

Antibiograms and Infection Prevention Efforts to Combat Antimicrobial Resistance Post COVID-19

Welcome!

- All lines are muted, so please ask your questions in Q&A
- For technical issues, chat to the 'Technical Support' Panelist
- Please actively participate in polling questions that pop up on the lower right-hand side of your screen

We will get started shortly!

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May 25, 2021

Darrell Childress, PharmD, Antimicrobial Stewardship Coordinator
Brooke Bailey, Director of Infection Prevention
East Alabama Medical Center

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Alabama Hospital Association
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Georgia Hospital Association
KFMC Health Improvement Partners
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Hospital Quality Improvement

**Welcome from
all of us!**



Featured Speakers



Darrell Childress, PharmD
Antimicrobial Stewardship Coordinator
& Pharmacy Residency Director
East Alabama Medical Center



Brooke Bailey
Director of Infection Prevention
East Alabama Medical Center

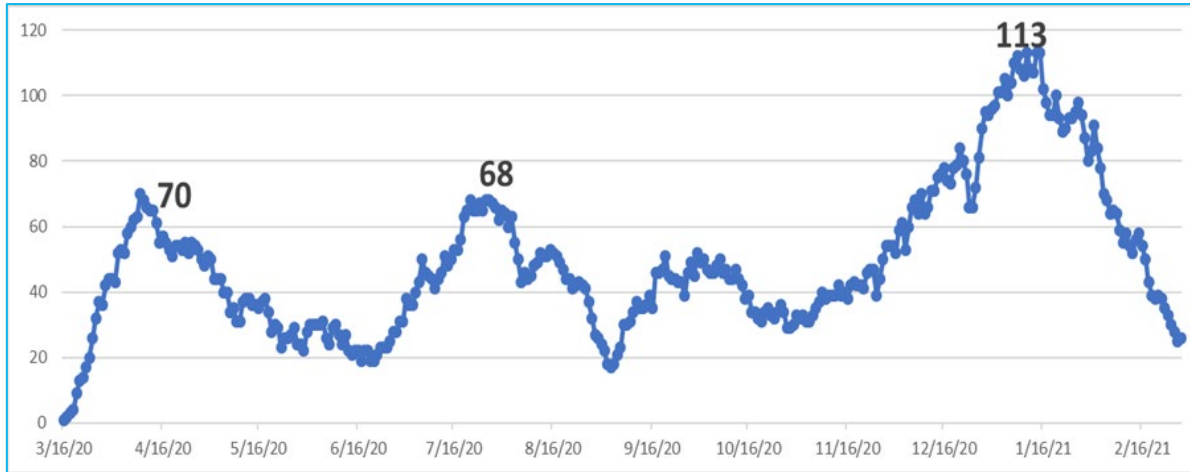
Learning Objectives

- Learn Today:
 - Evaluate the impact of COVID-19 on hospital acquired infections (HAI) and changes in resistance patterns
 - Review antibiograms and the importance of stratifying based on specific hospital locations
 - Discuss EAMC's antimicrobial stewardship efforts in combating antimicrobial resistance in a post COVID environment
- Use Tomorrow:
 - Analyze MDRO and HAI data to enhance and stratify antibiograms

East Alabama Medical Center

- 314-bed acute care regional referral center
- Antimicrobial Stewardship Team
 - Infectious Diseases (ID) Physician, ID Pharmacist , clinical microbiologists, and infection prevention nurses

