

A cut above:
optimizing efficiency
in operating rooms



Executive summary

Operating rooms (ORs) are at the heart of surgical care and hospital revenue, yet inefficiencies in workflows, scheduling, and resource utilization continue to hinder productivity – and most importantly, hinder the quality of life of the patients waiting for surgery. ORs account for 35-40% of hospital costs, and with growing patient waiting lists and staffing shortages globally, optimizing efficiency has never been more critical.

This report, commissioned by Proximie and informed by nearly 100 OR experts across the UK and US, highlights challenges within the current OR landscape and offers key strategies that hospitals could implement to maximize OR utilization and deliver more operations for patients without compromising quality of care.

The cost of inefficiency

- In the US, 7.2 million surgical cancellations each year costs hospital systems an estimated \$32.7 billion.
- In the UK, 135,000 on-the-day cancellations costs the NHS £400 million annually - 80% of which could have been avoided.
- As of late 2024, around 6.28 million individuals in England were on the waiting list for elective care, 3.06 million of whom had been waiting for longer than the 18-week standard. In the US, the average wait time for a new patient appointment across multiple specialties was 38 days - far exceeding the recommended 14-day benchmark.
 - Prolonged waiting times for surgical care has an unacceptable impact on patient health and wellbeing, often leading to deteriorating conditions and reduced quality of life.
- 50% of OR staff report spending over an hour daily resolving scheduling conflicts and equipment or staffing issues.
- 73% of surveyed OR leaders reported team members leaving due to poor work-life balance, such as late finishes – exacerbating existing workforce shortages that strain healthcare systems.



The opportunity for transformation

However, advancements in technology, innovative care models, and smarter strategies provide significant hope for the future. New tools and approaches offer a powerful opportunity to change the way surgical care is delivered - improving efficiency, enhancing staff experience, strengthening hospital sustainability, and ultimately expanding access to life-changing procedures for patients.

Proximie's partnership with a major US health system, revealed the opportunity to optimize 24% of total OR time, unlocking the potential to:

- Perform 9,000 additional surgeries annually
- Generate \$90 million in additional revenue

The value of new tools was recognized by staff, with many eager to adopt these potential solutions:

- 75% reported that replacing manual data input with real-time data collection, would improve OR throughput and allow them to treat a higher number of patients.

Recommendations for the future

By harnessing insights from OR experts, five key recommendations for the future were identified to unlock OR capacity, streamline existing processes, and increase throughput:

- 1. The intelligent OR:** Leveraging ambient real-time data collection through video technology and integration with advanced AI analytics tools to unlock efficiency opportunities
- 2. Smarter scheduling:** Adopting dynamic, data-driven scheduling systems that adjust in real-time based on historical procedure data, surgeon-specific metrics, and patient complexity
- 3. Standby lists:** Implementing standby patient systems to fill gaps caused by last-minute cancellations
- 4. Holistic, data-driven view:** Automating communication between departments to better anticipate demand, optimize scheduling, and remove barriers to timely treatment
- 5. A culture of continuous learning and performance improvement:** Using innovative training and evaluation techniques such as video-based case review to drive better surgical outcomes and workforce development

This report highlights that by embracing innovative tools and approaches in a system-wide approach, hospitals can transform the way that surgical care is delivered, improving both financial sustainability and patient outcomes.

Introduction:

The OR productivity opportunity

Operating rooms (ORs) are one of the most valuable assets within global healthcare systems. Not only the epicenter of surgical care, but they are also a critical driver of hospital revenue. With ORs accounting for 35-40% of a hospital's costs¹, enhancing efficiency is essential, both for financial sustainability, and crucially for the wellbeing of healthcare professionals and the people they serve.

Despite the vital role ORs play, inefficiencies persist across workflows, scheduling, and resource utilization, leading to vast, untapped opportunities for increasing productivity. The impact of these inefficiencies is felt most acutely by patients who face growing wait times for care, which is why finding innovative ways to treat more patients in less time remains a shared priority across healthcare systems.

Better is possible. Advancements in automation, AI, and data analytics, along with new strategies for planning and resource utilization can optimize efficiency and productivity without compromising quality of care.

This report has been commissioned by Proximie, the leading global health technology platform digitizing ORs, with input from nearly 100 OR experts in the UK and US. Combining new evidence and insights, this report highlights the critical issues facing OR productivity and recommendations for the future.

