

# Transforming Total Knee Replacement Care Through a Systematic Value-Based Care Methodology: The One NHG Experience



Dr Tan Tong Leng<sup>1</sup>, Dr Sim Wei Ping, Dr Mark Tan Chin Hung<sup>2</sup>, Dr Jason Lim Beng Teck<sup>3</sup>, Dr Daniel Tan<sup>4</sup>, Winnie Koh<sup>4</sup>, Ivan Tan<sup>4</sup>, Lemuel Lee<sup>4</sup>, Ho Wai Yee<sup>5</sup>

<sup>1</sup>Department of Orthopaedic Surgery, Tan Tock Seng Hospital, <sup>2</sup>Department of Orthopaedic Surgery, Khoo Teck Puat Hospital, <sup>3</sup>Department of Orthopaedic Surgery, Woodlands Health, <sup>4</sup>NHG Value Based Care, NHG Health, <sup>5</sup>Group Finance, NHG Health

## Introduction

National Healthcare Group (NHG) developed a standardised value-based care (VBC) methodology to transform healthcare delivery across multiple conditions. This study examines its implementation in the Total Knee Replacement (TKR) programme, where systematic process improvements and resource optimisation enhanced operational efficiency and patient outcomes, creating greater value for TKR patients.

## Methodology

### 1 Care Path Mapping

The transformation of TKR care began with **comprehensive care path mapping** across institutions, where **multidisciplinary teams charted detailed patient journeys**.

This systematic approach illuminated **critical touchpoints from initial consultation through post-discharge recovery**, providing clear visibility of the entire care continuum.

### 2 Data Analytics Framework Implementation

A data analytics framework was established to drive **evidence-based transformation**, integrating a carefully curated portfolio of metrics across **outcome, process, cost, and balancing measures**.

This comprehensive measurement system enabled a **holistic view of care quality** while **protecting against unintended consequences**, ensuring improvements created genuine value for patients.

### 3 Key Enhancement Opportunities and Targets

- Rigorous analysis revealed key opportunities for **enhancement across the care journey**.
- Priority areas included optimising ambulatory surgery utilisation, streamlining specialist outpatient clinic processes, improving implant usage efficiency, and expanding home nursing and rehabilitation services.

The framework established targets across **14 carefully selected indicators**, including six aligned with the Ministry of Health's Clinical-Quality Index (CQI) framework, drawing from local and international benchmarks to drive excellence in care delivery.

