



Toolkit: Supercharge Your ORs Using AI & Automation



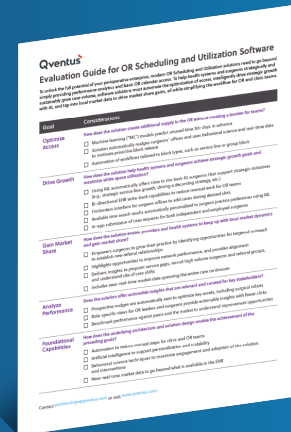
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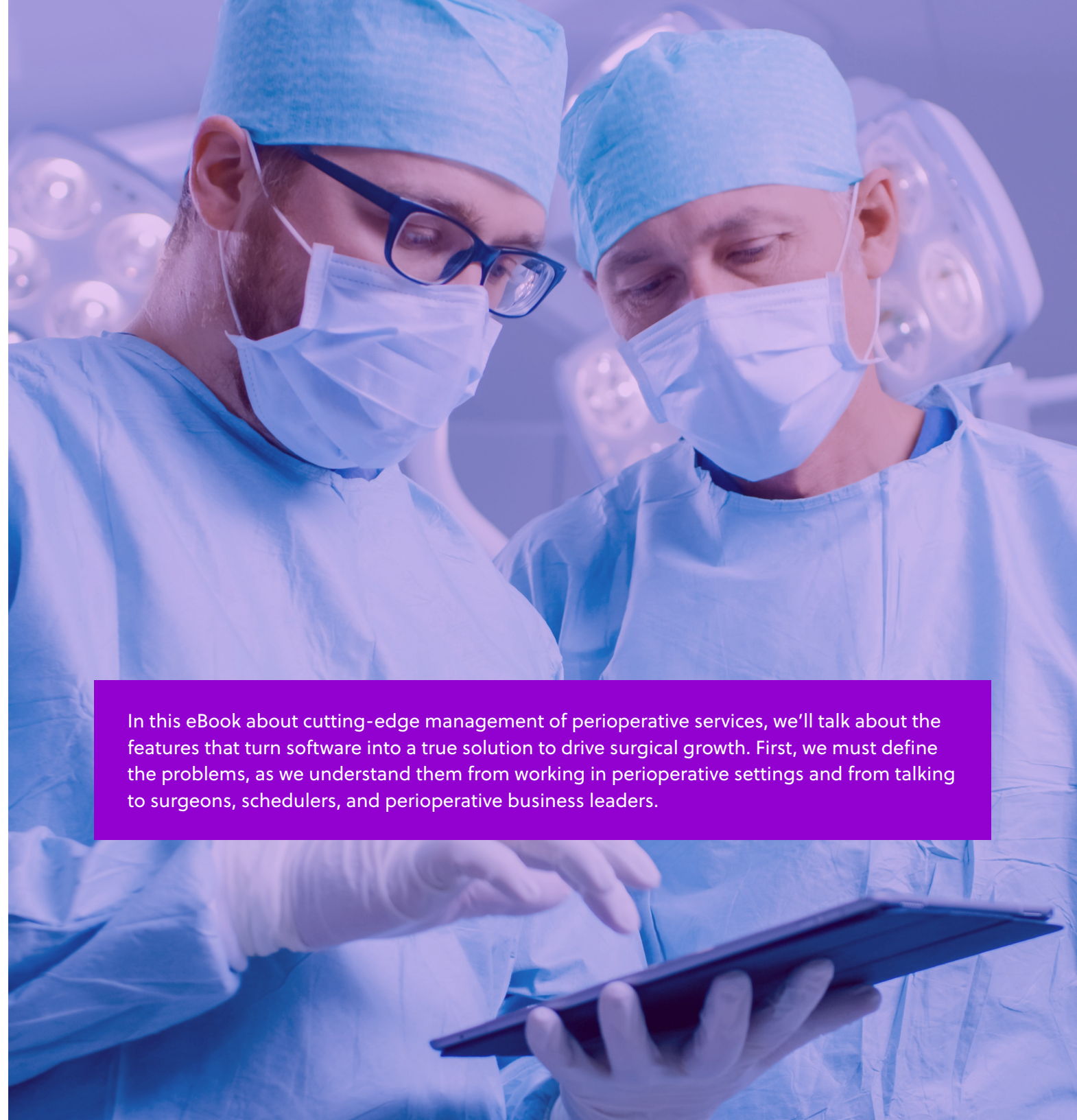
**3 Ways to
Supercharge
Your ORs Using
AI & Automation**



Common Challenges Due to Lack of Effective Automation

No department is more central than surgical services to the overall financial health of a hospital, nor more important to its reputation and its potential for growth. Some of its most advanced technology, from lasers to robots, is in its operating suites. All the more reason why managing surgical services should be equally high tech, rather than relying on an awkward combination of spreadsheets, EHR tools, phone calls, and faxes.

