Tuberculosis in Canada

Epidemiological Update 2022

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

Canada

To promote and protect the health of canadians through leadership, partnership, innovation and action in public health.

—Public Health Agency of Canada

Également disponible en français sous le titre :
Tuberculose au Canada : Mise à jour de l'épidémiologie 2022

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

Publication date: February 2025

Cat.: HP40-382/2022E-PDF
ISBN: 978-0-660-75541-0
Pub.: 240832

Table of Contents

Glossary

AB	Alberta
AFB	Acid-fast bacilli
BC	British Columbia
CFR	Case fatality rate
CTBLSS	Canadian Tuberculosis Laboratory Surveillance System
CTBRS	Canadian Tuberculosis Reporting System
EMB	Ethambutol
HIV	Human immunodeficiency virus
ICD	International Classification of Disease
INH	Isoniazid
MB	Manitoba
MDR	Multidrug-resistance
MTB	*Mycobacterium tuberculosis*
M. bovis BCG	*Mycobacterium bovis* Bacillus Calmette-Guérin
n	Cases
n/a	Not applicable
NAAT	Nucleic Acid Amplification Test
NB	New Brunswick
NL	Newfoundland and Labrador
NS	Nova Scotia
NT	Northwest Territories
NU	Nunavut
ON	Ontario
PE	Prince Edward Island
PHAC	Public Health Agency of Canada
PZA	Pyrazinamide
QC	Québec
RMP	Rifampin
SK	Saskatchewan
TB	Tuberculosis
XDR	Extensive Drug Resistance
YT	Yukon Territories
%	Proportion

Key findings

- The incidence of active tuberculosis (TB) in Canada has remained stable over the last 20 years. In 2022, there were 1,971 people in Canada diagnosed with active TB, corresponding to an incidence of 5.1 cases per 100,000 population. If this trend continues, Canada will not meet its global commitment for TB elimination of less than 1 case per 100,000 by 2035[1].
- There continues to be a disproportionate impact of TB among people born outside of Canada and Indigenous Peoples (in particular, Inuit). In 2022, where population subgroup was reported, 76.2% of TB cases occurred among people born outside of Canada (incidence of 14.4 per 100,000); 6.2% among Inuit (incidence of 136.7 per 100,000), 11.3% among First Nations (incidence of 21.4 per 100,000), and 0.6% among Métis (incidence of 2.0 per 100,000). Addressing TB in these populations is key to achieving TB elimination.
- The incidence of active TB among children less than 5 years of age in 2022 was the highest ever reported in the past decade in Canada at 4.0 per 100,000.
- Drug resistance continues to be relatively low, when compared internationally[2]. In 2022, 9.6% (n=156/1,632) of isolates that were submitted for drug susceptibility testing were resistant to first line drugs for the treatment of TB; 1.4% (n=22/1,632) were multidrug-resistant, 0.3% (n=5) were polydrug-resistant, and none were extensively drug-resistant.
- In 2021, treatment was deemed successful at the time of reporting for three quarters (75.3%; n=1,250/1,660) of cases and no treatment failures were reported. Less than ten percent (8.5%; n=141/1,660) of cases were continuing treatment at the reporting cut off.
- The case fatality rate for TB in Canada was 5.7% in 2021, and this has remained relatively stable over the past decade, ranging from 3.6% to 5.7%.

Methods

Data collection

The Public Health Agency of Canada (PHAC) in collaboration with provincial and territorial public health authorities, monitors TB in Canada through the Canadian Tuberculosis Reporting System (CTBRS), a national case-based surveillance system that collects and maintains non-nominal data on persons diagnosed with active TB. Active TB occurs when *Mycobacterium tuberculosis* causes an infection, either through primary infection or reactivation of latent TB, usually affecting the lungs although other organs or systems may be involved. For surveillance purposes, cases of active TB are either laboratory confirmed or clinically diagnosed and are defined as follows:

Laboratory confirmed TB case:

- A person for whom laboratory testing has detected Mycobacterium tuberculosis complex (excluding *Mycobacterium bovis* Bacillus Calmette-Guérin strain (*M. bovis* BCG) on culture.

  or

- A person for whom laboratory testing has detected Mycobacterium tuberculosis complex (excluding *M. bovis* BCG strain) by nucleic acid amplification testing (NAAT) and with clinical findings consistent with TB disease.

Clinically diagnosed case:

- A person for whom microbiological confirmation of active TB is absent and who meets one or more of the following criteria:
  - Signs or symptoms clinically compatible with active TB (respiratory or non-respiratory);
  - Diagnostic imaging findings compatible with active TB (respiratory or non-respiratory imaging);
  - Pathologic evidence of active TB (e.g., compatible histopathology, positive acid-fast bacilli (AFB) staining);
  - Post-mortem evidence of active TB;
  - Favourable response to a therapeutic trial of anti-TB drugs.

Cases meeting this definition are submitted to the CTBRS by the respective provincial and territorial public health authorities on a voluntary basis. Information is additionally collected for the following variables:

- diagnostic classification based on the disease site (respiratory or non-respiratory)
- demographic data (age, sex, ethnicity, country of birth, and place of residence)
- clinical information (medical co-morbidity: human immunodeficiency virus (HIV), diabetes, end-stage renal disease, abnormal chest X-ray, transplant-related immunosuppression, and corticosteroid use)
- selected social determinants of health (e.g., housing and substance use)
- other potential risk factors (e.g., contact with active TB, travel history to a high burden TB country, history of incarceration, etc.)

Active TB is classified as either respiratory or non-respiratory. Respiratory TB includes infection of the lungs and conducting airways (pulmonary), intrathoracic or mediastinal lymph nodes, larynx, nasopharynx, nose or sinuses[3]. Pulmonary TB is the most common form of respiratory TB and includes tuberculous fibrosis of the lung, tuberculous bronchiectasis, tuberculous pneumonia and tuberculous pneumothorax, isolated tracheal or bronchial TB, and tuberculous laryngitis[3]. Non-respiratory TB, also referred to as extra-pulmonary TB, includes all other disease sites (the peripheral lymph nodes, central nervous system and meninges, intestines, peritoneum and mesenteric glands, bones and joints, genito-urinary system, miliary, eyes, etc.)[3]. Due to the prolonged time required for TB treatment, data on treatment outcomes are submitted to the CTBRS one year (one reporting cycle) following the submission of the initial case report of incident TB. When treatment is ongoing at the time of this second data submission, the reporting jurisdiction submits an interim report followed by subsequent annual updates until the case file is resolved or closed. Updated data from previous years are always reflected in the most current surveillance report. The surveillance definition of treatment success includes cured (i.e., culture-negative at the end of treatment) or completion of the full-prescribed course of TB treatment.

Antimicrobial resistance data were captured through the Canadian Tuberculosis Laboratory Surveillance System (CTBLSS). All Mycobacterium tuberculosis complex isolates are sent to provincial laboratories or to the National Microbiology Laboratory (Atlantic region and Manitoba) for drug susceptibility testing using culture-based, phenotypic methods. Susceptibility testing is completed for first-line TB drugs, and isolates demonstrating resistance to first-line drugs are then submitted for testing against second-line TB drugs. Resistant isolates are classified as follows:

- Mono-resistance, defined as resistance to one first-line anti-TB drug only (isoniazid, rifampin, ethambutol or pyrazinamide);
- Poly-resistance, defined as resistance to more than one first-line anti-TB drug, not including the combination of isoniazid and rifampin;
- Multidrug-resistance (MDR), which is the resistance to isoniazid and rifampin with or without resistance to other anti-TB drugs; and
- Extensive drug-resistance (XDR), defined as resistance to first-line agents (isoniazid and rifampicin), AND any fluoroquinolone, AND to one or more second-line injectable drug (amikacin, kanamycin, or capreomycin).

Together with demographic data (sex, age, and province of residence), the results of culture-based, phenotypic drug susceptibility testing of isolates from active TB cases are submitted voluntarily to the CTBLSS by provincial TB laboratories every year. Territorial drug-susceptibility testing results are submitted by provincial laboratories on their behalf.

Latent TB infection is not nationally notifiable, and not reported through either the CTBLSS or CTBRS surveillance systems and therefore is not included in this report.

Data analysis

The incidence of active TB was calculated as the number of cases per 100,000 population. Denominator data used to calculate these rates came from multiple sources. Canadian population data were based on midyear estimates of the Canadian population from Statistics Canada[4]. For persons born outside Canada, data were obtained from population projections based on the most recent Canadian Census[5]. Denominators for First Nations, Métis and Inuit were obtained from Statistics Canada Projections of Indigenous Households in Canada, 2016 to 2041[6] for the years 2013 to 2020. Nowcasting projections[7] were utilized for the years 2021 and 2022. Nowcasting is a modeled population projection method intended to be used between census years.

Data received from provinces and territories were maintained according to PHAC's Directive for the Collection, Use and Dissemination of Information Relating to Public Health. Data were cleaned and analyzed using SAS™ Enterprise Guide and Microsoft™ Excel 2016. No statistical procedures were used for comparative analyses, nor were statistical techniques applied to account for missing data.

It should be noted that certain analyses do not include all jurisdictions due to missing data. British Columbia has not submitted information on Indigenous identity for TB cases since 2016. Since this time, cases from British Columbia have been reported as either Canadian-born or born outside Canada. For 2021 and 2022, data were not available from Quebec for the following population groups: First Nations, Métis, persons born outside Canada and non-Indigenous Canadian-born. Data were also missing for a number of variables including diagnostic site, risk factors, treatment outcomes and drug resistance. Consequently, analyses including these variables excluded Quebec.

