Quantifying the Current State of the Liver and Kidney Transplant Clinics

Final Report

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Executive Summary

Due to the transplant clinics at the University of Michigan hospital currently being located in various areas of the University of Michigan Hospital Taubman Center, a new Transplant Center is going to open in 2013. This new center will consolidate the several existing transplant clinics into one central location on the first floor of the Taubman Center. To provide the most efficient care to patients in the new Transplant Center, the Director of Operations asked the IOE 481 Team 04 from the University of Michigan to perform a study to analyze the current processes in the kidney and liver transplant clinics. This data will be used by the Transplant Center Director of Operations and other members of the Transplant Center team to develop improved workflows for the new Transplant Center.

Project Goals

This project’s goals include collecting and analyzing data relevant to only the outpatient procedures of the kidney and liver transplant clinics. The clinics in areas 2C and 3C of the Taubman Center at the University of Michigan Hospital examined were the following:

- Kidney Evaluation
- Pre-Kidney
- Kidney Post Transplant Acute
- Kidney Post Transplant Chronic Long Term
- Liver Evaluation
- Liver Post Transplant Chronic Long Term

These clinics service outpatients who have had or will have transplant surgery. Appointments at the clinics include wellness check-ups for post-transplant patients and evaluations of patients waiting to have transplant surgery to ensure the patient is still eligible to receive a transplant.

Methods

To quantify the current state of the kidney and liver transplant clinics, the team collected observation data, patient collected data, and team verification data.

- **Observation Data.** To better understand the clinic processes and how to undergo the data collection process, the team observed the patients and staff in clinics 2C and 3C in the Taubman Center from September 24 to October 4. The team and the Director of Operations agreed that the best method of data collection would be to have the patients self-collect as they move through their appointments. A few drafts of a data collection sheet were drafted, revised, and tested before the final data collection sheet was ready. See Appendix A for a sample of the data collection sheet.

- **Patient Collected Data.** The team created an instruction sheet for the clerical staff that distributed the data collection sheet to the patients. This instruction sheet ensured that the patients and staff would provide good, usable information and would also answer any questions that the staff or patients may have about the study. From October 22 to
November 9, the team distributed and collected 321 data sheets. The instruction sheet is attached in Appendix B.

- Team Verification Data. The decision to have the patients self-collect the data resulted in the need for the team to verify the accuracy of the data. To ensure accuracy, the team performed an accuracy check time study, in which members of the team followed 5 random patients through their appointment and collected times to compare to the patient’s data collection sheet. This study confirmed that patients were accurately filling out the data collection sheets.

- Data Analysis. The team stored and organized the data in a Microsoft Excel spreadsheet. This spreadsheet was used to calculate the mean times and standard deviations for each step in the transplant appointment process and for each visit type examined in the project. These times were analyzed to identify any areas for improvement. The Director of Operations will use the data to develop improved workflows for the new Transplant Center.

Findings and Conclusions

The results of the study showed that the average time spent waiting in the waiting room is 25 minutes, with a range from 0 minutes to 2 hours 54 minutes. To best quantify how a patient’s time during an appointment was spent, the team calculated the means, standard deviations, minimums, and maximums of the following steps of a visit:

- Total visit time
- Time spent in waiting room
- Time spent with the nurse
- Time spent with the physician
- Time spent with surgeon
- Time spent with a social worker
- Time spent with pharmacy

The average number of people that a patient brings with him or her to the appointment is 1 person. Patients were found to arrive, on average, 12 minutes early to their scheduled appointment, with a majority of them arriving within 30 minutes of their appointment time. The results of the team’s data analysis are summarized in Table 1.
Table 1. Summary of Data Analysis Results

<table>
<thead>
<tr>
<th>Data collection time frame</th>
<th>October 22, 2012 - November 9, 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sample size</td>
<td>321</td>
</tr>
<tr>
<td>Average time spent in waiting room</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Average number of people brought along</td>
<td>1 person</td>
</tr>
<tr>
<td>Average total length of visit</td>
<td>1:41</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidney Evaluation</td>
<td>3:18</td>
</tr>
<tr>
<td>Post Transplant Acute Kidney</td>
<td>1:33</td>
</tr>
<tr>
<td>Chronic Long Term Kidney</td>
<td>1:30</td>
</tr>
<tr>
<td>Pre-Kidney</td>
<td>2:13</td>
</tr>
<tr>
<td>Liver Evaluation</td>
<td>2:00</td>
</tr>
<tr>
<td>Chronic Long Term Liver</td>
<td>1:18</td>
</tr>
<tr>
<td>Average check-in time w.r.t.</td>
<td>12 minutes early</td>
</tr>
<tr>
<td>appointment time</td>
<td></td>
</tr>
</tbody>
</table>

