Newly Reportable Multidrug-Resistant Organisms (MDROs) in Wisconsin:
Information for Acute Care Facilities

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Topics for Today

- Brief overview of newly reportable organisms
- Wisconsin MDRO data snapshot
- Impact of this change on health care facilities
- Role of local and tribal health departments (LTHDs)
- New resources for facilities and LTHDs
- Questions and discussion

CDC's 2019 "Antibiotic Resistance Threats in the United States" Report

- Report identified 18 drug-resistant pathogens that pose an "urgent," "serious" or "concerning" threat to public health.
- To date, only one of the urgent threats (CP-CRE) has been reportable in Wisconsin.
- As of July 1, 2022, three additional MDROs will be reportable in Wisconsin.

https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf

CDC's "Targeted MDROs"

- Pan-resistant organisms
- Carbapenemase-producing *Enterobacterales* spp.
- Carbapenemase-producing *Pseudomonas aeruginosa*
- Carbapenemase-producing *Acinetobacter baumannii*
- *Candida auris*

As of July 1, 2022, will be Category II reportable conditions in Wisconsin

Carbapenemase-Producing Carbapenem-Resistant *Acinetobacter baumannii* (CP-CRAB)

- *Acinetobacter baumannii* is an opportunistic pathogen.
- It survives for a long time on surfaces, can colonize the skin, and causes severe infections.
- CP-CRAB can be highly resistant.
  - Most isolates are carbapenemase-producing.
  - Pan-resistant isolates have been detected in Wisconsin.
  - Treatment of CP-CRAB infections is complex.

Carbapenemase-Producing Carbapenem-Resistant *Pseudomonas aeruginosa* (CP-CRPA)

- *Pseudomonas aeruginosa* is found in water and soil.
- The species is naturally drug resistant and can cause severe wound, burn, and respiratory infections.
- CP-CRPA is relatively rare, but can cause very serious and hard-to-treat infections.

Carbapenemase-Producing Carbapenem-Resistant Enterobacterales (CP-CRE)

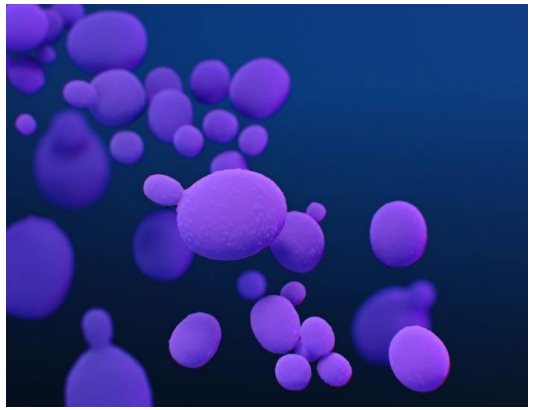
- The Enterobacterales order of bacteria is commonly found in the human digestive system as part of normal flora.
  - Examples include *E. coli, Klebsiella,* and *Enterobacter.*
- CP-CRE can cause serious infections if introduced to a sterile site.
- CP-CRE has been reportable in Wisconsin since 2018.
- As of May 1, 2022, reporting CRE in NHSN is no longer required, as data is available in WEDSS.

Carbapenemase-Producing Organisms

- Carbapenemases make an organism highly resistant to antibiotics, including to carbapenem antibiotics.
- Carbapenem antibiotics are often used as drugs of last resort for resistant infections.
- Carbapenemase genes (for example KPC, NDM-1, VIM, IMP, OXA-48) can transfer between bacteria, which can spread resistance within a patient's normal flora or between patients.

Candida auris

- This fungal pathogen is almost always resistant to antifungal medications, making infections difficult to treat.
- Special cleaning agents are needed to kill *C. auris* on surfaces (Environmental Protection Agency List P).
- CDC estimates that *C. auris* infections have a high mortality rate (30 to 60%).
- Wisconsin identified its first case of *C. auris* in January 2022.



Colonization vs. Infection with MDROs

Colonization

- An individual has the organism in or on their body, but it is not making them ill.
- Individuals who are colonized can still spread the organism to surfaces and others.
- Individuals may remain colonized indefinitely.

Infection

- An individual has the organism and it is causing symptoms or making them ill.
- The risk of infection is highest for those with in-dwelling devices, wounds, frequent healthcare visits or long stays, and other co-morbidities.

Affected Entities

- Hospitals
  - Acute care
  - Critical access
  - Specialty
  - Long-term acute care
- Nursing homes

WISCONSIN DEPARTMENT of HEALTH SERVICES

Bureau of Communicable Diseases

Three New Reportable Multidrug-Resistant Organism Disease Conditions in Wisconsin

The Bureau of Communicable Diseases (BCD) is announcing that infection or colonization with two carbapenemase-producing, multidrug-resistant organisms (MDROs) and one multidrug-resistant fungal organism will soon be reportable communicable disease conditions in Wisconsin. As of July 1, 2022, confirmed and probable cases of the following will be considered Category II reportable communicable diseases:

- Carbapenemase-producing carbapenem-resistant *Acinetobacter baumannii* (CP-CRAB)
- Carbapenemase-producing carbapenem-resistant *Pseudomonas aeruginosa* (CP-CRPA)
- *Candida auris*

To date, surveillance for these three organisms has been based on voluntary submission of isolates by clinical laboratories to the Wisconsin State Laboratory Hygiene (WSLH). **The addition of these organisms as reportable diseases will enable systematic, statewide surveillance, which is an essential part of controlling their spread.**

WSLH will continue to perform free confirmatory testing for these organisms and to automatically send confirmed results to the Wisconsin Electronic Disease Surveillance System (WEDSS) to support public health response and surveillance.

https://content.govdelivery.com/accounts/WIDHS/bulletins/314794a

Laboratory Results for CPOs

CPO Laboratory Results

- Confirmed cases have lab results indicating carbapenemase positivity
- Majority of results will come from WSLH and look like the below examples

TEST ORDERED: OXA-23, 24/40, 58-LIKE PCR

This assay was developed at the Centers for Disease Control and Prevention and its performance characteristics determined by the Wisconsin State Laboratory of Hygiene. It has not been cleared by the U.S. Food and Drug Administration.

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
OXA-23-LIKE GENE	No OXA-23-like DNA detected.				
blaOXA-23-like Islt/Spm QI	No OXA-23-like DNA detected.				
RESULT	**VALUE**	**UNITS**			
OXA-24/40-LIKE GENE	OXA-24/40-like DNA detected.				
blaOXA-24-like Islt/Spm QI	OXA-24/40-like DNA detected.				
RESULT	**VALUE**	**UNITS**			
OXA-58-LIKE GENE	No OXA-58-like DNA detected.				
blaOXA-58-like Islt/Spm QI	No OXA-58-like DNA detected.				

Performing Organization: Wisconsin State Laboratory of Hygiene
Performing Organization Address:

TEST ORDERED: CARBAPENEMASE PCR

This test was developed and its performance characteristics determined by the Wisconsin State Laboratory of Hygiene. It has not been cleared by the U.S. Food and Drug Administration.

