

### **Project Title**

To Design a Peripherally Inserted Central Catheter (PICC) Safeguard to Prevent Dislodgement of PICC

### **Project Lead and Members**

- Neo Soon Keow
- Qin Jing
- Ma Chongyan
- Lim Jia Yan
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### **Organisation(s) Involved**

Changi General Hospital

### **Healthcare Family Group Involved in this Project**

Nursing

### **Project Period**

Start date: Jan 2019

### **Aims**

- To develop a secondary securement device for patient with PICC within 3 months
- To achieve 50% reduction rate of PICC dislodgement in Ward 15 in 2019

### **Background**

See poster appended / below

### **Methods**

See poster appended / below

## **Results**

See poster appended / below

## **Lessons Learnt**

See poster appended / below

## **Conclusion**

See poster appended / below

## **Additional Information**

Singapore Healthcare Management (SHM) Conference 2021 – Merit Award (Patient Experience Category)

## **Project Category**

Technology, Product Development, Product Evaluation, Prototyping Resources, Care & Process Redesign, Quality Improvement, Valued Based Care, Patient Satisfaction, Productivity, Cost Saving, Safe Care, Risk Management

## **Keywords**

Dislodgement Incidents, Product Redesign

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Singapore Healthcare Management 2021

# To Design a PICC Safeguard to Prevent Dislodgement of PICC

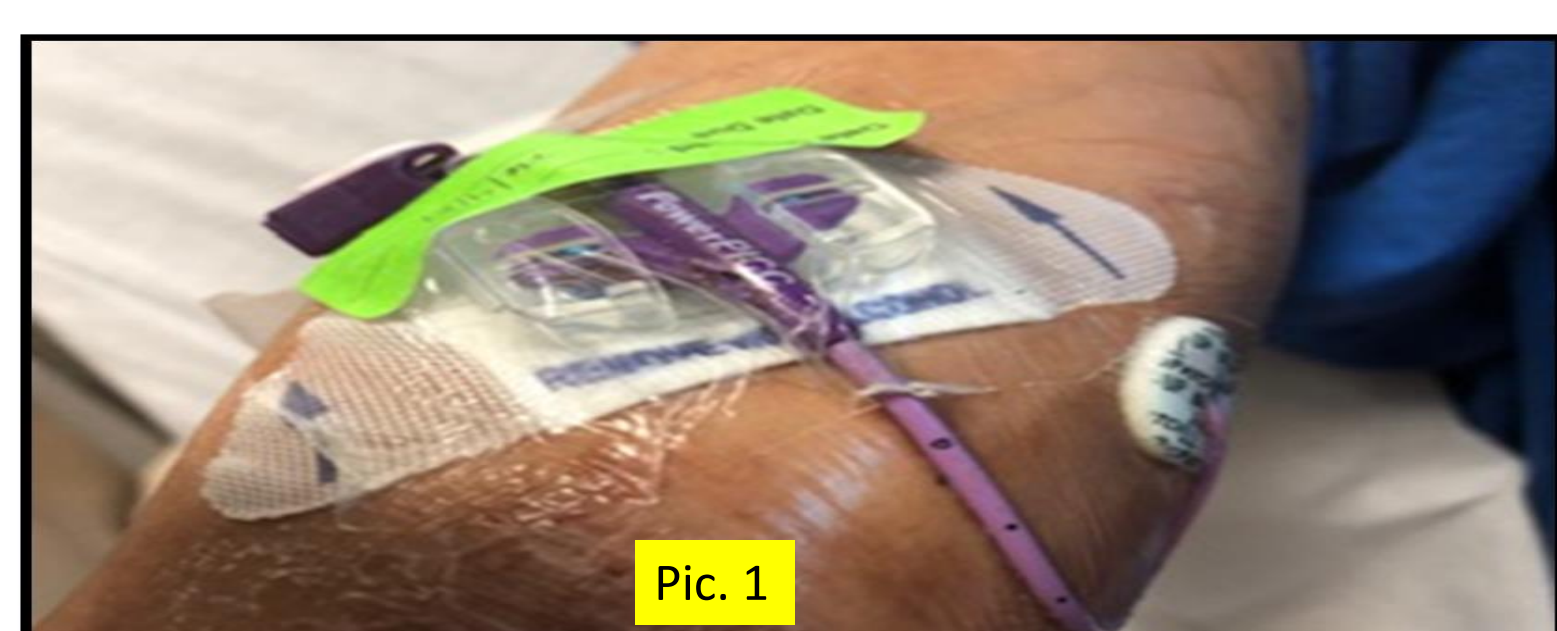
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## Project Background

