

TUBERCULOSIS:

DRUG RESISTANCE IN CANADA 2012



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INTRODUCTION

Drug-resistant strains of tuberculosis (TB) pose a serious threat to TB prevention and control efforts. In response to the growing number of global reports pointing to a rise in the prevalence of drug resistant TB, the Centre for Communicable Diseases and Infection Control (CCDIC), Public Health Agency of Canada (the Agency), in collaboration with the Canadian Tuberculosis Laboratory Technical Network (CTLTN)⁺ and participating laboratories (representing all provinces and territories) (*Appendix 1*), established the Canadian Tuberculosis Laboratory Surveillance System (CTBLSS) to monitor TB drug resistance patterns in Canada.

Participating laboratories report their results on anti-tuberculous drug susceptibility testing to the Agency for every patient for whom a specimen or an isolate has been received for each calendar year. The data are verified with the reporting laboratory, compiled and analyzed, and the results are published in this report.

This report describes information on TB isolates tested within the given calendar year and is intended to report on the overall level of TB drug resistance in Canada. TB drug resistance is determined through susceptibility testing of cultures (isolates) grown from clinical specimens obtained from culture-positive TB cases. Samples submitted for drug sensitivity testing may be obtained at any time during a particular patient's TB diagnosis and/or treatment and samples from the same case may be submitted to laboratories over the course of a number of years. Therefore, the number of isolates described in this report will not be equal to the number of culture-positive cases reported through case-based surveillance during the same calendar year. A case of culture-positive tuberculosis is reported only once in the year of diagnosis but may be tested for drug resistance over the course of several years until cured or the prescribed treatment has been completed.

METHODS

In Canada, a laboratory confirmed case of tuberculosis is any case with *Mycobacterium tuberculosis* complex demonstrated on culture, specifically *M. tuberculosis*, *M. africanum*, *M. canetti*, *M. caprae*, *M. microti*, *M. pinnipedii* or *M. bovis* (excluding *M. bovis* BCG strain). To align the drug susceptibility report with the case report, the CTBLSS contains drug susceptibility test results of *Mycobacterium tuberculosis* (MTB) and other tuberculosis 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.

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 of residence of patient), and province/territory where the drug susceptibility testing was performed.

Some jurisdictions perform drug testing for other provinces/territories. For first-line susceptibility testing, British Columbia tests British Columbia and Yukon isolates; Alberta tests Alberta and Northwest Territories isolates, Nova Scotia tests isolates for Nova Scotia and Prince Edward Island and Ontario tests isolates from Nunavut as well as its own. All other provinces report susceptibility results for isolates originating in their province only.

⁺ The Canadian Tuberculosis Laboratory Technical Network is a national network made up of a technical head of each provincial or territorial laboratory that performs Mycobacteriology testing, a representative from the National Reference Centre for Mycobacteriology, Public Health Agency of Canada (the Agency), and a designee from CCDIC.

In Canada, four laboratories conduct second-line testing: the provincial labs in Alberta, Ontario, Quebec and the National Reference Centre for Mycobacteriology (NRCM) in Manitoba. The NRCM will perform the second line testing for all other provinces and territories not set up to do their own testing.

Results from cultures that grow in a given year are included in the statistics for that calendar year; otherwise the result will be reflected in the subsequent year's report. For example, if a specimen were received by the laboratory on December 20, 2012, and the culture grew MTB only in January 2013, the susceptibility test results would be reflected in the 2013 report. Every effort is made to eliminate duplicate specimen results or results from two specimens taken from the same person in a calendar year. In the event that a duplicate record is found and confirmed, only the most recent susceptibility result is included for analysis in a given year.

All isolates are routinely tested for resistance against first-line anti-tuberculosis drugs. Results in this report present resistance patterns to first-line drugs routinely tested for in Canada, typically isoniazid (INH), rifampin (RMP), pyrazinamide (PZA) and ethambutol (EMB). However, not all isolates are tested for resistance to all drugs. For example, some provinces and territories do not routinely test for PZA. Therefore, for reporting mono-resistance, 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.

The Clinical and Laboratory Standards Institute¹ (CLSI), which offers practical operating guidelines that lead to consistent laboratory practices, precision, and efficient use of resources, recommends that after testing against first-line anti-tuberculosis agents, isolates found to be monoresistant to rifampin or which demonstrate resistance to any two of the first-line anti-tuberculosis drugs should be tested

against a panel of second-line drugs. Where fluoroquinolones may be added to therapy for cases showing mono-resistance to INH, it is also recommended that second-line antimicrobial testing be performed. Second-line drug testing varies between jurisdictions, but typically testing is done for amikacin (AK) and kanamycin (KM), capreomycin (CM), clofazimine (CF), ethionamide (ETH), ofloxacin (OFL), moxifloxacin (MOX) *para*-amino salicylic acid (PAS) and rifabutin (RBT).

Patients are said to have drug-resistant TB if the strain of *Mycobacterium tuberculosis* causing their disease is resistant to one or more of the four first line drugs. The following resistance patterns are described in this report:

- a) **monoresistance**—defined as resistance to one of the first-line drugs (INH, RMP, EMB or PZA);
- b) **poly-resistance** (other patterns)—defined as resistance to two or more first-line drugs not including the isoniazid and rifampin combination;
- c) **multidrug-resistant tuberculosis** (MDR-TB)—defined as TB that is resistant to at least the two best first-line anti-tuberculosis drugs, isoniazid and rifampin, but which does not meet the definition of extensively drug-resistant TB (XDR-TB); and
- d) **extensively drug-resistant TB** (XDR-TB)—defined as TB that is resistant to at least the two best first-line anti-tuberculosis drugs, isoniazid and rifampin, plus resistant to second-line drugs including any fluoroquinolone, and to at least one of three injectable second-line anti-tuberculosis drugs (amikacin, capreomycin and kanamycin).

All laboratories are now performing routine susceptibility testing of MTB or MTBC to first-line anti-tuberculosis drugs using fluorometric proportion method BACTEC® 960. In 2012, four of the laboratories conducted second-line anti-tuberculosis drug testing. 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 DRUG		
Anti-tuberculosis drugs	Critical Concentrations* (mg/L)	Comments
	BACTEC® 960†	
Isoniazid (INH)	0.1	When resistance to INH is found to 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)	1.0	
Ethambutol (EMB)	5.0	
Pyrazinamide (PZA)	100.0	Routine testing is not performed for isolates from British Columbia and Saskatchewan.
SECOND-LINE ANTI-TUBERCULOSIS DRUGS		
Anti-tuberculosis drugs	Critical Concentrations* (mg/L)	Comments
	BACTEC® 960†	
Amikacin (AK)	1	
Capreomycin (CM)	2.5	
Ethionamide (ETH)	5	
Kanamycin (KM)	2.5	
Linezolid (INN)	1	
Moxifloxacin (MOX)	0.25	
Ofloxacin (OFL)	2	
Para-amino salicylic acid (PAS)	4	
Rifabutin (RBT)	0.5	
Streptomycin (SM)	1	

* Critical concentrations: 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.

Antimicrobial testing methodology with the new technology (BACTEC 960) has been standardized and validated by multiple studies in reference laboratories and is reflected in the new Clinical and Laboratory Standards Institute (CLSI) Standard^{1,2}.

Members of the CTLTN participate in the NRCM proficiency testing program. In addition to this national initiative, a number of laboratories also participate in other select external proficiency programs such as the College of American Pathologists, Quality Management Program—Laboratory Services, the 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 CLSI document.

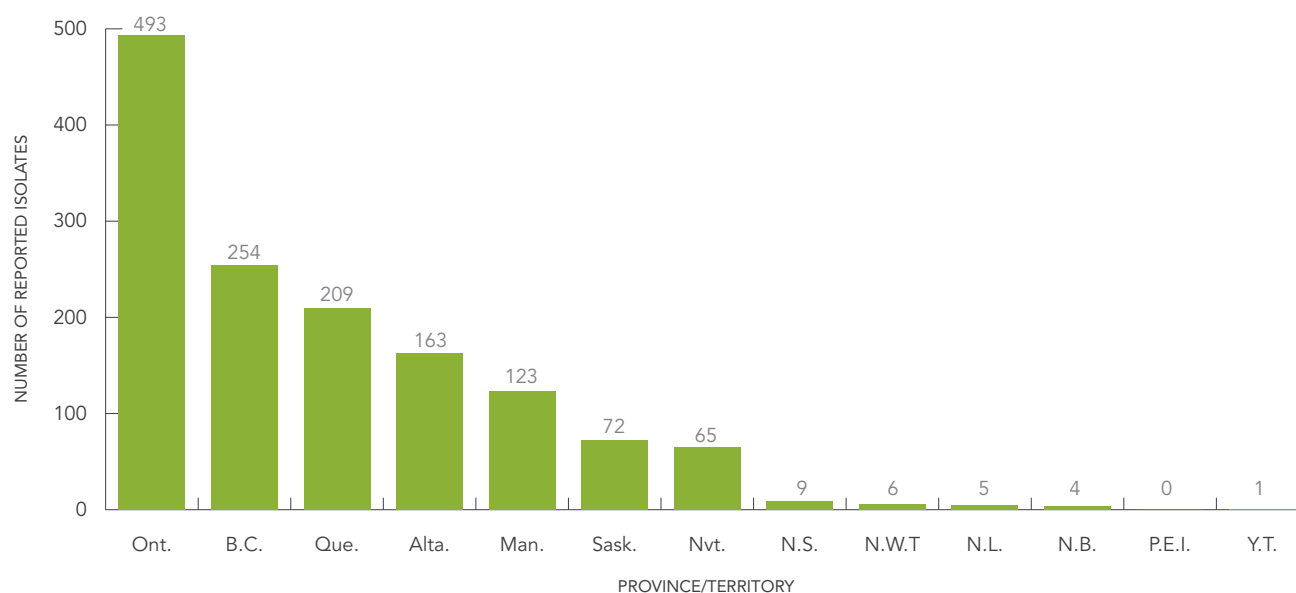
The information presented in this report represents the most up to date information available as of March 2013. The historic record is reviewed annually and adjustments are made to the tables as new/ updated information becomes available.

