LeanTaaS

Cornerstones of A Better System

7 steps to improve OR financial and operational performance

LeanTaaS
BETTER HEALTHCARE THROUGH MATH

iQueue
FOR OPERATING ROOMS

Overcoming the challenge of OR scheduling

How iQueue for OR uses artificial intelligence to allocate and release time blocks to maximize financial and operational performance.

One of the biggest challenges OR managers and VPs of surgery face is efficient use of OR time. They struggle to balance revenue and utilization targets with surgeon and staff preferences against a backdrop of often unpredictable supply and demand. The way in which blocks of OR time are allocated, taken away, and released into open time leaves a great deal of room for optimization.

With clinic days, teaching, and other commitments, surgeons have many restrictions on which days they can avail themselves of block time. They are somewhat territorial about their OR time and reluctant to lose their blocks.

Hospitals tend to assign block time based on the preferences, constraints, and availability of surgeons, sometimes also taking into account their seniority and status.

Usually, surgeons are encouraged to release upcoming blocks of time they know they will not be using due to planned absences, so that other surgeons may use them. If surgeons have not scheduled any cases for their assigned block by, say, a week before the date, the hospital's system may auto-release their block to others.

Hospitals must continually assess and reassess the utilization of their OR blocks — a process that can be contentious and somewhat political. Calculating block utilization is a cumbersome, time-consuming process that is subject to a variety of "rules" not everyone agrees with. This means a not-so-useful metric is being used to allocate one of the most expensive resources in a hospital!

Solving the OR problem

With the use of artificial intelligence, a solution is at hand. In one example, SUNY Upstate Medical University partnered with LeanTaaS to deploy iQueue for Operating Rooms, which is now used across campuses by OR management, OR scheduling, clinic scheduling, surgery chairs, and surgeons themselves.

The technology, which integrates easily with its Epic electronic health record (EHR), provides cloud-based mobile and web tools that display the right metrics to the right user in real time. Additionally, the product provides a new, more surgeon-centric framework for measuring OR utilization than block utilization does.

Key features include:

- Predictive analytics that forecast when blocks will be underutilized, encourage block release ahead of time, and create more access to shared open time.
- Prescriptive analytics that give transparent, actionable recommendations for department chairs to help direct data-driven decision-making and improve efficiency.
- A single source of truth for data across the organization, leading to unified decision making.
- Weekly personalized texts to surgeons about their performance, which create accountability and empower schedulers — who now have access to real-time data — to redesign block-scheduling patterns so they better coincide with surgeon and OR availability.

The results are impressive. A comparison of results for the first quarter post-iQueue launch with the same period during the previous calendar year shows:

SUNY RESULTS

5.5%

increase in usage of OR minutes within business hours

3.4%

increase in weekly case volume within existing capacity

2%

increase in prime time utilization

1%

increase in staffed room utilization

10-day

increase in “release proactivity”

The Cornerstones of a better system

We believe there are key cornerstones of a system that support outcomes like those seen by SUNY Upstate Medical University.

01 GET MORE TIME RELEASED EARLIER AND MAKE FINDING OPEN TIME AS EASY AS USING OPENTABLE

Currently, 15% to 20% of cases are done outside of block time, and 10% to 15% of time is underutilized or abandoned in many hospitals.

However, organizations that have begun to use predictive analytical tools are achieving positive results. More than 1,500 ORs across the country are using algorithms to monitor booking patterns and identify blocks that are likely to be underutilized. Surgeons and schedulers are reminded to proactively release these blocks into an open pool for colleagues to use. This step alone facilitates more time being released well in advance of the block.

During the peak of COVID-19, Novant Health, headquartered in North Carolina, faced a shortage of available OR time, elective surgery backlogs, and low block utilization. Leaders there sought a unified approach for making key decisions such as block time allocations, block release times, and streamlining operational improvements. They also wanted a credible “single source of truth” across all facilities for greater visibility and transparency into key metrics system-wide.

Novant partnered with LeanTaaS and selected iQueue for Operating Rooms. The iQueue software was deployed across its North Carolina facilities.

NOVANT RESULTS

2.6%

increase in weekly case volume

3.8%

increase in the number of OR minutes used

55%

of surgeons engaged with data

10.4+X

return on investment

This partnership has led to a 10.4+X return on investment (ROI) as well as increased engagement by surgeons and practice administrators at Novant.

