



Candida auris: an emerging fungal pathogen

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Epidemic Intelligence Service Officer

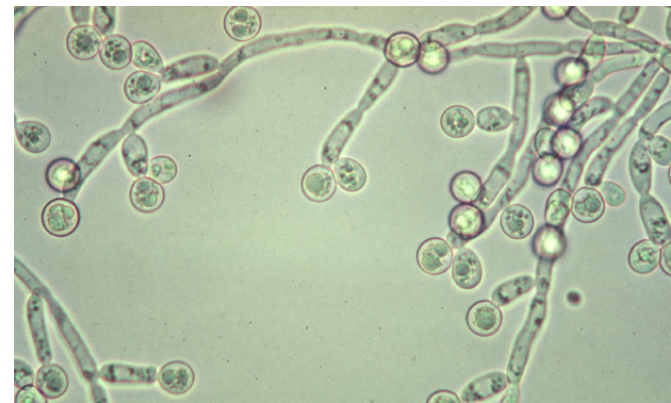
Mycotic Diseases Branch

14th Annual Georgia Emerging Infections Program Meeting

March 24, 2017

Candidemia

- Bloodstream infection caused by *Candida* spp.
- One of the most common healthcare-associated bloodstream infections in the United States
- Mortality 30-50%



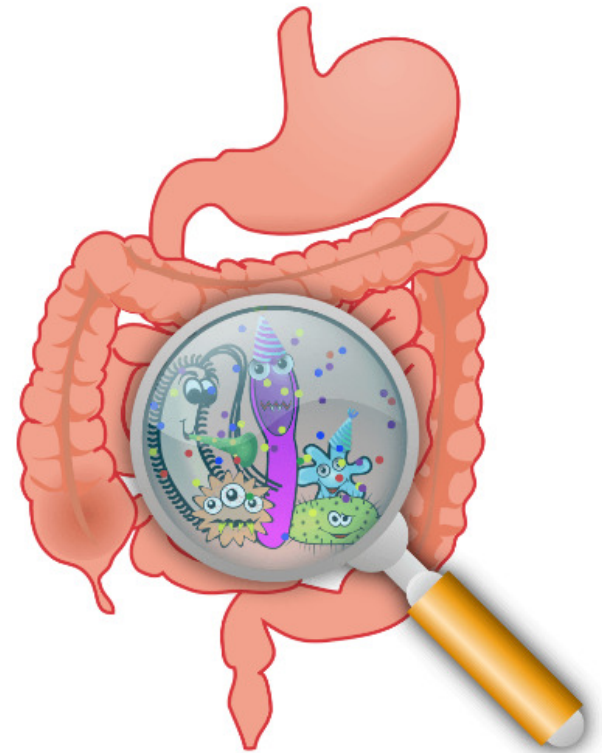
Who gets candidemia?

- Risk factors include:
 - Prolonged ICU stay
 - Central lines
 - Broad spectrum antibiotic use
 - Diabetics
 - Surgical patients
 - Immunocompromised patients