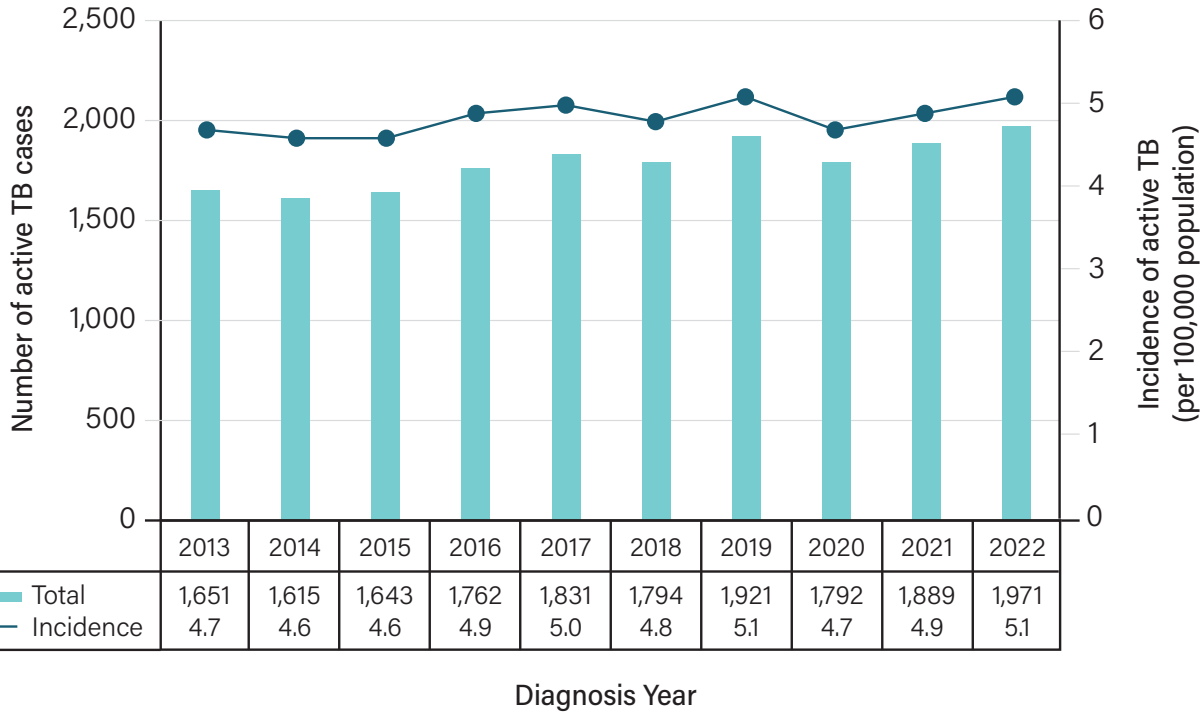
Data in this report are considered provisional and may be subject to change in future TB surveillance reports. If there are discrepancies between the data summarized in this report and provincial and territorial reports, the most recent provincial and territorial report should be used because updated national data may still be pending. This *Tuberculosis Epidemiological Update: 2022* incorporates data and/or updates received up to May 15, 2024.

Results

TB in Canada

In 2022, there were 1,971 people in Canada diagnosed with active TB, corresponding to an incidence of 5.1 per 100,000 (**Figure 1**). The overall annual number of cases has been steadily increasing over time from 1,651 in 2013 to 1,971 in 2022, with the corresponding incidence remaining stable between 4.6 and 5.1 per 100,000 per population (**Figure 1**).

Figure 1: Number and incidence of active TB (per 100,000) by year, CTBRS: 2013–2022



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total	1,651	1,615	1,643	1,762	1,831	1,794	1,921	1,792	1,889	1,971
Incidence	4.7	4.6	4.6	4.9	5.0	4.8	5.1	4.7	4.9	5.1

Geography

In 2022, the four most populous provinces, Ontario (38.4%; n=756), British Columbia (15.6%; n=308), Quebec (14.3%; n=282), and Alberta (12.4%; n=244) accounted for the majority (80.7%; n=1,590) of active TB cases (**Table 1**) as in past years). Jurisdictions consistently reporting the lowest numbers over time included Prince Edward Island (n=0–4), Yukon and Northwest territories (n=1–8) (**Table 2**).

The highest incidence of TB in Canada was in Nunavut at 130.8 per 100,000 population, whereas Nunavut accounted for a small proportion of the total cases in Canada at 2.7% of active TB cases. The second highest incidence of TB in 2022 was reported in Saskatchewan (12.1 per 100,000) followed by Manitoba (9.2 per 100,000) (**Table 1**).

Table 1: Number, proportion, and incidence of active TB (per 100,000) by jurisdiction, CTBRS: 2022

Jurisdiction	Cases	Proportion	Incidence *(per 100,000 population)*
Newfoundland and Labrador (NL)	17	0.9%	3.2
Prince Edward Island (PE)	3	0.2%	1.8
Nova Scotia (NS)	14	0.7%	1.4
New Brunswick (NB)	16	0.8%	2.0
Québec (QC)	282	14.3%	3.2
Ontario (ON)	756	38.4%	5.0
Manitoba (MB)	129	6.5%	9.2
Saskatchewan (SK)	145	7.4%	12.1
Alberta (AB)	244	12.4%	5.4
British Columbia (BC)	308	15.6%	5.8
Nunavut (NU)	53	2.7%	130.8
Northwest Territories (NT)	3	0.2%	6.6
Yukon (YT)	1	0.1%	2.3
Canada	**1,971**	**100%**	**5.1**

Note: Proportions presented are among all cases.

Table 2: Number and incidence of active TB (per 100,000) by jurisdiction, CTBRS: 2013–2022

Jurisdiction		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NL	Cases	13	7	33	24	13	30	14	11	10	17
	Incidence *(per 100,000)*	2.5	1.3	6.2	4.5	2.5	5.7	2.7	2.1	1.9	3.2
PE	Cases	0	3	3	4	0	1	4	3	2	3
	Incidence *(per 100,000)*	0.0	2.1	2.1	2.7	0.0	0.7	2.5	1.9	1.2	1.8
NS	Cases	8	7	6	3	9	8	5	12	17	14
	Incidence *(per 100,000)*	0.9	0.7	0.6	0.3	0.9	0.8	0.5	1.2	1.7	1.4
NB	Cases	3	5	6	12	8	6	11	9	10	16
	Incidence *(per 100,000)*	0.4	0.7	0.8	1.6	1.0	0.8	1.4	1.1	1.3	2.0
QC	Cases	240	207	244	252	217	275	290	240	229	282
	Incidence *(per 100,000)*	3.0	2.5	3.0	3.1	2.6	3.3	3.4	2.8	2.7	3.2
ON	Cases	634	585	597	641	676	659	742	675	714	756
	Incidence *(per 100,000)*	4.7	4.3	4.4	4.6	4.8	4.6	5.1	4.6	4.8	5.0
MB	Cases	166	135	158	201	187	187	180	146	153	129
	Incidence *(per 100,000)*	13.1	10.6	12.2	15.3	14.0	13.8	13.1	10.6	11.0	9.2
SK	Cases	86	88	70	91	94	79	66	102	122	145
	Incidence *(per 100,000)*	7.8	7.9	6.2	8.0	8.2	6.8	5.6	8.7	10.3	12.1
AB	Cases	187	217	210	238	227	222	245	251	241	244
	Incidence *(per 100,000)*	4.7	5.3	5.1	5.7	5.4	5.2	5.6	5.7	5.4	5.4
BC	Cases	257	269	264	238	288	264	304	301	309	308
	Incidence *(per 100,000)*	5.6	5.7	5.5	4.9	5.8	5.3	6.0	5.8	5.9	5.8
NU	Cases	51	84	44	54	101	57	54	34	77	53
	Incidence *(per 100,000)*	144.3	233.5	120.6	146.0	269.0	149.4	139.9	86.8	193.9	130.8
NT	Cases	4	4	5	3	3	3	5	7	4	3
	Incidence *(per 100,000)*	9.1	9.1	11.3	6.7	6.7	6.7	11.1	15.4	8.8	6.6
YT	Cases	2	4	3	1	8	3	1	1	1	1
	Incidence *(per 100,000)*	5.5	10.8	8.0	2.6	20.2	7.4	2.4	2.4	2.3	2.3
Canada	**Cases**	**1,651**	**1,615**	**1,643**	**1,762**	**1,831**	**1,794**	**1,921**	**1,792**	**1,889**	**1,971**
	Incidence *(per 100,000)*	**4.7**	**4.6**	**4.6**	**4.9**	**5.0**	**4.8**	**5.1**	**4.7**	**4.9**	**5.1**

Sex and age

In 2022, the incidence of active TB was higher among males (5.8 per 100,000) compared to females (4.3 per 100,000) (**Table 3**). This difference between males and females has been consistently observed over time (**Figure 2**) and is consistent with global trends[2].

Regarding age, the incidence of active TB was highest in the 65 years and older age group at 6.7 cases per 100,000 (**Table 4**). This age group represented 24.9% (n=490) of TB cases, but 18.8% of the total population[4] of Canada (**Table 3** and **Table 4**). The lowest incidence was reported in children between 5 and 14 years of age (1.5 cases per 100,000) (**Table 3**).

