Michigan Medicine
Performance Improvement

**Current State Assessment of Clinic Flow and Patient Scheduling for the Otolaryngology Clinic at the Livonia Center for Specialty Care**

**Final Report**

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Executive Summary
The Livonia Center for Specialty Care - Otolaryngology Department (OTO) provides surgery and treatment care for patients with diseases and disorders of the ear, nose, and throat (ENT), and related structures of the head and neck. OTO patients experience long lead times, wait times, and encounter cycle times (time spent in OTO) for and during appointments. As a result, providers state that their schedules are underutilized, but still experience delays in their schedules. OTO staff have recently taken steps to address these concerns, such as authorizing OTO checkout staff to schedule return visits and implementing a wait time TV display in the waiting room, though many solutions are still in the implementation phase and problems remain. The lead physician at OTO requested an Industrial & Operations Engineering IOE 481 student team to analyze the care flow and scheduling process, identify problems therein, and propose solutions. This report details the methods, findings and conclusions, and recommendations to these problems.

Background
The demand for the Otolaryngology Department at the Livonia Center for Specialty Care’s (OTO) services is extremely high. The lead physician of OTO said that despite the demand for the OTO’s services, many providers have underutilized schedules, some as low as 30%. The lead physician of OTO also reports that even with physicians and other care providers having many open appointment slots, 60% of patients who desire to schedule appointments at OTO still experience lead times longer than the 2-week standard and providers are often nearly constantly engaged. Additionally, the lead physician of OTO noticed that patients are spending longer than their scheduled appointment time in OTO, some longer than an hour. Determining possible root causes for long patient encounter time is key to increasing provider schedule utilization and minimizing non-value added steps in OTO’s care flow.

Methods
The team performed the following tasks to quantify and analyze the problems OTO faces:

Literature Search. The team conducted a literature search to learn about lean methods applied in healthcare. This study replicates the IOE 481 study from Fall 2016 in the Livonia Center Urology Clinic, one of the reviewed documents. Many of the methods the team used in this study were encouraged by that report and the other literature they found.

On-site OTO Observations. The team shadowed key employees, such as physicians, physician’s assistants (PAs), medical assistants (MAs), clerical staff (Checkout, Check-in, and records staff), and licensed nurse practitioners (LPNs) over a 7 week period.

Interviews to Gain a Qualitative Understanding of Problems and Standards within OTO and the Scheduling Call Center. The team interviewed 3 physicians, 1 PA, 2 MAs, 1 Administrative Manager of Associative Healthcare for OTO, 1 Call Center Manager, 1 checkout staff person, 1 LPN, and 1 records staff person for a total of 11 interviews.

Time Studies to Show an Accurate Representation of Time Durations for Each Step in the Care Process to Develop Current Value Stream Maps. The team collected 492 time study sheets across a 4-week period, in 2017, beginning in late February and ending in late March.
MiChart Data to Gain Insight on 4 Months of Historical Data for Encounter Cycle Time. The team obtained MiChart appointment data from October 1, 2016 to January 31, 2017 and used it to calculate encounter cycle time for 2,468 appointments. These encounter cycle times were stratified and analyzed by provider and by appointment type to determine any relationship between these factors and the time patients spend at OTO.

Findings and Conclusions
The team deduced the following findings and conclusions from the literature search, observations, interviews, time studies, and MiChart data.

Value Stream Mapping to Identify Non-Value Added Time - The data collected from time studies allowed the team, after identifying key steps in the care process, to quantify exactly how long each step takes and how much time is wasted in the process due to waiting. New patient appointments were found to have a value-added time (VA) of 52% of their total encounter cycle time while return visits were found to have only 44% VA, showing that the face to face time (VA) goal of 66% is not being met in either case. The majority of the wait times in both cases were between when the MA finishes their initial encounter with the patient and when the care provider arrives in the room, suggesting that OTO’s process to notify providers when their patients are ready is not working optimally.

Return Visit Encounter Cycle Time Longer than New Patient Encounter Cycle Time - The data collected from the time study showed that the average consultation times for return visits and new patients (14.7 minutes and 20.5 minutes respectively) are under the scheduled appointment length, 15 minutes for return visit and 30 minutes for new patient. The data also showed that the face to face time (VA) goal of 66% is not being met. Finally, it was determined that scheduling based on specific types of new patient appointments is unnecessary because the average of each is similar to the total average.