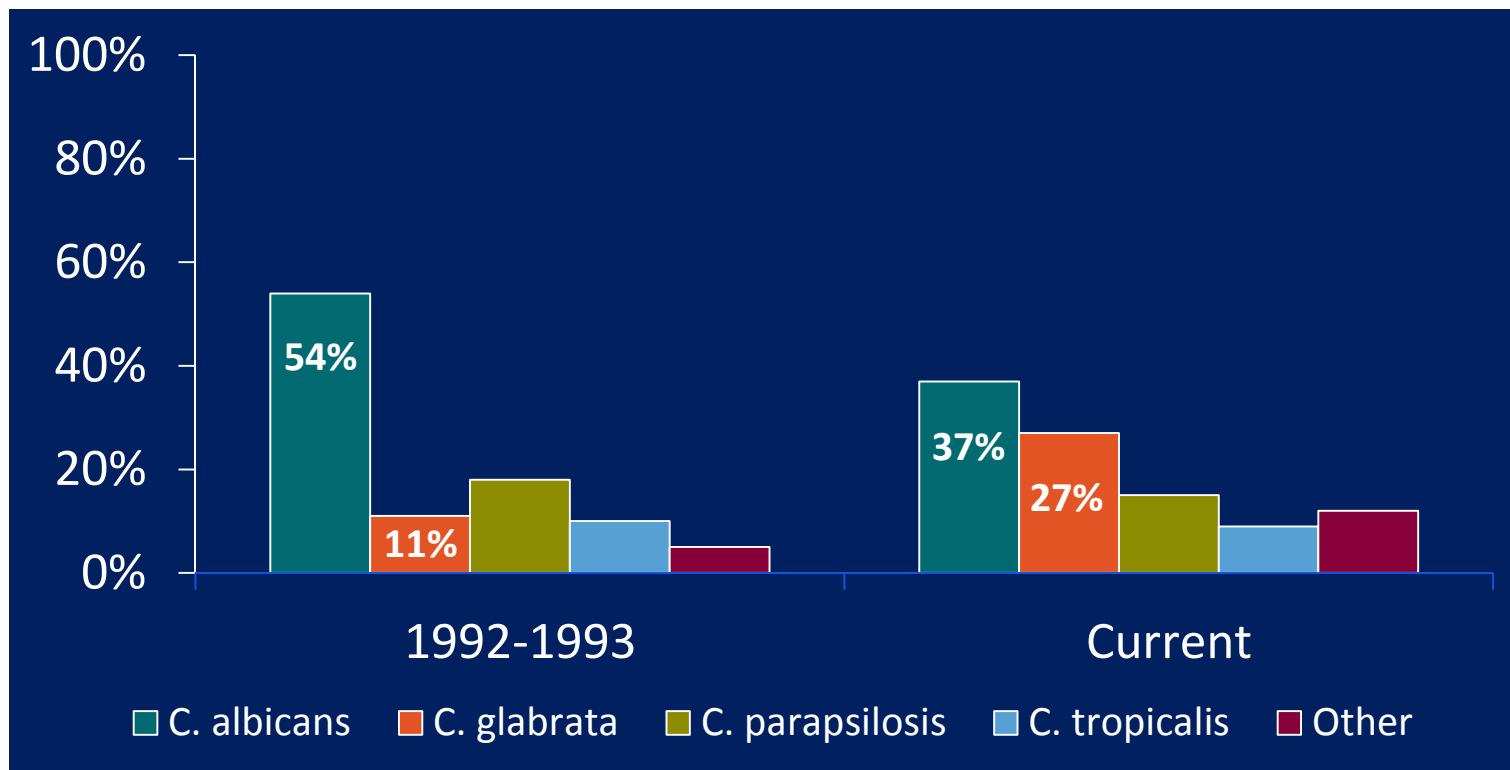


How do they get candidemia?

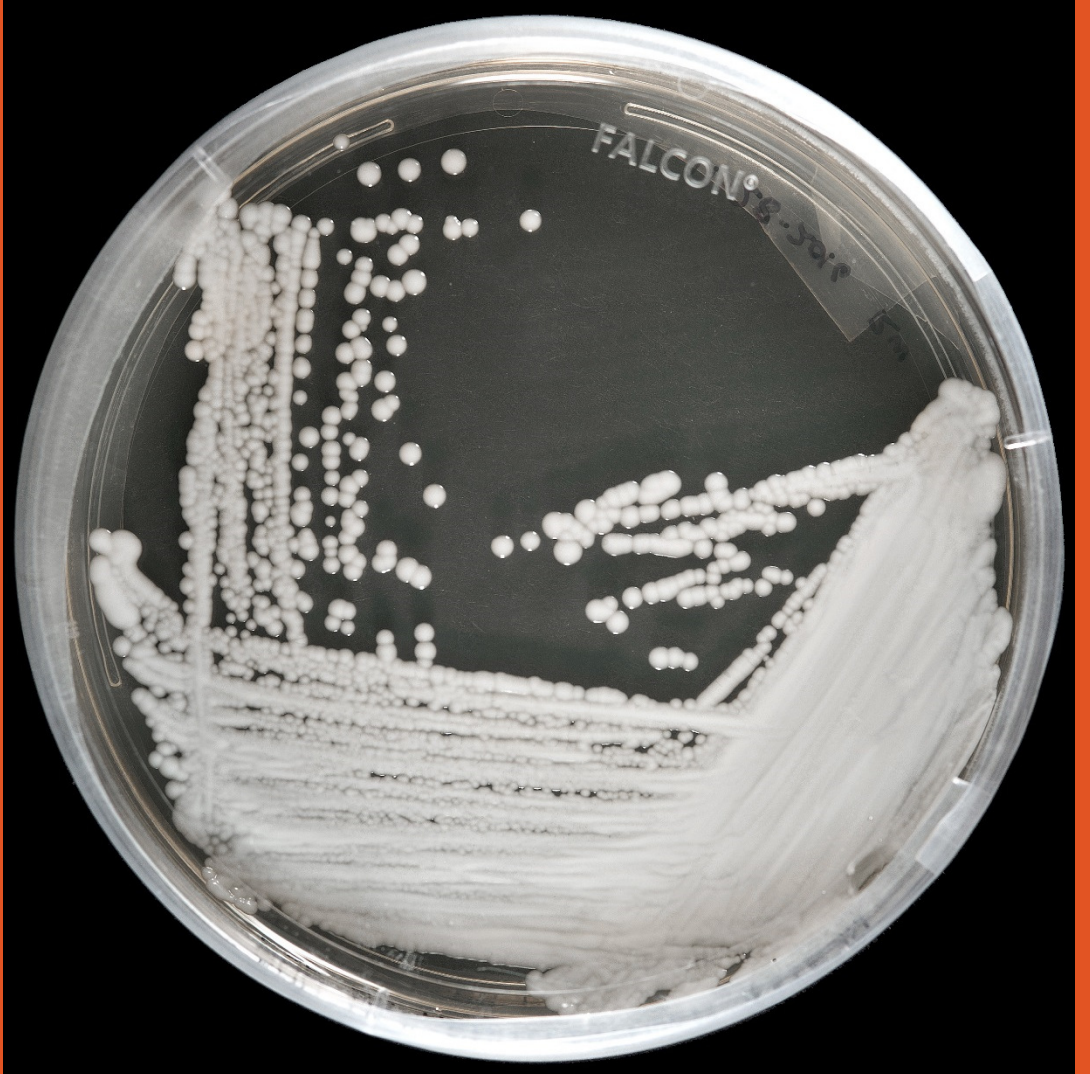
- Usually auto-inoculation of host flora (gut)
- Outbreaks rare, but reported with *Candida parapsilosis*