RESULTS

In 2012, anti-tuberculosis drug susceptibility test results for 1,413 isolates were reported to CCDIC-PHAC. Of these, 1,321 (93%) were reported as *Mycobacterium tuberculosis*, seven (0.5%) were *M. africanum*, five (0.4%) were *M. bovis*, and 71 (5.0%) were reported as *M. tuberculosis* complex (MTBC). An additional 9 (0.6%) isolates were identified as *M. bovis* BCG and were excluded from further analyses. For this report, the laboratory results for 1,404 isolates were analyzed.

In addition to testing all the isolates from Alberta and six isolates from Northwest Territories, Alberta also tested and reported results for one isolate from Saskatchewan and six from Nunavut. Similarly, British Columbia tested and reported the results for one isolate from Ontario and Ontario tested and reported the results for one isolate from Alberta (Appendix 3, Table 1). Figure 1 provides a breakdown of the number of isolates reported by the province/territory of origin.

FIGURE 1: Reported *Mycobacterium tuberculosis* complex isolates in Canada by province/territory: 2012



FIRST-LINE DRUG RESISTANCE

In 2012, all 1,404 isolates were tested for resistance to INH, RMP and EMB, and 1,175 were tested for resistance to PZA. Overall, 138 (9.8%) of the isolates tested were resistant to at least one of the first-line anti-tuberculosis drugs. Resistance to INH was detected in 111 (7.9%) of the isolates tested. Thirty-three (2.8%) isolates were resistant to PZA, 9 (0.6%) to RMP, and 4 (0.3%) to EMB. Figure 2 presents the proportion of the isolates resistant to each of the first-line drugs.

Between 2002 and 2012, trends in the reported prevalence of drug resistance have remained fairly stable. INH resistance was detected in 8% of tested isolates (range: 7.3%–9.4%). The proportion of isolates in which resistance to EMB or RMP was

detected has also remained stable between 2002 and 2011, at less than 2% for each drug. Between 2011 and 2012, a modest decrease the proportion of isolates showing resistance to RMP and EMB was noted.

Between 2002 and 2012, 2.3% of the isolates tested were resistant to PZA (range: 1.5%–2.8%). With respect to these isolates, 15% were *M. bovis*, which is known to be inherently resistant to PZA. Since 2009, there has been a modest but slight increase in the proportion of isolates reported to be resistant to PZA (*Appendix 3, Table 2*)

Figure 3 shows the trends overtime of the proportion of isolates for which any resistance to first-line drugs was detected for the years 2002 to 2012.

FIGURE 2: Reported TB drug resistance in Canada by type of first-line drug: 2012

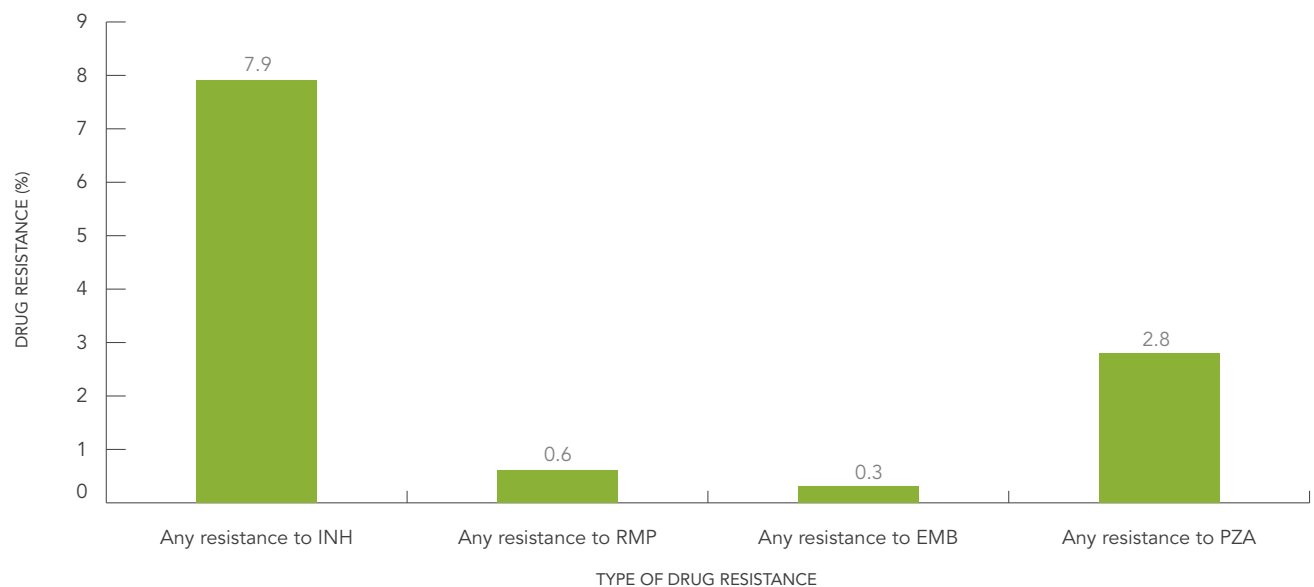
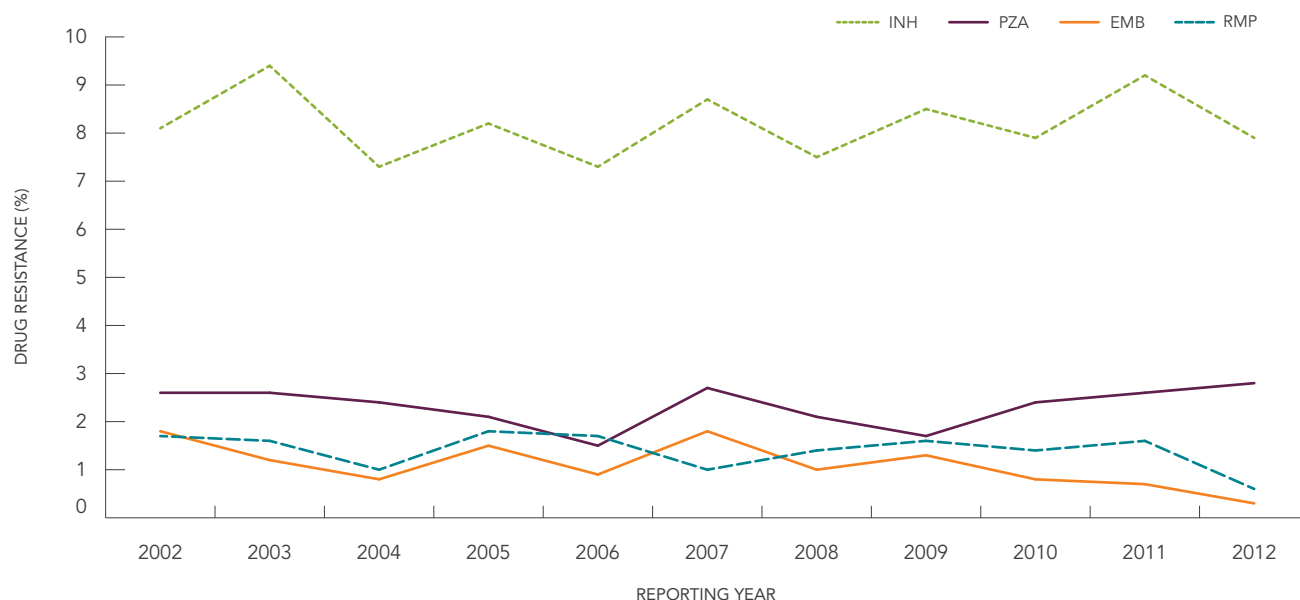


FIGURE 3: Any resistance by type of first-line drug as a percentage of isolates tested: 2002–2012

Of the 138 TB isolates reported to be resistant to at least one of the four first line drugs, the majority, 127 (92%) was mono-resistant. Of these, 100 (78%) were resistant to INH, 26 (20%) to PZA and one (2%) was resistant to EMB. Seventy-one of the INH monoresistant isolates were subsequently tested for resistance against second-line TB-drugs. Resistance to MOX was detected in two of the 71 isolates tested and resistance to OFL was detected in a third isolate.

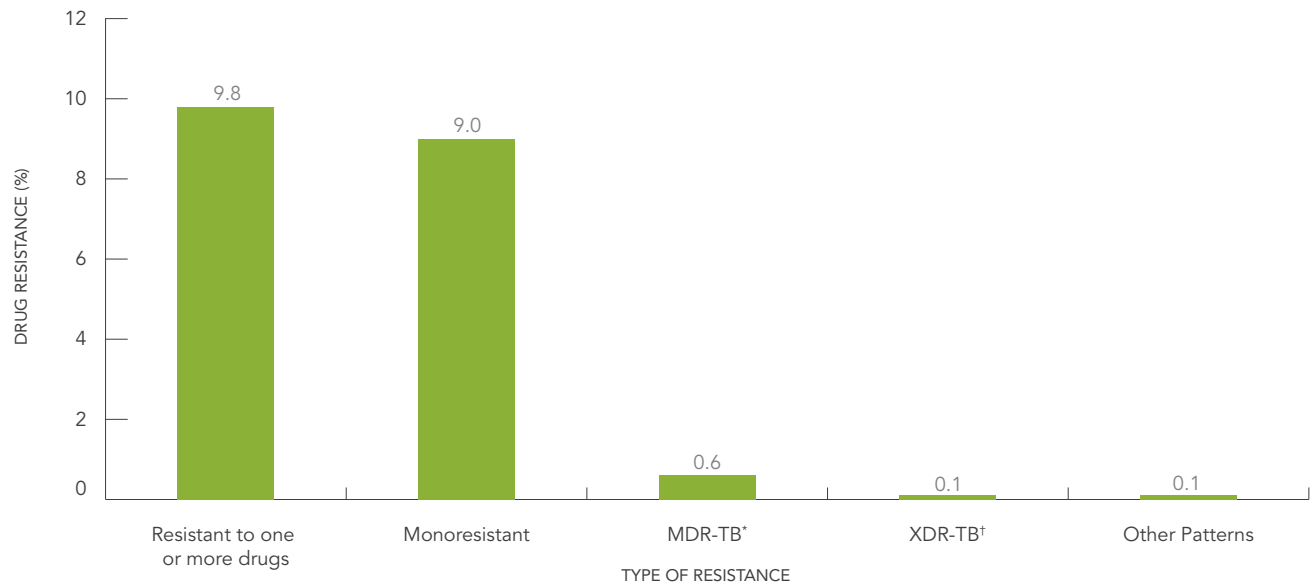
MULTIDRUG-RESISTANT AND EXTENSIVELY DRUG-RESISTANT TB

For 2012, a total of nine isolates were resistant to both INH and RMP, identifying them as at least MDR-TB. Of the nine, four were resistant to INH and RMP alone, two were also resistant to PZA, and three were resistant to all four first-line drugs (INH, RMP, EMB and PZA).

