

Outpatient antibiotic overuse: The scope of the problem and options for improvement

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Antibiotic Resistance

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

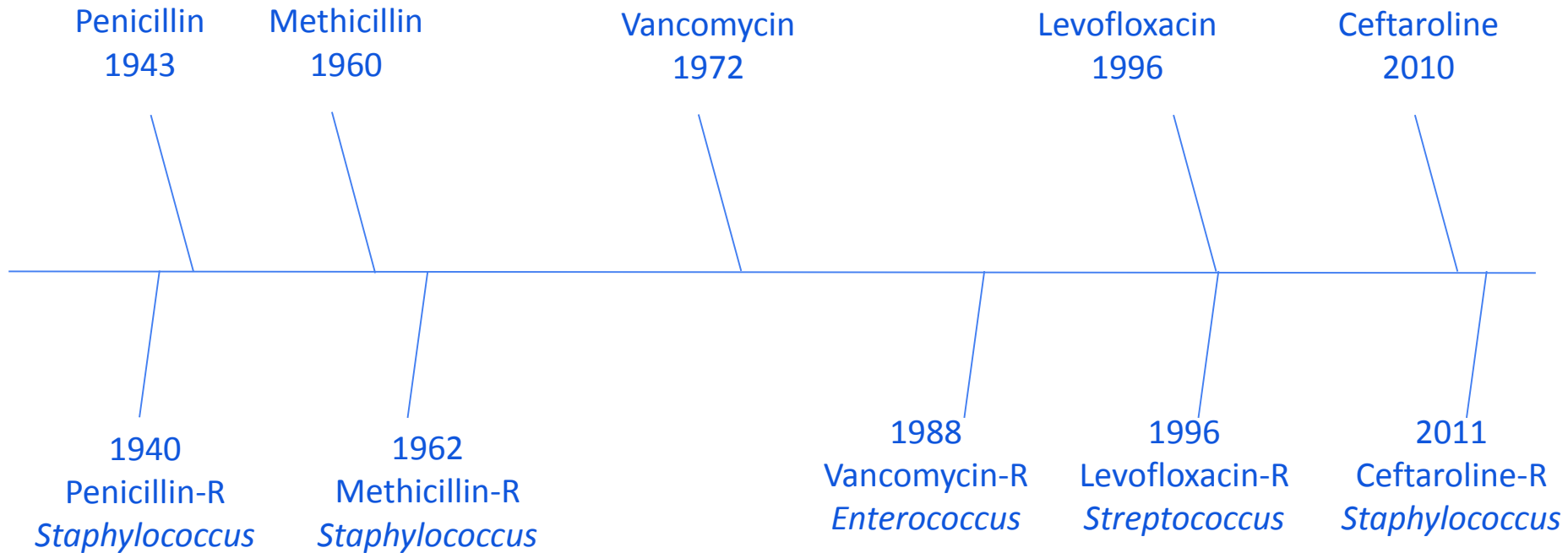
At least  **2,049,442** illnesses,
 **23,000** deaths

**bacteria and fungus included in this report*

\$20 billion in excess direct healthcare costs annually

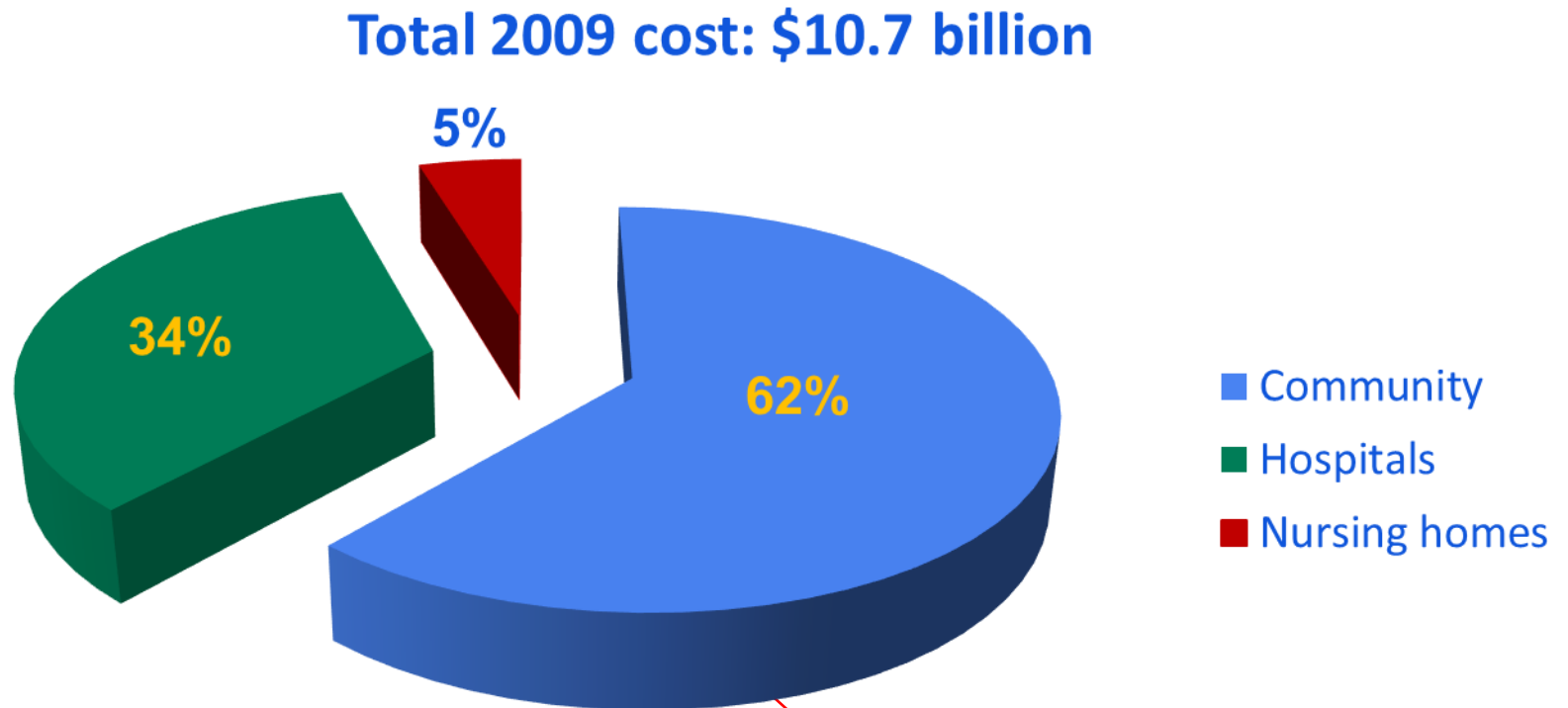
Antibiotic use drives resistance

Date of antibiotic introduction



Date of resistance identified

Antibiotic expenditures in United States by treatment setting



Estimate 80-90% of antibiotic use occurring in outpatient setting

Where Do We Want to Be?

