

COMMUNICABLE DISEASES EXERCISES AND RESOURCES

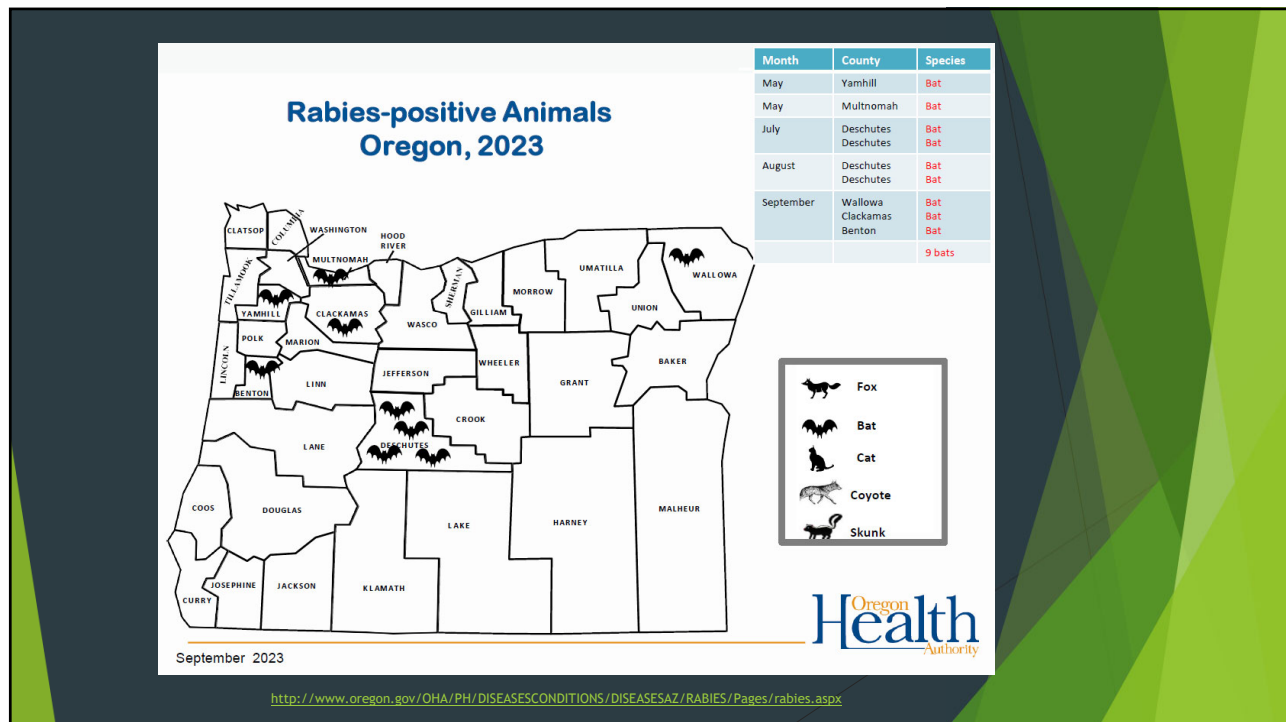
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Rabies Scenarios

Created with a little help from
Dr. Emilio Debess, DVM
& Dr. Steven Rekant, DVM (EIS Officer)

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Rabies Overview

- ▶ If someone is bit by a rabid animal:
 - ▶ Wash the wound immediately with soap, water and flushing
- ▶ Post exposure prophylaxis (PEP) should be initiated as soon as possible. This consists of:
 - ▶ Rabies immune globulin RIG
 - ▶ 4 vaccines given on days 0, 3, 7, 14
- ▶ Know where someone can get rabies PEP in your county


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To PEP or not to PEP?

- ▶ Recommendation for PEP or testing of an animal head varies by....
 - ▶ Type of animal involved
 - ▶ Vaccination status of the animal
 - ▶ The circumstances of the bite
 - ▶ Provoked?
 - ▶ An actual bite or just contact?
 - ▶ Behavior of the animal—was it acting weird or was it just scared

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 Acute and Communicable Disease Prevention



Animal Bites and Rabies Investigative Guidelines

December 2018

1. DISEASE REPORTING

1.1 Purpose of Reporting and Surveillance

1. To assess the risk of rabies in persons bitten or otherwise possibly exposed to recommend rabies post-exposure prophylaxis (RPEP) to those who need it, and to provide counseling and reassurance to those who don't.
2. As necessary to arrange for the capture and either confinement (10-day observation) of a live dog, cat or ferret, or the laboratory examination of an animal head. This may involve coordination with other agencies, e.g., the Humane Society, county sanitarians, animal control and local law enforcement.
3. To identify zoonotic sources of infection.

1.2 Reporting Requirements

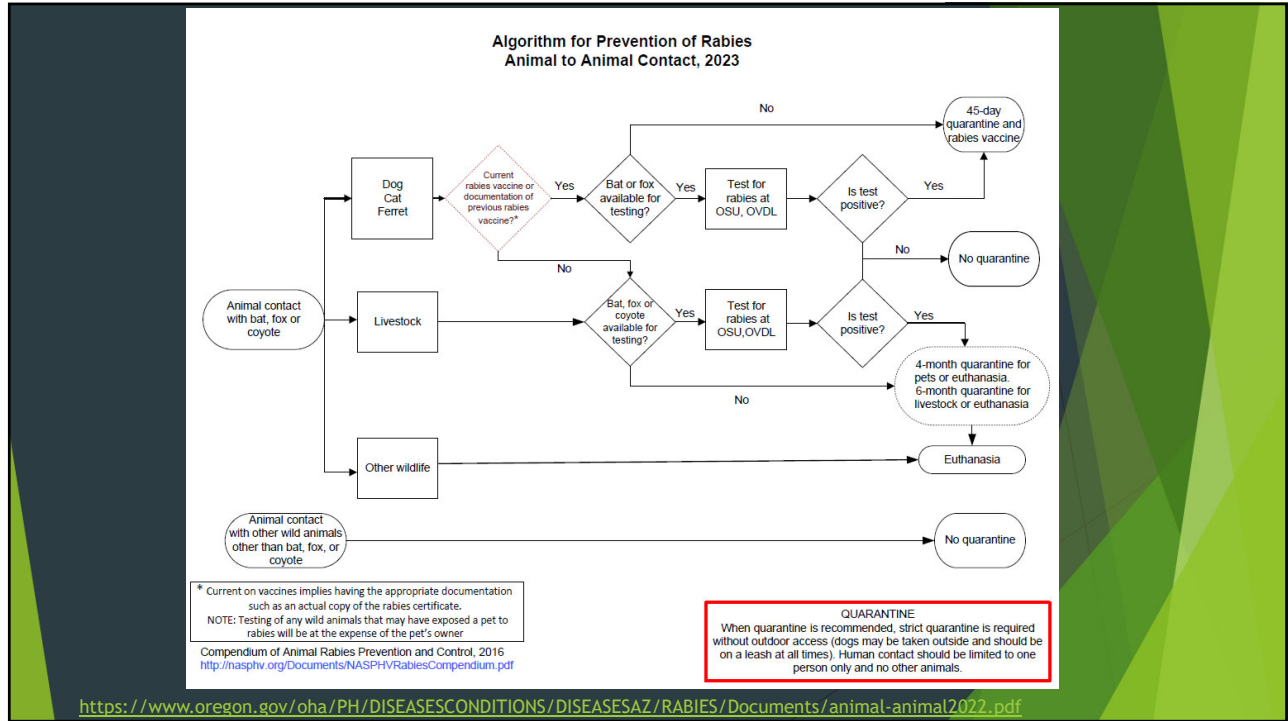
1. Anyone with knowledge of humans being bitten by potentially rabid animals (e.g., physicians, veterinarians, animal control personnel, law-enforcement officials, or animal owners), is required to report such incidents to the Local Health Department (LHD) within one working day.
2. Laboratories: Any confirmed case of rabies in an animal and any suspected or confirmed case of human rabies must be reported immediately (day or night) to the LHD. If the LHD cannot be reached, the Acute and Communicable Disease Prevention (ACDP) Section of Oregon Health Authority (OHA) should be contacted at 971-873-1111.

