

Sustainability Phase: Reducing the Rate of Central Line Associated Blood Stream Infections in the ICUs

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¹Medical ICU | ²Ward 6A | ³ICU Operations

Mission Statement

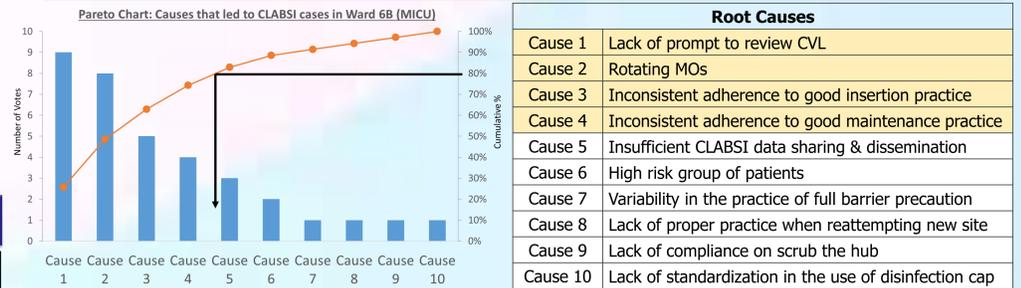
To reduce all ICUs Central Line Associated Bloodstream Infection (CLABSI) rate by 50% from 1.66 to 0.83 per 1000 central line days from Year 2020 to Year 2024

*All ICUs Central Line Associated Bloodstream Infection (CLABSI) rate: 1.66 (median of all ICU CLABSI rates of Year 2020) -> 0.83 (ie. 50% reduction in 3 Years)

Team Members

Team Structure	Names															
Team Lead	Dr Sennen Lew (MICU Director)															
Program Manager	Ms Nur Liyana Binte Ismail (Senior Executive, ICU Operations)															
Pilot Site (Ward 6B MICU) Team Members	SR Dr Angeline Tey Jie-Yin SRP Dr Mathew Sachin Philip NC Zhao Xiaoli ANC Tong Tiong Yein SSN Joey Tung See Yuen NC Gabrielle Chia Jia Min (Infection Prevention & Control)															
Spread Site Core Team Members	<table border="1"> <thead> <tr> <th>Spread Sites</th> <th>ICU Directors</th> <th>Nursing Officers</th> </tr> </thead> <tbody> <tr> <td>Ward 6A CICU</td> <td>Adj A/Prof Chia Yew Woon</td> <td>NC Li Yan & SNM Katherine Wong Kar Kar</td> </tr> <tr> <td>Ward 3B SICU</td> <td>Dr Lau Yie Hui</td> <td>SNC Hafizah Hasim</td> </tr> <tr> <td>Ward 3A NICU</td> <td>Dr Wong Yu Lin & Dr Lim Jia Yan</td> <td>NC Wong Hon Guan</td> </tr> <tr> <td>Ward 3E/3F OICU</td> <td>Dr Benjamin Ho & Dr Vicky Ng</td> <td>SNM Lorraine Tan Yee Ching</td> </tr> </tbody> </table>	Spread Sites	ICU Directors	Nursing Officers	Ward 6A CICU	Adj A/Prof Chia Yew Woon	NC Li Yan & SNM Katherine Wong Kar Kar	Ward 3B SICU	Dr Lau Yie Hui	SNC Hafizah Hasim	Ward 3A NICU	Dr Wong Yu Lin & Dr Lim Jia Yan	NC Wong Hon Guan	Ward 3E/3F OICU	Dr Benjamin Ho & Dr Vicky Ng	SNM Lorraine Tan Yee Ching
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Sponsors	Adj A/Prof Tan Hui Ling SNM Tan Pei Fern (ICU Unit Nurse Manager)															
Subject Matter Expert	DDN Poh Bee Fong (Infection Prevention & Control)															

Pareto Chart



Implementation

Root Causes	Interventions Roll Out at Pilot Site (Ward 6B MICU)	Time Period
Cause 1: Lack of prompt to review CVL	a) Empower nurses to prompt review of lines > 14 days b) Documentation of daily line review	Aug 2021 to Nov 2022
Cause 2: Rotating MOs Cause 7: Variability in Full Barrier Precaution Practices	a) STOP CLABSI Poster b) On-the-Floor Supervision by Trained Seniors c) Just-in-time Onboarding of MOs d) CVC PPE Poster	Sep 2021 to Jan 2022
Cause 3 & 4: Inconsistent adherence to good insertion and maintenance practice	a) Central Line Insertion Audit b) Central Line Maintenance Audit c) Performance Feedback & Learning	Feb 2022
Cause 5: Insufficient CLABSI data sharing & dissemination	CLABSI chart on display in tea room	Sep 2022
Cause 6: High risk group of patients	Octenisan Wipes	Dec 2021

Evidence for a Problem Worth Solving

- Central Line Associated Bloodstream Infection (CLABSI) is associated with increased morbidity, hospital length of stay and healthcare costs.
- In the TTSH Intensive Care Units (ICUs), implementation of full barrier precautions and a line maintenance bundle since Year 2016 and 2017 has helped to bring down CLABSI rates in the hospital. The effect of these interventions plateaued, and there were likely to be other factors which drive the CLABSI rate.
- In Year 2021, interventions to address these factors were implemented in one ICU as the pilot site and if found to be effective were spread to other ICUs.



