Operating Room Utilization and Perioperative Process Flow

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OVERVIEW

To accommodate a projected increase in patient volume and to facilitate patient flow throughout the Perioperative process, an assessment was requested of the OR case management and related patient access processes with initial emphasis on utilization and case time effectiveness.

Key clinical personnel were interviewed to get a better understanding of the operating environment and their key strategic concerns. Some on-site observation occurred but **the focus was on performing a detailed elemental analysis of cases performed in the OR to ascertain the utilization of the Operating Room** and to determine if availability exists to accommodate more cases or whether other alternatives such as expansion need to be explored.

The case scheduling process is the key system in the functioning of the Operating Room. The objective is to coordinate a large amount of considerations: the urgency of surgery; schedules of patients, surgeons, anesthesiologists, surgical room and OR staff; equipment; other services such as X-Ray and Pathology; and bed availability. The case schedule is important for the effectiveness and efficiency of the Operating Room. Established policies and procedures form the basis for case scheduling so that all the above factors and special requirements can be coordinated.

The OR scheduling process in effect at Premier Health System, like other comparable institutions, is Block Scheduling. It utilizes a master schedule which defines the number and types of rooms available, the hours that rooms will be open and the service or surgeons who are allocated the operating room time. It is felt, that as opposed to an open booking system, it is more efficient, but its effectiveness is dependent upon whether the scheduled block accurately reflects the actual patterns of usage and whether mechanisms are in place to release unreserved blocks in a timely manner.

With the considerable assistance of the OR Scheduling Office and OR Nursing an evaluation was conducted of block scheduling effectiveness and utilization, related policies and procedures, and access and coordination issues. In particular, special emphasis was placed on the surgical schedule since it directly impacts staffing, hours of work, and utilization of supplies and equipment.

The following reflects the results of this initial assessment.

CONSIDERATIONS

It is important to note that the assessment was conducted for a four-month period, from **September to December**. During this time there was a transition of surgical staff, so that the findings may not be reflective of future trends nor be fully representative of yearly activity.

In addition, to take more of a service orientation to the assignment of OR time, an attempt was made to also categorize time as service designated time as well as surgeon specific time. In so doing it may slightly under or overstate utilization statistics. (An example would be trying to break out the specific surgeons sharing the allocated OR time in the University Services group from the entire group. Likewise, the same holds true with separating surgeons like Jones from Surgery or Smith and Adams from ENT).

Overall, however, as the following table indicates, the utilization results for the Operating Room for the primary hours of operation (basically 8:00am-6:00pm, with the exception of Tuesday) for this four month period very closely mirror those that were generated by the OR Scheduling Office. (This minor difference is probably attributable to "rounding" of the numbers, minor computational errors on my part, or simply more exacting case start time parameters):

Month	OR. Scheduling Office % Utilization	This Assessment % Utilization
September	68%	68.8%
October	67%	69.3%
November	71%	70.4%
December	60%	58.3%

It should also be noted that **time away from Premier on the part of the surgeon was not reflected** in any of the analysis and if taken when the surgeon had dedicated block time during this period, it would lessen their utilization of OR time.

Likewise, the data collected is credited to the primary service performing the procedure and does not reflect the hours of surgery performed by a supporting service that follows the primary service in support of the case. Plastics is an example of a service that's OR time is often not truly reflected in OR statistics.

The case-time duration entered into the system, reflects only the "Patient Time In the Room" to the "Patient Time Out of the Room". Room Turnaround is computed separately and a standard allowance of twenty minutes (.33hrs) is added onto each case irrespective of the length of the procedure.

OBSERVATIONS

The assessment, as focused as it might be, noted considerable strengths and the existence of a fairly solid foundation that's in place to enable the Operating Room to maximize its utilization and case time effectiveness. In particular, the following was noted to be in effect:

- An active Chief of Surgery who, in the past, has undertaken much of the responsibility to oversee the case time effectiveness
- An accommodating and communicative Scheduling Office who, in addition, to their booking responsibilities, generates utilization based information
- A Block Scheduling routine that is accepted and already in place
- A "one stop", interactive booking process that enables the Surgeon to remotely schedule their cases and to view their schedule load
- A scheduling process that is a schedule management process rather than a clerical recording process that looks to increase surgeon access and schedule accuracy
- The establishment of Procedure times for each case based on objective data as provided by the data collection system
- General procedures for dealing with scheduling based issues
- General procedures for dealing with emergencies
- A computerized physician preference card that is generated at the scheduling of a case to facilitate the surgeon's resource needs for the case
- A variable block release time adjusted for the realities of individual surgeons and services
- A great deal of flexibility in the Pre Admissions and Same Day Surgery processes that make it a workable model despite the challenges of receiving patients and their information from multiple test sites
- A stable O.R Nursing and Anesthesia work force that enables all rooms to be opened and all scheduled cases to be performed
- Consistent interaction between the OR Scheduling Office and the surgeons' office staffs to promote awareness and understanding

