



Small But Mighty: Building Antimicrobial Stewardship Across a Diverse Health System

Andre Gouws memorial pharmacy lecture

September 25, 2026

Whitney Buckel, PharmD, BCIDP

System Antimicrobial Stewardship Program Manager

Learning Objectives

By the end of this presentation, the audience will be able to:

- Describe the Intermountain Health antimicrobial stewardship program
- Summarize evidence from the SCORE trial and Intermountain's small-hospital experience
- Assess potential application of Intermountain's stewardship interventions to your own practice setting

Disclosures

I have no relevant financial disclosures for this presentation.

INTERMOUNTAIN BY THE NUMBERS¹



6 Primary States²
(UT, NV, ID, CO, MT, WY)



**66,000+
Caregivers**



**Select
Health** **1.1 million
Members**



33* Hospitals
Including 1
Virtual Hospital



**\$16.06 billion
Total Revenue**



**400
Clinics**

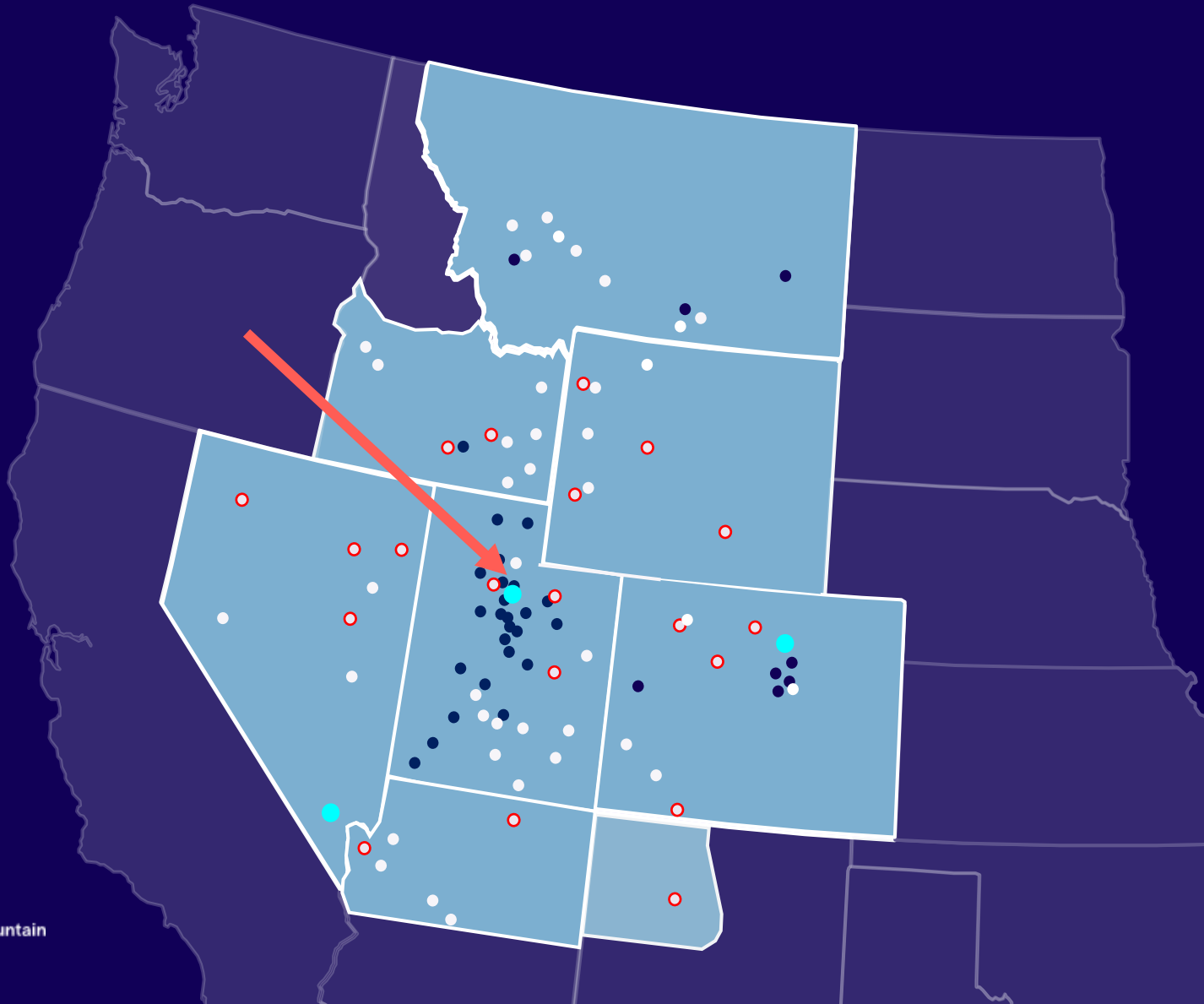


**4,800
Licensed Beds**



**4,600+ employed
Physicians & APPs**

Intermountain Health's Current Footprint



- Hospitals
- Region HQ
- Affiliate/Outreach Partnerships
- Classic Air Medical Bases

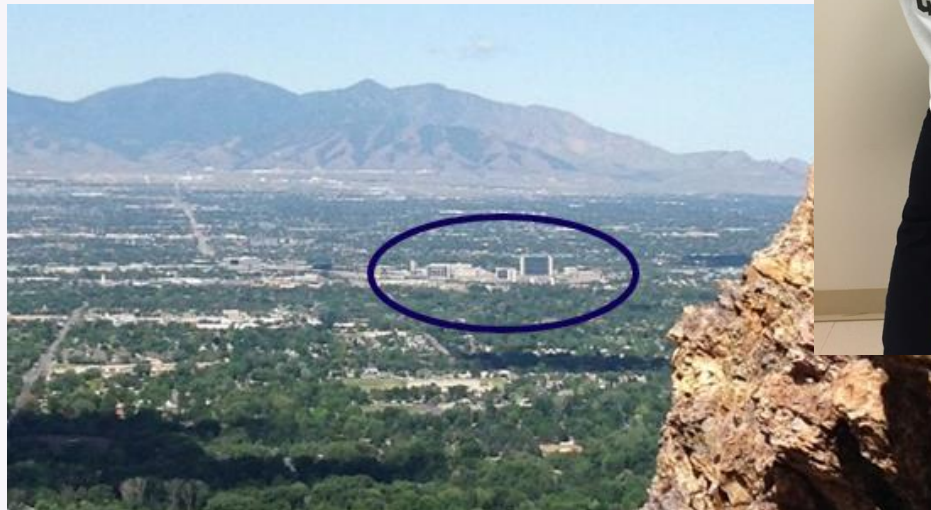
MY INTERMOUNTAIN STORY

2012

Joined as 4th
ID Pharmacist

2013-2015

SCORE
Study (Small
Hospitals)



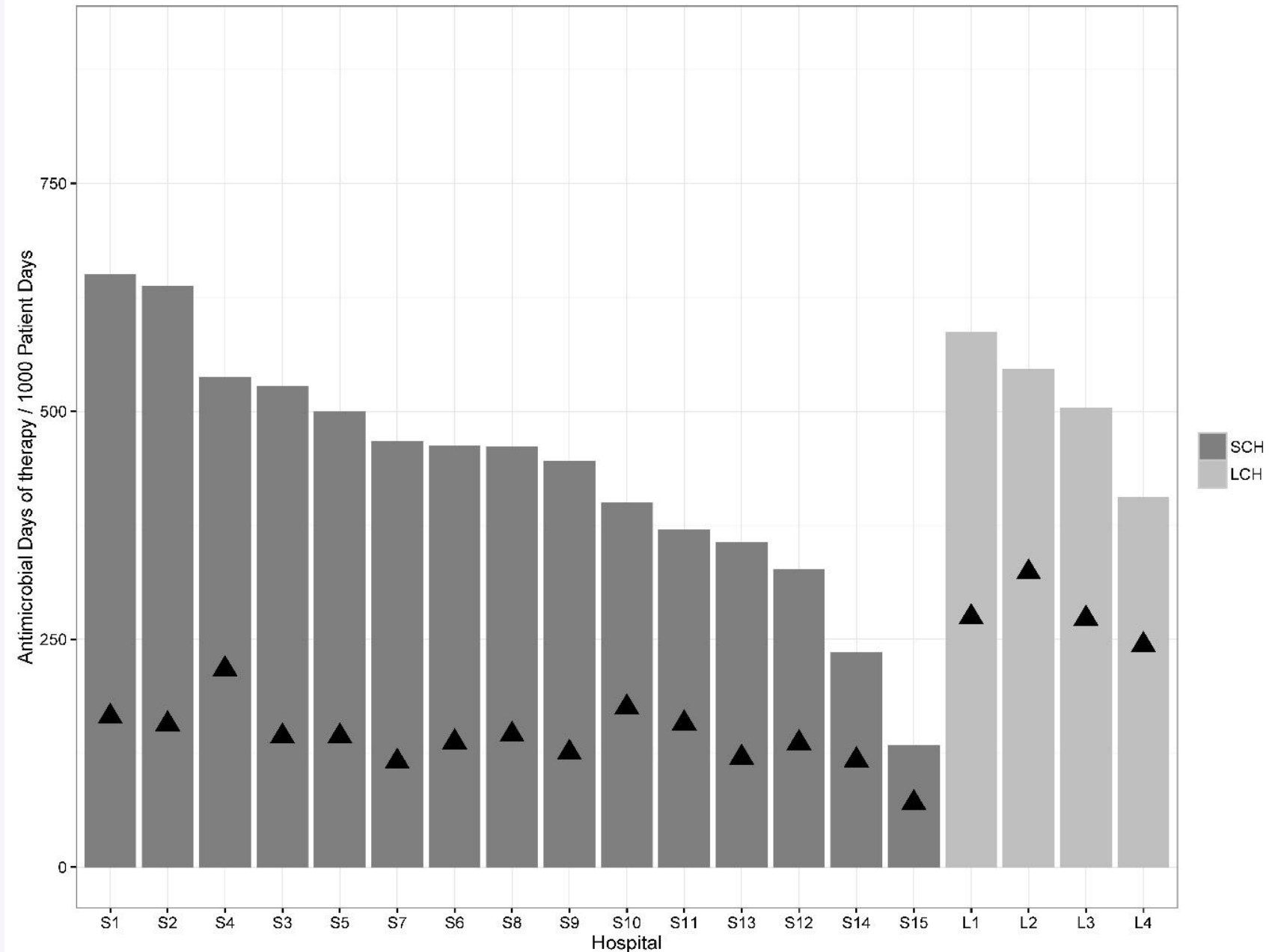
The SCORE Study: The Beginning



Stenehjem E, Hersh AL, Buckel WR, et al. Impact of implementing antibiotic stewardship in 15 small hospitals: a cluster-randomized trial. *Clin Infect Dis* 2018;67(4):525-532.

