Optimizing Prescribing for Common Infections

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Disclosures

- No disclosures relevant to this talk
  - Honoraria form American Academy of Pediatrics, National Board of Medical Examiners
  - Co-PI on an investigator-initiated Merck grant on improving equity in antimicrobial prescribing for common pediatric infections in the pediatric urgent care clinics
  - Award/grant support from APIC (Association for Professionals in Infection Control and Epidemiology) on outpatient antibiotic stewardship benchmarking project

- I will not be discussing off-label use of medications

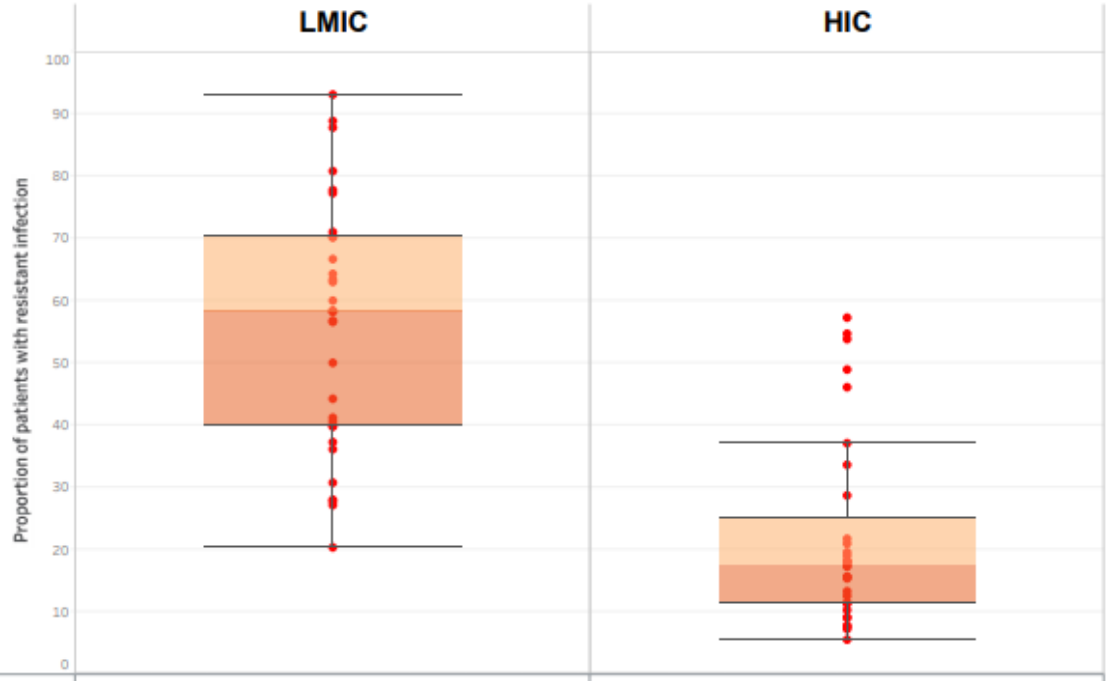
Objectives

- Recognize the overuse of antibiotics in outpatient settings
- Describe opportunities to improve antibiotic use in the outpatient setting
- Empower clinicians to develop strategies to improve pediatric antibiotic use for common infections

Antibiotic Resistance

- >2.8 million antibiotic-resistant infections in the US each year
- ALL antibiotic use contributes to antibiotic resistance, even when warranted
- Even 1 antibiotic course can influence resistance patterns of future infections the patient and population

Fig. 2.8. Proportion of patients with BSIs caused by *E. coli* resistant to 3rd generation cephalosporins by country income level



	LMIC	HIC
Reporting countries *(n)*	32	2
Patients with AST results *(n)*	22 371	218 031

LMIC, low-middle income countries; HIC, high-income countries

Paschke AA et al, *Pediatrics* 2010; 125: 664-672.)
Kuster SP et al *Clin Infect Dis* 2014; 59(7): 944-952
WHO Global Antimicrobial Resistance and Use Surveillance System (GLASS) report
https://www.who.int/publications/i/item/9789240027336

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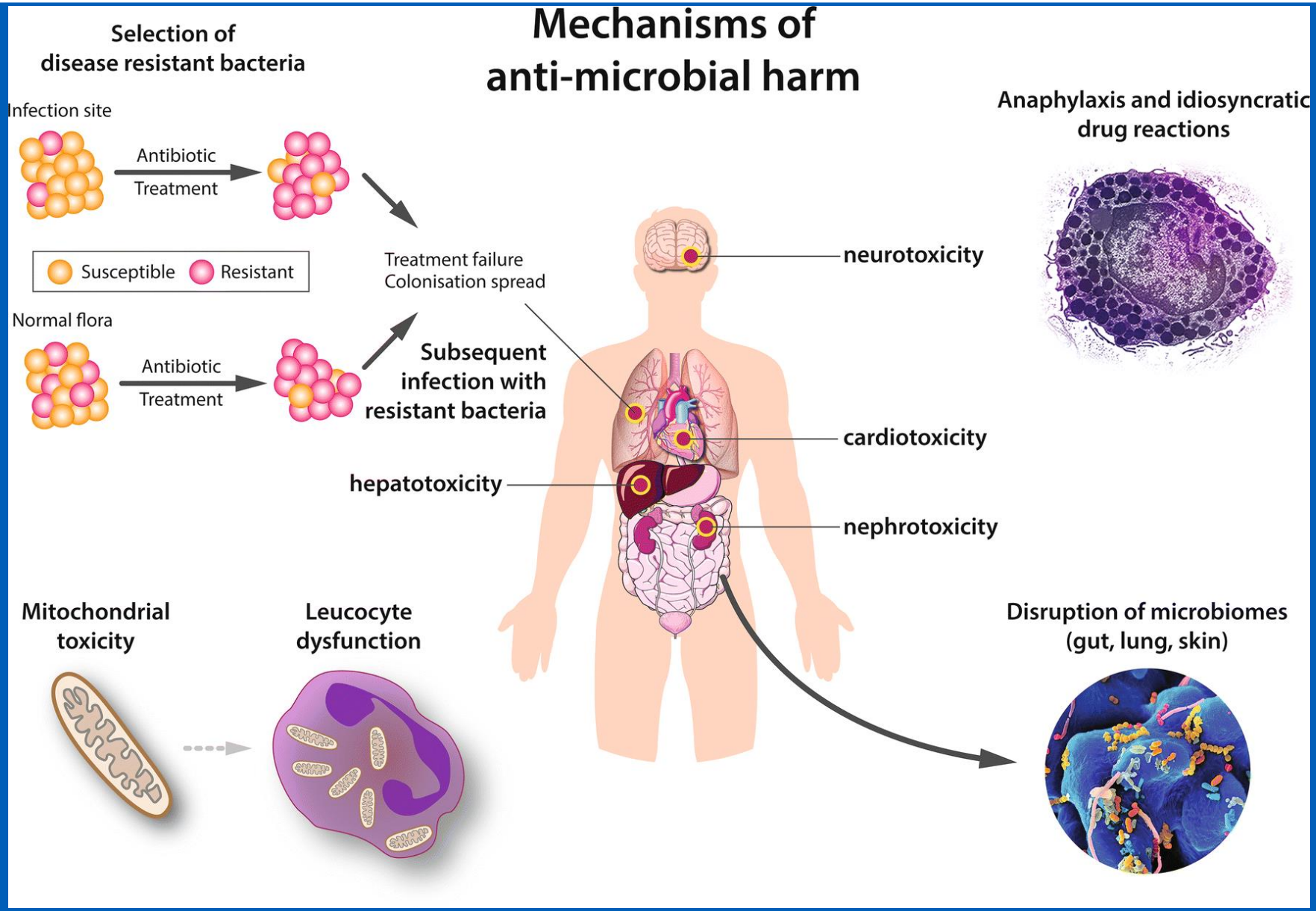

In Addition to Antibiotic Resistance…

- Adverse drug reactions
- *C. difficile* infections
- Microbiome alteration
- Family burden
- Cost

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Arulkumaran, N. *et al.* *Intensive Care Med* **46**, 225–235 (2020).
https://www.cdc.gov/antibiotic-use/stewardship-report/outpatient.html
Lovegrove MC et al. *J Pediatric Infect Dis Soc*. 2018 Aug 23.
Sammons JS, Toltzis P. *Curr Opin Pediatr*. 2013 Feb;25(1):116-21.