Scribes Do Not Decrease Consultation Time or Wait Time - Time study data showed that the average consultation with a scribe is 18.4 minutes which is approximately 1 minute longer than the average consultation without a scribe, 17.5 minutes. The wait times of patients who see a physician with a scribe are also significantly greater than the wait times of patients who see physicians without a scribe. This quantitative data does not support the qualitative data recorded through interviews and observations that scribes make OTO’s care flow more efficient.

First Patient of the Day Waits To Be Roomed and Seen and Impacts the Rest of the Day - In the conducted interviews, it was stated that the physicians are behind schedule from the start of the day because they are getting off to a late start. The analysis of the time study data verifies this information and shows that patients have to wait, on average, 24.5 minutes before seeing a provider.

Flag System not Standard - Observations and interviews showed many physicians do not currently recognize or use the flag system, and rely on the medical assistants to come get them. Other interviews showed that there were inconsistencies in the understood meaning of the flag system. MAs noted that the flag system relays valuable information about a room’s status.
Call Center Understaffed and Schedules Inconsistently - Interviews the team conducted revealed several misunderstandings and sources of confusion between Call Center and OTO staff. Call Center staff reported that they rarely consult scheduling guidelines specified by providers, which could explain why providers are sometimes scheduled with incorrect patient types. The Call Center also experiences a high turnover rate in their workforce, and past attempts from OTO staff to clarify and collaborate with Call Center staff were ineffective due to this high turnover rate. OTO recently authorized checkout staff to schedule some return visit appointments instead of the historical process, where checkout staff had to contact the Call Center and allow staff there to schedule appointments, but OTO staff still cannot schedule many return visit appointment types.

Providers’ Grids Allow for Double Booking Appointment Slots - Analysis of the MiChart data provided by the clients showed that some patients, many of whom were the first patient of the day, were double booked in the same appointment slot as another patient. This could have a profound effect on the first patient of the day analysis, and could result in large patient wait times. Examination of the scheduling guidelines showed that double bookings were allowed.

Recommendations
The following are the team’s recommendations to the Livonia Center for Specialty Care-Otolaryngology. They consist of both In-Clinic and Call Center related recommendations.

In-Clinic
The clinic should introduce morning huddles at the beginning of the workday in order to: 1) eliminate misunderstandings between OTO staff, 2) develop a plan for the day, and 3) allow OTO staff to coordinate for expected situations. Morning huddles will reduce wait times for patients, allow providers to start the day on time, and will help with the amount of time the first patient of the day waits before they see the physician.

OTO should introduce a buffer room to reduce the wait time of patients seeing the PA. Both PA’s and physicians will cycle through this room in order to optimize room availability.

OTO should improve the system by which MAs retrieve providers by removing inconsistencies in the color meanings of the flag system and having MAs immediately notify the provider. This will reduce patient wait times.

Call Center
The Call Center should have clinic staff schedule return visits to eliminate extra steps in the scheduling process and to reduce the encounter cycle time.

The Call Center should have physicians review the scheduling guidelines to simplify guidelines and better educate Call Center on scheduling goals. This will also remove scheduling variability.

Finally, Michigan Medicine should have the MDP team review collected data to create a more realistic scheduling grid and reduce patient wait times.
Introduction
The Livonia Center for Specialty Care- Otolaryngology Department (OTO) provides surgery and treatment care for patients with diseases and disorders of the ear, nose, and throat (ENT), and related structures of the head and neck. OTO’s current patient appointment scheduling process and care flow are both inefficient. The lead physician of OTO reported that the patient encounter cycle time, which is the time a patient spends in OTO, is too long. The lead physician of OTO also reported that physicians’ schedules are often underutilized. The physicians of OTO would like to know why the patient scheduling process is inefficient and if the inefficiency comes from the process that OTO follows and/or a problem with patient scheduling at the Call Center. To address this question, the lead physician of OTO asked an Industrial & Operations Engineering 481 student team from the University of Michigan to observe the current scheduling process and OTO’s care flow.

While observing, the team conducted time studies on OTO’s care flow, identified any non-value added time, studied the appointment scheduling process, and determined why the physicians felt that they were underutilized and why patient encounter cycle time was too long. Next, the team recommended changes to address the concerns of the physician and to decrease patient encounter cycle times. The purpose of this report is to show findings and conclusions the team made and recommendations the team suggests to decrease patients’ encounter cycle times, increase physician’s utilization, increase the efficiency of the call center scheduling process, and to minimize non-value added steps in OTO’s care flow.

Background
The demand for the Otolaryngology Department at the Livonia Center for Specialty Care’s (OTO) services is extremely high. The lead physician of OTO said that despite the demand for the OTO’s services, many providers have underutilized schedules, some as low as 30%. The lead physician of OTO also reports that even with physicians and other care providers having many open appointment slots, 60% of patients who desire to schedule appointments at OTO still experience lead times longer than the 2-week standard and providers are often nearly constantly engaged.

