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Tackling an Invasive, Emerging, Multi-drug Resistant Yeast: *Candida auris*—What Healthcare Providers Need to Know

Clinician Outreach and Communication Activity (COCA) Webinar

August 15, 2017


FUNGAL DISEASE AWARENESS WEEK
AUGUST 14-18, 2017
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Today's webinar will be archived

When: A few days after the live call

What: All call recordings (audio, webinar, and transcript)

Where: On the COCA Call webpage

https://emergency.cdc.gov/coca/calls/2017/callinfo_072717.asp

At the conclusion of today's webinar, the participant will be able to:

- Explain the epidemiology of *C auris*
- Describe the guidance for diagnosis and treatment of *C auris*
- Describe the infection control recommendations for containing *C auris*

Today's Presenter

Tom Chiller, MD, MPHTM
Chief, Mycotic Diseases Branch
Office of Infectious Diseases
National Center for Emerging and Zoonotic Diseases
Centers for Disease Control and Prevention

National Center for Emerging and Zoonotic Infectious Diseases

Tackling an Invasive, Emerging, Multi-drug Resistant Yeast: *Candida auris*—What Healthcare Providers Need to Know

Tom Chiller MD MPHTM

Chief

CDC Mycotic Diseases Branch

What the public thinks

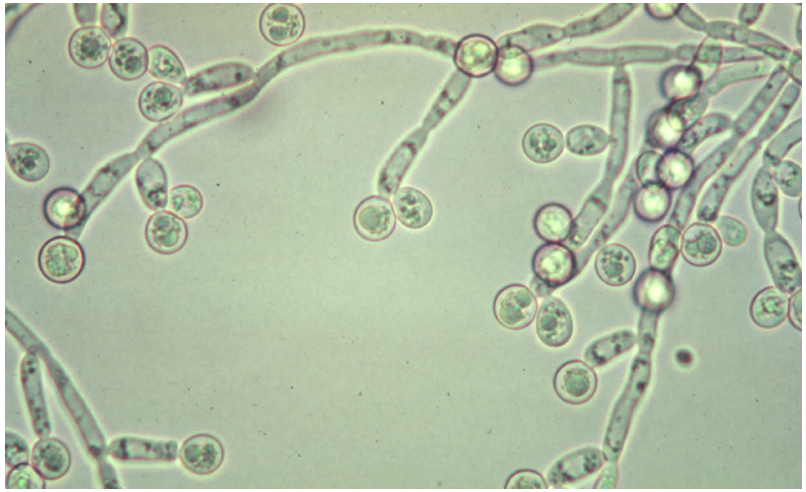
What the healthcare professionals think

Fungus

Fungi can cause serious invasive infections

- Candidemia

  Most common healthcare-associated BSI in a recent US point prevalence study
- Incidence of 5-15/100,000
- 30-50% mortality



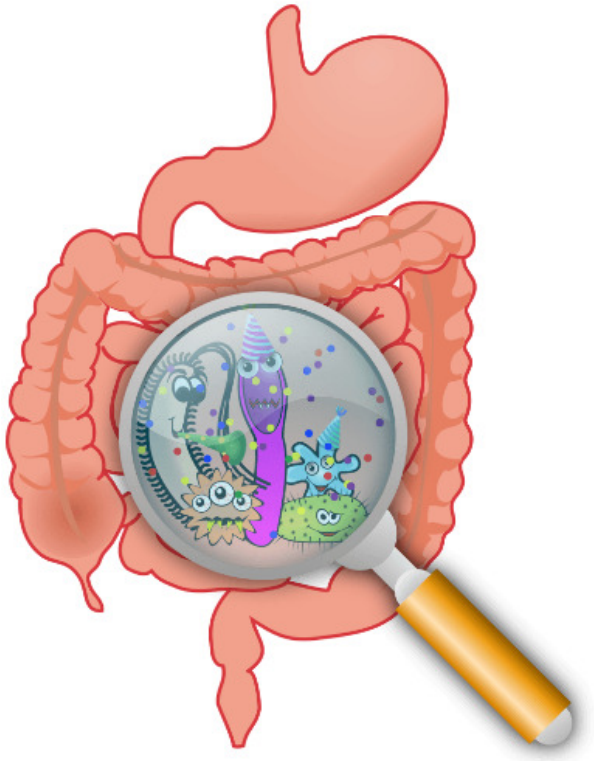
Magill et al, Multisite point prevalence survey of HAIs, NEJM 2012

Risk Factors for Candidemia ("the other *C. diff*")

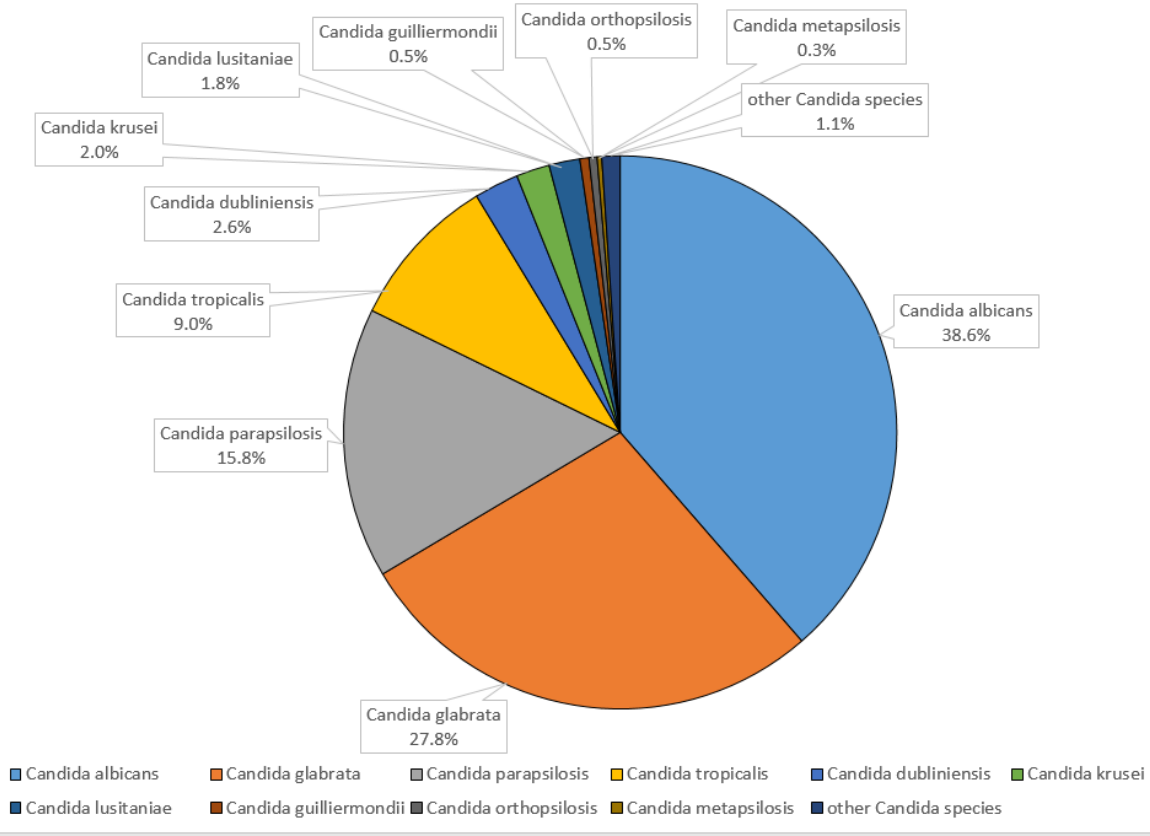
- Broad-spectrum antibiotic use
- Immune compromise
- Prolonged ICU stay
- Abdominal surgery
- Central lines

