



# Outbreak of VIM-producing *Pseudomonas aeruginosa* at a Chicago Skilled Nursing Facility

June 9, 2017

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City of Chicago  
Mayor Rahm Emanuel

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# 22<sup>nd</sup> Annual Chicago Infection Control Conference

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# 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**

Certificate will be sent to you by e-mail upon request.

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# VIM

- Verona integron-encoded metallo- $\beta$ -lactamase
- Type of enzyme called carbapenemase that breaks down carbapenems
- Causes antibiotic resistance
- VIM-producing *Pseudomonas aeruginosa* (VIM-PA) and carbapenem-resistant *Enterobacteriaceae* (VIM-CRE) identified
- VIM is very rare in the US

# PROTECT and REALM



- Chicago Prevention and Intervention Epicenter
- PROTECT:
  - Prevalence of CRE in Chicago region
  - Implement infection control intervention bundle
  - Control regional spread of CRE
- REALM:
  - Point prevalence surveys (PPSs) for CRE
  - Test for carbapenemases (e.g. VIM)

# Outbreak Notification

- Nov 2016 REALM PPS identified 20 cases of VIM-PA at a Chicago skilled nursing facility with ventilated patients (vSNF A)
- All rectal screening cultures

	VIM-PA	Total Swabbed	% Positive
Floor 2	4	56	7%
Floor 3	16	62	26%
Total	20	118	17%

# vSNF A

- Census: 260 residents
- 4 floors
  - Floor 1: short term rehab
  - Floor 2: skilled nursing unit
  - Floor 3: ventilated and trach patients
  - Floor 4: psych and dementia
- High-acuity patients



# ICAR Program



- Infection Control Assessment and Response
- CDC-sponsored program to improve infection prevention and control capacity
- Conducted by APIC consultants
- Provide on-site assessments and recommendations
- Inform infection control education and training
- vSNF A is a participating facility

# ICAR Findings

- Infection control gaps common among SNFs include:
  - Hand hygiene access
  - Environmental services
  - Bathing practices

# Case Investigation

- Chart reviews of original 20 cases:

Age , median (range)	63.5 (20-97)
Male, n (%)	12 (60)
Tracheostomy, n (%)	16 (80)
Ventilated, n (%)	7 (35)
Respiratory therapy, n (%)	17 (85)
PEG, n (%)	14 (70)
Ambulatory, n (%)	11 (55)
Length of stay, median (range)	2.5 yr (40 days-6 yr)

