

Project Title

Project InCRedible : Increase Enrolment in Cardiac Rehabilitation Package in Eligible

Post Acute Coronary Syndrome Patients

Project Lead and Members

- Dr Violet Hoon Hui Qing
- Ms Yvonne Chow Mei Wan
- Ms Jaclyn Chow Jie Ling
- Ms Jamie Lim Chuen
- Ms Gao Juan Nurse
- Dr Benita Chiang Shu Qi
- Ms Grace Fung Yu Si
- Adj A/Prof Chia Pow Li
- Dr William Chan Wai Lim

Organisation(s) Involved

Tan Tock Seng Hospital

Healthcare Family Group Involved in this Project

Allied Health, Medical, Nursing

Applicable Specialty or Discipline

Cardiology, Rehabilitation Therapy

Project Period

Start date: Sep 2019

Completed date: Oct 2020

Aims

To increase enrolment of cardiac rehabilitation (CR) package from 7.8 to 50 in eligible post-Acute Coronary Syndrome (ACS) patients over 6 months

- Cardiac Rehabilitation Package Consist of 8 or 10 sessions of exercise sessions with 2 pre and post assessment, and 6 interactive talks
- ACS (Acute Coronary Syndromes) Include ST elevation myocardial infarction, Non ST elevation myocardial infarction and Unstable angina
- Eligible post ACS patients Defined as patients admitted under Cardiology, who have been revascularized and suitable/fit to proceed with exercise

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Conclusion

See poster appended/ below

Additional Information

Accorded the NHG Quality Day 2022 (Category E: Innovation in Healthcare) Merit Award

Project Category

Care & Process Redesign

Access to Care, Readmission Rate, Productivity, Cost Saving, Risk Management, Adverse Outcome Reduction. Preventive Approach

Keywords

Cardiac Rehabilitation, Exercise, Cardiovascular Health, Post-Acute Coronary Syndrome

Name and Email of Project Contact Person(s)

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Mission Statement

To increase enrolment of cardiac rehabilitation (CR) package from 7.8% to 50% in eligible post-Acute Coronary Syndrome (ACS) patients over 6 months

- Cardiac Rehabilitation Package: Consist of 8 or 10 sessions of exercise sessions with 2 pre and post assessment, and 6 interactive talks.
- ACS (Acute Coronary Syndromes): Include ST elevation myocardial infarction, Non ST elevation myocardial infarction and Unstable angina.
- Eligible post-ACS patients: Defined as patients admitted under Cardiology, who have been revascularized and suitable/fit to proceed with exercise.

