Tan Tock Seng Hospital
National Healthcare Group

The Sustainable Hospital Playbook

A collaborative publication between the Centre for Healthcare Innovation and the NUS Division of Industrial Design

In collaboration with:

NUS National University of Singapore | Division of Industrial Design
College of Design and Engineering

SERVICE DESIGN LAB

CENTRE FOR HEALTHCARE INNOVATION

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Table of Contents

$70,000

IN PROJECTED COST SAVINGS. EXPLORE HOW WE ACHIEVE RESULTS IN OUR PLAYBOOK THROUGH OUR DESIGN SOLUTIONS THAT YIELD TANGIBLE OUTCOMES.

Read more inside →

CHAPTER 01

Foreword

The climate crisis is a healthcare crisis.

The impact of climate change on health and healthcare is multi-faceted, including the rise of vector-borne diseases, respiratory ailments, and heat-related illnesses. Increased hospital attendances and disruptions to critical supply chains will compound the strains on healthcare services and staff.

And paradoxically, the healthcare sector itself contributes significantly to the environmental challenges that jeopardise human well-being.

If healthcare were a country, it would rank as the fifth largest emitter globally.

Singapore's healthcare system, although lauded in many other respects, was cited in a 2021 Health Care Without Harm report as being a high-emission provider when compared to most other countries.

A March 2023 survey in TTSH revealed that while 98% of healthcare workers recognise the importance of sustainability, many lack a clear starting point.

Since 2023, the collaboration between the Centre for Healthcare Innovation and National University of Singapore has sparked the inception of 7 ground-up initiatives in TTSH such as reducing Endoscopy waste to optimising Counselling trips. The design solutions are set to yield tangible results, with projected cost savings estimated at $70,000.

To accelerate the translation of more of such ideas into action solutions and impactful outcomes, the Centre for Healthcare Innovation collaborated with the National University of Singapore's Division of Industrial Design to produce this Sustainable Hospital Design Playbook.

It provides practical guidance for those who wish to create a more environmentally friendly way to work and deliver care.

The playbook leverages local case studies to promote continuous improvement, using the UK Double Diamond Design approach and echoing Dieter Rams' principle: *"Good design is as little design as possible."*

The Hippocratic Oath states *"First, do no harm"*. While originally referring to patients, it is perhaps overdue to extend this ethos to our communities and our planet.

Achieving net-zero emissions by 2045 is an urgent moral obligation, and every action, no matter how small, will bring us closer to that target.

Let us, as fellow healthcare workers, become stewards of change for the better, and commit to building sustainable health for generations, together.

Prof. Wong Hon Tym
Clinical Director, Centre for Healthcare Innovation

CHAPTER 02

Background:

CHI x NUS

The Centre for Healthcare Innovation (CHI) collaborated with the National University of Singapore's Division of Industrial Design (NUS DID) to consider how various operations within Tan Tock Seng Hospital could be redesigned to operate in a more sustainable manner.

Taking place from August to November 2023, design teams worked closely with staff from the Endoscopy Centre, Inpatient Wards, Care & Counselling department, Community Health Team, and Kitchen to innovate feasible, low-cost solutions to address sustainability from a ground-up perspective.

This book, 'The Sustainable Hospital Playbook', details the various approaches and opportunities explored during the project. It also showcases the different design outcomes and impacts of each team's proposed interventions.

CHAPTER 03

Service Design for a Sustainable Hospital

What would 'design' do for environmental sustainability in a hospital?

Changing people's behaviours towards environmental sustainability is a complex question. In the hospital, everyday work and decision-making of hospital staff are driven by other values such as quality care, efficiency and precision, sanitation and so on. While hospital staff cognitively know the importance of environmental sustainability, it becomes less prioritised in their hectic routines.

This complexity drove the collaboration between Tan Tock Seng Hospital's Centre for Healthcare Innovation (CHI) and the National University of Singapore's Division of Industrial Design (NUS DID), co-exploring the question: "how might we design for a behavioural shift of the hospital staff towards more sustainable choices and actions?"

We focused on the capabilities of service design to tackle this problem. Service design is an approach that brings a holistic understanding of "human behaviours and motivations" as well as "organisational processes and values". Based on that understanding, service design identifies existing gaps and future opportunities that can drive human behaviours and transform organisational processes.

How it does it is through participation and co-creation. Service designers immerse themselves in the user's context to build empathy with them. End-users and various stakeholders are also invited to the design process as "experts of their experiences" to co-create future ideas together. Ideas are brought back to the real context as a form of prototype and tested by people in their everyday context.

This feedback then informs the improvement of design, and this iteration continues until the design creates the intended values. Its impact is measured, and the future roadmap of long-term transformation is discussed.

This is an overview of the process the 21 NUS DID students and many more TTSH staff went through to create the seed ideas to achieve a sustainable hospital, starting from small changes in their day-to-day work. The design solutions presented in this book are never grand but down-to-earth, and address gaps that have been taken for granted for far too long. The idea of small tweaks creating big impacts is something that we want to invite anyone in a hospital setting to take part in and try themselves.

We hope that this little book can serve as an inspiration and starting point for anyone in the healthcare sector to make a small step towards a greener future. Taking this opportunity, we would like to express our deep gratitude to all the hospital staff who opened the door for us and shared their valuable knowledge for this project.

Dr. Jung-Joo Lee
Associate Professor, Division of Industrial Design,
National University of Singapore
Director, Service Design Lab Singapore

CHAPTER 04

Inspiring Sustainable Improvements:

7 Sustainable Hospital Design Opportunities

Through the various sustainability projects with different departments, the NUS team consolidated a list of design opportunities which helped to guide their improvement efforts. Within this book, you will see how these prompts allowed teams to review the way hospital staff operate on a daily basis and invoke sustainable changes in their workflow. You can also use these prompts when considering your daily processes and how they can spark your own sustainability improvement projects!

1) Seamless integration into workflow
Ensuring that the solutions do not cause disruption to operations.

2) Use visual cues for behavioural change
The use of simple visual cues to raise awareness and cause opportunistic behavioural changes.

3) Streamline information distribution
Standardising the way information is circulated in different settings to reduce waste generation and errors.

4) Simplify adoption with existing platforms
Having solutions that tap on existing platforms to ensure low barrier of adoption.

5) Tackle systemic waste at its roots
Causing a system level improvement that is not reliant on the behaviours of individuals.

6) Cultivate ownership through participatory approach
Actively involving individuals in the improvement process.

7) Engage everyone across all levels of the system
Engaging all staff in sustainability awareness efforts through the sharing of best practices via different engagement platforms.

CHAPTER 05

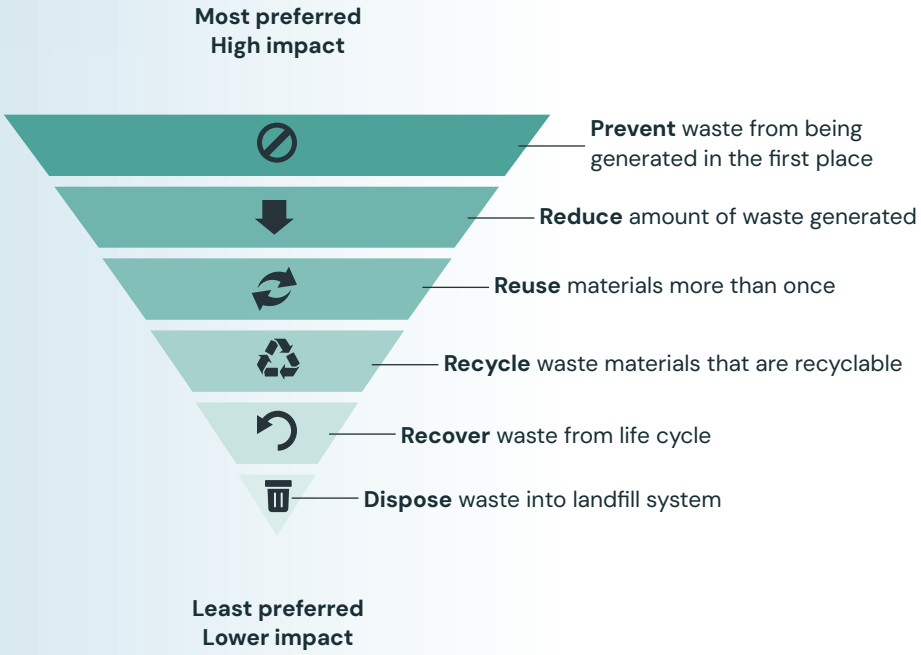
Waste Management Hierarchy

Waste Management is the hallmark of sustainable quality improvement projects and is crucial when designing desirable, feasible and sustainable solutions within healthcare.

The Waste Management Hierarchy is a structured guide that ranks different tiers of waste management according to their impact, and how upstream/downstream they lie on the journey of waste generation. It serves as a framework for teams to identify which angles of waste management are possible and to prioritise what they seek to tackle in their environments.

This categorisation of various waste management tiers helps guide teams on the different ways to influence sustainable changes whether at a ground or organisational/systems level.

In the following case studies, each design solution has been sorted into their relevant waste management tiers to show you the different approaches toward sustainable change.



https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/warr-strategy/the-waste-hierarchy

CHAPTER 06

Everyday Actions to Spark Change

While service design can be rigorous, its core steps are highly achievable and can be incorporated into daily routines to drive sustainability improvements. By integrating these actions into our everyday tasks, we can effectively identify and address problems in our work environment.

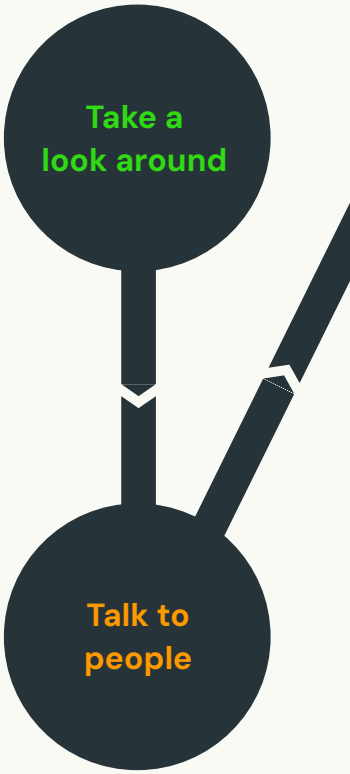
1. **Paying closer attention to our immediate environment and the things that happen within it**

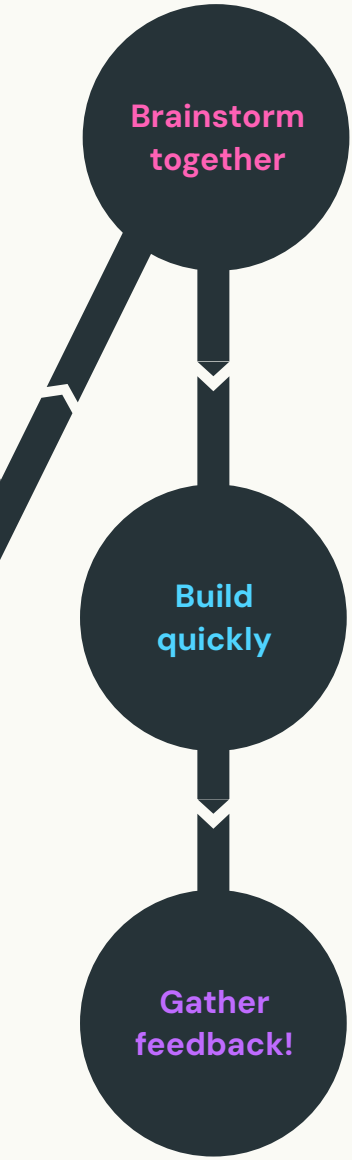
   - Identify issues that are easily missed.
   - Recognise inconveniences that persist simply because "that's how it's always been done" (e.g., legacy issues).
   - What daily encounters might be prime opportunities for problem-solving?

2. **Striking up conversations* with colleagues, including those outside your department**

   - Learn about the concerns and challenges others face at work.
   - Understand the skills and domain knowledge that others have.
   - What opinions and perspectives can you gather?

**It doesn't have to be an 'interview' - sometimes, casual conversations can provide the most insight!*





3 Coming together as a group to think of many ideas quickly

- Encourage open discussion and diverse perspectives to uncover innovative solutions.
- Avoid becoming too attached to any single idea being generated.
- Who could you enlist to help address these problems?

