Inventory Management System for Taubman General Internal Medicine Exam Rooms

General Internal Medicine Department
Program and Operations Analysis Department

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Client
Melissa Peterson, Health Center Administrator, Ambulatory Care Services
Seraphin Tam, Administrative Specialist, Ambulatory Care Services
Teresza Poe, Health Center Manager, Taubman General Medicine
Paul Tichenor, MD, Taubman General Medicine

Project Coordinator
Sheri Curnes, Senior Management Engineer

Course Instructor
Dr. Richard Coffey, Adjunct Associate Professor for IOE Department

Project Team
Nicole Francis, University of Michigan College of Engineering Student
Gerren Hinton, University of Michigan College of Engineering Student
Joshua Lee, University of Michigan College of Engineering Student
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EXECUTIVE SUMMARY

Background
The client, an administrative specialist of ambulatory care, has expressed to the project team that physicians in the Taubman Internal General Medicine Department were reporting having to frequently interrupt patient procedures to retrieve medical/surgical materials and forms that were stocked out of the exam rooms. The purpose of this project was to construct an inventory management system for the 19 exam rooms in the Taubman Internal General Medicine Department. This project will determine the items that should be removed or kept in the room, the quantities or par levels at which they should be stocked, and recommendations to improve the accessibility of all med/surg materials and forms in the exam rooms.

Methods
To determine the usage frequency of the med/surg materials and forms used in the exam rooms the physicians were asked to keep track of each time an item was used. The project team collected the usage data for two weeks by placing tick sheets in each exam room daily, conducted interviews with 10 key staff members, and distributed 23 surveys to the clinicians. Due to time constraints, the project team is unable to follow the project into implementation, therefore all plans, documents, instruction will be provided for the implementation stage of this project.

Ten clinician staff members were interviewed to get a better understanding of why the physicians have to leave exam rooms. The interviews concentrated on questions about usage of the forms and med/surg materials in the exam room and also focused on the setup of the forms and med/surg materials in the exam rooms too.

A 5S team will be assembled to complete the implementation stages of the project. It will consist of a physician, resident, and medical assistant that will act as the decision making body. They will develop a red tagging and color standard, remove unwanted items from the exam rooms, and fully install and reorganize all containers, bins, and carts. The implementation stage will be executed in two phases. In phase one, all organization materials such as mailbox slots, laundry bins, baskets, and organization containers, will be purchased and set-up in a pilot exam room. In case a specific organization container is not found mock containers will be temporarily be used. The room will be piloted and reviewed. Feedback will be provided and integrated into phase two. During phase two, the necessary changes will be made and all mock containers will be replaced with real containers. The remaining exam rooms will be set up like the pilot room once it is approved.

Findings and Conclusions
Through this analysis, it was found that the organization of med/surg materials and forms were inadequate, and the physicians and clinicians were not completely satisfied with the current stocking system. A few summarized key points are:

• There is no allotted time for medical assistants to re-stock med/surg materials and forms in exam rooms.
• Med/surg materials are not located in organized way, making it hard to find materials and causing inefficient utilization of the space in the exam room.
• Cabinet is placed too high and not easily accessible.
• Forms and med/surg materials are not labeled clearly, and they often overflow from their containers due to overstocking.
• (key points from interview)
• The most frequently used med/surg materials are adult ear piece, sheets and gowns and frequently used forms are lab requisition, outpatient referral and diagnostic service.
• Physicians use more materials and forms than residents do.
• Physicians leave the room to retrieve missing forms including diagnostic form, lab requisition and outpatient referral. They also leave the exam room to retrieve information release form, prescription forms and prints.

In hopes that this process is standardized across all clinics, the techniques and tools used to complete this project are included in APPENDIX J. These steps can be followed to replicate this inventory system process at other sites.

Some findings from the interviews were:

Materials
• Pap smears are set up ahead of time before the physicians see the patients (this saves time because the physicians don’t have to leave the exam room to find materials).

Room Setup
• The cabinets and the drawers under the bed are not easily accessible (the cabinets are too high and the drawers are usually blocked by patients legs).

Stocking
• No time is designated for the medical assistant’s to stock the exam rooms (right now the MA’s stock the exam rooms when they have some free time, which is not frequent).

Forms
• Frequently used forms:
  Lab requisition
  Outpatient Referrals
  Diagnostic Service
INTRODUCTION

The administrative specialist of ambulatory care services, our client, reported that the physicians in the General Internal Medicine Department at the University of Michigan Health System (UMHS) are experiencing difficulty finding forms in the exam room, and keeping the correct inventory of forms and medical/surgical materials stocked within the room. The forms in the General Internal Medicine exam rooms are usually difficult to locate due to the current inventory system. Physicians using these exam rooms either experienced a surplus, where forms and medical surgical materials were overflowing their designated container, or a shortage, where forms and medical surgical materials needed were not available while performing exams on patients. Therefore, the administrative specialist requested that a more efficient system of maintaining adequate inventory levels of forms and med/surg materials be developed along with a standardized system to sustain maintenance.

The purpose of this project was to construct an inventory management system for the 19 exam rooms in the Taubman Internal General Medicine Department. The IOE481 project team has collected the data, interviewed and surveyed the clinician staff, and analyzed the data. A SS team will be assembled to complete the implementation stages of the project. It will consist of a physician, resident, and medical assistant that will act as the decision making body. They will develop a red tagging and color standard, remove unwanted items from the exam rooms, and fully install and reorganize all containers, bins, and carts. The implementation stage will be executed in two phases. In phase one, all organization materials such as mailbox slots, laundry bins, baskets, and organization containers, will be purchased and set-up in a pilot exam room. In case a specific organization container is not found mock containers will be temporarily be used. The room will be piloted and reviewed. Feedback will be provided and integrated into phase two. During phase two, the necessary changes will be made and all mock containers will be replaced with real containers. The remaining exam rooms will be set up like the pilot room once it is approved.

BACKGROUND

The General Internal Medicine department at the UMHS acts as the primary care provider for many patients in the Ann Arbor area. In this department each patient is assigned to 1 of the 19 exam rooms where the physicians perform essential procedures and examinations.

The problem being experienced in this department, as relayed by the ambulatory specialist, was that med/surg materials needed for standard procedures are at times unavailable. These items range from examination gowns to tongue suppressors. Along with that, the forms needed are often unorganized or missing from the exam room. As a result, clinicians have to interrupt the exam to retrieve med/surg materials or forms that are unavailable. Each exam room contains a variety of forms, some of which are not used frequently. The materials in the exam rooms are held in bins in the desk drawers, under the exam tables or bed drawers, and in a cabinet above the desk. These problems could affect the scheduled time allotted for appointments causing them
to run longer than expected. Patients are negatively affected by the unexpected time delays and the interrupted service from the practitioners.

The project team used 5S methodology to begin developing a system for the forms and med/surg materials needed in the exam rooms. The 5S lean manufacturing process will develop workplace organization for the exam rooms. This process is based on 5S, which stands for Sort, Straighten, Sweep, Standardize, and Sustain. During the sort phase, the goal is to define the purpose of the project. The main focus includes red tagging the items that could be kept and items that could be removed. The next two stages are interchangeable, straighten and sweep. Straighten involves eliminating all excess waste by organizing and arranging, making all items visible, easy to locate, easy to retrieve, easy to return, and easy to identify. Third is sweep, which improves safety and usually boosts morale by inspecting and cleaning the work area to eliminate waste. Standardize involves implementing a system or baseline for continuous improvement. This includes using visual cues such as colored labels for easy identification or signs giving clear instruction. Lastly, sustain, which is the hardest part, promotes a safe work environment by setting policies and procedures needed for the newly developed system. Inventory check lists and other documents will be used to assist in the sustaining process.

GOALS AND OBJECTIVES

The objective of this project was to construct an inventory management system for the forms and med/surg materials in the Taubman General Internal Medicine exam rooms. The project team has:

- Observed the current process
- Interviewed physicians and clinical staff to identify challenges and problems
- Collected usage data
- Benchmarked other healthcare clinics

The 5S implementation team will:

- Performed 5S on med/surg materials and forms
- Developed inventory and organization system

APPROACH AND METHODOLOGY

To successfully complete this project, it was approached in three phases of collecting data, analyzing the current state, and implementing the future state. The administrative specialist, the client, was informed of the progress at weekly Friday meetings in the Taubman Medical Center and the coordinator meetings were held each Tuesday in the North Ingalls building.