We would like to thank the following for their contribution:

- Charles Kaczmarek, RN, MBA, BSN - Vice President of Surgical Services (System), Ascension Texas
- Jay A. Redan, MD, FACS– Past Chief of Surgery at Advent Health-Celebration, Associate Member Academy of Master Surgical Educators, Past President and Governor, Florida Chapter, American College of Surgeons, Past President-Society of Laparoscopic and Robotic Surgery, Professor of Surgery, University of Central Florida, Doctor Honoris Causa, Medical University -Pleven Bulgaria
- Robin Schaefer - B4 Consulting and Education, and experienced Perioperative leader
- Steve Atkinson – Commissioning Director at Tyneside Surgical Services

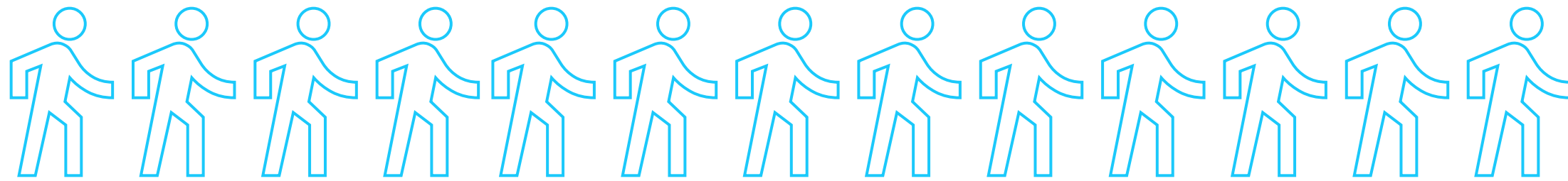
- James Curtis - Divisional Director for Surgery, Women's and Children at Great Western Hospitals NHS Foundation Trust
- Patrick McGinley – Head of Costing and Service Line Reporting at Maidstone & Tunbridge Wells NHS Trust
- Jitesh Patel – Deputy Director of Operations at Birmingham Women's and Children's NHS Foundation Trust
- Terry Whalley – Programme Director for New Models of Care at NHS Lancashire and South Cumbria Integrated Care Board (ICB), Non-Executive Director at Mid Cheshire Hospitals NHS Foundation Trust
- ZPB Associates, healthcare communications experts

Understanding current challenges in the OR

Access to care is a real problem when my surgeons are booked out through July for cancer care, and there's no more white space on the board to grow more cases. The only way to increase capacity is by reducing turnover.

Robin Schaefer - B4 Consulting and Education, and experienced Perioperative leader

The growing wait for medical procedures is a pressing global healthcare challenge, with the UK and US serving as notable case studies of this issue.



As of late 2024, around **6.28 million** individuals in England were on the waiting list for elective care, **3.06 million** of whom were waiting for longer than the 18-week NHS standard².

In the US, the average wait time for a new patient appointment across multiple specialties was **38 days** - far exceeding the recommended **14-day** benchmark³.

38
days

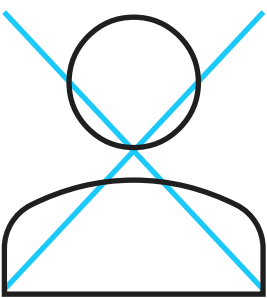
14
days

To understand these issues, we've surveyed senior surgeons and OR management in both the UK and US. 98% of respondents believe measures need to be taken to reduce time wastage in surgical workflows underlining the urgent need for identification of the reasons behind inefficiency, and institution of effective solutions⁴.

The financial and resource burden

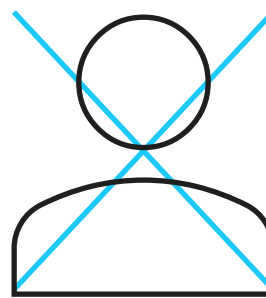
Failure to maximize operating room usage is a source of wasted economic and resource capability.

Delays and downtime are also driven by last-minute cancellations – many of which are for non-clinical and preventable reasons.



**7.2 million
cancellations
= \$32.7 billion**

In the US there are 7.2 million cancellations per year; using publicly available data, we have calculated that this costs hospital systems \$32.7 billion annually ^{5,6,7}



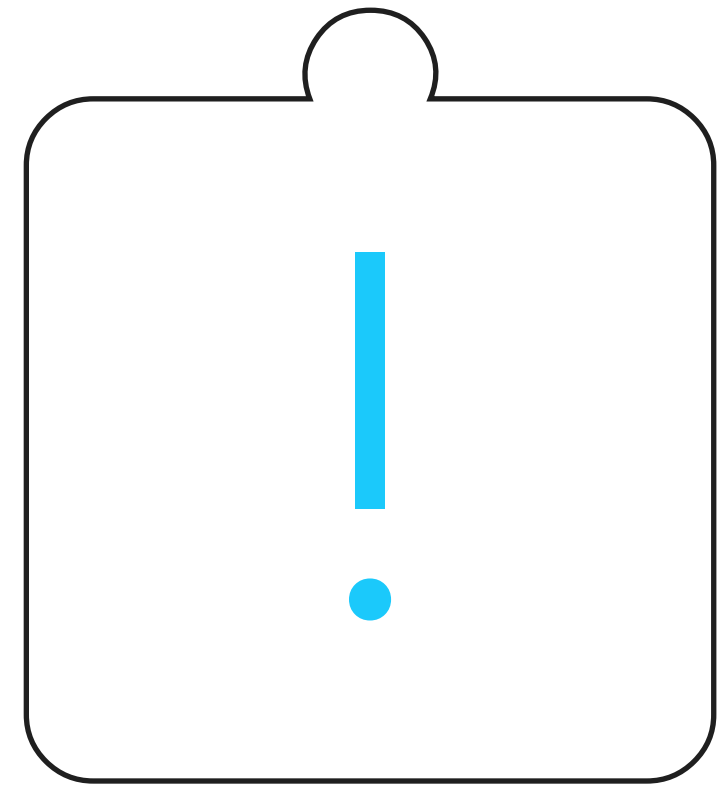
**135,000
cancellations
= £400 million**