**Recommendations**

The team used the electronic health record system used by the University of Michigan Hospital called MiChart to find missing information on the data collection sheets. Because the team experienced complications with the MiChart coding system, the team recommends that a simpler standardized MiChart coding system be implemented to help reduce any future problems. In the current system, sometimes one code maps to more than one type of visit. The new system should be clear and concise to all staff in the Transplant Center so that it can be used to reduce any potential confusion.

In addition, the team noticed the first come, first serve system that the clinics are currently using may be adversely affecting the flow of the patient appointments. Currently, patients who arrive on time for their appointment may spend a long time in the waiting room because of patients who arrived late or early for their appointments. The team recommends using the appointment times to determine which patients to call back from the waiting room. The team expects that using the scheduled appointment times should decrease the time spent in the waiting room and increase the likelihood that patients will arrive at their scheduled appointment time.
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INTRODUCTION

The transplant clinics are currently located in various areas of the University of Michigan Hospital Taubman Center. A new transplant center is going to open in 2013 that will consolidate these transplant clinics into one central location on the first floor of the Taubman Center. To provide the most efficient care to patients in the new transplant center, the Transplant Center Director of Operations asked the IOE 481 Team 04 from the University of Michigan to quantify the current outpatient flows, or the process of an outpatient moving through his or her appointment, of the kidney and liver transplant clinics. The data will help to reduce patient wait time and increase staff productivity in the new Transplant Center. This report presents results of the team’s data collection and analysis of outpatient flows in the current kidney and liver transplant clinics. This report also presents recommendations that resulted from the data analysis.

GOALS AND OBJECTIVES

The student team quantified outpatient workflows in the current liver and kidney transplant clinics in the Taubman Center. To reach this goal, the team completed the following tasks:

- Administer patient self-data collection sheets
- Analyze the data to find:
  - Duration of visit based on visit type
  - Amount of time patients arrive early/late for their appointment
  - Time spent in waiting room
  - Number of people brought to appointment

The data will be used by the Transplant Center Director of Operations and other members of the Transplant Center team to develop improved workflows for the new Transplant Center.

BACKGROUND

Transplant clinics are currently located in various areas of the Taubman Center (areas 2C and 3C) within the University of Michigan Hospital. This lack of consolidation leads to inconsistencies and inefficiencies with the transplant staff and faculty. The Transplant Center Director of Operations has requested a team of students from IOE 481 to observe and quantify the workflows in the current kidney and liver transplant clinics. The transplant clinics service outpatients who have had or will have transplant surgery. Appointments at the clinics include wellness check-ups for post-transplant patients and evaluations of patients waiting to have transplant surgery to ensure the patient is still eligible to receive a transplant.

A new formal Transplant Center is set to open in 2013 on the first floor of the Taubman Center. The University of Michigan Hospital is moving the transplant clinics from the second and third floors of the Taubman Center to the first floor. The new Transplant Center will incorporate the following outpatient services: adult liver, kidney and pancreas programs; non-transplant surgery services; and pediatric transition clinic for liver/kidney and clinical research.
The team’s data collection and analysis is just a small portion of the larger project of consolidating the transplant clinics to the first floor of the Taubman Center, so the Director of Operations and other members of the Transplant Center team will use the collected data to develop improved workflows for the new Transplant Center. The goals of the Transplant Center Move project are to seamlessly integrate patient care and outstanding service and to optimize the utilization of faculty.

KEY ISSUES

The following key issues drove the need for this project:

- Transplant clinics are currently spread across several Ambulatory Care Units (ACUs) throughout the Taubman Center, causing inconsistencies and inefficiencies with the transplant staff and faculty.
- Outpatient procedures are performed in various locations.
- All staff in the transplant departments are scattered and not collocated.

PROJECT SCOPE

This project included only the kidney and liver transplant centers. The clinics examined were the following:

- Kidney Evaluation
- Pre-Kidney
- Kidney Post Transplant Acute
- Kidney Post Transplant Chronic Long Term
- Liver Evaluation
- Liver Post Transplant Chronic Long Term

The locations of the clinics the team examined are areas 2C and 3C of the Taubman Center.

