

Adj Asst Prof Timothy Koh Jee Kam<sup>1</sup> | Dr Malcolm Mak Han Wen<sup>2</sup>

<sup>1</sup>Department of Renal Medicine | <sup>2</sup>Department of General Surgery

## Mission Statement

To decrease median time of referral to permanent vascular access creation in ESKD patients initiated on catheter dialysis from 142 days to 40 days in a six month period.

## Team Members

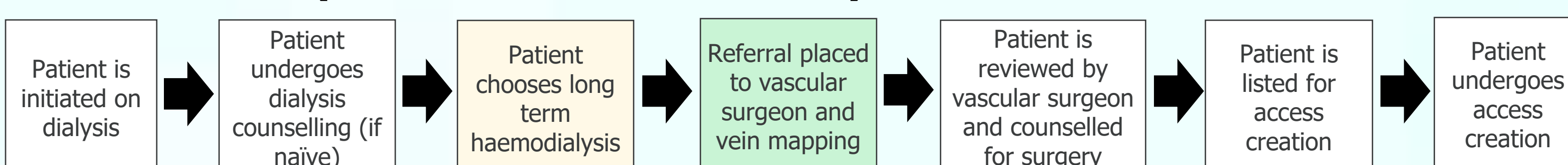
	Name	Designation	Department
Team Leaders	Adj Asst Prof Timothy Koh	Senior Consultant	Renal Medicine
	Dr Malcolm Mak	Associate Consultant	General Surgery
Team Members	Ms Pan Ying	Senior Staff Nurse	Nursing Specialty (Vascular)
	Ms Kristine Maano Leynes	Vascular Technologist	General Surgery
	Mr Jonathan Lee Zheng	Senior Patient Service Associate	Clinic 2A
	Ms Ashura Binte Mumazat	Patient Service Associate	Clinic 4B
	Ms Grace Tan Hui Min	Executive	Clinic B2B
	Dr Prajwala S Prakash	Resident	General Surgery
	Renal / Vascular Patients		