Source of infection

- **Conventional wisdom**: autoinfection with host gut flora
- Transmission in hospital environments not thought to be common
- Outbreaks rare



Candida species distribution, EIP Surveillance, U.S. 2008-2016 (n=~7000 isolates)



Why Do We Care About an Obscure *Candida* Species called *C. auris?*

Discovery of *C. auris*—2009

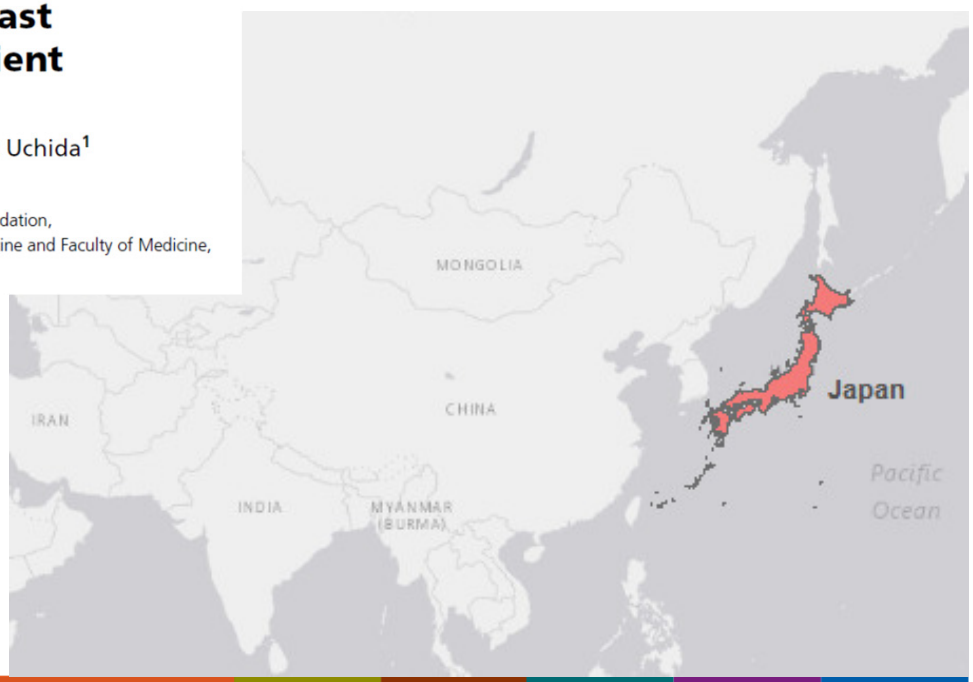
ORIGINAL ARTICLE

Candida auris sp. nov., a novel ascomycetous yeast isolated from the external ear canal of an inpatient in a Japanese hospital

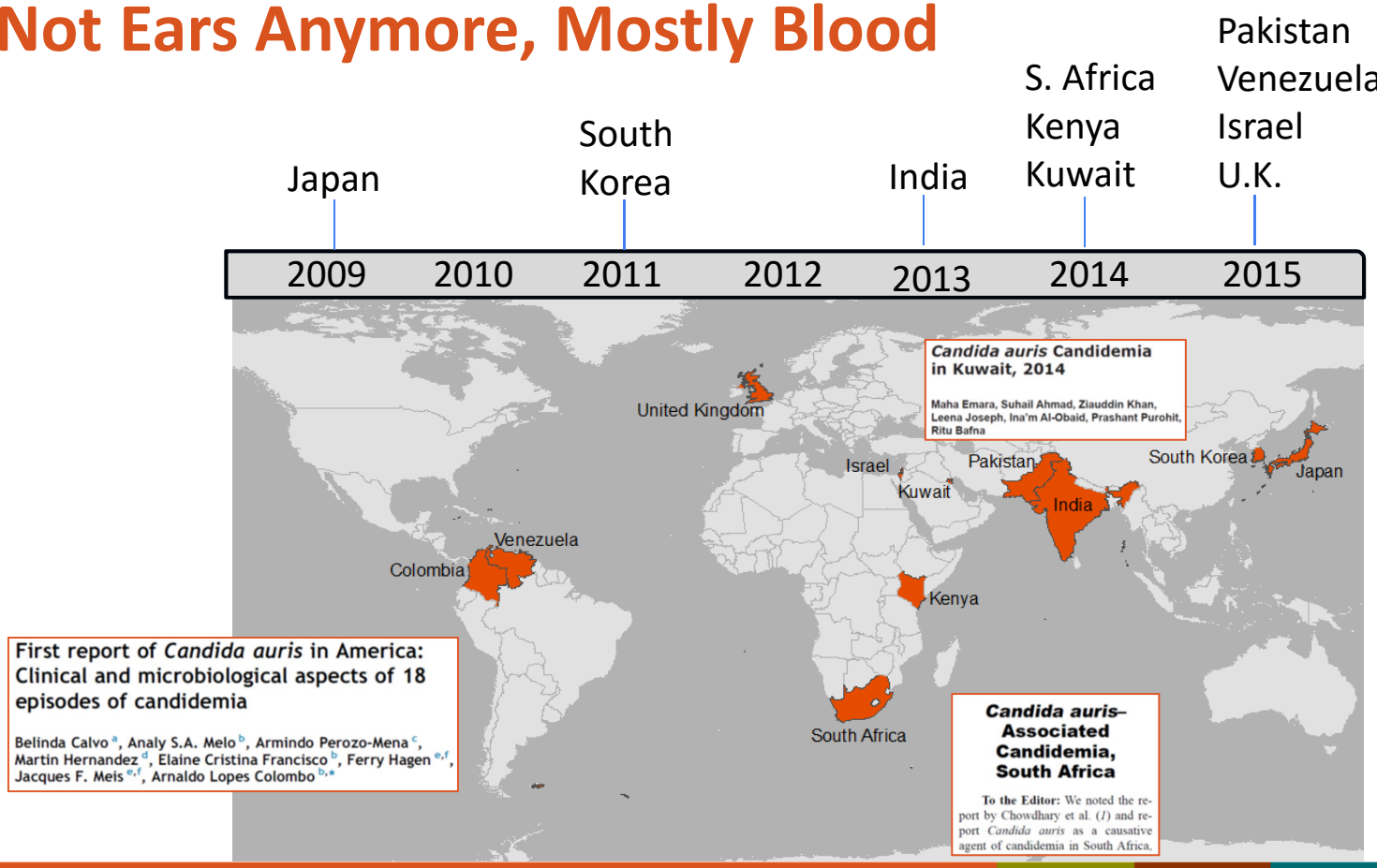
Kazuo Satoh[1,2], Koichi Makimura[1,3], Yayoi Hasumi[1], Yayoi Nishiyama[1], Katsuhisa Uchida[1] and Hideyo Yamaguchi[1]

