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

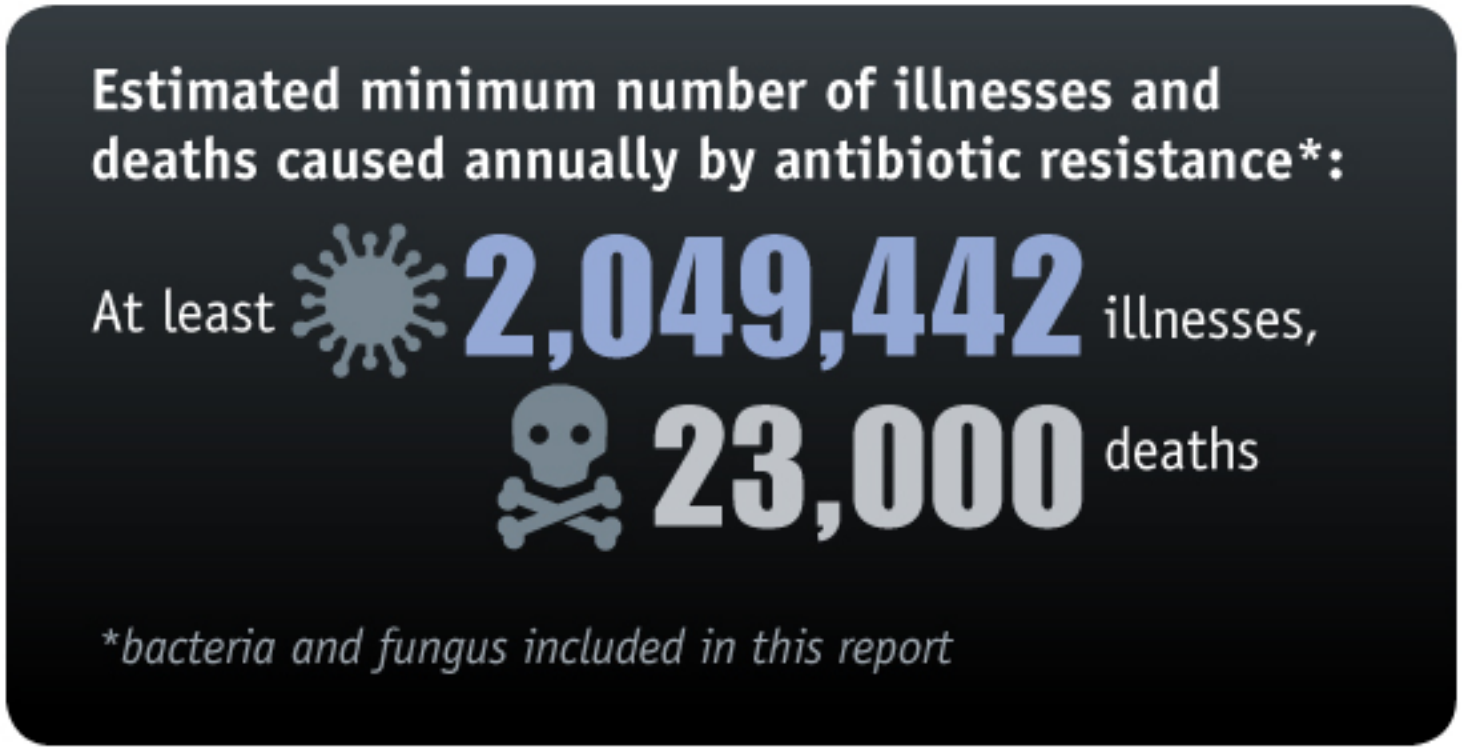
BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

Antibiotics are life-saving medicines that underpin modern medicine.

80 YEARS

+ MILLIONS OF LIVES

Antibiotic resistance is a pressing global public health threat.



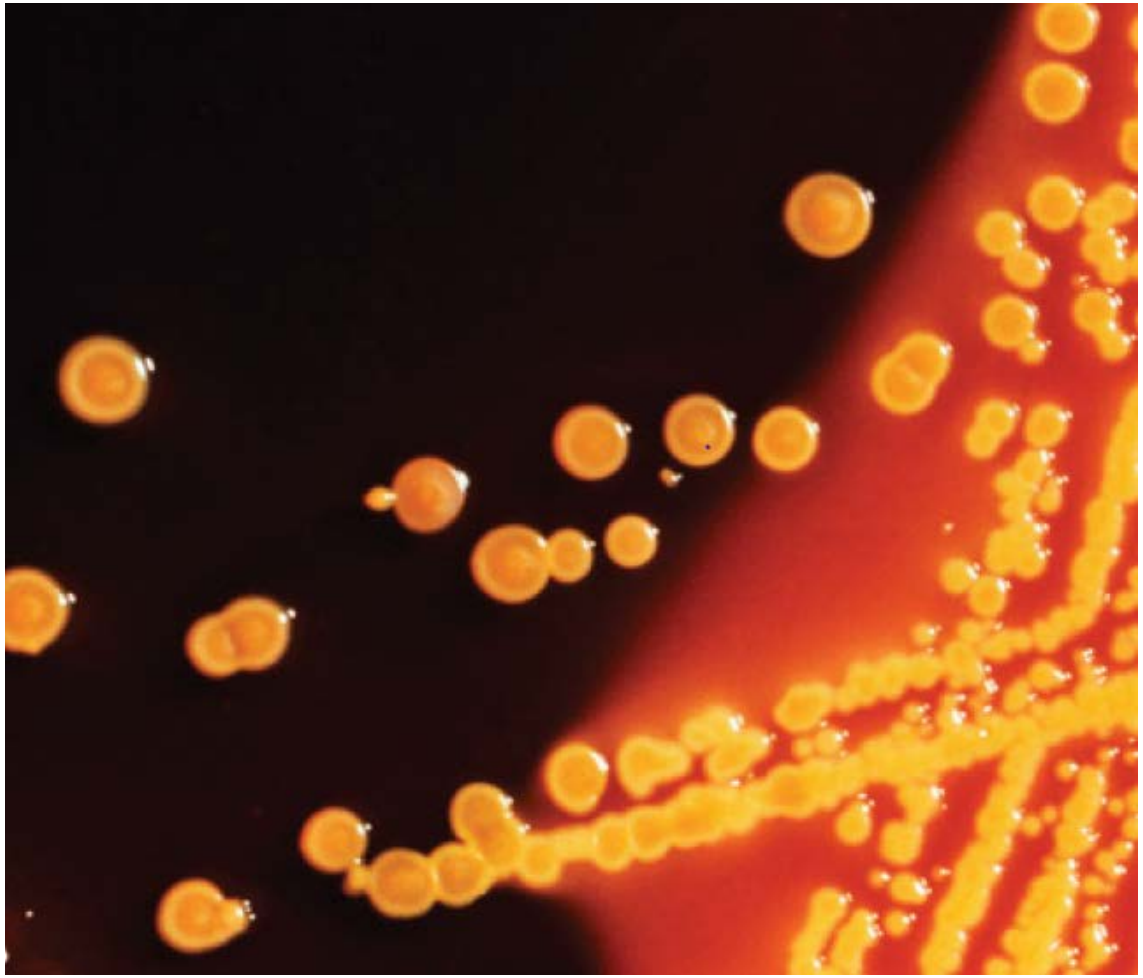
Annual excess direct healthcare cost: $20 billion
Additional annual cost of lost productivity: >$35 billion

www.cdc.gov/drugresistance/threat-report-2013/

Antibiotic resistance is a problem here in LA County.

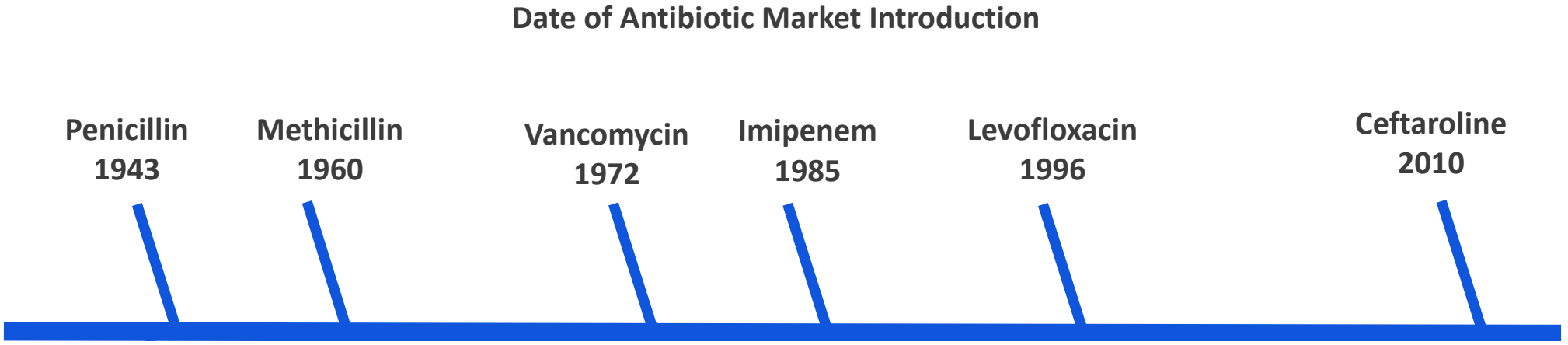
- Since 2017, LA County has received reports of over 50 confirmed novel organisms highly resistant to antimicrobials.

- LA County sees high rates of carbapenem-resistant Enterobactericeae, especially in long-term acute care settings
  - Community-onset rates of 2.5 per 100 admissions



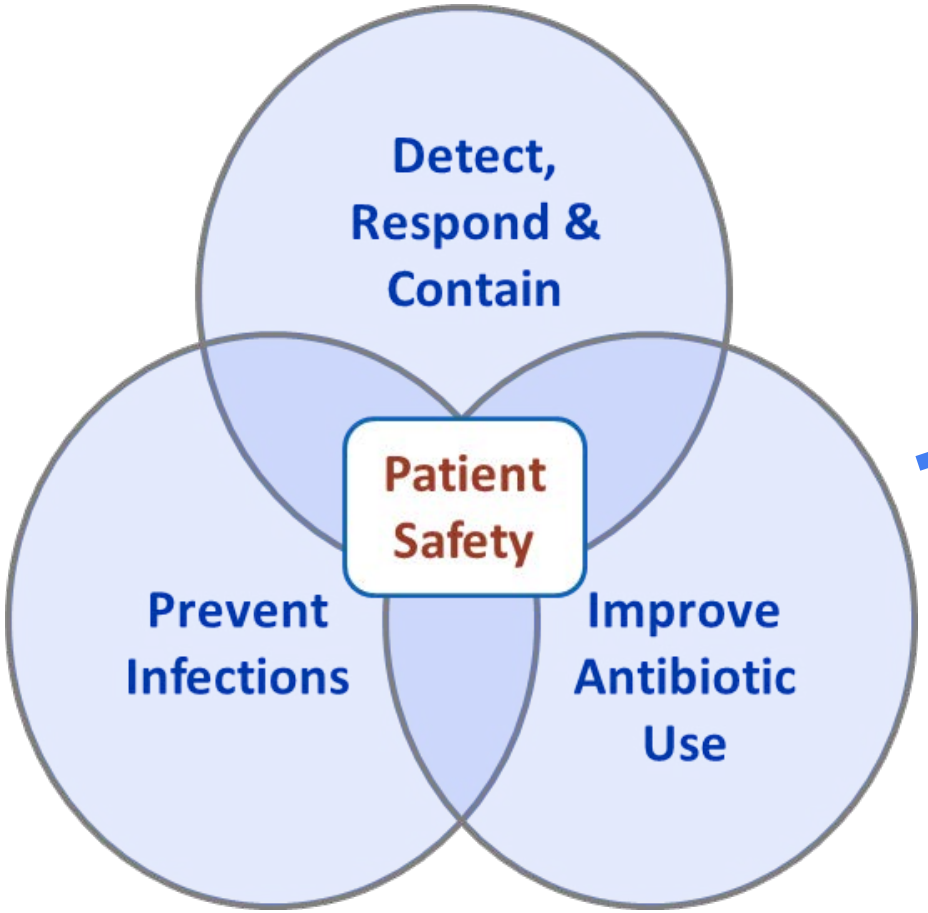
LACDPH data

Antibiotic use is a major driver of antibiotic resistance.



www.cdc.gov/drugresistance/about.html

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.

