Optimizing MiChart Ambulatory Team Intake Process and Resource Management
Final Report

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Date Submitted:

December 15, 2015
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**Executive Summary**

The MiChart Ambulatory Team (MAT) works on maintaining EpicCare software that is used in many Ambulatory Care clinics by nurses and doctors. The MAT addresses any break/fix tickets or enhancement requests. The current processes of the MAT could be more structured and efficient. Currently, the MAT utilizes huddle meetings each morning to keep each other updated on their overall status and to address any issues that would like to be discussed. These huddles vary daily anywhere from 5 to 30 minutes, and do not follow a specific structure each day. The MAT also feels as though the work done in Remedy, software used by the MAT to manage requests, does not add value. Lastly, the MAT does not have a set methodology to set target dates of expected ticket completion dates.

The MAT manager asked an IOE 481 student team from the University of Michigan to observe their team huddles, analyze past Remedy enhancement request data, and deliver recommendations to increase the MAT's productivity. The student team completed the data analysis, observations, and literature search to suggest improvements. The student team has provided the MAT with a huddle board design and meeting structure, in addition to recommendations on how to better forecast target dates and better utilize Remedy.

**Background**

The MAT supports and maintains EpicCare (electronic medical record charting system) functionality. The software is used by 12,000 employees and 120 Ambulatory Clinics. The manager reports that the MAT is overwhelmed with the number of requests they receive regarding issues or enhancements.

**Methods and Findings**

This project was performed in the following phases: literature reviews, value stream map analysis, observations of the MAT huddles, observations of external team huddles, interview with custom huddle board expert, and Remedy data analysis,

From the literature search the student team learned more about IT implementation, how huddles should be structured, and how to eliminate waste in healthcare. From observing the MAT, CVC, and Urology huddles, the student team was able to determine best practices and possible structures to propose to the MAT. Interviewing the custom huddle board expert gave the team insight as to what goes into designing a custom huddle board. Furthermore, from analyzing approximately three years of Remedy data history the student team was able to infer the types of enhancement requests, how popular each type is, and the duration it takes to complete each type of request. From the value stream map the student team became aware of the MAT’s ideas and concerns regarding the current process. This information enabled the student team to create a
process flow of their own to better understand and depict the remedy enhancement request process.

**Conclusions**

The student team noted that huddles lasted anywhere from 5 to 30 minutes on any given day, and through observation it was inferred that the huddle structure varied from day to day. In addition to this, the current huddle board contained minimal information. Thus, our team designed a new huddle board which has a 5K running theme and provides the MAT team with the ability to track current projects as well as metrics in order to assess progression. Additionally, a standard work describing the structure for how the huddle can be effectively conducted was deemed necessary to complement the new board design. Furthermore, the Remedy data provided by the MAT manager the student team found there to be seasonal trends in enhancement request arrivals as well as significant volume variation in some item types over others.

**Recommendations**

Based on these conclusions, the student team developed recommendations to improve the structure of the MAT's everyday huddles, to better forecast target dates, and lastly to better utilize Remedy. The student team has proposed a new huddle board design as well as a standard work structure the MAT can follow in order to effectively conduct huddle meetings. Furthermore, our team recommends that the MAT team utilize the 80th percentile value for number of days open to production in order to set the target date. In order to measure the success of the target date setting the MAT team should track the highest occurring categories separately which includes ‘Inbasket Request’, ‘Patient Portal Request’ and ‘Clinical Content/Documentation/Dictation Request.’ Lastly, our team recommends the MAT utilize the Remedy fields ‘TEST Actual’ and ‘Total Time Spent Hours’ and ‘Target Date’. By doing so, the MAT would get a more accurate estimate of the average number of days it takes an enhancement request to go into production and testing. In addition to this, our team recommends that the MAT share this estimated resolved date with the customer who submitted the request. Doing this can provide motivation and accountability to complete the request in a timely manner.
Introduction