[1]Teikyo University Institute of Medical Mycology, 359 Otsuka, Hachioji, Tokyo 192-0395, [2]Japan Health Sciences Foundation, 13-4 Nihonbashi-Kodenmacho, Chuo-ku, Tokyo 103-0001 and [3]Genome Research Center, Graduate School of Medicine and Faculty of Medicine, Teikyo University, Otsuka 359, Hachioji, Tokyo 192-0395, Japan

Auris is Latin for ear



Rapid Emergence Since 2009
Not Ears Anymore, Mostly Blood



Multidrug Resistant *Candida auris*

Polyenes

Azoles

Echinocandins

- A few resistant to all three classes

Healthy Skepticism

- Was *C. auris* with us all along?
- Maybe newer diagnostic methods responsible for supposed emergence
  - MALDI-TOF
  - DNA sequencing
- Most systems misidentify as *Candida haemulonii* or other species

Not Just Improved Detection

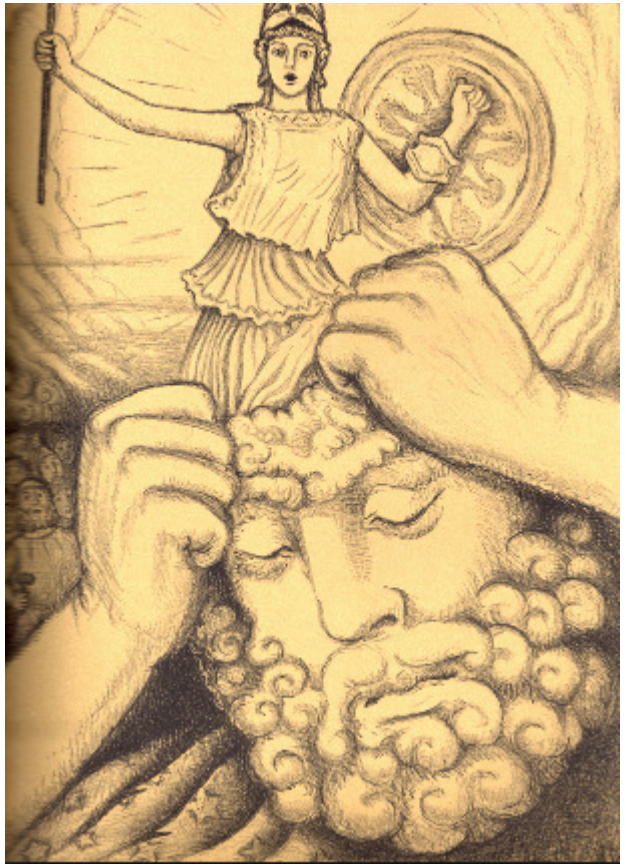
- EIP Candidemia Surveillance Program
  - >7000 *Candida* isolates collected in U.S. 2008 –2016
  - No *C. auris*

- SENTRY and ARTEMIS programs (private collections from 4 continents)
  - >30,000 *Candida* isolates from 1996-2015
  - No *C. auris* before 2009

- Earliest known isolate of *C. auris* has been recorded in S. Korea in 1996

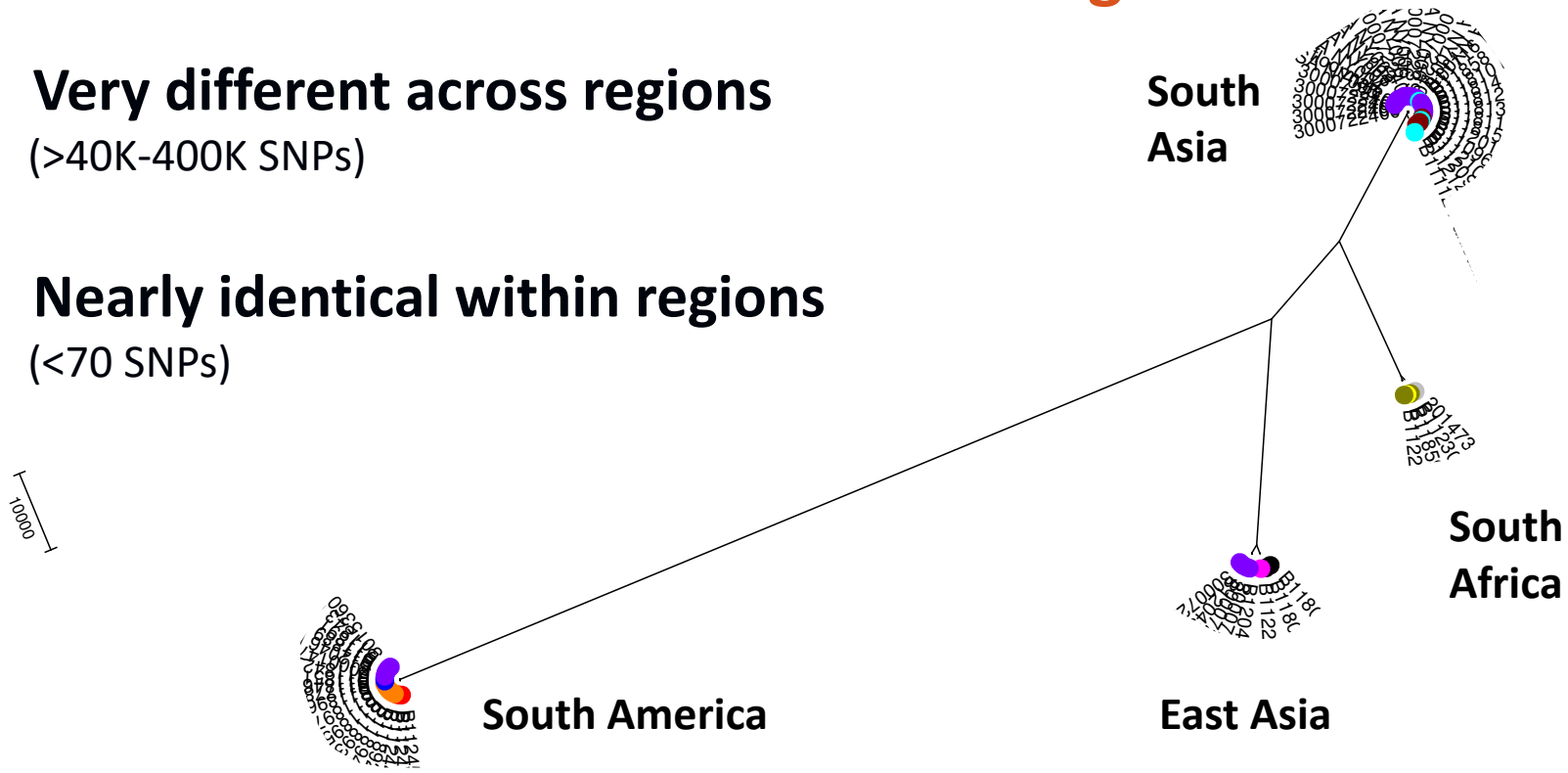
How Did *C. auris* Emerge?

