Blood Culture Contamination

Table of Contents

2012 Q-TRACKS Schedule .................. 1
About the Authors .......................... 1
For Assistance .................................. 2
Introduction .................................. 2
Definitions of Terms .......................... 4
Data Collection Instructions ............... 5
Customer-Defined Comparison Group Master List .................. 8

2012 Q-TRACKS Schedule

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Shipping Date*</th>
<th>Data Return Date*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012 B (April - June)</td>
<td>2/27/2012</td>
<td>7/6/2012</td>
</tr>
<tr>
<td>2012 C (July - September)</td>
<td>6/4/2012</td>
<td>10/5/2012</td>
</tr>
<tr>
<td>2012 D (October - December)</td>
<td>9/4/2012</td>
<td>1/11/2013</td>
</tr>
</tbody>
</table>

*Dates subject to change.

To ensure analysis of your quarterly Q-TRACKS data, submit it to the CAP according to the schedule.

If you do not receive your Q-TRACKS input forms within two weeks of the shipping date, please call the Customer Contact Center.

Return your data to the CAP using one of the following methods:

Online: www.cap.org (preferred method)
Fax: 866-FAX-2CAP (866-329-2227)

About the Authors

Kirsten Alcorn, MD is medical director of transfusion services at Washington Hospital Center in Washington, DC. She is also medical director of blood donor services for MedStar Health, serving seven hospitals in the Baltimore-Washington region. She received her medical degree and completed her residency training in anatomic and clinical pathology at the Medical College of Virginia. She is board certified in anatomic and clinical pathology and transfusion medicine/blood banking. She is a past member of the CAP Transfusion Medicine Committee and is currently a member of the CAP Quality Practices Committee.

Frederick A. Meier, MD is a senior staff pathologist in the division of anatomic pathology at Henry Ford Hospital in Detroit, Michigan, and Director of Regional Pathology Services in the Henry Ford Health System. Dr. Meier received his medical degree from McGill University in Montreal, Quebec, and is board certified in both clinical and anatomic pathology. He is a member of the Quality Practices Committee, and is the author of publications in the areas of medical decision-making and quality improvement in clinical pathology as well as bacterial infections.

©2012 College of American Pathologists. The CAP does not permit reproduction of any substantial portion of the material in this Report without its written authorization. The CAP hereby authorizes participants in the program to use the material in this Report solely for educational purposes within their own institutions. The CAP prohibits use of the material in the Report - and any unauthorized use of the CAP’s name or logo - in connection with promotional efforts by marketers of laboratory equipment, reagents, materials, or services.
and antigen detection in clinical microbiology. His current research interests are in the development and validation of methods that use information generated by pathology and laboratory practice to monitor and improve the safety and quality of routine patient care and methods that monitor the accuracy and utility of point-of-care test results.

Ron B. Schifman, MD is chief of diagnostics at the Southern Arizona VA Healthcare System and associate professor in the department of pathology at the College of Medicine, University of Arizona. He received his medical degree from the University of Kansas and completed his internship, residency, and fellowship training at the University of Arizona. He is board certified in clinical pathology and medical microbiology. He is currently a member of the CAP Quality Practices Committee.

For Assistance

Provide your CAP number and contact information with all correspondence.
Telephone: 800-323-4040 option 1 (Monday - Friday, 7:00 am – 5:30 pm Central Time) International Participants: 847-832-7000 option 1
Email: contactcenter@cap.org
Website: www.cap.org
Address: CAP Surveys Program
Q-TRACKS Program
325 Waukegan Road
Northfield, IL  60093-2750

Introduction

Objective

Investigate the rate of blood culture contamination using standardized criteria for classifying contaminants.

Background

Advances in blood culture practice and technology have led to improvements in laboratory productivity and method sensitivity, as well as in reducing the time to detect bacteremia. In spite of this progress, false positive blood culture results remain an important problem. While only a small percentage of all blood cultures become contaminated, they usually represent between 20 and 40 percent of all positive results. Laboratory evaluation and clinical intervention in response to blood culture contaminants consumes substantial resources. Furthermore, blood culture contaminants have been responsible for costly investigations of pseudoinfections and pseudoepidemics.