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
KPC	KPC gene detected.			Abnormal	Final
blaKPC AnorectIIslt QI PCR	KPC gene detected.			Abnormal	Final
RESULT	**VALUE**	**UNITS**	**REFERENCE RANGES**	**ABNORMAL**	**RESULT STATUS**
NDM-1	No NDM-1 gene detected.				Final
blaNDM AnorectIIslt QI PCR	No NDM-1 gene detected.				Final

Performing Organization: Wisconsin State Laboratory of Hygiene
Performing Organization Address:

Probable CPO Cases

- Lab results noting only “carbapenemase detected”
- Often these are phenotypic tests
- Are “probable” cases if no follow-up testing to determine which carbapenemase was present

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
Carbapenemase Islt QI	Detected			Abnormal	Final
Carbapenemase Islt QI	Detected			Abnormal	Final

Antibiotic Susceptibility Testing (AST)

AST can tell you if organism is CRAB or CRPA, but **not** if it is carbapenemase-producing

	KLE OXYTOC		ESC COLI	
	M.I.C.	RX	M.I.C.	RX
Ampicillin	>=32	R	>=32	R
AMP/SUL	>=32	R	>=32	R
ESBL	POS	+	NEG	-
Cefazolin	>=64	R	>=64	R
Ceftazidime	>=64	R	>=64	R
Ceftriaxone	>=64	R	>=64	R
Cefepime	2	S	8	I
Ciprofloxacin	<=0.25	S	<=0.25	S
Gentamicin	<=1	S	<=1	S
Imipenem	2	S	<=0.25	R
Levofloxacin	0.25	S	<=0.12	S
Nitrofurantoin	<=16	S	<=16	S
Piper/Tazo	>=128	R	>=128	R
Tobramycin	<=1	S	<=1	S
SXT	<=20	S	<=20	S
Ertapenem	2	R	2	R

Susceptibility

Acinetobacter baumannii complex

Antibiotic	Interpretation	Value
AMPICILLIN/SULBACTAM	**Intermediate**	16 ug/mL
PIPERACILLIN/TAZOBAC	**Resistant**	>=128 ug/mL
CEFTAZIDIME	**Resistant**	>=64 ug/mL
CEFEPIME	**Resistant**	>=64 ug/mL
IMIPENEM	**Resistant**	>=16 ug/mL
MEROPENEM	**Resistant**	>=16 ug/mL
GENTAMICIN	**Susceptible**	4 ug/mL
TOBRAMYCIN	**Intermediate**	8 ug/mL
CIPROFLOXACIN	**Resistant**	>=4 ug/mL
COLISTIN	**Intermediate**	<=2 ug/mL

TEST ORDERED: CULTURE, URINE, ROUTINE

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
ISOLATE 1:	Providencia rettgeri			Abnormal	Final
BACTERIA ISLT CULT	Providencia rettgeri			Abnormal	Final

THIS ORGANISM IS A CARBAPENEM RESISTANT ENTEROBACTERIACEAE.
PROVIDENCIA RETTGERI
GREATER THAN 100,000 CFU/ML OF

Performing Organization: QUEST DIAGNOSTICS WOOD DALE
Performing Organization Address: 1355 MITTEL BLVD, WOOD DALE, IL, 60191-1024
TEST ORDERED: URA,1NEG ~Providencia rettgeri~Providencia rettgeri

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
AMPICILLIN	16	1		Intermediate	Final
AMPICILLIN SUSC ISLT	16	1		Intermediate	Final
RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
AMP/SULBACTAM	16	1		Intermediate	Final
AMPICILLIN+SULBAC SUSC ISLT	16	1		Intermediate	Final
RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
CEFTRIAXONE	2	1		Intermediate	Final
CEFTRIAXONE SUSC ISLT	2	1		Intermediate	Final
RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
CEFAZOLIN	>=64	1		Resistant	Final
CEFAZOLIN SUSC ISLT	>=64	1		Resistant	Final

FOR UNCOMPLICATED UTI CAUSED BY E. COLI,
K. PNEUMONIAE OR P. MIRABILIS: CEFAZOLIN IS
SUSCEPTIBLE IF MIC <32 MCG/ML AND PREDICTS
SUSCEPTIBLE TO THE ORAL AGENTS CEFACLOR, CEFDINIR,
CEFPODOXIME, CEFPROZIL, CEFUROXIME, CEPHALEXIN
AND LORACARBEF.

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
CIPROFLOXACIN	>=4	1		Resistant	Final
CIPROFLOXACIN SUSC ISLT	>=4	1		Resistant	Final
RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
ERTAPENEM	>=8	1		Resistant	Final
ERTAPENEM SUSC ISLT	>=8	1		Resistant	Final

THIS ORGANISM DEMONSTRATES CARBAPENEM RESISTANCE.

Antibiotic Susceptibility Testing (AST)

- Carbapenem antibiotics
  - Ertapenem
  - Doripenem
  - Imipenem
  - Meropenem
- CRAB: If resistant to any carbapenem → lab should send isolate to WSLH for carbapenemase testing
- CRPA: If resistant to any carbapenem AND non-susceptible to cefepime or ceftazidime → lab should send isolate to WSLH for carbapenemase testing
- If isolate **is** susceptible to all tested carbapenem antibiotics (or if the results come back from WSLH that it is not a carbapenemase producer), it is not a reportable event.

Responding to a Possible Case

- **Determining if organism is reportable**

  - Confirmatory testing (often by WSLH) is needed to determine if an isolate is reportable.
  - For carbapenem-resistant organisms, remember that only **CP**-CRAB, **CP**-CRPA, and **CP**-CRE are reportable.
  - Reach out to your HAI Program regional IP if you or your LTHD have questions.

- **Infection control (IC) measures taken by your facility**

  - IC measures should be taken **immediately** upon identification of an MDRO.
  - Decisions about IC measures should not wait for results of confirmatory testing for carbapenemase production.

