

## RÉSUMÉ ÉPIDÉMIOLOGIQUE AMÉLIORÉ

# Maladie à mycobactéries nontuberculeuses en Ontario, du 1er janvier au 31 décembre 2020

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## Objet

Le présent rapport fournit de l'information sur des spécimens soumis à un test de dépistage des mycobactéries nontuberculeuses (MNT) au laboratoire de Santé publique Ontario (SPO) du 1er janvier au 31 décembre 2020. L'objectif est de décrire les caractéristiques de chaque spécimen selon l'état de maladie microbiologique MNT, de recenser les espèces MNT les plus fréquentes et de mesurer les taux de maladie MNT en Ontario.

## Contexte

Les MNT sont des organismes environnementaux omniprésents que l'on peut trouver à la fois dans les réservoirs naturels (p. ex., le sol, l'eau douce et l'eau salée non traitée) et les réservoirs créés par l'homme (p. ex., les appareils de chauffage et de refroidissement de l'eau, les piscines, les douches)<sup>1</sup>. Les gens sont continuellement exposés aux MNT; cependant, les personnes souffrant d'une maladie pulmonaire existante, ainsi que les personnes âgées ou immunodéprimées, sont plus exposées au risque de contracter une maladie à MNT. La forme la plus courante de maladie à MNT chez l'homme est l'infection pulmonaire<sup>2</sup>. Des infections MNT non pulmonaires peuvent également survenir et touchent principalement la peau, les ganglions lymphatiques, les tissus mous et les articulations<sup>3</sup>.

Les espèces de MNT comprennent tous les membres du genre *Mycobacterium*, à l'exclusion du complexe *Mycobacterium tuberculosis*, *Mycobacterium ulcerans* et *Mycobacterium leprae*<sup>4</sup>. Plus de 170 espèces de MNT ont été répertoriées. Parmi celles qui sont répertoriées en Ontario, les plus courantes historiquement ont été *Mycobacterium avium*, *Mycobacterium xenopi*, *Mycobacterium gordonae* et *Mycobacterium intracellulare*<sup>2</sup>.

Les infections aux MNT ne sont pas des maladies à déclaration obligatoire en Ontario, à moins qu'il soit déterminé qu'elles atteignent une proportion épidémique<sup>2</sup>. Il faut surveiller les données d'analyse de laboratoire concernant les espèces de MNT en circulation afin de comprendre l'épidémiologie et le fardeau de cette maladie.

## Définition des cas de MNT

La confirmation d'une maladie pulmonaire causée par les MNT repose sur des examens cliniques, radiologiques et microbiologiques<sup>2</sup>. Au laboratoire de Santé publique Ontario, nous n'avons pas accès aux renseignements cliniques et radiologiques de la personne. Par conséquent, les critères microbiologiques permettant d'attribuer un état pathologique lié aux MNT ont été adaptés à partir de lignes directrices établies conjointement par les organisations suivantes : American Thoracic Society, Infectious Diseases Society of America, la Société européenne des maladies respiratoires et la Société européenne de microbiologie clinique et des maladies infectieuses<sup>5</sup>.

En bref, cette définition attribue un état pathologique en fonction de la présence des espèces de MNT dépistées, de la fréquence d'isolement et du type de source(s) de spécimen(s) positif(s) aux espèces de MNT. Six états pathologiques microbiologiques de MNT ont été attribués dans ce rapport : régulier, strict, incertain, non pulmonaire, indéterminé et négatif (voir tableau A1). L'état pathologique régulier est la principale catégorie. Cet état répond aux exigences minimales de maladie à MNT confirmée (deux crachats positifs pour la même espèce dans une période de 24 mois; un lavage bronchique ou un lavage bronchoalvéolaire positif; ou un échantillon de biopsie pulmonaire positif). L'état strict de la maladie implique des critères plus rigoureux que la définition d'état régulier au chapitre de la fréquence de dépistage de MNT et de sources de spécimens ayant donné des résultats positifs. Par conséquent, les personnes à qui on a attribué l'état de maladie strict forment un sous-groupe des personnes classées dans l'état de maladie régulier. Les trois autres états pathologiques positifs (incertain, non pulmonaire et indéterminé) révèlent la présence d'espèces de MNT mais ne répondent pas à la définition d'état régulier pour différentes raisons. L'état pathologique négatif est attribué aux personnes qui ont obtenu un test positif aux espèces de MNT sans qu'il y ait de preuve en laboratoire de présence d'espèces de MNT dans leurs spécimens respiratoires ou non respiratoires.

## Dépistage des MNT au laboratoire de Santé publique Ontario

Pour diagnostiquer une infection pulmonaire liée aux MNT, on recommande les sources de spécimens suivantes : expectoration, aspiration trachéale, lavage broncho-alvéolaire, lavage bronchique, brossage œsophagien et tissu pulmonaire<sup>5</sup>. Afin d'accroître la probabilité de déterminer si une espèce de MNT est associée à la maladie chez une personne, il est recommandé de prélever trois échantillons d'expectoration tôt le matin le même jour, à une heure d'intervalle, et d'expédier ces échantillons au laboratoire de Santé publique Ontario pour analyse. Un frottis est préparé et observé au microscope à fluorescence pour déterminer la présence de mycobactéries. Tous les isolats cultivés de *Mycobacterium* sont identifiés au niveau de l'espèce en utilisant les méthodes décrites dans le tableau A3. Les procédures de prélèvement et d'analyse des échantillons sont décrites en détail dans le protocole de prélèvement et de manipulation des échantillons de Santé publique Ontario<sup>6</sup>.

## Points saillants

- Parmi les personnes soumises au test de dépistage des espèces de MNT en 2020, 12,1 % ont été classées en état de maladie microbiologique régulier, 6,9 % en état de maladie strict et 8,2 % en état de maladie incertain. Le taux de MNT régulier était de 19,0 pour 100 000 habitants.
- Les personnes classées dans les états pathologiques régulier et strict se situaient principalement dans la tranche d'âge de 70 à 79 ans. Plus précisément, la tranche d'âge de 70 à 79 ans compte 28,5 % des personnes en état de maladie régulier et 30,3 % des personnes en état de maladie strict.
- Les personnes classées dans les états pathologiques régulier et strict étaient le plus souvent des femmes, soit 53,4 % et 55,7 %, respectivement.

