Ambulatory Antimicrobial Steward**SHIP**: Navigating New and Unknown Waters

Lucas Schulz, Pharm.D., BCIDP
Clinical Coordinator – Infectious Diseases
University of Wisconsin Health

Rebekah H Wrenn, Pharm.D., BCPS
Infectious Diseases Clinical Pharmacist
Duke University Hospital

Disclosures

All planners, presenters, reviewers, and ASHP staff of this session report no financial relationships relevant to this activity.

GAME TIME: Intro!!

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Kahoot.it

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Learning Objectives

- Describe the need for ambulatory antimicrobial stewardship.

- Compare strategies to identify opportunities to improve antimicrobial prescribing.

- Plan an advocacy strategy for ambulatory stewardship locally and nationally.

World Health Organization 2019

Ten threats to global health in 2019

World Health Organization 2019

1. Air pollution and climate change

2. Diabetes, Cancer, Heart Disease

3. Global influenza pandemic

4. Drought, famine, conflict and population displacement

5. **Antimicrobial resistance**

6. Ebola and other high-threat pathogens

7. Weak primary health care

8. Vaccine hesitancy

9. Dengue

10. HIV

Ten threats to global health in 2019

MAKING THE CHANGE: NATIONAL GUIDANCE

Government Action to Combat Resistance

REPORT TO THE PRESIDENT ON COMBATING ANTIBIOTIC RESISTANCE

Executive Office of the President

President's Council of Advisors on Science and Technology

September 2014

The White House
Office of the Press Secretary

For Immediate Release   September 18, 2014

Executive Order -- Combating Antibiotic-Resistant Bacteria

EXECUTIVE ORDER

. . . .

COMBATING ANTIBIOTIC-RESISTANT BACTERIA

By the authority vested in me as President by the Constitution and the laws of the United States of America, I hereby order as follows:

Section 1. Policy. The discovery of antibiotics in the early 20th century fundamentally transformed human and veterinary medicine. Antibiotics save millions of lives each year in the United States and around the world. The rise of antibiotic-resistant bacteria, however, represents a serious threat to public health and the economy. The Centers for Disease Control and Prevention (CDC) in the Department of Health and Human Services (HHS) estimates that annually at least two million illnesses and 23,000 deaths are caused by antibiotic-resistant bacteria in the United States alone.

Detecting, preventing, and controlling antibiotic resistance requires a strategic, coordinated, and sustained effort. It also depends on the engagement of governments, academia, industry, healthcare providers, the general public, and the agricultural community, as well as international partners. Success in this

NATIONAL STRATEGY FOR COMBATING ANTIBIOTIC-RESISTANT BACTERIA

Vision: The United States will work domestically and internationally to prevent, detect, and control illness and death related to infections caused by antibiotic-resistant bacteria by implementing measures to mitigate the emergence and spread of antibiotic resistance and ensuring the continued availability of therapeutics for the treatment of bacterial infections.

September 2014

NATIONAL ACTION PLAN FOR COMBATING ANTIBIOTIC-RESISTANT BACTERIA

MARCH 2015

PACCARB
Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria

Meeting Summary

Eleventh Public Meeting of the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria January 30–31, 2019

"The effort to combat resistant bacteria will become an international priority for global health security."
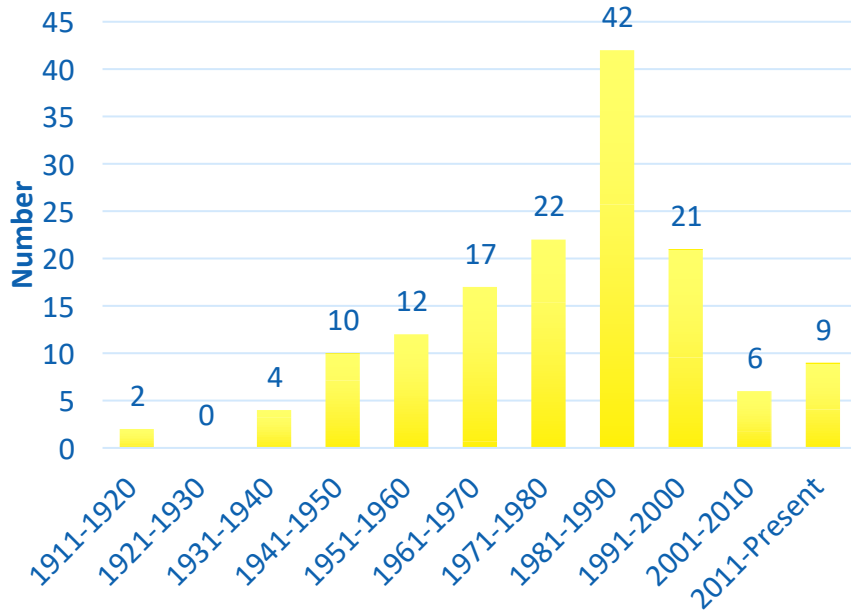– National Action Plan

Available at https://www.cdc.gov/drugresistance/us-activities/national-action-plan.html

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Supply side solution to antimicrobial resistance

New Antibiotics Approvals

- 90s-2000s: Call to action by ID professionals due to diminishing pipeline

- 2012: GAIN Act
  - Financial incentives targeting antibiotic research and development

http://sitn.hms.harvard.edu/flash/2018/less-rebooting-antibiotic-pipeline/

Antimicrobial StewardSHIP

GAME TIME: History!

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Kahoot.it

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CDC Core Elements: Hospital

- Leadership Commitment
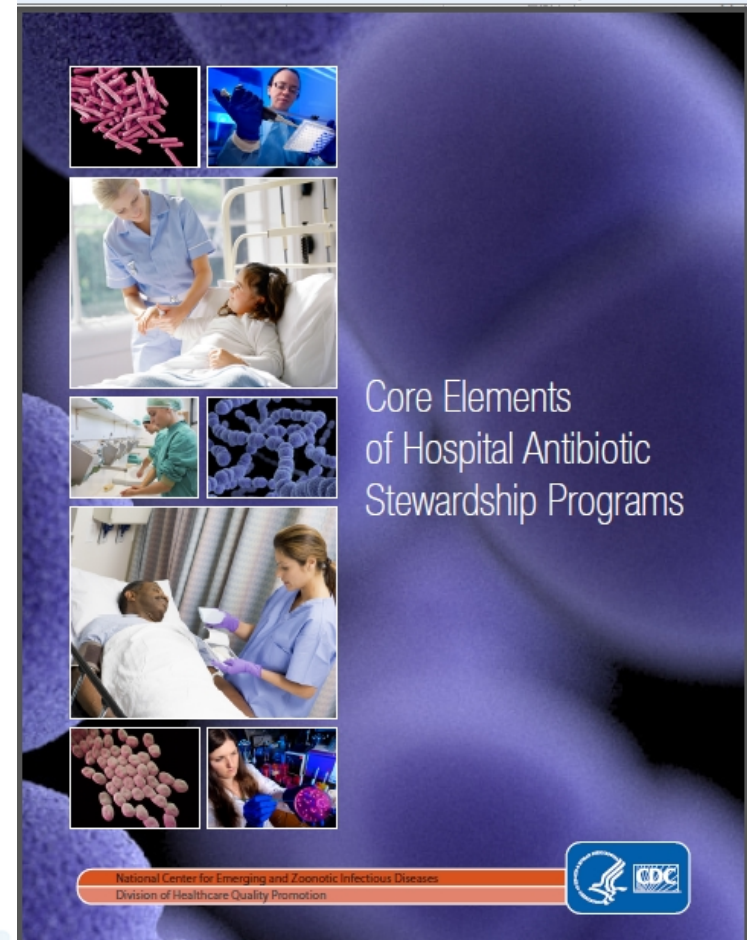- Accountability
- Drug Expertise
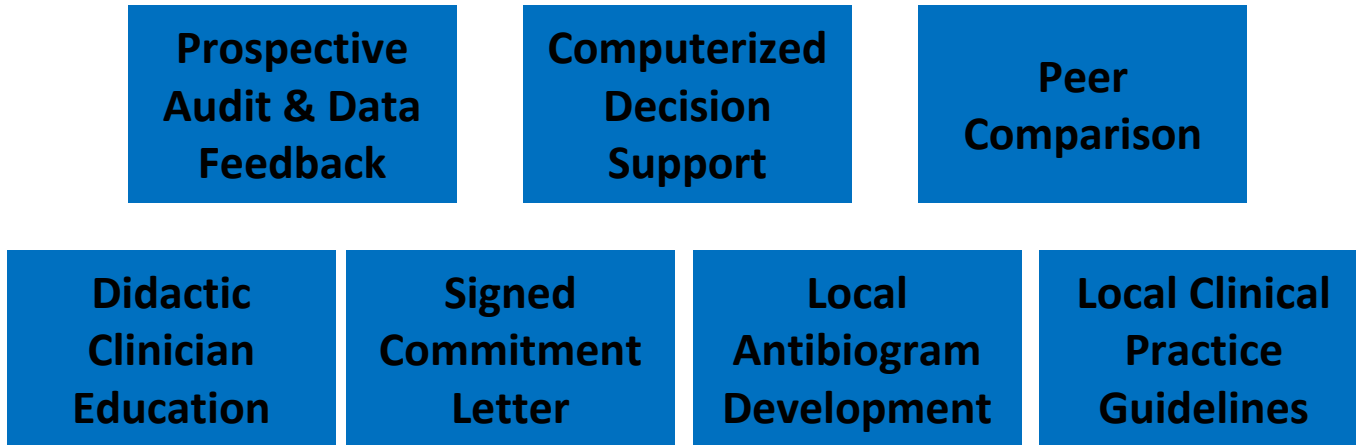- Action
- Tracking
- Reporting
- Education

Core Elements
of Hospital Antibiotic
Stewardship Programs

National Center for Emerging and Zoonotic Infectious Diseases
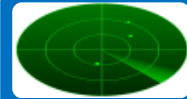Division of Healthcare Quality Promotion

CDC

Outpatient Stewardship

National guidelines recommendations on implementing outpatient antimicrobial stewardship

Prospective Audit & Data Feedback	**Computerized Decision Support**	**Peer Comparison**

Didactic Clinician Education	**Signed Commitment Letter**	**Local Antibiogram Development**	**Local Clinical Practice Guidelines**

Meeker D, et al. *JAMA*. 2016;315(6):562-70.
Barlam TF et al. *Clin Infect Dis*. 2016;62(10):e51-77.
Sanchez GV, et al. *MMWR Recomm Rep.* 2016;65(6).
Dobson EL et al. *J Am Pharm Assoc* 2017;57(4):464-73.

