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# CDC Antibiotic Resistance Laboratory Network- Southeast Region

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# Overview

- **ARLN Introduction**
- **Southeast Regional Laboratory Overview**
  - **ARLN Alert Values**
  - **Isolate flow**
- **CRE Colonization Screening**
- **Suspect *Candida auris* Testing**
- **Sentinel Laboratory Testing Activities**



NATIONAL ACTION  
PLAN FOR COMBATING  
ANTIBIOTIC-RESISTANT  
BACTERIA

MARCH 2015



[https://www.cdc.gov/drugresistance/pdf/carb\\_national\\_strategy.pdf](https://www.cdc.gov/drugresistance/pdf/carb_national_strategy.pdf)

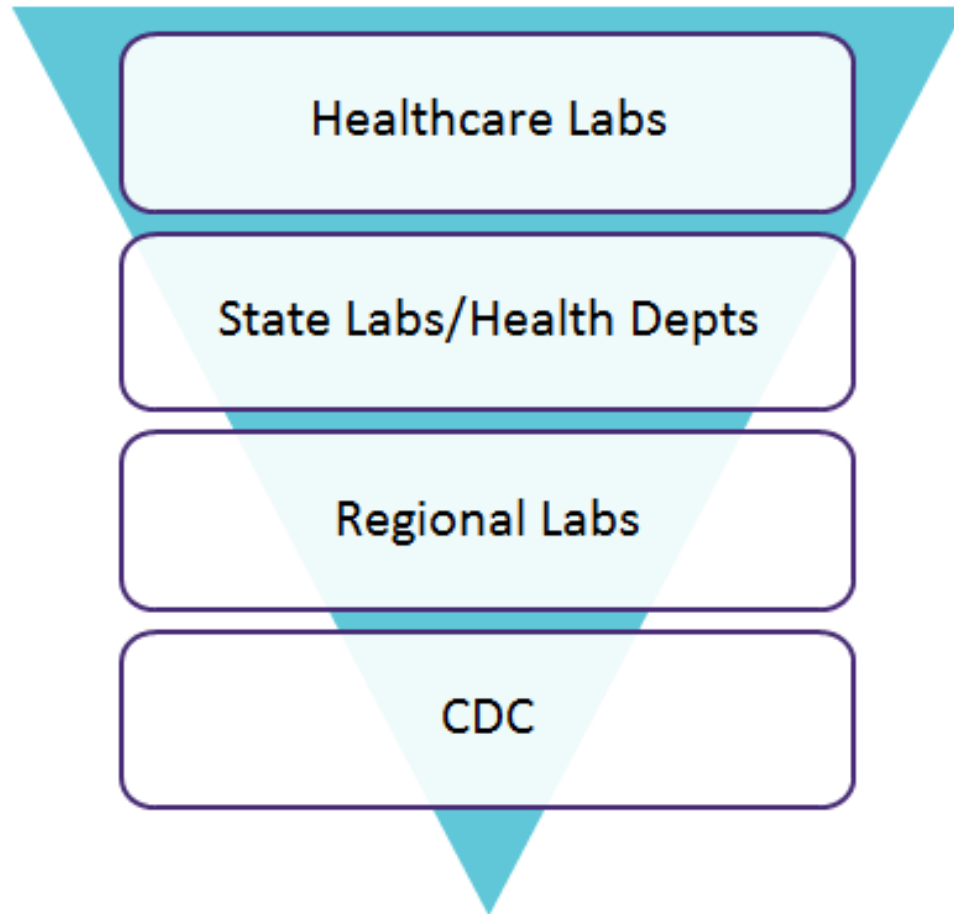
# Improving Laboratory Capacity



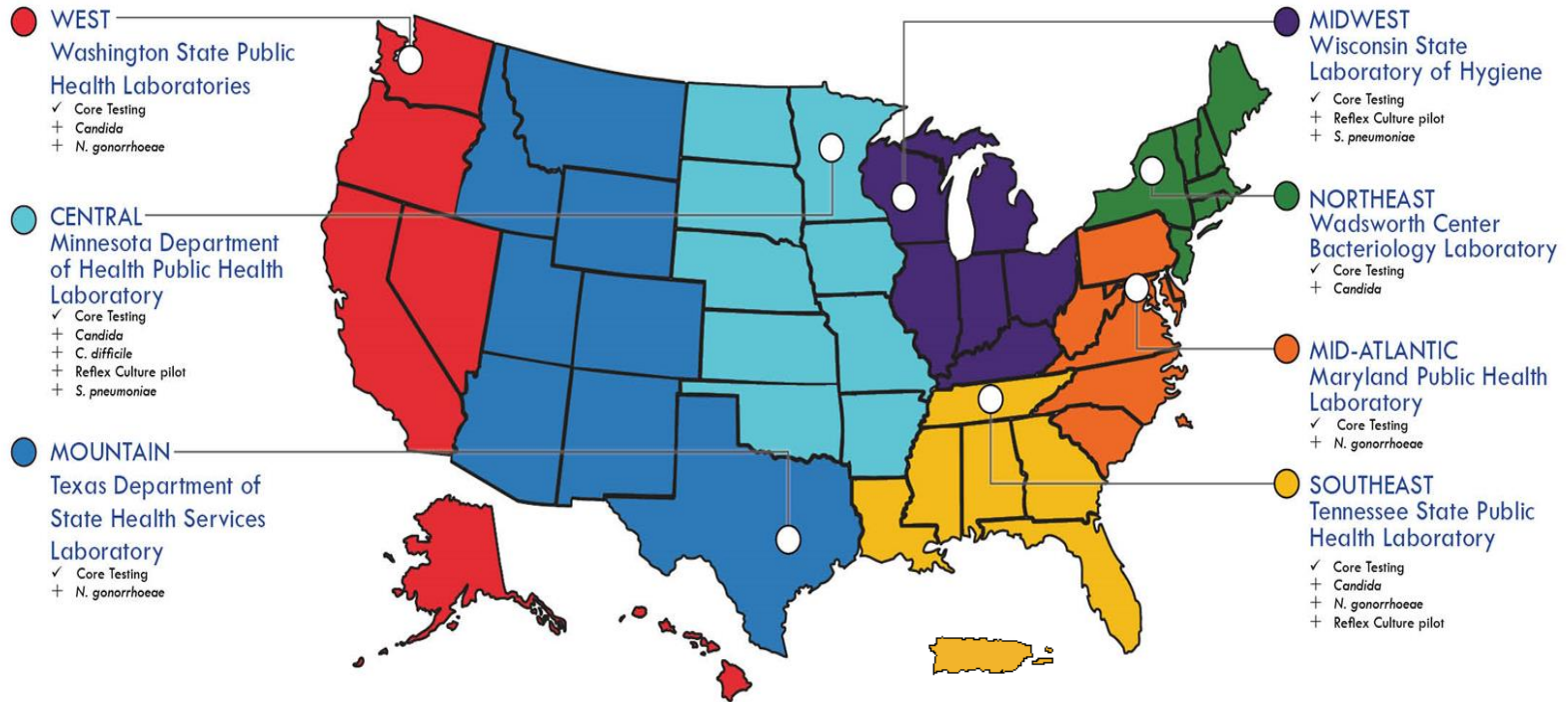
## **CARB Action Plan: Milestones to Improve Laboratory Capacity**

