

IMPLEMENTATION OF COMPREHENSIVE UNIT-BASED SAFETY PROGRAM FOR THE PREVENTION OF CATHETER ASSOCIATED BLOODSTREAM INFECTIONS

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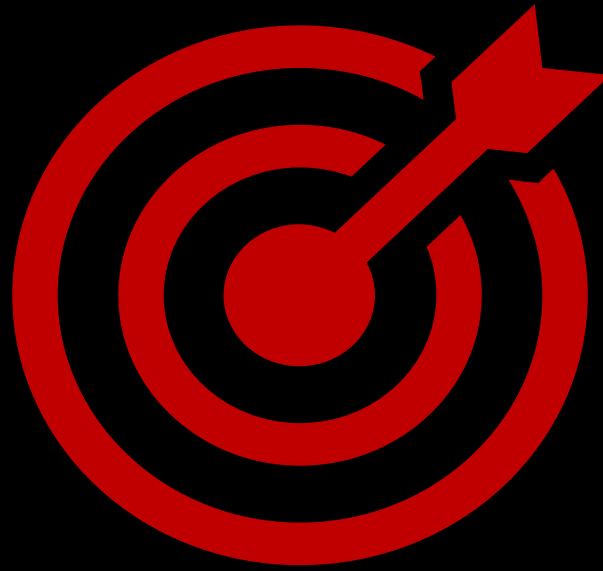
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BACKGROUND

- The growing use of **peripherally inserted central catheters (PICC)** has led to the recognition of the risk of **central line-associated bloodstream infections (CLABSIs)**.
 - *Historical data (2019) – Incidence of CLABSI per 1000 central line days in a **surgical ward** at a teaching hospital was **high (11.5%)***
- CLABSIs can cause **mortality**, increase **morbidity** and **length of stay**, and result in **higher health costs** (Rosenthal et al., 2009).
- **Comprehensive Unit-Based Safety Programs (CUSP)** are sustainable models to reduce CLABSIs
 - *developed by **Johns Hopkins Quality and Safety Research Group** and funded by **Agency for Healthcare Research and Quality** (AHRQ, 2017)*
- CUSP can improve **teamwork and safety culture** and help clinical teams **learn from mistakes** through the integration of **safety practices** into daily work (AHRQ, 2017)

References:

- AHRQ. 2017. Learn about CUSP. Agency for Healthcare Research and Quality, <http://www.ahrq.gov/professionals/education/curriculum-tools/cusptoolkit/modules/learn/index.html>
- Rosenthal VD. Central line-associated bloodstream infections in limited-resource countries: a review of the literature. *Clin Infect Dis.* 2009 Dec 15;49(12):1899-907.