The MiChart Ambulatory Team (MAT) maintains the clinical and operational IT system, EpicCare, used by the staff in University of Michigan Health Systems Ambulatory Care Sites. EpicCare is an electronic medical record charting system. The MAT, however, is having difficulty balancing resources while adequately addressing EpicCare software problems that require enhancement or fixing based on maintenance ticket requests. The Manager of the MAT would like the student team of three senior Industrial and Operations Engineering students from the University of Michigan, to provide recommendations to improve their huddles and intake processes. The Ambulatory team would like to restructure their huddles, a short team meeting at the beginning of each day; to optimize how to use Remedy, a tool used to track maintenance request issues; and lastly, to create a better methodology to determine and maintain target dates. The purpose of this project was to improve the MAT’s current processes by observing huddles, analyzing Remedy data, and conducting literature searches. The purpose of this report is to present the methods, findings, conclusions, and recommendations from the project.

Background

The MAT supports and maintains EpicCare functionality. The software is used by 12,000 employees and 120 Ambulatory Clinics. The manager reports that the MAT is overwhelmed with the number of ticket requests they receive regarding issues or enhancements. Currently, the process to address incoming tickets involves a triage system to determine whether or not a ticket can be resolved internally. These requests are reviewed by the Manager and Project Manager and are then prioritized and assigned to an Application Coordinator with a target date for completion. This process is depicted in the flowchart found in Appendix A. The MAT is having difficulty maintaining target dates, continuously adjusting them, and keeping a structured record of the number of times the target dates have been changed or what the initial date was. The MAT believes that part of the reason target dates are not met and need to be continuously adjusted is due to not being able to accurately forecast how much time is needed for each step in the process. Furthermore, the MAT is having difficulty effectively communicating the status of their work in team huddles, which also need to be restructured. Observation and analysis done by the team has helped determine the best way to resolve these problems with recommendations to improve the MAT's current processes, and in turn reduce wasted work.
Key Issues

The following key issues drove the need for this project:

- The MAT huddles lack structure and visibility
- There is no standard methodology for forecasting target dates in Remedy
- Target dates are suggested and flexible with no repercussions for missed dates
- The Remedy system is not being utilized to its best capability
- The MAT is unsure which metrics to track to measure progress

Goals and Objectives

To better manage the MAT's approach to resolving maintenance issues, the student team completed the following tasks:

- Observed huddles across various teams
- Understood how target dates are created and maintained
- Observed how Remedy is used and the software's capability

With this information, the team developed recommendations to:

- Restructure MAT huddles and redesign the huddle board
- Develop methodology to forecast accurate target dates
- Utilize Remedy effectively to meet the MAT team needs

Project Scope

This project focused on the MiChart Intake process utilized by the MAT. The student team was responsible for the EpicCare support and functionality the MAT addresses. This support plays a role in the clinical, operational and IT experience of the process for receiving information into the Remedy ticket system.

This project excludes any of the work already completed by the MAT with regards to defining the types of information needed from customers, such as the website work; thus, the team will not be reviewing or revising this portion of the system. Additionally the team will not be providing any recommendations for improving Remedy as a system.

Rather, the team will dedicate efforts to the reorganization of the MAT’s daily huddle that is scheduled to run for 15 minutes, but is currently conducted without structure. Additionally, focus was placed on solving the problem concerning target dates, which are currently suggested, and
not followed. The hope and desire was to extend the team's findings and new ideas to address any issues covered within this project scope.

Data Collection and Findings

A detailed explanation of the following data collection tasks and findings is included for the literature search, value stream map, MAT huddle observations, CVC huddle observations, Urology Clinic huddle observations, interview with custom huddle board expert, and Remedy data analysis.

Literature Search

The literature search was performed on three articles identified by the MAT manager. These articles were selected because the content discussed would provide the student team with background information on all of the project objectives.

Methods

The team analyzed the information presented in the three articles selected by the MAT manager. The team recorded the findings from the articles and used the information to accomplish the project objectives previously stated.

