

Project Title

Transforming from Reactive to Proactive Maintenance with Digitalisation

Project Lead and Members

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Organisation(s) Involved

NTUC Health

Healthcare Family Group(s) Involved in this Project

Healthcare Administration

Applicable Specialty or Discipline

Operations, Facilities Management

Project Period

Start date: Dec 2019

Completed date: Jul 2020

Aims

- Reduce equipment downtime as well as the time spent reporting a defect
- Effective communication within the team by standardizing the defect reporting channels
- Improve preventive maintenance and have a better overview by adopting digitalization to monitor the types of defects, minimize the number of handoffs and collate data for analysis

Background

See poster attached

Methods

See poster attached

Results

See poster attached

Lessons Learnt

Not available

Conclusion

See poster attached

Additional Information

Accorded the Productivity Improvement Award – Team Award (Gold) at AIC's
Community Care Excellence Award (CCEA) 2023

Project Category

Care & Process Redesign

Quality Improvement, Lean Methodology, Productivity, Operation Management,
Build Environment, Facilities Management Improvement

Technology, Digitalisation

Keywords

Infrastructure System, Equipment Repair and Maintenance, Value Stream Mapping,
Dashboard, Nursing Home

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Transforming from Reactive to Proactive Maintenance with Digitalisation

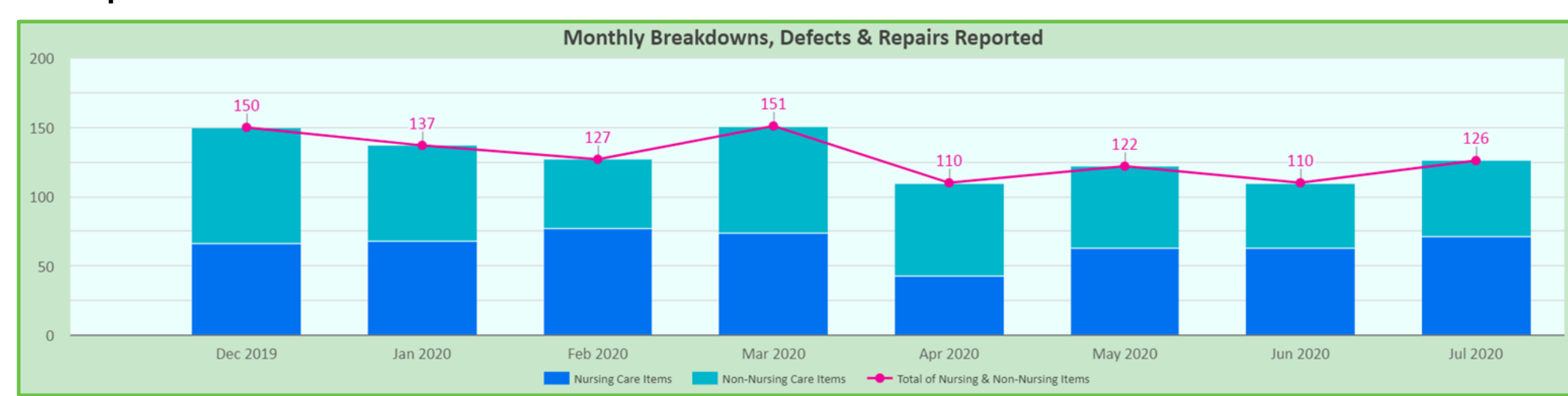
NTUC Health Co-operative Limited

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Background

To ensure smooth operations in a Nursing Home (NH), the upkeep of the infrastructure systems and equipment used by staff/residents is of utmost importance. External vendors were engaged to maintain infrastructure systems and clinical equipment such as passenger lifts, while general equipment repair and maintenance such as wheelchairs and commode chair are done by our own team of facility staff.

Data showed an **average of 129 requests per month** for general equipment repair. The process of reporting a defect alone would take an estimated 5 minutes per defect, totalling **11 hours every month**. This excludes equipment downtime or time spent on searching for a replacement. These 11 manpower hours can be reduced and put towards other productive use instead.