Choosing the Right Antibiotic

- Disease severity
- Patient's immune system
- Antibiotic allergies
- Absorption
- Activity at the site of infection
- Unique environments (e.g., acidity, anaerobic conditions)
- Local antibiograms

Why Outpatient ASP?

- Up to 95% human antibiotic used in outpatient settings
  - ~65 million antibiotic prescriptions / year to children in US

- Outpatient antibiotic prescriptions
  - 28-30% unnecessary
  - Bronchitis and viral URI in top 8 diagnoses with antibiotic prescriptions
  - 50% may be inappropriate
  - Up to 50% children with common respiratory diagnoses receive non-first line antibiotics

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Suda et al. Clin Infect Dis. 2018 Jan 6;66(2):185-190; King et al. Clin Infect Dis 2020; 70 (3):370-377
Fleming-Dutra et al. JAMA. 2016;315(17):1864-1873; Hersh et al. Clin Infect Dis 2021 23;72:133-137;
Hersh AL et al. *JAMA Internal Medicine* 2016; 176:1870.

Challenges to Optimal Prescribing

- Providers Perceptions that parents want antibiotics
- Decision fatigue
- Time constraints
- Parental/Patient pressure
- Uncertain diagnoses

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https://www.pewtrusts.org/en/research-and-analysis/articles/2017/06/30/why-doctors-prescribe-antibiotics-even-when-they-shouldnt
Antimicrob Agents Chemother. 2016;60(7):4106-18.
JAMA Intern Med. 2014;174(12):2029-31

Antibiotic Use and Race/Ethnicity

In Pediatric clinics, ED, UCC in US

- Compared to White NH children, Black and Hispanic children are:
  - Less likely to receive an ATB prescription from the same clinician per visit
  - Less likely to receive diagnoses that warranted antibiotic treatment
  - More likely to receive guideline-recommended antimicrobials
  - Less likely to receive broad-spectrum antimicrobials
- Similar trends for children on Medicaid and self-pay compared to commercial insurance; children whose primary language is Spanish compared to English

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Nedved et al. Infect Control Hosp Epidemiol. 2023 Jun 29:1-8.
Gerber JS et al *Pediatrics.* 2013.; Fleming-Dutra KE et al. *Pediatrics.* 2014.
Fleming-Dutra Keet al *JAMA.* 2016;315:1864-73; Goyal MK et al. *Pediatrics.* 2017;140:e20170203.

Factors Contributing to Inequities in Antibiotic Prescribing

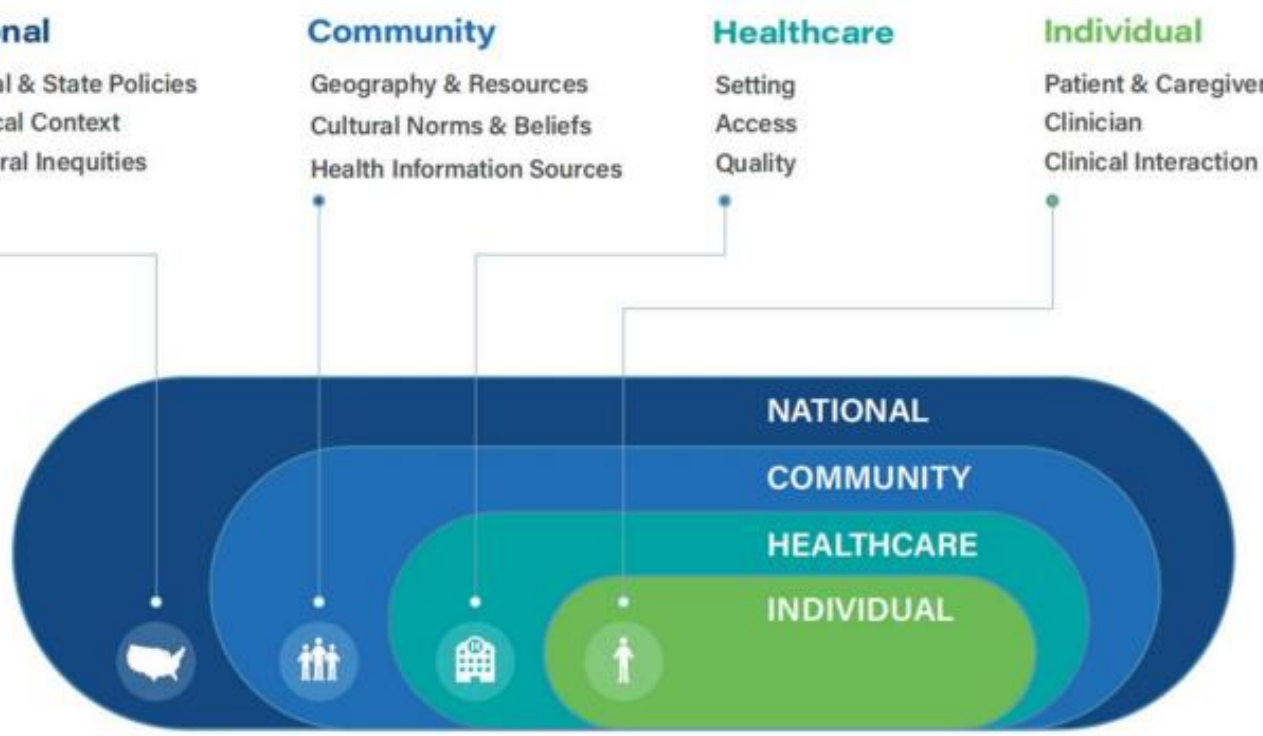


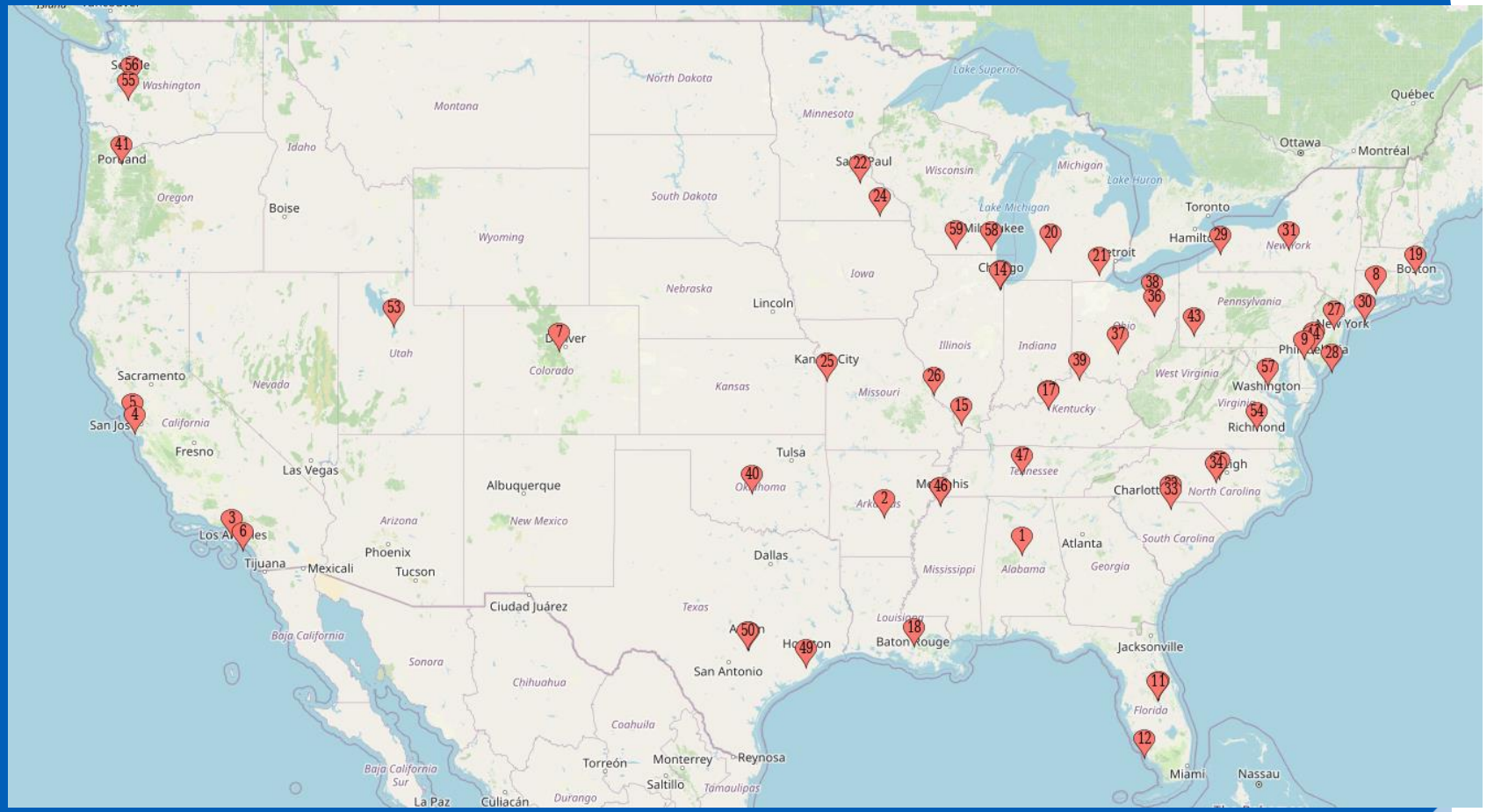
Figure 1. Factors contributing to inequities in antibiotic prescribing in the United States.

