Development of Cluster-wide Operating Theatres (OT) Performance Management Dashboards

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Introduction

Projection Description: With rising life expectancy, an ageing population places immense pressure on the healthcare infrastructure in Singapore. With the Operating Theatres proven to be main revenue generators in most hospitals, there is a growing need to manage these scarce resources efficiently and effectively. The OT Dashboard Project was hence conceived in a bid to optimise the utilisation of these OT resources.

4 Objectives

- **PROVIDE** accurate and contextual data for better management
- **ENABLE** visual analytics to facilitate effective identification of outlier trends
- **EMPOWER** stakeholders to drive improvement efforts
- **SUPPORT** performance reporting, planning and decision-making

The **DMADV Design for Six Sigma (DFSS) framework** was employed for the development of OT performance management dashboards.

Methodology

Define
project goals, activities, and deliverables

Measure
end-user requirements and specifications

Analyse
options and alternatives to meet requirements

Design
and develop desired product according to requirements

Verify
that product meets requirements and specifications

Follow-up

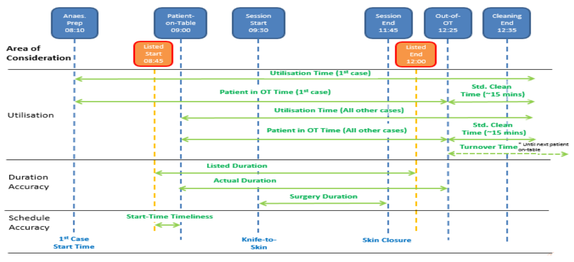
Implementation

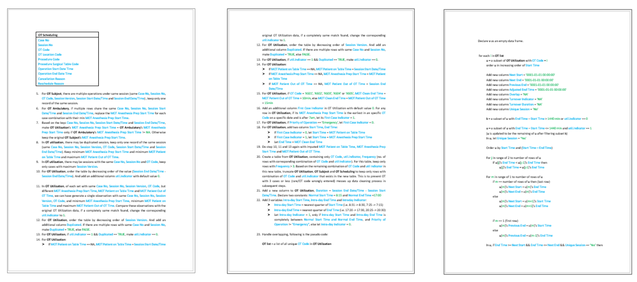
Stakeholder Engagement: Extensive stakeholder engagement was conducted to determine key performance areas which facilitate the optimisation of OT resources. Requirements were gathered from Clinician Leads and a list of proposed indicators was compiled.

4 performance areas

- **UTILISATION** Are OTs utilised efficiently?
- **LISTING ACCURACY** Are surgeries listed accurately?
- **TIMELINESS** Are surgeries starting on time?
- **CANCELLATIONS** What are the factors affecting cancellations?

Data Alignment: OT operational processes across the Cluster were mapped out and definitions of data fields and formulas for the computation of indicators were aligned.

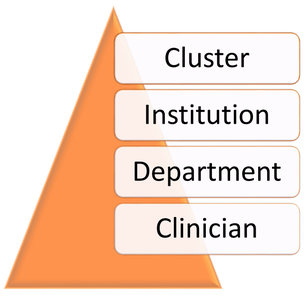




Data Processing: Computation of indicators was implemented through R programming. The data cleaning process was formulated, finalised and documented.

Requirements Gathering: Online survey forms were developed to obtain feedback from key OT stakeholders on the effectiveness and importance of proposed dashboard indicators.

Selection of KPIs: A list of KPIs was shortlisted and selected after the collation and analysis of survey results.



Customisation: Dashboards with different look-and-feel were designed for each level of the management hierarchy. The layout and colours were carefully crafted and picked to accentuate key data statistics.

Designed System Workflow

Design Conceptualisation: Preliminary designs were conceptualised and prototypes were developed on Tableau to create dashboard visualisations of the KPIs with cleaned and processed data.

Product Validation: Calculation algorithm implemented on R was compared against past utilisation figures to verify its correctness. Multiple iterations of validation were performed to ensure accuracy of computation.

