



Candida auris

Evidence of Healthcare Transmission—
Chicago, IL, 2016

Janna Kerins, VMD, MPH
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Janna Kerins

EIS Officer, Chicago Dept. of Public Health

All planners, editors, faculty and reviewers of this activity have no relevant financial relationships to disclose. This presentation was created without any commercial support.

Learning Objectives

At the conclusion of this course participants will be able to

- **Enable the learner to gain knowledge of emerging healthcare-associated infections pathogens.**
- **Identify effective infection control strategies to mitigate spread of multi-drug resistant organisms.**
- **Raise awareness of emerging disease threats and identify appropriate diagnostic testing, reporting and prevention methods.**
- **Raise awareness of local public health issues including opioid epidemic and immigrant health.**

To obtain credit you must:

- **Be present for the entire session**
- **Complete an evaluation form**
- **Return the evaluation form to staff**

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New Clonal Strain of *Candida auris*, Delhi, India

Anuradha Chowdhary, Cheshta Sharma, Shalini Duggal, Kshitij Agarwal, Anupam Prakash, Pradeep Kumar Singh, Sarika Jain, Shallu Kathuria, Harbans S. Randhawa, Ferry Hagen, and Jacques F. Meis

A new clonal strain of *Candida auris* is an emerging genetic agent of fungemia in Delhi, India. In 12 patients from 3 hospitals, it was resistant to fluconazole and genotyped as a novel strain. It was first reported in Japan, and then in India.

RESEARCH | OPEN ACCESS

First hospital outbreak of the globally emerging *Candida auris* in a European hospital

Silke Schelenz  , Ferry Hagen, Johanna L. Rhodes, Alireza Abdolrasouli, Anuradha Chowdhary, Anne Hall, Lisa Ryan, Joanne Shackleton, Richard Trimlett, Jacques F. Meis, Darius Armstrong-James and Matthew C. Fisher

Antimicrobial Resistance & Infection Control 2016 5:35 | DOI: 10.1186/s13756-016-0132-5 | © The Author(s). 2016

Received: 2 September 2016 | Accepted: 8 September 2016 | Published: 19 October 2016

Candida auris-Associated Candidemia, South Africa

Rindidzani E. Magobo, Craig Corcoran, Sharona Seetharam, and Nelesh P. Govender

First report of *Candida auris* in America: Clinical and microbiological aspects of 18 episodes of candidemia

Belinda Calvo ^a, Analy S.A. Melo ^b, Armino Perozo-Mena ^c, Martin Hernandez ^d, Elaine Cristina Francisco ^b, Ferry Hagen ^{e,f}, Jacques F. Meis ^{e,f}, Arnaldo Lopes Colombo ^{b,*}

Journal of Infection (2016) 73, 369–374

How does *C. auris* differ from other *Candida* spp.?

- Healthcare-associated outbreaks

JOURNAL OF CLINICAL MICROBIOLOGY, Sept. 2011, p. 3139–3142
0095-1137/11/\$12.00 doi:10.1128/JCM.00319-11
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First Three Reported Cases of Nosocomial Fungemia Caused by *Candida auris*[▽]

Wee Gyo Lee,¹ Jong Hee Shin,^{2*} Young Uh,³ Min Gu Kang,¹ Soo Hyun Kim,²
Kyung Hwa Park,⁴ and Hee-Chang Jang⁴

*Department of Laboratory Medicine, Ajou University School of Medicine, Suwon, South Korea*¹; *Department of Laboratory Medicine, Chonnam National University Medical School, Gwangju, South Korea*²; *Department of Laboratory Medicine, Yonsei University Wonju College of Medicine, Wonju, South Korea*³; and *Department of Internal Medicine, Chonnam National University Medical School, Gwangju, South Korea*⁴

Received 14 February 2011/Returned for modification 25 May 2011/Accepted 15 June 2011

How does *C. auris* differ from other *Candida* spp.?

- Healthcare-associated outbreaks
- Difficult to identify

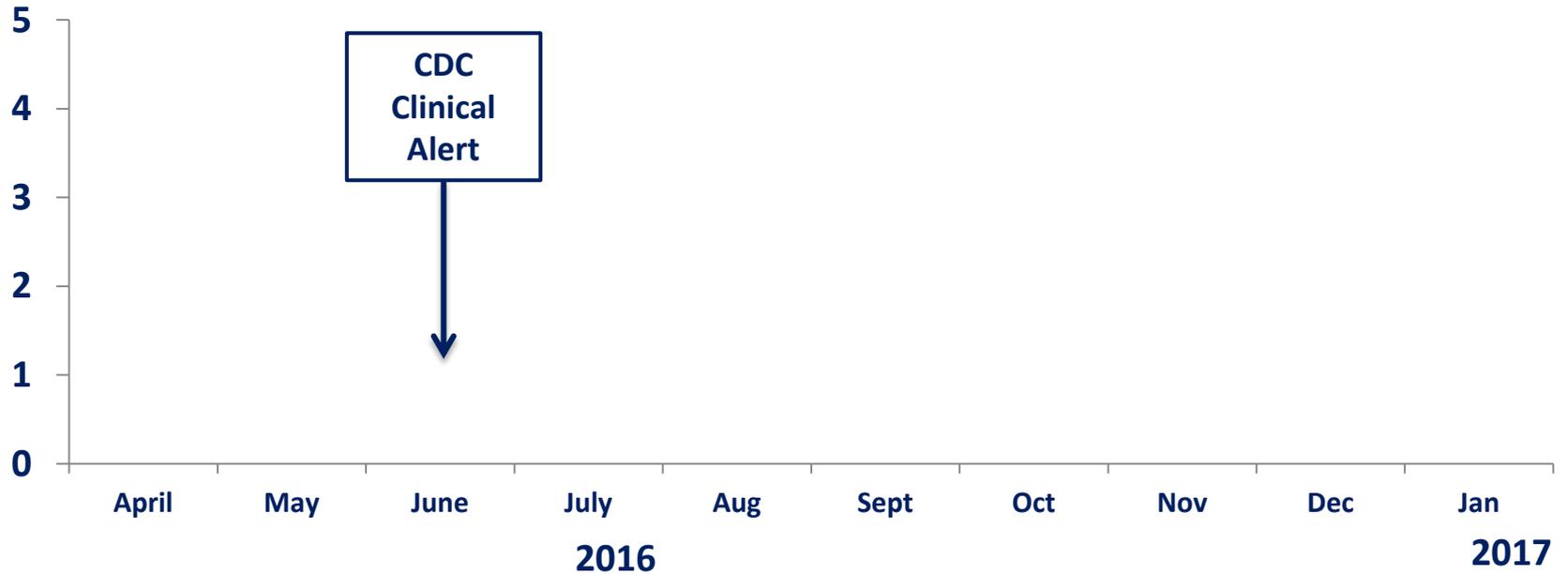
Common misidentifications of <i>C. auris</i>	
<i>C. haemulonii</i>	<i>C. lusitaniae</i>
<i>C. famata</i>	<i>C. guilliermondii</i>
<i>C. sake</i>	<i>Rhodotorula glutinis</i>
<i>C. catenulata</i>	Non-typable beyond <i>C. spp. non-albicans</i>

How does *C. auris* differ from other *Candida* spp.?

