UWTASP tele-antimicrobial stewardship program | echo

Antimicrobial Stewardship in Rural Communities

Zahra Kassamali Escobar, PharmD
September 24, 2024

Project ECHO

Objectives

1. **Identify the need** for antimicrobial stewardship in small and/or rural hospitals

2. **List barriers** to stewardship and quality improvement activities in rural hospitals

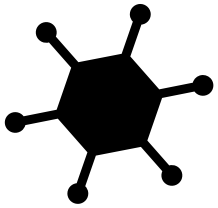
3. **Discuss parallels** between antimicrobial stewardship and other stewardship activities (e.g. opioid stewardship)

Antibiotics are used commonly

- Approximately 50% of all hospitalized patients receive an antibiotic during admission
- 1 in 8 patients are prescribed an antibiotic at hospital discharge
- 20% of patients seen in the ED receive an antibiotic

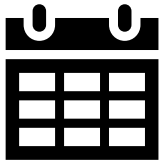
Infection Control & Hospital Epidemiology. 2019;40(8):847-854. doi:10.1017/ice.2019.118
Clin Infect Dis. 2022 May 1; 74(9): 1696–1702. doi: 10.1093/cid/ciab842
Antimicrob Steward Healthc Epidemiol. 2024; 4(1): e79. doi: 10.1017/ash.2024.79

30% of antibiotics are prescribed unnecessarily or inappropriately

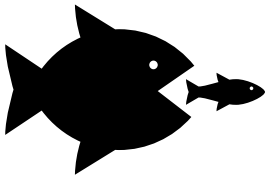


- viral infection

- non-infectious conditions



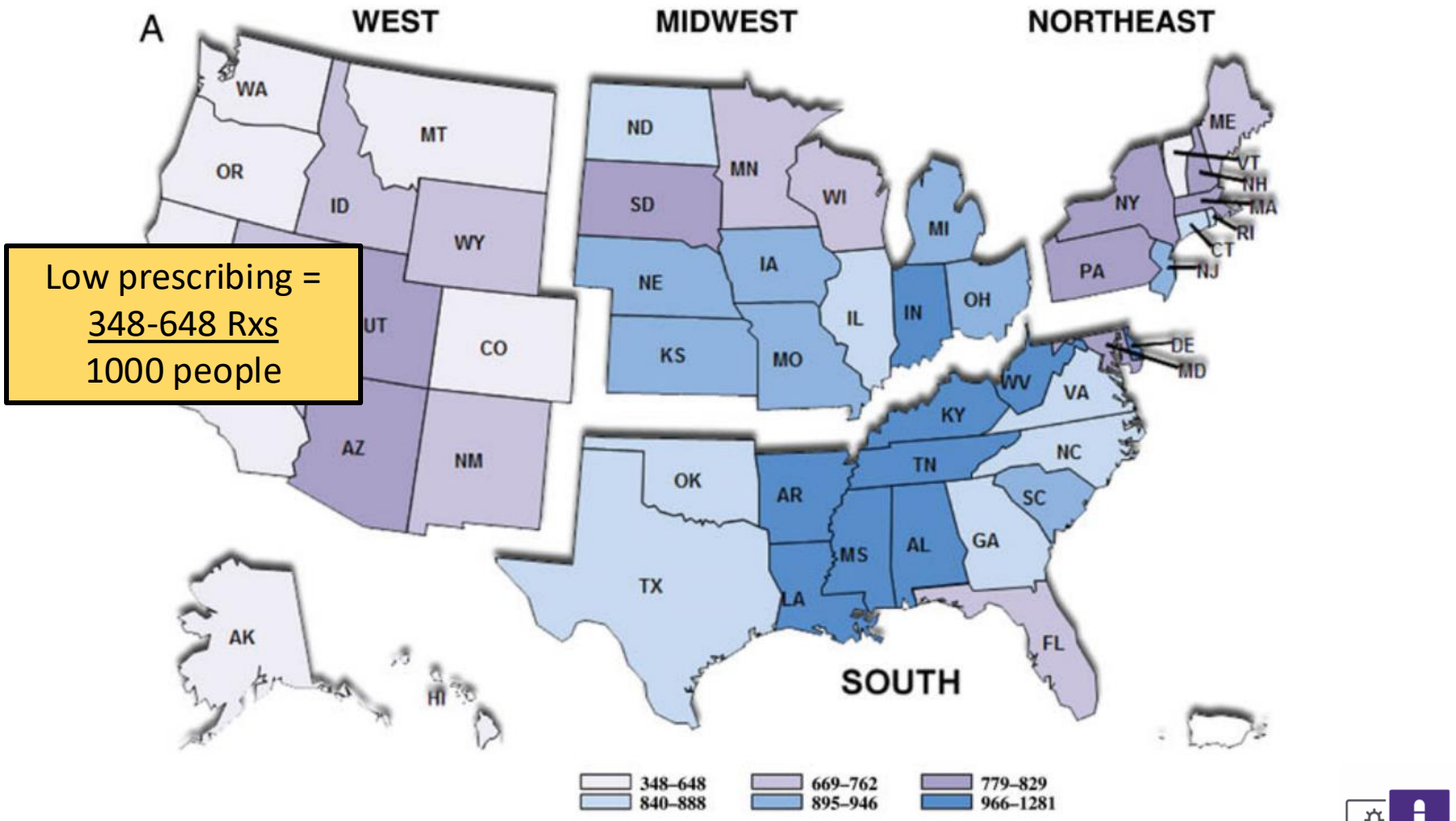
- excessively long durations



- broad-spectrum coverage

Clin Infect Dis. 2021 Jan 23; 72(1): 133–137. doi: 10.1093/cid/ciaa667

Antibiotic prescribing per 1000 persons by state



Low prescribing =
348-648 Rxs
1000 people

Clin Infect Dis. 2015 May 1;60(9):1308-16. doi: 10.1093/cid/civ076.

Why are antibiotics overprescribed?

a) Clinicians unaware of new data

b) Patient expectation or demand

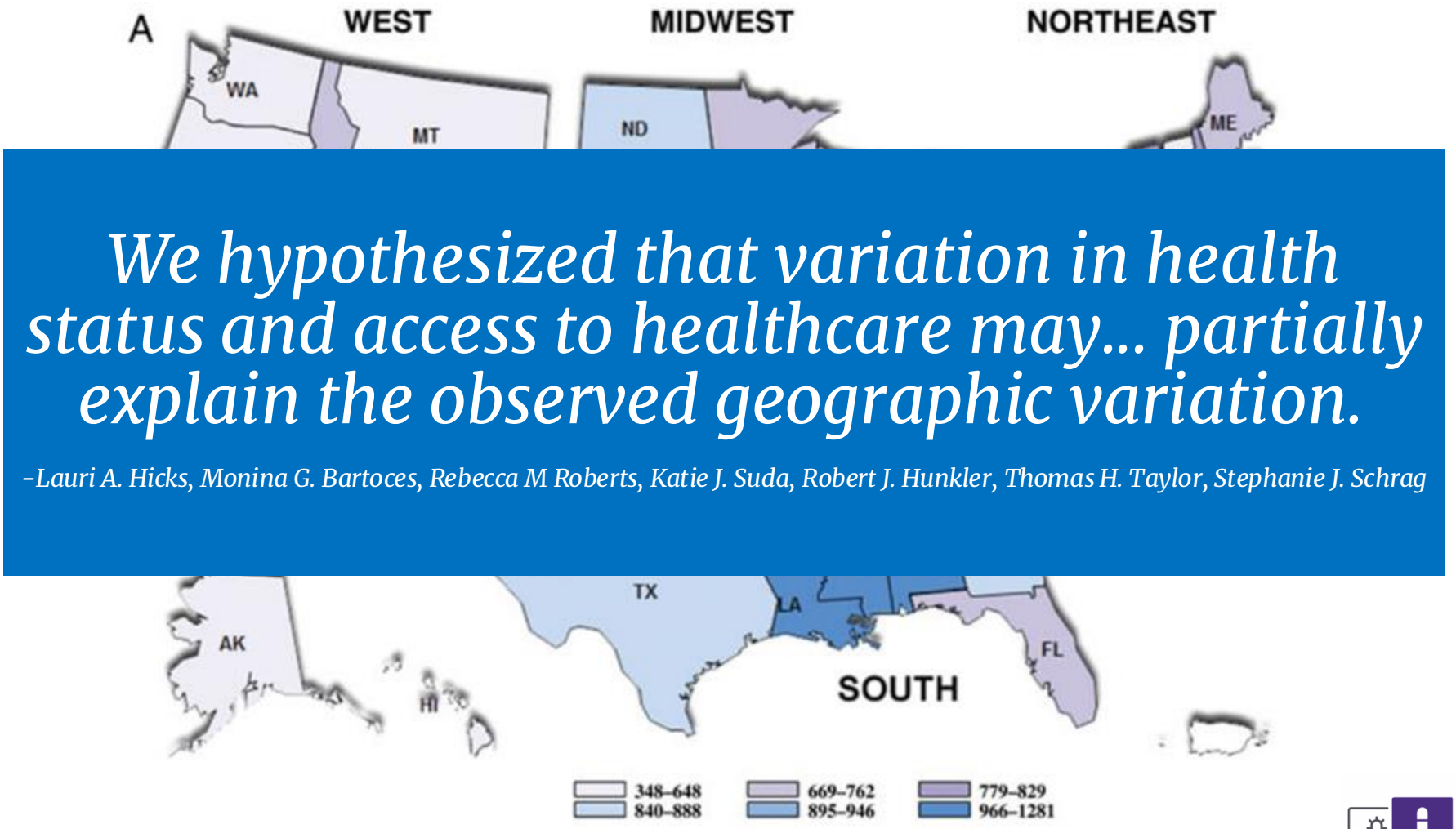
c) Fear of litigation / CYA

d) Something else

Antibiotics to Bridge the Gap

Image from:
https://media.istockphoto.com/id/1220259331/vector/communication.jpg?s=612x612&w=0&k=20&c=hjjc28k4rYORhGhCHjpL0N8Fw5MRhDwPeC4-AcpiuUM=

Antibiotic prescribing per 1000 persons by state



We hypothesized that variation in health status and access to healthcare may… partially explain the observed geographic variation.