All nine isolates resistant to both INH and RMP were subsequently tested for resistance to second-line drugs to rule out XDR-TB. Of particular interest was the resistance shown to the three injectable agents (amikacin (AK), capreomycin (CM), and kanamycin (KM)) and moxifloxacin (MOX) and ofloxacin (OFL), the fluoroquinolones routinely tested. Seven of the MDR-TB isolates were tested against AK, KM, CM, MOX and OFL; two were not tested against AK.

The results from the additional second-line testing of the MDR-TB isolates found that two of the nine isolates were also resistant to KM, one isolate was resistant to both OFL and MOX and a fourth isolate was resistant to CM. Of the nine isolates resistant to INH and RMP, additional testing identified one that was resistant to KM, MOX and OFL, thus identifying that isolate as XDR-TB. The final results of second-line testing confirmed eight MDR-TB isolates and identified one XDR-TB isolate (*Appendix 3, Table 3*).

Figure 4 presents the overall proportions in 2012 for each of the reported resistance patterns.

FIGURE 4: Overall pattern of reported TB drug resistance: 2012

* Multidrug-resistant TB (MDR-TB) is TB that is resistant to at least isoniazid and rifampin, but which does not meet the definition of XDR-TB.

† Extensively drug-resistant TB (XDR-TB) is TB that is resistant to at least the two best first-line drugs isoniazid and rifampin plus resistant to second-line drugs including any fluoroquinolone and at least one of three injectable agents, amikacin, capreomycin and kanamycin.

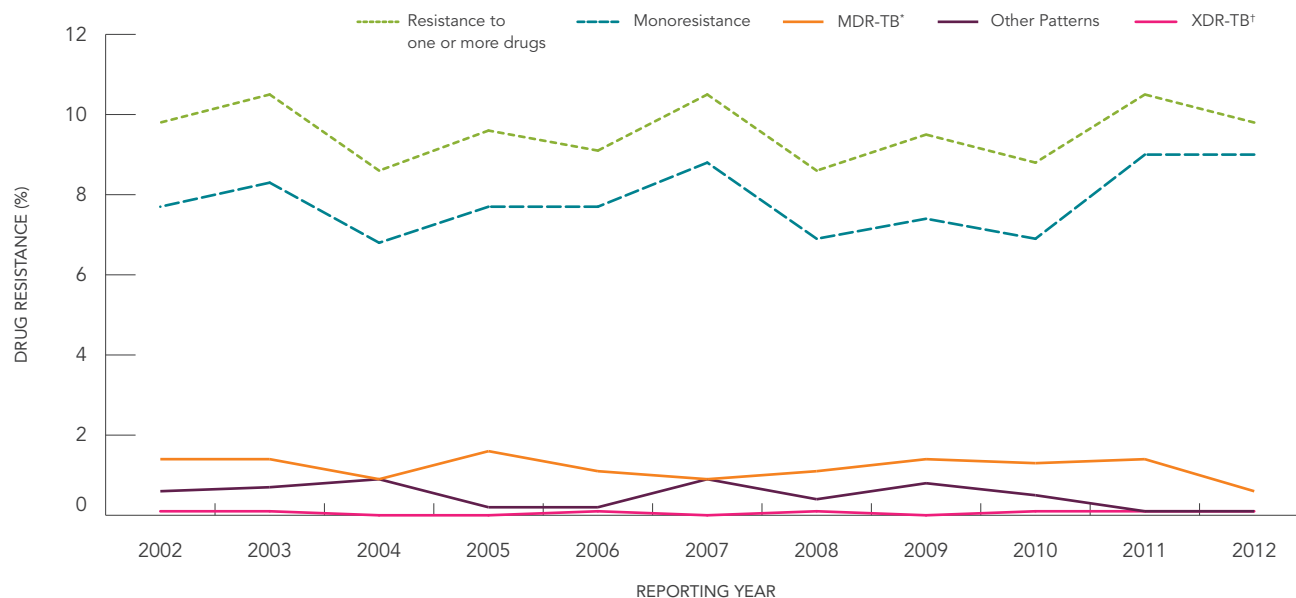
Between 2002 and 2012, a total of 176 isolates have been classified as MDR-TB, representing 1.2% of all isolates tested during that period.

Fluoroquinolones including ofloxacin and moxifloxacin, represent the most powerful class of bactericidal second-line drugs for the treatment of MDR-TB. Patients with MDR-TB and additional resistance to fluoroquinolones have a more serious form of disease compared to those with MDR-TB alone. Their disease is more difficult to treat, and risks evolving into XDR-TB and acquiring resistance to any

of the second-line injectable agents. Between 2002 and 2012, of the isolates found to be resistant to both INH and RMP, 14% were also resistant to a fluoroquinolone.

Between 2002 and 2012, results of second testing identified 7 isolates (0.05% of all those tested) classified as XDR-TB.

Figure 5 displays these proportions over time. Table B present the breakdown of the numbers of MDR-TB and XDR-TB isolates reported between 2002 and 2012.

FIGURE 5: Overall pattern of reported TB drug resistance as a percentage of isolates tested: 2002–2012

* Multidrug-resistant TB (MDR-TB) is TB that is resistant to at least isoniazid and rifampin, but which does not meet the definition of XDR-TB.

† Extensively drug-resistant TB (XDR-TB) is TB that is resistant to at least the two best first-line drugs isoniazid and rifampin plus resistant to second-line drugs including any fluoroquinolone and at least one of three injectable agents, amikacin, capreomycin and kanamycin.

TABLE B: Total number of isolates tested and number and percentage identified as MDR-TB and XDR-TB: Canada 2002–2012

YEAR	TOTAL NUMBER OF ISOLATES	MDR-TB* (%)	XDR-TB (%)
2002	1,419	20 (1.4%)	1 (0.1%)
2003	1,405	20 (1.4%)	1 (0.1%)
2004	1,376	12 (0.9%)	0
2005	1,335	22 (1.6%)	0
2006	1,389	15 (1.1%)	1 (0.1%)
2007	1,267	11 (0.9%)	0
2008	1,356	15 (1.1%)	1 (0.1%)
2009	1,331	18 (1.4%)	0
2010	1,279	17 (1.3%)	1 (0.1%)
2011	1,319	18 (1.4%)	1 (0.1%)
2012	1,404	8 (0.6%)	1 (0.1%)
TOTAL	14,880	176 (1.2%)	7 (0.05%)

* Does not include the XDR-TB

DEMOGRAPHIC INFORMATION

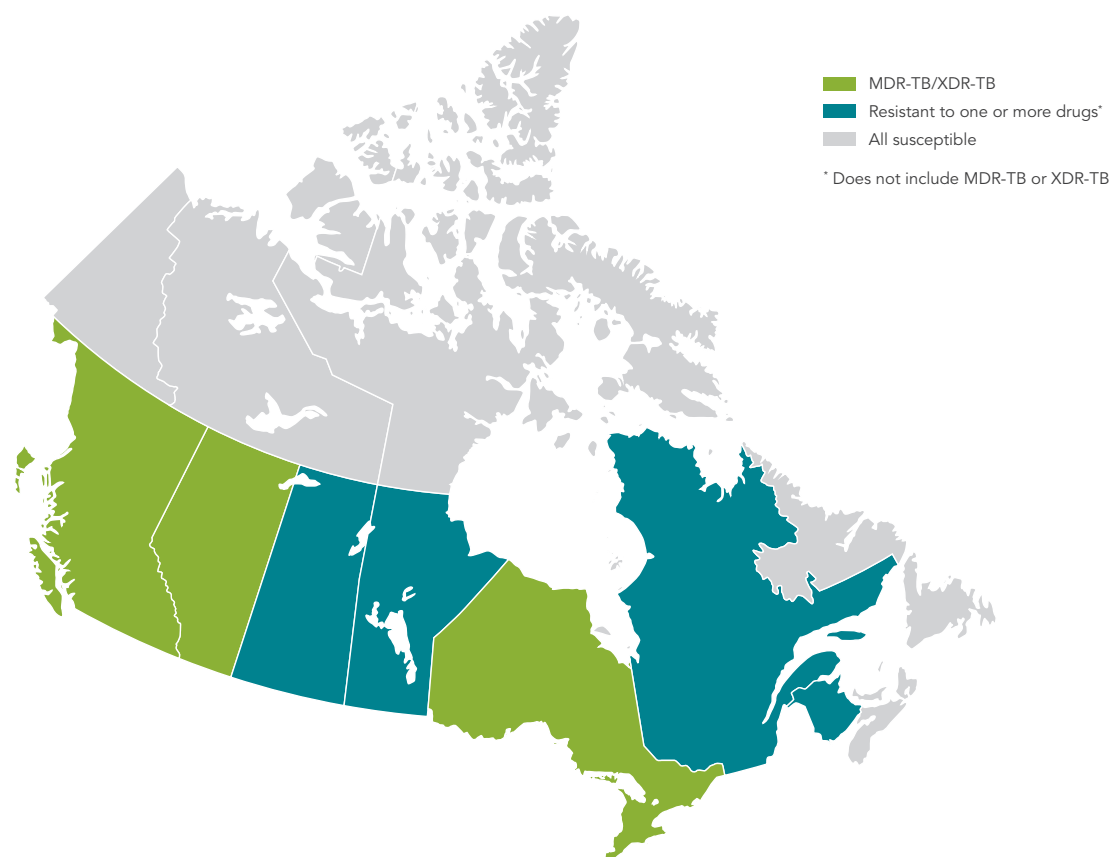
For 2012 age was available for all 1,404 of the isolates tested. Sixty-one percent of the isolates were from individuals between the ages of 15 and 54 years. Twenty-one percent of isolates were between 55 and 74 years of age and 15% of the reported cases were 75 years of age or older. Three percent of reported isolates were from individuals under 15 years of age.

