

Provincial Laboratory Services



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Health PEI
One Island Health System

Blood Culture Utilization and Quality 2020-2022

February 28, 2023

This information applies to: *Island Physicians, Nurse Practitioners, Directors of Nursing, Nurse Managers, Clinical Instructors/Educators and Infection Control Practitioners*

In 2022, almost 7,300 blood cultures were collected from patients across the Island. Regular audits on the proper utilization of this important diagnostic test provide a quality indicator which is measurable. **Our contamination rate remains low and the blood volume collected has improved over volumes collected in 2021.**

1. Blood Volume

The most recent audit indicates that most facility units consistently collected appropriate blood volumes; however, other sites are collecting volumes that are too low. **Incorrect volumes (either too high or too low) directly affect outcomes and lead to contamination and false results (see figure 1).**

The optimal collection volume for adult aerobic and anaerobic culture vials is 8-10mL and current blood collection policies require marking optimal blood volume level on the vial prior to performing venipuncture.

The QEH Microbiology laboratory will continue to add comments to blood culture reports where vials are received without a volume marking indicated on the bottle. In addition, incident reports will continue to be filed for any facility units that consistently fail to indicate target blood volume.

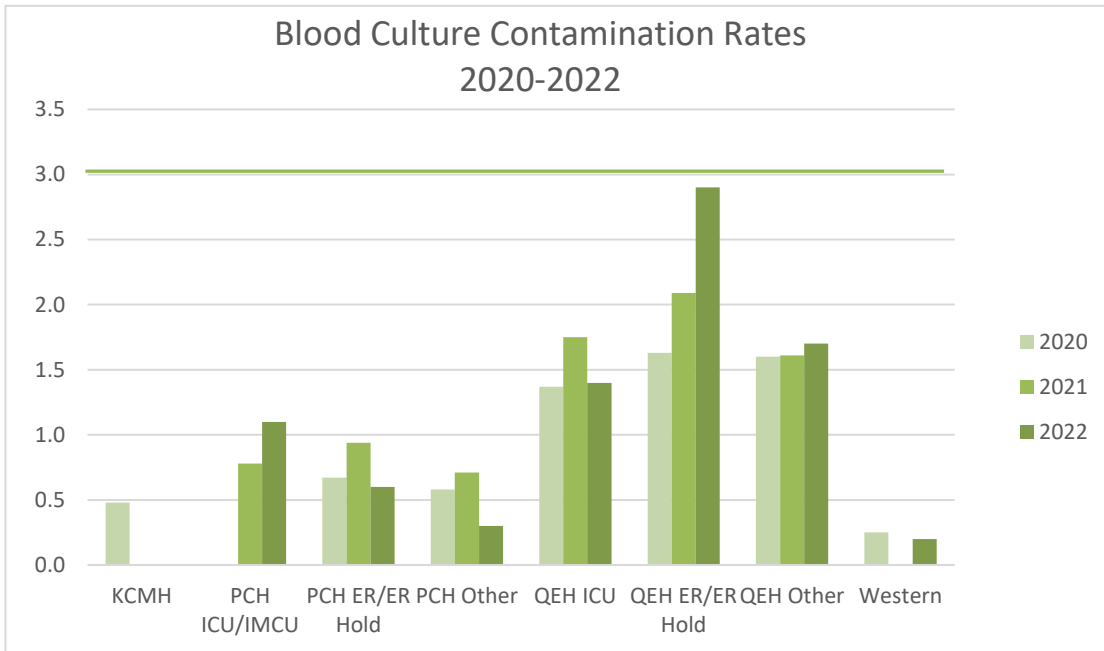
Appropriate Blood Culture Volumes by Facility and Unit

Volume collected too low (<8mL):
QEH ER/ER Hold
QEH Unit 1
QEH Unit 8

Appropriate volume collected (8-10mL):
PCH ER/ER Hold
PCH ICU/IMCU
PCH Medical
PCH Surgical
QEH ICU
QEH Unit 2
QEH Unit 3
QEH PSU

Figure 1: Percentage of blood culture volumes. Incorrect (light green) and Correct (dark Green). Target blood volume for adult aerobic/anaerobic culture vials is 8-10mL/vial. Locations collecting <100 adult aerobic vials/year could not be included in the blood volume audit.