The following areas were not included in the scope of this project:

- Non-transplant outpatients in the Taubman Center clinics
- Inpatients in the University of Michigan Hospital
- Transplant clinic services in area 3D of the Taubman Center

METHODS

The student team observed and collected data in the kidney and liver clinics in areas 2C and 3C of the Taubman Center. The main personnel involved in the project included clerical staff and patients of the transplant department.
**Observation Data**

Due to past successes with similar projects, the Director of Operations suggested the team work with the patients to collect the data. Because the team was not available during all hours of operation to collect the data and the length of appointments can be over an hour per patient, the team and Director of Operations agreed that this method was the most effective. To fully understand the clinic processes and to determine the best design for the data collection sheets, the team observed processes in clinics 2C and 3C in the Taubman Center. After the team developed two drafts of the data collection sheet, the Director of Operations and team agreed on a data collection sheet that captures the number of people the patient brings to the appointment and all the steps in the appointment process:

- Time patient checks in
- Time patient gets called back
- Time patient gets to the examination room
- Time the doctor, surgeon, nurse, social worker, and/or pharmacist enter and exit
- Time patient checks out

The data collection sheet is attached in Appendix A.

**Patient Collected Data**

To ensure the staff gave the collection form to only kidney and liver transplant patients, the team created an instruction sheet for the clerical staff that contains detailed instructions as to what types of patients receive the data collection sheet and how and why the patients fill out the form, if patients ask. The team emailed the instruction sheet to the clinic managers of areas 2C and 3C to prepare the staff in the clinics. After the instruction sheets were emailed to the managers, the team visited the clinics to train the check-in and checkout staff. The instruction sheet is attached in Appendix B.

**Results of Data Collection**

The check-in staff handed a clipboard with a clock and the data collection sheet to each patient at check-in. Data were collected from October 22, 2012 to November 9, 2012 and resulted in 321 data sheets. Below Table 1 shows the breakdown of the data collection sheets by visit types.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney Evaluation</td>
<td>17</td>
</tr>
<tr>
<td>Kidney Post Transplant Acute</td>
<td>65</td>
</tr>
<tr>
<td>Kidney Post Transplant Chronic LT</td>
<td>153</td>
</tr>
<tr>
<td>Pre Kidney</td>
<td>13</td>
</tr>
<tr>
<td>Liver Evaluation</td>
<td>41</td>
</tr>
<tr>
<td>Liver Post Transplant Chronic LT</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>321</strong></td>
</tr>
</tbody>
</table>
As seen in Table 1, Kidney Post Transplant Chronic Long Term patients had the largest sample size.

Complications During Data Collection

The primary goal of the data analysis was to separate and analyze the data by visit type; however, many patient data collection sheets were returned without the visit type marked. To fill out the missing visit type information, the coordinator provided the team with MiChart data from October 22, 2012 to November 9, 2012. MiChart is the electronic health record system used by the University of Michigan Hospital. This data included patient identification numbers, visit dates, check-in and checkout times, and visit types. As listed in the project scope, the team was asked to analyze six visit types; however, none of the visit codes listed in the MiChart data matched the wording of the original six visit types. The team talked with the Transplant Center Nursing Operations Manager and the administrative managers for the liver and kidney clinics. The goal of this discussion was to match the MiChart visit codes to the original six visit types. Unfortunately, no conclusion was reached regarding the visit type confusion through this discussion. During the client meeting on Wednesday, November 28, 2012, most of the MiChart visit codes were matched with the original six visit types.

The team used the information from the client meeting to go through each incomplete data sheet and identify its proper visit type. Of the 321 patient data points, the team was unable to identify the visit type for approximately 100 patients. The team met with the kidney and liver transplant administrative managers who are knowledgeable in and have access to the health records for the liver and kidney clinics. Fortunately, the administrative managers identified the visit types for the remaining unidentified patients. The visit type identification issues experienced in this project led to additional recommendations.

Team Verification Data

Because patients self-collected the data, the team needed to ensure data accuracy. To ensure accuracy, the team performed an accuracy check time study, in which members of the team followed 5 random patients through their appointments and collected times to compare to the patient’s data collection sheet. The results of this time study confirmed that patients were accurately filling out the data collection sheet.

Data Analysis

The team entered and organized the data in an Excel spreadsheet to facilitate quantitative statistical analysis. Specifically the team measured the data using the following:

- Mean values for:
  - Time spent in waiting room
  - Number of people brought to appointment
  - Total time of visit based on visit type
  - Time spent with each caregiver
  - Amount of time patients show up early/late for their appointment
• Histograms for:
  o Number of people patients bring to their appointment
  o Time spent in waiting room
  o Time patients arrived early
  o Time patients arrived late

These times and averages will be used by the Director of Operations and Transplant Center team to identify areas for improvement in the process and to develop improved workflows for the new Transplant Center.

