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**CDC Health Advisory**  
**Outbreak of Extensively Drug-resistant**  
***Pseudomonas aeruginosa* Associated with**  
**Artificial Tears**

February 2, 2023

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The Centers for Disease Control and Prevention (CDC) has issued a health advisory regarding a multi-state cluster of an extensively drug-resistant strain of Verona Integron-mediated Metallo- $\beta$ -lactamase (VIM) and Guiana-Extended Spectrum- $\beta$ -Lactamase (GES)-producing carbapenem-resistant *Pseudomonas aeruginosa* (VIM-GES-CRPA).

As of January 31, 2023, 55 case-patients with this rare strain of extensively drug-resistant *P. aeruginosa* have been identified across 12 states including California. Four cases have been identified in LA County to date. Patient outcomes include permanent vision loss resulting from cornea infection, hospitalization, and one death due to systemic infection. Most patients reported using artificial tears. The majority of cases who used artificial tears reported using EzriCare Artificial Tears, a preservative-free, over-the-counter product packaged in multidose bottles.

**The CDC recommends that patients and healthcare providers should immediately discontinue using EzriCare artificial tears pending additional guidance from CDC and the Food and Drug Administration (FDA).**

In LA County, laboratories identifying VIM-CRPA in any specimen collected on or after January 1, 2022, are asked to submit available isolates to the LAC Public Health Laboratories (LAC PHL) for further characterization. In addition, laboratories prospectively identifying CRPA not susceptible to cefepime, ceftazidime, and/or ceftolozane-tazobactam should consider performing or accessing carbapenem resistance mechanism testing for these isolates. Testing at LAC PHL is available if clinical laboratories are unable to perform this testing. Please contact [hai@ph.lacounty.gov](mailto:hai@ph.lacounty.gov) to coordinate isolate submission.

Healthcare providers should contact Public Health immediately if a patient is identified with infections either due to VIM-CRPA or CRPA not susceptible to cefepime, ceftazidime, and/or ceftolozane-tazobactam.

*Los Angeles County DPH Acute Communicable Disease Control:*

- Weekdays 8:30 am–5:00 pm: call 213-240-7941.
- After-hours: call 213-974-1234 and ask for the physician on call.

*Long Beach Health and Human Services:*

- Weekdays 8:00 am-5:00 pm: call 562-570-4302.
- After hours: call the duty officer at 562-500-5537.

*Pasadena Public Health Department:*

- Weekdays 8:00 am-5:00 pm: call 626-744-6089.
- After hours: call 626-744-6043.

**Read the CDC communication below or [online](#).**

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To view this and other communications or to sign-up to receive LAHANs, please visit [ph.lacounty.gov/lahan](http://ph.lacounty.gov/lahan).

**This is an official**  
**CDC HEALTH ADVISORY**

Distributed via the CDC Health Alert Network  
February 1, 2023, 7:00 PM ET  
CDCHAN-00485

**Outbreak of Extensively Drug-resistant  
*Pseudomonas aeruginosa* Associated with Artificial Tears**

**Summary**

The Centers for Disease Control and Prevention (CDC) is issuing this Health Alert Network (HAN) Health Advisory about infections with an extensively drug-resistant strain of Verona Integron-mediated Metallo- $\beta$ -lactamase (VIM) and Guiana-Extended Spectrum- $\beta$ -Lactamase (GES)-producing carbapenem-resistant *Pseudomonas aeruginosa* (VIM-GES-CRPA) in 12 states. Most patients reported using artificial tears. Patients reported more than 10 different brands of artificial tears, and some patients used multiple brands. The majority of patients who used artificial tears reported using EzriCare Artificial Tears, a preservative-free, over-the-counter product packaged in multidose bottles. CDC laboratory testing identified the presence of the outbreak strain in opened EzriCare bottles with different lot numbers collected from two states. Patients and healthcare providers should immediately discontinue using EzriCare artificial tears pending additional guidance from CDC and the Food and Drug Administration (FDA).

**Background**

As of January 31, 2023, CDC in partnership with state and local health departments identified 55 case-patients in 12 states (CA, CO, CT, FL, NJ, NM, NY, NV, TX, UT, WA, WI) with VIM-GES-CRPA, a rare strain of extensively drug-resistant *P. aeruginosa*. Thirty-five patients are linked to four healthcare facility clusters. Dates of specimen collection were from May 2022 to January 2023. Isolates have been identified from clinical cultures of sputum or bronchial wash (13), cornea (11), urine (7), other nonsterile sources (4), blood (2), and from rectal swabs (25) collected for surveillance; some patients had specimens collected from more than one anatomic site. These specimens were collected in both outpatient and inpatient healthcare settings. Patients had a variety of presentations including keratitis, endophthalmitis, respiratory infection, urinary tract infection, and sepsis. Patient outcomes include permanent vision loss resulting from cornea infection, hospitalization, and one death due to systemic infection.

Isolates in this outbreak are sequence type (ST) 1203, harbor *bla*<sub>VIM-80</sub> and *bla*<sub>GES-9</sub> (a combination not previously observed in the United States) and are closely related based on analysis of whole genome sequencing (WGS) data. These isolates are not susceptible to cefepime, ceftazidime, piperacillin-tazobactam, aztreonam, carbapenems, ceftazidime-avibactam, ceftolozane-tazobactam, fluoroquinolones, polymyxins, amikacin, gentamicin, and tobramycin; the subset of isolates that underwent antimicrobial susceptibility testing for cefiderocol were susceptible to this agent.