Gaining similar benefits in your own organization is largely a matter of mindset and willingness to adapt to new tools. Why are we still telephoning and emailing — even faxing — back and forth between clinics and ORs to look at open times of choice? Improved math and sophisticated, cloud-based tools already exist to make the process more efficient, accessible, and transparent. And the results are measurable.

02 DON'T RELY ON "TRIBAL" RULES FOR BOOKING

Many organizations fall back on historical and tribal "rules" to decide how much time to block and how much to keep open in their ORs for emergency or add-on cases. In working with more than 150 hospitals, we have heard many of these rules — for example, the "80/20" rule, which refers to the amount of block time vs. open time believed to be ideal.

These rules may be based on the preferences of an influential physician, or perhaps an industry "benchmark" that is determined by a consulting study or a research paper. Using benchmarks in healthcare is a bit like borrowing someone else's fingerprint — it doesn't make sense, because your case mix, your patient population, your surgeon population, and your facility's characteristics are all unique to you. One-size-fits-all "rules" are not only mathematically imprecise, they lead to poor decisions.

At Dignity Health, the fifth-largest health system in the nation and the largest hospital provider in California, traditional block scheduling resulted in a lack of foresight into what block time would ultimately go unused, limiting OR access.

Leaders there relied on a time-consuming manual release process that was dependent on each physician's office. Outdated phone and fax methods to change schedules were inefficient and unproductive.

Additionally, there was low accountability for block time using block utilization as the metric. It was hard to hold block owners accountable using a one-dimensional metric. Influence, not data, often drove allocation.

With limited visibility and transparency of key metrics, valuable information was buried in hundreds of reports that were time-consuming to produce and consume. Valuable OR time went unused, impacting surgeon satisfaction, patient access, and hospital financial performance.

Dignity Health partnered with LeanTaaS to deploy iQueue for Operating Rooms system-wide. iQueue made it possible to identify changes in business patterns, find opportunities for growth by unlocking OR time, and have more data-driven and actionable conversations with care practitioners.

Dignity Health's 36 hospital locations in aggregate have achieved an additional contribution margin upwards of 14.5X ROI over the span of 18 months.

DIGNITY OUTCOMES

153%

increase in blocks released

9%

increase in staffed room utilization

2.6M

minutes of service time made available

Comparing year-over-year results, Dignity Health more efficiently utilized staffed rooms and specialized ORs. All Dignity Health divisions significantly improved performance and gained millions of dollars in increased revenue.

03 EVALUATE BLOCK USAGE IN A MORE MEANINGFUL WAY

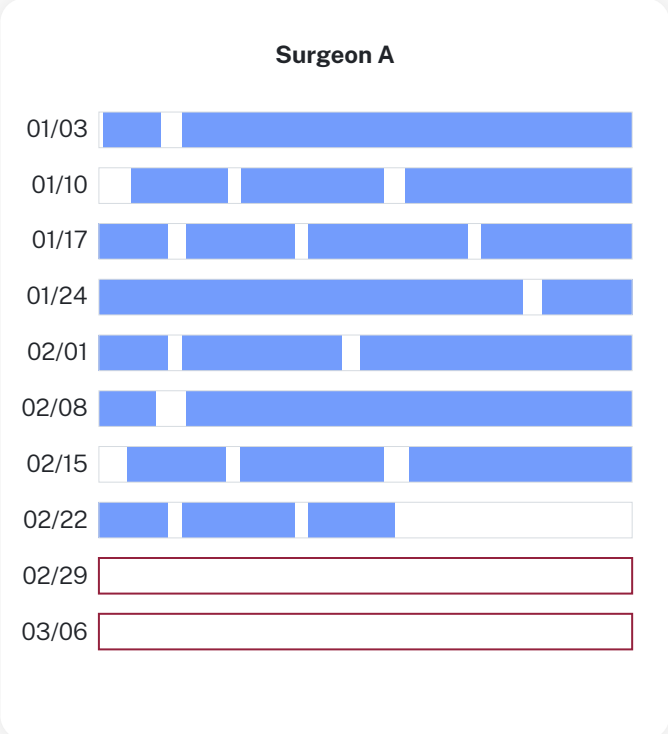
Dr. Kirk's astute observation reveals a fundamental flaw in using block utilization as a metric to evaluate block owners. Utilization patterns by surgeon have holes or white spaces in them, but those spaces are not all equal. A 10-minute first-case delay, a 15-minute turnover delay, and a case length overestimated by 30 minutes cannot be brought together to create enough open time for most ORs to fit in a case.