Sex was known for 1,390 of the reported isolates. Males accounted for 59% of these isolates and 64% of the 138 isolates in which resistance was detected. However, 100% of the MDR-TB isolates were from females; five of these were under the age of 35. The XDR-TB isolate was from a male in the 15–24 year age group (*Appendix III, Table 4*).

Stratifying the laboratory results by sex and age group found that among females, the greatest proportion (57%) of resistance was in individuals between 25 and 44 years of age. For males, however, isolates in which drug resistance was detected were distributed more evenly across all the age groups.

GEOGRAPHICAL DISTRIBUTION

Figure 6 presents the geographical distribution of drug resistance across Canada in 2012. Eighty percent of the laboratory results were for isolates originating from Alberta, British Columbia, Ontario and Quebec combined. Seven provinces reported at least one isolate that was resistant to at least one of the anti-tuberculosis drugs. For the Northwest Territories, Nunavut, Yukon, and three Atlantic provinces all isolates tested were fully susceptible to all first line drugs tested. The nine isolates resistant to both INH and RMP, originated from Alberta, British Columbia and Ontario.

FIGURE 6: Reported TB drug resistance in Canada by province/territory: 2012

Between 2002 and 2012, 82% of all the laboratory reports originated from Alberta, British Columbia, Ontario and Quebec, combined. Together, these four provinces reported 92% of all isolates showing resistance and 95% of the MDR-TB isolates. Ontario reported 47% of all isolates showing any resistance

and 59% of all MDR-TB reports. Between 2002 and 2012, only Manitoba and Ontario reported XDR-TB isolates. Table C presents the provincial/territorial distribution of isolates tested and the proportion of isolates for which resistance was detected for the years 2002 to 2012.

TABLE C: Provincial/territorial breakdown of number of isolates by type of resistance: 2002–2012

PROVINCE/TERRITORIES	TOTAL NUMBER OF ISOLATES	ANY RESISTANCE	MDR-TB*	XDR-TB
Ontario	5,896	664 (11.3%)	104 (1.8%)	5 (0.1%)
British Columbia	2,668	251 (9.4%)	25 (0.9%)	0 (0.0%)
Quebec	2,292	246 (10.7%)	18 (0.8%)	0 (0.0%)
Alberta	1,344	137 (10.2%)	21 (1.6%)	0 (0.0%)
Manitoba	1,209	73 (6.0%)	6 (0.5%)	2 (0.2%)
Saskatchewan	678	30 (4.4%)	2 (0.3)	0 (0.0%)
Nunavut	433	5 (1.2%)	0 (0.0%)	0 (0.0%)
Northwest Territories	89	3 (3.4%)	0 (0.0%)	0 (0.0%)
Nova Scotia	80	5 (6.3%)	0 (0.0%)	0 (0.0%)
New Brunswick	79	7 (8.9%)	0 (0.0%)	0 (0.0%)
Newfoundland and Labrador	74	3 (4.1%)	0 (0.0%)	0 (0.0%)
Yukon	28	0 (0.0%)	0 (0.0%)	0 (0.0%)
Prince Edward Island	10	1 (10.0%)	0 (0.0%)	0 (0.0%)
TOTAL	14,880	1,425 (9.6%)	176 (1.2%)	7 (0.05%)

* Does not include XDR-TB

For a complete review of the resistance patterns by province/territory, refer to tables 5 through 17 (Appendix 3, Table 5–17).

DISCUSSION

In many parts of the world, the increase in drug resistance is a major challenge in efforts to control and manage TB disease. Available data confirm that Eastern Europe and central Asia continue to have the world's highest proportion of MDR-TB among TB cases.³

Between 2002 and 2012, reported drug resistance in Canada remained consistently below international levels. Overall, there has been no significant change in the proportion of isolates showing any resistance to first-line medication over the 11 years analyzed in this report. In each of the past 3 years (2010–2012), there has been 1 XDR-TB result reported and between 2002 and 2012, there have been a total of seven XDR-TB isolates identified in the CTBLSS.

Susceptibility results were reported for 1,404 isolates in 2012. The proportion of the total number of isolates which demonstrated any type of drug resistance was 9.8%, a slight decrease from the previous year. Although there was one reported XDR-TB result in 2012, the proportion of isolates classified as MDR-TB fell from 1.4% in 2011 to 0.6% in 2012.

Organisms resistant to both INH and RMP pose a considerable challenge in treatment and prevention efforts by limiting the availability of effective anti-tuberculosis drug. Globally, 3.7% (2.1–5.2%) of new cases and 20% (13–26%) of previously treated cases are estimated to have MDR-TB. Compared with international reports, results observed to date in the CTBLSS show that the prevalence of MDR-TB in Canada remains low.³

Extensively drug-resistant tuberculosis is a growing international concern. Because XDR-TB isolates are resistant to the best first- and some of the best second-line drugs, treatment options are seriously limited. To continue surveillance of XDR-TB in Canada, all isolates resistant to both INH and RMP or monoresistant to RMP are recommended to be routinely tested for resistance to second-line antibiotics. The results presented here indicate that these recommendations are generally being followed.

LIMITATIONS

Typically, only isolates with MDR-TB or other extensive resistance patterns will receive drug sensitivity testing to select second-line drugs. Although the CLSI recommends that INH monoresistant isolates, as well as other poly-resistant, non-MDR isolates, be tested for second-line drug resistance, this is not universally reported in Canada. Other isolates may be resistant to a fluoroquinolone because of widespread use for respiratory infections, but not be MDR-TB. This limits the understanding of the emergence of second-line resistance within Canada.

Additional demographic and clinical information on individuals from whom the TB isolates were obtained would facilitate more in-depth epidemiologic assessment of drug resistance patterns in Canada. For example, with only the year of birth and sex of the individual available, no differentiation can be made between primary and secondary/acquired drug resistance and differing resistance patterns for new cases versus re-treatment cases from data in this system. However, the annual *Tuberculosis in Canada* reports (www.phac-aspc.gc.ca/tbpc-latb/surv-eng.php) provide more detailed information on TB drug resistance including information on primary and acquired drug resistance.

CONCLUSIONS

Surveillance data on drug resistance are used to track the effectiveness of TB prevention and control activities; accurately forecast the need for patient treatments and plan accordingly; design standardized regimens for the treatment of drug-resistant TB; assess epidemiological trends; and promptly identify and respond to outbreaks of drug-resistant TB. Data collected to date indicate that the presence of TB

drug resistance in Canada is below the global average and has remained stable since reporting began. However, with growing worldwide concern regarding resistance and with the emergence of extensively drug-resistant tuberculosis, surveillance systems such as the CTBLSS are vital in helping to inform tuberculosis control and prevention strategies.

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APPENDIX 1:

PARTICIPATING LABORATORIES OF THE CANADIAN TUBERCULOSIS LABORATORY SURVEILLANCE SYSTEM

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ONTARIO Central Public Health Lab Ontario Agency for Health Protection and Promotion Toronto, Ontario	Joanne Blair Head, Mycobacteriology Kevin May Public Health Lab-Toronto Dr. Frances Jamieson Medical Microbiologist—TB and Mycobacteriology Mr. Nicholas Paul Manager Direct Services Alex Marchand-Austin Manager, Laboratory Surveillance and Data Management
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SASKATCHEWAN Royal University Hospital Saskatoon, Saskatchewan Saskatchewan Disease Control Laboratory Regina, Saskatchewan	NORTH Nancy Hanson TB Laboratory/Clinical Microbiology Bonnie Kirkpatrick MLT—Technologist in Dr. J. Blondeau Interim Head for Pathology and Laboratory Medicine SOUTH Rita Thomas Technologist, TB/Bacteriology Ericka Grude Technologist, TB/Bacteriology Dr. Paul Levett Microbiologist Dr. David Alexander Microbiologist Dr. Greg Horsman Director, Saskatchewan Health
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APPENDIX 2:

M. TUBERCULOSIS COMPLEX ANTIMICROBIAL SUSCEPTIBILITY REPORTING FORM



Public Health
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Agence de la santé
publique du Canada

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

Unique Source Laboratory ID No.: Identificateur unique du laboratoire déclarant:		Date specimen / culture received at laboratory: Date de réception échantillon / culture au laboratoire:																																																																																																																																			
<input type="checkbox"/> M. tuberculosis complex (species known)* Complexe M. tuberculosis (espèce connue)*		<input type="checkbox"/> M. bovis <input type="checkbox"/> M. bovis BCG <input type="checkbox"/> MTB Complex (species unknown) Complexe MTB (espèce inconnue)																																																																																																																																			
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<input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui What is the previous Unique Source Laboratory ID No.? / Identificateur antérieur? <input type="text"/> What is the previous Form No.? (If known) / N° de formulaire antérieur? (Si connu) <input type="text"/>																																																																																																																																					
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 UN SEUL ISOLAT 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)	PROV / TERR CODES PROV / TERR 10 = N.L. / T.N.-L. 46 = Man. 11 = P.E.I. / Î.-P.-É. 47 = Sask. 12 = N.S. / N.-É. 48 = Alta. / Alb. 13 = N.B. / N.-B. 59 = B.C. / C.-B. 24 = Que. / Qc 60 = Y.T. / Yn 35 = Ont. 61 = N.W.T. / T.N.-O. 62 = Nvt. / Nt																																																																																																																																		
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* include/inclus: M. tuberculosis, M. africanum, M. canettii, M. caprae, M. microti, M. pinnipedii.

