ANTIMICROBIAL RESISTANCE SURVEILLANCE TASK FORCE, YEAR 3
Progress Report: Recommendations for Antimicrobial Resistance Surveillance in the United States
Terminology/Data Standards, Use of Standardized Codes

1. Identify/create LOINC codes for all relevant tests and SNOMED codes for pathogens and corresponding test results for all AR pathogens and AST, and a process for timely establishment of these codes.

Breakpoints

2. Encourage the adoption of the President’s Advisory Council – Combatting Antibiotic Resistant Bacteria (PAC-CARB) recommendation that use of most up-to-date breakpoints as a Clinical Laboratory Improvement Act (CLIA) requirement.

Data Suppression

3. Gather more information on the reasons surrounding data suppression, including which suppressed Antimicrobial Susceptibility Testing (AST) data may be useful for clinical and public health interventions.
4. Develop guidance for laboratories on how to approach de-suppression of AST data for public health purposes (e.g. CLSI M39). Include recommendations on how to apply suppression rules for public health surveillance to de-suppress appropriately.

AR Electronic Laboratory Reporting (ELR)

5. Establish and disseminate best practices in ELR for AR by revisiting the guidance document created by the CSTE AR/ELR Working group in 2017 for CRE, (“Best Practices for Surveillance of Antimicrobial Resistance via Electronic Laboratory Reporting Recommendations from the CSTE AR/ELR Working Group, June 2017”), and broadening its scope to include the other pathogens and AR mechanisms that should be reported through ELR.
6. Of those laboratories that submit via ELR, all should submit reportable AR laboratory findings to public health via ELR, with messages transmitted conforming to nationally accepted standards, and validated in content and structure for accuracy and completeness when sent or received. Laboratories that are not currently reporting via ELR are encouraged to do so, especially as electronic reporting of AR is a compelling reason to develop this capacity.
7. Laboratory results obtained through the AR Lab Network data should be interoperable and submitted to public health agencies using standardized HL7 messages.

Nationally Notifiable Disease Surveillance System Carbapenemase Producing-CRE Message Mapping Guide

8. Finalize and implement the Message Mapping Guide (MMG) for Nationally Notifiable Disease Surveillance System (NNDSS) Carbapenemase Producing Carbapenem-Resistant Enterobacteriacea (CP-CRE) and include the ARSTF MMG workgroup in this CDC process.

Linking Laboratory and Epidemiological Data

9. Publish guidelines for creating and maintaining linkages between laboratory findings and case findings for both state/local and CDC programmatic needs.
NHSN, Informatics to Track AR Among Healthcare Facilities

10. Healthcare facilities should use the NHSN AUR module (the AR Option in particular) and jurisdictions should consider using the AR Option as a component of their public health reporting system.

11. Develop surveillance infrastructure (registries, modeled on the XDRO registry in Illinois) to identify patients in outpatient settings and when they are admitted to healthcare facilities, as well as patients transferred between facilities.

Sustainability of AR Surveillance and the Work of the Task Force

12. Create and implement a plan to integrate AR surveillance planning into ongoing processes and organizations.

Surveillance Scope

13. Develop a policy for surveillance of colonization with multidrug resistant organisms (MDRO)/AR that can be used to inform CSTE Position Statements for standardized surveillance.

14. Develop guidance for jurisdictional antibiograms for use by States and large cities.
INTRODUCTION:

The Year 3 Antimicrobial Resistance Surveillance Task Force (ARSTF) annual report describes the progress made from July 2018 to June 2019. The report serves as an update to stakeholders in AR surveillance on the ARSTF recommendations that were developed and released in September 2018, offering ideas for continuation of current activities, as well as insights for planning future work of the ARSTF.

The intent of the Task Force is to plan and foster collaboration among stakeholders to address gaps in AR surveillance, identify and exploit opportunities, and respond to new epidemiological challenges posed by evolving pathogens, resistance mechanisms, and advancing technologies.

Information on the genesis of the Task Force, its mission and vision, and planning progress and activities over the first two years can be found in the "ARSTF Year 2 Report and Recommendations for AR Surveillance in the United States" (September 2018).

TASK FORCE RECOMMENDATIONS ADDRESSED IN YEAR 3:

In prioritizing and advancing the Task Force’s strategic objectives, in September 2018 the Task Force identified 14 key recommendations (some with sub-recommendations) among 9 topic areas. The following provides updates on each recommendation as of June 2019, categorized by topic area.