CDC Core Elements: Outpatient

The Core Elements of
Outpatient Antibiotic Stewardship

- Commitment

- Action for Policy and Practice
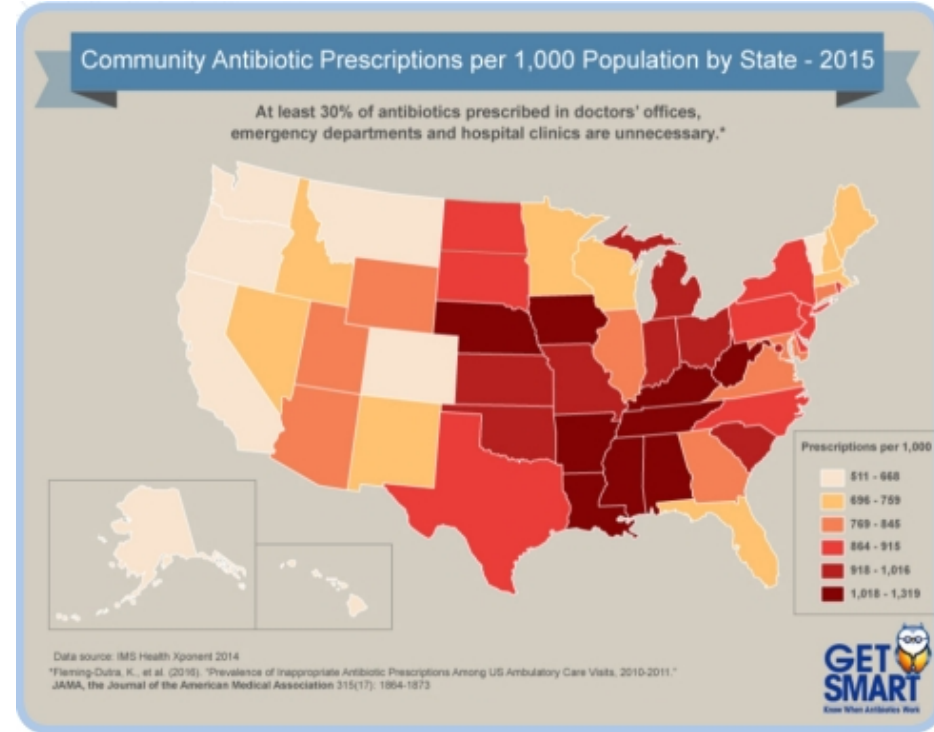
- Tracking and Reporting

- Education/Expertise

Why do we need ambulatory stewardship?

- Majority of antibiotic prescribing occurs in outpatient setting
  - 266 million <u>outpatient</u> antibiotic prescriptions
  - 835 antibiotic prescriptions per 1000 people

Community Antibiotic Prescriptions per 1,000 Population by State - 2015

At least 30% of antibiotics prescribed in doctors' offices, emergency departments and hospital clinics are unnecessary.*

Prescriptions per 1,000
- 511 - 668
- 696 - 759
- 769 - 845
- 864 - 915
- 918 - 1,016
- 1,018 - 1,319

Data source: IMS Health Xponent 2014
*Fleming-Dutra, K., et al. (2016). "Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care Visits, 2010-2011." JAMA, the Journal of the American Medical Association 315(17): 1864-1873
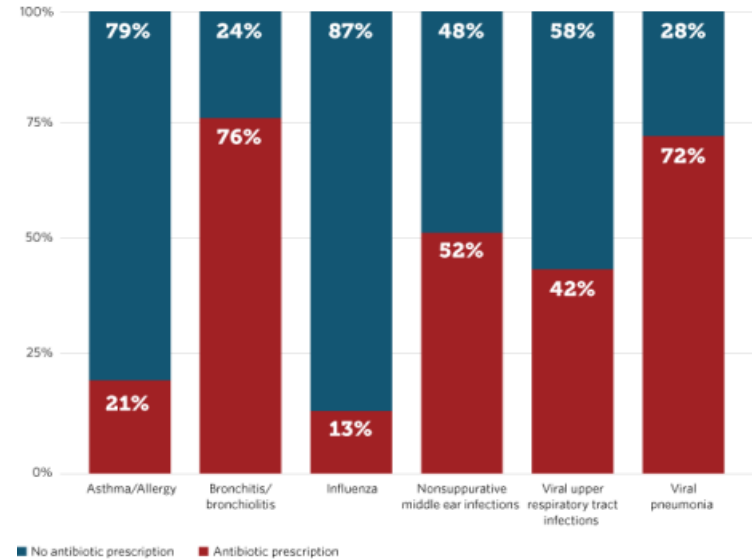
Who cares? We need to use antibiotics!

- National survey conducted in 2010-2011
  - 184,000 ambulatory visits
- Top 3 diagnoses
  - Sinusitis (56 rx/1000 people)
  - Suppurative otitis media (47 rx/1000 people)
  - Pharyngitis (43 rx/1000 people)

- Antibiotic prescribing rate = 506 rx/1000 people

- Estimated appropriate prescribing rate = 353 rx/1000 people

30% of outpatient prescriptions are unnecessary!

Figure 1
Conditions for Which Antibiotics Are Not Recommended
Percentage of urgent care visits resulting in an antibiotic prescription, 2014

	Asthma/Allergy	Bronchitis/bronchiolitis	Influenza	Nonsuppurative middle ear infections	Viral upper respiratory tract infections	Viral pneumonia
No antibiotic prescription	79%	24%	87%	48%	58%	28%
Antibiotic prescription	21%	76%	13%	52%	42%	72%

■ No antibiotic prescription   ■ Antibiotic prescription

Source: Analysis of Truven Health Analytics MarketScan data on U.S. antibiotic prescribing, 2014
© 2018 The Pew Charitable Trusts

Katherine E. Fleming-Dutra, Adam L. Hersh, Daniel J. Shapiro, Monina Bartoces, Eva A. Enns, Thomas M. File, Jonathan A. Finkelstein, Jeffrey S. Gerber, David Y. Hyun, Jeffrey A. Linder, Ruth Lynfield, David J. Margolis, Larissa S. May, Daniel Merenstein, Joshua P. Metlay, Jason G. Newland, Jay F. Piccirillo, Rebecca M. Roberts, Guillermo V. Sanchez, Katie J. Suda, Ann Thomas, Teri Moser Woo, Rachel M. Zetts, Lauri A. Hicks. Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care Visits, 2010-2011. *JAMA.* 2016;315(17):1864–1873.

Quantifying the Problem

	2007-2009	**2010-2011**
Visits resulting in antibiotics, %(N)	10% (101 million)	12.6% (154 million)
Infection Type		
Respiratory	41%	32%
Skin/mucosal	18%	19%
UTI	9%	10%
Unnecessary Antibiotic Use	>25%	30%

Shapiro, D, Hicks, L, Pavia, A & Hersh, A JAC 2014
Fleming-Dutra, Hersh, A Shapiro, D et al. JAMA 2016

Quantifying the Problem: Appropriateness

- Outpatient antibiotic prescriptions associated with 19.2 million privately insured patients (0-64 years) in 2016
- ICD-10 diagnosis were designated as "always", "sometimes", or "never" justified for antibiotics
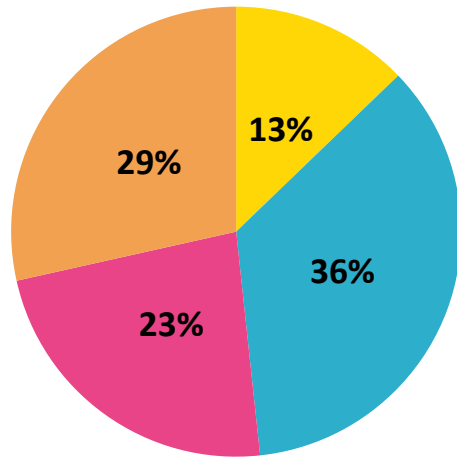
Appropriate **13%**

Potentially Appropriate **36%**

Inappropriate **23%**

No Recent Diagnosis Code **29%**

Locations of Inappropriate RX

- ❖ 71% Office Based
- ❖ 6%   Urgent Care
- ❖ 5%   Emergency Departments

Linder, J BMJ 2019; 364:K5092

Healthcare Effectiveness Data and Information [**HEDIS**]: Outpatient Measures

GOAL: 100%

2012 National Performance

1. Appropriate testing for children with pharyngitis — 80% (2-97%)
2. Appropriate treatment for children with upper respiratory infection (URI) — 83% (45-99%)
3. Avoidance of antibiotic treatment in adults with acute bronchitis — 23% (7-72%)

https://www.ncqa.org/hedis/

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- Office of Disease Prevention and Health Promotion
- 10-year national evidence based objectives for improving the health of all Americans

Objectives related to reducing antibiotic use:

1. Ear infections for young children
2. Treatment of the common cold

GAME TIME: Opportunities for improvement

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Kahoot.it

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Proposed Joint Commission Standard

The Joint Commission

Proposed New Requirements for Antimicrobial Stewardship

Ambulatory Health Care Accreditation Program

MM.09.01.03

1   Antimicrobial stewardship is identified as an organizational priority.

Elements of Performance (EPs) for MM.09.01.03

- ❑ **Goal:** Promote appropriate antimicrobial prescribing
- ❑ <u>**Individual**</u> responsible for developing, implementing, and monitoring activities
- ❑ Set goal(s)
  - ❑ **Protocol** and **Guidelines**
  - ❑ Patient/Family **Education**
  - ❑ Collect/analyze/report **data**

https://www.jointcommission.org/antimicrobial_stewardship_–_ambulatory_health_care_ahc/

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TJC Program Needs: Leadership

Pharmacists are well positioned leaders

- Leaders in inpatient antimicrobial stewardship
- Experts in medication management
  - pharmacokinetics and pharmacodynamics
  - adverse effects
  - drug-drug interactions
  - selection of non-antimicrobial symptomatic therapy alternatives

Goal (s):
- ❑ **Protocol** and **Guidelines**
- ❑ Patient/Family **Education**
- ❑ Collect/analyze/report **data**

J Am Pharm Assoc 2017;57(4):464-73

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What Should Pharmacy Leaders Know

- Anti-infectives are consistently in top category of health care expenditures

  - 10.7 Billion in 2010
  - 8.9 Billion in 2015

  60% in outpatient setting

  30% are NOT necessary

- Antibiotic use impacts the community not just the patient (ie. drug resistance, *c. difficile*)
- Adverse events from anti-infectives are costly to the healthcare system
- Antibiotic stewardship has the potential to reduce expenditures

Suda, K, CID 2018;66(2):185-90

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What Should Pharmacy Leaders Know

Evaluate

– Existing antimicrobial support for outpatient settings

– Current antimicrobial prescribing practices

Commit

– Administrative commitment to support antimicrobial stewardship is imperative

Promote

– Pharmacist as leaders

• Infectious Diseases training is essential (residency or training program)

A Commitment to Our Patients About Antibiotics

Antibiotics only fight infections caused by bacteria. Like all drugs, they can be harmful and should only be used when necessary. Taking antibiotics when you have a virus can do more harm than good: you will still feel sick and the antibiotic could give you a skin rash, diarrhea, a yeast infection, or worse.

Antibiotics also give bacteria a chance to become more resistant to them. This can make future infections harder to treat. It means that antibiotics might not work when you really do need them. Because of this, it is important that you only use an antibiotic when it is necessary to treat your illness.

How can you help? When you have a cough, sore throat, or other illness, tell your doctor you only want an antibiotic if it is really necessary. If you are not prescribed an antibiotic, ask what you can do to feel better and get relief from your symptoms.

Your health is important to us. As your healthcare providers, we promise to provide the best possible treatment for your condition. If an antibiotic is not needed, we will explain this to you and will offer a treatment plan that will help. We are **dedicated** to prescribing antibiotics **only** when they are needed, and we will avoid giving you antibiotics when they might do more harm than good.

If you have any questions, please feel free to ask us.

Sincerely,

Your name here

UW Business Case Example

- 2016 Request for additional 1.0 FTE clinical pharmacist to oversee Ambulatory, Pediatric, and Regional stewardship programs
- Core duties related to ambulatory stewardship
  - Conduct post-prescriptive antimicrobial order **audit and deliver provider feedback** (e.g. de-escalation, drug-bug mismatches, dose optimization, parenteral to oral conversion) **to UW Health Clinics**
  - Develop and **maintain clinical tools** for pediatric and clinic-based patients (**clinical practice guidelines, formulary restrictions, order sets, delegation protocols**) to improve safety and quality of antimicrobial use
  - Collaborate with infection control on drug-related initiatives related to healthcare-acquired infections
  - Lead **initiatives focused on meeting organizational population health goals** related to the use of antimicrobials
  - Coordinate the development of **clinician focused antimicrobial education and competencies**

UW Business Case Example

- Key benefits
  - Safety and quality (reduced antimicrobial variation -> improved patient outcomes)
  - Value management (improved diagnostic testing -> improved antimicrobial utilization)
  - Facilitate transitions of care (decrease ADRs and increase discharge capture rate)
  - Regulatory compliance (TJC standard coming soon)

- Bottomline
  - Addition of 1.0 FTE improves safety and quality, provides education, standardizes cost -effective care
  - Hard dollar ROI = 2:1
  - Soft dollar ROI = antimicrobial resistance mitigation, ensure regulatory compliance, improve external reporting

GAME TIME: The Joint Commission is Coming!

