Antimicrobial Steward Call
April 8, 2019
Tennessee Department of Health
Healthcare Associated Infections and Antimicrobial Resistance Program
Welcome
Adobe Connect Housekeeping

- All lines have been muted
- Press *6 to unmute your line
- Also can use the chat box to ask questions/comment
**2019 Reportable Conditions**

- **Candida auris** (including rule-out)
- Carbapenem-resistant Enterobacteriaceae (all genera)
- Carbapenem-resistant *Acinetobacter baumanii* *
- Colistin-resistant gram-negative bacteria
- ESBL-producing Enterobacteriaceae *
- Healthcare-associated infections
- Pan-nonsusceptible organisms and other unusual resistance patterns
- *Staphylococcus aureus*, vancomycin non-susceptible
- *Streptococcus pneumoniae* invasive disease
- Vancomycin-resistant Enterococcal invasive disease

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**2019 Tennessee Reportable Disease List for HEALTHCARE PROVIDERS**

<table>
<thead>
<tr>
<th>Disease/Condition</th>
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<tr>
<td>Candida auris</td>
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**Outbreaks and Events of Urgent Public Health Concern:**

- Disease clusters or outbreaks
- Single cases of pan-nonsusceptible organisms, unusual resistance mechanisms, or other emerging or unusual pathogens

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**Legends:**

- United States
- Louisiana
- Minnesota
- Oregon
- Washington
- California
- Florida
- Georgia
- Nevada
- New York
- Texas

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*From designated catchment regions*
Reporting Diseases and Events

• Local/Regional Health Offices:
  – https://www.tn.gov/health/health-program-areas/localdepartments.html

• State/CEDEP:
  – All conditions should be reported online through NBS beginning February 4, 2019: https://hssi.tn.gov/auth/login
  – More information about reporting is available on the Reportable Diseases website at https://www.tn.gov/health/cedep/reportablediseases.html
  – Contact CEDEP at (615) 741-7247 or (800) 404-3006.
Candida auris
DEADLY GERMS, LOST CURES

A Mysterious Infection, Spanning the Globe in a Climate of Secrecy

The rise of Candida auris embodies a serious and growing public health threat: drug-resistant germs.
Candida auris
Agent

- Multidrug-resistant yeast
- First described after being isolated from external ear discharge in 2009 in Japan
- CDC issued Clinical Alert to U.S. Healthcare Facilities in June 2016
- Invasive healthcare-associated infections with high mortality
- Can cause outbreaks and spread within healthcare facilities
- Difficult to identify in the lab
### Lab Identification

- **Rule-out**

<table>
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<tr>
<th>Identification Method</th>
<th>Organism C. auris can be misidentified as</th>
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</table>
| Vitek 2 YST                                         | Candida haemulonii  
|                                                     | Candida duobushaemulonii                                                       |
| API 20C                                             | Rhodotorula glutinis (characteristic red color not present)  
|                                                     | Candida sake                                                                   |
| BD Phoenix yeast identification system              | Candida haemulonii  
|                                                     | Candida catenulata                                                            |
| MicroScan                                           | Candida famata  
|                                                     | Candida guilliermondii  
|                                                     | Candida lusitaniae  
|                                                     | Candida parapsilosis                                                           |
| RapID Yeast Plus                                    | Candida parapsilosis                                                           |
Intensive care unit closed after new deadly superbug emerges in the UK
Resistance to Antifungals

90%  30%  5%
Case Definition Subtypes

- Colonization/Screening
- Clinical

 Patients can be colonized without active infection
  - Skin and other body sites

 A clinical case is not counted as a colonization/screening case if found to be colonized after infection
 A colonization/screening case can also be counted as a clinical case if infection develops after known colonization
Colonization/Screening - Confirmed

- Person with confirmatory laboratory evidence from a swab collected for the purpose of screening for *C. auris* colonization regardless of site swabbed

- Typical colonization/screening specimen sites are skin (e.g., axilla, groin), nares, rectum, or other external body sites

- Swabs from wound or draining ear are considered clinical
Clinical - Confirmed

- Person with confirmatory laboratory evidence from a clinical specimen collected for the purpose of diagnosing or treating disease in the normal course of care

- Specimens from sites reflecting invasive infection (e.g., blood, cerebrospinal fluid)

- Specimens from non-invasive sites such as wounds, urine, and the respiratory tract, where presence of C. auris may simply represent colonization and not true infection
Risk Factors

- Serious underlying medical conditions
- Recent surgery
- Diabetes
- Broad-spectrum antibiotic and antifungal use
- Prolonged hospitals stays
- Spending time in a nursing home
- Lines and/or tubes (breathing tubes, feeding tubes, central venous catheters)
- Colonization with other MDROs
Signs and Symptoms
Transmission

