Novel and Emerging Multidrug-resistant Organisms in California

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Presented via Webinar
APIC Sierra Valley Chapter

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Objectives

- Summarize background information on novel and emerging multidrug-resistant organisms (MDRO)
- Provide updates on MDRO cases and clusters in California
- Present statewide and regional MDRO prevention strategy and activities
- Describe recommendations for healthcare facilities to prevent MDRO transmission

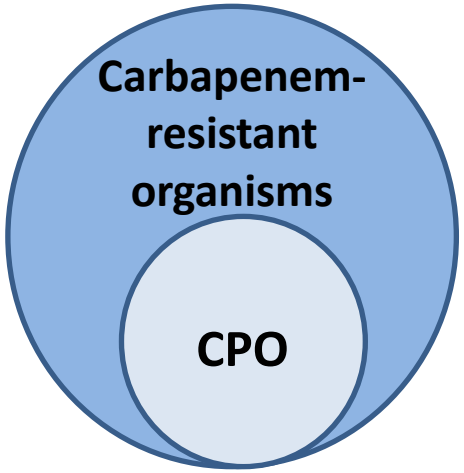
Novel and Emerging Multidrug-resistant Organisms (MDRO)

Novel and Emerging Healthcare-Associated MDRO

- Multidrug-resistant organisms (MDRO) are bacteria and fungi resistant to several classes of antibiotic or antifungal drugs
  - Treatments are less effective; more difficult and expensive to treat
  - Substantial morbidity and mortality
- Patients can remain colonized for many months, possibly indefinitely
  - Colonized patients can also go on to develop clinical infections
- Highly transmissible within and between healthcare facilities
- **Early and aggressive facility and public health containment efforts can limit spread**
  - We don’t want these pathogens to become common in healthcare facilities

Novel and Emerging MDRO Examples

- ***Candida auris***
- **Carbapenemase-producing organisms (CPO)**
  - Carbapenem-resistant
    - Enterobacterales, e.g., *E. coli, Klebsiella* and *Enterobacter* species (CRE)
    - *Pseudomonas aeruginosa* (CRPA)
    - *Acinetobacter baumannii* (CRAB)
  - Carbapenemases
    - Enzymes that confer carbapenem resistance
    - Carbapenemase genes transferred between/within species
    - KPC, NDM, OXA-48, VIM, IMP
    - Other variants including OXA-23, OXA-24/40, OXA-237



KPC=Klebsiella pneumoniae carbapenemase; NDM=New Delhi Metallo-β-Lactamase; OXA=Oxacillinase, VIM=Verona Integron Metallo- β-Lactamase; IMP= Imipenemase

Healthcare-associated MDRO*: What We Know

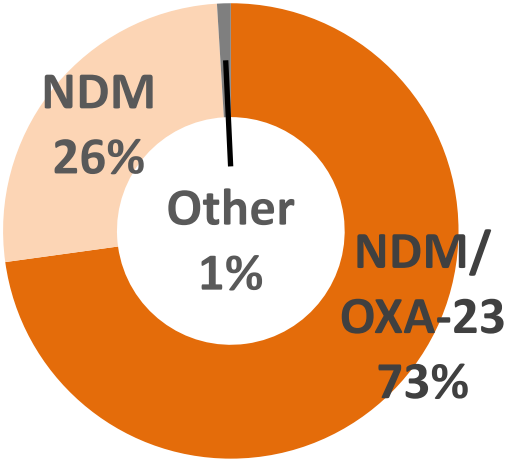
	C. auris	*Acinetobacter*	Other MDRO (e.g., CRE)	*C. diff*
Causes outbreaks in healthcare settings	X	X	X	X
Leads to substantial morbidity and mortality	X	X	X	X
Risk factors include frequent or extended healthcare exposure, antimicrobial use	X	X	X	X
Patients can remain colonized for many months (no “clearance” recommendations)	X	X	X	X
Persistent in the healthcare environment	X	X		X
Difficult to identify	X			

*Including *Clostridioides difficile (C. diff); C. auris=Candida auris;* CRE = carbapenem-resistant Enterobacteriaceae; MDRO=multidrug-resistant organism

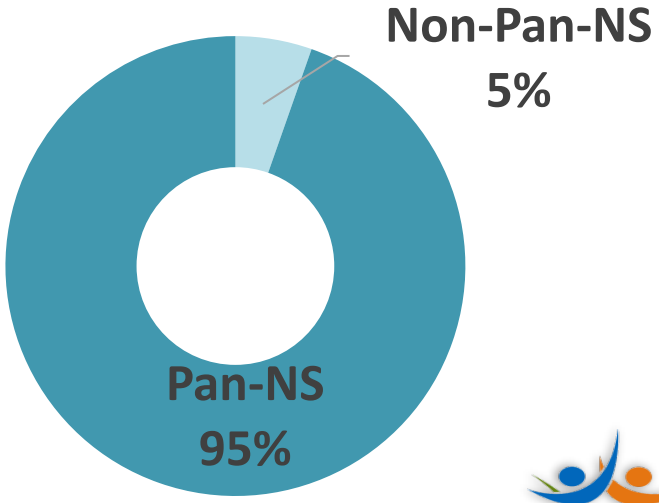
Regional Outbreaks of Novel and Emerging MDRO

Regional NDM CRAB Outbreak

- Cases first identified from May to June 2020 at an acute care hospital (ACH) participating in **AR Lab Network targeted surveillance program (PDF)**
  https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CDPH_ARLN_TargetedSurveillanceDescription_052521.pdf



- Most cases have been:
  - **dual mechanism NDM/OXA-23 CRAB**
  - **not susceptible (NS) to any antibiotic tested against it (pan-NS)**



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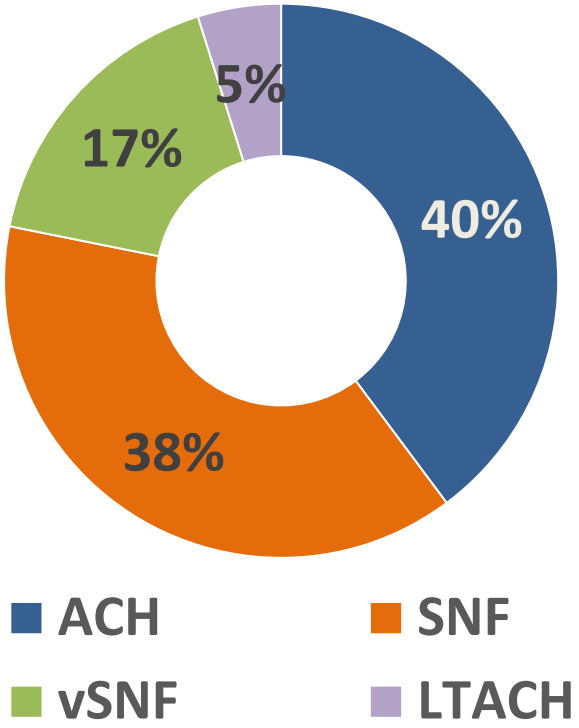
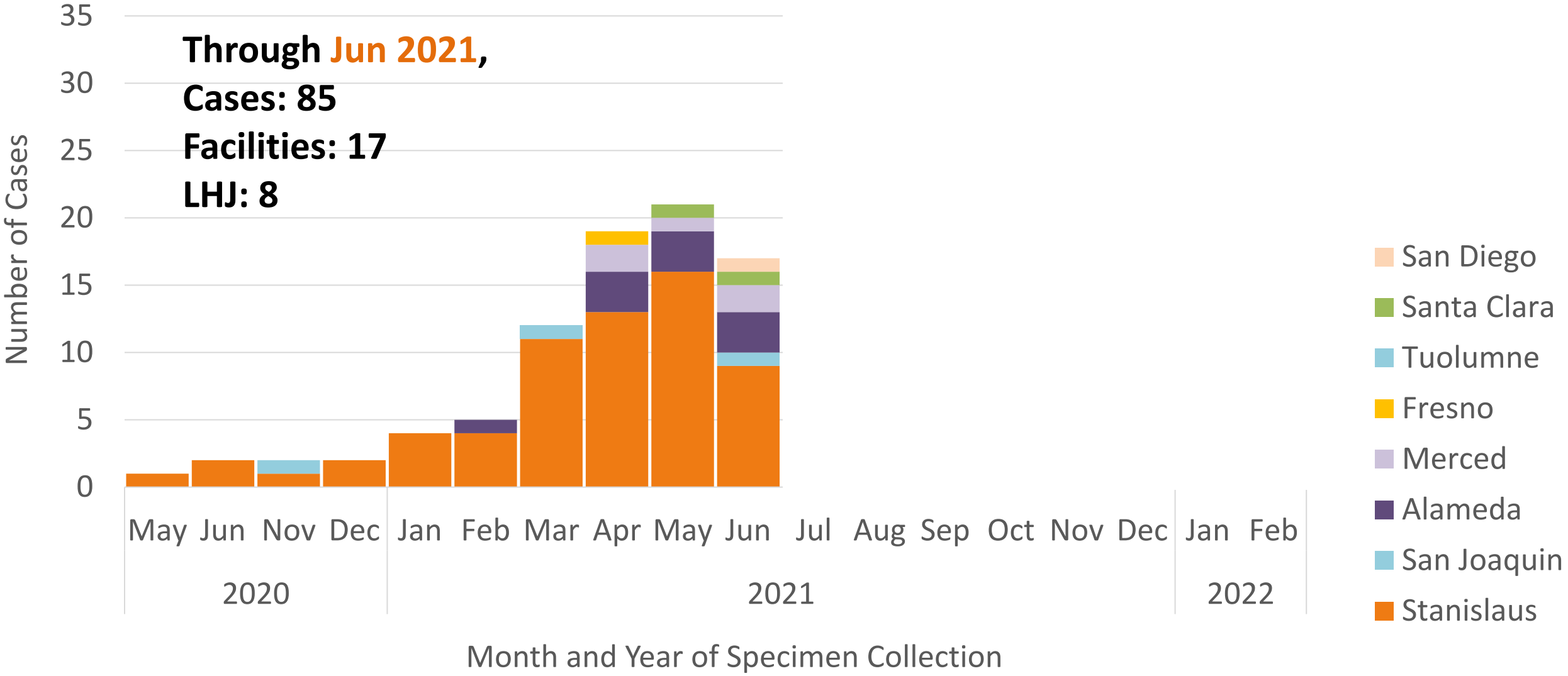
Regional NDM CRAB Outbreak

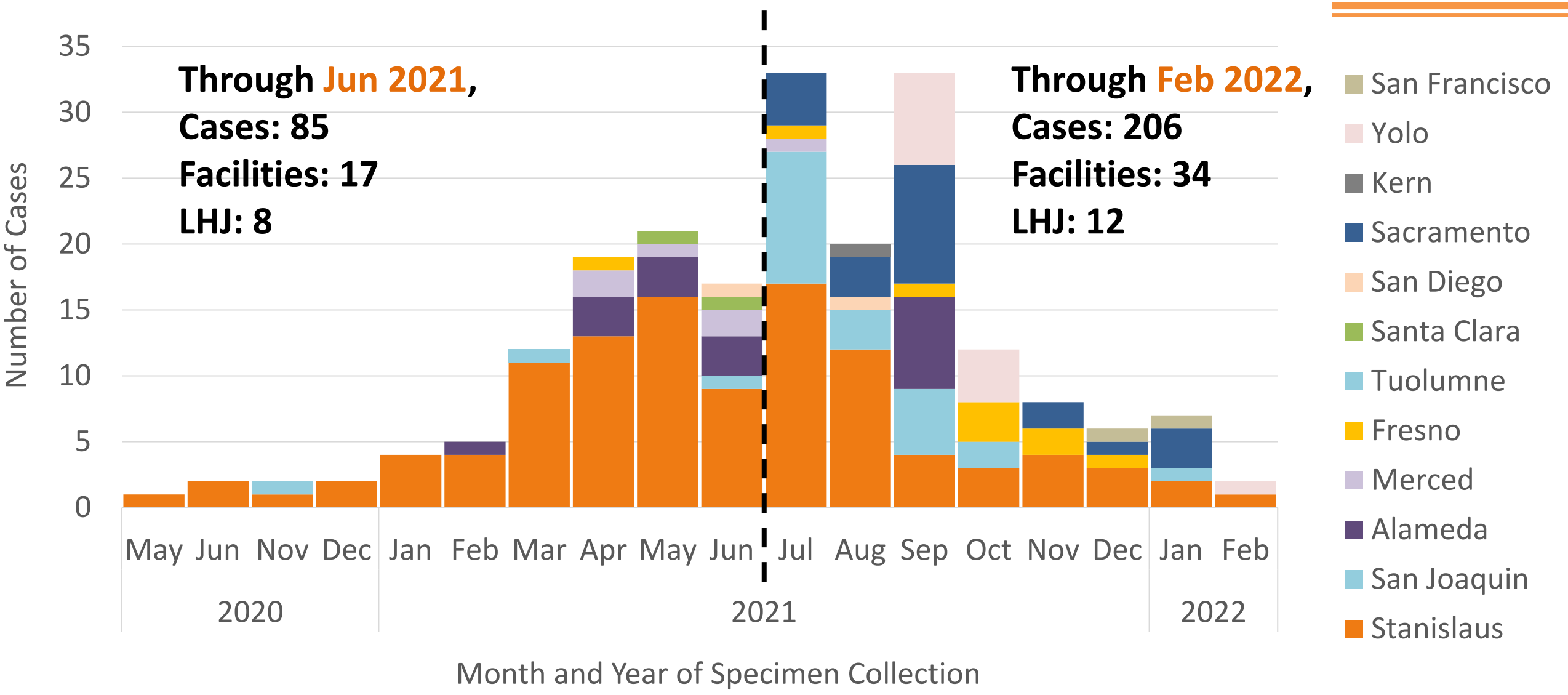
- NDM CRAB remain rare in US
- Most cases identified in **ACH** and **skilled nursing facilities (SNF)**
- Almost all cases of the **same strain**, pointing to **regional transmission**