## Evidence for a Problem Worth Solving

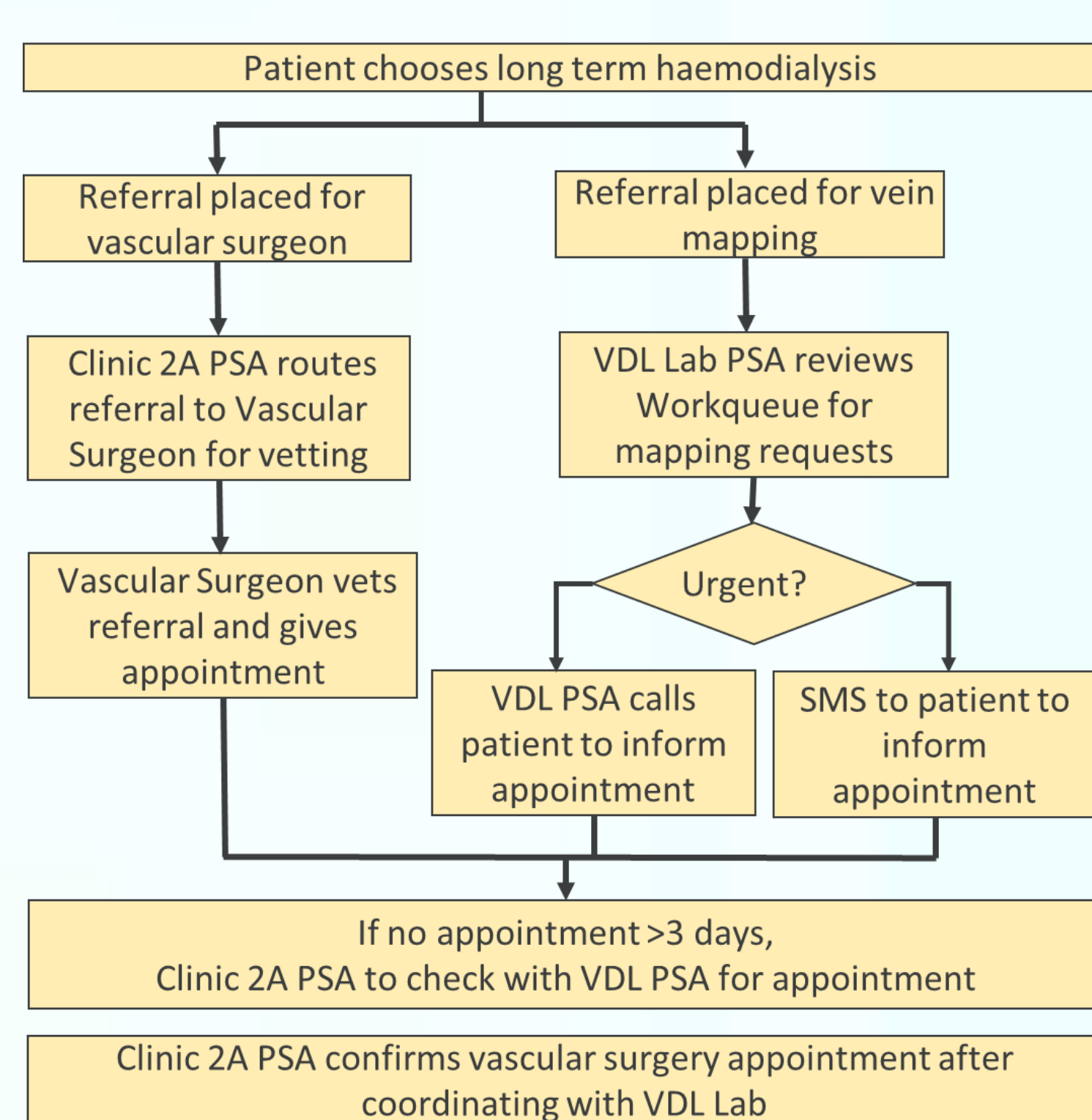
Singapore is currently number 2 worldwide for diabetes-induced kidney failure, with 6 new patients starting dialysis daily. Up to 80% of new ESKD patients in Singapore are initiated via a TDC. International data assessing time from referral to access creation surgery ranged from 5-6 days (Italy/Japan/Germany) to 40-43 days (Canada/United Kingdom). A sample of 80 patients in our institution from May to October 2023 showed a median time from referral to access creation of 142 days, with only 3% successfully undergoing surgery in <40 days from referral. The risk of catheter related complications is highest during the first 90 days of catheter placement. Our own data (2014-2015) showed that in patients with a TDC, the median time to a CRBSI was 102 days. For severe episodes of CRBSI with pathogens like Methicillinresistant Staphylococcus Aureus (MRSA), this was estimated to have an increased cost of \$5,645.91 to the patient (based on 2016 data). With this background, it highlights that this is indeed a problem worth solving to improve time to access creation.