**TOPIC: Terminology/Data Standards, Use of Standardized Codes**

**Recommendation 1:** Identify/create LOINC codes for all relevant tests and SNOMED codes for pathogens and corresponding test results for all AR pathogens and AST, and a process for timely establishment of these codes. Sub-recommendations include:

- a. Develop processes for ensuring that LOINC/SNOMED codes are available for non-proprietary tests.
- b. Encourage CLSI or FDA to require manufacturers to recommend a standard three-letter antibiotic code when submitting new compounds for review. CLSI or FDA should also submit a letter antibiotic code when submitting new compounds for review. CLSI or FDA should also submit a request to the Regenstrief Institute for the creation of relevant LOINC codes for new compounds under review.
- c. Document a standardized approach for submitting for LOINC and SNOMED codes for new/emergent pathogens.
- d. Support efforts to routinely include standard codes in package inserts for proprietary tests (e.g. SHIELD).
- e. Routinely include LOINC/SNOMED code recommendations in laboratory guidance documents (e.g. CLSI).
Progress Update: ARSTF workgroups met with various stakeholders to understand current processes for creating, curating, and standardizing LOINC and SNOMED codes for AR pathogens and AST results. The following insights emerged from workgroup discussions:

- There has already been significant effort and infrastructure developed to promote standardization of in vitro diagnostic tests and AR results, including through Regenstrief (LOINC) and National Library of Medicine (NLM) (SNOMED-CT). However, there is room for further improvement. This complicated topic would benefit from enhanced communication among stakeholders and collaborative efforts.
- FDA is already engaged in an exemplary effort to improve standardization and communication of electronic laboratory reporting (ELR) test results through the Systemic Harmonization and Interoperability Enhancement for Laboratory Data (SHIELD) collaborative. The ARSTF shall pursue designating permanent representatives to serve on the SHIELD collaborative. The role of these ARSTF representatives would be to ensure AR is adequately addressed through SHIELD initiatives and to link communication between the ARSTF and SHIELD.
- The ARSTF will consider publishing a White Paper for technical assistance to inform and encourage submitters to use the emergency approval approach already available through current processes. The Association of Public Health Laboratories (APHL) or the AR Lab Network (ARLN) could provide appropriate provide avenues for developing this technical assistance.
- There are current efforts from both APHL and SHIELD to work with CDC programs to reach out to vendors when new test kits are being submitted, as an approach to ensure that electronic reporting with standard codes is a consideration at time of development (and not as an afterthought). The Task Force will approach CDC Division of Healthcare Quality and Promotion (DHQP) regarding a similar approach for AR testing.
- To advance all standardization sub-recommendations, the ARTSF should connect with Regenstrief, NLM, and the SHIELD collaborative to explore the establishment of a strong system curating LOINC and SNOMED codes. This curation system would address the issue of laboratories using different codes to report the same test/result. Such a proposal would likely require additional resources and identification of curators (most likely Regenstrief and/or NLM).

TOPIC: Breakpoints

Recommendation 2: Encourage the adoption of the President’s Advisory Council – Combatting Antibiotic Resistant Bacteria (PAC-CARB) recommendation that use of most up-to-date break points becomes a CLIA requirement.

Progress Update: This recommendation was presented to the Clinical Laboratory Improvement Advisory Committee (CLIAC) at its November 2018 meeting. CLIA requirements are usually made upon recommendation of the CLIAC, then reviewed by Office of the Assistant Secretary for Health (OASH) at the
Department of Health and Human Services (DHHS). If accepted by that office, the CLIAC recommendation is then submitted to the appropriate agencies (commonly CMS and FDA) for their advice and action.

- The Clinical Laboratory Improvement Advisory Committee (CLIAC) accepted the Task Force’s Breakpoints Recommendation 2 as specified above, with the caveat that compliance may require more than the one-year proposed timeline that the Task Force initially recommended.
- The November 2018 CLIAC Summary Report made the following recommendations:
  - “In support of antibiotic stewardship efforts by the president’s advisory council and others, CLIAC recommends that CMS require that clinical laboratories, in a timely fashion (e.g. within at most one year) and using reasonable effort, convert to contemporary antimicrobial resistance breakpoints in accordance with manufacturer’s instructions.
  - Recognizing the urgency imposed by the pace of emerging antimicrobial resistance, CLIAC recommends that the FDA update existing guidance to prioritize manufacturers’ timely integration of updated antimicrobial susceptibility breakpoints.”
- The Task Force will continue to monitor implementation of this CLIAC recommendation.

**TOPIC: Data Suppression**

**Recommendation 3:** Gather more information on the reasons surrounding data suppression, including which suppressed Antimicrobial Susceptibility Testing (AST) data may be useful for clinical and public health interventions. Sub-recommendations include:

a. Gather list of expert rules from instrument manufacturers. Evaluate how those rules would impact public health surveillance data. This evaluation should include assessment of the impact of data suppression on public health reporting of AR resistant pathogens in antibiograms for AMS.

b. Assess the effect of data suppression rules on the availability and usefulness of resistance data on the data currently reported via the NHSN AUR module.

**Progress Update:** The Task Force engaged with AST instrument manufacturers to better understand suppression of AR data, also called “selective reporting.” While these discussions were a helpful starting point, additional engagement of manufacturers, representatives of clinical laboratories, and infection prevention and antimicrobial stewardship (AMS) programs is clearly needed.

