National Collaborating Centre for Infectious Diseases
Centre de collaboration nationale des maladies infectieuses

National Collaborating Centre for Indigenous Health
Centre de collaboration nationale de la santé autochtone

Towards TB Elimination: Shared Priorities for TB Program Performance Measurement in Canada

A Proposal for Discussion

June 2019

PREPARED BY:

Margaret Haworth-Brockman MSc
Shivoan Balakumar MSc
Breanne Head PhD(c)
Yoav Keynan PhD

Towards TB Elimination: Shared Priorities for TB Program Performance Measurement in Canada

A Proposal for Discussion

June 2019

National Collaborating Centre for Infectious Diseases

In partnership with

National Collaborating Centre for Indigenous Health

Contact us at:

National Collaborating Centre for Infectious Diseases
Rady Faculty of Health Sciences,
University of Manitoba
Tel: (204) 318-2591
Email: nccid@umanitoba.ca
www.nccid.ca

This is NCCID Project number 453.

ISBN: 978-1-927988-63-3

This document is for dissemination and discussion purposes. We welcome your comments and suggestions. The document is available in English only. A translation may be provided upon request.

Production of this document has been made possible through a financial contribution from the Public Health Agency of Canada through funding for the National Collaborating Centre for Infectious Diseases. The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

Table of Contents

Executive Summary i

Introduction 1

Part 1. TB Program Performance Indicators 2

International Context 2

Canada's Context 3

Health and Program Indicators 3

Part 2. Review of Potential TB Program Indicator Sets 5

Part 3. Proposal for TB Program Performance Measurement in Canada 9

A. Shared Key Performance Indicator Priorities 9

B. Additional Performance Indicator Priorities for First Nations Populations 15

C. Additional Performance Indicator Priorities for Inuit Communities 22

D. Additional Performance Indicator Priorities for Urban and Foreign-Born Populations 29

Part 4. Moving Forward 36

Collecting, Reporting and Presenting Data 36

Conclusion 37

References 38

Appendix: Meeting Worksheet: Aggregated indicators discussed at the November 2018 meeting

Supplemental Table — Complete List of Documents and Indicators from Low Incidence Countries Reviewed: https://bit.ly/2Ytb4IS

Executive Summary

Introduction

Canada's 2018 commitments to eliminating tuberculosis (TB) bring focus to a disease that has long required collaboration and coherence to effectively address its Indigenous and other determinants. Among points emphasized in recent discussions is the need for commonality in measuring Canada's progress to TB elimination. A strong system of program monitoring and performance measurement, in addition to established surveillance, is considered an essential component of any local or national strategy for TB elimination. Local and community circumstances, including explicit recognition of Indigenous and other structural determinants, are understood to be essential to the process of defining program performance indicators for TB.

As part of its ongoing commitment towards TB elimination, NCCID began a suite of activities in 2017-18 to support TB program performance indicator development in Canada. In November of 2018, NCCID, in partnership with the National Collaborating Centre for Indigenous Health,[1] convened a meeting of TB program representatives to undertake a conversation on performance indicator priorities in Canada.

Attendees identified potential TB program performance indicators for collaborative development based on their respective experiences and knowledge on program performance measurement, as well as TB elimination priorities in Inuit, First Nations, and urban dwelling and foreign-born populations in Canada. **We recognize that this leaves a critical gap for Métis communities, and does not provide adequate representation for all sub-population communities**. The meeting provided a space for TB programs in Canada to communicate their respective performance measurement priorities, and determine where there may be indicators of shared interest that could be applied and tracked across programs.

This document presents the results of this meeting. It proposes specific areas for collaborative TB program indicator development, based on shared performance measurement priorities identified by TB program and surveillance representatives from high-burden areas in Canada. This report can be used as a resource to support TB program performance indicator development across programs. Its results should be shared and discussed by public health personnel, federal, provincial and territorial decision-makers, and others involved in planning and delivering TB programs in Canada.

The document has four parts. Part 1 is a review of performance indicators and what they are intended to achieve. Part 2 describes the methods used to prepare for the November 2018 meeting on TB program performance indicators. Part 3 presents the results of the meeting discussions and proposes priorities for TB program performance measurement in Canada. The final section, Part 4, presents suggestions for reporting that can foster a cohesive and comprehensive view towards TB elimination.

[1] Previously known as National Collaborating Centre for Aboriginal Health

Part 1.

As recommended by the World Health Organization (WHO), health indicators (including health system performance indicators) should be developed in consultation with the communities using them, and should include measures reflecting their social, economic, and political context. The WHO *End TB Strategy,* the UN General Assembly political declaration on TB Elimination and the 2015 Sustainable Development Goals recommend comprehensive accountability and reporting frameworks that consistently dis-aggregate data by sex and by other determinants for effective monitoring and evaluation.

In keeping with international standards health indicators should meet six standard criteria. They should be: relevant, well-defined, reliable, technically feasible, and useable. Additionally, timely collecting, reporting and presenting of the indicators should be manageable.

A federated, decentralized system of surveillance, across 14 jurisdictions with varying legislation, reporting protocols, and public health capacity, creates the need for cross-jurisdictional collaboration to implement any cohesive new national surveillance and monitoring priorities. This document is the result of on-going desire from TB elimination stakeholders to find a way to develop consistent and comparable TB program performance indicators across jurisdictions.

Part 2.

From 2017 to 2018, NCCID undertook a review of Canadian and international TB programs, guidance documents, and surveillance reports to compile a resource to support TB program indicator development in Canada (see the Supplemental Table). In partnership with NCCIH, NCCID convened a meeting on TB program performance measurement in November 2018. Working in population-specific groups, the meeting participants reviewed and discussed an aggregated list of 105 potential TB program performance indicators, to determine which indicators were priorities for their programs and specific sub-populations. Participants also considered which indicators were meaningful to the communities they serve, as well as any gaps or missing indicators of interest. NCCID reviewed the lists of prioritized indicators and compared the points of discussion across population groups to identify shared priorities for indicator development. The results of this first conversation are presented in Part 3.

Part 3.

Participants at the November 2018 meeting agreed that the regular surveillance data collected and shared with the Public Health Agency of Canada are important and TB programs should continue to collect and monitor this information, including by regularly providing provincial and national-level data by sex for geographic location (rural/urban), and population group on cases and on treatment outcomes. Meeting participants therefore concentrated their recommendations on TB program performance indicators that are outside of this regular surveillance. The three population discussion

groups identified eight indicators in common as priorities for TB programs to develop across all three high burden populations.

Organized under the performance indicator domains of the meeting, the eight TB program performance indicators proposed for further development are presented in the table below. Beyond these eight shared indicator priorities, several additional population-specific priority indicators were identified for each of the three sub-population groups at the meeting. Decisions on sub-population priorities for measurement will require further engagement and discussion with member communities

Eight indicator priorities for TB program performance measurement in Canada, beyond regular surveillance, identified by participants at the November 2018 meeting.

Domain	Indicator
Lab Reporting	Cases - Genotyping
Case Management and Treatment	Cases - Timely Treatment Initiation
	Cases - Re-treatment/Relapse
Contacts	Contacts - High Priority Contact Examination
	Contacts - LTBI Identification
	Contacts - LTBI Treatment Initiation
	Contacts - LTBI Treatment Completion
Determinants	Indicator(s) of Housing Quality and/or Adequacy

Part 4.

Accomplishing successful TB elimination within Canada will require collaborative action between local and national jurisdictions, communities and ministries. All those involved in the development of this proposed list acknowledge that the indicator priorities identified herein will require further discussion and development to identify consistent definitions (numerators and denominators), as well as data collection, reporting, and response mechanisms. This proposal can inform ongoing performance indicator development initiatives in local programs, as well as across programs and jurisdictions.

There was consensus among participants at the Winnipeg meeting that to be meaningful, data reporting on diagnosis, treatment and treatment outcomes according to geographic location and specifically in high burden populations in Canada will help to inform public health actions. This recommendation for collecting, recording and presenting data by sex, age, geographic location, country or culture of origin, and other identifiers is aligned with recommendations by the WHO for TB measures and for all SDG indicators.

NCCID and NCCIH will continue to work with TB programs, our partners, and other stakeholders in 2019 to foster these discussions, with a goal to encourage consistent, comparable and actionable program performance indicators for TB elimination in Canada.

Introduction

Canada's commitments to eliminating tuberculosis (TB)(1,2) bring focus to a disease that has long required collaboration and coherence to effectively address its Indigenous and other determinants (3,4).

As part of on-going partnerships and discussions towards eliminating TB in Canada, there have been a number of recent policy documents and meetings to determine specific actions to be taken. The National Collaborating Centre for Infectious Diseases (NCCID) has supported some of these developments, fostering opportunities for knowledge translation and exchange for public health personnel, to ensure evidence and information are relevant and timely. The need for commonality in measuring Canada's progress to TB elimination has frequently been raised (5–7). A strong system of program monitoring and performance measurement is considered an essential component of any local or national strategy for TB elimination (8–10). As Heffernan and Long recommended in a 2018 manuscript, in order to eliminate TB in Canada, TB programs should develop and implement *key performance indicators*, beyond traditional surveillance, to better inform action both locally and nationally (11). **Local and community circumstances, including explicit recognition of Indigenous and other structural determinants, are understood to be essential to the process of defining program performance indicators for TB** (12–14).

As part of its ongoing commitment towards TB elimination, NCCID began a suite of activities in 2017-18 to support TB program performance indicator development in Canada. This began with a review of Canadian and international TB programs, and the creation of a reference document comparing performance indicators in use (or suggested for use) across these programs. In November of 2018, NCCID, in partnership with the National Collaborating Centre for Indigenous Health[2] (NCCIH), convened a meeting of TB program representatives to share their respective experiences with TB program performance measurement and to undertake a conversation on performance indicator

Recent Developments in Canada Towards TB Elimination

2012 –*Health Canada's Strategy against Tuberculosis for First Nations On-Reserve*

2014 –*Tuberculosis Prevention and Control in Canada: A Federal Framework for Action* (Public Health Agency of Canada)

2016, April – *Health Canada's Monitoring and Performance Framework for Tuberculosis Programs for First Nations On-Reserve*

2017, March –Towards Bold Innovations in the North (Manitoba meeting)

2017, Sept – Saskatchewan TB Partnership & NCCID Northern Meeting

2017, Oct – Inuit TB Elimination Meeting

2017, November – *Statement by Canada for the Moscow Declaration*

2018, Jan – Towards TB Elimination in Northern Indigenous Communities (national meeting)

2018, March – TB Deliberative Dialogue Meeting (Ottawa)

2018, March – *The Time is Now: CPHO Spotlight on: Eliminating Tuberculosis in Canada*

2018, Oct – UN General Assembly High Level Meeting on TB

2018, Nov – *Inuit Tuberculosis Elimination Framework* (Inuit Tapirit Kanatami)

2018, Nov – Aligning Key Program Performance Indicator Priorities for TB Elimination in Canada (national meeting)

[2] Previously known as National Collaborating Centre for Aboriginal Health

priorities. Attendees reviewed NCCID's indicator document in groups, and identified indicators of key importance based on their respective experiences and knowledge on Inuit, First Nations, urban dwelling, and foreign-born populations in Canada.

We recognize that this structure leaves a critical gap for Métis communities, and does not provide adequate representation for all sub-population communities. The meeting did however, provide a space for an initial conversation on TB program performance measurement priorities in Canada, and determine where there may be indicators of shared interest that could be applied and tracked across programs. ***This document presents the results of this meeting. It proposes specific areas for collaborative TB program indicator development, based on shared performance measurement priorities identified by TB program and surveillance representatives from high-burden areas in Canada. This report can be used as a resource to support TB program performance indicator development across programs. Its results should be shared and discussed by public health personnel, federal, provincial and territorial decision-makers, and others involved in planning and delivering TB programs in Canada*.**

The document has four parts. Part 1 is a review of program performance indicators and what they are intended to achieve. Part 2 describes the methods used to prepare for the November 2018 meeting on TB program performance indicators. Part 3 presents the results of the meeting discussions and proposes priorities for TB program performance measurement in Canada. The final section, Part 4, presents suggestions for reporting that can foster a cohesive and comprehensive view towards TB elimination.

Part 1. TB Program Performance Indicators

International Context

In anticipation of the United Nations 2015 Sustainable Development Goals (SDGs), and as the spectre of multidrug resistant TB cases looms, nation states and the World Health Organization (WHO) reinforced their emphasis on reducing and eliminating TB. The 2015 *End TB Strategy* (8) provides guidance for low and middle income countries, and the *Framework towards tuberculosis elimination in low-incidence countries* (*Framework*) is a companion document (15). In keeping with the *End TB Strategy*, targets for TB reduction are part of SDG Goal 3 (16).

The *Framework*, developed for low-incidence countries like Canada includes specific recommendations for surveillance and monitoring, especially for men and women with latent TB infections (LTBI):

> *"Special attention to TB rates in children, **disaggregation** according to risk profile and monitoring of people receiving LTBI treatment can also help determine trends in transmission and incidence for assessing impact and refining interventions.*
>
> *Fewer patients may make it more feasible to collect more variables … for studying risk factors and disease determinants. Due consideration should be given to **extending the range of variables** beyond those usually collected in TB surveillance*." ((15), page 40, emphasis added).