- Every patient gets optimal antibiotic treatment
 - Antibiotics only when they are needed
 - The right antibiotic
 - At the right dose
 - For the right duration
- Every provider and healthcare facility incorporate antibiotic stewardship
- Antibiotic stewardship:
 - The effort to optimize antibiotic use



NATIONAL ACTION PLAN FOR COMBATING ANTIBIOTIC-RESISTANT BACTERIA

By 2020, significant outcomes of Goal 1 will include:

- Establishment of antibiotic stewardship programs in all acute care hospitals and improved antibiotic stewardship across all healthcare settings.
- Reduction of inappropriate antibiotic use by 50% in outpatient settings and by 20% in inpatient settings.

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

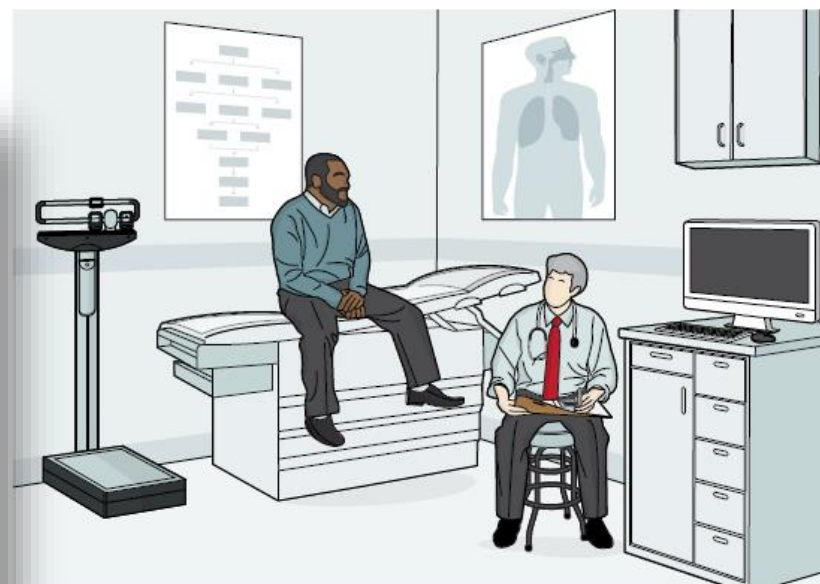
IMPORTANCE The National Action Plan for Combating Antibiotic-Resistant Bacteria set a goal of reducing inappropriate outpatient antibiotic use by 50% by 2020, but the extent of inappropriate outpatient antibiotic use is unknown.

← Editorial page

+ Supplemental
jama.com

+ CME Quiz at

Fleming-Dutra. JAMA 2016;315(17): 1864-1873.
The Pew Charitable Trusts. May 2016.



