Interior Health
Laboratory Service

Best Practices for Bacterial Blood Culture

Blood cultures are the critical specimens for diagnosing bloodstream infection. Ninety percent of blood cultures are negative. In Interior Health, 1-3% of positive blood cultures are contamination. Unrestricted repeating of blood cultures increases the risk of contamination, leading to false-positive results, additional cultures and imaging, and unnecessary antibiotic use. This document provides guidance on the indications for INITIAL and FOLLOW-UP blood cultures, and when the FOLLOW-UP blood culture is not required.
NOTE: Discuss with a Medical Microbiologist or Infectious Diseases if any questions about a specific scenario.

Indications for INITIAL Blood cultures in adult patients:

- **Blood cultures are INDICATED in the following scenarios:**
  - Sepsis/septic shock
  - Systemic signs of infection AND asplenia
  - Fever with signs of infection in severely immunosuppressed patients (e.g., neutropenia, hematopoietic stem cell or solid organ transplant)
  - Syndromes with high risk of bacteremia (>50%):
    - Endovascular infection
      - Infective endocarditis
      - Septic thrombophlebitis
      - Infected cardiac/vascular devices
    - Central nervous system (CNS) infections
      - Meningitis
      - Epidural abscess
    - Musculoskeletal infections
      - Native joint septic arthritis
      - Vertebral discitis/osteomyelitis
    - Catheter-related bloodstream infection
  - Syndromes with intermediate risk of bacteremia (>10%, <50%):
    - Cholangitis
    - Pyelonephritis
    - Severe pneumonia
    - Severe cellulitis/skin soft tissue infection (SSTI) (e.g., necrotizing soft tissue infection)
    - Non-severe cellulitis/SSTI with significant comorbidities (e.g., severely immunocompromised, end-stage renal or liver disease)

- **Blood cultures are NOT indicated in the following scenarios:**
  - Syndromes with low risk of bacteremia (<10%)
    - Non-severe cellulitis/SSTI
    - Lower urinary tract infection (e.g. cystitis, prostatitis)
    - Non-severe community-acquired pneumonia (CAP)
    - Non-severe diabetes related foot infection
    - Colitis (including *C. difficile*)
    - Aspiration pneumonitis
    - Uncomplicated cholecystitis, diverticulitis, or pancreatitis

- **Blood cultures are NOT indicated in the following scenarios cont'd:**
    - Fever or leukocytosis explained by a non-infectious cause (e.g., drug withdrawal, trauma, pulmonary embolism, etc.)
    - Isolated fever or leukocytosis without symptoms and signs of systemic infection
    - Post-operative fever within 48 hours
    - Persistent fever or leukocytosis in patient with negative blood culture in past 48-72 hours with out new localizing signs of infection
        - Other cultures or imaging to look for a source control issue would be more appropriate than blood cultures
        - Consider Infectious Diseases consultation
    - Surveillance blood cultures in patients without suspicion of bacteremia (e.g., from central line prior to TPN initiation, prior to central line replacement)

Indications for FOLLOW-UP Blood Culture to Document Clearance of Bloodstream Infections:

NOTE: Follow-up blood culture should be collected at least 48 hours from the initial positive blood culture, AND after effective antibiotics have been started, AND after source control has been achieved.

- Bacteremia caused by the following organisms:
    - Carbapenemase producing *Enterobacterales*
    - *Enterococcus spp.*
    - *Pseudomonas aeruginosa*
    - *Salmonella spp.*
    - *Staphylococcus aureus:* repeat blood culture every 72 hours and document clearance with two consecutive negative blood cultures
    - *Staphylococcus lugdunensis*
    - Yeast

- Suspected/proven intravascular infection, regardless of which microorganism was detected on initial blood culture
    - Endocarditis
    - Previous history of endocarditis
    - Cardiac comorbidities
        - Heart transplant-associated valvulopathy
        - Unrepaired congenital heart disease, repaired congenital heart disease with residual shunt or valvular regurgitation, or repaired congenital heart disease within the first six months post-repair)
    - Intra-cardiac medical device(ICD)/pacemaker
    - Vascular graft
    - Septic thrombophlebitis/septic emboli

- Other clinical indications, regardless of which microorganism was detected on initial blood culture
    - Epidural abscess
    - Persistent symptoms and lack of clinical improvement
    - Febrile neutropenia patient
    - Catheter-related bloodstream infection when attempting catheter retention

The Following Conditions DO NOT Require FOLLOW-UP Blood Culture:

- Single positive blood culture (i.e. 1 bottle positive or 2/4 from the same venipuncture) with skin flora, AND no clinically suspicious/ proven intravascular infection or other clinical indications for follow-up blood culture
    - *Actinomyces spp.*
    - *Bacillus spp.*
    - Coagulase-negative staphylococci
    - *Corynebacterium spp.*
    - *Cutibacterium acnes*
    - *Kocuria spp.*
    - *Micrococcus spp.*
    - Viridans group streptococci

- Uncomplicated gram-negative bacteremia
    - Clinically improving after 48 hours effective antibiotic treatment and source controlled

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