

REDUCING AVERAGE TIME FROM DIAGNOSIS TO APPLICATION OF DEFINITIVE ORTHOSES FOR PATIENTS WITH METATARSAL FRACTURES IN THE EMERGENCY DEPARTMENT

MEMBERS:

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- WORKPLACE / PATIENT SAFETY
- PATIENT EXPERIENCE
- INNOVATION AND PRODUCTIVITY
- GREEN & SUSTAINABILITY

Define Problem, Set Aim

Problem Statement/ Opportunity for Improvement

For patients with metatarsal fractures treated in the Emergency Department (ED), an above ankle plaster cast is typically applied, with a follow-up appointment given at the specialist outpatient clinic (SOC). The single-use ankle plaster cast will be removed when the patients are re-evaluated at SOC. As closed metatarsal fractures are mostly treated conservatively, these patients will be fitted with the short air-cast boot as the definitive treatment.

While the ankle plaster cast provide temporary rigid support, it may also cause discomfort for the patient as it cannot be removed. This can cause skin irritation, breakdown, and ulceration when moisture and pressure is built up. In October 2023, 49 patients were diagnosed with metatarsal fractures in P3 and discharged with ankle plaster cast. Of which, 8 (16%) of these patients were noted to have skin redness, foot bruising, non-compliance to the plaster cast and reattendances secondary to cast issues. The average time taken for these patients to be reviewed in SOC is 7 days with 35 patients (72%) eventually fitted with air-cast boots.

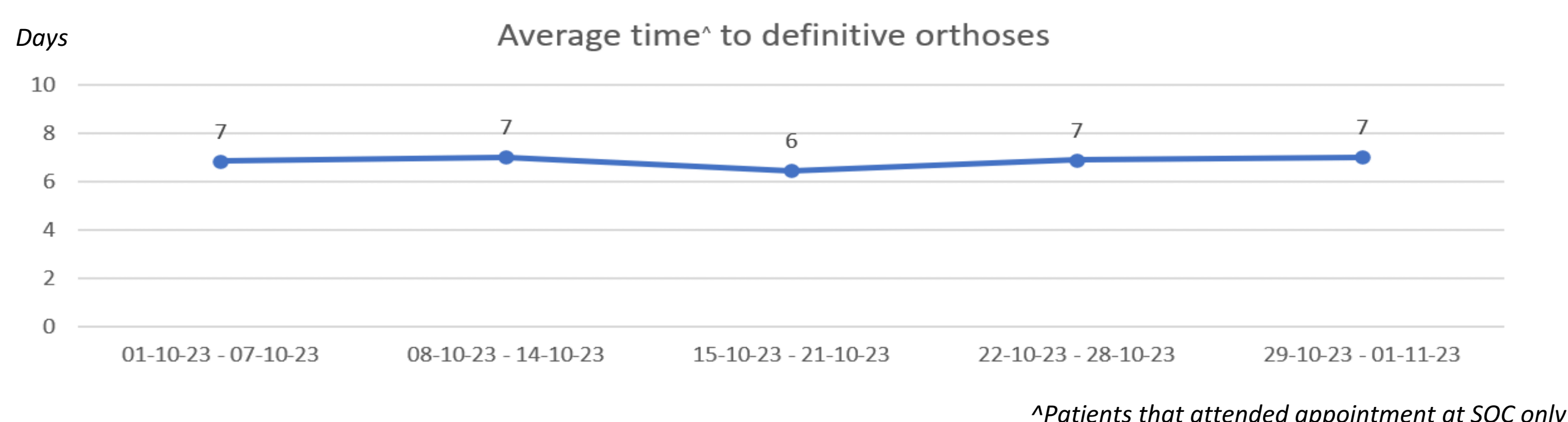
Application of air-cast boots in ED represents an opportunity to improve clinical outcomes and patient experience by enabling earlier definitive treatment while avoiding skin complications or reattendance issues.

Aim Statement

Reduce average time from diagnosis to application of definitive orthoses (i.e. short walker boot or air-cast boot) in adult patients (≥16 years old) with radiologically-proven metatarsal fractures seen in the ED by at least **25% from 7 days to 5 days**, by September 2024.

