

Project Title

OTSight: Data-Driven Workforce and Process Transformation For Operating Theatre (OT) Optimisation

Project Lead and Members

Project Lead: Dr Ng Chew Lip

Project Members: Ms Tan Seo Peng Joanna, Dr Hwang Chi Hong, Ms Christine Wu, Mr Kelvin Lew, Ms Trish Woon, Ms Lui Lok You, Ms Tammy Wong, Mr Chen Zhaoqi, Ms Geelyn Ng

Organisation(s) Involved

Ng Teng Fong General Hospital

Healthcare Family Group Involved in this Project

Healthcare Administration, Medical, Nursing, Pharmacy

Applicable Specialty or Discipline

Surgery, Anaesthesiology, Healthcare Administrators

Project Period

Start date: Jun 2022

Completed date: Dec 2022

Aims

- Designing a system to identify biggest value pools through deep analytics and data mining for intervention.
- Empower and involve staff in design and execution of intervention.
- Improve efficiency of current processes, cut wastes and further optimise OT utilisation and outcomes by 2022.

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Lessons Learnt

See poster appended/ below

Conclusion

See poster appended/ below

Additional Information

NHIP 2023 – Best Practice Medal (Automation, It & Robotics Innovation)

Project Category

Workforce Transformation

Job Redesign, Multi-disciplinary, Digital Workplace, Workforce Performance

Technology

Digital Health, Data Management, Data Analytics, Artificial Intelligence, Big Data

Organisational Leadership

Organisation Development, Culture Building

Keywords

Operating Theatre, Surgery, Data Management, EPIC, Data Visualisation, Data Mining,

Workflow Redesign, Resource Optimisation

Name and Email of Project Contact Person(s)

Name: Chen Zhaoqi

Email: Zhaoqi_Chen@nuhs.edu.sg

OTSIGHT : DATA-DRIVEN OPERATING THEATRE OPTIMISATION

- CARE REDESIGN
- WORKFORCE TRANSFORMATION
- AUTOMATION, IT, ROBOTICS INNOVATION

MEMBERS: TAN SEO PENG JOANNA, TRISH WOON, LUI LOK YIU, DR HWANG CHI HONG, CHRISTINE WU XIA, CHEN ZHAOQI, GEELYN NG, KELVIN LEW SIN MIN, TAMMY WONG, DR NG CHEW LIP

1. Define Problem, Set Aim

Background

- NTFGH observed increased surgical workload in 2021 amidst a national healthcare manpower shortage.
- Given limited OT resources and the complex and dynamic environment with multiple constraints, this could pose challenges to patient safety, care quality and hospital finances.

Problem/Opportunity for Improvement

- Coordination of resources and patient-flow planning are critical for effective OT management. We saw an opportunity to capitalise on our 6-year worth of Epic Electronic Medical Record (EMR) data to analyse the efficiency of each step of our patient's OT journey and identify areas for improvement.
- OTSight, an end-to-end ecosystem capable of extraction, analytics and visualisation for workforce transformation was conceptualised.