*Sub-Objective 2.1.1: Create a regional public health laboratory network that uses standardized testing platforms to expand the availability of reference testing services, characterize emerging resistance patterns & bacterial strains obtained from outbreaks & other sources, & facilitate rapid data analysis & dissemination of information.*

# ARLN



- **7 regional laboratories**



# Southeast Regional Laboratory

- **General testing activities**
  - CRE colonization screening
  - Identification of *Candida auris*
  - Antimicrobial susceptibility testing of *Neisseria gonorrhoeae*
  - Isolate collection for CDC AR Isolate Bank and WGS project
- **Sentinel Laboratory testing activities**
  - Special threat assessment on new or known threats like CR *Pseudomonas*, CR *Acinetobacter*, and ESBL *Klebsiella* and *E. coli*
  - *Candida glabrata* susceptibility testing

# Reportable Diseases in AL

## Immediate, Extremely Urgent Disease/Condition Investigation Forms

(Notify ADPH within 4 hours of presumptive diagnosis)

- Anthrax
- Botulism
- Plague
- Poliomyelitis, paralytic
- SARS-associated Coronavirus (SARS-CoV)
- Smallpox
- Tularemia
- Viral hemorrhagic fever
- Cases related to nuclear, biological, or chemical terrorist agents\*

## Immediate, Urgent Disease/Condition Investigation Forms

(Notify ADPH within 24 hours of presumptive diagnosis)

- Brucellosis
- Cholera
- Diphtheria
- *E. coli*, shiga-toxin producing (STEC)
- *Haemophilus influenzae*, invasive disease <sup>1</sup>
- Hemolytic uremic syndrome (HUS), post-diarrheal
- Hepatitis A, including ALT
- Legionellosis
- Measles
- Meningococcal disease <sup>1</sup>
- Novel influenza A virus (i.e., potential new strain)
- Pertussis
- Poliovirus infection, nonparalytic
- Rabies, human and animal
- Rubella
- Tuberculosis
- Typhoid fever
- Yellow fever
- Outbreaks of any kind <sup>2</sup>
- Cases of potential public health importance <sup>3</sup>

## Standard Notification Disease/Condition Investigation Forms

(Notify ADPH within 5 days, unless otherwise noted)

- [Anaplasmosis](#)
- Asthma <sup>4</sup>
- Arboviral disease (all resulted tests)
- Babesiosis
- Campylobacteriosis
- Chancroid\*\*
- *Chlamydia trachomatis*\*\*
- Cryptosporidiosis
- Dengue
- Ehrlichiosis
- Giardiasis
- Gonorrhea\*\*
- Hansen's disease (Leprosy)
- Hepatitis B, C, E, and other viral (acute only), including ALT
- HIV (including asymptomatic infection, AIDS, CD4 counts and viral load), pediatric and adult\*\*
- Influenza-associated pediatric mortality
- Lead, screening test results
- Leptospirosis
- Listeriosis
- Lyme Disease
- Malaria
- Mumps
- Perinatal HIV Exposure (<18 months of age)
- Psittacosis
- Q Fever
- Salmonellosis
- Shigellosis
- Spotted Fever Rickettsiosis
- *Staphylococcus aureus*, Vancomycin-intermediate (VISA) and Vancomycin-resistant (VRSA)
- *Streptococcus pneumoniae*, invasive disease <sup>1</sup>
- Syphilis\*\*
- Tetanus
- Trichinellosis (Trichinosis)
- Varicella
- Vibriosis

<http://www.adph.org/epi/Default.asp?id=5211>





# ARLN isolate shipping and lab reporting

- **Isolate FedEx shipping**

- **ARLN FedEx account can be used for all ARLN isolates**
  - **ARLN isolates shipped to the State Laboratory**
  - **CRE colonization swabs shipped to the Southeast Regional Laboratory**


- **Reporting**

- **Sending laboratory reports to the Southeast Regional Laboratory**
  - **Scan and securely email laboratory reports to [ARLN.Health@tn.gov](mailto:ARLN.Health@tn.gov) (preferred)**
  - **Fax to the TN state public health laboratory (615-262-6393)**
- **Receiving laboratory reports from the Southeast Regional Laboratory**
  - **Results of testing to be scanned and delivered via secure email or secure fax**

# ARLN Alert Values

- **ARLN Alert Values**
  - **CDC identified results that should trigger a response from laboratories to send isolates to the regional ARLN laboratory**

Updated April 20, 2017



**CDC AR LABORATORY NETWORK:**  
Action Guidance after Detection of New or Unusual Resistance

**PURPOSE**

As a part of the Antibiotic Resistance (AR) Laboratory Network, or ARLN, laboratories will conduct antimicrobial susceptibility testing on a number of organisms recognized as important AR threats. If findings show unusual resistance, then notifications, confirmatory testing, and/or specific follow-up actions are required to quickly implement appropriate prevention measures. The table below summarizes alert values for detection of new or unusual resistance and respective follow-up actions.