Kim et al. Open Forum Infect Dis 2023 Aug 19;10(9):ofad440

What is SHARPS- OP Collaborative?

- Created in summer 2020
  - 57 sites in US
  - 2 sites from UK
- Monthly webinars
- Collaborating on projects

- Interested in Joining PIDS/SHARPS webinar? email relfeghaly@cmh.edu



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Status of Pediatric Outpatient ASP in the US

- 45 institutions completed survey
- Biggest barriers to outpatient AP
  - Time (n = 41, 91.1%)
  - Financial support (n = 24, 53.3%)
  - Development of meaningful reports (n = 23, 51.1%)
  - Hospital administrative support (n = 20, 44.4%)

Support	
Allocated support for ASP (FTE)	43 (95.6)
ASP FTE physician (median, IQR)	0.3 (0.2-0.5)
ASP FTE pharmacist (median, IQR)	0.55 (0.4-1)
Outpatient ASP FTE	
Yes	5 (11.1)
Shared FTE	18 (40.0)
No	22 (48.9)
Estimated time spent on outpatient ASP per week	
<1 h	16 (35.6)
1–5 h	21 (46.7)
6–10 h	6 (13.3)
11–15 h	0 (0.0)
16–20 h	1 (2.2)
21–30 h	0 (0.0)
>30 h	1 (2.2)

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El Feghaly et al. Infect Control Hosp Epidemiol. 2021 Oct 22;1-7

Outpatient ASP Core Elements

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https://www.cdc.gov/antibiotic-use/community/pdfs/16_268900-A_CoreElementsOutpatient_508.pdf

Example of our Pediatric Outpatient ASP

1. Tracking and Reporting – Baseline Data

Figure 1A: Total ED/UCC Respiratory Infection Encounters

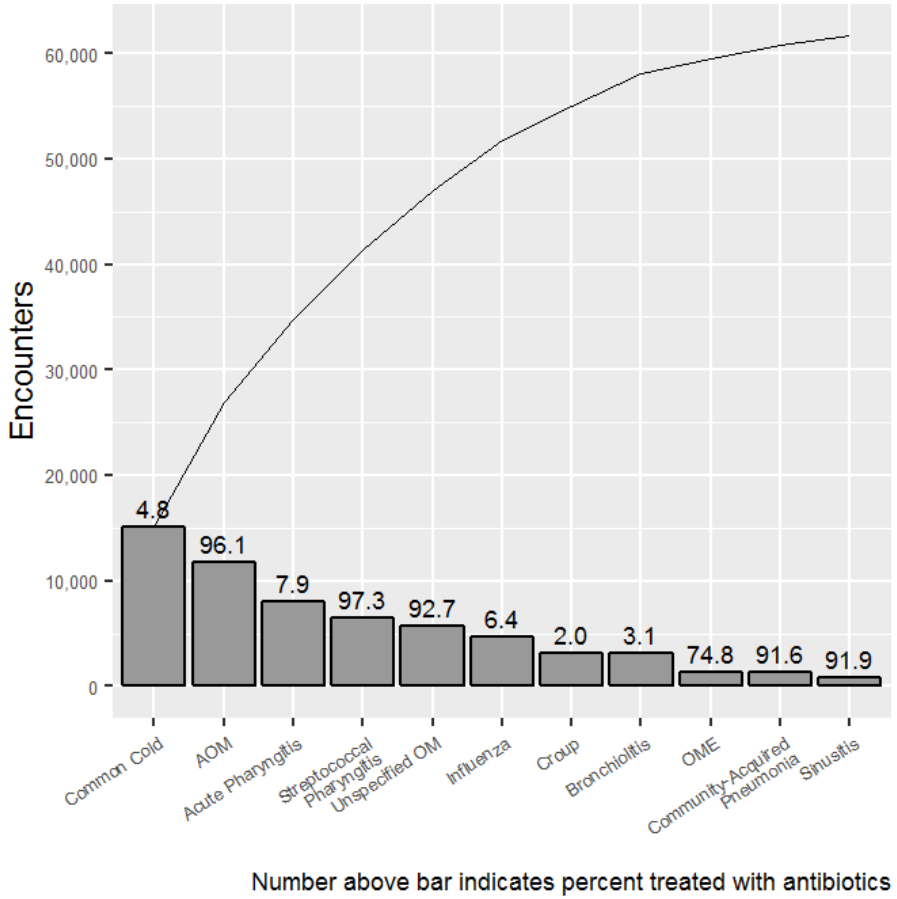
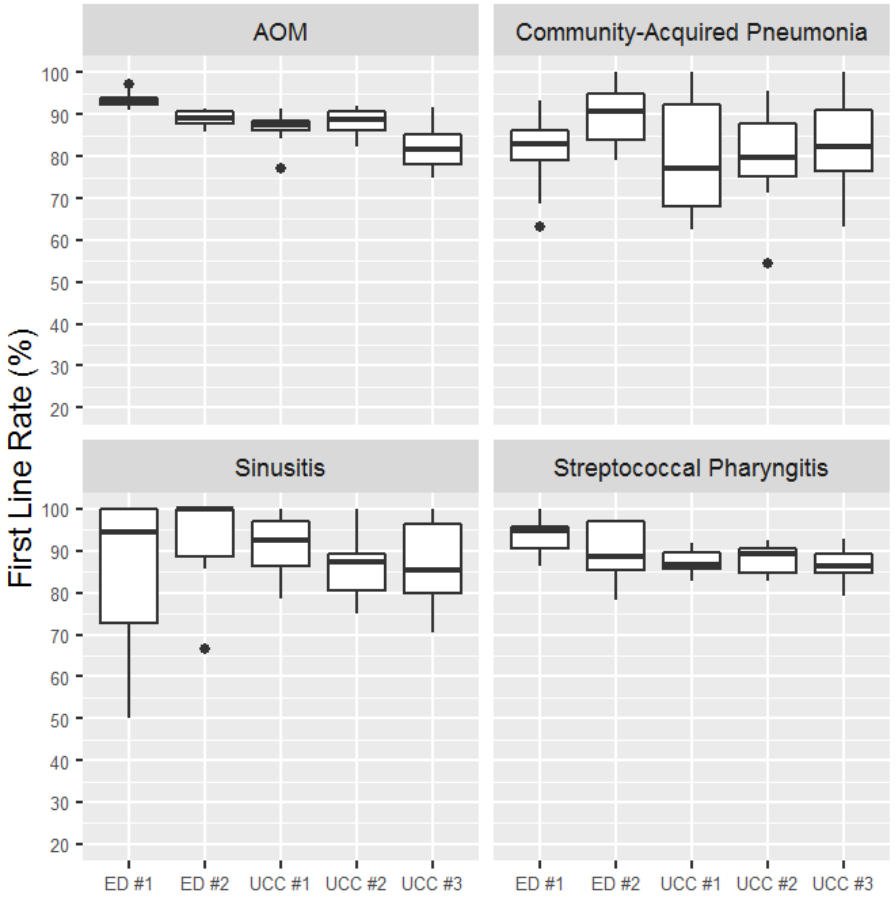


