



Unlocking OR Efficiency With Data-Driven Insights

CASE STUDY

How Proximie Helped A Major American Healthcare Provider Identify a \$90m Opportunity in OR Optimization

INTRODUCTION

In 2024, Proximie ran a data-led analysis of perioperative operations in partnership with a major US healthcare provider. The organization operates 24 hospitals and emergency departments covering more than 105 areas of medical specialism, and employs more than 29,000 people, including 4,750 qualified physicians. In 2023, the provider cared for 197,000 inpatients and 6.6 million outpatients.

The study employed continuous digital and ambient monitoring technology to gather detailed data about surgical procedures and workflows across operating rooms. The objective was to establish baseline performance metrics and surface strategic interventions for improving operational efficiency, clinical outcomes, and fiscal performance indicators.

PROBLEM

With ORs contributing between 35% to 40% of an average hospital's total costs, surgical services are a priority target for driving efficiencies that not only benefit overall economic performance in large healthcare systems but also raise the bar on patient outcomes and improve conditions for staff.

Inefficiencies in OR processes manifest themselves as delays, variations in practice, communication issues and sub-optimal use of time and resources. But given the complex, multi-layered interactions between practitioners, patients, machinery and other equipment that characterize these processes, it's difficult to identify root causes clearly.

While healthcare providers recognize the importance of OR technology and data analysis in improving efficiency, fragmented, non-integrated systems often result in inconsistent and incomplete insights. Most assessments still rely on manual inputs and subjective testimonies, making them prone to inaccuracies.

To drive operationally significant improvements, healthcare providers need a means of looking beyond top-level descriptions of what the sources of inefficiencies are, to see in detail how and why they are occurring. To achieve this, they need to move beyond disconnected, contextless data points to a holistic, integrated approach that captures a complete and objective picture.

