



Detection and Control of Antimicrobial Resistance; CDC Perspectives and Activities

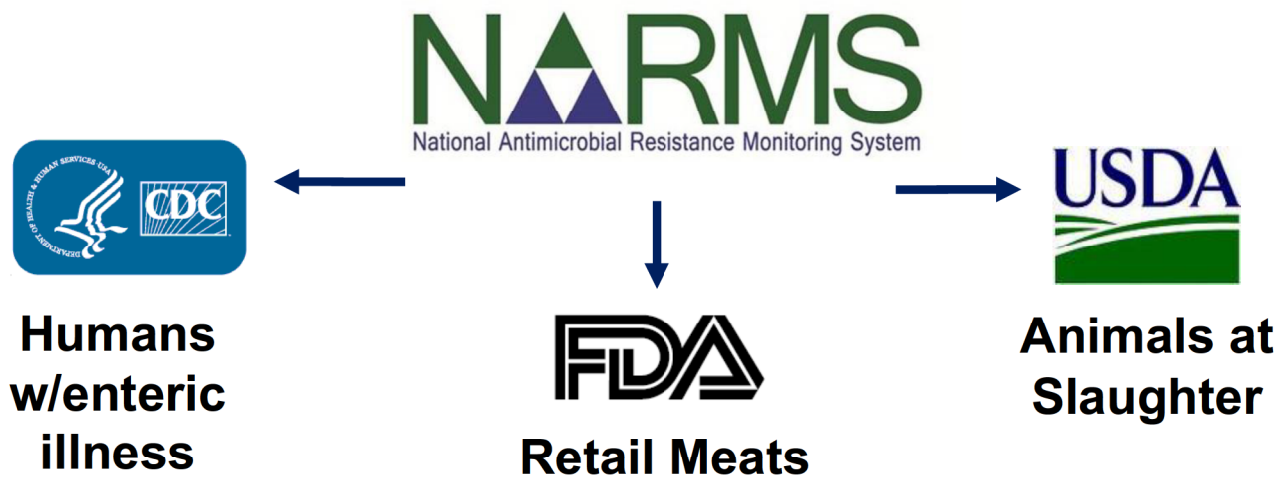
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Centers for Disease Control and Prevention

No conflicts of interest to declare.

Objectives and Targets

- Optimize Antimicrobial **Use**
- Increase AMR **Detection**
- Prevent AMR pathogen **Transmission**
 - Animal Health
 - Human Prescribing
 - Containment of Emerging Pathogens

National Antimicrobial Resistance Monitoring System (NARMS) for Agricultural/Foodborne Pathogens



NARMS – Bacteria and Resistance Testing

	Humans w/enteric illness	Retail Meats	Animals at Slaughter
Bacteria tested:	<ul style="list-style-type: none"> • <i>Salmonella</i> • <i>Campylobacter</i> • <i>Escherichia coli</i> O157 • <i>Vibrio</i> • <i>Shigella</i> 	<ul style="list-style-type: none"> • <i>Salmonella</i> • <i>Campylobacter</i> • <i>Escherichia coli</i> • <i>Enterococcus</i> 	<ul style="list-style-type: none"> • <i>Salmonella</i> • <i>Campylobacter</i> • <i>Escherichia coli</i> • <i>Enterococcus</i>



NARMS Surveillance at CDC

Two core surveillance activities

- **Routine surveillance** of human isolates
 - 1 in 20 isolates are shipped from States to CDC-NARMS for Antimicrobial Susceptibility Testing
 - Sequencing and identification of resistance genes for specified enteric isolates performed by States
- **Outbreak** isolate testing
 - Includes both active (multistate outbreaks) and supportive (single state outbreak) engagement



NARMS Reports, Interactive Data, and Data Sharing

NARMS
National Antimicrobial Resistance Monitoring System

2015 INTEGRATED REPORT

NARMS Now: Human Data

CDC > NARMS > NARMS Now: Human Data
Welcome to NARMS Now: Human Data, an interactive tool from CDC that contains antibiotic resistance data from bacteria isolated from humans as part of the National Antimicrobial Resistance Monitoring System (NARMS). [More](#)

Select a view: [Dashboard](#) [Tabular](#)

Search Options

Bacteria: *Salmonella* Serotype: Typhi Antibiotic: ralcivix acid From: 1999 To: 2015

States: All

Resistance By State Display: US Map

2015

Resistance by Year Display: Graph

Percentage

Acting to Combat Antibiotic Resistance

and Texas Health Officials Warn About Illness Linked to Raw Milk from Texas Dairy
 Milk contained rare but dangerous germ, consumers should get antibiotics



