

Project Title

Port-A-Cath Workflow Improvement

Project Lead and Members

Project lead: Dr Ong Shao Jin, Dr Samuel Ow

Project members: Dr Anil Gopinathan

Organisation(s) Involved

National University Hospital (NUH), National University Cancer Institute, Singapore (NCIS)

Aims

Port-A-Caths (PAC) are one of the most common forms of central venous access chosen by medical oncologists for use in cancer patients. Patients at NCIS who are identified for PAC insertion undergo the procedure at the Department of Diagnostic Imaging, National University Hospital (NUH).

PAC insertion is generally a safe procedure, but complications can arise e.g. PAC infection, thrombosis, local injury and bleeding. If the complication is significant, the PAC needs to be surgically removed, which would subsequently impact on the patient's cancer treatment. Complication rates post-PAC insertion reported in published literature vary from 0.1% to 7.6%, and may be subject to reporting bias. However, data from local institutions is lacking.

An audit of 56 PACs inserted at NUH between October 2018 and December 2018 revealed that the complication rate was ~15.6%, with majority of the complications occurring within 30 days of insertion. A team from Diagnostic Imaging and Haematology-Oncology was formed to analyze potential causes of complications and improve the workflow.

We aim to reduce the PAC early complication rate within 30 days from insertion) for Haematology-Oncology patients from an average of 15.6% to <2%.

Background

See attached

Methods

See attached

Results

See attached

Lessons Learnt

Engaging key stakeholders was essential in ensuring the success of this QIP. Meticulous examination of the entire process map can help highlight weak linkages which can be rapidly addressed in a systematic fashion. Regular monitoring of data and constant feedback is required to ensure sustainability and future success.

Conclusion

See attached

Project Category

Care Redesign

Keywords

Care Redesign, National University Hospital, National University Cancer Institute, Singapore, Process mapping, Port-A-Cath, Quality Improvement Project, Diagnostic Imaging, Haematology-Oncology, Infection Control, Chemotherapy, Peer Review Learning, Healthcare Failure Mode and Effect Analysis methodology

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Defining the Problem and Goal