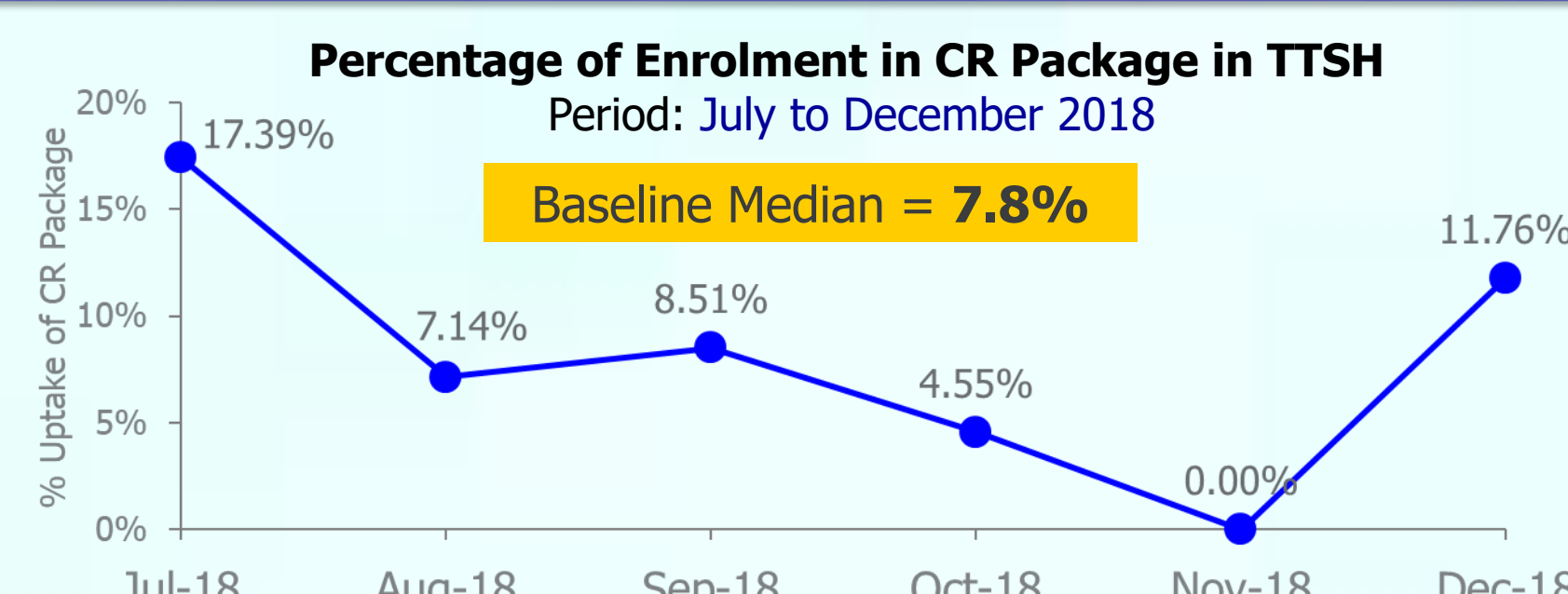
Team Members

	Name	Designation	Department
Team Leader	Dr Violet Hoon Hui Qing	Consultant	Cardiology
Team Members	Ms Yvonne Chow Mei Wan	Nurse Clinician	Nursing Service
	Ms Jaclyn Chow Jie Ling	Senior Physiotherapist	Physiotherapy
	Ms Jamie Lim Chuen	Assistant Director of Nursing	Nursing Service
	Ms Gao Juan	Nurse Clinician	Nursing Service
	Dr Benita Chiang Shu Qi	Senior Resident	Cardiology
	Ms Grace Fung Yu Si	Executive	Operations (Medicine)
Sponsor	Adj A/Prof Chia Pow-Li	Head of Department	Cardiology
Mentor	Dr William Chan Wai Lim		

Evidence for a Problem Worth Solving

1. Enrolment in the Cardiac Rehabilitation (CR) Package in TTSH has been very low in post-myocardial infarction (MI) patients:

- Year 2016 = 23.2%
- Year 2017 = 13.4%
- Year 2018 = 8.5%



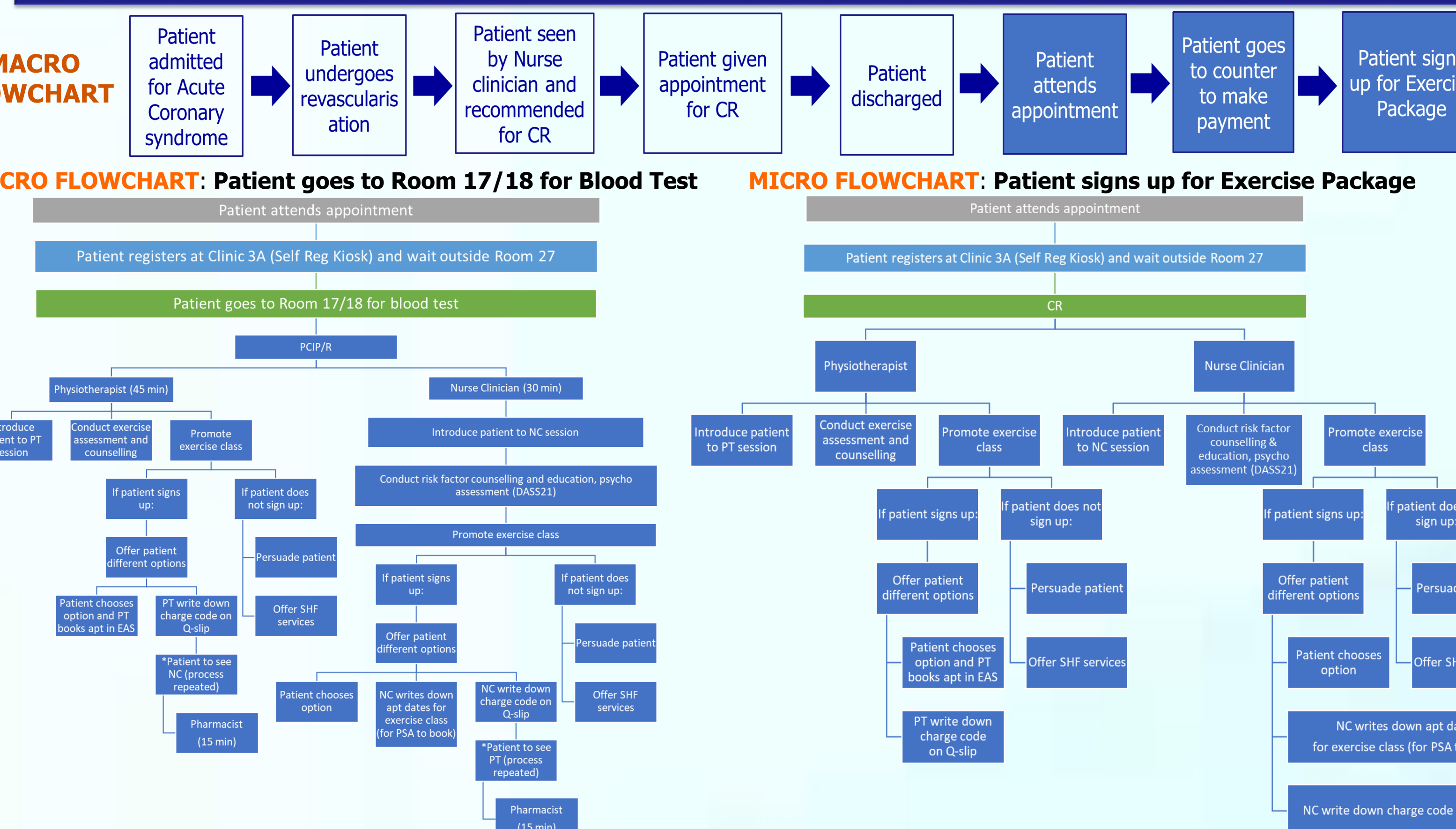
	Jul 2018	Aug 2018	Sep 2018	Oct 2018	Nov 2018	Dec 2018
No. of Patients who signed up for CR Package	8	3	4	2	0	4
No. of Eligible Patients	46	42	47	44	37	34

2. CR is a comprehensive secondary prevention program designed to improve cardiovascular health following a cardiac-related event or procedure:

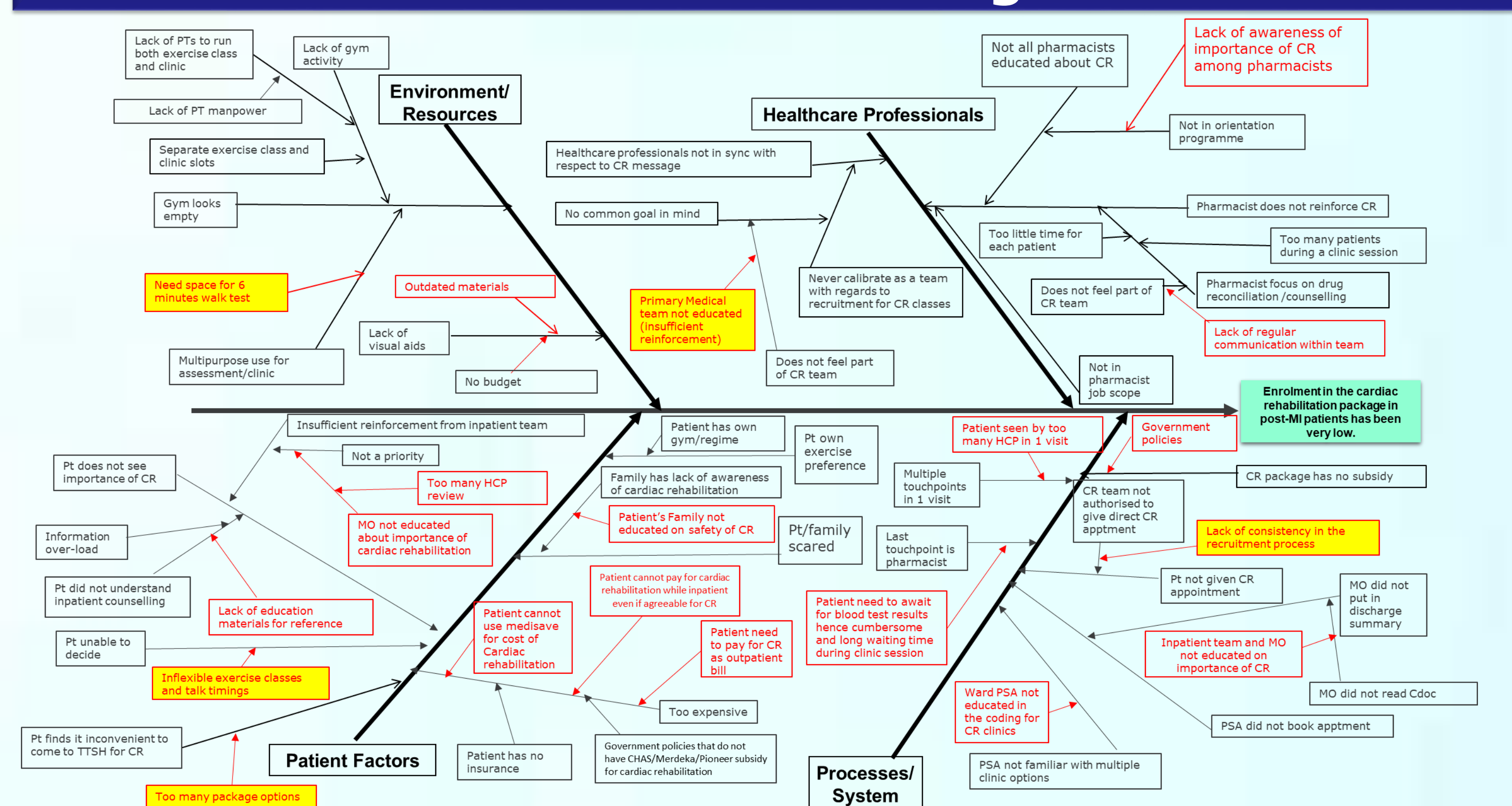
- Reduces the risk of death from any cause^{1,2}
- Reduces the risk of death from cardiac causes^{2,3}
- Reduces risk of recurrent myocardial infarction⁶
- Decreases hospital readmissions^{2,4}
- Improves functional status¹, quality of life²⁻⁴ and mood⁵