Surveillance reveals changing species epidemiology



Emergence of
C. auris



New species: *Candida auris*

- Discovered during the course of a study to analyze antifungal yeast diversity in humans



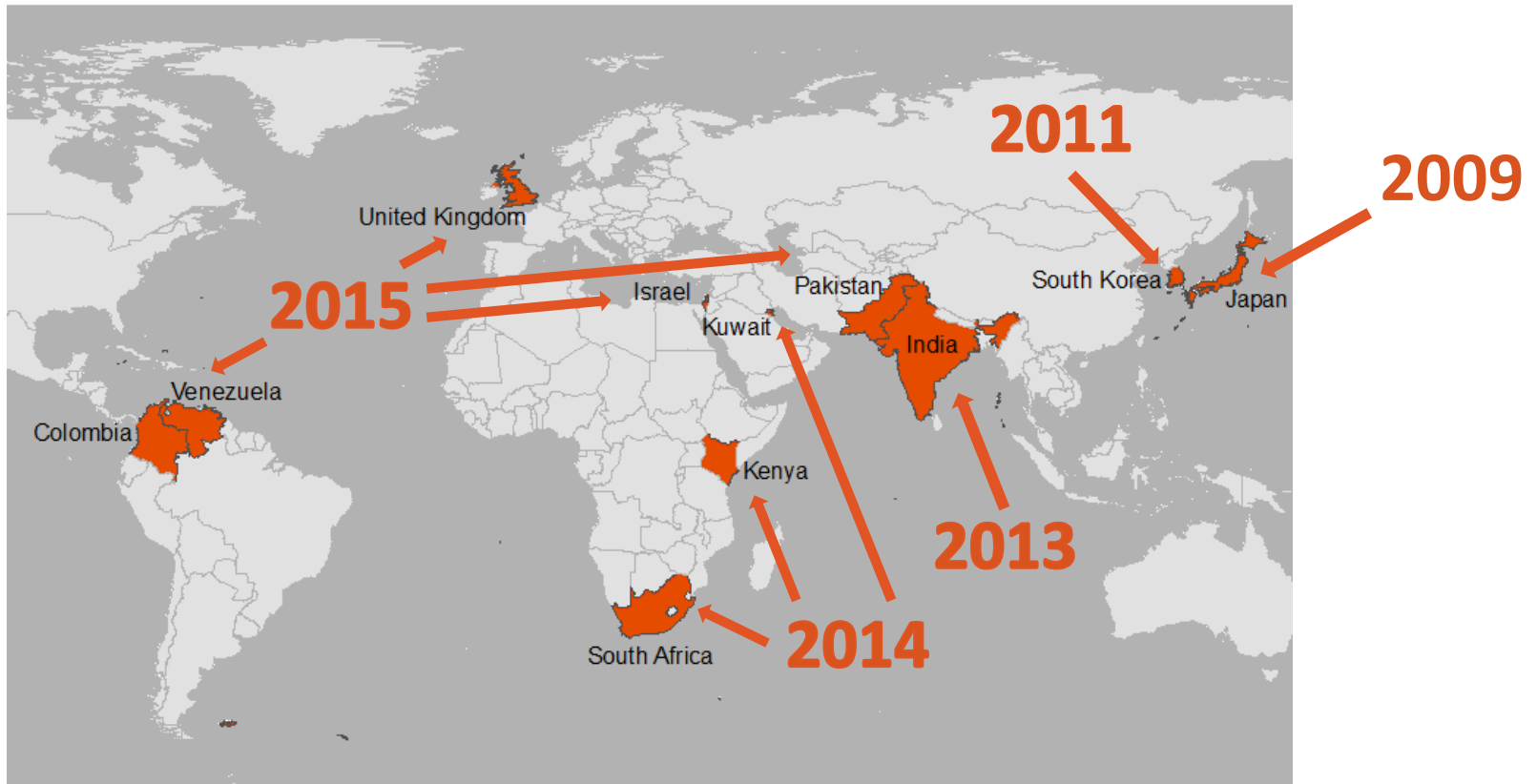
ORIGINAL ARTICLE

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

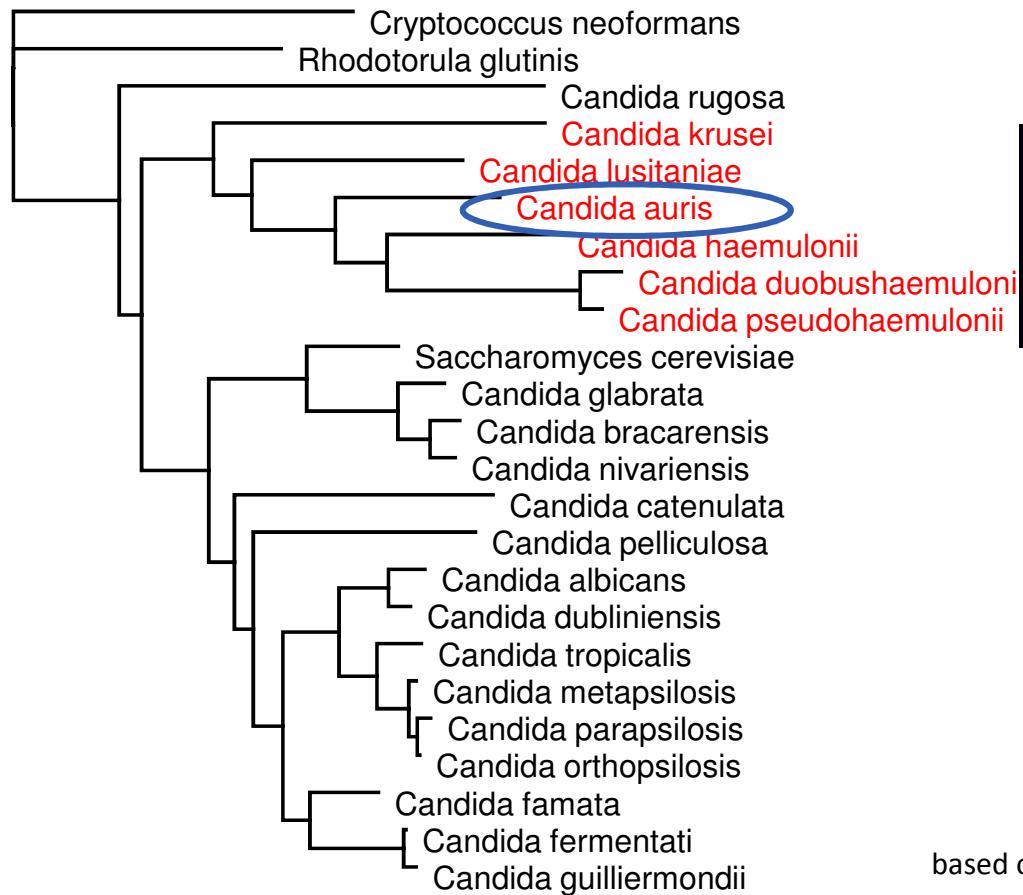
Kazuo Satoh^{1,2}, Koichi Makimura^{1,3}, Yayoi Hasumi¹, Yayoi Nishiyama¹, Katsuhisa Uchida¹ and Hideyo Yamaguchi¹