1.3 Local Health Department Reporting and Follow-Up Responsibilities

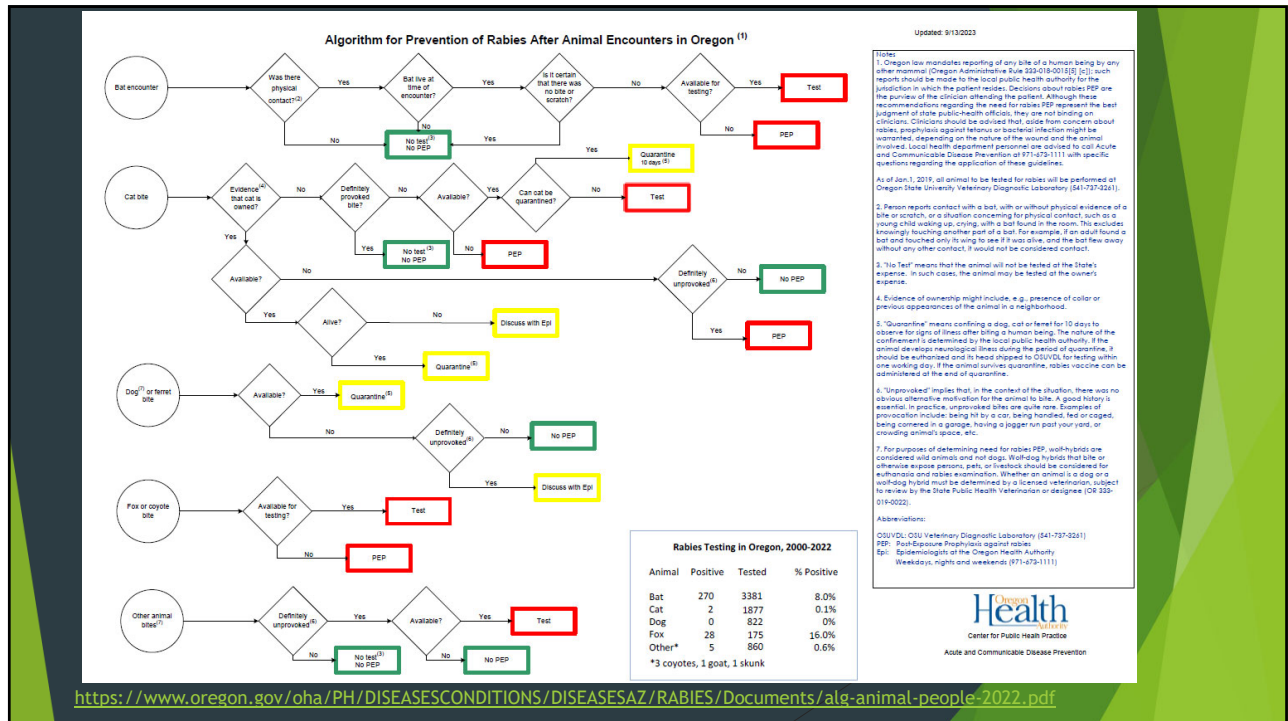
1. Investigate all reports of animal bites, on the day of the report whenever possible.
2. Determine, in consultation with OHA on-call staff as necessary, whether the exposure constitutes a significant risk for rabies, in which either empiric RPEP or testing of the animal is to be recommended. (N.B., a recommendation to test the animal should be made if, and only if, RPEP would be recommended if the animal proves to be rabid.) If testing is to be recommended, solicit approval from OHA staff for testing at OHA expense.
3. Enter into Orpheus any exposure, associated details, and ultimate disposition in which
 - empiric RPEP is recommended; or
 - testing of the animal is recommended.

December 2018

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General Rules of Thumb

- ▶ If it's a bat, fox or coyote - assume it has rabies
- ▶ Cats are sometimes rabid because they hunt bats
- ▶ If a wakeful child is involved - it's a provoked bite
- ▶ Rabies virus is in an infected animal's saliva in the days before they die, which is why we quarantine to see if they die
- ▶ Your state epi is here to help!

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1. A man calls to say that he was jogging close to his house when a dog ran out of its yard and bit him on the ankle. He wants to know what to do. What do you tell him?

- a. Advise him to seek medical attention for wound care.
- b. His health care provider may wish to consider antibiotics and a tetanus booster.
- c. Because he knows where the dog lives, advise him to report the bite to animal control so they can place the dog under a 10-day post-bite quarantine.
- d. The dog is probably vaccinated if it lives in his neighborhood. This is a low risk exposure so treat the wound, tell the jogger to be more careful next time.

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2. A vet clinic calls to say that a cat bit a child. The cat's owner wants to euthanize the cat immediately. What do you tell them?

- a. The 10-day post-bite quarantine is mandatory; exceptions are made if the animal is terminally ill or injured.
- b. In this case, the cat should be quarantined at a site other than the owner's home, such as the vet clinic, a boarding kennel, or an animal shelter.
- c. All quarantine expenses are the owner's responsibility.
- d. At his own expense, the owner can euthanize cat and pay for testing at OSU/VDL.★

This is only possible *if* the person bit is immediate family AND after signing a euthanasia consent form AND with epi approval. Give us a call, we won't bite.

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2. A family is having a BBQ. The parents look over just in time to see their two-year-old girl pick up a dead, desiccated bat on the deck and put it in her mouth. (Yes, this actually happened!) What do you tell them?

- A. Provide RIG and vaccines for the girl, as soon as possible.
- B. Bats rarely carry rabies in Oregon, no PEP.
- C. Rabies virus does not survive in saliva after an animal dies. No PEP recommended.
- D. Children will put anything in their mouths. Don't leave dead bats lying around.