In the UK there are 135,000 on-the-day cancellations a year costing the NHS an estimated £400 million – 80% of which could have been avoided⁸.

50% of respondents to our survey reported more than 1 hour per day is spent resolving issues such as scheduling conflicts, equipment availability and staff allocation. With each minute of OR time valued at approximately \$49⁹, this means hospital systems are wasting at least \$2,940 per OR, every single day. For 11% of those surveyed, the time reported as being spent resolving issues was up to 4 hours, meaning a cost of up to \$11,760 per day for each OR.

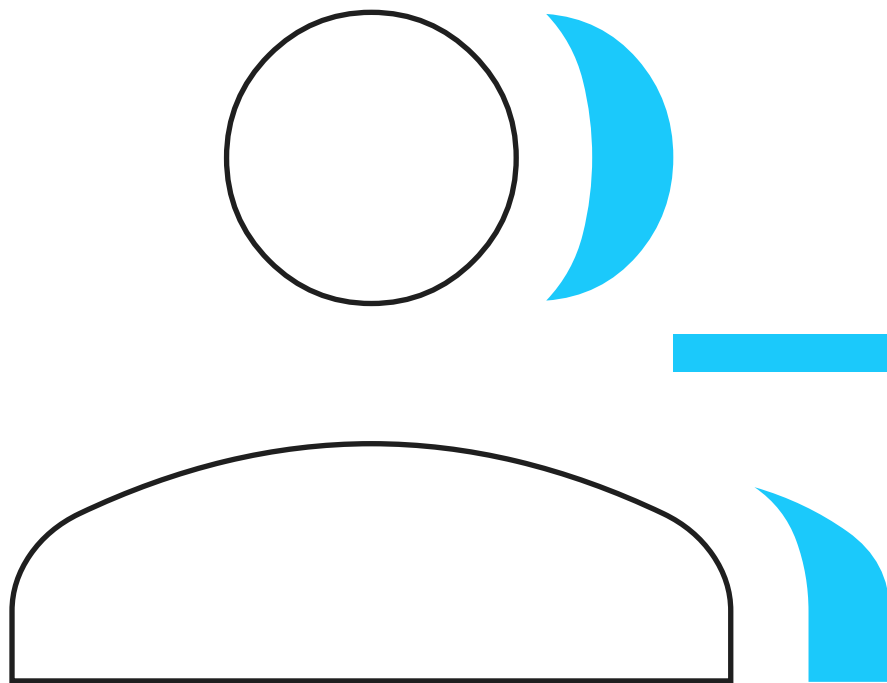
The consequences for staff and patients

These challenges reverberate across surgical departments and hospital systems. For staff, inefficiencies lead to unpredictable schedules, longer working hours, and frustration caused by avoidable delays, dampening morale and team collaboration.



80%

of senior OR staff say that their team experiences late finishes on a daily or weekly basis, primarily due to inefficiency, scheduling and overrunning procedures.



73%

reported losing team members in the last two years as a direct result of the late finishes and poor work-life balance.

The strain on operational proceedings of staff leaving is one that current health systems cannot afford. In the US, staffing levels are 10.5% lower than pre-pandemic levels¹⁰. In the UK 61% of nursing staff say they are too busy to provide the level of care to patients that they would like¹¹.

Inefficiencies also directly impact patients. Growing surgical waiting lists globally mean patients' conditions often worsen whilst awaiting treatment, affecting both their physical and mental wellbeing. One study revealed that patients waiting 25 weeks for a hip replacement – a reality for 58,000 people in England in 2021 – experienced quality of life losses equivalent to 80 days of perfect health¹². This underscores the need for improved productivity for the benefit of patients.

The wider impact on society is considerable; in the UK, growing numbers find themselves out of the workforce for extended periods of time at no fault of their own, exacerbating the impact on the economy¹³. In the US, deteriorations in health mean higher surgical costs that lead to higher insurance premiums, contributing to the growing number of Americans unable to afford health insurance¹⁴.

The drivers of inefficiency

Pinch points and pain points

Turnover time is the number one point of pain for the 90,000 surgeons at the American College of Surgeons.

