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

- Penicillin: 1943
- Methicillin: 1960
- Vancomycin: 1972
- Levofloxacin: 1996
- Ceftaroline: 2010

Date of resistance identified

- 1940: Penicillin-R Staphylococcus
- 1962: Methicillin-R Staphylococcus
- 1988: Vancomycin-R Enterococcus
- 1996: Levofloxacin-R Streptococcus
- 2011: Ceftaroline-R Staphylococcus

http://www.cdc.gov/drugresistance/about.html
Antibiotic expenditures in United States by treatment setting

Total 2009 cost: $10.7 billion

- 62%: Community
- 34%: Hospitals
- 5%: Nursing homes

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

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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.

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

- Sinusitis, 11%
- Suppurative otitis media, 9%
- Pharyngitis, 9%
- Skin infections, 8%
- Urinary tract infections, 7%
- Bronchitis, 5%
- Viral URI, 5%
- Remaining diagnoses, 44%
- Pneumonia, 2%
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

- **2010-11 rate of antibiotic prescriptions per 1000 population:** 506
- **Target rate of antibiotic prescriptions per 1000 population:** 353

30% reduction
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

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

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

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

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

Cals Ann Family Med 2013;11(2)157-64.
Little Lancet 2013:382(9899)1175-82.
Why might providers prescribe antibiotics inappropriately?

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  - 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?
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 ≥95% of ARI visits
  - Lowest 10% prescribed antibiotics in ≤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

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


- 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
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/getsмart
Get Smart Week: November 14-20, 2016

GET SMART About Antibiotics Week
WWW.CDC.GOV/GETSMART
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/getsmt/healthcare/implementation/core-elements.html

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
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

http://www.ncqa.org/hedis-quality-measurement/hedis-and-quality-measure-improvement
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

Managed Care Service Area

- Bexar
- Dallas
- El Paso
- Harris
- Hidalgo
- Jefferson
- Lubbock
- MRSA Central
- MRSA Northeast
- MRSA West
- Nueces
- Tarrant
- Travis

Reported Rate of Appropriate Treatment

- 89.2%
- 87.2%
- 90.2%
- 88.8%
- 90.1%
- 78.0%
- 83.7%
- 80.5%
- 72.8%
- 67.3%
- 80.1%
- 85.2%
- 92.6%

Overall: 85.7%

Data: http://www.hhsc.state.tx.us/hhsc_projects/ECI/Data-Reports.shtml
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

Reported Rate of Appropriate Testing

- Bexar: 57.6%
- Dallas: 75.2%
- El Paso: 53.7%
- Harris: 65.6%
- Hidalgo: 62.8%
- Jefferson: 61.6%
- Lubbock: 54.8%
- MRSA Central: 51.1%
- MRSA Northeast: 40.7%
- MRSA West: 46.8%
- Nueces: 55.6%
- Tarrant: 74.4%
- Travis: 70.0%
- Overall: 61.9%

Data: [http://www.hhsc.state.tx.us/hhsc_projects/ECI/Data-Reports.shtml](http://www.hhsc.state.tx.us/hhsc_projects/ECI/Data-Reports.shtml)
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

Data: http://www.hhsc.state.tx.us/hhsc_projects/ECI/Data-Reports.shtml
Thank you!
Questions?

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For more information, contact CDC
1-800-CDC-INFO (232-4636)

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.