University of Michigan Health System

Program and Operations Analysis

A Study of the Operating Room Assistants and Perioperative Technicians Productivity
Final Report

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Executive Summary

Introduction

The Operating Rooms (OR) of the University of Michigan Health Systems (UMHS) employs Operating Room Assistants (ORAs) and Perioperative Technicians (PTs), who perform tasks such as patient pickups, OR cleaning, and general stocking. Many of the duties defined in the ORA and PT job description are similar and overlapping. There is a perception that when the ORAs are absent, other employees including the PTs have been performing duties normally performed by the ORAs. The ORAs have also reportedly experienced an excessive amount of downtime. The purpose of this project was to study the productivity of the ORAs and the PTs and determine the validity of this perception.

Methodology

The first phase involved gathering data by regular visits to the OR. This data collection phase lasted from February until Mid-March. Four methods were used for data collection:

- Shadowing: Consisted of following an ORA or PT employee for a 2 to 4 hours and recording the tasks performed and their times.
- Floating: Consisted of recording radio requests and their times, and then determining who completed the request.
- Beeper Sampling: ORAs and PTs were given a beeper and recorded the task being performed each time the beeper vibrated.
- Random Sampling: The project team periodically walked through the OR recording the tasks being performed at the time and by whom (ORA or PT employee).

At the conclusion of data collection, the analysis phase began and lasted for about 3 weeks. Because of the lack radio usage and Beeper Sampling malfunctions, the findings and conclusions in this project are based on the Shadowing and Random Sampling data, although results from Floating and Beeper Sampling can be found in the appendices. Findings regarding Shadowing are based on approximately 14 hours of data for ORAs and 8 hours for PTs. Random Sampling findings are from 170 ORA and 59 PT observations.

Findings

Downtime was found to be a significant factor for both ORAs and PTs. From the Shadowing data, the downtime for ORAs and PTs was calculated to be 40% and 28% respectively, and was weighted towards the average number of hours each employee worked per week. From the Random Sampling data, the downtime was calculated to be 51% for ORAs and 19% for PTs. During downtime, employees have most frequently...
been located in one of the break lounges, or near the windows on the west side of the building.

Despite the similarities in ORA and PT job descriptions there is little coordination between the two to complete critical tasks such as OR cleaning and trash removal. Lack of coordination can lead to incomplete tasks or an excessive number of employees responding to a request. For both groups, there are employees who work harder than others. Some employees actively pursue tasks to perform while others wait to be asked.

There was no evidence that ORAs or PTs were unavailable or unreachable at critical times. No employees were observed turning off radios, consistently failing to respond to radio calls, or exiting the OR unit so that they could not be found. However, some ORAs were observed taking lunches and breaks at the same time, leaving an inadequate amount of staff until they returned. This is somewhat contrary to management’s perception that ORAs are avoiding work.

**Recommendations**

To achieve the goals of this study, the OR should:

- A 20-25% downtime should be considered acceptable. This will ensure the availability of ORAs and PTs when tasks are about to begin.
- Appoint three Lead PTs, one for each core, and one Lead ORA. The responsibilities of these positions include delegating tasks and coordinating efforts between groups.
- To reduce waiting time, patient pickup requests should only be made when paperwork is complete and the patient is ready
- Permit a maximum of two ORAs and four PTs on break simultaneously to ensure the OR is not understaffed
- Permit a maximum of two employees cleaning an operating room unless absolutely necessary; this will encourage the ORAs and PTs to be more dispersed, making them more available for other tasks
- Make no changes to the scheduling process because there were no observed problems with the current system
Introduction

The University Hospital (UH) Operating Rooms (OR) of the University of Michigan Health Systems (UMHS) employs Operating Room Assistants (ORAs) and Perioperative Technicians (PTs), who perform many similar and overlapping tasks. These overlapping tasks include OR cleaning, stocking/inventory, patient pickups, and pre-op shaves. There is a perception that when the ORAs are absent, other employees including the PTs have been performing duties normally performed by the ORAs. The ORAs have also reportedly experienced an excessive amount of downtime, or time spent not contributing to the operations of the OR unit. The purpose of this project was to study the productivity of the ORAs and the PTs. The productivity being measured included the coordination between the ORAs and the PTs and also the concentrations of downtime throughout the day and locations of employees during that time. The purpose of this report is to present our findings, conclusions, and recommendations.