The WHO *Framework* recommends this can include demographic, clinical, geo-positioning, vital statistics and socioeconomic data (15), and similarly, the 2018 *Political Declaration of the UN General Assembly High Level Meeting on the Fight Against Tuberculosis* references the need for **multisector accountability frameworks** (17). Some countries and regions have incorporated this approach in their most recent TB reports, Australia and England being two examples (18,19).[3]

Canada's Context

Canada's Constitution sets out the powers of the federal, provincial and territorial governments, and is the basis for the organization for health care and public health systems in the country. The provincial and territorial governments have most of the responsibility for delivering healthcare and public health services to citizens and residents, providing medically necessary services, physician and hospital services, as well as a supporting infrastructure, including for public health (20). As noted on the Health Canada website, "The federal government's roles in health care include setting and administering national principles for the system under the Canada Health Act; financial support to the provinces and territories; and several other functions, including funding and/or delivery of primary and supplementary services to certain groups of people. These groups include: First Nations people living on reserves; Inuit; serving members of the Canadian Forces; eligible veterans; inmates in federal penitentiaries; and some groups of refugee claimants"(20).

Provinces and territories conduct surveillance and are responsible for managing notifiable infectious diseases. National-level TB surveillance in Canada depends on the provinces and territories voluntarily providing data to the federal government (21,22). Canada's federated, decentralized system of surveillance, across 14 jurisdictions with varying legislation, reporting protocols, and public health capacity, creates the need for cross-jurisdictional collaboration to implement any cohesive new national surveillance and monitoring priorities.

Health and Program Indicators

Health indicators are characteristics that can be measured to describe one or more aspects of individual or population health (number of cases of tuberculosis, for example), or to describe living conditions and other determinants that influence health (relative income or number of households with running water, for example). They "provide **comparable** and **actionable** information across different geographic, organizational or administrative boundaries and/or can track progress over time" (23)(emphasis added). Health-related indicators are often organized, explicitly or implicitly, in a conceptual framework which depicts how the indicators can be understood in relation to each other (24,25). The Canadian Institute for Health Information has developed a framework for health system performance indicators that has been used across jurisdictions in Canada, for example (26).

[3] See also the recent, *Key Inequalities in Canada*, released by the Public Health Agency of Canada in 2018 (47).

The framework is potentially less important than processes used to select indicators. As recommended by the WHO, **health indicators (including health system performance indicators) should be developed in consultation with the community that will be using them**, and should include measures that reflect the social, economic, and political contexts of the lives of women, men, girls and boys (27) (emphasis added).

According to von Shirnding, health indicators should meet six standard criteria (28). They should be:

> ***Relevant,*** meaningful and familiar to the producers and the users. Ideally, TB programs will use the indicators to inform their day-to-day work in TB elimination.
>
> ***Well-defined***, clear and understandable to those gathering and using data. In other words, it should be evident what indicators are intended to measure and why.
>
> ***Valid and reliable***, accurately measure what they are supposed to measure, from location to location.
>
> ***Technically feasible***, possible to gather data for the indicator, either from existing survey or administrative data, or through some new instrument. It will be more likely that data will be used where it is already gathered, or if the inclusion of a new indicator is not onerous or costly, or can be planned to be included in the near-future (29).
>
> ***Usable***, in that they are meaningful in that they can lead to policy change where needed and be acted upon.

Additionally, there **should not be too many indicators**; collecting and reporting and presenting the indicators should be manageable. This will ensure that the data are readily and easily presented in a timely fashion, so that interventions and targets can be quickly identified and implemented (29).

Part 2. Review of Potential TB Program Indicator Sets

From 2017 to 2018, NCCID undertook a review of Canadian and international TB programs, guidance documents, and surveillance reports to compile a single resource to support TB program indicator development in Canada. We reviewed 25 documents and compiled tables of national and sub-national TB program indicators and frameworks from four high-income, low burden countries: Canada, Australia, U.S.A, and the United Kingdom (Table 1).

This compilation of performance indicator lists and surveillance reporting structures from all programs reviewed by NCCID is available on-line [Supplemental Table]. We compared and analyzed indicator lists and frameworks to derive a second, more condensed version table of indicators most relevant to the Canadian context. Many indicators were recommended across frameworks although they varied somewhat in exactly how they were to be measured. We grouped indicators according to their measurement intent; that is, our focus was on what is measured rather than how it is measured (e.g. rates, proportions). Despite some differences in terminology, wording, or definitions of numerators and denominators, we determined an aggregated list of 105 indicators, across domains of *incidence and inequalities*, *lab reporting*, *case management and treatment*, *contacts, screening and follow-up*, *other programmatic areas,* and *determinants* (See meeting worksheet, Appendix A).

After reviewing 25 documents from Canada and other low-incidence countries, NCCID determined an aggregated list of 105 indicators in the following domains:

- incidence and inequalities
- lab reporting
- case management and treatment
- contacts
- screening and follow-up
- other programmatic areas
- determinants

It is notable that although there are many documents that recognize the importance of social and structural determinants on the transmission and treatment of TB, the domain of “determinants” is consistently small across all the indicator documents we reviewed. Most indicators retrieved were focused on response systems (especially for active TB cases) and clinical outcomes.

Following consultations with TB program representatives in high-burden provinces and territories – as well as leaders from national organizations – in the summer and fall of 2018, NCCID, in partnership with NCCIH, convened a meeting on TB program performance measurement in Canada in November 2018. Invitations were sent to TB program staff and affiliates with expertise in TB program evaluation, surveillance, and elimination priorities for Inuit, First Nations, and urban and foreign-born populations in Canada.

Working in population-specific groups, the meeting participants discussed the aggregated list of 105 indicators at length, working through the entire set in each group to determine which indicators are priorities for their programs and specific sub-populations. Participants were asked to consider which indicators were meaningful to the communities they serve, as well as any gaps or missing indicators of interest in the compiled list. Following the November 2018 meeting, NCCID reviewed the lists of prioritized indicators and compared the points of discussion across population groups to identify shared priorities for indicator development.

The results of this first conversation on potential shared priorities for TB program performance indicator development are presented in Part 3.

Intended to be a forum to begin consultations on Key Performance Indicators for TB Programs, the November 2018 meeting objectives were:

1. Share information on TB program performance indicators and evaluation initiatives in Canada.
2. Discuss and consider TB program performance indicators that could be applied across Canada, and their implications for specific TB-affected communities and programs.
3. Explore and consider the value of performance indicators beyond the health sector.
4. Propose next steps for TB programs and other public health stakeholders to further develop and implement performance indicators for TB elimination in Canada.

Table 1. TB indicator documents reviewed. Full citations and indicator lists are provided in the Supplemental Table.

Canada	National level indicator documents	Health Canada's Monitoring and Performance Framework for Tuberculosis Programs for First Nations On-Reserve.	First Nations and Inuit Health Branch, Health Canada
		Guidance for Tuberculosis Prevention and Control Programs in Canada	Pan-Canadian Public Health Network, 2012
		Tuberculosis in Canada, 2016	Government of Canada Surveillance Released 2018
		TB Program Objectives and Performance Targets for FNIH Jurisdictions, 2010	Fanning A., Orr P., 2010
		Would program performance indicators and a nationally coordinated response accelerate the elimination of tuberculosis in Canada?, 2018	Heffernan C., Long R., 2018
	Sub national indicator documents*	Tuberculosis in Alberta Surveillance Report 2010 to 2012	Alberta Health, Office of the Chief Medical Officer of Health
		BC Strategic Plan Implementation 2017	Government of British Columbia
		TB in British Columbia - Annual Report, 2015	Government of British Columbia
		Tuberculosis: Ontario Provincial Report, 2012	Government of Ontario
	*Note that the ITK Inuit Tuberculosis Elimination Framework was not released until December 2018		
United States	National level indicator documents	United States National TB Program Objectives and Performance Targets for 2020	Centers for Disease Control and Prevention, Division of Tuberculosis Elimination, 2015
		2016 State and City Tuberculosis Indicators Report	Centers for Disease Control and Prevention
	Sub national documents	Tuberculosis in Alaska 2014 Annual Report	State of Alaska 2015
		Alaska Tuberculosis Program Manual	Alaska Department of Health and Social Services, 2017
		TB Performance Trends for National and California Objectives	California Department of Public Health, 2016
		California Objectives and Targets 2015-2019	California Department of Public Health - Tuberculosis Control Branch, 2015
		Tuberculosis (TB) Prevention and Control Program Objectives for Minnesota, 2015 – 2019	Minnesota Department of Health, 2015
United Kingdom	Sub national documents	England 2016 - Tuberculosis in England, 2017 report	UK Government
		Scotland 2016 -Tuberculosis Surveillance & Epidemiology - Immunization and Vaccines	UK Government
		Tuberculosis in Wales Annual Report 2017- Data to the end of 2016	UK Government
		Epidemiology of Tuberculosis in Northern Ireland, Annual Surveillance Report 2016	UK Government
Australia	National level indicator documents	Annual Report-Tuberculosis Notification 2014	Government of Australia
		The strategic plan for control of tuberculosis in Australia: 2011–2015	Government of Australia
		Annual Progress Report in 2013	Government of Australia
		Annual Report - Tuberculosis notifications in Australia, 2014	Government of Australia
WHO		The End TB Strategy, 2015	World Health Organization

Part 3. Proposal for TB Program Performance Measurement in Canada

What follows below are the notes, comments and opinions collected at the November 2018 meeting. They have been collated and analyzed to inform a proposal for a condensed set of priorities for TB program performance indicator development that can be discussed collaboratively by TB programs in Canada. Section A presents shared performance indicator priorities identified by participants across all three population-specific discussion groups at the meeting: First Nations, Inuit, and urban and foreign-born. Sections B, C and D provide additional performance indicator priorities identified by meeting participants in each of the population-specific discussion groups.

For each section, a brief introduction is given, followed by highlights of the key performance indicators identified in each population working group, as well as meeting notes on considerations and potential challenges associated with data collection, reporting, and response. Detailed tables of the lists of TB program performance indicators considered to be key (indicated in green), as well as indicators that were discussed but not considered high priorities for development (no colour), are included in each population-specific section.

A. Shared Key Performance Indicator Priorities

"*Functional surveillance and monitoring is necessary to meet the needs of people everywhere in Canada who are unjustly disadvantaged by TB*."(11)

Provincial and territorial governments routinely collect TB surveillance information on every patient's sex, place of residence, and country of origin. Case data also include: diagnosis, chest x-ray, bacterial strains, genotyping (where available), treatment details, case criteria, antibiotic resistance, treatment, mortality, TB history, case finding and risk factors/markers as part of regular surveillance (30).

National-level TB surveillance in Canada (collected and reported by the Public Health Agency of Canada (PHAC)) depends on the provinces and territories voluntarily providing data to the federal government (22,31), as health care is a provincial and territorial responsibility. Participants at the November 2018 meeting agreed that the **regular surveillance** data collected and shared with PHAC are important and TB programs **should continue** to collect and monitor this information, including by regularly providing provincial and national-level data by sex, by geographic location (rural/urban), and population group on cases and on treatment outcomes.

Participants therefore concentrated their recommendations for TB program performance indicators that are outside of regular

Eight indicators were considered priorities for development in common, across the three population groups:

- Genotyping;
- Timely treatment initiations;
- Retreatment or relapse;
- Assessment of high priority contacts;
- Identification of contacts with LTBI;
- LTBI treatment initiation for those contacts;
- Treatment completion for LTBI contacts; and
- A measure of housing adequacy

surveillance. Across the three population discussion groups, participants identified eight indicators that should also be priorities for TB programs across all three high burden populations (see Table 2).

These shared priorities include indicators within the categories of *lab reporting*, *case management and treatment*, *contacts*, and *determinants*. While most indicator development priorities were identified from the list of potential indicators in the reference document provided to participants, others were not in the list. These priorities have been noted in the table below as "*added*". There were discussions during the meeting about indicator definitions (numerators and denominators), feasibility and validity but, as noted, full development of priority indicators was beyond the scope of the November 2018 meeting and instead should be part of future discussions.

Lab Reporting

An indicator for ***genotyping*** within the domain of Lab Reporting was given priority by all three population discussion groups at the November 2018 meeting. Genotyping is considered useful for contact investigations in Indigenous communities, can help identify whether cases are reactivated or new, and can help identify imported strains. Participants discussed the potential benefits to support collaboration and public health responses. Participants agreed that the indicator may be aspirational for urban and foreign-born populations, with potentially more focus to be on Canadian-born populations. Heffernan and Long suggested an indicator of "proportion of culture-positive cases with genotyping" to be used to measure TB program performance (11).

Case Management and Treatment

Two indicators within the domain of Case Management and Treatment were considered priorities in all population discussion groups. While ***timely treatment initiation*** is considered critical and an obvious measure, there is no consensus in the documents reviewed on what is meant by "initiation" or "timely". For example, initiation could start at the time prescriptions are written for patients or when prescriptions are filled. Further discussion is needed to determine a potential universal indicator that will measure program effectiveness in getting treatment started early.

The other indicator within this domain that is considered a priority is a measure of ***re-treatment or relapse***. Meeting participants pointed out that information is currently collected, but not over a timeline that relates to the patient's experience. Participants noted that "relapse" potentially requires whole genome sequencing and therefore "re-treatment" is more likely to be an achievable measure.