- Suppressed AST results are defined by the ARSTF as results from drugs tested that are appropriate for the species but that are not reported for several reasons (susceptibility to narrow-spectrum drugs, patient demographics, body site, etc.).
- Data from a 2018 ARSTF Lab Workgroup assessment distributed to clinical laboratories and a handful of public health laboratories found that nearly half of the respondents do not include suppressed data in their cumulative antibiogram. This finding illustrates one area in which data suppression may potentially impact both clinical and public health interpretation of AR data.
- It would be beneficial for the ARSTF to further engage with STLT epidemiologists and CDC to specify what information needs to be de-suppressed and why, from a public health perspective. Scenarios crafted to exemplify both benefits and consequences of de-suppressing select data would be helpful tools to demonstrate real-world implications for public health.
• Once public health has identified specifically what AR data should be de-suppressed and why, the ARSTF can act as a coordinating body to facilitate discussions with manufacturers, vendors, and informaticians within the lab and hospital systems to understand how to achieve de-suppression of AR data where appropriate. The ARSTF should coordinate this engagement with NHSN staff, who are also engaging with vendors on these issues, to avoid duplication of effort and to minimize burden on the vendors.

• The Task Force could also reach out to clinical labs to inquire if editing the suppression rules on the AST instruments at the facility-level is possible and what the barriers may exist to implementing those changes (perhaps IT).

**Recommendation 4:** Develop guidance for laboratories on how to approach de-suppression of AST data for public health purposes (e.g. CLSI M39). Include recommendations on how to apply suppression rules for public health surveillance to de-suppress appropriately.

**Progress Update:** The Task Force has not yet begun work on this recommendation, which is contingent upon the completion of the first topic area Recommendation 3, “Gather more information on the reasons surrounding data suppression, including why those data are suppressed, and which of those data may be helpful or harmful to appropriate and useful clinical and public health interventions.”

**TOPIC: AR Electronic Laboratory Reporting (ELR)**

**Recommendation 5:** Establish and disseminate best practices in ELR for AR by revisiting the guidance document created by the CSTE AR/ELR Working group in 2017 for CRE, (“Best Practices for Surveillance of Antimicrobial Resistance via Electronic Laboratory Reporting Recommendations from the CSTE AR/ELR Working Group, June 2017”), and broadening its scope to include the other pathogens and AR mechanisms that should be reported through ELR.

**Progress Update:** The ARSTF reviewed the 2017 CSTE AR/ELR guidance document which, while comprehensive, could be more widely publicized and utilized.

- The Task Force identified criteria for improving the document, including creating a broader, principle-based supplement that is not as detailed and specific as the current CRE-only document. This supplemental guidance would focus on principles that apply to other possible pathogens and resistance mechanisms, as well as other initiatives related to reporting (e.g., message mapping guides). Drafting the supplemental document is a recommended ARSTF activity in the coming year.

- The 2017 AR/ELR guidance document shall be attached to the supplemental principles-based document and can serve as a template that could be used for applications beyond CP-CRE.
**Recommendation 6**: Laboratories that submit reportable lab findings to public health via ELR should submit reportable AR laboratory findings via ELR, with messages conforming to national standards and validated for accuracy and completeness of content and structure when sent or received. Laboratories that are not currently reporting via ELR are encouraged to do so, especially as electronic reporting of AR is a compelling reason to develop this capacity.

**Progress Update**: The Task Force communicated with CDC Epidemiology and Laboratory Capacity (ELC) cooperative agreement staff, and suggested they include guidance on incorporation of AR data into the content of ELR in the ELC funding guidance. The following insights were gleaned through stakeholder engagement:

- This year’s new 5-year ELC cooperative agreement funding cycle, in conjunction with national CP-CRE reporting, offers an opportunity to both monitor the use of AR data via ELR and to promote incorporation of AR into CDC ELR guidance and technical assistance.
- CDC’s ELC must play a continued and enhanced role in disseminating technical assistance and financial support to states. The ARSTF encourages incorporation of Recommendation 6 (above) into ELC’s ELR practices, especially through their regular conference calls with states and though their annual ELC grant budget period applications.
- In this year’s ELC, there were no special instructions in the guidance concerning working specifically on ELR for AR. However, the guidance did include support for a priority enhancement to state grantee information systems to enable automatic processing of ELR, including complete susceptibility findings. Future CDC supplemental guidance to the states should reference ARSTF Recommendation 6 (AR ELR).

**Recommendation 7**: Laboratory results obtained through the AR Lab Network data should be interoperable and submitted to public health agencies using standardized HL7 messages.

**Progress Update**: The ARSTF endorses use of HL7 as the messaging standard for AR Lab Network data back to public health agencies, which after configuration would allow for automatic uploading to state AR epidemiology program databases. The ARSTF discussed key considerations for improving data system interoperability and efficiencies for AR Lab Network data:

- AR Lab Network regional laboratories currently send laboratory reports via PDF to clinicians and to state surveillance/epidemiology programs. These reports are not in an ELR format; therefore, states need to reenter these data into their AR surveillance data systems in order to optimize epidemiological tracking.
- Routing HL7 messages from the AR Lab Network through the APHL Informatics Messaging System (AIMS) is reasonable and advisable. Funding for this approach would likely need to come from a mechanism other than the ELC cooperative agreement. Additionally, states would need to standardize system configurations to make maintenance of the feeds manageable.
- One key priority of the updated CDC Data Strategy is the modernization of Laboratory Information Systems, including ELR. While AIMS presents one potential solution to routing HL7 messages back to public health agencies, it is possible there may be a nationally-developed platform for message routing in the future, including for AR Lab Network data.
**TOPIC: NNDSS CP-CRE Message Mapping Guide**

**Recommendation 8:** Finalize and implement the message mapping guide (MMG) for NNDSS CP-CRE and include the ARSTF MMG workgroup in this CDC process.

