted this was not applicable to their setting, as BCG continues to be administered only in [some high TB incidence communities in Canada](#) (responses to this question are included in **Appendix Figures A1-A2**).

Figure 7. TB program lead and staff responses to the following likert question relating to LTBI treatment during the COVID-19 pandemic.



Box 5. Additional experiences of Canadian TB program leads and staff regarding LTBI treatment initiation during the COVID-19 pandemic

"TB elimination projects have completely stalled over the past 15 months due to COVID-19 reallocation of resources and people. Public Health Units have not been able to start people on LTBI prophylaxis because of lack of resources. TSTs are not being done unless 'urgent' because of the same reasons."

~ TB Program Lead

"Lack of access to rifapentine contributed to large declines in LTBI treatment starts."

~ TB Program Lead

"The initial shutdown during Covid put LTBI on the backburner for a few months but we were able to provide LTBI [treatment] to those folks once the public health measures lightened."

~ TB Staff

"LTBI treatment [was] practically suspended across the board during COVID pandemic, mostly due to redeployment of staff."

~ TB Staff

3.2.7 ACTIVE CASE FINDING AND CONTACT TRACING

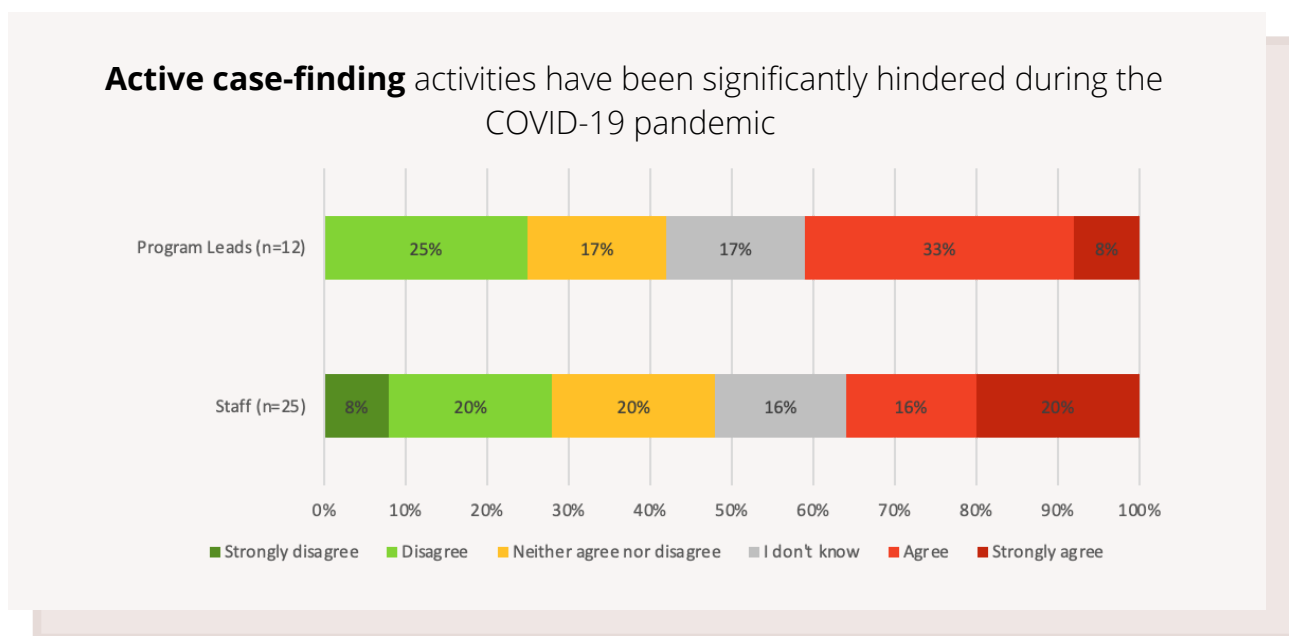
The impact of COVID-19 on active case-finding (ACF) and contact tracing activities differed across provinces. In some provinces, TB staff and program leads reported that ACF and contact tracing activities continued during the pandemic, while those in other provinces noted that they were completely put on hold. 41% of TB program leads and 36% of TB staff reported that ACF activities were significantly hindered during the pandemic (**Figure 8**), while 58% of TB program leads and 56% TB staff reported that contact tracing activities were significantly hindered (**Figure 9**).

Building on years of experience in contact tracing, TB staff were redeployed towards COVID-19 contact tracing, placing strain on human resource capacity. As COVID-19 outbreaks occurred throughout the country, COVID-19 became a priority: **"Most contact tracing resources [are] going to COVID"** (TB staff). TB ACF and contact tracing were further complicated by the strict social distancing measures put in place, often preventing staff from interacting with people with TB and their contacts: **"In attempting to limit exposure, we have reduced the number of face to face visits with our patients which likely hampered the number of contacts we obtained"** (TB staff). Other times, TB contacts were not reaching the health facility for follow-up investigation out of fear of contracting COVID-19: **"Some contacts decline investigation because of fear of hospitals and [lab] facilities and possible COVID exposure"** (TB program lead). Because of the decreased capacity for ACF, a program lead noted that this had been largely scaled back to passive case-finding (**Box 6**).