- Parmi les personnes classées dans les états pathologiques régulier et strict, celles résidant dans la région desservie par le service de santé publique de Toronto représentaient les proportions les plus élevées, soit 55,0 % et 56,2 % respectivement, suivies par celles de la zone desservie par le service de santé publique de la région de York, soit 15,8 % et 17,1 %. De même, les taux de MNT chez les personnes classées dans l'état pathologique régulier étaient les plus élevés dans la circonscription sanitaire de Toronto (49,8 pour 100 000 habitants), suivie du Centre-Est (17,0 pour 100 000 habitants).
- Les espèces de MNT les plus fréquemment dépistées chez les personnes classées dans les états pathologiques régulier et strict étaient *Mycobacterium avium*, découvert chez 69,2 % des personnes en état pathologique régulier, et 73,1 % des personnes en état pathologique strict. Les deuxièmes espèces de MNT en ordre de fréquence étaient *Mycobacterium intracellulare*, découverte chez 6,4 % des personnes en état de maladie régulier, et *Mycobacterium abscessus*, découvert chez 7,1 % des personnes en état de maladie strict.

## Results

**Table 1. Number and percentage of specimens positive and tested for NTM species by specimen category, Ontario, January 1, 2020 to December 31, 2020**

Specimen category	Positive for at least one NTM species	Tested
Pulmonary	8,412 (20.3%)	41,471
Sterile non-pulmonary	88 (1.3%)	6,558
Other	202 (3.4%)	5,871
Total	8,702 (16.1%)	53,900

**Note:** One individual may have more than one specimen tested. Specimen sources included for each specimen category are detailed in Table A2.

**Data source:** Public Health Ontario Laboratory Information Management System

**Table 2. Number and percentage of individuals by NTM disease state, Ontario, January 1, 2020 to December 31, 2020**

NTM disease state	Number of individuals (%)
Standard	2,824 (12.1%)
Strict	1,602 (6.9%)
Uncertain	1,899 (8.2%)
Non-pulmonary	55 (0.2%)
Indeterminate	7 (<0.1%)
Negative	18,503 (79.5%)
Total	23,288 (100%)

**Note:** More than one microbiological disease state was assigned for an individual if two different NTM species were identified, the same NTM species was identified from pulmonary and sterile non-pulmonary specimen sources. In addition, individuals with a strict disease state are a subset of individuals with the standard disease state, and therefore not included in the total.

**Data source:** Public Health Ontario Laboratory Information Management System

**Table 3. Number and percentage of individuals tested by NTM disease states and age group, Ontario, January 1, 2020 to December 31, 2020**

Age group	Standard	Strict	Uncertain	Non-pulmonary	Indeterminate	Negative	Total
0 to 19	31 (1.1%)	23 (1.4%)	35 (1.8%)	3 (5.5%)	0 (0.0%)	595 (3.2%)	664 (2.9%)
20 to 39	238 (8.4%)	114 (7.1%)	271 (14.3%)	10 (18.2%)	1 (14.3%)	2,522 (13.6%)	3,042 (13.1%)
40 to 59	459 (16.3%)	232 (14.5%)	389 (20.5%)	11 (20.0%)	1 (14.3%)	4,744 (25.6%)	5,604 (24.1%)
60 to 69	725 (25.7%)	420 (26.2%)	441 (23.2%)	16 (29.1%)	3 (42.9%)	4,234 (22.9%)	5,419 (23.3%)
70 to 79	805 (28.5%)	485 (30.3%)	438 (23.1%)	9 (16.4%)	1 (14.3%)	3,962 (21.4%)	5,215 (22.4%)
80+	565 (20.0%)	327 (20.4%)	321 (16.9%)	6 (10.9%)	1 (14.3%)	2,410 (13.0%)	3,303 (14.2%)
Unknown	1 (<0.1%)	1 (<0.1%)	4 (0.2%)	0 (0.0%)	0 (0.0%)	36 (0.2%)	41 (0.2%)
<b>Total</b>	<b>2,824 (100%)</b>	<b>1,602 (100%)</b>	<b>1,899 (100%)</b>	<b>55 (100%)</b>	<b>7 (100%)</b>	<b>18,503 (100%)</b>	<b>23,288 (100%)</b>

**Note:** Age was calculated as the difference between the date of the earliest specimen tested in 2020 and the individual's birth date.

**Data source:** Public Health Ontario Laboratory Information Management System

**Table 4. Number and percentage of individuals tested for NTM species by disease states and sex, Ontario, January 1, 2020 to December 31, 2020**

Sex	Standard	Strict	Uncertain	Non-pulmonary	Indeterminate	Negative	Total
Female	1,507 (53.4%)	892 (55.7%)	903 (47.6%)	24 (43.6%)	5 (71.4%)	8,555 (46.2%)	10,994 (47.2%)
Male	1,285 (45.5%)	696 (43.4%)	958 (50.4%)	31 (56.4%)	2 (28.6%)	9,667 (52.2%)	11,943 (51.3%)
Unknown	32 (1.1%)	14 (0.9%)	38 (2.0%)	0 (0.0%)	0 (0.0%)	281 (1.5%)	351 (1.5%)
Total	2,824 (100%)	1,602 (100%)	1,899 (100%)	55 (100%)	7 (100%)	18,503 (100%)	23,288 (100%)

Data source: Public Health Ontario Laboratory Information Management System

**Table 5. Number and percentage of individuals in the standard and strict disease states by public health unit and region, Ontario, January 1, 2020 to December 31, 2020**

Public health unit	Standard	Strict	All disease states
Northwestern Health Unit	1 (<0.1%)	1 (<0.1%)	172 (0.7%)
Thunder Bay District Health Unit	8 (0.3%)	6 (0.4%)	270 (1.2%)
TOTAL NORTH WEST	9 (0.3%)	7 (0.4%)	442 (1.9%)
Algoma Public Health	13 (0.5%)	6 (0.4%)	223 (1.0%)
North Bay Parry Sound District Health Unit	9 (0.3%)	7 (0.4%)	195 (0.8%)
Porcupine Health Unit	2 (<0.1%)	0 (0.0%)	131 (0.6%)
Public Health Sudbury & Districts	19 (0.7%)	10 (0.6%)	415 (1.8%)

