

## Mission Statement

At-risk groups undergo screening for diabetes. The 2017 Appropriate Care Guide recommends 6-monthly glycaemic monitoring for prediabetics<sup>1</sup>. This project aimed to improve frequency of glycaemic monitoring in newly diagnosed prediabetics in Yishun Polyclinic from 57% to 100% within 6 months, and sustain the improvement for at least 1 year. The long-term aim, outside the scope of this project, is for regular 6-monthly glycaemic monitoring for all prediabetics.

## Team Members

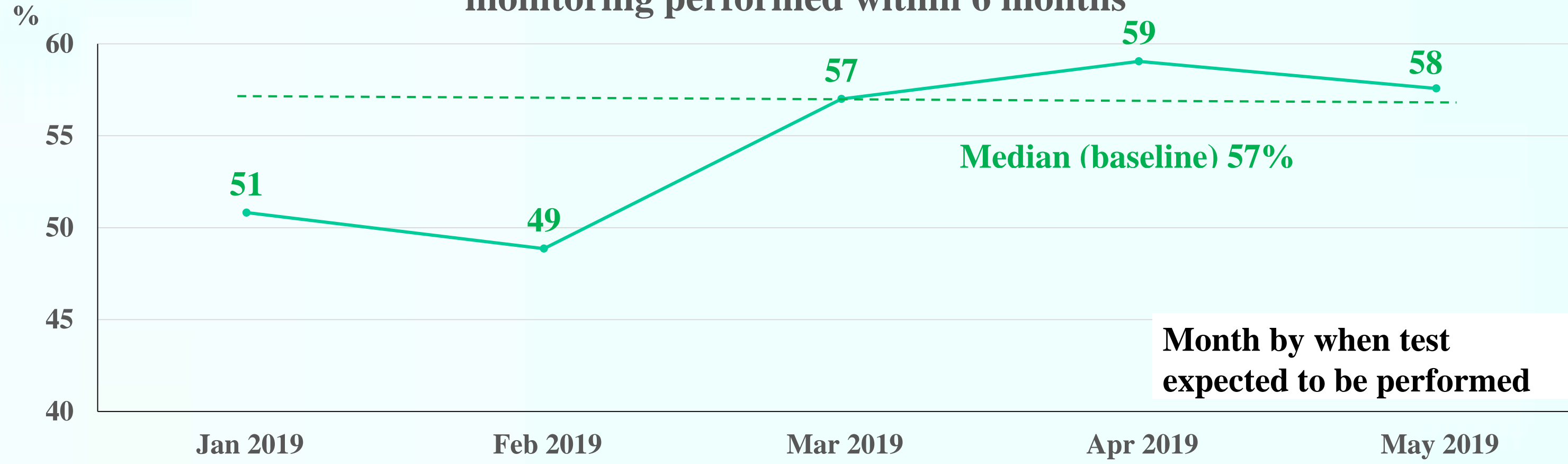
Team Leaders	Dr Patrick Ee Yang Zhi	Family Physician	Yishun Polyclinic
	Ng Sze Ern	Care Manager (SSN)	
Team Members	Jerlin Lee	Care Coordinator	
	Judy Goh	PSA	
	Dr Mogilan S/O Mohan	Family Physician	
	Noelina Delson Cadwising	Medical Technologist	
	Dr Teo Zhi Han	Family Physician	
Facilitator	Dr Lim Ziliang	Family Physician	
Sponsor	Dr Kwan Pek Yee	Family Physician	

