Candidemia: New Sentinel Surveillance in the 7-County Metro

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Objectives

- Describe candidemia epidemiology and antifungal resistance
- Explain upcoming candidemia surveillance in the 7-county metro area
- Clarify the expectations for submission of possible *Candida auris* isolates
- Discussion/questions
Candida spp.

- Yeast that colonizes the gastrointestinal tract and skin
- Low risk of invasive infection in healthy individuals
- Can cause invasive candidiasis (IC) in susceptible hosts
  - 46,000 health care-associated infections (HAIs) per year
  - Risk factors: antibiotics, immunosuppression, neutropenia, abdominal surgery, ICU admissions
  - Infection sites: bloodstream (candidemia), deep-seated organ infections, other normally sterile sites
  - Increased mortality, patient length of stay, and health care costs
- Over 90% of IC caused by five species: *C. albicans*, *C. glabrata*, *C. tropicalis*, *C. parapsilosis*, and *C. krusei*
Candidemia

- Most common form of IC
- Among the most common types of HAI bloodstream infections
- Attributable mortality 10-49%*
- Requires prompt treatment with an effective antifungal
  - Complicated by
    - Diagnostic challenges
    - Antifungal resistance

Fluconazole Resistance in *Candida*

- Fluconazole is the most readily available and frequently prescribed antifungal
- Fluconazole-resistant *Candida* included as serious threat in a 2013 CDC report
- Resistance varies by species
  - *C. albicans* (low), *C. glabrata* (high)
Echinocandin and Multidrug Resistance in *Candida glabrata*

- Echinocandins are now the first line of therapy for IC
- *C. glabrata*
  - Increase in echinocandin resistance
  - Increase in multidrug resistance

*C. glabrata* comprised 74% of echinocandin-resistant and 94% of multidrug-resistant isolates

Changing Species Distribution

- 1980s: *C. albicans* comprised 76% of cases
- 1990s: Decreasing proportion of *C. albicans* and increasing proportion of *C. glabrata*
- Current picture:

Oregon EIP Candidemia Surveillance:
Candidemia Surveillance

- CDC Emerging Infections Program (EIP)
  - Started in 2008
  - Five states currently conduct surveillance
  - Minnesota and other EIP sites joining in 2017
- Goals:
  - Track incidence of candidemia and monitor trends
  - Detect emergence and spread of antifungal resistance
  - Estimate the national burden of disease
  - Understand and describe genetic mutations associated with resistance
  - Identify areas where candidemia prevention and intervention strategies can be focused
Case definition:
Blood culture positive for Candida from a resident of the 7-county metro (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington Counties)

- Begins with specimen collection dates of 1/1/2017
- Updated Reportable Disease Poster available early January

Diseases Reportable to the Minnesota Department of Health

Report immediately by telephone:
- Anthrax (Bacillus anthracis)
- Botulism (Clostridium botulinum)
- Brucellosis (Brucella spp.)
- Cholera (Vibrio cholerae)
- Diphtheria (Corynebacterium diphtheriae)
- Ebola (Ebolavirus species)
- Encephalitis (rabies and human cases and suspected cases)
- Influenza and pneumococcal pneumonia
- Orthopox virus
- Plague (Yersinia pestis)
- Poliomyelitis
- Rabies (Canidae) (Canis lupus familiaris)
- Rabies (other animals)
- Respiratory syncytial virus (RSV)

Sentinel Surveillance:
- *Diseases reportable through sentinel surveillance are reportable based on the residence of the patient or the specific healthcare facility. Sentinel surveillance is not statewide reporting.

- Staphylococcus aureus
- Candidemia (Candida spp. (blood isolates only))
- Carbapenem-resistant Acinetobacter spp. (CR-ABA), and Pseudomonas aeruginosa (CR-PM)
- Clostridium difficile
- Severe Acute Respiratory Illness
- Respiratory syncytial virus (RSV)
How and What to Report

- Report cases using Disease Report Card:
  - Currently “Yellow Card” – updated version available early January

http://www.health.state.mn.us/divs/idepc/dtopics/reportable/forms/reptcard.html
How and What Isolates to Submit

- Save and send all *Candida* spp. from **blood cultures** (sterile sites not included at this time)
- If a patient with many duplicate isolates of the same *Candida* spp. is encountered, call lab to discuss limiting submission
- Send on any **media** that supports the growth of yeast
- Include **copy of susceptibility** result performed in your laboratory (automated, Etest, MIC, etc.)
How and What Isolates to Submit

Clinical Testing and Submission Form

Be sure to include:

- Project number (2151)
- Patient information
- Specimen source
- Collection date
- Isolate genus/species

http://www.health.state.mn.us/divs/phl/clin/print_mdh.pdf
Lab Testing at MDH-PHL

- Verify identification by MALDI-TOF
- Performing susceptibility on *C. glabrata* by TREK MIC – currently research use only (RUO)
  - Voriconazole
  - Anidulafungin
  - Caspofungin
  - Fluconazole
  - Itraconazole
  - Isavuconazole
  - Posaconazole
  - Micafungin
Lab Testing

- Other *Candida sp.* will be forwarded to CDC for additional susceptibility testing.
- Goal – yearly antibiogram to describe the landscape of *Candida sp.* anti-fungals for Minnesota isolates
Lab Reports from MDH-PHL