Public health unit	Standard	Strict	All disease states
Timiskaming Health Unit	4 (0.1%)	1 (<0.1%)	62 (0.3%)
<b>TOTAL NORTH EAST</b>	<b>47 (1.7%)</b>	<b>24 (1.5%)</b>	<b>1,026 (4.4%)</b>
Ottawa Public Health	57 (2.0%)	16 (1.0%)	618 (2.7%)
Eastern Ontario Health Unit	5 (0.2%)	2 (0.1%)	119 (0.5%)
Hastings Prince Edward Public Health	20 (0.7%)	9 (0.6%)	238 (1.0%)
Kingston, Frontenac, and Lennox & Addington Public Health	16 (0.6%)	6 (0.4%)	507 (2.2%)
Leeds, Grenville & Lanark District Health Unit	12 (0.4%)	6 (0.4%)	128 (0.5%)
Renfrew County and District Health Unit	4 (0.1%)	3 (0.2%)	51 (0.2%)
<b>TOTAL EASTERN</b>	<b>114 (4.0%)</b>	<b>42 (2.6%)</b>	<b>1,661 (7.1%)</b>
Durham Region Health Department	58 (2.1%)	36 (2.2%)	964 (4.1%)
Haliburton, Kawartha, Pine Ridge District Health Unit	24 (0.8%)	13 (0.8%)	354 (1.5%)
Peel Public Health	169 (6.0%)	89 (5.6%)	2,689 (11.5%)
Peterborough Public Health	23 (0.8%)	13 (0.8%)	328 (1.4%)
Simcoe Muskoka District Health Unit	43 (1.5%)	21 (1.3%)	832 (3.6%)
York Region Public Health	445 (15.8%)	274 (17.1%)	2,213 (9.5%)
<b>TOTAL CENTRAL EAST</b>	<b>762 (27.0%)</b>	<b>446 (27.8%)</b>	<b>7,380 (31.7%)</b>

Public health unit	Standard	Strict	All disease states
Toronto Public Health	1,554 (55.0%)	900 (56.2%)	7,767 (33.4%)
TOTAL TORONTO	1,554 (55.0%)	900 (56.2%)	7,767 (33.4%)
Chatham-Kent Public Health	11 (0.4%)	4 (0.2%)	84 (0.4%)
Grey Bruce Health Unit	6 (0.2%)	5 (0.3%)	179 (0.8%)
Huron Public Health	3 (0.1%)	0 (0.0%)	54 (0.2%)
Lambton Public Health	4 (0.1%)	0 (0.0%)	117 (0.5%)
Middlesex-London Health Unit	21 (0.7%)	9 (0.6%)	513 (2.2%)
Perth Public Health	3 (0.1%)	1 (<0.1%)	52 (0.2%)
Southwestern Public Health	10 (0.4%)	5 (0.3%)	193 (0.8%)
Windsor-Essex County Health Unit	32 (1.1%)	13 (0.8%)	487 (2.1%)
TOTAL SOUTH WEST	90 (3.2%)	37 (2.3%)	1,679 (7.2%)
Brant County Health Unit	12 (0.4%)	8 (0.5%)	151 (0.6%)
City of Hamilton Public Health Services	100 (3.5%)	58 (3.6%)	830 (3.6%)
Haldimand-Norfolk Health Unit	7 (0.2%)	6 (0.4%)	124 (0.5%)
Halton Region Public Health	55 (1.9%)	37 (2.3%)	825 (3.5%)
Niagara Region Public Health	17 (0.6%)	8 (0.5%)	494 (2.1%)



Public health unit	Standard	Strict	All disease states
Region of Waterloo Public Health and Emergency Services	38 (1.3%)	20 (1.2%)	558 (2.4%)
Wellington-Dufferin Guelph Public Health	19 (0.7%)	9 (0.6%)	334 (1.4%)
TOTAL CENTRAL WEST	248 (8.8%)	146 (9.1%)	3,316 (14.2%)
Unknown	0 (0.0%)	0 (0.0%)	17 (<0.1%)
TOTAL ONTARIO	2,824 (100%)	1,602 (100%)	23,288 (100%)

**Note:** Public health unit was assigned based on individual's postal code of residence if available, and submitter's postal code otherwise.

**Data source:** Public Health Ontario Laboratory Information Management System

**Table 6. Number and percentage of individuals assigned to the standard and strict disease states by NTM species/subspecies, Ontario, January 1, 2020 to December 31, 2020**

NTM species/subspecies	Standard	Strict
<i>M. abscessus</i>	164 (5.8%)	114 (7.1%)
subspecies <i>abscessus</i>	95 (3.4%)	66 (4.1%)
subspecies <i>bolletii</i>	1 (<0.1%)	1 (<0.1%)
subspecies <i>massiliense</i>	52 (1.8%)	38 (2.4%)
subspecies unassigned	16 (0.6%)	9 (0.6%)
<i>M. avium</i>	1,954 (69.2%)	1,171 (73.1%)
<i>M. chimaera</i>	39 (1.4%)	18 (1.1%)
<i>M. fortuitum</i>	98 (3.5%)	53 (3.3%)
<i>M. gordonae</i>	117 (4.1%)	26 (1.6%)
<i>M. intracellulare</i>	182 (6.4%)	101 (6.3%)
<i>M. xenopi</i>	123 (4.4%)	63 (3.9%)
Other NTM species	147 (5.2%)	56 (3.5%)
Total	2,824 (100%)	1,602 (100%)

**Note:** Includes NTM species/subspecies based on the frequency and clinical importance. *M. abscessus* subspecies are not included in the total.

**Data source:** Public Health Ontario Laboratory Information Management System

**Table 7. Number and percentage of individuals in the standard disease state by NTM species and age group, Ontario, January 1, 2020 to December 31, 2020**

Age group	<i>M. abscessus</i>	<i>M. avium</i>	<i>M. chimaera</i>	<i>M. fortuitum</i>	<i>M. gordonae</i>	<i>M. intracellulare</i>	<i>M. xenopi</i>	Other NTM species	Total
0 to 19	12 (7.3%)	15 (0.8%)	1 (2.6%)	0 (0.0%)	1 (0.9%)	1 (0.5%)	0 (0.0%)	1 (0.7%)	31 (1.1%)
20 to 39	31 (18.9%)	153 (7.8%)	2 (5.1%)	3 (3.1%)	12 (10.3%)	7 (3.8%)	6 (4.9%)	24 (16.3%)	238 (8.4%)
40 to 59	18 (11.0%)	321 (16.4%)	10 (25.6%)	23 (23.5%)	24 (20.5%)	20 (11.0%)	18 (14.6%)	25 (17.0%)	459 (16.3%)
60 to 69	32 (19.5%)	508 (26.0%)	11 (28.2%)	26 (26.5%)	26 (22.2%)	37 (20.3%)	42 (34.1%)	43 (29.3%)	725 (25.7%)
70 to 79	51 (31.1%)	555 (28.4%)	8 (20.5%)	27 (27.6%)	28 (23.9%)	66 (36.3%)	39 (31.7%)	31 (21.1%)	805 (28.5%)
80+	20 (12.2%)	401 (20.5%)	7 (17.9%)	19 (19.4%)	26 (22.2%)	51 (28.0%)	18 (14.6%)	23 (15.6%)	565 (20.0%)
Unknown	0 (0.0%)	1 (<0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (<0.1%)
Total	164 (100%)	1,954 (100%)	39 (100%)	98 (100%)	117 (100%)	182 (100%)	123 (100%)	147 (100%)	2,824 (100%)

