

17-ID-07

Committee: Infectious Disease

Title: Standardized Case Definition for Extrapulmonary Nontuberculous Mycobacteria Infections

I. Statement of the Problem

Nontuberculous mycobacteria (NTM) are opportunistic pathogens that can be difficult to treat. While pulmonary NTM infection is a well-recognized cause of illness among those with underlying lung disease, extrapulmonary NTM infections appear to be increasing and are often associated with severe disease and poor outcomes. Extrapulmonary NTM infections are a cause of both sporadic and healthcare-associated infections in the United States. Outbreaks have been associated with medical devices, cosmetic procedures, contaminated parenteral medications, and medical tourism, as well as with community exposures such as tattoo parlors and nail salons. The true burden and incidence of NTM infections is unknown. Extrapulmonary NTM infection is not nationally notifiable and is currently reportable in a few jurisdictions, such as Oregon. Given the insidious nature of extrapulmonary NTM infections, i.e. nonspecific symptomatology and prolonged time between exposure and symptom onset, detecting outbreaks of extrapulmonary NTM infections can be challenging, which poses barriers to the identification and elimination of sources of infection. Establishing a case definition for extrapulmonary NTM infections will help to identify populations at risk and detect outbreaks in a timely manner to allow for early public health intervention.

Word Count: 186/300

II. Background and Justification

NTM are Mycobacterial species other than *M. tuberculosis* and *M. leprae*. NTM are generally free-living organisms and are ubiquitous in the environment, particularly soil and water (1). Over 150 NTM species exist. In the U.S., the species most commonly linked to human disease are *M. avium* complex and *M. kansasii*. Other human-pathogenic NTM species include slow-growing species, such as *M. marinum*, *M. xenopi*, *M. simiae*, *M. malmoense*, and *M. ulcerans*, and rapid-growing species such as *M. abscessus*, *M. fortuitum*, and *M. chelonae*. NTM are not typically transmitted from human-to-human. Disease in humans is thought to be acquired from environmental exposures (1).

Pulmonary disease is the most common clinical manifestation of NTM and occurs most frequently among those with underlying lung disease such as chronic obstructive pulmonary disease (COPD), bronchiectasis, and cystic fibrosis. Extrapulmonary NTM infections, however, are less common and include infections with culture-positive specimens obtained from normally sterile body sites. Clinically, these infections present as lymphadenitis (primarily in children), disseminated disease (most commonly in severely immunocompromised patients), and skin and soft tissue infection (usually due to direct inoculation) (2).

Symptoms of NTM infection are dependent on the site of infection. In many instances, onset of symptoms can occur months to years following exposure. Given the long duration to symptom onset and the nonspecific symptomatology of many extrapulmonary NTM infections, diagnosis and treatment are often delayed. Treatment may involve a combination of surgical intervention and extended antibiotic therapy.

Although NTM have historically been considered opportunistic infections, NTM infections are emerging in new settings among immunocompetent individuals (1). Outbreaks of extrapulmonary NTM infections have been reported in a number of settings. In almost all cases, outbreaks are due to the introduction of water sources. Settings with increased risk of NTM infections include tattoo parlors, nail salons, and hot tubs or spas. Outbreaks have also been reported in the healthcare setting due to contaminated water and the ability of NTM to form biofilms in hospital waterlines and on medical devices (3,4). Healthcare setting outbreak examples include surgical site infections among plastic surgery patients (5), injection site

abscesses due to contaminated medications, eye infections following Lasik surgery due to operating room humidifier use (6), and cervical lymphadenitis in children undergoing dental procedures due to contaminated dental waterlines (7).

Establishing a standardized case definition for extrapulmonary NTM infections will allow jurisdictions to make NTM infections reportable and lead to more timely outbreak detection and public health interventions to decrease risk of new infections. An example in which a standardized case definition might have led to timely detection of a national outbreak is the identification of NTM-contaminated heater-cooler devices used during cardiac surgery; delayed patient infection identification placed hundreds of thousands of patients at risk for extrapulmonary *M. chimaera* infections over many years (8, 9). Oregon epidemiologists identified NTM outbreaks, where extrapulmonary NTM infections are reportable.

