Prevention and Control of Antibiotic Resistance: The Public Health Approach

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PACCARB

Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria

Prevention & Antibiotic Stewardship: Prevention and Control of Antibiotic Resistance—The Public Health Approach

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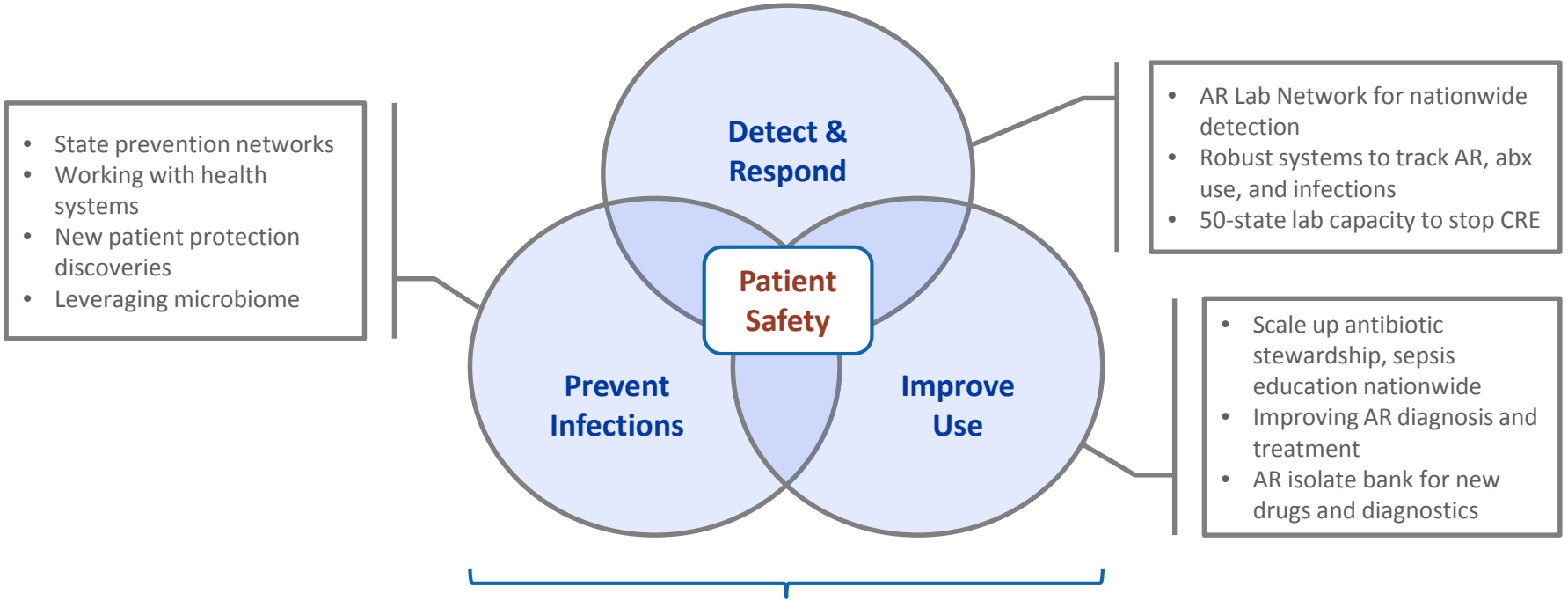
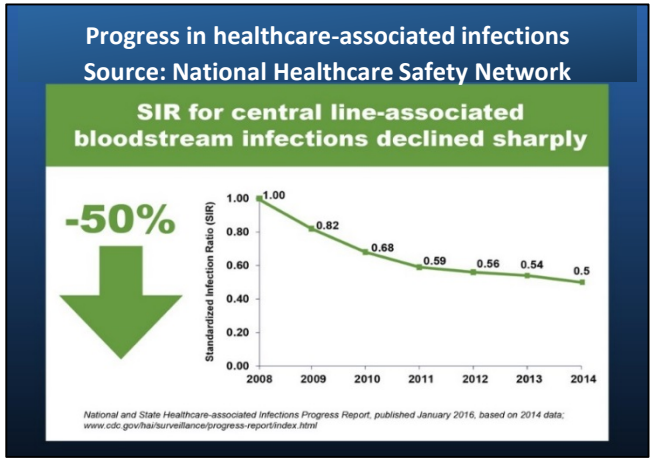
Build and Expand HAI Prevention Success: AR Solutions Initiative Continues Focus on Patients

