

FEATURE STORY

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uncovering key data points to improve OR profitability

Hospital finance leaders can increase profit from operating rooms by developing performance improvement plans around key statistics, such as utilization, unique morning starts, and delays.

AT A GLANCE

Using data analysis to target areas for performance improvement in the operating room (OR) involves:

- > Regularly monitoring key OR statistics, such as through use of a dashboard
- > Determining the root causes of problems uncovered by the data analysis
- > Making appropriate corrections and continuing to monitor performance

“Big data” analytics is widely used today to streamline processes and improve efficiency in many industries. Hospital leaders, however, have historically made relatively little investment in this area, perhaps because of the historically solid revenue streams and healthy profit margins in health care. But in this new era of increased scrutiny and revenue pressures, business intelligence data is a must for healthcare organizations.

Hospital leaders can apply data analytics to better understand and optimize hospital operations in countless ways. One of the most important areas on which to focus is the operating room (OR), which generates more than 65 percent of most facilities’ revenue.^a The performance measures identified through analysis of OR data can give administrators an accurate basis for comparing their organizations’ performance with that of competitors and for tracking their own performance over time. Such an analysis also can highlight opportunities for process improvement and provide a clear understanding of OR efficiency.

Key statistics for surgical services, which can provide actionable information when incorporated into weekly and monthly dashboard reports, include:

- > OR utilization
- > Unique morning starts
- > Block utilization
- > Day-of-surgery delays
- > Day-of-surgery cancellations
- > Percentage of add-on cases

a. Cantlupe, J., “Anesthesiology Focus for Operating Room Efficiency,” *HealthLeaders*, December 2012.

OR Utilization

OR utilization is the highest-level metric to gauge OR efficiency. It serves as a “stoplight” on the dashboard and prompts leaders to consider their OR’s performance. It also helps leaders determine what further analysis is necessary.

Two measures of utilization are common in the industry. The measure used in this article refers only to actual, or raw, utilization—that is, the number of minutes a patient is actually in the OR, wheels-in to wheels-out. The other common measure also includes OR turnover time.

When comparing data across facilities, we find actual utilization to be the most helpful because it is a hard measure that should be calculated the same way in each facility.

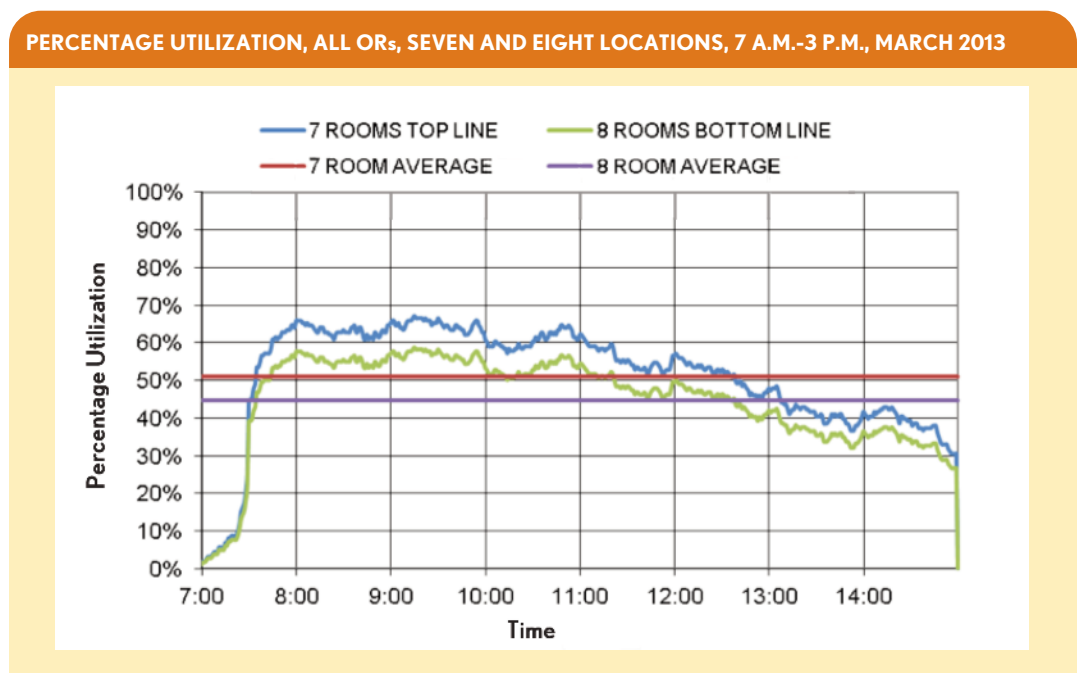
On the surface, OR utilization seems like a simple measure. However, in practice, this measure is often calculated erroneously, even at the most sophisticated facilities. Hospitals tend to calculate OR utilization by determining how well all of their physical locations are utilized. Instead, the proper statistic to calculate is how well the *staffed* ORs are utilized. This provides much more accurate data because it is rare for a hospital to staff all physical ORs every day.