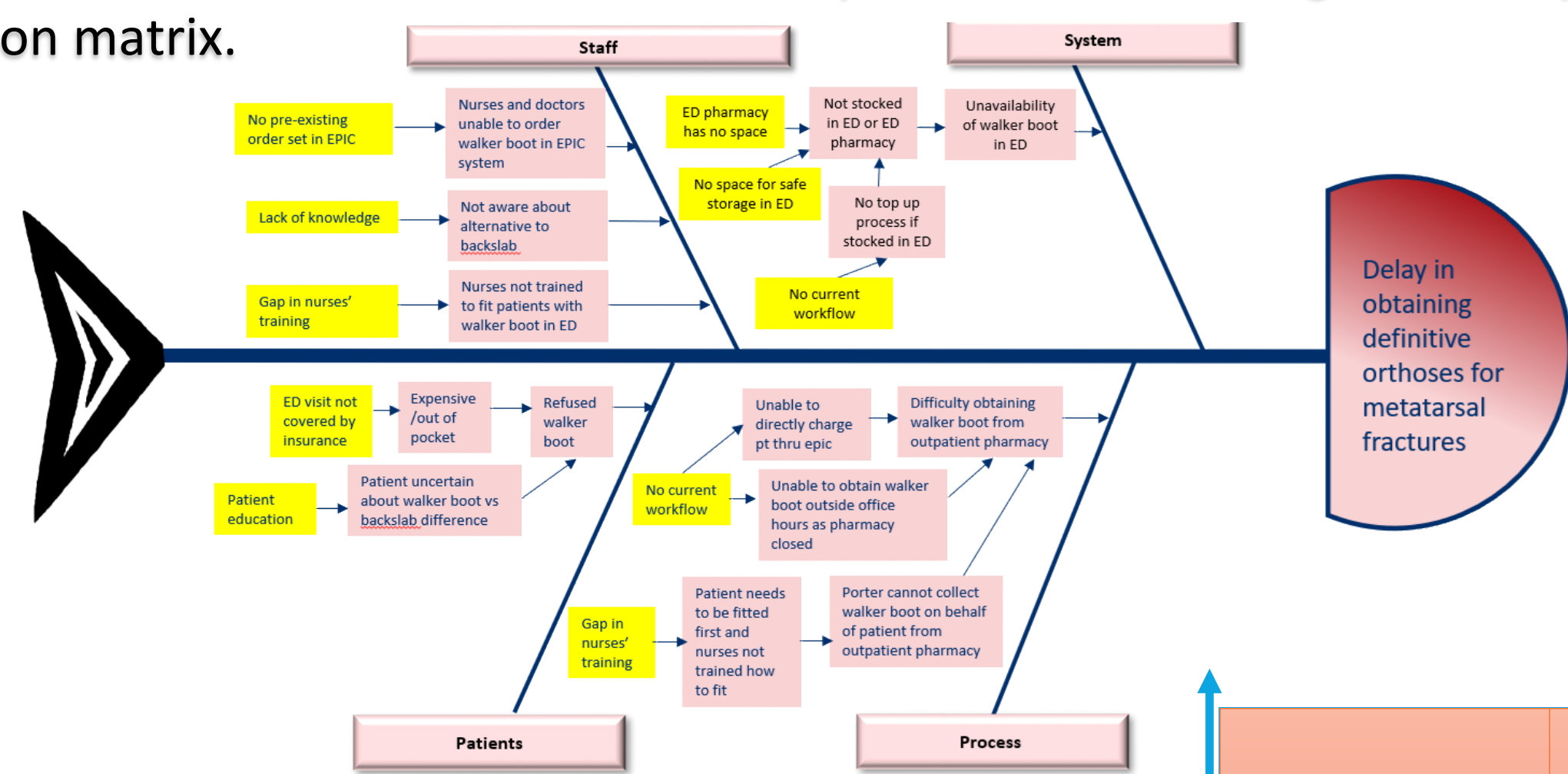
Establish Measures

Type of Measure	Measure
Outcome	Average time taken (days) from diagnosis of metatarsal fractures in ED to application of definitive orthoses (i.e. short walking boot/air-cast boot).
Process	Number of P3 patients with metatarsal fractures and being fitted with air-cast boot in the ED. % of P3 patients diagnosed with metatarsal fractures and being fitted with air-cast boot in the ED.
Balancing	Median length of stay (from Triage to OOD) of P3 patients discharged with metatarsal fracture. % of patients with documented complications (e.g. skin irritation, breakdown, ulceration, worsening bruising) when reviewed in SOC or during re-attendance.