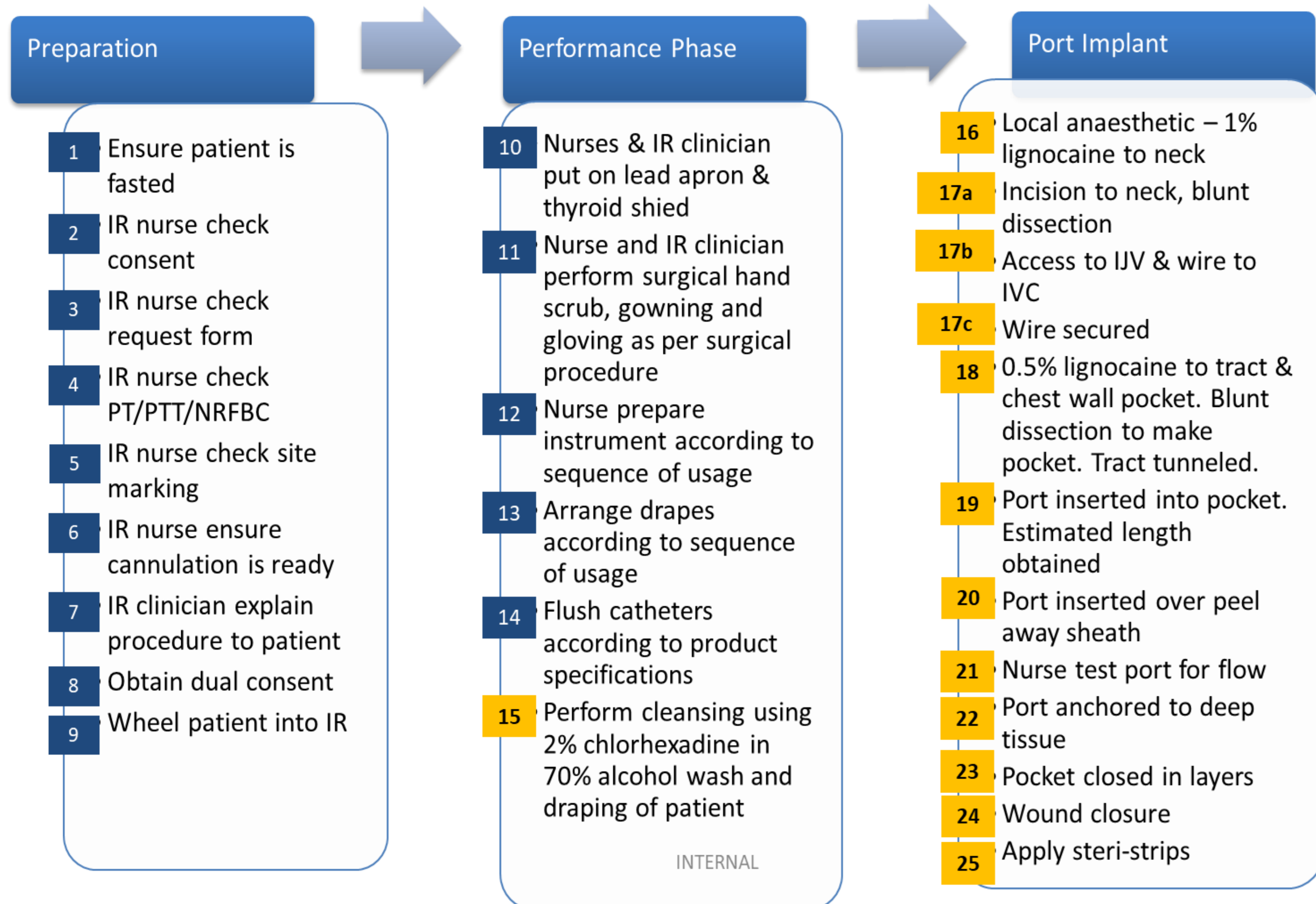
- Cancer patients who have poor venous access, or who are receiving infusional chemotherapy, require central venous line insertion to facilitate treatment. Port-A-Caths (PAC) are one of the most common forms of central venous access chosen by medical oncologists for use in cancer patients.
- PAC insertion is generally a safe procedure, but complications can arise. Complication rates post-PAC insertion reported in published literature vary from 0.1% to 7.6%, and may be subject to reporting bias.
- An audit of 56 PACs inserted at NUH between October 2018 and December 2018 revealed that the average monthly complication rate was ~15.6%, with majority of the complications occurring within 30 days of insertion.
- A team from Diagnostic Imaging, Haematology-Oncology, Nursing and Infection Control was formed to analyze potential causes of complications and improve the workflow.
- We aim to reduce the PAC early complication rate within 30 days from insertion) for Haematology-Oncology patients from an average of 15.6% to <2%.

