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OPTIMIZING OUTCOMES

Enhancing Antimicrobial Stewardship Programs Through Collaboration With the Microbiology Laboratory

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- The presenters have no real or perceived conflicts of interest related to this presentation

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Learning Objectives

At the end of this session, participants should be able to:

1. Identify potential obstacles to forming a successful collaboration between stewardship programs and microbiology labs.
2. Recall three microbiology reporting approaches that can influence prescribing practices.
3. Describe the potential benefits of collaboration from a patient, laboratory and stewardship perspective.



Collaboration With the Microbiology Lab: Why is it important?

Nichole Neville, PharmD, BCIDP

Collaboration With the Microbiology Lab: Why is it important?

- Antimicrobial resistance (AMR) is a pressing worldwide concern
 - Estimated 4.95 million deaths were associated with drug-resistant infections in 2019 global systematic analysis
 - 1.27 million deaths **directly** attributable to bacterial AMR
- 2022 CDC Special Report indicated historic gains made on antibiotic stewardship were reversed during the COVID-19 pandemic



Available data show an alarming increase in resistant infections starting during hospitalization, growing at least 15% from 2019 to 2020.

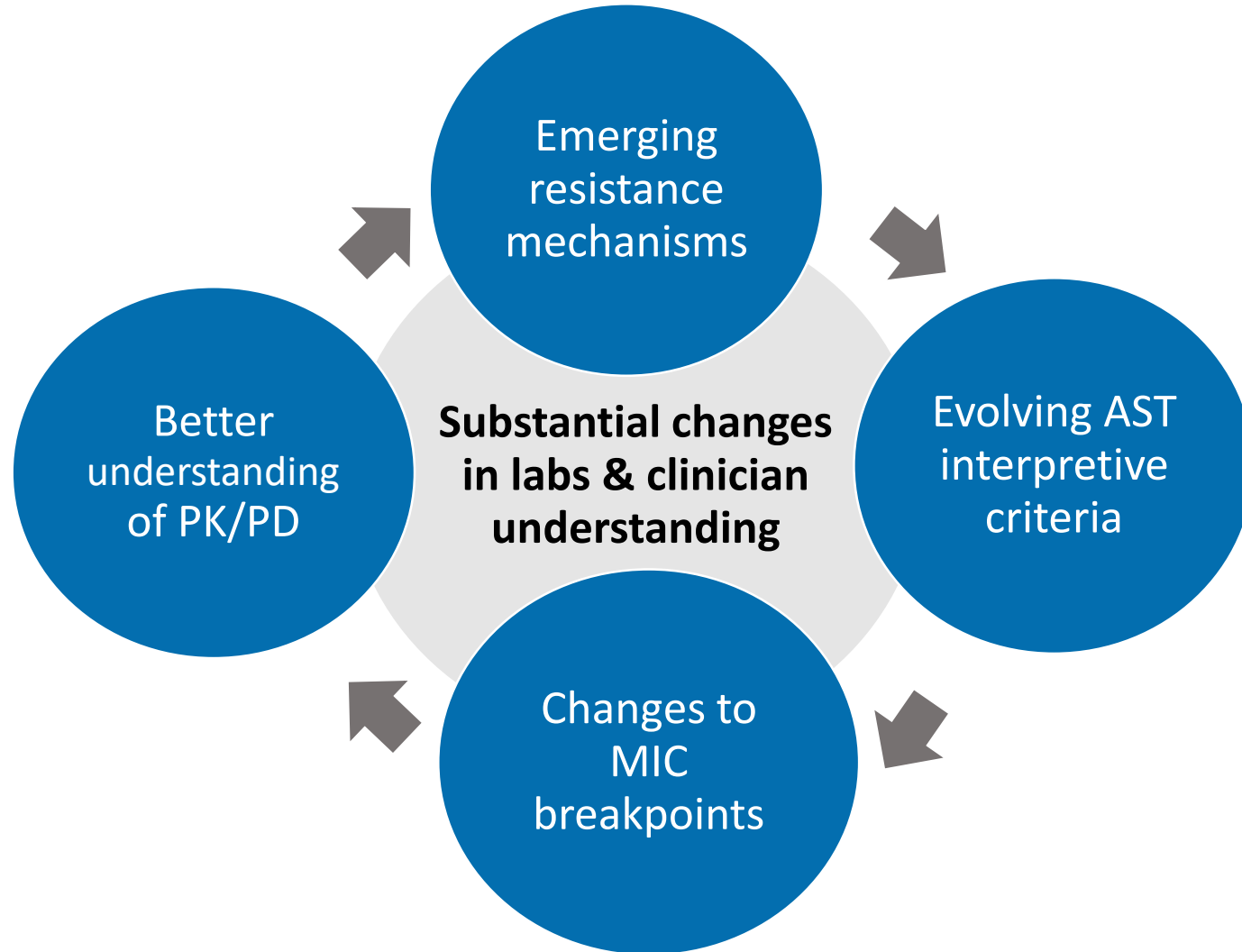
- Carbapenem-resistant *Acinetobacter* (+78%)
- Antifungal-resistant *Candida auris* (+60%)*
- Carbapenem-resistant Enterobacterales (+35%)
- Antifungal-resistant *Candida* (+26%)
- ESBL-producing Enterobacterales (+32%)
- Vancomycin-resistant Enterococcus (+14%)
- Multidrug-resistant *P. aeruginosa* (+32%)
- Methicillin-resistant *Staphylococcus aureus* (+13%)

Source: Antimicrobial Resistance Collaborators. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. Lancet. 2022 Feb 12;399(10325):629-655. doi: 10.1016/S0140-6736(21)02724-0. Epub 2022 Jan 19. Erratum in: Lancet. 2022 Oct 1;400(10358):1102.

Source: CDC. COVID-19: U.S. Impact on Antimicrobial Resistance, Special Report 2022. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2022.

<https://www.cdc.gov/drugresistance/covid19.html>. Accessed 5/23/2023.

Collaboration With the Microbiology Lab: Why is it important?



Collaboration With the Microbiology Lab: Why is it important?

- Varied resistant mechanisms, delays in testing, out-of-date breakpoints, lack of understanding risk factors for resistant infections etc., all impact antibiotic therapy and lead to delays in administration of effective treatment
- Delayed appropriate therapy is associated with worse outcomes
 - Increased total in-hospital costs
 - Increased lengths of stay
 - 20% increased in-hospital mortality
- Time to appropriate antibiotic therapy shown to be an independent predictor of 30-day mortality in patients with certain resistant organisms

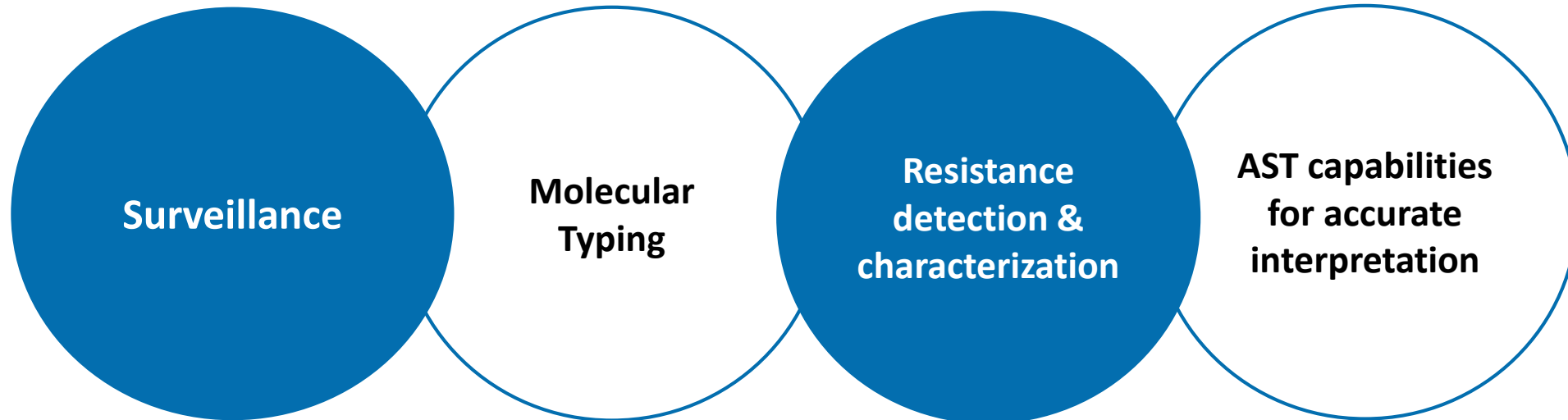
Source: Bassetti M, Kanj SS, Kiratisin P, Rodrigues C, Van Duin D, Villegas MV, Yu Y. Early appropriate diagnostics and treatment of MDR Gram-negative infections. *JAC Antimicrob Resist.* 2022 Sep 13;4(5):dlac089. doi: 10.1093/jacamr/dlac089.

Source: Bonine NG, Berger A, Altincatal A, Wang R, Bhagnani T, Gillard P, Lodise T. Impact of Delayed Appropriate Antibiotic Therapy on Patient Outcomes by Antibiotic Resistance Status From Serious Gram-negative Bacterial Infections. *Am J Med Sci.* 2019 Feb;357(2):103-110. doi: 10.1016/j.amjms.2018.11.009. Epub 2018 Nov 22.

Source: Falcone M, Bassetti M, Tiseo G, Giordano C, Nencini E, Russo A, Graziano E, Tagliaferri E, Leonildi A, Barnini S, Farcomeni A, Menichetti F. Time to appropriate antibiotic therapy is a predictor of outcome in patients with bloodstream infection caused by KPC-producing *Klebsiella pneumoniae*. *Crit Care.* 2020 Jan 30;24(1):29. doi: 10.1186/s13054-020-2742-9.

Collaboration With the Microbiology Lab: Why is it important?

- Ability to fight and halt further resistance is directly related to the capacity of the microbiology lab's ability to perform:



Source: Wenzler, E, Maximos M, Asempa TE, Biehle L, Schuetz AN, Hirsch EB. Antimicrobial susceptibility testing: an updated primer for clinicians in the era of antimicrobial resistance: insights from the Society of Infectious Diseases Pharmacists. *Pharmacotherapy*. 2023 Feb 24. Doi: 10.1002/phar.2781. Epub ahead of print.