Contacts

All three population discussion groups agreed that TB programs should have a performance measure for proportion of ***high priority contacts assessed***, with an emphasis on contacts younger than 5 years old. This indicator was added by all three population discussion groups to the reference list. Participants acknowledged that the ability to set and achieve a benchmark for reaching priority contacts (>90% high-risk contacts reached, was proposed; time to reach 90% was not defined during the meeting) is

dependent on the information recorded at the time of case identification – so that a contact list can be created within one week. Discussants acknowledged that re-infection cases could make collecting and interpreting these indicators challenging.

Three additional indicators considered priorities for all high-burden populations relate to follow up with TB case contacts who are diagnosed with LTBI. Overall, ***identification of contacts with LTBI***, ***LTBI treatment initiation*** for those contacts, and ***treatment completion*** could be reframed within a treatment cascade. That is, potentially conceived as a benchmark of 90-90-90 or 80-80-80 LTBI contacts tested, treatment initiated and treatment completed. Stratifiers proposed by the meeting participants for these three indicators are high priority contacts of LTBI patients (e.g. pregnant women, children under 5 years) over all contacts.

Determinants

Finally, all participants in the meeting agreed that at a minimum, TB program performance measures must include some indicator of ***housing quality or adequacy.*** This was considered by all discussants as the most basic determinant to be included as part of the context provided for active and LTBI cases. As the November 2018 meeting concluded, all discussion groups agreed that there needs to be dedicated time created to work with local populations (First Nations, Inuit, foreign-born and other urban) to determine meaningful indicators that account for determinants that hinder or facilitate TB elimination. As noted above, TB program and community discussion on Métis-specific indicators is also needed. Furthermore, presentations of TB program indicators must be contextualized within other structural, and societal determinants, and the lived experiences of TB patients and their communities.

Table 2. TB Program Performance Indicators Proposed for all High Incidence Populations in Canada

Domain	Indicator group	Priority	Potential Indicators (from discussion and/or referenced documents)	Discussion Notes		
				Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Lab Reporting	Genotyping		Heffernan & Long (2018) -"*Proportion of culture positive cases with genotyping*". USA CDC (2015) - "*For TB patients with a positive culture result, the proportion who have a MTBC genotyping result reported*"		Genotyping can be a useful tool for contact investigation in Indigenous communities – can help identify reactivation vs new infection, and help identify imported strains; can support collaboration and improve public health response.	Genotyping needs to be improved – Does not meet everyone's needs, and only certain communities have access. May be aspirational for urban and foreign-born populations – could potentially focus on Canadian born populations. **Note**: While data are collected, the "proportion of cases with genotyping" is not currently consistently calculated or used as a performance indicator. This could be an easy KPI.
Case Management and Treatment	Timely Treatment Initiation		Heffernan/Long (2018) – "*Proportion of smear-positive pulmonary cases starting treatment within 72 hours of NAAT report*"; PHN 2012, Fanning & Orr (2010) - "P*roportion of cases started on anti-TB drugs within 48 hours of diagnosis"* USA CDC (2015) - "*For TB patients with positive AFB sputum smear results, the proportion who initiated treatment within 7 days of specimen collection*"		Early treatment initiation is critical (even more important than the specific type of treatment). Earlier treatment translates to less infectivity, and less investment in contact tracing.	Need to define initiation (e.g. when prescription is written vs filled)
	Re-treatment/ Relapse		Fanning & Orr (2010) - "*Proportion of cases per year that are relapsed (re-treatment cases*)". PHN (2012) - "*Re-treatment rate within two years after the end of previous treatment in Canada*" Australia Strat Plan (2015) -"*Proportion of cases initially treated in Australia who relapse within 5 years of treatment*"			Information currently collected, but no timeline in reportable form. May be better to be called "re-treatment" – "relapse" is nice to have, but theoretically requires whole genome sequencing. **Potential benchmark:** clinical trials use 3.8%, other sources use 3%, could use 4%.

Domain	Indicator group	Priority	Potential Indicators (from discussion and/or referenced documents)	Discussion Notes		
				Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Contacts	ADDED – High Priority Contact Examination		Percent of high priority contacts which have been assessed; Measure pediatrics (< 5 years old) or other high priority contacts in household over a period of time Need to standardize - define priority/close contact, infectious case, and assessment		Important at a programmatic/ regional level; Need to prioritize high risk and close contacts (household, close contact, immunocompromised, young children < 5 years old)	**Potential benchmark**: >90% high-risk priority; Dependent on initial information collected; Infectious cases should have a contact list established within a week; Challenges with applying social networking to genomic systems- relapse and reinfection in high incidence community- contacts for multiple source cases
	Contacts - LTBI Identification		FNIHB (2015) - "*Of the number of contacts screened for LTBI, the number with a new positive TST/IGRA or TST/IGRA conversion (i.e. number of newly identified LTBI*"	Priority contacts (exposure vs risk, previously positive, women of child-bearing age/ pregnant)	Helps us understand burden of TB infection	Could be part of *LTBI Cascade* - How many contacts within last 2 years; Proportion of TB contacts that have been tested for LTBI; Total screened; total LTBI; proportion LTBI treatment initiated; completed, accurate adherence and timeframe; Could look at 90-90-90 or 80-80-80 for LTBI
	Contacts - LTBI Treatment Initiation		PHN (2012) - "*Proportion of contacts with a dx of LTBI who begin Tx*" FNIHB (2015) - "*Of the number of contacts accepting treatment for LTBI, the number who started treatment (without contraindications to INH or RMP)"* Heffernan/Long (2018) - "*Proportion of close contacts recommended Tx LTBI, who start Tx (<5yrs, and ≥5yrs of age)"* USA CDC (2015) -*"Proportion of contacts to sputum AFB smear-positive TB cases diagnosed with latent TB infection, who start treatment."* WHO (2015) – "*Percentage of eligible people living with HIV and children aged under-five who are contacts of TB patients being treated for LTBI"*			Could use a measure for "was the prescription dispensed?" **Challenge**: LTBI is not always reportable

Domain	Indicator group	Priority	Potential Indicators (from discussion and/or referenced documents)	Discussion Notes		
				Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Contacts (continued)	Contacts - LTBI Treatment Completion		PHN (2012) – "*Proportion of contacts beginning treatment for LTBI who complete treatment*" FNIHB (2015) – "*Of the number of contacts starting treatment of LTBI above (and without contraindications to INH or RMP), the number completing treatment at the time of reporting (irrespective of length of treatment)"* Heffernan/Long (2018) – *"Proportion of close contacts accepting TX LTBI who complete treatment (< 5 years of age and ≥ 5 years of age)"* Fanning & Orr (2010) – *"Percent completion of prophylaxis among those who accept"* USA CDC (2015) – "*Proportion of contacts to sputum AFB smear-positive TB cases who have started treatment for latent TB infection, who complete treatment."* Need to define completion. Definition depends on drugs used and length of time needs to be defined for each LTBI regimen	Children <5 years old vs adults; High priority vs all contacts		Part of cascade of care/ contact investigation package: Proportion of priority contacts assessed, proportion offered LTBI treatment, proportion accepted treatment and proportion that completed treatment; timelines for providers to follow. Example: 3-, 6- and 9-month follow-ups; Certain contacts may require tighter timelines
Determinants	ADDED - Housing		Potential indicator "number of people per bedroom / household"		Density/ventilation/ housing repair are all important considerations for TB risk. Need to consider both individual and community overcrowding and housing repairs	Bring housing to program – homes/shelters/hotels/ correctional facilities Canada TB guide; PC Satisfaction survey Need to understand overcrowding

B. Additional Performance Indicator Priorities for First Nations Populations

From the outset, participants noted that appropriate TB program indicators cannot be established without more discussion with First Nations communities to help ensure indicators are community driven and relevant.

The overall impression among the First Nations discussion group was that Canada has not yet made the progress that it intends to make nor needs to make to achieve TB elimination in First Nations populations in Canada. First Nations communities have some of the highest reported incidence rates of active TB disease, representing 8.6% of the reported cases in 2017 (21), which is disproportionate to the 2.8% First Nations of the Canadian population overall (32,33). In order to address this ongoing issue, TB strategies need to be implemented and accelerated. In addition, the consensus from the discussion group was that:

- Canada needs to form a cohesive vision for TB elimination;
- An accountability framework should be implemented to ensure success of the program;
- First Nations TB elimination initiatives should be community led and include collaborators from all sectors and levels (i.e. federal, provincial and territorial)

Indicator Priorities for First Nations Populations

There are several different documents on priority indicators for First Nations populations in Canada including those from First Nations Inuit Health (FNIHB) (13), Fanning and Orr (34), and Heffernan and Long (11). During the meeting, many of these indicators were discussed by the First Nations discussion group with the goal of determining a group of priority indicators or indicator domains that could potentially be implemented to help improve TB surveillance and monitoring systems and translate into action to improve the health of First Nations populations across Canada.

Twenty-six indicators, ***beyond*** those collected by the PHAC Active TB Case Report Form (30), were identified as priorities by the First Nations discussion group and are listed in Table 3.

New indicators added by the group

From the domain Incidence and Inequalities, the discussion group added two indicators: ***comorbidity*** and ***women of child-bearing age*****.** Among First Nations populations, comorbidity rates may be higher than they are for other populations with TB (35). Risk factors for the development of active TB disease include: HIV infection, diabetes mellitus, and end-stage renal disease (35), as well as factors related to stressful living conditions (including structural and colonial legacies). The discussion group noted that women of childbearing age are also an important group to be considered for TB disease transmission as they are often around children (a high-risk population).

In addition, under the domain of Contacts, an indicator for ***secondary case contacts*** was also added. The rationale for this addition was that monitoring, for example, the "Proportion of children who are

household contacts that have progressed to disease by the time they are tested" would allow the TB program to assess how well it is doing at preventing further transmission events.

Rolling up indicators at the national level

One suggestion discussed at great length during the meeting was the idea of grouping program indicators into one nationally reportable indicator in lieu of reporting each indicator individually. For example, although ***timely lab arrival, timely smear, timely NAAT, timely report-back, genotyping, DST and diagnostic delay*** would be reported at a local level, they could be rolled up nationally as a combined indicator (through the use of a yes/no checkbox) and could potentially be reported as, "percentage of individuals that completed the lab reporting package". This notion of combining performance indicators was also suggested for contact investigation, completion of investigative tests and evaluation during treatment and would facilitate information collection.

Contextualizing Health Indicators for First Nations

From: Text Box 4 *in* Health Inequalities in Context: Indicators for Indigenous Populations **in** *Key Health Inequalities in Canada: A National Portrait* (46).

… "*without adequate explanatory context about the historic, economic, political and social factors that have impacted Indigenous communities (e.g. inadequate infrastructure funding, discriminatory policies that limited access to loans or mortgages), indicators that focus solely on the problems in these communities can reinforce discriminatory attitudes towards Indigenous people … The identification of protective factors such as resilience, self-determination, and identity—and the inclusion of qualitative and culturally appropriate ways of capturing this knowledge—provides a more complete understanding of the issue and can be more effective in empowering and mobilizing individuals or a community towards improving health*".

Determinants

Some of the determinants that were discussed and considered important were those that targeted community partnerships, wellness and resources as well as those that measured employment, education, stigma reduction and the catastrophic costs associated with TB infection. However, it was acknowledged that **appropriate indicators for determinants cannot be established without the input from First Nations communities**. TB programs need to enable community engagement and partnerships if goals and targets are to be achieved. As well, **the importance of responsible engagement, measurement and reporting was noted, as several aspects of TB burden for individuals and communities are rooted in historic and ongoing trauma and colonial history**.

Suggestions that were recommended by the First Nations population discussion group to increase community involvement, and by extension the success of a TB program, included:

- Create a coalition made up of TB workers, community members, medication dispensers, Elders, students, and former patients to serve as liaisons between TB programs and the community as well as serve as advocates for TB prevention within the community.

- Destigmatize TB disease by: a) engaging Elders; b) creating open dialogue with former patients; c) minimizing remote respiratory isolation to avoid feelings of incarceration; and d) educating health care providers to normalize TB care.
- Provide TB education material in the respective language of the community to increase accessibility.

Other Considerations for Key Performance Indicators

The discussion group participants noted that due to their geographic and social concerns, including a lack of access to health care, higher rates of overcrowding, as well as the deeply-rooted stigma associated with TB infection, unique approaches are needed to address TB in First Nations populations.

One of the challenges that arises when working with First Nations communities is that community boundaries do not always correspond geographically to a single census subdivision (36). First Nations communities can be quite fluid. Therefore, the group noted, when trying to devise a TB elimination strategy for a particular community, the interconnectedness with other communities, both on and off-reserve, needs to be considered.

Table 3. Proposed TB program performance indicators specific to First Nations populations. Dark green indicates indicators considered high priorities during the group discussion; no colour indicates lower priority indicator.