4 Bringing your ideas to life through hands-on creation

- Ideas can be brought to life with inexpensive tools and a bit of curiosity.
- Never be afraid to build something even if it does not look polished!
- What simple ideas can you experiment with to find effective solutions?

5 Getting others to comment on your ideas

- Feedback from others can help identify problems and suggest improvements for your design.

These steps are only a rough guide to the sequence you can take when first starting your sustainability improvement efforts!

CHAPTER 07

7 Projects, 7 Opportunities

ENDOSCOPY CENTRE

At Tan Tock Seng Hospital's Endoscopy Centre, staff perform endoscopic procedures for the diagnosis and management of patients with disorders of the digestive, respiratory, and urological systems.

Projects:

GREEN INVENTORY: MEDICAL RESOURCE MANAGEMENT

Design Opportunity

Seamless integration into workflow

Design Solutions

- Colour-coded Dual Bins
- Cabinet Visual Prompts
- Carton Demarcation

RE-THINKING SUSTAINABLE PRACTICES IN ENDOSCOPY REPROCESSING

Design Opportunity

Use visual cues for behavioural change

Design Solutions

- Basin Visual Marker
- Document Re-design
- Wastebin Compactor
- Roll Call Bulletin

Green Inventory: Medical Resource Management

Opportunity showcased:

Seamless integration into workflow

Sustainability improvements should not be an obstacle to patient care and impede existing workflows.

The seamless integration of solutions into current practices not only encourages staff adoption, but also has the potential to make work easier when processes are optimised.

In this project, the NUS team closely considered the endoscopy team's behavioural traits to spur effective change regarding optimal supply usage and awareness of stock tracking.

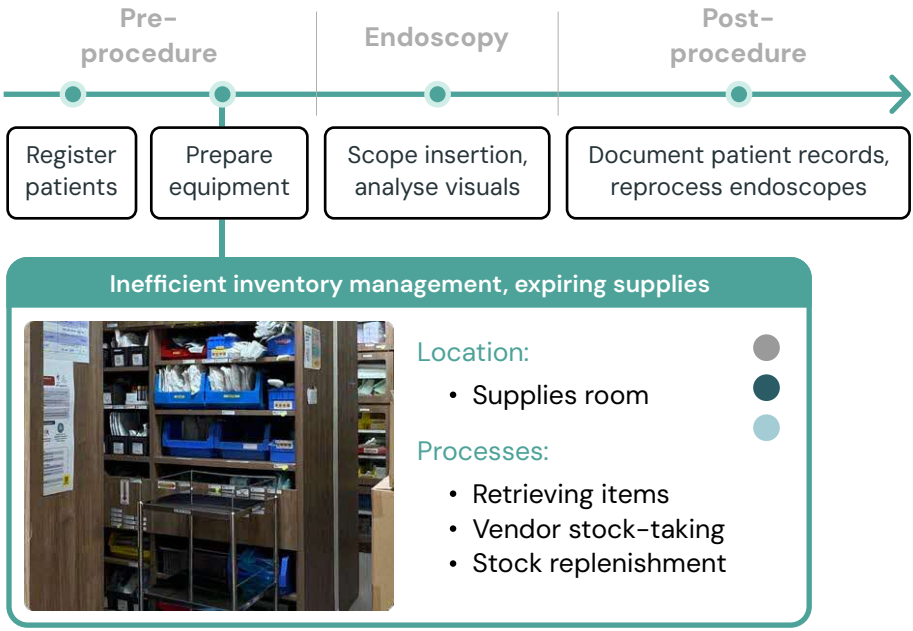
Other opportunities shown:

- *Tackle systemic waste at its roots*
- *Use visual cues for behavioural change*

PROJECT CONTEXT

Inventory management of medical supplies is key to the functioning of the endoscopy department. However, inventory management has posed a challenge with untracked items expiring over time, resulting in wastage.

CURRENT ENDOSCOPY TIMELINE/FLOW



Stakeholders involved

- Endoscopists
- Nurses
- Housekeepers
- Healthcare Assistants
- Supply Vendors

Research Approach

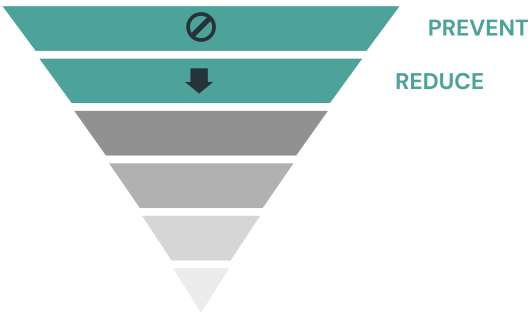
EVERYDAY ACTION STEPS	ACTIVITIES DONE BY TEAM	INSIGHTS IDENTIFIED
Talk to people	Interviewed endoscopist for initial insights	Expired medical supplies is a pressing issue
Take a look around	Observed: • Endoscopy procedures • Supplies room and its inventory system • Process of ordering supplies	Supplies tracking is disorganised Staff communicate with suppliers using hand-written notes
Build quickly	Ideated & created low-fidelity prototypes	
Brainstorm together	Co-created solutions with endoscopy staff in workshop	EEFO (Earliest Expiry First Out) rule not followed, items of varying expiry dates are jumbled
Gather feedback	Designed and tested solutions	

Design Challenge

How might we streamline the ordering, sorting, retrieval, and restocking routines to minimise expired items and improve workflow of endoscopy staff?

Design Solution

The team's design solutions aim to **prevent** supply wastage arising from items being forgotten and left to expire.

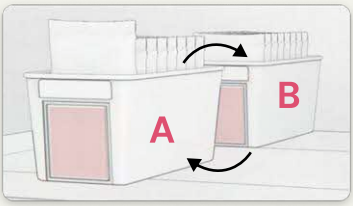


They also aim to **reduce** time wasted during the supply restock and replenishment process.

Design Solution 01

Colour-coded Dual Bins

2 bin Kanban system with demand-tracking coloured cards.



2 BIN SYSTEM USAGE:

- Use items from A until empty
- Replace A with B
- Replenish A as B is being used

WHITE	GREEN	RED
Normal demand: standard restock at usual PAR level*	**Low demand:** restock below PAR level*	**High demand:** restock above PAR level*

**PAR = Periodic Automatic Replenishment*

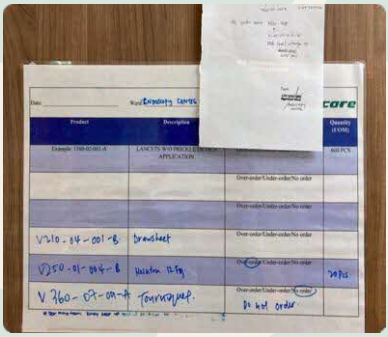
Consider this!

Can you **Integrate solutions seamlessly into workflows?**

Sustainable solutions that also improve existing workflows benefit the staff who use them daily.

Innovations that make the lives of others easier facilitates seamless implementation amongst busy teams.

Solutions like the colour-coded dual bins are non-intrusive and easy to implement, helping to streamline the workflow of Healthcare Assistants.



Problem Addressed

Staff do not have to waste time hand-writing memos to communicate stock demand to suppliers.

How?

Coloured cards are inserted into bins to indicate the level of item usage.

Stock ordering is streamlined as the visualisation of stock demand via coloured cards ensures quicker, accurate restocks.

"It's really organised, and motivates me to maintain it since it's easy to find things."
› Healthcare Assistant, Nita

Design Solution 02

Cabinet Visual Prompts

Adding EEFO (Earliest Expiry First Out) labels in drawers and bins in cabinets provides visual guidance, organising supplies by their expiry dates.

Consider this!

Can you **Tackle systemic waste at its roots*?**

*Refer to pg. 72 to know more.

PROBLEM ADDRESSED

Medical supplies in drawers are now organised and sorted by expiry dates. Staff are facilitated to adhere to EEFO rule when retrieving items.

OUTCOME

Improved staff adherence to the EEFO retrieval rule ensures that supplies with earlier expiry dates are consumed first. This reduces waste arising from items being forgotten and left to expire.

Before: Items randomly arranged

After: Items arranged by expiry order with EEFO labels

Design Solution 03

Carton Demarcation

Consider this!

Can you **Use visual cues for behavioural change*?**

**Refer to pg. 32 to know more.*

Carton boxes arranged by destination locations in demarcated areas.

Before: Unsorted clutter

After: Sorted by destination

PROBLEM ADDRESSED

Staff spend less time looking for items in organised cartons.

OUTCOME

A clearly demarcated carton area makes it easier and faster for external supply vendors and Healthcare Assistants to replenish and retrieve supplies.

User Testing

Reduced time in demand signalling

Colour-coded Dual Bins

The team tested the colour-coded dual bins with nurses, and found that they reduced the time and effort spent on writing individual stock memos.

[2 week testing period]

"The new system is good, will help with retrieval, would be even better if ST Healthcare staff are also informed about this change."
> Nurse, Hana

Increased Adherence to EEFO retrieval

Cabinet Visual Prompts

The team placed EEFO labels in supply cabinets to test if items near expiry (<4 months) were consumed first.

[2 week testing period]

Before:
27

After:
0

REDUCED INCORRECT ITEM RETRIEVALS (1 DAY)

100%

"It reminds me to follow EEFO, making weekly check-ins easier."
> Sister Kai Xin

Increased Efficiency in Replenishment

Carton Demarcation

To test if the new system increased replenishment efficiency, the team timed the duration of replenishment runs from ST Healthcare staff before and after the carton area was demarcated.

[2 week testing period]

Before:
44 mins

After:
24 mins

AVG. REPLENISHMENT TIME SAVINGS/SESSION

20 mins

The new arrangement helps ST Healthcare staff save time. Healthcare Assistants can also locate items faster due to designated carton areas.


DIRTY REPROCESSING
INVENTORY


E E F O
Nutrition Information
E E F O

GREEN INVENTORY: MEDICAL RESOURCE MANAGEMENT

TEAM MEMBERS

TEO SWEE YIN

Swee Yin, an industrial designer specialising in product, service, graphic, and UI/UX design, advocates for a design approach that not only addresses practical needs but also enhances the aesthetic and emotional dimensions of user interaction.

LIU XIN XIN

An industrial designer who's passionate about product, service, UI/UX as well as interior design. She has a simple love for nature and model building, and she likes to observe usual things in unusual ways.

SARAH CHAN

Sarah is an industrial designer with internship experience designing products for medical and industrial applications. In her free time, she enjoys animation and penguins.

Re-Thinking Sustainable Practices in Endoscopy Reprocessing

Opportunity showcased:

Use visual cues for behavioural change

Sometimes, sustainability improvements are obvious and only require the highlighting of specific focus areas.

The use of simple visual cues to draw attention and raise awareness of more sustainable practices can lead to natural changes in habits.

In this project, the NUS team understood the workflow of the endoscopy department, identified the areas of waste, and used visual cues to seamlessly influence staff behaviours.

Other opportunities shown:

 *Seamless integration into workflow*

 *Tackle systemic waste at its roots*

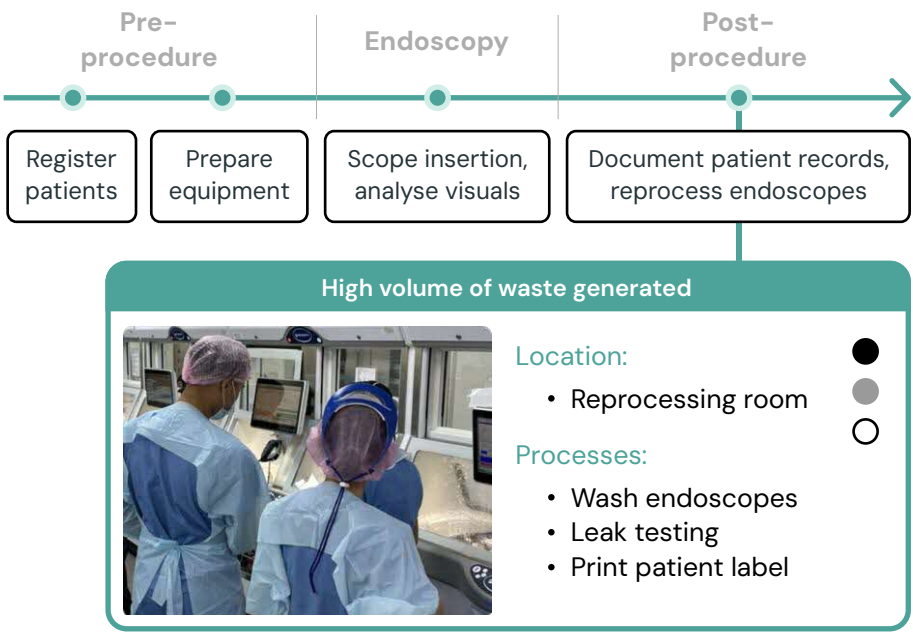
 *Streamline information distribution*

PROJECT CONTEXT

The tail end of the endoscopy process involves documenting patient records, and washing endoscopes thoroughly to prevent contamination and to prepare them for their next use.