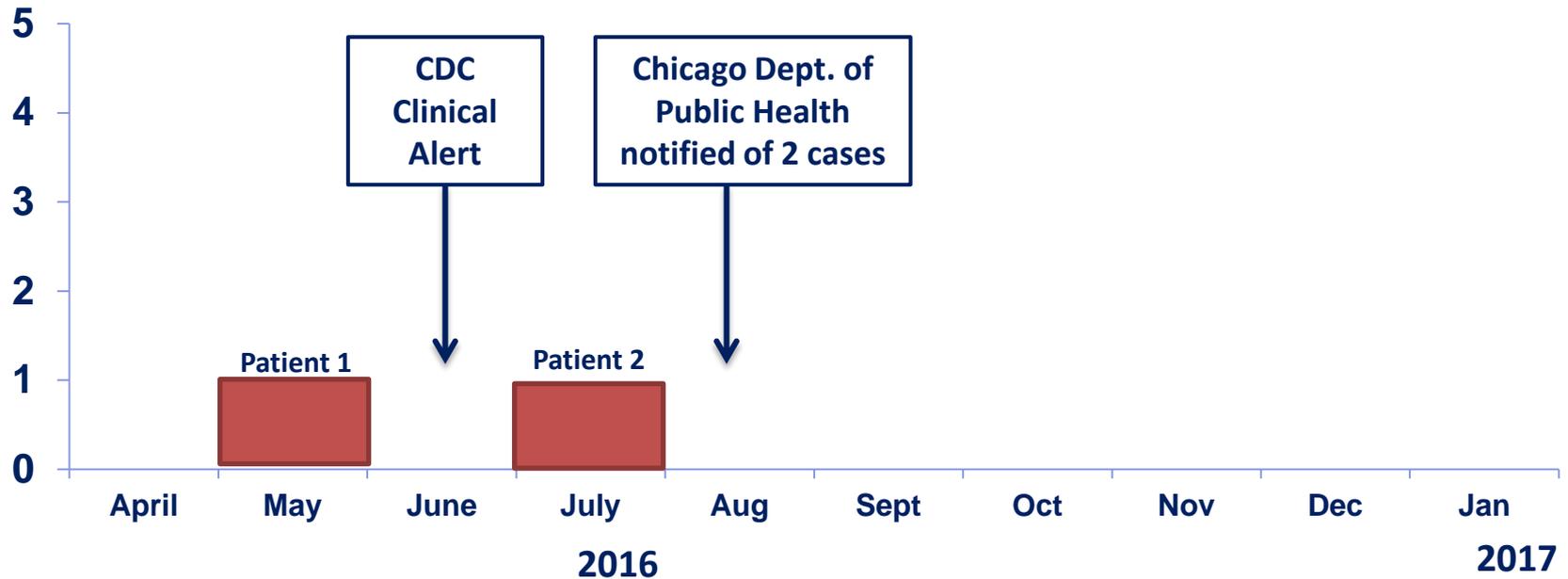
- Healthcare-associated outbreaks
- Difficult to identify
- Potential resistance to all 3 classes of anti-fungals
 - Azoles
 - Polyenes
 - Echinocandins



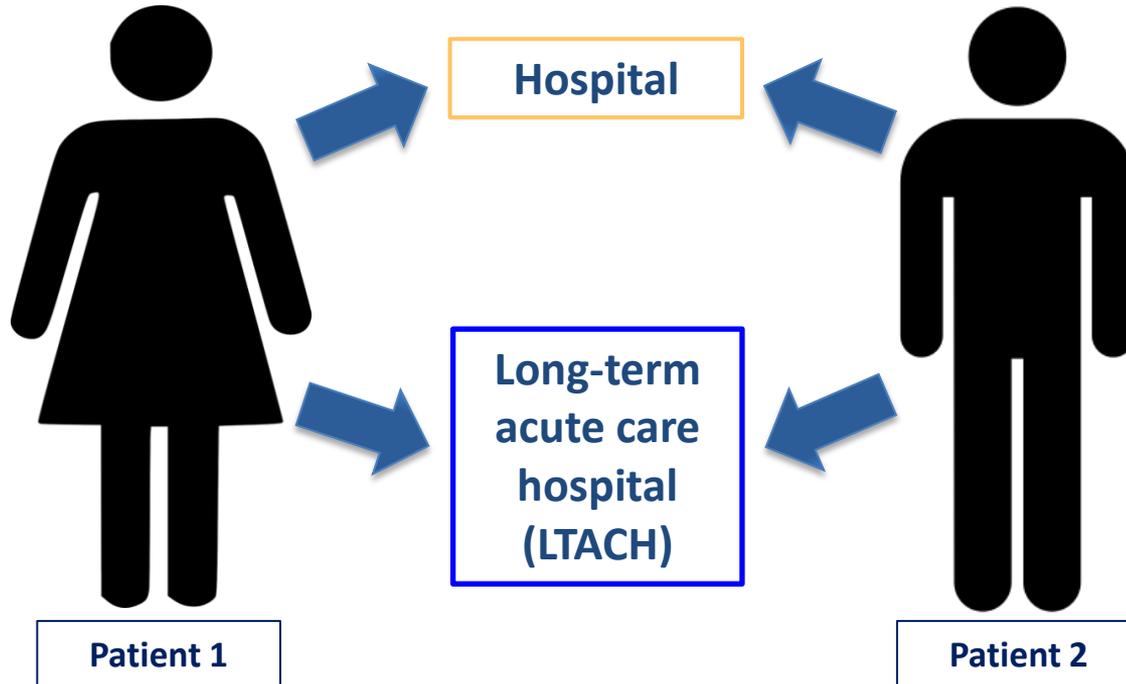
June 2016



Two *C. auris* cases in Chicago



Two shared healthcare facilities



Investigation objectives

- Determine whether healthcare transmission had occurred
- Identify further cases

Case definition

- *C. auris* isolated from clinical cultures
 - Blood
 - Urine
 - Wounds
 - Ear discharge



Medical record review

- Examined patient characteristics
- Compared hospitalization history for overlaps in time or location

Patient 1 and Patient 2

Patient 1

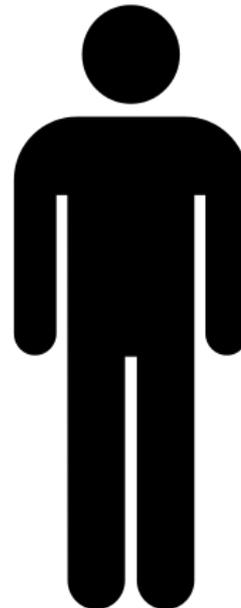
- 56yo F
- Short gut syndrome
- Continuous TPN
- PICC line
- Multiple MDROs



Patient 1

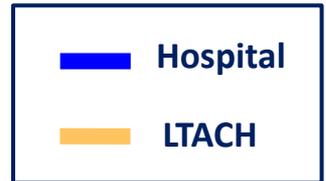
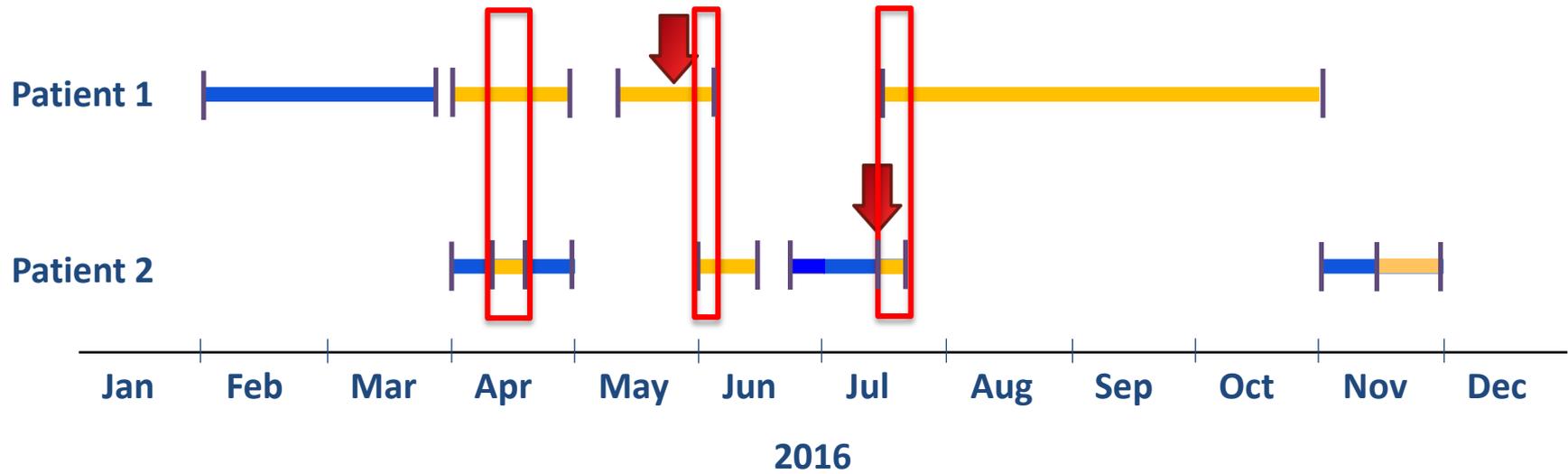
Patient 2

