



Candida auris: An Emerging Resistant Fungus

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PACCARB

July 10, 2019

"All the News
That's Fit to Print"

The New York Times

Late Edition

Today, sunshine mixing with some clouds, mād, high 64. Tonight, cloudy, periodic rain, low 53. Tomorrow, a brief shower or two, high 72. Details in SportsSunday, Page 10.

VOL. CLXVIII . . No. 58,290

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NEW YORK, SUNDAY, APRIL 7, 2019

\$6.00



DADO GALDEZI FOR THE NEW YORK TIMES

A scout discovered Maradoninha, 11, two years ago. His family moved 1,200 miles to enable him to get first-class training.

Fungus Immune to Drugs Quietly Sweeps the Globe

*Lethal Infection Adds Alarming Dimension
to Dangers of Overusing Medicines*

By MATT RICHTEL and ANDREW JACOBS

Last May, an elderly man was admitted to the Brooklyn branch of Mount Sinai Hospital for abdominal surgery. A blood test revealed that he was infected with a newly discovered germ as deadly as it was mysterious. Doctors

swiftly isolated him in the intensive care unit.

DEADLY GERMS, LOST CURES *A New Public Health Threat*

The germ, a fungus called *Candida auris*, preys on people with weakened immune systems, and it is quietly spreading across the globe. Over the last five years, it has hit a neonatal unit in Venezuela, swept through a hospital in Spain, forced a prestigious British medical center to shut down its intensive care unit, and taken root in

world's most intractable health threats: the rise of drug-resistant infections. For decades, public health experts have warned that the overuse of antibiotics was reducing the effectiveness of drugs that have lengthened life spans by curing bacterial infections once commonly fatal. But lately, there has been an explosion of resistant fungi as well, adding a new and frightening dimension to a phenomenon that is undermining a pillar of modern medicine.

"It's an enormous problem," said Matthew Fisher, a professor of fungal epidemiology at Imperial College London, who was a co-author of a recent scientific review on the rise of resistant fungi.



Common perception
of a **Fungal Infection**



Most Common Healthcare-Associated Bloodstream Infection was *Candida*



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ORIGINAL ARTICLE

Multistate Point-Prevalence Survey of Health Care–Associated Infections

Shelley S. Magill, M.D., Ph.D., Jonathan R. Edwards, M.Stat., Wendy Bamberg, M.D., Zintars G. Beldavs, M.S., Ghinwa Dumyati, M.D., Marion A. Kainer, M.B., B.S., M.P.H., Ruth Lynfield, M.D., Meghan Maloney, M.P.H., Laura McAllister-Hollod, M.P.H., Joelle Nadle, M.P.H., Susan M. Ray, M.D., Deborah L. Thompson, M.D., M.S.P.H., Lucy E. Wilson, M.D., and Scott K. Fridkin, M.D., for the Emerging Infections Program Healthcare-Associated Infections and Antimicrobial Use Prevalence Survey Team*

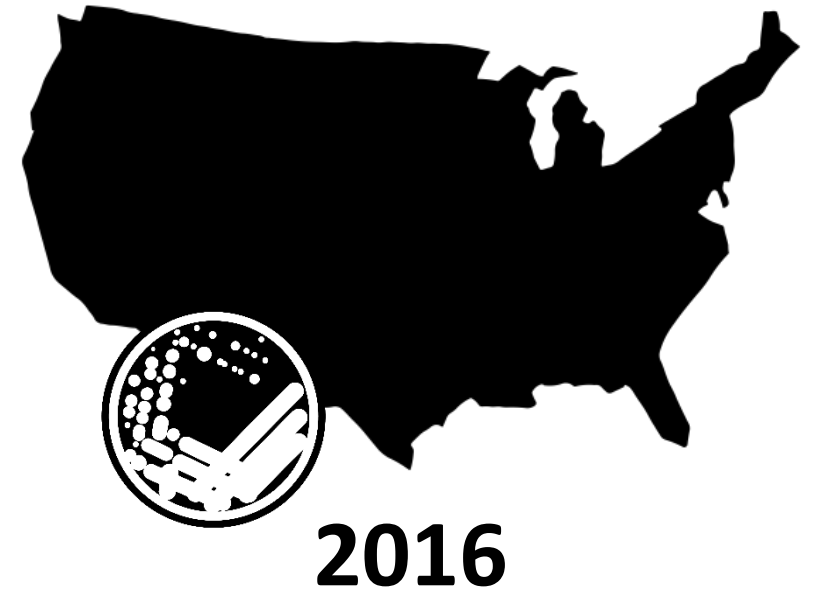
N Engl J Med 2014; 370:1198-1208 | [March 27, 2014](#) | DOI: 10.1056/NEJMoa1306801

First reported in Japan and now, worldwide

Japan



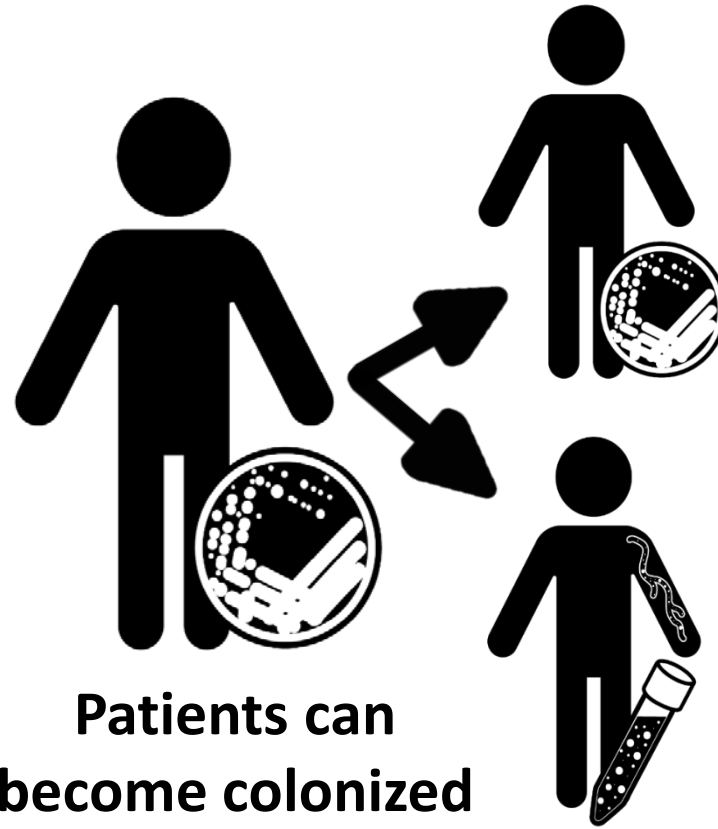
United States



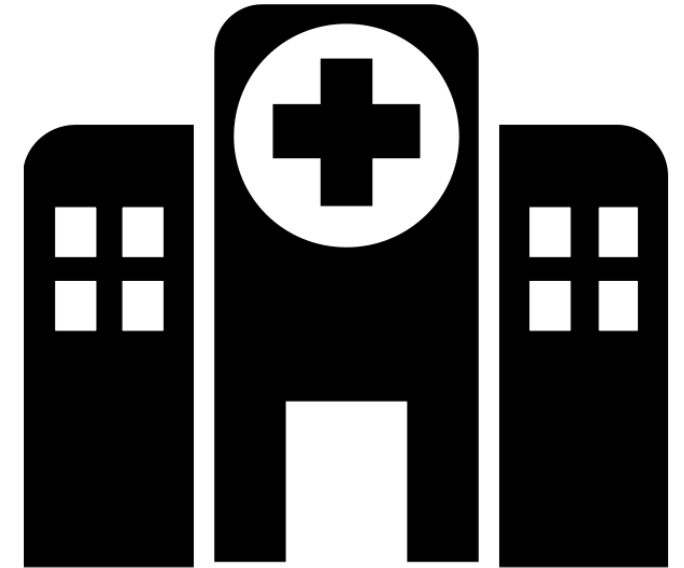
Why are we concerned about *Candida auris*?