The blood culture contamination rate is a key indicator of preanalytical performance in medical microbiology. The CAP Laboratory Accreditation Manual states that “The inspector should assess the adequacy of the blood culture system for detection of microorganisms for the patient population. It is recommended that the laboratory keep blood culture statistics as a monitor of collection techniques, including the number of true positive cultures and the number of contaminated cultures.”
This Q-TRACKS monitor will benchmark your laboratory’s performance using a standardized procedure for continuous monitoring of blood culture contamination rates. To achieve uniform comparisons, all laboratories will use the same criteria for classifying contaminants, based on microorganism identification and the number of positive specimens observed in a series. Blood cultures will be stratified as neonatal and all others.

This Q-TRACKS monitor also has an optional component for examining laboratory-specific parameters that may affect contamination rates (eg, patient location, phlebotomist, specimen collection procedure, disinfectant, timing, etc.). These factors are institution-specific and may be internally benchmarked.

### Performance Indicators

**Reportable Performance Indicator:**
Overall contamination rate

**Additional Performance Indicators:**
- Neonatal contamination rate
- Other (nonneonatal) patient contamination rate
- Institution-specific subgroup contamination rate

### Calculation

Contamination rate (%):

\[
\frac{\text{Number of contaminated blood cultures}}{\text{Total number of routine blood cultures accessioned}} \times 100
\]

### Analysis Variables

Specific institutional practices and demographics including: collection personnel, disinfectant solutions used and collection methods.

### References

Definitions of Terms

Blood culture: Sample of blood obtained from a single collection site and inoculated to media that will support microbial growth. Samples obtained from arterial lines are acceptable for this study.

Blood culture bottle: A single bottle containing aerobic, anaerobic, or other culture media that is inoculated with patient blood.

Blood culture set: One or more blood culture bottles collected through a single venipuncture. A blood culture set usually consists of two blood culture bottles for adults (an aerobic and anaerobic bottle), but in some instances consists of a single bottle. In many settings a pediatric blood culture set consists of a single bottle. Two bottles collected simultaneously by separate venipunctures are counted as two different blood culture sets.

Blood culture series: One or more sets of blood culture sets that are collected serially to detect a bacteremic episode. A blood culture series usually consists of two or three blood culture sets. Blood culture sets within a blood culture series are generally collected over the course of an hour, but may sometimes be collected over a longer interval, up to 24 hours.

Neonatal blood culture: A blood culture collected from the following locations: newborn nursery, neonatal intensive care unit, or a special care nursery. Blood cultures from neonates in any other hospital location (ie, emergency department) are not tabulated in the “neonatal patient” category, but are included in the “other patient” category.

Blood culture contaminant: For the purposes of this monitor, consider any blood culture to be contaminated if one or more of the following organisms are found in only one of a series of blood culture specimens (eg, 1 of 1; 1 of 2; 1 of 3, etc.). If the contaminated blood culture also contains an organism not on the list, it is still considered contaminated.

Coagulase negative Staphylococcus
Micrococcus
Alpha-hemolytic viridans group streptococci
Propionibacterium acnes
Corynebacterium sp. (diphtheroids)
Bacillus sp.

The definition of blood culture contamination used in this study is appropriate for calculating institutional blood culture contamination rates, but should not be used for clinical decision-making, as some isolates classified as contaminates in this study may be associated with clinical infection. This is particularly true in settings where patients are likely to have indwelling catheters, such as adult and neonatal intensive care units.

Institution-specific subgroups: Parameters that may affect contamination rates in your institution. Tracking institution-specific subgroup information is optional and for internal use only. For example, you may want to examine the contamination rate in a specific department, for a specific patient population, or evaluate the effect of using a different decontamination or culture procedure. Each institution may choose up to 13 subgroups by which to stratify their blood culture rates. An area
to record the names of these subgroups has been provided on the input form for your convenience, but this information will not be used by the CAP. Subgroups will be identified on your report by letter only; no confidential information (eg, location) will appear on the final report. These factors are institution-specific and may be internally benchmarked.

**Data Collection Instructions**

**Inclusions and Exclusions**

*Include* only positive blood cultures identified by routine procedures used in your laboratory for detecting most microorganisms in blood specimens. Blood cultures from indwelling catheters are included. Include blood cultures from inpatients and outpatients.