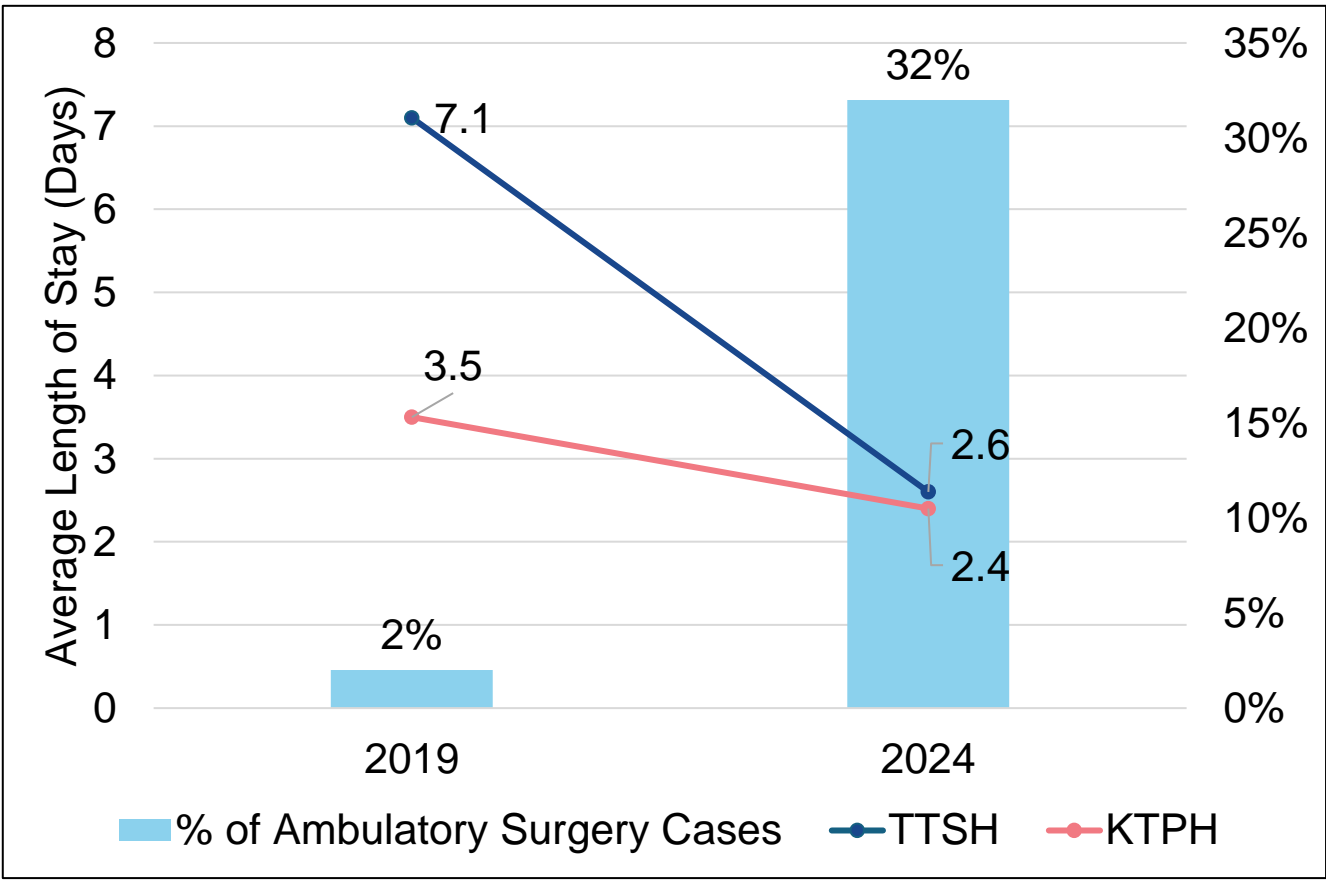
### 4 Cross-institutional Collaboration and Standardisation

- The transformation culminated in regular VBC workgroup sessions that fostered **cross-institutional collaboration** and **standardised care delivery**.
- The cluster implemented targeted interventions including Enhanced Recovery After Surgery (ERAS) care concepts, expanded home-based care services, and optimised rehabilitation pathways.

These initiatives, supported by **patient care bundles as financial enablers**, drove the development of a unified One NHG TKR care model that **standardised best practices** while **reducing care variations across institutions**.

## Results

Between 2018 and 2024, NHG's VBC methodology yielded remarkable improvements across health outcomes, costs, and patient experience. The successful implementation of ERAS care concepts, alongside seamlessly integrated home nursing and rehabilitation services while awaiting enrolment in day rehabilitation centres, significantly enhanced patient recovery. A pilot initiative expediting access to day rehabilitation centres further supported timely recovery and improved outcomes.



**Average length of stay (ALOS) decreased dramatically:**

**TTSH**

7.1 days in 2019 → 2.6 days in 2024

**63% Reduction**

**KTPH**

3.5 days in 2019 → 2.4 days in 2024

**31% Reduction**

**Ambulatory surgery rates increased significantly from 2% in 2019 to 32% in 2024.**

Through careful resource optimisation and strategic implant selection, both institutions maintained stable costs between 2018 to 2023 despite inflationary pressures.

Balancing metrics, including 90-day readmission and complication rates, blood transfusion rates, and inpatient mortality rates, **consistently demonstrated excellence** with results **ranging between 0-3%**.

These improvements across 14 key indicators validate the **effectiveness of the One NHG TKR care model** in delivering **enhanced value** while ensuring **sustainable healthcare costs**.

### Conclusion

NHG's systematic VBC methodology has successfully transformed TKR care delivery, demonstrating simultaneous improvements in outcomes, efficiency, and costs. This scalable framework establishes a foundation for future healthcare transformation initiatives while reinforcing NHG's commitment to sustainable, high-value care.