From 2016 to current, there were 27 cases of Peripherally Inserted Central Catheter (PICC) dislodgement incidents reported in CGH. PICC dislodgement associated with many patient safety issues, such as haemorrhage and embolization may occur with serious complications. Reinsertion increase cost, prolong hospitalization and also significantly affect patient's experience.



PICC dressed up with stat lock and transparent dressing



PICC External lines exposed and tangling without support potentially loosen PICC dressing and increase risk of dislodgement

## Aims

- To develop a secondary securement device for patient with PICC within 3 months
- To achieve 50% reduction rate of PICC dislodgement in Ward 15 in 2019 (27 cases of PICC dislodgement reported in CGH from 2016-Jan 2019 which includes 3 cases reported in Ward 15)

## Methodology

With the incident data and the survey from 226 nurses, we identified the top 2 reasons of the PICC dislodgement were: (1) removed by patient and (2) dressing was not secured (Fig. A). 40.7% of nurses experienced PICC dislodgement (Fig. B) and 53.5% felt that there is a need to improve securement method for PICC (Fig. C).

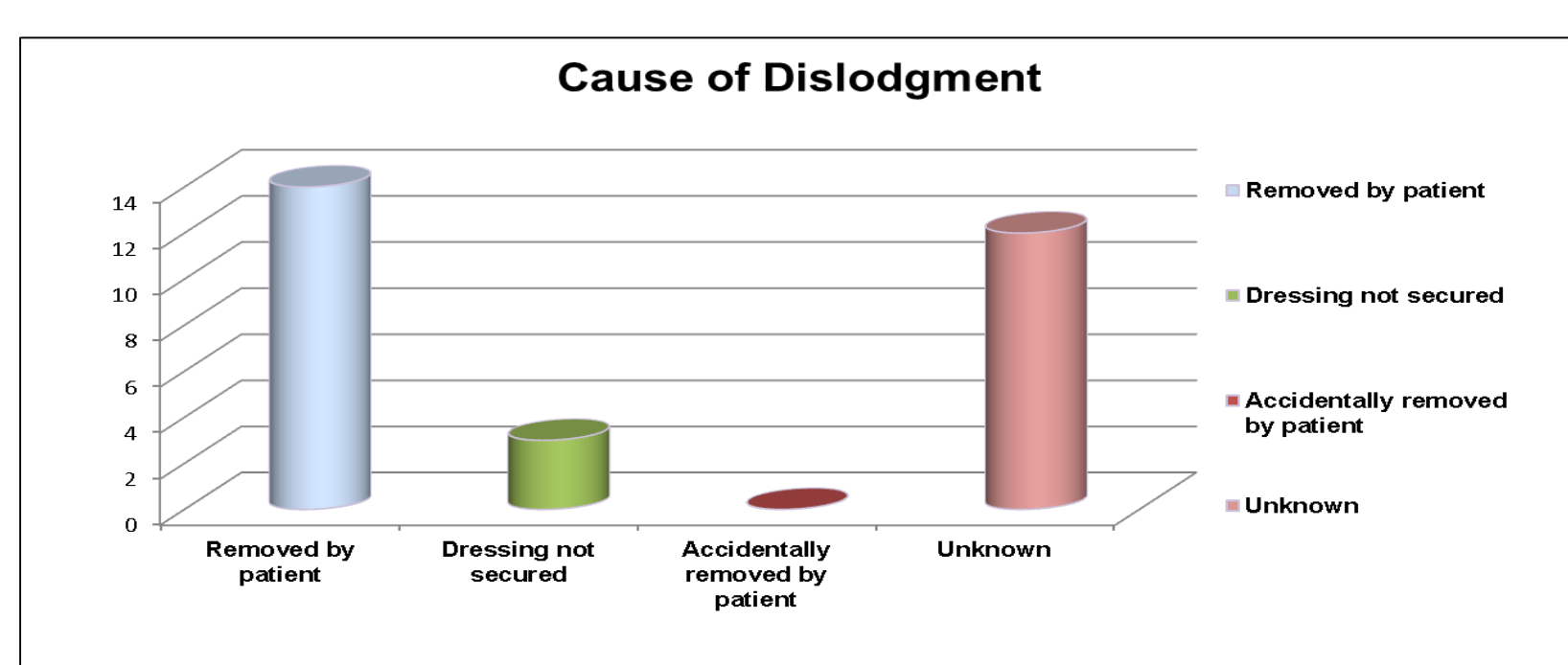


Fig. A