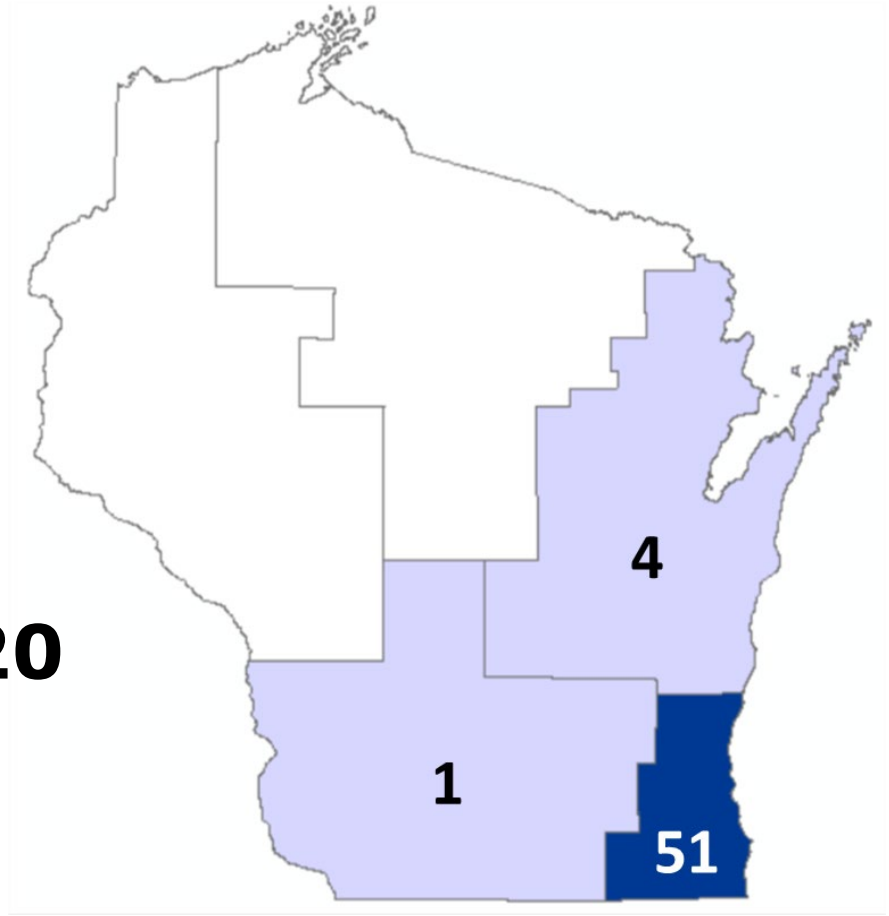
Wisconsin MDRO Data Snapshot

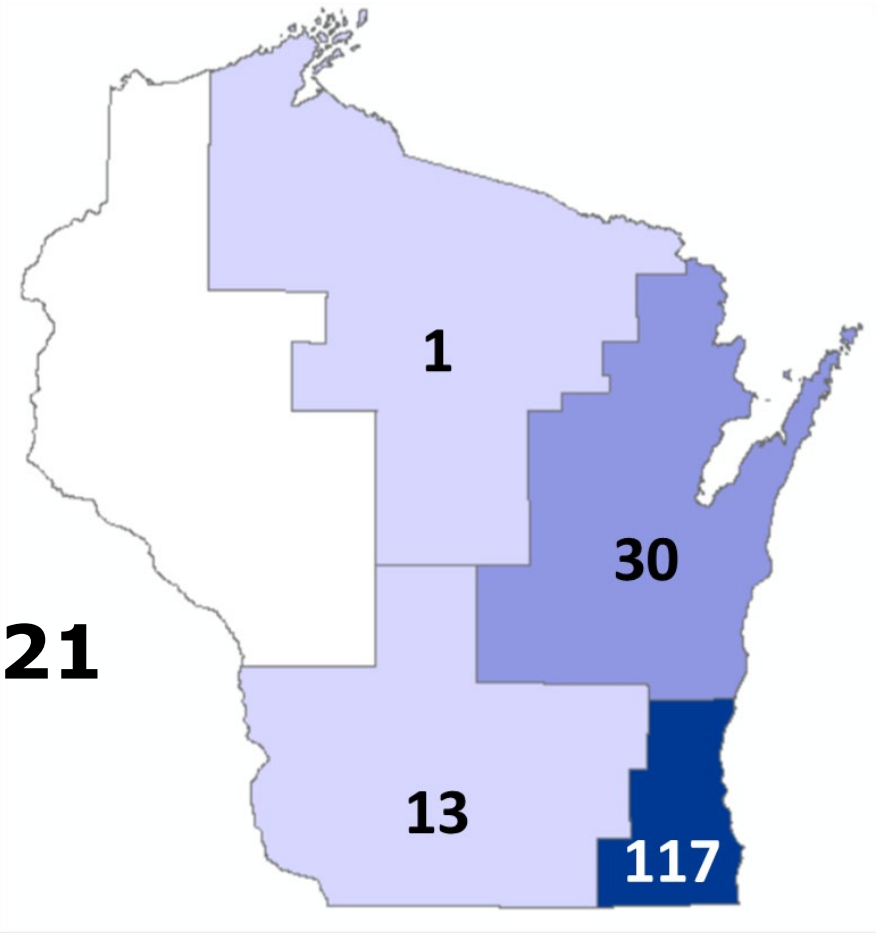
Reported Cases* of CP-CRE, CP-CRPA, and *Candida auris* in Wisconsin, 2020 and 2021

	2020	2021
CP-CRE	30	46
CP-CRPA	2	3
Candida auris	0	1

*Cases include both clinical and colonization screening isolates. Also, the numbers in the table and maps are not de-duplicated across years.

CP-CRAB Cases in Wisconsin, 2020-2021

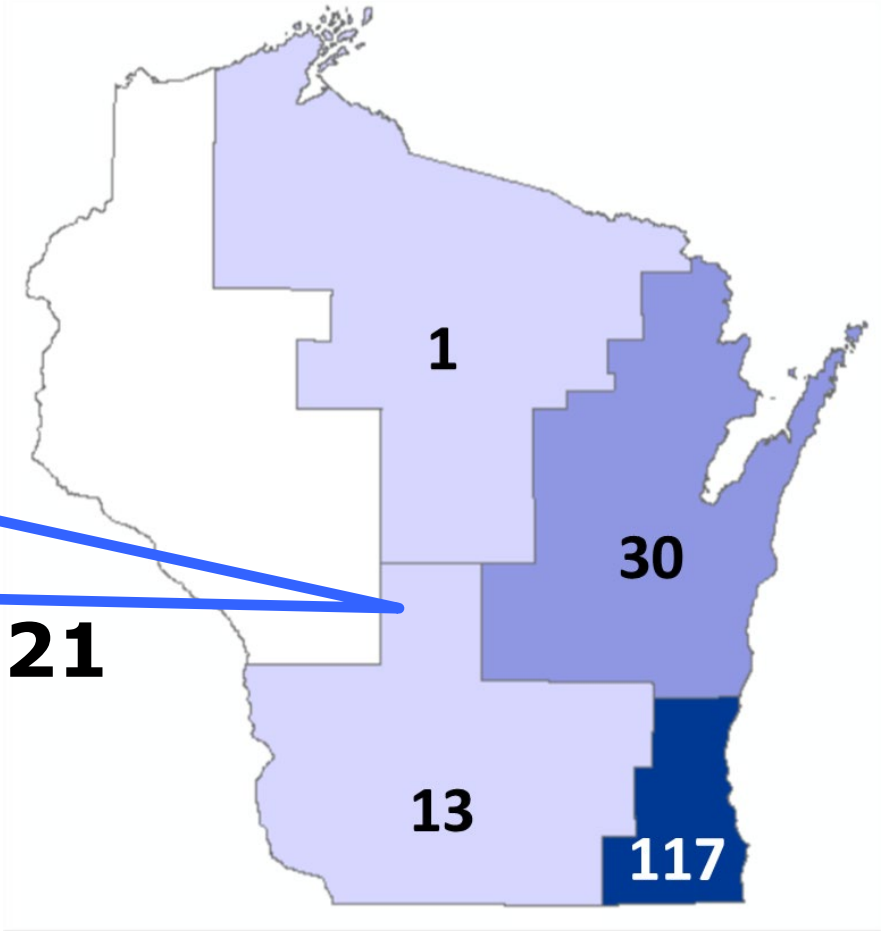




*Cases include both clinical and colonization screening isolates.
Also, the numbers in the table and maps are not de-duplicated across years. Data source: WSLH

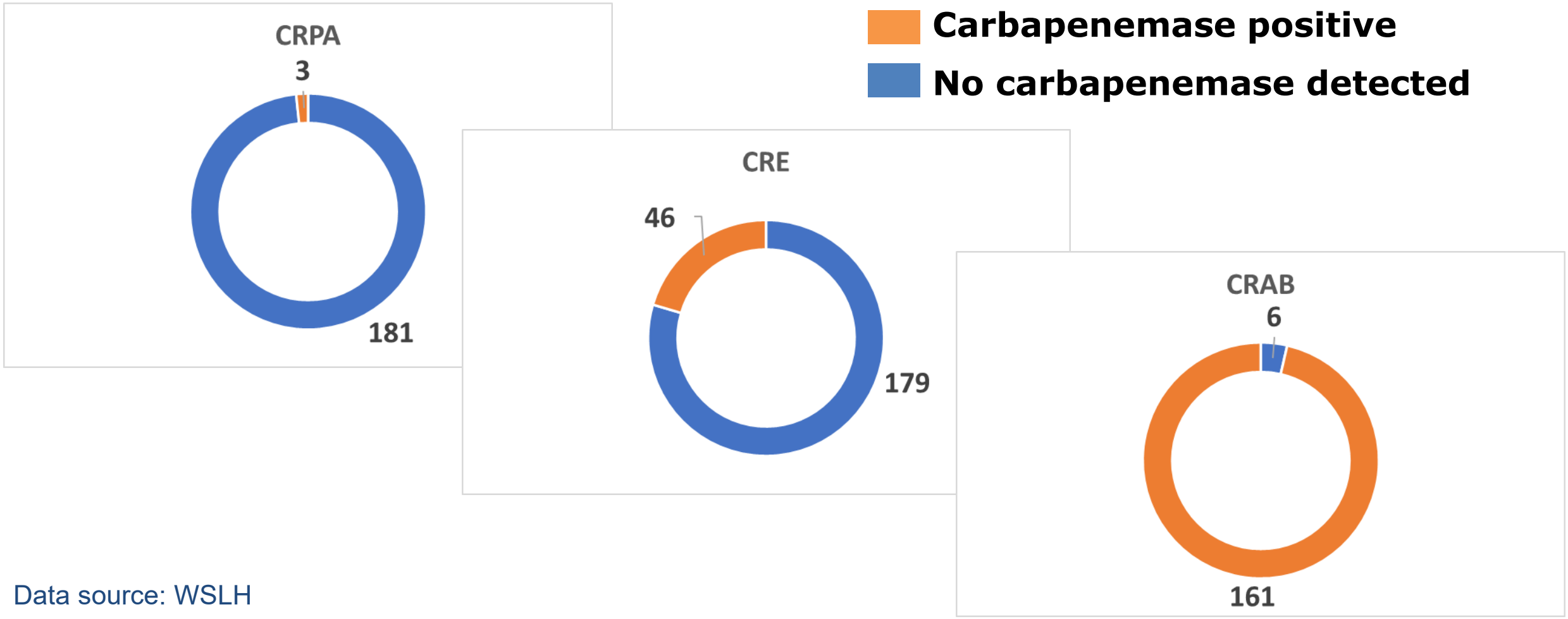
CP-CRAB Cases in Wisconsin, 2021

Of the 134 individuals for which case history information was available, 121 or **90%** were either a **current or former resident of a long-term care facility**.



