State Strategies to Address Antimicrobial Resistance

In the United States, a critical need exists for comprehensive programs to address healthcare-associated infections (HAIs) and antimicrobial resistance (AMR), which are key public health concerns. State health agencies can help fight HAIs and AMR by coordinating and facilitating prevention activities, monitoring resistance across their jurisdictions, leveraging existing partnerships and resources to prevent infections, and developing or implementing stewardship policies to improve antimicrobial prescribing.

State health agencies are critical to building important partnerships to address AMR, and are uniquely positioned to identify synergies among prevention efforts. They can address AMR across a range of settings, including hospitals, long-term care facilities, outpatient settings, and the community, and can collaborate with veterinary medicine and animal agriculture partners to support antibiotic stewardship outside of healthcare. Collaborative efforts led by state health agencies can lead to a greater impact on reducing emergence, transmission, and spread of AMR. According to a 2015 CDC *Vital Signs* report, a coordinated approach that includes health departments tracking antibiotic-resistant organisms and alerting healthcare facilities to target prevention could prevent up to 70 percent of life-threatening carbapenem-resistant *Enterobacteriaceae* (CRE) infections over five years.

The National Strategy for Combating Antibiotic-Resistant Bacteria, National Action Plan for Combating Antibiotic-Resistant Bacteria, and Antibiotic Resistance Solutions Initiative have highlighted AMR as a major issue and promoted actions that stakeholders can take to combat it. The current national funding and momentum around AMR present opportunities for states to build or enhance capacity to develop comprehensive HAI/AMR prevention programs. Additionally, the National Action Plan and AMR Solutions Initiative call for greater support and use of state HAI/AMR prevention programs. HAI/AMR programs should include the following core capacities:

- ***Technical Expertise*:** Establish technical expertise to advance AMR prevention (e.g., outbreak investigation capacity and skills, stewardship, surveillance and lab data analysis, clinical microbiology).
- ***Surveillance/Data*:** Increase availability of relevant data and enhance surveillance analytic capacity to inform prevention efforts and essential response capacity.
- ***Coordinated Prevention Efforts*:** Prevent the spread of AMR pathogens or infection with AMR pathogens within and between healthcare facilities.
- ***Antimicrobial Stewardship*:** Reduce patient risk for AMR infections and *Clostridium difficile* infection by promoting antimicrobial stewardship regionally.

Sharing examples of progress and best practices can inform efforts as states work to build or enhance effective HAI/AMR programs. In June 2015, ASTHO hosted a meeting, "State Health Agency Action Steps to Address Antimicrobial Resistance," to discuss current and potential state health agency activities under the core capacities. These technical briefs outline strategies, challenges, recommendations, and resources that the meeting participants discussed. Participants identified keys factors for success of these core strategies as leadership, coordination, and communication between the program and healthcare facilities across the region. The following technical briefs describe recommendations, resources, and challenges that were identified by the participants at the meeting. Additionally, ASTHO hosted conference calls with key state health agency representatives in September 2016 to provide

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feedback on the technical briefs and describe progress addressing challenges identified during the meeting.

Technical Expertise

State health agencies are leaders in AMR prevention and control efforts and can coordinate prevention activities across healthcare settings. To do so, they must have access to technical expertise that advances AMR prevention, such as outbreak investigation, stewardship, clinical microbiology, surveillance, and lab data analysis.

Example strategies include:

Coordinate Activities and Seek Subject Matter Expert Input

- Coordinate existing efforts throughout the state, including the state HAI/AMR program, and other related efforts (e.g., One Health) to achieve shared goals.
- Convene a wide range of partners to inform a multidisciplinary HAI/AMR strategy.
- Gather input from an advisory group (e.g., AMR subcommittee of HAI advisory group) to provide guidance about state HAI/AMR prevention strategies.
- Engage with state medical and pharmacy societies or schools of medicine and pharmacy to gather external expertise; use a formal mechanism, such as a contract, if appropriate.
- Identify infectious disease experts to champion HAI/AMR and stewardship efforts in the state.