## Evidence for a Problem Worth Solving

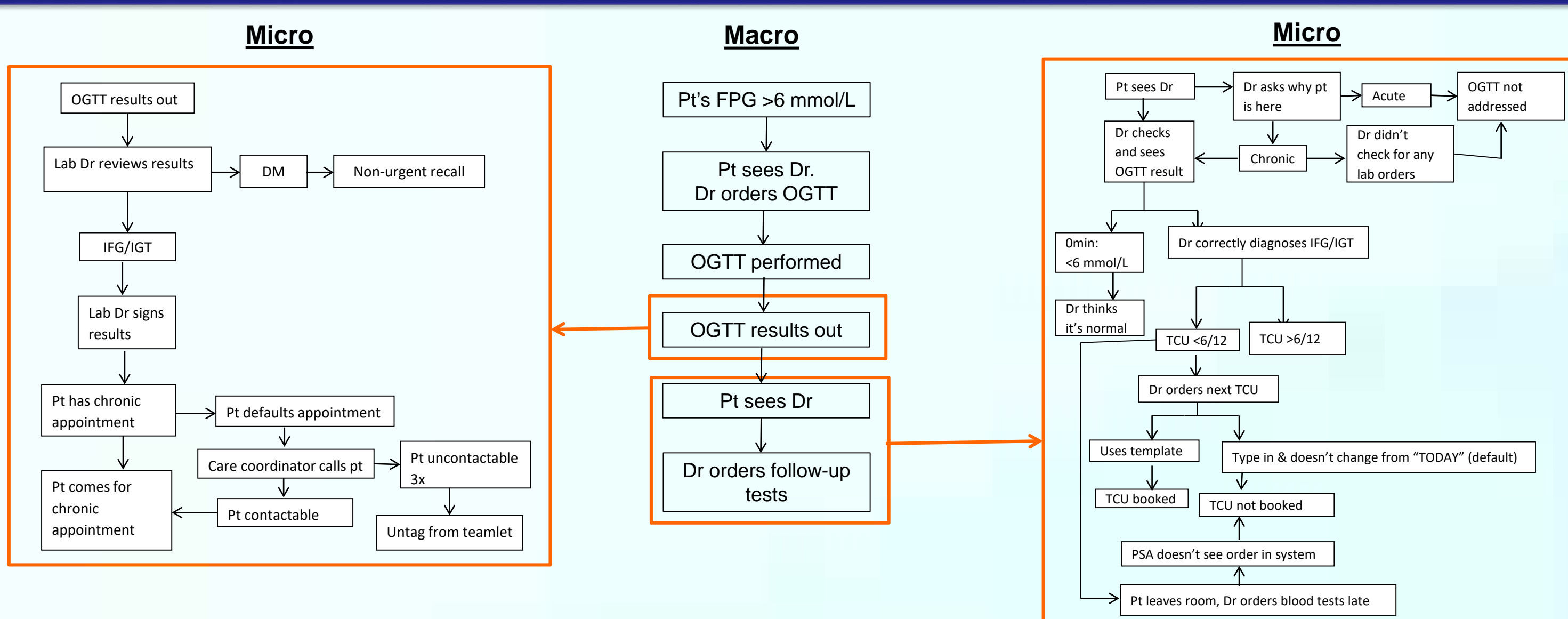
Patients with elevated FPG of 6.1-6.9 mmol/L undergo an OGTT to exclude diabetes (2-hour glucose  $\geq 11.1$  mmol/L). Prediabetes is defined as IFG (FPG 6.1-6.9, 2-hour glucose  $< 7.8$  mmol/L) or IGT (FPG  $< 7.0$ , 2-hour glucose 7.8-11.0 mmol/L). A 2003 local study<sup>2</sup> showed that 35.1% of patients with IGT progress to diabetes, while a 2017 meta-analysis<sup>3</sup> showed that lifestyle interventions can reduce this progression by 36% over 6 months to 6 years. Retarding this progression can reduce subsequent diabetic complications. Pharmacotherapy (e.g. metformin) is recommended for patients whose glycaemic control worsens after 6 months despite lifestyle interventions<sup>4</sup>.

