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Tuberculosis

Drug resistance in Canada

2008

Reported susceptibility results of the Canadian Tuberculosis Laboratory Surveillance System

Canada

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INTRODUCTION

Drug-resistant strains of tuberculosis (TB) pose a serious threat to TB prevention and control efforts. Although drug-resistant TB has not yet been identified as a major problem in Canada, the potential exists due to the increase and ease of international travel. In response, Tuberculosis Prevention and Control (TBPC) in collaboration with the Canadian Tuberculosis Laboratory Technical Network (CTLTN) (Appendix 1) and participating laboratories (representing all provinces and territories) established the Canadian Tuberculosis Laboratory Surveillance System (CTBLSS) to monitor TB drug resistance patterns in Canada.

Each year laboratories report to TBPC the results of anti-tuberculosis drug susceptibility testing of patients for whom an isolate or specimen has been received within the previous calendar year. TBPC subsequently produces this annual report.

METHODS

TBPC maintains the CTBLSS which contains drug susceptibility test results of *Mycobacterium tuberculosis* (MTB) and other TB species (*M. africanum, M. canetti, M. caprae, M. microti, M. pinnipedii or M. bovis).* It also contains MTB complex (MTBC) isolates as laboratories report identification of isolates either at the complex level (MTBC) or at the species level. Isolates identified as *Mycobacterium bovis* BCG are included in the CTBLSS but are excluded from this report. *M. bovis* (BCG) is intrinsically resistant to pyrazinamide (PZA) and the identification of the majority of these resistant isolates can be inferred from a history of recent vaccination.

Data are collected either through manual completion of a standard reporting form (Appendix 2) or by electronic transmission. Information collected includes: sex, year of birth, province/territory from which the specimen originated, province/territory where the tests were performed, and susceptibility test results. Some provinces perform drug testing for other provinces/territories. For first-line susceptibility testing, British Columbia tests British Columbia and Yukon isolates; Alberta tests Alberta, Northwest Territories and Nunavut isolates, and Nova Scotia tests isolates for Nova Scotia and Prince Edward Island. All other provinces report susceptibility results for isolates originating in their province only. Four laboratories conduct second-line drug testing: Alberta (testing isolates for Alberta, Northwest Territories and Nunavut), Ontario, Quebec and the National Reference Centre for Mycobacteriology (NRCM) in Manitoba (testing isolates for British Columbia, Manitoba, New Brunswick, Newfoundland, Nova Scotia, Prince Edward Island, Saskatchewan and Yukon).

Every effort is made to eliminate duplicate specimen results or results from two specimens taken from the same individual. In the event that a duplicate record is found, only the most recent susceptibility test result is included for analysis.

This report presents resistance patterns to first-line drugs routinely tested, typically: isoniazid (INH), rifampin (RMP), ethambutol (EMB) and pyrazinamide (PZA). Starting with this report, the resistance patterns for all multidrug-resistant TB (MDR-TB) cases will also include resistance patterns to both first and second-line drugs. All provinces/territories submitted second-line drug testing results for all MDR-TB cases from 1998 forward. Tables in this report have been updated accordingly. Second-line drug testing varies among jurisdictions, but typically includes susceptibility testing for: streptomycin, amikacin or kanamycin, capreomycin, ethionamide, ofloxacin, para-amino salicylic acid and rifabutin.

Not all isolates are tested for resistance to all drugs. For example, some provinces do not routinely test for PZA. Therefore, the percentage of isolates showing resistance to a particular drug is expressed as the number of isolates resistant to the drug over the total number of isolates tested for sensitivity to that particular drug.

In 2005, streptomycin (SM) was reclassified as a second-line anti-TB drug in Canada. Starting with this report, SM resistance is reported for only MDR-TB and extensively drug-resistant TB (XDR-TB) isolates. This will result in a decrease in the total number and proportion of isolates reported as monoresistant (e.g., see Figure 3). For historical information on resistance to SM, readers are referred to previous drug resistance reports (http://www.phac-aspc.gc.ca/tbpc-latb/surv-eng.php).

Resistance patterns that are described in this report include: a) monoresistance which is resistance to one of the first-line drugs (INH, RMP, EMB, or PZA); b) polyresistance defined as resistance to two or more first-line drugs but not including the isoniazid and rifampin combination; c) MDR-TB defined as resistance to at least isoniazid and rifampin; and finally d) XDR-TB defined as resistance to at least rifampin and isoniazid and further resistance to any fluoroquinolone, and to at least one of the three injectable second-line drugs (amikacin, capreomycin and kanamycin).

Prior to 2007, all specimens received by laboratories between January 1 and December 31 of a calendar year were included in the annual report. However, this resulted in delayed reporting of results for specimens that were received in late December. Thus, starting in 2007, all cultures that grew in a laboratory as of December 31 were submitted and counted for that calendar year. Otherwise, the results are recorded in the next year's set. For example, if a specimen was received on December 20, 2008 and the culture grew only in January 2009 it would be considered a 2009 isolate. With this approach the majority of results will be ready by January 31 of each subsequent year.

Laboratories perform routine susceptibility testing of MTB or MTBC using either the radiometric proportion method BACTEC® 460 or the fluorometric proportion method MGIT® 960. New Brunswick, Newfoundland and Labrador, Nova Scotia, Ontario, Quebec and Saskatchewan use MGIT® 960. All other provinces/territories used BACTEC® 460. Table A lists the first-line and second-line anti-tuberculosis drugs and the critical concentrations in *mg/L* used by the participating laboratories.

Table A: Critical concentrations for routine testing of anti-tuberculosis drugs

First-line anti-tuberculosis drugs			
Anti-tuberculosis drugs	Critical concentration* (mg/L)		Comments
	BACTEC® 460	MGIT® 960†	
Isoniazid (INH)	0.1	0.1	When resistance to INH is found at the 0.1 mg/L, tests are repeated with INH 0.4mg/L to determine the level of resistance. Regardless, the isolate will be reported as resistant using the 0.1 mg/L cut off level.
Rifampin (RMP)	2.0	1.0	
Ethambutol (EMB)	2.5	5.0	
Pyrazinamide (PZA)	100.0	100.0	Routine testing **is not** performed for isolates from British Columbia, Saskatchewan.
Second-line anti-tuberculosis drugs			
Anti-tuberculosis drugs	Critical concentration‡ (mg/L)		Comments
Streptomycin (SM)	2.0	1.0	
Amikacin (AMI)	1.0		
Capreomycin (CAP)	1.25		
Ethionamide (ETH)	2.5		
Kanamycin (KAN)	5.0		
Para-amino salicylic acid (PAS)	4.0		
Ofloxacin (OFL)	2.0		
Rifabutin (RIF)	0.5		

* Critical concentration: the lowest concentration of drug that will inhibit 95% of wild strains of MTB that have never been exposed to drugs while at the same time not inhibiting strains of MTB that have been isolated from patients who are not responding to therapy and that are considered resistant.

† MGIT® 960 concentrations are pending approval from the Clinical and Laboratory Standards Institute (CLSI).

‡ Most of the second-line drugs were not used at the time of the development of the Proportion Method and the definition of critical concentrations. For the current report we are using the "concentration tested" and suggest caution to be exercised when interpreting results. Concentrations listed are for the BACTEC® 460.

All members of the CTLTN participate in the NRCM (National Reference Centre for Mycobacteriology) proficiency testing program. In addition to this national initiative, a number of laboratories also participate in other select external proficiency programs such as College of American Pathologists, Quality Management Program – Laboratory Services, United States Centers for Disease Control and Prevention Drug Susceptibility Testing or the New York State Department of Health. All testing methods, including drug selection and concentrations, are done in compliance with the recommended laboratory standards detailed in the Clinical and Laboratory Standards Institute document.[1]

The information presented in this report represents the most up to date information available as of March, 2009. The historic record is reviewed annually and adjustments are made to the tables as new/updated information becomes available.

RESULTS

For 2008, 1,367 reports were received. Of these, eight were *Mycobacterium bovis* (BCG) and were excluded from the analyses. Between 1998 and 2006 the average annual rate of decline in the number of isolates submitted was 1.5%. However, between 2007 and 2008 there was an increase of 7% in the number of isolates reported. This increase was due in part to the change in methods introduced in 2007. Prior to 2007, isolates received by the lab before December 31 would have been counted in the report for that year even if the culture grew in January of the next year. With the change only isolates that were received in 2007 and for which culture grew in 2007 were reported in 2007; otherwise the isolates were reported in 2008. Thus the percentage increase in the number of isolates reported in 2008 is partially the result of counting isolates in 2008 that would have been counted in the 2007 report under the old reporting system.

There were no reports received from Prince Edward Island. All isolates reported from New Brunswick, Newfoundland and Labrador, Northwest Territories, Nova Scotia, Nunavut and Yukon were susceptible to all first-line anti-tuberculous drugs.

Of the 1,359 isolates included for analysis, 119 (8.8%) were resistant to at least one of the first-line anti-tuberculosis drugs tested: INH, RMP, EMB or PZA. Ninety-seven (7.1%) of the isolates were monoresistant and of those 80 (82.4%) were resistant to INH. Of all the isolates tested, 7.5% demonstrated some resistance to INH. Fifteen isolates (1.1%) were MDR- TB; there was one XDR-TB isolate identified (Table 1).

Demographic information on individual patients from whom the isolates originated is limited in this laboratory-based surveillance system with only age and sex reported. Age of the individual was known for 1,348 of the isolates, with 34% between the age of 25 and 44. For isolates showing any resistance, 41% were from individuals between the ages of 25 and 44. The majority of the MDR-TB isolates were also from individuals between 24 and 44 years of age. Sex of the individual was reported for 1,328 of the isolates with 55% being male. Fifty-four percent of the isolates with known resistance were from males; 60% of the indentified MDR-TB isolates were from male cases. When stratified by both sex and age, MDR-TB cases were found to be associated with being male and in a younger age group (Table 4).

In Canada, between 1998 and 2008, 181 isolates have been classified as MDR-TB representing 1.2% of all isolate data in the CTBLSS. A retrospective review of all MDR-TB isolates from 1998-2008 identified four XDR-TB isolates: three were male and one was female. Table B provides a summary of the isolates that were tested and of those, the number and the percentage that were identified as MDR-TB and XDR-TB. The majority of the MDR-TB isolates were reported from Ontario and British Columbia, the two provinces from which the majority of isolates originate (Table C).

Table B: Total number of isolates tested and number and percentage identified as MDR-TB and XDR-TB, Canada – 1998-2008

Year	Total number of Isolates	MDR-TB (%)	XDR-TB (%)
1998	1,461	18 (1.2)	0 (–)
1999	1,415	18 (1.2)	0 (–)
2000	1,491	15 (1.0)	0 (–)
2001	1,476	15 (1.0)	0 (–)
2002	1,419	20 (1.4)	1 (0.07)
2003	1,407	20 (1.4)	1 (0.07)
2004	1,378	12 (0.9)	0 (–)
2005	1,336	22 (1.6)	0 (–)
2006	1,389	15 (1.1)	1 (0.07)
2007	1,267	11 (0.9)	0 (–)
2008	1,359	15 (1.1)	1 (0.07)
TOTAL	**15,398**	**181 (1.2)**	**4 (0.03)**

Table C: Provincial/territorial breakdown of identified MDR-TB and XDR-TB isolates, Canada – 1998-2008

Province	MDR-TB (%)	XDR (%)
Alberta	11 (6.1)	0
British Columbia	37 (20.4)	0
Manitoba	9 (5.0)	1 (25.0)
Nunavut	1 (0.6)	0
Ontario	107 (59.1)	3 (75.0)
Quebec	16 (8.8)	0
TOTAL	181 (100.0)	4 (100.0)

DISCUSSION

Susceptibility results were reported for 1,359 isolates in 2008. The percentage of isolates demonstrating any type of drug resistance was 8.8%, compared to 11% in 2007. The proportion of isolates classified as MDR-TB increase slightly from 0.9% in 2007 to 1.1% in 2008. The average annual percentage of reported MDR-TB since 1998 was 1.2%. As of February 2009, the CTLSS has identified four XDR-TB cases, one in each of the years 2002, 2004, 2006 and 2008. Additionally, a literature review identified a fifth Canadian case diagnosed in 1997 with a highly drug-resistant strain of *M. bovis*, which met the criteria for XDR-TB[2].