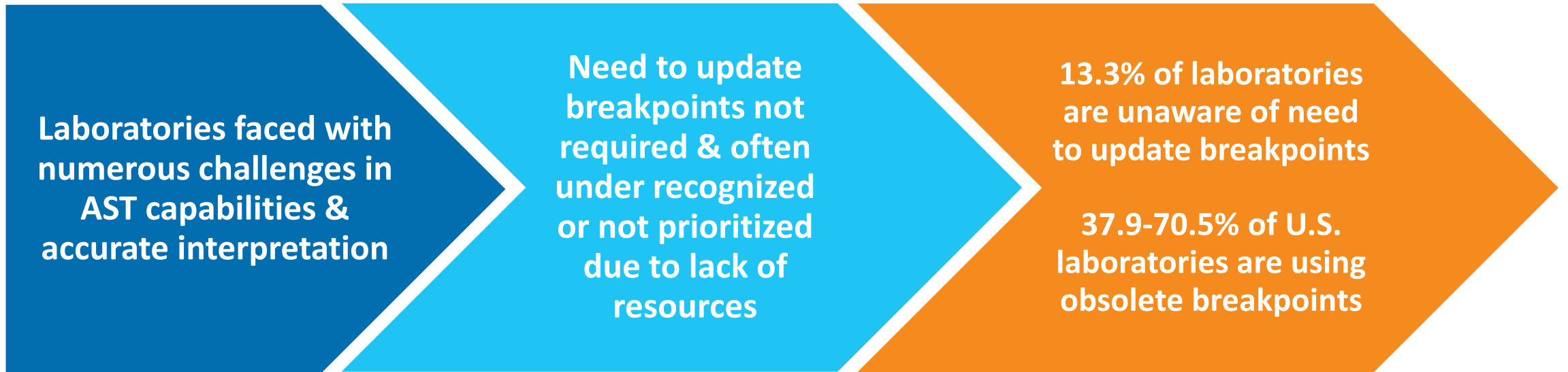
Collaboration With the Microbiology Lab: Why is it important?

- Challenges for microbiology labs in optimizing AST
 - Emergence of new resistance mechanisms
 - Development of new antibiotics
 - Revisions to established methods and breakpoints

Labs may interpret AST results using obsolete breakpoints:

- **Serious patient safety concerns and ramifications**
- **Hinders ability to track AMR**

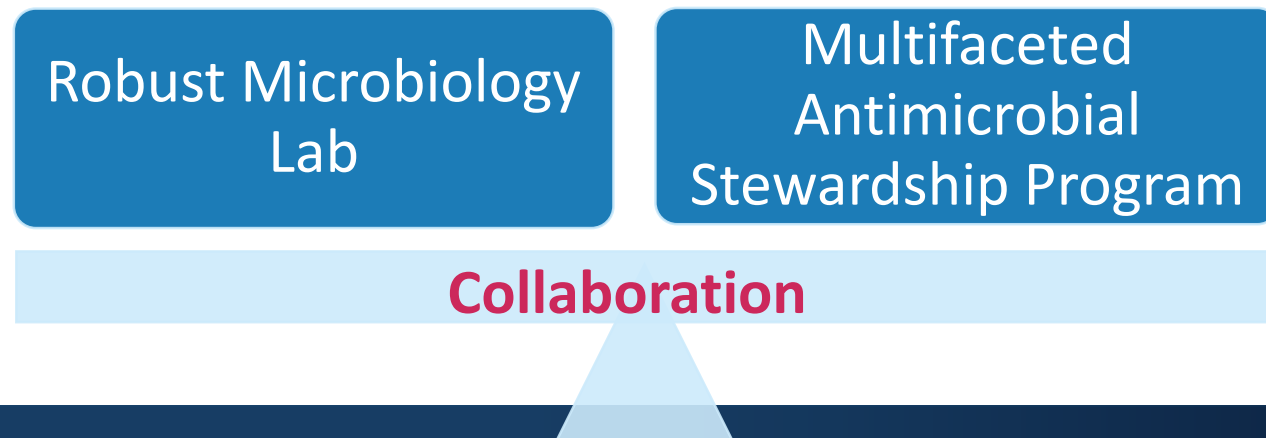
Collaboration With the Microbiology Lab: Why is it important?



Source: Simner PJ, Rauch CA, Martin IW, et al.. Raising the bar: Improving antimicrobial resistance detection by clinical laboratories by ensuring use of current breakpoints. *Open Forum Infect Dis.* 2022;9 (3). doi.org/10.1093/ofid/ofac007

Collaboration With the Microbiology Lab: Why is it important?

- Well informed clinicians can help bridge the gap between AST challenges and frontline experience to improve patient outcomes in a world of rapidly changing/increasing AMR
- The microbiology laboratory's capabilities paired with clinician expertise and collaboration are essential in this AMR fight to:
 - Decrease mortality
 - Improve clinical and economic outcomes
 - Reduce delays in time to effective and optimal antimicrobial therapy

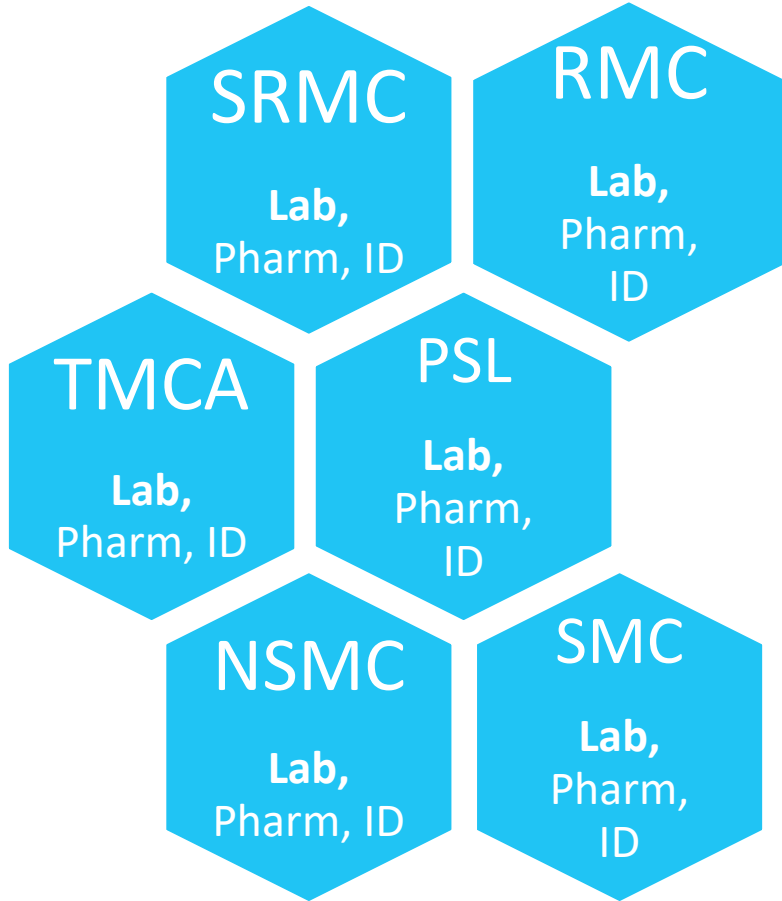


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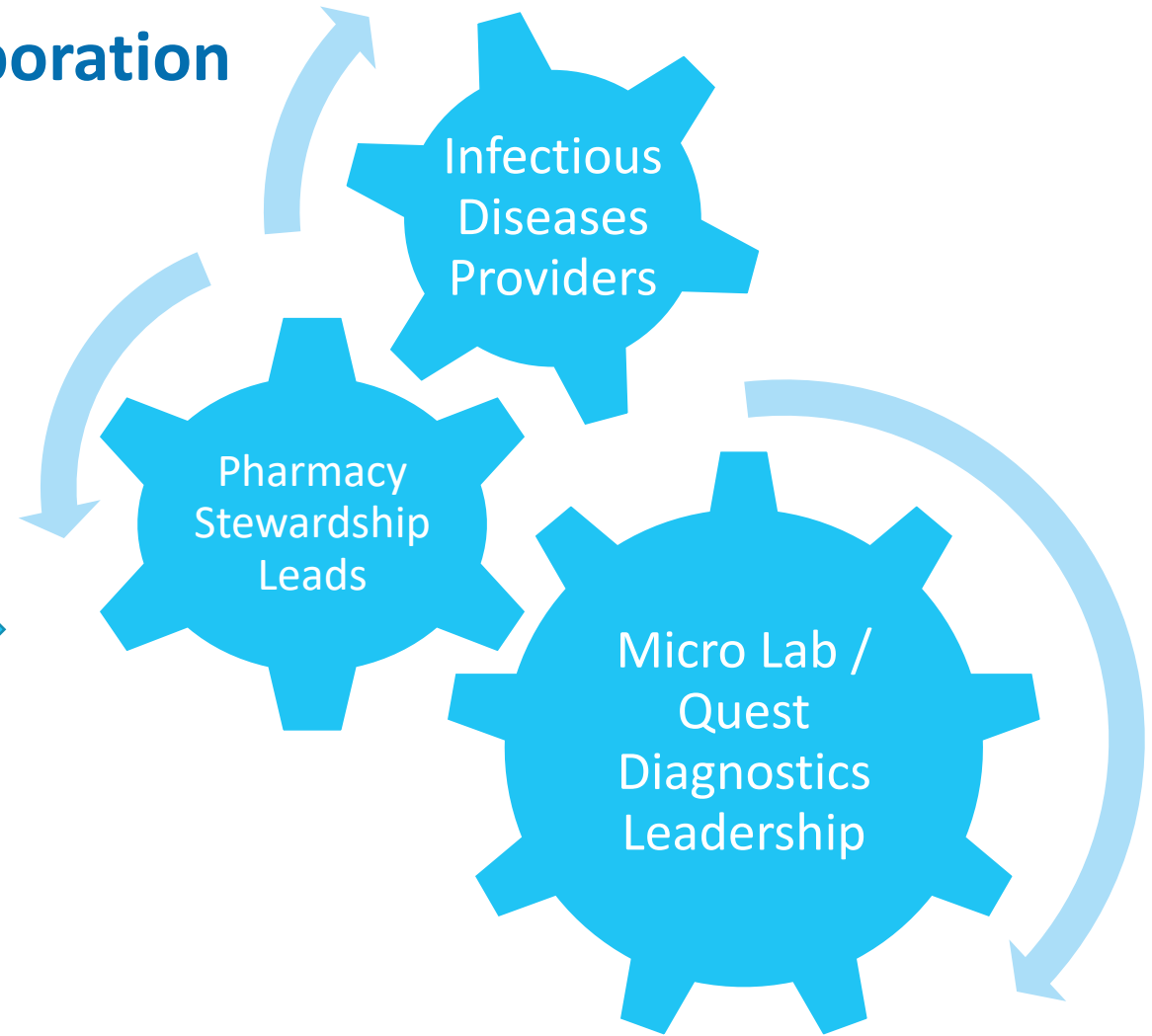
Forming a Successful Collaboration Between the Microbiology Lab & Stewardship Teams