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

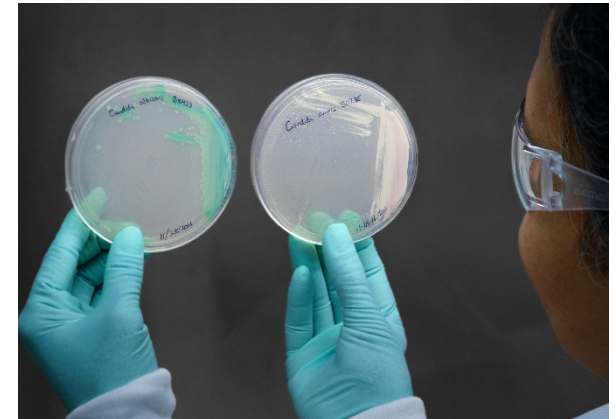
Global emergence of *C. auris*



Phylogenetic tree of *Candida* spp



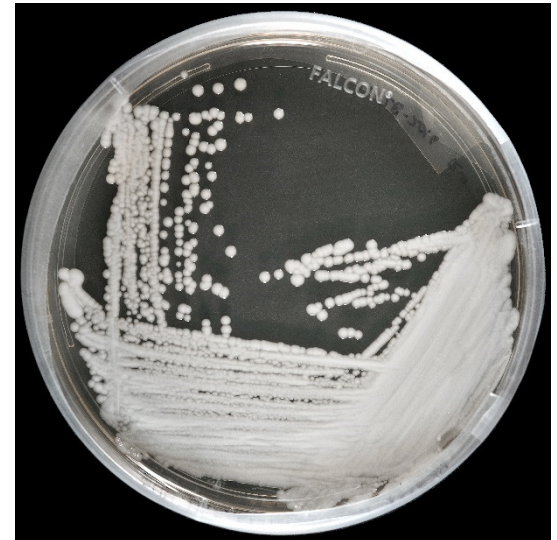
Antifungal
resistant
clade



based on rDNA sequencing

Preliminary epidemiology of *Candida auris*

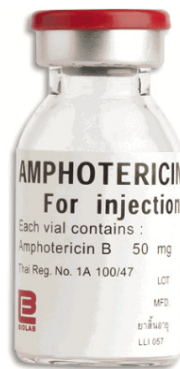
- Patients of all age ranges
- Similar risk factors as for other *Candida* spp.
- Median time from admission to infections: 19 days
- Mortality ~60%
- Many patients on antifungal treatment when *C. auris* isolated