The following are some similarities and differences between ORAs and PTs:

- The UH Operating Rooms currently employs 6 ORAs and 22 PTs:
- Both jobs include similar and overlapping tasks within the Operating Room unit, including stocking inventory, transporting patients, and cleaning the operating rooms
- Tasks exclusive to the ORAs are patient pickups and pre-op shaves, except when the ORAs are not present
- Tasks exclusive to the PTs are picking case supplies and prepping operating rooms
- The ORA is a union position that requires on-the-job training
- The PT position is a non-union position created in 1992 to provide more versatile and technical OR support
- The PT position requires 5 months of training in a Medical Assistant program
- All current ORAs have been offered PT training
- The current scheduling system is staggered, with approximately 30 minutes between the arrival of 1-4 employees

A study performed in 1997 identified an ORA downtime percentage of approximately 42%. In that study, ten ORAs and no PTs were studied, and four of the ORAs studied have since left. This resulted in scheduled lunches that required the employee to check in and out. This eliminated the possibility of ORAs going on break as a group.

There is no maximum number of employees that can be cleaning an individual OR at any the same time. A study performed in C.S. Mott Children’s hospital in 2003 found that it takes two PTs an average of 6.8 minutes to clean an operating room.

Project Plan and Scope

This study took place in the UH Operating Rooms (OR), Cores A, B and C, and began in early February. The Program and Operations Analysis team’s main focus was examining the productivity of the Operating Room Assistants (ORAs), their interaction with the PTs, and their downtime. The tasks of the ORAs include (but are not necessarily limited to)
stocking supplies, transporting patients, removing trash and cleaning the ORs. The other parties involved in this project were PTs, Core Managers and Clinical Nurses within the OR. The scope of the project included all of the tasks listed above and excluded any tasks that were not duties of the ORAs and the PTs. The ORA shift from 10:30 PM to 6AM was eliminated from this study because of complications within the observation process.

**Key Issues**
There were many concerns held by OR managers about the role of the ORAs such as:
- Overlapping work done between the ORAs and the PTs
- Concerns that the downtime is excessive
- Perception that the ORAs neglect certain duties
- Possible absence of the ORAs during non-critical times

**Goals and Objectives**
The purpose of this project is to improve the effectiveness of the ORAs by:
- Improving coordination between the ORAs and the PTs
- Creating effective scheduling for ORAs and PTs
- Reducing unnecessary idle time for the ORAs and the PTs
- Reducing delays in patient care caused by lack of adequate staff
- Providing a future productivity reference tool that can be used to evaluate proposed changes

**Approach and Methodology**
The study was performed in the following stages: data collection, data analysis and recommendation development.

**Data Collection**
During the first phase we:
- Observed ORAs and the PTs in the Operating Room Unit (from a respectful distance to avoid discomfort and unnecessary distractions)
- Collected data on the ORA and the PT productivity. Each team member collected data for 6-10 hours a week over the course of 6 weeks
- Collected data from a sample of all the ORA shifts over a 24-hour time period
- Instructed the ORAs and PTs to collect task information, using a random beeper to determine sample times
- Received information regarding staff schedules
- Conducted informal interviews with the ORAs and PTs
- Performed a literature search to determine previous methods and results
- Held meetings with client and coordinators on a weekly basis

Four methods were used for data collection; a Floater method, a Shadower method, a Beeper Sample method, and a Random Sample method.
**Shadower/Floater Sampling**
The Floater and Shadower methods were initially the key means for gathering data. In the Shadowing method, the team member followed an employee and recorded the time, task performed and duration of the task. ORAs were shadowed for 14 hours and 3 minutes, and PTs were shadowed for 7 hours and 49 minutes. The Floater method required a team member to carry a radio used to monitor the communications between management and employees. When a task was requested over the radio, the team member would record when it was requested, when it was completed, and by whom. The forms used for these two methods can be found in Appendices D and E.

**Beeper Sampling**
The two other methods involved beepers and random sampling and were used in the last two weeks of data collection. Employees were given a beeper that went off randomly four times every hour and then recorded their current activity at that time. There were 273 observations collected for ORAs and 450 observations for PTs. The forms used for the beeper sample method can be found in Appendix F.