## Flow Chart of Process

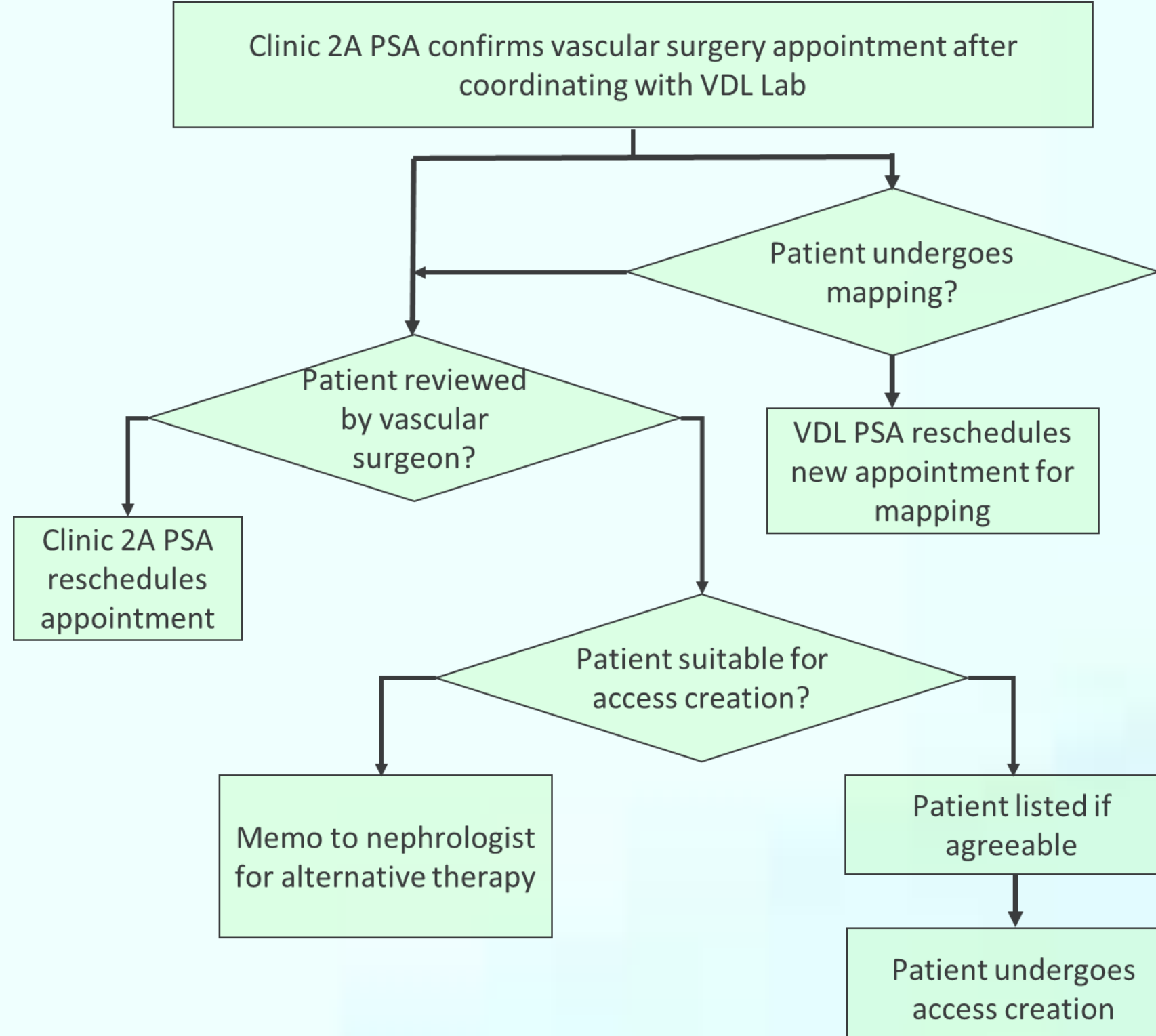
### MACRO FLOW (Permanent Access Creation)