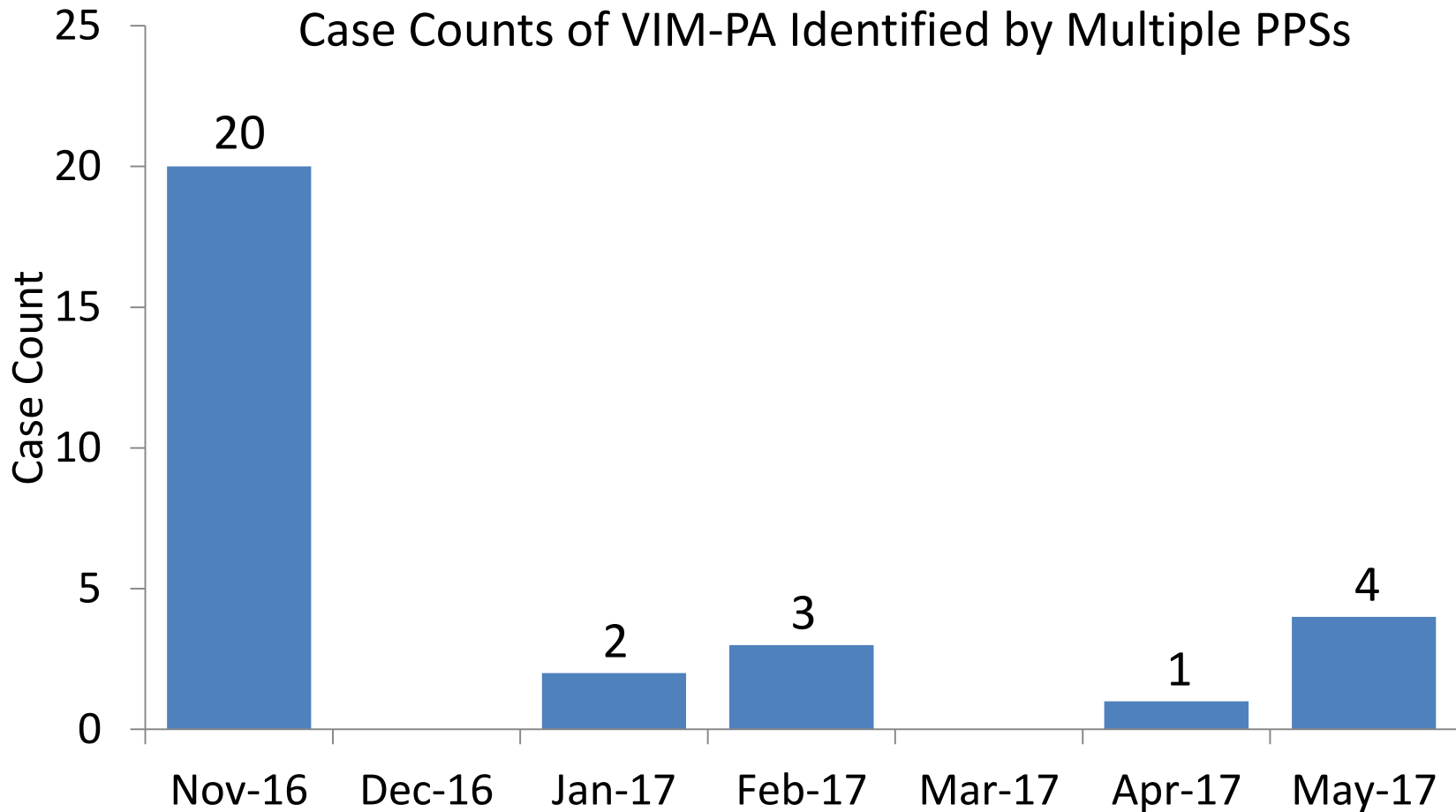
# Case Control Study

- Controls: residents of vSNF A who tested VIM-PA negative
- 2 controls matched to 1 case
- Matched on age and floor

# Case Control Results

	Crude OR (95% CI)	Adjusted OR (95% CI)	P-value
<b>Tracheostomy</b>	1.3 (0.4-4.9)	2.5 (0.2-29.5)	0.5
<b>Ventilated</b>	0.9 (0.3-2.8)	1.1 (0.3-4.6)	0.9
<b>PEG Tube</b>	0.9 (0.3-2.9)	2.9 (0.2-42.9)	0.4
<b>Ambulatory vs Bedbound</b>	2.3 (0.8-6.8)	6.2 (1.04-37.2)	0.05
<b>Length of Stay</b>			
>2 years vs <1 year	4.2 (0.9-18.5)	5.8 (1.1-31.3)	0.04
1-2 years vs <1 year	2.5 (0.5-12.1)	3.0 (0.5-17.3)	0.2