* <https://PMC9899172/>

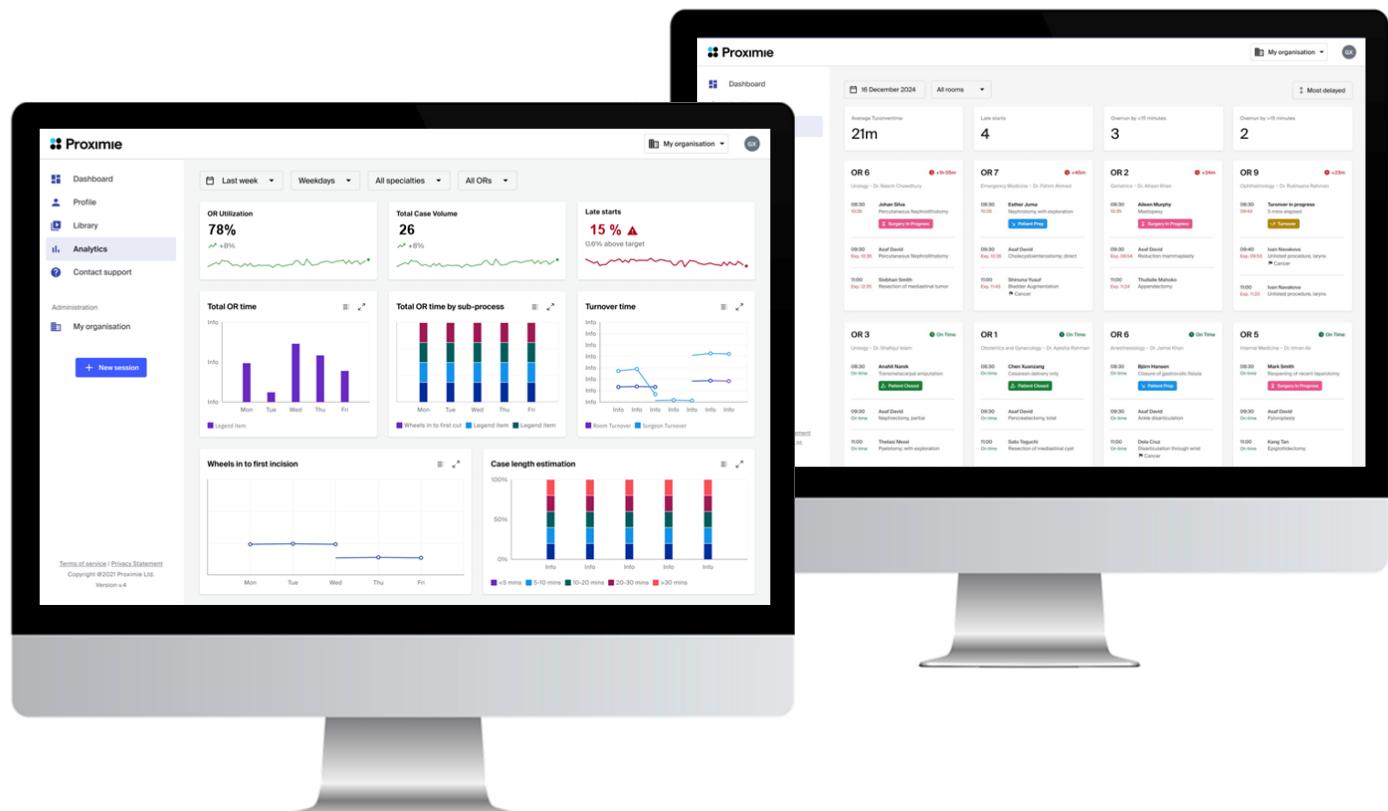
SOLUTION

Proximie offers a comprehensive data capture and analysis solution for the OR.

Our platform's systems-agnostic cloud-based data layer seamlessly integrates feeds from all devices in use. Combined with always-on ambient video capture that provides a 360-degree view of everything that happens in the OR, Proximie allows providers to match performance data to the fine details of intraoperative events - or to see the how and why.

Asked by our partner to demonstrate how this would lead to actionable insights for improvement, Proximie proposed a study across three procedure areas - robotic bariatric surgery, vascular, and endoscopy.

Across 35 days, more than 700 hours of video were recorded and analyzed alongside more than 10,000 data points from surgical devices.



FINDINGS AND ANALYSIS

Proximie integrated data from all OR devices and added their ambient video data collection to their analytics. This empowered the provider to unpack the root causes of inefficiencies and furthermore identify opportunities for improvement.

Variations in OR Time

Variations in “surgical time”, or the time spent actually performing a procedure from first incision to final closure, occur for all sorts of clinically justifiable reasons and are an accepted part of the surgical process.

However, data from all procedural areas in the study revealed significant variations before and after “surgical time” which could not be explained by case complexity or other clinical reasons. These were therefore identified as opportunities to improve efficiency by reducing total OR time.

Key findings

In vascular procedures

24%

of observed total OR time, or an average of 38 minutes per procedure, provided opportunities to cut overall OR time outside of actual surgery taking place. We labelled this ‘opportunity time’. (Figure 1)

In endoscopy procedures

70%

of procedures started within 12 minutes of wheels in. But 10% took longer than 16 minutes to start. Time from close of surgery to wheels out varied from 5 minutes to 12 minutes.

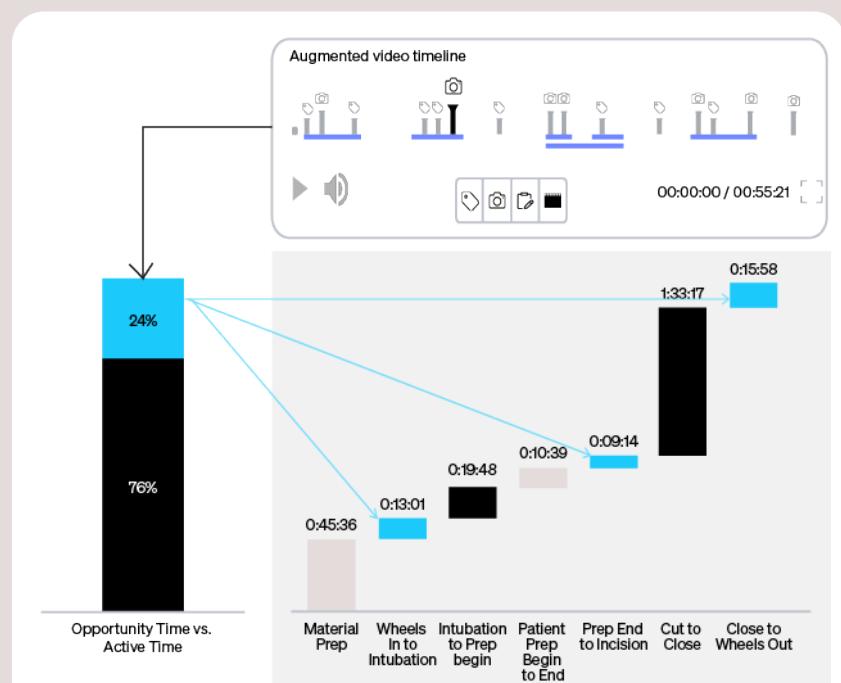


Figure 1. 24% of observed total OR time provided opportunities to cut overall OR time outside of actual surgery taking place.