Three-Year Facility-wide Antibiotic Use

Intermountain
2011 to 2013

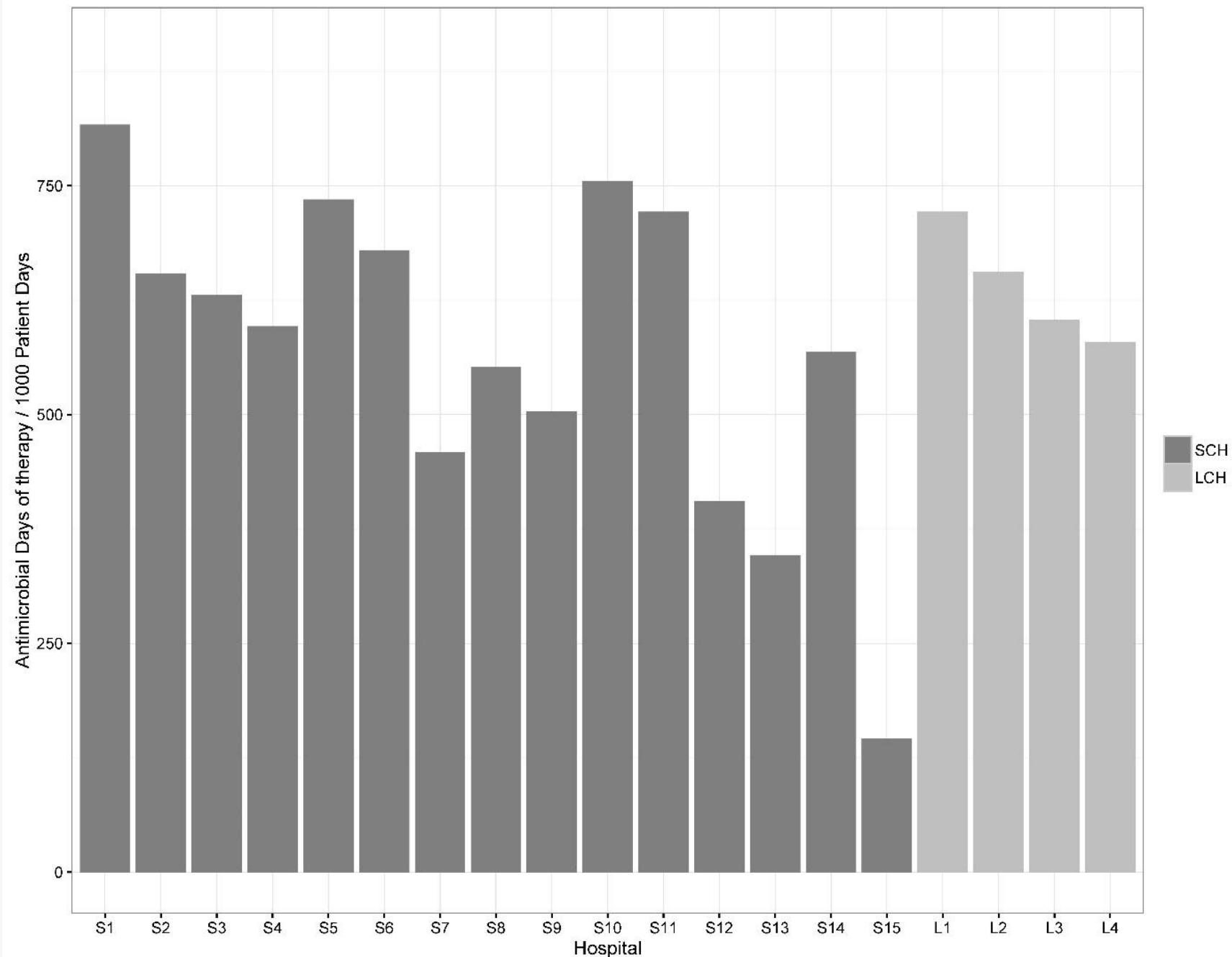


Distribution of Floor Types in Small Hospitals

Hospital	Licensed Beds	Total Patient Days	Medical/Surgical Days	Intensive Care Unit Days	Pediatric Days	Other Days*
Small, community hospitals						
S11	146	44,174	13,976 (32%)	3,351 (8%)	4,619 (10%)	22,228 (50%)
S14	97	33,319	8,082 (24%)	802 (2%)	3,000 (10%)	21,435 (64%)
S6	89	27,491	11,363 (41%)	1,895 (7%)	4,677 (17%)	9,556 (35%)
S10	71	23,448	8,913 (38%)	933 (4%)		13,602 (58%)
S1	48	11,642	7,765 (67%)	1,531 (13%)		2,346 (20%)
S15	24	10,118	6,091 (60%)			4,027 (40%)

A significant proportion of patient days present were in labor & delivery, maternity, nursery and psychiatry units (Other Days*)

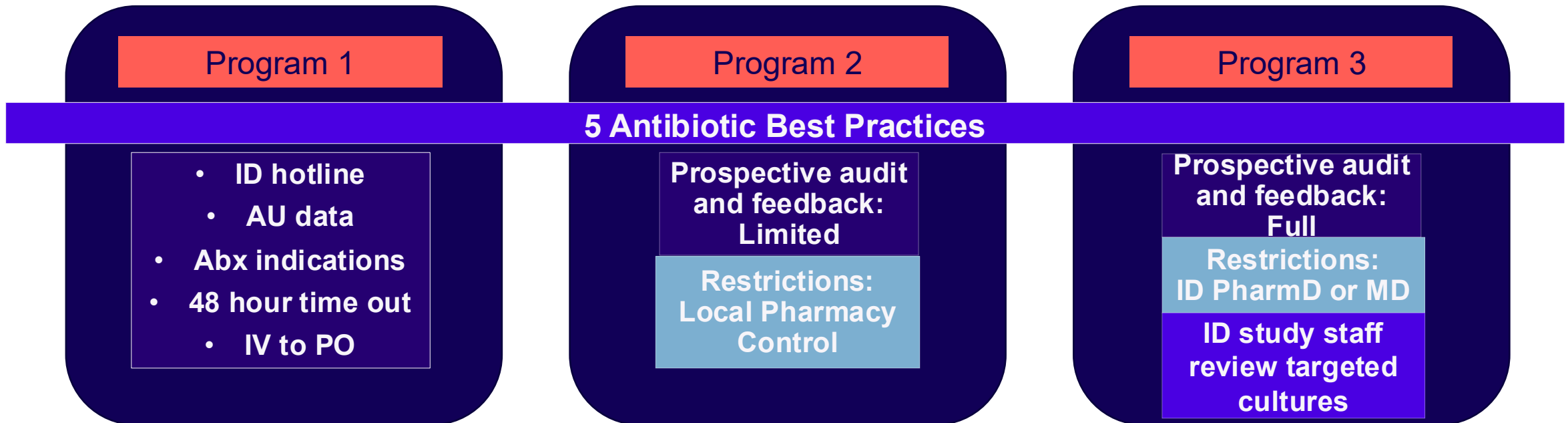
Facility Level – Excluding “Other”



Stewardship in Community Hospitals Outcomes and Resources

SCORE Cluster Randomized Trial

- Goal: Define an antibiotic stewardship strategy for Intermountain's smaller hospitals that optimizes outcomes while maximizing resources



Stewardship in Community Hospitals Outcomes and Resources **SCORE Results**

- Reduced total antibiotic use
 - Intervention vs Expected: Program 3 vs 1: RR 0.84 (0.68, 1.04) p = 0.04
 - Intervention vs Expected: Program 2 vs 1: RR 0.94 (0.76, 1.17) p = 0.42
- Reduced restricted agents
 - Program 1: 41% (RR, 0.59; CI, 0.25-1.37)
 - Program 2: 52% (RR, 0.48; CI, 0.21-1.08)
 - Program 3: 86% (RR, 0.14; CI, 0.06-0.33)
- Became a resource and developed relationships

Take Home Point

Because of our data, we chose to pursue Program 3 ongoing.

THE INTERMOUNTAIN HEALTH EXPERIENCE

2012

Joined as 4th
ID Pharmacist

2013-2015

SCORE
Study (Small
Hospitals)

2016

Launched
TeleID (5th
pharmacist)

Started with an ID services for 16 community/rural hospitals (10-150 beds)

Inpatient face-to-face ID consultation via in-room camera

M-F 8:30 am - 4:30 pm

Telephone ID consultation and advice

Inpatient, outpatient, emergency department, acute care clinics: 24/7
coverage via ID Hotline

Antimicrobial stewardship support

ID PharmD and ID MD

Health System Stewardship



Buckel WR, Stenehjem EA, Hersh AL, Hyun DY, Zetts RM. Harnessing the power of health systems and networks for antimicrobial stewardship. Clin Infect Dis. 2022 Nov 30;75:2038–2044.

Defining Health System or Network Stewardship

Intermountain Health and Pew Charitable Trusts Collaborative Definition

A health system or network level antimicrobial stewardship program includes a **community of stewards** from **multiple sites and settings**. The goal is to implement stewardship interventions within this community that provide **consistent**, high-quality and safe care that improves outcomes, eliminates avoidable harms and reduces antimicrobial resistance.