Providers note that they feel like they are constantly engaged because much of their time is spent on clerical work instead of medical practice, while their main goal for the year is to exceed their minimum Relative Value Unit (RVU) target. These RVUs are a performance measure corresponding to how much actual medical practice a physician performs and clerical work often does not apply. Many of the physicians at OTO are not easily able to meet this target because of the non-physician work that they must do when seeing return patients. In order to reach their yearly RVU target, physicians must see a certain number of new patients, since these types of patients typically contribute more RVUs than returning ones. Optimizing OTO care provider schedule utilization and patient flow is therefore necessary for them to easily meet their targets.

The patient type determines appointment scheduled time. There are two general types of patients: return visit (RV) and new patient (NP). Return visit appointments are scheduled for 15 minutes and all new patient appointments are scheduled for 30 minutes. There are five types of new patients: NP Sinus, NP Balance, NP General, NP Head & Neck, and NP Pediatrics. The lead physician of OTO noticed that patients are spending longer than their scheduled appointment
time in OTO, some longer than an hour. Determining possible root causes for long patient encounter time is key to increasing provider schedule utilization and minimizing non-value added steps in OTO’s care flow.

Key Issues
The following issues have led to the need for this project:
- Physician schedules are underutilized, a provider stated as low as 30%
- Physicians are completing tasks that are not part of their medical care process
- Patient encounter cycle time is too long
- Physicians are not meeting their yearly RVU target
- Patient wait time to get a new appointment slot appears too long, with 60% of patients over the two weeks standard

Goals and Objectives
To determine why the physicians are underutilized and why patient encounter cycle times are too long in the Otolaryngology Department at the Livonia Center for Specialty Care (OTO), the team completed the following:
- Conduct time studies on OTO’s care flow
- Observe OTO’s care flow
- Interview staff involved in OTO’s care flow and the patient scheduling process
- Identify non-value added time, the duration of any action or lack of action not directly supporting patient care

After completing the above tasks, the team developed multiple recommendations that:
- Decrease patients’ encounter cycle time
- Increase physicians’ utilization
- Increase efficiency of scheduling process and OTO’s care flow
- Minimize non-value added steps in OTO’s care flow
- Provide needed data to the Multidisciplinary Design Program (MDP) schedule planning team for OTO
- Decrease patient wait time to 33% of their encounter cycle time

Project Scope
This project included the patient scheduling process at the Call Center, the care flow at the Otolaryngology Department at the Livonia Center of Specialty Care (OTO), and the patient arrival process to OTO. The scheduling process started when the patient called the Call Center and ended when the patient hung up with the Call Center. OTO’s care flow started when the patient checked in at the check-in desk and ended when the patient checked out at the checkout desk. The team studied the patient arrival process to OTO to identify root causes for patient lateness.

Any other tasks that are not included in the patient scheduling process, the care flow at OTO, and the patient arrival process were not in the scope of this project. Although the team did not study the other departments at the Livonia Center for Specialty Care, the team hopes that the recommendations from this project will help these other departments in the future.
Methods
The team used five methods to collect and analyze data on the current processes at OTO: literature search, observations, interviews with key staff and the Call Center, time studies, and data analysis. The following section describes the data collection and analysis methods in detail.

Literature Search
The team used 4 mediums to grasp the problems OTO faces, the methods the team should conduct to analyze the data collected, and the solutions the team might propose. The most important reference was Analyzing Patient Flow and Process Waste at the Urology Clinic at the Livonia Center for Specialty Care, a report a student team prepared in the Fall 2016 term for IOE 481 in which they analyzed the clinic flow and scheduling problems at the Livonia Center for Specialty Care Urology Department [1]. This reference demonstrated the importance of value stream mapping to determine where non-value added (NVA) time occurs in a process. It also revealed in detail how to analyze the wastes and confidence intervals for instance, identified using value stream mapping. This study replicates the IOE 481 study from Fall 2016 in the Livonia Center Urology Clinic.

The Harden and Resar paper, “Patient Flow in Hospitals: Understanding and Controlling It Better”, revealed the importance of scheduling standards to clinic flow. This reference demonstrated the value in smoothing clinic schedules regarding visit type to minimize additive time wasted, suggesting that the team review OTO’s scheduling principles [2]. The focus of this review should be any scheduling standards that allow consecutive slots to be filled with procedures especially prone to exceed their allotted times.

