



Reduction of Methicillin-Resistant Staphylococcus Aureus (HO-MRSA) Bacteraemia Using Multi-Strategies Approach

Singapore Healthcare Management 2024

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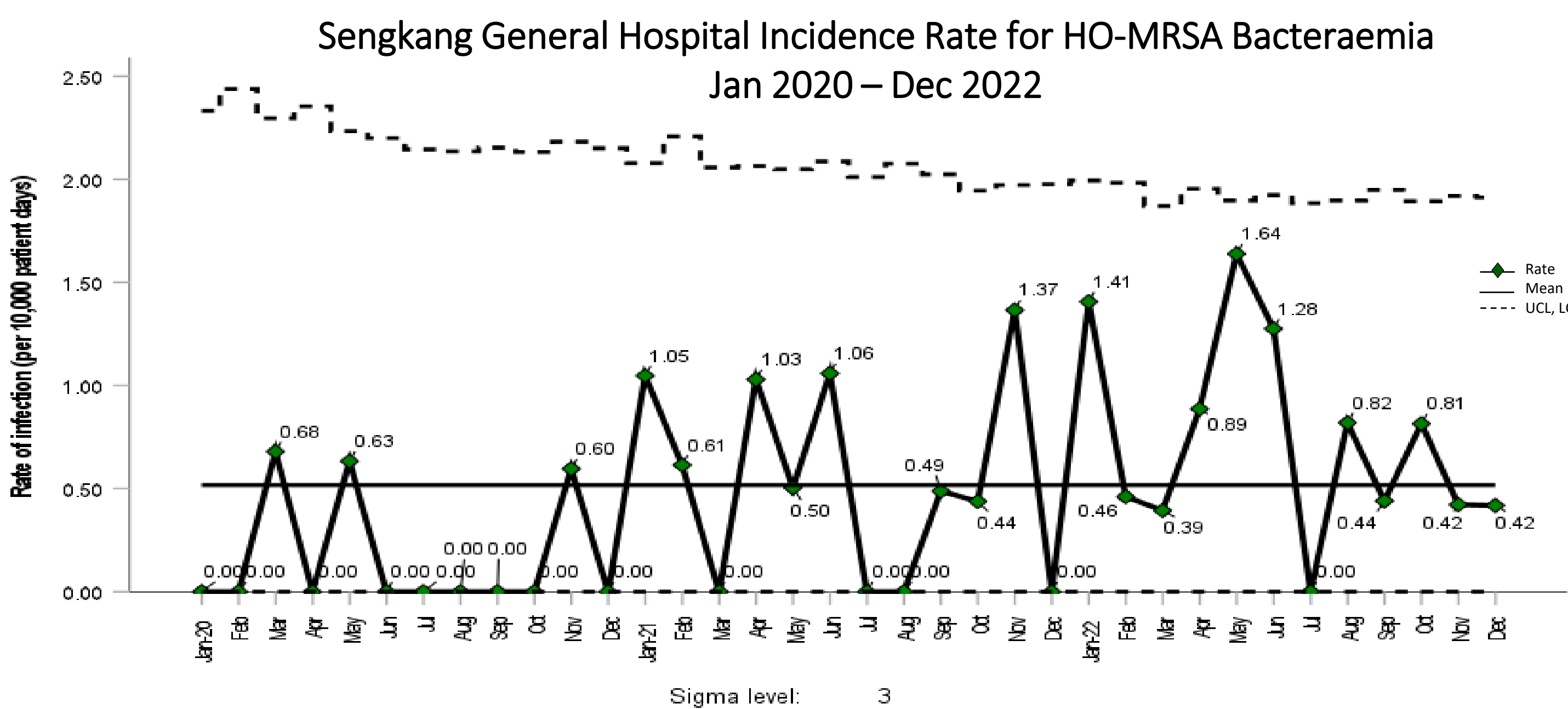


Background

Methicillin-resistant *Staphylococcus aureus* (MRSA) bacteraemia is a blood stream infection caused by antibiotic-resistant bacteria which posing serious health risk and prolong hospitalization. It also increases morbidity and mortality rate and surges healthcare cost. Hence, Ministry of Health Singapore sets Healthcare-Onset MRSA (HO-MRSA) bacteraemia as one of the Key Performance Indicator (KPI) for all acute care hospitals.