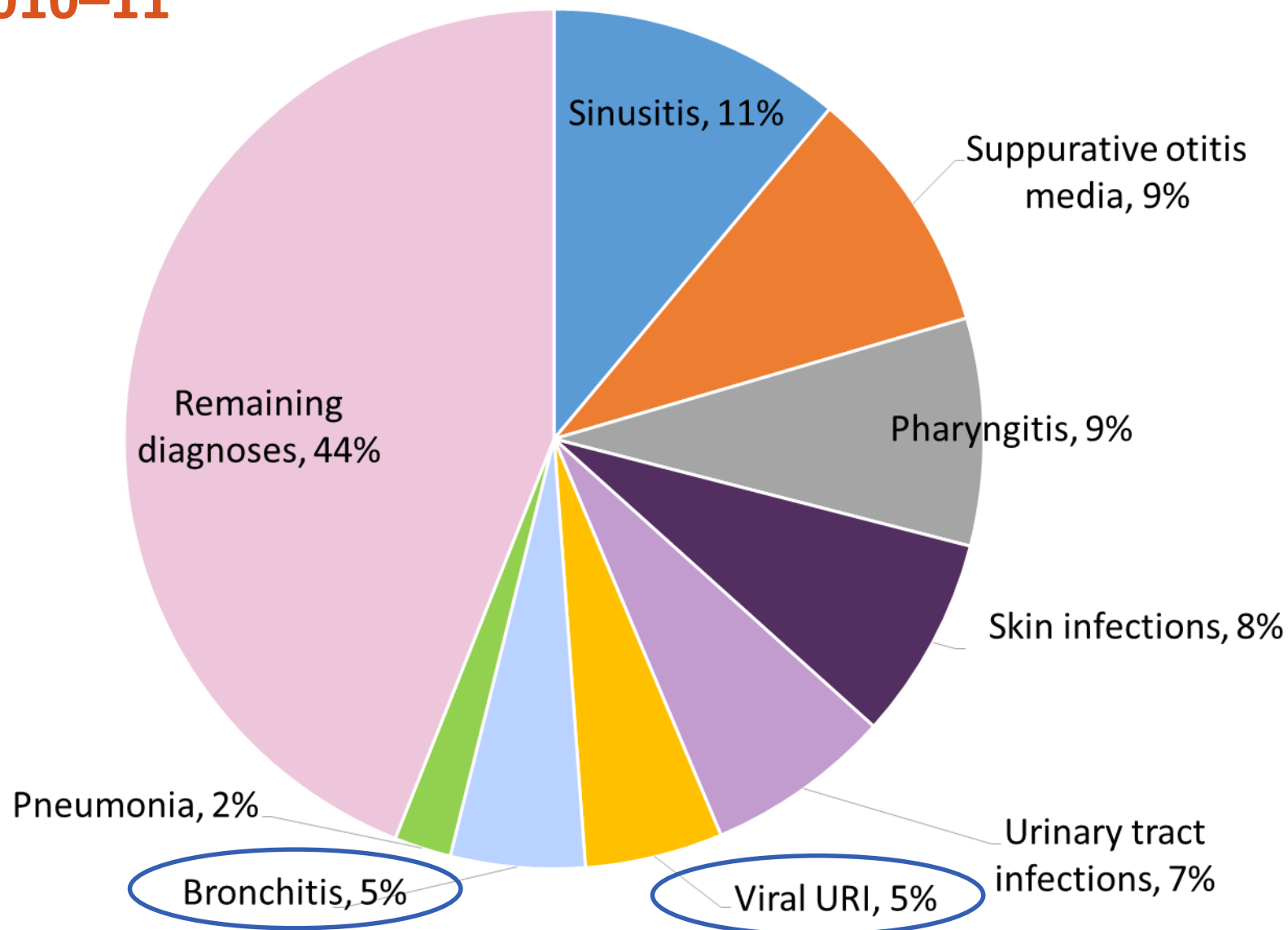
Antibiotic Use in Outpatient Settings

Health experts create national targets to reduce unnecessary antibiotic prescriptions

Data Sources

- National Ambulatory Medical Care Survey (NAMCS)
 - Sample of visits to non-federal employed office-based physicians
- National Hospital Ambulatory Medical Care Survey (NHAMCS)
 - Sample of visits to emergency and outpatient departments in non-institutional, general and short-stay hospitals
- “Designed to meet the need for objective, reliable information about the provision and use of ambulatory medical care services in the United States”
 - Data include demographics, diagnoses, and medications
 - Nationally representative
- Included visits from 2010–11

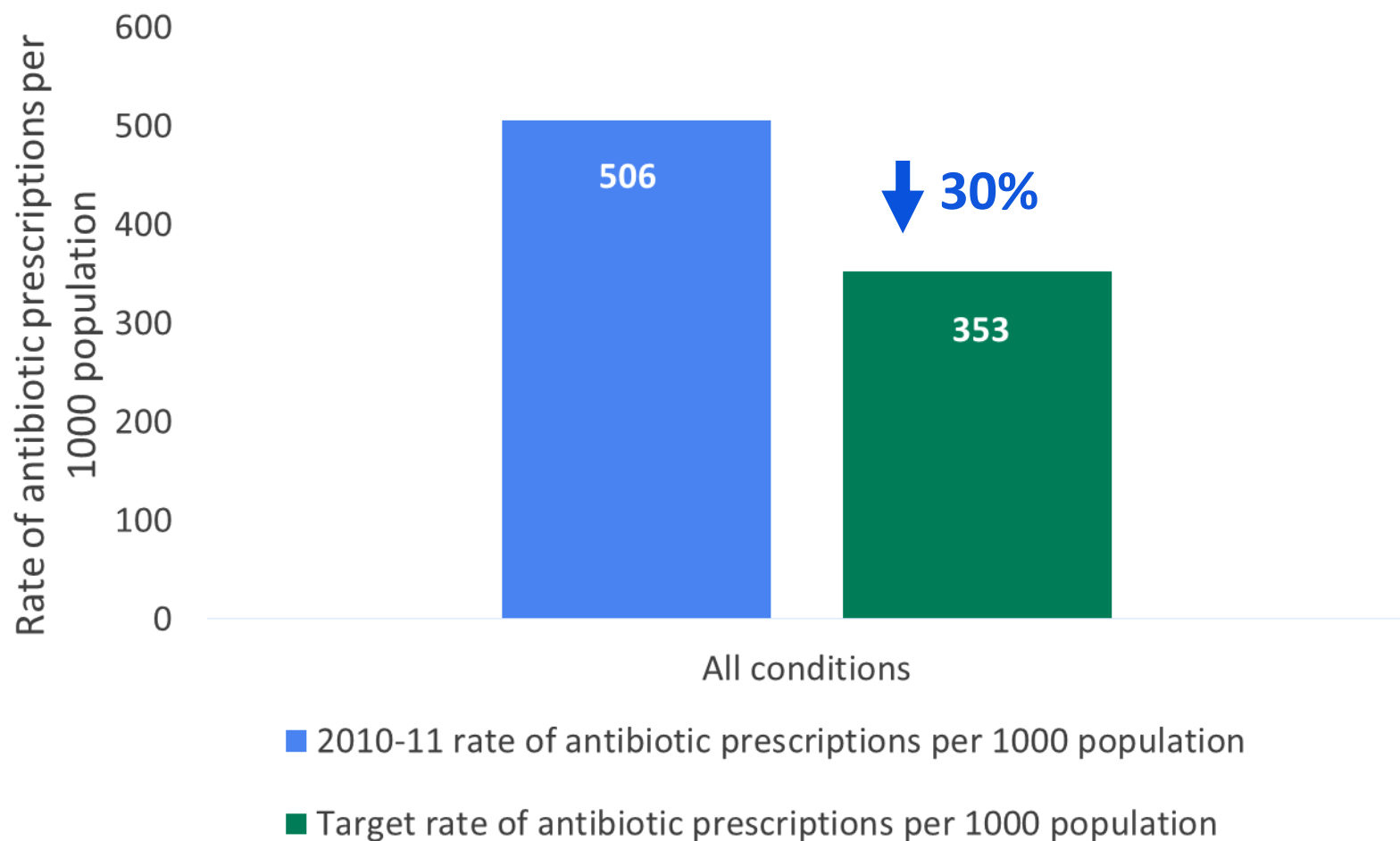
Diagnoses leading to antibiotics — United States, 2010–11



