



# Did we just become friends? Microbiology Lab Collaborations with Antimicrobial Stewardship Teams

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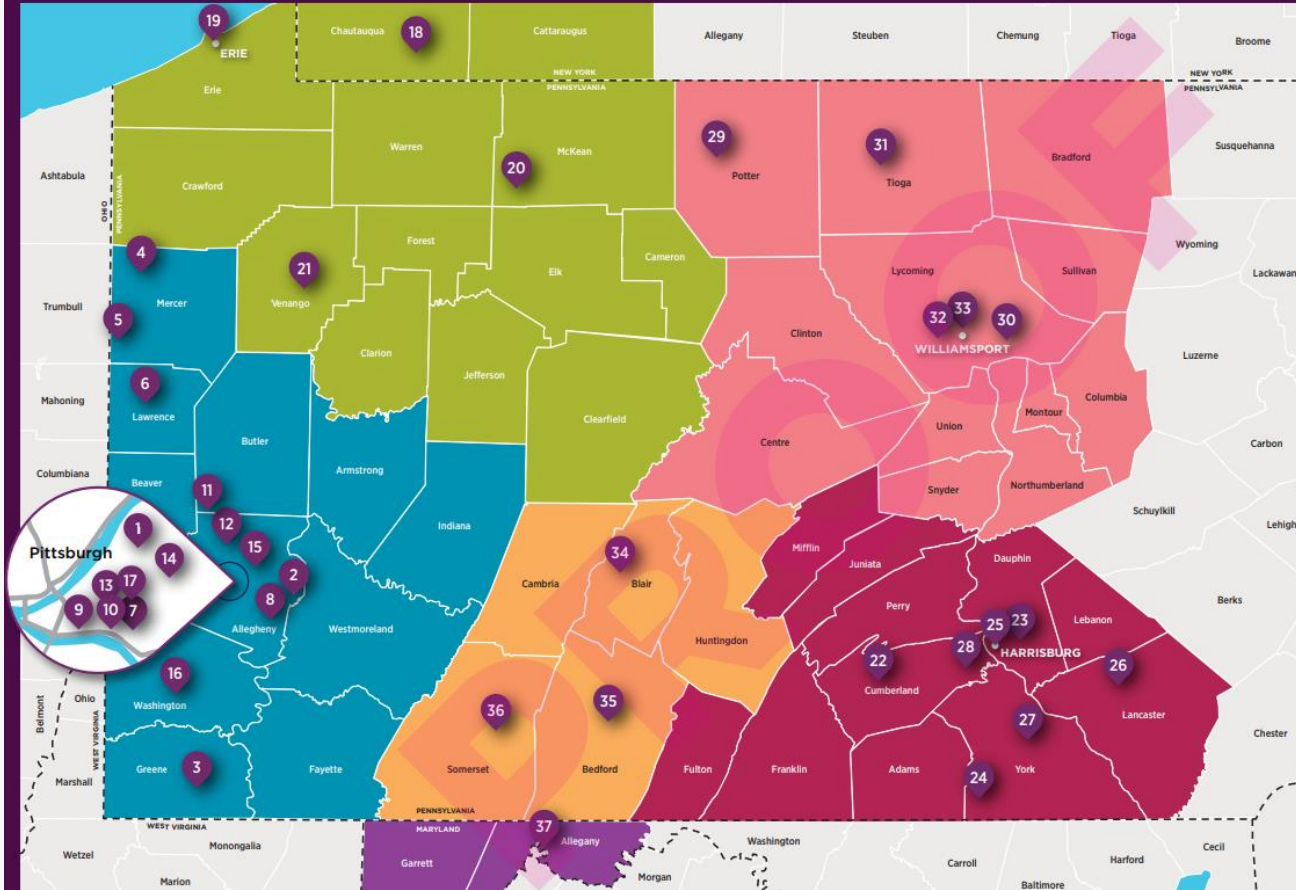
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Dept of Medicine

# Disclosures

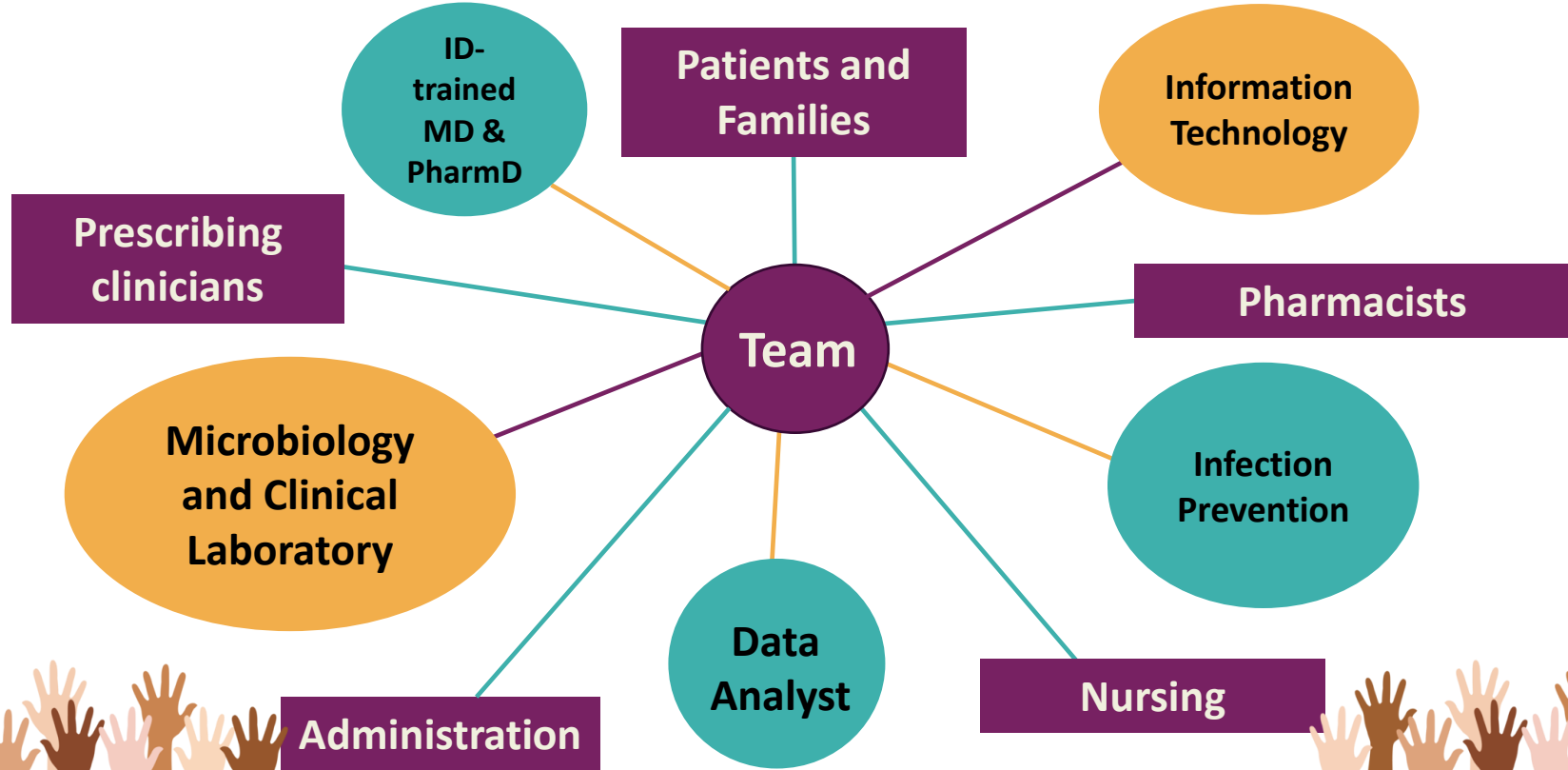
- Advisory board: Beckman Coulter, GSK, Basilea, Invivyd, Meitheal, Merck, Shionogi
- Honoria: GSK, BioMérieux, Abbvie
- Meeting travel support: BioMérieux, GSK

