

Reducing Length of Stay in Head and Neck Cancer Patients Undergoing Free Flap Reconstruction :

A Quality Improvement Initiative

A. Illango, BHSc¹; C. Schmidt MD²; A. Mendez MD²; T. Phillips, MD²; K. Fung, MD, FRCSC²; A. Nichols, MD FRCSC²; J. Yoo, MD, FRCSC²; J. Strychowsky, MD, FRCSC²; A. Dzioba, MSc²; D. MacNeil, MD, FRCSC²

¹Schulich School of Medicine & Dentistry, Western University, London, ON, Canada

²Department of Otolaryngology – Head and Neck Surgery, London Health Sciences Centre, London, ON, Canada



INTRODUCTION

Free flap surgery often results in prolonged hospital stays (LOS 10–14 days). Enhanced Recovery After Surgery (ERAS) protocols aim to reduce LOS through targeted improvements in airway and nutrition management.

- **Airway** : Avoiding **prophylactic tracheostomy** shortens LOS (**14 vs 17 days, $p < 0.001$**) **without added complications**. **Early decannulation** (<7 days) further reduces LOS (**10 vs 15 days**) and **NG tube duration** (**7 vs 10 days**).
- **Nutrition**: **Early oral feeding** (<5 days) decreases **LOS, NG use, and weight loss**, with **no increased fistula risk**.
- **Local Context**: LHSC LOS exceeds comparable centers, likely due to **complex tertiary referrals** and **rural catchment**. However, post-op pathways can be optimized to improve flow and outcomes.

OBJECTIVE

This QI project evaluates **three post-operative care protocols** for HNC patients undergoing free flap reconstruction with the following goals:

- **Identify and implement** strategies to reduce **hospital LOS**
- Ensure LOS reductions are achieved **without compromising safety**

QI AIM: Reduce **median hospital length of stay** by **2 days** over a **2-year period** through iterative pathway refinements.”

METHODS

Plan-Do-Study-Act (PDSA) Cycle

Institutional Baseline Assessment

Retrospective Data: 50 prior oral cavity/oropharynx free flap

- **Mean Hospital LOS** : 14.1 days (Range 7–44)
- **Tracheostomy Rate**: 100%
- **Discharge with a Feeding Tube**: 58%
- **Return to OR**: 16%

Protocol Development

Developed three risk-adapted postoperative care pathways:

Cohort 1: **No Tracheostomy, Early discharge**

Cohort 2: **Early Decannulation and Oral feeding**

Cohort 3: **Standard Flap Pathway**

Stratification based on: Tumor subsite, number of subsites, tumor stage, prior radiotherapy, length of bone resection, flap type, and flap surface area

Prospective Implementation

Primary Outcome: Length of Stay

Secondary Outcomes:

- Complication rates
- 30-day readmissions,
- Feeding/tube metrics

Statistical Analysis:

- Kruskal-Wallis & Mann-Whitney U tests
- Fisher's exact test for categorical data
- Negative binomial regression (GLM)
- SPC charts for trends in LOS and complications

Iterative Evaluation & Refinement

- Current efforts focused on pathway validation and refinement
- Assessing impact of clinical variables on LOS and discharge outcomes
- Conducting multidisciplinary review to align cohort assignment with patient risk factors