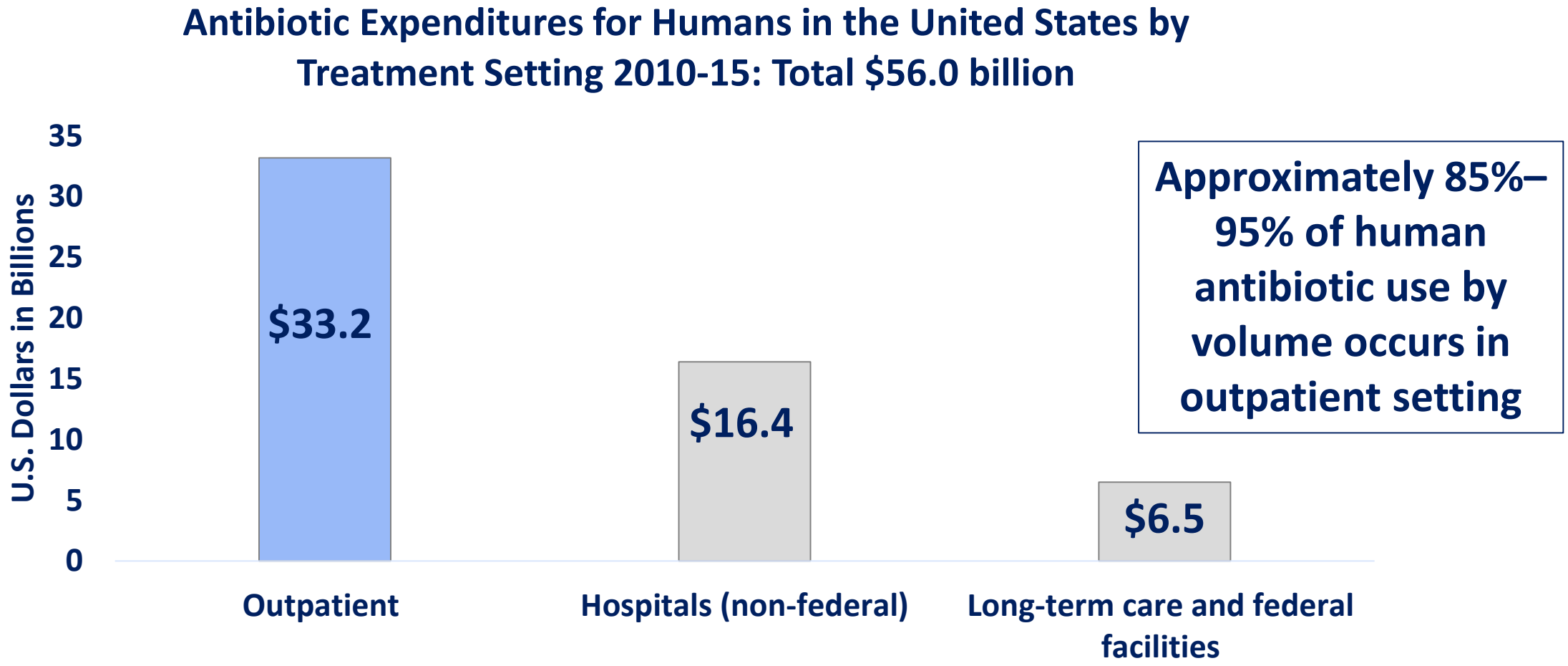


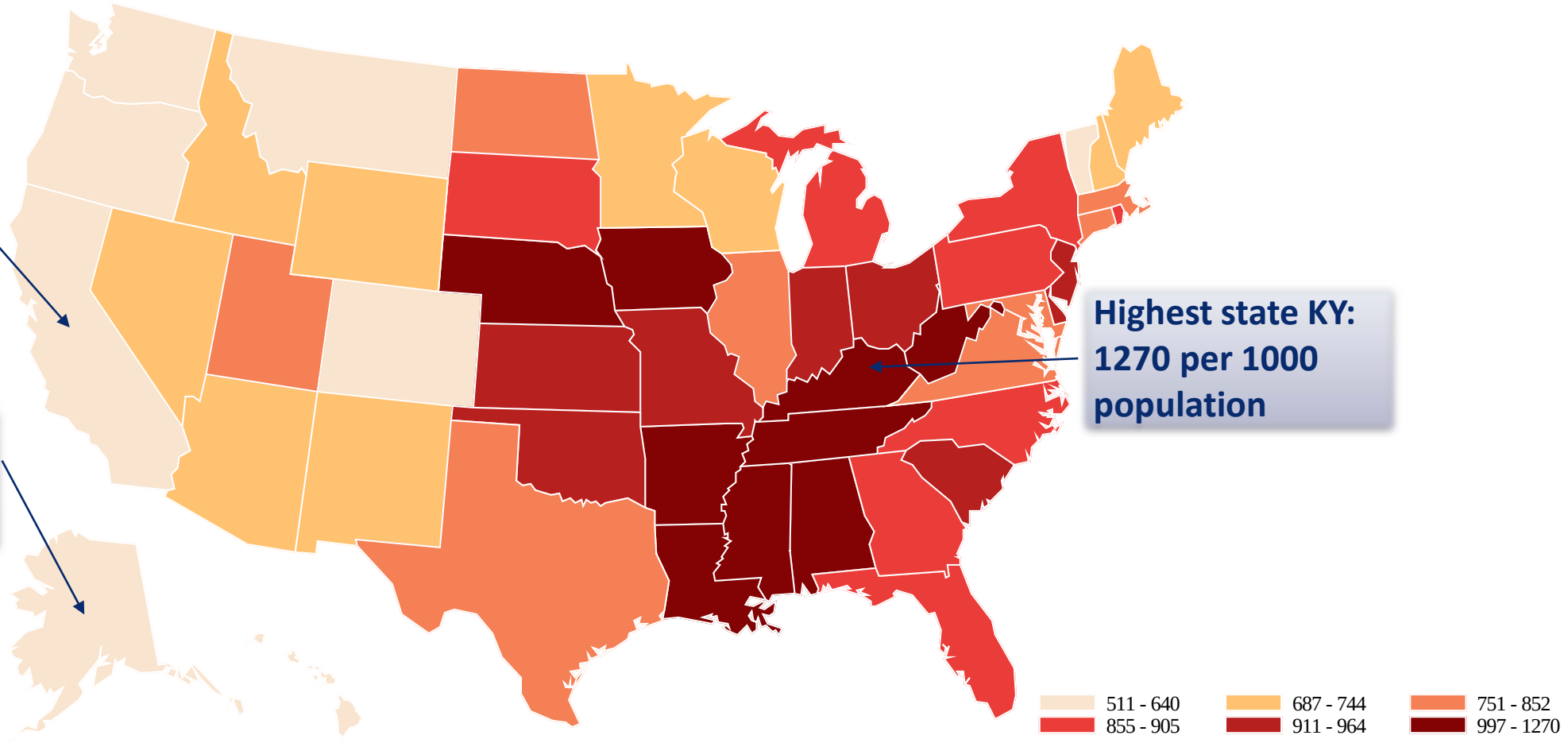
Figure created from data from: Suda et al. *Clin Infect Dis*. 2017; cix773.
Duffy et al. *J Clin Pharm Ther*. 2018; 43(1): 59-64.

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

CA: 567 per 1000 population
3rd lowest state

Lowest state AK: 511 per 1000 population

Highest state KY: 1270 per 1000 population



Outpatient antibiotic prescriptions dispensed per 1000 population, IQVIA 2016

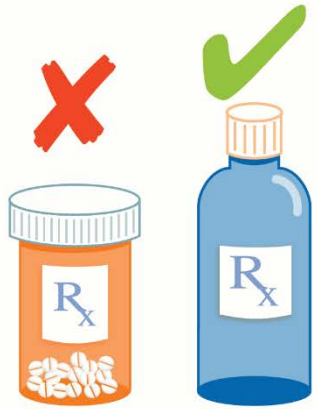
Part D claims data indicates LA County members were prescribed 981,492 antibiotic prescriptions in 2015 (about 0.1 per member per month).

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

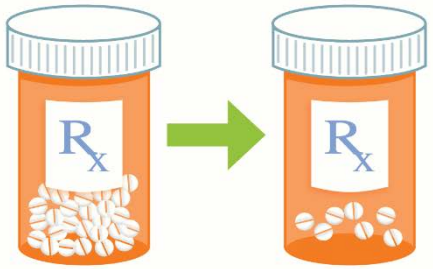
LACDPH data

Inappropriate antibiotic use includes all of these.

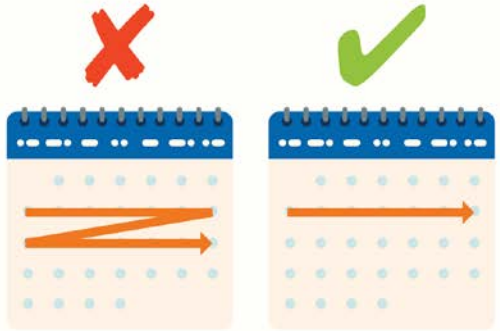
Unnecessary antibiotic use



Improper antibiotic selection



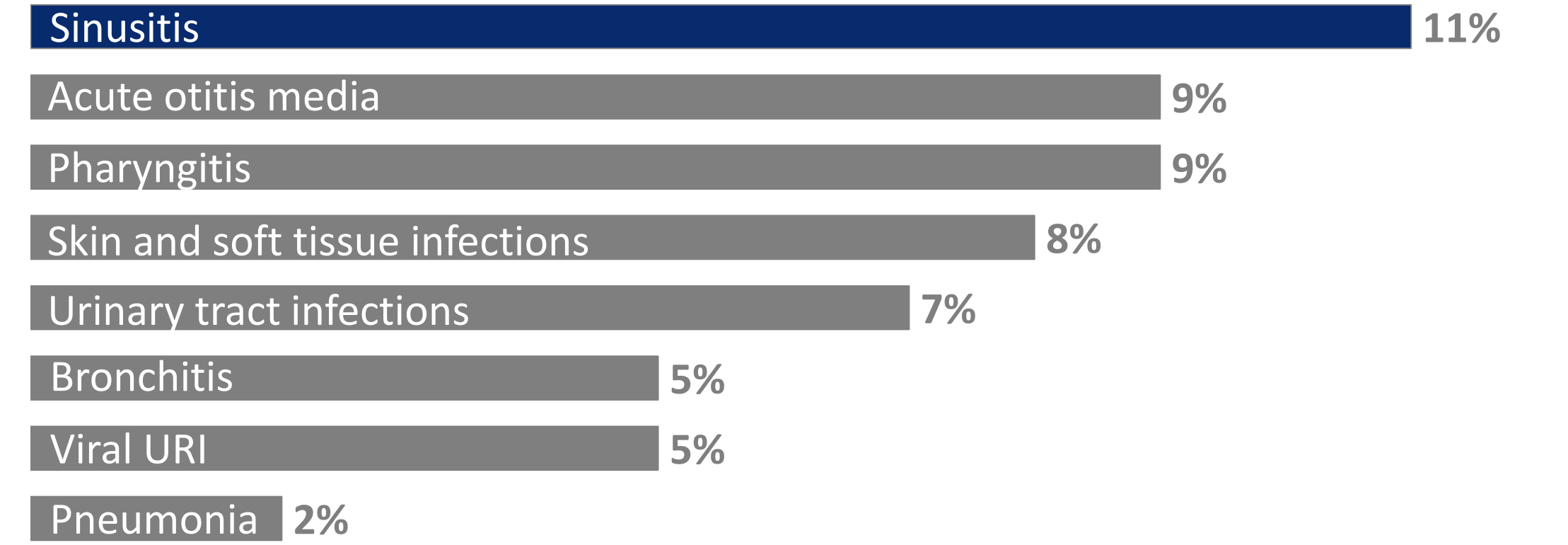
Errors in antibiotic dosing



Errors in antibiotic duration

Reducing unnecessary antibiotic use is critical.

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

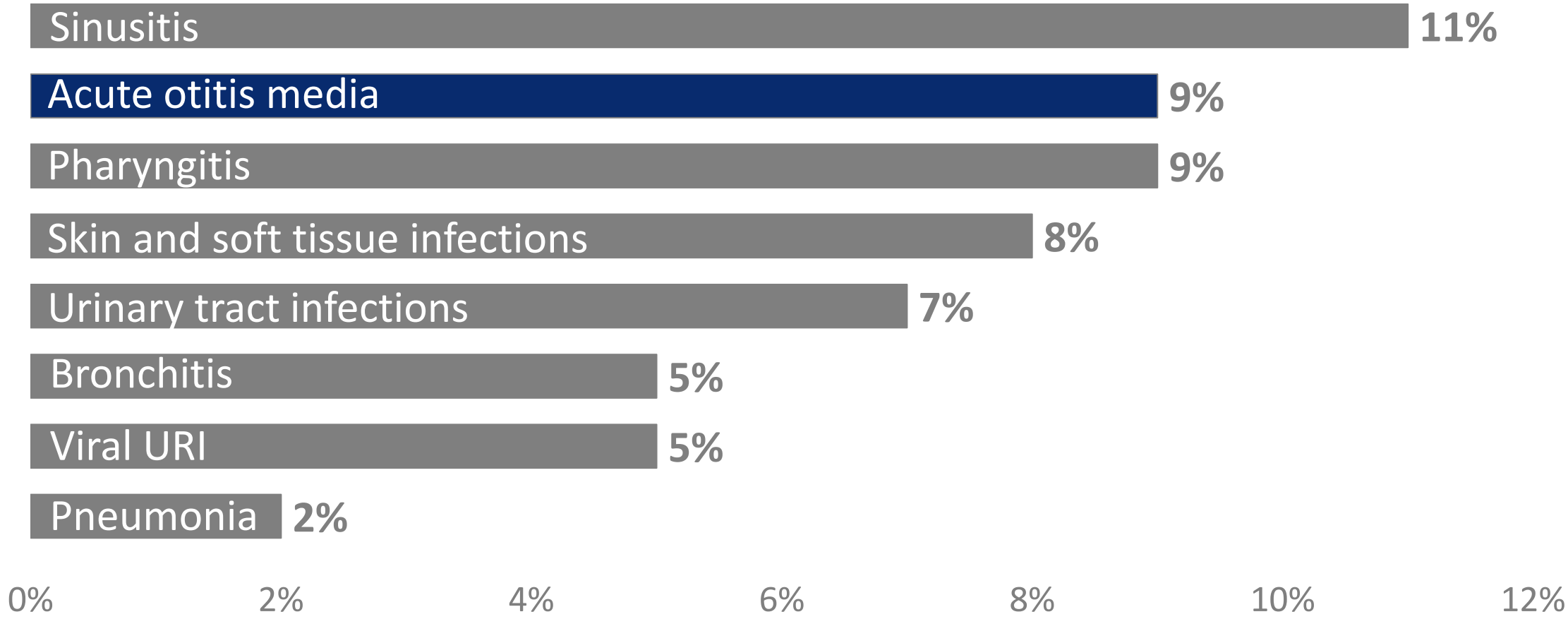


Top diagnoses leading to antibiotic prescriptions in U.S. doctors' offices and emergency departments, 2010-11