- 44yo M
- Paraplegia
- Well-controlled DM
- Chronic urinary catheter
- History of MRSA

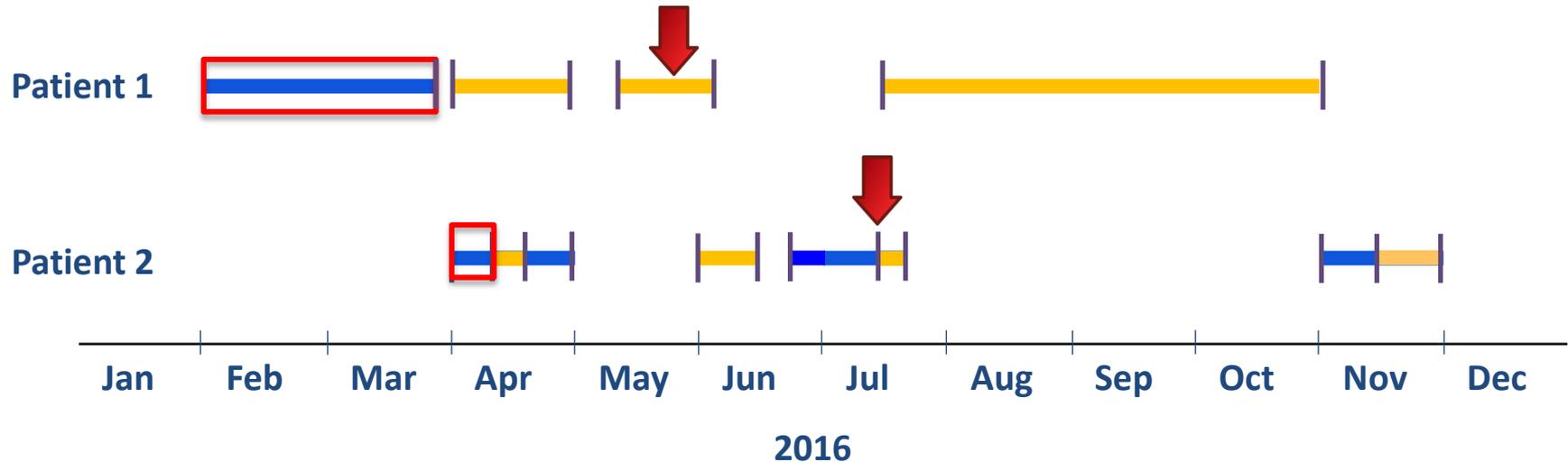


Patient 2

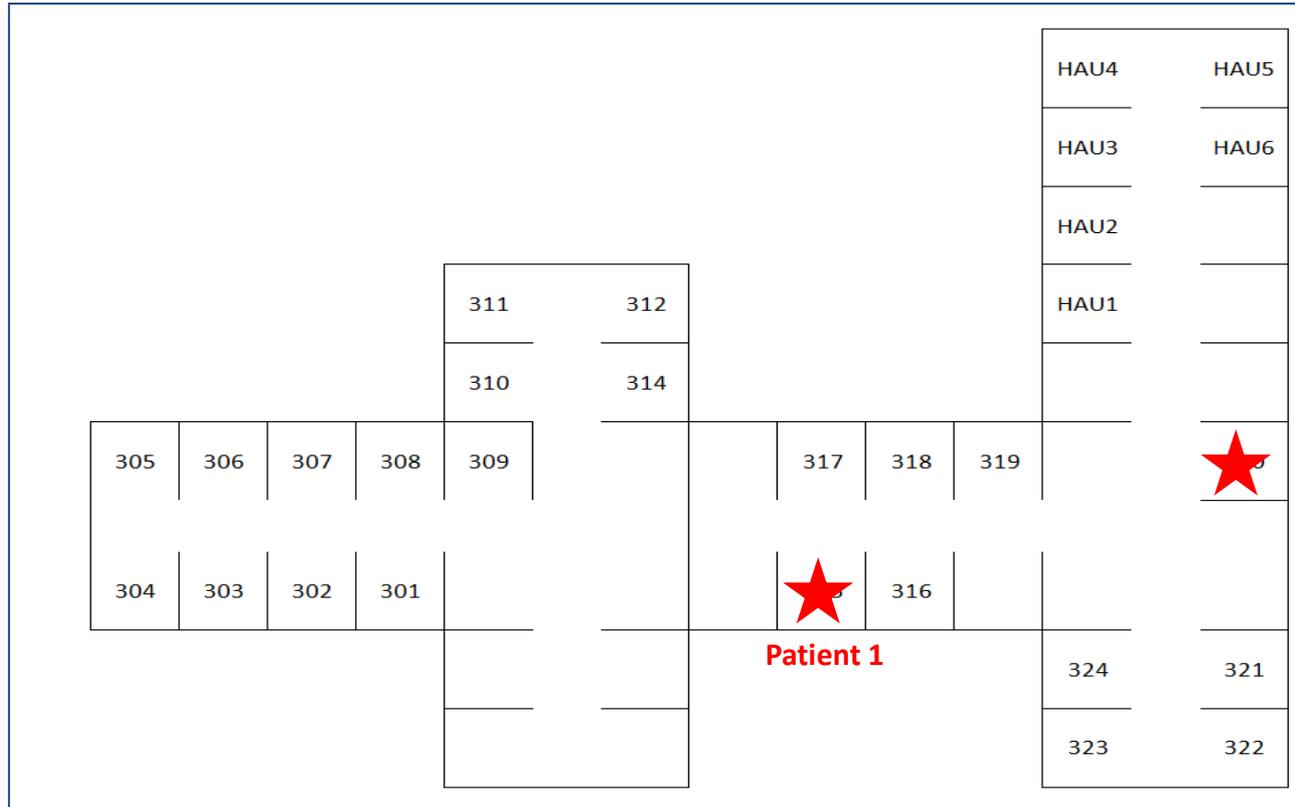
Timeline of hospitalizations: Overlap in time but not location at the Hospital



Timeline of hospitalizations: Overlap in location but not time at the LTACH



Overlap in location at the LTACH



Patient 2

Patient 1

Isolates from Patients 1 and 2 were nearly identical

- CDC performed Whole Genome Sequencing (WGS) of isolates
- Isolates were virtually identical to one another
 - Less than a 10 SNP difference between them
 - Common source of transmission