# UPMC REGIONAL MAP



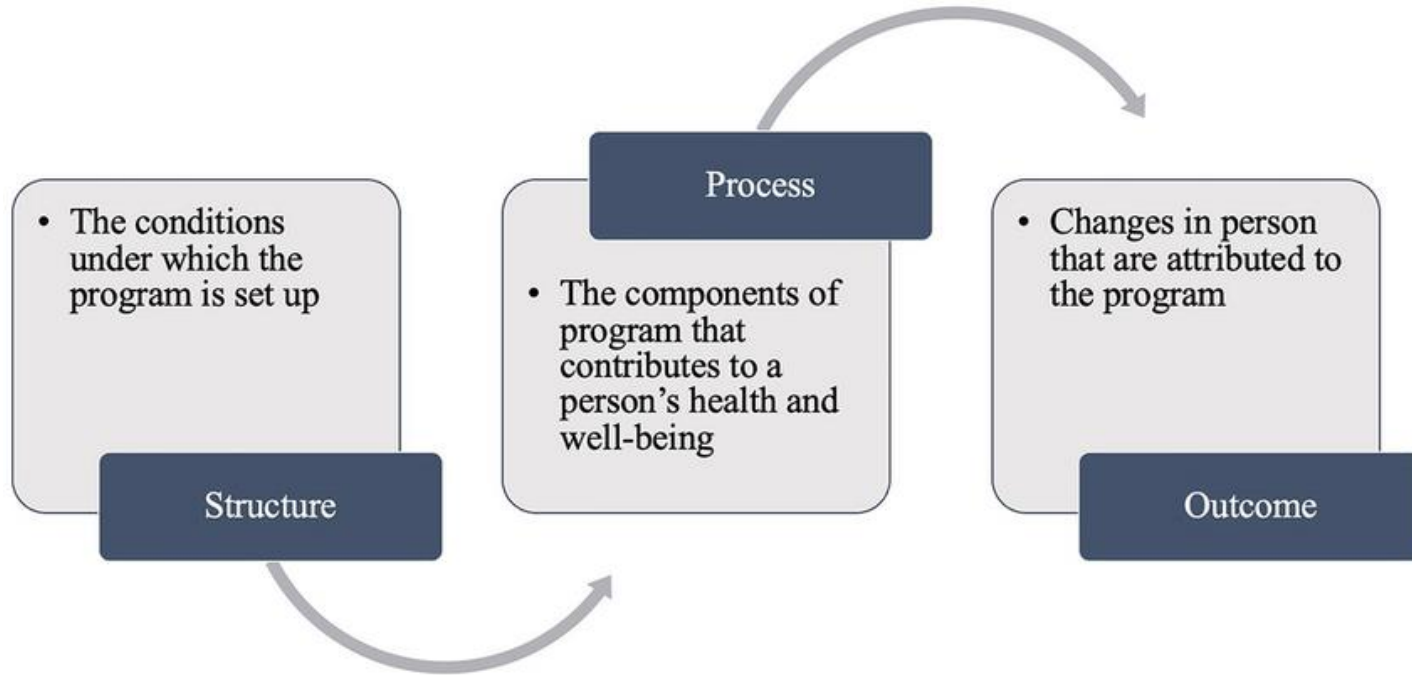
# Antimicrobial Stewardship Takes a Village

*“Coordinated interventions designed to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy, and route of administration.”*