Domain	Indicator group		Priority	Potential Indicator	Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Incidence and Inequalities (Stratify by age, sex, registered status, self-identification)	Higher-Risk Groups - Enhanced						
	Inequalities			Number of people living in a bedroom / household		Difficult to quantify since the official number of people could be different than the true number of people living there	Challenge: Obtaining an appropriate measure (i.e. deprivation score, community-well-being index etc.); Potential stigma issues surrounding scores
	ADDED- Comorbidity			Proportion of individuals with Diabetes	well-managed vs uncontrolled diabetes	Diabetes is an important comorbidity for First Nations communities	
	ADDED- Women of child-bearing age/pregnant					Women of child-bearing age/women who are pregnant are often around children (a high-risk population); An important group that is often missed;	
Lab Reporting	ADDED- Lab reporting package	Timely Lab arrival				Information could be rolled up from local programs to the national level as a combined indicator (through the use of a yes/no checkbox form) to facilitate information collection Diagnostic delay is an implementable measure if well-defined; Could provide a form with check boxes (yes/no) and define criteria to break down where the delay is (patient, HCP, or administrative) so that you know where to target	
		Timely Smear					Need sensitive engagement for populations as certain aspects of TB (for example, sputum collection) can be routed in trauma and colonial history; Not all programs have access to NAAT (i.e. GeneXpert) which could lead to potential failures for implementation
		Timely NAAT					**Potential benchmark:** Ideally performed on Day 1 following a positive smear result
		Timely Report back					
		Genotyping					
		DST					
		Diagnostic delay					
	Culture-during treatment			Indicator described by Heffernan & Long			To be included in "Evaluation package during treatment"
Case Management and Treatment	ADDED - Evaluation package- during treatment					Information should be rolled up from local programs to the national level as a combined indicator (through the use of a yes/no checkbox form) to facilitate information collection Include culture-during treatment, sputum and chest x-ray at treatment initiation as well as sputum and chest x-ray at the end of the treatment phase	

Domain	Indicator group		Priority	Potential Indicator	Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Case Management and Treatment (continued)	Early Diagnosis-Smear positive						
	Early Diagnosis-symptoms-to-treatment						An indicator based on symptoms is challenging since it can be subjective
	Treatment completion			Indicator described by WHO (within 12 months for drug susceptible);	Drug susceptible, drug resistant and LTBI cases	Need to stratify since each type of TB will have different treatment length requirements	
	DOT						
	Underserved populations						Difficult to quantify because needs to encompass physical, social and emotional aspects
	HIV serologic testing						Part of the "Evaluation/Completion of Investigative tests" package which could be rolled up Nationally from local programs
	ADDED- Completion of investigative tests			Proportion of patients that completed the full investigation package (identified using a checkbox format)? Or what percent of patients had a complete assessment?		Information should be rolled up from local programs to the national level as a combined indicator (through the use of a yes/no checkbox form) which could facilitate data collection Include information on chest x-ray, AFB, culture, HIV serologic testing, hemoglobin A1CC [diabetes], ALT [liver function], and renal function	
Contacts	Contact investigation Information should be rolled up from local programs to the national level as a combined indicator (LTBI identification, treatment recommended, initiated, completed)	Contact - LTBI identification		Proportion of priority contacts invited; proportion you have reached; proportion of completeness of those contacts	High priority/high risk contacts (children < 5 years old, HIV, women of childbearing age/pregnant and those with high exposure)	Prioritize high priority contacts to focus resources	Potential benchmark: Household contacts and children < 5 years old should be admitted to program for symptom assessment within 48 hours.
		Contact- LTBI treatment recommend					
		Contact- LTBI treatment initiated					
		Contact- LTBI treatment completion					
	Contact Identification			*PHN - Proportion of infectious TB cases where*			

Domain	Indicator group	Priority	Potential Indicator	Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Contacts (continued)			*initial list of contacts is completed within seven calendar day* *FNIHB - Total number of reported contacts of active TB cases diagnosed in (year)* *CDC/England - Proportion of TB patients with positive AFB sputum-smear results, who have contacts elicited.*			
	Contacts - Close		Indicator by Heffernan & Long but modified it to, "Number of close contacts of active TB cases diagnosed in (year)";	Household vs non-household contacts	Prioritize high risk contacts (individuals with risk factors, close contacts, children < 5 years old, etc.);	When contact investigations are incomplete, can miss a large group of people that don't enter into LTBI cascade Challenging to examine all contacts –see shared indicator for high-priority contacts
	Contacts - LTBI Treatment Recommended (offered)					Not every case is high risk and should be a priority for treatment;
	Contacts - LTBI Treatment Acceptance					
	ADDED- Contacts- Secondary cases		Proportion of children who are household contacts that have progressed to disease by the time they are tested		Using secondary contacts as an indicator allows the program to assess how well its doing at preventing transmission	
	EXTRA NOTES	Data collection is a challenge as a lot of information is not currently systematically collected				
Screening and Follow up	People Living with HIV					Difficult for Public Health and TB programs to monitor since many people are managed by primary care
	People with Impaired Immunity					Organizational challenges and difficulty with follow-ups due to lack of manpower
Other programmatic	BCG - Community				Relevant at the local level	
	BCG - Administered				Relevant at the local level	
	BCG - Eligible				Relevant at the local level	
	BCG - Adverse Reactions				Relevant at the local level	
	Outbreaks - New				Relevant at the local level	
	Ongoing Outbreak - Active Cases				Relevant at the local level	
	Evaluation and Strategic Planning		Indicator described by Fanning & Orr		Can ask high incidence communities if they felt that they had meaningful engagement in their TB program; Programs have a duty to engage	**Note**: Specific for community consultation activities; Need to consider that communities

Domain	Indicator group	Priority	Potential Indicator	Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Determinants			Potential indicator specific for FNIHB/FNHA/NITHA and could report quarterly (like FNHA)		communities to participate in program decision making;	are fluid and should think of them as community areas;
	Education- Health care provider				Relevant at the local level	
	Education - Community		Proportion of schools that have TB in their curriculum		Relevant at the local level	
	Ethics		Indicator described by Fanning & Orr selected			May look different for different communities/regions; Reconciliation and nation-to-nation are essential practices; Need to determine a data-sharing agreement and where data should be kept
	ADDED- Partnerships		What is the relationship between the program and the community? (details to be determined)		Need to have a way to measure community partnerships since these partnerships are essential for success of the program; Creates a mechanism to advocate for self-determination	
	ADDED- Community Resources		Is there a capitation system in place to access the amount and appropriateness of resources for the community		Communities need to be properly resourced to deal with TB;	
	ADDED - Employment/ unemployment					
	ADDED – Education (attainment and quality of primary and secondary education)					
	ADDED - Community wellness indicator		Indicator to measure self-assessed status (i.e. nourishment, tobacco smoking etc.) (details to be determined)			
	ADDED - Catastrophic costs		Proportion of cases that became unemployed during treatment; OR measure homelessness/isolation (details to be determined)		If the "cost" of TB is known (social, mental, physical, and economical) this may help acquire funding for disease management and prevention	**Challenge**: Difficult to define and capture.
	ADDED- Stigma reduction		How are physicians normalizing TB care to reduce stigmatization?			**Challenge**: Finding a meaningful "high level measurement"

C. Additional Performance Indicator Priorities for Inuit Communities

Note that people participating in the Inuit-specific discussion group were familiar with the *Inuit Tuberculosis Elimination Framework* and the forthcoming Action Plans developing in the four Inuit regions - Inuvialuit, Nunavut, Nunavik, Nunatsiavut, however those documents had not been formally released at the time of this meeting.

The overall impression among the Inuit discussion group was that the Inuit population faces greater health challenges compared to other Canadians and although progress is being made to address these inequities, Inuit are still disproportionally affected by TB. According to Patterson et al., active TB rates were 290 times higher among the Arctic Inuit population compared to Canadian-born, non-Indigenous individuals in 2018 (37). Moreover, in 2017, 17 of the 25 Nunavut communities had 1 or more cases of TB (either latent or active) (37). Thus, precise goals and concrete plans are needed to tackle the TB crisis within these northern communities.

Indicator Priorities for Inuit Communities

During the meeting, health indicators were discussed by the Inuit discussion group with the goal of choosing/ creating priority indicators which could help monitor progress as well as improve TB outcomes for Inuit communities. The consensus from the Inuit discussion group was that:

- The indicators under Incidence and Inequalities should be continued as routine surveillance
- A distinction should be made between indicators that are required at a local or programmatic level and those that should be national priorities.

Altogether, 37 indicators were identified as priorities for the Inuit discussion group and included indicators at both the local and national levels (see Table 4). Many of the indicators which were deemed to be locally relevant were those associated with the *Lab Reporting*, *Case Management and Treatment* or *Other Programmatic* sections.

New indicators added by the group

The discussion group identified two new indicators to be added under the domain of Lab Reporting. ***Laboratory*** was suggested by the discussion group because every lab should have a set of indicators for quality control, turn-around-times, and reporting to ensure proper accountability.

***Turn-around time for TB genotyping*,** the second indicator, is a lab-based technique used to analyze the genetic material of the TB bacteria. When combined with epidemiological data, genotyping can help identify TB transmission patterns as well as distinguish between new and old infections (38). According to Clark et al. (39), having an indicator which measures the genotyping turn-around-time can have multiple benefits for TB control, including:

- Leading to more rapid and efficient understanding of ongoing transmission rates
- Allowing for more focused program interventions for specific populations
- Refining contact investigation methods

Determinants

High TB incidence among Inuit has been rooted in the legacy of colonization – including the history of TB sanatoria, living conditions and other social determinants of health (37) and as such, improving social determinants of health are critical for TB elimination. With the release of the recent *Inuit TB Elimination Framework* by Inuit Tapiri Kanatami (14), the foundation for addressing TB transmission and TB outbreaks is already in place. Many of the indicator priorities identified during the meeting by the Inuit discussion group aligned with those released in the 2018 ITK report, and included:

- ***Access to care***
- ***Education***
- ***Wellness indicator***
- ***Poverty***
- ***Traditional livelihood***
- ***Safety and security***
- ***Early childhood development***
- ***Addictions and psychiatric comorbidities***

As determinants are risk factors for TB, it was also suggested by the discussion group that these determinant indicators be collected on the TB form. Lastly, the discussion group noted the need to monitor post-treatment mortality for TB patients.

Other Considerations for Key Performance Indicators

The Inuit discussion group recognizes that the ability to change many of the outlined determinants is challenging. In addition, since indicators are often defined differently in different sources of data, a well-defined group of indicators which can be implemented across programs is needed. Likewise, the issue of data availability also needs to be addressed. **Data need to be recorded, assimilated and distributed in a way that is in the best interests of Inuit communities, and access rights to the data needs to be decided**. Lastly, as for First Nations-specific program indicators, understanding community differences will also be important for designing and implementing key indicators for regional TB elimination in Inuit communities.

Table 4. Proposed TB program performance indicators specific to Inuit communities. Dark green indicates nationally relevant indicator; light green indicates locally relevant indicator; no colour indicates lower priority indicator.

Domain	Indicator group	Priority	Potential Indicator	Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Incidence and Inequalities	Higher-Risk Groups - Enhanced			Stratify by geography, ethnicity, beneficiary of benefits vs self-defined, status vs non-status		**Challenges**: High-risk can be locally defined; Questions too vague on national form information; Health providers don't ask the questions; incarceration within the last two years, recent infection, recent converter High-Risk Group Enhanced- Primary infection may provide this information- if there is a recent converter→ more important than a contact; indicators that reflect epidemiology for prediction; Prediction indicators being tested in Nunavik- Smear positive vs probable (clinical) case vs bacteriological positive smear negative; It's good to have groups to review probable cases for consensus; Public Health case can be different than clinical case
	Health care-acquired		Couldn't define how to report			
	Inequalities		Not understood by the group what this might mean			
Lab Reporting	ADDED - Laboratory				Lab should create indicators regarding quality, time, accountability and reporting;	
	Timely Lab Arrival				Important regionally but not required at the national level	**Challenges**: Issue in remote communities, logistics; pathway evaluation
	Timely Smear				Not necessary at a national level since labs should be doing internally	
	Timely NAAT				Should be performed regionally	**Challenges**: Samples go to National lab due to limited resources (takes a long time); Requires communities to have GeneXpert;
	Timely Culture				Important at a regional level; Each lab should be responsible; Not specific to TB	
	Culture-confirmation					Should report back on quality of the sputum (is it truly negative or an issue with the sample?)- An issue regarding clinical vs lab confirmed case; Not only for pulmonary cases

Domain	Indicator group	Priority	Potential Indicator	Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Lab Reporting (continued)	ADDED- Turn-around-time for Genotyping					
	Timely Species Identification				Should be done as part of lab process	
	DST					
	Timely DST (Culture)		"Lab performance-time of sample reception to the lab"***?***		Anything with time should be lab process;	
	Culture-during treatment				Assesses treatment outcome	
	Timely Report Back				Should be standard	
	Diagnostic Delay				Difficult to measure since can be subjective; Not a priority	
Case Management and Treatment	Early Diagnosis-Smear positive				Always reported; More related to incidence	
	Early Diagnosis-symptoms-to-treatment				Not practical since treatment can be delayed due to many reasons (e.g., patient unable to get to clinic or unable to attain medications)	
	Recommended Treatment Initiation				Not a priority	
	Sputum Culture Conversion				Important at a clinic level but not at a programmatic level	
	Treatment Completion		Treatment adherence percent in a time-frame whether or not they are cured; Should also include cure and culture;		Need to consider adherence	
	Lost-to-follow up			Left- treatment; Transfer out of province	Relevant at the community level; Already within reporting	
	Left-treatment		Potential indicator by FNIHB	Transfer out of country	Should be a sub-indicator of lost-to follow-up; Need to account for missing cases	
	TB Deaths			Age and sex		