Antifungal resistance of *Candida auris*

- There are 3 major classes of antifungal drugs

Polyenes



- Amphotericin B

Azoles



- Fluconazole
- Voriconazole
- Itraconazole

Echinocandins



- Caspofungin
- Micafungin
- Anidulafungin



Antifungal resistance of *Candida auris*

- There are 3 major classes of antifungal drugs

Polyenes



Azoles



Echinocandins

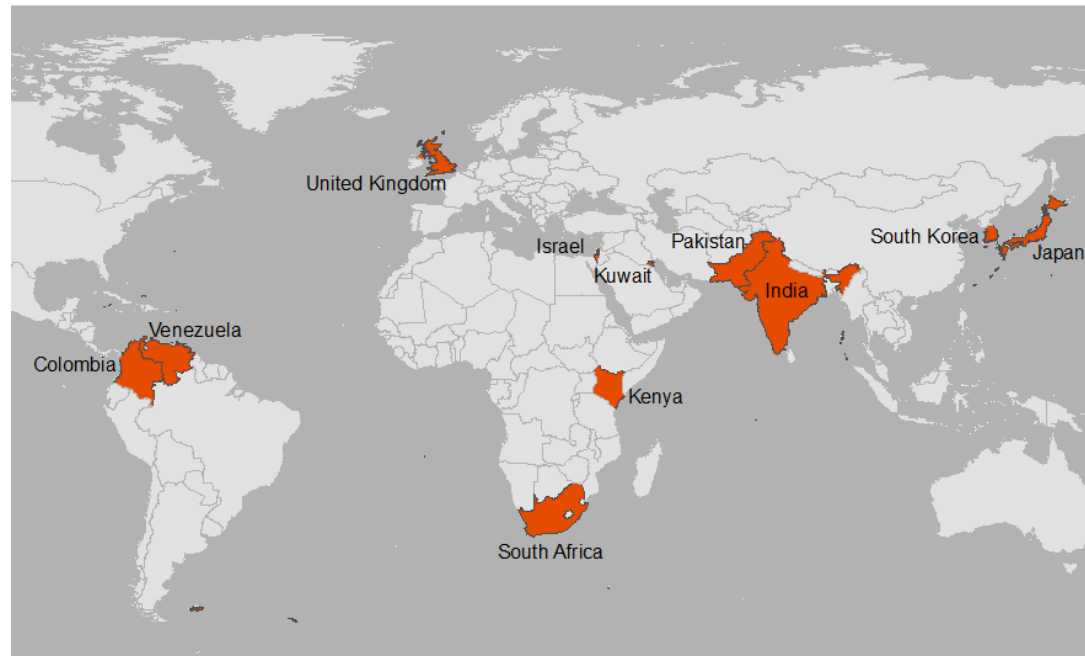


- Many isolates multi-drug resistant
- Few resistant to all three classes



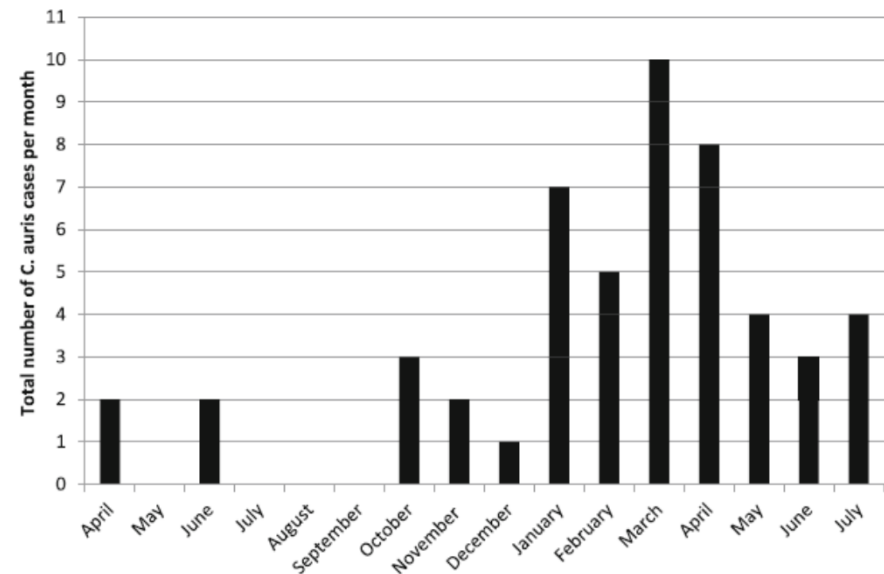
C. auris is a serious global health threat

- Difficult to identify
- Multidrug-resistance
- Nosocomial pathogen
- Outbreak potential



Outbreak in the United Kingdom

- ICU in large referral center with >50 *C. auris* infections
 - 20% with candidemia
- Patients found to be colonized on the skin