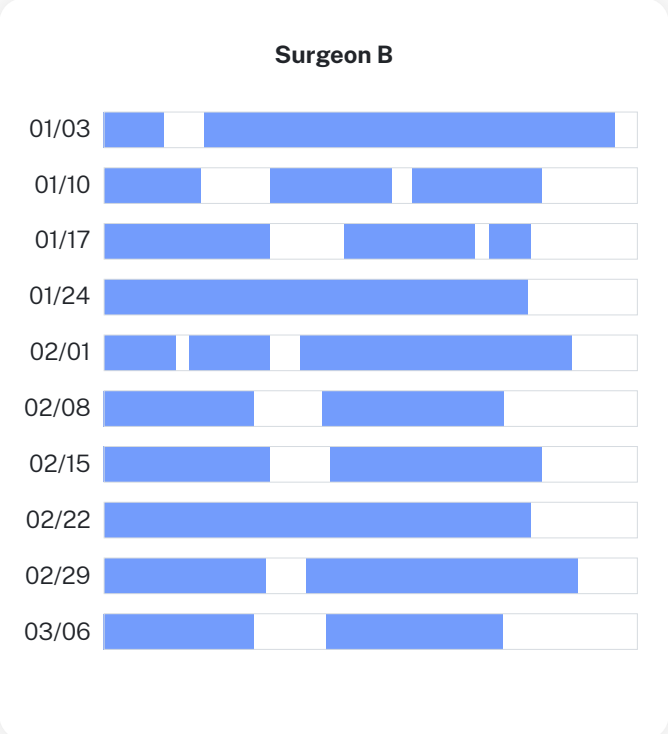
EHRs and other block scheduling tools typically fail to differentiate between "meaningful holes" and "small grains of sand" that may matter from a day-to-day operational perspective but don't really matter from an access perspective. What's worse is that this metric tends to focus surgeons on those small delays in their surgical process that they are not responsible for and to penalize them for the wrong things. For example, surgeons finishing cases early are often penalized for efficiency, resulting in a direct misalignment of incentives. This is why conversations centered on block utilization often end with no actionable result or decision.

The magic in making block rightsizing decisions is to identify block owners with large enough unused holes that taking away one or more blocks from them still allows them to do all of their procedures. We call this "Collectable Time."

> "The smallest quantum of usable time in an OR is not a minute, it's the smallest amount of time needed to do a case.
>
> 
>
> **Dr. Allan Kirk**
> Surgeon-in-Chief,
> Duke University
> Health System