Existing control measures in Sengkang General Hospital (SKH) are active surveillance of MRSA upon admission, transfer and discharge, contact precautions for MRSA cases, environment cleaning with sodium hypochlorite 1000ppm for MRSA cases, hand hygiene programme, bed discharged audit with fluorescent marker and UVC light, daily antiseptic shower/bed sponging for MRSA patients and post infection review for all HO-MRSA bacteraemia.

SKH annual HO-MRSA bacteraemia rate had been increasing since 2020 from average 0.16 per 10,000 inpatient days to 0.74 per 10,000 inpatient days in 2022, more than threefold increase in the HO-MRSA bacteraemia rate. Due to COVID-19 pandemic, healthcare workers (HCWs) efforts were spent curbing COVID-19 pandemic from 2020.



Mission Statement

To reduce HO- MRSA bacteraemia rate in SKH by 50% within 12 months.

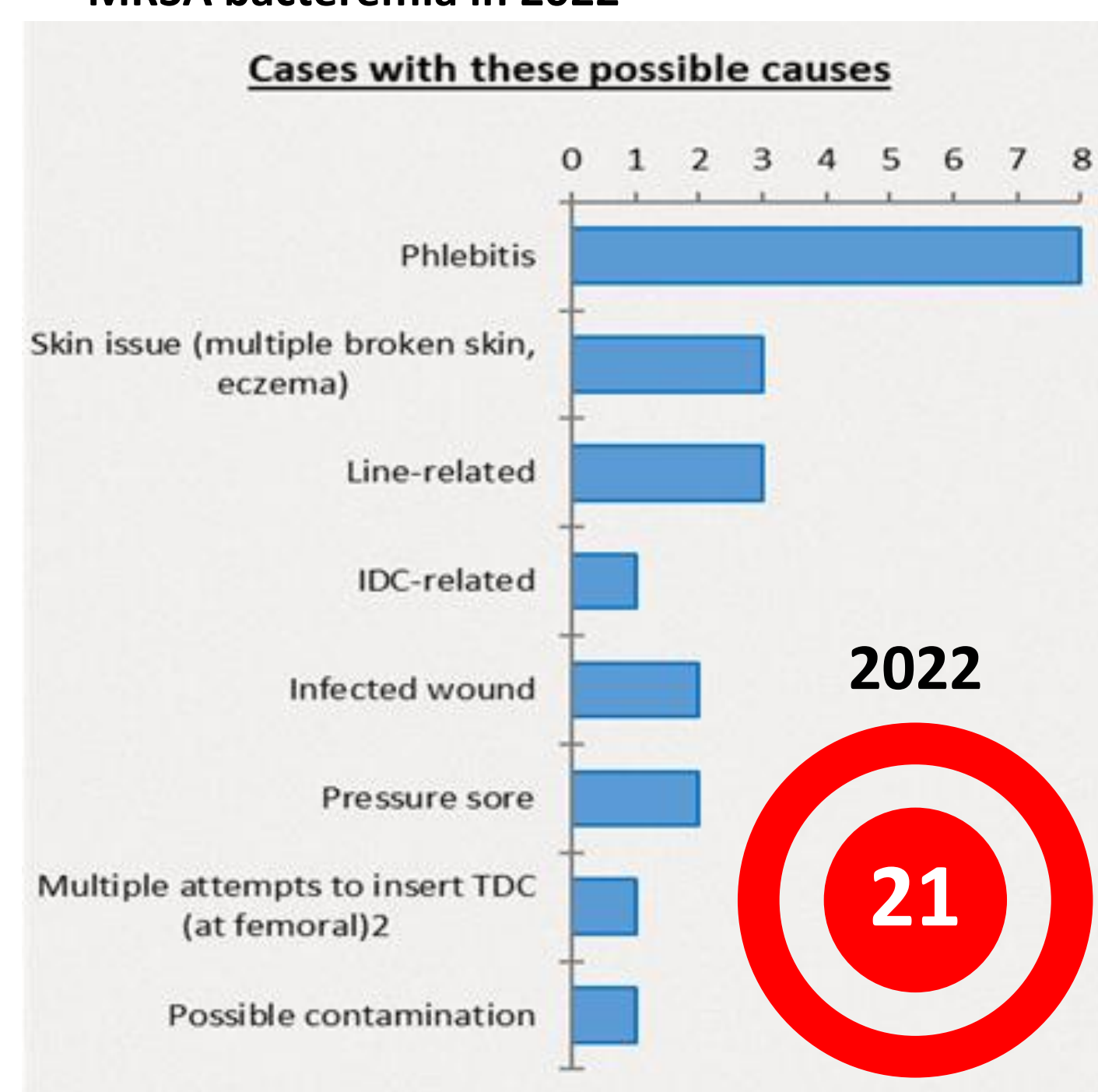
Methodology

Post infection review was done for every case of HO-MRSA bacteremia with infectious disease physician and infection prevention control team.