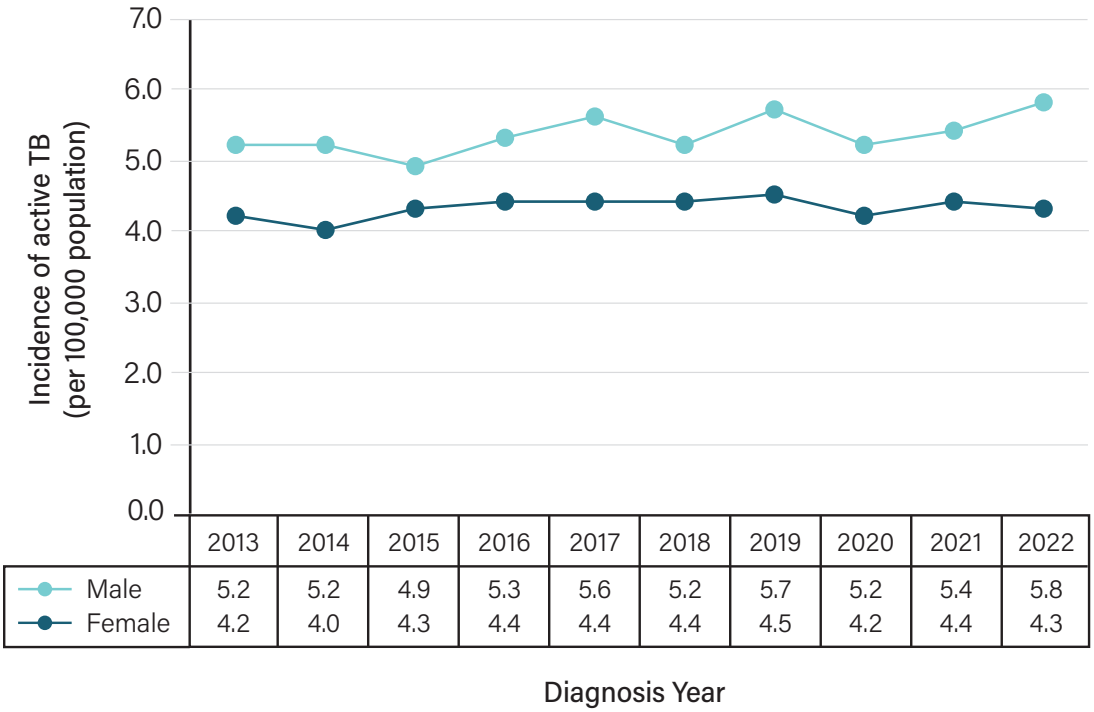
Table 3: Proportion and incidence of active TB (per 100,000) by age group and sex, CTBRS: 2022

Age Group	Cases			Proportion			Incidence *(per 100,000)*			General make up of the Canadian population
	Female	Male	Total	Female	Male	Total	Female	Male	Total	
<5 years old	33	42	75	3.9%	3.7%	3.8%	3.6	4.4	4.0	4.8%
5–14 years old	29	31	61	3.4%	2.8%	3.1%	1.4	1.4	1.5	10.8%
15–24 years old	129	145	275	15.3%	12.9%	14.0%	5.7	6.1	5.9	11.9%
25–34 years old	159	170	329	18.8%	15.1%	16.7%	6.0	6.0	6.0	14.1%
35–44 years old	110	149	259	13.0%	13.3%	13.1%	4.2	5.6	4.9	13.6%
45–54 years old	99	148	247	11.7%	13.2%	12.5%	4.1	6.2	5.1	12.4%
55–64 years old	95	139	235	11.3%	12.4%	11.9%	3.6	5.3	4.5	13.6%
65+ years old	190	300	490	22.5%	26.7%	24.9%	4.8	8.9	6.7	18.8%
Canada	**844**	**1,124**	**1,971**	**100%**	**100%**	**100%**	**4.3**	**5.8**	**5.1**	**100%**

Note: Proportions presented are among all cases, or among Canadian population.

Although those under 5 years of age had the second lowest incidence of any age group in 2022 (4.0 cases per 100,000), this represented the highest rate observed in this age group in a decade (**Table 4** and **Table 5**). Notably, this elevated rate among children under 5 years of age was associated with a high number of cases in Saskatchewan (36.1 per 100,000; n=26), Quebec (5.0 per 100,000; n=21), and Nunavut (145.8 per 100,000; n=6). One explanation for this trend may be a possible increase in active transmission of TB disease from outbreaks that resulted in more pediatric cases in 2022 compared to previous years[8,9]. The evolution of this increase in young children will require monitoring over time to determine if this trend continues with similar geographic patterns.

Figure 2: Incidence of active TB (per 100,000) by sex, CTBRS: 2013–2022



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Male	5.2	5.2	4.9	5.3	5.6	5.2	5.7	5.2	5.4	5.8
Female	4.2	4.0	4.3	4.4	4.4	4.4	4.5	4.2	4.4	4.3

Table 4: Incidence of active TB (per 100,000) by age group over time, CTBRS: 2013–2022

Age Group		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<5 years old	Cases	51	44	50	49	56	51	50	35	40	75
	Incidence *(per 100,000)*	2.6	2.3	2.6	2.5	2.9	2.6	2.6	1.8	2.1	4.0
5–14 years old	Cases	61	33	46	41	66	49	64	35	51	61
	Incidence *(per 100,000)*	1.6	0.9	1.2	1.0	1.7	1.2	1.6	0.8	1.2	1.5
15–24 years old	Cases	209	196	196	229	247	239	282	298	276	275
	Incidence *(per 100,000)*	4.6	4.3	4.4	5.1	5.5	5.3	6.1	6.5	6.1	5.9
25–34 years old	Cases	269	288	281	342	315	321	353	336	379	329
	Incidence *(per 100,000)*	5.6	5.9	5.7	6.9	6.3	6.3	6.7	6.3	7.1	6.0
35–44 years old	Cases	244	241	247	245	269	257	267	262	280	259
	Incidence *(per 100,000)*	5.2	5.1	5.2	5.2	5.6	5.2	5.3	5.1	5.4	4.9
45–54 years old	Cases	238	222	212	204	216	221	236	219	224	247
	Incidence *(per 100,000)*	4.5	4.2	4.1	3.9	4.2	4.4	4.8	4.5	4.7	5.1
55–64 years old	Cases	189	198	187	194	195	201	209	200	193	235
	Incidence *(per 100,000)*	4.1	4.2	3.8	3.9	3.8	3.9	4.0	3.8	3.6	4.5
65+ years old	Cases	390	393	424	458	467	455	460	407	446	490
	Incidence *(per 100,000)*	7.3	7.1	7.4	7.7	7.6	7.2	7.0	5.9	6.3	6.7
Canada	**Cases**	**1,651**	**1,615**	**1,643**	**1,762**	**1,831**	**1,794**	**1,921**	**1,792**	**1,889**	**1,971**
	Incidence *(per 100,000)*	**4.7**	**4.6**	**4.6**	**4.9**	**5.0**	**4.8**	**5.1**	**4.7**	**4.9**	**5.1**

Table 5: Number and incidence of active TB (per 100,000) for children aged < 5 years by jurisdiction over time, CTBRS: 2013–2022

Jurisdiction		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NL	Cases	1	0	4	0	0	2	0	0	0	0
	Incidence *(per 100,000)*	4.2	0.0	17.3	0.0	0.0	9.1	0.0	0.0	0.0	0.0
PE	Cases	0	0	0	0	0	0	0	0	0	0
	Incidence *(per 100,000)*	n/a	0.0	0.0	0.0	n/a	0.0	0.0	0.0	0.0	0.0
NS	Cases	0	0	0	0	0	0	0	0	0	0
	Incidence *(per 100,000)*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NB	Cases	0	0	0	1	0	0	0	0	0	0
	Incidence *(per 100,000)*	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0
QC	Cases	16	8	20	7	9	21	12	9	6	21
	Incidence *(per 100,000)*	3.6	1.8	4.5	1.6	2.0	4.8	2.8	2.1	1.4	5.0
ON	Cases	7	12	6	8	9	2	6	8	6	9
	Incidence *(per 100,000)*	1.0	1.7	0.8	1.1	1.3	0.3	0.8	1.1	0.8	1.3
MB	Cases	8	7	7	15	7	9	13	8	8	11
	Incidence *(per 100,000)*	9.9	8.6	8.4	17.7	8.2	10.5	15.2	9.4	9.6	13.5
SK	Cases	6	5	2	4	6	5	8	6	9	26
	Incidence *(per 100,000)*	8.2	6.7	2.7	5.3	7.8	6.5	10.4	8.0	12.3	36.1
AB	Cases	6	4	5	5	2	3	1	0	4	2
	Incidence *(per 100,000)*	2.3	1.5	1.8	1.8	0.7	1.1	0.4	0.0	1.5	0.8
BC	Cases	3	2	2	3	5	1	2	2	3	0
	Incidence *(per 100,000)*	1.3	0.9	0.9	1.3	2.2	0.4	0.9	0.9	1.3	0.0
NU	Cases	4	6	4	6	18	8	8	2	4	6
	Incidence *(per 100,000)*	94.5	138.6	92.5	138.7	416.1	185.3	188.2	47.7	94.8	145.8
NT	Cases	0	0	0	0	0	0	0	0	0	0
	Incidence *(per 100,000)*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YT	Cases	0	0	0	0	0	0	0	0	0	0
	Incidence *(per 100,000)*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canada	**Cases**	**51**	**44**	**50**	**49**	**56**	**51**	**50**	**35**	**40**	**75**
	Incidence *(per 100,000)*	**2.6**	**2.3**	**2.6**	**2.5**	**2.9**	**2.6**	**2.6**	**1.8**	**2.1**	**4.0**

Place of birth and population group

Information on place of birth was available for 1,651 of the 1,971 cases of active TB reported in Canada in 2022; and of those cases, 76.2% (n=1,258) were born outside Canada, corresponding to an incidence of 14.4 cases per 100,000 population (**Table 6A**).