Causes of inefficiencies

- **Lack of standardized procedures in material preparation.** Video evidence showed inconsistent table arrangements which led to instances of practitioners having to make long walks back and forth between the sterile instrument table and case cart. In one case, this happened 12 times. Lack of organization in the case cart led to delays as practitioners sifted through materials to find what they needed. In some cases, items were missing and had to be retrieved from outside the OR. These contributed to variations of 16 minutes in observed materials prep times.
- **Idle times in patient preparation.** There were noticeable gaps in productivity after patients arrived in the OR for preparation. For example, during observations of vascular procedures, idle times of up to 6 minutes were observed before disinfection started because materials were not ready. There were also idle times before draping and first incision when the surgeon was not present or ready.
- **Delays in turnaround.** Inefficient cleaning and sterilization protocols at the end of one procedure caused delays in turnaround times averaging 6 minutes. Interestingly, the data also showed a knock-on effect carried over into delays in anesthesia and intubation in the next procedure. For every 10 minutes of turnover, an extra two minutes were added on average to anesthesia times. Delays retrieving the patient and room, equipment, and anesthetics not being ready when the patient arrived were consistently observed.
- **Distractions during breakdown.** During robotic bariatric surgery, team members were seen having to split their attention between patient and material breakdown, meaning both took longer to complete, or else people were pulled out of the room for another task completely.

Optimization opportunities

Variations in non-surgical time showed that some procedures were taking longer for non-clinical reasons. Using Proximie, the provider was able to build simulation models from the data that showed where workflows could be optimized in three areas:



Standardizing the preoperative process by establishing clear protocols for briefings, assessments, and preparations.

By eliminating issues such as case carts being disorganized and surgeons not being ready due to poor communication, it was found that better turnaround and preparation processes could reduce delays by 22 minutes between wheels-in and intubation, and from patient prep to first incision.



Coordinating patient & material preparation in parallel, rather than as separate tasks with very little communication between the teams carrying them out.

Modelling showed that better synchronization could yield substantial gains, such as reducing OR time by 15 minutes (12.5% of a two-hour surgery) in bariatric surgery and cutting time from prep end to incision by 34% and total OR time by 28% in vascular procedures.



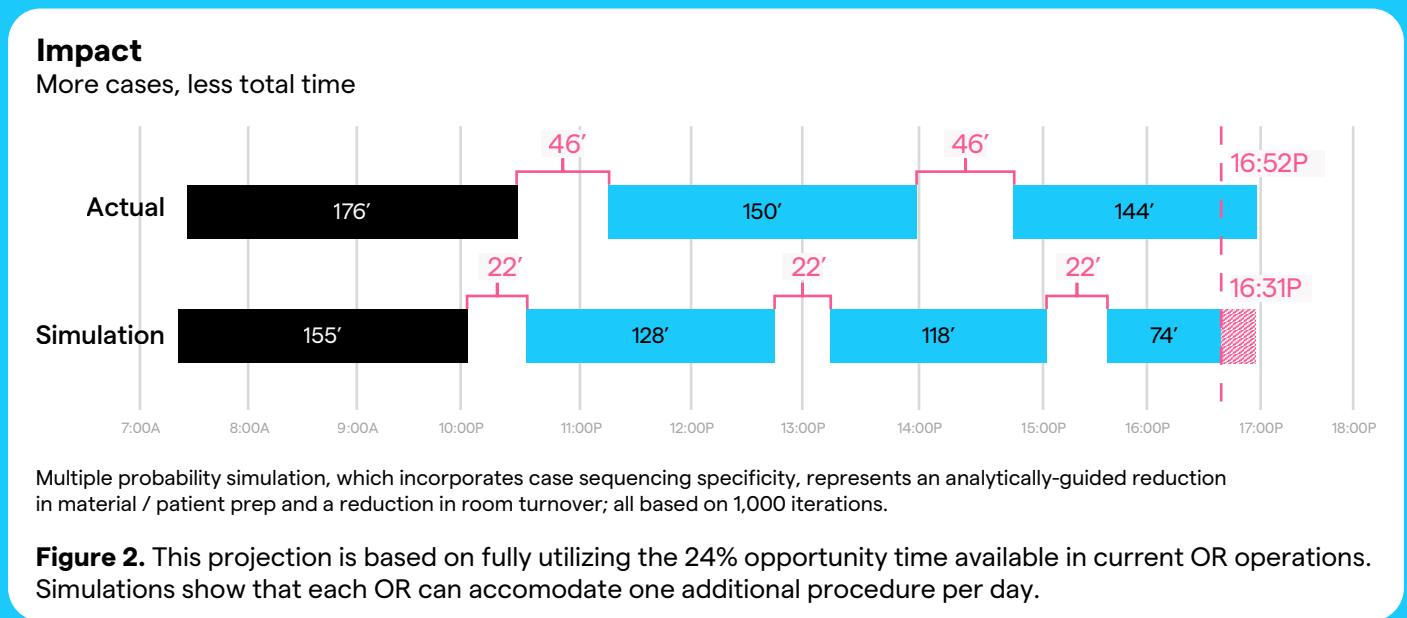
Making turnovers more consistent.