Figure 1B: Use of First-Line Antibiotics for Select Bacterial Respiratory Infections



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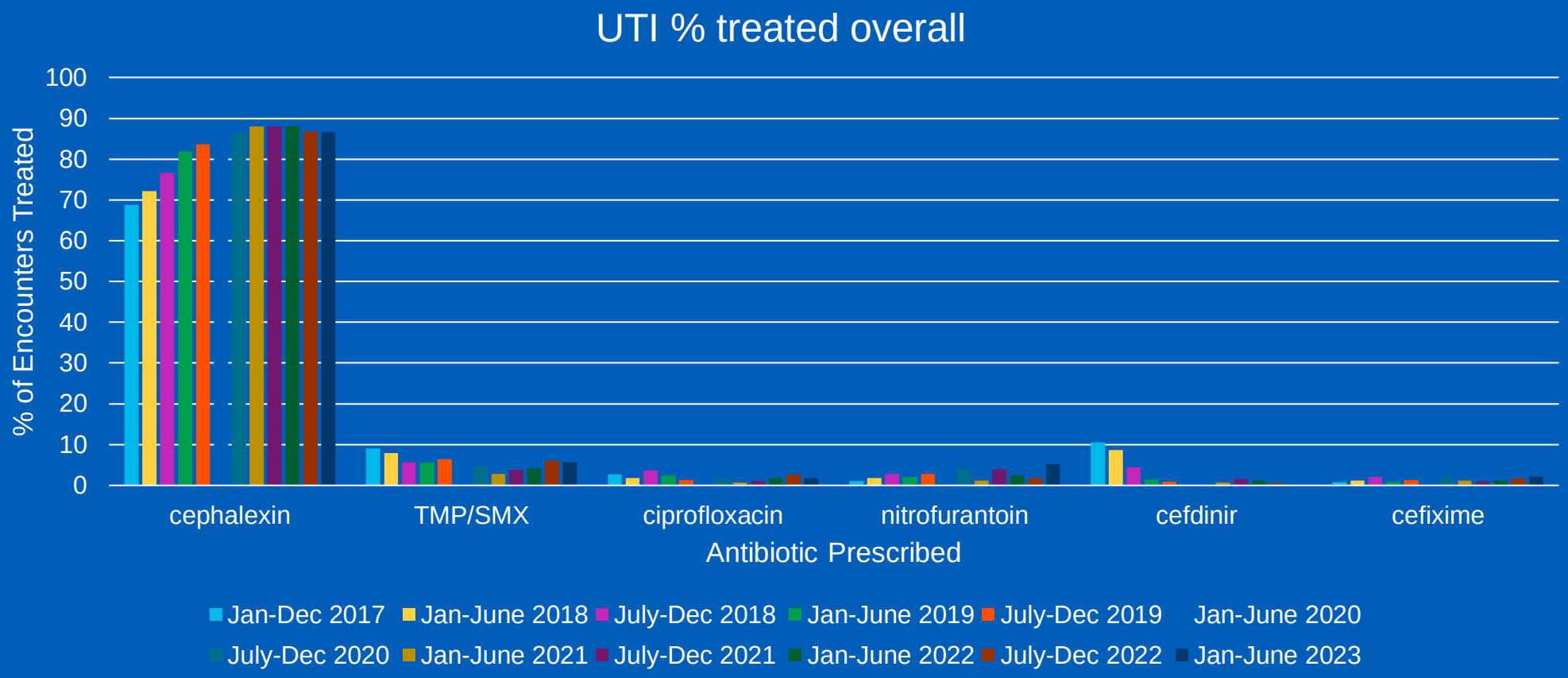
El Feghaly RE et al. Am J Infect Control. 2021 Mar;49(3):398-400.

1. Tracking and Reporting - Trends



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1- Tracking and Reporting – National

Proposed Metrics to Benchmark Antibiotic Prescribing in Pediatric Outpatient Settings

Authors review existing tools to measure antibiotic use

Pool NM, Wattles BA, El Feghaly RE, SHARPS-OP Benchmarking Group

Quantitative and qualitative metrics described and compared

Expert consensus prioritized:

- ✓ % of respiratory infections prescribed antibiotics
- ✓ Amoxicillin Index
- ✓ Duration of therapy

Streamlined use of metrics will allow for:

- Monitoring over time
- Identification and improvement
- National benchmarking

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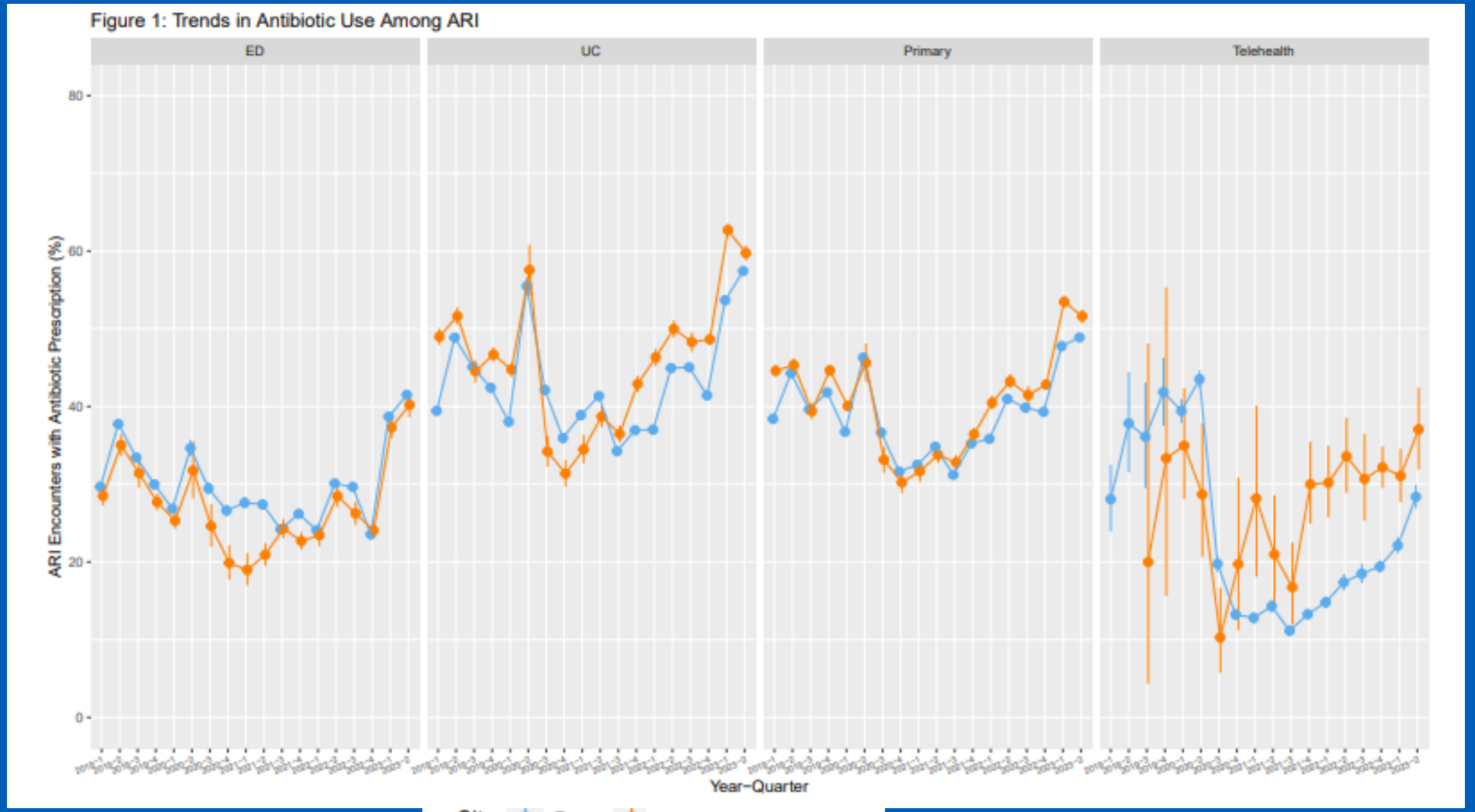
Poole et al. Am J Infect Control. 2021 Dec;49(12):1547-1550.