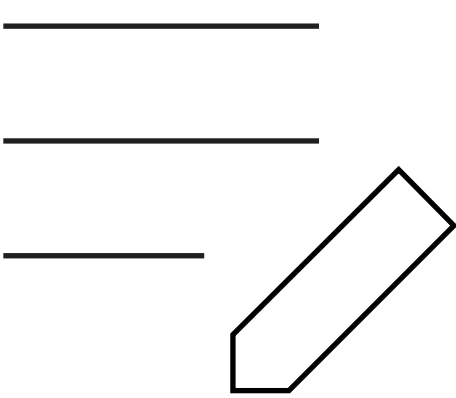
Jay A. Redan, MD, FACS - Past Chief of Surgery at Advent-Health Celebration

Operating room inefficiencies stem from multiple factors, disrupting workflow and reducing surgical throughput.

- **Preoperative process variability** – Lack of standardized material preparation and setup causes delays and idle time.
- **Coordination gaps** – Misalignment between patient prep, surgical team readiness, and material availability disrupts workflows.
- **Turnover inefficiencies** – Inconsistent case breakdown and cleaning procedures cause prolonged room turnover times, delaying subsequent cases.
- **Communication breakdowns** – Insufficient real-time coordination among surgical, anesthesia, and nursing teams leads to mismanaged transitions between cases and preventable delays.
- **Patient-related disruptions** – Incomplete preoperative assessments, missing test results, and late patient arrivals contribute to scheduling inefficiencies and delayed case starts.

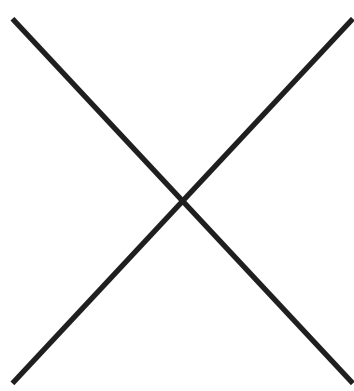
Lack of accurate, real-time data

There is difficulty in identifying and addressing drivers of inefficiency due to a lack of accurate data. In most cases, hospitals rely on manual data reported at the end of the case or day by the lead surgeon. This can lead to inconsistency and makes improving performance a challenge.



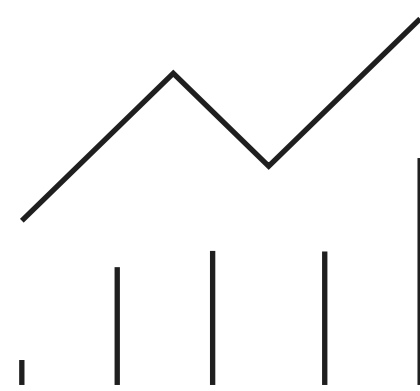
30%

reported that manually inputted data has little or no reliability



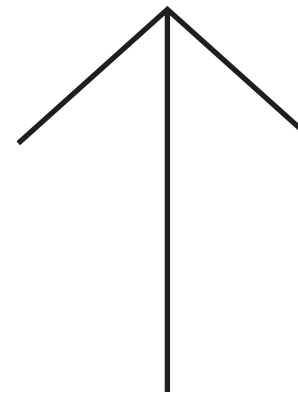
40%

reported their operating room team rarely or never uses any real-time data monitoring, or AI.



70%

believe automatic collection of real-time data via AI technology would be vastly more accurate than manual input.



70%

reported that automating tasks such as administrative work and data input would drive moderate to significant improvement in staffing levels.

The absence of analytics tools to understand the data, prevents the root causes of inefficiencies from being fully understood, or identification of the key areas within a surgical workflow for improvement. Widespread integration of reliable data and AI across the surgical pathway could therefore be invaluable.

- 75% reported replacing manual data input with real-time data collection, would improve OR throughput and allow them to treat a higher number of patients

Data must be at the heart of driving change, using real-time information to generate meaningful insights. Without such insights, data is just noise and cannot drive effective action

Terry Whalley - New Models of Care Programme Director at NHS Lancashire and South Cumbria ICB and Non-Executive Director at Mid Cheshire Hospitals NHS Foundation Trust

For informed and dynamic decision-making across ORs, we must increase the validity of data collected, whilst applying analytics that can highlight trends and generate insightful analysis for immediate application.