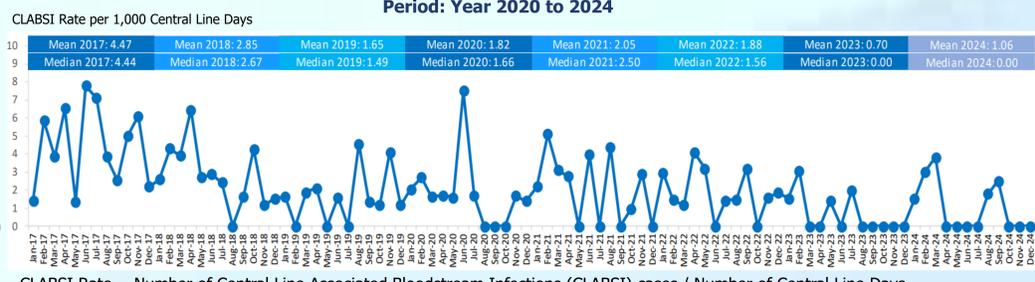
Results

TTSH Hospital Overall CLABSI Rate

Year	2020	2021	2022	2023	2024
Annual CLABSI Rate	1.82	2.05	1.88	0.70	1.06
No. of CLABSI Case	14	18	15	5	7

A significant reduction in CLABSI infections over the course of the project.

CLABSI Rates in all ICUs



CLABSI Rate = Number of Central Line Associated Bloodstream Infections (CLABSI) cases / Number of Central Line Days
Source: QMIS

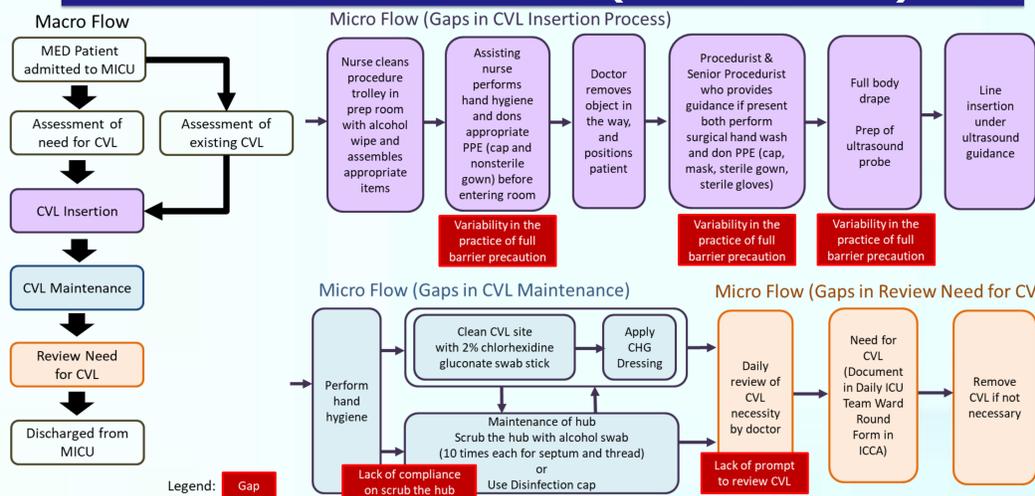
Cost Savings

For Ward 6B	CLABSI	No CLABSI
Average Length of Stay (Per Patient)	16.5 days	6 days
Total Cost of Care (Per Patient)	16.5 x \$4477 = \$73,870.50	6 x \$4477 = \$26,862
Bed Days Saved per Prevented CLABSI (Per Patient)	16.5 - 6.0 = 10.5 days	
Potential Cost Saved per Prevented CLABSI (In Monetary Terms)	\$73,870.50 - \$26,862 = \$47,008.50	

Lessons Learnt

- The approach to containment of CLABSI rates is multidisciplinary. Staff need to feel that they have some skin in the game.
- Cases of CLABSI were painstakingly analyzed and a root cause analysis was undertaken to identify factors which led to the occurrence of the case.
- The results of the audits and CLABSI rates were regularly announced at nursing roll calls and department meetings, which lead to increased staff engagement and buy in.

Flow Chart of Pilot Site (Ward 6B MICU)



Cause and Effect Diagram