The Applications for Medical Practice Success reference provided the team with in-depth knowledge on the relative value unit (RVU) schema OTO uses for their physicians. This reference provided the definition of RVUs, the reason for using RVUs and how RVUs are calculated [3]. RVUs are relative units of measure for the value of services and the relative differences when providing different services. RVUs are used to calculate reimbursement for providers’ services and to measure internal productivity. RVUs are calculated by taking into consideration the time and intensity of patient visits and total RVUs encompass time, effort, and resources consumed.

The Washington Manual of Patient Safety and Quality Improvement introduced the usage of a fishbone/Ishikawa diagram to show how major factors and variables influence wait time in a clinic [4]. The fishbone diagram provides the team a way to visualize the major factors influencing the long patient encounter time at OTO and acted as a working document that the team updated as they found more factors that influenced wait time.

Observations
The team observed at OTO, specifically the interactions between the patients and their physicians, medical assistants, and administrative staff, and collected information that allowed the team to analyze the care flow at the OTO clinic. Four observations took place at OTO from January 17th, 2017 to February 24th, 2017, and each observation was two hours long. The observations started when the MA retrieved the patient and ended after the patient checked out with the checkout desk. Through the observations, the team created a swim lane diagram modeling the flow of the patient through the care flow process at OTO, which can be seen in...
Appendix A. The swim lane shows patient icons that indicate which elements of the process act directly with the patient and distinguishes the process elements that must occur in order to facilitate the overall patient flow.

The team created a fishbone diagram that demonstrates possible non-value added time, where value-added time is the duration of any action that directly supports patient care and non-value added time is any time duration of an action or lack of an action that does not support direct patient care, in the clinic based on the observations, which can be seen in Appendix B. The box on the right of the diagram shows the problem in the OTO clinic, which is the long patient encounter time. The team has identified three main factors with subcategories that contribute to the problem, which are the providers, medical assistants, and patients. Additionally, the team used the process information gathered from the observations to develop the steps in the time study and identified what kind of data to collect using the time study.

Interviews
The team interviewed ten key staff involved with the care flow of the patient at OTO: three physicians, an administrative manager, one physician assistant, two medical assistants, one check out staff, one licensed practical nurse, and a patient record assistant. The team developed seven questions for the providers to obtain possible root causes of delay, which can be seen in Appendix C. The team also used different variations of the seven questions for the rest of the key staff. Additionally, the team interviewed the Manager of the Otolaryngology Call Center to determine if the patient scheduling process is a potential cause for providers’ underutilized schedules. The client assisted in arranging for the interviews and these interviews occurred between March 2nd, 2017 and March 20th, 2017.

Time Studies
The team conducted a time study on the patient flow at OTO to collect timing and process information. The team adopted the time study form created by the previous IOE 481 team for the Urology Clinic at the same center, Livonia Center for Specialty Care. The form was altered to better fit the patient flow at the Otolaryngology Clinic and to incorporate feedback from the clients, which can be seen in Appendix D. The form collected the following data fields:

- Patient visit date and scheduled time
- Provider name
- Visit type
- Time of each staff interaction
- Scribe vs. no scribe
- Comments

The time study forms were distributed in the OTO clinic for 4 weeks, starting from February 27th, 2017 to March 24th, 2017. A total of 492 time study forms were collected. The Administrative Manager printed the time study sheets on brightly colored papers and placed them on clipboards that have integrated clocks. Printing the forms on brightly colored papers acted as a reminder for the MAs to fill out the forms and the MAs referring to the clocks on the clipboards ensured accuracy for the times collected. These clipboards were handed to the medical assistants along with the patient folders by the front desk clerks and followed the patients throughout the clinic. The data from the time study forms was transformed into value stream maps and analyzed according to physicians. The team inputted the data collected from the
time study into a Microsoft Excel file, with columns for the type of visit, provider, and time and comments of each staff interaction. The data was stratified by appointment type and provider, and it was analyzed to identify the effect scribes have on encounter times, how much time each step in the care process takes, and how much time patients spend waiting.

**MiChart Data**
The team obtained MiChart data from the Administrative Manager of Associative Healthcare from October 1, 2016 to January 31, 2017. The data for this period had 2,468 entries on patients’ check in times and check out times. An additional 662 patient records were obtained from February 27, 2017 to March 24, 2017 to correspond to the time study data collection period. The visit type of the patient and the provider the patient was seeing were also stated in the records. The team analyzed this data to find the average total time spent in clinic, based on their visit type and their provider. The team only considered a maximum of 10 minutes early for patients when calculating the encounter cycle times. Patients are told to arrive 10 minutes early and the clinic should not be accountable for any time before that. These values were filtered into two blocks, new patients and return visits, and compared to the actual scheduled appointment time given to each type of patient. The team also used the MiChart data to fill in any missing fields in the time study data, such as provider or visit type. The team followed all Health Insurance Portability and Accountability Act (HIPAA) compliance provisions when working with patient information.

