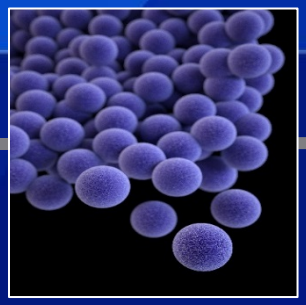
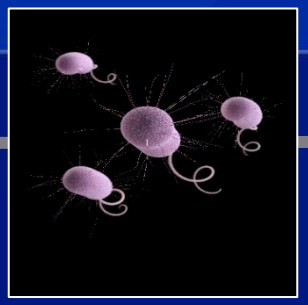


CDC Vitalsigns™

Making Health Care Safer
Stop Spread of Antibiotic Resistance

Scott Fridkin, MD

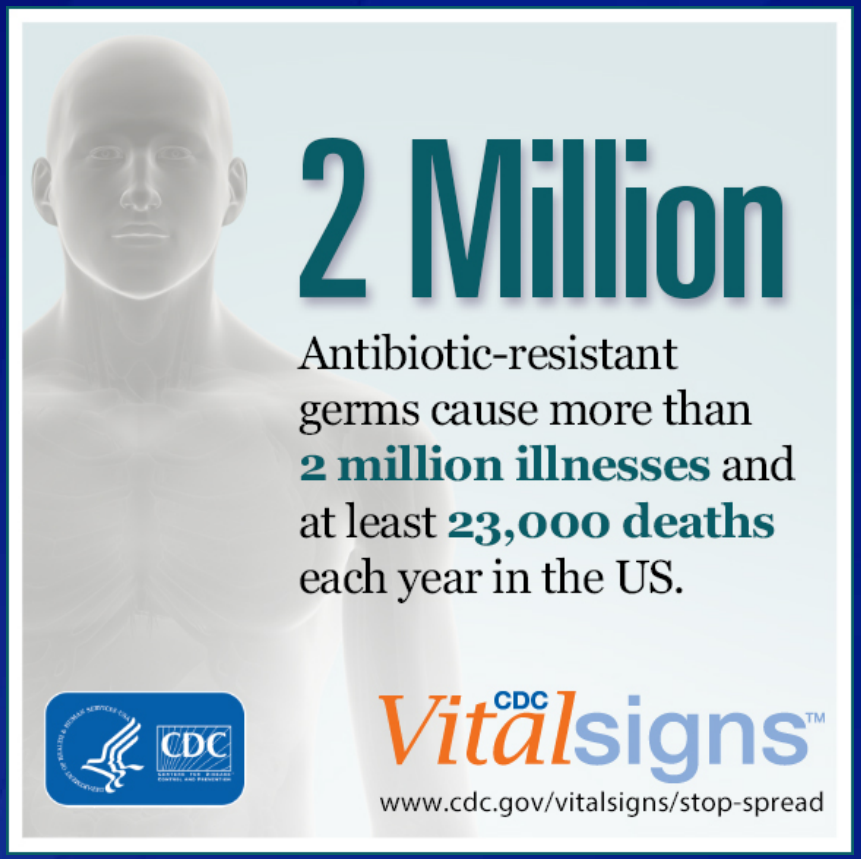
Senior Advisor

Antibiotic Resistance in Healthcare

Division of Healthcare Quality Promotion

National Center for Emerging and Zoonotic Infectious Diseases

Spread of Antibiotic-Resistant Germs

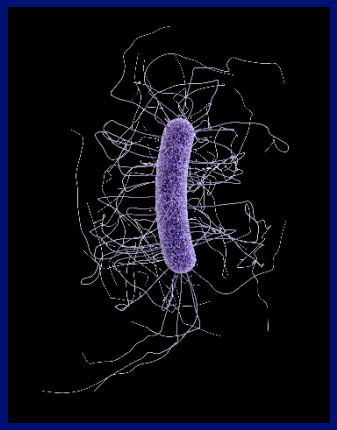


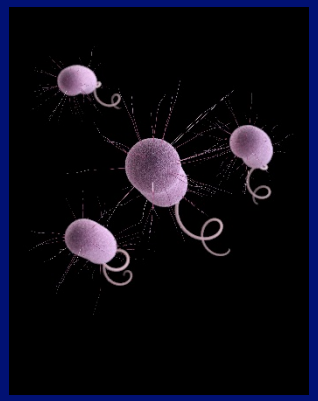
- Antibiotic-resistant germs cause more than 2 million illnesses and at least 23,000 deaths each year
- Half of the antibiotic-resistant “threats” are predominately healthcare-associated infections

August 2015 Vital Signs

- **These infections can lead to serious health complications, including sepsis or death.**

- **CDC Vital Signs Report shows that spread of drug-resistant and *Clostridium difficile (C. difficile)* germs will increase without immediate, nationwide improvements in infection control and antibiotic prescribing.**