Despite this disruption, respondents noted that the COVID-19 pandemic has had a positive impact on people’s understanding of ACF and contact tracing for TB: **“people now seem to understand isolation and contact tracing better”** (TB staff). Additional responses regarding ACF and contact tracing are shown in **Boxes 6 and 7**.

[Targeted campaigns for identifying active TB and LTBI in Canada](#) have been successful in high-incidence communities. Relying on passive case-finding therefore comes at the risk of missing affected people, delaying diagnoses and increasing community transmission. ACF and contact tracing initiatives for TB must therefore be reinstated as soon as possible. COVID-19 has paved the way to make these activities more socially acceptable and has driven investment in systems to facilitate their implementation. TB programs in Canada should leverage these resources and systems to strengthen TB case-finding and control transmission.

Figure 8. TB program lead and staff responses to the following likert question relating to active case-finding during the COVID-19 pandemic.

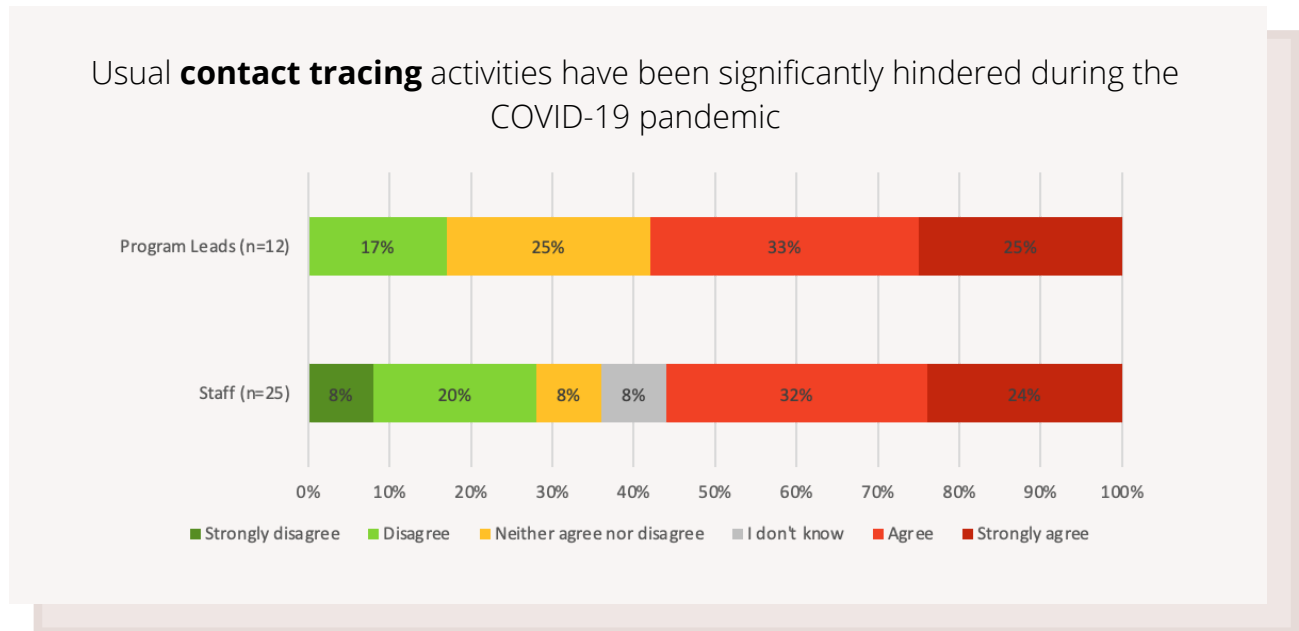


Box 6. Additional experiences of Canadian TB program leads and staff regarding active case-finding during the COVID-19 pandemic

“We remain understaffed since 75% of our TB staff continue to be deployed to [the] COVID-19 response team, thus active case finding activities have been significantly affected.”
~ TB Staff

“Very much scaled back to passive case finding.”
~ TB Program lead
“We are no longer doing ACF.”
~ TB program lead

Figure 9. TB program lead and staff responses to the following likert question relating to contact tracing activities during the COVID-19 pandemic.



Box 7. Additional experiences of Canadian TB program leads and staff regarding contact tracing activities during the COVID-19 pandemic

"No issues with contact tracing activities, but just noted significant decrease in number of close contacts, mostly due to lock downs."

~ TB Staff

"...Onsite screening and contact follow-up clinics at schools or workplaces are currently suspended."

~ TB Staff

"In some communities, staffing has been a massive problem. This delays contact investigation activities and [there have been] some instances where TSTs and screening has been delayed by months."

