Emerging Infections Program
Healthcare-Associated Infections – Community Interface Activity Report: Pulmonary Nontuberculous Mycobacteria (PNTM), 2021

Last Updated: February 5, 2026

Erratum: The previous version of this report had an error in the calculation of the Charlson Comorbidity Score, which has been corrected.

Surveillance Catchment Areas:

Colorado (5 county Denver area); Minnesota (2 county Minneapolis – St. Paul area); New York (1 county Rochester area); Oregon (3 county Portland area).

Population:

The surveillance area represents 7,229,632 persons.

Source: U.S. Census Bureau, Population Division, Vintage 2021 Special Tabulation

Case Definition:

A PNTM case was defined as first identification during 2021 of an NTM species from a pulmonary (e.g., sputum, tracheal aspirate, bronchoalveolar lavage, or lung tissue specimen) site in a resident of the surveillance area. Mycobacterial species excluded from surveillance were: *Mycobacterium tuberculosis* complex (causes tuberculosis); *Mycobacterium leprae* and *Mycobacterium lepromatosis* (cause leprosy); *Mycobacterium ulcerans* (causes Buruli ulcer); and *Mycobacterium gordonae* and *Mycobacterium paragordonae* (most often non-pathogenic).

Cases were considered prevalent if:

- Medical records indicated PNTM disease was present in the 12 months prior to PNTM identification in 2021, or
- NTM was detected in at least one pulmonary specimen in 2020 within 12 months before the date of the initial PNTM specimen collection in 2021.

Cases were otherwise considered incident.

If medical records and specimen information from the 12 months before the date of the initial PNTM specimen collection were not available, the case was not classified as either incident or prevalent.

PNTM cases were given a microbiologic case classification based solely on the microbiologic component of U.S. and European clinical practice guideline criteria for PNTM disease diagnosis (1) and were considered:

- Confirmed if NTM was identified from

  - two separate sputum, tracheal, or endotracheal specimens within a 12-month period,
  - one bronchial wash or bronchoalveolar lavage or one lung tissue specimen, or
  - at least one pulmonary specimen and a lung biopsy specimen with histopathologic features consistent with mycobacterial infection (granulomatous inflammation or acid-fast bacilli).

- Possible if NTM were identified from a pulmonary site but none of the above criteria were met.

For cases with a single sputum, tracheal, or endotracheal specimen, if medical records and specimen information from the 12 months after the date of the initial PNTM specimen collection were not available, the case was not classified as confirmed or possible and the microbiologic case classification was considered unknown.

Methods:

Case finding was active, laboratory-based, and population-based. EIP site personnel routinely contacted microbiology laboratories serving residents of the surveillance area to identify cases.

A standardized case report form was completed for each case through review of medical records. Medical records were reviewed for information on demographic characteristics, clinical features, and potentially relevant exposures. Exposures were captured if they occurred in the year before the date of index specimen collection, and if they were determined not to have occurred as a result of efforts to diagnose or treat PNTM disease.

Rates of PNTM infection were calculated using special tabulation U.S. Census population estimates for 2021.

PNTM surveillance data undergo regular data cleaning to ensure accuracy and completeness. Cases from 2021 with complete report form data as of August 20, 2024, were included in this analysis. Because data can be updated as needed, analyses of datasets generated on a different date may yield different results.

Results:

Note: The numbers of cases and denominators used for incidence rate calculations and case descriptions vary from table to table.

Table 1 includes incident and prevalent cases that were classified as either confirmed or possible (N=673). Tables 2–5 and Figure 1 include only incident cases (both confirmed and possible) (N=456).

Tables 6–7 include only incident confirmed cases (N=273).

Table 1. PNTM (N=673)[a] Cases by Incident Status and Case Classification, Emerging Infections Program, 2021

Incident Status	Confirmed PNTM No.	Confirmed PNTM (Rate[b])	Possible PNTM No.	Possible PNTM (Rate[b])
Incident	273	3.8	183	2.5
Prevalent[c]	173	2.4	44	0.6
TOTAL[d]	446	6.2	227	3.1

[a] Two cases with unknown microbiologic case definition and three cases with unknown incident status were excluded.
[b] Cases per 100,000 population for EIP areas.
[c] Excluded from subsequent tables, which focus on incident cases.
[d] Total rate represents overall prevalence.

Note: Definitions for confirmed and possible cases can be found on pages 1 and 2 of this report.