**Random Sampling**
For the Random Sampling method a team member selected 2-4 ORAs or PTs to sample at random times throughout their shift. The team member would then observe and record the employees’ activity at those times. A total of 170 observations for ORAs and 59 observations for PTs were made using the Random Sample method. The form used for the random sample method can be found in Appendix G.

**Changes to Data Collection**
Several changes were made to the data collection. The floater method turned out to be ineffective because the radio is mainly used for announcing breaks and lunches. There was very little data that could be collected using this method. Consequently, the data collected using the Floater method is not included in the analysis. The Beeper data was also discarded because of beeper malfunction and numerous errors in filling out the forms. A summary of the data collected using the beepers are provided in Appendix B.

**Data Analysis**
In the data analysis phase, graphs depicting the typical workloads for an ORA and a PT were created using Microsoft Excel. Flow charts for critical tasks were generated and are presented in Appendix C. Quantitative results, such as percent downtime, were also calculated. From the graphs, we determined the downtime of ORAs and PTs on a typical day. This information led to recommendations regarding the scheduling and coordination of the ORAs and the PTs, and also recommendations regarding specific tasks.

**Findings and Conclusions**
While all employees were usually friendly and helpful, the student team experienced a general feeling of mistrust, especially from employees who participated in the 1997 downtime study. A friendly approach by the team helped ease mistrust and increased the
accuracy of our data. However, some data had to be discarded because the employee studied insisted on the observers helping with tasks.

**Downtime Comparison (ORA vs. PT)**

Downtime was found to make up a large portion of both the ORAs and PTs time. Approximately 30% of observed downtime occurrences lasted longer than 0:30 for ORAs and 0:10 for PTs. Observed ORA and PT downtime ranged from 0:03 to 1:10 and 0:03 to 0:21, respectively. Downtime is inevitable by the nature of each position; however, downtime exceeding 0:30 suggest that employees avoid tasks. During downtime it was found that employees were most likely to be located in the anesthesiology lounge, the physician’s lounge, the nursing lounge, or near the windows on the north side of the building.

**Figure 1: ORA Downtime Length**

![ORA Downtime Length Proportion](chart)

The percentage of downtime observed is summarized in Table 1 and also visually in Appendix A.

**Table 1: Downtime Percentage Calculations for ORAs and PTs**

<table>
<thead>
<tr>
<th>Method</th>
<th>ORA (95% Confidence)</th>
<th>PT (95% Confidence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shadowing</td>
<td>40% +/-3.37%</td>
<td>28% +/-4.07%</td>
</tr>
<tr>
<td>Random Sample</td>
<td>51% +/-7.48%</td>
<td>19% +/-3.36%</td>
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</tbody>
</table>

These results were calculated by weighing the observations according to the hours/week a person worked. This would take into account those employees who were studied longer and only account them for them the fraction of the total number of hours worked by an entire group (i.e. ORAs or PTs). This was then used to calculate a 95% confidence interval. There are significant differences in the amount of reported downtime depending...
on which sampling method was used. Those subjects that were being shadowed had a
tendency to act busier then they would normally which is what would be expected. These
results may fall under the Hawthorne effect; people in working situations are more
efficient and stay busier when they know that they are being studied. However, we found
that although ORA downtime derived from Random Sampling was higher than downtime
from Shadowing, PT downtime decreased when Random Sampling was used.

In Figure 2 the typical amount of time in an hour that is downtime can be visualized
along with the appropriate confidence intervals.

**Figure 2: ORA/PT Downtime Comparison (Average Minutes/Hour)**

![Figure 2: ORA/PT Downtime Comparison (Average Minutes/Hour)](image)

Although the confidence intervals for the ORA downtime do not overlap, they are very
close (21.0 min/hr, 26.0 min/hr) and (26.1 min/hr, 35.0 min/hr) for the shadowing and
random sample respectively. This shows that the downtime for the ORAs would fall
somewhere between 26.0 min/hr and 26.1 min/hr or approximately 43%. This is also the
case for the PT downtimes, (9.4 min/hr, 13.4 min/hr) and (14.4 min/hr, 19.2 min/hr) for
the random sample and shadowing respectively. From these intervals the PT downtime
would fall somewhere between 13.4 min/hr and 14.4 min/hr or approximately 23%.
Figure 4 is a summary of task distributions for ORAs using the different data collection methods.