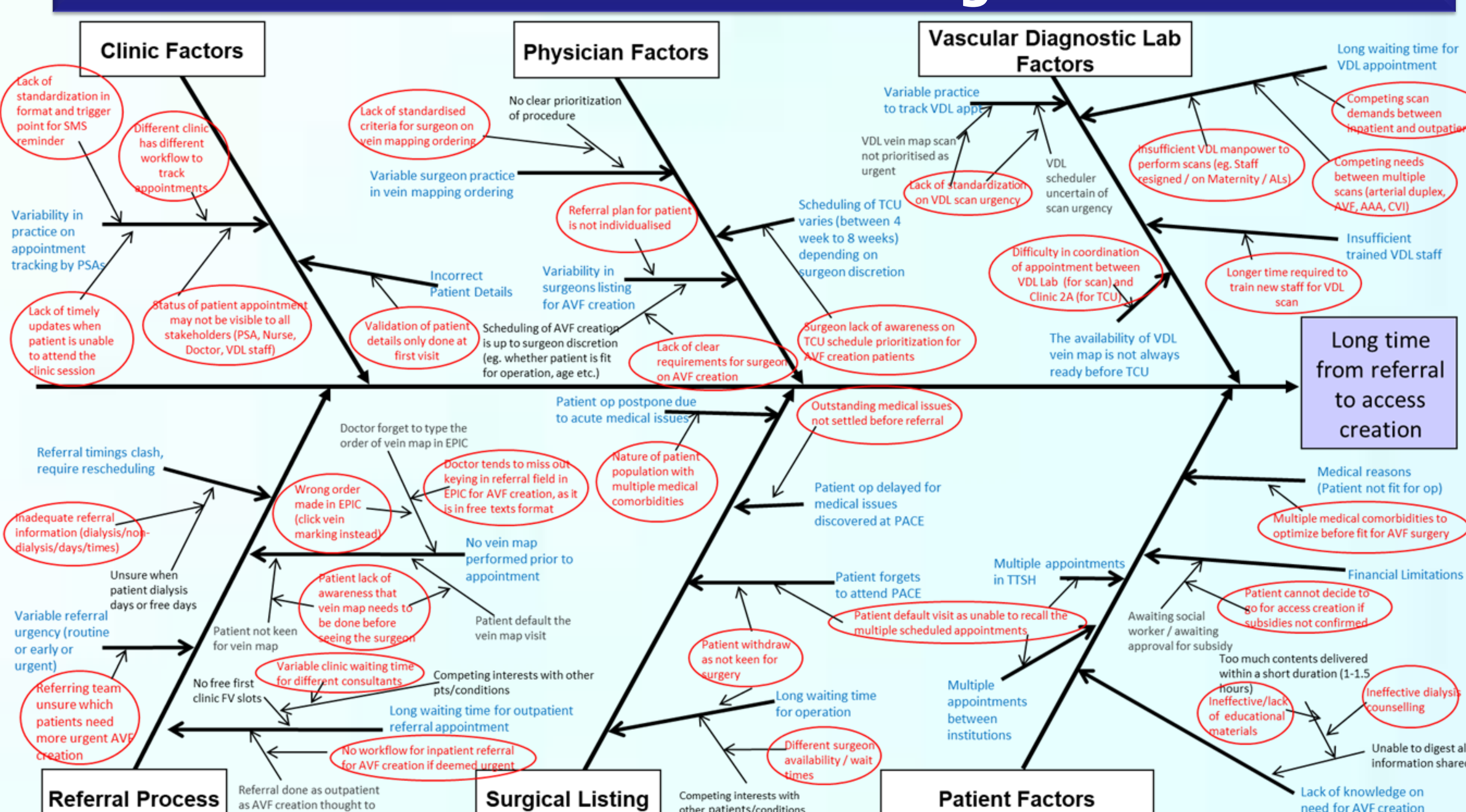
### MICRO FLOW Patient chooses long term haemodialysis