Turnover time directly impacts total OR time and efficiency. Longer turnover correlates with delays in anesthesia and intubation, reducing peak OR utilization. Efficient turnover sets the stage for smooth operations, preventing inefficiencies from snowballing.

ECONOMIC IMPACT

The efficiency improvements identified in this study present a significant economic opportunity.

- By reducing average OR time, more procedures can be performed each day, increasing patient throughput and revenue - all without requiring additional resources or major operational changes.
- Simulations quantified the impact of these measures, showing that by optimizing preoperative preparation, eliminating idle time, and streamlining turnovers, each OR could accommodate one additional procedure per day. This projection is based on fully utilizing the 24% opportunity time available in current OR operations.



- Although the opportunity time identified in the study could warrant one extra procedure per OR per day, we used the more conservative figure of three extra procedures per week to estimate the revenue opportunity for the organization.
- With 60 ORs in the health system, based on 9,000 additional procedures being carried out per year and a conservative reimbursement of \$10,000 per procedure, this worked out at \$90 million in additional revenue per year (See Appendix).

 **9,000**
additional procedures

 **\$90 Million**
in additional revenue per year

CONCLUSION

Through Proximie, this study provided a major healthcare provider with a deeper understanding of the root causes behind OR variations and inefficiencies and offered actionable insights for improvement. In doing so, it also confirmed the benefits of being able to interpret OR performance data via visual assessment of workflows.

Addressing the optimization opportunities identified to reduce unnecessary variations, delays and idle times before and after procedures start establishes a foundation for continuous improvement and an economic benefit calculated conservatively at \$90 million per year. Basing this calculation on figures at the lower threshold of what is possible demonstrates the size of the financial and operational gains that can be made even from partial implementation of the opportunity.

Beyond operational gains, these improvements also have a direct human impact. A more structured and predictable OR schedule benefits surgical teams by reducing stress and ensuring a smoother, more efficient work environment. This, in turn, enhances patient care, increasing the number of procedures performed while maintaining high-quality outcomes.



APPENDIX

The following describes how we calculated the economic impact of efficiency gains leading to three additional procedures being carried out per OR across the organization:

3 surgeries per OR \times **60** ORs $=$ **180** additional surgeries per week

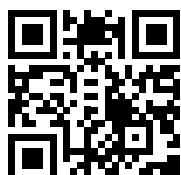
180 surgeries/week \times **50** weeks $=$ **9,000** additional surgeries per year (Assuming 2 weeks for holidays/maintenance)

Avg. reimbursement per surgery $=$ **\$10,000** (considering typical reimbursement ranges of \$5,000–\$15,000 based on surgical complexity and payer mix)

9,000 surgeries \times **\$10,000** $=$ **\$90,000,000** in additional gross annual revenue

These estimations are based on real-world case study findings and simulations as outlined in the case study, taking into account existing patient volumes and resource availability. One of the reasons that a figure of three extra procedures per week per OR was used was that this could be reasonably assumed to be achievable via the outlined efficiency improvements without any additional staffing considerations (i.e. the need to hire extra personnel).

The figure of \$10,000 revenue per procedure is a conservative midpoint assumption based on reimbursement ranges for surgery in general.



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