# Emerging Infections Program
# Healthcare-Associated Infections – Community Interface Activity Report: Pulmonary Nontuberculous Mycobacteria (PNTM), 2023

Last Updated: May 26, 2026

## 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 7,257,825 persons.
Source: U.S. Census Bureau, Population Division, Vintage 2023 Special Tabulation

## Case Definition:

A PNTM case was defined as first identification during 2023 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 2023, or
- NTM was detected in at least one pulmonary specimen in 2022 within 12 months before the date of the initial PNTM specimen collection in 2023.

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 2023.

Bayesian Improved Surname Geocoding (BISG) was used to impute missing race/ethnicity[2]. BISG uses surname and geocoded home address to estimate a patient's probability of membership in each of five racial/ethnic groups: Hispanic or Latino (any race), non-Hispanic Asian and/or Native Hawaiian/Pacific Islander, non-Hispanic Black or African American, non-Hispanic White, and non-Hispanic other (including American Indian/Alaska Native and multiracial). Race/ethnicity was considered missing if a patient had unknown ethnicity (regardless of reported race) or if a patient had unknown race and was not Hispanic or Latino. Probabilities for patients with known race/ethnicity were set to 1 for reported race/ethnicity and 0 for all other racial/ethnic groups. Race/ethnicity-stratified case counts were then calculated by summing the probabilities for each racial/ethnic group. Case rates were calculated using race/ethnicity-stratified U.S. Census population estimates for 2023. The U.S. census categorizes individuals reported as both non-Hispanic Asian and Native Hawaiian/Pacific Islander as "non-Hispanic multiracial"[3], whereas the BISG method does not distinguish between these two racial/ethnic groups and categorizes these individuals as "non-Hispanic Asian and/or Native Hawaiian/Pacific Islander". Therefore, a small proportion of patients with missing race/ethnicity who were multiracial may have been imputed as non-Hispanic Asian and/or Native Hawaiian/Pacific Islander using the BISG method.

PNTM surveillance data undergo regular data cleaning to ensure accuracy and completeness. Cases from 2023 with complete report form data as of May 26, 2026, 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=856). Tables 2–5 and Figure 1 include only incident cases (both confirmed and possible) (N=693). Table 6 includes only incident confirmed cases (N=414).

## Table 1. PNTM (N=856)[a] Cases by Incident Status and Case Classification, Emerging Infections Program, 2023

| Incident Status | Confirmed PNTM No. | Confirmed PNTM (Rate[b]) | Possible PNTM No. | Possible PNTM (Rate[b]) |
|---|---|---|---|---|
| Incident | 414 | 5.7 | 279 | 3.8 |
| Prevalent[c] | 152 | 2.1 | 10 | 0.1 |
| Unknown[c] | 1 | <0.1 | 0 | 0.0 |
| TOTAL[d] | 567 | 7.8 | 289 | 4.0 |

[a] 4 cases with unknown microbiologic case definition 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=693) Case Counts by Race/Ethnicity (Reported and BISG-imputed), Emerging Infections Program, 2023

| Race/Ethnicity[a] | Confirmed (N=414) No. (%) | Rate[b] | Possible (N=279) No. (%) | Rate[b] |
|---|---|---|---|---|
| **Hispanic or Latino, any race** | 36 (8.7) | 3.0 | 25 (9.0) | 2.1 |
| **Not Hispanic or Latino - White** | 317 (76.6) | 6.8 | 161 (57.7) | 3.5 |
| **Not Hispanic or Latino - Black or African American** | 29 (7.0) | 4.8 | 50 (17.9) | 8.3 |
| **Not Hispanic or Latino – Asian or Native Hawaiian/Other Pacific Islander** | 31 (7.5) | 5.8 | 39 (14.0) | 7.2 |
| Not Hispanic or Latino – Asian only | 26 (6.3) | 5.0 | 30 (10.8) | 5.7 |
| Not Hispanic or Latino – Native Hawaiian/Other Pacific Islander only | 1 (0.2) | 6.3 | 1 (0.4) | 6.3 |
| **Not Hispanic or Latino – American Indian/Alaska Native or Multiracial** | 1 (0.2) | 0.4 | 4 (1.4) | 1.5 |
| Not Hispanic or Latino – American Indian/Alaska Native only | 0 (0) | 0 | 1 (0.4) | 2.7 |
| Not Hispanic or Latino – Multiracial only | 0 (0) | 0 | 1 (0.4) | 0.4 |