Centralized ASP Structures

Model	Utilized by Participating Systems/Networks, n (%)	Description
Collaborative	3 (15%)	• No formal structure • Committee with limited accountability • Often formed organically
Centrally Coordinated	6 (30%), with 3 (15%) in this category and 3 (15%) in transition to a centrally led model (below)	• Formal written structure • Committee with at least some system accountability • Often formed organically after initial collaborative stage
Centrally Led	8 (40%)	• Formal system of stewardship leaders • System accountability held by system leaders • Requires system-level resources
Collaborative, Consultative Network Model	2 (10%)	• External leaders and SMEs serve as consultants and mentors

Responsibilities of System and Network Leaders

Category	Described as a core activity	Subtheme
Developing and implementing antibiotic stewardship policies and practices	19 (95%)	Create and disseminate antimicrobial-stewardship related policies and guidelines, design and implement EHR tools or software
Communication and education	18 (90%)	Lead committee meetings, design educational material, maintain a website
Development of validated data streams	16 (80%)	Develop key metrics and dashboards, perform data validation
Building and leading a stewardship community	15 (75%)	Develop a community of stewards, provide training, mentorship, coaching, travel to sites
Provision of subject-matter expertise	11 (55%)	Answer clinical questions directly or indirectly related to patient care
Strategic planning and goal setting	7 (35%)	Strategic plan, goal setting

Adapted from Table 3

THE INTERMOUNTAIN HEALTH EXPERIENCE

Timeline of Growth

2012

Joined as 4th
ID Pharmacist

2013-2015

SCORE
Study (Small
Hospitals)

2016

Launched
TeleID (5th
pharmacist)

2017-2018

System-level
ASP Created
(PharmD & MD)

2018

Hired 5
pharmacists

2019

SIDP grant to
start PGY2
(2020-2021)

2020

Expanded
Tele (1 Adult,
1 Peds)

2022

Merged with
SCL Health
(6 PharmDs)

2024-2026

Hired 3 more
pharmacists

Stewardship Examples



Where to Start?

Examples for Today's Presentation

- **Drug-specific**
 - Fluoroquinolones
 - Meropenem
- **Disease-specific**
 - Pneumonia and vancomycin use
- **Process-specific**
 - Penicillin allergy delabeling

Table 2

Actionable, intervention-based metrics to consider by topic

Topic	Possible Metrics	Potential Action
Drug-specific Examples: • Meropenem MUE • Clindamycin MUE • All broad-spectrum	• Number of doses per month • DOT or DDD per 1000 patient days (present) • Acquisition cost • % appropriate (criteria-based, route-based, dosing/renal adjustment-based) • Antibiotic-related ADRs (such as AKI or high vancomycin troughs)	• Education on appropriateness • Restriction • Prospective audit and feedback • STOP and review at order entry
Disease-specific Examples: • CAP • UTI/ASB • Bloodstream infections	• % guideline adherent treatment • % appropriate route • Length of therapy • Rate of <i>Clostridium difficile</i>^a • Length of stay (ICU/hospital) • Readmissions^a • Mortality^a	• Guideline development • Guideline promotion, education, and integration into CPOE • Prospective audit and feedback (eg, daily review of positive blood cultures, urine cultures and/or <i>S pneumoniae</i> urinary antigen testing)
Process-specific Examples: • Rapid diagnostics • Allergy assessment • ED culture follow-up	• Time to appropriate antibiotics • % adherence to policies • % allergies with a documented reaction • No. patients with cultures reviewed within __ time • No. patients in whom antibiotic therapy was changed based on culture follow-up • No. (%) of patients who received empiric therapy that covered the organism that grew	• Standard operating procedures • Changes in the electronic health record • Guideline development • Education • Micro laboratory calls to pharmacy with rapid diagnostic results

Abbreviations: ADR, adverse drug reaction; AKI, acute kidney injury; ASB, asymptomatic bacteriuria; CAP, community-acquired pneumonia; CPOE, computerized prescriber order entry; DDD, defined daily doses; DOT, days of therapy; ED, emergency department; ICU, intensive care unit; MUE, medication use evaluation; UTI, urinary tract infection.

^a May be challenging for small facilities to demonstrate meaningful change.

Fluoroquinolone Utilization



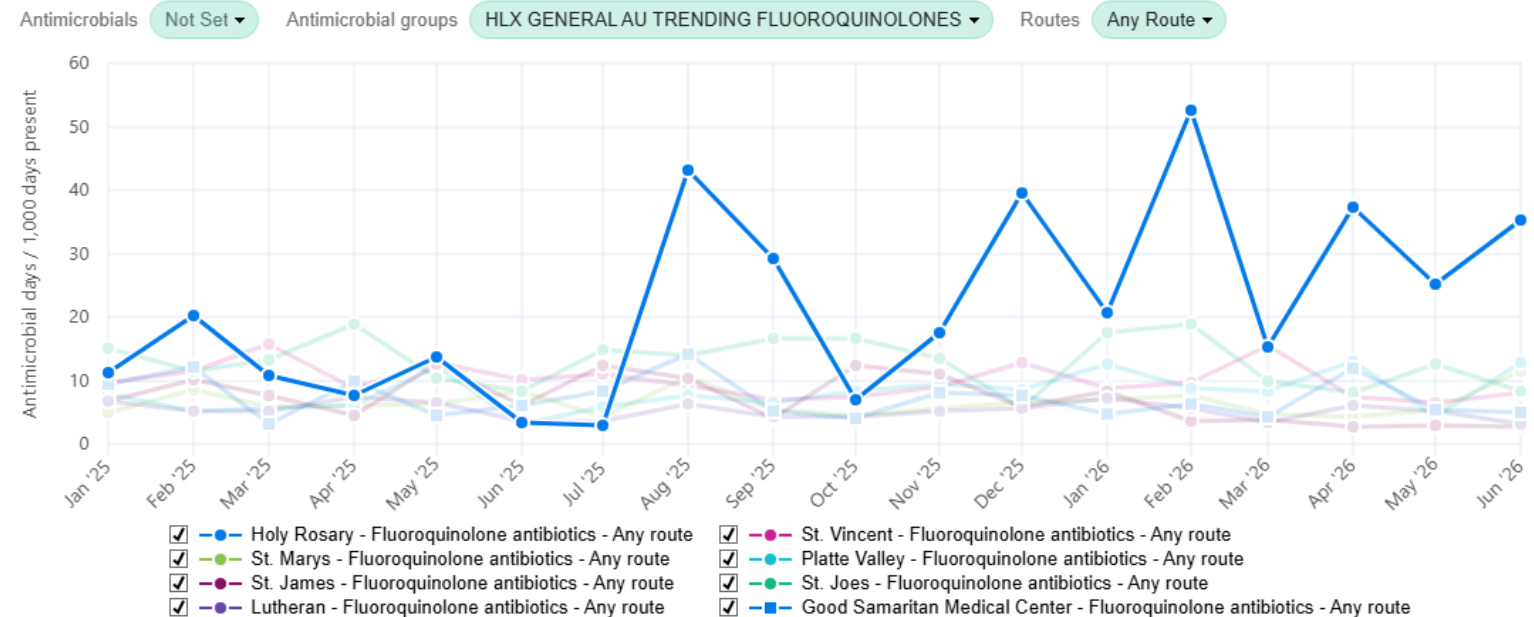
Sara Palmquist, PharmD

St. Vincent Hospital and Holy Rosary Hospital

High Fluoroquinolone Utilization Identified

- A critical access hospital consistently utilized the most fluoroquinolones in the region
- Early 2025 orders were from ID providers
- Trend shifted in late 2025 to hospitalists ordering for UTIs and pneumonia

Antimicrobial Usage Trends



Intervention – July 2026

Emailed SBAR to Hospitalists

- Included
 - System resources
 - Updated UTI care process model
 - Summary of updated national UTI guidelines
 - High-level facility data

Please take a few minutes to review these resources as they may help support antimicrobial stewardship efforts. Antibiotic utilization data for 2026 show Holy Rosary is an outlier among Peaks facilities for fluoroquinolone use (please see SBAR below).

SBAR: Elevated Fluoroquinolone Use

S – Situation

Holy Rosary has the highest fluoroquinolone use among Peaks facilities, with rates consistently exceeding system benchmarks over the past 6 months. Holy Rosary's utilization is 2-5 times higher than most comparator hospitals in the system.

B – Background

Fluoroquinolone use peaked at approximately 52 DOT/1,000 patient days in February and remained elevated through June. Most peer facilities maintained utilization below 15 DOT/1,000 patient days during the same period. Given the association of fluoroquinolones with *C. difficile* infection, antimicrobial resistance, and other serious adverse events, stewardship guidelines recommend limiting use when effective alternatives are available.

A – Assessment

Current prescribing patterns suggest an opportunity to optimize fluoroquinolone use, particularly for common indications such as urinary and respiratory tract infections where guideline-concordant alternatives may be appropriate.

R – Recommendation

Please review fluoroquinolone prescribing practices, including indication, duration, and opportunities for de-escalation or alternative therapy when clinically appropriate. This may help improve patient safety and align utilization with stewardship best practices.

Responses from Providers

- “Okay, thank you. We will discuss at our next provider meeting. I am one of those to blame.”
- “Interesting, because I can only think of a handful of patients treated with a fluoroquinolone, and because of allergies. Could we see the raw data?”
- “Agree. I don’t recall ordering it. Only rarely. Indeed, it would be informative to see the associated data.”

Additional Data Sent

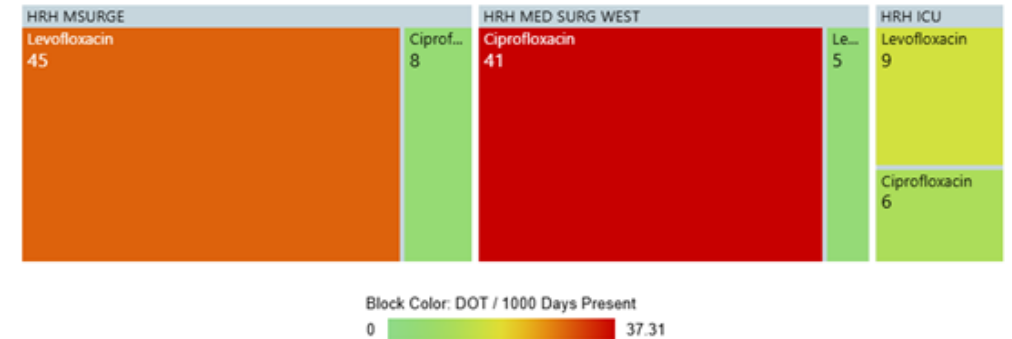
Noted levofloxacin ranked as the #10 most utilized antimicrobial

Tone of email was friendly and helpful but direct

Jan – June 2026 data for HRH by Unit:

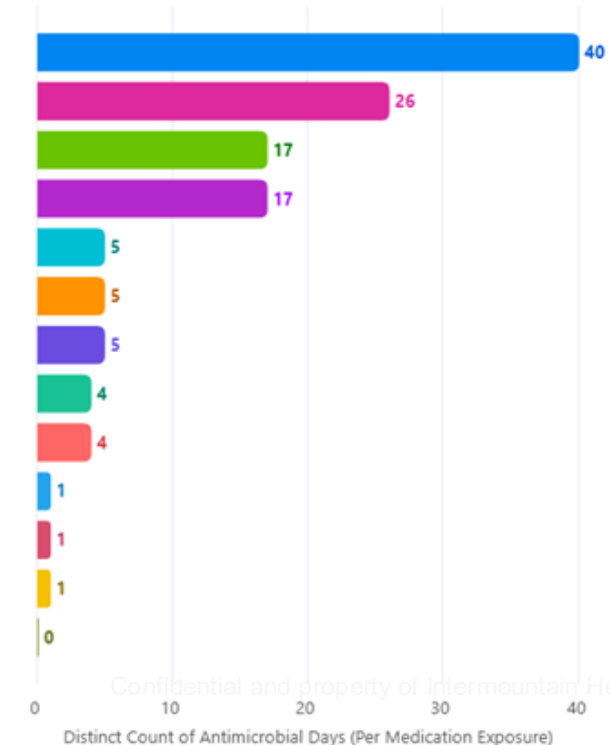
Antimicrobial Usage by Reporting Unit

This graph displays antimicrobial usage sliced by reporting unit. The size of each block and the number within it represents the absolute days of therapy, while the color of each block represents the normalized rate of antimicrobial usage per 1000 days present.