There were total of 21 cases of HO-MRSA bacteremia in 2022. Major causative factors were phlebitis and patient related factors such as skin diseases (psoriasis, eczema), infected wound, pressure sores. Other factors including trauma during indwelling urinary catheter, invasive line insertion and possible blood culture contamination during collection (Table 1).

Since majority of the HO-MRSA bacteraemia were related to phlebitis and patient factors. Infection Prevention and Control (IPC) team met up and discussed on the interventions targeting phlebitis and patient factors.

Table 1 – Analysis causative factors for HO-MRSA bacteremia in 2022



Top 3 non-compliances identified from phlebitis care audits are:

1. Insertion site was not monitored every shift for phlebitis.
2. Poor maintenance of disconnected infusion tubing (e.g. disconnected tubing has no stopper at the end).
3. Validate the need for cannula

Intervention/ Initiatives

PDSA 1 Nursing Phlebitis Workgroup – started Jan 2023

Education and Awareness

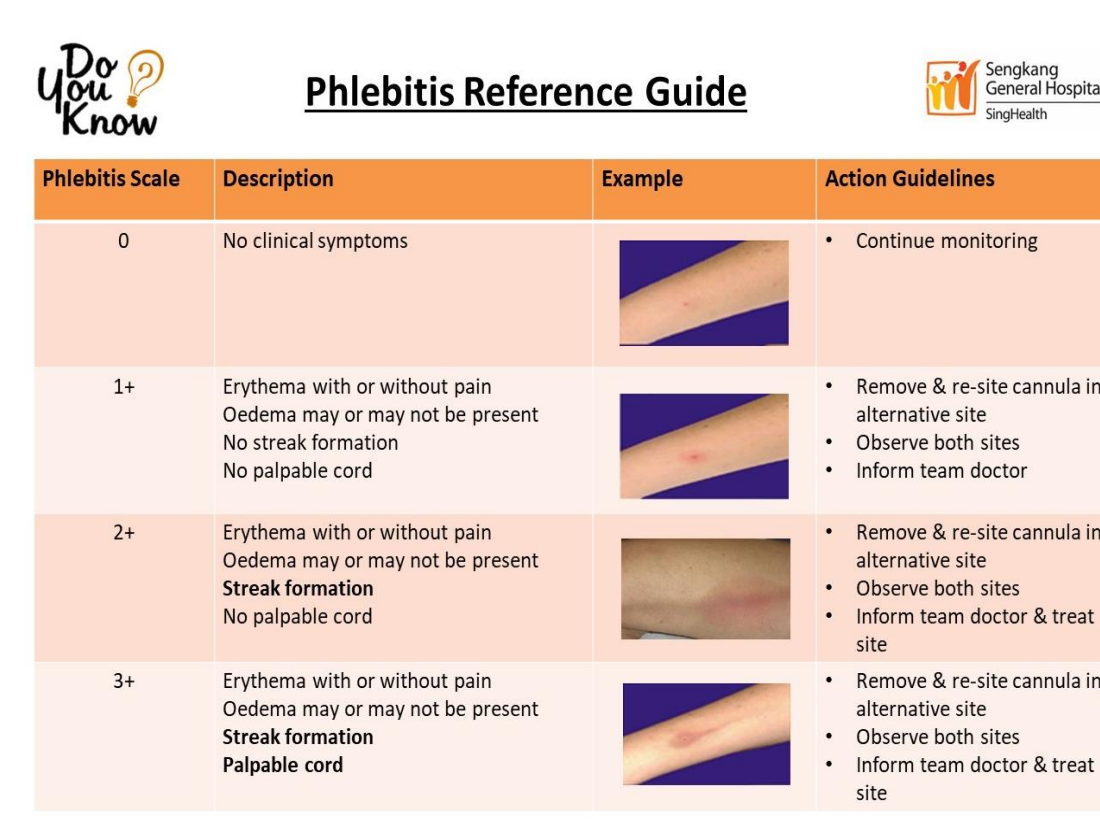
Online refresher course on “Prevention of Phlebitis” were done for all nurses. SKH Zero Harm Fiesta “Prevention of Phlebitis” were held in February 2023 to educate and create awareness about phlebitis. The team had reviewed Quick Reference Guide on phlebitis scale (Picture 1).

