Candida auris

Drug Development Considerations for the Prevention of Healthcare-Associated Infections - Virtual Public Workshop

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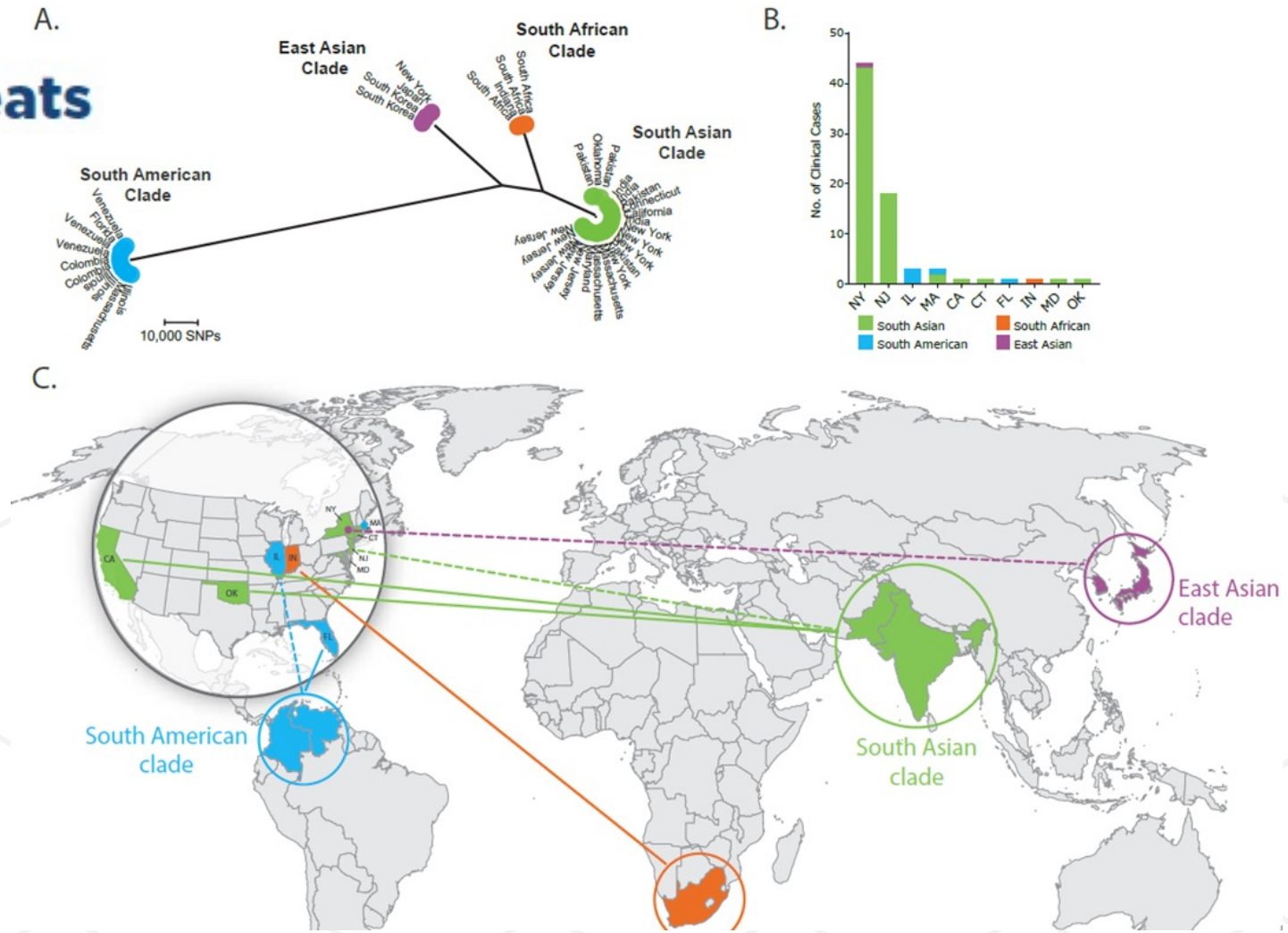
The findings and conclusions in this presentation are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention

THE PROBLEM

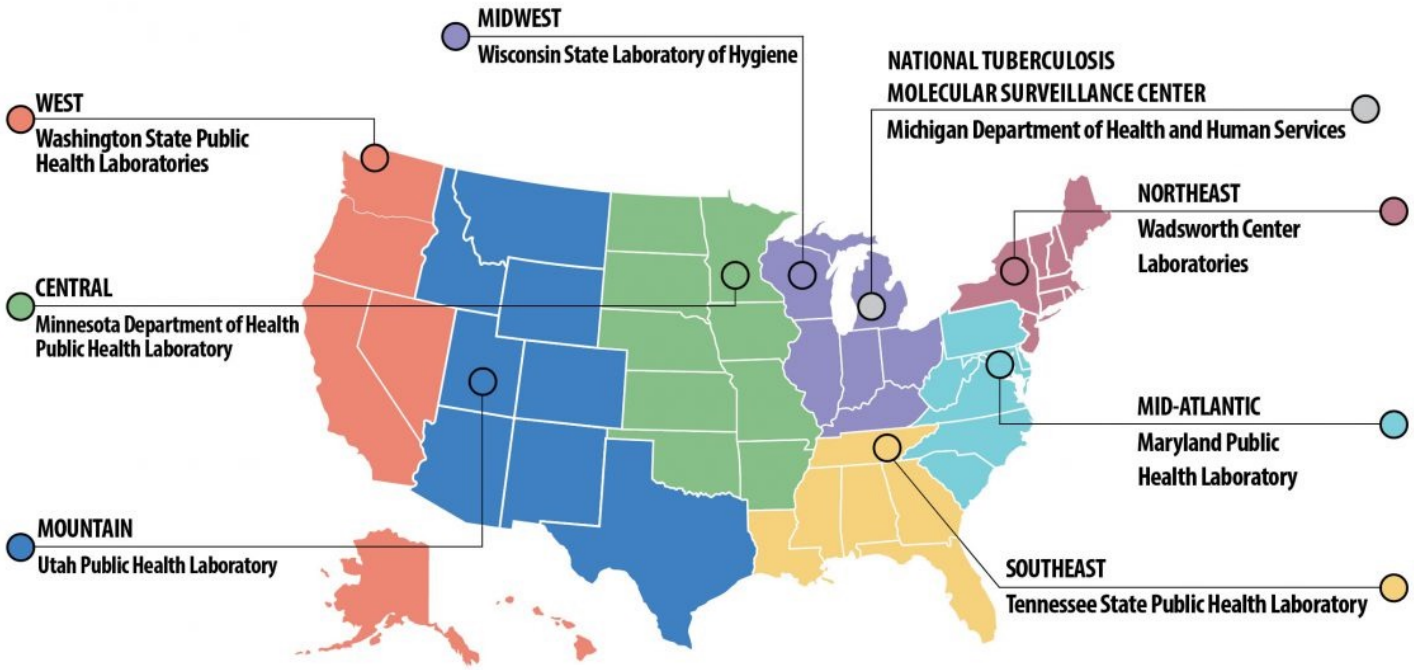
First described in 2009 – now an “Urgent” AR Threat