**Findings and Conclusions**
The goals of this project were to decrease patients’ encounter cycle time, to increase physicians’ utilizations, to increase the efficiencies of both the call center scheduling process and OTO’s care flow, and to minimize non-value added steps in OTO’s care flow. To achieve these goals, the team conducted time studies on OTO patient flows, identified non-value added time in OTO’s care flow, observed OTO and the Call Center, and conducted interviews with relevant individuals like medical providers, medical assistants, and Call Center staff. The team analyzed the time study data to determine how much time each step in the care process takes as well as how much time results to waste from patients waiting. MiChart data was also used to quantify patient encounter cycle times. Both the time study data and the MiChart data analyses included stratification by both appointment type and provider to define any inconsistencies resulting there. Qualitative insights from interviews both contributed to findings as well as directed the team to analyze quantitatively certain areas of the clinic care flow.

**Value Stream Mapping to Identify Non-Value Added Time**
The value stream maps the team developed in Appendix E and Appendix F help to efficiently visualize where wait time comes from in the clinic in both new patient and return visits. The time data on the two value stream maps was derived from the time study data the team collected. Both value streams show a percentage of value added time significantly lower, 44% for return visits and 52% for new patient visits, than the process goals of 66% value added time and 33% or less total wait time for both. Pie charts in Appendices G and H are additional graphics that show both new and return visit patients experience more than 33% of their total encounter cycle time as wait time. The majority of the wait time in both processes comes from the wait time the patient experiences between their encounter with the medical assistant and their encounter with the medical provider, which might be related to the flag system discussed below.
Clinic staff expect that return visit patients spend less time with providers than new patients, and return visit patients do in fact have a shorter face to face time, but the value stream maps show that return visits have less value added time as a percentage of the total encounter cycle time than new patients. New patients are expected to have longer wait times according to the interviews the team conducted, with clinic staff expecting more time devoted to obtaining medical records and general clerical work, illustrating a misunderstanding within OTO that new patient visits are actually the less efficient visits. In reality, new patient visits have 4% more value added time than return visits for total encounter cycle time.

**Return Visit Encounter Cycle Time Longer than New Patient Encounter Cycle Time**

There are two general types of patients: return visit and new patient. Return visit appointments are scheduled for 15 minutes and the new patient appointments are scheduled for 30 minutes. The time study data collected was stratified into both of these types. The average consultation, wait, and face to face times are shown in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Consultation Time</th>
<th>Wait Time</th>
<th>Face to Face Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Return Visit</strong></td>
<td>15.6 minutes</td>
<td>33.8 minutes</td>
<td>26.7 minutes</td>
</tr>
<tr>
<td><strong>New Patient</strong></td>
<td>18.5 minutes</td>
<td>28.1 minutes</td>
<td>30.8 minutes</td>
</tr>
</tbody>
</table>

As shown in the table, the average consultation time fits within the allotted slot of 30 minutes for New Patients, but Return Visit Patients exceed their 15 minute consultation time allotment slightly. The average wait times for Return Visit Patients is greater than the average face to face time. Furthermore, New Patients actually have a shorter encounter cycle time (wait time + face to face time) than Return Visit patients. Both the return visit vs. new patient percentage of value added time does not meet the client’s goal of 66% face to face time and 33% wait time.

The team also found that different types of new patient appointments may be longer or shorter than the allotted appointment time of 30 minutes, and that scheduling based on the specific types of new patients may be beneficial. Therefore, the time study data was also stratified into the different types of new patient appointments: NP Sinus, NP Balance, NP General, NP H&N, and NP Peds. The average of each type was compared to the average of all new patient appointments for face to face time, consultation time, and wait time, and this is shown in Figures 1, 2, and 3.
Figure 1 above shows the average face to face time for each different type of new patient appointment compared to the average face to face time for all new patient appointments, which is 32.9 minutes and denoted by the orange line on the chart. Figure 2 below shows the average consult time for the different types of new patient compared to the average consult time for all new patient appointments, which is 20.5 minutes and denoted by the orange line on the chart.

Figure 3 on the following page shows the average wait times for the different types of new patient appointments compared to the average wait time for all new patient appointments, which is 32.4 minutes and denoted by the orange line on the chart.
The figures show that each new patient type has averages of face to face, consultation, and wait times very similar to that of the average of all new patient appointments. The NP Balance appointments did show a trend that they were longer than normal new patient appointments; however, there was only a sample size of n = 2, so conclusions cannot be made. Based on this data, the team concluded that scheduling appointments based on the specific types of new patients is not necessary.