Data source: WSLH

Proportion of CRPA, CRE and CRAB Cases that were Carbapenemase-Producing, 2021



Data source: WSLH

Impacts of the New Reportables on Health Care Facilities

Summary of Impacts on Health Care Facilities

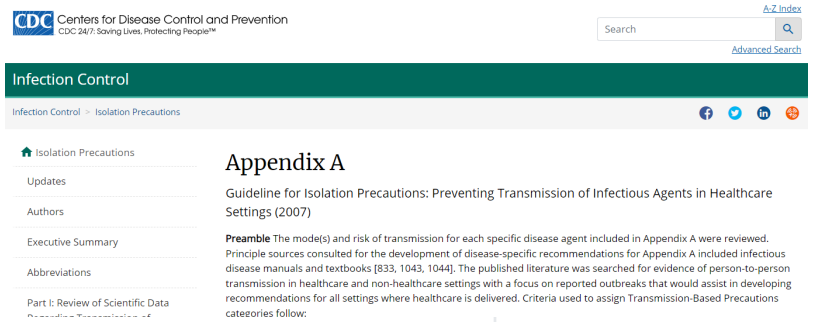
- Not likely to increase reporting burden
  - Confirmatory testing of isolates for carbapenemase production or *C. auris* identification by Wisconsin State Laboratory of Hygiene (WSLH)
  - WSLH reports cases in WEDSS
  - No NHSN reporting requirements for these MDROs
- May increase the number of cases identified
- Will likely increase outbreak response activities, particularly for LTCFs

Targeted MDRO Response in Acute Care Settings

- The response when a patient is identified as infected or colonized with a newly reportable MDRO is the **same as for other MDROs.**
- **Acute care facilities should:**
  - Flag the patient chart per facility's usual procedure for MDROs.
  - Place the patient in appropriate precautions.
  - Assess the risk of transmission within the facility.
  - Consider whether screening of other patients is warranted.
  - Ensure processes are in place to communicate the patient's MDRO status upon transfer or receipt of ancillary services.

Precautions Review

CDC's Guideline for Isolation Precautions "Appendix A" remains a key resource on precautions.



Multidrug-resistant organisms (MDROs), infection or colonization (e.g., MRSA, VRE, VISA/VRSA, ESBLs, resistant *S. pneumoniae*)	Contact + Standard		MDROs judged by the infection control program, based on local, state, regional, or national recommendations, to be of clinical and epidemiologic significance. Contact Precautions recommended in settings with evidence of ongoing transmission, acute care settings with increased risk for transmission or wounds that cannot be contained by dressings. See recommendations for management options in Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006 [870]. Contact state health department for guidance regarding new or emerging MDRO.

www.cdc.gov/infectioncontrol/guidelines/isolation/appendix/index.html

Decolonization

CDC's *Management of MDROs in Healthcare Settings*

- Formal recommendations
  - Only addresses decolonization for methicillin-resistant *S. aureus* (MRSA)
  - Consult with physicians trained in infectious diseases or epidemiology
  - No recommendations for vancomycin-resistant Enterococci (VRE) or multidrug-resistant gram-negative bacilli (MDR-GNB) decolonization
- Prevention of infections section
  - Decolonization regimens "are not sufficiently effective to warrant routine use."
  - Limitations include "recolonization with the same strain, initial colonization with a mupirocin-resistant strain, and emergence of resistance to mupirocin during treatment can occur."

www.cdc.gov/infectioncontrol/guidelines/mdro/recommendations.html
www.cdc.gov/infectioncontrol/guidelines/mdro/prevention-control.html

Point Prevalence Screening (PPS)

- Involves screening patients to assess transmission of the targeted MDRO
- Scope of screening activities will be informed by the risk assessment
- Type of swab will depend on the organism, but often involves a bilateral axilla/groin swab
- Supplies and testing provided by WSLH at no charge
- HAI Prevention Program will advise and assist

PPS Follow-up

- Patients who test positive for a targeted MDRO:
  - Should have the positive noted in their chart for caregivers' ongoing awareness.
  - Will need a review of their precautions and any other transmission risks.
  - Are assumed to be colonized indefinitely and will not need to be tested again.
- Screenings are generally repeated until there are two consecutive rounds of screening with no positive results (deemed contained).
- Follow up colonization screening may be repeated 1-2 months later to detect any further transmission.

Patient Transfers and External Communication

- Importance of clear and timely communication when a patient who is colonized or infected with a targeted MDRO is transferred **cannot be overstated**.
- Communication failures have been identified as a key contributor to the spread of MDROs between facilities in Wisconsin and in other states.
- Communication is essential for ancillary services as well as facility transfers.

Environmental Cleaning

Some targeted MDROs can persist in the environment, making thorough environmental cleaning and disinfection key to controlling their spread.

Health care facilities should:

- Increase the frequency of cleaning when a targeted MDRO is present, focusing on high-touch surfaces.
- Consider designating specific environmental services staff to the affected care unit.
- Clean from least soiled to most soiled and from physically high to physically low areas.

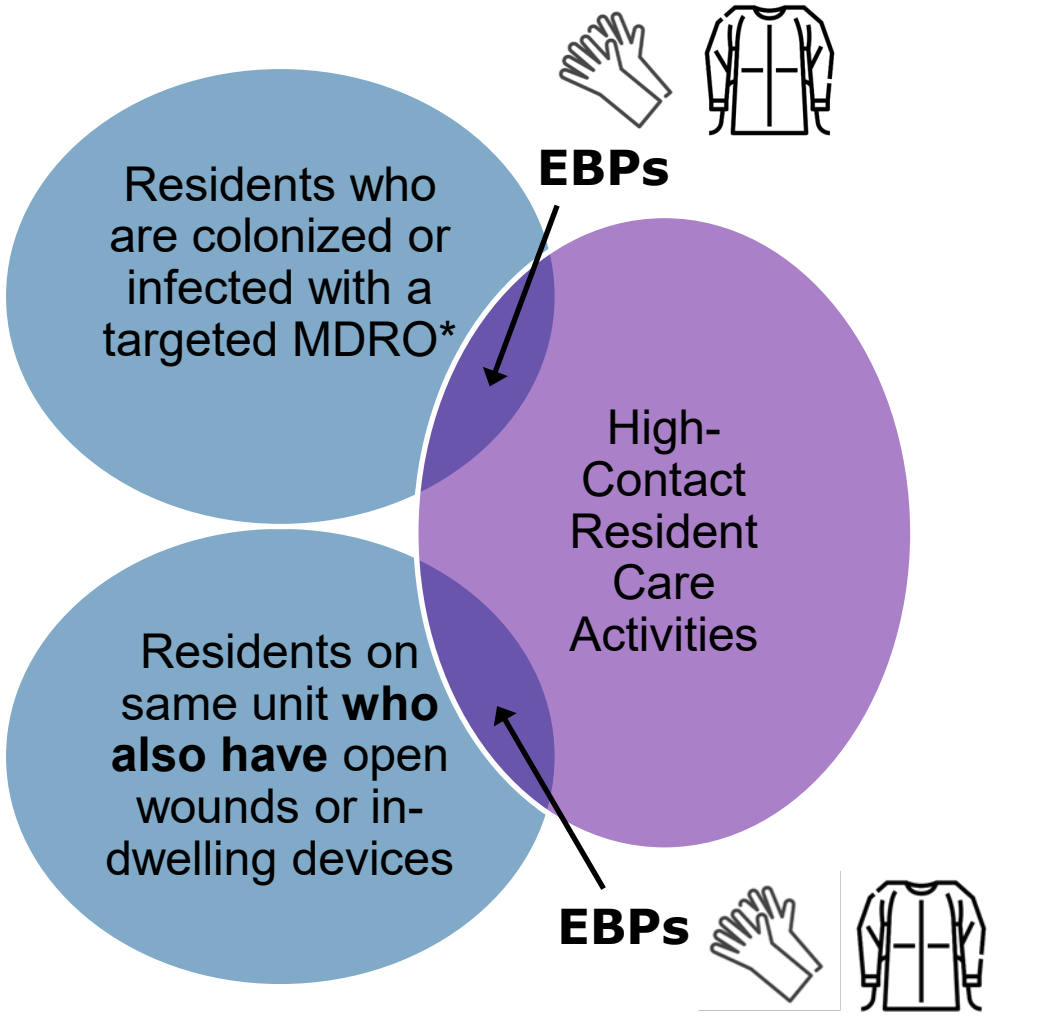
Overview of Response in Other Settings

Key Response Activities when Targeted MDRO is Identified in LTCFs

- Participation in case investigation and risk assessment
- Possible screening of other residents for the organism
- Implementation of appropriate precautions
- Increased environmental cleaning and attention to hand hygiene
- Staff, resident, and visitor education
- Communication with other facilities on resident transfers