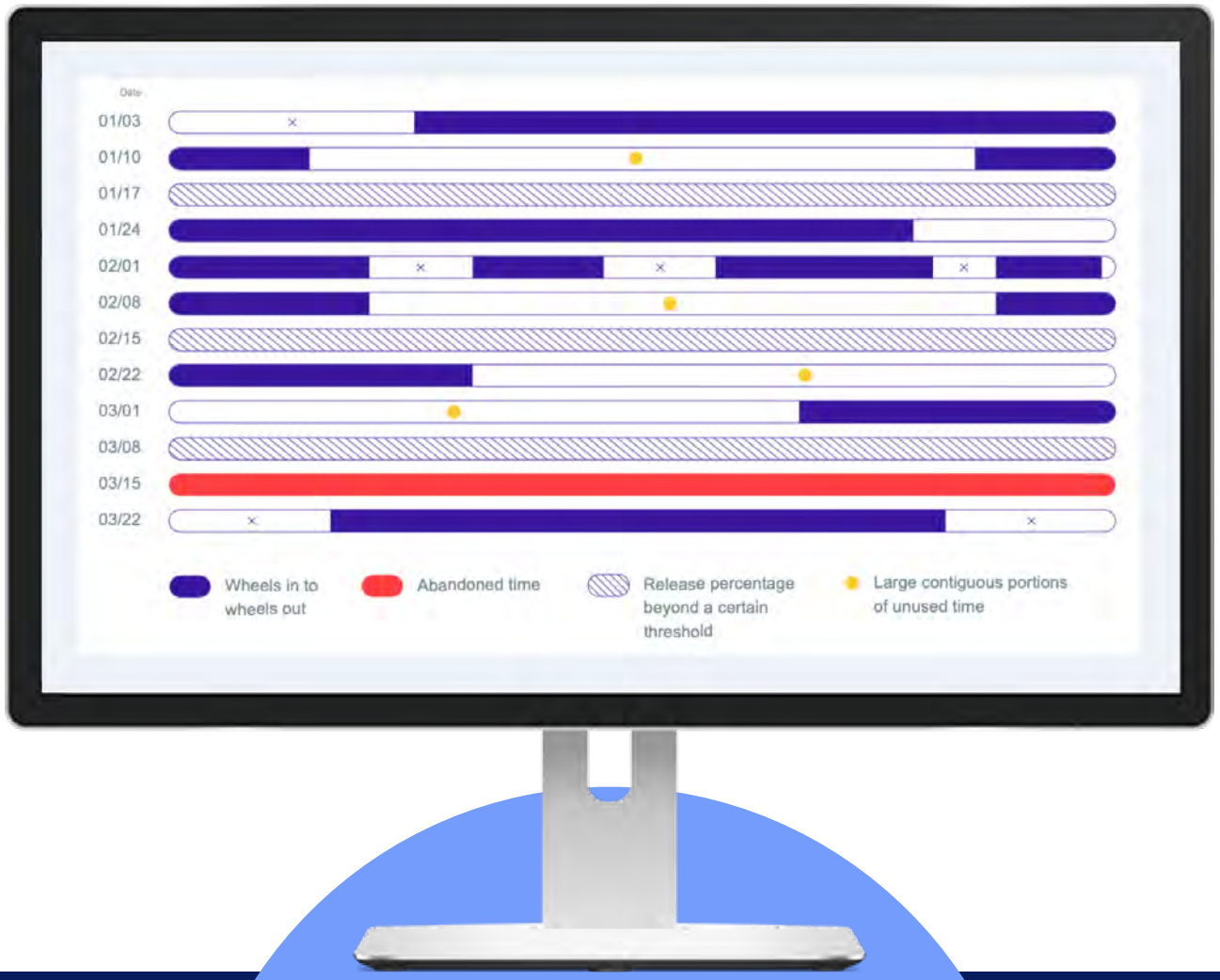
For example, in the following diagram, two surgeons with the same total unused time (and hence the same block utilization), but with widely different distributions of that unused time, have vastly different Collectable Time. Surgeon A has a lot of Collectable Time, but Surgeon B, who has much more unpredictable case durations, has very little, even though they both have exactly the same block utilization.





Collectable Time doesn't penalize surgeons for delays or efficiency. Often a surgeon finishes some cases early, but the amount of time freed up is not enough to accommodate another procedure. Block utilization would penalize the surgeon for that amount each day, but Collectable Time ignores it.

Focusing on just the large chunks of unused block time can facilitate more surgeon accountability and data-driven discussions. Using tools like iQueue for OR, perioperative leaders can expect time utilization to shift with outcomes like those shown in the diagram below.



04 PROVIDE CLEAN, CREDIBLE, AND TRANSPARENT REAL-TIME DATA

With today's technology, we expect to have access to real-time data such as bank balances, stock prices, or the exact location of a package in transit.

By contrast, much of the important information used in OR scheduling is opaque, difficult to access, and disputable.

In the OR world, we have seen:

- Multi-hospital systems in which each location uses its own definition of turnover time, block utilization, prime time, first-case delays, and more.
- An abundance of reports but little action taken. In many systems, dozens or even hundreds of reports are generated every month — paper-based, EHR-based, Tableau-and Excel-based. Recipients often don't know what to do with the data, and they request even more data in order to gain clarity.
- Many questions, few answers. Almost every hospital we have worked with has people questioning the numbers. For example, surgeons may distrust their utilization data, or the definition of case start and end times may differ. Or someone doesn't believe a metric is being defined well or reported correctly. These multiple sources of truth lead to lack of faith in the data, so data may be ignored.

Imagine instead a world where:

- you can access your report of choice from a mobile device 24/7 without needing anyone to create it for you
- the data are clean and displayed in a visually intuitive form
- the data are updated consistently in a timely manner
- metrics are unambiguously defined and curated to optimize actionability and decision-making
- you can drill down into each metric with the tap of a screen

Reporting should not hinge on belief, opinion, or point of view. But that's how things work when you use non-scalable, person-dependent ways of gathering data, and when you fail to establish a shared understanding of what the data means.

