Poor Performance on Collecting Correct Volume of Blood Across the Province - Blood Culture Utilization and Quality 2018-2020

February 23, 2021

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

Blood cultures are one of the most important microbiological tests available to the clinician. In 2020, over 6,500 blood cultures were drawn from patients across the Island. Regular audits on the proper utilization of this diagnostic test provide a quality indicator which is measurable. Our contamination rate remains very low; however, blood culture volume is an **on-going major problem** requiring prompt attention.

1. Blood volume

The most recent audit indicated that Western Hospital consistently collected appropriate blood volumes; however, almost all other sites are collecting **too much blood per bottle,** with three sites collecting too little. Incorrect volumes (either too high or too low) directly affect outcomes and lead to **falsely negative results** (see figure 1).

The optimal volume to be collected in adult aerobic and anaerobic culture vials is 8-10mL.
Please see QEH Nursing policy “Blood Cultures” and/or Provincial Laboratory Procedure “PRMPRE002 Blood Cultures Collection” for collection instructions.

These current blood culture collection policies require **marking the optimal blood volume level on the culture vial prior** to performing venipuncture (see appendix 1).
In the future, the Microbiology laboratory will be adding a comment to blood culture reports where culture vials are received without a blood volume marking indicated on the bottle. In addition; incident reports will be filed monthly for any facility units that fail to indicate the target blood volume on the culture vial. Thank you for providing education to the nursing staff on this practice change.

2. Contamination

The target rate for contamination is ≤ 3% (see figure 2). Sites throughout the province are **doing very well** with regard to collection technique.

Cc: Shane Buchanan
Brian Timmons
Corinne Rowswell

For more information or questions regarding this test process, contact:

Vanessa Arseneau *Chief Technologist, QEH Microbiology* *Queen Elizabeth Hospital* *(902) 894-2310* *vlarseneau@ihis.org*	*Jennifer Dowling* *Medical Lab Technologist II* *Queen Elizabeth Hospital* *jldowling@ihis.org*	*Dr. Kristen Mead* *Provincial Medical Director* *Laboratory Services* *(902) 894-2316* *kamead@ihis.org*

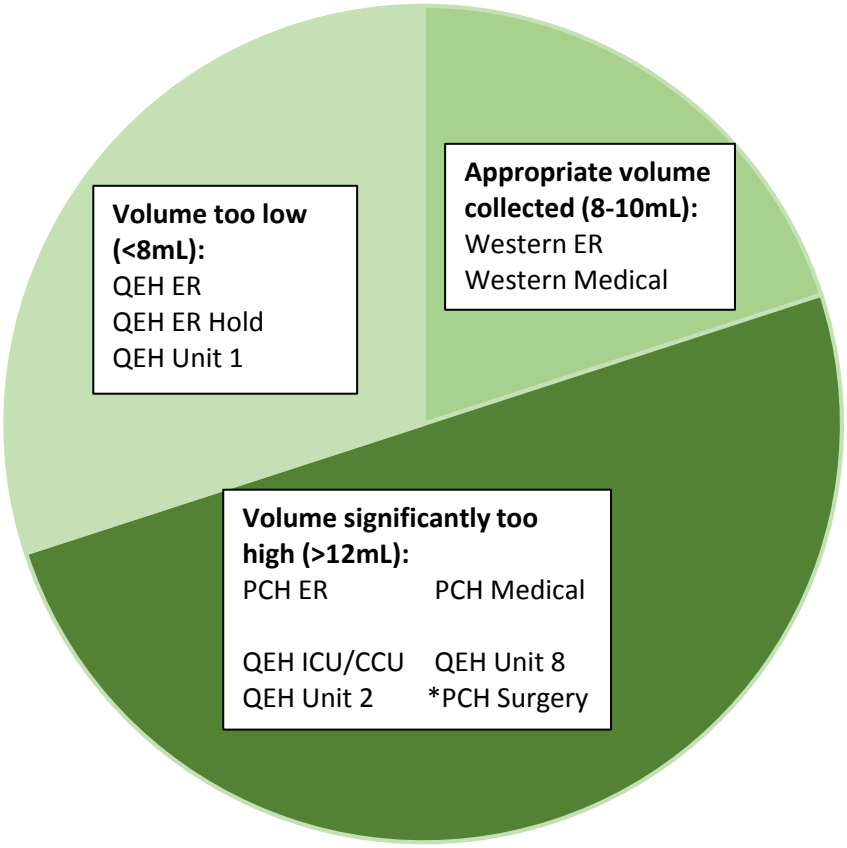
REFERENCE: Baron, E. J. *et al*. (2005). Blood Cultures IV. In E. J. Baron (Ed.), *Cumitech: Cumulative Techniques and Procedures in Clinical Microbiology* (pp. 1-25). Washington, DC: ASM Press.