There's no shortage of software purporting to deliver high-tech management to perioperative services, but it rarely addresses the full scope of strategies that surgical services must pursue to maximize their resources and stay competitive. A solution may address one limited problem — for example, providing visibility into OR schedules and performance — but does nothing to help the department maximize white space, or find opportunities for growth. Moreover, a solution may even create more work for teams — such as requiring schedulers to manually transfer information from one screen to another — instead of automatically completing tasks to reduce workload.



In this eBook about cutting-edge management of perioperative services, we'll talk about the features that turn software into a true solution to drive surgical growth. First, we must define the problems, as we understand them from working in perioperative settings and from talking to surgeons, schedulers, and perioperative business leaders.



Most surgical departments lack effective automation to address these two typical challenges:

Manual processes.

Surgical scheduling is typically characterized by stressed, overstretched administrative staff at both ends: in the hospital and in surgeons' practices. Automation should remove friction at every step and ease their burdens from end to end. A process that requires staff to repeatedly check calendars for time that opens up is better than having to manually call the scheduling office and being put on hold, but does not solve the underlying problem.

Inadequate analytics.

Turning data into action can be difficult when systems are not specifically designed to analyze and present the data in a way that motivates users to take the needed actions. Basic data visualization and performance analytics are a given for any software, but most perioperative management software isn't sophisticated enough to coordinate the steps or drive the behaviors needed to maximize scheduling lead times and strategically fill white space.

Most departments also need better ways to solve these three common problems.

Problem 1: Optimizing OR access.

Most surgical departments routinely block time for surgeons who bring a substantial number of procedures to the hospital. Some surgeons don't use all their block time, nor do they willingly release it soon enough for someone else to use it. OR capacity is unused or filled at the last minute with whatever cases the staff can find.

Problem 2: Achieving targeted growth with the existing surgeon base.

While some scheduling software can show the block times that surgeons have released, it may not have an effective method of offering open slots to other surgeons likely to make the best use of them, and will fill the slots on a first-come, first-serve basis that may not fit the hospital's strategic priorities.

Problem 3: Broadening market share.

Every healthcare organization wants to attract the best mix of surgeons and procedures available in its service area. While that mix will vary depending on the market and the organization, understanding it requires both comprehensive data beyond the EHR and the ability to analyze it, in order to recruit new referrals or expand existing relationships.

Our next three chapters will delineate how advanced automation capabilities like machine learning, artificial intelligence, and behavioral science can combine to address all of these problems and take surgical departments to a new level of performance.



Unlocking More OR Time

It's only natural to conserve scarce resources to be sure they're there when you need them. That's what surgeons tend to do with operating room "block time." Block time lets them establish predictable schedules for themselves and their patients, and assures them of being able to do procedures in a timely fashion.

When they don't need all their time, they should release it, but they often don't. Their schedulers are too busy and may hang onto it "just in case," and only release it when they're absolutely sure they can't use it – which may be too late for anyone else to use it. Typically 30% or more of available hours go unused, and the slots that can be rebooked on short notice can't be used for procedures that require more lead time and may represent more value to the hospital.

How can automation help use this time more effectively and still keep surgeons comfortable that they'll have OR time when they need it? Today's surgical scheduling software employs various approaches, but most are partial solutions, addressing only one or two aspects of what's really quite a complex problem.



