BioFire Blood Culture Identification (BCID) Empiric Treatment Pathway for Adults

Empiric antibiotic recommendations, along with BCID results, are intended to provide a general guidance for therapy based upon the DUH antibiogram and to minimize unintended consequences to the patient.
See BCID General Education document for background information, antibiogram data used to make agent selections below, and FAQs.
Questions? Page 970-GERM or the Antimicrobial Stewardship Evaluation Team (ASET) Pharmacist at 970-6666.

Table 1. Gram Positive Blood Culture Empiric Treatment Pathway: Speciation and resistance genes detected via BioFire BCID

Gram Stain Result	BCID group target	BCID Pathogen target	BCID Gene Target	Display in EPIC	1st Line Empiric Antibiotic	2nd Line Empiric Antibiotic	Notes
Gram positive cocci clusters **OR** **Gram positive cocci pairs and chains**	*Staphylococcus*	Staphylococcus epidermidis	none	Staphylococcus epidermidis mecA/C gene NOT detected. Staphylococcus species is NOT Methicillin resistant	Cefazolin	Vancomycin†	-Evaluate clinically to determine if true pathogen
			mecA/C	Staphylococcus epidermidis mecA/C gene DETECTED. Staphylococcus species is METHICILLIN RESISTANT	Vancomycin	Daptomycin*	-Daptomycin is inactivated by lung surfactant
		Staphylococcus lugdunensis	none	Staphylococcus lugdunensis mecA/C gene NOT detected. Staphylococcus species is NOT Methicillin resistant	Cefazolin	Vancomycin†	-S. lugdenensis has clinical disease similar to S. aureus and ID consult is recommended
			mecA/C	Staphylococcus lugdunensis mecA gene DETECTED. Staphylococcus species is METHICILLIN RESISTANT	Vancomycin	Daptomycin*	-Daptomycin is inactivated by lung surfactant
		Staphylococcus aureus	none	Staphylococcus aureus mecA and MREJ genes NOT detected. Staphylococcus species is NOT Methicillin resistant	Cefazolin	Vancomycin†	-Nafcillin should be considered if CNS penetration is desired
			mecA/C and MREJ	Methicillin Resistant Staphylococcus aureus mecA/C and MREJ gene DETECTED. Staphylococcus species is METHICILLIN RESISTANT	Vancomycin	Daptomycin*	-Daptomycin is inactivated by lung surfactant
		none	none	Staphylococcus coagulase negative	Vancomycin	Daptomycin*	-See Table 2 for example species -Daptomycin is inactivated by lung surfactant

	Streptococcus	*Streptococcus agalactiae*	----	Streptococcus agalactiae, group B	Penicillin	Ceftriaxone or vancomycin†	
		Streptococcus pneumoniae	----	Streptococcus pneumoniae	Ceftriaxone	Vancomycin	-Add Vancomycin to ceftriaxone if meningitis suspected
		Streptococcus pyogenes	----	Streptococcus pyogenes, group A	Penicillin	Ceftriaxone or vancomycin†	
		none	----	Streptococcus species	Ceftriaxone	Vancomycin†	- *Streptococcus* species without specific BCID identification, see Table 2 for example species
	none	*Enterococcus faecalis*	none	Enterococcus faecalis Van A/B gene NOT detected	Ampicillin	Vancomycin†	
			vanA/B	Enterococcus faecalis Van A/B gene DETECTED	Ampicillin	Daptomycin*	-Daptomycin is inactivated by lung surfactant
	none	*Enterococcus faecium*	none	Enterococcus faecium Van A/B gene NOT detected	Vancomycin†	Daptomycin*	-Daptomycin is inactivated by lung surfactant
			vanA/B	Enterococcus faecium Van A/B gene DETECTED	Daptomycin*	Linezolid	
	none	none	----	Gram stain result Organism not identified by rapid BioFire FilmArray Blood Culture (BCID) panel	Vancomycin	Linezolid* or daptomycin*	See Table 2 -Daptomycin is inactivated by lung surfactant -Consider the possibility of an anaerobic organism
Gram positive rod	none	*Listeria monocytogenes*	----	Listeria monocytogenes	Ampicillin	TMP/SMX	
	none	none	----	Gram stain result Organism not identified by rapid BioFire FilmArray Blood Culture (BCID) panel	Vancomycin -If high suspicion for Nocardia (e.g. immunosuppressed host), consult ID for empiric treatment recommendation		-See Table 2 -Evaluate clinically to determine if true pathogen -Consider the possibility of an anaerobic organism

Note: obtain surveillance blood cultures every 24-48 hours to assess for documented clearance

* ID consult required for approval

† only considered if severe B-lactam allergy present. Assess allergy and consider penicillin skin testing.

Table 2. Gram-positive organisms NOT detected by BioFire BCID pathogen targets (not all inclusive)

Coagulase negative Staphylococcus spp. (CoNS)	Streptococcus spp.	Gram positive rod	Gram positive anaerobes	Other gram positives
Staphylococcus haemolyticus	*Streptococcus anginosis*	*Actinobacteria sp.*	*Actinomyces*	*Gardnerella sp.*
Staphylococcus hominis	*Streptococcus bovis*	*Bacillus sp.*	*Bifidobacterium sp.*	*Micrococcus sp.*
Staphylococcus caprae	*Streptococcus mitis*	*Corynebacterium sp.*	*Clostridium sp.*	*Enterococcus species*
Staphylococcus saprophyticus	*Streptococcus dysgalactiae*	*Erysipelothrix sp.*	*Lactobacillus*	*Rothia sp.*
Staphylococcus capitis	*Streptococcus intermedius*	*Nocardia sp.*	*Peptostreptococcus sp.*	*Granulicatella sp*
			Propionibacterium sp.	*Cutibacterium acnes*