Table 2. Incident PNTM (N=456) Case Counts by Race/Ethnicity, Sex, and Age Group, Emerging Infections Program, 2021

Race/Ethnicity	Confirmed (N=273) No.	Confirmed %	Possible (N=183) No.	Possible %
Hispanic or Latino, any race	14	5.1	11	6.0
Not known to be Hispanic or Latino[a] - White[b]	205	75.1	95	51.9
Not known to be Hispanic or Latino[a] - Black or African American[c]	20	7.3	37	20.2
Not known to be Hispanic or Latino[a] - Asian[d]	26	9.5	19	10.4
Not known to be Hispanic or Latino[a] - Other or multiple races[e]	1	0.4	2	1.1
Not known to be Hispanic or Latino[a] - Unknown race[f]	7	2.6	19	10.4

Sex	Confirmed (N=273) No.	Confirmed %	Possible (N=183) No.	Possible %
Male	112	41.0	99	54.1
Female	161	59.0	84	45.9

Age Group (years)	Confirmed (N=273) No.	Confirmed %	Possible (N=183) No.	Possible %
0–17	2	0.7	2	1.1
18–34	13	4.8	17	9.3
35–49	14	5.1	31	16.9
50–64	62	22.7	44	24.0
65+	182	66.7	89	48.6

[a] Records either indicated ethnicity was non-Hispanic or Latino, or ethnicity was not known.
[b] 7 confirmed and 3 possible cases with unknown ethnicity.
[c] 1 confirmed and 2 possible cases with unknown ethnicity.
[d] 2 confirmed cases with unknown ethnicity.
[e] American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, or ≥2 races reported; 0 cases with unknown ethnicity.
[f] 4 confirmed and 13 possible cases with unknown ethnicity.
Note: Definitions for confirmed and possible cases can be found on pages 1 and 2 of this report.

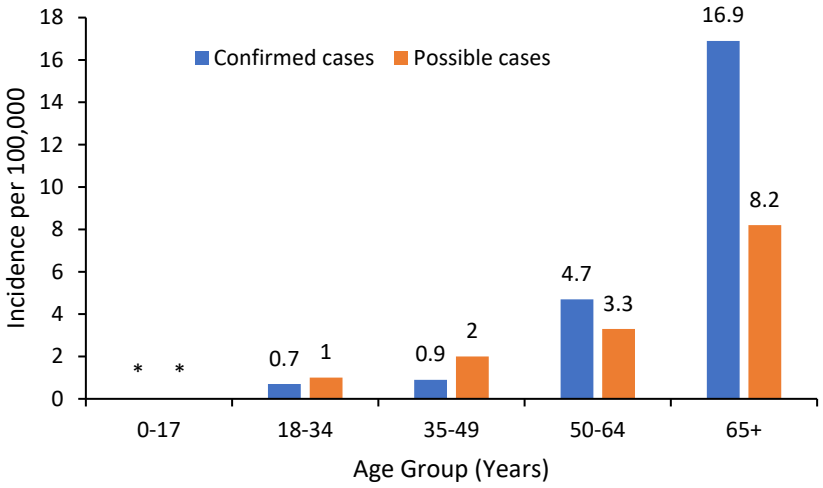
Table 3. Incident PNTM (N=456) Case Rates by Race/Ethnicity and Sex, Emerging Infections Program, 2021

Race/Ethnicity[a]	Rate[b] - Confirmed cases	Rate[b] - Possible cases
Hispanic or Latino, any race	1.2	1.0
Non-Hispanic or Latino[c] - White	4.3	2.0
Non-Hispanic or Latino[c] - Black or African American	3.4	6.3
Non-Hispanic or Latino[c] - Asian	5.3	3.8
Non-Hispanic or Latino[c] - Other or multiple races[d]	--	--

Sex	Rate[b] - Confirmed cases	Rate[b] - Possible cases
Male	3.1	2.7
Female	4.4	2.3

[a] Cases with unknown race (7 confirmed and 19 possible cases) are excluded from rate calculations.
[b] Cases per 100,000 population for EIP areas.
[c] For calculating rates, the numerator includes both cases with non-Hispanic or Latino ethnicity and ethnicity not known.
[d] Rates are not provided for privacy reasons.
Note: Definitions for confirmed and possible cases can be found on pages 1 and 2 of this report.

Figure 1. Rate[a,b] of Incident PNTM (N=456) Cases by Age Group, Emerging Infections Program, 2021



[a] Incidence (no. per 100,000 population per year) calculated using 2021 special tabulation U.S. Census Data.
[b] An asterisk represents a case count of <5; rates for these groups have been suppressed.