**Note:** Includes NTM species based on the frequency and clinical importance.

**Data source:** Public Health Ontario Laboratory Information Management System

**Table 8. Number and percentage of individuals in the standard disease state by NTM species and sex, Ontario, January 1, 2020 to December 31, 2020**

Sex	<i>M. abscessus</i>	<i>M. avium</i>	<i>M. chimaera</i>	<i>M. fortuitum</i>	<i>M. gordonae</i>	<i>M. intracellulare</i>	<i>M. xenopi</i>	Other NTM species	Total
Female	102 (62.2%)	1,051 (53.8%)	17 (43.6%)	47 (48.0%)	46 (39.3%)	114 (62.6%)	63 (51.2%)	67 (45.6%)	1,507 (53.4%)
Male	62 (37.8%)	881 (45.1%)	22 (56.4%)	50 (51.0%)	70 (59.8%)	65 (35.7%)	57 (46.3%)	78 (53.1%)	1,285 (45.5%)
Unknown	0 (0.0%)	22 (1.1%)	0 (0.0%)	1 (1.0%)	1 (0.9%)	3 (1.6%)	3 (2.4%)	2 (1.4%)	32 (1.1%)
Total	164 (100%)	1,954 (100%)	39 (100%)	98 (100%)	117 (100%)	182 (100%)	123 (100%)	147 (100%)	2,824 (100%)

**Note:** Includes NTM species based on the frequency and clinical importance.

**Data source:** Public Health Ontario Laboratory Information Management System

**Table 9. Number and percentage of individuals in the standard disease state by NTM species, public health unit and region, Ontario, January 1, 2020 to December 31, 2020**

Public health unit	<i>M. abscessus</i>	<i>M. avium</i>	<i>M. chimaera</i>	<i>M. fortuitum</i>	<i>M. gordonae</i>	<i>M. intracellulare</i>	<i>M. xenopi</i>	Other NTM species	All NTM species
Northwestern Health Unit	0 (0.0%)	1 (<0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (<0.1%)
Thunder Bay District Health Unit	1 (0.6%)	5 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.5%)	0 (0.0%)	1 (0.7%)	8 (0.3%)
TOTAL NORTH WEST	1 (0.6%)	6 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.5%)	0 (0.0%)	1 (0.7%)	9 (0.3%)
Algoma Public Health	0 (0.0%)	10 (0.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (1.1%)	1 (0.8%)	0 (0.0%)	13 (0.5%)
North Bay Parry Sound District Health Unit	0 (0.0%)	7 (0.4%)	1 (2.6%)	0 (0.0%)	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	9 (0.3%)
Porcupine Health Unit	0 (0.0%)	1 (<0.1%)	1 (2.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (<0.1%)
Public Health Sudbury & Districts	3 (1.8%)	9 (0.5%)	0 (0.0%)	0 (0.0%)	3 (2.6%)	4 (2.2%)	0 (0.0%)	0 (0.0%)	19 (0.7%)
Timiskaming Health Unit	0 (0.0%)	1 (<0.1%)	0 (0.0%)	0 (0.0%)	1 (0.9%)	2 (1.1%)	0 (0.0%)	0 (0.0%)	4 (0.1%)
TOTAL NORTH EAST	3 (1.8%)	28 (1.4%)	2 (5.1%)	0 (0.0%)	4 (3.4%)	9 (4.9%)	1 (0.8%)	0 (0.0%)	47 (1.7%)

Public health unit	<i>M. abscessus</i>	<i>M. avium</i>	<i>M. chimaera</i>	<i>M. fortuitum</i>	<i>M. goodnae</i>	<i>M. intracellulare</i>	<i>M. xenopi</i>	Other NTM species	All NTM species
Ottawa Public Health	5 (3.0%)	16 (0.8%)	2 (5.1%)	2 (2.0%)	10 (8.5%)	8 (4.4%)	0 (0.0%)	14 (9.5%)	57 (2.0%)
Eastern Ontario Health Unit	1 (0.6%)	1 (<0.1%)	0 (0.0%)	1 (1.0%)	1 (0.9%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	5 (0.2%)
Hastings Prince Edward Public Health	3 (1.8%)	14 (0.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (1.6%)	1 (0.7%)	20 (0.7%)
Kingston, Frontenac, and Lennox & Addington Public Health	1 (0.6%)	10 (0.5%)	2 (5.1%)	1 (1.0%)	0 (0.0%)	2 (1.1%)	0 (0.0%)	0 (0.0%)	16 (0.6%)
Leeds, Grenville & Lanark District Health Unit	0 (0.0%)	9 (0.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (1.1%)	0 (0.0%)	1 (0.7%)	12 (0.4%)
Renfrew County and District Health Unit	0 (0.0%)	1 (<0.1%)	0 (0.0%)	0 (0.0%)	1 (0.9%)	0 (0.0%)	1 (0.8%)	1 (0.7%)	4 (0.1%)
<b>TOTAL EASTERN</b>	<b>10 (6.1%)</b>	<b>51 (2.6%)</b>	<b>4 (10.3%)</b>	<b>4 (4.1%)</b>	<b>12 (10.3%)</b>	<b>12 (6.6%)</b>	<b>3 (2.4%)</b>	<b>18 (12.2%)</b>	<b>114 (4.0%)</b>
Durham Region Health Department	9 (5.5%)	34 (1.7%)	2 (5.1%)	1 (1.0%)	1 (0.9%)	5 (2.7%)	5 (4.1%)	1 (0.7%)	58 (2.1%)