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CURRENT AMBULATORY ANTIMICROBIAL STEWARDSHIP EFFORTS

Complex problems require simple solutions!

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Infection Type		
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Unnecessary Antibiotic Use	**>25%**	**30%**

- Appropriate
- Potentially Appropriate
- Inappropriate
- No Recent Diagnosis Code

13% 36% 23% 29%

Linder, J BMJ 2019; 364:K5092
Shapiro, D, Hicks, L, Pavia, A & Hersh, A JAC 2014
Fleming-Dutra, Hersh, A Shapiro, D et al. JAMA 2016

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Successful Strategies: Nudges

Original Investigation

Nudging Guideline-Concordant Antibiotic Prescribing
A Randomized Clinical Trial

- Nudge: "prod (someone) gently, ~~typically with one's elbow,~~ in order to draw their attention to something"

- Goal: to improve over prescribing for Upper Respiratory Tract Infections (URI)
  - URI: mostly viral ≠ antibiotics
- Intervention: N=14 clinicians, 5 clinics
  1. Poster-size commitment letters in exam rooms
  2. Standard practice

Nudge

Improving Decisions about
Health, Wealth, and Happiness

Richard H. Thaler and Cass R. Sunstein
...with a new afterword

"One of the few books I've read recently that fundamentally changes the way I think about the world." —Steven Levitt, coauthor of *Freakonomics*
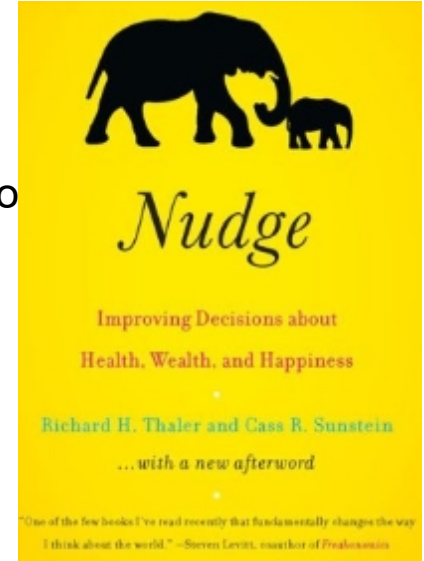
Meeker, D *JAMA Intern Med.* 2014;174(3):425-431

Poster Examples

Successful Strategies: Nudges

Inappropriate URI Prescribing

Meeker, D *JAMA Intern Med.* 2014;174(3):425-431

Successful Strategies: Nudges

Conclusions

- Simple, low cost, easily scalable intervention
- Harnessed the clinicians' desire to be consistent with "public commitment"
  - Poster included picture and signature as endorsement
  - "Antibiotic Judo"
- Extrapolated avoidance if applied intervention across US
  - 2.6 million unnecessary antibiotics
  - $70.4 million antibiotic associated savings

Meeker, D *JAMA Intern Med.* 2014;174(3):425-431
Spellberg, B *JAMA Intern Med.* 2014;174(3):432-33

Successful Strategies: Nudge

Impact of Education and Data Feedback Interventions on Outpatient Prescribing for Urinary Tract Infections at DUHS

- **Study population**: Adult patients seen for acute UTI at primary care or urgent care clinics between 8/1/16 and 4/3/18

- **Primary endpoint**: Rate of guideline concordant antibiotic prescriptions

- **Statistics:** Interrupted time series analysis used to assess phase and trend changes

Funaro, J Wrenn, RH Open Forum ID 2018; 5 (suppl 1):S89

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Pre-Education
- Development of clinic-specific urinary antibiograms
- Creation of UTI diagnosis and quinolone-sparing treatment guidelines based on resistance trends

Education
- One-hour educational session delivered to clinic providers
  - Primary Care Clinic: August 15, 2017
  - Urgent Care Clinic: November 7 & November 14, 2017
- Provided antibiotic dosing recommendations and link to CustomID.org

Post-Education
- Posted Duke "Commitment to Patients" Posters
- Data feedback email sent to both clinics on February 20, 2018

Funaro J, Wrenn RH, Open Forum ID 2018; 5 (suppl 1):S89

Successful Strategies: Nudges

DIAGNOSIS

Diagnosis requires both microbiologic & symptomatic criteria. *A positive urinalysis alone is usually not adequate to diagnose a UTI**

A) Microbiologic Criteria		B) Symptomatic Criteria	
Pyuria (WBCs $\geq$10/HPF) **OR** (+) leukocyte esterase	**AND**	**Cystitis**[1-3]	**Pyelonephritis or Catheter Associated UTI**[1-3]
		Acute presentation of at least one of the classic symptoms: • Dysuria • Urinary frequency • Urinary urgency Other possible indicators: • Suprapubic pain • Hematuria	May experience cystitis symptoms along with systemic symptoms specific to pyelonephritis: • Fevers (temperature $\geq$ 38 C) • Chills • Flank pain • Costovertebral angle pain • Nausea & vomiting

*Conditions where asymptomatic bacteriuria may be adequate to initiate treatment for UTI include pregnancy, traumatic genitourinary procedures associated with mucosal bleeding, and immunosuppressed patients[2]

CLASSIFICATION

Uncomplicated UTI [1]	Complicated UTI [1,3]
• **Non-pregnant females**	• Males; pregnant or preadolescent females
• **Immunocompetent**	• Immunocompromised (e.g. high dose steroids, immunosuppressive

TREATMENT

Consider culture history and prior antibiotic exposure when determining treatment of choice.
For detailed dosing recommendations, please refer to customid.org

Cystitis (complicated or uncomplicated)[4]				
	Agent	Duration of Therapy		Comments
		Uncomplicated	Complicated	
1st line	Nitrofurantoin	5 days	7 days	Avoid if pyelonephritis, in 3rd trimester, or if CrCl <4
	TMP-SMX	3 days	7 days*	*Use duration of 10-14 days if delayed response.
2nd line	Cephalexin	7 days	10-14 days	

A COMMITMENT TO OUR PATIENTS ABOUT ANTIBIOTICS

ANTIBIOTICS ARE IMPORTANT FOR FIGHTING INFECTIONS CAUSED BY BACTERIA

Taking antibiotics when you don't need them can cause unwanted issues, like a skin rash or diarrhea. It can also lead to bacteria changing and becoming more resistant, which makes infections harder to treat.

As healthcare providers, we promise to provide the best possible treatment for your condition.

If an antibiotic is not needed, we will explain this to you and offer a plan that can help.

We are dedicated to providing antibiotics only when they are needed, and we will avoid giving you antibiotics when they might do more harm than good.

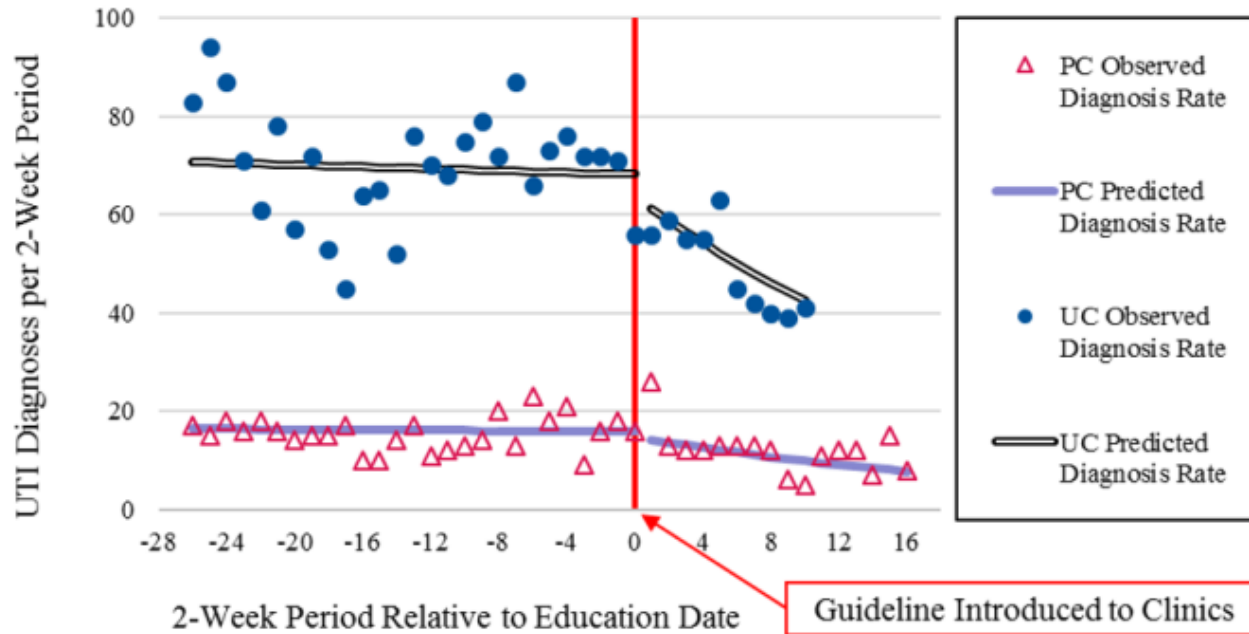for more information, please visit dcasip.medicine.duke.edu

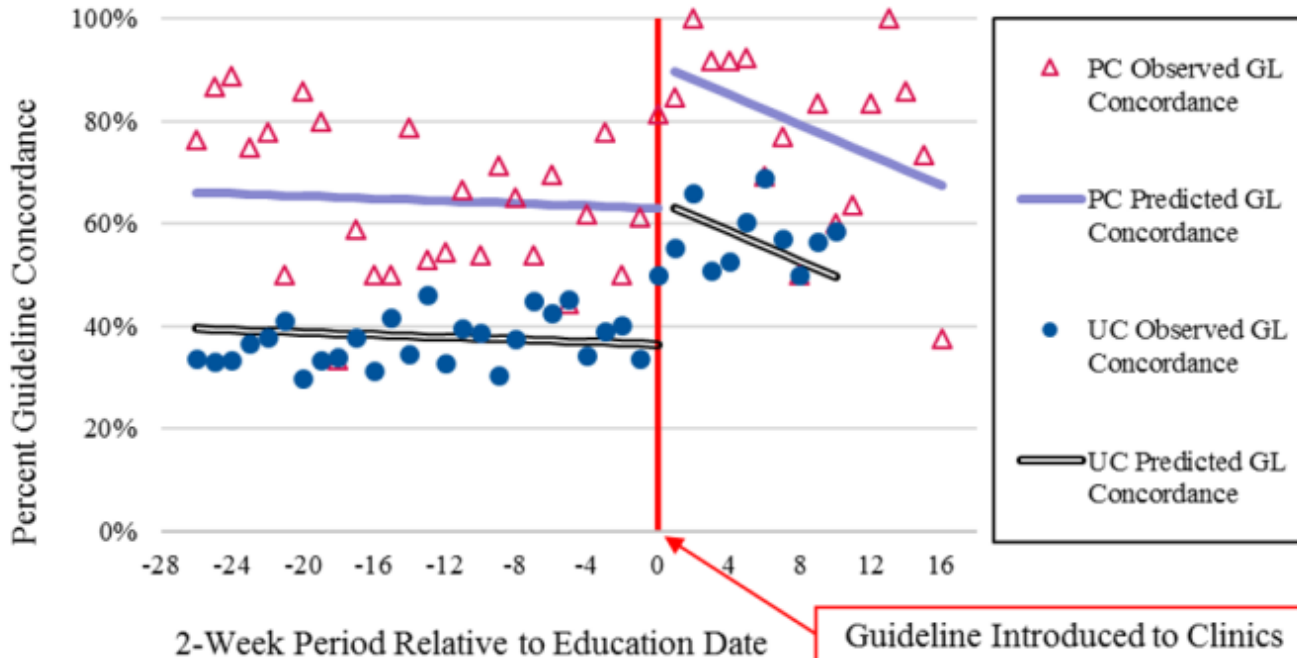Duke Center for Antimicrobial Stewardship and Infection Prevention