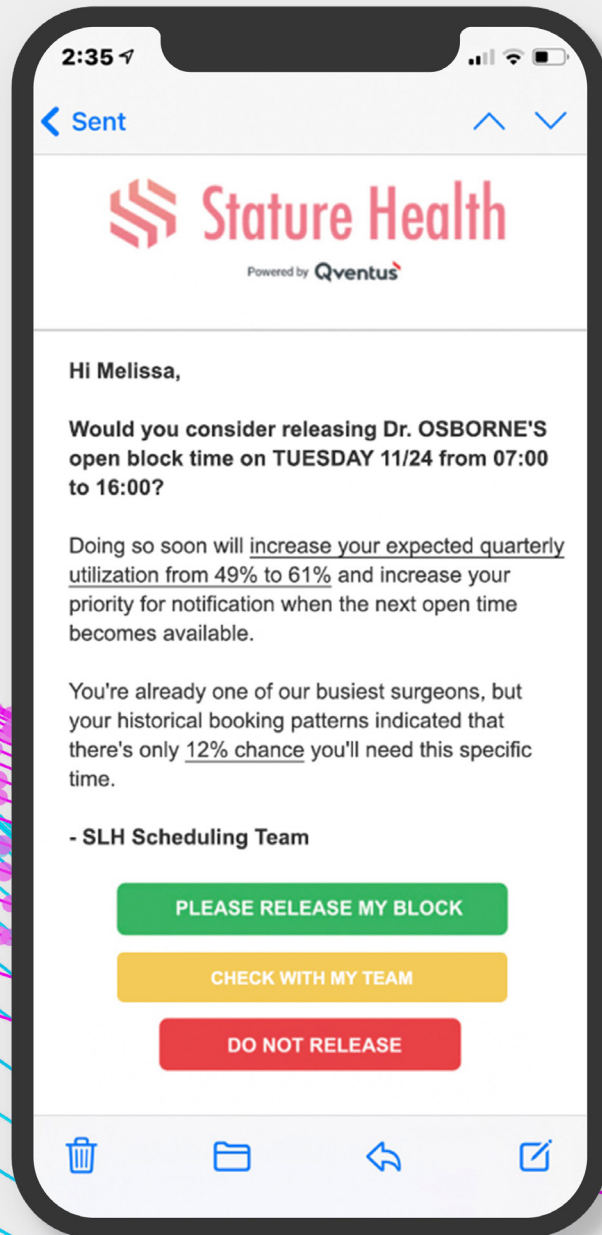
Limitations with EHRs and first-generation scheduling systems

Most EHRs and scheduling systems can be set to detect unscheduled block time a fixed number of days in advance and release it automatically. The hospital can choose the number of days, but if time is released far enough in advance to accommodate the lead time for many procedures (typically at least a week), the surgeon who “owns” the time might feel resistant, to the detriment of the hospital-surgeon relationship.

Some systems use more sophisticated rules to identify empty blocks farther in advance of autorelease and send automated emails to surgeons asking that they release the time. However, these reminders are generic: they can be noise for surgeons with shorter scheduling lead times, or they miss opportunities for earlier release for surgeons with longer scheduling lead times. They also create extra work because the surgeon’s scheduler has to double check that the time is really free before releasing it. On the other hand, some software using machine learning may be able to identify largely empty blocks but not specific slots within those blocks. Thus, even if the time is released, the hospital’s schedulers must determine exactly which slots are available before they can be offered to another surgeon, adding a manual administrative layer to a process that ought to be automatic.

However, software with advanced machine learning capabilities can learn the booking patterns of each block owner with great precision. With enough historical data, a genuinely intelligent machine learning model can predict up to 30 days out how likely it is that a surgeon will use a certain slot that hasn’t yet been scheduled, and employ principles of behavioral science to liberate it for use by another surgeon.

[See how automation can transform the "market" for OR time →](#)



How Automation Unlocks the "Market" for OR Time

First, the software can automatically send targeted, personalized "nudges" to surgeons and their schedulers. Rather than a generic and easily ignored reminder, schedulers receive a targeted message that requests the release of specific unscheduled slots and shows the exact odds that the surgeon will turn out to need that particular time. Because hospitals base their block allocations on how much time a surgeon actually uses, the "nudge" message can incentivize the release by showing how much the surgeon's utilization percentage will improve if they release the time. The software uses its knowledge of surgeons' needs and usage patterns to automatically align their interests with those of the hospital.

Second, because these targeted releases can typically free up OR time that would have previously gone unused, the department can more easily assure its surgeons that it can accommodate procedures outside of their assigned blocks, further reducing the perceived risk of releasing unused time.

And third, the department can begin to consider how to use its newly freed resources for strategic growth. We'll talk about that next.

Increasing Strategic Surgical Cases

We've talked about how OR automation software enabled by artificial intelligence can help persuade surgeons to give up their unused block time early enough for it to be used by others, dramatically increasing OR utilization. How can these same AI capabilities help surgical departments identify the best candidates to take over a given slot, extend invitations to book the time, and track overall schedule patterns as surgeons' practices evolve?