We plan to provide supplemental information - likely to the healthcare-associated infections subcommittee web page. Look there for symptom information, Oregon NTM outbreaks examples, and Oregon NTM surveillance data.

Word Count: 499/500

III. Statement of the desired action(s) to be taken

1. Utilize standard sources (e.g. reporting*) for case ascertainment for extrapulmonary nontuberculous mycobacteria (NTM). Surveillance for extrapulmonary NTM should use the following recommended sources of data to the extent of coverage presented in Table III.

Table III. Recommended sources of data and extent of coverage for ascertainment of cases of extrapulmonary nontuberculous mycobacteria.

Source of data for case ascertainment	Coverage	
	Population-wide	Sentinel sites
Clinician reporting	X	X
Laboratory reporting	X	X
Reporting by other entities (e.g., hospitals, veterinarians, pharmacies, poison centers)	X	X
Death certificates	X	X
Hospital discharge or outpatient records	X	X
Extracts from electronic medical records	X	X
Telephone survey		
School-based survey		
Other _____		

2016 Template

2. Utilize standardized criteria for case identification and classification (Sections VI and VII) for extrapulmonary NTM but do not add extrapulmonary NTM to the *Nationally Notifiable Condition List*. If requested by CDC, jurisdictions (e.g. States and Territories) conducting surveillance according to these methods may submit case information to CDC.

3. Utilize standardized criteria for case identification and classification (Sections VI and VII) for extrapulmonary NTM and add extrapulmonary NTM to the *Nationally Notifiable Condition List*.

- 3a. Immediately notifiable, extremely urgent (within 4 hours)
- 3b. Immediately notifiable, urgent (within 24 hours)
- 3c. Routinely notifiable

CSTE recommends that all States and Territories enact laws (statute or rule/regulation as appropriate) to make this disease or condition reportable in their jurisdiction. Jurisdictions (e.g. States and Territories) conducting surveillance (according to these methods) should submit case notifications** to CDC.

Expectations for Message Mapping Guide (MMG) development for a newly notifiable condition: NNDSS is transitioning to HL7-based messages for case notifications; the specifications for these messages are presented in MMGs. When CSTE recommends that a new condition be made nationally notifiable, CDC must obtain OMB PRA approval prior to accepting case notifications for the new condition. Under anticipated timelines, notification using the Generic V2 MMG would support transmission of the basic demographic and epidemiologic information common to all cases and could begin with the new *MMWR* year following the CSTE annual conference. Input from CDC programs and CSTE would prioritize development of a disease-specific MMG for the new condition among other conditions waiting for MMGs.

4. CDC should publish data on extrapulmonary NTM as appropriate in *MMWR* and other venues (see Section IX).

CSTE recommends that all jurisdictions (e.g. States or Territories) with legal authority to conduct public health surveillance follow the recommended methods as outlined above.

Terminology:

* Reporting: process of a healthcare provider or other entity submitting a report (case information) of a condition under public health surveillance TO local or state public health.

**Notification: process of a local or state public health authority submitting a report (case information) of a condition on the Nationally Notifiable Condition List TO CDC.

IV. Goals of Surveillance

To identify and stop outbreaks of extrapulmonary NTM, as well as to prevent future outbreaks through the recognition and correction of risk factors such as poor infection control practices. Also, to provide information on the temporal, geographic, and demographic occurrence of outbreak-associated extrapulmonary NTM cases.

Word Count: 45 /100

V. Methods for Surveillance: Surveillance for extrapulmonary NTM should use the recommended sources of data and the extent of coverage listed in Table III.