Jan – June 2026 data for HRH by Ordering User:

Days of Therapy by Ordering Provider, Overall (choose antimicrobial above) (Top 15)

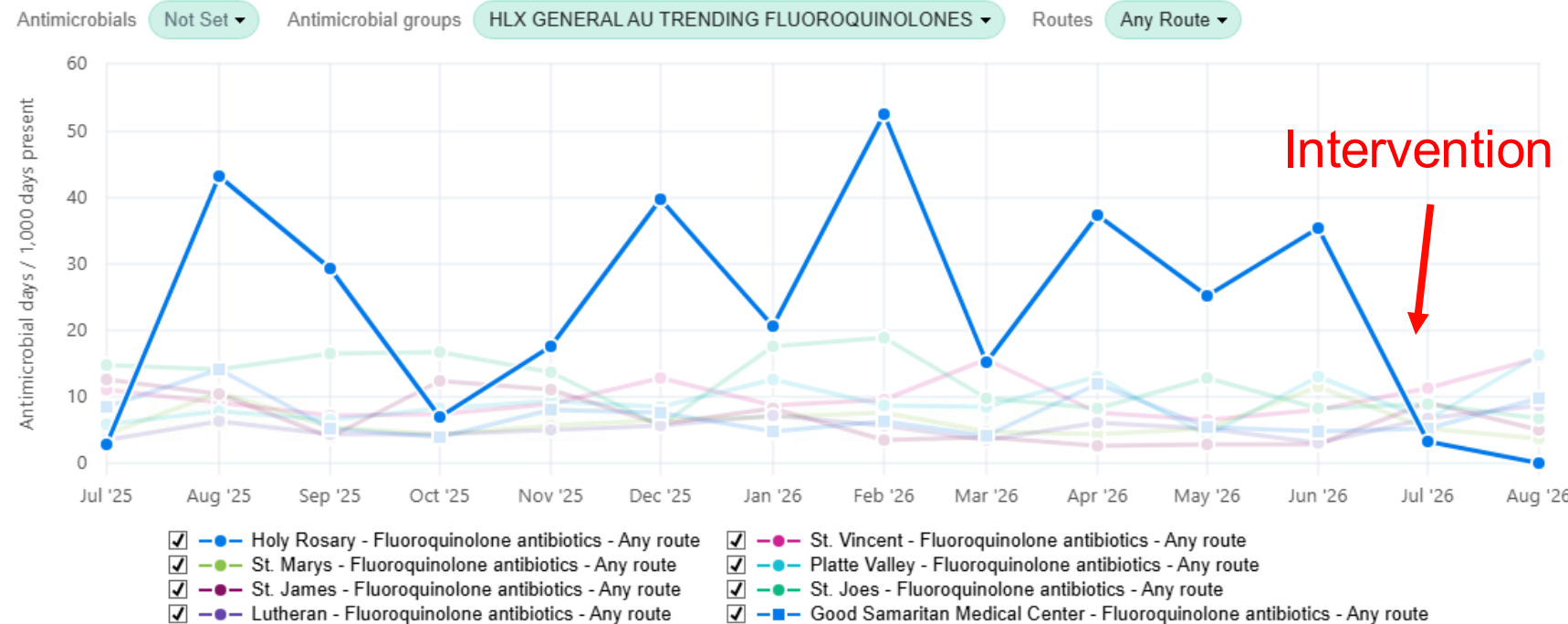


Tracking the Intervention

Success!

- Moved from highest to lowest fluoroquinolone utilization
- Planning on resharing data in next 2-3 months

Antimicrobial Usage Trends



Conclusion

- A targeted stewardship intervention changed prescribing behavior and moved the facility from highest to lowest fluoroquinolone utilization in the region
- Data transparency helped with buy-in from providers
- Utilized several components of the Core Elements of Hospital Antibiotic Stewardship Programs (i.e., accountability, action, tracking, reporting)

Meropenem Utilization



Stephanie May, PharmD & Nick Tinker, PharmD

Intermountain Tele Infectious Diseases

Purpose & Scope

Purpose: To optimize the appropriate use of meropenem by defining and educating to appropriate empiric and targeted therapy criteria

Scope: All inpatients receiving meropenem

Expected Benefit: Reduction in overuse of broad-spectrum carbapenem therapy to reduce downstream development of antibiotic resistant in the patient and community, *C. difficile* infection, and other adverse drug events.

Goal: Development and education surrounding meropenem use criteria, along with real-time feedback, will results in a decrease meropenem days of therapy (DOT) by 5%/10%/15% (entry/target/stretch)

At baseline across the system, approximately 40% of meropenem days of therapy (DOT) were in patients WITHOUT a microbiologic indication OR antibiotic allergy, identifying opportunity for improvement.

Interventions

- Meropenem use criteria was developed and approved by the Intermountain Antimicrobial Stewardship Committee.
- Education was provided to sites in a multimodal fashion, based on site-specific needs, including an EASIE ECHO session.
- Day-to-day antimicrobial stewardship interventions referenced the meropenem use criteria to provide real-time, patient-specific feedback.

Meropenem Use Criteria | September 2022

Applies to | Providers and pharmacists across all hospitals

What is changing | Implementation of meropenem use criteria to optimize appropriate use

Key Points

- Meropenem is a broad-spectrum carbapenem antibiotic with activity against extended-spectrum beta-lactamase (ESBL)-producing organisms and *Pseudomonas aeruginosa*.
- Overuse of broad-spectrum antibiotics like meropenem contributes to antibiotic resistance in the patient and community, *C. difficile* infection and other adverse drug events.
- Meropenem use criteria were developed to prevent meropenem overuse and optimize prescribing.
- This is **not** a formulary restriction and prescribers may continue to prescribe meropenem without delays in therapy. These criteria are a resource for pharmacists and physicians to promote appropriate use of medications and antimicrobial stewardship.

Meropenem Use Criteria
• Empiric therapy for severe infection in patients with risk factors for ESBL-producing organism or MDRO resistant to cefepime and piperacillin/tazobactam (e.g. prior colonization with a resistant organism¹, multiple prior courses of IV antibiotics within 90 days)
Contact your local ID pharmacist with questions on possible risk factors for these resistant organisms
• Targeted therapy for treatment of ESBL infection or infection caused by MDRO resistant to cefepime and piperacillin/tazobactam when unable to use ertapenem or non-beta-lactam therapy^{2,3}
• Empiric or definitive therapy for patients with severe allergies (e.g. anaphylaxis, shortness of breath, oropharyngeal swelling, DRESS⁴, SJS⁴) to penicillin and cephalosporin antibiotics ○ Verify all allergic reactions and de-escalate as appropriate ○ Most patients with mild allergies <u>may receive alternative beta-lactam antibiotics</u>.

¹Consider culture history within the previous 12 months

²Antibiotic cost should not be a primary driver in antibiotic selection. The average cost per day of ertapenem therapy has dropped by almost 50% in the last 5 years, and at this time is comparable to the average cost per day of meropenem therapy.

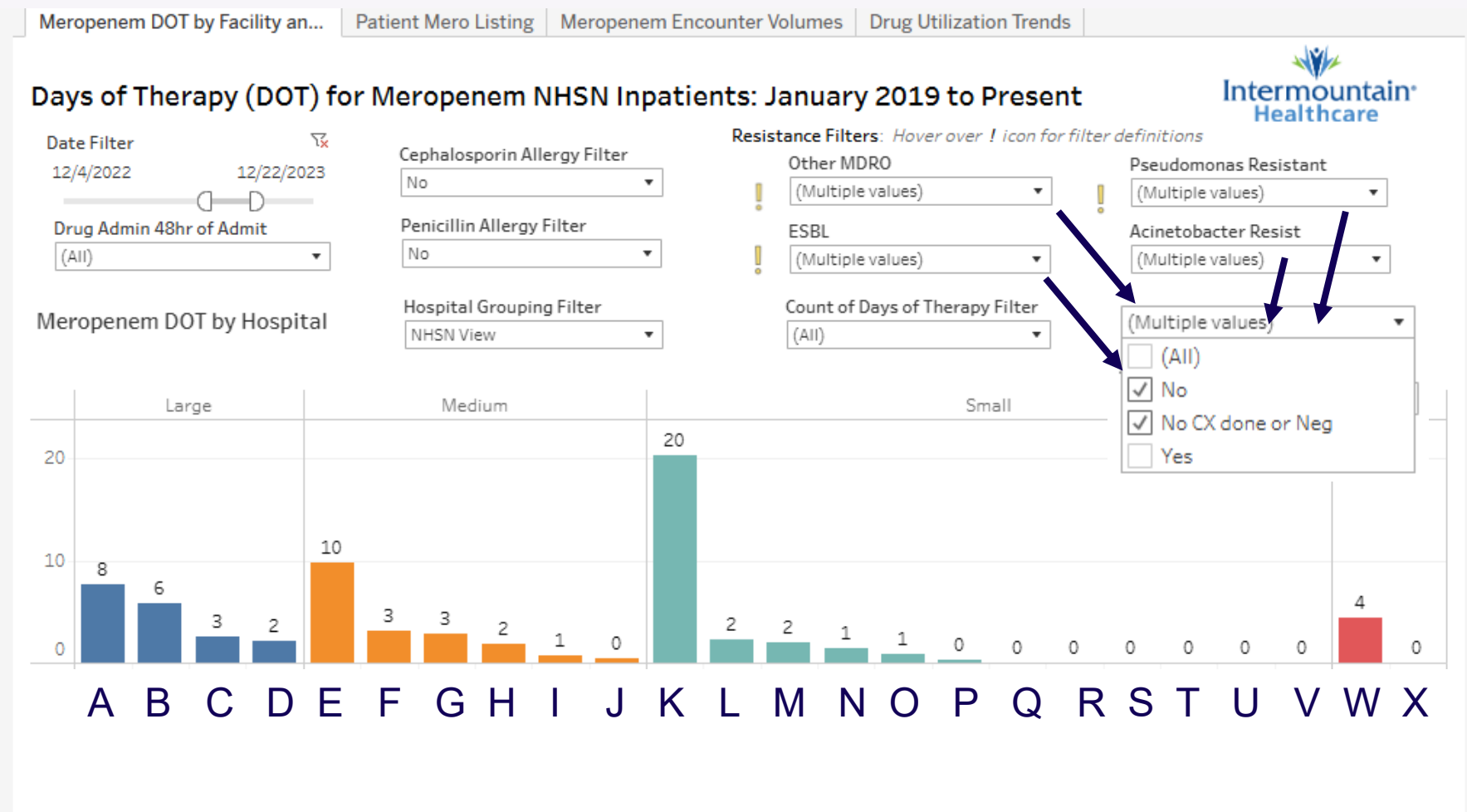
³Examples of non-beta-lactam therapy options include trimethoprim/sulfamethoxazole or fluoroquinolones when susceptible.