NDM CRAB Epi Curve through Feb 2022 (n=206)



NDM CRAB Epi Curve through Feb 2022 (n=206)



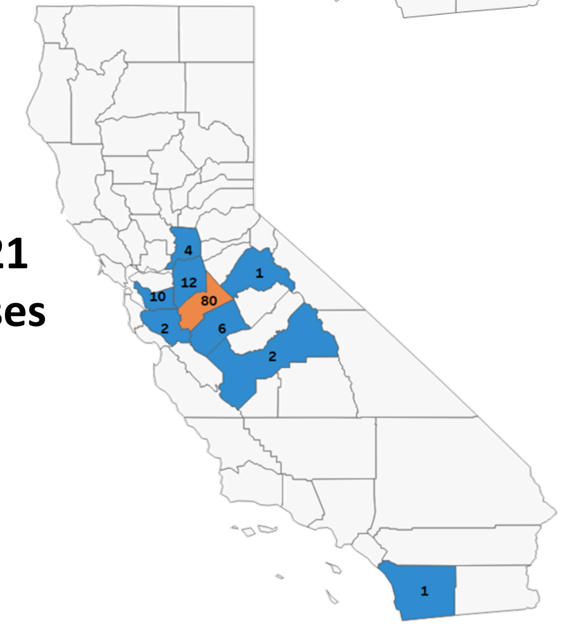
NDM CRAB Cases, May 2020 through Jan 2022

May 2020
1 Case

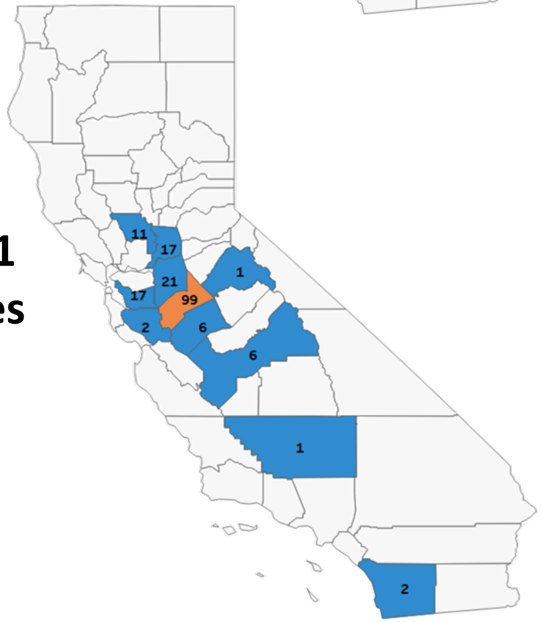
Jan 2021
11 Cases

Apr 2021
47 Cases

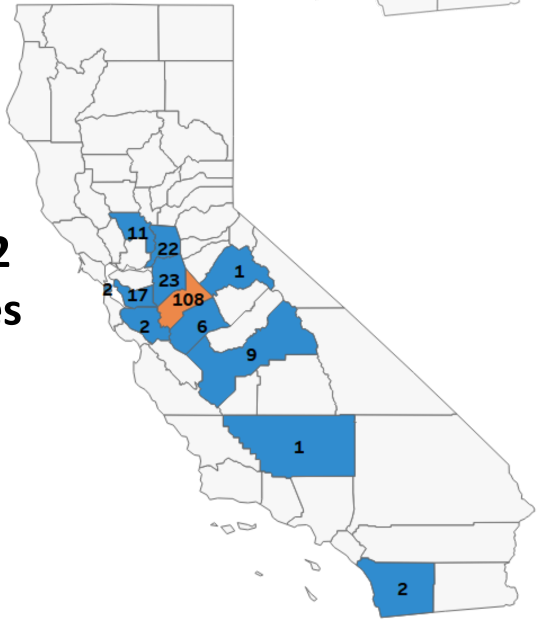
Jul 2021
118 Cases



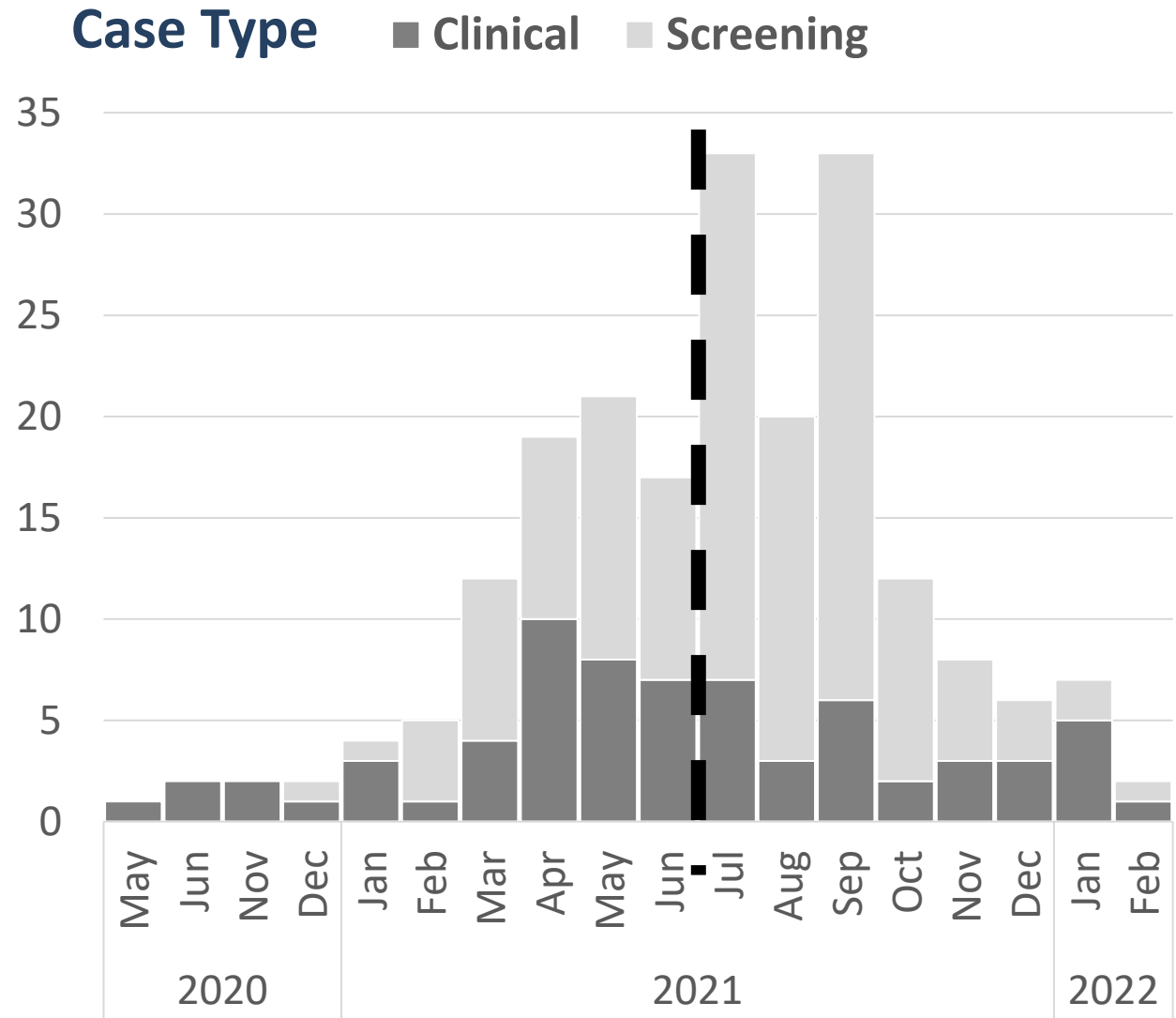
Oct 2021
183 Cases



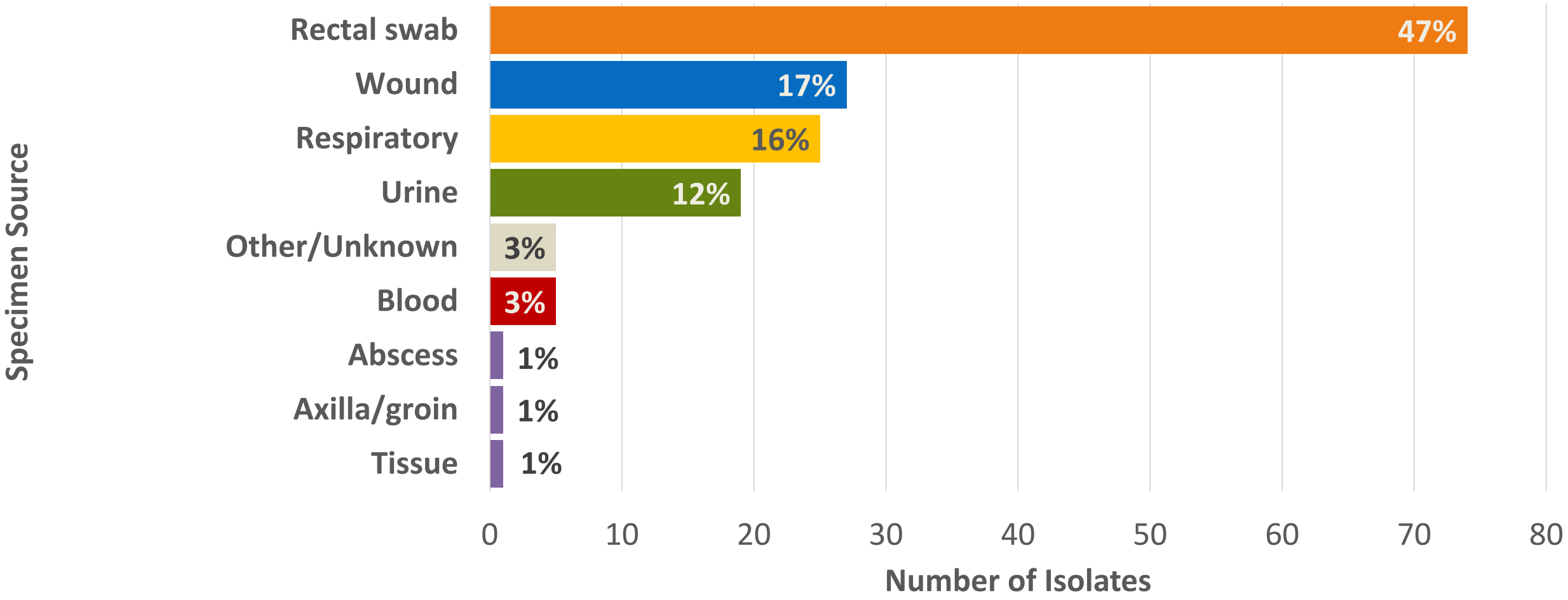
Jan 2022
204 Cases



NDM CRAB Clinical and Screening Cases



NDM CRAB Cases by Specimen Source



NDM CRAB Response

- **Coordinated regional response** by engaging local public health and healthcare facilities
  - Conducting epidemiological investigations
  - Performing **screening testing and onsite IPC assessments**
    - Targeting outbreak facilities and interconnected, high-risk facilities
  - **Educating** healthcare personnel and facilities about ongoing transmission risk
  - Increasing **laboratory surveillance** for CRAB
    - **Public health surveillance was crucial for identifying this outbreak**

- County-specific interventions in affected facilities
  - Enhanced **EVS training** in SNF
  - **Antimicrobial stewardship and interfacility communication** promotion and support in hospitals, SNF

NDM CRAB CAHAN

Active Surveillance

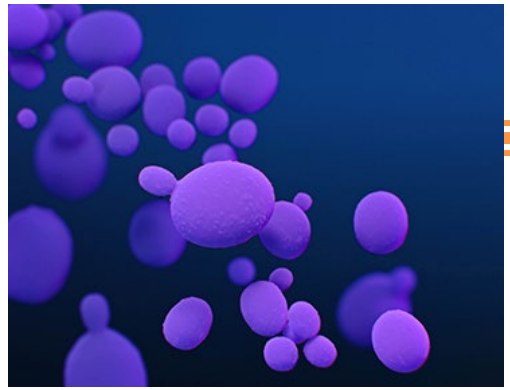
- Patients who are not known to be colonized with NDM CRAB and admitted from healthcare facilities experiencing NDM CRAB outbreaks should be screened for carbapenemase-producing organisms (including CRAB) and placed on empiric Contact precautions while awaiting results. Local health departments can notify facilities of where outbreaks are occurring.