Highly
drug-resistant



Patients can
become colonized
and develop
invasive infections



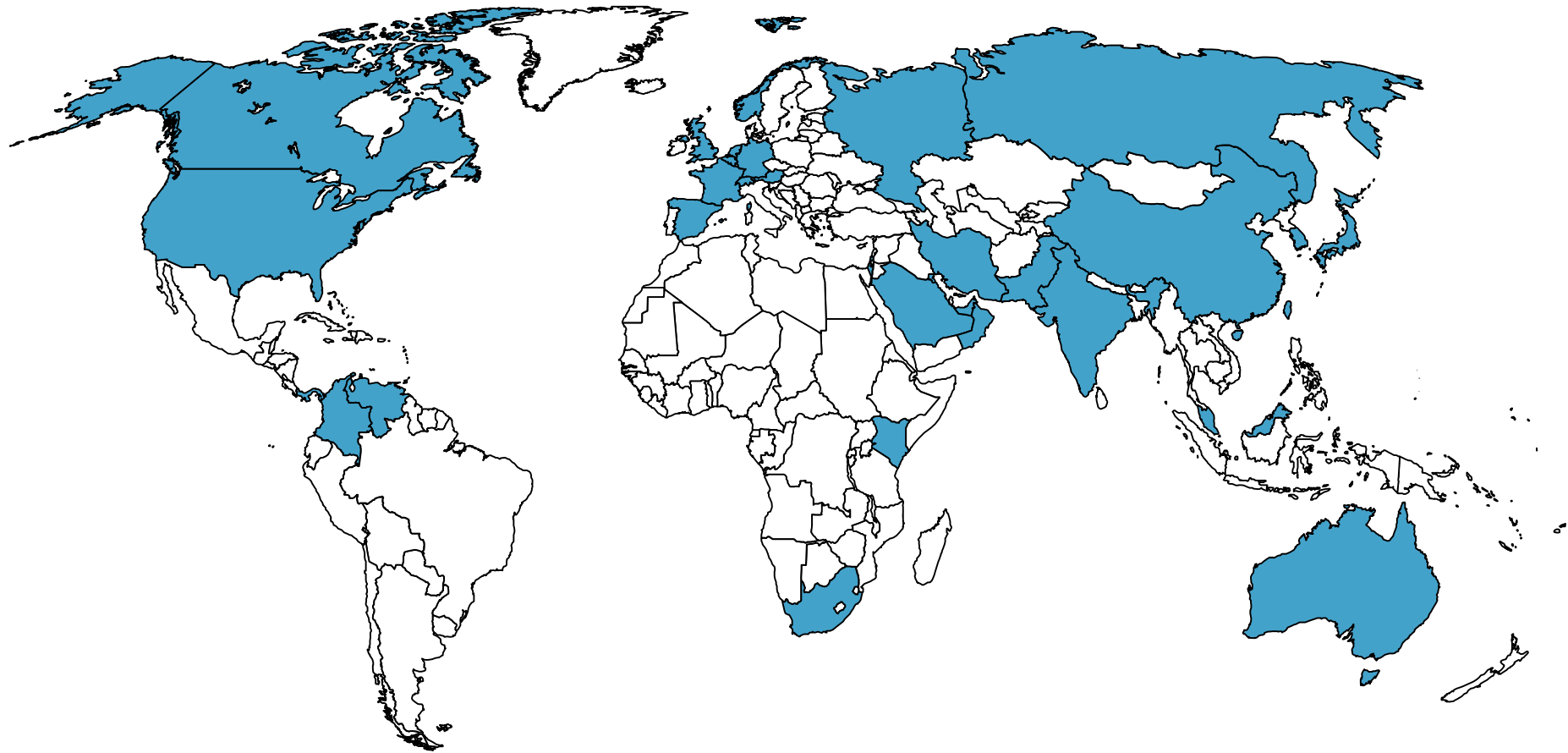
Spreads in healthcare
settings

A paradigm shift for *Candida* infections

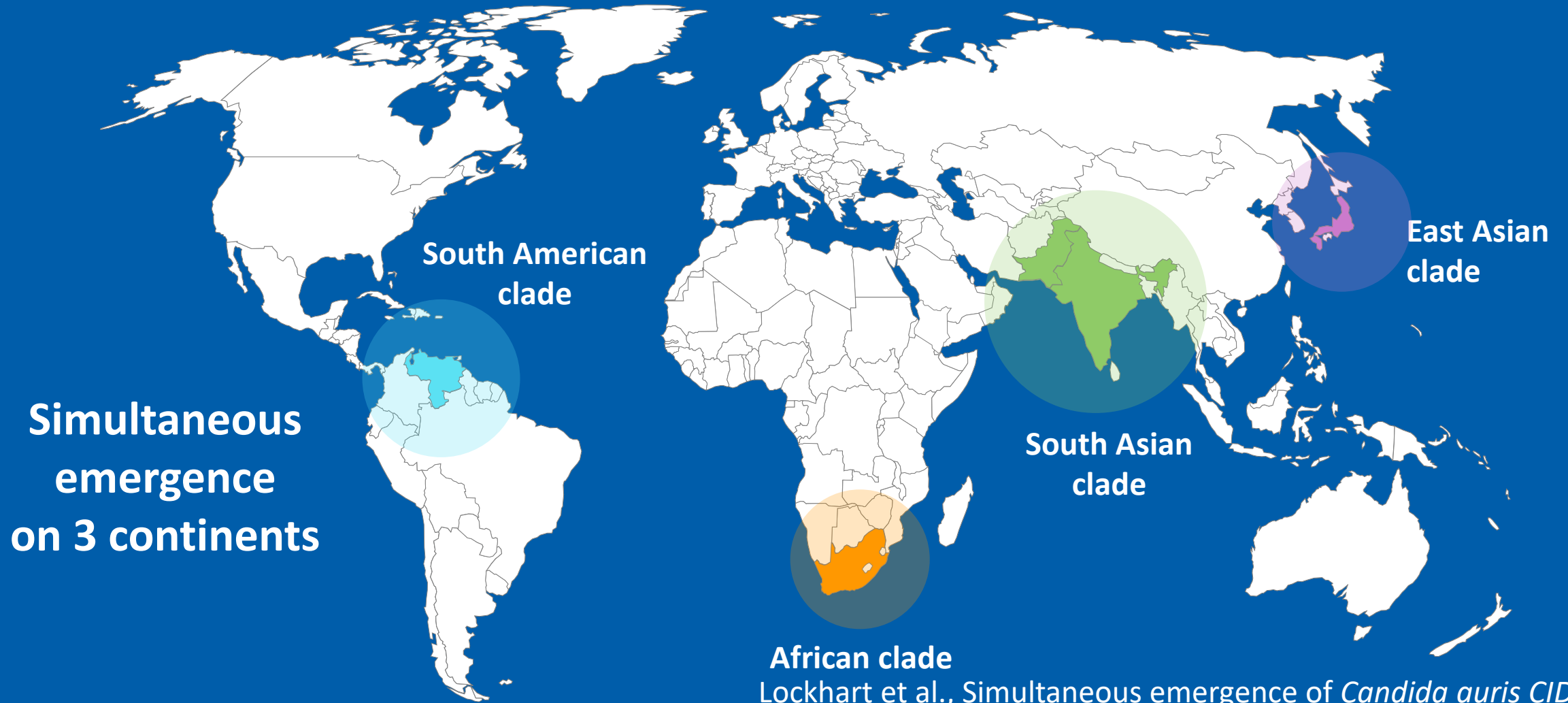
A Yeast that acts like a Bacteria!

- Resistance is the norm
- Thrives on skin
- Contaminates patient rooms
- **TRANSMITTED IN HEALTHCARE SETTINGS**