SCAN ME:
Cohort Protocols

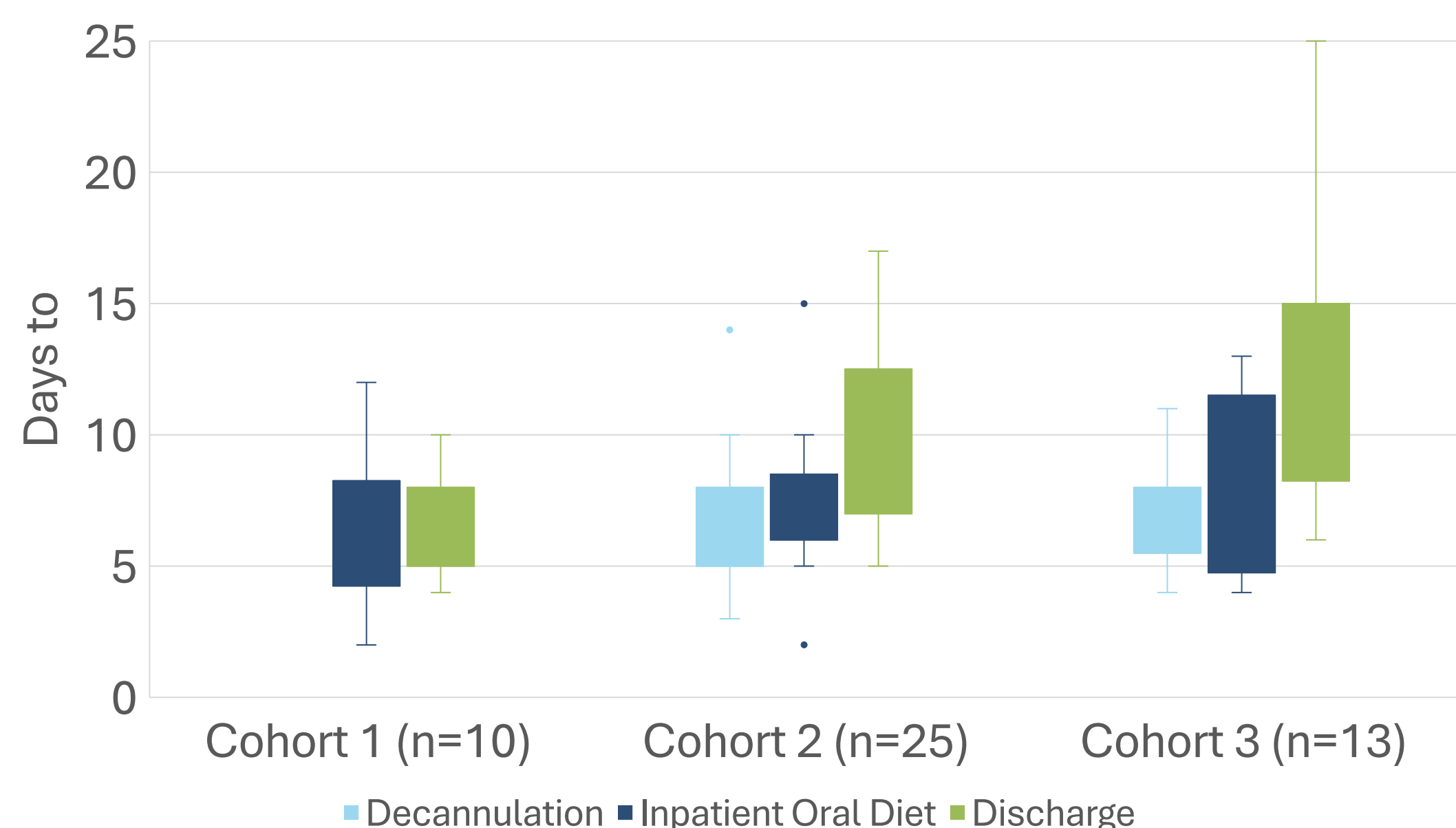


Figure 1. Cohort Comparison of Days to Decannulation, Inpatient Oral Feeding, and Length of Hospital Stay

Box plots show the distribution of days to decannulation, oral feeding, and hospital discharge across Cohorts 1 (n = 10), 2 (n = 25), and 3 (n = 13). Boxes represent the interquartile range (IQR), lines indicate medians, and outliers are shown as individual points. Cohort 3 achieved earlier oral feeding, while Cohorts 2 and 3 had longer hospital stays than Cohort 1.

Table 1: Patient Demographics

Demographic	Value
Total patients (n)	48
Gender (M:F)	31:17
Age, years (mean ± SD)	66.2 ± 14.2
Bone resection (n, %)	20 (42%)
Bilateral neck dissection (n, %)	17 (36%)
Moderate/severe trismus (n, %)	9 (19%)
Length of stay, days (mean ± SD)	10.4 ± 7.8
30-day readmissions (n, %)	5 (10.4%)
Any perioperative complication (n, %)	10 (20.8%)

DISCUSSION

- **Avoiding prophylactic tracheostomy** (Cohort 1) was associated with the **shortest LOS, no complications, and no readmissions** in appropriately selected patients.
- **Early decannulation and feeding** (Cohort 2) offered **partial benefit**, but did **not reduce LOS** compared to standard care.
- **Routine tracheostomy** (Cohort 3) was associated with the **highest LOS and complication rate**.
- **Multivariable modeling** showed that both **protocol type** and **post-op complications** independently influenced LOS.
- **Cohort 3 patients were selected for tracheostomy** due to **higher baseline risk**, including extensive resections, oropharynx involvement, prior radiotherapy, and complex flaps.
- These findings emphasize a **risk-stratified approach to airway and nutrition management** to optimize recovery without compromising safety.

FUTURE DIRECTIONS

1. **Refine protocol assignment** using real-time clinical decision tools (e.g., LOS risk calculators, pre-op flags).
2. **Pilot early recovery interventions**, including:
 - Suture tracheostomy sites post-decannulation to support earlier oral intake and discharge
 - Early mobilization pathways
 - Standardized criteria for feeding tube removal
3. **Expand QI metrics** beyond LOS: (i.e. Tracheostomy-free discharge, Functional oral intake at discharge, Patient satisfaction and readiness for discharge).
4. **Full implementation** with ongoing **PDSA cycles** to adapt protocols and address patient barriers.

REFERENCES

1. Dawson R, Phung D, Every J, et al. Tracheostomy in free-flap reconstruction of the oral cavity: can it be avoided? A cohort study of 187 patients. ANZ J Surg. 2021;91:1246–1250.
2. Adhikari A, Noor A, Mair M, et al. Comparison of postoperative complications in early versus delayed tracheostomy decannulation in patients undergoing oral cancer surgery with microvascular reconstruction. Br J Oral Maxillofac Surg. 2022;61(1):101–106.
3. Tan N, Lin C, Lin Y, et al. Early oral intake after reconstruction with a free flap for cancer of the oral cavity. Br J Oral Maxillofac Surg. 2013;51(3):224–227.
4. QI Protocol – Major Head and Neck Cancer and Free Flap Surgery. London Health Sciences Centre, 2024. Internal Quality Improvement Document.