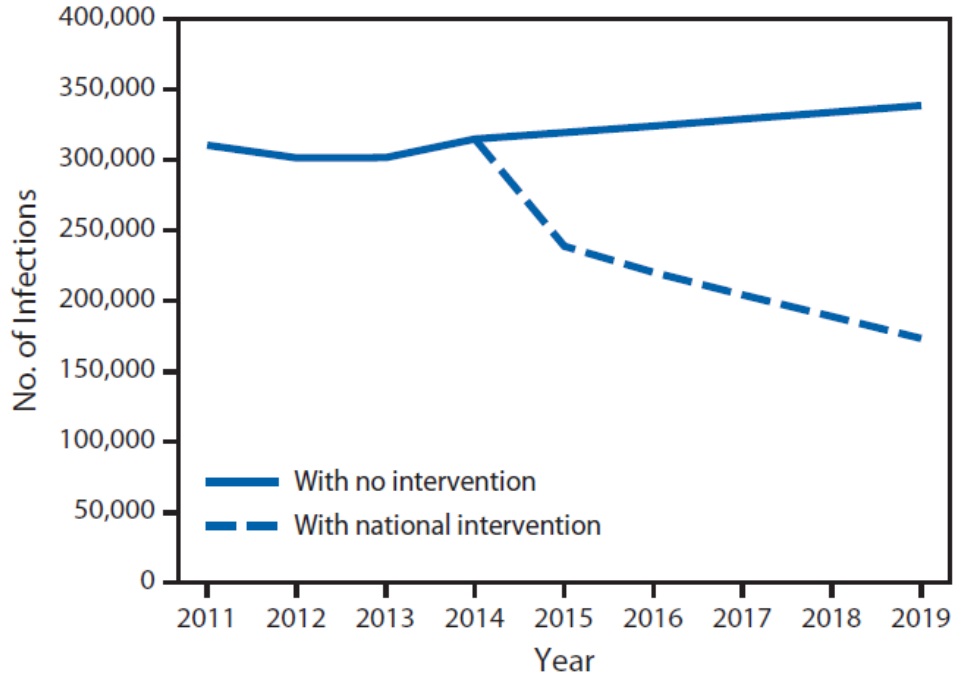





Can we quantify the potential impact of replicating in the US the successful reduction of antimicrobial resistant infections seen in other countries?

- **Similar methods to "Antibiotic Resistance Threats in the United States,2013"**
- **Estimates included 4 particularly problematic HAIs**
  - CRE, multidrug-resistant *Pseudomonas aeruginosa*, invasive Methicillin-resistant *Staphylococcus aureus* (MRSA), & *Clostridium difficile* Infections (CDI)
- **Data sources**
  - Emerging Infections Program (EIP)
    - Prevalence survey burden
    - Mortality estimates
  - National Healthcare Safety Network (NHSN)
    - Percentage resistant
  - U.S. Census Bureau
    - Population projections
  - Published literature
    - Mortality estimates
    - Potential effect size of national interventions

Results: Comparison between the projected number of annual HAIs with no intervention and with an aggressive national intervention — United States, 2014-2019

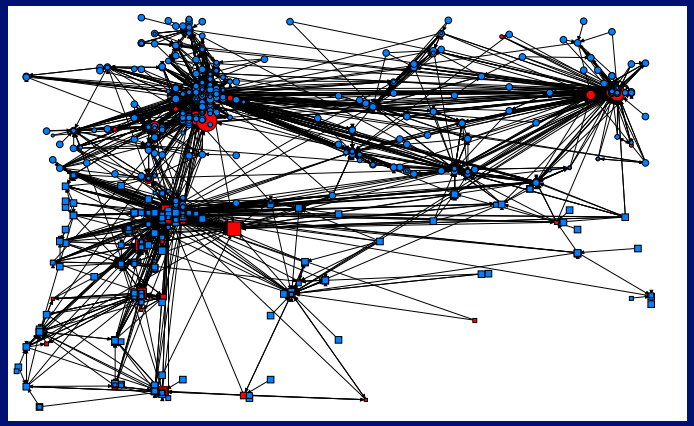


* Methicillin-resistant *Staphlococcus aureus*, carbapenem-resistant *Enterobacteriaceae*, and multidrug-resistant *Pseudomonas aeruginosa*.
† Additional information available at http://www.cdc.gov/drugresistance/resources/publications.html.

Preventing Infections Saves Lives

- **CDC modeling**
  - Projects forward 5 years
  - Estimates cumulative number of infections (and deaths)
  - Estimate number “averted” with nationwide improvements in infection control and antibiotic prescribing
- **619,000 AR Infections Averted (37,000 deaths)**

Is there an advantage to using a regional approach for CRE prevention across a healthcare network?



- **Inpatients frequently move back and forth between hospitals, long term acute care facilities, and nursing homes in the region through readmission and transfer**
  - In Orange County, CA, 29% of patients had multiple hospital admissions within 365 days
- **Connectedness of hospitals through patient sharing was a risk factor for the number of facility-wide Clostridium difficile infections in a recent study**
- **Antibiotic resistance is a regional problem**

Lee BY, McGlone SM, Song Y, Avery TR, Eubank S, Chang CC, et al. Social network analysis of patient sharing among hospitals in Orange County, California. American journal of public health. 2011 Apr;101(4):707-13. PubMed PMID: 21330578. Pubmed Central PMCID: 3052345.

Simmering JE, Polgreen LA, Campbell DR, Cavanaugh JE, Polgreen PM. Hospital Transfer Network Structure as a Risk Factor for Clostridium difficile Infection. Infection control and hospital epidemiology. 2015 Jun 15:1-7. PubMed PMID: 26072907.

