Managing OR Time For Profit

Using the flip-room model could enhance hospital revenue and make surgeons happy

Late start-times and long turnover-times in the OR suite are frequently matters of concern for hospital administrators. Both impact the profitability of the OR and can affect the attractiveness of that particular OR to surgeons. Potential conflicts between increasing profitability for the hospital and retaining surgeons arise due to how these terms are defined and managed. By examining an OR schedule in more detail, it is possible to shed light on how to manage the dual goals of maximizing OR profitability and meeting the needs of surgeons.

The advantages of flip-rooms and starting on time are readily apparent from the graphs at the end of this paper. However, a scientific approach, with clear terminology and appropriate measurements, are necessary to recognize opportunities and pitfalls when considering implementing these techniques.

A typical case in the OR can be illustrated using the following time line definitions:

S……..P……..I……C……F

S				Start of setup – OR crew begins up room
xxxxxxxxxxxxxxx				setup-period (duration)
	xxxxxxx			pre-incision period (duration)
	P			Patient enters OR room (sometimes start-time)
		I		Incision by surgeon (sometimes start-time)
			C	Closing of wound begins; bandages
				F Finish case, room clean and ready for setup

Start-time means different things in different ORs (as seen by the definitions of P and I above). Often there is disagreement between surgeons and the OR management as to the definition of start-time. Some hospitals and surgeons define start-time as the time when the patient enters the operating room. For instance, a start-time of 7am means that the patient will be in the operating room at 7am. Another hospital or surgeon may define start-time as when the surgeon makes his initial incision. Anyone who has worked in an OR knows that the time that elapses between when a patient enters the operating room and the time of surgical incision, called pre-incision period hereafter, can be very long.

This pre-incision period can also vary significantly depending on the type of case. An outpatient procedure for cataracts could have a pre-incision period of less than 5 minutes, whereas the pre-incision period for an orthopedic, cardiovascular or neurosurgical case could be up to an hour. In more complicated cases, such as neurosurgical, orthopedic or cardiovascular, an increased pre-incision period may be due to special procedure specific requirements by the surgeon for positioning or monitoring that can only be performed AFTER the patient is asleep. In any OR case, regardless of the procedure or surgeon, the

health of a particular patient may require special patient specific monitoring or treatment (e.g. a-line, central venous line or swan-ganz, difficult intubation techniques) that requires extra time BEFORE the patient is asleep. Just as there can be a five-fold variability in the time to perform the operation, there can be a large difference in the pre-incision periods for specific cases.

The huge variability of pre-incision period will not effect start-time if OR policy defines start-time as when the patient enters the room. However, as most surgeons prefer, if start-time is defined as the time that the surgeon makes his incision, then the OR suffers the cost of the pre-incision variability.

Surgeons prefer the latter definition because then they would have a precise time to arrive and be assured of not waiting to cut on the patient. By doing this, the cost of the pre-incision variability has been passed onto the hospital (and anesthesiologists). Even though the surgical procedure itself may have a duration variability measured in hours, to a surgeon the delay of five minutes in start-time is greater. Setting the start-time policy is a variable over which the hospital has control, and can be negotiated with the surgeon. Understanding setup-periods and pre-incision periods is the first step in minimizing the individual factors involved. The first cases of the day have unique startup problems that could cause backups the rest of the day, so it is important to examine those in more detail.

Inpatient surgery candidates may be delayed getting to the OR due to problems on the floor, such as people arriving late for work, the nursing report that occurs during the 7am shift change, non-signed orders and the inability to contact the involved doctors at that time of the morning, or the inability to get necessary lab tests, x-rays, or other procedures that are not done at night. Patients scheduled for outpatient surgery may be late due to traffic, oversleeping, or car breakdown.

Other problems common throughout the day, but worse in the morning due to the shorter time from discovery to need, are those that deal with sterilizing instruments; calibrating instruments, and repairing or replacing non-functioning equipment; getting the right implants; reassigning personnel due to some not showing up; and finding the surgeon. Troubleshooting is common in any OR, and a well-run OR will be constantly looking for and correcting these potential problems. However, many of these problems are not discovered overnight and do not become apparent until the morning when the staff has little time to correct them. To compensate, OR staff usually arrive early so they will have a time buffer for the morning's surprises. The amount of time buffer the OR staff requires to set up these morning cases depends on OR management's leniency for late starts.

To illustrate the effect of OR policy on shifting the cost of start-time (chosen to be incision time in this case) from hospital to surgeon, let's contrast the difference between an OR policy that requires that the surgeon can cut at 7am for a hip replacement 95% of the time to a less stringent policy where incision can occur at 7am 75% of the time. The following scenario with chart and graphs helps explain the effects OR policy has on when the OR crew will need to begin setting up for the case.