The exhibit below demonstrates the monthly average utilization of a hospital’s staffed ORs during prime OR time, 7 a.m. to 3 p.m. The green line shows OR utilization with eight staffed rooms. The blue line represents that metric with seven staffed rooms. This type of graph helps leaders determine the optimal number of staffed locations at a facility given the actual surgical minutes.

In the case shown in the exhibit, eight locations were originally staffed. However, the facility administrators chose to reduce the number of staffed locations to seven to increase average utilization to more than 50 percent. Decisions such as these must take into account the competitive local market dynamics, opportunities for recruitment of additional surgeons, surgical case types, and payer mix. However, as a first step, utilization graphs help leaders see where the improvement opportunities exist.

The utilization percentages in this exhibit can be compared with benchmarking data compiled from an analysis of OR logs from 50 hospitals.^b Data from this analysis show the average OR

^b Information from internal Enhance Healthcare database, based on actual OR log data gathered during 2011-13.



utilization of staffed locations for prime time—typically 7 a.m. to 3 p.m.—is 48.4 percent, with a range of 28 to 69 percent. The actual utilization noted in the OR logs often differed significantly from that reported by the hospital in the OR metrics. Numerous reasons for the discrepancy exist, including use of an incorrect number of staffed locations, inclusion of nonoperative cases, use of scheduled time rather than actual time, and improper interpretation of data from OR information systems.

Different visualizations of OR efficiency data can lead to other insights. For example, the exhibit below displays OR utilization of 15 staffed locations within a hospital by day of the week. This chart, which is based on data from four weeks, points to a common area of concern for hospital leaders: The facility’s ORs are well-utilized on Tuesdays, but otherwise, utilization is rather poor, especially on Fridays.

Based on the data in the exhibit below, OR leaders should attempt to shift surgical block time from Tuesdays to other days or adjust the number of staffed locations to meet actual day-of-week demand.

Unique Morning Starts

The measure of unique morning starts pertains to the number of surgical starts—typically from 6:30 to 9 a.m.—in an OR each business day. In this calculation, if a series of short cases begins in an

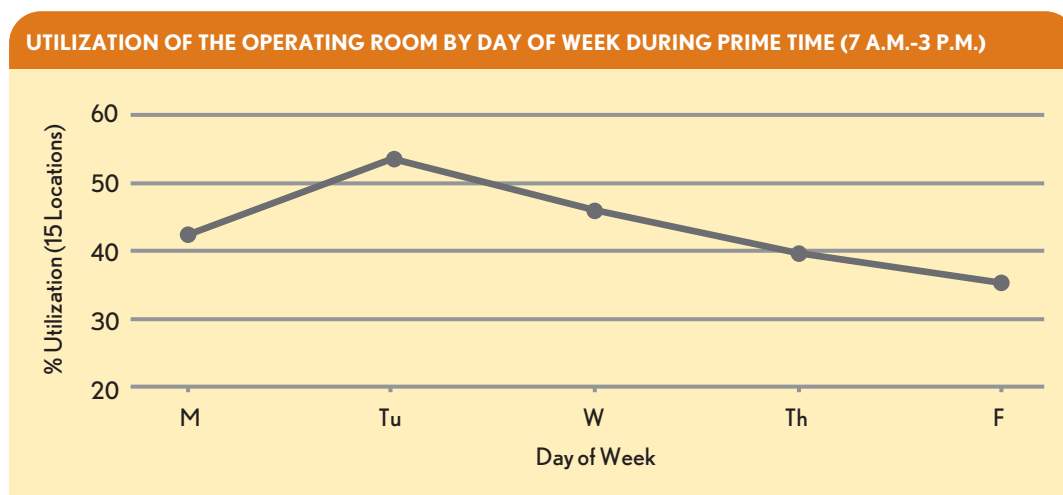
OR prior to 9 a.m., it counts as a single unique start because the focus is on the discrete OR location and the staffing required for that location, not the consecutive number of surgeries in that one location. Identifying unique morning starts is important because this figure acts as a proxy for the actual number of anesthetizing and nursing locations in use during the day. This measure is typically more accurate than the planned staffed number, which is often overstated.