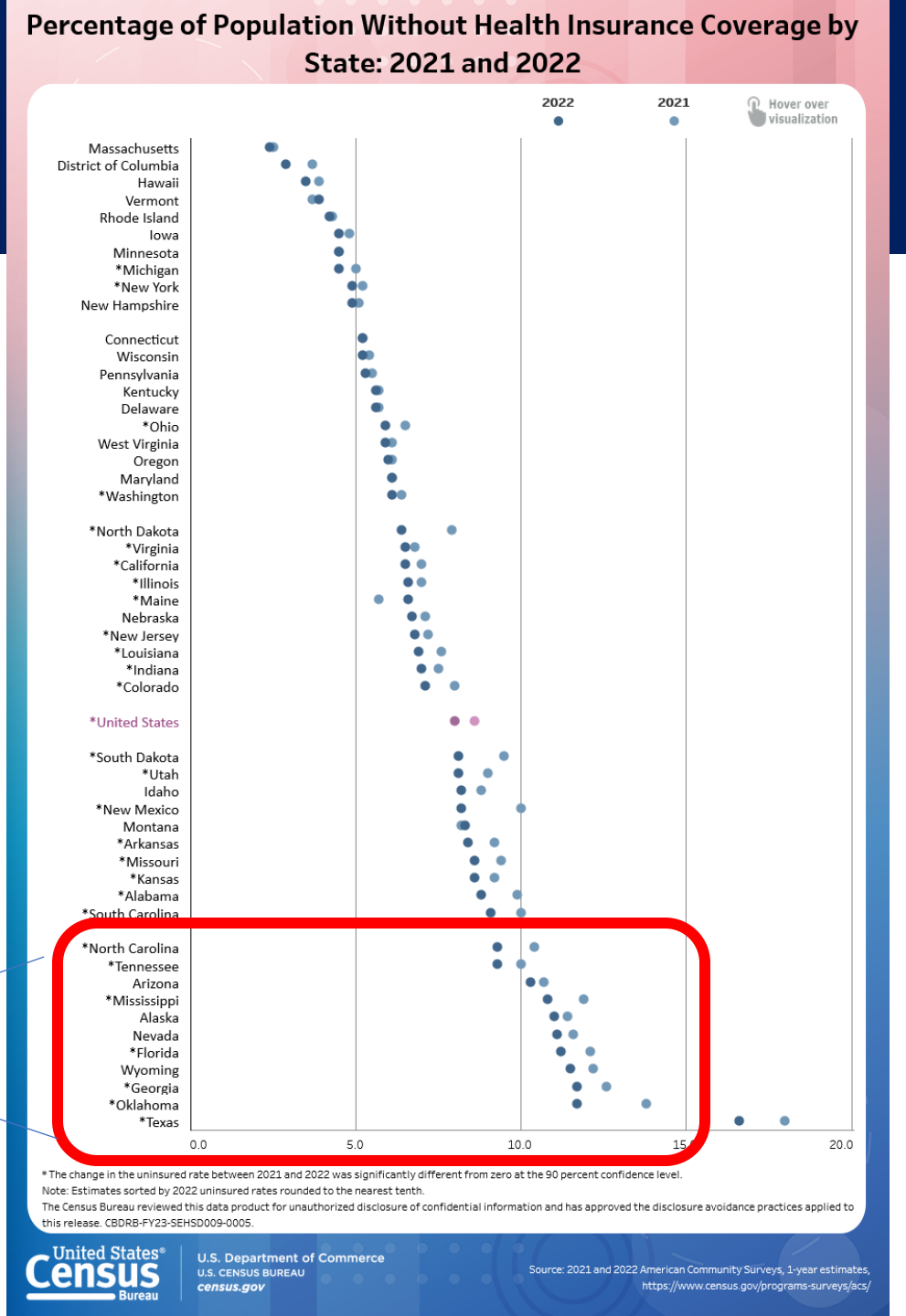
-Lauri A. Hicks, Monina G. Bartoces, Rebecca M Roberts, Katie J. Suda, Robert J. Hunkler, Thomas H. Taylor, Stephanie J. Schrag

Clin Infect Dis. 2015 May 1;60(9):1308-16. doi: 10.1093/cid/civ076.

States with ≥10% uninsurance

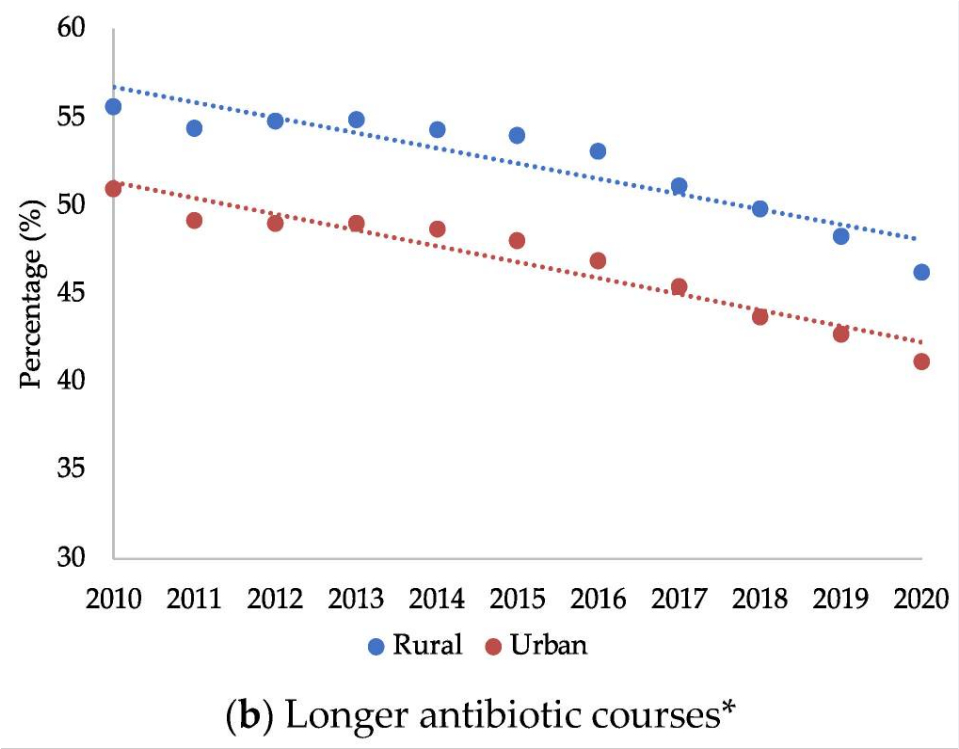
- North Carolina
- Tennessee
- Arizona
- Mississippi
- Alaska
- Nevada
- Florida
- Wyoming
- Georgia
- Oklahoma
- Texas

https://www.census.gov/library/stories/2023/09/health-insurance-coverage.html



Rural Patients Receive MORE Antibiotics

N = 1,405,642 patients



(b) Longer antibiotic courses*

19% longer durations

URI: upper respiratory infection, PNA: pneumonia, UTI: urinary tract infection, SSTI: skin and soft tissue

Antibiotics (Basel). 2023 Feb; 12(2): 224.

Rural Patients Receive MORE Antibiotics

N = 1,405,642 patients

10% longer durations

Prescribers may have a low threshold to prescribe antibiotics to rural-residing patients who show signs of a viral infection due to fears of complications arising from a secondary bacterial infection and issues related to the patient being unable to access follow-up care. Rural-residing patients may come to expect antibiotics if they drive long distances....

-Haley J. Appaneal, Aisling R. Caffrey, Vrishali Lopes, David Dosa, and Kerry L. LaPlante

URI: upper respiratory infection, PNA: pneumonia, UTI: urinary tract infection, SSTI: skin and soft tissue

Antibiotics (Basel). 2023 Feb; 12(2): 224.