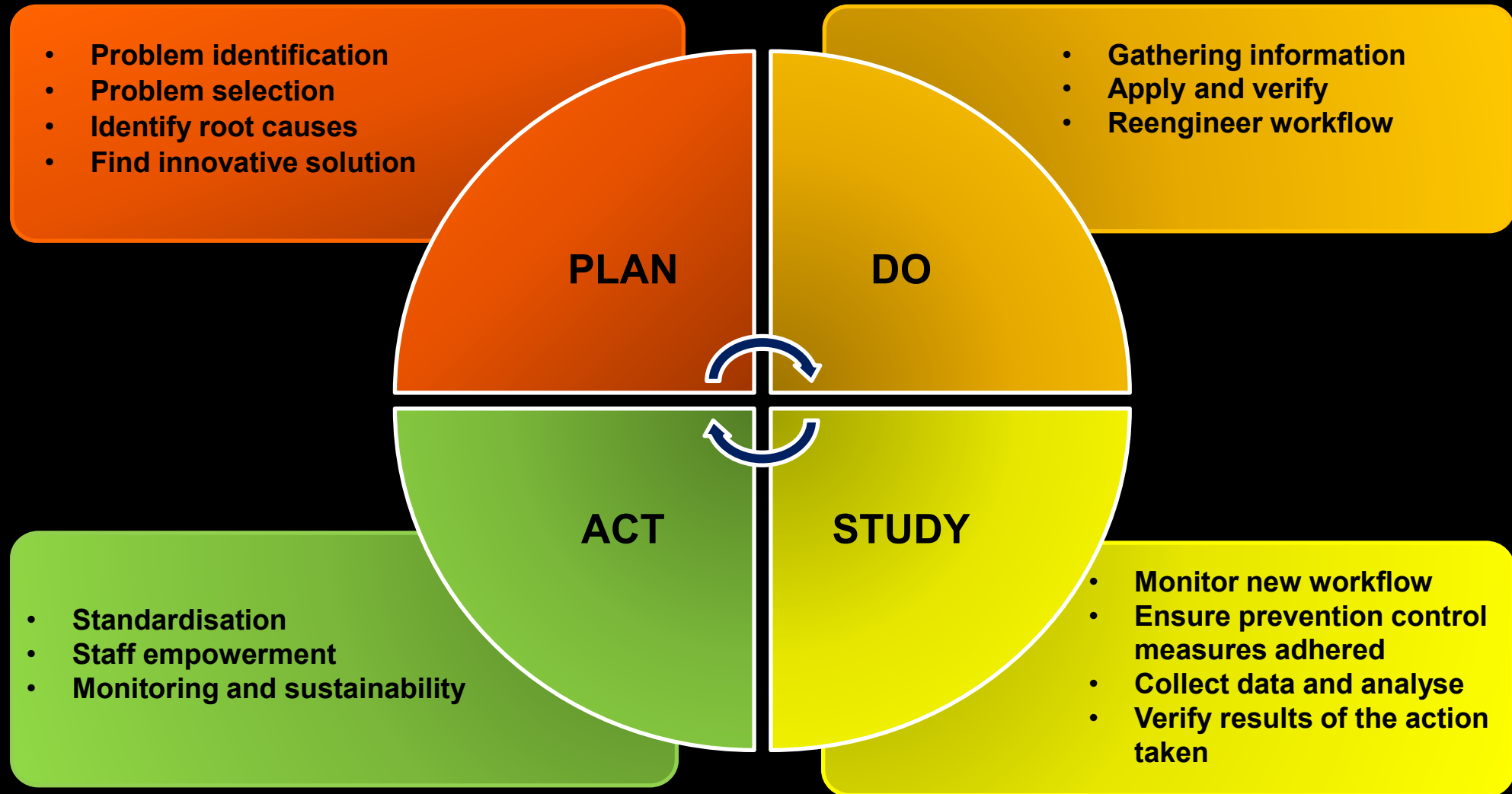


OBJECTIVE

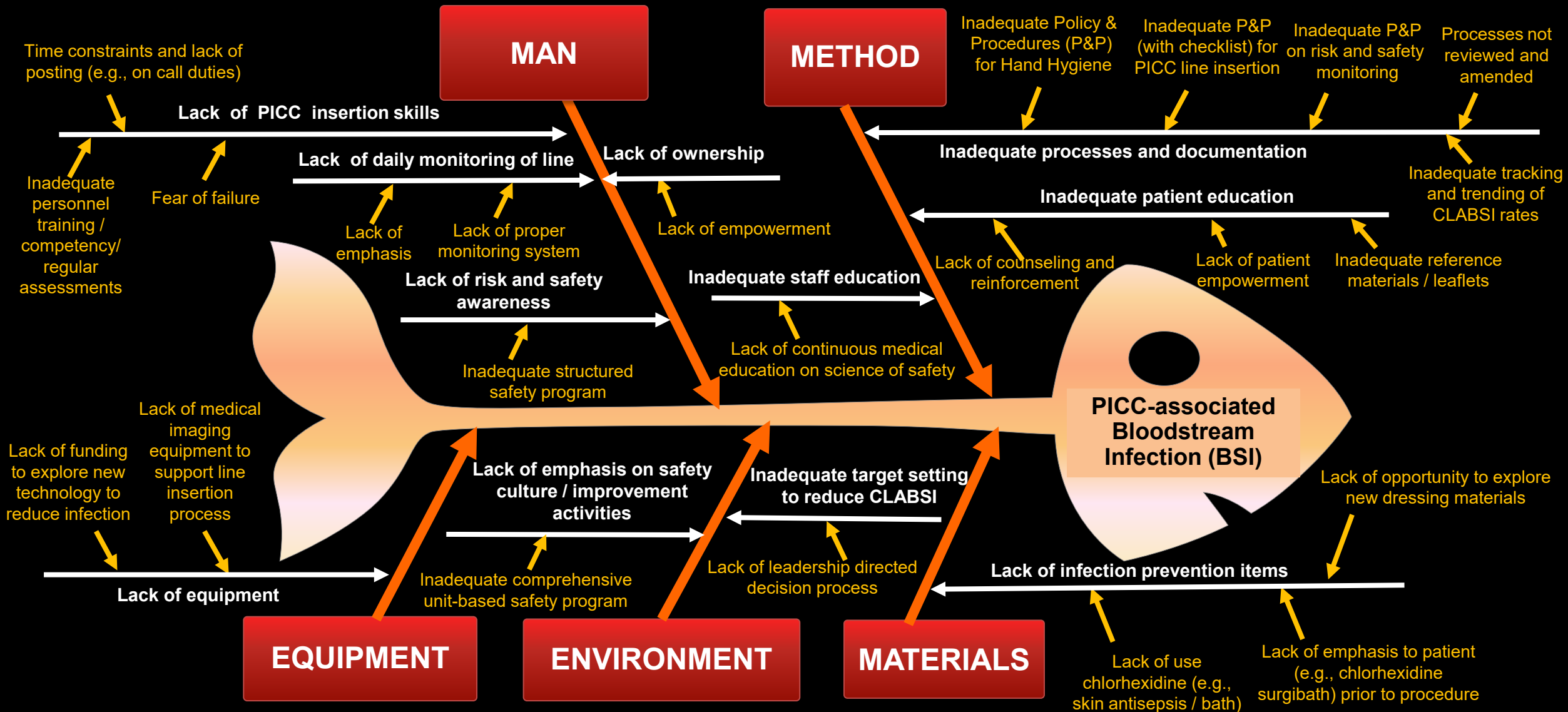
- To evaluate the implementation of **CUSP** for the reduction of **PICC-associated bloodstream infections (BSI)**

AIM

- **<5 per 1000 catheter days**
(target of rate was determined by guidelines set by Ministry of Health, Malaysia)



- CUSP dovetails with and supports a range of **quality and safety improvement models** such as **Plan-Do-Study-Act (PDSA) Cycles** (AHRQ 2017)