***C. auris* cases have been reported in >30 countries**



Strong phylogeographic structure – 4 clades

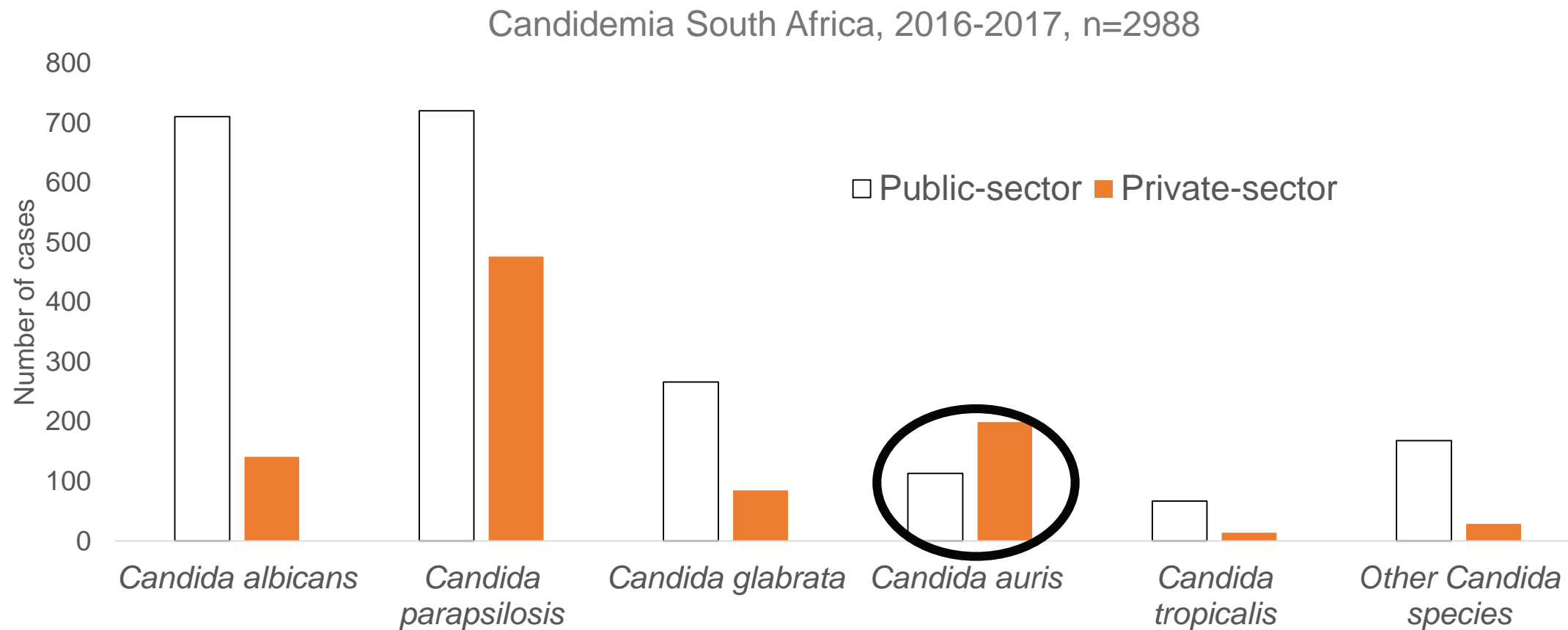


India

- Study of 27 ICUs in India (2011-12)
 - 19 already had *C. auris*
 - 5% of candidemia in ICUs
 - As high as 50% in some hospitals

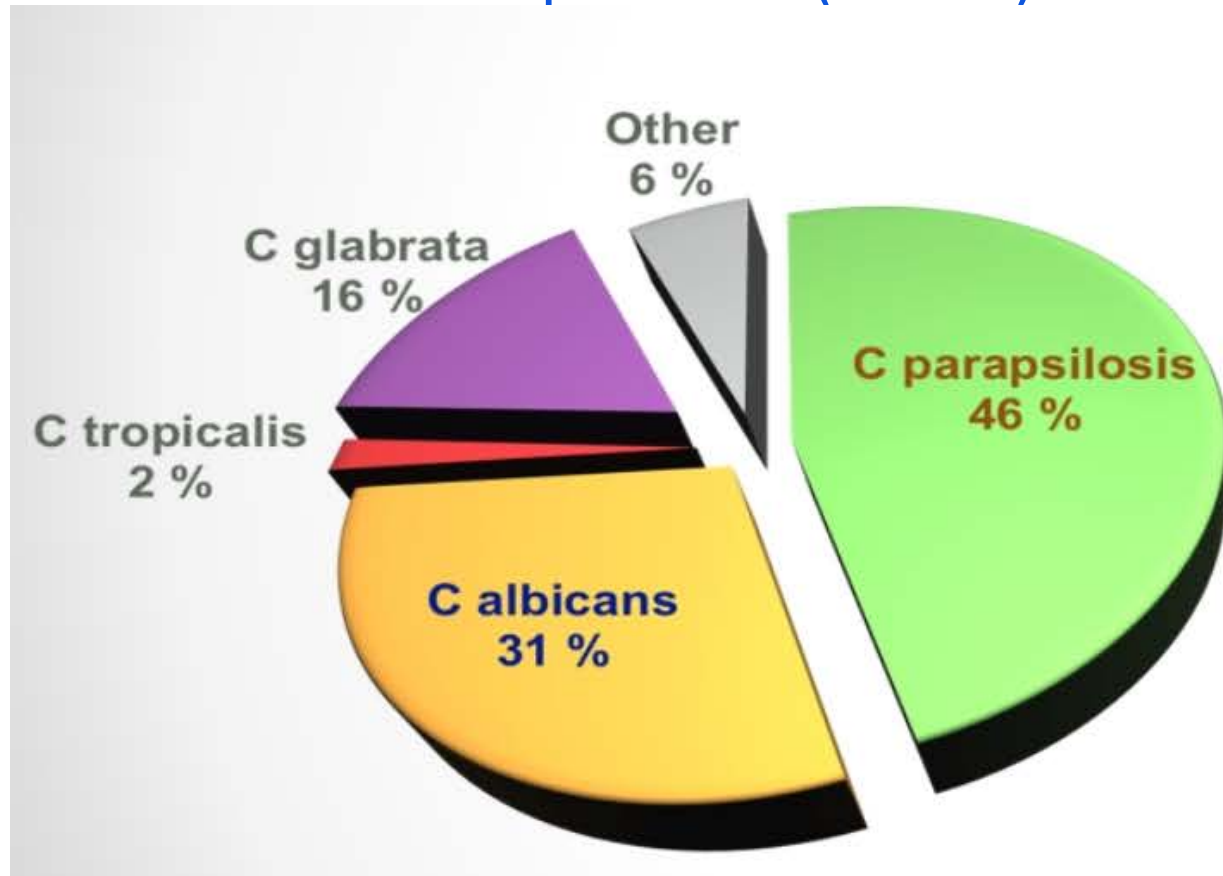


South Africa – now Major Cause of Candidemia

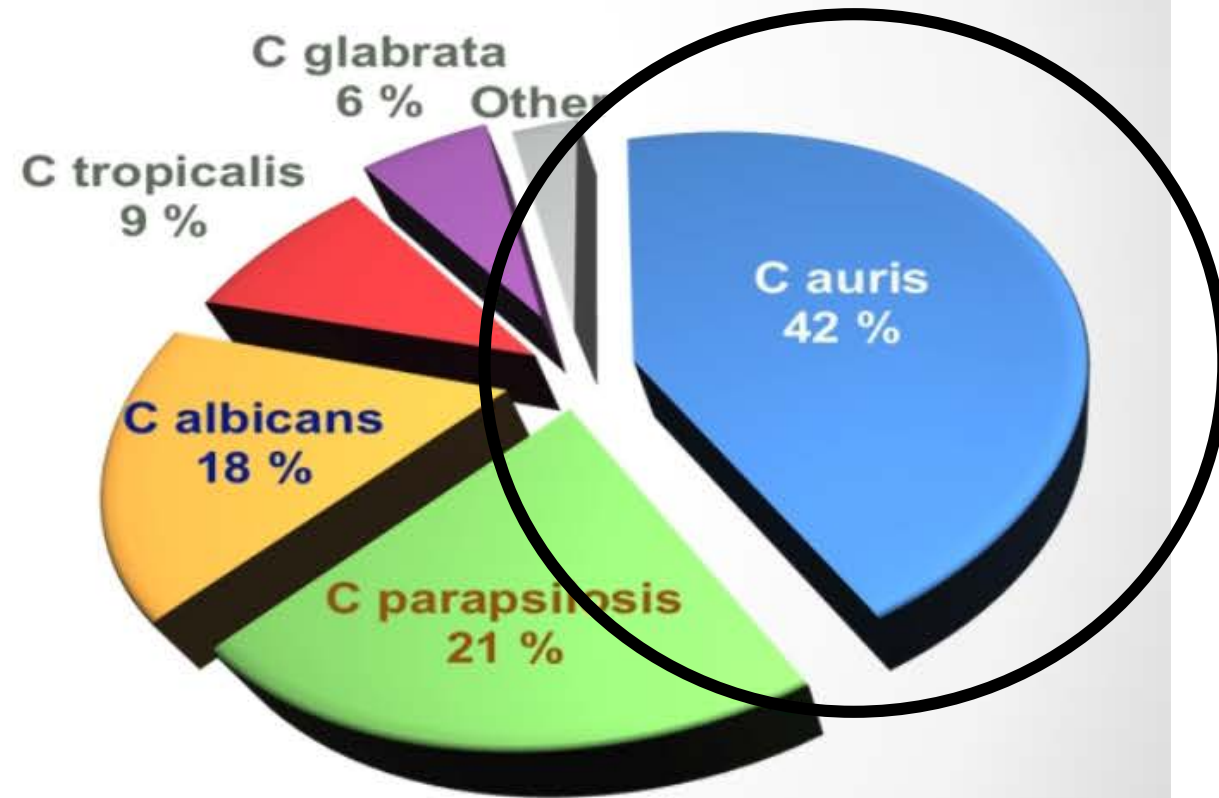


Spain Outbreak (2014-2017)