(See the attached Perioperative Process Flow Chart for a graphic representation of the process from Pre Admissions to Post Operative Care)

FINDINGS

Utilization of the Operating Room was computed in two different ways; namely an assessment of the block time that was allocated specifically to a surgeon or service (termed **"Block Utilization")** and an assessment of the utilization of all surgical time, block and non-block time during the primary hours of surgery (essentially 8:00am-6:00pm) (termed "**Primary Hour Utilization**"). If a surgeon was assigned block time on a specific day(s) of the week, their utilization of this block time would simply be a measurement of how many hours of surgery were performed that specific day against the number of block hours assigned. Their Primary Hour utilization would consider these hours plus the hours of surgery performed during other days of the week. This would be reflective of total primary time used (and perhaps needed) during the course of a week.

It is important to note that **Primary Hour Utilization is the measure used to reflect the utilization of all the available time in the Operating Room** and it is the measure most referenced comparatively in performance benchmarks.

Overall for this four month period, Primary Hour Utilization was **66.8%** and the Block Time assigned utilization by those surgeons/services that were slated to use that time was **61.9%**.

Comparatively, the Healthcare Financial Management Association and the Clinical Advisory Board in a recent report (2001) stated that the "industry average utilization" was 68%. (Cooper's OR Scheduling Office, for the calendar year, determined utilization to be 68%). OR Benchmarks©, a recognized healthcare source, stated that median utilization for the hospitals in their database was 73%.

Most industry sources indicate that they believe that acceptable utilization for the OR should be in the range of 75%-80%. (The American Hospital Association uses a guideline of 75% (2000) and Johnson and Johnson indicated that they would like to see utilization of 75 % for individual surgeons and 80% for service blocks). To realize utilization in excess of 80% would require extremely good supporting systems, particularly with respect to bed availability, pre admissions testing and the PACU access.

Premier Health System's utilization, in essence, is right about at the average and as such has some opportunity to increase its surgical activity. If you assume that on the average 2060 monthly hours are available for surgery (excluding Room 11) at 75% utilization you would be performing 1545 hours of surgery a month. At the current 66.8% utilization this would leave you availability to perform another 169 hours of surgery. (In actuality, if you consider the surgeons/ services that are operating beyond the 75% threshold and you assume that their level of activity will continue to exist, **189 hours for surgery would be available to reach the 75% target**). (See The Identification of Hours Available at Target OR Utilization Range of 75 % and 80% worksheet in the Identification of Hours Available section). To reach the more ambitious target of **80% utilization**, viewing the same worksheet, **292 hours for surgery would be available**.

The most obvious way to provide this availability is to **take "Unused" block time away** from surgeons/services that are not meeting the 75%-80% threshold. This is often difficult because of the sensitivities and perceptions involved and the fear of having a disgruntled surgeon/group take their business elsewhere. To accomplish this, it will require close coordination between the chiefs of service and support for the OR Committee to increase its threshold target for block retention to 75% -80% and reallocate block time periodically, preferably every six months. Likewise, Anesthesia should be given the authority to make interim adjustments to the allocation of time as they become aware of changing needs and demands.

Another option is to **increase the block release time** (the number of days in advance when the block can be relinquished for other surgeons/services to use) for those services/surgeons that are not meeting the 75%-80% threshold. The intent here is that others who have a need would be able, with advanced notice of availability, to be able to book cases they normally wouldn't be able to perform in their allotted block. In addition, a greater release time

would give some of the newer, rising surgeons more availability to perform their surgery and better insure that their practices grow within the confines of Premier. The overall intent is to increase usage and thus utilization of time that may go unused. An issue that may make this difficult is the timing of the assessments, tests and the changing nature of the patient's condition.