These procedures happen frequently, and high patient turnover compounds the waste generated in the form of water, paper, and time.

CURRENT ENDOSCOPY TIMELINE/FLOW



Stakeholders involved

- Endoscopists
- Nurses
- Housekeepers
- Healthcare Assistants
- Supply Vendors

Research Approach

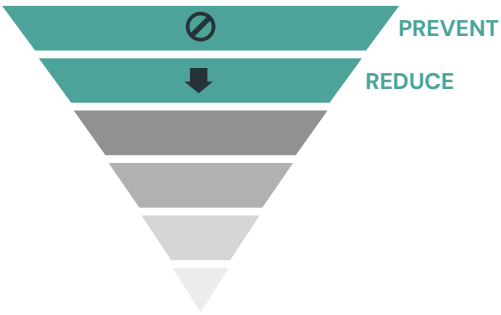
EVERYDAY ACTION STEPS	ACTIVITIES DONE BY TEAM	INSIGHTS IDENTIFIED
Take a look around Talk to people	Observed reprocessing room	Lots of paperwork & paper waste involved Excessive water used during scope washing
Build quickly	Crafted rapid prototypes	
Brainstorm together	Conducted a workshop with endoscopy staff	Rubbish bins in department frequently cleared regardless of fullness
Gather feedback	Designed and tested solutions	

Design Challenge

How might we reduce waste while adhering to Standard Operating Procedures (SOPs) for safety and efficiency in the endoscope cleaning process?

Design Solution

The team developed four design ideas addressing waste generation associated with endoscopy reprocessing procedures.



These design ideas aim to **prevent** paper and plastic waste, and **reduce** the amount of water waste from inconsistent basin fill levels.

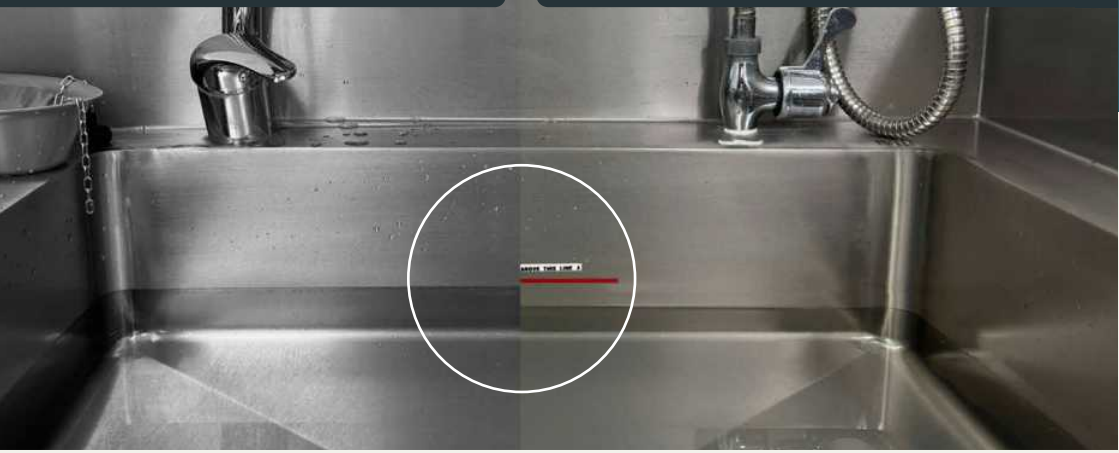
Design Solution 01

Basin Visual Marker

Rinsing labels indicating the maximum water level, effectively alerting staff to avoid exceeding this point.

Before: Roughly estimate fill level

After: Consistent visual cue/limit



Consider this!

Can you **Use visual cues for behavioural change?**

Visual cues are important because they draw our attention to areas of concern.

Small additions such as labels/graphics can act as important reminders or reference points for us to practice sustainable behaviour.

This solution utilises a simple label to demarcate an appropriate fill level for the water basin.

Problem Addressed

With the guesswork removed, nurses can now accurately estimate how much water to use when washing endoscopes.

"Because we eye-ball water level, I used to overfill as a safety measure."
> Ms Siti, Scrub Nurse

How?

Nurses are encouraged to maintain water levels below the designated mark, successfully mitigating water wastage.

Design Solution 02

Document Re-design

A re-designed document form accommodating the details of four patients instead of three.

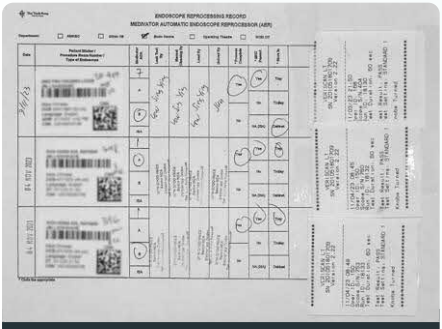
Consider this!

Can you **Seamlessly integrate your solution into existing workflows*?**

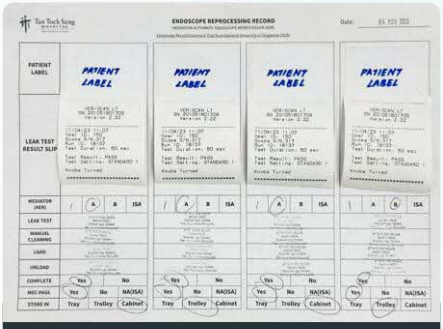
*Refer to pg. 20 to know more.

PROBLEM ADDRESSED

Reduced paper usage compared to the previous format of documenting endoscope patient records.



Before: Landscape orientation, 3 patient slots



After: Portrait orientation, 4 patient slots

OUTCOME

The new document format saves paper used for documenting records as more information can be captured per sheet. It was also found to be more readable, making the documentation process easier for nurses.

"The new vertical layout is easier to read."
> Mdm Pei Yee, Senior Nurse

Design Solution 03

Wastebin Compactor

Consider this!

Can you **Tackle systemic waste at its roots*?**

**Refer to pg. 72 to know more.*

An automatic trash compacting fixture.

PROBLEM ADDRESSED

Bin liners are now changed only when bins are full, instead of frequent mandated changes in the past regardless of waste volume.

OUTCOME

Bin liner usage is reduced.

Design Solution 04

Roll Call Bulletin

A whiteboard as a physical information bulletin

Consider this!

Can you **Streamline information distribution*?**

**Refer to pg. 46 to know more.*

PROBLEM ADDRESSED

Staff do not miss important announcements/information.

OUTCOME

This encourages acknowledgement of information, potentially reducing miscommunication and double work.

User Testing

Increased Awareness of Water Usage

Basin Visual Marker

The markers were pasted on various basins in the reprocessing room to test their effectiveness.

[2 week testing period]

"The sticker is good, lets me know how much water is considered 'too much'"
> Mdm Goh, Senior Nurse

Daily endoscope washes: **81**
Yearly endoscope washes: **23,166**

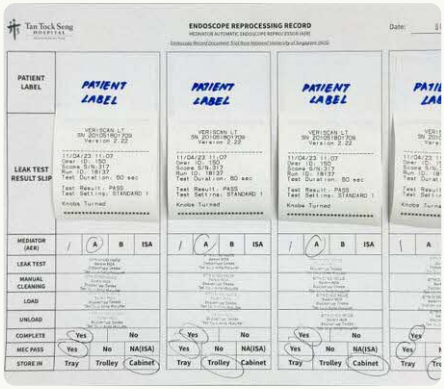
The marker prevents unnecessary overfilling by ensuring consistency, potentially saving a **significant amount of water** across **thousands of washes** annually.

Decreased Paper Usage

Document Re-design

The team trialled the new document format with 5 nurses, who all agreed that it did not disrupt their current workflow.

[2 week testing period]



Current use:
7,140

Projected use:
5,284

PAPER SAVED ANNUALLY

25%

The new template saves 5 pieces of A4 sized paper daily (1,856 saved annually). Beyond paper savings, it helps save time during documentation.

Decreased Annual Bags Usage

Wastebin Compactor

The team tested this solution with 5 nurses and 2 housekeepers, and received positive feedback from them.

[2 week testing period]

Current use:
1,683

Projected use:
976

BAGS SAVED ANNUALLY

42%

The bin compactor intervention has successfully saved 2 bags a day, and can potentially save 707 bags annually.

Increased Response, Awareness

Roll Call Bulletin

The team tested the bulletin board with 5 nurses, all of whom managed to **acknowledge the messages** written on it.

[2 week testing period]

> *"Useful because I can see who is updated or not, on the latest announcement"*
> *> Mdm Goh, Senior Nurse*

Senior nurses found it more beneficial compared to younger nurses, as they appreciated a physical medium for information dissemination.


DIRTY REPROCESSING


SAVE THE TRASH BAGS!
CRUSH YOUR WASTE

RE-THINKING SUSTAINABLE PRACTICES IN ENDOSCOPY REPROCESSING

TEAM MEMBERS

MUHAMMAD HAZIQ BIN ROSLANY

An industrial designer whose unique style may be considered niche, yet he consistently discovers innovative ways to transform the seemingly impossible into reality. For him, design is a continual process of reimagining and redefining.

LOH YI ZHI

A passionate industrial designer devoted to human-centered healthcare design, constantly exploring practical solutions to enhance user experiences and streamline processes. He is committed to creating innovative designs that prioritise functionality and user well-being in the healthcare industry.

NOR NADIA DIYANA BINTE MOHD NORZAIDI

Nadia thrives in the iterative journey of experimenting with diverse mediums where her curiosity fuels ambitious ideas, embracing evolution through trial and error. Crafting with intention and purpose resonates deeply, and she is eager to learn, share, and enhance her designs globally, enriching user experiences.

CARE & COUNSELLING

The Care and Counselling (C&C) team attends to patients and families who experience challenges in managing emotional, psychological, social, environmental and practical issues arising from illness or the sudden onset of traumatic injuries. The multi-disciplinary team works together with community partners and organisations and aims to facilitate the recovery and healing process, optimise the well-being of individuals, and enhance family functioning and community reintegration.

Project:

ONECLAIM: STREAMLINED REIMBURSEMENT, CONSOLIDATED TRIPS

Design Opportunity

Streamline information distribution

Design Solutions

- OneClaim

OneClaim: Streamlined Reimbursement, Consolidated Trips

Opportunity showcased:

Streamline information distribution

Inefficient communication between different parties can give rise to process waste such as wasted time and motion.