References
¹ Heran BS, Chen JM, Ebrahim S, Moham T, Oldridge N, Rees K, et al. Exercise-based cardiac rehabilitation for coronary heart disease. *Cochrane Database Syst Rev*. 2011;(7):CD001800.
² Taylor RS, Brown A, Ebrahim S, Jolliffe J, Noorani H, Rees K, et al. Exercise-based rehabilitation for patients with coronary heart disease: systematic review and meta-analysis of randomized controlled trials. *Am J Med*. 2004;116(10):682-92.
³ Anderson L, Oldridge N, Thompson DR, Zwisler A-D, Rees K, Martin N, Taylor RS. Exercise-based cardiac rehabilitation for coronary heart disease. *Cochrane Database Syst Rev*. 2016;67(1):1-12.
⁴ Rejeski WJ, Foy CG, Brubaker PH, Brubaker PH, Focht BC, Norris JL 3rd, Smith ML. Older adults in cardiac rehabilitation: a new strategy for enhancing physical function. *Med Sci Sports Exerc*. 2002;34(11):1705-13.
⁵ Oldridge N, Strainer D, Hoffmann R, Guyatt G. Profile of mood states and cardiac rehabilitation after acute myocardial infarction. *Med Sci Sports Exerc*. 1995;27(6):900-5.
⁶ Thomas et al. Effect of cardiac rehabilitation on 24-month all-cause hospital readmissions: A prospective cohort study. 2019. 18(3): 234-244