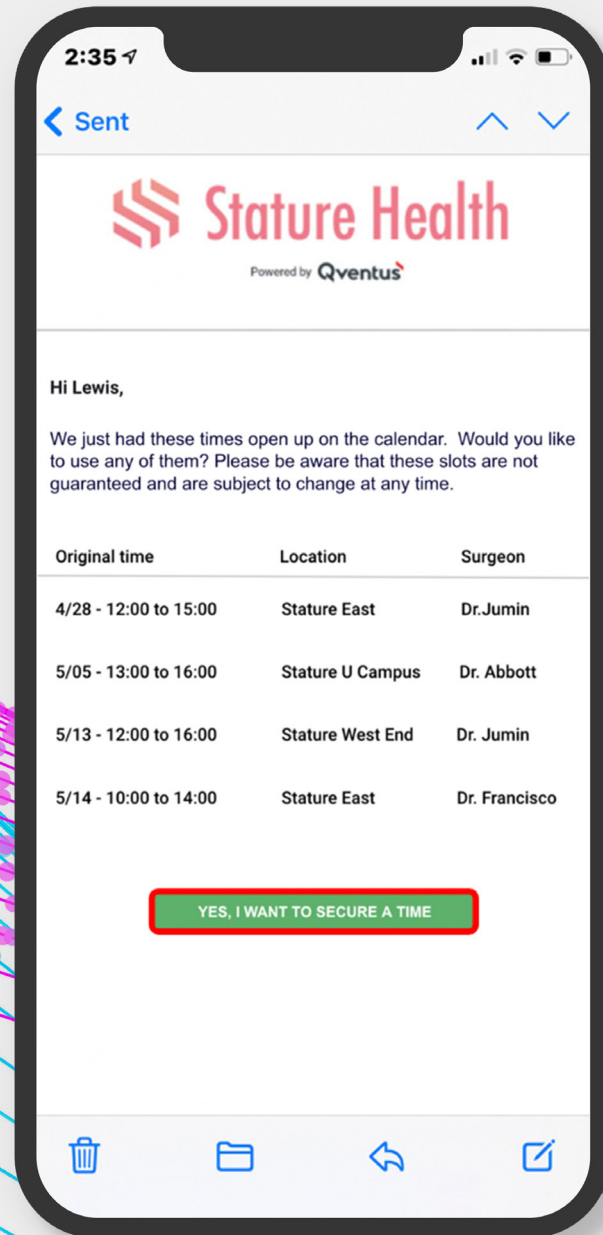
As we've noted, typical OR scheduling software can highlight unused block time on the department calendar with varying degrees of precision, but then what? Two possibilities:

- 1 At the surgical practice, a scheduler in search of a free slot manually clicks through screens and eyeballs the calendar for something suitable.
- 2 At the hospital, the OR scheduler reaches out to surgeons' practices by phone or email, hoping to find procedures in need of a slot.

Either way is generally first-come, first-serve; for instance, there's no guarantee that a room with a surgical robot is prioritized for robotic procedures. It's also largely manual. And it doesn't lend itself to a strategic approach: the hospital may be seeking to grow its orthopedic service line, for example, but it has no easy way to prioritize adding the highest value orthopedic procedures when it has open OR time.



Increasing Strategic Surgical Cases



OR software enabled by advanced machine learning (a category of AI) and behavioral science, can cut through all of these hitherto manual processes. It can account for many variables at once: which surgeons favor Tuesday mornings or typically need longer surgery times, which ones need the robotic room, how many days of lead time each surgeon typically needs, how often a surgeon starts procedures late, which surgeons perform the procedures that represent the highest value to the hospital. It can hold and analyze more information than even the most experienced human scheduler.

This analysis allows the system to identify the optimal surgeon for a particular slot and automatically reach out to their scheduler, much as an online retailer can look at buying habits across millions of customers and recommend products with sometimes eerie accuracy. The system automatically emails the scheduler with multiple available time slots identified as a fit for the surgeon, reducing the overall number of email notifications. The scheduler can easily request one or multiple slots, further streamlining the process of securing optimal OR time. No more hit-or-miss, no more first-come, first-serve, no more manual calling to find a slot for a case.

What's more, each time a surgeon's scheduler accepts an offer for OR time, that information adds to the system's knowledge base and improves its next round of recommendations.

Increasing Strategic Surgical Cases

Surgeons' schedulers can also tap into the system via a search function that works like an online travel booking site that brings up the best flight options within seconds. They enter multiple search criteria (time of day, case type, length of procedure, room type, preferred location) and receive a list of slots that are the best fit.

Especially for independent practices, when it's this easy for surgeons' schedulers to find available OR time, they'll turn first to the hospital using this software, and save themselves the tedium of calling other facilities. In a competitive market, it gives the hospital a distinct advantage when it matters most — right at the time of booking.

These automation capabilities enable surgical departments to grow revenues in a strategic manner that was never before possible. Hospitals are typically able to book over 80% of released OR time and add more than 3 cases per OR per month, boosting revenue by up to \$15 million revenue for a single facility.

With this level of optimization in place, many hospitals will find they have liberated enough OR time to accommodate more surgeons and strategic procedures. Next, we'll explore how to "grow the pie."

Hospitals are typically able to book over 80% of released OR time and add more than 3 cases per OR per month

The screenshot displays the Timefinder interface for a search. The search criteria are: Case Name: J.T. Chole, Surgeon: Dr. Haas, General Timeline: 2021-07-12 to 2021-08-12, Case type: Lap Cholecystectomy, Case length: 90 minutes. The results are categorized into Available Times, Hospitals, Room Type, and Days of the Week. A callout box highlights the 'Machine learning prioritizes times for user' feature, pointing to the 'OPEN TIMES' section.