Stage One

The first stage was to collect data to determine the usage of materials and forms. Tick sheets were placed in each exam room every morning before the clinic opened, and physician information, such as name and rooms assignments, was collected both in the morning and afternoon shifts. The project team also took this time to remind the physicians and medical assistants to mark the tick sheets. Physicians and medical assistants were asked to mark a tick
next to the name of each form or med/surg material used, whether it was found in the room or they had to retrieve the item from outside the room. This usage data was collected daily for two weeks. Interviews were also performed to see how the opinion and ideas about the forms and med/surg materials varied between the different clinician staff members. Meanwhile, a survey was distributed to a few physicians, medical assistants, nurses, and offices assistants to measure individual opinions about the accessibility of forms and med/surg materials, and to gather comments and future suggestions for improvements.

**Clinician Opinions**

To determine how the clinicians felt about the arrangement/stocking of the med/surg materials and forms in the exam rooms, interviews were performed at the Taubman General Internal Medicine in Pod B. The interviews were performed on ten clinicians: four physicians, three residents, two nurses, and one medical assistant. These interviews provided insight into the reasons physicians had to leave the exam rooms to locate forms and med/surg materials. The interviews showed that clinicians want to see an improvement in the setup, and the arrangement of the med/surg materials in the exam rooms. The clinicians were indifferent when it came to changing the setup of the forms in the exam rooms. The responses varied when asked about the visibility of the forms. An important aspect from the interviews was the structure of stocking the exam rooms. The medical assistants stocked the exam rooms when they had time to stock them. No set time was set aside for them to stock the rooms.

The setup includes arrangement/stocking of forms and med/surg materials and arrangement of the exam rooms. There were similarities in clinician responses to some questions which relate to these issues for explain, labels should be placed on the outside of the bed and desk drawers which lets the physicians know what materials are placed inside of the bed and desk drawers. Some clinicians also gave key suggestions, which will be useful in implementing changes to the exam rooms for explain, non-pelvic exam rooms materials need to be removed from the bed drawers for accessibility purposes. The complete clinicians' interviews are found in APPENDIX A.

Surveys were also conducted to collect opinions from several physicians, residents and clinicians that were unable to be interviewed. Surveys were distributed to the staff in the Taubman General Internal Medicine exam rooms from February 27, 2006 through March 10, 2006. A total of 28 surveys were collected and responders included nine physicians, six residents, six nurses and three medical assistants. The survey results validated clinicians' opinions in the interviews and enabled a quantitative analysis of the clinicians' opinions with a large sample size.

Eighty-six percent of the respondents indicated that they were satisfied with the current arrangement of the forms but no responder was dissatisfied. Eighty percent of responders were either satisfied or neutral with the arrangement of the materials and the other twenty percent were dissatisfied. Therefore, the arrangement of med/surg materials was less satisfactory than the form arrangement. Physicians left the room to retrieve information release forms, prescription form and prints. Responders indicated that lab requisitions, outpatient referrals and information release forms were most frequently missing and disability parking forms and advance directive forms were less frequently used. Forty-four of responders felt that overhead cabinet is not
Stage Two
In the second stage, the current state was analyzed to develop the future state. The project team has analyzed the usage data, and made recommendations that will be implemented by the 5S implementation team. Using the utilization data, the 5S implementation team will determine the inventory par-levels or base lines (min, max) for the med/surg materials and the restocking quantities for the forms by instructing the medical assistants to use the par-level tracking sheet. They will record the current inventory or par-level, whether or not they should increase or decrease it, and what they suggest the new level should be (See Par-level tracking sheet APPENDIX F). Lean principles were used to standardize the restocking system used to sustain the new process. A part stocking system for the med/surg materials and a kanban system for forms were suggested to remind the clinician staff of the reorder or replenishing point.

Stage Three
In the third stage, the future state will be implemented. The 5S implementation team will reorganize, color code, and label materials and forms in a pilot room. Kanban cards containing the restocking quantities for the forms will be integrated into the new system. Lastly, an interview with physicians and medical assistants will be conducted to get feedback on any further improvements that are needed; once all changes are approved the 19 exam rooms will be reformed to match the pilot room.

FINDINGS AND CONCLUSIONS

To better understand the current state of the operations, the inventory system that was being used for the med/surg materials and forms was analyzed. Data collection was done by interviewing physicians, residents, and nurses; measuring the usage rate and unavailability rate of the med/surg materials and forms; and distributing surveys to the clinician staff.

Current State
Currently, teams are formed each morning consisting of medical assistants, nurses, and physicians. Medical assistants stock the rooms assigned to them during free time and when quantities of med/surg materials and forms run low. While stocking rooms, medical assistants pay special attention to the forms and med/surg materials that are frequently used. The med/surg materials are refilled from the stock room that is shared with the other surrounding clinics. Ten forms in the exam room are refilled from the staff room that also stores other types of forms. (See to APPENDIX C for lists of med/surg materials and forms). Materials that expire are stored in the procedure cart which is kept on the GMF side; this cart is shared by the entire clinic.

Interview Findings

Materials
• Clinicians like the arrangement of the materials in the exam rooms.
• Pap smears are set up ahead of time before the physicians see the patients.
• The physicians leave the room to get materials from the procedure carts.
• Physician leave the exam rooms to retrieve material from the procedure cart (most of these materials are not kept in the exam rooms)
• Materials are just thrown into the desk, and it’s hard to find the supplies in the desk.
• The materials are not organized in the desk, which make it hard to locate them.
• Most of the materials in the cabinet are duplicates of materials kept in the drawers under the bed.
• The lubricant gel tubes may be causing cross contamination

*Room Setup*

• Clinicians like the location of the forms in the exam rooms.
• Clinicians do not like two forms per one slot
• Clinicians are indifferent about the mailbox containers; but suggested to make sure there is enough space for the containers in the exam rooms.
• The drawers under the bed are not easy to access, patients are asked to move their legs in order to get the materials that stored in these containers.
• The physicians have a hard time locating materials in the desk drawers (physicians do not know that materials are in the drawer)

*Stocking*

• No time is designated for the MA’s to stock the exam rooms.
• The materials in the exam rooms are stocked to capacity; there is no set par-level for stocking materials. Over stocking makes it hard to open and close drawers.

*Cabinets*

• The cabinets are not easily accessible; they are too high and most clinicians have trouble reaching and seeing materials.
• Most clinicians worry that if the cabinets are lowered they will hit their heads.
• Clinicians want to be able to see materials in cabinets (should probably have clear doors).
• Materials on the top shelf of the cabinet are hardly used.

*Forms*

• Physicians leave exam room to get forms that are out of stock.
• Frequently used forms are lab requisition, outpatient referrals and diagnostic service.
• Physicians want all the forms to stay in the exam room.
• Physicians do not know of any forms that are not frequently used.

*Printing*

• Physicians believe that a printer should be placed into each exam room for printing prescriptions and forms.

*Kits*

• Clinicians think kits should be made for top procedures.

*Inventory List*
• The supplies in the drawers are inconsistent with the list on the wall.
• The list on the back of the door is not the one used to stock the materials in the desk.

Other
• One physician stated that he/she has to leave the exam room between 6-10 times a shift to get forms and prescriptions from the printer.
• Laundry basket in the exam rooms should be smaller, and changed more frequently because they are in the way during pelvic exams.
• Patients don’t have designated space to place their belongings.
• Clinicians want paper tape in exam room

Quantitative Analysis Indicates Form Usages Vary

Medical/Surgical usages
The med/surg material usages are plotted below based on usage. The adult ear pieces are used most frequently along with sheets, gowns, and gloves. The most frequently used materials correlate with the most commonly performed in the clinic, such as ear examinations, pap smears, and injections.

