

Utilization Fraction of Instruments in Panniculectomies: Cost Reduction Through Surgical Tray Optimization

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INTRODUCTION

- Healthcare spending will equate to approximately 20% of the US GDP by 2028.
- Surgical care = ~33% of all healthcare spending in the US
- Innovative solutions for healthcare cost savings include micro cost analysis, such as utilization fraction

Objectives:

1. Assess the utilization fraction of surgical instruments during panniculectomies

2. Assess overall cost saving impact and implications for savings

METHODS

- Single-center prospective analysis of surgical instruments used during panniculectomies in both a private (#1) and public hospital (#2) setting over a six-month time span.
- Data collected: Instruments used, instruments opened, internal central sterile processing values for instrument processing, annual volume of panniculectomies performed at both sites

Analysis:

$$UF_n = \left(\frac{I_{used}}{I_{opened}} \right) \times 100\%$$

Where n = Site 1 or Site 2

I_{used} = Instruments used during case

I_{opened} = Instruments opened during case

- Descriptive statistics using R to calculate averages: Mann-Whitney test where applicable
- Statistical significance reported as $P < 0.05$

RESULTS

Utilization Fraction

- For most cases, an average of two trays were opened: **one general tray** and **one retractor tray**
- A mean of **129.9 ± 64.6** instruments were opened at the start of each case.
- An average of only **19.7 ± 8.6** instruments were used during each procedure, yielding a mean UF of **17.1 ± 7.0%**
- Although the number of instruments used significantly differed between sites (14.8 ± 4.7 vs 25.6 ± 8.2 instruments; p = 0.035), **UF did not vary** (20.4 ± 7.3% vs 13.1 ± 4.5%; p = 0.082)

Cost Implications

- CSP estimates processing cost at \$1.56 per instrument; corresponding to an average of **\$202 per procedure** with annual reprocessing costs of approximately \$12k and \$36k at the private and public hospitals respectively
- Two theoretically created optimized trays were then created to only include instruments used >20% of the time. These trays lowered reprocessing costs by **71.5%** and **73.8%** respectively at sites 1 and 2.
- Using cited values of processing costs between \$0.51 to \$3.19, theoretical reprocessing costs varied between **\$4k – 24k** at the private hospital and **\$12k - \$73k** at the public hospital

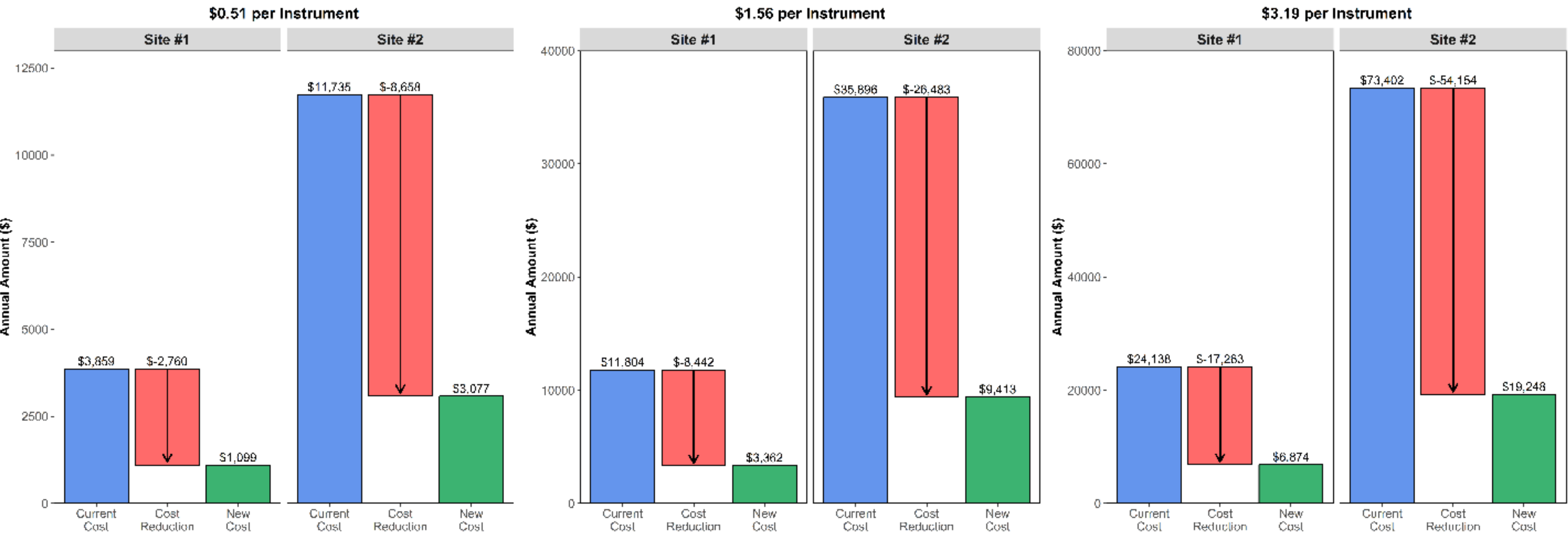


Figure 2. Cost Reduction via Tray Optimization

	Tray	# Instruments	# Unique Instruments	# Duplicate Instruments
Site #1 - Private	Breast Tray	58	11	20
	Plastics Retractor Tray	10	2	4
	Plastics Large Dissecting Tray	122	17	32
Site #2 – Public	General Plastics Tray	156	26	53
	Plastics Retractor Tray	39	5	13