Enhanced Barrier Precautions

- Developed by CDC to control targeted MDROs in nursing homes
- Offer a “mid-point” between standard and contact precautions
- Involve gown and glove use by staff during high-contact resident care activities
- Are intended to be implemented for the duration of a resident’s stay in the facility



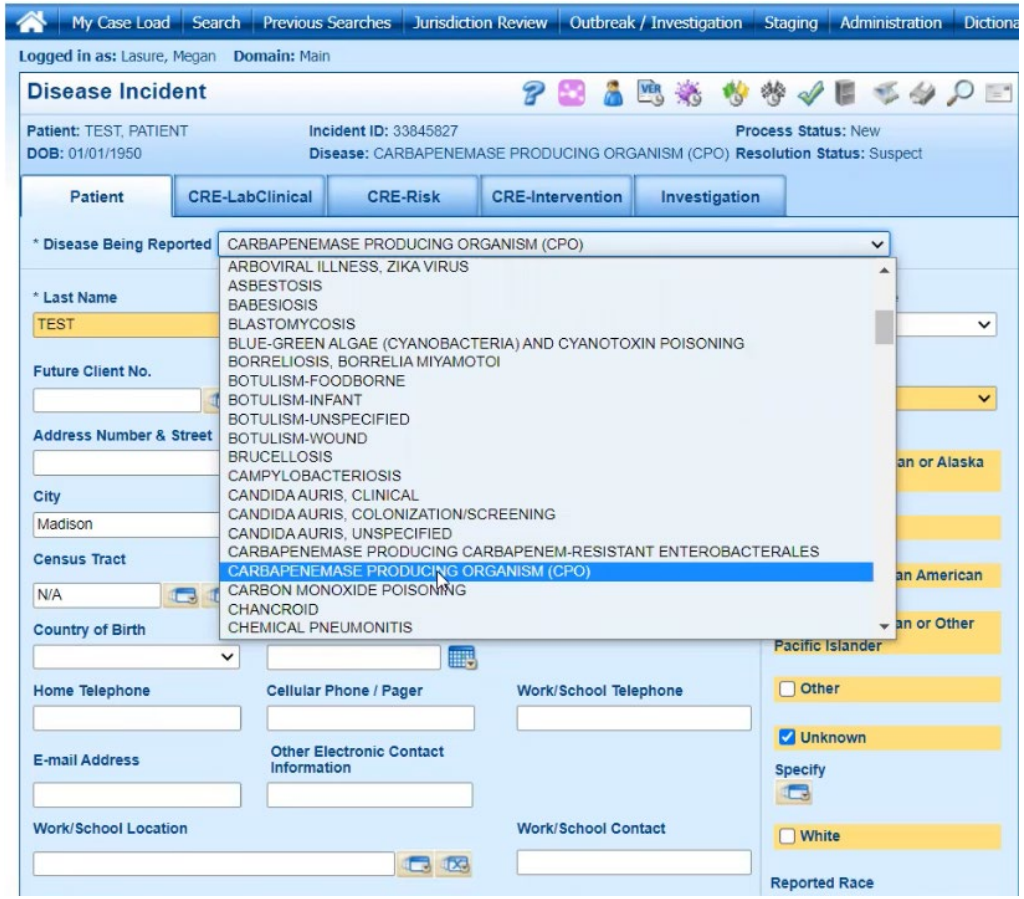
*For whom contact precautions do not apply

Overview of Impacts of New MDRO Reportables on LTHDs

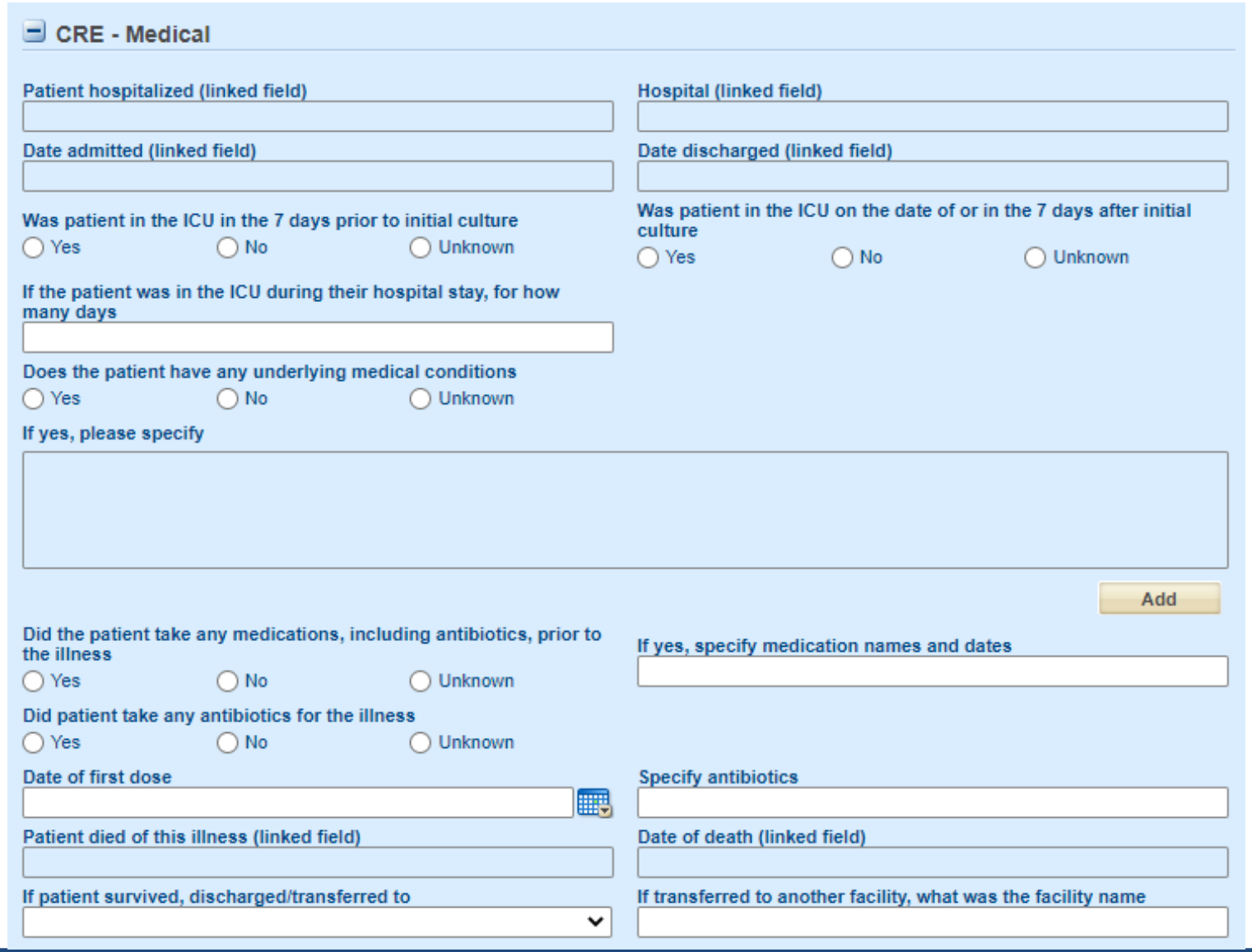
- May see increase in number of cases in WEDSS
- Additional documentation in WEDSS will be needed
- May receive additional requests for assistance from LTCFs on response
- May interact and collaborate more with HAI Prevention Program and regional infection preventionists (IPs) to support facilities