What is the problem with antibiotic overprescribing?

a) Side effects
b) Multidrug resistant bacteria
c) Microbiome disruption
d) One or more of the above
e) None of the above

Adverse Drug Events (ADE) by Setting

Hospital, Community, Mixed

- 20% of patients
- Most common:
  - 1) Central nervous system
  - 2) Gastrointestinal
  - 3) Hepatic
- Dermatologic: 13% increased odds with each additional day

Hospital

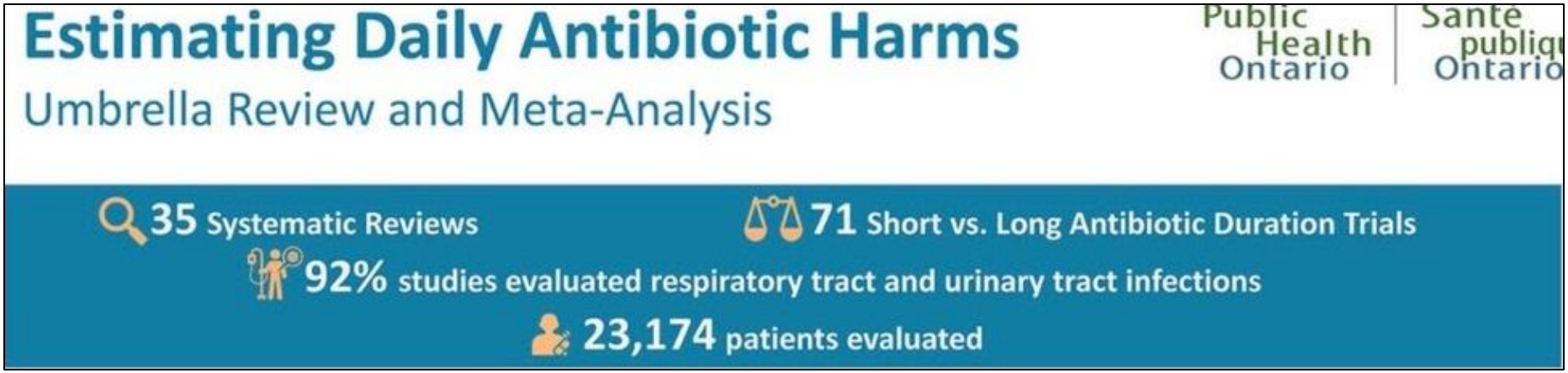
- 16% of patients
- Most common:
  - 1) Gastrointestinal
  - 2) Renal
  - 3) Hematologic abnormalities
- Prolonged hospitalization in 24% of ADE patients

Curran et al. Clin Micro Infect. 2021.

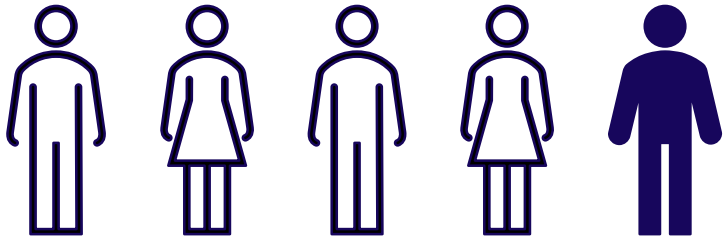
Tamma et al. JAMA Intern Med. 2021.

Slide Credit: Whitney Hartlage, PharmD

Antibiotic Harms



4,565 Harm events = **19.6%**

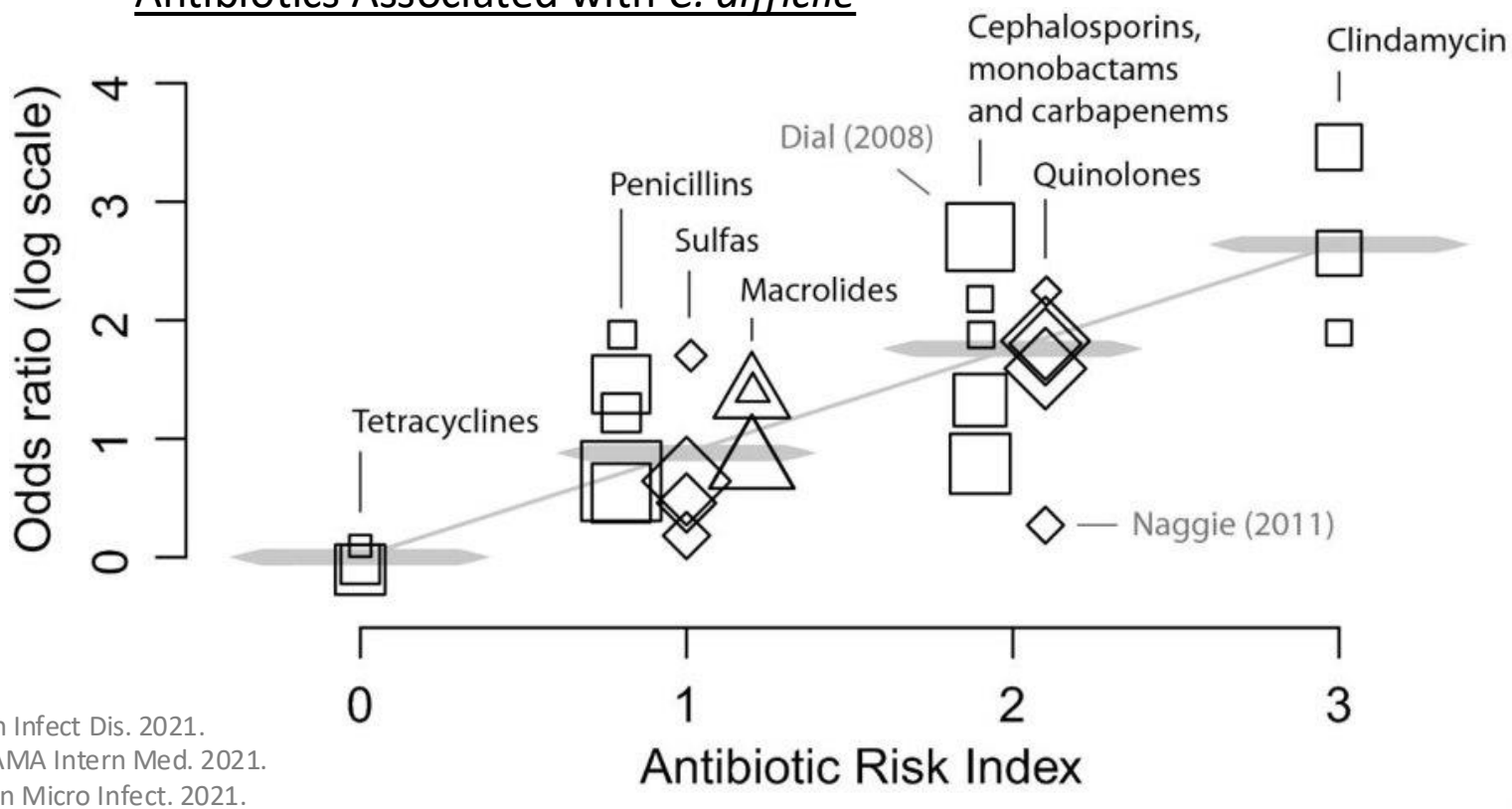


Slide Credit: Whitney Hartlage, PharmD

Curran et al. Clin Micro Infect. 2021.

Super Infections

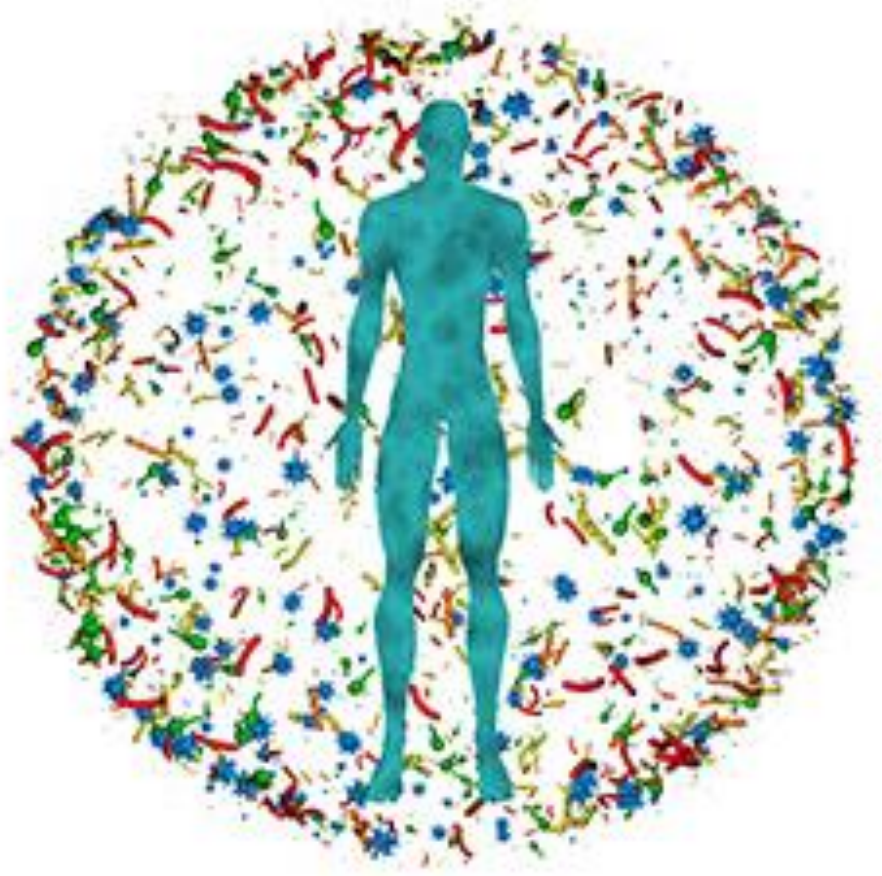
- *Clostridioides difficile* infection
  - 9-13% increase in relative risk with each additional day of therapy



Butler et al. Clin Infect Dis. 2021.
Tamma et al. JAMA Intern Med. 2021.
Curran et al. Clin Micro Infect. 2021.
Brown et al. Antimicrob Agents Chemother. 2013.

Slide Credit: Whitney Hartlage, PharmD

Antibiotics and the Microbiome



NIH defines the microbiome as **The collection of all microbes, such as bacteria, fungi, viruses, and their genes, that naturally live on our bodies and inside us.**

National Institute of Environmental Health Science: www.niehs.nih.gov/health/topics/science/microbiome

Altering the Microbiome Alters Response to Cancer Treatment

The Oncologist®

Immuno-Oncology

Cumulative An

Checkpoint Inh

J Natl Cancer Inst. 2021 Feb 1;113(2):162-170. doi: 10.1093/jnci/djaa057.