In looking at the current utilization of OR time, to try to ascertain **where the availability may lie, the following table reveals performance for the four month period**. (Note that Rm.11 hours assigned is not incorporated in this table, but do exist in other worksheets):

Surgeon/Service	Block Utilization	Primary Hr. Utilization
Univ Surg/ SS	**76.2%**	**76.2%**
VF	**39.3%**	**46.7%**
Fin	**66.4%**	**122.0%**
Jar	**58.1%**	**64.5%**
Slo**	**79.7%**	**97.2%**
Dre-Can	**63.0%**	**68.8%**
Hou	**35.3%**	**38.7%**
Sch	**57.1%**	**66.0%**
Gynecology	**54.5%**	**64.7%**
Eye Institute	**66.6%**	**84.1%**
Nus	**83.3%**	**215.3%**
Orthopaedics**	**79.5%**	**79.5%**
Trauma	**57.0%**	**658.1%**
Urology	**78.3%**	**78.3%**
Plastics**	**70.0%**	**82.4%**
Oral Surgery (w. Nus)	**58.3%**	**80.6%**
Cardiac Surgery	**69.6%**	**69.6%**
RadOncol	**42.7%**	**42.7%**
Pediatric Surgery	**53.0%**	**83.7%**
Neurosurgery	**20.2%**	**20.2%**
***(Less Rm 11 Hrs)**		

Based upon the above the services/surgeons that appear to have the most availability, just focusing on the utilization of primary hour time, are as follows:

Neurosurgery- 20.2% utilization
Houston- 38.7% utilization
VF Group- 46.7% utilization
Gynecology 64.7% utilization

Jar at 64.5% utilization and **Sch at 66.0%** would also need to be considered.

(Note: although Radiation Oncology's usage is low it only amounts to one assigned hour of block time a week).

To give you a sense for what this means in potential availability of time the following table is presented:

Surgeon/Service	Avg. Mth. Block Hrs Assigned	Average Mth. Hours used (Primary and Block)	Difference (in Hours)
VF	**112.8**	**52.6**	**60.2**
Gynecology	**326.5**	**211.2**	**115.3**
Neurosurgery	**205.5**	**41.5**	**164.0**
Cardiac Surgery	**225.5**	**156.9**	**68.6**
Univ. Surg/SS	**305.5**	**233.0**	**72.5**
Oral Surgery (less Nussbaum)	**42.5**	**27.5**	**15.0**

The utilization of the first four services/surgeons cited above amounts to 53.1%. Hence, they present areas of availability and opportunity.

To put utilization in its perspective and give you some sense for how the hours are allocated and used (based on my grouping of surgeons into a service designation), the following table was also prepared:

DISTRIBUTUION and GENERAL USE OF BLOCK TIME (W/O Rm.11)

SERVICE	% of the Block Hrs Assigned	% of Primary Hrs Used
General Surgery	**25.6%**	**29.9%**
Orthopaedics (with Rm 11)	**20.7%**	**13.2%**
Orthopaedics (w/o Rm 11)	**13.2%**	**14.9%**
Gynecology	**15.1%**	**15.4%**
Cardio-Thoracic	**10.4%**	**11.4%**
Neurosurgery	**9.5%**	**3.0%**
Urology	**6.3%**	**7.8%**
Plastics	**4.2%**	**4.9%**
Otolaryngology	**2.5%**	**2.5%**
Dentistry/Oral Surgery	**2.2%**	**2.8%**
Ophthalmology	**1.7%**	**1.9%**
Pediatric Surgery	**1.3%**	**1.7%**
Trauma	**0.2%**	**2.4%**
Radiation Oncology	**0.2%**	**0.1%**
Podiatry	**0.0%**	**1.3%**
Pain Management	**0.0%**	**0.0%**
Transplant	**0.0%**	**0.0%**