Domain	Indicator group	Priority	Potential Indicator	Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Case Management and Treatment (continued)	Drug-Resistant Treatment Initiation				Combine with other DST indicators	
	Drug-Resistant Treatment Outcome			Treatment		
	HIV - Treatment				Less relevant for Inuit communities	
	DOT			Enhanced vs standard DOT		Confirmed cases are DOT but DOT needs to be defined;
	Underserved populations				Difficult to define (e.g. ethnicity, self-identification); lots of social risk factors	
Contacts (Definition standardization needed)	Contacts - LTBI Treatment Recommended (offered)					
	Contacts – Timely LTBI Treatment Initiation		PHN indicator selected; Need to define LTBI and timeframe;	LTBI (old vs new)		Cascade: Proportion offered treatment, proportion that accept, proportion that start, proportion that complete;
	DOPT					Note: Not sure
	Contacts - Timely LTBI Treatment Completion					
	Contacts - LTBI - Reactivation				Not relevant nationally	
	Contacts - LTBI - Decline Treatment F/up					
Screening and Follow up	People with Suspected TB				Difficult to define; Not applicable for the Inuit population	
	People Living with HIV				Not relevant for the Inuit population but theoretically important	
	People with Impaired Immunity				No evidence for people to be treated >1 for LTBI in a lifetime;	Issue with PHN indicator as has no denominator
	IRCC Referrals - Examination Initiation				Important for occupational screening	

Domain	Indicator group	Priority	Potential Indicator	Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Other programmatic	BCG - Community				Relevant at a regional level; Should be under vaccine coverage	
	BCG - Administered				Considered under vaccine coverage rules	
	BCG - Eligible					
	BCG - Adverse Reactions					
	Outbreaks - New				Relevant for epidemiology; Not required as a performance indicator;	**Challenge**: How is outbreak defined- What is a cluster vs outbreak; Needs to be explored further
	Outbreaks - Ongoing					
	New Outbreak - Active Cases					
	Ongoing Outbreak - Active Cases					
	CTBRS Reporting - Completeness				Surveillance performance indicator	
	Report Publication		Indicator described by Australia;		Indicator of the surveillance program; A jurisdictional report could state what each region is doing which could help hold programs accountable	
Determinants	Nutrition		Percentage of population without undernutrition		Food security is important for Inuit community	
	ADDED- Addictions and Psychiatric comorbidities		Indicator to measure tobacco cessation; Indicator to measure alcohol abuse program in place or effectiveness			
	ADDED- Access to care					
	ADDED- Education				Education impacts both mental wellness and poverty	
	ADDED- Wellness indicator		Indicator to measure social and emotional well being (details to be determined)			**Challenge**: Mental wellness is defined differently in different sources of data

Domain	Indicator group	Priority	Potential Indicator	Additional Stratification (beyond age & sex)	Rationale	Extra Notes
Determinants (continued)	ADDED- Poverty		Indicator to measure income distribution		Reducing poverty should be a priority	
	ADDED- Traditional livelihood					
	ADDED- Safety and Security					
	ADDED- Early childhood development					
	ADDED- Mortality post treatment					
	EXTRA NOTES	**Challenges**: Ability to change these determinants; Defining important indicators; Availability of data; **Note**: Need to understand community differences Inuit framework already in place; Should be pursued for Inuit purposes- Not National; Social determinants are risk factors for TB and should be collected on the TB form				

D. Additional Performance Indicator Priorities for Urban and Foreign-Born Populations

TB is a social disease, known to go hand-in-hand with many conditions that affect urban areas such as homelessness, population density and limited access to health care (40). Foreign-born persons who have lived in a country where TB is endemic may have higher rates of TB due to their increased exposure risk in their country of origin, as a result of conditions related to the migration journey that may have facilitated TB transmission, or potentially due to LTBI reactivation as a result of stressors related to immigration (41). With different circumstances for exposure, and ability to find and obtain health care in Canada, specific measures are needed to improve TB outcomes in urban and foreign-born populations.

Indicator Priorities for Urban and Foreign-Born Populations

During the meeting, many of the indicators discussed were seen as indicators which should be collected as part of routine surveillance in TB. In addition to the surveillance indicators, the urban and foreign-born discussion group identified 27 priority indicators during the meeting which could be useful at a national level (see Table 5).

The general consensus among the urban and foreign-born discussion group was that:

- Using country of origin at the local level to categorize foreign-born individuals while using the WHO regions nationally, may be less stigmatizing;
- There is currently discordance in the way labs do their reporting across Canada;
- All aspects associated with case management and treatment should be considered routine surveillance

New indicators added by the group

During the discussion, indicators were added in the domains of *Incidence and Inequalities*, and *Lab Reporting*. Within the topic of Incidence, the indicators ***homeless-TB therapy*** and ***locally acquired TB*** were identified as priorities for the group. Tuberculosis cases have been well-documented in urban areas and are a significant problem in the homeless population, a group which has increased TB incidence as well as difficulty accessing the health care system, the latter of which is a major obstacle when it comes to TB therapy (42). This may be compounded by other physical and mental health conditions within this population, which can further lead to complicated treatment outcomes and issues with treatment adherence (9).

The discussion group noted that investigating incidence of locally acquired TB is also an important measure to collect as it would allow for a better understanding of local transmission while also serving

as an outbreak measure. Moreover, with the availability of molecular epidemiologic techniques, accurately estimating TB transmission dynamics has become increasingly more feasible.

Another indicator added during discussion was ***timely DST (molecular)***. Due to increasing prevalence of drug-resistant tuberculosis, DST, or drug susceptibility testing, has become critical for proper TB management. Although conventional DST remains the standard of care and depends on mycobacterial culture, molecular methods, like the GeneXpert assay, are advantageous as they can provide results in as little as 2 hours (43). Having indicators for measuring the turn-around-time rates for both molecular and culture DST can provide insight into lab efficiency as well as provide a benchmark for timely reporting of laboratory test results.

Determinants

Determinants that were discussed and identified to be important for the urban and foreign-born populations by the discussion group were those associated with ***addictions and psychiatric comorbidities***, ***homelessness***, ***health care*** (***access to care, system navigation, discharge support, and health literacy***), ***community engagement***, among others. However, the group acknowledged that several details will need to be addressed first in order to ensure successful collection and management of the determinant information. Firstly, details regarding who owns or controls the data needs to be determined. Additionally, a framework for information dissemination within the community as well as for potential strategic approaches that can be taken by the community to bring about change need to also be considered. Since the needs can vary between regions, a customizable approach for each community may be required. Moreover, capacity building will likely entail the help of peer navigators, peer educators, as well as community champions.

Other Considerations for Key Performance Indicators

Designing and conducting successful TB control measures in urban and foreign-born populations is challenging. As was mentioned by the First Nations discussion group, stigma surrounding TB disease is a hurdle. In addition, political leadership changes often and therefore the required support, which is crucial to the success of program, is not always sustained.

Table 5. Proposed TB program performance indicators specific to urban and foreign-born populations. Dark green notes indicators considered high priority by the discussion group.

Domain	Indicator group	Priority	Potential Indicator	Additional stratification (beyond age & sex)	Rationale	Extra Notes
Incidence and Inequalities	ADDED - Locally acquired TB		Need an indicator for local transmission	Stratify by age, country of origin, foreign borne, indigenous group		Locally acquired touches on outbreak measure; **Potential benchmark**: Overall foreign born locally acquired < 5%;
	ADDED - Homeless- TB therapy					
	EXTRA NOTES	Incidence, prevalence, mortality- higher risk/enhance are all given. Need to consider: 1) Length of exposure within country of birth, in relation to year landing in Canada, 2) Immigration classification (refugee, transition) and 3) Age, eg) < 5 years old; Note: Could use WHO regions nationally and country of origin locally;				
Lab reporting	Timely Smear		PHN indicator selected- AFB smear > 48 hrs, or NAAT although NAAT may be more valuable because something can be smear negative and culture positive;			Discordance between lab reporting across Canada; Labs should be determining their own turn-around-time
	Timely NAAT		Same day NAAT result with smear result			
	Timely DST (Culture)		2 weeks from positive culture to primary susceptibility results			
	ADDED- Timely DST (Molecular)					
Case Management and Treatment (Should be part of regular surveillance)	Early Diagnosis-Smear positive				Routine surveillance	Given; Every positive smear needs to be typed
	Early Diagnosis-symptoms-to-treatment		Replace with Indicator described by Fanning & Orr; Onset of cough to 1st AFB			
	Drug-Resistant Treatment Outcome		Create Drug-Resistant Report which could include: Proportion on drug resistant treatment, proportion that completed treatment, and proportion that died;			

Domain	Indicator group	Priority	Potential Indicator	Additional stratification (beyond age & sex)	Rationale	Extra Notes
Change Management and Treatment (continued)	HIV - Treatment				Should be in the HIV Program Performance Indicators	
	DOT				Treatment support not DOT; Only important for high risk populations; not useful as an indicator;	
	Underserved populations		Could use England indicator "… patients with social risk factors recorded who received enhanced case management" as a potential program-oriented indicator		Need a patient-oriented indicator such as catastrophic clinical consequences (proportion of job loss, that can't access social support, expenses paid out of pocket), or employment benefits, social supports, patient satisfaction	
Contacts	Contact Identification		Priorities list generated in 7 days of diagnosis of index case; Then full contact list within a month (30 days)		Reasonable to prioritize high risk and close contacts (household, close contact, immunocompromised, young children < 5 years old); Timeline may need to depend on patient group (e.g. may require > 7 days to find contacts of an inner-city IDU or crystal meth patient)	**Challenges**: Time benchmark- Individuals may have new memories of who they've had contact with; Limited literature on success in finding contacts; system performance limitations of iPHIS;
	Contacts - Close					
	Contact Examination Adapted to: ADDED – High Priority Contact Examination		Could modify Heffernan & Long indicator to "Proportion of high risk/priority contacts of smear-positive pulmonary cases completely assessed (define "completely assessed"); Indicators should be different for adult vs children: 1) Proportion of children < 5 years old assessed within 7 days for pulmonary TB, starting prophylaxis; 2) Proportion of children < 5 starting treatment; 3) Proportion of other high priority contacts assessed within 30 days; 4) Proportion of high priority contacts that completed screening			**Potential benchmark**: > 90% High priority contacts identified within 48 hours and examined 8 days later;
	Contacts - LTBI Treatment				This indicator is subjective because it is based on providers	**Challenges**: Requires a chart review; Difficult to know reason for not starting LTBI treatment;

Domain	Indicator group	Priority	Potential Indicator	Additional stratification (beyond age & sex)	Rationale	Extra Notes
Contacts (continued)	Recommended (offered)					
	Contacts - LTBI Treatment Acceptance				If treatment is initiated, can assume that it was accepted	
	Contacts – Timely LTBI Treatment Initiation		Proportion of high priority contacts start within 30 days of LTBI diagnosis; Indicator described by PHN and Fanning		Individuals that are initially negative can convert to positive so 28 days might not be useful. Need to consider time to specialist referral; Focusing on high priority contacts may be more feasible;	**Potential benchmark:** > 80%
	Contacts - LTBI - Decline Treatment F/up				Should not encourage as a metric, gives credence to bad care	
Screening and Follow up	People Living with HIV				Individuals tested for TB should also be tested for HIV;	Not certain if collected by HIV Programs
	People with Impaired Immunity		Indicator described by PHN although can make it less complex- Proportion of TB individuals in dialysis, TNF, Transplant;		Implementation easier as there are already biologic screening clinics in Canada; Easy to collect denominator; Can easily do cascade; IGRA in country of origin for HIV, TNF, Dialysis and silicosis;	**Challenge:** TST & IGRA testing not funded in some provinces
	IRCC Referrals - Examination Initiation		Cascade measure on highest risk people; EG) Renal program- linking dialysis codes with IGRA- potential place to focus and change reporting structure (TNF-inhibitor, high risk, IGRA positive, LTBI screened);			IRCC-PHAC study with looking at screening high risk migrants – current groups using IGRAs in country of origin for LTBI, HIV, end-stage kidney, silicosis, close contacts, TNF → Broaden screening in long term; IGRA system better than TST- allows for reporting;
	IRCC Referrals - Examination Completion				Already being reported	Will become relevant if screening is done; Keep as part of KPI?
	IRCC Referrals - Treatment Initiation				If the patient has an IGRA then LTBI treatment initiation will be measurable	
	IRCC Referrals - Treatment Completion				Need to revisit this topic	

Domain	Indicator group	Priority	Potential Indicator	Additional stratification (beyond age & sex)	Rationale	Extra Notes
Screening & Follow up (continued)	New Entrant LTBI Screening Initiative		Proportion of refugees screened? Prioritize based on country of origin – Proportion of refugees screened from countries with > 30 or 200/100 000 incidence?		Difficult to define indicator since challenges with capturing data, and issues with decentralized systems (Patients may see multiple family physicians- could maybe add prompt)	**Challenges**: In some jurisdictions, immigrants from high incidence countries have higher burden than refugees but not formal screening process (no strategy to tackle this large LTBI reservoir); Stigma can be challenging when partnering with community; Some people don't believe TST- follow-up is with IGRA- 5% risk of activation doesn't concern them;
Other programmatic	Outbreaks - New			Locally acquired TB vs TB acquired overall		
	CTBRS Reporting - Completeness				Important surveillance priority which can improve program performance/ quality	
	Report Publication				Need to have real-time reporting to partners as well as agreements for reporting, metrics and info sharing to make informed decision making	
	Education- Health care provider		Not sure how to measure or the impact on change of behavior		Building health care capacity (i.e. primary physician competency) can aid in prevention and control of TB	
	Ethics		Need a community-oriented metric to measure community engagement activities;			National and international activities should promote collaboration; Involve TB affected individuals;
Determinants	Nutrition		Measure food security both pre and post treatment			
	ADDED- Support for System Navigation					
	ADDED - Addictions and Psychiatric comorbidities		Proportion that have addiction; What proportions are referred to services;			Trauma informed care
	ADDED - Housing status/homelessness		Indicator to measure housing status at diagnosis	Spectrum of homelessness		Social worker logs what is provided

