



MICROBIOLOGY NEWSLETTER

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**THERE ARE NO NORMAL VALUES IN MICROBIOLOGY!
AN IMPROPERLY COLLECTED SPECIMEN MEANS UNINTERPRETABLE RESULTS!**

CLS Blood Culture Contamination Rates

CLS provides diagnostic bacteriology services to the Calgary Health Region via a centralized regional laboratory. Blood cultures are one of the most commonly ordered tests on critically ill patients. CLS Microbiology currently analyzes ~60,000 blood culture sets or ~120,000 individual bottles per annum on a centralized bank of BacT-Alert 2-D automated cabinets. CLS Microbiology routinely monitors the rate of blood culture contamination that occurs at each acute care hospital in Calgary and rural centers, as well as in the community as part of an extensive blood culture quality assurance program. This newsletter outlines our performance over the past year.

1) CLS Regional Blood Culture Phlebotomy Protocol

CLS developed and implemented a standardized blood culture phlebotomy protocol in the region in 1997. The detailed procedure can be reviewed on our website at <http://www.calgarylabservices.com>. For adults, two blood culture sets each consisting of an aerobic and anaerobic bottle are routinely drawn whenever this test is ordered. Both the patient's skin and the bottle septa are decontaminated prior to phlebotomy and each blood culture set is drawn from a different venipuncture site. For children, the phlebotomy protocol varies according to the age and for neonates, the weight of the patient.

2) Why are Blood Culture Contamination Rates Monitored?

Blood cultures may easily become contaminated during the phlebotomy or bottle inoculation steps and result in the laboratory reporting isolation of an organism that is not causing disease or a pseudobacteremia event. Patients may be inadvertently treated for pseudobacteremia unless the laboratory includes a comment on their report that indicates that this is most likely a contaminated culture. Contaminated blood cultures also impact the efficiency of the laboratory to perform 'real work' on true bacteremia isolates, and have been shown to substantially increase both laboratory and patient care costs.

3) Definition of Blood Culture Contamination

Microbiology laboratories use two major parameters to decide whether a blood culture bottle has become contaminated including: a) Number of Bottles Positive - if an isolate only grows in one of the bottles in a 4-bottle set it may be considered to be a contaminant if it is part of the normal flora found on the skin, **and** b) Type of Isolate - Bacteria that are common skin commensals may be considered contaminants if they are only recovered from a single bottle in a blood culture set. Coagulase negative Staphylococci, Streptococcus viridans group, Bacillus spp., Corynebacterium spp. and *Propionibacterium acnes* are some of the most common blood culture contaminants.

4) What is the Allowed Blood Culture Contamination Rate?

Ideally, blood cultures would never become contaminated but since it only take one organism to contaminate a bottle it is not possible to achieve a null rate. Current standards dictate that no more than 3% of all blood cultures should be considered contaminated each month in any institution. However, the CLS goal has been to consistently achieve as low a contamination rate as possible at every site within the region.

5) How Does CLS Monitor Blood Culture Contamination Rates?

The Technologist II in charge of the CLS Microbiology blood culture bench in collaboration with the Quality Coordinator internally track and collate blood culture contamination rates for each acute care hospital site in Calgary as well as the rural centers and the community on a monthly basis. **Figure 1** provides a breakdown of the overall blood culture contamination rates for each of these sites during the first three quarters of 2004. Blood culture contamination rates for each site have consistently been well below the 3% cut-off. Rates tended to fluctuate the most at sites having a higher proportion of pediatric patients because non-phlebotomy personnel draw a higher proportion.

Figure 1.

Collection Site	Jan – Mar 2004		1.1 Apr – Jun 2004		Jul – Sept 2004	
	Total Collections	Contamination Rate	Total Collections	Contamination Rate	Total Collections	Contamination Rate
ACH	1,397	1.0%	1,149	1.2%	1,204	1.1%
FMC	5,346	1.6%	5,388	1.7%	5,407	1.8%
PLC	2,545	2.0%	2,377	2.2%	2,282	2.2%
RGH	1,790	1.8%	1,685	2.3%	1,641	2.5%
Community	379	1.7%	352	0.9%	370	2.4%

CLS has also enrolled in a external monitoring as part of the Q-Probe Program provided by the College of American Pathologists (CAP). This program allows us to routinely compare our rates of blood culture contamination against those achieved by other laboratories throughout the USA and other international sites. In the 3-years that CLS has participated in this external benchmarking program, the laboratory has consistently been a best performer with one of the lowest rates of contamination of the 140 laboratories enrolled.

6) Measures Used to Correct High Blood Culture Contamination Rates

If the current standard for an acceptable blood culture contamination rate was exceeded at any of our regional sites, then the root causes would be investigated including monitor of the individual contamination rate of phlebotomists and other healthcare workers. Staff would be re-educated about correct procedure for blood culture phlebotomy if this was determined to be the root cause of the problem. All other causes of potential blood culture contamination would also be immediately investigated including external and internal sources.

Physicians should immediately notify the Medical Microbiologist on call (MOC) at 770-3757 of any clinical concerns regarding potentially contaminated blood cultures.

IF YOU HAVE ANY QUESTIONS OR COMMENTS ABOUT HOW THE LABORATORY WORKS, PLEASE CALL US AT 770-3396 (Brenda Kirkham, Manager, Microbiology) or 770-3281 (Dr. Church, Division Head, Microbiology)

The Microbiology Newsletter is also available on the Internet and may be accessed at:
<http://www.crha-health.ab.ca/clin/cme/microbio.htm>

or

<http://www.calgarylabservices.com/LabTests/Microbiology/MicrobiologyNewsletters.htm>