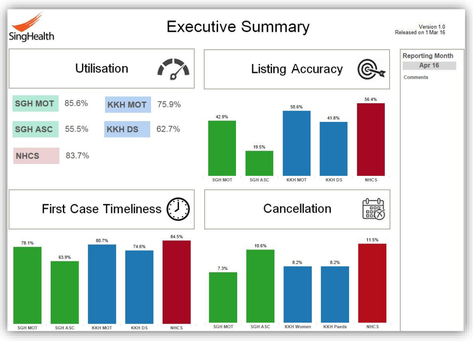
Product Presentation: Dashboard prototypes were presented at management and department meetings to engage stakeholders of varying hierarchy.

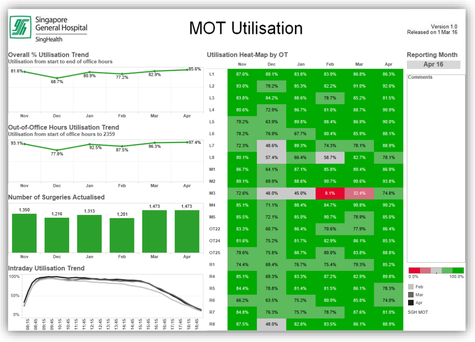
Product Enhancement: Comments and feedback were consolidated and incorporated into the final product.

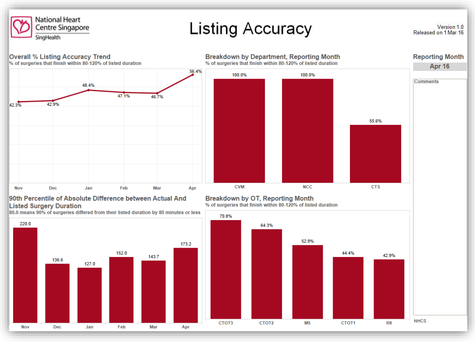
Documentation: All technical information including data cleaning methodology and Tableau implementation were documented.

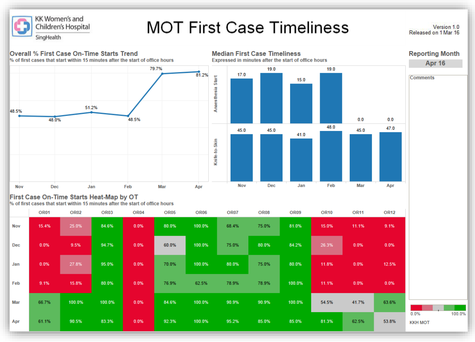
Training: Training programmes were conducted for institutional representatives to ensure sustainability of the OT dashboard.

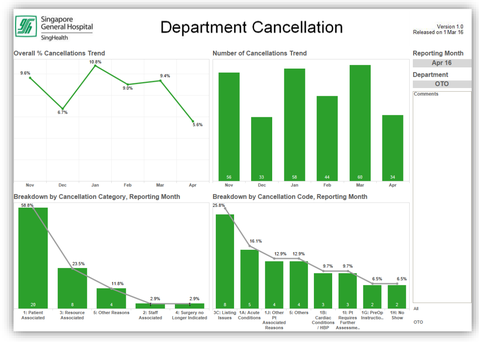
Product & Impact











- **1 Cluster, 3 Institution, and 27 Department Dashboards** from SGH, KKH and NHCS were developed and implemented on Tableau according to requirements by specified roll-out date.
- Dashboard users are empowered with capabilities to **accurately monitor** OT resource usage in 4 aspects and **perform basic drill-down** to derive relevant performance insights.
- The OT Dashboard equips institutions and departments with a decision support system to **identify key improvement areas** customised to their needs and specifications

Conclusion

Since the implementation of the OT Dashboard, there is strong demand and support for clinician reports to be developed. The clinician scorecards and enhancements for existing OT Dashboards will be included in future phases. The successful deployment of the OT dashboards attests to the systematic and innovative approach exemplified through the DMADV framework.