Methodology

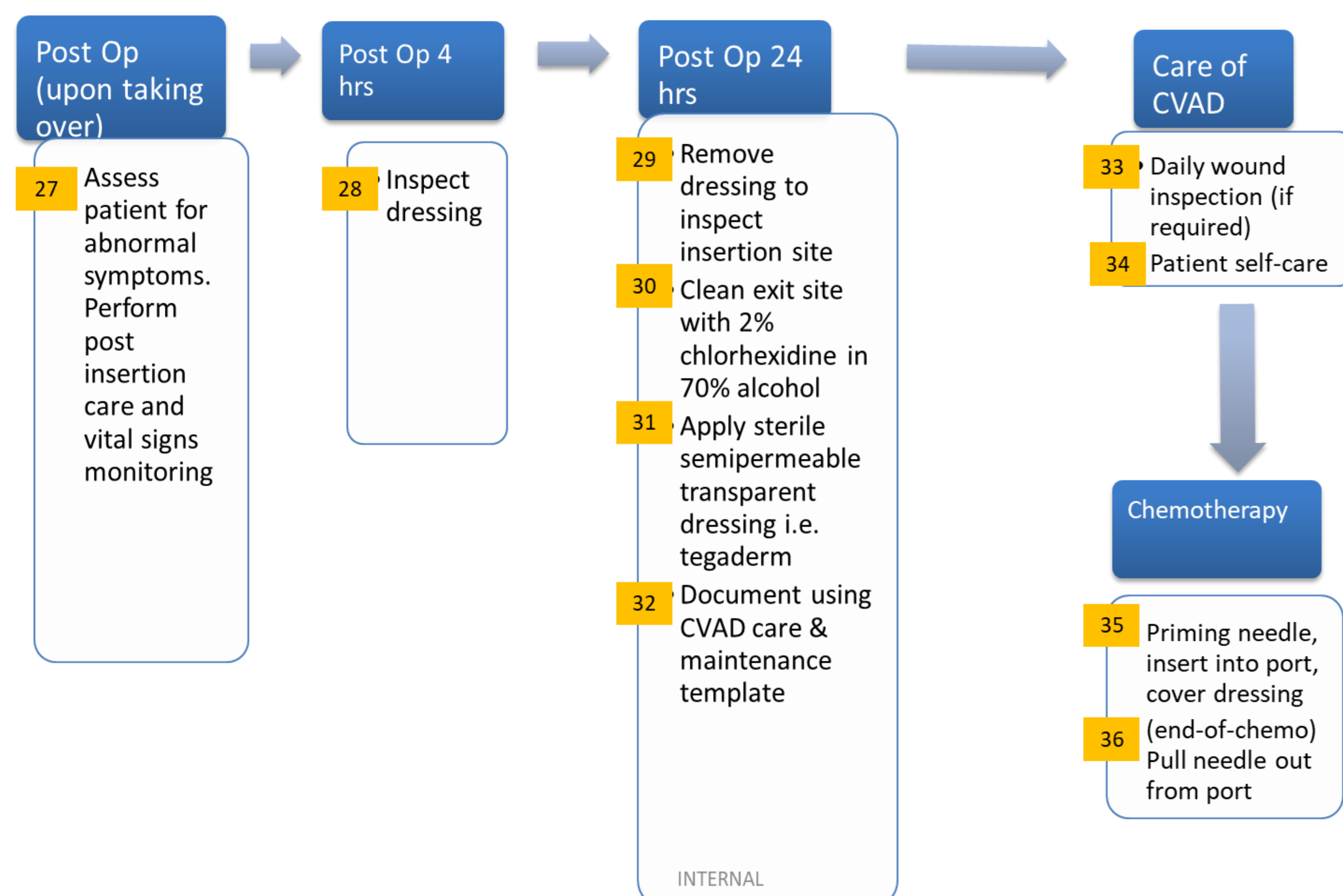
- Process mapping of the entire patient journey from the PAC preparatory phase, to insertion, post-procedural care and commencement of chemotherapy was performed.
- Using Healthcare Failure Mode and Effect Analysis methodology, the team examined potential weak links in the process map.