of COVID-19 cases/day



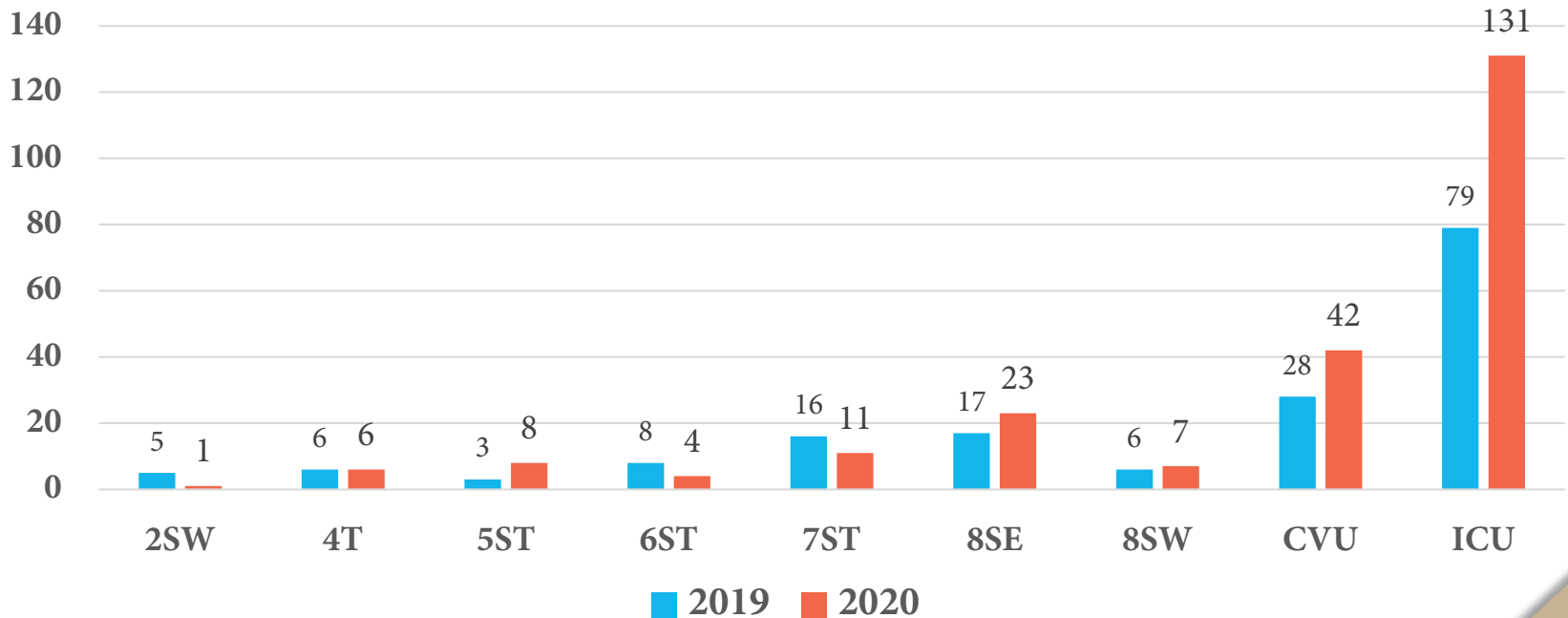
Antimicrobial Stewardship

- Diversion of resources for COVID-19
 - Testing and Reporting
 - Monitoring inpatients
 - Medication procurement
 - Assisting with ID rounds
- Surveillance cultures for patients receiving immunosuppressive therapy for COVID-19

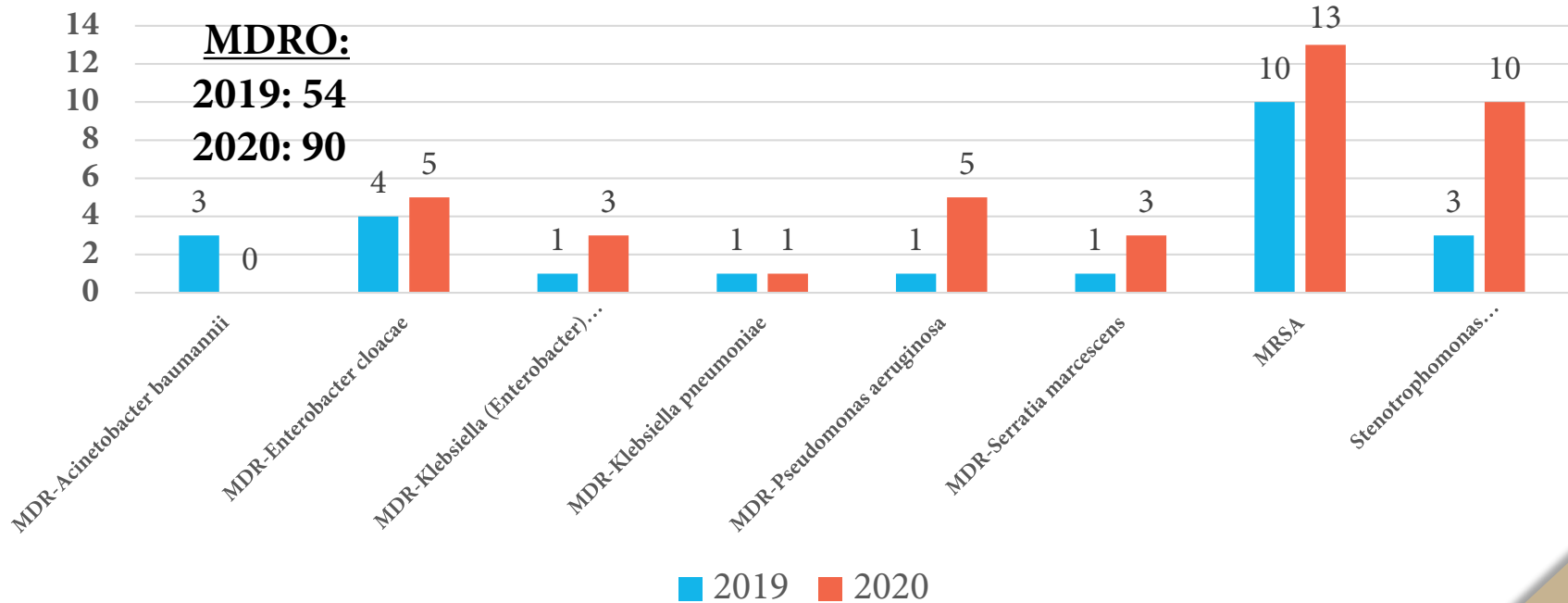
“We haven’t seen that organism before”

