



**Department  
of Health**

**Wadsworth  
Center**

# **Understanding the Human Diagnostic Communication Network**

**(Labs, Public Health Departments, and Providers)**

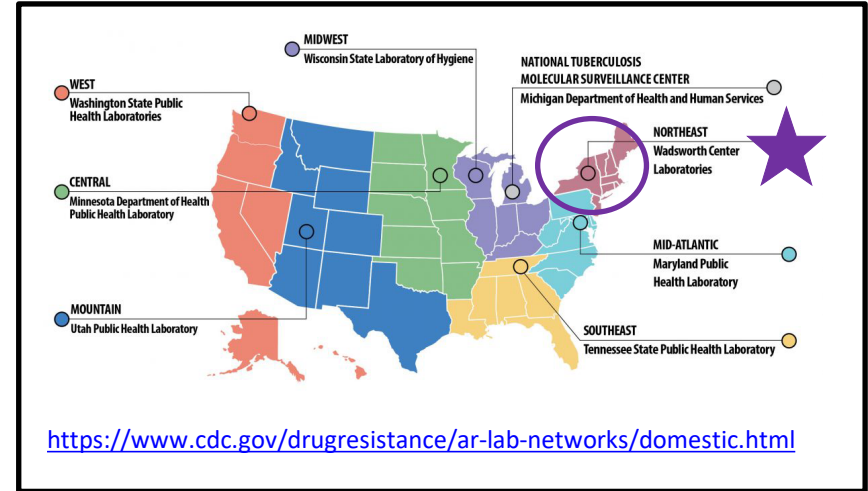
**Kimberlee A. Musser, Ph.D.**

CLIA/CLEP Laboratory Director- David Axelrod Institute  
Wadsworth Center, NYSDOH