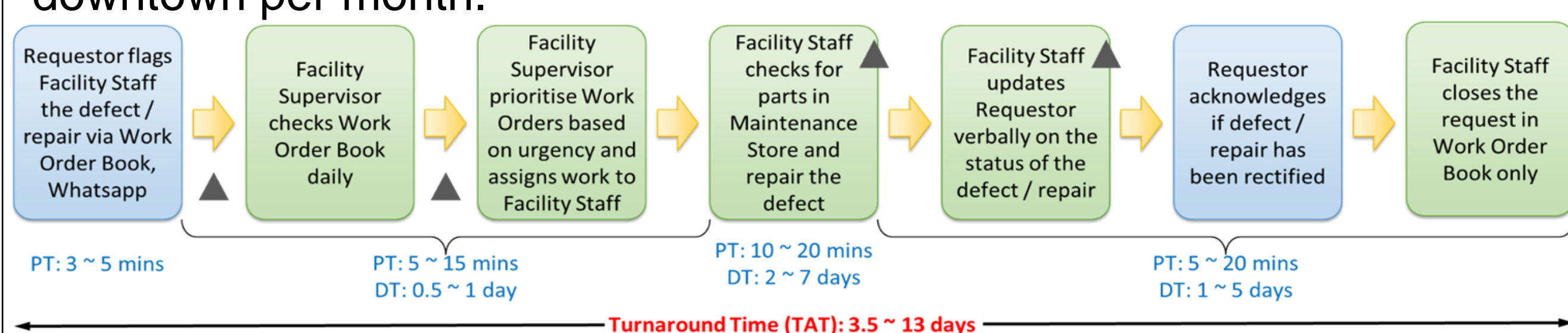


Objectives

1. Reduce equipment downtime as well as the time spent reporting a defect.
2. Effective communication within the team by standardising the defect reporting channels.
3. Improve preventive maintenance and have a better overview by adopting digitalisation to monitor the types of defect, minimise the number of handoffs and collate data for analysis.

Problem Analysis

The Go and See approach was conducted to observe the current repair and maintenance process. The process to report a defect was also mapped using Value Stream Mapping to provide a full understanding on the non-value-added activities and potential delays in the entire process flow. The total Turnaround Time (TAT) from reporting till completion of repair/replacement ranged between **3.5 to 13 days** (average 8 days of downtime) per defect, totaling 129 requests x 8 days = **1,064 days** of downtime per month.



A Root Cause Analysis (RCA) was conducted to identify the root causes for high number of repairs reported every month and the long turnaround time taken to complete the repair.

Problem/Effect	Root Causes	Category
• High number of repairs reported monthly which results in manpower hours needed to report defects	• Lack of proper tools for repair & maintenance.	Machine / Material
	• Lack of essential spare parts for repairs.	Machine / Material
• Long waiting time for defects to be repaired	• Preferred to retrofit instead replacing with quality parts.	Man
	• Working culture is to act upon request.	Man
• Inefficient process to analyse the types of repair/defect reported and track requests.	• Lack of standardised check sheets for preventive maintenance.	Method
	• Act on repairs when reported. No regular preventive maintenance for general equipment.	Method
• Inefficient storage planning which causes difficulty in inventory control.	• Inefficient storage planning which causes difficulty in inventory control.	Environment
	• Inadequate work benches for repair works.	Environment