An analysis of unique morning starts often uncovers instances when the hospital is paying to staff locations that are not used. This excess capacity has a significant cost related to nursing and anesthesia staff, and such labor cost can be fairly significant in multihospital systems. For example, a health system may make a deal with an anesthesia company to staff 10 ORs in each of its four facilities, for a total of 40 ORs. It would not be surprising, after analyzing unique morning starts over several months, to discover the health system never uses more than 34 ORs concurrently. That would mean it is paying for staff capacity that is never used—a large and unnecessary expense.

The exhibit on page 4 highlights one such example.

Block Utilization

Block scheduling is used at many hospitals to attract and retain surgeons because it provides surgeons with predictability in scheduling. Problems can arise, however, when surgeons fail to book enough



cases to fill their block time. Some surgeons attempt to hold their time by booking “phantom patients,” or do not give the hospital sufficient notice to allow other surgeons to book unused time.

Block-schedule rules are designed to protect against the misuse of allocated time. Such rules create requirements for block maintenance, including minimum utilization thresholds. The rules also may stipulate release times by specialty and create mechanisms for tracking compliance.

Each surgeon’s block utilization should be tracked on a monthly basis and reported to the block committee on a quarterly basis. It should be measured by actual OR time divided by allocated block time. Tracking block maintenance provides the data necessary to enforce established block-utilization rules. An effective enforcement process warns surgeons if their block utilization falls below the necessary threshold, and repeat offenders see their block time reduced or eliminated. Properly monitored, block utilization is a fundamental data point for the proper use and allocation of valuable block time.

Day-of-Surgery Delays

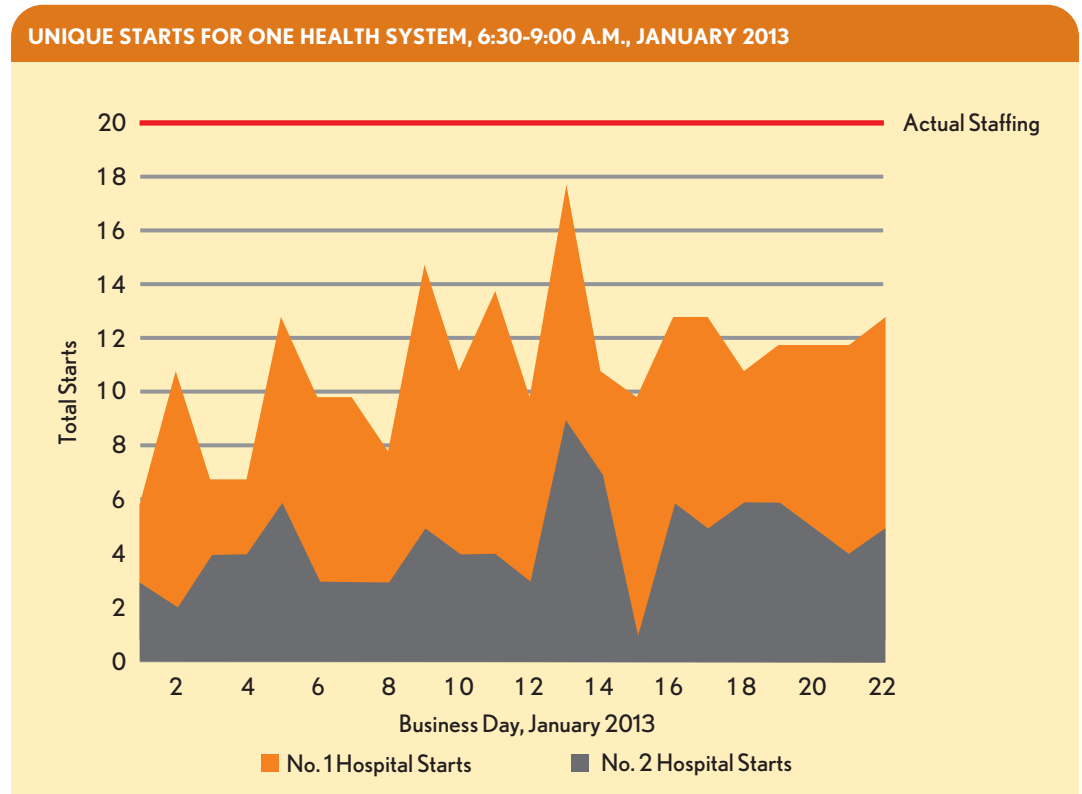
With OR staffing costing hospitals roughly \$20 per minute, surgery delays cost hospitals significant dollars.^c Delays also contribute to poor OR utilization. Perhaps more important, recurring late starts can reduce surgeon satisfaction and drive their cases to competing facilities.

