Outpatient Infusion Access Analysis

Evaluating the current processes for providing infusion services

Final Report
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University of Michigan Health System Program and Operations Analysis

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Executive Summary

Problem
Staff members expressed their dissatisfaction with the current outpatient infusion scheduling process. In an effort to increase employee satisfaction, the team’s client, Barbara Radloff, Management Systems Coordinator, requested that the team examine the current process of scheduling outpatient infusions at UMHS and determine how improvements can be made. The study was limited to non-cancer outpatients using the infusion rooms at the Bone Marrow Transplant Unit (UH-8A), the Transplant Ambulatory Care Unit (UH-5C), Mott Children’s Hospital (7 Mott) and the Pediatrics clinic. Issues regarding insurance authorizations have not been included.

Purpose
The purpose of this project was to study the current state of the outpatient infusion services offered by the University of Michigan Health System (UMHS), identify inefficiencies in the process, and make recommendations for improvement.

Approach and Methodology

Defined Project Scope
On October 1, 2003, our client, Barbara Radloff, held a meeting with approximately fifteen hospital administrators along with our team and project coordinator to discuss the outpatient infusion process at UMHS. The team, along with the client, and coordinator, Jacquelynn Lapinski, discussed all aspects of the problem and decided to narrow the scope of the project to focus only on the current process taken to get a patient an infusion.

Conducted Literature Search
First, the team conducted a literature search but was unable to find any information pertaining to the outpatient infusions scheduling process. Next, websites of the top 16 hospitals in the country based on the US News and World Report Honor Roll, (see Appendix E) were examined to determine of the hospital had a comprehensive infusion clinic. The only hospital that had an efficient comprehensive clinic was the Mayo Clinic located in Rochester, MN, which we contacted for further information.

Conducted Interviews
The team performed interviews in two stages. In the first stage, the team interviewed nurses that work in the four specified infusion areas. The objective of these interviews was to view the infusion room layout and to enhance the team’s knowledge of the infusion process. The nurses explained that when a patient needs an infusion, a clinical coordinator from the referring clinic in UMHS contacts the infusion room to schedule an appointment. The team was provided with a list of staff member who schedule infusion by the nurses that were interviewed.

In the second stage of interviews, the team interviewed clinical coordinators that utilize the infusion services provided by the four clinics studied. The names of the staff members interviewed were provided by the client as well as the nurses previously
interviewed. The clinical coordinators discussed the procedures they follow to schedule an infusion, the amount of time scheduling takes, and the inefficiencies in the scheduling process.

**Analyzed Data**

After completing the interviews, the team analyzed the data and created flowcharts of the current scheduling process. We created flowcharts documenting the process of each person interviewed in the second stage of interviews. All of the flowcharts created can be found in Appendix D. The flowcharts were then analyzed to determine in which departments the process was most complex. The flowcharts also revealed which actions were unnecessary and which were the most time-consuming. Data from the flowcharts compiled into a table that included four categories: the number of phone calls necessary to schedule an infusion, how often infusions were scheduled in the clinic, the average time needed to schedule an infusion, and which clinics were called to perform the infusion. This data summary table can be found in Appendix C. Using the flowchart and data summary table, the team evaluated the current state and developed recommendations for an improved scheduling process.

**Findings**

From analyzing the data collected through interviews, and evaluating the flow of the scheduling processes using the flowcharts created, the following results were found:

- No uniform scheduling process exists
- The process used by the Pediatrics department is the most efficient, but it can still be improved
- Some departments send patients to multiple infusion locations
- Multiple phone calls need to be placed before an infusion is scheduled
- Some of the clinics offering infusions do not have a specific contact
- UMHS loses a number of patients due to time or availability conflicts
- Some patients have difficulties contacting clinical coordinators
- Different infusion rooms follow different procedures once the infusion is scheduled

**Alternatives Considered**

From our findings, the team considered many possible solutions to improve the current infusion scheduling process. However, two approaches that we considered but did not recommend are: the implementation of a central phone line, and the creation of a comprehensive infusion clinic. Implementation of a central phone line would increase the efficiency of the scheduling process, while the creation of a comprehensive infusion clinic would increase the availability of infusion services. However, additional research is recommended to determine the benefit of these alternatives had they been recommended and implemented.
Conclusions and Recommendations

After analyzing the data and examining the flowcharts, our team was able to make the following final conclusions and recommendations.

Make Improvements to the Current Pediatrics Scheduling Process
If the Pediatrics clinic scheduler did not have to consult with the infusion room nurse regarding the length of the infusion before scheduling an appointment, the process would take even less time. We recommend that a comprehensive list be created containing the average infusion duration and amount of nursing attention required for each type of infusion.

The infusion room in the Pediatrics clinic operates on a handwritten calendar. We recommend that use of the wall calendar for scheduling be eliminated in the Pediatrics clinic. We propose that the scheduler use EWS to print the next week’s schedule and post it in the area where the calendar is currently located.