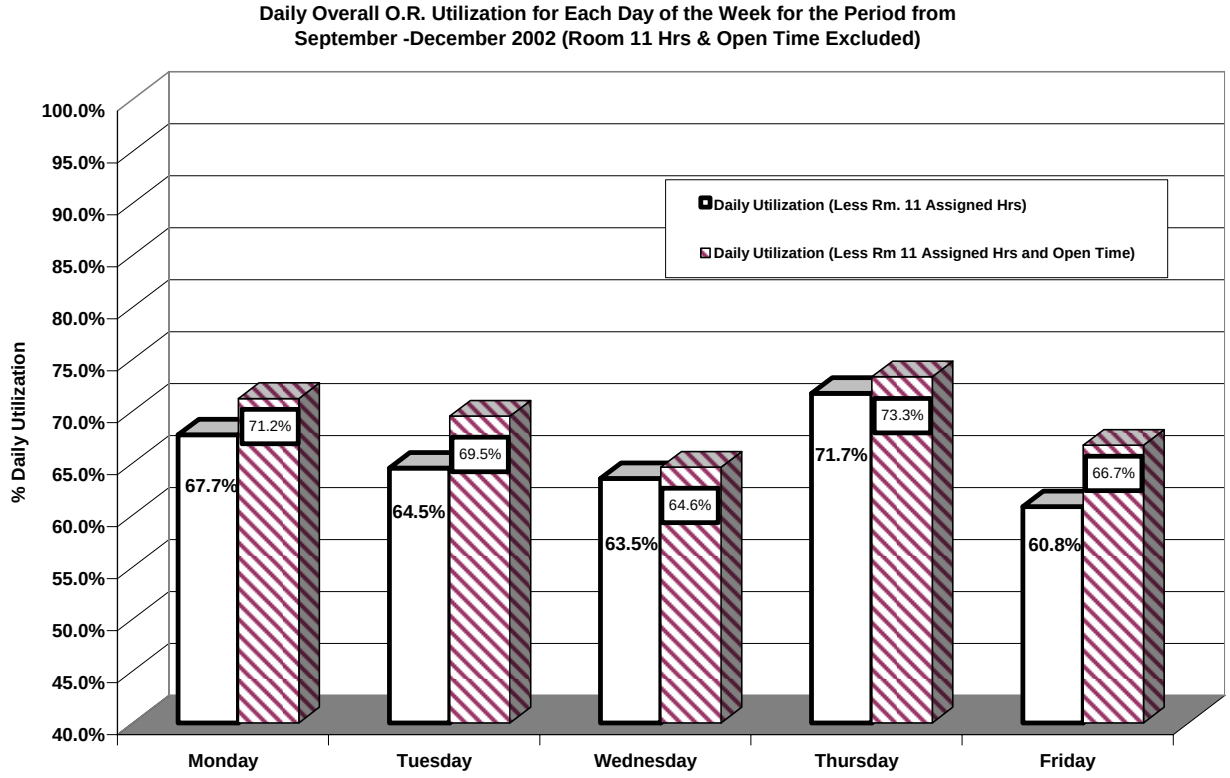
As you can note the services with the highest percentage of allocated (assigned block) time (less Rm. 11 assigned hours) are:

General Surgery-	**25.6 % of block time**
Gynecology-	**15.1%**
Orthopaedics (w/o Rm 11)-	**13.2%**
Cardiac Surgery	**10.4%**
Neurosurgery-	**9.5%**
Urology-	**6.3%**
Plastics-	**4.2%**

The service with the largest discrepancy between time allocated and time used is as follows:

Neurosurgery- 6.5% difference

In looking at the **day-of –the-week –activity** to ascertain where the specific availability lies, the following analysis was also performed:



As is evident, for this period, excluding Rm. 11, **Wednesday and Friday are the days of lowest utilization.**

With respect to each designated service and their daily OR utilization for each day of the week the following was further revealed:

	Monday	Tuesday	Wednesday	Thursday	Friday
Orthopaedics*	94.8%	85.9%	91.2%	93.4%	44.7%
General Surgery	84.7%	77.0%	59.3%	64.7%	85.0%
Otolaryngology	84.4%	21.8%	57.1%		99.2%
Gynecology	65.9%	60.3%	56.9%	66.6%	77.1%
Trauma					223.6%
Urology	52.1%	113.2%	85.4%	89.5%	76.6%
Neurosurgery	8.7%	35.2%	1.6%	45.9%	10.5%
Plastics	72.4%	57.5%		77.4%	82.8%
Ophthalmology	44.4%	66.3%	61.0%		155.5%
Dentistry/Oral Surgery				60.2%	140.8%
Podiatry					
Cardio-Thoracic	84.0%	96.2%	78.7%	71.1%	35.6%
Radiation Oncology			40.6%		
Pediatric Surgery	54.2%		68.5%		

Again, as is evident, Friday is a day of low utilization for Orthopaedics, as is Tuesday for Otolaryngology, Monday for Urology, Monday and Wednesday for Neurosurgery, Wednesday for General Surgery, and Monday for Ophthalmology.