**Progress Update:** Message mapping guides (MMG) are instructions and a set of required or optional data elements that are collected nationally to implement the nationally notifiable disease surveillance system (NNDSS). The CDC Center for Surveillance, Epidemiology, and Laboratory Services (CSELS) collaborates with subject matter experts and states to define the data elements and pilot the MMGs.

- In collaboration with CDC staff, a Task Force workgroup developed a set of data elements based on the state experience of data elements that are most relevant for surveillance of carbapenemase-producing carbapenem-resistant Enterobacteriaceae (CP-CRE).
- The CP-CRE data elements were incorporated into an MMG for drug resistant organisms, the “Healthcare Associated Infections, multi-drug resistant organism” (HAI MDRO) MMG. The MMG also supports *Candida auris* reporting and data submissions by the Emerging Infections Program (EIP) sites participating in Multi-site Gram-negative Surveillance Initiative (MuGSI).
- Task Force work on this recommendation has been completed. The MMG is currently being piloted in 3 states. It will be finalized by CDC staff, and rolled out in late Fall 2019.

**TOPIC: Linking Laboratory and Epidemiological Data**

**Recommendation 9:** Publish guidelines on how to create and maintain linkages between laboratory findings and case findings for state, local and CDC programmatic needs.

**Progress Update:** A comprehensive and efficient surveillance network for antimicrobial resistance accurately links lab data and epi case findings in a timely manner. The ARSTF explored potential linkages, including a standard identifier that can be used by clinical labs, state and local public health labs, and CDC to link their data.

- The ARSTF workgroup discussions identified state lab ID numbers as the likely best linking accession number. The AR Lab Network can be a key partner in promoting this as the linking identifier.
- To better fully understand the challenge of linking lab and epidemiology data, it would be beneficial to conduct an assessment of the AR Lab Network inquiring about data linkage and barriers between the state labs and epidemiology programs. Assessment results may inform a White Paper to define the issue and discuss potential solutions.
- The Message Mapping Guide for CP-CRE can serve as a driver that will push people to consider how to bring lab results into the epi/surveillance system for case ascertainment and classification.
**Recommendation 10:** Healthcare facilities should use the NHSN AUR module (the AR Option in particular) and states should consider using the AR Option as a component of their public health surveillance.

**Progress Update:** The NHSN AUR Module provides a mechanism for facilities to report and analyze antimicrobial use and/or resistance data. While the Antimicrobial Use (AU) option has steadily increased in facility uptake, the Antibiotic Resistance (AR) option has not gained the same level of traction. ARSTF discussions explored mechanisms to further promote AR option utilization and uptake.

- The AU option is currently undergoing metric maintenance for National Quality Forum (NQF) endorsement, but there are no current plans to do the same for the AR option. The measure to renew the AU option as an NQF metric has been resubmitted and is currently in the approval process. That measure will not call for CMS payment incentivization.
- Guidance to health departments would be helpful to better understand how state and large city health departments can help promote AU/AR uptake in facilities, as health departments may not always be familiar with the barriers and technical challenges of the AUR module as opposed to other NHSN reporting modules.
- NHSN could provide a train-the-trainer training to health departments to increase the capability of health departments to help facilities both adopt and maintain AR option participation. This endeavor would enable them to more effectively outreach and promote the option to facilities.
- It would be beneficial for NHSN to develop materials that market why AR option would be useful to Infection Preventionists. This engagement should be facilitated through the Association for Professionals in Infection Control and Epidemiology (APIC).
- Participation from IT vendors has increased substantially, mainly driven by Promoting Interoperability Program (previously Meaningful Use). NHSN does have a Clinical Document Architecture (CDA) Toolkit for vendors, which should continue to be promoted.
- The antibiogram in the AR option does not align with CLSI M39 standards. It is recommended that the NHSN antibiogram methodology should match the M39 methodology, with the ARSTF coordinating future discussions to facilitate this alignment.

**Recommendation 11:** Develop a surveillance infrastructure (registries, similar to the XDRO registry in Illinois) to rapidly identify patients that are infected or colonized with certain AR pathogens so that appropriate infection control measures can be taken upon admission and when transferred between facilities.

**Progress Update:** The Task Force explored state-level efforts for developing registries for tracking multi-drug resistance organisms (MDRO) across healthcare settings. Key takeaways and considerations for next steps include:

- The discussion reinforced the relevance and usefulness of the CSTE position statement SI-16-09, “Interfacility Communication to Prevent and Control Healthcare-Associated Infections and Antimicrobial Resistant Pathogens across Healthcare Settings,” which includes recommendations for a CDC/APIC/SHEA collaboration to develop guidance for standardized interfacility communication.
• CDC is not currently planning to create infrastructure for a national MDRO surveillance registry. In the future, CDC may use state experiences and best practices to develop a model for state-level standardized infrastructure that would link together into a national system.
• CDC contributed to an HL7 working group to produce a set of recommended supplements to admission, discharge, transfer (ADT) records to include data about MDROs; this effort supplements existing Clinical Document Architecture (CDA) software that are being used by facilities. A logical next step would be to collaborate with vendors to pilot these supplements to understand how they would work in routine clinical practice.
• State-developed MDRO registries should be developed with interoperability as a key consideration. While jurisdictions may vary in registry design, implementation, and capability, registries should adhere to a common set of standardized guiding principles. The ARSTF shall work with CDC to produce national guidance and technical assistance for jurisdictions developing MDRO tracking registry infrastructure.