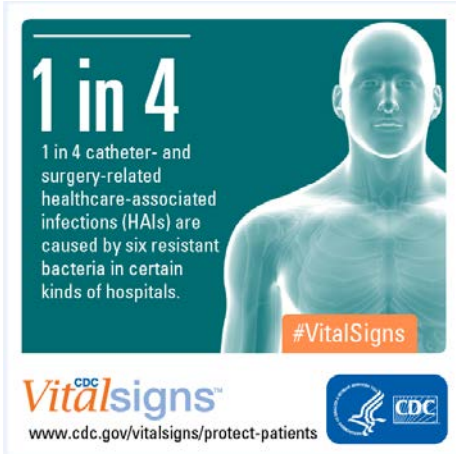


Innovation: CDC continually improves and develops innovative approaches to maximize public health impact

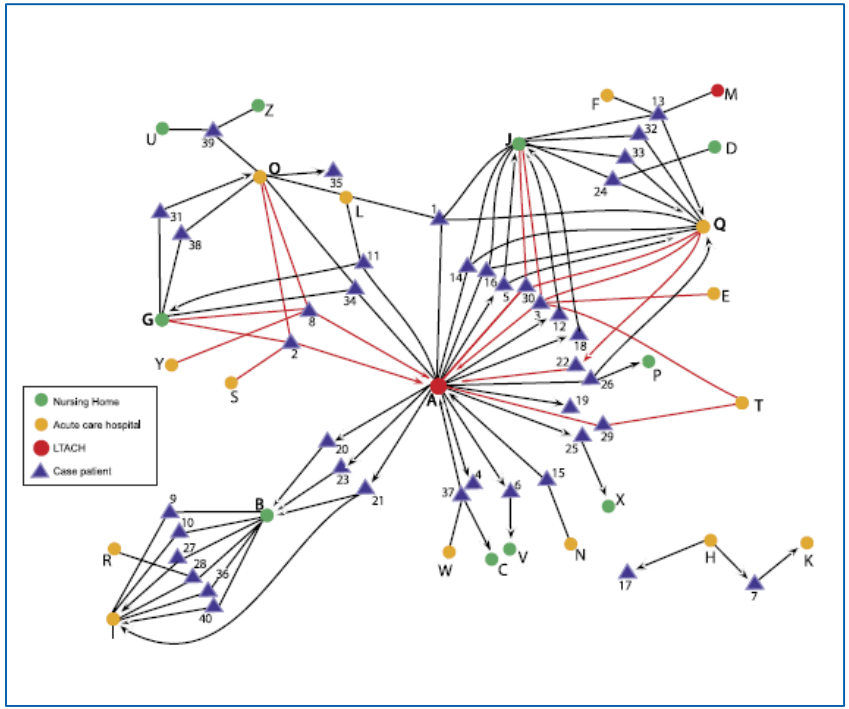
Building on Success: Healthcare-Associated Infections

- Many HAIs are caused by the most urgent and serious antibiotic-resistant bacteria and may lead to sepsis or death.
- CDC uses data for action to prevent infections, improve antibiotic use, protect patients.
- Combination of CDC data, guidelines, state support, and collaborations with CMS & AHRQ provide a unique opportunity to make major gains in reducing healthcare-associated infections and drug resistant infections to meet national goals.





Regional Control of Drug-Resistant Infections and *C. difficile*



- Traditional approach
  - Promotion of prevention efforts independently implemented by individual health care facilities
  - Does not account for inter-facility spread through movement of colonized/infected
- Regional Approach
  - Recognizes that individual facilities are components of integrated and dynamic networks connected via patient movement
  - Occurrences in one healthcare facility may affect many other healthcare facilities

Won S, Munoz-Price S, Lolans K, Hota B, Weinstein R, Hayden M. for the Centers for Disease Control Prevention Epicenter Program. Rapid and Regional Spread of Klebsiella pneumoniae Carbapenemased CID 2011:53

Building on Success: Working with States to Prevent HAI/AR

Using Data for Action in Tennessee

- Using infection data to target hospitals with the most CLABSIs in the state to focus prevention efforts
- Integrating HAI/AR prevention into CMS-funded networks, state hospital associations, and local partners to set reduction goals and priorities
- Reducing CLABSIs by 52%, 2008-2015