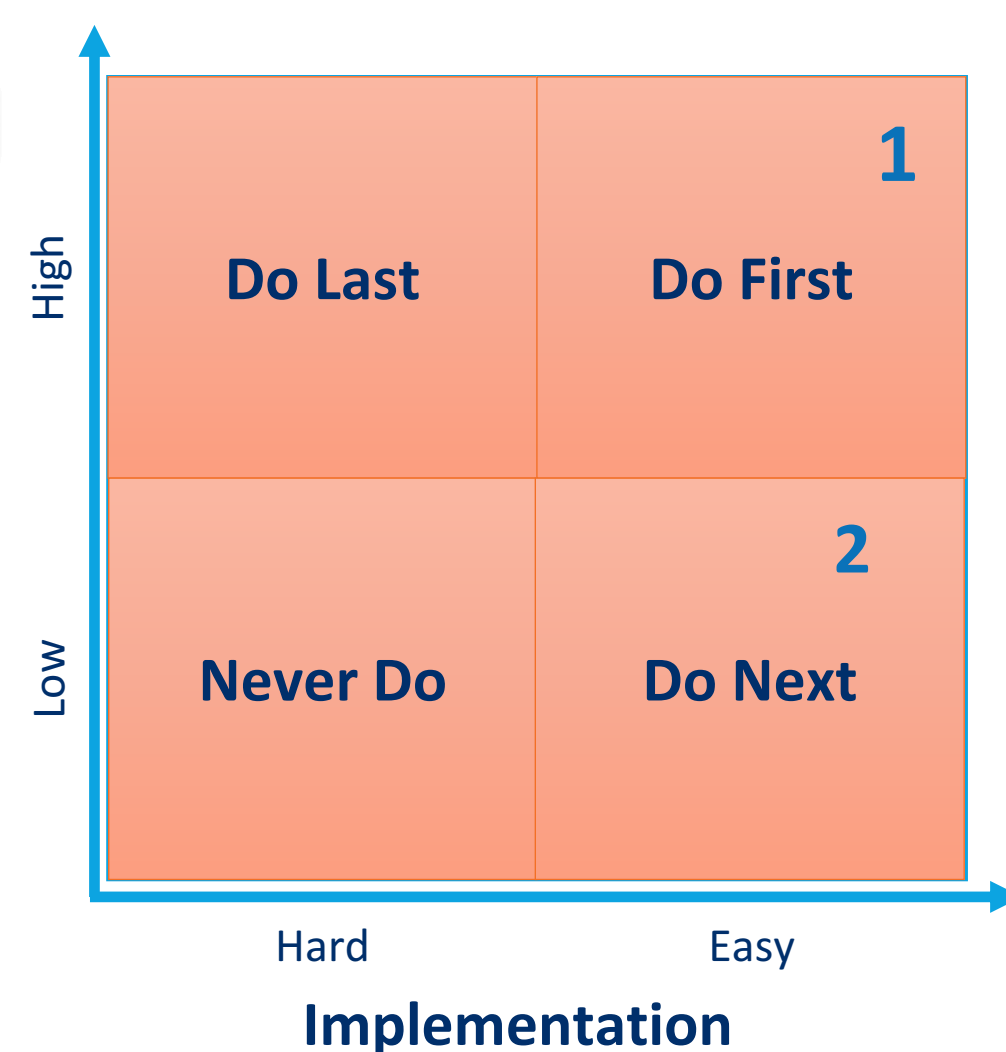


Analyse Problem

Using the fishbone diagram, the team identified the following root causes. Potential solutions to address the root causes were then ranked and implemented according to the Impact vs Implementation matrix.