Seventy percent of the reported TB isolates in Canada in 2008 originated from British Columbia, Ontario and Quebec which have consistently reported the majority of isolates in the ten years of data collection. Since the initiation of this laboratory-based surveillance system the Atlantic Provinces, Northwest Territories, Saskatchewan and Yukon have not reported any MDR-TB isolates.

XDR-TB is a growing international concern. By the end of 2008, 55 countries, including Canada, had reported the presence of XDR-TB cases. Because XDR-TB is resistant to the best first- and second-line drugs, treatment options are seriously limited. In order to continue surveillance of XDR-TB in Canada, all MDR-TB isolates will be routinely tested for resistance to second-line antibiotics.

In the fourth report of the global TB drug resistance surveillance project jointly conducted by the World Health Organization (WHO) and the International Union Against Tuberculosis and Lung Disease (IUATLD),[3] the global population weighted percentage for any resistance was 17% among new cases, 35% among previously treated cases and 20% among all cases combined. In Canada for 2008, the percentage of isolates showing any resistance was 8.8%, lower than the WHO global estimate.

The global estimated number of incident MDR-TB cases as reported for 2006 in the WHO/IUALTD drug resistance report was 4.8%[3]. In 2008, the percentage of isolates that were identified as MDR-TB in Canada was 1.1%, again lower than the global average estimated by the WHO.

LIMITATIONS

More epidemiological information on the TB cases from which the isolates were submitted is desirable to examine more critically the demographic profile of drug resistant TB in Canada. However, this information is difficult to collect as isolates are often submitted to the laboratories with only the sex and year of birth of the individual. As well, no differentiation can be made between primary and secondary/acquired drug resistance from the data. The annual *Tuberculosis in Canada* reports (http://www.phac-aspc.gc.ca/tbpc-latb/surv-eng.php) include additional drug resistance data for each reported TB case.

Typically, resistance to RMP or resistance to at least two first-line drugs receive drug sensitivity testing to selected second-line drugs. Other isolates may be resistant to a fluoroquinolone, because of their widespread use for respiratory infections, but not be MDR-TB. This may limit the understanding of the emergence of second-line resistance within Canada.

CONCLUSIONS

With growing worldwide concern regarding anti-TB drug resistance and with the emergence of extensively drug-resistant TB, this surveillance system is vital in providing the necessary data in a timely manner to monitor trends in TB drug resistance in Canada. The surveillance data collected to date indicate that the presence of TB drug resistance in this country is below the global average.

REFERENCES

1. National Committee for Laboratory Standards. *Susceptibility testing of mycobacteria, Nocardiae, and other aerobic actinomycetes: approved standard M24-A*. Wayne PA, National Committee for Clinical Laboratory Standards, 2003.
2. Long R, Nobert E, Chomyc S, van Embden J, McNamee C, Rey Duran R, Talbot J, Fanning A. *Transcontinental spread of multidrug-resistant Mycobacterium bovis.* American Journal of Respiratory and Critical Care Medicine 1999;159: 2014–2017.
3. The WHO/IUALTD Global Project on Anti-tuberculosis drug Resistance Surveillance 2002-2007. *Anti-Tuberculosis Drug Resistance in the World: Fourth Global Report* (WHO/HTM/TB/2008.394) Geneva: World Health Organization, 2008.

Figure 1
Reported TB drug resistance in Canada by province/territory – 2008

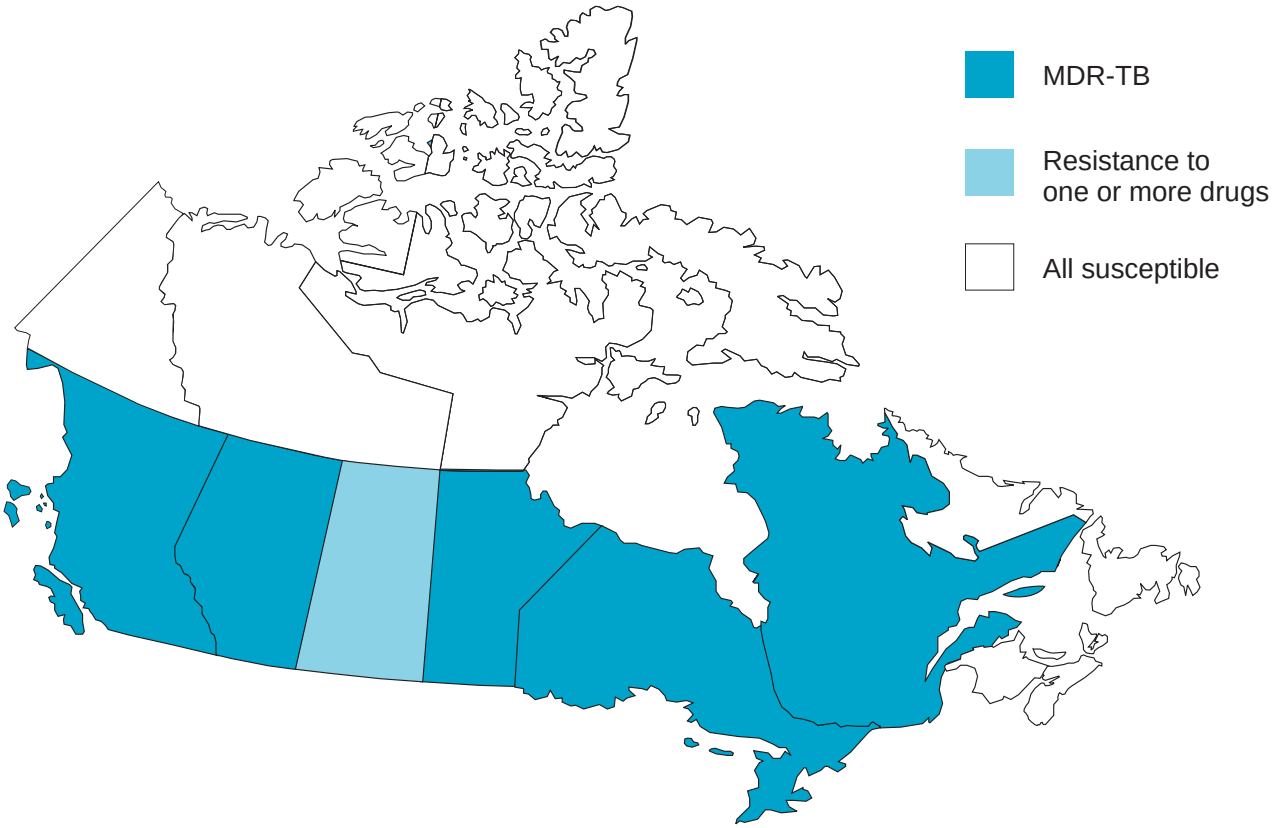


Figure 2
Reported *Mycobacterium tuberculosis* isolates in Canada by province/territory– 2008

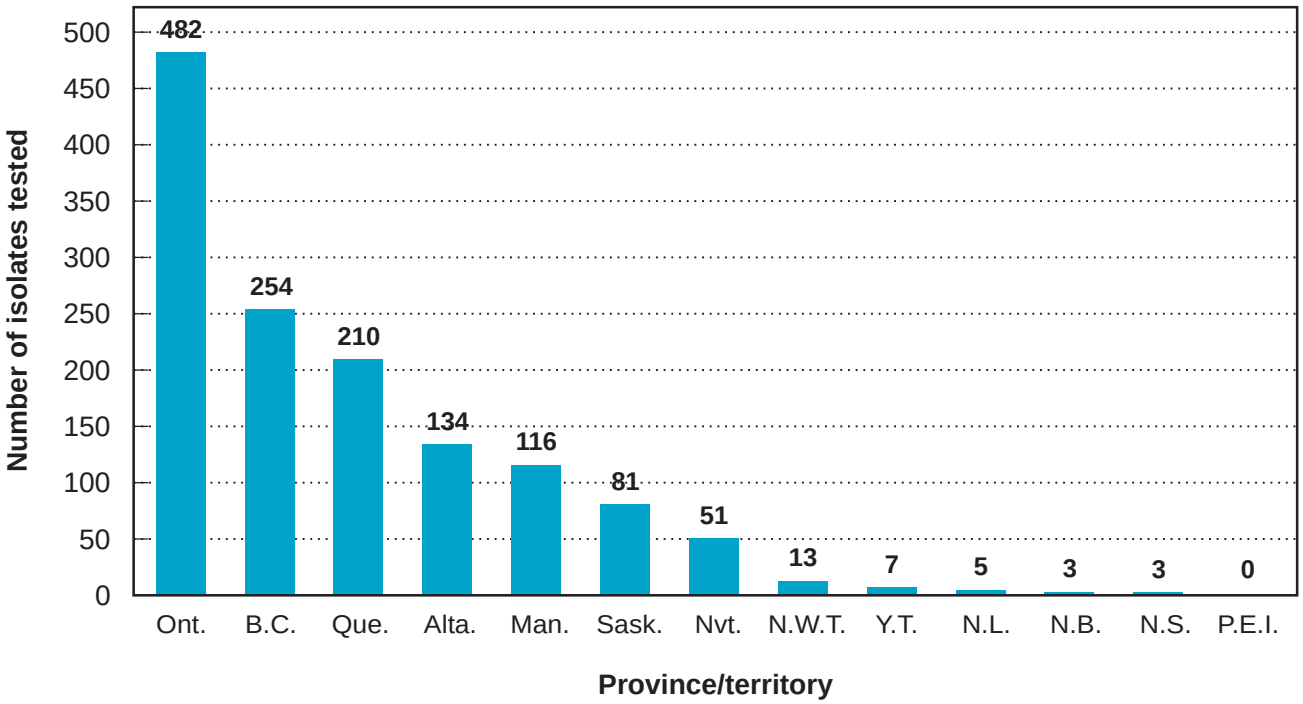
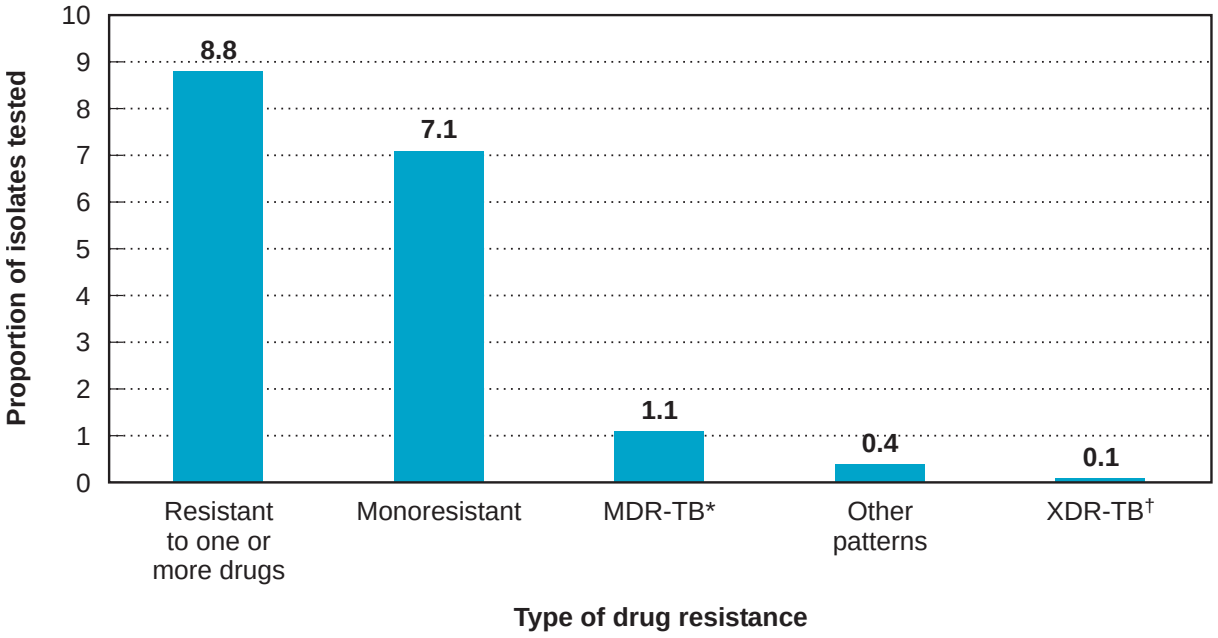