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Emerging Pathogen Threats in Oregon

Carbapenem-Resistant Organisms and *Candida auris*

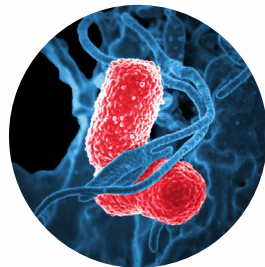
Slides from OHA Healthcare-Associated Infections Program



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Two multidrug-resistant organisms (MDRO) of concern:

**Carbapenem-resistant organisms
(CRO)**



Carbapenem-resistant *Klebsiella pneumoniae*
source: CDC

***Candida auris*
(*C. auris*)**

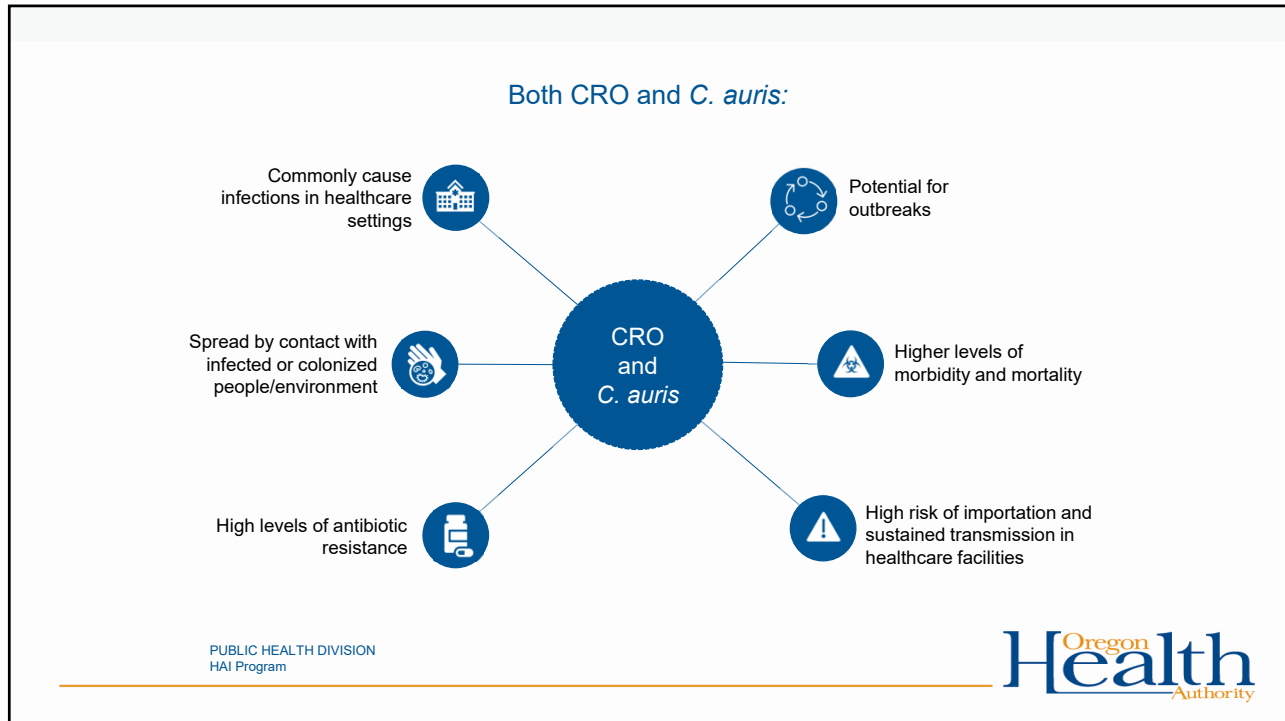


Candida auris
source: CDC

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2022 SPECIAL REPORT
COVID-19
U.S. IMPACT ON ANTIMICROBIAL RESISTANCE

<https://www.cdc.gov/drugresistance/pdf/covid19-impact-report-508.pdf>

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⚠ Available data show an alarming increase in resistant infections starting during hospitalization, growing at least 15% from 2019 to 2020.

- Carbapenem-resistant *Acinetobacter* (+78%)
- Antifungal-resistant *Candida auris* (+60%)*
- Carbapenem-resistant Enterobacterales (+35%)
- Antifungal-resistant *Candida* (+26%)
- ESBL-producing Enterobacterales (+32%)
- Vancomycin-resistant Enterococcus (+14%)
- Multidrug-resistant *P. aeruginosa* (+32%)
- Methicillin-resistant *Staphylococcus aureus* (+13%)

Resistant Pathogen	2017 Threat Estimate	2018 Threat Estimate	2019 Threat Estimate	2017-2019 Change	2020 Threat Estimate and 2019-2020 Change
URGENT Carbapenem-resistant <i>Acinetobacter</i>	8,500 cases 700 deaths	6,300 cases 500 deaths	6,000 cases 500 deaths	Stable*	7,500 cases 700 deaths Overall: 35% increase* Hospital-onset: 78% increase*
Antifungal-resistant <i>Candida auris</i>	171 clinical cases*	329 clinical cases	466 clinical cases	Increase	754 cases Overall: 60% increase
<i>Clostridioides difficile</i>	223,900 infections 12,800 deaths	221,200 infections 12,600 deaths	202,600 infections 11,500 deaths	Decrease	Data delayed due to COVID-19 pandemic
Carbapenem-resistant Enterobacterales	13,100 cases 1,100 deaths	10,300 cases 900 deaths	11,900 cases 1,000 deaths	Decrease*	12,700 cases 1,100 deaths Overall: Stable* Hospital-onset: 35% increase*

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<https://www.cdc.gov/drugresistance/pdf/covid19-impact-report-508.pdf>

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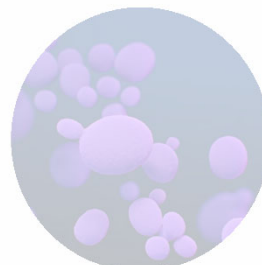
Two multidrug-resistant organisms of concern:

Carbapenem resistant organisms (CRO)



Carbapenem-resistant *Klebsiella pneumoniae*
source: CDC

Candida auris

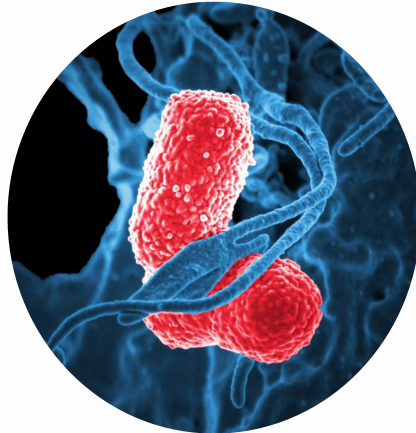


Candida auris
source: CDC



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Carbapenem resistant organisms (CRO)