PHAC/ASPC 9061
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APPENDIX 3:

DATA TABLES

TABLE 1: Reported *Mycobacterium tuberculosis* complex isolates by "reporting" and "originating" province/territory, Canada: 2012

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	1,404	5	—	9	4	209	493	123	72	163	254	1	6	65
N.L.	5	5	0	0	0	0	0	0	0	0	0	0	0	0
N.S.	9	0	0	9	0	0	0	0	0	0	0	0	0	0
N.B.	4	0	0	0	4	0	0	0	0	0	0	0	0	0
Que.	209	0	0	0	0	209	0	0	0	0	0	0	0	0
Ont.	552	0	0	0	0	0	492	0	0	1	0	0	0	59
Man.	124	0	0	0	0	0	0	123	1	0	0	0	0	0
Sask.	70	0	0	0	0	0	0	0	70	0	0	0	0	0
Alta.	175	0	0	0	0	0	0	0	1	162	0	0	6	6
B.C.	256	0	0	0	0	0	1	0	0	0	254	1	0	0

TABLE 2: Overall pattern of reported tuberculosis drug resistance in Canada: 2002–2012

	2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012	
	TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
Total number of isolates	1,419	100.0	1,405	100.0	1,376	100.0	1,335	100.0	1,389	100.0	1,267	100.0	1,356	100.0	1,331	100.0	1,279	100.0	1,319	100.0	1,404	100.0
Isolates susceptible	1,280	90.2	1,257	89.5	1,257	91.4	1,207	90.4	1,263	90.9	1,134	89.5	1,240	91.4	1,204	90.5	1,167	91.2	1,180	89.5	1,266	90.2
Any Resistance*																						
INH	115	8.1	132	9.4	100	7.3	109	8.2	101	7.3	110	8.7	102	7.5	113	8.5	101	7.9	122	9.2	111	7.9
RMP	24	1.7	23	1.6	14	1.0	24	1.8	24	1.7	13	1.0	19	1.4	21	1.6	18	1.4	21	1.6	9	0.6
EMB	26	1.8	17	1.2	11	0.8	20	1.5	12	0.9	23	1.8	13	1.0	17	1.3	10	0.8	9	0.7	4	0.3
PZA	29	2.6	29	2.6	26	2.4	22	2.1	16	1.5	27	2.7	22	2.1	18	1.7	25	2.4	28	2.6	33	2.8
Resistance to one or more drugs	139	9.8	148	10.5	119	8.6	128	9.6	126	9.1	133	10.5	116	8.6	127	9.5	112	8.8	139	10.5	138	9.8
Monoresistance	109	7.7	117	8.3	94	6.8	103	7.7	107	7.7	111	8.8	94	6.9	98	7.4	88	6.9	119	9.0	127	9.0
MDR-TB†	20	1.4	20	1.4	12	0.9	22	1.6	15	1.1	11	0.9	15	1.1	18	1.4	17	1.3	18	1.4	8	0.6
Other Patterns	9	0.6	10	0.7	13	0.9	3	0.2	3	0.2	11	0.9	6	0.4	11	0.8	6	0.5	1	0.1	2	0.1
XDR-TB‡	1	0.1	1	0.1	—	—	—	—	1	0.1	—	—	1	0.1	—	—	1	0.1	1	0.1	1	0.1

* Not all isolates were tested for resistance to all drugs; percentage reflects the total number of isolates actually tested.

† Multidrug-resistant TB (MDR-TB) is TB that is resistant to at least isoniazid and rifampin but which does not meet the definition of XDR-TB.

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

TABLE 3: Reported multidrug-resistant TB and extensively drug-resistant-TB isolates by province/territory, Canada: 2012

	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	1,404	5	0	9	4	209	493	123	72	163	254	1	6	65
Total number of MDR-TB isolates*	8	0	0	0	0	0	5	0	0	1	2	0	0	0
INH & RMP	4	0	0	0	0	0	3	0	0	1	0	0	0	0
INH & RMP & EMB	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INH & RMP & PZA	2	0	0	0	0	0	1	0	0	0	1	0	0	0
INH & RMP & EMB & PZA	2	0	0	0	0	0	1	0	0	0	1	0	0	0
Total number of XDR-TB isolates†	1	0	0	0	0	0	1	0	0	0	0	0	0	0
INH & RMP & EMB & PZA & SM & KAN & OFL & ETH & RBT & MOX	1	0	0	0	0	0	1	0	0	0	0	0	0	0

* Multidrug-resistant TB (MDR-TB) is TB that is resistant to at least isoniazid and rifampin but which does not meet the definition of XDR-TB.

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

TABLE 4: Reported TB drug resistance by sex and age group, Canada: 2012

AGE GROUP (YRS)		ISOLATES			ANY RESISTANCE			MDR-TB			XDR-TB		
		NUMBER	%		NUMBER	%		NUMBER	%		NUMBER	%	
Total		1,404	100.0		138	100.0		8	100.0		1	100.0	
< 5	Males	13	0.9		3	2.2		0	0.0		0	0.0	
	Females	8	0.6		0	0.0		0	0.0		0	0.0	
	Unknown	1	0.1		0	0.0		0	0.0		0	0.0	
	Total	22	1.6		3	2.2		0	0.0		0	0.0	
5–14	Males	17	1.2		0	0.0		0	0.0		0	0.0	
	Females	9	0.6		2	1.4		0	0.0		0	0.0	
	Unknown	0	0.0		0	0.0		0	0.0		0	0.0	
	Total	26	1.9		2	1.4		0	0.0		0	0.0	
15–24	Males	108	7.7		12	8.7		0	0.0		1	100.0	
	Females	93	6.6		6	4.3		2	25.0		0	0.0	
	Unknown	0	0.0		0	0.0		0	0.0		0	0.0	
	Total	201	14.3		18	13.0		2	25.0		1	100.0	
25–34	Males	122	8.7		16	11.6		0	0.0		0	0.0	
	Females	114	8.1		14	10.1		3	37.5		0	0.0	
	Unknown	5	0.4		0	0.0		0	0.0		0	0.0	
	Total	241	17.2		30	21.7		3	37.5		0	0.0	
35–44	Males	122	8.7		12	8.7		0	0.0		0	0.0	
	Females	100	7.1		14	10.1		1	12.5		0	0.0	
	Unknown	2	0.1		0	0.0		0	0.0		0	0.0	
	Total	224	15.9		26	18.8		1	12.5		0	0.0	
45–54	Males	119	8.5		17	12.3		0	0.0		0	0.0	
	Females	67	4.8		2	1.4		0	0.0		0	0.0	
	Unknown	2	0.1		0	0.0		0	0.0		0	0.0	
	Total	188	13.4		19	13.8		0	0.0		0	0.0	
55–64	Males	99	7.0		12	8.7		0	0.0		0	0.0	
	Females	41	2.9		3	2.2		1	12.5		0	0.0	
	Unknown	1	0.1		1	0.7		0	0.0		0	0.0	
	Total	141	10.0		16	11.6		1	12.5		0	0.0	

AGE GROUP (YRS)		ISOLATES		ANY RESISTANCE		MDR-TB		XDR-TB	
		NUMBER	%	NUMBER	%	NUMBER	%	NUMBER	%
65–74	Males	100	7.1	10	7.2	0	0.0	0	0.0
	Females	55	3.9	5	3.6	1	12.5	0	0.0
	Unknown	2	0.1	0	0.0	0	0.0	0	0.0
	Total	157	11.2	15	10.9	1	12.5	0	0.0
75+	Males	129	9.2	6	4.3	0	0.0	0	0.0
	Females	74	5.3	3	2.2	0	0.0	0	0.0
	Unknown	1	0.1	0	0.0	0	0.0	0	0.0
	Total	204	14.5	9	6.5	0	0.0	0	0.0
Unknown	Males	0	0.0	0	0.0	0	0.0	0	0.0
	Females	0	0.0	0	0.0	0	0.0	0	0.0
	Unknown	0	0.0	0	0.0	0	0.0	0	0.0
	Total	0	0.0	0	0.0	0	0.0	0	0.0
Total	Males	829	59.0	88	63.8	0	0.0	1	100.0
	Females	561	40.0	49	35.5	8	100.0	0	0.0
	Unknown	14	1.0	1	0.7	0	0.0	0	0.0