The primary source of data will be from laboratory reporting. In states where extrapulmonary NTM is a reportable condition, laboratories should report extrapulmonary NTM cases to public health authorities. Healthcare facilities, clinicians, and infection preventionists who become aware of patients with extrapulmonary NTM should also report these cases to public health authorities. Other data sources (e.g., death certificates or hospital discharge data) may be used as supplementary case-finding methods.

Word Count: 69/100

VI. Criteria for case identification

A. Narrative: A description of suggested criteria for case ascertainment of a specific condition.

In public health jurisdictions where extrapulmonary NTM is classified as a reportable disease or condition, clinicians and laboratories should report to public health authorities any of the following:

Clinical evidence: Clinician-diagnosed NTM infection

Laboratory evidence: A positive culture or molecular evidence, such as polymerase chain reaction (PCR) or 16S ribosomal RNA gene sequencing (16S), of mycobacteria in any sterile body site (including pleural fluid) or in tissue, or wounds

- Exclude cultures or molecular evidence positive for *M. tuberculosis*, *M. gordonae*, or *M. leprae*
- Exclude cultures or molecular evidence from lower respiratory samples, including: sputum, bronchial alveolar lavage, tracheal aspirate cultures, or lung tissues
- Exclude stool specimens

Standard reporting of laboratory test results is recommended.

B. Table of criteria to determine whether a case should be reported to public health authorities

Table VI-B. Table of criteria to determine whether a case should be reported to public health authorities.

Criterion	Extrapulmonary NTM
<i>Clinical Evidence</i>	
Clinician-diagnosed NTM infection	S
<i>Laboratory Evidence</i>	
A positive culture of mycobacteria species in any sterile body site (including pleural fluid), or in tissue or wounds	O
Molecular evidence, such as PCR or 16S, of mycobacteria, in any sterile body site (including pleural fluid) or in tissue or wounds	O
Exclude cultures or molecular evidence positive for <i>M. tuberculosis</i> , <i>M. gordonae</i> * or <i>M. leprae</i>	N
Exclude cultures or molecular evidence from lower respiratory samples, including: sputum, bronchial alveolar lavage, tracheal aspirate cultures, or lung tissues.	N
Exclude stool specimens	N

Notes: **M. gordonae* is known to be a contaminant in pulmonary specimens. However, less is known about whether *M. gordonae* is more often a pathogen versus a contaminant in extrapulmonary specimens. Rare case reports of *M. gordonae* causing extrapulmonary disease exist. Health jurisdictions may consider including *M. gordonae* isolates from sterile extrapulmonary sites as clinical cases in order to better understand the clinical significance and epidemiology of these isolates. However, the benefit of *M.*

gordonae reporting in identifying outbreaks compared to the resources required to investigate these cases is unclear. Therefore, *M. gordonae* is excluded from the proposed case definition.

S = This criterion alone is Sufficient to report a case.

N = All “N” criteria in the same column are Necessary to report a case.

O = At least one of these “O” (One or more) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all “N” criteria in the same column—is required to report a case.

A requisition or order for any of the “S” laboratory tests is sufficient to meet the reporting criteria.

C. Disease-specific data elements

Clinical Information:

None

Laboratory information:

- o Mycobacteria species or complex

Epidemiological Information:

None

VII. Case Definition for Case Classification

A. Narrative: Description of criteria to determine how a case should be classified.

Probable Case:

In a patient with signs or symptoms referable to the area, culture or molecular evidence of infection by a mycobacterial species known not to be *Mycobacterium tuberculosis* but lacking species or complex determination, from at least one of the following extrapulmonary sites:

1. Skin or soft tissue
2. Lymph node
3. Urine
4. A normally sterile body site such as blood, spinal fluid, bone marrow, abdominal fluid, pleural fluid, or bone.

For example, *Mycobacterium* isolates that are PCR negative for *M. tuberculosis*, correspond to probable case classification.