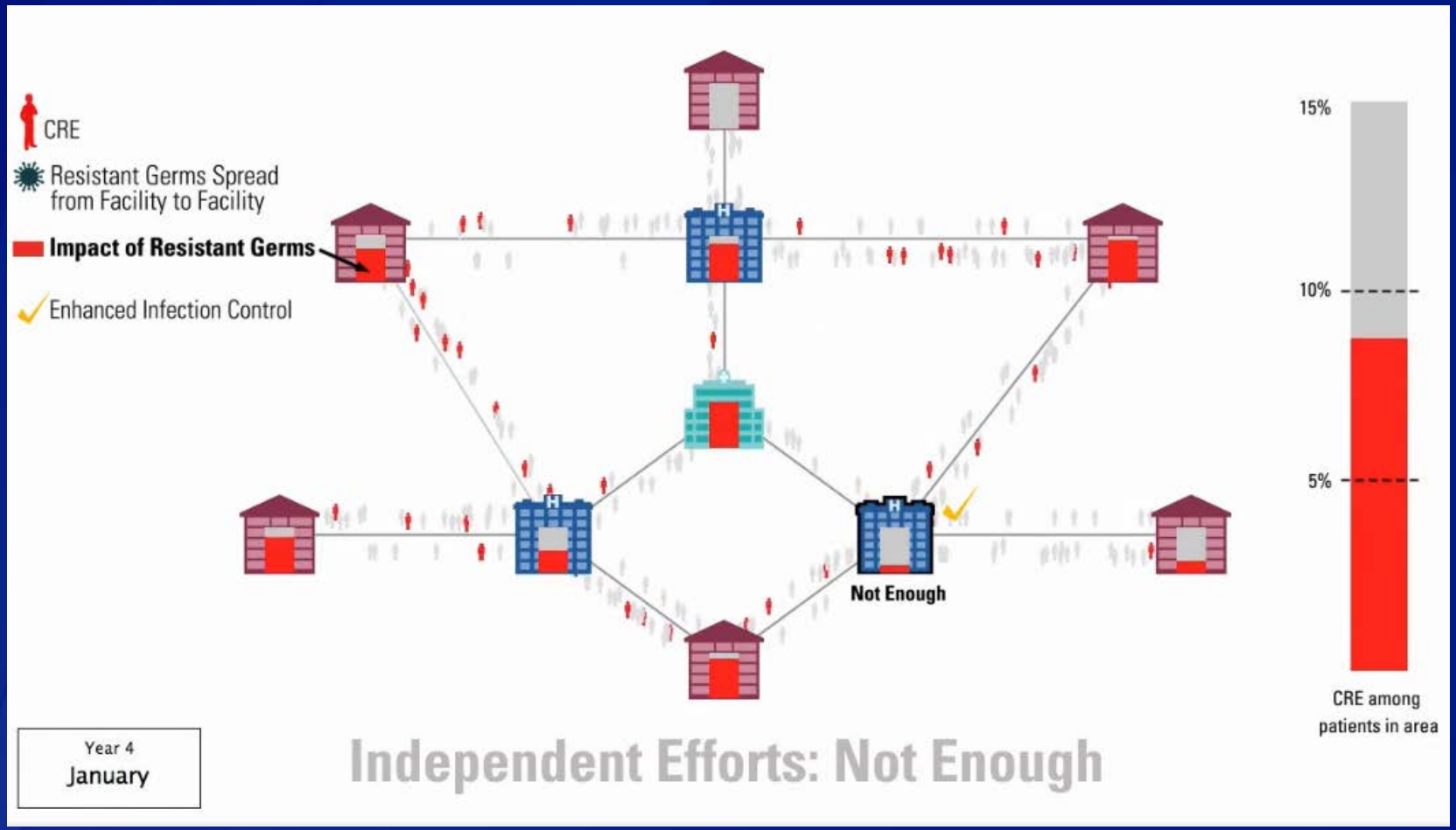
Methods: Estimating effect of a coordinated approach

- **Developed two complementary agent-based models**
  - Model 1: 10-facility model based upon VA data
  - Model 2: 102-facility model of Orange County, California
- **Simulated the spread of CRE among patients in**
  - Acute care hospitals
  - Long-term acute care hospitals (LTACs)
  - Free-standing nursing homes
- **Models parameterized and calibrated with real-world data**
  - **Model 1:** Clinical studies on CRE testing, incidence, and prevalence; VA administrative data
  - **Model 2:** Clinical studies on CRE testing, incidence, and prevalence; California State Inpatient Database; CMS administrative data