TABLE 5: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Alberta: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	108 (100.0)	92 (100.0)	96 (100.0)	129 (100.0)	104 (100.0)	98 (100.0)	134 (100.0)	159 (100.0)	107 (100.0)	156 (100.0)	163 (100.0)
Isolates susceptible	100 (92.6)	78 (84.8)	84 (87.5)	115 (89.1)	95 (91.3)	92 (93.9)	123 (91.8)	145 (91.2)	96 (89.7)	133(85.3)	148 (90.8)
Isolates resistant to one or more of the first line drugs (INH, RMP, EMB, PZA)	8 (7.4)	14 (15.2)	12 (12.5)	14 (10.9)	9 (8.7)	6 (6.1)	11 (8.2)	14 (8.8)	11 (10.3)	23 (14.7)	15 (9.2)
Monoresistance	7 (6.5)	11 (12.0)	9 (9.4)	10 (7.8)	8 (7.7)	6 (6.1)	8 (6.0)	12 (7.5)	6 (5.6)	16 (10.3)	13 (8.0)
INH	7 (6.5)	9 (9.8)	7 (7.3)	10 (7.8)	7 (6.7)	5 (5.1)	8 (6.0)	8 (5.0)	6 (5.6)	14 (9.0)	10 (6.1)
RMP	—	—	—	—	—	—	—	1 (0.6)	—	—	—
EMB	—	—	—	—	—	—	—	—	—	—	—
PZA	—	2 (2.2)	2 (2.1)	—	1 (1.0)	1 (1.0)	—	3 (1.9)	—	2 (1.3)	3 (1.9)
Other Patterns	1 (0.9)	2 (2.2)	1 (1.0)	—	—	—	1 (0.7)	2 (1.3)	2 (1.9)	—	1 (0.6)
INH & EMB	—	1 (1.1)	—	—	—	—	1 (0.7)	1 (0.6)	—	—	—
INH & PZA	1 (0.9)	1 (1.1)	1 (1.0)	—	—	—	—	1 (0.6)	1 (0.9)	—	1 (0.6)
INH & EMB & PZA	—	—	—	—	—	—	—	—	1 (0.9)	—	—
MDR-TB†	—	1 (1.1)	2 (2.1)	4 (3.1)	1 (1.0)	—	2 (1.5)	—	3 (2.8)	7 (4.5)	1 (0.6)
INH & RMP	—	—	—	—	—	—	—	—	—	1 (0.6)	1 (0.6)
INH & RMP & EMB	—	—	—	1 (0.8)	—	—	—	—	—	—	—
INH & RMP & PZA	—	—	—	—	—	—	—	—	1 (0.9)	—	—
INH & RMP & RBT	—	—	—	—	—	—	—	—	—	1 (0.6)	—
INH & RMP & ETH	—	1 (1.1)	—	—	—	—	—	—	—	—	—
INH & RMP & ETH & RBT	—	—	—	—	—	—	—	—	—	2 (1.3)	—
INH & RMP & SM	—	—	—	1 (0.8)	—	—	—	—	—	—	—
INH & RMP & EMB & PZA	—	—	—	1 (0.8)	—	—	1 (0.7)	—	—	—	—
INH & RMP & EMB & SM	—	—	—	—	1 (1.0)	—	1 (0.7)	—	—	—	—

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
INH & RMP & EMB & PZA & SM	—	—	—	1 (0.8)	—	—	—	—	—	—	—
INH & RMP & EMB & SM & OFL	—	—	1 (1.0)	—	—	—	—	—	—	—	—
INH & RMP & EMB & AK & RBT	—	—	1 (1.0)	—	—	—	—	—	—	—	—
INH & RMP & EMB & PZA & SM & RBT	—	—	—	—	—	—	—	—	1 (0.9)	1 (0.6)	—
INH & RMP & PZA & SM & ETH	—	—	—	—	—	—	—	—	—	1 (0.6)	—
INH & RMP & PZA & SM & RBT	—	—	—	—	—	—	—	—	—	1 (0.6)	—
INH & RMP & PZA & SM & RBT & OFL	—	—	—	—	—	—	—	—	1 (0.9)	—	—

* Includes *M. africanum* isolate: 2 in 2007, 2009, 3 in 2010 and 1 in 2011; *M. bovis*: 2 in 2009, 2011 and 1 in 2012

† Multidrug-resistant TB (MDR-TB) is TB that is resistant to at least isoniazid and rifampin but which does not meet the definition of XDR-TB (see methods section for definition of XDR-TB).

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
INH & RMP & PZA & SM & ETH & RBT	—	—	—	1 (0.5)	—	—	—	—	—	—	—
INH & RMP & PZA & SM & PAS & RBT	—	—	—	—	—	—	—	—	—	1 (0.5)	—
INH & RMP & EMB & SM & RBT	—	—	—	—	—	—	—	—	—	—	1 (0.4)
INH & RMP & EMB & PZA & SM	1 (0.4)	1 (0.3)	—	1 (0.5)	—	—	—	—	—	—	—
INH & RMP & EMB & PZA & ETH	—	1 (0.3)	1 (0.4)	—	—	—	—	—	—	—	—
INH & RMP & EMB & PZA & SM & ETH	—	1 (0.3)	—	—	—	—	—	—	—	—	—
INH & RMP & EMB & SM & ETH & PAS	—	—	—	1 (0.5)	1 (0.4)	—	—	—	—	—	—
INH & RMP & EMB & SM & KAN & RBT	—	—	—	—	—	—	—	—	—	—	1 (0.4)
INH & RMP & EMB & PZA & SM & OFL & ETH & PAS	—	—	—	—	—	1 (0.4)	—	—	—	—	—
INH & RMP & EMB & PZA & KM & CM & ETH	—	—	—	—	—	1 (0.4)	—	—	—	—	—

* Includes *M. bovis* isolates: 1 in 2002, 2003, 2006 and 2007; *M. africanum* 1 in 2008 and 2009; 5 in 2012.

† Routine testing for PZA not conducted.

‡ Multidrug-resistant TB (MDR-TB) is TB that is resistant to at least isoniazid and rifampin but which does not meet the definition of XDR-TB (see methods section for definition of XDR-TB).

TABLE 7: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Manitoba: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	113 (100.0)	122 (100.0)	122 (100.0)	94 (100.0)	119 (100.0)	84 (100.0)	116 (100.0)	106 (100.0)	113 (100.0)	97 (100.0)	123 (100.0)
Isolates susceptible	106 (93.8)	117 (95.9)	121 (99.2)	92 (97.9)	113 (95.0)	75 (89.2)	111 (95.7)	99 (93.3)	99 (87.6)	90 (93.0)	113 (91.9)
Isolates resistant to one or more of the first line drugs (INH, RMP, EMB, PZA)	7 (6.2)	5 (4.1)	1 (0.8)	2 (2.1)	6 (5.0)	9 (10.7)	5 (4.3)	7 (6.6)	14 (12.4)	7 (7.2)	10 (8.1)
Monoresistance	4 (3.5)	4 (3.3)	1 (0.8)	2 (2.1)	6 (5.0)	8 (9.5)	4 (3.4)	5 (4.7)	11 (9.7)	5 (5.2)	10 (8.1)
INH	3 (2.7)	3 (2.5)	—	2 (2.1)	6 (5.0)	7 (8.3)	4 (3.4)	4 (3.8)	10 (8.8)	5 (5.2)	10 (8.1)
PZA	1 (0.9)	1 (0.8)	1 (0.8)	—	—	1 (1.2)	—	1 (0.9)	1 (0.9)	—	—
Other Patterns	1 (0.9)	—	—	—	—	1 (1.2)	—	2 (1.8)	1 (0.9)	—	—
INH & PZA	1 (0.1)	—	—	—	—	—	—	1 (0.9)	1 (0.9)	—	—
INH & EMB	—	—	—	—	—	1 (1.2)	—	1 (0.9)	—	—	—
MDR-TB†	1 (0.9)	1 (0.8)	—	—	—	—	1 (0.9)	—	1 (0.9)	2 (2.1)	—
INH & RMP	1 (0.9)	—	—	—	—	—	—	—	1 (0.9)	—	—
INH & RMP & RBT	—	1 (0.8)	—	—	—	—	—	—	—	1 (1.1)	—
INH & RMP & PZA & SM & RBT	—	—	—	—	—	—	1 (0.9)	—	—	—	—
INH & RMP & EMB & PZA & SM & AK & KM & CM & ETH	—	—	—	—	—	—	—	—	—	1 (1.1)	—
XDR-TB‡	1 (0.9)	—	—	—	—	—	—	—	1 (0.9)	—	—
INH & RMP & EMB & PZA & OFL & ETH & RBT & KM	—	—	—	—	—	—	—	—	1 (0.9)	—	—

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
INH & RMP & EMB & PZA & CM & OFL & ETH & RBT	1 (0.9)	—	—	—	—	—	—	—	—	—	—

* Includes *M. bovis* isolates: 1 in 2002, 2003, 2006 and 2007; *M. africanum*: 1 in 2008.

† Multidrug-resistant TB (MDR-TB) is TB that is resistant to at least isoniazid and rifampin but which does not meet the definition of XDR-TB.

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

TABLE 8: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, New Brunswick: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	10 (100.0)	14 (100.0)	11 (100.0)	5 (100.0)	3 (100.0)	5 (100.0)	3 (100.0)	10 (100.0)	9 (100.0)	5 (100.0)	4 (100.0)
Isolates susceptible	9 (90.0)	13 (92.9)	10 (90.9)	4 (80.0)	3 (100.0)	5 (100.0)	3 (100.0)	10 (100.0)	7 (77.8)	5 (100.0)	3 (75.0)
Isolates resistant to one or more of the first line drugs (INH, RMP, EMB, PZA)	1 (10.0)	1 (7.1)	1 (9.1)	1 (20.0)	—	—	—	—	2 (22.2)	—	1 (25.0)
Monoresistance	1 (10.0)	1 (7.1)	1 (9.1)	1 (20.0)	—	—	—	—	2 (22.2)	—	1 (25.0)
INH	1 (10.0)	1 (7.1)	1 (9.1)	—	—	—	—	—	2 (22.2)	—	—
PZA	—	—	—	1 (20.0)	—	—	—	—	—	—	1 (25.0)