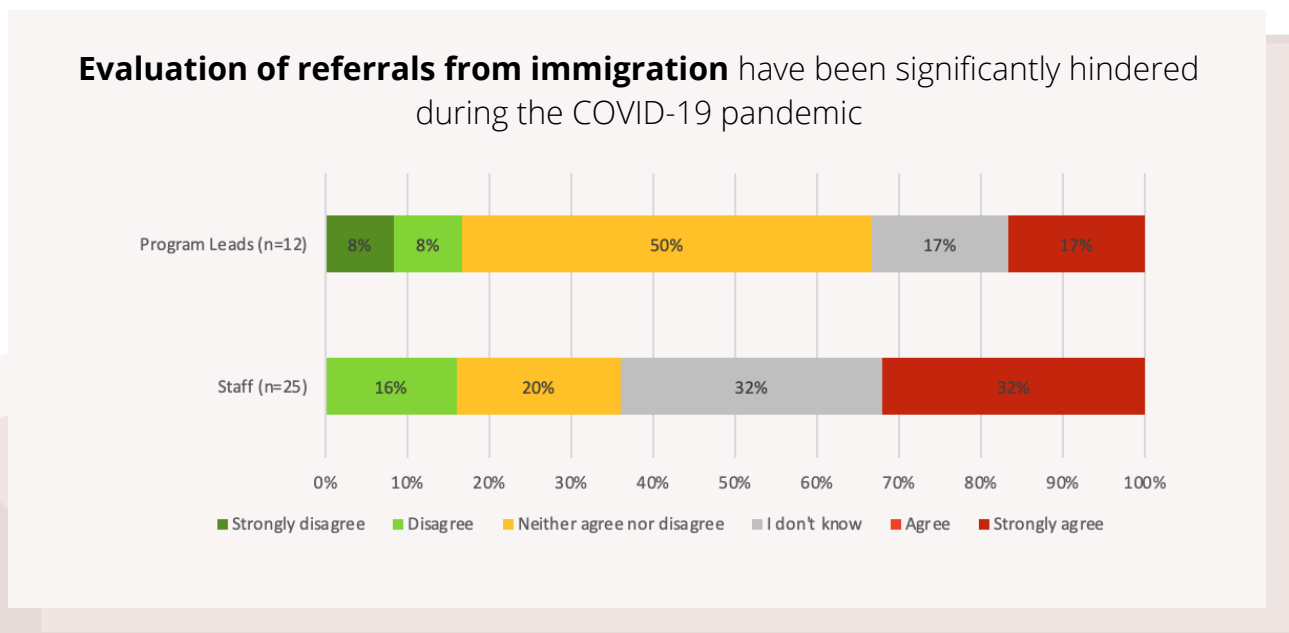
~ TB Staff

3.2.8 EVALUATION OF REFERRALS FROM IMMIGRATION, REFUGEES AND CITIZENSHIP CANADA (IRCC)

Given that newcomer communities bear a [large proportion of the burden of TB in Canada](#), evaluation of referrals from Immigration, Refugees and Citizenship Canada (IRCC) are an important component of TB control in the country. 17% of program leads and 32% of TB staff agreed that evaluation of these referrals was significantly hindered during the pandemic (**Figure 10**), with one respondent noting; **“Currently, we are only able to manage/ process urgent/high risk referrals”** (TB staff), which was echoed by a program lead. Another TB staff member, however, reported continuation of follow-up of those referred from immigration. It was noted by a program lead that fewer IRCC referrals are coming in, but that it is unclear if this is due to the pandemic. It is clear however that travel restrictions imposed due to COVID-19 drastically reduced immigration, with only about [one third the number of newcomers arriving in Canada](#) in the second quarter of 2020, compared to the same period in 2019, so this may in part explain the lower number of referrals.

TB staff in other provinces mentioned that they were unable to comment on this as the community in which they work generally sees low levels of immigration (even prior to COVID-19), likely accounting for the high proportion of *“neither agree nor disagree”* / *“I don't know”* responses. Concerningly, however, one program lead from a major newcomer-accepting province stated that evaluation of referrals from immigration is one of their **“greatest backlogs.”** This suggests potential delays in care for newcomer communities, who already face other significant barriers to healthcare access.

Figure 10. TB program lead and staff responses to the following likert question relating to the evaluation of referrals from immigration during the COVID-19 pandemic.



3.3 LEVERAGING LESSONS LEARNED FROM COVID-19 TO IMPROVE TB CARE

Although the COVID-19 pandemic has presented significant challenges for TB care and set back progress on eliminating TB globally and in Canada, it has also provided [valuable lessons](#) for improving TB surveillance and care. This includes [leveraging COVID-19 tools and systems](#) to strengthen the TB response (for example, implementing [integrated testing](#) for COVID-19 and TB, and making timely TB data available). With this in mind, the following sections discuss how Canadian TB programs have adapted to the COVID-19 pandemic, what resources they feel are needed to continue providing quality TB care during the pandemic, and which opportunities or lessons learned from COVID-19 can be leveraged to improve TB care.

3.3.1 HOW TB PROGRAMS HAVE ADAPTED TO THE COVID-19 PANDEMIC

Many respondents mentioned the shift to virtual care as one of the main ways their TB program adapted to providing services during the pandemic, with in-person care often being provided only to high-risk patients: ***“We have had to significantly prioritize TB Program work to active cases and high-risk contacts. We have moved to virtual care...and only provide essential in person care to high-risk clients...”*** (TB program lead). It is important to note however, that without an in-person evaluation, it may be challenging to adequately identify those at high-risk, underlining a further limitation of virtual care, in addition to those mentioned previously (limited applicability in remote settings with low internet connectivity, and reduced quality of care, particularly for patients with language barriers).