# Wadsworth Center, New York state's public health laboratory

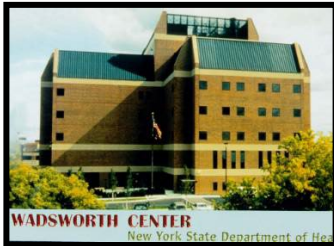
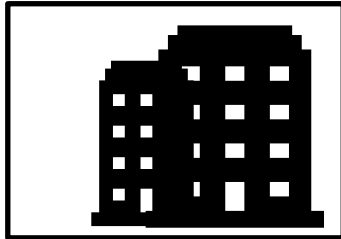
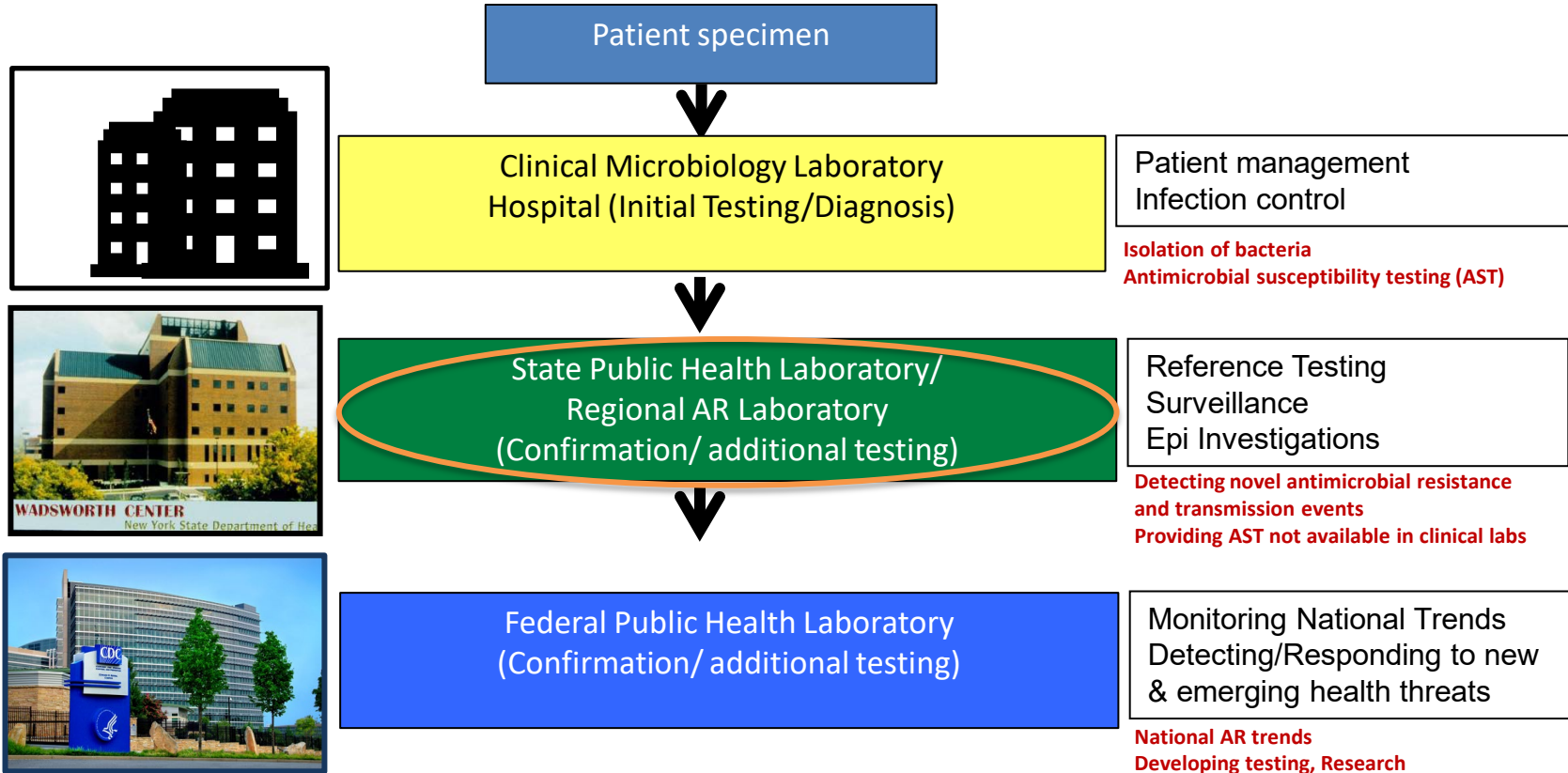


- ~750 staff, >150 doctoral level scientists
- 10,000 sq. ft. BSL-3
- Research Programs-External grant funding
- Largest State Public Health Lab in the US
- Regulatory role






Wadsworth Center:  
A Regional AR Laboratory

# Antimicrobial Resistance (AR) Testing



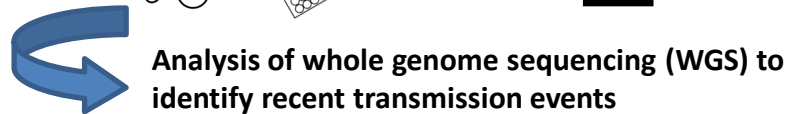
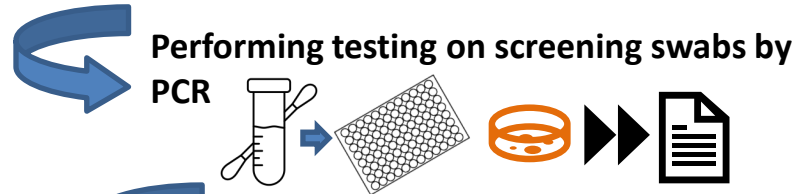
<https://www.cdc.gov/about/business/index.htm>