[a] The bolded rows include both reported and imputed race/ethnicity. Race/ethnicity was imputed for cases with missing race/ethnicity (n = 25 [6.0%] confirmed cases; n = 37 [13.3%] possible cases) using BISG, as described in the methods section. Among cases with non-missing race/ethnicity, for confirmed and probable cases, respectively, there were 35 and 33 Hispanic or Latino (any race), 303 and 147 non-Hispanic White, 24 and 39 non-Hispanic Black or African American, 27 and 31 non-Hispanic Asian or Native Hawaiian/Other Pacific Islander, and 0 and 2 non-Hispanic American Indian/Alaska Native or multiracial. Non-bolded rows are sub-groups of bolded rows above them. Case counts for non-bolded rows were calculated using reported (i.e., non-missing) data only. Missing data for these racial/ethnic groups were not separately imputed because BISG combines each of these groups with another racial/ethnic group.

[b] Cases per 100,000 population for EIP areas (crude rates).

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

## Table 3. Incident PNTM (N=693) Cases and Rates by Sex, Emerging Infections Program, 2023

| Sex | Confirmed (N=414) No. (%) | Confirmed Rate[a] | Possible (N=279) No. | Possible Rate[a] |
|---|---|---|---|---|
| Male | 160 (38.6) | 4.4 | 139 (49.8) | 3.8 |
| Female | 254 (61.4) | 7.0 | 140 (50.2) | 3.8 |

[a] Cases per 100,000 population for EIP areas.

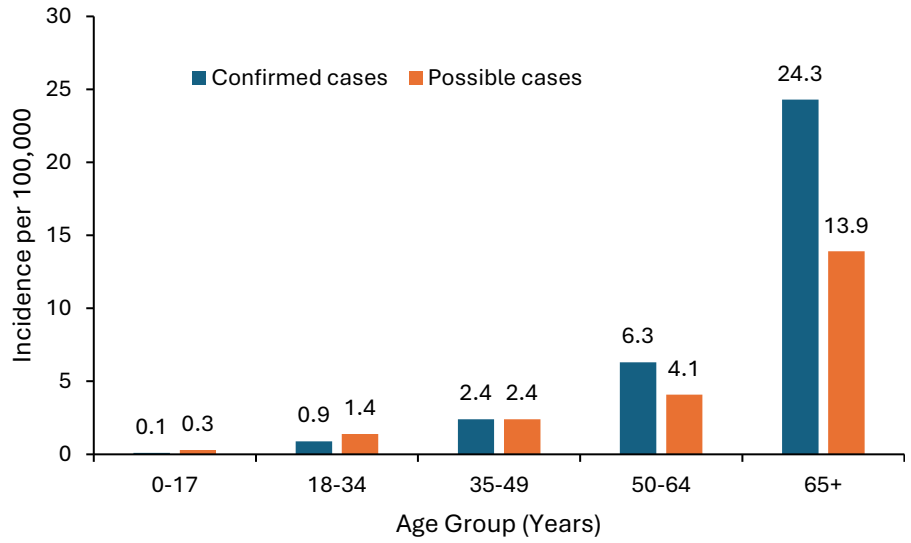
Note: Definitions for confirmed and possible cases can be found on pages 1 and 2 of this report.

## Table 4. Incident PNTM (N=693) Case Counts by Age Group, Emerging Infections Program, 2023

| Age Group (years) | Confirmed (N=414) No. | Confirmed % | Possible (N=279) No. | Possible % |
|---|---|---|---|---|
| 0–17 | 1 | 0.2 | 5 | 1.8 |
| 18–34 | 16 | 3.9 | 24 | 8.6 |
| 35–49 | 37 | 8.9 | 38 | 13.6 |
| 50–64 | 81 | 19.6 | 52 | 18.6 |
| 65+ | 279 | 67.4 | 160 | 57.3 |

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

## Figure 1. Rate[a] of Incident PNTM (N=693) Cases by Age Group, Emerging Infections Program, 2023




[a] Incidence (no. per 100,000 population per year) calculated using 2023 special tabulation U.S. Census Data.