## Current Performance of a Process

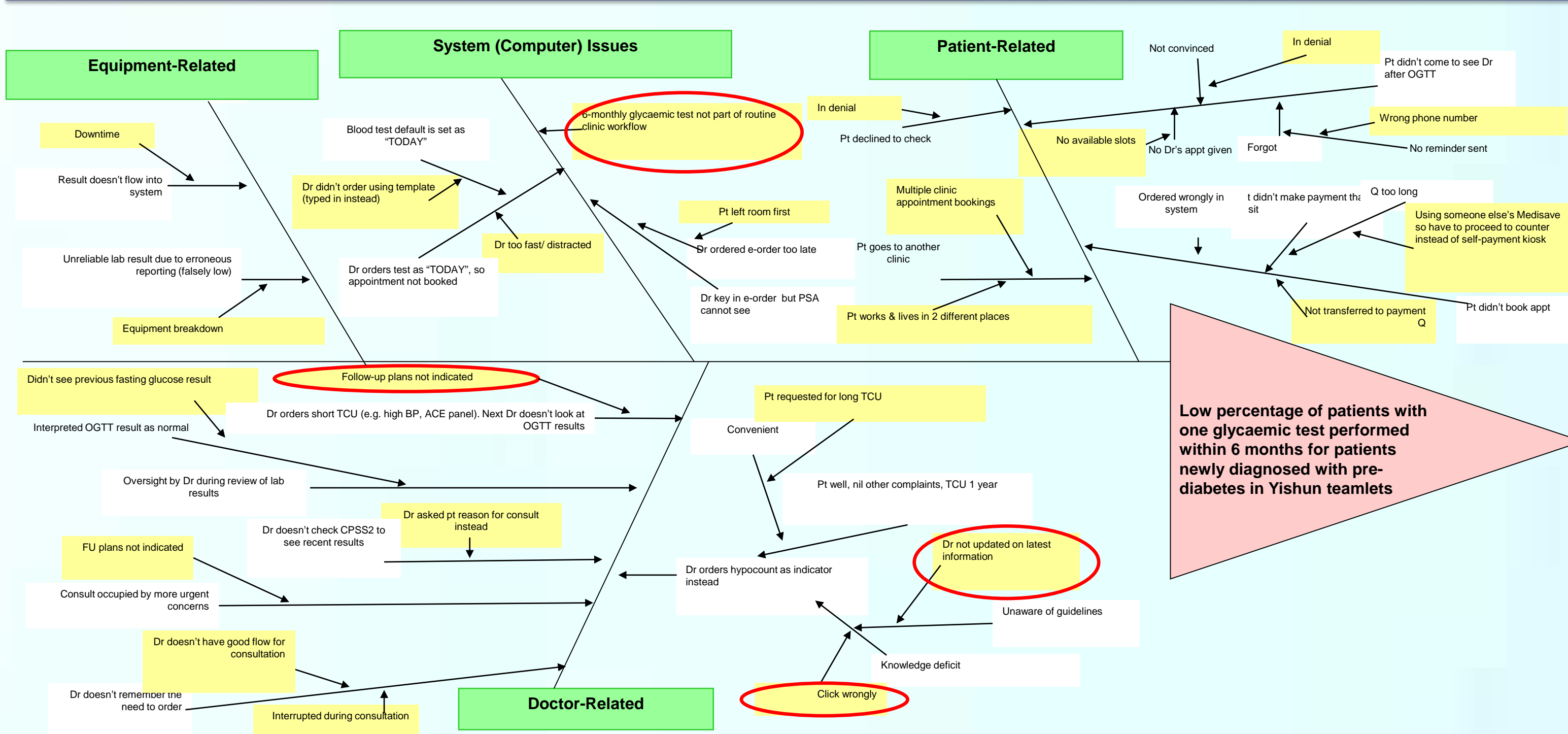
Teamlet patients with prediabetes in Yishun Polyclinic who had glycaemic monitoring performed within 6 months