Assessment of *C. auris* colonization in Patients 1 & 2

Patient 1:
Nares
Oral Cavity
Axilla
Groin
Rectum
Vagina



Patient 2:
Nares
Oral Cavity
Axilla
Groin
Rectum
Wound
Urine

Positive surveillance cultures of Patients 1 & 2

Patient 1:
Nares
Oral Cavity
Axilla
Groin
Rectum
Vagina



Patient 2:
Nares
Oral Cavity
Axilla
Groin
Rectum
Wound
Urine

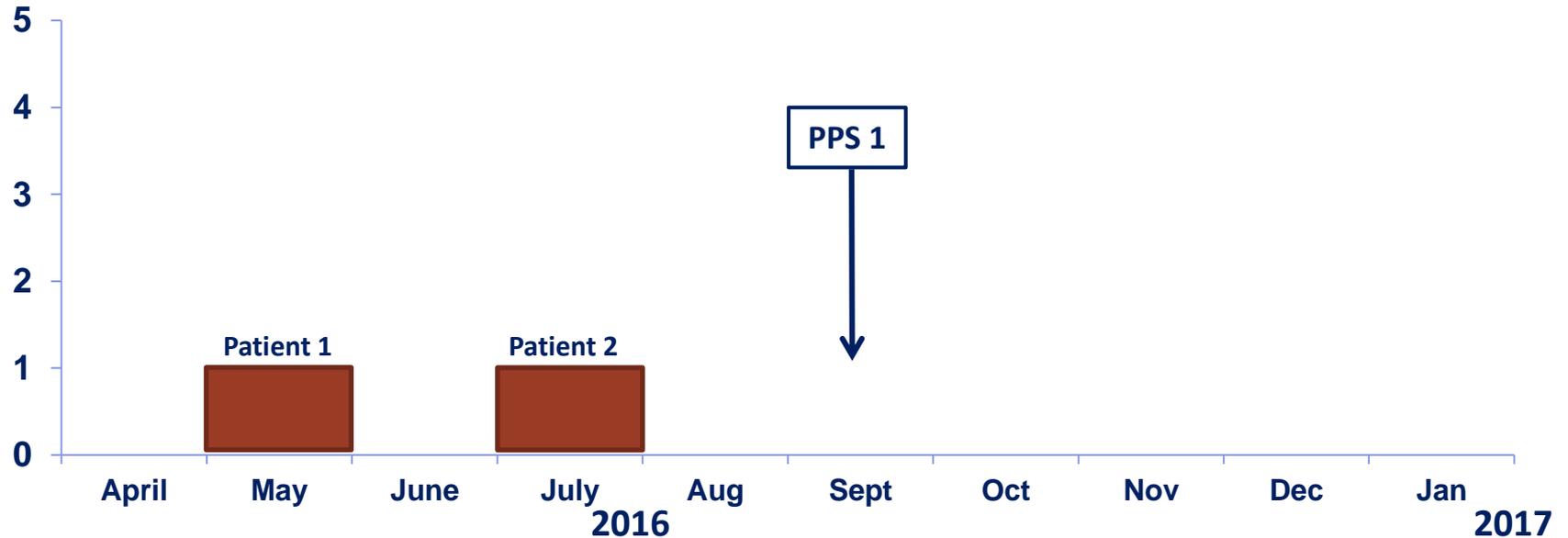
Environmental sampling



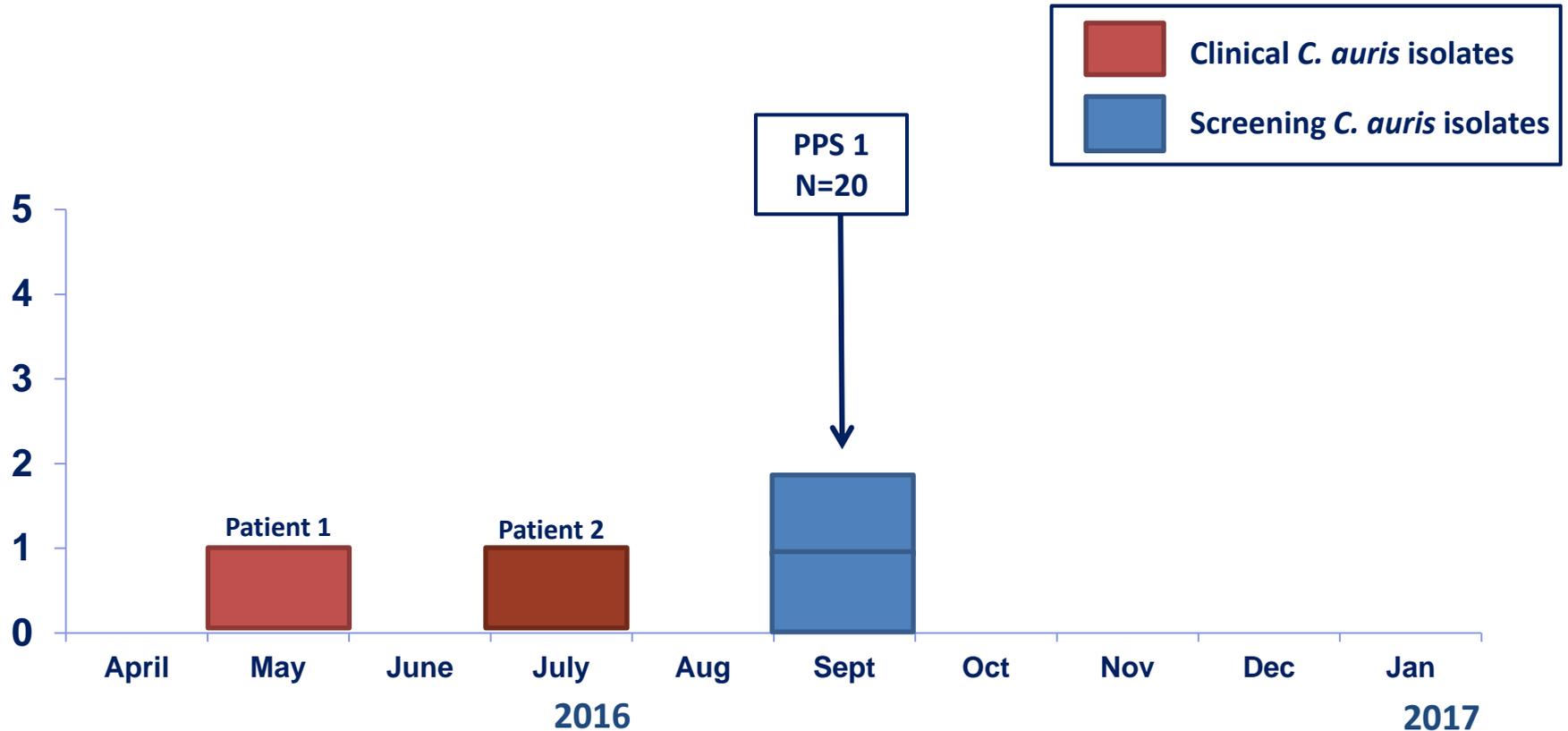
Environmental sampling



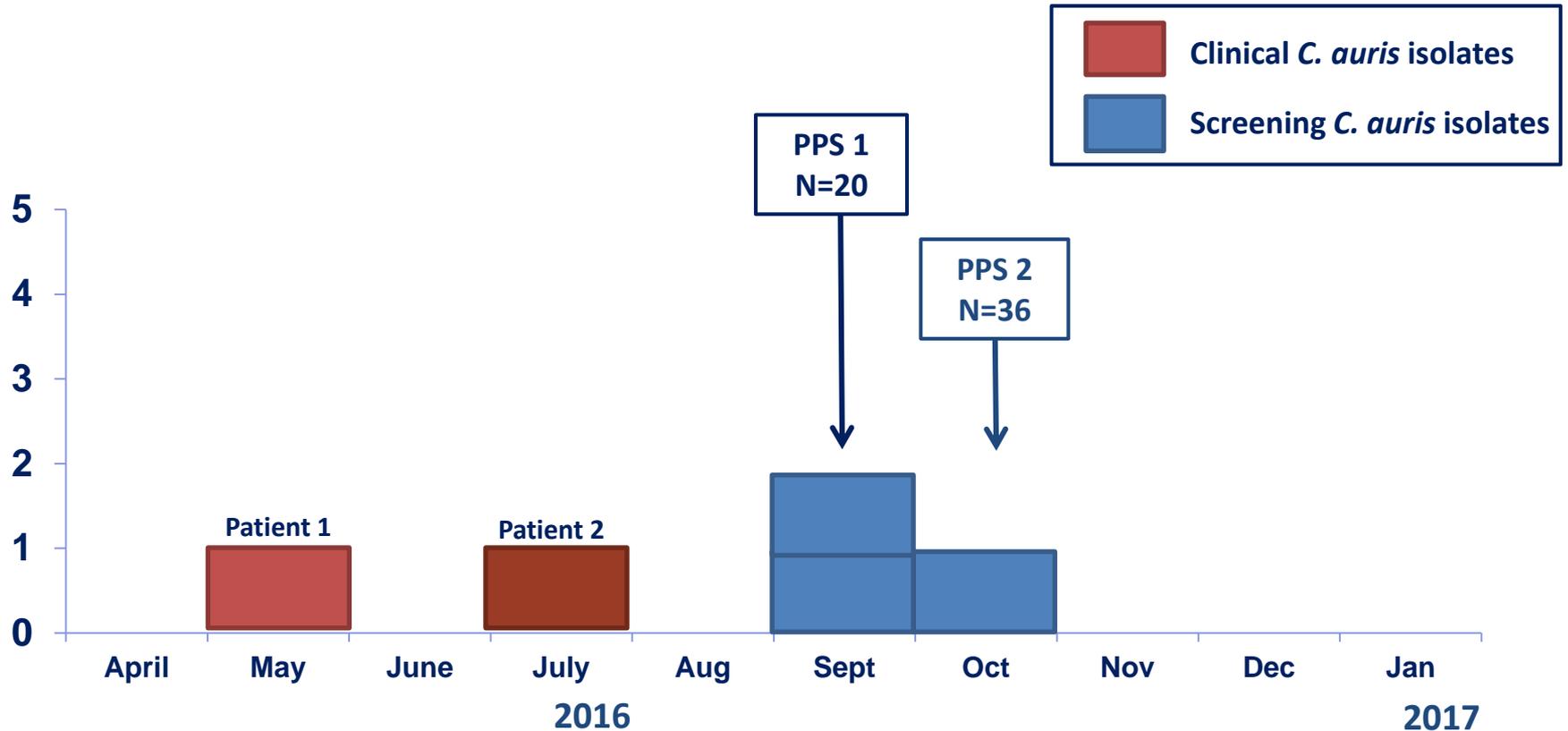
Point Prevalence Survey (PPS)