Of the 1,606 cases of TB where the population group was reported, the highest incidence was among the Inuit at 136.7 per 100,000, followed by First Nations at 21.4 per 100,000 (**Table 6B**). The incidence of TB among the Métis was 2.0 cases per 100,000, which is lower than the national overall rate of 5.1 per 100,000. Comparatively, individuals born outside Canada had the third highest incidence with 14.4 cases per 100,000 population (**Table 6B**). The incidence of active TB in First Nations differed between those living on or off reserve. For those on reserve, it was 32.6 per 100,000, compared to 8.6 per 100,000 those off reserve (**Table 6C**).

Table 6A: Number, proportion, and incidence (per 100,000) of active TB by place of birth, CTBRS: 2022

Place of birth	Cases	Proportion	Incidence *(per 100,000 population)*
Born outside of Canada	1,258	76.2%	14.4
Born in Canada	393	23.8%	1.4
Place of birth known	**1,651**	**100%**	**n/a**
Place of birth unknown	320	n/a	n/a
Canada	**1,971**	**100%**	**5.1**

Notes:

- Data were not available for Quebec except for Inuit.
- Indigenous identity and non-Indigenous Canadian born identity were not available for British Columbia.
- Proportions presented are among total cases with known place of birth.

Table 6B: Number, proportion, and incidence (per 100,000) of active TB by population group, CTBRS: 2022

Population group	Cases	Proportion	Incidence *(per 100,000 population)*
Born outside of Canada	1,258	78.3%	14.4
Non-Indigenous Canadian born	56	3.5%	0.3
Métis	10	0.6%	2.0
Inuit	100	6.2%	136.7
First Nations	182	11.3%	21.4
Population group known	**1,606**	**100%**	**n/a**
Population group unknown	365	n/a	n/a
Canada	**1,971**	**100%**	**5.1**

Notes:

- Data were not available for Quebec except for Inuit.
- Indigenous identity and non-Indigenous Canadian born identity were not available for British Columbia.
- Proportions presented are among total cases with known population group.

Table 6C: Number, proportion, and incidence (per 100,000) of active TB in First Nations by residence on or off reserve, CTBRS: 2022

First Nations by residence	Cases	Proportion	Incidence *(per 100,000 population)*
First Nations residing on reserve	130	71.4%	32.6
First Nations residing off reserve	35	19.2%	8.6
Residence unknown	17	9.3%	n/a
First Nations	**182**	**100%**	**21.4**

Notes:

- Data were not available for Quebec except for Inuit.
- Indigenous identity and non-Indigenous Canadian born identity were not available for British Columbia.
- Proportions presented are among total First Nations cases.

Regarding the geographic distribution of cases by population group, most cases among Inuit (91.0% of the Inuit cases in Canada) were reported in Nunavut (n=53) and Nunavik in Quebec (n=38) (**Table 7A**) in 2022. For First Nations, the majority (83.5%; n=152) of cases (**Table 7A**) were reported in Saskatchewan (n=95) and Manitoba (n=57), respectively at a rate of 71.1 and 36.9 per 100,000 (**Table 7A**). However, only 11.0% of First Nations reside in Saskatchewan and 13% in Manitoba[7]. As for the Métis, nine of the 10 cases (90.0%) were reported in Saskatchewan (**Table 7A**), although approximately 10% of Métis[7] live in this province.

For cases of TB among persons born outside Canada, over 90.0% were reported in Ontario (53.1%; n=668), Alberta (18.0%; n=227), and British Columbia (20.7%; n=261) (**Table 7A**). The proportion of cases born outside Canada was higher in Alberta (93.0%; n=227), Ontario (88.4%; n=668), and British Columbia (84.7%; n=261). It was also higher in the Atlantic provinces of New Brunswick (100%; n=16), Prince Edward Island (100%; n=3) and Nova Scotia (78.6%; n=11) (**Table 7B**). Note that Quebec did not report population group in 2022.

The lowest incidence of TB in Canada in 2022 was reported among Canadian-born non-Indigenous persons (56 cases) at 0.3 per 100,000 (**Figure 3**).

The incidence of TB in Inuit and First Nations populations fluctuated from year to year but have been consistently higher than the Canadian overall incidence (**Figure 3**). Due to the small population size of these groups, the rates can fluctuate drastically even with small changes in the number of cases, and the TB rates tend to fluctuate year to year depending on outbreaks. TB continues to disproportionately impact Indigenous Peoples especially the Inuit, who have the highest incidence in Canada (136.7 per 100,000 in 2022), signalling the persistent health inequities that Inuit, First Nations and Métis continue to face in addition to stigma, reduced access to health care, overcrowding, food insecurity and the ongoing historical effects of colonialism. (**Figure 3**).

Table 7A: Distribution of active TB cases (Number, proportion, and incidence (per 100,000)) by jurisdiction and within each population group, CTBRS: 2022

Jurisdiction	Born in Canada																			
	Inuit			First Nations			Métis			Non-Indigenous			Indigenous identity unknown		Born outside of Canada			Population group unknown		Total		
	Cases	Proportion	Incidence (per 100,000)	Cases	Proportion	Incidence (per 100,000)	Cases	Proportion	Incidence (per 100,000)	Cases	Proportion	Incidence (per 100,000)	Cases	Proportion	Cases	Proportion	Incidence (per 100,000)	Cases	Proportion	Cases	Proportion	Incidence (per 100,000)
NL	4	4.0%	53.5	4	2.2%	13.1	1	10.0%	13.0	3	5.4%	0.7	0	0.0%	5	0.4%	22.6	0	0.0%	**17**	**0.9%**	**3.2**
PE	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	3	0.2%	14.7	0	0.0%	**3**	**0.2%**	**1.8**
NS	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	2	3.6%	0.2	0	0.0%	11	0.9%	10.1	1	0.3%	**14**	**0.7%**	**1.4**
NB	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	16	1.3%	24.5	0	0.0%	**16**	**0.8%**	**2.0**
QC	38	38.0%	244.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	244	76.3%	**282**	**14.3%**	**3.2**
ON	5	5.0%	109.2	14	7.7%	4.9	0	0.0%	0.0	39	69.6%	0.4	1	2.2%	668	53.1%	13.1	29	9.1%	**756**	**38.4%**	**5.0**
MB	0	0.0%	0.0	57	31.3%	36.9	0	0.0%	0.0	2	3.6%	0.2	1	2.2%	28	2.2%	8.6	41	12. 8%	**129**	**6.5%**	**9.2**
SK	0	0.0%	0.0	95	52.2%	71.7	9	90.0%	13.2	3	5.4%	0.4	0	0.0%	38	3.0%	22.1	0	0.0%	**145**	**7.4%**	**12.1**
AB	0	0.0%	0.0	9	4.9%	5.3	0	0.0%	0.0	7	12.5%	0.2	1	2.2%	227	18.0%	19.4	0	0.0%	**244**	**12.4%**	**5.4**
BC	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	42	93.3%	261	20.7%	14.6	5	1.6%	**308**	**15.6%**	**5.8**
NU	53	53.0%	154.6	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0	0.0%	0.0	0	0.0%	**53**	**2.7%**	**130.8**
NT	0	0.0%	0.0	2	1.1%	14.8	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	1	0.1%	19.0	0	0.0%	**3**	**0.2%**	**6.6**
YT	0	0.0%	0.0	1	0.5%	13.1	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0	0.0%	0.0	0	0.0%	**1**	**0.1%**	**2.3**
Canada	100	100%	136.7	182	100%	21.4	10	100%	2.0	56	100%	0.3	45	100%	1,258	100%	14.4	320	100%	1,971	100%	5.1

Notes:

- Data were not available for Quebec except for Inuit; Indigenous identity and non-Indigenous Canadian born identity were not available for British Columbia.
- Proportions presented are among total cases within each population group.

