

ABSTRACT

Objective: Nontuberculous mycobacteria (NTM) lung infections are difficult to diagnose since symptoms, such as coughing and fatigue, are common of other respiratory comorbidities. These overlapping symptoms may mask the infection, delaying diagnosis. NTM lung infections are growing among patients over 65 and can exacerbate the deterioration of lung function, compounding respiratory problems for some patients with serious comorbidities. NTM lung infections are challenging to diagnose and treat, which can lead to prolonged treatment with multiple antibiotics. The annual occurrence of new NTM lung infection diagnoses (incidence), length of time in plan, and continued enrollment of those in a large US health plan Medicare population were examined.

Methods: Using Medicare medical and pharmacy claims between January 1, 2008, and December 31, 2013, patients (n = 1613) were defined by identifying at least 2 separate medical claims for NTM lung infection (ICD-9-CM 031.0); first diagnosis served as the index date. Included patients had ≥1 days of medical coverage. Annual incidence of diagnosis was defined as the number of unique members with NTM lung infection divided by the total number of members during that year and was computed per 100,000 members. Length of time members remained in the plan post-index was examined, and an analysis was conducted to determine continued enrollment in the plan of the population.

Results: Average yearly incidence rate of diagnosis was 14.8 per 100,000 members. NTM lung infection incidence of diagnosis increased from 11.9 in 2008 to 16.2 in 2013 ($P < .001$), a 36.1% increase. The greatest increase was in the age group of 65-74 years (56.3%). Once diagnosed with NTM lung infection, members remained in the plan on average 24.1 months post-index.

Conclusions: Incidence rates for diagnosis of NTM lung infection are increasing within the Medicare population. The majority of members continue to remain with their plan for an extended period of time post-diagnosis, indicating continued resource utilization. Based on these findings, we propose that healthcare plans consider mechanisms to identify this population and monitor their resource utilization.

INTRODUCTION

- Pulmonary nontuberculous mycobacteria (PNTM) infections are difficult to diagnosis, since their symptoms, such as coughing and fatigue, are common of other respiratory comorbidities.
 - These overlapping symptoms may mask the NTM infection and subsequently delay diagnosis.^{1,3}
- NTM lung infections are increasing among patients >65 years old¹ and can exacerbate deterioration of lung function, compounding respiratory problems for patients with serious comorbid conditions.²
- NTM lung infections are challenging to diagnosis and treat, which can lead to prolonged treatment with multiple antibiotics.^{3,4}

OBJECTIVE

- To examine the annual occurrence of new PNTM infection diagnoses (incidence) and continued enrollment in the plan of those diagnosed in a large US health plan (Medicare) population

METHODS

Study Design

- Medical and pharmacy claims between January 1, 2008, and December 31, 2013, were used to identify Medicare members with PNTM infection.
- Medicare members with PNTM infection were defined by:
 - Identifying ≥2 separate medical claims for PNTM infection (ICD-9-CM 031.0), with claim for first diagnosis serving as the index date; and
 - Age ≥18 years and age ≤89 years at index date; and
 - ≥1 days of medical coverage

NOTE: We decided to exclude 2007 as it is the start anchor year for our database and subject to point prevalence. The results we report for 2008 are all incident cases. 2008 members were not counted if they had submitted claims for PNTM in prior years.

Outcome Measures

- Annual incidence of PNTM infection was calculated for the calendar years 2008 through 2013. Incidence was defined as:
 - The number of unique members with PNTM infection (as defined by 2 claims) divided by the total number of members during that year.

$$\text{Incidence of PNTM infection} = \frac{\text{Total \# of unique members diagnosed with PNTM infection during specific year}}{\text{Total \# of members during specific year}}$$

- Incidence was computed per 100,000 members.
- For those members with diagnoses during 2 separate calendar years, the year of the first diagnosis was the only one counted towards incidence rate.

- Continued enrollment in the plan of patients with PNTM infection
 - Continued enrollment in the plan was based on members who remained in the plan after their index diagnosis of PNTM.
 - Total number of months could not exceed 72 months and could be smaller as a function of the index date.

RESULTS

Annual Incidence and Continued Enrollment in the Plan

- The average annual incidence was 14.8 per 100,000 members.
- A 36.1% increase was seen in the incidence of PNTM infections between 2008 and 2013 (**Table 1**), a significant increase ($P < .001$) in the 6-year period.
- The greatest increase in incidence (56.3%) from 2008 to 2013 was found for those members 65-74 years of age (**Table 1, Figure 1**).
- The majority of members (70%) were still continuously enrolled after 3 years (**Figure 2**).

Table 1. Annual Incidence by Year						
	Year of PNTM Infection Diagnosis					
	2008	2009	2010	2011	2012	2013
Number of members with a PNTM infection diagnosis	163	224	227	283	329	387
Total population	1,364,106	1,464,985	1,692,802	1,820,901	1,972,915	2,390,240
Incidence (per 100,000 members)	11.9	15.3	13.4	15.5	16.7	16.2
Incidence by age group (% patients per age group)^a						
18-34 years (<1%)	0.0	14.0	13.3	11.9	28.8	16.4
35-44 years (2%)	0.0	8.6	4.2	7.7	13.0	5.7
45-54 years (5%)	10.7	14.1	7.9	8.4	13.4	5.4
55-64 years (13%)	10.6	12.8	8.9	10.0	11.9	13.1
65-74 years (48%)	10.3	11.8	11.0	15.1	16.7	16.1
75-89 years (32%)	16.1	22.4	19.8	20.0	19.4	19.8
Continued enrollment in the plan, mean months post-index (SD)^b	37.4 (25.9)	33.2 (20.5)	29.8 (15.3)	22.6 (10.6)	15.5 (6.4)	5.9 (3.6)

^aAge as of index date; numbers in parentheses represent the percentage of patients in each age group that were part of the Medicare population each year. ^bA simple average was originally calculated for continuous enrollment, however, it was recognized that patients in later years would have limited months available to contribute. Hence, the Kaplan-Meier (Figure 2) was conducted to better represent the time patients were continuously enrolled.