TOPIC: Sustainability of AR Surveillance and the Work of the Task Force

Recommendation 12: Create a plan and implement it to integrate AR surveillance planning into ongoing processes and organizations.

Progress Update: The ARSTF has been extended for an additional year (August 2019 – July 2020) to coordinate and continue ongoing work. The Task Force will convene in-person in Fall 2019 to review progress to date, evaluate governance and organization, and to plan strategically for the coming year. Strategic planning should prioritize alignment with other national surveillance and data strategies.

TOPIC: AR Surveillance Scope

Recommendation 13: Develop a policy for surveillance of colonization with MDRO/AR that can be used to inform a CSTE Position Statement for standardized surveillance of MDRO colonization.

Progress Update: A focus group of State Epidemiologists, ARSTF representatives, and CSTE ID Steering Committee leadership was convened in Spring 2019 to explore the challenges and implications for standardized surveillance for colonization.

• As a result of the scoping conversation, the Surveillance Colonization Workgroup was formed to assess the issue more comprehensively and develop guidance for incorporating colonization information in CSTE position statements for standardized surveillance (i.e., case definitions). This guidance will be developed throughout Fall 2019 and vetted through the CSTE Briefs mechanism.
• Due to the broad nature of the topic, the workgroup will sit under the CSTE Surveillance/Informatics Steering Committee, collaborating with the ARSTF for AR-related considerations, and subject matter experts from other programs as necessary.
**Recommendation 14:** Develop guidance for jurisdictional antibiograms for use by States and large cities.

**Progress Update:** Public health antibiograms aggregate antimicrobial susceptibility profiles from multiple healthcare facilities over a broader geographic region and can be used as a tool to help public health agencies conduct antibiotic resistance surveillance and engage local partners in antibiotic stewardship efforts. The ARSTF explored standards for developing antibiograms across multiple levels and assessed jurisdictions’ experiences with developing public health antibiograms.

- In Summer 2019, CSTE released a national assessment to query jurisdictions’ experiences related to developing, publishing, and using public health antibiograms. CSTE will complete the analysis and publish the findings of that assessment in the next project year. The assessment was initially only distributed to ELC State HAI Coordinators; however, it would be worthwhile to expand data collection to gather local health department perspectives as well.
- States have a wide variety of experience in the development and use of public health antibiograms. Some jurisdictions have years of experience, while several others have only recently developed or considered developing public health antibiograms. Many jurisdictions do not have near-term plans for developing a public health antibiogram.
- Clinical laboratories may not fully adhere to CLSI M39 standards for antibiogram development. The development of a public health antibiogram can promote standardization and improve laboratory and facility-level antibiograms.
- Some states are careful to inform clinicians that public health antibiograms are not to be used to guide empiric therapy. Careful consideration should be given on how to avoid inappropriate use of public health antibiograms as a clinical tool if they would be potentially harmful in that role.
- The ARSTF shall collaborate with CDC and other partners as relevant on the development of a public health antibiogram toolkit aimed at addressing technical assistance needs identified within the assessment results. At a minimum, the toolkit should include guidance on:
  - The objectives of public health antibiograms, and
  - How jurisdictions can properly create, evaluate and improve public health antibiograms and their use at various levels.

**CONCLUSION:**

The work of the ARSTF in Year 3 further reaffirms the complexity of surveillance for antimicrobial resistance in the United States. While this report details progress of each recommendation individually, the overlapping nature of ARSTF-coordinated activities across recommendations and topic areas cannot be overlooked. Certain themes emerged across all workgroup discussions:

- **Identifying, assessing, and leveraging existing infrastructure and processes:** Numerous workgroup discussions yielded the realization that there were already ongoing efforts related to various ARSTF recommendations, efforts of which the Task Force was previously unaware. To that end, discussions aimed at information gathering were extremely beneficial to refining the original recommendations. The ARSTF should continue to 1) identify existing processes related to the recommendations, for example the creation of standardized codes or development and implementation of AST data suppression rules, 2) partake in informational conversations to augment understanding of these existing processes, and
3) explore how this existing infrastructure can be leveraged so that we are not unnecessarily duplicating efforts. The ARSTF can serve as a coordinating body to identify and link these potentially siloed or unknown initiatives.

- **Interoperability and standardization as foundational components to surveillance:** Comprehensive surveillance for antimicrobial resistance incorporates data systems across laboratories, healthcare facilities, and public health agencies. While differing functional needs drive customization of these systems, it is critical that independent systems remain interoperable to enhance accuracy, timeliness, and efficiency of data for public health action. CDC’s updated Data Strategy epitomizes these criteria through its key principles, including: 1) enterprise-wide solutions, 2) cloud computing, 3) data standards, 4) interoperability, and 5) a prepared workforce to sustain these foundational components. The ARSTF will incorporate tenets of the CDC Data Strategy as it works to implement recommendations and develop guidance.