Domain	Indicator group	Priority	Potential Indicator	Additional stratification (beyond age & sex)	Rationale	Extra Notes
Determinants (continued)	ADDED -Meaningful engagement					**Challenge**: Data and capacity
	ADDED - Access to care		Proportion that have access to care; proportion that have access to care with a co-morbidity;			
	ADDED - Discharge support		Proportion that have a GP when they leave care		Re-linkage to primary care is important; Want patients to be better off after care	
	ADDED - Health literacy		Has health literacy improved over the course of care			
	ADDED - Catastrophic costs		Need a measure of patient hardship (e.g. Proportion that lost their job, became homeless, or can't access social welfare services)		Having a patient-oriented metric would allow patients to better tell their story and inform practice	Look to HIV for patient experience metrics
	ADDED - Mortality, post treatment				Beneficial to know the reason behind mortality post treatment such as trauma, drug-use, co-morbidity, cardiac or respiratory issues	
	ADDED - Migration			Choice vs forced;	Individuals often move from high incidence communities to cities or between jurisdictions	Housing stability; need for core housing
	EXTRA NOTES	**Challenges**: Stigma; Leadership changes often so buy-in is not there; Should include package of factors that reflects principles of the TRC; Need to address: 1) Who owns/ controls data, 2) how information reported to the community, 3) understanding within community 4) how the community can take action; May need to customize by community; Need peer navigator, peer education, and community champions for capacity building				

Part 4. Moving Forward

Accomplishing successful TB elimination within Canada will require collaborative action among local, provincial, territorial, and national jurisdictions, communities and ministries.

All those involved in the development of this proposed list understand that the indicator priorities identified herein will require further discussion and development to identify consistent definitions, as well as data collection, reporting, and response mechanisms. This proposal can inform ongoing performance indicator development initiatives in local programs, as well as across programs and jurisdictions.

Collecting, Reporting and Presenting Data

Within each TB program, routine data quality assurance should be ongoing. In addition, as this proposal is discussed and refined, decisions must be made about how TB performance measures are presented, for example as rate ratios or rate differences; decisions which are not value-neutral (44). Regardless, there was consensus among participants at the Winnipeg meeting that to be meaningful, data reporting on diagnosis, treatment and treatment outcomes according to geographic location and specifically in high burden populations in Canada will help to inform public health actions. This recommendation for collecting, recording and presenting data by sex, age, geographic location, country or culture of origin, and other identifiers, is aligned with recommendations by the WHO for TB measures and for all SDG indicators (16,27).

Health status profiles in Canada have similarly contextualized dis-aggregated data, drawing on related evidence to understand the determinants that influence a given health outcome (45–47). Reporting data by sex provides information on any disproportionate burden experienced by males or females (25,46,47). Similarly, dis-aggregation by age – and ideally age and sex – can provide otherwise masked information on the TB trends faced by elderly men and women, young women and men who may currently not be able to participate in the labour force, or challenges in monitoring pediatric cases, for example (9). The value of consistently disaggregating TB data in affected groups by age, sex, and other stratifiers is that public health actions to combat TB can be better informed and also monitored for their effectiveness (9).

Research and community information from other sources may also be needed to contextualize presentations of the program performance indicators. Additional quantitative and qualitative evidence provides information on the drivers and the implications of commonalities and differences observed in the data. Information from small-scale or localized studies may be the only way to understand sub-regional differences or health inequalities in minority populations. By asking why the health differences come about and how they are differently experienced, it is possible to make policy decisions for improvements that can reduce health inequities and lead to improved equality. With coordination and consistency across the provinces and territories, national-level TB surveillance reports can illustrate the value of consistent dis-aggregation of indicator data. This would inform directed and effective

interventions where they are needed most to reduce inequalities, as envisaged from the time public health systems were renewed in Canada (48,49). Within jurisdictions and within regions, there are already initiatives to establish local level TB indicators. Community involvement in determining meaningful indicators is essential to these deliberations for different First Nations, Métis, Inuit – and potentially foreign-born – communities. For example, population-specific TB determinants were recently published by Dehghani et al. (50) and the results illustrated where the greatest improvements had been made in reduced TB incidence annually.

Conclusion

There is fairly good consensus about the need for more indicator data on TB in populations at higher risk for infection and disease. Researchers, clinicians and public health personnel in Canada have recently called again for a set of national-level TB indicators (11). As with other disease surveillance (41), a shared vision and principles for collaboration will be required from all jurisdictions in the federation to determine and then monitor a core set of indicators, as well as consistent data reporting at the national level to monitor progress to TB elimination. Before such agreement is reached, however, we will need additional conversations - particularly with community experts on TB in Métis, First Nations, and Inuit populations to identify population-specific priorities for TB program performance measurement. Collaboration to realize shared priorities for TB program performance measurement alongside population-specific priorities will be essential.

Preparing for and following up on the November 2018 meeting, NCCID and NCCIH have helped to re-start the conversations to derive a core set of common indicators. In the months leading up to the gathering, we reviewed numerous documents and engaged stakeholders across the country to determine a process and way forward. Those we have heard from so far agree that the intent is to crystalize a minimal set of program performance indicators, while maintaining consistent routine surveillance and reporting.

Coordination of these efforts will require commitment from all jurisdictions and some additional resources for data development, presentation and analysis. However, without a common aspiration for improved, meaningful data to inform public health action, monitoring and evaluation, Canada is likely to fall short of its TB elimination goal.

NCCID and NCCIH will continue to work with TB programs, our partners, and other stakeholders in 2019 to foster these discussions, with a goal to encourage consistent, comparable and actionable program performance indicators for TB elimination in Canada.

References

1. CBC. Ottawa vows to eliminate tuberculosis in Inuit communities by 2030 | CBC News [Internet]. [cited 2019 Jun 19]. Available from: http://www.cbc.ca/news/politics/tuberculosis-philpott-obed-fight-1.4589028

2. Government of Canada. Statement of Canada on the Moscow Declaration to End TB. First WHO Global Ministerial Conference Ending TB in the Sustainable Development Era: A Multisectoral Response. Moscow, Russian Federation. November 16-17, 2017 [Internet]. World Health Organization. 2017 [cited 2019 Jun 18]. Available from: https://www.who.int/tb/Statement_on_the_Declaration_EndTB/en/

3. Halseth R, Odulaja O. Addressing the challenge of latent tuberculosis infections among Indigenous peoples of Canada [Internet]. National Collaborating Centre for Indigenous Health: Prince George, BC; 2018. Available from: https://www.nccih.ca/495/Addressing_the_challenge_of_latent_tuberculosis_infection_among_Indigenous_peoples_in_Canada.nccah?id=242

4. King M. Reflection. From: NCC Knowledge Exchange Forum: Towards TB Elimination in Northern Indigenous Communities. Winnipeg, MB: National Collaborating Centre for Infectious Diseases. 2018. Available from: https://nccid.ca/ncc-knowledge-exchange-forum-towards-tb-elimination-in-northern-indigenous-communities/

5. Essue BM, Milinkovic D, Birch S. Better data to drive more effective care for people with latent tuberculosis infection in Canada. Can Med Assoc J. 2018 Jun 11;190(23):E700–1.

6. NCCID. Overarching Themes and Priorities Arising from Forum Discussions [Internet]. NCC Knowledge Exchange Forum: Towards TB Elimination in Northern Indigenous communities. Winnipeg, MB: National Collaborating Centre for Infectious Diseases. 2018. Available from: https://nccid.ca/wp-content/uploads/sites/2/2018/10/Overarching-Themes-and-Priorities_TB-Forum-Discussions.pdf

7. Author. TB Deliberative Dialogue Meeting March 21-22, 2018: Proceedings. Winnipeg, MB: National Collaborating Centre for Infectious Diseases and Public Health Agency of Canada. 2018.

8. World Health Organization. The End TB Strategy: Global strategy and targets for tuberculosis prevention, care and control after 2015 [Internet]. Geneva, Switzerland; 2015. Available from: https://www.who.int/tb/strategy/End_TB_Strategy.pdf?ua=1

9. Pan-Canadian Public Health Network. Guidance for Tuberculosis Prevention and Control Programs in Canada - Pan-Canadian Public Health Network [Internet]. Ottawa; 2012 [cited 2018 Oct 11]. Available from: http://www.phn-rsp.ca/pubs/gtbpcp-oppctbc/index-eng.php

10. Theron G, Jenkins HE, Cobelens F, Abubakar I, Khan AJ, Cohen T, et al. Data for action: Collection and use of local data to end tuberculosis. Lancet. 2015;386(10010):2324–33.

11. Heffernan C, Long R. Would program performance indicators and a nationally coordinated response accelerate the elimination of tuberculosis in Canada? Can J Public Heal. 2019 Feb;110(1):31–5.

12. Lix L M, Plourde P J, Larcombe L, Kinew K A, Basham C A, Derksen S, Srisakuldee W, Schultz J and MS. Exploring Tuberculosis Treatment, Management, and Prevention in Manitoba's Administrative Health Data [Internet]. Winnipeg, MB; 2019. Available from: http://mchp-appserv.cpe.umanitoba.ca/reference/MBTB_Report_web.pdf

13. First Nations Inuit Health Branch. Monitoring and Performance Framework for Tuberculosis Programs for First Nations On-Reserve [Internet]. Ottawa; 2016 [cited 2019 Feb 28]. Available from: https://www.canada.ca/en/health-canada/services/publications/science-research-data/monitoring-performance-framework-tuberculosis-programs-first-nations-reserve-2015.html

14. Inuit Tapiriit Kanatami. Inuit Tuberculosis Elimination Framework [Internet]. Ottawa; 2018 [cited 2019 Mar 6]. Available from: https://www.itk.ca/inuittbeliminationframework/

15. World Health Organization. Framework towards tuberculosis elimination in low incidence countries [Internet]. 2014 [cited 2018 Jun 18]. Available from: http://www.who.int/tb/publications/elimination_framework/en/

16. World Health Organization. Goal 3. Sustainable Development Knowledge Platform [Internet]. 2017 [cited 2018 Jun 18]. Available from: https://sustainabledevelopment.un.org/sdg3

17. United Nations. Political Declaration of the UN General Assembly High-Level Meeting on the Fight Against Tuberculosis [Internet]. 2018. p. 20. Available from: https://www.who.int/tb/unhlmonTBDeclaration.pdf

18. Toms C, Stapledon R, Coulter C, Douglas P. Tuberculosis Notifications in Australia, 2014. Commun Dis Intell [Internet]. 2017 [cited 2019 Jun 25];41(3). Available from: http://www.health.gov.au/internet/main/publishing.nsf/Content/9938F170EAA88BD3CA2581F70014931D/$File/CDI4103-k.pdf

19. Public Health England. Tuberculosis in England 2016 report (presenting data to end of 2015). 2016 [cited 2019 Jun 25]; Available from: https://www.tbalert.org/wp-content/uploads/2016/09/PHE_TB_Annual_Report_2016.pdf

20. Government of Canada. Canada's Health Care System [Internet]. Ottawa. 2018 [cited 2019 May 30]. Available from: https://www.canada.ca/en/health-canada/services/health-care-system/reports-publications/health-care-system/canada.html

21. LaFreniere M, Hussain H, He N, McGuire M. Tuberculosis in Canada: 2017. Canada Commun Dis Rep. 2019 Feb 7 45(2/3):68–74.

22. Public Health Agency of Canada. Surveillance of tuberculosis (TB) [Internet]. 2018 [cited 2018 Oct 11]. Available from: https://www.canada.ca/en/public-health/services/diseases/tuberculosis-tb/surveillance-tuberculosis-tb.html

23. Canadian Institute for Health Information. Health indicators [Internet]. [cited 2019 Feb 28]. Available from: https://www.cihi.ca/en/health-indicators

24. Kryzanowski JA, McIntyre L. A holistic model for the selection of environmental assessment indicators to assess the impact of industrialization on indigenous health. Can J Public Health. 2011;102(2):112–7.

25. Haworth-Brockman MJ, Isfeld H. Better Evidence to Improve Women's Health with Gender and Hhealth Statistics: Health indicator frameworks. Winnipeg: Prairie Women's Health Centre of Excellence; 2012.

26. Canadian Institute for Health Information. A Performance Measurement Framework for the Canadian Health System [Internet]. Ottawa; 2013. Available from: https://secure.cihi.ca/free_products/HSP_Framework_Technical_Report_EN.pdf

27. Amin A. Better evidence to improve women's health through gender and health statistics. Washington. Better evidence for health through gender and health statistics. World Health Organization; 2010.