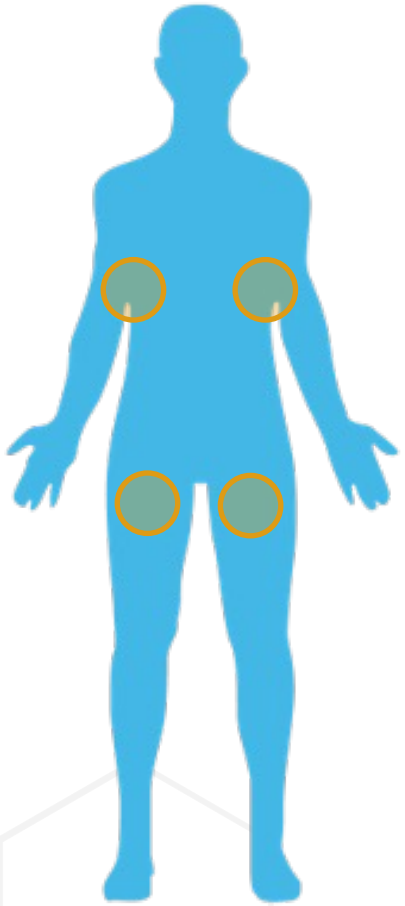
Urgent Threats

- *C. auris* is an emerging and multidrug resistant fungal pathogen identified in 2009
- *C. auris* heavily colonizes patients' skin, leading to outbreaks in healthcare settings
- There are **no decolonization or pathogen reduction strategies** for *C. auris* colonization



Tracking *C. auris* colonization through CDC's AR Lab Network





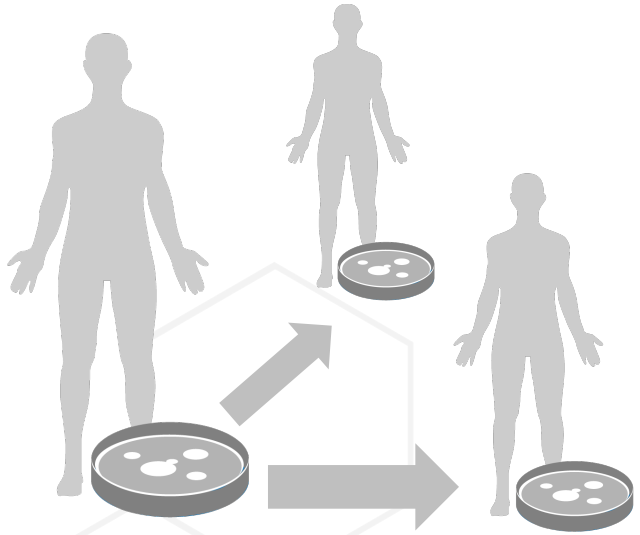
Why are we concerned about *C. auris*?

Only 3 classes of Antifungals

>80% isolates resistant to 1

>25% of isolates resistant to 2

Now over 30 total Pan R isolates



Colonization amplifies the problem

5-10% of colonized patients develop invasive infections

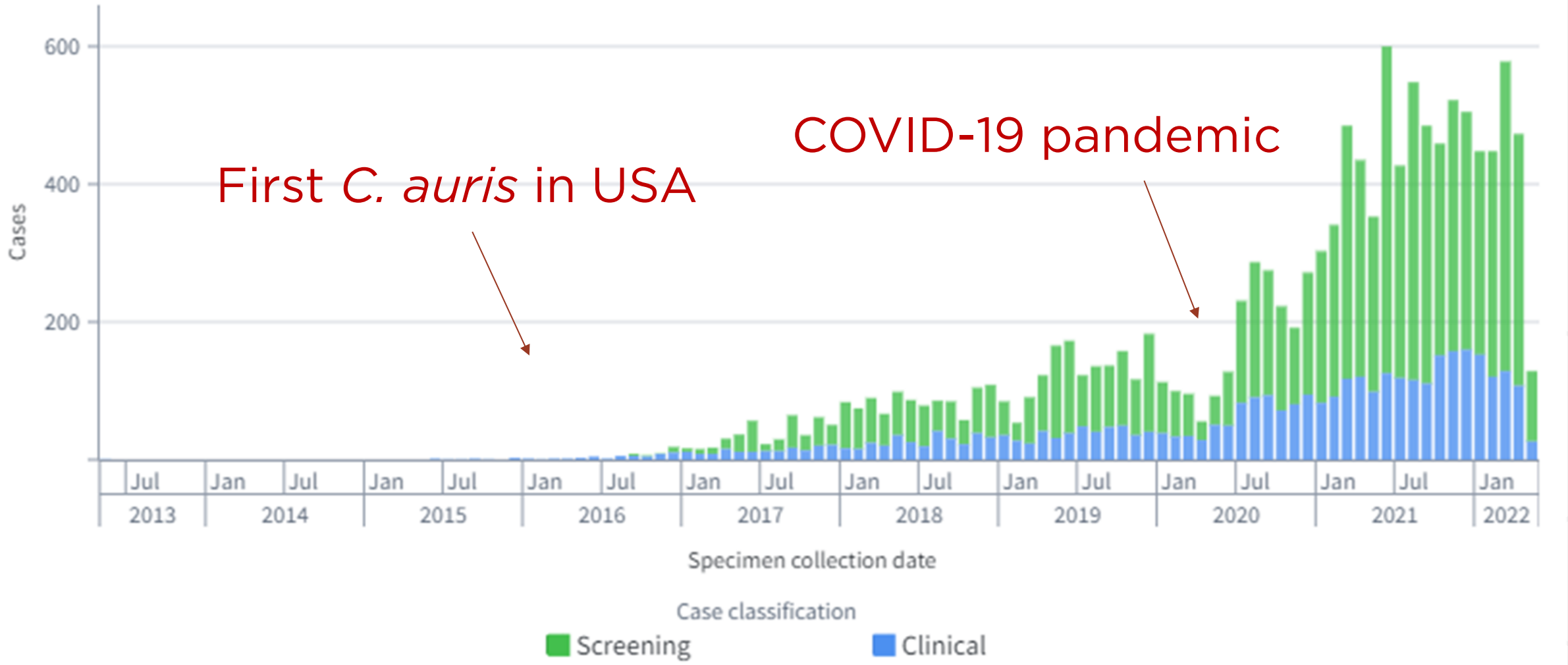
>45% mortality within 30 days

Large outbreaks in healthcare settings

Some facilities have **>70% colonization prevalence**

Outbreaks are difficult to control

C. auris cases are increasing



Who gets colonized by *C. auris?*

Known Risk Factors:

- Mechanically Ventilated
- Having ≥1 acute care hospital visit in the prior 6 months
- Carbapenem antibiotics in the prior 90 days
- Systemic fluconazole in the prior 90 days

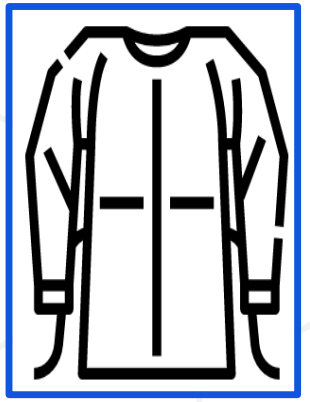
Table 3. Multivariable Logistic Regression Models for Assessing Factors for Association With *Candida auris* Colonization, New York, 2016–2018

		95% Confidence Interval	
Factors	aOR	Lower	Upper
Mechanically ventilated[a]	5.88	2.25	15.37
Any ACH visit in the 6 months prior to PPS[b]	4.23	1.87	9.60
Received a carbapenem in the 90 days prior to PPS[c]	3.52	1.62	7.63
Received systemic fluconazole in the 90 days prior to PPS[d]	5.98	1.58	22.64
Received vancomycin in the 90 days prior to PPS[e]	1.65	.75	3.67
Any MDRO in the 90 days prior to PPS[f]	1.25	.56	2.76
Room with a colonized roommate[g]	.37	.12	1.16
Room type at time of screening[h]			
In a room with 1 bed	Ref	Ref	Ref
In a room with 2 beds	1.44	.55	3.80
In a room with 4 beds	2.04	.54	7.70

Rossow et al, Clinical Infectious Diseases. 2021.

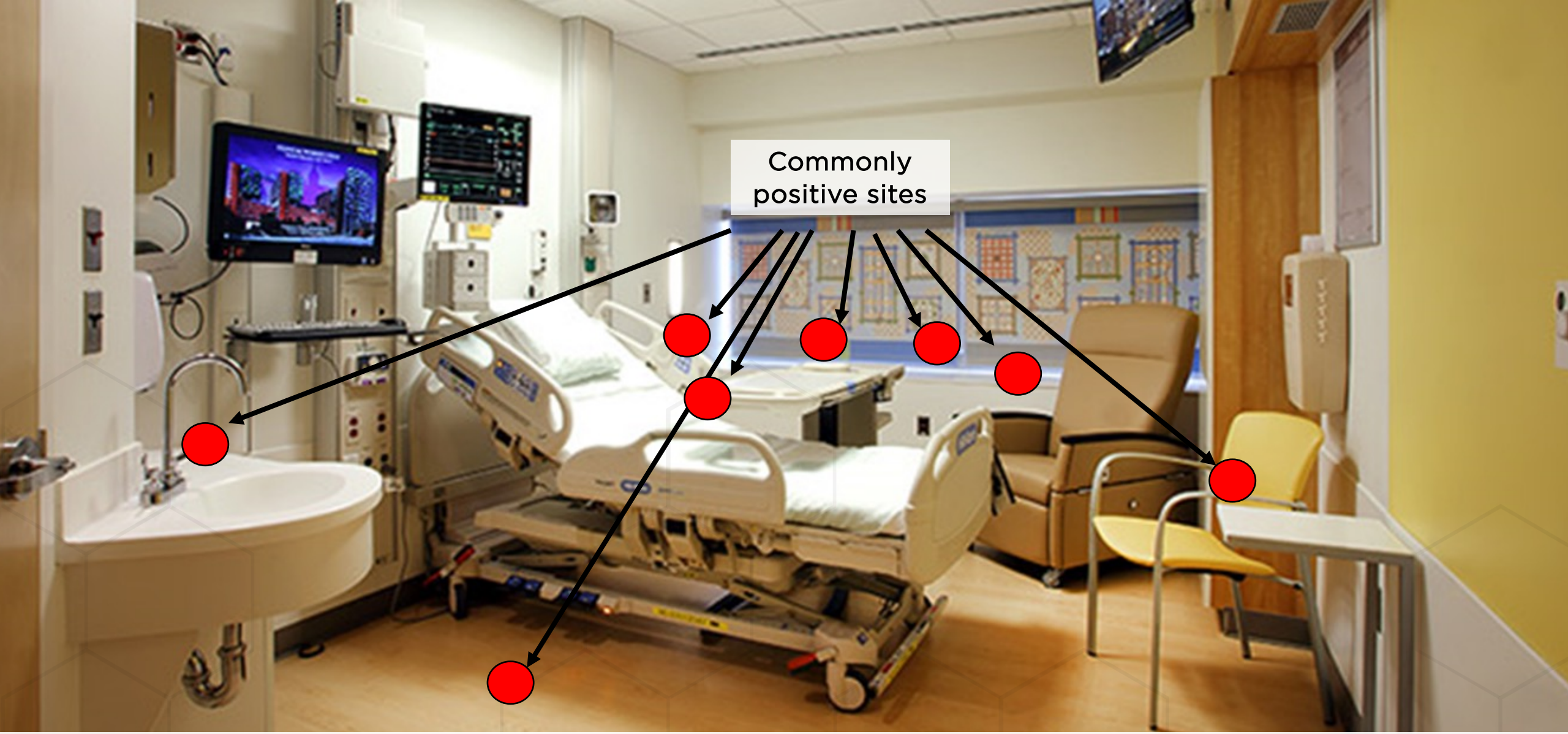
Challenges caring for patients colonized with *C. auris*

- Increased resources to implement robust transmission-based precautions and IPC program
- EPA's "List P" disinfectants
- Challenges discharging - some facilities now rejecting patients colonized with *C. auris*
- Common question: "how do we decolonize patients"
- There are no options for decolonization or *C. auris* reduction strategies