UTI Diagnosis PLUS Antibiotics Rate

Guideline Concordance Rate

	Recommended Agent	
Cystitis	**Primary Care**	**Urgent Care**
1st line	Nitrofurantoin TMP-SMX	Nitrofurantoin
2nd line	Cephalexin	Cephalexin
3rd line	Ciprofloxacin Fosfomycin	TMP-SMX Ciprofloxacin Fosfomycin
Pyelonephritis	**Primary Care**	**Urgent Care**
1st line	Ciprofloxacin	Ceftriaxone AND either TMP-SMX OR Ciprofloxacin
2nd line	Ceftriaxone AND either TMP-SMX OR PO beta-lactam	Ceftriaxone AND PO beta-lactam

■ Baseline   ■ Post-Education

41% increase

46% decrease

98% increase

30% decrease
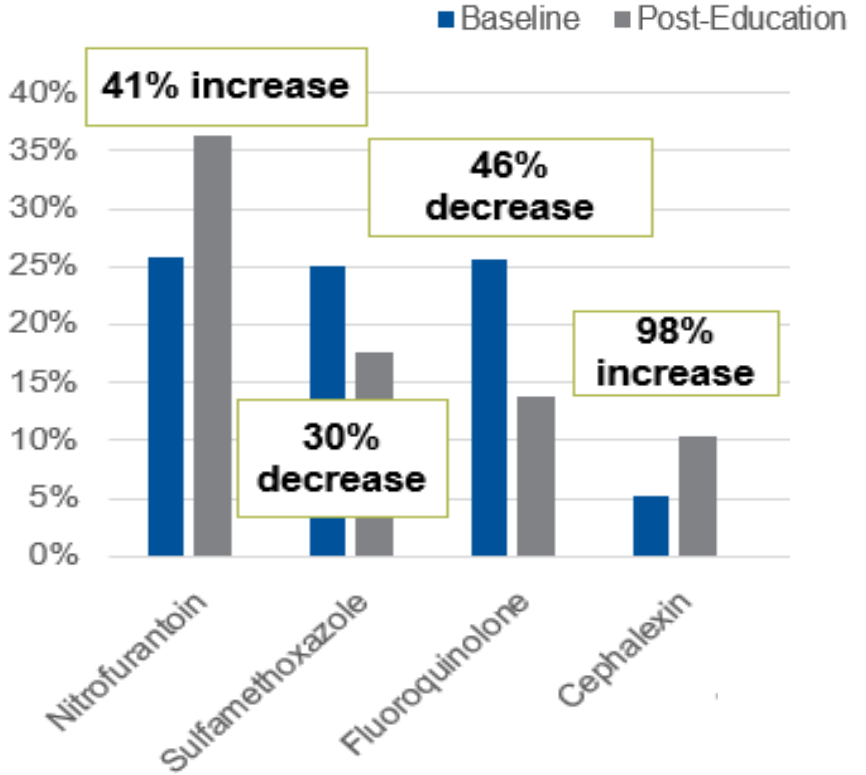
Study Conclusions

- Antimicrobial stewardship education is effective at enhancing guideline-directed UTI prescribing
  - 19% increase in guideline-concordant antibiotic prescribing, as a result of:
    - **41% increase** in nitrofurantoin prescribing
    - **46% decrease** in fluoroquinolone prescribing
    - **98% increase** in cephalexin prescribing

  - 21% reduction in mean number of UTI visits with antibiotics prescribed
- Efficacy of educational intervention wanes over time

Remaining Questions:
1. Impact of routine data feedback
2. Sustainability

Successful Strategies: Address duration early
Default Duration Removal

- DUH discharge antibiotic data from April – September 2016 (N=4527 admissions)
  - Ciprofloxacin: most common discharge antibiotic
    - 16% (N=927) of the discharge antibiotics (N=5692 antibiotics)
    - Median duration of 9 days and a range of 1-365 days
- Fluoroquinolones highly associated with collateral damage
  - 2016 FDA black box warning advocating against use for certain uncomplicated infections
- UK demonstrated 80% reduction in the rates of C. difficile after reducing fluoroquinolone utilization both in and outpatient

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Successful Strategies: Address duration early
Default Duration Removal

Default EPIC electronic prescription (e-Script) durations for antimicrobials ranged from 5 to 365 days

Change Implemented 12/19/17:

1. Removed 10 day default for fluoroquinolones to a blank days field
2. Add CustomID to reference links within antimicrobial orders

	Pre-DDR 12/20/16-12/20/17	Post-DDR 12/20/17- 3/20/18
Clinic Encounters	30508	8016

DDR=Default Duration Removal

https://idsa.confex.com/idsa/2018/webprogram/Paper71592.html

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Successful Strategies: Address duration early
Default Duration Removal

	FQ e-Script Cumulative Days of Therapy		FQ e-Script Mean Duration		
	Pre-DDR	Post-DDR (3mo)	Pre-DDR	Post-DDR	p
Clinics	245723	63340	7.89	7.74	0.004

- Duke University Hospital ambulatory care fluoroquinolone exposure avoided
  - **1202 days avoided** in the **3 months** post duration default removal
- Control group (Augmentin and Bactrim)
  - Mean duration pre 9.15 and post 9.11 (p=0.2)
- Simple intervention with associated avoidance

DDR=Default Duration Removal

https://idsa.confex.com/idsa/2018/webprogram/Paper71592.html

Successful Strategies: Change diagnostic testing!
Duke Psychiatric UTI OrderSet

- Annually 4000 adult patients receive psychiatric consultations in the Duke ED
- Duke Psychiatry Admission Policy required mandatory UA

Baseline Antibiotic Treatment of Psychiatric Patients

- 30% — Asymptomatic bacteriuria
- 70% — Symptomatic bacteriuria
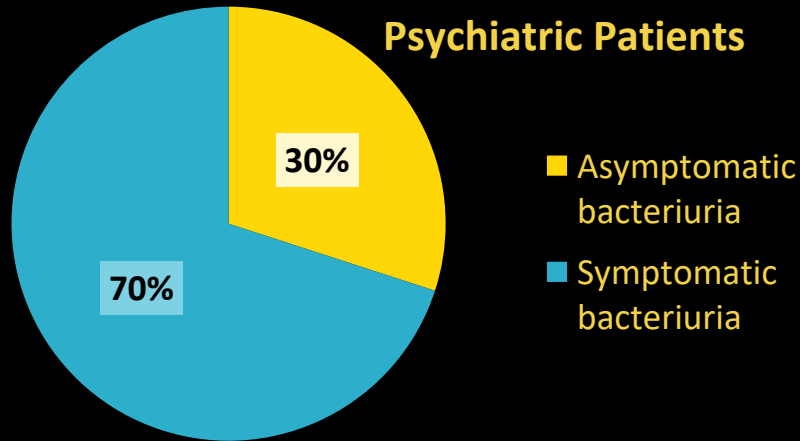
Solution
- Queried psychiatry facilities regarding their medical screening requirements
- Education
- Creation of two order sets +/- UA

Conclusion
Review order set – You'll be surprised what you find!!

Helmke, N, Wrenn RH Association of Medicine and Psychiatry; October 2018

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Successful Strategy: Address diagnostic testing!

- 2016 – unlinked urine culture from UA

requires indication

GAME TIME: Simple Solutions!

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~~Complex problems require simple solutions!~~

Complex problems require complex solutions!

Understanding ambulatory prescribing

Restriction/Prior Authorization

Prospective audit and feedback

Four Moments of Ambulatory Prescribing

Infection requiring antibiotics?	Appropriate cultures ordered?
Do I still need antibiotics?	What is appropriate duration?

Ambulatory Antibiotic Prescription (center)

- In order to change ambulatory prescribing patterns, need to address 4 critical points of prescribing

Tamma PD, Miller MA, Cosgrove SE. Rethinking How Antibiotics Are Prescribed: Incorporating the 4 Moments of Antibiotic Decision Making Into Clinical Practice. *JAMA.* 2019;321(2):139–140. doi:10.1001/jama.2018.19509

Factors that influence ambulatory prescribing

Modifiable

- Patient factors
  - Education
  - understanding of appropriate antimicrobial use
- MD experience
- MD training method

Non-modifiable

- Insurance type
- Clinic volume
- Physician workload

1. Jung, Sophia, et al. "Variability of antibiotic prescribing in a large healthcare network despite adjusting for patient-mix: reconsidering targets for improved prescribing." Open Forum Infectious Diseases. 2019.
2. Tamma PD, Miller MA, Cosgrove SE. Rethinking How Antibiotics Are Prescribed: Incorporating the 4 Moments of Antibiotic Decision Making Into Clinical Practice. *JAMA.* 2019;321(2):139–140. doi:10.1001/jama.2018.19509
3. Spellberg, Brad. "Antibiotic judo: working gently with prescriber psychology to overcome inappropriate use." *JAMA internal medicine* 174.3 (2014): 432-433.

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Successful Strategies: Changing Drug Choice
Addressing Penicillin Allergies

β-lactam antibiotics are preferred agents for many infections

Around 10-24% of patients report PCN allergy

- Only **2-15%** of patients with reported penicillin allergies actually have a positive reaction to penicillin skin testing
- Adverse reactions account for 30 – 75% of reported allergies

Implications of PCN allergy

- Increased rates of C.difficile, MRSA and VRE infections, LOS, surgical site infections

Rimawi RH, Cook PP, Gooch M. et al. J Hosp Med 2013
Macy E, Schatz M, Lin C, Poon K-Y. Perm J 2009
Macy E, Ngor E. J Allergy Clin Immunol Practice 2013
Charneski L, Deshpande G, Smith SW. Pharmacotherapy 2011

Unger NR, Gauthier TP, Cheung LW. Pharmacotherapy 2013
Lee CE, Zembowoer TR, Fotis MA, et al. Arch Intern Med 2000
KG Blumenthal, EE Ryan,Y Li, et al . CID 2018

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Successful Strategies: Changing Drug Choice
Improving the Allergy Interview

- **What** age the patient was when the reaction occurred
- **When** the reaction occurred in relation to taking the antibiotic
- **Where** the reaction occurred (localized v. whole body)
- **How** the reaction was treated (did they need to seek urgent medical care?)
- Was the medication was ever **re-challenged?**
- Have they have tried **similar antibiotics?**
  - E.g. Augmentin, Amoxicillin, Keflex/Cephalexin
- Look at medication history to see if they have received similar antibiotics in our system
- <u>**Educate the patient**</u> why your questions are important so they want to keep answering them ☺

Successful Strategies: Changing Drug Choice
Improving the Allergy Documentation

Poor Documentation

	React...	Severity	Reaction Type	Noted
Allergies				
✏ **Penicillins**	HIV...			5/31/2017

✔ Mark as <u>R</u>eviewed | Unable to Assess | 📅 ...ewed by Erin K M... ...31/2017 at 8:30 AM (History)

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Good Documentation

	Reaction	Severity	Reaction Type	Noted	Valid Until	Updated
Allergies						
✏ **Penicillins**	HIVES			5/31/2017		Past Updates...

Occurred 40+ years ago 2-4 hours after receiving IM injection. Hives were localized to arm. Patient reports she has tolerated amoxicillin in the past. Also tolerated cefazolin at UW on 5/31/17.