DATE	LOCATION	AVAILABLE TIMES
TUES 7/15/2021	RIDGES	0630-1830
TUES 7/22/2021	RIDGES	0800-1830
TUES 7/15/2021	RIDGES	1330-1830
WED 7/16/2021	IMPERIAL BEACH	1130-1830
FRI 7/18/2021	SOUTHDALE	1030-1330
MON 7/21/2021	RIDGES	1430-1830
WED 7/23/2021	EAST BANK MED...	0630-1500
WEDS 8/02/2021	RIDGES	1030-1530

Gaining Additional Market Share

We've discussed how intelligent OR automation software can pinpoint unbooked block time up to a month in advance, persuade its owner to release it, and offer it to other surgeons in a way that yields maximum benefit to both them and the hospital.

Once your hospital has optimized this process, you may find that your new efficiencies have liberated OR time that you can use to expand your market share and volumes. According to a [recent survey](#) by The Health Management Academy, 86% of health system executives say that increasing referrals and reducing leakage is important or extremely important for increasing surgical revenue.



What's the best way to accomplish those goals, and how can artificial intelligence help? You can explore three avenues, depending on the characteristics of your market, your current services, and your strategic plan:

- Help your existing surgeons develop their practices by strengthening their referral networks.
- Encourage "splitters" who use more than one hospital to consolidate their OR use with you.
- Identify surgeons not currently affiliated with your hospital whose practices dovetail with your strategic goals, and reach out to develop new relationships.

What do these avenues have in common? Data. Through the data gathered by your AI-enabled surgical scheduling system, combined with electronic health records and other internal sources, you already have a comprehensive picture of what happens within your organization. But that data by itself can't help you see what's happening in your market, let alone drive the change you need.

You can expand this picture by adding recent real-world data on OR utilization patterns for your entire service area. (It's important for this data to be recent; today's healthcare environment changes quickly and what was happening a year ago may no longer be relevant.) Where does it come from? Insurance claims clearinghouses, the industry's most consistent and comprehensive source of healthcare utilization data generally.