Kelsey Melander, PharmD, BCIDP

Centralization & the Necessity of Collaboration

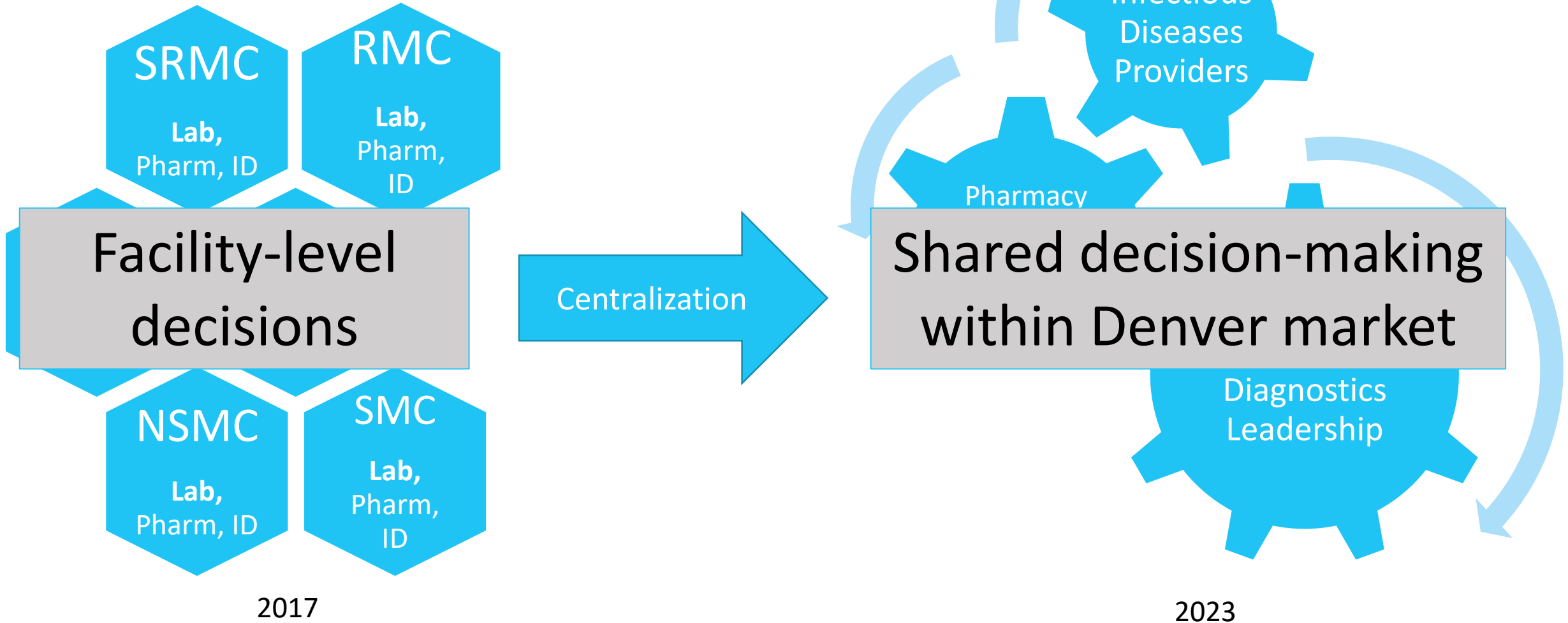


2017

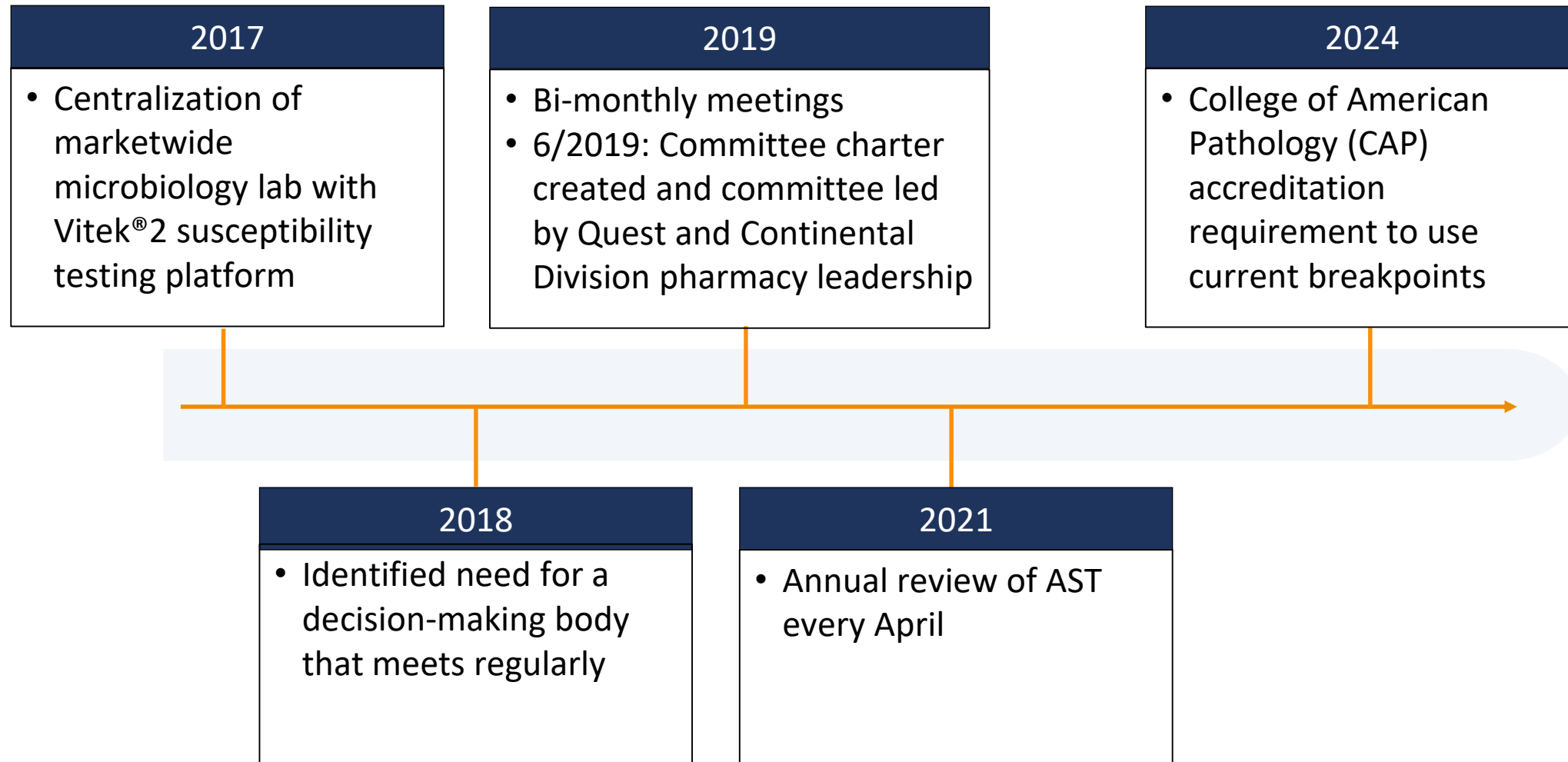


2023

Centralization & the Necessity of Collaboration



Formation of Laboratory/Stewardship Committee



Centralization & the Necessity of Collaboration

Case example: Implementation of updated cefazolin breakpoints for Enterobacterales

1. Recognizing the need for microbiological and clinical expertise
2. Including the right voices
3. Appreciating different perspectives