- Global spread of single epidemic strain? (e.g., through food or medical product)
- Many introductions from the environment or other sources?
- Whole-genome sequencing (WGS) provides remarkable but puzzling results



WGS of 47 isolates from 4 world regions

- **Very different across regions**
  (>40K-400K SNPs)
- **Nearly identical within regions**
  (<70 SNPs)



But This Really Got Our Attention…

- *C. auris* outbreak in a UK hospital
- 9 *C. auris* bloodstream infections
- >40 people colonized
- Clear patient-to-patient transmission

Hard to Control

- Contact precautions
- Screening for colonization
- Chlorhexidine bathing
- Cleaning room with bleach 3X/day
- Terminal cleaning with higher concentration bleach
- Eventually closed unit

C. auris cultured from many hospital surfaces

CDC Clinical Alert to Healthcare Facilities – June 2016

Fungal Diseases

Fungal Diseases
Types of Fungal Diseases −
Aspergillosis +
Blastomycosis +
Candidiasis −
Oropharyngeal / Esophageal Candidiasis
Genital / vulvovaginal candidiasis
Invasive candidiasis
Candida auris Q&A
***Candida auris* Alert**
Coccidioidomycosis +
C. neoformans Infection +
C. gattii Infection +
Fungal Eye Infections +

CDC > Fungal Diseases > Types of Fungal Diseases > Candidiasis

Clinical Alert to U.S. Healthcare Facilities

Global Emergence of Invasive Infections Caused by the Multidrug-Resistant Yeast *Candida auris*

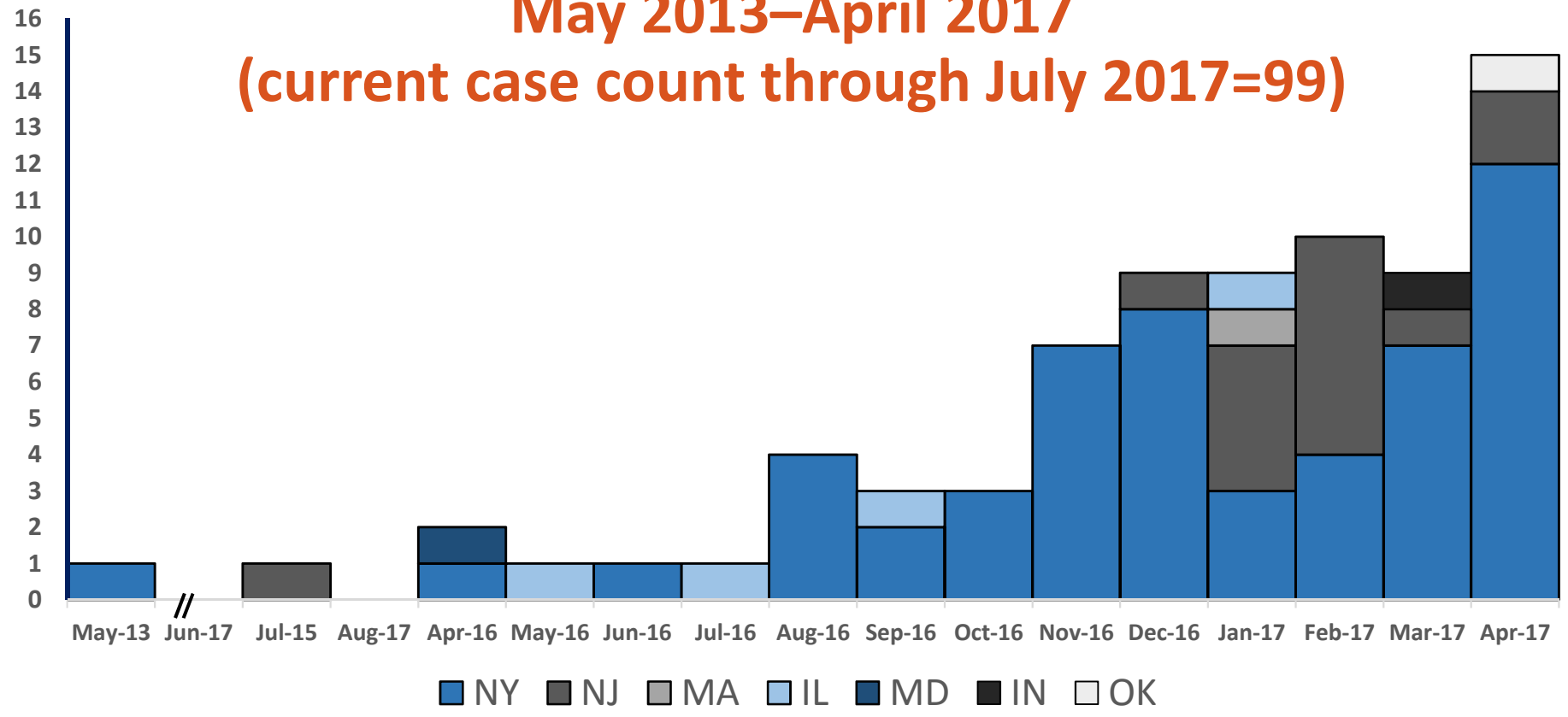
Summary: The Centers for Disease Control and Prevention (CDC) has received reports from international healthcare facilities that *Candida auris*, an emerging multidrug-resistant (MDR) yeast, is causing invasive healthcare-associated infections with high mortality. Some strains of *C. auris* have elevated minimum inhibitory concentrations (MICs) to the three major classes of antifungals, severely limiting treatment options. *C. auris* requires specialized methods for identification and could be misidentified as another yeast when relying on traditional biochemical methods. CDC is aware of one isolate of *C. auris* that was detected in the United States in 2013 as part of ongoing surveillance. Experience outside the United States suggests that *C. auris* has high potential to cause outbreaks in healthcare facilities. Given the occurrence of *C. auris* in nine countries on four continents since 2009, CDC is alerting U.S. healthcare facilities to be on the lookout for *C. auris* in patients.