Forms usages
The physicians used the lab requisition, outpatient referral, and diagnostic service forms most frequently. These forms also happen to be the most frequently missing forms as indicated later in the data analysis. Physicians have requested during interviews that the information release form be stocked in exam room; however the data collected from the staff room underestimate its usage.
Med/Surg materials usages by GMO and GMF
The total med/surg materials usages are divided into GMF and GMO exam rooms below. The result indicates that physicians in the GMF exam rooms used more med/surg materials than residents in the GMO exam rooms.

Figure 2. Forms usage from February 27, 2006 to March 10, 2006 (* forms not in exam room)

Figure 3. GMO and GMF med/surg materials usage
Form usages by GMO and GMF
The form usage was also separated to review the GMO and GMF exam room usages. Physicians in GMF exam rooms used about twice as many forms as the residents in GMO exam rooms. (See Figure 4.)

![Figure 4. GMO and GMF forms usage](image)

Med/surg supplies unavailability
Information was collected to determine how often an item was needed but was unavailable. For example, the reflex hammer was needed 4 times but was missing one time over two weeks time span. Therefore, the reflex hammer was unavailable 25% of the time.

<table>
<thead>
<tr>
<th>Med/Surg Materials</th>
<th>Needed frequency for two weeks</th>
<th>Total unavailable frequency for two weeks</th>
<th>Percent</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflex hammer</td>
<td>4</td>
<td>1</td>
<td></td>
<td>25.00%</td>
</tr>
</tbody>
</table>
Forms unavailability
The most frequently used forms-diagnostic service, lab requisition and outpatient referrals- were unavailable 8.19%, 4.42%, and 1.11% of the time, respectively when needed.

Table 2. Unavailability analysis for forms

<table>
<thead>
<tr>
<th>Forms</th>
<th>Needed frequency for two weeks</th>
<th>Total unavailable frequency for two weeks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic Service/Radiology</td>
<td>61</td>
<td>5</td>
<td>8.19%</td>
</tr>
<tr>
<td>Lab Requisition</td>
<td>113</td>
<td>5</td>
<td>4.42%</td>
</tr>
<tr>
<td>Outpatient Referral</td>
<td>90</td>
<td>1</td>
<td>1.11%</td>
</tr>
</tbody>
</table>

Items not stocked in the room
Physicians left the exam room to retrieve the following materials not stocked in the room. However, a majority of the materials listed in Table 3 cannot be stocked in the room due to issues with safety and expiration dates. Therefore, they are stored the procedure cart.

Table 3. Usage of materials not on inventory list

<table>
<thead>
<tr>
<th>Materials</th>
<th>Total unavailable frequency for two weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver Nitrate sticks</td>
<td>2</td>
</tr>
<tr>
<td>Liquid Nitrogen</td>
<td>2</td>
</tr>
<tr>
<td>Thermometer</td>
<td>1</td>
</tr>
<tr>
<td>Sterile Cotton Tip</td>
<td>1</td>
</tr>
<tr>
<td>Towel</td>
<td>1</td>
</tr>
<tr>
<td>Small Gloves</td>
<td>1</td>
</tr>
<tr>
<td>Biohazard bag</td>
<td>1</td>
</tr>
<tr>
<td>Pillow</td>
<td>1</td>
</tr>
<tr>
<td>Wart freeze</td>
<td>1</td>
</tr>
<tr>
<td>Scalpel and blade</td>
<td>1</td>
</tr>
<tr>
<td>Joint Cart</td>
<td>1</td>
</tr>
<tr>
<td>Strep Swab</td>
<td>1</td>
</tr>
<tr>
<td>Chair</td>
<td>1</td>
</tr>
</tbody>
</table>

Quantitative analysis conclusions
Some exams rooms were assigned to urgent care, pre-op, or overflow and did not show many usage ticks. Because of the low usage of materials, our data analysis was not sufficient to validate the removal of a med/surg material or form from the exam room. Therefore, a physician familiar with clinics will assist the project team in red tagging the med/surg materials. Overall, the adult ear pieces, sheets, and gowns had the most usages of the med/surg materials with frequency of 29, 26 and 23 respectively over two week period. Of the forms lab requisitions, outpatient referrals, and diagnostic forms were mostly frequently used with frequency of 113, 90 and 61, respectively. The data showed that the med/surg material usages from the GMF exam rooms were significantly higher than usages from the GMO exam rooms. Diagnostic service
forms were unavailable 8.19% of the time they was needed, lab requisition forms 4.42%, and outpatient referral forms 1.11% of the time.

Survey Analysis

Satisfaction level on current location of forms

![Figure 5. Satisfaction level on the current location of forms](image)

- Eighty-six percent indicated that they are satisfied with the current arrangement of the forms.
- Comments:
  - Location of diagnostic service forms is inconvenient.

Most frequently missing forms
The forms that are most frequently needed yet unavailable validated with interview results. These are:
- Lab requisitions
- Outpatient referral forms
- Information release forms
- Colonoscopy forms

Less frequently used Forms
The forms least used that are located in the exam rooms are:
- Disability Parking forms
- Advance Directive forms

Future location of forms
When asked which orientation of the forms, in the future, would staff think is most convenient:
• Four percent of staff surveyed would like to place the forms in a filing cabinet under the desk
• Ninety-six percent of staff would like to keep the forms visible on the wall

Future form organization
When asked which container staff would prefer to store the forms while in the room:
• Fifty percent of staff wanted to have one form per slot within an organization container that was mounted on the wall
• Fifty percent of staff wanted to keep the forms in folders in the current container being used

Satisfaction level on arrangement of med/surg supplies

![Pie chart showing satisfaction levels]

Figure 6. Satisfaction level on arrangement of Med/Surg supplies

• Eighty percent of responders were either satisfied or neutral with the arrangement of the materials and the other twenty percent were dissatisfied. The arrangement of med/surg materials was less satisfactory than the form arrangement.
• Comments:
  • Ear examination supplies, 4x4s, band aids, and tape should not be in the drawer under patients.

Med/Surg supplies not frequently or not being used at all
There are no med/surg materials not used or less frequently used.
Frequency of leaving exam room

Figure 7. Frequency of leaving exam room

- Seventy-two percent of responders said they leave the exam room sometimes or often.

Items leaving the exam room for
The following forms and materials are not kept in the room. Physicians and residents leave the room to retrieve them.
- Information release form
- Prescription forms
- Rectal Exam Item

Overhead Cabinet Accessibility

Figure 8. Accessibility of overhead cabinet

- Forty-four percent of responders felt that overhead cabinet is not accessible.
- Comments:
• Some responders can hardly reach for materials and they have to pull down containers to look.
• Materials are not clearly labeled.

Other comments
• Redundancy of items- Items in a portable container in the overhead cabinet are redundant to what is in the exam table.
• Stocking Room - There is no time allocated to stock rooms. Rooms are often occupied when the medical assistants try to stock the room.

BENCHMARKING
Benchmarking took place on February 24, 2006 when the project team, project coordinator, and the client visited three The Briarwood Medical Group (BMG), Briarwood Family Medicine (BFM), and Briarwood Health Associates (BHA). There were common themes among the clinics; we observed that the clinics BMG and BFM that stocked the exam rooms weekly, as Taubman does and experience the same problems of materials and forms not being readily available. BHA clinic stocks daily and does not experience any complaints from the physicians. The three clinics were organized and had all materials and forms labeled. Yet BHA was by far the best example of a well organized and executed inventory system. The exam rooms were identical and every item in the room was labeled. The purpose for these visits was to view the differences in inventory and organization systems and to see if any of these tactics can be applied to the Taubman General Internal Medicine Department.

RECOMMENDATIONS
The project team recommends that a few changes be made to the Taubman General Internal Medicine department exam rooms, to reduce the volume of problems experienced.