1. Tracking and Reporting – Benchmarking



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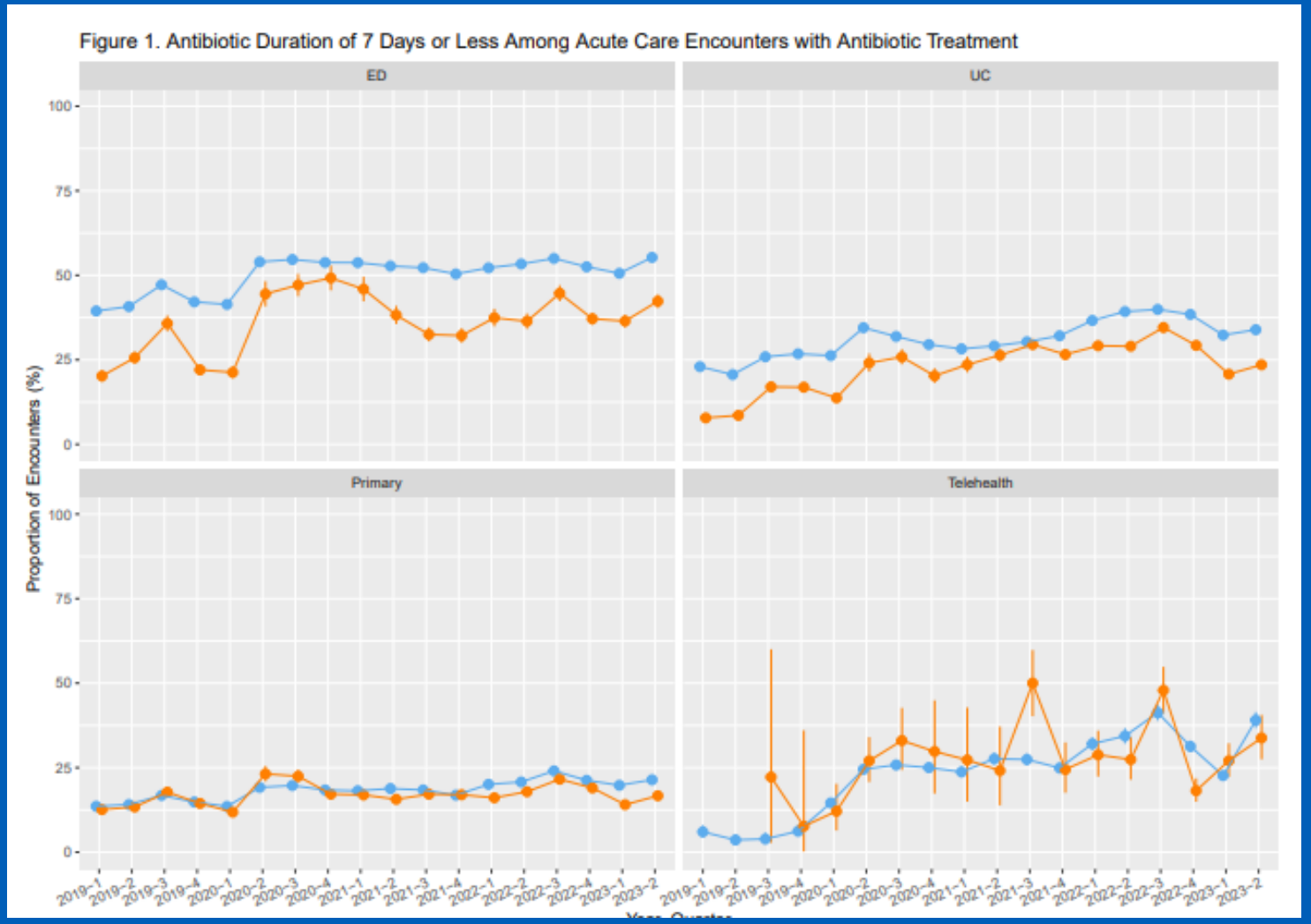
El Feghaly RE et al. J Pediatric Infect Dis Soc. 2023 Jun 30;12(6):364-371.

1. Tracking and Reporting – Benchmarking

- **Duration ≤7 days**
  - Captures appropriate duration for most infections
    - Multiple studies/guidelines suggest 5-7 days for most infections (CAP, AOM, UTI, SSTI, ABRS)



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Poole et al. Amer J Infect Control 2021 Dec;49(12):1547-1550
https://publications.aap.org/redbook/book/347/chapter/5758498/Systems-based-Treatment-Table
El Feghaly RE. et al. J Pediatric Infect Dis Soc. 2023 Jun 30;12(6):364-371.

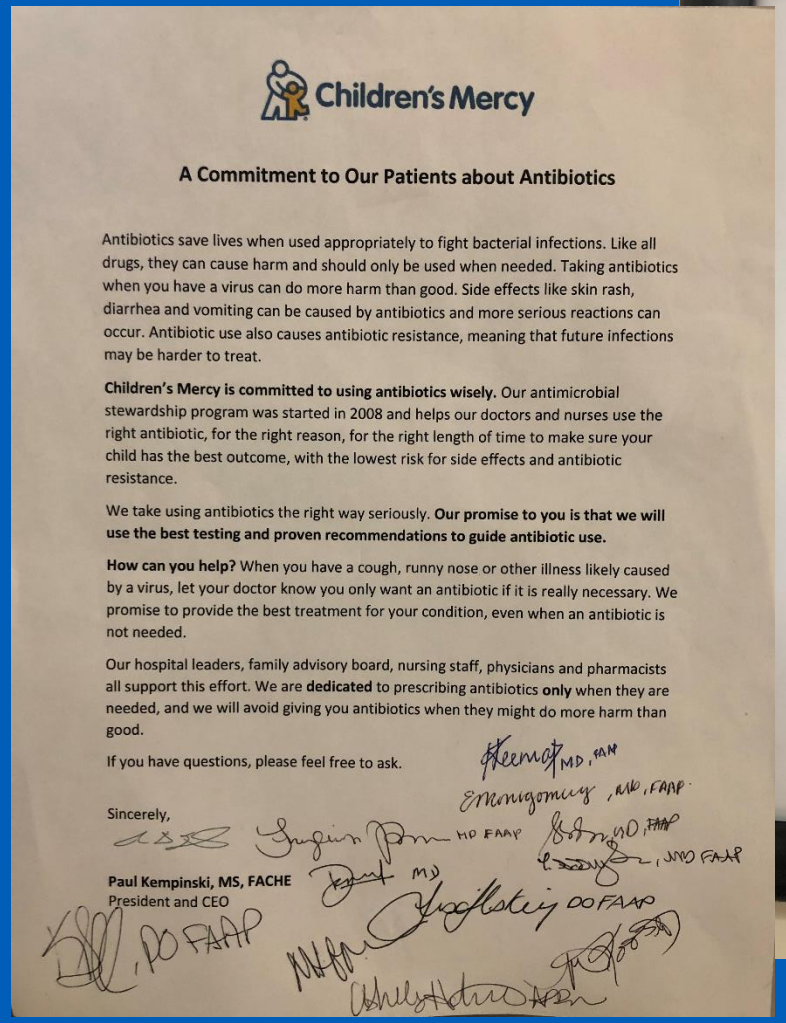
2. Commitment

- At CMH, we created a multidisciplinary Outpatient ASP Advisory board
  - RNs, APPs, MD/DOs from ED, UCC, PCC
  - Pharmacists
  - ID physicians and pharmacists
  - Data analyst
  - Patient advocate

  - Meets every 2 months to discuss all ASP projects

2. Commitment

- In every exam room, signed by our CEO
- In workrooms, signed by providers
- One consistent message!