Create One Uniform Scheduling Process Modeled After the Pediatrics Department
We conclude that there is currently no uniform process for scheduling an infusion. We also determined that the majority of the nurses who had no complaints with the process worked in the Pediatrics department. Due to the simplicity and efficiency of the Pediatrics process, we recommend that all other departments adopt a process similar to that used in the Pediatrics department.

Use One Unified Method of Sending Drug Orders and Patient Information
From our interviews, we found that the method of delivering the drug order and other pertinent information varies depending on in which clinic the infusion is scheduled. Based on these findings, we concluded that the current scheduling processes do not have a uniform way to provide the infusion room with the drug order. We recommend that all orders be sent through the pneumatic tubing system to the infusion rooms.

Simplify Calling Procedures for Scheduling Coordinators
The schedulers do not know which clinic they are supposed to call to schedule certain types of infusions or who to talk to at the clinics when they call. They also do not know what the limitations of infusion rooms are. We recommend UMHS create a call list for each department, which should consist of an ordered list of clinics for the nurse to call for an infusion appointment. In addition to the call list, an infusion information list that includes names of contacts at each clinic, the operating hours of the clinic and what types of patients cannot be sent to their clinic should be created. Both of these lists should be available online.

Clinical Coordinators Must Be More Accessible to Patients
Through our interviewing process, one clinical coordinator in the pediatrics clinic expressed her frustration with not having her own phone. If the scheduler does not have their own phone, it can be difficult for patients to contact clinical coordinators. Patients are dissatisfied because they are unable to directly contact the coordinator when they need to and the situation can result in many phone calls between the patient and
coordinator. We recommend that every clinical coordinator is provided with a phone line.

UMHS is Losing Patients Due to Unavailability of Appointments
We found that it is very common for patients to be sent elsewhere to receive an infusion because UMHS cannot accommodate them due to unavailability of appointments. Although we cannot quantify exactly how many patients are sent elsewhere, five out of the 12 nurses we interviewed often refer patients to outside facilities to receive their infusion. We recommend UMHS consider extending the hours they offer infusions.
Introduction

The University of Michigan Health System (UMHS) performs, on average, 50 to 60 outpatient infusion services each week. Patients may receive infusions in one of numerous locations on- or off-site. The on-site areas that provide outpatient infusions services include Mott Children’s Hospital (7 Mott), the Transplant Ambulatory Care Unit (UH-5C), the Pediatrics clinic, and Bone Marrow Transplant (UH-8A). Many nurses that work in these departments report that scheduling an outpatient infusion is often frustrating and inefficient.

Therefore, Barbara Radloff, Management Systems Coordinator, requested that the team examine the current process of scheduling outpatient infusions at UMHS and determine how it can be improved. The study was limited to non-cancer outpatients using the infusion rooms at UH-8A, UH-5C, 7 Mott and the Pediatrics clinic. Also, any problems regarding insurance authorizations have not been included.

The purpose of this report is to explain how we gathered and analyzed our information. We will discuss alternative solutions that were considered and why they were not recommended. We will also present our findings, conclusions, and recommendations for improvement. We will then offer a course of action to implement the recommendations. The appendices will include the questions we asked during the interviews, the data we extracted from the interviewees’ responses, the flowcharts we created, and templates that can be used to implement our recommendations.

Approach and Methodology

Defined Project Scope

On October 1, 2003, our client, Barbara Radloff, held a meeting with approximately fifteen hospital administrators along with our team and project coordinator to discuss the outpatient infusion process at UMHS. At the meeting, it became clear there were additional perceived problems within the outpatient infusion process. Our team, along with the client and coordinator, discussed all aspects of the problem and decided to narrow the scope of the project to focus only on the current process necessary to schedule an infusion. The keys steps taken to approach the problem are summarized below in Table 1.
Table 1. Key Steps in Approach to the Problem

<table>
<thead>
<tr>
<th>Task</th>
<th>Date(s) Performed</th>
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<tr>
<td>Met with hospital administrators to discuss problem and define project scope</td>
<td>October 1</td>
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<tr>
<td>Conducted literature search</td>
<td>October 1 - 15</td>
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<tr>
<td>Interviewed four nurses from infusion rooms at UH-8A, UH-5C, 7 Mott and the Pediatrics clinic</td>
<td>October 15-24</td>
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<tr>
<td>Interviewed 12 nurses from various departments that send patients to the infusion rooms at UH-8A, UH-5C, 7 Mott and the Pediatrics clinic</td>
<td>October 27 – November 19</td>
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<tr>
<td>Analyzed data and prepared final recommendations</td>
<td>November 12- November 24</td>
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Conducted Literature Search

First, the team conducted a literature search. We did not find any documents pertaining to the process required to schedule outpatient infusions, so we examined the websites of the top 16 hospitals in the country based on the *US News and World Report* Honor Roll, (see Appendix E) to benchmark UMHS’s outpatient infusion process with that of comparable hospitals. Based on information from these websites, we were able to determine whether the hospital had a comprehensive infusion center. We then called those hospitals to get more information.

The team contacted six hospitals. The Mayo Clinic in Rochester, MN, was the only hospital we found that had a comprehensive infusion center that treated non-cancer patients. We interviewed the infusion center’s nurse manager, and the list of the questions we asked appears in Appendix I.