# Donabedian model

*Yes, I am a quality and operations nerd*



# Infectious Diseases Strategy Collaborative

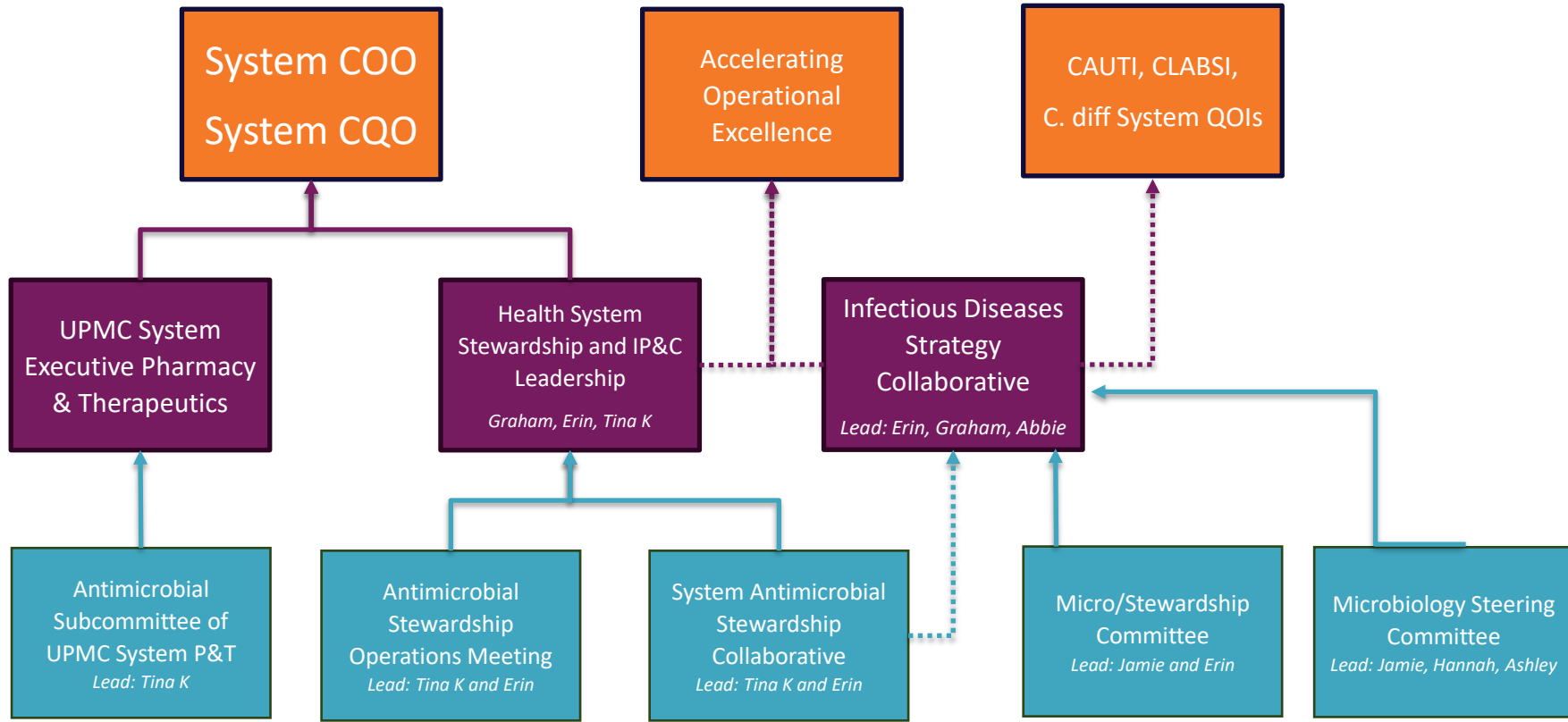
*Purpose: To identify opportunities for high-quality and high-value infectious diseases-related care and facilitate system-wide updates to clinical practice or operations.*

Comprises UPMC leaders in ID-related areas (N=17):

- Infection Prevention & Control
- Antimicrobial Stewardship
- Laboratory/Microbiology service line (majority of membership!!)
- Executive practicing ID physicians and APPs
- Pediatrics
- System Clinical Content Management and Care Pathways
- Co-leaders: Physician, Pharmacist, Lab VP

Ideas? Reach us at [IDStrategyCollab@upmc.edu](mailto:IDStrategyCollab@upmc.edu)

# Micro and Stewardship Organizational Chart



**STRUCTURE**

# Stewardship and Lab Work Streams

Team	Operations	System Stewardship Collaborative	Antimicrobial P&T Subcommittee	Microbiology/ Stewardship Working Group	Infectious Diseases Strategy Collaborative
Lead	Tina Khadem	Tina Khadem, Erin McCreary	Tina Khadem, Tina Borneman	Erin McCreary Select Lab Leadership	Graham Snyder, Erin McCreary, Abbie Mallon
Key Metrics	IV to PO Pharmacist interventions / ILUM Insight Usage	NHSN AU Data	Formulary management	CAP requirements – updated breakpoints and standardized reporting	NHSN AU Data HAIs CAP requirements
Areas of Focus	Implementation of ASP principles: Nursing workflows Provider education Pharmacy operations Daily tasks Drug shortage mitigation	Antimicrobial usage Cost savings programs System guidance on infectious syndromes Diagnostic stewardship Quality Improvement	New drug review Drug class reviews Product optimization Voting body for guidance approval	Microbiology lab standardization to improve access to and reporting of results across all laboratories, patients, and clinicians	Establishing high-quality high-value Infectious Disease-related care, incorporating four domains of expertise: ASP IP&C Microbiology Clinical

**STRUCTURE**

# Agenda Request Form - System Antimicrobial Stewardship

NEW SINGLE, DIGITAL WORKSPACE

Hi, Erin. When you submit this form, the owner will see your name and email address.

\* Required

1. Date of Request \*

Please input date (M/d/yyyy)

Collaborative Posts Files **Fill | Agenda Request ...** Notes Project Tracker

+ New Edit in grid view Share Export Integrate Open in ShareP

### Stewardship Project Tracker

Project Ti...	Initial Committee Assig...	Person Respon...	Status	Next Committee M...	Next Committee Meetin
Rifaximin interchange (CSI)	Operations	Borneman, Tina	On Hold	Operations	
Cefazolin IV push in ORs	Operations	McCreary, Erin	On Hold	Operations	10/02/2024
ABX Renal Dosing Chart 2024 Update	Operations	McCreary, Erin Khadem, Tina	In Progress	Operations	06/05/2024

- SA System Antimicrobial...
- General
- Collaborative
- Leadership
- Operations
- PT Subcommittee

PROCESS

# Let's go back – what do you want to know about micro and stewardship?

“Making sure susceptibilities are up to date (even with the new standard) especially for small labs”

“...[it] **takes a lot of work and collaboration to understand each other when it feels like we speak different languages at times due to varying perspectives...** we often get responses like “release everything, clinicians should know what to do with it.” Stewardship knows that’s not the case. So the tug between ensuring results are presented in a way to promote stewardship and working with lab leadership to understand the value in that, even when it sometimes may mean more calls to the lab or an extra step on their part, too.”

# Set Mutual Goals and Work Together to Achieve Them

Shadow each  
other's  
workflows

Err on over-  
informing

Schedule at  
least monthly  
standing  
meeting time

Local and  
system!!


Ongoing  
feedback and  
data tracking

Set up team  
secure chat

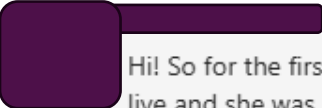

# Why is it important to touch base?

Today

3:14 PM

hi!!! how is pbp going 

Last read

 Hi! So for the first week and a half I wasn't seeing it reported on anyone so I emailed  to ask if it was delayed go live and she was confused because they had been running it

turns out the lab was typing it in some notes section on Sunquest that doesnt cross over to Powerchart lol. BUT I'm glad I asked because it is live now and going well! We have had 2 S aureus bacteremias in the last week that we deescalated early because of the results (MSSA)



# Why is it important to collaborate?


FW: BV/Candida/Trich PCR


 Summarize



1/24/2025

[Redacted]

 Business General

 You replied to this message on 2/7/2025 3:49 PM.