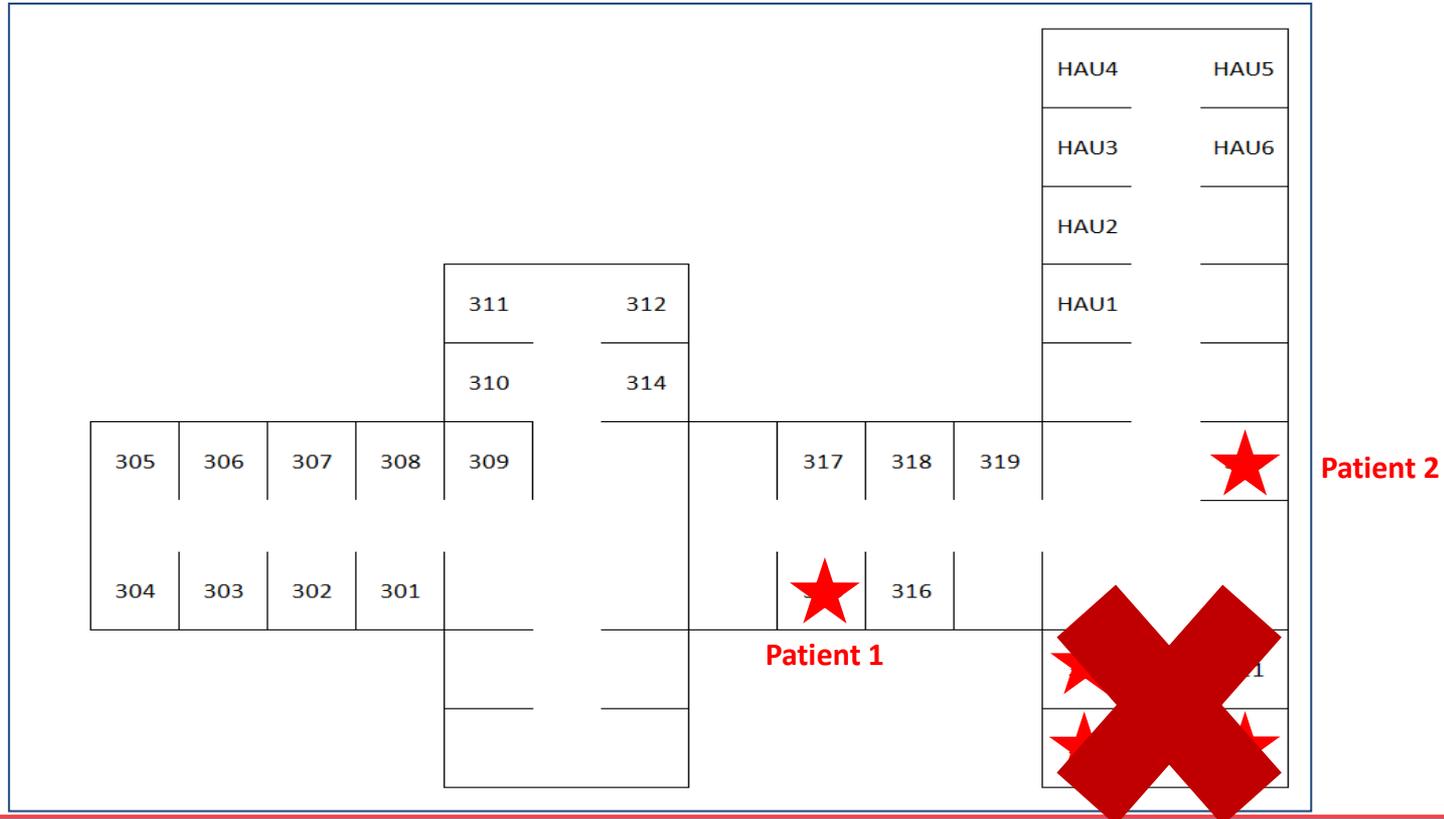
PPS identified 2 colonized patients at the LTACH



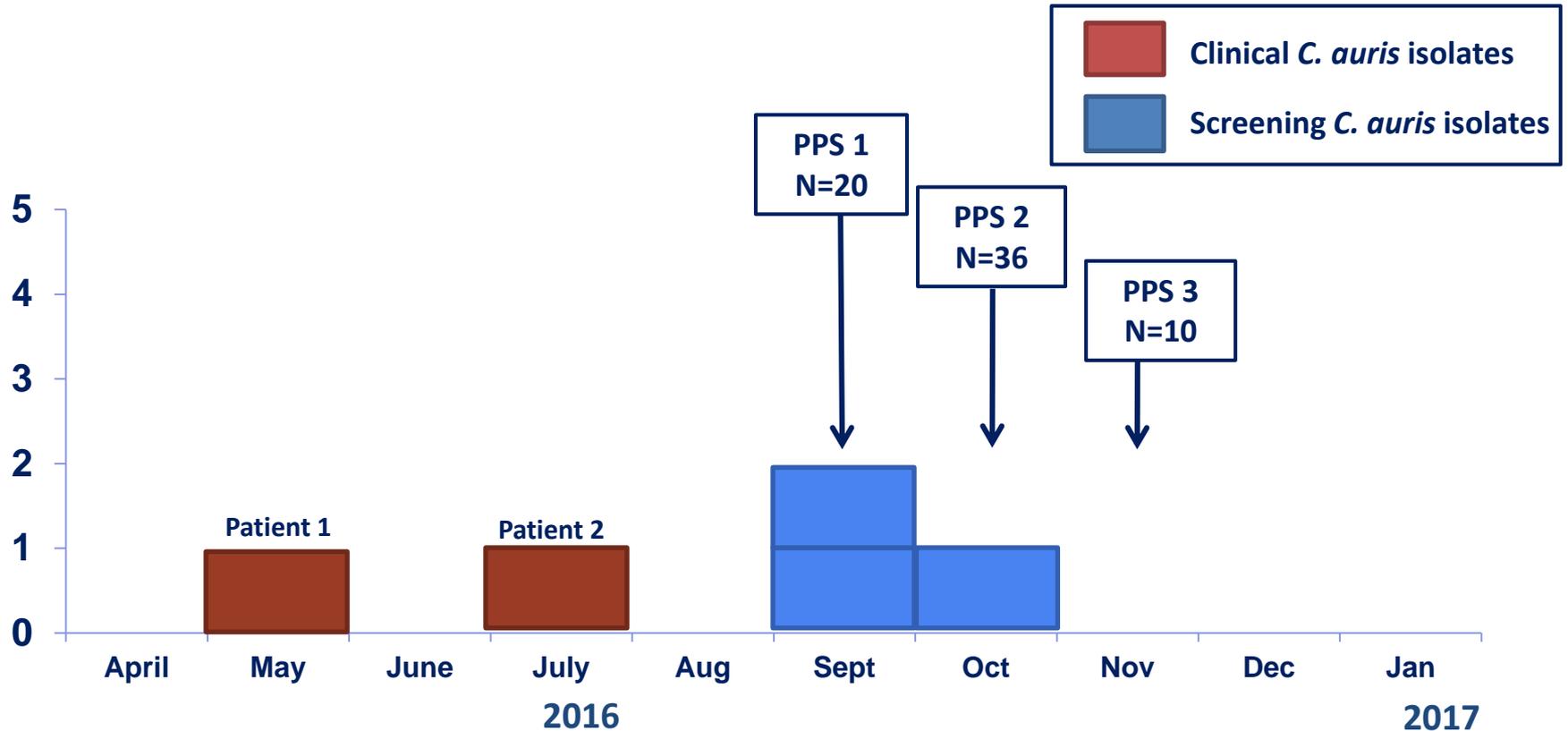
PPS identified 3 colonized patients at the LTACH