Background

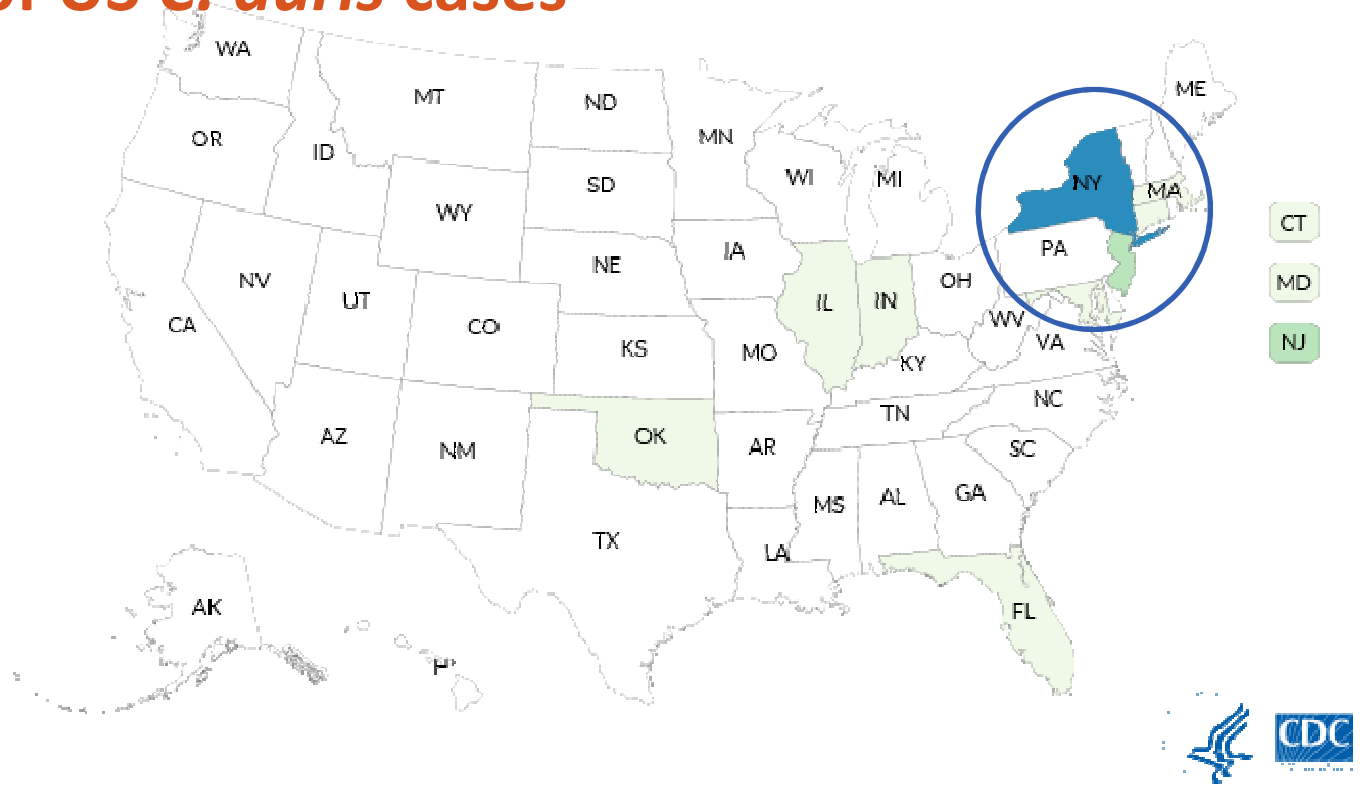
Candida auris is an emerging multidrug-resistant (MDR) yeast that can cause invasive infections and is associated with high mortality. It was first described in 2009 after being isolated from external ear discharge of a patient in Japan [1]. Since the 2009 report, *C. auris* infections, specifically fungemia, have been reported from South Korea [2], India [3], South Africa [4], and Kuwait [5]. Although published reports are not available, *C. auris* has also been identified in Colombia, Venezuela, Pakistan, and the United Kingdom.

It is unknown why *C. auris* has recently emerged in so many different locations. Molecular typing of strains performed by CDC suggests isolates are highly

Clinical *C. auris* cases by date
May 2013–April 2017
(current case count through July 2017=99)



Map of US *C. auris* cases



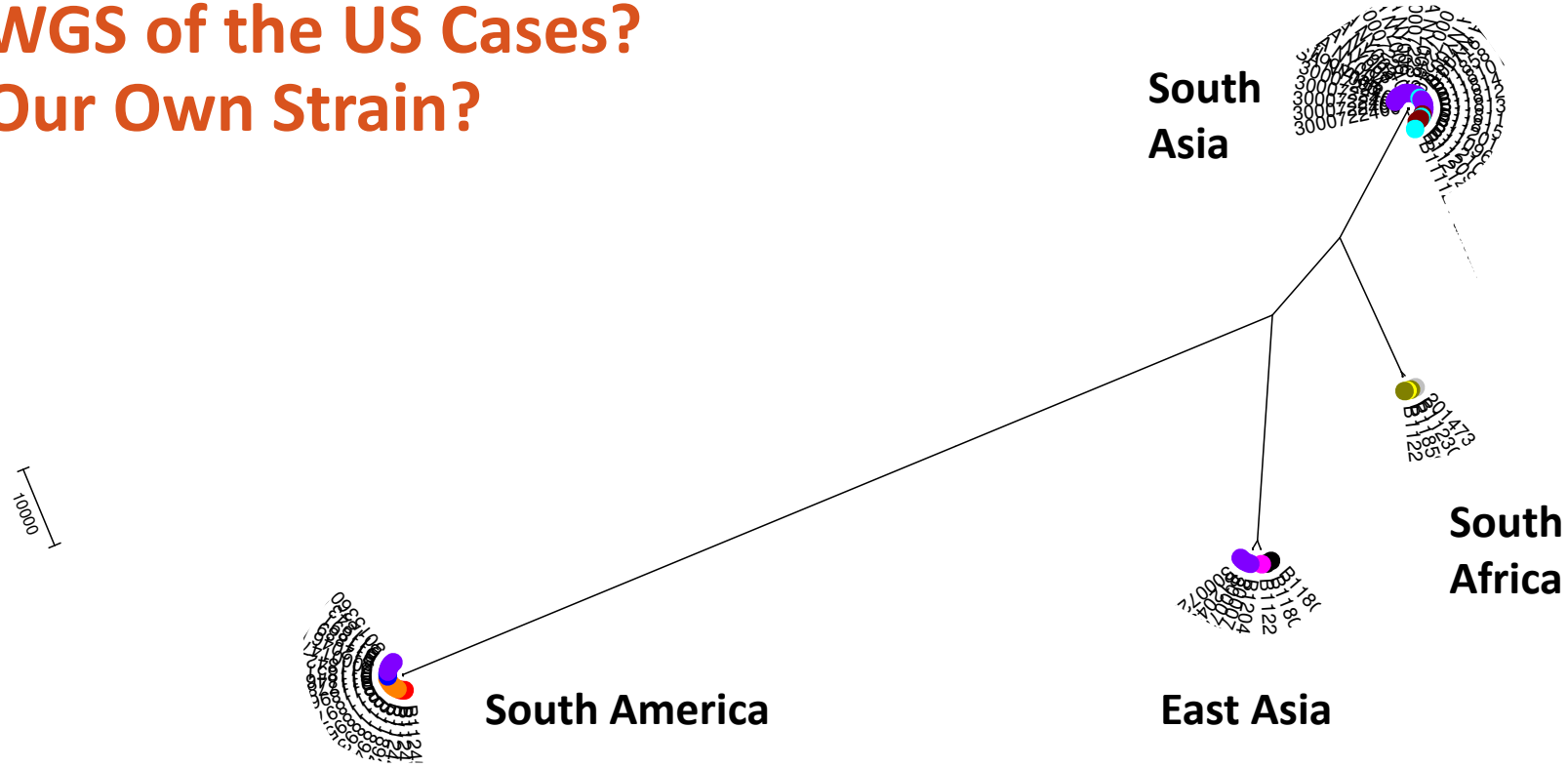
Epidemiologic Characteristics of US Cases

