

Antibiotic Stewardship in the Outpatient Setting

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Division of Healthcare Quality Promotion
National Center for Emerging and Zoonotic Infectious Diseases
Centers for Disease Control and Prevention



Antibiotics are life-saving medicines that underpin modern medicine.

80 YEARS
+ **MILLIONS OF LIVES**



Antibiotic resistance is a pressing global public health threat.

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

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

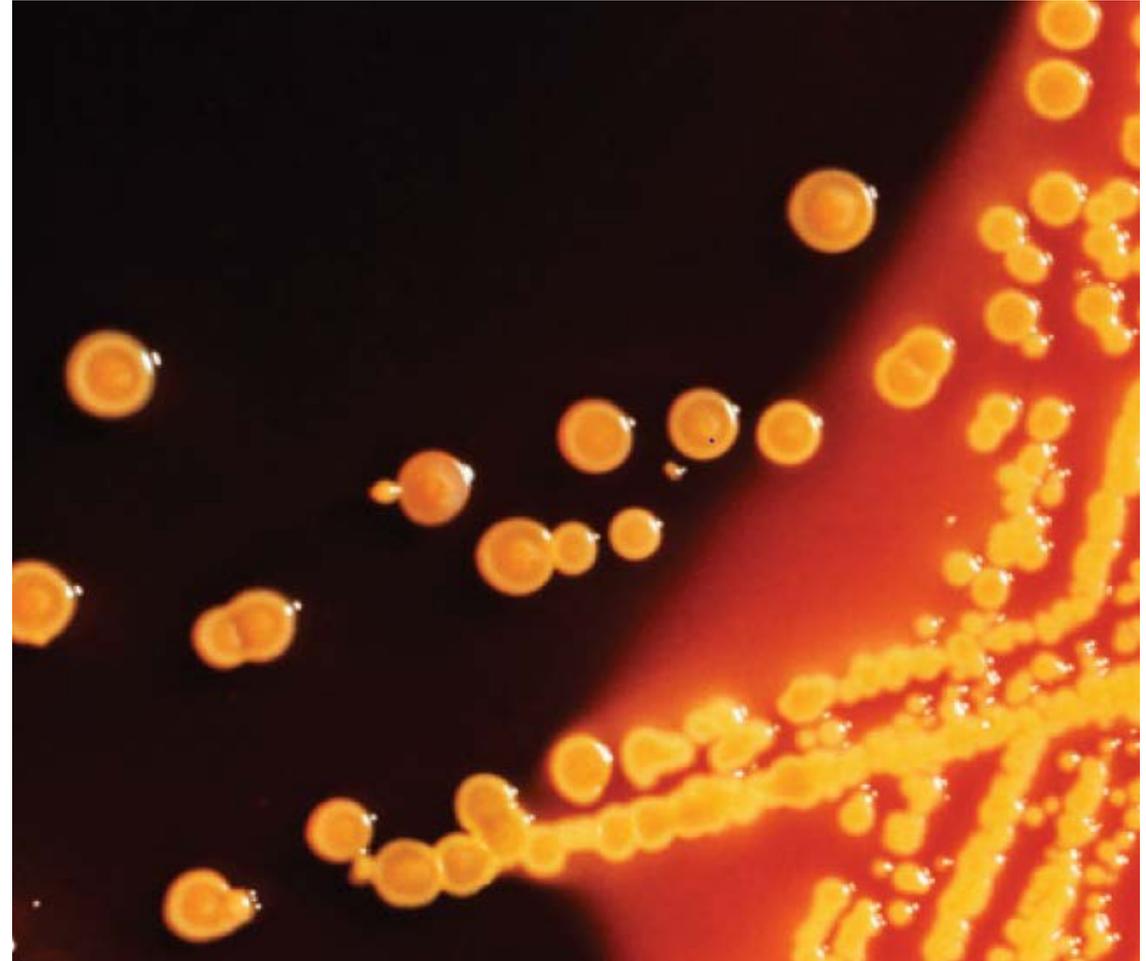
**bacteria and fungus included in this report*

Annual excess direct healthcare cost: \$20 billion

Additional annual cost of lost productivity: >\$35 billion

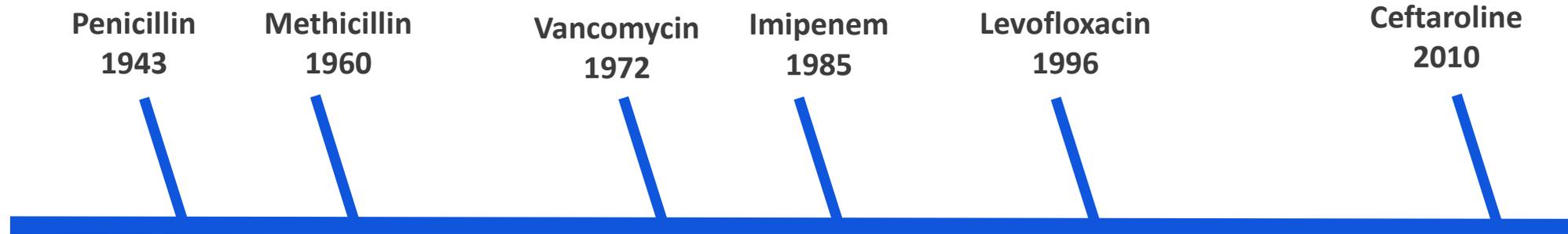
Antibiotic resistance is a problem here in LA County.

- Since 2017, LA County has received reports of over 50 confirmed novel organisms highly resistant to antimicrobials.
- LA County sees high rates of carbapenem-resistant Enterobacteriaceae, especially in long-term acute care settings
 - Community-onset rates of 2.5 per 100 admissions

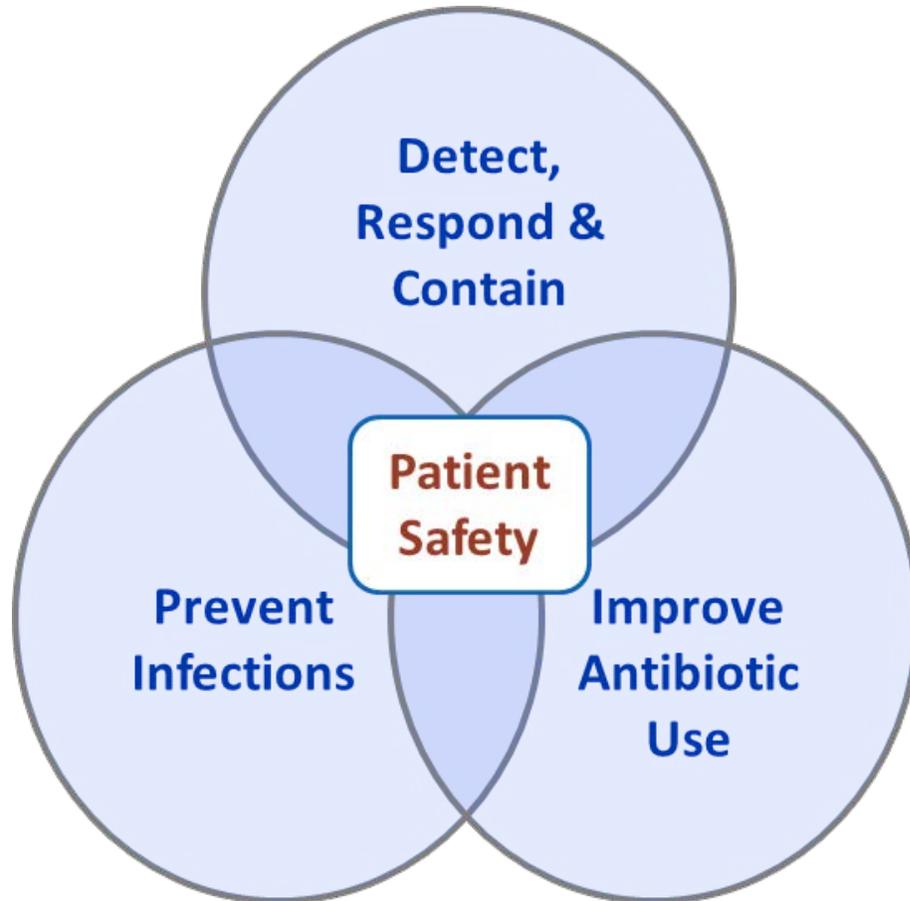


Antibiotic use is a major driver of antibiotic resistance.

Date of Antibiotic Market Introduction



CDC's response to combat antibiotic resistance is multifaceted.



CDC's Office of Antibiotic Stewardship

Mission: To optimize antibiotic use in human healthcare to combat antibiotic resistance and improve healthcare quality and patient safety.

The majority of antibiotic use in human healthcare occurs in outpatients.

Antibiotic Expenditures for Humans in the United States by Treatment Setting 2010-15: Total \$56.0 billion

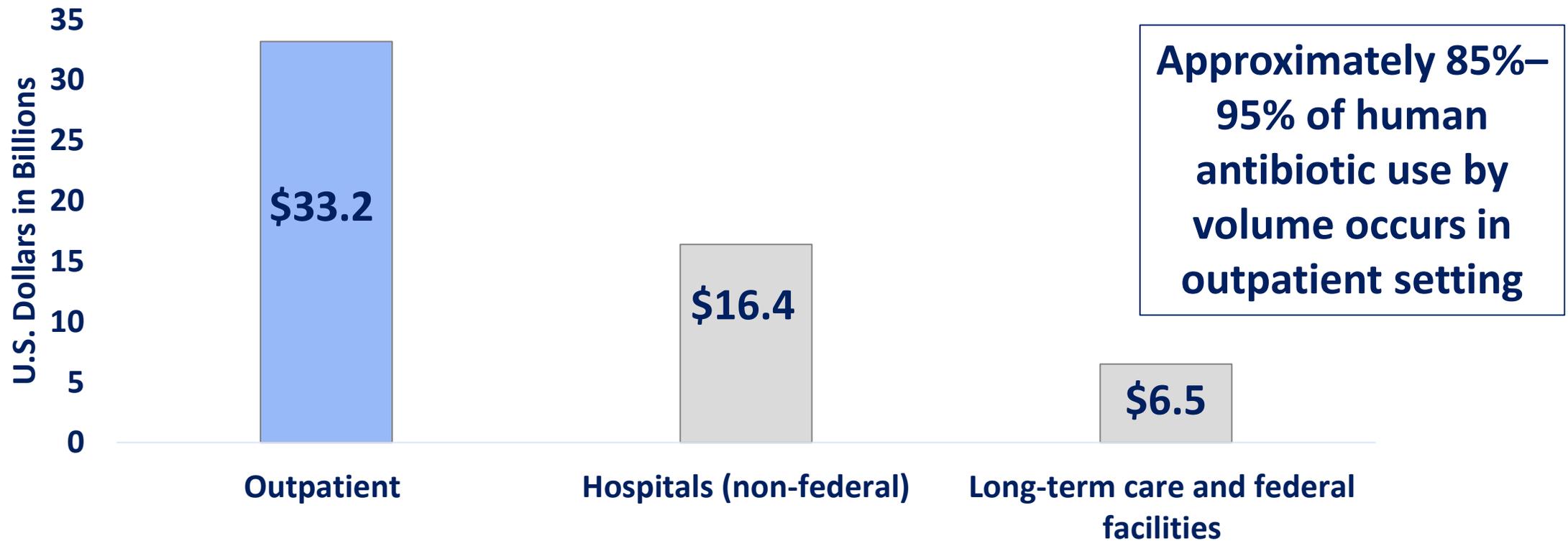
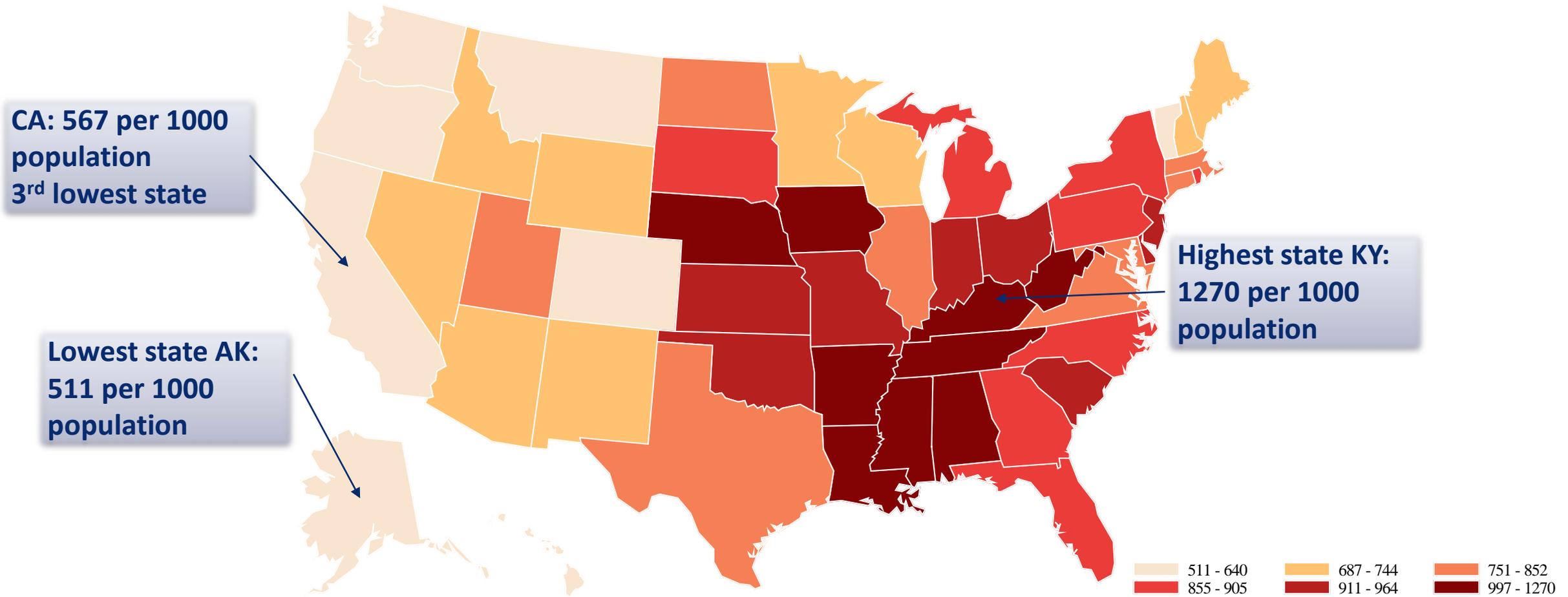