Recognizing the Need for Microbiological & Clinical Expertise

Cefazolin/Enterobacterales susceptibility reporting

- Cascade reporting based on cefazolin susceptibility

Primary Antibiotic Reporting

1. Ampicillin
2. Cefazolin
3. Ceftriaxone
4. Gentamicin
5. Levofloxacin

If Cefazolin resistant

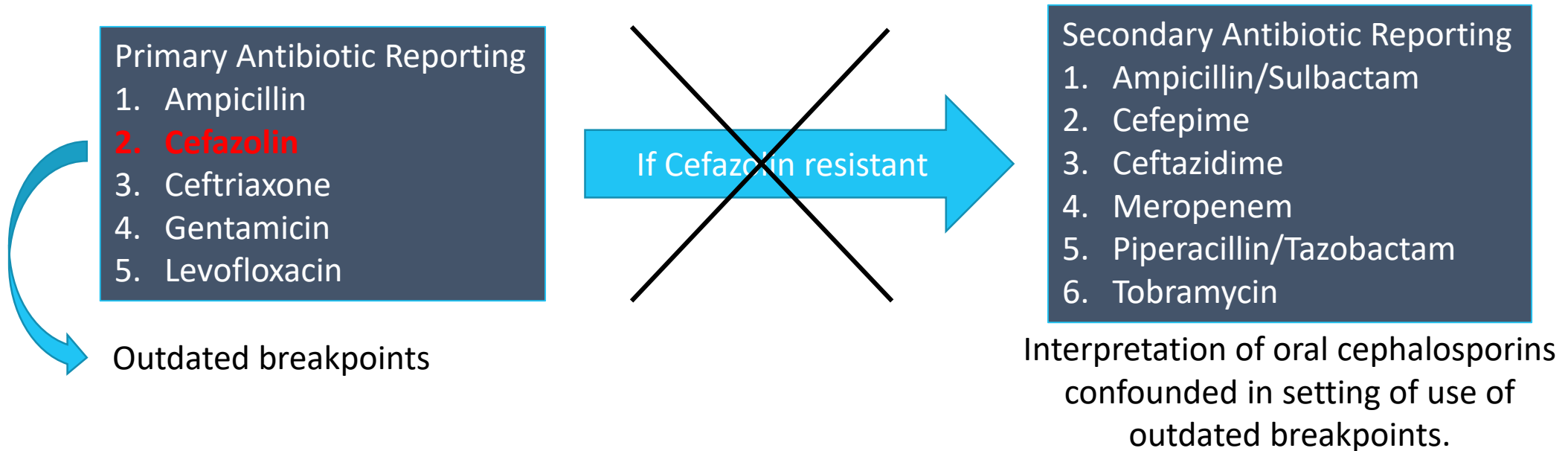
Secondary Antibiotic Reporting

1. Ampicillin/Sulbactam
2. Cefepime
3. Ceftazidime
4. Meropenem
5. Piperacillin/Tazobactam
6. Tobramycin

Recognizing the Need for Microbiological & Clinical Expertise

Cefazolin/Enterobacterales susceptibility reporting

- Cascade reporting based on cefazolin susceptibility



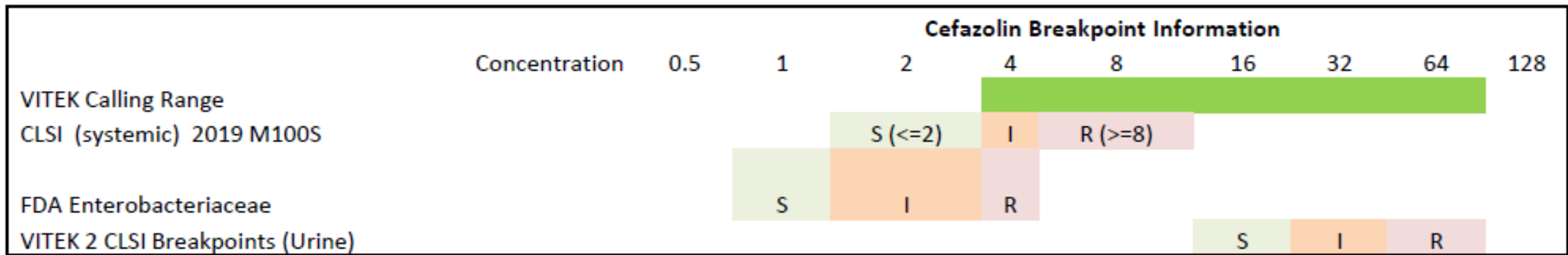
In 2019, a survey of 1,490 CAP-accredited clinical laboratories demonstrated a low rate of compliance with current breakpoints (29.5%–62.1%). Breakpoints surveyed had been implemented as of 2010.

Source: Simner PJ, Rauch CA, Martin IW, et al.. Raising the bar: Improving antimicrobial resistance detection by clinical laboratories by ensuring use of current breakpoints. *Open Forum Infect Dis.* 2022;9 (3). doi.org/10.1093/ofid/ofac007

Recognizing the Need for Microbiological & Clinical Expertise

Cefazolin/Enterobacterales susceptibility reporting

- Cefazolin susceptibilities were not in alignment with CLSI or FDA and outside of the Vitek®2 calling range



Source: Humphries RJ, Abbott AN, Hindler JA. Understanding and addressing CLSI breakpoint revisions: a primer for clinical laboratories. *J Clin Microbiol.* 2019;57(6):e00203-19. doi:

10.1128/JCM.00203-19

bioMérieux. (2018). Vitek®2 AST-GN80.

Recognizing the Need for Microbiological & Clinical Expertise

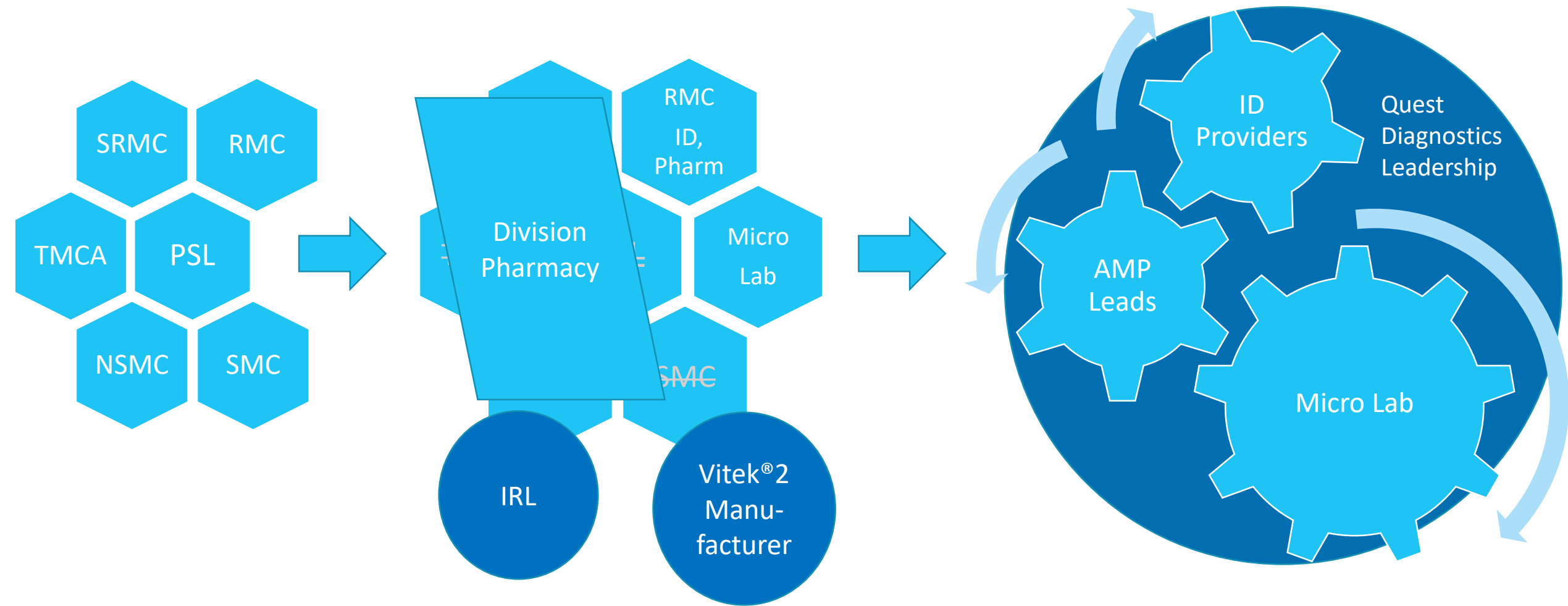
Clinical Expertise

- Recognition of breakpoints most in alignment with clinical and PK/PD data
- Communicate potential clinical impact of requested change
- Recommending the need for automated vs. by request only work-up

Microbiological Expertise

- Knowledge of validation procedures to update breakpoints
- Working within confines of technology limitations
- Balance efficient laboratory workflow vs. accommodate all clinician requests
- Knowledge of multiple microbiological techniques to form creative solutions

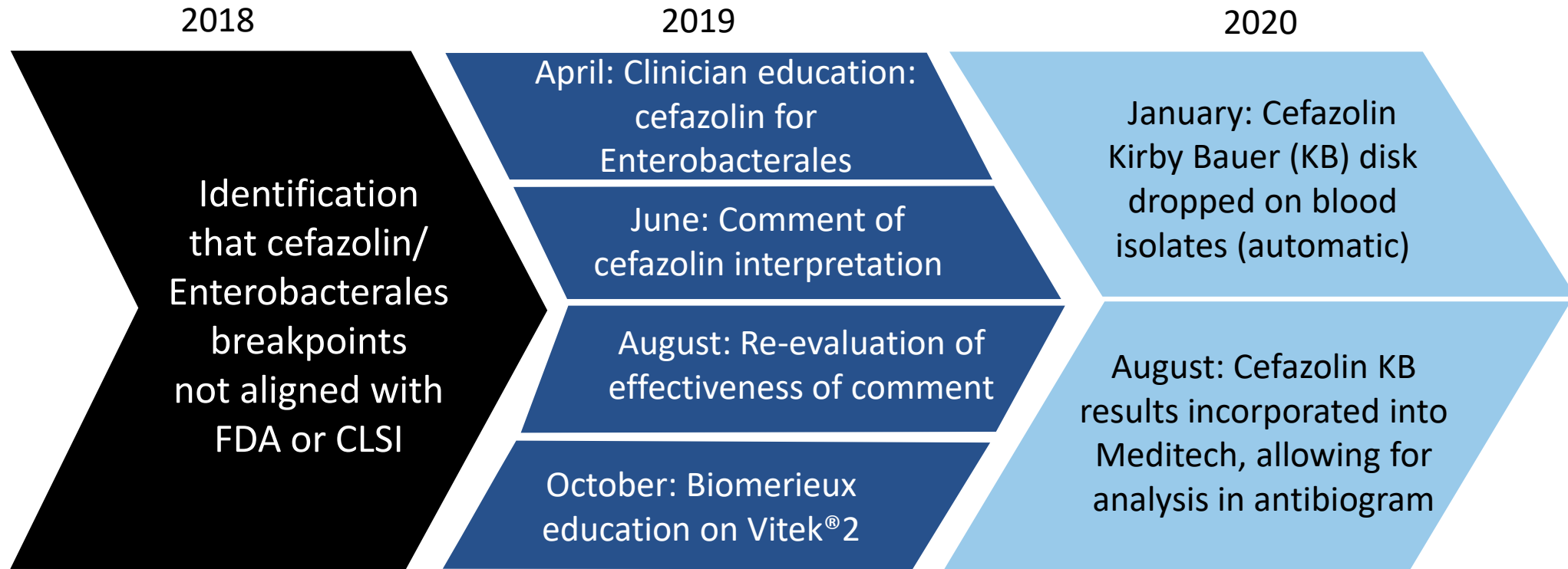
Including the Right Voices



Appreciating Different Perspectives

- Create a bridge between clinical and laboratory personnel
 - Weighing the clinical benefit against the “lift” required for implementation
 - Timeline for implementation and setting reasonable expectations (updated cefazolin breakpoints: 2018–2020; reporting with limitations)
- Communication with providers
 - Effectiveness of implementation: automated work-up vs. by request only
 - Supplemental education
 - Comments included in microbiology results

Implementation of Updated Cefazolin/Enterobacterales Breakpoints



Change and optimization of reporting takes time.