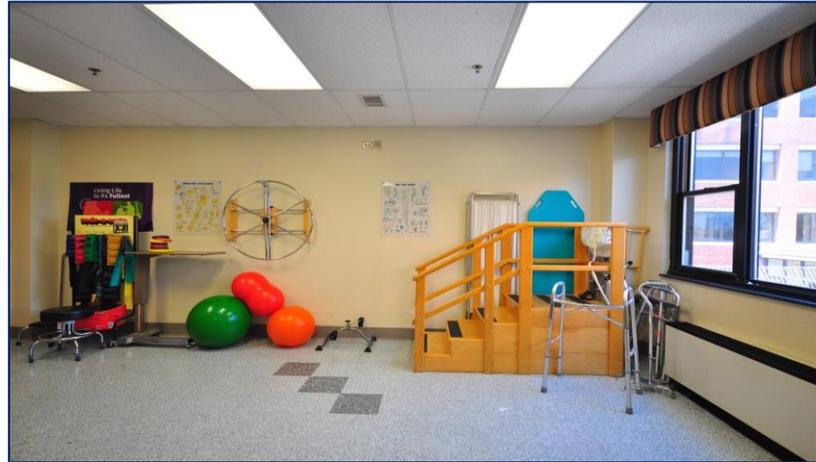
All 5 patients overlapped in location at the LTACH



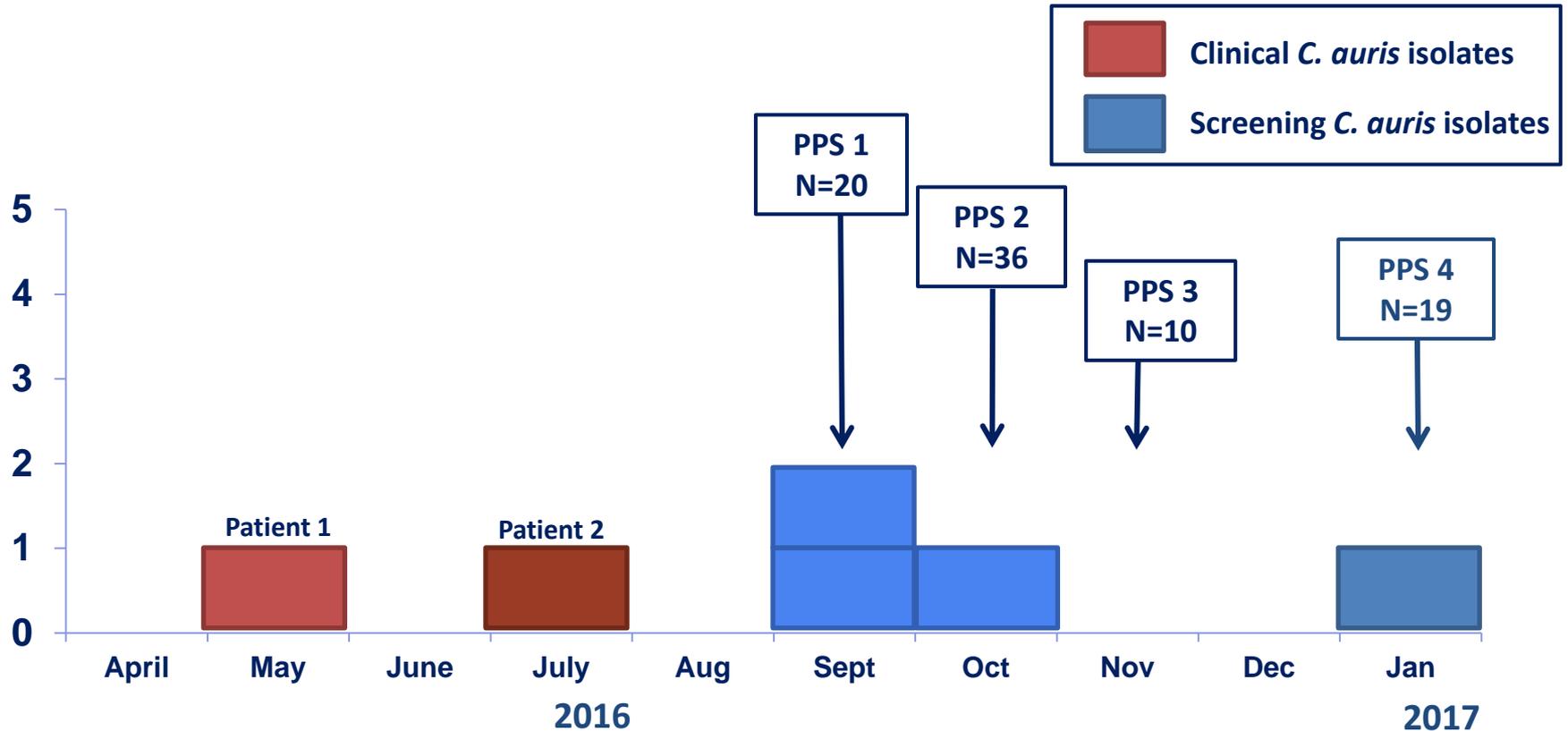
Additional point prevalence survey at the LTACH