Table 1. Surgical Tray Composition

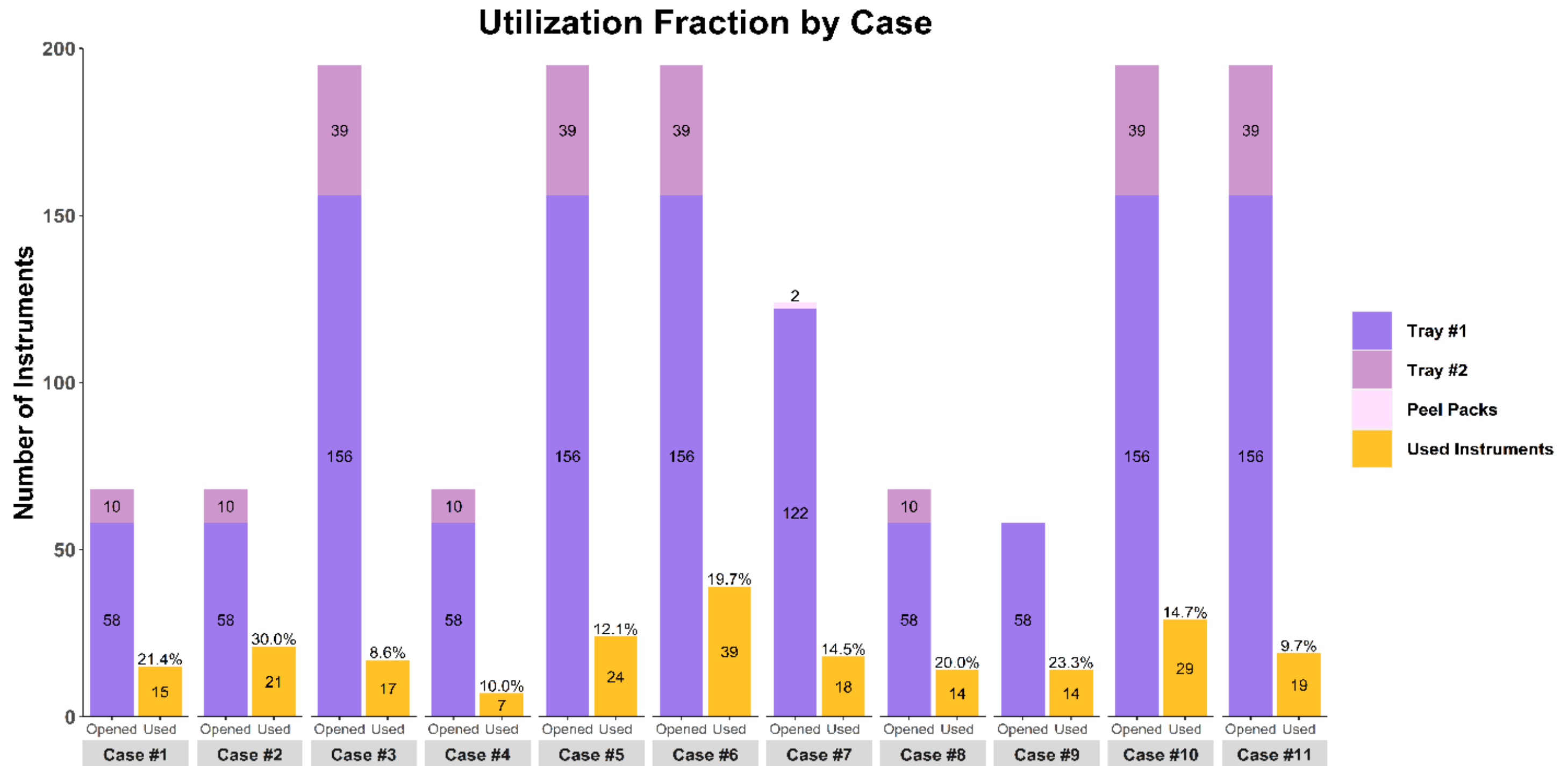


Figure 1. Instrument Utilization Fraction by Case

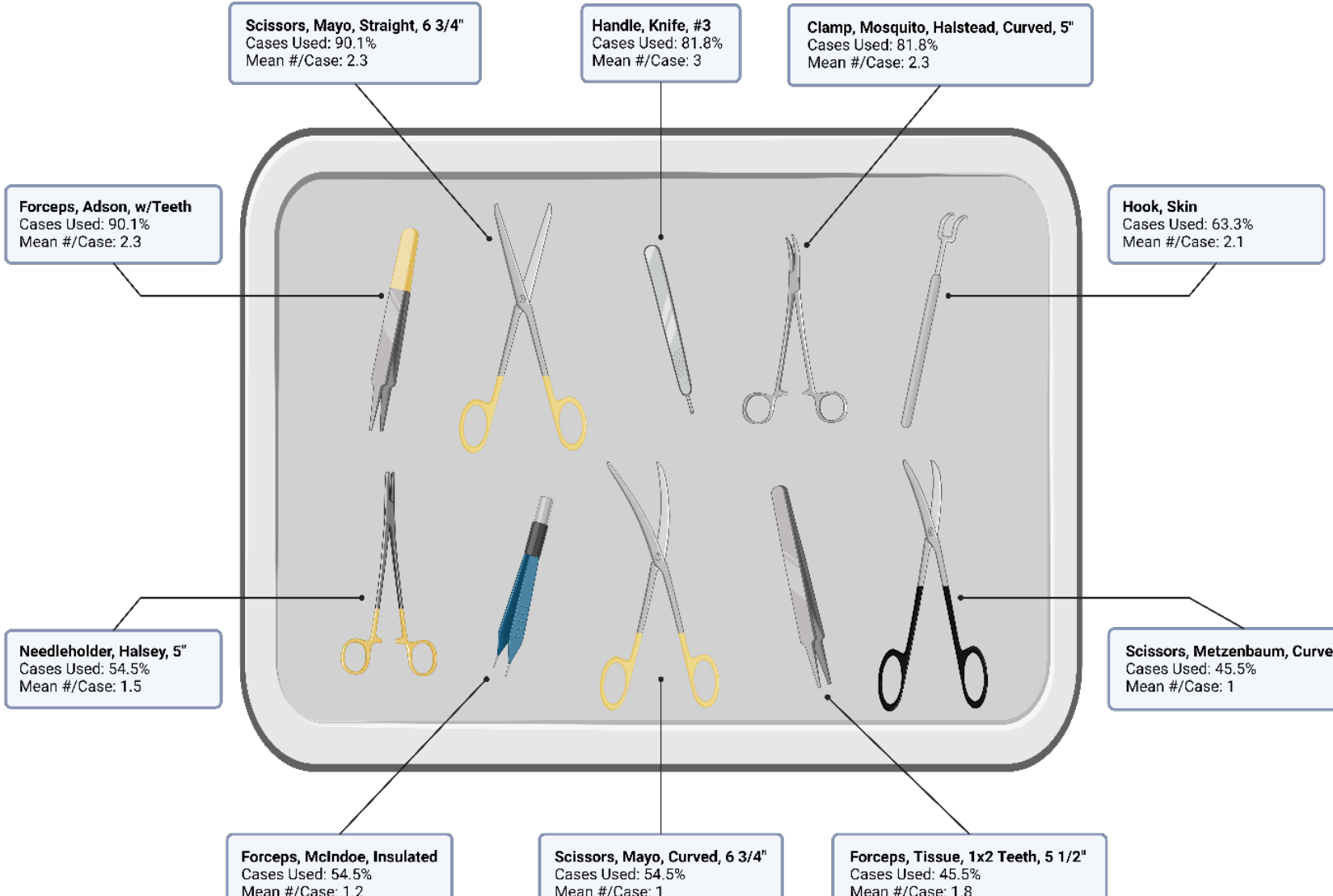


Figure 3. Top 10 Instruments According to Cumulative Case Utilization, made with BioRender

DISCUSSION

- Previous similar studies by Farrokhi et al demonstrated a 70% decrease in tray size, 30% faster OR turnover, and \$2.8 million annual savings when applied across specialties.
- Utilization fraction (UF) in panniculectomies is <20% on average at our institutions, in concordance with previous data demonstrating variable UF
- Surgical tray optimization for this procedure alone can result in cost savings of up to \$54,000 annually
- Tray optimization and faster OR turnover can subsequently increase the amount of cases performed, ultimately increasing profit margins and allowing for redirection of funds to other aspects of care

CONCLUSIONS

- Surgical tray optimization is a viable way to use micro-cost analysis for potential robust health-care cost savings
- Can be broadly applied at institutions between multiple specialties for more dramatic savings and implementation of sustainable practices
- Future studies can include implementation of optimized and general surgical trays with prospective cost analysis

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