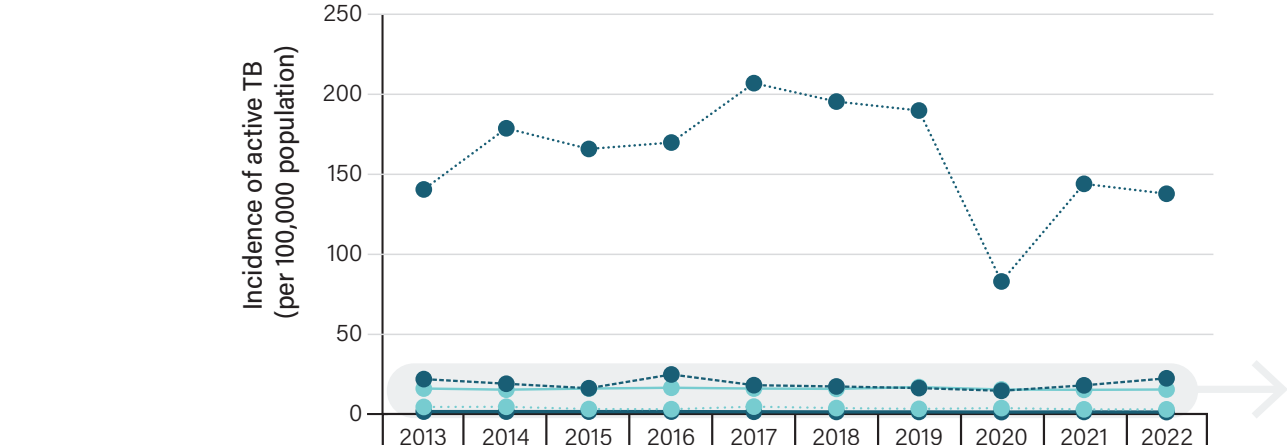
Table 7B: Distribution of active TB cases (Number, proportion, and incidence (per 100,000)) by population group and within each jurisdiction, CTBRS: 2022

Jurisdiction	Born in Canada																		Born outside of Canada			Population group unknown		Total		
	Inuit			First Nations			Métis			Non-Indigenous			Indigenous identity unknown														
	Cases	Proportion	Incidence (per 100,000)	Cases	Proportion	Incidence (per 100,000)	Cases	Proportion	Incidence (per 100,000)	Cases	Proportion	Incidence (per 100,000)	Cases	Proportion	Cases	Proportion	Incidence (per 100,000)	Cases	Proportion	Cases	Proportion	Cases	Proportion	Incidence (per 100,000)
NL	4	23.5%	53.5	4	23.5%	13.1	1	5.9%	13.0	3	17.6%	0.7	0	0.0%	5	29.4%	22.6	0	0.0%	**17**	**100%**	**3.2**
PE	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	3	100%	14.7	0	0.0%	**3**	**100%**	**1.8**
NS	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	2	14.3%	0.2	0	0.0%	11	78.6%	10.1	1	7.1%	**14**	**100%**	**1.4**
NB	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	16	100%	24.5	0	0.0%	**16**	**100%**	**2.0**
QC	38	13.5%	244.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	244	86.5%	**282**	**100%**	**3.2**
ON	5	0.7%	109.2	14	1.9%	4.9	0	0.0%	0.0	39	5.2%	0.4	1	0.1%	668	88.4%	13.1	29	3.8%	**756**	**100%**	**5.0**
MB	0	0.0%	0.0	57	44.2%	36.9	0	0.0%	0.0	2	1.6%	0.2	1	0.8%	28	21.7%	8.6	41	31.8%	**129**	**100%**	**9.2**
SK	0	0.0%	0.0	95	65.5%	71.7	9	6.2%	13.2	3	2.1%	0.4	0	0.0%	38	26.2%	22.1	0	0.0%	**145**	**100%**	**12.1**
AB	0	0.0%	0.0	9	3.7%	5.3	0	0.0%	0.0	7	2.9%	0.2	1	0.4%	227	93.0%	19.4	0	0.0%	**244**	**100%**	**5.4**
BC	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	42	13.6%	261	84.7%	14.6	5	1.6%	**308**	**100%**	**5.8**
NU	53	100%	154.6	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0	0.0%	0.0	0	0.0%	**53**	**100%**	**130.8**
NT	0	0.0%	0.0	2	66.7%	14.8	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	1	33.3%	19.0	0	0.0%	**3**	**100%**	**6.6**
YT	0	0.0%	0.0	1	100%	13.1	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0	0.0%	0.0	0	0.0%	**1**	**100%**	**2.3**
Canada	**100**	**6.0%**	**136.7**	**182**	**13.2%**	**21.4**	**10**	**0.7%**	**2.0**	**56**	**4.1%**	**0.3**	**45**	**2.7%**	**1,258**	**74.5%**	**14.4**	**320**	**16.2%**	**1,971**	**100%**	**5.1**

Notes:

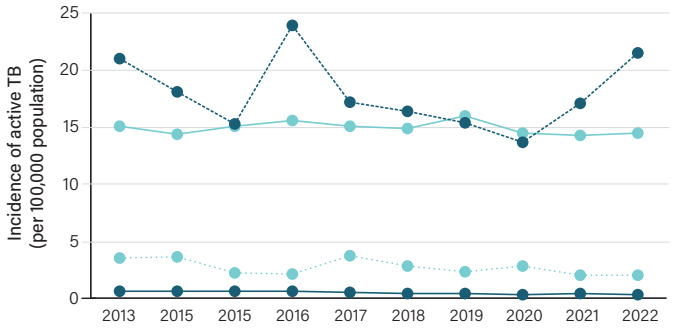
- Data were not available for Quebec except for Inuit; Indigenous identity and non-Indigenous Canadian born identity were not available for British Columbia.
- Proportions presented are among total cases within each jurisdiction.

Figure 3: Incidence of active TB (per 100,000) by population group, CTBRS: 2013–2022



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Inuit	139.4	177.6	164.7	168.7	205.8	194.3	188.7	87.9	142.9	136.7
First Nations	20.9	18.0	15.2	23.8	17.1	16.3	15.3	13.6	17.0	21.4
Métis	3.5	3.6	2.2	2.1	3.7	2.8	2.3	2.8	2.0	2.0
Individuals born outside of Canada	15.0	14.3	15.0	15.5	15.0	14.8	15.9	14.4	14.2	14.4
Non-Indigenous Canadian born	0.6	0.6	0.6	0.6	0.5	0.4	0.4	0.3	0.4	0.3

Diagnosis Year



Notes:

- 2021 and 2022 data were not available for Quebec, except for Inuit.
- 2016–2022 data were not available for British Columbia for Indigenous identity and the non-Indigenous Canadian born.

Diagnostic site

Diagnostic site information was available for 1,688 (85.6%) of the 1,971 active TB cases in Canada for 2022. Of these, 75.4% (n=1,273) of active TB cases were classified as respiratory TB and 67.2% (n=1,134) were classified as pulmonary TB (**Table 8**). The proportion of individuals with pulmonary TB was higher among Inuit (96.4%, n=80) and Métis (80.0%, n=8), which may reflect more active transmission dynamics in these populations[10]. TB of the peripheral lymph nodes (n=183; 10.8%) was the most common non-respiratory form of TB reported (**Table 8**).

Table 8: Diagnostic sites of active TB by population group, CTBRS 2022

Diagnostic sites		Born in Canada										Born outside of Canada		Unknown population group		Total	
		First Nations		Inuit		Métis		Non-Indigenous		Indigenous identity unknown							
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Respiratory TB	Pulmonary	116	67.4%	80	96.4%	8	80.0%	42	76.4%	40	88.9%	801	64.2%	47	62.7%	1,134	67.2%
	Primary	35	20.3%	0	0.0%	0	0.0%	4	7.3%	0	0.0%	22	1.8%	9	12.0%	70	4.1%
	Other Respiratory	5	2.9%	1	1.2%	1	10.0%	0	0.0%	1	2.2%	58	4.6%	3	4.0%	69	4.1%
	Subtotal	**156**	**90.7%**	**81**	**97.6%**	**9**	**90.0%**	**46**	**83.6%**	**41**	**91.1%**	**881**	**70.6%**	**59**	**78.7%**	**1,273**	**75.4%**
Non-respiratory TB	Peripheral Lymph Nodes	6	3.5%	0	0.0%	1	10.0%	4	7.3%	1	2.2%	167	13.4%	4	5.3%	183	10.8%
	Central Nervous System	2	1.2%	0	0.0%	0	0.0%	1	1.8%	0	0.0%	16	1.3%	0	0.0%	19	1.1%
	Miliary	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	2.2%	14	1.1%	2	2.7%	17	1.0%
	Other non-respiratory	8	4.7%	2	2.4%	0	0.0%	4	7.3%	2	4.4%	170	13.6%	10	13.3%	196	11.6%
	Subtotal	**16**	**9.3%**	**2**	**2.4%**	**1**	**10.0%**	**9**	**16.4%**	**4**	**8.9%**	**367**	**29.4%**	**16**	**21.3%**	**415**	**24.6%**
Total diagnostic site reported		**172**	**100%**	**83**	**100%**	**10**	**100%**	**55**	**100%**	**45**	**100%**	**1,248**	**100%**	**75**	**100%**	**1,688**	**100%**
Total diagnostic site not reported		10	5.5%	17	17.0%	0	0.0%	1	1.8%	0	0.0%	10	0.8%	245	76.6%	283	14.4%
Canada		**182**	**100%**	**100**	**100%**	**10**	**100%**	**56**	**100%**	**45**	**100%**	**1,258**	**100%**	**320**	**100%**	**1,971**	**100%**

Notes:

- Indigenous (First Nations, Inuit, Métis), non-Indigenous, and Indigenous identity unknown population groups are born in Canada.
- Data were not available for Quebec, except for Inuit. Indigenous identity and non-Indigenous Canadian born identity were not available for British Columbia.
- Pulmonary TB includes tuberculosis of the lungs and conducting airways: tuberculous fibrosis of the lung, tuberculous bronchiectasis tuberculous pneumonia, tuberculous pneumothorax, isolated tracheal or bronchial tuberculosis and tuberculous laryngitis (International Classification of Disease (ICD)-9 codes: 011–011.9, 012.2, 012.3, ICD-10 codes: A15.0-A15.3, A15.5, A15.9, A16.0-A16.2, A16.4, A16.9.
- Primary TB includes primary respiratory tuberculosis and tuberculosis pleurisy in primary progressive tuberculosis (ICD-9 codes: 010, 010.0–010.1, 010.8–010.9, ICD10 codes: A15.7, A16.7).
- Proportions presented are among total number of cases with available information diagnostic site in each population group; the proportions with no information on diagnostic site was calculated using the total active cases reported within each population group.