Table 3.Gram Negative Blood Culture Treatment Pathway: Speciation and resistance genes detected via BioFire BCID

Gram Stain Result	BCID Pathogen target	BCID Gene Target	Reported As	1st Line Empiric Antibiotic	2nd Line Empiric Antibiotic	Notes
Gram Negative Rod	*Acinetobacter baumannii*	none	Acinetobacter baumannii	Ampicillin-sulbactam	Meropenem*	Meropenem: 3h infusion -Use higher doses
		KPC	Acinetobacter baumannii Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials	Consult ID		
	Bacteroides Fragilis	--	Bacteroides fragilis	Piperacillin-tazobactam	Cefepime AND Metronidazole	-This likely represents a polymicrobial infection or bowel leak. Maintain broad coverage and pursue source control.
	Enterobacter cloacae complex	none	Enterobacter cloacae complex	Cefepime	Ciprofloxacin	-Amp C producer, avoid ceftriaxone or pip-tazo even if susceptible -Rapid susceptibilities expected within 10 hrs
		KPC	Enterobacter cloacae complex Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials	Consult ID		
	Escherichia coli	none	Escherichia coli	Piperacillin/tazobactam	Cefepime	-Rapid susceptibilities expected within 10 hrs
		KPC	Escherichia coli Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials	Consult ID		
	Klebsiella oxytoca	none	Klebsiella oxytoca	Cefepime	Ciprofloxacin	
		KPC	Klebsiella oxytoca	Consult ID		

			Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials			
	Klebsiella (Enterobacter) aerogenes	none	Klebsiella (Enterobacter) aerogenes	Cefepime	Ciprofloxacin	-Amp C producer, avoid ceftriaxone or pip-tazo even if susceptible
		KPC	Klebsiella (Enterobacter) aerogenes *Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials*	Consult ID		
	Klebsiella pneumoniae	none	Klebsiella pneumoniae	Cefepime	Ciprofloxacin	-Rapid susceptibilities expected within 10 hrs
		KPC	Klebsiella pneumoniae *Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials*	Consult ID		
	Proteus	none	Proteus	Ceftriaxone	Ciprofloxacin	-Rapid susceptibilities expected within 10 hrs
		KPC	Proteus *Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials*	Consult ID		
	Salmonella	none	Salmonella	Ceftriaxone	Ciprofloxacin	
		KPC	Salmonella *Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials*	Consult ID		
	Serratia marcescens	none	Serratia marcescens	Cefepime	Ciprofloxacin	-Rapid susceptibilities expected within 10 hrs
		KPC	Serratia marcescens *Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials*	Consult ID		
	Haemophilus influenzae	----	Haemophilus influenzae	Ceftriaxone	Ciprofloxacin	
	Neisseria meningitidis	----	Neisseria meningitidis	Ceftriaxone		
	Pseudomonas aeruginosa	none	Pseudomonas aeruginosa	Cefepime	Meropenem*	Meropenem: 3h infusion -Use higher doses
		KPC	Pseudomonas aeruginosa *Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials*	Consult ID		
	Stenotrophomonas maltophilia	----	Stenotrophomonas maltophilia	ID Consult		Recommend ID consultation
	None	None	Enteric gram-negative rods *Organism not identified by rapid BioFire FilmArray Blood Culture (BCID) panel*	Cefepime	Piperacillin/Tazobactam	-See Table 4 “Enteric GNRs”

		None	Gram negative rods *Organism not identified by rapid BioFire FilmArray Blood Culture (BCID) panel*	Consider ID Consult -If high suspicion for Burkholderia: Meropenem*	-These pathogens are NOT in the Enteric GNR group. -See Table 4
		KPC	Enteric gram-negative rods *Carbapenem Resistance (KPC) gene DETECTED. Organism is resistant to all carbapenem antimicrobials*	Consult ID	

* ID consult required for approval

Table 4. Gram negative organisms NOT detected by BioFire BCID (not all inclusive)

Enteric GNRs	*Non-Enteric Organisms*	*Gram Negative Anaerobes (also Non-Enteric)*
Morganella Morganii	*Aeromonas sp.*	*Bacteroides sp.*
Providencia sp.	*Burkholderia sp.*	*Fusobacterium sp.*
Serratia liquefaciens	*Kingella sp*	*Pasteurella sp.*
Citrobacter freundii	*Vibrio sp*	*Prevotella sp.*
Yersina sp	*Haemophilus sp*	*Campylobacter sp.*
Citrobacter koserii	*Achromobacter sp.*	

Table 5. Yeast Blood Culture Empiric Treatment Pathway identified via BioFire BCID

Organism	Resistance Gene Detected	1st Line Empiric Antibiotic	2nd Line Empiric Antibiotic	Notes
Candida albicans	----	Micafungin*		-ID consult required
Candida auris		Micafungin*		-ID consult required
Candida tropicalis	----	Micafungin*		-ID consult required
Candida parapsilosis	----	Micafungin*		-ID consult required
Candida glabrata	----	Micafungin*		-ID consult required
Candida krusei	----	Micafungin*	Amphotericin B (Ambisome)*	-ID consult required
Cryptococcus neroformas/gattii		Amphotericin B (Ambisome)* + Flucytosine		-ID consult required
Yeast*	----	Micafungin*	Voriconazole	-Contact lab for fungal stain results. Pathogen may be Malassezia or other Candida sp -ID consult required.

Note: obtain surveillance blood cultures every 24-48 hours to assess for documented clearance

*ID consult required for candidemia and approval of designated agents