



# The Big Picture: Using Antibiotic Use and Surveillance Data to Better Inform Stewardship in Healthcare Settings

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Get Smart: Know When Antibiotics Work  
Office of Antibiotic Stewardship  
Centers for Disease Control and Prevention

International Society for Disease Surveillance Webinar  
June 1, 2016

What is the problem?

# **ANTIBIOTIC RESISTANCE**

# Antibiotic Resistance Threat Report 2013

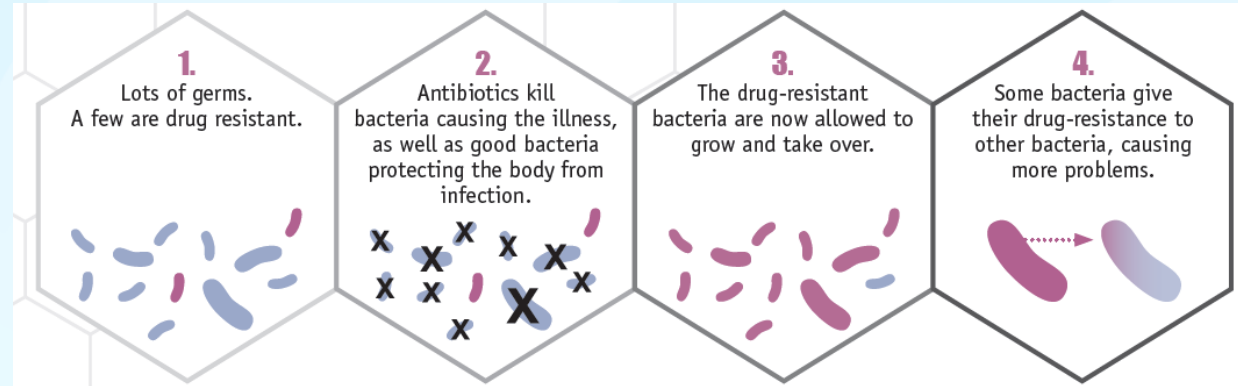
Estimated minimum number of illnesses and deaths caused annually by antibiotic resistance\*:

At least  **2,049,442** illnesses,  
 **23,000** deaths

*\*bacteria and fungus included in this report*

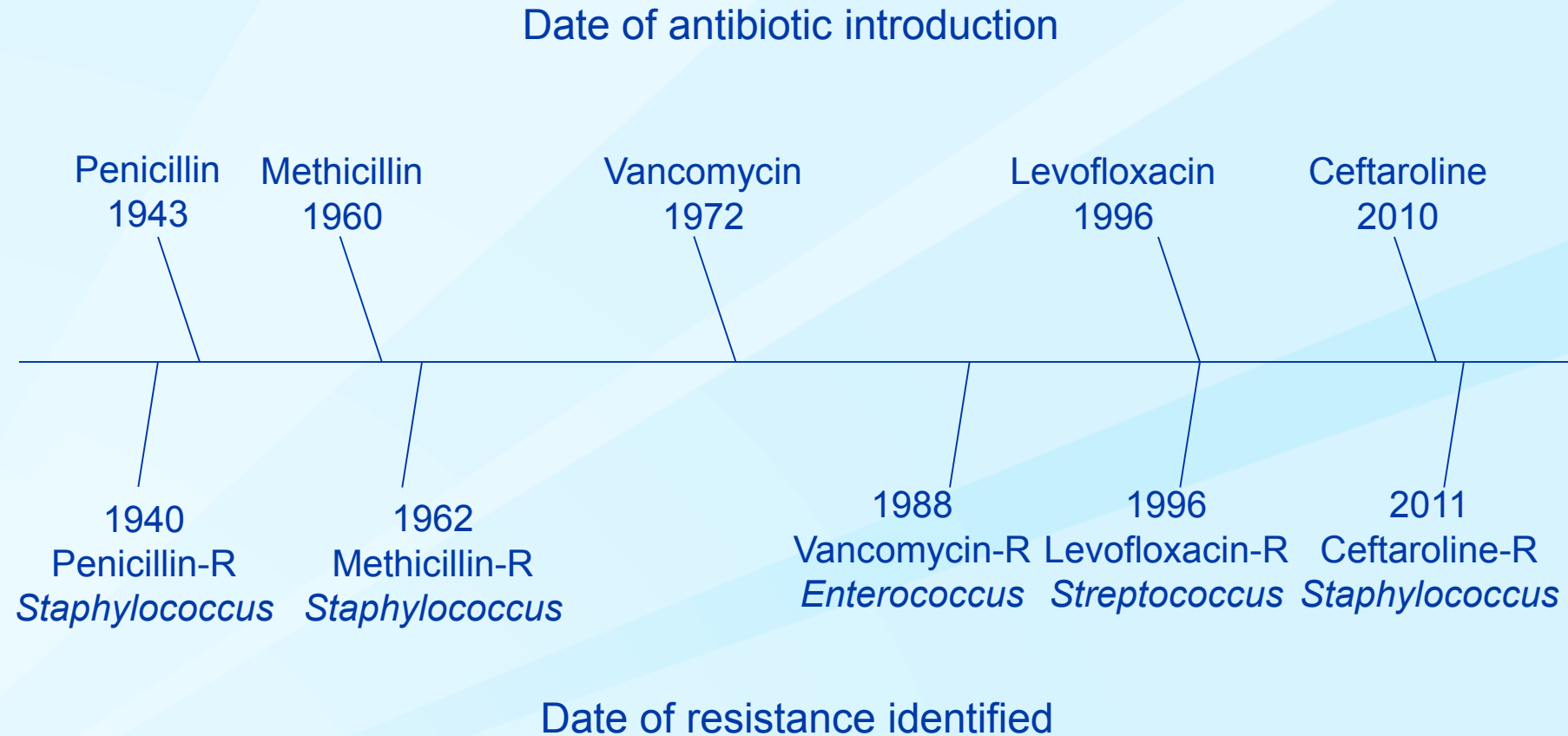
**Estimated annual \$20 billion in excess direct healthcare costs**

# Antibiotic Resistance



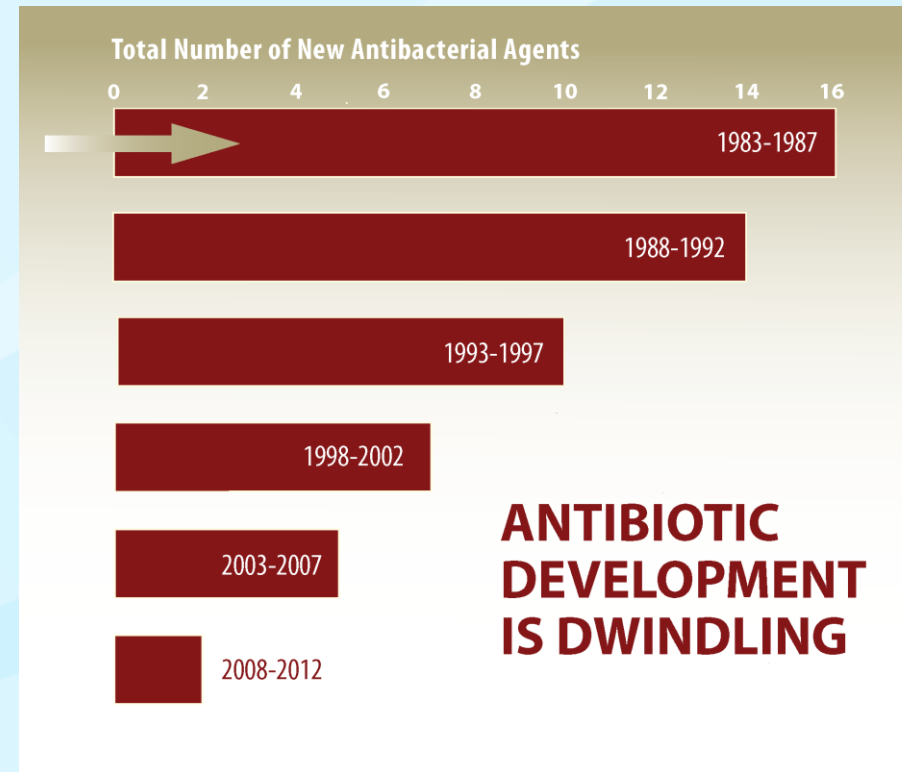
- ❑ **Some of the reasons for this are out of our control**
  - The ability of bacteria to mutate to resist antibiotics
- ❑ **BUT- some of the most important ones are very much in our control**
  - Overuse of antibiotics
  - Spread of resistant organisms in healthcare settings through poor infection control practices