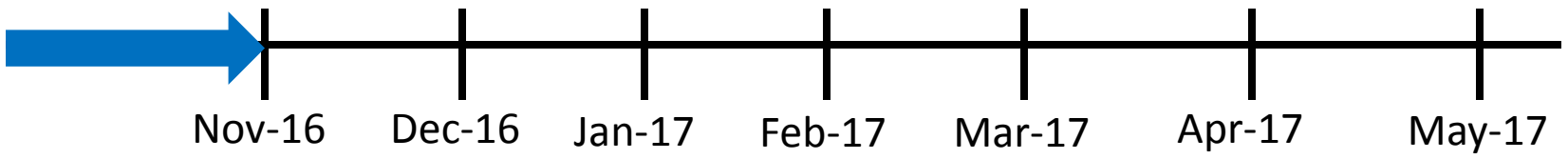
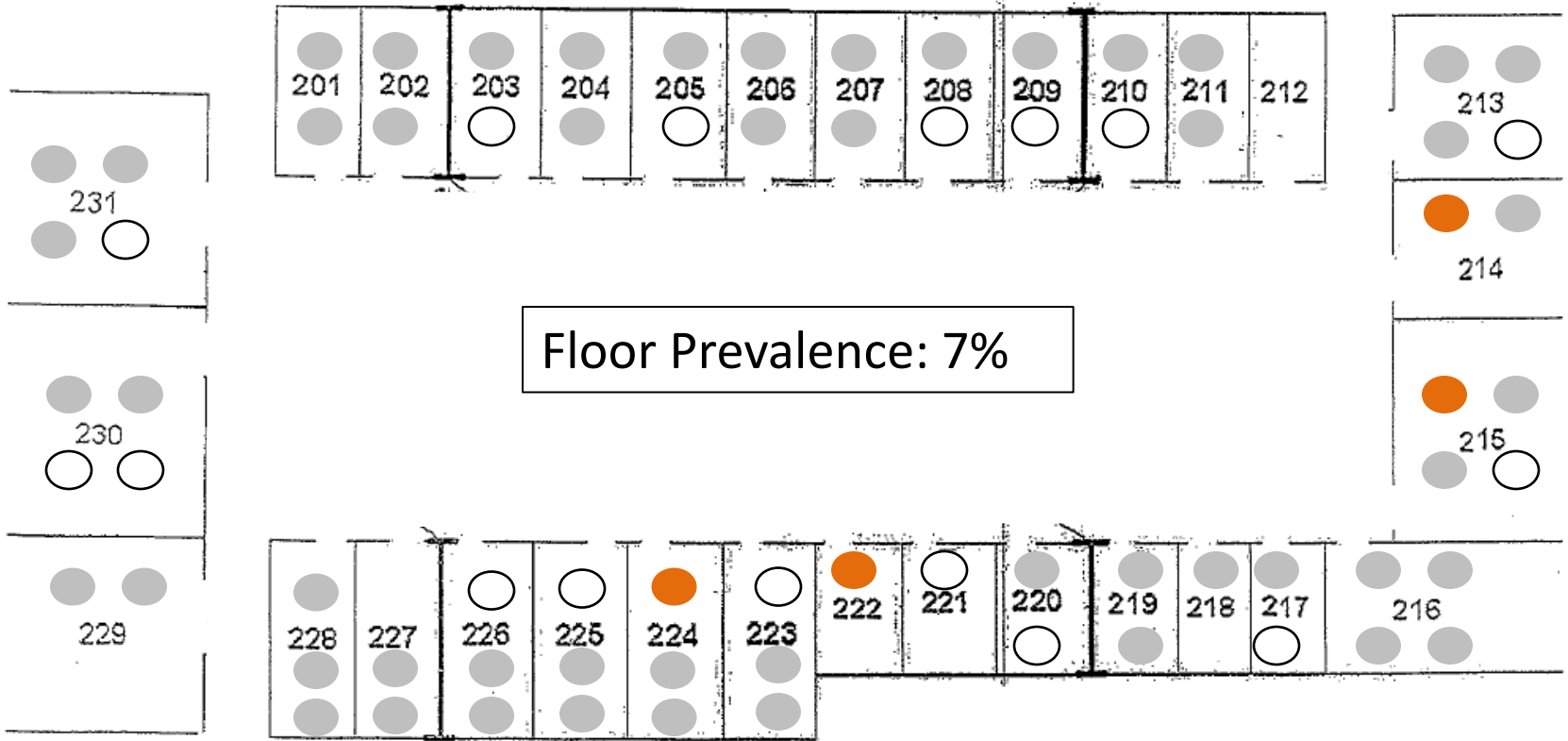
# Ongoing Transmission