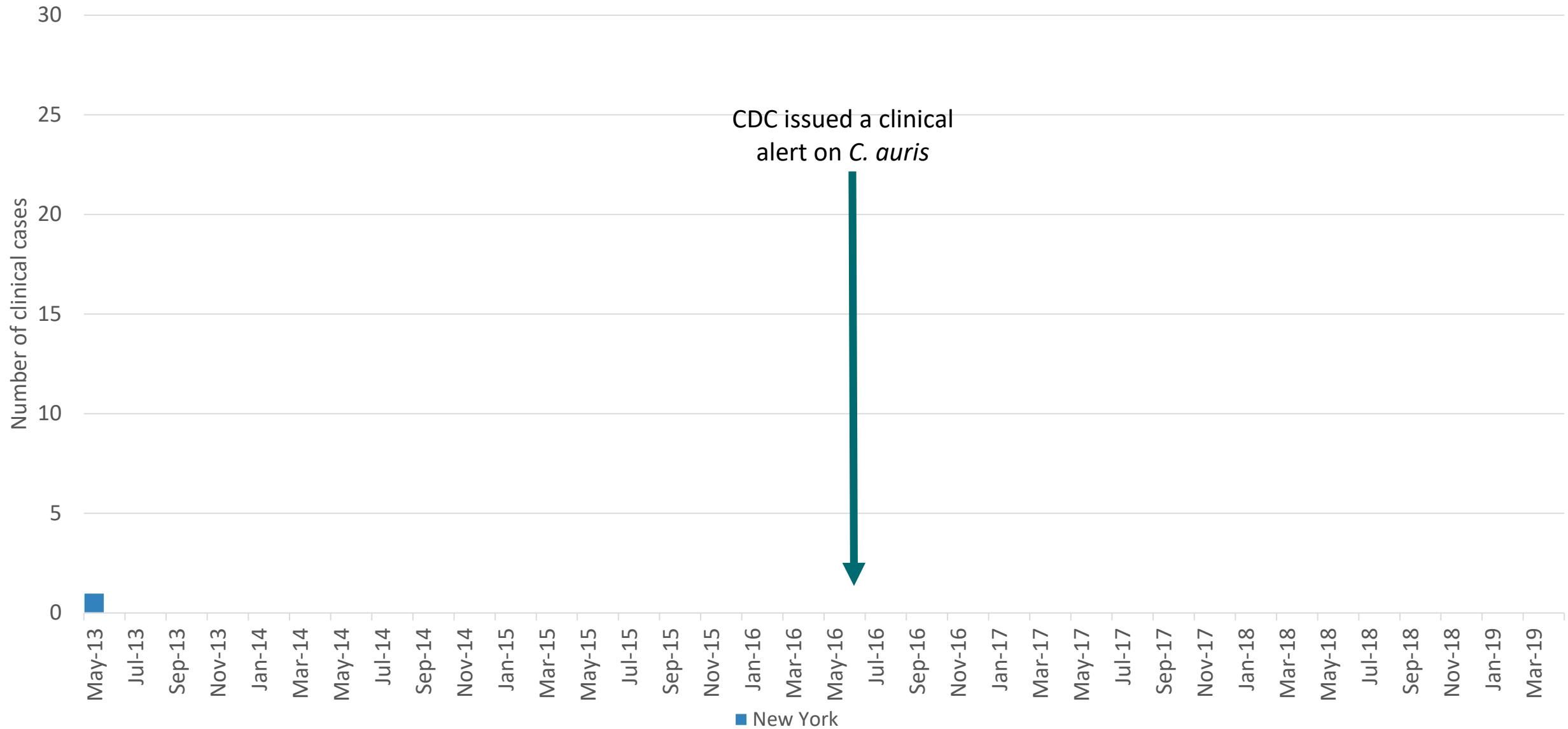
Prior to April 2016 (n=154)



Post April 2016 (n=154)