# Antibiotic use drives resistance



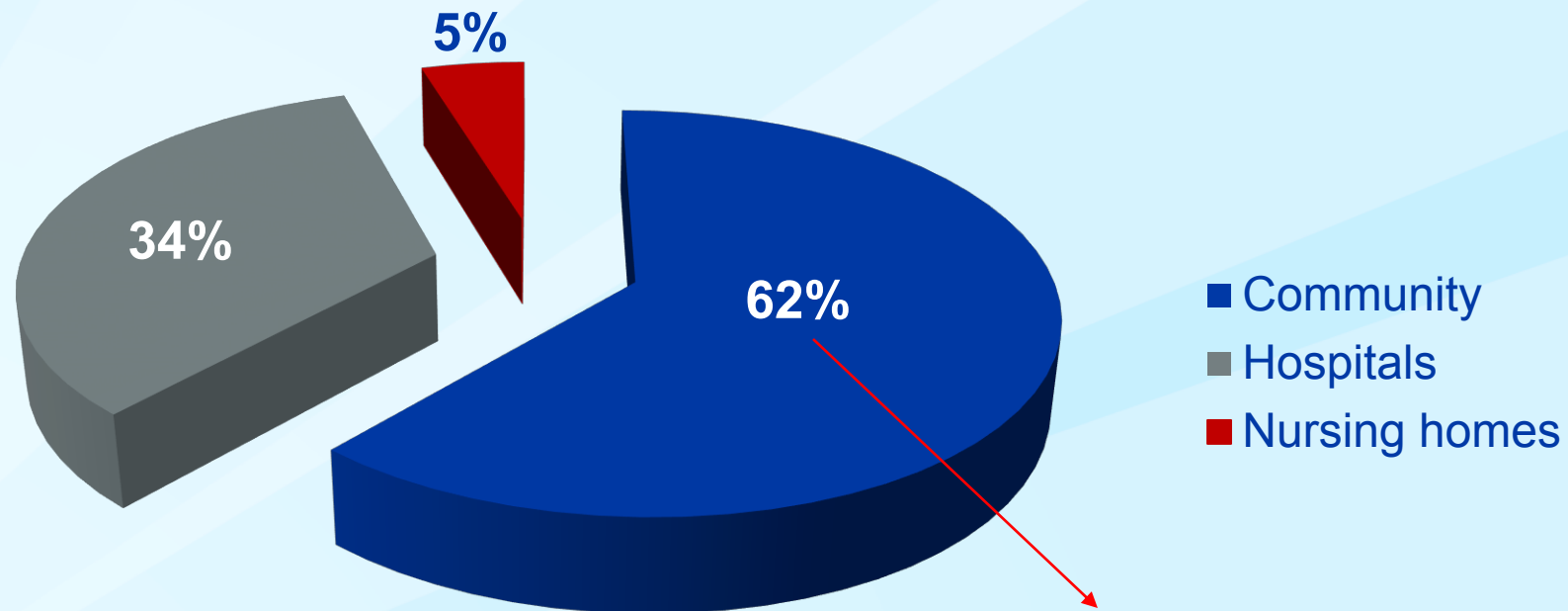
## Facing the End of the Antibiotic Era

- ❑ No new classes of antibiotics developed in over 10 years
- ❑ More toxic antibiotics being used to treat common infections
- ❑ Must treat antibiotics as precious and finite resource



# Antibiotic expenditures in United States by treatment setting

Total 2009 cost: \$10.7 billion



Estimate >80% of antibiotic use occurring in outpatient setting

What is happening?

# **EPIDEMIOLOGY OF OUTPATIENT ANTIBIOTIC USE IN THE UNITED STATES**



## Outpatient Antibiotic Prescriptions per 1000 Persons in the United States, 2013

- **849 antibiotic courses per 1000 population in outpatient settings**
  - 4 prescriptions for every 5 people
  - 269 million prescriptions annually in the US

## Outpatient Antibiotic Prescriptions per 1000 Persons in the United States, 2013

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  - 4 prescriptions for every 5 people
  - 269 million prescriptions annually in the US
  
- ❑ **Sweden in 2014: 328 antibiotic courses per 1000 population**

Hicks CID 2015: 60(9):1308-16; CDC. *Outpatient antibiotic prescriptions — United States, 2013*. Available via the internet: [http://www.cdc.gov/getsmart/community/pdfs/annual-reportsummary\\_2013.pdf](http://www.cdc.gov/getsmart/community/pdfs/annual-reportsummary_2013.pdf)

<http://www.sva.se/en/antibiotics-/svarm-reports>

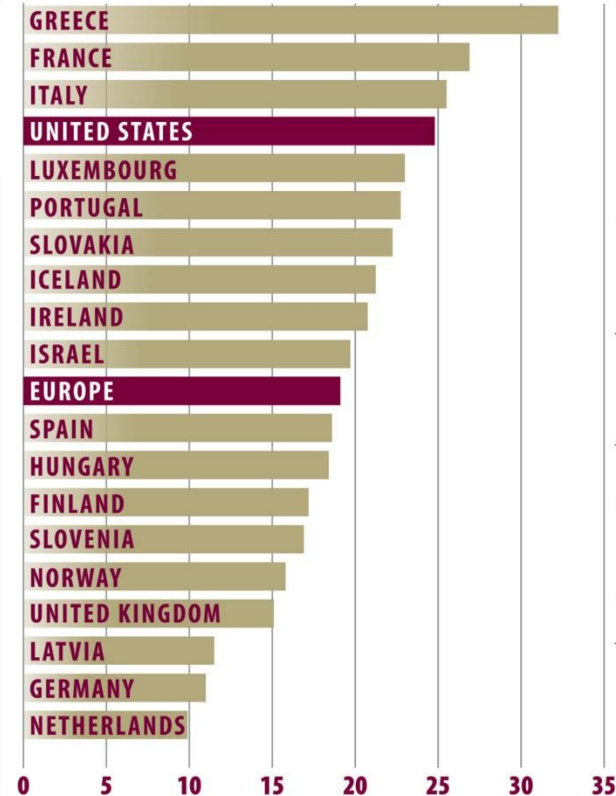
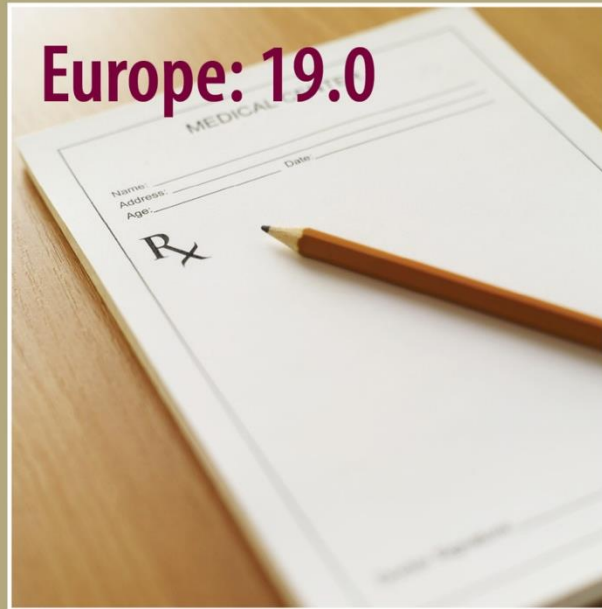
# How do we compare?