Aim

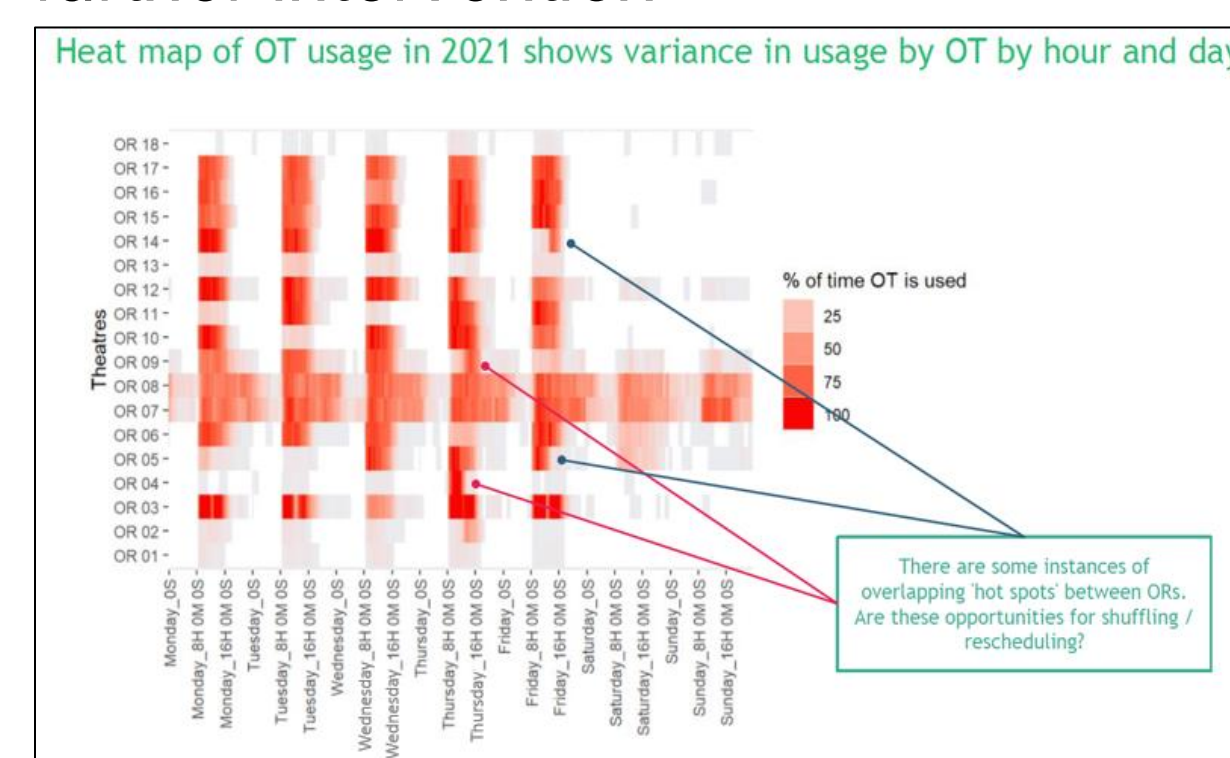
- Designing a system to identify biggest value pools through deep analytics and data mining for intervention.
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2. Strategy for Change