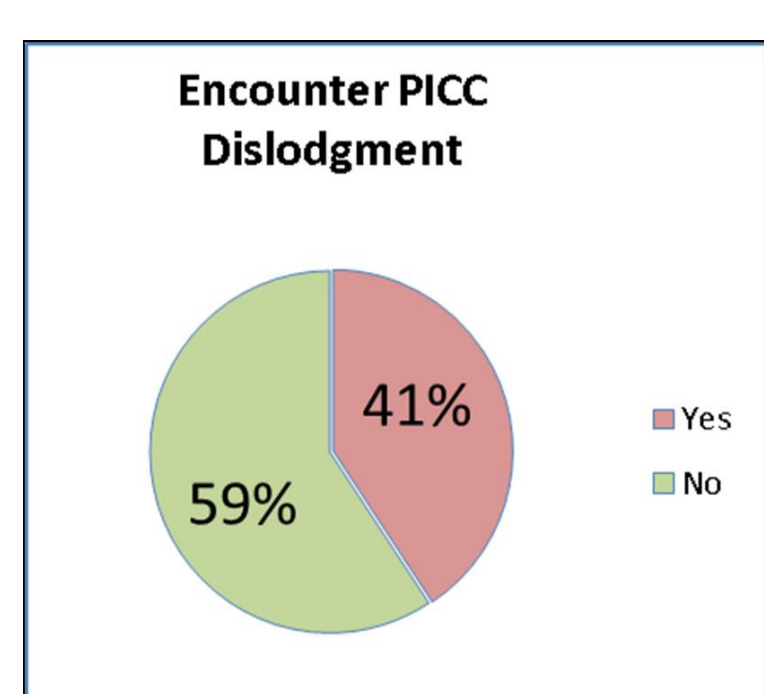


Fig. B

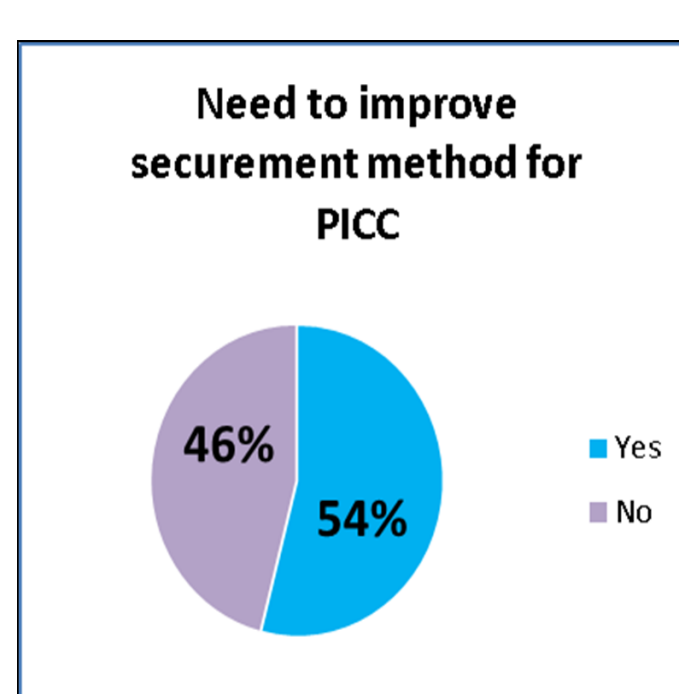


Fig. C

## Root Cause Analysis conducted with 5 Root Causes Identified (Fig. D)

### Fishbone Diagram

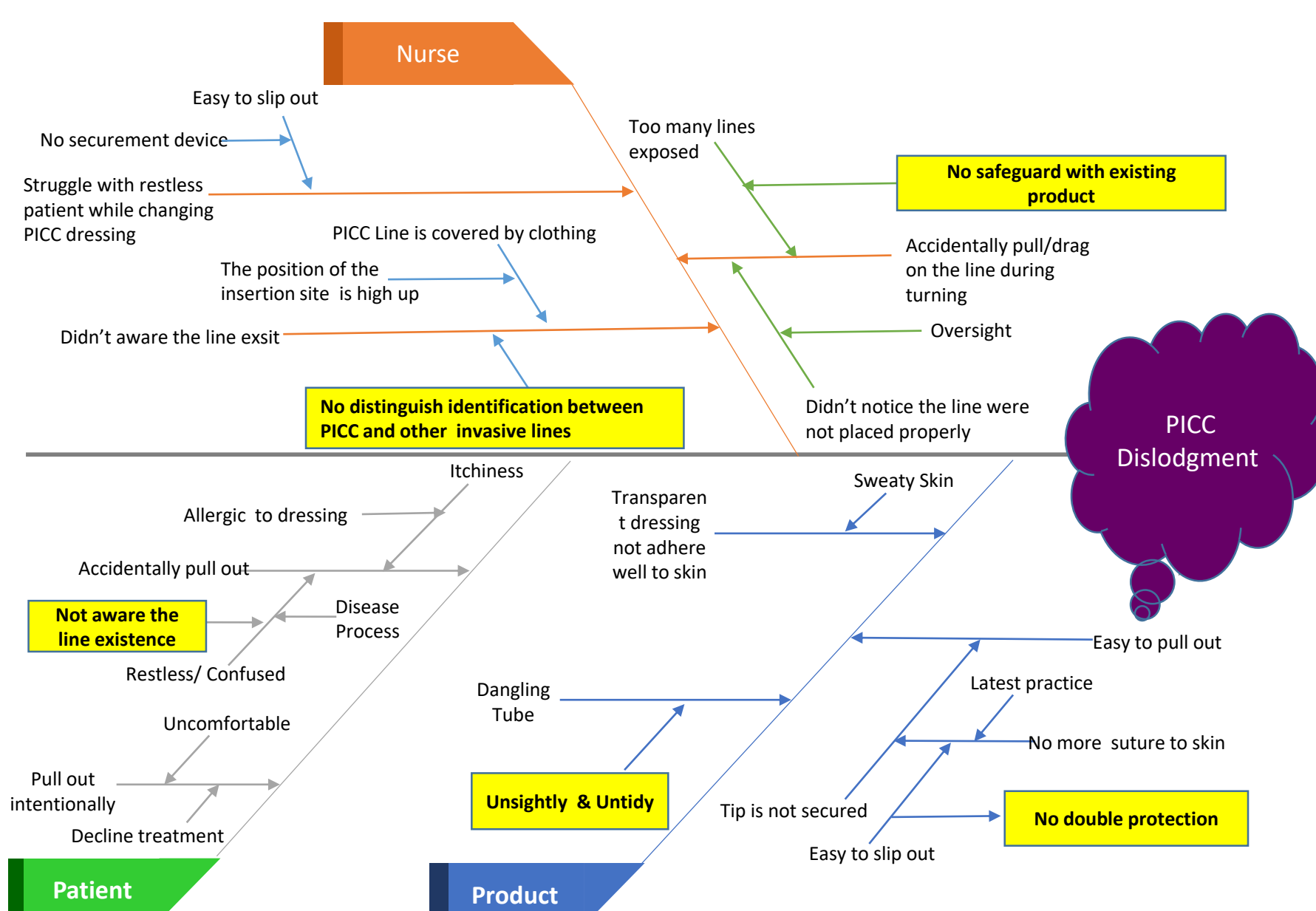


Fig. D

## Plan-Do-Study-Act



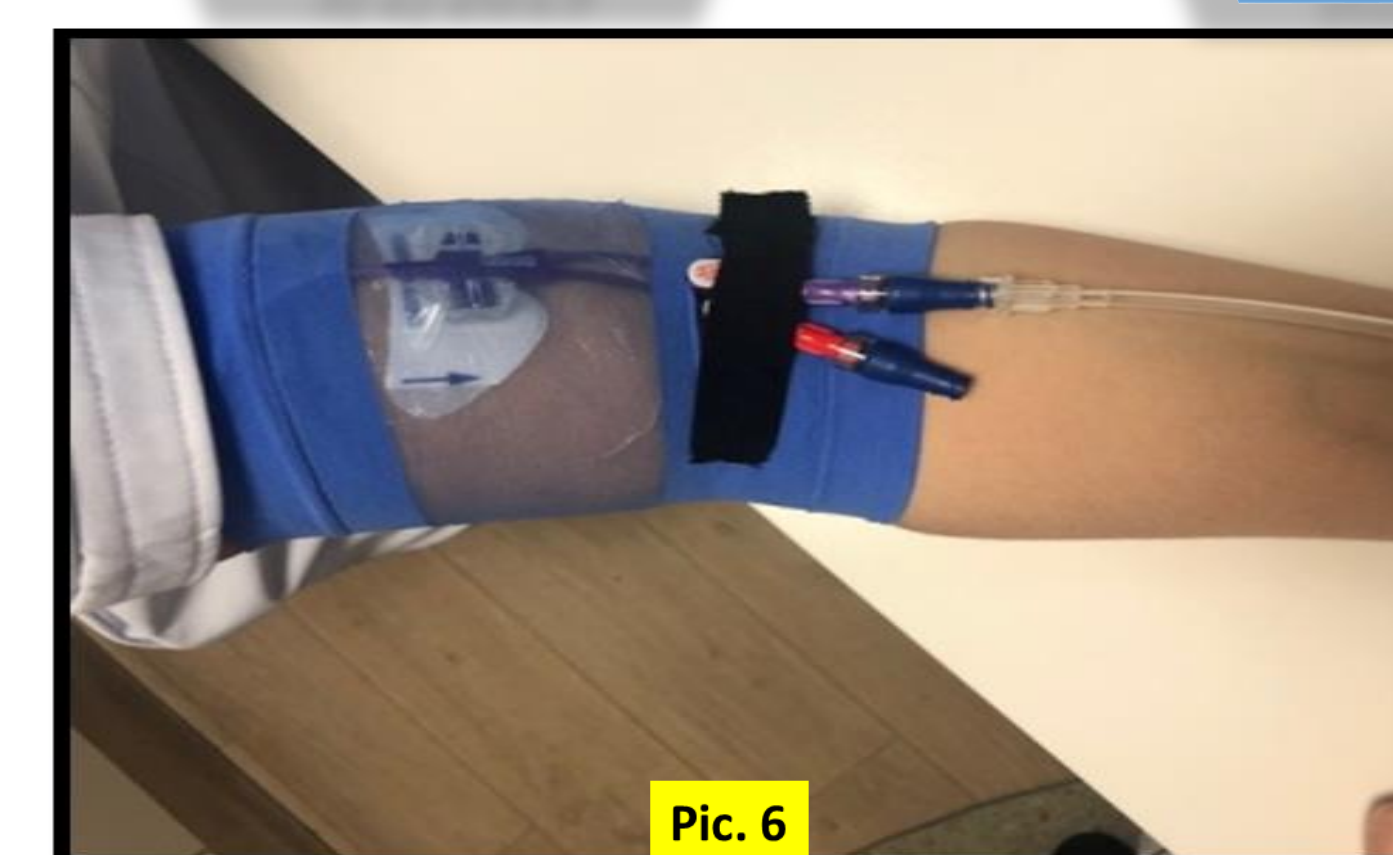
PDSA Cycle 1  
1<sup>st</sup> Prototype created based on root causes identified on 3/2/2019