Change is possible:

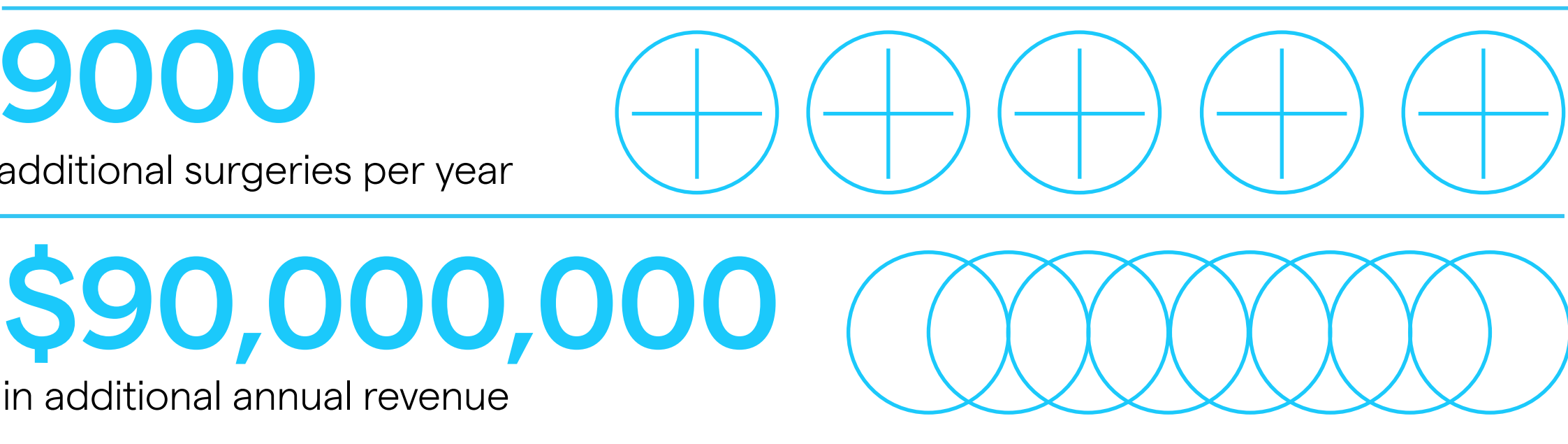
The cost of an inefficient ORs is measured not only in financial burden, but in lives and wellbeing. Every idle minute translates into wasted operational costs and delayed care. But change is possible.

To understand this issue, Proximie worked with a large US-based health system in the US which operates 16 hospitals and 10 freestanding emergency departments. The analysis demonstrated the potential for broader impact across global health systems.

700 hours of surgical video and over 10,000 data points were analyzed across three areas of specialization to identify variability and pinpoint areas for optimization. The data revealed significant non-clinical variations and delays, including inconsistencies in patient and material preparation, anesthesia time, breakdown protocols, team communication, and turnover processes. These findings highlight the need for greater visibility across operating rooms and increased automation of workflows.

For example, overlapping patient and material preparation – an adjustment identified through ambient video analysis – reduced total OR time by up to 28%.

Overall, the modeling revealed that 24% of OR time could be optimized for greater efficiency. Saving 15 minutes per procedure could lead to a 12.5% reduction in the total time for each surgical cycle. These small improvements - conservatively estimated to deliver 3 additional cases per week in each OR - when scaled across the health system of 60 ORs could deliver:



The opportunity highlighted in this study to perform thousands more operations annually has the potential to significantly benefit patients by reducing surgical wait times and improving access to care.

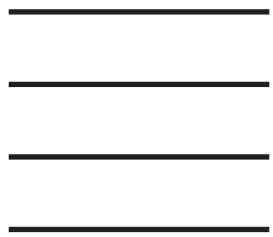
Recommendations for the future

The following recommendations could help unlock this additional capacity, streamlining processes and maximizing throughput:

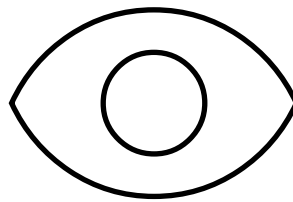
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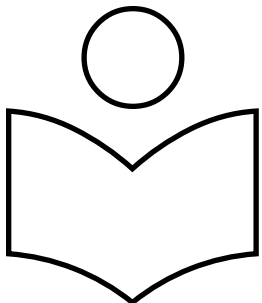
Smarter, data-driven scheduling that reflects real-world needs
- 2



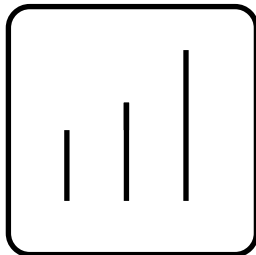
Standby patient lists to reduce the impact of day-of cancellations
- 3



A holistic view of the surgical pathway, with automated communication across the whole system
- 4



Embedding a culture of continuous learning, sharing of best practice, and performance improvement
- 5



The intelligent operating room, which harnesses real-time data collection and AI analytics tools to streamline workflows

1. Smarter scheduling that reflects real-world needs

Scheduling is poor - time doesn't work in the way we've allowed and allocated. Why do I have theatre timetables, my most expensive resource, allocating 15 and 20 and 40 minute blocks if the procedures take 21 and 33 minutes?