- Multi-Drug resistant Organisms (MDRO)
 - *Ewingella americana*
 - *Stenotrophomonas maltophilia*
 - Carbapenem Resistant *Pseudomonas*
 - Carbapenem Resistant *Acinetobacter*
 - *Aspergillus fumigatus*

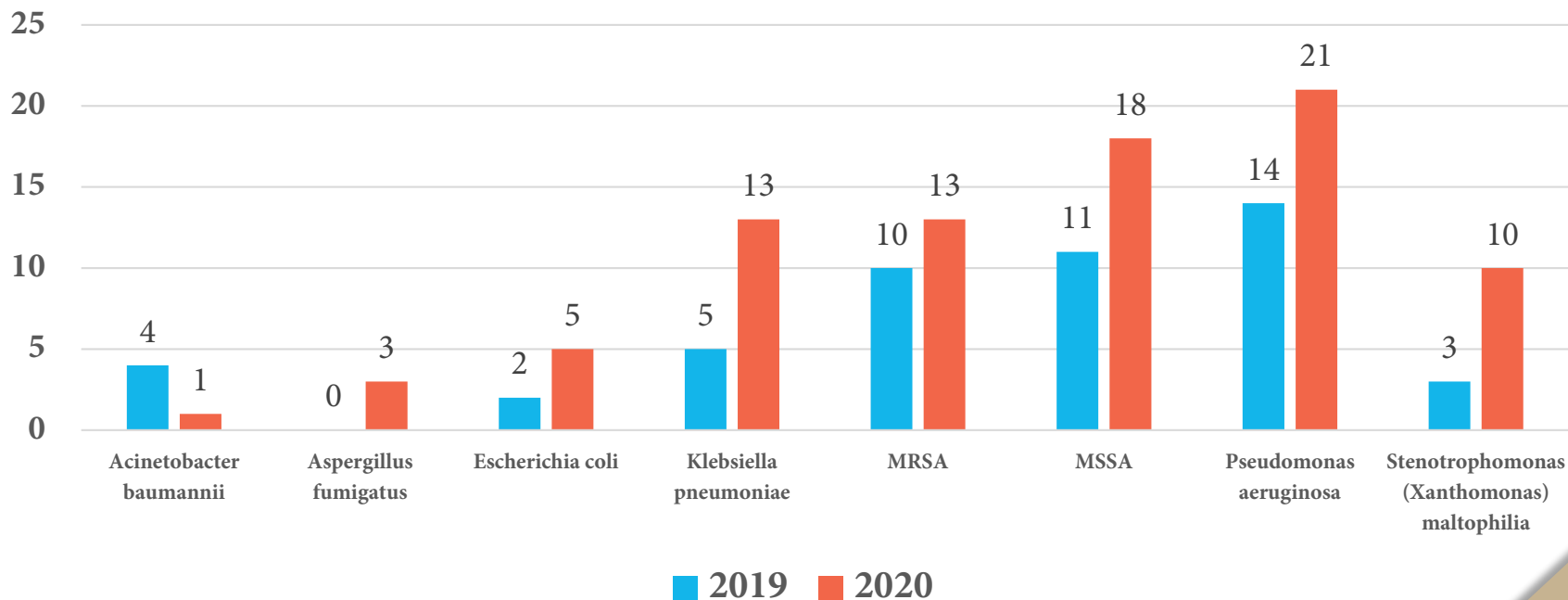
Respiratory Organisms 2019-2020



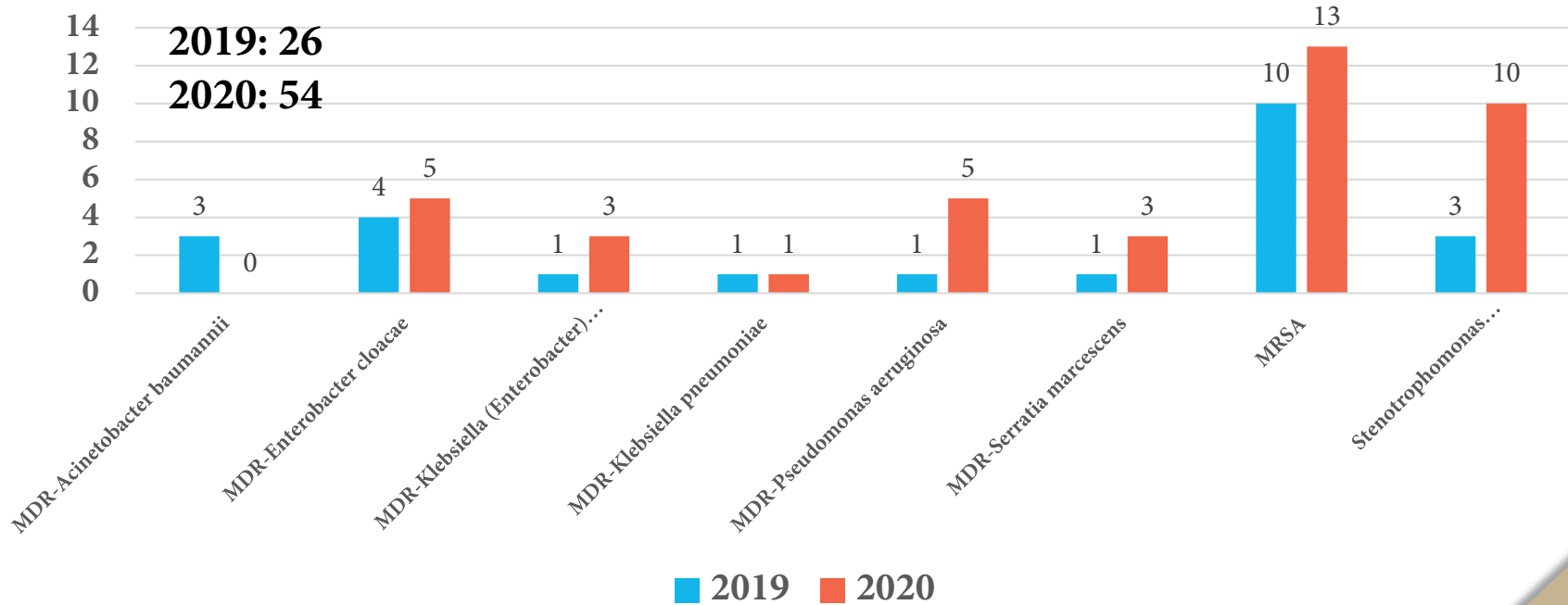
MDRO Respiratory 2019-2020



ICU Pathogens

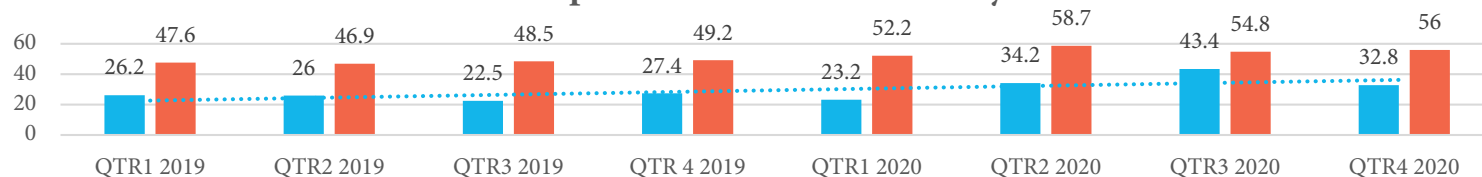


MDRO-ICU

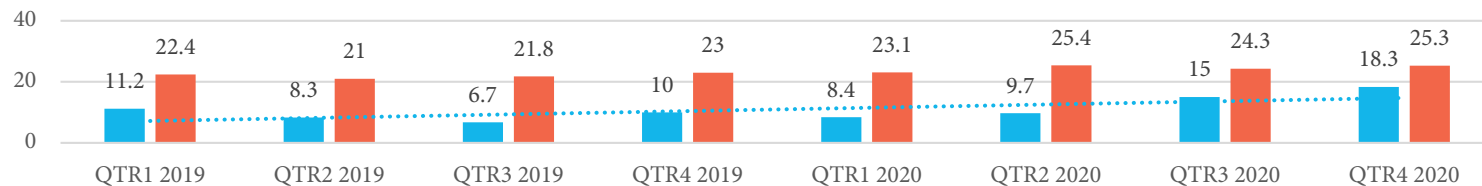


Broad Spectrum Antibiotic Usage

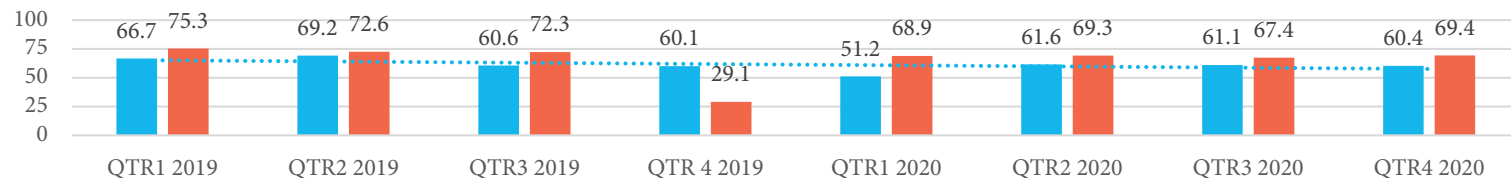
Cefepime DOT/1000 Patient days



Meropenem DOT/1000 Patient days

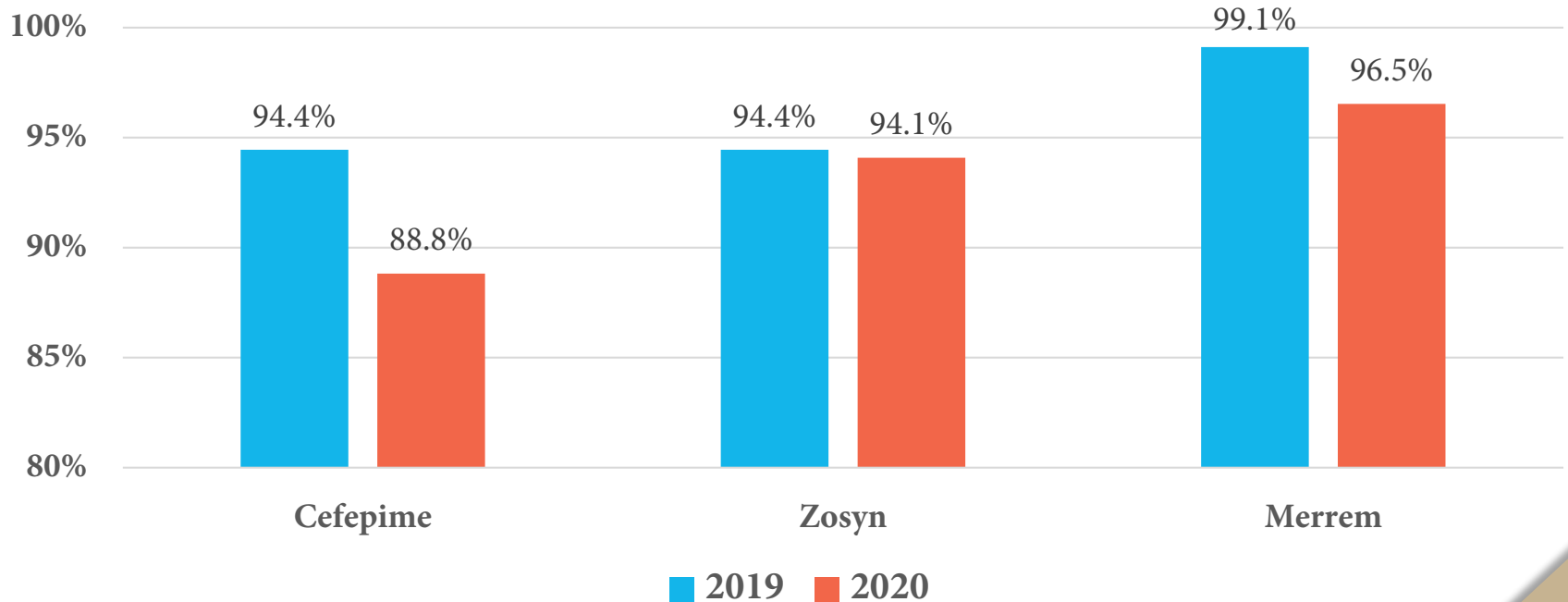