Case detection method

Information about case detection method was available for 1,669 (84.7%) of the 1,971 reported active TB cases in Canada for 2022. The majority of cases (77.5% ; n=1,294) were detected through the presentation of symptoms consistent with active TB to a health care provider. Detection through active methods included: contact investigation (5.0%; n=83), screening (4.4%; n=73), and immigration medical surveillance (3.9%; n=65). A minority of cases were detected through post-mortem analysis (0.4%; n=7) or as incidental findings (2.0%; n=33) (**Table 9**).

Examining TB detection methods by population group, the primary method of detection varies by sub-group. For people born outside of Canada (n=1,220), the vast majority (84.1%, n=1,026) were detected on symptom presentation, whereas for First Nations (n=174) and Métis (n=10), although symptom presentation was the primary method of detection, it accounted for closer to half of cases (First Nations 54.6%, n=95; Métis 40%, n=4). For Inuit (n=96), the primary method of detection was contact investigation (48%; n=48) (**Table 9**). This difference in case detection method may be partially due to a difference in TB transmission dynamics and screening initiatives across populations and jurisdictions in Canada.

Table 9: Number and proportion of case detection method by population group, CTBRS: 2022

Case Detection Method	Born in Canada										Born outside of Canada		Population group unknown		Total	
	First Nations		Inuit		Métis		Non-Indigenous		Indigenous identity unknown							
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Symptoms	95	54.6%	36	37.5%	4	40.0%	38	67.9%	39	88.6%	1,026	84.1%	56	81.2%	1,294	77.5%
Contact Investigation	18	10.3%	48	50.0%	0	0.0%	9	16.1%	1	2.3%	6	0.5%	1	1.4%	83	5.0%
Screening	8	4.6%	7	7.3%	1	10.0%	4	7.1%	2	4.5%	43	3.5%	8	11.6%	73	4.4%
Incidental Findings	0	0.0%	4	4.2%	0	0.0%	1	1.8%	0	0.0%	28	2.3%	0	0.0%	33	2.0%
Post-mortem	1	0.6%	1	1.0%	0	0.0%	1	1.8%	0	0.0%	3	0.2%	1	1.4%	7	0.4%
Immigration Medical Surveillance	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	65	5.3%	0	0.0%	65	3.9%
Other case detection method	52	29.9%	0	0.0%	5	50.0%	3	5.4%	2	4.5%	49	4.0%	3	4.3%	114	6.8%
Total case detection method reported	**174**	**100%**	**96**	**100%**	**10**	**100%**	**56**	**100%**	**44**	**100%**	**1,220**	**100%**	**69**	**100%**	**1,669**	**100%**
Total case detection method not reported	8	4.4%	4	4.0%	0	0.0%	0	0.0%	1	2.3%	38	3.0%	251	78.5%	302	15.2%
Canada	**182**	**100%**	**100**	**100%**	**10**	**100%**	**56**	**100%**	**45**	**100%**	**1,258**	**100%**	**320**	**100%**	**1,971**	**100%**

Notes:

- Indigenous (First Nations, Inuit, Métis), non-Indigenous, and Indigenous identity unknown population groups are born in Canada.
- Data were not available for Quebec, except for Inuit. Indigenous identity and non-Indigenous Canadian born identity were not available for British Columbia.
- Other case detection methods include incidental findings, immigration medical surveillance, post-mortem analysis, other, and unknown.
- Proportions presented are among total number of cases with available information on case detection method in each population group; proportions with no information on case detection method was calculated using total active cases reported within each population group.

HIV (human immunodeficiency virus)

Information about human immunodeficiency virus (HIV) status of active TB cases reported in 2022 was available for 819 cases, of which 12 (1.5%) were HIV positive. However, data quality was limited, and results should be interpreted with caution as HIV status was reported for less than half (41.6%; n=819) of active TB cases recorded. Similarly, time trends in HIV-TB co-infection cannot be interpreted due to the low level of data reporting (HIV status was reported for only 28.6% to 58.4% of TB cases from 2013–2022) (**Table 10**).

Table 10: Number and proportion of active TB cases by HIV status, CTBRS, 2013–2022

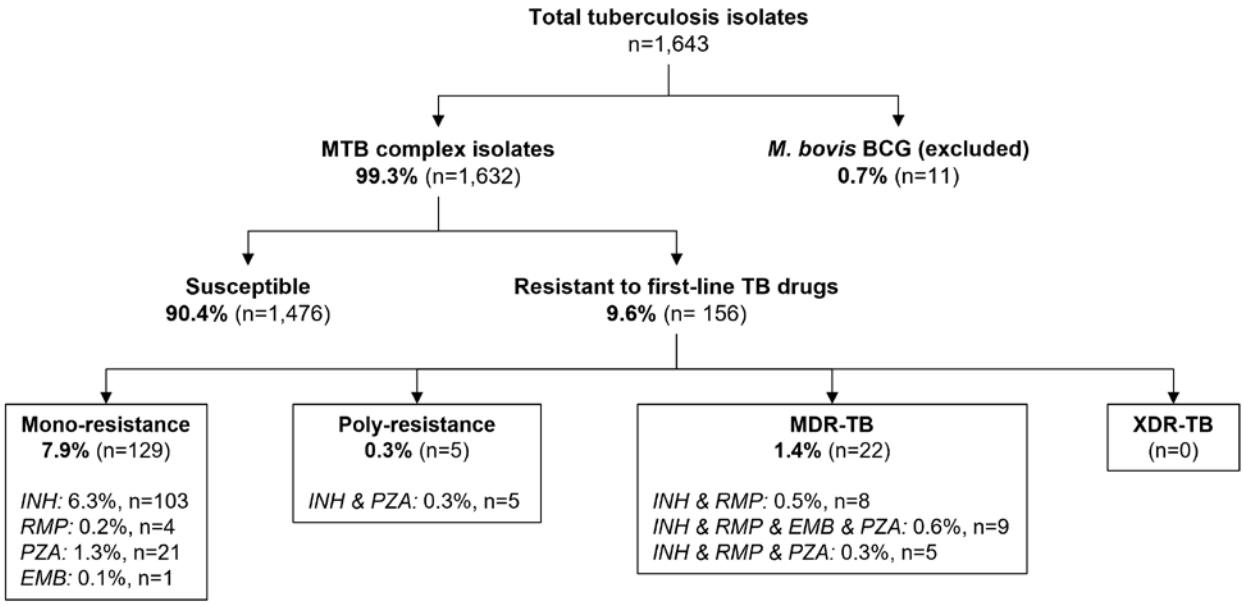
HIV status		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Positive	Cases	70	65	67	92	28	42	37	51	20	12
	Proportion	10.1%	7.8%	9.2%	11.8%	2.2%	3.5%	2.7%	5.2%	2.3%	1.5%
Negative	Cases	625	772	659	690	1,237	1,161	1,334	938	844	807
	Proportion	89.9%	92.2%	90.8%	88.2%	97.8%	96.5%	97.3%	94.8%	97.7%	98.5%
HIV status reported	**Cases**	**695**	**837**	**726**	**782**	**1,265**	**1,203**	**1,371**	**989**	**864**	**819**
	Proportion	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
HIV status not reported	Cases	956	778	917	980	566	591	550	803	1,025	1,152
	Proportion	57.9%	48.2%	55.8%	55.6%	30.9%	32.9%	28.6%	44.8%	54.3%	58.4%
Canada	**Cases**	**1,651**	**1,615**	**1,643**	**1,762**	**1,831**	**1,794**	**1,921**	**1,792**	**1,889**	**1,971**
	Proportion	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Note: Proportions presented are among total number of cases with available information on HIV status; proportions with no information was calculated using the total active cases reported.

Drug resistance

In 2022, a total of 1,643 isolates were submitted to the CTBLSS, of which 11 were excluded as they did not meet the case definition (**Figure 4**). Resistance to one or more first-line TB drugs was detected in 9.6% (n=156) of eligible isolates (n=1,632). Mono- and poly-resistance accounted respectively for 7.9% (n=129) and 0.3% (n=5), and the remaining 1.4% (n=22) were multidrug-resistant. None of the isolates was extensively drug-resistant (**Figure 4**).

Figure 4: Drug susceptibility testing for Mycobacterium tuberculosis isolates, CTBLSS: 2022



Notes:

- Proportions presented are among MTB complex isolates.
- *M. bovis* BCG, *Mycobacterium bovis* Bacillus Calmette-Guérin vaccine; INH, isoniazid; RMP, rifampin; PZA, pyrazinamide; EMB, ethambutol; MDR-TB, multidrug-resistant TB; XDR-TB, extensive-drug resistant TB.

Drug resistance was detected in all age groups though only two (1.2%) of the isolates were in children under 15 years of age; one was mono-resistant and the other multidrug-resistant (**Table 11**).

