August 6, 2021

Dear Laboratory Managers, Microbiology Supervisors and Infection Preventionists,

During the past year, laboratory and healthcare systems capacity have been stretched to their limits due to the COVID-19 response. The focus of the Utah Department of Health (UDOH) Healthcare-associated Infections (HAI/AR) Program has been on protecting vulnerable populations in long-term care settings. While we are not out of the woods with COVID-19, we are looking forward to some new developments in the coming year to enhance our detection of multi-drug resistant organisms (MDROs) in healthcare settings. One of the proposed projects includes the development of an MDRO registry, which would be accessible by healthcare facilities, allowing early detection of potentially colonized patients. Additionally, since the Utah Public Health Laboratory (UPHL) became the Antibiotic Resistance Laboratory Network (AR Lab Network) Regional Lab for the Mountain Region in 2019, the testing menu at UPHL has expanded. As such, we would also like to focus on getting out information about available resources that can be effectively utilized to strengthen the prompt detection of antibiotic resistance threats in Utah. We are also developing a lab web portal to allow facilities to access results and order testing directly. More information on these new activities will follow in the next few months.

The purpose of this letter is to provide:

- A situational awareness update on antibiotic resistance trends in Utah and how Utah compares to other states,

- Information about new testing capacity at the Utah Mountain Region Antibiotic Resistance (AR) Laboratory based at the Utah Public Health Laboratory (UPHL) in Utah, and

- A reminder about reporting and isolate submission requirements and the Utah Communicable Disease Rule (R386-702).
Situational Awareness

During 2020, the Utah Public Health Laboratory (UPHL) received a total of 485 carbapenem-resistant bacterial isolates (including CRE, CRA and CRPA) for rule out of carbapenemase production (CP) by both phenotypic and/or genotypic mechanism testing. Despite impacts of the COVID-19 pandemic, this set a new record over 2019 submissions of 458. We truly appreciate your continued commitment to submitting isolates for further testing.

A 2019 and 2020 summary of carbapenem-resistant organisms (CRO) reported to public health is shown in Table 1.

Table 1. CRE, CRA and CRPA reported to public health—Utah 2019 and 2020

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbapenem-resistant <em>Enterobacteriaceae</em> (CRE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. coli</em></td>
<td>27</td>
<td>40</td>
</tr>
<tr>
<td><em>Enterobacter</em> spp.</td>
<td>91</td>
<td>134</td>
</tr>
<tr>
<td><em>Klebsiella</em> spp.</td>
<td>40</td>
<td>48</td>
</tr>
<tr>
<td>Other <em>Enterobacteriaceae</em> e.g., <em>Citrobacter</em> spp., <em>Providencia</em> spp., etc.</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Carbapenem-resistant <em>Acinetobacter</em> spp. (CRA)</td>
<td>55</td>
<td>48</td>
</tr>
<tr>
<td>Carbapenem-resistant <em>Pseudomonas aeruginosa</em> (CRPA)</td>
<td>472</td>
<td>344</td>
</tr>
</tbody>
</table>

Isolates positive for carbapenemase genes (by mechanism) broken down by CRE, CRA and CRPA are shown in the pie charts in Figure 1.
Figure 1. Isolates positive for carbapenemase (CP) genes (by mechanism) broken down by CRE, CRA and CRPA.

Carbapenem-resistant Enterobacterales (CRE)

Carbapenem-resistant Acinetobacter (CRA)

Carbapenem-resistant Pseudomonas aeruginosa (CRPA)

*Following recent taxonomic changes in 2016, CRE are now referred to as carbapenem-resistant Enterobacterales. The new Enterobacterales order comprises 7 new families including the amended Enterobacteriaceae family.
How does Utah stack up against other states?

Carbapenem-Resistant Enterobacterales (CRE)
The CDC Patient Safety Portal ([https://arpsp.cdc.gov/profile/arln/cre](https://arpsp.cdc.gov/profile/arln/cre)) provides an interactive tool to compare rates of carbapenemase gene mechanisms identified as a proportion of the total number of CRE isolates tested by state and region. Looking at 2017-2019 data and utilizing the aforementioned website, the percentage of CRE isolates tested with at least one carbapenemase gene is 34.73% (Figure 2) for all isolates tested through AR Laboratory Network laboratories. For the same time period, there were 41 isolates out of a total of 283 CRE isolates tested, showing 14.49% of isolates with at least one identified carbapenemase in the state of Utah. This Utah figure compares very favorably with the 29.29% average for the ARLN Mountain Region states which includes UT, ID, WY, CO, NM, AZ, TX and MT. Therefore, Utah appears to be a low prevalence state for CP-CRE (carbapenemase-producing CRE).