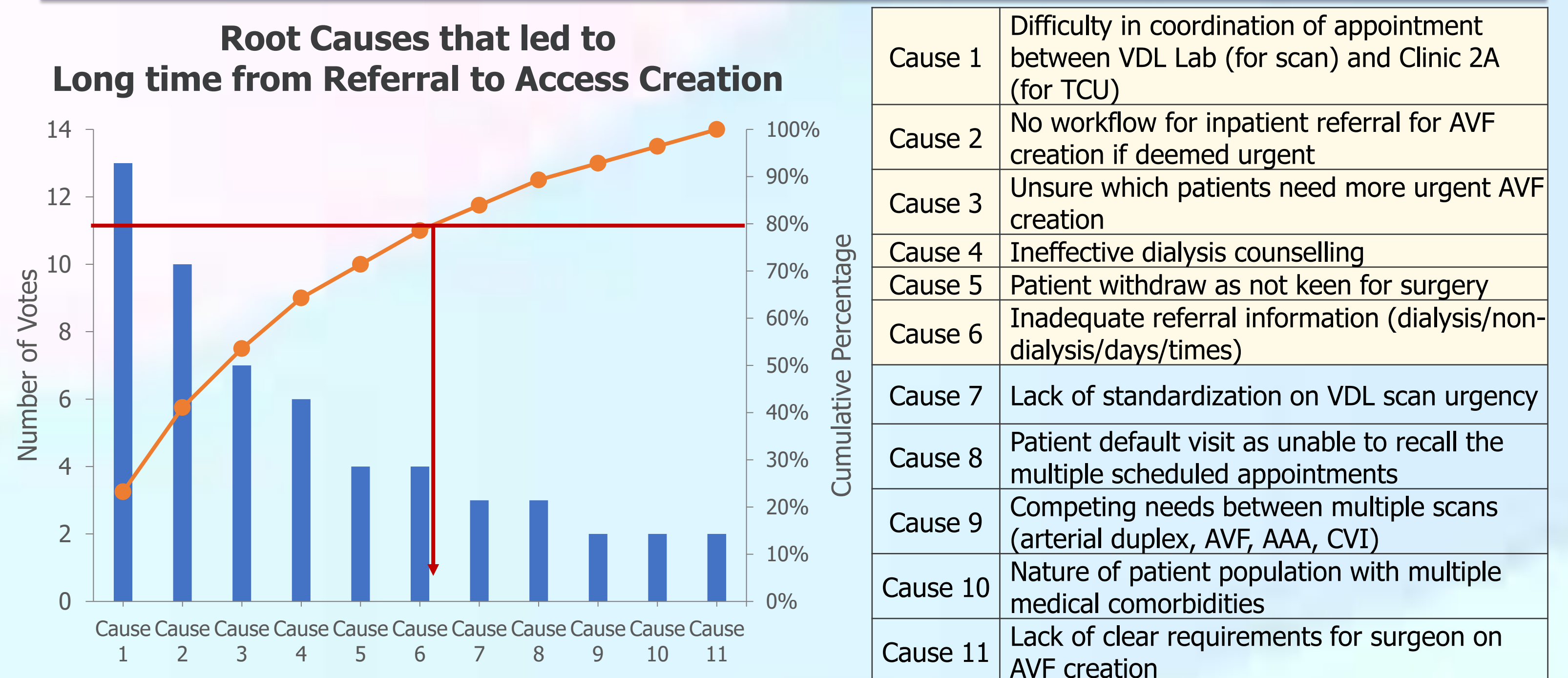
### MICRO FLOW Referral placed to vascular surgeon & vein mapping