Figure created from data from: Suda et al. *Clin Infect Dis*. 2017; cix773.
Duffy et al. *J Clin Pharm Ther*. 2018; 43(1): 59-64.

In 2016, **270 million** antibiotic prescriptions were dispensed from US outpatient pharmacies, for a rate of **836 per 1000** population.



Outpatient antibiotic prescriptions dispensed per 1000 population, IQVIA 2016

Part D claims data indicates LA County members were prescribed 981,492 antibiotic prescriptions in 2015 (about 0.1 per member per month).

Rates of broad spectrum antibiotics about twice that of narrow spectrum antibiotics in LA County.



LACDPH data

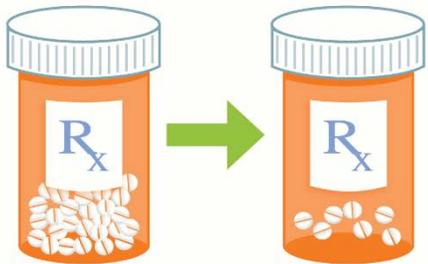
Inappropriate antibiotic use includes all of these.



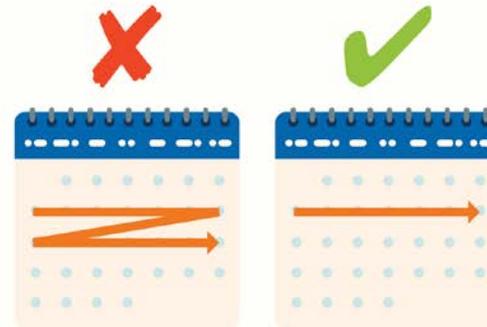
**Unnecessary
antibiotic use**



**Improper antibiotic
selection**



**Errors in antibiotic
dosing**

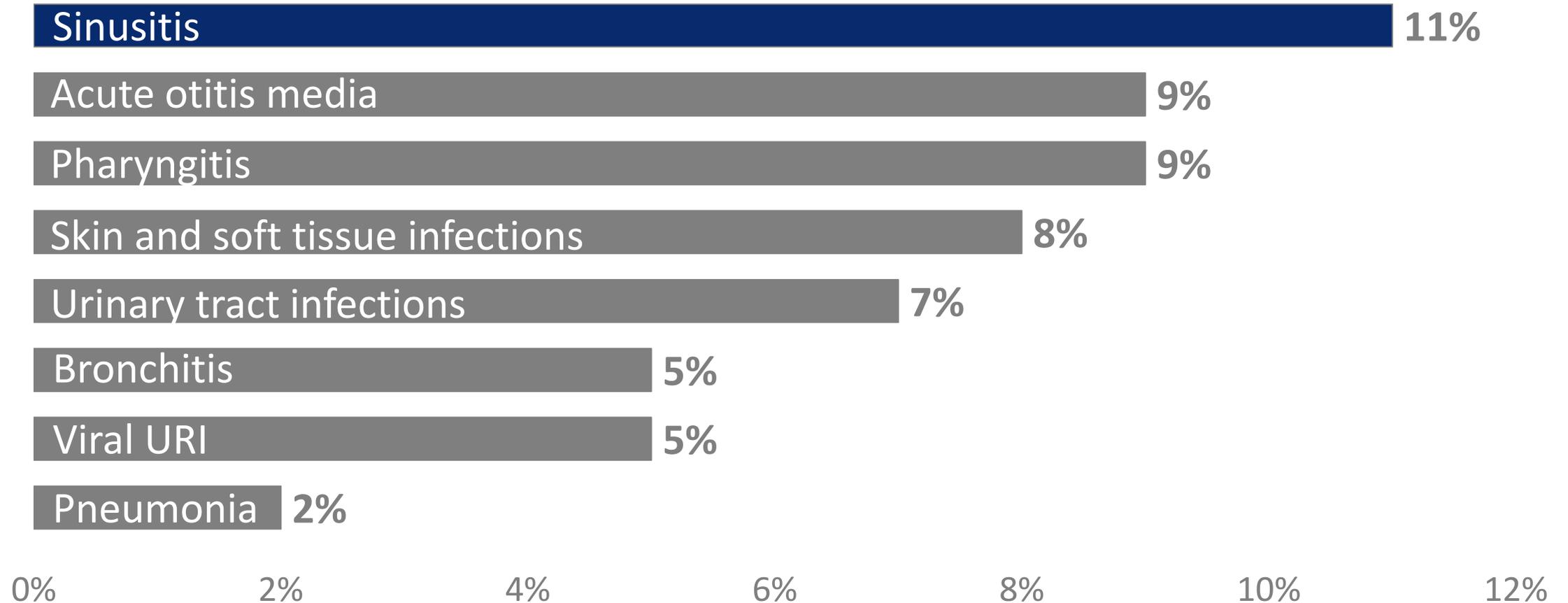


**Errors in antibiotic
duration**

Reducing unnecessary antibiotic use is critical.



Respiratory infections are major drivers of antibiotic use in outpatient settings.

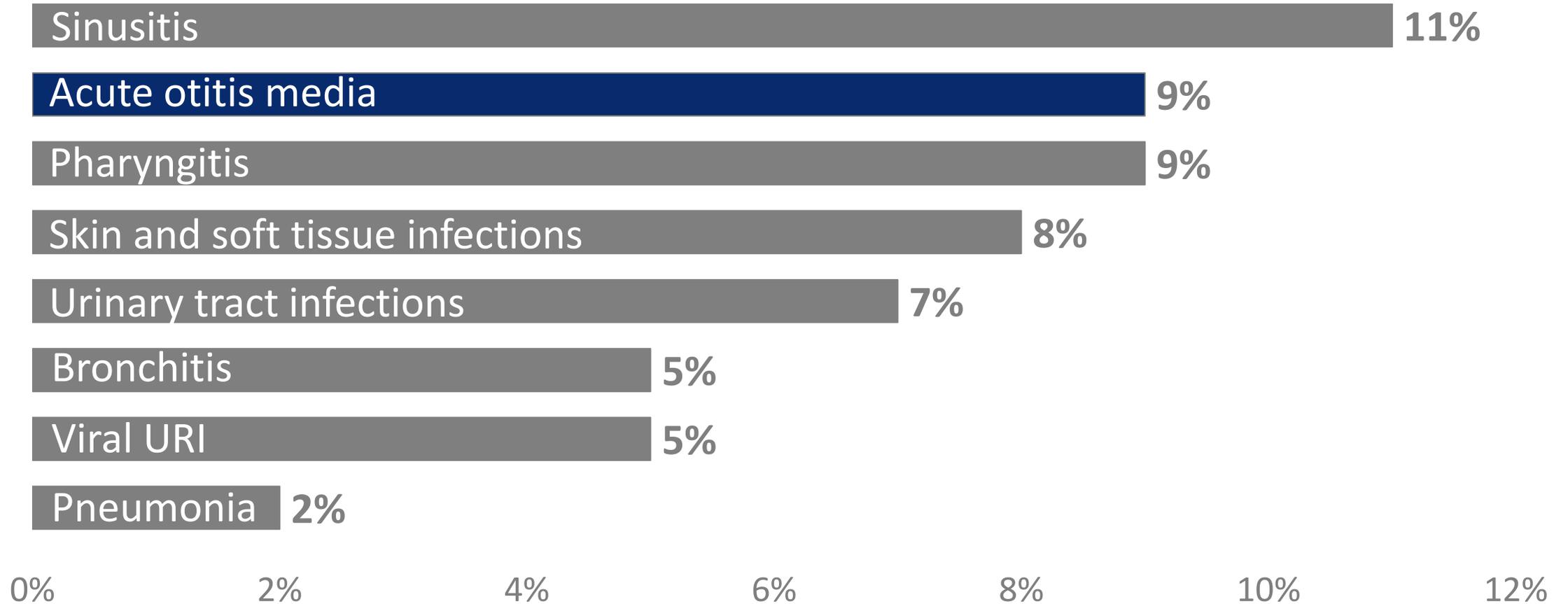


Top diagnoses leading to antibiotic prescriptions in U.S. doctors' offices and emergency departments, 2010-11

URI=upper respiratory infection

Fleming-Dutra et al. JAMA. 2016;315(17):1864-1873.

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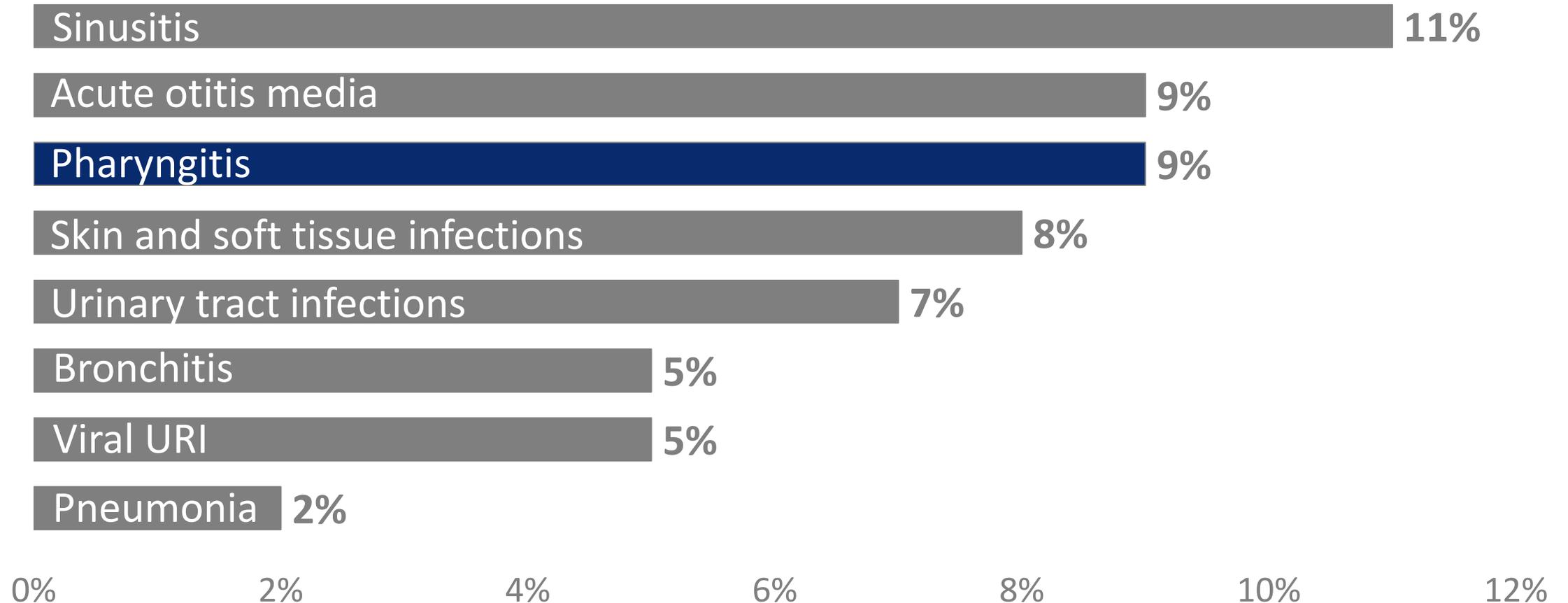