Patrick McGinley – Head of Costing and Service Line Reporting at Maidstone & Tunbridge Wells NHS Trust

Traditional time-blocking for ORs is often rigid and non-specific, failing to reflect the real-world variability in surgical procedures. Hospitals must move beyond static scheduling models and adopt dynamic, data-driven scheduling systems that adjust in real-time.

By integrating algorithms that consider historical procedure data, surgeon-specific metrics, and patient complexity and risk-factors from electronic health records, schedules can be precisely tailored to individual cases automatically.

Instead of using preset 15, 20, or 40 minute increments, scheduling systems should assign time dynamically based on predicted procedure length. This can be supported by predictive complexity scoring which categorizes cases into low-, medium-, or high-complexity levels based on a patient's medical history. The same procedure can vary drastically in length depending on the patient's prior surgical history. Factoring this into scheduling reduces variability and allows for better OR planning.

We all know you can do a robotics surgery but if you have a patient that has a ton of adhesions then it's going to take longer than if the patient has never been in surgery before. Unless you have three levels, and the surgeon says this patient's had 10 abdominal surgeries, it's going to be complex and a level three, then your average time can go anywhere from 15 minutes to 290 minutes.

Robin Schaefer – B4 Consulting and Education and experienced Perioperative leader

2. Standby lists to reduce wasted OR time

A cancelled surgery presents a double loss - a patient remains untreated, and OR time goes unused. With many surgical slots lost to same-day cancellations due to patient no-shows ('did not attends'), illness, or incomplete pre-operative clearance, hospitals need a structured, proactive approach to fill these gaps on short notice.

A standby patient system ensures last-minute cancellations do not result in wasted capacity:

- Pre-assessed, pre-cleared patients should be given the opportunity to be on standby lists for a given period, to take available surgery slots with minimal notice.
- Geographic proximity should be considered, with patients living nearby hospitals being most appropriate for short-notice procedures.
- Preoperative preparation and digital consent could support this, ensuring hospitals have patients 'OR-ready' with minimal lead time.

Some hospitals have already begun piloting standby patient lists, with early results proving to be a cost-effective solution that is well-received by patients. One study in the UK for example, trialled this with a list of 12 standby patients, 6 of whom were operated on in their standby slot, 1 cancelled, and the rest had surgery within 6 weeks, delivering an additional £15,240 to the NHS trust¹⁵.

We should be offering people the chance to come in at very short notice if suitable to take a void [operating] slot; a standby list to see if we can plug gaps that arise.

Terry Whalley - Programme Director for New Models of Care at NHS Lancashire and South Cumbria Integrated Care Board (ICB), Non-Executive Director at Mid Cheshire Hospitals NHS Foundation Trust

3. A holistic, data-driven view of the surgical pathway

A full pathway view would be valuable. I want to know by sub-specialty, where we are falling short and what that means for operating theatres. Who needs to be seen, how many diagnostic appointments do they need, what is the conversion through to operation? That gives the scope of the whole pathway, from referrals to treatment.

James Curtis – Divisional Director for Surgery, Women's and Children at Great Western Hospitals NHS Foundation Trust

Access to surgical care is often a fragmented process, with departments working in silos rather than part of a connected system. By adopting a whole-system approach and automating communication between areas, hospitals can better anticipate demand, optimize scheduling, and remove barriers to timely treatment.

Mapping across the surgical pathway by sub-specialty allows hospitals to pinpoint underutilization or delays in different areas, ensuring bottlenecks are addressed before they impact OR capacity. Standby lists can be proactively supported by flagging suitable patients earlier in the referral or consultation stage, ensuring a faster response to cancellations.

- Automated, real-time prompts could be used to facilitate communication between areas, which is currently mostly manual and done by phone:
 - Ward staff are notified in advance to prepare patients for surgery, minimizing delays in patient readiness.
 - Laboratory staff receive automated prompts to prioritize preoperative blood tests and diagnostics for patients with upcoming surgeries, reducing delays caused by incomplete test results.
 - Sterile services receive real-time prompts to prioritize instrument sterilization based on upcoming procedures.
- All of which reduces turnover time, creating an opportunity to spend more time delivering care to additional patients.

4. Embedding a culture of continuous learning and performance improvement

Surgeons who use video-based analytics and take the feedback have OR times that are shorter, their variation in instrumentation per surgical procedure is less so their cost is lower, and their patients' length of stay is lower. We can create a culture where everyone's helping each other. This makes for a good environment where everyone has each other's back.

Jay A. Redan, MD, FACS - Past Chief of Surgery at Advent-Health Celebration



A culture of continuous improvement is essential to driving better surgical outcomes, efficiency, and workforce development. Yet traditional training and evaluation methods are inconsistent and lack real-time feedback. Innovative training and evaluation techniques such as video-based case reviews coupled with AI analytics should be used to provide objective, data-driven performance metrics. This has been seen to correlate with improved patient outcomes, decreased operative time, decreased likelihood of reoperation and readmission, and lowered malpractice premiums¹⁶.