| Organism                       | Reason for Submission to the ARLN Regional Lab |   | ARLN Confirmation   |              | Follow-up Actions for Confirmed Results | Notifications for Confirmed Results   |                         |
|--------------------------------|--|---|---|--------------|---|---|-------------------------|
|                                | Testing Type                                   | Results                                       | Method  | Performed By |   | To Whom   | Timeframe               |
| <i>Acinetobacter baumannii</i> | Carbapenemase production testing and PCR       | Isolate(s) positive for carbapenem resistance | Perform carbapenemase production test and run full PCR panel (i.e., KPC, NDM, OXA-48 like, VIM, and IMP) to identify carbapenemase-encoding genes | Regional lab | Send isolate(s) to CDC                  | Report isolate(s) with suspected novel resistance (carbapenemase-producing but PCR-negative) to: <ul style="list-style-type: none"> <li>▪ CDC via email to <a href="mailto:ARLN_alert@cdc.gov">ARLN_alert@cdc.gov</a><sup>1</sup></li> <li>▪ Jurisdictional public health department</li> </ul> | Within 1 day of results |

# ARLN Alert Results vs. CLSI M-100 Appendix A

- **CLSI M-100 Appendix A**
  - Suggested test result confirmation and organism identification
  - Can serve as a guide about when to contact public health authorities
  - Three categories of action
    - **Category I**
      - Send isolate to public health lab
    - **Category II**
      - Check to determine which isolates should be sent to SPHL
    - **Category III**
      - Check with infection control in the facility to determine if additional action needed

# ARLN Alert Results vs. CLSI M-100 Appendix A



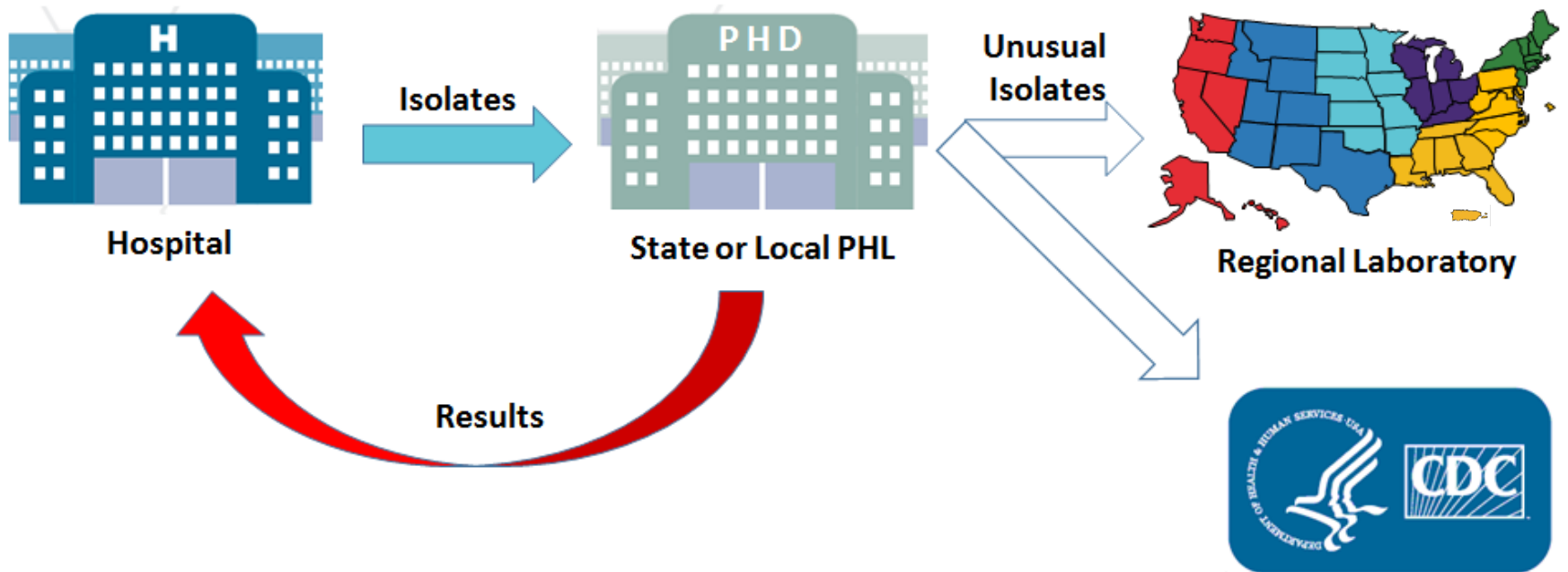
## Southeast Regional Laboratory: Comparison of ARLN Alert Values to M-100 Appendix A\*

| Organism                       | Test Result  | ARLN Alert | M-100 Appendix A Category** |
|--------------------------------|--|------------|-----------------------------|
| <i>Acinetobacter baumannii</i> | Isolate(s) positive for carbapenem resistance  | ★          | ★<br>Category III           |
|                                | Pan-resistant (resistant to all drugs tested by the submitting clinical laboratory and public health laboratory) | ★          |                             |
|                                | Colistin minimum inhibitory concentrations (MICs) $\geq 4$ $\mu\text{g/mL}$                                      | ★          | ★<br>Category II            |
| <i>Candida spp.</i>            | Identification of <i>C. auris</i> or <i>C. haemulonii</i>  | ★          |                             |
|                                | <i>C. glabrata</i> resistance to echinocandin  | ★          |                             |