• Person to person

• Persistent colonization

• Contaminated environment
  – High touch surfaces
  – Equipment

• Survives in environment for long period of time
Prevention

- **Prompt identification**
- **Screen patients with healthcare in a foreign country or in New York City, New Jersey, or Chicago in the last 12 months**
- **Immediately place suspect or confirmed cases in private rooms under contact precautions**
- **Routine and terminal cleaning of patient environment should be done with sporicidal agents (i.e. bleach)**
C. auris clinical cases reported by state — United States, 2013–November 2018

~520 clinical cases
~1420 clinical + screening cases
Reporting

- Includes rule-out
- Phone next business day
  - HAI.health@tn.gov or 615-741-7247 or (800) 404-3006
- Written report using PH-1600 in 1 week
- Isolate submission required
Reason for Surveillance

- Tier 1 organism in CDC’s Interim Guidance for a Public Health Response to Contain Novel or Targeted Multidrug-Resistant Organisms
- CDC issued Clinical Alert to U.S. Healthcare Facilities in June 2016
Responsible Program/Person

- Healthcare Associated Infections and Antimicrobial Resistance Program (HAI/AR)
  - Dr. Marion Kainer
  - Carolyn Stover
Mysterious *Candida* in NE TN
Simultaneous Presentations of Unidentified Candidemia

Paul Lewis, PharmD, BCPS (AQ-ID)
Johnson City Medical Center
Case 1

- 43 y/o incarcerated male with hx of IDU was transferred from another facility for a NSTEMI and a vegetation discovered on the aortic valve, with moderate stenosis, and an EF 20%. He was admitted to the ICU, intubated, and placed on pressers
- Blood cultures were drawn and the patient was empirically started on piperacillin/tazo and vancomycin
- On day 2, condition worsened, patient was made a DNR
- On day 3, aerobic blood culture bottles returned positive for budding yeast
  - Anidulafungin was started
  - Biofire BCID was negative, the organism was plated on a blood agar and incubated overnight
- On day 4, the organism was run on MALDI-TOF, which failed to identify a genus or species
- Patient continued to decline and eventually expired
Case 2

- 40 y/o hispanic male with alcoholism was transferred from same facility with aspiration pneumonia, sepsis/shock, and fungemia
- He was continued on vancomycin, meropenem, and anidulafungin
- Blood cultures drawn on admission at OSH grew budding yeast from the aerobic bottle. BCID was negative
- MALDI-TOF was performed simultaneously in duplicate with the previous patient’s fungus and was negative for identification
- A repeat MALDI-TOF performed 6 hours later (4 total) returned as *Candida parapsilosis*
- Fluconazole was given
- The patient ultimately expired the next day
Could this be *Candida auris*?

**Candida auris:**
A drug-resistant germ that spreads in healthcare facilities

*Candida auris* (also called *C. auris*) is a fungus that causes serious infections. Patients with *C. auris* infection, their family members and other close contacts, public health officials, laboratory staff, and healthcare workers can all help stop it from spreading.
Why is *Candida auris* a problem?

- **It causes serious infections.** *C. auris* can cause bloodstream infections and even death, particularly in hospital and nursing home patients with serious medical problems. More than 1 in 3 patients with invasive *C. auris* infection (for example, an infection that affects the blood, heart, or brain) die.

- **It’s often resistant to medicines.** Antifungal medicines commonly used to treat *Candida* infections often don’t work for *Candida auris*. Some *C. auris* infections have been resistant to all three types of antifungal medicines.

- **It’s becoming more common.** Although *C. auris* was just discovered in 2009, it has spread quickly and caused infections in more than a dozen countries.

- **It’s difficult to identify.** *C. auris* can be misidentified as other types of fungi unless specialized laboratory technology is used. This misidentification might lead to a patient getting the wrong treatment.

- **It can spread in hospitals and nursing homes.** *C. auris* has caused outbreaks in healthcare facilities and can spread through contact with affected patients and contaminated surfaces or equipment. Good hand hygiene and cleaning in healthcare facilities is important because *C. auris* can live on surfaces for several weeks.
<table>
<thead>
<tr>
<th>Identification Method</th>
<th>Database/Software, if applicable</th>
<th>C. auris is confirmed if initial identification is C. auris.</th>
<th>C. auris is possible if the following initial identifications are given. Further work-up is needed to determine if the isolate is C. auris.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruker Biotype MALDI-TOF</td>
<td>RUO libraries (Versions 2014 [5627] and more recent)</td>
<td>C. auris</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>CA System library (Version Claim 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bioMérieux VITEK MS MALDI-TOF</td>
<td>RUO library (with Saramis Version 4.14 database and Saccharomycetaeae update)</td>
<td>C. auris</td>
<td>C. haemulonii No identification</td>
</tr>
<tr>
<td></td>
<td>IVD library</td>
<td>n/a</td>
<td>C. haemulonii No identification</td>
</tr>
<tr>
<td>VITEK 2 YST</td>
<td>Software version 8.01</td>
<td>C. auris</td>
<td>C. duobushaemulonii Candida spp. not identified</td>
</tr>
<tr>
<td></td>
<td>Older versions</td>
<td>n/a</td>
<td>C. haemulonii C. duobushaemulonii Candida spp. not identified</td>
</tr>
<tr>
<td>API 20C</td>
<td></td>
<td></td>
<td>Rhodotorula glutinis (with characteristic red color present) C. sake Candida spp. not identified</td>
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<tr>
<td>BD Phoenix</td>
<td></td>
<td></td>
<td>C. catenulata C. haemulonii Candida spp. not identified</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td>MicroScan</td>
<td></td>
<td></td>
<td>C. lusitaniae* C. guillermondii* C. parapsilosis* C. famata Candida spp. not identified</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td>RapID Yeast Plus</td>
<td></td>
<td></td>
<td>C. parapsilosis* Candida spp. not identified</td>
</tr>
</tbody>
</table>
Next Steps