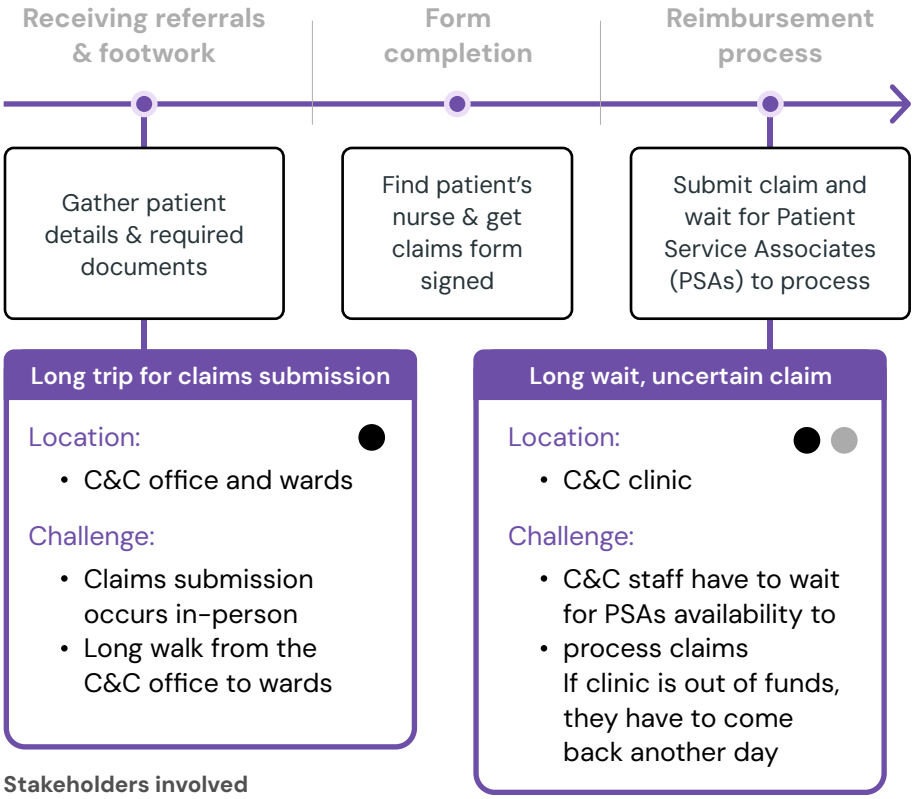
In this case, the NUS team aimed to streamline the reimbursement process for the C&C department.

By designing a more standardised way of communicating claims requests between Medical Social Workers (MSWs) and Patient Service Associates (PSAs), the designers sought to reduce the frequency of wasted trips made by C&C staff.

PROJECT CONTEXT

Medical Social Workers (MSWs) usually use their own money to pay for patients' expenses first. However, when they want to submit claims, they face various challenges such as long walking distances, wasted claims trips, and long waiting times.

CURRENT CLAIMS REIMBURSEMENT PROCESS



Research Approach

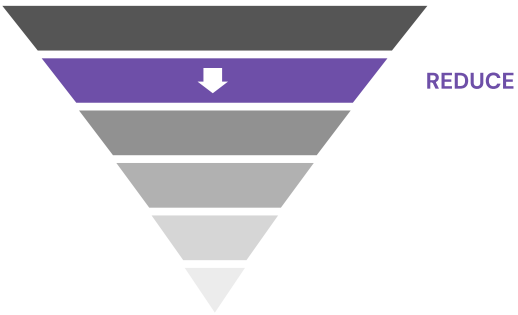
EVERYDAY ACTION STEPS	ACTIVITIES DONE BY TEAM	INSIGHTS IDENTIFIED
Take a look around	Shadowed C&C staff and their routine at work	Reimbursement trips are time-consuming, have to walk long distances
Talk to people	Interviewed MSWs	MSWs are turned away when clinic's daily cash fund is depleted
Brainstorm together	Conducted co-creation workshop with C&C staff	Claims issue was confirmed to be a key problem faced by C&C
Build quickly Gather feedback	Designed and tested solutions	Realised there were deeper systemic issues

Design Challenge

How might we streamline the reimbursement process for Medical Social Workers (MSWs) by reducing the number of wasted claims trips?

Design Solution

The team designed a standardised approach for MSWs and PSAs to communicate and coordinate their claims needs and availabilities.



This approach seeks to **reduce** wasted trips and motion by guaranteeing a higher successful claim rate.

Problem Addressed

Poor communication between PSAs and MSWs results in a lack of information on fund availability and waiting times, leading to sometimes redundant, lengthy trips that waste time and energy.

Medical Social Worker (MSW)

- ✗ No way to contact PSA beforehand to know remaining clinic cash funds
- ✗ No way to contact PSA beforehand to check if they are free to process claims

Patient Service Associate (PSA)

- ✗ No way to indicate remaining clinic cash funds to MSWs
- ✗ No way to indicate availability to process claims

Consider this!

Can you **Standardise cross-functional communication?**

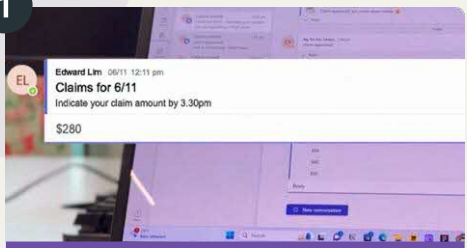
Different teams and roles have their own preferred ways of communicating. Agreeing on timings, key information to be received, as well as which channels to use (e.g., Microsoft Teams) can help to smoothen work processes between different parties.

Design Solution

OneClaim

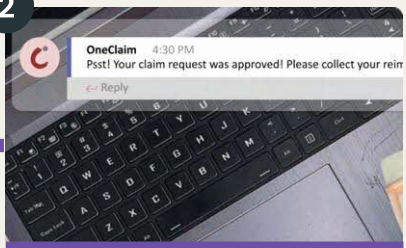
A communication protocol for MSWs and PSAs to confirm fund availability and designate a claims submissions timeslot through Microsoft Teams before any physical trip is made.

1



MSWs type in amount they wish to claim for the day on Teams chat

2



PSAs check if funds are available, approve requests in the chat

3

MSWs make a combined trip down to C&C clinic after PSAs give them a shared timeslot

4

PSAs reimburse MSW claims with minimal wait time at the clinic

Potential impact:
Better coordination minimises wasted trips, thus saving time and energy for both MSWs and PSAs.

User Testing

Care & Counselling Office and Clinic: 9 day testing period

Increased Operational Efficiency

OneClaim

The team interviewed various MSWs about the time saving benefits that OneClaim could have for them.

[2 week testing period]

Current waiting time:
~15 min
Projected waiting time:
0 min

POTENTIAL TIME SAVED IN 1 MONTH (~132 CLAIMS)

33h

"There is value in consolidating claims. Time savings means more time for patient-fronting work."
> I, Principal MSW

OneClaim could eliminate unnecessary waiting times faced by MSWs, channelling time savings **into patient-focused care.**

Reduced energy waste

OneClaim

OneClaim could reduce 12 wasted trips per month (based on estimations from MSWs) and associated lift trips.

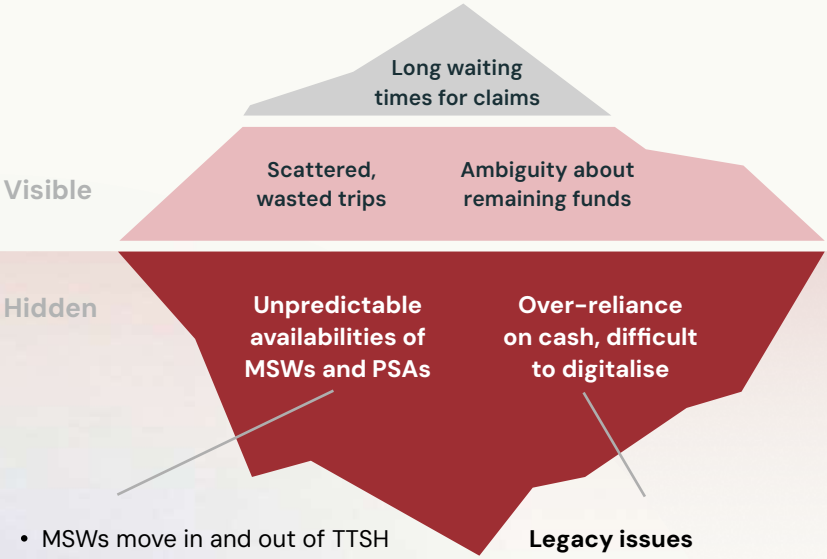
Wasted lift trip:
2kWh
Wasted trips/month:
12

ENERGY SAVED IN 1 MONTH

24kWh

Reflection

However, the team's testing revealed that there were various underlying, systemic issues that OneClaim could not solve.



- MSWs move in and out of TTSH based on ad-hoc patient needs, making it hard to predict when they are available to submit claims
- PSAs deal with unpredictable patient loads, making it hard to estimate when they are free to handle MSW claims

Legacy issues

- MSWs used to current practice
- Low confidence in disruption due to busy schedules

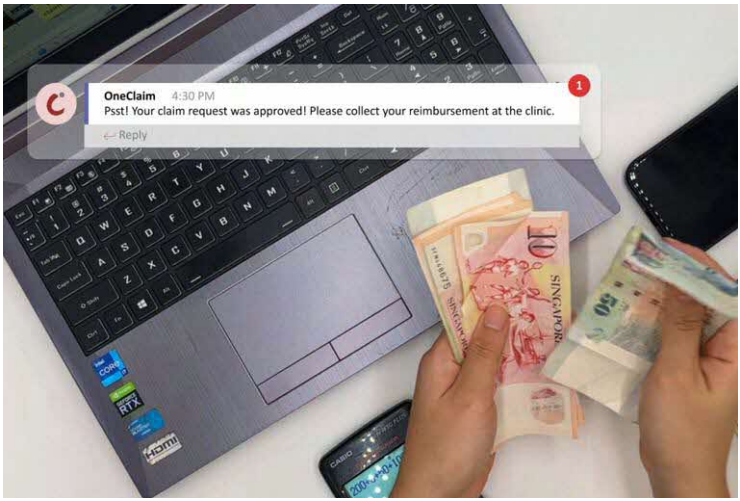
Cash reliance

- MSWs deal with external parties such as drivers, who only use cash-on-hand

Digital reimbursements could be an alternative that takes into account the fluid nature of MSW and PSA interactions, and would remove the need for MSWs to make claims trips in the first place.

However, the C&C department would need support in terms of change management, external stakeholder buy-in, and technical assistance if the entire claims process were to be digitalised.


ATRI


OneClaim 4:30 PM
Psst! Your claim request was approved! Please collect your reimbursement at the clinic.
Reply
1
SINGAPORE
10
50

TEAM MEMBERS

ONECLAIM: STREAMLINED REIMBURSEMENT, CONSOLIDATED TRIPS

CHAN ZHENG QI, ZOEY

Highly motivated to understand the human experience, while injecting a spirit of imagination and excitement into everything, Zoey is a wholehearted designer who seeks creativity in the mundane. On the side, she moonlights as an illustrator.

MADELINE SEE

Madeline is an industrial designer passionate about product, service and UI/UX design. Fueled by a spirit of exploration, she sees design as an imprint of human touch, extending beyond functionality. Outside the studio, she finds joy and inspiration in cooking and photography.

NG YIN YIN, CANICE

With a curious mind, Canice enjoys finding inspiration from all things around her. She believes in the importance of empathising and connecting with users. Adding in splashes of fun and personal touches, she strives to resonate with others through design, aiming to simplify, enrich, and inspire.

COMMUNITY HEALTH TEAM

The Community Health Team (CHT) supports holistic and comprehensive community care across a resident's health journey. CHT's scope of services includes post-hospital discharge reviews, medical/nursing care, medication advice, health education, lifestyle advice and coaching, and coordination of referrals to other health and social support services.

Project:

HAND IN HAND: EQUIPMENT DONATION MATCHING PLATFORM

Design Opportunity

Simplify adoption with existing platforms

Design Solutions

- Digitised Inventory Management System
- Educational Pamphlet on Donation Process
- Website to Facilitate Equipment Exchange

Hand in Hand: Equipment Donation Matching Platform

Opportunity showcased:

Simplify adoption with existing platforms

Utilising existing platforms allows for:

- Low barriers to implementation in terms of speed and cost,
- Low barriers to adoption as there is less need to retrain staff,
- A more sustainable solution as less 'new' waste is created.

Therefore, designing sustainable solutions is often more efficient and impactful when we build upon existing systems instead of starting from scratch!

In this project, the NUS team was able to quickly learn and **build solutions on existing digital platforms** to address **resource management gaps** faced by the Community Health Team (CHT).