# Public Health AR Testing

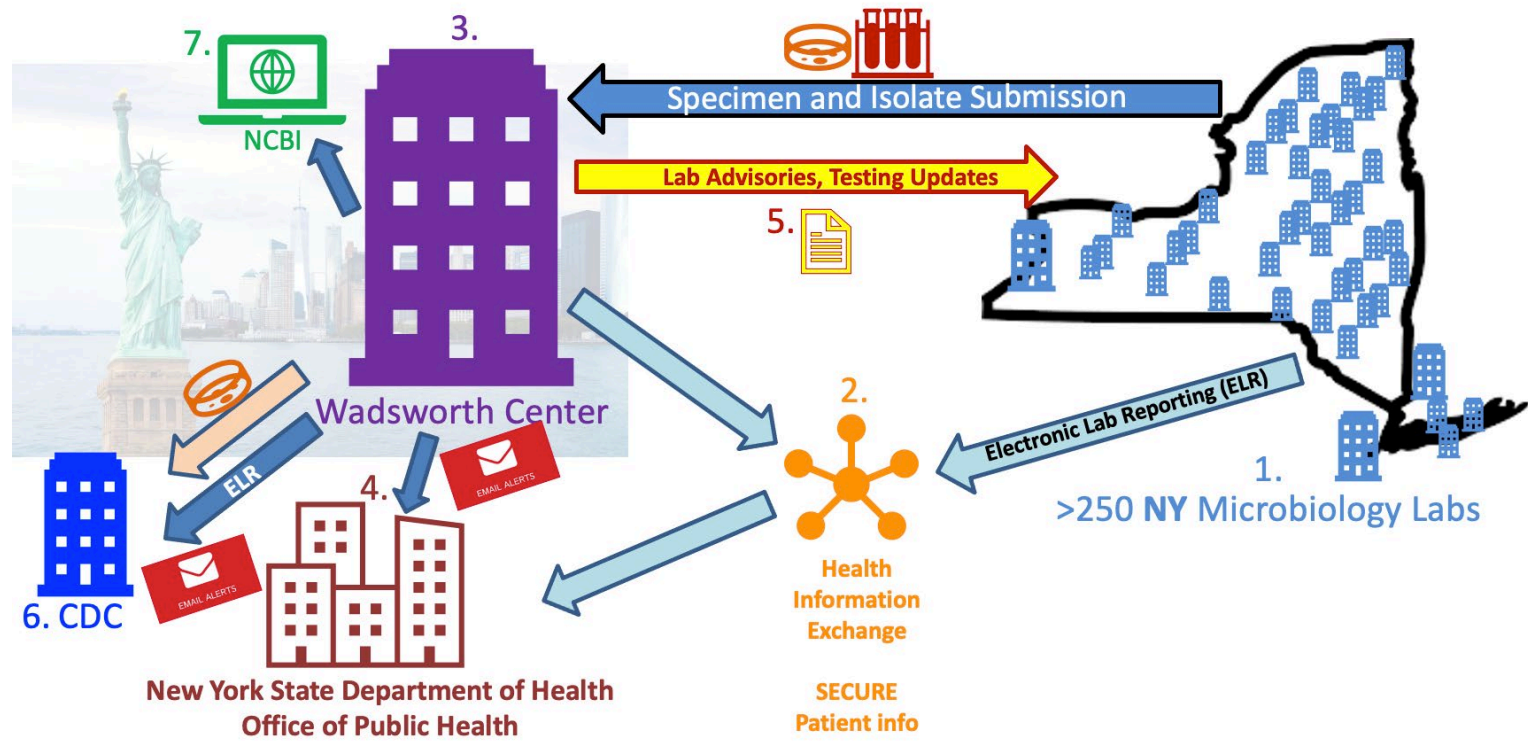
- AR Lab Network- Transmissible carbapenem-resistant bacteria
  - **CRE** (carbapenem-resistant Enterobacteriales)
  - **CRPA** (CR *Pseudomonas aeruginosa*)
  - **CRAB** (CR *Acinetobacter baumannii*)
  - **Colonization Screening**
  - *Candida auris*
- State Public Health
  - **MRSA** (methicillin-resistant *Staphylococcus aureus*)-outbreaks
  - **VRSA** (vancomycin-resistant *Staphylococcus aureus*)-screening
  - Bacterial meningitis (*Neisseria meningitidis*, *Streptococcus pneumoniae*, *Haemophilus influenzae*)
  - *Legionella*
- Advanced methods for AR testing
  - LDT real-time PCR, Cepheid Carba-R
    -  HOURS
  - Expanded AST
    -  DAYS
  - Whole genome sequencing (WGS) and bioinformatic analysis
    -  WEEKS