Campylobacter (Campylobacteriosis)



Learn more about the multistate outbreak of multidrug-resistant infections linked to pet store puppies

NATIONAL CENTER FOR EMERGING AND ZONOTIC INFECTIOUS DISEASES



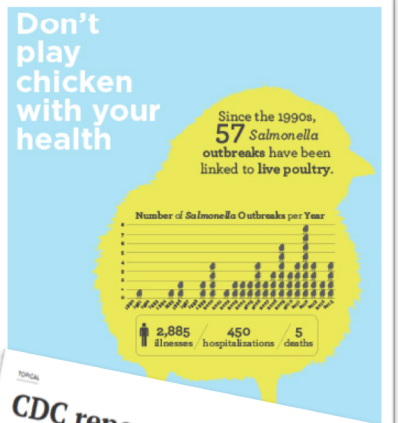
TAKING A ONE HEALTH APPROACH

Newly Reported Gene, *mcr-1*, Threatens Last-Resort Antibiotics

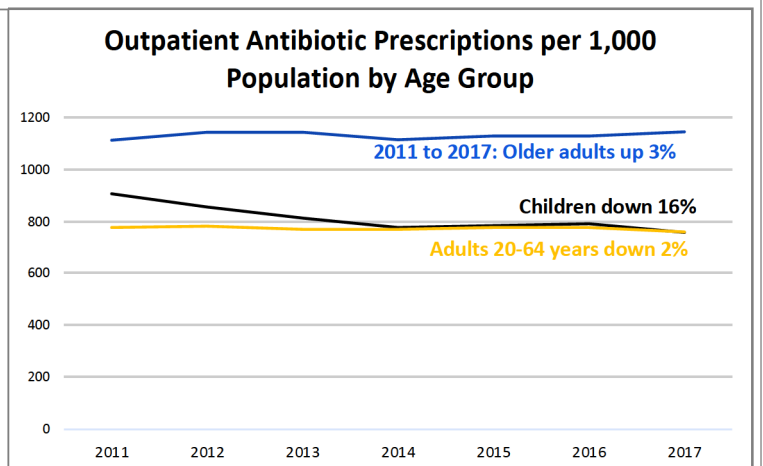
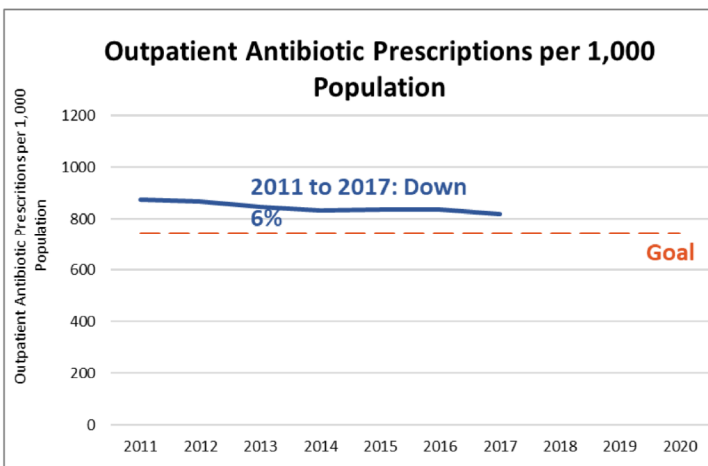
A new gene known as *mcr-1*—which can make bacteria resistant to colistin, a last-resort drug for some multidrug-resistant infections—was first reported in China in November 2015 and in the United States in May 2016. After the gene was discovered in bacteria from a patient in the United States, CDC and state and local health departments immediately launched a coordinated public health investigation to potentially prevent *mcr-1* from becoming widespread in the U.S. Additional discoveries have been made, including those of two pigs in the United States, and further *mcr-1* findings are expected.