September 12, 2019

Association of Antibiotic Exposure With Survival and

Antibiotic Therapy: The Cornerstone of Iatrogenic Resistance to Immune Checkpoint Inhibitors

Authors: David J. Pinato, MD, MRes, MRCP, PhD, and Alessio Cortellini, MD, PhD | AUTHORS INFO & AFFILIATIONS

Publication: Journal of Clinical Oncology • Volume 41, Number 17

https://doi-org.offcampus.lib.washington.edu/10.1200/JCO.23.00049

With Cancer

PMID: 32294209 PMCID: PMC7850522 DOI: 10.1093/jnci/djaa057

Authors: Lawson Eng, MD, SM, Rinku Sutradhar, PhD, Yue Niu, MSc, Ning Liu, PhD, Ying Liu, MSc, Yosuf Kaliwal, MSc, Melanie L. Powis, MSc, Geoffrey Liu, MD, MSc, Jeffrey M. Peppercorn, MD, MPH, Philippe L. Bedard, MD, and Monika K. Krzyzanowska, MD, MPH | AUTHORS INFO & AFFILIATIONS

Publication: Journal of Clinical Oncology • Volume 41, Number 17

Annual antibiotic expenditures: $9 billion dollars

Table 1. Antibiotic Expenditures Overall and by Year in Healthcare Settings in the United States, 2010–2015[a]

Year	Antibiotic Expenditures (in Millions)	% Growth
2010	$10 569	…
2011	$9788	–7.4
2012	$8436	–13.8
2013	$9163	8.6
2014	$9095	–0.7
2015	$8810	–3.1
Total expenditures, 2010–2015	$55 861	–16.6

[a] $P = .1119$ for trend.

Clinical Infectious Diseases, Volume 66, Issue 2, 15 January 2018, Pages 185-190, https://doi.org/10.1093/cid/cix773

Barriers to Stewardship and Quality Improvement in Rural Hospitals

Current State

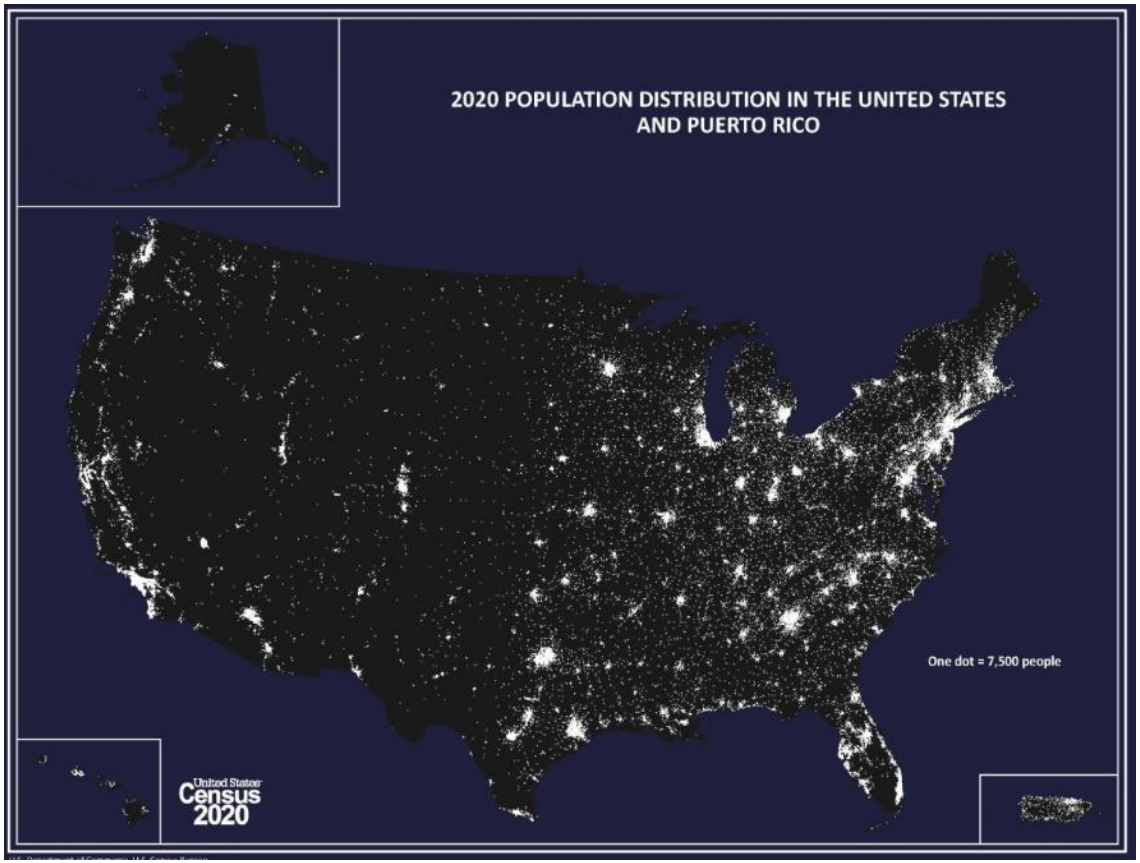
Rural Medicine cares for 1 in 5 Americans

128

Rural hospitals closed since 2010, another 20% are financially unstable

1954

Community health center closures since May 2020



https://www.census.gov/library/visualizations/2021/geo/population-distribution-2020.html
https://www.idsociety.org/globalassets/idsa/public-health/covid-19/covid19-health-disparities-in-rural-communities_leadership-review_final_ab_clean.pdf
https://www.healthaffairs.org/do/10.1377/forefront.20200429.583513/. May 3, 2020.

Current State:
Supply Shortfall

80%

of US Counties without ID specialists

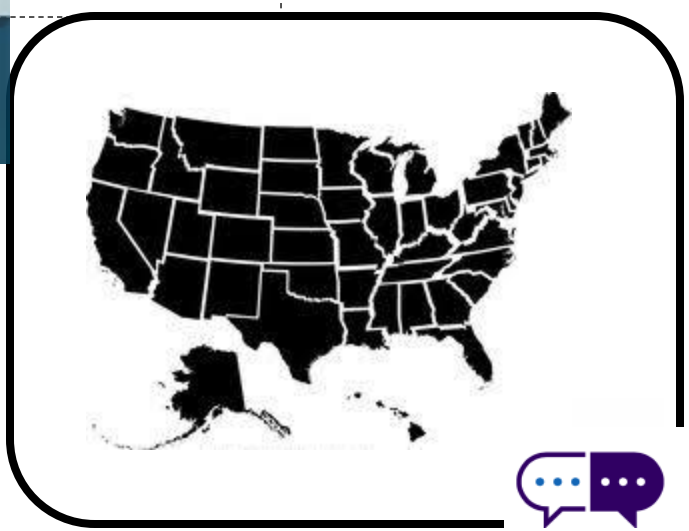
3800-13400

Shortage range for medical subspecialties predicted by 2034

https://www.aamc.org/news-insights/press-releases/aamc-report-reinforces-mounting-physician-shortage. June 11, 2021
https://www.idsociety.org/globalassets/idsa/public-health/covid-19/covid19-health-disparities-in-rural-communities_leadership-review_final_ab_clean.pdf

The Need for a Tele-Solution

Supply + Geography



Tele-Antimicrobial Stewardship
Opportunities

Distributing ID expertise

Shared experiences and avoiding duplicate work

Community

Center for Stewardship in Medicine

TASP ECHO

TELE-ANTIMICROBIAL STEWARDSHIP PROGRAM

- A weekly Telehealth meeting with peer facilities for education and case discussion

Tools

CSIM STEWARDSHIP CORE ELEMENTS

- CSiM faculty-led Antimicrobial Stewardship assessment and review
- Hospital-led Quality Improvement PDSAs tools and templates
- Toolkits, resources, and guidelines
- Grand Rounds opportunities with CSiM faculty
- Antibiotic Pocket Guide
- Annual Conference
- Quality Improvement mentoring & support

The microbiome is the collection of all microbes, such as bacteria, fungi, viruses, and their genes, that naturally live on our bodies and inside us.

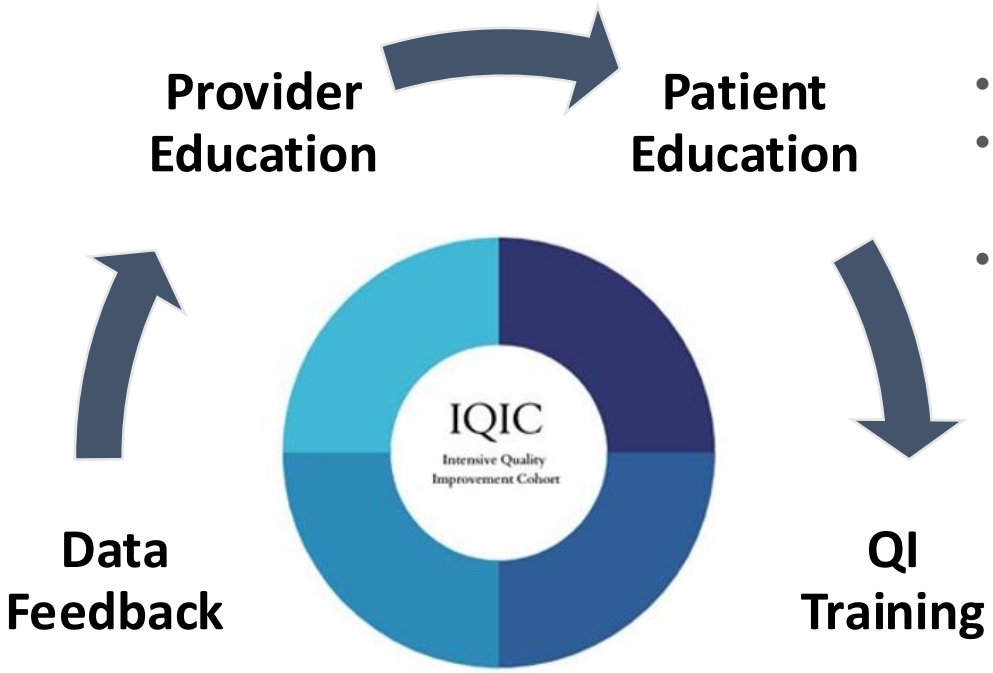
IQIC

INTENSIVE QUALITY IMPROVEMENT COHORT

- A 12-month sub-cohort of CSiM members working on quality improvement interventions based on local hospital data and goal setting.
- Current IQICs: Asymptomatic Bacteriuria 101 and 201