URI=upper respiratory infection

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

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



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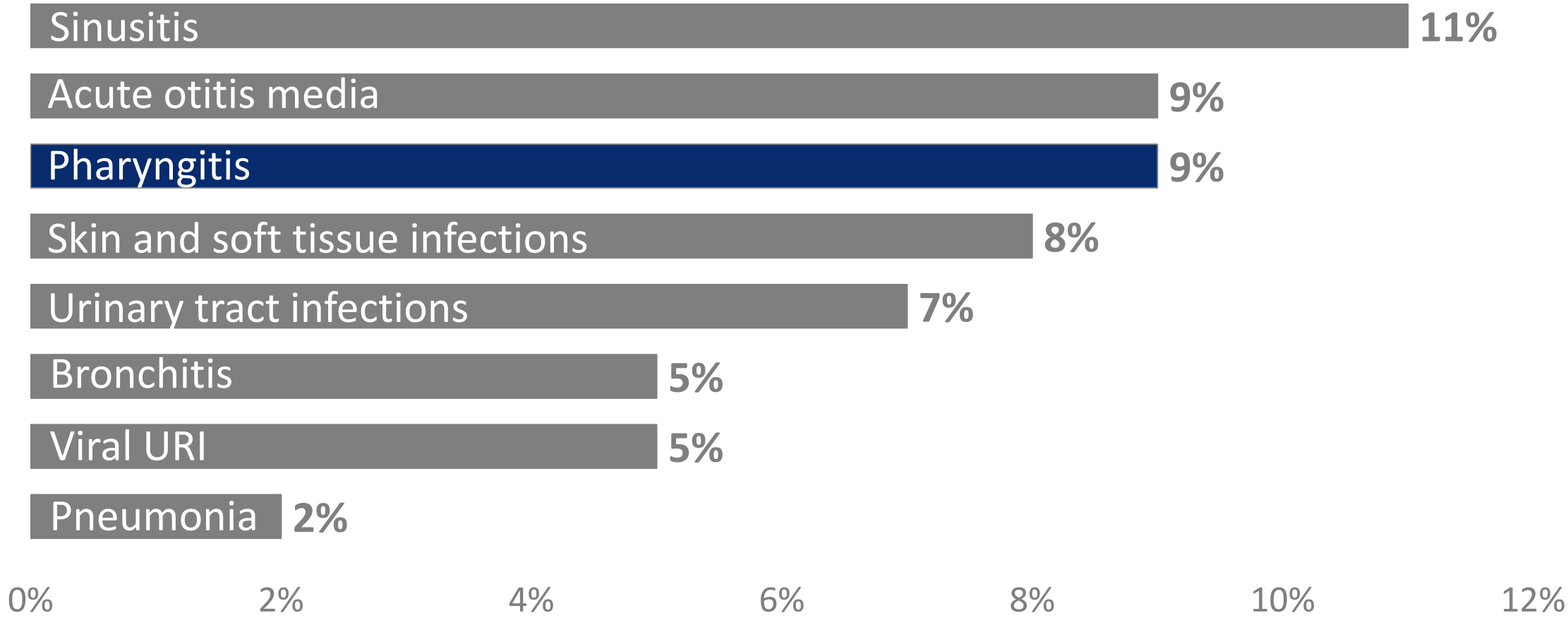

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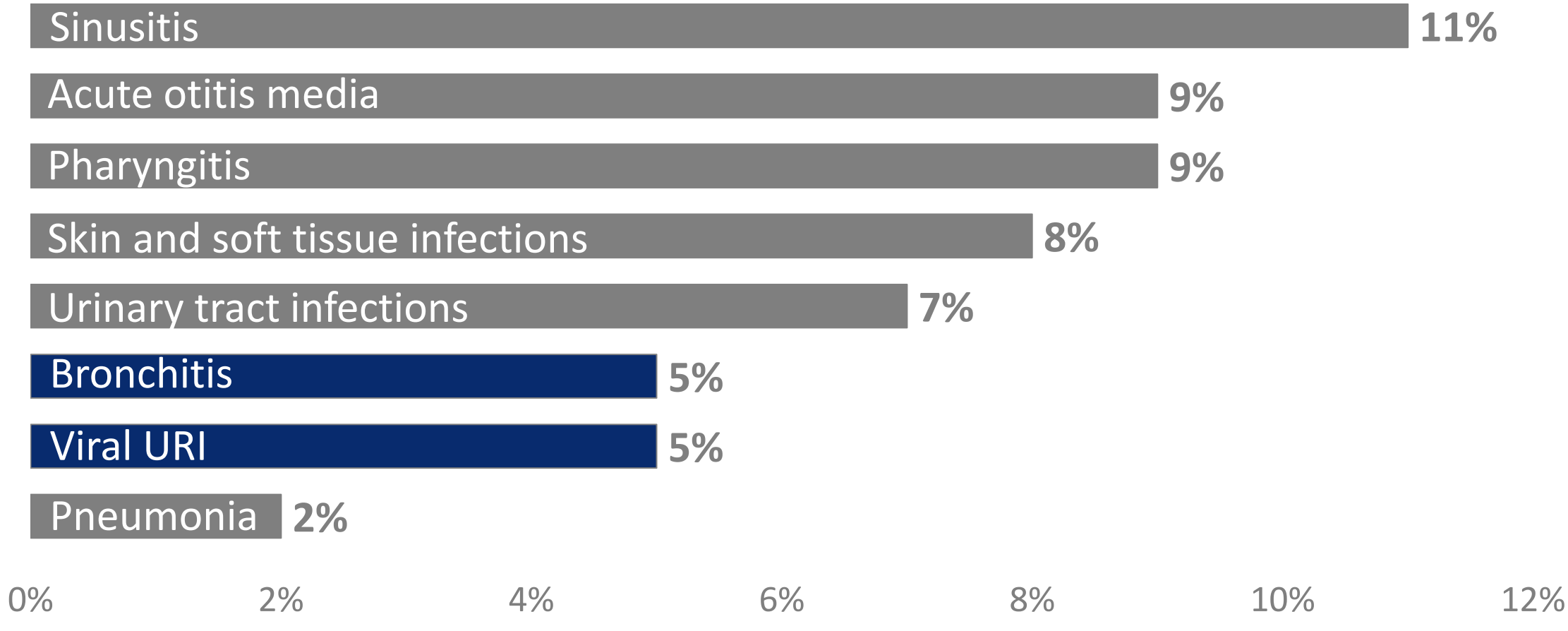

Top diagnoses leading to antibiotic prescriptions in U.S. doctors' offices and emergency departments, 2010-11

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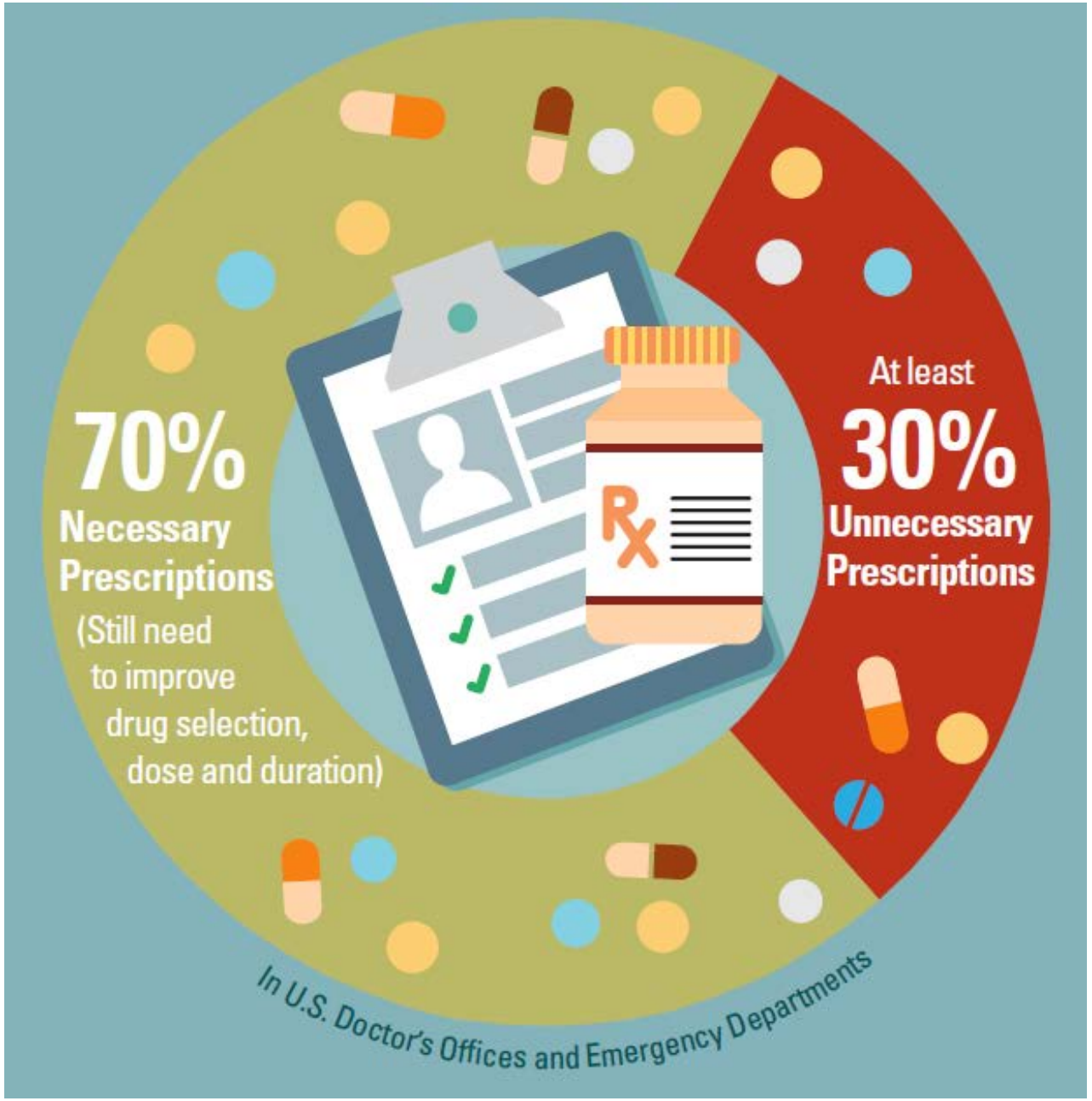
At least 30% of antibiotic prescriptions written in U.S. doctors offices and emergency departments are unnecessary.



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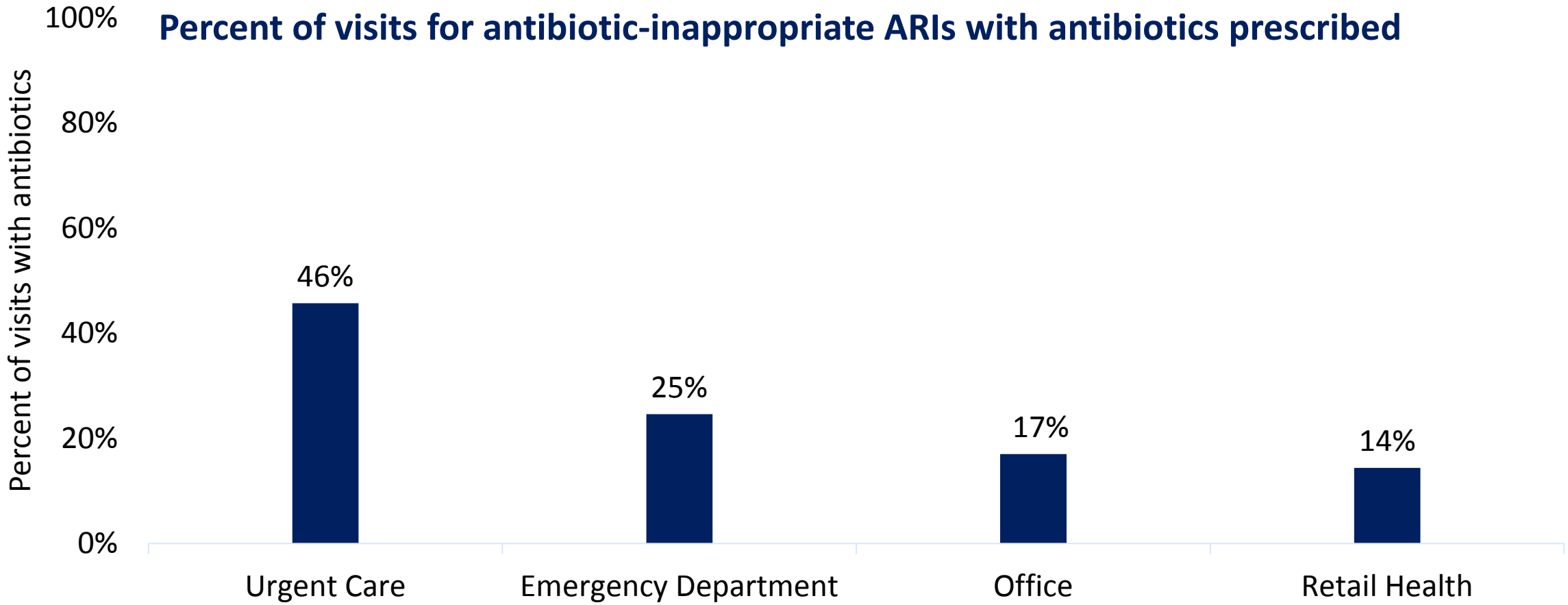
Antibiotic prescribing for antibiotic-inappropriate acute respiratory infections (ARIs) is common in outpatient settings, especially urgent care.



*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.

Linder. *Clin Infect Dis*. 2008 Sep 15;47(6):744-6 Shehab, et al. *Clin Infect Dis*. 2008 Sep 15;47(6):735-43. Shehab et al. *JAMA 2016*:316:2115-25. Bourgeois, et al. *Pediatrics.* 2009;124(4):e744-50.

Clostridioides difficile infection is a serious consequence of antibiotic use.