[Redacted]

Last Update:	[Redacted]	<b>BV, CANDIDA, TRICH PCR</b>	Status: Final
Collected:	[Redacted]	[Redacted]	
BACTERIAL VAGINOSIS:	Not Detected		
CANDIDA GROUP RESULT:	Not Detected		
CANDIDA GLABRATA-KRUSEI:	DETECTED		
TRICHOMONAS RESULT:	Not Detected		

Do you ladies know about this test?

[Redacted] the **Candida** glabrata/krusei lumping tripped us up a little. After speaking with reproID, we have a better handle on how to respond to this test but side note...their sentiment was that it gets way overused and is pricey.

Just making you aware if you aren't already.

# What do you want to know about micro and stewardship?

“Vitek validation. I’m not micro dumb, but I just don’t understand how a bug/drug combo can’t get validated. Why haven’t I had FEP on Enterobacterales???”



Here is another report with incomplete sensitivities, different patient:

**BLOOD CULTURE** [redacted] Status: Final

Specimen Desc: Blood

Gram Stain: Gram Negative Rods; Results called to and read back by [redacted] to AL91096.

Culture: *Morganella morganii*

**MORGANELLA MORGANII**

	MIC (mcg/mL)	MIC Interpretation
Cefoxitin	16	Intermediate
Ciprofloxacin	<=0.06	Sensitive
Gentamicin	<=1	Sensitive
Levofloxacin	<=0.12	Sensitive
Piperacillin/Tazobactam	<=4	Sensitive
Sulfa/Trimethoprim	<=20	Sensitive



Morganella on vitek cannot report ceftazidime, cefepime, or ceftriaxone due to a package insert limitation. We also hide Ampicillin, Cefazolin, Cefuroxime, Amoxicillin/clavulanate, Ampicillin/sulbactam, and Aztreonam on this bug due to AmpC



and carbapenem is hidden to decrease carbapenem use



no idea why the carbapenems aren't released, ill ask



they are requiring pharmacy to approve release if results omg



CASCADING, SUPPRESSING



# Cascade and/or Suppression Reporting

- This can be a good or bad thing
- If you do it, remember to re-evaluate annually
  - Time to report daptomycin and linezolid routinely on *S. aureus*?
  - Time to report ceftolozane/tazobactam automatically on *R. pseudo*?
- AR reporting, antibiograms
- Gram positive and Gram negative are different
  - Positive - Usually helpful; Negative – headaches

# Gram positive reporting examples

PM34	PC43	Staphylococcus	Enterococcus
Penicillin	Penicillin	H	H+
Ampicillin	Ampicillin	H	R
Oxacillin	Oxacillin	R	NR
Clindamycin	Clindamycin	R	NR
Vancomycin	Vancomycin	R	R
Daptomycin	Daptomycin	R	R
Linezolid	Linezolid	R	R
Ceftaroline	Ceftaroline	H+	NR
Ciprofloxacin	Ciprofloxacin	H+	Report only on urines that are resistant to nitrofurantoin AND ampicillin OR by ID/AMS request <b>(CASCADE EXAMPLE)</b>
		Report only with AMS or ID request; add comment about not using for monotherapy <b>(SUPPRESSION EXAMPLE)</b>	
Levofloxacin	Levofloxacin		

H+ = suppress, but ID or stewardship can call lab to request it be reported

H, NR = always suppressed

R = always reported

# Real email re: gram positives

Hi Erin,

I think the request from stewardship was to report Clindamycin for Strep pneumo only if resistant. How strongly do you guys feel about this (as compared to just not reporting it at all)? I understand the thought about putting it out there if it is resistant, but that puts us in the place of having to test every isolate for inducible clindamycin resistance and it turns out that will require manual D-testing for Phoenix. It will also mean that anyone testing manually will have to test clinda in the first place.

Hannah

Result = always suppress

# Real email re: gram negatives

*“One additional clarification- the XYZ Hospital lab is now suppressing cefazolin (because breakpoint validation was incorrect – it is being suppressed while we fix it). Ceftriaxone is also suppressed due to a cascade rule and only reported if the suppressed cefazolin is resistant. I was going to advocate to just report ceftriaxone regardless of cefazolin susceptibility since both are now suppressed. Just wanted to double check this had not been discussed already. Thank you again!”*

Result = remove cephalosporin  
cascading

# Cascade and/or Suppression Reporting

- In general, I am not a fan of cascade reporting in its purest sense
  - Selective suppression can be helpful, and we do this a lot
- Gram-negatives
  - Cascading new BLBLIs based on other resistance or genotypic results is helpful
  - Cascading cephalosporins and TZP can make some phenotypic interpretations more difficult and cause problems when breakpoints update, new rules are added, etc
  - Make backfire on you depending how classes are set up
- Consider allergies and other patient-specific situations
- Consider site of infection – different rules may apply!
- In general, should report drugs that are R – don't assume

# Gram negative reporting example - AmpC

Type of bug	Drugs suppressed	Additional comments
<p><b>“Inducible AmpC”</b></p> <ul style="list-style-type: none"> <li>•Enterobacter cloacae complex*</li> <li>•Klebsiella (Enterobacter) aerogenes</li> <li>•Citrobacter freundii complex**</li> <li>•Hafnia alvei</li> <li>•Yersinia enterocolitica</li> </ul>	<p>Ampicillin Cefazolin Cefuroxime Amoxicillin/clavulanate Ampicillin/sulbactam Aztreonam Ceftazidime Ceftriaxone</p>	<p>Comment added: “Most penicillins and cephalosporins are suppressed due to inducible mechanism of resistance leading to treatment failure with these agents”</p> <p>*E. asburiae, E. bugandensis, E. cancerogenus, C. chuandaensis, E. cloace, E. hormachei, E. kobei, E. lugwigii, E. roggenkampii, E. sichuanensis</p> <p>**C. braakii, C. freundii, C. gillenbergii, C. murliniae, C. portucalensis, C. sedlakii, C. werkmanii, C. youngae</p>

The drama around pip/tazo here!!!