In addition, respondents mentioned having to advocate for TB to remain a priority, as well as advocating for staff to remain available for TB work amidst diversions to COVID-19-related tasks. As one TB program lead noted, ***“...[it is] very stressful trying to keep TB a priority to the 'decision makers' in the organization so we don't get pulled into COVID. Constantly advocating for this.”*** In response to these staff diversions, some programs have trained additional staff to take over TB work (**Box 8**).

Unfortunately, TB program leads also reported that adapting to the circumstances required halting or scaling back work on non-urgent, but still important, initiatives and tasks, such as progressing on ongoing TB elimination projects, holding educational sessions about TB, and updating manuals. As one program lead states, ***“...The biggest loss has been losing momentum on any LTBI/TB elimination work that was scheduled to be completed. [A TB elimination project with the Public Health Agency of Canada, Inuit Tapiriit Kanatami and the Government of the Northwest Territories] has fallen to one [person] who...has had no support from the TB program because of COVID-19 priorities. Tons of TB priorities have [been put on the] back burner, including education, updating of manuals, policies, etc.”***

On a positive note, however, some respondents also noted that the challenges associated with providing TB care during the pandemic resulted in increased collaboration between programs and organizations. For example, a program lead stated ***“[We] have established a working group with FNIHB to ensure ongoing problem solving between the Winnipeg TB support team and TB staff in remote communities.”*** This indicates that the need to operate more efficiently with limited staff and resources during the pandemic has pushed programs to find ways to work more closely together. Hopefully, these ties will serve to strengthen TB programs even beyond the pandemic.

Lastly, a program lead mentioned that their TB program had adapted by offering more support to those affected by TB, including cell phones for virtual care, food, and other supports (**Box 8**). [Making TB care more person-centered](#) and comprehensive facilitates better treatment outcomes, including addressing not just the disease itself but also other health needs such as food security, safe housing and mental health supports. If we are to recover from COVID-19-related setbacks on ending TB, turning adaptations like this into a lasting feature of TB care is critical.

Box 8. Additional ways in which Canadian TB program leads adapted their programs to be able to continue to deliver TB services during the COVID-19 pandemic.



Task decentralization:

“We have advocated for additional dedicated TB nurses in communities with TB cluster[s]. To lower workload for the nurses, we have started training DOT workers for the provision of DOT to patients on TB medications.”

~ TB program lead



Staff cross-training:

“[We] undertook cross-training of staff within [the] TB program to oversee different areas with limited staff ([the] majority were deployed to COVID response).”

~ TB program lead



Inter-organizational collaboration:

“High level of cross organization[al] collaboration.”

~ TB program lead



Prioritization:

“...Focus on the priorities i.e case and contact tracing, etc. and less on tasks that are important but [for which there is] no time...really scaled back work [for World] TB Day to a poster - [we] usually do a big in-person education session...”

~ TB program lead



Patient-centered care:

“Provision of a higher level of...support for clients, including cell phone[s] with internet [connection] as well as food and other basic needs support...”

~ TB program lead

3.3.2 RESOURCE NEEDS AND OPPORTUNITIES FOR PROVIDING QUALITY TB CARE DURING AND AFTER THE PANDEMIC

As mentioned above, the COVID-19 pandemic has provided an opportunity to re-imagine TB service delivery. **Table 1** shows TB program lead and staff perspectives on the resources that are needed to continue to provide quality TB care during the pandemic, as well as the opportunities they see for learning from COVID-19 to improve TB care.

In terms of resource needs, respondents mentioned a need for greater implementation of technologies, including electronic charting and telemedicine. Other concerns raised include the need to inform the public to continue to seek care for non-COVID-19 health concerns during the pandemic, and increasing awareness of TB. In addition, respondents called for an Indigenous-led TB response.

Organizational shortcomings and staffing needs were also highlighted, including the need for adequate staff to respond to both TB and COVID-19, particularly in First Nations communities, and, at the organizational level, more oversight of provincial TB programs. This lack of oversight of provincial programs is also related to the longstanding concern of the unavailability of timely national TB data in Canada. [Updated data are critical](#) if we are to progress towards eliminating TB in the country, and in particular, mitigate the disruptive impacts of COVID-19 on TB control.

Lastly, TB staff and program leads also called for more funding for TB, not only for TB service delivery itself, but for providing increased non-medical support (food and clean water, housing and income support) to those affected by TB. This was echoed by one of the respondents affected by TB, who stated that they would have liked to have more financial support during their journey with TB.

In terms of lessons learned or opportunities identified to leverage the COVID-19 response to improve TB care, respondents mentioned that the pandemic had opened avenues to integrate different approaches to care, including offering more virtual care (although, as discussed in previous sections, this may not be appropriate for all patients or communities). In addition, respondents hoped that the Indigenous-led COVID-19 response could be learned from to shape an Indigenous-led TB response.