**Scribes Do Not Decrease Consultation Time or Wait Time**

The team determined the average consultation and wait times for the patients seen by providers with scribes and for patients seen by providers without scribes by using data from the time study data forms. Interestingly, the average consultation time of patients seen by providers with a scribe is 18.4 minutes, which is a minute longer than the average consultation time of patients seen by providers without scribes, which is 17.5 minutes. Many of the providers noted that having scribes increase the efficiency of their day. The average wait time of patients seen by providers with a scribe is 28.0 minutes, while the average wait time of patients seen by providers without a scribe is 21.7 minutes. The increase in average wait times when providers use a scribe cannot be attributed directly to scribe use because providers spend about as much time with patients whether they utilize scribes or not, as evidenced by how close average consultation time is under both conditions. This means that patients of providers using scribes do not wait longer as a result of scribes prolonging consultation times. Therefore, the increase in average wait time for patients of providers using scribes must be attributed to some other factor.

Scribes do, however, significantly reduce the amount of time providers spend charting outside of OTO on a weekly basis. Providers reported in interviews that without scribes they spend between 10 and 15 hours per week charting for their patients, but providers spend significantly less time, between 6 and 7 hours per week, reviewing their scribes’ notes. Scribes, therefore, do reduce the overall time providers spend charting.
First Patient of the Day Waits to be Roomed and Seen and Impacts the Rest of the Day

An OTO physician stated in their interview that a major reason they run behind schedule is that the rooming of their first patient of the day is delayed. Furthermore, they said their first patient of the day should be roomed as soon as they arrive so that providers can see them immediately.

The time study data showed that the first patient of the day has to wait, on average, 17.6 minutes before seeing a provider. This is shown below in Table 2.

<table>
<thead>
<tr>
<th>Wait Time in Waiting Room</th>
<th>MA Time</th>
<th>Wait Time in Patient Room</th>
<th>Consult Time</th>
<th>Check-Out Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.2 minutes</td>
<td>6.9 minutes</td>
<td>7.4 minutes</td>
<td>20.5 minutes</td>
<td>2.5 minutes</td>
</tr>
</tbody>
</table>

The team concluded that the medical assistants and physicians are starting late, thus pushing their schedule behind immediately. On average, MAs start seeing the first patient 10.2 minutes after the patient is instructed to arrive, excluding any time early patients wait before their instructed arrival time. Furthermore, providers’ first patients are waiting on average 7.4 minutes for the provider after the MA finishes with them, so the first patient of the day waits on average 17.6 minutes before they even see their provider. Including time spent with the MA, the first patient of the day does not see their provider until 24.5 minutes after their scheduled consultation time.

Flag System Not Standard

The interviews that the team conducted revealed that there is an overall misunderstanding regarding what exactly the clinic flags mean. There are inconsistencies between what each flag color means as well as in what clinic staff believe providers know regarding the flags. Medical assistants reported that physicians and physician’s assistants not only know what the flags mean but that they use them as references daily. Interviews with medical care providers revealed, however, that they not only do not know what each flag means, but that they do not consult the flags at all. Providers rely entirely on medical assistants to notify them when their patients are ready in examination rooms.

Physician’s Assistants Often Wait for Physicians

Physicians Assistants reported in interviews that their schedules are often pushed behind because they require a physician to conduct a secondary consultation and must wait for a break in the physician’s schedule. Interviews also revealed that it would be effectively impossible to synchronize the PA and physician schedules. The team found that patients are only waiting on average 5.9 minutes for an additional encounter with a physician, but the time study data collection period only accounted for 10 instances when a PA’s patient waits for a physician for an additional encounter so this data might not entirely capture the true picture. Since PAs
reported that their schedules are often pushed back as a result of waiting for physicians, the team concludes that this must be a significant issue despite the data’s lack of support.

**Call Center Understaffed and Schedules Inconsistently**
Providers and other clinic staff reported misunderstandings between them and the Call Center scheduling staff in interviews. The Call Center reported that they rarely consult the scheduling guidelines specified by providers because they are confusing, and the team, in reviewing these documents, found extremely confusing bulleted lists without much description or motivation behind assertions. The Call Center also stated that they do not consider utilization of individual physicians while scheduling patients. Their primary goal, the Manager of the Otolaryngology Call Center said, is to schedule patients for appointments as soon as possible.