- Environmental sampling showed extensive contamination around bed space areas



So, is it in the United States?

- EIP Candidemia Surveillance Program
 - >7000 *Candida* isolates collected in U.S. 2008 –2016
 - No *C. auris*
- SENTRY system (Private collection funded by pharma)
 - >6000 North American isolates collected from the US since 2004
 - 1 *C. auris* isolate from 2013



Research and analysis

Candida auris identified

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Public Health
Agency of Canada

Agence de la santé
publique du Canada

Canada

Public Health Agency of Canada
www.publichealth.gc.ca

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

+

Summar

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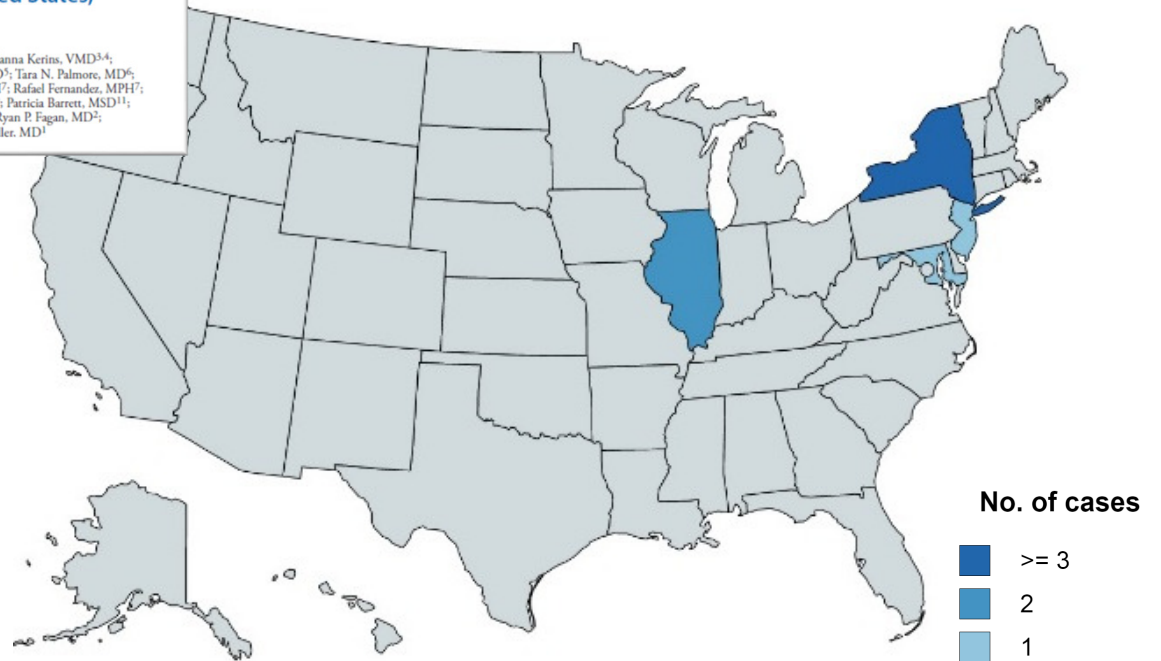
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PHAC Communication Re: Emerging global HAI-AMR issue – *Candida auris*