Forms kanban system, and organization containers changed
The forms in the exam rooms should be placed in a container that will allow one form per slot, for easy search and retrieval. This container may be two containers such as the one being used currently or a mail slot-like container that would be attached underneath the above desk cabinet. The diagnostic forms are currently on the left side of the desk away from the rest of the forms, which are located on the right; they will be moved to the left side of the desk. The Release of Information form will be moved into the exam rooms, due to suggestions from physicians. A color standard will be developed for all forms for easy identification, and a par-level system will be implemented for restocking using kanbans. A kanban is a card that is used to signal the restocking of a form. The kanban card contains the re-stocking quantity, exam room number, slot location, and form name. A kanban card will be placed in each form slot between the safety stock level and the par-level quantity. The safety stock will be paper clipped to the kanban card, and once it is exposed it will cue the medical assistant to re-stock this particular form. The kanban card will then be removed and placed in a collection bin.
Desk and bin organizers added to exam rooms

It is recommended that paper tape for posting educational signs and desk drawer organizers will be added to the room. The desk organizers will allow for easy retrieval of materials such as paper and office supplies that will be kept in the desk. The reflex hammer, monofilaments, and tuning forks will be removed from the desk drawers and placed in a more accessible location in the exam room. To avoid the adult and children ear pieces being unevenly stocked due to the similarity in appearance, a label will be used to differentiate between the two attachments. All materials in the bed drawers that are not used for pelvic exams will be relocated to a separate bin, for hassle free retrieval of materials during non-pelvic procedures. This bin will be placed to the side of the examination bed against the wall and will also house the reflex hammer, monofilament, and tuning fork previously removed from the desk drawer. All duplicates of materials in the above desk cabinet will be removed. The gloves that are currently kept at the sink will be moved to wall mounts. There is concern with cross contamination that can possibly be caused by using the lubricating gel tube. Multiple physicians are touching the tube with the gloves that have touched the patients, and are replacing it for other physicians to use. This problem can be eliminated if only lubricating gel packets are used, and the tubes are discontinued.

Personal basket added to exam room, stocking schedule increased to twice weekly

A personal belongings basket will be put in each room for the convenience of the patient, and the laundry bin will be smaller in size to free space in the exam rooms. Keeping the patients in mind, a basket designated to hold personal belongings (clothing, shoes, undergarments, bags, etc.) will be placed under one of the two chairs in the exam rooms. This basket will be accompanied by a sign to inform the patient, and will have a plastic bag lining that will be frequently changed for sanitation purposes. The current laundry bin is restricting the movement of the physicians during pelvic exams, due to the new larger bed examination tables. The smaller laundry bin and possible relocation of the laundry bin will resolve the restricted space issue, but require more frequent laundry bin changes. The restocking schedule will also be changed from the current system. One medical assistant from each team (consisting of physicians, medical assistants, and nurses) will follow a stocking schedule. The designated medical assistant will restock the rooms that are assigned to their teams. This will be built into their paid time and schedule.

Implementation plan

The implementation stage will take place in May; therefore the project team hand over responsibility to the project coordinator. This stage will be executed in two phases. Phase1 will include forming the 5S implementation team that will be comprised of a physician, a resident, and a medical assistant. This team will be act as the decision making body. They will sort, define a red tagging standard, and red tag the med/surg materials and forms that will be removed or kept in the room, develop a color labeling standard, and finalize and approve all recommendations made by the project team. During this phase sort, sweep, and straighten will be performed by the implementation team to one exam room and most materials from the Purchase List will be placed in the room, excluding the draw organizers (See Purchase List APPENDIX F). The desk organizers will be marked off with tape until the most functional organizer is found. This exam room will act as a model, in that feedback will be given pertaining
to the set-up (organizers, laundry bin, form containers, etc.) from this feedback changes will be made. In phase 2 all items that were not purchased for the phase 1 will be purchased and placed in the exam room. Once this room receives approval from all necessary parties, all exam rooms will be set up according to this same standard. The exam rooms will then be inspected weekly to determine a schedule or a routine of standardizing, inspecting, and sustaining to maintain the rooms.

In hopes that the process is standardized across all clinics, the techniques and tools used to complete this project are included in Inventory Management System document in APPENDIX J. These steps can be followed to replicate this inventory system process at other sites.
Appendices
APPENDIX A: Interviews

Interview Questions

General Questions
Overall, how do you feel about the arrangement of the materials in the exam room (needed items by place where the procedure is performed)?

What suggestions do you have?

Do you feel the cabinet in the exam room is accessible (too high, enough space, etc)?

Do you have any suggestions?

Do you ever leave the exam room to find needed materials that are not in the exam room?
If so, how many times per ½ day session?

How much time do you think it takes each time you leave?

What items are being retrieved?

Are there items in the exam room that are not used frequently or not being used at all?

What do you think about having procedure kits made for the top 20% of procedures performed?
Would it be hard to use?

Forms
Are you able to quickly locate forms in the exam rooms?

Do you tend to leave the exam room to find a form needed?
If so, how many times per ½ day session?

How much time do you think it takes each time you leave to retrieve a form?

Which forms are missing most frequently?

Are there forms that are stocked in the room that are less frequently used?

How do feel about the current form arrangement within the room (location, wall arrangement, etc)?

Would it be easier to place the forms in filing cabinet under the desk or keep them visible on the wall?

Would it be easier to have one form per slot with more slots?
Would it be easier to have the form slots similar to mail slots?

Do you have any suggestions about the form storage?

**Overall**
If there is one thing you could change in the set-up or stocking of the materials what would it be?

**Medical Assistant**
How often are the forms and materials stocked in the exam rooms?

Is there a standardize routine that you follow for stocking the room?

Can you walk me through the stocking process?

How much time do you have to restock the room?

How much time do you have to prepare a room for a patient between procedures?

When stocking the rooms for a specific procedure, are all materials needed in the room?
   If not, where do you get them from?

What would you like to change about the current process?
Clinician Interviews

Dr. Billi (Faculty)

What do you think about the arrangement of materials in the exam rooms?

The arrangement is good.

Forms

Only uses a couple of the forms that are stocked in the exam rooms.
Forms are kept in folders which are not visible.
Hard to see the name on the outside of the forms.
The forms should be placed in folders that are easy to see for the people who come in and stock the exam room.
Most of the forms that are used are in the exam room.
Hard to tell which forms are running low.
Needs some type of par level to tell which forms are low and need to be stocked.

Supplies

The supplies in the drawers are inconsistent with the list on the back of the door. MA’s do not use this list to stock the materials in the desk.
Materials are just thrown into the desk, and it’s hard to find the materials in the desk because it is not organized.
There are no labels on the drawer to the desk so it is hard to identify what materials are present in the desk.
Ear speculum and tongue depressor are in a good spot.
The orthroscope and thermososcope have messing head pieces, not checked in the morning.

Are the cabinets easy to access?

Does not use the cabinet a lot, but said it is probably not accessible to most clinicians its too high and hard to reach and see inside of the cabinet.

Why do you have to leave the exam rooms?

Leaves the exam room for printing, since there is not a printer in the exam rooms he has to leave the exam room to print prescriptions and patient education information for the patients. Has to go to the staff room to get what was printed.

Leaves once to three times per visit of a patient. Next he leaves to get help from medical assistant, does not have pager numbers of rotating medical assistants.
Happens once every five visit per patient.
Top procedures

Doctor only does about two or three procedures

Do you leave the exam room to find forms?

Leave exam rooms to find forms that were not stocked in the morning. The system for restocking the room is inconsistent. Sometimes the rooms are stocked well and sometimes they’re not stocked well.

What are the most frequently used forms?

Referral forms
Lab requisition
Diagnostic service
Direct access

How often are the forms in the exam rooms stocked?

The MA’s are used to stocking the forms every couple of days because that is how long the forms are usually stocked. Sometimes they run out of forms because they are not stocked daily.

Rooms not 5S

Hard to see in the cabinets, (most lean offices don’t have doors on cabinets want to be able to see inside them) if the cabinets were lowered than people might hit their heads.

Clear folders would be easier to see, should be one form per slot instead of two forms per slot. Should use par- level for stocking the forms. The mailbox idea for forms takes up too much space in the exam rooms. Have labels on the drawers and desk so you know what is in the them.

The form setup would be more efficient if the forms were raised up and the less used forms were up higher because the forms are in an idea spot for the doctors to grab them.

Change one thing to the room

The rooms are stocked uniformly everyday and that a printer be placed in every exam room.

Dr. Ahmed (Resident)

What do you think about the arrangement of the materials in the exam room?

Pretty good arrangement no problem for him, only uses reflex hammer and gloves. In clinic for half a day out of the week usually.
Are the cabinets easily accessible?
The materials are easily accessible in the cabinet.
Has to use the forms that are in the staff room and not in the exam room.