**Piperacillin/tazobactam WILL be reported**

# Gram negative reporting example - AmpC

Type of bug	Drugs suppressed	Additional comments
<b>“Noninducible AmpC”</b> <ul style="list-style-type: none"><li>•M. morganii</li><li>•P. rettgeri</li><li>•P. stuartii</li><li>•Serratia marcescens</li></ul>	Ampicillin Cefazolin Cefuroxime Amoxicillin/clavulanate Ampicillin/sulbactam Aztreonam	Piperacillin/tazobactam, ceftriaxone, and ceftazidime WILL be reported

# Gram negative reporting example - AmpC

Type of bug	Drugs suppressed	Additional comments
<p><b>“Noninducible AmpC”</b></p> <ul style="list-style-type: none"><li>•Proteus vulgaris</li><li>•Proteus penneri</li></ul>	<p>Ampicillin Cefazolin Cefuroxime Ceftriaxone (P. vulgaris only)</p>	<p>P. vulgaris carries a cefuroximase named CumA on its chromosome that can be derepressed as a result of mutation and confer resistance to ceftriaxone. Ceftriaxone will therefore be hidden from P. vulgaris antimicrobial susceptibility reports. Derepressed isolates typically remain susceptible to penicillin/penicillinase-inhibitor combinations, aztreonam, and ceftazidime, so those drugs WILL be reported.</p>



# BREAKPOINT UPDATES AND AST STANDARDIZATION



In early 2024, we decided our priority work was to get all labs on updated panels and breakpoints

- This was the structure that would drive all process and outcomes
- Was essential to complete prior to Epic transition
- Stewardship picked panels; lab did assessment for implementation
- WEEKLY workgroup meetings to coordinate

A	B	C	D	E	F
Micro Lab Location	Hospital	AST Platform	Step 1: LabPro 5 Upgrade	Step 1: Due Date	Step 1: Date Completed
Bedford	Bedford	MicroScan	Complete	4/15/2024	4/9/2024
Carlisle	Carlisle	MicroScan	Complete	4/15/2024	4/15/2024
Chautauqua	Chautauqua	MicroScan	Complete	4/15/2024	4/15/2024
Children's	Children's	MicroScan	Complete	4/15/2024	4/15/2024
<b>CLB</b>	East, Magee, McKeesport, Presbyterian/Montefiore, Shadyside, St. Margaret, Western Psych	MicroScan	N/A	4/15/2024	N/A
Cole	Cole	MicroScan	Complete	4/15/2024	4/22/2024
Hanover	Hanover	MicroScan	Complete	4/15/2024	4/15/2024
<b>Harrisburg</b>	Community Osteopathic, Harrisburg, Lititz, West Shore	MicroScan	Complete	4/15/2024	4/15/2024
<b>Jameson</b>	Horizon (Shenango/Greenville), Jameson, Northwest	MicroScan	Complete	4/15/2024	4/15/2024
Passavant	Passavant Cranberry and McCandless	MicroScan	Complete	4/15/2024	
<b>Williamsport</b>	Lock Haven (ED only), Muncy, Williamsport	MicroScan	Complete	4/15/2024	4/15/2024
			0	Not Started	
*8 sites need to perform verification/validation (Steps 1-5):			0	In Progress	
Bedford, Carlisle, Chautauqua, Cole, Hanover, Harrisburg,			10	Complete	
Jameson, Passavant (all sites need to complete steps 6-9)			1	N/A	
			11		

Step 2: Obtain isolates needed for verification/validation		Step 2: Due Date	Step 2: Date Completed	Step 3: Obtain panels from Beckman		Step 3: Due Date	Step 3: Date Completed	
Step 4: Run panels for NUC103 verification and pip/tazo validation		Step 4: Due Date	Step 4: Date Completed	Step 5: Medical direct review of results		Step 5: Due Date	Step 5: Date Completed	
Step 6: Build of alert rules, drug suppression rules & breakpoint updates in LabPro		Step 6: Due Date	Step 6: Date Completed	Step 7: Testing of built rules and alerts. Downstream checks with test patients.		Step 7: Due Date	Step 7: Date Completed	
AQ	AK	AS	AI	AU	AV	AW	AX	AY
Step 8: Provider Education	Step 8: Due Date	Step 8: Date Completed	Step 9: Go Live	Step 9: Due Date	Step 9: Date Completed	Step 10: Downstream Checks	Step 10: Due Date	Step 10: Date Completed

- Shared isolates
- Shared rules
- Main hospital leaders did site visits to communities
- Created system Micro Steering Committee

# And oh my goodness did we write rules

1	2	3	4	5	6	7	8	9	10	11
HC comment	Concerns (Micro use only)	Description	Method (MVP is microscan, vitek, and phoenix)	IF bug/organism group	IF drug	IF drug result	THEN	Note for Micro		
<p>Prevalence of negative results is easier to just always Etest.</p>										
<p>Prelim this? Are there lots of major or very major errors? If ertapenem is reported I'd follow the same pathway from Phoenix where we only prelim this if ertapenem is I or R</p>	PI limitation	Mero limitation	Vitek 2	Proteus vulgaris	Meropenem	Interp = S, I, or R; MIC =	1) Add organism comment: "Susceptibility testing for Meropenem is in progress."	Package insert limitation: Perform an alternative method of testing prior to reporting of results for the following antibiotic/organism combination(s):		
							2) Pop-up alert for techs: "Set up or send out for Meropenem Etest."			
<p>Will trigger CARBA5. If CARBA5 pos, will get flipped to R anyway. If CARBA5 neg, then Etest? Yes</p>	PI limitation	Mero limitation	Vitek 2	Citrobacter koseri, Hafnia alvei	Meropenem	Interp = R	1) Add organism comment: "Susceptibility testing for Meropenem is in progress."	Package insert limitation: The ability of the AST card to detect resistance with the following combination(s) is unknown because an insufficient number of resistant strains were available at the time of comparative testing:		
							2) Pop-up alert for techs: "Set up or send out for Meropenem Etest."			
<p>How often is the XN33 getting set up on Morganella? Just hide this</p>	PI limitation	Ceftazidime limita	Vitek 2: AST-XN33	Morganella morganii	Ceftazidime	Interp = S, I, or R; MIC =	1) Add organism comment: "Susceptibility testing for Ceftazidime is in progress."	Package insert limitation: Perform an alternative method of testing prior to reporting of results for the following antibiotic/organism combination(s):		
							2) Pop-up alert for techs: "Set up or send out for Ceftazidime Etest."			
<p>Hide it? Hide it</p>	PI limitation	Ceftazidime limita	Vitek 2: AST-XN33	Citrobacter koseri, Yersinia enterocolitica	Ceftazidime	Interp = R	1) Add organism comment: "Susceptibility testing for Ceftazidime is in progress."	Package insert limitation: The ability of the AST card to detect resistance with the following combination(s) is unknown because an insufficient number of resistant strains were available at the time of comparative testing:		
							2) Pop-up alert for techs: "Set up or send out for Ceftazidime Etest."			
<p>Test if R to other standard beta lactams? Just hide it Issue here is FDA lack of intermediate category, which CLSI has. If Ceftaz breakpoints validated without issue, I say we ignore this.</p>	PI limitation	Ceftazidime limita	Vitek 2: AST-XN33	Pseudomonas aeruginosa	Ceftazidime	MIC = 8	1) Add organism comment: "Susceptibility testing for Ceftazidime is in progress."	Package insert limitation: The lack of an intermediate category has shown very major discrepancies when compared to the reference method. Testing should be repeated using an alternative method prior to reporting results for the following antibiotic/organism combination(s):		
							2) Pop-up alert for techs: "Set up or send out for Ceftazidime Etest."			