Interviewed Infusion Room Nurses

Next the team interviewed four nurses from four infusion rooms at UMHS: Jenny Miller from UH-5C; Ilene Philips from the Pediatrics clinic; Pat Yost from UH-8A; and Gretel Quitmeyer from 7 Mott. For the Pediatrics clinic, the team interviewed three additional nursing staff. The objective of these meetings was to view the infusion room and clinic layout, and to enhance the team member’s knowledge of infusion in general. The team also asked the nurses for contacts from other departments within the hospital to determine who refers patients to these infusion rooms. A complete list of the interview questions appears Appendix A.

Interviewed Nurses Who Refer Patients to Infusion Rooms
Next, the team contacted 17 nurses from 13 UMHS departments who refer patients to the infusion rooms at UH-8A, UH-5C, 7 Mott and the Pediatrics clinic. The list of departments in which these nurses work can be found in Appendix F. Meetings were arranged if possible, but if the nurse or clinical staff was unavailable, the interview questions were sent via email. The purpose of these interviews was to determine how often infusions are needed, how long infusions take to schedule and to gather information regarding the steps taken to schedule infusion. A complete list of the interview questions can be found in Appendix B.

**Analyzed Data**

After all the interviews were completed, the team analyzed the data by creating a set of flowcharts. We created one flowchart documenting the process of each person interviewed in the second stage of interviews. All of the flowcharts created can be found in Appendix D. Then the flowcharts were analyzed to determine in which departments the process was most complex. The flowcharts also helped to reveal which actions were unnecessary or caused frustration among the staff. Data from the flowcharts was compiled into a table that included the amount of phone calls necessary to schedule an infusion, how often infusions were scheduled in the clinic, the average time needed to schedule an infusion, and which clinics were called to perform the infusion. This data summary table can be found in Appendix C. Using the flowchart and data summary table, the team evaluated the current state and developed ideas for an improved scheduling process.

**Current Situation**

Currently, the infusion scheduling process is inconsistent in each department. This inconsistency can be seen in the flowcharts of the scheduling processes of the departments. With four locations offering infusions, nurses may often need to call three or all four of the infusion rooms before finding an infusion room accommodating the patient’s schedule. Many infusions require eight hours, with some as short as six or even four hours. Due to the high demand for infusions, the scheduling nurses state that most outpatient infusion appointments are scheduled with an average wait time of two weeks. This two-week wait time is the time the patient must wait from the time the appointment is scheduled and when the appointment takes place.

Because patients are often in urgent need of an infusion, two weeks may not be soon enough. Due to the infusion room’s constraints on space and time, UMHS is often unable to accommodate patients in a short time frame. Five out of the 12 nurses claimed to refer their patients to outside facilities in these instances.

The quickest way for a patient to receive an infusion at UMHS is as a walk-in patient. However, due to the infusion rooms’ tight schedule, walk-ins can only be accommodated when a scheduled patient misses their appointment. Since infusions are scheduled back to back, and the amount of time required to administer the infusion is long, by the time the infusion room nurse realizes the patient is not going to attend the appointment, there is rarely adequate time to administer a walk-in patient’s infusion before the next
scheduling a patient arrives. Because walk-ins are difficult to accommodate, most infusions are scheduled.

The typical process of scheduling an infusion appointment occurs when the doctor notifies the scheduling nurse that a patient needs an infusion. The nurse then checks for insurance authorization. Once insurance is authorized, the nurse begins calling infusion rooms to find time and availability for the infusion. The nurse confirms the appointment time with the patient, and calls the infusion room back to confirm the time. Although this process should be simple, and only takes five to ten minutes to schedule infusions in clinics such as Pediatric Nephrology, and Pediatric Gastroenterology, and Rheumatology, this process can take up to an hour in others, such as the Neurology department. The average time to schedule an infusion in each department can be seen in Figure 1.

![Figure 1. Average Time Needed to Schedule an Infusion by Clinic](image)

* All times are estimates given by nurses who schedule infusions in each department
* 1 & 2 means two people within the same department were interviewed

**Figure 1. Average Time Needed to Schedule an Infusion by Clinic**

**Alternatives Considered**

The team considered two alternative approaches for increasing the efficiency of the infusion scheduling process at UMHS: implementing a central phone line, and creating a comprehensive infusion clinic. The following sections explain what these alternatives entail, and what additional research would be necessary to determine whether implementation would be beneficial to UMHS. We also explain why we did not recommend these possibilities.
**Implement a Central Phone Line**

During the interviews, three problems with the scheduling process were mentioned by several nurses. First, clinical coordinators often have to call two to four infusion rooms to find one that can accommodate their patient. Second, nurses feel they are “asking for a favor” because they contact infusion clinics infrequently. Third, not every coordinator has a personal phone line which leads to hindered communication between the coordinator and patient. One possible solution to these problems is to implement a central phone line for all clinical coordinators to call when they need to schedule an infusion.