- **Partner and stakeholder engagement across public health agencies, healthcare facilities, and vendors, within both the private and public sector:** Crosscutting discussions spanning ARSTF workgroups highlighted the importance of bridge building across disciplines and sectors. In the chain of AR surveillance, laboratorians, clinicians, vendors, informaticists, academic partners, and public health practitioners are essential “links.” Each link must be reinforced and engaged in order to strengthen the system as a whole. While public health and laboratory science are clearly represented within the Task Force, the ARSTF should consider additional engagement with Electronic Health Record (EHR) and Laboratory Information System (LIS) vendors, as well as engagement with decision-makers at healthcare institutions who are the main “customers” of these vendors.

The ARSTF will keep these emergent themes top-of-mind as it continues work in the coming year.

**ACKNOWLEDGMENTS:**

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- ARSTF Co-Chairs: Dan Pollock (CDC), Pete Shult (APHL), Rich Melchreit (CSTE)
- ARSTF Core Group members and Full Task Force members
- Participating staff: Brooke Beaulieu (CSTE), Kelly Wroblewski (APHL), Nikki Marchan (APHL)
- Workgroup 1, Data Standardization, Reporting, and Linkage: Lead (Scott Troppy) and members
- Workgroup 2, Breakpoints and Data Suppression: Lead (Megin Nichols) and members
- Workgroup 3, CP-CRE MMG: Leads (Scott Troppy and DJ Shannon) and members
- Workgroup 4, NHSN, Tracking AR Among Healthcare Facilities: Lead (DJ Shannon) and members
- Workgroup 5, AR Surveillance Scope: Members

The ARSTF is truly grateful for your time and thoughtful contributions to advancing the landscape of antimicrobial resistance surveillance.
LINKED RESOURCES:

- For more information on previous ARSTF activities and genesis of the recommendations: ARSTF Year 2 Report and Recommendations for AR Surveillance in the United States.
- For more information about the ARSTF mission, vision, and contact information: CSTE ARSTF webpage
- CSTE Position Statement 16-SI-09: Interfacility Communication to Prevent and Control Healthcare-Associated Infections and Antimicrobial
- For updates and resources related to PAC-CARB: https://www.hhs.gov/ash/advisory-committees/paccarb/index.html
- For updates and resources related to CLIAC: https://www.cdc.gov/CLIAC/
- For more information on the NHSN AUR module: AUR module manual

COMMONLY USED ACRONYMS:

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADT</td>
<td>Admission, discharge, transfer</td>
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<td>AIMS</td>
<td>APHL Informatics Messaging Service</td>
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<td>AMS</td>
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<td>Electronic laboratory reporting</td>
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<td>Message mapping guide</td>
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<td>Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria</td>
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Antimicrobial Resistance Surveillance Task Force
CSTE National Assessment of Jurisdictional
Antibiograms

Antimicrobial resistance surveillance, control, and prevention are growing responsibilities of public health agencies. Antibiograms are profiles of cumulative antimicrobial susceptibility results for specific microorganisms, usually compiled at a healthcare facility level, over a period of time (often annually). The Clinical and Laboratory Standards Institute (CLSI) publishes guidance for antibiogram development and data presentation though the M39 standards. Antibiograms have long been used by clinical care providers to make antibiotic prescribing decisions; however, they are also increasingly becoming seen as a valuable public health tool.

The Antimicrobial Resistance Surveillance Task Force (ARSTF) recommends the creation of jurisdictional antibiograms, which aggregate antimicrobial susceptibility profiles from multiple healthcare facilities over a broader geographic region (often at the state or county level), as a tool to help public health agencies conduct antibiotic resistance surveillance and engage local partners in antibiotic stewardship efforts.

Some public health agencies have already developed and are using jurisdictional antibiograms, while others are in the process of developing them. The purpose of this assessment is to evaluate public health agency experiences with the development and use of jurisdictional antibiograms. The ARSTF will use the assessment findings to develop recommendations and guidance regarding the technical assistance needs of public health to develop and use jurisdictional antibiograms.

While the most appropriate person to respond to the assessment may vary among public health departments, we are sending this assessment to the ELC-funded HAI Coordinator, with the understanding that the Coordinator may consult other individuals such as the State Epidemiologist, ELC-funded AR Expert, State Laboratory Director or State Microbiology Laboratory Director, State Healthcare Associated Infections Medical Director, or state surveillance informatics staff. We ask that each jurisdiction only submit one completed assessment.

The estimated time to fill out assessment is about 15-20 minutes. If accessed from the same computer, your assessment progress will be saved should you wish pause and come back to complete at a later time. For revisions after your assessment has been officially submitted, or other questions related to the assessment, please contact Brooke Beaulieu at brooke@cste.org.

