

# Developing a Protocol for Obtaining Blood Cultures From Central Venous Catheters and Peripheral Sites

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Obtaining blood cultures from patients with cancer when temperature spikes occur has been surrounded by long-standing controversy and confusion. Observations in clinical practice have revealed that variations exist in clinicians' perceptions of where, when, and how blood cultures should be obtained.

The Oncology Nursing Society Appropriate Treatment Assures Quality (ATAQ) program aims to provide oncology nurses with information and strategies to anticipate and manage neutropenia and infection. One debate in the program is about the need for both peripheral and central line cultures when patients with cancer become febrile. Some ATAQ participants suggested eliminating or limiting peripheral blood drawing for blood cultures. One proposal involved drawing blood cultures only from central lines; if a positive culture was obtained, then further investigation would be warranted and peripheral cultures could or could not be drawn. The rationale for the proposal was based on the following considerations.

- The presence of a central line presents a high risk of infection in the target population.
- Blood cultures from a central line can identify colonization from either the line itself or bloodstream infection.
- Regardless of where a microorganism is isolated, treatment (i.e., appropriate antimicrobial treatment) would not change.
- Unnecessary venipunctures in immunocompromised patients (e.g., patients who

Blood cultures frequently are obtained from patients with cancer who are suspected to have infection. A review of the literature revealed that consistent clinical guidelines or standards for obtaining blood cultures from patients with cancer do not exist. The published literature varies greatly with respect to site selection (peripheral or central), frequency, and timing. In addition, a survey at the researchers' institution revealed that blood culture orders were written and interpreted in various ways. After a multidisciplinary discussion, a review of the literature, and receiving expert advice, an institutional protocol for obtaining blood cultures from patients with cancer was developed. The protocol specifies between peripheral and central line sampling and establishes timing, frequency, and other guidelines so nurses can perform consistent and evidence-based blood culture sampling. Use of the protocol has improved patient care and helped standardize the practice of obtaining blood cultures.

are anemic, neutropenic, or thrombocytopenic) would be avoided.

## Literature Review

A review of the literature revealed limited discussion, recommendations, or evidence-based guidelines about sites and frequency of blood culture sampling and the number of samples that should be drawn. Published studies that included details about how blood cultures were obtained usually were small, nonrandomized, and nonblinded and used limited or various data analysis techniques. Notable, however, were the statistics about how infrequently blood cultures drawn from any site actually identified specific microorgan-

isms—only 2%–28% of the time (Smith & Sheperd, 1995).

One study compared 551 central line blood culture results with peripheral blood culture results (obtained by venipuncture) drawn from 185 hospitalized patients with cancer who were suspected to have an infection (DesJardin et al., 1999). Cultures were paired (i.e., drawn within four hours of each other, usually drawn at the same time), and results were as follows.

- Eighty-five percent were catheter-negative/venipuncture-negative.
- Six percent were catheter-positive/venipuncture-positive.
- Three percent were catheter-negative/venipuncture-positive.
- Six percent were catheter-positive/venipuncture-negative.

The researchers suggested that using central venous catheters to obtain blood for cultures may be an acceptable method for ruling out bloodstream infection. However, a positive culture from a central line would warrant further investigation (DesJardin et al.).

Since publication of the DesJardin et al. (1999) study, several authorities have come forth to support or dispute its conclusions. A commentary published in the *Annals of Internal Medicine* supported the 1990 American College of Physicians guidelines that discouraged the use of central venous catheters for blood culture sampling (Johnson, 2000).

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