PHAC has recently learned of a public health alert from US CDC in relation to the global emergence of invasive infections caused by the Multidrug-Resistant yeast organism, *Candida auris*.

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

Snigdha Vallabhaneni, MD¹; Alex Kallen, MD²; Sharon Tsay, MD^{1,3}; Nancy Chow, PhD¹; Rory Welsh, PhD¹; Janna Kerins, VMD^{3,4}; Sarah K. Kemble, MD⁵; Massimo Pacilli, MS⁵; Stephanie R. Black, MD⁴; Emily Landon, MD⁵; Jessica Ridgway, MD⁵; Tara N. Palmore, MD⁶; Adrian Zelzany, PhD⁶; Eleanor H. Adams, MD⁷; Monica Quinn, MS⁷; Sudha Chaturvedi, PhD⁷; Jane Greenko, MPH⁷; Rafael Fernandez, MPH⁷; Karen Southwick, MD⁷; E. Yoko Furuya, MD⁸; David P. Calfee, MD⁹; Camille Hamula, PhD¹⁰; Gopi Patel, MD¹⁰; Patricia Barrett, MSD¹¹; Patricia Lafaro¹²; Elizabeth L. Berkow, PhD¹; Heather Moulton-Meissner, PhD²; Judith Noble-Wang, PhD²; Ryan P. Fagan, MD²; Brendan R. Jackson, MD¹; Shawn R. Lockhart, PhD¹; Anastasia P. Litvinseva, PhD¹; Tom M. Chiller, MD¹



US Investigations: New York, Illinois, New Jersey

- Medical chart reviews
- Facility and microbiology lab visits
- Case-patient, contacts, and environmental sampling
- Infection control assessments
- Wider point-prevalence surveys



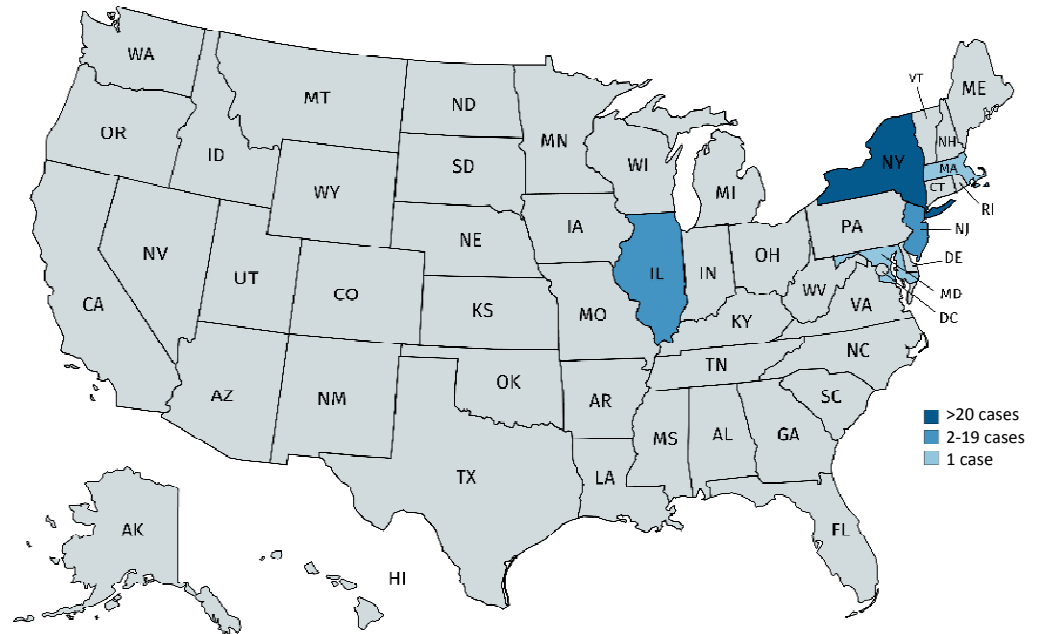
What did we find?