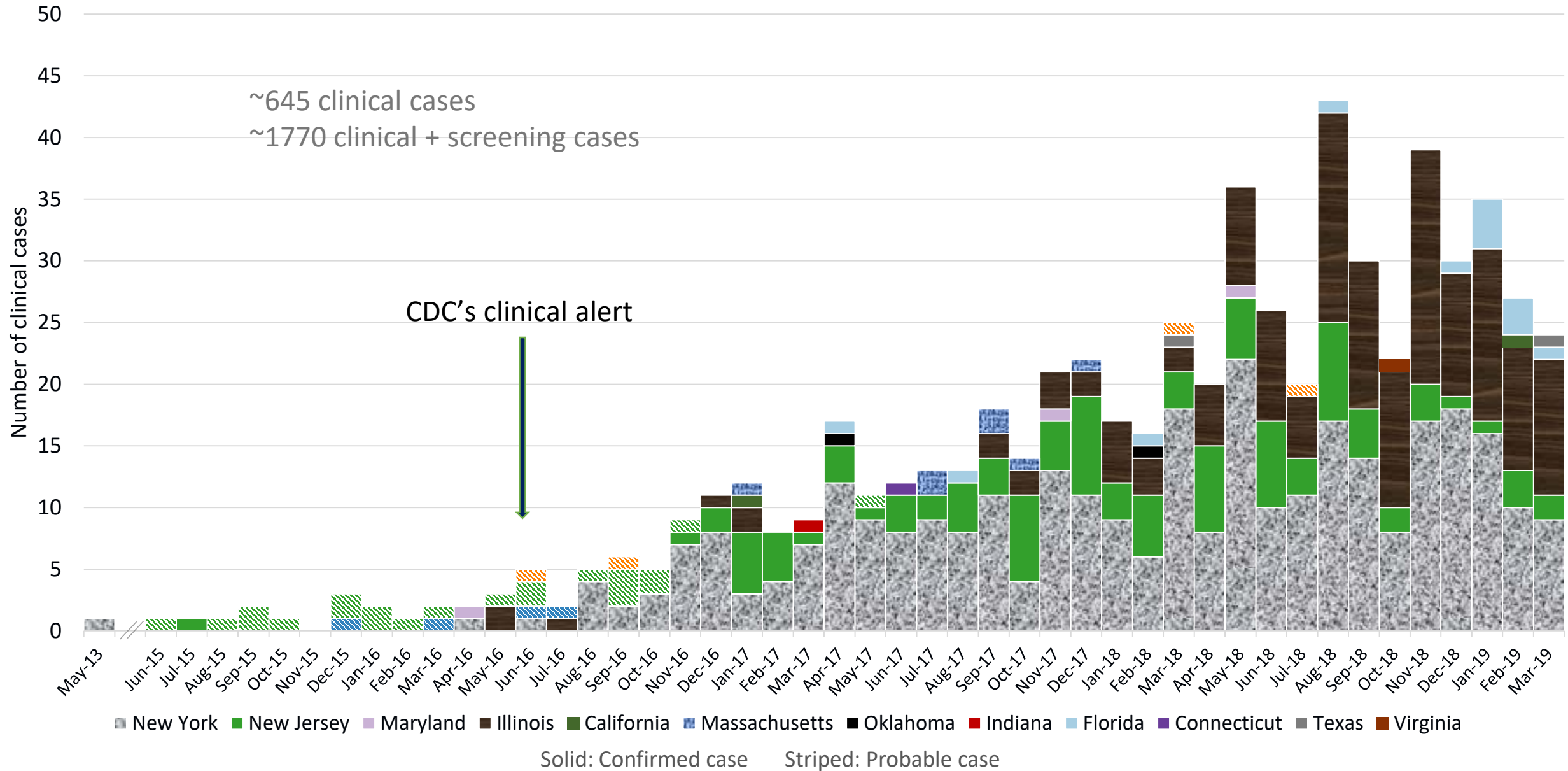


C. auris clinical cases reported by state — United States, June 2016

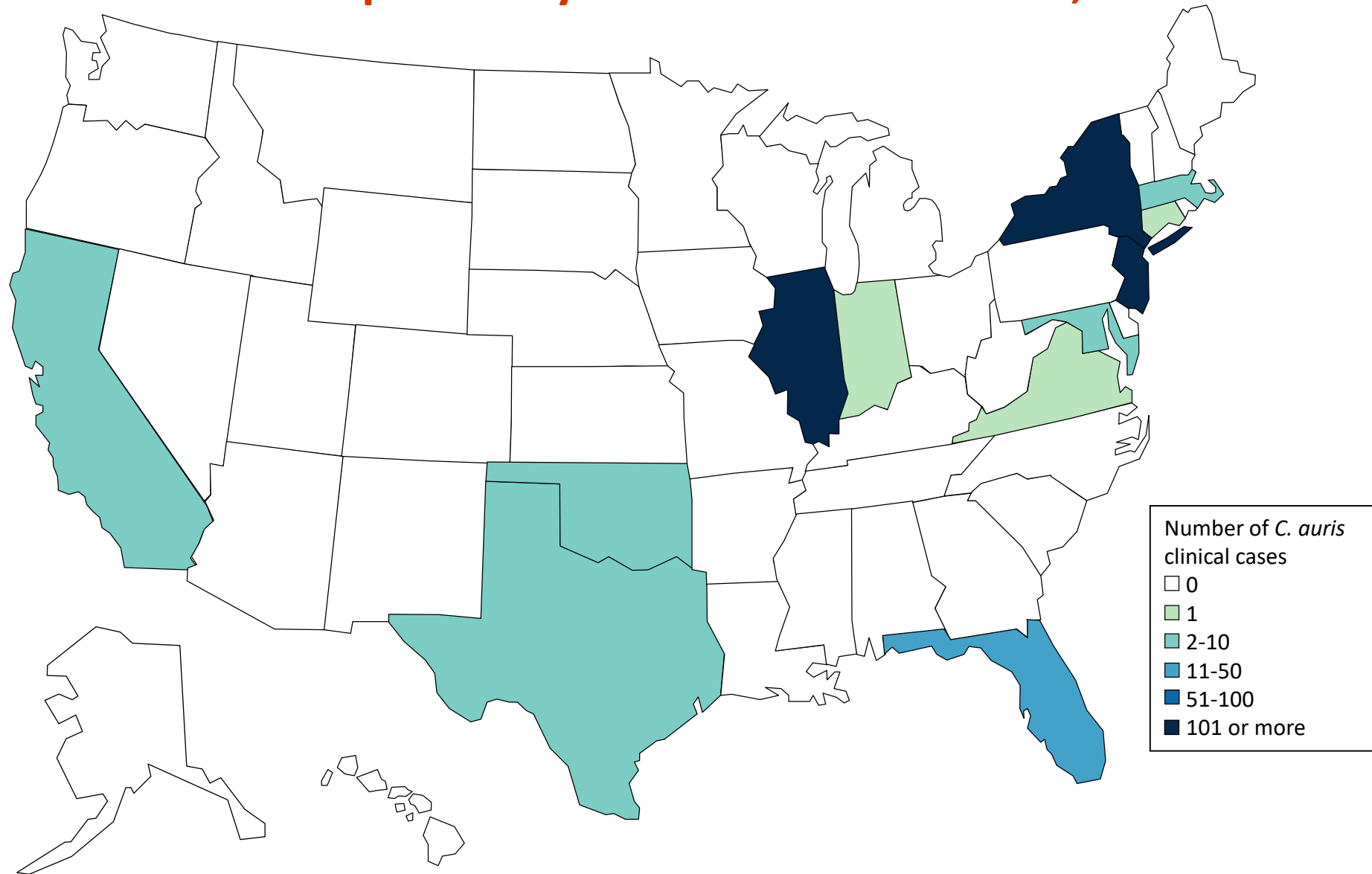


Clinical alert issued June 2016.

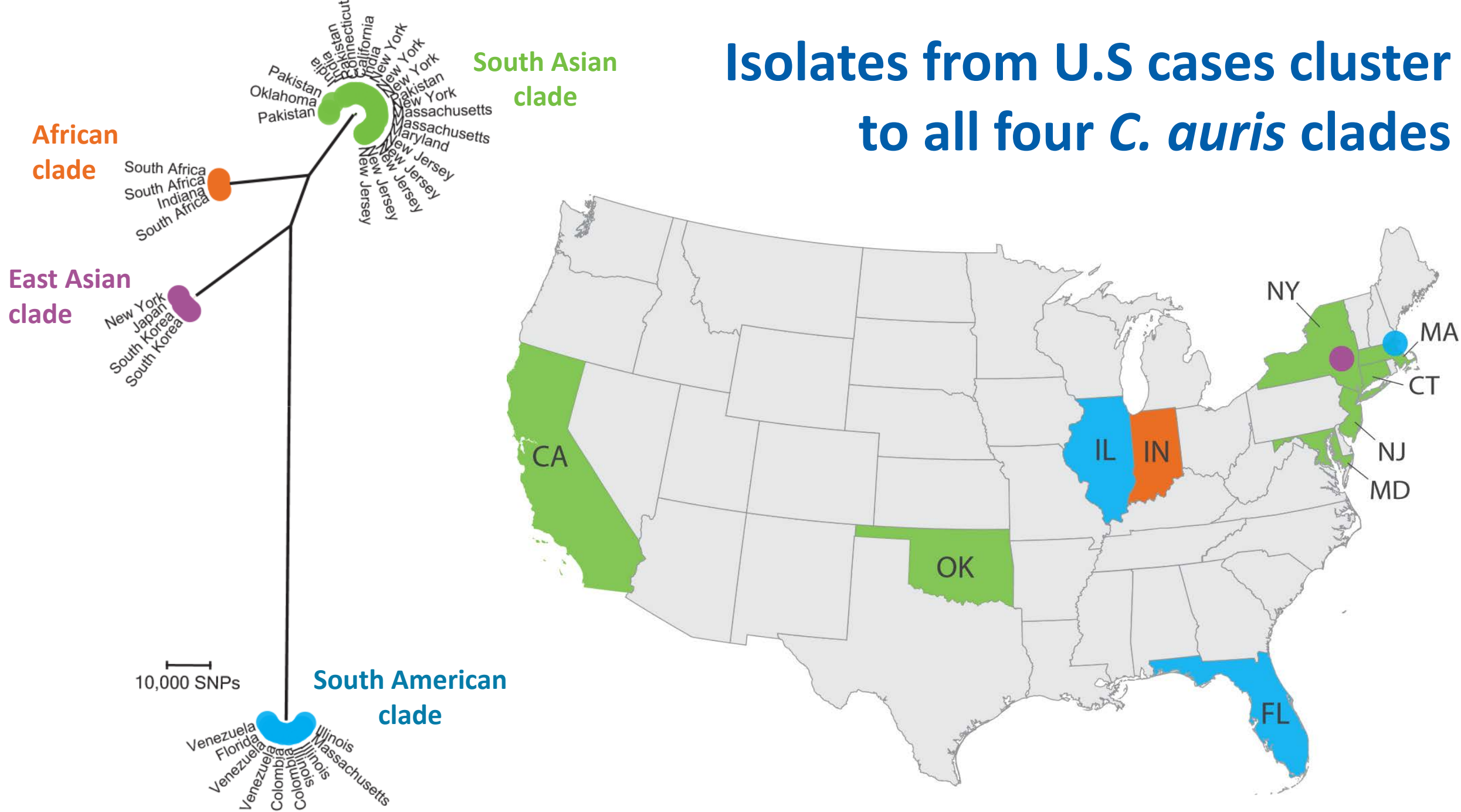
C. auris clinical cases reported by state — United States, 2013–March 2019