The coordinators often feel frustrated about the amount of time and energy required to locate a facility for their patient because they “can’t call just one place.” With a central phone line, the schedulers would call the central coordinator and give him/her all of the patient’s information. Once the central coordinator has scheduled the patient using EWS, the clinical coordinator should be notified of the date, time, and location of the infusion. The clinical coordinator should then follow up with the patient either by mail or phone to ensure that they know where and when their appointment is, and to provide the patient with any necessary instructions.

The schedulers feel like they are “asking for a favor” because they have to reestablish who they are and what department they work for each time they call. This lack of familiarity with the nurses would not be a problem anymore if the only person necessary to contact is the central coordinator. The central coordinator should be familiar with everyone s/he talks to when scheduling an infusion.

The central coordinator should be responsible for contacting the patients about the available dates and times. Implementing this suggestion would reduce the responsibility of the clinical coordinators because they would not have to contact patients for scheduling purposes.

The implementation of a central phone line was not included as a recommendation, because the team did not have all of the resources necessary to determine if this was the best plan for UMHS. We recommend that a future team further examines this idea to establish whether the plan is ideal for UMHS. An analysis should be performed to determine how often patients schedule appointments, how many hours the central coordinator should work, and how much it would cost to implement this plan. Further analysis should be conducted to determine whether the hours of the clinical coordinators would be reduced. The projected future volume of patients may also be useful to determine how practical the central phone line will be in the future.

**Create a Comprehensive Clinic**

During the benchmarking process, we researched *US News and World Report*’s top ranking hospitals to explore alternative infusion processes at other well known hospitals. We discovered that the Mayo Clinic has a comprehensive infusion center and contacted the clinic to gain more information. We found that the Mayo Clinic currently has an efficient comprehensive infusion center that treats all of their adult and pediatric patients,
including cancer patients. The center allows anyone seeking an infusion to schedule an appointment seven days a week between 7:00 a.m. and 11:30 p.m. Every person that contacts this facility can receive an infusion within 24 hours of their call.

The implementation of a comprehensive center is not being recommended at this time because further analysis is needed. More information should be gathered to determine if the benefits of creating a comprehensive center at UMHS would outweigh the costs. The current and future patient flow of both cancer and non-cancer patients should be determined if the center should treat both types of patients. The team recommends more in-depth research to determine if the implementation of a comprehensive infusion center is exactly what UMHS needs.

**Findings, Conclusions, and Recommendations**

After analyzing the data and examining the flowcharts, our team was able to make the following final conclusions and recommendations.

**Make Improvements to the Current Pediatrics Scheduling Process**

*Findings.* When scheduling an infusion in the Pediatrics clinic, the appointment is first documented in Enterprise Wide Scheduling (EWS), an online database. The appointment is then handwritten on a wall calendar located by the infusion rooms. Although all of the necessary information can be found online, our interviews at the Pediatrics clinic indicated that the clinic’s infusion room functions on the handwritten calendar. The two scheduling systems can be hard to coordinate and causes the staff to go back and forth between calendars. Another concern, although no problems have been reported, is the possibility that an appointment could be scheduled on one calendar and not the other.

Our interviews also indicated that the scheduling staff often has to go back to the infusion room to ask the nurse questions regarding the time and the amount of nursing attention required to administer the infusion.

*Conclusions.* The infusion scheduling process is more streamlined in the Pediatrics clinic than in any other clinic. The scheduling process within the Pediatrics clinic appears to be quick and simple (see Appendix D), but there are still some aspects that could be improved. Scheduling staff should not be required to walk back to the infusion room to schedule appointments. If the staff did not have to consult with the infusion room nurse or verify scheduling times with a second calendar, the scheduling process could take even less time.

*Recommendations and Action Plan.* We recommend that a comprehensive list be created containing the average infusion duration and amount of nursing attention required for each type of infusion. There is an example of this list in Appendix G. To implement this recommendation, a nurse from each infusion room should provide information about each type of infusion that can be administered in their infusion room into the Microsoft Excel spreadsheet we have provided. Then, a technical employee can compile the information provided from each nurse into one Excel spreadsheet. As this information is
not confidential patient information, it can be posted on the internet, readily available to all staff members who schedule infusions. This information should be updated semiannually to ensure its accuracy. This solution would cost UMHS about an hour of time from four nurses (one nurse from each infusion room) and one hour time from a technical employee to implement.

Compiling this information will improve the scheduling process. It will eliminate the step in the Pediatrics flowchart (Appendix D) where the scheduler has to walk to the infusion room and consult the nurse. Not only will implementing this recommendation shorten the infusion scheduling time, it will also eliminate the infusion room nurse’s involvement from the scheduling process.

We also recommend that use of the wall calendar for scheduling be eliminated in the Pediatrics clinic. We propose that the scheduler use EWS to print the next week’s schedule and post it in the area where the calendar is currently located. The scheduler should print a new copy of the schedule every morning to ensure that it is up to date. If there is a sudden schedule change, the scheduler should page the nurse to inform him/her of the change. A nurse taking personal leave should inform the scheduler of their absence as soon as they are aware of it. In the future, another more costly option UMHS might consider is putting a computer where the calendar is now. This would allow nurses to enter in the days they will be taking leave and would also allow the nurses to view information regarding upcoming appointments.