Fishbone / Ishikawa diagram for possible causes of PICC-associated BSI

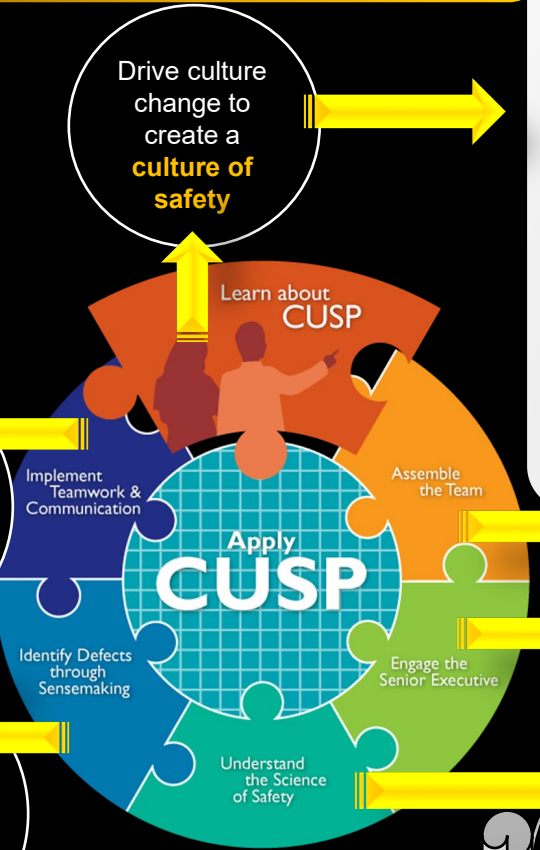
METHODOLOGY APPLY CUSP MODEL

ENVIRONMENT

- Goals of reducing **hospital acquired infections (HAI)** announced
- Target set **<5 per 1000 catheter days** (adopted from MOH, Malaysia)
- Performance **data** was **transparently shared** during **CQA-HAI** meetings

MAN / METHOD / MATERIALS

- Analyzed cause and effects using **Ishikawa (Fishbone)** diagram
- A series of interventions implemented:
 - Reengineer PICC **workflow**
 - Patient Education** (PICC Patient Information Leaflet)
 - Chlorohexidine bath** prior to PICC procedure
 - Chlorohexidine skin antiseptis** (monitoring checklist)
 - Hand hygiene** and **maximal sterile barrier** precautions (monitoring checklist)
 - Standardized** dressing
 - Safety rounds** established by Interventional Radiology team (**24 hours and 48 hours**) post insertion
 - Daily assessment** of line at ward (monitoring checklist)
 - Explore new **technology** / medical imaging **units** for central line insertion
 - Process** and **progress** evaluation (e.g., **analyses** and **improvement activities**)



MAN / ENVIRONMENT

- Organizational level, **clinical quality assurance (CQA)** committee formed.
- Unit level, the **CUSP model** applied using an implementation **science framework (Science of Safety)**
- Concerted efforts initiated to drive culture change through **CUSP model - awareness program**
- Infrastructure initiated to support **quality improvement efforts**
- Obtain **leadership commitment**

MAN / METHOD / ENVIRONMENT

- CUSP implemented with **team-based approach** – **collaboration effort** of **medical imaging** department with **infection control** department and a **surgical ward**
- CUSP team formed - created **coordinating team** and **engaging clinical department staff**, including
 - radiologists
 - infection control physician
 - radiographers
 - medical doctors
 - nurses (from medical imaging, infection control team and surgical ward)

MAN

- Staff training and awareness** of CUSP model
- Education and awareness using **Science of Safety**

Root Cause(s)

Solutions / Interventions

METHOD

- 1. Inadequate processes and documentation
- 2. Inadequate patient education
- 3. Inadequate staff education

- 1. Prepare new Standard Operating Procedures
- 2. Prepare checklist for monitoring and documentation
- 3. Staff education and awareness on science of safety
- 4. Patient education – use Patient Information Leaflet (PIL) to aid explanation and understanding



MAN

- 1. Lack of PICC insertion skills
- 2. Lack of daily monitoring line
- 3. Lack of ownership

- 1. More opportunity for personnel to learn skills (more clinical postings)
- 2. A proper daily monitoring system in Electronic Medical Record (EMR) for documentation and data analysis
- 3. Staff empowerment initiatives (dedicated team with appointed team leader)



EQUIPMENT

- 1. Lack of funding to explore new technology
- 2. Lack of equipment to guide the central line insertion process (*existing unit is shared with other clinical areas*)

- 1. Procure a new ultrasound unit
- 2. To secure grants / fundings

Rejected due to lack of funding



ENVIRONMENT

- 1. Lack of emphasis on safety culture / improvement activities
- 2. Inadequate safety programme
- 3. Inadequate target setting to reduce CLABSI