FINDINGS AND CONCLUSIONS

Based on the patient self-collected data, the team found the average number of people patients bring along to their appointments, the length of visit based on patient visit type, the average time spent in the waiting room based on patient visit type, the time spent with each caregiver based on patient visit type, and the amount of time patients arrive early or late to their appointment.

Patients Bring One Person on Average to Appointment

In the beginning of the project, the Transplant Center team expressed a concern for lack of space in the new Transplant Center waiting room. The new waiting room is small for the number of patients the Transplant Center plans to service and the Transplant Center team was worried that there would not be adequate space for both the patients and the friends or family that may accompany patients to their appointments. Figure 1 below shows the distribution of the number of additional people patients bring to their appointment.

Figure 1. Majority of patients bring one other person to their appointment
Figure 1 shows that the majority of patients bring zero or one other person to their appointment, thus space in the waiting room should not be a major concern.

**Evaluation Patients Have Longest Average Overall Length of Visit**

Below, Figure 2 shows the average length of visit for each patient visit type.

![Figure 2. Kidney Evaluation patients have the longest visit length](image)


As seen in Figure 2, Kidney Evaluation patients have the longest visit length on average. The second and third longest visit lengths are Pre-Kidney (a subset of Kidney Evaluation) and Liver Evaluation patients, respectively. Evaluation visit types having the longest visit length is expected, as evaluation appointments also include an education portion. The visit breakdown of Kidney Evaluation patients is shown in Table 2 below.

**Table 2. Kidney Evaluation Visit Breakdown**

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Visit Breakdown</strong></td>
</tr>
<tr>
<td><strong>Total Visit</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
</tr>
<tr>
<td><strong>Std Dev</strong></td>
</tr>
<tr>
<td><strong>Min</strong></td>
</tr>
<tr>
<td><strong>Max</strong></td>
</tr>
</tbody>
</table>

As seen in Table 2, the average total visit length for Kidney Evaluation patients is 3 hours 18 minutes. The average time spent in the waiting room is 45 minutes. The longest average time spent with a provider is with pharmacy for 27 minutes. Table 3, below, shows the visit breakdown of Kidney Post Transplant Acute patients.
Table 3. Kidney Post Transplant Acute Visit Breakdown  

<table>
<thead>
<tr>
<th></th>
<th>Total Visit</th>
<th>Waiting Room</th>
<th>Nurse</th>
<th>Physician</th>
<th>Surgeon</th>
<th>Social Worker</th>
<th>Pharmacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1:33</td>
<td>0:27</td>
<td>0:09</td>
<td>0:21</td>
<td>0:08</td>
<td>0:08</td>
<td>N/A</td>
</tr>
<tr>
<td>Std Dev</td>
<td>0:43</td>
<td>0:27</td>
<td>0:05</td>
<td>0:11</td>
<td>0:04</td>
<td>0:05</td>
<td>N/A</td>
</tr>
<tr>
<td>Min</td>
<td>0:36</td>
<td>0:01</td>
<td>0:02</td>
<td>0:08</td>
<td>0:05</td>
<td>0:03</td>
<td>0:00</td>
</tr>
<tr>
<td>Max</td>
<td>3:31</td>
<td>1:57</td>
<td>0:16</td>
<td>0:54</td>
<td>0:11</td>
<td>0:13</td>
<td>0:00</td>
</tr>
</tbody>
</table>

As seen in Table 3, the average total visit length for Kidney Post Transplant Acute patients is 1 hour 33 minutes. The average time spent in the waiting room is 27 minutes. The longest average time spent with a provider is with the physician for 21 minutes. Table 4, below, shows the visit breakdown of Kidney Post Transplant Chronic Long Term patients.