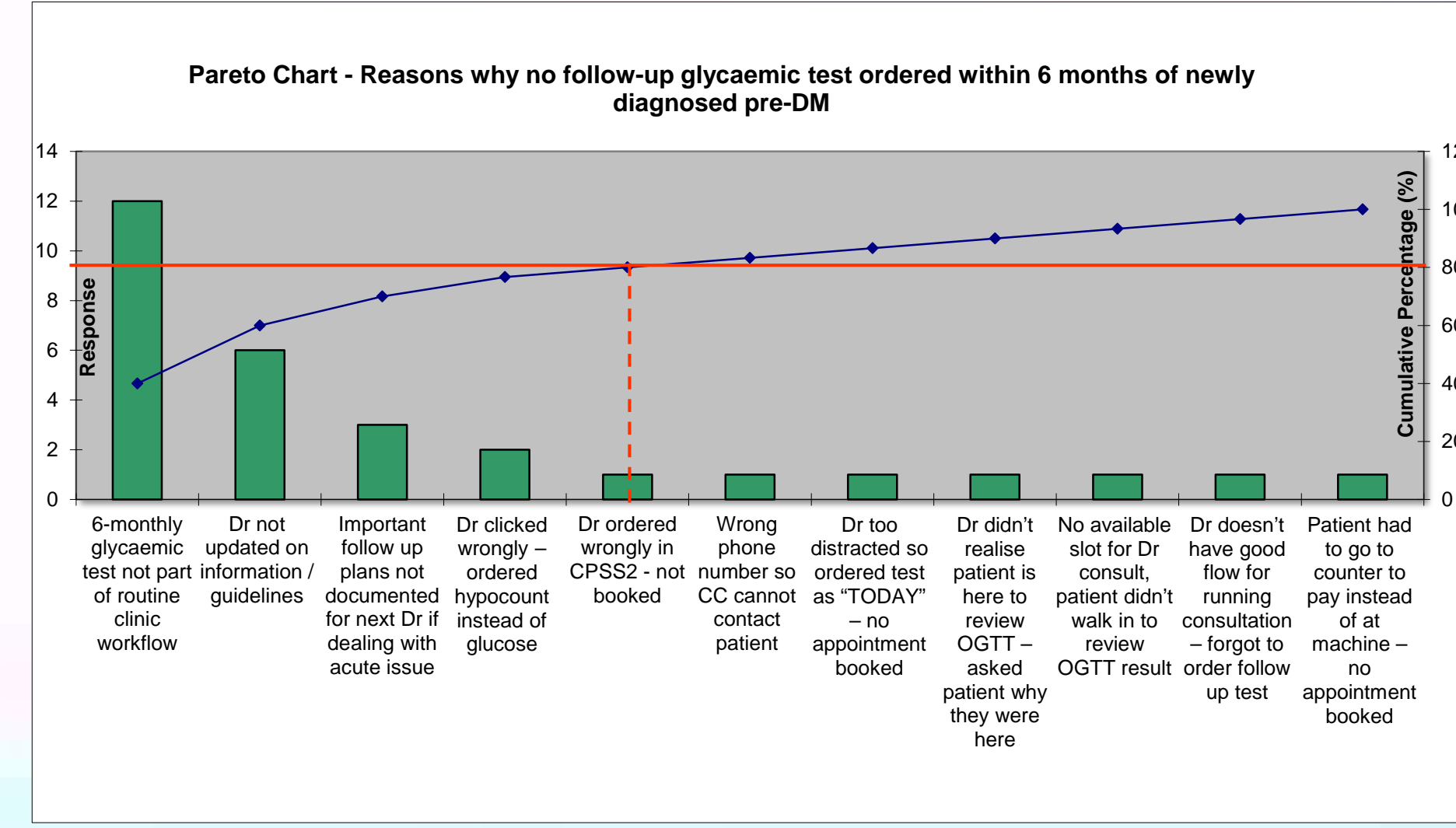
## Flow Chart of Process



## Cause and Effect Diagram



## Pareto Chart

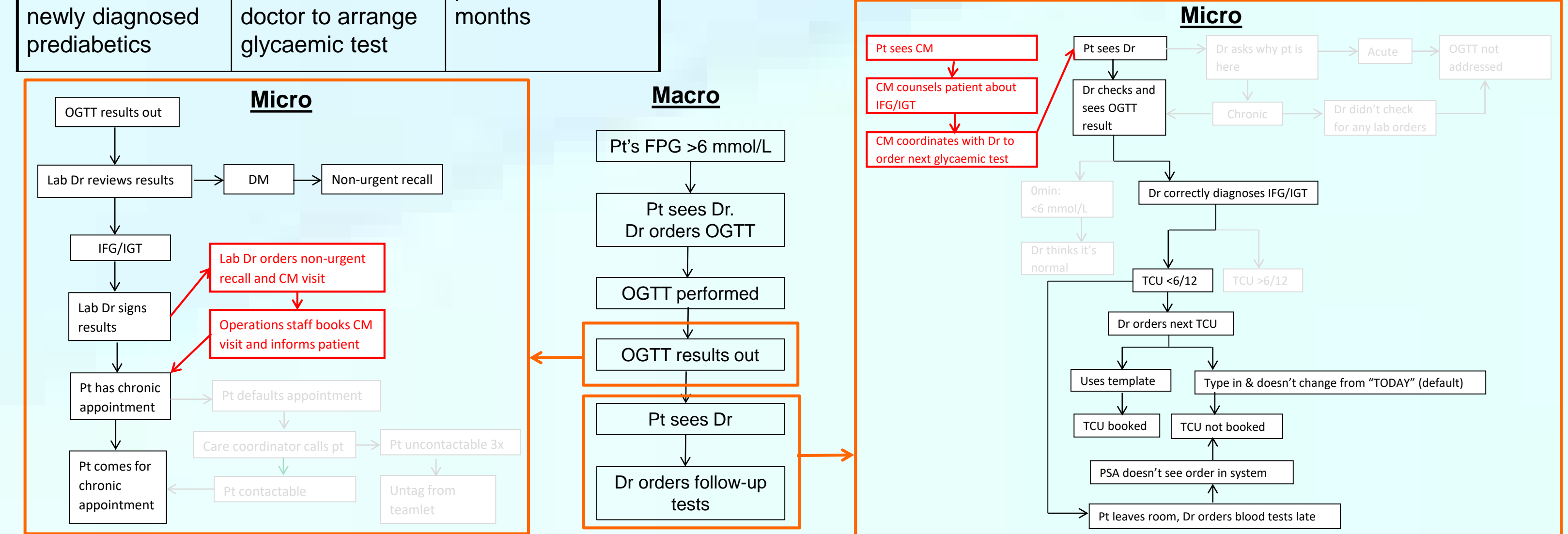


Multi-voting identified a systemic cause to address: there was no existing clinic workflow to guide healthcare professionals with regards to regular glycaemic monitoring in prediabetic patients.