The total number of day-of-surgery delays for first-case starts can be uncovered by comparing scheduled start times to actual start times. Most current OR information systems can track this information. Tracking delays in first-case starts is particularly important because such delays can have a domino effect and frequently provide the explanation as to why delays are occurring with cases that are scheduled to follow later in the day.

For administrators, the first challenge is to understand how prevalent the delays are at their

c. Macario, A., “What Does One Minute Of Operating Room Time Cost?” *Journal of Clinical Anesthesia*, 22:233-236, 2010; and Park, K.W., and Dickerson, C., “Can Efficient Supply Management in the Operating Room Save Millions?” *Current Opinion in Anaesthesiology*, April 2009.

This exhibit shows the number of unique morning starts across a two-facility health system in January 2013. As the chart demonstrates, the ORs were scheduled to full capacity, with an anticipated 20 morning starts. Yet the health system never came close to meeting that number. Instead, the most unique starts it had scheduled in a single day was 17. This health system was contracted to pay its anesthesia group for at least three staffed ORs that it did not need.



facilities. Unfortunately, as with many other OR data points, there is no consensus as to the definition of “on-time.” Some facilities feel that one minute beyond the scheduled time is late. Others allow five, 10, or 15 minutes leeway. We commonly recommend using a definition of five minutes beyond the scheduled time as the threshold for on-time. Using this definition, we see a wide variation of surgical delays, ranging from 10 to 80 percent of scheduled first-case starts.

To improve performance, it is necessary to understand the underlying causes of first-case delays. Creating a Pareto diagram describing the key root causes is an excellent tool to uncover this information. See, for example, the exhibit on page 6.

Delays are frequently caused by late arrivals of surgeons, which is a problem that can be difficult to address. However, numerous other causes can be reduced or completely prevented. Causes that are easy to identify include lack of anesthesia pre-op assessment, lack of pre-op medical clearance, incomplete lab data, and lack of proper equipment.

Actively addressing day-of-surgery delays begins with identifying the total number of delays and determining the root causes. Root causes of delays are most commonly tracked by OR nursing personnel using definitions that are accepted by all parties at their facility. Examples of causative factors include nursing equipment issues, delayed patient transport, prolonged post op pain block, or late surgeons. Implementing fixes for the identified causative factors and continually monitoring progress will reduce delays and the associated costs.

Day-of-Surgery Cancellations

Sometimes, day-of-surgery cancellations are caused by dire medical issues that prevent the surgery from taking place. However, much like day-of-surgery delays, many cancellations are preventable. In such situations, cancellations may have a greater negative impact on OR flow, surgeon satisfaction, and cost than delays do.

As with delays, the absolute number of day-of-surgery cancellations should be tracked, along

with an analysis of the root causes. Day-of-surgery cancellations can vary greatly—from 0.2 percent to 5 percent—and root-cause analysis often can be used to identify opportunities to reduce them dramatically. As with the root causes of delays, root causes of cancellations are most commonly tracked by operating room nursing personnel using definitions accepted by all parties at their facility. Examples of causative factors include incomplete patient workup, missing equipment or implants, or laboratory abnormalities identified on the day of surgery.