Methods: Key Model Scenarios

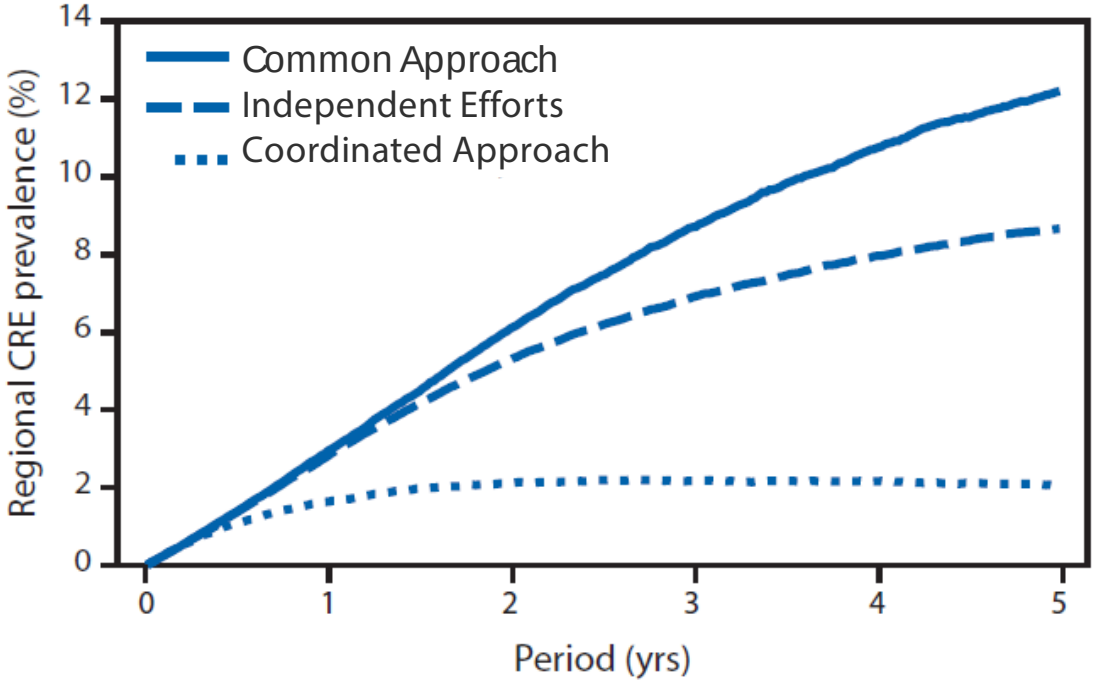
- **Infection control activity currently in common use (Common Approach)**
  - Clinical cultures and contact precautions
- **Augmented efforts implemented independently at individual subsets of facilities (Independent Efforts)**
  - Subset of hospitals begin CRE testing once a facility- specific trigger is reached
  - Improved use of contact precautions
  - Improved recordkeeping of CRE positive patients on readmission
- **Coordinated augmented approach across a health care network (Coordinated approach)**
  - All hospitals begin CRE testing once a network-wide trigger is reached
  - Improved use of contact precautions
  - Improved recordkeeping of CRE positive patients on readmission and transfer to other facilities

Independent Efforts Are Not Enough



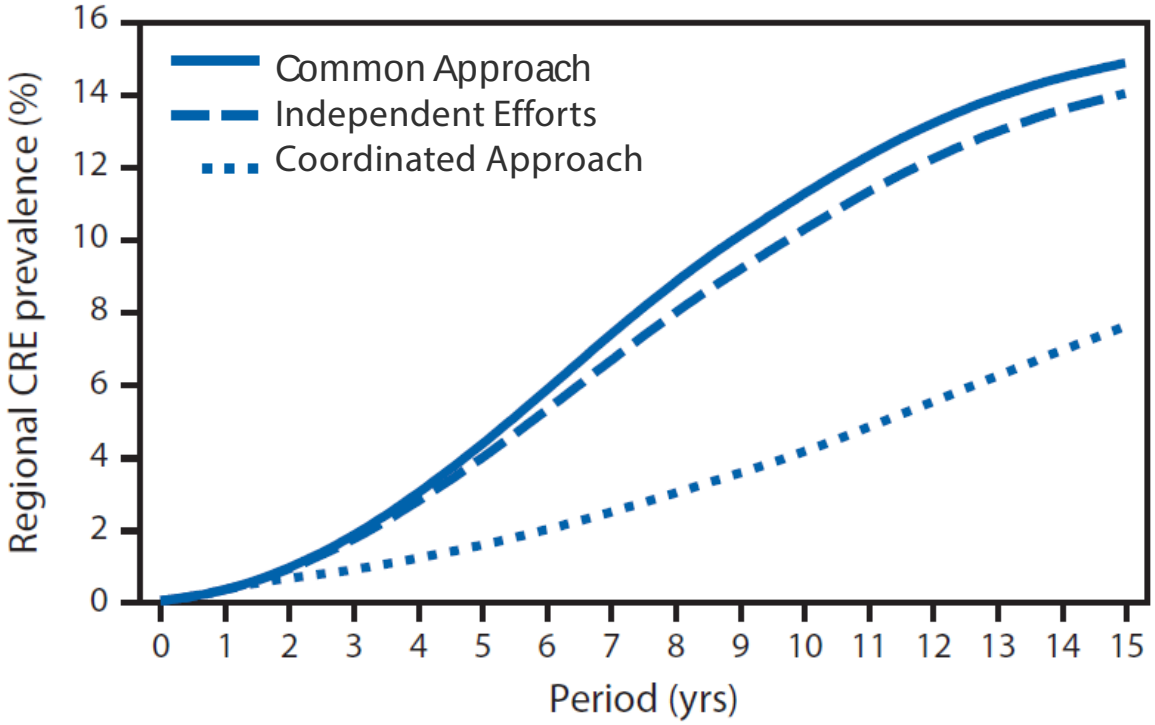
https://www.youtube.com/watch?v=2INGuNAvAOE

Projected regional prevalence of CRE over a 5-year period under three different intervention scenarios — 10 facility model, United States



* 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.