By eradicating the use of the handwritten calendar, confusion created by the use of two calendars would be eliminated and the probability of scheduling errors would decrease. It would also save time in the infusion scheduling process, because the scheduler should not have to walk back to the infusion room to confirm the schedule for a particular day (Appendix D).

Create One Uniform Scheduling Process Modeled After the Pediatrics Department

Findings. After each follow up interview with a departmental nurse, the team created a flowchart diagramming the process s/he follows to schedule an infusion appointment, which can be found in Appendix D. In the Pediatrics department, nurses found their process easy to follow. However, in other departments, such as Neurology and Pulmonary, nurses find certain aspects and steps in the scheduling process time consuming and confusing, leading to an overall frustration and dissatisfaction with the scheduling process. Examining the scheduling process, we found that although each department had similarities in the process, no two processes were exactly the same. Each department essentially has a different process to schedule infusions.

Conclusions. We conclude that there is currently no uniform process for scheduling an infusion. We also determined that the majority of the nurses who had no complaints with the process worked in the Pediatrics department. This satisfaction with the Pediatrics process was attributed to the easy, straightforward process, which took the shortest time to complete at an average of less than 12 minutes.
**Recommendation and Action Plan.** Currently, the infusion scheduling process used in the Pediatrics department is not perfect. However, due to its simplicity and efficiency, we recommend that all other departments adopt a process similar to that used in the Pediatrics department. This would eliminate the majority of the aspects that nurses find frustrating and time-consuming within their department’s current process. Also, problems could be resolved more quickly and efficiently. If a problem arose within a department’s scheduling process, it would be much easier to solve because every department would follow a similar process. Departments could then communicate between one another with questions as there would be little, if any, variation between the processes of different departments.

To streamline the scheduling process within these departments the scheduling staff from each department should meet to discuss their current process. As the Pediatrics clinics process is currently the most efficient, its process can be applied to the other departments. This meeting should determine the aspects of each process that can be improved by comparing it to the process at the Pediatrics Clinic. Once these aspects are determined, they can be discussed, and recommendations for improvement can be made.

**Use One Unified Method of Sending Drug Orders and Patient Information**

**Findings.** From our interviews, we found that the method of delivering the drug order and other pertinent information varies depending on in which clinic the infusion is scheduled. The flowchart in Appendix D (from the Pulmonary department) shows the different steps required to schedule an infusion. This flowchart also shows the delivery method necessary to send the drug order and patient information to the infusion room. For example, UH-8A prefers to have the scheduling nurse fax the order to the infusion room whereas UH-5C prefers the patient deliver the order and a copy of the order be sent through UMHS’s pneumatic tubing system.

**Conclusions.** Based on these findings, we concluded that the current scheduling processes do not have a uniform way to provide the infusion room with the drug order. This inconsistency can increase the amount of time required to schedule the infusion since the person scheduling must ask each clinical coordinator how to deliver the order.

**Recommendations and Action Plan.** We recommend that all orders be sent through the pneumatic tubing system to the infusion rooms. Although many of the clinics prefer the order be faxed, fax machines are not yet accessible to all departments. However, every clinic currently has access to the tubing system, so this option is the most cost effective way to standardize the process. Until every clinic and department has access to a fax machine, the standard method should be to send the order through the pneumatic tubing system. However, if in certain situations, this option is not feasible, the nurse or clerk at the infusion room should notify the scheduling nurse of their preferred method of contact.

To implement this recommendation, UMHS must inform all employees who are involved in the scheduling process that tubing the order is the new standard procedure. This will benefit scheduling nurses and the clinical coordinators that schedule the infusions because nurses should not spend more time asking how to send the order. This would
also benefit the clinical coordinator as well, as s/he should not have to expend more time explaining the procedure to send the order.

**Simplify Calling Procedures for Scheduling Coordinators**

*Findings.* Several nurses mentioned the following frustrating aspects in the scheduling process: the confusion over what clinic to call, and who to talk to in order to schedule an infusion appointment. The schedulers do not know which clinic they are supposed to call to schedule certain types of infusions. In many cases, even when the schedulers do know which clinic to call, they do not know who to talk to at that clinic. In addition, patients with special precautions or other uncommon situations are not accepted at all infusion rooms, and departments are not aware of these limitations before calling the clinics.

*Conclusions.* From these nurses’ statements, we concluded that some departments do not have a specific order of which clinic to call to schedule an infusion appointment. We also concluded that some of the clinics do not have a specific contact who schedules each appointment. This second conclusion is the main cause of the unfamiliarity that exists between departments and clinics, which leads to the nurses’ feeling of “asking for a favor” (see Appendix C for verbatim) when trying to schedule an infusion.

*Recommendations and Action Plan.* UMHS should eliminate the nurses’ decision process of which clinic to call and who to talk to at each clinic when an infusion appointment is needed. One way to do this is by creating a call list for each department, which should consist of an ordered list of clinics for the nurse to call for an infusion appointment. This would eliminate the nurses’ confusion of which clinic to call for each type of infusion, as well as create a sense of familiarity between departments and clinics. Using the same clinic and talking to the same person every time would help prevent the nurses from feeling like they are “asking for a favor.”