IQIC:
A Multimodal Stewardship Strategy

- Monthly didactics
- Distribute educational tools
  - Nursing huddles
  - Medical staff meetings
  - ED workgroup meetings
  - AMS meetings



- Clinics
- Emergency department
- Nursing stations

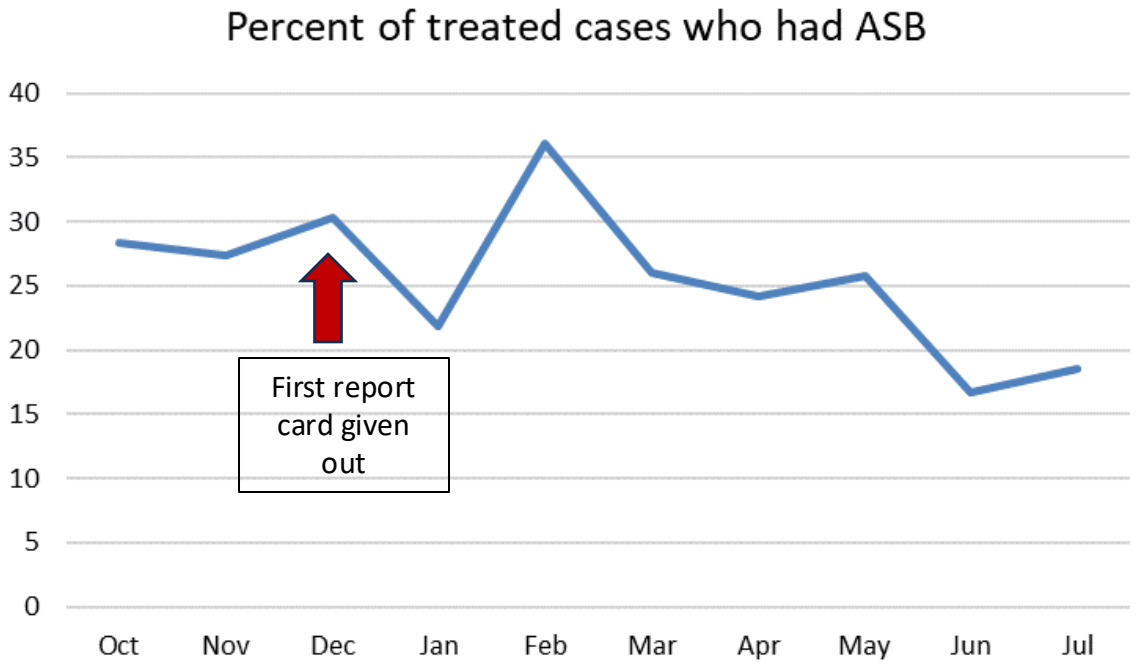
Analyze data → provide results and feedback to hospital staff

- Monthly didactics
- One-on-one coaching sessions (30 min)
  - SMART goal creation and record progress in PDSA cycle

Urine cultures collected:

- Inpatient
- Emergency department***

Results: Primary Aim



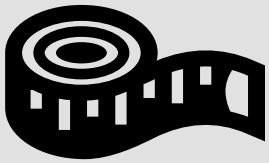
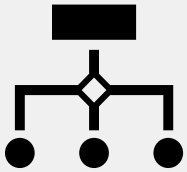
34.5% relative reduction from Oct-July

p=0.055

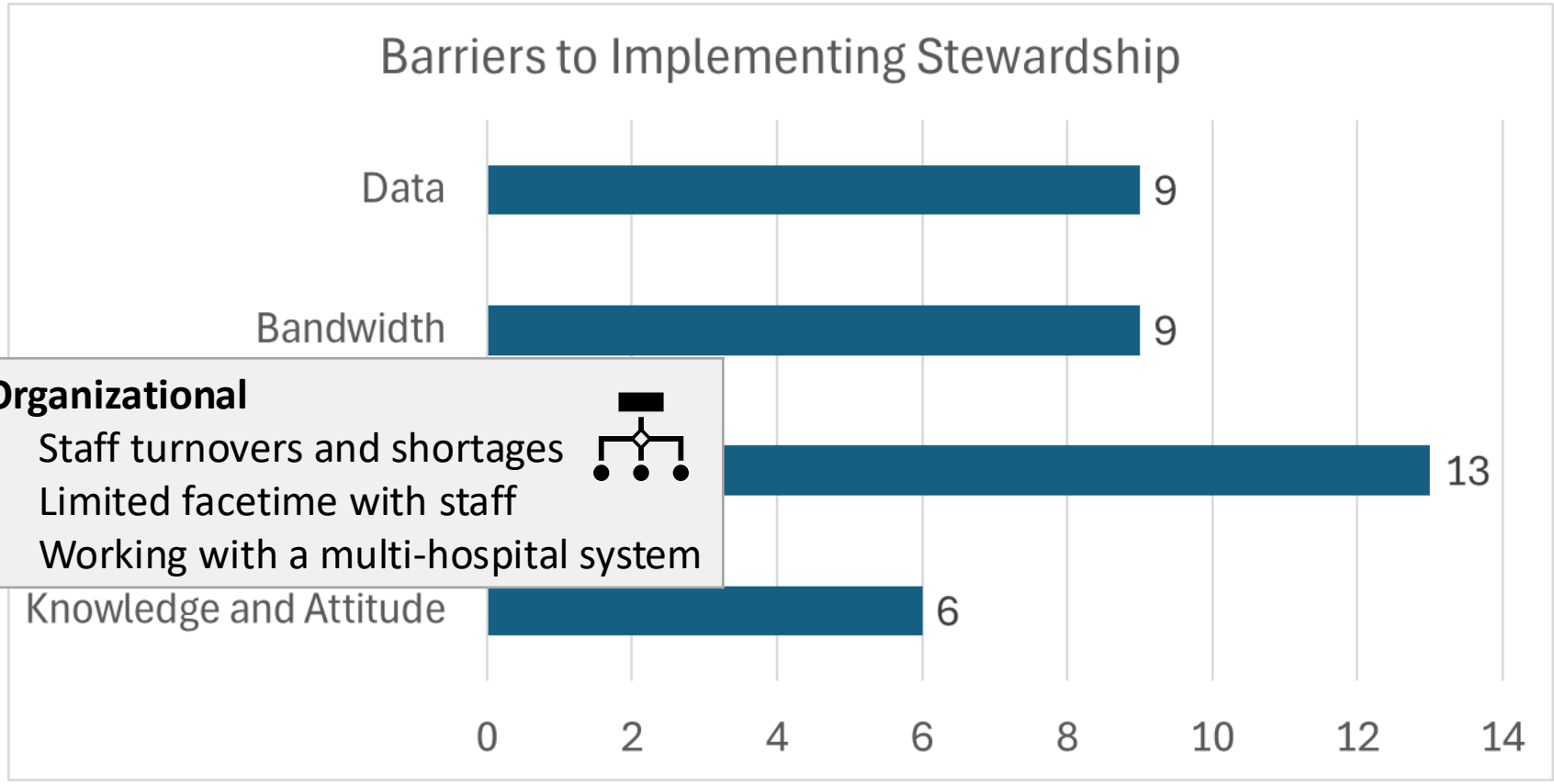
Mixed-effects Poisson regression

Summary of Barriers

Kassamali Escobar et al. Antimicrob Steward Healthc Epidemiol. 2024: Accepted for publication.