- 75% of isolates from blood
- Median age: 70; one case in a neonate
- Multiple underlying medical conditions and indwelling devices
  - Tracheostomy tube, central venous catheter, gastrostomy tube
- Extensive healthcare exposure (acute care hospitals, LTACHs, vSNFs)
- Resistant: 80% to Fluconazole, 40% to Ampho B, ~3% to Echinocandins
- ~30% 30-day mortality

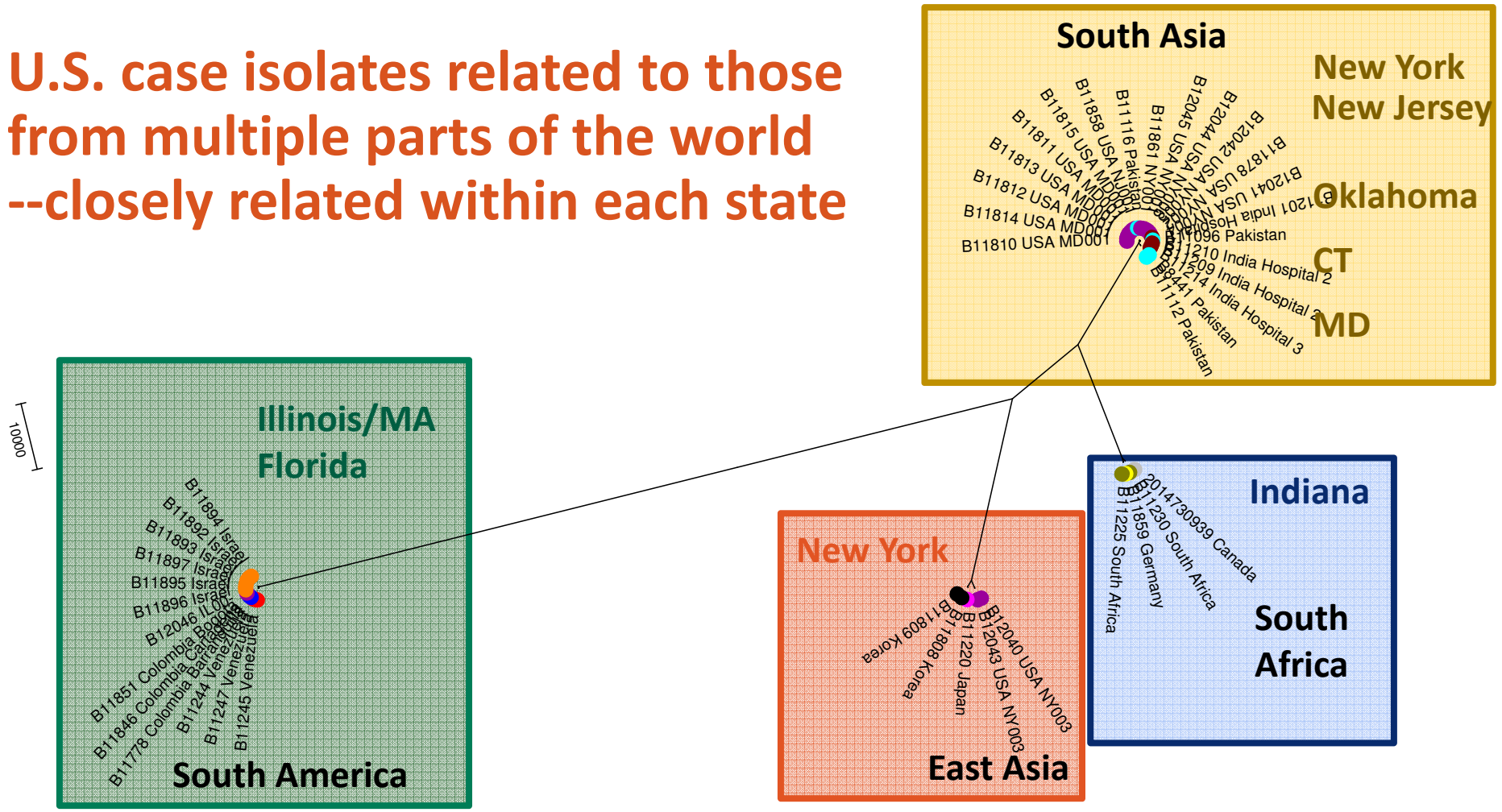
Four cases with recent travel

- Countries involved:
  - India
  - Pakistan
  - South Africa
  - Venezuela
- Cases involved urine and wound cultures
- Occurred in CT, OK, IN, FL

WGS of the US Cases?
Our Own Strain?



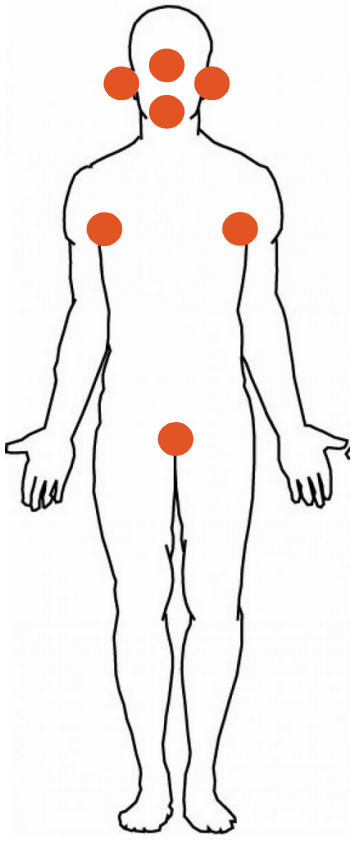
U.S. case isolates related to those from multiple parts of the world --closely related within each state



Recent emergence (mid 2015)
Multiple introductions of *C. auris*
followed by local transmission