# Key Points for Stewardship and Microbiology Collaboration - Breakpoints

- Three options
  - Panel FDA-cleared with new breakpoints → use the new breakpoints!
  - Panel not FDA-cleared with new breakpoints, but can report low enough MICs → lab verification and use the new breakpoints
  - Panel not FDA-cleared and the MICs aren't reported low enough → **stewardship team collaboration**
- Stewardship options
  - Testing each isolate likely not feasible for the lab
  - Additional testing upon request requires collaboration
  - It's really hard for the lab to update breakpoints for us!

# Aminoglycosides and *Pseudomonas aeruginosa* at UPMC

	Enterobacterales	Pseudomonas
Amikacin	Don't report	Don't report – even urines
Tobramycin	Report $\leq 2$ S	Report $\leq 1$ S (Vitek) $\leq 2$ no interpretation (Phoenix, Microscan) COMMENT: Tobramycin does not predict gentamicin susceptibility
Gentamicin	Report $\leq 2$ S	Don't report



# Blood Culture Rapid Diagnostics Expansion



# Blood RDT expansion

- This was very little about the cost of the equipment and very much about
  - Physical space and electricity capacity for machine
  - Tech staffing, competencies
  - Shifts for blood culturing (operational logistics of incubation, Gram staining, plating, AST)
  - Stewardship response process and staffing hours
  - IT interface for targets
  - Prescriber education
  - Patient outcomes from the big picture – not just drug cost

Installed 8 new machines

Shifted blood incubation away from 11 community hospitals into 5 regional hubs

LOS decrease ~2 days

# Why workflow matters

	Current TAT	Future TAT
Bottle arrives in local lab	2/3/25 2300	2/3/25 2300
Bottle arrives at reference lab	N/A	2/4/25 0200
Bottle gets loaded on Bactec	2/4/25 0530	2/4/25 0215
Bottle goes positive	2/4/25 1900	2/4/25 1500
Bottle removed from Bactec	2/5/25 0530	2/4/25 1530
Provider called with gram stain	2/5/25 0600	2/4/25 1600
Culture planted	2/5/25 0630	2/4/25 1600
Culture arrives at reference lab	2/5/25 1000	N/A
Eplex run	N/A	2/4/25 1600
Culture read	2/6/25 0630	2/5/25 0700
AST results	2/7/25 0600	2/6/25 0600

- Move blood workup from on site to off site
- Added cost of couriers, RDT equipment
- Significant improvement in patient care

Gram stain result 1 day sooner


Organism ID and resistance markers 3 days sooner









# MRSA PCR<sub>s</sub>



They order the wrong MRSA screen, I catch it the next day and realize they definitely meant to order the PCR, have to make the decision of whether or not to order the actual MRSA PCR on top of the infection prevention screen that already got collected, you see the ongoing issue from a resource utilization standpoint haha. Hopefully lab leadership will help us

Search:     Inpatient"/>

      Folder:

- MRSA nasal screen by PCR
- MRSA Screen for Infection Control (Nose Culture)
- MRSA Screen for Infection Control (Nose Culture) Nasal/Nose
- MRSA/MSSA Culture
- Culture for MRSA/MSSA
- Screen for Infection Control MRSA (Nose Culture)
- Nares Screen for Infection Control (MRSA Screen)
- Nasal Culture for Infection Control (MRSA Screen)
- Nose Culture for Infection Control (MRSA Screen)

## Stewardship

- Wanted to expand MRSA PCR availability to improve antibiotic de-escalation
- Concerned about cost of test, space on platforms for more PCRs, etc

## Lab

- Agar is time consuming and our techs don't like it
- We already have the platform that runs this test at every hospital because we use it for Cdiff (no capital investment)
- We need to offset IP&C volumes
- Having PCR and Agar is confusing and patients get 2 tests

## IP&C

- We've been meaning to tackle our MRSA screening criteria!
- Standardize to 3 specific patient populations
- As a bonus, surgeons want this

Result =  
**'Agar Free UPMC!'**  
By Summer 2026



ESBLs



# ESBL testing and reporting

- Do you know your labs process for ESBLs?
- Automated susceptibility testing panels
  - Suppress drugs?
  - Flip to R? → lab preferred!
  - Report MICs or not?
    - Stewardship and ID can interpret the MICs, everyone else sees red
- Confirmation testing
  - To confirm or not confirm
    - Report any CRO  $\geq 1$  as ESBL vs confirmatory testing?
  - Can you rely on AST platforms? vs disc or other confirmation?
- Don't forget about infection prevention!

# Our process

If isolate is ceftriaxone resistant *E. coli*, *Klebsiella pneumoniae*, *Klebsiella oxytoca*, or *Proteus* AND confirmatory well available in Microscan

- Positive → report ESBL producer and flip interps to R
- Negative → report not an ESBL producer and report susceptibilities as is
- Indeterminate → set disk, suppress all susceptibilities and add presumed ESBL comment until disk result back

ALL RESULTED MICROBIOLOGY studies available for this patient in eRecord. Most recently updated results at the top.

