

BioFire Blood Culture Identification (BCID) System: Frequently Asked Questions

This document is intended to provide general information about the technology and empiric treatment pathway for adults with positive blood culture at DUH. For empiric treatment recommendations, please see our [Antibiotic Recommendations for Rapid Blood Culture](#) documents on CustomID. Questions? Page 970-GERM or the Antimicrobial Stewardship Evaluation Team (ASET) Pharmacist at 970-6666

- **What is BioFire BCID?**
 - BioFire BCID identifies 43 molecular targets on a limited list of pathogens that commonly cause bacteremia. BCID may identify one target, multiple targets, or no targets. It additionally tests for common resistance genes to help guide empiric therapy.
 - DUHS last updated this technology with an expanded number of targets in 12/2022.
- **When is BioFire BCID used?**
 - BioFire BCID will only be run when a blood culture has a positive gram stain. This test will be run on the initial blood culture per patient/episode of bacteremia. It will NOT be run on follow up cultures.
- **When can results be expected and who will receive them?**
 - BCID results will be available approximately two hours after gram stain on positive blood culture.
 - Clinicians will continue to be notified by the microbiology lab with positive gram stain results only. BCID results will be updated in MaestroCare when available.
 - Sensitivities are not available on the BCID and will result after subculture growth for most pathogens.
 - For five enteric gram-negative pathogens, rapid susceptibilities will be available within approximately 10 hours (E. coli, E. cloacae complex, K. pneumoniae, Proteus sp., Serratia marcescens). Rapid susceptibility data will be updated in MaestroCare when available.
 - Antibiotics should be narrowed from empiric treatment recommendations once sensitivity information is available.
- **Can BioFire BCID be negative after a positive gram stain?**
 - A negative BioFire BCID result does NOT rule out a potential infection. If no targets are detected, this means that the culture is positive, but the pathogen is likely not one of the 43 targets tested by BCID.
- **What are other important considerations when choosing the most appropriate empiric therapy?**
 - Blood Culture Treatment Pathways are a guideline for empiric therapy of bacteremia based on BCID results and antibiogram data from Duke University Hospital. Important clinical factors may lead to different empiric therapy decisions than those outlined below. Examples include:
 - Primary source of bacteremia that is polymicrobial where other potential pathogens may not have been recovered from blood, especially anaerobic organisms (e.g. intra-abdominal source, polymicrobial wound infections).
 - Adequacy of antibiotic penetration into sequestered spaces (e.g. CNS infection)
 - Patient's previous culture and sensitivity results and/or risk factors for MDRO.
- **What data were used to guide empiric therapy recommendations in the adult pathway?**

- Data from adult (>=18yo) patients with positive blood cultures from Duke University Hospital and emergency department were summarized to create a bloodstream infection specific antibiogram from calendar year 2021 (**Table**). Values indicate percent of blood isolates susceptible. Duplicate isolates from the same patient over 1 year were removed.

Table. Duke University Hospital Blood Culture Isolate Antibiogram for Adults, 2021

Gram-negative Pathogen group (N isolates)	AMP	AMP-SUL	PIP-TAZ	CFZ	CTX	CPM	MER	CIP	T-S
<i>E. coli</i> (242)	38	47	84	78	80	84	99	63	61
<i>K. pneumoniae</i> (117)	0	57	74	65	78	82	99	85	73
<i>P. aeruginosa</i> (73)	-	-	86	-	-	86	86	87	-
<i>E. cloacae</i> complex (60)	-	-	55	-	58	83	91	88	90
<i>S. marcescens</i> (30)	-	-	80	-	83	96	100	96	96
<i>P. mirabilis</i> (29)	79	79	93	34	96	96	96	65	75

Other gram-negative blood pathogens included N<30 isolates: *K. oxytoca* (17), *Klebsiella* (*Enterobacter*) *aerogenes* (11), *Acinetobacter* sp. (10), *Stenotrophomonas maltophilia* (9), *Morganella morganii* (8), *C. freundii* (5), *C. koserii* (4), *Achromobacter* (3), *Proteus* sp. (3), *Burkholderia* sp. (2)

Gram-positive Pathogen group (N isolates)	AMP	NAF	CFZ	VAN	DAP
<i>Staphylococcus</i> (coagulase negative) sp. (121)	-	28	28	100	100
<i>Staphylococcus aureus</i> (not MRSA) (120)	-	100	100	100	100
Methicillin resistant <i>Staphylococcus aureus</i> (MRSA) (103)	-	1	1	100	98
<i>E. faecalis</i> (76)	100	-	-	97	98
<i>E. faecium</i> (25)	12	-	-	36	92

Other gram-positive blood pathogens included N<30 isolates: *S. mitis* (23), *S. anginosus* (8), *S. pneumoniae* (7), *S. salivarius* (7), *Enterococcus* sp. (5), *S. agalactiae* (3), *S. bovis* (1).

- Where can I get more information regarding antibiotic dosing and duration?**
 - [CustomID.org](https://www.customid.org) should be utilized for indication-specific dosing and dose adjustments for renal dysfunction.
 - Refer to [Targeted Duration of Adult Antimicrobial Therapy](#) document for treatment duration considerations.
- What are all these gene targets for the staphylococci?**
 - The BCID2 panel includes specific resistance gene targets for Staphylococci, these vary depending on the species identified.
 - For general coagulase negative staphylococci, there will be no testing for resistance genes. This represents a change from the original BCID panel.
 - For *Staphylococcus epidermidis* and *Staphylococcus lugdunensis*, two of the most common coagulase negative staphylococci, the panel will test for the presence of the *MecA/C* genes which confer methicillin resistance.
 - For *Staphylococcus aureus* the panel specifically looks for *MecA/C* PLUS the *MREJ* locus. *MREJ* represents a Staph aureus-specific region that borders *mecA/C*. The detection of both is necessary for MRSA identification on the BCID2.

- **If I have a polymicrobial blood culture can I still use the genetic resistance testing results?**
 - Yes, but with caution. The test does not distinguish which pathogen the genetic result is from. Imagine a patient with a blood culture positive for BOTH *Staphylococcus epidermidis* and *Staphylococcus lugdunensis*. A positive MecA/C result could be attributed to either pathogen individually, or both. A polymicrobial culture could also have additional organisms present which are not on the BCID panel.
- **Enterobacterales? Enterobacter? Enteric gram negatives? How do I keep all this straight?**
 - Enterobacterales is an order of bacteria consisting of Gram-negative bacilli commonly found in the gastrointestinal system. The BCID panel has a broad target for bacteria in this order. In our guidance document and on Epic we refer to these as “Enteric gram negatives” to avoid confusion with the specific genus of bacteria *Enterobacter*.
- **Other Questions?**
 - Don’t hesitate to reach out to the inpatient ID consult team at 970-4376 or Antimicrobial Stewardship Evaluation Team (ASET) Pharmacist at 970-6666