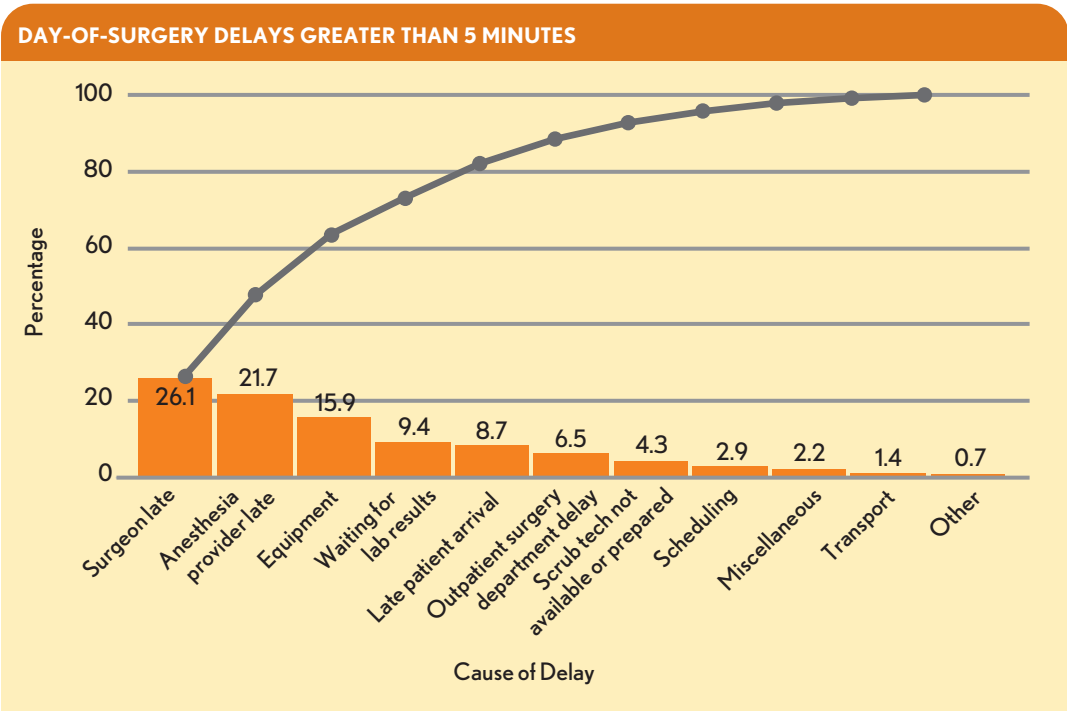
Process-improvement initiatives to address common root causes can help significantly in reducing cancellations and accompanying costs.

Percentage of Add-Ons

Add-on cases are cases that, for a variety of reasons, must be squeezed into the schedule after the elective schedule has been finalized. These cases are often added on the actual day of surgery, requiring OR managers to identify gaps in the schedule to accommodate the short-notice cases. Such cases disrupt and extend OR schedules when an OR manager fails to account for them. As a result, staff must work overtime, which can lead not only to overtime expense, but also lower staff morale and even loss of surgical volume due to surgeon dissatisfaction.

An accurate account of a facility’s daily or weekly percentage of add-on cases is therefore necessary to create a well-planned OR staffing matrix. Staffed locations and the block schedule allocation should take into account the amount of add-on case time, which can vary considerably among different facilities, both within a health system and across different health systems. The percentage of add-on cases will tend to increase proportionately with the acuity of the patient population and the complexity of cases performed. The presence of a trauma program also typically increases the percentage of add-on cases.

Most OR information systems can report the ongoing number of cases and surgical minutes of add-on cases. This report should be incorporated into the dashboard viewed by OR management,



and information from this report should be incorporated into the planning process.

Opportunity in the Numbers

Most of these metrics appear to be fairly easy to calculate. For a variety of reasons, including a lack of resources or a lack of in-depth understanding of key OR drivers, many hospital administrators do not regularly track this information. Therefore they do not understand many key performance-driving data points regarding their OR, such as what percentage of OR cases in their hospital start on time or what is their actual OR utilization.

Furthermore, the industry has not settled on standard definitions of these measures or how to calculate them. And various OR information systems calculate this information in different ways. Consequently, benchmarking can be difficult.

This failure represents untapped opportunity for today’s hospital leaders. Hospitals can realize dramatic cost-savings by developing their capability to collect and analyze data and using the resulting information to guide decision-making. Many

hospitals already have a proven track record in successfully implementing the technology required to accomplish these goals.

As the healthcare environment continues to evolve, hospital executives are under increased pressure to reduce costs and improve efficiency. Developing targeted, actionable metrics can support a well-run OR, which could be the difference between a thriving hospital and one that struggles. ●

About the authors



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