- Bloodstream infections
- Traditional candidemia risk factors – with the addition of nursing homes
- Colonized on skin in multiple sites
- Rooms colonized when patients present
- Multiple contacts of cases were positive on point-prevalence surveys
- Whole genome sequencing



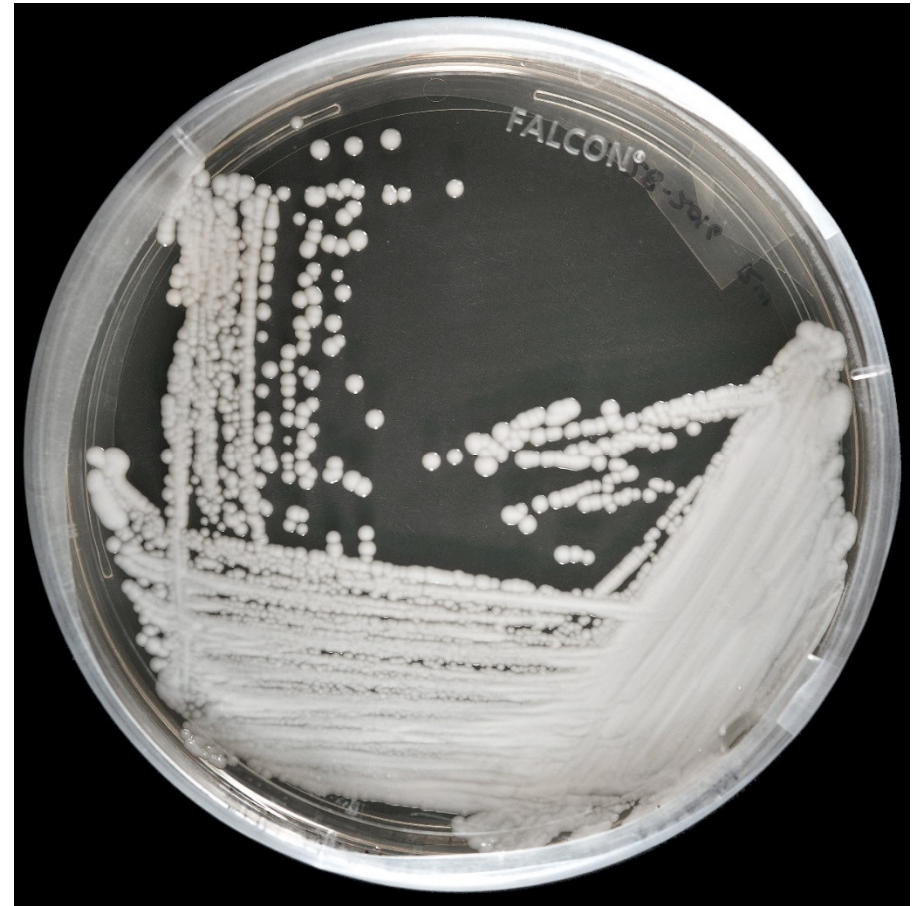
US situation

- As of March 16, 80 positive
 - 53 clinical cases
 - 27 screening positive
- Clusters in NY, NJ, IL
- Laboratory look-backs



C. auris: A global health threat now in the U.S.

- Challenging to identify
- Multidrug resistant
- Outbreaks



***Candida auris*: what you should know**

1. It is difficult to identify... so when should *C. auris* be suspected?

- Resistance to one or more antifungals
- An isolate is identified as:
 - *Candida haemulonii*
 - *Candida famata*
 - *Candida sake*
 - *Rhodotorula glutinis*, or
 - *Candida* spp after a validated method of *Candida* identification was attempted.

***C. auris* can be identified using MALDI-TOF and sequencing of the D1-D2 region.**



***Candida auris*: what you should know**

2. Treatment for invasive *C. auris* infection is same as IDSA guidelines.

- First line antifungal drug: echinocandin
- Careful monitoring for treatment failure



***Candida auris*: what you should know**

3. Specific infection control practices are recommended.

- Standard and Contact Precautions
- Single room
- Daily and terminal cleaning of patient rooms with EPA-registered disinfectant known to be effective against *C. difficile* (i.e., bleach)
- On transfer to another facility, notification and need for precautions communicated

Report all cases to state & local public health departments and CDC:

candidaauris@cdc.gov



***C. auris* Response Plan: halt the spread!**

- Increase awareness
- Expand avenues for surveillance
- Toolkit in production for epidemiologic investigation and infection control
- Laboratory and epidemiologic studies to understand organism and transmission
- Large scale control efforts based on other MDROs in highly affected areas like NY



Thank you for your time and attention.
Any questions?

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