Public health unit	<i>M. abscessus</i>	<i>M. avium</i>	<i>M. chimaera</i>	<i>M. fortuitum</i>	<i>M. goodnae</i>	<i>M. intracellulare</i>	<i>M. xenopi</i>	Other NTM species	All NTM species
Haliburton, Kawartha, Pine Ridge District Health Unit	6 (3.7%)	11 (0.6%)	0 (0.0%)	0 (0.0%)	1 (0.9%)	1 (0.5%)	3 (2.4%)	2 (1.4%)	24 (0.8%)
Peel Public Health	15 (9.1%)	95 (4.9%)	2 (5.1%)	5 (5.1%)	8 (6.8%)	19 (10.4%)	12 (9.8%)	13 (8.8%)	169 (6.0%)
Peterborough Public Health	3 (1.8%)	5 (0.3%)	0 (0.0%)	0 (0.0%)	1 (0.9%)	5 (2.7%)	5 (4.1%)	4 (2.7%)	23 (0.8%)
Simcoe Muskoka District Health Unit	5 (3.0%)	26 (1.3%)	1 (2.6%)	0 (0.0%)	1 (0.9%)	4 (2.2%)	3 (2.4%)	3 (2.0%)	43 (1.5%)
York Region Public Health	28 (17.1%)	315 (16.1%)	1 (2.6%)	21 (21.4%)	28 (23.9%)	13 (7.1%)	19 (15.4%)	20 (13.6%)	445 (15.8%)
TOTAL CENTRAL EAST	66 (40.2%)	486 (24.9%)	6 (15.4%)	27 (27.6%)	40 (34.2%)	47 (25.8%)	47 (38.2%)	43 (29.3%)	762 (27.0%)
Toronto Public Health	60 (36.6%)	1,195 (61.2%)	22 (56.4%)	58 (59.2%)	42 (35.9%)	62 (34.1%)	55 (44.7%)	60 (40.8%)	1,554 (55.0%)
TOTAL TORONTO	60 (36.6%)	1,195 (61.2%)	22 (56.4%)	58 (59.2%)	42 (35.9%)	62 (34.1%)	55 (44.7%)	60 (40.8%)	1,554 (55.0%)
Chatham-Kent Public Health	1 (0.6%)	2 (0.1%)	0 (0.0%)	2 (2.0%)	2 (1.7%)	4 (2.2%)	0 (0.0%)	0 (0.0%)	11 (0.4%)

Public health unit	<i>M. abscessus</i>	<i>M. avium</i>	<i>M. chimaera</i>	<i>M. fortuitum</i>	<i>M. goodnae</i>	<i>M. intracellulare</i>	<i>M. xenopi</i>	Other NTM species	All NTM species
Grey Bruce Health Unit	0 (0.0%)	6 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	6 (0.2%)
Huron Public Health	0 (0.0%)	2 (0.1%)	0 (0.0%)	0 (0.0%)	1 (0.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (0.1%)
Lambton Public Health	0 (0.0%)	1 (<0.1%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	2 (1.1%)	0 (0.0%)	0 (0.0%)	4 (0.1%)
Middlesex-London Health Unit	1 (0.6%)	11 (0.6%)	1 (2.6%)	0 (0.0%)	0 (0.0%)	5 (2.7%)	1 (0.8%)	2 (1.4%)	21 (0.7%)
Perth Public Health	0 (0.0%)	2 (0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	3 (0.1%)
Southwestern Public Health	1 (0.6%)	3 (0.2%)	0 (0.0%)	1 (1.0%)	2 (1.7%)	1 (0.5%)	0 (0.0%)	2 (1.4%)	10 (0.4%)
Windsor-Essex County Health Unit	1 (0.6%)	10 (0.5%)	2 (5.1%)	2 (2.0%)	1 (0.9%)	7 (3.8%)	1 (0.8%)	8 (5.4%)	32 (1.1%)
TOTAL SOUTH WEST	4 (2.4%)	37 (1.9%)	3 (7.7%)	6 (6.1%)	6 (5.1%)	19 (10.4%)	2 (1.6%)	13 (8.8%)	90 (3.2%)
Brant County Health Unit	0 (0.0%)	10 (0.5%)	1 (2.6%)	0 (0.0%)	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	12 (0.4%)
City of Hamilton Public Health Services	5 (3.0%)	64 (3.3%)	1 (2.6%)	1 (1.0%)	8 (6.8%)	9 (4.9%)	8 (6.5%)	4 (2.7%)	100 (3.5%)



Public health unit	<i>M. abscessus</i>	<i>M. avium</i>	<i>M. chimaera</i>	<i>M. fortuitum</i>	<i>M. goodnae</i>	<i>M. intracellulare</i>	<i>M. xenopi</i>	Other NTM species	All NTM species
Haldimand-Norfolk Health Unit	1 (0.6%)	3 (0.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (1.1%)	0 (0.0%)	1 (0.7%)	7 (0.2%)
Halton Region Public Health	4 (2.4%)	36 (1.8%)	0 (0.0%)	1 (1.0%)	1 (0.9%)	7 (3.8%)	4 (3.3%)	2 (1.4%)	55 (1.9%)
Niagara Region Public Health	5 (3.0%)	7 (0.4%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	3 (1.6%)	0 (0.0%)	1 (0.7%)	17 (0.6%)
Region of Waterloo Public Health and Emergency Services	2 (1.2%)	24 (1.2%)	0 (0.0%)	0 (0.0%)	3 (2.6%)	5 (2.7%)	3 (2.4%)	1 (0.7%)	38 (1.3%)
Wellington-Dufferin Guelph Public Health	3 (1.8%)	7 (0.4%)	0 (0.0%)	0 (0.0%)	1 (0.9%)	5 (2.7%)	0 (0.0%)	3 (2.0%)	19 (0.7%)
TOTAL CENTRAL WEST	20 (12.2%)	151 (7.7%)	2 (5.1%)	3 (3.1%)	13 (11.1%)	32 (17.6%)	15 (12.2%)	12 (8.2%)	248 (8.8%)
Unknown	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
TOTAL ONTARIO	164 (100%)	1,954 (100%)	39 (100%)	98 (100%)	117 (100%)	182 (100%)	123 (100%)	147 (100%)	2,824 (100%)

**Note:** Includes NTM species based on the frequency and clinical importance.

**Data source:** Public Health Ontario Laboratory Information Management System

**Table 10. Number and percentage of individuals in the strict disease state by NTM species and age group, Ontario, January 1, 2020 to December 31, 2020**