# Detecting Antimicrobial Resistance

Carbapenem-resistant bacterial isolates are submitted for additional characterization

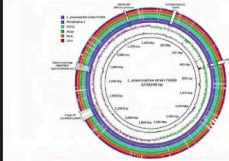
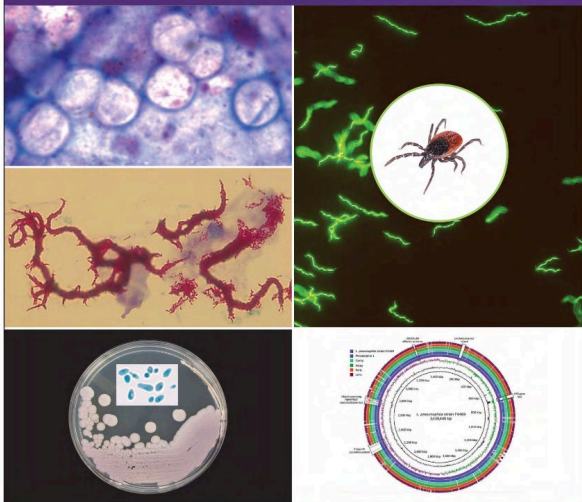


# The Network: testing, reporting, submission & communication



# Laboratory Reporting of Communicable Diseases

2020 Edition



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## Mandatory Reporting and Submission of AR is Key!

### New York State Department of Health

#### Laboratory Reporting and Specimen Submission Requirements for Communicable Diseases

2020

**Suspected or confirmed organisms/diseases must be reported immediately by phone to the local health department in which the patient resides.**

Specimens REQUIRED to be submitted for confirmation are listed in the table. Additional tests on non-required submissions are also available at public health laboratories. Details on required forms and on how to submit isolates or specimens, please visit [www.wadsworth.org/programs/id](http://www.wadsworth.org/programs/id) or contact:

Wadsworth Center's Microbiology Laboratories or Biodefense Laboratory at 518-474-4177. Outside routine business hours contact the NYSDOH Duty Officer at 866-881-2809.

Electronic submission of specimen information to the Wadsworth Center is preferred. Details can be found at <https://www.wadsworth.org/programs/id> under 'Electronic Test Request/Reporting'. Labs that do not have electronic access may print the paper requisition from the link found on that site.

<p><i>Enterobacteriaceae</i>, carbapenem-resistant (CRE)</p>	<p>Carbapenem-resistant <i>Enterobacteriaceae</i> infection or colonization</p>	<p><i>Enterobacter</i> spp., <i>Klebsiella</i> spp., and <i>Escherichia coli</i> that are resistant to imipenem, meropenem, doripenem (MIC of <math>\geq 4 \mu\text{g/ml}</math>), or ertapenem (MIC of <math>\geq 2 \mu\text{g/ml}</math>) by standard susceptibility testing methods. Include positive and negative carbapenemase testing results (phenotypic and/or molecular), if available.</p>	<p><b>Yes</b> - Only submit <i>Enterobacteriaceae</i> isolates that are positive for carbapenemase testing (e.g. mCIM, Carba NP) and/or positive for a non- <i>bla</i><sub>KPC</sub> carbapenemase resistance gene (e.g. <i>bla</i><sub>NDM</sub>, <i>bla</i><sub>IMP</sub>, <i>bla</i><sub>VIM</sub>, <i>bla</i><sub>OXA48</sub>)</p>
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Laboratory reporting of suspected or confirmed positive findings or markers of communicable diseases is mandated under the New York State (NYS) Public Health Laws 2102 and 576-C and NYC Health Code Articles 11 and 13.