WHAT WE HAVE

Current tools, studies, and data gaps

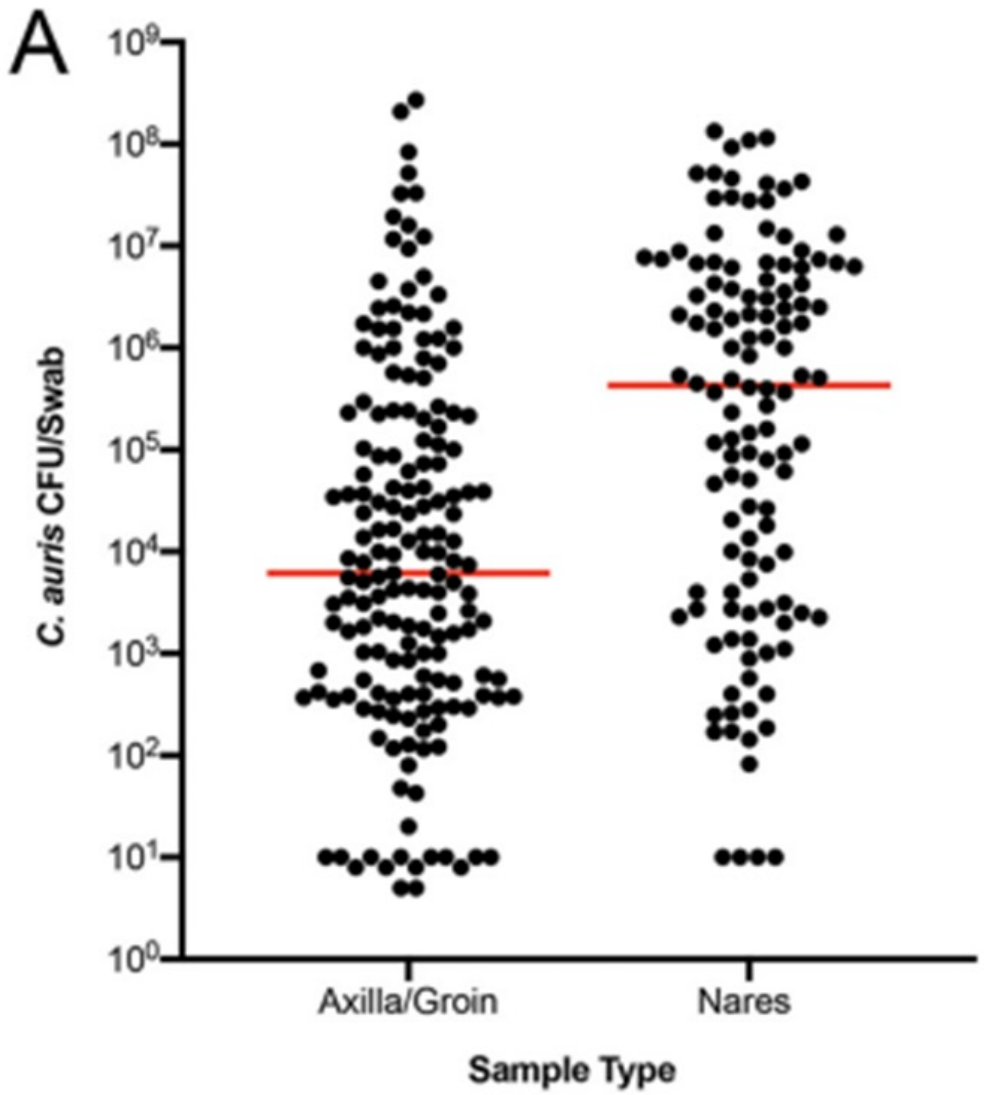


Candida auris contaminates and persists in the environment

High concentrations of *C. auris* detected in colonization screening swabs

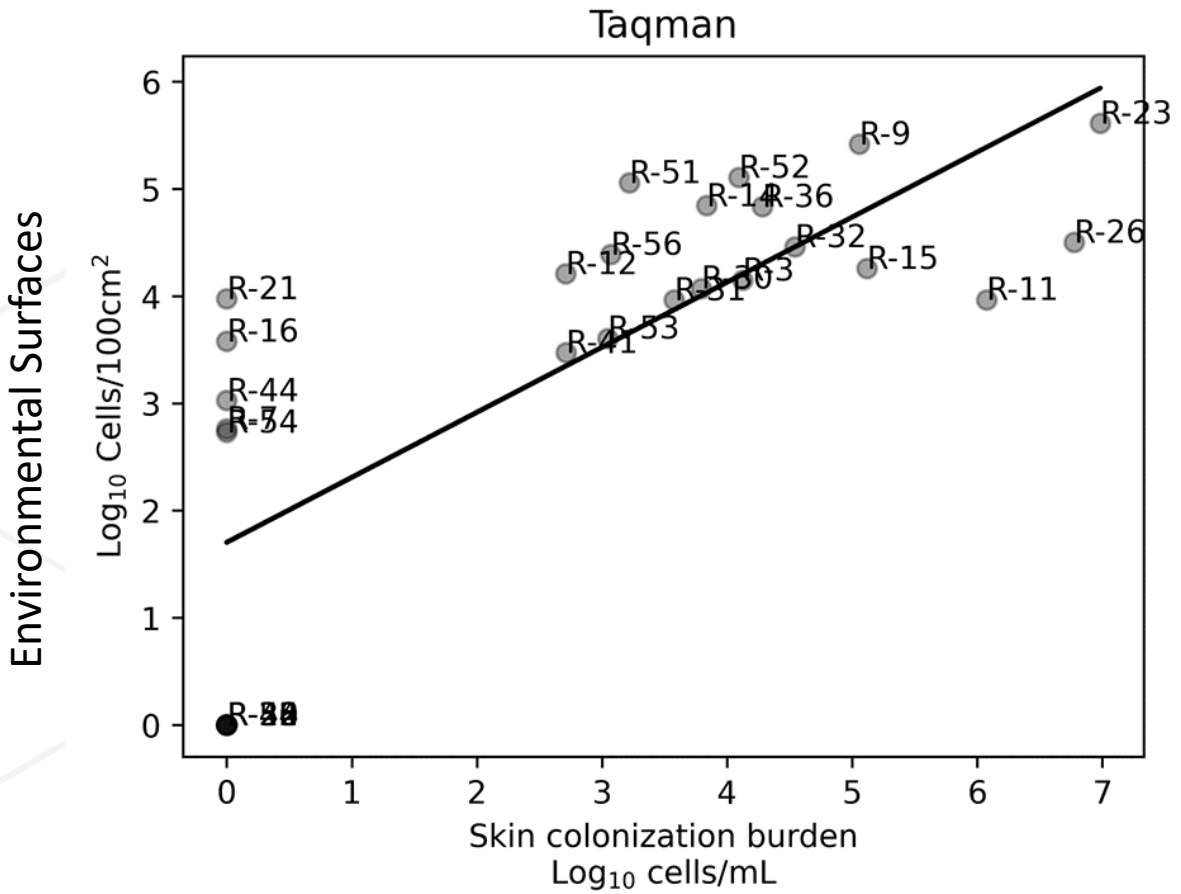
Notable Observations:

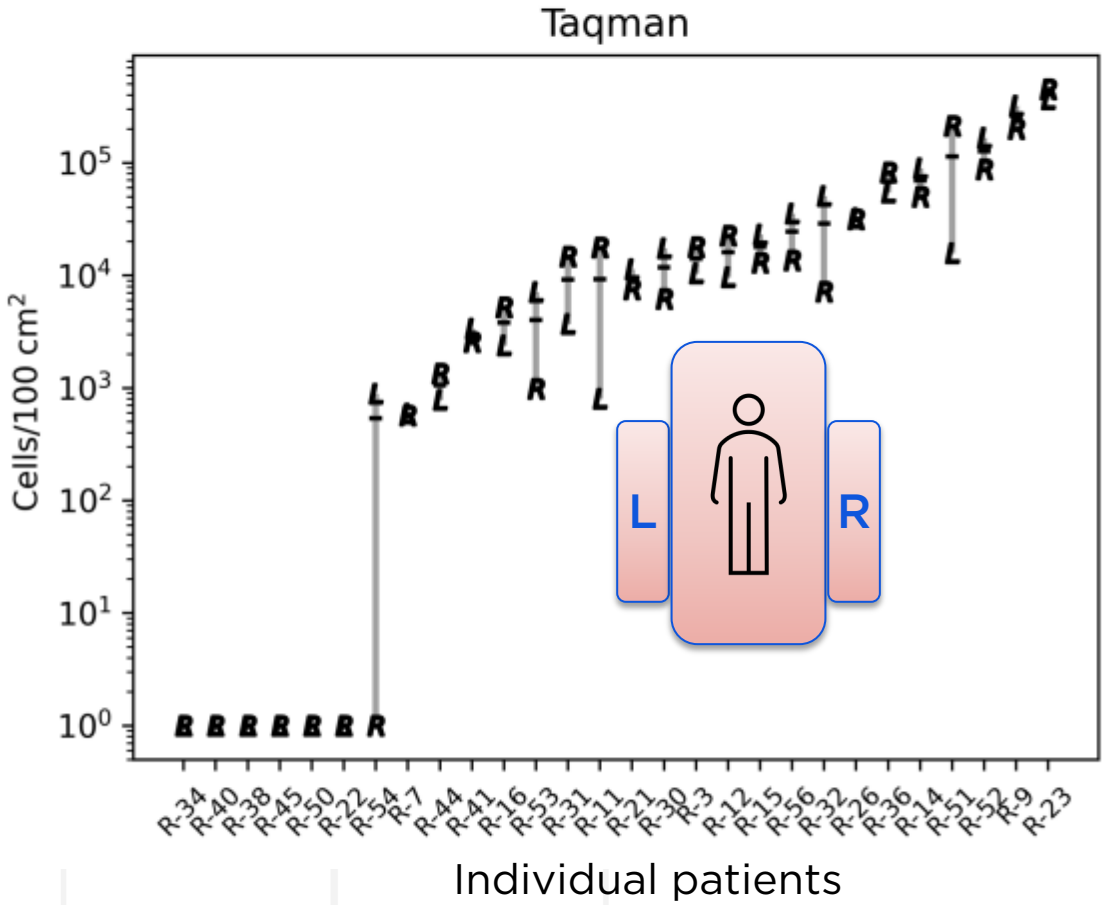
- Large range of colonization burdens, many very high (10^1 – 10^8 CFU)
- High *C. auris* concentrations observed in both axilla/groin and anterior nares



Zhu et al, Journal of Clinical Microbiology. 2020.

Patients with more *C. auris* on their skin have more *C. auris* in their environment