Age group	<i>M. abscessus</i>	<i>M. avium</i>	<i>M. chimaera</i>	<i>M. fortuitum</i>	<i>M. gordonae</i>	<i>M. intracellulare</i>	<i>M. xenopi</i>	Other NTM species	Total
0 to 19	8 (7.0%)	13 (1.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	1 (1.8%)	23 (1.4%)
20 to 39	24 (21.1%)	74 (6.3%)	1 (5.6%)	1 (1.9%)	3 (11.5%)	3 (3.0%)	2 (3.2%)	6 (10.7%)	114 (7.1%)
40 to 59	13 (11.4%)	172 (14.7%)	5 (27.8%)	10 (18.9%)	1 (3.8%)	11 (10.9%)	9 (14.3%)	11 (19.6%)	232 (14.5%)
60 to 69	23 (20.2%)	303 (25.9%)	3 (16.7%)	16 (30.2%)	7 (26.9%)	23 (22.8%)	23 (36.5%)	22 (39.3%)	420 (26.2%)
70 to 79	35 (30.7%)	351 (30.0%)	6 (33.3%)	18 (34.0%)	6 (23.1%)	40 (39.6%)	18 (28.6%)	11 (19.6%)	485 (30.3%)
80+	11 (9.6%)	257 (21.9%)	3 (16.7%)	8 (15.1%)	9 (34.6%)	23 (22.8%)	11 (17.5%)	5 (8.9%)	327 (20.4%)
Unknown	0 (0.0%)	1 (<0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (<0.1%)
Total	114 (100%)	1,171 (100%)	18 (100%)	53 (100%)	26 (100%)	101 (100%)	63 (100%)	56 (100%)	1,602 (100%)

**Note:** Includes NTM species based on the frequency and clinical importance.

**Data source:** Public Health Ontario Laboratory Information Management System

**Table 11. Number and percentage of individuals in the strict disease state by NTM species and sex, Ontario, January 1, 2020 to December 31, 2020**

Sex	<i>M. abscessus</i>	<i>M. avium</i>	<i>M. chimaera</i>	<i>M. fortuitum</i>	<i>M. gordonae</i>	<i>M. intracellulare</i>	<i>M. xenopi</i>	Other NTM species	Total
Female	68 (59.6%)	653 (55.8%)	10 (55.6%)	26 (49.1%)	10 (38.5%)	71 (70.3%)	29 (46.0%)	25 (44.6%)	892 (55.7%)
Male	46 (40.4%)	506 (43.2%)	8 (44.4%)	27 (50.9%)	16 (61.5%)	28 (27.7%)	34 (54.0%)	31 (55.4%)	696 (43.4%)
Unknown	0 (0.0%)	12 (1.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (2.0%)	0 (0.0%)	0 (0.0%)	14 (0.9%)
Total	114 (100%)	1,171 (100%)	18 (100%)	53 (100%)	26 (100%)	101 (100%)	63 (100%)	56 (100%)	1,602 (100%)

**Note:** Includes NTM species based on the frequency and clinical importance.

**Data source:** Public Health Ontario Laboratory Information Management System

**Table 12. Number and rate (per 100,000 population) of individuals in the standard disease state by sex and health region, Ontario, January 1, 2020 to December 31, 2020**

Region	Female	Male	Total
Central East	421 (18.5)	327 (14.8)	762 (17.0)
Central West	135 (9.4)	111 (7.9)	248 (8.7)
Eastern	62 (6.3)	52 (5.5)	114 (5.9)
North East	20 (7.1)	27 (9.8)	47 (8.4)
North West	5 (4.2)	4 (3.4)	9 (3.8)
South West	37 (4.3)	52 (6.2)	90 (5.3)
Toronto	827 (51.9)	712 (46.6)	1,554 (49.8)
Total	1,507 (20.0)	1,285 (17.6)	2,824 (19.0)

**Note:** Rate is calculated based on the number of individuals in the standard disease state divided by population for each region and sex combination, multiplied by 100,000. Individuals with unknown sex (n=32) were included in totals only.

**Data source:** Public Health Ontario Laboratory Information Management System; Ontario population, Statistics Canada 20217

**Table 13. Number and rate (per 100,000 population) of individuals in the standard disease state by the three most common NTM species and health region, Ontario, January 1, 2020 to December 31, 2020**

Region	<i>M. abscessus</i>	<i>M. avium</i>	<i>M. intracellulare</i>	Other NTMs	All NTMs
Central East	66 (1.5)	486 (10.8)	47 (1.0)	163 (3.6)	762 (17.0)
Central West	20 (0.7)	151 (5.3)	32 (1.1)	45 (1.6)	248 (8.7)
Eastern	10 (0.5)	51 (2.6)	12 (0.6)	41 (2.1)	114 (5.9)
North East	3 (0.5)	28 (5.0)	9 (1.6)	7 (1.3)	47 (8.4)
North West	1 (0.4)	6 (2.5)	1 (0.4)	1 (0.4)	9 (3.8)
South West	4 (0.2)	37 (2.2)	19 (1.1)	30 (1.8)	90 (5.3)
Toronto	60 (1.9)	1,195 (38.3)	62 (2.0)	237 (7.6)	1,554 (49.8)
Total	164 (1.1)	1,954 (13.1)	182 (1.2)	524 (3.5)	2,824 (19.0)

**Note:** Rate is calculated based on the number of individuals in the standard disease state divided by population for each region and NTM species combination, multiplied by 100,000. The three NTM species included in this table were selected based on importance and frequency.

**Data source:** Public Health Ontario Laboratory Information Management System; Ontario population, Statistics Canada 20217

# Technical notes

## Data Sources

- Data were extracted from Public Health Ontario Laboratory Information Management System March 1, 2021 for testing completed from January 1, 2018 to December 31, 2020.
- Ontario population statistics were used to calculate rates and were obtained from Statistics Canada.<sup>7</sup>

## Methods

- Mycobacterium test results were extracted from the Public Health Ontario Laboratory Information Management System for all individuals tested from 2018 to 2020.
- Results were assigned for specimens based on culture and subsequent identification methods. A positive result was assigned for a specimen if at least one NTM species was identified; an indeterminate result was assigned for a specimen with positive NTM result but the species was unable to be confirmed; and a negative result was assigned for a specimen if no NTM was identified. If a specimen was positive for *M. tuberculosis* complex, *M. ulcerans* or *M. leprae*, but not for any NTM species, a negative result was assigned.
- Specimens were classified into pulmonary, sterile non-pulmonary and other categories based on the specimen source. A pulmonary category was assigned if the specimen was collected from the respiratory tract. A sterile non-pulmonary category was assigned for specimens isolated from a normally sterile non-respiratory tract site.<sup>8</sup> The remaining specimen sources were assigned to the 'other' category. Specimens classified as 'other' were not used for further disease state assignment, as they did not meet the specimen source criteria defined in case definition (Table A1). The list of specimen sources and categories is detailed in Table A2.
- Unique individuals were determined using health card number or first name, last name and date of birth. In instances where there were multiple demographic records for an individual, the information associated with the first specimen in 2020 was used to assign date, age, sex, public health unit and region. If age, sex or public health unit were missing, then the individual was categorized as "unknown" for that demographic.
- Only individuals tested in 2020 were included in this analysis. However, individuals that were positive in 2020, had previous test results assessed for the past 24 months.
- Individuals were assigned to one or more of the NTM disease states (Table A1) based on the frequency of identification of the same NTM species/subspecies and the specimen source criteria identified in the case definition.