Pip/Tazo DOT/1000 Patient days



■ EAMC ■ Benchmark Linear (EAMC)

Susceptibility of β -Lactams



Polling:

Is this happening at your facility?

- **Is your facility seeing an increase in antimicrobial resistance or MDROs?**
 - A. Yes**
 - B. No**

COVID-19's Effect on HAI

- Grasselli et al., Hospital-acquired infections in critically-ill COVID-19 patients.
 - 46% Patients developed HAI
 - 35% MDRO
 - 50% VAP
 - 34% BSI
 - 10% CLABSI

CLABSI and CAUTI during the Pandemic

Coronavirus disease 2019 (COVID-19) pandemic, central-line–associated bloodstream infection (CLABSI), and catheter-associated urinary tract infection (CAUTI): The urgent need to refocus on hardwiring prevention efforts

- CLABSI rates increased by 51.0% during the pandemic
 - Hospitals with high monthly COVID-19 patients (>10%) had SIR 2.38 times higher than hospitals with <5%
- No significant changes were identified for CAUTI

Possible Reasons for HAI in COVID-19

- Unnecessary antimicrobial administration
 - ~80% patients received antibiotics on admission
- Prolonged mechanical ventilation
- Higher device utilization
- Disruption in infection prevention strategies
 - Assessment of central lines, etc.
- Treatment options for COVID
 - Steroids
 - IL-6/IL-1 inhibitors
- Redeployment of staff