Part of Dignity Health's success is due to data transparency. Utilizing the "Exchange" module of iQueue for OR, Dignity created OR access for surgeons needing time through an OpenTable-like "marketplace for Open Time." It encouraged the proactive release of allocated block time and created transparency into open time. The result? Shorter wait times for patients, more tightly packed schedules, and more cases scheduled.

iQueue's Exchange module has provided surgeons and schedulers alike with increased visibility into the OR schedule and the opportunity to release and request OR time, when needed, through a seamless, web-based process available through laptop/desktop computers and mobile devices. The exponential increase in total number of blocks released year over year — a 153% increase — illustrates the genesis of downstream benefits.

05 ENGAGE STAKEHOLDERS IN THE DATA

Suppose perioperative leaders received a succinct mobile text each week to let them know what's going on in their ORs. For example, surgeons would receive a short and meaningful summary of their OR activity with a link that takes them to a better understanding of:

- how they are contributing to OR volume
- how their performance measures are trending
- ways to improve their utilization
- recurring causes of delays when they operate

Imagine, too, if every surgical committee had a browser in the room and was able to navigate to answers to key questions while the meeting was still going on: "Are we using our robots efficiently? Which 10 surgeons need the most help with their case-length predictions? Which service lines are dropping the most in volume, and is that unusual at this time of year?"

What if, in fact, we were able to evolve past the "report" mindset entirely? What if, instead of waiting on reports, everyone had the self-service capability to access the important data in real time? What if the data were believable and could be shown to have clear and demonstrable outcomes? What if we could send "early warnings" to block owners to show that their performance might result in the loss of OR time or that "on Wednesdays when you work with Case Team B you always start late?"

That world can and does exist.

> We have decided to open up web-based reporting tools to every surgeon and service line across the board so there is full transparency on the key metrics we care about across the institution. The process of cleaning up the data, agreeing on the metrics, and making [the information] universally accessible and useful has been game-changing culturally.

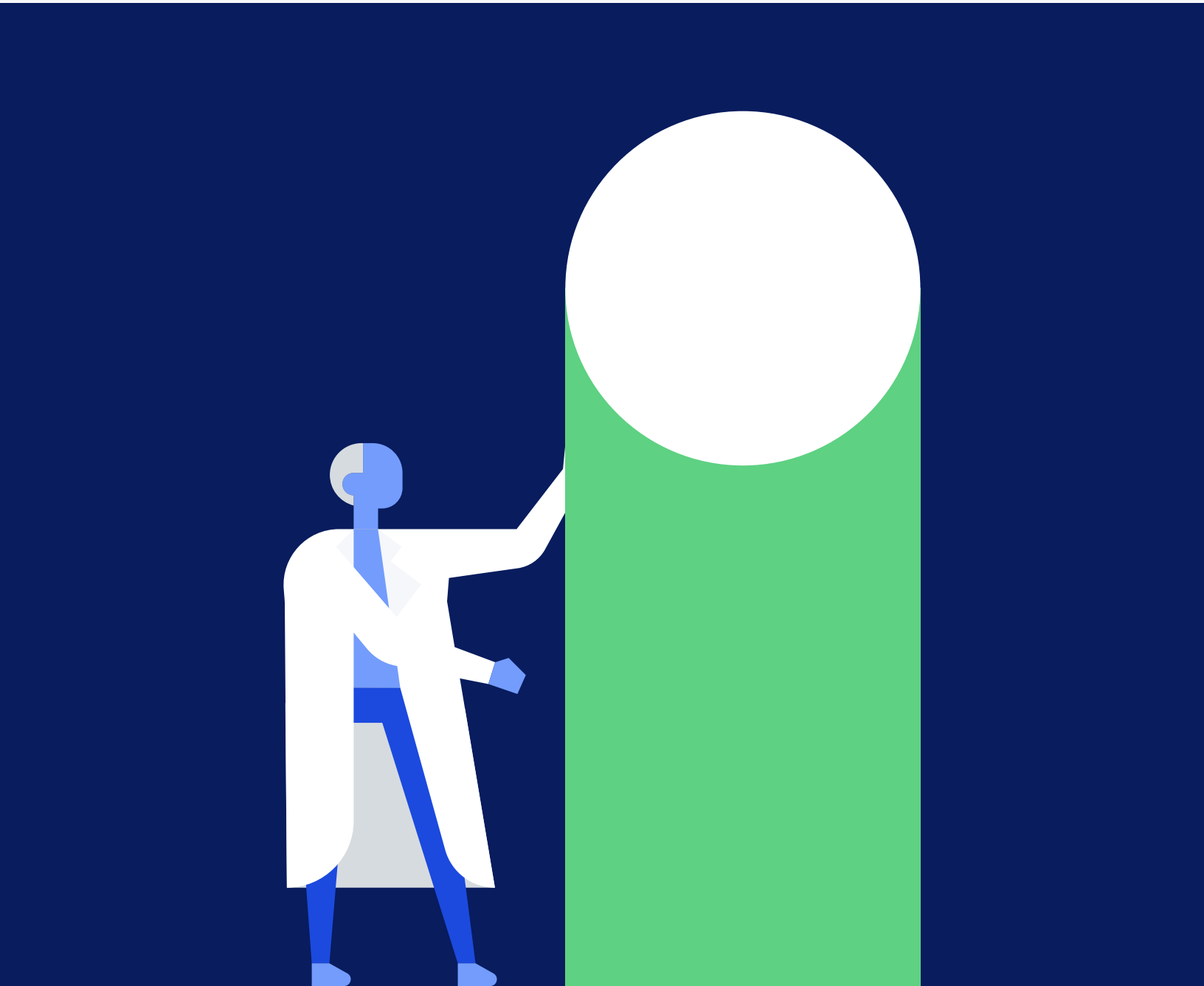
Dio Sumagaysay
Oregon Health & Science University