With respect to the surgeons themselves and their activity, an analysis was also conducted of the **number of cases performed** for this period to determine who the most active surgeons were in terms of cases and hours of surgery performed. This assessment identified the following :

30 Most Active Surgeons in Number of Cases Performed-Including Weekends

SURGEON	Sept	Oct.	Nov.	Dec	Total Cases
Cat	53	53	36	13	155
Ful	30	39	23	24	116
Kri	26	27	29	16	98
Hum	0	29	34	31	94
Cat	34	23	16	19	92
Fin	26	28	21	15	90
Slo	20	25	23	20	88
Bla	28	23	25	8	84
Ier	24	22	20	17	83
Hoel	22	19	22	19	82
Ata	16	15	27	23	81
Dre	16	20	23	20	79
Pel	29	16	8	19	72
Fah	16	28	12	12	68
Fee	17	18	16	11	62
Sei	10	19	18	15	62
Mar	14	10	12	14	50
War	17	10	17	6	50
Kon	12	10	20	7	49

Lan	**12**	**19**	**10**	**8**	**49**
Sim	**1**	**4**	**21**	**22**	**48**
Aik	**5**	**9**	**17**	**14**	**45**
Mat	**10**	**17**	**5**	**12**	**44**
Roc	**16**	**13**	**5**	**10**	**44**
Sim	**7**	**16**	**11**	**8**	**42**
Ant	**9**	**13**	**9**	**7**	**38**
Ale	**9**	**10**	**9**	**9**	**37**
Car	**8**	**9**	**12**	**5**	**34**
Mac	**8**	**10**	**5**	**9**	**32**
Vil	**6**	**10**	**12**	**3**	**31**

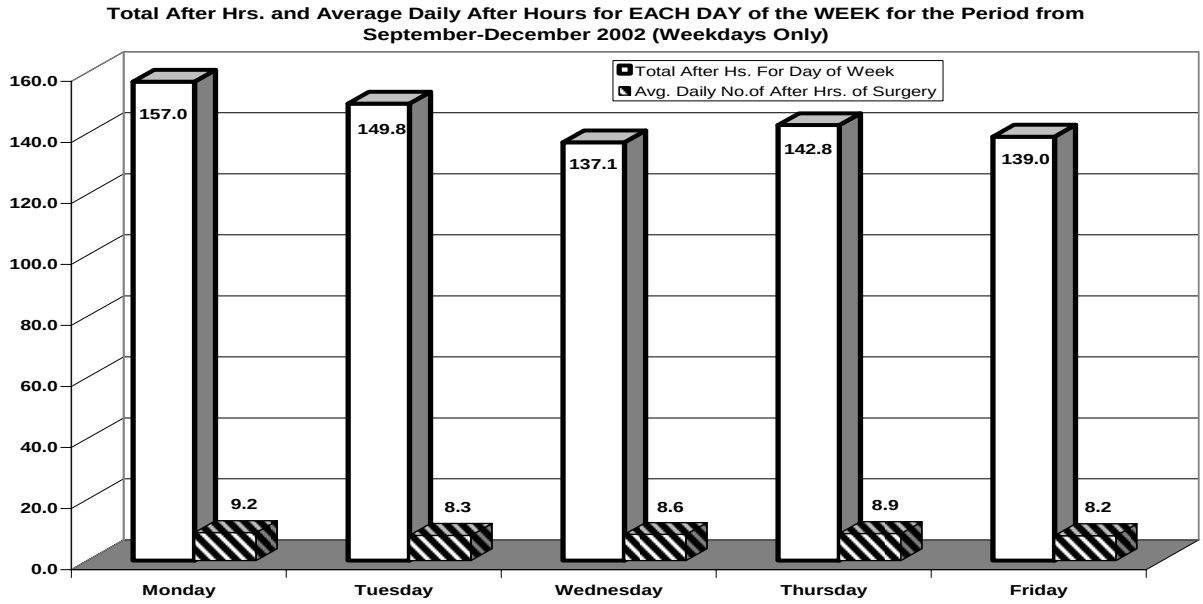
In terms of the **number of hours of surgery performed**, the following analysis revealed the 30 Most Active Surgeons (weekend Activity excluded):