Respondents also stated that the contact tracing management systems used for COVID-19 could be applied to TB for greater efficiency. Although not mentioned by respondents, integrated TB and COVID-19 testing could also be considered, particularly in communities with high TB incidence.

A further main take-away from the pandemic has been the fact that it has made clearer than ever the importance of social determinants of health. As a result, respondents hope for the implementation of measures to protect vulnerable populations, such as increasing accessibility of health services regardless of provincial insurance coverage.

Table 1: TB program leads' and staff perspectives of resource needs and opportunities for providing quality TB care during and after the COVID-19 pandemic

Solutions / resources needed to continue provision of quality TB care and mitigate impacts of COVID-19:	Opportunities to leverage the COVID-19 pandemic (lessons learned, systems, tools) to improve TB Care:
<p>Access to and use of tools/systems:</p> <ul style="list-style-type: none"> • Electronic charting • Better access to asynchronous DOT • Access to IGRA • Telemedicine <p>Outreach:</p> <ul style="list-style-type: none"> • Expanding outreach TB services • Indigenous-led TB response <p>Organization:</p> <ul style="list-style-type: none"> • Better oversight of provincial TB activities • Reconstitute the TB advisory group to PHAC • Increased staff for both COVID and TB in First Nation communities. <p>Education:</p> <ul style="list-style-type: none"> • Public awareness to continue to seek care for non-COVID concerns, especially among risk groups • Educational modules on COVID and TB <p>Data:</p> <ul style="list-style-type: none"> • Prompt and comprehensive TB data from the federal government <p>Funding:</p> <ul style="list-style-type: none"> • Dedicated funding to TB • Increased funding for non-medical support to those affected by TB (food, housing, clean water, employment support during isolation) 	<p><u>Tools/systems to leverage:</u></p> <ul style="list-style-type: none"> • Electronic charting • Integration of virtual care into routine care <p><u>Lessons learned:</u></p> <p>Social determinants of health:</p> <ul style="list-style-type: none"> • Reminder that pandemics disproportionately affect vulnerable groups • Expansion of provision of healthcare services to everyone, regardless of whether they hold a provincial health card. • Elimination of the waiting period for newcomers to be eligible for provincial healthcare coverage <p>Approaches to care:</p> <ul style="list-style-type: none"> • Patient-centered care • Flexibility and creativity in providing care in remote communities • Transition Indigenous-led COVID response into Indigenous-led TB response <p>Organization:</p> <ul style="list-style-type: none"> • More efficient contact tracing <p>Awareness:</p> <ul style="list-style-type: none"> • Public awareness of infectious disease transmission and infection control

3.4 QUANTITATIVE FINDINGS:

3.4.1: ACTIVE TB CASE NOTIFICATIONS IN 2019 VS. 2020

It is difficult to conclude whether case notifications significantly decreased during the COVID-19 pandemic compared to prior to the pandemic (i.e., 2019 vs. 2020 onwards), as few provincial/territorial programs had case notification data available for these years (again underlining the urgent need for timely and accessible reporting of TB data across Canada), or their epidemiology teams were unable to dedicate time to sharing this data given the ongoing COVID-19 response. **Figure 11.** shows monthly case notifications for 2019 and 2020 in the Northwest Territories (NT), British Columbia (BC) (preliminary/as of time of reporting), and Saskatchewan (SK). Monthly counts were not available for the remaining provinces/territories, although annual counts were available for Ontario, Manitoba and Nunatsiavut (in addition to NT, BC and SK), and are shown in **Table 2.** Considering the significant reduction in diagnostic capacity for TB during the pandemic, these data suggest a significant number of undiagnosed TB cases in Canada, although further data are needed to ascertain this.

Figure 11. Monthly incident active TB cases in the Northwest Territories, British Columbia, and Saskatchewan, 2019 and 2020

