

Value Comparison of Endoscopic Carpal Tunnel Release in Two Surgical Settings

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Introduction

- To help combat the rising costs of healthcare, the field of orthopaedics is transitioning to a **value-based care** model¹⁻³
- The goal of value-based care is to **maximize outcomes while minimizing costs**⁴

Aims and Objectives

- Purpose:** To compare the value of Carpal Tunnel Release (CTR) in a Hospital Outpatient Department (HOPD) vs an Ambulatory Surgical Center (ASC)
- Hypothesis:** The ASC will demonstrate greater value by generating similar outcomes at a lower cost

Methods

- Separate process maps**, including all steps of patient care from arrival to discharge, were constructed for patients undergoing CTR in the HOPD and ASC per the **Time Driven Activity Based Costing (TDABC)** methodology⁵⁻⁹ (Figure 1).
- The average time needed to complete each step for **25 HOPD and 25 ASC patients** was recorded.
- Time data was used to calculate costs according to the following categories¹⁰:
 - Direct Variable:** Personnel cost
 - Direct Fixed:** Building fees, material, equipment
 - Indirect:** Marketing, administration, maintenance
- Outcome Metrics:** PROMIS UE CAT v2.0 and PI CAT v1.1 scores were collected preoperatively and three months post-operatively.
- Average value** was determined for each patient by calculating an **Average Cost-Effectiveness Ratio (ACER)** by **dividing total cost by QALY_{UE} and QALY_{PI}** (Figures 2).
- Value comparison** between surgical modalities was calculated using an **Incremental Cost-Effectiveness Ratio (ICER)** for each outcome metric based on the equation in Figure 3, resulting in an **ICER_{UE}** and **ICER_{PI}**.
 - Lower ICER = Greater Value**