Figure 3
Overall pattern of reported TB drug resistance in Canada – 2008



* Multidrug-resistant TB (MDR-TB) is resistance to at least isoniazid and rifampin.

† Extensively drug-resistant TB (XDR-TB) is MDR-TB plus resistance to any fluoroquinolone and at least one of three injectable second-line drugs: amikacin, capreomycin and kanamycin.

Figure 4
Reported TB drug resistance in Canada by type of drug – 2008

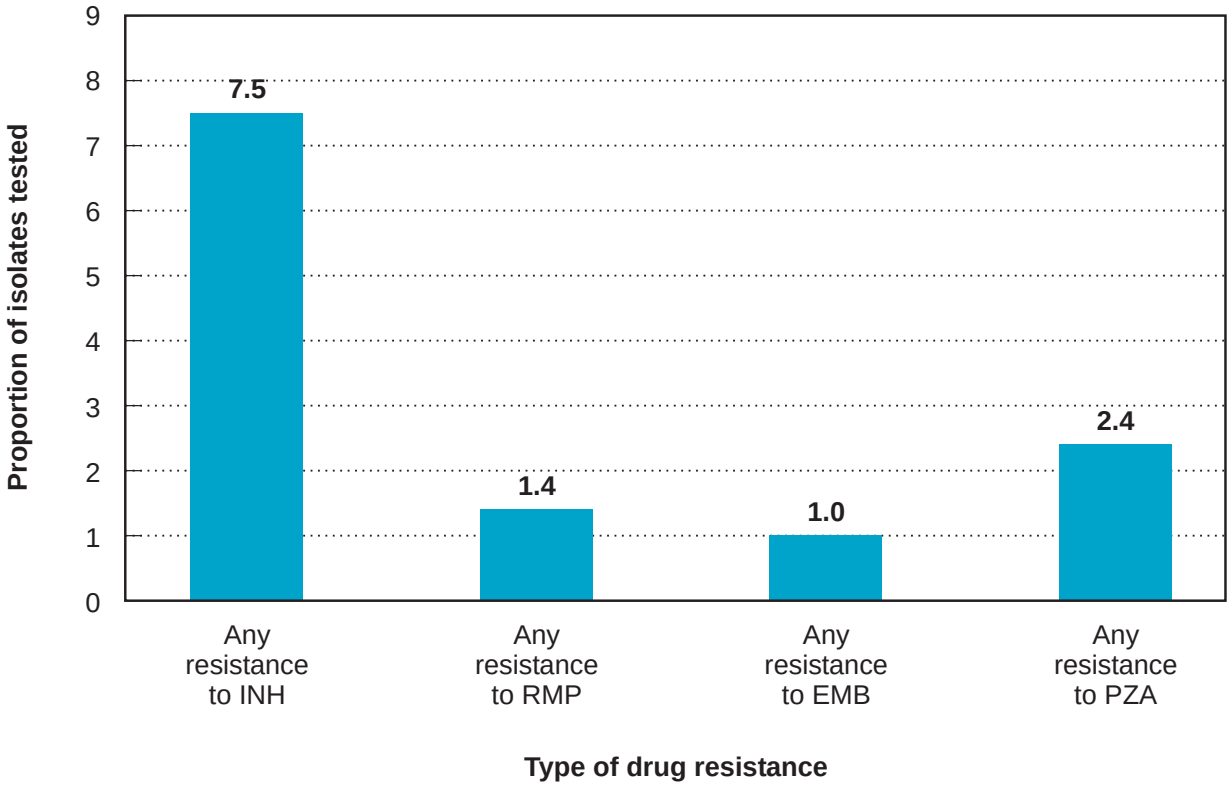


Figure 5
Any resistance by type of drug as a proportion of the number of isolates tested – 1998-2008

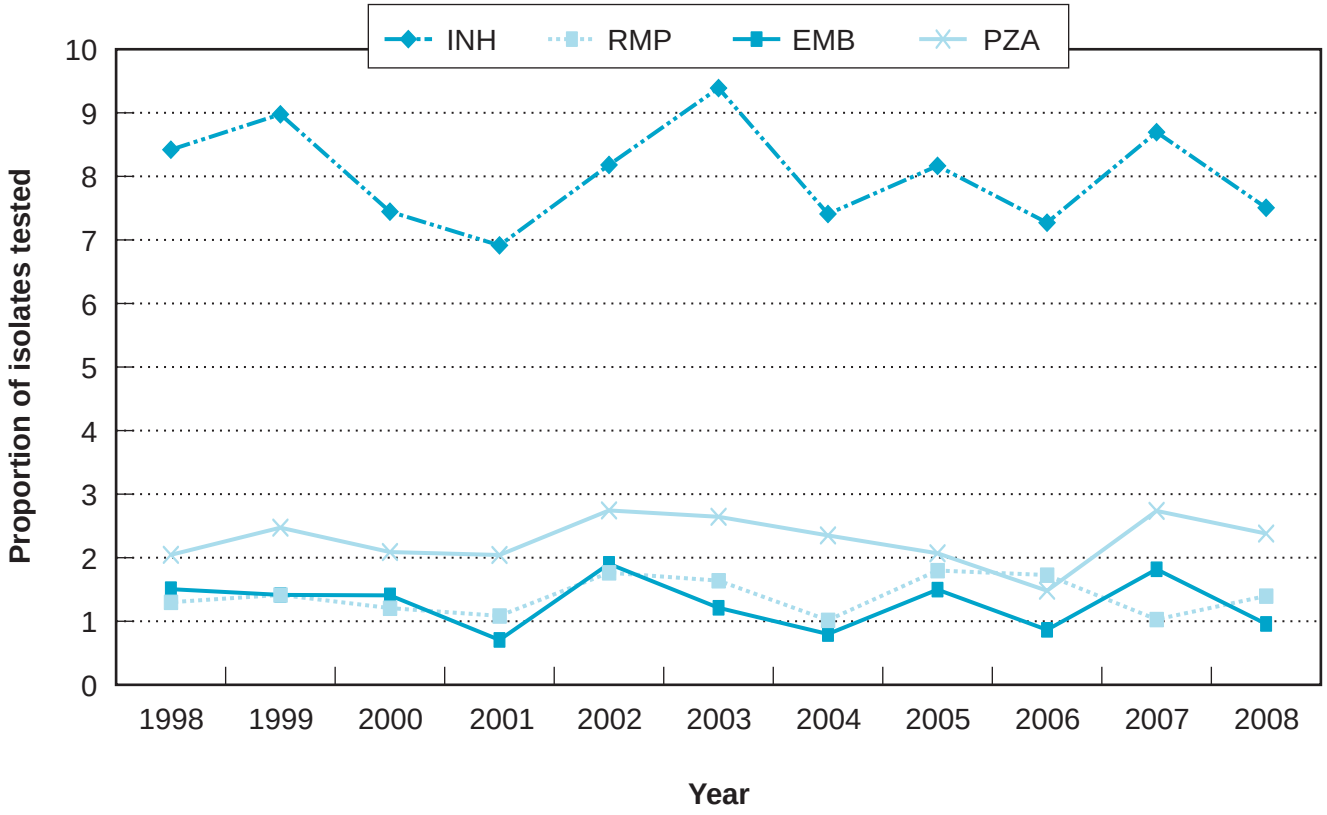
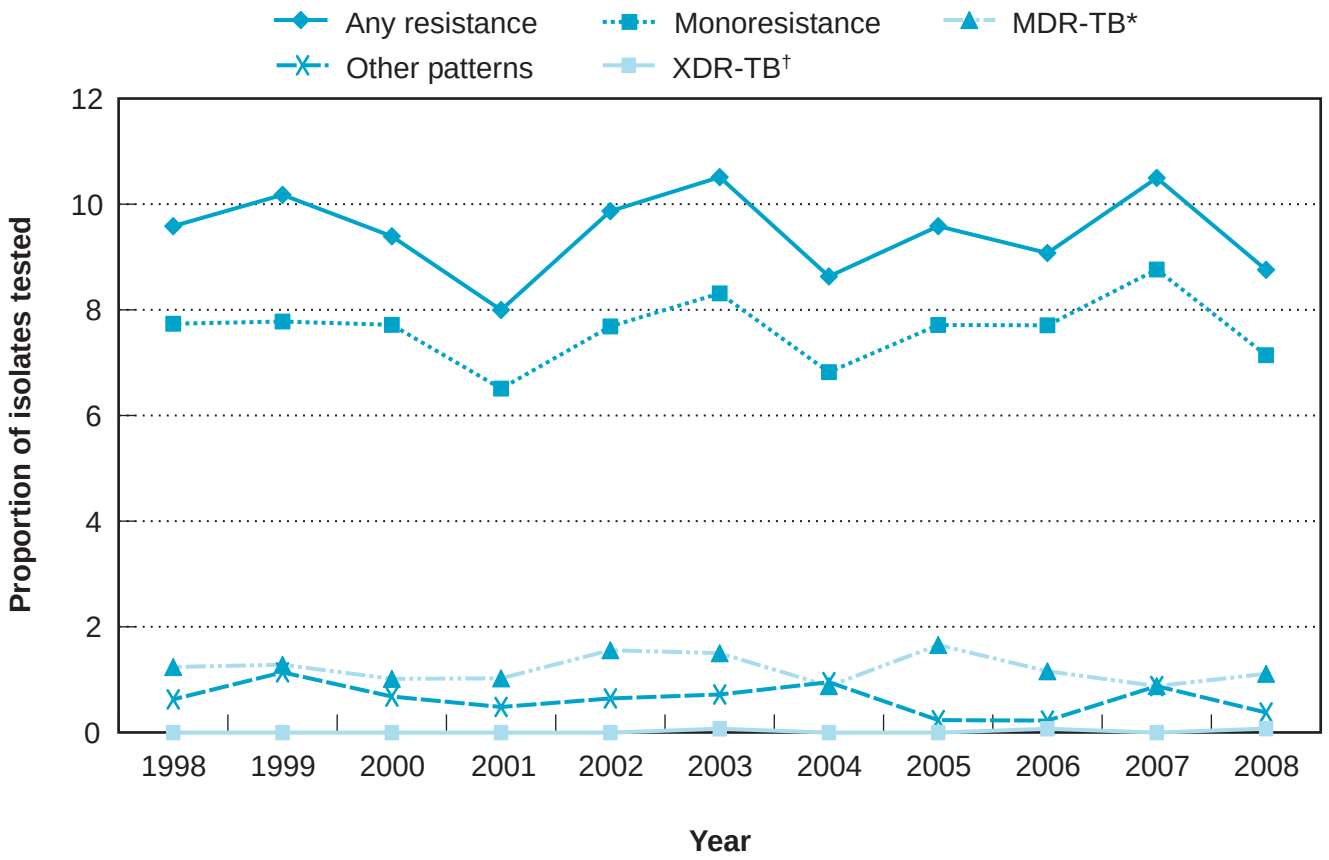


Figure 6

Overall pattern of reported TB drug resistance as a proportion of the number of isolates tested – 1998-2008



* Multidrug-resistant TB (MDR-TB) is resistance to at least isoniazid and rifampin.