## Data caveats

- Public Health Ontario Laboratory does not have clinical or radiological information to ascertain an individual's disease state. As such, individuals with uncertain or indeterminate disease states are likely colonized with NTM rather than infected.<sup>3</sup>
- This report includes only individuals tested at Public Health Ontario Laboratory. Public Health Ontario Laboratory covers the majority of NTM testing in Ontario, however a small number of other laboratories perform NTM testing. When these samples are positive, they are submitted to Public Health Ontario for additional testing. As Public Health Ontario does not receive negative samples from these other laboratories, positivity in this report may be higher than true positivity.
- Individuals were assigned up to eight disease states, with 95.2% (20,418/21,452) of individuals having only one disease state. Individuals were counted multiple times in the following scenarios:
  - Different NTM species were identified in the same individual.
  - The same species was identified from pulmonary and sterile non-pulmonary specimens in the same individual.
  - Individuals assigned to strict disease state also met the criteria for standard disease state.
- The recommended specimen collection practice for Mycobacterium testing at Public Health Ontario includes three sputum specimens, collected early in the morning of the same day.<sup>2</sup> Instances where fewer than three sputum specimens were submitted may have affected disease state assignment.

## Appendices

**Table A1. Disease state definitions**

Disease State	Definition
Standard (pulmonary)	Two or more instances of isolation of the same NTM species from a sputum specimen or One or more instances of isolation of any NTM species from bronchial washing or lavage specimen (with or without sputum isolation) or Isolation of any NTM from a lung biopsy specimen
Strict (pulmonary)	Three or more instances of isolation of the same NTM species from sputum or Two or more instances of isolation of the same NTM species from bronchial washing or lavage specimen (with or without sputum isolation) or One instance of bronchial washing or lavage isolation plus at least one instance of sputum isolation of the same NTM species, or isolation of any NTM from a lung biopsy specimen
Uncertain (pulmonary)	One instance of single isolation of NTM species from sputum specimen
Non-pulmonary disease	One isolation of any NTM from a normally sterile non-pulmonary source
Indeterminate	Specimen positive for NTM by presence of NTM species was unable to be confirmed
Negative state	No <i>Mycobacterium</i> identified

**Table A2. The list of pulmonary, sterile non-pulmonary and other categories by specimen source**

Specimen Source	Specimen Category
Bronchial (aspirate, brush, wash)	Pulmonary
Bronchial Alveolar Lavage	Pulmonary
Lung (aspirate, tissue, wash)	Pulmonary
Sputum	Pulmonary
Tracheal	Pulmonary
Ascitic Fluid	Sterile non-pulmonary
Bile	Sterile non-pulmonary
Biopsy	Sterile non-pulmonary
Blood	Sterile non-pulmonary
Bone	Sterile non-pulmonary

Specimen Source	Specimen Category
Brain	Sterile non-pulmonary
Cardiac tissue	Sterile non-pulmonary
Cerebral Spinal Fluid	Sterile non-pulmonary
Elbow	Sterile non-pulmonary
Fluid, Joint	Sterile non-pulmonary
Heart Valve	Sterile non-pulmonary
Kidney	Sterile non-pulmonary
Liver	Sterile non-pulmonary
Lymph Node	Sterile non-pulmonary
Pancreas	Sterile non-pulmonary
Pancreatic fluid	Sterile non-pulmonary
Paracentesis	Sterile non-pulmonary
Pericardial	Sterile non-pulmonary
Peritoneal	Sterile non-pulmonary
Pleural Fluid	Sterile non-pulmonary
Spleen	Sterile non-pulmonary
Thorax	Sterile non-pulmonary
Vitreous Fluid	Sterile non-pulmonary
Anal	Other
Appendix	Other
Aspirate, Nasogastric	Other
Auger Suction	Other
Axilla	Other
Biopsy, Gastric	Other
Bowel	Other
Cervical	Other
Cornea	Other
Cyst	Other
Drainage	Other
Duodenal fluid	Other
Ear	Other



Specimen Source	Specimen Category
Endometrium	Other
Epiglottis	Other
Esophagus	Other
Foot	Other
Hand	Other
Lesion	Other
Mass	Other
Nasal Pharyngeal	Other
Neck	Other
Placenta	Other
Prostatic Fluid	Other
Rectal	Other
Scalp	Other
Seminal fluid	Other
Skin scraping	Other
Stool (Preserved & Unpreserved)	Other
Swab	Other
Tissue	Other
Urethra	Other
Urine	Other
Wound	Other

**Table A3. The list of test methods included in this report.**

Test description	Contribution to the report
Culture of respiratory/non-respiratory specimens and blood culture	Primary test. Considered for both positive and negative NTM specimens
PCR and sequence analysis	Provided further species-level identification of positive NTM specimens
Liquid or solid culture on an isolate followed by one of the PCR tests	Provided further species-level identification of positive NTM specimens
<i>Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-ToF MS)</i>	Provided further species-level identification of positive NTM specimens
Line probe assay	Provided further species-level identification of positive NTM specimens

**Note:** Result of nucleic acid amplification tests directly from specimen were not considered for this report.

**Table A4. Number and percentage of individuals assigned to the three most frequent NTM disease states by NTM complex and species, Ontario, January 1, 2020 to December 31, 2020**