Hip Replacement Scenario: setup-period in minutes represented by the symbols *, >, X with the percentage of the time ready for the surgeon to cut.

per cent	Minutes	Symbol
0%	0	S
50%	25	*
75%	32	>
95%	67	X

Putting this information on a time line looks like this: (S represents when the OR crew starts setting up)

Minutes S …….15..…*.30.>…...45.....….60….X

If we place the actual time of day above the time line for the hip replacement, we can tell what time the OR crew had to start to be ready for the surgeon to incise.

Graph 1

Time of day AM …..6……|.....|.....|.....7.....|.....
S …….15..…*.30.>…...45.....….60….X …

In this particular instance, the above time line has been placed to coincide with a policy that requires the OR room to be ready 95% of the time for a 7am start-time (the X was placed under 7am). Notice that the OR crew has to begin before 6am to make this happen. Contrast that with the following graph when OR policy is set so that the room must be ready 75% of the time:

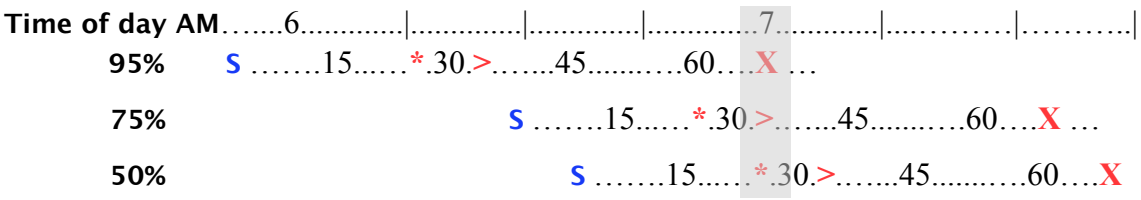
Graph 2

Time of day AM…....6.....|.....|.....|.....7.....|.....|……..|
S …….15..…*.30.>…...45.....….60….X …

The time line has been shifted to the right so that the > representing 75% is under 7am. In this case, the OR staff has to begin about 6:30, roughly 35 minutes later than the 95% policy. If the policy was a 50% start time, the * would be placed

under 7am and the OR crew would begin setting up around 6:30. The effects are shown together in Graph 3 below.

Graph 3



With an OR policy that dictates cases must start by 7am 95% of the time, the OR staff will have to arrive earlier than when policy dictates a success rate of 75% or 50%. With a 95% success of starting by 7am, the majority of the time the case could start before 7am if the surgeon were present and ready. If the surgeon who demands a 95% success rate is not ready to start the case before 7am, then the OR incurs a non-productive cost for employees for the amount of time before 7am that they are waiting on him. Indirect costs to the hospital include delaying the following surgeons and not being able to add on additional cases due to the wasted time. In the above hip replacement case represented by the time lines, the hospital is paying for the OR crew to arrive 35 minutes earlier for a 95% guaranteed start-time than they would have to arrive for a 75% guaranteed start-time, and 45 minutes earlier than for a 50% guaranteed start-time. Also, if the surgeon does not show up early to take advantage of the potential early start, then the anesthesiologist incurs a time cost (potentially the cost of another anesthesia partner or CRNA to cover the non-productive time). So, how does the hospital negotiate with a surgeon who demands a 95% guaranteed start-time?

Educating surgeons to the intricacies of start-times and costs involved could be the first step in having surgeons show up early. If that fails to improve operations, more aggressive tactics are possible. One possibility is to allow a 7am start-time to only those surgeons who are willing to come in early. A second possibility, for some surgeons, is to offer them 'flip-rooms' in the afternoon. A third possibility is to have the surgeon's partners' cases follow after his in the same room so that they encourage him to be prompt. A fourth possibility is to have the surgeon supply additional people, a PA for instance, to help setup the case and decrease the pre-incision period. A fifth possibility is to have the surgeon pay for the time the OR crew is waiting on him. The first two possibilities, having the surgeon come in early and flip-rooms, deserve more discussion as to benefits and implementation.

The surgeon coming in early

The first possibility, in which the surgeon comes in early, has the benefit that 95% of the time he will be able to make his incision before 7am, be done earlier, and make it possible for the OR to routinely schedule more cases for each day. A

surgeon coming in early will further expedite the start of the case since he can help troubleshoot any questions or problems and build rapport with the OR crew. There are a couple of options to make coming in earlier more palatable for the surgeon. Some hospitals provide breakfast in the surgeons lounge, a good television, computers with web connections, or having charts that the surgeon can sign so that he is not wasting time, or he is at least having a good time while he waits. Also, the hospital can take advantage of OR personnel who want to start early by having flexible work hours and seeing that the OR tries to schedule those people to the early cases and let them end their day early.