In addition to the call list, an infusion information list that includes names of contacts at each clinic, the operating hours of the clinic and what types of patients can not be sent to their clinic should be created. An example of this list can be found in Appendix H. A third list should include the types of infusions are performed in each clinic as well as the approximate time and nursing attention required for each infusion. An example of this list can be found in Appendix G.

To implement this recommendation, nurses in each infusion room with thorough knowledge of the infusions that can be performed should create a list for their clinic. Once this is complete, a technical employee can compile this data, and provide each department with this list. From this list, each department can determine which clinic to contact to have patients infused. They will also know who they are talking to, and will be able to build a positive working relationship with each other. This list should be updated semiannually to ensure accuracy.

This information should also be accessible online. Every department should have the ability to view the available appointment times and locations. Once the appointment is
scheduled with the patient, the necessary information can be sent online to another department. This would eliminate phone calls to everyone except the patient, making the process much shorter and more efficient.

**Clinical Coordinators Must Be More Accessible to Patients**

*Findings.* Through our interviewing process, one clinical coordinator in the pediatrics clinic expressed her frustration with not having her own phone. Therefore, the amount of time required for her to make an infusion appointment can vary from 20 to 45 minutes. In particular, she expressed difficulty receiving calls from patients in addition to hindering communication with patients.

*Conclusion.* It can be difficult for patients to contact clinical coordinators, which is frustrating for both the patient and for the coordinator. Patients are dissatisfied because they are unable to directly contact the coordinator when they need to and the situation can result in many phone calls between the patient and coordinator.

*Recommendations and Action Plan.* Clinical coordinators should be more accessible to patients in order to increase patient satisfaction, as well as departmental efficiency. It is important that the patient is able to contact the coordinator directly. If every clinical coordinator is provided with a phone line, patient satisfaction would increase. If it is not practical for the coordinator to have a desk phone, a cell phone should be provided. Cell phones that may be used within the hospital are available and cost approximately $500 per phone. They are being used on a trial basis in UMHS and the phones have been operating well within the hospital and are easy to repair. The phones operate anywhere within the hospital, but cannot be used out of the hospital.

**UMHS is Losing Patients Due to Unavailability of Appointments**

*Findings.* UMHS should be able to accommodate any patient that needs an infusion. However, during the interviews we found that it is very common for patients to be sent elsewhere to receive an infusion because UMHS cannot accommodate them due to unavailability of appointments.

*Conclusions.* UMHS is frequently losing patients to other sites for infusion appointments. Although we cannot quantify exactly how many patients are sent elsewhere, five out of the 12 nurses we interviewed often refer patients to outside facilities to receive their infusion. When patients receive infusions elsewhere, UMHS loses profit with each patient lost. Although the health and safety is and should be the first concern of the hospital, all profit loss delays improvements that could be made to the hospital.

*Recommendations and Action Plan.* If UMHS wishes to minimize the number of patients that are sent elsewhere to receive infusions, they can extend the hours of operations in the clinics that provide infusions. If they keep these clinics open longer, they can accommodate more patients. Patients that may have odd time schedules will have a better chance at scheduling an appointment. Also, infusions that take longer to perform will now have more time to complete. To employ this recommendation, more
information is needed to determine which clinic’s hours to expand, as some clinics may provide infusions with higher demand for evening appointments. The demand for the increase in hours should be determined and documented in order to implement this recommendation.
Appendix A – Stage One Interview Questions

Patients
1. Who send the patients?
2. Who are the major types of patients/why are patients sent for an infusion?
3. How does a patient get there?
4. Who do they call to schedule an appointment?

Forms
1. What forms need to be filled out?
2. Where does the patient fill out these forms?
3. How long does it take them to fill the forms out?

Process
1. How do you handle walk-ins?
2. Do you transfer patients to other infusion rooms?
3. What happens when the clinic is full?
4. What is needed before an infusion can take place?
5. Where does the preliminary process take place?
6. What materials and equipment are needed for infusion?
7. How much time does infusion set up take?
8. How much time does it take to administer an infusion?
9. Are there different kinds of infusions?
10. What are your hours of operations?
11. Are there any bottlenecks that can be readily identified?
12. What is the patient to staff ratio?
13. What staff needs to be present during the infusion?
14. What supervision is necessary for the infusion process?
15. How is overflow handled?
16. Are there any infusions that take priority over other infusions?
17. What may affect the infusion process? (new drugs, confounding circumstances)
18. How are emergencies dealt with?
Appendix B - Stage Two Interview Questions

1. If a patient needs an infusion, what steps do you take to get them one?

2. How often do you setup infusions? (per week? Month? Day?)
   - do you know anyone who infrequently sets up appointments that we
     could talk to?