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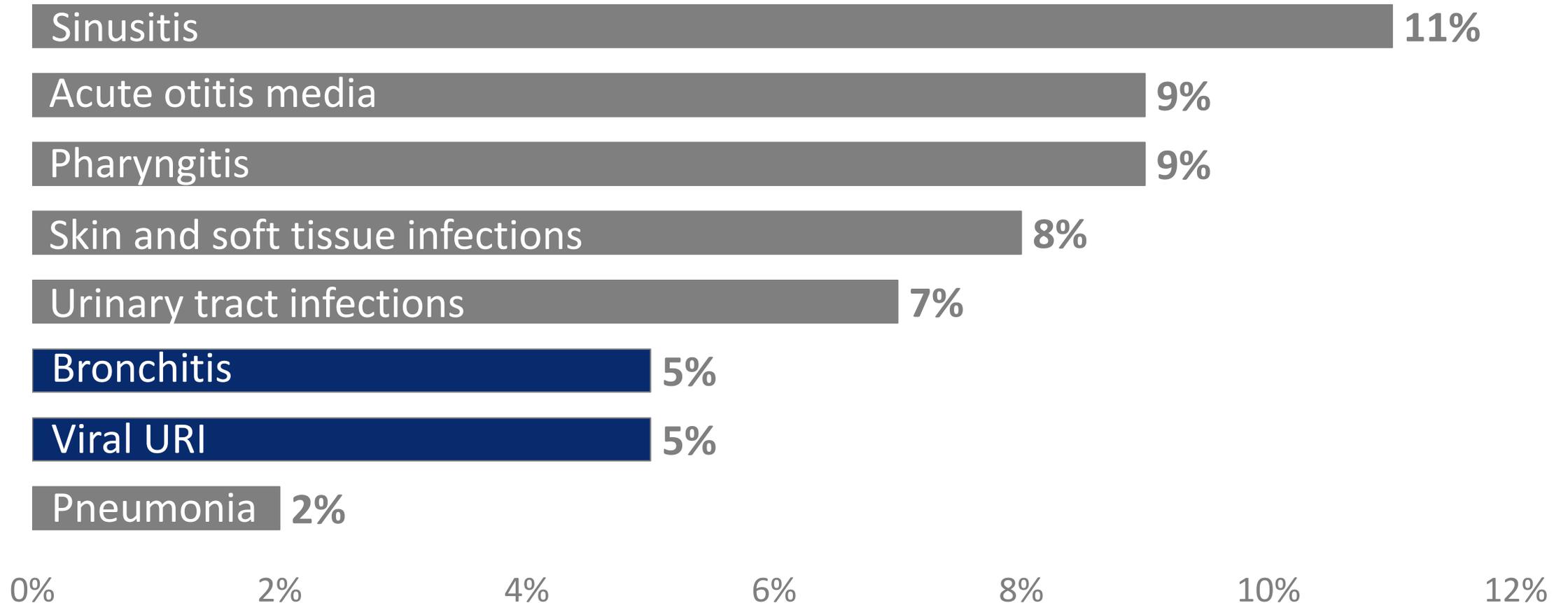


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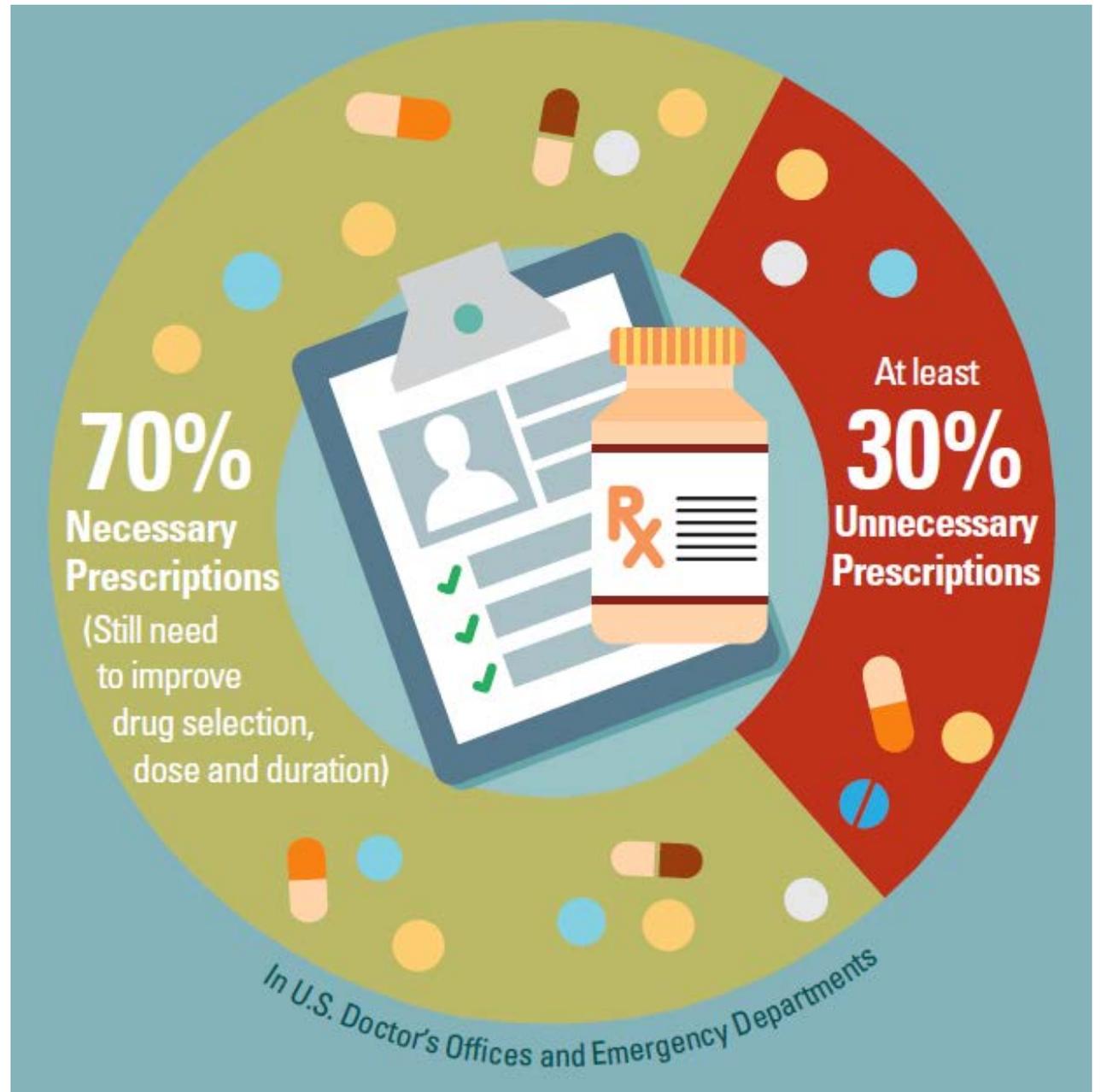


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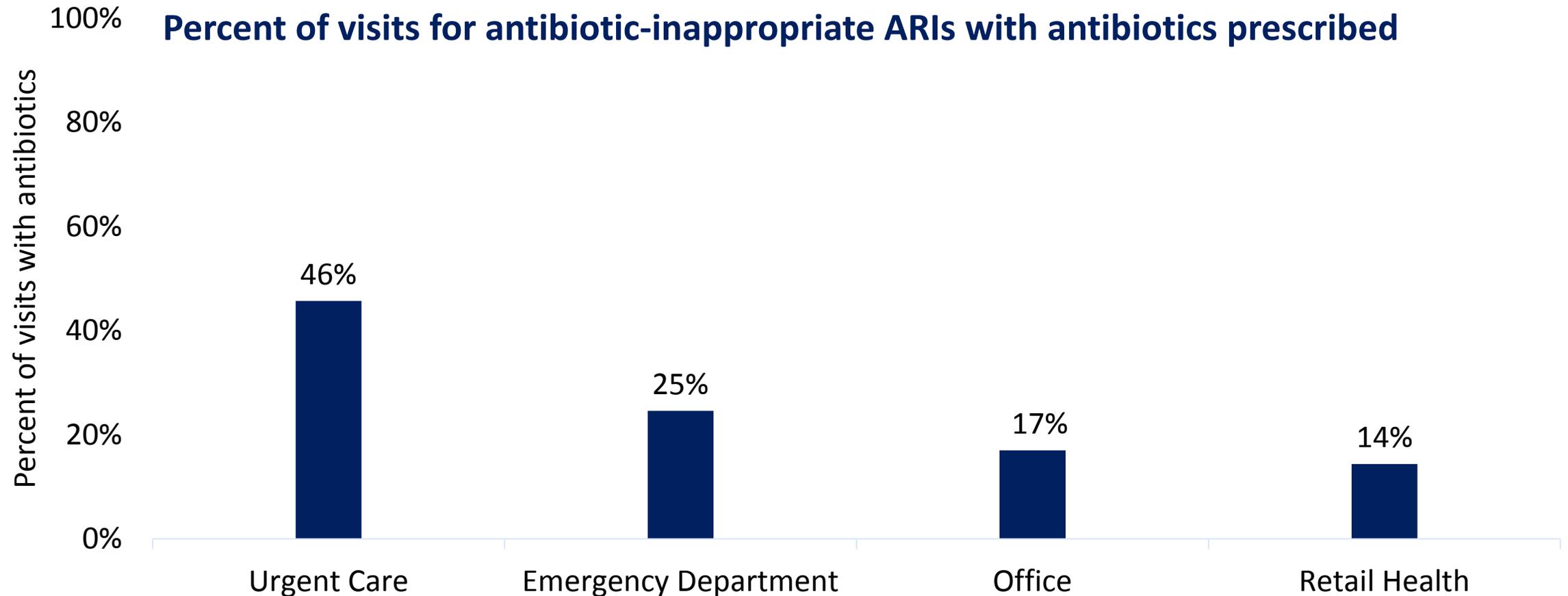
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Fleming-Dutra et al. JAMA. 2016;315(17):1864-1873.

At least **30%** of antibiotic prescriptions written in U.S. doctors offices and emergency departments are **unnecessary**.



Antibiotic prescribing for antibiotic-inappropriate acute respiratory infections (ARIs) is common in outpatient settings, especially urgent care.



*Antibiotic-inappropriate ARIs include: Viral URI, bronchitis, bronchiolitis; influenza; nonsuppurative otitis media; viral pneumonia; asthma/allergy. Visits with additional diagnoses of concomitant bacterial infections (e.g. pneumonia, urinary tract infections, acute otitis media, sinusitis) were excluded.

Palms D, Hicks L, Hersh AL, et al. *JAMA Int Med*. E-Publish Ahead of print July 16, 2018.

Antibiotic adverse events can be severe, including allergic reactions.



Antibiotic adverse events can lead to emergency department visits.

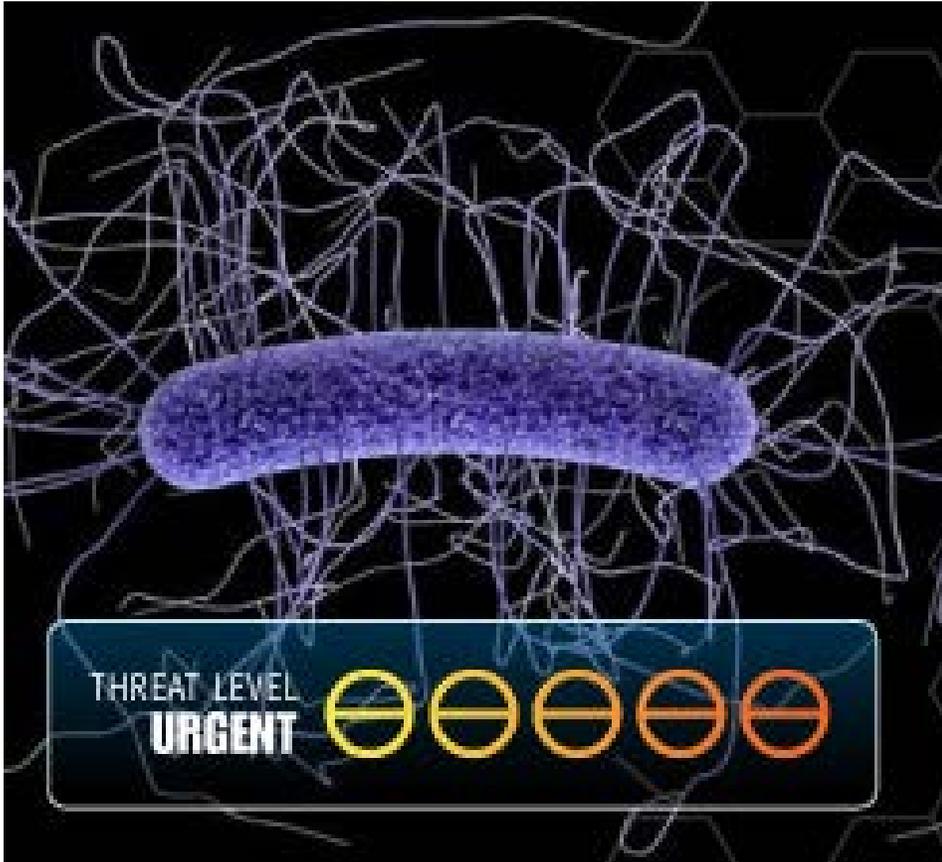


1 in 1000 antibiotic prescriptions leads to an ED visit for an adverse event



200,000 ED visits/year in U.S.