Overview of LTHD Case Investigation

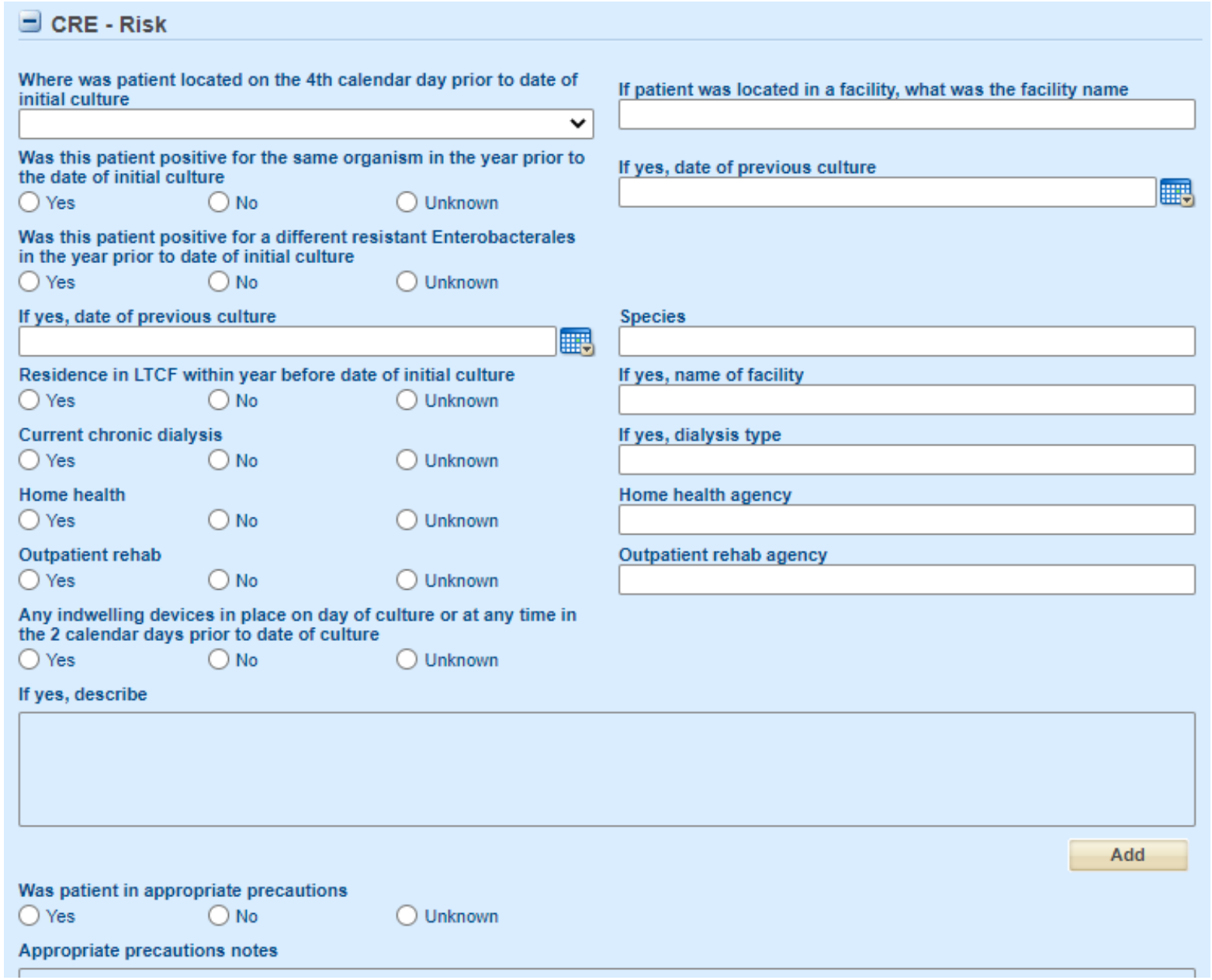
- Two new disease incident types in WEDSS
  - Carbapenemase-producing organism (CPO)
  - *Candida auris*
- Follow-up differs from other conditions
  - Generally not interviewing cases
  - Follow up with facility IPs or health care providers
- May run across more cross-jurisdictional issues
  - Address in WEDSS may not be same as where individual currently resides
  - May follow up with hospital or LTCF in another jurisdiction



LabClinical Tab: Medical



Risk Tab


CRE - Risk
Where was patient located on the 4th calendar day prior to date of initial culture
If patient was located in a facility, what was the facility name
Was this patient positive for the same organism in the year prior to the date of initial culture
Yes
No
Unknown
If yes, date of previous culture
Was this patient positive for a different resistant Enterobacterales in the year prior to date of initial culture
Yes
No
Unknown
If yes, date of previous culture
Species
Residence in LTCF within year before date of initial culture
Yes
No
Unknown
If yes, name of facility
Current chronic dialysis
Yes
No
Unknown
If yes, dialysis type
Home health
Yes
No
Unknown
Home health agency
Outpatient rehab
Yes
No
Unknown
Outpatient rehab agency
Any indwelling devices in place on day of culture or at any time in the 2 calendar days prior to date of culture
Yes
No
Unknown
If yes, describe
Add
Was patient in appropriate precautions
Yes
No
Unknown
Appropriate precautions notes