453,000 infections and **15,000** deaths in the US annually[1]

35% are community-associated[1]

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

LA County has high community-onset CDI rates[3]

0.3 per 100 admissions in GACH

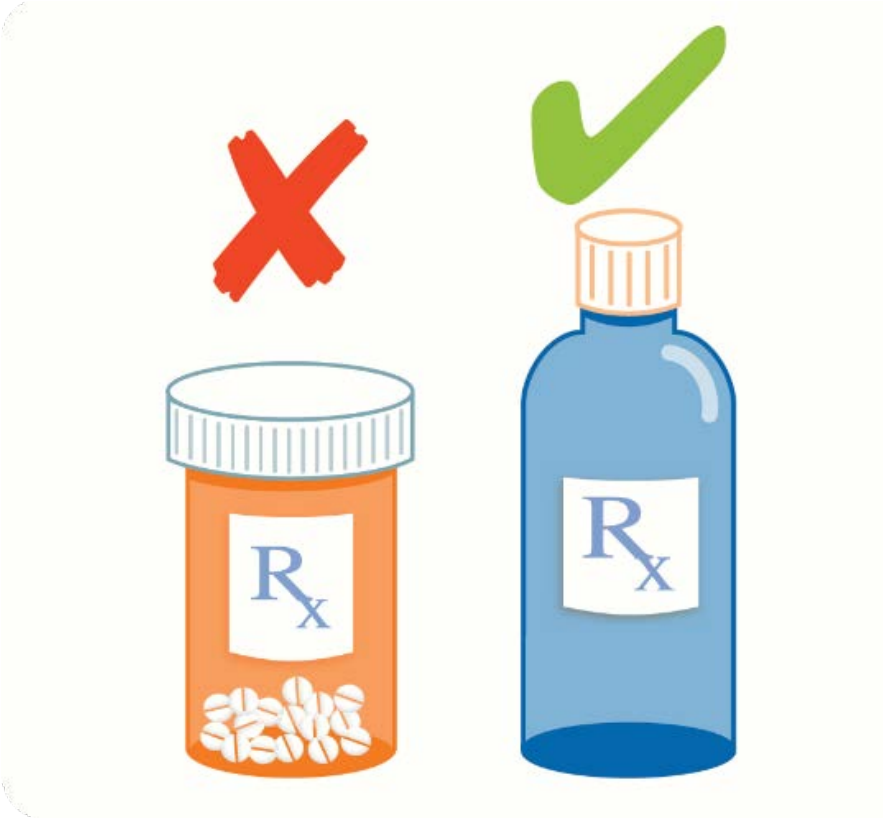
1.4 per 100 admissions in LTAC

1. Lessa NEJM 2015;372(9):825-34
2. 2. Zhang, S., et al. *BMC Infectious Diseases 2016;*16(1): 447.
3. LACDPH data

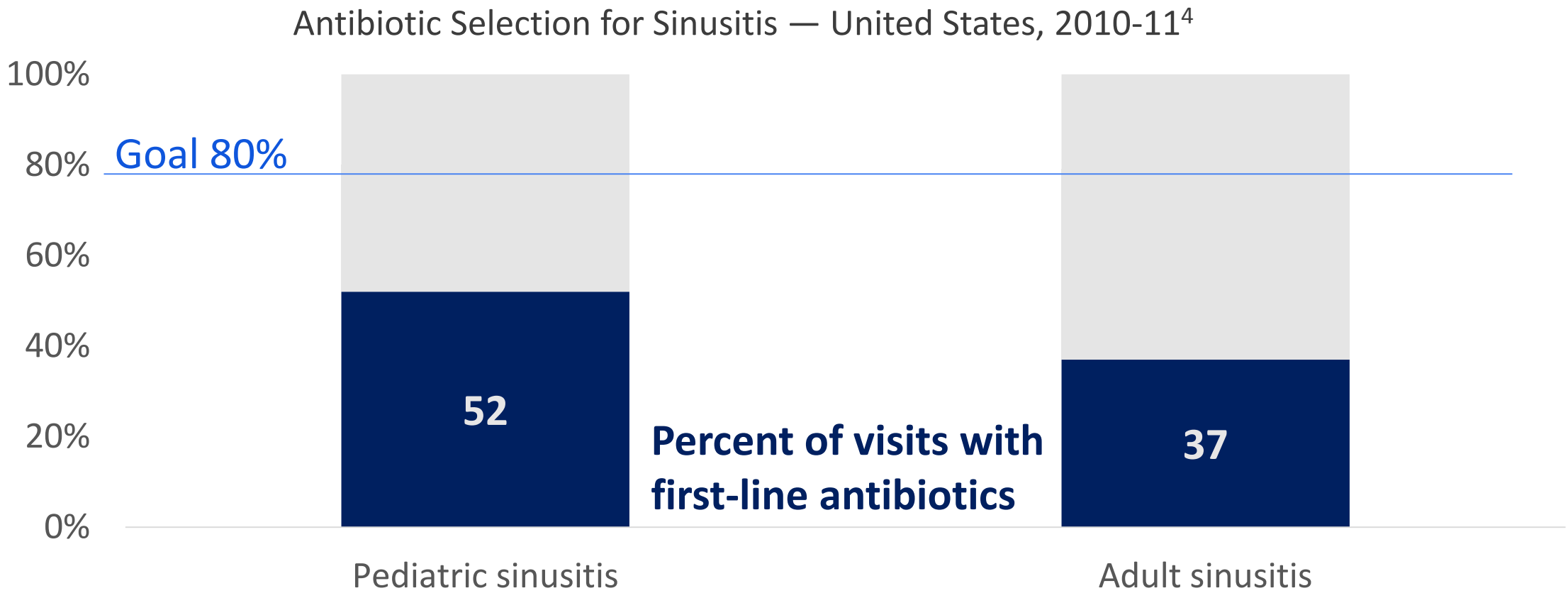
Antibiotic adverse events may have long-term consequences for chronic disease through disruption of the microbiome.

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

Antibiotic selection needs improvement.

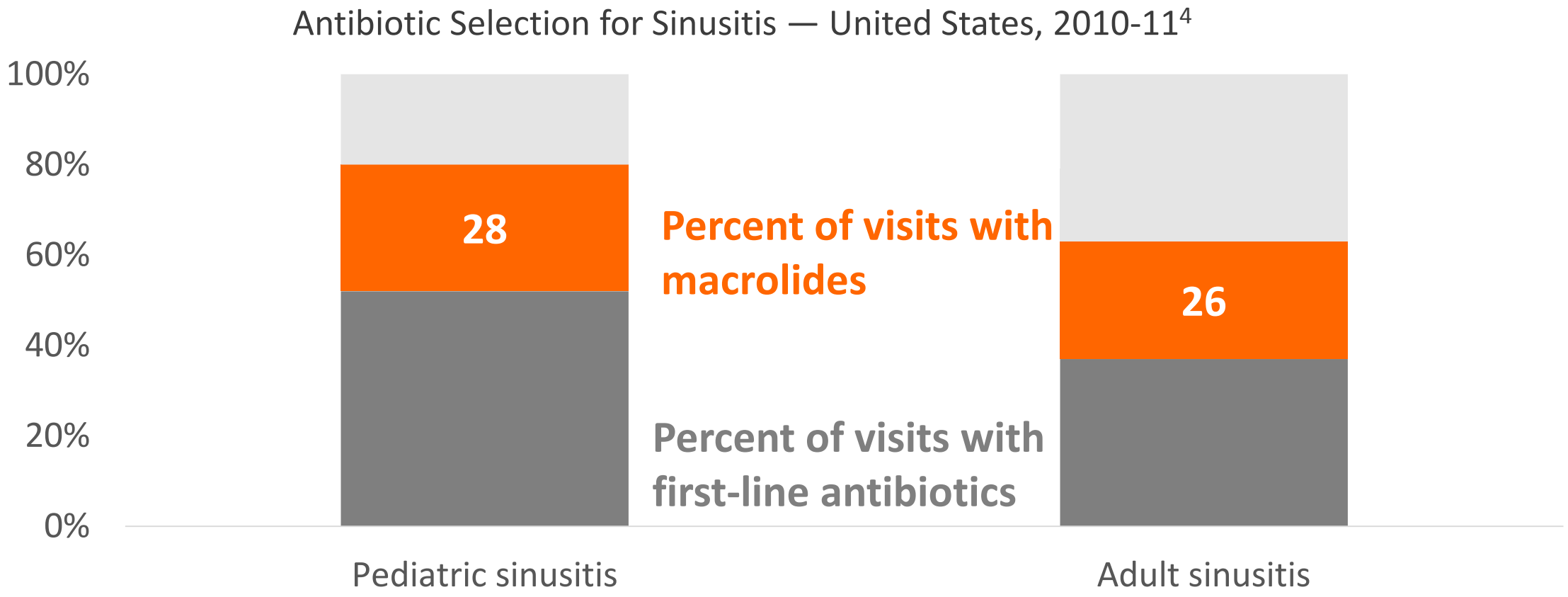


Patients with sinusitis who are prescribed antibiotics too often receive the wrong antibiotic.



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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3. Chow (2012) Clin Infect Dis. Apr;54(8):e72-e112.
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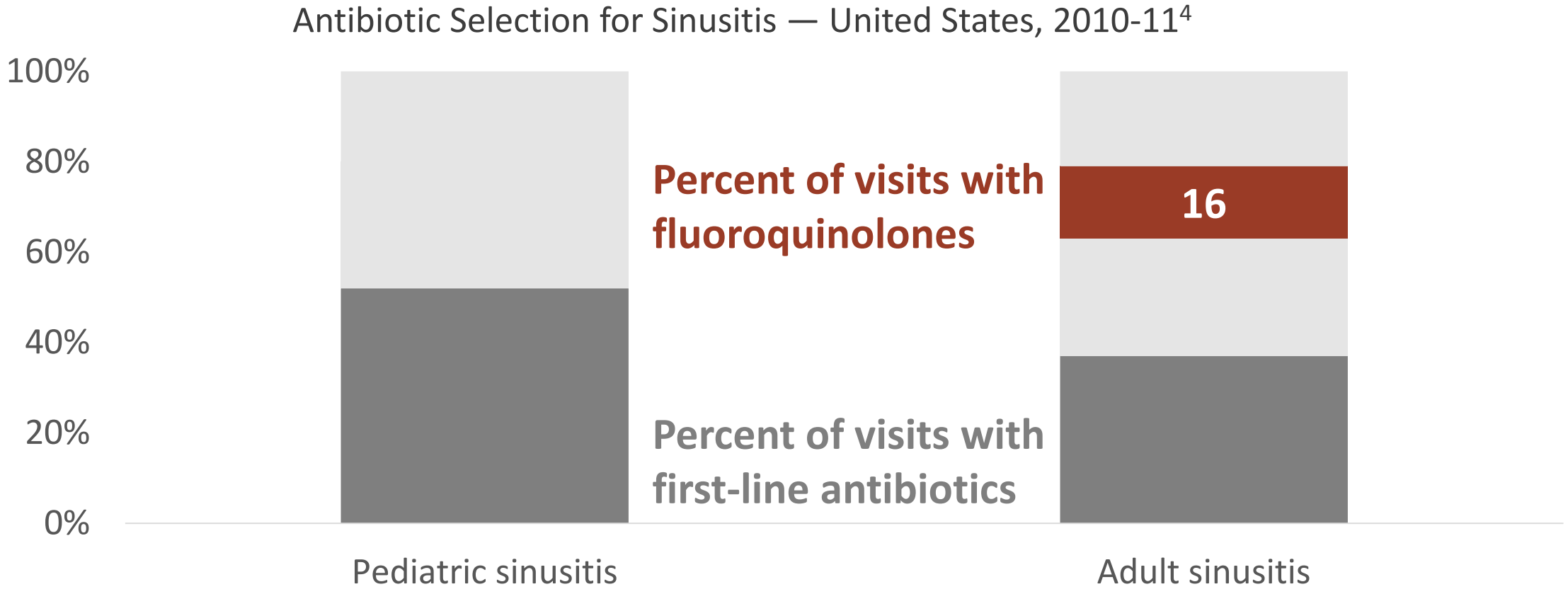
Fluoroquinolones are also prescribed to about 16% of adults with sinusitis, but are higher risk for adverse events.



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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.

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

U.S. Food and Drug Administration
Protecting and Promoting Your Health

Drug Safety Communications

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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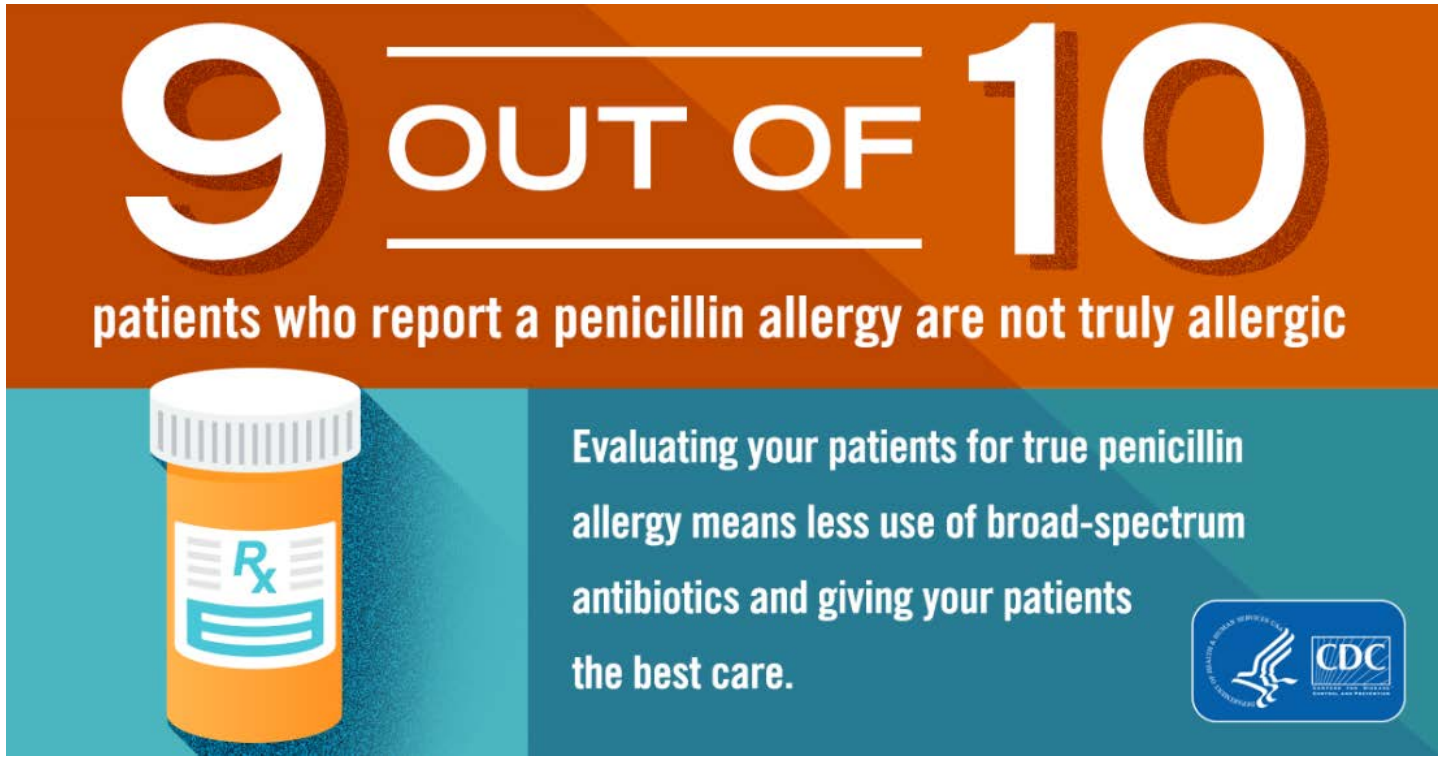
December 20, 2018