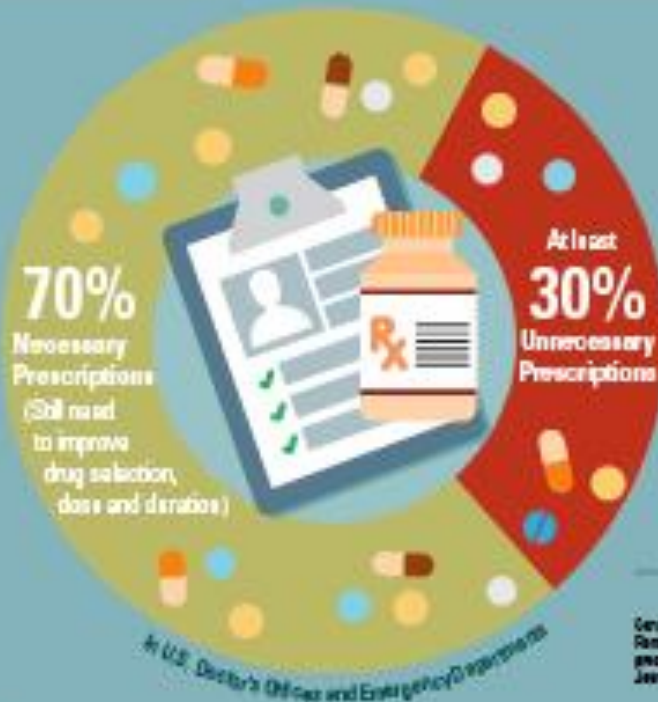
Targets for appropriate antibiotic prescribing by condition

- No reduction in antibiotics
 - Pneumonia, urinary tract infections and miscellaneous bacterial infections
- No antibiotics
 - Bronchitis, bronchiolitis, viral upper respiratory infection (URI), influenza, non-suppurative otitis media, viral pneumonia, asthma, and allergy
- Test for bacterial infection
 - Pharyngitis (all-cause)
- Reduction in antibiotics to level of the lowest prescribing region
 - Sinusitis
 - Suppurative otitis media
 - All other remaining conditions

Target rate for outpatient antibiotic prescriptions



Improve Antibiotic Use to Combat Antibiotic Resistance



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).
Rising Stars, K et al. Prevalence of inappropriate antibiotic prescriptions among US ambulatory care visits, 2011-2012.
Journal of the American Medical Association. May 2014.



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

47 million unnecessary antibiotic prescriptions per year

Meeting the CARB goal

NATIONAL ACTION PLAN FOR COMBATING ANTIBIOTIC-RESISTANT BACTERIA

- Reduction of inappropriate outpatient antibiotic use by 50% by 2020
- 30% of outpatient antibiotic use is inappropriate
- Goal: Reduction of overall outpatient antibiotic use by 15% by 2020

Why are providers prescribing antibiotics inappropriately?

Why might providers prescribe antibiotics inappropriately?

- Lack of knowledge of appropriate indications?
- Fear of complications?
- Patient pressure and satisfaction?
- Habit?

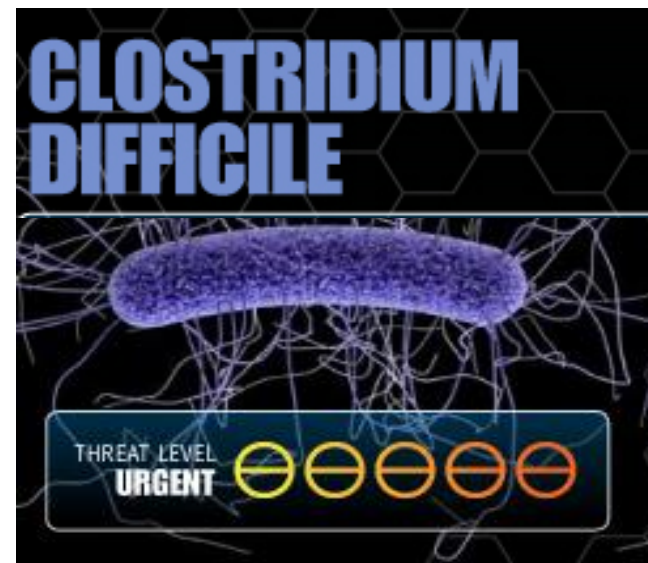


Why might providers prescribe antibiotics inappropriately?

- ~~Lack of knowledge of appropriate indications~~
 - Providers generally know the guidelines
- Fear of complications
 - Providers cite fear of infectious complications

What if something bad happens?

- Without an antibiotic
 - Complications to 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 adverse events
 - *Clostridium difficile* infection



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

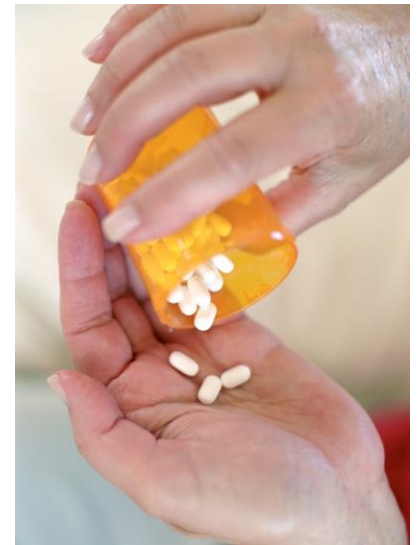
Physician perception of patient expectations

- 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



Why do we think patients want antibiotics?

- Physicians thought parents wanted antibiotics when
 - Parents suggested a candidate diagnosis
 - Parents questioned non-antibiotic treatment plan
- Parents who questioned the treatment plan were equally likely to expect or not expect antibiotics
- Two different conversations
 - One that the physician understands
 - One that the patient is having



Stivers. *Journal Family Practice* 2003; 52(2):140-8.

Mangione-Smith. *Arch Pediatr Adolesc Med* 2006;160(9): 945-952.

Patient satisfaction

- Parents are still satisfied if they don't get antibiotics
- Parents are dissatisfied if communication expectations are not met
- What do parents want?
 - Explanation + positive recommendations
 - Contingency plan



Mangione-Smith *Pediatrics* 1999;103(4):711-8.
Mangione-Smith *Arch Pediatr Adolesc Med* 2001;155:800-6.
Mangione-Smith *Ann Family Med* 2015; 13(3) 221-7.

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



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
 - *Effective communication can help*
- Habit?

Sanchez, EID; 2014; 20(12);2041-7

Jones. *Ann Int Med* 2015;163(2):73-80.

Gerber. *JPIDS* 2015;4(4): 297-304.

Provider variability: Habit of prescribing antibiotics

- In a large study of 1 million VA outpatient visits for acute respiratory infections (ARIs, many of which did not require antibiotics)
 - Highest 10% of providers prescribed antibiotics in $\geq 95\%$ of ARI visits
 - Lowest 10% prescribed antibiotics in $\leq 40\%$ of ARI visits
- In a pediatric network, antibiotic prescribing variability among 25 practices
 - 18 to 36% of acute visits resulted in antibiotic prescriptions by practice
 - 15 to 57% of antibiotics were broad-spectrum by practice

Child with same complaint in high use practice: 2x as likely to get antibiotics and 4x as likely to get broad-spectrum antibiotics

Jones. *Ann Int Med* 2015;163(2):73-80.