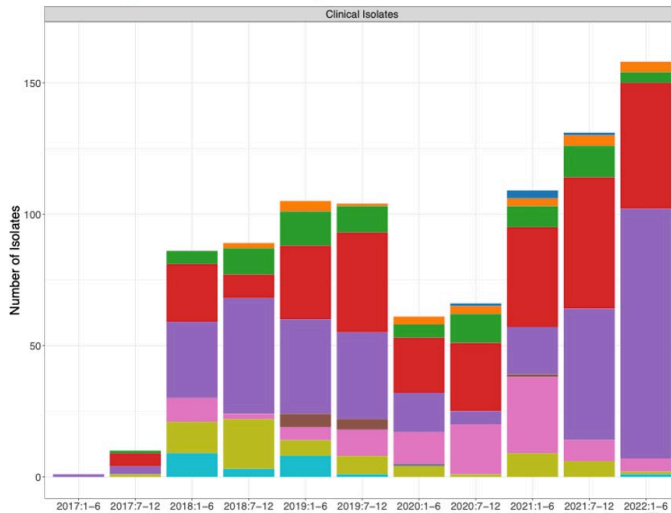
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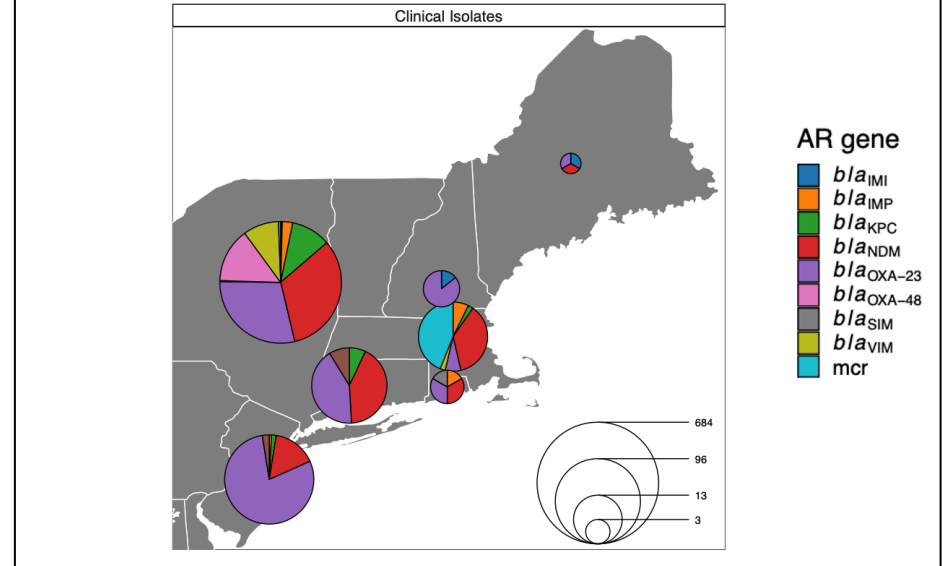


# New Tools for AR- Whole genome sequencing

## AR genes by WGS 2017-2022



## WGS AR gene distribution by state



WGS Improves AR Detection and Infection Control



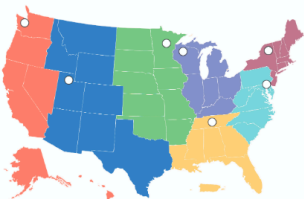
## Expanded Antimicrobial Susceptibility Testing for Hard-to-Treat Infections



### Antimicrobial susceptibility testing for Enterobacteriales producing a metallo-beta-lactamase (MBL)

Clinicians and clinical and public health laboratories can request expanded antimicrobial susceptibility testing (**ExAST**) from CDC's Antibiotic Resistance Lab Network (AR Lab Network) to find potentially effective treatment options for their patients' most resistant infections.

- Resistance to new drugs used for treatment of carbapenem-resistant Enterobacteriales (CRE) has been identified, specifically to ceftazidime-avibactam, meropenem-vaborbactam, and imipenem-relebactam. However, these bacteria may be susceptible to the combination therapy ceftazidime-avibactam plus aztreonam, a combination of drugs that is an option in current IDSA guidance for treatment of serious infections caused by MBL-producing Enterobacteriales.\*
- Susceptibility testing is **CLIA-compliant** and is performed at **no cost**. **MIC results** will be reported within **3 business days** for treatment of ceftazidime-avibactam, aztreonam, and aztreonam-avibactam to help assess utility of combination therapy.



