CENTER FOR HEALTHCARE ENGINEERING & PATIENT SAFETY
UNIVERSITY OF MICHIGAN

Understanding Operating Room (OR) Utilization at the VA Ann Arbor Healthcare System

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INTRODUCTION

The Team
Ann Arbor VA: surgery chief, anesthesia chief, analysts, and the administrative officer from surgery service
Center for Healthcare Engineering & Patient Safety (CHEPS): students, faculty, and staff

Our Goal
We are working to better understand how operating rooms are scheduled and used in the VA Ann Arbor Healthcare System. We assessed the current state of the OR schedule at one hospital. The team will make recommendations to improve utilization, reduce variation in metrics, and increase throughput.

UNDERSTANDING CURRENT STATE

Observe surgery and OR room use

Observe surgery scheduling & workflow

Understand how utilization is calculated across VA

Understand how block time is released & picked up

Identify opportunities for improvement

CURRENT STATE FINDINGS

- We found the VA used the following formula when calculating utilization. Using this formula we found that utilization was equal to **82.9% ± 10.3% SD** in August (**84.9% ± 10.5% SD** as of December)**:**

$$\textbf{Utilization} = \frac{\textbf{surgery time} + \textbf{turnover time}}{\textbf{allocated daily block time}}$$

- Through observations, the team found variability in scheduling procedures across the various services
- The institution lacked a standardized process for releasing allocated block time; each service released time based on their unique scheduling processes
- Earlier release times were correlated to higher likelihood of the block time being picked up by another service

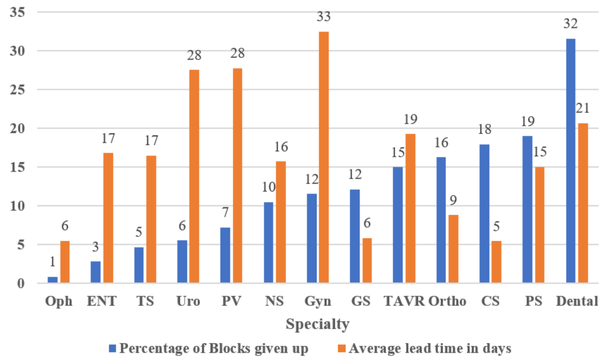
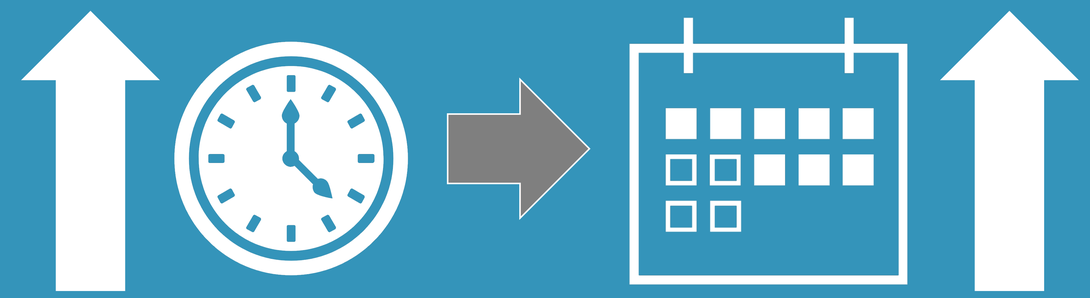
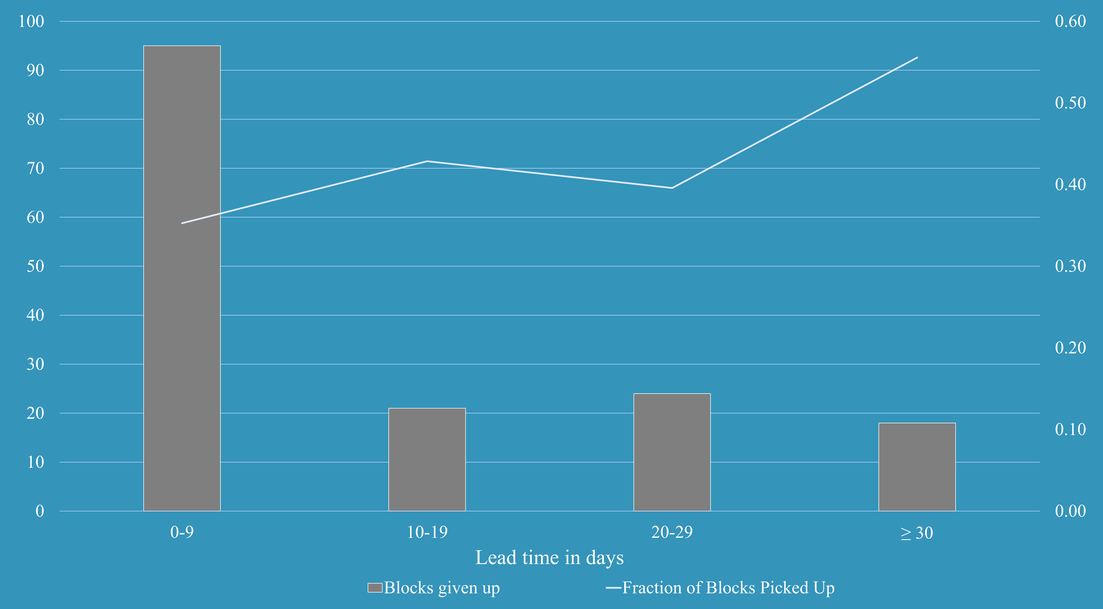


