

BLAST* and CLEAR† Catheter in the Community

*optimising Blood flow, Locking solution, Anticoagulant and Standardising Technique

†Catheter flow restoration with Lytic dwELL at community diAllysis centRe

In collaboration with the following institutions:

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INTRODUCTION

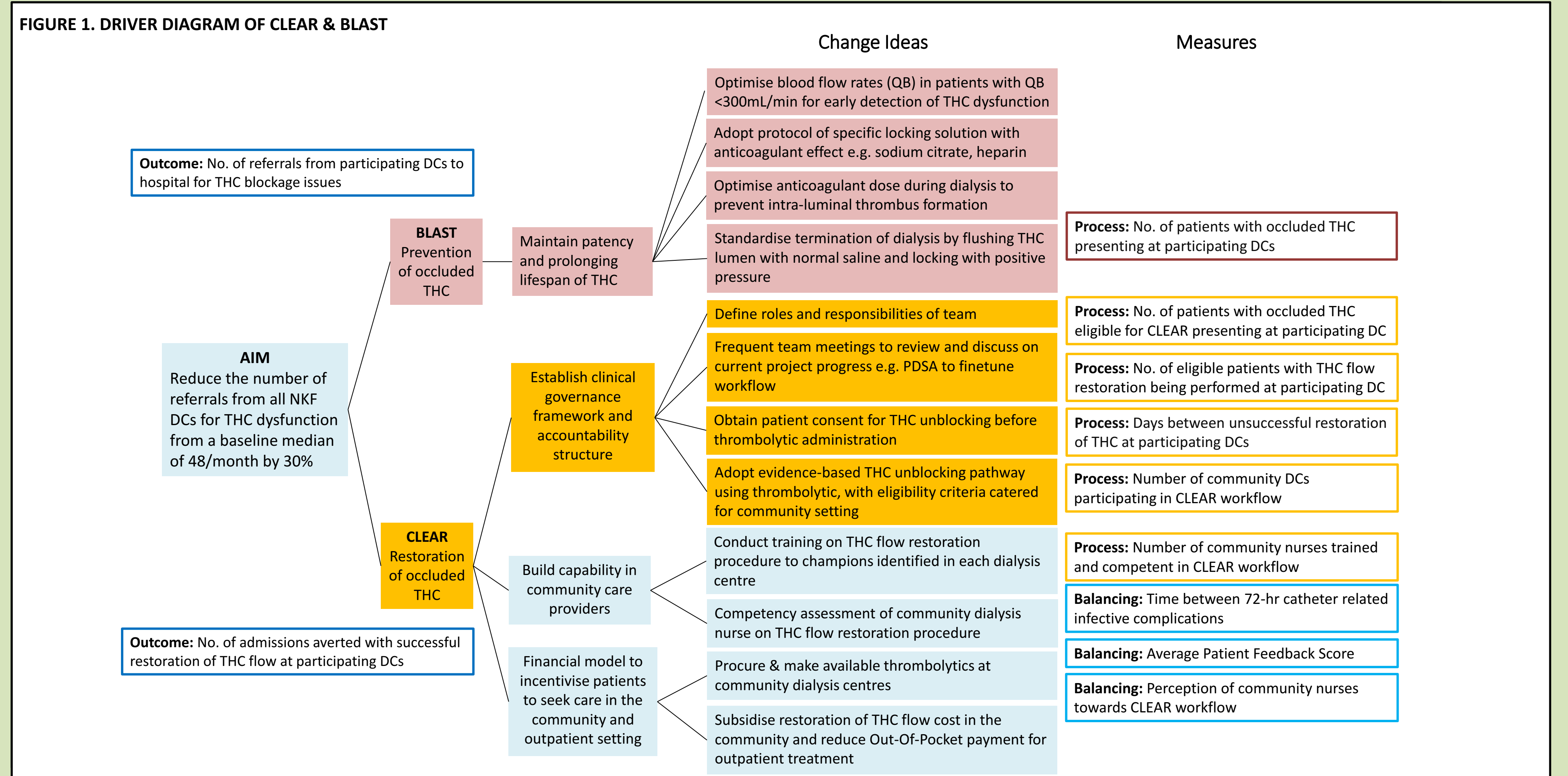
- The majority of patients with End-Stage Kidney Disease (ESKD) in Singapore chose haemodialysis (HD) as their maintenance renal replacement therapy. Of these, a significant number of them required tunnelled haemodialysis catheter (THC) to receive life-sustaining HD therapy.
- However, the use of THC is associated with a relatively high incidence of complications and one of the most frequent complications is catheter occlusion due to thrombosis.
- In Singapore, the administration of a lytic dwell to restore the flow of occluded THC is traditionally performed in acute hospitals as an inpatient procedure, resulting in delay in dialysis, inconvenience to patients, increased hospital bed occupancy and overall healthcare costs.

