The Challenge and the Promise of Surgical Optimization

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OR efficiency can provide a blueprint for health system excellence across key performance categories.

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Managing a health system's surgical business line requires the ability to identify several key factors and the ways in which they interact. Financial, clinical and demographic changes have made this even more difficult, and nothing indicates this trend will abate in the near future.

A first glance at the available literature confirms the **financial** impact of surgical care on overall health system finance, where OR activity can represent up to 60 percent of the system's net margin. However, it's worth noting that the expression "up to" is doing most of the heavy lifting in the preceding sentence. A more granular analysis of margin metrics shows high variability, which makes sense for any business line that combines unpredictable volume with high fixed-cost assets (i.e., Operating Rooms are among the most expensive square footage in healthcare). Margin-related risk will not only increase due to the factors we'll discuss below, but it also explains why additional capital expenditures to expand surgical capacity by building more ORs is unlikely.

From a **clinical and demographic** perspective, the increasing incidence of multimorbidity will make surgeries riskier and raise the bar when it comes to patient safety and care quality. As my former colleagues at **Advisory Board** explained in their **recent forecast**, the volume of surgeries where comorbidities are a significant risk factor is expected to grow by 64 percent between 2023 and 2033.

The talent management side is not any less complicated. **Surgeons have always been fiercely independent**, particularly when they work as VMOs with privileges across multiple sites. The **lure of ASCs** and the undeniable **trend towards site neutrality** make the challenge even more difficult for any hospital that wants to remain as the site chosen by top surgical talent.

We know it seems trite to provide yet another example proving that the (seemingly evergreen) mandate in healthcare is *'Do more with less'*, but the factors listed above make this both emphatic and urgent for surgical management. The actionable corollary is that advanced data analytics is a better choice than physical expansion when tackling these challenges. We are aware of a wide variety of initiatives often implemented across the OR value chain to streamline and optimize it, and we respect the valid methodologies (e.g., 6 Sigma) used for that purpose. However, we also believe that Data Analytics and AI are uniquely apt to provide incremental value when an extra layer of actionable intelligence is needed to deal with high (and arguably increasing) levels of complexity. In turn, this means that operational excellence for surgical pavilions can only result from the combination of the ability to anticipate volume and trends (Predictive Analytics) and the ability to schedule procedures in a way that maximizes productivity while ensuring patient safety (Prescriptive Analytics).

An example of successful implementation by a non-profit health system we've both worked with shows the way to use data analytics and AI for these ends. This health system has over 35 ORs with an occupancy rate of 85 percent for elective procedures. The goals shared by the health system's leadership included advanced forewarning of demand volume and fluctuations, sustainably high utilization rates, increased accuracy of operational metrics and principled prioritization criteria that balanced efficiency with surgeon and patient preferences.

The solution delivered rested on a combination of machine learning and optimization tools that analyzed the system's own surgical data, detected patterns and provided actionable insights that, in turn, guided the decisions of the OR management team.

The first component of the suite is a **forecasting algorithm** that accurately predicts the volume of surgical demand, as well as its composition (building a taxonomy that classifies procedures by specialty, site, case complexity, etcetera). This tool gives the OR team a highly dependable two-month time horizon for capacity planning purposes, greatly decreasing the frequency with which they are forced to make unsupported last-minute decisions.

The second piece is a surgical **case length estimator** that allows them to determine the actual utilization time for each procedure, factoring in the impact of the patient's profile and the surgeon's track record on the standard OR time typically associated with that kind of procedure. This yielded more reliable results than the previous habit of trusting the *'guesstimates'* offered

by surgeons, some of which were notoriously imprecise. Trustworthy data also translated into a perception of *'fairness'* from those surgeons who previously suffered cancellations due to unforeseen case length extensions linked to a few usual suspects.

The third and final element is a **scheduling optimizer** that feeds on the outputs of the preceding components and generates a prescriptive output. This piece tracks changes in demand and identifies procedure scheduling and sequencing options that balance the desired utilization rate with considerations such as patient safety and surgeon preference. Since the scheduling optimizer considers the availability of equipment, staff and other resources ahead of time, its use also prevents last-minute surprises when the lack of a specific input can derail an OR's workplan for an entire day. Over the years both of us have come across surgical managers with many frustrating stories about procedures that were cancelled or postponed due to incorrectly stocked carts, to name just one example.

Since its implementation, this health system has experienced an increase of 5 to 8 percent in its effective surgical capacity, without having to incur in the capital expenditure that would have been required to build two or three additional ORs.

In short, well-run surgical wings are often vital to the financial viability of health systems, which has been a widely held consensus by health system CXOs for quite some time. Though less intuitive, it is equally true that OR capacity management offers an ideal opportunity to fine-tune operations management across the entire patient journey. The experience hospital administrators and OR managers gain by balancing institutional priorities against the needs of fiercely independent surgeons completes the trifecta of reasons why surgical optimization can be seminal to healthcare excellence.