In the coming months, the ARSTF will share aggregate findings from the assessment through various forums, including the CSTE Annual Conference, the ARSTF Year 3 Summary Report, and other communications avenues.
GLOSSARY:

Antibiograms and related concepts may be termed differently depending on the jurisdiction or institution. For consistency in interpretation and response, we have defined below various terms that appear throughout the assessment itself or that are conceptually related to the subject matter.

- **Antibiogram** – A listing of antimicrobial susceptibilities and resistances performed on a single isolate.

- **Cumulative Antibiogram** – A compilation of individual antibiograms into a single table containing a pairwise listing of the number of isolates and the rate of susceptibility to a given antibiotic. Antibiograms have commonly been developed for specific healthcare facilities (“facility-level”) to guide empiric antibiotic therapy for patients at those facilities.

- **CLSI M39** - A guidance document developed by the Clinical and Laboratory Standards Institute (CLSI) that describes methods for recording and analyzing antimicrobial susceptibility test data and provides guidance to clinical laboratories in the preparation of a cumulative antibiogram. The document contains specific recommendations for data collection, storage, analysis, and presentation. CLSI guidance functions as a standard for laboratory practice.

- **Multi-facility Antibiogram** - A compilation of multiple facility-level cumulative antibiograms across a defined geographic region within a given time frame for the purpose of tracking resistance patterns across a broader area.

- **Jurisdictional Antibiogram** (see also multi-facility antibiogram) – For the purposes of this assessment, we will use the term ‘Jurisdictional Antibiogram’ to refer to antibiograms developed by health departments that compile cumulative antibiograms across a specified jurisdictional or sub-jurisdictional level.
Section 1: Jurisdiction Information

1. Please select your jurisdiction (dropdown includes ELC-funded large cities):

▼ Alabama ... Wyoming

2. Complete the demographics of the primary respondent to this assessment:

- First and Last Name: 
- Job Title/Role: 
- Email Address: 
- Telephone: 

3. As necessary, please provide the names and roles of others consulted to fill out the assessment:

- Additional Name and Role: 
- Additional Name and Role: 
- Additional Name and Role: 
- Additional Name and Role: 
- Additional Name and Role: 

4. May CSTE staff contact you to follow up on specific responses?

- No
- Yes
Section 2: Jurisdictional Antiobigram Development and Specifications

5. Has your jurisdiction developed a jurisdictional antiobigram?

- No
- Yes, we have developed a jurisdictional antiobigram or are in the process of developing one
- Yes, but we decided to discontinue. If selected, text box will display for specification.

*If respondents answer ‘No’ to this question, they will be directed to Q25. Skip patterns may affect the display of questions throughout the assessment.

Please answer the following questions regarding the development of your jurisdictional antiobigram. If your antiobigram is a discontinued activity, please give responses relevant to when it was an ongoing activity.

6. In which year did you start:

The initial process for developing the jurisdictional antiobigram?

Collecting data for the jurisdictional antiobigram?

Publicly distributing the jurisdictional antiobigram?

7. In terms of geographical stratification, is your jurisdictional antiobigram (check all that apply):

- Jurisdiction-wide
- Stratified by geographical sub-jurisdiction (e.g., metro areas, counties, division of a state)
- Stratified by health system (e.g., an organization consisting of a group of health facilities and services of the same or various types, such as hospitals, nursing homes, home health care)
- Stratified by type of facility (e.g., LTAC, nursing homes, etc.)
- Stratified by patient location (e.g., inpatient vs. outpatient, or by hospital ward/unit, ER)
- Stratified by other. If selected, text box will display for specification.
Please answer the following questions related to your infrastructure for your jurisdictional antibiogram development.

8. For the most recently published year, how are data entered into your jurisdiction’s antibiogram database? Check all that apply.

   Automated entry

   Manually entered

9. What IT platforms, databases, or software (e.g., SQL, Oracle, Access) do you use to:

   Capture the data from facilities?

   Store and manage the data?

   Analyze the data and generate reports?

Please provide the following information regarding your public health agency’s staff involvement in data collection and analysis for your jurisdictional antibiogram (excluding staff involvement of responding laboratories/health facilities).

Specify the types (disciplines) of your (state/territorial/city health department staff) involved in creating your jurisdictional antibiogram (Note: this does not include the staff from laboratories or health facilities that are submitting data to you). In this context, Full Time Equivalent (FTE) refers to 40 hours/week of effort on average split among one or more staff persons (e.g., an epidemiologist working 10 hrs/wk on the antibiogram on average over the year equals 0.25 FTE for that discipline).

10. Please check all that apply and specify number of FTE in the corresponding text field.

   Epidemiology staff. If selected, number of FTE per year:

   Informatics staff. If selected, number of FTE per year:

   Laboratory staff. If selected, number of FTE per year:
Please answer the following questions regarding data collection.

11. Is reporting of data for your jurisdictional antiibiogram mandatory?

- Not, it is voluntary. *If selected, text box will appear asking to specify how jurisdictions encourage labs/facility to voluntarily submit.*
- Yes, it is mandatory.