† Extensively drug-resistant TB (XDR-TB) is MDR-TB plus resistance to any fluoroquinolone and at least 1 of 3 injectable second-line drugs: amikacin, capreomycin, and kanamycin.

Table 1. Overall pattern of reported TB drug resistance in Canada – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates	1,461 (100.0)	1,415 (100.0)	1,491 (100.0)	1,476 (100.0)	1,419 (100.0)	1,407 (100.0)	1,378 (100.0)	1,336 (100.0)	1,389 (100.0)	1,267 (100.0)	1,359 (100.0)
Isolates susceptible	**1,321 (90.4)**	**1,271 (89.8)**	**1,351 (90.6)**	**1,358 (92.0)**	**1,279 (90.1)**	**1,260 (89.6)**	**1,259 (91.4)**	**1,208 (90.4)**	**1,263 (90.9)**	**1,134 (89.5)**	**1,240 (91.2)**
Any resistance*											
INH	123 (8.4)	127 (9.0)	111 (7.4)	102 (6.9)	115 (8.1)	132 (9.4)	102 (7.4)	109 (8.2)	101 (7.3)	110 (8.7)	102 (7.5)
RMP	19 (1.3)	20 (1.4)	18 (1.2)	16 (1.1)	24 (1.7)	23 (1.6)	14 (1.0)	24 (1.8)	24 (1.7)	13 (1.0)	19 (1.4)
EMB	22 (1.5)	20 (1.4)	21 (1.4)	10 (0.7)	26 (1.8)	17 (1.2)	11 (0.8)	20 (1.5)	12 (0.9)	23 (1.8)	13 (1.0)
PZA	26 (2.2)	29 (2.5)	25 (2.1)	23 (2.1)	29 (2.6)	29 (2.6)	23 (2.1)	22 (2.1)	16 (1.5)	27 (2.7)	25 (2.4)
Resistance to one or more drugs	140 (9.6)	144 (10.2)	140 (9.4)	118 (8.0)	139 (9.8)	148 (10.5)	120 (8.7)	128 (9.6)	126 (9.1)	133 (10.5)	119 (8.8)
Monoresistance	113 (7.7)	110 (7.8)	115 (7.7)	96 (6.5)	109 (7.7)	117 (8.3)	94 (6.8)	103 (7.7)	107 (7.7)	111 (8.8)	97 (7.1)
MDR-TB†	18 (1.2)	18 (1.3)	15 (1.0)	15 (1.0)	20 (1.4)	20 (1.4)	12 (0.9)	22 (1.6)	15 (1.1)	11 (0.9)	15 (1.1)
Other patterns	9 (0.6)	16 (1.1)	10 (0.7)	7 (0.5)	9 (0.6)	10 (0.7)	14 (1.0)	3 (0.2)	3 (0.2)	11 (0.9)	6 (0.4)
XDR-TB‡	0 (-)	0 (-)	0 (-)	0 (-)	1 (0.1)	1 (0.1)	0 (-)	0 (-)	1 (0.1)	0 (-)	1 (0.1)

* Not all isolates were tested for resistance to all drugs; percentage reflects the total number of isolates actually tested.
† MDR-TB is defined as resistance to at least rifampin and isoniazid.
‡ XDR-TB is defined as resistance to at least rifampin and isoniazid and further resistance to any fluoroquinolone, and to at least one of three injectable second-line drugs (amikacin, capreomycin and kanamycin).

Table 2. Reported *Mycobacterium tuberculosis* isolates by "reporting" and "originating" province/territory, Canada – 2008

Reporting province	CANADA	Originating Province/Territory												
		N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nvt.
Number of isolates	**1,359**	**5**	**0**	**3**	**3**	**210**	**482**	**116**	**81**	**134**	**254**	**7**	**13**	**51**
N.L.	**5**	5	0	0	0	0	0	0	0	0	0	0	0	0
N.S.	**3**	0	0	3	0	0	0	0	0	0	0	0	0	0
N.B.	**3**	0	0	0	3	0	0	0	0	0	0	0	0	0
Que.	**210**	0	0	0	0	210	0	0	0	0	0	0	0	0
Ont.	**482**	0	0	0	0	0	482	0	0	0	0	0	0	0
Man.	**116**	0	0	0	0	0	0	116	0	0	0	0	0	0
Sask.	**79**	0	0	0	0	0	0	0	79	0	0	0	0	0
Alta.	**201**	0	0	0	0	0	0	0	2	134	0	1	13	51
B.C.	**260**	0	0	0	0	0	0	0	0	0	254	6	0	0

Table 3. Reported MDR-TB isolates by province/territory, Canada – 2008

	CANADA	Originating Province/Territory												
		N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nvt.
Total number isolates tested	**1,359**	**5**	**0**	**3**	**3**	**210**	**482**	**116**	**81**	**134**	**254**	**7**	**13**	**51**
Total number of MDR-TB isolates*	**15**	**0**	**0**	**0**	**0**	**2**	**7**	**1**	**0**	**2**	**3**	**0**	**0**	**0**
INH & RMP	**1**	0	0	0	0	0	0	0	0	0	1	0	0	0
INH & RMP & EMB & PZA	**3**	0	0	0	0	0	0	0	0	1	2	0	0	0
INH & RMP & EMB & SM	**1**	0	0	0	0	0	0	0	0	1	0	0	0	0
INH & RMP & EMB & RIF	**0**	0	0	0	0	0	1	0	0	0	0	0	0	0
INH & RMP & SM & RIF	**4**	0	0	0	0	1	3	0	0	0	0	0	0	0
INH & RMP & ETH & RIF	**1**	0	0	0	0	0	1	0	0	0	0	0	0	0
INH & RMP & PZA & SM & RIF	**1**	0	0	0	0	0	0	1	0	0	0	0	0	0
INH & RMP & EMB & PZA & SM & RIF	**1**	0	0	0	0	0	1	0	0	0	0	0	0	0
INH & RMP & PZA & SM & ETH & RIF	**1**	0	0	0	0	0	1	0	0	0	0	0	0	0
INH & RMP & PZA & SM & AMI & KAN & CAP	**1**	0	0	0	0	1	0	0	0	0	0	0	0	0
Total number of XDR-TB isolates†														
INH & RMP & PZA & EMB & CAP & OFL & ETH & RIF & PAS	**1**	0	0	0	0	0	1	0	0	0	0	0	0	0

* MDR-TB is resistance to at least rifampin and isoniazid. First and second-line resistance are reported. Second-line drugs include: CAP = capreomycin; ETH= ethionamide; KAN = kanamycin; OFL = ofloxacin; RIF = rifabutin.

† XDR-TB is defined as resistance to at least rifampin and isoniazid and further resistance to any fluoroquinolone, and to at least one of three injectable second-line drugs (amikacin, capreomycin and kanamycin). Second-line drugs include: CAP = capreomycin; ETH= ethionamide; KAN: kanamycin; OFL = ofloxacin; RIF = rifabutin.

Table 4. Reported TB drug resistance by sex and age group, Canada – 2008

Age Group		Isolates		Any Resistance		MDR-TB		XDR-TB	
		Number	(%)	Number	(%)	Number	(%)	Number	(%)
Total		**1,359**	**(100.0)**	**119**	**(100.0)**	**15**	**(100.0)**	**1**	**(100.0)**
0-4	Males	4	(0.3)	1	(0.8)	0	(0.0)	0	(0.0)
	Females	4	(0.3)	0	(0.0)	0	(0.0)	0	(0.0)
	Unknown	1	(0.1)	0	(0.0)	0	(0.0)	0	(0.0)
	Total	**9**	**(0.7)**	**1**	**(0.8)**	**0**	**(0.0)**	**0**	**(0.0)**
5-14	Males	9	(0.7)	0	(0.0)	0	(0.0)	0	(0.0)
	Females	15	(1.1)	1	(0.8)	0	(0.0)	0	(0.0)
	Unknown	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
	Total	**24**	**(1.8)**	**1**	**(0.8)**	**0**	**(0.0)**	**0**	**(0.0)**
15-24	Males	92	(6.8)	6	(5.0)	2	(13.3)	0	(0.0)
	Females	76	(5.6)	6	(5.0)	1	(6.7)	0	(0.0)
	Unknown	5	(0.4)	1	(0.8)	1	(6.7)	0	(0.0)
	Total	**173**	**(12.7)**	**13**	**(10.9)**	**4.0**	**(26.7)**	**0**	**(0.0)**
25-34	Males	125	(9.2)	15	(12.6)	4	(26.7)	0	(0.0)
	Females	116	(8.5)	9	(7.6)	1	(6.7)	0	(0.0)
	Unknown	5	(0.4)	0	(0.0)	0	(0.0)	0	(0.0)
	Total	**246**	**(18.1)**	**24**	**(20.2)**	**5**	**(33.3)**	**0**	**(0.0)**
35-44	Males	112	(8.2)	10	(8.4)	2	(13.3)	0	(0.0)
	Females	106	(7.8)	15	(12.6)	2	(13.3)	0	(0.0)
	Unknown	5	(0.4)	0	(0.0)	0	(0.0)	0	(0.0)
	Total	**223**	**(16.4)**	**25**	**(21.0)**	**4**	**(26.7)**	**0**	**(0.0)**
45-54	Males	131	(9.6)	11	(9.2)	1	(6.7)	0	(0.0)
	Females	72	(5.3)	8	(6.7)	0	(0.0)	0	(0.0)
	Unknown	2	(0.1)	0	(0.0)	0	(0.0)	0	(0.0)
	Total	**205**	**(15.1)**	**19**	**(16.0)**	**1**	**(6.7)**	**0**	**(0.0)**
55-64	Males	94	(6.9)	4	(3.4)	0	(0.0)	0	(0.0)
	Females	48	(3.5)	5	(4.2)	1	(6.7)	0	(0.0)
	Unknown	3	(0.2)	1	(0.8)	0	(0.0)	0	(0.0)
	Total	**145**	**(10.7)**	**10**	**(8.4)**	**1**	**(6.7)**	**0**	**(0.0)**
65-74	Males	88	(6.5)	8	(6.7)	0	(0.0)	1	(100.0)
	Females	52	(3.8)	5	(4.2)	0	(0.0)	0	(0.0)
	Unknown	8	(0.6)	0	(0.0)	0	(0.0)	0	(0.0)
	Total	**148**	**(10.9)**	**13**	**(10.9)**	**0**	**(0.0)**	**1**	**(100.0)**
75+	Males	96	(7.1)	8	(6.7)	0	(0.0)	0	(0.0)
	Females	78	(5.7)	4	(3.4)	0	(0.0)	0	(0.0)
	Unknown	1	(0.1)	0	(0.0)	0	(0.0)	0	(0.0)
	Total	**175**	**(12.9)**	**12**	**(10.1)**	**0**	**(0.0)**	**0**	**(0.0)**
Unknown	Males	2	(0.1)	0	(0.0)	0	(0.0)	0	(0.0)
	Females	3	(0.2)	0	(0.0)	0	(0.0)	0	(0.0)
	Unknown	6	(0.4)	1	(0.8)	0	(0.0)	0	(0.0)
	Total	**11**	**(0.8)**	**1**	**(0.8)**	**0**	**(0.0)**	**0**	**(0.0)**
Total	**Males**	**753**	**(55.4)**	**63**	**(52.9)**	**9**	**(60.0)**	**1**	**(100.0)**
	Females	**570**	**(41.9)**	**53**	**(44.5)**	**5**	**(33.3)**	**0**	**(0.0)**
	Unknown	**36**	**(2.6)**	**3**	**(2.5)**	**1**	**(6.7)**	**0**	**(0.0)**