## URINE CULTURE

Specimen Desc: Urine

Culture: *Escherichia coli* Extended spectrum beta lactamase producer (ESBL)


Colony Count: Greater than 100,000 cfu/mL


### ESCHERICHIA COLI

	MIC (mcg/mL)	MIC Interpretation
Amox/K Clavulanate	<=8/4	Resistant
Amp/Sulbactam	>16/8	Resistant
Ampicillin	>16	Resistant
Aztreonam	>16	Resistant
Cefazolin	>16	Resistant
Cefepime	>16	Resistant
Ceftazidime	>16	Resistant
Ceftriaxone	>32	Resistant
Cefuroxime	>16	Resistant
Ertapenem	<=0.5	Sensitive
Gentamicin	<=4	Sensitive
Meropenem	<=1	Sensitive
Nitrofurantoin	<=32	Sensitive
Piperacillin/Tazobactam	32	Resistant
Sulfa/Trimethoprim	<=2/38	Sensitive
Tobramycin	<=4	Sensitive

# Why lab and stewardship communication is important, an ESBL love story

[Redacted]

 Patient-Member Confidential

 You replied to this message on [Redacted]

This finalized as an ESBL e coli ... didn't know if we were keeping track on any "misses" for lack of a better word

---

**From:** [Redacted]  
**Sent:** [Redacted]  
**To:** NorthCommunityBCID <[NorthCommunityBCID@upmc.edu](mailto:NorthCommunityBCID@upmc.edu)>  
**Subject:** Horizon UPMC Blood Culture Results

<b>Patient Name</b>	[Redacted]
<b>Hospital</b>	Horizon
<b>MRN</b>	[Redacted]
<b>Organism Target(s)</b> [bug name or N/A]	Enterobacterales, E coli, Klebsiella oxytoca
<b>Resistance Target(s)</b> [marker name or N/A]	N/A
<b>If OUTPATIENT, Gram stain was called to</b> [phone number or N/A]	

Subject: JAM UPMC Blood Culture Results

Hey [REDACTED]

This is an interesting one, looping [REDACTED]

LAB

LAB This blood triggered Kleb oxytoca and E. coli on [REDACTED], but only E. coli grew

Then – phenotypically – it looks like Kleb oxy or it's mixed? Ceftazidime at the breakpoint (K1 enzyme?), ceftriaxone  $\leq 1$ , interps flipped so I suppose the Microscan ESBL test was positive? Aztreonam, ampicillin, and amp/sulbactam are also all susceptible (just with flipped interps) so this looks wonky to me...

Do you mind looking at this plates and re-running these sensis?

Thanks,

E

## E. coli

Drug	MIC	Interpretation
Amp/sulbactam	$\leq 8/4$	Resistant
Ampicillin	$\leq 8$	Resistant
Aztreonam	$\leq 8$	Resistant
Cefazolin	$>16$	Resistant
Ceftazidime	8	Resistant
Ceftriaxone	$\leq 1$	Resistant
Cefuroxime	$\leq 4$	Resistant
Ciprofloxacin	$\leq 0.25$	Resistant
Ertapenem	$\leq 0.5$	Susceptible
Gentamicin	$\leq 2$	Susceptible
Meropenem	$\leq 1$	Susceptible

The techs pulled the plates, and the MAC's look like just E. Coli, and there is nothing else suspicious for Kleb. They are resubbing the bottles and will definitely reset the E. Coli and try and sub out a colony that looks like a Kleb and set if possible.



I also reminded them to reference the [REDACTED] result when working cultures and try and get the culture to match the [REDACTED] if possible.

I looked at the panel report, and I called the lab and asked them to make sure they set the panel up using pleuronic water, which is more accurate than using the prompt method. I'm betting the ceftazidime MIC backs off, and it no longer is an ESBL. They just resubbed it today so we will have a repeat sensi Wednesday. I will also follow-up tomorrow if the Kleb shows up.

It's possible that it was a false pos ESBL call from [REDACTED]. We catch them because 1) we have the advantage of having cefotaxime (although that also generates false pos) and more clav wells and 2) all ESBL pos with cefepime  $\leq 2$  have to go through a medical director (and get disk tested if we're skeptical). This is effective, but won't work for the entire system. I'm in the process of going through the data to determine if there is a set of rules we can write that will flag most of these (at least on [REDACTED]). We can talk more about it at Micro/stewardship work group if you want.

I will note that most of the false-pos that come from ceftazidime are at MICs of 4 (which I suspect are actually 2, but there is no 2 well, which I think is why MIC variability causes false pos ESBL calls). [REDACTED] has a 4 well for ceftaz, right?

I think that a rules flag would be very helpful, especially for the newer techs who are working through exceptions. I know our panels will also alert as an ESBL on panels that are totally sensitive with one well with growth in Aztreonam as well as a few other senerios. The ESBL usually resolves with repeating in pleuronic.

Yes [REDACTED] has a 4 well.

Following up on the resub. All the bottles are now growing the Kleb. JAM will reset the E. Coli and Kleb today in pleuronic water.

This was edited and finalled today as an E. Coli NOT ESBL and a Kleb oxytoaca.

Let me know if you need anything additional from me.

Culture: *Escherichia coli* CORRECTED FROM ESBL Results called to and read back by [REDACTED]

*Klebsiella oxytoca*  
PCR Setup SEE [REDACTED]

ESCHERICHIA COLI

	MIC (mcg/mL)	MIC Interpretation
Amp/Sulbactam	<=8/4	Sensitive
Ampicillin	<=8	Sensitive
Aztreonam	<=4	Sensitive
Cefazolin	<=2	Sensitive
Cefepime	<=2	Sensitive
Ceftazidime	<=1	Sensitive
CORRECTED ON 02/11/2026 at 08:00 : PREVIOUSLY REPORTED AS 8 R		
Ceftriaxone	<=1	Sensitive
Cefuroxime	<=4	Sensitive
Ciprofloxacin	<=0.25	Sensitive
Ertapenem	<=0.5	Sensitive
Gentamicin	<=2	Sensitive
Levofloxacin	<=0.5	Sensitive
Meropenem	<=1	Sensitive
Piperacillin/Tazobactam	<=8	Sensitive
Sulfa/Trimethoprim	<=2/38	Sensitive
Tetracycline	<=4	Sensitive
Tobramycin	<=2	Sensitive

KLEBSIELLA OXYTOCA

	MIC (mcg/mL)	MIC Interpretation
Amp/Sulbactam	<=8/4	Sensitive
Ampicillin	>16	Resistant
Aztreonam	<=4	Sensitive
Cefazolin	>16	Resistant
Cefepime	<=2	Sensitive
Ceftazidime	<=1	Sensitive
Ceftriaxone	<=1	Sensitive
Cefuroxime	8	Sensitive
Ciprofloxacin	<=0.25	Sensitive
Ertapenem	<=0.5	Sensitive
Gentamicin	<=2	Sensitive
Levofloxacin	<=0.5	Sensitive
Meropenem	<=1	Sensitive
Piperacillin/Tazobactam	<=8	Sensitive
Sulfa/Trimethoprim	<=2/38	Sensitive
Tetracycline	<=4	Sensitive
Tobramycin	<=2	Sensitive