✔ Mark as <u>R</u>eviewed | Unable to Assess | 📅 Last Reviewed by Erin K McCreary, RPH on 5/31/2017 at 8:30 AM (History)

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Successful Strategies: Changing Drug Choice
Improving access to allergy testing

- Impact of penicillin allergy on surgical site infections (SSI)
  - Retrospective cohort study (N=8385), 2010- 2014
  - Hip or knee arthroplasty, hysterectomy, colon surgery, and coronary artery bypass grafting

- 50% increase risk of SSI
- Increase use of alternative agents

Allergy assessments needed to prevent 1 SSI: 112-124

Pre-op Prophylaxis	Reported PCN Allergy	No Reported PCN Allergy	p value
Cefazolin	12%	92%	<0.001
Clindamycin	49%	3%	<0.001
Vancomycin	35%	3%	<0.001
Gentamicin	24%	3%	<0.001

KG Blumenthal, EE Ryan,Y Li, et al . CID 2018

Successful Strategies: Changing Drug Choice
Penicillin Allergy Relabeling Avoidance

Penicillin Allergy Assessments and Skin Testing at DUH

May 2015: Pilot study of targeted allergy assessment

Establish allergy assessment tool and operationalized

Transition of care technician completed, Verified by pharmacist

Nov 2016: Penicillin skin testing (PST) program Go-Live

102 patients skin tested

Intensified targeted allergy assessment increased removal of PCN allergy

July 2017: Allergy assessments outpatient and referrals to outpatient PST

BMT, Lung Transplant, and (later) Heart Transplant/VAD

Post-PST

1. Inform patient and family members
2. Inform primary team and consulting team (if applicable)
3. Complete progress note
4. Remove allergy from chart (if applicable)

Avoiding Allergy Re-entry

A Best Practice Alert (BPA) created to alert staff who attempt to **re-enter** a penicillin allergy on a patient who had a negative PST

Allergies/Contraindications   [x]

⚠ PENICILLIN G is currently marked as deleted.
       Noted: 1/29/2018
       Reactions: Hives
       Reaction Type: Allergy
       Delete reason: No Longer Allergic
       Delete comment: **Negative Penicillin Skin Test on 5/30/2017**

   Would you like to undelete this agent?

                                        [Yes]   [No]

Successful Strategies: Changing Drug Choice
Penicillin Allergy Relabeling Avoidance

- BPA fires inpatient to end user when allergy re-entered
  - 100% of re-entered allergies have been removed by end user
- BPA initially did not fire to end user in outpatient setting
  - Allergies can be entered by non-prescribers
  - Challenging for inpatient antimicrobial stewardship team to connect with outpatient personnel who entered the allergy

This patient has been flagged due to a re-entry of a Penicillin Allergy. This patient's penicillin allergy was previously removed following the Pre-Pen Skin Test, the penicillin allergy is not clinically relevant, or the patient is no longer allergic based on the Allergy Assessment questionnaire.

Inactive

Date		Actions Taken	Triggers	Comment
07/17/18 1333	RMA	Send In Basket Message	Enter Allergy - SmartData Element (PATIENT) DUHS RX PRE-PEN SKIN TEST [DUHS#1567]: Yes - Allergen: PENICILLINS	None

Successful Strategies: Changing Drug Choice
Penicillin Allergy Relabeling Avoidance

Conclusions:

1. Appropriate allergy histories are <u>**very**</u> important in the ambulatory setting

2. Think about operational aspects BUT don't stop there
   - ❑ A consistent member of the ambulatory care staff is important
   - ❑ Transition of care or pharmacy technicians are well positioned

3. Patients appreciate the education and clarification

4. It is important to consider the care continuum

Successful Strategies: Feedback

Original Investigation

Effect of Behavioral Interventions on Inappropriate Antibiotic Prescribing Among Primary Care Practices
A Randomized Clinical Trial

- Goal: Improve over prescribing for Upper Respiratory Tract Infections (URI)
- Interventions: Behavioral + Nudges
    1. Suggested alternatives
    2. Accountable justification
    3. Peer comparison
- Primary care clinicians (N=248) in 47 practices randomized to 0, 1, 2, or 3 interventions

Meeker, D JAMA 2016;315:562-570

Successful Strategies: Feedback

1. Suggested alternatives

   EMR Note : Antibiotics are generally not recommended for X indication

   Orders built into EMR

   - ❑ Decongestants, Antihistamines, Cough Suppressants, Bronchodilators
   - ❑ Excuse from work patient letter

2. Accountable justification

   EMR Note : Antibiotic for a likely viral process, enter justification below

   – if nothing is entered "No justification for prescribing antibiotic was given" will **appear in patient's record**

3. Peer comparison

   Email: "You are a Top Performer" vs "You are not a Top Performer"

Meeker, D JAMA 2016;315:562-570

Successful Strategies: Feedback

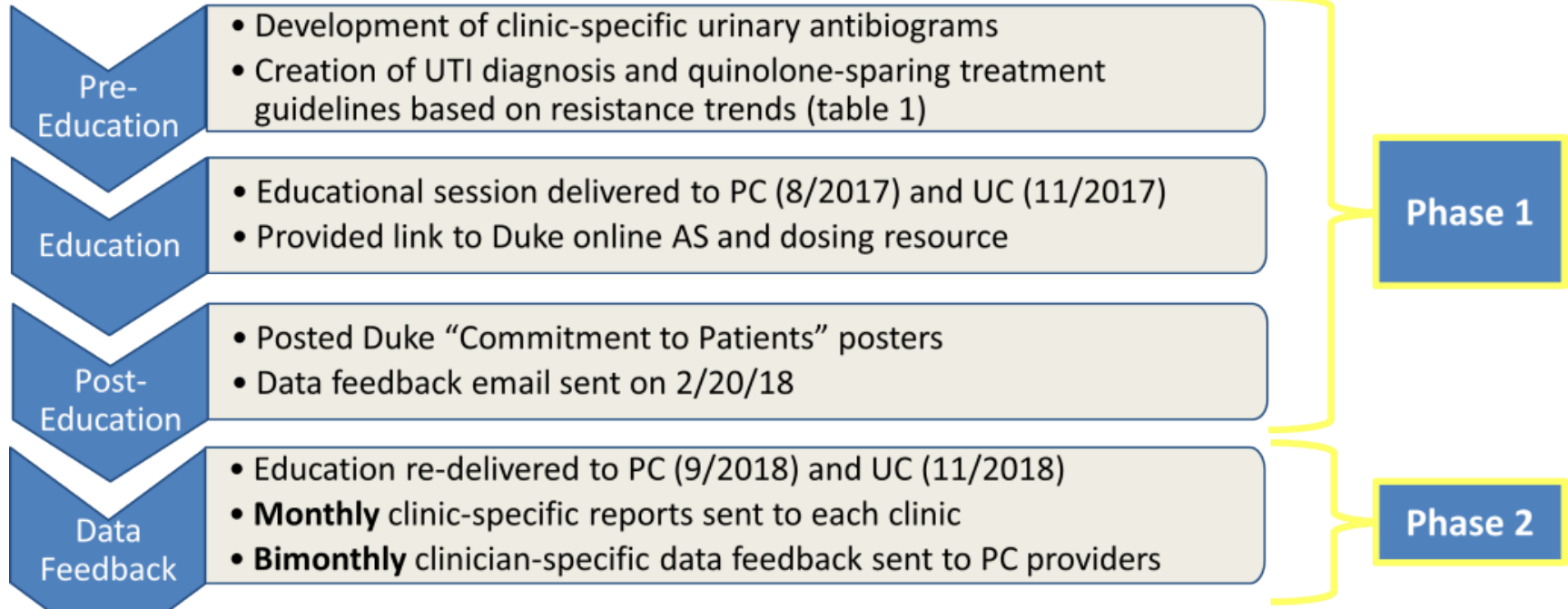| Antibiotic Use			
	Baseline	**Post Intervention**	**p**
Control	24%	11%	
Suggested Alternatives	22%	16%	NS
Accountable Justification	23%	18%	<0.001
Peer Comparison	20%	16%	<0.001
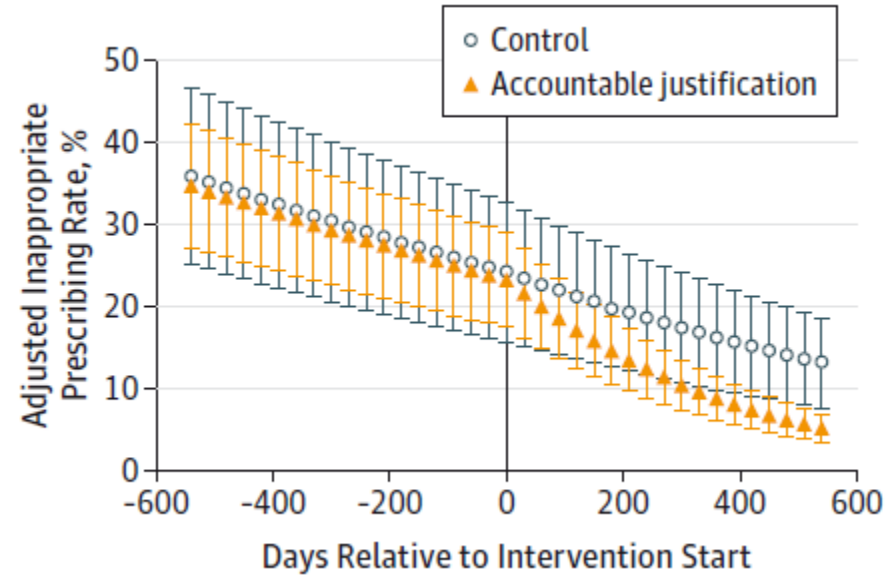
Meeker, D JAMA 2016;315:562-570

Successful Strategies: Feedback

Impact of routine education and data feedback on the durability of an antimicrobial stewardship intervention for urinary tract infections

Pre-Education
- Development of clinic-specific urinary antibiograms
- Creation of UTI diagnosis and quinolone-sparing treatment guidelines based on resistance trends (table 1)

Education
- Educational session delivered to PC (8/2017) and UC (11/2017)
- Provided link to Duke online AS and dosing resource

Post-Education
- Posted Duke "Commitment to Patients" posters
- Data feedback email sent on 2/20/18

Data Feedback
- Education re-delivered to PC (9/2018) and UC (11/2018)
- **Monthly** clinic-specific reports sent to each clinic
- **Bimonthly** clinician-specific data feedback sent to PC providers
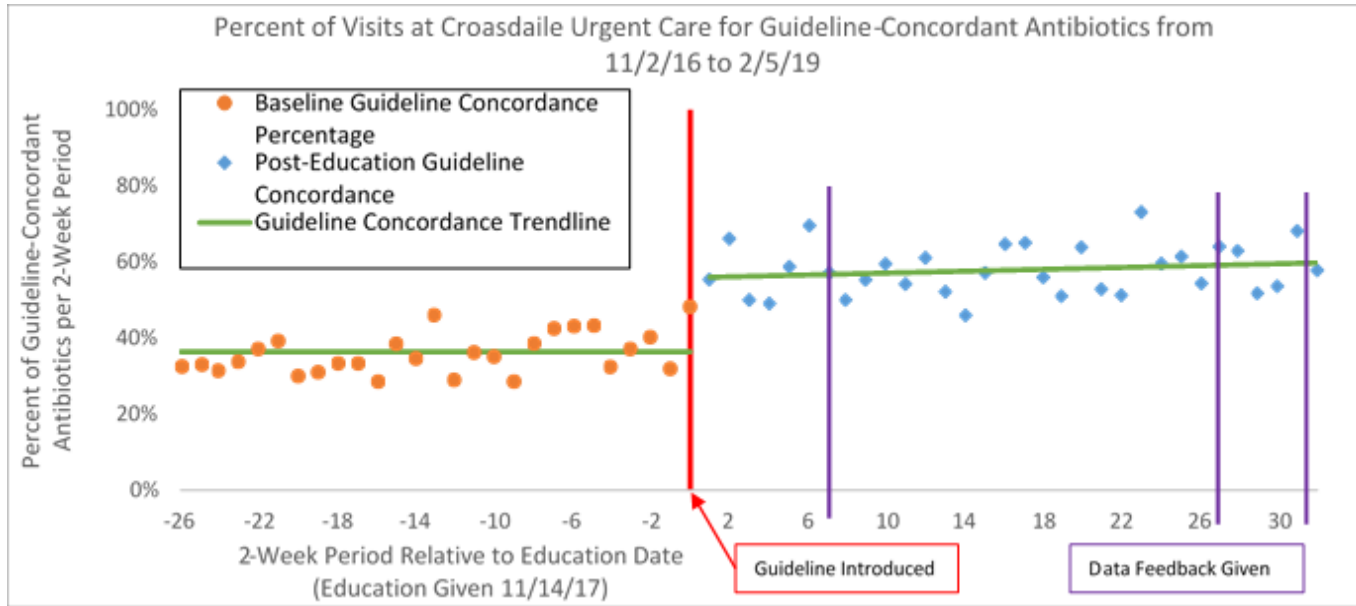
Phase 1

Phase 2

Successful Strategies: Feedback

Impact of routine education and data feedback on the durability of an antimicrobial stewardship intervention for urinary tract infections

Sustainability?