Table 4. Kidney Post Transplant Chronic Long Term Visit Breakdown  

<table>
<thead>
<tr>
<th></th>
<th>Total Visit</th>
<th>Waiting Room</th>
<th>Nurse</th>
<th>Physician</th>
<th>Surgeon</th>
<th>Social Worker</th>
<th>Pharmacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1:13</td>
<td>0:14</td>
<td>0:11</td>
<td>0:25</td>
<td>0:45</td>
<td>0:19</td>
<td>N/A</td>
</tr>
<tr>
<td>Std Dev</td>
<td>0:36</td>
<td>0:15</td>
<td>0:05</td>
<td>0:17</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Min</td>
<td>0:40</td>
<td>0:01</td>
<td>0:07</td>
<td>0:09</td>
<td>0:45</td>
<td>0:19</td>
<td>0:00</td>
</tr>
<tr>
<td>Max</td>
<td>2:27</td>
<td>0:51</td>
<td>0:21</td>
<td>0:55</td>
<td>0:45</td>
<td>0:19</td>
<td>0:00</td>
</tr>
</tbody>
</table>

As seen in Table 4 the average total visit length for Kidney Post Transplant Chronic Long Term patients is 1 hour 13 minutes. The average time spent in the waiting room is 14 minutes. The longest average time spent with a provider is with the surgeon for 45 minutes. Table 5, below, shows the visit breakdown of Pre-Kidney patients.

Table 5. Pre-Kidney Visit Breakdown  

<table>
<thead>
<tr>
<th></th>
<th>Total Visit</th>
<th>Waiting Room</th>
<th>Nurse</th>
<th>Physician</th>
<th>Surgeon</th>
<th>Social Worker</th>
<th>Pharmacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2:13</td>
<td>0:32</td>
<td>0:07</td>
<td>0:28</td>
<td>0:06</td>
<td>0:16</td>
<td>0:11</td>
</tr>
<tr>
<td>Std Dev</td>
<td>1:48</td>
<td>0:23</td>
<td>0:03</td>
<td>0:19</td>
<td>N/A</td>
<td>0:07</td>
<td>N/A</td>
</tr>
<tr>
<td>Min</td>
<td>0:56</td>
<td>0:04</td>
<td>0:03</td>
<td>0:10</td>
<td>0:06</td>
<td>0:11</td>
<td>0:11</td>
</tr>
<tr>
<td>Max</td>
<td>8:00</td>
<td>1:08</td>
<td>0:12</td>
<td>0:58</td>
<td>0:06</td>
<td>0:21</td>
<td>0:11</td>
</tr>
</tbody>
</table>

As seen in Table 5 the average total visit length for Pre-Kidney patients is 2 hours 13 minutes. The average time spent in the waiting room is 32 minutes. The longest average time spent with a provider is with the physician for 28 minutes. Table 6, shows the visit breakdown of Liver Evaluation patients.
As seen in Table 6 the average total visit length for Liver Evaluation patients is 1 hour 59 minutes. The average time spent in the waiting room is 10 minutes. The longest average time spent with a provider is with the physician for 21 minutes. Table 7, below, shows the visit breakdown of Liver Post Transplant Chronic Long Term patients.

As seen in Table 7 the average total visit length for Liver Post Transplant Chronic Long Term patients is 1 hour 19 minutes. The average time spent in the waiting room is 24 minutes. The longest average time spent with a provider is with the physician for 38 minutes.

**Patients Arrive 12 Minutes Early on Average to Appointment**

Visit length is affected by time spent in the waiting room, which can vary based on patient arrival time. Based on the patient self-collected data, the team found that on average, patients were approximately 12 minutes early to their appointment. The distribution of times of patients who arrive before their scheduled appointment time is shown in Figure 3.
As seen in Figure 3, the majority of patients who arrive early, arrive between 5 and 35 minutes before their scheduled appointment time. While this may seem beneficial, patients arriving much earlier than their scheduled appointment time can have a negative effect on the clinic process. The transplant clinics run on a first come, first serve basis. The first come, first serve process means that a patient can arrive much earlier than his or her scheduled appointment time and may be called back before the patients who arrive on time to their earlier scheduled appointment, which may lead to longer wait times for those patients who arrive on time to their appointment.

The distribution of times of patients who arrive after their scheduled appointment time is shown below in Figure 4.
As seen in Figure 4, the majority of patients who arrive late, arrive between 2 and 17 minutes after their scheduled appointment time. Since the late patients are not necessarily brought immediately back to an examination room, they have to wait in the waiting room until an examination room becomes available.

**Patients Spend 25 Minutes on Average in the Waiting Room**

Figure 5, below, shows the distribution of time spent in the waiting room.

![Histogram of wait times](image)

Figure 5. Majority of time spent in waiting room is 5 minutes or less  

As seen in Figure 4, the majority of time spent in the waiting room is 5 minutes or less; however, for 34 of the 321 data points collected wait times exceed one hour. The median wait time is 14 minutes and the average wait time spent in the waiting room is 25 minutes.