Flow Chart of Process

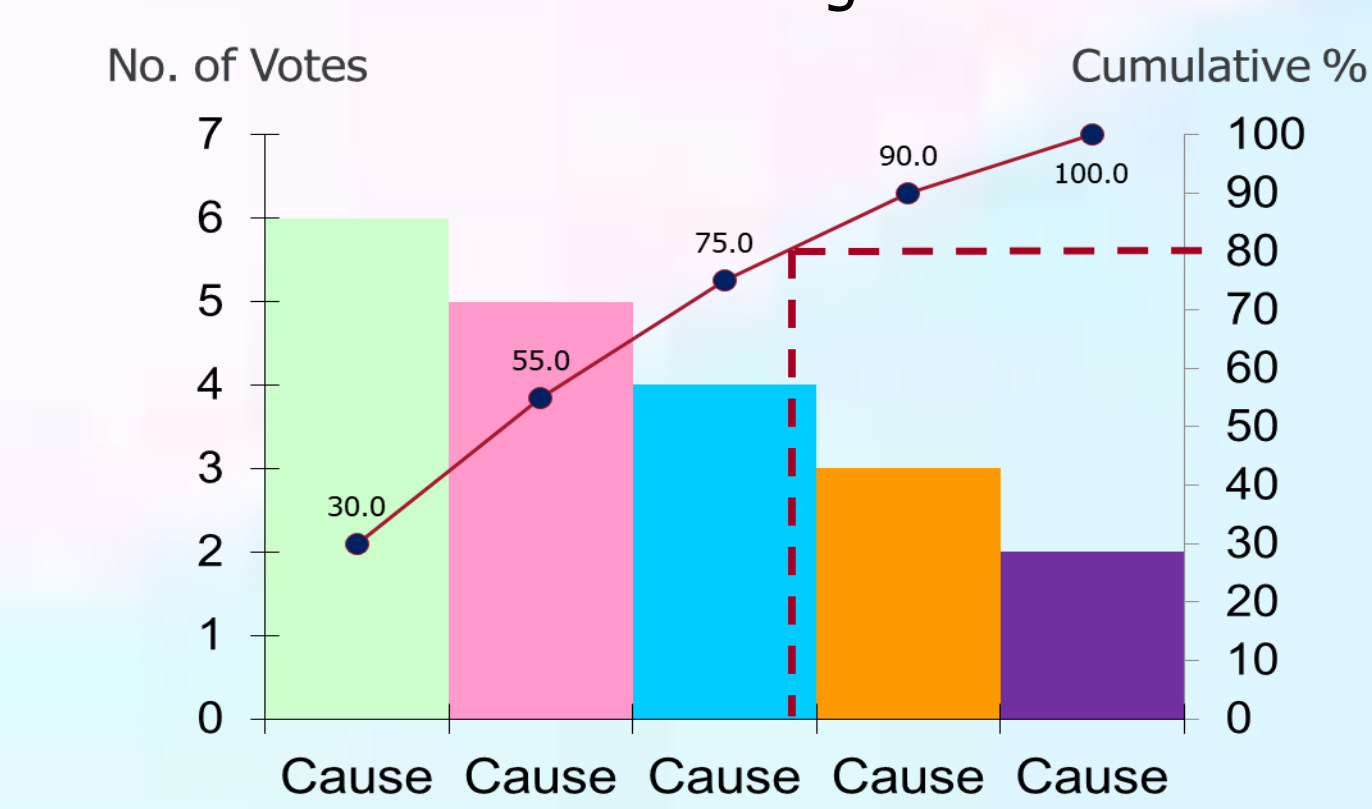


Cause and Effect Diagram



Pareto Chart

Causes of Causes on Low Enrolment in the Cardiac Rehabilitation Package in Post-MI Patients



Cause	Description
Cause A	Lack of consistency in the recruitment process
Cause B	Primary Medical team not educated (insufficient reinforcement)
Cause C	Inflexible exercise classes and talk timings
Cause D	Need space for 6 minutes walk test
Cause E	Too many package options