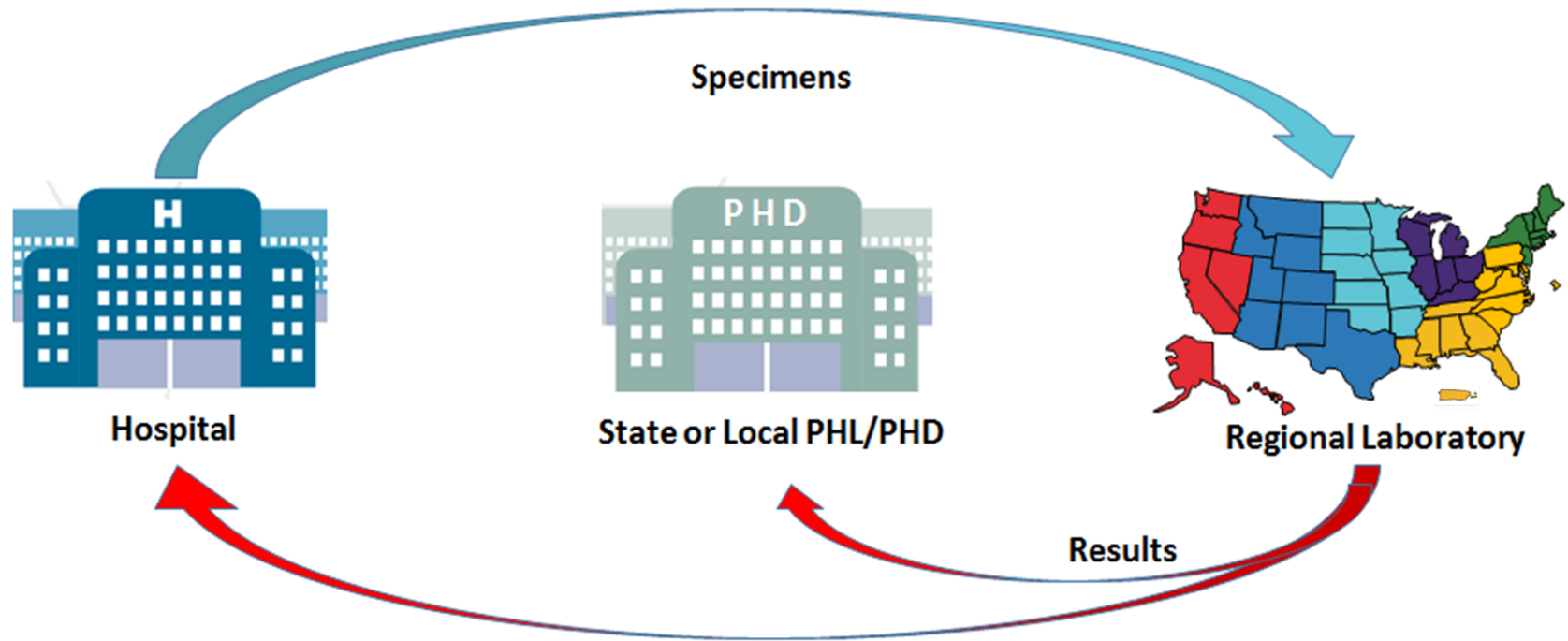
# Southeast ARLN: Current Testing Offered

- **CRE/CRPA**
  - Confirmation of specimen ID by MALDI-TOF
  - mCIM (modified carbapenem inactivation method)
  - Resistance mechanism PCR
    - KPC
    - NDM
    - Oxa-48
    - VIM
  - Cepheid (GeneXpert)
- **Candida**
  - Confirm specimen identification by MALDI-TOF
- ***Neisseria gonorrhoeae* (GC)**
  - Susceptibility testing

# Testing Flow- CRE and CRPA Isolates

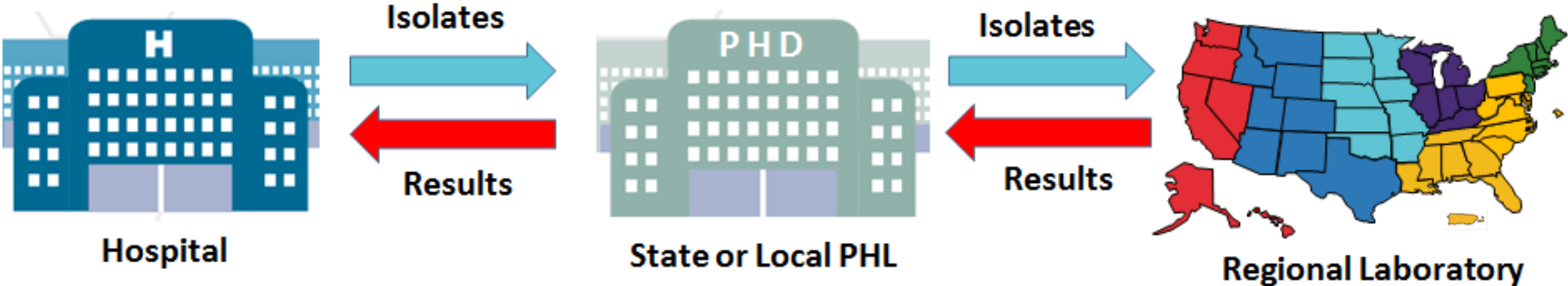


# CRE Colonization Screening- Specimen Flow





# Testing Flow- Other Testing



All testing is done at the regional laboratory.

# Estimated Impact of the ARLN

| Public Health Priority   | Current Lab Capacity  | With the ARLN  |
|--|---|--|
| <b>Gonorrhea Testing</b>   | <b>6,000 isolates per year</b><br>by all state health departments | <b>20,000 isolates per year</b><br>by four regional labs   |
| <b>CRE Characterization</b>  | <b>8 states</b><br>conduct testing through the EIP                | <b>All 50 states</b><br>conduct characterization testing, regional labs to confirm especially unusual resistance |
| <b>CRE Outbreak Lab Support</b>  | <b>Upon request</b><br>Provided by CDC to states                  | <b>Sustained capacity</b><br>Provided by all regional labs and CDC   |
| <b>Detecting new resistance threats, like <i>mcr-1</i> and <i>C. auris</i></b> | <b>Reported ad hoc</b><br>Often detected first in academia        | <b>Sentinel surveillance</b><br>Sustained, adaptable capacity to identify and address new AR threats             |

# CRE Colonization Screening

- **Rationale**
  - **Screen and detect for colonizing CRE if indicated**
  - **Prevent further transmission**
  - **Increase laboratory capacity by providing service at no cost**

# CRE Colonization Screening

- **When to screen:**
  - When a patient has confirmed CP-CRE
    - Epi-linked contacts (roommates)
  - Consider broader screening depending on the following:
    - Setting
    - Overlap in the length of stay
    - Level of care provided
    - Presence of risk factor (e.g. wound, incontinence)
  - When screening exposed discharged patients
    - Device exposures
    - Substantial overlap
    - High levels of care

# CRE Colonization Screening

- **Sample Collection and Submission**
  - Regional lab deploys swab kit to facility requesting colonization testing
  - Swabs are used to collect peri-rectal or rectal specimens from contacts of the index case
  - There will be a packet accompanying swabs
    - Specimen collection guide
    - Packaging for transport guide
    - FedEx shipping information



# CRE Colonization Screening



## CDC AR LABORATORY NETWORK: Quick-Glance Sampling Guidance for CRE Colonization Screening by Cepheid GeneXpert

### PURPOSE.

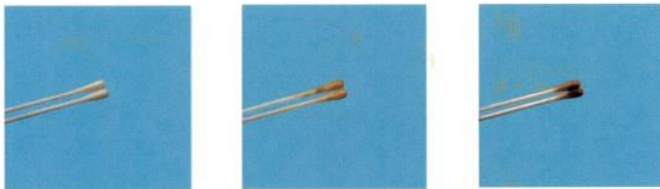
The Cepheid GeneXpert Carba-R test is the only FDA-approved commercial test for the detection of carbapenemase resistance gene targets in human rectal swab specimens and has a rapid turn-around time for results. Proper sampling is critical for obtaining accurate results. This guidance provides a visual reference for what is considered acceptable versus unacceptable sampling for use in the Cepheid GeneXpert Carba-R assay.