Figure 2.
**Candida auris**
In addition to the low burden of carbapenemase production in CRE, there have been no cases of *Candida auris* in Utah to date. *Candida auris*, an emerging multi-drug resistant yeast with high mortality rate, has now been identified in over 20 states (see map in Figure 3) including some states in the Mountain Region. This highlights the need to be aware of high-risk patients with travel history or patients transferring into Utah facilities from facilities out of state. To this end, we sent out a letter in 2019 letting facilities know about admission screening for *Candida auris* colonization and other options for differentiating *Candida auris* from other yeast species in clinical specimens from both sterile and non-sterile sites. Colonization screening is now provided free-of-charge at UPHL and more details about this can be found in the next section outlining available testing.

**Figure 3.**

[Image of a map showing reported clinical cases of *Candida auris* from February 1, 2020 to January 31, 2021 across the United States.]


**New Testing Capacity**

In August 2019, the Utah Public Health Laboratory (UPHL) became the reference lab for 8 Mountain Region states (AZ, CO, WY, NM, TX, MT, ID) including Utah.

UPHL works closely with the Healthcare-associated Infections (HAI/AR) program within the Utah Department of Health to offer testing and support in the following areas:

**Surveillance**
- Characterization of presumptive CRE, CRPA, CRA (species ID, antibiotic susceptibility testing (AST), phenotypic and molecular carbapenemase production assays)
- Yeast speciation (including *C. auris*) and antifungal susceptibility
- Colistin resistance (AST and molecular detection)
IP support
- Colonization screening for CRE, CRPA, CRA and *C. auris* (culture-based and molecular detection)*
- Outbreak investigation support (Whole genome sequencing and molecular epidemiology analyses)

Patient care
- Extended antimicrobial susceptibility testing (AST) including aztreonam/avibactam combination for difficult-to-treat infections (only for *Enterobacteriaceae* producing IMP, VIM and NDM carbapenemases)**
- [A one-page flyer advertising ExAST for hard-to-treat infections](#) follows in Appendix A

Training and education
- Assistance for small clinical labs in implementing AR testing

* All AR Lab colonization screening activities and extended AST should be coordinated through the Mountain Region AR Lab Coordinator by emailing [ARLNUtah@utah.gov](mailto:ARLNUtah@utah.gov) with prior approval from the UDOH HAI Program, [hai@utah.gov](mailto:hai@utah.gov).

** Pre-authorization form for this test can be downloaded from the website at: [https://uphl.utah.gov/arln-utah/](https://uphl.utah.gov/arln-utah/)

More information about testing services offered through the AR Laboratory Network at UPHL can be found at [here](#).

Additional activities offered through other laboratories within the AR Lab network include:

(i) **Surveillance testing of *Aspergillus fumigatus* for azole resistance.** Azole resistance is becoming more common in *Aspergillus fumigatus*, the most common cause of aspergillosis, due to prolonged treatment and over-use in agricultural settings. Testing for this resistance in the Mountain Region states is performed through the Southeastern Regional AR Lab in Tennessee. More information about submitting isolates for this test can be found [here](#) or in Appendix B.

(ii) **A *N. gonorrhoeae* gradient strip AST testing service** is now offered through Maryland Department of Public Health (MDPH). More information about this service can be found [here](#) or in Appendix C. If patients persistently test positive for *Neisseria gonorrhoeae* following treatment and reinfection has been ruled out, UPHL can arrange submission of the isolate to MDPH for AST testing.

**Reporting and Isolate Submission Requirements**
There were no changes to the Utah Communicable Disease Rule for multidrug resistant organisms (MDROs) in 2020. Current reporting and submission requirements are outlined in Table 2 below. For a comprehensive list of organisms reportable under R386-782, please click [here](#).
<table>
<thead>
<tr>
<th>Genus &amp; species</th>
<th>Reporting and submission notes</th>
</tr>
</thead>
</table>
| **Carbapenem-resistant Enterobacteriaceae (CRE)** | - Statewide reporting (within 3 working days)  
- Submission of screening/surveillance and clinical isolates  
- Documented production of carbapenemase is reportable in all *Enterobacteriaceae*  
- Please note: although there is no current requirement for reporting/submission of other members of the Enterobacterales order, these isolates can be submitted to UPHL for rule out of carbapenemase production using the listed criteria:  
  - *Providencia* spp., *Proteus* spp. and *Morganella* spp. with resistance to a carbapenem antibiotic (excluding imipenem)  
  - *Citrobacter* spp. and *Serratia* spp. with resistance to any carbapenem antibiotic |
| *E. coli* |  |
| **Klebsiella spp.** |  |
| **Enterobacter spp.** |  |
| **Carbapenem-resistant Acinetobacter spp. (CRA)** | - Statewide reporting (within 3 working days) and isolate submission  
- Documented carbapenemase production reportable |
| **Carbapenem-resistant Pseudomonas aeruginosa (*CRPA*)** | - Statewide reporting by electronic laboratory reporting (ELR) for surveillance only and submission  
- Documented carbapenemase production reportable  
- A 2019 CDC study showed that 90% of carbapenemase production in CRPA can be identified by ‘‘testing isolates resistant to ceftazidime or cefepime in addition to a carbapenem’’(CDC, 2019). These criteria can be utilized to better target CRPA isolate submission for CP-testing. |
| **Candida auris** | - Statewide reporting and submission of both screening/surveillance and clinical isolates  
- *Candida haemulonii* and other rare *Candida* spp. or *Candida* spp. from sterile sites implicated in invasive disease that cannot be accurately speciated should also be submitted  
- Since *Candida auris* often colonizes the respiratory and urinary tracts, yeast or *Candida* species from non-sterile sites can also be submitted for rule-out of *Candida auris*. |