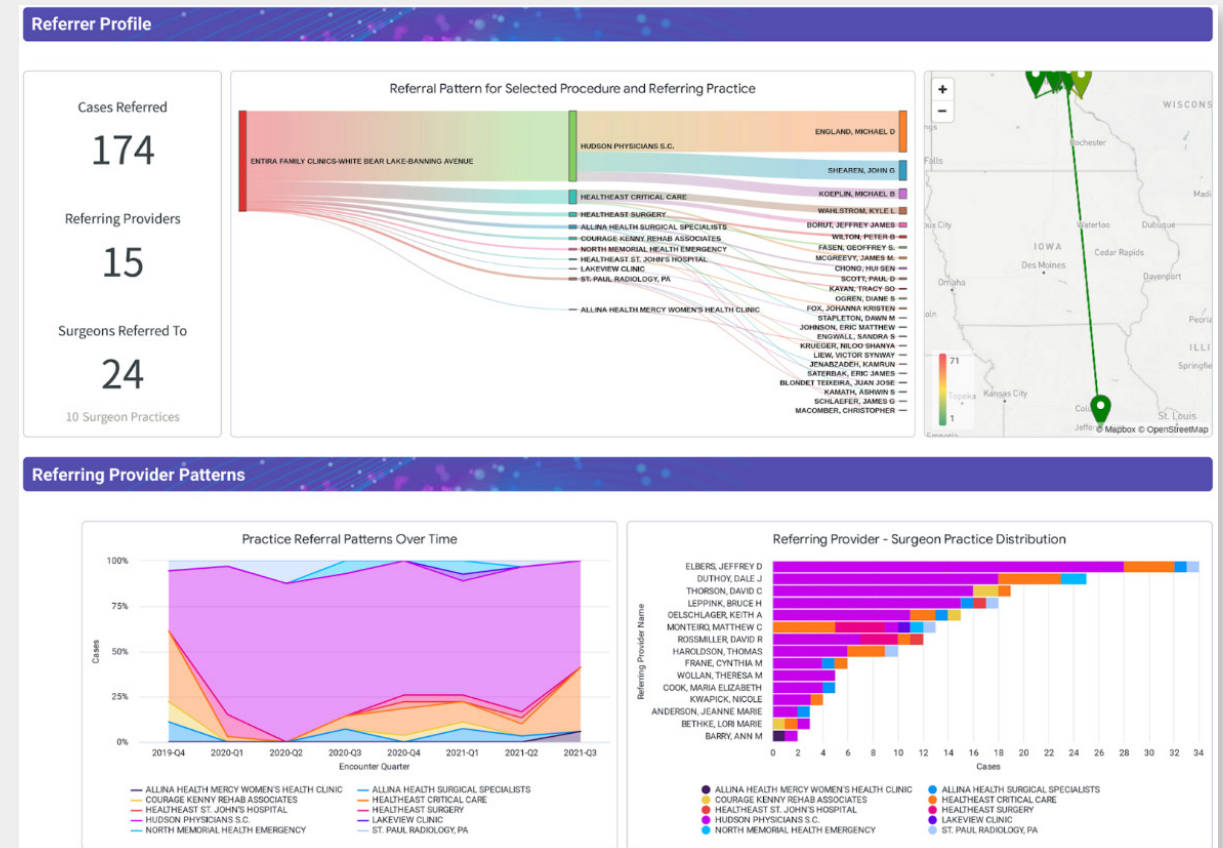
See how it works



Here's how it works. Claims data from multiple clearinghouses is combined and then stripped of identifying information to protect patient privacy. However, even though you don't know the identity of individual patients, a process called "tokenization" lets you link together records from the same patient, creating a detailed picture of their care journey across multiple providers: not just your own facilities but all the hospitals and practices in your area. Machine learning is then applied to fill any gaps and improve the precision of the data. You can then identify practice and referral patterns: which surgeons do what types of procedures (and where), and which primary care physicians refer patients to those surgeons.

With this picture of the dynamics in your service area, you can:

- **Identify physicians who refer patients to your surgeons—and which other surgeons they refer patients to.** Your surgeons can use this information to see where they might be losing referrals, and take steps to strengthen their relationships with those referring physicians.
- **Look at the overall utilization patterns of your "splitters."** What other facilities do they use, how often, and for which procedures? Armed with this information, you can offer block time, or tweak the time they already have, to encourage them to stick with your site, and also find out what other factors might be making other sites more appealing.
- **Identify surgeons who do the types of procedures you want to attract to your organization, and see where they are performing those procedures now.** This information gives you a starting point to analyze how you can reach out to these high-value surgeons and what you can do to attract them to your facilities.



Throughout this series, we've talked about the features that turn software into a true automation solution to drive surgical growth. Manual processes and inadequate analytics can hold you back from achieving your goals. By using automation, behavioral science, and comprehensive real-world data, you can unleash the full potential of your OR enterprise — and supercharge your perioperative growth.

Take the Next Step with Qventus

Interested in learning how you can harness the power of automation?
Contact partnerships@qventus.com to schedule an introductory meeting.



Allina Health, one of the largest not for profit health systems in the U.S., serves Minnesota's Twin Cities, Minneapolis and St. Paul, as well as the surrounding area and part of neighboring Wisconsin, with top-flight quaternary services. Its 12 hospitals performed more than 86,000 surgical procedures in 2021. Its flagship, 652-bed Abbott-Northwestern Hospital in Minneapolis, has 36 operating rooms including five robotic rooms. Those ORs are used by over 130 surgeons, of whom ~30% are employed by Allina Health and ~70% are in independent practice. Allina adopted AI-powered OR scheduling software from Qventus as part of a larger organizational initiative to minimize variability in all areas and optimize resource use. In the first three months of use, Allina has added more than three additional cases to each OR per month.

Background:

- 12 hospitals
- 1,800 staffed beds
- \$4.5 billion net operating revenue (2021)
- 100,000 inpatient hospital admissions
- 36 ORs and 5 surgical robots at flagship hospital

Challenges:

- Improve OR utilization
- Match resources (e.g. surgical robots and IOMRI) with surgeon needs
- Eliminate antiquated manual scheduling processes
- Improve satisfaction for surgeons, staff, and patients

EHR:

- Epic

Qventus Solutions:

- Perioperative

Challenges

Like every health system, Allina Health relies on surgical procedures as a core financial driver. In 2018, as part of an overall health system initiative to improve patient flow and increase capacity, Allina sought to optimize its surgical services by minimizing variability in every aspect of the process, from determining the appropriateness of surgery, to the surgeries themselves, to the operations of the post-anesthesia care unit. The leadership expected that with improved consistency, Allina could increase surgical volumes overall—in particular, the volume of cases using its surgical robotic capabilities—and explore new market opportunities that its existing inefficiencies wouldn't allow.

A key part of reimagining surgical services was creating a systemwide surgery scheduling policy to fill OR time more effectively. Planning around the Covid-19 pandemic took its toll on the predictability of surgical volumes and temporarily reduced the urgency of this part of the project. However, it became clear going into a somewhat more normal 2022 that surgeons' assigned block times were not being used at anything like full capacity.