Gerber. *JPIDS* 2015;4(4): 297-304.

Methods to change antibiotic prescribing

Methods to change provider behavior

- Educational methods — decisions are based on knowledge
 - Guidelines
 - Clinical decision support
- Behavioral methods — decisions are influenced by psychosocial factors
 - Communications training
 - Public commitments
 - Audit and feedback with comparisons to peers*
 - Academic detailing (one-on-one education)*

*Both categories

Public commitment posters

- Simple intervention: poster-placed in exam rooms with provider picture and commitment to use antibiotics appropriately
- Randomized-controlled trial
- Principle of behavioral science: desire to be consistent with previous commitments

Adjusted absolute reduction: -20% compared to controls, $p=0.02$

Peer Comparison to Top Performers

- Please see Meeker, Linder, et al. *JAMA* 2016;315(6): 562-570.
- Statistically significant reduction in mean inappropriate prescribing as compared to controls

Audit and feedback: Effect in pediatric practices

- Significant reduction in non-recommended broad-spectrum prescribing for targeted conditions as compared to controls
- Prescribing returned to baseline when intervention stopped
- Please see Gerber. *JAMA* 2013; **309**(22): 2345-2352. and Gerber. *JAMA* 2014 Dec 17;312(23): 2569-70.

Peer Comparison: Further evidence

- National Health Service randomized trial of letters to general practitioner (GP) practices (1581 practices included)
 - Your practice is prescribing antibiotics at a rate higher than 80% of your local GP practices
 - Included actions to improve prescribing
 - From England's Chief Medical Officer
- 3.3% relative reduction in antibiotic prescribing relative to controls
 - Estimated ~73,000 antibiotic prescriptions saved
- Concluded it was cost effective
 - Materials to send letters v. cost of antibiotic prescriptions

The Get Smart Campaign

- CDC launched the 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 healthcare providers and general public
 - www.cdc.gov/getsmart



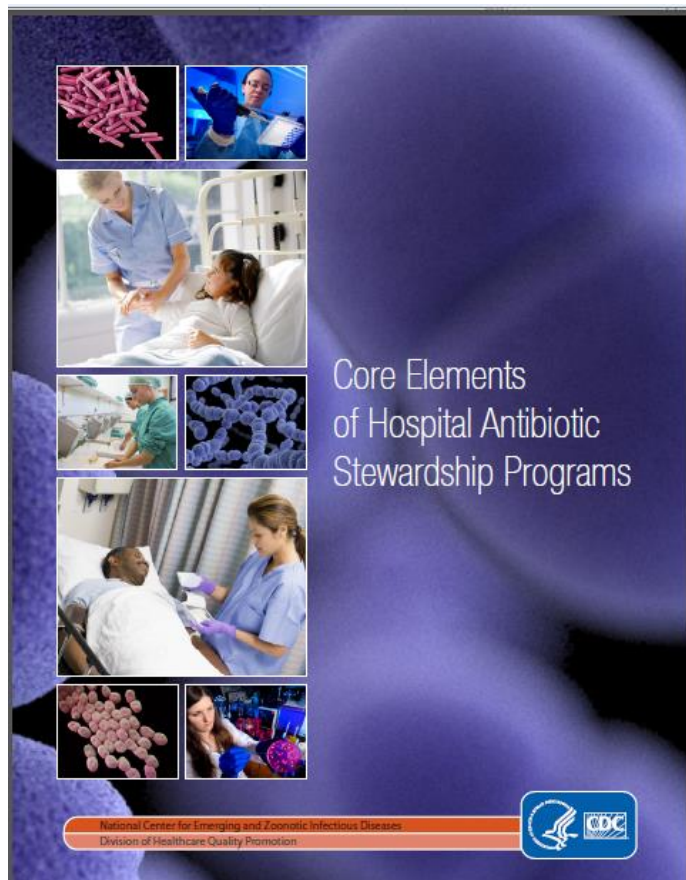
Get Smart Week: November 14-20, 2016



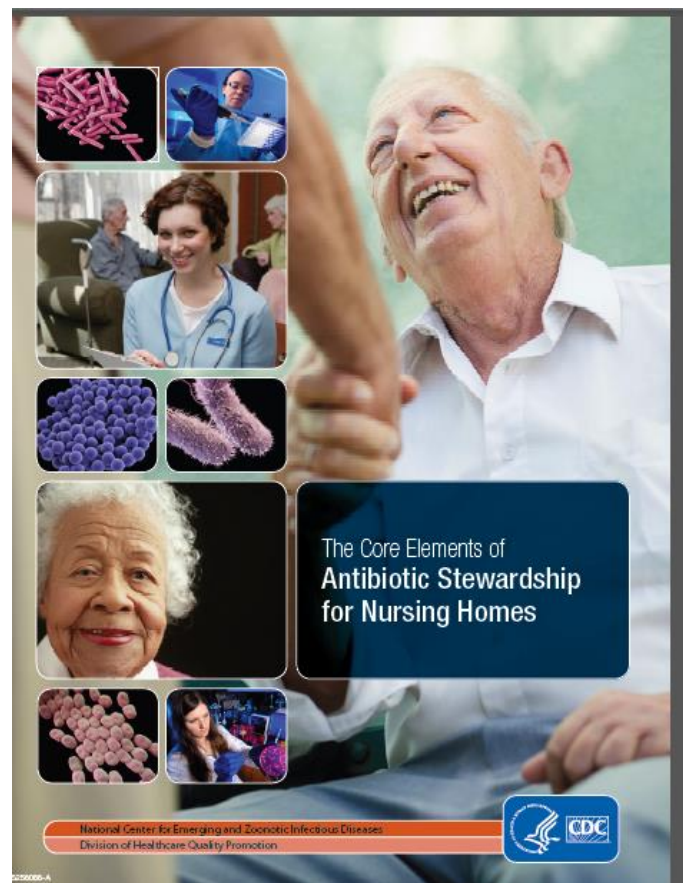
Antibiotic Stewardship Partnerships

- International
 - European Centre for Disease Prevention and Control
 - World Health Organization
- Professional societies
- Payers and insurers
- Health systems
- Retailers
- State and local health departments
- Consumer and patient organizations
- Quality organizations