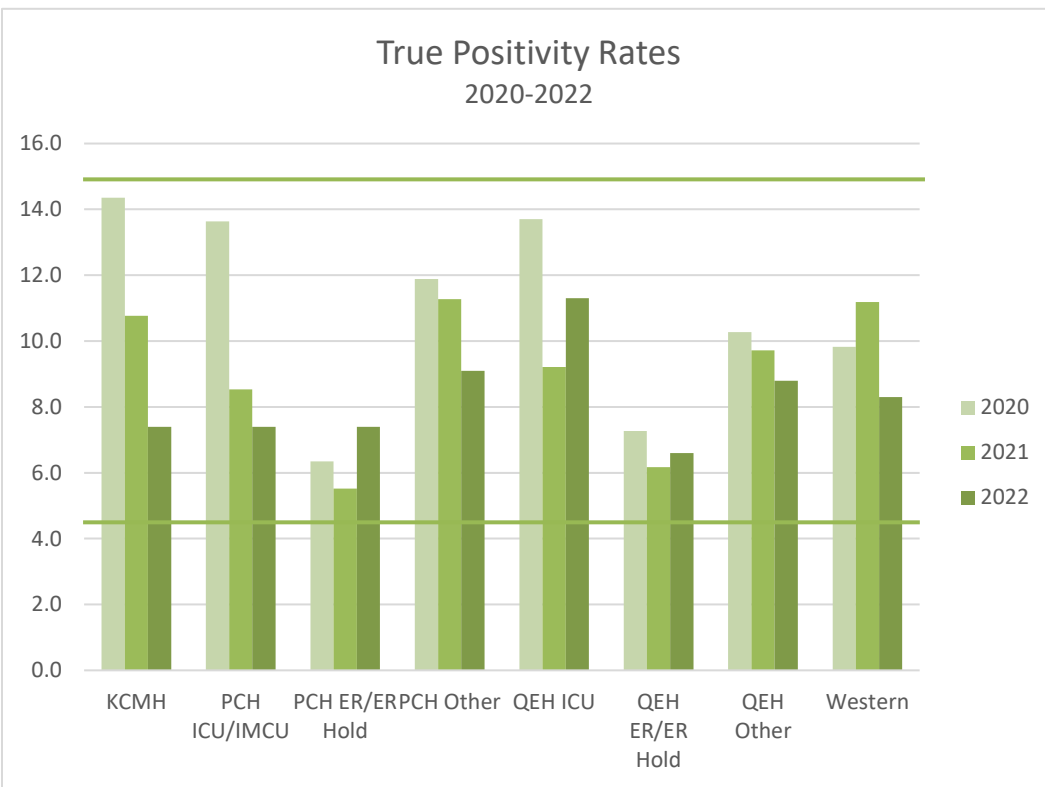
2. Contamination and True Positivity



The target contamination rate is $\leq 3\%$ (see figure 2). Although the contamination rate for a few sites increased in 2022, generally sites throughout the province continue to do well regarding this aspect of collection technique.

The goal rate for true positivity is 5-15%. True positivity is the percentage of positive blood cultures (excluding contamination) over all blood cultures collected (see figure 3).

Figure 2: Comparison of blood culture contamination rates for 2020 vs 2021 vs 2022. Target contamination rate is $<3\%$



A true positivity of less than 5% may indicate that blood cultures are being collected too often; however, it may also be due to inappropriate collection technique (i.e. underfilled vials). A true positivity of greater than 15% indicates that blood cultures are not being collected often enough.

References: Baron, E. J. *et al.* (2005). Blood Cultures IV. In E. J. Baron (Ed.), *Cumitech: Cumulative Techniques and Procedures in Clinical Microbiology* (pp. 1-25). Washington, DC: ASM Press; Doern, G. V. *et al.* (2019). Practical Guidance for Clinical Microbiology Laboratories: A Comprehensive Update on the Problem of Blood Culture Contamination and a Discussion of Methods for Addressing the Problem. *Clinical Microbiology Reviews*, 33(1). Doi: 10.1128/CMP.00009-19.

Figure 3: Comparison of blood culture positivity rates for 2020 vs 2021 vs 2022. Target positivity rate range is 5-15%.

For more information, contact:

Vanessa Arseneau
Chief Technologist
Provincial Laboratory Services
Queen Elizabeth Hospital
(902) 894-2310
VLArseneau@ihis.org

Jennifer Dowling
Medical Laboratory Technologist II
Microbiology Lab
Queen Elizabeth Hospital
(902) 894-2312
JLDowling@ihis.org