Notify Tennessee Department of Health
- Develop plan for patients
- Assistance with additional testing

Notify Infection Prevention and the Microbiology Lab
- Implement isolation precautions
- Request additional testing and screening

Notify hospital administration and previous hospital
- Implement additional isolation precautions
- Transparency in communication
C. metapsilosis

- Candida metapsilosis as the least virulent member of the 'C. parapsilosis' complex. 
Come visit Northeast Tennessee! It’s beautiful and not ground zero for Candida auris.
Antibiotic Resistance Lab Network

**WEST**
- Washington State Public Health Laboratories
  - Core Testing
  - N. gonorrhoeae

**CENTRAL**
- Minnesota Department of Health Public Health Laboratory
  - Core Testing
  - C. difficile
  - S. pneumoniae

**MOUNTAIN**
- Texas Department of State Health Services Laboratory
  - Core Testing
  - N. gonorrhoeae

**MIDWEST**
- Wisconsin State Laboratory of Hygiene
  - Core Testing
  - S. pneumoniae

**NATIONAL TUBERCULOSIS MOLECULAR SURVEILLANCE CENTER**
- Michigan Department of Health and Human Services
  - M. tuberculosis

**NORTHEAST**
- Wadsworth Center Laboratories
  - Core Testing

**MID-ATLANTIC**
- Maryland Public Health Laboratory
  - Core Testing
  - N. gonorrhoeae

**SOUTHEAST**
- Tennessee State Public Health Laboratory
  - Core Testing
  - N. gonorrhoeae
Activities

• CDC-directed projects of AR threats:
  – MDR Pseudomonas & Acinetobacter
  – CRE Characterization
  – ESBL-producing Enterobacteriaceae
  – Fungal identification and susceptibility testing of *Candida* species

• Additional non-HAI performed at SE Regional Laboratory
  – Isolate collection for the AR Isolate Bank
  – Antimicrobial susceptibility of *N. gonorrhoeae*
MBL+ Enterobacteriaceae in the U.S.

- From isolates collected in the AR Lab Network – about 7% of CRE are NDM-positive
- Most common type of CP-CRE world wide
- Treatment options very limited
  - 2018 Sanford Guide recommends ceftazidime-avibactam + aztreonam for treatment of serious infections
- There is no way for hospital labs to test for susceptibility to this drug combination
A Pilot Program – Susceptibility Testing of New Drugs

- Closes the gap between new drug approval and the availability of testing methods in hospital laboratories
- HP inkjet printer allows for on-demand reference susceptibility testing of new drugs in regional labs of the AR Lab Network
- Rapid reporting to improve care via AR Lab Network IT reporting to hospitals for tailored patient treatment
Testing of isolates submitted to ARLN

• Susceptibility testing of ceftazidime-avibactam + aztreonam for MBL+ Enterobacteriaceae
  – Ceftazidime-avibactam
  – Aztreonam
  – Ceftazidime-avibactam + aztreonam
  – Aztreonam-avibatam

• Turn-around-time of 3 working days

• Which isolates can be submitted:
  – Enterobacteriaceae that test resistant to either ceftazidime-avibactam or meropenem-vaborbactam, or
  – Enterobacteriaceae that are positive for NDM, VIM or IMP by a molecular test
For More Information

- ARLN.Health@tn.gov
- HAI.Health@tn.gov
Final Announcements

• TDH AU PP Survey
  • Q1 2019 Data due 04/30/2019

• Next Call
  • June 11 at 2pm Eastern/1pm Central Time
  • Effects of Data Suppression for Antibiotic Susceptibility Testing

• Opportunities for involvement
  • Speaker or Topic for future call
  • Antibiotic Use Reporting into NHSN and TDH AU Point Prevalence Survey

• Feedback always appreciated
  • Christopher.evans@tn.gov