## Outpatient antibiotic use in US v. Europe, 2004

Defined Daily Dose / 1,000 Inhabitants per day

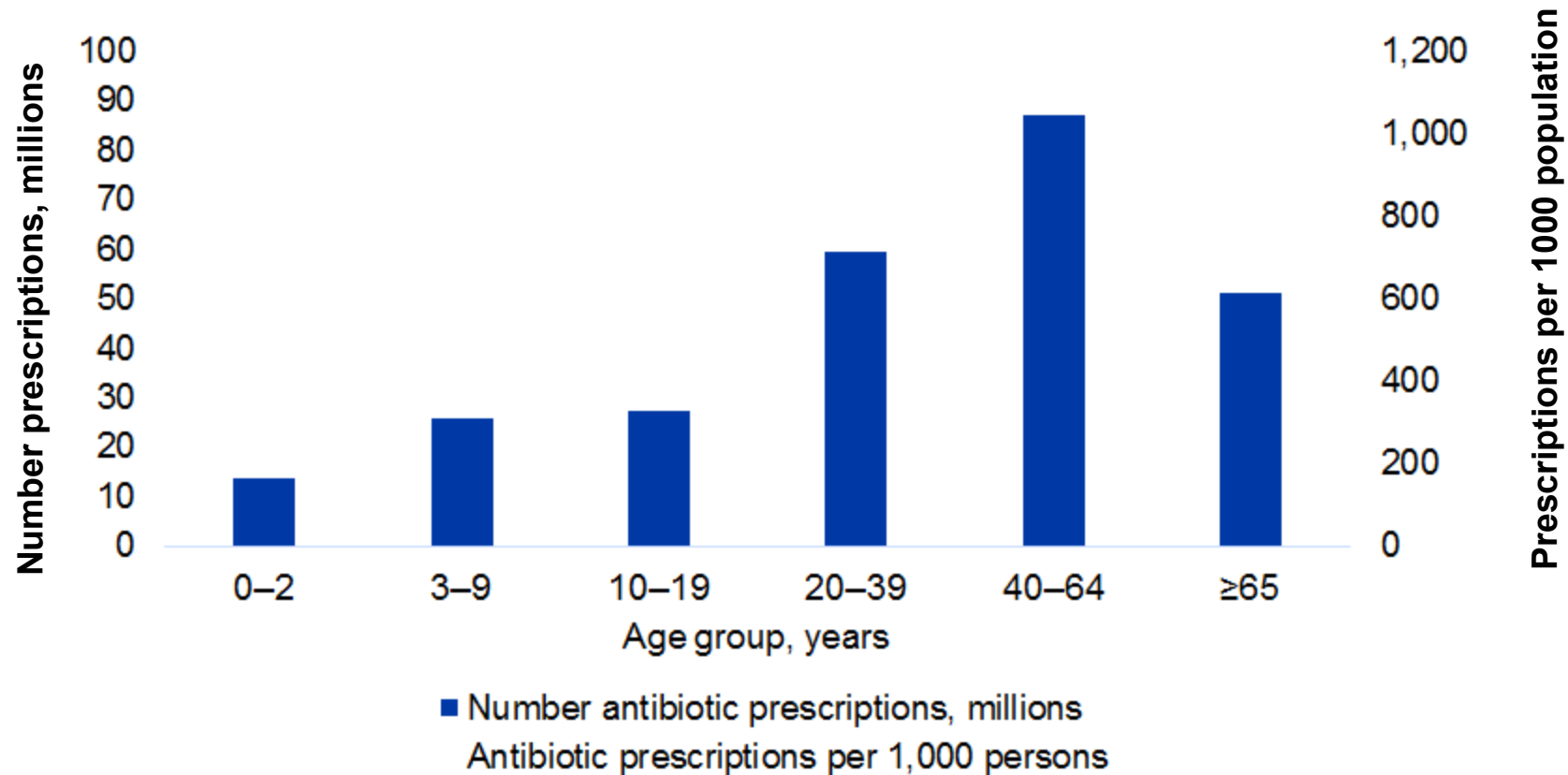
United States: 24.9

Europe: 19.0



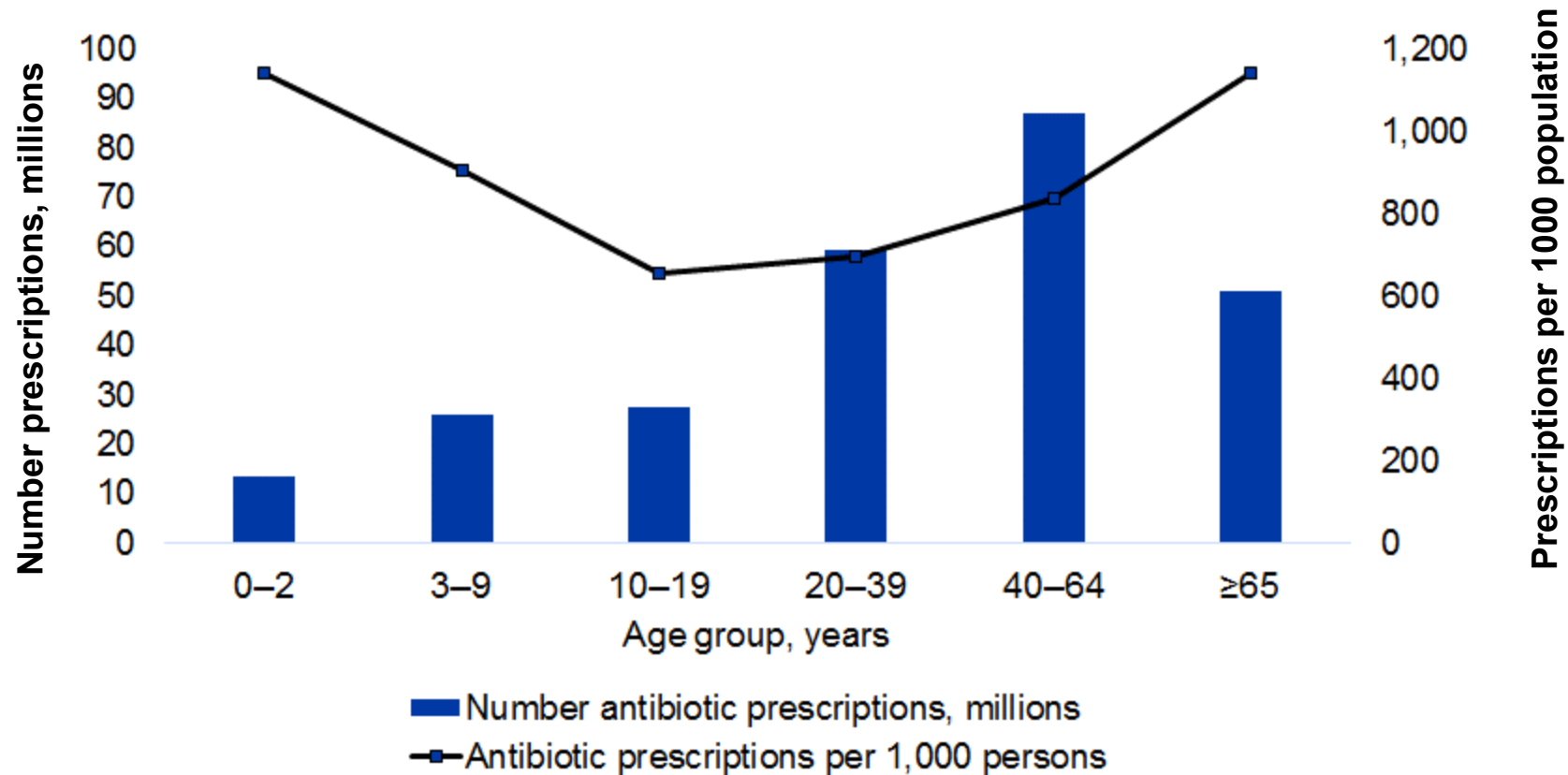
Goossens et al. CID 2007;44:1091-5; erratum CID 2007;44:1259

# Community Antibiotic Prescribing Practices United States, 2013



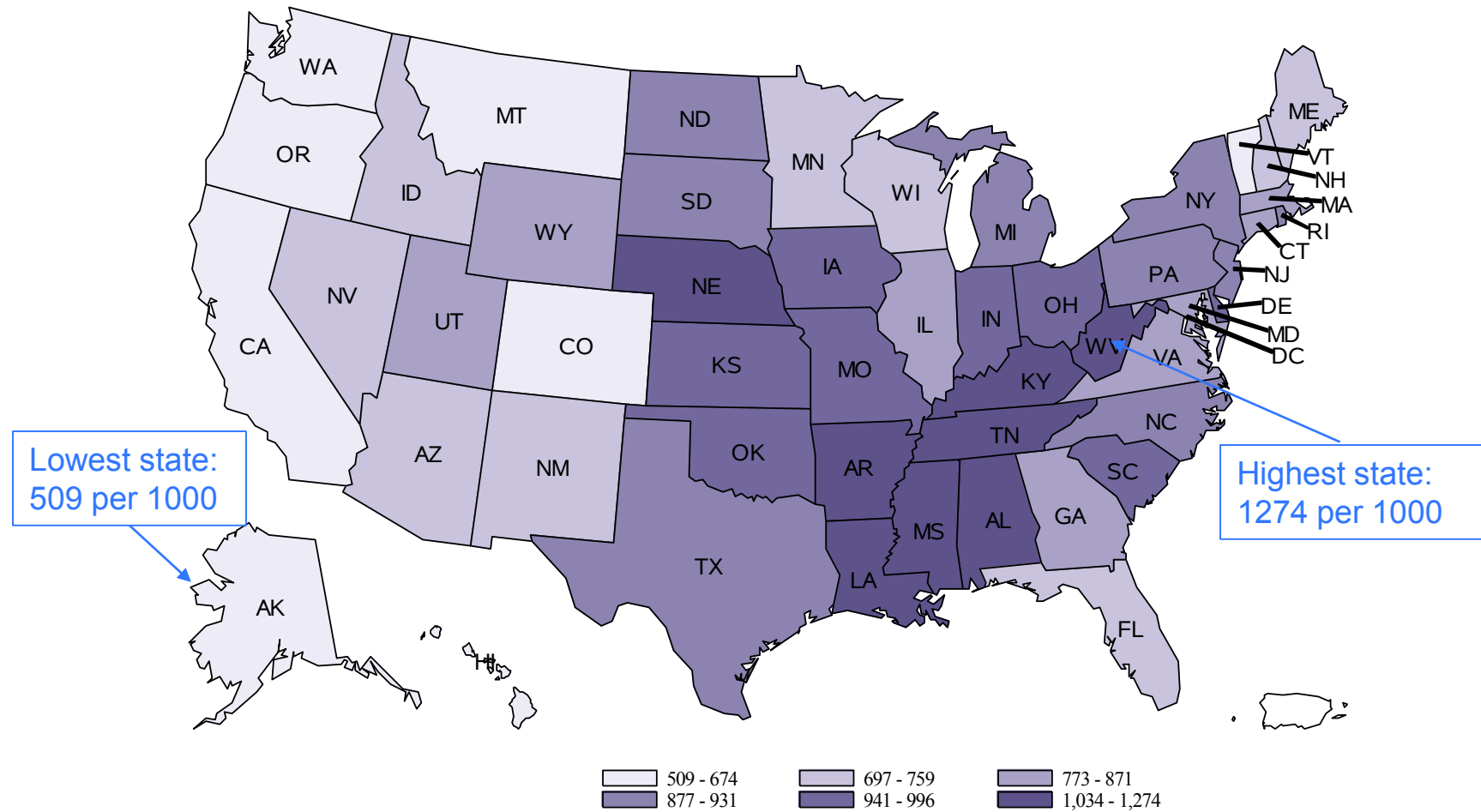
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# Community antibiotic prescribing rates per 1000 population — United States, 2013