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A Commitment to Our Patients about Antibiotics

Antibiotics save lives when used appropriately to fight bacterial infections. Like all drugs, they can cause harm and should only be used when needed. Taking antibiotics when you have a virus can do more harm than good. Side effects like skin rash, diarrhea and vomiting can be caused by antibiotics and more serious reactions can occur. Antibiotic use also causes antibiotic resistance, meaning that future infections may be harder to treat.

Children's Mercy is committed to using antibiotics wisely. Our antimicrobial stewardship program was started in 2008 and helps our doctors and nurses use the right antibiotic, for the right reason, for the right length of time to make sure your child has the best outcome, with the lowest risk for side effects and antibiotic resistance.

We take using antibiotics the right way seriously. **Our promise to you is that we will use the best testing and proven recommendations to guide antibiotic use.**

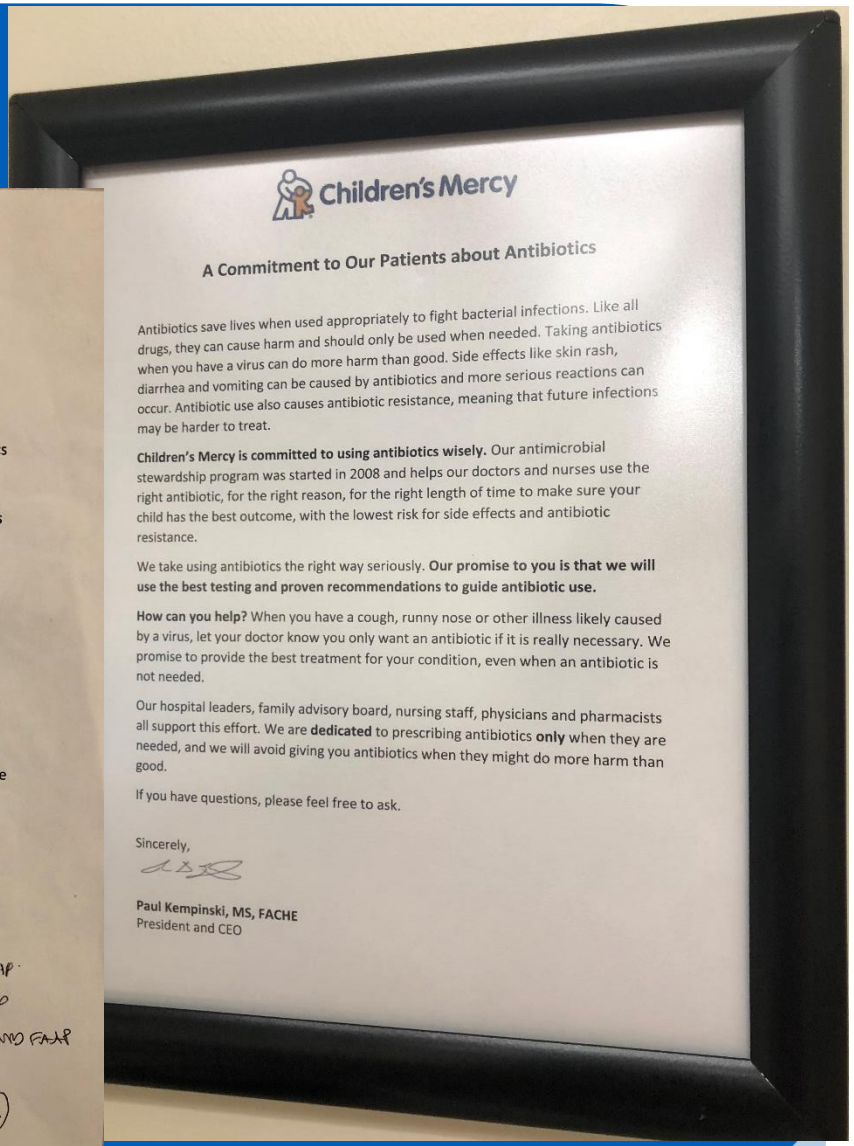
How can you help? When you have a cough, runny nose or other illness likely caused by a virus, let your doctor know you only want an antibiotic if it is really necessary. We promise to provide the best treatment for your condition, even when an antibiotic is not needed.

Our hospital leaders, family advisory board, nursing staff, physicians and pharmacists all support this effort. 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 questions, please feel free to ask.

Sincerely,

Paul Kempinski, MS, FACHE
President and CEO



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President and CEO

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3. Action for policy and practice: Quality Improvement Approach…

- "The use of QI methods, including Plan–Do–Study–Act cycles through the Model for Improvement and statistical process control charts, is essential in conducting successful implementation of guidelines and other stewardship interventions."

J Newland, Improving Antibiotic Use Through Quality Improvement Methods, The Joint Commission Journal on Quality and Patient Safety 2019; 45:787–788

- Our Approach: Engaging frontline providers and coaching them while they lead QI initiatives

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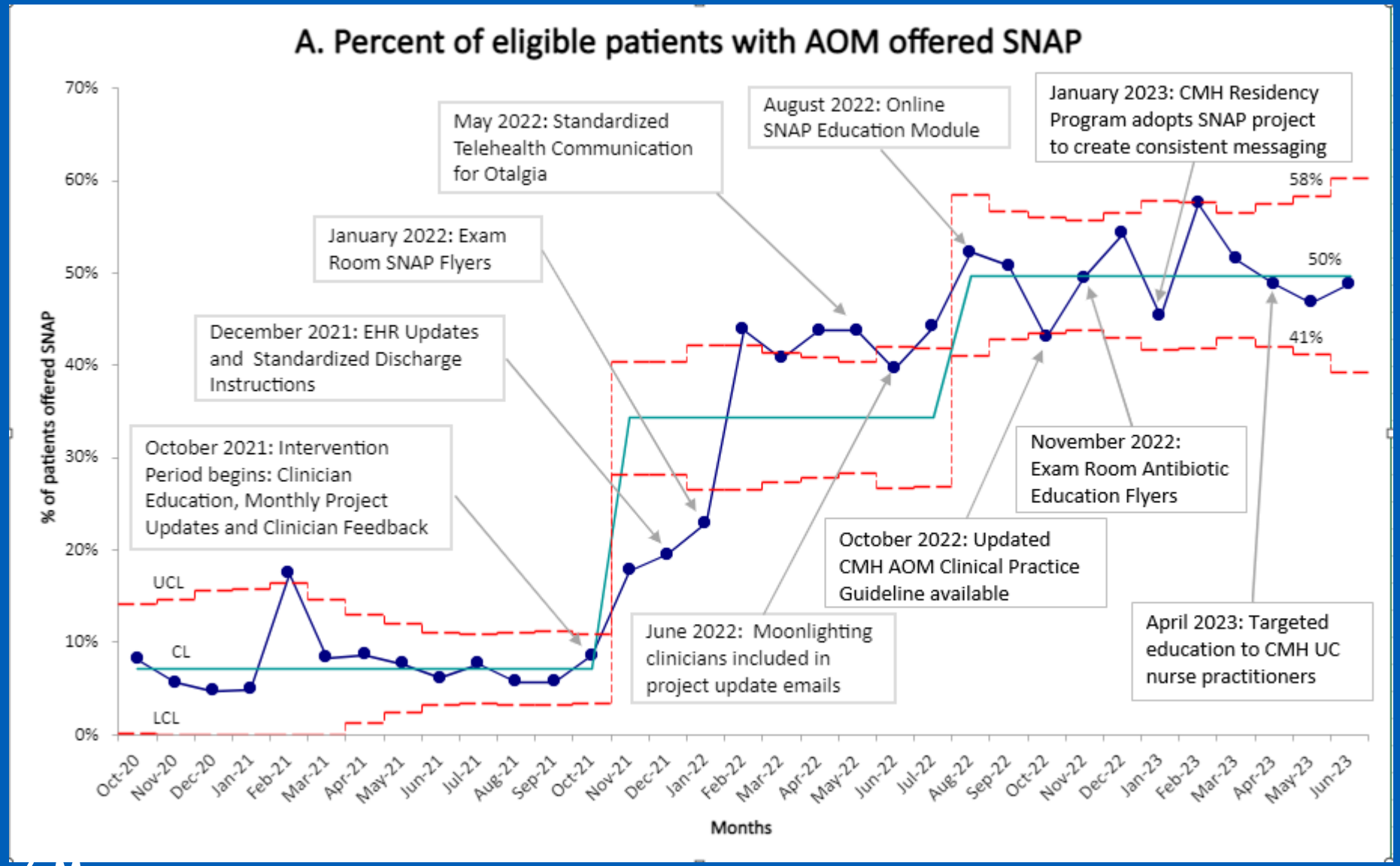
Quality Improvement Example