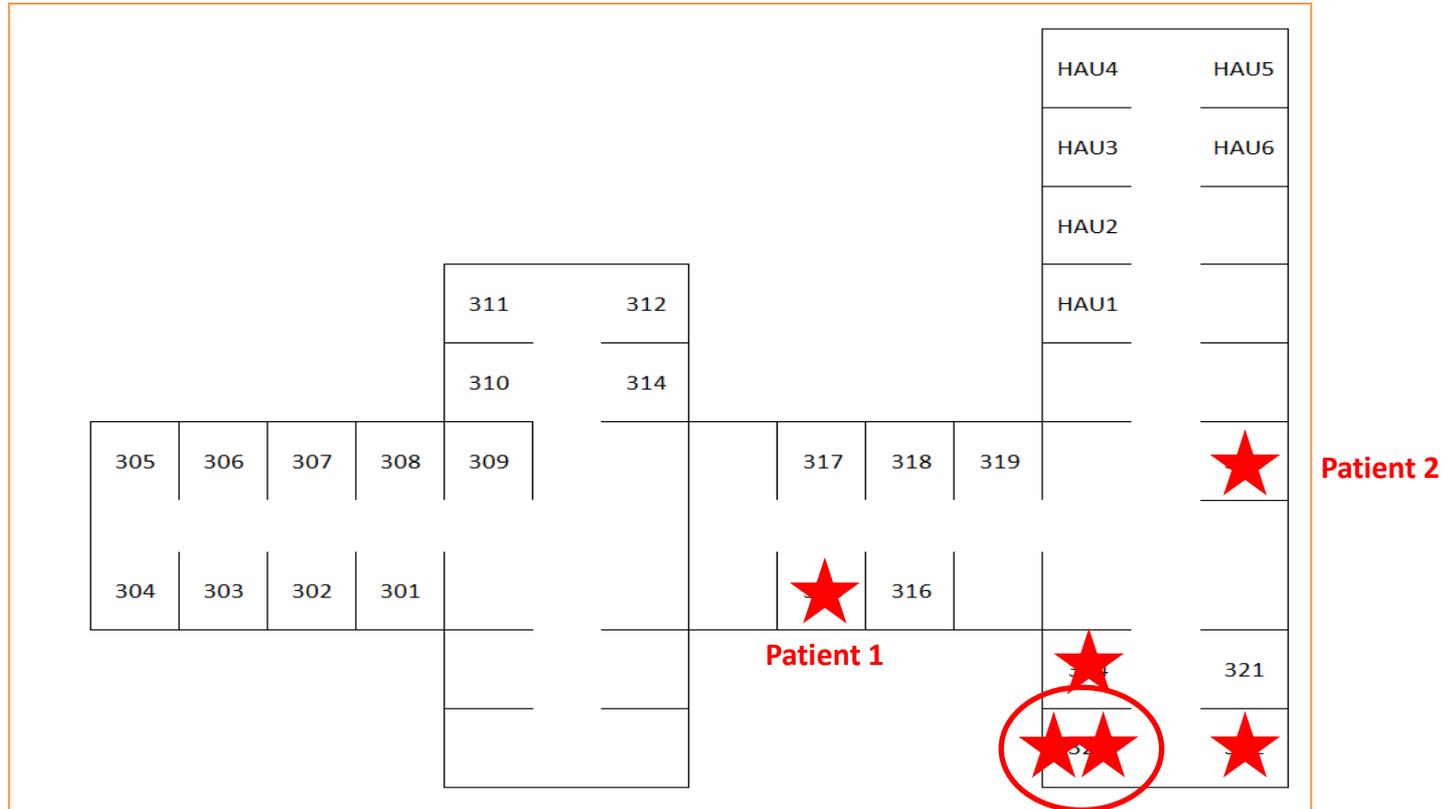
Environmental sampling at the LTACH



Additional point prevalence survey at the LTACH



All 6 patients overlapped in location at the LTACH



Microbiology look-backs

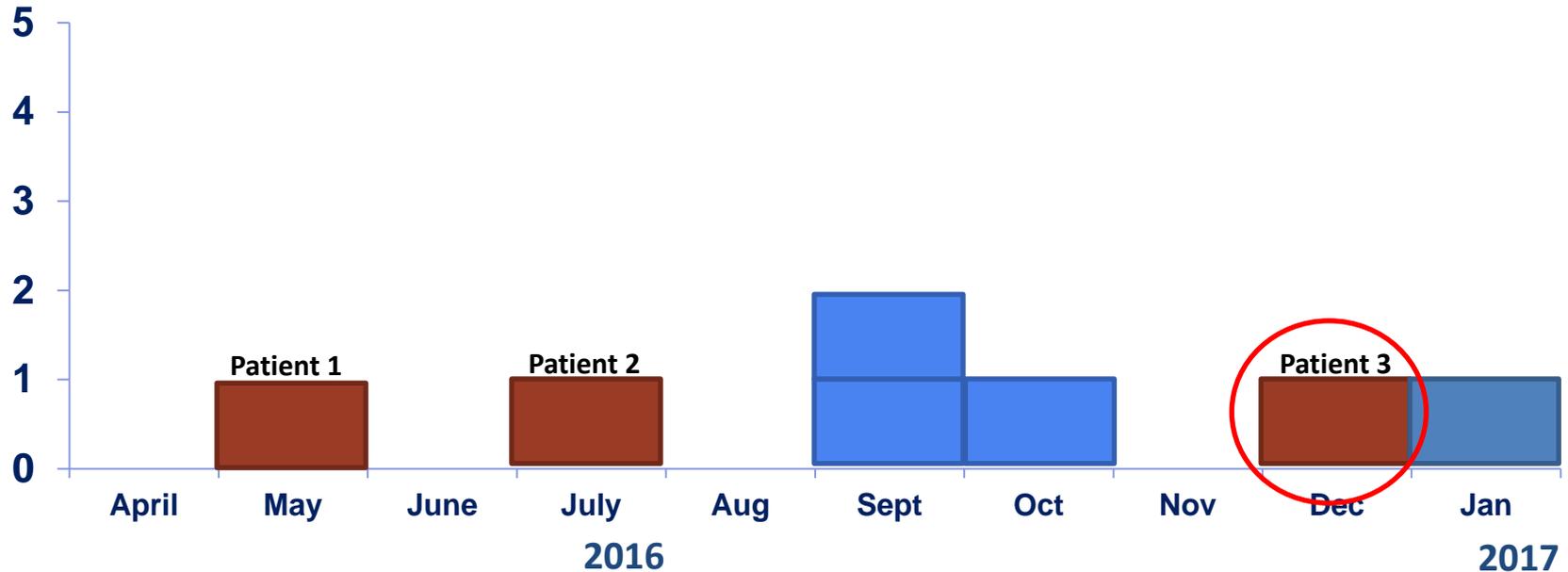
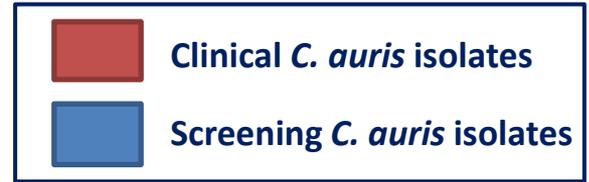
- Hospital
- LTACH
- Health alert network

Microbiology look-back isolates	
<i>C. haemulonii</i>	<i>C. sake</i>
<i>C. famata</i>	<i>Rhodotorula glutinis</i>
<i>Saccharomyces cerevisiae</i>	Non-typable beyond <i>C. spp. non-albicans</i>

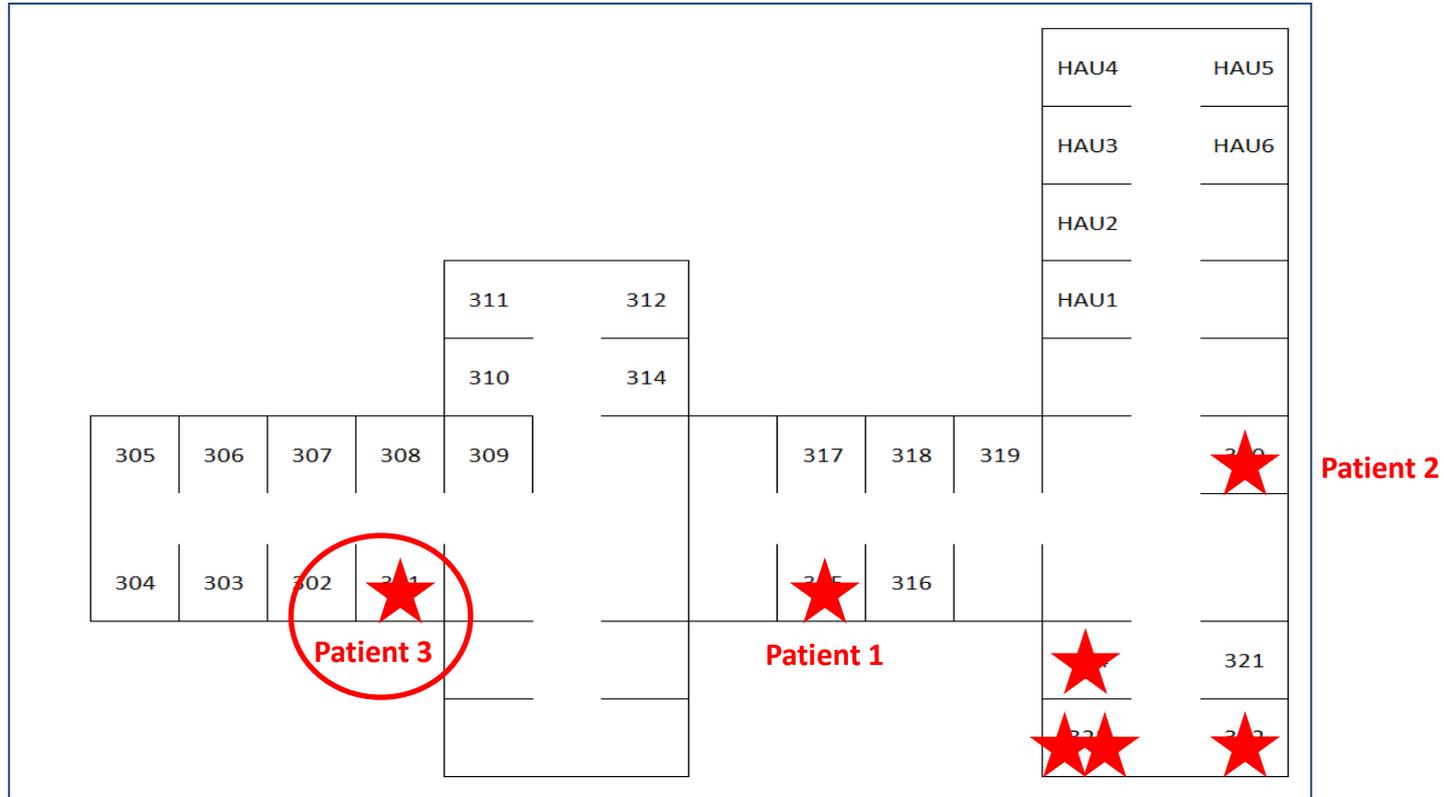
Microbiology look-backs at the Hospital & LTACH