Routine re-evaluation of the effectiveness of new processes.

Implementation without provider education will have a limited impact.

Assessment Question 1

How did the example of implementing updated cefazolin/enterobacterales breakpoints expose the obstacles to forming a successful partnership between stewardship programs and microbiology labs?

- A. Based on the pharmacokinetics of cefazolin, two separate breakpoints exist depending on site of infection (systemic vs. cystitis). This represents need for clinical expertise.
- B. Based on technology limitations associated with automated susceptibility testing platforms, the microbiology lab was unable to fully align susceptibility reporting with current breakpoints. This represents the need for microbiological expertise.
- C. Implementation of Kirby Bauer discs for Enterobacterales (limited to blood source) highlighted the ability to align breakpoints with current recommendations demonstrated the ability to accommodate clinical and laboratory needs.
- D. All of the above

Assessment Question 1 | Answer...

How did the example of implementing updated cefazolin/enterobacterales breakpoints expose the obstacles to forming a successful partnership between stewardship programs and microbiology labs?

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Influential Microbiology Reporting Approaches

Nichole Neville, PharmD, BCIDP

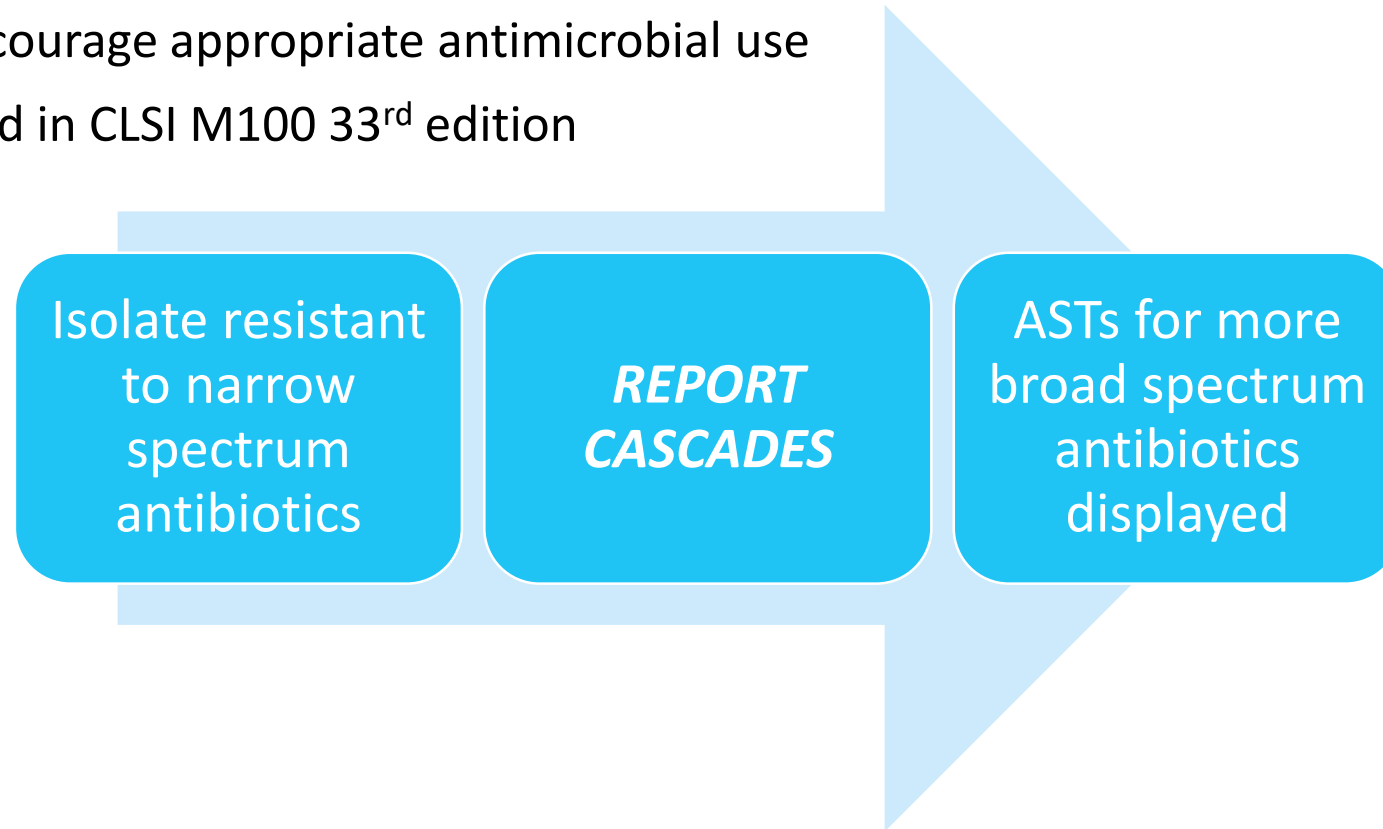
Microbiology Reporting Approaches That Can Influence Prescribing Practices



Microbiology Reporting Approaches That Can Influence Prescribing Practices

- **Cascade Reporting (CR):**

- Reporting results for specific antimicrobial agents based on the AST profile/pattern of the isolate
- Utilized to encourage appropriate antimicrobial use
- Recommended in CLSI M100 33rd edition



Source: CLSI. *Performance Standards for Antimicrobial Susceptibility Testing*. 33rd ed. CLSI supplement M100. Clinical and Laboratory Standards Institute; 2023.

Microbiology Reporting Approaches That Can Influence Prescribing Practices

- **Cascade Reporting (CR):**

- **Laio, et al.:**

- Decreased cefepime utilization in using CR based on ceftriaxone susceptibility

- Mean DOT among patients who received cefepime decreased from 1.229 days during baseline period to 0.813 days post-CR ($p < .0001$)
- Significantly lowers the lengths of stay (14.139 days to 10.882 days) during the post-CR period compared to baseline ($p < .0001$)
- No change in inpatient mortality

- **Langford, et al.:**

- In outpatients aged >65 yo, reporting antibiotic susceptibility on urine cultures was associated with increased odds of prescribing the reported antibiotic (adjusted OR 1.23, 95%CI 1.13–1.33, per 25% increase in reporting)

Source: Liao S, Rhodes J, Jandarov R, DeVore Z, Sopirala MM. Out of Sight-Out of Mind: Impact of Cascade Reporting on Antimicrobial Usage. Open Forum Infect Dis. 2020 Jan 8;7(2):ofaa002. doi: 10.1093/ofid/ofaa002.

Source: Langford BJ, Daneman N, Diong C, Marchand-Austin A, Adomako K, Saedi A, Schwartz KL, Johnstone J, MacFadden DR, Matukas LM, Patel SN, Garber G, Brown KA. Antibiotic susceptibility reporting and association with antibiotic prescribing: a cohort study. Clin Microbiol Infect. 2021 Apr;27(4):568-575. doi: 10.1016/j.cmi.2020.10.001. Epub 2020 Oct 12.

Microbiology Reporting Approaches That Can Influence Prescribing Practices

- **Cascade Reporting (CR):**

- **Weichman, et al.:**

- Implemented CR for Enterobacterales in urine cultures at a network of urgent care clinics
 - Interrupted time series analysis (ITSA) measuring monthly antibiotic prescriptions per 1000 patient encounters showed 38% reduction in fluoroquinolone prescribing rates post CR ($p < .0001$)

Based on the evidence displaying substantial benefits for CR, the Denver Market of the Continental Division implemented widespread use of CR

Source: Weichman, B., Bushman, A., Rogers, K., & Rosa, R. (2022). Impact of fluoroquinolone cascade reporting of urine samples on antibiotic prescribing rates in a network of urgent care clinics. *Antimicrobial Stewardship & Healthcare Epidemiology*, 2(1), E97. doi:10.1017/ash.2022.227

Microbiology Reporting Approaches That Can Influence Prescribing Practices

Cascade Reporting: Denver Market Examples

<i>Escherichia coli:</i> Non-cascaded susceptibility report	<i>Escherichia coli:</i> Cascaded susceptibility report
<pre> 1. ESCHERICHIA COLI KIRBY BAUER INTERP ----- CEFAZOLIN S 1. ESCHERICHIA COLI RX may vary depending on target, route, and dose MIC INTERP ----- AMPICILLIN <=2 S AMP/SULBACTAM <=2 S CEFTRIAXONE <=1 S TRIMETH/SULFA <=20 S </pre>	<pre> 1. ESCHERICHIA COLI ESBL RX may vary depending on target, route, and dose MIC INTERP ----- CEFTRIAXONE >=64 R GENTAMICIN >=16 R MEROPENEM <=0.25 S PIPERACILLIN/TAZOBACTAM <=4 S TOBRAMYCIN >=16 R TRIMETH/SULFA <=20 S </pre>
<ul style="list-style-type: none"> Organism is pan-sensitive Susceptibility report does not cascade 	<ul style="list-style-type: none"> Resistant Ceftriaxone fires the cascade

Microbiology Reporting Approaches That Can Influence Prescribing Practices

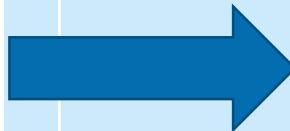
Cascade Reporting: Denver Market Examples

Carbapenem Resistant Organism (CRO): *Pseudomonas aeruginosa*

Cascaded CRO *Pseudomonas aeruginosa* susceptibility report

1. PSEUDOMONAS AERUGINOSA CRO
RX may vary depending on target, route, and dose

	MIC	INTERP
	-----	-----
CEFEPIME	32	R
GENTAMICIN	<=1	S
LEVOFLOXACIN	>=8	R
MEROPENEM	>=16	R
PIPERACILLIN/TAZOBACTAM	>=128	R
TOBRAMYCIN	<=1	S



1. PSEUDOMONAS AERUGINOSA CRO
KIRBY BAUER INTERP

	MIC	INTERP
	-----	-----
CEFIDEROCOL		S

1. PSEUDOMONAS AERUGINOSA CRO
RX may vary depending on target, route, and dose

	MIC	INTERP
	-----	-----
CEFTAZIDIME/AVIBACTAM	8/4	S

1. PSEUDOMONAS AERUGINOSA CRO
RX may vary depending on target, route, and dose

	MIC	INTERP
	-----	-----
CEFTOLOZANE/TAZOBACTAM	1.5/4	S

1. PSEUDOMONAS AERUGINOSA CRO
RX may vary depending on target, route, and dose

	MIC	INTERP
	-----	-----
RECARBRIO	12/4	R

- Resistant meropenem fires the automated cascaded report

- Microbiology automatically begins ASTs for expanded antimicrobials and reports when complete

Microbiology Reporting Approaches That Can Influence Prescribing Practices



Microbiology Reporting Approaches That Can Influence Prescribing Practices

- **Selective Reporting (SR):**


- Utilizes reporting results for specific antimicrobial agents based on specific criteria instead of AST results
- May occur for the following reasons:
 - Specific bug/drug combination is inappropriate for a given site of infection
 - Drug is not on the facility formulary
 - A drug may be inappropriate for the source of infection and/or particular patient populations
 - Specific testing method may have bug/drug limitations
 - Literature suggests suboptimal outcomes with a particular drug in the treatment of specific resistance phenotypes and/or types of infections

Source: CLSI. *Performance Standards for Antimicrobial Susceptibility Testing*. 33rd ed. CLSI supplement M100. Clinical and Laboratory Standards Institute; 2023.