## Cause and Effect Diagram



## Pareto Chart

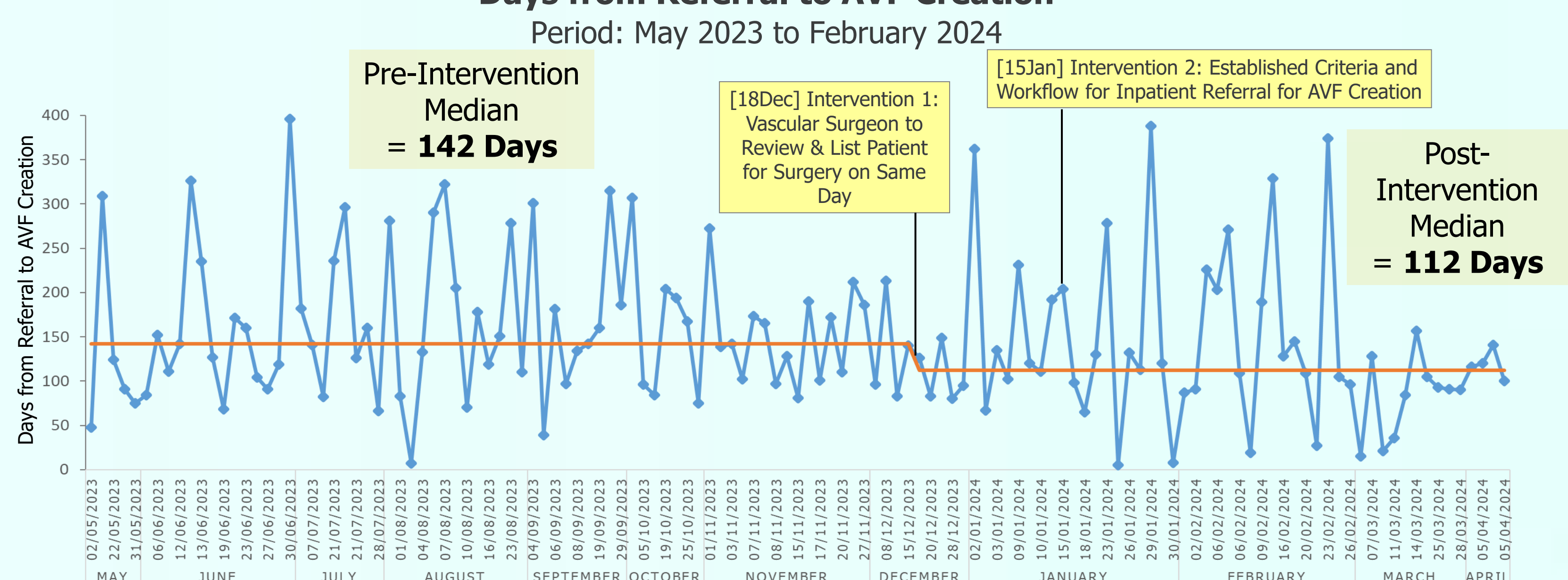


## Implementation

CAUSE	INTERVENTION	DATE OF IMPLEMENTATION
<b>Cause 1:</b> Difficulty in coordination of appointment between VDL Lab (for scan) and Clinic 2A (for TCU)	<b>Intervention 1:</b> Vascular Surgeon to Review & List Patient for Surgery on Same Day of Clinic TCU	18 Dec 2023
<b>Cause 2:</b> No workflow for inpatient referral for AVF creation if deemed urgent	<b>Intervention 2:</b> Established Criteria and Workflow for Inpatient Referral for AVF Creation	15 Jan 2024
<b>Cause 3:</b> Unsure which patients need more urgent AVF creation		

## Results

### Days from Referral to AVF Creation



Month	Year 2023							Year 2024				
	May	June	July	August	September	October	November	December	January	February	March	April
No. of Patients	5	14	8	13	9	7	15	9	19	16	10	4
No. of Patients under 40 days	0	0	0	1	1	0	0	0	2	2	3	0

## Cost Avoidance

- Reduced time to AVF creation → translate to faster time dialysis catheter can be removed
- Time to CRBSI – median 102 days, mean 200 days

	Dysfunctional Catheter	Catheter-related blood stream infection
LOS (days)	7-10	14
Cost per admission (\$)	12,429.50	21,261.64
Number of clinic presentations (2022)	211	Unavailable
Percentage requiring admission	33%	Unavailable
Annualized cost (\$)	870,065	Unavailable

## Problems Encountered

- In implementing Intervention 1, there was initial increased stress on the outpatient load due to rearrangement of outpatient appointments for same-day VDL map and clinic appointment, but this does not affect future appointments. The use of bedside US allowed listing of patient for surgery without formal vein map but increased clinic consultation time; this was balanced by shorter time to surgery and reduced extra clinic appointment.
- In implementing Intervention 2, there was increased workload on the inpatient team for inpatient review. This however was balanced by reduced SOC clinic load and correspondingly, decreased SOC waiting time.

## Strategies to Sustain

- Changing the process flow for both outpatient (PDSA 1) and inpatient (PDSA 2) referrals
- To regularly remind stakeholders regarding ongoing process
- Receive feedback from stakeholders and patients regarding process flow to fine-tune and improve it