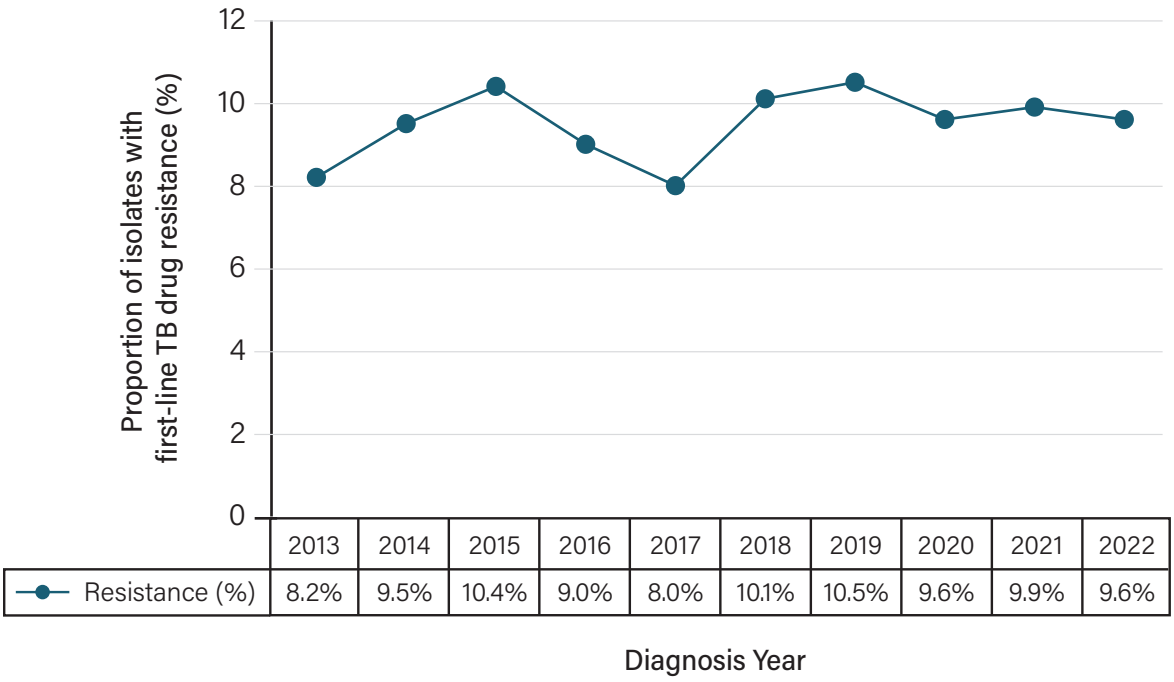
Drug resistance in Canada has been consistently low when compared internationally[2] and has remained stable for the past decade. From 2013 to 2022, 8.0 to 10.5% of isolates submitted to the CTBLSS for drug susceptibility testing were resistant to one or more first line TB drugs (**Figure 5**).

Table 11: Number and proportion of isolates with drug resistance by age group, CTBLSS: 2022

Age group	Mono-resistance		Poly-resistance		Multidrug-resistance	
	n	%	n	%	n	%
5–14 years old	1	0.6%	0	0.0%	1	0.6%
15–24 years old	10	6.4%	0	0.0%	1	0.6%
25–34 years old	22	14.1%	0	0.0%	8	5.1%
35–44 years old	14	9.0%	3	1.9%	3	1.9%
45–54 years old	22	14.1%	0	0.0%	3	1.9%
55–64 years old	22	14.1%	0	0.0%	4	2.6%
65–74 years old	28	18.0%	0	0.0%	2	1.3%
≥75 years old	10	6.4%	2	1.3%	0	0.0%
All age groups	**129**	**82.7%**	**5**	**3.2%**	**22**	**14.1%**

Note: Proportions presented are among all MTB complex isolates that exhibited resistance to an anti TB drug.

Figure 5: Proportion of isolates with resistance to one or more first-line TB drug, CTBLSS: 2013–2022



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Resistance (%)	8.2%	9.5%	10.4%	9.0%	8.0%	10.1%	10.5%	9.6%	9.9%	9.6%

Note: Proportions presented are among all MTB complex isolates, per year.

Treatment outcomes

Data on TB treatment outcomes were reported to the CTBRS for 1,660 of 1,889 active TB cases identified during the 2021 surveillance year (note outcomes are reported for the previous year's cases). Treatment was deemed successful in 1,250 (75.3%) of the 1,660 cases with reported outcomes (**Table 12**), and no treatment failures were recorded. Additionally, 176 cases were either still on treatment (8.5%; n=141/1,660) at the time of reporting or could not be evaluated (2.1%; n=35/1,660) for a variety of reasons including moving out of the reporting jurisdiction before completion of treatment (**Table 12**); consequently, treatment success is likely underreported.

Table 12: Treatment outcomes by population group, CTBRS: 2021

Place of Birth & Population group			Treatment				Death (all-cause)	Lost to follow-up	Not evaluated	Unknown	Total
			Success	Ongoing	Failure	Discontinued					
Born outside of Canada		Cases	945	92	0	6	109	4	25	42	**1,223**
		Proportion	77.3%	7.5%	0.0%	0.5%	8.9%	0.3%	2.0%	3.4%	**100%**
Born in Canada	First Nations	Cases	91	29	0	0	14	1	1	7	**143**
		Proportion	26.6%	8.5%	0.0%	0.0%	4.1%	0.3%	0.3%	2.0%	**41.8%**
	Inuit	Cases	70	1	0	3	5	3	3	1	**86**
		Proportion	20.5%	0.3%	0.0%	0.9%	1.5%	0.9%	0.9%	0.3%	**25.1%**
	Métis	Cases	7	0	0	0	2	0	0	1	**10**
		Proportion	2.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.3%	**2.9%**
	Non-Indigenous	Cases	50	2	0	0	5	2	1	1	**61**
		Proportion	14.6%	0.6%	0.0%	0.0%	1.5%	0.6%	0.3%	0.3%	**17.8%**
	Indigenous identity unknown	Cases	32	0	0	1	4	1	1	3	**42**
		Proportion	9.4%	0.0%	0.0%	0.3%	1.2%	0.3%	0.3%	0.9%	**12.3%**
	Subtotal	Cases	**250**	**32**	**0**	**4**	**30**	**7**	**6**	**13**	342
		Proportion	**73.1%**	**9.4%**	**0.0%**	**1.2%**	**8.8%**	**2.0%**	**1.8%**	**3.8%**	100%
Population group unknown		Cases	55	17	0	0	9	0	4	10	**95**
		Proportion	57.9%	17.9%	0.0%	0.0%	9.5%	0.0%	4.2%	10.5%	**100%**
Canada		Cases	**1,250**	**141**	**0**	**10**	**148**	**11**	**35**	**65**	1,660
		Proportion	**75.3%**	**8.5%**	**0.0%**	**0.6%**	**8.9%**	**0.7%**	**2.1%**	**3.9%**	100%

Notes:

- 2021 data were not available for Quebec.
- Proportions presented are among total number of cases within each population group.

The proportion of TB cases successfully treated within a year of follow-up after diagnosis over the past decade has ranged between 75.3% to 84.3% (**Table 13**).

Table 13: Treatment outcomes over time, CTBRS: 2012–2021

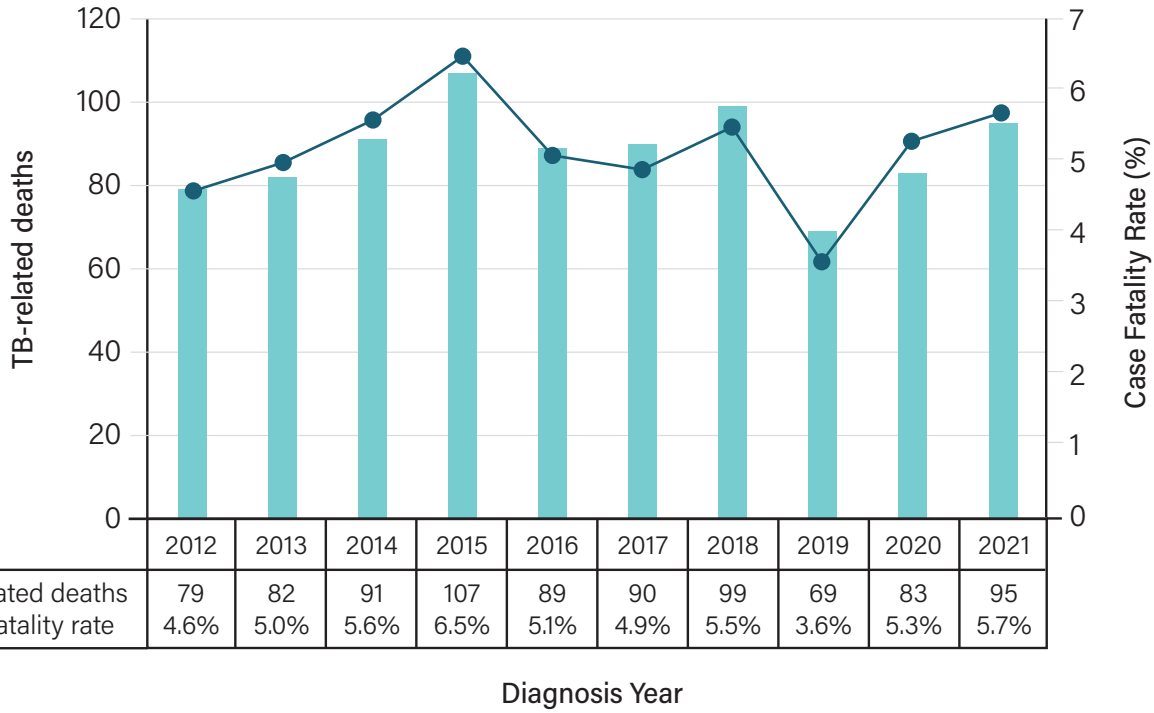
Treatment outcomes		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Treatment Success	Cases	1,415	1,378	1,361	1,382	1,406	1,484	1,464	1,519	1,188	1,250
	Proportion	83.2%	83.5%	84.3%	84.1%	79.8%	81.0%	81.6%	79.1%	76.5%	75.3%
Treatment ongoing	Cases	66	62	39	31	73	71	44	82	73	141
	Proportion	3.9%	3.8%	2.4%	1.9%	4.1%	3.9%	2.5%	4.3%	4.7%	8.5%
Treatment failure	Cases	1	1	0	0	1	0	0	0	0	0
	Proportion	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Treatment discontinued	Cases	7	9	10	4	1	1	2	7	6	10
	Proportion	0.4%	0.5%	0.6%	0.2%	0.1%	0.1%	0.1%	0.4%	0.4%	0.6%
Death (all causes)	Cases	129	126	122	142	135	128	138	120	128	148
	Proportion	7.6%	7.6%	7.6%	8.6%	7.7%	7.0%	7.7%	6.2%	8.2%	8.9%
Lost to follow-up	Cases	22	17	20	18	10	21	24	40	24	11
	Proportion	1.3%	1.0%	1.2%	1.1%	0.6%	1.1%	1.3%	2.1%	1.5%	0.7%
Not evaluated	Cases	52	51	51	51	64	47	49	45	42	35
	Proportion	3.1%	3.1%	3.2%	3.1%	3.6%	2.6%	2.7%	2.3%	2.7%	2.1%
Treatment outcome unknown	Cases	8	7	12	15	72	79	73	108	91	65
	Proportion	0.5%	0.4%	0.7%	0.9%	4.1%	4.3%	4.1%	5.6%	5.9%	3.9%
Canada	**Cases**	**1,700**	**1,651**	**1,615**	**1,643**	**1,762**	**1,831**	**1,794**	**1,921**	**1,552**	**1,660**
	Proportion	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Notes:

- TB outcome data for 2020 and 2021 were not available for Quebec.
- Proportions presented are among total number of cases each year.

In 2021, the case fatality rate (CFR) for Canada was 5.7%. This rate has remained relatively stable between 2012 and 2021 ranging between 3.6% and 6.5 % (**Figure 6**) but in 2021 was higher than the previous two years. Despite having a high TB incidence rate, the Inuit had a lower CFR (ranging from 0% to 3.5%) compared with other population groups (**Figure 7**).

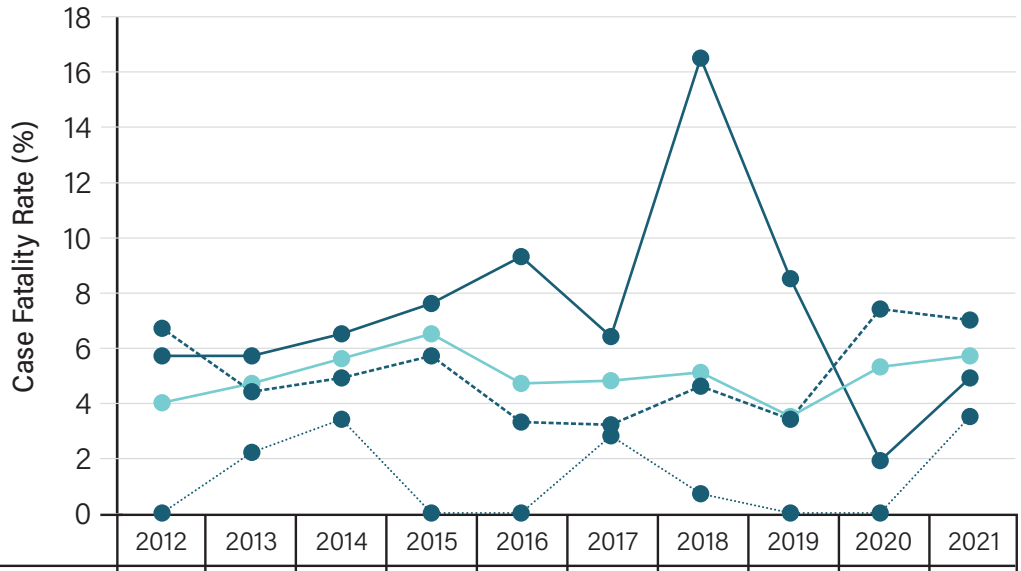
Figure 6: TB case fatality rate for Canada, CTBRS: 2012–2021



Note:

- TB outcome data for 2020 and 2021 were not available for Quebec.
- Proportions presented are among total number of cases per year.

Figure 7: TB case fatality rate among different population groups over time, CTBRS: 2012–2021



Note: 2020 and 2021 outcome data for Quebec and 2016–2021 data on Indigenous identity for British Columbia were not available.

Acknowledgements

The publication of this report would not have been possible without the collaboration of public health surveillance and epidemiology partners and laboratories in all provinces and territories. We appreciate and acknowledge the collaboration of all our surveillance partners:

Newfoundland and Labrador

Rhiannon Cooper, Lola Gushue, Janice Fitzgerald, Krista Baker, Elaine Martin, Shawna Pierce, Lisa Morgan, Samantha Slaney, Lei Jiao, Robert Taylor

Prince Edward Island

Marguerite Cameron, Connie Cheverie, Stacey Burns

Nova Scotia

Jayne Boutilier, Aini Khan, Louise Murphy, Melissa Meagher, Todd Hatchette

New Brunswick

Suzanne Savoie, Hanan Smadi, Sophie Wertz, Hope Mackenzie

Quebec

Marc-André Dubé, Eveline Toth, Isabelle Rouleau, Stephanie Lachance, Marie-Andrée Leblanc, Lisvia De-Wekker, Pierre-Marie Akochy

Yukon

Jeanine O'Connell, Jan McFadzen

Ontario

Liane MacDonald, Karin Hohenadel, Michael Whelan, Cecilia Fung, Andrea Saunders, Kirby Cronin, Pauline Zhang

Manitoba

Debbie Nowicki, Rachel McPherson, Ann Penamora, Okeh Ndu, Heejune Chang, Valentina Russell, Heather Adam

Saskatchewan

Helen Bangura, Isa Wolf, Richa Tikoo, Bijay Adhikari, Brian Quinn, Alanna Senecal, Sonia Atkinson, Tracy Bjorgan, Mohey Alawa, Steven Sanche, Rachel DePaulo, Meredith Faires

Alberta

Rosa Mahedon, Misha Miazga-Rodriguez, Mugove Manjengwa, Céline O'Brien, Christa Smolarchuk, Lisa Eisenbeis, Sandy Cockburn, Jeanine Robinson, Gregory Tyrrell, Cary Shandro

British Columbia

James Johnston, Victoria Cook, Arina Zamanpour, Fay Hutton, Kirsty Bobrow, Justin Sorge, Mabel Rodrigues, Inna Sekirov

Northwest Territories

Caroline NewBerry, Sarah Jeffrey, Kitty Dang, Nicole Haywood, Kristen Irwin, Laura Steven

Nunavut

Keith Travers, Kethika Kulleperuma, Jan McFadzen, Susan Marchand

Public Health Agency of Canada

Maureen Carew, Tiffany Locke, Vanita Sahni, Aboubakar Mounchili, Reshel Perera, Marie LaFreniere, Carly Henry, Céline Signor, Nisrine Haddad

National Microbiology Laboratory

Hafid Soualhine, Meenu Sharma, Michael Stobart, Melissa Rabb

References

1 World Health Organization. (2014). Towards Tuberculosis Elimination: an action framework in low-incidence countries. Geneva: World Health Organization. https://www.who.int/publications/i/item/9789241507707

2 World Health Organization. (2023). Global tuberculosis report 2023. World Health Organization. https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2023

3 Barss, L., Conners, W.J.A., Fisher, D. (2022). Chapter 7: Extra-pulmonary tuberculosis. Canadian Tuberculosis Standards—8th Edition. Canadian Journal of Respiratory, Critical Care, and Sleep Medicine, 6(sup1), 87–108. https://www.tandfonline.com/doi/full/10.1080/24745332.2022.2036073

4 Statistics Canada. (2022). Annual population estimates by age and sex for July 1, 1971 to 2022, Canada, provinces and territories: Table 17–10–0005–01. Statistics Canada. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000501

5 Statistics Canada. Table 98–10–0302–01 Immigrant status and period of immigration by place of birth and citizenship: Canada, provinces and territories and census metropolitan areas with parts. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=9810030201

6 Statistics Canada. Custom projection based on "Projections of the Indigenous populations and households in Canada, 2016 to 2041: Overview of data sources, methods, assumptions and scenarios". Catalogue no. 17–20–0001. https://www150.statcan.gc.ca/n1/en/catalogue/172000012021001

7 Statistics Canada. (2022). Nowcasting projections by Indigenous identity, age group, sex, and prov./terr. of residence, Canada, July 1st 2022. Demosim, Statistics Canada. Custom product

8 Vescera, Zak. Children hospitalized as TB rocks northern Saskatchewan. Saskatoon StarPhoenix. Feb 17, 2022. https://thestarphoenix.com/news/saskatchewan/children-hospitalized-as-tb-rocks-northern-saskatchewan

9 2022 World TB Day Joint SK FN MHO Message. March 11, 2022. https://www.nitha.com/wp-content/uploads/2022/04/2022-World-TB-Day-Joint-SK-FN-MHO-Message_Final.pdf

10 Long, R., Divangahi, M., and Schwartzman, K. (2022). Chapter 2: Transmission and pathogenesis of tuberculosis. Canadian Journal of Respiratory, Critical Care, and Sleep Medicine, 6(sup1), 22–32. Full article: Chapter 2: Transmission and pathogenesis of tuberculosis. https://www.tandfonline.com/doi/full/10.1080/24745332.2022.2035540