Stewardship across the spectrum of healthcare



<http://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html>



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

Summary

- Outpatient prescribing in the United States can be improved
 - 30% of outpatient antibiotic prescriptions in the United States are unnecessary
 - National goal is to reduce inappropriate outpatient antibiotic prescribing by 50% by 2020
 - 15% of all outpatient antibiotic prescribing
- Providers prescribe antibiotics inappropriately
 - Fear of complications
 - Perceived patient expectations
 - Provider prescribing pattern variability

Summary

- Interventions can be effective in improving antibiotic use
 - Likely need to address more than just knowledge deficits
 - Incorporating principles of behavioral science can help change behavior
- Providers can
 - Display a poster-commitment to using antibiotics appropriately
 - Use effective communication techniques
- Clinics, health systems and payers can
 - Audit and feedback with peer comparisons
 - Many other evidence-based interventions (www.cdc.gov/Getsmart)
- Stay tuned—lot more to come

Texas Medicaid HEDIS Antibiotic

Calendar Year 14 data

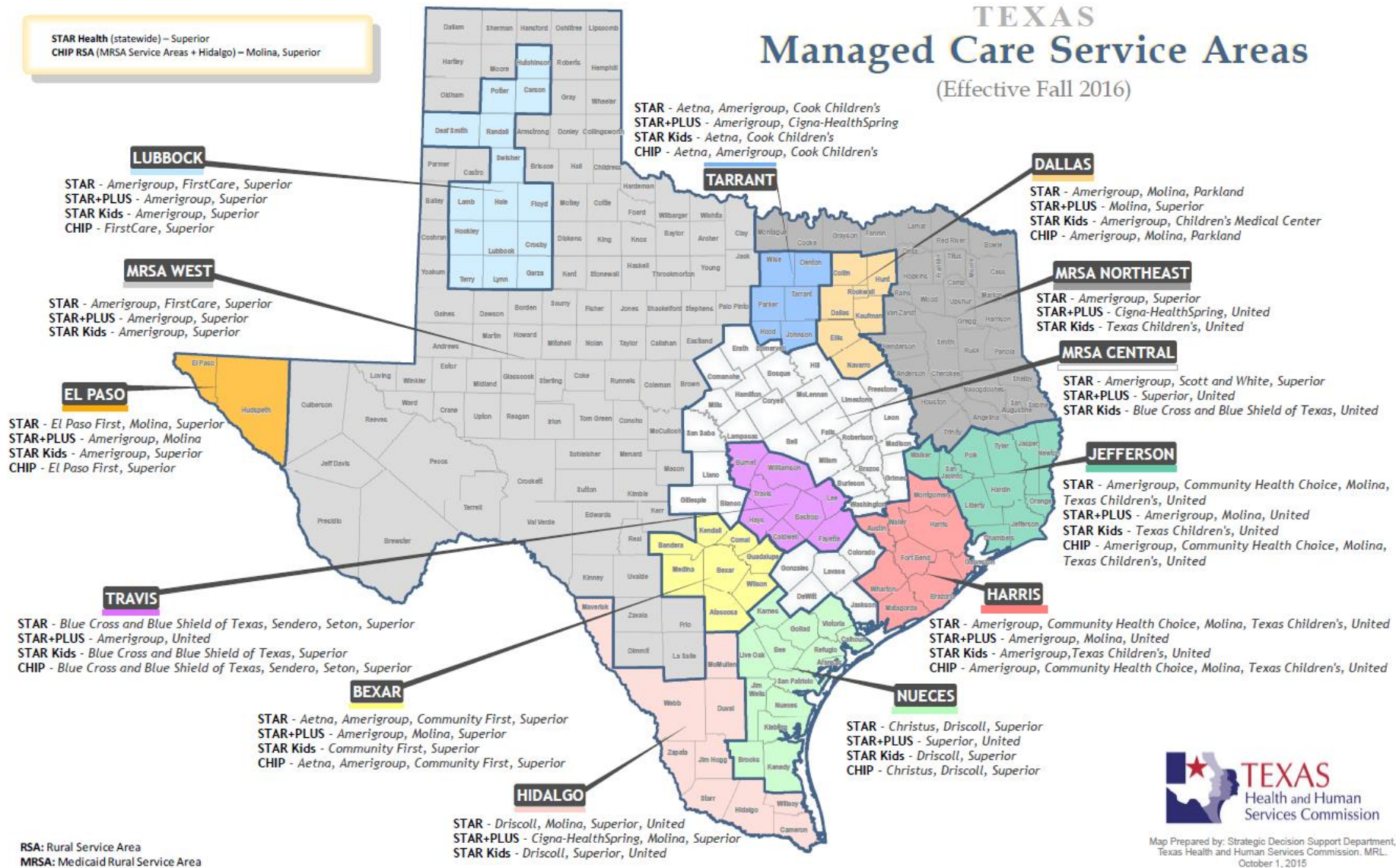
Prepared by the Institute for Child Health Policy,
University of Florida

James Cooley

TEXAS Managed Care Service Areas

(Effective Fall 2016)

STAR Health (statewide) – Superior
CHIP RSA (MRSA Service Areas + Hidalgo) – Molina, Superior



Map Prepared by: Strategic Decision Support Department,
Texas Health and Human Services Commission. MRL
October 1, 2015