NTM species/NTM group	Standard	Strict	Uncertain	Total
<i>M. abscessus/chelonae</i> complex	190 (6.7%)	123 (7.7%)	106 (5.6%)	419 (6.6%)
<i>M. abscessus</i>	164 (5.8%)	114 (7.1%)	57 (3.0%)	335 (5.3%)
subspecies <i>abscessus</i>	95 (3.4%)	66 (4.1%)	26 (1.4%)	187 (3.0%)
subspecies <i>bolletii</i>	1 (0.0%)	1 (0.1%)	4 (0.2%)	6 (0.1%)
subspecies <i>massiliense</i>	52 (1.8%)	38 (2.4%)	21 (1.1%)	111 (1.8%)
subspecies unassigned	16 (0.6%)	9 (0.6%)	6 (0.3%)	31 (0.5%)
<i>M. chelonae</i>	23 (0.8%)	9 (0.6%)	46 (2.4%)	78 (1.2%)
<i>M. franklinii</i>	2 (0.1%)	0 (0.0%)	2 (0.1%)	4 (0.1%)
<i>M. immunogenum</i>	1 (0.0%)	0 (0.0%)	1 (0.1%)	2 (0.0%)
<i>M. smegmatis</i> complex	3 (0.1%)	0 (0.0%)	9 (0.5%)	12 (0.2%)
<i>M. goodii</i>	0 (0.0%)	0 (0.0%)	2 (0.1%)	2 (0.0%)

NTM species/NTM group	Standard	Strict	Uncertain	Total
<i>M. mageritense</i>	3 (0.1%)	0 (0.0%)	6 (0.3%)	9 (0.1%)
<i>M. smegmatis</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
<i>M. avium</i> complex	2,178 (77.1%)	1,291 (80.6%)	990 (52.1%)	4,459 (70.5%)
<i>M. arosiense</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
<i>M. avium</i>	1,954 (69.2%)	1,171 (73.1%)	835 (44.0%)	3,960 (62.6%)
<i>M. chimaera</i>	39 (1.4%)	18 (1.1%)	53 (2.8%)	110 (1.7%)
<i>M. colombiense</i>	0 (0.0%)	0 (0.0%)	6 (0.3%)	6 (0.1%)
<i>M. intracellulare</i>	182 (6.4%)	101 (6.3%)	89 (4.7%)	372 (5.9%)
<i>M. marseillense</i>	3 (0.1%)	1 (0.1%)	1 (0.1%)	5 (0.1%)
<i>M. vulneris</i>	0 (0.0%)	0 (0.0%)	5 (0.3%)	5 (0.1%)
<i>M. fortuitum</i> complex	101 (3.6%)	53 (3.3%)	160 (8.4%)	314 (5.0%)
<i>M. farcinogenes</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
<i>M. fortuitum</i>	98 (3.5%)	53 (3.3%)	144 (7.6%)	295 (4.7%)
<i>M. peregrinum</i>	0 (0.0%)	0 (0.0%)	7 (0.4%)	7 (0.1%)
<i>M. porcinum</i>	2 (0.1%)	0 (0.0%)	3 (0.2%)	5 (0.1%)
<i>M. senegalense</i>	1 (0.0%)	0 (0.0%)	5 (0.3%)	6 (0.1%)
<i>M. simiae</i> complex	27 (1.0%)	15 (0.9%)	53 (2.8%)	95 (1.5%)
<i>M. interjectum</i>	1 (0.0%)	1 (0.1%)	0 (0.0%)	2 (0.0%)
<i>M. kubicae</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
<i>M. lentiflavum</i>	21 (0.7%)	12 (0.7%)	47 (2.5%)	80 (1.3%)
<i>M. palustre</i>	0 (0.0%)	0 (0.0%)	2 (0.1%)	2 (0.0%)
<i>M. simiae</i>	5 (0.2%)	2 (0.1%)	3 (0.2%)	10 (0.2%)
<i>M. terrae</i> complex	2 (0.1%)	1 (0.1%)	7 (0.4%)	10 (0.2%)
<i>M. arupense</i>	0 (0.0%)	0 (0.0%)	3 (0.2%)	3 (0.0%)

NTM species/NTM group	Standard	Strict	Uncertain	Total
<i>M. kumamotonense</i>	1 (0.0%)	0 (0.0%)	3 (0.2%)	4 (0.1%)
<i>M. nonchromogenicum</i>	1 (0.0%)	1 (0.1%)	0 (0.0%)	2 (0.0%)
<i>M. terrae</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
Other NTM species	323 (11.4%)	119 (7.4%)	574 (30.2%)	1,016 (16.1%)
<i>M. asiaticum</i>	1 (0.0%)	1 (0.1%)	1 (0.1%)	3 (0.0%)
<i>M. canariasense</i>	1 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)
<i>M. cosmeticum</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
<i>M. eburneum/talmoniae</i>	1 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)
<i>M. elephantis</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
<i>M. gastri</i>	1 (0.0%)	0 (0.0%)	1 (0.1%)	2 (0.0%)
<i>M. gordonae</i>	117 (4.1%)	26 (1.6%)	282 (14.8%)	425 (6.7%)
<i>M. llatzerense</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
<i>M. iranicum</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
<i>M. kansasii</i>	22 (0.8%)	12 (0.7%)	17 (0.9%)	51 (0.8%)
<i>M. malmoense</i>	2 (0.1%)	2 (0.1%)	2 (0.1%)	6 (0.1%)
<i>M. mantenii</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
<i>M. mucogenicum</i>	15 (0.5%)	5 (0.3%)	30 (1.6%)	50 (0.8%)
<i>M. mucogenicum-phocaicum</i>	14 (0.5%)	3 (0.2%)	51 (2.7%)	68 (1.1%)
<i>M. neoaurum</i>	3 (0.1%)	2 (0.1%)	9 (0.5%)	14 (0.2%)
<i>M. obuense</i>	1 (0.0%)	1 (0.1%)	7 (0.4%)	9 (0.1%)
<i>M. paragordonae</i>	14 (0.5%)	1 (0.1%)	38 (2.0%)	53 (0.8%)
<i>M. phlei</i>	1 (0.0%)	0 (0.0%)	3 (0.2%)	4 (0.1%)
<i>M. scrofulaceum</i>	1 (0.0%)	1 (0.1%)	3 (0.2%)	5 (0.1%)
<i>M. shimoidei</i>	2 (0.1%)	0 (0.0%)	0 (0.0%)	2 (0.0%)

NTM species/NTM group	Standard	Strict	Uncertain	Total
<i>M. szulgai</i>	3 (0.1%)	2 (0.1%)	1 (0.1%)	6 (0.1%)
<i>M. triviale</i>	0 (0.0%)	0 (0.0%)	1 (0.1%)	1 (0.0%)
<i>M. vaccae</i>	1 (0.0%)	0 (0.0%)	1 (0.1%)	2 (0.0%)
<i>M. xenopi</i>	123 (4.4%)	63 (3.9%)	122 (6.4%)	308 (4.9%)
Total	2,824 (100%)	1,602 (100%)	1,899 (100%)	6,325 (100%)

**Data source:** Public Health Ontario Laboratory Information Management System

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