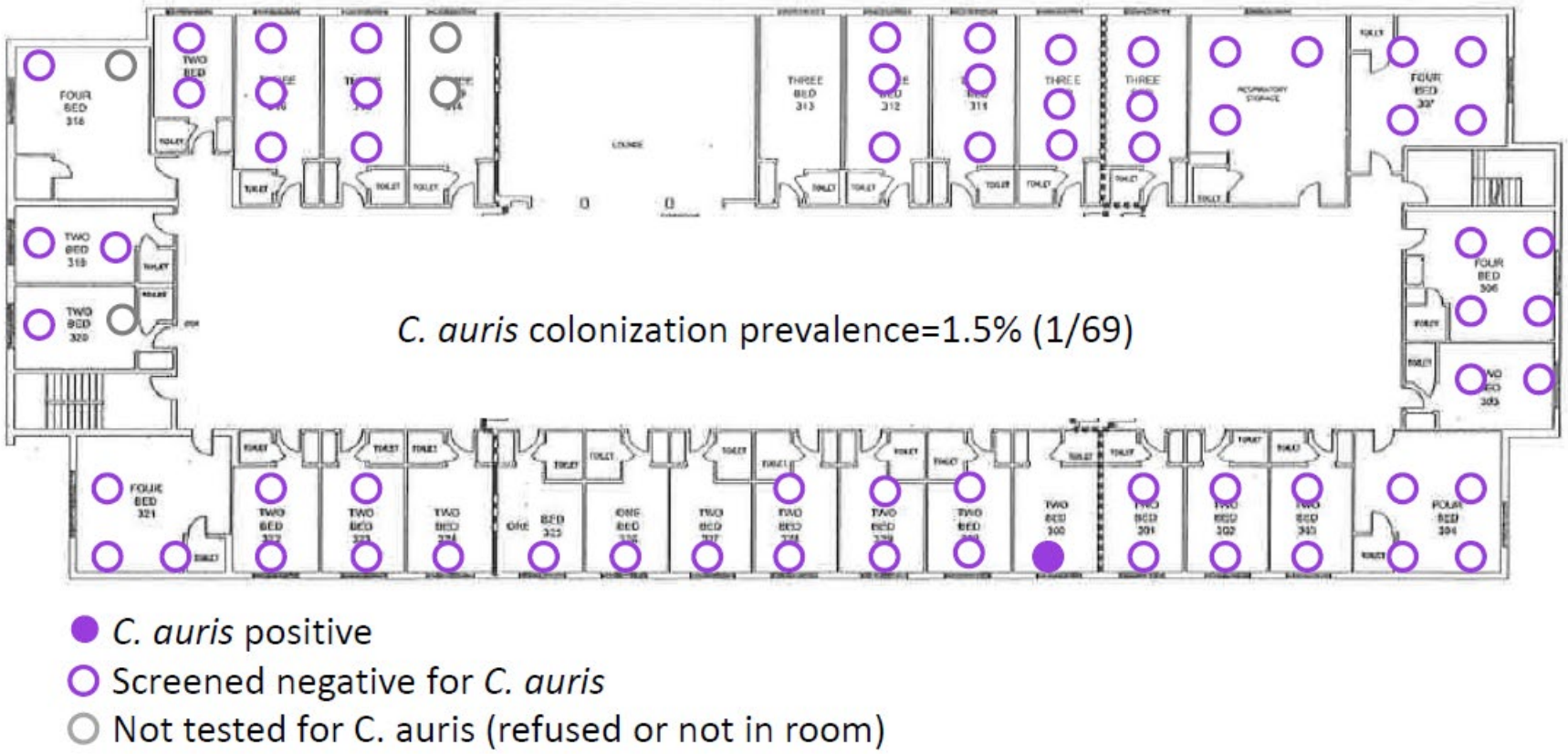
Risk Tab


Patient
CRE-LabClinical
CRE-Risk
CRE-Intervention
Investigation
CRE - Risk
CRE - Hospitalizations Within 1 Year
CRE - Surgeries Within 1 Year
CRE - LTACH Admissions Within 1 Year
CRE - Other Healthcare Services/Procedure Within 1 Year
CRE - Travel History

What's All the Fuss?

Case Example

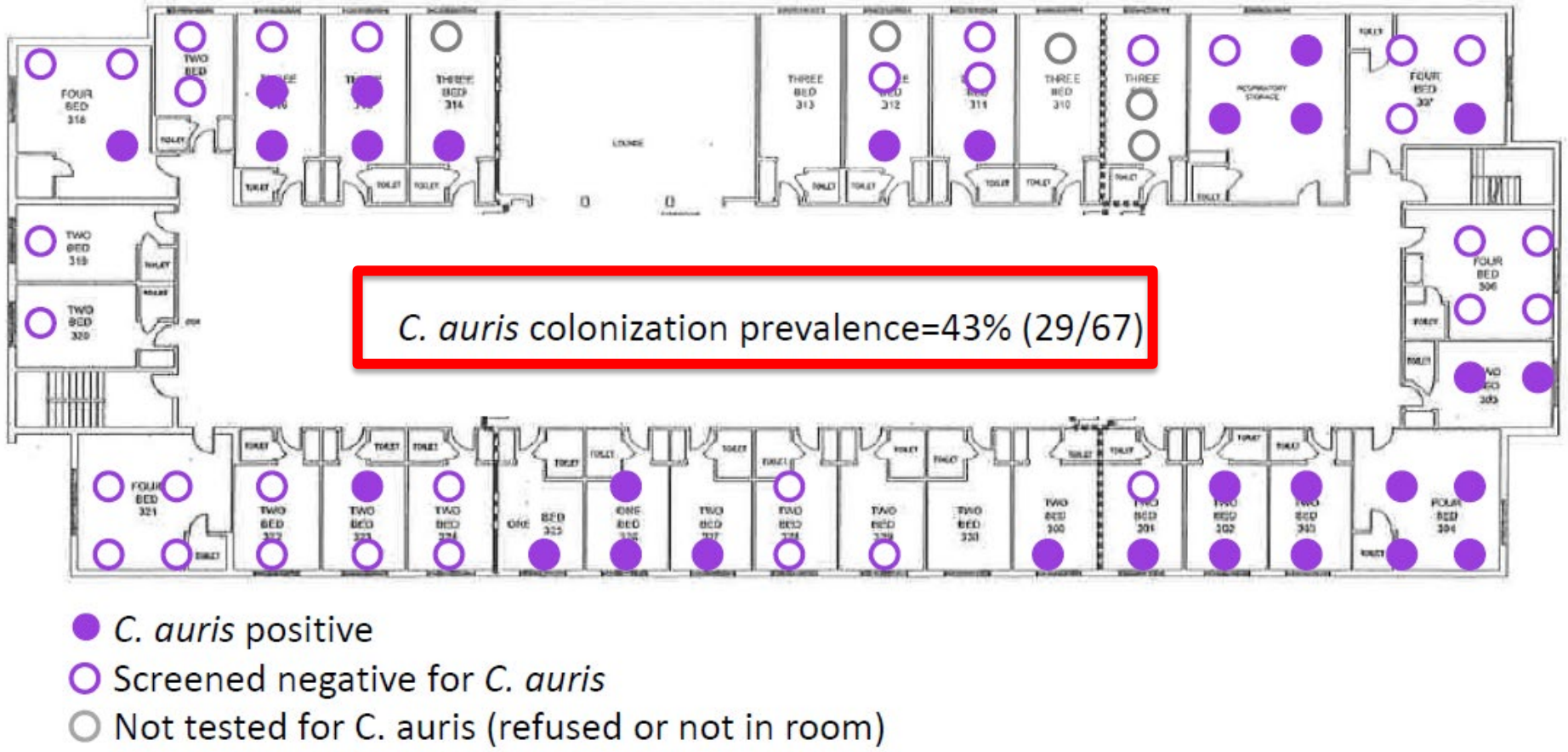
vSNF B 3rd Floor
March 2017 *C. auris* PPS Results



Source: Chicago Department of Health

Case Example

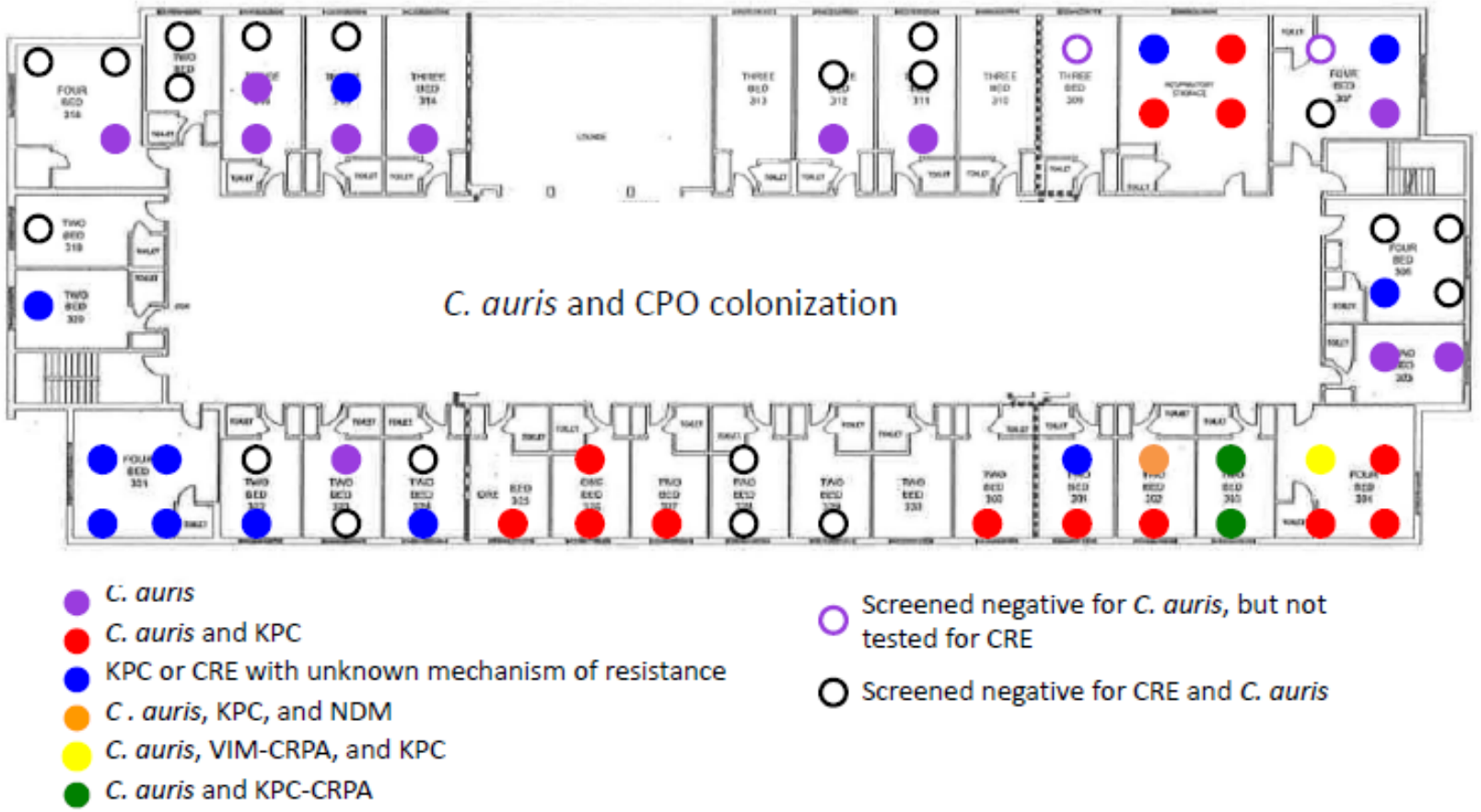
vSNF B 3rd Floor
January 2018 *C. auris* PPS Results