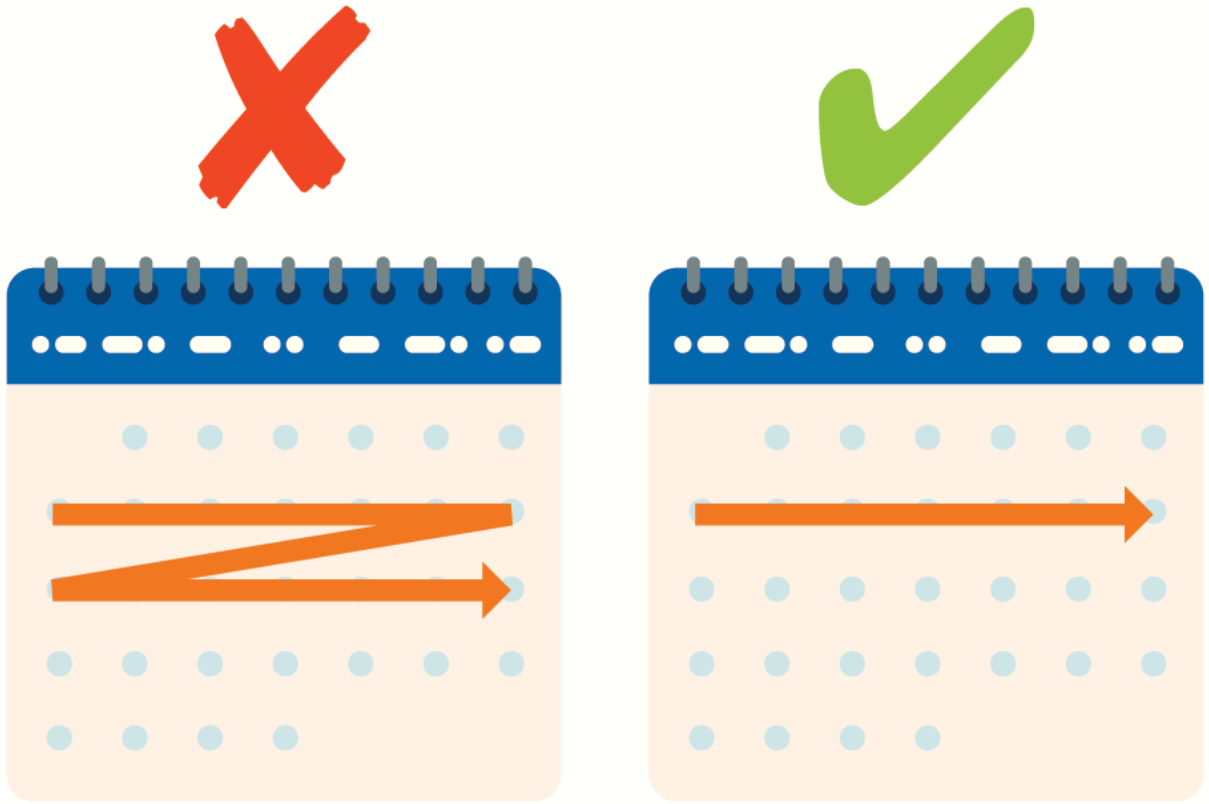
www.fda.gov/Drugs/DrugSafety/ucm500143.htm
https://www.fda.gov/NewsEvents/Newsroom/FDAInBrief/ucm628956.htm

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

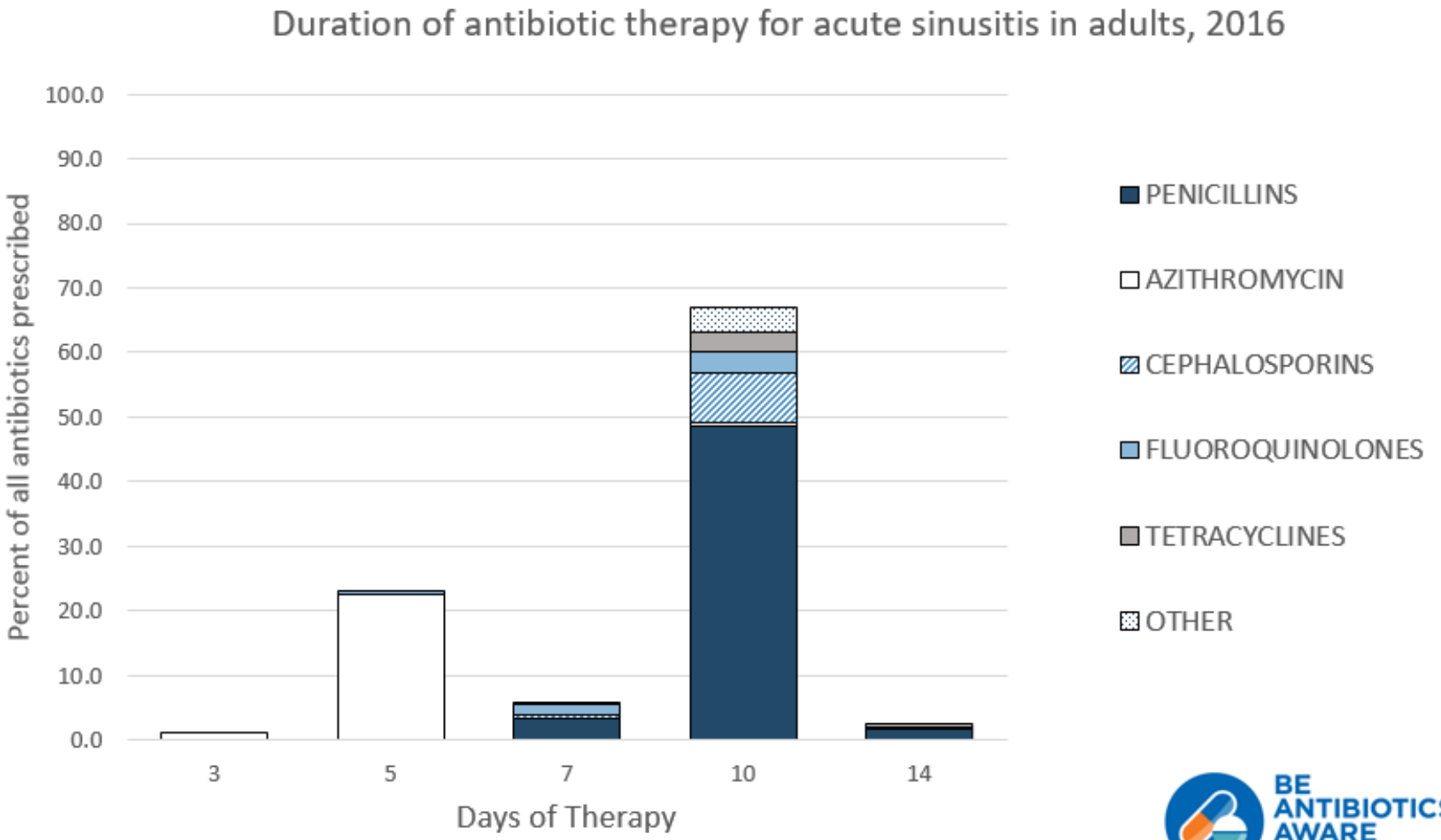


https://www.cdc.gov/antibiotic-use/community/pdfs/penicillin-factsheet.pdf

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.



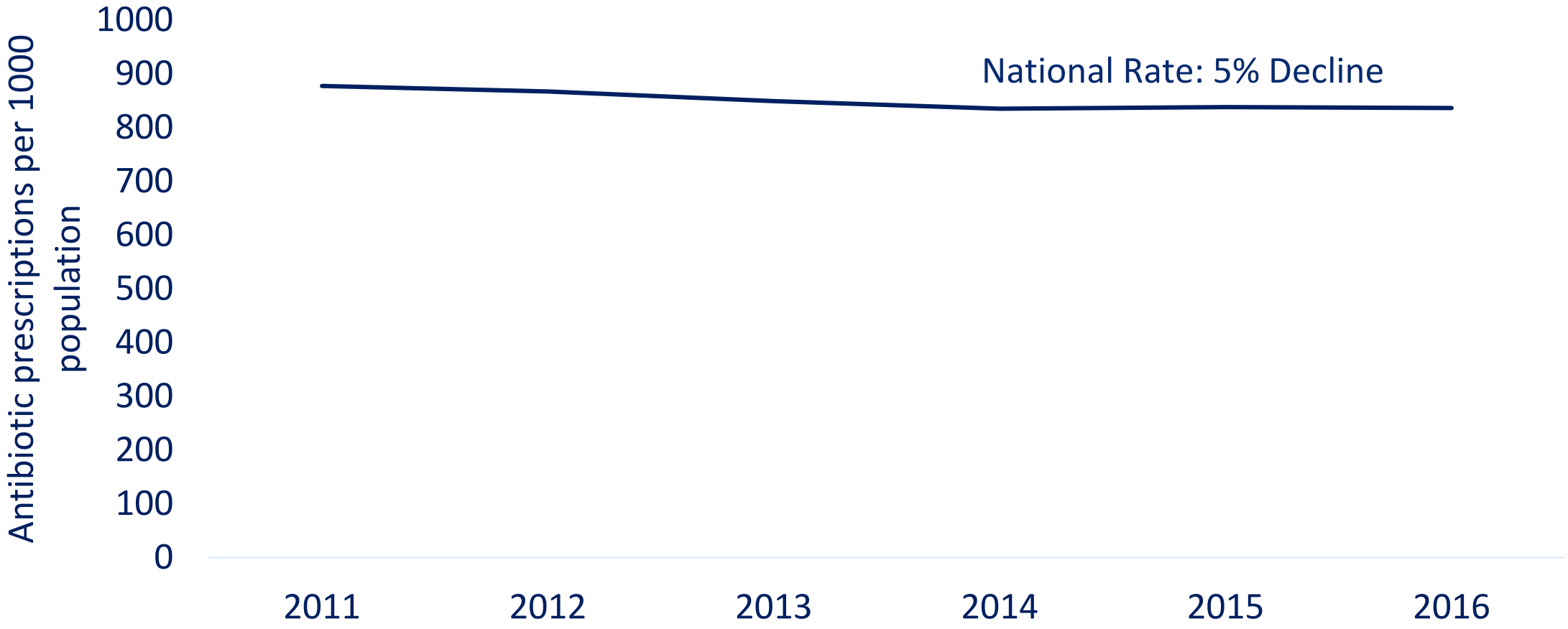
BE ANTIBIOTICS AWARE
SMART USE, BEST CARE
www.cdc.gov/antibiotic-use

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?

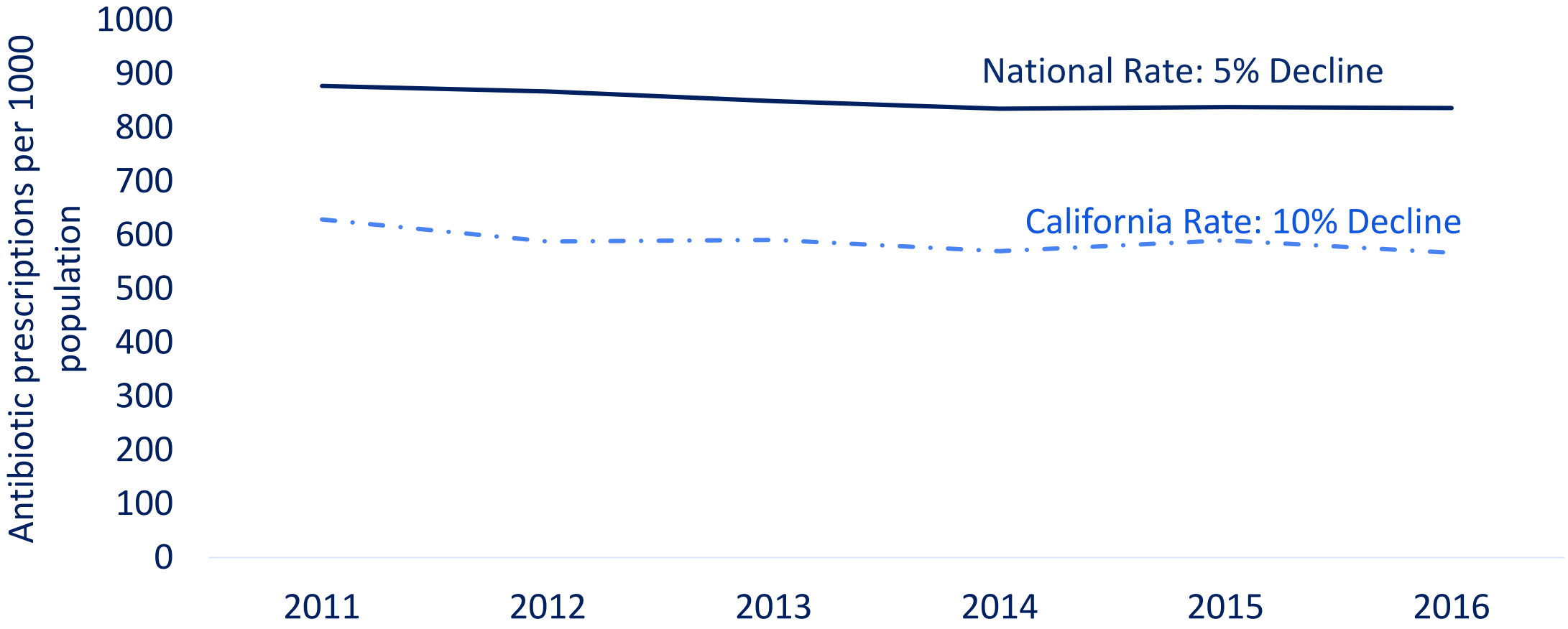
National outpatient antibiotic prescription rates decreased 5% from 2011-16.