Which forms are frequently used?
Diagnostic service
Referral forms

Do you like the setup of the forms in the exam room?
The forms are located well on the wall.

Which materials do you frequently use?
Does not use materials that are in the exam room

Patty (RN on GMO side)

Who do you feel about the arrangement of the materials in the exam rooms??
Works in GMO not in the exam room when the doctors work with patients

Do you feel that the cabinets are easy to access?
The cabinets are too high, can not reach or see the materials in the cabinets
The doors on the cabinets are awkward; have to open up one at a time.

Do the doctors have to leave the exam rooms to find supplies?
Exam rooms are kept stocked well, only have to leave the exam room to get equipment which is not kept in the exam room.

Are there materials in the exam room that are not frequently used?
Not sure because she does not stock the exam rooms

Are kits made for the top procedures?
Yes, kits are made for procedures they are a great idea, easy to access and get for doctors MA do not need to know all the materials used for certain procedure.

Are doctors quickly able to locate the forms in the exam rooms?
Sometimes but other times the doctors ask the MA’s where a certain form is, but they are usually already in the exam rooms.

*Do the doctors run out of the forms?*

No, the forms are stocked frequently, they print the forms up, and people are at the printer for about an hour printing up the forms.

*Do you like the arrangement of the forms on the wall?*

Yes, the forms are in their sight and are easy to access, but the doctors still leave the rooms to ask MA’s where a certain form is located.

*Do you think the mailbox slot containers are better for holding the forms?*

They will stick out too far, take up too much space in the exam rooms.

*Do you think it’s better to have one form per slot instead of two forms per slot?*

I think whatever we set up will work.

*What is one thing you would change about the setup of the exam rooms?*

The drawers under the bed, patient’s feet are here so it makes it difficult for the doctors to reach the materials. Also more space in the exam rooms

*Is there a routine followed for stocking the exam rooms?*

Yes, they fill the rooms to capacity

*Is there a time limit for stocking the rooms?*

No, they fill the rooms when they have time to fill them because they are usually very busy. Do not have time to stock the exam rooms, should be a time set aside to stock all the rooms properly.

*Are the rooms prepared for the procedures before doctors see the patients?*

Yes, pap smears are always prepared before the doctors see the patients.

Rooms are usually set up on the GMF side and not on the GMO side because they are still learning and have to set it up themselves.

*Sue (RN on faculty side)*

*How do you feel about the arrangement of the materials in the exam rooms?*
The rooms are setup fine the materials that the doctors use are generally located in the appropriate spots.

Setup for pap smears ahead of time, and what they need at the bed side are in the drawers under the bed.

_Do you feel that the cabinets are easy to access?_

Yes they are adequate

_Do the doctors have to leave the rooms to get material that they need?_

Sometimes they have to leave to retrieve materials for procedures that are on the procedure cart. They try to have all the materials ready and in the exam rooms for the doctors to use. Sometimes the patients ask the doctors to check something else, so then they have to leave the room to get the item. Usually everything is in the room or on the procedure cart.

_Are there items in the exam rooms that are frequently used or not used at all?_

Everything stocked in the exam room is used

_Should there be kits made for the top 10 procedures?_

All the materials for the procedures done are on the procedure cart. Do not know where they would keep kits for these procedures do not have enough storage space for all these kits.

_Do the doctors have to leave the exam rooms to go the staff room to retrieve a form?_

Most of the forms are in the exam rooms, they would only leave the room if a form is not in the exam room to retrieve it from the staff room.

_What do you think about the arrangement of the forms?_

Thinks the forms are very handy does not think there is anymore space for the forms in the rooms. Likes the location and setup of the forms in the exam rooms.

_Is there anything that you will change about the exam rooms?_

More space in the exam rooms.

_Are the forms and materials stocked weekly in the exam rooms?_

Yes they are stocked weekly

_Is there a routine for stocking the rooms?_
Yes, each MA has a checklist of what is needed in the exam rooms

*Is there a time schedule to stock the rooms?*

No, the MA's are very busy so they have to find time in their schedule to stock the exam rooms.

*Where does the MA get the materials for procedures?*

Get the materials from the stock room and from the procedure cart.

**Interview Fendrick (faculty) and John Gilbar (Resident)**

*How do you feel about the arrangement of the materials in the exam room?*

The arrangement of the materials in the exam room is adequate.

*Are the cabinets accessible in the exam rooms?*

The cabinets are accessible.

*Do you have to leave the exam room to get materials?*

Yes, leaves the exam rooms sometimes to get materials that are not kept in exam rooms ie. injections, anesthetics, etc.

*Are all the materials used frequently?*

All the items in the exam rooms are used frequently.

*Do you think kits should be prepared for the top procedures?*

Don’t do enough procedures to have kits made for them.

*Can you locate all the forms in the exam rooms?*

Can locate the forms in the exam rooms, but not all the same forms are in all the exam rooms.

*Do you have to leave the exam room to find locate a form?*

Yes, leaves the exam room to find radiology form.

*Do you like the arrangement of the forms in the exam rooms?*

Likes the arrangement of the forms in the exam rooms.
Interview Dr. Tichenor (Faculty)

What do you like about the arrangement of the materials in the exam rooms?

Does not like that the patients have to move their legs out of the way when he has to get materials out of the drawers in the bed.

Materials for pelvic exams and pap smears should be kept in the drawers under the beds.

Suggestions – Wants a shelf or a separate container/bin for all materials that are not used for pelvic exams.

He wants the gloves to be in a separate container or mounted on the wall.

Reflex hammers, microfilaments and the tuning forks to be placed in this container.

Want paper tape placed in all the exam rooms.

Do you think the cabinets are accessible?

The cabinets are accessible.

Does not like the double doors on the cabinet; he thinks they should be taken off.

Do you have to leave the exam room to locate materials?

He leaves the exam room to find paper tape, anus scope, reflex hammer, paper microfilaments, and tuning forks.

He leaves the exam rooms to get materials from the procedure carts, needs to train MA’s to find the materials that he needs from the carts.

Which forms are frequently used in the exam rooms?

Some of the forms are rarely used but he wants to keep them in the room.

Wants theses materials to be added to the room: KOH potassium hydroxide, saline, slides, and cover slips.

Do you think kits should be made for the top procedures?

Believes that ear kits would be useful.

Can you locate all the forms in the exam rooms?
Can locate the forms, but the diagnostic service forms should be placed near the other forms.

Release of patient information form should be placed in the exam rooms

*Do you like the arrangement of the forms in the exam rooms?*

Likes the arrangement of the forms on the wall, but each form should have their own slots.

**Interview Larry (MA on GMO Side)**

*What do you feel about the arrangement of the materials in the exam room?*

The materials in the bed are fine, but the ones in the cabinet are redundant, they never use them. Rarely has to restock the materials in the cabinet. Addition room is needed for Pap smear kits only, the remaining items can be removed from the cabinets.

*Do you think the cabinet is accessible?*

Can not reach the top shelf in the cabinet but able reach the bottom shelf. Some of the other faculty members would have problems reaching it.

*Do you know why the doctors leaving the exam rooms while working with a patient?*

Doctors leave to get the *Release of information form* (rare form but should be placed in the rooms), or if someone has not stocked the room properly then doctors leave to retrieve a med/surg material.

*Any items in the exam rooms that are not used frequently or not used at all?*

Forms which are used frequently are lab requisition, outpatient referrals, and colonoscopy forms; the materials frequently used are paper, gowns and drape sheets. All the materials are needed, should not remove any materials.

*Do you think kits should be made for the top 10 procedures?*

Thinks kits should be made for the procedures because the doctors have to leave the room to get materials from the procedure cart. Save time, and more convenient

*Is a kit made for ear irrigation?*

There is a tray with all the materials for this procedure

*Do doctors have a problem locating the forms?*
No, there set up all the same in all the rooms, it’s accessible, and easy to find them, they only have problems when the forms are not in stock.

*Do you think there should be one form per slot instead of two per slot?*

Yes, this is a good idea because it’s hard to stock two forms in one slot (etc. lab requisition)

*Do you think the forms should be in a cabinet under the desk?*

No, likes the setup easy for the doctors to access the forms.