Carbapenem-resistant *Klebsiella pneumoniae*
source: CDC

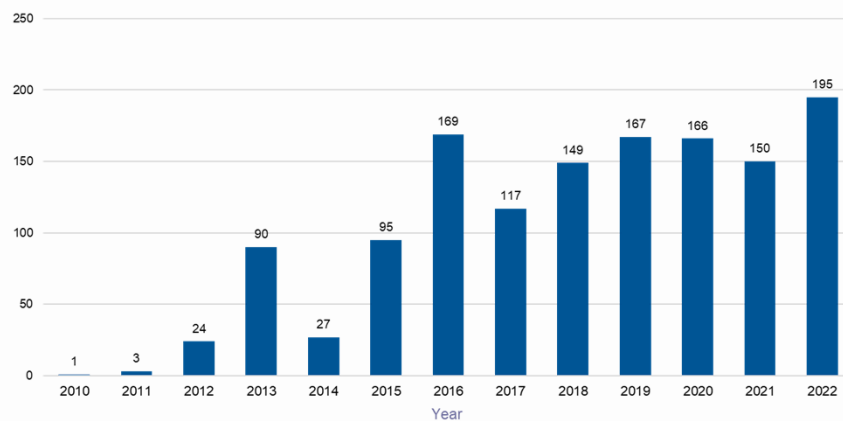
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- Carbapenems
 - Class of broad spectrum β -lactam antibiotics
 - Meropenem, imipenem, ertapenem
- CRO = bacteria that have developed resistance to carbapenem antibiotics
- Often gram-negative bacilli
 - Commonly found in gastrointestinal tract



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Oregon CRO* cases, Nov 2010 - Dec 2022



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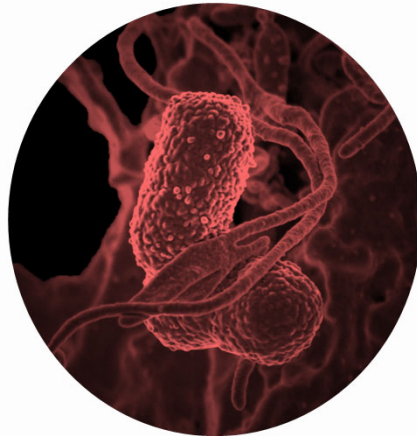


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*data includes only CRO of the Enterobacteriales order

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Not all carbapenem resistant organisms (CRO) are equal



Carbapenem-resistant *Klebsiella pneumoniae*
source: CDC

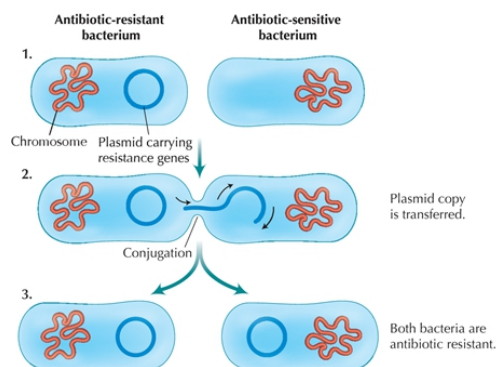
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- There are different mechanisms of carbapenem resistance
- **Some CRO produce carbapenemases**
 - Proteins that degrade carbapenem antibiotics
- These are called **carbapenemase-producing organisms (CPO)**

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Carbapenemase-producing organisms (CPO) can easily spread antibiotic resistance among bacteria

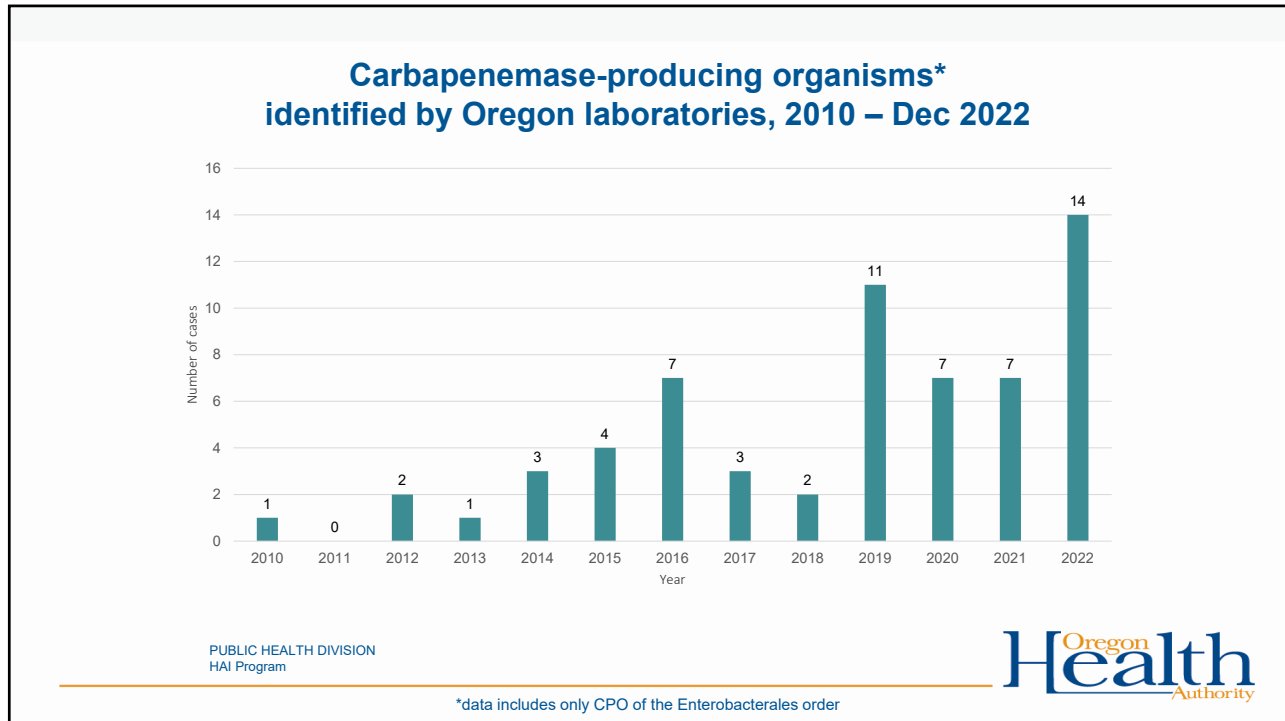


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- 5 main carbapenemases
 - VIM, NDM, OXA-48, KPC, IMP
- Few labs in OR test for these
 - Labs are required to send isolates of reportable CRO to the OR State Public Health Lab (OSPHL)
- OSPHL tests carbapenem resistant isolates received for carbapenemase production

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Public Health Reporting of CROs

Carbapenem-resistant organism (CRO)	Reportable
Bacteria of the Enterobacterales order (CRE)	YES
Pan non-susceptible (panNS) organisms	YES
<i>Acinetobacter</i> species	Upcoming
Carbapenemase producing organisms (CPO)	Upcoming
<i>Pseudomonas aeruginosa</i>	NO, unless CPO or panNS

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Preventing and Responding to CRO: Investigative Guidelines

- Refer to the guidelines to determine how to classify a case
- More aggressive recommendations for CPOs; HAI Program involvement
- Includes an appendix of bacteria included in the Enterobacterales order

https://www.oregon.gov/oha/PH/DISEASES/CONDITIONS/COMMUNICABLEDISEASE/REPORTINGCOMMUNICABLEDISEASE/REPORTINGGUIDELINES/Documents/CRE_Iguide.pdf

PUBLIC HEALTH DIVISION
Acute and Communicable Disease Prevention



Carbapenem-Resistant Enterobacterales Investigative Guidelines

September 2022

1. DISEASE REPORTING

1.1 Purpose of Reporting and Surveillance

1. To prevent transmission of infections with carbapenem-resistant Enterobacterales (CRE) between patients, within or among health care facilities, or between health care facilities and the community.
2. To prevent CRE from becoming endemic in Oregon, necessitating empiric use of even broader-spectrum antibiotics.
3. To identify outbreaks and potential sources or sites of ongoing transmission.
4. To better characterize the epidemiology of these infections.