*Exclude* autopsy cultures. Do not include microorganisms detected by procedures that are used only occasionally to detect special microorganisms such as mycobacteria, cell wall deficient bacteria, fungi, etc.

If possible, *exclude* blood cultures drawn from lines specifically to determine if the line is contaminated.

**Data Collection**

1. Each month, total the number of routine blood cultures processed during the entire month (both positive and negative). Tabulate your totals separately for neonatal and other blood cultures (see Definitions of Terms). Record the information for neonatal patients, other patients, and total patients in the appropriate area on the Data Input Form.

   *Note: If you are unable or do not wish to separate your blood culture information into the neonatal and other categories, you may record only the total patients information on the Data Input Form and leave the other spaces blank.*

2. Obtain and record the total number of contaminated blood cultures (see Definitions of Terms). Tabulate this data separately for neonatal and other patients.

3. If your institution chooses to examine institution-specific subgroups (see Definitions of Terms), tally the total number of blood cultures performed and the total number of contaminated blood cultures for the subgroup. Reporting by subgroups is optional.

   *Note: In order to obtain meaningful historical comparisons, we recommend that laboratories do not change their subgroup definitions from quarter to quarter.*
Q-PROBES/Q-TRACKS Demographic Forms

All participants are required to complete Q-PROBES/Q-TRACKS Demographics Forms once each year. These forms must be completed and submitted to the CAP with your first data submission of the year. The demographic forms will be provided each quarter with your result forms. Once you have returned your demographic forms for the year, do not resubmit the forms in subsequent quarters. To accomplish this for online result reporting, ignore the associated demographic forms. Do not save or approve these pages. For result reporting by fax, do not fax back the demographic forms. If your laboratory is enrolled in both Q-PROBES and Q-TRACKS, it is only necessary to submit one set of demographic forms.

If you need to update your demographic information after you have submitted your forms for the year, call the Customer Contact Center.

If the CAP does not receive your demographic forms, you will not receive all peer comparisons. If you submit the form after the first data submission due date, your peer comparisons will be generated with the next available quarterly report cycle.

General Questionnaire

This questionnaire requests information regarding your institution’s policies and practices related to blood cultures. This form must be completed and returned to the CAP with the first quarter’s data submitted for your institution during the program year even if you have participated in the monitor the previous year. You will be sent a blank questionnaire each quarter. If your institution’s policies or practices change during the program year, please submit a new questionnaire to the CAP and indicate the date of the change in the space provided. If there is no change in your information, there is no need to submit additional questionnaires after the first quarter.

Customer-Defined Comparison Group

Participants will have the opportunity to construct their own custom peer group by selecting up to 5 characteristics from a master list that they would like to measure their laboratory’s performance against. This feature is useful to your facility if it has some unique characteristics and you want to ensure that you are matched to other facilities that have characteristics that reflect the special nature of your operation.

The Customer-Defined Comparison Group input form must be completed and returned with the first data submission of the year, even if your selections are the same as last year. If no changes are needed in subsequent quarters, it is not necessary to return the completed Customer-Defined Comparison Group input form. Your current selections will be maintained in our database. Do not fax a blank Customer-Defined Comparison Group form, as this will remove all your previous selections. For online result reporting, ignore the Customer-Defined Comparison Group form. Do not save or approve this page.

To generate a Customer-Defined Comparison Group select, in order of importance, up to 5 characteristics of the group to be compared against from the master list.
Example:
Millennium Hospital management would like to have their customer-defined comparison group consist of the following characteristics, listed in order of importance:
• Designated trauma center level I
• Central or “core” laboratory serving a multi-hospital system
• Heart and/or lung transplant service
• Trains pathology residents/fellows
• City location