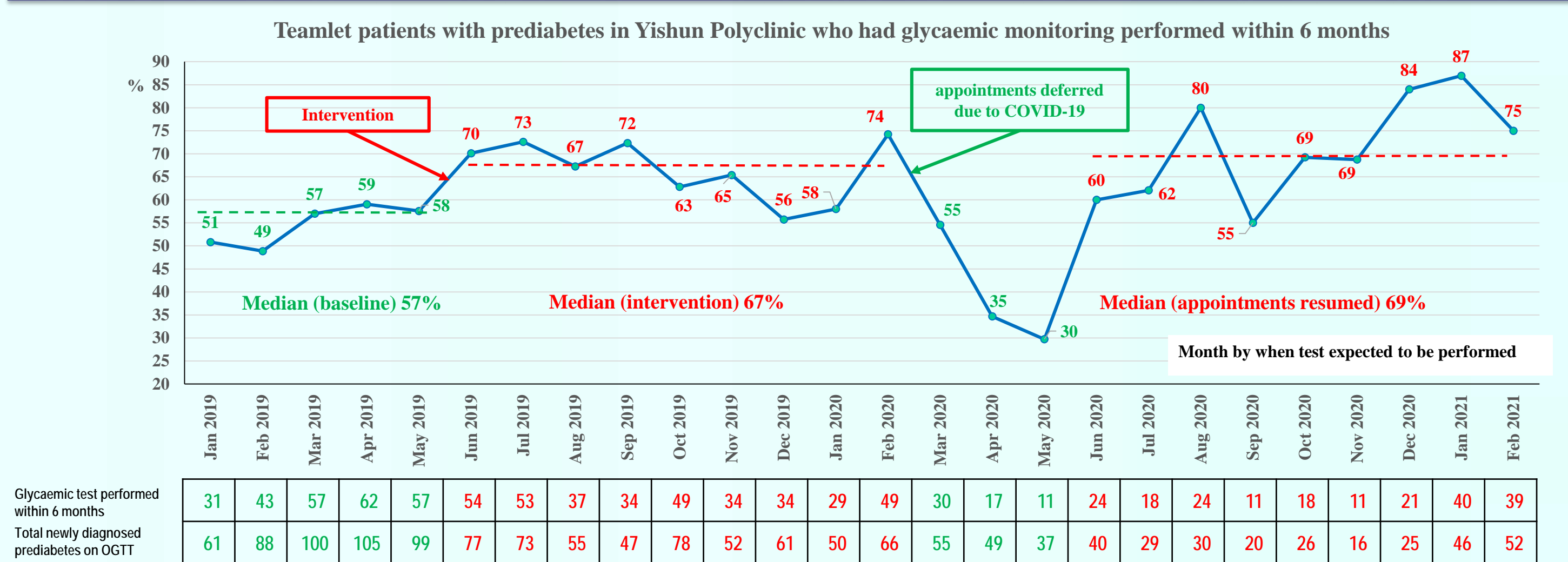
## Implementation

CAUSE / PROBLEM	INTERVENTION	PROCESS MEASURE
6-monthly glycaemic test not part of routine clinic workflow for newly diagnosed prediabetics	Recall patients for counselling by CM, and coordinate with doctor to arrange glycaemic test	% of patients with follow-up glycaemic test performed within 6 months

Recall prediabetics to see their teamlet CM for counselling, and coordinate with doctor to arrange glycaemic test. In order to remove erroneous actions in the micro-flow.



## Results



Increased from 57% to 69%. Expected decline during appointment deferment due to COVID-19. Rebound improvement when appointments resumed.

## Cost Savings

Clinic service	Pre-diabetic (e.g. with hypertension)*	Well controlled diabetic	Poorly controlled diabetic			
<b>Consultations*</b>	2 x Dr visits 1 x CM visit	\$26.40 \$7.30	2 x Dr visits 1 x CM visit	\$26.40 \$7.30	4 x Dr visits 2 x CM visits	\$52.80 \$14.60
<b>Lab tests*</b>	1 x Hypertension panel 1 x Fasting glucose	\$19.40 \$5.10	1 x Diabetes panel 1 x HbA1c	\$35.30 \$14.20	1 x Diabetes panel 3 x HbA1c	\$35.30 \$42.40
<b>Medications</b>	No diabetes medications	Nil	Metformin 250mg BD	\$73.00	Metformin 500mg BD Glipizide 5mg BD Glargine 8 units ON	\$146.00 \$73.00 \$84.00
<b>Other services</b>	No retinal photography (DRP) or foot screening (DFS)	Nil	1 x DRP 1 x DFS	\$12.80 \$12.80	1 x DRP 1 x DFS	\$12.80 \$12.80
<b>Total cost for patient</b>		\$ 58.20		\$ 181.80		\$ 473.70

**Savings:**

- \$123.60 (88%) compared to a well controlled diabetic
- \$415.50 (88%) compared to a poorly controlled diabetic

**Remarks:**

- These savings exclude the added cost of treating complications of diabetes, which may be even greater
- specialist clinic visits (e.g. for retinopathy, ESRF)
- emergency visits and hospital admissions (e.g. for hyperglycaemic crises, AMI, stroke)
- interventions (e.g. amputations, dialysis)
- Other positive impacts on our healthcare system may include:
  - patient's sense of well-being and mental health, reduced workload on healthcare providers

\*estimated number of Dr/CM visits and Lab tests based on NHGP Hypertension and Diabetes Care Paths  
\*including 1 extra CM visit and 1 extra Fasting Glucose for pre-diabetic patients as per our intervention

## Problems Encountered

Occasional inadequate CM appointment slots for patients to see their teamlet CM before the doctor. Omissions still occurred intermittently at various points in the workflow. Discussion and correction was carried out regarding these limitations.

## Strategies to Sustain

- Targeting a systemic change, instead of individual actions, will aid in sustaining the improvement. Discussion was also carried out with the involved healthcare professionals, who agreed with the project's rationale.
- The workflow may be extended to non-teamlet patients, who do not have a dedicated CM and a group of doctors managing their health. The outcome might be limited due to reduced interdisciplinary staff familiarity as a result of staff rotation.
- Spreading the intervention to other clinics may be possible.

## References

- Agency for Care Effectiveness, 2017
- Wong MS et al, Diabetes Care 2003; 26: 3024-30
- Barry et al, BMJ 2017; 356: i6538
- Twigg et al, Med J Aust 2007; 186: 461-5

## Abbreviations

- CM: care manager
- FPG: fasting plasma glucose
- OGTT: oral glucose tolerance test
- IFG: impaired fasting glucose
- IGT: impaired glucose tolerance
- DM: diabetes mellitus