Table 5. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Alberta – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	**119 (100.0)**	**117 (100.0)**	**104 (100.0)**	**91 (100.0)**	**108 (100.0)**	**92 (100.0)**	**96 (100.0)**	**129 (100.0)**	**104 (100.0)**	**98 (100.0)**	**134 (100.0)**
Isolates susceptible	**112 (94.1)**	**114 (97.4)**	**95 (91.3)**	**82 (90.1)**	**100 (92.6)**	**78 (84.8)**	**84 (87.5)**	**115 (89.1)**	**95 (91.3)**	**92 (93.9)**	**123 (91.8)**
Isolates resistant to one or more of the first line drugs	**7 (5.9)**	**3 (2.6)**	**9 (8.7)**	**9 (9.9)**	**8 (7.4)**	**14 (15.2)**	**12 (12.5)**	**14 (10.9)**	**9 (8.7)**	**6 (6.1)**	**11 (8.2)**
Monoresistance	**5 (4.2)**	**3 (2.6)**	**7 (6.7)**	**7 (7.7)**	**7 (6.5)**	**11 (12.0)**	**9 (9.4)**	**10 (7.8)**	**8 (7.7)**	**6 (6.1)**	**8 (6.0)**
INH	5 (4.2)	3 (2.6)	5 (4.8)	7 (7.7)	7 (6.5)	9 (9.8)	7 (7.3)	10 (7.8)	7 (6.7)	5 (5.1)	8 (6.0)
RMP	–	–	–	–	–	–	–	–	–	–	–
EMB	–	–	1 (1.0)	–	–	–	–	–	–	–	–
PZA	–	–	1 (1.0)	–	–	2 (2.2)	2 (2.1)	–	1 (1.0)	1 (1.0)	–
Other Patterns	**1 (0.8)**	**–**	**2 (1.9)**	**2 (2.2)**	**1 (0.9)**	**2 (2.2)**	**1 (1.0)**	**–**	**–**	**–**	**1 (0.7)**
INH & EMB	–	–	1 (1.0)	–	–	1 (1.1)	–	–	–	–	1 (0.7)
IHH & PZA	1 (0.8)	–	1 (1.0)	2 (2.2)	1 (0.9)	1 (1.1)	1 (1.0)	–	–	–	–
MDR-TB†	**1 (0.8)**	**–**	**–**	**–**	**–**	**1 (1.1)**	**2 (2.1)**	**4 (3.1)**	**1 (1.0)**	**–**	**2 (1.5)**
INH & RMP	–	–	–	–	–	–	–	–	–	–	–
INH & RMP & EMB	–	–	–	–	–	–	–	1 (0.8)	–	–	–
INH & RMP & EMB & PZA	–	–	–	–	–	–	–	1 (0.8)	–	–	1 (0.7)
INH & RMP & EMB & SM	–	–	–	–	–	–	–	–	1 (1.0)	–	1 (0.7)
INH & RMP & EMB & PZA & SM	1 (0.8)	–	–	–	–	–	–	1 (0.8)	–	–	–
INH & RMP & ETH	–	–	–	–	–	1 (1.1)	–	–	–	–	–
INH & RMP & SM	–	–	–	–	–	–	–	1 (0.8)	–	–	–
INH & RMP & EMB & SM & OFL	–	–	–	–	–	–	1 (1.0)	–	–	–	–
INH & RMP & EMB & AMI & RIF	–	–	–	–	–	–	1 (1.0)	–	–	–	–

* Includes 2, *M.africanum* in 2007.

† MDR-TB is defined as resistance to at least rifampin and isoniazid. First and second-line resistance are reported. Second-line drugs include: AMI = amikacin; ETH = ethionamide; KAN = kanamycin; OFL = ofloxacin; RIF = rifabutin.

Table 6. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, British Columbia – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	**237 (100.0)**	**244 (100.0)**	**277 (100.0)**	**332 (100.0)**	**259 (100.0)**	**291 (100.0)**	**263 (100.0)**	**204 (100.0)**	**275 (100.0)**	**231 (100.0)**	**254 (100.0)**
Isolates susceptible	**214 (90.2)**	**226 (92.6)**	**253 (91.3)**	**306 (92.2)**	**236 (91.1)**	**264 (90.7)**	**237 (90.1)**	**182 (89.3)**	**257 (93.5)**	**210 (90.9)**	**230 (90.6)**
Isolates resistant to one or more of the first line drugs	**23 (9.7)**	**18 (7.4)**	**24 (8.7)**	**26 (7.8)**	**23 (8.8)**	**27 (9.3)**	**26 (9.9)**	**22 (10.8)**	**18 (5.8)**	**21 (9.1)**	**24 (9.4)**
Monoresistance	**19 (8.0)**	**15 (6.1)**	**17 (6.1)**	**18 (5.4)**	**20 (7.2)**	**20 (6.9)**	**17 (6.5)**	**17 (8.3)**	**16 (5.8)**	**17 (7.4)**	**21 (8.3)**
INH	18 (7.6)	13 (5.3)	15 (5.4)	17 (5.1)	15 (5.8)	19 (6.5)	13 (4.9)	11 (5.4)	7 (2.5)	13 (5.6)	18 (7.1)
RMP	1 (0.4)	1 (0.4)	1 (0.4)	1 (0.3)	2 (0.8)	–	–	2 (1.0)	6 (2.2)	–	3 (1.2)
EMB	–	1 (0.4)	1 (0.4)	–	2 (0.8)	1 (0.3)	1 (0.4)	4 (2.0)	3 (1.1)	4 (1.7)	–
PZA†	–	–	–	–	1 (0.4)	–	3 (1.1)	–	–	–	–
Other Patterns	**2 (0.8)**	**2 (0.8)**	**2 (0.7)**	**–**	**1 (0.4)**	**1 (0.3)**	**7 (2.7)**	**1 (0.5)**	**–**	**2 (0.9)**	**–**
INH & EMB	1 (0.4)	2 (0.8)	2 (0.7)	–	–	–	1 (0.4)	1 (0.5)	–	2 (0.9)	–
INH & PZA	1 (0.4)	–	–	–	1 (0.4)	1 (0.3)	4 (1.5)	–	–	–	–
RMP & PZA	–	–	–	–	–	–	2 (0.8)	–	–	–	–
MDR-TB‡	**2 (0.8)**	**1 (0.4)**	**5 (1.8)**	**8 (2.4)**	**2 (0.8)**	**6 (2.1)**	**2 (0.8)**	**4 (2.0)**	**2 (0.7)**	**2 (0.9)**	**3 (1.2)**
INH & RMP	–	–	–	3 (0.9)	–	–	–	–	1 (0.4)	–	1 (0.4)
INH & RMP & EMB	–	–	1 (0.4)	–	1 (0.4)	–	1 (0.4)	–	–	–	–
INH & RMP & PZA	–	–	–	–	–	1 (0.3)	–	–	–	–	–
INH & RMP & SM	–	–	1 (0.4)	2 (0.6)	–	1 (0.3)	–	–	–	–	–
INH & RMP & AMI	–	–	–	1 (0.3)	–	–	–	–	–	–	–
INH & RMP & EMB & PZA	–	–	–	–	–	–	–	–	–	–	2 (0.8)
INH & RMP & PZA & SM	1 (0.4)	–	–	–	–	–	–	1 (0.5)	–	–	–
INH & RMP & EMB & SM	–	–	1 (0.4)	–	–	–	–	–	–	–	–

continued…

Table 6. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, British Columbia – 1998-2008 *(continued)*

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
INH & RMP & SM & ETH	–	–	1 (0.4)	–	–	–	–	–	–	–	–
INH & RMP & PZA & ETH	–	–	–	–	–	1 (0.3)	–	–	–	–	–
INH & RMP & EMB & SM & ETH	–	–	–	–	–	–	–	1 (0.5)	–	–	–
INH & RMP & EMB & SM & RIF	1 (0.4)	–	–	–	–	–	–	–	–	–	–
INH & RMP & EMB & PZA & SM	–	1 (0.4)	–	1 (0.3)	1 (0.4)	1 (0.3)	–	1 (0.5)	–	–	–
INH & RMP & EMB & PZA & ETH	–	–	–	1 (0.3)	–	1 (0.3)	1 (0.4)	–	–	–	–
INH & RMP & EMB & PZA & SM & ETH	–	–	1 (0.4)	–	–	1 (0.3)	–	–	–	–	–
INH & RMP & EMB & SM & ETH & PAS	–	–	–	–	–	–	–	1 (0.5)	1 (0.4)	–	–
INH & RMP & EMB & PZA & SM & OFL & ETH & PAS	–	–	–	–	–	–	–	–	–	1 (0.4)	–
INH & RMP & EMT & PZA & KAN & CAP & ETH	–	–	–	–	–	–	–	–	–	1 (0.4)	–

* Includes 1 *M. bovis* isolate for each 2002, 2003, 2006 and 2007; 1 *M.africanum* in 2008.

† Routine testing for PZA not conducted.

‡ MDR-TB is defined as resistance to at least rifampin and isoniazid. First and second-line resistance are reported. Second-line drugs include: CAP = capreomycin; ETH = ethionamide; KAN = kanamycin; OFL = ofloxacin; RIF = rifabutin.