Potential revenue gains from having the surgeon start early would come from doing an additional case in the room. If the net income from all procedures, lab tests, x-rays, etc for that case were $1,000, the OR would add that amount to the hospitals revenue for the day.

On the other hand, it may not always be a good idea to try to achieve a 95% 7am start-time. The 30 or 45 minute later start with a 75% or 50% start-time permits the OR crew to tend to obligations that they have in the morning such as dropping kids at school or another spouse at work. If OR personnel are hard to acquire because of early morning starts, a more lax start time may be worthwhile. And even though you may have a 75% guaranteed start time, the surgeon is still starting at 7am three out of four times.

Flip Rooms

The second possibility, in which the surgeon is guaranteed flip-rooms later in the day, has a potential advantage of freeing up a 7am start-time for another surgeon. There is also the possibility of the flip-room surgeon scheduling more cases per day since he can get more done in the same amount of time. Another chart and graph for a hypothetical case may help elucidate this concept:

S	Start of setup	0
I	Incision by surgeon	45m
C	Closing of wound begins	1hr 45m
F	Finish case, room clean	2hr 30m

Surgeon's Gap (turnover time for surgeon); if not present, then no gap

No room activity (nurses break); if not present , then no break

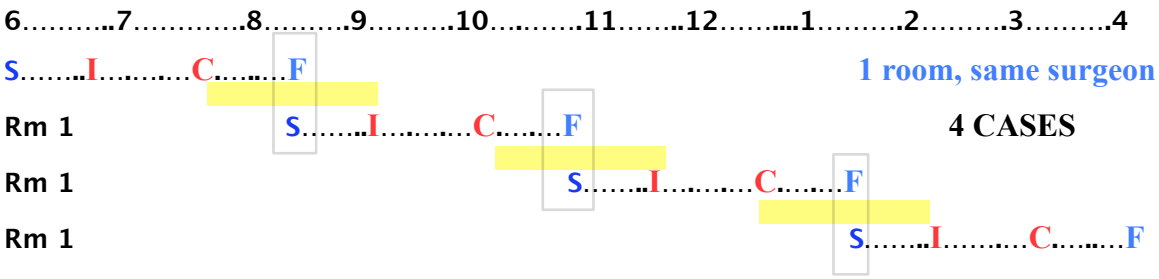
Shows alignment of same room finish and next start

Show alignment of same surgeon finish and next start

If the surgeon follows himself in the same room, then the cases can be graphically represented by placing the S of the successive case under the F of the prior case.

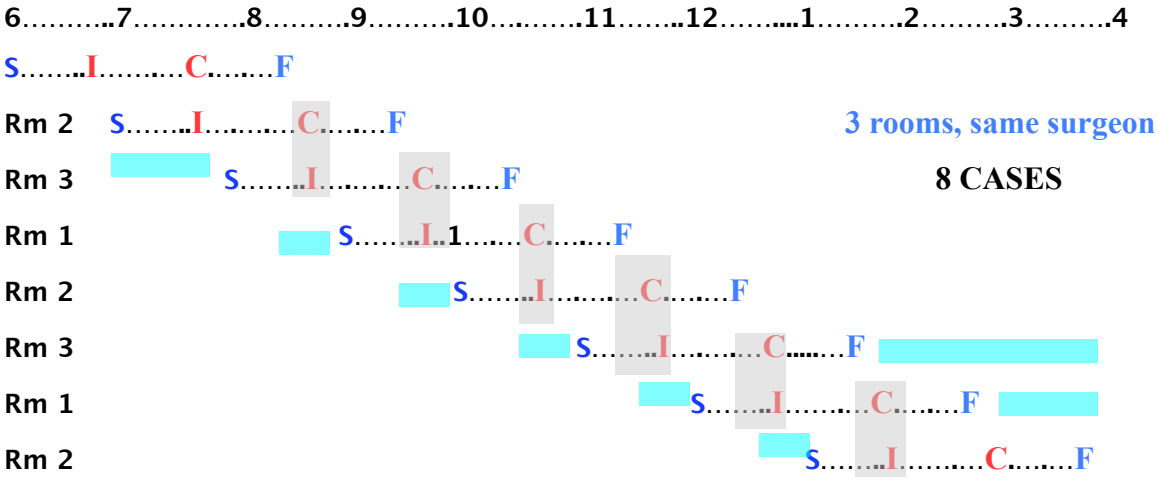
Graph 4

Time of day, 6am to 4pm



The surgeon can do four cases a day if he starts at 7am and tries to finish by 4pm. Contrast that with the extreme case in which the surgeon flips between three rooms. With the help of physician assistants (PA), he can immediately go from the closing time C of the prior room to the incision time I in the next room. This is represented graphically by placing the I of the successive case under the C of the prior case as shown in the following graph. The surgeon starts in Room 1.