Appendix 1: Blood culture vial with required blood volume level marked

Volume end line (required volume is 8-10mL)

Volume start line

Figure 1: Blood Volumes



Appropriate volume (8-10mL)

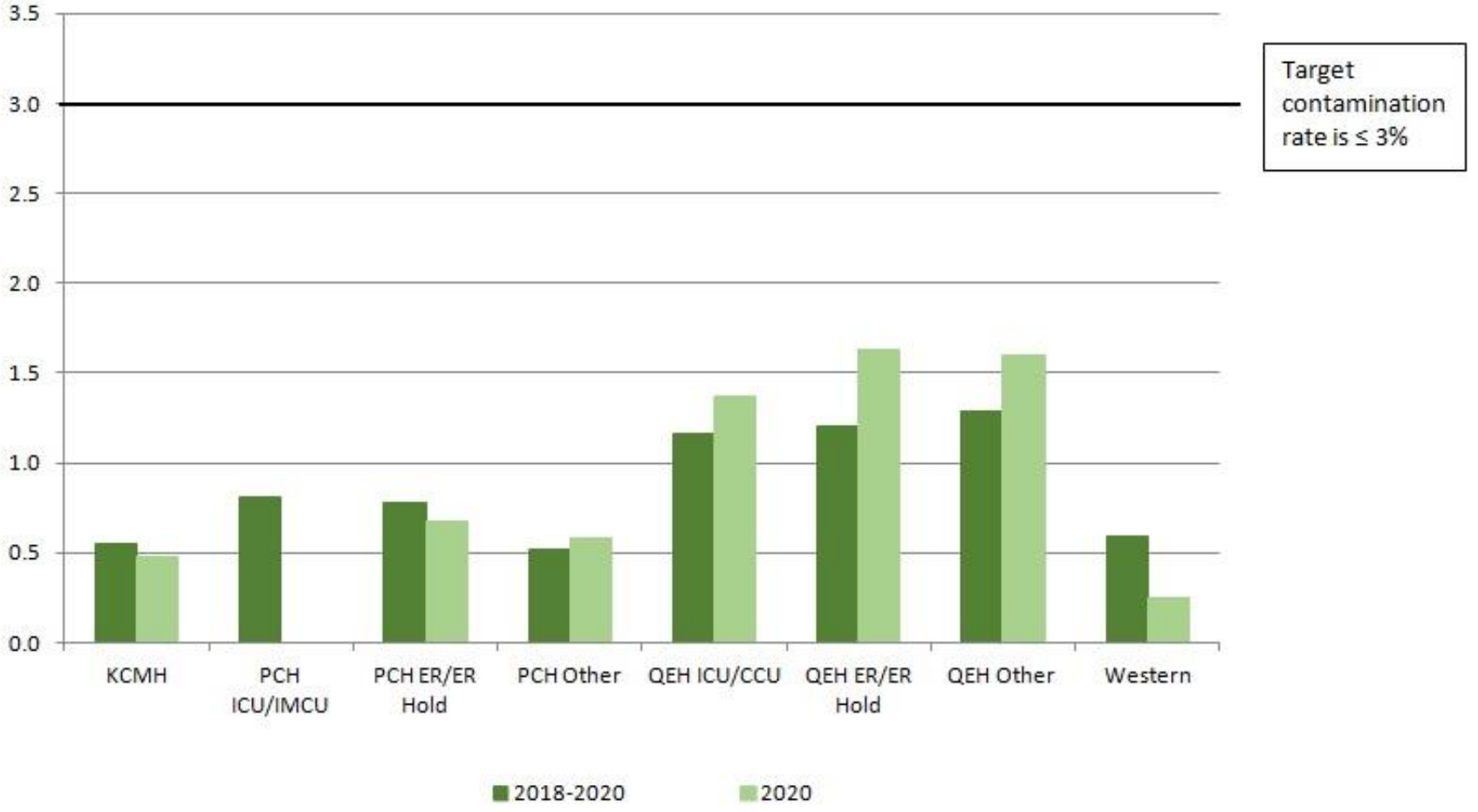
Volume significantly too high (>12mL)

