Combating Antibiotic-Resistant Bacteria (CARB): CDC’s Antibiotic Resistance Solutions Initiative

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Antibiotic resistance in the United States

- Sickens >2 million people/year
- Kills at least 23,000 people/year, plus 15,000/year from *C. difficile*
- >$20B/year in health care costs
- Threat to economic stability
- Need to act now or even drugs of last resort will soon be ineffective
Antibiotic resistant threats in the U.S.

- CDC’s AR Report ranked 18 drug-resistant threats: Urgent, Serious, and Concerning
- Urgent threats include
  - Carbapenem-resistant Enterobacteriaceae (CRE)
  - Clostridium difficile
- Serious threats include
  - Drug-resistant non-typhoidal *Salmonella*
  - Methicillin-resistant *Staphylococcus aureus*
National Momentum on Antibiotic Resistance

For more information, see http://www.cdc.gov/drugresistance/federal-engagement-in-ar/index.html
Three core activities across AR threats
(healthcare-associated, foodborne, and community pathogens)

Prevention
- Develop evidence-based guidelines
- Assist in outbreak response
- Implement prevention strategies with states and partners
- Conduct applied research to inform prevention

Stewardship
- Track antibiotic use, especially in healthcare settings
- Provide research tools and guidance on improving antibiotic use
- Improve consumer and provider education

Surveillance
- Implement real-time data systems for tracking and quality improvement
- Define risk populations
- Provide national and international laboratory expertise, testing, and diagnostic capacity
FY16 Antibiotic Resistance Solutions Initiative: New Chapter $264 Million

Detect & Respond
- Regional Lab
- EIP
- NARMS

Protect
- State AR Prevention (Protect) Programs
- Stewardship

Innovate
- Microbiome
- Prevention Epi-Centers

- Comprehensive Tracking
- Rapid Detection
- Faster Outbreak Response
- Insights for Research Innovation
- Better Patient Care
- Improved Prescribing

CDC’s proposed FY 16 AR activities will also be supported through the FY 16 proposed increase to CDC’s National Healthcare Safety Network (NHSN).
AR Solutions Initiative: State AR Prevention Programs

Building state health department capacity to address the spread of infectious disease across healthcare settings and in the community

- Antibiotic Resistance
- Infection Control

State Core Capacity:
- Provide Regional Awareness of AR Threats
- Assess, Improve Infection Control
- Assess, Improve Prescribing Across Healthcare
- Protect Patients from AR, Other Infectious Threats
Facilities work together to protect patients.

**Common Approach** *(Not enough)*
- Patients can be transferred back and forth from facilities for treatment without all the communication and necessary infection control actions in place.

**Independent Efforts** *(Still not enough)*
- Some facilities work independently to enhance infection control but are not often alerted to antibiotic-resistant or *C. difficile* germs coming from other facilities or outbreaks in the area.
- Lack of shared information from other facilities means that necessary infection control actions are not always taken and germs are spread to other patients.

**Coordinated Approach** *(Needed)*
- Public health departments track and alert health care facilities to antibiotic-resistant or *C. difficile* germs coming from other facilities and outbreaks in the area.
- Facilities and public health authorities share information and implement shared infection control actions to stop spread of germs from facility to facility.
Lack of coordination between facilities can put patients at increased risk of infections.

Public health authorities and health care facilities should work together to share experiences and connect patient safety efforts:

- Up to 70% fewer patients will get CRE over 5 years if facilities coordinate to protect patients.

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**More patients get infections when facilities do not work together.**

(Example: 5 years after CRE enters 10 facilities in an area sharing patients)

- **Common Approach (status quo):**
  - 2,000 patients will get CRE.
  - CRE will impact 12% of patients.

- **Independent Efforts:**
  - 1,500 patients will get CRE.
  - CRE will impact 8% of patients.

- **Coordinated Approach:**
  - 400 patients will get CRE.
  - CRE will impact 2% of patients.

SOURCE: CDC Vital Signs, August 2015.
Track and Improve Prescribing

Improve antibiotic use and reduce antibiotic resistance

- Provide real-time data about antibiotic use to better understand prescribing.
- Set national standards of antibiotic use to improve use and reduce resistance.
- Ensure all hospitals have effective stewardship programs.
- Understand and act upon state-by-state differences in antibiotic prescribing rates.
- Evaluate and test intervention strategies to improve antibiotic prescribing.
- Create state programs to improve antibiotic prescribing in hospitals and the community.
Detect
- Detect resistance and connections among strains
- Accumulate real-time, actionable information
- Support hospital labs with confirmation and characterization
- Improve health outcomes by testing all resistant salmonella and other resistant foodborne pathogens through NARMS
- Integrate with the AR Isolate Bank & National Sequence Database
National Antimicrobial Resistance Monitoring System for Enteric Bacteria (NARMS)

Tracking Trends in Resistance

The National Antimicrobial Resistance Monitoring System for Enteric Bacteria (NARMS) was established in 1996. NARMS is a collaboration among state and local public health departments, CDC, the U.S. Food and Drug Administration (FDA), and the U.S. Department of Agriculture (USDA). This national public health surveillance system tracks changes in the antimicrobial susceptibility of certain enteric (intestinal) bacteria found in ill people (CDC), retail meats (FDA), and food animals (USDA) in the United States. The NARMS program at CDC helps protect public health by providing information about emerging bacterial resistance, the ways in which resistance is spread, and how resistant infections differ from susceptible infections.