Other opportunities shown:

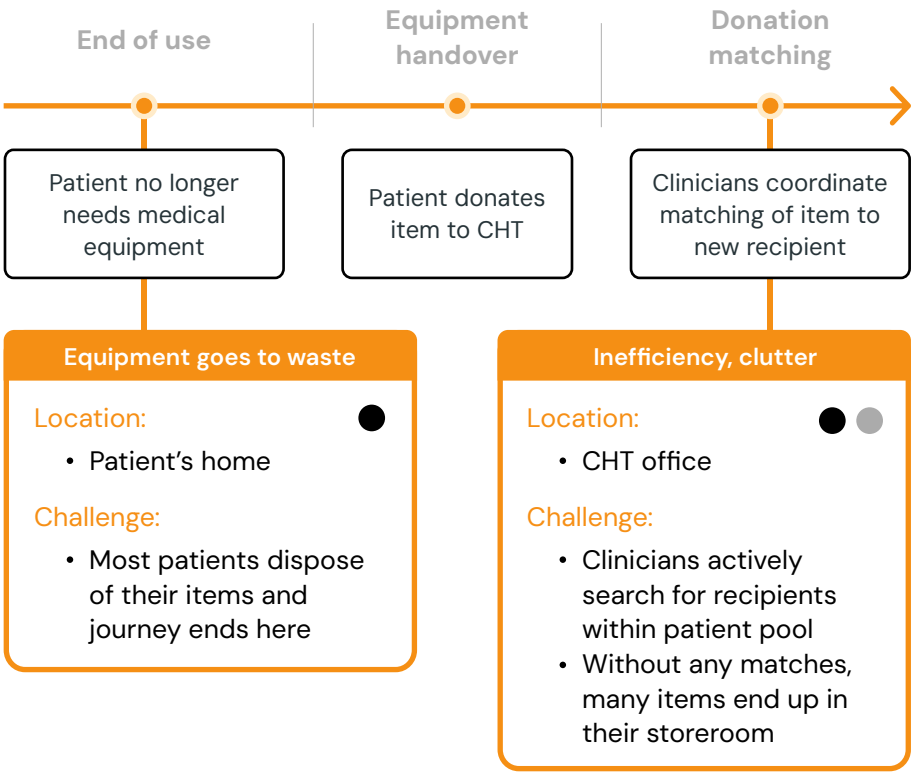
Tackle systemic waste at its roots

Seamless integration into workflow

PROJECT CONTEXT

Currently, CHT facilitates medical equipment donation between patients on top of their daily duties. However, there are difficulties faced in inventory tracking and many missed donation opportunities.

CURRENT EQUIPMENT DONATION TIMELINE



Stakeholders involved

- Patient
- CHT Nurse

Research Approach

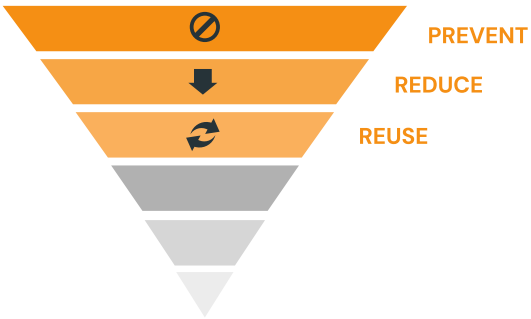
EVERYDAY ACTION STEPS	ACTIVITIES DONE BY TEAM	INSIGHTS IDENTIFIED
Take a look around	Observed CHT's patient home visits	Many of the patients struggle financially; medical items can be a huge cost burden Patients are unaware of how to donate/ request for medical equipment
Talk to people	Interviewed nurses	CHT fears that their department will become a 'waste disposal centre'
Brainstorm together	Conducted a co-creation workshop to focus on patient generated waste	Clinicians go beyond their job scope to facilitate equipment donations between patients Clinicians have no efficient way to track inventory
Build quickly Gather feedback	Designed and tested solutions	

Design Challenge

How might we encourage equipment donations from patients while optimising CHT clinicians' workload?

Design Solution

The design team came up with **Hand in Hand,** a programme that aims to create sustainable life cycles for used equipment by streamlining donation processes for both patients and CHT nurses.

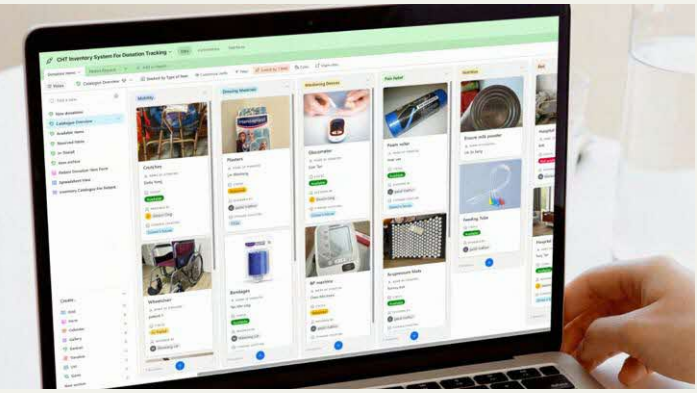


This solution **prevents** the need for new equipment, **reduces** the amount of waste from discarded equipment, and **reuses** functioning equipment from patients.

Design Solution 01

Digitised Inventory Management System

An online inventory management system built on *Airtable* - an **accessible, free, cloud-based software** - allows clinicians to track patient requests and donated items in their inventory.



Consider this!

Can you **Simplify adoption with existing platforms?**

Adapting existing digital systems, apps, or software within the organisation saves time and resources while reducing waste. It removes the need for staff retraining, and minimises complications associated with introducing completely new infrastructure.

Alternatively, finding commercially available platforms can also help speed up implementation. Avoid creating digital platforms from scratch unless there are features unavailable to the mass market.

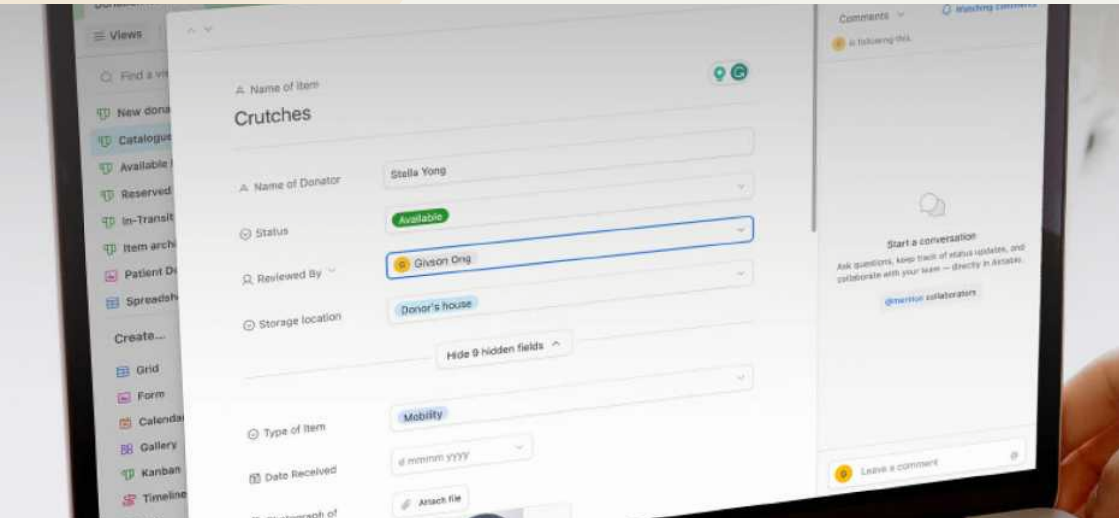
Problem Addressed

Clinicians no longer have to physically check the storeroom upon each request to determine the serviceability of items.

How?

Airtable's simple interface allows clinicians to:

- Easily access an online inventory via a mobile app or computer
- Easily enter donated items into the inventory
- Set status tags (e.g., Available/Reserved) to track inventory
- Reduce manual accounting of the storeroom items as donated items can be accounted for through the online inventory



Design Solution 02

Educational Pamphlet on Donation Process

Educate patients on donation and reuse process through multilingual pamphlets.

Consider this!

Can you **Tackle systemic waste at its roots*?**

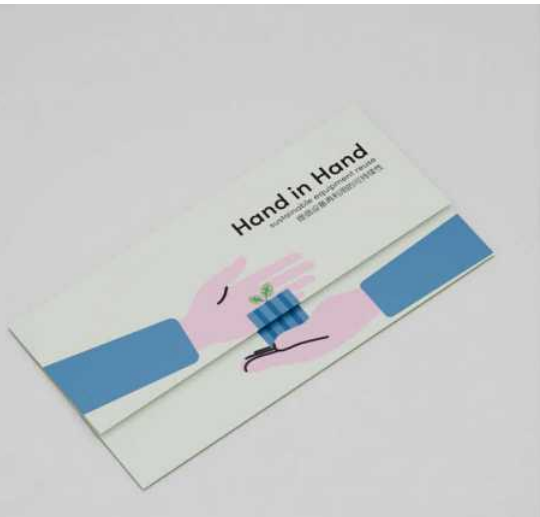
*Refer to pg. 72 to know more.

PROBLEM ADDRESSED

More patients will be informed that they can donate their used equipment through CHT.

OUTCOME

Patients/next-of-kin (NOK) are more inclined to donate used equipment, thus **preventing** unnecessary disposal.



Design Solution 03

Website to Facilitate Equipment Exchange

Consider this!

Can you **Seamlessly integrate your solution into existing workflows*?**

*Refer to pg. 20 to know more.

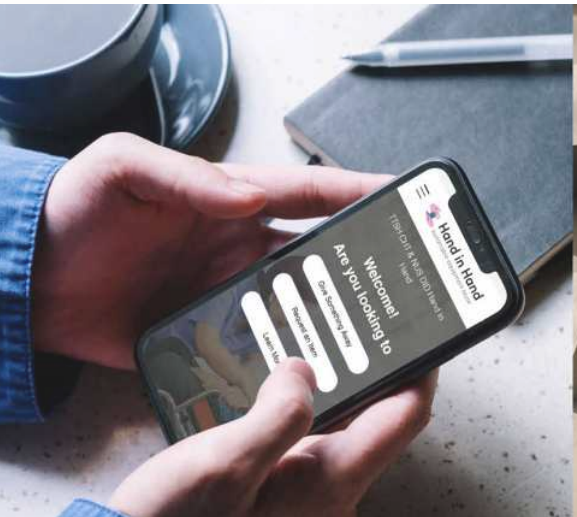
A website built on WIX - a freemium, no-code website builder - that provides information to patients/NOK on how to properly donate used equipment that is still usable, or request for items.

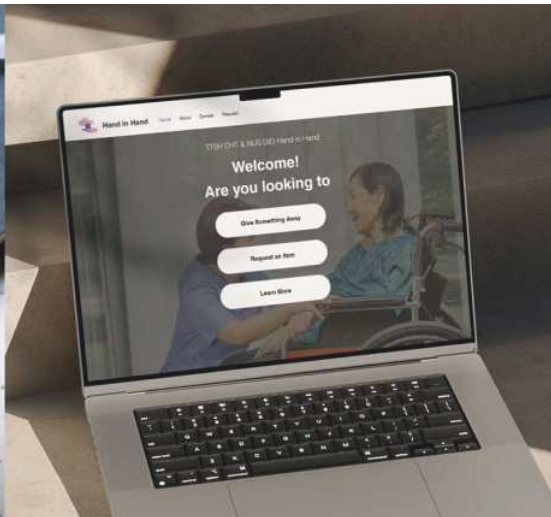
PROBLEM ADDRESSED

Clinicians can efficiently match donated equipment to patients and spend less time doing so.

OUTCOME

Used equipment is sourced and matched more effectively, thus driving **reuse** in donation pools.





User Testing

To validate the potential of the *Hand in Hand* programme in its entirety, the three key touchpoints were tested over a 2 week period with CHT nurses, stakeholders, as well as patients and next-of-kin (NOK).

1

Patients/NOK are introduced to *Hand in Hand* through pamphlet

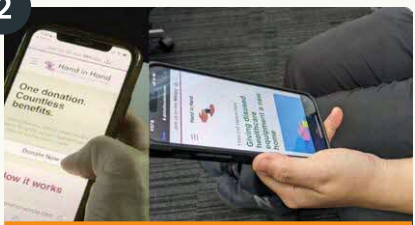
Educational pamphlet on donation process

Patients and NOK found the pamphlet easy to understand.

"Chinese translations made it easier for me to explain everything to my elderly mom."
> Mrs. D.(NOK)

Scanning a QR code brings users to the *Hand in Hand* info website

2



Details on the donation process are found here, including an online donation request form

Website to Facilitate Equipment Exchange

Nurses accessed the WIX-based website on their laptops and smartphones and gave positive feedback regarding the content and accuracy of information.