# 11/1/16 REALM PPS

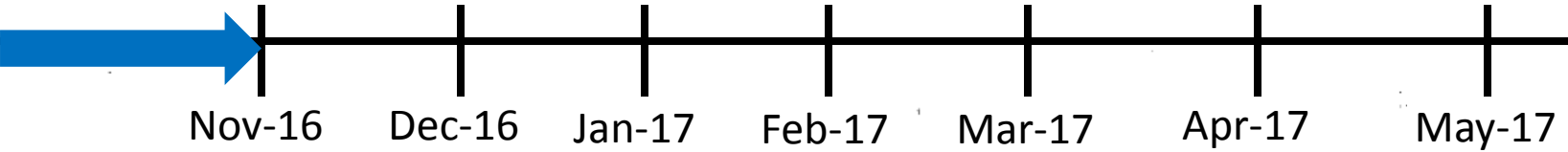
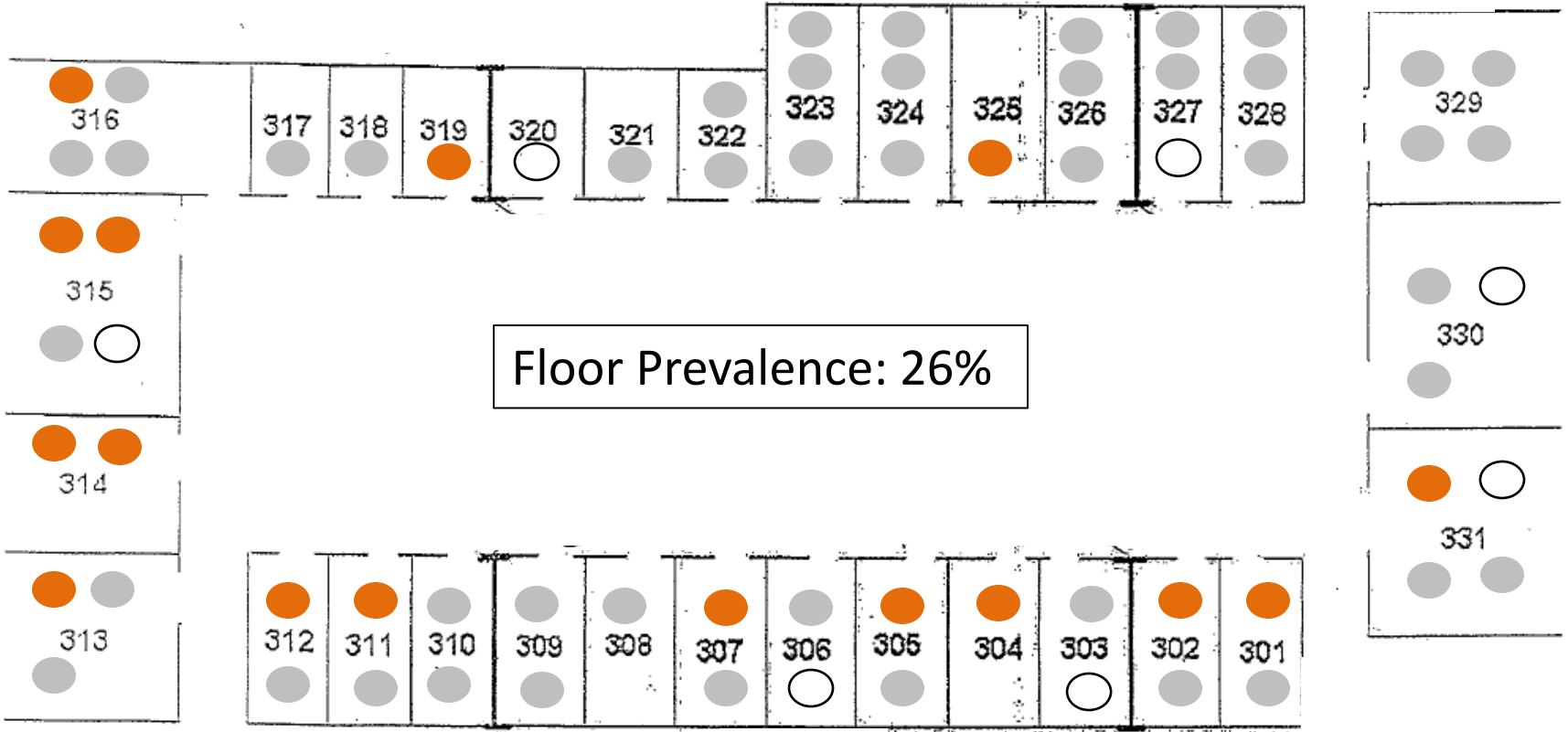
## 2<sup>nd</sup> Floor