3. How many people (on average) do you talk to before you get an appt set up?

4. How much time (on average) does it take?

5. Who notifies the patient about their appt?

6. What are the most frustrating aspects of appt scheduling?

7. Who provides the drugs?


9. How much business do you think UMHS loses when appointments can’t be made in a
   timely fashion?

10. Are there any types of infusions that require special considerations for scheduling?

11. What do you like about the current process?

12. What would you change about the current process?

13. What do you think is the ideal scheduling process?
Appendix C – Findings from Stage Two Interviews

Frustrating Aspects of Scheduling Process

1. Obtaining new authorizations
2. Scheduling in outside facilities
3. Not knowing that patient needs infusion because they weren’t given the orders
4. Doesn’t have her own phone line
5. It can take up to 2 weeks before an insurance company will authorize an infusion
6. It’s frustrating to schedule through the cancer center
7. It is hard to when nurses go on vacation to orient substitute nurses
8. People feel like they are begging to get infusions scheduled
9. Hard to find nurses to see how long the infusion will take and the amount of nursing attention required
10. Can’t just call one place
11. Closed mentality about ambulatory infusions
12. I think it needs to be standardized one set of orders should work for all outpatient infusions. A standardized scheduling or central area where all infusion area openings can be easily accessed to focus calling area that appears to be able to do infusion in time frame required.
13. There is not enough availability or flexibility, it's not awful but we definitely have moved infusions elsewhere because of the work involved and the difficulty scheduling
14. The arrangement of in hospital infusions is prohibitive and we do everything we can now to do our infusions through out of house companies because of the inefficient and scheduling difficulties.

Suggestions

1. Have infusion site available for pediatric patients (under age 16) on weekends especially when they are 2 or 3 day infusions. Currently patients are being admitted to have them done on the weekend. This keeps the patients from missing numerous days of school.
2. Have better guidelines so the scheduler doesn’t have to go to and from the infusion room.
3. Improve organization because scheduler doesn’t always call the right person or place to schedule an infusion appointment.
4. Be able to call one person by having a list of what types of patients will be accepted into different infusion rooms.
5. Tie in everyone’s needs by centralized, accessible, consolidated information handling and electronically managing information.
## Appendix C - Interview Data Summary

<table>
<thead>
<tr>
<th>Clinic of Person Interviewed</th>
<th>What is the first Clinic you call to schedule an infusion?</th>
<th>How do you find out that a patient needs an infusion?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary</td>
<td>8A</td>
<td>The doctor tells them</td>
</tr>
<tr>
<td>Peds Clinic 1</td>
<td>Peds</td>
<td>checkout sheet, doctor or nurse will tell her</td>
</tr>
<tr>
<td>Peds GI</td>
<td>Peds</td>
<td>Doctor Tells me</td>
</tr>
<tr>
<td>Peds Clinic 2</td>
<td>Peds</td>
<td>Doctor Tells me</td>
</tr>
<tr>
<td>Peds Rheumatology</td>
<td>Peds</td>
<td>70% dr. tells, 30% patient calls</td>
</tr>
<tr>
<td>Rheumatology</td>
<td>8A</td>
<td>Doctor tells me</td>
</tr>
<tr>
<td>Neurology 1</td>
<td>depending on infusion: TACU for 3 day Solu-medrol</td>
<td>not sure</td>
</tr>
<tr>
<td>Neurology 2</td>
<td>TACU</td>
<td>not sure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinic of Person Interviewed</th>
<th>Who does the paperwork?</th>
<th>Who notifies the patient?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary</td>
<td>you send the order to the infusion room and then they will order the drugs</td>
<td>Me</td>
</tr>
<tr>
<td>Peds Clinic 1</td>
<td>you send the order to the infusion room and then they will order the drugs</td>
<td>Me</td>
</tr>
<tr>
<td>Peds GI</td>
<td>you send the order to the infusion room and then they will order the drugs</td>
<td>Me</td>
</tr>
<tr>
<td>Peds Clinic 2</td>
<td>sends orders to room, and sends letter to patient</td>
<td>Me</td>
</tr>
<tr>
<td>Peds Rheumatology</td>
<td>does authorization if needed, sends orders to infusion room.</td>
<td>Me</td>
</tr>
<tr>
<td>Rheumatology</td>
<td>do auth if needed, send instruc to patients, get free meds if req, redo every 6 mo</td>
<td>Me</td>
</tr>
<tr>
<td>Neurology 1</td>
<td>usually nurse</td>
<td>Me</td>
</tr>
<tr>
<td>Neurology 2</td>
<td>nursing faxes orders, referrals, billing staff faxes insurance info</td>
<td>Me</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinic of Person Interviewed</th>
<th>How often do you schedule infusions?</th>
<th>Who orders the drugs?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary</td>
<td>about 1 every 2 months</td>
<td>infusion room</td>
</tr>
<tr>
<td>Peds Clinic 1</td>
<td>12 per week</td>
<td>infusion room</td>
</tr>
<tr>
<td>Peds GI</td>
<td>at least 10 per month</td>
<td>infusion room</td>
</tr>
<tr>
<td>Peds Clinic 2</td>
<td>5-6 per week</td>
<td>infusion room</td>
</tr>
<tr>
<td>Peds Rheumatology</td>
<td>1-2 per month</td>
<td>infusion room</td>
</tr>
<tr>
<td>Rheumatology</td>
<td>2-5 per week</td>
<td>infusion room</td>
</tr>
<tr>
<td>Neurology 1</td>
<td>7-14 per week</td>
<td>infusion room</td>
</tr>
<tr>
<td>Neurology 2</td>
<td>1-4 infusions per week</td>
<td>infusion room</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinic of Person Interviewed</th>
<th>How much time does it take on average?</th>
<th>How often are patients admitted due to lack of space?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary</td>
<td>20 minutes</td>
<td>less than 20%</td>
</tr>
<tr>
<td>Peds Clinic 1</td>
<td>less than 5 minutes</td>
<td>NA</td>
</tr>
<tr>
<td>Peds GI</td>
<td>couple of minutes</td>
<td>NA</td>
</tr>
<tr>
<td>Peds Clinic 2</td>
<td>15 if patient is in office, 30-45 otherwise</td>
<td>NA</td>
</tr>
<tr>
<td>Peds Rheumatology</td>
<td>20-30 minutes</td>
<td>NA</td>
</tr>
<tr>
<td>Rheumatology</td>
<td>5-15 if 8A is available, 30 otherwise</td>
<td>5%</td>
</tr>
<tr>
<td>Neurology 1</td>
<td>usually 1 hour, could be 30 min.</td>
<td>don't know</td>
</tr>
<tr>
<td>Neurology 2</td>
<td>about 30 minutes</td>
<td>don't know</td>
</tr>
</tbody>
</table>
Neurology 2