3

Incoming donation requests show up on CHT's Airtable inventory database

Digitised inventory management system

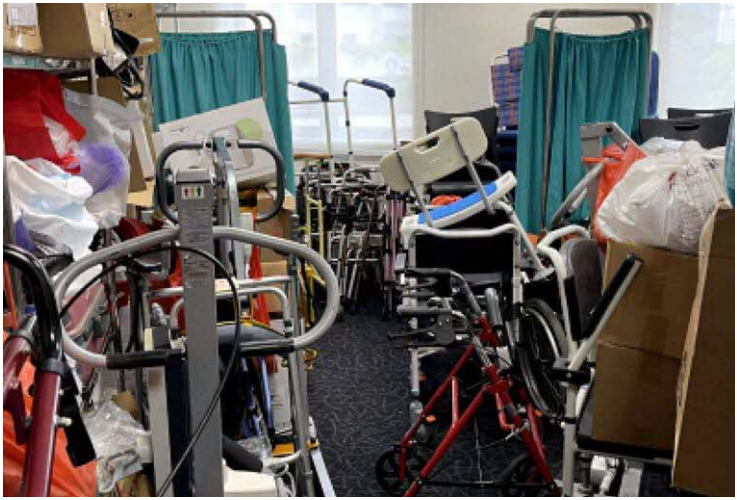
Nurses were given hands-on time with an *Airtable* prototype of the inventory management system to test out the donation matching concept.

"The Airtable inventory streamlines the process of matching donations with patients more efficiently compared to our WhatsApp chat groups."
> Nurse E.

STAKEHOLDER FEEDBACK:

Finally, the entire *Hand in Hand* concept was tested with other stakeholders. The NUS team was able to get support from healthcare executives involved in running donation matching programs of their own.

> *We are already doing informal donation matching at our AAC, and this platform would help us. We'd like to implement this in our centre.*
>
> *> Tan Shi Min, Assistant Executive, Active Ageing Centre*



HAND IN HAND:
DONATION-MATCHING PLATFORM

TEAM MEMBERS

LIN WENKANG

Wenkang is a 2nd year DID student who is very interested in user research. He enjoys getting to know the perspectives of different people and works toward building empathy in his design work.

GIVSON ONG

Givson is a 3rd year undergraduate with dual majors in ID + iDP whilst pursuing interdisciplinary studies at NUS College. He is adept in the design process and excels in interdisciplinary collaboration where design is integrated within technical and business constraints to drive improvements and change for humanity.

GAZAL MATHUR

Gazal is a junior studying industrial design at Georgia Tech. She believes in creating products that delight and connect with people through a user centered design approach.

KITCHEN

Tan Tock Seng Hospital Food Services plays a vital role in the hospital's commitment to patient care and wellbeing. TTSH Food Services is dedicated to providing essential and nutritious meals to patients.

With a focus on dietary needs, food textures and presentation, TTSH Food Services works closely with healthcare professionals to support the overall health and recovery of patients.

Project:

TACKLING FOOD WASTE THROUGH PROCESS RE-DESIGN

Design Opportunity

Tackle systemic waste at its roots

Design Solutions

- Special Feeding Requirement Indicators
- Reduce Portion, Increase Consumption

Tackling Food Waste Through Process Re-design

Opportunity showcased:

Tackle systemic waste at its roots

One of the most effective ways to tackle waste is to ensure that it is not generated in the first place.

When considered in the context of a large system like a hospital kitchen service, waste generation compounds significantly with every passing day.

In this project, the NUS team sought out ways to nip food-related waste in the bud by considering the complete journey of meal service from preparation to consumption.

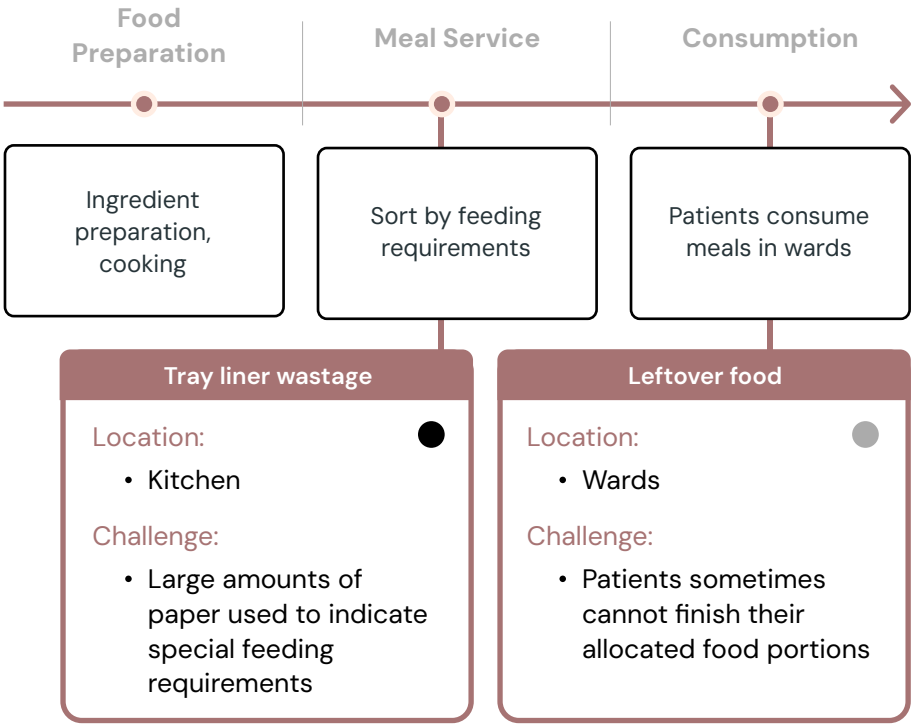
Other opportunities shown:

Simplify adoption with existing platforms

PROJECT CONTEXT

Food portions prepared in the Tan Tock Seng Hospital kitchen cater to a range of feeding requirements. Due to the nature of mass food preparation, sorting and serving, a large amount of waste is generated each day. The biggest challenge lies in identifying opportunities to stop waste at source.

CURRENT MEAL SERVICE TIMELINE



Stakeholders involved

- Kitchen staff
- Nurses

Research Approach

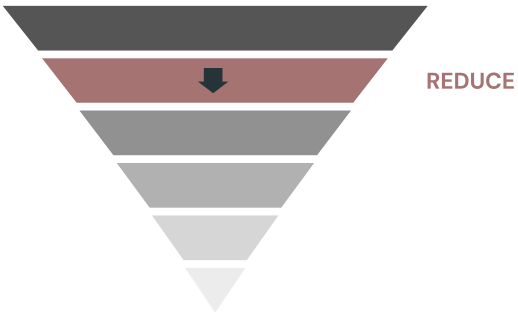
EVERYDAY ACTION STEPS	ACTIVITIES DONE BY TEAM	INSIGHTS IDENTIFIED
Take a look around	Observed behind-the-scenes processes of food preparation	Some waste is inevitable due to safety and hygiene concerns
Brainstorm together	Held a workshop with nurses, chefs and dietitians to address issues and explore solutions	'Food adjacent' waste such as tray liners is also a problem
Talk to people	Talked to nurses in wards about meal service	Patients do not normally ask for smaller meal portions even if they struggle to finish food
Build quickly	Designed and tested solutions	
Gather feedback		

Design Challenge

How might we reduce waste while fostering responsibility and accountability for sustainable mindsets and behaviours in kitchen processes?

Design Solution

The team focused on two final design solutions to tackle waste across the entire food service journey in Tan Tock Seng Hospital.



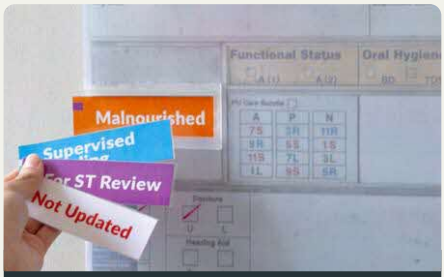
Their solutions aim to **reduce** material waste generated from sorting feeding requirements, and food waste from meal leftovers.

Design Solution 01

Special Feeding Requirement Indicators

A reusable indicator card system integrated with existing label slots on patient boards.

Before: Disposable tray liners



After: Reusable indicators on patient board

Consider this!

Can you **Tackle systemic waste at its roots?**

One of the most effective ways to tackle waste is to identify and address its root cause.

The kitchen's current method of cutting hundreds of A4-size papers into tray liners to denote feeding requirements is an inefficient use of both paper and time.

This solution addresses the root cause of paper waste by proposing a reusable indicator system instead.

Problem Addressed

The reusable indicator cards differentiate each patient's feeding requirements as effectively as the current disposable tray liner system while reducing large amounts of paper waste.

How?

Indicators placed on existing patient boards denote unique feeding requirements, and are easily changed out using the slots provided.

The indicators' prominent placement, coupled with bold graphics, colours, and labels makes it easy for nurses to read and serve the correct meals.

All indicators are laminated and sturdy, ensuring that each set can be reused for a long time.

Design Solution 02

Reduce Portion, Increase Consumption

Consider this!

Can you **Simplify adoption with existing platforms*?**

*Refer to pg. 58 to know more.

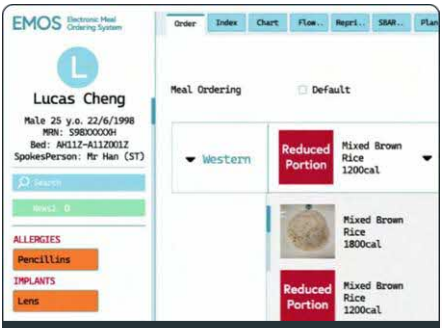
Adding a 'reduced portion' option directly into the EMOS (Electronic Meal Ordering System) for nurses, and raising awareness among patients about the option to ask for less rice via a laminated poster.

PROBLEM ADDRESSED

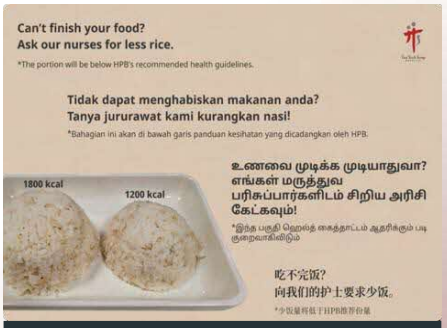
Nurses can now select smaller rice portions with just one click. Previously, nurses had to submit detailed requests for reduced portions for each patient.

OUTCOME

Patients are more likely to finish their food resulting in a reduction in food waste from leftovers.



Mock-up of 'Reduced Portion' option in EMOS



'Reduced Portion' awareness poster in wards

User Testing

Reduction in paper-related expenditure

Special Feeding Requirement Indicators

The team tested the new indicator system with 20 nurses, with 90% of them feeling that this was more convenient to use.

[2 week testing period]

Before:
$6,866
After:
$143

ANNUAL SAVINGS IN PAPER EXPENDITURE

$6,723

The new indicator system could save **~722,200 paper tray liners** annually once it is rolled out across the entire hospital.

Reducing food waste and spreading awareness

Reduce Portion, Increase Consumption

The team surveyed 20 patients, and found that **all** would opt for reduced portions. They also received positive feedback from a dietitian and the head chef about the viability of reduced portions.

[1 week testing period]

RICE SAVED ANNUALLY IF 10 PATIENTS OPT IN/WARD

9800KG

This significant reduction in wasted rice portions means that **~$14,900** can be saved annually.

TACKLING FOOD WASTE
THROUGH PROCESS RE-DESIGN

TEAM MEMBERS

GOH BING JUN

Bing Jun is a dynamic and cheerful designer fuelled by a deep-seated passion for continual learning and exploration. Specialising in industrial design, he aspires to shape the future by creating innovative and groundbreaking products.

SHAHEED IBNU MOHAMED HASSAN

Shaheed is a designer who firmly believes in the interconnectedness of improving human life through both tangible and intangible designs. Infusing his life with a playful yet impactful approach, he aspires to contribute to making the lives of others a tad bit better.

ZHANG BO YA, GRACE

In her final year as a student, Grace assumes the role of the team's nurturing figure. Her vibrant and compassionate nature infuses joy and wonder, as she hopes to create a positive and uplifting atmosphere and designs for everyone around her.