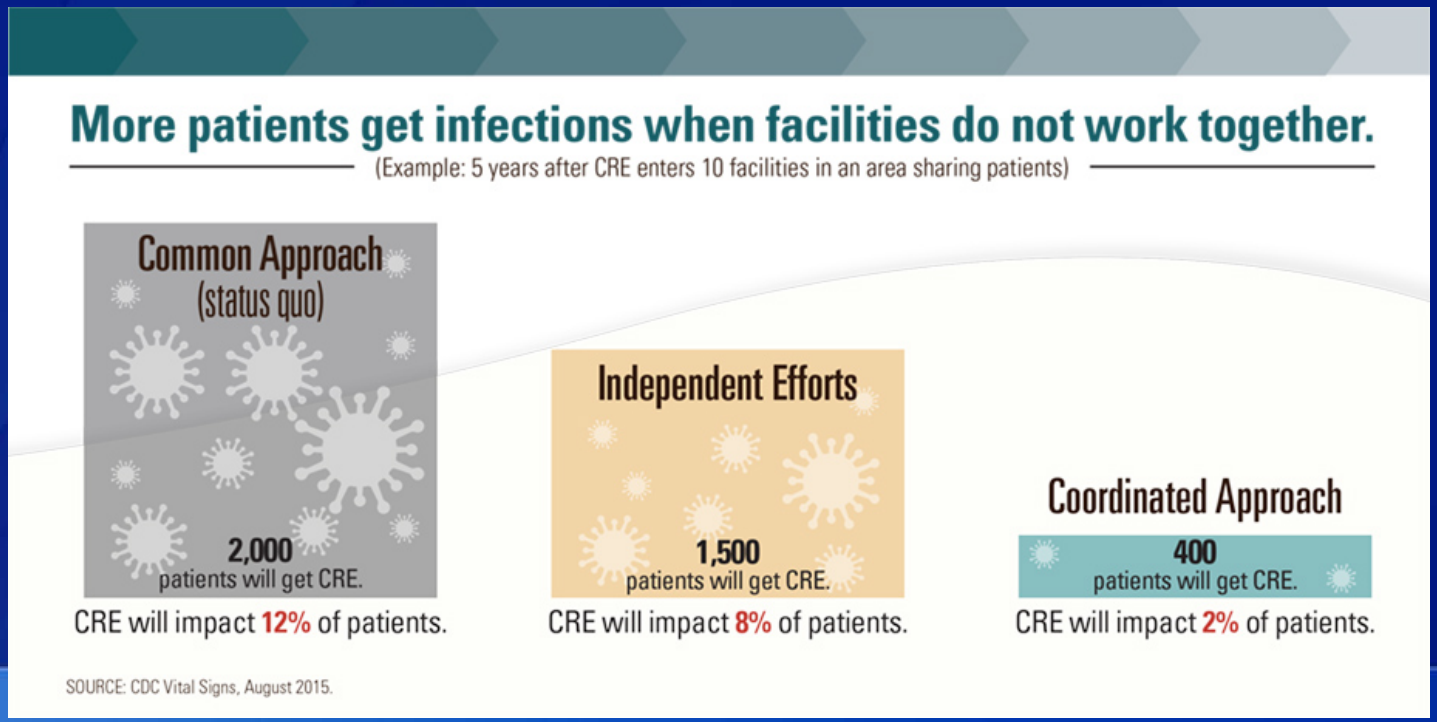
Projected countywide prevalence of CRE over a 15-year period under three different intervention scenarios — Orange County, California



* Additional information available at http://www.cdc.gov/drugresistance/resources/publications.html.

Working Together Is Vital

- More patients get infections when facilities do not work together
- Up to 70% fewer patients will get CRE over 5 years if facilities coordinate to protect patients