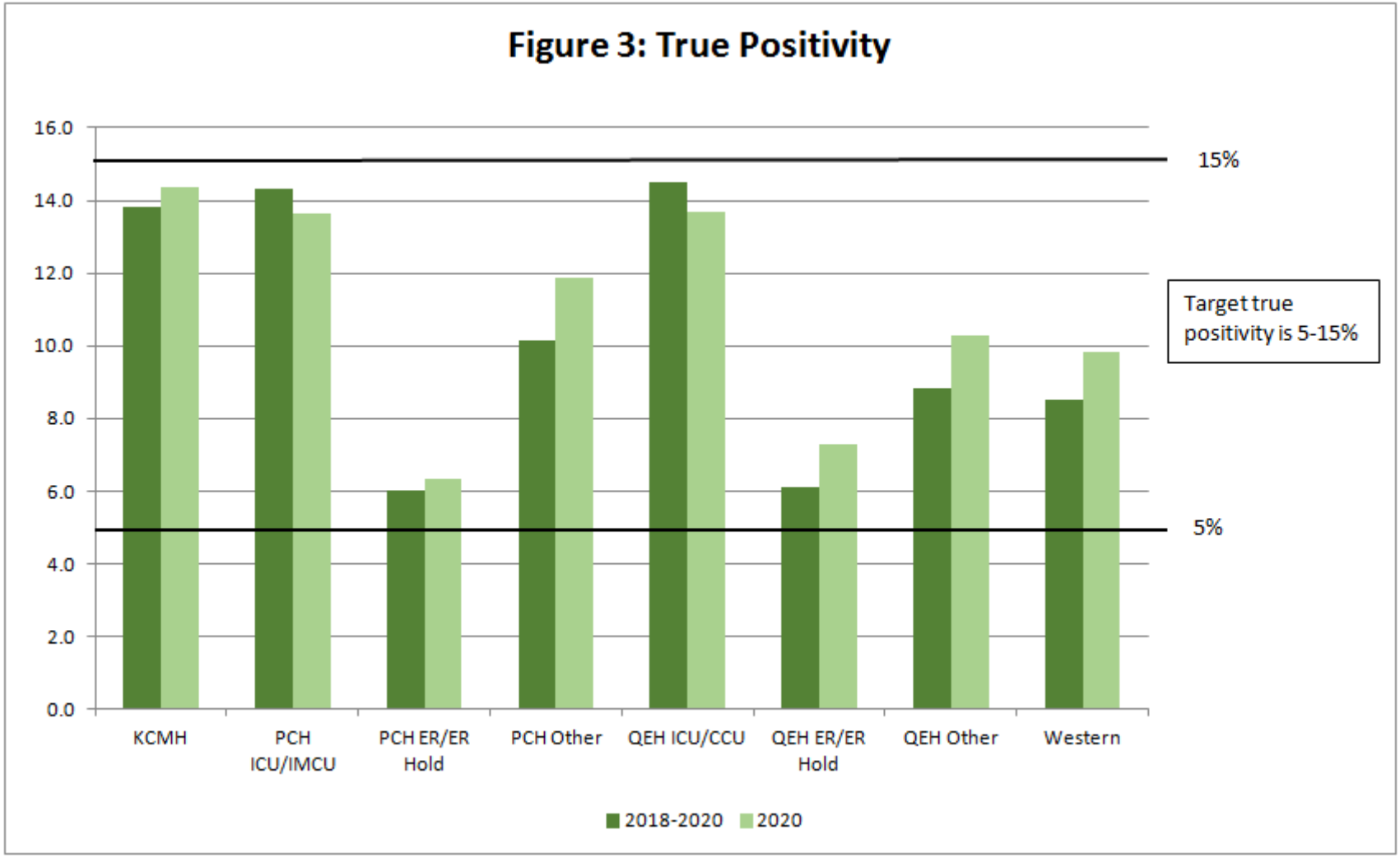
Volume too low (<8mL)

*PCH Surgery collections were evenly divided between blood volume collected significantly too high (35%) and marginally too high (35%).

Locations collecting <100 adult aerobic vials/year could not be included in the blood volume audit.

Figure 2: Contamination





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 2).

- A true positivity of less than 5% indicates that blood cultures are being collected too often. A low true positivity may also be due to inappropriate collection technique (ie. underfilled vials).
- A true positivity of greater than 15% indicates that blood cultures are not being collected often enough.