- 1. To apply Comprehensive Unit-Based Safety Program (CUSP)
- 2. To map and conduct improvement activities following the CUSP model
- 3. Leadership buy in – set target rate based on guidelines
- 4. Goals of reducing Hospital Acquired Infections (HAI) announced



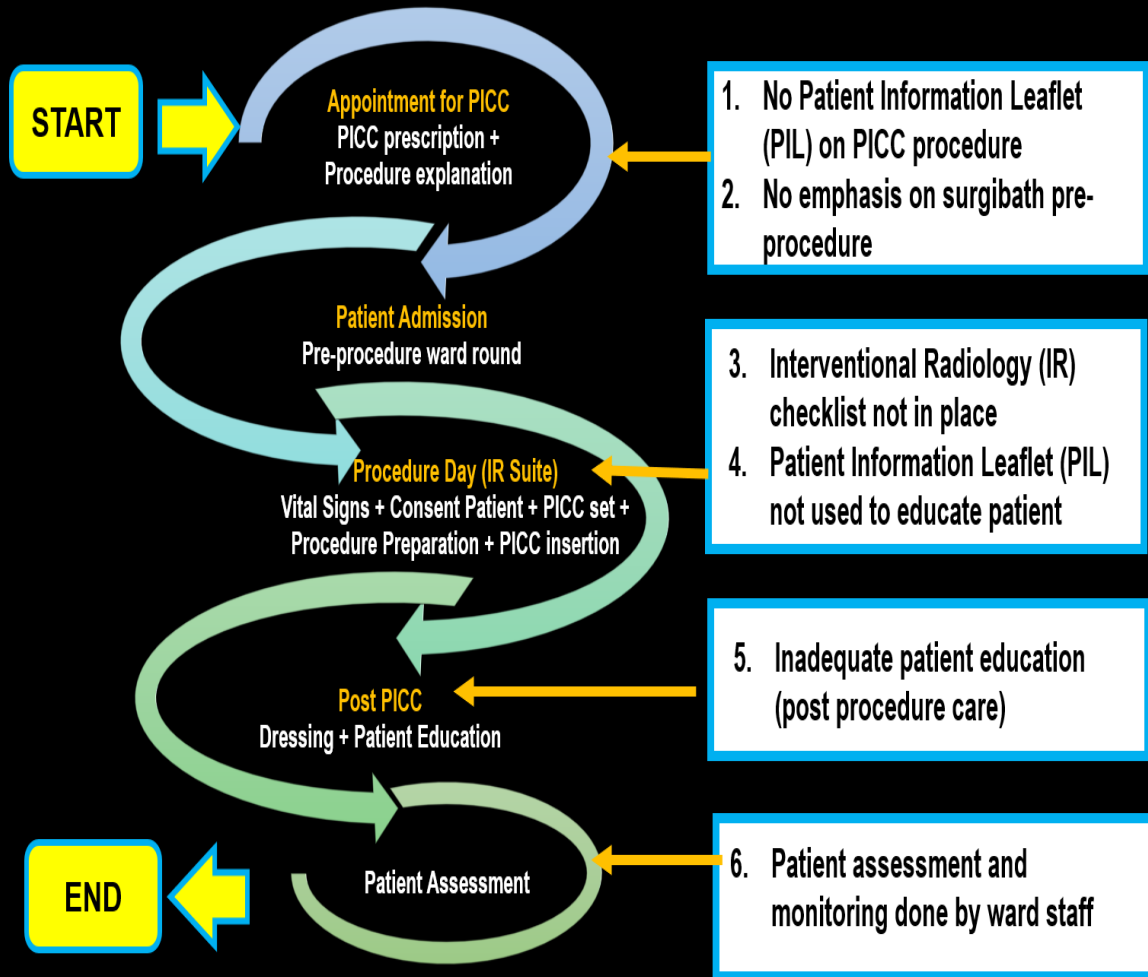
MATERIALS

- 1. Lack of infection prevention items
- 2. Lack of use of antiseptics solutions items
- 3. Lack of opportunity to explore new dressing materials