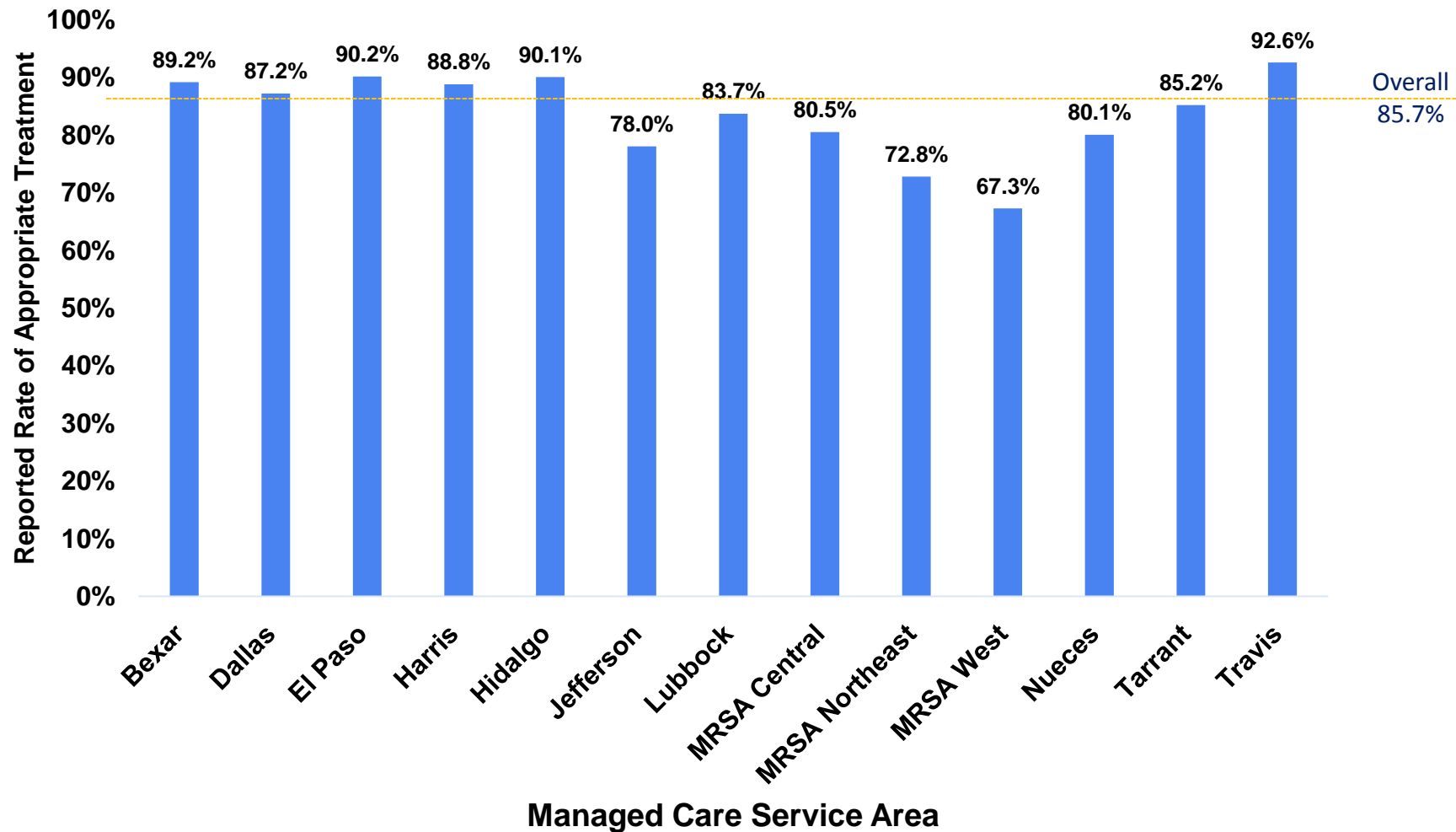
HEDIS: Healthcare Effectiveness Data and Information Set

- ❑ Used by more than 90 percent of America's health plans to measure performance on important dimensions of care and service
- ❑ Texas Medicaid calculates three HEDIS antibiotic avoidance measures, with comparisons by MCO, region, and plan code
- ❑ This data is made readily available to the public on the HHSC quality website; Google "HHSC Quality" and then go to the "Data and Reports" page

Appropriate Treatment for Children With Upper Respiratory Infection

- ❑ Percentage of children 3 months–18 years of age who were given a diagnosis of upper respiratory infection (URI) and were not dispensed an antibiotic prescription on or three days after the visit
- ❑ Higher score indicates better performance

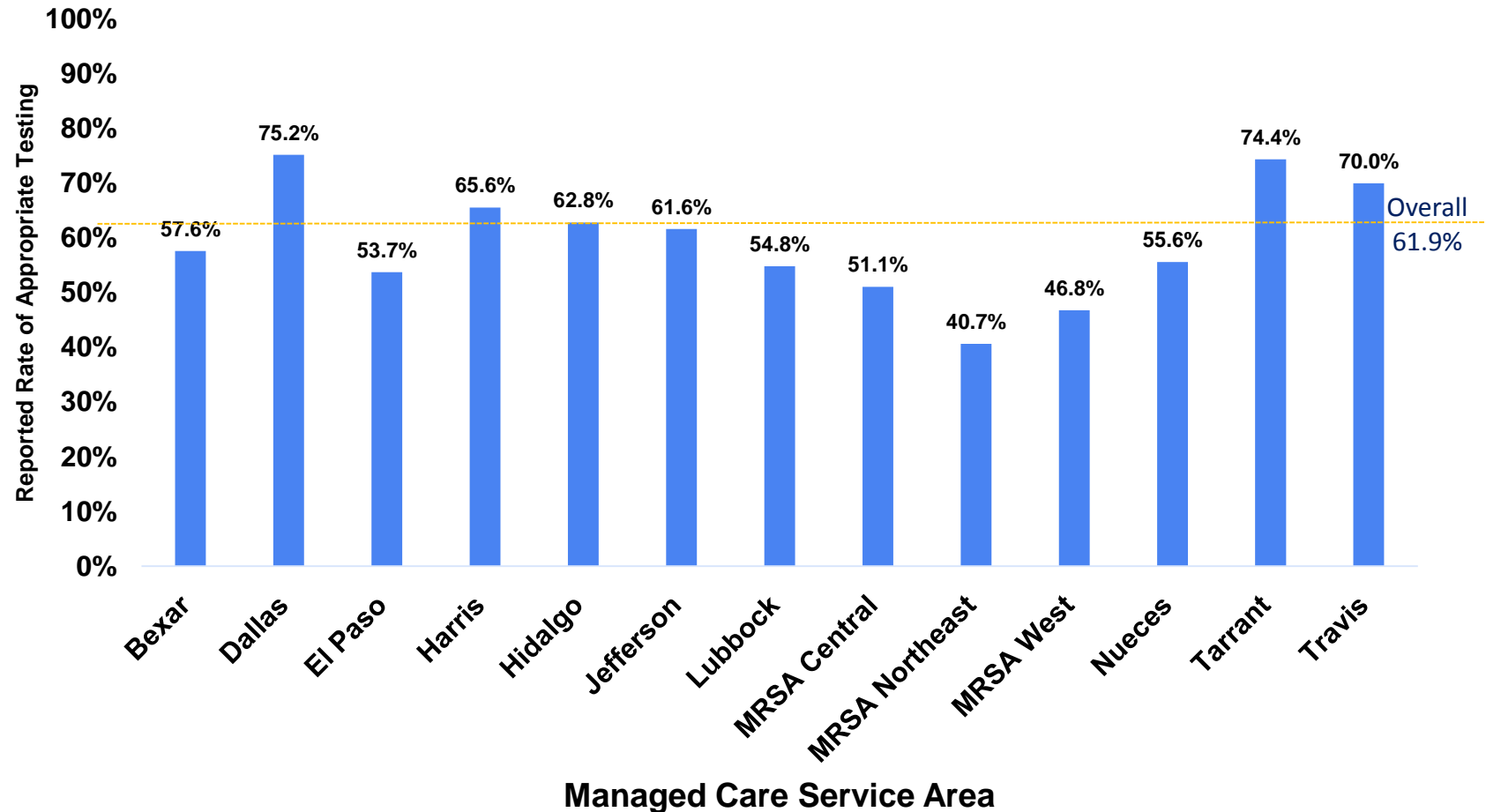
HEDIS® 2015 Appropriate Treatment for Children with Upper Respiratory Infection (URI15) – STAR, Calendar Year 2014