Provide Technical Assistance to Healthcare Facilities

- Use HAI/AMR program staff or subject matter experts from other health agency programs or private organizations to provide technical assistance to healthcare facilities.
- Participate in or co-develop trainings that align with CDC recommendations and guidelines for healthcare facilities. Engage regional and local experts to present on HAI/AMR epidemiology in the jurisdiction.
- Develop or use a needs assessment to learn what support healthcare facilities need. Respond to facility requests for assistance in implementing AMR prevention and control efforts.
- Engage regulatory partners, such as surveyors, to conduct infection control assessments and educate facilities about infection control; use facility-specific infection rates whenever possible.
- Promote improved use of antibiotics in hospitals and across healthcare settings. Partner with academic medical centers, the infectious disease pharmacy community, and healthcare networks to lead coordinated efforts. Use CDC's core elements of antibiotic stewardship in hospitals, long-term care facilities, and outpatient settings.

Challenges:

- Recruiting experienced and trained epidemiology and infection prevention experts to lead HAI and AMR programs.
- Hiring necessary staff in a timely manner when new grant funding becomes available.
- Engaging small or remote healthcare facilities.
- Addressing data infrastructure challenges (e.g., compatibility between state health agency and state public health laboratory data systems).
- Sharing data and analytical tools across jurisdictions.

Surveillance/Data

The epidemiology of antibiotic-resistant organisms is local, so health agencies can use state- and facility-based data to establish baselines and coordinate prevention and response efforts. With adequate capacity, epidemiologists can analyze surveillance data to determine trends, target prevention efforts, and identify areas where further data collection may be needed.

Example strategies include:

Coordinate and Analyze Existing Data

- Identify the best available sources of data and an appropriate use for each data source to prioritize data collection and response activities and link data to public health outcomes. Sources of data may include:
    - National Healthcare Safety Network (NHSN).
    - National Notifiable Diseases Surveillance System (NNDSS) or an NNDSS-based system.
    - Emerging Infections Program data.
    - Hospital discharge or readmission data.
    - Laboratory data.
    - Healthcare Cost and Utilization Project data (free access for states).
    - All-payer claims data.
    - Prescription drug monitoring programs.
- Examine data on reportable resistant organisms or other reportable diseases that involve resistant bacteria.
- Work with state hospital associations and partners to promote collecting data on AMR infections and antibiotic use.
- Engage CDC to navigate the corporate landscape of NHSN antibiotic use and resistance reporting. Engage informatics stakeholders such as IT, CMS, and IMS health data vendors to leverage public health support for collecting data related to AMR. Starting with major electronic laboratory or health reporting vendors serving large facilities or hospital systems can help target efforts.
- Map current lab testing capacity, such as the ability to conduct resistance mechanism testing, including through the newly-funded Antibiotic Resistance Lab Network.
- Analyze data for trends (e.g., monitor the spread of organisms regionally, identify outbreaks or spread among facilities that share patients).
- Consider advocating for a requirement for reporting resistant pathogens, such as CRE (linked with lab reporting), to public health if such a regulation does not already exist.

Build Surveillance and Epidemiology Capacity

- Ensure guidelines for reportable diseases are available to healthcare facilities and educate them about the importance of reporting infections and exposure events. Develop analysis and response plans in advance to ensure meaningful data are collected. Support incentives for reporting.
- Facilitate and accelerate reporting of antibiotic use and resistance data from facilities to NHSN.
- Help facilities learn how their infection rates compare to other facilities in the area.

- Use the Targeted Assessment for Prevention (TAP) strategy with NHSN data to target prevention efforts and develop a TAP-like strategy for non-NHSN data.
- Communicate data to state leaders and stakeholders to inform policy.

Challenges:

- Coordinating data sources related to antibiotic use or resistance to analyze across different settings.
- Conducting data validation to ensure accurate and comparable data.
- Comparing data reported for different organisms.
- Reporting requirements and elements vary across state borders.
- Lack of public health access to electronic systems, including infection reports, and costs to acquire data from health information exchanges.
- Analyzing healthcare-acquired versus community-onset infection data.
- Sharing data among health department programs addressing different disease areas.
- Identifying a healthcare facility from lab-based reports or combining information from different sources due to separate lab and case reporting.
- Suppressed susceptibility data in lab reports.
- Increased use of culture-independent diagnostic testing resulting in a decrease in isolates sent to public health.
- Balancing public health intervention with facility privacy.

Coordinated Prevention Efforts

State health agencies can serve as leaders and coordinate efforts to stop the spread of AMR. With adequate capacity, state health agencies can support healthcare facilities in their jurisdictions to achieve prevention goals.