⁴DRESS = Drug rash with eosinophilia and systemic symptoms, SJS = Stevens-Johnson Syndrome

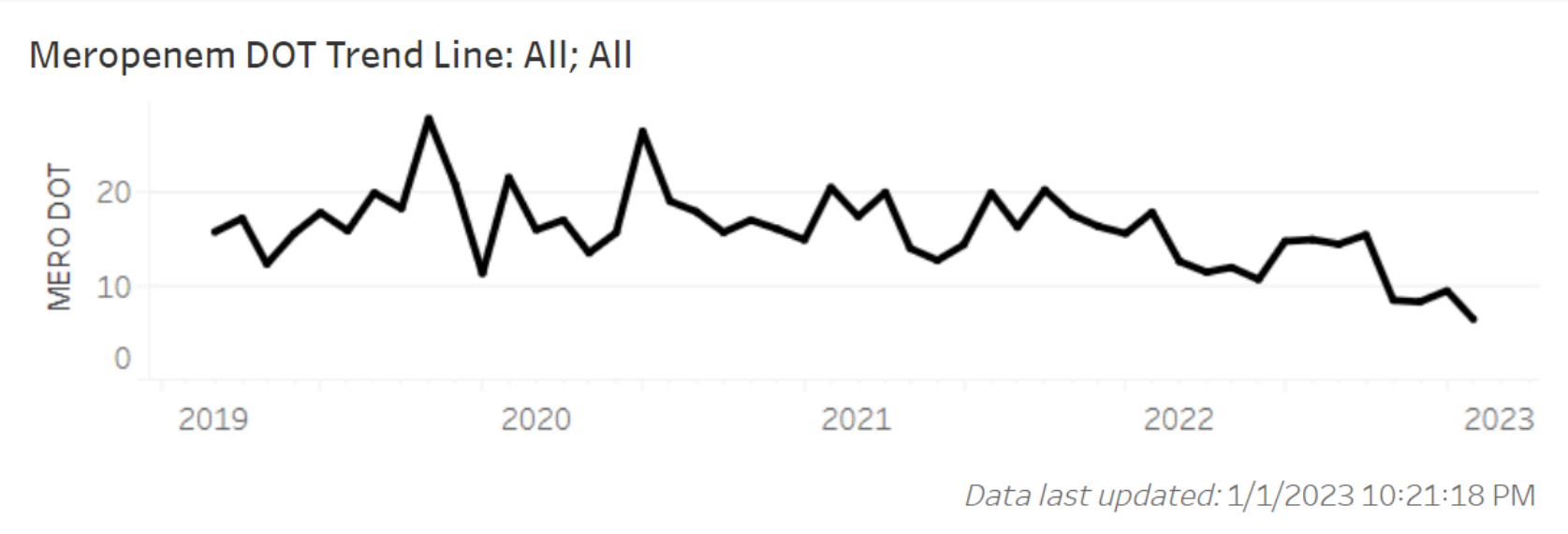
Dashboard

A meropenem use dashboard with drill down capabilities was developed

Shared with antimicrobial stewardship leaders across the system.



Success & Sustainability



Across the system in 2022, unnecessary meropenem days of therapy decreased from 13 to 6 days per 1000 patient days present.

2023, 2024 and 2025 data:

Details	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Meropenem days of therapy per 1000 patient days present (2022 average 11)	9	10	6	4	3	2	4	4	4	3	3	1

Details	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Meropenem days of therapy per 1000 patient days present (WATCH) (average 8 in 2023)	3	2	3	2	3	4	3	2	3	2	1	3

Details	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Meropenem days of therapy per 1000 patient days present (WATCH) (average 3 in 2024, 8 in 2023)	2	3	3	3	4	3	3	2

MRSA Nasal Swabs: No to Vanco



Scott Yardley, PharmD

Cedar City Hospital

In collaboration with John Veillette PharmD, Katie Roper PharmD, and Becky Leavitt PharmD.

Background/Problem

- Vancomycin and Pneumonia
- MRSA is responsible for 3% of all pneumonia
- IDSA guidelines call for vancomycin to be started in patients with high risk for drug resistance
- Unnecessary vancomycin comes with a whole host of problems:
 - Adverse effects – kidney injury, infusion reactions, allergic reactions, *C. difficile*, colitis
 - Increased antibiotic resistance
 - Increased cost – troughs, drug costs, pharmacist time for monitoring
 - Patients are admitted with isolation precautions

MRSA Nasal Swab PCR

- Can be obtained quickly – takes approx. 1 hr. 15 min to run
- They are extremely accurate – 99% negative predictive value
- Allows for antibiotic de-escalation
- Patient avoid unnecessary vancomycin treatment
- By decreasing the use of vancomycin, we decrease the risk of antibiotic resistance

Intervention

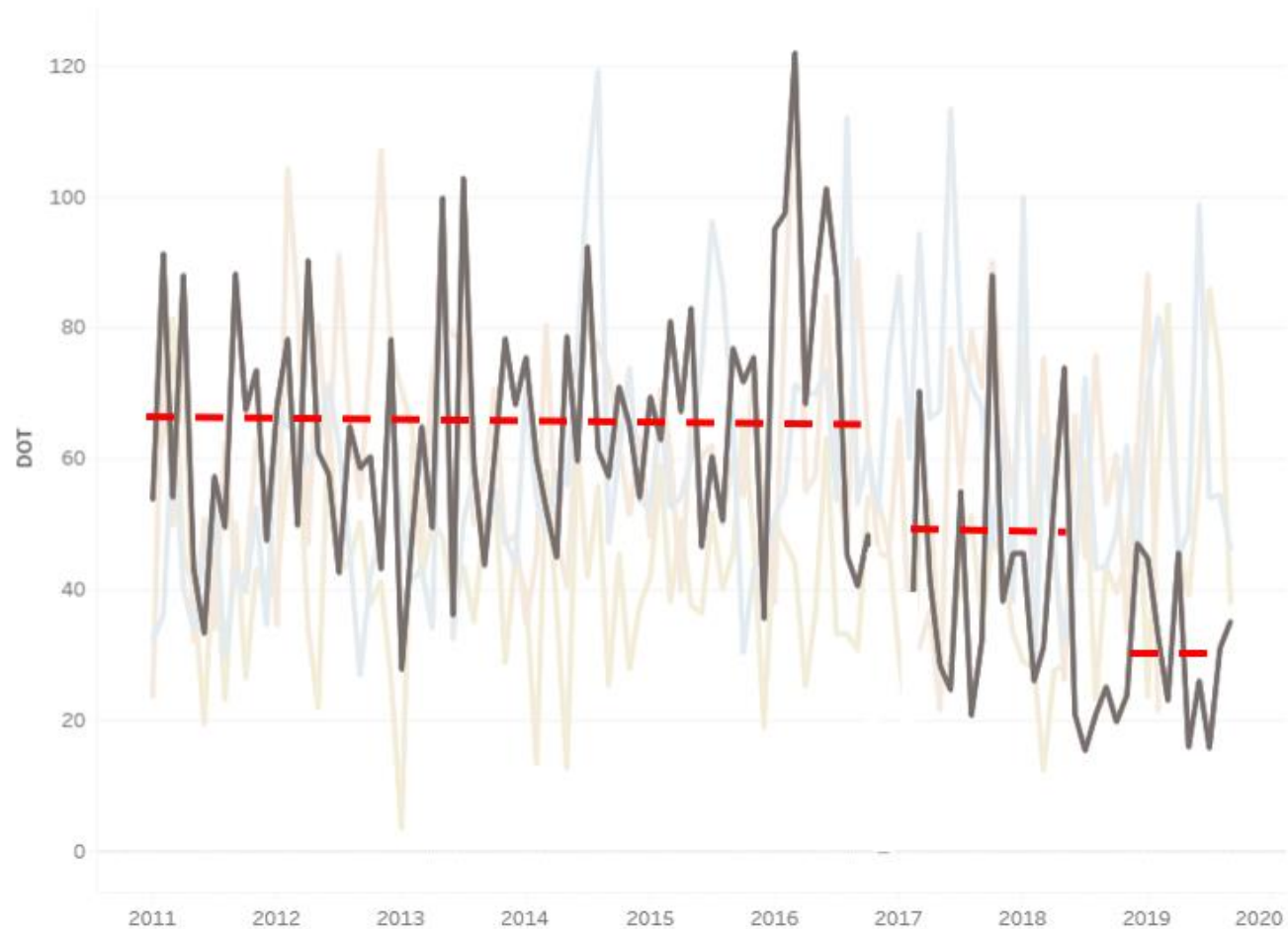
- Our hospital was able to procure the MRSA PCR machine following suit from other Intermountain facilities.
- MRSA PCR went live 3/14/2019
- Education to Medical Staff on March 2019
- Changed HCAP/High DRIP score pneumonia processes
 1. Collect a STAT MRSA nasal swab
 2. In non-critically ill patients, start with broad spectrum antibiotic (Zosyn) and azithromycin
 3. Hold vancomycin for pending results of nasal swab, if not already back – Discontinue order if negative.
 4. In critically ill patients – obtain STAT nasal swab, but vancomycin dose will NOT be held for pending results

