

Overlapping Surgery

A Case Study in Operating Room Throughput and Efficiency



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KEYWORDS

- Concurrent • Efficiency • Metrics • Operations • Overlapping • Parallel • Surgery
- Throughput

KEY POINTS

- Fundamentals of OR management depend on optimal access, safety, efficiency, and throughput, and a keystone is proper allocation of OR time.
- Timely OR access is important to surgeons, so the opportunity cost of denying a surgeon's request to perform overlapping surgery must be considered.
- Published studies consistently lack higher adverse events for overlapping surgery, but overlap of "critical" portions of procedures should not occur and should be monitored.
- Overlapping surgery promotes efficiency when: surgeon idle time is costly, nonsurgical time is greater than surgical time, and surgeries can progress more in parallel.
- Overlapping surgery promotes throughput and productivity for: consistent, short-duration, and higher contribution margins per OR hour cases, and procedure lengthening is important.

The fundamentals of operating room (OR) management depend on developing policies and procedures that optimize access, safety, efficiency, throughput, and staff satisfaction. Later in this article, the authors present overlapping surgery as a case study toward these goals.

The authors have nothing to disclose.

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MANAGEMENT GOALS FOR THE SURGICAL SUITE

The goals of OR management are inextricably linked. For example, increasing efficiency and throughput cannot come at the expense of patient safety. Increasing efficiency from the surgeon's perspective (maximal access and minimal nonsurgical time) must consider resultant inefficient use of other OR staff and their satisfaction. Increased efficiency may not translate to increased throughput and vice versa.

Given these multiple points of view, a starting point may be in the mathematical basis for the term OR inefficiency. OR inefficiency is defined by 2 crucial concepts: "overutilized and underutilized time" and ultimately is a function of the sum of these values¹ (Table 1). As the day of surgery approaches, the cost of underutilized OR time becomes negligible relative to the cost of overutilized time.²

Like the mathematical basis for OR inefficiency, there are agreed upon quantitative benchmarks for other measures that characterize optimally managed surgical faculties. From the example in Table 1, 10% to 20% excess staffing costs would reflect suboptimal OR management³ (Table 2).

Because OR inefficiency is a function of overutilized and underutilized time, proper allocation of OR time is essential to efficiency. "Allocation" can be defined in the context of other important OR management terms (Table 3). Intuitively, this makes sense because if an OR is staffed for only 6 hours, yet the room consistently runs 9 hours, then this OR is not efficient. Because OR allocation is done months ahead of the day of surgery during tactical decision making, little can be done on the day of surgery to increase efficient use of OR staff.

Building upon the concepts of overutilized and underutilized time and allocated OR time, OR utilization reflects time that the OR is progressing with a case during allocated OR time. Herein, there are 2 ways of measuring utilization: "raw" versus "adjusted." "Raw utilization" equals proportion of allocated OR time that is taken up by hours of elective cases performed by a surgeon or surgical group during allocated OR time, excluding turnover times (Fig. 1). In other words, raw utilization reflects occupancy, not turnover times. On the other hand, "adjusted utilization" includes turnover time.⁴

Although efficiency focuses on minimizing overutilized and underutilized time and maximizing utilization during allocated OR time, throughput introduces an additional aim of maximizing number of cases. "Productivity" is the quotient of "throughput," that is, number of cases performed, over labor costs.¹ The distinction is important because an OR could be 100% efficient if zero cases were performed, so throughput, that is, performing cases, and more specifically productivity, which considers financial gains and losses of each case, must be higher priorities.

Table 1 Measures of operating room inefficiency	
Overutilized time	The hours that ORs run long. For example, if 12 h of cases (including turnovers) are performed with staff scheduled to work 10 h, there are 2 overutilized hours. The excess staffing cost is 40% ($2 \text{ h}/10 \text{ h} = 20\%$, which is then multiplied by 2 to account for the overtime wages paid to late-staying staff and for the loss of staff due to poor morale and resulting recruitment costs for new staff)
Underutilized time	The hours a room finishes early and sits idle. If OR staff is scheduled to work from 7 AM to 5 PM, but the room finishes early at 4 PM, then there would be 1 h of underutilized time. The excess staffing cost would be 10% ($1 \text{ h}/10 \text{ h}$)

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