



CDC AR LABORATORY NETWORK: Guidance for Implementation of Targeted Surveillance Testing in Regional Laboratories

PURPOSE.

AR Lab Network Regional Laboratory grantees are asked to provide reference laboratory testing to better understand an emerging or changing AR threat. This testing is to be conducted among a network of collaborating clinical or reference laboratories representing each jurisdiction in the region. This document clarifies the goals and expectations for Targeted Surveillance Testing (previously known as “Activity 2”).

GOALS.

The two goals of Targeted Surveillance are:

1. To allow Regional Laboratories to develop a network of clinical or reference laboratories that will allow for ongoing evaluation of AR questions through the submission of isolates and/or laboratory data; and
2. To test the utility and effectiveness of this system by using it to evaluate emerging AR threats from sentinel labs (outlined below)

GENERAL CONSIDERATIONS.

In order to decrease the overall burden on the Regional Laboratories, the following simplification of Targeted Surveillance are proposed:

1. Regional laboratories should work with AR Lab Network funded state and local public health labs in their region to identify and reach out to clinical labs in their jurisdiction who might be willing to submit isolates for further characterization.
2. Targeted surveillance networks should consist of between 7 and 15 laboratories per region (including at least 1 laboratory from each jurisdiction). Preference should be given to laboratories that have a high prevalence of the targeted threats and/or they serve the types of facilities where risk of transmission is greatest..
3. Isolates may be processed in batches. This includes batching by the participating clinical laboratories for shipment and batching by the regional laboratory for testing. For the sake of public health action, we ask regional labs to process submitted targeted surveillance isolates at least twice monthly (i.e., mid-month and end-of-month).

ISOLATE COLLECTION.

Isolate collection strategies for submitting sites:

- *Acinetobacter* resistant to imipenem, meropenem, or doripenem by standard susceptibility testing methods (i.e., minimum inhibitory concentrations of ≥ 8 $\mu\text{g}/\text{mL}$)
- A subset (number and submission scheme to be determined in collaboration with jurisdictional and regional labs) of *E. coli* or *Klebsiella spp* that are **susceptible** to all carbapenems and resistant to at least

one third-generation cephalosporin, by standard susceptibility testing methods (i.e. minimum inhibitory concentrations of $\geq 4 \mu\text{g/ml}$ for cefotaxime, and ceftriaxone or $\geq 16 \mu\text{g/ml}$ for ceftazidime). A positive test result for ESBL production would further narrow submissions, if available.

LABORATORY TESTING.

1. Species identification

- Species should be confirmed on all *Acinetobacter*, *E. coli*, and *Klebsiella spp* received using one of the methods listed below:
 - MALDI-TOF mass spectrometry
 - Commercial identification method (e.g., VITEK 2)

2. Antimicrobial susceptibility testing (AST)

- All isolates should be tested against drugs listed in Table 1 for phenotypic confirmation of carbapenem-resistant *Acinetobacter* and ESBL-like *E. coli* and *Klebsiella spp*.
- Broth microdilution should be conducted using frozen or dried panels

Table 1. Drugs used to confirm carbapenem-resistant *Acinetobacter* and third-generation-resistant *E. coli* and *Klebsiella spp*.

Drug class	Carbapenem-resistant <i>Acinetobacter</i>	Third-generation cephalosporin-resistant <i>E. coli</i> and <i>Klebsiella spp</i>
Carbapenems	2 carbapenems (imipenem, doripenem, or meropenem)	2 carbapenems (ertapenem and either imipenem, doripenem, or meropenem)
Cephems	ceftazidime and cefepime	cefotaxime, ceftriaxone, ceftazidime, and cefepime
B-lactam/B-lactamase inhibitor combinations	piperacillin-tazobactam	ceftazidime- and cefotaxime-clavulanate
Monobactams	aztreonam	aztreonam
Polymyxins	colistin	colistin

1. Molecular Detection

Table 2. List of required and optional molecular targets for carbapenem-resistant *Acinetobacter* and ESBL-producing *E. coli* and *Klebsiella spp*.

PCR	Carbapenem-resistant <i>Acinetobacter</i>	ESBL-producing <i>E. coli</i> and <i>Klebsiella spp</i>
Required	<i>bla</i> _{KPC} , <i>bla</i> _{NDM} , <i>bla</i> _{OXA-23-like} *, <i>bla</i> _{OXA-48-like} , <i>bla</i> _{VIM} , <i>bla</i> _{IMP}	<i>mcr</i> genes
Optional	<i>mcr</i> genes	NA

*PCR protocol for OXA-23 multiplex assay is forthcoming (est fall 2018).

Table 3. List of recommended PCR detection methods

Test Name	Type	Source	Targets	Instrumentation
Real-time PCR KPC/NDM	PCR	CDC	<i>bla</i> _{KPC} / <i>bla</i> _{NDM}	ABI 7500
Real-time PCR OXA-48	PCR	CDC	<i>bla</i> _{OXA-48-like}	ABI 7500

Real-time PCR OXA-23	PCR	CDC	<i>bla</i> _{OXA-23-like}	ABI 7500
Real-time PCR VIM	PCR	CDC	<i>bla</i> _{VIM}	ABI 7500
Real-time PCR IMP	PCR	CDC	<i>bla</i> _{IMP}	ABI 7500
Real-time PCR <i>mcr-1</i>	PCR	CDC	<i>mcr</i> genes	ABI 7500
X-pert Carba-R	PCR	Cepheid	<i>bla</i> _{KPC} , <i>bla</i> _{NDM} , <i>bla</i> _{OXA-48-like} , <i>bla</i> _{VIM} , <i>bla</i> _{IMP-1} group	GeneXpert®

REQUIRED REPORTING.

1. **Labs will report ARLN alert values within 1 day of detection.** Findings of *mcr* -positive isolates and carbapenemase gene-positive *Acinetobacter* will be reported to the submitting healthcare facility, their jurisdictional HAI coordinator, and CDC within 1 day of detection. Reports to CDC will use the ARLN Alerts inbox at ARLN_alert@cdc.gov.)
2. **Labs will submit a monthly report of all Targeted Surveillance testing results to CDC by the 10th of each month for the previous months' testing.** This report will be submitted through the APHL portal. In the meantime, monthly summaries may be submitted using the monthly reporting form for Targeted Surveillance (available on the Share File site).
3. **Labs will provide a monthly report of Targeted Surveillance testing results back to participating sentinel labs, the jurisdictional state public health laboratory, and the jurisdictional HAI epidemiologist.** These reports will be submitted via secure communications.

CONTACT INFORMATION.

For questions or further information, please contact Dr. Sarah Malik (vgg9@cdc.gov) or CDC's ARLN inbox at ARLN@cdc.gov.