- If identification does not correlate with submitted ID, then the laboratory will be notified (discussion)
- No susceptibility results will be reported initially
- Discussions with CDC and others regarding reporting of susceptibility results (discussion)
Assessment of Lab Practices

- Laboratory practice questionnaire will be sent out in January to collect data on:
  - *Candida* culture volumes
  - *Candida* identification practices
  - Antifungal susceptibility testing methods and practices
MDH Follow-up of Reported Cases

- MDH staff will conduct chart reviews to complete case report forms
- Work with each facility to coordinate review
Candidemia Surveillance Summary

- Reporting of cases beings January 1, 2017
- Please fill out the Disease Report Card
- Submission of isolates to MDH-PHL
Candidemia Surveillance Resources

CDC invasive candidiasis website:

- Describes EIP surveillance sites and activities
- Data
- Relevant publications
Questions/Discussion
Candida auris: Globally emerging, multidrug-resistant yeast
Global Emergence of *C. auris*

- First report from Japan in 2009
  
  *Candida auris* sp. nov., a novel ascomycetous yeast isolated from the external ear canal of an inpatient in a Japanese hospital
  
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- South Korea reports
  - 2011: 3 cases of *C. auris* candidemia at 1 hospital, 1996 and 2009

- To date, reports in 12 countries, including the U.S.
Why the Concern about *C. auris*?

- Invasive infections with mortality estimated at 60%
- High level of antifungal resistance
  - 93% resistant to fluconazole
  - 35% resistant to amphotericin B
  - 7% resistant to echinocandins
  - 41% multidrug-resistant and 4% resistant to all three major antifungal classes
- Usually misidentified by clinical laboratories
  - Other *Candida* spp., *Rhodotorula* or *Saccharomyces*
- Causes outbreaks in health care settings
  - Can colonize health care environments and skin
  - Infection control challenges
C. auris Outbreaks

- Pakistan, single hospital, 2014-2015
  - 30 cases
  - Initially identified as *Saccharomyces cerevisiae*
  - Requested CDC assistance in 2015

- UK, adult ICU, 2015-2016
  - >40 patients colonized or infected, 20% of these with candidemia
  - Difficult to control, even with intensive infection prevention efforts
  - Environmental transmission with persistence in hospital rooms despite cleaning
Alerts to Health Care Facilities

- CDC: June 2016
  
  https://www.cdc.gov/fungal/diseases/candidiasis/candida-auris-alert.html

- MDH alert to clinical labs and IPs: July 2016
  - Requested isolates for *C. haemulonii* or *S. cerevisiae* from sterile sites
  - Infection control recommendations
C. auris in the U.S.

- CDC MMWR report describing first 7 reported cases, 2013-2016
  - 5 East Coast, 2 Illinois
  - 5 blood, 1 urine, 1 ear
  - 5 misidentified as C. haemulonii or Candida spp.
  - 4 died
  - Isolated from patient’s health care environment
  - Evidence of transmission in health care setting

**Morbidity and Mortality Weekly Report (MMWR)**

Investigation of the First Seven Reported Cases of *Candida auris*, a Globally Emerging Invasive, Multidrug-Resistant Fungus — United States, May 2013–August 2016

*Weekly* November 11, 2016 / 65(44):1234–1237
C. auris in the U.S. (cont.)

As of December 13, 2016
https://www.cdc.gov/fungal/diseases/candidiasis/candida-auris.html
Current Request for Case Notification and Isolate Submission

- MDH update to clinical labs and IPs: November, 2016
- Notify MDH and submit isolates (project # 2093) of the following *Candida* species from any body site:
  - *Candida auris*
  - *Candida haemulonii*
  - *Candida famata*
  - *Candida sake*
  - *Saccharomyces cerevisiae*
  - *Rhodotorula glutinis*
  - *Candida* spp.
    - Only if isolate could not be identified. Do not send isolates that had no identification performed/attempted
Biochemical-based tests: API, BD Phoenix, VITEK-2, MicroScan
- *C. auris* not in libraries
- Most commonly identified organism varies by type of testing instrument*
  - API: *R. glutinis*
  - BD Phoenix: *C. haemulonii*
  - VITEK-2: *C. haemulonii*
  - MicroScan: *C. famata, C. guilliermondii*, other species

Identification of *C. auris* currently requires MALDI-TOF or sequencing
- However, *C. auris* is not included in all MALDI databases

Current Infection Control Recommendations for *C. auris*

- Single rooms
- Standard and Contact Precautions
- Notify receiving facilities if transferring patient
- Assessment of colonization: axilla and groin swabs
- Thorough daily and terminal cleaning and disinfection of patients’ rooms using EPA-registered hospital-grade disinfectant with fungal claim
C. auris Resources

- General: https://www.cdc.gov/fungal/diseases/candidiasis/candida-auris.html

- Recommendations for Health Care Facilities and Labs: https://www.cdc.gov/fungal/diseases/candidiasis/recommendations.html

- MMWR: https://www.cdc.gov/media/pdf/releases/2016/p1104-candida-auris-mm6544e1-ebook.pdf
Questions?

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