

OR throughput

Is time on first-case starts well spent?

OR leaders spend a great deal of time and effort on improving on-time starts for first cases of the day. Is that time well spent? How can you determine whether reducing late starts would help save substantive costs before you embark on the effort?

Two articles in *Anesthesia & Analgesia* evaluated the psychology and economics of first-case-of-the-day starts. The second article includes a table for doing a quick calculation of potential cost savings (chart).

Psychology of first-case starts

The psychological study was motivated by an observation that we made at a hospital that had a committee that met for months to improve on-time starts. Many of the physicians and nurse leaders seemed to assume that starting the first case late “cascaded,” causing all subsequent cases to be late. When interviewed, however, none knew correctly how the start times of cases that appeared on the schedule were calculated. This observation suggested a psychological bias.

We had an opportunity to explore the psychology of first-case starts when the same hospital used an anonymous electronic survey about preference cards before implementation of a new OR information system. We added some scientific questions to the survey.

For example, we asked the participants to respond to the following statement: “Starting the first case in a room 10 minutes late because of missing supplies likely causes each following case to start at least 10 minutes late.” They could respond on a 5-point scale from “strongly disagree” to “strongly agree.”

The statement is not true because if cases are scheduled based on the mean of historical data, then slightly more than half of cases take less time than scheduled. At the studied hospital, the cases that followed a first case of the day that started 5 minutes to 15 minutes late did, of course, start on average later than if the first case started on time. But the average increase in tardiness was only 1.1 minutes, not 10 minutes.

Results reveal bias

Respondents had a 1 in 5 (20%) chance to guess the correct answer of “strongly disagree,” but only 1 in 57 (2%) did so. When the results for those who answered “disagree” were added, 12% gave the correct answer when there was a 40% chance of guessing right. The results, which were worse than random chance, are precisely what would be expected if staff have a psychological bias that cases either start on time or late (ie, do not start early).

We also evaluated to what extent the respondents knew that fewer than half of cases last longer than scheduled. The knowledge was low, with only 32% answering correctly, which was less than the random rate of 50%. More importantly, none of the respondents with this knowledge applied it to

**Daily reduction in labor cost from reducing first-case-of-the-day tardiness
(normalized to labor cost of \$1 per regularly scheduled minute)**

		Reduction in tardiness (min)							
		1	2	3	4	5	6	7	8
ORs with >8 hrs of cases and turnovers	1	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8
	2	2.2	4.4	6.6	8.8	11.0	13.2	15.4	17.6
	3	3.3	6.6	9.9	13.2	16.5	19.8	23.1	26.4
	4	4.4	8.8	13.2	17.6	22.0	26.4	30.8	35.2
	5	5.5	11.0	16.5	22.0	27.5	33.0	38.5	44.0
	6	6.6	13.2	19.8	26.4	33.0	39.6	46.2	52.8
	7	7.7	15.4	23.1	30.8	38.5	46.2	53.9	61.6
	8	8.8	17.6	26.4	35.2	44.0	52.8	61.6	70.4
	9	9.9	19.8	29.7	39.6	49.5	59.4	69.3	79.2
	10	11.0	22.0	33.0	44.0	55.0	66.0	77.0	88.0

Source: Dexter F, Epstein R H. *Anesth Analg*. 2009;108:1282-1287. Reprinted with permission.

answering the question about first-case starts correctly. This finding, once again, is consistent with staff having a bias that cases do not start early, even though cases do start early more than half the time when scheduled appropriately.

Results seen in earlier study

We have seen such results before. Previously, we performed an experimental study of case scheduling with nursing students at a different university (Dexter et al, 2007). In that study, everyone had to learn and be tested on their knowledge that around half the cases start early in order to proceed with case scheduling. Just as for the new first-case-start study, that knowledge was ignored.

These results show that education on principles of first-case starts and waiting is likely of no benefit. If we want to reduce waiting times of patients and surgeons, committees will not succeed—and incidentally, neither will improving first-case starts.

Instead, the average lateness of starts is built into the scheduled start-time estimates and patient arrival times (Wachtel and Dexter, 2007 and 2009). Will changing the start-time calculations result in counterproductive changes in behavior? Ironically no; because of the bias, people have essentially no idea how the scheduled start times are chosen.

Minimal economic savings

The advantage of focusing on first-case starts is principally an economic one, but rarely is the focus important economically. Why is this not obvious? In our 2006 systematic review of service-specific staffing calculations (McIntosh, et al), we included the validated methodology for using each hospital’s OR information system data or anesthesia group data to calculate the savings from improving first-case starts. The example in that paper showed minimal economic savings from improving on-time starts.

Likely, we know why the results do not seem to apply. In the psycholo-

gy study, we asked a third question about basic knowledge of OR efficiency (ie, economics of OR staffing). There was a 40% chance to guess the correct answer, and 37% did so. The good news is that there was not a bias, just lack of knowledge. Nevertheless, the result shows that knowledge of OR efficiency appears not to be learned “on the job” by working in ORs. Consequently, referring members of a committee to the 2006 review article is unlikely to be convincing unless they want to learn the science because it would seem not to apply to your own facility.

Determining potential savings

The second new paper includes a table designed to help in determining how much labor-cost savings you could expect from improving on-time starts for first cases of the day. The table is intuitive and can be used with your own data. Understanding the table does not rely on understanding principles of OR efficiency. Note that the table does not include the value of reducing the intangible cost of delayed surgeons and patients. That can be fixed without actually changing the on-time start by planning the average lateness in subsequent scheduled start times (Wachtel and Dexter, 2007 and 2009).

Using the table

To use the table to determine the potential cost savings by reducing tardiness for first cases of the day, select the cell corresponding to the typical number of ORs with more than 8 hours of cases and turnovers and the anticipated reduction in tardiness. Multiply the value in the cell by the actual staffing cost at your facility in dollars per minute.

For example, at the studied 6-OR facility, there were 2 ORs running more than 8 hours of cases each day and a proposed reduction in tardiness of 3 minutes. Therefore, the value in the cell would be 6.6. Based on an OR labor cost of \$3.35 per regularly scheduled minute of OR time, a typical value including both nursing and anesthesia costs, the daily savings for the surgical suite would be approximately \$22.11, where $\$22.11 = 6.6 \times \3.35 .

For a facility that gets a result like \$22.11, no more analysis is required because interventions to improve on-time starts will cost more in comparison to changing OR schedules, which usually is a one-time cost of a few hours of programmers’ time.

For some facilities with large average lateness of first-case starts and almost all ORs with more than 8 hours of cases, the estimated savings from the table can be far larger. If substantive savings seem possible, then that value should not be considered correct and used to justify an investment. Instead, the next step is to confirm the results by performing the full analysis (McIntosh et al, 2006). ❖

—Franklin Dexter, MD, PhD
University of Iowa
www.FranklinDexter.net

Franklin Dexter, MD, PhD, is a researcher in the science of OR management.

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