IQVIA pharmacy dispensing data

gis.cdc.gov/grasp/PSA/indexAU.html

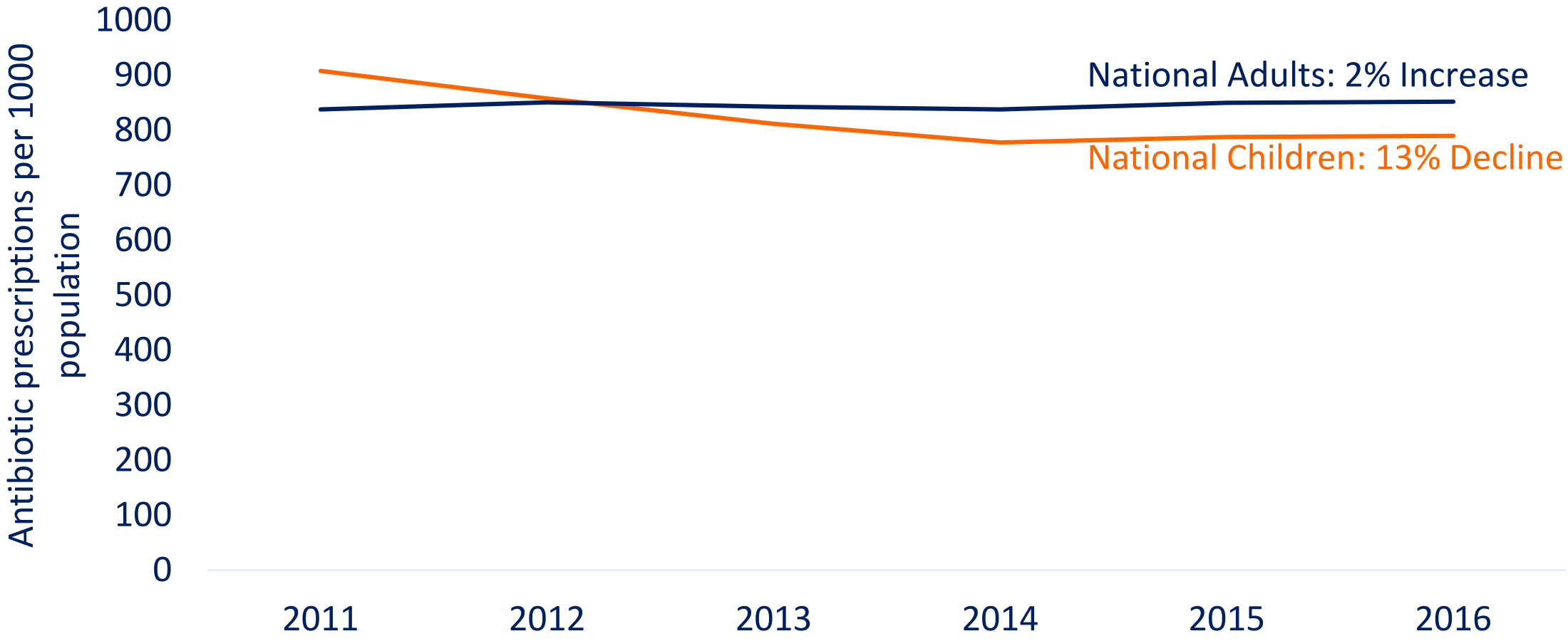
California outpatient antibiotic prescription rates decreased 10% from 2011-16.



IQVIA pharmacy dispensing data

gis.cdc.gov/grasp/PSA/indexAU.html

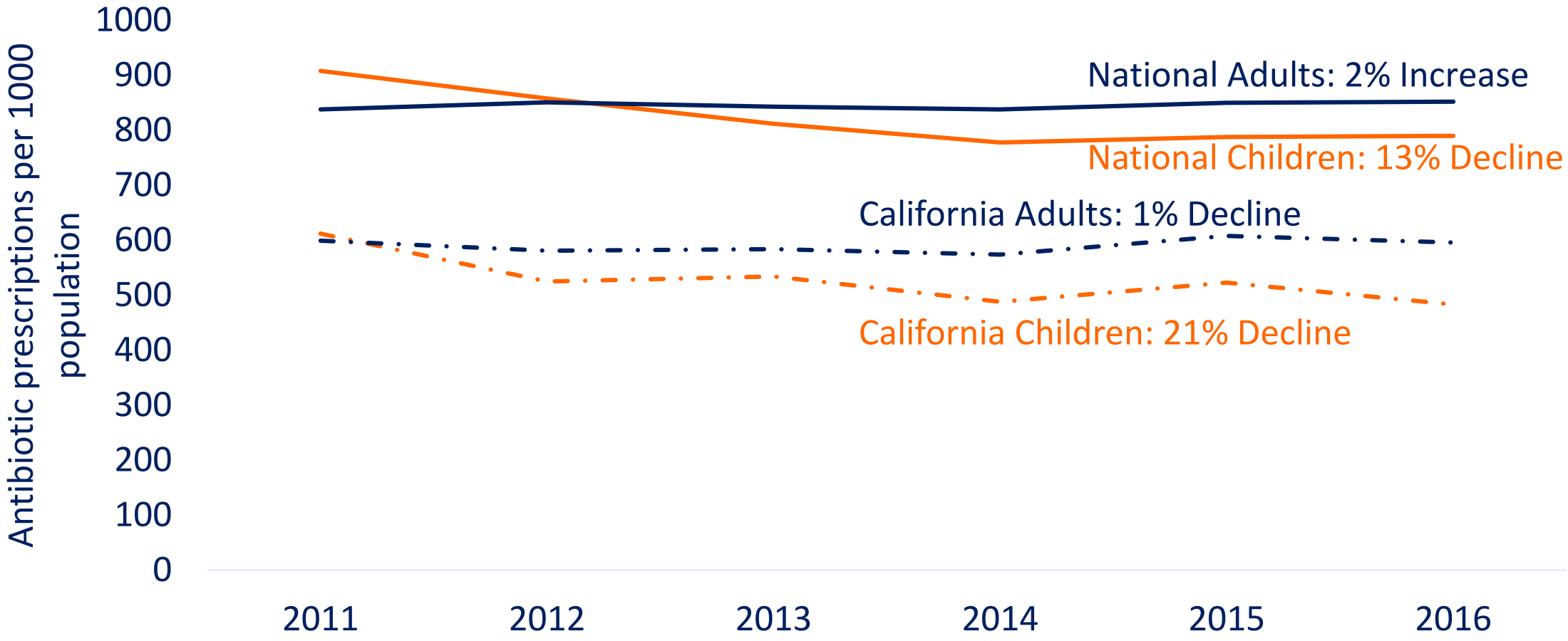
The reductions in antibiotic prescribing have been entirely driven by reductions in children.



IQVIA pharmacy dispensing data

gis.cdc.gov/grasp/PSA/indexAU.html

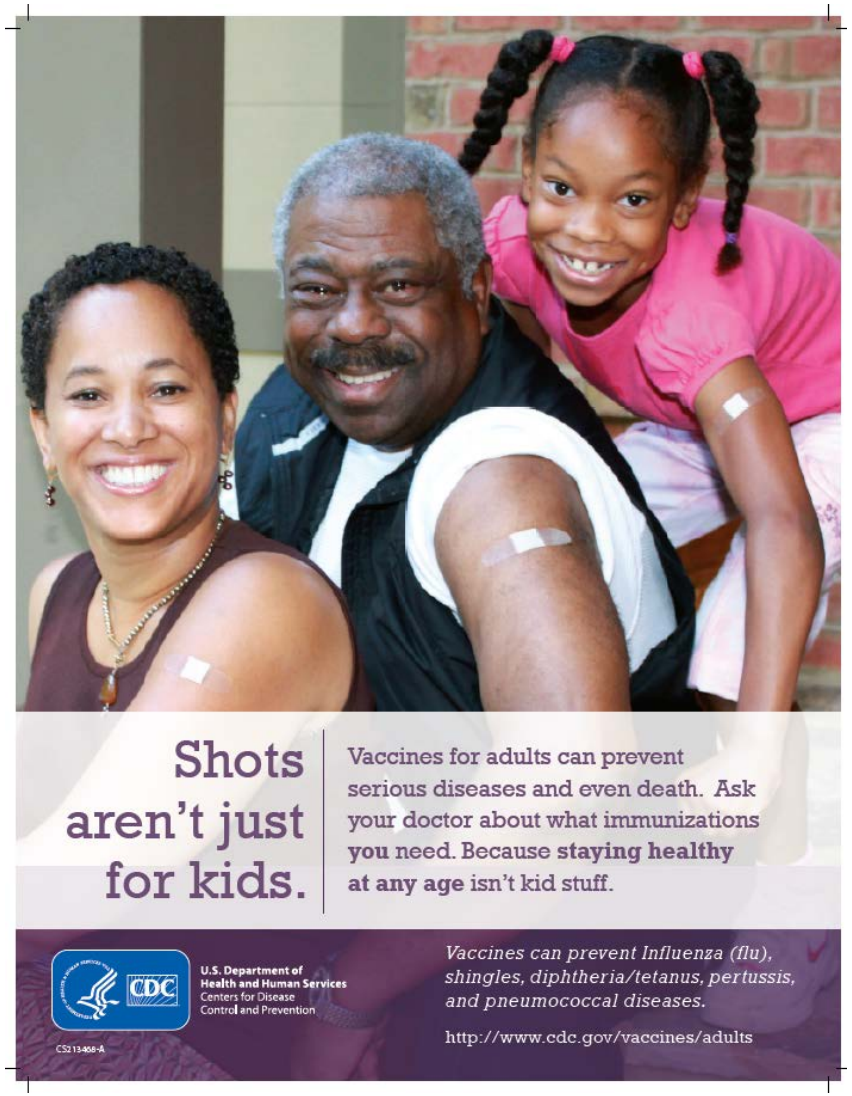
California outpatient antibiotic prescribing rates to children decreased 21% but rates for adults only decreased by 1%.



IQVIA pharmacy dispensing data

gis.cdc.gov/grasp/PSA/indexAU.html

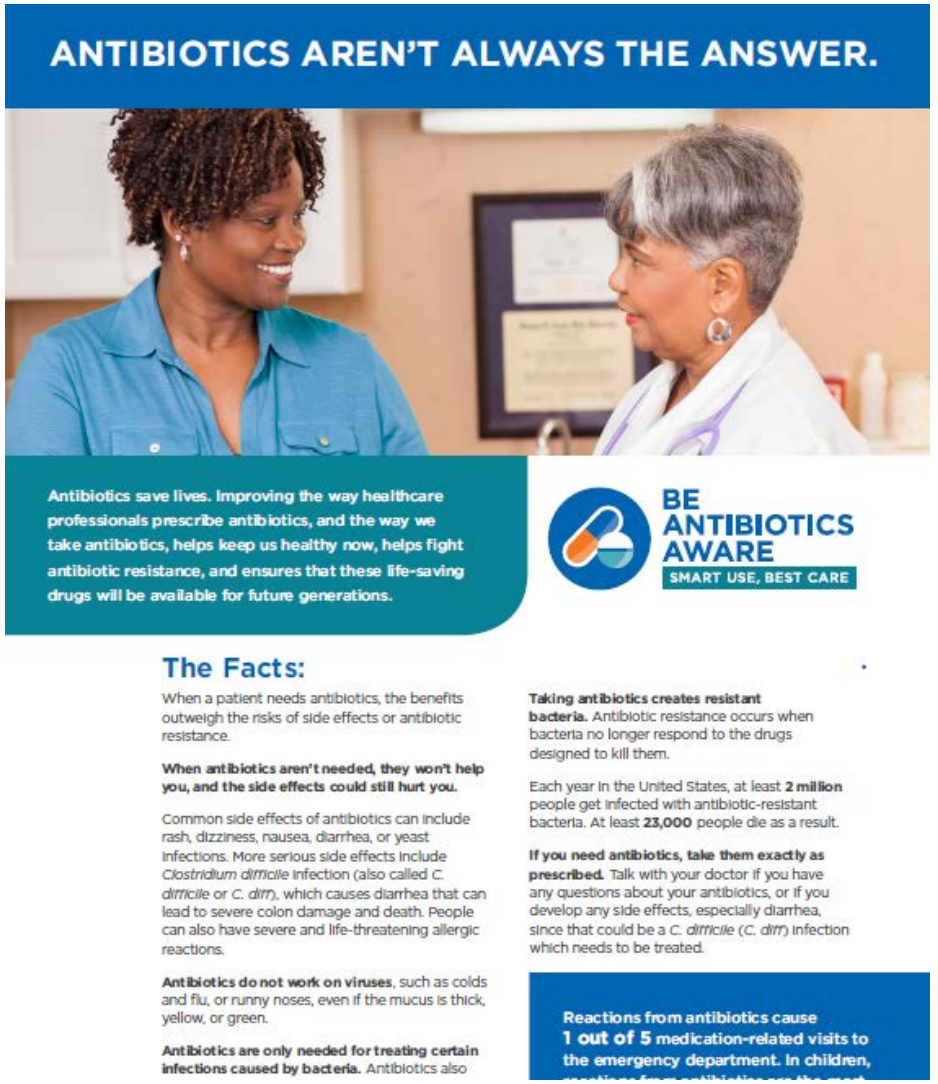
Lesson learned: Vaccines are key antibiotic stewardship tools.