OBJECTIVES

- Our project aims to reduce the number of referrals from the National Kidney Foundation (NKF) dialysis centres (DCs) to hospitals due to THC dysfunction by 30%, from a baseline mean of 48 referrals per month.
- To achieve this, we reviewed the upstream process to prevent THC occlusion and empowered community dialysis nurses to treat catheter dysfunction by administering lytic dwells.

METHOD

- Starting from 1 Dec 2022, the following change ideas were tested in 42 community DCs over time: (Figure 1.)
 - optimising Blood flow, Locking solution, Anticoagulant and Standardising Technique (BLAST)
 - Catheter flow restoration with Lytic dwELL at community diAllysis centRe (CLEAR)
- A decision tree model was constructed using TreeAge Pro 2024 to estimate the incremental costs associated with intervention (CLEAR) vs the usual care of patients going to the hospitals.



RESULTS

- As of 31 December 2024, **117** community dialysis nurses from NKF had been trained.
- 339** lytic dwell procedures were performed at participating community dialysis centres with **86.4%** success rates; translating to 292 hospital admissions that were averted, and 584 hospital days saved.
- Median number of referrals to public health care institutions was **reduced by 77.1%** from a median of 48 cases per month to 11 cases per month. (Figure 2)
- The treatments were well received by patients with an average patient feedback score of **4.95/5** per month, indicating high patient satisfaction. (Figure 3)
- Cost analysis showed a cost saving of **\$258,038** for every 100 patients treated in the community, with probabilistic sensitivity analysis (PSA) confirming a >99% probability of cost-saving for this community-based intervention. (Table 1)

FIGURE 2. BLAST & CLEAR C-Chart: No. of referrals from participating DCs to hospitals