CDC renews probe into outbreak of resistant salmonella tied to Wisconsin calves



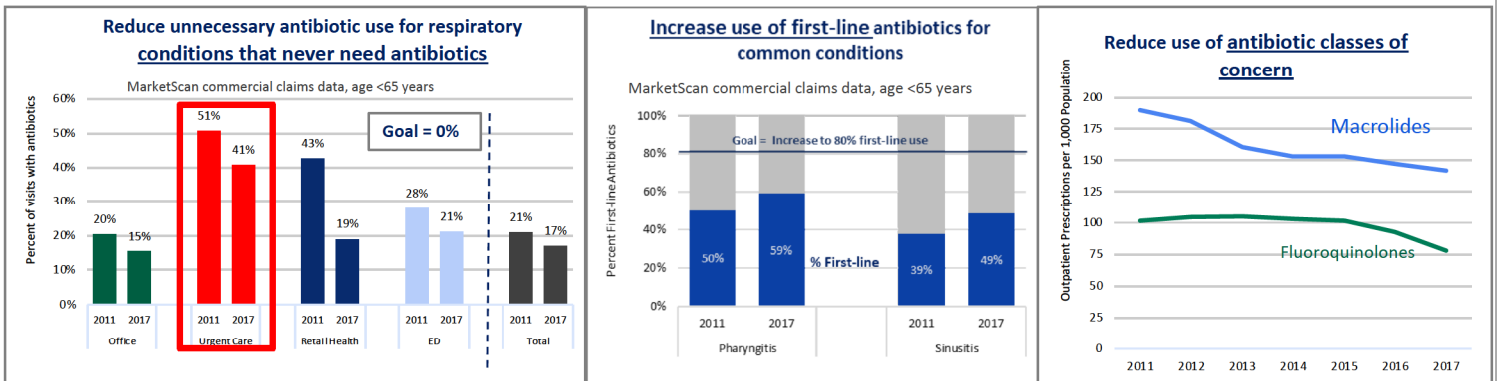
Improving Outpatient Antibiotic Use



- **Goal: Reduce inappropriate outpatient use by 50%**
- Baseline: 2011, 30% of outpatient antibiotics unnecessary
- Target: 15% reduction of overall outpatient antibiotic use

- Target: specific populations
 - **Reductions in children have driven national improvements**
 - Increased efforts to target improvements in antibiotic use in adult patients

Improving Outpatient Antibiotic Use



- Goal: No antibiotic prescribing for conditions that never need antibiotics (e.g., colds)
- Target: specific settings and infections
 - Opportunities to target improvements in **urgent care**
- Goal: Increase use of first-line antibiotics for common conditions to at least 80%
- Target: specific drugs and infections
 - Increase use of recommended **narrow-spectrum antibiotics** for common infections
- Goal: Reduce use of antibiotic classes of concern
- Target: specific drugs
 - **Macrolides** – commonly used when no antibiotic needed
 - **Fluoroquinolones** – high-risk for adverse events (e.g., *C. difficile* infection)

Improving Stewardship Across All Healthcare Settings

Implementation of Antibiotic Stewardship Core Elements at Small and Critical Access Hospitals

The Core Elements of Hospital Antibiotic Stewardship Programs

The Core Elements of Antibiotic Stewardship for Nursing Homes

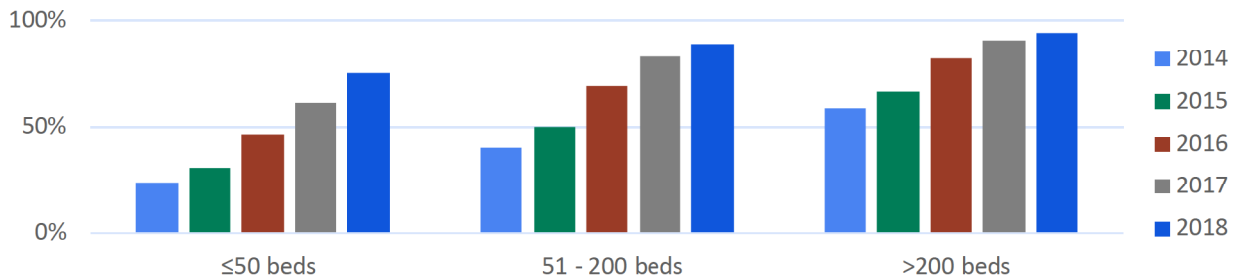
The Core Elements of Outpatient Antibiotic Stewardship

Logos: American Hospital Association, HRSA, PEW, CDC, National Center for Disease Control and Prevention, Division of Healthcare Quality Promotion.

- <https://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html>
- <https://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html>
- <https://www.cdc.gov/getsmart/community/improving-prescribing/core-elements/core-outpatient-stewardship.html>
- <https://www.cdc.gov/getsmart/healthcare/implementation/core-elements-small-critical.html>