- **Screen patients** admitted from NDM CRAB outbreak facilities and empirically place on Contact precautions
- Local health department can provide further information about facilities that are experiencing outbreaks of NDM CRAB
- **Core IPC practices!**

CAHAN: https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CAHAN_NDM_OXA23_CRAB_May2021.pdf

Candida auris

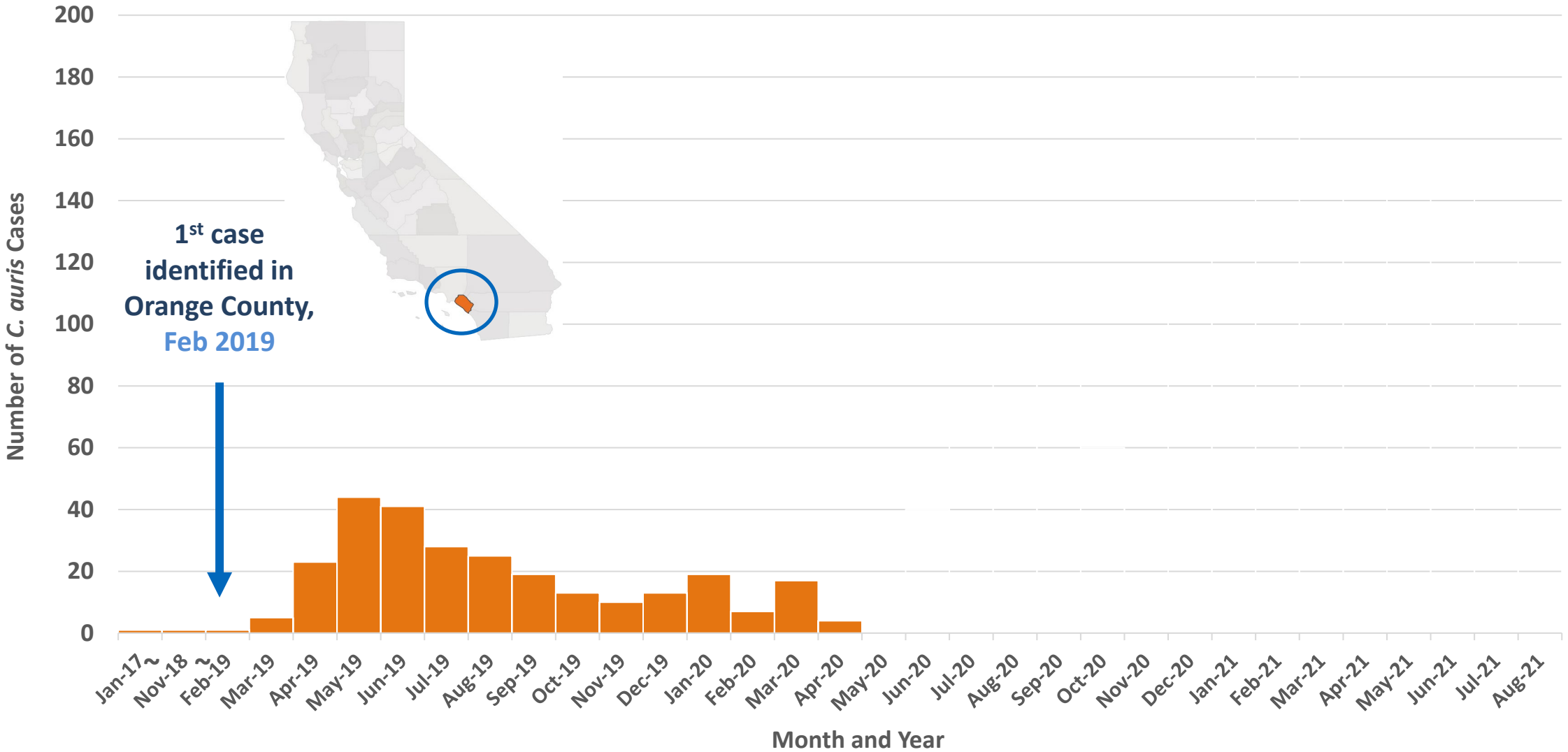
Candida auris



- Multidrug-resistant yeast, some pan-resistant
- Individuals can remain colonized for long periods
  - Invasive infections can lead to 30-60% mortality
- Persists in the healthcare environment
- Can spread rapidly in healthcare settings, causing outbreaks; in United States:
  - Long-term acute care hospitals (LTACH), ventilator-capable skilled nursing facilities (vSNF)
  - Less common in short-stay acute care hospitals (ACH)

Source: https://www.cdc.gov/fungal/candida-auris/candida-auris-qanda.html

C. auris Cases in CA through April 2020 (N=271)



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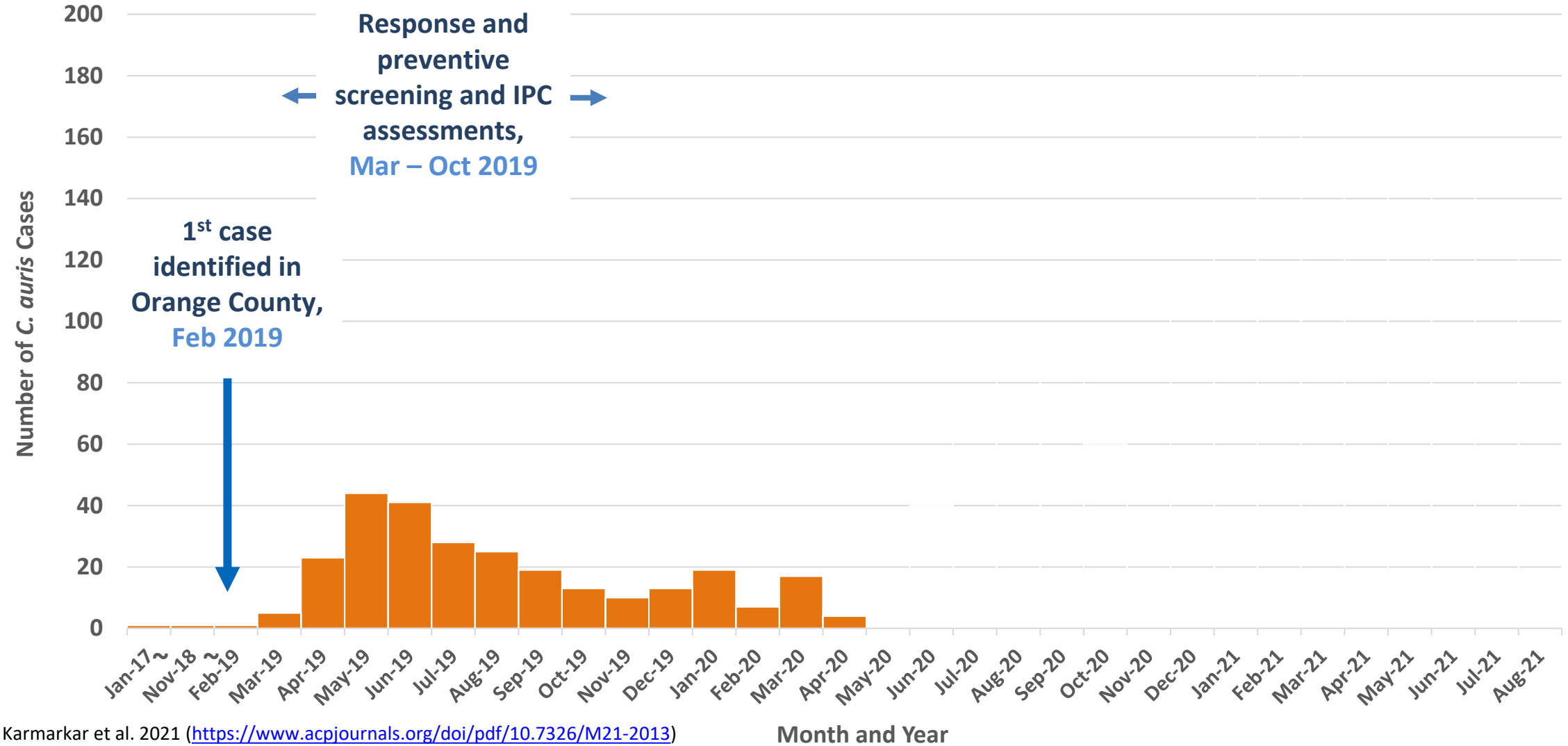

Karmarkar et al. 2021 (https://www.acpjournals.org/doi/pdf/10.7326/M21-2013)

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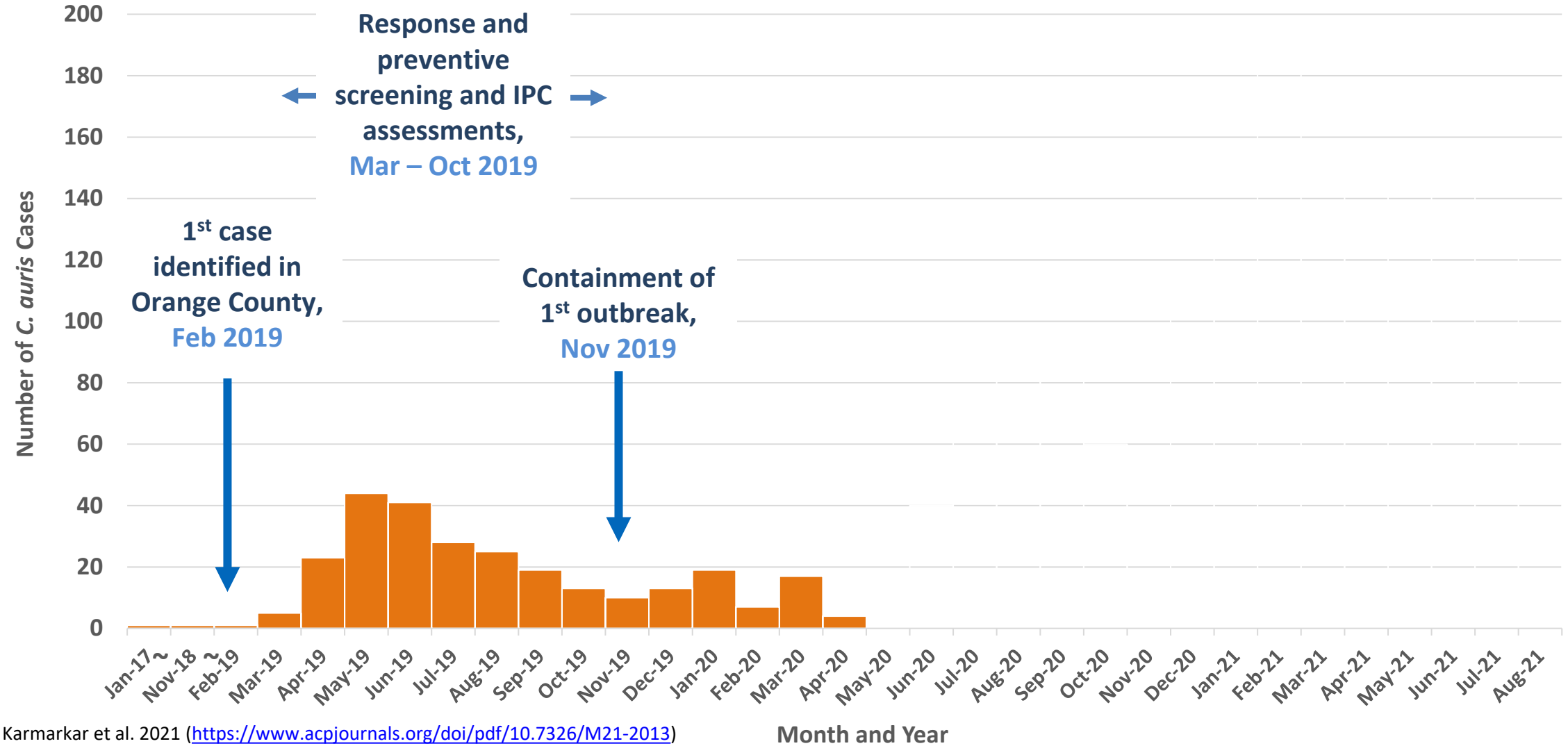