Table 7. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Manitoba – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	**106 (100.0)**	**100 (100.0)**	**102 (100.0)**	**110 (100.0)**	**113 (100.0)**	**122 (100.0)**	**122 (100.0)**	**94 (100.0)**	**119 (100.0)**	**85 (100.0)**	**116 (100.0)**
Isolates susceptible	**100 (94.3)**	**92 (92.0)**	**94 (92.1)**	**105 (95.5)**	**106 (93.8)**	**117 (95.9)**	**121 (99.2)**	**92 (97.9)**	**113 (95.0)**	**75 (88.2)**	**111 (95.7)**
Isolates resistant to one or more drugs	**6 (5.7)**	**8 (8.0)**	**8 (7.8)**	**5 (4.5)**	**7 (6.2)**	**5 (4.1)**	**1 (0.8)**	**2 (2.1)**	**6 (5.0)**	**10 (11.7)**	**5 (4.3)**
Monoresistance	**4 (3.8)**	**4 (4.0)**	**8 (7.8)**	**3 (2.7)**	**4 (3.5)**	**4 (3.3)**	**1 (0.8)**	**2 (2.1)**	**6 (5.0)**	**9 (10.6)**	**4 (3.4)**
INH	4 (3.8)	4 (4.0)	8 (7.8)	3 (2.7)	3 (2.7)	3 (2.5)	–	2 (2.1)	6 (5.0)	8 (9.4)	4 (3.4)
PZA†	–	–	–	–	1 (0.9)	1 (0.8)	1 (0.8)	–	–	1 (1.2)	–
Other Patterns	**–**	**2 (2.0)**	**–**	**–**	**1 (0.9)**	**–**	**–**	**–**	**–**	**1 (1.2)**	**–**
INH & PZA	–	1 (1.0)	–	–	1 (0.1)	–	–	–	–	–	–
INH & EMB	–	1 (1.0)	–	–	–	–	–	–	–	1 (1.2)	–
MDR-TB‡	**2 (1.9)**	**2 (2.0)**	**–**	**2 (1.8)**	**1 (0.9)**	**1 (0.8)**	**–**	**–**	**–**	**–**	**1 (0.9)**
INH & RMP	–	1 (1.0)	–	1 (0.9)	1 (0.1)	–	–	–	–	–	–
INH & RMP & EMB	1 (0.9)	–	–	–	–	–	–	–	–	–	–
INH & RMP & RIFA	–	–	–	–	–	1 (0.8)	–	–	–	–	–
INH & RMP & PZA & SM & RIF	–	–	–	–	–	–	–	–	–	–	1 (0.9)
INH & RMP & EMB & PZA & SM	1 (0.9)	–	–	1 (0.9)	–	–	–	–	–	–	–
INH & RMP & PZA & SM & CAP	–	1 (1.0)	–	–	–	–	–	–	–	–	–
XDR–TB§	**–**	**–**	**–**	**–**	**1 (0.9)**	**–**	**–**	**–**	**–**	**–**	**–**
INH & RMP & EMB & PZA & CAP & OFL & ETH & RIFA	–	–	–	–	1 (0.1)	–	–	–	–	–	–

* Includes 1 *M. bovis* isolate for 2002.

† Routine testing for PZA not conducted.

‡ MDR-TB is defined as resistance to at least rifampin and isoniazid. First and second-line resistance are reported. Second-line drugs include: CAP = capreomycin; ETH= ethionamide; OFL = ofloxacin; RIF = rifabutin.

§ XDR-TB is defined as resistance to at least rifampin and isoniazid and further resistance to any fluoroquinolone, and to at least one of three injectable second-line drugs (amikacin, capreomycin and kanamycin). Second line drugs include: CAP = capreomycin; ETH = ethionamide; OFL = ofloxacin; RIF = rifabutin.

Table 8. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, New Brunswick – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	**10 (100.0)**	**12 (100.0)**	**9 (100.0)**	**10 (100.0)**	**10 (100.0)**	**14 (100.0)**	**11 (100.0)**	**5 (100.0)**	**3 (100.0)**	**5 (100.0)**	**3 (100.0)**
Isolates susceptible	**9 (90.0)**	**12 (100.0)**	**9 (100.0)**	**10 (100.0)**	**9 (90.0)**	**13 (92.9)**	**10 (90.9)**	**4 (80.0)**	**3 (100.0)**	**5 (100.0)**	**3 (100.0)**
Isolates resistant to one or more drugs	**1 (10.0)**	**–**	**–**	**–**	**1 (10.0)**	**1 (7.1)**	**1 (9.1)**	**1 (20.0)**	**–**	**–**	**–**
Monoresistance	**1 (10.0)**	**–**	**–**	**–**	**1 (10.0)**	**1 (7.1)**	**1 (9.1)**	**1 (20.0)**	**–**	**–**	**–**
INH	1 (10.0)	–	–	–	1 (10.0)	1 (7.1)	1 (9.1)	–	–	–	–
PZA	–	–	–	–	–	–	–	1 (20.0)	–	–	–

* Includes 1 *M. africanum* isolate for 2007.

Table 9. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Newfoundland and Labrador – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA	**8 (100.0)**	**9 (100.0)**	**11 (100.0)**	**9 (100.0)**	**4 (100.0)**	**6 (100.0)**	**8 (100.0)**	**6 (100.0)**	**11 (100)**	**5 (100.0)**	**5 (100.0)**
Isolates susceptible	**8 (100.0)**	**9 (100.0)**	**11 (100.0)**	**9 (100.0)**	**4 (100.0)**	**4 (66.7)**	**8 (100.0)**	**5 (83.3)**	**11 (100)**	**5 (100.0)**	**5 (100.0)**
Isolates resistant to one or more drugs	**–**	**–**	**–**	**–**	**–**	**2 (33.3)**	**–**	**1 (16.7)**	**–**	**–**	**–**
Monoresistance	**–**	**–**	**–**	**–**	**–**	**2 (33.3)**	**–**	**1 (16.7)**	**–**	**–**	**–**
INH	–	–	–	–	–	1 (16.7)	–	1 (16.7)	–	–	–
RMP	–	–	–	–	–	1 (16.7)	–	–	–	–	–

Table 10. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Northwest Territories – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA	**27 (100.0)**	**11 (100.0)**	**8 (100.0)**	**6 (100.0)**	**3 (100.0)**	**11 (100.0)**	**10 (100.0)**	**6 (100.0)**	**4 (100.0)**	**14 (100.0)**	**13 (100.0)**
Isolates susceptible	**27 (100.0)**	**11 (100.0)**	**8 (100.0)**	**6 (100.0)**	**3 (100.0)**	**11 (100.0)**	**10 (100.0)**	**6 (100.0)**	**3 (66.7)**	**14 (100.0)**	**13 (100.0)**
Monoresistance	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**1 (33.3)**	**–**	**–**
INH	–	–	–	–	–	–	–	–	1 (33.3)	–	–

Table 11. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Nova Scotia – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA	**9 (100.0)**	**8 (100.0)**	**4 (100.0)**	**7 (100.0)**	**10 (100.0)**	**6 (100.0)**	**9 (100.0)**	**7 (100.0)**	**8 (100.0)**	**5 (100.0)**	**3 (100.0)**
Isolates susceptible	**8 (88.9)**	**7 (87.5)**	**4 (100.0)**	**7 (100.0)**	**9 (90.0)**	**6 (100.0)**	**9 (100.0)**	**6 (85.7)**	**8 (100.0)**	**5 (100.0)**	**3 (100.0)**
Isolates resistant to one or more drugs	**1 (11.1)**	**1 (12.5)**	**–**	**–**	**1 (10.0)**	**–**	**–**	**1 (14.3)**	**–**	**–**	**–**
Monoresistance	**1 (11.1)**	**1 (12.5)**	**–**	**–**	**1 (10.0)**	**–**	**–**	**1 (14.3)**	**–**	**–**	**–**
INH	1	1 (12.5)	–	–	–	–	–	–	–	–	–
PZA	–	–	–	–	1 (10.0)	–	–	1 (14.3)	–	–	–

Table 12. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Nunavut* – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA	N/A	15 (100.0)	29 (100.0)	31 (100.0)	22 (100.0)	4 (100.0)	16 (100.0)	27 (100.0)	37 (100.0)	24 (100.0)	51 (100.0)
Isolates susceptible	N/A	15 (100.0)	28 (96.6)	30 (96.8)	22 (100.0)	4 (100.0)	16 (100.0)	27 (100.0)	37 (100.0)	24 (100.0)	51 (100.0)
Isolates resistant to one or more drugs	N/A	–	1 (3.4)	1 (3.2)	–	–	–	–	–	–	–
Monoresistance	N/A	–	1 (3.4)	–	–	–	–	–	–	–	–
INH	N/A	–	1 (3.4)	–	–	–	–	–	–	–	–
MDR-TB†	N/A	–	–	1 (3.2)	–	–	–	–	–	–	–
INH & RMP	N/A	–	–	1 (3.2)	–	–	–	–	–	–	–

* Nunavut began reporting in 1999.

† MDR-TB is defined as resistance to at least rifampin and isoniazid.

Table 13. Reported results for routine drug susceptibility testing of MTB isolates to anti–tuberculosis drugs, Ontario – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	**629 (100.0)**	**589 (100.0)**	**599 (100.0)**	**588 (100.0)**	**586 (100.0)**	**592 (100.0)**	**599 (100.0)**	**553 (100.0)**	**567 (100.0)**	**538 (100.0)**	**482 (100.0)**
Isolates susceptible	**549 (87.3)**	**508 (86.2)**	**535 (89.3)**	**534 (90.8)**	**517 (88.2)**	**526 (88.9)**	**539 (90.0)**	**487 (88.1)**	**504 (88.9)**	**466 (86.6)**	**427 (88.6)**
Isolates resistant to one or more drugs	**80 (12.7)**	**81 (14.8)**	**64 (10.7)**	**54 (9.2)**	**69 (11.8)**	**66 (11.1)**	**60 (10.0)**	**66 (11.9)**	**63 (11.1)**	**72 (13.4)**	**55 (11.4)**
Monoresistance	**64 (10.2)**	**58 (9.8)**	**50 (8.3)**	**46 (7.8)**	**49 (8.4)**	**47 (7.9)**	**49 (8.2)**	**51 (9.2)**	**49 (8.6)**	**61 (11.3)**	**43 (8.9)**
INH	54 (8.6)	54 (9.2)	37 (6.2)	36 (6.1)	43 (7.3)	42 (7.1)	46 (7.7)	44 (8.0)	39 (6.9)	50 (9.3)	33 (6.8)
RMP	–	–	–	–	–	1 (0.2)	–	–	1 (0.2)	1 (0.2)	–
EMB	4 (0.6)	–	1 (0.2)	1 (0.2)	1 (0.2)	–	–	–	–	1 (0.2)	1 (0.2)
PZA	6 (1.0)	4 (0.7)	12 (2.0)	9 (1.5)	5 (0.9)	4 (0.7)	3 (0.5)	7 (1.3)	9 (1.6)	9 (1.7)	9 (1.9)
Other Patterns	**5 (0.8)**	**10 (1.7)**	**5 (0.8)**	**5 (0.8)**	**4 (0.7)**	**1 (1.2)**	**4 (0.7)**	**2 (0.4)**	**3 (0.5)**	**4 (0.7)**	**4 (0.8)**
INH & EMB	4 (0.6)	8 (1.4)	3 (0.5)	3 (0.5)	3 (0.5)	5 (0.8)	3 (0.5)	2 (0.4)	3 (0.5)	1 (0.2)	2 (0.4)
INH & PZA	1 (0.2)	2 (0.3)	–	2 (0.3)	–	1 (0.2)	1 (0.2)	–	–	2 (0.4)	–
EMB & RMP	–	–	2 (0.3)	–	–	–	–	–	–	–	–
EMB & PZA	–	–	–	–	–	–	–	–	–	1 (0.2)	–
INH & EMB & PZA	–	–	–	–	1 (0.2)	1 (0.2)	–	–	–	–	2 (0.4)
MDR-TB†	**11 (1.8)**	**13 (2.2)**	**9 (1.5)**	**3 (0.5)**	**16 (2.7)**	**11 (1.9)**	**7 (1.2)**	**13 (2.4)**	**10 (1.8)**	**7 (1.3)**	**7 (1.5)**
INH & RMP	1 (0.2)	2 (0.3)	1 (0.2)	–	–	1 (0.2)	2 (0.3)	–	2 (0.4)	–	–
INH & RMP & PZA	1 (0.2)	–	–	–	–	–	1 (0.2)	–	–	–	–
INH & RMP & EMB	–	–	2 (0.3)	1 (0.2)	1 (0.2)	–	–	–	–	–	–
INH & RMP & SM	1 (0.2)	3 (0.5)	2 (0.3)	–	1 (0.2)	–	–	–	–	–	–
INH & RMP & RIF	–	–	–	–	–	1 (0.2)	–	3 (0.5)	1 (0.2)	–	–
INH & RMP & ETH	–	1 (0.2)	–	–	–	–	–	–	–	–	–
INH & RMP & ETH & RIF	–	–	–	–	1 (0.2)	1 (0.2)	–	–	1 (0.2)	–	1 (0.2)
INH & RMP & CAP & RIF	–	–	–	–	–	–	–	–	1 (0.2)	–	–
INH & RMP & SM & RIF	–	–	–	–	1 (0.2)	–	–	2 (0.4)	–	–	3 (0.6)
INH & RMP & PZA & SM	–	–	1 (0.2)	–	–	–	1 (0.2)	–	–	–	–
INH & RMP & PZA & RIF	–	–	–	–	–	2 (0.3)	–	–	–	–	–
INH & RMP & EMB & SM	2 (0.3)	–	1 (0.2)	–	–	–	–	–	–	–	–