# MICRO NUDGES



# Comments or “nudges” are wonderful collaborations

**Say it ain't *Steno*: a microbiology nudge comment leads to less treatment of *Stenotrophomonas maltophilia* respiratory colonization**

Published online by Cambridge University Press: **03 December 2024**

Stormmy R. Boettcher , Rachel M. Kenney, Christen J. Arena, Amy E. Beaulac, Robert J. Tibbetts, Anita B. Shallal, Geehan Suleyman and Michael P. Veve  [Show author details](#)

HECK-YES bugs: “Most penicillins and cephalosporins are suppressed due to inducible mechanism of resistance leading to treatment failure with these agents”

Specimen/Source: Other/Nasal Passage  
 Collected: 01/12/21 14:10

Status: Final    Last Updated: 01/14/21 10:13

Culture Result (Final)  
 No Methicillin Resistant Staph aureus Isolated

Isolate 1  
 A negative MRSA nasal swab has a >95% negative predictive value to rule out MRSA pneumonia. A negative MRSA nasal swab can be used to reliably discontinue empiric MRSA coverage unless patients have concern for empyema, lung abscess, necrotizing or cavitary infiltrates, or preceding or concurrent influenza pneumonia.

## MRSA screening with comment for negative results

*Open Forum Infectious Diseases*

**MAJOR ARTICLE**

**Microbiology Comment Nudge Improves Pneumonia Prescribing**

Mary A. Musgrove,<sup>1</sup> Rachel M. Kenney,<sup>1</sup> Ronald E. Kendall,<sup>2</sup> Michael Peters,<sup>1</sup> Robert Tibbetts,<sup>3</sup> Linoj Samuel,<sup>3</sup> and Susan L. Davis<sup>1,4</sup>







# CROs IN THE COMMUNITY



# Large, community hospital in rural PA with no rapid genotypic testing available

## KLEBSIELLA OXYTOCA

	MIC (mcg/mL)	MIC Interpretation	
Amox/K Clavulanate	>=32	Resistant	
Amp/Sulbactam	>=32	Resistant	
Ampicillin	>=32	Resistant	
Aztreonam	>=64	Resistant	
CEFTAZIDIME/AVIBACTAM	>=16	Resistant	Resistant
Cefepime	>=32	Resistant	
Cefotaxime	>=64	Resistant	
Cefoxitin	>=64	Resistant	
Cefpodoxime	>=8	Resistant	
Ceftazidime	>=32	Resistant	
Ceftolozane/Tazobactam	>=32	Resistant	
Ceftriaxone	>=64	Resistant	
Cefuroxime	>=64	Resistant	
Cefuroxime (po)	>=64	Resistant	
Ciprofloxacin	0.12	Sensitive	
Doxycycline	8	Intermediate	
Gentamicin	2	Sensitive	
Imipenem	<=0.25	Intermediate	
Levofloxacin	0.5	Sensitive	
Meropenem	2	Resistant	
Meropenem/Vaborbactam	2	Sensitive	Sensitive
Piperacillin/Tazobactam	>=128	Resistant	
Sulfa/Trimethoprim	<=20	Sensitive	

Hello,

We can add the CRO flag on this patient from this body fluid culture. The patient currently has a roommate. Does this patient now have to be considered as NDM exposed?

Thank you,

AODs and patients nurse are aware. Moving the roommate out and placed CRO in the banner bar and isolation precaution order.

Thanks!

# CARBA5

## Stewardship

I wanted this badly  
Prepared to beg, borrow, and  
steal for systemwide,  
automatic implementation  
Pre-compromised in my head  
for mero-R only

## Lab

- This test is technically very easy
  - Relatively inexpensive
  - Easier for us to do on all erta-R and mero-R
    - Good for patients

# CARBA5 Implementation

- Automatically run on all erta/mero-R Enterobacterales
- Real time email alerts on all positives to centralized system team
- CARBA5 team loops in local stewardship, IP&C support

From: [REDACTED]  
Sent: Tuesday, [REDACTED]  
To: Carba5 <[Carba5@upmc.edu](mailto:Carba5@upmc.edu)>  
Subject: CARBA5 ALERT

<b>Patient Current Hospital Location</b>	UPMC ALTOONA HOSPITAL TOWER [REDACTED]
<b>Patient Name</b>	[REDACTED]
<b>Patient MRN</b>	[REDACTED]
<b>Specimen Accession</b>	[REDACTED]
<b>Specimen Type</b>	CLEAN CATCH URINE
<b>Organism Name</b>	Serratia marcescens
<b>Carbapenemase detected</b> (CARBA 5 Result)	NDM - VIM - IMP - KPC + OXA48 -



To Wrap Up...





## #91 – Teamwork Makes the Dream Work: Preparation Pearls for Stewardship and...

Society of Infectious Diseases Pharmacists

- 10s



+ 30s

01:06:21 • [Download](#)



## #40 – Breakpoints Talks Breakpoints: Microbiology Labs and Stewardship

Society of Infectious Diseases Pharmacists

- 10s



+ 30s

01:13:34 • [Download](#)



10/09/2025

### 207: Micro Lab and Stewardship: Collaboration in Action (Pt.2)

In this second half of our discussion with Dr. Erin McCreary and Dr. Hannah Creager, we dive deeper into how microbiology and antimicrobial stewardship teams collaborate to improve patient outcomes. They unpack how to prioritize breakpoint updates, the pros and cons of cascade reporting, and what nudges can do to guide better prescribing. Then we explore a powerful example of collaboration—the transition from MRSA agar to PCR across hospitals—and what it taught both teams about communication, resource sharing, and pa...

10/02/2025

### 206: Micro Lab and Stewardship: Collaboration in Action (Pt.1)

Good communication isn't optional—it's essential for patient care. In Part 1 of this two-part series, Dr. Erin McCreary and Dr. Hannah Creager join Luis to talk about how microbiology labs and antimicrobial stewardship teams can collaborate more effectively. They share real-world examples from their system-wide work—aligning AST panels and breakpoints across multiple platforms, navigating reporting challenges like the clindamycin D-test and rifampin comments, and building consistent communication through monthly micro-stewardship...

# They're not employees, they're people

The hospital is “altogether the most complex human organization ever devised”

- Peter F Drucker, HBR 2002

# Thank you to the village!





# Better Together: Microbiology Laboratory and Antimicrobial Stewardship Teams

**Erin K. McCreary, PharmD, BCIDP, FIDSA**

Senior Director, Infectious Diseases Strategy, UPMC

Clinical Assistant Professor, University of Pittsburgh  
Dept of Medicine