NARMS Topics

About NARMS
Tracking antimicrobial resistance in enteric (intestinal) bacteria...

Pathogens & Diseases
Organisms and enteric diseases associated with antimicrobial resistance...

Publications
NARMS-related abstracts, manuscripts, and other publications...

Antibiotic Resistance
Common questions about antibiotic resistance...

Food-Producing Animals
Antibiotic Use in Food-producing Animals...

NARMS Reports
Summaries of information collected through active surveillance...

Spotlight

All New! 2013 NARMS Annual Report

2013 Antibiotic Resistance Threats Report

www.cdc.gov/narms
CDC now reports NARMS results routinely with all *Salmonella* outbreak reports.
NARMS Now

• New interactive tool
• Provide public access to NARMS antimicrobial susceptibility data for *Salmonella*, *Campylobacter*, *E. coli* O157, and *Shigella* isolates from people
• Interactive maps, graphs, and tables

www.cdc.gov/narmsgnow
Welcome to NARMS Now, an interactive tool from CDC that contains human antibiotic resistance data from the National Antimicrobial Resistance and Monitoring System (NARMS). NARMS Now makes it easier and quicker than ever to find out how antibiotic resistance for four bacteria transmitted commonly through food—Campylobacter, E. coli, Salmonella, and Shigella—has changed over the past two decades. Get started by filling in the search options below—or scroll down the page to download NARMS data.

**Search Options**

Bacteria: Salmonella
Serotype: Newport
Antibiotic: ceftriaxone
From: 1996
To: 2013
States: All

**By State**

2013

Set your search above, then press play to see changes in resistance over time.

**Resistance by Year**

[Graph showing percentage resistant over years]
Enhancing surveillance for human infections with antibiotic-resistant *Salmonella*

- Currently: NARMS tests 1 in 20 *Salmonella*, and 3 strains from each outbreak, usually weeks after illness
- CARB Action Plan: test all *Salmonella* from patients in close to real time
- Benefits of enhancement
  - In outbreaks, know resistance as soon as outbreak is detected; resistant outbreaks can be prioritized for investigation
  - Closer tracking of resistance trends in different parts of the country, different demographic groups, different *Salmonella* serotypes
  - Better tracking of sources of resistant infections—eg, domestic vs international, outbreak sources, etc.
AR Isolate Bank

- Launched by CDC and FDA in June 2015
- Provides collections of bacteria to support research and development of new diagnostic tests and antibiotic drugs
  - Curated panels from the AR isolate bank can be used to challenge and design the next generation of clinical tests and therapeutic agents
- To date, bank contains over 220 isolates comprised of first collections of CRE and other multi-drug resistant gram-negative rods
  - CDC filled 35 orders from diagnostic test manufacturers, pharmaceutical companies, and academic researchers within 3 months of launch

For more information, see [http://www.cdc.gov/drugresistance/resistance-bank/index.html](http://www.cdc.gov/drugresistance/resistance-bank/index.html)
Get Smart Week
Nov. 16-22, 2015  #AntibioticResistance

- Goal: Raise awareness of AR and the importance of appropriate antibiotic prescribing and use
- 92+ million impressions in 2014
- 2015 will highlight stewardship commitments
- 24-hour global Twitter chat
- First international awareness week

www.cdc.gov/getsmtart
Antibiotic Resistance: Tools for Partners

http://www.cdc.gov/drugresistance/resources.html
CARB could achieve reductions in many infections

**Anticipated reduction rate (%)**

- **C. difficile**: DOWN 50%
- **CRE**: DOWN 50%
- **MDR Pseudomonas**: DOWN 30%
- **Invasive MRSA**: DOWN 30%
- **MDR Salmonella**: DOWN 25%

**Type of germ**
National Action Plan for Combating Antibiotic-Resistant Bacteria (CARB)

FY 2016 President’s Budget
+$264 million
• State HAI/AR Prevention (Protect) Programs
• Antibiotic stewardship activities
• Detect Network of AR Regional Labs

+$14 million
• National Healthcare Safety Network (NHSN)

Supports implementation of CDC’s activities under the National Strategy and National Action Plan
Thank you

For more information please contact Centers for Disease Control and Prevention

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.