CLABSI and CAUTI 2019 vs 2020

CY2019				CY2020		
-	<u># OF INFECTIONS</u>	<u>SIR</u>	<u>RATE per 1000 catheter days</u>	<u># OF NFECTIONS</u>	<u>SIR</u>	<u>RATE per 1000 catheter days</u>
CLABSI						
ALL CMS REPORTED UNITS	0		0	8	1.292	1.06
ICUs only	0		0	8	2.009	1.74
CAUTI						
ALL CMS REPORTED UNITS	1	0.17	0.14	8	1.225	1.06
ICUs only	1	0.395	0.35	5	1.443	1.29

Other Contributing Factors

- Disruption of Infection Prevention Strategies
- Patient census and acuity levels
 - Higher device utilization
 - Prolonged ventilation
- Existing staff reallocation
- Large amount of contract staff
- Supply deficient
- Alternate care sites

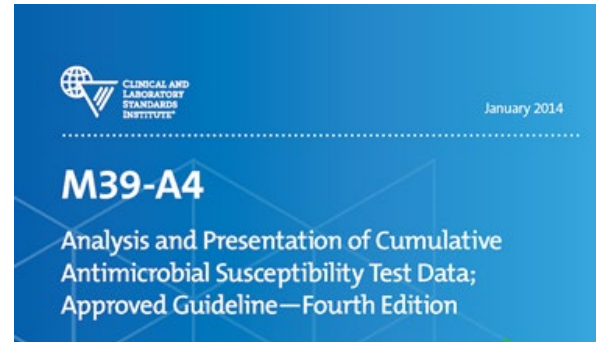
EAMC's Efforts to Combat HAI Post COVID-19 Peak

Infection Prevention Strategies

- Back to Basics
 - Interdisciplinary collaboration
 - Device utilization/Bundle compliance
 - Appropriate utilization of PPE
 - More frequent rounding
 - Staffing consistency

Antibiogram Development

- Published by the Clinical Laboratory Standards Institute (CLSI)
- Recommendations
 - Report number of isolates tested per timeframe
 - Report species with ≥ 30 isolates
 - Report only the first isolate per patient during timeframe
 - Present percentage susceptible



Polling:

Who publishes your antibiogram?

- **At your facility, who is in charge of publishing the antibiogram?**
 - A. Microbiology**
 - B. Pharmacy**
 - C. A & B**
 - D. Other**

Enhanced Antibigram



Antibiogram and Empiric Treatment Guide 2021

INFECTION TYPE	PATHOGENS	Duration	EMPIRIC TREATMENT	ALTERNATIVE
RESPIRATORY				
HAP/VAP*	MRSA/MSSA	7	Vancomycin (PTD)	ICU/CVU: Recommend ID consultation due to increased MDRO from COVID-19
	<i>K. pneumoniae</i>	7	AND	
	<i>P. aeruginosa</i>	7	Cefepime 2 gm IV Q8hrs	
	<i>S. maltophilia</i>	7	AND Tobramycin (PTD)	
CAP	MRSA/MSSA	7	Ceftriaxone	Levaquin 750 mg IV Q24hrs
	<i>S. pneumoniae</i>	5	2 gm IV Q24hrs	
	<i>P. aeruginosa</i>	5	AND	
	<i>H. influenzae</i>	5	Azithromycin 500 mg IV Q24hrs	



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	<i>S. maltophilia</i>	7	AND Tobramycin (PTD)	
CAP	MRSA/MSSA	7	Ceftriaxone	Levaquin 750 mg IV Q24hrs
	<i>S. pneumoniae</i>	5	2 gm IV Q24hrs	
	<i>P. aeruginosa</i>	5	AND	
	<i>H. influenzae</i>	5	Azithromycin 500 mg IV Q24hrs	
INTRA-ABDOMINAL	<i>E. Coli</i>	4-7	Piperacillin-Tazobactam	Cefepime 1 gm IV Q6hrs AND Flagyl 500 mg IV Q8hrs
	<i>P. mirabilis</i>	4-7	3.375 gm IV Q8hrs	
	Anaerobes	4-7	(4 hr infusions)	
<i>Clostridioides difficile</i>		10	Vancomycin 125mg PO QID	Vancomycin 125 mg PO QID
BACTEREMIA*	MRSA/MSSA	14-42	Vancomycin (PTD)	Penicillin Allergy: Vancomycin (ETD) AND Aztreonam 2 gm IV Q8hrs
	<i>E. Coli</i>	7-14	AND	
	<i>K. pneumoniae</i>	7-14	Piperacillin-Tazobactam	
			3.375 gm IV Q8hrs (4hr infusions)	
CELLULITIS	MRSA/MSSA	10	Vancomycin (PTD)	
	Group A/B Strep	10		
DIABETIC FOOT INFECTION	MRSA/MSSA	14-42	Vancomycin (ETD)	Penicillin Allergy: Vancomycin (ETD) AND Aztreonam 2 gm IV Q8hrs
	Group B Strep	14-42	AND	
	<i>K. pneumoniae</i>	14-42	Piperacillin-Tazobactam	
	<i>E. Coli</i>	14-42	3.375 gm IV Q8hrs (4 hr infusions)	
MENINGITIS†	<i>P. aeruginosa</i>	14-42	AND	CSF Shunts: Vancomycin (ETD) AND Mupirocin 2 gm IV Q8hrs
	<i>S. pneumoniae</i>	14	Vancomycin (ETD)	
	<i>N. meningitidis</i>	7	Ceftriaxone 2 gm IV Q12hrs	
URINE	<i>E. Coli</i>	7	Ceftriaxone 1 gm IV Q24hrs	Gentamicin (PTD)
	<i>K. pneumoniae</i>	7		
	<i>P. aeruginosa</i>	7		