Enhanced Documentation

Post cannula removal monitoring documentation were implemented in nursing electronic documentation in March 2023. This is to facilitate nurses to document condition of the site of post cannula removal.

Audits

Audits were conducted by Nursing Quality Management team and safety champion in the wards. The audit tools were revised and focused on cannula insertion, maintenance of intravenous therapy and removal of intravenous cannulation.



Picture 1

Intervention/ Initiatives (continue)

PDSA 2 Reduction of MRSA bioburden from skin source – Feb 2023

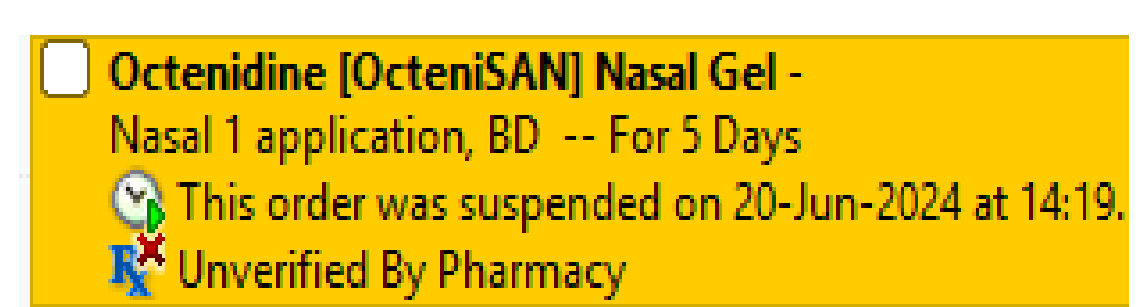
As patient related factors such as skin diseases (psoriasis, eczema), infected wound, pressure sores were identified as another major causative factor of HO-MRSA bacteraemia and after reviewing evidence-based practices reported from local and overseas hospital indicating that by solely performing daily antiseptic shower/bed sponging for MRSA patients were insufficient to reduce the MRSA bioburden from patients. Hence, IPC team decided to further reduce the MRSA bioburden from skin source by extending the bioburden reduction to include decolonisation therapy using nasal antiseptic gel twice a day for five days.