30 Most Active Surgeons in Number of Hrs. of Surgery Performed (No Weekend Activity);

Doctors	TOTAL Primary Hrs. Used	TOTAL AFTER HRS Used	Total Hours
Cat	**240.7**	**40.6**	**281.2**
Slo	**252.6**	**15.6**	**268.2**
Ful	**210.1**	**44.2**	**254.3**
Sim	**182.4**	**24.0**	**206.4**
Ier	**201.5**	**1.5**	**203.0**
Pel	**164.3**	**30.1**	**194.4**
Sei	**160.48**	**23.85**	**184.3**
Cil	**168.1**	**16.1**	**184.2**
Kri	**180.8**	**3.2**	**184.0**
Fee	**150.61**	**31.28**	**181.9**
Cata	**158.06**	**21.3**	**179.4**
Hum	**165.59**	**8.52**	**174.1**
Fin	**169.1**	**0.0**	**169.1**
Ata	**152.43**	**15.78**	**168.2**
Lot	**136.62**	**25.01**	**161.6**
Bla	**111.25**	**46.51**	**157.8**
Fah	**134.21**	**7.14**	**141.4**
Aik	**120.78**	**2.6**	**123.4**
Roc	**118.44**	**4.1**	**122.5**
Ant	**108.53**	**11.9**	**120.4**
Mat	**113.46**	**5.1**	**118.6**
War	**92.66**	**11.1**	**103.8**
Dre	**92.63**	**9.72**	**102.4**
Hoe	**92.04**	**7.33**	**99.4**
Lan	**84.98**	**14.22**	**99.2**
Car	**94.23**	**3.3**	**97.5**
Sim	**81.8**	**13.51**	**95.3**

Ale	**91.27**	**2**	**93.3**
Mar	**86.97**	**4.6**	**91.6**
Mac	**87.25**	**4.2**	**91.5**

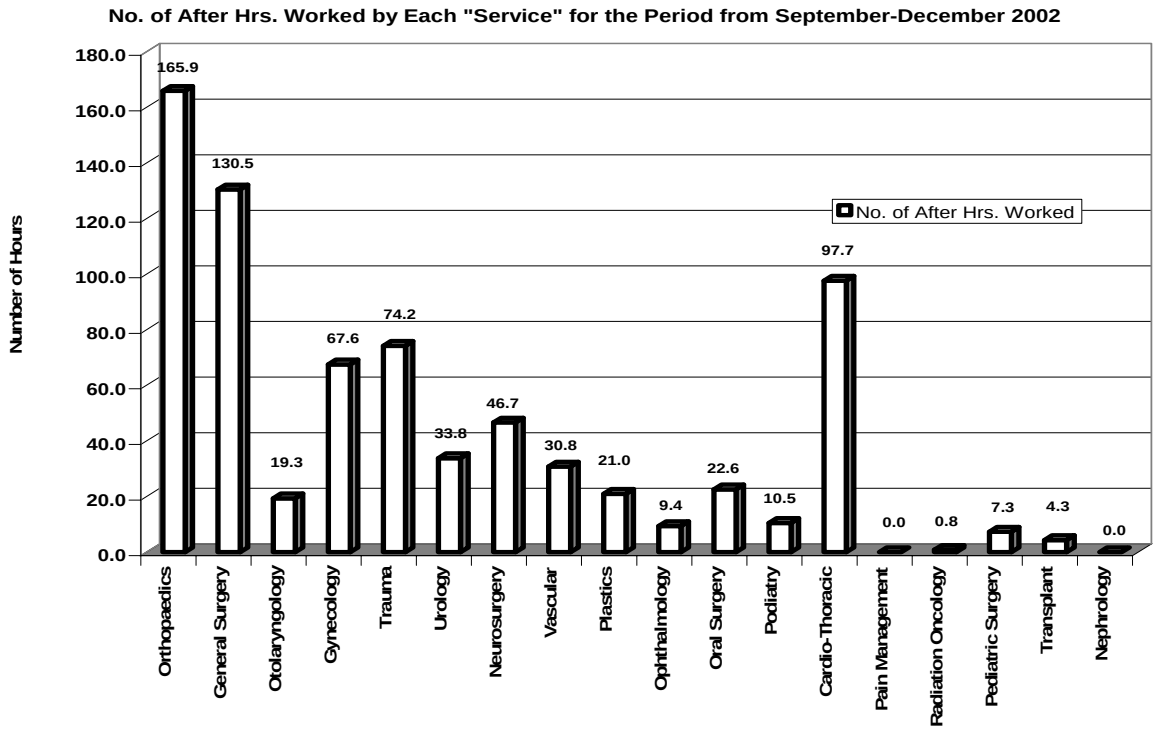
A final analysis was conducted of **After Hour activity** (essentially the surgical time before 8:00am and after 6:00pm) to determine the amount of surgical activity since it may, in some instances, be an indicator of the need for more surgical time. The following was revealed:



As the above indicates Monday is the day of greatest after hour activity, but the week is pretty consistent, on an average basis, from day to day.

With respect to the actual services themselves and their use of surgical time beyond the "normal" working hours, the next chart reveals the following:

AFTER HRS. WORKED BY EACH SERVICE:



Orthopaedics, who is currently requesting more Block time to accommodate their new surgeons, performs the most number of "After Hour" surgery, followed by General Surgery and Cardiac Surgery.