28. von Schirnding Y. Health in Sustainable Development Planning: The role of indicators [Internet]. World Health Organization. World Health Organization; 2010 [cited 2019 Feb 28]. Available from: https://www.who.int/wssd/resources/indicators/en/

29. Lin V, Gruszin S, Ellickson C, Glover J, Silburn K, Wilson G, et al. Comparative evaluation of indicators for gender equity and health. Vol. WHO/WKC/Tech Series/03.2. Kobe, Japan: Women and Health Programme, World Health Organization; 2003.

30. Public Health Agency of Canada. Active TB Case Report Form - New and Retreatment Cases [Internet]. 2011. Available from: http://www.phac-aspc.gc.ca/tbpc-latb/pdf/atcrform-eng.pdf

31. Vachon J, Gallant V, Siu W. Tuberculosis in Canada, 2016. 2018 [cited 2018 Jun 18]; Can. Commun. Dis. Rep. 44(34).

32. Statistics Canada. The Daily — Population size and growth in Canada: Key results from the 2016 Census [Internet]. [cited 2019 Jun 27]. Available from: https://www150.statcan.gc.ca/n1/daily-quotidien/170208/dq170208a-eng.htm

33. Statistics Canada. The Daily — Aboriginal peoples in Canada: Key results from the 2016 Census [Internet]. 2017 [cited 2019 Jun 27]. Available from: https://www150.statcan.gc.ca/n1/daily-quotidien/171025/dq171025a-eng.htm

34. Fanning A, Orr P. TB Program Objectives and Performance Targets for FNIH Jurisdictions. Unpublished; 2010. p. 4.

35. Alvarez GG, Orr P, Wobeser W, Cook V, Long R. Tuberculosis Prevention and Care in First Nations, Inuit and Metis Peoples. In: Canadian Tuberculosis Standards: 7th Edition. 2014. p. Chp 14.

36. Amorevieta-Gentil M, Bourbeau R, Robitaille N. Migration among the First Nations: Reflections of inequalities. Popul Chang Lifecourse Strateg Knowl Clust Discuss Pap Ser [Internet]. 2016 Jan 6 [cited 2019 Mar 5];3(1):Article 10. Available from: https://ir.lib.uwo.ca/pclc/vol3/iss1/10

37. Patterson M, Finn S, Barker K. Addressing tuberculosis among Inuit in Canada. 2018 [cited 2018 Jun 18]; Can. Commun. Dis. Report 44(34).

38. Centers for Disease Control and Prevention. Genotyping | Data & Statistics | TB | CDC [Internet]. Atlanta: CDC. [cited 2019 Mar 16]. Available from: https://www.cdc.gov/tb/publications/factsheets/statistics/genotyping.htm

39. Clark CM, Driver CR, Munsiff SS, Driscoll JR, Kreiswirth BN, Zhao B, et al. Universal genotyping in tuberculosis control program, New York City, 2001–2003. Emerg Infect Dis. 2006; 12(5):719–24.

40. Oren E, Winston CA, Pratt R, Robison VA, Narita M. Epidemiology of urban tuberculosis in the United States, 2000-2007. Am J Public Health. 2011 Jul;101(7):1256–63.

41. World Health Organization. TB and Migration [Internet]. World Health Organization; 2019 [cited 2019 May 31]. Available from: http://www.euro.who.int/en/health-topics/communicable-diseases/tuberculosis/areas-of-work/vulnerable-populations-risk-factors-and-social-determinants/tb-and-migration

42. Aho J, Lacroix C, Bazargani M, Milot DM, Sylvestre JL, Pucella E, et al. Outbreak of tuberculosis among substance users and homeless people in Greater Montreal, Canada, 2003-2016. Can Commun Dis Rep. 2017 Mar;43(3–4):72–6.

43. Heysell SK, Houpt ER. The future of molecular diagnostics for drug-resistant tuberculosis. Expert Rev Mol Diagn. 2012 May;12(4):395–405.

44. Harper S, King NB, Meersman SC, Reichman ME, Breen N, Lynch J. Implicit value judgments in the measurement of health inequalities. Milbank Q [Internet]. 2010;88(1):4–29.

45. Donner L, Isfeld H, Haworth-Brockman M, Forsey C. A Profile of Women's Health in Manitoba [Internet]. Winnipeg: Prarie Women's Health Centre of Excellence; 2008. Available from: http://www.pwhce.ca/profile/pdf/ProfileWomensHealthManitobaComplete.pdf

46. Pederson A,Haworth-Brockman M CB. Rethinking Women and Healthy Living in Canada [Internet]. BC Centre of Excellence for Women's Health. 2013 [cited 2018 Nov 23]. Available from: http://bccewh.bc.ca/2014/02/rethinking-women-and-healthy-living-in-canada/

47. Pan-Canadian Health Inequalities Reporting Initiative. Key Health Inequalities in Canada [Internet]. 2018 [cited 2018 Jun 18]. Available from: https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/science-research/key-health-inequalities-canada-national-portrait-executive-summary/hir-full-report-eng.pdf

48. National Advisory Committe on SARS and Public Health. Learning from SARS: Renewal of Public Health in Canada [Internet]. Ottawa, Canada; 2003. Available from: http://www.phac-aspc.gc.ca/publicat/sars-sras/pdf/sars-e.pdf

49. Office of the Auditor General of Canada. Chapter 5—Surveillance of Infectious Diseases—Public Health Agency of Canada [Internet]. 2008 [cited 2018 Oct 11]. Available from: http://www.oag-bvg.gc.ca/internet/English/parl_oag_200805_05_e_30701.html#hd5d

50. Dehghani K, Lan Z, Li P, Michelsen SW, Waites S, Benedetti A, et al. Determinants of tuberculosis trends in six Indigenous populations of the USA, Canada, and Greenland from 1960 to 2014: a population-based study. Lancet Public Heal. 2018 Mar 1;3(3):e133–42.

A Compilation of TB Program Performance Indicators Across Canadian and International Source Documents

	PHN Butler-Jones D, Corriveau A. Guidance for Tuberculosis Prevention and Control Programs in Canada. Pan-Canadian Public Heal. Netw. 2012; :1–69.	**FNIHB** First Nations and Inuit Health Branch, Health Canada. Health Canada's Monitoring and Performance Framework for Tuberculosis Programs for First Nations On-Reserve.	**Heffernan/Long** Heffernan C, Long R. Would program performance indicators and a nationally coordinated response accelerate the elimination of tuberculosis in Canada? Can J Public Heal 2018; 2050.	**Fanning/Orr** Fanning A, Orr P. TB Program Objectives and Performance Targets for FNIH Jurisdictions. 2010	**WHO** World Health Organisation. The End TB Strategy. Geneva, Switzerland: 2015. http://www.who.int/tb/strategy/End_TB_Strategy.pdf?ua=1.	**USA-CDC** CDC. National TB Program Objectives & Performance Targets for 2020. 2015. https://www.cdc.gov/tb/programs/evaluation/pdf/programobjectives.pdf.	**England** Public Health England, NHS England. Collaborative Tuberculosis Strategy for England: 2015 to 2020. 2015. www.gov.uk/government/uploads/system/uploads/attachment_data/file/396263/CollaborativeTBStrategyEngland_FINAL.pdf.	**Australia** National Tuberculosis Advisory Committee. The Strategic Plan for Control of Tuberculosis in Australia: 2011 – 2015. Commun Dis Intell 2012; 36:E286–E293.
Incidence and Inequalities								
Overall and Subpopulation	National Incidence Rate	Number of newly reported cases of **active TB** (new and re-treatment cases)	Incidence	TB Case Incidence	TB Incidence, Prevalence, and Mortality	TB Incidence Rate	TB incidence per 100,000 population. Three year **rolling average** for local levels	Incidence of TB
Pediatric			Proportion of **pediatric cases** (< 5 years)			Incidence of TB disease among **children younger than 5 years of age.**	TB incidence per 100,000 population in UK born **children aged under fifteen years.**	
Respiratory/Non-Respiratory		Number of newly reported cases of **respiratory** (primary, pulmonary, other) and **non-respiratory TB**						
Drug-Resistance	Acquired **drug resistance rate**	Number of newly reported cases of **drug-resistant TB**					Number and proportion of **culture confirmed TB cases** with **any first line drug resistance**. Annual number and proportion of culture confirmed TB **cases with MDR-TB.**	Incidence and **characteristics** of **drug resistant** TB acquired **within Australia**. Incidence and **characteristics** of **drug resistant** TB in **migrants.**
HIV Co-Infection		Number of newly reported new cases of active TB who were also **co-infected with HIV**						
Higher-Risk Groups - Enhanced								Incidence and **Characteristics of TB** in **higher risk groups** (overseas born persons; healthcare workers; irregular maritime arrivals).
Health care-acquired								Number of **cases** of TB **acquired** within Australian **health care institutions/ laboratories**
Inequalities							Slope index of **inequalities (SII) in TB rates** (use index of deprivation score)	
Lab Reporting								

Lab Arrival Time	Turnaround **time** between specimen **collection** and **arrival** at the **laboratory**							
Smear-time	Turnaround **time** between **specimen receipt** and AFB **smear microscopy**							
NAAT-time	Turnaround **time** between smear result and **Nucleic acid amplification testing** for M. tuberculosis complex detection		Turn-around **time (NAAT)**			For TB patients with respiratory specimens positive for MTBC by **nucleic acid amplification (NAA)**, the proportion **reported** by the laboratory **within 6 days** from the date the **specimen was collected**.		
Culture-time	Turnaround **time** between specimen receipt and **bacteriological diagnosis - culture**		Turn-around **time (Culture)**			For TB patients with **cultures** of respiratory specimens identified with M. tuberculosis complex (MTBC), the **proportion reported** by the laboratory **within 25 days** from the date the **specimen was collected.**		
Culture-confirmation						For TB **patients** ages 12 years or older with a pleural or respiratory site of disease, the **proportion** who have a **sputum culture result reported**.	Number and proportion of pulmonary **TB cases** that were **culture confirmed.**	Proportion of TB notifications **confirmed by** microbiological **laboratory diagnosis.**
Genotyping			Proportion of **culture-positive cases with genotyping**			For TB patients with a **positive culture** result, increase the proportion who have a **MTBC genotyping result reported**.		
Species Identification-time	Turnaround time between specimen receipt and **identification of mycobacterial species**							
DST			Proportion of c**ulture-positive cases with DST**		Percentage of all TB patients for whom results of **drug susceptibility testing** were available	For TB patients with positive culture results, the proportion who have initial **drug-susceptibility results reported.**	Number and proportion of **culture confirmed** TB cases with **drug susceptibility testing** reported for the **four first line agents**.	Proportion of **culture-confirmed cases** that undergo **drug susceptibility testing**.
DST-time	Turnaround time between positive culture and primary **susceptibility testing**							**Time** to **identification** of **drug resistant TB.**

Culture-during treatment			Proportion of smear-positive pulmonary cases with **sputum culture** and **CXR,** end of **initial phase** of **treatment** Proportion of smear-positive pulmonary cases with **sputum culture** and **CXR,** end of **continuation phase** of **treatment**					
Report Back-time	Turnaround **time** between **test** completion and **reporting** of **all test results** (electronically and hard copy)			Turnaround **time** for **sputum smears** to be **reported back to ordering staff/facility** Proportion of **smears reported** back **within 48 hours of collection**				Proportion of **laboratories meeting** the **recommended** turn around **time**.
Diagnostic Delay								Proportion of **cases** with a **diagnostic delay** of **greater than 1 month.**
Case Management and Treatment								
Early Diagnosis-Smear positive				Percentage of pulmonary **TB cases** that are **smear positive**				
Early Diagnosis-symptoms-to-treatment				Proportion of cases where mean and median **time** from **onset of symptoms** to **onset of therapy** is l**ess than 4 months**			Number and proportion of pulmonary TB cases **starting treatment within two months** and **four months** of **symptom onset**.	
Treatment Initiation	Proportion of cases where treatment is **started with 4 or more anti-TB drugs** until drug sensitivity test results are available, unless there are current local drug sensitivity data showing that resistance is not a risk		i) Proportion of **Canadian-born cases**/w no past hx TB **started** on a **minimum of 3 drugs** ii) Proportion of **foreign-born cases**/w no past hx TB **started** on a **minimum of 4 drugs**			For patients whose **diagnosis is likely** to be TB disease, the proportion who are s**tarted on the recommended initial 4-drug regimen.**		
Treatment Initiation-time	Proportion of cases **started** on anti-TB drugs **within 48 hours of diagnosis**		Proportion of smear-positive pulmonary cases **starting treatment within 72 h of NAAT**	Proportion of patients who are **diagnosed** with TB (clinically or microbiologically) that **start treatment within 48 hours** of **diagnosis**		For TB patients with positive acid-fast bacillus (AFB) sputum smear results, the proportion who **initiated treatment within 7 days of specimen collection.**		
Sputum Culture Conversion	Proportion of culture-positive, drug-sensitive respiratory cases with **sputum culture conversion** (three consecutive negative sputum cultures **within 60 days** of treatment initiation)			**Sputum Culture Conversion** - Proportion of patients with culture positive sputum that are sputum negative **within 4 months** of treatment initiation		For TB patients with **positive sputum culture** results, the proportion who have documented **conversion** to negative results **within 60 days** of treatment initiation.		
Treatment Completion	Proportion of cases with **treatment success** (cure or completion) **within 12 months** of treatment initiation for patients who did not die or transfer out during treatment	Number of TB cases (active and re-treatment) diagnosed in (year) who **completed treatment** (including cured) **within one year** of treatment start date	Proportion of smear-positive pulmonary cases that **complete treatment within 12 months**	Proportion of patients with newly diagnosed TB, for who 12 months or less of treatment is indicated, who **complete treatment within 12 months**	Tuberculosis **treatment success** rate	For patients with newly diagnosed TB disease for whom 12 months or less of treatment is indicated, the proportion who **complete treatment within 12 months.**	Number and proportion of **drug sensitive TB cases** who had **completed** a full course of **treatment by 12 months**.	Proportion of **successful treatment of TB.**