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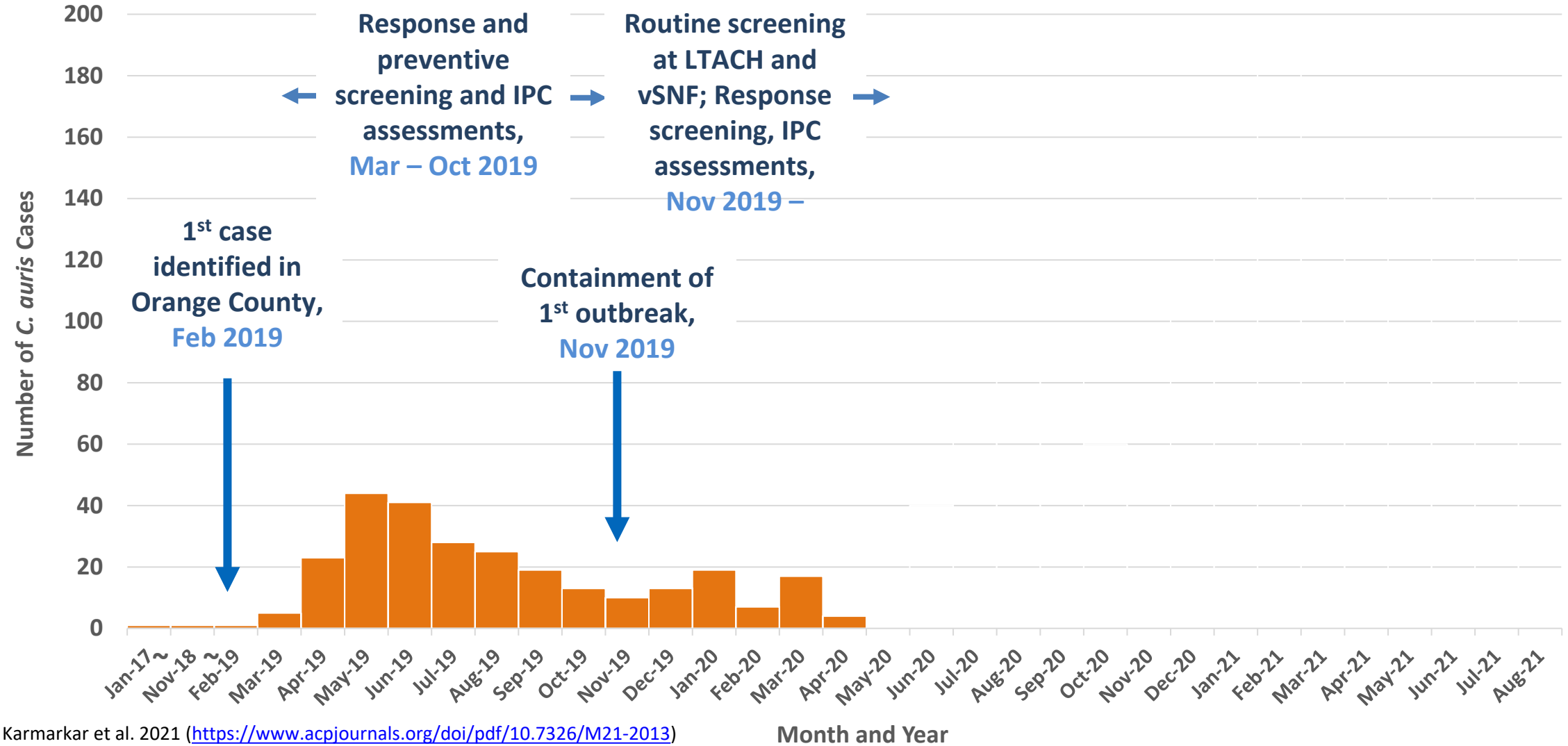

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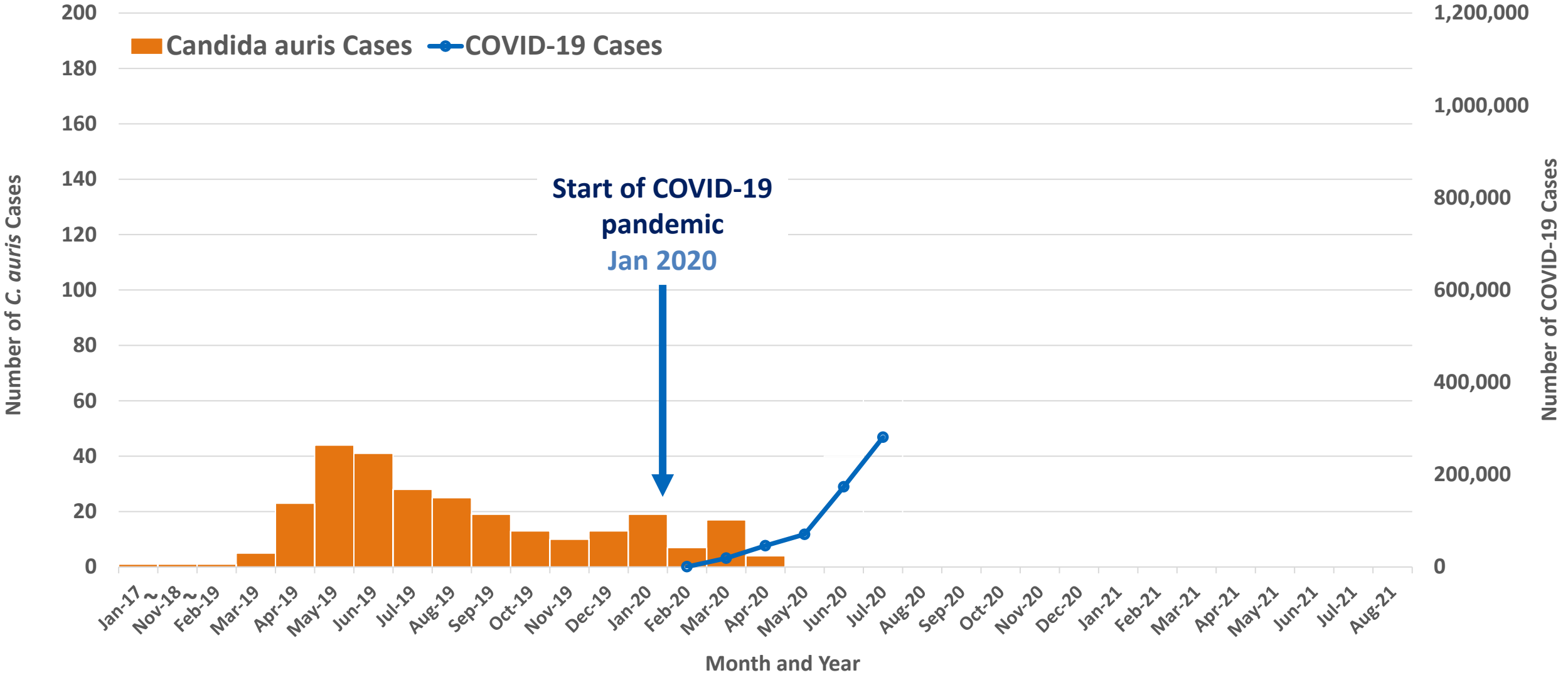
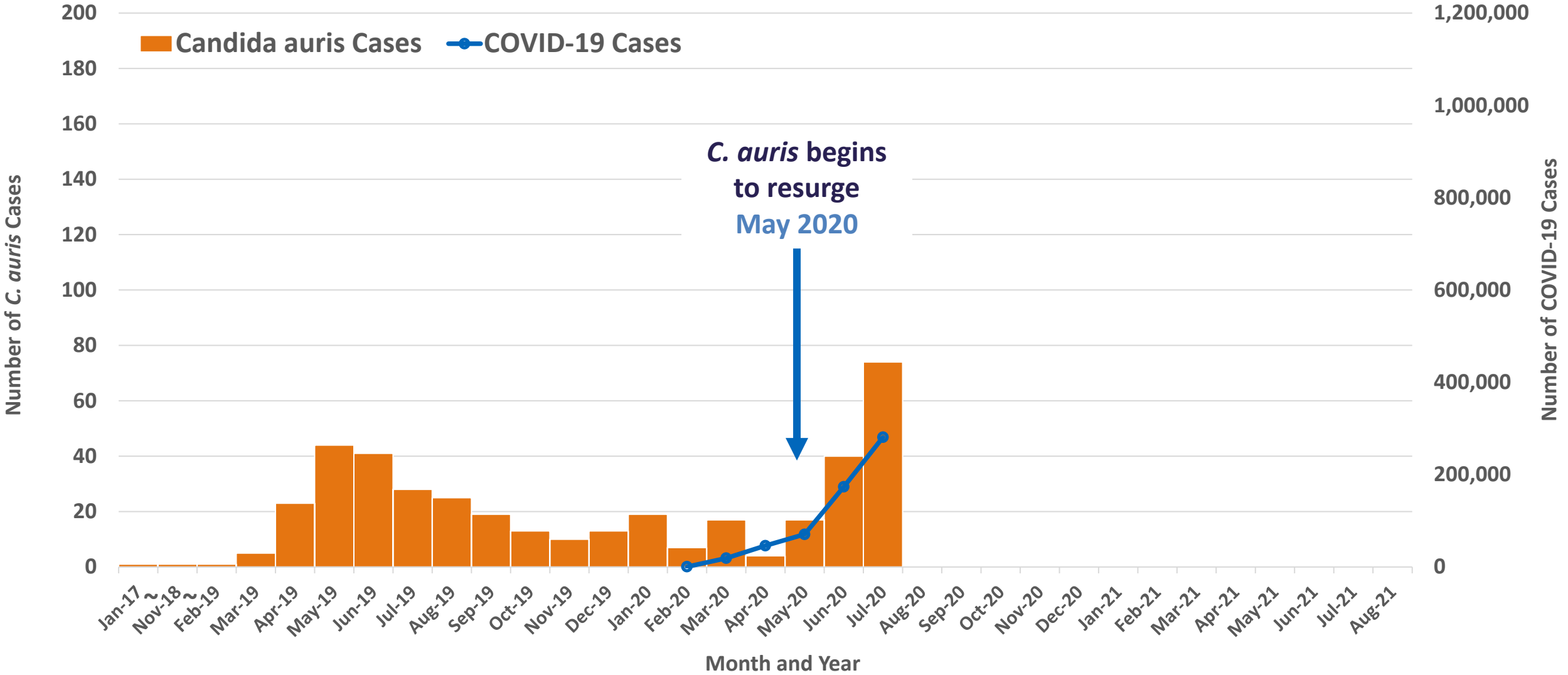
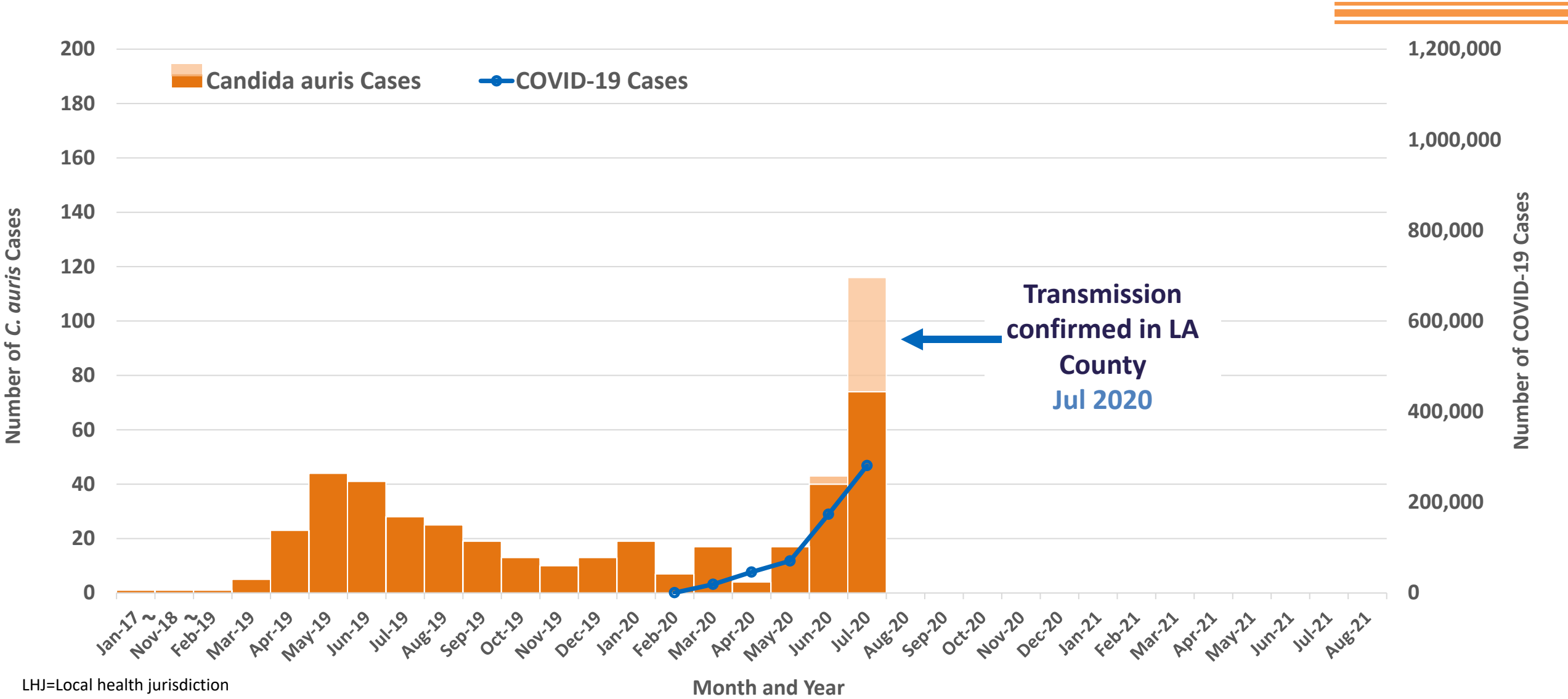
C. auris and COVID-19 Cases