Antibiotic Use			
	Baseline	Post Intervention	**Post Intervention Removal**
Control	24%	-11%	**-2.4%**
Suggested Alternatives	22%	-16%	**+1.4%**
Accountable Justification	23%	-18%	**+4.1%**
Peer Comparison	20%	-16%	**+1.5%**
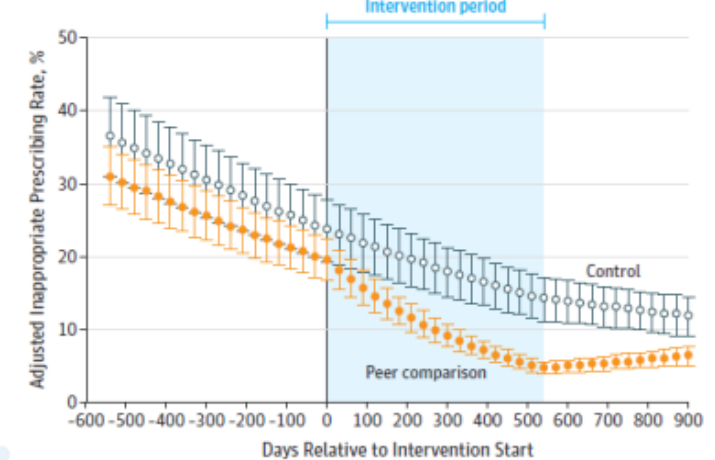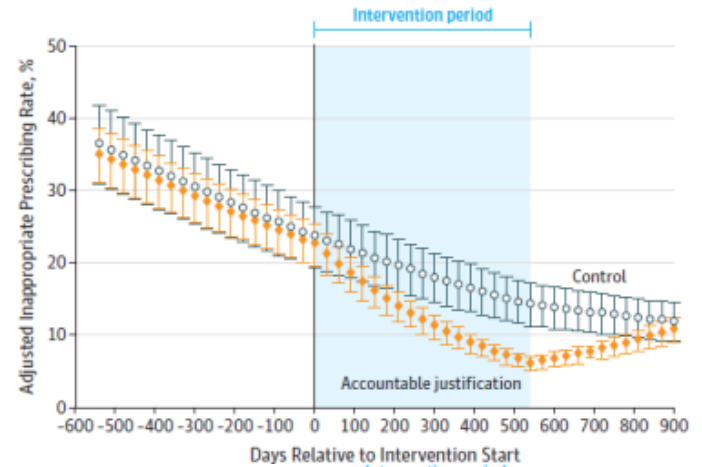
Linder, J JAMA 2017;318:1391-1392

UW approach to ambulatory feedback

- 2017: evaluate ambulatory prescribing patterns

- 2018: develop antimicrobial order tool (indications)

- 2019: roll out reporting platform
  - Executive level
  - Department level
  - Provider level

1. Chief complaint/ Reason for call

2. Billing associated diagnosis

3. Encounter Diagnosis

4. Order-associated Diagnosis

5. Indication requirement (pre-determined Medispan)

6. Order question (customized)

Methods of Measuring Antibiotic Indication

1. Chief complaint / Reason for call

- Advantages
  - Already a requirement to close office visits, telephone encounters, and refill encounters
  - Gives some historical data to start baseline analysis

- Disadvantages
  - Often entered by MA in many clinics
  - Lacks specificity (Ex. "cough")
  - Patients often have multiple complaints
    - Which may have led to anti-infective order?

Methods of Measuring Antibiotic Indication

2. Billing diagnosis

- Advantages
  - Gives some historical data to start baseline analysis
  - Billing data is typically consistent

- Disadvantages
  - Diagnosis determined by coders
  - Not available for un-billed encounters like telephone and refill encounters
    - Phone/refill represents 27% of antibiotic prescribing
  - Typically many billing diagnoses per encounter
    - Difficult to determine which may have led to anti-infective order

Methods of Measuring Antibiotic Indication

3. Encounter diagnosis

- Advantages
  - Existing workflow requirement for office visits
  - Gives some historical data to start baseline analysis

- Disadvantages
  - Currently not required to close telephone and refill encounters
    - Phone/refill represents 27% of antibiotic prescribing
      - Only 1/3 of these encounters have any encounter diagnosis documented at all
  - Typically multiple diagnoses per encounter for those where it is documented
    - 2.3 per encounter
    - Difficult to determine which may have led to anti-infective order
  - Uncertain who populates this field (MD vs RN vs MA)

4. Order associated diagnosis

- Advantages
  - Can pinpoint a reason why a drug was ordered
  - Providers familiar with providing diagnosis in clinic encounters

- Disadvantages
  - Additional step for providers
  - Appears as though this would need to be required for all medications, not only antibiotics
  - Little historical data for baseline analysis
    - Only 20% of antibiotics currently have any diagnosis associated

Order Associated Diagnosis

Class:

| E-Prescribe 🔍 | **E-Prescribe** | Local Printer | No Print | Phone In | Historical Med | Print for Fax | Normal |

> This medication will not be e-prescribed. If patient is present, script will go to printer. Otherwise, script will go to nursing or tech pool. Invalid items: **Provider** **Details**... .

Dx Assoc.: Click to associate diagnoses

Note to Pharmacy (F6): (300 char max.) Click to add text

When you click on "associate diagnoses"

Class:

| E-Prescribe 🔍 | **E-Prescribe** | Local Printer | No Print | Phone In | Historical Med | Print for Fax | Normal |

> This medication will not be e-prescribed. If patient is present, script will go to printer. Otherwise, script will go to nursing or tech pool. Invalid items: **Provider** **Details**...

Dx Assoc.:

	Assc	Encounter Diagnoses	Codes	Qualifier	Comment
1	☐	Sternal osteomyelitis	M86.9		
2	☐	Bacteremia	R78.81		
3	☐	·			

Note to Pharmacy (F6): (300 char max.) Click to add text

Methods of Measuring Antibiotic Indication

5. Indication requirement (pre-determined by Medispan)

- Advantages
  - Can pinpoint a reason why a drug was ordered
  - Can be used in any type of encounter (office visit, phone, etc.)
  - Can be turned on for anti-infectives only
  - Relatively easy to build and maintain

- Disadvantages
  - Additional step for providers
  - Little historical data to start baseline analysis
    - Only 1.6% of anti-infective prescriptions currently have any indication documented
  - Indications provided by Medispan are cumbersome and have limited utility

Medispan Indications for Trimethoprim/Sulfamethoxazole

Bacterial endocarditis	Diarrhea	Skin and soft tissue infection	Pediculosis capitis
Paratyphoid fever	Typhoid fever	Traveler's diarrhea	Shigellosis
Nocardiosis	Isosporiaosis	Meningitis	Bacterial septicemia
Infection of burn wound	Biliary tract infection	Granuloma inguinale	Septic arthritis
Chancroid	Lymphogranuloma venereum	Paracoccidioidomycosis	Whipple's disease
Chlamydia infection	Acne vulgaris	Gonorrhea	Spontaneous bacterial peritonitis
Pertussis	Osteomyelitis	Brucellosis	HIV
Plague	Cholera	Bone and/or joint infection	Community acquired pneumonia
Toxoplasmosis	Respiratory tract infection	Diabetic foot infection	Bacterial bronchitis
Acute exacerbation of chronic bronchitis	Upper respiratory tract infection	Device-related osteoarticular infection caused by MRSA	

UTI not included!

Methods of Measuring Antibiotic Indication

6. Indication requirement
(UW customized: "order tool")

- Advantages
  - Can pinpoint a reason why a drug was ordered
  - Can be used in any type of encounter (office visit, phone, etc.)
  - Can be turned on for anti-infectives only
  - Used for inpatients for years, highly successful
  - Can customize indications to ensure they are useful

- Disadvantages
  - Additional step for providers
  - No historical data to start baseline analysis
  - Must be built in Epic

1. Chief complaint/ Reason for call

- Gives historical data
- Not specific enough for purposes of antimicrobial stewardship
- Coof vs cough

2. Billing associated diagnosis

- Gives historical data
- Determined by coders
- Multiple diagnoses per encounter
- Often non-specific
- Data difficult to interpret, making antimicrobial feedback limited

3. Encounter Diagnosis

- Gives historical data
- Multiple diagnoses per encounter
- Often non-specific
- Data difficult to interpret, making antimicrobial feedback limited (although better than billing)

4. Order-associated Diagnosis

- Extra "click"
- Providers familiar with providing this in clinic encounters
- Can't be selectively turned on for antibiotics ("all or none")

5. Indication requirement (pre-determined Medispan)

- Extra "click"
- Can turn on for antibiotics only
- Easy to build
- Indications of limited utility for prescribers and stewardship team

6. Order question (customized)

- Extra "click"
- Can turn on for antibiotics only
- Questions easy to use
- Provides good data to allow for meaningful feedback
- Must be built in Epic

Ambulatory Antibiotic Order Tool

- Level 1 – pick infection site:

- Level 2 – pick infection type:

- Collect ACCURATE data on antimicrobial prescribing

- Give regular feedback to each provider on prescribing

Time Commitment for Adding Indication

- 155,091 antibiotics prescribed in 2016 by 887 providers at UW medicine clinics

175 antibiotic prescriptions per year per provider

Taking Out the Bottom 50% of Prescribers...
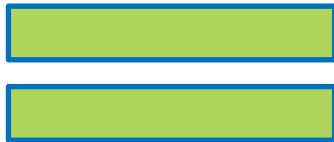
1.3 antibiotic prescriptions per <u>weekday</u> per prescriber

Time Commitment for Adding Indication

- If a prescriber takes 10 seconds to click an antibiotic indication, this will add an average of 13 seconds of work per weekday

The same amount of time it takes to tie your child's shoes while they misbehave

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Ambulatory Stewardship Agenda

Goal: improve community health by encouraging prudent antibiotic use for UW Health patients using evidence-based medicine practices including antibiotic use tracking and reporting actionable data and providing strategic feedback and direction to improve our performance.