INPATIENT WARDS

At Tan Tock Seng Hospital, inpatient nursing focuses on delivering comprehensive patient care. The nursing team performs clinical procedures, addressing both the immediate physical and emotional needs of patients. This approach ensures that each patient receives attentive, personalised care during their stay at the hospital.

Projects:

GREENER OWNERSHIP CULTURE AND PROCUREMENT STRATEGY

Design Opportunity

Cultivate ownership through participatory approach

Design Solutions

- ZOOdles: Mascot-based Sustainability Framework
- Subtle Reduction in Default Paper Towel Size

FOSTERING RECYCLING AWARENESS IN INPATIENT WARDS

Design Opportunity

Engage everyone across all levels of the system

Design Solutions

- Conversational Card Set
- Satellite Recycling Bins
- Tuesdays with Tong

Greener Ownership Culture and Procurement Strategy

Opportunity showcased:

Cultivate ownership through participatory approach

Sustainable design solutions are only effective if the stakeholders involved are willing to be advocates of change.

When individuals develop a sense of ownership over an initiative, their personal motivations drive sustainable behaviour change within their circles.

In this project, the NUS team sought to make their design solutions relatable and personable to nurses in order to make waste reduction in wards a lasting, effective endeavour.

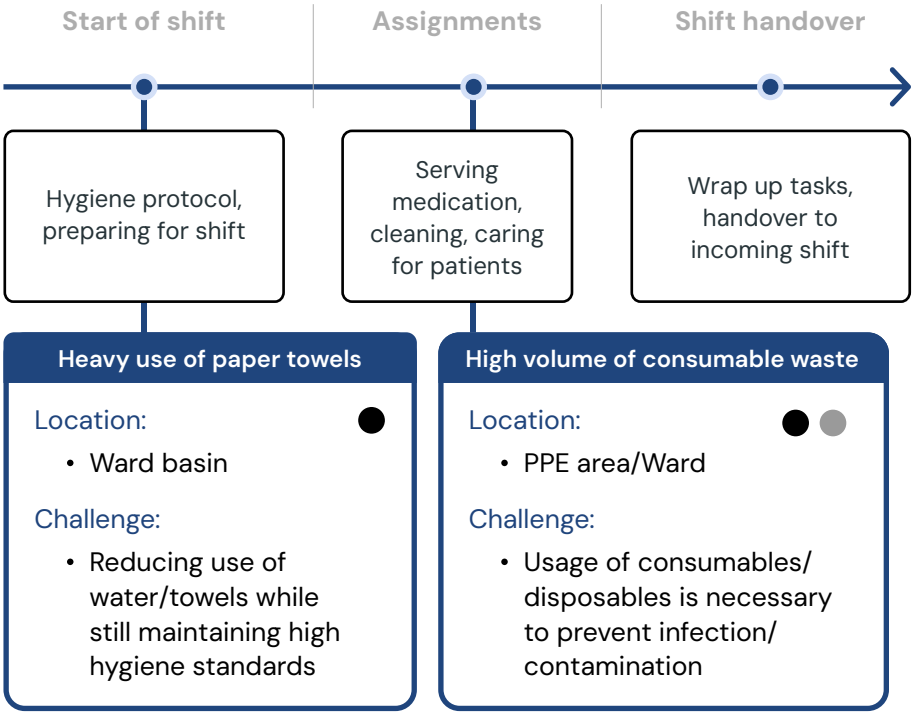
Other opportunities shown:

Tackle systemic waste at its roots

PROJECT CONTEXT

Nursing wards place patient care at the forefront. The need to ensure a high standard of cleanliness drives a high rate of hygiene consumables consumption. As such, infection control standards are prioritised over minimising waste.

CURRENT WORKFLOW AND CHALLENGES



Stakeholders involved

- Nurses
- Housekeepers

Research Approach

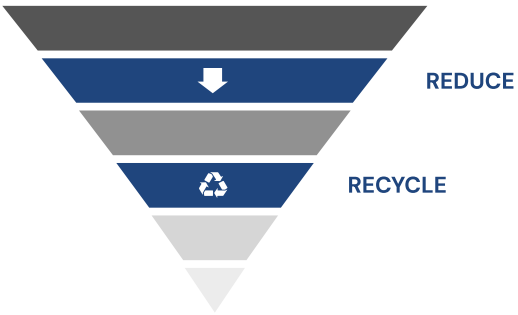
EVERYDAY ACTION STEPS	ACTIVITIES DONE BY TEAM	INSIGHTS IDENTIFIED
Take a look around	Conducted observations in wards	Excessive use of paper towels when drying hands
Talk to people	Interviewed nurses	Recycling is not a common practice due to hectic schedules
Brainstorm together	Held a co-creation workshop with nursing staff	
Build quickly Gather feedback	Designed and tested solutions	

Design Challenge

How might we motivate nurses to participate in acts of recycling and reduce the amount of waste generated in an inpatient ward?

Design Solution

The team focused on two design solutions to tackle nurses' motivation behind sustainable habits.



Their solutions aim to **reduce** waste generated from paper towel usage, and increase **recycling** rates within wards.

Design Solution 01

ZOOdles: Mascot-based Sustainability Framework

A participatory, mascot-based system to create a sense of ownership and cultivate positive associations with recycling.

Consider this!

Can you **Cultivate ownership through a participatory approach?**

It is easier to convince others to embrace sustainability if they can relate or develop a personal connection to it.

By encouraging nurses to draw the mascots used to adorn recycling points, a participatory, personal link is created. This allows nurses to feel ownership of their environment through the bins that they and their colleagues decorate by hand.

Problem Addressed

Nurses are motivated to recycle even more with the new bin designs. Previously, recycling rates were low even with ample bins.

How?

The new recycling point designs feature ZOOdle mascots drawn by nurses, as well as transparent bins that come with graphical labels denoting what can and cannot be recycled. These bins make every recycling interaction a joyful and well-informed one while providing humour through the unpolished nature of the drawings.

Design Solution 02

Subtle Reduction in Default Paper Towel Size

Consider this!

Can you **Tackle systemic waste at its roots*?**

*Refer to pg. 72 to know more.

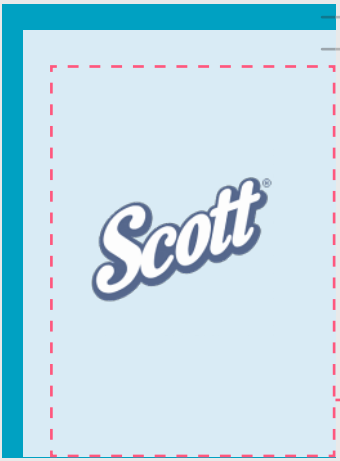
Procuring paper towels of smaller dimensions to reduce material waste generated.

PROBLEM ADDRESSED

By accepting the fact that nurses use many paper towels to dry their hands quickly, the subtle replacement of smaller paper towels guarantees a reduction of material waste.

OUTCOME

The team procured paper towels that looked similar but were **10% smaller in size and 20% cheaper.** The change was not noticed by nurses, indicating that the towels were not inferior in drying quality.



Just Noticeable Difference (JND)
The difference threshold beyond which a behavioural change is observed

Scott PRO Multifold 28620 (Current)

Scott PRO Multifold 26165 (Proposed)
Just below the JND level, ensuring that nurses do not feel the need to pull more towels to dry their hands well.

Anything smaller would be noticed and lead to more towel pulls.

User Testing

Increase in ward recycling rate

ZOOdles: Mascot-based sustainability framework

The team got nurses to draw the mascots used to decorate recycling bins placed around the ward. This led to a **doubled recycling rate.**

[2 week testing period]

Before:
42.9%
After:
84.6%

INCREASE IN WARD RECYCLING RATE

2X

"The drawings caught my attention, I find them very cute."
> Physiotherapist

Reduction in material waste for paper towels

Subtle reduction in default paper towel size

The team counted the average number of towels used per wash before and after the towels were replaced with smaller ones.

[2 week testing period]

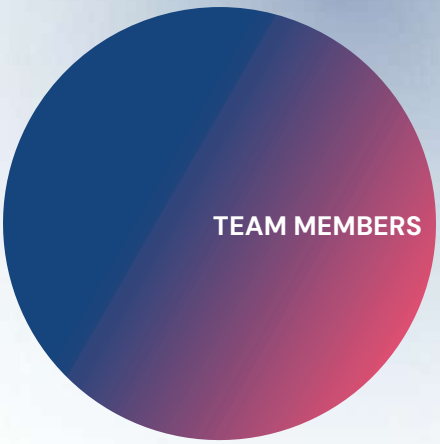
ANNUAL REDUCTION IN PAPER TOWEL WASTE

179kg

Replacing the towels with those that were 10% smaller saw **no change in user behaviour,** indicating that they dried just as effectively.


Kimberly-Clark


APPY DIWALI
ubacute Ward
ED ZEPPELIN



GREENER OWNERSHIP CULTURE AND PROCUREMENT STRATEGY

LUKE GOH

Luke has a curious mind and loves tinkering with things. He strongly believes in good affordance in everyday things, observing the nuances in the things around us and wondering if it could be done better.

BRYCE LIM

Bryce is a designer driven by curiosity and exploration, fascinated by the challenge of discovering new possibilities through rigour and experimentation. His work is infused with a deep appreciation for exceptional craftmanship, blending aesthetics and functionality to create impactful designs.

DAMIAN LIM

Damian is driven by the belief that good design can transform our daily lives. Striving for simplicity and effectiveness, he approaches design challenges with the aim of creating solutions that positively reshape the way we interact with the world around us.

Fostering Recycling Awareness in Inpatient Wards

Opportunity showcased:

Engage everyone across all levels of the system

Sustainability awareness engagement can take many forms and exist through different touchpoints.

For this to be effective, a comprehensive approach is needed so stakeholders can engage with critical content in a variety of ways, and thus be more receptive to sustainable messaging.

In this project, the NUS team devised a package of solutions to drive recycling awareness amongst nursing staff.

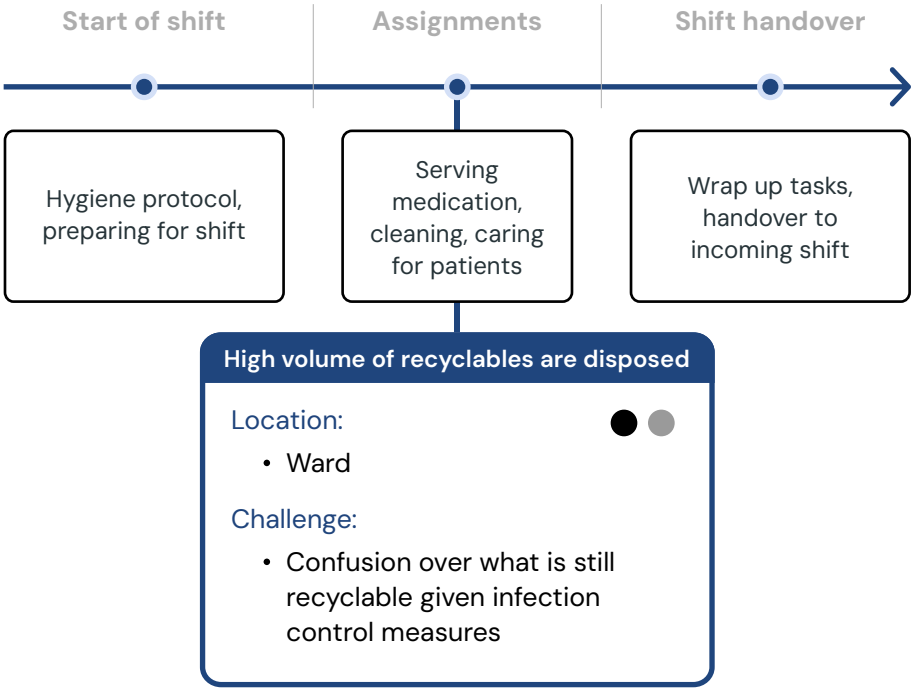
Other opportunities shown:

- *Seamless integration into workflow*
- *Streamline information distribution*

PROJECT CONTEXT

A large proportion of waste generated in wards is conventionally considered recyclable (e.g., plastic/paper packaging). However, strict infection control measures coupled with a lack of recycling motivation drives nurses to dispose of these items after use.