Results

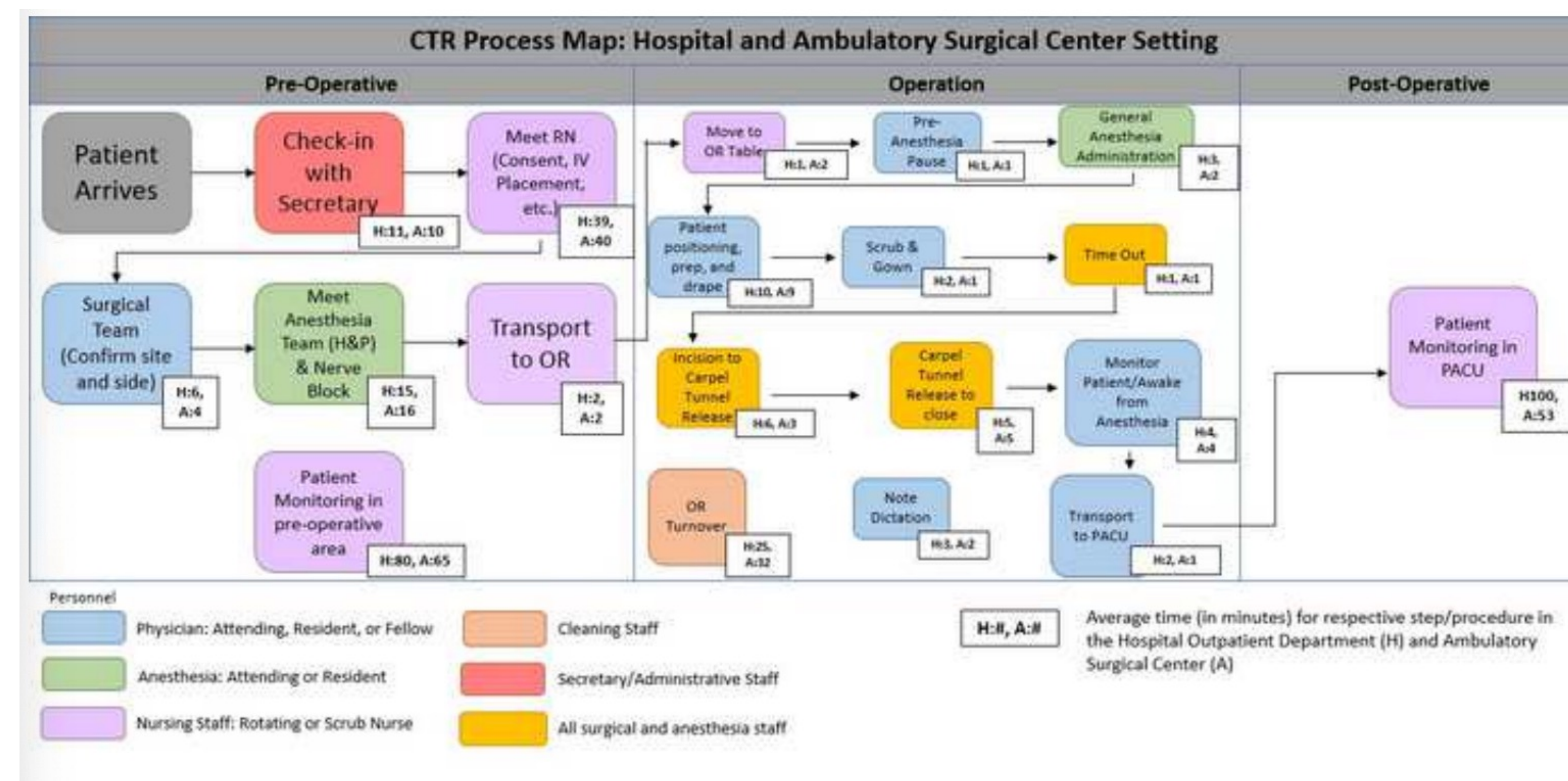


Figure 1. TDABC Combined Process Map for HOPD and ASC Carpal Tunnel Releases

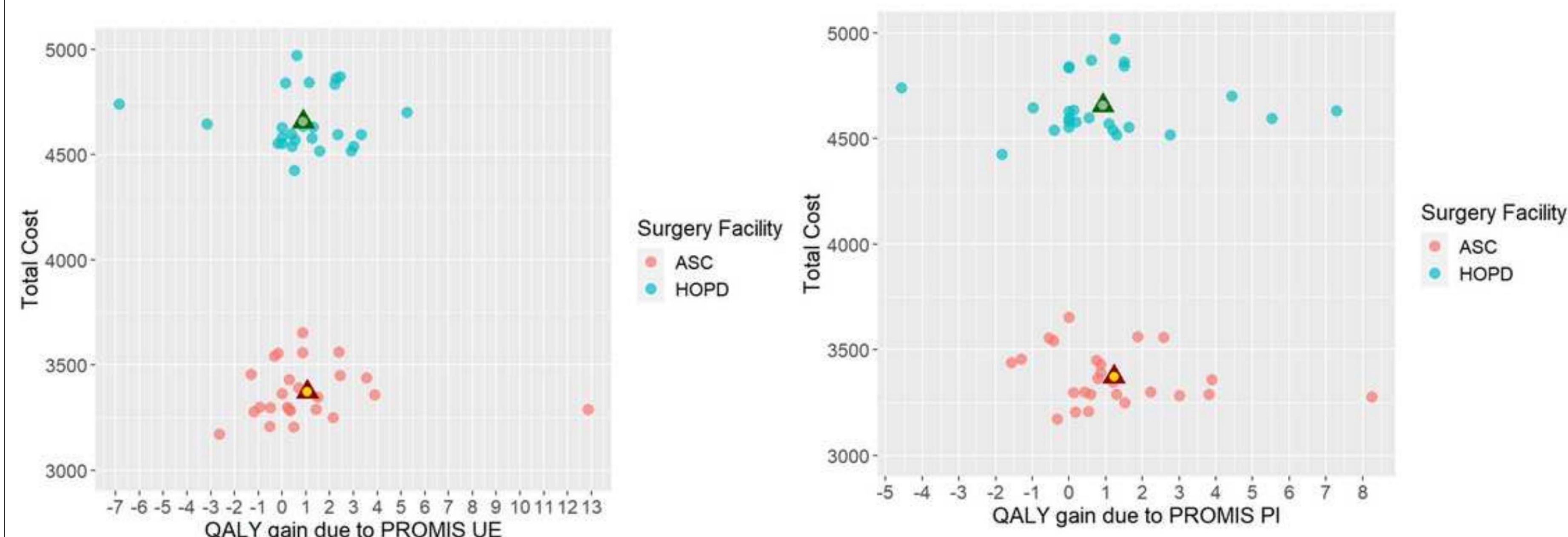


Figure 2. Average Cost-Effectiveness Ratios for HOPD and ASC patients, utilizing QALY gain 3-months postoperatively from PROMIS UE (right figure) and PROMIS PI (left figure).

$$ICER = \frac{\text{Incremental costs}}{\text{Incremental effectiveness}} = \frac{\text{Cost}_{HOPD} - \text{Cost}_{ASC}}{QALY_{(UE/PI)} - QALY_{(UE/PI)}} = \text{Cost per 1 QALY}$$

Figure 3. Incremental Cost Effectiveness Ratio (ICER) equation.

Results Ctd.

- Costs were significantly lower in the ASC** by \$1,284.02, or **28% (p<0.001)**.
- ASC QALY_{UE} was greater than HOPD QALY_{UE} (1.06 vs 0.89)
- ASC QALY_{PI} was similarly greater than HOPD QALY_{PI} (1.22 vs 0.92)
- HOPD ICER_{UE} was greater** than ASC ICER_{UE}
 - HOPD: \$5,242.78 (95% CI: \$2,457.76;\$29,645.61)
 - ASC: \$3,168.81 (\$1,221.21;\$14,100.07)
- HOPD ICER_{PI} was greater** than ASC ICER_{PI}
 - HOPD: \$5,038.04/QALY (\$2,224.85;\$23,751.20)
 - ASC: \$2,759.90/QALY (\$1,496.80;\$5,999.89)

Conclusions

- CTRs performed in the **ASC generate between 40-45% greater value** than HOPD
- The **28% lower costs** in the ASC **doesn't fully explain the value differential** observed, highlighting the importance of collecting outcomes
- This data can aid **patient-level and system-level decision-making** regarding operative treatment options for carpal tunnel syndrome

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