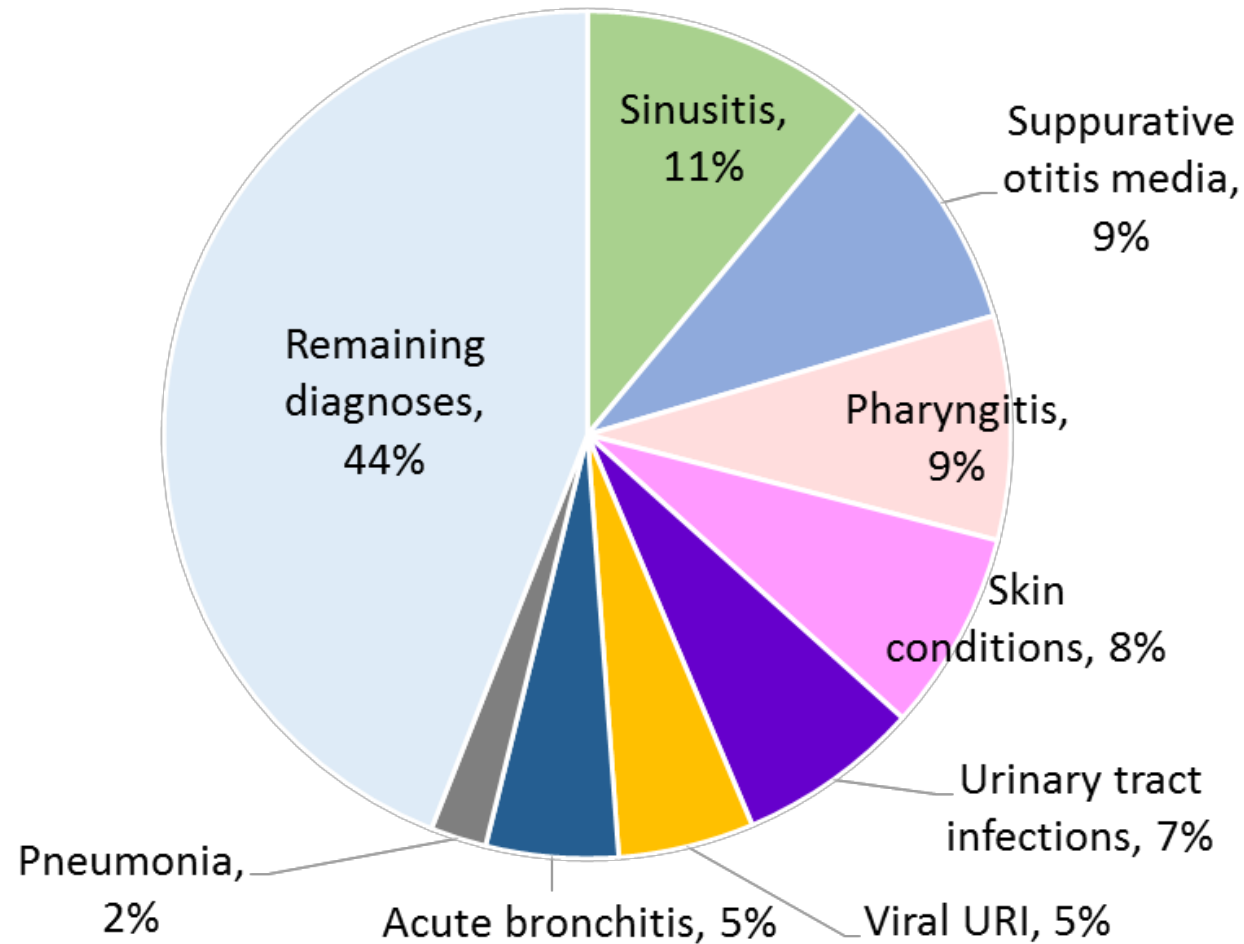


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## Top specialties by volume of outpatient antibiotic prescribing — United States, 2013

Provider specialty	No. antibiotic prescriptions	Percent of total antibiotic prescriptions
Family practice	61,000,000	23%
Physician Assistants & Nurse Practitioners	48,000,000	18%
Internal medicine	32,000,000	12%
Pediatrics	27,000,000	10%
Dentistry	25,000,000	9%
Emergency Medicine	14,000,000	5%

## Diagnoses leading to antibiotics — United States, 2010–11



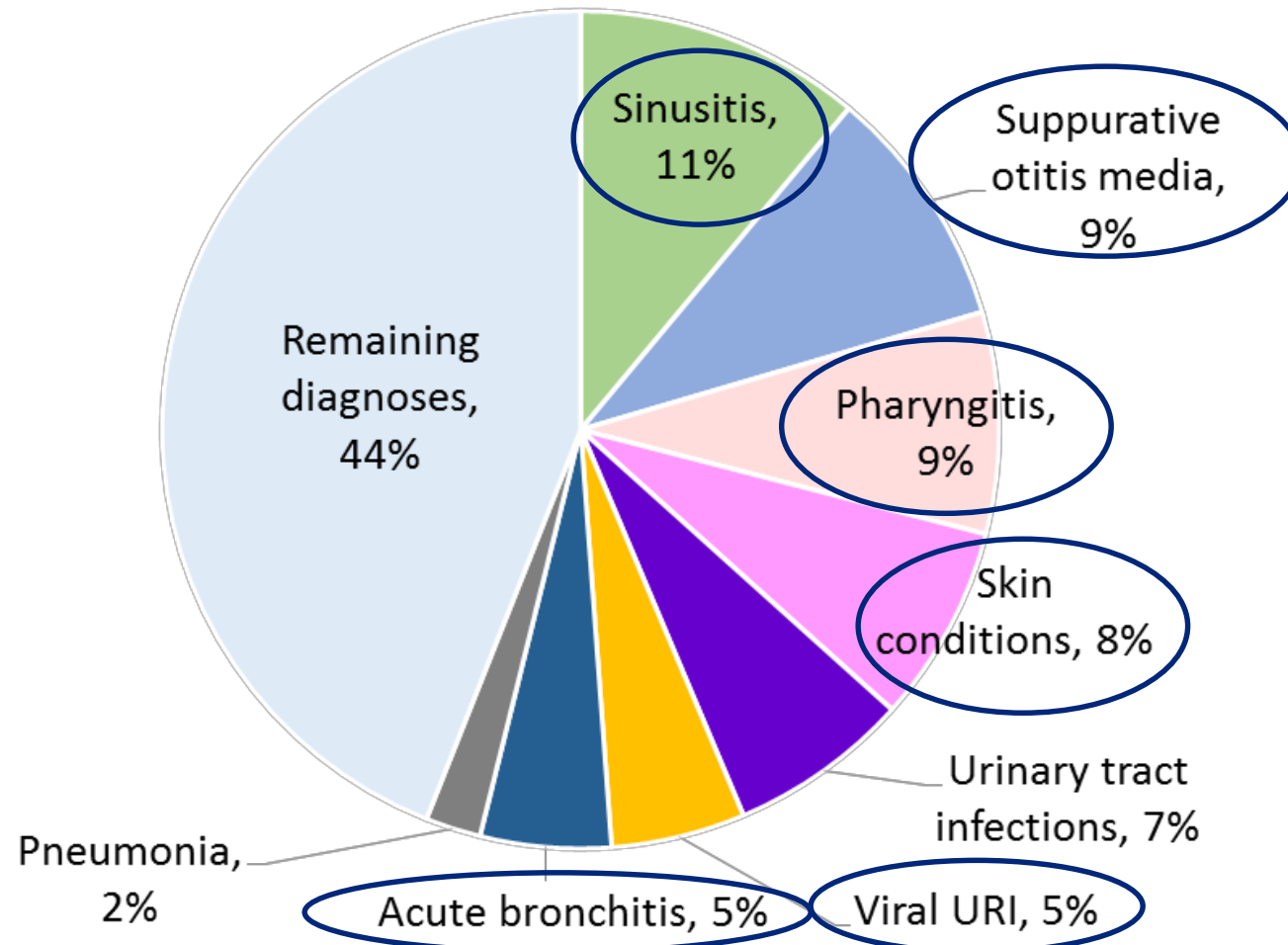
NAMCS/NHAMCS data, 2010-11. URI=Upper respiratory infection