1. Review of PRIMARY care prescribing antibiotics

2. Department- and provider-level reporting capabilities

3. Order tool reporting

4. Changing antibiotic prescribing patterns

JANUARY 15, 2018

AMBULATORY ANTIMICROBIAL STEWARDSHIP
PROGRAM EXECUTIVE REPORT
JANUARY 2019

UW HEALTH ANTIMICROBIAL STEWARDSHIP PROGRAM
BARRY FOX, MD AND LUCAS SCHULZ PHARMD

93.4% of antibiotic prescriptions originate from office and telephone visits

- Primary Care Report Inclusion:
  - Family medicine
  - Internal Medicine
  - Urgent Care
  - Geriatrics
  - General Pediatrics
- Excludes: specialty care clinics, antiviral/antifungal/topical medications

- 648,003 annual office visits
  - 86,882 antibiotic prescriptions
- 1,129,241 annual telephone calls
  - 29,937 antibiotic prescriptions
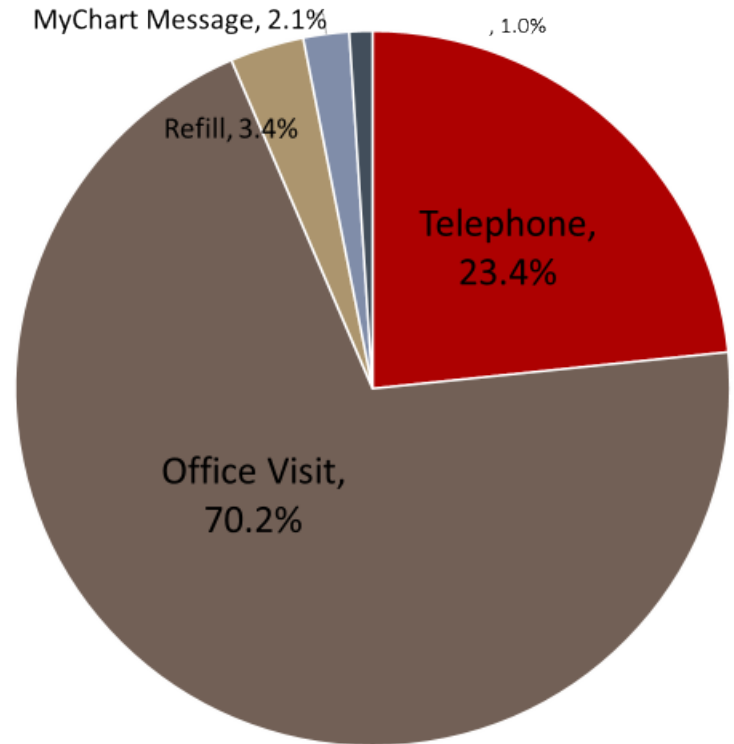
Figure 1: % antibiotics ordered by encounter type 2013-2018

MyChart Message, 2.1%
, 1.0%
Refill, 3.4%
Telephone, 23.4%
Office Visit, 70.2%

What are antibiotics prescribed to treat?

- **Respiratory infections (50%)**
  - bronchitis
  - sinusitis
  - upper respiratory infections
  - pharyngitis
  - otitis media
  - pneumonia

- **Urinary tract (14%)**

- **Skin infections (11%)**

* Data abstracted from encounter diagnosis of office and telephone visits (not order tool)

Deeper Dive Into Respiratory Tract Infections

Antibiotics prescribed in 2018 by primary care providers for treatment of respiratory tract infections

Figure 2: Antibiotic Orders for Targeted Conditions in Primary Care 2018

Other
25%

RTI
50%

UTI
14%

SSTI
11%

Upper respiratory infection
6%

Pharyngitis,Sinusitis, chronic acute non-bacterial 2%
4%

Bronchiolitis
0%

Otitis media, chronic
0%

Bronchitis, acute non-bacterial
9%

Pneumonia/LRTI
10%

[CATEGORY NAME] [PERCENTAGE]

Otitis media, acute
22%

Pharyngitis, strep/bacterial
11%
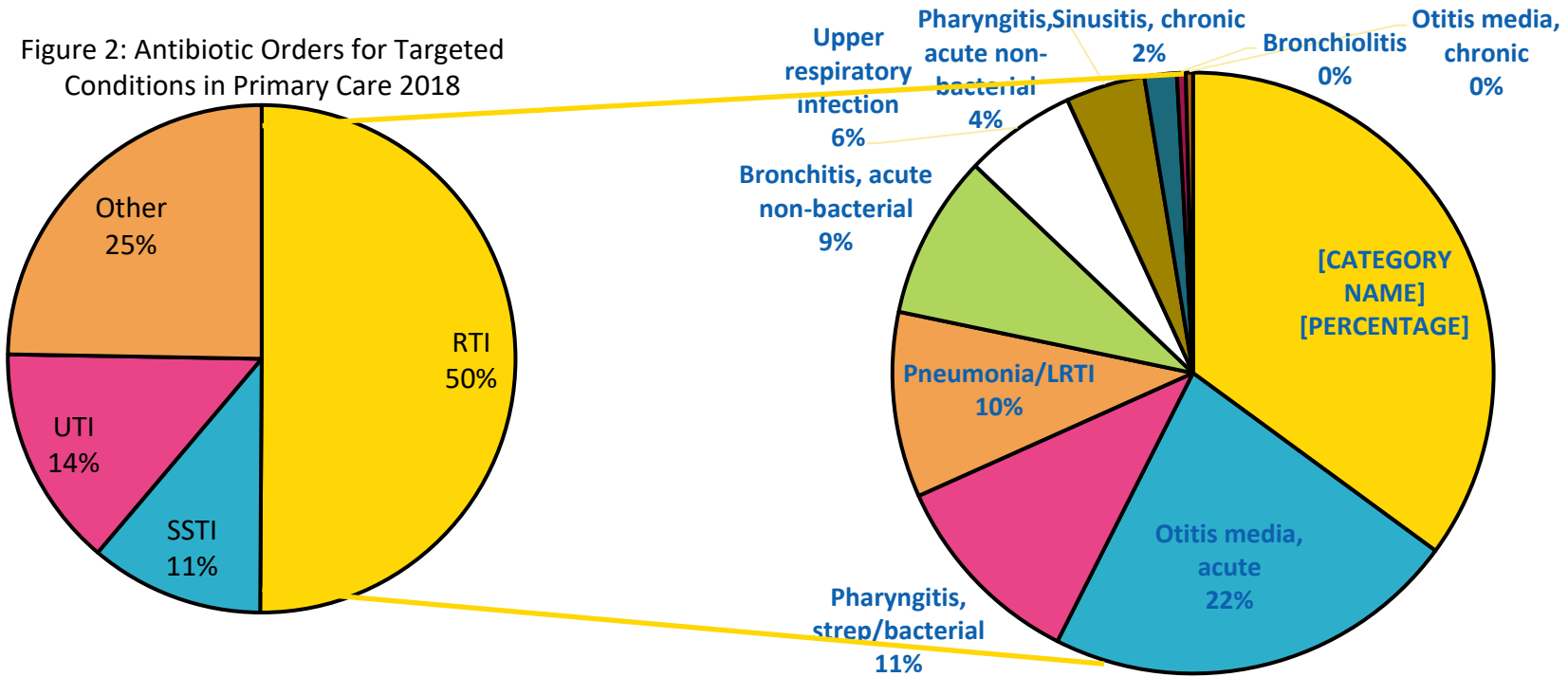
- Acute sinusitis is most common indication for antibiotics in outpatient setting

Sinusitis- UW Health total

- Encounter diagnoses searched

Acute ethmoidal sinusitis	Acute ethmoidal sinusitis, recurrence not specified
Acute frontal sinusitis	Acute frontal sinusitis, recurrence not specified
Acute frontal sinusitis, unspecified	Acute infection of nasal sinus
Acute maxillary sinusitis	Acute maxillary sinusitis, recurrence not specified
Acute maxillary sinusitis, unspecified	Acute non-recurrent ethmoidal sinusitis
Acute non-recurrent frontal sinusitis	Acute non-recurrent maxillary sinusitis
Acute non-recurrent pansinusitis	Acute non-recurrent sinusitis of other sinus
Acute non-recurrent sinusitis, unspecified location	Acute non-recurrent sphenoidal sinusitis
Acute rhinosinusitis	Acute sinus infection
Acute sinusitis	Acute sinusitis, recurrence not specified, unspecified location
Acute sinusitis, unspecified	Acute sphenoidal sinusitis
Acute sphenoidal sinusitis, recurrence not specified	Acute suppurative sinusitis
Clinical sinusitis	Ethmoid sinusitis
Ethmoidal sinusitis	Frontal sinusitis
Frontal sinusitis, unspecified chronicity	Left maxillary sinusitis
Left maxillary sinusitis, unspecified	Maxillary sinusitis
Maxillary sinusitis, acute	Refractory sinusitis
Rhinosinusitis	Rhinosinusitis, unspecified
Right maxillary sinusitis	Right maxillary sinusitis, chronic
Sinus infection	Sinusitis
Sinusitis acute	Sinusitis in pediatric patient
Sinusitis nasal	Sinusitis with nasal polyps
Sinusitis, acute	Sinusitis, acute ethmoidal
Sinusitis, acute frontal	Sinusitis, acute maxillary
Sinusitis, acute, maxillary	Sinusitis, acute, sphenoidal
Sinusitis, unspecified	Sinusitis, unspecified chronicity, unspecified location
Sphenoid sinusitis	Sphenoidal sinusitis

Deeper Dive Into Respiratory Tract Infections

Variability in RTI prescribing by Primary Care Department for 2018

Department Specialty	RTI O/T Encounter (n)	Abx Orders (n)	Orders/ 1000 RTI O/T Encounter	Orders/ RTI O/T Encounter
Immediate Care	13613	9175	674.0	67.4%
Pediatrics	9654	6044	626.1	62.6%
Family Medicine	13202	7786	589.8	59.0%
Internal Medicine	5924	3261	550.5	55.0%
Gerontology	172	39	226.7	22.7%

Deeper Dive Into Respiratory Tract Infections

Variability in RTI prescribing by Primary Care Clinic Location for 2017-2018

Clinic Location	RTI O/T Encounter (n)*	Orders/ 1000 RTI O/T Encounter	Orders/ RTI O/T Encounter
UNIV STATION PEDS URGENT CARE	262	813	81.3%
UNIV STATION PEDS AFTER HOURS	3396	790	79.0%
WEST CLINIC PEDS	1986	777	77.7%
COTTAGE GROVE MAIN FAM MED	1361	774	77.4%
OREGON FAM MED	1607	765	76.5%
UNION CORNERS URGENT CARE	14688	752	75.2%
CROSS PLAINS FAM MED	1425	711	71.1%
⋮	⋮	⋮	⋮
AFCH COMPLEX CLINIC	87	368	36.8%
EAST CLINIC GERIATRICS	185	281	28.1%
UNIV STATION GERIATRICS	235	264	26.4%

- Minimum 25 encounters per year   RTI = Respiratory Tract Infection

Deeper Dive Into Respiratory Tract Infections

Variability in RTI prescribing by Provider Specialty for 2017-2018

Department Specialty	RTI O/T Encounter (n)*	Orders/ 1000 RTI O/T Encounter	Orders/ RTI O/T Encounter
FM1	571	908.9	81.3%
FM2	314	866.2	79.0%
FM3	244	856.6	77.7%
FM4	855	843.3	77.4%
FM5	420	828.6	76.5%
FM6	115	826.1	75.2%
⋮	⋮	⋮	⋮
FM141	174	229.9	36.8%
FM142	57	210.5	28.1%
FM143	53	132.1	26.4%

- Minimum 25 encounters per year   RTI = Respiratory Tract Infection

Order Tool – Variability by Department/Provider

Reason for use: (Select all that apply)

| Abdomen / Gastrointestinal | Bacteremia | Bone / Joint | Gynecologic / Pelvic | HEENT | Insect Borne | Lower respiratory | Mycobacteria | Non-infectious |

| Other bacterial infection | Prophylaxis | Sexually transmitted infection | Skin and soft tissue | Surgical wound infection | Urinary tract |