PDSA Cycle 2  
Window material changed from plastic to stocking



PDSA Cycle 3  
Improve material elasticity based on feedback



PDSA Cycle 4  
Collaboration with External Vendor for Mass Production



PDSA Cycle 5  
Create Opening at elbow for patient comfort and skin integrity assessment

## Results

### Before Implementation

- High incident rate of PICC dislodgment
- Difficult to distinguish PICC from other invasive lines
- No double protection for PICC
- Looks unsightly and untidy
- No exiting safeguard product

### After Implementation

- Zero dislodgment incidents during the trial period
- 95% Cost saving for both patient and organisation (Fig. E)
- 100% positive feedback from both staff (Fig. F) and patients (Fig. G) that result in improved staff confidence and patient's satisfaction
- Promote patient safety and prevent prolong hospitalisation

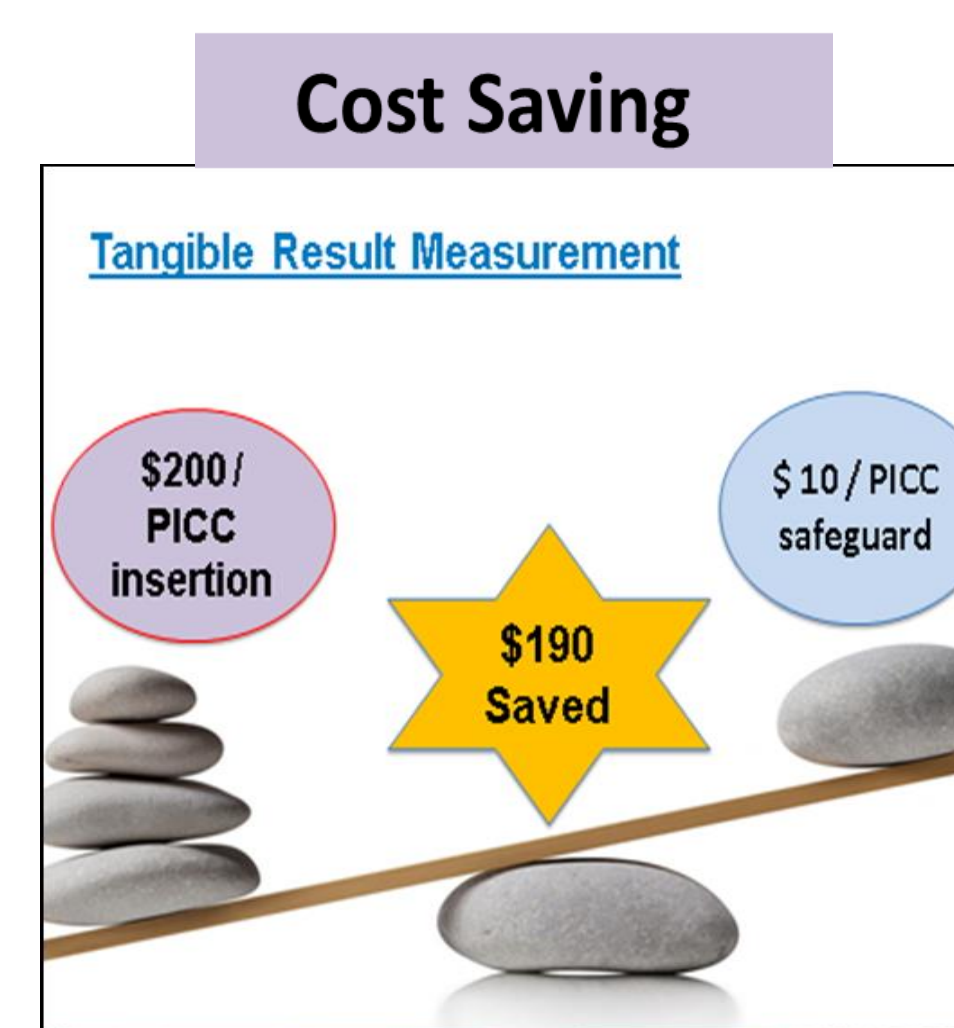


Fig. E

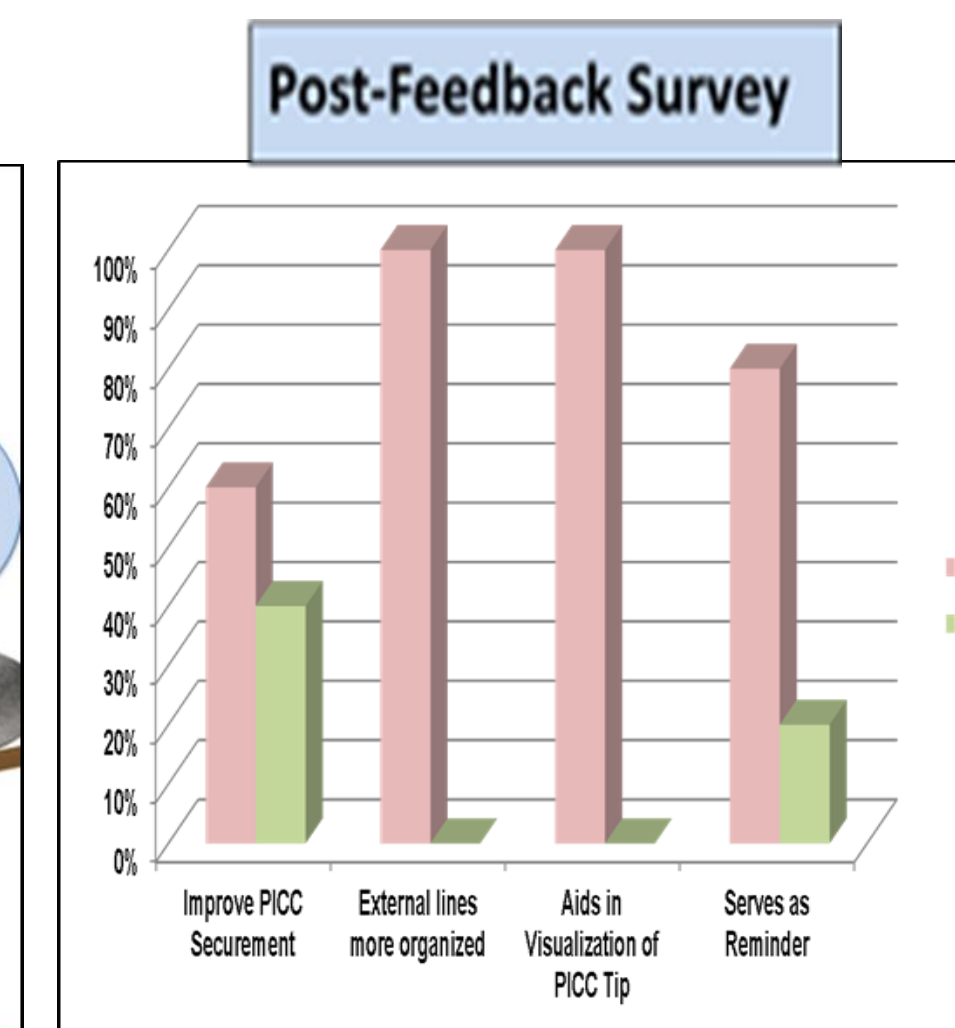


Fig. F

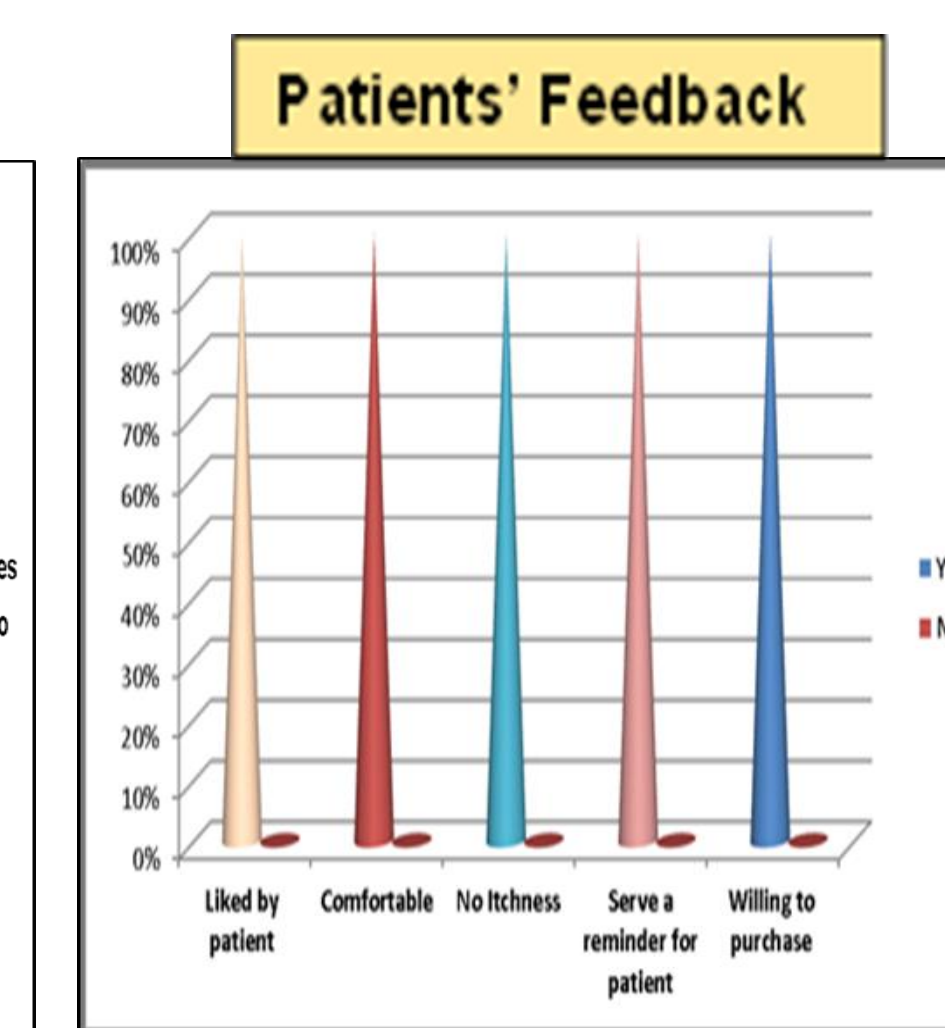


Fig. G

## Description of the Intervention

5 PDSA cycles were conducted, and product redesign were done based on the trial feedback. Final Trial Version:

- The material is stretchable
- Good Securement
- Comfortable, not hot
- Visible at insertion site
- Fit to all arm PICC circumferences
- Fit for different directions of PICC insertion

## Conclusion

Through this project, our team re-looked into risk management in terms of PICC lines dislodgement. Our project aims better visualization of PICC, organizing of the exposed external lumens and reduce the risk of dislodgement. We had provided continuous training to end users to ensure staff competency and compliance in practice. In Mar 2021, we had the privilege to be awarded with funding under SingHealth Smart Nursing Programme. With that, our team aims to start hospital wide trial in Sep 2021.