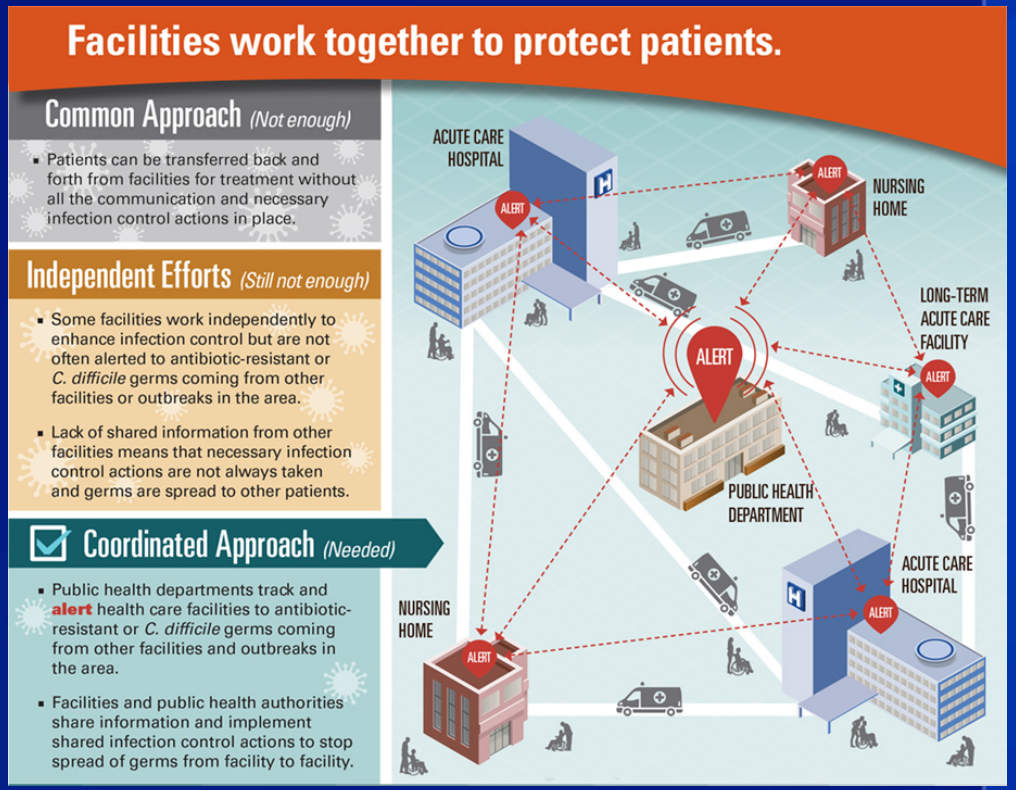


What You Should Remember

- Mathematical modeling projects increases in drug-resistant infections and *C. difficile* without immediate, nationwide improvements in infection control and antibiotic prescribing.
- CDC modeling projects that a coordinated approach—that is, healthcare facilities and health departments in an area working together—could prevent life-threatening infections.
- We need to think in terms of our whole community.
- Forward-looking approach; we realize that not all health departments will be able to implement this strategy without investments.

Action: CDC Recommends a Coordinated Approach

- Public health authorities and health care facilities should work together to share experiences and connect patient safety efforts
- Lack of coordination between facilities can put patients at increased risk



State and Local Health Departments Action

- Identify the healthcare facilities in the area and how they are connected. Know their infection prevention and antibiotic stewardship activities
- Dedicate staff to improve connections and coordination with healthcare facilities in the area
- Work with CDC to use data for action to better prevent infections and improve antibiotic use in health care settings
- Know the antibiotic resistance threats in the area and state

What Can Be Done?

The Federal government is

- Implementing activities across all government agencies to address the National Action Plan for Combating Antibiotic-Resistant Bacteria.
  www.whitehouse.gov/sites/default/files/docs/national_action_plan_for_combating_antibiotic-resistant_bacteria.pdf
- For example, CDC is:
  - Protecting more people by tracking outbreaks, monitoring antibiotic use and resistance, improving prescribing, and preventing infections through investment in State HAI/Antibiotic Resistance Protect Programs, as described in the President's proposed FY16 budget.
    www.cdc.gov/drugresistance/solutions-initiative/index.html
  - Supporting health departments, health care facilities, health care networks, and professional and quality improvement organizations to track and respond to data about HAIs and antibiotic-resistant infections.

State and local health departments can

- Identify the health care facilities in the area and how they are connected. Know their infection prevention and antibiotic stewardship activities.
- Dedicate staff to improve connections and coordination with health care facilities in the area.
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Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333

Publication date: 9/4/2015

Health care facility CEOs/ administrators can

- Implement systems to alert receiving facilities when transferring patients who have drug-resistant germs.
- Review and perfect infection control actions within your facility.
- Get leadership commitment to start or join HAI/ antibiotic resistance prevention activities in the area.
- Connect with the public health department to share data about antibiotic resistance and other HAIs.
- Make sure clinical staff have access to prompt and accurate laboratory testing for antibiotic-resistant germs.

Prescribers and healthcare staff can

- Prescribe antibiotics correctly. Get cultures then start the right drug promptly at the right dose for the right duration. Know when to stop antibiotics.
- Be aware of antibiotic resistance patterns in your facility and area to protect your patients.
- Ask patients if they have recently received care in another facility.
- Follow hand hygiene and other infection control measures with every patient.
  www.cdc.gov/handhygiene/

Patients and their families can

- Ask your healthcare provider what they and the facility will do to protect you and your family from an antibiotic-resistant or *C. difficile* infection.
- Tell your doctor if you have been hospitalized in another facility or country.
- Insist that everyone wash their hands before touching you, and wash your hands often.

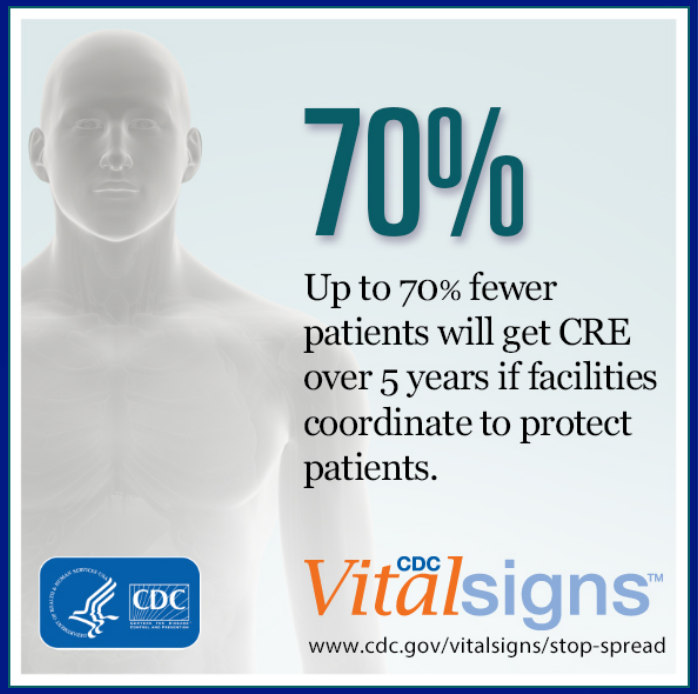
Facility and Provider Action

- Stop Silent Spreading (share data)
- Perfect infection control actions
- Get leadership commitment
- Connect with public health
- Ensure lab testing is top notch