Source: Chicago Department of Health

Case Example

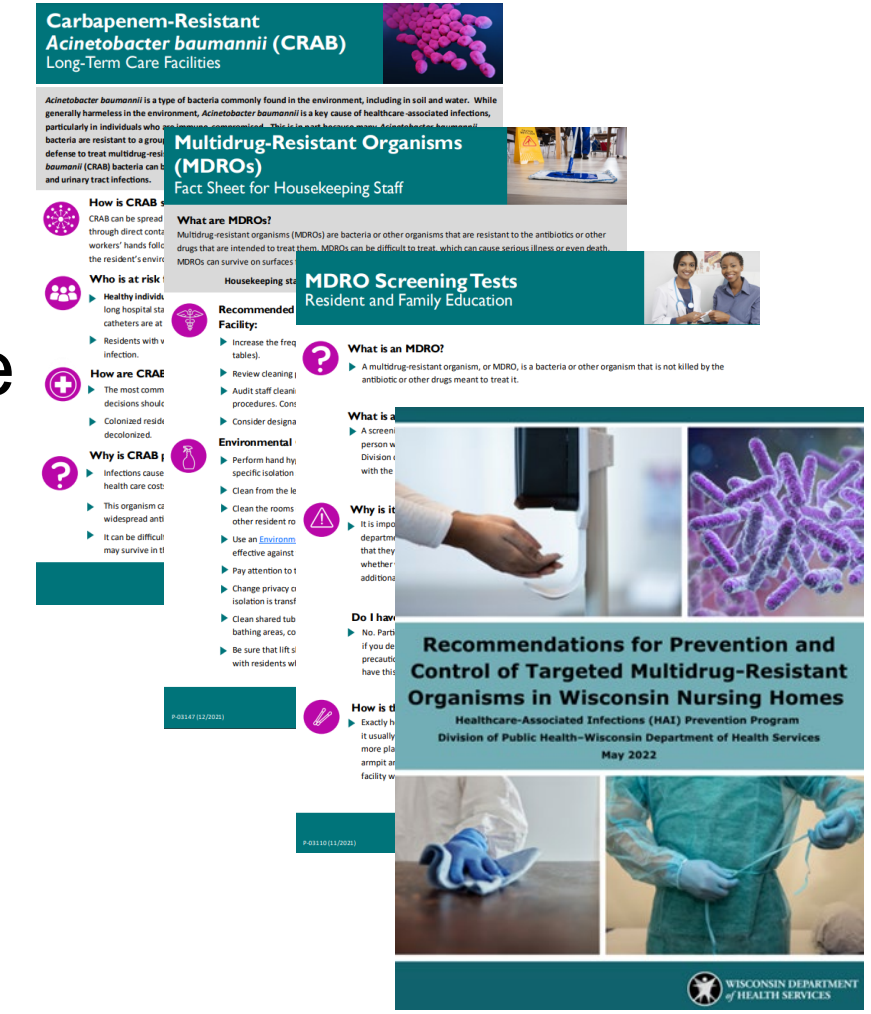
vSNF B 3rd Floor
January 2018 CPO and *C. auris* PPS Results



Source: Chicago Department of Health

New HAI Program Resources

- New MDRO Reportables Webpage: www.dhs.wisconsin.gov/hai/reportable-mdro.htm
- Nursing Home MDRO Response Guide
- MDRO response fact sheets for acute care and LTCF
- Recordings of educational sessions on newly reportable MDROs
- Recorded WEDSS walk-throughs



Key CDC Resources

- Containment Strategy Guidelines: Interim Guidance for a Public Health Response to Contain Novel or Targeted Multidrug-resistant Organisms https://www.cdc.gov/hai/containment/guidelines.html
- Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings (2007): Appendix A www.cdc.gov/infectioncontrol/guidelines/isolation/appendix/index.html
- Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006 www.cdc.gov/infectioncontrol/guidelines/mdro/index
- Implementation of Personal Protective Equipment (PPE) in Nursing Homes to Prevent Spread of Novel or Targeted Multidrug-resistant Organisms (MDROs) https://www.cdc.gov/hai/containment/PPE-nursing-homes.html

Questions?

HAI Prevention Program

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HAI Prevention Program Staff Contacts:

https://www.dhs.wisconsin.gov/hai/contacts.htm

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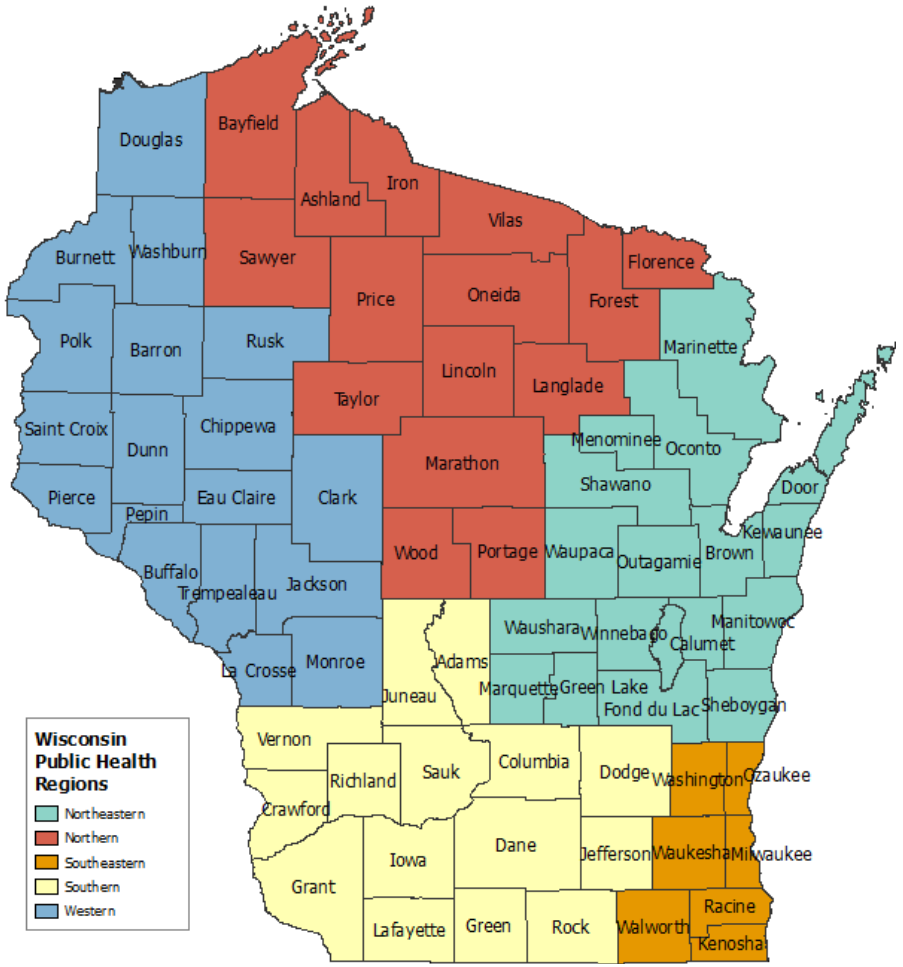

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