With respect to the surgeons themselves, the following surgeons performed the most "After" Hour Surgery during this period:

Surgeon	**No. of After Hrs**
Bla	**46.5**
Ful	**44.2**
Cat	**40.6**
Fee	**31.3**
Pel	**30.1**
Mon	**28.3**
Lot	**25.0**
Sim	**24.0**
Sei	**23.9**
Cata	**21.3**
Kon	**17.3**
Eak	**16.7**
Cil	**16.1**
Ata	**15.8**
Slo	**15.6**
Lan	**14.2**

Sim	**13.5**
Wei	**12.4**
Cle	**12.2**
Ant	**11.1**
Ros	**10.6**

Since all of the above is intended to show that availability currently exists, it is recognized that additional guidance and direction will be necessary to assist the OR Committee and the Chief of Surgery in orchestrating the changes necessary to optimize the case time effectiveness process and strive to reach a targeted goal of 75%-80% utilization.

Scheduling Rules:

Increasing case time effectiveness will require the imposition of more specific and focused scheduling rules as well as the possible redesign of supporting processes. It will place the responsibility on the shoulders of everyone involved in the day to day operation. It will probably necessitate minimizing between case delays, ensuring first-case on time starts and it may require reconfigurations in staff utilization and composition, including the PACU. And, it most definitely will require the following:

- Revised block assignments
- Revised and documented scheduling rules and regulations
- Consistent monitoring of turnaround times
- Monitoring of how cases are prioritized
- Establishing quality indicators, such as late starts, block utilization and case lengths exceeding block time allotment

One of the things that may help is establishing guidelines for services to allocate elective service time to individual surgeons. This would require the development of a prioritization scheme where the highest priority number will receive first choice. A formula like the following could be used for revising the system as to who gets first choice of blocks and for readjustment of block times.

Total Surgery Hours per month + Total Cases per Month +Total Years of Seniority = Priority Number

With respect to the rule modifications and guidelines the attached draft may serve as starting point from which to identify and address some of the enhancements that may be necessary. They focus on clarification of start time, day of surgery related activities, block time parameters, and the scheduling process and related issues such as tardiness. Considerable discussion and support will probably be necessary to ensure that any changes are viable.

Pre Admissions Process:

The **rethinking and subsequent redesigning of the Pre-Admissions process** may also present an opportunity to reduce operating theater delays and cancellations, thereby improving O.R. utilization. The function of preadmission testing is to ensure that initial assessment procedures, such as X-Rays, are completed and the record is forwarded to the OR before the

patient's arrival. It ideally should be one-stop shopping, encompassing all dimensions of preoperative screening. This includes the anesthesiologist's interview, preoperative teaching, and laboratory, radiology and electrocardiogram services. If additional physician consults are required, such consults must be available at the time of preadmission, leaving no consult or clearance elements to be performed in the immediately preoperative stage.