Outcomes

Group	Total Patients	Vanco Days	Vanco Doses
MRSA PCR off-site (10/2018 – 3/14/19)	N = 21	30	35 (Average 1.7 doses per patient)
Off-Site data adjusted for 35 patients	N = 35	48	56 (Average 1.7 doses per patient)
MRSA PCR on-site (3/15/19 – 10/2019)	N = 35	10	12 (Average 0.34 doses per patient)

Outcomes

Unit Trend DOT comparison



Drug Category: Vancomycin
CDC Antibacterial Category: All

VANCOMYCIN

Unit Groups: Medium

Med/Surg

Med Surg

Med Surg

Cedar City CC_Med Surg

Med Surg

Savings

- Patients treated with vancomycin:
 - Off-site MRSA PCR: 95% did receive vancomycin
 - On-site MRSA PCR: 23% did receive vancomycin
 - On-site excluding the ER: 13% (3 patients received vancomycin after normal hours)
- Estimated Vancomycin doses saved: $56 - 12 = 44$ doses
 - Vancomycin cost savings: 44 doses x \$75 per dose = **\$3,300**
- Pharmacists time in monitoring vancomycin and doing the initial workup
- The decrease in vancomycin resistance and exposure to unnecessary antibiotics

Sustainment

- Work with the corporate iCentra team to add MRSA nasal swabs to certain power plans
- Continue to educate individual physicians that aren't ordering the nasal swab in a proper time frame
- Educate nurses about the proper MRSA PCR swabbing techniques
- After presentation to system leaders, almost every mid-sized and small sites received PCR machines in their labs.

Penicillin Allergy Delabeling



Wes Crouch, PharmD

Sanpete Valley Hospital

In collaboration with system leaders.

Step 1: Allergy Assessment and Documentation

In the Canyons and Desert region, a 2024 evaluation of a random sample of 50 inpatients with penicillin class allergies, found that 23 (46%) did not have a documented reaction and 41 (82%) were missing a comment.

Clinical Guideline



Beta-Lactam Allergy Assessment and Documentation | November 2024

Applies to | Pharmacy Interns, Technicians and Pharmacists, Peaks Region

Why it's important | Evaluation of antibiotic allergies is essential for optimizing treatment of infectious diseases. Documented penicillin allergies, in particular, can lead to higher costs, increased risk of antibiotic resistance and worse patient outcomes. While penicillin allergies are reported in approximately 10% of patients, the true incidence is 1-5%. A detailed allergy history is a key step to determine appropriate assessment of the patient's allergy and need for further evaluation, such as an oral challenge. Allergies are often documented by pharmacists and pharmacy technicians at the time of medication reconciliation; however, allergy review and documentation are not consistent. In a 2024 evaluation of a random sample of 50 inpatients with penicillin class allergies, 23 (46%) did not have a documented reaction and 41 (82%) were missing a comment. Standardization of allergy documentation would mitigate harms associated with a documented penicillin allergy, improve appropriate antibiotic use and increase communication across care sites.

Allergy Assessment Script for Patients / Family Members Interview

When conducting allergy history interviews with a patient or family member, obtain as much detailed information as possible. Document word for word any description provided regarding the prior allergy history.

Epic Allergy Documentation Tools

Utilized by Pharmacists, Pharmacy Interns, and Pharmacy Technicians

PEN-FAST assessment		
Specific Medication		penicillin
Moment reaction started after ...		6 - 24 hours
Age at reaction (in yrs)		5
Was the reaction in the last Fiv...		0
Reaction		2.0
Treatment required		1
Treatment Medications		Antihistamines
Pen Fast Score		3

SMART assessment		
Specific Medication		
Moment reaction started after ...		
Age at reaction (in yrs)		
Was the reaction in the last Fiv...		
Reaction		
Treatment required		

1

Amoxicillin

Agent: Amoxicillin

Reactions: Hives Severity: Noted:

pen

Title	Number
z PEN-FAST 0	27
z PEN-FAST 1-2	28
z PEN-FAST 3	29
z PEN-FAST 4+	30

Past Updates

2

Comments:

Med: penicillin
When rxn started after med: 6 - 24 hours
Age at rxn (yrs): 5
Rxn in last 5 yrs: No
Rxn: Severe cutaneous reaction
Tx required: Yes

Use .RXSMART or .RXPENFAST

✓ Accept

3

Step 2: Assessment for and Completion of Oral Challenge



CLINICAL GUIDELINE

MAY 2025

Penicillin Allergy Challenge – Adults

Canyons, Desert, and Peaks Regions

Up to 95% of reported penicillin allergies are not true allergies. This guideline applies to patients with reported allergy to penicillin(s), amoxicillin, and ampicillin who can complete a challenge and subsequent penicillin allergy delabeling in the inpatient setting, with the collaboration of the Intermountain Allergy/Immunology, Infectious Disease, and

with ID.

Calculate Pen – FAST score

F – Five years or less since reaction	2 pts
A – Anaphylaxis or angioedema OR S – Severe cutaneous reaction (B)	2 pts
T – Treatment required for reaction	1 pt

Avoid all PCN.
DO NOT perform
PCN challenge.
Consider consult
with ID.

no

Is Pen – FAST score ≤ 2 ?

yes

Consider a one-step oral penicillin allergy challenge.*
IH Penicillin Allergy Challenge (3856) in Epic (See page 2).

One-step Oral Penicillin Allergy Challenge

- Check vitals and inspect skin.
- Administer one oral dose of amoxicillin (500 mg - full dose).
- Monitor for adverse reaction indicating allergy (C) every 30 minutes X 2 and ask patient to report any difficulty in breathing, dizziness, throat irritation, or tongue swelling.
- If adverse reactions occur, follow instructions below based on severity.
- If patient tolerates oral challenge, proceed to Delabeling of Penicillin Allergy

Delabeling of Penicillin Allergy

- If patient has no reaction after challenge, they are considered non-allergic.
- The provider or designee will document in the allergy section in the EHR with a comment including the challenge date, dose, and results. See [\$\beta\$ -lactam Allergy Assessment and Documentation \(Epic\)/\(Cerner\)](#) for details.
- The patient may begin a normal schedule for medication therapy.

Epic Order Set: IH Penicillin Allergy Challenge

Live as of September 2025

Order and Order Set Search

IH PENICILLIN

Order Sets & Panels

Name
IH HOS Penicillin Allergy Challenge

Updated from the iCentra version to promote a 1-step instead of a 2-step oral amoxicillin challenge

Orders Clear All Orders

IH HOS Penicillin Allergy Challenge Manage User Versions Remove Order Sets

▼ Nursing Care

▼ Vitals & Monitoring - PCN Allergy Challenge

- ☒ Measure Vital Signs
Routine, EVERY 30 MIN, First occurrence today at 2023, For 3 occurrences
- ☒ Notify Provider
Routine, UNTIL DISCONTINUED, Starting today at 2023, Until Specified
*SBP less than 90 or 40 below baseline *MAP less than 65 *O2 less than 90%

▼ Medications

▼ Amoxicillin Challenge

- ☒ amoxicillin (AMOXIL) tablet 500 mg
500 mg, Oral, ONE TIME, 1 dose, today at 2030
- ☐ amoxicillin (AMOXIL) suspension for 1-step allergy challenge
500 mg, Feeding Tube, ONE TIME, For penicillin allergy challenge

► Bronchodilators Click for more

- ☒ albuterol 2.5 mg/3 mL (PROVENTIL) nebulization solution 2.5 mg
2.5 mg, Nebulization, EVERY 20 MINUTES AS NEEDED, Starting today at 2022, Until tomorrow at 0021, anaphylaxis

▼ Symptom Management Click for more

► Primary Treatment Click for more

- ☒ EPINEPHrine (ADRENALIN) (conc: 1 mg/mL) injection 0.5 mg
0.5 mg, Intramuscular, EVERY 5 MINUTES AS NEEDED, Starting today at 2022, Until tomorrow at 0021, Anaphylaxis
For INTRAMUSCULAR administration

① EPINEPHrine

- ↑ Daily dose of **24 mg** (0.5 mg EVERY 5 MINUTES AS NEEDED) exceeds recommended maximum of **6 mg** by **300%**
- ↑ Frequency of **48 doses/day** exceeds recommended maximum of **6 doses/day**

► Adjunctive Agents Click for more

- ☒ H1 Antihistamines
- ☒ cetirizine (Zyrtec) tablet 10 mg
10 mg, Oral, ONE TIME AS NEEDED, 1 dose, Starting today at 2022, Until Discontinued, Allergies, allergic reaction

Step 3: Patient Education & Efforts to Prevent Re-Labeling

Fact Sheet for Patients and Families



Penicillin Allergy Challenge: What you need to know

What is a penicillin allergy challenge?

A penicillin allergy challenge helps your doctors find out if you're really allergic to penicillin. Even if it says you're allergic in your medical record, that might not be true. During the test, your care team will give you a small amount of penicillin medicine and watch closely to see if you have any reaction.

Why is it important to know if I have a true allergy to penicillin?

Many people think they are allergic to penicillin, but most are not. In fact, 9 out of 10 people who say they are allergic really aren't. It's important to know for sure, because if you're not truly allergic, doctors can use penicillin and similar medicines to treat infections more easily and safely.

If you're allergic to penicillin, doctors can't use it to treat infections. This can cause some problems, like:

- Staying in the hospital longer and spending more money
- Getting infections that are harder to treat
- Getting sick again more often
- Having more trouble with other antibiotic medicines

These problems happen because penicillin is a strong medicine that works well, and not being able to use it makes treatment harder.

Who decides if a penicillin allergy challenge is right for me?

You get to decide if you want to do the penicillin allergy test. A pharmacist will talk with you about what happened when you took penicillin before. This helps them understand your past reactions and figure out if the test is right for you.



What happens during a penicillin allergy challenge?