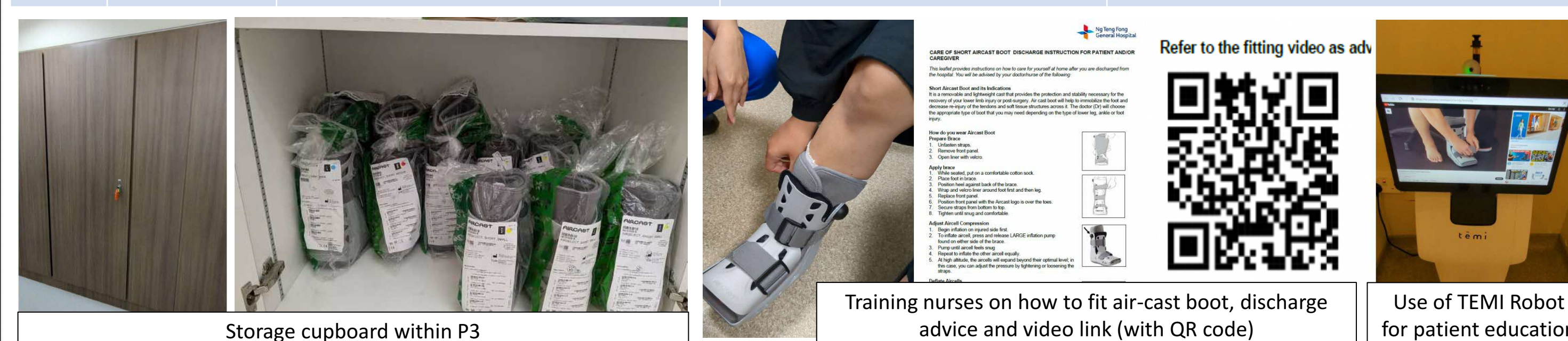


Root Cause	Potential Solutions
No current workflow	1. Creating a clinical workflow 2. Creating ordering sets and discharge information in EPIC
No place for safe storage in ED	3. Creating a safe storage space in ED
Gap in nurses' training	4. Training the nurses to fit the air-cast boot
Lack of knowledge	5. Educating the medical and nursing team about the air-cast boot