Figure 1. Annual incidence for members 65-74 years of age.

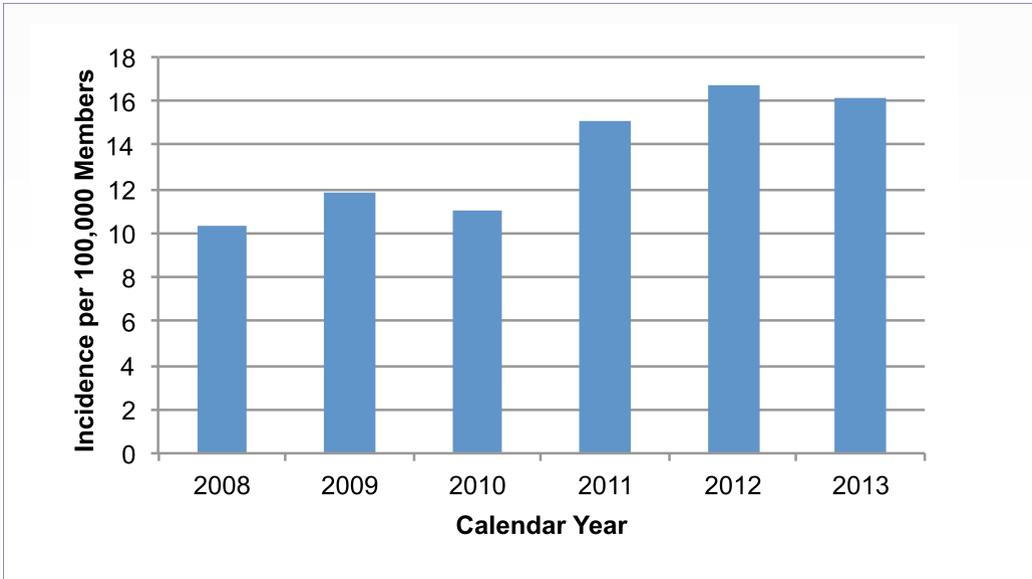
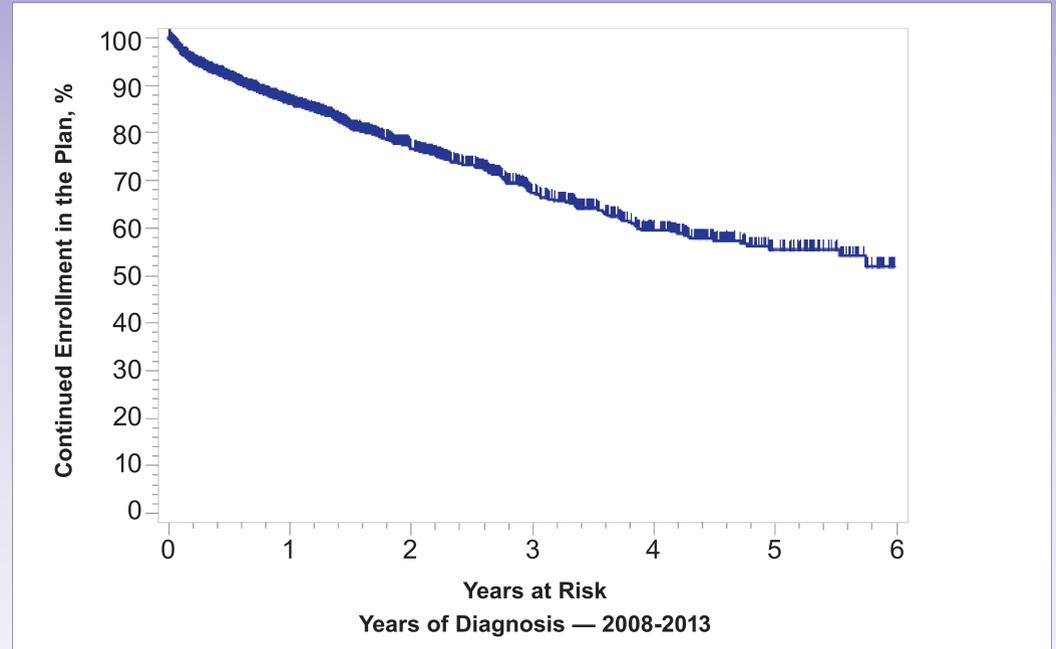


Figure 2. Continued enrollment in the plan of members with PNTM infection diagnosis.



CONCLUSIONS

- The incidence of PNTM infection in the Medicare population rose between 2008 and 2013.
- These incidence rates appear to be increasing, with the fastest growth in the 65-74 years of age member cohort.
- Following diagnosis with PNTM infection, over 50% of members were still in the plan after 6 years.
- Based on these findings, we propose that healthcare plans consider mechanisms to identify this population and monitor their resource utilization.

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DISCLOSURES

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