	**Data** • Difficulty getting data from the lab/EMR • Lack of documentation • Long turnaround time for culture results
	**Bandwidth** • Competing priorities • No time to participate or collect data
	**Organizational** • Staff turnovers and shortages • Limited facetime with staff • Working with a multi-hospital system
	**Knowledge and Attitude** • Provider resistance (*we've always done it this way*) • Lack of awareness of current guidelines

Frequency of Barriers



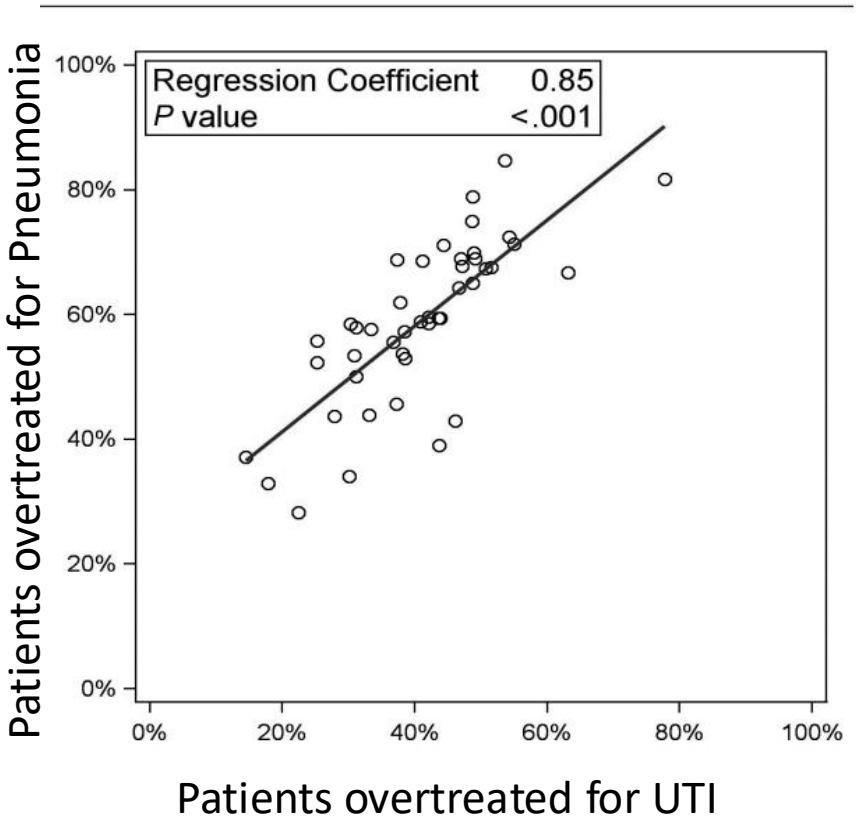
Kassamali Escobar et al. Antimicrob Steward Healthc Epidemiol. 2024: Accepted for publication.

Successful Quality Improvement is Site Specific

Image from: https://www.redbubble.com/people/jcorbettcartoon/shop

Parallels between antimicrobial stewardship and other stewardship activities

Antibiotic overprescribing in two infections



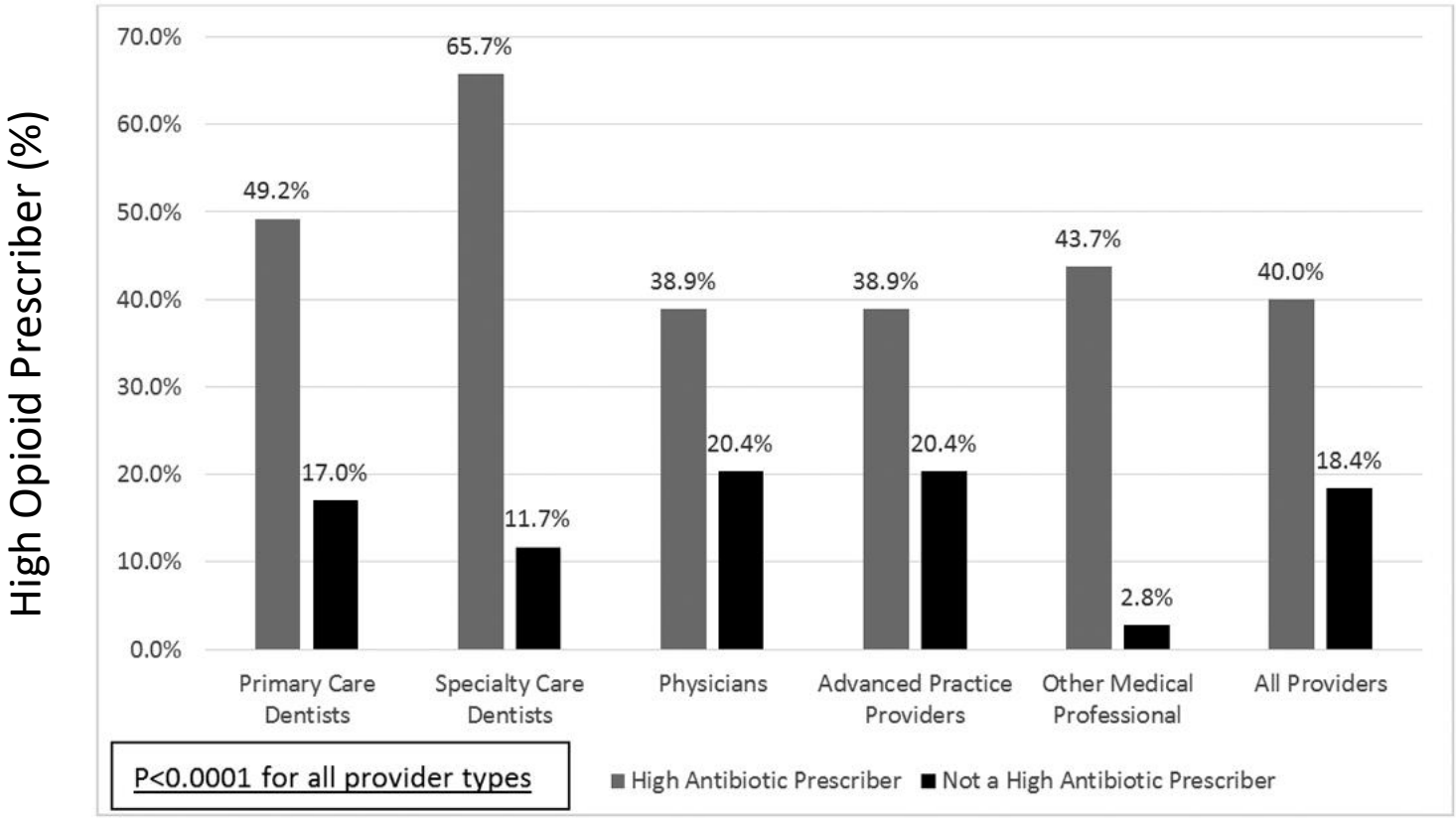
Category of overuse	Definition	Example
Unnecessary antibiotics	Non-infectious or non-bacterial conditions	Patient with a normal chest x-ray Patient with asymptomatic bacteriuria
Excess duration	Duration > guideline indicated without clinical reason	CAP treated >5 days despite being afebrile & clinically stable x48h

Clin Infect Dis. 2021;(73)11:e4499–e4506. https://doi.org/10.1093/cid/ciaa1372

High Prescribing of Antibiotics is Associated with High Prescribing of Opioids

Percentage of Providers who were High

Prescribers of Opioids by High Antibiotic Prescribing Status and Provider Type



Evans CT et al. Pharmacotherapy. 2022 Sep; 42(9): 716–723.

Antimicrobial stewardship programs

Three tenets of ASPs and OSPs

Opioid stewardship programs

Increase patient/provider/public awareness

Emphasize prevention

Improve assessment and management

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9926985/

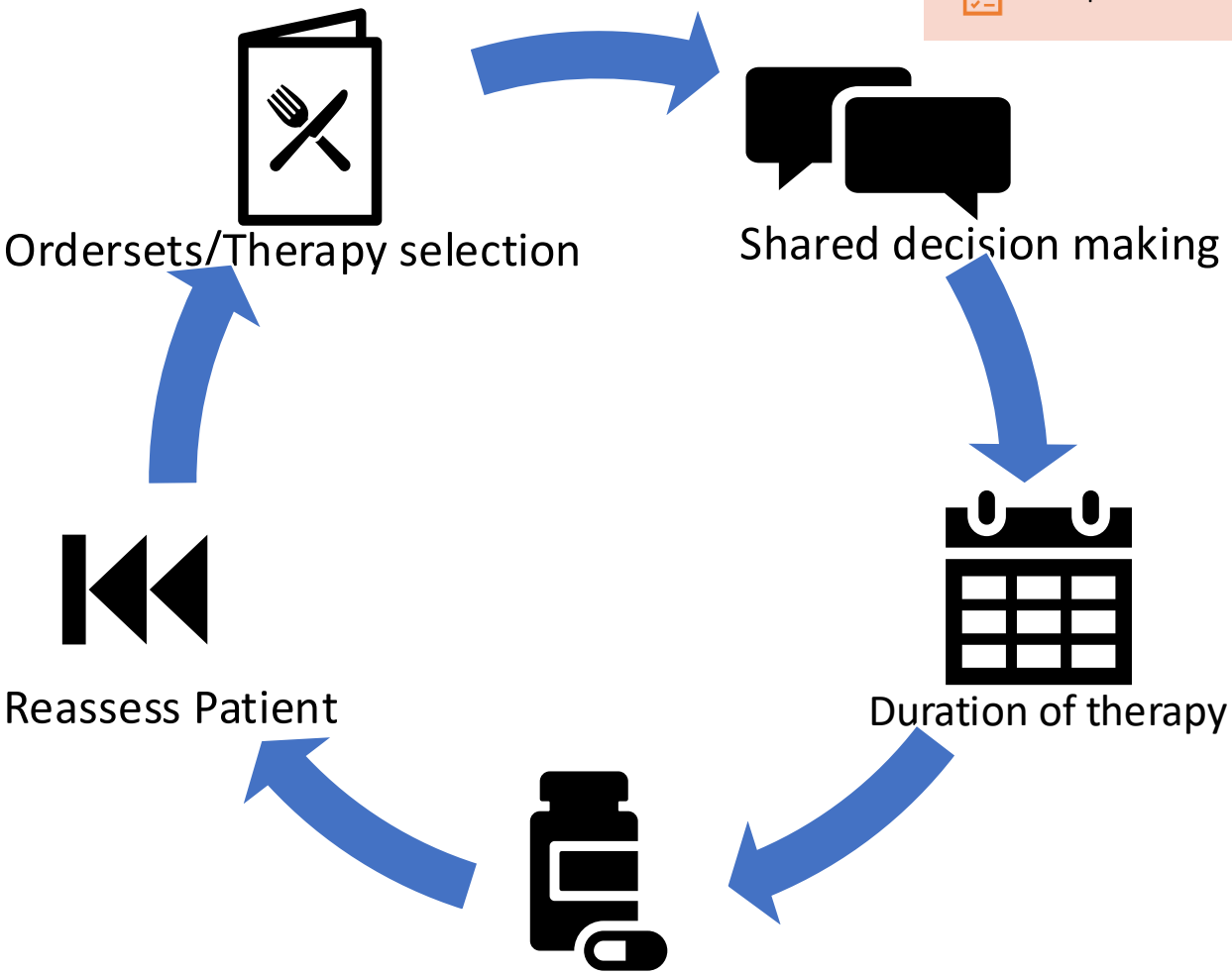
QI Playbook
Same Game, Different Field

Fundamentals of Opioid Stewardship	Core Elements of Antibiotic Stewardship
Leadership Commitment & Culture	(1) Leadership Commitment
Organizational Policies	(4) Action to Support Optimal Antibiotic Use
Clinical Knowledge, Expertise, and Practice	(3) Drug Expertise
Patient and Family Caregiver Education & Engagement	(7) Education of Clinicians, Patients, and Families
Tracking, Monitoring, Reporting	(5,6) Tracking & Monitoring, Reporting
Accountability	(2) Accountability
Community Collaboration	