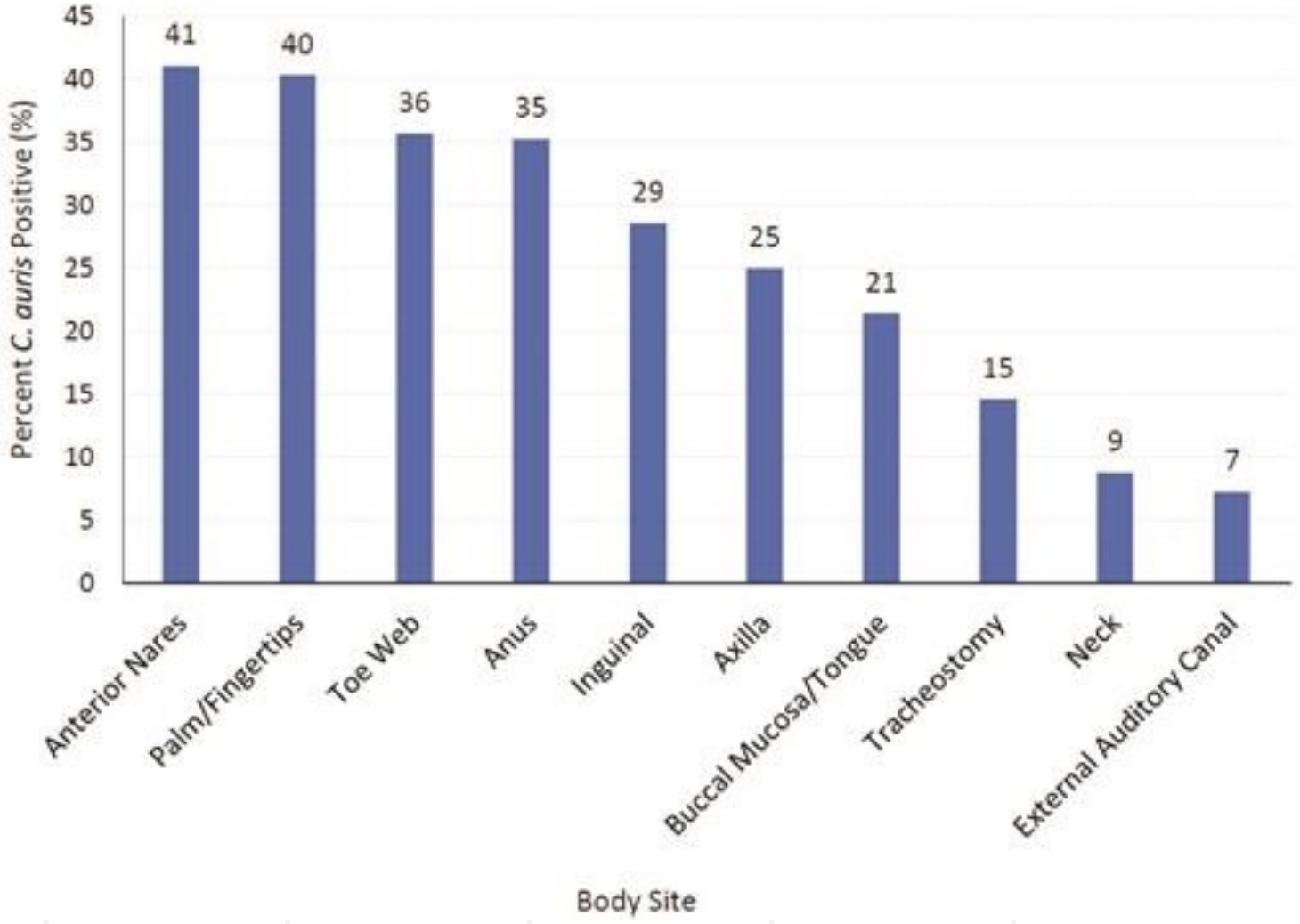




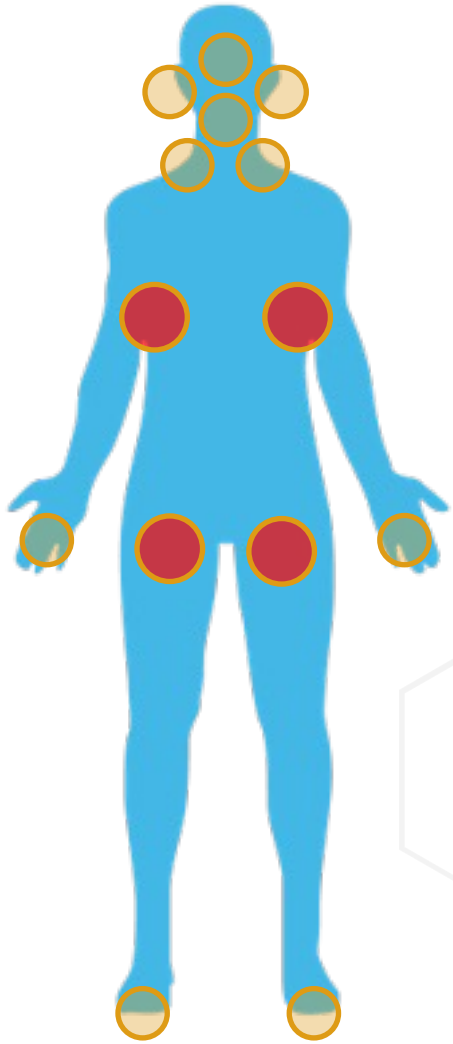
Sexton et al, Clinical Infectious Diseases. 2021.

Frequency of *C. auris* colonization at specific body sites

Figure 1: Proportion *C. auris* Positive Samples at first Survey by Body Site (N = 57 patients, 541 samples)



N = 57



Hayden et al, Open Forum Infectious Diseases. 2019

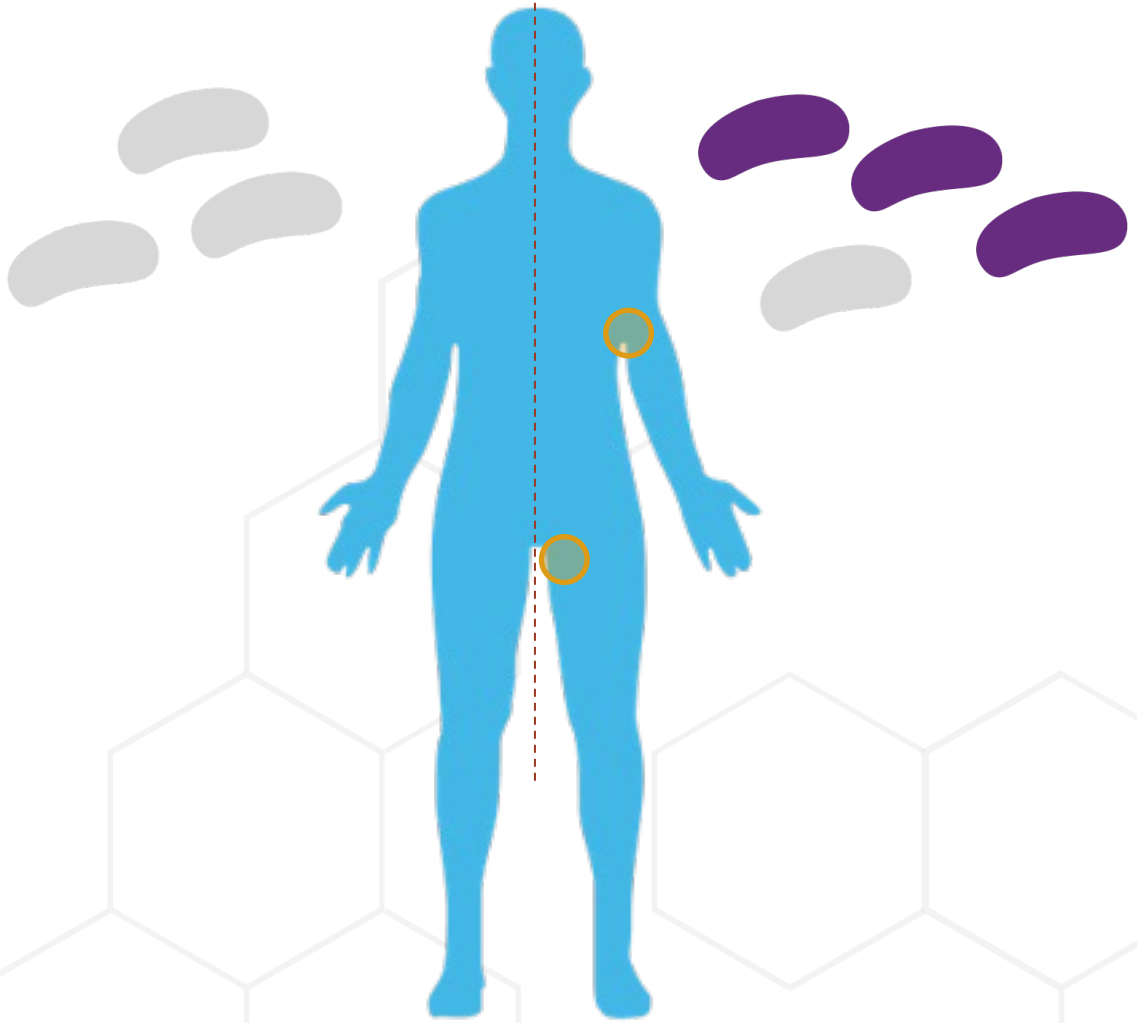
Microbiome relevance?