Type of infection

| Pharyngitis (Streptococcal) | Pharyngitis (non-streptococcal) | Otitis media (acute) | Otitis media (chronic) | Otitis externa | Sinusitis (acute) | Sinusitis (chronic) |

| Dental | Pertussis (Whooping cough) | Ophthalmic | Other |

Click YES if this is a "just in case" medication

Yes   No

Figure 6: Acute Sinusitis
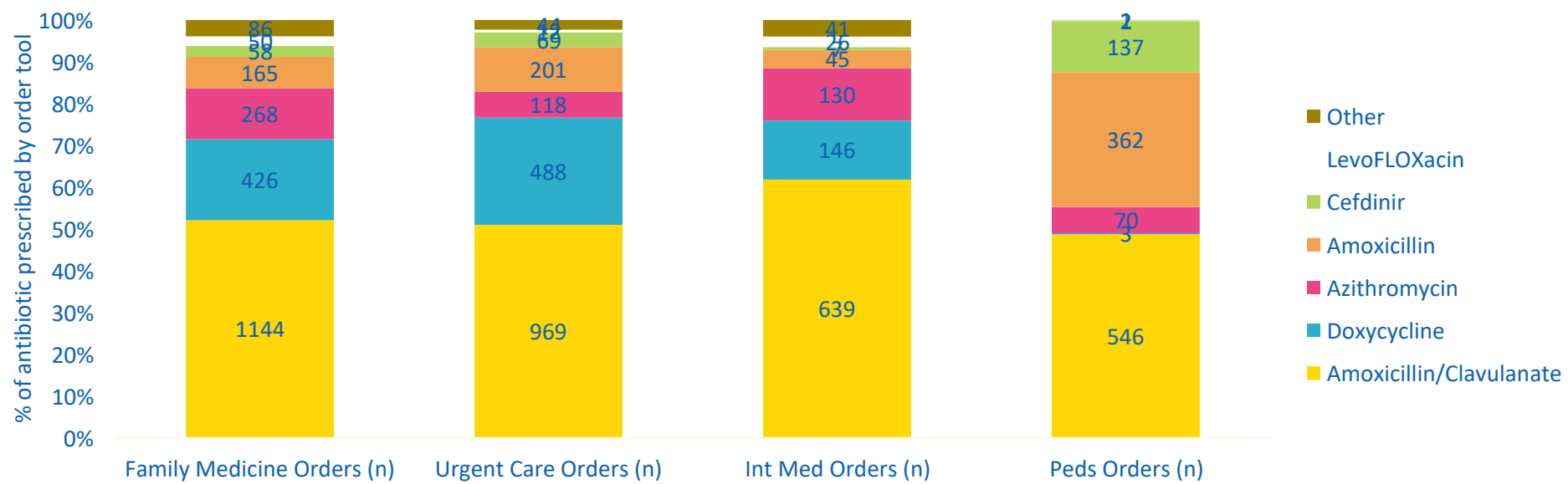
Early Impact of Order Tool on Changing Prescribing Patterns

- Pre-order tool: July – Dec 2017

- Post-order tool: July – Dec 2018

- Primary care department specialties for encounters assigned to targeted conditions (*taken from encounter diagnosis for both time periods)

- Fischer's exact t-test for statistical analysis

Targeted Condition Group*	Pre Order Tool Orders/encounter type (%)	Post Order Tool Orders/encounter type (%)	p-value
All Encounter Diagnoses	6.1%	6.3%	0.721
Respiratory Tract Infections			
Sinusitis, acute	**96.4%**	**95.4%**	**0.062**
Otitis media, acute	84.8%	86.3%	0.470
Pharyngitis, acute non-bacterial	*25.4%*	*22.1%*	*0.078*
Bronchitis, acute non-bacterial	**60.0%**	**52.8%**	**0.034**
Pneumonia/LRTI	**87.3%**	**88.7%**	**0.046**
Pharyngitis, strep/bacterial	95.4%	98.1%	0.169
Sinusitis, chronic	41.1%	39.6%	0.646
Bronchiolitis	17.4%	18.8%	0.794
Otitis media, chronic	52.0%	29.0%	0.063
Upper Respiratory Tract	**24.0%**	**19.8%**	**0.017**
Skin Infections			
Skin and soft tissue infection	69.7%	73.2%	0.109
Urinary Tract Infections			
Urinary tract infection	58.6%	58.9%	0.817

Education is Effective (Urgent Care Pilot)

Targeted Condition Group*	Pre-intervention orders/encounter type (%)	Post-intervention Orders/encounter type (%)	p-value
All Encounter Diagnoses	**78.6 ± 0.4%**	**75.3 ± 0.3%**	**0.03**
Respiratory Tract Infections			
Sinusitis, acute	**100+%**	**97.2%**	**0.001**
Otitis media, acute	96.4%	97.2%	0.590
Pharyngitis, acute non-bacterial	**31.5%**	**25.8%**	**0.006**
Bronchitis, acute non-bacterial	**73.0%**	**54.0%**	**<0.0001**
Pneumonia/LRTI	**100+%**	**100+%**	**0.001**
Pharyngitis, strep/bacterial	100+%	100+%	0.651
Sinusitis, chronic	90.0%	70.5%	0.142
Otitis media, chronic	**96.5%**	**50.1%**	**<0.0001**
Upper Respiratory Tract Infection	**30.9%**	**25.2%**	**0.004**
Skin Infections			
Skin and soft tissue infection	100+%	100+%	0.795
Urinary Tract Infections			
Urinary tract infection	94.8%	90.9%	0.009

- Pre-intervention: Oct 2015 – Dec 2016 (15 months)

- Post-intervention: Oct 2017 – Dec 2018 (15 months)

- Intervention: Education

- Target: Urgent Care Clinics treating RTI

>100% prescribing possible if more than one antibiotic is prescribed during the encounter
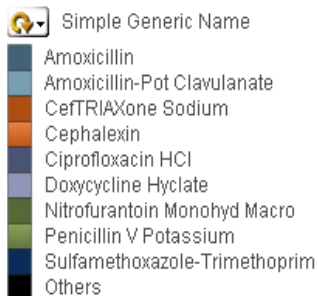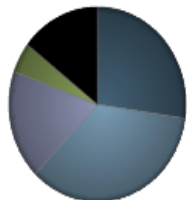
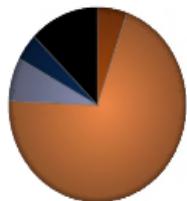# Provider Specific Reporting

Provider Specific Reporting

Types of Orders by I.D. Encounter Dx Category

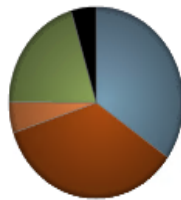### Respiratory Tract Infections

Skin and soft tissue infection

Urinary tract infection

Simple Generic Name
- Amoxicillin
- Amoxicillin-Pot Clavulanate
- CefTRIAXone Sodium
- Cephalexin
- Ciprofloxacin HCl
- Doxycycline Hyclate
- Nitrofurantoin Monohyd Macro
- Penicillin V Potassium
- Sulfamethoxazole-Trimethoprim
- Others

Types of Orders by Dx Group Captured by Ordering Tool

RTI

Skin

Urine

Simple Generic Name
- Acyclovir
- Amoxicillin
- Amoxicillin-Pot Clavulanate
- Azithromycin
- Cefdinir
- CefTRIAXone Sodium
- Cephalexin
- Doxycycline Hyclate
- MetroNIDAZOLE
- Nitrofurantoin Monohyd Macro
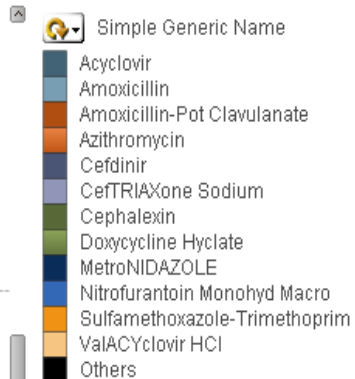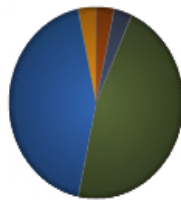- Sulfamethoxazole-Trimethoprim
- ValACYclovir HCl
- Others

Successful Strategies: MONEY

National Health Service in England

Extra funding to Clinical Commissioning Groups (CCGs)

1. ↓ Primary care antibiotics by 4% compared to 2013-14

2. Additional funding if reduce broad spectrum (amox-clav, cephalosporins, and quinolones) to 10% of ttl abx

Clinical Infectious Diseases

MAJOR ARTICLE

IDSA
Infectious Diseases Society of America

hivma
hiv medicine association

OXFORD

The Impact of a National Antimicrobial Stewardship Program on Antibiotic Prescribing in Primary Care: An Interrupted Time Series Analysis

RESULT (23 post intervention months)

○ Antibiotics↓ by 8.2%, 5.9 million prescriptions

○ 18.9% reduction in broad spectrum antibiotics

Wise, BMJ 2016: 352:i1499
Balinskaite, V CID 2018;1-6

ashp SUMMER MEETINGS & EXHIBITION 2019

GAME TIME: Complex Solutions!

1. Open an internet browser on your phone
2. Type **Kahoot.it**
3. Enter the new game PIN
4. Name yourself
5. Get ready to play!

- Points are assigned based on correct answers and the time to answer
- You will see immediately on your personal device if you were correct
- The name of the top scorers will be posted on the leaderboard

Kahoot.it

Navigating the stormy seas of antimicrobial stewardSHIP
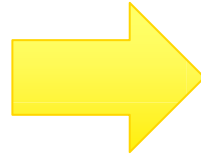
ADDITIONAL RESOURCES

Outpatient Stewardship Resources

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.

Primary care clinics and clinicians

Retail health clinics and clinicians

Outpatient specialty and subspecialty clinics and clinicians

Urgent care clinics and clinicians

Emergency departments (EDs) and emergency medicine clinicians

Dental clinics and dentists

Core Elements of Outpatient Antibiotic Stewardship. MMWR: CDC; 2016;65 (RR-6):1-12

Outpatient Stewardship Resources

- Evidence outline in the Core Elements Appendix

REFERENCE	INTERVENTIONS AND OUTCOMES	METHODS, PARTICIPANTS, AND SETTINGS	RESULTS	CONCLUSIONS
Arnold SR, et al. Interventions to improve antibiotic prescribing practices in ambulatory care. *Cochrane Database Syst Rev* 2005. 4:CD003539.	**Interventions** • Physician educational materials • Audit and feedback • Educational meetings • Educational outreach visits • Financial and healthcare system changes • Physician reminders • Patient-based interventions • Multi-faceted interventions **Outcomes**	**Methods** • Systematic review **Participants** • Healthcare consumers or primary care providers **Setting** • Primary care clinics and ambulatory care clinics	• 39 studies • Only small changes observed for single interventions using printed educational materials or audit and feedback. • Active educational interventions are more effective than nonactive interventions. • Delayed prescriptions effectively reduced antibiotic use by patients without negatively affecting	• Multifaceted interventions are most effective. • No single intervention is recommended for all settings.

- Field guide
- MITIGARE Toolkit
- Free CE modules
- Adult and Pediatric Treatment Guides

Core Elements of Outpatient Antibiotic Stewardship. MMWR: CDC; 2016;65 (RR-6):1-12

KEY TAKEAWAYS

1) *Ambulatory antimicrobial stewardship is an important strategy to improve patient care, reduce unnecessary risk, mitigate antimicrobial resistance, and meet future regulatory accreditation standards*

2) *Pharmacists are uniquely positioned to develop and lead ambulatory stewardship programs. Pharmacists are positioned to reduce antimicrobial exposure through education, data analysis, and patient-specific interventions*

3) *Interventions to improve antimicrobial prescribing range from simple to challenging. Start somewhere and see improvement!*

Ambulatory Antimicrobial Steward**SHIP**: Navigating New and Unknown Waters

Lucas Schulz, Pharm.D., BCIDP
Clinical Coordinator – Infectious Diseases
University of Wisconsin Health
lschulz2@uwhealth.org

Rebekah H Wrenn, Pharm.D., BCPS
Infectious Diseases Clinical Pharmacist
Duke University Hospital
rebekah.wrenn@duke.edu

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