**Figure 4: Task distributions for ORAs**

Downtime is significantly lower during shadowing than random sampling. Patient pickups are also much more prevalent during shadowing, suggesting that ORAs are busier when shadowed.

During patient pickups, ORAs experienced delays because of incomplete paperwork and unprepared patients. Currently, ORAs wait approximately 10 minutes after receiving a request for a pickup to account for this delay. However, additional delays of up to 15 minutes are still common after the ORAs arrive for the pickup.

Figure 5 shows the PT task distribution for the Shadowing and Random Sampling methods is shown.
The job tasks are more evenly distributed as compared with the ORA task distribution in Figure 4. The predominant tasks performed by the PTs are OR Cleaning and Picking Cases while Downtime is the third most frequent.

**Coordination**

From the Shadowing observations we found the following regarding coordination between ORAs and PTs:

- Members of both groups are capable of performing tasks that are supposedly unique to the other
- Based on the tasks performed by each, insufficient communication is apparent between ORAs and PTs
- For both groups, some employees will actively pursue tasks more than others.

**Availability**

We found the following regarding availability for ORAs and PTs:

- There was no evidence that ORAs or PTs were unavailable or unreachable at critical times.
- No employees were observed turning off radios, consistently failing to respond to radio calls, or exiting the OR unit so that they could not be found.
- The radios keep employees in contact with management even when they are in one of the lounges.
- Some ORAs take lunches and breaks at the same time, leaving an inadequate amount of staff until they return.
- The current scheduling system does not create an inadequate amount of staff present at any observed time
Recommendations

An appropriate amount of downtime for the ORAs should be around 20-25%. This was calculated by assuming that the downtimes that were greater than 15 minutes could be reduced to 15 minutes and those durations that were less than 15 minutes were the result of the ORA being available for a task about to begin. This is consistent with benchmarks where operating rooms are trying to achieve balanced utilization and productivity. If downtime were 0% this would result in longer turnovers and increased bottlenecks throughout the UH OR. Consequently a downtime of 20-25% for ORAs and PTs would create a level of availability for handling of critical situations.

To reduce the amount of downtime and to address the goals and objectives of this project, the following are recommendations based on our findings and conclusions.

Maintain Current Scheduling Practices
Since the current staggered scheduling system did not create a lack of staff or any other observed problem, we do not recommend any scheduling changes at this time. However to ensure adequate staff, we recommend that no more than two ORAs and four PTs be on break at any time.

Reduce Downtime through Lead ORA
Since the current amount of idle time for ORAs is significantly larger than PTs, reducing their downtime is our immediate focus. Therefore we recommend that one of the current ORAs, designated by the Clinical Nursing Manager, be assigned as a Lead ORA. This position should enable him or her to assign the other ORAs tasks and ensure that they are performed. This position should not be assigned to any specific location so that the Lead ORA has the flexibility to manage and coordinate ORAs in all areas. The Lead ORA should be in daily, direct communication with the Clinical Nursing Supervisor to establish which tasks should be performed that particular day. The Lead ORA should also be responsible for ensuring that the ORAs are available at all times, that no tasks are neglected, and that downtime is not excessive. By appointing this position, overall idle time will be reduced since ORAs will be assigned tasks more frequently.
**Recommendations for Individual Tasks:**

**Patient Pick-ups**
A request for a pickup should be made only when paperwork is complete and the patient is ready for transport. This will significantly reduce the amount of time required for a patient pickup. Ensuring that all proper forms are filled out for transport will reduce unnecessary time spent correcting these errors.

**Specimen Transport**
The front desk should notify the appropriate ORA as soon as time sensitive specimens arrive. This delivery should be made as soon as possible after the request call is made.

**Operating Room Clean**
Based on the findings from the Mott Children’s Hospital, no more than two PTs/ORAs should be cleaning a room at a time. This will optimize the employee efficiency.

**Improve Coordination between ORAs and PTs**
Since the combination of the ORAs and PTs is not feasible at this time, we recommend that three Lead PTs be appointed, one for each core, similar to the Lead ORA. In addition to duties outlined for the Lead ORA, the Lead PTs would be responsible for communicating and coordinating with the Lead ORA so that tasks can be delegated appropriately and efficiently between the two groups. At times when there is only one ORA working, the Lead PTs will be responsible for this ORA in addition to the PTs. With the improved coordination between the ORAs and PTs will lead to more completed tasks and synchronization between the two positions.