Example strategies include:

Coordinate Efforts Across Partners

- Partners may include:
  - Hospital epidemiologists.
  - Infection preventionists.
  - Healthcare systems.
  - Hospital associations.
  - State public health laboratories.
  - Commercial laboratories.
  - State medical and pharmacy societies.
  - CMS quality improvement organizations.
  - Healthcare licensure and regulatory agencies.
  - State health agency general counsel.
  - Hospital improvement and innovation networks.
  - Payers (e.g., Medicaid, commercial insurers).
  - CMS Innovation Center State Innovation Models.
- Inventory current prevention efforts in the state to help coordinate initiatives, such as ongoing efforts to prevent hospital readmissions.
- Review prevalence data for resistant organisms to determine how to concentrate efforts.
- Promote infection prevention or control trainings with healthcare facilities and schools of public health or nursing.
- Consider supporting an infection preventionist staff position or epidemiologist with salary funding from health department and/or a hospital or healthcare system to coordinate regional efforts.
- Engage in planning with healthcare coalitions and work with their regional health coordinators.

Develop Resources and Provide Technical Assistance

- Implement interfacility infection control transfer forms or tracking mechanisms, including plans and support for use; consider requiring use of transfer forms through legislation.
- Work with CDC to map facilities that share or transfer patients. Share scenarios for patient transfer with linked facilities.
- Work with the state public health labs to educate other clinical labs on appropriate testing techniques.

Use Regulatory and Policy Levers

- Address regulatory barriers (e.g., privacy issues that delay public health from investigating potential outbreaks).
- Incentivize facilities to participate in coordinated efforts to address resistance.

- Use public health regulatory capacity to require interfacility collaboration and information sharing.
- Work with CDC to establish data use agreements between facilities.

Challenges:

- Coordinating collection of and analyzing timely and complete data to target response activities.
- Enforcing use of interfacility infection control transfer forms or tracking mechanisms.
- Ensuring cross-state communication when patients are transferred across state lines.
- State and local variation in regulations.
- Limited laboratory testing capacity.

Antimicrobial Stewardship

Antimicrobial stewardship programs can ensure judicious antimicrobial use to improve individual patient outcomes, prevent *C. difficile* infections, prevent death from resistant infections, slow resistance, and reduce healthcare costs. State health agencies can support healthcare facility stewardship programs by leveraging policies, providing education and training, conducting surveys, communicating with stakeholders about antimicrobial stewardship, and supporting prevention collaboratives. In their role as coordinators, state health agencies can promote antimicrobial stewardship regionally and help identify how elements of a stewardship program can be best applied in different settings.

Example strategies include:

Identify Needs and Build Capacity

- Build on successful HAI programs and partnerships. Work with an existing HAI advisory group or develop a subcommittee focused on stewardship.
- Use stewardship consultants, such as academic experts, to inform activities.
- Explore purchasing proprietary antibiotic use data (e.g., IMS) to identify needs and guide activities.
- Survey healthcare facilities to determine current activities and existing gaps. Examine what stewardship programs look like in different healthcare settings.
- Lead or participate in antimicrobial stewardship collaboratives to share information and lessons learned across facilities. Identify champion facilities to serve as mentors for other members.

Engage and Educate Partners

- Engage hospital leadership and hospital associations to educate stakeholders about antimicrobial stewardship; leverage partnerships built during the national Ebola response.
- Focus on key issues for stakeholders (e.g., asymptomatic bacteruria in long-term care facilities).
- Educate providers and the public about judicious use of antibiotics. Use CDC-developed Get Smart: Know When Antibiotics Work materials.
- Communicate with healthcare facilities about forthcoming efforts, such as including stewardship programs under CMS Conditions of Participation.
- Borrow messaging or communication channels from related work, such as inappropriate prescribing of opioids or community-associated MRSA.
- Engage consumers and patient advocates in promoting judicious antibiotic use.

Challenges:

- Reduced capacity in some healthcare facility settings to implement comprehensive antimicrobial stewardship programs (e.g., critical access hospitals or long-term care facilities)

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ASTHO wishes to thank the meeting attendees and participants in the state action steps follow-up conference calls for discussing their experiences. The following links provide additional resources about

the four technical areas described in these briefs. Additional information on ASTHO's AMR activities may be found on ASTHO's AMR website.