C. auris clinical cases reported by state — United States, 2013–March 2019



Isolates from U.S. cases cluster to all four *C. auris* clades



Typically affects the sickest of the sick

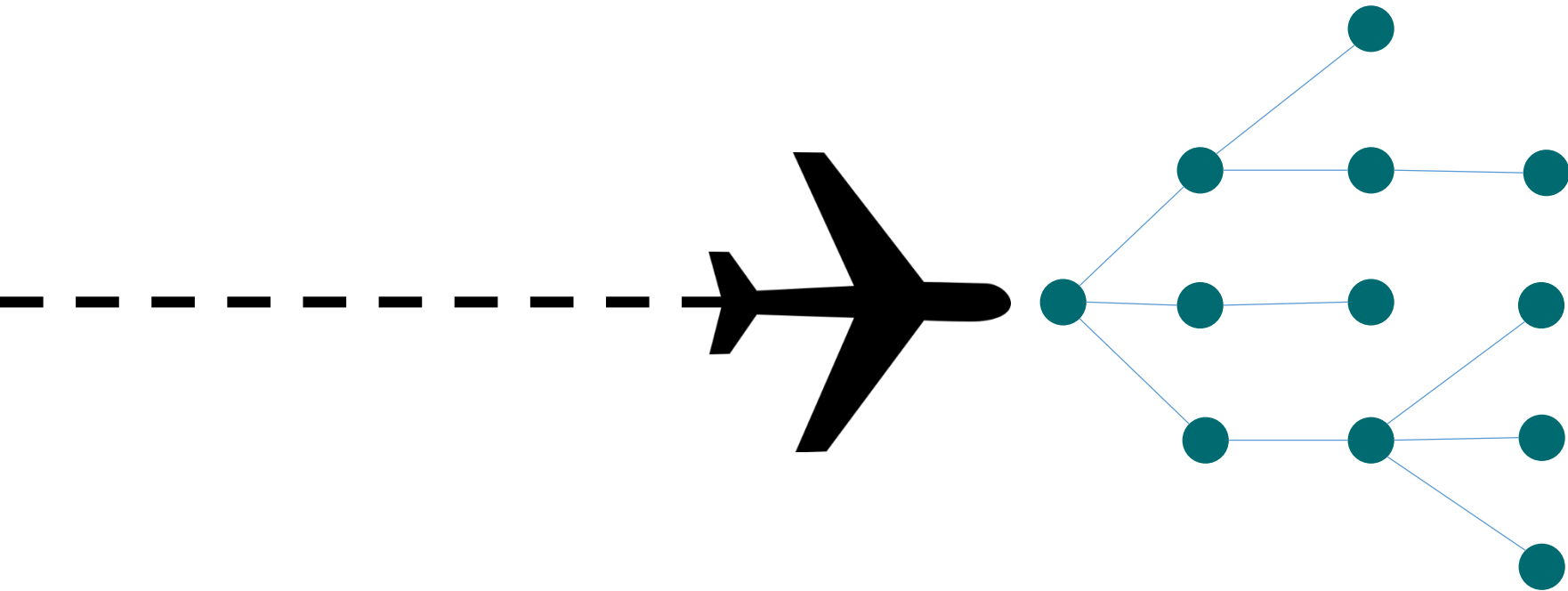
- Tracheostomies
- Ventilator-dependent
- Colonized with other MDROs
- Recently received Antibacterials and Antifungals



Not a threat to general public or healthy individuals

Healthcare abroad is risk factor for *C. auris* in the U.S.

- Majority of cases don't have direct links to healthcare abroad
- Cases are a result of introductions from abroad followed by local transmission



Healthcare facility exposure... ventilated Skilled Nursing Facilities (vSNF)

C. auris prevalence



in vSNFs:

7.7%

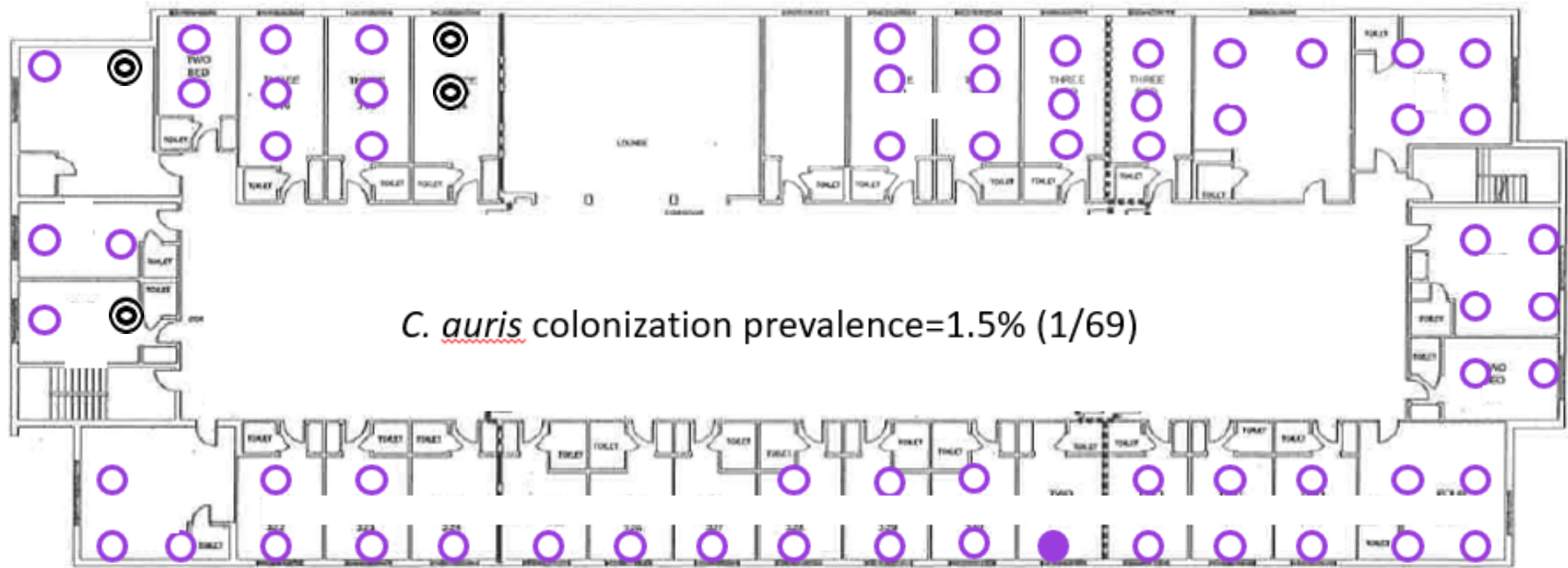
C. auris prevalence



in SNFs:

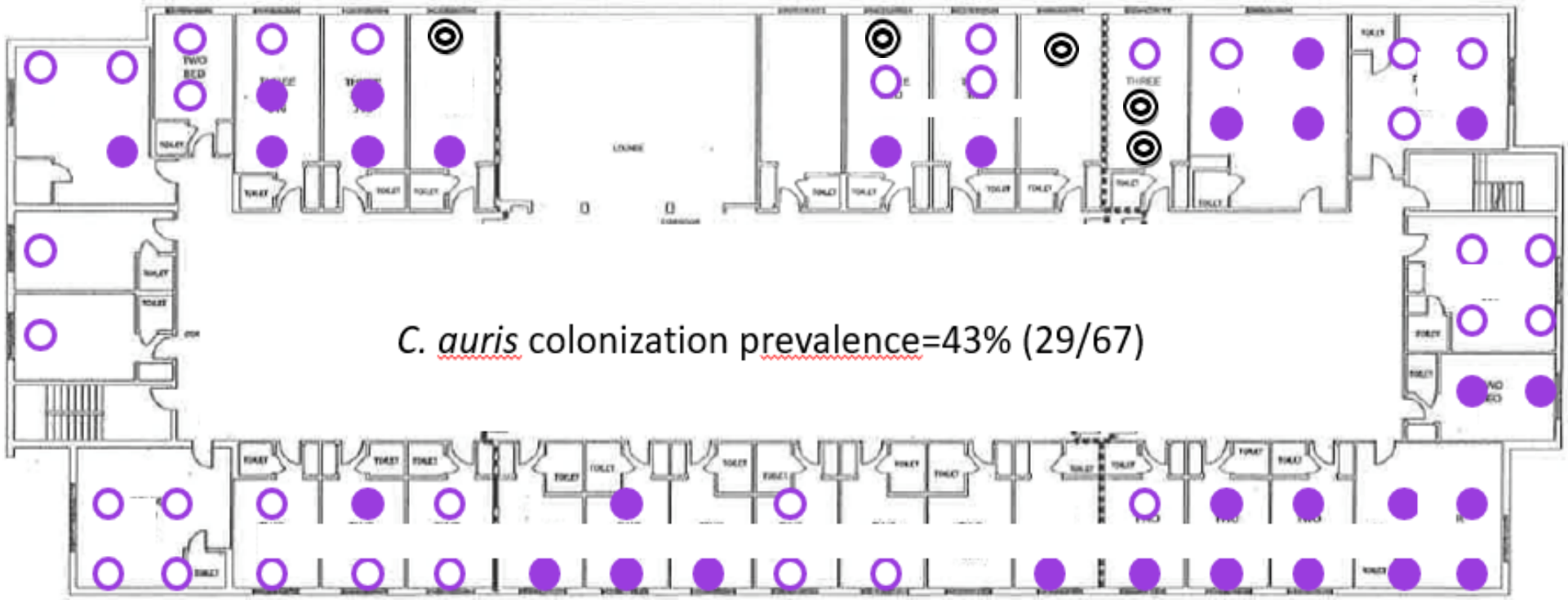
0.7%

Colonization testing of vSNF March 2017



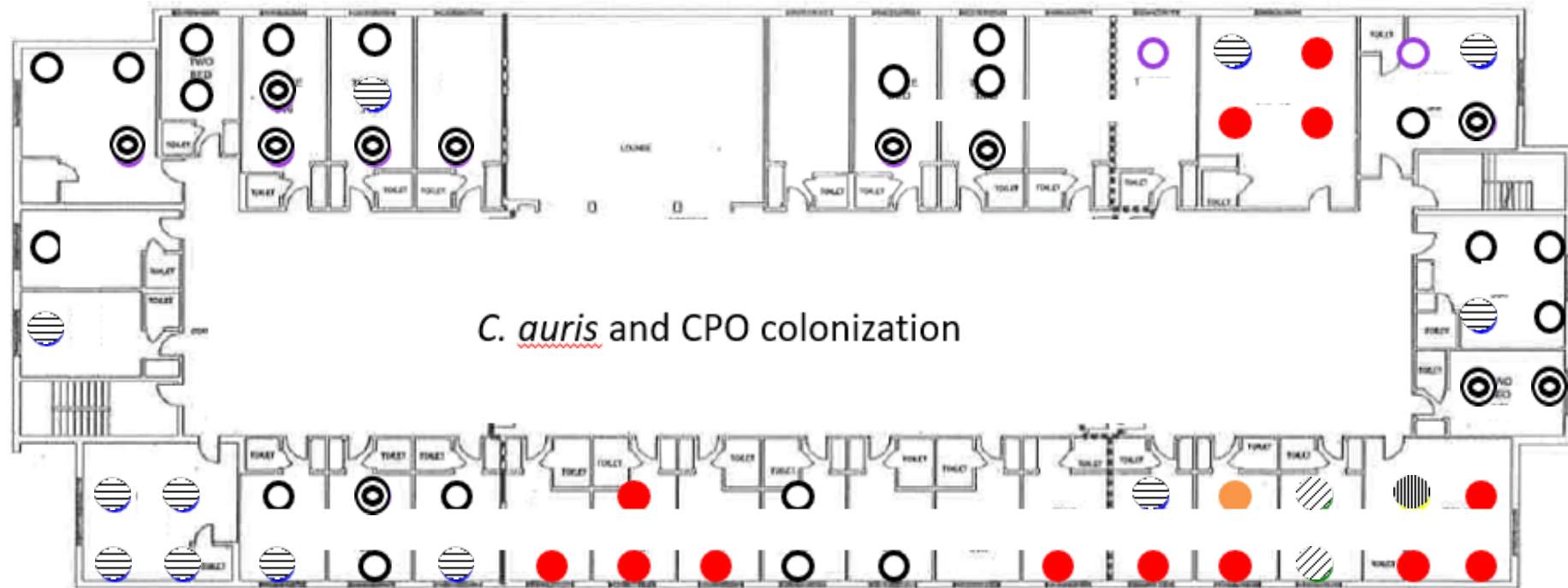
- *C. auris* positive
- Screened negative for *C. auris*
- ⊙ Not tested for *C. auris* (refused or not in room)

Re-Colonization testing of vSNF January 2018



- *C. auris* positive
- Screened negative for *C. auris*
- ⊙ Not tested for *C. auris* (refused or not in room)

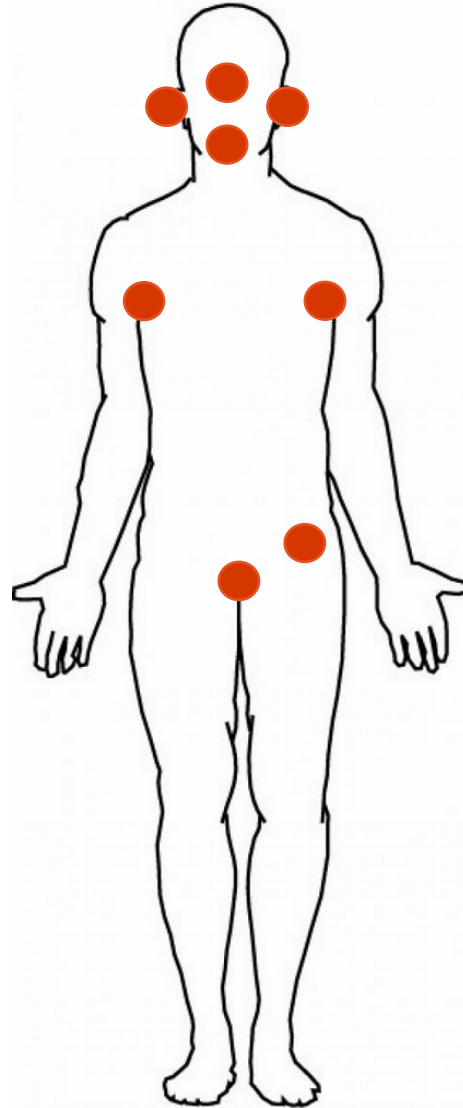
Co-Colonization with other MDROs



- ⊙ *C. auris*
- *C. auris* and KPC
- ⊖ KPC or CRE with unknown mechanism of resistance
- *C. auris*, KPC, and NDM
- ⊖ *C. auris*, VIM-CRPA, and KPC
- ⊖ *C. auris* and KPC-CRPA
- Screened negative for *C. auris*, but not tested for CRE
- Screened negative for CRE and *C. auris*

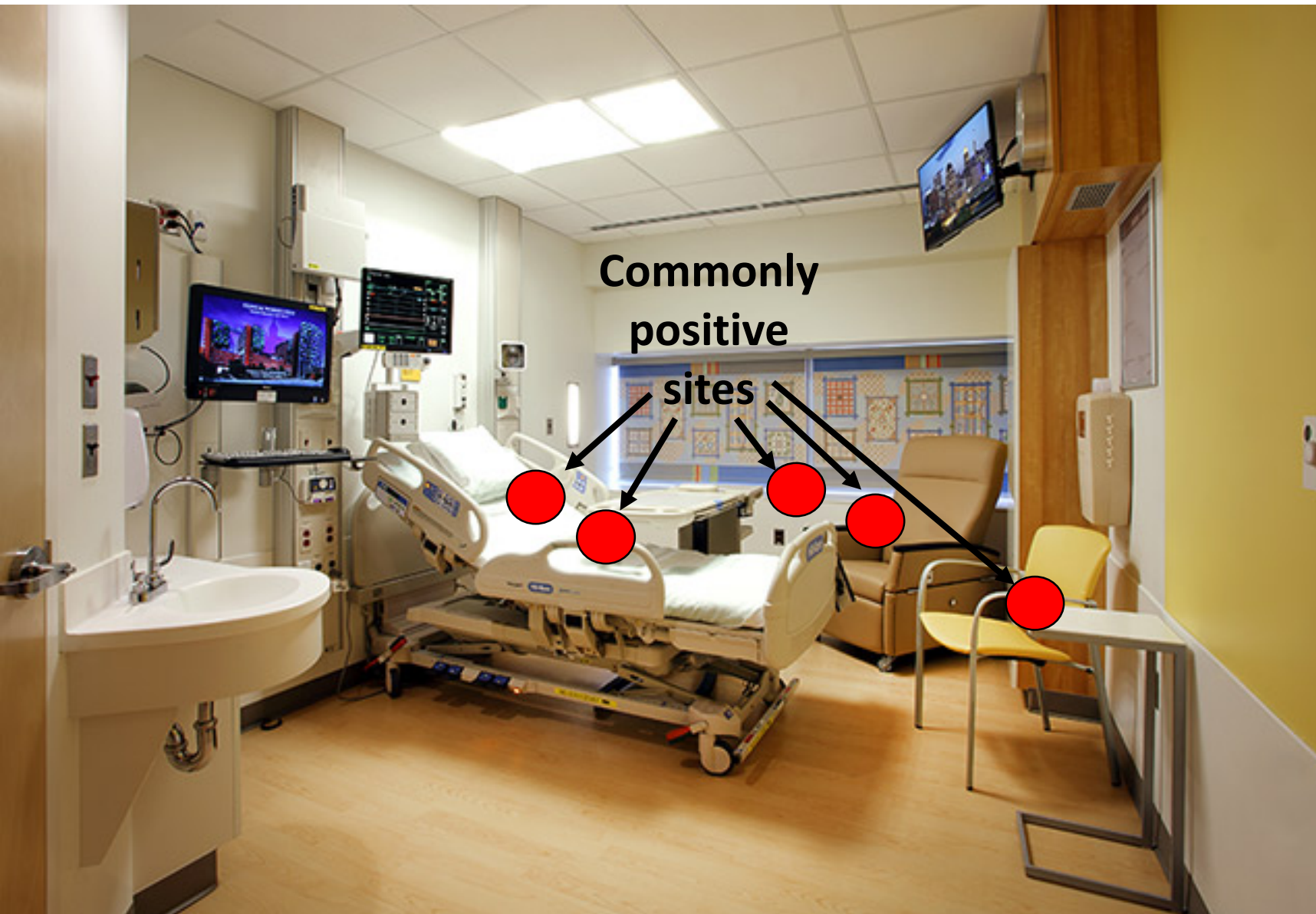
Patients are often colonized for the long term