# Overview of clinical guidelines

- ❑ **Antibiotics not indicated**
  - Upper respiratory infections (URIs)
  - Acute uncomplicated bronchitis
  - Viral pharyngitis
- ❑ **Antibiotics sometimes indicated**
  - Sinusitis
  - Acute suppurative otitis media
  - Skin and soft tissue infections (e.g. cellulitis, abscesses)
- ❑ **Antibiotics indicated**
  - Pneumonia
  - Urinary tract infections
  - Streptococcal pharyngitis

## Diagnoses leading to antibiotics — United States, 2010–11



NAMCS/NHAMCS data, 2010-11. URI=Upper respiratory infection

# Just how much prescribing in the outpatient setting is inappropriate?

Research

## Original Investigation

### Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care Visits, 2010-2011

Katherine E. Fleming-Dutra, MD; Adam L. Hersh, MD, PhD; Daniel J. Shapiro; Monina Bartoces, PhD; Eva A. Enns, PhD; Thomas M. File Jr, MD; Jonathan A. Finkelstein, MD, MPH; Jeffrey S. Gerber, MD, PhD; David Y. Hyun, MD; Jeffrey A. Linder, MD, MPH; Ruth Lynfield, MD; David J. Margolis, MD, PhD; Larissa S. May, MD, MSPH; Daniel Merenstein, MD; Joshua P. Metlay, MD, PhD; Jason G. Newland, MD, MEd; Jay F. Piccirillo, MD; Rebecca M. Roberts, MS; Guillermo V. Sanchez, MPH, PA-C; Katie J. Suda, PharmD, MS; Ann Thomas, MD, MPH; Teri Moser Woo, PhD; Rachel M. Zetts; Lauri A. Hicks, DO

**IMPORTANCE** The National Action Plan for Combating Antibiotic-Resistant Bacteria set a goal of reducing inappropriate outpatient antibiotic use by 50% by 2020, but the extent of inappropriate outpatient antibiotic use is unknown.

**OBJECTIVE** To estimate the rates of outpatient oral antibiotic prescribing by age and diagnosis, and the estimated portions of antibiotic use that may be inappropriate in adults and children in the United States.

**DESIGN, SETTING, AND PARTICIPANTS** Using the 2010-2011 National Ambulatory Medical Care

← Editorial page 1839

+ Supplemental content at [jama.com](#)

+ CME Quiz at [jamanetworkcme.com](#)

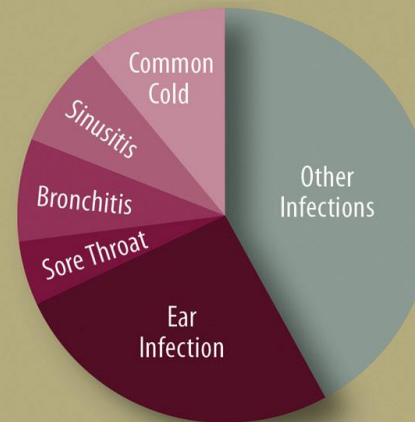
# Have we made any progress?

## Good News / Bad News Antibiotics prescribed for acute respiratory infections in kids younger than 15 years of age



\*Comparing 1993–94 to 2007–08

Still account for **58%**  
of all antibiotics prescribed



Most of these acute respiratory infections do not require antibiotic treatment; patients may benefit from symptomatic therapy

Source: MMWR. 2011;60:1153-6

What about surveillance?

# **USING SURVEILLANCE AND ANTIBIOTIC USE DATA TOGETHER**

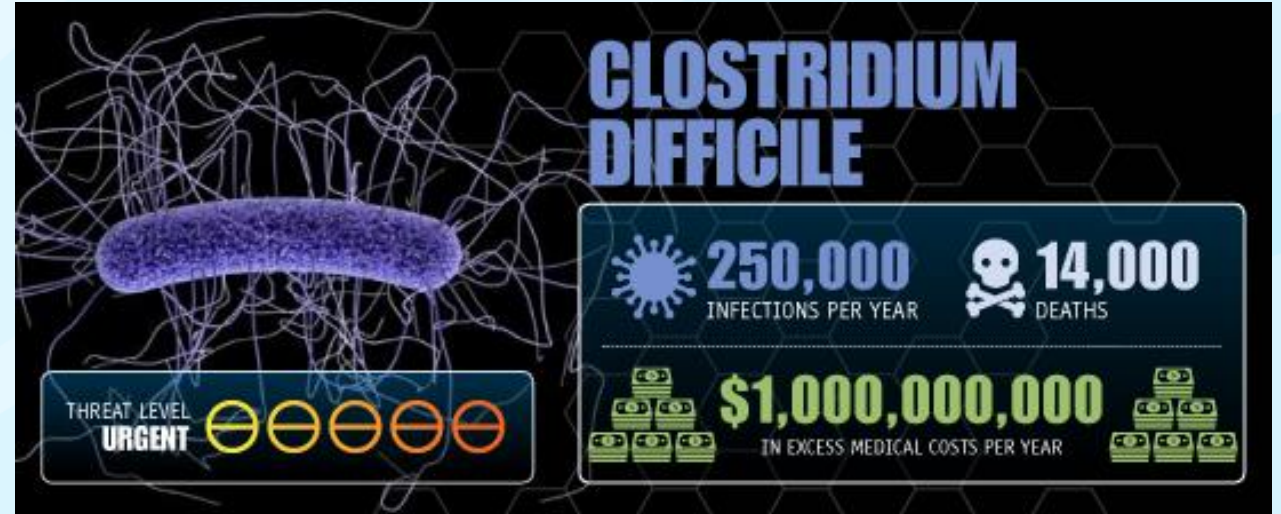
# Unintended Consequences of Antibiotic Use: *Clostridium difficile*

More recent estimates: 453,000 infections and caused 15,000 deaths in the US annually

Antibiotic exposure is the single most important risk for *Clostridium difficile* Infections

**Exposure to antibiotics increases the risk of *C. diff* infection by at least 3 fold for at least a month**

**Up to 85% of patients with *C. diff* infection have antibiotic exposure in the 28 days before infection**





# Association Between Outpatient Antibiotic Prescribing Practices and Community-Associated *Clostridium difficile* Infection

MAJOR ARTICLE

## Association Between Outpatient Antibiotic Prescribing Practices and Community-Associated *Clostridium difficile* Infection

Raymund Dantes,<sup>1</sup> Yi Mu,<sup>1</sup> Lauri A. Hicks,<sup>1</sup> Jessica Cohen,<sup>1,2</sup> Wendy Bamberg,<sup>3</sup> Zintars G. Beldavs,<sup>4</sup> Ghinwa Dumyati,<sup>5</sup> Monica M. Farley,<sup>6,7</sup> Stacy Holzbauer,<sup>8</sup> James Meek,<sup>9</sup> Erin Phipps,<sup>10</sup> Lucy Wilson,<sup>11,12</sup> Lisa G. Winston,<sup>13,14</sup> L. Clifford McDonald,<sup>1</sup> and Fernanda C. Lessa<sup>1</sup>

<sup>1</sup>Centers for Disease Control and Prevention, Atlanta, and <sup>2</sup>Atlanta Research and Education Foundation, Georgia; <sup>3</sup>Colorado Department of Public Health and Environment, Denver; <sup>4</sup>Oregon Health Authority, Portland; <sup>5</sup>University of Rochester Medical Center, New York; <sup>6</sup>Emory University, Atlanta, and <sup>7</sup>Atlanta Veterans Affairs Medical Center, Georgia; <sup>8</sup>Minnesota Department of Health, St. Paul; <sup>9</sup>Connecticut Emerging Infections Program, New Haven; <sup>10</sup>University of New Mexico, Albuquerque; <sup>11</sup>Maryland Emerging Infections Program Baltimore, and <sup>12</sup>Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland; <sup>13</sup>University of California, San Francisco; and <sup>14</sup>San Francisco General Hospital, California

**Background.** Antibiotic use predisposes patients to *Clostridium difficile* infections (CDI), and approximately 32% of these infections are community-associated (CA) CDI. The population-level impact of antibiotic use on adult CA-CDI rates is not well described.