- Prescribe antibiotics optimally
- Talk with patients about prior care
- Practice perfect infection control

Forward Looking Approach: Investments Needed

- Now we have a clear sense not only how bad the problem is, but also what needs to be done, and what the benefits of doing it will be
- Health departments and facilities need support
- Now it is up to Congress to support the resources needed
  - Some starting now



August 4th: Materials Associated with Vital Signs

- Fact Sheet
- MMWR, Technical appendix
- Press Release with a graphic
- Digital Press Kit
- Media Advisory
- Capitol Hill Alert
- GovDelivery Email blast
- Social Media
- Safe Healthcare Blogs
- Telebrief Script
- Talking Points with tough Q&A
- Advance Media Work, Op-eds
- Partner Calls and Emails
- Coordinated Approach Video
- Medscape Ads and Google Ads
- Dr. Frieden Critical Contacts email
- Dear Colleague Letter
- Podcast

Factsheet

AUGUST 2015

CDC Vitalsigns™

Making Health Care Safer

Stop Spread of Antibiotic Resistance

We're at a tipping point: an increasing number of germs no longer respond to the drugs designed to kill them. Inappropriate prescribing of antibiotics and lack of infection control can contribute to drug resistance and put patients at risk for deadly diarrhea (caused by *C. difficile*). Even if one facility is following recommended infection controls, germs can be spread inside of and between health care facilities when patients are transferred from one health care facility to another without appropriate actions to stop spread. Lack of coordination between facilities can put patients at increased risk. Now more than ever is the time for public health authorities and health care facilities to work together, sharing experiences and connecting patient safety efforts happening across the state.

Health care facility CEOs/administrators can:

- Implement systems to alert receiving facilities when transferring patients who have drug-resistant germs.
- Review and perfect infection control actions within your facility.
- Get leadership commitment to join healthcare-associated infection (HAI)/antibiotic resistance prevention activities in the area.
- Connect with the public health department to share data about antibiotic resistance and other HAIs.
- Make sure clinical staff have access to prompt and accurate laboratory testing for antibiotic-resistant germs.

2 Million

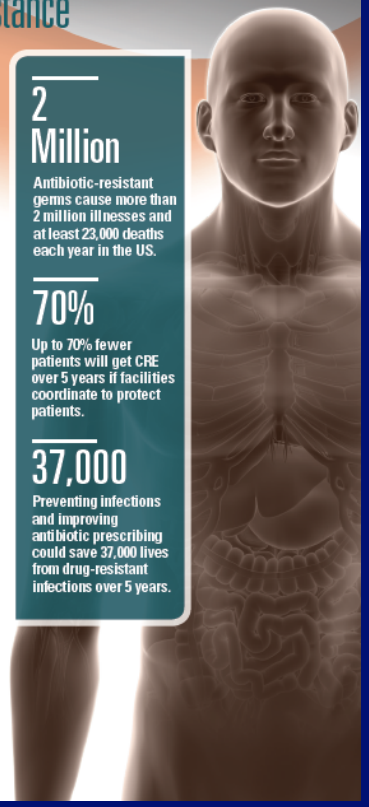
Antibiotic-resistant germs cause more than 2 million illnesses and at least 23,000 deaths each year in the US.

70%

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

37,000

Preventing infections and improving antibiotic prescribing could save 37,000 lives from drug-resistant infections over 5 years.



Want to learn more? www.cdc.gov/vitalsigns/stop-spread

Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases

Problem:

Germs spread between patients and across health care facilities.

Antibiotic resistance is a threat.

- Nightmare germs called CRE (carbapenem-resistant *Enterobacteriaceae*) can cause deadly infections and have become resistant to all or nearly all antibiotics we have today. CRE spread between health care facilities like hospitals and nursing homes when appropriate actions are not taken.
- MRSA (methicillin-resistant *Staphylococcus aureus*) infections commonly cause pneumonia and sepsis that can be deadly.
- The germ *Pseudomonas aeruginosa* can cause HAIs, including bloodstream infections. Strains resistant to almost all antibiotics have been found in hospitalized patients.
- These germs are some of the most deadly resistant germs identified as "urgent" and "serious" threats.

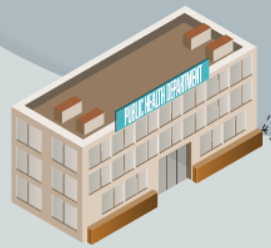
***C. difficile* infections are at historically high rates.**

- *C. difficile* (*Clostridium difficile*), a germ commonly found in health care facilities, can be picked up from contaminated surfaces or spread from a healthcare provider's hands.
- Most *C. difficile* is not resistant to antibiotics, but when a person takes antibiotics, some good germs are destroyed. Antibiotic use allows *C. difficile* to take over, putting patients at high risk for deadly diarrhea.

Working together is vital.

- Infections and antibiotic use in one facility affect other facilities because of patient transfers.
- Public health leadership is critical so that facilities are alerted to data about resistant infections, *C. difficile*, or outbreaks in the area, and can target effective prevention strategies.
- When facilities are alerted to increased threat levels, they can improve antibiotic use and infection control actions so that patients are better protected.
- National efforts to prevent infections and improve antibiotic prescribing could prevent 619,000 antibiotic-resistant and *C. difficile* infections over 5 years.

Take Steps Now! Public health departments should lead coordination.



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- Know the antibiotic resistance threats in the area and state.

SOURCE: CDC Vital Signs, August 2015.