Figure 2: Blocks given up and lead time by specialty



Longer Lead Time (and Standard Process)

Higher Chance Block is Picked Up



OPTIMIZING SCHEDULING PRACTICES: METHODS

The team was tasked with identifying the services which could benefit most greatly from additional block time, as the VA was considering adding one more OR per day.

The team approached this by:

- Fitting distributions for most common procedure types
- Meeting with each specialty's scheduler to identify and group similar cases
- Evaluating scheduling accuracy for each service
- Creating a tool to find monthly block hours by service in a given range of dates
- Identifying common procedure types with high inaccuracy

OPTIMIZING SCHEDULING PRACTICES: FINDINGS

- Services almost always underestimate procedure duration, as seen in Figure 3 (an OR schedule coordinator adjusts requested times based on procedure type and surgeon)
- While the durations of some procedure types each follow bell curves, as seen in Figure 4, the duration of some other procedure types also depends on the initial scheduled duration of the case (such as in Figure 5)

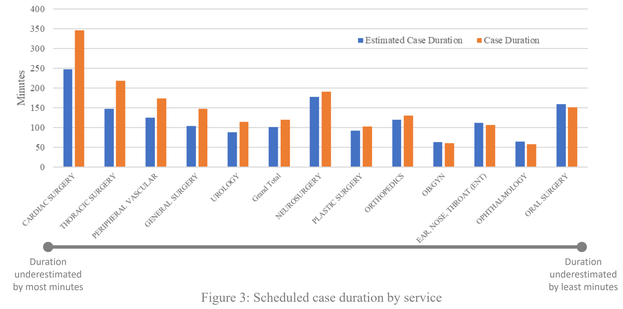


Figure 3: Scheduled case duration by service

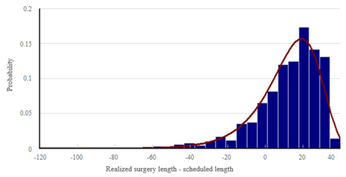


Figure 4: Distribution of realized Cataract Surgery lengths minus scheduled block time

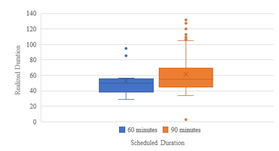


Figure 5: Distribution of realized Cystoscopy surgery lengths based on scheduled length

FUTURE WORK

Evaluate effects of on-time starts and its downstream implications

How do we reduce utilization variation? Which cases are likely to run late?

Which services should we allocate potential new block time to?

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