Clostridioides difficile infection is a serious consequence of antibiotic use.



453,000 infections and **15,000** deaths in the US annually¹

35% are community-associated¹

\$20,000: average cost of a hospitalization for community-onset *C. difficile* infection in 2015 US\$²

LA County has high community-onset CDI rates³

0.3 per 100 admissions in GACH

1.4 per 100 admissions in LTAC

1. Lessa NEJM 2015;372(9):825-34

2. Zhang, S., et al. BMC Infectious Diseases 2016;16(1): 447.

3. LACDPH data

Antibiotic adverse events may have long-term consequences for chronic disease through disruption of the microbiome.

Vangay, et al. Cell host & microbe 2015; 17(5): 553-564.

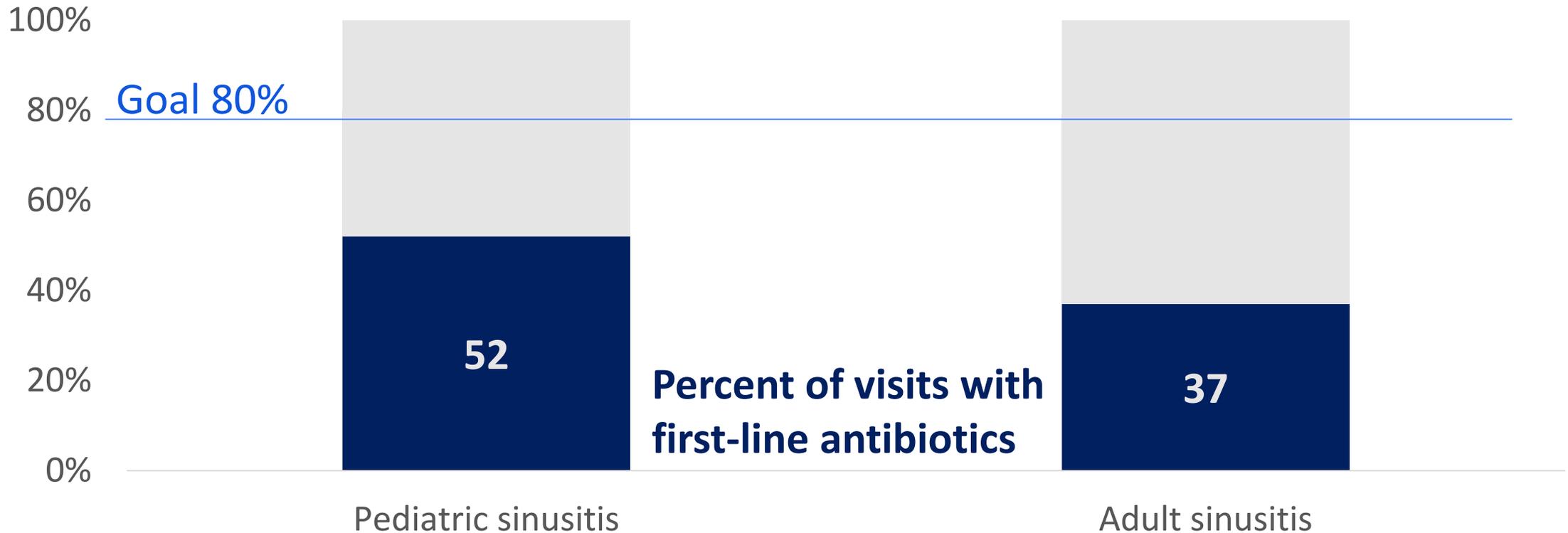


Antibiotic selection needs improvement.



Patients with sinusitis who are prescribed antibiotics too often receive the wrong antibiotic.

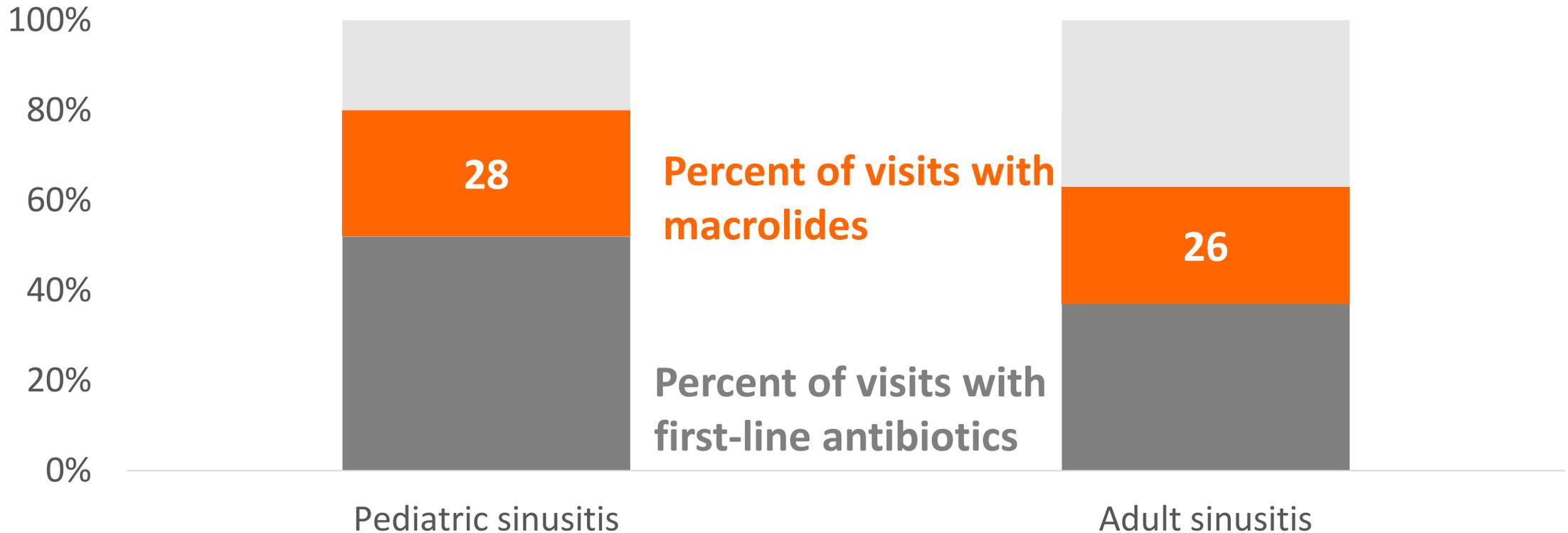
Antibiotic Selection for Sinusitis — United States, 2010-11⁴



1. Rosenfeld (2015) Otolaryngol Head Neck Surg. 152(2 Suppl):S1-S39.
2. Wald et al. Pediatrics 2013;132(1): e262-e280.
3. Chow (2012) Clin Infect Dis. Apr;54(8):e72-e112.
4. Hersh et al. JAMA Int Med 2016;315(17): 1864-1873.

Macrolides are commonly prescribed but are not recommended for sinusitis.

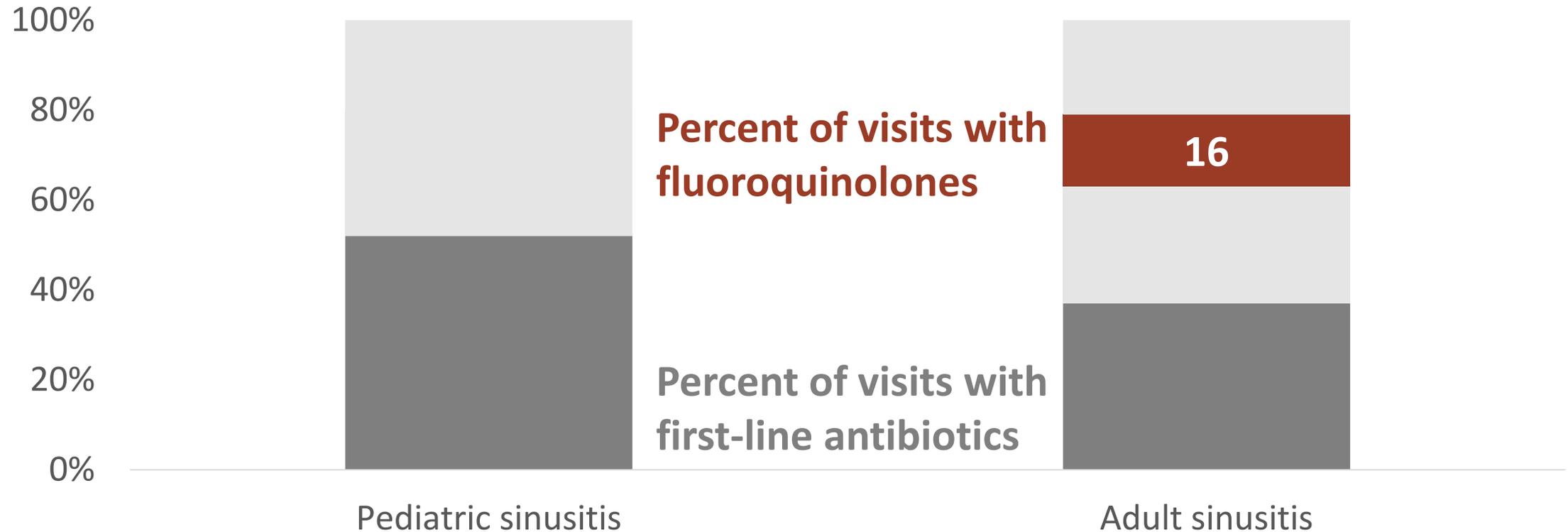
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Fluoroquinolones are also prescribed to about 16% of adults with sinusitis, but are higher risk for adverse events.

Antibiotic Selection for Sinusitis — United States, 2010-11⁴



1. Rosenfeld (2015) Otolaryngol Head Neck Surg. 152(2 Suppl):S1-S39.
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3. Chow (2012) Clin Infect Dis. Apr;54(8):e72-e112.
4. Hersh et al. JAMA Int Med 2016;315(17): 1864-1873.

Fluoroquinolones should only be used when other options are not available.



The banner features the FDA logo on the left, followed by the text "U.S. Food and Drug Administration Protecting and Promoting Your Health". To the right, the title "Drug Safety Communications" is displayed in a large, bold, white font against a blue background.

FDA Drug Safety Communication: FDA updates warnings for oral and injectable fluoroquinolone antibiotics due to disabling side effects

FDA In Brief: FDA warns that fluoroquinolone antibiotics can cause aortic aneurysm in certain patients

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December 20, 2018

www.fda.gov/Drugs/DrugSafety/ucm500143.htm

<https://www.fda.gov/NewsEvents/Newsroom/FDAInBrief/ucm628956.htm>

Reported penicillin allergy is a major driver of broad-spectrum antibiotic use.



9 OUT OF 10
patients who report a penicillin allergy are not truly allergic

Evaluating your patients for true penicillin allergy means less use of broad-spectrum antibiotics and giving your patients the best care.



<https://www.cdc.gov/antibiotic-use/community/pdfs/penicillin-factsheet.pdf>

Is it Really a Penicillin Allergy?

Evaluation and Diagnosis of Penicillin Allergy for Healthcare Professionals

Did You Know?

5 Facts About Penicillin Allergy (Type 1, Immunoglobulin E (IgE)-mediated)

1. Approximately 10% of all U.S. patients report having an allergic reaction to a penicillin class antibiotic in their past.
2. However, many patients who report penicillin allergies do not have true IgE-mediated reactions. When evaluated, fewer than 1% of the population are truly allergic to penicillins.¹
3. Approximately 80% of patients with IgE-mediated penicillin allergy lose their sensitivity after 10 years.¹
4. Broad-spectrum antibiotics are often used as an alternative to penicillins. The use of broad-spectrum antibiotics in patients labeled "penicillin-allergic" is associated with higher healthcare costs, increased risk for antibiotic resistance, and suboptimal antibiotic therapy.¹
5. Correctly identifying those who are not truly penicillin-allergic can decrease unnecessary use of broad-spectrum antibiotics.¹

10% of the population reports a penicillin allergy but <1% of the whole population is truly allergic.