*What do you think about the mailbox slot setup for the forms?*

Thinks it would be fine, as long as they do not take up a lot of space.

*What is one thing you would change about the exam room?*

There should be more slots for the forms one form per slot.

*How often do you stock the forms in the exam room?*

Does a walk through on a daily basis, on the average stocks the rooms about once a week.

*Is there a standard routine for stocking the forms??*

No routine, just knows which forms need to be stocked (frequently used).

*Do you have time to stock the rooms?*

No, there is no set time to stock the rooms (this is a problem)

*How long does it take to stock the rooms?*

20 mins per rooms

Uses a cart to stock all the rooms

*Are the materials in the exam room when a doctor does a certain procedure?*

Not all the procedures that require materials are in the exam room; sometimes have to bring the materials into the room from the procedure cart or for procedures that require items that are against regulation to stock in the room (syringed, medicines, blades, etc.) This is the reason for the procedure carts.
Interview McCort

How do you feel about the arrangement of the materials in the exam rooms?

She wants all the forms located in a central location and close to her.

The patients have to move their legs so the doctor can get the materials from the drawers in the bed.

Are the cabinets accessible?

Top shelves in the cabinets are too reach and it’s hard to reach up there, but the materials up there are not used often.

Do you leave the exam rooms?

Leaves the room everyday to show patients educational books, use equipment, during pap smears, printing, and also to get materials from the procedure cart.

How many times do you leave the room in half a day?

Leave 6-10 times for printing
2-3 for other things

What materials are used frequently in the exam room?

Gowns, materials for pap smears. soap, tongue depressor, paper clips

She brings her own paper and reflex hammer.

Should kits be made for the top procedures?

That’s a good idea would save a lot of time

Are forms easily accessible?

Yes, they’re all in the same place, but do not like the forms that are in pads. It is hard to get a form because you have to tear form from the pad.

The forms not used frequently are harder to find.

The patient release forms are not in the rooms. Too many forms are in the slots, which makes it hard to grab a form out of the slots

Either there are a lot of forms in the exam rooms or no forms at all in the exam rooms
How often do you leave the rooms to find a form?
Once or twice a week, but she prints her own forms.

Which forms are used frequently?
Lab requisition

Which forms are not used frequently?
Does not know because she does not use these forms

What if the forms were put into a file cabinet?
Not easy to access

What about the mailbox slots?
This would be fine, but need enough space for them.

What if the forms are under the cabinet?
Need to have enough space, might hit your head.

What is one thing you would change about the room setup?
Put a window in every room
Taubman General Medicine Forms and Med/Surg Supplies Survey

Your comments, concerns and suggestions will contribute to the improvement of material and form inventory systems in our exam room. Your cooperation is greatly appreciated.

1. How do you feel about the current location of the forms within the room (wall, desk drawer, etc.)?
   - Strongly Satisfied
   - Satisfied
   - Neutral
   - Dissatisfied
   - Strongly Dissatisfied
   Comments:

2. Which forms are missing most frequently?

3. Which forms are less frequently used?

4. Please, check the future arrangement that you prefer:
   - Location of forms
     - Place the forms in filing cabinet under the desk
     - Keep them visible on the wall
     - Other
   - Form organization
     - One form per slot within an organization container mounted on the wall
     - Keep the forms in folders
     - Other
   Comments:

Med/surg supplies

5. How do you feel about the arrangement of the med/surg supplies in the exam room (needed items by place where the procedure is performed)?
   - Strongly Satisfied
   - Satisfied
   - Neutral
   - Dissatisfied
   - Strongly Dissatisfied
   Comments:

6. Are there med/surg supplies in the exam room that are not used frequently or not being used at all?
   If yes, please list

7. How often do you leave the exam room for the forms or med/surg supplies that are not in the exam room?
   - Often
   - Sometimes
   - Rarely
   - Never

8. What items are you leaving the exam room to retrieve?

9. Do you feel the above desk bin in the exam room is accessible?
   - Yes
   - No
   If no, please explain.
   Comments:
<table>
<thead>
<tr>
<th><strong>Staff Room Forms</strong></th>
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<tbody>
<tr>
<td>Advance Directives</td>
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<tr>
<td>Anticoagulation</td>
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<tr>
<td>Breast Imaging</td>
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<tr>
<td>Colonoscopy</td>
</tr>
<tr>
<td>CT Radiology Computerized Requisition</td>
</tr>
<tr>
<td>CT Radiology Requisition Breast Imaging</td>
</tr>
<tr>
<td>Cytopathology Requisition Lab</td>
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<tr>
<td>Diagnostic Service</td>
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<tr>
<td>Direct Access Endoscopy</td>
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<tr>
<td>Disability Parking Placard App.</td>
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<tr>
<td>Endocrine Testing</td>
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<tr>
<td>Hemoccult Kit</td>
</tr>
<tr>
<td>HIV Packet/Consent</td>
</tr>
<tr>
<td>Hospital Consent</td>
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<tr>
<td>Information Release Form</td>
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<td>Lab Requisition</td>
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<td>Letterhead</td>
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<tr>
<td>Living Will Packet</td>
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<td>Outpatient Consult Request</td>
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<td>Outpatient Referral</td>
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<td>Proof of Disability</td>
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<tr>
<td>Surgical Pathology Requisition</td>
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<tr>
<td>Vestibular Appointment</td>
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<td><strong>Write in:</strong></td>
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## APPENDIX C: Sample Tick Sheet

<table>
<thead>
<tr>
<th>Wall Forms</th>
<th>Exam Room</th>
<th>Left Exam Room</th>
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</thead>
<tbody>
<tr>
<td>Advance Directives</td>
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<td></td>
</tr>
<tr>
<td>Breast Imaging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colonoscopy</td>
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<tr>
<td>Cytopathology Requisition Lab</td>
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<tr>
<td>Diagnostic Service</td>
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<tr>
<td>Disability / Parking</td>
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<tr>
<td>Hemoccult Kit</td>
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<tr>
<td>HIV Consent Form</td>
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<td>Lab Requisition</td>
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<tr>
<td>Outpatient Referral</td>
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</table>
# Sample Tick Sheet

<table>
<thead>
<tr>
<th>Location</th>
<th>Exam Room</th>
<th>Left Exam Room</th>
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</thead>
<tbody>
<tr>
<td>Exam Table Cabinet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gowns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Upper Cabinet</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4x4 Gauze</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPR mask to mouth</td>
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<td></td>
</tr>
<tr>
<td>Formulin</td>
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</tr>
<tr>
<td>Hemoccult developer (2)</td>
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</tr>
<tr>
<td>Latex Free Gloves</td>
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<td></td>
</tr>
<tr>
<td>Lubricating jelly tube</td>
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<td></td>
</tr>
<tr>
<td>Thin Prep</td>
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<td></td>
</tr>
<tr>
<td>Towels</td>
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</tr>
<tr>
<td>Trays</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above Sink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold cups in dispenser</td>
<td></td>
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<tr>
<td>Large and Medium Gloves</td>
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<tr>
<td><strong>Back of Exam Table</strong></td>
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<td></td>
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<tr>
<td>Table paper (3 rolls)</td>
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<tr>
<td><strong>Top Drawer</strong></td>
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<tr>
<td>Alcohol prep pads</td>
<td></td>
<td></td>
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<tr>
<td>2x2 sterile gauze</td>
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<tr>
<td>Band aids</td>
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<td></td>
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<tr>
<td>Culture swabs</td>
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<td></td>
</tr>
<tr>
<td>Lubricating jelly packs</td>
<td></td>
<td></td>
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<tr>
<td>Providone Swabs</td>
<td></td>
<td></td>
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<tr>
<td>Safety pins</td>
<td></td>
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<tr>
<td>Tampons</td>
<td></td>
<td></td>
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<tr>
<td>Tape measure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triple Antibiotic Ointment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bottom Drawer**

<table>
<thead>
<tr>
<th>Exam Room</th>
<th>Left Exam Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anal Speculum</td>
<td></td>
</tr>
<tr>
<td>Big Q-tip swabs</td>
<td></td>
</tr>
<tr>
<td>Blue pads</td>
<td></td>
</tr>
<tr>
<td>Extra speculum</td>
<td></td>
</tr>
<tr>
<td>G&amp;C Swabs</td>
<td></td>
</tr>
<tr>
<td>Hemoccult card</td>
<td></td>
</tr>
<tr>
<td>Saline/Wet Prep</td>
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</tr>
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</table>