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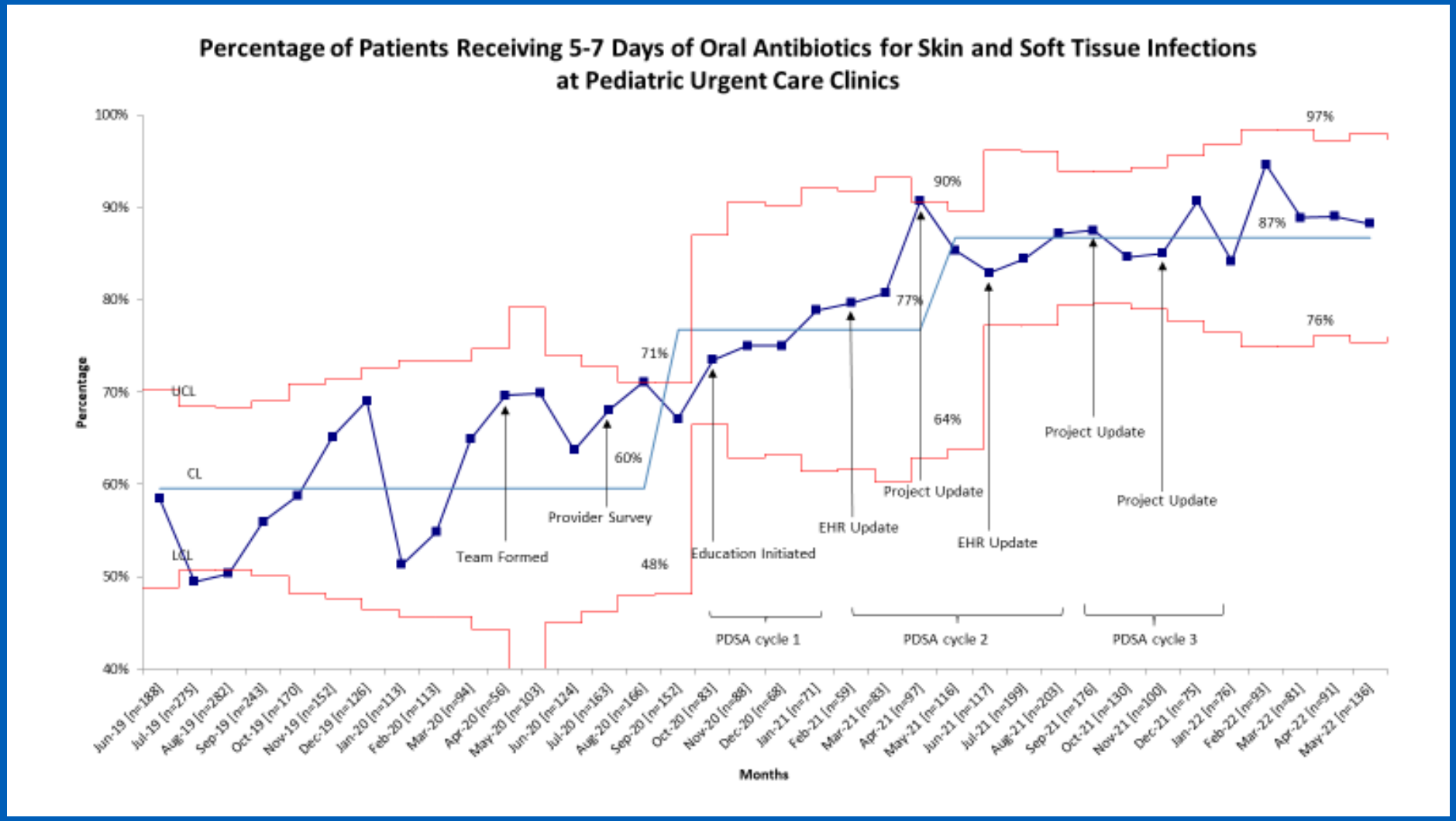
McKinsey J, Nedved A et al. Manuscript in preparation

Quality Improvement Example



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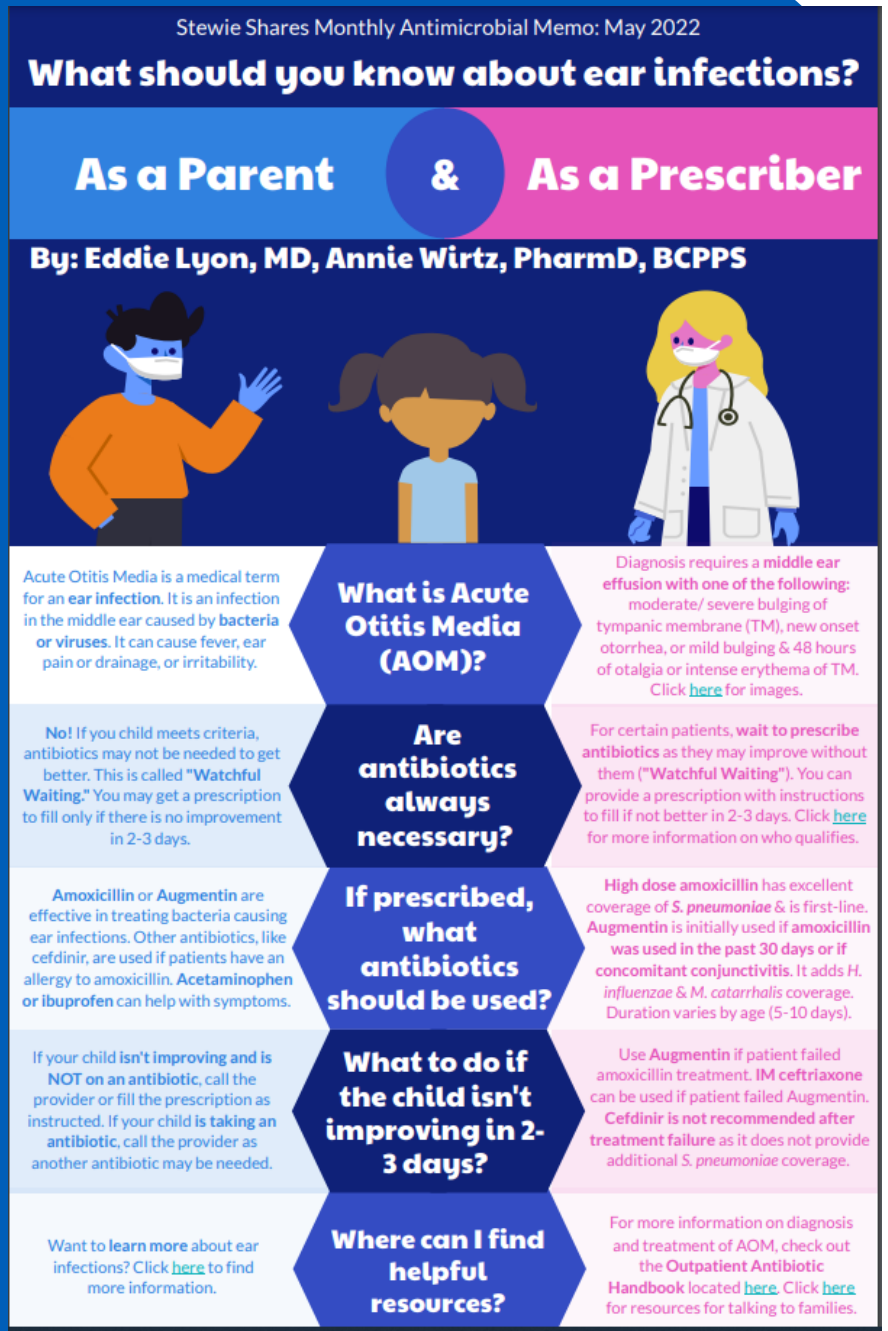
Hamner et al. Pediatrics. 2022 Dec 1;150(6):e2022057974

4. Education and Expertise

- Cookie rounds with UCC, ED, PCC during their division meetings biannually
- Lectures
- “The Link” wise use of antibiotics articles
- “Parentish” articles
- Stewie shares monthly
- Involvement with EBP - multiple CPGs / power plans
- EHR changes
- Allergy de-labeling clinics and education



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Family Education

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WHEN DOES MY CHILD NEED ANTIBIOTICS?