Review of common exposures revealed that most patients, including most patients with eye infections, used artificial tears prior to identification of VIM-GES-CRPA infection or colonization. Patients reported more than 10 brands of artificial tears, and some patients used multiple brands. The majority of patients who used artificial tears reported using EzriCare Artificial Tears, a preservative-free product dispensed in multidose bottles. This was the only common artificial tears product identified across the four healthcare facility clusters. CDC laboratory testing identified the presence of VIM-GES-CRPA in opened EzriCare Artificial Tears bottles from multiple lots; these bottles were collected from patients with and without eye infections in two states. These product-related VIM-GES-CRPA match the outbreak strain. VIM-GES-CRPA recovered from opened bottles could represent either bacterial contamination during use or during

the manufacturing process. Testing of unopened bottles of EzriCare Artificial Tears is ongoing to assist in evaluating for whether contamination may have occurred during manufacturing.

### Recommendations for Healthcare Providers

- Immediately discontinue using EzriCare Artificial Tears pending additional guidance from CDC and FDA.
- Advise patients who used EzriCare Artificial Tears to monitor for signs and symptoms of infection. Perform culture and antimicrobial susceptibility testing when clinically indicated.
- Healthcare providers treating patients for keratitis or endophthalmitis should ask patients if they have used EzriCare Artificial Tears. Providers should consider performing culture and antimicrobial susceptibility testing to help guide therapy if patients report use of this product.
- Healthcare providers treating VIM-GES-CRPA infections should consult with a specialist knowledgeable in the treatment of antibiotic-resistant bacteria to determine the best treatment option. VIM-GES-CRPA isolates associated with this outbreak are extensively drug-resistant. Isolates that underwent susceptibility testing at public health laboratories were not susceptible to cefepime, ceftazidime, piperacillin-tazobactam, aztreonam, carbapenems, ceftazidime-avibactam, ceftolozane-tazobactam, fluoroquinolones, polymyxins, amikacin, gentamicin, and tobramycin. A subset of 3 isolates that underwent antimicrobial susceptibility testing for cefiderocol at clinical laboratories or CDC were susceptible to this agent.
- Place patients infected or colonized with VIM-GES-CRPA and admitted to acute care settings in isolation and use [Contact Precautions](#). For residents of skilled nursing facilities who are infected or colonized with VIM-GES-CRPA, use [Enhanced Barrier Precautions](#) if the resident does not have an indication for Contact Precautions.
- At this time, CDC does not recommend testing patients who have used this product and who are not experiencing any signs or symptoms of infection.

### Recommendations for Clinical Laboratories

- Clinical laboratories that identify *P. aeruginosa* resistant to imipenem or meropenem are encouraged to perform carbapenem resistance mechanism testing; isolates may also be submitted to the Antimicrobial Resistance Laboratory Network for mechanism testing.
  - Laboratories wishing to apply a more specific definition when identifying isolates that might be related to this cluster for mechanism testing could limit testing to carbapenem-resistant *P. aeruginosa* that are also resistant to cefepime, ceftazidime, and (if tested) ceftazidime-avibactam and ceftolozane-tazobactam.
- Clinical laboratories that identify any carbapenem-resistant *P. aeruginosa* from an ocular specimen or VIM-CRPA from any specimen source should submit the isolate to the [Antimicrobial Resistance Laboratory Network](#) for further characterization. Please reach out to your health department's [healthcare-associated infections contact](#) or email [haioutbreak@cdc.gov](mailto:haioutbreak@cdc.gov) for assistance submitting isolates.

### Recommendations for the Public

- Discontinue using EzriCare Artificial Tears pending additional guidance from CDC and FDA.
- If patients were advised to use EzriCare Artificial Tears by their healthcare provider, they should follow up with their healthcare provider for an alternative artificial tears product to use.
- Patients who used EzriCare Artificial Tears and who have signs or symptoms of an eye infection, such as discharge from the eye, eye pain or discomfort, redness of the eye or eyelid, feeling of something in the eye, increased sensitivity to light, or blurry vision, should seek timely medical care. At this time, CDC does not recommend testing of patients who have used this product and who are not experiencing any signs or symptoms of infection.

### For More Information

- [CRPA Outbreak Linked to Artificial Tears](#)
- [Antimicrobial Resistance Laboratory Network](#)
- Visit [CDC-INFO](#) or call CDC-INFO at 1-800-232-4636
- CDC 24/7 Emergency Operations Center (EOC) 770-488-7100

*The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.*

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**Categories of Health Alert Network messages**

**Health Alert** Requires immediate action or attention. Conveys the highest level of importance about a public health event.

**Health Advisory** Requires immediate action. Provides important information about a public health event.

**Health Update** May require immediate action. Provides updated information about a public health event.

**HAN Info Service** Does not require immediate action. Provides general information about a public health event.

##This message was distributed to state and local health officers, state and local epidemiologists, state and local laboratory directors, public information officers, HAN coordinators, and clinician organizations##