Selections may be changed quarterly. A blank Customer-Defined Comparison Group input form will be included each quarter. If you wish to change any of your selected characteristics, all 5 selections must be included in the order of importance on the Customer-Defined Comparison Group input form. Referring to the example, you decide to change the characteristic heart and/or lung transplant service to liver transplant service and the other 4 characteristics will remain the same. You must submit all 5 codes on the input form (the new code for liver transplant service and the 4 codes that remain the same).
<table>
<thead>
<tr>
<th>Volume Measures</th>
<th>Administrative Services Provided by your Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>576 Total annual inpatient days</td>
<td>308 Courier services contracted</td>
</tr>
<tr>
<td>577 Percent of acute care</td>
<td>309 Courier services supplied by laboratory</td>
</tr>
<tr>
<td>578 Occupied bed size</td>
<td>310 Dedicated laboratory staff for outreach marketing/sales</td>
</tr>
<tr>
<td>706 Percent billable procedures from outpatient/outreach sites</td>
<td>311 Dedicated laboratory business office (ie, billing and collection functions)</td>
</tr>
<tr>
<td></td>
<td>312 Medical transcription staff for Anatomic Pathology</td>
</tr>
<tr>
<td></td>
<td>313 Procure, own, and support peripheral information equipment outside the laboratory (ie, teleprinters, fax machines)</td>
</tr>
<tr>
<td></td>
<td>314 Outpatient registration</td>
</tr>
</tbody>
</table>

**Institution Type (Select only one.)**
- Nongovernmental
- Governmental, nonfederal
- Governmental, federal

**Institution Location (Select only one.)**
- City
- Suburban
- Rural

**Research and Development**
- Includes staff dedicated to research
- Services research protocols
- Includes staff dedicated to the development of new methodologies

**Training**
- Includes NAACLS accredited program(s) for Laboratory Allied Health
- Trains other Laboratory Allied Health students
- Trains pathology residents/fellows
- Trains graduate students
- Trains phlebotomists

**Outpatient/Outreach Specimens**
- Physician office(s)
- Nursing home(s)
- On-site ambulatory clinics
- Off-site ambulatory clinics
- Industry/business
- Veterinarian office(s)

**Levels of Service**
- Central laboratory serving a single hospital
- Central or “core” laboratory serving a multi-hospital system
- Central esoteric laboratory serving a multi-hospital system
- Routine testing laboratory serving a multi-hospital system
- Multiple laboratories serving a multi-hospital system
- Support of discrete satellite laboratories in the same hospital
- Support and staffing of remote physician office laboratories
- Support and staffing of remote clinic or group practice laboratories
- Supervise and staff point-of-care testing performed by laboratory personnel
- Supervise point-of-care testing performed by non-laboratory personnel
- Perform more than 25 percent of all laboratory tests as stat
- Assist at bone marrow biopsy and aspiration
- Assist at FNA in either radiography or pathology
- Dedicated stat laboratory or section
- Laboratory staff routinely perform arterial punctures

**Phlebotomy Services**
- **Inpatient Blood Specimens**
  - Primarily performed by non-laboratory staff
  - Primarily performed by laboratory staff

**Outpatient Blood Specimens**
- Primarily performed by non-laboratory staff
- Primarily performed by laboratory staff

**Hospital Complexity**
- General acute care
- Obstetrical service
- High risk obstetrics
- Pediatric service (general)
- Psychiatric inpatient service
- Kidney transplant service
- Liver transplant service
- Heart and/or lung transplant service
- Bone marrow or peripheral stem cell transplant
- Pancreas transplant service
- Burn intensive care service
- Medical intensive care service
- Designated trauma center level I
- Designated trauma center level II
- Designated trauma center level III
- Surgical intensive care service
- Cardiac intensive care service
- Pediatric intensive care service
- Maternal intensive care service
- Neonatal intensive care service (nursery level 2 or 3)
- Neurosurgery service
- Orthopedic surgery service
- Cardiac surgery service
- Oncology

**Teaching Hospital**
- Teaching hospital
- Non-teaching hospital

**Laboratory Quality Assurance**
- Staff person devoted exclusively to quality assurance/quality improvement activities
- Committee specifically designated for patient safety/quality assurance
- Pathologist(s) serves on the patient safety/quality assurance committee
- Electronic order/entry system
- Bar coding to check patient identification
- Formal, written reporting mechanism for medical errors
- Tracks the number of amended/revised reports
- Written protocol for addressing personnel who have made errors
- Quality assurance education for laboratory personnel
- Documentation of continuous quality improvement (CQI) initiatives performed