Not colonized by *C. auris*

Malassezia dominated “mycobiome”

Colonized by *C. auris*

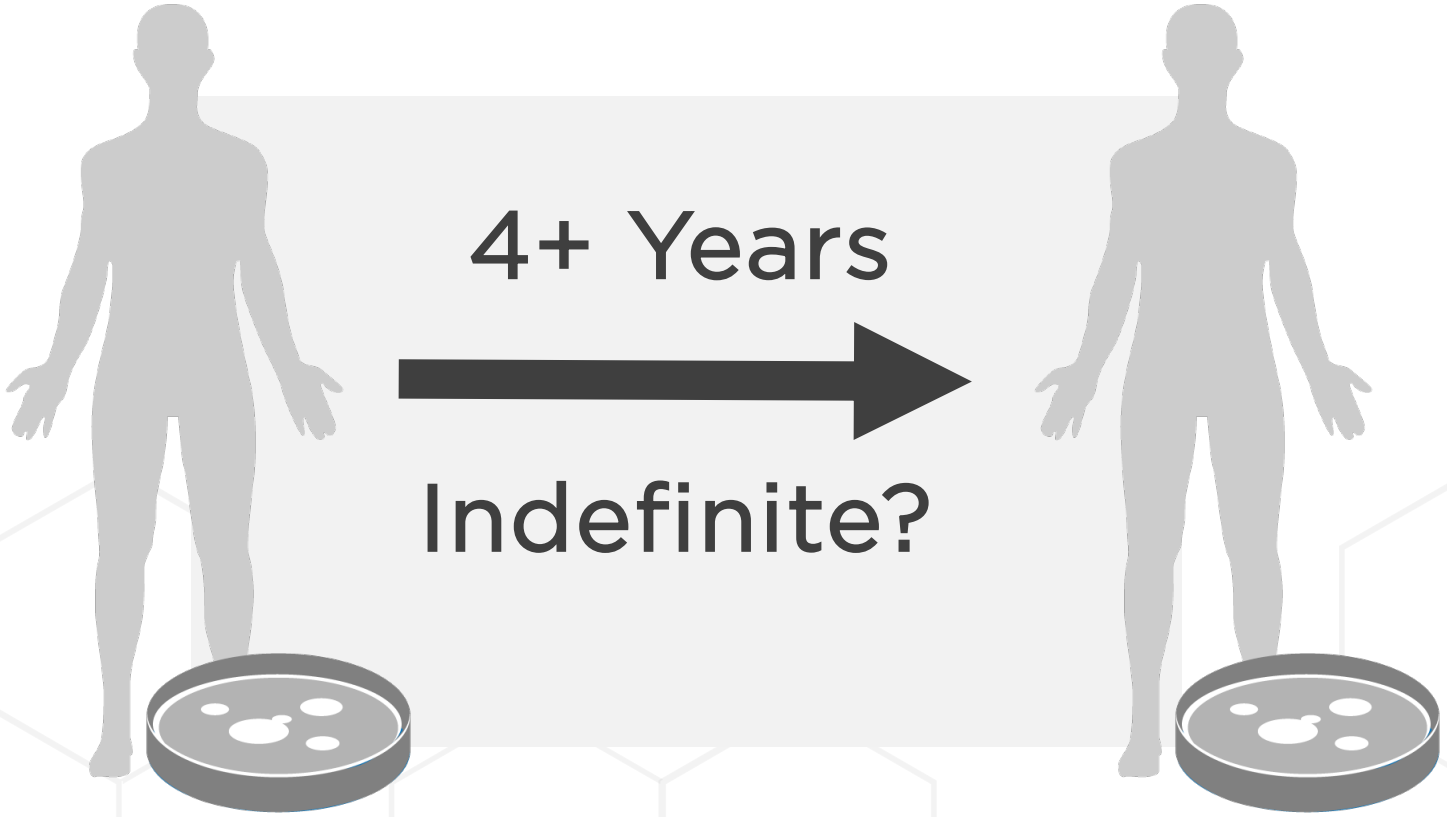
C. auris dominated “mycobiome”



Proctor et al, Nature Medicine. 2021.