https://www.qualityforum.org/Publications/2018/05/Opioid_Stewardship_Playbook.aspx
https://www.cdc.gov/antibiotic-use/hcp/core-elements/hospital.html

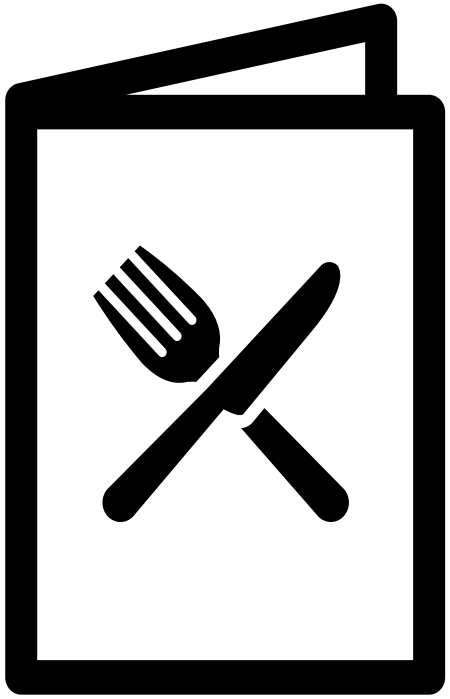
Multimodal Strategies

Improve assessment and management



J Pain Palliat Care Pharmacother. 2020 Dec;34(4):181-183.doi: 10.1080/15360288.2020

Ordersets & Therapy Selection



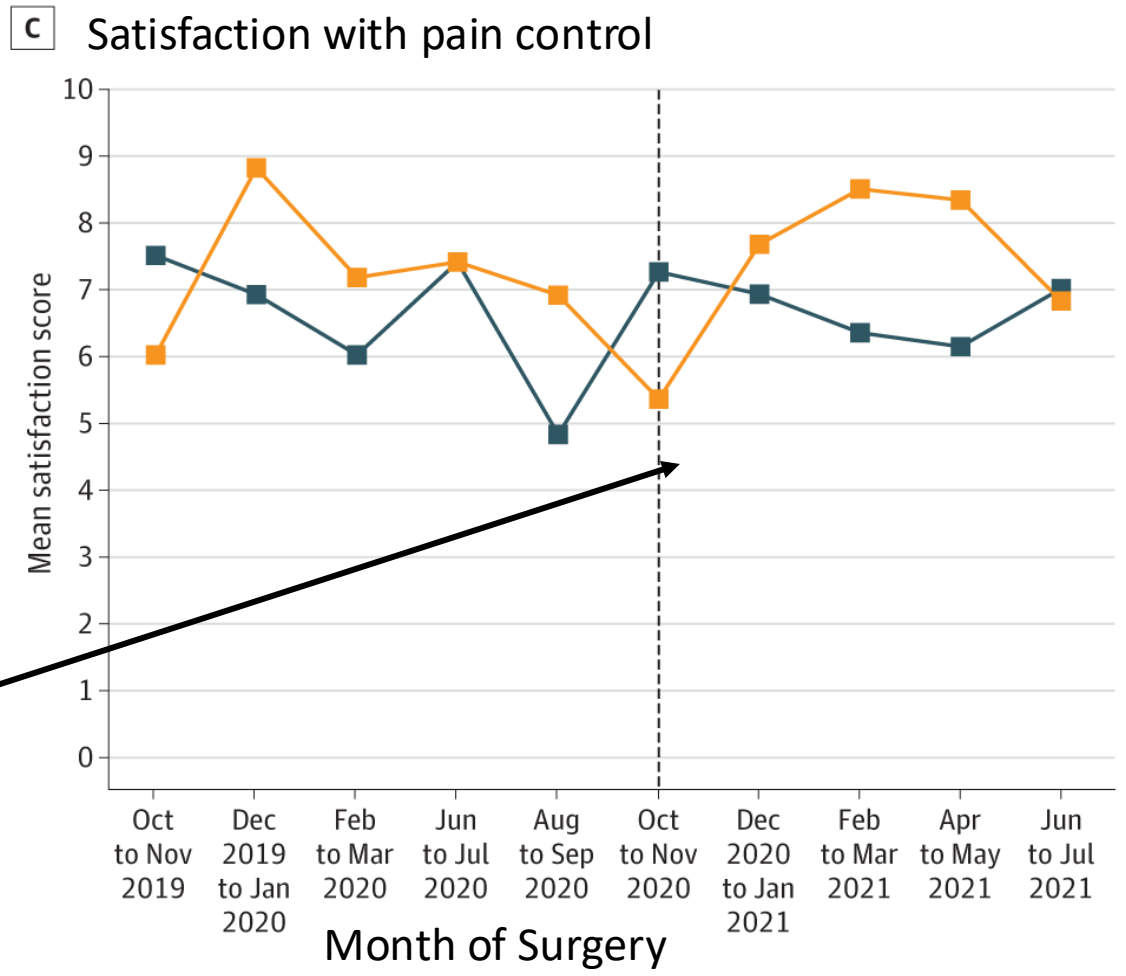
Can guide prescribers and patients to preferred and equally effective strategies

JAMA Netw Open. 2022;5(6):e2219701. doi:10.1001/jamanetworkopen.2022.19701

Impact of order set change on opioid use

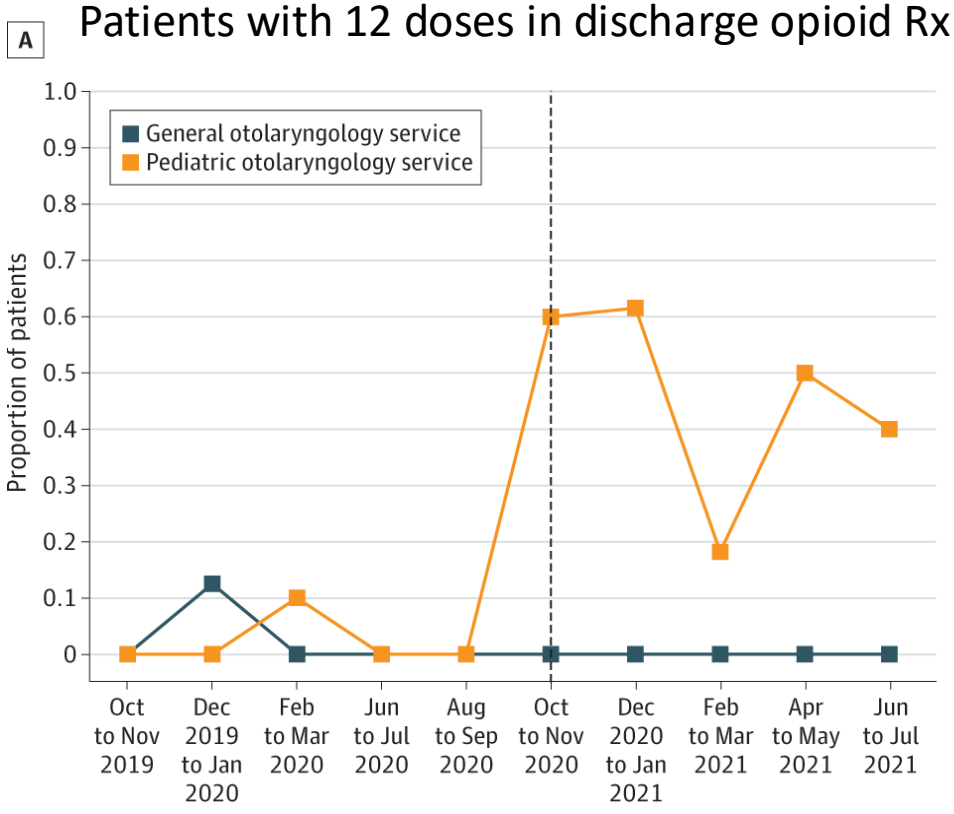
Patients undergoing tonsillectomy at University of Michigan (N = 237)