Expand and Improve Inpatient Stewardship Programs

Percentage of U.S. Hospitals with Stewardship Programs Meeting All Core Elements

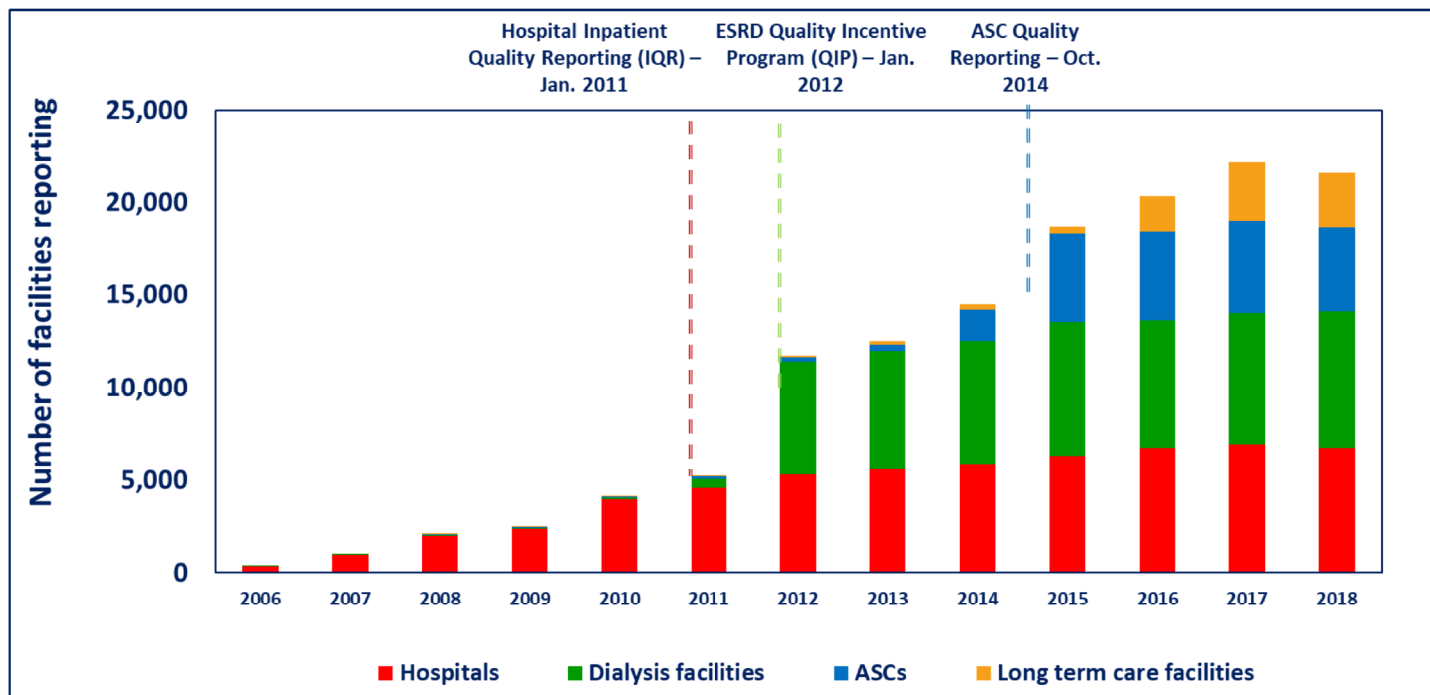


- Progress: Number of hospitals with stewardship programs increased to 80%
- Increased participation in NHSN antibiotic use (AU) & resistance (AR) reporting
 - Number of facilities reporting AU: 1,375
 - Number of facilities reporting AR: 614
- Focus for 2020: Improve the quality of stewardship programs (e.g., via accreditation requirements)

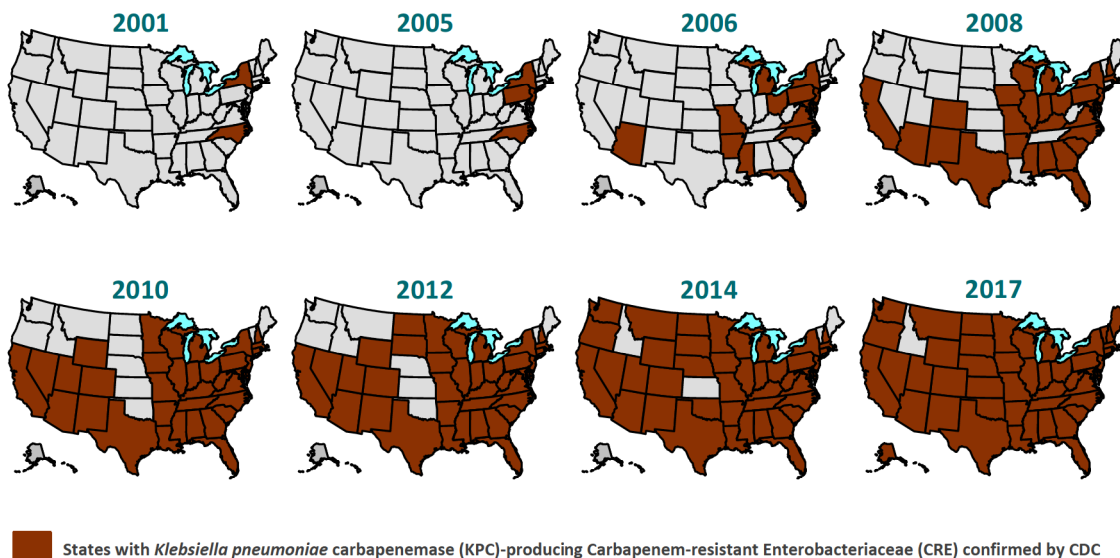
HAI and AUR Data Submitted via Clinical Documents Architecture (CDA) to National Healthcare Safety Network (NHSN) as of 2018