*Risk factors for MRSA or septic shock, double coverage with anti-Pseudomonas antibiotics.
†Recommend adding Ampicillin 2gm IV Q4hrs for Pregnancy or Adults over 50 years of age.
PTD= Pharmacy to Dose

Antibiogram Stratifications

- EAMC stratifies based on:
 - Community versus Hospital acquired
 - Unit*
 - ICU versus Non-ICU
 - Urine versus non-Urine
 - Respiratory (HAP/VAP/CAP)
 - Intra-abdominal infections (IAI)
 - Skin/Soft Tissues infections (SSTI)
 - Meningitis

Rapid Diagnostics

- Current arsenal
 - MALDI-TOF mass spectrometry
 - *Clostridioides difficile* PCR
 - BIOFIRE® respiratory panel (2.1)
- Future armament
 - FUNGITELL®
 - BIOFIRE® Pneumonia and Blood culture (BCID2)

Summary

- EAMC is not unique to other healthcare facilities
- Re-education and getting back to basics is key
- Be creative with Antibiofilms

Resource

- CDC's The Core Elements of Hospital Antibiotic Stewardship Programs and Program Assessment Tool (Checklist)

<https://www.cdc.gov/antibiotic-use/core-elements/hospital.html>

References

1. Grasselli G, Scaravilli V, Mangioni D, et al. Hospital-acquired infections in critically-ill COVID-19 patients. CHEST. 2021 April. <https://doi.org/10.1016/j.chest.2021.04.002>
2. Fakih MG, Bufalino A, Strum L, et. al. Coronavirus disease 2019 (COVID-19) pandemic, central-line-associated bloodstream infection (CLABSI), and catheter-associated urinary tract infection (CAUTI): The urgent need to refocus on hardwiring prevention efforts. Infection Control & Hospital Epidemiology. 2021. Feb. doi:10.1017/ice.2021.70
3. Smith L, Karaba SM, Amoah J, et al. Hospital-acquired infections among adult patients admitted for coronavirus disease 2019 (COVID-19). . Infection Control & Hospital Epidemiology. 2021. doi:10.1017/ice.2021.148

Key Takeaways



- Learn Today:
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 - Review antibiograms and the importance of stratifying based on specific hospital locations
 - Discuss EAMC's antimicrobial stewardship efforts in combating antimicrobial resistance in a post COVID environment
- Use Tomorrow:
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How will this change what you do? Please tell us in the poll...

Questions?



Email us at HospitalQuality@AlliantQuality.org or call us 678-527-3681



Oral Antibiotic Discharge: Selection & Duration Guideline		
Infection Diagnosis	Empiric Treatment	Duration of Therapy
Urinary Tract Infections		
Uncomplicated UTI (cystitis)	Nitrofurantoin (NFT) 100mg BID (CrCl≥30) β-lactams Fosfomycin 3g x 1 dose TMP/SMX (SMT) 1 DS tab BID	NFT: 5 β-lactams: 5-7 Fos: 1 SMT: 3
Complicated UTI (pyelonephritis)	Levofloxacin 750mg QDay β-lactams TMP/SMX 1-2 DS tab BID	FQs: 5-7 TMP/SMX: 10 β-lactams: 10
Asymptomatic bacteriuria	Treatment is NOT recommended unless pregnant or GU procedure	0
Skin & Soft Tissue Infections		
Non-purulent cellulitis	Cephalexin 500 mg QID Clindamycin 300 mg QID†	5
Purulent cellulitis (after I&D)	TMP/SMX 1 DS tab BID Doxycycline 100mg BID	5
Animal bite wound	Amox/Clav 875/125mg BID	7-10
Community Acquired Pneumonia (CAP)		
Without comorbidities** or risk factors for DRSP	Doxycycline 100mg BID Z-Pak Amoxicillin 1000mg TID	5
Comorbidities or risk factors for DRSP	Amox/Clav 2000/125mg BID + Z-Pak or Doxycycline Cefuroxime 500mg BID + Z-Pak or Doxycycline Levofloxacin 750mg QDay	7 Z-Pak: 5
Upper Respiratory Tract Infections		
Bacterial Rhinosinusitis	98% Viral Antibiotics not recommended	Watchful waiting
Bronchitis	~90% Viral Antibiotics not recommended	Watchful waiting
Pharyngitis	> 90% Viral Antibiotics not recommended unless GAS pharyngitis	0
Acute COPD exacerbation	Doxycycline 100mg BID Z-Pak	5-7
Influenza	Oseltamivir 75mg BID	5