At the same time, surgeons looking for slots outside their assigned block times, as well as newer surgeons seeking to establish enough volume to justify a block assignment, were hampered by manual scheduling processes that hadn't changed in 30 years. Those processes also frustrated the schedulers, leading to low job satisfaction.

"We knew automation had to be the next step in our journey."

William Evans Vice President for Surgical Services and Orthopedics, Allina Health



Change Process

The first step was to achieve buy-in from all key leaders by delineating the existing problems and the potential rewards of addressing them. Evans took the case for automation first to the perioperative services director and the scheduling manager. Once they were on board, the next stop was the hospital president, who would make the funding decision, and then the rest of the executive team and the surgeon advisory group. All agreed that a new approach was needed.

To begin the formal approval process for purchasing a solution, Evans lined up the IT department and its resources. “Once I had already gotten the groundswell from all of the frontline users, it was not a question of whether we were going to do it, but when and how.” Over about six months, Evans and the IT team identified Qventus as Allina’s best option.

Automation with Qventus

The Qventus Perioperative Solution automates every step of the scheduling process and eliminates the manual processes that cause scheduling bottlenecks and mismatches. Its AI-powered software combines pattern recognition and predictive capabilities with principles of behavioral science to address all of Allina’s most serious scheduling problems:

Improving block time utilization. The system uses past data to learn the practice patterns of block time holders, and can predict, up to a month in advance, when a surgeon will ultimately not use block or time within a block. (Each scheduled procedure adds to the system’s knowledge base and increases its accuracy over time.) When the system identifies a slot with a high probability of going unused, it sends an automated “nudge” to the surgeon’s scheduler, requesting a release of the slot. To incentivize the release, the nudge includes a calculation of how much the release will improve the surgeon’s block utilization rate.

Accommodating requests for time outside block. The Qventus TimeFinder product can accept multiple parameters for a time request—day, time, type of room and any special equipment needed, duration of procedure—and quickly give a surgeon’s scheduler a list of available slots that most closely fit the criteria. The clinic scheduler can book the time and submit the case request information with a few clicks.

Proactively filling unused slots. Under a manual process, unused slots are often filled with the first available procedure, rather than the most appropriate one. The Qventus Perioperative Solution’s Available Time Outreach product analyzes the characteristics of available slots and matches them with surgeons’ predicted needs, and then offers each one via email to the surgeon who’s most likely to use it and also represents the highest value to Allina Health. The scheduler can accept or decline with a few clicks. If they decline, the system automatically moves to the next most likely candidate.

Allina Health phased in the system over several months at Abbott Northwestern, starting with its robotic surgeons, who Evans says had been most vocal in their complaints about access issues. The second phase included all block holders, and the third phase represented all surgeons who had privileges at the hospital but did not hold block time. The organization chose to make usage of the system voluntary rather than mandatory, and positioned it as a tool to help the surgeons, even though its use will also enable Allina Health to optimize and grow its surgical services.

“Once I had already gotten the groundswell from all of the frontline users, it was not a question of whether we were going to do it, but when and how.”

William Evans Vice President for Surgical Services and Orthopedics, Allina Health

Results

Uptake was rapid: within the first three months, all of the hospital's key surgeons—more than 130—were preferentially booking their cases through Qventus. The system liberated 132 hours of OR capacity in its first three months of full operations. After 3 months, Allina Health is seeing the following results:

Growth

3.5

additional cases
per OR per month

33+

cases per month
added via ML-driven
automations

Utilization

100+

hours of block
released early
per month

49%

utilization of released
OR block time

Efficiency

97%

OR requests through
Qventus accepted

79%

of time requests filled
in under 60 mins

Robotics

36%

increase in robot
utilization

3x

increase in robotic
case volume

Based on results so far at Abbott Northwestern, Evans looks forward to rolling out the system to Allina Health's other hospitals.

User Response

Evans says schedulers at both ends—the hospital and the surgical practice—have welcomed the new system. “We had significant scheduler turnover before, and now people are really engaged,” he says. “They love having a cool cutting-edge tool that makes their jobs easier.”

Surgeons are delighted with the quick response time, which improves their patients' experience by often allowing their surgery to be scheduled during their office visit. The system also allows schedulers to easily find and book rooms with specialized resources like intra-operative MRI.

Lessons Learned

Evans shares these lessons from Allina Health's deployment of the Qventus Perioperative Solution:

- Engage surgeons and scheduling staff early
- Meet with clinic teams frequently
- Phase the implementation
- Listen to the experts
- Mandate cautiously
- Don't underestimate pre-work
- 10% increased OR efficiency is possible

Evaluation Guide for OR Scheduling and Utilization Software

To unlock the full potential of your perioperative enterprise, modern OR Scheduling and Utilization solutions need to go beyond simply providing performance analytics and basic OR calendar access. To help health systems and surgeons strategically and sustainably grow case volume, software solutions must automate the optimization of access, intelligently drive strategic growth with AI, and tap into local market data to drive market share gains, all while simplifying the workflow for OR and clinic teams.