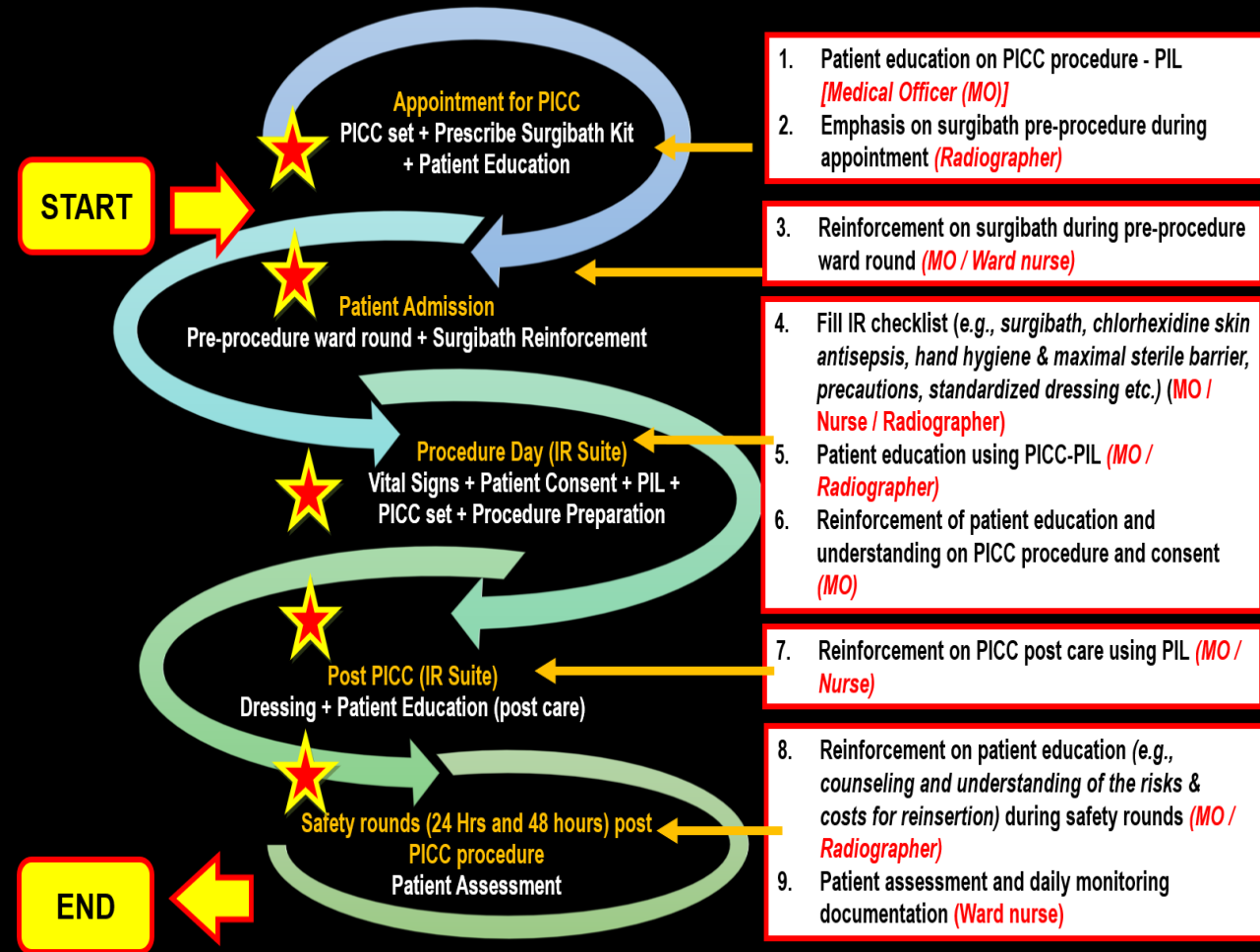
- 1. Reengineer workflow
- 2. Apply chlorhexidine skin antiseptics and bath before procedure
- 3. Compliance to hand hygiene and maximal sterile barrier precautions