† Alternative for severe β-lactam allergy

** Comorbidities include chronic heart, lung, liver, or renal disease; diabetes mellitus; alcoholism; malignancy; or asplenia.

COMMUNITY ACQUIRED													
All Sources Except Urine													
GRAM-POSITIVE Community-Acquired Percent Susceptible		# of Isolates	PENICILLIN G	Oxacillin	AMPCILLIN	CLINDAMYCIN	DAPTOMYCIN	ERYTHROMYCIN	LEVOFLOXACIN	LINEZOLID	RIFAMPIN	TETRACYCLINE	TMP-SMX
Enterococcus faecalis		86	100		95	100			100				98
Enterococcus spp (all)		73	100		100	100			100				98
Staphylococcus aureus		301	6	54	81	100	42		100	93	97	100	
Staphylococcus aureus - MRSA		136	0	0	80	100	16		100	94	94	100	
Staphylococcus aureus - MSSA		165	12	100	81	100	64		100	92	100	100	
Staphylococcus coagulase negative - ALL		69	12	47	69	100	40		100	98	76	81	100
Streptococcus agalactiae (Group B)		67	100		47				98				
All Sources Except Urine													
GRAM-NEGATIVE Community-Acquired Percent Susceptible		# of Isolates	AMIKACIN	GENTAMICIN	TOBRAMYCIN	AMOXICILLIN/CLAV	AMPCILLIN/CLAV	AMPCILLIN	PIPERAZONE	CEFAZOLIN	CEFOXITIN	CEFTAZIDIME	CEFTIOXIME
Escherichia coli		155	99	87	89	83	57	54	98	87	96	92	92
Klebsiella pneumoniae		73	100	87	87	86	76	0	97	86	93	86	84
Proteus mirabilis		58	100	96	96	91	100	86	98	100	100	100	100
Pseudomonas aeruginosa		92	94	90	98				97			96	94
Urine Isolates Only													
GRAM-POSITIVE Community-Acquired Percent Susceptible		# of Isolates	PENICILLIN G	Oxacillin	AMPCILLIN	CLINDAMYCIN	DAPTOMYCIN	LEVOFLOXACIN	LINEZOLID	NITROFURANTOIN	RIFAMPIN	TETRACYCLINE	TMP-SMX
Enterococcus faecalis		122	100		99	100	71	100	100		27		96
Enterococcus spp (all)		129	100		96	100	69	100	99		28		95
Staphylococcus coagulase negative (all)		68		44		100	77	100	100		83	77	100
Staphylococcus epidermidis		40	50		100	70	100	100	100		82	67	100
Streptococcus agalactiae (Group B)		31	100				100						
Urine Isolates Only													
GRAM-NEGATIVE Community-Acquired Percent Susceptible		# of Isolates	AMIKACIN	GENTAMICIN	TOBRAMYCIN	AMOXICILLIN/CLAV	AMPCILLIN/CLAV	AMPCILLIN	PIPERAZONE	CEFAZOLIN	CEFOXITIN	CEFTAZIDIME	CEFTIOXIME
Escherichia coli		700	100	92	92	84	56	50	98	83	92	90	89
Klebsiella pneumoniae		199	100	92	90	90	80		98	90	95	91	91
Proteus mirabilis		66	96	87	92	95	90	84	100	90	93	96	98
Pseudomonas aeruginosa		57	98	92	100				100			92	91

HQIC Goals



Behavioral Health Outcomes & Opioid Misuse

- ✓ Promote opioid best practices
- ✓ Decrease high dose opioid prescribing and opioid adverse events in all settings
- ✓ Increase access to behavioral health services



Patient Safety

- ✓ Reduce risky medication combinations
- ✓ Reduce adverse drug events
- ✓ Reduce *C. diff* in all settings



Quality of Care Transitions

- ✓ Convene community coalitions
- ✓ Identify and promote optimal care for super utilizers
- ✓ Reduce community-based adverse drug events

Upcoming Events



June 22, 2021, 2:00 p.m. EST

**Monoclonal Antibody Therapy for
High Risk COVID Patients**

<https://bit.ly/3tXjdUS>

July 27, 2021, 2:00 p.m. EST

Opioid Pain Management

<https://bit.ly/2RZJYLo>

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How did we do today?



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