C. auris and COVID-19 Cases

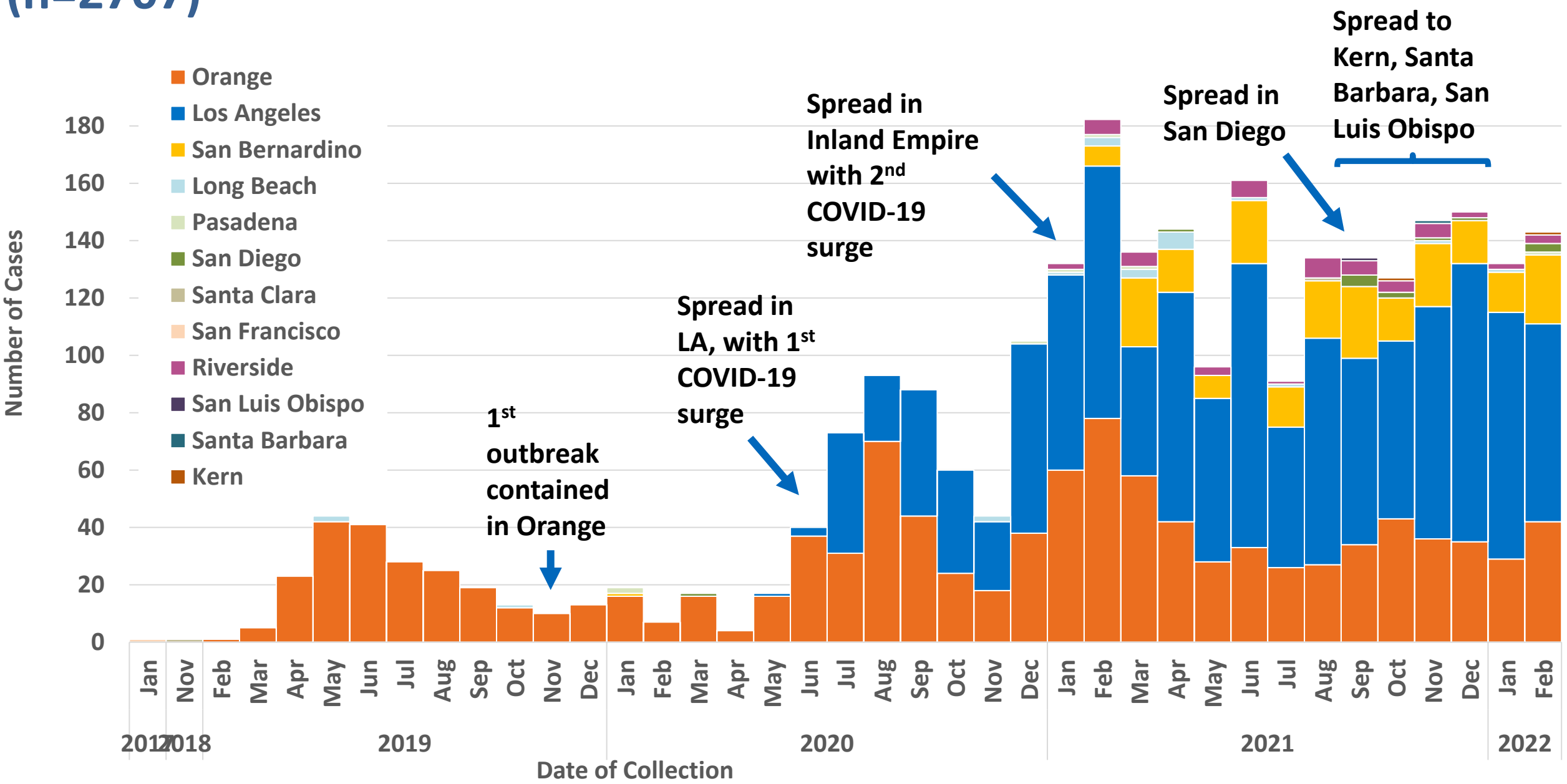


C. auris and COVID-19 Cases

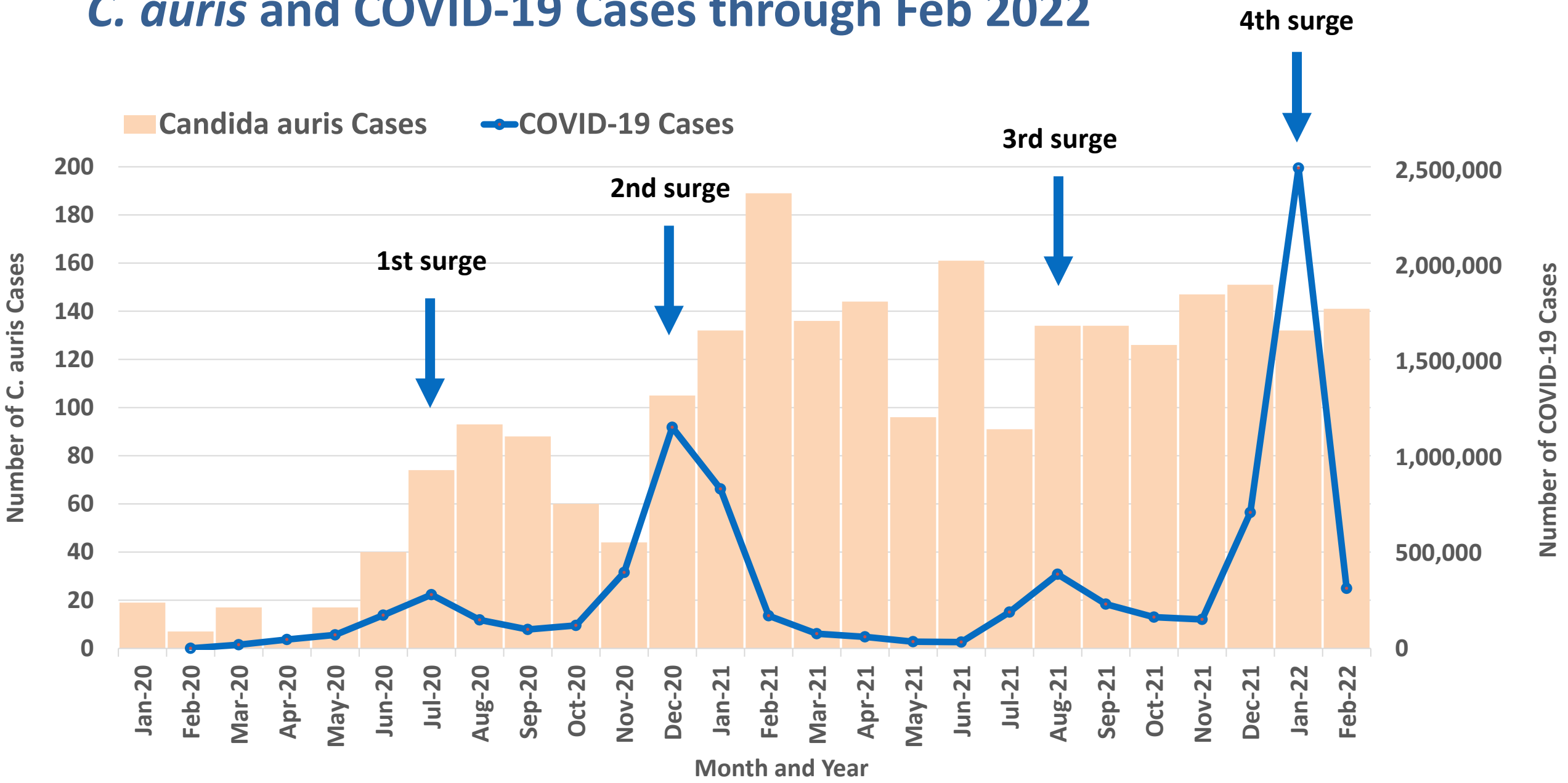


LHJ=Local health jurisdiction

C. auris Cases Reported by Local Health Jurisdiction through Feb 2022 (n=2707)



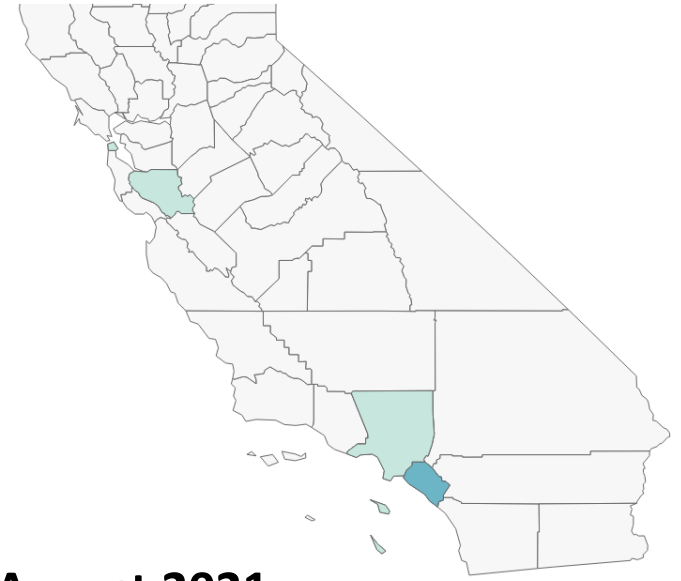
C. auris and COVID-19 Cases through Feb 2022