### GENERAL CONSIDERATIONS.

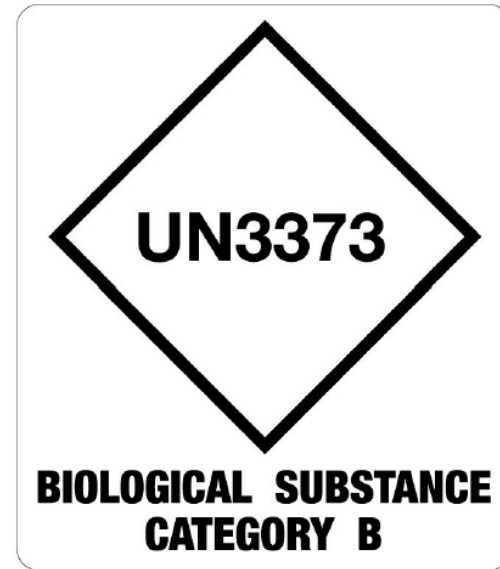
- Sampling should be performed using the Cepheid dual swab collection device (Cepheid catalog # 900-0370)
- Images below provide information on acceptable versus unacceptable specimens whether collected by rectal sampling or swab preparation from a fecal specimen; images obtained from Cepheid product insert
- In general, swabs should not be overloaded with specimen

### REPRESENTATIVE IMAGES OF ACCEPTABLE AND UNACCEPTABLE SWAB SPECIMENS.

#### Acceptable Specimens



Example of an appropriate label



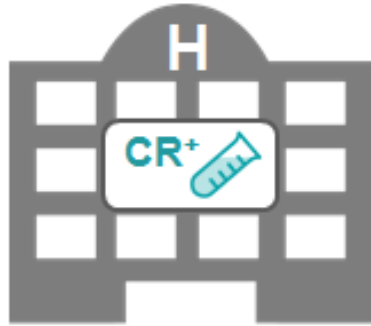
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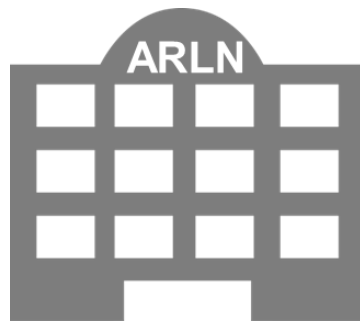
# CRE Colonization Screening

- **Sample Collection and Submission (continued)**
  - **Samples collected from epi-linked contacts of the index patient**
  - **Swabs shipped to SE regional laboratory within one day of collection**
  - **Isolate from index patient sent to SE regional laboratory**
  - **SE regional laboratory to submit results to the submitting laboratory and IP of facility and HAI coordinator within one working day of test completion**