CLABSI events	45%
CAUTI events	42%
SSI events	36%
LabID events	60%
AU numerator	100%
AR numerator	100%

Healthcare Facilities Reporting to NHSN and Onset of CMS Reporting Requirements

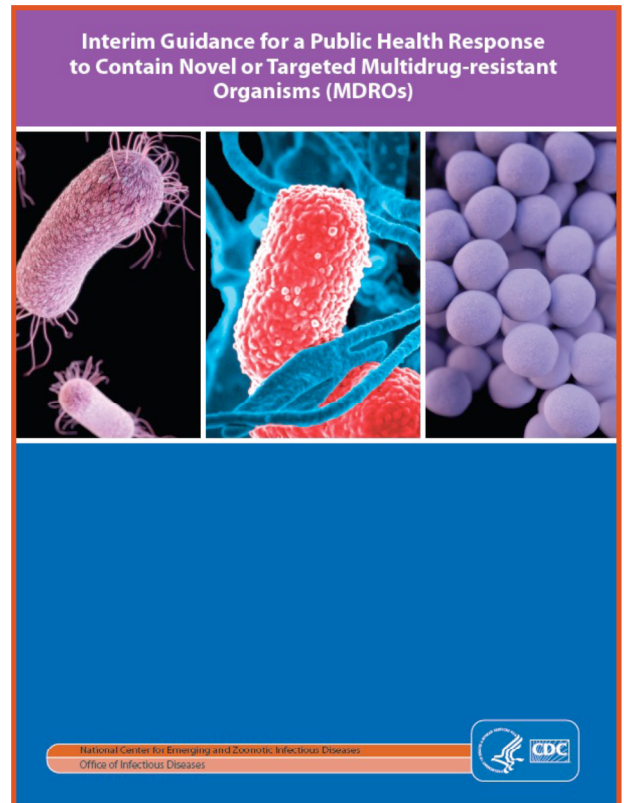


CRE in the US -2001 to 2017



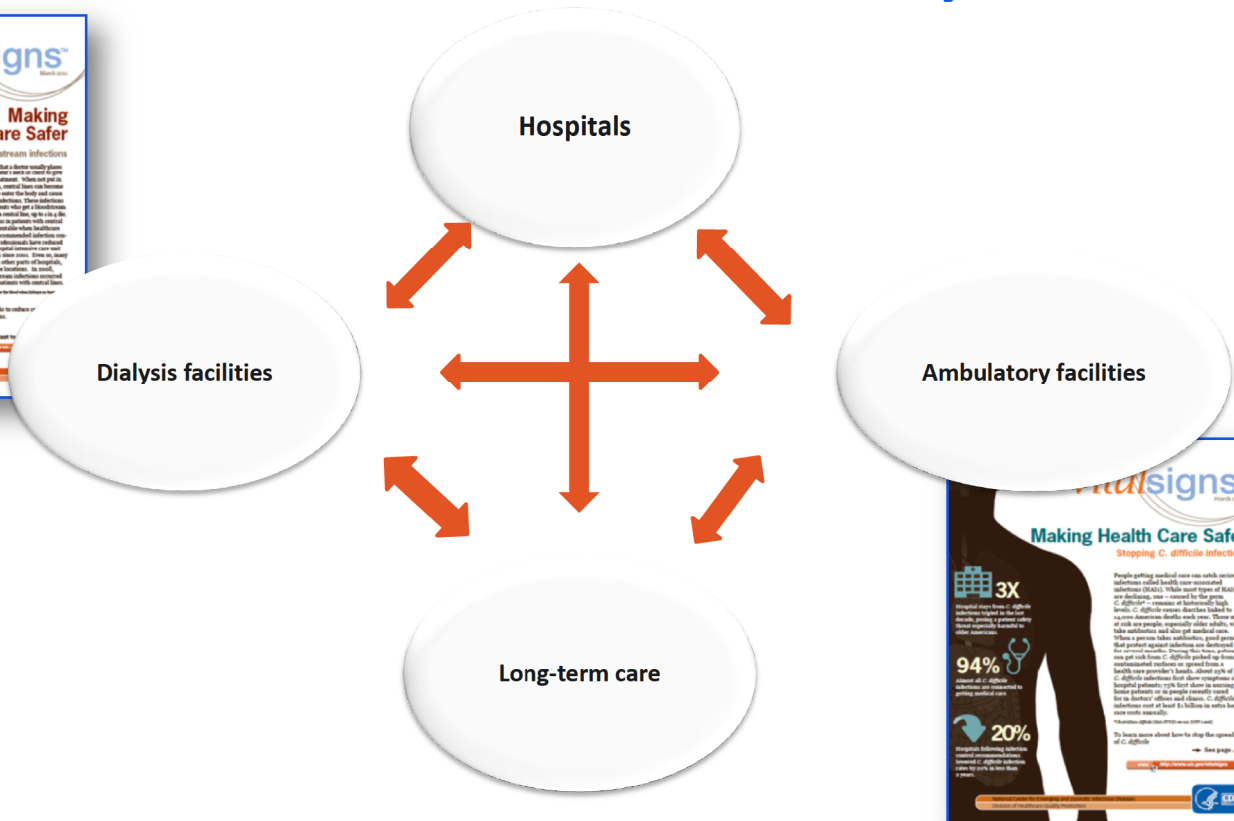
Containment Strategy

- Goal: slow the spread