- Primarily on skin, but nares and other body sites also can become colonized
- Persistent, for many months
- No currently known decolonization strategies



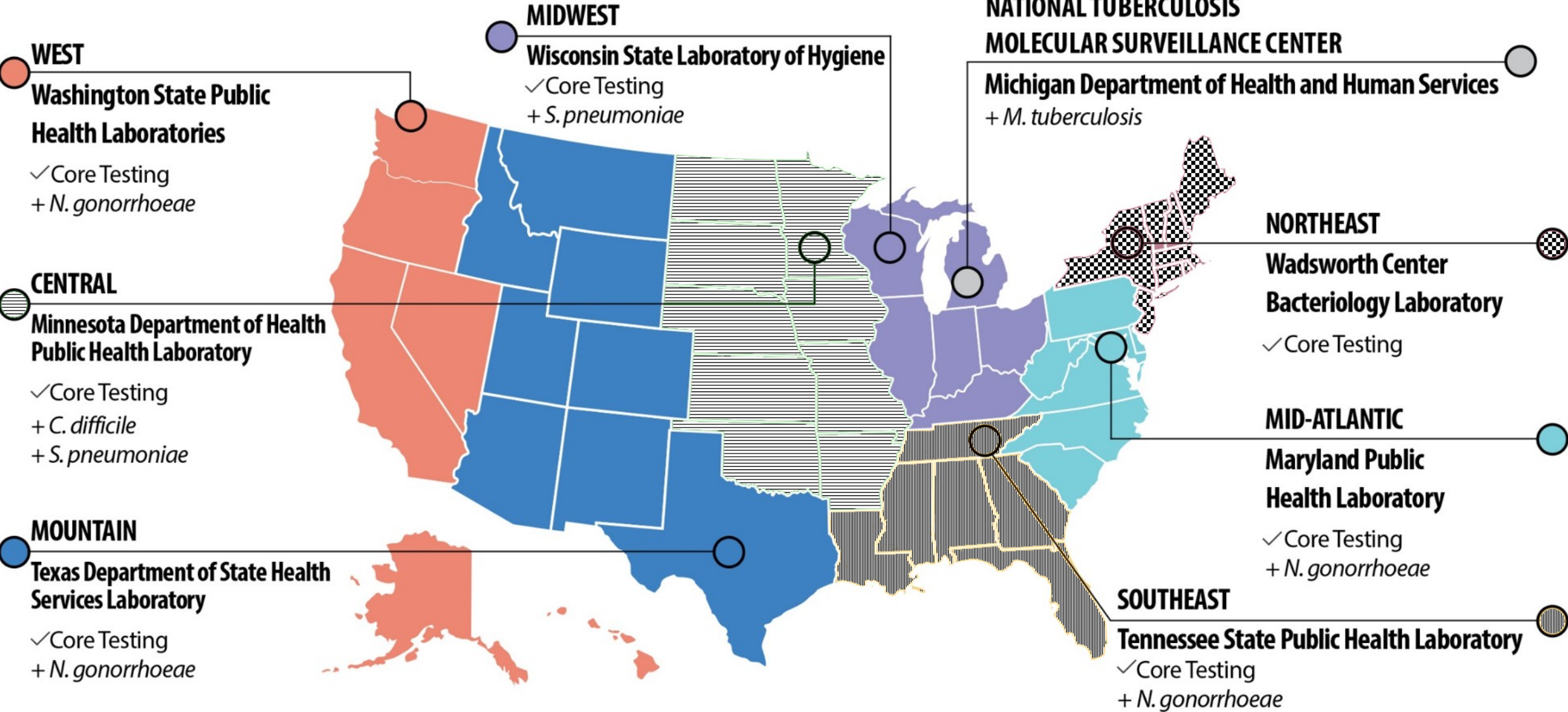
- Leads to invasive infection
- Transmission to others

C. auris persists in the environment



- Can survive over a month
- Some common disinfectants (quats) don't work

ARLN Labs – *Candida auris* identification services available



THREE CLASSES OF ANTIFUNGALS

1 Azoles

2 Polyenes

3 Echinocandins

Resistance in the US

1 Azoles
87.6%

2 Polyenes
33.7%

3 Echinocandins
1.7%

- **33% multidrug resistant (2 drugs)**
- **2 pan-resistant isolates found in 2019**

Pan-resistance – all three classes

- First 2 CDC-confirmed pan-resistant *C. auris* cases found in NY
- Cases were unrelated
- Developed resistance on echinocandin treatment
 - already resistant to fluconazole and amphotericin B
- No transmission of resistance seen
- Pan-resistance has also been reported from a few other countries (5)



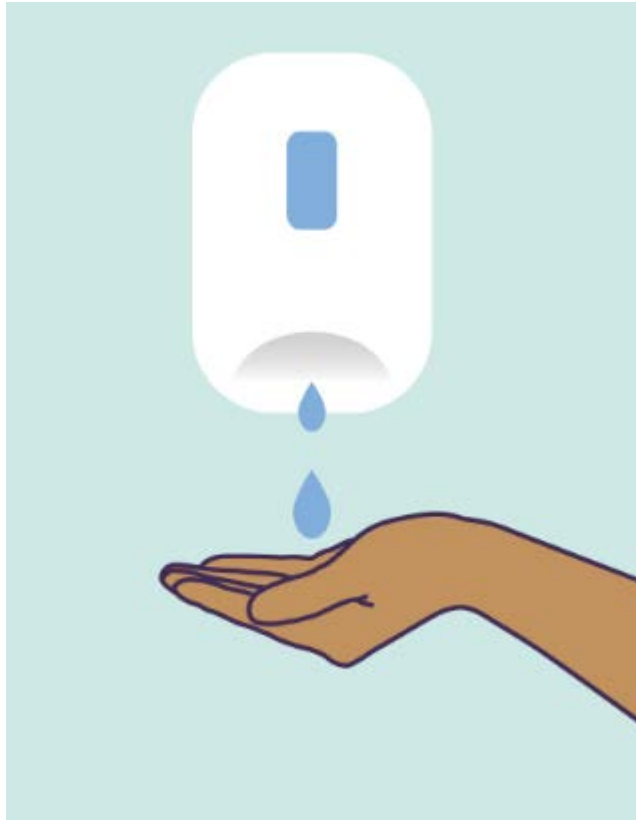
It's new bug using old tricks

- Drug resistant, makes people sick, and spreads
- Similar to CRE, VRE, MRSA, and other drug resistant bugs
- We are still learning a lot about *C. auris*, but we also know how to control the spread of other similar germs
 - Many of the same principles can be applied to *C. auris*

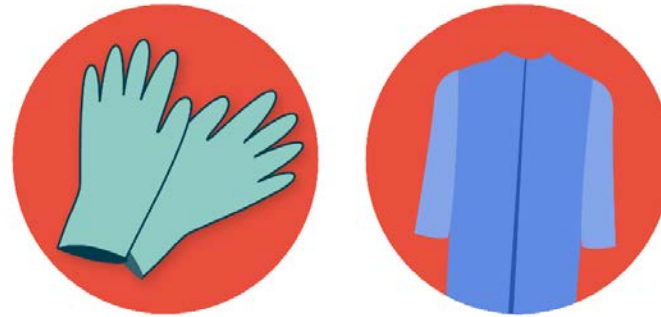


Facility Level Prevention Strategies: Back to Basics....

But needs to applied to vSNFs and long term care



Hand Hygiene



**Personal Protective
Equipment & Precautions**



**Environmental
Cleaning &
Disinfection**

What Keeps Us Up at Night

C auris leaping ahead
of other *Candida*