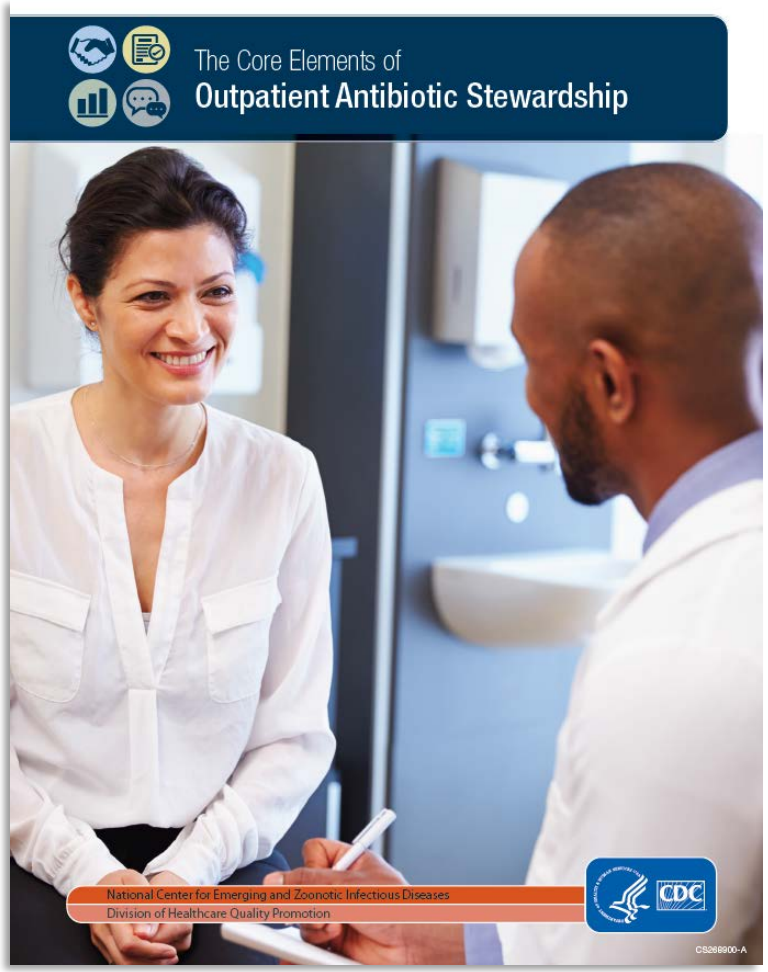
Nuorti P. & Whitney C. *MMWR Rec Rep* 2010; 59(RR-11): 1–18

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.



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.

Sanchez GV, Fleming-Dutra KE, Roberts RM, Hicks LA. Core Elements of Outpatient Antibiotic Stewardship. MMWR Recomm Rep 2016;65(No. RR-6):1-12. https://www.cdc.gov/mmwr/volumes/65/rr/rr6506a1.htm?s_cid=rr6506a1_e

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.

Madaras-Kelly et al. IDWeek 2018

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?

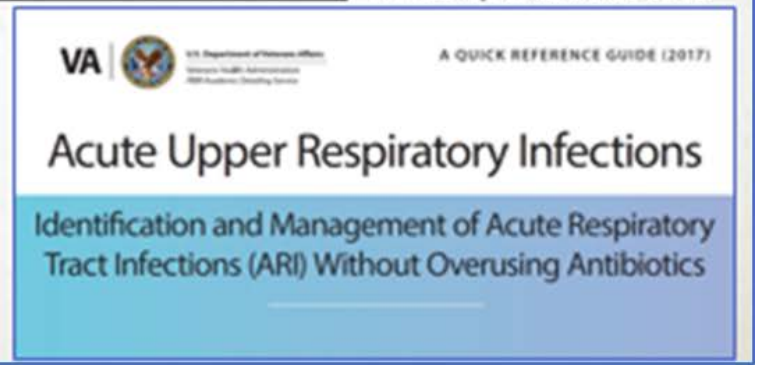
- Clinic champions engaged providers in detailing visits for ~ 20 minute either in small groups or one on one. During these sessions providers received personalized reports and latest evidence concerning the current best practices for ARI encounters.

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

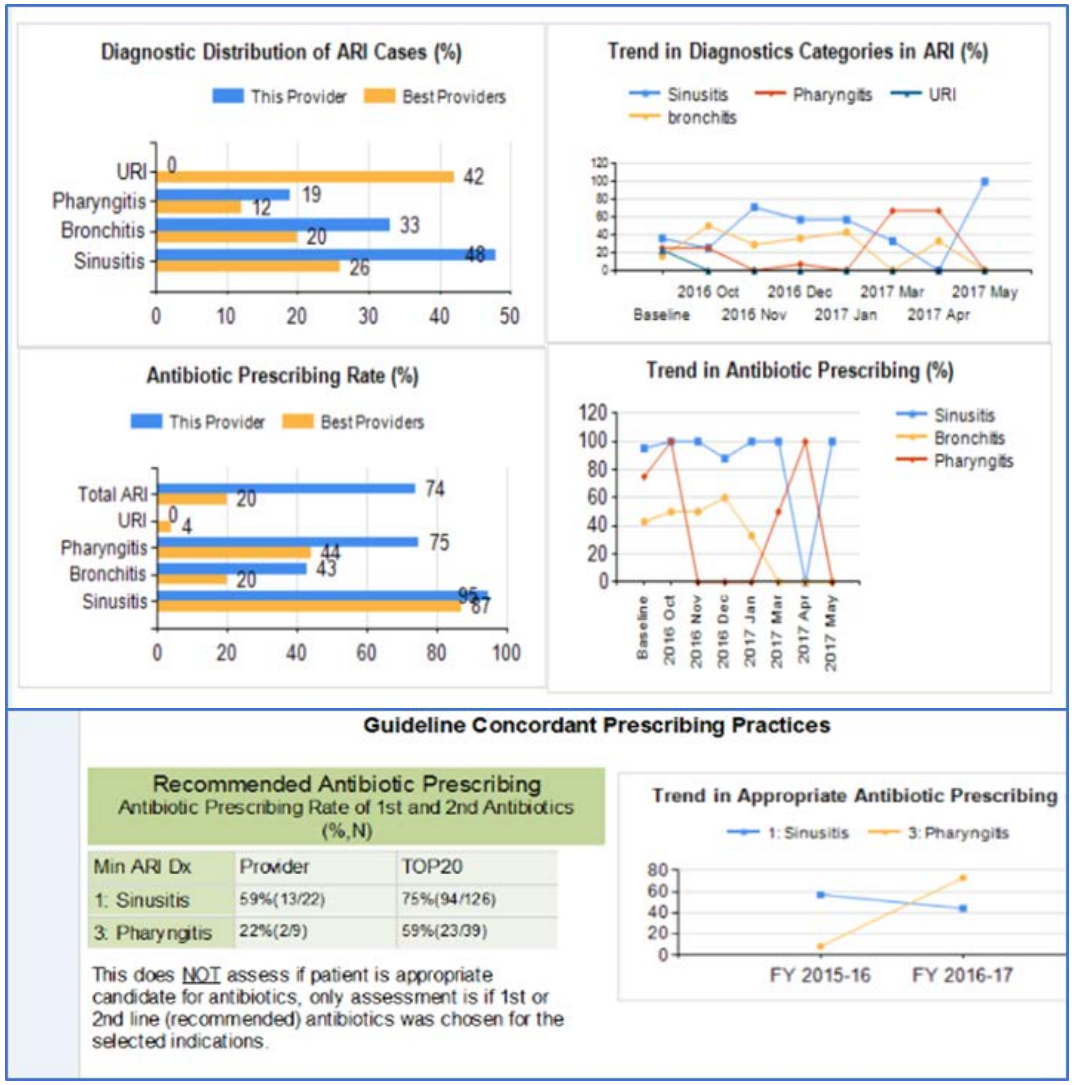
Clinicians Guide to Acute Respiratory Infections

Provider Quick Reference Guide



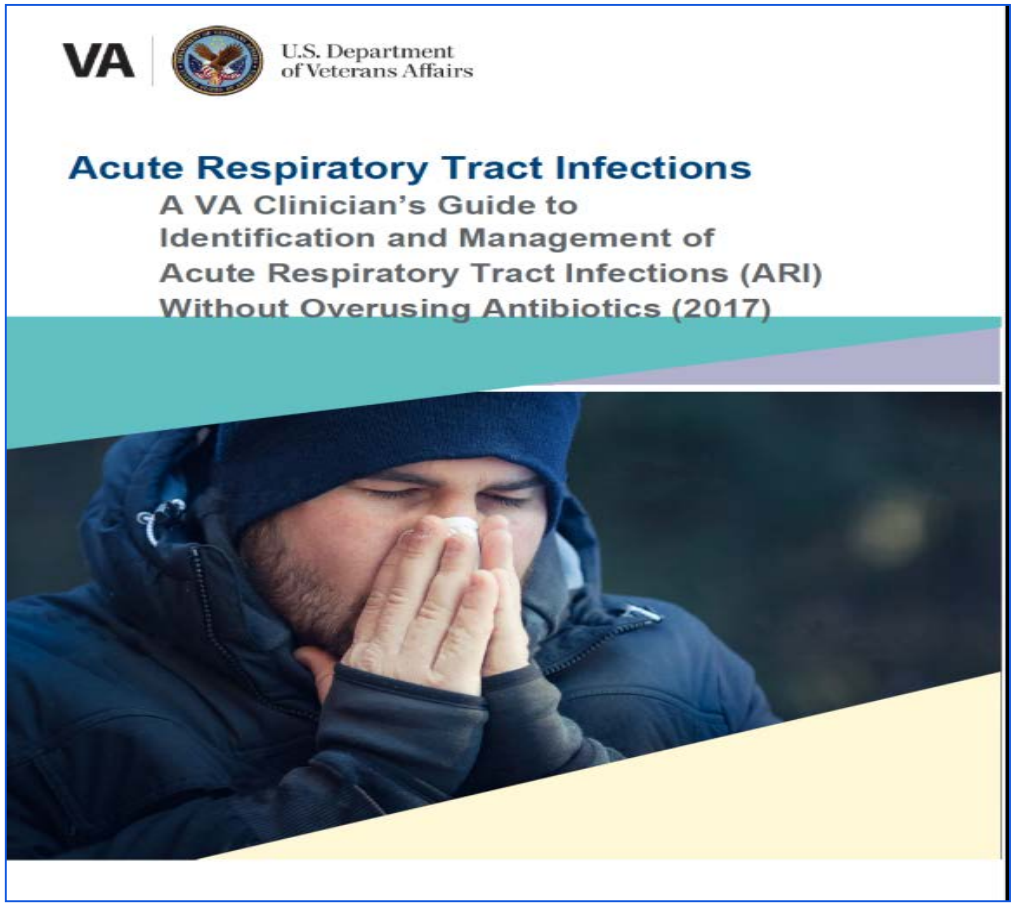
Madaras-Kelly et al. IDWeek 2018

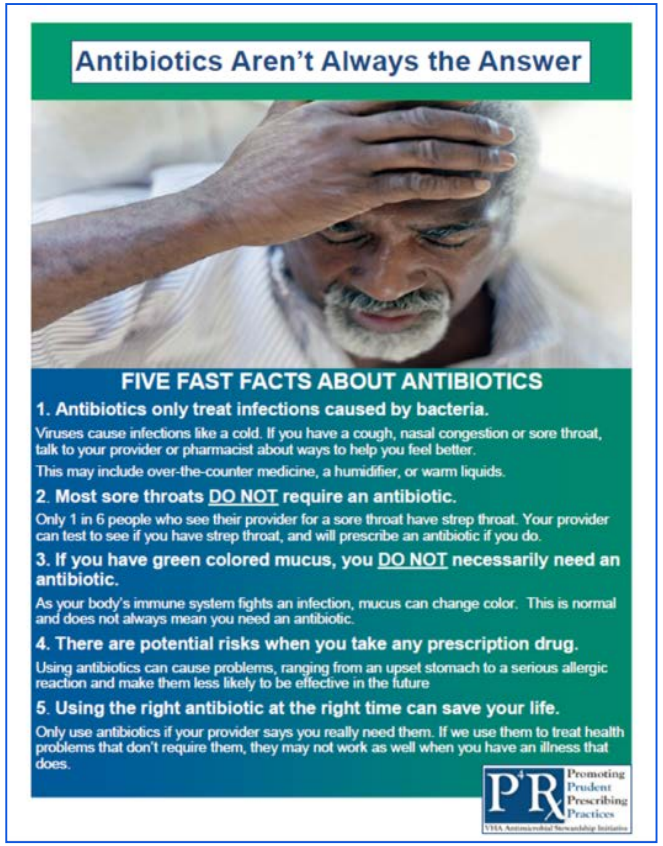
Antibiotic prescribing was tracked and reported back to providers at all sites.