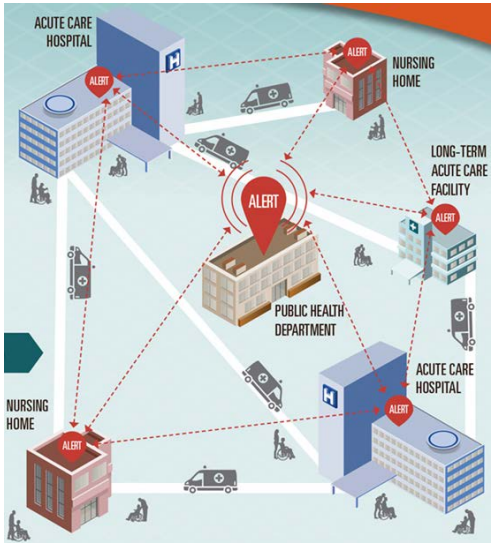
Preventing *C. difficile* in New York

- Growing state prevention partnerships to produce and promote prevention tools and stewardship programs
- Tracking CDI reductions with more hospitals and nursing homes reporting NHSN data and active partnerships through EIP AR surveillance
- Decreasing hospital-onset CDI by 10%, 2013-2015

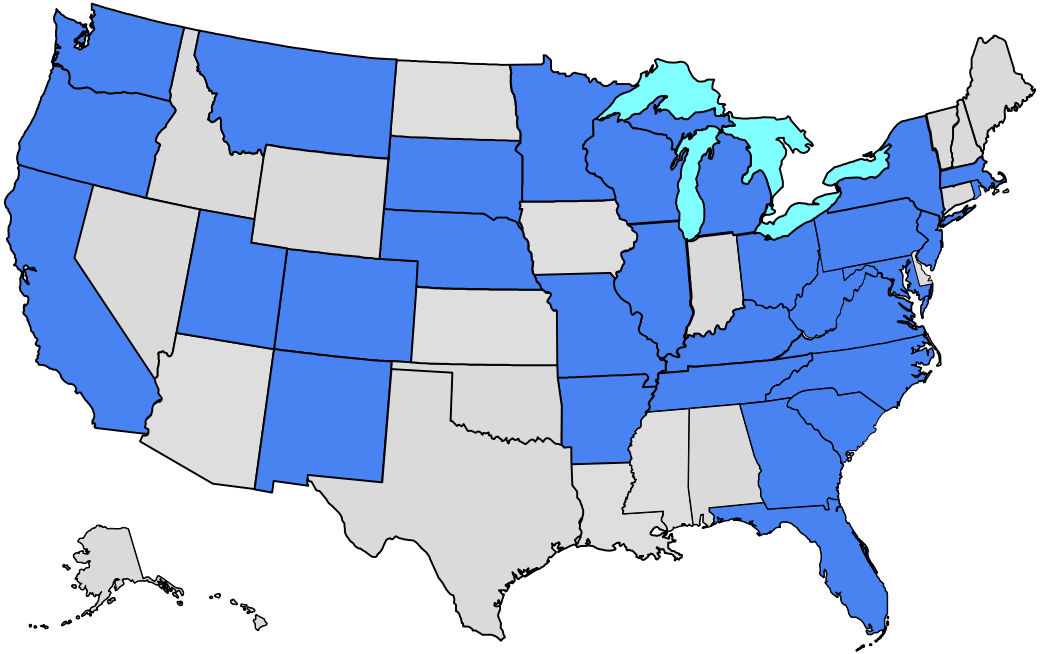
Expanding HAI/AR Programs to Every State

CDC is expanding implementation of prevention networks—where public health and healthcare work together—to better prevent and stop spread of infections and improve antibiotic use

- **Detection & Response:** In all 50 states, 6 cities and Puerto Rico, CDC is supporting local AR expertise and lab capacity to improve identification and response to all emerging threats, leading to synchronized action across healthcare and communities to quickly protect patients and control spread.
- **Prevention & Stewardship:** In 25 states and 3 cities, CDC is aggressively expanding CRE, *C. difficile*, and other MDRO prevention and antibiotic stewardship programs, implementing proven strategies in healthcare facilities to prevent infections and transmission across healthcare settings.



