

# A CLUSTER-WIDE BLOOD CULTURE CONTAMINATION REDUCTION PROGRAM

Cheng KL (1) Ng PY (1), Lee KP (1), Cheung WS (2), Chang SL (2), Luk S (2), Leung WC (3), Lam PK (4), Chan WWM (5)

(1) Infection Control Team, Caritas Medical Centre, (2) Infection Control Team, Princess Margaret Hospital (3) Infection Control Team, Yan Chai Hospital (4) Information Technology Division, Princess Margaret Hospital, (5) Central Nursing Division, Kowloon West Cluster

## BACKGROUND



Blood culture contamination has significant impacts on patient care and clinical outcomes.

It can lead to false diagnoses of bacteremia or sepsis, resulting in unnecessary antibiotic treatment and increased healthcare costs.

In Kowloon West Cluster (KWC) hospitals, contaminated blood cultures contributed to up to 9% of cases during the root cause analysis of MRSA bacteremia in 2024. To address this, a cluster-wide quality improvement program was initiated with an aim to

- i) to standardize the protocol on blood culture collection across KWC;
- ii) to evaluate the technique of collectors with repeatedly contamination events and
- iii) to provide phlebotomists with specific, timely feedback on contamination rates.

## METHODS

### i) Standardization of Protocol

A unified KWC blood culture collection protocol was established, emphasizing sterile glove use, aseptic technique, and proper skin antisepsis.



Comprehensive training materials—including a demonstration video, photo-guide, and competency checklist—were developed. Over 500 collectors (doctors, nurses, and phlebotomists) were trained in Q3–Q4 2025.

### ii) Evaluation of Collectors with Repeated Contamination

Any collector (doctor, nurse, or phlebotomist) with two contamination events within six months underwent a formal reassessment of their technique using a standardized checklist. From 2024 to 2025, 73 collectors were evaluated.

Common lapses identified included inadequate skin antisepsis contact time (<30 seconds), failure to allow complete air-drying, and insufficient disinfection of the blood culture bottle septa.



### iii) Phlebotomist-Specific Contamination Report

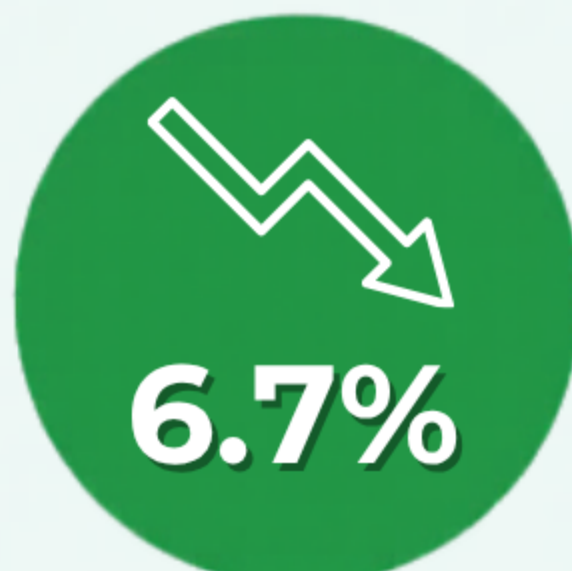
To close the feedback loop, a personalized contamination report—modeled on a successful initiative from Yan Chai Hospital—was implemented with the assistance of KWC and Head Office IT.



This report provides individual contamination rates alongside an anonymous team average, fostering peer benchmarking, self-reflection, and behavioral change. The system was launched in Q3 2025.

