

## In This Issue

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## Don't Forget!

- **Fungal Disease Awareness Week:**  
Sept 23-27  
Focusing on Valley Fever, Histoplasmosis, Blastomycosis

### Just a reminder:

C. auris Lunch & Learn:  
<https://www.train.org/pa/course/1086465/>

### HAN:

[https://www.health.pa.gov/topics/Documents/HAN/2017-PAHAN-387-08-11-ADV\\_C%20auris\\_sk.pdf](https://www.health.pa.gov/topics/Documents/HAN/2017-PAHAN-387-08-11-ADV_C%20auris_sk.pdf)

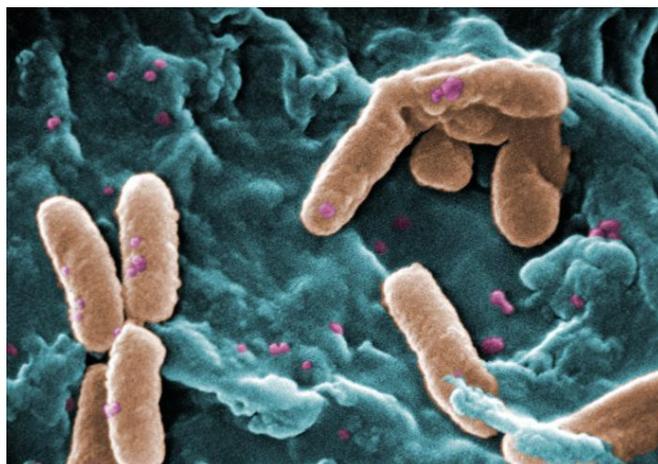
### Azole Resistant Aspergillus:

<https://www.cdc.gov/mmwr/volumes/67/wr/mm6738a5.htm>

## Carbapenem Resistant *Pseudomonas aeruginosa*

By: Jane M. Gould, MD, FAAP & Julie Paoline, MA, CPHA, CIC

*Pseudomonas aeruginosa* is a water-loving, non-fermentative, gram-negative bacilli found widely in nature. The bacteria are responsible for serious infections in vulnerable patient populations, such as pulmonary exacerbations in cystic fibrosis patients, wound infections in burn patients, catheter-associated infections in congenital urogenital and immunocompromised patients and patients with ventilator-associated pneumonia.



A scanning electron microscopic (SEM) image of several rod-shaped, Gram-negative, *Pseudomonas aeruginosa* bacteria. **Source:** CDC Photo Library

*Pseudomonas* infections are often difficult to eradicate due to virulence factors that the organism produces and the ability to produce biofilms with a polysaccharide matrix resulting in high adhesion ability on surfaces, avoidance of innate immune clearance mechanisms and resistance to antimicrobials from the lower metabolic rate of sessile biofilm organisms (Gellatly, 2013).

Outbreaks of *Pseudomonas* are often linked with a water source in health care facilities due to its ability to exist in a biofilm formation within showerheads, water tanks, faucets, aerators, water fountains, and ice machines. Biofilm mode of growth has been shown to require up to 1,000 times the concentration of an antimicrobial to be effective compared to a planktonic (non-biofilm form) bacteria. Subminimal inhibitory concentration (sub-MIC) levels of antimicrobials can also stimulate biofilm production. *Pseudomonas aeruginosa* is intrinsically resistant to

• **International Infection Prevention Week:** October 13-19

• **Global Handwashing Day:** October 15

• **Lunch and Learn: PA DOH Quarterly Webinar for Hospital Infection Preventionists**  
October 22 at 12:00pm

• **Antibiotic Awareness Week:**  
Nov 18-24

## News You Can Use

- ✓ Effective January 1, 2020, new antimicrobial stewardship requirements will be applicable to Joint Commission-accredited ambulatory health care organizations that routinely prescribe antimicrobial medications. This was reported in the report entitled "R3 Report: Antimicrobial Stewardship in Ambulatory Health Care".

some antibiotics and can acquire additional resistance during antibiotic therapy (Carvalho, 2019 and Perez, 2012). Acquired resistance can be mediated by enzymes, such as chromosomally mediated AmpC cephalosporinases that are usually repressed, but can be induced by cephalosporin use, and the easily transferable plasmid mediated  $\beta$ -lactamases and carbapenemases. Additional resistance mechanisms include loss or alteration of outer membrane porins, upregulation of efflux pumps and plasmid mediated aminoglycoside-modifying enzymes. If a biofilm form of the organism also acquires a plasmid that harbors a carbapenemase gene (such as blaSPM-1), this combination of a metallo- $\beta$ -lactamase and biofilm capabilities can make the bacteria even more resistant to antimicrobials. Biofilm mediated resistance has also been shown for polymyxin B, one of the last-resort antimicrobials for this organism (Carvalho, 2019).