Confirmed case:

In a patient with signs or symptoms referable to the area, nontuberculous mycobacteria species or complex identified in culture or by molecular methods, from at least one of the following extrapulmonary sites:

1. Skin or soft tissue
2. Lymph node
3. Urine
4. A normally sterile body site such as blood, spinal fluid, bone marrow, abdominal fluid, pleural fluid, or bone,

except for *M. gordonae* and *M. leprae* species.

We plan to provide supplemental information - likely to the healthcare-associated infections subcommittee web page. Look there for a suspect case definition for use specifically in outbreak settings and proposed epidemiologic information to be gathered in an outbreak or case investigation.

Clinical Criteria

Examples of signs and symptoms of clinical disease include (but are not limited to):

- Fever
- Fatigue
- Weight loss
- Lymphadenopathy
- Surgical site infections
- Wound Infections
- Cellulitis
- Granulomas
- Sepsis
- Failure to thrive
- Osteomyelitis

Laboratory Criteria

Probable Case Laboratory Criteria:

Positive culture or nucleic acid test (e.g. PCR or 16S) for *Mycobacterium* genus

Exclude cultures from lower respiratory samples, such as: sputum, bronchial alveolar lavage, tracheal aspirate cultures, or lung tissue.

Confirmatory Case Laboratory Criteria:

Positive culture and identification to the species or complex level of nontuberculous mycobacteria,

or

Positive nucleic acid test specific for a given species or complex of nontuberculous mycobacteria.

Exclude specimens that indicate *M. tuberculosis*, *M. goodii*, or *M. leprae*.

Exclude cultures from lower respiratory samples, including: sputum, bronchial alveolar lavage, tracheal aspirate cultures, or lung tissue.

Criteria to distinguish a new case of this disease or condition from reports or notifications which should not be enumerated as a new case for surveillance

Invasive NTM infections often persist for extended periods of time and recurrences can occur after completion of antibiotic therapy. To minimize duplicate counting of chronic infections, illnesses in a given person should be counted no more than once every 24 months, unless a different species is identified.

B. Classification Tables
Table VII-B. Criteria for defining a case of extrapulmonary nontuberculous mycobacterial infection.

Criterion	Probable	Confirmed	
<i>Clinical Evidence</i>			
Fever	○	○	○
Fatigue	○	○	○
Weight loss	○	○	○
Lymphadenopathy referable to the area from which the specimen in which mycobacteria were identified	○	○	○
Surgical site infections referable to the area from which the specimen was obtained, in which mycobacteria were identified	○	○	○
Wound Infections referable to the area from which the specimen was obtained, in which mycobacteria were identified	○	○	○
Cellulitis referable to the area from which the specimen was obtained, in which mycobacteria were identified	○	○	○
Granulomas referable to the area from which the specimen was obtained, in which mycobacteria were identified	○	○	○
Sepsis	○	○	○
Failure to thrive	○	○	○
Osteomyelitis referable to the area from which the specimen was obtained, in which mycobacteria were identified	○	○	○
Other infection signs or symptoms referable to the area from which the specimen was obtained, in which mycobacteria were identified	○	○	○
<i>Laboratory evidence</i>			
Specimen from skin, soft tissue, a lymph node, urine or a normally sterile body	N	N	N

site (e.g., blood, spinal fluid, bone marrow, abdominal fluid, pleural fluid, or bone)			
Positive culture for <i>Mycobacterium</i> genus	O		
Positive nucleic acid test for <i>Mycobacterium</i> genus	O		
Positive culture for mycobacteria, identified to species		O	
Positive nucleic acid test for mycobacteria, identified to species		O	
Positive culture for mycobacteria, identified to complex			O
Positive nucleic acid test for mycobacteria, identified to complex			O
Culture or molecular evidence that the infecting mycobacterial species is not <i>Mycobacterium tuberculosis</i>	N	N	N
Absence of identification of the mycobacterial species or complex involved.	N		
Identification of the mycobacterial species or complex involved		N	N
Exclude <i>M. gordonae</i> *, or <i>M. leprae</i> species		N	N
Exclude cultures from lower respiratory samples, such as: sputum, bronchial alveolar lavage, tracheal aspirate cultures, pleural fluid, or lung tissue	N	N	N
<i>Criteria to distinguish a new case:</i>			
At least 24 months have lapsed since last reported onset of NTM of the same species in same individual, unless a different species is identified	N	N	N