* Includes 1 *M. africanum* isolate for 2007

TABLE 9: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Newfoundland and Labrador: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA	4 (100.0)	6 (100.0)	8 (100.0)	6 (100.0)	11 (100)	5 (100.0)	5 (100.0)	10 (100.0)	9 (100.0)	5 (100.0)	5 (100.0)
Isolates susceptible	4 (100.0)	4 (66.7)	8 (100.0)	5 (83.3)	11 (100)	5 (100.0)	5 (100.0)	10 (100.0)	9 (100.0)	5 (100.0)	5 (100.0)
Isolates resistant to one or more of the first line of the first line drugs (INH, RMP, EMB, PZA)	—	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 *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Northwest Territories: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA	3 (100.0)	11 (100.0)	9 (100.0)	6 (100.0)	4 (100.0)	14 (100.0)	13 (100.0)	10 (100.0)	5 (100.0)	8 (100.0)	6 (100.0)
Isolates susceptible	3 (100.0)	11 (100.0)	9 (100.0)	6 (100.0)	3 (75.0)	14 (100.0)	13 (100.0)	9 (90.0)	4 (80.0)	8 (100.0)	6 (100.0)
Isolates resistant to one or more of the first line of the first line drugs (INH, RMP, EMB, PZA)	—	—	—	—	1 (25.0)	—	—	1 (10.0)	1 (20.0)	—	—
Monoresistance	—	—	—	—	1 (25.0)	—	—	1 (10.0)	1 (20.0)	—	—
INH	—	—	—	—	1 (25.0)	—	—	—	1 (20.0)	—	—
RMP	—	—	—	—	—	—	—	1 (10.0)	—	—	—

TABLE 11: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Nova Scotia: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	10 (100.0)	7 (100.0)	9 (100.0)	7 (100.0)	8 (100.0)	5 (100.0)	3 (100.0)	7 (100.0)	8 (100.0)	7 (100.0)	9 (100.0)
Isolates susceptible	9 (90.0)	7 (100.0)	9 (100.0)	6 (85.7)	8 (100.0)	5 (100.0)	3 (100.0)	7 (100.0)	5 (62.5)	7 (100.0)	9 (100.0)
Isolates resistant to one or more of the first line drugs (INH, RMP, EMB, PZA)	1 (10.0)	—	—	1 (14.3)	—	—	—	—	3 (37.5)	—	—
Monoresistance	1 (10.0)	—	—	1 (14.3)	—	—	—	—	2 (25.0)	—	—
INH	—	—	—	—	—	—	—	—	1 (12.5)	—	—
PZA	1 (10.0)	—	—	1 (14.3)	—	—	—	—	1 (12.5)	—	—
Other Patterns	—	—	—	—	—	—	—	—	1 (12.5)	—	—
INH & PZA	—	—	—	—	—	—	—	—	1 (12.5)	—	—

* Includes 1 *M. bovis* isolate for 2010

TABLE 12: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Nunavut: 2002–2012

[illegible]

TABLE 13: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Ontario: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	586 (100.0)	592 (100.0)	599 (100.0)	553 (100.0)	567 (100.0)	538 (100.0)	479 (100.0)	488 (100.0)	496 (100.0)	507 (100.0)	493 (100.0)
Isolates susceptible	517 (88.2)	526 (88.9)	539 (90.0)	487 (88.1)	504 (88.9)	466 (86.6)	427 (89.1)	428 (87.7)	456 (91.9)	454 (89.5)	430 (87.2)
Isolates resistant to one or more of the first line drugs (INH, RMP, EMB, PZA)	69 (11.8)	66 (11.1)	60 (10.0)	66 (11.9)	63 (11.1)	72 (13.4)	52 (10.9)	60 (12.3)	40 (8.1)	53 (10.5)	63 (12.8)
Monoresistance	49 (8.4)	47 (7.9)	49 (8.2)	51 (9.2)	49 (8.6)	61 (11.3)	40 (8.4)	44 (9.0)	29 (5.8)	45 (8.9)	56 (11.4)
INH	43 (7.3)	42 (7.1)	46 (7.7)	44 (8.0)	39 (6.9)	50 (9.3)	33 (6.9)	39 (7.8)	27 (5.4)	39 (7.7)	45 (9.1)
RMP	—	1 (0.2)	—	—	1 (0.2)	1 (0.2)	—	—	—	—	—
EMB	1 (0.2)	—	—	—	—	1 (0.2)	1 (0.2)	1 (0.2)	—	—	1 (0.2)
PZA	5 (0.9)	4 (0.7)	3 (0.5)	7 (1.3)	9 (1.6)	9 (1.7)	6 (1.3)	4 (0.8)	2 (0.4)	6 (1.2)	10 (2.0)
Other Patterns	4 (0.7)	1 (1.2)	4 (0.7)	2 (0.4)	3 (0.5)	4 (0.7)	4 (0.8)	5 (1.0)	1 (0.2)	—	1 (0.2)
INH & EMB	3 (0.5)	5 (0.8)	3 (0.5)	2 (0.4)	3 (0.5)	1 (0.2)	2 (0.4)	3 (0.6)	—	—	—
INH & PZA	—	1 (0.2)	1 (0.2)	—	—	2 (0.4)	—	—	1 (0.2)	—	1 (0.2)
EMB & PZA	—	—	—	—	—	1 (0.2)	—	—	—	—	—
INH & EMB & PZA	1 (0.2)	1 (0.2)	—	—	—	—	2 (0.4)	2 (0.4)	—	—	—
MDR-TB†	16 (2.7)	11 (1.9)	7 (1.2)	13 (2.4)	10 (1.8)	7 (1.3)	7 (1.5)	11 (2.3)	10 (2.0)	7 (1.3)	5 (1.0)
INH & RMP	—	1 (0.2)	2 (0.3)	—	2 (0.4)	—	—	1 (0.2)	—	—	—
INH & RMP & PZA	—	—	1 (0.2)	—	—	—	—	—	—	—	—
INH & RMP & EMB	2 (0.4)	—	—	—	—	—	—	—	—	—	—
INH & RMP & SM	1 (0.2)	—	—	—	—	—	—	—	—	—	1 (0.2)
INH & RMP & RBT	—	1 (0.2)	—	3 (0.5)	1 (0.2)	—	—	—	2 (0.4)	—	—
INH & RMP & EMB & SM	—	—	—	—	—	—	—	—	1 (0.2)	—	—
INH & RMP & EMB & RBT	—	—	—	—	2 (0.4)	1 (0.2)	1 (0.2)	2 (0.4)	—	—	—
INH & RMP & PZA & SM	—	—	1 (0.2)	—	—	—	—	—	—	—	—

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
INH & RMP & PZA & RBT	—	2 (0.3)	—	—	—	—	—	—	—	—	—
INH & RMP & SM & KAN & ETH & RBT	—	—	—	—	—	—	—	—	—	—	1 (0.2)
INH & RMP & SM & RBT	1 (0.2)	—	—	2 (0.4)	—	—	3 (0.6)	1 (0.2)	1 (0.2)	1 (0.2)	1 (0.2)
INH & RMP & ETH & RBT	1 (0.2)	1 (0.2)	—	—	1 (0.2)	—	1 (0.2)	1 (0.2)	—	—	—
INH & RMP & CM & RBT	—	—	—	—	1 (0.2)	—	—	—	—	—	—
INH & RMP & EMB & SM & RBT	1 (0.2)	—	—	2 (0.4)	—	—	—	—	2 (0.4)	—	—
INH & RMP & EMB & PZA & RBT	1 (0.2)	1 (0.2)	—	—	—	1 (0.2)	—	—	—	—	—
INH & RMP & EMB & PZA & RBT & PAS	—	—	—	—	—	—	—	—	—	1 (0.2)	—
INH & RMP & EMB & PZA & CM & RBT	—	1 (0.2)	—	1 (0.2)	—	—	—	—	—	1 (0.2)	1 (0.2)
INH & RMP & PZA & SM & RBT	—	—	—	—	—	—	—	—	2 (0.4)	1 (0.2)	—
INH & RMP & PZA & ETH & RBT	—	—	—	—	1 (0.2)	—	—	—	—	—	—
INH & RMP & SM & ETH & RBT	4 (0.7)	—	—	1 (0.2)	—	—	—	1 (0.2)	—	—	—
INH & RMP & SM & OFL & RBT	—	1 (0.2)	—	1 (0.2)	—	—	—	—	—	—	—
INH & RMP & SM & OFL & ETH	—	—	—	—	—	—	—	1 (0.2)	—	—	—
INH & RMP & SM & OFL & MOX	—	—	—	—	—	—	—	—	—	—	1 (0.2)
INH & RMP & AK & CM & RBT	—	—	—	—	1 (0.2)	—	—	—	—	—	—
INH & RMP & OFL & ETH & RBT	—	—	1 (0.2)	—	—	—	—	—	—	—	—

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
INH & RMP & CM & ETH & RBT	—	—	1 (0.2)	—	—	—	—	—	—	—	—
INH & RMP & EMB & SM & ETH & RBT	—	—	—	—	—	—	—	1 (0.2)	—	—	—
INH & RMP & EMB & PZA & SM & ETH	1 (0.2)	—	—	—	—	—	—	—	—	1 (0.2)	—
INH & RMP & EMB & PZA & SM & RBT	—	—	—	—	—	1 (0.2)	1 (0.2)	1 (0.2)	2 (0.4)	1 (0.2)	—
INH & RMP & PZA & SM & ETH & RBT	—	—	—	1 (0.2)	—	1 (0.2)	1 (0.2)	1 (0.2)	—	—	—
INH & RMP & PZA & EMB & ETH & RBT	—	1 (0.2)	—	—	—	2 (0.4)	—	—	—	—	—
INH & RMP & OFL & MOX & ETH	—	—	—	—	—	—	—	—	—	1 (0.2)	—
INH & RMP & SM & OFL & ETH & RBT	—	—	—	—	—	—	—	1 (0.2)	—	—	—
INH & RMP & OFL & ETH & RBT & PAS	—	—	—	—	1 (0.2)	—	—	—	—	—	—
INH & RMP & PZA & EMB & SM & ETH & RBT	2 (0.3)	1 (0.2)	—	1 (0.2)	—	—	—	—	—	—	—
INH & RMP & PZA & EMB & SM & OFL & RBT	—	—	—	1 (0.2)	—	—	—	—	—	—	—
INH & RMP & PZA & EMB & SM & ETH & RBT & OFL	1 (0.2)	1 (0.2)	1 (0.2)	—	—	—	—	—	—	—	—
INH & RMP & EMB & PZA & AK & CM & ETH & RBT	—	—	—	—	—	1 (0.2)	—	—	—	—	—

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
INH & RMP & EMB & PZA & SM & AK & CM & RBT	1 (0.2)	—	—	—	—	—	—	—	—	—	—
XDR-TB*	—	1 (0.2)	—	—	1 (0.2)	—	1 (0.2)	—	—	1 (0.2)	1 (0.2)
INH & RMP & EMB & PZA & SM & KAN & OFL & ETH & RBT & MOX	—	—	—	—	—	—	—	—	—	—	1 (0.2)
INH & RMP & EMB & PZA & SM & AK & CM & ETH & OFL & RBT	—	1 (0.2)	—	—	—	—	—	—	—	—	—
INH & RMP & AK & CM & OFL & ETH & RBT	—	—	—	—	1 (0.2)	—	—	—	—	—	—
INH & RMP & EMB & PZA & CM & OFL & RBT & PAS	—	—	—	—	—	—	1 (0.2)	—	—	—	—
INH & RMP & EMB & PZA & SM & KAN & OFL & ETH & RBT & PAS & MOX	—	—	—	—	—	—	—	—	—	1 (0.2)	—

* Includes *M. bovis* isolates: 1 *M. bovis* isolate for 2002, 2003, 2004; 2 for 1999, 2000, 2001, 2009, 2010; 3 for 2011, and 4 for 2006.