12. What is the source of data for your jurisdictional antiibiogram? Check all that apply.

   - Clinical laboratories
   - Reference laboratories
   - State public health laboratory (e.g., ARLN activity data)
   - Healthcare providers (e.g., IP programs)
   - Other. *If selected, text box will display for specification.*

13. What is the method of data entry? Check all that apply.

   - Unstructured: Health department staff enter the data once they receive it from the facilities/labs. I.e., “Send us what you’ve got”

   - Structured: The facility/lab/provider enter the data into a form, spreadsheet, or online template provided by health department.

14. What is the approximate number of clinical microbiology laboratories in your jurisdiction (either number licensed if known, or number reporting infectious disease test results to the health department)? Please enter this response as a number.

   [ ]
15. What is the approximate number of facilities (those noted in Question 12) that you are requesting data from for your jurisdictional antibiogram? Please enter this response as a number

   

16. Of those facilities from which you request data, approximately how many comply and submit? Please enter this response as a number.

   

Section 3: Use of Antibiograms and Adherence to Standards

11. How does your health department use your jurisdictional antibiogram? Check all that apply.
Tracking antibiotic resistance patterns over time

   Comparing antibiotic resistance between geographic regions or healthcare facilities/systems

   Benchmarking and comparing antibiotic resistance rates between facilities

   Creation of clinical messaging about antibiotic prescribing (e.g., guidelines for empiric therapy)

   Engagement of providers and facilities in coordinated stewardship initiatives

   Sending written reports back to facilities (education of labs, clinicians)

   Other. If selected, text box will display for specification.

12. Do you assess if/how your jurisdictional antibiogram is being used by clinicians?

   ○ No

   ○ Yes. If selected, text box will display for specification.
13. Do you have near-term (1-2 years) plans to improve your jurisdictional antibiogram?

- No
- Yes. *If selected, text box will display for specification.*

Please provide information about the models or standards used in your jurisdictional antibiogram.

14. Does your jurisdictional antibiogram conform to the following CLSI M39 standards for a standard antibiogram? Check all that apply.

- Analyze/present data at least annually
- Include only final, verified results
- Include only susceptibility results with at least 30 isolates reported
- Include diagnostic (not surveillance) isolates
- Include the first isolate per patient, irrespective of body site
- Full profile of pathogen/drug susceptibility results
- Include only drugs routinely tested
- Present % susceptible (not % resistant)
- Calculate % fully susceptible (i.e. results do not include % with intermediate susceptibility)
- Trends in susceptibility over time
- Don't know
15. Do you segregate data or perform analysis beyond that suggested for a standard antibiogram as listed below in M39 for enhanced antibiograms? Select all that apply.

- Location (E.g., outpatient vs. inpatient, unit specific)
- Specimen type (E.g., urine, blood)
- Clinical condition (E.g., cystic fibrosis, burn patient)
- Patient age (E.g., pediatrics vs. adults)
- Resistance phenotype (E.g., MRSA, MSSA; K. pneumoniae: all, carbapenem-R, carbapenem-S)
- Resistance profiles
- % Susceptible for combinations of drugs (Piperacillin/tazobactam, ampicillin/sulbactum)
- % Susceptible for groups of organisms (E.g., all GNR from blood)
- % Non-susceptible
- % Susceptible dose-dependent (SDD)
- Don't know
- Other. If selected, text box will display for specification.

16. What documents (including other jurisdiction's antibiograms) or standards have you used to develop and refine your jurisdictional antibiogram?

17. Please describe any external collaborations that have been convened to review and further the work of the health department's antibiogram activities. Examples include Advisory Councils, multidisciplinary workgroups (physicians, nurses, pharmacists, etc.).
18. If you have any samples of your antibiogram, protocols, technical assistance materials, or communications with labs and clinicians (e.g., letter templates, formal reporting templates, data request forms, etc.) that you are willing to share with the ARSTF, please attach the most recent versions via the file upload functionality below or link the online version in the text box below.

Use the prompt to upload a file.
Use the prompt to upload a file.
Use the prompt to upload a file.
Use the prompt to upload a file.

Please use the text box below to link any additional documents.

Section 4: Future Planning and Technical Assistance Needs

19. Is your jurisdiction planning on developing a jurisdictional antibiogram in the near future (1-2 years)?

☐ No, we do not plan to develop a jurisdictional antibiogram. If selected, text box will display for specification on barriers to development.

☐ Yes, we plan to develop a jurisdictional antibiogram

☐ Unsure at this time

20. Please relay any additional questions or thoughts your jurisdiction may have about developing a jurisdictional antibiogram.
21. What would you like guidance or technical assistance on regarding jurisdictional antibiograms? Check all that apply.

- Education about the recommended standards (i.e., CLSI M39)
- How to develop a jurisdictional antibiogram
- Conducting a facility/laboratory assessment
- Data collection
- Data management and analysis
- Assessing and validating quality of the submitted data
- Presentation
- Using an antibiogram as a public health tool for tracking and reporting
- Evaluation of the development, implementation, and use of the jurisdictional antibiogram

Other. *If selected, text box will display for specification.*

22. What format would be most beneficial to provide this technical assistance? Check all that apply.

- Guidelines
- Toolkit (a collection of technical assistance materials, such as facility background information survey templates, database templates, model data presentation templates, sample letters to reporting sources and providers, etc.)
- Webinars

Other. *If selected, text box will display for specification*

End of Assessment