Notes:

* *M. gordonae* is known to be a contaminant in pulmonary specimens. However, less is known about whether *M. gordonae* is more often a pathogen versus a contaminant in extrapulmonary specimens. Rare case reports of *M. gordonae* causing extrapulmonary disease do exist. Health jurisdictions may consider including *M. gordonae* isolates from sterile extrapulmonary sites as

clinical cases in order to better understand the clinical significance and epidemiology of these isolates. However, the benefit of *M. gordonae* reporting in identifying outbreaks compared to the resources required to investigate these cases is unclear. Therefore, *M. gordonae* is excluded from the proposed case definition.

S = This criterion alone is Sufficient to classify a case.

N = All “N” criteria in the same column are Necessary to classify a case. A number following an “N” indicates that this criterion is only required for a specific disease/condition subtype (see below). If the absence of a criterion (i.e., criterion NOT present) is required for the case to meet the classification criteria, list the Absence of criterion as a Necessary component.

O = At least one of these “O” (One or more) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all “N” criteria in the same column—is required to classify a case. (These “O” criteria are alternatives, which means that a single column will have either no O criteria or multiple O criteria; no column should have only one O.) A number following an “O” indicates that this criterion is only required for a specific disease/condition subtype.

1 =

2 =

3 =

4 =

VIII. Period of Surveillance

Surveillance should be ongoing.

IX. Data sharing/release and print criteria

Data will be used to detect outbreaks, determine the burden of illness due to extrapulmonary NTM, and characterize trends of illness over time. Data may also enable comparing extrapulmonary NTM cases across jurisdictions.

Data sharing is strictly voluntary. If willing, states and territories will send CDC data for selected cases based on case classification; states and territories will send core/generic data or supplemental/extended data. Only fully de-identified case data will be released by CDC to the general public, other releases by CDC require signed data-sharing agreements using a format pre-approved by the state/territorial health agency.

CDC publication criteria will exclude selected cases from final printed counts based on case classification; provisional case report data will not be used by CDC until verification procedures are complete.

X. Revision History

None

XI. References

1. Falkinham JO III. Environmental sources of nontuberculous mycobacteria. *Clin Chest Med.* 2015; 36:35-41.
2. Griffith DE, Aksamit T, Brown-Elliott BA, Catanzaro A, Daley C, Gordin F, et al. An official ATS/IDSA statement: diagnosis, treatment, and prevention of nontuberculous mycobacterial diseases. *Am J Respir Crit Care Med.* 2007; 175:367-416.
3. Wallace RJ Jr, Brown BA, Griffith DE. Nosocomial outbreaks/pseudo-outbreaks caused by nontuberculous mycobacteria. *Annu Rev Microbiol* 1998; 52:453-90.