Source: Selective reporting of antimicrobial susceptibility testing results: a primer for antibiotic stewardship programs. Centers for Disease Control and Prevention website. <https://www.cdc.gov/antibiotic-use/pdfs/Selective-Reporting-508.pdf> CAa. Published 2020. Accessed May 23, 2023.

Microbiology Reporting Approaches That Can Influence Prescribing Practices

Selective Reporting (SR)

- 
- Aims to guide antimicrobial prescribing to the most appropriate, guideline-recommended antimicrobials
 - Recommended in French, European and international guidelines to reduce the number of inappropriately prescribed antibiotics
 - Recommended in CLSI M100 33rd edition
 - Found to decrease broad spectrum antibiotic prescriptions

Source: Le Dref G, Simon M, Bocquier A, Fougnot S, Kivits J, Duda A, Pulcini C, Thilly N; ANTIBIO-ciblés Scientific Committee‡. Selective reporting of antibiotic susceptibility testing results for urine cultures: feasibility and acceptability by general practitioners and laboratory professionals in France. *JAC Antimicrob Resist.* 2023 Feb 11;5(1):dlad013. doi: 10.1093/jacamr/dlad013.

Source: CLSI. *Performance Standards for Antimicrobial Susceptibility Testing.* 33rd ed. CLSI supplement M100. Clinical and Laboratory Standards Institute; 2023.

Microbiology Reporting Approaches That Can Influence Prescribing Practices

Selective Reporting (SR)

- Simon, et al.:
 - Prospective, multi-center, controlled before/after intervention study
 - Assessed impact of SR of AST results for urine cultures positive with *Escherichia coli* on prescription of broad spectrum antibiotics with a higher risk of selection for resistance
 - Conclusion:
 - Decreased proportion of broad-spectrum antibiotic prescriptions was significantly higher for SR of AST
 - Attributable decrease in prescription proportion of 3rd gen cephalosporins (-8.5% for selective reporting vs. -0.1% for complete reporting, $p < 0.001$)

Source: Simon M, Fougnot S, De Monchy P, Duda A, Thilly N, Pulcini C; ANTIBIO-ciblés Scientific Committee. Impact of selective reporting of antibiotic susceptibility testing results for urinary tract infections in the outpatient setting: a prospective controlled before-after intervention study. Clin Microbiol Infect. 2023 Mar 13:S1198-743X(23)00126-X. doi: 10.1016/j.cmi.2023.03.012. Epub ahead of print.

Microbiology Reporting Approaches That Can Influence Prescribing Practices

Selective Reporting (SR): Denver Market Examples

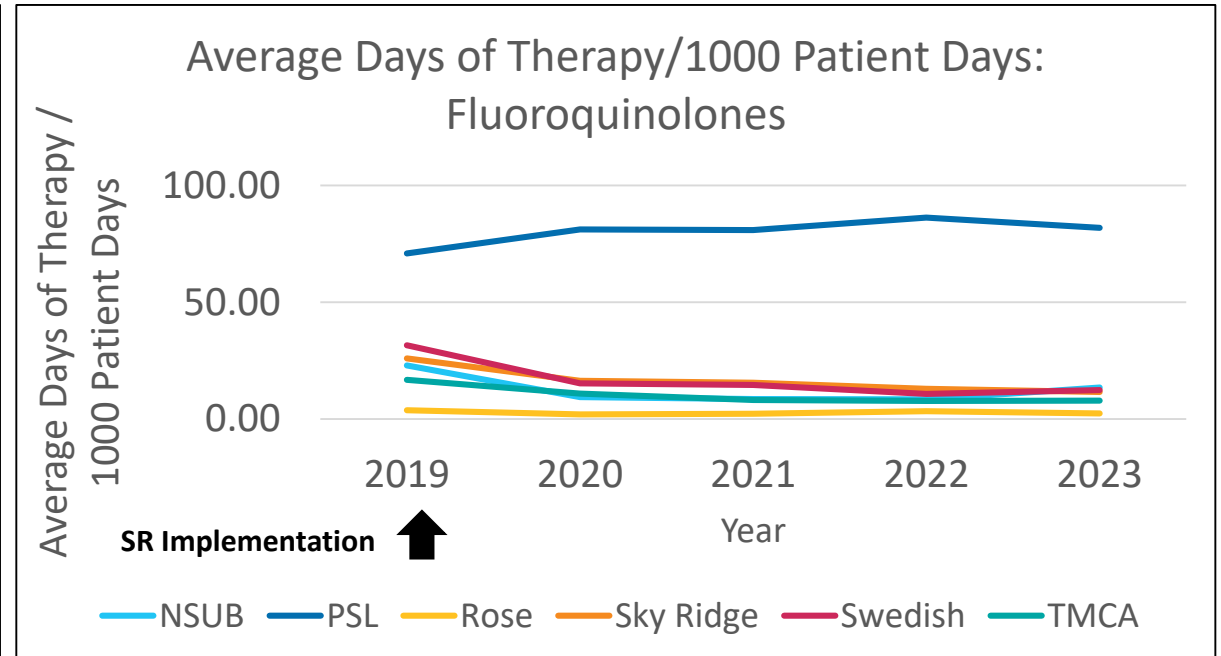
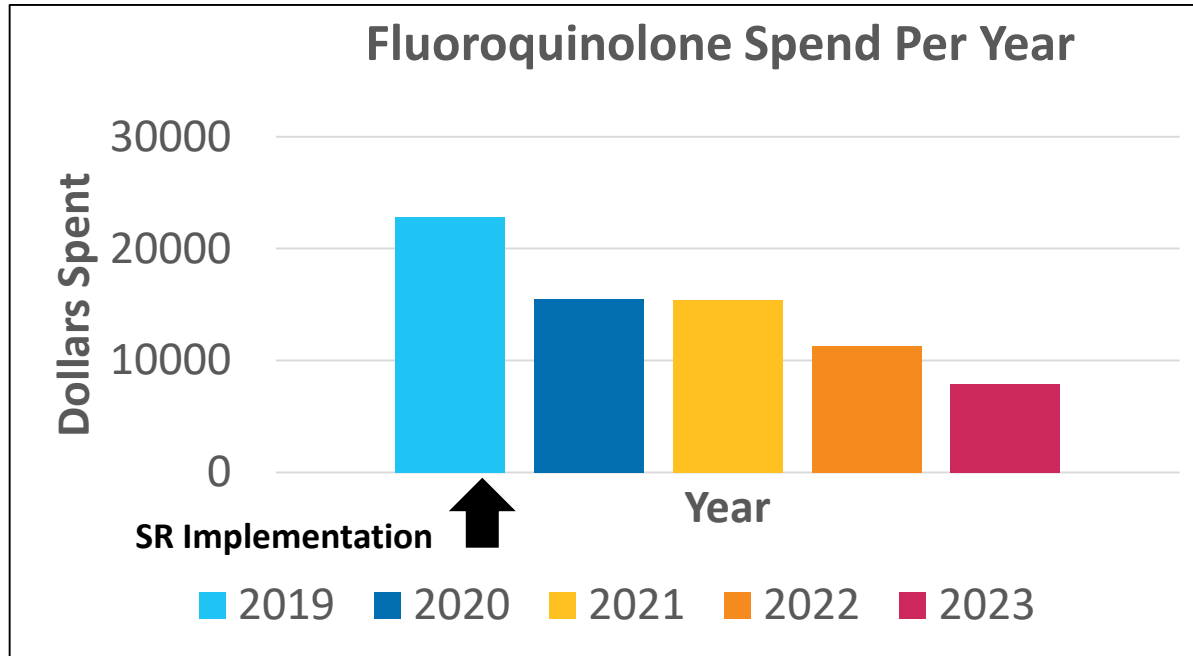
- Fluoroquinolones

- 2019 HCA Continental Division Denver Market implemented SR by masking fluoroquinolones from susceptibility reports for Enterobacterales
- Providers must contact pharmacy or call the microbiology lab for susceptibility information, if needed

```
URINE AEROBIC CULTURE Final
Organism 1 ESCHERICHIA COLI
COLONY COUNT GREATER THAN 100,000 CFU'S/ML

1. ESCHERICHIA COLI
RX may vary depending on target, route, and dose
MIC INTERP
-----
AMPICILLIN 8 S
CEFAZOLIN <=4 S
CEFTRIAXONE <=1 S
GENTAMICIN <=1 S
NITROFURANTOIN <=16 S
TRIMETH/SULFA <=20 S
```

Continental Division: Denver Market Data



- Selective Reporting implemented 12/2019
- Most hospitals decreased fluoroquinolone spend by 72–89%

- **Non-transplant facilities** decreased fluoroquinolone Average DOT by 35–60%

Microbiology Reporting Approaches that Can Influence Prescribing Practices



Microbiology Reporting Approaches That Can Influence Prescribing Practices

Reporting additional information to susceptibility reports can benefit prescribing practices by:



Educating clinicians about the most appropriate antimicrobial dose for a susceptible-dose-dependent (SDD) isolate



Notifying prescribers when specific organisms requiring broad-spectrum antibiotics are not present



Informing clinicians when the laboratory is no longer working up an isolate

Microbiology Reporting Approaches that Can Influence Prescribing Practices

Clarity of Reporting: Incorporation of SDD designation

Enterococcus

- Daptomycin treatment failures have been demonstrated in Enterococci with elevated MICs
- Standard doses of 4-6mg/kg may not attain pharmacodynamic targets for selected Enterococci
- CLSI approved SDD breakpoint range for Enterococcus spp in 2018
 - SDD breakpoint based on dosage regimen of 8–12mg/kg every 24 hours for serious Enterococci infections

Source: CLSI. *Performance Standards for Antimicrobial Susceptibility Testing*. 33rd ed. CLSI supplement M100. Clinical and Laboratory Standards Institute; 2023.