The antiseptic nasal gel were piloted in Ward 410 in 2021. This was later expanded to three other wards in September 2022 and fully rolled out to all inpatient wards in Feb 2023. Inpatient staff nurses were given the order right to facilitate the ordering process. Frequency and duration of nasal gel order is fix to ease the ordering process (Picture 3). Pharmacist were involved in reviewing and verified the order to ensure correct interval and no allergy concern (Picture 4)

Picture 3

Medication Name	Start Date	Order Priority	Route	Dose	UOM	Calc Dose Info	Frequency	Stop After
Octenidine [OcteniSAN] Nasal Gel	20-Jun-2024	Routine	Nasal	1	application		BD	5 Days

Picture 4



Results / Follow up

We met our target of reducing HO-MRSA bacteraemia rate in SKH by 50% within 12 months in 2023. After implementation of PDSA 1 and PDSA 2, **HO-MRSA bacteraemia rate decreased from 0.74 per 10,000 inpatient days in 2022 to 0.24 per 10,000 inpatient days in 2023.** Annual rates HO-MRSA bacteraemia cases decreased by **67.6% from 2022 to 2023.**

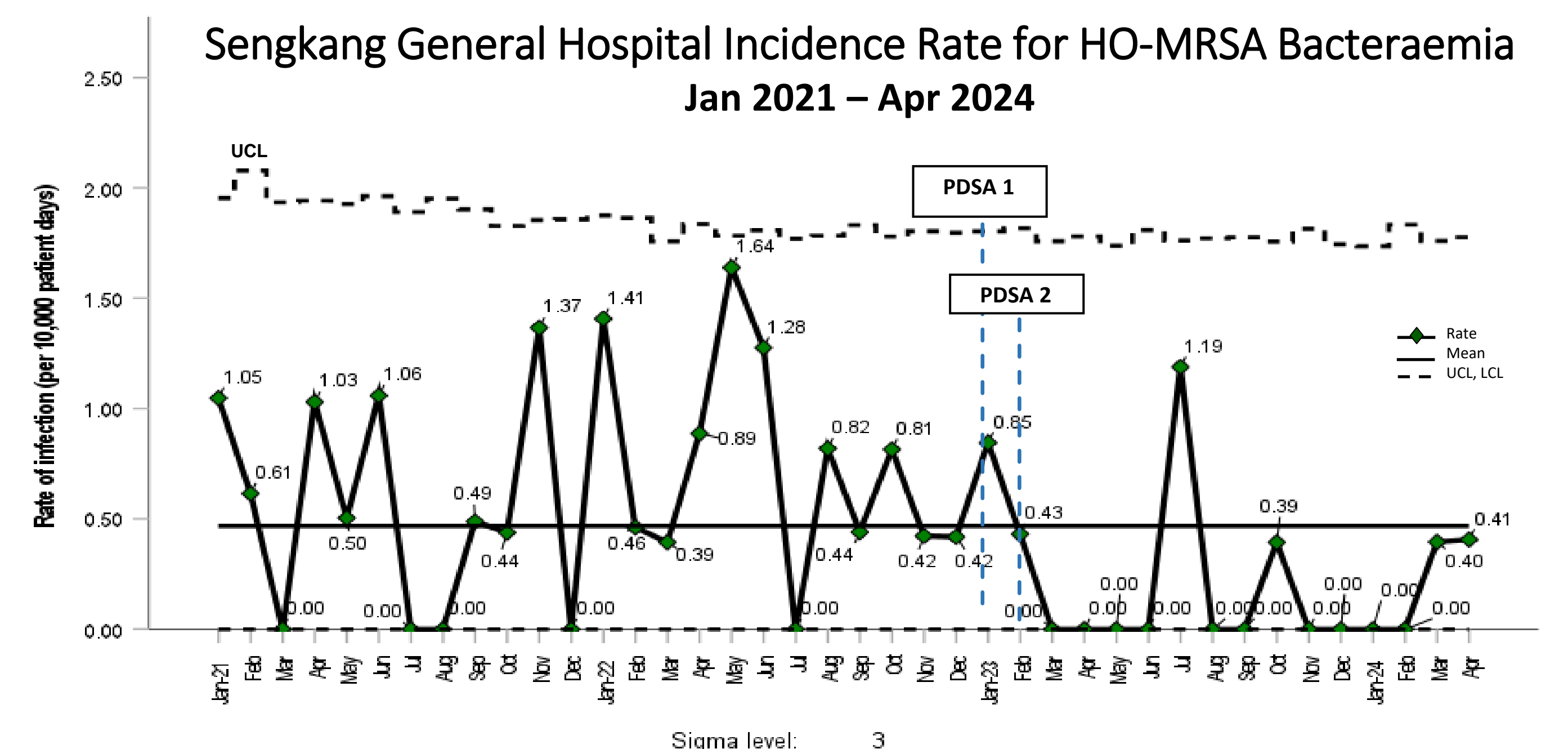
We achieved our target despite increasing patient’s days of 4.5% comparing 2022 with 2023 (refer to table 1). Being a new hospital with ramping up of new beds, there is also increased of new healthcare workers by 7.7% (refer to table 2).