Before prescribing broad-spectrum antibiotics to a patient thought to be penicillin-allergic, evaluate the patient for true penicillin allergy (IgE-mediated) by conducting a history and physical, and, when appropriate, a skin test and challenge dose.

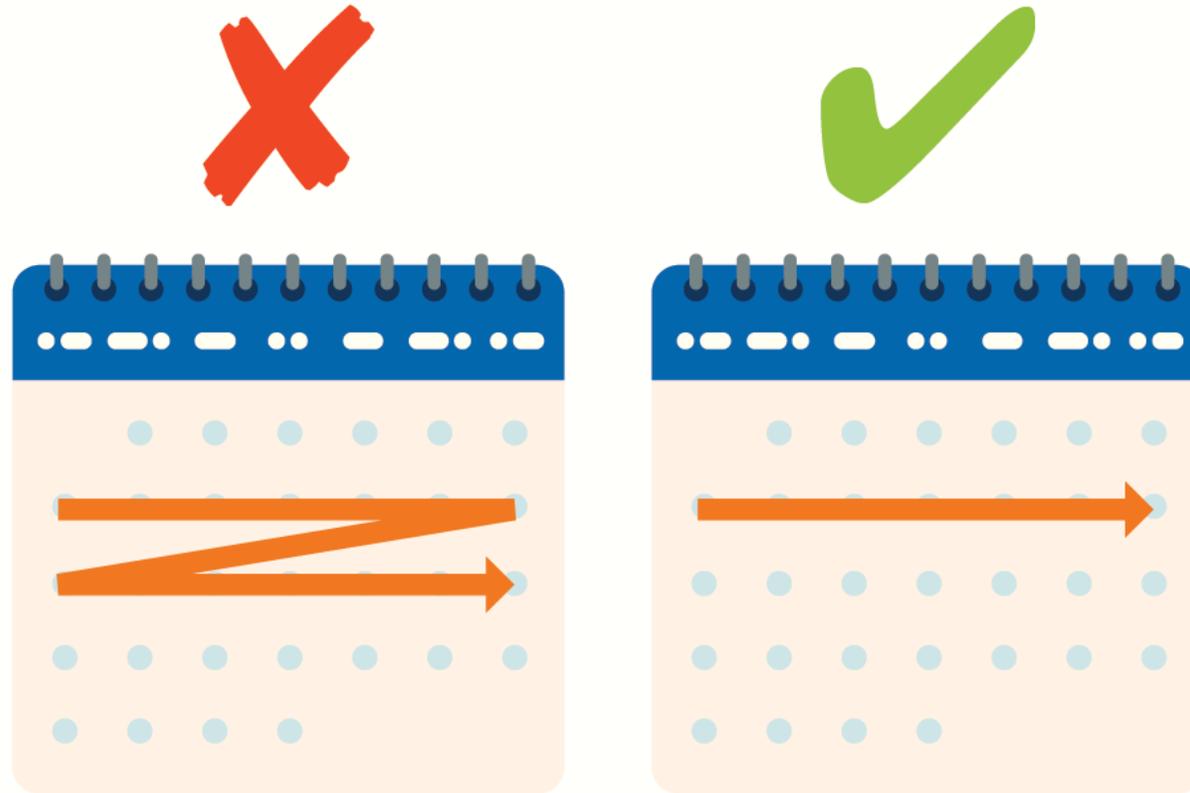
History and Physical Examination

The history and physical examination are important components when evaluating a patient's drug reactions.¹

- Questions to ask during the examination:
 - What medication were you taking when the reaction occurred?
 - What kind of reaction occurred?
 - How long ago did the reaction occur?
 - How was the reaction managed?
 - What was the outcome?²
- Characteristics of an IgE-mediated (Type 1) reaction:
 - Reactions that occur immediately or usually within one hour¹
 - Hives: Multiple pink/red raised areas of skin that are intensely itchy³
 - Angioedema: Localized edema without hives affecting the abdomen, face, extremities, genitalia, oropharynx, or larynx⁴
 - Wheezing and shortness of breath
 - Anaphylaxis

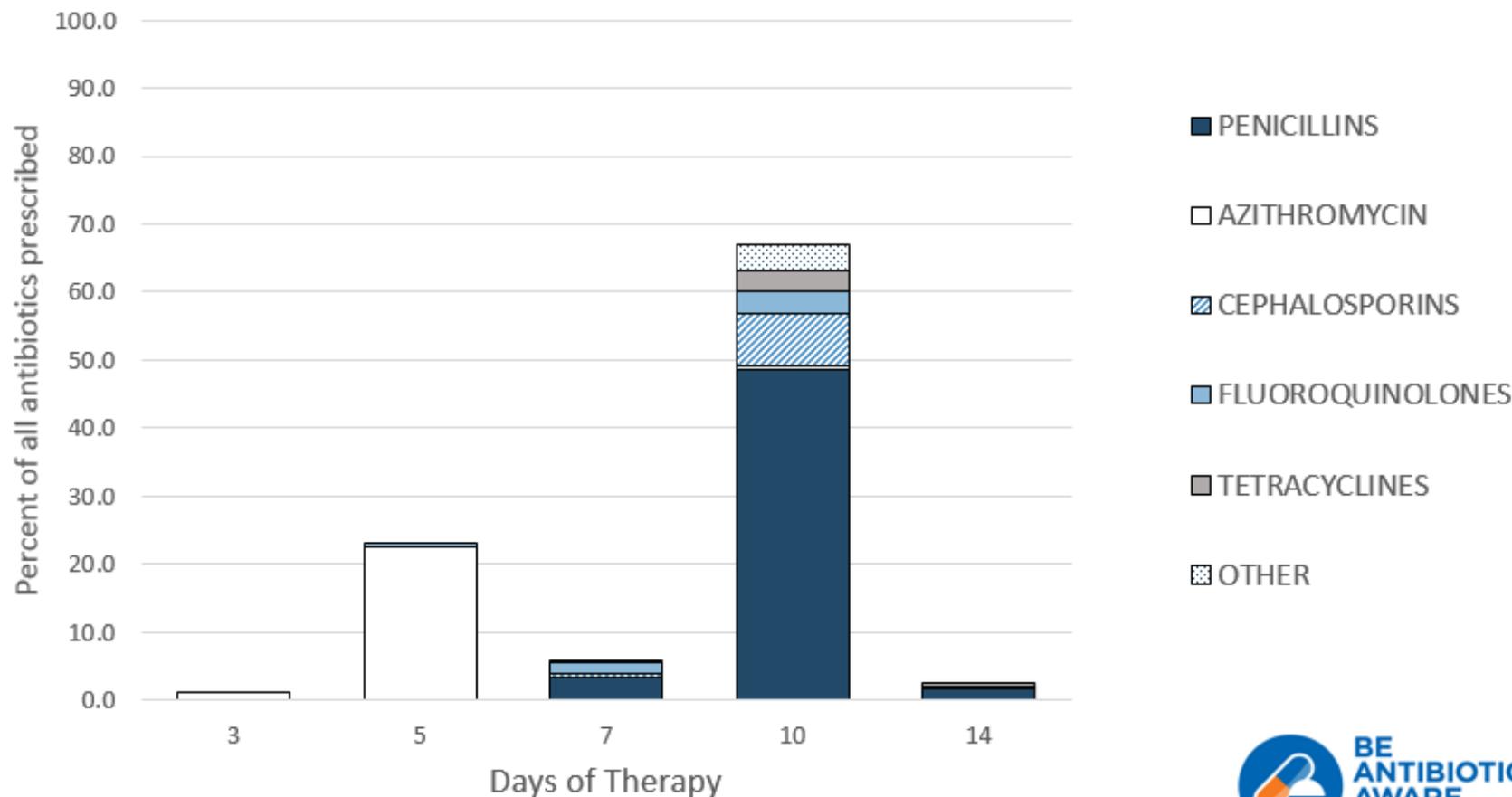
- Broad-spectrum antibiotics are often used as an alternative to narrow-spectrum penicillins.
- Using broad-spectrum antibiotics can increase healthcare costs and antibiotic resistance, and may mean your patient receives less than the best care.
- Correctly identifying if your patient is actually penicillin-allergic can decrease these risks by reducing unnecessary use of broad-spectrum antibiotics.

Using the minimum effective duration is a key antibiotic stewardship target.



IDSA recommends 5-7 days of antibiotics for adults with uncomplicated acute sinusitis, but most adults receive 10 days.

Duration of antibiotic therapy for acute sinusitis in adults, 2016

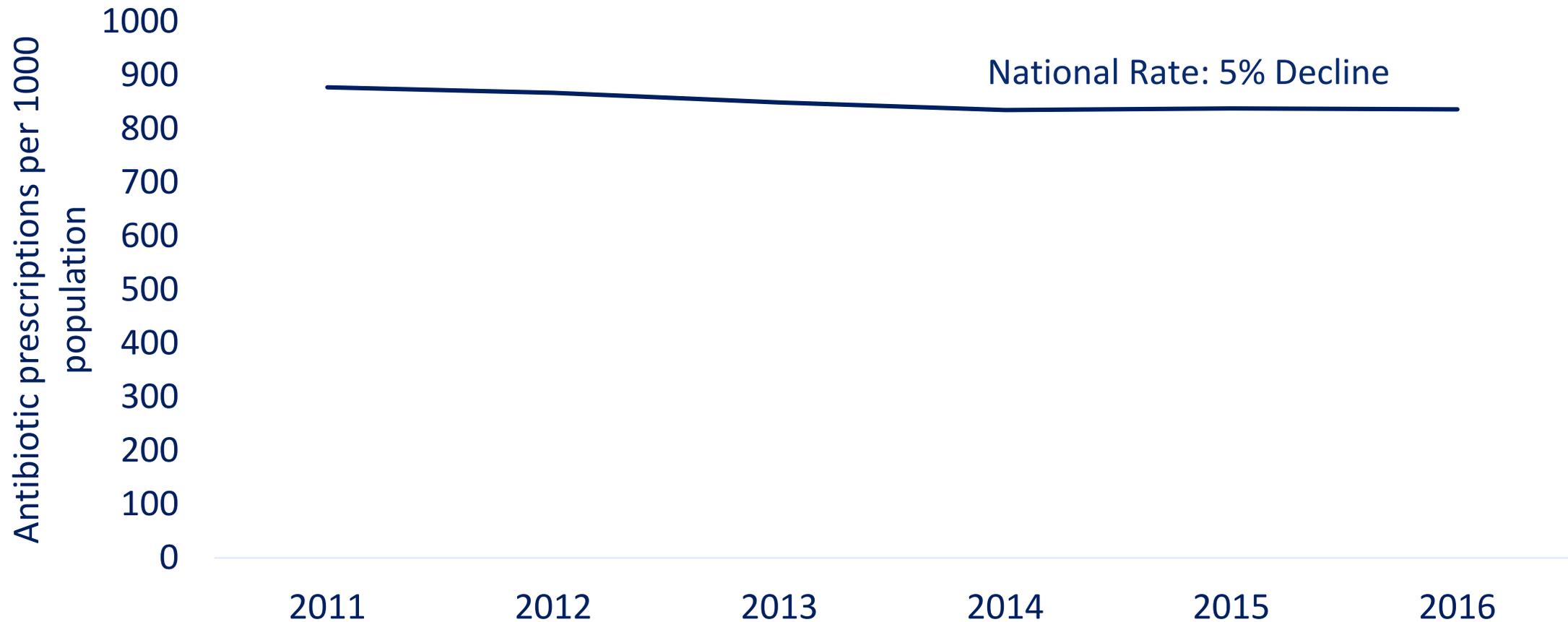


King et al. *JAMA Intern Med*. Published online March 26, 2018.