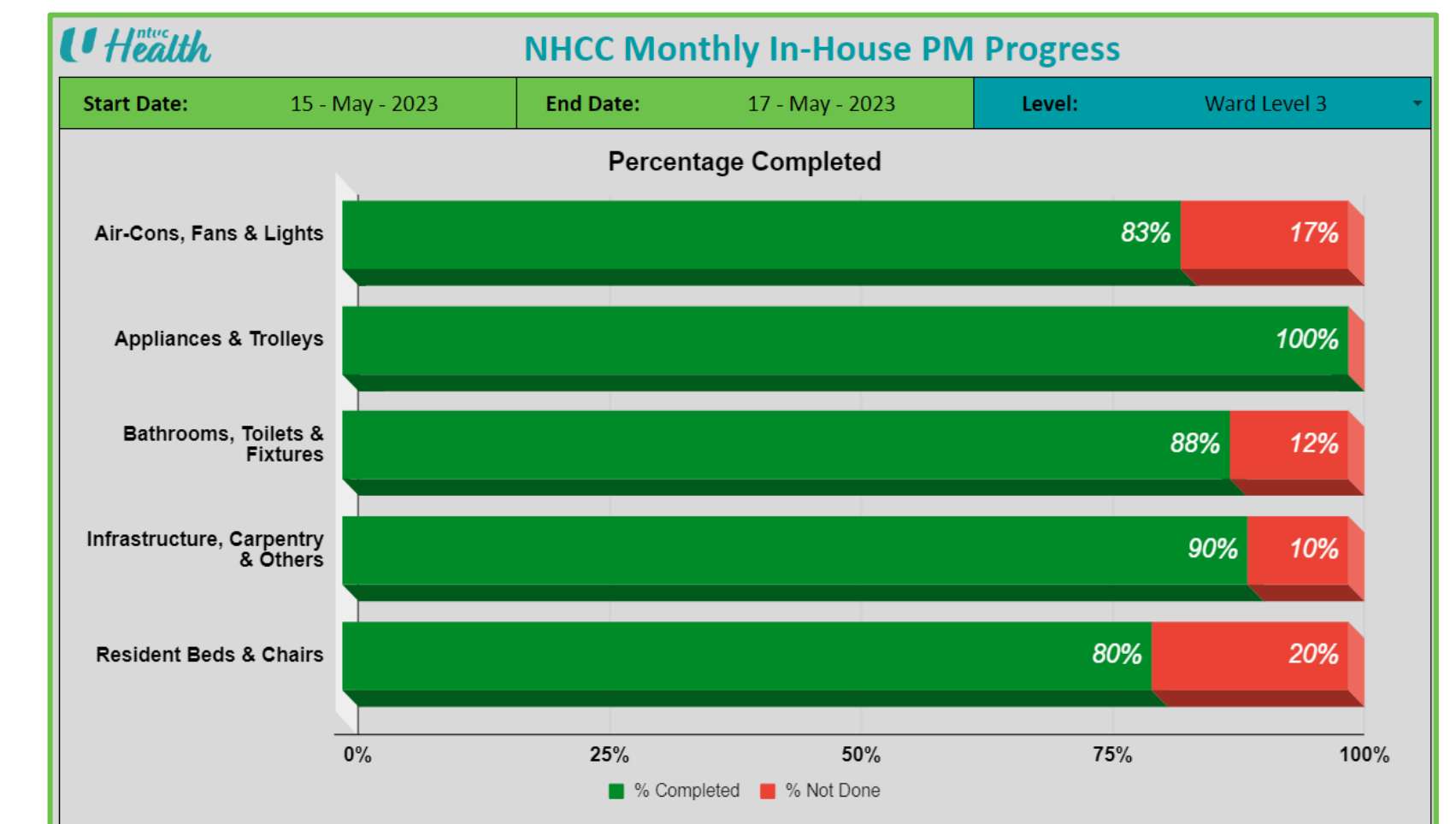
Implementation Plan

A new maintenance approach was developed to our objectives through the use of technology:

1. Moved away from acting on Work Orders (Reactive) to Proactive Preventive Maintenance (PM) according to specific schedule.
2. Established five PM categories and developed online check sheets.
3. Consolidated defect reporting channels and standardised into Work Order Request Form. Defects can be reported through webpage or scanning of QR code.
4. Developed online dashboard to provide 'live' updates on PM progress, tracking and analytics of work orders and defects.