In 2018 and 2019, several states including Utah, experienced an increase in CP-CRPA cases due to an outbreak connected to medical tourism for procedures in Tijuana, MX. A CDC advisory released in early 2021, noted that cases of VIM-producing CRPA were still being identified in American travelers receiving procedures in Mexican hospitals in 2020. Healthcare providers of patients with a history of surgical procedures in Mexico are encouraged to consult the guidelines in the [February 2021 Update](#) and contact public health for further guidance.
Table 2 continued.

<table>
<thead>
<tr>
<th>Genus &amp; species</th>
<th>Reporting and submission notes</th>
</tr>
</thead>
</table>
| Vancomycin-resistant Staph aureus (VRSA) | • Statewide within 24 hours (immediately notifiable)  
• Suspected VRSA isolates should be verified through repeat testing to confirm vancomycin-resistance (MIC ≥ 16 ug/mL)  
Suspected VRSA isolates will be referred to the CDC for confirmation |

*Following recent taxonomic changes in 2016, CRE are now referred to as carbapenem-resistant Enterobacterales. The new Enterobacterales order comprises seven new families including the amended Enterobacteriaceae family.

**Please note: there have been some recent naming changes to species of the genus Enterobacter. One species of Enterobacter—namely aerogenes—has been moved to the genus Klebsiella and is now more commonly known as Klebsiella aerogenes.

The UDOH is grateful for your continued commitment to quality laboratory practices and patient care and for your cooperation in ensuring reporting and isolate submission are consistent with Utah’s Communicable Disease Rule. Together, we can prevent transmission and enhance containment of these concerning MDROs in Utah.

Sincerely,

Alessandro Rossi, PhD D (ABMM)  
CLIA Director and Chief Scientist  
Utah Public Health Laboratory

Maureen Vowles, MPH, M(ASCP), CIC  
AR Laboratory Coordinator—Mountain Region

Michelle Hofmann, MD, MPH, MHCDS, FAAP  
Deputy Director, Utah Department of Health

April Clements, BSN, RN, CIC  
HAI/AR Program Manager
Antimicrobial susceptibility testing for Enterobacteriaceae producing a metallo-beta-lactamase (MBL)

Clinicians, hospital laboratories, and public health labs can request expanded antimicrobial susceptibility testing (ExAST) from CDC’s Antibiotic Resistance Lab Network (AR Lab Network) to find new, effective treatment options for their patients’ most resistant infections.

- Enterobacteriaceae are resistant to new drugs for carbapenem-resistant Enterobacteriaceae (CRE) treatment, specifically ceftazidime-avibactam and meropenem-vaborbactam. However, these bacteria may be susceptible to the combination therapy ceftazidime + avibactam + aztreonam*.

*Ceftazidime + avibactam + aztreonam is a combination of drugs recommended by the 2018 Sanford Guide for treatment of serious infections caused by MBL-producing Enterobacteriaceae.

- Susceptibility testing is CLIA-compliant and results will be reported for ceftazidime + avibactam, aztreonam; and aztreonam + avibactam to help assess utility of combination therapy.

- CDC plans to expand testing as new antimicrobial treatment options become available for other hard-to-treat bacterial infections.

- There is no cost for this service.

1. What isolates can I submit?

Hospital laboratories and clinicians are encouraged to submit Enterobacteriaceae isolates that:

- Test non-susceptible to all beta-lactams, including either ceftazidime-avibactam or meropenem-vaborbactam. These isolates may be MBL-producing isolates with few effective treatment options.

- OR -

- Enterobacteriaceae with NDM, VIM, or IMP genes confirmed by a molecular test.

2. What is the testing process?

- AST turn-around time is 3 business days (once isolate received) for therapy decisions.

- Isolates will be tested to confirm carbapenem resistance, carbapenemase production, and to identify carbapenemase gene-coded resistance.