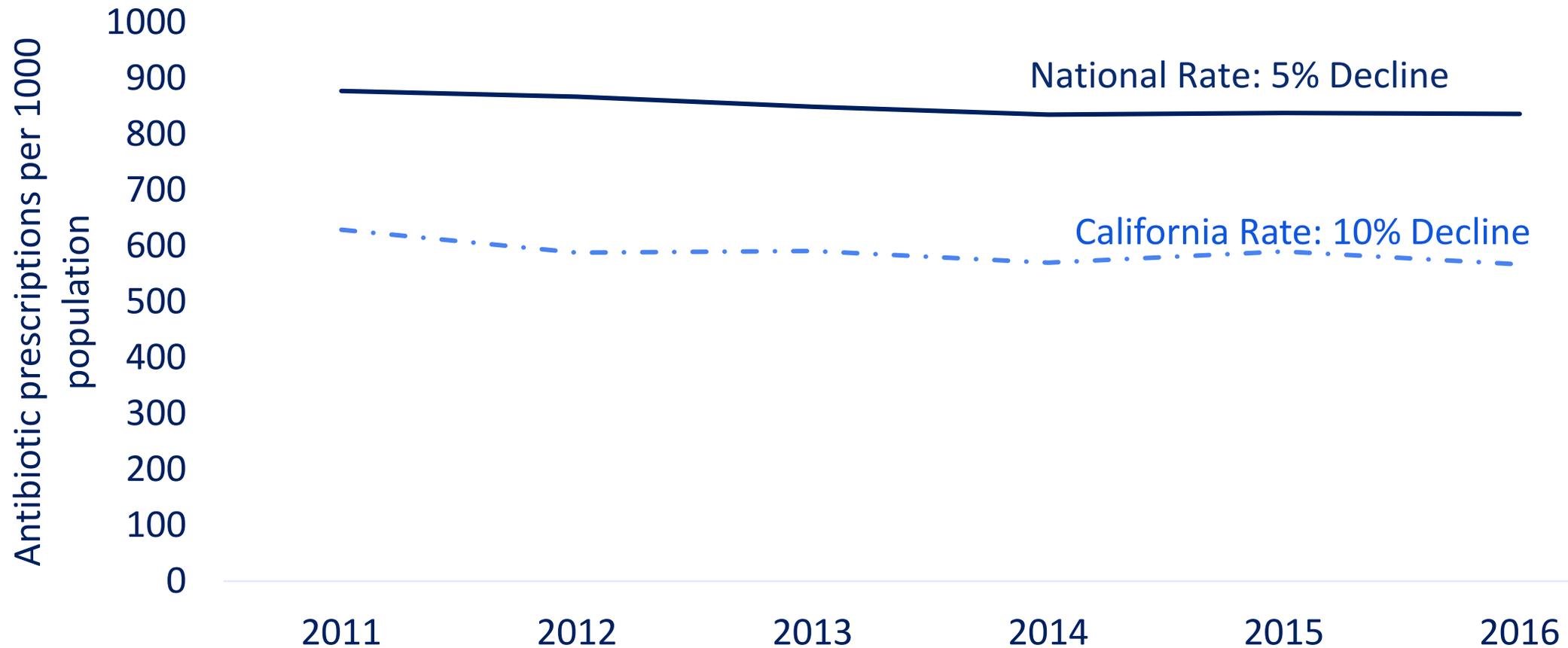
Chow (2012) *Clin Infect Dis*. Apr;54(8):e72-e112.

Have we made any progress in improving antibiotic use?

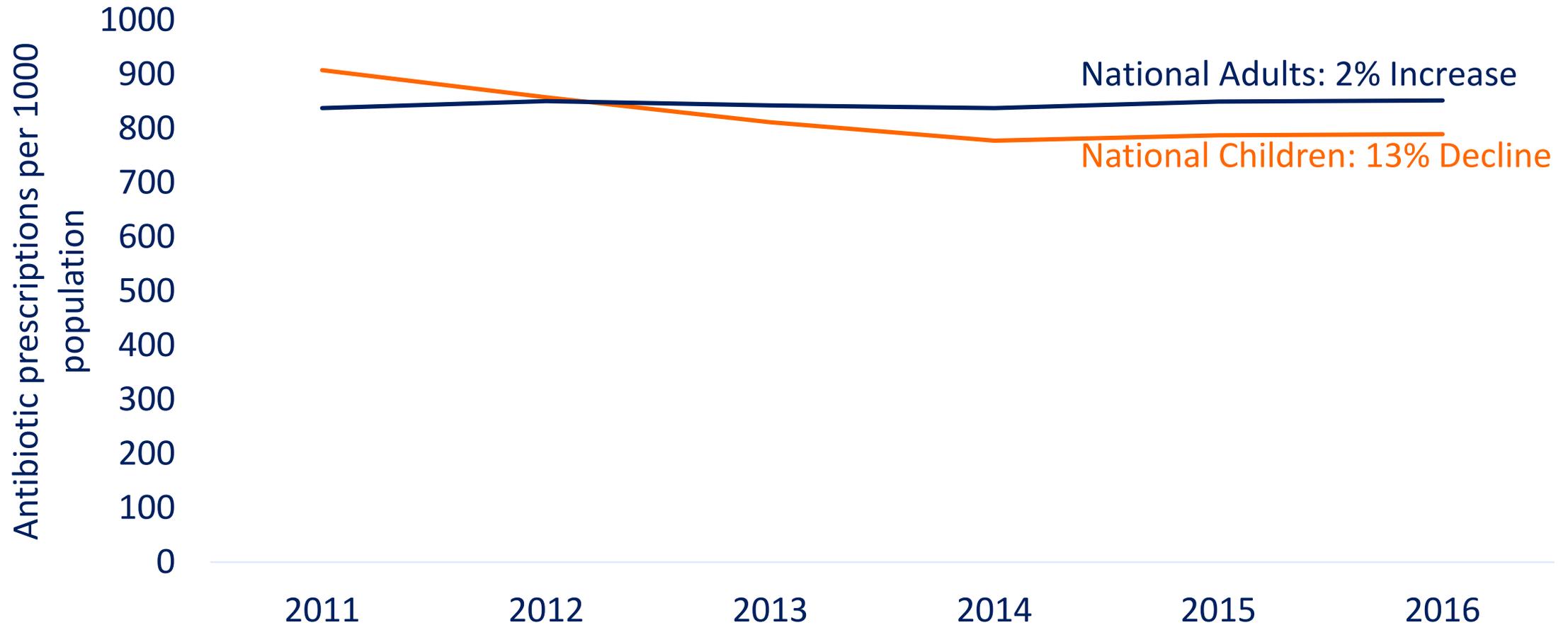
National outpatient antibiotic prescription rates decreased **5%** from **2011-16.**



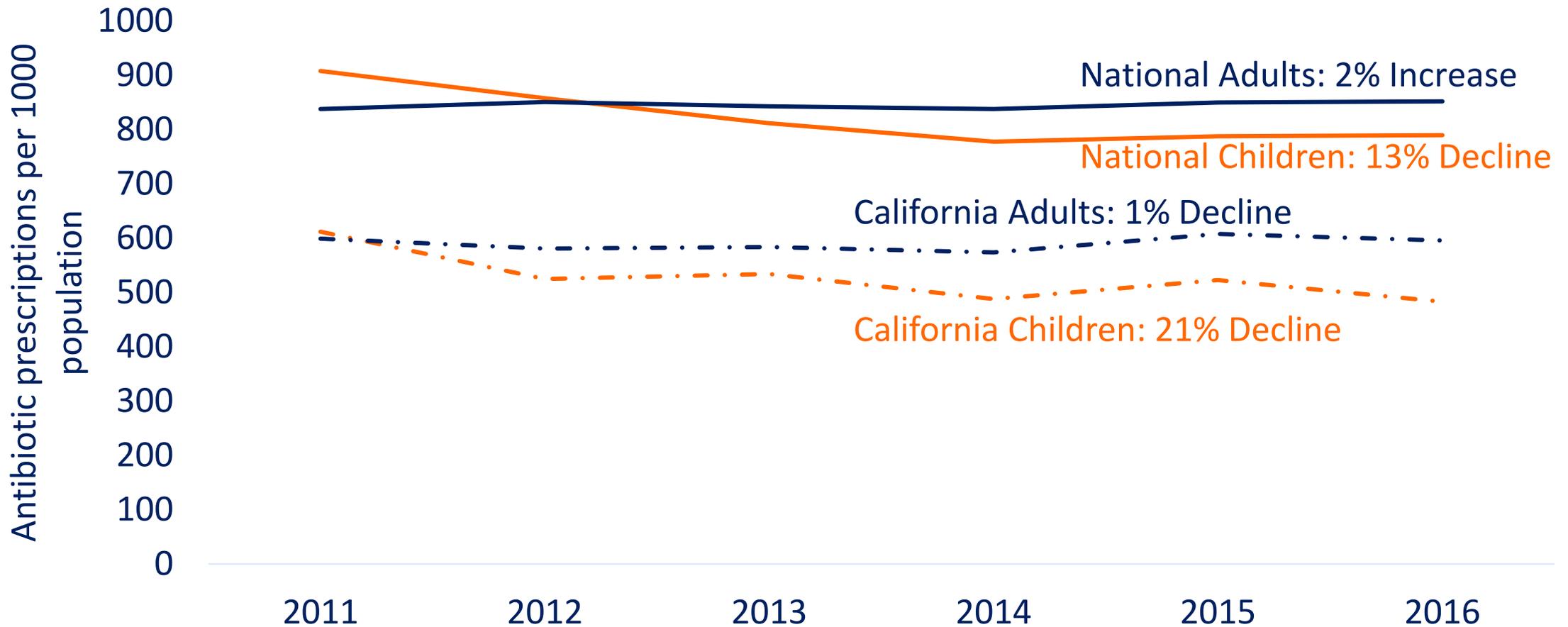
California outpatient antibiotic prescription rates decreased **10%** from 2011-16.



The reductions in antibiotic prescribing have been entirely driven by reductions in children.



California outpatient antibiotic prescribing rates to children decreased **21%** but rates for **adults** only decreased by **1%**.



Lesson learned: Vaccines are key antibiotic stewardship tools.



**Shots
aren't just
for kids.**

Vaccines for adults can prevent serious diseases and even death. Ask your doctor about what immunizations you need. Because staying healthy at any age isn't kid stuff.

 U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Vaccines can prevent Influenza (flu), shingles, diphtheria/tetanus, pertussis, and pneumococcal diseases.

<http://www.cdc.gov/vaccines/adults>

CS213-660-A

Nuorti P. & Whitney C. *MMWR Rec Rep* 2010; 59(RR-11): 1–18
www.cdc.gov/flu/pdf/freeresources/updated/f-adults-shots.pdf

Lesson learned: Public health and pediatric healthcare providers helped improve antibiotic use in children by working together.



Snort. Sniffle. Sneeze.
No Antibiotics Please.
Treat colds and flu with care.
Talk to your doctor.

As a parent, you want to help your child feel better. But antibiotics aren't always the answer. They don't fight the viruses that cause colds and flu. What will? Fluids and plenty of rest are best. Talk to your doctor. Find out when antibiotics work – and when they don't. The best care is the right care.

For more information, please call 1-888-246-2675 or visit www.cdc.gov/getsmart.



ANTIBIOTICS AREN'T ALWAYS THE ANSWER.



Antibiotics save lives. Improving the way healthcare professionals prescribe antibiotics, and the way we take antibiotics, helps keep us healthy now, helps fight antibiotic resistance, and ensures that these life-saving drugs will be available for future generations.



The Facts:

When a patient needs antibiotics, the benefits outweigh the risks of side effects or antibiotic resistance.

When antibiotics aren't needed, they won't help you, and the side effects could still hurt you.

Common side effects of antibiotics can include rash, dizziness, nausea, diarrhea, or yeast infections. More serious side effects include *Clostridium difficile* infection (also called *C. difficile* or *C. diff*), which causes diarrhea that can lead to severe colon damage and death. People can also have severe and life-threatening allergic reactions.

Antibiotics do not work on viruses, such as colds and flu, or runny noses, even if the mucus is thick, yellow, or green.

Antibiotics are only needed for treating certain infections caused by bacteria. Antibiotics also

Taking antibiotics creates resistant bacteria. Antibiotic resistance occurs when bacteria no longer respond to the drugs designed to kill them.

Each year in the United States, at least **2 million** people get infected with antibiotic-resistant bacteria. At least **23,000** people die as a result.

If you need antibiotics, take them exactly as prescribed. Talk with your doctor if you have any questions about your antibiotics, or if you develop any side effects, especially diarrhea, since that could be a *C. difficile* (*C. diff*) infection which needs to be treated.

Reactions from antibiotics cause 1 out of 5 medication-related visits to the emergency department. In children, reactions from antibiotics are the most

Core Elements of Outpatient Antibiotic Stewardship provide a framework for implementing antibiotic stewardship in outpatient settings.



CORE ELEMENTS OF OUTPATIENT ANTIBIOTIC STEWARDSHIP



COMMITMENT

Demonstrate dedication to and accountability for optimizing antibiotic prescribing and patient safety.



ACTION FOR POLICY AND PRACTICE

Implement at least one policy or practice to improve antibiotic prescribing, assess whether it is working, and modify as needed.



TRACKING AND REPORTING

Monitor antibiotic prescribing practices and offer regular feedback to providers, or have providers assess their own antibiotic prescribing practices themselves.



EDUCATION AND EXPERTISE

Provide educational resources to providers and patients on antibiotic prescribing, and ensure access to needed expertise on optimizing antibiotic prescribing.