Lost-to-follow up							Number and proportion of **drug sensitive TB cases** that were **lost to follow up** at last reported outcome.	
Left-treatment		Number of TB cases diagnosed in (year) who **transferred out before treatment completion** within one year of treatment start date						
TB Deaths		Number of TB cases diagnosed in (year) who **died before or during treatment** within one year of treatment start date Number of **deaths** - TB was a **direct cause** Number of **deaths** - TB **contributed,** but was not the cause of death Number of **deaths** - **had TB**, but did not contribute to death	Proportion with **TB-related death of preceding years' cases**				Number and proportion of **drug sensitive TB cases** that had **died** at **last reported outcome**.	
Re-treatment/ Relapse	**Re-treatment rate within two years** after the end of previous treatment in Canada			Proportion of **cases per year** that are relapsed (**re-treatment cases**)				Proportion of **cases** initially treated in Australia who **relapse within 5 years of treatment.**
Drug-Resistant Treatment Initiation					Percentage of patients with **drug-resistant TB** enrolled **on second-line treatment**			
Drug-Resistant Treatment Outcome							Number and proportion of **drug resistant** TB cases who had **completed treatment at 24 months**. Number and proportion of **drug resistant** TB cases who were **lost to follow up** at last reported outcome. Number and proportion of **drug resistant** TB cases who had **died** at last reported outcome	
HIV - Treatment					Percentage of **HIV-positive** TB patients on **anti-retroviral therapy**			
DOT	Proportion of **cases** treated by standard or enhanced **directly observed therapy (DOT)**			Proportion of cases that are **treated by DOT** **Proportion of TB-HIV co-infected cases that are treated by DOT**				

Underserved Populations							Number and proportion of drug sensitive **TB cases with at least one social risk factor** who **completed treatment within 12 months**. Proportion of TB **patients with social risk factors** recorded who received **enhanced case management.** (*In development)	
HIV Serologic Testing	Proportion of cases where **HIV status known and reported** on PHAC Active TB Case Report Form		Proportion **HIV tested**	Proportion of TB cases that have **HIV testing** and have the **results reported** provincially and federally	Proportion of TB patients **screened for HIV**	Proportion of TB patients who have a **positive or negative HIV test result reported**	Number and proportion of TB cases **offered an HIV test**.	Proportion of TB cases with a **recorded HIV status.**
Contacts								
Contact Identification	**Proportion** of infectious **TB cases** where **initial list of contacts** is **completed** within **seven** calendar **days**	**Total number of reported contacts** of active TB cases diagnosed in (year)		**Contact list** for each infectious case is **completed within 7 days of diagnosis** of index case		**Proportion** of TB patients with **positive AFB sputum-smear** results, who have **contacts elicited.**	**Proportion** of pulmonary **TB cases** who had **close contacts identified** *(*In development)*	
Contacts - Close		Number of **close contacts** of active TB cases diagnosed in (year) Number of **Other Contacts (not close**) of active TB cases diagnosed in (year)						
Contact Examination		Of the total number of reported **contacts** of active TB cases diagnosed in [year], the number having no known past history of TB or LTBI (positive TST/IGRA), who were **screened for LTBI**	Proportion of close **contacts** of smear-positive pulmonary cases **completely assessed** (< 5 years of age and ≥ 5 years of age)		**Percentage** of eligible **index cases** of TB for which **contact investigations** were undertaken.	Proportion of **contacts** to sputum AFB smear-positive TB cases, who are **examined for infection and disease.**	Proportion of identified **close contacts** of pulmonary TB cases that were **evaluated.** *(*In development)*	
Contacts - LTBI Identification		Of the number of **contacts screened** for LTBI above, the number with a new positive TST/IGRA or TST/IGRA conversion (i.e., number of newly **identified LTBI)**						
Contacts - LTBI Treatment Recommended		Of the number of **contacts** with a new **positive** TST/IGRA or TST/IGRA **conversion** above, the number **recommended for treatment of LTBI**	Proportion of close **contacts** with new **positive** TST/TST **conversion recommended TX LTBI** (< 5 years of age and ≥ 5 years of age)					
Contacts - LTBI Treatment Acceptance		Of the number of **contacts recommended** for treatment of LTBI above, **the number who accepted treatment for LTBI**		Percentage of client **acceptance of** offered **prophylaxis**				

Contacts - LTBI Treatment Initiation	Proportion of contacts with a **diagnosis of LTBI** who **begin treatment**	Of the number of **contacts accepting** treatment of LTBI above, the number who **started** treatment Of the number of **contacts accepting** treatment of LTBI above, the **number** (**without contraindications** to INH or RMP) **who started treatment**	Proportion of close **contacts recommended** TX LTBI, who **start treatment** (< 5 years of age and ≥ 5 years of age)		Percentage of eligible **people living with HIV** and **children** aged **under-five who are contacts** of TB patients being **treated for LTBI**	Proportion of **contacts** to sputum AFB smear-positive TB cases diagnosed **with latent TB infection**, who **start treatment**.		
Contacts - LTBI Treatment Initiation - Time	Proportion of **close contacts** where **assessment is completed and LTBI treatment started**, if indicated and not contraindicated or refused, **within 28 calendar days**			**Contacts are assessed** and, for those for whom prophylaxis is appropriate, the **prophylaxis is started within 28 days** of completion of contact list				
DOPT				Proportion of all **preventative therapy** that is given **by DOPT**				
Contacts - LTBI Treatment Completion	Proportion of contacts **beginning treatment** for LTBI who **complete treatment**	Of the number of **contacts starting** treatment of LTBI above (and without contraindications to INH or RMP), the **number completing treatment** at the time of reporting (**irrespective of length of treatment**)	Proportion of close **contacts accepting** TX LTBI who **complete treatment** (< 5 years of age and ≥ 5 years of age)	Percent **completion of prophylaxis** among those **who accept**		Proportion of **contacts** to sputum AFB smear-positive TB cases who have **started treatment** for latent TB infection, **who complete treatment.**		
Contacts - LTBI Treatment Completion - Time		Of the number of **contacts starting** treatment of LTBI above (and without contraindications to INH or RMP), the **number completing treatment within 12 months of** treatment **initiation**						
Contacts - LTBI - Reactivation	Proportion of contacts completing treatment who show **active TB disease within two years** after completion							
Contacts - LTBI - Decline Treatment F/up	Proportion of contacts with **LTBI** at high risk of progression to active TB disease, but unable or **unwilling to be treated** for LTBI who have **chest radiography and sputum smear plus culture at 6, 12, and 24 months**							
Screening and Follow-up								
People with Suspected TB					Percentage of **people** with **suspected** tuberculosis **tested** using WHO recommended rapid diagnostics.			
People Living with HIV	Proportion of **HIV-positive** individuals **screened** for active TB diseases and LTBI			Proportion of **HIV positive persons** that are **tested for TB infection/disease**				

People with Impaired Immunity	Proportion of individuals with **end-stage renal disease** screened for active TB diseases and LTBI Proportion of individuals with **transplant-related immunosuppression** screened for active TB diseases and LTBI Proportion of individuals with **tumor necrosis factor alpha inhibitor use** screened for active TB diseases and LTBI Proportion of individuals with **long - term (> 1 month) corticosteroid use** (prednisone > 15 mg/day or equivalent) screened for active TB diseases and LTBI			Proportion of **those at increased risk for TB reactivation** due to **impaired immunity** (other immunosuppressed conditions, diabetes, renal failure as defined by creatinine clearance less than 20 ml/min., immunosuppressant medication, pulmonary silicosis) are **tested for LTBI** and **assessed for** possible **preventative therapy**				
IRCC Referrals - Examination Initiation			Proportion of **IRCC referrals** who **initiate examination** within 30 days of notification			For **immigrants and refugees** with **abnormal** chest radiographs **(X-rays)** read overseas as consistent with TB, the proportion who i**nitiate a medical examination within 30 days of notification**.	Proportion of eligible **new entrants** covered by screening programs **who accept LTBI screening** *(*In development)*	
IRCC Referrals - Examination Completion	Proportion of individuals referred for **immigration medical surveillance** who (1) **keep the first appointment** with the clinic/physician **or** who have been **evaluated by public health** and (2) the relevant provincial/territorial authorities have **reported** such information **to IRCC**		Proportion of **IRCC referrals** who **complete examination** within 90 days of notification			For **immigrants and refugees** with abnormal **chest X-rays** read overseas as consistent with TB, the proportion who **complete a medical examination within 90 days of notification**.		
IRCC Referrals - Treatment Acceptance			Proportion of **IRCC referrals recommended TX LTB**I who **accept**					
IRCC Referrals - Treatment Initiation						For **immigrants and refugees** with abnormal chest X-rays read overseas as consistent with TB who are diagnosed **with latent TB infection** or have radiographic findings consistent with prior pulmonary TB (ATS/CDC Class 4) on the basis of examination in the U.S., for whom **treatment** was **recommended,** the proportion **who start treatment.**		

IRCC Referrals - Treatment Completion			Proportion of **IRCC referrals accepting TX LTBI who complete**			For **immigrants and refugees** with abnormal chest X-rays read overseas as consistent with TB who are diagnosed with **latent TB infection** or have radiographic findings consistent with prior pulmonary TB (ATS/CDC Class 4) on the basis of examination in the U.S., and **who have started on treatment,** the proportion **who complete treatment.**	**Proportion** of (new entrant) individuals who **complete LTBI treatment amongst those who start** treatment *(*In development)*	
New Entrant LTBI Screening Initiative							The **number** of **local authorities** that have a systematic **new entrant LTBI screening initiative** in place (*In development)	
Other Programmatic								
BCG - Community		Number of **communities using BCG vaccination**						
BCG - Administered		Number of **BCG vaccinations administered**					Proportion of **babies** in areas with a universal BCG programme **who received BCG vaccine** *(*In development)*	
BCG - Eligible		Number of **births eligible to receive BCG** vaccination during reporting period						
BCG - Adverse Reactions		Number of reported **adverse reactions from BCG** **Adverse reactions from BCG:** line list of type of reaction(s) for each adverse event						
Outbreaks - New		Number of **new outbreaks** (new in the reporting period)						
Outbreaks - Ongoing		Number of **outbreaks** in [year] that were **ongoing from previous year**						
New Outbreak - Active Cases		Number of **active TB cases per new outbreak**						
Ongoing Outbreak - Active Cases		Number of **active TB cases per outbreak ongoing from previous year(s)**						

CTBRS Reporting - Completeness			Proportion of **completed** CTBRS active **TB case report forms** (last full year) Proportion of **completed CTBRS treatment outcome forms** (next to last full year)			Percent **completeness of each core Report** of Verified Case of Tuberculosis (RVCT) data item reported **to CDC**, as described in the TB cooperative agreement announcement. Percent **completeness of each core Aggregate Reports** for Tuberculosis Program Evaluation (ARPE) data items reported **to CDC**, as described in the TB cooperative agreement announcement.		**Completeness** of quarterly **reporting**.
Report Publication								Publication of a combined **notification and laboratory annual TB report** by December of the following year.
WHO Reporting								**Annual reporting to WHO.**
Global TB Elimination Activities								**Report** Australia's **participation** in **global control activities,** annually.
Evaluation and Strategic Planning Activities				**Meetings** held at least **twice yearly** between all program partnership members (federal, provincial, regional, community leadership/membership) **to review evaluation data** and to **propose/discuss/ achieve improvements** All cases of **treatment failure, disease relapse**, and of **drug resistance** are **reviewed** at least **monthly** by public health and clinical experts. General **conclusions** are **shared** with partnership members. Federal, provincial, regional and community TB program partners will hold **community consultations each year**, in selected (to be agreed upon) endemic and epidemic communities in order **to report** to the people they serve **and** to **receive feedback** on the program.		**Number** of program **evaluation activities**, **program progress** and **evaluation status** of TB cooperative agreement recipients. The percent of TB cooperative agreement recipients who submit a **program-specific human resource development plan** (HRD) and a **yearly update of progress**, as outlined in the TB cooperative agreement announcement.		

Education - Health Provider				Proportion of **health care providers** working in (TB-affected) communities who have **completed an online course** specifically developed (for their) context, **regarding TB** (infection and disease) **diagnosis and therapy**. (**note - adapted to apply across population groups*)		The percent of TB cooperative agreement recipients that **have a TB training focal point.**		
Education - Community				Radio, print and/or TV (e.g. DVD) **educational materia**l regarding TB are **available to 60% of (TB-affected) communities**. These resources are **language and culture specific**, and focus on creating a shared understanding of TB causation and elimination. (**note - adapted to apply across population groups)*				
Ethics				**Agreement** will be sought in each jurisdiction to ensure the **confidentiality of individual health data** regarding TB, while **respecting** communal **needs and rights**... within the context of their culture, traditions and legal powers. (**note - adapted to apply across population groups*)				
Determinants								
Nutrition					Percentage of population without **undernutrition**			