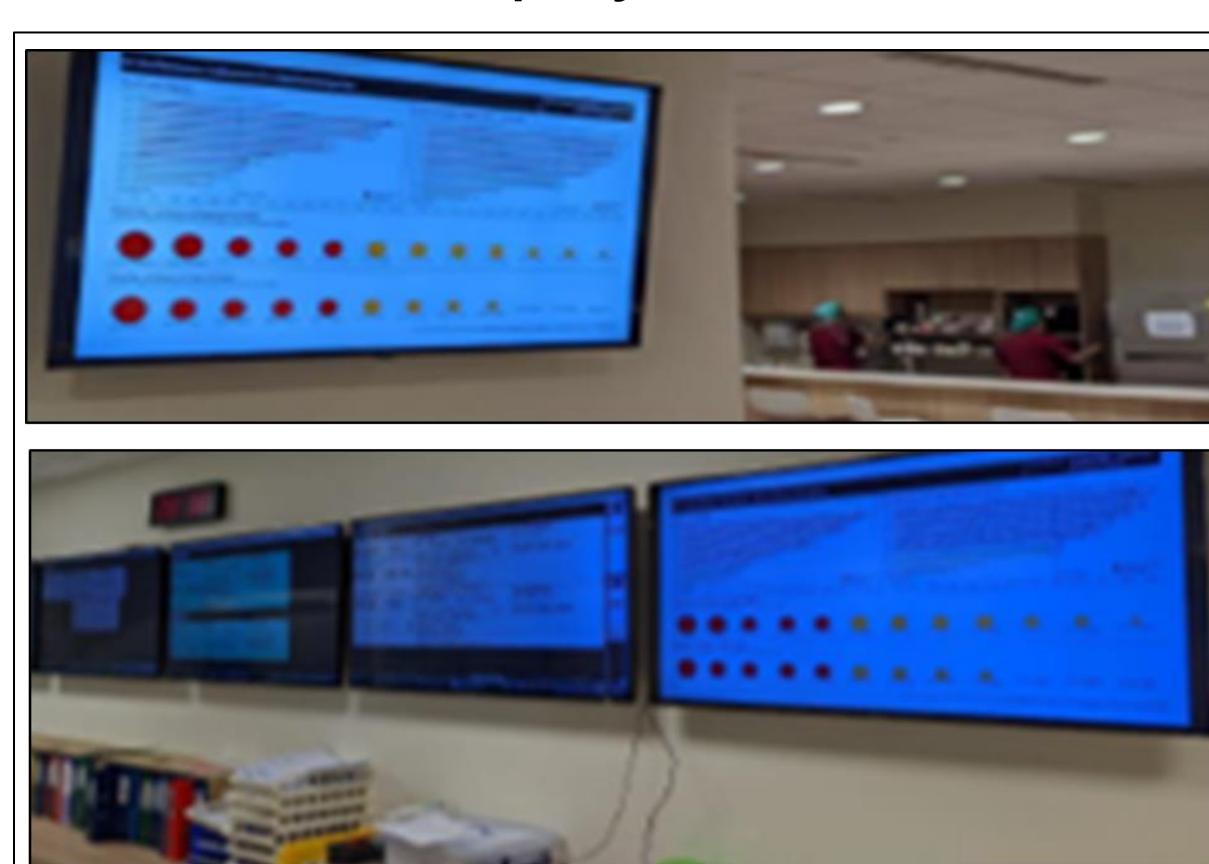
1. Unleash The Power Of Data

- Backbone of OTSight: Extraction and analytics algorithms; Dashboard infrastructure.
- Analysed efficiency of each step in OT to identified greatest improvement opportunities.
- Employed innovative "dollar-value tagging" for each proposed intervention with benchmarks to visualise objective rationale for these interventions.
- Deployed dashboard in pantry to improve data visualization and cascading of information; Spurring behavioural changes through leader board concept.
- Objective data obtained project buy in from OT stakeholders.

Heatmaps capturing OT over-utilisation patterns – possibilities for further intervention