# CRE Colonization Screening- Specimen Flow

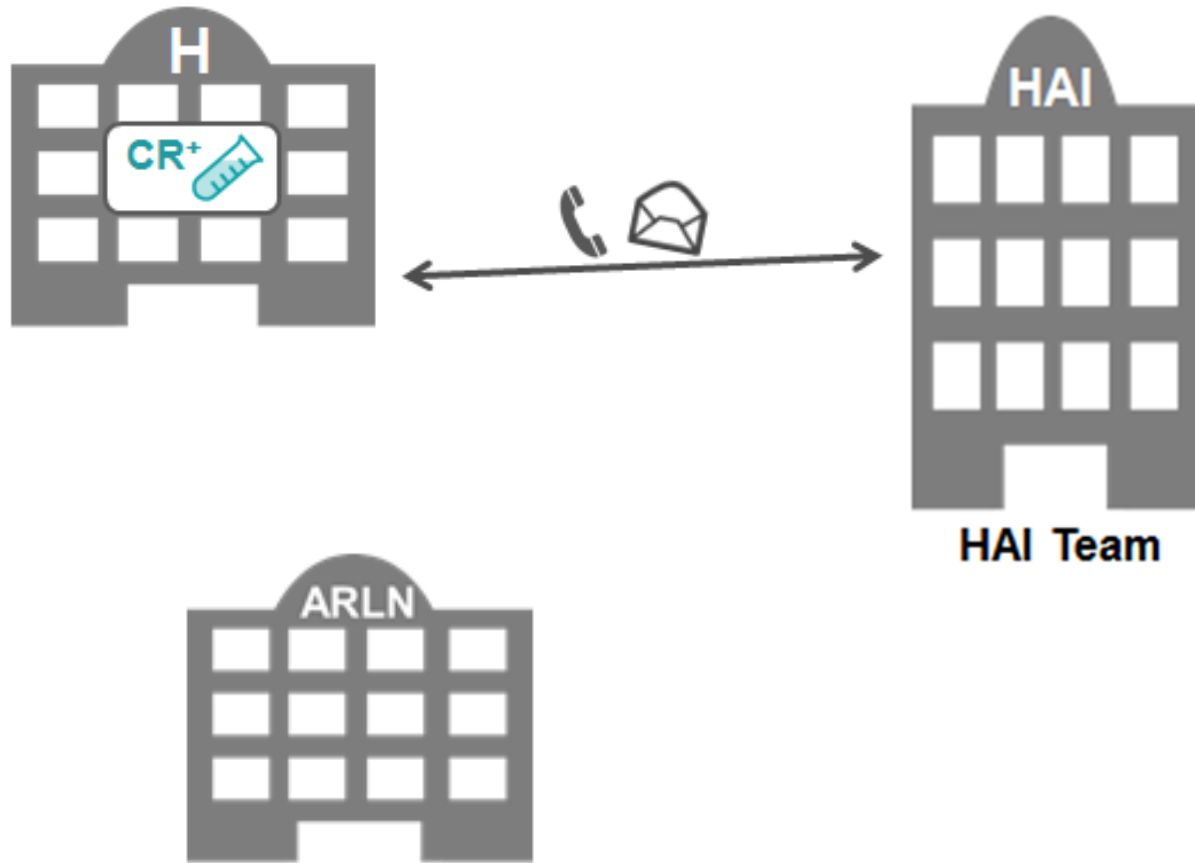


**HAI Team**

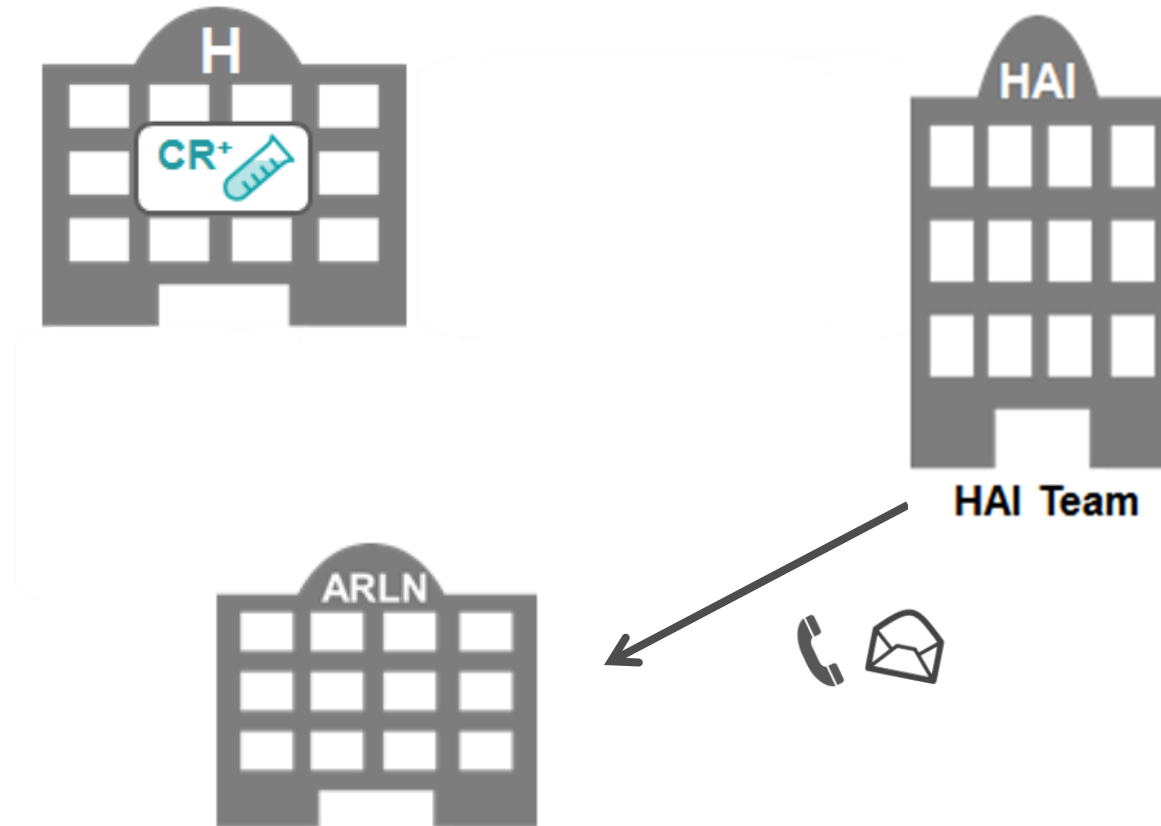




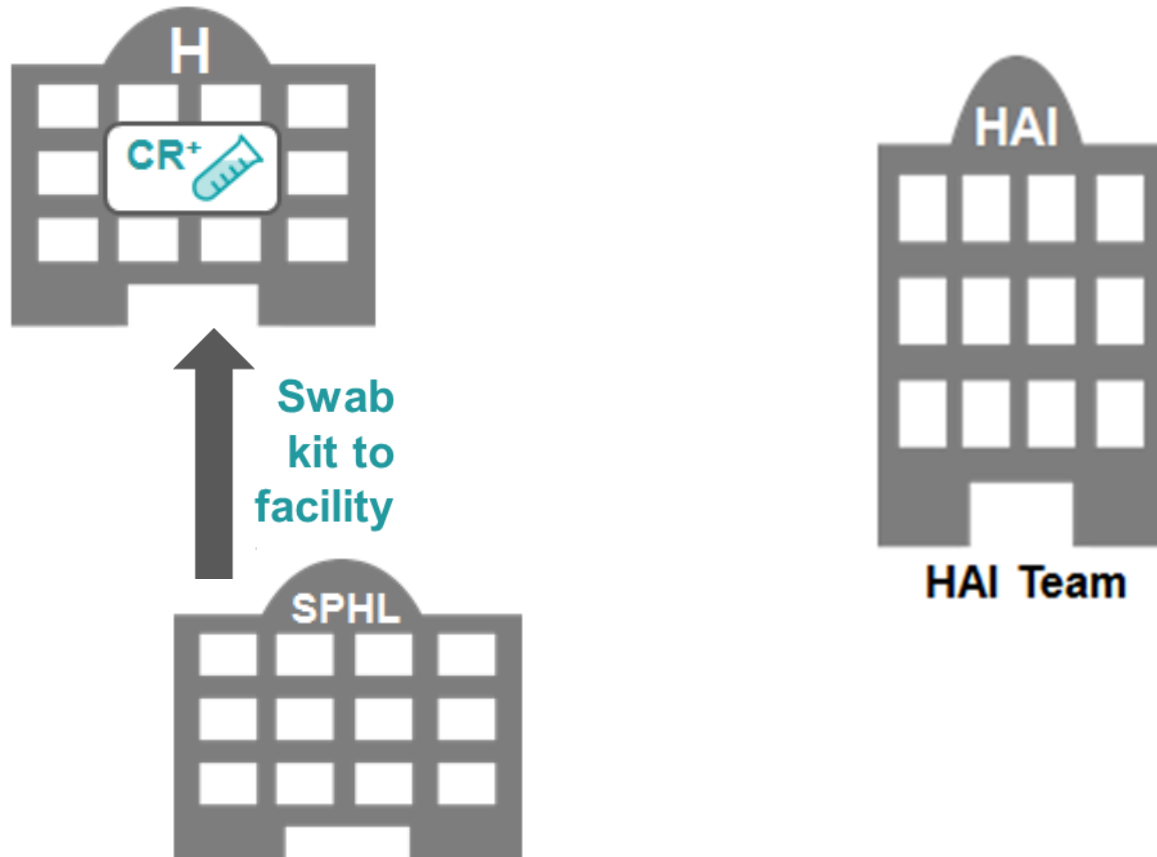