06 DON'T USE "BAD MATH"

Decision makers in the OR use many metrics that are based on averages — auto-release triggers that open up time if cases are not scheduled by a certain date, average turnover times, average first-case delay times, and average block utilization. What meaningful information do these averages really give us?

Using "global averaging" to estimate case lengths — especially in complex surgical cases like multi-level spine fusions — leads to errors. What sense does it make to average a two-level fusion with other multi-level fusions? The number we produce tells us nothing about how long a specific fusion case will take.

Looking at data correctly is vital. Using sophisticated classification algorithms to identify the right types of cases — those that share meaningful characteristics — and then clustering those cases together to distill their means/medians/percentiles and other useful data makes eminent sense, but the hard work is in the "classification and clustering" methods. That's how Amazon's and Netflix's personalized recommendation engines work. The same type of thing can be done in the OR by using the right math.



07 STOP "ADMIRING THE PROBLEM"

We expect to receive notifications like flight delays or delivery times for packages. But much of what passes for useful information in the OR setting flows from a backward-looking dashboard. When we assess what went wrong last quarter, we end up admiring the problem rather than solving it. But now we can harness a huge amount of data to usefully predict future outcomes and prescribe courses of action, such as:

- which blocks will likely go underutilized and should be released by the block owner
- which block owners have too much time and which ones have too little
- which surgeons' or teams' performance is trending in a statistically significant direction, either positive or negative
- whether the OR will have an unusually high volume or low volume day on day X, and whether staffing should be adjusted accordingly

When we predict these kinds of important answers and prescribe actions against them, we create tangible, measurable value in our ORs. Let's stop admiring the problem. Let's solve it. We have the technology.

Conclusion

To successfully manage OR time, perioperative leaders need to have direct access to transparent data, defensible metrics, visualizations, and easy-to-use tools “on the fly.” “Tribal” or highly customized methods of allocating OR time are inconsistent, outdated, and inefficient.

Applying consistent standards and tools across a system allows for leveraging data analytics, giving healthcare system leadership a clear view of performance across a system.

iQueue creates a credible, fair, and transparent system for managing block and open time while maximizing staff, equipment, and capital utilization. The results: $500K improvement in revenue per OR per year. Higher surgeon, patient and staff satisfaction. Increased primetime utilization. Growth of surgical market share.

These results prove that by “systematizing” the process, removing cultural and “tribal” scheduling barriers, and basing decisions on easily accessible data, OR utilization can be improved, and improved quickly.

“As a perioperative leader, I oversaw a large team of physicians, nurses, managers, and IT specialists to analyze the operational statistics, develop dashboards, and implement reports. This process demanded a large manpower commitment. Like many organizations, we have homegrown queries on top of our electronic medical record (EMR). Before using mathematical optimization solutions, my team produced tons of data, requiring immense time commitments to pull it together into actionable reports, and, at the end of the day, I was looking backward. I needed something that was less time-consuming and more forward-looking.

Dr. Jose Melendez
Chief Medical Officer,
UCHealth, South Region

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