The Call Center has a high employee turnover rate, OTO staff reported. Past attempts from clinic staff to help Call Center employees, who quickly left the organization, understand the clinic better and encourage more communication and collaboration were ineffective as a result. Clinic staff must contact the Call Center in order to schedule return visits during checkout instead of having authorization to schedule appointments for patients. Checkout staff were recently given the ability to schedule some return visits, but there are still some types of visits they cannot schedule. Ideally, allowing and training OTO Checkout staff to schedule all return visit appointments would greatly reduce the load on the already understaffed Call Center.

**Providers’ Grids Allow for Double Booking Appointment Slots**
After analyzing the MiChart Data, the team discovered that some of the providers had double booked patients, meaning two or more patients were being scheduled for the same appointment slot. This happened multiple times throughout the time period of MiChart data the team received. Many of these double bookings occurred at the first patient of the day, so this could have an effect on the first patient of the day analysis. After examination of the providers’ scheduling guidelines, the team found that the scheduling grids do in fact allow for overlapping appointments and double bookings. This double booking of appointment slots may have been a cause for why providers were falling behind schedule.

**Summary of Conclusions**
Using the methods described above, the team made several findings. From these findings, the team described several implications and conclusions. The following are summaries of the findings and conclusions outlined in the section above.

**Value Stream Mapping to Identify Non-Value Added Time** - The face to face time (VA) goal of 66% is not being met for either Return Visit or New Patient. The majority of the wait times in both cases were between when the MA finishes their initial encounter with the patient and when the care provider arrives in the room, suggesting that OTO’s process to notify providers when their patients are ready is not working optimally.

**Return Visit Encounter Cycle Time Longer than New Patient Encounter Cycle Time** - The average consultation times for return visits and new patients (14.7 minutes and 20.5 minutes respectively) are under the scheduled appointment length, 15 minutes for return visit and 30 minutes for new patient. It was also determined that scheduling based on specific types of new
patient appointments is unnecessary because the average of each is similar to the total average.

**Scribes Do Not Decrease Consultation Time or Wait Time** - The average consultation times of patients seen with a scribe is longer than patients seen without a scribe, but using a scribe greatly reduces the amount of hours that providers spend charting outside of clinic from 10 to 15 hours per week to 6 to 7 hours per week. The wait times of patients who see a physician with a scribe is significantly greater than the wait times of patients who see physicians without a scribe; however, this increase in wait times cannot be attributed to scribe use because the scribes do not affect average consultation time significantly. These findings warrant additional studies on the scribes.

**First Patient of the Day Waits to be Roomed and Seen and Impacts the Rest of the Day** – The first patient of the day waits, on average, 17.6 minutes, not including MA time, to see their provider. These patients are not being roomed or seen by their provider on time.

**Flag System not Standard** - The flag system is used by MAs, but inconsistencies in it show that the system is not very useful for providers. Providers also rely on Mas to notify them of patient readiness.

**Call Center Understaffed and Schedules Inconsistently** - Call Center staff are mis-scheduling patients due to complicated scheduling guidelines given by providers. High turnover rate and understaffing also contributes to this.

**Providers’ Grids Allow for Double Booking Appointment Slots** - Some patients, many of whom were the first patient of the day, were double booked in the same appointment slot as another patient. This could have a profound effect on the first patient of the day analysis, and could result in large patient wait times for both the overbooked patients and patients scheduled later on in the day. Examination of the scheduling guidelines showed that double bookings were allowed.

**Recommendations**
The following section contains recommendations for in-clinic improvement as well as recommendations for Call Center related changes. These recommendations are based on quantitative and qualitative data. The recommendations are presented in no particular order.

**In-Clinic**
The recommendations below focus on in-clinic improvements.

*Introduce morning huddles at the beginning of the workday*
The beginning of the day sets the tone for whether or not the provider is on schedule with seeing his/her patients. Introducing morning huddles will help mitigate and confusion between medical assistants and providers and increase communication. Specifically, the schedule of the day should be discussed to determine when the day is busiest and where providers should focus on being as efficient as possible. It is also important for the medical assistants and physicians to start the day off on time, which these morning huddles can help with. In order for this
recommendation to work to its fullest potential, the team also recommends coming in at 7:40-7:45 a.m.

*Introduce a buffer room*
To reduce wait times for patients and to increase the efficiency of PA consultations, a buffer room, an examination room PAs and physicians share and cycle back and forth, should be available. If, for example, a PA requires a physician to examine his/her patient, the PA can use the buffer room to see the next patient. When the PA’s original patient is finished, his/her original room cycles back to being the current buffer room. This will help reduce wait times because the PA does not have to wait for the physician to be finished with the patient, nor does he/she have to wait for the room to become clean and available. This increases PA efficiency because more patients can be seen.