**Wall**

<table>
<thead>
<tr>
<th>Exam Room</th>
<th>Left Exam Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult ear piece</td>
<td></td>
</tr>
<tr>
<td>Pediatric ear piece</td>
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</tr>
<tr>
<td>Tongue Depressor</td>
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</tbody>
</table>

**Desk drawer/ Wall**

<table>
<thead>
<tr>
<th>Exam Room</th>
<th>Left Exam Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic Request (wall)</td>
<td></td>
</tr>
<tr>
<td>Hemoccult Cards (wall)</td>
<td></td>
</tr>
<tr>
<td>Monofilament</td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td></td>
</tr>
<tr>
<td>Reflex hammer</td>
<td></td>
</tr>
<tr>
<td>Tissue</td>
<td></td>
</tr>
<tr>
<td>Tuning fork</td>
<td></td>
</tr>
</tbody>
</table>

**Write in:**

<p>| | | |</p>
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</thead>
</table>

38
APPENDIX D: Letter to the head of staff

The purpose of this project is to streamline the inventory system and material setup for the Taubman General Internal Medicine department. This includes all medical materials and forms in the 19 exam rooms for both the GMO and GMF sides. The methodology utilized will be a combination of surveys, interviews, and data collection tick-sheets. The information will be collected and analyzed. The team will recommend an inventory management solution and a redesigned setup of the room based on 5S methodologies.

The project team will distribute surveys to the clinic staff (physicians, residents, medical assistants) to gain a better understanding of their opinions toward the current process and inquire suggestions about the future improvement. Interviews will be conducted with a few physicians and clinicians to grasp the specifics and details of the current issues being experienced.

To accomplish this task the IOE481 project team must collect usage data for the forms and materials used in the exam rooms. The project team plans on placing tick-sheets in each of the 19 exam rooms. When a physician or resident uses a form or material, s/he will simply place a mark next to the form or material name on the tick-sheet in the appropriate column. We will place each tick-sheet so it is visible yet in a place that does not interfere with daily activities. The project team will collect the tick-sheets at the end of each day. The data will be collected for 2 weeks.

To accomplish this task we request your cooperation. Please let us know how to proceed. Thank you for your time.

Sincerely,

IOE481 project team
Nicole Francis
Gerren Hinton
Joshua Lee
APPENDIX E: Letter to staff

Dear

There is a project being done on the forms and materials stored in the exam rooms to address concerns about having to constantly leave the exam rooms to retrieve needed materials.

There will be a survey distributed to each physician, resident, and medical assistant to complete requesting feedback and comments regarding the current material setup and inventory system. Please complete them and place them in the XXXXXX by XXX.

We need to obtain usage data for the materials stocked in the exam room in order to ensure rooms are stocked appropriately. Starting XXX there will be a tick-sheet placed in each exam room. Simply place a tick mark next to the name of a form or material you have used. If you have to leave the room, place the tick mark under the “left exam room” column. If the material was in the room place the tick mark under the “exam room” column. We will be collecting data for a period of 2 weeks.

It is important that we all complete both the tick sheets and the survey to correct this problem in a timely manner. If we do not have accurate data the exam room may not be stocked accurately. Thank you in advance for your cooperation.

Sincerely,
APPENDIX F: Purchase List

Purchase List

Laundry bin
Color labels
Drawer dividers
Mailbox slot holders
Basket for personal items
  *Plastic bags (sanitary)
Paper clips (big)
Laminated paper (Kanban cards)
Glove container wall mount (4)
Plastic cart (non-pelvic exam med/surg materials)
Signs (laminated)
  *Personal items baskets
Printers
Desk dividers
New desks
Labeling machine
Sign wall adhesive (tape, putty, etc.)
Table paper (wider)
Kanban collection bins (each exam room)
APPENDIX G: Sample Kanban Card

Taubman General Internal Medicine

**Kanban Card**

<table>
<thead>
<tr>
<th>Form Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exam Room</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Refill Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
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<table>
<thead>
<tr>
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</table>
## APPENDIX H: Patient Tracking Sheet

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<th>Current Level</th>
<th>Suggestion (Circle one)</th>
<th>New Level</th>
<th>Suggestion (Circle one)</th>
<th>New Level</th>
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</thead>
<tbody>
<tr>
<td>Gowns</td>
<td>Inc / Dec / Same</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Upper Cabinet</td>
<td>Inc / Dec / Same</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>4x4 Gauze</td>
<td>Inc / Dec / Same</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Formulin</td>
<td>Inc / Dec / Same</td>
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<tr>
<td>Hemocult developer (2)</td>
<td>Inc / Dec / Same</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Thin Prep</td>
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<tr>
<td>Towels</td>
<td>Inc / Dec / Same</td>
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<tr>
<td>Above Sink</td>
<td>Inc / Dec / Same</td>
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<tr>
<td>Cold cups in dispenser</td>
<td>Inc / Dec / Same</td>
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<td></td>
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<tr>
<td>Back of Exam Table</td>
<td>Inc / Dec / Same</td>
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<td></td>
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<tr>
<td>Medium Glove</td>
<td>Inc / Dec / Same</td>
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<tr>
<td>Large Glove</td>
<td>Inc / Dec / Same</td>
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</tr>
<tr>
<td>Latex Free Gloves</td>
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<tr>
<td>Table paper (3 rolls)</td>
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<td>Band aids</td>
<td>Inc / Dec / Same</td>
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<tr>
<td>Big Q-tip swabs</td>
<td>Inc / Dec / Same</td>
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<tr>
<td>Blue pads</td>
<td>Inc / Dec / Same</td>
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<tr>
<td>Culture swabs</td>
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<tr>
<td>G&amp;C Swabs</td>
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<tr>
<td>Monofilament</td>
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<tr>
<td>Safety pins</td>
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<tr>
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<tr>
<td>Bed Drawers</td>
<td>Inc / Dec / Same</td>
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<td></td>
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<tr>
<td>Anal Speculum</td>
<td>Inc / Dec / Same</td>
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<tr>
<td>Extra speculum</td>
<td>Inc / Dec / Same</td>
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<td>Lubricating jelly packs</td>
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<td>Adult ear piece</td>
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<td>Inc / Dec / Same</td>
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<tr>
<td>Tongue Depressor</td>
<td>Inc / Dec / Same</td>
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Write in:
## APPENDIX I: Inventory List

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<th>Par-level</th>
<th>Drawers</th>
<th>Par-level</th>
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</thead>
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<td>Anal Speculum</td>
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</tr>
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<td>Sheets</td>
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</tr>
<tr>
<td><strong>Upper Cabinet</strong></td>
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<td>Lubricating jelly packs</td>
<td></td>
</tr>
<tr>
<td>4x4 Gauze</td>
<td></td>
<td>Providone Swab</td>
<td></td>
</tr>
<tr>
<td>CPR mask to mouth</td>
<td></td>
<td>Saline/Wet Prep</td>
<td></td>
</tr>
<tr>
<td>Formulin</td>
<td></td>
<td>Tampons</td>
<td></td>
</tr>
<tr>
<td>Hemoccult developer (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin Prep</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Towels</td>
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<td></td>
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<tr>
<td>Trays</td>
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<tr>
<td><strong>Above Sink</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cold cups in dispenser</td>
<td></td>
<td></td>
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<tr>
<td><strong>Back of Exam Table</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium Glove</td>
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<tr>
<td>Large Glove</td>
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</tr>
<tr>
<td>Latex Free Gloves</td>
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<tr>
<td>Table paper (3 rolls)</td>
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<tr>
<td><strong>Bins</strong></td>
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<td>2x2 sterile gauze</td>
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<tr>
<td>Alcohol prep pads</td>
<td></td>
<td></td>
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<tr>
<td>Band aids</td>
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<tr>
<td>Big Q-tip swabs</td>
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<tr>
<td>Blue pads</td>
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<tr>
<td>Culture swabs</td>
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<tr>
<td>G&amp;C Swabs</td>
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<tr>
<td>Hemoccult card</td>
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<tr>
<td>Monofilament</td>
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<tr>
<td>Reflex hammer</td>
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<tr>
<td>Safety pins</td>
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<tr>
<td>Tape measure</td>
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<tr>
<td>Triple Antibiotic Ointment</td>
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<td></td>
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<tr>
<td>Tuning fork</td>
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<td></td>
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<tr>
<td><strong>Wall</strong></td>
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<td></td>
</tr>
<tr>
<td>Adult ear piece</td>
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<tr>
<td>Pediatric ear piece</td>
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<td>Tissue</td>
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<tr>
<td>Tongue Depressor</td>
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<tr>
<td><strong>Desk drawer</strong></td>
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<tr>
<td>Paper</td>
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</tbody>
</table>

44
APPENDIX J: Template

INVENTORY MANAGEMENT SYSTEM
Manual and Spreadsheet Techniques

OBJECTIVE
To construct an inventory management system that best utilizes the organization and placement of the forms and medical/surgical materials in the Internal Medicine exam rooms.