 - of novel or rare multidrug-resistant organisms or mechanisms
- Systematic, intensive response
 - to single cases of high concern
 - focus on stopping transmission
- Tiered approach based on organism/mechanism attributes
- Complements existing guidance



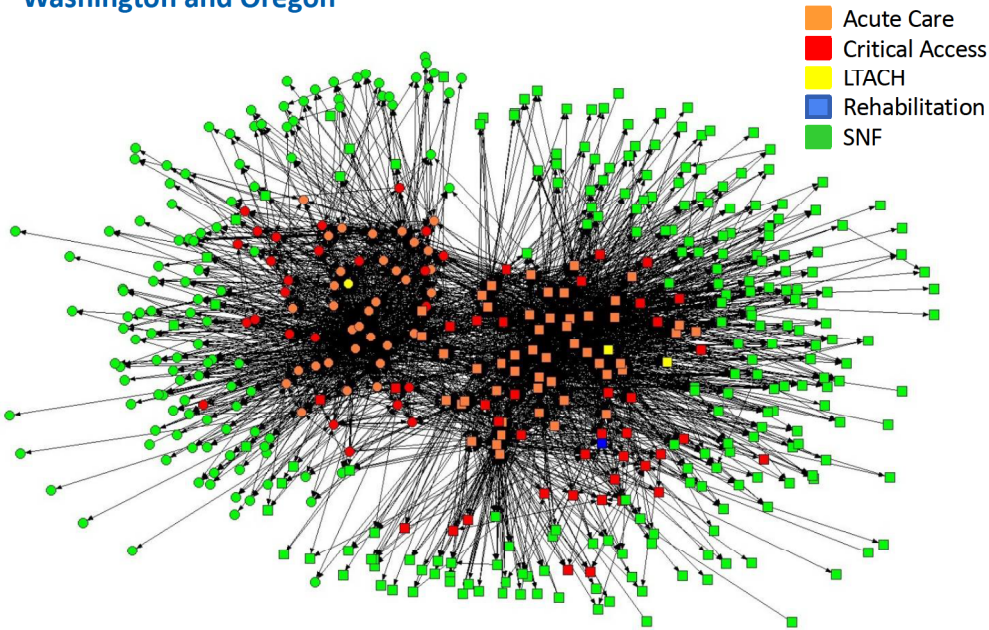
<https://www.cdc.gov/hai/containment/index.html>