14 VHA clinics implemented Core Elements to improve antibiotic use for acute respiratory infections (ARIs).

VHA

U.S. Department of Veterans Affairs

Veterans Health Administration

- Data from 2014-2018
- Staggered roll out of intervention
 - 4 sites in 2015
 - 10 sites in 2017
- Total ARI visits included
 - Pre-intervention: 29,782
 - Post-intervention: 8,369

Sites demonstrated commitment by recruiting stewardship champions at all sites.



Volunteer “stewardship champions” disseminate stewardship messages, and provide guidance on best practices.

Academic detailing was used to fulfill action for policy and practice.

VA Intervention Tools- Academic Detailing

Academic Detailing concerning ARI management was provided as part of this intervention.

Why?

- Academic detailing saves providers time and effort in staying up-to-date with current research and best practice!
- Helps apply evidence based medicine to practice!
- Provides an avenue for personalized feedback (Clinic & Provider Reports)

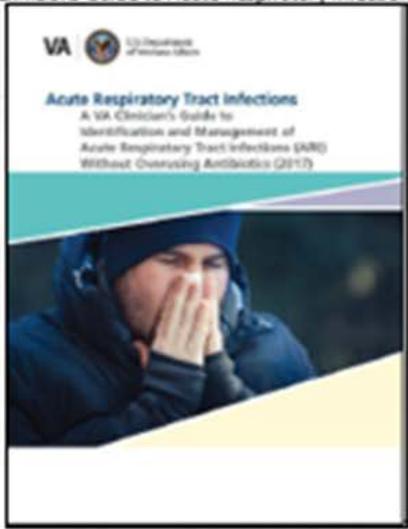
How?

- Clinic champions engaged providers in detailing visits for ~ 20 minute either in small groups or one on one. During these sessions providers received personalized reports and latest evidence concerning the current best practices for ARI encounters.

Who?

- Clinic champions trained in academic detailing for ARI encounters identified providers with >15 ARI encounters during the baseline period and every two months post intervention Kick-Off

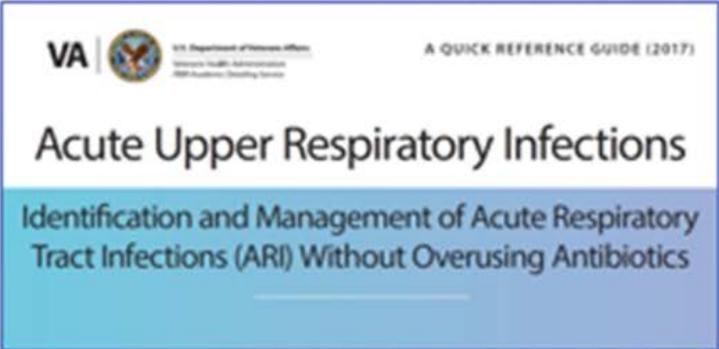
Clinicians Guide to Acute Respiratory Infections



VA | U.S. Department of Veterans Affairs
U.S. Department of Health & Human Services
VA Academic Detailing Service

Acute Respiratory Tract Infections
A VA Clinician's Guide to Identification and Management of Acute Respiratory Tract Infections (ARI) Without Overusing Antibiotics (2017)

Provider Quick Reference Guide

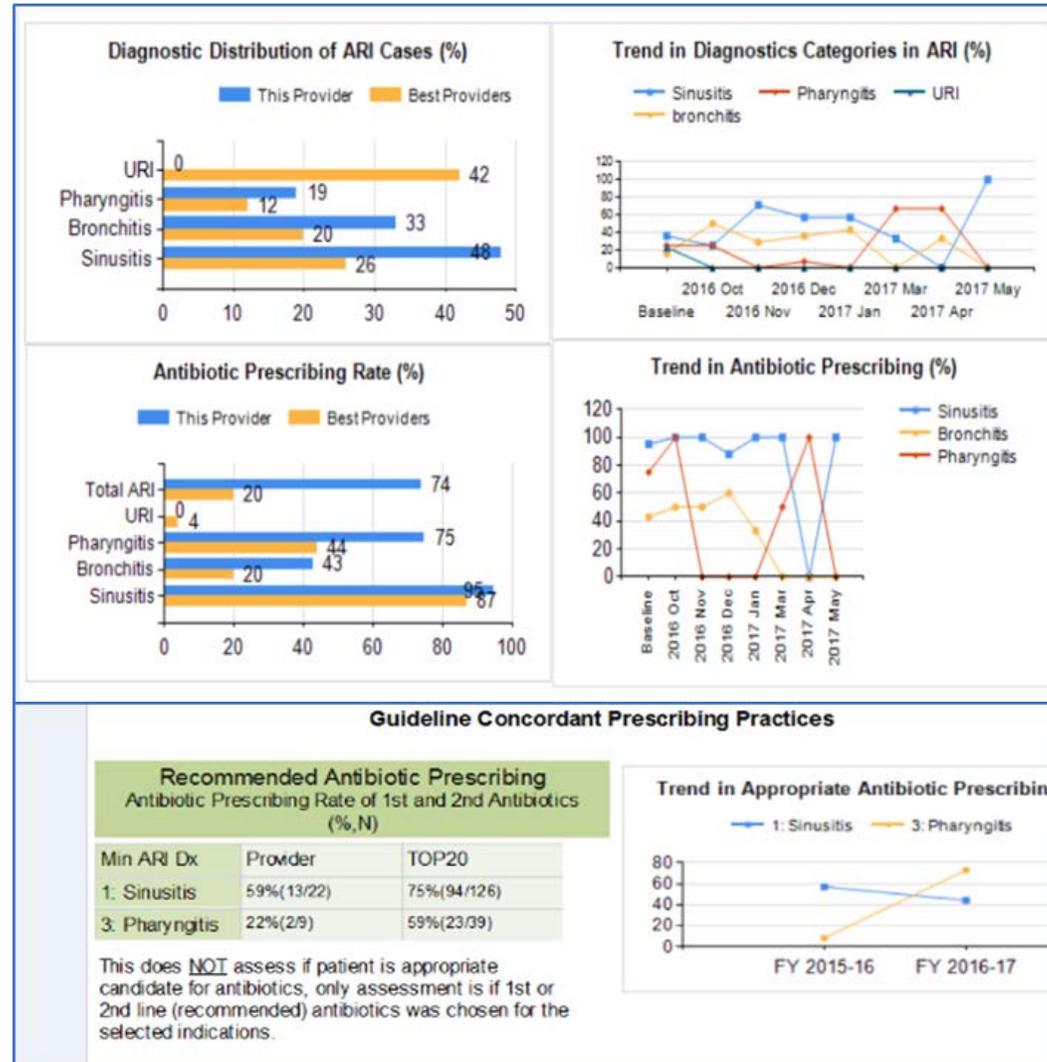


VA | U.S. Department of Veterans Affairs
U.S. Department of Health & Human Services
VA Academic Detailing Service

A QUICK REFERENCE GUIDE (2017)

Acute Upper Respiratory Infections
Identification and Management of Acute Respiratory Tract Infections (ARI) Without Overusing Antibiotics

Antibiotic prescribing was tracked and reported back to providers at all sites.



Education and expertise were provided to healthcare providers and patients at all sites.

VA |  U.S. Department of Veterans Affairs

Acute Respiratory Tract Infections

A VA Clinician's Guide to Identification and Management of Acute Respiratory Tract Infections (ARI) Without Overusing Antibiotics (2017)



Antibiotics Aren't Always the Answer



FIVE FAST FACTS ABOUT ANTIBIOTICS

- 1. Antibiotics only treat infections caused by bacteria.**

Viruses cause infections like a cold. If you have a cough, nasal congestion or sore throat, talk to your provider or pharmacist about ways to help you feel better. This may include over-the-counter medicine, a humidifier, or warm liquids.
- 2. Most sore throats DO NOT require an antibiotic.**

Only 1 in 6 people who see their provider for a sore throat have strep throat. Your provider can test to see if you have strep throat, and will prescribe an antibiotic if you do.
- 3. If you have green colored mucus, you DO NOT necessarily need an antibiotic.**

As your body's immune system fights an infection, mucus can change color. This is normal and does not always mean you need an antibiotic.
- 4. There are potential risks when you take any prescription drug.**

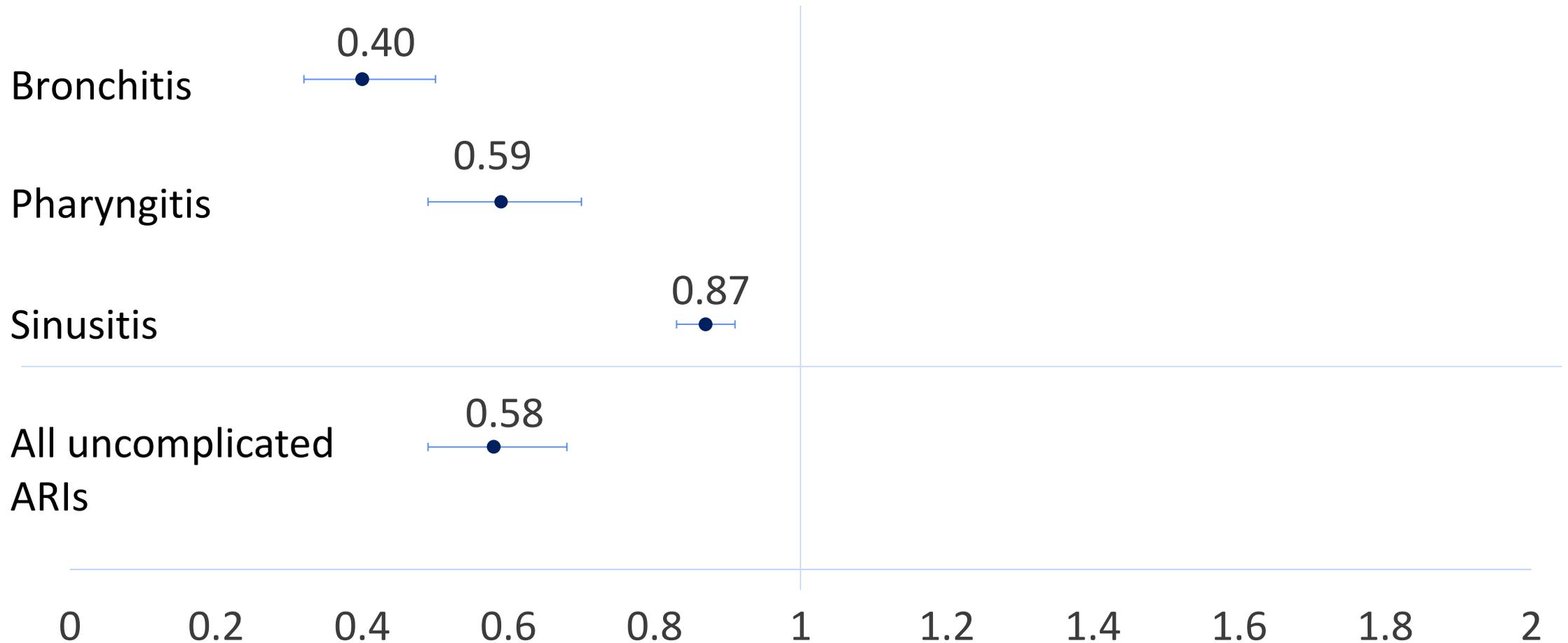
Using antibiotics can cause problems, ranging from an upset stomach to a serious allergic reaction and make them less likely to be effective in the future.
- 5. Using the right antibiotic at the right time can save your life.**

Only use antibiotics if your provider says you really need them. If we use them to treat health problems that don't require them, they may not work as well when you have an illness that does.