1.2 Laboratory and Physician Reporting Requirements

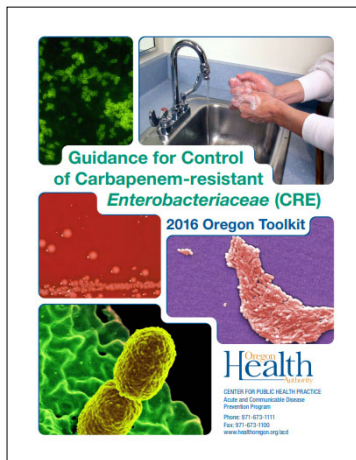
1. Providers and laboratories must report cases to local public health authorities (LPHAs) within one working day.
2. Clinical and reference laboratories must forward isolates from any sterile or non-sterile site (e.g., urine, blood, sputum, endotracheal aspirate, bronchoalveolar lavage, wound) that meet the confirmed CRE case definition below along with the automated test system susceptibility printouts (Vitek or Microscan report) to the Oregon State Public Health Laboratory (OSPHL).
3. Isolates of *Proteus*, *Providencia*, or *Morganella* which show only imipenem non-susceptibility, in the absence of resistance to another carbapenem, do not need to be submitted.

1.3 Local Public Health Authority Reporting and Follow-Up Responsibilities

1. LPHAs will confirm that a case meets the case definition by reviewing the isolate's susceptibility information (antibiogram), consulting with the ACDP on-call epidemiologist as necessary. Both minimum inhibitory concentration (MIC) values and interpretations are needed to verify a case meets the definition. (See Confirmed Case §3.1.)
2. If a case meets the case definition, the LPHA will investigate.
3. Report cases to ACDP within one working day. Use the Orpheus CRE case report. A paper CRE case investigative form is also available [pdf](#).
4. Intervene to prevent the spread of the organism and take action based upon the resistance mechanism of the isolate (See §3.2 and Case Investigation §4.1 below).



Preventing and Responding to CRO: Toolkit



- Toolkit currently being updated
- Until update is available, the current version remains helpful
- Available at: https://www.oregon.gov/oha/PH/DISEASE/CONDITIONS/DISEASESAZ/CRE1/cre_toolkit.pdf

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EXERCISE

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How would you classify this case?
Is this reportable?

Antibiotic	Organism #1		Organism #2	
	<i>Klebsiella pneumoniae</i>		<i>Acinetobacter baumannii</i>	
	Susceptibility	MIC	Susceptibility	MIC
Amp/Sul	Resistant (R)	≥ 32	Susceptible (S)	$< 8/4$
Ceftazidime	R	≥ 64	R	> 16
Ertapenem	Intermediate (I)	1	R	> 1
Ceftriaxone	R	≥ 64	R	> 32
Ciprofloxacin	R	≥ 4	R	> 2
Gentamycin	R	≥ 16	S	< 4
Imipenem	-	-	I	4
Levofloxacin	R	≥ 8	R	> 4
Meropenem	R	4	R	8
Tobramycin	R	≥ 16	S	< 4

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How would you classify this case? Is this reportable?

Antibiotic	Organism #1	
	<i>Klebsiella pneumoniae</i>	
	Susceptibility	MIC
Amp/Sul	Resistant (R)	>=32
Ceftazidime	R	>=64
Ertapenem	Intermediate (I)	1
Ceftriaxone	R	>=64
Ciprofloxacin	R	>=4
Gentamycin	R	>=16
Imipenem	-	-
Levofloxacin	R	>=8
Meropenem	R	4
Tobramycin	R	>=16

Enterobacterales
order resistant to

APPENDIX

Appendix 1 – List of genera in the Enterobacterales order¹

<i>Aceribabans</i>	<i>Enterobacillus</i>	<i>Kosakonia</i>	<i>Phytobacter</i>	<i>Scandinavium</i>
<i>Arsenophonus</i>	<i>Enterobacter</i>	<i>Leclercia</i>	<i>Plesiomonas</i>	<i>Serratia</i>
<i>Biostraticola</i>	<i>Erwinia</i>	<i>Lelliottia</i>	<i>Pluralibacter</i>	<i>Shigella</i>
<i>Brenneria</i>	<i>Escherichia</i>	<i>Leminorella</i>	<i>Pragia</i>	<i>Shimwellia</i>
<i>Buchnera</i>	<i>Ewingella</i>	<i>Limnobaculum</i>	<i>Proteus*</i>	<i>Siccibacter</i>
<i>Budvicia</i>	<i>Franconibacter</i>	<i>Lonsdalea</i>	<i>Providencia*</i>	<i>Sodalis</i>
<i>Buttiauxella</i>	<i>Gibbsiella</i>	<i>Mangrovibacter</i>	<i>Pseudoescherichia</i>	<i>Tatumella</i>
<i>Cedecea</i>	<i>Hafnia</i>	<i>Mixta</i>	<i>Pseudocitrobacter</i>	<i>Trabulsieella</i>
<i>Chania</i>	<i>Insectihabans</i>	<i>Moellerella</i>	<i>Rahnella</i>	<i>Wigglesworthia</i>
<i>Chimaeribacter</i>	<i>Intestinirhabdus</i>	<i>Morganella*</i>	<i>Raoultella</i>	<i>Xenorhabdus</i>
<i>Citrobacter</i>	<i>Izhakiella</i>	<i>Obesumbacterium</i>	<i>Rosenbergiella</i>	<i>Yersinia</i>
<i>Casenzoea</i>	<i>Jinshanibacter</i>	<i>Pantoea</i>	<i>Rouxiiella</i>	<i>Yokenella</i>
<i>Cronobacter</i>	<i>Kalamielli</i>	<i>Pectobacterium</i>	<i>Saccharobacter</i>	
<i>Dickeya</i>	<i>Klebsiella</i>	<i>Phaseolibacter</i>	<i>Salmonella</i>	
<i>Edwardsiella</i>	<i>Kluyvera</i>	<i>Photorhabdus</i>	<i>Samsonia</i>	

¹ Elevated MICs to imipenem in *Morganella* spp., *Proteus* spp., and *Providencia* spp. are frequently due to mechanisms other than carbapenemases. Please do NOT send isolates of these genera to OSPHL unless there is also resistance to other carbapenems.
²The most common CRE genera are highlighted



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How would you classify this case? Is this reportable?

