Geographic diversity of nontuberculous mycobacteria species among infected populations in the United States

Mehdi Mirsaedi[1], Joseph Falkinham[3], Matthias Salathe[1], Andreas Schmid[1], Esther Irene Diaz[1], Michael Campos[1], Amy Leitman[2], Susan Wisliceny[2], Philip Leitman[2]

[1]Division of Pulmonary, Allergy, Critical Care & Sleep Medicine, University of Miami, FL, USA, [2]NTM Info & Research, Coral Gables, FL, USA, [3]Department of Biological Sciences, Virginia Tech, Blacksburg, VA, USA

Synopsis

Nontuberculous mycobacteria (NTM) species are mycobacteria other than those belonging to the M. *tuberculosis complex* and M. *leprae* classes. NTM are generally free-living ubiquitous organisms and are highly prevalent in the environment. More than 140 NTM species and sub-species have been identified.

The incidence of pulmonary NTM disease in aged populations has been rising and is higher than TB in the U.S. Isolation of NTM from patients is generally a reflection of environmental NTM strains. NTM species isolated from patients are clearly associated with distribution of environmental NTM species where they live. Geographic diversity of NTM in the U.S. has not yet been studied.

Methods

- A three-month long population-based, patient-centered study via a survey among patients who have NTM and are registered with NTMinfo.org
- Age, gender, location, NTM species, organ site isolated-pulmonary/extrapulmonary, treatment status
- De-identified data analyzed and presented as central indexes
- Regression model analyzed to correlate between M. *abscessus* and M. *avium complex* (MAC) isolates

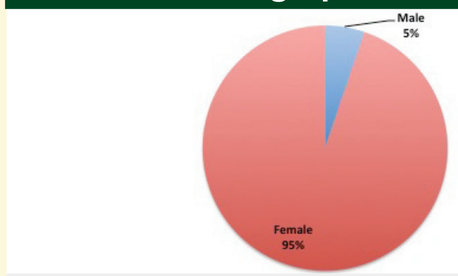
Results: Survey Responses

- 537 respondents, mean age of 66.9 years (max:91, min:13), 95% were female, residing in 46 U.S. states
- All respondents reported their isolated mycobacteria species, with a total of 657 isolates reported
- States with the highest respondents included California, Florida, New York, Pennsylvania, Texas
- 367 subjects indicated where they lived at the time of diagnosis: 91% lived at the time of survey in the same state as when they were diagnosed

Results: Data Analysis

- Top 3 isolates: MAC (570/72%), M. *abscessus* (113/17%), M. *kansasii* (23/3.5%); others: M. *chelonae* (23/3%), M. *fortuitum* (13/2%), M. *simiae* (7/1%), M. *xenopi* (6/0.9%), other species 0.6%
- Highest ratio of MAC to other species (75th percentile) reported in 26 states including Vermont, Utah, Tennessee, and Alaska
- 19 states had higher than average ratio of M. *abscessus*, including New Hampshire, New Mexico, Ohio, Indiana, Hawaii, and Texas
- There was a correlation (R^2=0.46) between isolation of MAC and M. *abscessus* in this study

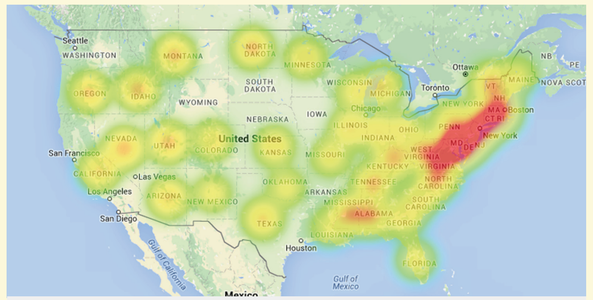
Demographic Data



Gender diversity of study population with NTM

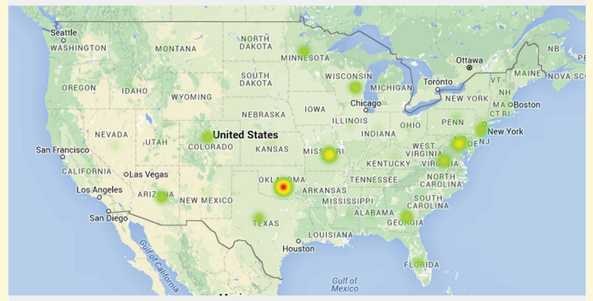
Geographic Data

Geographic diversity of isolated NTM species in the US



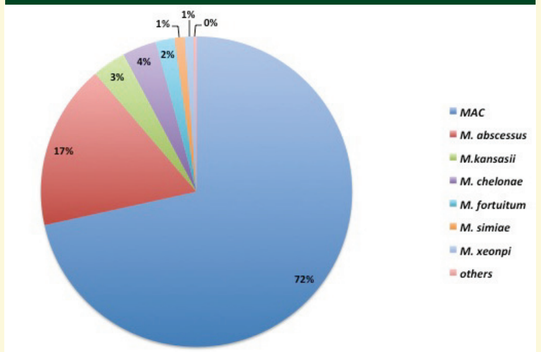
Geographic diversity of MAC species in the US

Geographic diversity of isolated M. *abscessus* species in the US

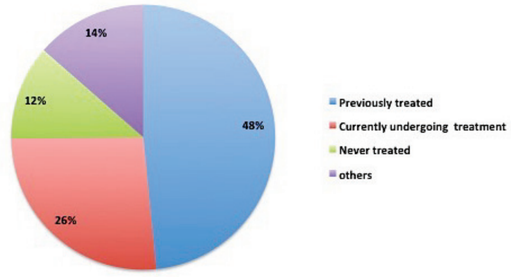


Geographic diversity of isolated M. *kansasii* species in the US

Statistical Data



Percent abundance per NTM species isolated



Percent treatment status: treated/untreated

Conclusions

Knowing the geographic distribution of NTM helps prioritize resources at the regional level and improve local diagnostic and treatment strategies, further enhancing detection and treatment of NTM in the U.S.

References:

Mirsaeidi M, Farshidpour M, Allen MB, Ebrahimi G, Falkinham JO. Highlight on advances in nontuberculous mycobacterial disease in North America. Biomed Res Int. 2014; 2014:919474.

Mirsaeidi M, Farshidpour M, Ebrahimi G, Aliberti S, Falkinham JO. Management of nontuberculous mycobacterial infection in the elderly. European Journal of Internal Medicine. 2014 April; 25(4): 356-63.

Mirsaeidi M, Machado RF, Garcia JG, Schraufnagel DE. Nontuberculous mycobacterial disease mortality in the United States, 1999-2010: a population-based comparative study. PLoS One. 2014 March 14; 9(3):e91879.

No relevant financial or commercial interests to disclose