US Healthcare Care Delivery

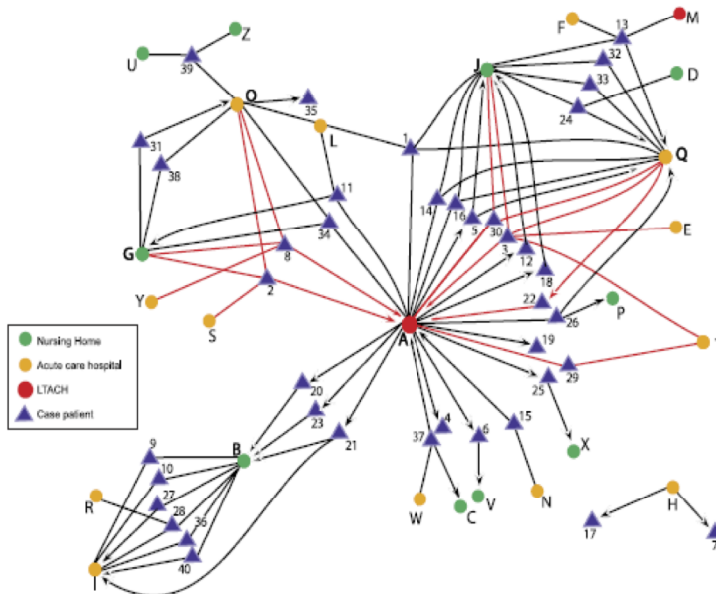


Connectedness of Facilities

Washington and Oregon

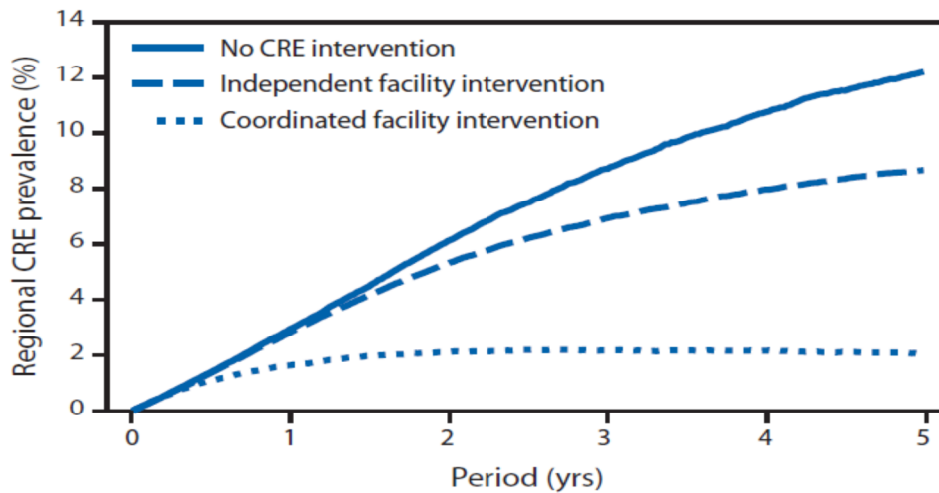


Regional control of Carbapemen-resistant Enterobacteriaceae (CRE)



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* Carbapenemase. *CID* 2011;53: 532-540

Projected Reduction of Prevalence of CRE Based on Modeling



* Additional information available at <http://www.cdc.gov/drugresistance/resources/publications.html>. A video of the model simulations is available at <http://www.cdc.gov/drugresistance/resources/videos.html>.

Containment requires:

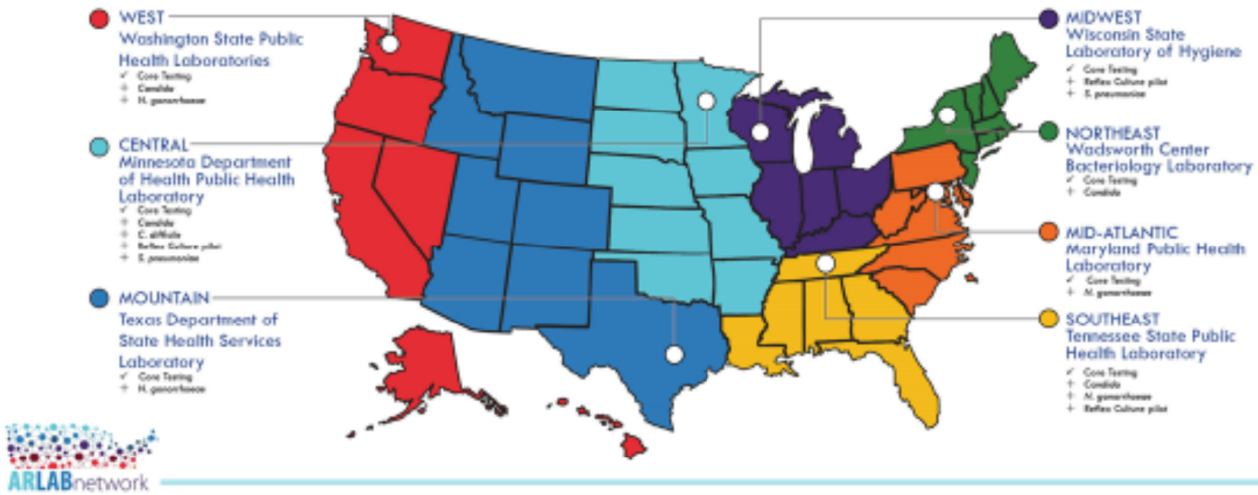
- Early detection of individual cases
- Fast and thorough assessment of
 - other potentially colonized individuals
 - environmental reservoirs
 - linked facilities and residences
- Sustained efforts until resolution is confirmed
- State and Local capacity and resources