Dashboard Deployment at OT Pantry



2. Understand And Empower Staff

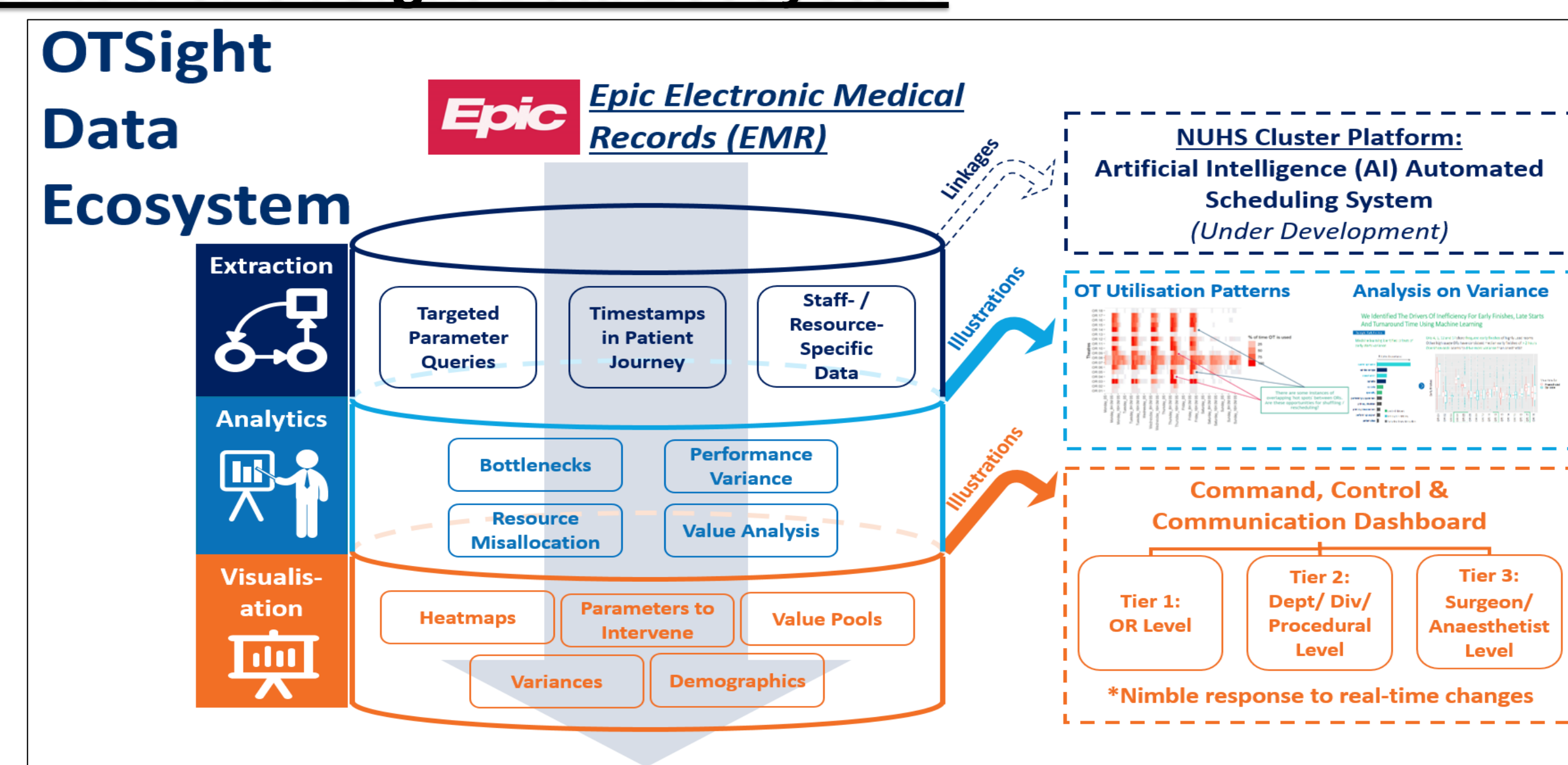
- Engaged OT stakeholders to comprehend operational roles, dependencies, collaboration difficulties, and corroborate analytic outcomes with ground situation.
- Process created ownership and buy in for solutions proposed.
- Induced a transformation in culture and habits.

3. Regular Review

- Weekly meetings with ground staff to assess interim outcomes and adjust efforts; Updates to Senior Management for leadership guidance and support.
- Roll out of individual projects built momentum and organisational support, enabling outcomes to be synergised and aggregated into a system level improvement.

3. Interventions and Results

Overview of OTSight Data Ecosystem



Overview of Key Interventions & Examples

S/N	Intervention
1	Redesign of Ambulatory Ward Layout & Workflow • Streamlined operational workflows for specialisation and efficiency
2	Redesign of Administrative Workflow from Specialist Outpatient Clinic (SOC), Admissions Office (AO), Business Office (BO) to Discharge Care • Streamlined administrative workflows for efficiency
3	New Letter of Guarantee (LOG) Workflow for Non-Residents (NR) • Redesigned process to reduced NR without LOG, reducing cancellation or rescheduling of surgery
4	Post-Op Care Videos Implementation • Videos optimised post-op education, availing nurses for higher-value tasks
5	Streamlining Patient-Flow from AO to Discharge • Enhanced process to relieve bottlenecks
6	Creating Platforms for Communications • Improved communication and teamwork with workflows and tools