**Methods.** We used 2011 active population- and laboratory-based surveillance data from 9 US geographic locations

# Association Between Outpatient Antibiotic Prescribing Practices and Community-Associated *Clostridium difficile* Infection

- ❑ 2011 – active and laboratory based surveillance data from 9 US geographic locations
- ❑ Identified adult CA-CDI cases from the surveillance area
  - *C difficile* – positive stool specimen from outpatients or patients  $\leq 3$  days after hospital admission
  - All cases surveillance area residents  $\geq 20$  y/o with no positive test  $\leq 8$  weeks prior and no overnight stay in a healthcare facility  $\leq 12$  weeks prior
- ❑ Outpatient oral antibiotics obtained from IMS Health© Xponent database for 2010
- ❑ Regression models examined the association between outpatient antibiotic prescribing and adult CA-CDI rates



## **Association Between Outpatient Antibiotic Prescribing Practices and Community-Associated *Clostridium difficile* Infection**

- ❑ Healthcare providers prescribed 5.2 million courses of antibiotics among adults in the surveillance population (average of 0.73 per person)
- ❑ Across sites, antibiotic prescription rates and unadjusted CA-CDI rates varied
- ❑ Regression modeling indicated that reducing antibiotic prescribing rates 10% among the surveillance population was associated with a 17% decrease in CA-CDI rates after adjusting for age, gender, race and type of diagnostic assay
- ❑ Reductions in prescribing penicillins and amoxicillin/clavulanic acid were associated with the greatest decreases in CA-CDI rates

# Outpatient Antibiotic Prescribing and Nonsusceptible *Streptococcus pneumoniae* in the United States, 1996-2003

MAJOR ARTICLE

## Outpatient Antibiotic Prescribing and Nonsusceptible *Streptococcus pneumoniae* in the United States, 1996–2003

Lauri A. Hicks,<sup>1</sup> Yu-Wen Chien,<sup>2</sup> Thomas H. Taylor Jr,<sup>1</sup> Michael Haber,<sup>3</sup> and Keith P. Klugman,<sup>4,5</sup> on behalf of the Active Bacterial Core Surveillance (ABCs) Team<sup>a</sup>

<sup>1</sup>Division of Bacterial Diseases, Centers for Disease Control and Prevention, <sup>2</sup>Department of Epidemiology, and <sup>3</sup>Department of Biostatistics and Bioinformatics, Rollins School of Public Health, School of Medicine, Emory University, <sup>4</sup>Hubert Department of Global Health, Rollins School of Public Health, School of Medicine, Emory University, and <sup>5</sup>Division of Infectious Diseases, School of Medicine, Emory University, Atlanta, Georgia

(See the Editorial Commentary by Huttner and Samore, on pages 640–643.)

**Background.** *Streptococcus pneumoniae* infections have become increasingly complicated and costly to treat with the spread of antibiotic resistance. We evaluated the relationship between antibiotic prescribing and nonsusceptibility among invasive pneumococcal disease (IPD) isolates.

**Methods.** Outpatient antibiotic prescription data for penicillins, cephalosporins, macrolides, and trimetho-

## **Outpatient Antibiotic Prescribing and Nonsusceptible *Streptococcus pneumoniae* in the United States, 1996-2003**

- ❑ **Evaluation of the relationship between antibiotic prescribing and nonsusceptibility among invasive pneumococcal disease (IPD) isolates**
- ❑ **Analyzed IPD data from 7 of the Centers for Disease Control and Prevention's Active Bacterial Core surveillance sites (pop 18.6 million)**
- ❑ **Abstracted prescription data from IMS Health© Xponent for penicillins, cephalosporins, macrolides, and trimethoprim-sulfamethoxazole**

## **Outpatient Antibiotic Prescribing and Nonsusceptible *Streptococcus pneumoniae* in the United States, 1996-2003**

- ❑ **Yearly prescribing rates for children <5 decreased by 37% and those  $\geq 5$  also decreased by 42%**
- ❑ **An increase in azithromycin prescribing was noted in both groups**
- ❑ **Sites with high rates of antibiotic prescribing had a higher proportion of IPD nonsusceptibility than did low-prescribing sites**
- ❑ **Suggests that local prescribing practices contribute to local resistance patterns**

What is happening to combat antibiotic resistance and improve use in the outpatient setting?

# **GET SMART: KNOW WHEN ANTIBIOTICS WORK**

# The Get Smart Campaign

- ❑ CDC launched National Campaign for Appropriate Antibiotic Use in the Community, 1995
- ❑ *Get Smart: Know When Antibiotics Work*, 2003
- ❑ Program works closely with variety of partners to reduce unnecessary antibiotic use in community
- ❑ Focus on increasing awareness among providers and general public
  - [www.cdc.gov/getsmart](http://www.cdc.gov/getsmart)



Providers



# Get Smart: Know When Antibiotics Work

## Educational Materials


A GUIDE FOR PARENTS QUESTIONS AND ANSWERS

Fluid in the Middle Ear (Otitis Media with Effusion)

**GET SMART**  
Know When Antibiotics Work

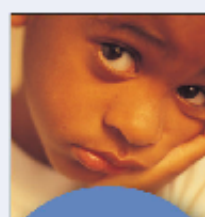
A healthcare provider said your child has fluid in the middle ear, also called otitis (oh-TIE-ye) media with effusion (oh-FEW-ee-oh) (OME). Fluid usually does not bother children, and it almost always goes away on its own. This does not have to be treated with antibiotics, unless it lasts for a few months. Here are some facts about OME and ear infections.

What are the main kinds of ear infections?



FOR PARENTS

**GET SMART**  
Know When Antibiotics Work

Snort.  
Snuffle.  
Sneeze.  
No Antibiotics  
Please.

COLD COMFORT

SOMETIMES THE BEST MEDICINE IS NO MEDICINE AT ALL

With cold and flu season reaching its peak, the nation's top health experts are feverishly waging a cold war of their own. Even if your throat is sore and scratchy and your sniffles are now official antibiotics.


**GET SMART**  
Know When Antibiotics Work

Cold or Flu,  
Antibiotics Don't  
Work for You.



A VECES,  
EL REMEDIO ES  
PEOR QUE LA  
ENFERMEDAD

Campana para promover el uso correcto de los antibióticos.



**INFÓRMESE**  
Antibiocarse con antibióticos puede perjudicar su salud

Rx Name: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

**GET SMART**  
Know When Antibiotics Work

**Diagnosis:**

Cold  Middle ear fluid (Otitis Media with Effusion, OME)

Cough  Viral sore throat

Flu  Other: \_\_\_\_\_

You have been diagnosed with an illness caused by a virus. Antibiotics do not cure viral infections. If given when not needed, antibiotics can be harmful. The treatments prescribed below will help you feel better while your body's own defenses are fighting the virus.

**General instructions:**

Drink extra water and juice.

Use a cool mist vaporizer or saline nasal spray to relieve congestion.

For sore throats, use ice chips or sore throat spray; lozenges for older children and adults.

**Specific medicines:**

Fever or aches: \_\_\_\_\_

Ear pain: \_\_\_\_\_

\_\_\_\_\_


Use medicines according to the package instructions or as directed by your healthcare provider. Stop the medication when the symptoms get better.

**Follow up:**

If not improved in \_\_\_\_ days, if new symptoms occur, or if you have other concerns, please call or return to the office for a recheck.

Other: \_\_\_\_\_

Signed: \_\_\_\_\_

 For More Information call 1-800-CDC-INFO or visit www.cdc.gov/getsmart



**BE SMART**  
Antibiotics Will Not Help a Cold or the Flu.



# Why might providers prescribe antibiotics inappropriately?

- ❑ **Lack of knowledge of appropriate indications**
  - Providers generally know the guidelines
- ❑ **Fear of complications**
  - Providers cite fear of infectious complications
  - *Also adverse events*
- ❑ **Patient pressure and satisfaction**
  - Providers universally cite patient requests for antibiotics
  - Providers worry about losing patients to other providers





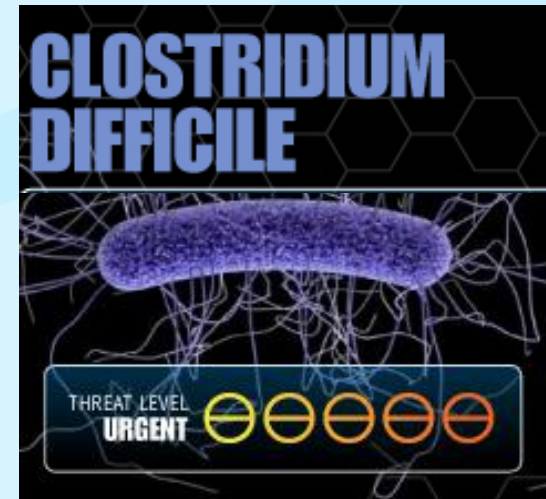
# What if something bad happens?