Technical Expertise Resources

State Advisory Committees:

- Arizona Department of Health Services HAI Advisory Committee Antimicrobial Stewardship Subcommittee
- Arizona Department of Health Services HAI Advisory Committee Long Term Care Subcommittee
- Georgia HAI Advisory Committee
- South Dakota Antimicrobial Stewardship Workgroup
- Utah Healthcare Infection Prevention (UHIP) Governance Committee

Online Trainings:

- SHEA's Online Primer on Healthcare Epidemiology, Infection Control & Antimicrobial Stewardship
- Making a Difference in Infectious Diseases (MAD-ID)

Surveillance/Data Resources

- Illinois Extensively Drug Resistant Organism (XDRO) Registry
- Tennessee HAI Prevention Calculator
- California My Hospital's Infections
- Council of State and Territorial Epidemiologists HAI Data Analysis and Prevention Standardization Toolkit
- CDC's Targeted Assessment for Prevention Strategy
- CDC's Antibiotic Resistance Patient Safety Atlas
- NARMS Now: Human Data

Coordinated Prevention Efforts Resources

- ASTHO Information Scan: Regional Prevention Efforts for Carbapenem-Resistant Enterobacteriaceae
- CDC Key Investments to Combat Antibiotic Resistance
- CDC Vital Signs, 2016: Making Health Care Safer: Think Sepsis. Time Matters
- CDC *Vital Signs*, 2016: Making Health Care Safer: Protect Patients from Antibiotic Resistance
- CDC *Vital Signs*, 2015: Making Health Care Safer: Stop Spread of Antibiotic Resistance
    - CDC *Vital Signs*, 2015: Stop the Spread of Antibiotic Resistance video
- CDC *Vital Signs*, 2013: Making Health Care Safer: Stop Infections from Lethal CRE Germs Now
- CDC *Vital Signs*, 2012: Making Health Care Safer: Stopping *C. difficile* Infections
- CDC Facility Guidance for Control of *Carbapenem-resistant Enterobacteriaceae* (CRE)
- Illinois Infection Prevention and CRE Workshops
- CSTE Position Statement: 13-SI-01 - Recommendations for Strengthening Public Health Surveillance of Antimicrobial Resistance in the United States

- CSTE Position Statement: 16-ID-09 - Interfacility Communication to Prevent and Control Healthcare-Associated Infections and Antimicrobial Resistant Pathogens across Healthcare Settings
- Interfacility Infection Control Transfer Form for States Establishing HAI Prevention Collaboratives (Utah HAI working group)
- Interfacility Infection Control Transfer Form for States Establishing HAI Prevention Collaboratives Using ARRA Funds (Utah HAI working group)
- California Inter-facility Infection Control Transfer Form
- North Dakota Inter-facility Infection Control Transfer Form

Antibiotic Stewardship Resources

- ASTHO Report: Combating Antibiotic Resistance: Polices to Promote Antimicrobial Stewardship Programs
    - State Examples of Antimicrobial Stewardship Activities
    - Antimicrobial Stewardship Tools for State Health Agencies
    - State Health Agency Antimicrobial Resistance and Stewardship Webpages
- Greater New York Hospital Association Antimicrobial Stewardship Toolkit: Best Practices from the GNYHA/UHF Antimicrobial Stewardship Collaborative
- Colorado Hospital Association Antimicrobial Stewardship Program
- University of New Mexico School of Medicine ECHO Model
- Massachusetts Coalition for the Prevention of Medical Errors Improving Evaluation of Urinary Tract Infections in the Elderly: Collaborative on Antibiotic Stewardship for Seniors in Long Term Care
- Minnesota Infection Control and Assessment and Response
- CDC Vital Signs, 2014: Making Health Care Safer: Antibiotic Rx in Hospitals: Proceed with Caution
- The Joint Commission New Antimicrobial Stewardship Standard
- National Quality Partners Playbook: Antibiotic Stewardship in Acute Care
- CMS Conditions of Participation for Critical Access Hospitals
- CMS Conditions of Participation for Long-Term Care Facilities

CDC's Core Elements of Antibiotic Stewardship Programs

- For Hospitals
- For Nursing Homes
- For Outpatient Settings

Professional Organizations and Advisory Groups

- Infectious Diseases Society of America
- Society for Healthcare Epidemiology of America
- Association for Professionals in Infection Control and Epidemiology
- Society of Infectious Diseases Pharmacists
- Society of Hospital Medicine
- Healthcare Infection Control Practices Advisory Committee