"All Hands On Deck" Campaign

Grouping Operating Rooms to allow for resource mobilization and better teamwork

- OR 1-6
- OR 9-11
- OR 12-OR 14
- OR 15-OR 17

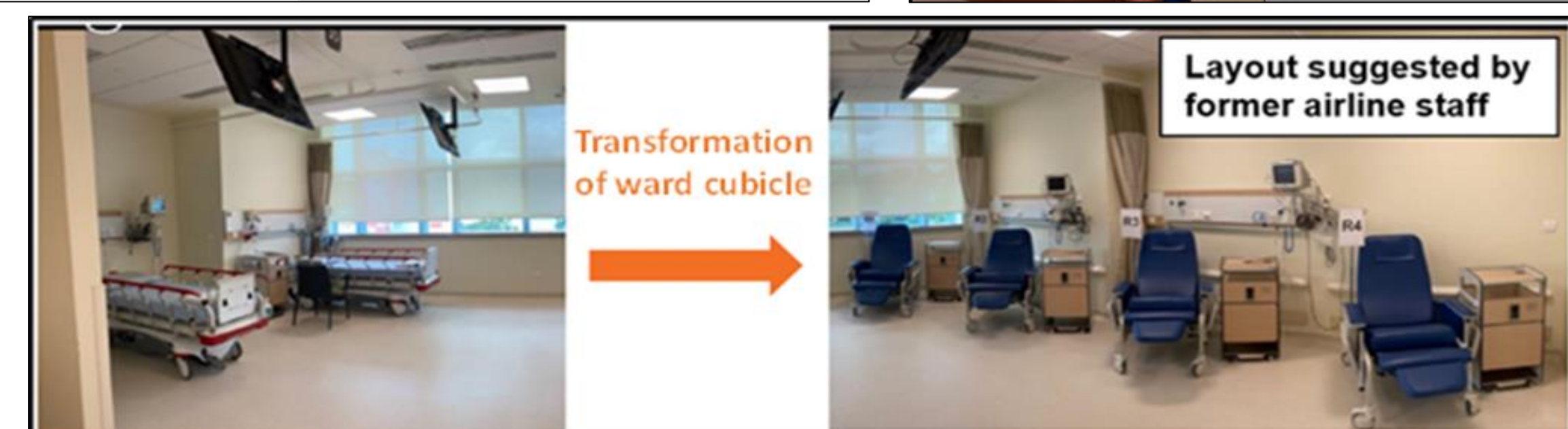
Announcement made "All hands on deck at OR 17" via PA system.



Implementation of Post-Op Care Video



Re-orientation of Holding Areas for patients awaiting Discharge from Post Anaesthesia Care Unit (PACU)



Results: Improvement In OT Utilisation and Outcomes

- OT utilisation rate increased from 86.8% to 100.5% with no corresponding manpower increase, contributed by: reduction in overall turnaround time between surgeries and late starts, efficient processes that shortened patient processing by 24 minutes; core transformation of OT culture.

	Pre-Intervention	Post-Intervention	Difference	P-Value*
% Turnaround Time (> 15 mins)	32.5% (Jun'21 – Dec'21)	24.8% (Jun'22 – Dec'22)	- 7.7%	<0.05
% of Late Starts for 1 st surgery (After 8:35am) - Overall	25.5% (Jun'21 – Dec'21)	20.9% (Jun'22 – Dec'22)	- 4.7%	<0.05
Time Taken To Complete OT Journey	102 mins (1 Feb'22 – 22 Mar'22)	78 mins (23 Mar'22 – 31 Mar'22)	- 24 mins	NA
OT Utilisation Rate	86.8%	100.5%	13.7%	>0.05
<i>Adjusted for differences in manpower</i>	(Jun'21 – Dec'21)	(Jun'22 – Dec'22)		

4. Learning Points

- With Epic go-live across Singapore, OTSight data ecosystem can be effectively scaled by leveraging on similar databases, data linkages and current dashboard frameworks.
- Objective data analytics is helpful in strategic decision-making and nimble resource allocation.
- Stakeholder buy-in, along with staff engagement and empowerment are critical in this bottom up initiatives.
- A paradigm shift in culture is necessary to effect changes in deeply rooted practices.
- Organisational support is critical for project take-off.

Contact person: Trish Woon (Trish_Woon@nuhs.edu.sg)
Lui Lok Yiu (Lui_Lok_Yiu@nuhs.edu.sg)