Antibiotic	Organism #2	
	<i>Acinetobacter baumannii</i>	
	Susceptibility	MIC
Amp/Sul	Susceptible (S)	<8/4
Ceftazidime	R	>16
Ertapenem	R	>1
Ceftriaxone	R	>32
Ciprofloxacin	R	>2
Gentamycin	S	<4
Imipenem	I	4
Levofloxacin	R	>4
Meropenem	R	8
Tobramycin	S	<4

Acinetobacter
species resistant

APPENDIX

Appendix 1 – List of genera in the Enterobacterales order¹

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<i>Biostraticola</i>	<i>Erwinia</i>	<i>Lelliottia</i>	<i>Pluralibacter</i>	<i>Shigella</i>
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<i>Buchnera</i>	<i>Ewingella</i>	<i>Limnobaculum</i>	<i>Proteus*</i>	<i>Siccibacter</i>
<i>Budvicia</i>	<i>Franconibacter</i>	<i>Lonsdalea</i>	<i>Providencia*</i>	<i>Sodalis</i>
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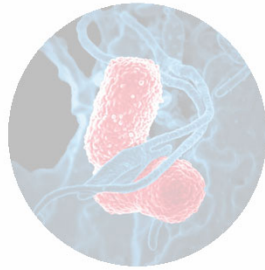


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Two multidrug-resistant organisms of concern:

Carbapenemase-producing organisms (CPO)



Carbapenem-resistant *Klebsiella pneumoniae*
source: CDC

Candida auris



Candida auris
source: CDC

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Candida auris

- Fungus (yeast)
- Some strains resistant to all classes of available antifungals
- Very rare in Oregon
- Can cause serious illness, outbreaks
– contact ACDP immediately
- First case in Oregon, December 2021
– Led to a large multi-facility outbreak investigation