CONTENTS
This packet provides techniques and tools to assist in repeating this inventory management system process at various clinic sites.

METHODOLOGY
Approach and Methodology
To successfully complete this project, it was approached in three phases of collecting data, analyzing the current state, and implementing the future state.

First phase - Current state
Observe and understand the current process of clinics and gather usages of med/surg materials and forms through observation, data sheets, and feedback from staff

1. Understand the overall flow of clinic with support from staff by identifying:
   a. Clinician shift schedules
   b. Storage locations of the med/surg materials and forms
   c. Current restocking schedule
   d. Criteria used to determine the need for restocking

2. Obtain inventory lists of med/surg materials and forms

3. Gather usage information:
   a. Create tick sheets to gather usage data in each exam room (see page X for detailed instruction)
      i. Based on the estimated time length of the project, determine the data collection period
      ii. Place the tick sheets in each exam room every morning before the clinic opens, and collect physician information, such as name and rooms assignments for both the morning and afternoon shifts.
      iii. Remind the physicians and medical assistants daily to mark the tick sheets before the shifts begin
         1. Ask physicians and medical assistants to mark a tick next to the name of each form or med/surg material used whether it is available in the room or whether they have to retrieve the item from outside the room.
         b. Or pull data from past orders and material usage.
4. Create interview questions to measure individual opinions about the accessibility of forms and med/surg materials, and to gather comments and future suggestions for improvements.

5. Create survey questions to gather opinions from a larger sample size that the interview process was not able to include (see page X for detailed instruction)

6. Obtain approval on interview and survey questions and tick sheets from the head of staff.

7. Conduct interviews on key staff, personally selected physicians, residents, medical assistants, nurses and other clinicians that are experienced with the clinic.

8. Distribute surveys to physicians, medical assistants, nurses, and office assistants

**Second phase - Future state -** The current state is analyzed to develop the future state.

1. Using the usage data, determine inventory par-levels or base lines (min, max) for the med/surg materials and the restocking quantities for the forms (see Future state technical instruction below).

2. Take into account the previous organization and layout of the med/surg materials and forms and draw a new design according to 5S methods while keeping in mind suggestions from the staff.

3. Use lean principles to standardize the restocking system used to sustain the new process. A stocking system for the med/surg materials and a kanban system for forms can be developed to remind the staff of the replenishing point (see the technical instruction).

**Third phase - Implementation - future state is implemented.**

1. Seek support from faculty to form lean implementation team to execute changes to one trial exam room.

2. Restocking markers for materials and kanban cards containing the restocking quantities for the forms will be integrated into the new system.

3. Interview physicians and medical assistants to get feedback on any further improvements.

**Future state technical instruction**

**Setting par-level for med/surg materials**

There are two methods that can be used when determining par-levels based on data availability. If the data collected was sufficient then a formula method could be used, if the data collected was not sufficient a trial method could be used to estimate the par-levels. These methods are explained in more detail below.

When the usage data collected is sufficient to determine the inventory level alone this formula method is used to calculate daily usage:

- Calculate the minimum level: annual usage / 365 x delivery time + safety stock
- Calculate the maximum level: annual usage / 365 x days to store + safety stock

When the usage data collected is not sufficient, this trial and error method should be used:

**Approach 1**
Determine the number of times you can stock the exam room. For example, daily, or two times a week. Once this is decided, determine whether or not there is sufficient room in the exam room to store enough supplies so that there are not stock outs. This is calculated by determining the daily usage and multiplying it by the number of days in between stocking the room.

Approach 2

Estimate an appropriate par level including safety stock level and place in exam room or use existing levels to start with. Using a tracking sheet, record the current par-level. If a stock-out occurs, then increase the par-level by an appropriate estimate. If excess materials remain, decrease the par-level by an estimate. Repeat this par-level tracking until appropriate par-level is found.

Installation kanban system: forms

A kanban is a card that is used to signal the restocking of a form. The kanban card contains the re-stocking quantity, exam room number, slot location, and form name. This card will be placed in the container holding the forms to remind the medical assistants to restock the inventory. This card will be placed just before the safety stock level. Once the kanban card is the first form in the container, the medical assistants will be cued to restock. Although there are still forms behind the kanban card, the goal is to not have to use many forms from the safety stock. When exam rooms are being restocked, medical assistants will collect exposed kanban cards, replenish stock, and replace kanban cards. This system can easily be installed by following the steps below:

1. Determine par-level quantity and safety stock quantity based on the desired frequency of restocking.
2. Prepare a laminated kanban card with form name, exam room number, location in wall mount, and par-level quantity.
3. Attach the kanban card and safety stock forms with a paper clip.
4. Place kanban collecting bin in exam room next to forms (mount on wall).
5. Physicians use forms in front of paperclip first. Once physician gets to paperclip and kanban, physician places kanban card in kanban bin, notifying MA that form needs to be restocked.
Interview questions
Purpose and instruction
The interviewing process is crucial, in that it gathers subjective opinions and feelings about the current inventory and organization system from physicians and clinicians that are being experienced within the clinics. Also, suggestions on the future suggestions of arrangement from physicians and clinicians are valuable information in designing functional future arrangements that would suit the needs of physicians and clinicians. In forming interview questions, med/surg materials and forms questions should be grouped separated to avoid confusions. (See APPENDIX A)

Survey Questions
Purpose and instruction
The survey questions are derived from interview questions and have the similar purpose as interview questions. Yet, they enables the project team to gather opinions from more clinicians that were not able to be interviewed. It is important that the survey is kept short in length (10 questions or less) and simple in orientation to prevent overcrowding. For multiple choices, extra space should be provided for any comments. To ensure quantifiable data, any frequency-related questions that have the tendency to be qualitative should be quantified by adding a numerical scaling range of values. (See APPENDIX B).

Analyzing Survey
Utilizing pie charts and to summarize the survey results is an excellent visual representation.

Tick sheet
Purpose and instructions
Tick sheets gather usage data for med/surg materials and forms located within the exam rooms when you are not able to pull usage information from material management systems. This method requires full cooperation from physicians and clinician staff, therefore it is important to remind the clinician staff, individually before each shift begins. Along with collecting the tick sheets, the project team should record the exam room number, date, and physician room assignments. Physicians place a tick in the ‘Exam Room’ column each time they use a corresponding med/surg material or form that was found in the exam room. In ‘Left Room’ column, physicians mark a tick when they must retrieve the needed med/surg or form from outside the exam room. Write-in section at the bottom of the list is provided to track any other med/surge materials or forms that are not stocked in exam room. (See APPENDIX C)

Analyzing Usage
Once the project team completes data collection, the tick sheet data is then entered into a formatted Microsoft Excel spreadsheet. Utilizing the transpose and sorting functions, the data is organized and processed. Pivot tables can be a useful tool when processing data that will decrease the time spent summing the columns, and grouping the information in a table, etc. Total usages can be found by summing ticks from both ‘Exam room’ column and ‘Left exam room’ column. Plots that support solutions to the problem being experienced are generated. To calculate the percentage of time a material or form is unavailable, the data value from the “Left Room” column is divided by the total usage, then multiply by 100. If technical support is needed
please contact the University of Michigan Hospital Program and Operations Analysis Department.