Note: Definitions for confirmed and possible cases can be found on pages 1 and 2 of this report.

Table 4. Incident PNTM (N=456) Cases by Species Identified from Index Specimen, Emerging Infections Program, 2021

Organism	Confirmed (N=273) No.	Confirmed %	Possible (N=183) No.	Possible %
***M. avium* complex (MAC)**	215	78.8	116	63.4
M. avium	47	17.2	35	19.1
M. intracellulare subsp. *chimaera*	5	1.8	0	0.0
M. intracellulare subsp. *intracellulare*	43	15.8	18	9.8
Other[a]	1	0.4	2	1.1
Not otherwise specified	119	43.6	61	33.3
Non-*M. avium* complex	62	22.7	67	36.6
M. abscessus[b]	22	8.1	10	5.5
M. chelonae complex	9	3.3	9	4.9
M. fortuitum complex	17	6.2	24	13.1
M. kansasii complex	6	2.2	0	0.0
Other[c]	9	3.3	24	13.1
Not otherwise specified	0	0.0	1	0.6
Not TB[d], not characterized further	1	0.4	1	0.6

[a] Other MAC species include *M. bouchedurhonense, M. colombiense*, and *M. marseillense*.
[b] Subspecies information for *M. abscessus* was not collected for this report.
[c] Other non-MAC species include *M. arupense, M. hassiacum, M. kumamotonense, M. lentiflavum, M. llatzerense, M. mageritense, M. mucogenicum, M. neoaurum, M. nonchromogenicum, M. obuense, M. paraense, M. paraffinicum, M. phocaicum, M. simiae, M. triplex, M. virginiense,* and *M. xenopi*
[d] TB=*Mycobacterium tuberculosis*.

Note: 5 index specimens from confirmed cases had >1 species reported: MAC, not otherwise specified and *M. abscessus* (2); MAC, not otherwise specified, *M. abscessus*, and *M. fortuitum* complex (1); MAC, not otherwise specified, and *M. chelonae* complex (1); *M. avium* and *M. kansasii* complex (1). Two index specimens from possible cases had >1 species reported: MAC, not otherwise specified, and *M. fortuitum* complex (1); *M. chelonae* complex and *M. fortuitum* complex (1).

Definitions for confirmed and possible cases can be found on pages 1 and 2 of this report.

Table 5. Location of Incident PNTM (N=456) Cases at Time of Incident Specimen Collection, Emerging Infections Program, 2021

Location of Incident Specimen Collection	Confirmed (N=273) No.	Confirmed %	Possible (N=183) No.	Possible %
Outpatient setting or emergency department	172	63.0	115	62.8
Acute care hospital	93	34.1	67	36.6
Long-term care facility	0	0.0	0	0.0
Long-term acute care hospital	0	0.0	0	0.0
Other	0	0.0	0	0.0
Unknown	8	2.9	1	0.6

Note: Definitions for confirmed and possible cases can be found on pages 1 and 2 of this report.

Table 6. Selected Clinical Characteristics of Incident Confirmed PNTM (N=273) Cases, Emerging Infections Program, 2021

Charlson Comorbidity Index[a]	No.	%
0	32	11.8
1	105	38.6
≥2	135	49.6

Underlying Conditions[a,b]	No.	%
Any transplant (stem cell, solid organ)	3	1.1
Chest wall deformity	3	1.1
Chronic lung disease[c]	209	76.8
Chronic lung disease: Bronchiectasis[d]	137	50.4
Chronic lung disease: Chronic obstructive pulmonary disease	73	26.8
Chronic lung disease: Cystic fibrosis	4	1.5
Chronic lung disease: Emphysema	50	18.4
Connective tissue disease	21	7.7
Connective tissue disease: Rheumatoid arthritis	12	4.4
Cough suppression disorder	0	0.0
Diabetes mellitus	29	10.7
Gastroesophageal reflux disease	101	37.1
History of tuberculosis	10	3.7
Immunosuppressive medication[e,f]	145	53.3
Malignancy, solid organ	47	17.3
Hematologic malignancy	11	4.0
HIV	11	4.0
Mitral valve prolapse	5	1.8
Obesity (body mass index ≥ 30)	30	11.0
Scoliosis	7	2.6
Smoker (current)	34	12.5
Underweight (body mass index<18.5)	43	15.8
None of the above	7	2.6