**RECOMMENDATIONS**

The primary purpose of this project was to quantify the current state of the kidney and liver clinics. Table 8 shows a summary of the team’s data analysis results.
### Table 8. Summary of Data Analysis Results


<table>
<thead>
<tr>
<th>Data collection time frame</th>
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<tbody>
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</tr>
<tr>
<td>Average number of people brought along</td>
<td>1 person</td>
</tr>
<tr>
<td>Average total length of visit (hours:minutes)</td>
<td>1:41</td>
</tr>
<tr>
<td>Kidney Evaluation</td>
<td>3:18</td>
</tr>
<tr>
<td>Post Transplant Acute Kidney</td>
<td>1:33</td>
</tr>
<tr>
<td>Chronic Long Term Kidney</td>
<td>1:30</td>
</tr>
<tr>
<td>Pre-Kidney</td>
<td>2:13</td>
</tr>
<tr>
<td>Liver Evaluation</td>
<td>2:00</td>
</tr>
<tr>
<td>Chronic Long Term Liver</td>
<td>1:18</td>
</tr>
<tr>
<td>Average check-in time w.r.t. appointment time</td>
<td>12 minutes early</td>
</tr>
</tbody>
</table>

Due to the complications the team experienced during data collection, the team recommends that a standardized MiChart coding system be implemented in the new Transplant Center to easily identify the patient visit type. Many of the codes currently used are not explicit to one visit type; sometimes two or three codes can refer to the same visit type. The new coding system would need to be clear and concise so that all levels of staff in the Transplant Center will be aware of each specific code’s meaning.

In addition, the team recommends that the new Transplant Center uses the scheduled appointment times rather than the first come, first serve system clinics are currently using. The team expects using the appointment times will decrease patient times in the waiting room and increase the likelihood that patients will arrive at their scheduled appointment time.

**EXPECTED IMPACT**

The time studies allowed the team to quantify the current state of the transplant clinics’ workflows. The collected data will be used by the Transplant Center team to:

- Create efficient flow design of the new transplant center
- Develop adequate staffing levels at the new transplant center
- Improve patient throughput
- Improve quality of patient care
### Appendices

**Appendix A: Data Collection Sheet**

- [ ] Kidney Eval
- [ ] Liver Eval
- [ ] Kidney Post Acute
- [ ] Liver Post Acute
- [ ] Kidney Post Tx Chronic LT
- [ ] Liver Post Tx Chronic LT

The data we are collecting will be used to improve wait time and your overall experience to make your visits as pleasant as possible. We appreciate you taking the time to fill it out!

### How many people did you bring with you today?

- [ ] 0
- [ ] 1
- [ ] 2
- [ ] 3
- [ ] 4
- [ ] 5+

Please write down the times that any of the following happen during your appointment. Please use the same clock throughout your entire visit. Your check-in time has been logged for you.

<table>
<thead>
<tr>
<th>Stage of Visit (Note: not listed in any particular order)</th>
<th>Time ENTERED</th>
<th>Time EXITED</th>
<th>Circle ‘N/A’ if this was not part of your visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check In</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Get called back</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Get to room</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Nurse</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Physician</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Surgeon</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Social Worker</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Pharmacist</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Check Out</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

Additional Comments:
Appendix B: Clerical Staff Instruction Sheet

Patient Data Collection Form
Reference for Check-In Staff – Areas 2C and 3C
We are only collecting data for patients with the following visit types:
Kidney Eval    Kidney Post Acute    Kidney PostTx Chronic LT
Liver Eval     Liver Post Acute     Liver PostTx Chronic LT
✓ Check the type of visit that the patient is here for (upper left-hand corner)
✓ Place patient info sticker in upper right-hand corner
✓ Record the time that the patient comes to the check-in desk in the appropriate slot
✓ Give the patient one of the BLUE clipboards (that have a Michigan M and clock on them) for their documents
✓ If a patient doesn’t seem receptive to the idea of them writing down times, please stress that this study is to improve the work-flow for the new Transplant Center opening on the first floor of Taubman (in 2013)
✓ “Your feedback will help the Transplant team conduct more comprehensive time studies and will help to increase your satisfaction with the U of M Health Care System.”
✓ If you encounter any problems, please contact the clinic manager on duty.
✓ If you have any questions or recommendations for the data collection team, please contact us at transplantmove.students@umich.edu
Appendix C: Contact Information

**Student Team**
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