- New VIM-PA
- VIM negative
- Not tested



# 11/1/16 REALM PPS 3<sup>rd</sup> Floor

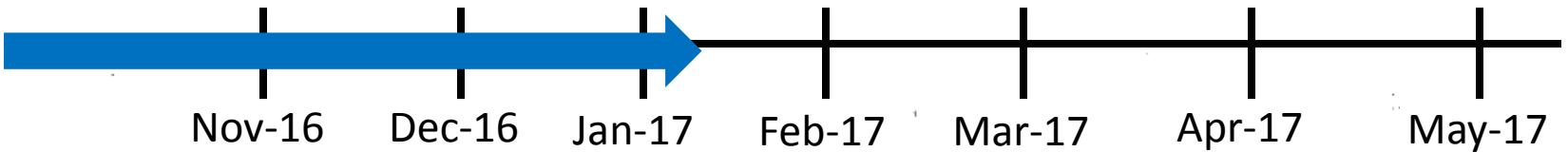
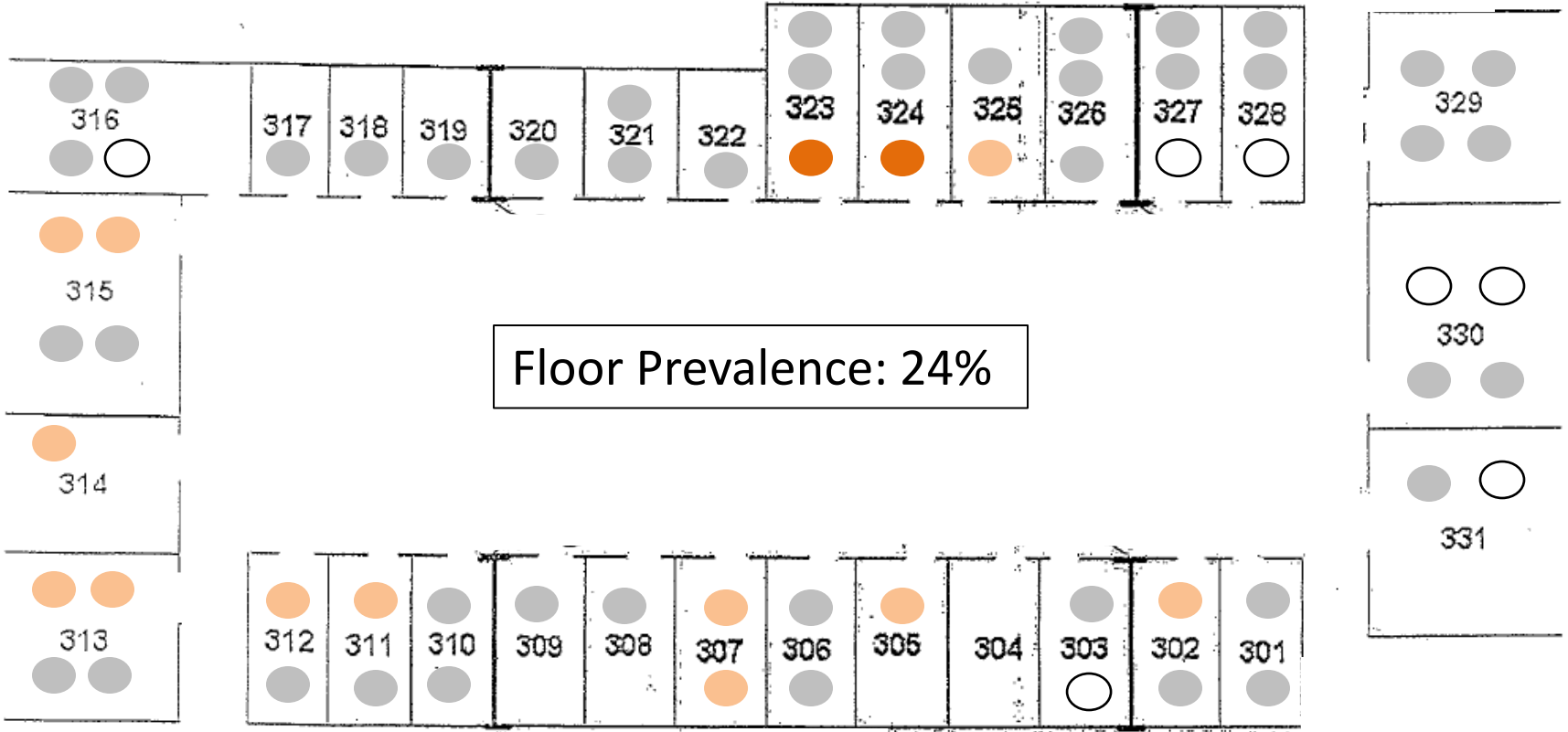
- New VIM-PA
- VIM negative
- Not tested