The nurses will help with the penicillin allergy test. Here's what they'll do. They will:

- Check your vital signs like blood pressure, heart rate, and breathing
- Give you a small dose of amoxicillin (a type of penicillin) to swallow
- Watch you closely for about 1 hour to see if anything changes

If you have a reaction, they'll give you medicine to help right away. The results will be added to your medical record.

If you don't have a reaction, the penicillin allergy will be removed from your record.

I completed the penicillin challenge.

- ☐ I am not allergic to penicillin. Through this challenge, we showed that you did not have an immediate, dangerous reaction. You may develop a rash several days into treatment, but this is typically not dangerous, and can usually be treated with antihistamines and the course of antibiotics can be completed.
- ☐ I'm allergic to penicillin. I did react to the penicillin allergy challenge.

Describe reaction: _____

Date: _____

Location: _____

Local Champion Developed a Quick Sheet

Penicillin Delabeling

For more in-depth information read [Penicillin Allergy Guideline](#)

(1) Identify patient allergy – Go to talk with patient about it

Provide patient with copy of the "Patient Education Penicillin Allergy Challenge"

(2) Determine patient eligibility

We have some questions about your penicillin allergy.

Pen – FAST Score		Talking Points: SMART questions
F – Five years or less since reaction	2 pts	Do you remember which Specific medication you had a reaction to?
A – Anaphylaxis or angioedema OR S – Severe cutaneous reaction	2 pts	Moment - When did the reaction occur in relation to taking the medication Age when reaction occurred. Can you describe the Reaction to me?
T – Treatment required for reaction	1 pt	What Treatment did you receive for your reaction (did you require hospitalization)?

(3) Scoring and Discussion

High Score >2 = Do not continue with challenge. Chart Pen-FAST score in allergy section to avoid duplicate work in the future.

Score (≤2) = Ask patient - Would you be open to our penicillin challenge while you are here? About 95% are not true allergies, so challenge helps to determine if you are allergic!

Need more info? Review the medical record to determine if other agents in the same class were previously administered and tolerated.

Discussion points for the challenge:		
Reduces	Expands	Challenge cost
Chance of readmission	ABX options with potentially less side effects	Cheaper to do in the hospital during an admission than to have a separate visit to a clinic
Future medical costs	Cheaper antibiotic options	
Time spent in hospital		

(4) Challenge Explanation

- We administer 1 dose of Amoxicillin (500 mg)
- Then we closely monitor you for any reactions every 30 minutes.
- Tell patient to please report any difficulty breathing, dizziness, throat irritation, or tongue swelling.

(5) Document and order

(1) Pen-Fast Flowsheet

Flowsheet → under pen-FAST assessment answer the questions in the boxes

(2) Allergy Section

Go into Allergies tab → Click on the Penicillin allergy → Enter either or .RXPENFAST OR .RXSMART into the comments box

(3) Ordering (if score was ≤ 2)

Provider: Go into orders tab → type into search bar "IH HOS Penicillin Allergy Challenge" → make sure any beta blockers have been withheld for 24 hours in case there is any need to administer epinephrine

(4) Remove allergy if they pass the oral test

Pharmacist will discontinue the allergy and document that the patient passed an oral challenge.

Intermountain Resources – Type /ABX into internet toolbar to access stewardship website



Local Success

Medical Specialties PCN Delabeling Dashboard Hospital Level Report

Data Refreshed:
9/14/2026 2:41:09 PM
Data Through: 9/13/2026 11:49:00 PM



Region: (All) Hospital: CSP Main Hospital Year of Inpt Admit Date: 2026

of Inpatient Admissions (All)

275

of Distinct Inpatients (All)

257

of PCN Allerges Documented (All)

# PCN Allergy	% PCN Allergy
42	15.3%

of PEN-FAST Score Documented (All)

# PEN-FAST Score Documented	% PEN-FAST Score Documented
11	26.2%

Inpatient PCN Allergies Documented at Encounter Admission Level

Region: (Canyons) / Hospital: CSP Main Hospital

Region	2026			
	# Inpt Admissions	# Distinct pt	# PCN Allergy	% PCN Allergy
Canyons	275	257	42	15.3%
Grand Total	275	257	42	15.3%

Inpatient PEN-FAST Score Documented at Encounter Level

Region: (Canyons) / Hospital: CSP Main Hospital

Region	2026			
	# PCN Allergy	# Distinct pt	# PEN-FAST Score Documented	% PEN-FAST Score Documented
Canyons	42	39	11	26.2%
Grand Total	42	39	11	26.2%

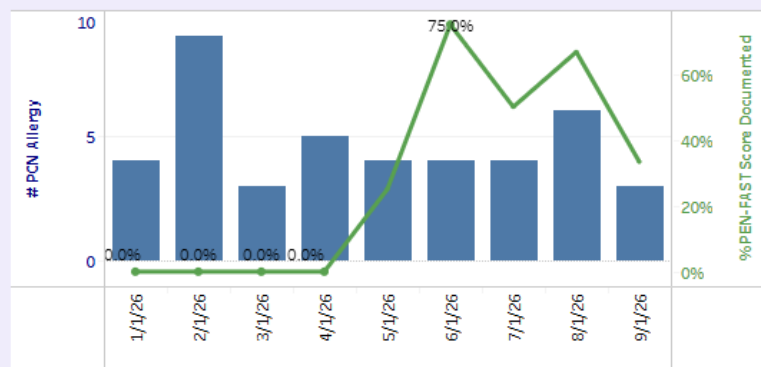
Inpatient PCN Delabeled at Patient Level with PEN-FAST Score 0,1,2

Region: (Canyons) / Hospital: CSP Main Hospital

Region	2026				
	# Eligible for Delabeling	# Delabeled	% Delabeled	# Inpatient AMX	Median Days between PEN FAST Scored and Delabeled
Canyons	10	7	70.0%	1	0.00
Grand Total	10	7	70.0%	1	0.00

Inpatient PEN-FAST Score Documentation Rate at Encounter Level

Region: (All) / Hospital: CSP Main Hospital



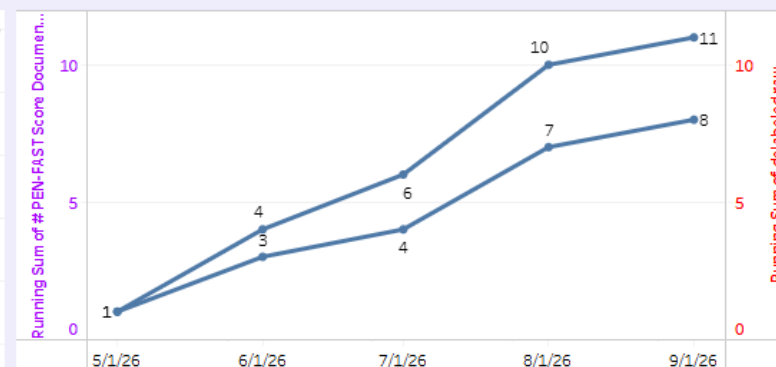
Inpatient PCN Delabeled at Encounter Level with PEN-FAST Score 0,1,2

Region: (All) / Hospital: CSP Main Hospital



Cumulative PEN-FAST Score documented and PCN Delabeled

Region: (All) / Hospital: CSP Main Hospital



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Action Example Summaries

Topic	Metric	Actions
Drug-specific: Fluoroquinolones	Days of therapy (DOT) per 1,000 patient days present (PDP)	• Periodic audit/evaluation • Emailed feedback
Drug-specific: Meropenem		• Criteria for use with education • Daily audit and feedback • Dashboard
Process-based: MRSA Nasal Swab	DOT per 1,000 PDP; Number of vanc doses per patient	• On-site lab testing • Pharmacy driven protocol
Process-based: Penicillin Allergy Delabeling	Percent of patients with PCN allergy with PEN-FAST completed; Percent with PEN-FAST 0, 1 or 2 with allergy delabeled	• Guidelines, algorithms • EHR tools • Stakeholder engagement

DOT= Days of Therapy; EHR=Electronic Health Record; PCN=penicillin; PDP=Patient Days Present, PEN-FAST=a validated risk score to assess penicillin allergies for eligibility for amoxicillin oral challenges

Conclusion



Small hospitals aren't small problems — they're the biggest opportunity.



You don't need a big team to do great stewardship.



Data transparency is an effective intervention.



Start with one drug, one process, one clinician.



Build it to outlive you.