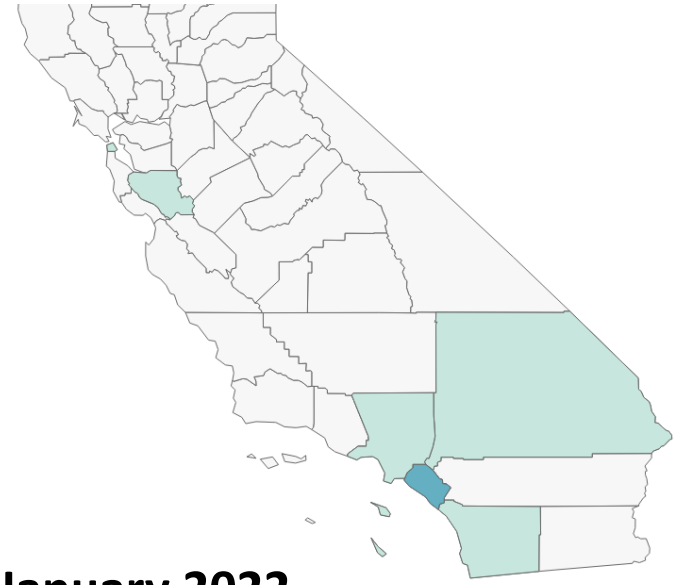
C. auris Cases, February 2019 through January 2022

February 2019

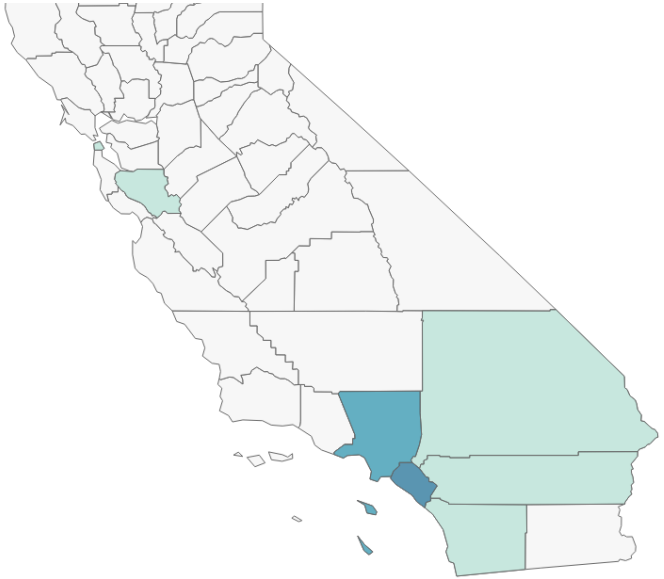
December 2019



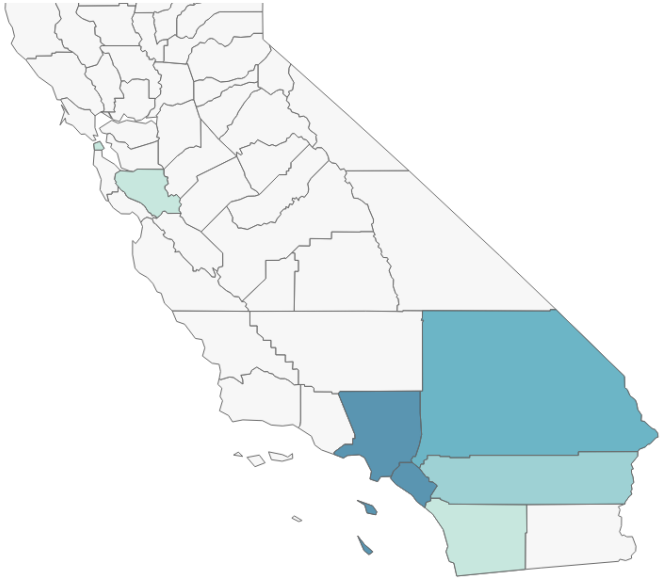
June 2020



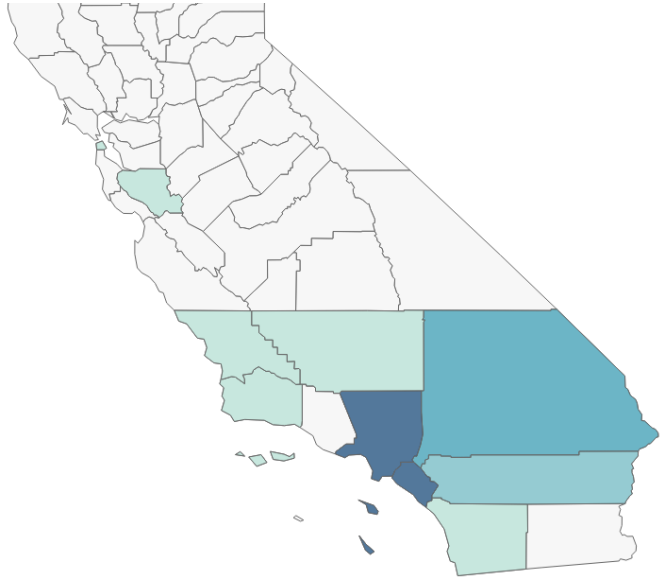
January 2021



August 2021



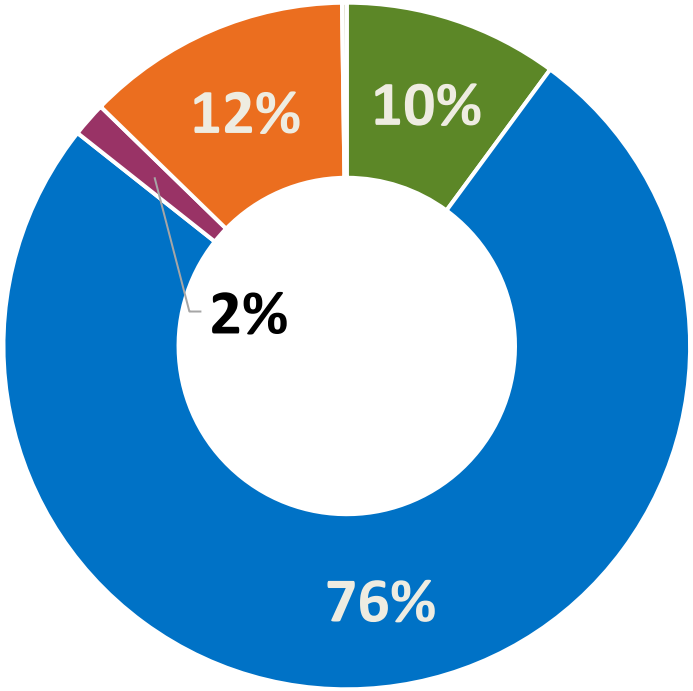
January 2022



Number of cases

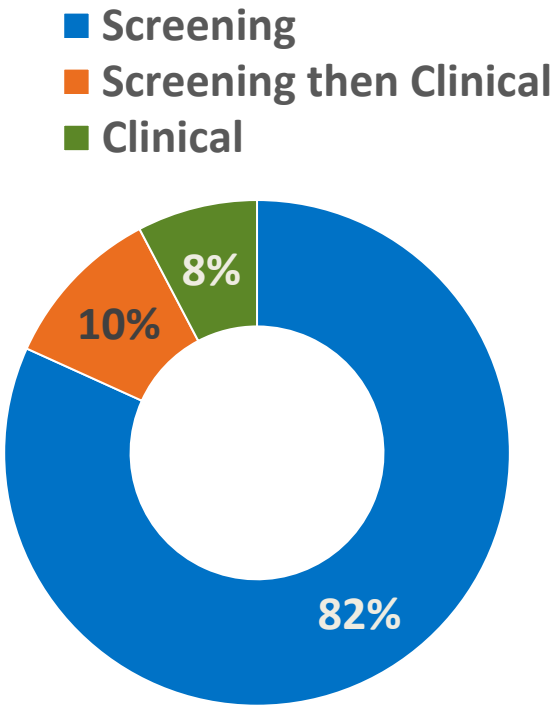
- 1-10
- 11-100
- 101-500
- 501-1000
- 1001-1500

C. auris Collection Facility Type and Risk Factors



- Prolonged admission in healthcare settings, particularly high-acuity long-term care facilities, such as **LTACH** and **vSNF**
- Presence of **indwelling devices**
- **Broad-spectrum antibiotic and antifungal use**

C. auris Cases by Case, Clinical Specimen Type through Feb 2022



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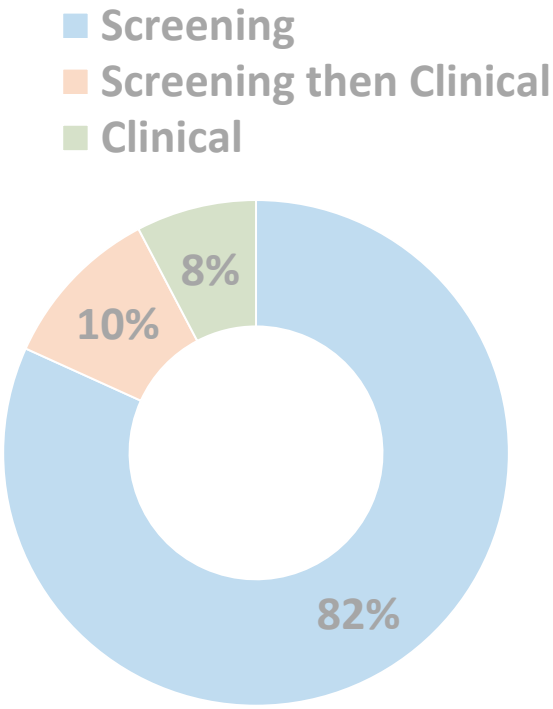
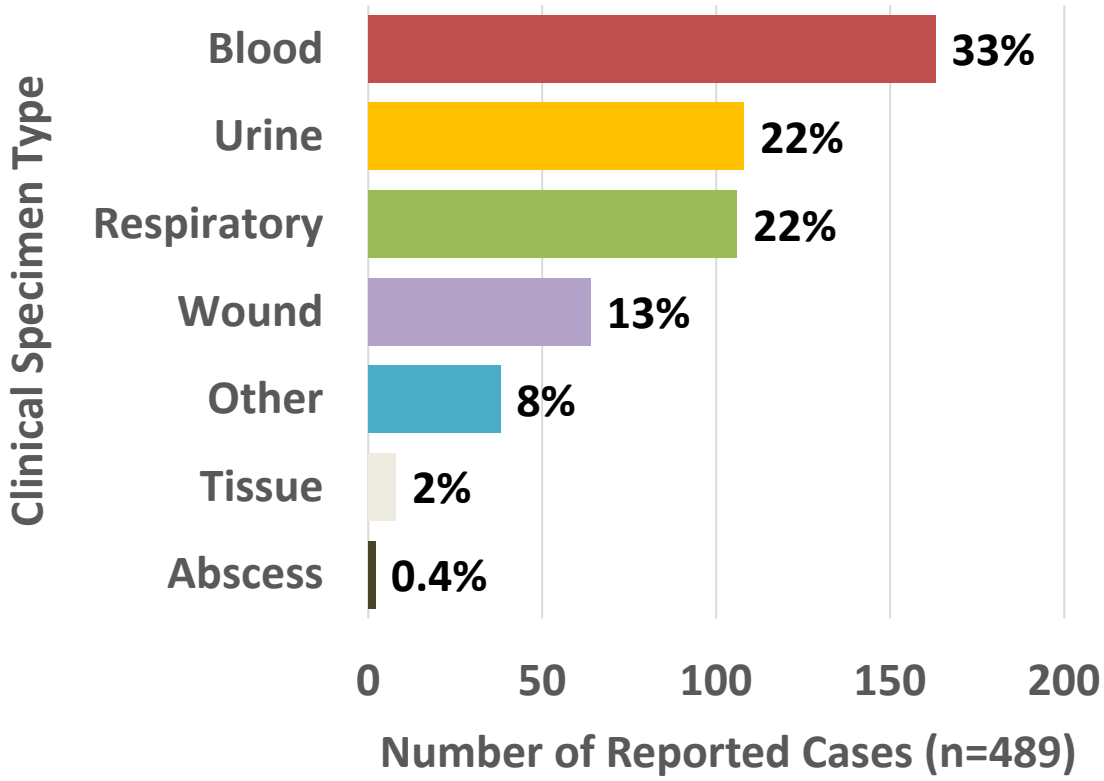