Microbiology Reporting Approaches That Can Influence Prescribing Practices

Clarity of Reporting: Incorporation of SDD designation

Adema, et al.:

- Mixed-methods study combined a clinician survey with a retrospective pre-post prescribing analysis
- Found SDD reporting for *Enterococcus* spp was associated with a change in definitive daptomycin dosing
 - Daptomycin dosage following susceptibility testing found to be significantly higher post-SDD compared with pre-SDD (8.5 mg/kg vs 6.4 mg/kg; $P < .001$)
- Showed ID clinicians had more confidence in SDD category compared to internal medicine clinicians
 - Significant difference between knowledge and interpretation of SDD interpretive category when applied to daptomycin for the treatment of Enterococci

Source: Adema JL, Lake LN, Stevens RW, Hogan BM, Schuetz AN, Tande AJ, Mara KC, Eberly AR, Rivera CG. Understanding and Application of Daptomycin-Susceptible Dose-Dependent Category for *Enterococcus*: A Mixed-Methods Study. *Open Forum Infect Dis*. 2022 Jan 10;9(1):ofab611. doi: 10.1093/ofid/ofab611.

Microbiology Reporting Approaches That Can Influence Prescribing Practices

Clarity of Reporting

- **Denver Market incorporation of Susceptible Dose Dependent (SDD) designation**
 - Added SDD designation with specified MIC
 - Provided comment regarding the dosing regimen that SDD is based on
 - Included recommendation to consult Infectious Diseases

1. ENTEROCOCCUS FAECIUM,VRE
RX may vary depending on target, route, and dose

	MIC	INTERP
AMPICILLIN	>=32	R
GENTAMICIN SYNERGY SCREEN	SYN-S	S
LINEZOLID	2	S
STREPTOMYCIN SYNERGY SCREEN	SYN-S	S
VANCOMYCIN	>=32	R

1. ENTEROCOCCUS FAECIUM,VRE
RX may vary depending on target, route, and dose

	MIC	INTERP
DAPTOMYCIN	4	SDD

The breakpoint for SDD (susceptible-dose dependent) is based on a dosage regimen of 8-12 mg/kg and is intended for serious infections due to E.faecium. Consult with infectious disease is recommended.

S=SUSCEPTIBLE

I=INTERMEDIATE

R=RESISTANT

N/R=NOT REPORTED

BLANK=DATA NOT AVAILABLE, OR DRUG NOT ADVISABLE OR TESTED

MIC=mcg/ml (mg/L)

Source: CLSI. *Performance Standards for Antimicrobial Susceptibility Testing*. 33rd ed. CLSI supplement M100. Clinical and Laboratory Standards Institute; 2023.

Microbiology Reporting Approaches That Can Influence Prescribing Practices

Clarity of Reporting

- Simple behavioral strategies in microbiology reporting can improve antimicrobial de-escalation and/or discontinuation of unnecessary broad-spectrum antibiotics



Microbiology Reporting Approaches That Can Influence Prescribing Practices

Clarity of Reporting

Open Forum Infectious Diseases

MAJOR ARTICLE



Microbiology Comment Nudge Improves Pneumonia Prescribing

Musgrove, et al.:

- Single pre-test, post-test quasi experiment in four-hospital health system
 - Pre-test: reports stated “commensal respiratory flora”
 - Post-test: reports stated “Commensal respiratory flora only: No *S. aureus*/MRSA or *P. aeruginosa*”
- Found 5.5-fold increased odds of de-escalation in patients being treated with anti-MRSA and antipseudomonal antibiotics for respiratory infections when the laboratory report indicated no MRSA or PSA for respiratory cultures where neither was cultured and there was no dominant organism growth

Source: Musgrove MA, Kenney RM, Kendall RE, Peters M, Tibbetts R, Samuel L, Davis SL. Microbiology Comment Nudge Improves Pneumonia Prescribing. *Open Forum Infect Dis.* 2018 Jul 10;5(7):ofy162. doi: 10.1093/ofid/ofy162.

Microbiology Reporting Approaches That Can Influence Prescribing Practices

Clarity of Reporting

- Implementation of a Denver Marketwide comment regarding no PSA on respiratory cultures where the organism was not isolated

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RESPIRATORY AEROBIC CULTURE   Final                               05/24/23-0914           COE

Organism 1                     NORMAL UPPER RESPIRATORY FLORA
  QUANTITATION                 ABUNDANT
Organism 2                     NO P. AERUGINOSA ISOLATED
```

Microbiology Reporting Approaches That Can Influence Prescribing Practices

Clarity of Reporting

- Based on favored response from previously mentioned clarifications of reporting, working group implemented additional explanations in reporting:
 - Sent out for susceptibility testing vs. “No further work-up”

```
BLOOD CULTURE Preliminary (PREVIOUS RPT) 05/24/23-1302
GS: 05/23/23 1003 AMLB.TS>>GNB
```

```
Organism 1 SALM. ENTERICA SSP ENTERICA
BOTTLES(S) AEROBIC AND ANAEROBIC BOTTLE POSITIVE
STATUS SUSCEPTIBILITY RESULTS TO FOLLOW
```