Remote mentoring and digital learning tools can also support training at scale, helping to mitigate workforce shortages and ensure all surgical teams have access to best practices.

5. The intelligent OR

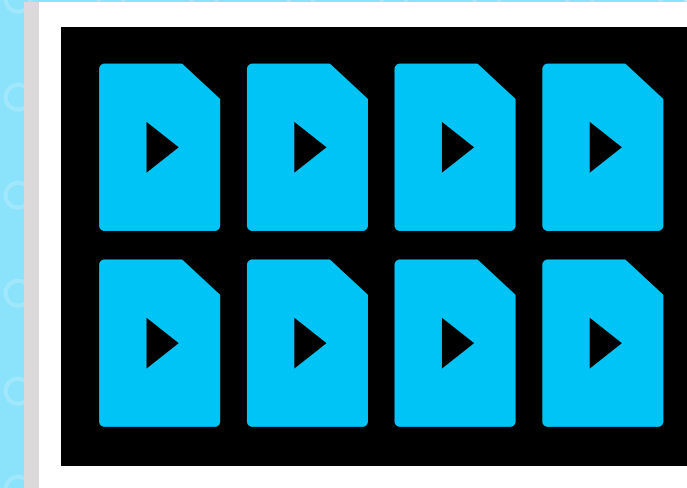
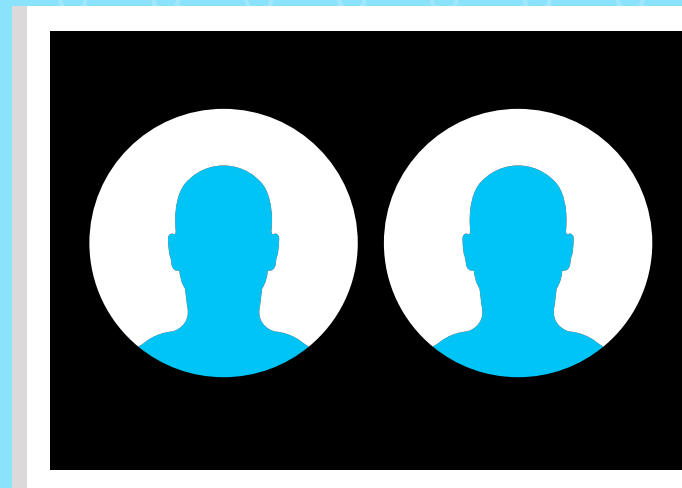
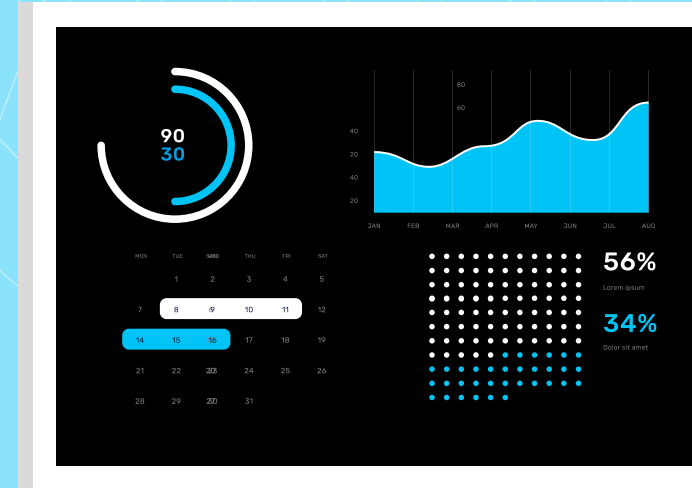
A new paradigm for ORs is emerging: the intelligent operating room. This vision is not about adding complexity but about simplifying and streamlining workflows through better use of existing resources and available metrics. By leveraging ambient real-time data collection through video technology, and integration with advanced AI analytics tools, hospitals can unlock previously untapped opportunities for efficiency.

See it brought to life on the next page.

Connectivity at every level

- Telepresence capability, allowing remote participation from anywhere in the world.
- OR forward-looking view to understand utilisation in advance.
- Video library of all recorded cases for training and education.