Healthcare-associated MDRO*: What We Know

	C. auris	CRAB	Other MDRO (e.g., CRE, CRPA)	*C. diff*
Causes outbreaks in healthcare settings	X	X	X	X
Leads to substantial morbidity and mortality	X	X	X	X
Risk factors include frequent or extended healthcare exposure, antimicrobial use	X	X	X	X
Patients can remain colonized for many months (no “clearance” recommendations)	X	X	X	X
Persistent in the healthcare environment	X	X		X
Can be difficult to identify	X			

*Including *Clostridioides difficile (C. diff); C. auris=Candida auris;* CRAB = carbapenem-resistant *Acinetobacter baumannii;* CRE = carbapenem-resistant Enterobacterales; CRPA = carbapenem-resistant *Pseudomonas aeruginosa:* MDRO=multidrug-resistant organism

C. auris Response

- **Coordinated regional response** by engaging local public health and healthcare facilities
  - Conducting epidemiological investigations
  - Performing **screening testing and onsite IPC assessments**
    - Targeting outbreak facilities and interconnected, high-risk facilities
  - **Educating** healthcare personnel and facilities about ongoing transmission risk
  - Increasing **laboratory surveillance** for *C. auris*
    - **Enhanced laboratory surveillance was crucial for identifying this outbreak**
- Released **3 CAHAN advisories**

CAHAN Key Messages

- *C. auris* is **highly transmissible** in the healthcare environment
- Since 2020, ***C. auris* spread has followed COVID-19 surges**, in part due to related infection prevention and control (IPC) challenges
- Risk factors include **prolonged admission in healthcare settings**, esp. high-acuity long-term care facilities such as LTACH and vSNF
- During COVID-19 surges, **long-term admissions in high-acuity ACH units** (e.g., ICU and step-down units (SDU)) might also increase risk
  - Santa Barbara, Kern, San Luis Obispo
- **Early detection and containment** can prevent further spread

CAHAN: https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CAHAN_Cauris_Surveillance_Feb2022_ADA.pdf

CAHAN Updated Recommendations

- **Use disinfectant with *C. auris* claims** (List P, List K, bleach)
  - All LTACH
  - SNF ventilator units
  - ACH high-acuity units (e.g., ICU, SDU)
- **Assess and conduct screening testing** for highest risk patients on admission, those:
  - From any LTACH
  - From SNF ventilator unit in jurisdictions with known *C. auris* transmission
  - From any facility with known transmission
  - With other known risk factors (e.g., international healthcare exposure, CPO co-colonization) (https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/Candida-auris.aspx)
- **In addition to adhering to core IPC practices…**

Infection Prevention and Control Practices

MDRO* and COVID-19 Containment and IPC Measures

	C. auris	CRAB	Other MDRO (e.g., CRE, CRPA)	*C. diff*	COVID-19
Good hand hygiene – ABHS preferred	X	X	X	Soap & water	X
Contact precautions, single room if possible	X	X	X	X	+ respirator, eye protection
Thorough environmental cleaning and disinfection	Use List P agent (List K agent or bleach, OK)	X	X	Use List K agent	Use List N agent (List P and K agents OK)
Routine adherence monitoring	X	X	X	X	X
Cohorting of patients and HCP	X	X	X	X	X
Lab surveillance	X	X	X	X	X
Screening of high-risk contacts	X	X	X		X

*Including *Clostridioides difficile (C. diff); C. auris=Candida auris;* CRAB = carbapenem-resistant *Acinetobacter baumannii;* CRE = carbapenem-resistant Enterobacterales; CRPA = carbapenem-resistant *Pseudomonas aeruginosa:* MDRO=multidrug-resistant organism

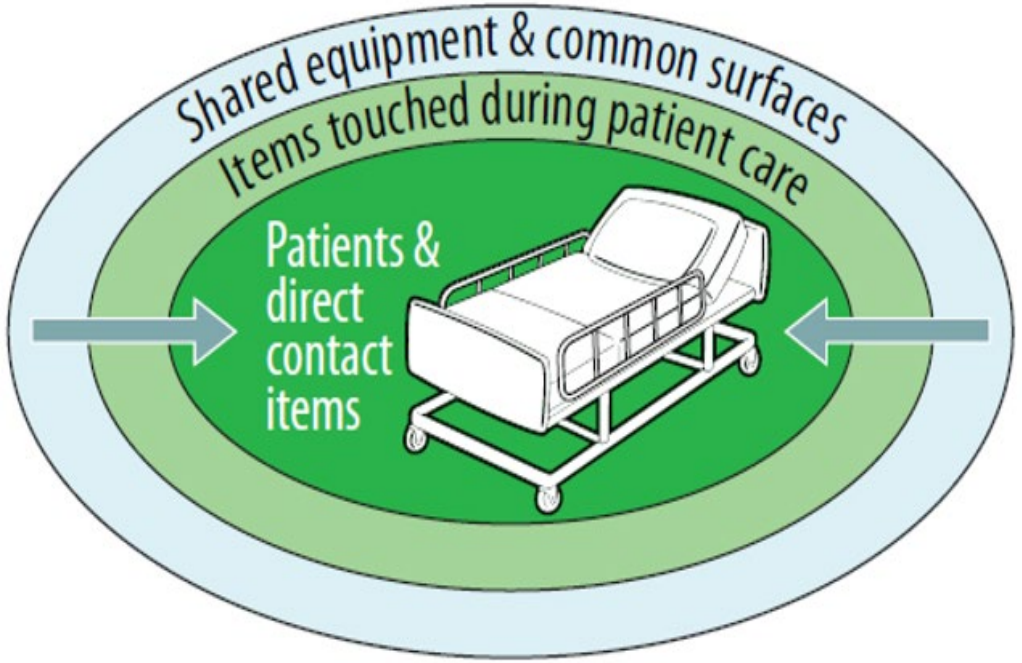
Hand Hygiene

- Use ABHS over soap and water (unless visibly soiled hands*/C. diff)*
- More then just gel-in/gel-out; remember the **5 moments**
- Gloves are **NOT** a substitute for HH; perform HH before donning PPE, after doffing
- Perform adherence monitoring

[WHO 5 Moments for Hand Hygiene]
(www.who.int/infection-prevention/campaigns/clean-hands/5moments/en/)

Infection Control: Environmental Cleaning

- Daily and terminal cleaning and disinfection of patient care environment
  - **For *C. auris,* use List P, List K or bleach agent in high-risk patient areas**
- High-touch surfaces, mobile medical equipment
- Nursing vs. EVS: who cleans what, and audit separately
- Read labels: know contact time
- Observe and monitor with fluorescent marker



CDC Environmental Cleaning Procedures
(www.cdc.gov/hai/prevent/resource-limited/cleaning-procedures.html)

PPE and Contact Precautions

- **Do not practice** extended use or reuse of gowns* and gloves
- Everyone should adhere, including physicians and ancillary staff
- Double-gowning and -gloving are **NOT** recommended
- Don/Doff WITH hand hygiene
- Keep signage simple and consistent

*Strategies for Optimizing the Supply of Isolation Gowns (www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/isolation-gowns.html)

CDC Contact Precautions Signage (PDF) (www.cdc.gov/infectioncontrol/pdf/contact-precautions-sign-P.pdf)

California Department of PublicHealth

Patient Placement

- If applicable, cohort patients with the same MDRO, regardless of specimen source, infection or colonization status
  - In acute care settings, patients with MDROs should be in single-bed rooms for the duration of the admission
- Avoid unnecessary patient movement

Communication

- Key to preventing inter-facility transmission!
- Actively seek MDRO status of all admissions
- Flag medical record for future admissions
- Inform receiving facility of patient MDRO status and IC recommendations
- Reach out to high-volume transfer facilities (hospital-SNF), share IP expertise
- Educate patients and family
- Use interfacility transfer form

[Interfacility Transfer Communications Guide](www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/InterfacilityCommunication.aspx)
(www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/Interfacility Communication.aspx)

HEALTHCARE FACILITY TRANSFER FORM

Affix patient labels here.

Use this form for all transfers to an admitting healthcare facility.

Patient Name (Last, First):

Date of Birth: | MRN: | Transfer Date:

Receiving Facility Name:

Contact Name: Contact Phone:

Sending Facility Name:

Contact Name: Contact Phone:

PRECAUTIONS

Patient currently on precautions? ☐ **Yes** ☐ **No**

If yes, check all that apply: ☐ Airborne ☐ Contact ☐ Droplet ☐ Enhanced Standard*

Personal protective equipment (PPE) to consider at receiving facility*:

☐ Gloves ☐ Gown ☐ Mask ☐ N95/PAPR ☐ Eye Protection

Long-term care facilities may implement Enhanced Standard precautions for patients with MDRO or risk factors for transmission, i.e., gown and glove use for high-contact care activities (https://www.cdph.ca.gov/Programs/CHCQ/LCP/CDPH%20Document%%20Library/AFL-19-22.pdf); such patients may be on Contact precautions in acute care settings.

ORGANISMS (Include copy of **lab results** with organism ID and antimicrobial susceptibilities.)

Patient has multidrug-resistant organism (MDRO) or other lab results requiring precautions?

☐ **Yes** (record organism(s), specimen source, collection date) ☐ **No**

☐ **Exposed to MDRO/other** (record organism(s) and last date(s) of exposure if known)

Organism	Carbapenemase (if applicable)**	Source	Date
☐ *Candida auris* (***C. auris***)			
☐ *Clostridiodes difficile* (***C. diff***)			
☐ *Acinetobacter*, multidrug-resistant (e.g., **CRAB****)			
☐ Carbapenem-resistant Enterobacterales (**CRE****)			
☐ *Pseudomonas aeruginosa*, multidrug-resistant (e.g., **CRPA****)			
☐ Extended-spectrum beta-lactamase (**ESBL**)-producer			
☐ Methicillin-resistant *Staphylococcus aureus* (**MRSA**)			
☐ Vancomycin-resistant *Enterococcus* (**VRE**)			
☐ No organism identified (e.g., molecular screening test**)			
☐ **Other, specify**: (e.g., SARS-CoV-2 (COVID-19), lice, scabies, disseminated shingles (*Herpes zoster*), norovirus, influenza, tuberculosis)			

**Note specific carbapenemase(s) (e.g., NDM, KPC, OXA-23) if known

California Department of PublicHealth

Antimicrobial Stewardship (AS)

Limit unnecessary use of antimicrobial agents

- Broad-spectrum antimicrobials (e.g., carbapenems)
- Antifungal treatment not recommended for *C. auris* isolated from noninvasive sites without evidence of infection
- **Reach out to SNF in patient sharing network to support their AS activities**

CDPH AS Program Honor Roll

(www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/Honor_Roll.aspx)

- 1-on-1 ASP Mentorship
- 2-year designation
- March 1 + Sept 1 rolling enrolment

CA AS Collaborative Network (ASCN) Listserv

(https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/ASCN.aspx)

