Blood Culture Identification Molecular Panel

Beginning December 6th, 2021, the UH Microbiology Laboratory will automatically perform the FilmArray Blood Culture Identification Panel (BCID2, bioMérieux) on initial positive routine blood cultures (LAB462) for inpatients of all ages. This updated molecular panel detects multiple bacteria, yeast, and antimicrobial resistance genes (Table). Due to staffing limitations, this testing will initially be performed daily on all 3 shifts for patients ≤18 years and during the day shift only for adults. 24/7 testing for patients of all ages will be implemented as soon as feasible.

Gram-Positive Bacteria	**Gram-Negative Bacteria**
Enterococcus faecalis and *E. faecium*	Enterobacterales*
Listeria monocytogenes	*Enterobacter cloacae* complex
Staphylococcus species	*Escherichia coli*
*Staphylococcus aureus***, *S. epidermidis*, *S. lugdunensis*	*Klebsiella aerogenes, K. oxytoca, K. pneumoniae* group
Streptococcus species	*Proteus* species
S. agalactiae (*Streptococcus* Group B)	*Salmonella* species
S. pneumoniae	*Serratia marcescens*
S. pyogenes (*Streptococcus* Group A)	*Neisseria meningitidis* (encapsulated)
Yeast**	*Bacteroides fragilis*
Candida albicans	*Haemophilus influenzae*
Candida auris	*Pseudomonas aeruginosa*
Candida glabrata, C. krusei, C. parapsilosis, C. tropicalis	*Acinetobacter calcoaceticus-baumannii* complex
Cryptococcus neoformans/gattii	*Stenotrophomonas maltophilia*
Antimicrobial Resistance Genes	
*mec*A/C – methicillin resistance	CTX-M – extended-spectrum beta-lactamase
*van*A/B – vancomycin resistance	*mcr*-1 – colistin resistance
KPC, NDM, VIM, IMP, OXA-48-like – carbapenem resistance	

*Taxonomic classification (Order) that includes enteric GNR infecting humans; will only appear when all species-specific results (e.g., *Escherichia coli*) are negative.
**Infectious Diseases consult strongly recommended (see below).

Turn-around-time:

- Pediatric patients: within 2 hours of growth detection.
- Adult patients: within 18 hours of growth detection.

Notes:

- This test will be performed once per patient admission unless the Gram stain of subsequent positive cultures is different.
- Telephonic notification of the initial positive blood culture
    - Pediatric patients: will include both Gram stain and molecular panel results.
    - Adult patients: will include both Gram stain and molecular panel results when both are available simultaneously; otherwise, the molecular panel result will be available for review in Epic within 18 hours of the Gram stain report.

- Standard organism identification and antimicrobial susceptibility testing will continue to be performed.
- All results for a given specimen will be included under the same accession number.
- Blood culture ordering remains unchanged – follow-on testing is automatically performed by the laboratory.
- Infectious Diseases consultation is **strongly recommended** for patients with a blood culture positive for fungi or *Staphylococcus aureus* (both methicillin-susceptible and methicillin-resistant). Infectious Diseases consultation has been associated with improved adherence to evidence-based management and improved clinical outcomes including lower mortality among patients with fungemia and *Staphylococcus aureus* bacteremia.[1-4]

1. Lee RA, Zurko JC, Camins BC, et al. Impact of infectious disease consultation on clinical management and mortality in patients with candidemia. Clin Infect Dis. 2019;68(9):1585-87.
2. Kobayashi T, Marra AR, Scheeizer M, et al. Impact of infectious disease consultation in patients with candidemia: A retrospective study, systematic literature review, and meta-analysis. Open Forum Infect Dis. 2020;7(9):ofaa270.
3. Bai AD, Showler A, Burry L, et al. Impact of infectious disease consultation on quality of care, mortality, and length of stay in Staphylococcus aureus bacteremia: Results from a large multicenter cohort study. Clin Infect Dis. 2015;60(10):1451-6.
4. Buehrle K, Pisano J, Han Z, et al. Guideline compliance and clinical outcomes among patients with Staphylococcus aureus bacteremia with infectious diseases consultation in addition to antimicrobial stewardship-directed review. Am J Infect Control. 2017;45(7):713-716.

Example Reports

Gram-negative rods, negative BCID2

Result Information

Flag: Abnormal ! Status: Final result (Collected: 11/3/2021 13:06) Provider Status: Ordered

Blood culture ;

Collected **11/3/2021 13:06** Status: **Final result** Visible to patient: **Yes (not seen)**