- **Southeast:** Tennessee Public Health Laboratory | [ARLN.health@tn.gov](mailto:ARLN.health@tn.gov)
- **Mid-Atlantic:** Maryland Public Health Laboratory | [MDPHL.arln@maryland.gov](mailto:MDPHL.arln@maryland.gov)
- **Northeast:** Wadsworth Center Labs | [ARLNcoreNY@health.ny.gov](mailto:ARLNcoreNY@health.ny.gov)
- **Midwest:** Wisconsin State Lab of Hygiene | [wIARLN@slh.wisc.edu](mailto:wIARLN@slh.wisc.edu)
- **West:** Washington State Public Health Labs | [ARLN@doh.wa.gov](mailto:ARLN@doh.wa.gov)
- **Central:** Minnesota Dept. of Health Public Health Lab | [ARLNmn@state.mn.us](mailto:ARLNmn@state.mn.us)
- **Mountain:** Utah Public Health Lab | [ARLNUtah@utah.gov](mailto:ARLNUtah@utah.gov)

\*Tamma PD, Aiklen SL, Boronko RA, Mathers AJ, van Duin D, Clancy CJ. Infectious Diseases Society of America Guidance on the Treatment of Extended-Spectrum  $\beta$ -lactamase Producing Enterobacteriales (ESBL- $\beta$ ), Carbapenem-Resistant Enterobacteriales (CRE), and *Pseudomonas aeruginosa* with Difficult-to-Treat Resistance (DTR-*P. aeruginosa*). Clin Infect Dis. 2021 Apr 8;72(7):e169-e183. doi: 10.1093/cid/ciaa478. PMID: 33106864.

### 1. Isolates to submit:

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

- Test "not susceptible" to all beta lactams tested, including ceftazidime-avibactam, meropenem-vaborbactam, or imipenem-relebactam. These may be MBL-producing isolates with few treatment options.

-OR-

- Enterobacteriales that test positive for NDM, VIM, or IMP genes.

### 2. What is the testing process?

- Isolates will be tested to confirm carbapenem resistance, carbapenemase production, and to identify the presence of specific carbapenemase genes.
- Isolates meeting the inclusion criteria will be tested against ceftazidime-avibactam, aztreonam, and avibactam-aztreonam.
- AST turn-around time is 3 business days after receipt of isolate.

### 3. How do I request ExAST and receive results?

- Please email your AR Lab Network Regional Laboratory (see map) to request testing and submission instructions.
- Please provide prior laboratory testing results, including organism identification and AST.
- Please confirm that Infection Prevention and Infectious Diseases services are aware of this patient and isolate.

# New Tools for AR- ExAST

## HP Printing technology repurposed for dispensing antibiotics instead of ink



- HP D300e allows for in-house creation of BMD panels with novel antibiotics
- The combinations are **not yet included in commercially available BMD panels**
  - Aztreonam
  - Ceftazidime-Avibactam
  - Aztreonam-Avibactam
  - Aztreonam-Ceftazidime-Avibactam

<https://h20195.www2.hp.com/V2/GetPDF.aspx/4AA5-9729ENW.pdf>

For more information on CDC's AR Lab Network, visit:  
[www.cdc.gov/drugresistance/laboratories.html](https://www.cdc.gov/drugresistance/laboratories.html)



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<https://www.cdc.gov/drugresistance/pdf/drug-susceptibility-tests-508.pdf>

# Scenario- AR

- **Considerations:**

- Clinical Microbiology lab- Maintaining reporting and isolate/specimen submissions
- State or Regional Lab/Health Dept- Providing advisories and testing updates
- All labs- Implementing multiple options for testing, platforms, extracting DNA
- Epidemiology and infection control staff- Maintaining focus on reporting of cases outside of pandemic response
- Tools- Utilizing new data visualization tools, integrating databases
- Communication- Maintaining lab ↔ epi & PH lab ↔ clinical lab