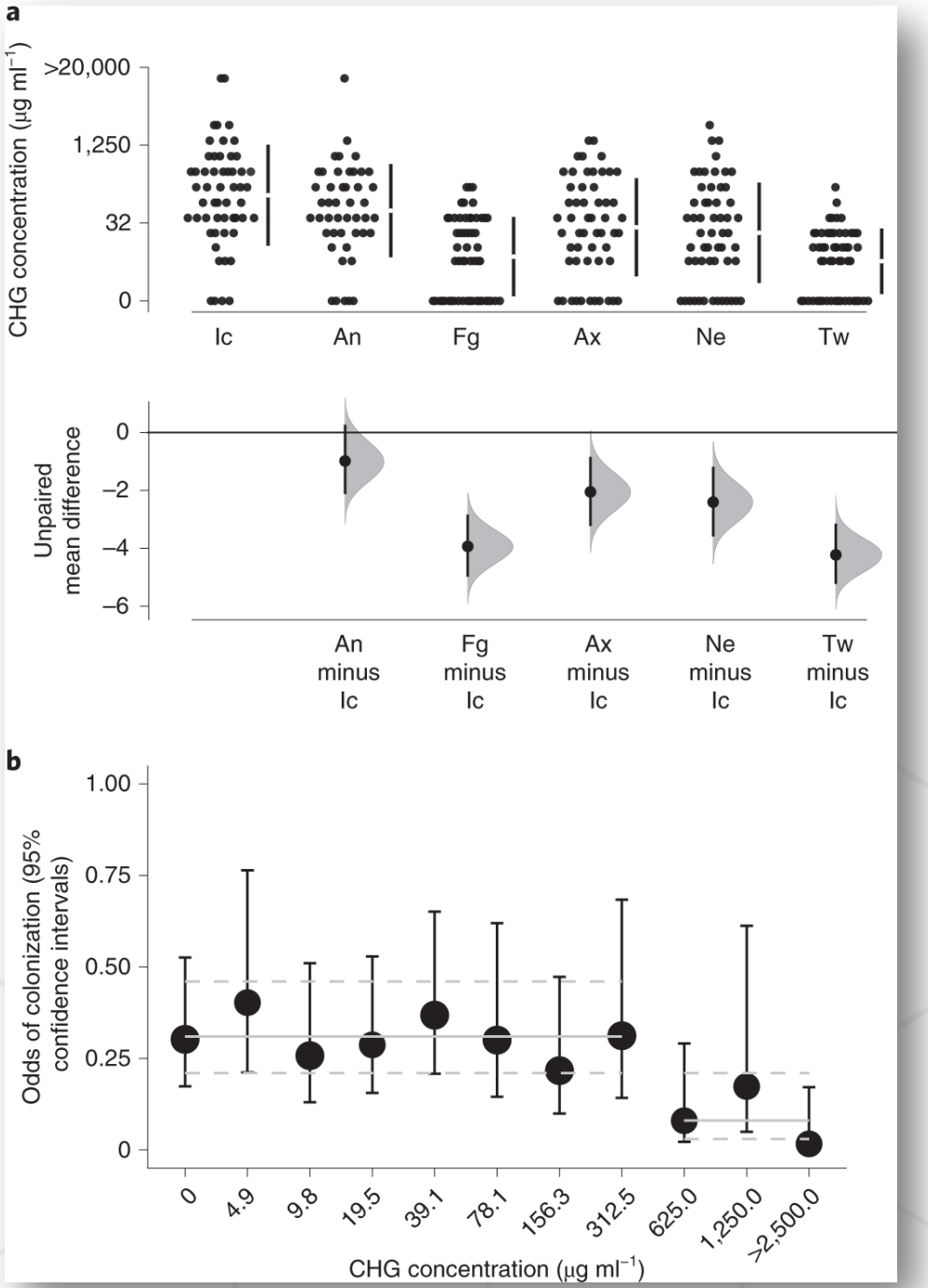
C. auris colonization last years, may be indefinite

- Colonization can last very long times, perhaps indefinitely
- Colonization status can fluctuate between sampling
- Some individuals do not become colonized despite high exposure



What we know about *C. auris &* CHG

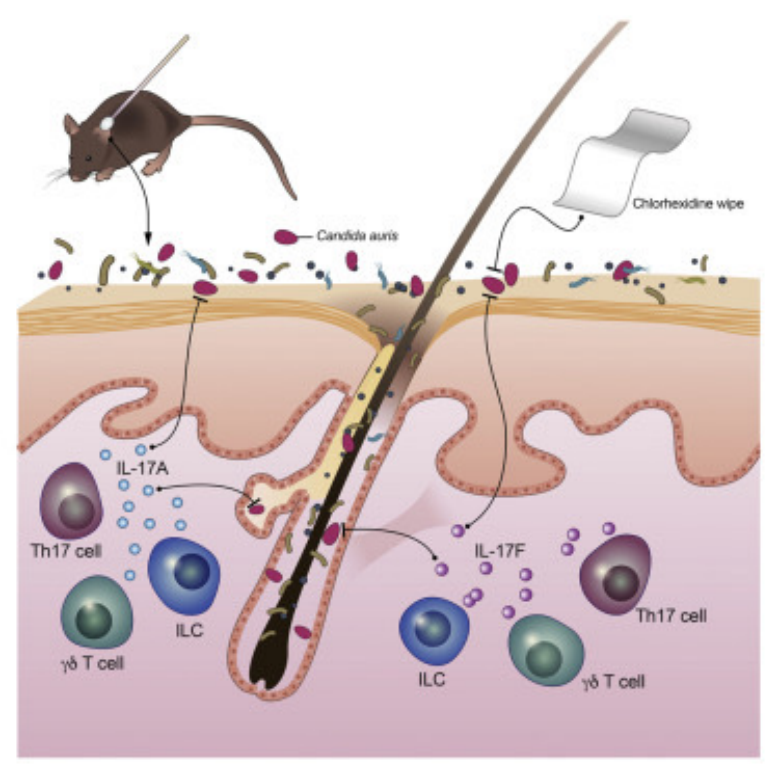
- Looking at cohort in vSNF unit
- Measured CHG concentrations achieved on skin
- Reduction in colonization observed if CHG > 625 µg/mL
- Much higher than required in vitro (16 – 32 µg/mL)
- Take away – May be difficult to achieve CHG concentrations necessary in practice



Proctor et al, Nature Medicine. 2021.

Mouse-model work

- *C. auris* colonized to base of hair follicles, may provide safe harbor



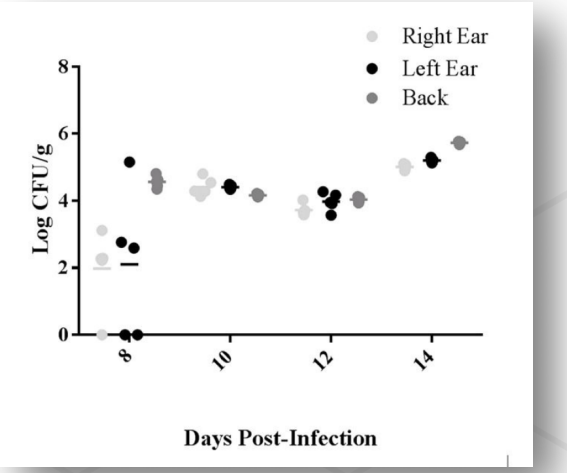
- Clades differed in ability to colonize
- Chlorhexidine was evaluated for decolonization, may be protective

Huang et al, Cell Host Microbe. 2021.

- Achieved stable *C. auris* colonization
- Terbinafine and Clomitrazole based products evaluated for suppressing colonization

1% CLOTRIMAZOLE **UNTREATED**

- Colonization burden reduced, not eliminated



Ghannoum et al, Antimicrobial Agents Chemotherapy. 2021.

WHAT WE NEED

C. auris colonization summary

- *C. auris* can asymptomatically colonize patients' skin, which increases their risk of developing infection and contributes to environmental contamination and transmission
- Healthcare facilities often ask about decolonization treatments, but no options available
- Patients colonized with *C. auris* are increasingly stuck at the wrong level of care because other facilities refuse to accept them.
- Public health need for decolonization or pathogen reduction strategies to address *C. auris* colonization
- Need standardized laboratory models to help evaluate the efficacy of decolonization and pathogen reduction strategies

Special thanks

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- Julie Segre and NIH
- Susan Huang and UCI

Thank you.

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