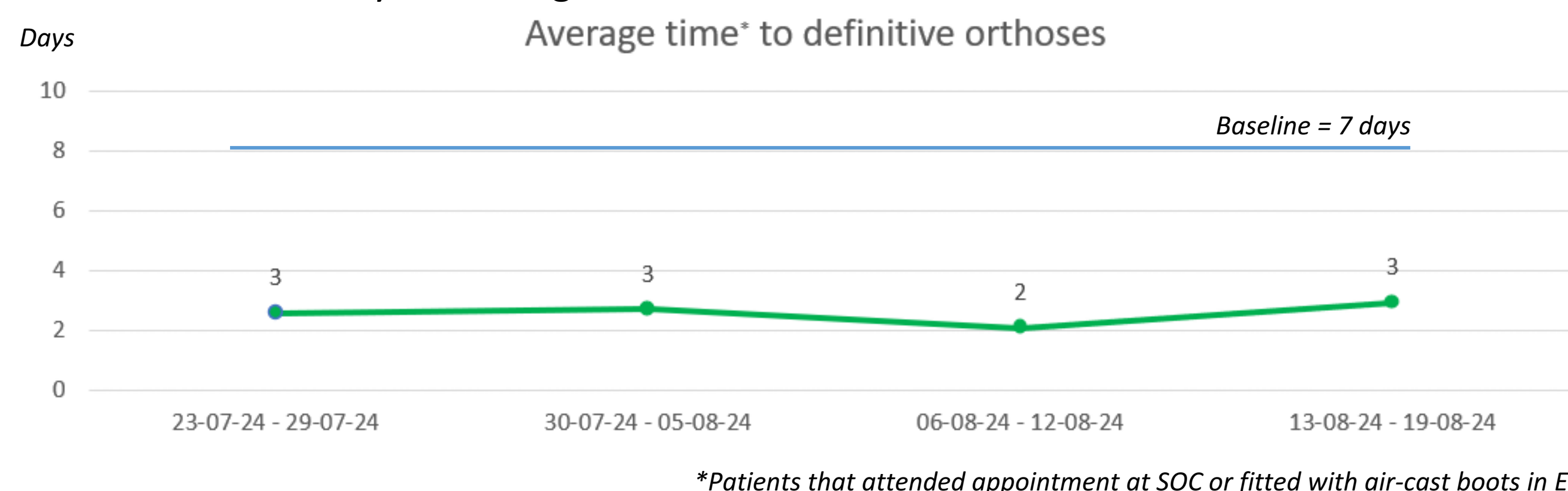
Test & Implement Changes

CYCLE	PLAN	DO	STUDY	ACT
1	Creating a safe space in the ED for storage of the air-cast boot	1. Discussed with ED pharmacy about feasibility of storage of items in the ED pharmacy 2. As space was limited in the ED pharmacy, another location where items can be kept under lock and key within the ED was identified.	Feedback was gathered from the P3 nurses: 1. The identified space was deemed to be too far from the P3 area which made it difficult to retrieve the items.	ADAPT 1. A new location was identified within the P3 area itself to ensure that nurses could easily access the items.
2	Creating a clinical workflow	1. Indications and contraindications for air-cast boot fitting was established with Orthopaedics. 2. Workflow was drafted and reviewed by stakeholders (ED, pharmacy, orthopaedics)	1. Stakeholders were receptive to the new workflow. 2. There were suggestions for inclusion of use of walking frames or wheelchair for patients >65 years old in view of high fall risk.	ADOPT 1. Workflow was edited accordingly, approved and broadcasted to ED nurses and clinicians.
3	Creating order sets in EPIC and discharge advice	1. Discussion with pharmacy medical informatics on creation of the air-cast boot order set in EPIC and the appropriate charging mechanism. 2. Discharge advice leaflets, including the link to a video on the care of the air-cast boot, were created and uploaded in EPIC.	1. The nurses and doctors were able to easily order the air-cast boot and access the discharge advice on EPIC. 2. The nurses feedback that the discharge advice was clear and the video link was helpful.	ADOPT 1. The ED team has continued to order the air-cast boot and the discharge advice in the system with no issues encountered. 2. The TEMI robot will be introduced to assist with patient education by end-August 2024.
4	Training the nurses to fit the air-cast boot	1. A competency checklist was created. 2. Training sessions by the physiotherapists and pharmaceutical rep were held to train the nurse trainers, who in turn trained the rest of the nurses.	1. About 70% of nurses were trained within 1 month in June 2024	ADOPT 1. Nurses who had not yet completed their competency will receive ad-hoc training from the nurse trainers. 2. Competency in air-cast boot fitting will be built into the orientation program for new nurses.
5	Educating the medical and nursing team about the air-cast boot	1. The workflow and utility of the air-cast boot was introduced during the monthly morbidity and mortality sessions to the doctors. 2. The workflow was introduced to the nurses during their roll calls.	1. ED doctors and nurses remained uncertain about the utility and workflow.	ADAPT 1. Face to face reinforcement on the ground was carried out, resulting in increased prescription in subsequent weeks from 50% to 64%. 2. Hard copy materials were printed out and placed in P3 for easy reference.



Outcome

Significant reduction in average time taken time from diagnosis to application of definitive orthoses from **7 days to 3 Days (57% reduction)** for ED P3 patients discharged with metatarsal fracture between 12 July to 19 August 2024.



Median length of stay (from Triage to OOD) of P3 patients discharged with metatarsal fracture improved by **26 minutes (16%)!**

Type of Measure	Measure	Pre-intervention (1 to 31 Oct 2023)	Post-intervention (23 Jul to 19 Aug 2024)
Process	Number of P3 patients with metatarsal fractures and being fitted with air-cast boot in the ED	0	27
	% of P3 patients diagnosed with metatarsal fractures and being fitted with air-cast boot in ED	0	53%
Balancing	Median length of stay (from Triage to OOD) of P3 patients discharged with metatarsal fracture	165 minutes	139 minutes
	% of patients with documented skin complications (e.g. irritation, breakdown, or ulceration) when reviewed in SOC	8 (16%)	3 (14%)* *Patients fitted with air-cast boots only

Spread Changes, Learning Points

What are/were the strategies to spread change after implementation?

- The par levels of the air-cast boot were increased after close monitoring of data, within 1 week of implementation, which prevented disruption of supply.
- Appointment of air-cast workflow champions to advocate the use of the air-cast boot and garner support from the staff in the Emergency Department, which in turn, increases sustainability of this initiative.
- There are plans to fast-track patients with metatarsal fractures in P3, to further reduce their length of stay in ED.
- The team is also planning methods to evaluate and enhance patient experience through surveys administered at the SOC.

What are the key learnings from this project?

- It is important to consider all stakeholders' perspectives in implementation of these initiatives, e.g. where to store the air-cast boots, and adapt accordingly.
- Face-to-face reinforcement of new workflows may be necessary to help clarify doubts and concerns.

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Scan to VOTE!