```
BLOOD CULTURE Final 05/18/23-1103
```

```
Organism 1 BACILLUS SPS, NOT ANTHRACIS
BOTTLES(S) AEROBIC BOTTLE POSITIVE
STATUS NO FURTHER WORK-UP WILL BE PERFORMED
```

Microbiology Reporting Approaches That Can Influence Prescribing Practices

Clarity of Reporting

- **Clarification of organism**
 - Specific reporting for Carbapenem Resistance Organisms (CROs)
 - Specific reporting for Extended Spectrum Beta Lactamase organisms (ESBLs)
- Provides crucial information to clinicians for treatment considerations
- Provides necessary information to Infection Prevention teams for appropriate patient isolation requirements

TISSUE AEROBIC CULTURE Final

Organism 1
QUANTITATION

PSEUDOMONAS AERUGINOSA CRO
RARE

Organism 1
QUANTITATION

ESCHERICHIA COLI ESBL
ABUNDANT

BODY FLUID AEROBIC CULTURE Final

Organism 1
QUANTITATION
STATUS

ENTEROCOCCUS FAECIUM, VRE
RARE
****VANCOMYCIN RESISTANT****

Assessment Question 2

What are three microbiology reporting approaches that can influence prescribing practice?

- A. Selective Reporting (SR) – Can assist in influencing prescribers to not prescribe a specific antimicrobial that literature suggests suboptimal outcomes in the treatment of specific resistance phenotypes
- B. Cascade Reporting (CR) – Can aim to guide antimicrobial prescribing to the most appropriate guideline-recommended antimicrobials
- C. Clarity of Reporting – Can help guide prescribers to potential de-escalation and/or discontinuation of unnecessary broad spectrum antibiotics if specific organisms are not isolated
- D. All of the above

Assessment Question 2 | Answer...

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Benefits of Collaboration

Kelsey Melander, PharmD, BCIDP

Benefits of Collaboration — Patient Perspective

Receive antimicrobial therapy that is based on validated, local data

- Empiric therapy: Antibigram data
- Preliminary targeted therapy: Rapid diagnostics
 - Verigene[®] Bloodstream Infection Testing Panels
 - MALDI-TOF
- Targeted therapy: Implementation of current breakpoints



Benefits of Collaboration — Laboratory Perspective

- Create a space where conversation can occur
- Understand the “why” and help microbiologists see the clinical impact of the work they do
- Creation of a market-wide decision-making body
- Find a balance between workflow logistics and accommodation of clinician requests



Benefits of Collaboration — Stewardship Perspective

- Automation of processes improves timeliness of results
 - Automation of susceptibility results
 - Cefazolin Kirby Bauer disks on blood isolates
 - Ertapenem reporting for ESBL susceptible isolates (resistant isolates require confirmatory testing)
 - Azole susceptibility testing for candidemia
 - MDRO cascade upon identification of carbapenem resistance
 - Labeling of resistant isolates with “ESBL” or “CRO”
 - Aids in identification from an infection prevention perspective
 - Faster time to finalization of blood cultures (60% improvement upon implementation of Virtuo[®] automated system)
- Serving as the intermediary between laboratory practices and front-line clinicians enhances clinical impact



Benefits of Collaboration — Best Practices

Clinical & Laboratory Standards Institute (CLSI):

- Annual CLSI 2023 AST webinar's emphasis on collaboration with local stewardship teams in decisions affecting breakpoints, ESBL testing, comments, and cascade reporting

CDC's Core Elements (2019)

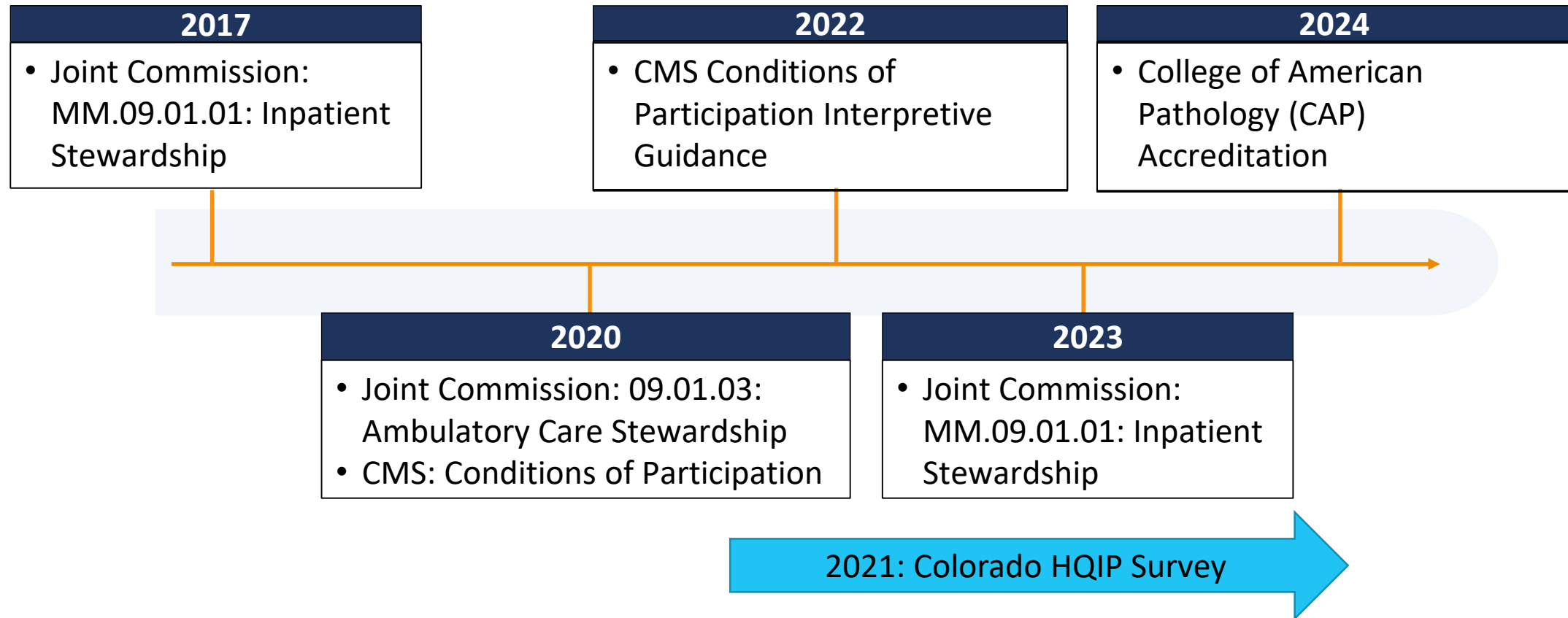
- 4 of 7 core elements have potential for microbiology involvement: hospital leadership commitment, action, tracking, reporting

Source: Humphries RM, Bobenchik AM. 2023, April 5. *What's new in the 2023 CLSI standards antimicrobial susceptibility testing (AST)*. CLSI. https://learn.clsi.org/products/clsi-m100-ed33-2023-ast-update-462023-day-2#tab-product_tab_overview

Source: Core elements of hospital antibiotic stewardship programs. Centers for Disease Control and Prevention website. p. 1–40. <https://www.cdc.gov/antibiotic-use/healthcare/pdfs/hospital-core-elements-H.pdf>. Published 2021. Accessed March 17, 2023.

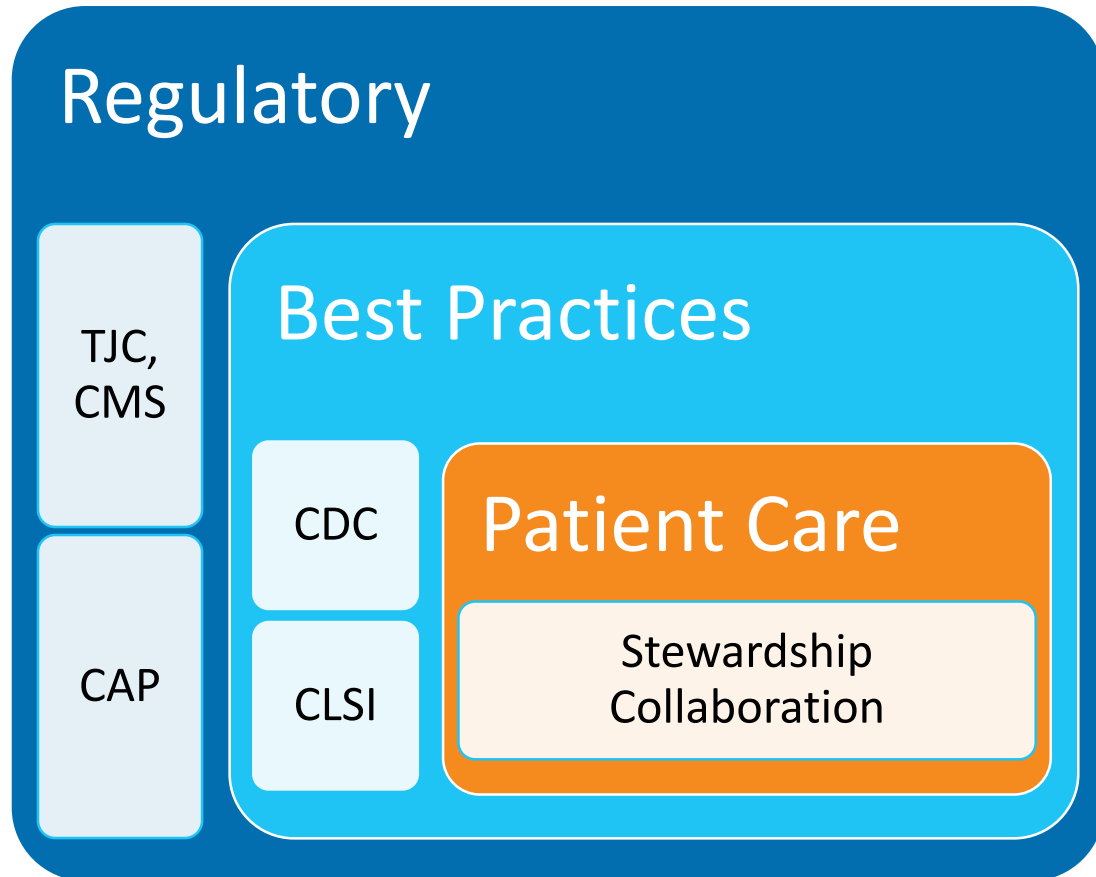


Benefits of Collaboration: Regulatory



Source: The Joint Commission. (2022). Available at https://www.jointcommission.org/-/media/tjc/documents/standards/r3-reports/r3_antibioticstewardship_july2022_final.pdf Accessed 3/17/2023. Centers for Medicare and Medicaid Services, Conditions of Participation for Hospitals, Infection Prevention and Control and Antibiotic Stewardship Programs, 42 C.F.R §482.42 (2019). CHASE: 2023 Hospital Quality Incentive Payment (HQIP) Program. (2023). Available at: https://hcpf.colorado.gov/sites/hcpf/files/2023%20CO%20HQIP%20Measure%20Details_June%202022_0.pdf. Accessed 5/31/2023. Simner PJ, Rauch CA, Martin IW, et al.. Raising the bar: Improving antimicrobial resistance detection by clinical laboratories by ensuring use of current breakpoints. *Open Forum Infect Dis.* 2022;9 (3). doi.org/10.1093/ofid/ofac007

Future of Collaboration



Through the microbiology/stewardship collaboration, we have maintained a focus on providing optimal patient care. Taking these steps has helped us adhere to best practices outlined by national organizations and newly implemented regulatory requirements.

Continuation of this partnership will be necessary as breakpoints evolve, new rapid diagnostics are developed, and new antimicrobials are brought to the market.

Assessment Question 3

In what way(s) does a patient benefit from the collaboration between stewardship programs and the microbiology lab?

- A. Higher likelihood of receiving optimal antimicrobial therapy
- B. Lower medical bill
- C. Enhanced understanding of diagnostic processes
- D. All of the above

Assessment Question 3 | Answer...

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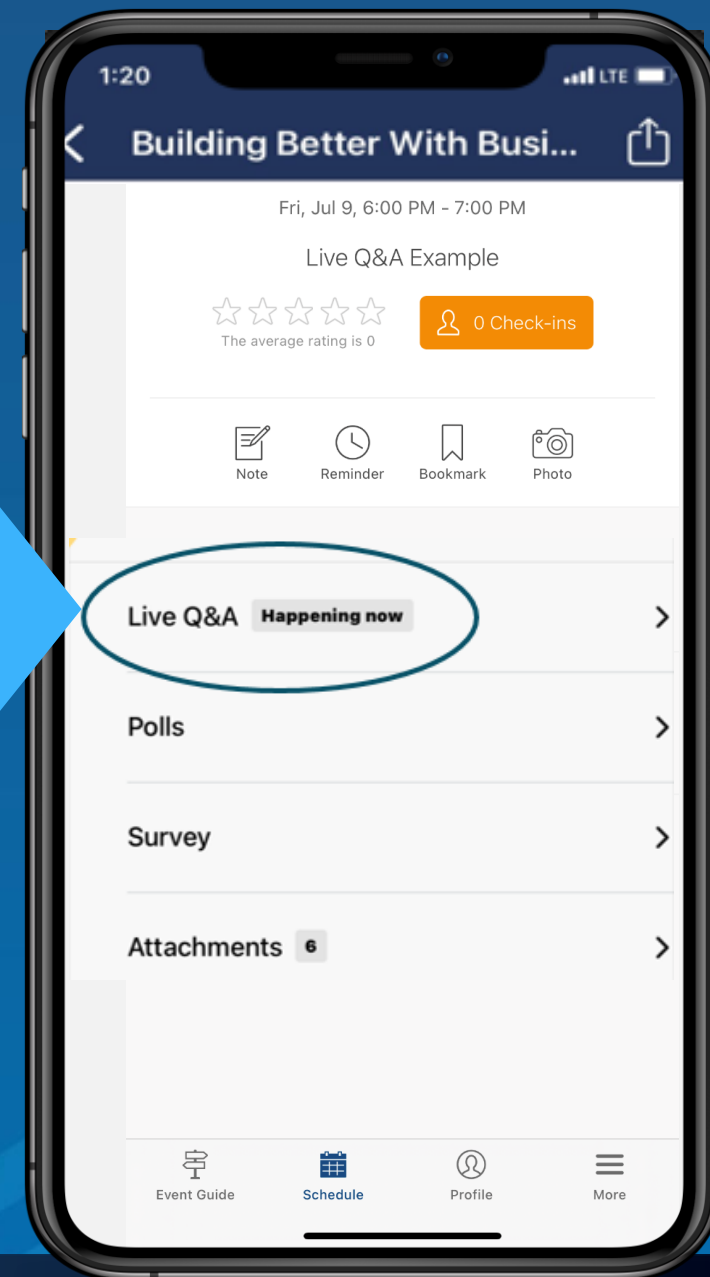
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