 Promoting Prudent Prescribing Practices
VHA Antimicrobial Stewardship Initiative

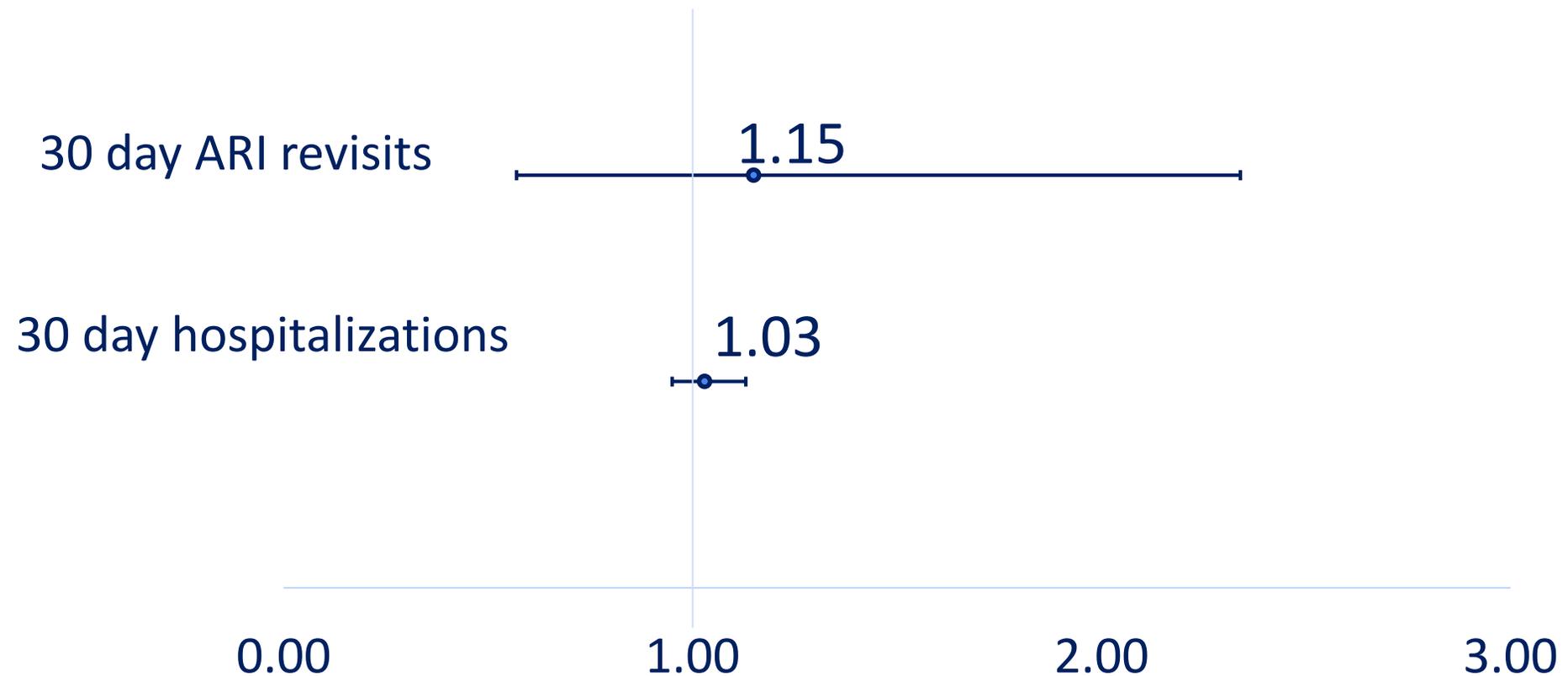
Interventions resulted in decreases in antibiotic prescription rates for all acute respiratory infections (ARIs).

Prevalence rate ratio for antibiotic prescribing for ARI post versus pre-intervention



Interventions were safe, as there were no differences in revisits for acute respiratory infections or hospitalizations within 30 days.

Risk ratio and 95% confidence intervals for ARI visits post- compared to pre-intervention



CMS tasked the QIN-QIOs to implement CDC's Core Elements of Outpatient Antibiotic Stewardship.

Total Recruited Facilities	7,629
Physician practices	5,948
Hospital Emergency Departments	748
Standalone Emergency Room/Urgent Care	470
Others	463

CMS data as of January 2018

https://qioprogram.org/sites/default/files/editors/141/C310_Field_Guide_20180730_FNL.pdf



CDC Training on Antibiotic Stewardship fulfils Improvement Activities Patient Safety and Practice Assessment (PSPA_23 and PSPA_24) under CMS's Merit-Based Incentive Payment Program (MIPS).



https://www.train.org/cdctrain/training_plan/3697

CDC's 6|18 Initiative targeting six common and costly health conditions with 18 proven interventions and includes improving antibiotic use.

CDC'S 6|18 INITIATIVE

Accelerating
Evidence
into Action

SIX WAYS TO SPEND SMARTER FOR HEALTHIER PEOPLE



REDUCE
TOBACCO USE



CONTROL
BLOOD PRESSURE



IMPROVE
ANTIBIOTIC USE



CONTROL ASTHMA



PREVENT UNINTENDED
PREGNANCY



PREVENT TYPE 2
DIABETES

Aetna has sent ~2600 letters to clinicians informing them that they prescribed antibiotics over 50% of time for adults with acute bronchitis.

FierceHealthcare

HOSPITALS & HEALTH SYSTEMS TECH PAYER FINANCE PRACTICES REGULATORY

Payer

'Superprescribers' on notice: Aetna, CDC team up to tackle antibiotic overuse

by Leslie Small | Jul 10, 2017 8:34am



Harold L. Paz, M.D., M.S.
Executive Vice President
Chief Medical Officer
151 Farmington Ave, RC5A
Hartford, CT 06156

aetna®

Dear Dr. X,

Help Us Prevent Antibiotic Resistance

Antibiotic resistance is among the greatest threats to our health today. As you know, inappropriate prescribing of antibiotics threatens the usefulness of these agents, which may result in more prolonged and severe infections, potential need to use more toxic and less effective alternate-line therapies and the emergence of "superbugs." In the United States, an estimated 2 million people become infected with antibiotic-resistant bacteria and at least 23,000 people die annually as a direct result of these infections.¹ At least 30% of outpatient antibiotic prescriptions in the United States are believed to be unnecessary.²

In order to combat this growing threat, Aetna is collaborating with Centers for Disease Control and Prevention (CDC) to focus on the topic of improving antibiotic prescribing among our clinical community. One element is to share best practices for prescribing antibiotics and to help doctors understand how their antibiotic prescribing habits compare to those of their peers. As part of this effort, we are identifying and alerting prescribers who our data indicates are outliers in their antibiotic prescribing patterns. Based on Aetna's analysis of our claims and pharmacy data over the past year, you have been identified as prescribing antibiotics at least 50% of the time for acute uncomplicated bronchitis for at least 5 Aetna members. This analysis was based upon the HEDIS (Healthcare Effectiveness Data and Information Set) quality measure of avoidance of antibiotic treatment in adults with acute uncomplicated bronchitis. As per CDC's Office of Antibiotic Stewardship "Antibiotics are not indicated to treat acute bronchitis. Using antibiotics when not needed could do more harm than good."³

We know this information will provide useful perspective as you evaluate your approach to antibiotic prescribing. This is not a punitive action, nor will Aetna share your name or prescribing patterns with any outside entity. Additional information is available at: <https://www.cdc.gov/getsmart/>.

Email us at AntibioticStewardship@aetna.com if you have any questions. We welcome the opportunity to collaborate with you in combating antibiotic resistance.

Sincerely,

Harold L. Paz, M.D., M.S.
Executive Vice President,
Chief Medical Officer

¹ CDC. Antibiotic resistance threats in the United States, 2013 [Internet]. Atlanta, GA: US Department of Health and Human Services, CDC; 2013. <http://www.cdc.gov/drugresistance/threat-report-2013/index.html>

² Fleming-Dutra KE, Hersh AL, Shapiro DJ, et al. Prevalence of inappropriate antibiotic prescriptions among U.S. ambulatory care visits, 2010-2011. JAMA 2016;315:1864-73.

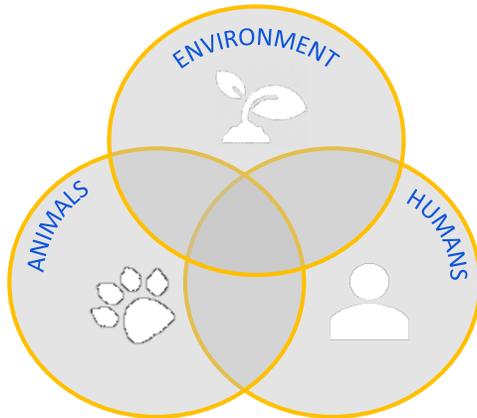
³ <https://www.cdc.gov/getsmart/community/for-patients/common-illnesses/bronchitis.html>

THE AMR CHALLENGE

Will you fight or fuel antimicrobial resistance?

Antimicrobial Resistance (AMR) is a **One Health** problem.

AMR is one of the greatest global health issues of our time, and is threatening our progress in healthcare, food security, and life expectancy.



The U.S. Government is leading a yearlong initiative to bolster global efforts across sectors and around the world to step up, partner, and each play our part in the fight against AMR.

COMMIT TO ACTION
DELIVER RESULTS
COMBAT AMR

How will you lead?

Across five commitment areas, commit to action and results that combat antimicrobial resistance.

Tracking and Data

Share data and improve data collection

Infection Prevention and Control

Reduce the spread of resistant germs

Antibiotic Use

Improve appropriate antibiotic use, including ensuring access

Environment and Sanitation

Decrease antibiotics and resistance in the environment

Vaccines, Diagnostics, Therapeutics

Invest in development and improved access

THE #GLOBALAMRCHALLENGE
SEPT. 2018-SEPT. 2019

THE AMR CHALLENGE

Will you fight or fuel antimicrobial resistance?

The Los Angeles County Department of Public Health (LACDPH) will continue to prevent, detect, and respond to antibiotic-resistant infections in healthcare settings, using surveillance data to identify threats requiring response. LACDPH will promote the appropriate use of antibiotics among the public and human and veterinary healthcare providers, and will train healthcare staff across the continuum of care in appropriate antibiotic use and stewardship.

Conclusions

- Antibiotic stewardship is one of the most important strategies to combat antibiotic resistance and keep our patients safe.
- Antibiotic stewardship must include all settings of healthcare, including the outpatient setting.
- We need to improve outpatient prescribing in the United States.
 - 30% of outpatient antibiotic prescriptions in the United States are unnecessary.
 - We also need improvement in antibiotic selection, dosing and duration.
- *Core Elements of Outpatient Antibiotic Stewardship* provides a framework for improving outpatient antibiotic prescribing.

“The Right Tool” Public Service Announcement



AN ANTIBIOTIC IS THE WRONG TOOL TO TREAT A VIRUS.

Make sure you use the right tool for the job.

Antibiotics save lives by treating certain infections caused by bacteria, not viruses like colds or flu. When they're not needed, antibiotics won't help you, and the side effects could still hurt you. Ask your doctor when an antibiotic is the right tool for your illness and when it's not.

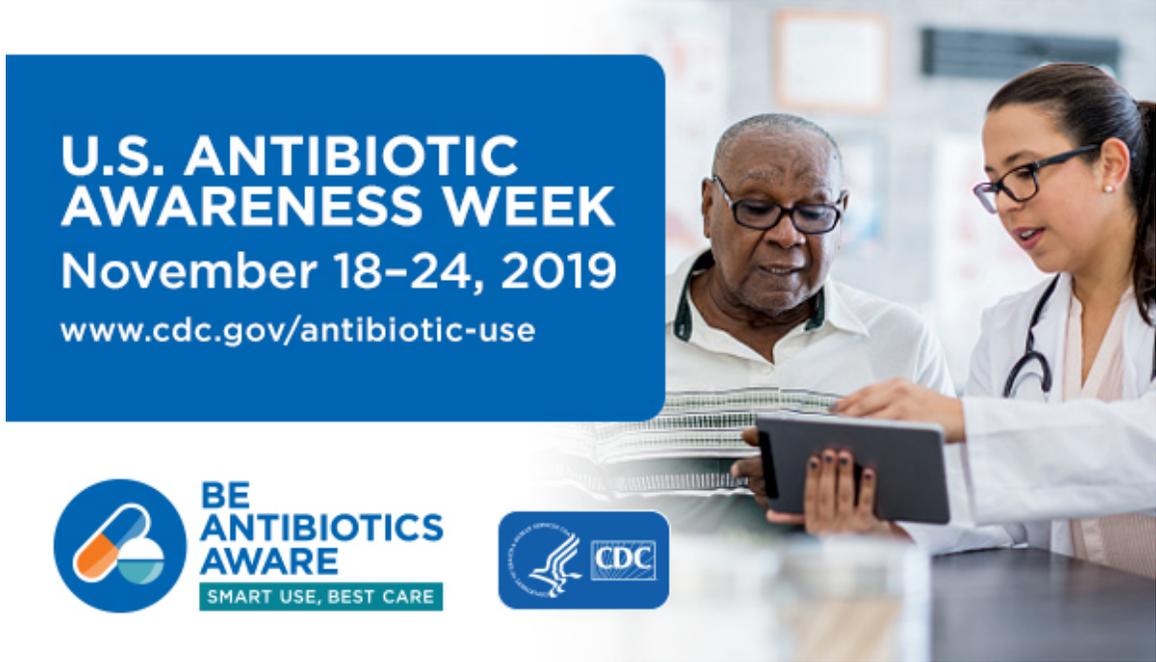
To learn more about antibiotic prescribing and use, visit www.cdc.gov/antibiotic-use.

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

CDC



<https://www.youtube.com/watch?v=dETK7Jc-XWA>



For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

AntibioticUse@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.