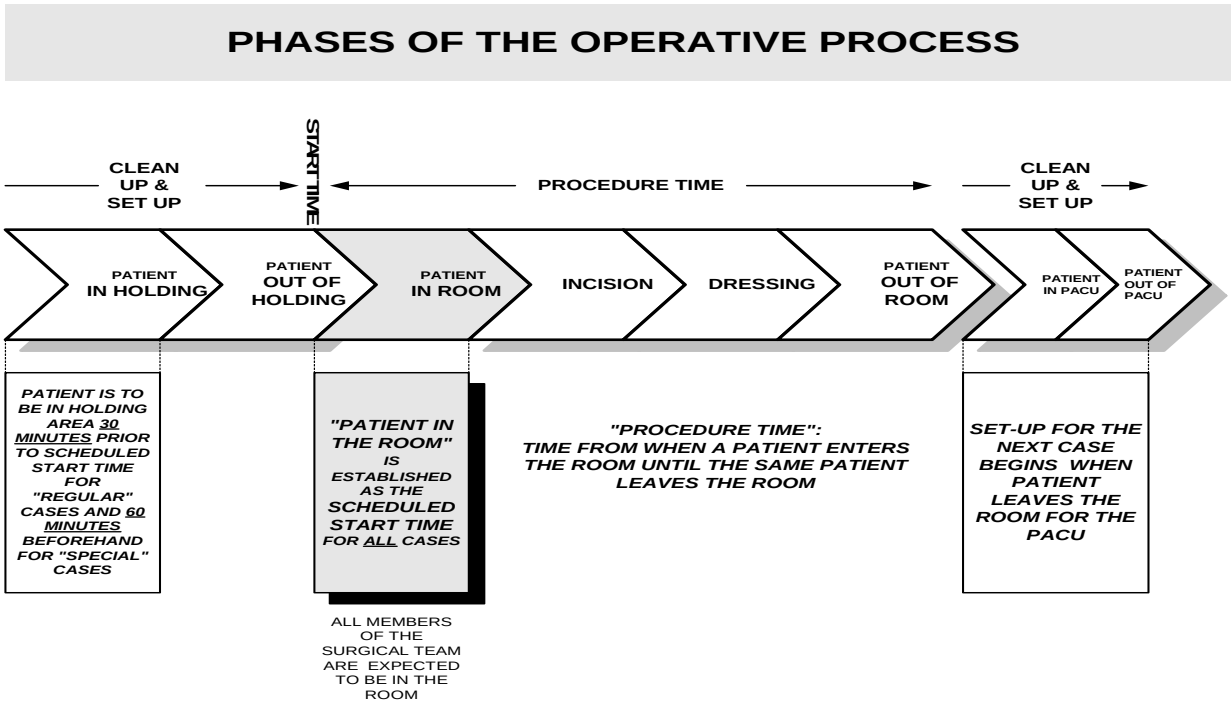
The Pre-Admissions process at Premier is fragmented with approximately only 20% of the patients being evaluated at the 3 Premier Center site. Both the Anesthesia and Nursing staffs make a herculean effort to gather all the necessary consents and clearances and perform the appropriate assessments, but with 80% of the patients coming from other surrounding locations it is very difficult to ensure that all the necessary documentation is received and in order. The process is perceived by most that are involved to be a major bottleneck. For Anesthesia, in particular, it often forces them to conduct their initial assessment (rather than a review) directly in the Holding Area. For Nursing, it often has to look on-line or through sheaves of paperwork to ascertain that the tests required are completed. The consequences of failing to complete the requested tests might include having to perform the test on a STAT basis on the day of surgery, delaying the surgical schedule or causing a cancellation.

One of the alternatives suggested to better facilitate and monitor the patients prior to surgery was designating a site(s) that would perform the preadmissions testing at no cost to the patient. It is felt that this would greatly minimize delays and cancellations the day of surgery. This concept, should be investigated further to determine how resource intensive and cost effectiven it is.

Start Time Defined:

One fundamental step that may help as well to reduce delays and improve utilization is agreeing on a **definition of "start time".** In a report on best performing OR's, *OR Manager*© described a hospital that during a campaign to cut turnover time discovered the root of another problem: none of the major players agreed on what a 7:30 am start time meant. Was the start time the time of first incision? Was it the time of the patient's arrival in the OR? This particular hospital got everyone to agree that the start time was the when the patient was ready for induction.

Because some confusion exists at Premier Health System as to what constitutes start time, an accepted definition that has been used by the Anesthesia Clinical Directors (AACD), D.J. Sullivan and the Governance Committee should be considered. In reflecting on the options they agreed on the following: **"Patient in the Room Time"** is be established as the scheduled start time for all cases. This is the time when the patient enters the Operating Room and all members of the surgical team are expected to be in Room at this time. Graphically it is shown as follows:



In so doing, it is important to determine what is expected of each participant, where they should be and what should be done if they are not present. Terms and definitions should be consistent with the computer system definitions.

Information System:

In addition, and as has been identified already, the need exists for an upgrade to OR Information system to enable the Scheduling Office to maximize the use of such a system to enable it to generate a greater variety of forms and reports and perhaps provide a patient tracking and broader viewing and access capability.

General:

As the Healthcare Advisory Board recently pointed out, **"Scheduling just one additional case daily can result in as much as $1.8 million in additional annual revenue"** (Deborah Lang- Kuitse, 2001). On-time starts and turnover time in the minds of many sources, likewise represents a substantial opportunity to streamline work processes, increase revenue and reduce costs. The Healthcare Advisory Board, further quantified this opportunity by noting that the average hospital only experiences 27 percent on time case starts while best in class institutions experience 76% on time starts.

To this end, the next phase of the assessment will focus on evaluating the processing of PAT and Same Day Surgery patients, with emphasis on the impact that incomplete information causes on the day of surgery activities, particularly delays in the Operating Room. Since, as noted, only 20% of the PAT patients are seen at 3 Premier considerable potential exists for delays that can impact the surgical schedule despite the significant efforts of the staff.

In addition, an assessment is underway to evaluate first and subsequent delays and room turnaround to determine the reasons why and the impact it has on the processing patients through the OR.