Appropriate Testing for Children with Pharyngitis

- ❑ Percentage of children 2 to 18 years of age who were diagnosed with pharyngitis, dispensed an antibiotic and received a group A *Streptococcus* test for the episode
- ❑ Higher score represents better performance

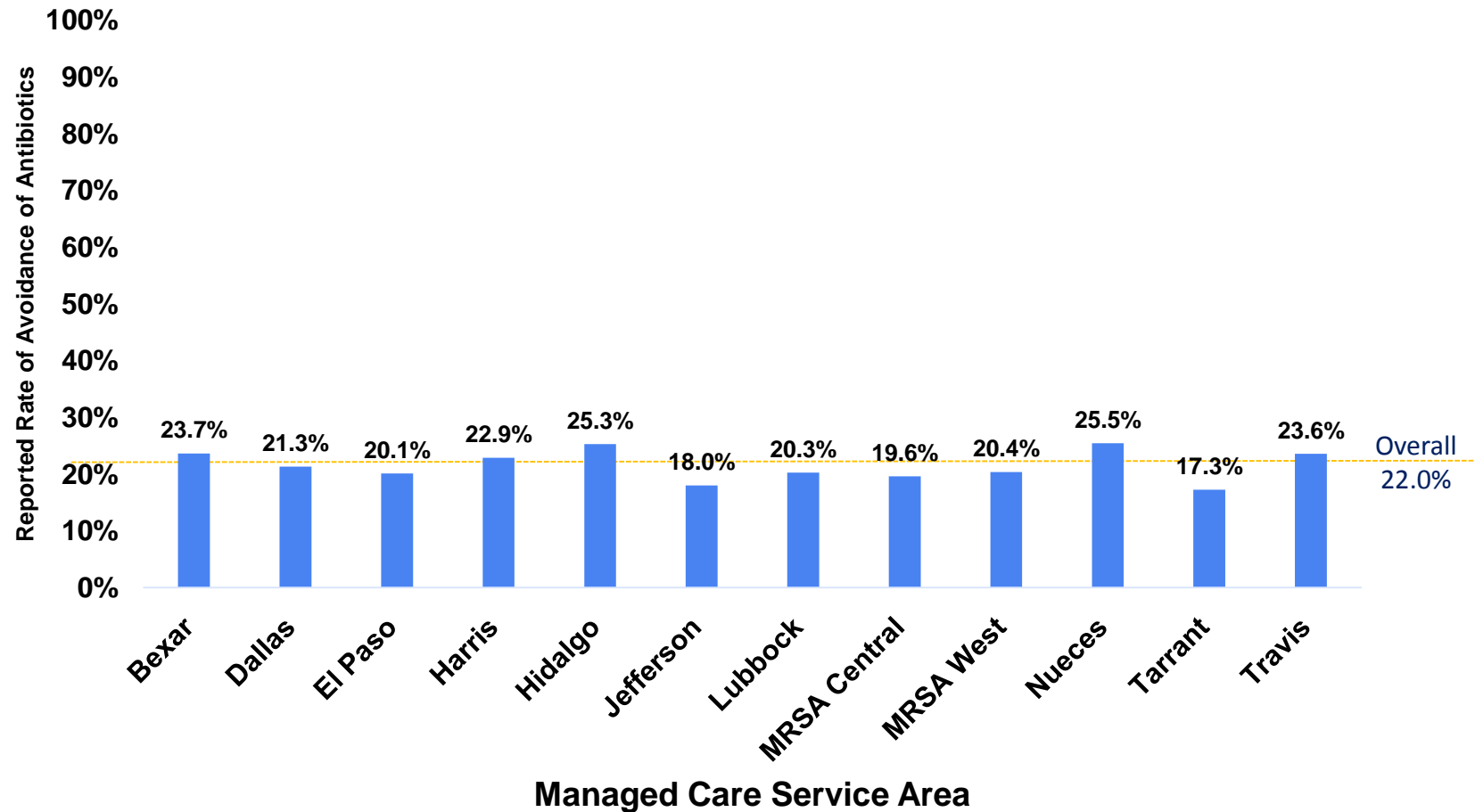
HEDIS®/CHIPRA® 2015 Appropriate Testing for Children with Pharyngitis – STAR, Calendar Year 2014



Avoidance of Antibiotic Treatment in Adults with Acute Bronchitis

- ❑ Percentage of healthy adults 18 – 64 years of age with a diagnosis of acute bronchitis who were not dispensed an antibiotic prescription
- ❑ Higher score represents better performance

HEDIS® 2015 Avoidance of Antibiotic Treatment in Adults With Acute Bronchitis (AAB15) – STAR+PLUS, Calendar Year 2014



**Thank you!
Questions?**

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

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