4. Phillips MS and von Reyn CF. Nosocomial infections due to nontuberculous mycobacteria. *CID* 2001; 33:1363-74.
5. Rugg E, Cheretakis A, Modarress A, Harbarth S, Pittet-Cuenod B. Multistate infection with *Mycobacterium abscessus* after replacement of breast implants and gluteal lipofilling. *Case Rep Infect Dis* 2015; 361: Epub 2015 Mar 29.
6. Edens C, Liebich L, Halpin AL, Moulton-Meissner H, Eitniear S, Zgodzinski E et al. *Mycobacterium chelonae* eye infections associated with humidifier use in an outpatient LASIK clinic—Ohio, 2015. *MMWR Morb Mortal Wkly Rep* 2015; 64:1177.
7. Peralta G, Tobin-D'Andgelo M, Parham A, Edison L, Lorentzson, Smith C. et al. Notes from the Field: *Mycobacterium abscessus* infections among patients of a pediatric dentistry practice—Georgia, 2015. *MMWR Morb Mortal Wkly Rep*. 2016; 65:355-6.
8. Sax H, Bloemberg G, Hasse B, Sommerstein R, Kohler P, Achermann Y et al. Prolonged outbreak of *Mycobacterium chimaera* infection after open-chest heart surgery. *Clin Infect Dis* 2015; 61:67-75.
9. Perkins KM, Lawsin A, Hasan NA, Strong M, Halpin AL, Rodger RR, et al. Notes from the Field: *Mycobacterium chimaera* contamination of Heater-Cooler Devices Used in Cardiac Surgery – United States. *MMWR Morb Mortal Wkly Rep*. 2016; 65:1117-8.

XII. Coordination**Agencies for Response**

- (1) Centers for Disease Control and Prevention
Anne Schuchat, MD
Acting Director, CDC, and Acting Administrator, ATSDR
1600 Clifton Rd NE, MS G-14
Atlanta, GA 30329
404-639-7000
ASchuchat@cdc.gov

Agencies for Information:

- (1) **National TB Controller's Association**
Peter Davidson, PhD
NTCA President
Michigan Department of Community Health
201 Townsend Street
Lansing, MI 48913
517-335-8165
Email: DavidsonP@michigan.gov
- (2) National Jewish Health
Max Salfinger, MD, FIDSA, FAAM
Executive Director, Advanced Diagnostic Laboratories
Laboratory Director, Mycobacteriology & Pharmacokinetics
National Jewish Health
1400 Jackson Street
Denver, CO 80206
303-398-1335 (Virley Gottfried, Administrative Assistant)
salfingerm@njhealth.org
- (3) Association for Professionals in Infection Control and Epidemiology
Katrina Crist, MBA
Chief Executive Officer 1275 K St. NW, Suite 1000
Washington, DC 20005-4006
202-789-1890
kcrist@apic.org
- (4) Society for Healthcare Epidemiology of America
Eve Humphreys, MBA, CAE
Executive Director
1300 Wilson Boulevard, Suite 300
Arlington, VA 22209
703-684-1006
ehumphreys@shea-online.org
- (5) Infectious Disease Society of America
William G. Powderly, MD, FIDSA
1300 Wilson Boulevard
Suite 300
Arlington, VA 22209

1-703-229-0200

XIII. Submitting Author:

- (1) June Bancroft, MPH
Epidemiology and Laboratory Capacity Clinical Epidemiologist
Oregon Health Authority, Acute and Communicable Diseases Prevention Section
800 NE Oregon St.
Ste 772
Portland, OR 97232
971-673-1045
June.E.Bancroft@dhsaha.state.or.us

Co-Author:

- (1) Active Member Associate Member

David Shih, MD, MS
Epidemic Intelligence Service Officer
Oregon Health Authority, Acute and Communicable Diseases Prevention Section
800 NE Oregon St.
Ste 772
Portland, OR 97232
971-673-0497
David.C.Shih@dhsaha.state.or.us

- (2) Active Member Associate Member

P. Maureen Cassidy, MPH
Epidemiologist
Oregon Health Authority, Acute and Communicable Diseases Prevention Section
800 NE Oregon St.
Ste 772
Portland, OR 97232
971-673-1043
Maureen.P.Cassidy@dhsaha.state.or.us

- (3) Active Member Associate Member

Paul Cieslak, MD
Medical Director
Oregon Health Authority, Acute and Communicable Diseases Prevention Section
800 NE Oregon St.
Ste 772
Portland, OR 97232
971-673-1082
Paul.R.Cieslak@dhsaha.state.or.us

- (4) Active Member Associate Member

Richard Leman, MD
Chief Medical Officer
Oregon Health Authority, Public Health Division
Health Security, Preparedness, and Response, Center for Public Health Practice