continued…

Table 13. Reported results for routine drug susceptibility testing of MTB isolates to anti–tuberculosis drugs, Ontario – 1998-2008 *(continued)*

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
INH & RMP & EMB & RIF	–	–	–	–	–	–	–	–	2 (0.4)	1 (0.2)	1 (0.2)
INH & RMP & EMB & SM & RIF	–	–	–	–	1 (0.2)	–	–	2 (0.4)	–	–	–
INH & RMP & EMB & SM & ETH	–	–	1 (0.2)	–	–	–	–	–	–	–	–
INH & RMP & SM & OFL & RIF	–	–	–	–	–	1 (0.2)	–	1 (0.2)	–	–	–
INH & RMP & AMI & CAP & RIF	–	–	–	–	–	–	–	–	1 (0.2)	–	–
INH & RMP & PZA & ETH & RIF	–	–	–	–	–	–	–	–	1 (0.2)	–	–
INH & RMP & PZA & SM & ETH & RIF	–	–	–	–	–	–	–	–	–	1 (0.2)	–
INH & RMP & OFL & ETH & RIF	–	–	–	–	–	–	1 (0.2)	–	–	–	–
INH & RMP & OFL & ETH & RIF & PAS	–	–	–	–	–	–	–	–	1 (0.2)	–	–
INH & RMP & CAP & ETH & RIF	–	–	–	–	–	–	1 (0.2)	–	–	–	–
INH & RMP & EMB & PZA & RIF	–	–	–	–	1 (0.2)	1 (0.2)	–	–	–	1 (0.2)	–
INH & RMP & PZA & OFL & CIPRO	–	1 (0.2)	–	–	–	–	–	–	–	–	–
INH & RMP & EMB & PZA & SM	3 (0.5)	3 (0.5)	–	–	–	1 (0.2)	–	1 (0.2)	–	–	–
INH & RMP & SM & ETH & RIF	–	–	1 (0.2)	–	4 (0.7)	–	–	1 (0.2)	–	–	–
INH & RMP & EMB & PZA & SM & ETH	3 (0.5)	3 (0.5)	–	–	1 (0.2)	–	–	–	–	–	–
INH & RMP & EMB & PZA & SM & RIF	–	–	–	–	–	–	–	–	–	1 (0.2)	1 (0.2)
INH & RMP & PZA & SM & ETH & RIF	–	–	–	–	–	–	–	1 (0.2)	–	–	1 (0.2)
INH & RMP & PZA & EMB & ETH & RIF	–	–	–	1 (0.2)	–	1 (0.2)	–	–	–	2 (0.4)	–
INH & RMP & PZA & EMB & SM & ETH & RIF	–	–	–	1 (0.2)	2 (0.3)	1 (0.2)	–	1 (0.2)	–	–	–
INH & RMP & PZA & EMB & SM & OFL & RIF	–	–	–	–	–	–	–	1 (0.2)	–	–	–
INH & RMP & PZA & EMB & SM & ETH & RIF & OFL	–	–	–	–	1 (0.2)	1 (0.2)	1 (0.2)	–	–	–	–

continued…

Table 13. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Ontario – 1998-2008 *(continued)*

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
INH & RMP & EMB & PZA & AMI & CAP & ETH & RIF	–	–	–	–	–	–	–	–	–	1 (0.2)	–
INH & RMP & EMB & PZA & SM & AMI & CAP & RIF	–	–	–	–	1 (0.2)	–	–	–	–	–	–
XDR–TB‡	**–**	**–**	**–**	**–**	**–**	**1 (0.2)**	**–**	**–**	**1 (0.2)**	**–**	**1 (0.2)**
INH & RMP & EMB & PZA & SM & AMI & CAP & ETA & OFL & RIF	–	–	–	–	–	1 (0.2)	–	–	–	–	–
INH & RMP & AMI & CAP & OFL & ETH & RIF	–	–	–	–	–	–	–	–	1 (0.2)	–	–
INH & RMP & EMB & PZA & CAP & OFL & RIF & PAS	–	–	–	–	–	–	–	–	–	–	1 (0.2)

* Includes 1 *M. bovis* isolate for 1999, 2 *M. bovis* isolates for 2000, 2 *M. bovis* isolates for 2001, 1 *M. bovis* isolate for 2002,1 *M. bovis* isolate for each 2003, 2004 and 2005 and 4 *M. bovis* for 2006.

† MDR-TB is defined as resistance to at least rifampin and isoniazid. First and second-line resistance are reported. Second-line drugs include: AMI = amikacin; CAP = capreomycin; CIPRO = ciprofloxacin; ETH = ethionamide; KAN = kanamycin; OFL = ofloxacin; RIF = rifabutin.

‡ XDR-TB is defined as resistance to at least rifampin and isoniazid and further resistance to any fluoroquinolone, and to at least one of three injectable second-line drugs (amikacin, capreomycin and kanamycin).

Table 14. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Prince Edward Island – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	**2 (100.0)**	**2 (100.0)**	**3 (100.0)**	**2 (100.0)**	**1 (100.0)**	**2 (100.0)**	**1 (100.0)**	**1 (100.0)**	**0 (0.0)**	**0 (0.0)**	**0 (0.0)**
Isolates susceptible	**2 (100.0)**	**2 (100.0)**	**3 (100.0)**	**1 (50)**	**1 (100.0)**	**2 (100.0)**	**1 (100.0)**	**1 (100.0)**	**–**	**–**	**–**
Isolates resistant to one or more drugs	**–**	**–**	**–**	**1 (50)**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Monoresistance	**–**	**–**	**–**	**1 (50)**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
PZA	–	–	–	1 (50)	–	–	–	–	–	–	–

* Includes 1 *M. bovis* isolate for 2001.

Table 15. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Quebec – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	**264 (100.0)**	**268 (100.0)**	**278 (100.0)**	**221 (100.0)**	**247(100.0)**	**219 (100.0)**	**207 (100.0)**	**226 (100.0)**	**201 (100.0)**	**200 (100.0)**	**210 (100.0)**
Isolates susceptible	**244 (92.4)**	**236 (88.1)**	**249 (89.6)**	**202 (91.4)**	**222 (89.9)**	**187 (85.4)**	**190 (91.8)**	**207 (91.6)**	**173 (86.1)**	**177 (88.5)**	**188 (90.0)**
Isolates resistant to one or more drugs	**20 (7.6)**	**32 (11.9)**	**29 (10.4)**	**19 (8.6)**	**25 (10.1)**	**32 (14.6)**	**17 (8.2)**	**19 (8.4)**	**28 (13.9)**	**23 (11.5)**	**22 (10.5)**
Monoresistance	**17 (6.4)**	**28 (10.4)**	**28 (10.1)**	**18 (8.1)**	**23 (9.3)**	**31 (14.2)**	**15 (7.2)**	**18 (8.0)**	**26 (12.9)**	**17 (8.5)**	**19 (9.0)**
INH	11 (4.2)	17 (6.3)	19 (6.8)	14 (6.3)	13 (5.3)	25 (11.4)	11 (5.3)	14 (6.2)	21 (10.4)	12 (6.0)	15 (7.1)
RMP	–	1 (0.4)	–	–	1 (0.4)	–	–	–	1 (0.5)	1 (0.5)	–
EMB	–	–	–	–	–	–	–	–	–	–	–
PZA	6 (2.3)	10 (3.7)	9 (3.2)	4 (1.8)	9 (3.6)	6 (2.7)	4 (1.9)	4 (1.8)	4 (2.0)	4 (2.0)	4 (1.9)
Other Patterns	**1 (0.4)**	**2 (0.7)**	**0 (0)**	**0 (0)**	**1 (0.4)**	**0 (0)**	**1 (0.5)**	**0 (0)**	**0 (0)**	**4 (2.0)**	**1 (0.5)**
INH & EMB	–	–	–	–	1 (0.4)	–	1 (0.5)	–	–	3 (1.5)	–
INH & PZA	1 (0.4)	2 (0.7)	–	–	–	–	–	–	–	1 (0.5)	1 (0.5)
MDR-TB†	**2 (0.8)**	**2 (0.7)**	**1 (0.4)**	**1 (0.5)**	**1 (0.4)**	**1 (0.5)**	**1 (0.5)**	**1 (0.4)**	**2 (1.0)**	**2 (1.0)**	**2 (1.0)**
INH & RMP & SM	1 (0.4)	1 (0.4)	–	–	–	–	–	–	–	–	–
INH & RMP & ETH	–	–	–	–	–	1 (0.5)	–	–	–	–	–
INH & RMP & RIF	–	–	–	–	–	–	1 (0.5)	–	–	–	–
INH & RMP & EMB & ETH	1 (0.4)	–	–	–	–	–	–	–	1 (0.5)	1 (0.5)	–
INH & RMP & SM & RIF	–	–	–	1 (0.5)	–	–	–	–	–	–	1 (0.5)
INH & RMP & EMB & SM & RIF	–	–	–	–	–	–	–	–	–	1 (0.5)	–
INH & RMP & EMB & ETH & RIF	–	–	–	–	–	–	–	–	1 (0.5)	–	–
INH & RMP & PZA & ETH & RIF	–	–	–	–	–	–	–	1 (0.4)	–	–	–
INH & RMP & EMB & SM & ETH & PAS	–	–	–	–	1 (0.4)	–	–	–	–	–	–
INH & RMP & EMB & PZA & SM & CAP	–	1 (0.4)	–	–	–	–	–	–	–	–	–
INH & RMP & PZA & SM & AMI & KAN & CAP	–	–	–	–	–	–	–	–	–	–	1 (0.5)

* Includes *M. bovis* isolates: 1 in 1998, 1999, 2001, 2002, 2003, 2007, and 2 in 2002, 2004, 2006; *M. caprae*: 1 in 2002 and 2006; *M. africanum*: 1 in 2003, 2005, 2006, 2008 and 2 in 2007.