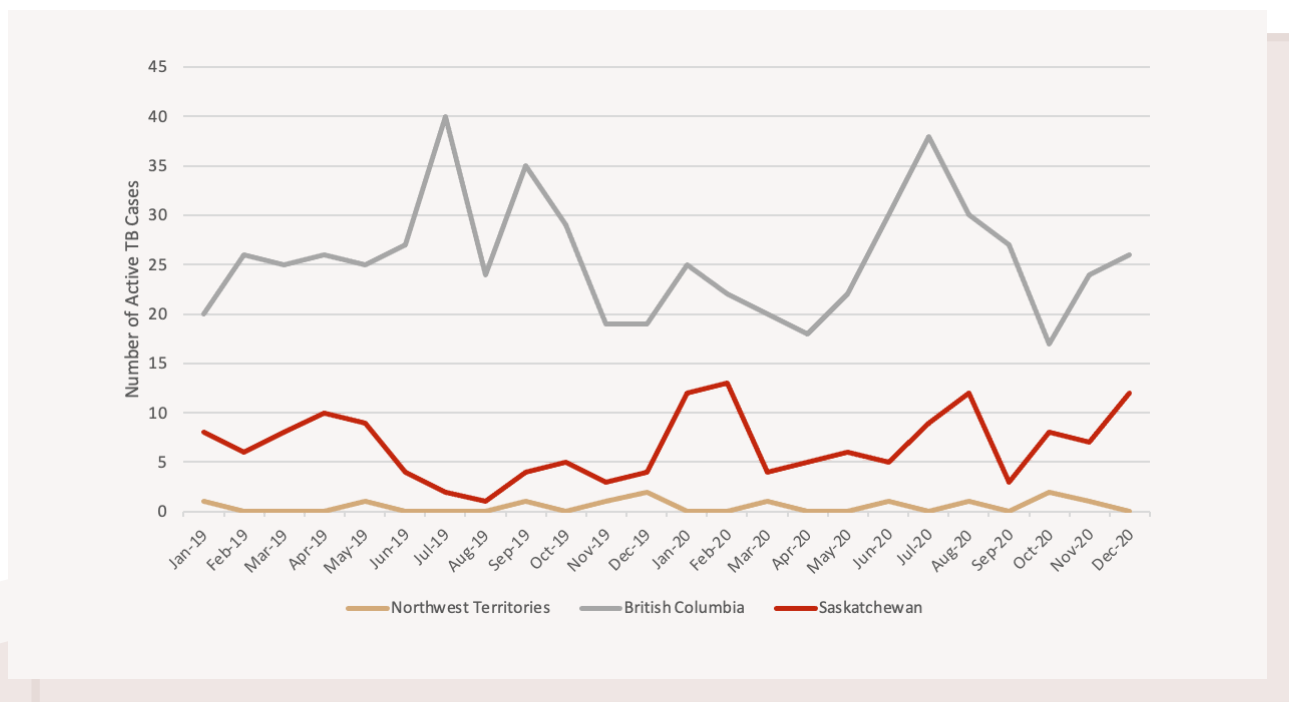


Table 2. Annual incident active TB cases in Canadian provinces and territories (2019-2020)

Province/Territory/ Region	Incident active TB cases, 2019	Incident active TB cases, 2020
Northwest Territories	6	6
British Columbia	315	299
Saskatchewan	64	96
Nunatsiavut	5	6
Manitoba	186	161
Ontario	746	678

Data on culture confirmation and smear status of cases was also collected, as well as the number of COVID-19 and TB co-infections, but few programs were able to provide these data (**Table 3**). Concerningly, while only 1 case of disseminated TB (TB that has spread to at least two non-contiguous areas of the body, often resulting in [particularly poor outcomes](#), especially if diagnosis or treatment are delayed) was reported for Saskatchewan in 2019, 10 were reported in 2020. Manitoba was the only province to provide data on TB and COVID-19 co-infection (defined as being diagnosed with both TB and COVID-19 within one month of each other), reporting 16 cases in 2020. Stratification by new vs. relapse cases was available only for Saskatchewan, which reported 61 new and 3 relapse cases in 2019, and 92 new and 4 relapse cases in 2020.

Table 3. Annual incident cases by disease site, smear status & COVID-19 co-infection

	2019						2020						N COVID-19 & TB co-infections ^c
	N PTB	N EPTB	N diss.	N C+	Of C+, N S+	Of C+, N S-	N PTB	N EPTB	N diss.	N C+	Of C+, N S+	Of C+, N S-	
BC	247 ^a	66 ^a	-	-	-	-	232 ^b	49 ^b	-	-	-	-	-
SK	46	17	1	49	20	29	63	34	10	70	30	69	-
Nsvt	5	0	-	3	-	-	6	0	-	3	-	-	-
MB	153	33	-	143	46	75	122	39	-	115	34	55	16

a: Sum of extra-pulmonary and pulmonary cases differs from total shown in Table 2 as 2 cases were categorized as N/A for disease site.
 b: Sum of extra-pulmonary and pulmonary cases differs from total shown in Table 2 as 18 cases were categorized as N/A for disease site.
 c: TB & COVID-19 diagnoses within 1 month of each other. - : Not reported. PTB: Pulmonary TB. EPTB: Extra-pulmonary TB.
 diss.: Disseminated TB. C+: Culture-positive. S+/S-: Smear-positive/negative. BC: British Columbia. SK: Saskatchewan. Nsvt: Nunatsiavut.
 MB: Manitoba. N: number of cases.

3.4.2: MODE OF DELIVERY OF DIRECTLY OBSERVED THERAPY (DOT) 2019 VS. 2020

Estimated counts for the number of patients receiving directly observed therapy (DOT) virtually and in person in 2019 and 2020 were provided only for Manitoba, with 164 patients receiving DOT in person and none virtually in 2019, while 89 received it in person in 2020, and 56 received virtual DOT. The breakdown of virtual compared to in-person DOT delivery was described qualitatively for Saskatchewan, with the respondent reporting that a 'minority' received DOT virtually in 2019, and this rose to about 25% of patients receiving virtual DOT in 2020. These reports align with the qualitative findings in section 3.2 regarding the substantial shift to virtual care during the pandemic.