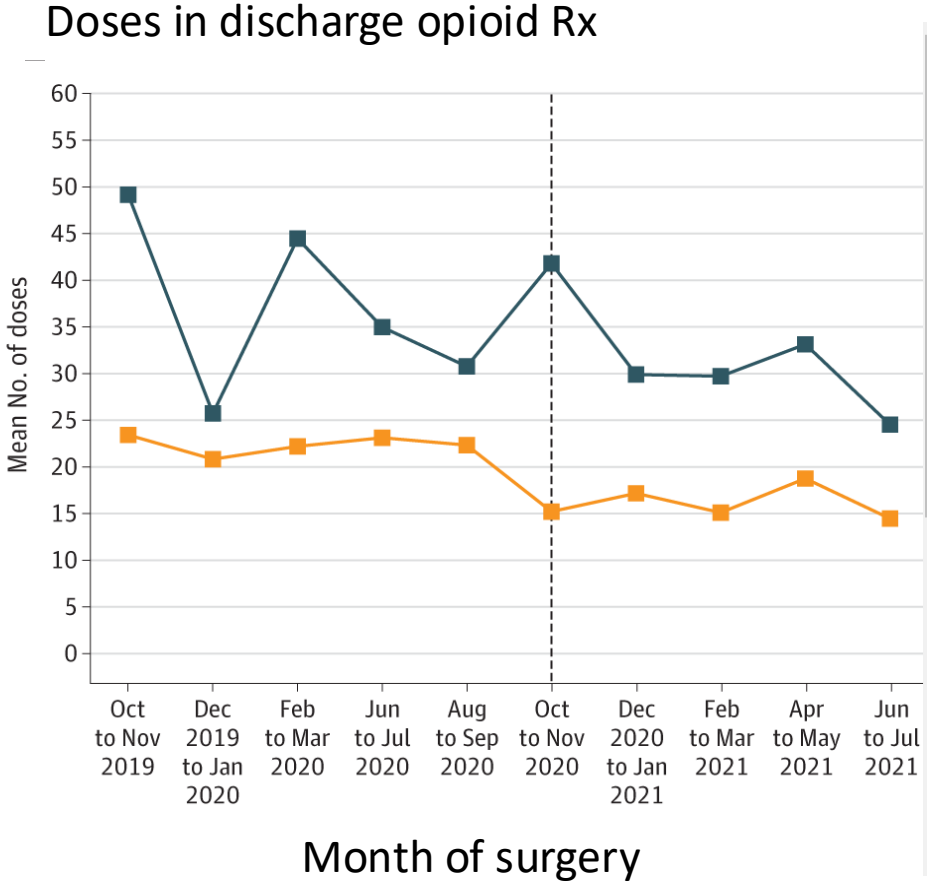
Changed from 30 to 12 doses of opioid pain medications



JAMA Netw Open. 2022;5(6):e2219701. doi:10.1001/jamanetworkopen.2022.19701

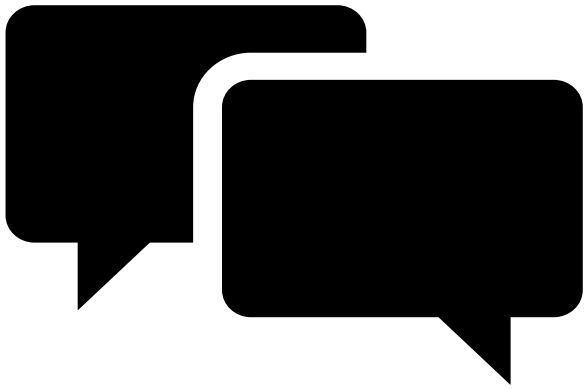
Incremental change is still change





JAMA Netw Open. 2022;5(6):e2219701. doi:10.1001/jamanetworkopen.2022.19701

Shared Decision Making



Shared decision making between patients and providers can optimize and personalize treatment

https://www.ncbi.nlm.nih.gov/books/NBK598858/pdf/Bookshelf_NBK598858.pdf

Dialogue Around Respiratory Illness Treatment (DART)

Two-part Treatment recommendation	Contingency plan
• Negative recommendation (diagnosis or which antibiotic won't help) • Positive recommendation (non-antibiotic treatment that will help)	• Symptoms to look out for

Patient Educ Couns. 2022 Jul; 105(7): 2611–2616.doi: 10.1016/j.pec.2022.03.011

Dialogue Around Respiratory Illness Treatment (DART)

Two-part Treatment recommendation	Contingency plan
• (Negative) What we have here is a really bad cold, so an antibiotic won't help • (Positive) Giving her an extra pillow at night can help with draining the congestion	• (Contingency) Definitely call me if she starts having high fevers. I don't expect that to happen, but that's what you should watch for

Patient Educ Couns. 2022 Jul; 105(7): 2611–2616.doi: 10.1016/j.pec.2022.03.011

The value of conversations

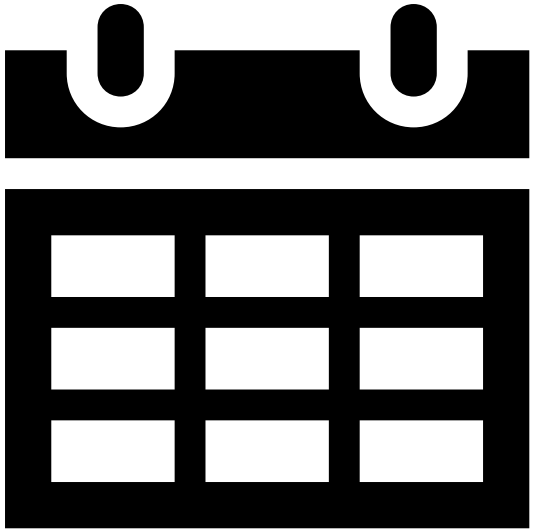
- Penicillin allergies

What is the harm of an incorrectly documented penicillin allergy?

- Penicillin allergies

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7461202/pdf/PEDS_20200038.pdf

Duration of Therapy



- For acute pain, most patients only need 3-7 days of therapy
- 5 for 5
  - UTI
  - CAP
  - AOM
  - Sinusitis
  - Cellulitis

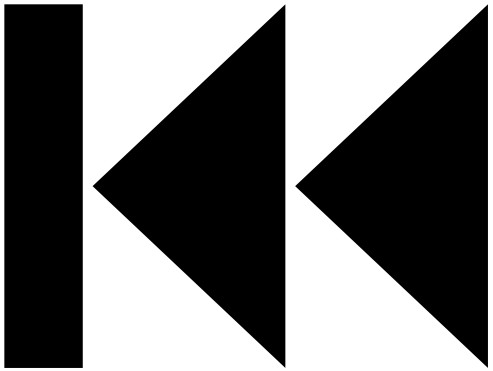
Open Forum Infectious Diseases, Volume 10, Issue Supplement_2, December 2023, ofad500.1826, https://doi.org/10.1093/ofid/ofad500.1826

Discharge Prescribing

- 45% of patients receive 3x the pain medication (morphine mg equivalents) than what they used in the 24h prior to discharge
- Discharge prescribing contributes to >90% of excess duration of antibiotic treatment

Ann Intern Med. 2019 Aug 6;171(3):153-163. doi: 10.7326/M18-3640.
https://www.ncbi.nlm.nih.gov/books/NBK598858/pdf/Bookshelf_NBK598858.pdf

Reassess Patient



Take medications until you feel better

Re-view expectations

does feel better = feel like you did before?

https://www.ncbi.nlm.nih.gov/books/NBK598858/pdf/Bookshelf_NBK598858.pdf

CAP Expectations

I have a friend with debilitating low back pain

Auto accident. Failed surgeries. "We've done all that we can do." Not a druggie. Just a guy. **Oral opioids kept his pain under control for years**. **A few years ago the medical world went gaga on opioids and refuse to prescribe them.** One doctor with a conscience who did was berated by his supervisor - a nurse - for prescribing oral opioids to him and was told by said nurse: "never do it again!" For asking for the opioids that work for him, he is labeled in medical records as a "drug seeker," and all doctors dealing with him view him as a dirtball. **Pain doctors only offer him spinal injections - this works for a few weeks, then fails.** He is not a candidate for electrical stimulation. He says the whole injection thing is a medical racket.

Previously, any Family Practitioner could prescribe him his needed pain meds, which were not expensive. Now Family Practitioners have to send him to a "pain specialist" whose injections each cost thousands of dollars charged to insurance. I used to think he was a low-life "drug seeker," giving me a line. But back when he had access to effective oral meds, we were able to hang out together - get in the car and go places. Now - I only see him on his back on his sofa - shifting his position only in great pain. He sold his car - hey, he can't go anywhere. Pain med doctors have their scientific studies. They are self-serving half-truths. He lives the full truth.

https://www.nytimes.com/2024/09/14/health/medical-practices-treatments-patients.html

Finding the Balance

OVERUSE

Opioids
- Adverse effects
- Respiratory depression,
- Substance use disorder

Antibiotics
- Adverse effects
- Microbiome disruption
- Antibiotic resistance

UNDERUSE

Opioids
- Un/undertreated pain
- Withdrawal
- Distress
- Suicidal ideation

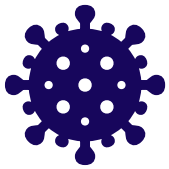
Antibiotics
- Undertreatment
- Sepsis

https://www.ncbi.nlm.nih.gov/books/NBK598858/

Antibiotic Harms

1) Adverse drug events

2) Microbiome disruption/ Super infections



3) Antimicrobial resistance

4) Drug interactions

Slide Credit: Whitney Hartlage

Opioid Harms

1) Constipation

2) Respiratory Depression

3) Somnolence

4) Dependence / Opioid Use Disorder

Stewardship

first do no harm

HIPPOCRATIC OATH

Three tenets of ASPs and OSPs

How is your program doing?

ASP		OSP
☐	 Increase patient/provider/public awareness	☑
☐	 Emphasize prevention	☐
☑	 Improve assessment and management	☐