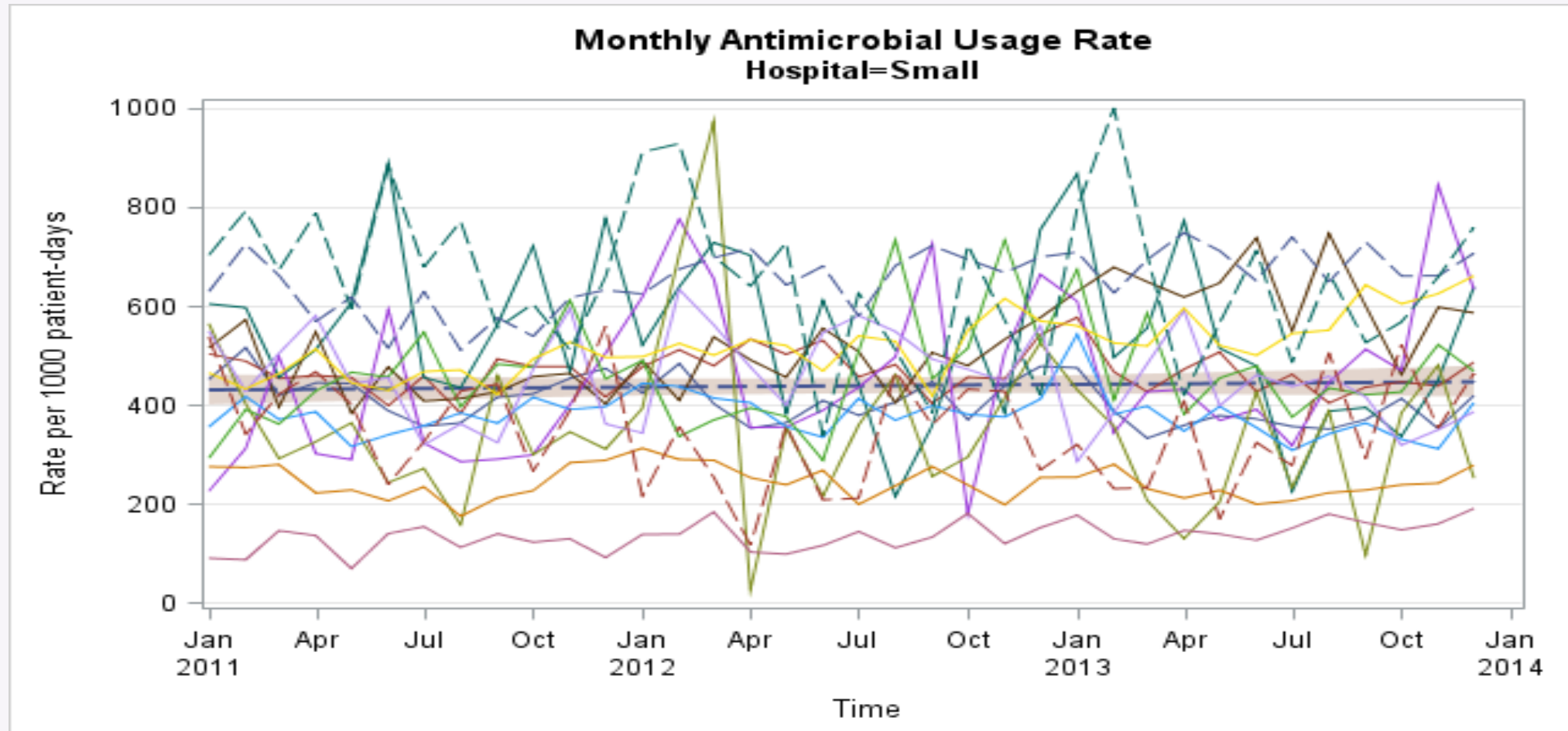
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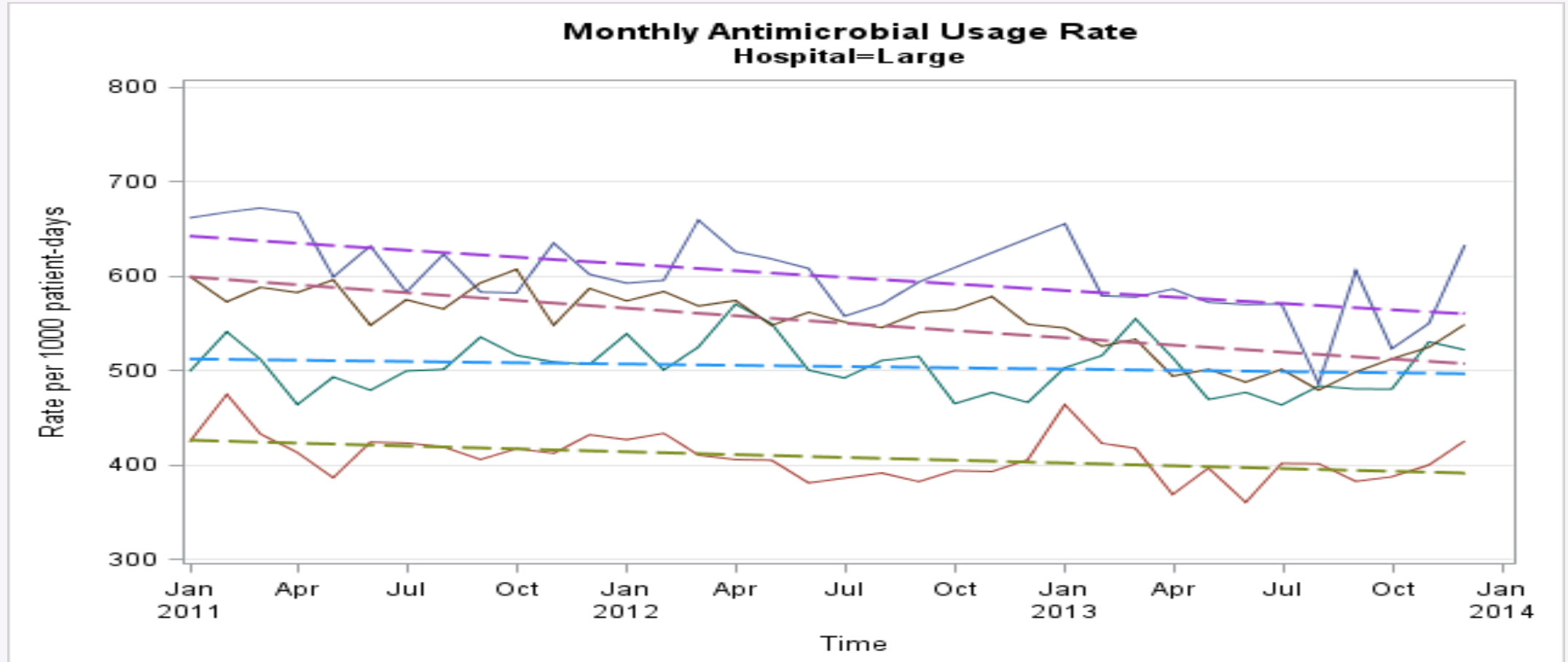
Thank you



Baseline Trend in 15 Small Hospitals



Baseline Trends in 4 Large Hospitals



CDC Core Elements

Core Elements of Hospital Antibiotic Stewardship Programs



Hospital Leadership Commitment

Dedicate necessary human, financial, and information technology resources.



Accountability

Appoint a leader or co-leaders, such as a physician and pharmacist, responsible for program management and outcomes.



Pharmacy Expertise (previously “Drug Expertise”):

Appoint a pharmacist, ideally as the co-leader of the stewardship program, to help lead implementation efforts to improve antibiotic use.



Action

Implement interventions, such as prospective audit and feedback or preauthorization, to improve antibiotic use.



Tracking

Monitor antibiotic prescribing, impact of interventions, and other important outcomes, like *C. difficile* infections and resistance patterns.



Reporting

Regularly report information on antibiotic use and resistance to prescribers, pharmacists, nurses, and hospital leadership.



Education

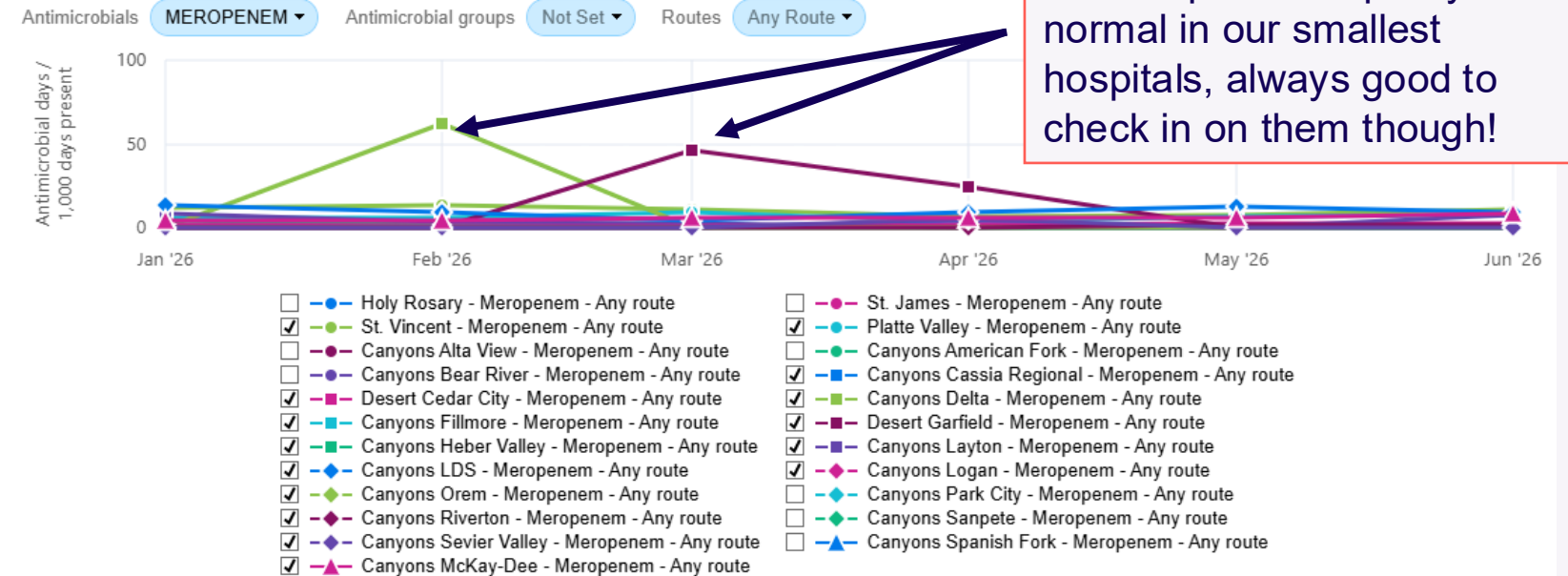
Educate prescribers, pharmacists, nurses, and patients about adverse reactions from antibiotics, antibiotic resistance, and optimal prescribing.

Today

Still working on recreating our dashboard after the transition from Cerner to Epic

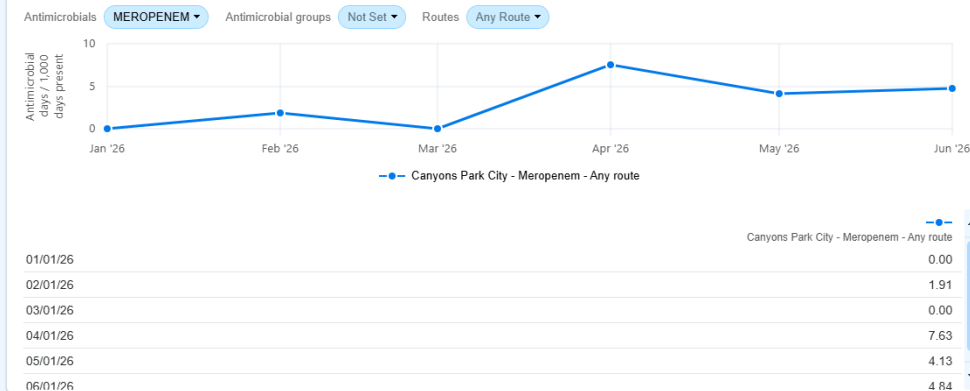
Right now, have Meropenem AU data from basic reports in Epic to trend day of therapy.

Antimicrobial Usage Trends



Antimicrobial Usage Trending Reporting Hospitals: Canyons Park City Reporting Units: Not Set

Antimicrobial Usage Trends



SAAR : 1/1/26 - 6/30/26