Year	Patient Days	Remarks
2022	282, 932	
2023	295, 705	↑ 4.5%

Year	Average Healthcare Workers (HCWs) (no)	Remarks
2022	3782	
2023	4071	↑ 7.6

Table 1 : Comparing Patient’s Days 2022 with 2023

Table 2 : Comparing HCWS number in 2022 with 2023



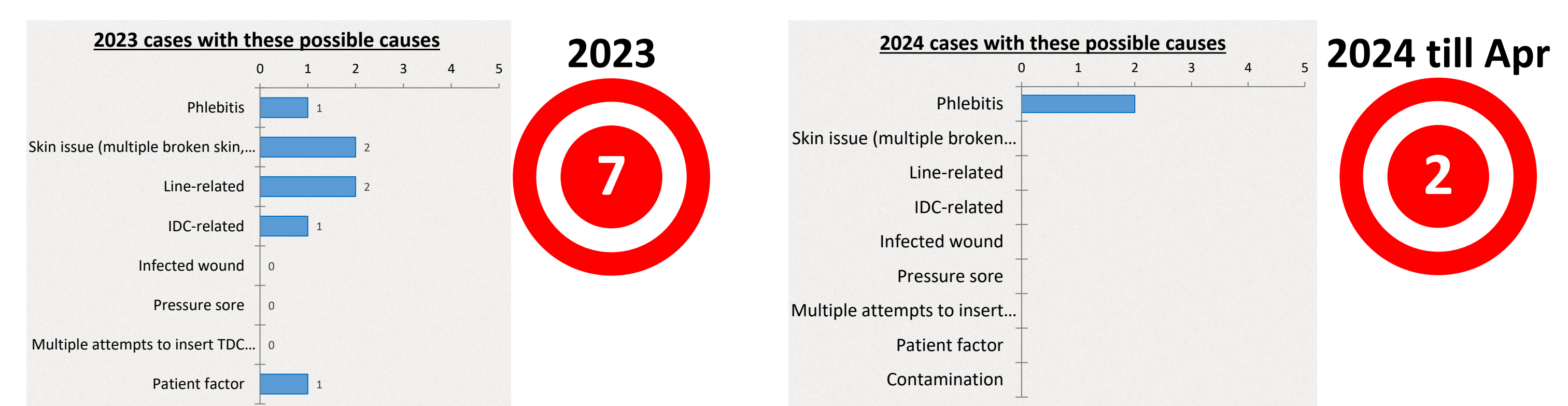
Phlebitis audit results had met the compliance target of 95% . Refer to Table 3

Months	Phlebitis Prevention - Insertion Compliance (%)	Phlebitis Prevention - Care Compliance (%)	Phlebitis Prevention - Removal Compliance (%)
April - June 2023	97.50%	97.20%	97.10%
July - Dec 2023	98.20%	98.00%	97.80%

Table 3 : Results of the Phlebitis Audit

We continued to monitor our HO-MRSA bacteremia in 2024. SKH has only 2 cases from Jan 2024 to April 2024. We noted the phlebitis infection rate was increasing, phlebitis interventions were not sustainable and thus more new interventions were required to reduce phlebitis in SKH.

Analysis of the causative factors for MRSA bacteraemia in 2023 & 2024:



Conclusion

Reduction in HO-MRSA bacteraemia is achievable through interprofessional collaboration and with the use of the multi-strategy approach.

Acknowledgement:

SKH Nursing Quality and Risk Management