AR Lab Network 7 Regional Labs



ARLN Regional Labs perform specialty testing (see map) and Core Testing, which includes:

- CRE/CRPA isolate characterization
- Targeted surveillance of Carbapenem-R *Acinetobacter* spp. and ESBL-producing *Enterobacteriaceae*
- CRE colonization screening



Thank you

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
 Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
 E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

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.



Market-Based Solutions to Reduce Antibiotic Use in Food Animals

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ANTIBIOTIC
RESISTANCE
ACTION CENTER



Current U.S. Policy Landscape

- Until recently, medically important antibiotics were allowed for use in food animals for growth promotion, prevention, control and treatment.
- In 2012, President Obama's FDA began a process to voluntarily ban growth promotion uses of medically important antibiotics.
- In January 2017, this ban took effect.
- **Too slow and significant loopholes!**

Turning to the Market to Reduce Use Faster

- Small coalition of groups began private meetings and public campaigns targeting select companies: Chick-Fil-A, McDonalds, Subway, KFC, Wendy's etc.
- Chick-Fil-A made first major commitment in 2014: all chicken served would be raised without antibiotics. Achieved this goal in July 2019.
- McDonald's was next and soon followed with a major beef commitment.

Chain Reaction III Scorecard	
A	
B+	
B	
B-	
C+	
C	
D+	
D	
E	
F	

Consumer Groups Push KFC to Stop Routine Antibiotic Use in Its Chicken

By Reuters August 10, 2016



SUBWAY: Stop the routine use of antibiotics in the production of your meat!

The misuse of antibiotics in farm animals is creating superbugs and antibiotic-resistant bacteria that threaten humans.

At least 2 million Americans are infected and 23,000 die every year due to this crisis.

"If we don't act now, our medicine cabinet will be empty and we won't have the antibiotics we need to save lives" —CDC

SIGN THE PETITION: foodbabe.com/subwaymeat #SubwayNoDrugs

NRDC AND OUR ALLIES DELIVERED MORE THAN

125,000

PETITION SIGNATURES CALLING ON WENDY'S TO END ROUTINE ANTIBIOTIC USE IN ITS BEEF SUPPLIES.



Serious Success in Chicken

Reductions in Hatcheries:

- ≈% of broiler chicks receiving antimicrobials decreased from 93% in 2013 to 17% in 2017
- Hatchery gentamicin use in broiler chicks decreased ≈74% between 2013 and 2017

Reduction in Broilers from 2013-2017:

- In-feed virginiamycin use decreased ≈60%
- In-feed tetracycline use decreased ≈95%

Sales of antibiotics important to human medicine for use in livestock dropped 28 percent from 2009 to 2017

New Target: Beef

- Beef & pork industries remain high users of antibiotics: 5.1 million pounds and 4.5 million pounds in sales respectively in 2017, compared to 590,000 pounds chickens.



McDonald's has a plan to reduce antibiotics in beef

WE ARE ASKING THE SIX LARGEST FAST FOOD COMPANIES IN THE WORLD TO BECOME ANTIBIOTIC STEWARDSHIP LEADERS.

THEY HAVE THE POWER TO TRANSFORM SUPPLY CHAINS IN THE UNITED STATES AND BEYOND. ALL OF THESE COMPANIES COMMITTED TO SOURCING RESPONSIBLY RAISED CHICKEN; NOW IT IS TIME FOR THEM TO EXPAND THIS APPROACH ACROSS ALL MEATS, AND IMPLEMENT COMMITMENTS THAT HAVE BEEN MADE.

Antibiotics Off the Menu Coalition calls on Wendy's to end antibiotic overuse in beef supply

June 4, 2019

Certified Responsible Antibiotic Use

- Allow for minimal, responsible use of antibiotics poultry
- Verification of compliance required – USDA certifier
- Expanding to pork and beef later this month.
- Some of the largest chicken and turkey companies use our standard.