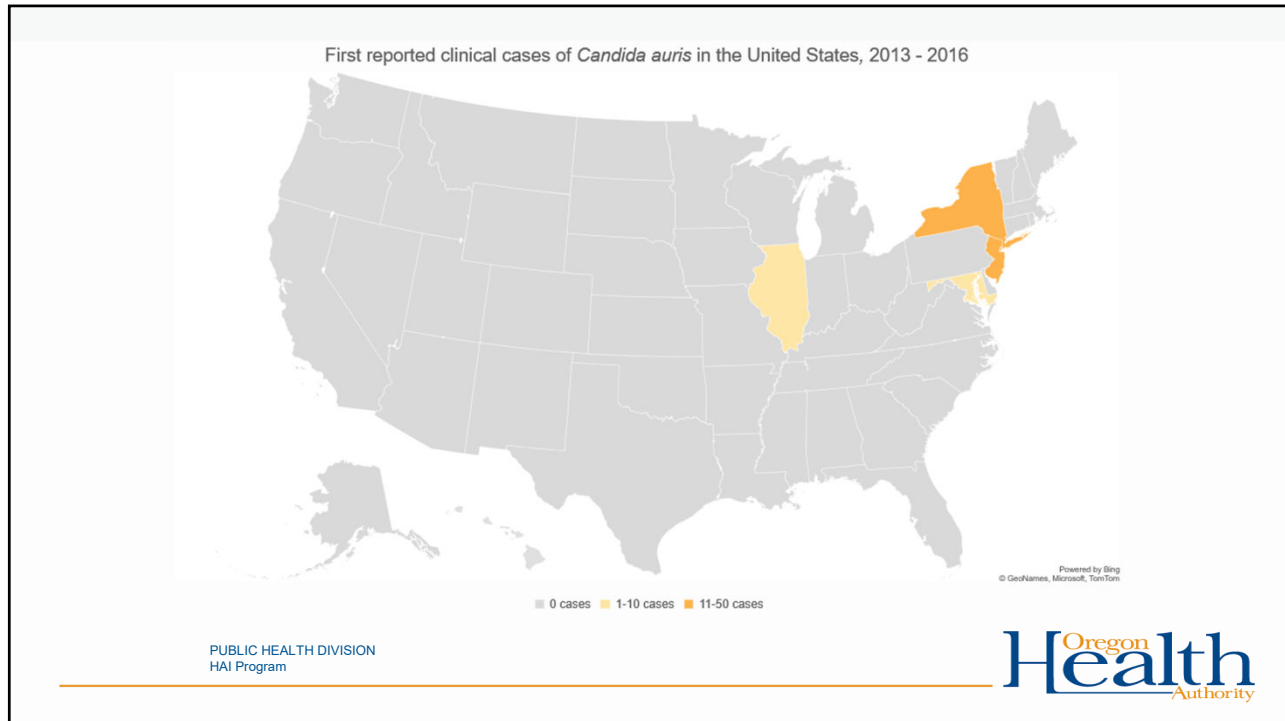


Candida auris
source: CDC

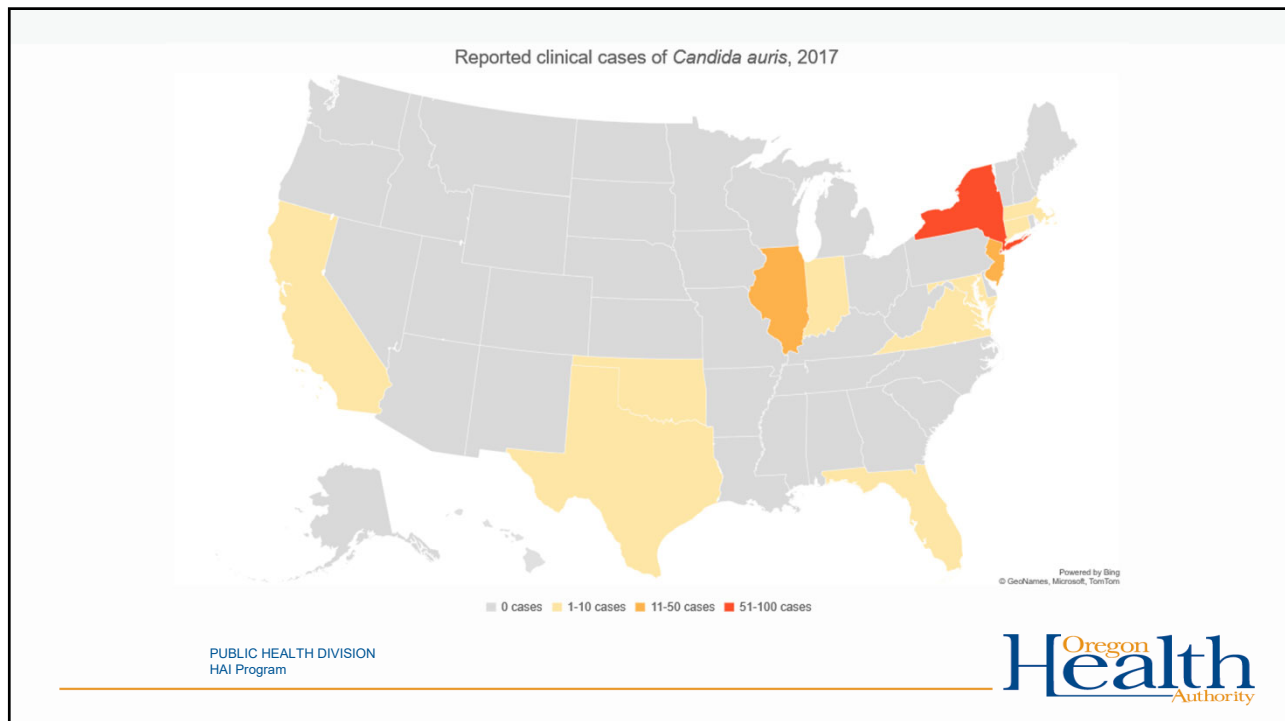
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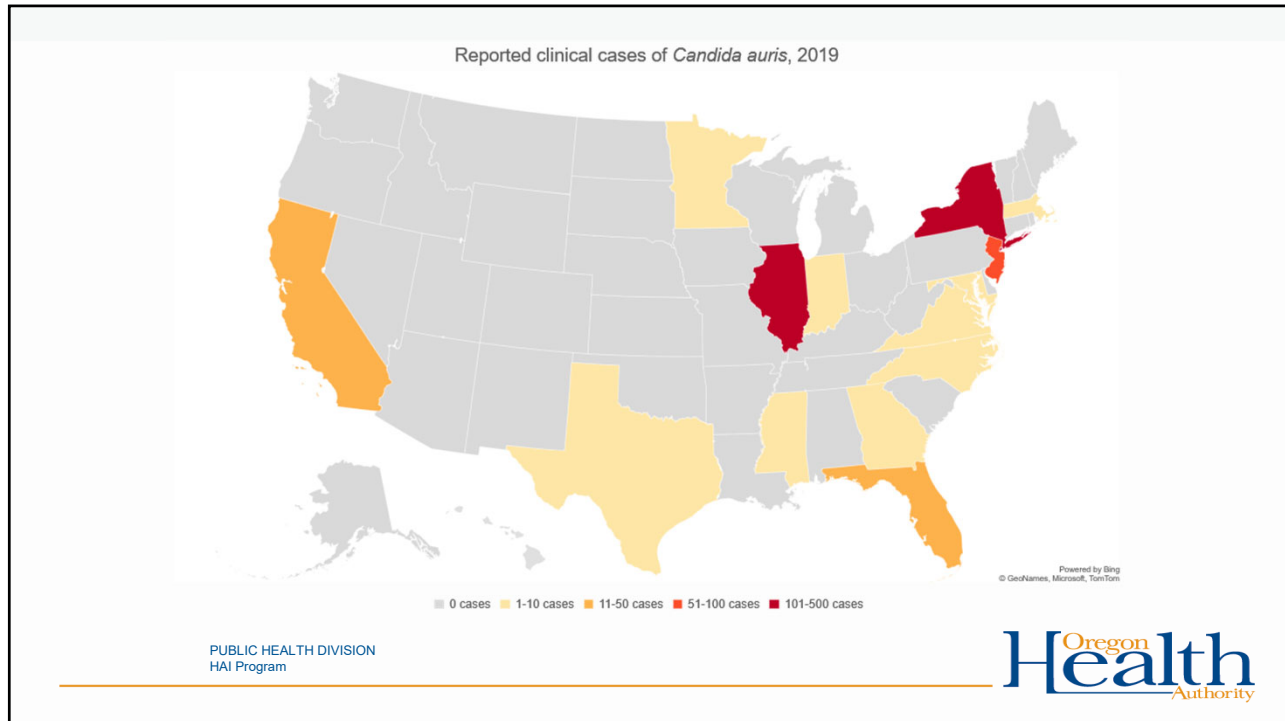
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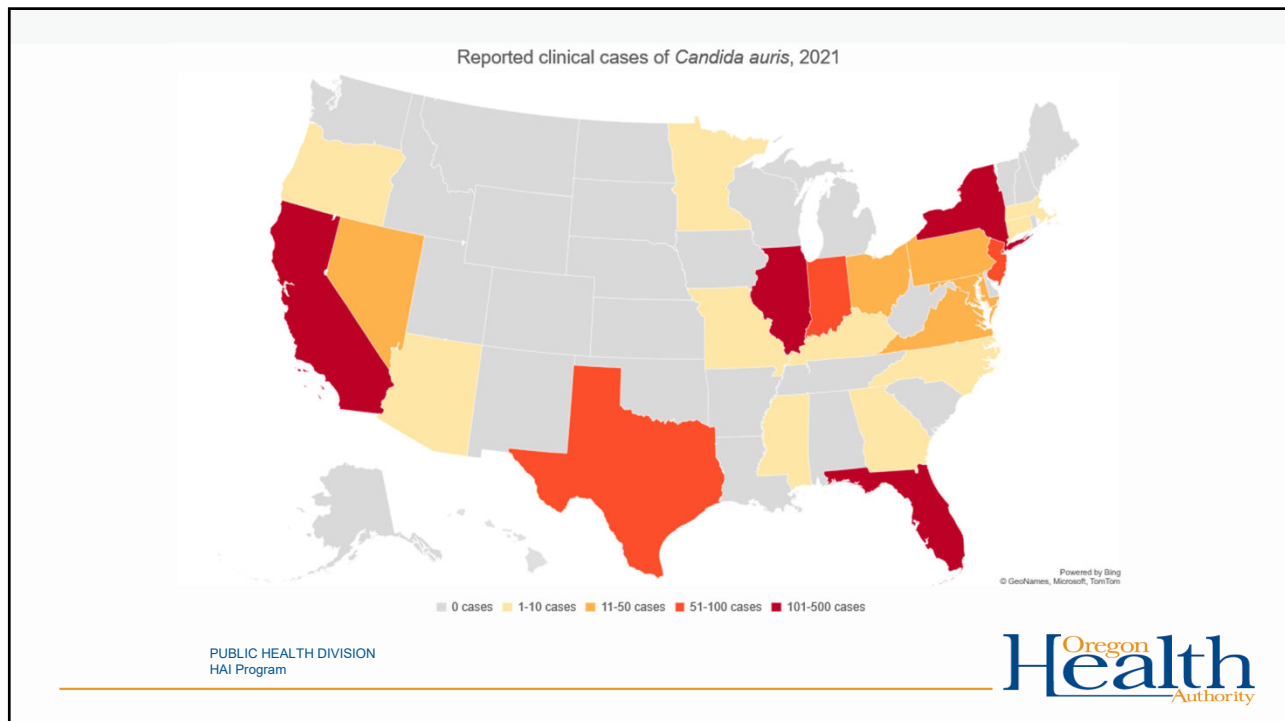
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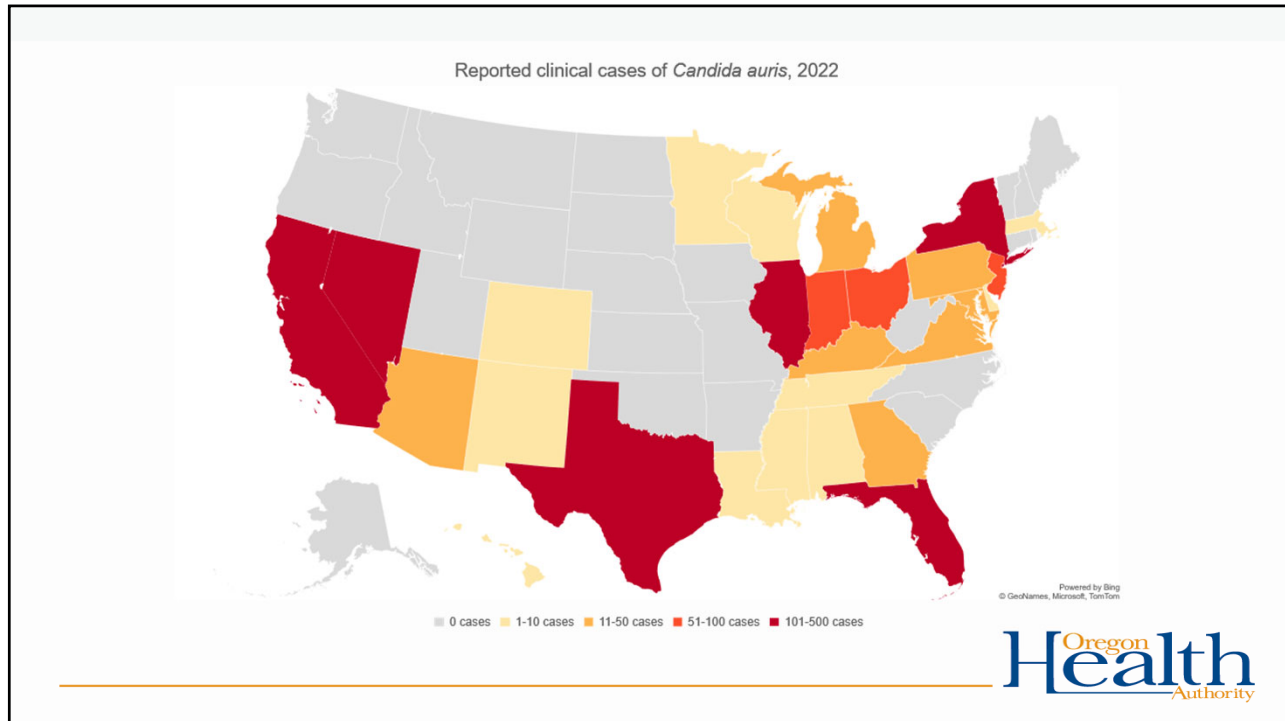
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3 cases of *C. auris* in Oregon made local and national news Dec. 2021