CURRENT WORKFLOW AND CHALLENGES



Stakeholders involved

- Nurses
- Housekeepers

Research Approach

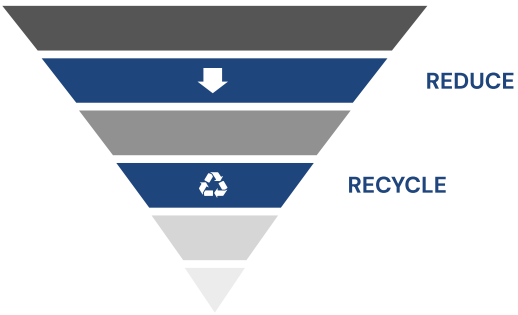
EVERYDAY ACTION STEPS	ACTIVITIES DONE BY TEAM	INSIGHTS IDENTIFIED
Take a look around	Observed wards, hospital bin centre	High volume of plastic recyclables generated Difference in type of recyclables collected at ward level, and what is accepted downstream
Talk to people	Interviewed nurses, housekeepers, recycling vendor	Lack of alignment on what types of waste are recyclable
Brainstorm together	Held a co-creation workshop with nursing staff	
Build quickly Gather feedback	Designed and tested solutions	

Design Challenge

How might we engage ward staff holistically to impart greater knowledge of recyclables and recycling practices?

Design Solution

The team focused on a three-pronged approach to foster a culture of recycling awareness within the hospital.



Their initiative aims to **reduce** waste generated from discarded recyclables, and increase **recycling** rates within wards.

Design Solution 01

Conversational Card Set

A conversational card set to be used during meetings, trainings, and co-creation sessions to spark discussions on sustainable practices.

Consider this!

Can you **Engage everyone across all levels of the system?**

Different people within the same department can have different levels of understanding on protocol, standard operating procedures, and sustainability practices.

It is important to engage all parties to ensure a shared, unified level of sustainability understanding across teams. The design solutions found in this feature aim to address that through a holistic range of sustainability engagement channels.

Problem Addressed

The card set bridges gaps in understanding of waste management practice in wards, and resolves conflicting opinions on what can be recycled.

How?

Each card's face contains a type of waste commonly found in wards, and a discussion prompt on the other side.

These cards aim to spark discussions that re-examine current practices around sustainability and ward waste, and thus provide an opportunity to improve and align recycling literacy.

Consider this!

Can you **Seamlessly integrate your solution into existing workflows*?**

*Refer to pg. 20 to know more.

Design Solution 02

Satellite Recycling Bins

Satellite recycling bins with clear recycling instructions are attached to recyclable waste generation hotspots such as PPE (Personal Protective Equipment) booths and medicine trolleys, making recycling convenient and accessible.

PROBLEM ADDRESSED

Recycling bins are now conveniently located around the ward, and nurses no longer have to detour to recycle items.

OUTCOME

More types and larger volumes of recyclables are being collected from the wards, while prominent labelling of recyclable categories ensures a lower contamination rate.

Satellite recycling bin attached to ward trolley mock-up

Satellite recycling bin attached to PPE booth

Consider this!

Can you **Streamline information distribution*?**

*Refer to pg. 46 to know more.

Design Solution 03

Tuesdays with Tong

Utilising internal digital messaging/newsletter systems to effectively share bite-sized content on sustainability topics.

PROBLEM ADDRESSED

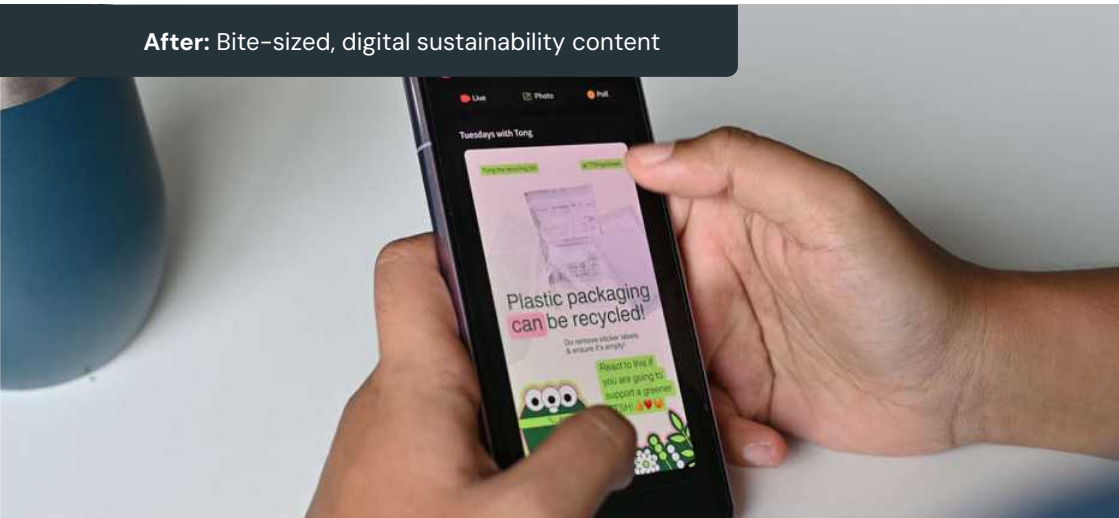
Sustainability information is delivered in a targeted manner, compared to the current visual clutter of sustainability related posters on ward walls which are usually left ignored.

Before: Cluttered posters

OUTCOME

Consistent, easily understandable tidbits of information that aim to present sustainable actions in a more accessible way, thus nudging greener actions.

After: Bite-sized, digital sustainability content



Testing

Ward environment: 2 week testing period

Bridging sustainable knowledge gaps

Conversational Card Set

"Easy to use & fun tool! Can be used during meetings."
> Sister Mariam

Potential to increase recycling literacy and spark discussions on building sustainable habits.

Increase in ward recycling rate

Satellite Recycling Bins

Before:
5g
After:
37g

INCREASE IN WARD RECYCLING RATE/SHIFT

7.4x

The satellite bins expanded the range of what was recyclable. This resulted in a significant increase of 340g recyclables collected over a period of 9 shifts compared to an initial, negligible amount (<5g).


PPE Plastic
Packaging
HERE
move sticker labels

FOSTERING RECYCLING AWARENESS IN IN-PATIENT WARDS

TEAM MEMBERS

GOH YU YAN

Yu Yan is a design student that is passionate about integrating human experience with technology. Beyond the design realm, Yu Yan finds joy in exploring the humanities and fulfilment in orchestra music playing.

CHAN JIA YING

Jia Ying is an industrial designer who fearlessly embraces being an amateur, approaching every experience with fresh eyes. With an inclination towards people-centric design, she enjoys delving into users' stories. As her skills evolve, she is eager to explore the realm of user experience. She also finds joy in photography.

WINA NASHITA RAKANA ADISETYA

Wina is a dynamic & resourceful designer, who pushes material boundaries with innovation. Wina's designs reflect practicality, simplicity and thoughtfulness, all underpinned by a desire to leave a meaningful, positive impact. Her design philosophy emphasises the journey and creative process, valuing them just as much as the final outcomes.

CHAPTER 08

Sustainability Impact Evaluation

$70,000*

Estimated annual cost savings from combined student interventions

**Estimated cost based on calculations from Inpatient ward and Kitchen interventions*

179kg

Paper towels potentially saved (Inpatient wards)

Doubled

Recycling rate (Inpatient wards)

9,800kg

Rice saved per year (Kitchen)

$6,723

Savings in tray liner expenditure (Kitchen)

707

Bin liners saved annually (Endoscopy Centre)

1,856

Pieces of A4 paper saved per year (Endoscopy Centre)

>80%

Of Tan Tock Seng Hospital staff and stakeholders involved* were receptive of the interventions proposed by the design teams.

**Out of 42 participants surveyed*

Impact Breakdown by Department

ENDOSCOPY CENTRE

> 100% increase in staff awareness of water usage
> Projected **25% decrease** in paper used every year
> Projected **42% decrease** in bin liners used every year

> 100% identification and reduction of expired supplies
> Supplies replenishment duration **decreased by 45.5%**

CARE & COUNSELLING

> Potential **decrease in wasted trips,** time savings, enhanced operational efficiency, and improved patient-focused care

COMMUNITY HEALTH TEAM

> Potential **increase in circularity of used items** in donation matching pools by preventing waste caused by disposal, and reducing time and effort spent on inventory management

KITCHEN

> Projected **95% decrease** in tray liner papers used every year
> Projected savings of **9,800kg of rice** per year (~$14,900) if 10 patients per ward opted for reduced portions

INPATIENT WARDS

> Projected **179kg** waste, **$53,144** saved per year
> Initial recycling rate of **42.9%** doubled to **84.6%**

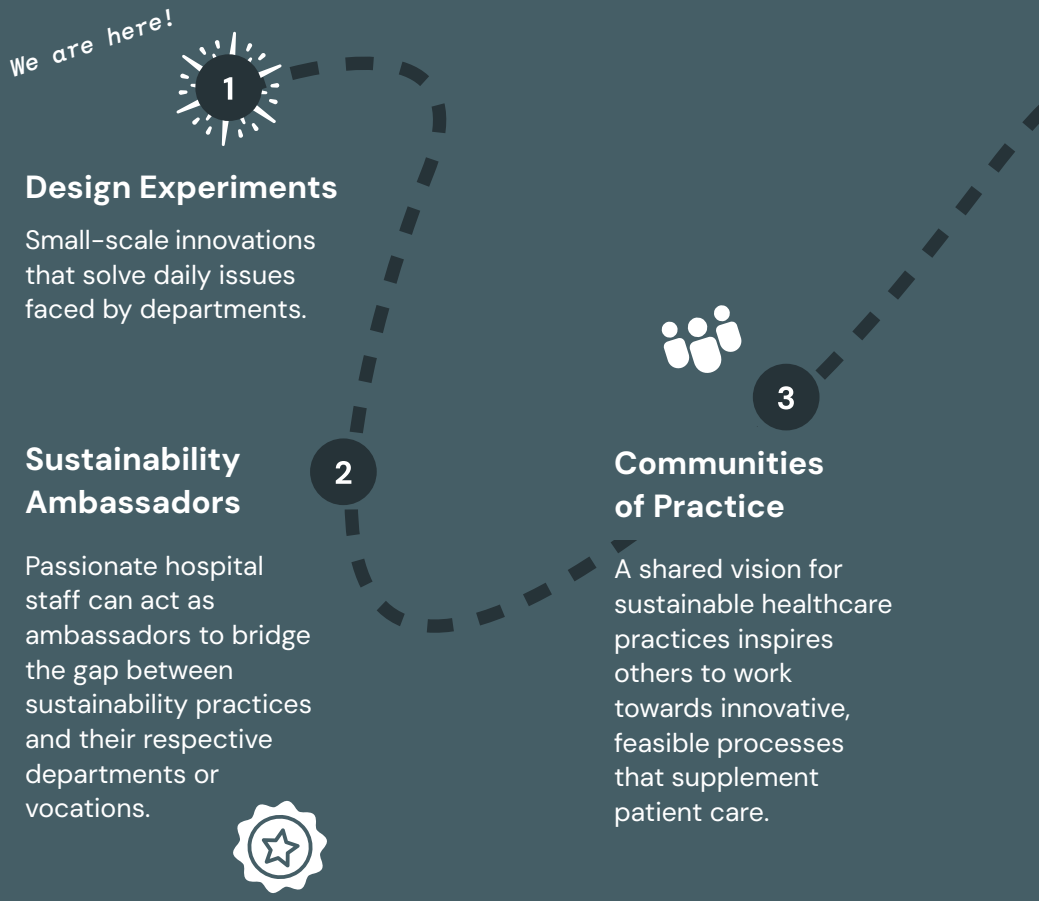
> Potential to **increase recycling literacy** and spark discussions on building sustainable habits

CHAPTER 09

Aspirational Roadmap

Did you know that everyday actions can spark change on a larger scale? This roadmap envisions how design experiments undertaken by individuals and small teams can lead to sustainability change across entire hospitals.

The most important thing is to take the first step!



Organisational process change

Sustainable innovation can ripple outward as more and more people see its benefits.

4

Ingrained within hospital culture

5 Our Goal!

Eventually, sustainable practices could be ingrained within hospital culture and be reflected in everyday processes.

Ultimately, a supportive working environment helps to facilitate meaningful changes starting from the ground.

Let's work towards a more sustainable hospital environment for all!