Problem Analysis

Process Mapping: Preparation and PAC Insertion



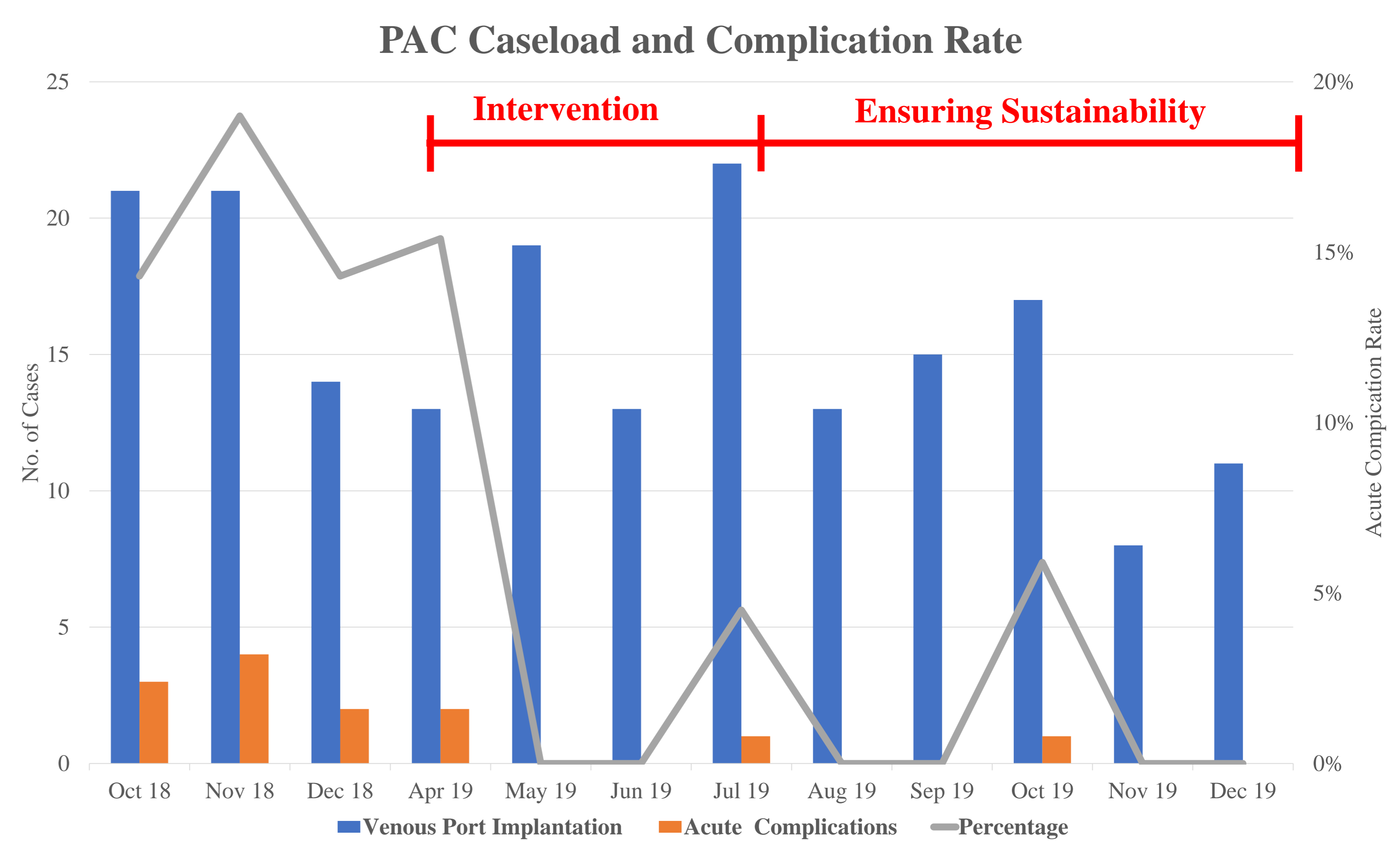
Process Mapping: Post-Procedural Care



Strategy for Change

Problem	Intervention	Date of Implementation
Non-Standardised PAC Insertion Techniques	Standard techniques and practices for existing and new doctors in Diagnostic Imaging was established <ul style="list-style-type: none"> • Implanting PAC at a uniform depth (0.5-2cm) • Closing wound in layers • Compulsory subcuticular sutures and introduction of Dermabond 	April 2019
Potential Early Wound Disruption	<ul style="list-style-type: none"> • Extending PAC wound inspection to 48h to prevent unnecessary wound dehiscence • Commencement of same-day chemotherapy was not permitted • Chemotherapy nurses were empowered to recommend not to commence chemotherapy to primary oncologist, based on wound assessment 	April 2019
Late Identification of PAC Complication	<ul style="list-style-type: none"> • Strengthen patient education pre-PAC insertion with mandatory counselling sessions, and revamping patient education material • Establish workflow to escalate to senior nurse, medical oncologist and Diagnostic Imaging upon recognition of PAC complication 	April 2019

Measurement of Improvement



Introduction of interventions resulted in dramatic reduction in Acute PAC Complications from an average monthly rate of 15.6% (October 2018 – December 2018) to 1.3% (May 2019 – December 2019). Prevention of acute complications would result in average saving of \$1715 per episode, and allow for timely cancer treatment.

Measures for Sustainability

- Interventions were communicated to key stakeholders at respective department meetings
- Culture of early recognition and early escalation for acute PAC complications was formed
- PAC complications are tracked systematically and communicated to ensure timely and continuous feedback loop between Diagnostic Radiology, Haematology Oncology and Nursing

Conclusion

- Meticulous examination of the entire process map showed key weaknesses and gaps resulting in acute PAC complications
- Using Healthcare Failure Mode and Effect Analysis, our multidisciplinary team was able to introduce a suite of targeted interventions, resulting in rapid reduction in the acute PAC complication rate
- Prevention of PAC complications translated to direct cost savings for the patient
- By continuously engaging stakeholders and regular data monitoring, we were able to sustain the results and will continue to strive for better outcomes