## □ Without an antibiotic

- Complications from common respiratory infections are very rare
- Over 4000 patients with colds need to be treated to prevent 1 case of pneumonia

## □ With an antibiotic

- Side effects
  - Diarrhea in 5-25%
  - Yeast infections
  - Allergic reactions and anaphylaxis
- 1 in 1000 antibiotics lead to ED visit for an adverse event



# Physician Perception of Patient Expectations

- ❑ Overt requests for antibiotics are rare
- ❑ When physicians think patients/parents want antibiotics, they are more likely to prescribe
  - 62% when they thought parent wanted antibiotics
  - 7% when they thought parent did **not** want antibiotics
- ❑ Physicians are terrible at predicting which patients want antibiotics



# Patient Satisfaction

- ❑ Patients are still satisfied if they don't get antibiotics
- ❑ Patients are dissatisfied if communication expectations are not met
  
- ❑ What do patients want?
  - Explanation
  - Positive recommendations
  - Contingency plan



## Communication training as a public health intervention?

- ❑ Enhanced communications training reduces antibiotic prescribing for respiratory infections in all ages
- ❑ Effect appears to be sustainable over time



## Delayed Antibiotic Prescriptions

- ❑ Safety-net prescriptions or wait-and-see prescriptions
- ❑ Give the patient an antibiotic prescription and tell them to fill it in 2-10 days if they are not better
  - Put an expiration date on the prescription
  - Consider post-dating the prescription
- ❑ Asking the patient to wait 2-10 days and call or return to clinic to get an antibiotic prescription
- ❑ Used when need for antibiotic is unclear or a watchful waiting period is indicated

# Clinical Decision Support

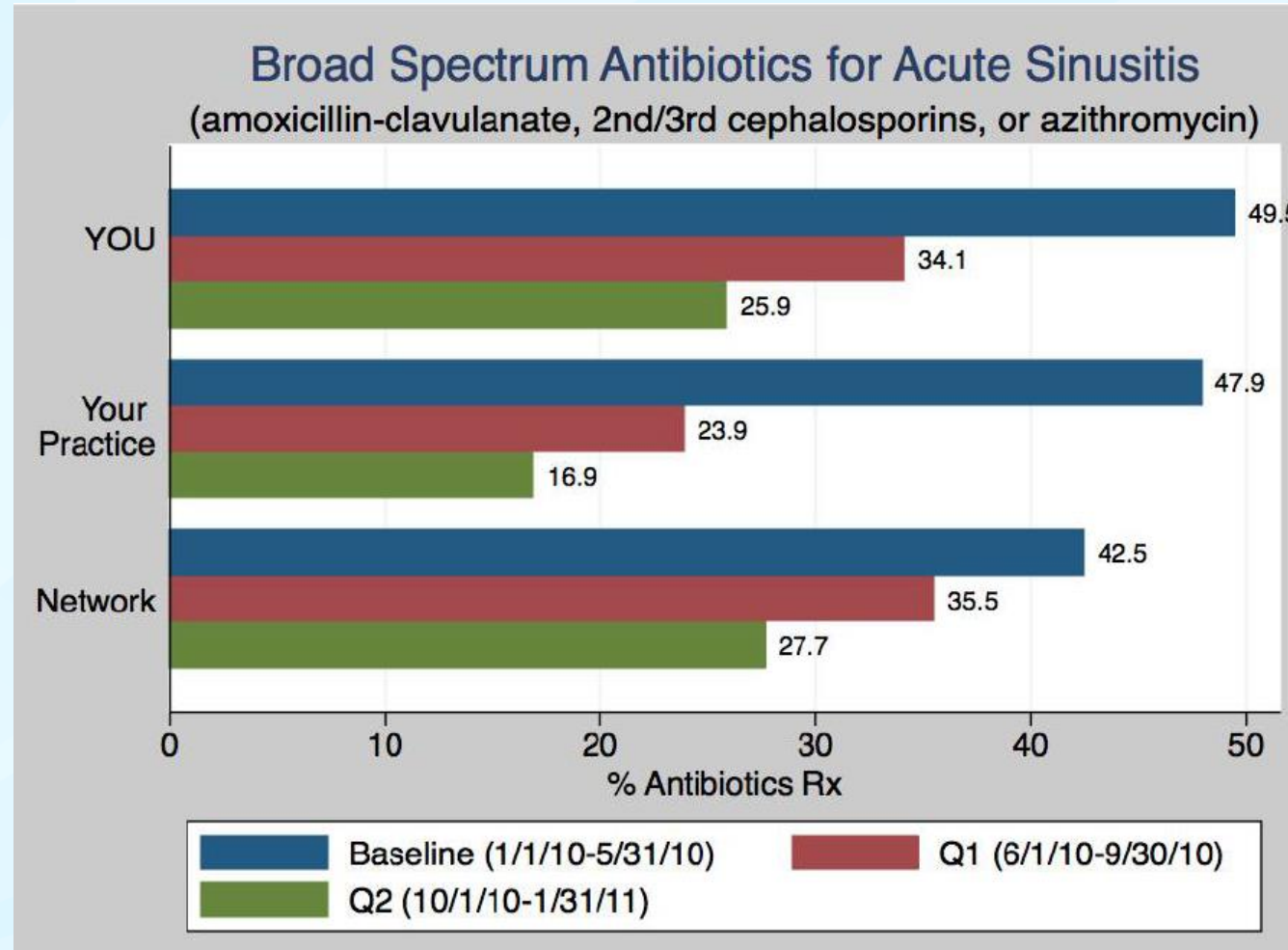
## ❑ Effective intervention

- Acute bronchitis: 12–14% reduction in antibiotic prescribing
- Pharyngitis: reduced antibiotics use
- Pneumonia: improved antibiotic selection

## ❑ Important considerations

- Print and electronic tools are likely equally effective
- Tools need to be **used** to be effective
  - In one study, tool was used in 6% of eligible visits
- Alert fatigue is a problem

# Audit and Feedback





## Public Commitment Posters

- ❑ Simple intervention: poster-placed in exam rooms with provider picture and commitment to use antibiotics appropriately
- ❑ *“As your doctors, we promise to treat your illness in the best way possible. We are also dedicated to avoid prescribing antibiotics when they are likely do to more harm than good.”*
- ❑ 20% absolute reduction in inappropriate antibiotic prescribing for acute respiratory infections compared to controls



# **“All of the Above” Approach Most Successful in Changing Antibiotic Prescribing**

## **❑ Interventions that work**

- Academic detailing
- Audit and feedback
- Clinical decision support
- Communications training
- Public commitments

## **❑ Combined interventions are most successful**

## **❑ Interventions must be tailored by practice setting and targeted medical conditions**

What about other healthcare settings?

# **INPATIENT AND NURSING HOME SETTINGS**

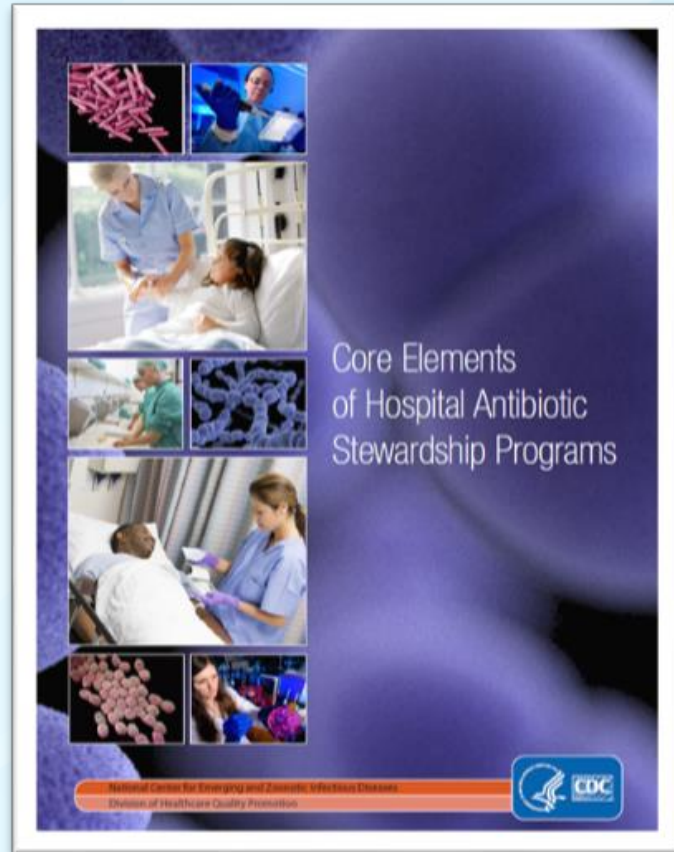
# Antibiotic Use and Misuse in Hospitals

- ❑ In a 2011 single-day point prevalence survey in roughly 200 Emerging Infection Program Hospitals, 50% of patients were receiving at least one antibiotic
- ❑ Approximately 30% of antibiotic use in hospitals is unnecessary or inappropriate

# Antibiotic Stewardship Programs

- ❑ Antibiotic stewardship ensures that the patient only receives an antibiotic when needed AND the right drug, dose, and duration is prescribed
- ❑ CDC recommends that all hospitals should have antimicrobial stewardship programs
  - ❑ Programs will look different in various hospitals, depending on the size and complexity of the patient population

# Core Elements of Hospital Antibiotic Stewardship Programs



- Leadership Commitment
- Accountability
- Drug expertise
- Action to improve use
- Tracking
- Reporting
- Education

