

Community-based Model of Care to Reduce Hospital Referrals for Tunnelled Haemodialysis Catheter (THC) Dysfunction

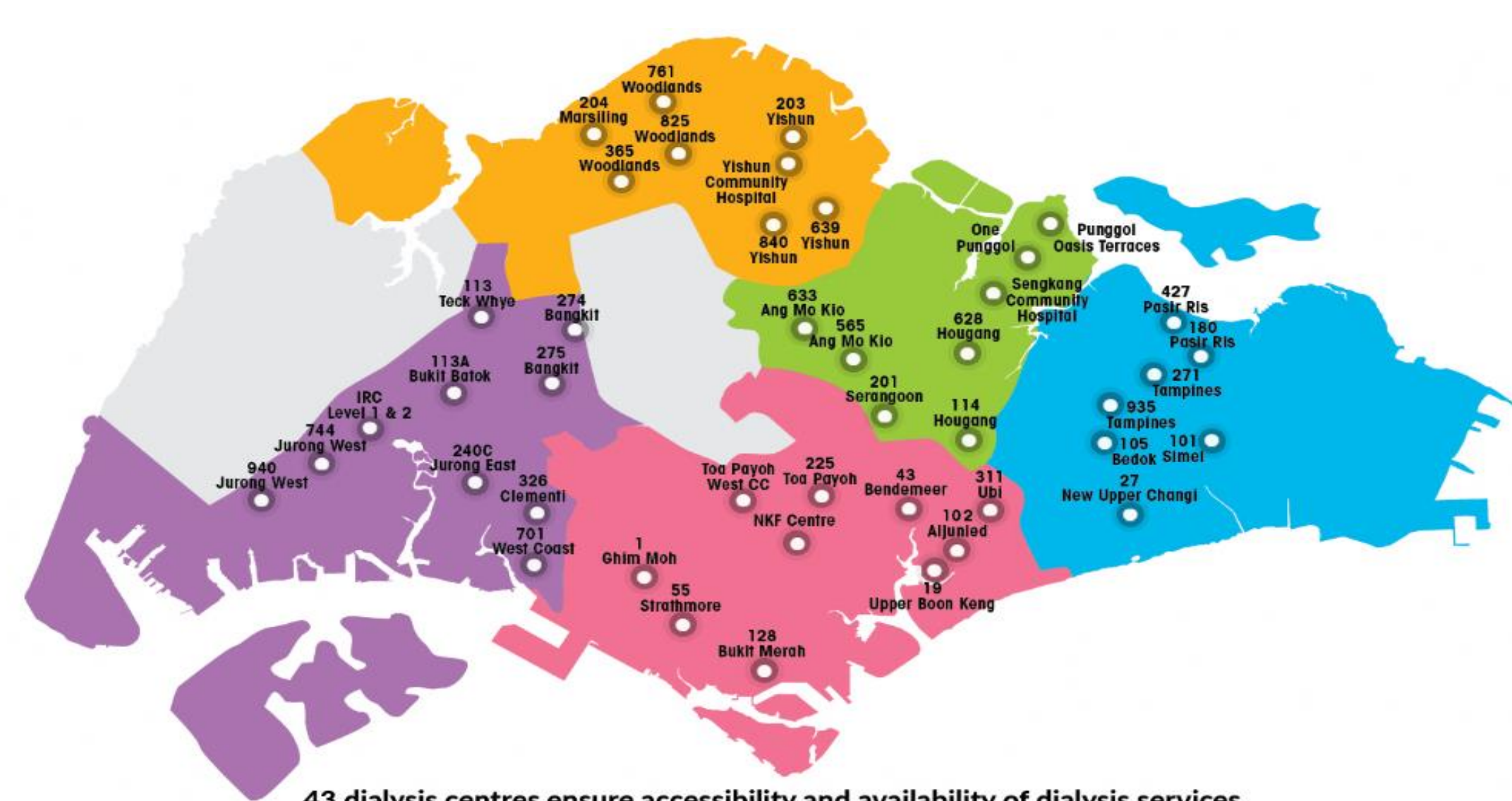
The National Kidney Foundation

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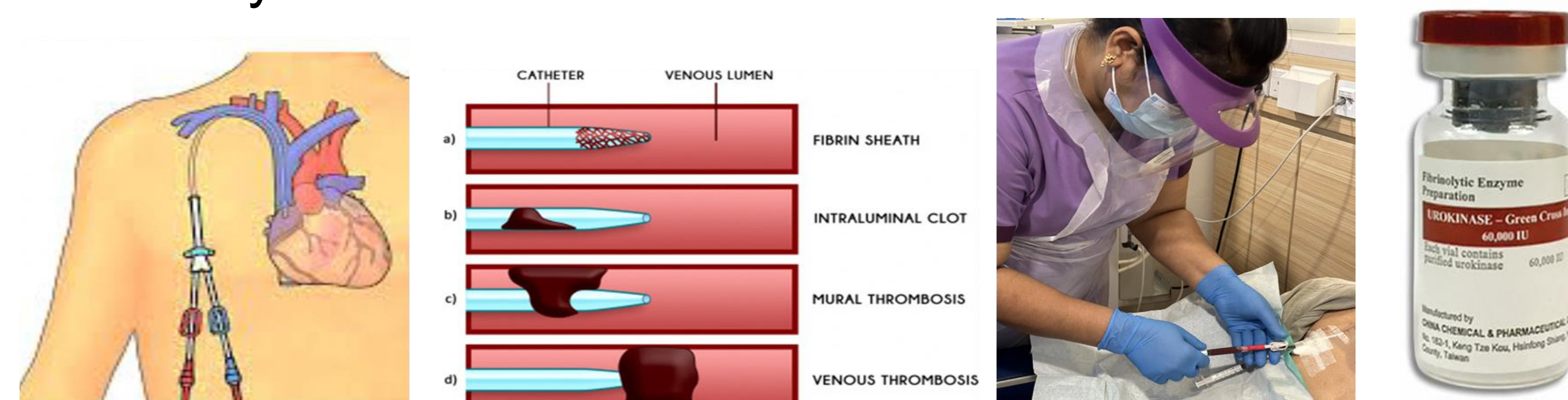
Introduction/Background

The National Kidney Foundation (NKF) is a non-profit healthcare organisation that provides haemodialysis (HD) for more than 5000 patients in 43 community-based dialysis centres (DC) across Singapore in 2023. Of these, 17% of patients were using tunnelled haemodialysis catheters (THC) as their vascular access. THC dysfunction was a common and challenging problem in NKF, and administration of lytic dwell to restore the flow of occluded THC has been traditionally performed in acute hospitals as an inpatient procedure.



Goal/Objective

Motivated by the high prevalence of THC dysfunction among NKF patients (median number of 48 referrals per month), which posed a significant burden on the patients, the DCs, and the acute hospitals. This project aimed to reduce the hospital referrals of haemodialysis patients with occluded THC by implementing a protocol for lytic dwell administration in the community-based DCs of NKF.



Problem Analysis

Patients who present with catheter dysfunction at community DCs are typically referred to the Emergency Department (ED) of acute hospitals for management. This approach has several implications:

- Delayed HD treatment poses patient safety risks**
Catheter dysfunction can prevent patients from receiving their scheduled HD treatments, exposing them to potential complications such as fluid overload, uremia, and electrolyte imbalances.
- Disruption to routine and added inconvenience**
Unplanned hospital visits disrupt patients' daily routines and may place additional stress on their families.
- Increased financial burden**
Hospital-based treatment often leads to higher out-of-pocket expenses and hospitalisation costs for patients.
- Strain on emergency services and healthcare resources**
The high number of referrals for THC dysfunction contributes to ED overcrowding, bed shortages, and increased demand on healthcare resources.

Implementation Plan

The project team collaborated with Singapore General Hospital and the National Improvement Unit (NIU) to develop and test the protocol, train the DC staff, and monitor the outcomes. This was followed by further collaboration with Alexandra Hospital, Changi General Hospital, Khoo Teck Puat Hospital, National University Hospital, Ng Teng Fong General Hospital, Tan Tock Seng Hospital and Sengkang General Hospital. The project involved implementing a bundle of interventions in stages:

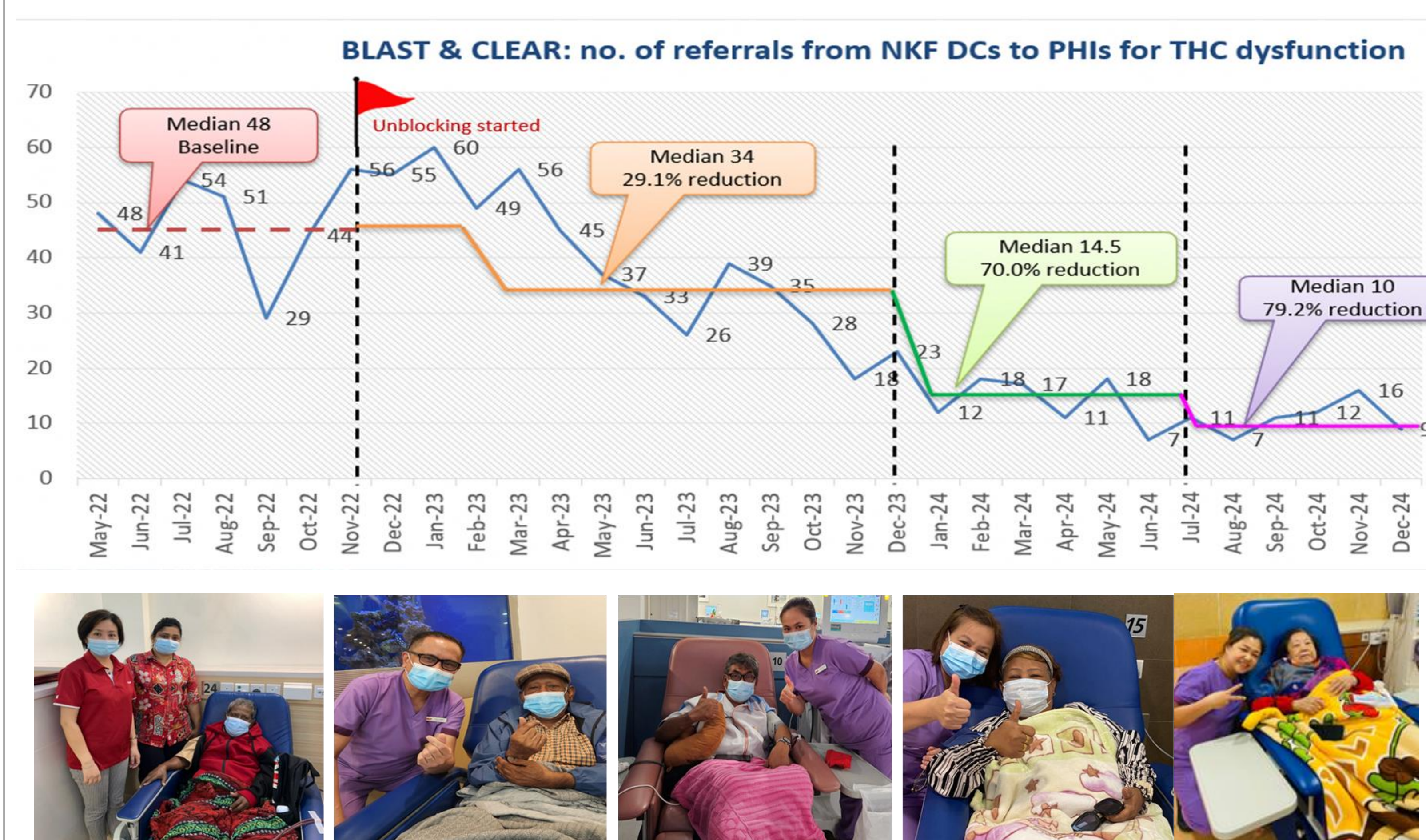
- Optimising Blood flow, Locking solution, Anticoagulant & Standardising Technique (BLAST)
- Empowering community dialysis nurses to perform Catheter flow restoration with Lytic dwell at community dialysis centre (CLEAR)

Outcome measures were the median number of THC dysfunction and referrals to hospital monthly. The process measure was the number of nurses trained to administer lytic agent while the balancing measure was infective complications within 72 hours.

Benefits/Results

- Following the implementation of the change ideas, there was a 29.2% reduction in the median number of monthly hospital referrals for THC dysfunction at 1 year, 70.0% reduction at 1.5 years and **79.2% reduction at 2 years in Dec 2024**.
- A total of 107 community nurses have been trained to administer lytic agents to restore THC flow.
- Lytic dwell was performed in **338 cases** of THC dysfunction with **86.4% success rate**.
- Hence, **292 admissions were averted** and the median number of monthly hospital referrals for THC dysfunction reduced from 48 cases from baseline to 10 cases, as shown in Figure 1 below.
- There were no infective complications with lytic dwell administration in the community DCs.

Figure 1: Reduction in number of hospital referrals for THC dysfunction



Sustainability & Reflections

The project demonstrated that community dialysis nurses can safely and effectively perform lytic dwell for THC dysfunction, leading to improved patient care and reduced healthcare costs.