Specimen Information: Blood

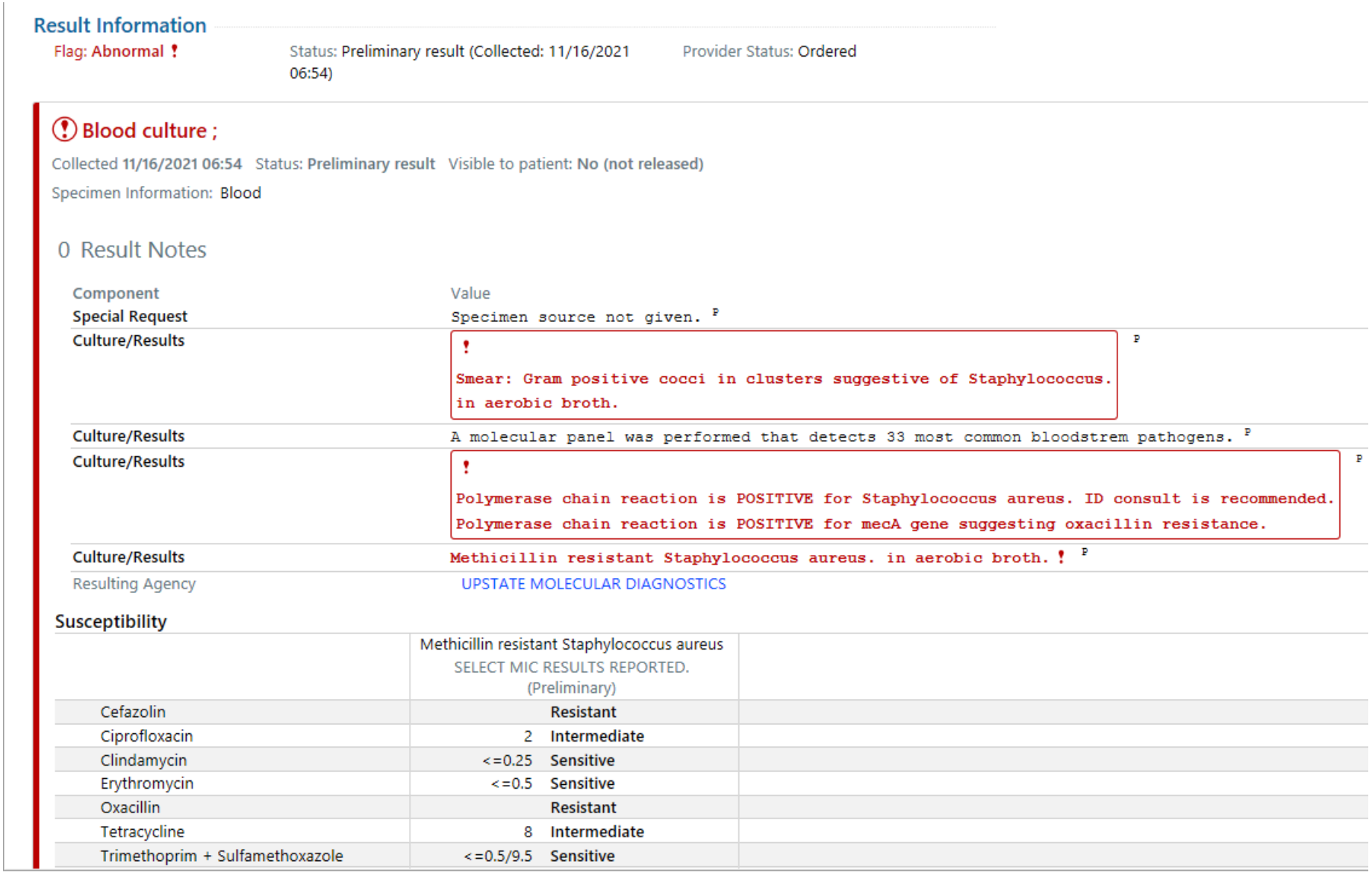
0 Result Notes

Component	Value
Special Request	Specimen source not given.
Culture/Results	Smear:Gram negative rods in aerobic broth. !
Culture/Results	Polymerase chain reaction is negative for 33 most common blood stream pathogens.
Culture/Results	Pseudomonas putida in aerobic broth. !
Resulting Agency	UPSTATE MOLECULAR DIAGNOSTICS

Susceptibility

	Pseudomonas putida SELECT MIC RESULTS REPORTED.	
Cefepime	4	**Sensitive**
Ceftazidime	16	**Intermediate**
Ciprofloxacin	<=0.25	**Sensitive**
Gentamicin	1	**Sensitive**
Meropenem	<=0.25	**Sensitive**
Piperacillin + Tazobactam	8	**Sensitive**
Tobramycin	<=1	**Sensitive**

Gram-positive cocci in clusters, BCID2 positive for methicillin-resistant *Staphylococcus aureus* (MRSA)



Result Information

Flag: Abnormal ! Status: Preliminary result (Collected: 11/16/2021 06:54) Provider Status: Ordered

Blood culture ;

Collected **11/16/2021 06:54** Status: **Preliminary result** Visible to patient: **No (not released)**

Specimen Information: Blood

0 Result Notes

Component	Value
Special Request	Specimen source not given. P
Culture/Results	! Smear: Gram positive cocci in clusters suggestive of Staphylococcus. in aerobic broth. P
Culture/Results	A molecular panel was performed that detects 33 most common bloodstrem pathogens. P
Culture/Results	! Polymerase chain reaction is POSITIVE for Staphylococcus aureus. ID consult is recommended. Polymerase chain reaction is POSITIVE for mecA gene suggesting oxacillin resistance. P
Culture/Results	Methicillin resistant Staphylococcus aureus. in aerobic broth. ! P
Resulting Agency	UPSTATE MOLECULAR DIAGNOSTICS

Susceptibility

	Methicillin resistant Staphylococcus aureus SELECT MIC RESULTS REPORTED. (Preliminary)	
Cefazolin		**Resistant**
Ciprofloxacin	2	**Intermediate**
Clindamycin	<=0.25	**Sensitive**
Erythromycin	<=0.5	**Sensitive**
Oxacillin		**Resistant**
Tetracycline	8	**Intermediate**
Trimethoprim + Sulfamethoxazole	<=0.5/9.5	**Sensitive**