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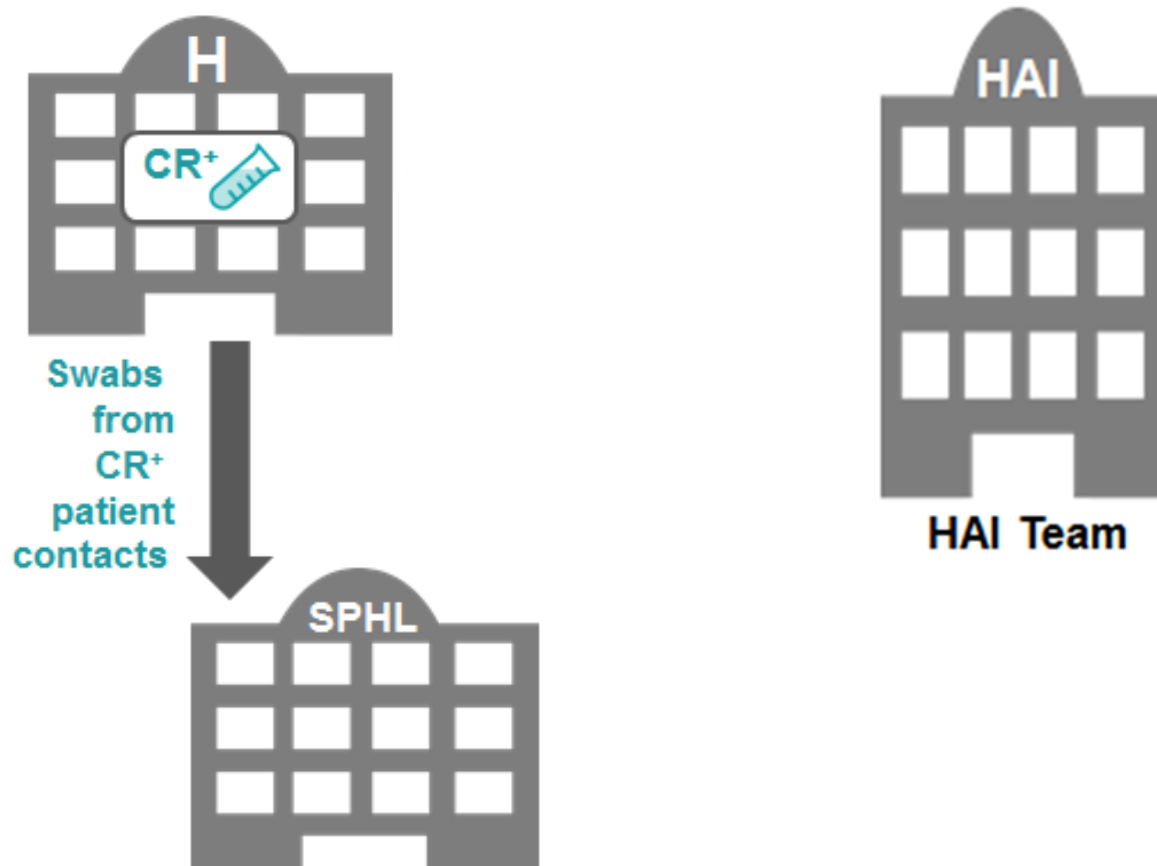
# CRE Colonization Screening- Specimen Flow



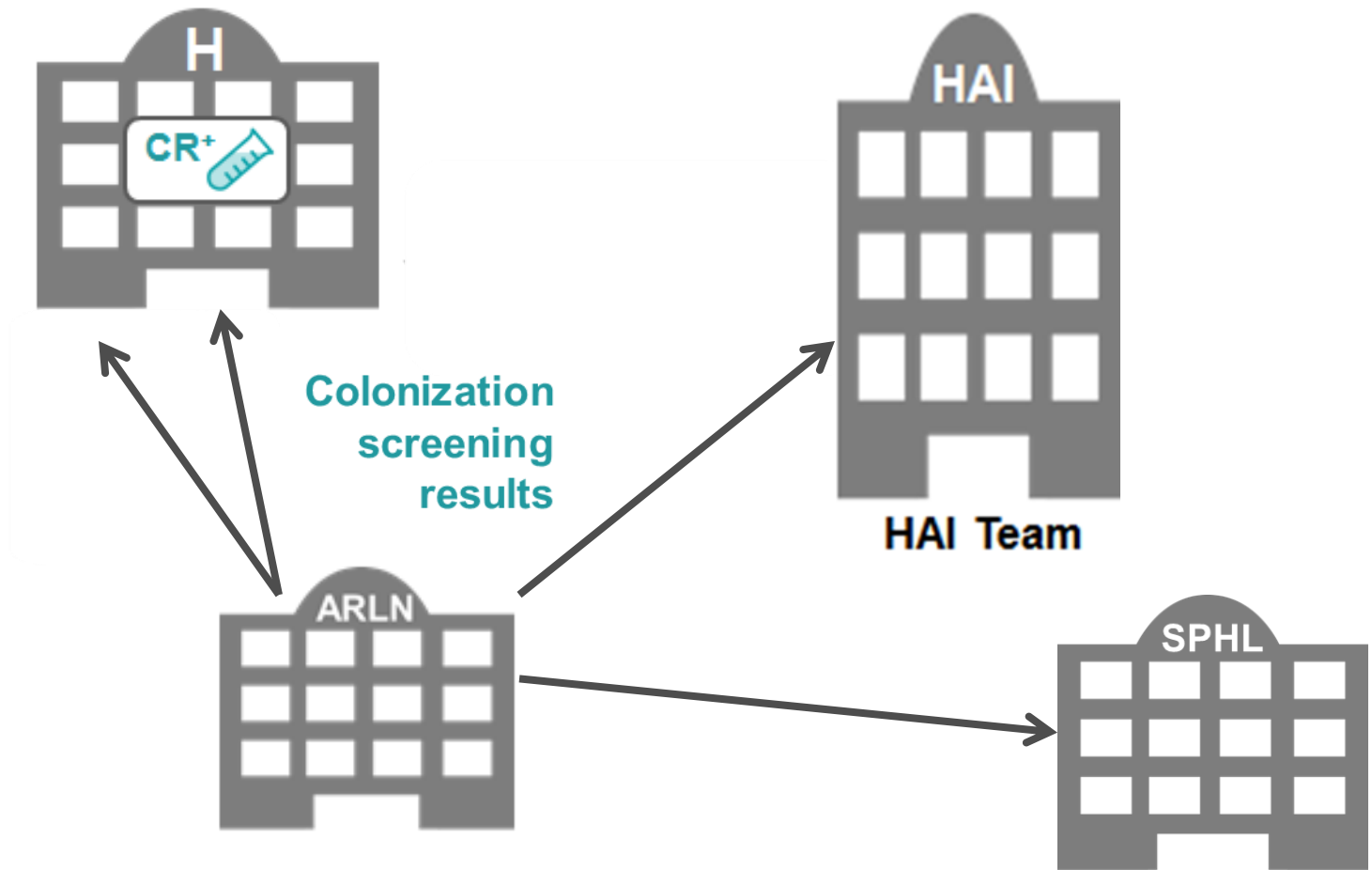
# CRE Colonization Screening- Specimen Flow



