

NEWSLETTER

Best Practices in Blood Culture Collection



Benefits of Engaging Phlebotomists in Blood Culture Collections

Blood cultures are the most direct method for detecting bacteraemia in patients. However, interpretation of blood culture results may be complicated by recovery of bacteria that are potential contaminants (1). False positive blood culture test results are common and caused by contamination that occurs from the introduction of organisms outside the bloodstream (e.g., skin or environmental contaminants) into the sample of blood obtained for culture that cannot be completely eliminated. While a relatively small percentage of all blood cultures are contaminated, it represents a large proportion of all positive results and therefore has been recognized as an important quality problem for decades. Although no definitive estimate is available, of all positive cultures, 20% to 50% are likely false positives. According to the American Society for Microbiology (ASM) and the Clinical Laboratory Standards

Institute (CLSI) overall blood culture contamination rates should not exceed 3%, however reported contamination rates in hospitals vary widely ranging from 0.6% to 12.5%, with the highest rates associated with emergency department settings. False positive results can lead to inappropriate patient diagnosis, follow-up and unnecessary treatment, creating substantial adverse consequences for patients and cost burdens for the healthcare system. This includes re-collection of blood cultures, other laboratory tests for re-evaluation, incorrect or delayed diagnosis due to errors in clinical interpretation, inappropriate antibiotic treatment as well as unnecessary and longer hospital stays and costs associated with these outcomes (2).

Trained phlebotomy or blood culture teams have been found to decrease blood culture contamination rates. In one study at a community teaching hospital, blood cultures drawn by a dedicated blood culture team using a commercially available kit had a contamination rate of 1%, as opposed to cultures drawn by resident physicians, which had a contamination rate of 4.8% using the same kit. They compared the costs of this team to the cost savings associated with a reduction in contamination rates and reported a net savings of \$40,000 over a 6-month period. Investigators in the College of American Pathologists (CAP) Q-Probes study found that contamination rates were 3.9% at institutions where more than half of all blood cultures were collected by resident physicians, versus 2.2% at institutions where less than half of all blood cultures were obtained by resident physicians. In the more recent Q-Tracks study, there was a statistically significant difference in contamination rates between institutions that utilized a dedicated phlebotomy team versus other staff for culture collection. Institutions in which the large majority of cultures were drawn by nursing staff had a contamination rate of 4.21%, while those institutions in which those same individuals did not collect any culture specimens had a contamination rate of 2.17%. Dedicated phlebotomy teams are increasingly common in the inpatient setting; in a study of 640 institutions, Schiffman et al. noted that, on average, 70% of cultures were collected by phlebotomy teams at teaching institutions, while 85% of cultures were collected by such teams at nonteaching hospitals (3).

In addition, several studies have projected the overall cost savings to a facility when a dedicated phlebotomy team is employed to collect blood cultures. An editorial published in the Mayo Clinic Proceedings in 1998 calculates that “the typical savings associated with using a phlebotomy service can be predicted to be about \$20 per blood-culture specimen collected. A study by Weinbaum, et al, reports that the mean hospital charges for patients with false-positive blood cultures was more than 50% higher than for similar patients with true-negative cultures. The report projected that the 487-bed facility studied might save as much as \$1.2 million annually if it employed a dedicated phlebotomy team to collect blood cultures (4).

Moreover, Gander R.M. and colleagues evaluated that the contamination rates were lowered to recommended levels by utilizing phlebotomists to collect blood cultures in the emergency department, with projected reductions in patient charges of approximately \$4.1 million per year (1). Ingen J.V. and colleagues also reported that education of phlebotomy teams improves the blood volume in blood culture bottles and thus aid to optimize the sensitivity of blood culture. The educational activities should be a continuous part of laboratory quality control procedures (5).

In conclusion, Snyder S.R. et al. concluded that the use of phlebotomy teams are effective practices for reducing blood culture contamination rates in diverse hospital settings and are recommended as evidence-based “best practices” with high overall strength of evidence and substantial effect size ratings (2).



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