- <http://wwwdev.cdc.gov/getsmart/healthcare/pdfs/core-elements.pdf>









## NHSN Antimicrobial Use Option

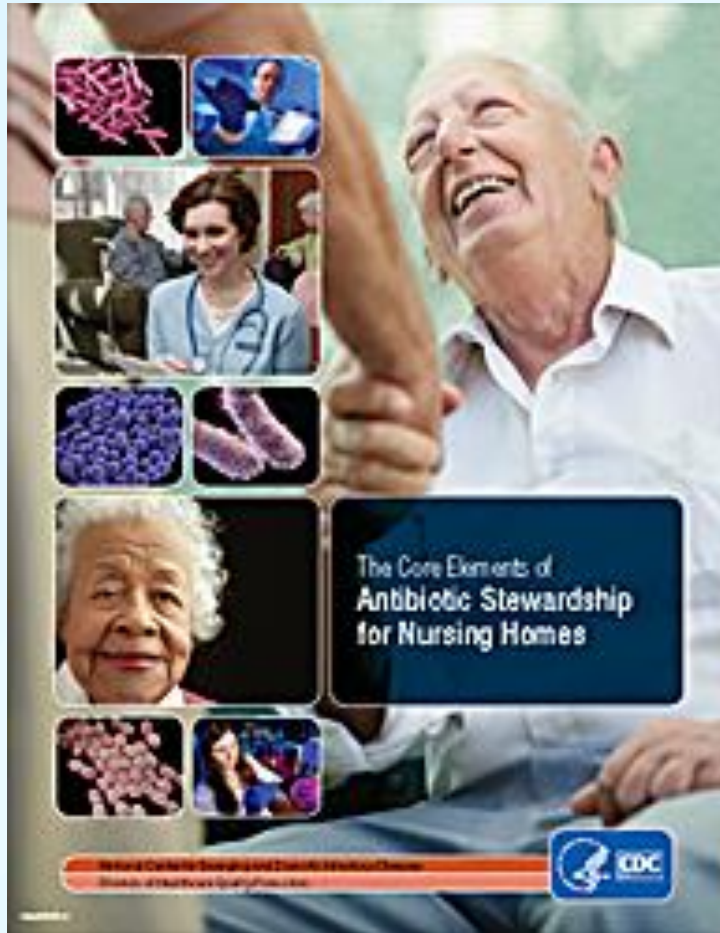
- ❑ **Objective: Measure antibiotic use to provide risk-adjusted inter- and intra-facility comparisons**
- ❑ **Antibiotic resistance surveillance option also available**



# Antibiotic use in Nursing Homes

- Antibiotics are among the most frequently prescribed medications in nursing homes, with up to 70% of residents in a nursing home receiving one or more courses of systemic antibiotics when followed over a year.
- Similar to the findings in hospitals, studies have shown that 40–75% of antibiotics prescribed in nursing homes may be unnecessary or inappropriate.
- Harms from antibiotic overuse are significant for the frail and older adults receiving care in nursing homes.

# Core Elements of Antibiotic Stewardship for Nursing Homes



- ❑ Leadership Commitment
- ❑ Accountability
- ❑ Drug expertise
- ❑ Action to improve use
- ❑ Tracking
- ❑ Reporting
- ❑ Education

<http://www.cdc.gov/longtermcare/pdfs/core-elements-antibiotic-stewardship.pdf>

What is the big picture?

# **NATIONAL POLICY AND INITIATIVES TO IMPROVE ANTIBIOTIC USE**

# Get Smart About Antibiotics Week

## November 14-20, 2016

The screenshot shows a web browser window displaying the CDC's "Get Smart About Antibiotics Week" page. The browser's address bar shows the URL <http://www.cdc.gov/getsmart/week>. The page header includes the CDC logo and the text "Centers for Disease Control and Prevention" with the tagline "CDC 24/7: Saving Lives. Protecting People™". A search bar is located in the top right corner. Below the header, a dark blue banner reads "Get Smart About Antibiotics Week". On the left side, there is a navigation menu with the following items: "Get Smart Week Home", "Overview", "Partners", "Activities and Events", "Promotional Materials", and "Educational Resources". Below the menu is a "Related Links" section with a link to "Antibiotic/Antimicrobial Resistance". The main content area features the title "Get Smart About Antibiotics Week" with social media icons for Facebook, Twitter, and a plus sign. Below this is the "GET SMART About Antibiotics Week" logo, which includes a stylized character with glasses and the website URL [WWW.CDC.GOV/GETSMART](http://WWW.CDC.GOV/GETSMART). To the right of the logo, a text box states: "2016 Get Smart Week is November 14-20. Get Smart About Antibiotics Week is an annual one-week observance to raise awareness of the threat of antibiotic resistance and the importance of appropriate antibiotic prescribing and use." At the bottom of the page, the word "OVERVIEW" is visible. The Windows taskbar at the bottom shows the system clock as 9:40 AM on 5/31/2016.

# World Antibiotic Awareness Week

BE PART OF THE FIRST

## WORLD ANTIBIOTIC AWARENESS WEEK

16-22 November 2015



Antibiotic resistance is one of the biggest threats to global health today. It is rising to dangerously high levels in all parts of the world. It is compromising our ability to treat infectious diseases and putting people everywhere at risk.

[#AntibioticResistance](#)



The World Health Organization is leading a global campaign '**Antibiotics: Handle with Care**' calling on individuals, governments, health and agriculture professionals to take action to address this urgent problem.

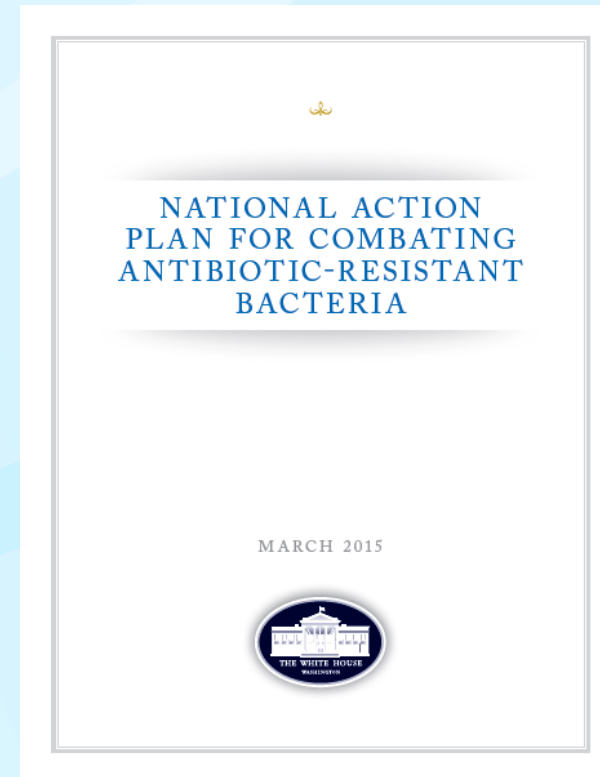
Working together, we can ensure antibiotics are used only when necessary and as prescribed. Antibiotics are a precious resource that we cannot continue to take for granted—we need to handle them with care.



# National Action Plan for Combating Antibiotic-Resistant Bacteria (CARB)

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- ❑ Released March 27, 2015
- ❑ Outlines steps to implement the National Strategy and address policy recommendations
- ❑ Significant outcomes expected by 2020



# **National Action Plan for Combating Antibiotic-Resistant Bacteria (CARB)**

- ❑ Objective 1.1 Implement public health programs and reporting policies that advance antibiotic resistance prevention and foster antibiotic stewardship in healthcare settings and the community**
- ❑ Goal: Reduction of inappropriate antibiotic use by 50% in outpatient settings and by 20% in inpatient settings.**



# The White House Forum on Antibiotic Stewardship

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- ❑ **Over 150 organizations across human and animal health:**
  - ~roughly 2/3 human health representing inpatient settings (hospitals, long-term care), outpatient settings, patient advocates, diagnostic & pharmaceutical manufacturers (CDC lead)
  - ~roughly 1/3 animal health partners representing food producers, retailers, veterinary societies and organizations, animal pharmaceuticals (USDA lead, FDA/CDC support)
- ❑ **Government-wide collaboration (CDC, AHRQ, CMS, FDA, USDA, DOD, VA) to support implementation and acceleration of CARB Action Plan**



FORUM ON ANTIBIOTIC STEWARDSHIP

JUNE 2, 2015



# Improve Antibiotic Use to Combat Antibiotic Resistance

**70%** Necessary Prescriptions  
(Still need to improve drug selection, dose and duration)

**At least 30%** Unnecessary Prescriptions

**CDC is working to reduce unnecessary antibiotic use**

White House National Action Plan to Combat Antibiotic-Resistant Bacteria (CARB)

**Goal: By 2020, reduce inappropriate outpatient antibiotic use by 50%**

Find out when antibiotics are necessary. Visit: <http://www.cdc.gov/getsmart>

Centers for Disease Control and Prevention (CDC)  
Reining Sutra, K et al. Prevalence of inappropriate antibiotic prescriptions among US ambulatory care visits, 2010-2011. *Journal of the American Medical Association*, May 2014.

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

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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.

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