† MDR-TB is defined as resistance to at least rifampin and isoniazid. First and second-line resistance are reported. Second-line drugs include: AMI = Amikacin; CAP = capreomycin; ETH = ethionamide; KAN = kanamycin; RIF = rifabutin.

Table 16. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Saskatchewan – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	**49 (100.0)**	**40 (100.0)**	**64 (100.0)**	**68 (100.0)**	**56 (100.0)**	**46 (100.0)**	**34 (100.0)**	**75 (100.0)**	**58 (100.0)**	**60 (100.0)**	**81 (100.0)**
Isolates susceptible	**47 (95.9)**	**39 (97.5)**	**58 (92.2)**	**65 (95.6)**	**51 (91.1)**	**45 (97.8)**	**32 (94.1)**	**73 (97.3)**	**57 (98.3)**	**59 (98.3)**	**79 (97.5)**
Isolates resistant to one or more drugs	**2 (4.1)**	**1 (2.5)**	**5 (7.8)**	**3 (4.4)**	**5 (8.9)**	**1 (2.2)**	**2 (5.9)**	**2 (2.7)**	**1 (1.7)**	**1 (1.7)**	**2 (2.5)**
Monoresistance	**2 (4.1)**	**1 (2.5)**	**4 (6.3)**	**3 (4.4)**	**4 (7.1)**	**1 (2.2)**	**2 (5.9)**	**2 (2.7)**	**1 (1.7)**	**1 (1.7)**	**2 (2.5)**
INH	2 (4.1)	1 (2.5)	2 (3.1)	3 (4.4)	3 (5.4)	1 (2.2)	2 (5.9)	2 (2.7)	1 (1.7)	1 (1.7)	2 (2.5)
EMB	–	–	1 (1.6)	–	1 (1.8)	–	–	–	–	–	–
Other Patterns	**–**	**–**	**1 (1.6)**	**1 (1.5)**	**1 (1.8)**	**–**	**–**	**–**	**–**	**–**	**–**
INH & EMB	–	–	1 (1.6)	–	1 (1.8)	–	–	–	–	–	–

* Routine testing for PZA not conducted.

Table 17. Reported results for routine drug susceptibility testing of MTB isolates to anti-tuberculosis drugs, Yukon – 1998-2008

	1998 Total (%)	1999 Total (%)	2000 Total (%)	2001 Total (%)	2002 Total (%)	2003 Total (%)	2004 Total (%)	2005 Total (%)	2006 Total (%)	2007 Total (%)	2008 Total (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	**1 (100.0)**	**–**	**3 (100.0)**	**1 (100.0)**	**–**	**1 (100.0)**	**3 (100.0)**	**2 (100.0)**	**2 (100.0)**	**2 (100.0)**	**7 (100.0)**
Isolates susceptible	**1 (100.0)**	**–**	**3 (100.0)**	**1 (100.0)**	**–**	**1 (100.0)**	**3 (100.0)**	**2 (100.0)**	**2 (100.0)**	**2 (100.0)**	**7 (100.0)**

* Routine testing for PZA not conducted.

Appendix 1

Participating Laboratories of the Canadian Tuberculosis Laboratory Surveillance System

Alberta **(Alberta, Northwest Territories and Nunavut)**	Cary Shandro Mycobacteriology Provincial Laboratory of Public Health Dr. Greg Tyrrell Medical Microbiologist Provincial Laboratory of Public Health Dr. Jutta Preiksaitis Director Provincial Laboratory of Public Health
British Columbia **(British Columbia and Yukon Territory)**	Dr. Mabel Rodrigues, Ph.D. Section Supervisor TB B.C. Centre for Disease Control Dr. Patrick Tang Medical Microbiologist B.C. Centre for Disease Control Dr. Judy L. Isaac-Renton Director, Provincial Laboratory B.C. Centre for Disease Control
Manitoba	Assunta Rendina, MLT Charge technologist, Mycobacteriology section Clinical Microbiology Diagnostic Services of Manitoba Dr. Michelle Alfa Medical Director Clinical Microbiology Diagnostic Services of Manitoba
New Brunswick	Hope MacKenzie Microbiology Laboratory Department of Laboratory Medicine Dr. Glenna Hardy Medical Microbiologist Department of Laboratory Medicine Dr. Anne O'Brien Clinical Head Department of Laboratory Medicine Saint John Regional Hospital

Newfoundland and Labrador	Sandra B. March, MSc ART Clinical Microbiologist Newfoundland Public Health Laboratory Dr. Sam Ratnam Director Newfoundland Public Health Laboratory
Northwest Territories **(see also Alberta)**	Evelyn Smith Supervisor, Bacteriology Stanton Territorial Hospital Mr. Robin Greig Manager Therapeutic & Diagnostic Services
Nova Scotia **(Nova Scotia and Prince Edward Island)**	Cheryl Brine, Tech II, MLT Division of Medical Microbiology Department of Pathology & Laboratory Medicine Queen Elizabeth II Health Sciences Centre Dr. David Haldane Director of Special Pathogens and Microbiology Queen Elizabeth II Health Sciences Centre Dr. Kevin Forward Director Department of Public Health Pathology & Laboratory Medicine Queen Elizabeth II Health Sciences Centre
Ontario	Pamela Chedore, MLT Head, Mycobacteriology Public Health Laboratories Ontario Agency for Health Protection and Promotion Dr. Frances Jamieson Medical Microbiologist Public Health Laboratories Ontario Agency for Health Protection and Promotion Mr. Nicholas Paul Manager Direct Services Public Health Laboratories Ontario Agency for Health Protection and Promotion

Quebec		Louise Thibert, MSc Head, Mycobacteriology and Aerobic Actinomycetes Laboratoire de santé publique du Québec Institut national de santé publique du Québec Dr. Anne-Marie Bourgeault Director Laboratoire de santé publique du Québec Institut national de santé publique du Québec
Saskatchewan	*North:*	Colleen Foster Clinical Microbiology Royal University Hospital Saskatoon, Saskatchewan Dr. J. Blondeau Department Head Microbiology/Mycobacteriology Royal University Hospital Saskatoon, Saskatchewan
	South:	Elaine Schweitzer Clinical Services/Microbiology Saskatchewan Health Provincial Laboratory Dr. Paul Levett Microbiologist Saskatchewan Health Provincial Laboratory Dr. Greg Horsman Director Laboratory and Disease Control Services Saskatchewan Health
Federal		Joyce Wolfe, ART Program Manager, Mycobacteriology National Reference Centre for Mycobacteriology Public Health Agency of Canada

Appendix 2

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The Canadian Tuberculosis Laboratory Surveillance System
M. TUBERCULOSIS COMPLEX ANTIMICROBIAL SUSCEPTIBILITY REPORTING FORM

Système de surveillance des laboratoires de tuberculose au Canada
RAPPORT SUR LA SENSIBILITÉ DES SOUCHES DU COMPLEXE M. TUBERCULOSIS AUX ANTIMICROBIENS

FOR INTERNAL USE ONLY - POUR USAGE INTERNE SEULEMENT

Date Rec'd at TBPC: / **Date de réception au LATB:** Y / A | M | D / J

TBPC Number: / **Numéro du LATB:**

Unique Source Laboratory ID No. - Identificateur unique du laboratoire déclarant:

Date specimen / culture received at laboratory: / **Date de réception échantillon / culture au laboratoire:** Y / A | M | D / J

Specie: / **Espèce :** ☐ M. tuberculosis (may include M. africanum or M. microti) (peut inclure M. africanum et M. microti) ☐ M. bovis ☐ M. BCG bovis ☐ MTB Complex (species unknown) Complexe MTB (espèce inconnu)

Have susceptibility test results been previously reported for this patient? - Des résultats d'antibiogramme ont-ils déjà été fournis pour ce patient?

☐ No / Non ☐ Yes / Oui → What is the **previous** Unique Source Laboratory ID No.? / Identificateur **antérieur**?

→ What is the **previous** Form No.? (If known) / N° de formulaire **antérieur**? (Si connu)

Note: Only DRUG TESTING RESULTS OF ONE ISOLATE are to be reported. No subsequent drug testing results for the same patient are to be reported unless the sensitivity pattern changes.

Note: Ne fournir que les RÉSULTATS POUR UNE SEULE SOUCHE par patient à moins d'un changement du profil de sensibilité.

1 Province / territory from which this report originates: / Province / territoire qui soumet ce rapport : (see code list) (voir liste de codes)

2 Province / territory from which specimen originated: / Province / territoire d'où provient l'échantillon : (see code list) (voir liste de codes)

3 Patient's date of birth: / Date de naissance du patient : Y / A | M | D / J (CCYY/MM/DD) (SSAA/MM/JJ) ☐ Unknown / Inconnu

4 Patient's gender: / Sexe du patient : ☐ Male / Masculin ☐ Female / Féminin ☐ Unknown / Inconnu

PROV / TERR CODES PROV / TERR

10 = NFLD / TN	46 = MAN
11 = PEI / IPÉ	47 = SASK
12 = NS / NÉ	48 = ALTA / ALB
13 = NB	59 = BC / BC
24 = QUÉ / Qc	60 = YUK
35 = ONT	61 = NWT / TNO
	62 = NUN

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LABORATORY RESULTS / RÉSULTATS DE LABORATOIRE	**Concentration** (if different from on file) **Concentration** (si autre que spécifiée)	**Results** (check appropriate box for every drug) **Résultats** (cocher la case pertinente pour chaque antibiotique)		
Antituberculous Drugs / Agents Antituberculeux		Sensitive / Sensible	Resistant / Résistant	Other (specify) / Autre (préciser)
SM (Streptomycin) (Streptomycine)	mg / L	☐	☐	
INH (Isoniazid) (Isoniazide)	mg / L	☐	☐	
RMP (Rifampin) (Rifampicine)	mg / L	☐	☐	
EMB (Ethambutol)	mg / L	☐	☐	
PZA (Pyrazinamide)	mg / L	☐	☐	
2nd line drugs (specify) / Antibiotiques de 2e ligne (préciser)	**Concentration**	Sensitive / Sensible	Resistant / Résistant	Other (specify) / Autre (préciser)
1.	mg / L	☐	☐	
2.	mg / L	☐	☐	
3.	mg / L	☐	☐	
4.	mg / L	☐	☐	
5.	mg / L	☐	☐	
6.	mg / L	☐	☐	

6 **Comments - Commentaires**

HC/SC 9061 (07-2000)

Copy 1 (White) - Reporting Laboratory
Copie 1 (Blanche) - Laboratoire déclarant

Copy 2 (Yellow) - Tuberculosis Prevention and Control (TBPC)
Copie 2 (Jaune) - Lutte anti-tuberculeuse (LATB)