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

## Table 5. Incident PNTM (N=693) Cases by Species Identified from Index Specimen[a] at Clinical Laboratories, Emerging Infections Program, 2023

| Slowly Growing NTM Species | Confirmed (N=414) No. | Confirmed % | Possible (N=279) No. | Possible % |
|---|---|---|---|---|
| *M. arupense* | 3 | 0.7 | 0 | 0.0 |
| *M. avium* complex - *M. avium* | 99 | 23.9 | 71 | 25.4 |
| *M. avium* complex - *M. intracellulare* subsp. *chimaera* | 14 | 3.4 | 6 | 2.2 |
| *M. avium* complex - *M. intracellulare* subsp. *intracellulare* | 79 | 19.1 | 37 | 13.3 |
| *M. avium* complex - *M. intracellulare* subsp. unknown | 0 | 0.0 | 1 | 0.4 |
| *M. avium* complex – *M. marseillense* | 1 | 0.2 | 1 | 0.4 |
| *M. avium* complex, not otherwise specified | 111 | 26.8 | 61 | 21.9 |
| *M. celatum* | 1 | 0.2 | 0 | 0.0 |
| *M. kansasii* | 15 | 3.6 | 2 | 0.7 |
| *M. kubicae* | 0 | 0.0 | 1 | 0.4 |
| *M. lentiflavum* | 2 | 0.5 | 3 | 1.1 |
| *M. malmoense* | 1 | 0.2 | 0 | 0.0 |
| *M. paraffinicum* | 0 | 0.0 | 1 | 0.4 |
| *M. scrofulaceum* | 0 | 0.0 | 1 | 0.4 |
| *M. shimoidei* | 0 | 0.0 | 1 | 0.4 |
| *M. szulgai* | 0 | 0.0 | 1 | 0.4 |
| *M. terrae* complex[c] | 0 | 0.0 | 1 | 0.4 |
| *M. terrae* | 0 | 0.0 | 1 | 0.4 |
| *M. xenopi* | 5 | 1.2 | 1 | 0.4 |
| *Total* | 331 | 80.0 | 190 | 68.1 |

| Rapidly Growing NTM Species | Confirmed (N=414) No. | Confirmed % | Possible (N=279) No. | Possible % |
|---|---|---|---|---|
| *M. abscessus* complex[b] | 43 | 10.4 | 17 | 6.1 |
| *M. aubagnense* | 2 | 0.5 | 0 | 0.0 |
| *M. canariasense* | 0 | 0.0 | 1 | 0.4 |
| *M. chelonae* complex[c] | 14 | 3.4 | 21 | 7.5 |
| *M. fortuitum* complex[c] | 25 | 6.0 | 33 | 11.8 |
| *M. frederiksbergense* | 0 | 0.0 | 1 | 0.4 |
| *M. llatzerense* | 1 | 0.2 | 0 | 0.0 |
| *M. mageritense* | 0 | 0.0 | 1 | 0.4 |
| *M. mucogenicum* complex [c] | 3 | 0.7 | 8 | 2.9 |
| *M. mucogenicum* | 1 | 0.2 | 6 | 2.2 |
| *M. neoaurum* | 0 | 0.0 | 1 | 0.4 |
| *M. smegmatis* complex[c] | 2 | 0.5 | 3 | 1.1 |
| Total | 91 | 22.0 | 92 | 33.0 |

| Undetermined Growth Rate NTM, Species Not Determined | Confirmed (N=414) No. | Confirmed % | Possible (N=279) No. | Possible % |
|---|---|---|---|---|
| Not TB[d], not characterized further | 2 | 0.5 | 4 | 1.4 |

[a] 9 index specimens from confirmed cases had >1 species reported. 7 index specimens from possible cases had >1 species reported.

[b] Subspecies identification not reported to CDC.

[c] Species identification not reported to CDC .

[d] TB=*Mycobacterium tuberculosis* complex.

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

## Table 6. Location of Incident PNTM (N=693) Cases at Time of Incident Specimen Collection, Emerging Infections Program, 2023

| Location of Incident Specimen Collection | Confirmed (N=414) No. | Confirmed % | Possible (N=279) No. | Possible % |
|---|---|---|---|---|
| Outpatient setting or emergency department | 293 | 70.8 | 169 | 60.6 |
| Acute care hospital | 118 | 28.5 | 105 | 37.6 |
| 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 | 3 | 0.7 | 5 | 1.8 |