3.4.3: MANAGEMENT OF LATENT TB INFECTION (LTBI)

Data on the management of latent TB infection (LTBI) were generally not available in the format requested in the survey (number of close contacts vs. other contacts of culture-confirmed, smear-positive pulmonary cases aged >14 years, and of those, the number that started preventive therapy), however, some programs provided additional data in other formats. For example, data provided by the British Columbia program stated there were a total of 766 LTBI treatment initiations in 2019, compared to 626 in 2020. In Nunatsiavut, 23 and 5 people completed LTBI treatment in 2019 and 2020, respectively. Provincial data for Ontario show 7,285 cases of LTBI in 2019, and 4,027 in 2020. Only Manitoba provided data on contacts, reporting 700 close contacts and 864 other contacts in 2019, and 568 and 382 close and other contacts, respectively, in 2020, but the number of people started on preventive therapy was not available.

No programs were able to provide data on the number of referrals from Immigration and Citizenship Canada (IRCC) and the number of those who were subsequently started on LTBI treatment.

3.4.4 SCARCITY OF DATA

The scarcity of data and the lack of standardized reporting made evident by this report underlines the urgent need for [consistent and timely national TB data](#) to be made available in Canada. This is not only crucial to tracking progress towards TB elimination, but also for evaluating and addressing the impact of COVID-19 on Canadian TB services.

3.5 IMPLEMENTATION OF THE TUBERCULIN SKIN TEST (TST) AND INTERFERON-GAMMA RELEASE ASSAYS (IGRAS) IN THE CONTEXT OF COVID-19 VACCINATION:

As there is [not yet conclusive evidence](#) for whether COVID-19 vaccination may affect TST or IGRA results, program leads were asked which of the following measures were being taken in their programs with respect to the implementation of TST/IGRA in the context of COVID-19 vaccination:

1. If COVID-19 vaccine has already been administered, delaying TST/IGRA testing for a period of 4 weeks after 2nd dose of COVID-19 vaccine.
2. If COVID-19 vaccine has already been administered, but a period of 4 weeks has not elapsed, proceeding with a TST or IGRA if indicated and if patients accepts; if result is negative repeat the test after 4 weeks have elapsed.

Results are shown in **Table 4**. Most programs noted delaying TST/IGRA for 4 weeks after the 2nd COVID-19 vaccine dose, although the program lead from British Columbia underlined that delaying was only considered in low-risk individuals (e.g. not in contacts of active TB cases). It should be noted that the guidelines for TST/IGRA testing in the context of COVID-19 vaccination were only made available after the Nunatsiavut program had already completed their community vaccination campaigns, highlighting that such information should in future be made available earlier to the relevant communities, where possible.

Table 4. Measures taken in Canadian TB programs regarding interpretation of TST/IGRA in the context of COVID-19 vaccination

	If COVID-19 vaccine has already been administered, delaying TST/IGRA testing for a period of 4 weeks after 2nd dose of COVID-19 vaccine	If COVID-19 vaccine has already been administered, but a period of 4 weeks has not elapsed, proceeding with a TST or IGRA if indicated and if patients accepts; if result is negative repeat the test after 4 weeks have elapsed.
Northwest Territories	✓	✓
Manitoba	✓	
British Columbia	a	
Ontario ^b	✓	
Atlantic	✓	✓
Alberta	✓	
Saskatchewan		✓
Nunatsiavut	c	

a: Delaying TST/IGRA was considered only if the individual to be tested is at low risk (for example, not a contact of an active TB case), and LTBI testing was not delayed in individuals that need testing.

b: Except the Ontario Region First Nations and Inuit Health Branch (FNIHB), which reported both measures being taken.

c: Information regarding measures to take with respect to LTBI testing in the context of COVID-19 vaccination only became available after the community vaccination campaigns in the area had been completed.

4. CONCLUSION

This report provides some insight into the experiences of Canadian TB program leads, staff, and, to a limited degree, people affected by TB, regarding TB care and services during the COVID-19 pandemic. The data collected support concerns regarding disruptions to Canadian TB services, and a potential increase in the burden of TB in Canada. It is important to note, however, that responses were received by only some provincial/territorial program leads (n=12) and staff (n=25), and the experiences of others are therefore not captured here. In addition, responses by those affected by TB were scarce (n=6), and our findings in this regard are limited as our survey is less likely to have reached patients in remote communities, and those experiencing greater barriers to healthcare access or language barriers, meaning that the results are not fully representative of the experience of those affected by TB in Canada.

Our findings indicate that one of the most significant impacts felt by TB programs has been the large diversion of TB staff towards COVID-19-related work, which has in turn resulted in a scale-back of important TB program activities, such as LTBI follow-up, contact tracing, and active case-finding. The scale of these disruptions points to an urgent need to address the backlog that this has created for the TB response, as well as the need for longer-term health systems strengthening to ensure that [critical work for other diseases can continue](#) during large-scale health crises.

As several respondents described deeply concerning cases where diagnostic delays had led to serious declines in health, and even mortality, it is imperative that the COVID-19 response is balanced with the ongoing need to provide timely care for other conditions. In particular, TB should not be deprioritized to the point that it fails to be adequately evaluated, especially in individuals who present with respiratory symptoms in high TB incidence communities. In addition, given the importance of LTBI management in order to achieve TB elimination in overall [low-incidence countries](#) such as Canada, the significant scale-back of LTBI treatment noted by most respondents threatens to jeopardize progress on ending TB in Canada.