Solutions

1. Online Work Order Request Form and PM Progress Dashboard



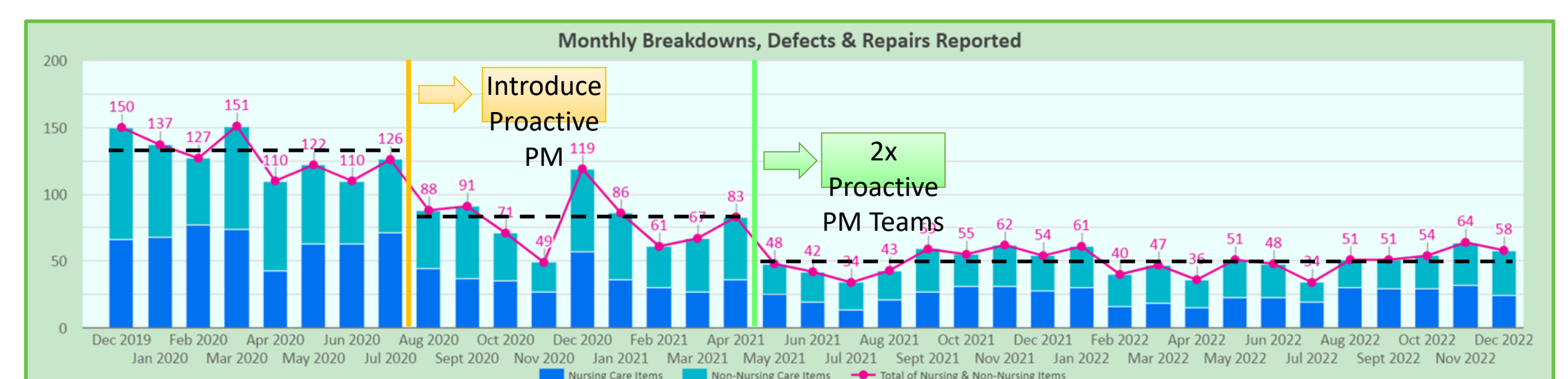
2. Work Order Status and Defects Analysis Dashboard

WOR ID	Date	Types of Request	Level	Location & Category	Details	Status	TAT (D)
230521-145710	21 May 2023	Breakdowns / Defects / Repairs	L7	Room 2 Air-cons, Fans & Lights	Ceiling Fan	Open	0
230520-153804	20 May 2023	Addition / Replacement of Gener...	-	Addition / Replacement of General Appliances o...	Ward Level 4 - Mr. Goh Ching Guan (4603) was asse...	Open	1
230223-093557	23 Feb 2023	Breakdowns / Defects / Repairs	L5	ISO Room / T5-10 General Appliances	Others	Open	1.4
230519-094829	19 May 2023	Addition / Replacement of Gener...	-	Addition / Replacement of General Appliances o...	Ward Level 4 - Mr. Goh Ching Guan (4603) was asse...	Open	2.2
230519-094952	19 May 2023	Addition / Replacement of Nursin...	-	Addition / Replacement of Nursing Items, Medici...	Ward Level 5 - Wheelchair	Open	2.2
230518-144351	18 May 2023	Addition / Replacement of Gener...	-	Addition / Replacement of General Appliances o...	Ward Level 4 - Mr. Khis bin abdul kadir (requesting ...	Open	3
230518-144715	18 May 2023	Addition / Replacement of Gener...	-	Addition / Replacement of General Appliances o...	Ward Level 4 - Mr. Joh chee choong (requesting new...	Open	3
230513-103045	13 May 2023	Breakdowns / Defects / Repairs	L10	Friendship Room Others	Below the freezer the black cover is broken	Open	8.2



Benefits/Results

The new Proactive PM approach was progressively tested at different wards in Chai Chee Nursing Home after rigorous Plan-Do-Check-Act trial. Further system enhancements were made and rolled out to other nursing homes in 2022. Between January to December 2022, the repairs **reduced significantly by 61%**, to an **average of 50 repairs per month**. This is equivalent to **6.6 hours saved every month** from reporting defects.



With the reduction in monthly repairs and improvement of spare parts inventory, the TAT to complete a Work Order had reduced from an average of 8 days per defect to **5 days**. Total defects downtime reduced to **250 days** (50 requests x 5 days) per month, a **77% reduction** in defects downtime.



Benefits/Results

Transforming from a reactive working method to a proactive PM required change management. Communication on the rationale for change, setting achievable targets and celebrating success were essentials to keep the momentum within the team. The success of this proactive PM approach, coupled with dashboards and standardising the defects reporting using online Work Order Request form provided a 'live' visualisation of the entire process through technology. This allowed the team to analyse the types of defect, predict the potential defects for a targeted PM as well as appreciate how their PM efforts were translated into quantitative outcome.

Proactive PM, online Work Order Request and monitoring dashboards are progressively implemented in the remaining five NTUC Health Nursing Homes and are expected to be completed by 2023.