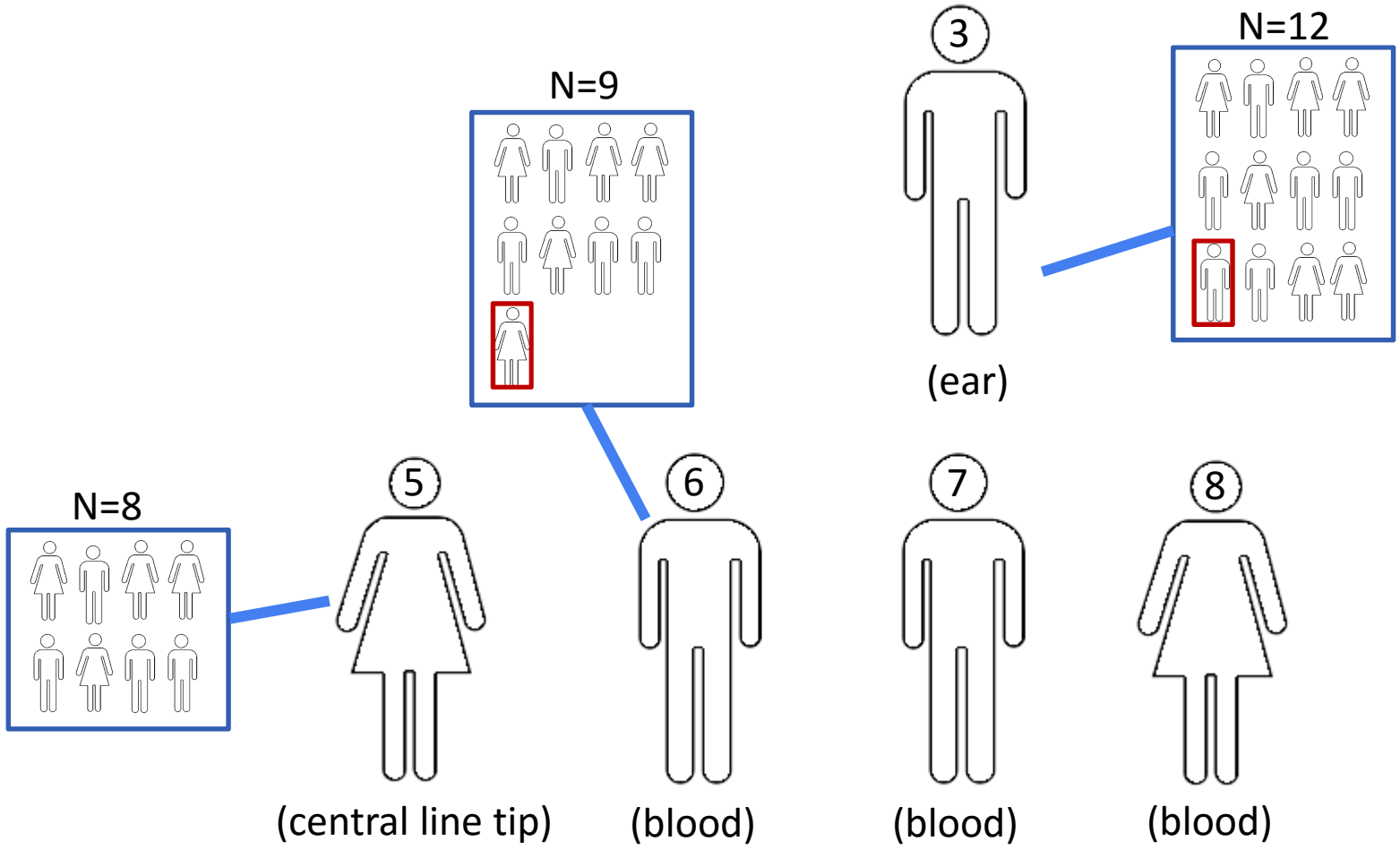
Transmission of Candida?

C. auris Colonizes Skin and Other Body Sites



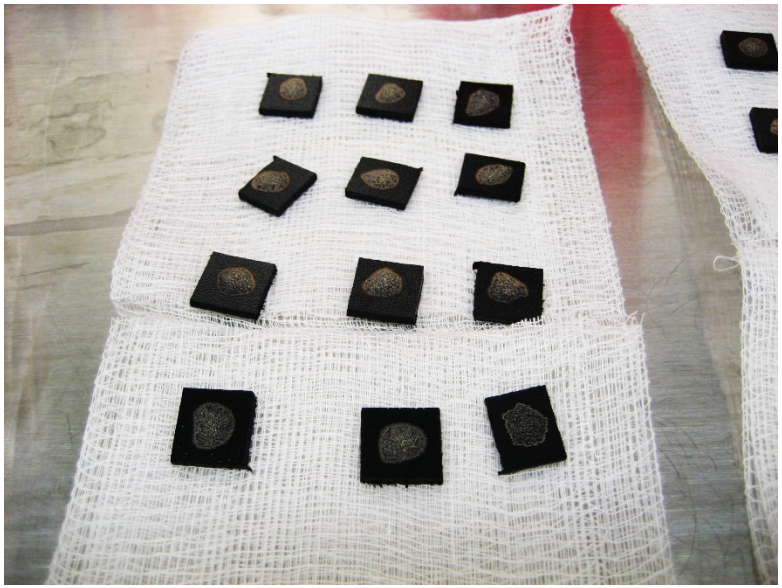
C. auris Contaminates the Environment

Contacts Get Colonized with *C. auris*



What Could Account for Transmission?

- Persists as skin colonizer for many months
- In lab, persists for >4 weeks on plastic surfaces
- Quaternary ammonium compounds inadequate for disinfection



A Paradigm Shift for *Candida* infections

- Antifungal resistance is the norm
- Thrives on skin
- Contaminates patient rooms
- **CAN SPREAD IN HEALTHCARE SETTINGS**

Controlling the spread of *C. auris*

IDENTIFY

TREAT

INFECTION CONTROL

Challenges with Identification

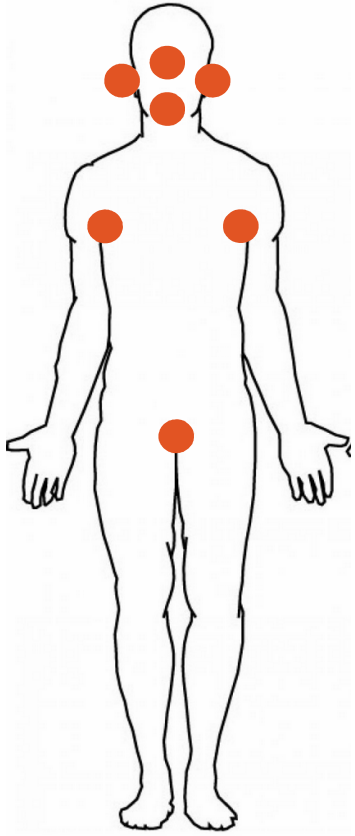
- *C. auris* can be misidentified as
  - *Candida haemulonii*
  - *Candida famata*
  - *Candida sake*
  - *Candida guilliermondii*
  - *Candida lusitaniae*
  - *Rhodotorula glutinis*,
  - *Candida* spp. after a validated method of *Candida* identification attempted.