Unfortunately, given the lack of updated national TB data in Canada, with the [latest report](#) providing data for 2017, we lack even the most basic information needed to assess and effectively respond to the disruptions COVID-19 has presented for TB care. The scarcity of the data presented in this report for 2019 and 2020 exemplifies this issue. Moreover, although data on case notifications are presented where available, outcome data (treatment success, death, etc) were not collected, as these were not yet available for 2020. Without recent data as the cornerstone of an effective public health response, we therefore [cannot measure progress](#) towards elimination milestones, nor by how much the pandemic has set back this progress. The Canadian government has [committed to ending TB across Inuit Nunangat by 2030](#) (with at least a 50% reduction in active cases by 2025). This commitment seems disingenuous if we are not at the very least measuring our progress towards the targets, allowing for accountability. Appropriate TB surveillance and data management should therefore be an urgent priority for the agencies who have both the mandate and funding to do so, rather than being left to a voluntary civil society accountability effort.

Lastly, although COVID-19 represents devastating set-backs for TB elimination globally, valuable [lessons can be drawn from it and applied to the Canadian TB response](#). Respondents to our surveys were at no loss for ideas regarding ways in which the COVID-19 response could be leveraged or learned from to improve TB care, from providing more flexible modes of care to people affected by TB (such as virtual care, where deemed suitable by the individual or community), to building stronger organizational collaborations to more efficiently provide TB services at limited capacity during the pandemic. Furthermore, respondents stated that the pandemic had once more brought to the forefront the importance of the social determinants of health in creating conditions that directly shape vulnerability to disease. This understanding should be leveraged to provide impetus to finally address the [longstanding inequities in health](#) that allow TB to persist in Canada today.

5. APPENDIX

A summary of all likert responses are shown in **Figures A1** (program leads) and **A2** (program staff). Some differences are noted between program lead and staff responses, which may in part be due to program leads having more oversight regarding capacity and services at the program-level (e.g. trends in case notifications or TB staff diversions to COVID-19 work), whilst staff may have more detailed insight on patient-level impacts of the pandemic on TB services (e.g. impacts on quality of care or scale-back of LTBI treatment).

Figure A1. Canadian TB program leads' experiences of TB service disruptions during the COVID-19 pandemic (n=12)

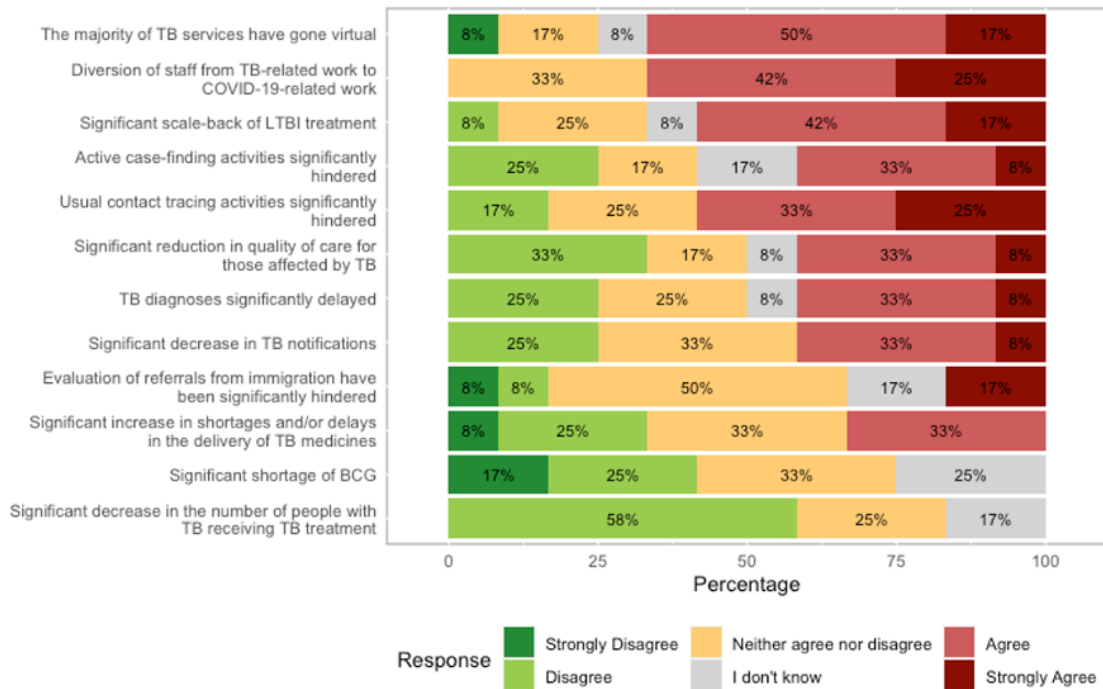


Figure **A2**. Canadian TB staff experiences of TB service disruptions during the COVID-19 pandemic