800 NE Oregon ST
Ste 772
Portland, OR 97232
971-673-1089
Richard.F.Leman@dhsosha.state.or.us

- (5) Active Member Associate Member

Zintars Beldavs
ACDP Section Manager
Oregon Health Authority, Public Health Division
Center for Public Health Practice
Acute and Communicable Disease Prevention (ACDP)
800 NE Oregon St Ste 772
Portland, OR 97232-2187
971-673-0166
Zintars.G.Beldavs@dhsosha.state.or.us

- (6) Active Member Associate Member

Suzanne Zane, DVM, MPH
Senior Maternal & Child Health Epidemiologist
Maternal and Child Health Section
Center for Prevention and Health Promotion
Oregon Health Authority
800 NE Oregon Street, Suite 825
Portland, OR 97232
971-673-0559
suzanne.zane@state.or.us

- (7) Active Member Associate Member

Katrina Hedberg, MD, MPH
Health Officer and State Epidemiologist
Oregon Health Authority, Public Health Division
800 NE Oregon St.
Ste 772
Portland, OR 97232
971-673-1050
Katrina.Hedberg@dhsosha.state.or.us

- (8) Active Member Associate Member

Marion Angelika Kainer MD, MPH, FRACP, FSHEA
Director, Healthcare Associated Infections and Antimicrobial Resistance Program
Tennessee Department of Health
710 James Robertson Parkway
Nashville, TN, 37243
615-741-7247
marion.kainer@tn.gov

- (9) Active Member Associate Member

Raphaelle H. Beard, MPH
Epidemiologist II, Healthcare Associated Infections and Antimicrobial Resistance Program
Tennessee Department of Health
710 James Robertson Parkway
Andrew Johnson Tower 3rd Floor
Nashville, TN 37243
615-253-9972
Raphaelle.Beard@tn.gov

- (10) Active Member Associate Member

Pamela Talley MD
Deputy Director, Healthcare Associated Infections and Antimicrobial Resistance Program
Tennessee Department of Health
Andrew Johnson Tower
710 James Robertson Parkway
Nashville, TN 37243
615-532-6821
pamela.talley@tn.gov

- (11) Active Member Associate Member

Eileen Farnon, MD, MPH
HAI/AR Program Director
Philadelphia Department of Public Health
500 S. Broad St.
2nd Floor
Philadelphia, PA 19146
(215)685-6827
eileen.farnon@phila.gov

- (12) Active Member Associate Member

Matthew Crist, MD, MPH
Medical Officer, Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention
1600 Clifton Road
MS A-31
Atlanta, GA 30329
404-639-8268
cwu0@cdc.gov

- (13) Active Member Associate Member

Shannon Novosad, MD
Epidemic Intelligence Service Officer, Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention
1600 Clifton Road
MS A-31
Atlanta, GA 30329
404-639-4353

ydz1@cdc.gov

- (14) Active Member Associate Member

Kiran M Perkins, MD, MPH
Medical Officer, Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention
1600 Clifton Road
MS A-31
Atlanta, GA 30329
404-639-1161
guu9@cdc.gov

- (15) Active Member Associate Member

Joseph F. Perz, DrPH
Lead, Quality Standards and Safety Team, Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention
1600 Clifton Road
MS A-31
Atlanta, GA 30329
404-639-1544
bzp4@cdc.gov

- (16) Active Member Associate Member

Sujan C. Reddy, MD
Medical Officer, Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention
1600 Clifton Road
MS A-31
Atlanta, GA 30329
404-718-6665
kuj0@cdc.gov

- (17) Active Member Associate Member

Kevin Winthrop, MD, MPH
Professor of Public Health
Associate Professor of Infectious Diseases and Ophthalmology
Oregon Health & Science University
3181 SW Sam Jackson Park Rd
Mail Code GH 104
Portland, OR 97239
503-494-5496
winthrop@ohsu.edu