Chest imaging type in the 90 days before or after index specimen[g]	No.	%
Computed tomography	244	89.4
Radiograph	174	63.7
None of the above	7	2.6
Unknown	1	0.4
Chest imaging findings	No.	%[h]
Bronchiectasis	118	44.5
Cavity or cavitation	41	15.5
Nodules	197	74.3
Tree-in-bud	81	30.6
None of the above	30	11.3
Unknown	2	0.8

[a] One case excluded because of unknown underlying conditions.
[b] Underlying conditions are not mutually exclusive.
[c] Includes bronchiectasis, chronic obstructive pulmonary disease, cystic fibrosis, emphysema. Some patients had more than one diagnosis.
[d] Includes patients with a clinical diagnosis documented in a provider note as well as patients with bronchiectasis seen on chest imaging.
[e] Includes abatacept, B cell depletion agents, IL-6 blockers, JAK inhibitors, steroids (intravenous, intramuscular, inhaled or oral), and TNF-α inhibitors.
[f] Three cases had unknown immunosuppressive medication. For 101 cases, the only immunosuppressive medication was inhaled steroids.
[g] 153 cases had both computed tomography and radiograph.
[h] Percentage is calculated out of those with chest imaging (N=265).

Table 7. Selected Exposures and Risk Factors in the Year Before Index Specimen Collection, Incident Confirmed PNTM (N=273) Cases, Emerging Infections Program, 2021

Exposures[a]	No.	%
Bird contact	6	2.2
Bronchoscopy	16	5.9
Construction[b]	10	3.7
Cystic fibrosis clinic	2	0.7
Dental procedure	12	4.4
Gardening or landscaping	31	11.4
Hot tub	3	1.1
Humidifier	6	2.2
Injection/Infusion	70	25.6
Medical device	39	14.3
Nebulizer	71	26.0
Neti pot	4	1.5
Surgical procedure	35	12.8
Swimming pool	7	2.6
Other	13	4.8
None of the above	86	31.5
Unknown	6	2.2

[a] Exposures are not mutually exclusive.

[b] Persons who work in construction or persons who have lived or worked in a building undergoing renovations.

Summary

Surveillance data from 2021 represent the first full year of population-based surveillance for pulmonary nontuberculous mycobacteria infections (PNTM) through the Emerging Infections Program (a surveillance pilot was conducted for six months during 2019–2020)[2]. The crude annual prevalence and incidence rates of confirmed PNTM in 2021 were 6.2 and 3.8 per 100,000 persons, respectively. Incidence rates of confirmed PNTM increased with age and were higher among females than males. Among race/ethnicity groups evaluated, rates of incident confirmed cases ranged from 1.2 among Hispanic or Latino persons to 5.3 per 100,000 in Asian non-Hispanic or Latino persons. For incident confirmed cases, *M. avium* complex was the most frequently isolated species group, followed by *M. abscessus.* Most confirmed cases had underlying chronic lung disease.

The characteristics of possible PNTM cases were generally similar to confirmed cases; however, among non-Hispanic or Latino Black or African Americans, the rate of possible PNTM cases was more than twice that of confirmed PNTM cases. For possible cases, *M. fortuitum* complex was the most frequently isolated species group after *M. avium* complex.

References

1. Daley, C. L., et al., *Treatment of nontuberculous mycobacterial pulmonary disease: An official ATS/ERS/ESCMID/IDSA clinical practice guideline.* Clin Infect Dis, 2020. **71**(4): e10–e36.
2. Grigg, C, Jackson KA, Barter D, et al. Epidemiology of Pulmonary and Extrapulmonary Nontuberculous Mycobacteria Infections at 4 US Emerging Infections Program Sites: A 6-Month Pilot. Clin Infect Dis. 2023 Aug 22; 77(4):629–639. doi: 10.1093/cid/ciad214.

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For more information, visit our web sites:

- Nontuberculous Mycobacteria (NTM) Surveillance | HAIs | CDC (https://www.cdc.gov/healthcare-associated-infections/php/haic-eip/ntm.html?CDC_AAref_Val=https://www.cdc.gov/hai/eip/ntm.html
- About Nontuberculous Mycobacteria (NTM) Infections | NTM | CDC (https://www.cdc.gov/nontuberculous-mycobacteria/about/?CDC_AAref_Val=https://www.cdc.gov/hai/organisms/nontuberculous-mycobacteria.html)