**Hourly Routine**
A task list should be made for each ORA position. For example, for the floater ORA this would include: check all the trash bins, linen carts, and empty rooms to make sure they were cleaned, and check in with the front desk, and with pre-op. For the Pre-Op ORA this would include: check to see if all beds are prepared, check if there are any shave requests, and perform general stocking. Using this task list should reduce the amount of tasks perceived to be neglected throughout the day.

**Use Report as a Reference Tool**
A follow up study should be conducted to ensure the managers are effective and downtime has been reduced.
Implementation Plan

For these recommendations to be effective, the following steps should be implemented:

- Specific duties, responsibilities and guidelines for Lead the ORA and Lead PTs should be defined and established by Nursing Managers within three months. It will take a significant amount of time to establish the responsibilities of each Lead position.
- Lead positions should be selected and trained by Nursing Managers within six months. Training will also require a significant amount of time.
- New guidelines for patient pickups should be established and implemented within three months. This will allow for all parties involved to be notified of the changes.
- New guidelines for breaks should be implemented as soon as possible.
- The follow up study should be conducted approximately six months after the implementation of the managers.

The dates proposed for implementation of the recommendations do not need to be strictly adhered to but act more as general guidelines. Once these steps and guidelines are in place, the coordination, overall efficiency, and productivity within the ORA and PT positions should be increased.
Appendix A: Downtime Summary Charts

ORA Time Allotment (Shadowing)
Dates: 2/13/04 - 3/9/04  Total Observation Time (hours): 14:03

Tasks 60%
Downtime 40%

PT Time Allotment (Shadowing)

Tasks 72%
Downtime 28%

ORA Time Allotment (Random Sampling)
Dates: 3/10/04 - 3/19/04  Observations: 170

Tasks 49%
ORA Downtime 51%

PT Time Allotment (Random Sampling)
Dates: 3/10/04 - 3/19/04  Observations: 59

Tasks 81%
PT Downtime 19%
Appendix B: Beeper Data Summary

ORA Beeper Sampling

PT Beeper Sampling
Appendix B: Beeper Data Summary

ORA Time Allotment (Beeper Sampling)
Dates: 3/12/04 - 3/19/04 Observations: 273

PT Time Allotment (Beeper Sampling)
Dates: 3/12/04 - 3/19/04 Observations: 450
Appendix C: Flow Charts of Tasks

Patient Shave

1. Get Shave Order from Board
2. Go to Patient
3. Does patient require shave?
   - Yes: Get Disposable Razor, Perform Shave, Dispose of Razor
   - No: Stop
Specimen/Equipment Transport

1. Receive Call for Transport to OR
2. Go to Front (OR) Ask; get Specimen/Equipment
3. Go to OR
4. Is Specimen/Equipment Needed?
   - Yes: Leave Specimen/Equipment in OR
   - No: Take Back to Front Desk
Patient Pick-ups

Receive Patient Slip → Pickup Needed Now?

- YES → Go to unit desk station and get paperwork → Go to patient's room
- NO → Wait Approx 10min

Is Patient ready?

- YES → Is Patient paperwork correct?
- NO → Wait until Patient ready

- YES → Transport Patient to Pre-Op
- NO → Transfer Patient to Gurney
Operating Room Cleaning

1. Receive call for OR Cleaning
2. Get Supply Cart
3. Wipe Down all Surfaces with Virex
4. Replace Suction Tubes
5. Remove Trash and Linens
6. Sweep and Mop OR
7. Deconstruct Operating Bed and Sterilize
8. Does Cart Need to be Restocked with Supplies?
   - Yes: Restock with Supplies, Replace Trash and Linen Bags, Redress Bed for Next Case
   - No: Return Supply Cart
## Appendix D: Data Collection - Floater Form

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Appendix E: Data Collection - Shadower Form

<table>
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Appendix F: Data Collection - Random Sample Form

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| Date: | ____________________________ |
| Position |

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22
### Appendix G: Data Collection - Beep Form

#### Perioperative Technician Beep Form

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#### Operating Room Assistant Beep Form

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