PRE-INTERVENTION

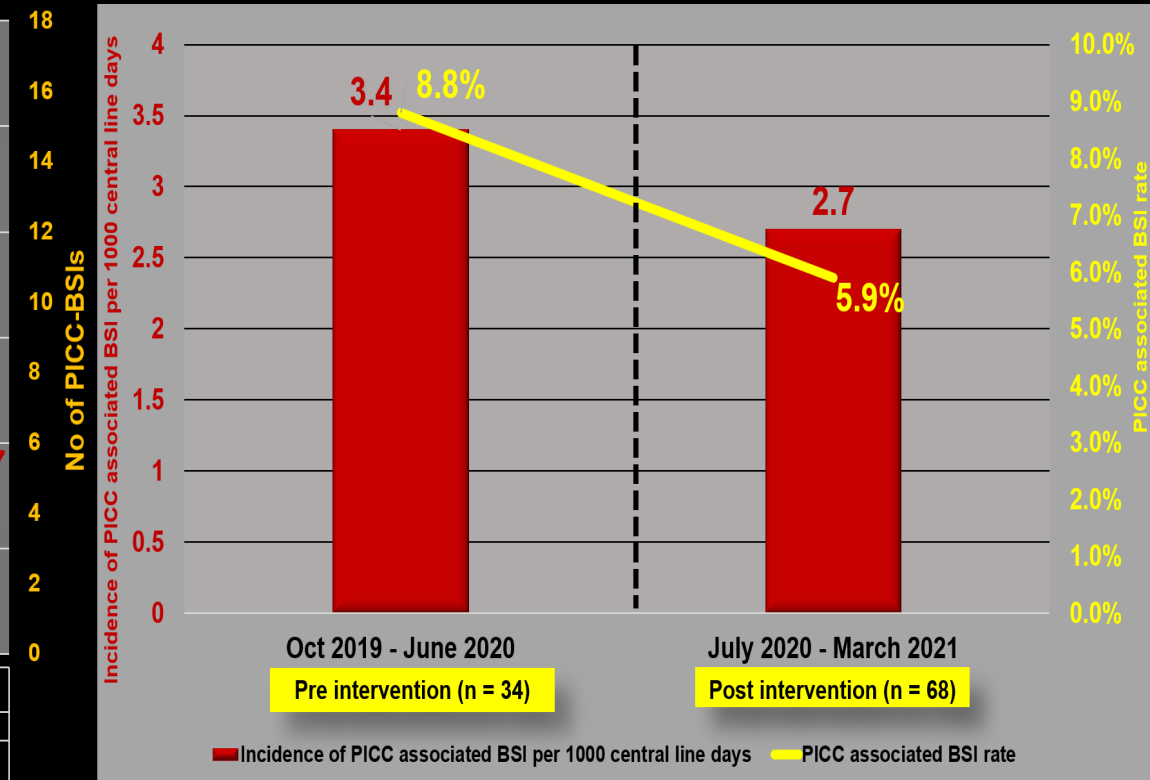
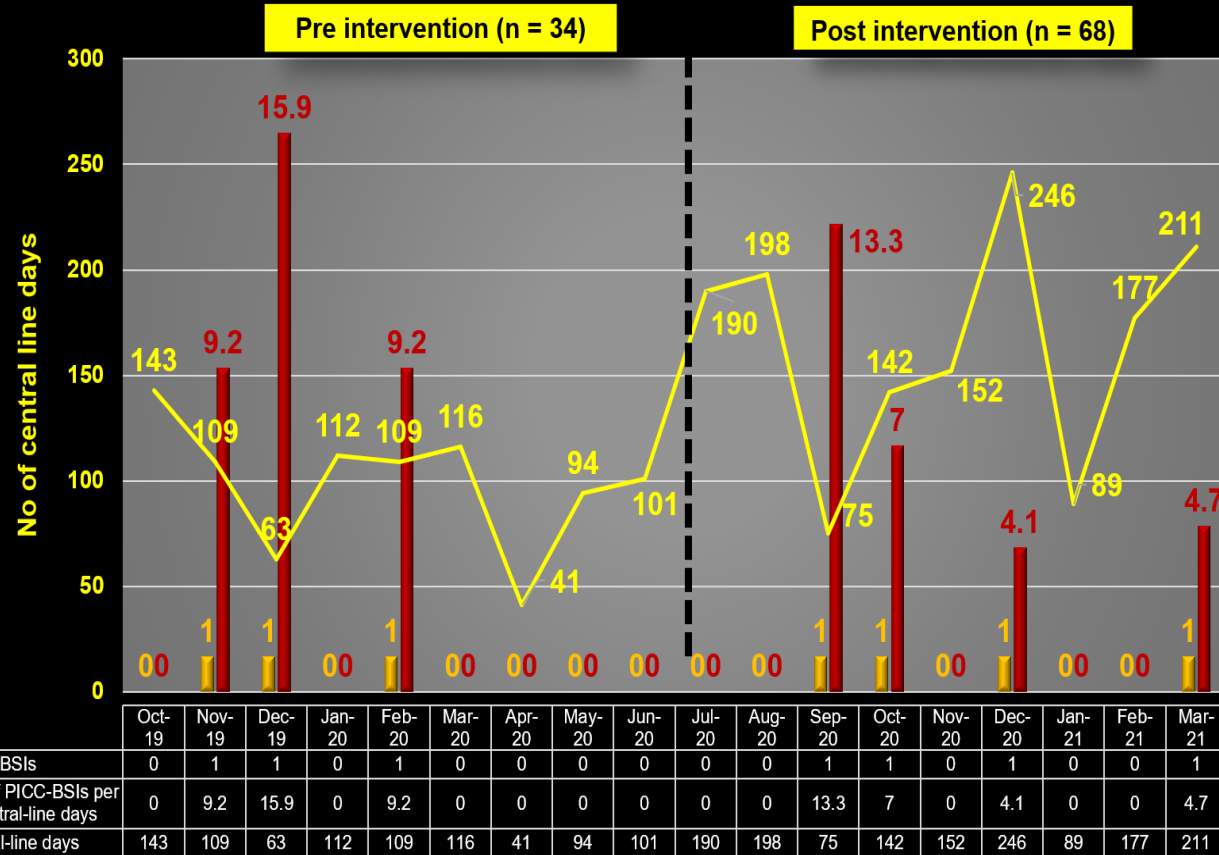


POST INTERVENTION



RESULTS

PERIPHERALLY INSERTED CENTRAL CATHETERS (PICC) ASSOCIATED BLOODSTREAM INFECTIONS



Following CUSP intervention:

- PICC-associated BSI rates had reduced from **3.4 per 1,000** central line days **pre intervention** to **2.7 per 1,000** central line days **post intervention**.
- Correspondingly, **BSI rate** had reduced from **8.8%** to **5.9%**.

CONCLUSION

- CUSP intervention was effectively implemented, and **reduced BSI associated with PICC-lines** inserted at a medical imaging department of a teaching hospital.
- Such interventions should be considered in other medical imaging departments, as it involves **minimal cost** with potentially **large impact** on PICC-associated BSI which are potentially **life-threatening**.
- It is believed that the results of this quality improvement study will **improve healthcare and safety practices**, which will be manifested in measurably **better outcomes** for patients.



NEXT STEP



- Expand the CUSP model to include **other wards** in this hospital
- Culture of **continuous improvement** to **reduce CLABSIs**
- Aim for **ZERO** PICC-associated BSIs