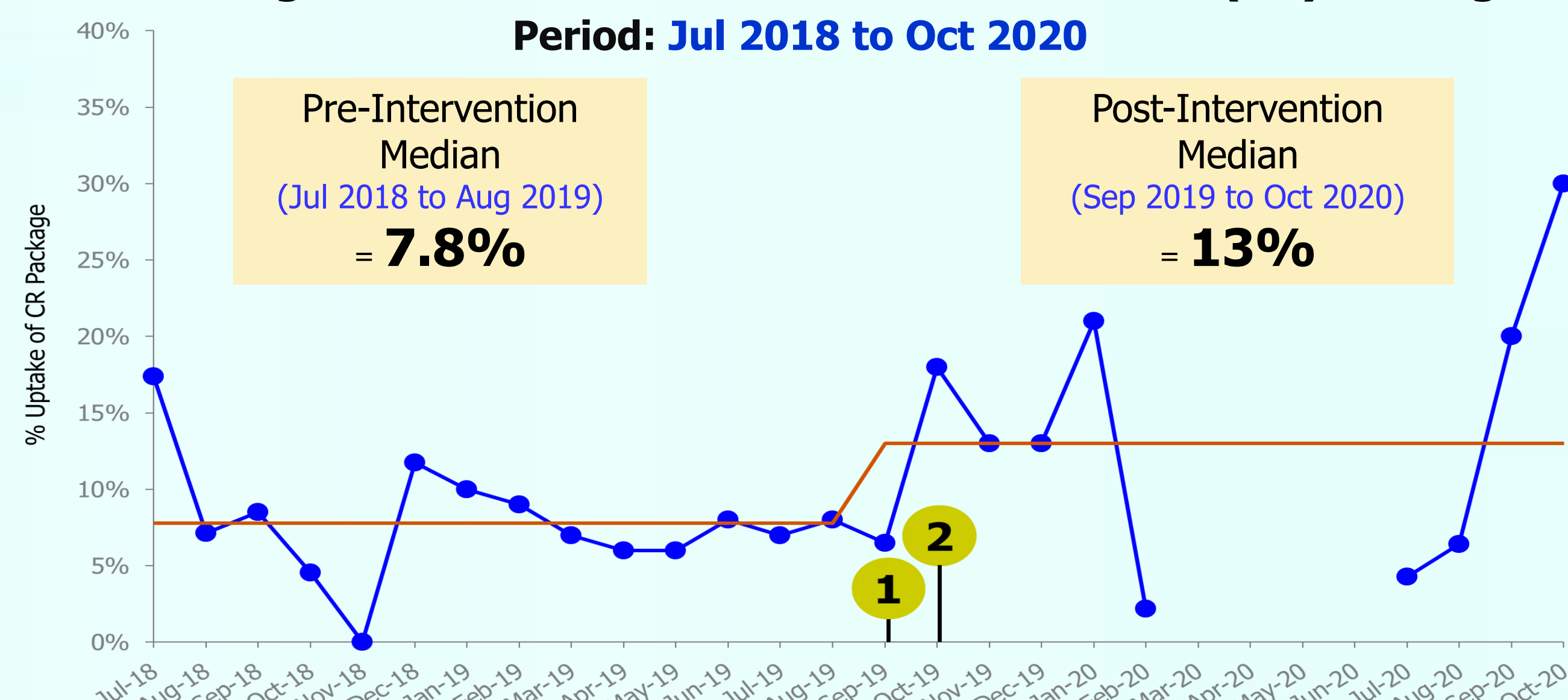
Implementation

Root Cause	Intervention	Implementation Date
Cause A: Lack of consistency in the recruitment process	Direct referrals to Cardiac Rehab team by Nurse Clinician & Physiotherapist	16 Sep 2019
Cause B: Primary Medical team not educated (insufficient reinforcement)	Reinforce importance of cardiac rehabilitation to Medical Officers & Registrars	16 Oct 2019

Results

Percentage of Enrolment in Cardiac Rehabilitation (CR) Package

Period: Jul 2018 to Oct 2020



- 1 Intervention 1:** Direct referrals to Cardiac Rehab team by Nurse Clinician & Physiotherapist
- 2 Intervention 2:** Reinforce importance of cardiac rehabilitation to Medical Officers & Registrars

	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20
Take CR	8	3	4	2	0	4	5	3	3	4	4	0	4	4	6	10	11	9	2	1	0	0	0	0	0	2	3	13	12
Eligible	46	42	47	44	37	34	43	44	48	42	42	39	45	42	42	42	46	50	25	21	NA	NA	NA	NA	NA	46	47	63	40

Cost Savings

	Pre-Intervention	Post-Intervention
Average Length of Stay (Per Patient)	5 Days	0 Day
Cost of ICU/HD Ward & General Ward Stay (Per Patient)	(2 x \$2080) + (3 x \$1114) = \$7,502	\$0
Bed Days Saved in Monetary Terms (Per Patient)		-\$10,400
Assume No. of Patients readmitted for STEMI/NSTEMI in 1 Year = 50		
Total Length of Stay (Annualized)	5 Days x 50 patients/year = 250 Days	0 Day
Total Cost of ICU/HD Ward & General Ward Stay (Annualized)	\$7502 x 50 = \$375,100	\$0
Bed Days Saved in Monetary Terms (Annualized)		-\$375,100

Note: Unit Cost for ICU / HD Ward Stay Per Day Per Patient = \$2,080 & Unit Cost for Inpatient Ward Stay Per Day Per Patient = \$1,114

Problems Encountered

Following the 6 months CPIP project journey, the team noted that most patients miss the crucial part of rehabilitation as many of them need to return to work or other duties. Hence, there was a need to develop a strategy to empower patients to exercise safely and effectively beyond clinic walls. With that, the team continued with their strategies to sustain by using Heart-Track™ as an alternative to Cardiac Rehabilitation.

Strategies to Sustain

To encourage patients to take charge of their health, the multi-disciplinary team comprising of physiotherapists, cardiologist and cardiac nurses co-developed the Heart-Track™, to make cardiac rehabilitation fun and convenient, while keeping care personalized. Heart-Track™ is a gamified, wearable technology that can automate patient progression and prescriptions, anytime, anywhere. It is a new collaborative model of care that empowers patients to exercise on their own while being monitored remotely for safety and effectiveness. Built to be a cost efficient and convenient care option, Heart-Track™ will pave the way for more activated patients, and a more sustainable continuum of care from hospital to community.