Factsheet

Facilities work together to protect patients.

Common Approach *(Not enough)*

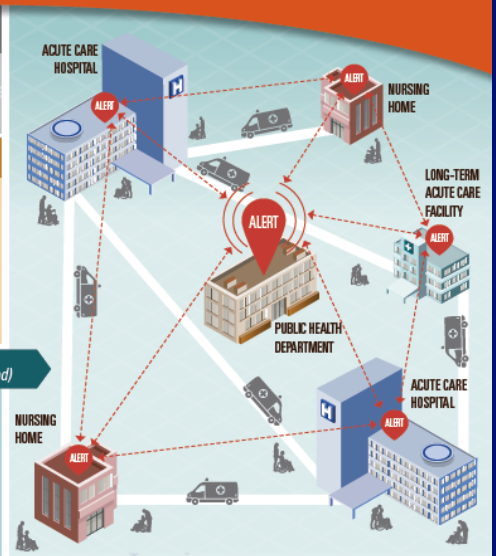
- Patients can be transferred back and forth from facilities for treatment without all the communication and necessary infection control actions in place.

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.



More patients get infections when facilities do not work together.

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

SOURCE: CDC Vital Signs, August 2015.

3

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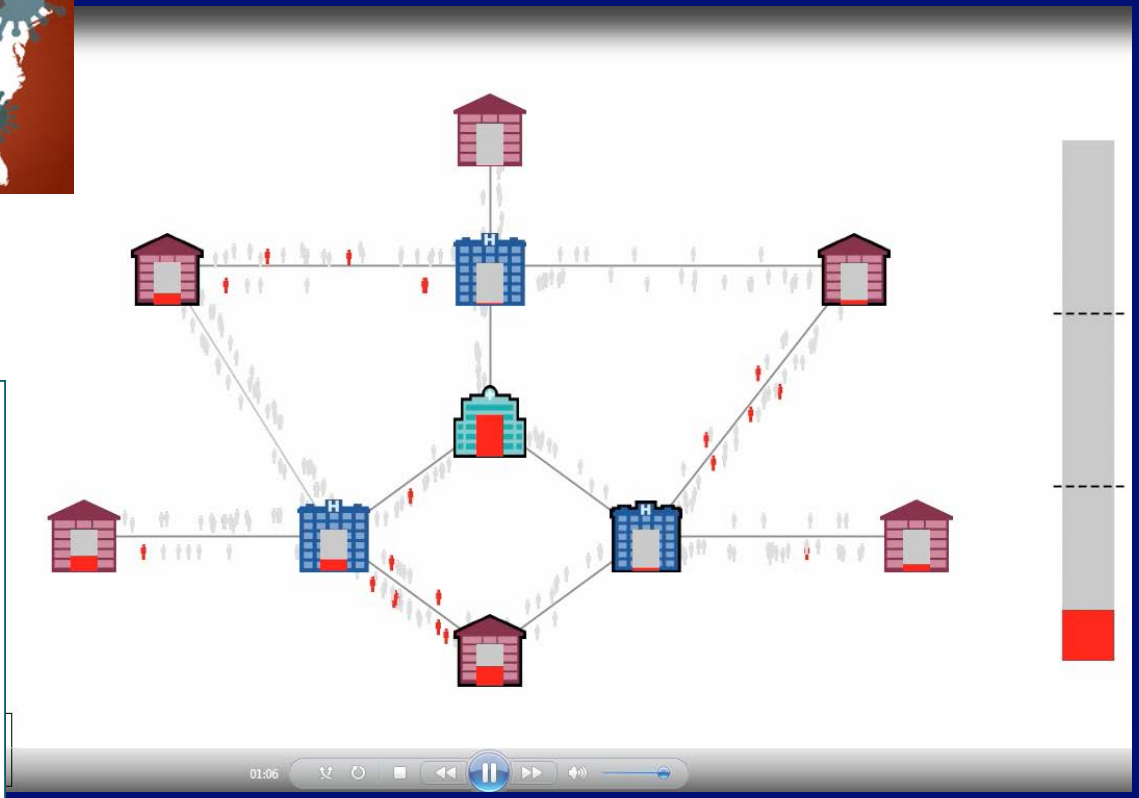
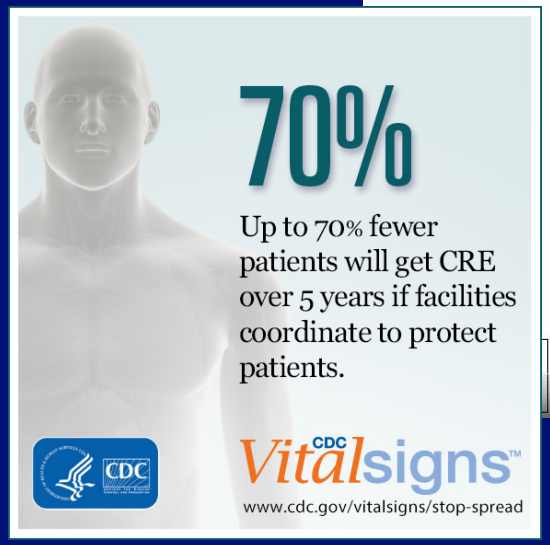
Video to Explain Model





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10-Facility Model Team

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CDC

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- Kate Wiedeman
- Melissa Brower
- Krissy Brinsley-Rainisch
- Vital Signs Team

Questions?

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