## RESULTS

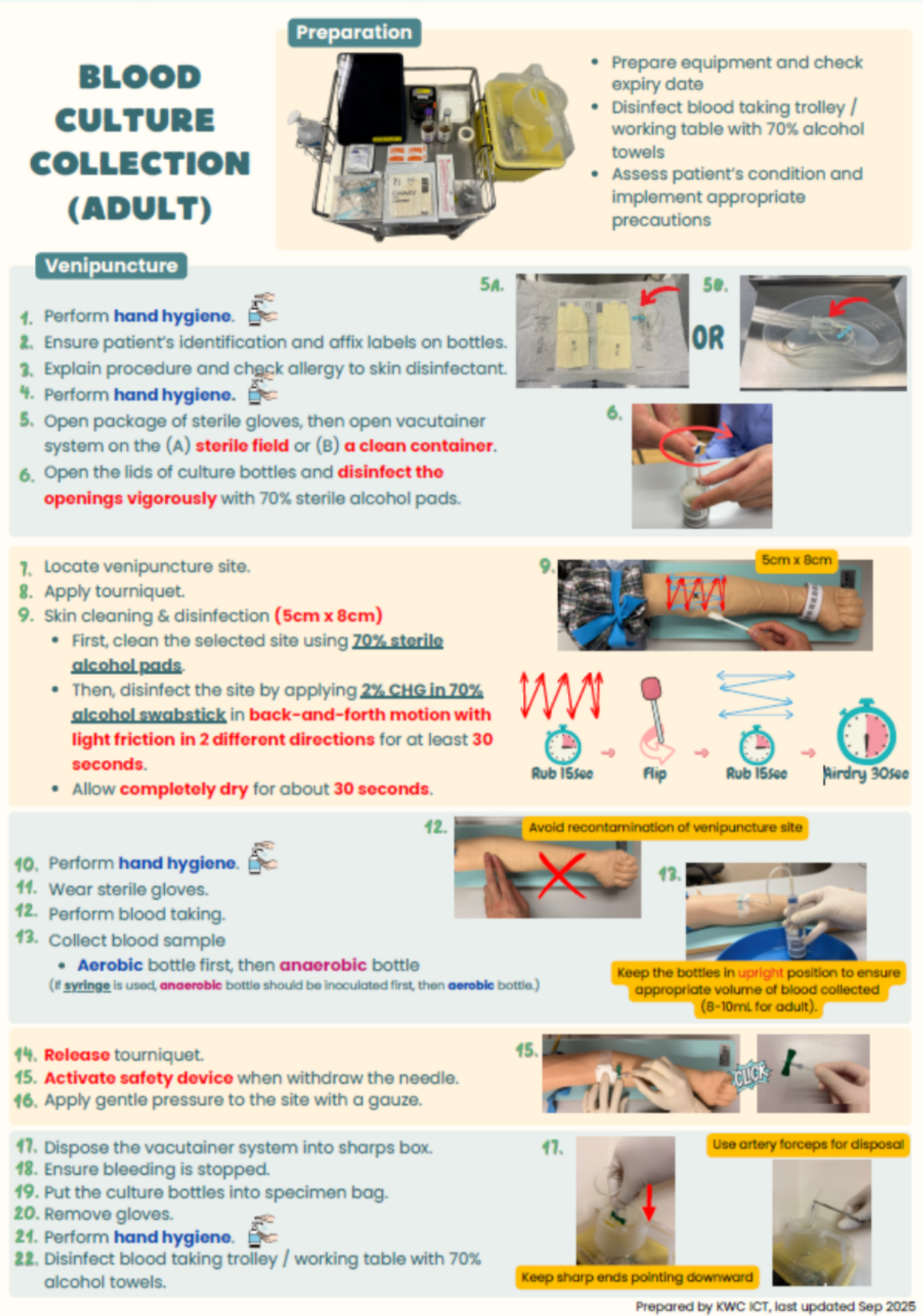
This multifaceted initiative resulted in a measurable reduction in blood culture contamination.



Cluster-Wide Contamination Rate Decreased (Q1-Q2 vs. Q3-Q4 2025)

The contamination rate decreased by 6.7% from the first half (Q1–Q2) to the second half (Q3–Q4) of 2025 in KWC.

A sub-group analysis was performed for individual hospitals due to different implementation stages. Notably, the Evaluation of Collectors with Repeated Contamination began in Q1 2024 at Caritas Medical Centre (CMC). With the addition of the other two interventions in 2025, the number of contaminated blood cultures at CMC decreased from 25 in Q1 2024 to 10 in Q4 2025, representing a 68% reduction. We anticipate achieving greater reductions as the program is fully implemented across all KWC hospitals.



Caritas Medical Centre: Contaminated Blood Cultures

| 血液培養樣本污染報告          |       |         |  |
|---------------------|-------|---------|--|
| 報告期間: 報告控制          |       |         |  |
| 學期: 2025 至 2026 第一季 |       |         |  |
| 部門: 急症室             |       |         |  |
| 負責員工: 謝嘉儀           |       |         |  |
|                     | 合醫期   | 部門 (共計) |  |
| 血液培養樣本總數:           | 2796  | 448     |  |
| 樣本污染總數:             | 0     | 0       |  |
| 污染率 (%)             | 0.21% | 0.00%   |  |

| 姓名 | 血液培養樣本總數 | 樣本污染總數 | 污染率   |
|----|----------|--------|-------|
| 1  | 94       | 0      | 0.00% |
| 2  | 83       | 0      | 0.00% |
| 3  | 81       | 0      | 0.00% |
| 4  | 71       | 0      | 0.00% |
| 5  | 61       | 0      | 0.00% |
| 6  | 54       | 0      | 0.00% |

血液培養樣本污染定義:  
(i) 由病原菌污染之血液或組織液在血液培養瓶內生長之菌落, 包括:  
• 芽生菌屬 (Bacillus species)  
• 腐敗菌屬 (Clostridium species)  
• 假單胞菌屬 (Pseudomonas species)  
• 棒狀芽生菌屬 (Propionibacterium species)  
• 棒狀桿菌屬 (Diphtheroids)  
(ii) 由微生物學室主檢報告有非預期菌落 (MRSA) 血液培養樣本污染

## CONCLUSION

This reduction enhances patient safety and diagnostic accuracy while curbing unnecessary treatments and associated costs. Through a systemic approach combining protocol standardization, targeted reassessment, and continuous feedback, the program has identified key drivers for sustained improvement and equipped healthcare professionals with the tools and knowledge to adhere to best practices.



Caritas Medical Centre