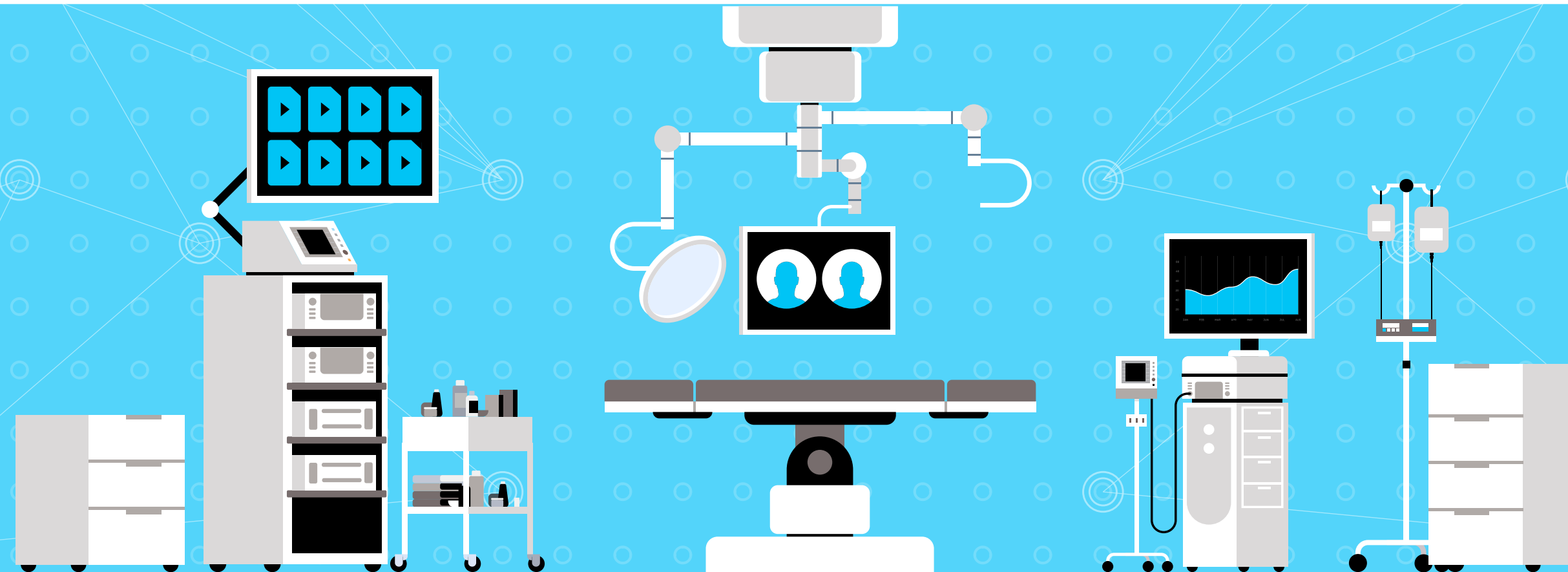
Software and AI analytic tools are integrated with existing customer systems and devices (e.g., EHR).



- Real time dashboard view that provides a snapshot of all OR proceedings against scheduled proceeding.
- Interactive performance dashboard that surfaces pertinent info such as late starts, variations in procedure length, overruns etc by OR, speciality.

Present in the OR

- Ambient data collection of the entire workflow from cameras that obscure sensitive information at source.

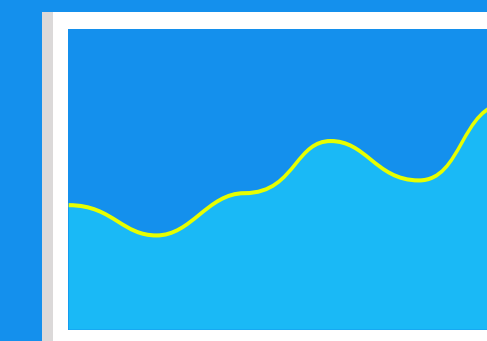


Outcomes

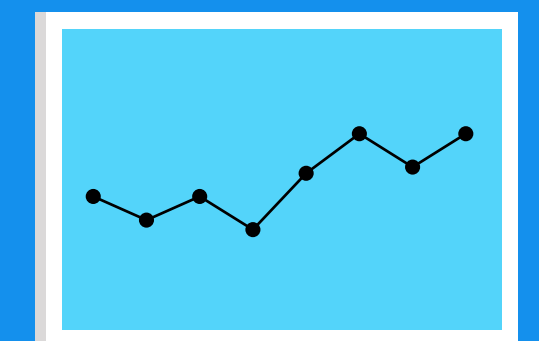
- Optimised OR management through more informed and proactive decision-making processes, allowing for increased productivity.
- Improved transparency with accurate trusted data.
- Clinical excellence and a culture of continuous improvement.
- Enhanced quality of staff training.



Better patient outcomes



Improved hospital throughput



Increased financial revenue

Hospitals cannot afford to focus on efficiency in isolation – unlocking additional surgical capacity to treat more patients requires a system-wide approach. By using innovative strategies and tools to break down silos, optimize scheduling, reduce idle and inefficient OR time, and embed a culture of continuous learning, healthcare systems can fundamentally reshape the way surgical care is delivered.

These essential improvements have the potential to deliver operational success and financial sustainability – yet even more importantly, prevent unnecessary delays to patient care, preserve quality of life, and improve patient health outcomes. By embracing these solutions, healthcare systems can drive meaningful, lasting change, delivering the right care, at the right time, for every patient.

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6. Calcium – More than Just Annoying, Surgery Cancellations Are Costly and Largely Preventable
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