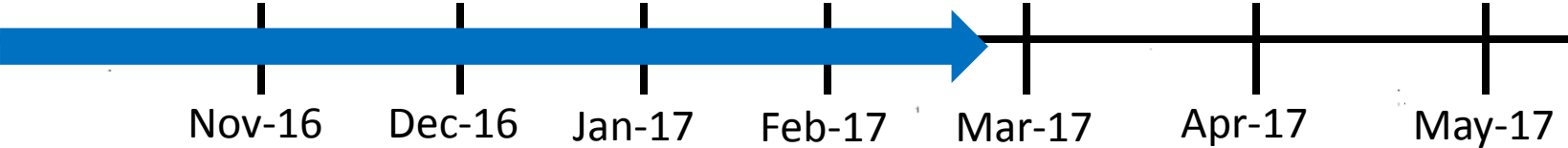
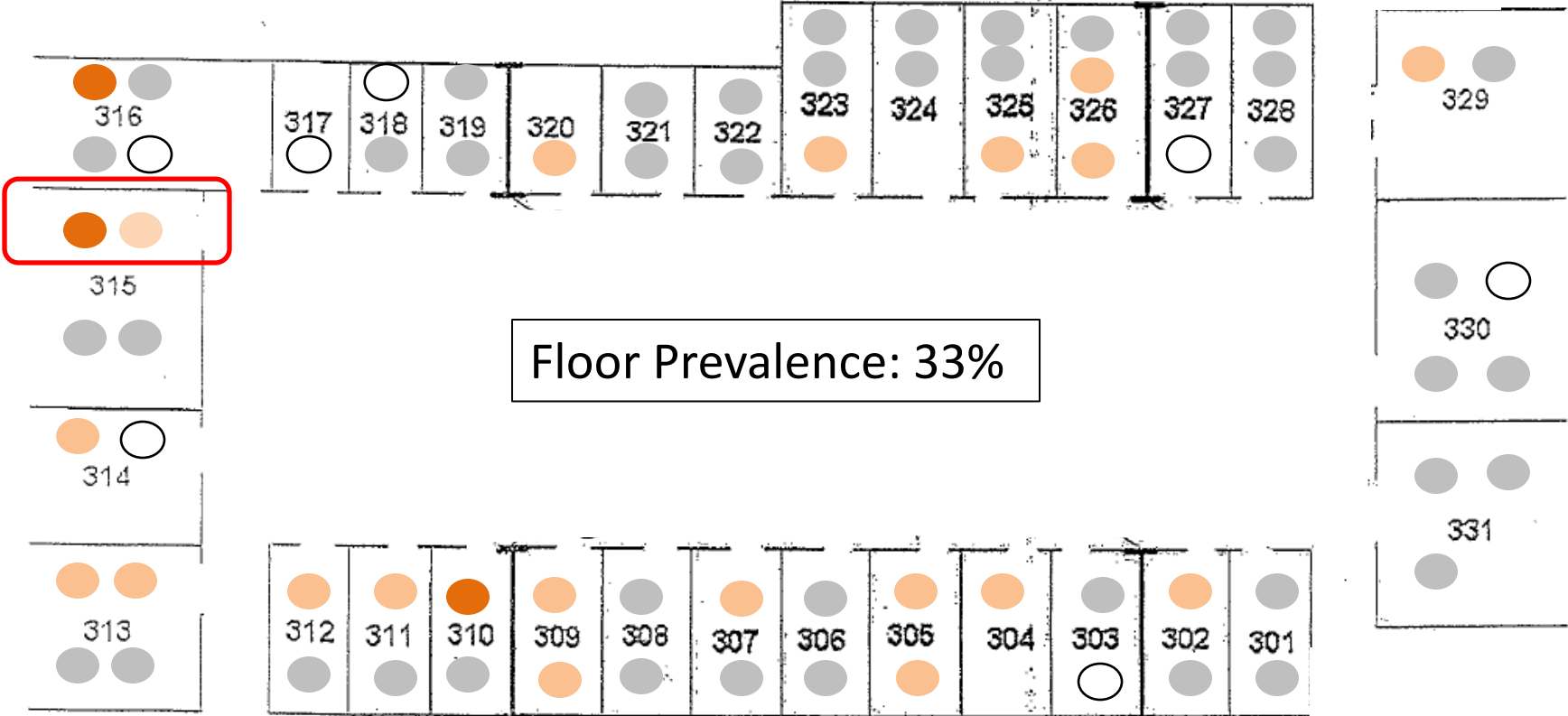
# 1/9/17 CDPH PPS 3<sup>rd</sup> Floor