MDRO Prevention Activities: A Comprehensive Approach

Phased Approach to MDRO Prevention and Containment

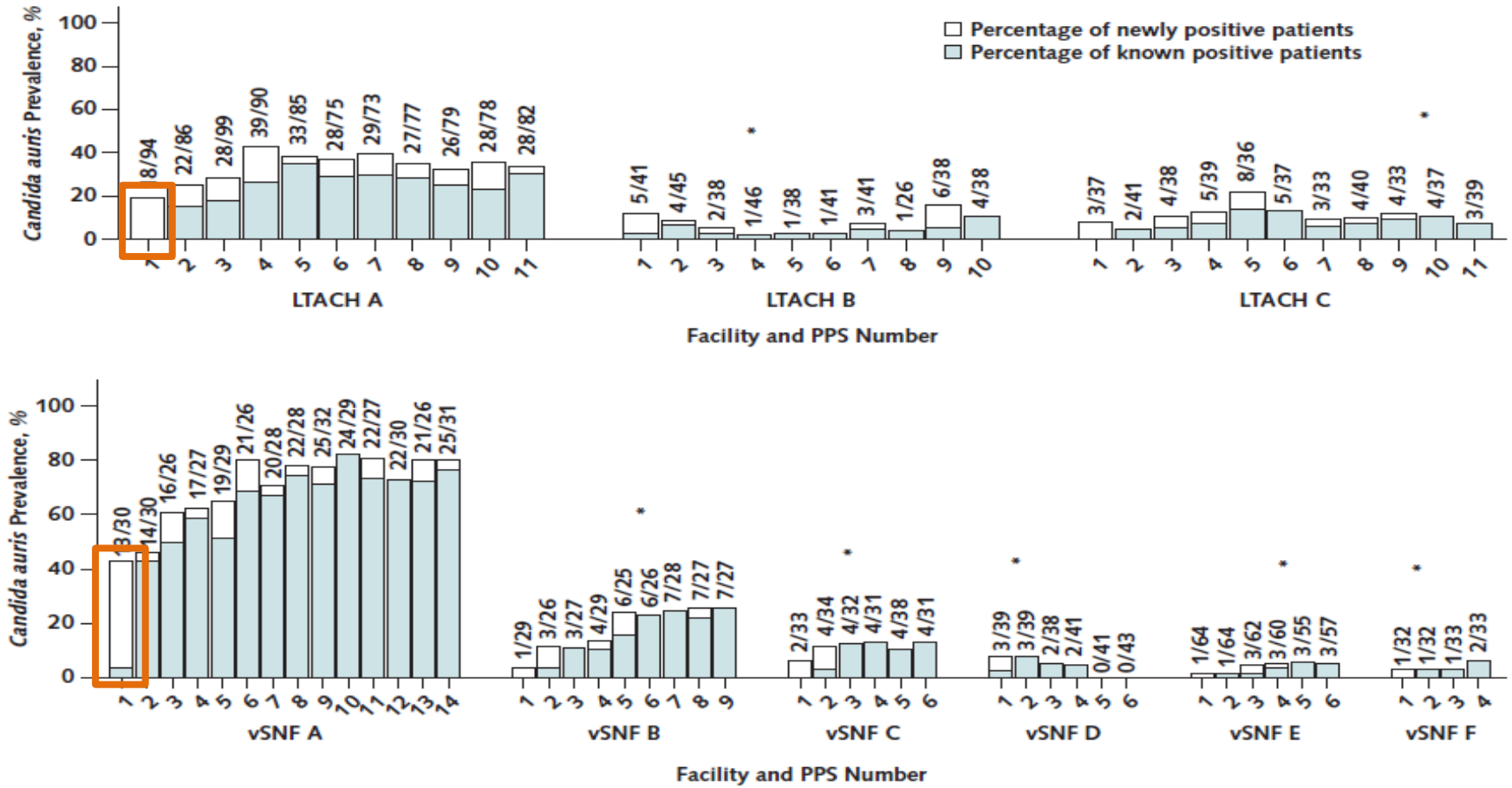
- Activities and resources depend on jurisdiction-specific **epidemiology and phase** for a given MDRO (*C. auris,* CPO)
- **Focus on prevention**, including proactive screening testing and IPC assessments
- **Early detection and aggressive response** in affected facilities complement prevention efforts in unaffected facilities
- Public health responsibility for activities shifts to healthcare facilities in later phases
- **Strengthen foundation for prevention and containment activities**: laboratory testing capacity, facility IPC practices, antimicrobial stewardship, interfacility communication

Comprehensive MDRO Prevention Activities

1. Routine and proactive **MDRO screening and clinical testing**
   - Understand baseline prevalence + early detection
   - Prevent spread in high-risk facilities in adjacent/interconnected jurisdictions

Lesson Learned: Higher Initial Burden → More transmission

Figure 1. Prevalence of *Candida auris* and the total number of screening cases (new and known) among total facility census, identified on serial PPSs within all OC LTACHs and 6 vSNFs (A to F), by PPS number–OC, California, March to October 2019.



LTACH = long-term acute care hospital; OC = Orange County; PPS = point prevalence survey; vSNF = ventilator-capable skilled-nursing facility.
* First facility instances of 2 consecutive PPSs with no new positive detections.

Karmarkar et al. 2021 (https://www.acpjournals.org/doi/pdf/10.7326/M21-2013)

Routine Surveillance

- Detection of MDROs ensures timely IPC interventions to prevent their spread

- **CPO**
  - Perform or access carbapenemase testing for CRE, CRPA, and CRAB isolates
    - Testing resources available through public health
- ***C. auris***
  - Identify all *Candida* from sterile sites to the species level
  - Consider identifying *Candida* from urine and other non-sterile sites to the species level, especially in high-risk patients

MDRO Screening: Proactive Colonization Testing

- In **LTACH + vSNF**, baseline and follow-up PPS, with IPC onsite assessment

- In **all facilities**, conduct admission screening + empiric Contact precautions for high-risk patients:
  - from any LTACH
  - from vent unit in vSNF, esp. from area with ongoing transmission
  - from any known outbreak facility
  - with other risk factors (e.g., international healthcare exposure)

MDRO Screening: Response Colonization Testing

When new case is identified, screen:

- Roommates, those who shared bathroom
- Other epi-linked high-risk patient contacts
  - Shared medical equipment/services (e.g., respiratory therapy)
  - Ventilated, incontinent, bedbound, in high-risk (intensive care/burn/oncology) unit overlapping on same unit/ward

- Consider point prevalence survey (PPS) if longer length of stay, or high-risk unit or facility (vSNF, LTACH)

CDPH *C. auris* and CPO Screening Decision Tree (PDF)
(www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/Tier2_Pathogen_Screening_Decision_Tree_Oct2020.pdf)

Public Health MDRO Testing Capacity

Public Health Laboratory	CPO Screening (rectal)	Carbapenemase Testing	*C. auris* Screening (axilla/groin)	*C. auris* ID/ Confirmatory Testing	Antimicrobial Susceptibility Testing
Local, some		X	X	X	
State, MDL		CRE, CRPA	Coming soon	X	
Regional, AR Lab Network	CRE, CRPA, CRAB	CRE, CRPA, CRAB*	X	Non-*albicans Candida* spp.*	CRE, CRPA, CRAB*, *non-albicans Candida* spp.*

- Access state and regional testing in consultation with CDPH HAI Program, HAIProgram@cdph.ca.gov
- Guidance available for prioritizing carbapenemase testing, CPO/*C. auris* screening

* Available through AR Lab Network Targeted Surveillance Program

Reporting

- **Carbapenemase-producing CRE** (*Klebsiella, Enterobacter* species, *E. coli*) are lab-reportable under Title 17. See CP-CRE Reporting Requirements FAQ (PDF) (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CP_CRE_ReportingFAQ_Approved_10.4.19_ADA.pdf).

- **Other carbapenemase-producing organisms (CPO), or other unusual or highly-resistant organisms, including *C. auris*** are reportable as unusual infectious disease occurrences and outbreaks to public health under Title 17, and CDPH Licensing & Certification per All Facilities Letter 19-18 (PDF) (www.cdph.ca.gov/Programs/CHCQ/LCP/CDPH%20Document%20Library/AFL-19-18.pdf)

- **Proposed updates to Title 17** include **expanding CP-CRE to include all CPO and adding *C. auris***

Comprehensive MDRO Prevention Activities

1. Routine and proactive **MDRO testing and screening**
   - Understand baseline prevalence + early detection
   - Prevent spread in high-risk facilities in adjacent/interconnected jurisdictions

2. Proactive and follow-up **onsite infection prevention and control (IPC) assessments**
   - Experienced HAI Program infection preventionists (IP)

3. **Statewide** vSNF and LTACH MDRO Prevention Projects
   - Patient sharing networks, **interfacility communication**
   - Strengthen **core IPC practices** (vSNF) and **antimicrobial stewardship (AS)** (LTACH)

4. **Regional** MDRO Prevention Projects
   - All facility types
   - Strengthen core IPC practices, AS, interfacility communication, lab capacity

A Success Story: San Diego County

Initiated **proactive** onsite assessments and PPS at LTACH/vSNF

Apr 9, 2021

First local case identified at **ACH**

Apr 21, 2021

Initiated **admission screening** at LTACH

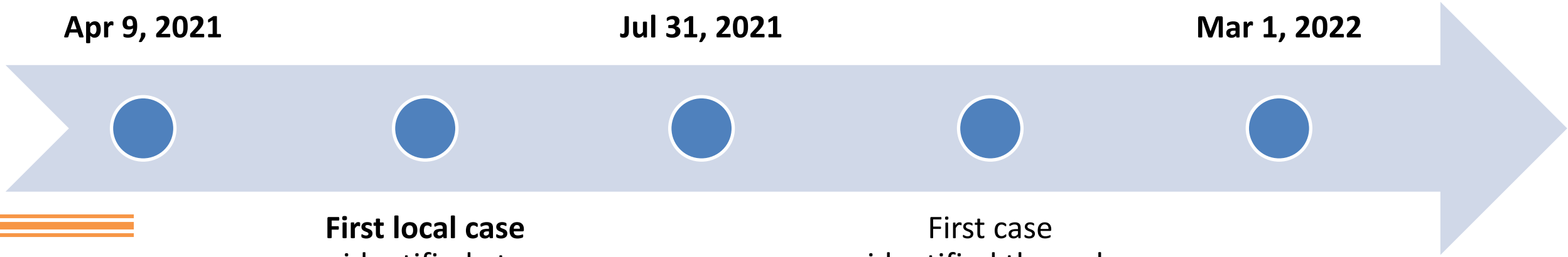
Jul 31, 2021

First case identified through LTACH admission screening

Sep 1, 2021

11 total cases identified: 2 at ACH; 5 by LTACH admission screening; 4 by LTACH PPS

Mar 1, 2022



California Department of PublicHealth

A Success Story: San Diego County

Before report of first locally-identified case, initiated:

1. **Proactive onsite IPC assessments, strengthen IPC practices, ensure interfacility communication**

2. **Proactive PPS:** baseline at all vSNF/LTACH, continuing quarterly at LTACH; response testing at 2-week intervals as necessary

2. **Routine admission screening and identifying *Candida* species of clinical isolates**

- 9/11 cases identified, all through **LTACH testing**
  - 4 from PPS; 5 from admission screening

- **Early detection and prevention** were key in preventing widespread transmission!

Conclusions

- Antimicrobial resistance threatens our ability to prevent and treat infectious diseases

- Core actions to prevent resistance include improving antimicrobial prescribing through **stewardship, reducing infections, and preventing transmission** of MDRO

- **Proactive, routine, and active surveillance** for *C. auris* and CPOs are crucial to identify these organisms and prevent transmission and ensuring patient safety

- Public health is here to support you!

Resources

Resources

- CDPH Antimicrobial Resistance Resources landing webpage (www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/AntimicrobialResistanceLandingPage.aspx)
- CDPH CRO Webpage (www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/CRE_InfectionPreventionStrategies.aspx)
- CDPH CRE Quicksheet (PDF) (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CRE_QuicksheetOct2019.pdf)
- CDPH CRPA and CRAB Quicksheet (PDF) (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CRO_Quicksheet_Oct2020.pdf)
- CDPH *C. auris* Webpage (www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/Candida-auris.aspx)
- CDPH *C. auris* Quicksheet (PDF) (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/C%20auris%20Quicksheet_Interim_070720_ADA.pdf)
- CDPH *C. auris* and CPO Screening Decision Tree (PDF) (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/Tier2_Pathogen_Screening_Decision_Tree_Oct2020.pdf)
- CDPH Algorithm for Prioritizing Carbapenemase Testing (PDF) (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CP_Testing_Prioritization_Algorithm_Oct2020.pdf)

Resources

- CDC/CDPH Novel MDRO in Long-Term Care Facilities Webinar (slides)(PDF) (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/C_auris_AHR_CDC_CDPHshareWebinarcCombined_ADA_121020.pdf)
- CDC/CDPH Novel MDRO in Long-Term Care Facilities Webinar (recording) (YouTube) (www.youtu.be/5uIpo7wi6xk)
- CDPH CRE for Families Webpage (https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/Carbapenem-resistantEnterobacteriaceae(CRE).aspx)
- CDPH CRAB for Families Webpage (https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/Carbapenem_resistantAcinetobacter.aspx)
- CDPH CRPA for Families Webpage (https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/Carbapenem_resistantPseudomonas.aspx)

Thank you!

Questions?

For more information,
contact

HAIProgram@cdph.ca.gov