Carbapenem-resistant *Pseudomonas aeruginosa* (CRPA) is one of the resistant organisms defined by the World Health Organization (WHO) as a critical pathogen, since infections caused by them are difficult to treat and have higher mortality rate (WHO, 2017). A recent outbreak of Verona Integron-Mediated Metallo- $\beta$ -lactamase-producing CRPA (VIM-CRPA) was identified in U.S patients who had invasive medical procedures in Mexico. As of January 2019, 12 cases were identified in seven states between 2015 and December 2018. Six patients required hospitalization in the U.S. for their VIM-CRPA infection and one died (Kracalik, 2019). Although in the U.S., carbapenemase production in *Pseudomonas aeruginosa* is less common than carbapenemase production in Enterobacteriaceae (CP-CRE), it is still important to identify the resistance mechanism in CRPA since the plasmid carbapenemase genes are easily transferable to other organisms and the requisite public health response to prevent transmission is very robust (Tier 2).

The state public health laboratory began conducting mechanism testing on CRPA isolates in December 2018. Since that time, 48 CRPA isolates have been analyzed and none were found to be carbapenemase-producing. However, in 2018, an IMP-CRPA was identified in a patient at a Pennsylvania acute rehab facility after being detected at the regional public health laboratory in Maryland.

In conclusion, laboratorians should alert public health when carbapenem-resistant *Pseudomonas aeruginosa* isolates are identified. State or local epidemiologists will provide guidance and assist with coordination of isolates for mechanism testing, as well as initiate the appropriate containment response as needed.

✓ Congratulations to Allegheny General Hospital for being designated as an IDSA Antimicrobial Stewardship Center of Excellence. They join UPMC Shadyside campus as being the only two hospitals in Pennsylvania to hold this designation. Applications to obtain a Center of Excellence designation from IDSA close on January 31, 2020.

## Do You Have a Success Story Related to Your Work in AS/AR?

We would love to feature your facility or lab as a success story in a future edition of The Steward! Please send a brief summary related to preventing antimicrobial resistance or promoting stewardship activities to our resource mailbox at [RA-DHHAI@pa.gov](mailto:RA-DHHAI@pa.gov).

## Antimicrobial Resistance Threats, 2019 Quarter 2 Data

By: Pennsylvania Department of Health

Carbapenemase mechanism	Quarter 2 Count 4/1/2019 – 6/30/2019	2019 Year-to-Date
KPC	56	66
NDM	4	7
IMP	0	0
OXA-48	0	0
VIM	0	0
mCIM positive with no genotype detected	0	1

Resistance mechanism	Quarter 2 Count 4/1/2019 – 6/30/2019	2019 Year-to-Date
mcr-1 gene	0	0
mcr-2 gene	0	0
Any novel resistance gene	0	0

**Footnotes:** CP-CRE is not yet reportable in Pennsylvania (PA). The cases identified above were obtained through voluntary reporting by healthcare facilities and laboratories, including the PA Bureau of Laboratories.

## Antimicrobial Resistance Threats, 2019 Quarter 2 Data

By: Philadelphia Department of Public Health, Division of Disease Control, Healthcare-associated Infections/ Antimicrobial Resistance Program

Carbapenemase mechanism	Quarter 2 Count 4/1/2019 – 6/30/2019	2019 Year-to-Date
KPC	22	49
NDM	2	6
IMP	0	0
OXA-48	1	1
VIM	0	0
mCIM positive with no genotype detected*	1	3

Resistance mechanism	Quarter 2 Count 4/1/2019 – 6/30/2019	2019 Year-to-Date
mcr-1 gene	0	0
mcr-2 gene	0	0
Any novel resistance gene	0	0

**Footnotes:** CP-CRE is reportable in Philadelphia. \*Philadelphia's number for mCIM positive with no genotype detected includes CRE isolates that were tested for carbapenemase production in clinical laboratories but were not submitted for mechanism testing by PDPH due to limitations in testing capacity and/or availability of isolate. These isolates may have tested positive for carbapenemase production via methods other than mCIM (i.e. MHT, Carba-NP).

## Opportunity to Participate in Ambulatory Antibiotic Stewardship Collaborative:

The Agency for Healthcare Research and Quality (AHRQ) Safety Program for Improving Antibiotic Use is recruiting pediatric and adult ambulatory clinics to participate in a free 12-month program that seeks to improve antibiotic prescribing. Please see this website for more information: <https://safetyprogram4antibioticstewardship.org/page/AHRQ-Safety-Program-for-Improving-Antibiotic-Use>

## Utilizing Expert Pharmacists By: Jane M. Gould, MD, FAAP & Christine L. Mulgrew, MPH, PhD

The contributions of a pharmacist trained in antimicrobial stewardship practices are critical to having a successful antibiotic stewardship program (ASP). Unfortunately, developing expertise among existing staff or identifying a pharmacist to support smaller facilities can be a challenge. In time, it is anticipated that every ASP will have a board-certified pharmacist with post-graduate residency training or a fellowship training in infectious disease (Heil, 2016). In the meantime, infectious disease and stewardship trainings are available to hospital-based pharmacists. Trainings are provided through the [Society for Infectious Diseases Pharmacists \(SIDP\)](#) and the [Making a Difference in Infectious Diseases \(MAD-ID\)](#) organization.