† Multidrug-resistant TB (MDR-TB) is TB that is resistant to at least isoniazid and rifampin but which does not meet the definition of XDR-TB.

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

TABLE 14: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Prince Edward Island: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	1 (100.0)	2 (100.0)	1 (100.0)	1 (100.0)	—	—	—	1 (100.0)	1 (100.0)	3 (100.0)	—
Isolates susceptible	1 (100.0)	2 (100.0)	1 (100.0)	1 (100.0)	—	—	—	1 (100.0)	1 (100.0)	2 (66.7)	—
Isolates resistant to one or more of the first line drugs (INH, RMP, EMB, PZA)	—	—	—	—	—	—	—	—	—	1 (33.3)	—
Monoresistance	—	—	—	—	—	—	—	—	—	—	—
PZA	—	—	—	—	—	—	—	—	—	1 (33.3)	—

* Includes 1 *M. bovis* isolate for 2001

TABLE 15: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Quebec: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	247 (100.0)	219 (100.0)	207 (100.0)	226 (100.0)	201 (100.0)	200 (100.0)	210 (100.0)	171 (100.0)	197 (100.0)	205 (100.0)	209 (100.0)
Isolates susceptible	222 (89.9)	187 (85.4)	190 (91.8)	207 (91.6)	173 (86.1)	177 (88.5)	188 (89.5)	156 (91.2)	179 (90.9)	180 (87.8)	187 (89.5)
Isolates resistant to one or more of the first line drugs (INH, RMP, EMB, PZA)	25 (10.1)	32 (14.6)	17 (8.2)	19 (8.4)	28 (13.9)	23 (11.5)	22 (10.5)	15 (8.8)	18 (9.1)	25 (12.2)	22 (10.5)
Monoresistance	23 (9.3)	31 (14.2)	15 (7.2)	18 (8.0)	26 (12.9)	17 (8.5)	19 (9.0)	9 (5.3)	16 (8.1)	24 (11.7)	22 (10.5)
INH	13 (5.3)	25 (11.4)	11 (5.3)	14 (6.2)	21 (10.4)	12 (6.0)	15 (7.1)	7 (4.1)	11 (5.6)	18 (8.8)	13 (6.2)
RMP	1 (0.4)	—	—	—	1 (0.5)	1 (0.5)	—	—	—	—	—
PZA	9 (3.6)	6 (2.7)	4 (1.9)	4 (1.8)	4 (2.0)	4 (2.0)	4 (1.9)	2 (1.2)	5 (2.5)	6 (2.9)	9 (4.3)
Other Patterns	1 (0.4)	—	1 (0.5)	—	—	4 (2.0)	1 (0.5)	—	1 (0.5)	—	—
INH & EMB	1 (0.4)	—	1 (0.5)	—	—	3 (1.5)	—	—	—	—	—
INH & PZA	—	—	—	—	—	1 (0.5)	1 (0.5)	—	1 (0.5)	—	—
MDR-TB†	1 (0.4)	1 (0.5)	1 (0.5)	1 (0.4)	2 (1.0)	2 (1.0)	2 (1.0)	6 (3.5)	1 (0.5)	1 (0.5)	—
INH & RMP & ETH	—	1 (0.5)	—	—	—	—	—	—	—	—	—
INH & RMP & RBT	—	—	1 (0.5)	—	—	—	—	—	—	—	—
INH & RMP & EMB & ETH	—	—	—	—	1 (0.5)	1 (0.5)	—	—	—	—	—
INH & RMP & EMB & RBT	—	—	—	—	—	—	—	1 (0.6)	—	—	—
INH & RMP & SM & RBT	—	—	—	—	—	—	1 (0.5)	2 (1.2)	—	—	—
INH & RMP & ETH & RBT	—	—	—	—	—	—	—	1 (0.6)	—	—	—
INH & RMP & EMB & SM & RBT	—	—	—	—	—	1 (0.5)	—	—	—	—	—
INH & RMP & EMB & ETH & RBT	—	—	—	—	1 (0.5)	—	—	—	—	—	—
INH & RMP & PZA & ETH & RBT	—	—	—	1 (0.4)	—	—	—	—	—	—	—

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
INH & RMP & PZA & EMB & RBT	—	—	—	—	—	—	—	1 (0.6)	—	—	—
INH & RMP & EMB & PZA & SM & ETH	—	—	—	—	—	—	—	—	1 (0.5)	—	—
INH & RMP & EMB & PZA & SM & RBT	—	—	—	—	—	—	—	—	—	1 (0.5)	—
INH & RMP & EMB & SM & ETH & PAS	1 (0.4)	—	—	—	—	—	—	—	—	—	—
INH & RMP & PZA & SM & KM & CM & ETH	—	—	—	—	—	—	—	1 (0.6)	—	—	—
INH & RMP & PZA & SM & AK & KM & CM	—	—	—	—	—	—	1 (0.5)	—	—	—	—

* Includes *M. bovis* isolates: 1 in 1998, 1999, 2001, 2002, 2003, 2007, 2009; 2 in 2002, 2004, 2006, 2010; 3 in 2011; 4 in 2012; *M. caprae*: 1 in 2002, 2006; *M. africanum*: 1 in 2003, 2005, 2006, 2008; 2 in 2007 and 2012; 3 in 2009 and 2011; and 4 in 2010.

† Multidrug-resistant TB (MDR-TB) is TB that is resistant to at least isoniazid and rifampin but which does not meet the definition of XDR-TB (see methods section for definition of XDR-TB).

TABLE 16: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Saskatchewan: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	56 (100.0)	46 (100.0)	34 (100.0)	75 (100.0)	58 (100.0)	60 (100.0)	81 (100.0)	77 (100.0)	54 (100.0)	66 (100.0)	72 (100.0)
Isolates susceptible	51 (91.1)	45 (97.8)	32 (94.1)	73 (97.3)	57 (98.3)	59 (98.3)	79 (97.5)	72 (93.5)	51 (94.4)	62 (93.9)	68 (94.4)
Isolates resistant to one or more of the first line drugs (INH, RMP, EMB, PZA)	5 (8.9)	1 (2.2)	2 (5.9)	2 (2.7)	1 (1.7)	1 (1.7)	2 (2.5)	5 (6.5)	3 (5.6)	4 (6.1)	4 (5.6)
Monoresistance	4 (7.1)	1 (2.2)	2 (5.9)	2 (2.7)	1 (1.7)	1 (1.7)	2 (2.5)	3 (3.9)	2 (3.7)	4 (6.1)	4 (5.6)
INH	3 (5.4)	1 (2.2)	2 (5.9)	2 (2.7)	1 (1.7)	1 (1.7)	2 (2.5)	3 (3.9)	2 (3.7)	4 (6.1)	1 (1.4)
EMB	1 (1.8)	—	—	—	—	—	—	—	—	—	—
PZA	—	—	—	—	—	—	—	—	—	—	3 (4.2)
Other Patterns	1 (1.8)	—	—	—	—	—	—	1 (1.3)	—	—	—
INH & EMB	1 (1.8)	—	—	—	—	—	—	1 (1.3)	—	—	—
MDR-TB†	—	—	—	—	—	—	—	1 (1.3)	1 (1.9)	—	—
INH & RMP & RBT	—	—	—	—	—	—	—	—	1 (1.9)	—	—
INH & RMP & SM	—	—	—	—	—	—	—	1 (1.3)	—	—	—

* Routine testing for PZA not conducted.

† Multidrug-resistant TB (MDR-TB) is TB that is resistant to at least isoniazid and rifampin but which does not meet the definition of XDR-TB (see methods section for definition of XDR-TB).

TABLE 17: Reported results for routine drug susceptibility testing of *Mycobacterium tuberculosis* complex isolates to anti-tuberculosis drugs, Yukon: 2002–2012

	2002 TOTAL (%)	2003 TOTAL (%)	2004 TOTAL (%)	2005 TOTAL (%)	2006 TOTAL (%)	2007 TOTAL (%)	2008 TOTAL (%)	2009 TOTAL (%)	2010 TOTAL (%)	2011 TOTAL (%)	2012 TOTAL (%)
Total number of isolates tested for INH, RMP, EMB and PZA*	—	1 (100.0)	3 (100.0)	2 (100.0)	2 (100.0)	2 (100.0)	7 (100.0)	3 (100.0)	5 (100.0)	2 (100.0)	1 (100.0)
Isolates susceptible	—	1 (100.0)	3 (100.0)	2 (100.0)	2 (100.0)	2 (100.0)	7 (100.0)	3 (100.0)	5 (100.0)	2 (100.0)	1 (100.0)

* Routine testing for PZA not conducted