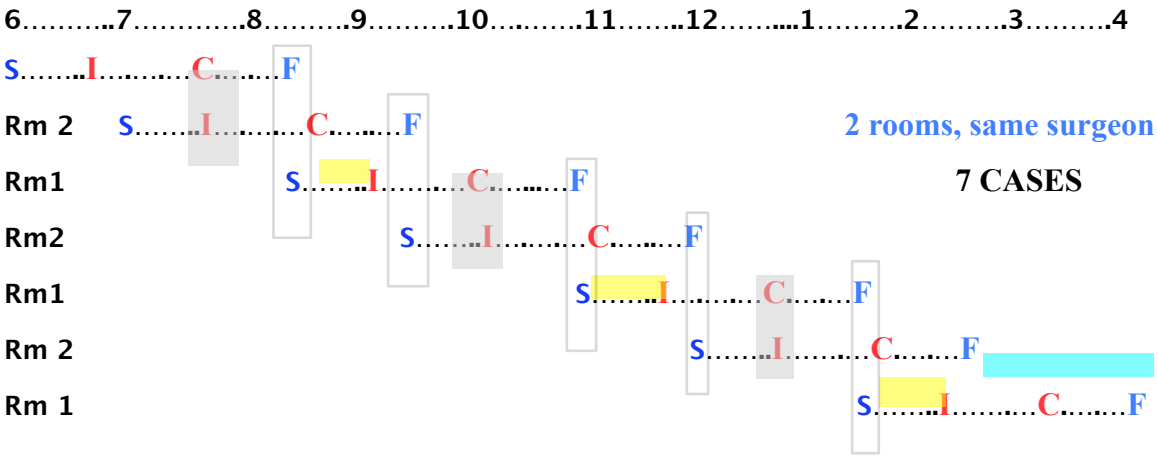
Graph 5



He can do eight cases instead of four during the day, and be out by 3pm to make rounds while his physician assistant finishes closing in the OR. By 4pm he could be ready to go home. In addition, the nurses in each room will have about a 30 minute break between the times they have to be working in their room. In only one room will the nurses be working until 4pm; room 3 will be done before 2pm; and room 1 will be done before 3pm.

If the surgeon had only 2 rooms, as shown below, he'd have a break of about 30 minutes after every other case while waiting for the prior room to be cleaned, and he would have time for only 7 cases. The surgeon starts in Room 1 (not indicated for first case).

Graph 6



From the preceding graphs, you can see that it's possible to offer the surgeon a later start time with the chance of doing more cases each day by utilizing flip-rooms. This would open up an additional 7am start room to be utilized by a different surgeon. If there were extra rooms throughout the day, the hospital could utilize flip-rooms for a surgeon who wishes to build his practice and in the process significantly increase the net income for the hospital. In the ideal circumstance above, if each case netted $1000 for the hospital, the day would bring in (8-4)x $1,000 = $4,000 extra from this surgeon alone. The income from the marketing potential for enticing active surgeons to move some of their operations from other competing hospitals and from their own office ORs could far exceed this amount for this one surgeon on one day. There are many subtleties in using flip-rooms, both in the implementation and benefits. One interesting point is the ability to alter turnover-time (more aptly called turnover-period) to suit the surgeon.

To some surgeons, turnover-time is the period of time during which they are not doing any cutting. For instance: when having only a single room to work in, the period in a case between S and I, and the period between C and F added together could be considered turnover time. With the use of flip-rooms, the OR could vary the amount of time the surgeon has between different cases from zero minutes to however long he wants.

In summary, the Operating Room does not have to be a black box in which you throw surgeons, anesthesiologists, nurses and patients in one end and hope to get revenue out the other. Get involved. The head OR nurse may not have the knowledge, experience, or authority to negotiate with the surgeons and other OR personnel. With a little knowledge you can peer inside the box, bring insight, negotiate with the people involved, and improve your bottom line.

Brian D. Gregory MD, MBA (520) 204-7707

Deborah W. Gregory PhD, CFA