Patient Needs Infusion

Contact Deb Walters (6-9003) for insurance authorization

Is insurance approved?

No

Alternate means of payment

Yes

Contact infusion rooms to check availability dates

Is client homebound?

Yes

Contact Practice management

Can practice management help?

Yes

Practice management gives names of contacts in patient’s area to contact

Practice management takes care of scheduling

Process Complete

No

Contact Practice management

Attempt contact for expected time frame needed to schedule ASAP.

Determine if space and appropriate time is available, through 3-way conference call, or take various times down and contact patient for confirmation, and call back infusion room with confirmation.
Neurology 1
Process approx 30 min, depending on space availability and insurance authorizations

- Patient needs infusion
  - Infusion ordered
    - Call infusion rooms: 8A, 5 TACU, or Pediatric.
      - Is the infusion for chemotherapy?
        - Yes
          - Is this procedure part of a study?
            - No
              - Infusion room space and availability needs to be coordinate with doctors schedule, as well as patients schedule.
            - Yes
              - Infusion room space and availability needs to be coordinate with doctors schedule, as well as patients schedule, the study coordinator.
        - No
          - Process complete
Appendix E

U.S. News and World Report
Best Hospitals – Honor Roll

1. Johns Hopkins Hospital, Baltimore
2. Mayo Clinic, Rochester, Minnesota
3. UCLA Medical Center, Los Angeles
4. Massachusetts General Hospital, Boston
5. Cleveland Clinic
6. Duke University Medical Center, Durham, N.C.
7. University of California, San Francisco Medical Center
8. Barnes-Jewish Hospital, St. Louis
9. University of Michigan Medical Center, Ann Arbor
10. University of Washington Medical Center, Seattle
11. New York Presbyterian Hospital
12. Brigham and Women’s Hospital, Boston
13. Hospital of the University of Pennsylvania, Philadelphia
14. University of Chicago Hospitals,
15. Stanford Hospital and Clinics, Stanford, California
16. University of Pittsburgh Medical Center
17. Vanderbilt University Medical Center, Nashville
Appendix F – Departments Contacted for Stage Two Interviews

1. Allergy
2. Pulmonary
3. Neurology
4. Urology
5. Neurosurgery
6. Infectious Disease
7. Geriatrics
8. Plastic Surgery
9. Rheumatology
10. Discharge Planning
11. Pediatric Rheumatology
12. Pediatric Gastroenterology
13. Pediatric Clinic
### Appendix H. Infusion Room Contact Information

<table>
<thead>
<tr>
<th>Clinic</th>
<th>Hours of Operation</th>
<th>Contact Person</th>
<th>Types of Patients not Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric Clinic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8A</td>
<td>Sunday - Friday 7:30am - 4pm Sunday Bone Marrow Patients Only</td>
<td>Sandy Trembath (weekdays only)</td>
<td></td>
</tr>
<tr>
<td>5C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Mott</td>
<td>After Hours (5pm - midnight) Holidays and Weekends</td>
<td>Bonnie or any infusion room nurse</td>
<td></td>
</tr>
</tbody>
</table>
Appendix I – Questions to Benchmark UMHS Infusion Rooms

1. What are the hours of operation?
2. What types of infusions do you perform?
3. What types of patients do you treat?
4. What happens if there is an overflow of patients?
5. Are there other locations that provide infusions?
6. Is the infusion center located within the hospital?
7. Where do you receive your drugs?
8. When do you mix the drugs?
9. Is there a physician on call or on duty at the infusion center?
10. How do you schedule an infusion?
11. How easy or difficult is it to schedule an infusion?
12. When was the infusion center built?
13. How well do you think the infusion center works?