See the table to determine whether your facility ranks “good,” “better” or “best”.

	Good	Better	Best
Have a pharmacist lead	✓	✓	✓
Pharmacist trained in antimicrobial stewardship principles		✓	✓
Pharmacist promotes optimal use of antimicrobial agents		✓	✓
Pharmacists crafts policies to reduce healthcare associated infections.		✓	✓
Pharmacist participates in awareness campaigns		✓	✓
Pharmacist educates staff, visitors and patients		✓	✓
Pharmacist trained in infectious diseases.			✓

According to the American Society of Health-System Pharmacists (2010), it is vital that pharmacists develop policies to improve antibiotic stewardship. The first improvement area is to promote optimal use of antimicrobial agents within the facility. This may include developing policies that balance optimal therapeutic outcomes with the risk of developing resistant strains of microorganisms or this may include aiding in the appropriate selection, optimal dosing, rapid initiation, proper monitoring and de-escalation of antimicrobial therapies. The second improvement area is to reduce healthcare-associated infections. The pharmacist can advocate for use of single dose, sterile products instead of multi-dose containers and encourage routine immunization among patients and facility staff. The final improvement area is educating staff, visitors and patients about antimicrobial stewardship and policies. Patients, their families and caregivers should be educated about adhering to prescribed

## Do You Know About TRAIN PA?

TRAIN PA is a learning management system and is the most comprehensive catalog of public health training opportunities for professionals. TRAIN is a free service for learners. TRAIN contains courses from CDC and health departments across the United States. You will find live and prerecorded trainings here as well as a searchable course catalog. There is also a built-in tracking system to track your learning on TRAIN PA. Many courses offered here also include continuing education credits.

### To access TRAIN PA, just go to:

<https://www.train.org/pa/>

You will then need to click on the "Create an Account" button found on the left side of the screen.

Once you are logged in, use the search tool to locate training topics or if you have a course ID, you can enter that number.

antimicrobial use and how this integrates in the larger ASP. Examples of education can include providing newsletter articles, posters, and displaying computer screen savers to reinforce this message. Educating staff who prescribe is not alone effective. According to the literature (Bantar, 2003, Belongia, 2005, and Girotti, 1990), long-term change in prescribing behavior is only effective when paired with an intervention. It is important to educate prescribers when implementing stewardship policy changes that impact prescribing patterns.

Small hospitals, nursing homes, long term acute care hospitals and other small community hospitals with barriers to ASP adoption are encouraged to seek collaborative activities (Bhatt, 2019). Numerous resources are available from key stakeholders including: Agency for Healthcare Research and Quality (AHRQ), large hospitals/health systems and academic medical centers, hospital associations, federal, state, and local public health organizations, and federal and state offices of rural health.

Example of a Pennsylvania Resource:

- Hospital and Healthsystem Association of Pennsylvania (HAP) continues to enroll acute care hospitals in its Antimicrobial Stewardship Program. During the three years of this program, the collaborative has seen fluoroquinolone and carbapenem days of therapy (DOT) reduced by 34% and 35% respectively. For more information on this program, contact Mary Catanzaro at [mcatanzaro@haponline.org](mailto:mcatanzaro@haponline.org).
- Quality Insights anticipates working with all types of facilities, including physician practices, to improve ASPs beginning later this Fall.

## Antibiotic Awareness Week Seminars:

### **Penn State University, November 19<sup>th</sup>**

Dr. Louise Watkins, Centers for Disease Control and Prevention

### **Penn State Health Milton S. Hershey Medical Center, December 3<sup>rd</sup>**

Dr. Keith Hamilton, Children's Hospital of Philadelphia

Pediatric and Internal Medicine Grand Rounds

### **University of Pittsburgh School of Pharmacy, TBD**

Speaker on Antibiotic Stewardship

For more information send email to:

[PAantimicrobialstewardship@gmail.com](mailto:PAantimicrobialstewardship@gmail.com)

Open to all

## Antibiotic Use in the United States:

Progress and Opportunities, 2018 Update: CDC released [this report](#), which is an update to CDC's 2017 antibiotic stewardship report. Improving antibiotic use is important to effectively treat infections, protect patients from harms caused by unnecessary antibiotic use, and combat antibiotic resistance, one of the most urgent threats to the public's health. Progress has been made in improving antibiotic prescribing and use, but many opportunities remain.

## Contact Us

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