Enhancing HAI/AR Detection & Response, Prevention, and Antibiotic Stewardship Across the Nation



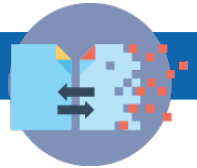
- Chicago
- Houston
- LA County
- New York City
- Puerto Rico
- Philadelphia
- Washington, DC

Source: CDC's Epidemiology and Laboratory Capacity, FY 2016 funding

Detection & Response Infrastructure funding only

Detection & Response Infrastructure and HAI/AR Prevention (including Antibiotic Stewardship) funding

Expanding CDC Efforts to Improve Antibiotic Use



Better data to drive action

- Expand NHSN antibiotic use reporting to guide local prevention
- Turn state outpatient prescribing rate data into action
- Support diagnostic innovations to improve prescribing
- Define sepsis epidemiology and pilot new sepsis surveillance definition

Enhanced prevention to save lives

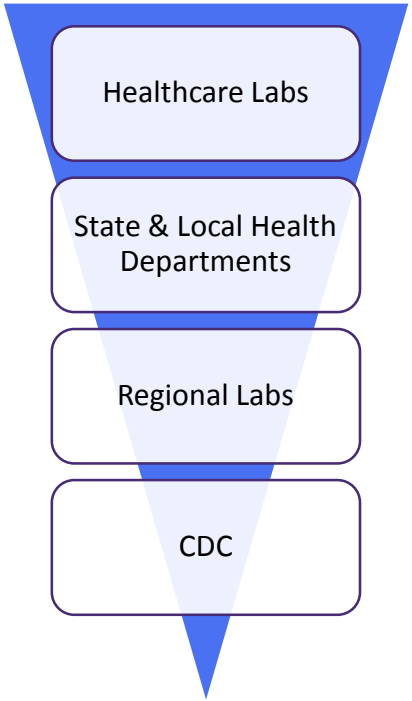
- Implement CDC Core Elements for Antibiotic Stewardship in Acute Care Hospitals, Nursing Homes, and Outpatient Settings (alignment of sepsis and stewardship programs in hospitals)
- Tailor state programs to improve prescribing in hospitals and communities
- Assess impact of strategies to improve prescribing, treat and prevent sepsis

Heightened public awareness to improve use and prevent sepsis

- Expand CDC's Get Smart: Know When Antibiotics Work program
- Promote sepsis recognition awareness among healthcare professionals, patients and families, and partners

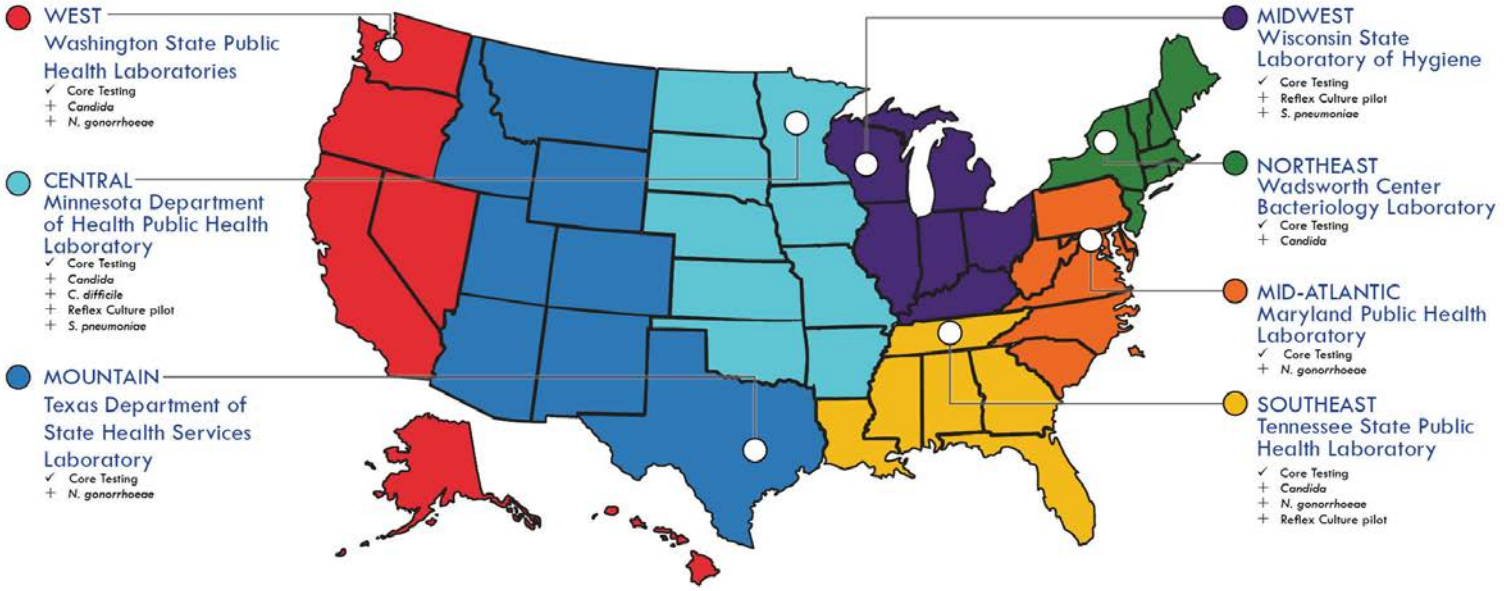
Creating a CDC AR Laboratory Network (ARLN)