*Improve and standardize flag system*
To eliminate confusion on when a patient is ready to see a physician, the flag system currently used should be improved and standardized. As stated in the Findings and Conclusions, many of the physicians either do not understand what the flags mean or do not use them at all. The flag system should be standardized across all physicians and MAs, so there is a mutual understanding. The MAs should also directly retrieve the physicians, and should not wait for the physicians to notice the flags, or the electronic markers.

**Call Center**
The recommendations below focus on improvements to the connection between in clinic and the Call Center.

*Have clinic staff schedule return visits*
The clinic staff at the checkout desk have the ability to schedule most return visits for patients. By scheduling through the clinic instead of the Call Center, efficiency of the Call Center is improved. Also, because the clinic staff are not dealing with hundreds of doctors like the Call Center is, the patient can be scheduled at a time convenient for both the patient and physician, as well as see the proper physician. This will increase and equitize physician utilization throughout the week.

*Have physicians review the scheduling procedure at the Call Center*
In order to improve the process of patient scheduling for the Call Center, physicians should examine the guidelines for scheduling patients. In doing so, the physicians may see the confusion in their guidelines, and can possibly rewrite how they want patients scheduled. This will ultimately lead to an increase in physician utilization and decrease in wait times, because patients could be distributed equally on each day of the week.

*Do not allow double booking of appointment slots create a more realistic scheduling grid*
To reduce wait times of patients and to assist providers in starting their appointments on time, the scheduling grids should be changed to prevent double booking of appointment slots. The team recommends that the MDP team assisting in creating the new scheduling grids, look further into this problem and use this information in their establishment of these new scheduling grids.
Expected Impact

The recommendations provided by the team will:

- Decrease patient’s encounter cycle time and ensure direct time is greater than wait time
- Increase physicians’ utilizations
- Increase efficiency of the Call Center scheduling process
- Reduce non-value added time in steps in the current care flow
- Provide needed data to the Multidisciplinary Design Program (MDP) schedule planning team for OTO
References:


Appendix A: Swim Lane Diagram

N = 6, Collection Dates: Feb. 27, 2017 - March 24, 2017
Source: OTO Observations
Appendix B: Fishbone Diagram Showing Major Factors Influencing Long Patient Encounter Time
Appendix C: Provider Interview Questions

Provider Interviews:

- Do you know what the flags mean?
  - Which of the three types of flags do you usually look at?
- How do you determine when a patient is ready to be seen?
- What is something that you do that you seen as Non Value Added time?
- If you think you are always behind schedule, what do you think is the cause?
- Does having a scribe help you?
  - Is the inconsistency of them being there difficult for you?
- Do you think that your current allotted time is enough for new patients? How about returning patients?
- What tasks do you perform that you don't see as directly contributing to patient care?
Appendix D: 492 Time Study Forms Received

This form will aid in a process improvement study to improve patient experience in the clinic.

Date: _________  Scheduled Time: ___:___  Scheduled Appt. Length: ___:___

Provider (Select One):
Ahmed  Bohm  Cooper  Hoff  Hogikyan  Passamani  Pynnonen
Stanley  Stucken  Terrell  Tiefel  Urban  Zacharek  Other: ______

Visit Type:
Please indicate the time each activity begins and ends using the stopwatch attached to the clipboard.
DO NOT START/STOP THE STOPWATCH. Thank You!

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<th>Activity</th>
<th>Staff</th>
<th>Start Time</th>
<th>End Time</th>
<th>Comments</th>
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Additional Comments (You May Also Use the Back of this Form):
Appendix E: Return Visit Value Stream Map
Collection Dates: Feb. 27, 2017 - Mar. 24, 2017
Source: Time Study Data
Appendix F: New Patient Visit Value Stream Map
Collection Dates: Feb. 27, 2017 - Mar. 24, 2017
Source: Time Study Data
Appendix G: New Patient Encounter Cycle Time Breakdown

N = 166
Collection Dates: Feb. 27, 2017 - Mar. 24, 2017
Source: Time Study Data

![Pie chart showing time breakdown for new patient encounters.](chart.png)

- Check In Time
- Wait Time for MA
- MA Time
- Wait Time for Consult
- Consult Time
- Wait Time for Check Out
- Check Out Time
Appendix H: Return Visit Encounter Cycle Time Breakdown

N = 247
Collection Dates: Feb. 27, 2017 - Mar. 24, 2017
Source: Time Study Data