Some infections are not treated with antibiotics. It is important to use antibiotics only when they are needed. Antibiotics do not treat infections caused by viruses and should only be used for infections from bacteria. The chart below shows what infections are caused by a virus, bacteria, or both and when antibiotics are needed.

Common Condition	Common Cause			Are Antibiotics Needed?
	Virus	Either	Bacteria	
Bronchiolitis (inflammation of small airways)	X			No
COVID-19	X			No
Flu	X			No
Fluid in the Middle Ear	X			No
Other Throat Infections (except strep)	X			No
Upper Respiratory Infection (Common Cold)	X			No
Otitis Media (Ear Infection)		X		Maybe
Sinus Infection		X		Maybe
Strep Throat			X	Yes
Urinary Tract Infection (UTI)			X	Yes

Content adapted from CDC

CHILDREN'S MERCY ANTIMICROBIAL STEWARDSHIP PROGRAM

For More Information
Scan the QR Code or visit:
cmkc.link/when-to-use-antibiotics

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5 THINGS TO KNOW ABOUT ANTIBIOTICS

1. It is not safe to take leftover antibiotics or antibiotics given to someone else.

Do not keep any extra antibiotics. Do not give your child leftover antibiotics because it might not be the right kind or the right dose to treat the infection your child has. Side effects could happen if the dose is too high, too low, or not the right antibiotic choice. Antibiotics that are expired or stored wrong can cause harm. If you have extra antibiotic doses, do not keep them. Scan the QR code below to learn about ways to throw away medications safely.

2. Your child does not need antibiotics every time they are sick.

Antibiotics should only be used to treat certain infections from bacteria like strep throat or urinary tract infections. Antibiotics do not treat infections caused by viruses, like colds or a runny nose, even if the snot is yellow/green and thick. Antibiotics can cause side effects like diarrhea, vomiting, or rash, so it is important to only take them when they will work the best. Scan the QR code below to learn more about when antibiotics are needed.

3. All antibiotics work differently.

Each antibiotic works differently. Your health care team will pick an antibiotic that works best for the infection your child has and will cause the fewest side effects. This is why you might get one kind of antibiotic one time and a different one the next time.

4. The antibiotics my child takes can affect other people.

We need antibiotics to get better from infections from bacteria. There are wrong ways to take antibiotics including taking the wrong dose, taking them for the wrong length of time, or taking them when you don't need to. When antibiotics are taken in the wrong way, bacteria have a chance to learn more and can be harder to treat in the future. This is called antibiotic resistance. The bacteria can be passed to other people and cause infections. These infections are harder to treat because the bacteria have learned to protect themselves from the antibiotics. Scan the QR code below to learn more.

5. Some side effects to antibiotics are normal. Having these does not mean your child should never take that antibiotic again.

If your child had mild side effects, like stomach upset or mild diarrhea, they can use the antibiotic again. If your child developed signs of an allergic reaction, like hives or throat swelling, this could mean they have true allergy and your child should not take the antibiotic again. If family members are allergic to an antibiotic, it does not mean your child will be allergic too. Many children grow out of antibiotic allergies to penicillin or amoxicillin. Children's Mercy Penicillin Allergy Testing Clinic can test your child to see if they are still allergic. Ask your health care team if a referral is right for you. Talk with your health care team about your child's allergies to learn which antibiotics your child should not take.

For More Information
Scan the QR Code or visit:
cmkc.link/when-to-use-antibiotics

CHILDREN'S MERCY ANTIMICROBIAL STEWARDSHIP PROGRAM

A Useful Way to Discuss Management of Viral Infections

- Dialogue Around Respiratory Illness Treatment (DART)
- If a parent expects antibiotics and you determine they are unnecessary, use these 4 components:
  - 1) Review PE findings to make the case for your diagnosis
  - 2) Deliver the diagnosis
  - 3) Deliver a 2-part treatment recommendation: ***Negative recommendation*** **FIRST followed by a *Positive* recommendation**
  - 4) Provide a contingency plan

https://www.uwimtr.org/dart/

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4. Education - Outpatient Antibiotic Handbook

- https://www.childrensmercy.org/health-care-providers/pediatrician-guides/antimicrobial-stewardship/

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What is the IMPACT of Outpatient ASP?

Impact of an Antibiotic Stewardship Program on Antibiotic Choice, Dosing, and Duration in Pediatric Urgent Cares

Implementation of an outpatient antimicrobial stewardship program (ASP) increased antibiotic appropriateness for common pediatric infections at pediatric urgent cares (PUCs).

Antibiotics are overused in outpatient settings.

Errors in antibiotic choice, dose, or duration are observed in ≥ 20% of prescriptions.

Antibiotic appropriateness for 5 infections was assessed in 4 PUCs after outpatient ASP initiation.

CDC Core Elements of Outpatient ASP were implemented in our PUCs.

- Commitment – 07/2019
- Action for Policy/Practice – 2019
- Tracking/Reporting – 08/2018
- Education/Expertise – 08/2018

Increase in appropriate duration
63.2% ⟶ 80.5%

Increase in appropriate dose
64.6% ⟶ 77%

Increase in appropriate antibiotic
78.4% ⟶ 80.8%

Outpatient ASPs positively influence prescribing behaviors of outpatient clinicians and should be prioritized.

Nedved A, Lee BR, Hamner M, Wirtz A, Burns A, and El Feghaly RE

AJIC American Journal of Infection Control

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Nedved A et al. Amer J Infect Control 2021 Dec;49(12):1547-1550

Some of our Challenges

- Getting clean data (can’t associate diagnosis to prescription)
- Frontline providers buy-in: ID may be perceived as outsiders
- Shifting focuses from upper management in setting of external circumstances (e.g. pandemic)
- Different divisions/sites have different priorities and require different approaches/ different pace
- Successes/collaborations vary depending on leadership in each site
- Too many other QI projects in our hospital/ competing interests
- Poor FTE support– need for additional resources

Some Tools for Successful Outpatient ASP

- Buy-in from frontline providers
- Use resources available to you from the CDC, Health Departments, WHO
- Focus on Low Hanging Fruits
  - Duration
  - Dosing
  - SNAP for AOM
- Leverage your EHR when possible

Some Resources

- https://www.cdc.gov/antibiotic-use/core-elements/outpatient.html
- Antimicrobial Stewardship: Optimizing Use of Antibiotics | Children's Mercy Kansas City (childrensmercy.org)
- https://pids.org/pediatric-asp-toolkit/
- https://www.cdc.gov/abcs/bact-facts-interactive-dashboard.html
- https://www.childrensmercy.org/siteassets/media-documents-for-depts-section/documents-for-health-care-providers/evidence-based-practice/clinical-practice-guidelines--care-process-models/outpatient-antibiotic-handbook.pdf
- https://www.idsociety.org/practice-guideline/skin-and-soft-tissue-infections/
- American Academy of Pediatrics, Redbook 2021
- Liberthal et al. Pediatrics March 2013, 131 (3) e964-e999
- https://www.cdc.gov/antibiotic-use/week/get-involved.html
- https://www.cdc.gov/antibiotic-use/week/toolkit.html
- https://www.cdc.gov/antibiotic-use/community/materials-references/graphics.html

Questions?

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