	Hospital	LTACH
Timeframe	4 years	2 years
Total isolates	25	40 (blood)
<i>C. haemulonii</i>	0	0
Non-typable <i>Candida</i> spp.	2 (Patient 1)	0

HAN Alert resulted in 1 additional clinical patient

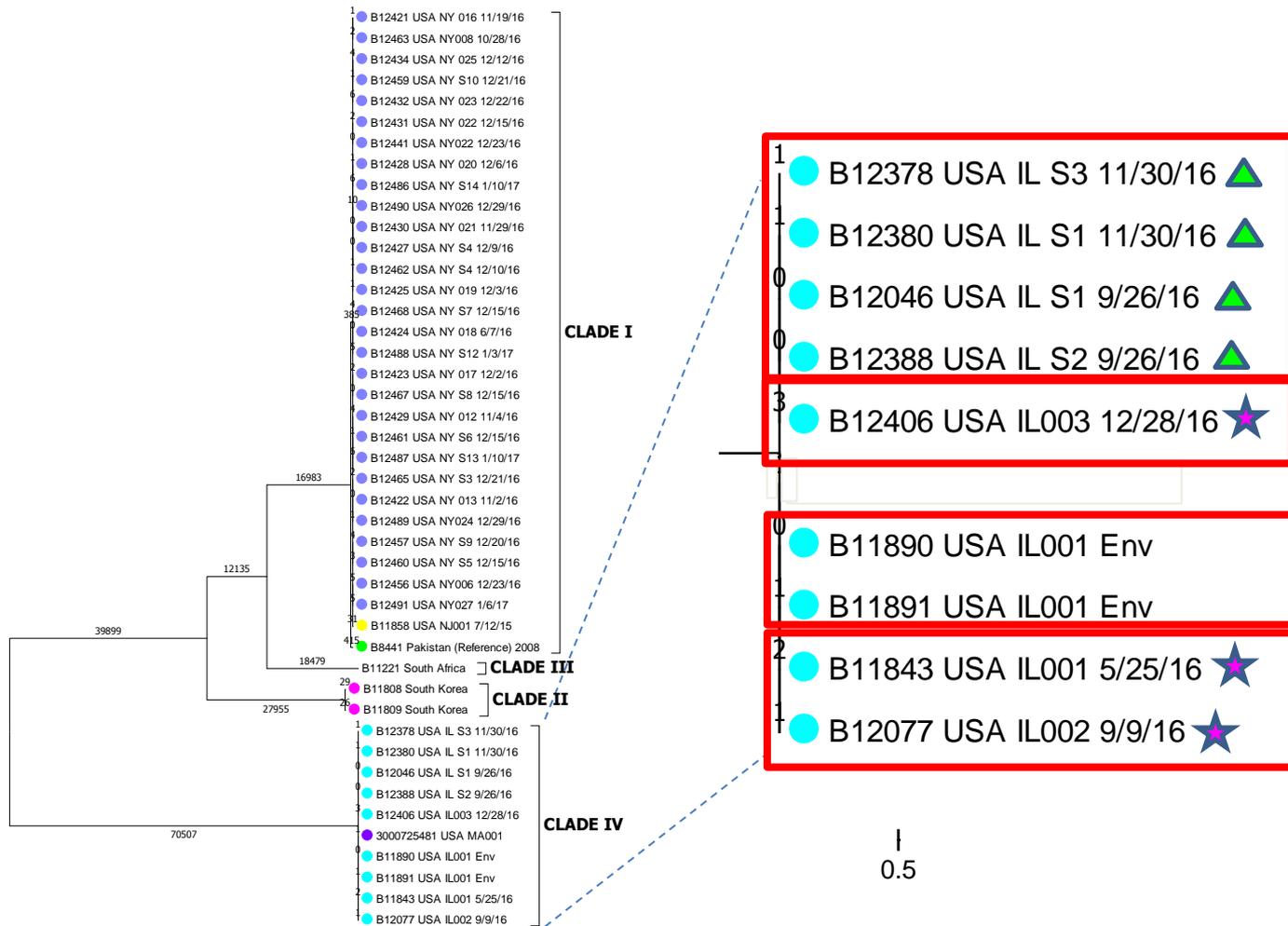


All 7 patients overlapped in location at the LTACH



-  USA_NY
-  USA_NJ
-  Pakistan
-  South Africa
-  South Korea
-  USA_IL

-  IL Case
-  IL Colonized patient



Courtesy of:
Mycotic Diseases Laboratory

Facility Recommendations

- Infection control
 - Isolation/cohorting of patients
 - Adherence to Standard & Contact Precautions
 - Hand hygiene
- Environmental decontamination
- Laboratory surveillance

Conclusions

- Health-care transmission is likely at the LTACH
 - Strains nearly indistinguishable
 - All cases exposed to a single ward
- Limited outbreak
 - Microbiology review identified no new cases
 - HAN Alert identified only 1 case

Next Steps

- Potential screening of healthcare workers
- Surveillance via the Extensively Drug-Resistant Organism (XDRO) Registry
 - Facilities can query the registry for patient's *C. auris* status
 - Select facilities alerted when *C. auris* patients admitted
- Ongoing point prevalence surveys throughout Chicago
 - Collaboration with local partners
 - Based on social network analysis

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Questions?



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HealthyChicago@CityofChicago.org



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Susceptibility of patient swabs

Patient 1 Susceptibility Results

Source: Skin
Culture Date: 8/10/2016
MALDI-TOF and D2 LSU sequencing

Anidulafungin	0.5 µg/mL	S
Micafungin	1.0 µg/mL	S
Caspofungin	0.25 µg/mL	S
5-flucytosine	0.5 µg/mL	S
Posaconazole	0.125 µg/mL	S
Voriconazole	0.03 µg/mL	S
Itraconazole	0.125 µg/mL	S
Fluconazole	4.0 µg/mL	S
Amphotericin	0.25 µg/mL	S

Patient 2 Susceptibility Results

Source: Skin
Culture Date: 8/11/2016
MALDI-TOF and D2 LSU sequencing

Anidulafungin	0.5 µg/mL	S
Micafungin	0.5 µg/mL	S
Caspofungin	0.125 µg/mL	S
5-flucytosine	0.5 µg/mL	S
Posaconazole	0.06 µg/mL	S
Voriconazole	0.06 µg/mL	S
Itraconazole	0.125 µg/mL	S
Fluconazole	4.0 µg/mL	S
Amphotericin	0.25 µg/mL	S

Point Prevalence Survey 1

Hospital A	Hospital B
Surgical ICU	Entire Unit (LTACH)
6 patients	14 patients
Bilateral nares Axillae/Groin	Bilateral nares Axillae/Groin
0 positive	2 positive

- Patient 3: 83yo F
 - Positive on axilla/groin sample
 - PPMHx: Asthma, CHF, HTN, CAD, ICD, PICC, upper extremity DVT, GERD
- Patient 4: 86yo M
 - Positive on axilla/groin sample
 - PPMHx: Colon CA, hemicolectomy, C. diff, PICC, TPN

Point Prevalence Survey 2

Hospital B
Entire LTACH (all floors)
36 patients
Bilateral ears Bilateral nares Axillae/Groin
1 positive

- Patient 5: 59yo F
 - Positive on nares and axilla/groin samples
 - PPMHx: quadriplegia, MS, chronic UTIs, sacral decubitus ulcer, osteomyelitis, HTN, GERD, colostomy

Point Prevalence Survey 3

Hospital B
Entire Unit
10 patients
Bilateral nares Axillae/Groin
0 positive

Hospital B
Environmental sampling
4 rooms
Keyboard Call button Bedside Table Bedside Chair Window Ledge
0 positive