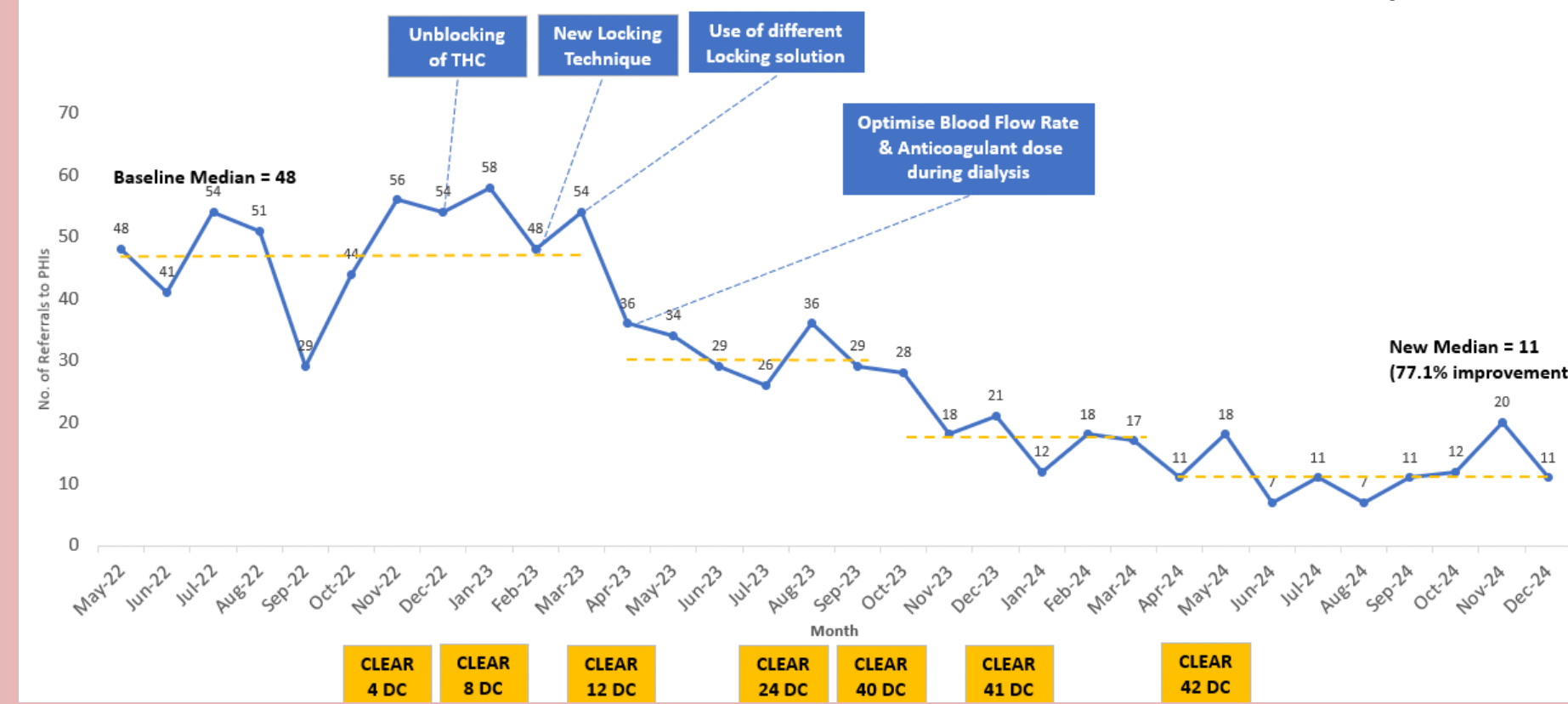


FIGURE 3. AVERAGE PATIENT FEEDBACK SCORE

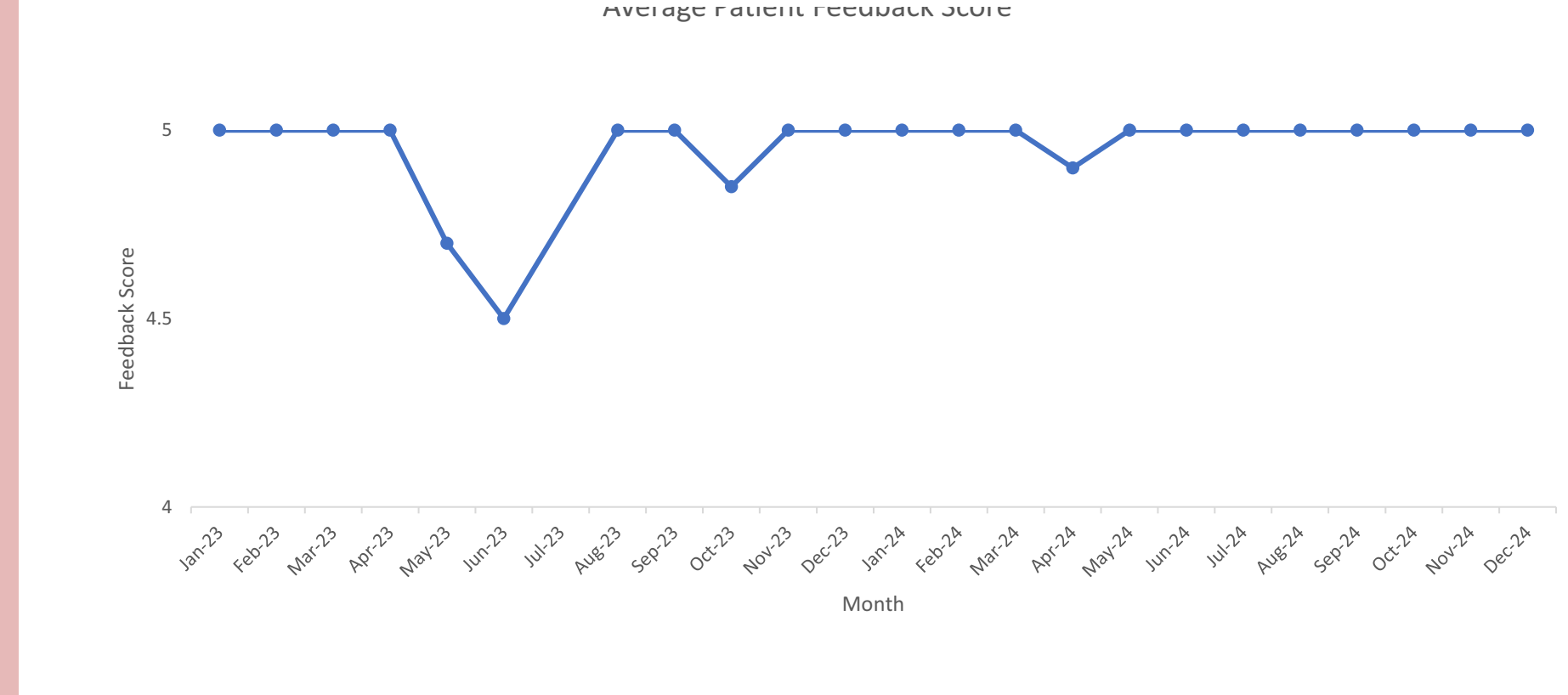


TABLE 1. COST-ANALYSIS: INTERVENTION (I) VS. USUAL CARE (U)

	Average cost (95% CI)	Incremental Cost (95% CI)	PSA
I	\$207,705 (166,102 to 253,634)	-\$258,038	>99%
U	\$465,744 (378,727 to 562,508)		

Patient Stories



"Going to the hospital is difficult. It is **inconvenient and not very comfortable as I need to ask people for help**. I will also need to seek Medical Social Worker for help if the bill is high. When I was told that the unblocking procedure can be done at the dialysis centre, **I was happy.**"

Mr Abdul Salam, the first patient to receive successful restoration of his THC in the community on 31 Dec 2022

"I really appreciate that **NKF nurses can perform THC unblocking procedure for me** when I have a blocked catheter. It **saves me time** having to go to the Emergency Department and this is a big help for me in reducing my financial burden. The nurses are **my life savers.**"



Mr Ng Hock Chye had successful restoration of his THC on 14 Oct 2023

Staff Story



"This unblocking procedure was something we have **wished to be able to do for our patients** at the centre for a long time as previously patients had to be directed to ED. I feel good about the procedure and it is **something worthwhile and significant I can do to avert an admission.**"

Sister Sivamani Anandam
Nurse manager that performed the lytic dwell in community on 31 Dec 2022, together with Sister Lucy Lu

SPREAD and SCALE

- The team developed a change package that informed evidence-based strategies, tools and best practices designed to guide the implementation of BLAST and CLEAR initiatives and distributed it to all other dialysis providers in Singapore since January 2024.
- From January to December 2024, the project has expanded and scaled to cover at least 80% of the HD population in Singapore with a total of 181 community dialysis nurses trained.

CONCLUSIONS

- Our project illustrated the importance of reviewing existing processes for continuous improvement and empowering nurses in the community to practice at the top of their licenses.
- Transition away from predominantly inpatient care is essential to improve patient outcomes and reduce the burden on our healthcare system.
- Bringing together individuals with a shared common vision, catalysed by our National DM collaborative, ensured the availability of essential resources at the opportune moment

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