USA Today
Oregon hospital reports outbreak of rare superbug *Candida auris* ...
The risk of infection to otherwise healthy people is "extremely low." Since 2013, about 1,150 clinical cases of *Candida auris* have been...

KTVZ
Oregon reports first 3 cases of drug-resistant 'superbug' ...
Oregon reports first 3 cases of drug-resistant 'superbug' fungus *Candida auris* ...
PORTLAND, Ore. (KTVZ) — The Oregon Health Authority said late...

Gizmodo
Deadly Superbug Yeast Sickens Patients at Oregon Hospital
Dec 29, 2021 — Three people at the hospital have contracted the hardy fungus known as *Candida auris*, which is often resistant to multiple drugs.

FOX 5 New York
Oregon hospital reports rare, fungal outbreak
Health officials said the first-ever *Candida auris* case found in Oregon was detected at the hospital Dec. 11 and confirmed Dec.

Oregon Live
Oregon records 1st cases of rare, serious fungal infection *Candida auris* in 3 Salem patients
Since 2013, more than 1,150 clinical cases of *Candida auris* have been identified in the United States. No cases of the fungus identified in...

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Breaking News: First case of *Candida auris* detected in Washington State at an LTACH conducting routine admission screening

Pierce County man believed to be first in state infected with potentially deadly fungus



By **Deedee Sun, KIRO 7 News**
July 19, 2023 at 12:49 pm PDT



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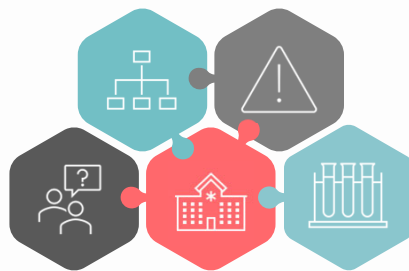
OHA is working to prevent CRO and *C. auris* cases in Oregon

Expanding HAI team

Including an additional dedicated epidemiologist for multidrug-resistant organism surveillance and response

Supporting local public health

By providing targeted training and webinars on CPO and *C. auris* prevention and response



Antibiotic Resistance Information Exchange

ARIE alerts emergency departments and skilled nursing facilities when a patient when an MDRO is admitted, launched in October 2022

New state lab technology

Validating new technology at the Oregon State Public Health Laboratory for improved testing capabilities

Working closely with facilities

Who are most at risk of encountering a CPO and/or *C. auris* case, and who are most at risk of an outbreak

PUBLIC HEALTH DIVISION
HAI Program



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Oregon Public Health Division Resources

- ▶ Resources for Local Public Health Authorities
<https://www.oregon.gov/oha/PH/DiseasesConditions/CommunicableDisease/Pages/For-lhd.aspx>
- ▶ Communicable Disease Trainings and Toolkits
<https://www.oregon.gov/oha/PH/DISEASESCONDITIONS/COMMUNICABLEDISEASE/Pages/CD-Trainings-Toolkits.aspx>
- ▶ Communicable Disease Surveillance Data and Reports
<https://www.oregon.gov/oha/PH/DISEASESCONDITIONS/COMMUNICABLEDISEASE/DISEASESURVEILLANCEDATA/Pages/index.aspx>
- ▶ Subscribe to get the Weekly Flu Bites report: www.healthoregon.org/fludata
- ▶ Subscribe to get the CD Summary Reports: www.healthoregon.org/cdsummary
- ▶ Crisis and Emergency Risk Communication (CERC) Toolkits: www.healthoregon.org/cerc
- ▶ Oregon Public Health Division Youtube Channel: <https://www.youtube.com/user/healthoregon>

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CD101 End of Day 2

**Please fill out your Post-Test
and
Please complete the Course Evaluation**

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Authority**

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