Goal	Considerations
Optimize Access	<p>How does the solution create additional supply in the OR without creating a burden for teams?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Machine learning (“ML”) models predict unused time 30+ days in advance <input type="checkbox"/> Solution automatically nudges surgeons’ offices and uses behavioral science and real-time data to motivate proactive block release <input type="checkbox"/> Automation of workflows tailored to block types, such as service line or group block
Drive Growth	<p>How does the solution help health systems and surgeons achieve strategic growth goals and maximize white space utilization?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Using ML automatically offers time to the best-fit surgeons that support strategic initiatives (e.g., strategic service line growth, driving a decanting strategy, etc.) <input type="checkbox"/> Bi-directional EHR write-back capabilities to reduce manual work for OR teams <input type="checkbox"/> Frictionless interface for surgeon offices to add cases during desired slots <input type="checkbox"/> Available time search results automatically personalized to surgeon practice preferences using ML <input type="checkbox"/> In-app submission of case requests for both independent and employed surgeons
Gain Market Share	<p>How does the solution enable providers and health systems to keep up with local market dynamics and gain market share?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Empowers surgeons to grow their practice by identifying opportunities for targeted outreach to establish new referral relationships <input type="checkbox"/> Highlights opportunities to improve network performance, and provider alignment <input type="checkbox"/> Delivers insights to pinpoint service gaps, recruit high volume surgeons and referral groups, and understand site of care shifts <input type="checkbox"/> Includes near-real-time market data spanning the entire care continuum
Analyze Performance	<p>Does the solution offer actionable insights that are relevant and curated for key stakeholders?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prospective nudges are automatically sent to optimize key assets, including surgical robots <input type="checkbox"/> Role-specific views for OR leaders and surgeons provide actionable insights with fewer clicks <input type="checkbox"/> Benchmark performance against peers and the market to understand improvement opportunities
Foundational Capabilities	<p>How does the underlying architecture and solution design enable the achievement of the preceding goals?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Automation to reduce manual steps for clinic and OR teams <input type="checkbox"/> Artificial intelligence to support personalization and scalability <input type="checkbox"/> Behavioral science techniques to maximize engagement and adoption of the solution and interventions <input type="checkbox"/> Near-real-time market data to go beyond what is available in the EHR

OR Scheduling and Utilization Software Landscape

Qventus has a next-generation Periop Solution that uses ML and behavioral science to proactively release and fill OR capacity, improves robotic utilization, and leverage non-EHR data to drive OR growth. With more urgency than ever to grow market share and reduce staff burden, you need to not only run a more efficient OR, but also drive faster, more strategic growth. Our solution provides you with the personalization, automation, and comprehensive data required to achieve these objectives.

	Qventus	Other Scheduling Software	EHR
Optimize Access: How does the solution optimize OR access and unlock hidden time?			
Marketplace for all surgeons to find available times	✓	✓	✗
ML personalizes nudges to release specific unused OR time	✓	✗	✗
AI optimize key assets such as surgical robots to create capacity	✓	✗	✗
Drive Growth: How does the solution strategically optimize OR utilization and drive health system objectives?			
ML matches available time to surgeons based on strategic goals	✓	✗	✗
ML prioritizes times within marketplace based on surgeon preferences & health system objectives	✓	✗	✗
Automation proactively offers times to best-fit surgeons	✓	✗	✗
Automation writes procedure info to EHR	✓	✗	✗
Capture Market Share: How does the solution enable health systems and surgeon practices to gain market share?			
Health system insights into referral & leakage patterns to improve network performance and provider alignment	✓	✗	✗
Surgeon insights into practice growth opportunities (e.g., new referral relationships)	✓	✗	✗
Analyze Performance: Does the solution offer insights that make it easy for key stakeholders to take action			
Robust analytics to track OR & surgeon performance	✓	✓	✓
Detailed engagement insights to find coaching opportunities	✓	✗	✗
Insights to inform block allocation decisions	✓	✓	✗
Foundational Capabilities: Does the solution provide the foundational technologies and services to help you reduce manual workload and achieve outcomes?			
AI / ML trained on your data to learn organizational patterns	✓	✓	✗
Automated, personalized nudges to reduce manual calls	✓	✗	✗
Writes key information back into EHR	✓	✗	✓
Behavioral science used to drive engagement & action	✓	✗	✗
Market data provides visibility into local referral trends	✓	✗	✗
Change management & training services included	✓	✓	✗

Contact partnerships@qventus.com or visit www.qventus.com