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

## Table 7. Selected Clinical Characteristics of Incident Confirmed PNTM (N=414) Cases, Emerging Infections Program, 2023

| Charlson Comorbidity Index[a] | No. | % |
|---|---|---|
| 0 | 60 | 14.6 |
| 1 | 174 | 42.2 |
| ≥2 | 178 | 43.2 |

| Underlying Conditions[a,b] | No. | % |
|---|---|---|
| Any transplant (stem cell, solid organ) | 11 | 2.7 |
| Chest wall deformity | 1 | 0.2 |
| Chronic lung disease[c] | 290 | 70.4 |
| Chronic lung disease: Bronchiectasis[d] | 221 | 53.6 |
| Chronic lung disease: Chronic obstructive pulmonary disease | 113 | 27.4 |
| Chronic lung disease: Cystic fibrosis | 9 | 2.2 |
| Chronic lung disease: Emphysema | 47 | 11.4 |
| Connective tissue disease | 21 | 5.1 |
| Connective tissue disease: Rheumatoid arthritis | 16 | 3.9 |
| Cough suppression disorder | 0 | 0.0 |
| Diabetes mellitus | 44 | 10.7 |
| Gastroesophageal reflux disease | 122 | 29.6 |
| History of tuberculosis | 20 | 4.9 |
| Immunosuppressive medication[e,f] | 176 | 42.7 |
| Malignancy, solid organ | 70 | 17.0 |

| Underlying Conditions[a,b] | No. | % |
|---|---|---|
| Hematologic malignancy | 10 | 2.4 |
| HIV | 16 | 3.9 |
| Mitral valve prolapse | 5 | 1.2 |
| Obesity (body mass index ≥ 30)[g] | 54 | 13.4 |
| Scoliosis | 8 | 1.9 |
| Smoker (current or former)[h] | 214 | 51.9 |
| Smoker (current only) | 51 | 12.4 |
| Underweight (body mass index<18.5)[g] | 50 | 12.4 |
| None of the above | 15 | 3.6 |

| Clinical NTM infection type[i] | No. | % |
|---|---|---|
| Disseminated NTM infection | 13 | 3.1 |
| PNTM infection, Not Disseminated | 169 | 40.8 |
| None | 222 | 53.6 |
| Unknown | 10 | 2.4 |

| Chest imaging type in the 90 days before to 180 days after index specimen[j] | No. | % |
|---|---|---|
| Computed tomography | 361 | 87.2 |
| Radiograph | 265 | 64.0 |
| None of the above | 20 | 4.8 |
| Unknown | 3 | 0.7 |
| **Chest imaging findings** | No. | %[k] |
| Bronchiectasis | 179 | 45.8 |
| Cavity or cavitation | 78 | 20.0 |
| Consolidation | 136 | 34.8 |
| Infiltrate | 72 | 18.4 |
| Nodular opacities | 117 | 29.9 |
| Nodules | 254 | 65.0 |
| Tree-in-bud | 132 | 33.8 |
| None of the above | 31 | 7.9 |
| Unknown | 1 | 0.3 |

| Outcomes | No. | % |
|---|---|---|
| Surgery to manage NTM[l] | 4 | 1.0 |
| Death with 180 days of specimen collection | 36 | 8.7 |

[a] Two cases excluded because of unknown underlying conditions and clinical characteristics.

[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, azathioprine, B cell depletion agents, cyclophosphamide IL-6 blockers, JAK inhibitors, steroids (intravenous, intramuscular, inhaled or oral), mycophenolate, tacrolimus and TNF-α inhibitors.
[f] For 57 cases, the only immunosuppressive medication was inhaled steroids.
[g] Ten cases had unknown BMI. Percentage is calculated from those with known BMI.
[h] Includes tobacco, e-cigarette, and marijuana.
[i] NTM infection type as documented by a clinician in the medical record.
[j] 235 cases had both computed tomography and radiograph.
[k] Percentage is calculated out of those with chest imaging (N=391).
[l] For two cases, surgical management of NTM was unknown. Percentage is calculated from those with known surgical management of NTM.

## Summary

Surveillance data from 2023 represent the third 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)[4]. The annual crude incidence and total prevalence rates of confirmed PNTM in 2023 were 5.7 and 7.8 per 100,000 persons, respectively, an increase from 2022 (4.6 and 7.0 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 with more than one incident confirmed case, rates of incident confirmed cases ranged from 3.0 among Hispanic or Latino persons to 6.8 per 100,000 in White 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. For possible cases, highest rates were in Black non-Hispanic or Latino persons and *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. Using the Census Bureau's Surname List to Improve Estimates of Race/ethnicity and Associated Disparities (https://thecre.com/insurance/wp-content/uploads/2010/06/CFPB-Paper.pdf).
3. Population Estimates Categorical Variables 2023 (https://www.census.gov/data/developers/data-sets/popest-popproj/popest/popest-vars/2023.html)
4. 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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- 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)