Madaras-Kelly et al. IDWeek 2018

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

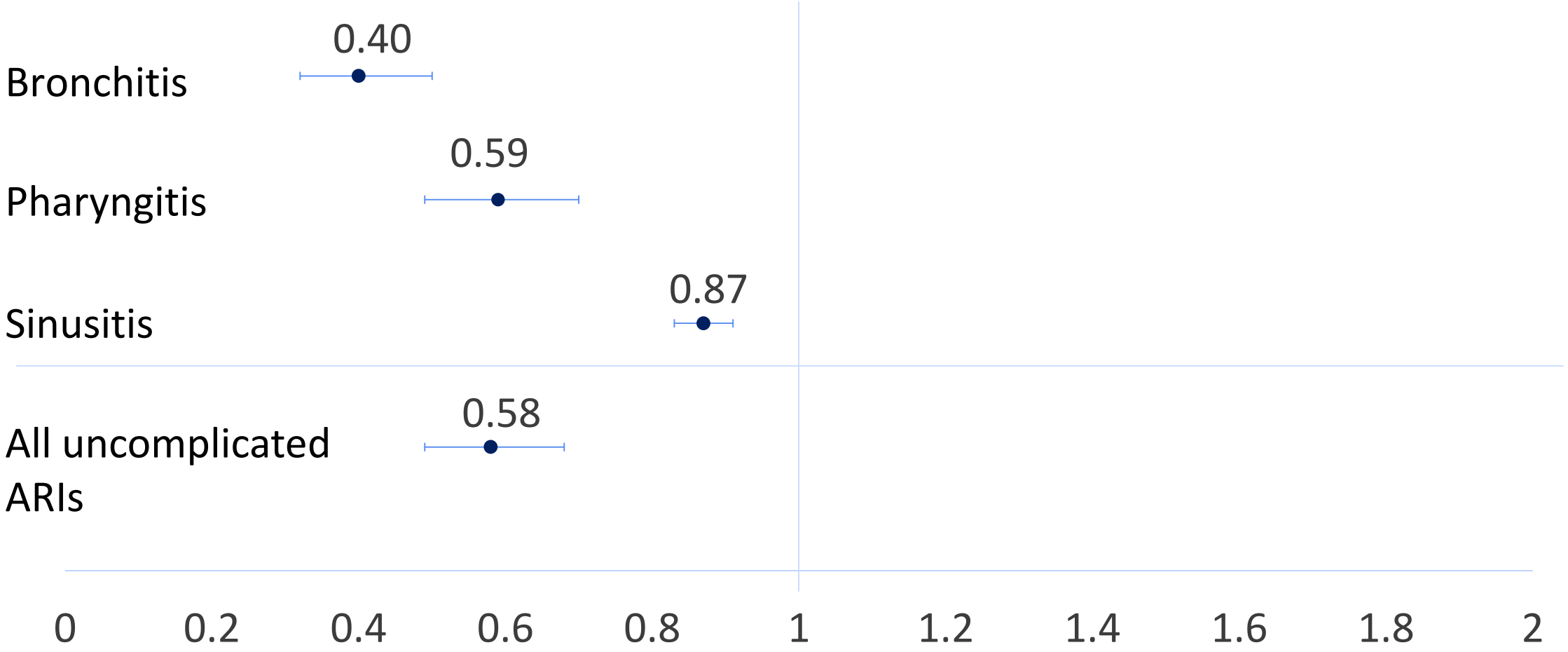




Madaras-Kelly et al. IDWeek 2018

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

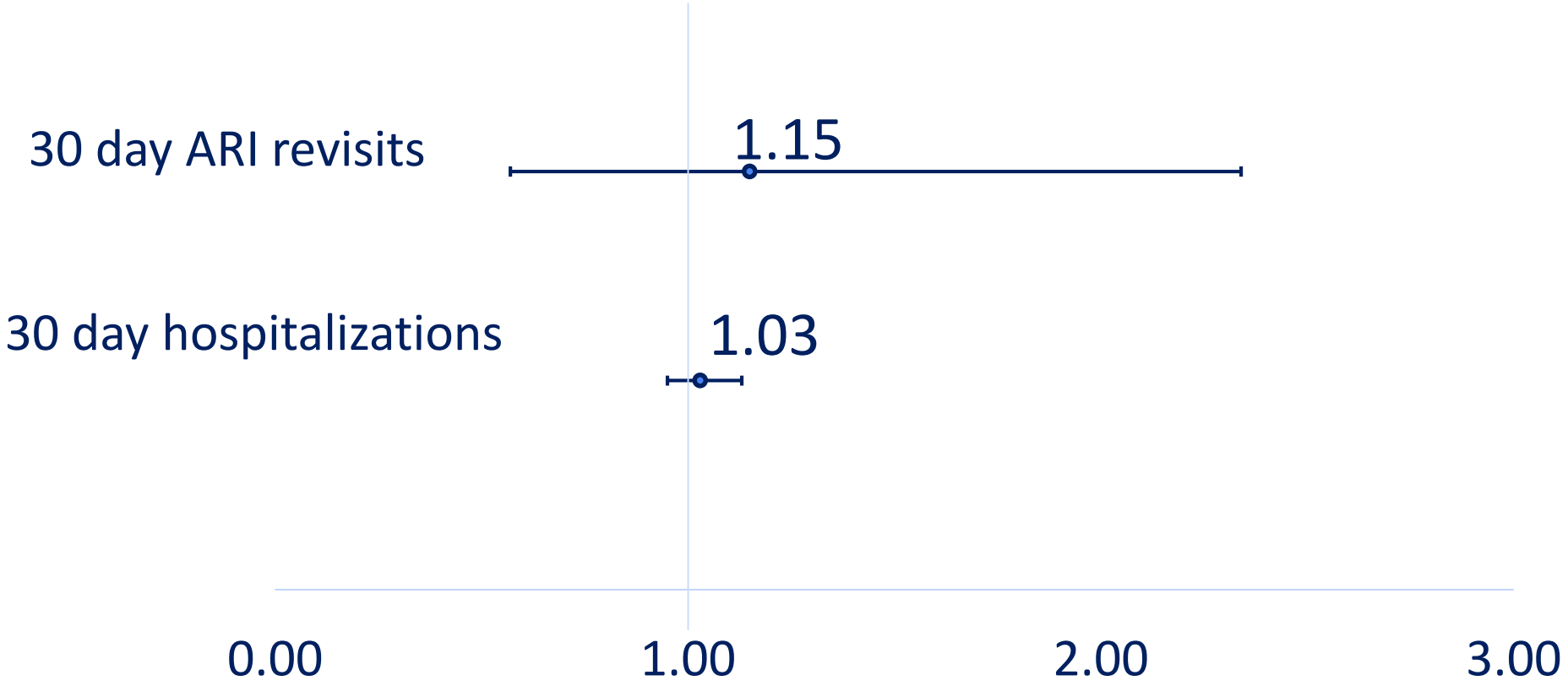
Prevalence rate ratio for antibiotic prescribing for ARI post versus pre-intervention



Madaras-Kelly et al. IDWeek 2018

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

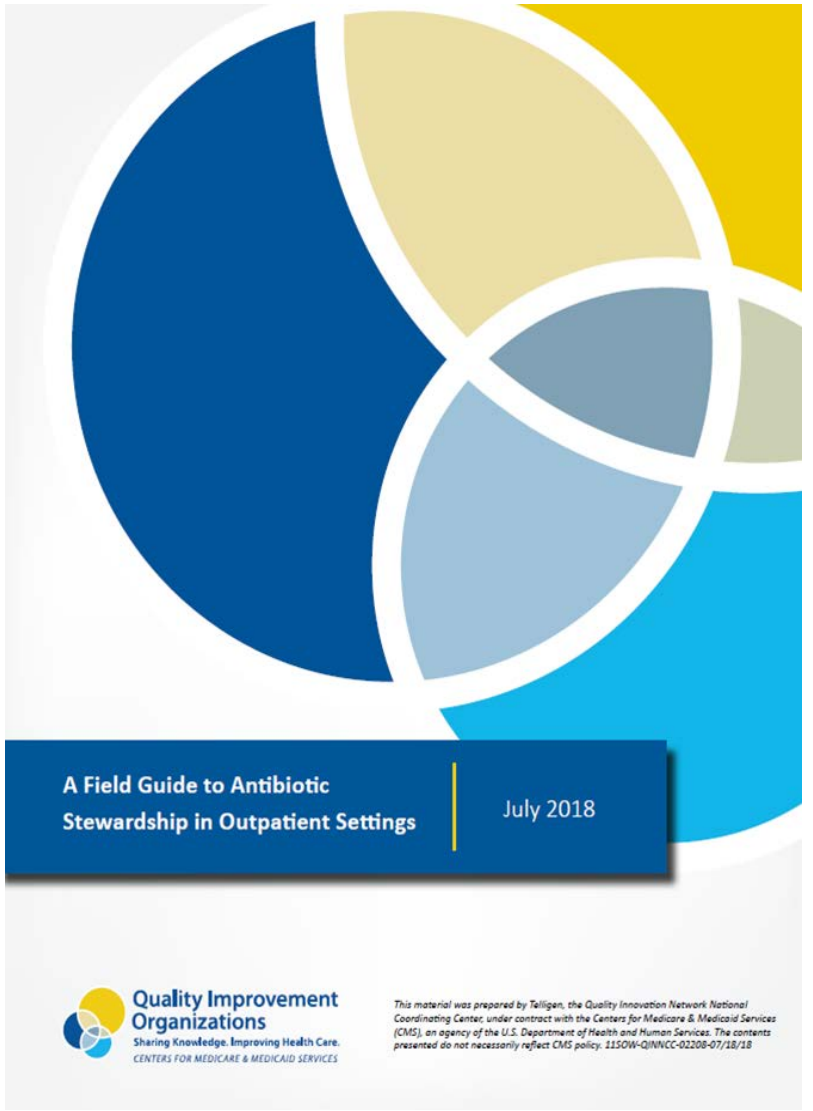


Madaras-Kelly et al. IDWeek 2018

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

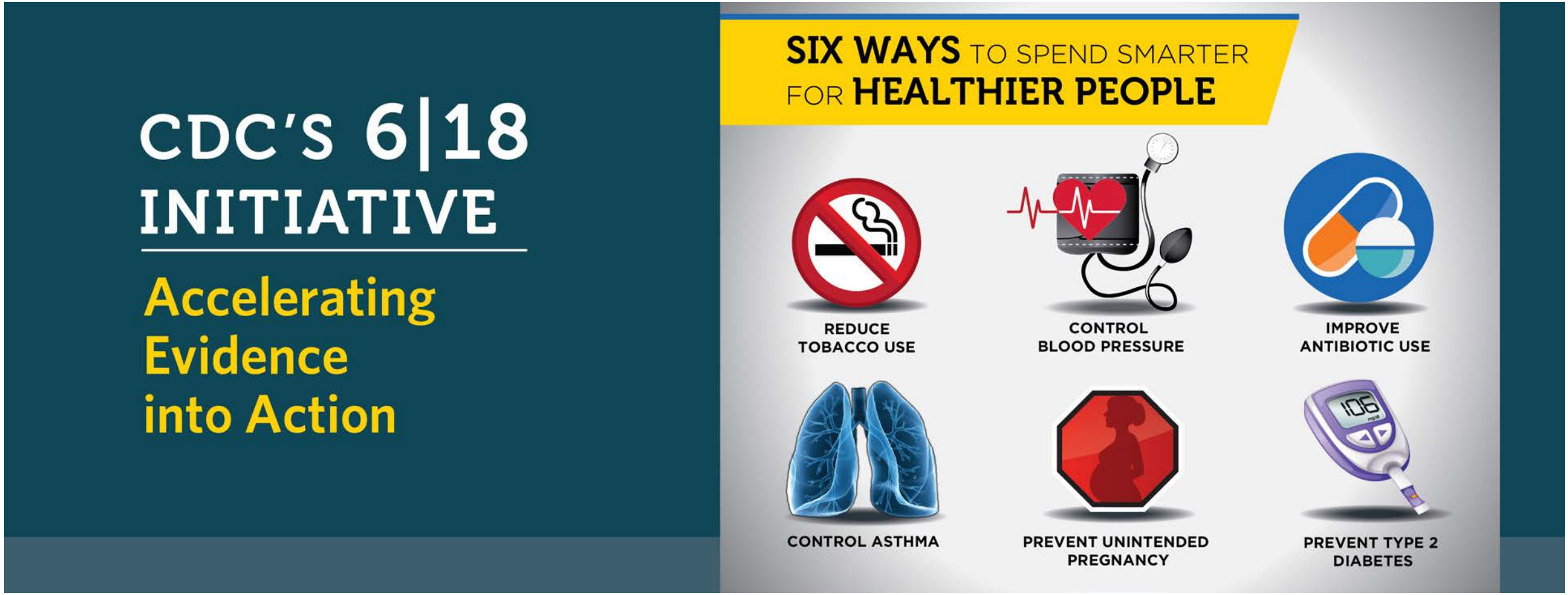
CMS data as of January 2018
https://qioprogram.org/sites/default/files/editors/141/C310_Field_Guide_20180730_FNL.pdf



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.



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

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[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.

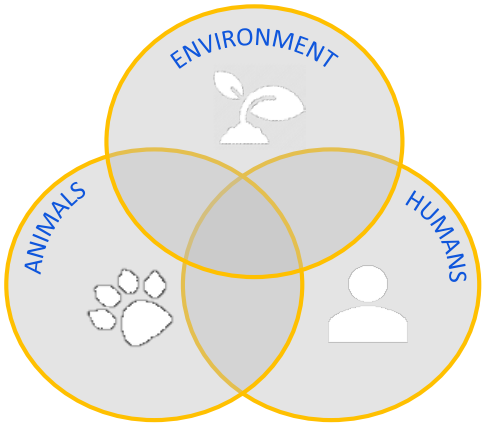
[3] https://www.cdc.gov/getsmart/community/for-patients/common-illnesses/bronchitis.html

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.

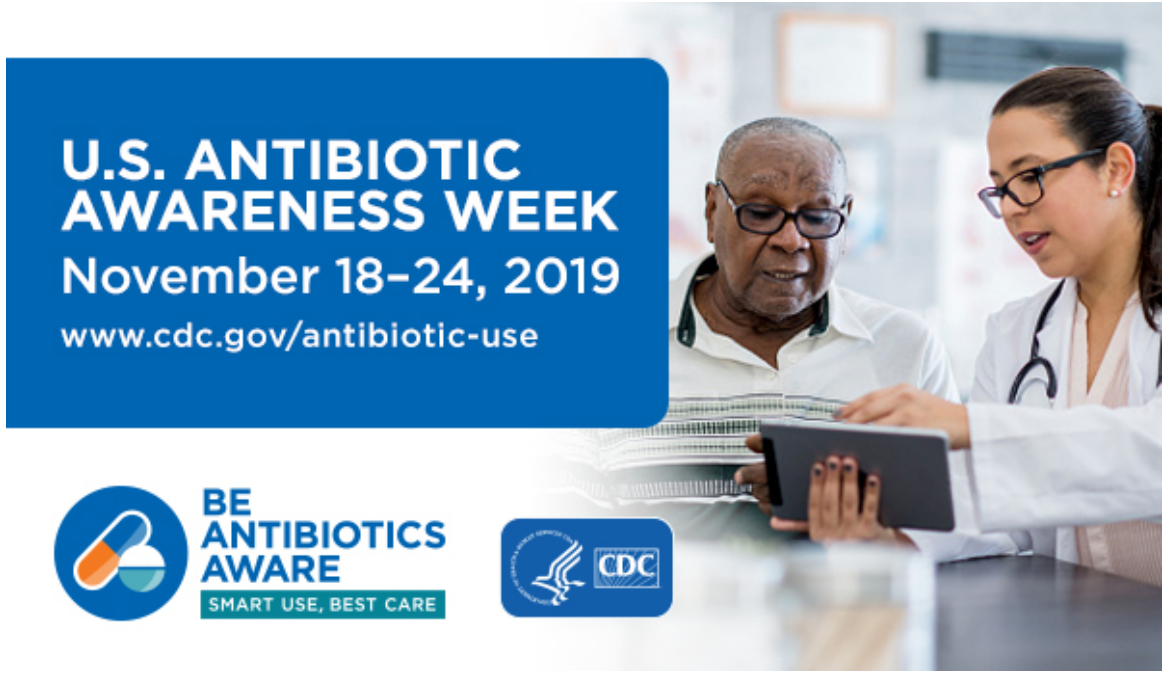
- Antibiotic stewardship must include all settings of healthcare, including the outpatient setting.

- 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

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.