***C. auris* can be correctly identified using MALDI-TOF and DNA sequencing**

Challenges with Identification

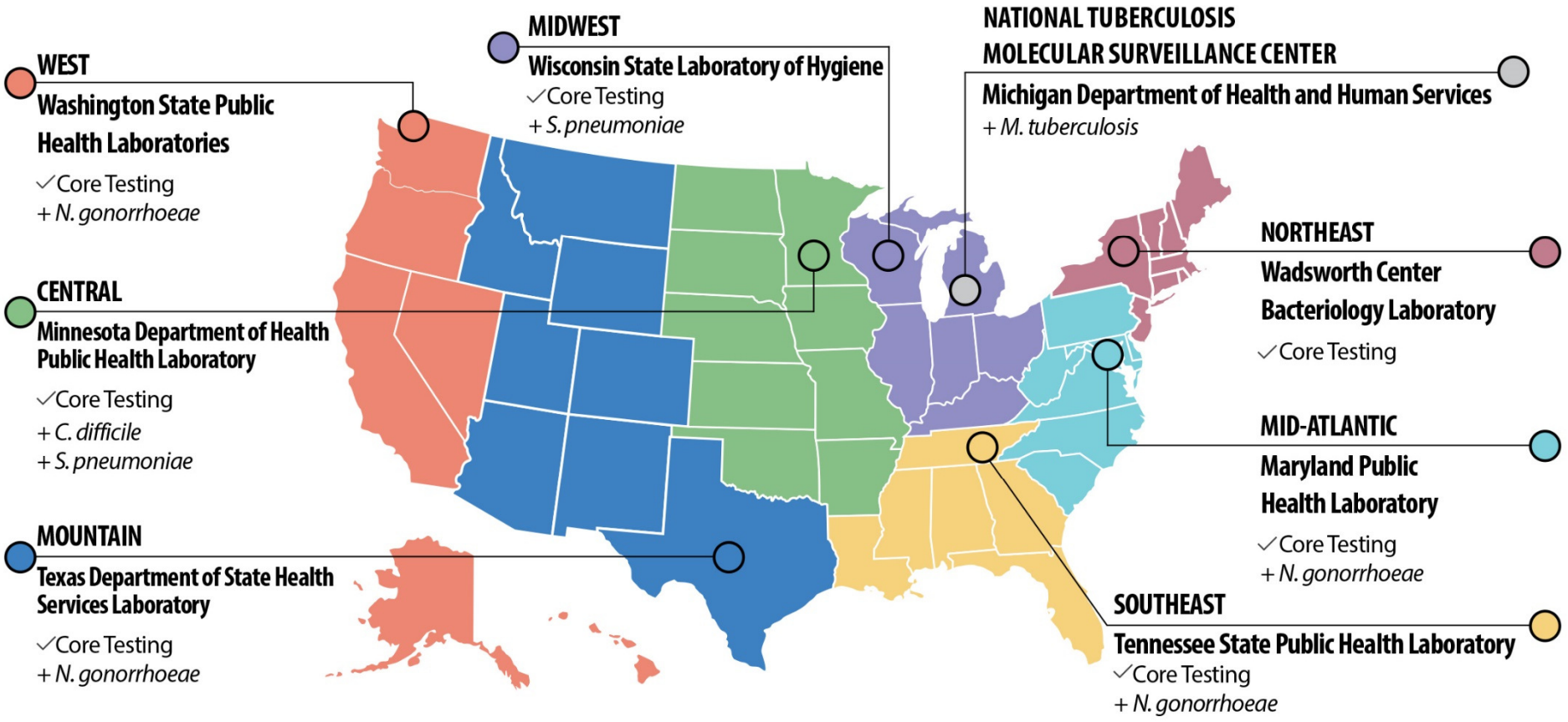
- 30% of clinical cases in the U.S. have been from non-bloodstream isolates (urine, bile, wounds, etc)
- Isolates form non-sterile sites may not be worked up to species level
  - Though no treatment may be needed, infection control is needed if *C. auris*

Challenges with Detecting Colonized individuals



Important because infection control measures are needed

ARLN Labs – Candida part of CORE



Treatment

- Echinocandins are first line
- Resistance can be problematic
  - Some echinocandin resistant isolates
  - At least one case with documented development of echinocandin resistance on treatment
- Close monitoring of patient needed

Infection control is key for stopping transmission of *C. auris*

Recommended Infection Control Practices

- Standard and Contact Precautions
- Single room
- Hand hygeine
- Daily and terminal cleaning with disinfectants with Clostridium difficile claim
- Contact tracing

Global *C. auris* Situation

- Now common in some international hospitals
  - Up to 40% of *Candidas* in 1 Indian and 1 Kenyan hospital
  - 10% of *Candidas* in private South African hospitals
  - Probably well-established in Venezuela (limited dx capacity)
  - Cases now in Colombia and Panama
- UK continues to have introductions; seem to have controlled initial spread
- No further isolates in Japan; relatively few in South Korea
- Major unknowns in most of Africa and parts of Latin America

Need for further work

- Improved diagnostics, assessment of diagnostic capacity
- Expand understanding of epidemiology, risk factor for invasive infection and colonization
- Characterize resistance, virulence factors
- Evaluate effectiveness of new antifungal agents against *C. auris*
- Assess decolonization strategies
- Strengthen IPC; evaluate effectiveness of various IPC interventions
- Determine environmental niche/origins of *C. auris*

Summary

- *C. auris*
  - Causes invasive infections with high mortality
  - Challenging to identify
  - Multidrug resistant
  - Transmitted in healthcare settings
- Surveillance and Infection Control are needed to control its spread

CDC guidance on *C. auris* can be found here:
https://www.cdc.gov/fungal/diseases/candidiasis/candida-auris.html


FUNGAL DISEASE AWARENESS WEEK
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We Need Your Help!

- Surveillance
- Raise awareness
- Containment once cases are detected

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  - CDC Media: media@cdc.gov or 404-639-3286
  - Patients, please refer your questions to your healthcare provider

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Topic: The Ecology of Emerging Zoonotic Diseases

When: Thursday, September 21, 2017

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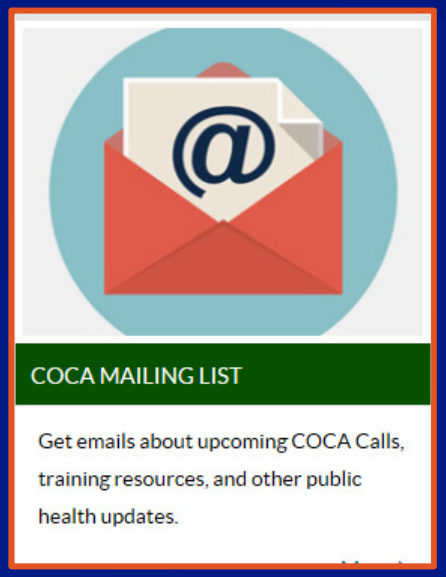

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