- Previous VIM-PA
- New VIM-PA
- VIM negative
- Not tested



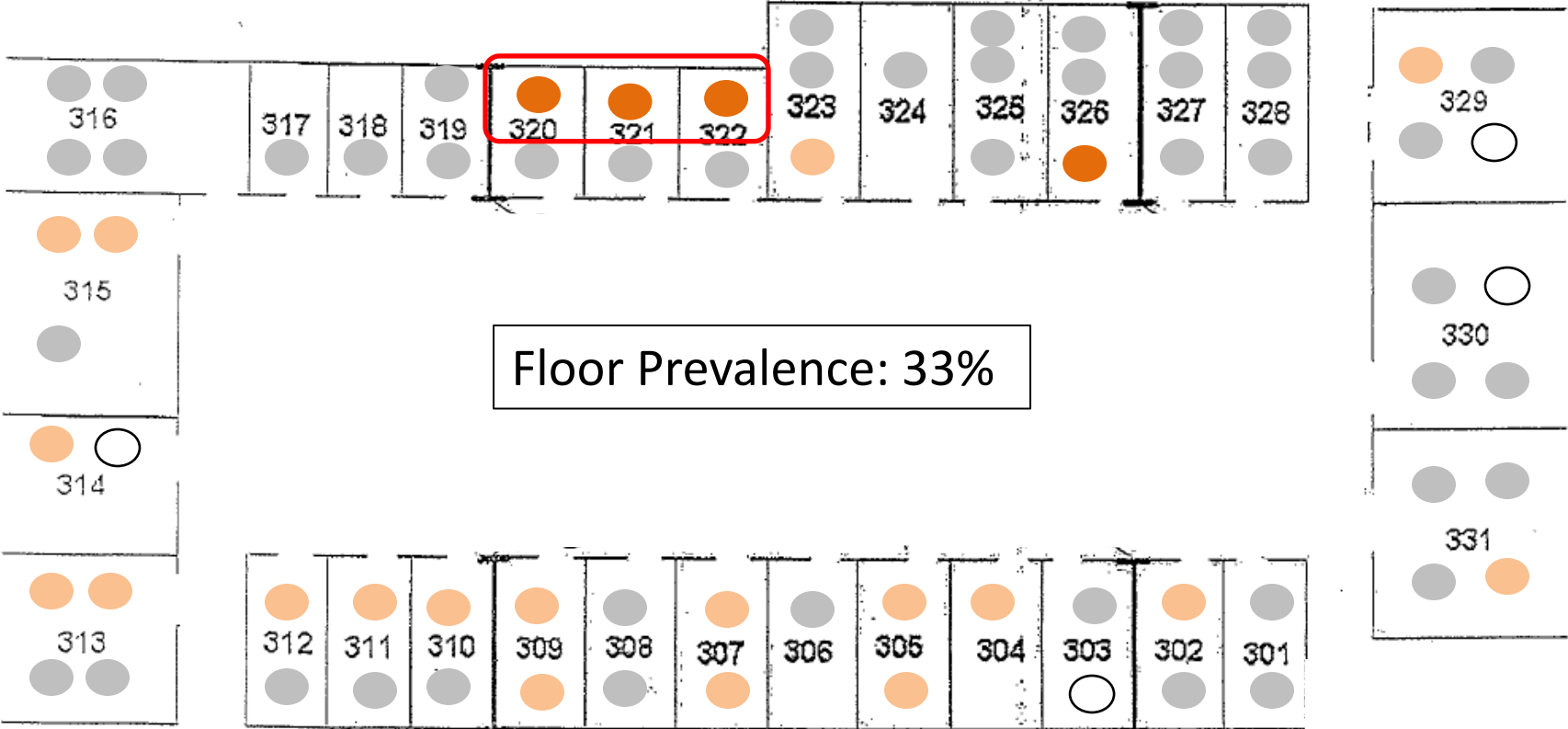
# 2/27/17 CDPH PPS 3<sup>rd</sup> Floor

- Previous VIM-PA
- New VIM-PA
- VIM negative
- Not tested

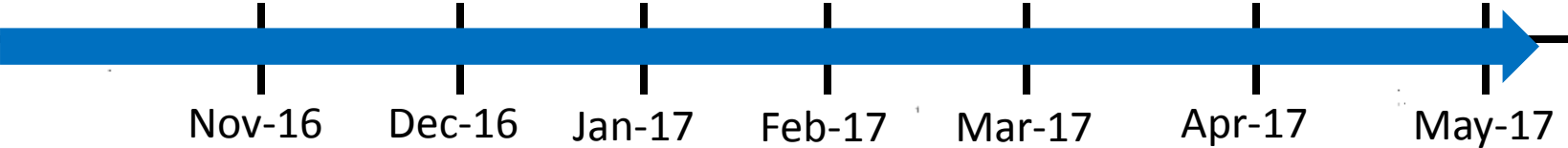


# 5/10/17 CDPH PPS 3<sup>rd</sup> Floor

- Previous VIM-PA
- New VIM-PA
- VIM negative
- Not tested



Floor Prevalence: 33%



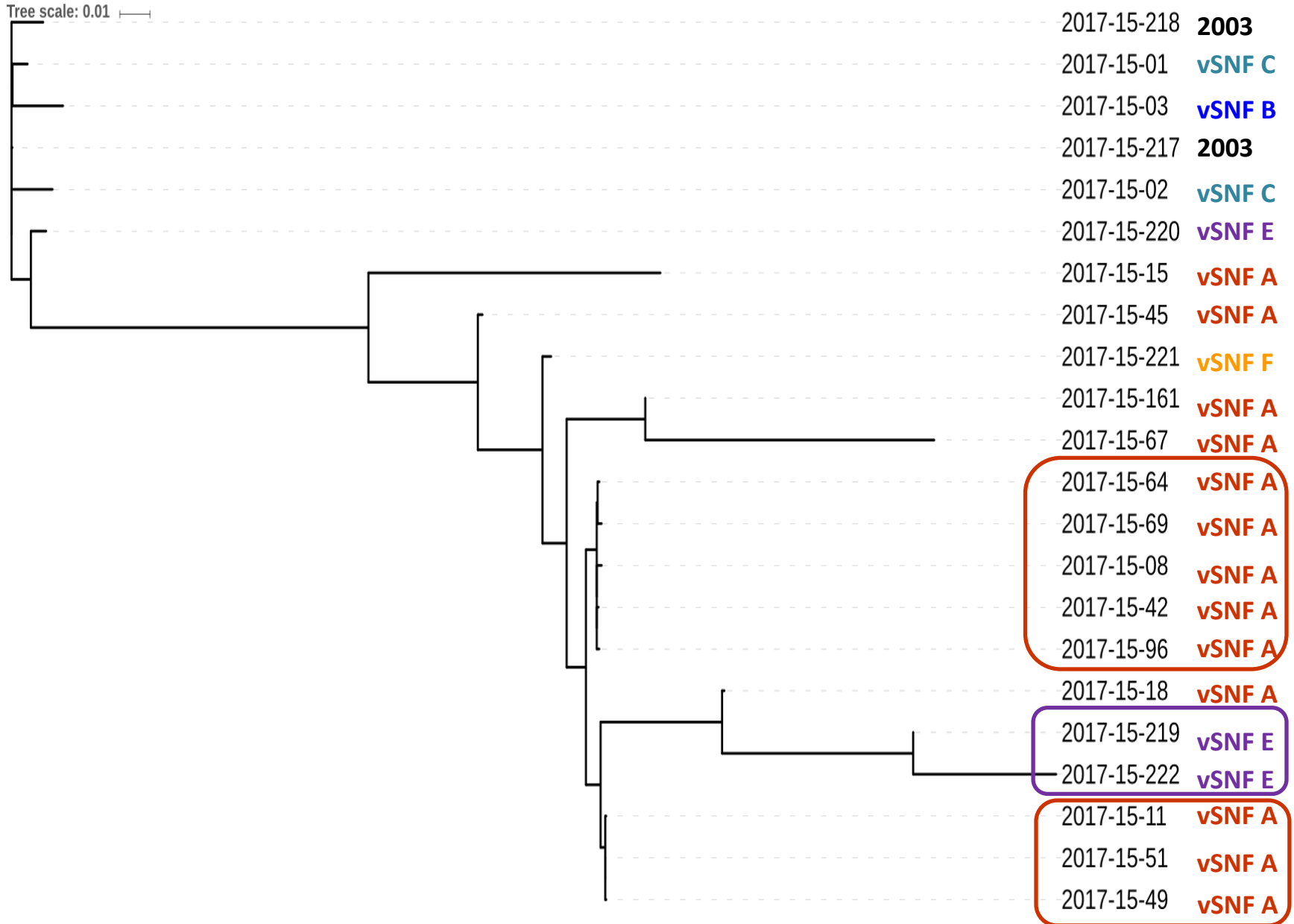
# VIM-PA in Chicago Region



Facility	Date of PPS	VIM-PA	Total Swabbed	% Positive
vSNF B	Nov-16	3	72	4
vSNF C	Dec-16	2	76	3
vSNF D	Dec-16	1	81	1
vSNF E	Mar-17	3	77	4
vSNF F	Mar-17	2	114	2
LTACH A	Apr-17	1	49	2

# Whole Genome Sequencing

Tree scale: 0.01



# Interventions

- CHG bathing on Floor 3
- Improved environmental cleaning practices
- ABHR dispensers outside patient rooms
- APIC follow up on-site visit
- Carbapenemase-producing *Pseudomonas* added to XDRO Registry

# Still to come...



- On-site follow up visits to assess, monitor, and provide feedback
- Environmental cultures
- Additional PPSs on Floor 3
- Project PROTECT intervention bundle (summer 2017)

# Lessons Learned



- Need for ongoing infection control monitoring and support tailored to individual facilities
- Collaboration with academic, APIC, and public health partners is crucial
- Emerging regional pathogen or increased detection?



# Thank You

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