# CRE Colonization Screening- Specimen Flow



# CRE Colonization Screening- Specimen Flow



# CRE Colonization Screening

- **Supplemental questions**
  - **Questions of epidemiologic significance to answer during the CRE colonization screening process**
    - **Inform how CRE is transmitted in the state**
    - **Improve our ability to advise facilities considering colonization screening**

# Suspect *Candida auris* testing- All facilities

- ***Candida sp.* isolates to submit**
  - *Candida auris*
  - Suspected *C. auris*
- ***Candida auris* and suspect *Candida auris* to be submitted from all sites (sterile or otherwise) and all facilities**
- **Link to interim guidance from CDC on *Candida auris***
  - <https://www.cdc.gov/fungal/diseases/candidiasis/recommendations.html#diagnosis>

# ***Candida auris* can be misidentified as:**

- ***C. haemulonii***
- **Simply reported as *Candida* spp. after a validated method of *Candida* species identification was attempted**
- **MicroScan**
  - ***Candida catenulata*,**
  - ***Candida famata*,**
  - ***Candida guilliermondii*,**
  - ***Candida lusitaniae***
- **Phoenix**
  - ***Candida catenulata***
- **API 20C**
  - ***Candida sake***
  - ***Rhodotorula glutinis* and the characteristic red color of *R. glutinis* is not present**



# ***Candida auris*: Check with your Laboratory**

- **Which identification methods are used in your Laboratory?**
  - Vitek
  - MicroScan
  - Phoenix
  - API
  - MALDITOF
- **Know limitations of identification methods**
- **Check if using most recent software/ database update (and whether it identifies *C. auris*)**
- **Consider requiring speciation for all *Candida* spp.**

# Laboratory Recruitment- Background

- **Laboratory recruitment for the ARLN allows ongoing evaluation of AR questions through the submission of isolates of interest for further characterization.**
- **Data obtained from this sentinel laboratory testing will enhance our understanding of emerging or changing AR threats**
- **Laboratories that participate in this testing will have data provided to them and the ability to compare that data to the region to better understand local AR patterns**

# Laboratory Recruitment Flyer

## ARLN Sentinel Laboratory Testing



### Purpose

As part of the antibiotic resistance laboratory network (ARLN) the Southeast regional ARLN laboratory located in Nashville, TN is recruiting sentinel laboratories dedicated to submitting isolates of public health significance.

### Benefits of Being an ARLN Sentinel Laboratory

- ❑ Be on the front lines of detection of novel resistance types
- ❑ Provide data essential to better understanding emerging or changing antimicrobial resistance threats
- ❑ Obtain reports of data from additional characterization of submitted isolates
- ❑ Data from isolates can be compared to the data from the Southeast region

### Isolates of Interest

#### ❑ *Candida spp*

Participating labs will:

- Submit all *Candida glabrata* isolated from sterile sites\* for susceptibility testing
- Submit isolates of all *Candida spp* not specifically excluded recovered from a sterile site
  - EXCLUDED: *C. albicans*,  
*C. dublinensis*, *C. krusei*,  
*C. parasilosis*, *C. lusitaniae*  
and *C. tropicalis*

#### ❑ Carbapenem resistant *Acinetobacter spp*

Participating laboratories will:

- Submit all *Acinetobacter spp* isolates resistant to imipenem, doripenem, or meropenem by standard AST methods\*

#### ❑ Extended beta lactamase producing (ESBL) *Klebsiella spp* and *E. coli*

Participating laboratories will:

- Submit isolates of *Klebsiella spp* and *E. coli* resistant to third-generation cephalosporins by standard AST methods\*

\*see reverse for additional information

Please contact us at [ARLN.Health@tn.gov](mailto:ARLN.Health@tn.gov) with any questions

# Laboratory Recruitment- *Candida* Testing

- **Recruiting laboratories:**
  - To submit all *C. glabrata* isolated from sterile sites (e.g. blood, CSF) for susceptibility testing
  - Any *Candida sp.* not specifically excluded recovered from a sterile site
    - EXCLUDED *Candida sp.* are *C. albicans*, *C. dublinensis*, *C. krusei*, *C. parasilosis*, *C. lusitaniae* and *C. tropicalis*
- Participating hospitals/laboratories to complete annual survey on volume and methods of fungal identification and susceptibility testing

# Laboratory Recruitment- Additional Testing

- **Recruiting clinical laboratories to provide the following isolates (in addition to *C. glabrata* recruitment):**
  - **Carbapenem resistant *Acinetobacter***
  - **ESBL *Klebsiella* and *E. coli***
  - **Carbapenem resistant *Pseudomonas aeruginosa***
- **One laboratory can provide isolates of multiple organisms if they have the capacity to do so**
- **Laboratories can discuss becoming a sentinel laboratory with the state HAI Coordinators**

# With our powers combined...



# ARLN Contacts

- **Southeast Region Contact**
  - **Southeast ARLN contact**
    - [ARLN.Health@tn.gov](mailto:ARLN.Health@tn.gov)