- Nationwide testing to fill data gaps, inform prevention & response
- Tracking changes in resistance for hard-to-treat pathogens
- Sentinel surveillance, with robust testing and standardized alert values, for new and unusual resistance threats
- Piloting strategies to collect critical public health data in an era of culture-independent diagnostics



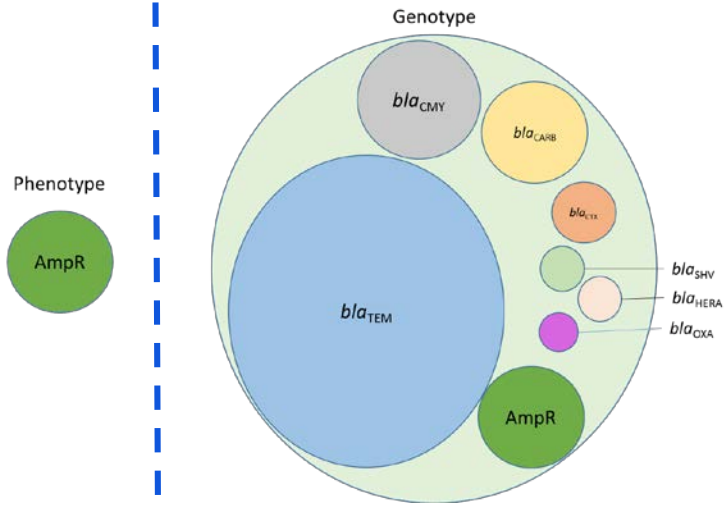
Creating AR Regional Labs

Healthcare Labs	State/Local Labs	**Regional Labs**	CDC



Next Generation Tracking: Whole Genome Sequencing

- WGS provides a very precise DNA fingerprint
  - Enables rapid detection of genes that make bacteria resistant to antibiotics critically important to human medicine
  - Allows public health officials to pinpoint investigations of outbreaks caused by antibiotic resistant pathogens/mechanisms
- WGS provides more detailed data to enable public health to track antibiotic resistance patterns and trends more effectively



Building State Capacity to Fight Foodborne Infections:

Conduct whole genome sequencing to enhance investigations, patient interviews

Detect and describe resistant bacteria rapidly.

Increase state laboratory capacity to rapidly uncover foodborne drug-resistant bacteria, including *Campylobacter* and *Salmonella*, using whole genome sequencing (WGS).

Improve health outcomes.

With increased lab capacity, track and investigate life-threatening *Salmonella* infections to prevent outbreaks and provide rapid response.

Find outbreaks faster by increasing lab testing.

Test every *Salmonella* isolate for drug resistance.

Promote responsible antibiotic use in food-producing animals.

Promote responsible use of antibiotics to prevent drug resistance by providing tools, information, and training to practicing veterinarians

Protecting Patients with Innovative Implementation of Proven Prevention Strategies

CDC works with partners to implement proven prevention strategies to change clinical practice and maximize public health impact

Working with health systems

- Working with CMS quality improvement partners on infection control and stewardship
- Test regional interventions (Orange County, Chicago) to reduce incidence of MDRO infections
- Improve antibiotic use through implementation and evaluation of Core Elements of Antibiotic Stewardship
  - Hospitals
  - Nursing Homes
  - Outpatient Settings
- Antibiotic use, resistance and stewardship in veterinary practice

Protecting Patients with Innovative Public Health Interventions

Collaborate with academic investigators (e.g., CDC Prevention EpiCenters) to discover new ways to protect patients & scale up effective interventions across health systems

- Testing innovative strategies for improving the use of personal protective equipment, hand hygiene and environmental cleaning.
- Multicenter randomized controlled trial of early discontinuation of empiric antibiotics started for possible respiratory infections among patients on mechanical ventilation.
- Multicenter study to define factors, exposures, and fecal microbiota characteristics that predict acquisition of enteric MDROs in a multicenter cohort ICU patients.
- Multicenter study to evaluate pre-operative antimicrobial therapy as a risk factor for surgical site infection.
- Multicenter randomized clinical trial to detect hospital-based outbreaks compared to routine methods for detecting and containing outbreaks.