- Isolates that meet the inclusion criteria will be tested for susceptibility to ceftazidime + avibactam, aztreonam and avibactam + aztreonam.

3. How do I request the test and receive results?

- Healthcare providers, hospital laboratories, and public health labs should email their regional lab to request testing and instructions for submitting the bacterial isolate.

- Provide preliminary lab testing results and confirm that the facility’s infection control department has been notified and/or infectious disease physician has been consulted.

As part of the AR Lab Network, your state and regional lab work to:
Detect resistant species & new threats | Perform susceptibility testing to track resistance | Help respond to outbreaks

AR Lab Network Testing & Resources (https://www.cdc.gov/drugresistance/laboratories.html)
Clinical, reference, public health laboratories:

CDC AR Lab Network requests isolates of Aspergillus fumigatus for surveillance of azole resistance

Testing for azole-resistance in Aspergillus fumigatus is now offered by the AR Lab Network Regional Labs located at the Maryland and Tennessee Public Health Laboratories (PHL). These laboratories perform screening for azole resistance with supplemental testing and additional antifungal susceptibility testing when warranted. Results will be reported to submitting facilities as well as jurisdictional public health departments within two weeks of receipt of the isolate. Testing is available to all states at no cost, including shipping.

Clinical, reference, public health laboratories submitting isolates:

› Submit clonal isolates (selected from a single colony) that have already been identified as Aspergillus fumigatus by any CLIA-approved method.
› Ship on Sabouraud Dextrose agar slant.
› Prioritize isolates from invasive infections, as well as isolates that, if tested, show resistance to azoles.

Why submit Aspergillus isolates?

The most common cause of human aspergillosis, Aspergillus fumigatus, can develop resistance to azoles during long-term treatment of infected patients or in environments where azoles have been used in agriculture.* Azole-resistant strains have been identified in the United States, increasing the need for awareness and action by clinical and public health professionals.

Please contact the designated AR Lab Network Regional Laboratory for your area (see coded map below) to discuss submission guidance and shipping instructions:

Send to Maryland Public Health Laboratory in Baltimore
Contact: MDPHL.arln@maryland.gov

Send to Tennessee Public Health Laboratory in Nashville
Contact: ARLN.health@tn.gov

Note: Contact your state health department for questions about whether isolates should be submitted directly to the AR Lab Network Aspergillus Laboratory or first to your state public health laboratory for forwarding, as states vary in requirements.

*Information and references about resistance in Aspergillus:
https://www.cdc.gov/fungal/diseases/aspergillosis/antifungal-resistant.html

If further information is needed, please contact aspergillus@cdc.gov or ARLN@cdc.gov

For more information on CDC’s AR Lab Network, visit:
www.cdc.gov/drugresistance/laboratories.html
**Neisseria gonorrhoeae gradient strip AST service now available**

For STI providers and affiliated laboratories when gonococcal treatment failure is suspected

Through CDC’s AR Lab Network, the Maryland Public Health Laboratory offers nationwide gradient strip method antimicrobial susceptibility testing (AST)—at no cost—to assist in care of patients with potentially drug-resistant gonorrhea infections. The Maryland lab provides CLIA-compliant susceptibility testing for azithromycin, cefixime, and ceftriaxone, with results expected within 10 days of receipt.

**PROVIDERS with patients who may have antibiotic-resistant *N. gonorrhoeae***:

If patients persistently test positive for *N. gonorrhoeae* (gonococcus or GC) after treatment (with or without symptoms) and reinfection has been ruled out, please consider sending their specimen or isolate for susceptibility testing. Data from this testing helps CDC monitor for new types of resistance and can provide information for treatment decisions.

Consult your public health department and CDC, as needed, and do one of the following:

› Submit a fresh clinical specimen to your local laboratory that performs GC culture, and ask them to save an isolate for shipment to Maryland Public Health Laboratory (MDPHL).

› Ask the laboratory that has already isolated GC from your patient to ship the isolate to MDPHL for further testing.

› If a local laboratory is not available to perform GC culture, please email MDPHL.arln@maryland.gov to plan specimen collection and shipment for GC culture.

**LABORATORIES that may isolate antibiotic-resistant *N. gonorrhoeae* in culture**:

Please save and be prepared to send isolates of interest to MDPHL for rapid AST by gradient strip method and to receive CLIA-compliant results for sharing with your providers. Pure frozen or lyophilized isolates, as well as culture growth on media may be sent for testing.

**MARYLAND PUBLIC HEALTH LAB provides instructions, specimen collection materials, and free shipping**

Further information is available at: https://health.maryland.gov/laboratories/Pages/ARLNHome.aspx

Please follow your local/state requirements for notification of health department or state public health laboratory when preparing shipment to Maryland.

For more information on CDC’s AR Lab Network, visit: www.cdc.gov/drugresistance/laboratories.html