Findings: Insight on Huddles and Healthcare

The article “Are we ready for the business of the day?” [1] provided the team with a basic understanding of what a daily 20-minute huddle in a hospital should look like. The information from this article provided a basis for the design of the new MAT huddle structure.

The article “Change Management in EHR Implementation” [2], developed by the Health Information Technology Research Center and provided by the National Learning Consortium, presented a guide for health IT implementers for implementing and managing changes, and understanding who and what the changes affect. The team used this information to analyze how the Remedy system can be utilized more effectively in the MAT process.

Lastly, the article, “From Waste to Value in Health Care” [3], illustrated the idea of mapping out areas of opportunity and waste in a system, and using quality improvement research to determine the best ways to utilize those opportunities. The team utilized this principle to design a new huddle structure and board, and to identify ways to better utilize Remedy.

Value Stream Map Analysis

The team obtained a value stream map (VSM) of the Remedy enhancement request process from the MAT manager.
Methods

The obtained VSM was a combination of large pieces of paper and sticky notes that outlined the process steps. Using this, the student team created a digital VSM of the current process using Microsoft Visio. The MAT manager suggested revisions to the VSM that would classify each step; one issue to be corrected was to indicate which steps an enhancement request could go through multiple times. The team implemented the suggested changes to the VSM, which is attached in Appendix A.

Findings: Understanding of Remedy Enhancement Request Process

Analysis of the VSM provided the team with a better understanding of the current Remedy process. Enhancement requests go through the following steps: the call center transcribes requests; tickets are assigned to Managers; the Managers prioritize tickets and assign them to Application Coordinators (AC); and lastly, the AC’s resolve the ticket request and send it to production. The student team worked with the MAT to determine approximately how long each step took, and whether each type of ticket, based on category, goes through all governance steps. This information was used to develop the methodology for forecasting target dates for Remedy enhancement requests.

MAT Huddle Observations

The team observed eight MAT huddles. The MAT huddles occur daily at 10 am in the MAT office at Domino’s Farms. A picture of the current MAT huddle board can be found in Appendix B. The current huddle board is a white board with six headings:

- CLINICAL DC AC TODAY
- TRIAGE AC TODAY
- ON CALL AC TODAY
- OFF SITE
- IMPORTANT/URGENT ISSUES
- WAR ROOM AGENDA’

Before each huddle, either a manager or a person from the MAT fills out the sections on the whiteboard.

Methods

During the huddle observations, the student team recorded the following information about each huddle:

- Who led the huddle
- What subject matter was discussed at the huddle
- How long the huddle lasted
- How the huddle board was utilized
- How the visibility of progress was communicated
Findings: Areas for Improvement

Once the team completed the MAT huddle observations, the information recorded by the team was summarized. From this information, the student team gathered that there is no rotation between huddle leaders, the topics discussed at each huddle vary, the duration of the huddle spans anywhere from 5 minutes to 30 minutes, and the huddle board and charts surrounding are under-utilized.

After each observed huddle, the student team met with the MAT for a huddle debrief. During these meetings, the MAT clarified any issues discussed during the huddle. The team analyzed the information obtained from the observations and identified the following areas in the huddle structure that needed improvement:

- Need for a core huddle structure
- Utilization of visual progress aides, such as graphs of metrics
- Utilization of the huddle board
- Rotation of leadership within the team huddle

These areas of improvement were identified based on information obtained from the literature search, and from observations of other UMHS department huddles. An established huddle structure would help the huddles stay on track and cover all necessary information in an appropriate time frame. Visual progress aides, such as a chart showing the team’s progress at meeting target dates, would be more effective than just reading the statistics out loud. One main area of improvement identified is the utilization of the huddle board. Currently only names are written on it before the huddle. Integrating a custom huddle board to follow along with during team huddle would keep the team more engaged and effectively provide the MAT with all necessary information. Using a huddle board to display the information would also allow members of the MAT who missed the huddle to view the information they missed.

Cardiovascular Center Huddle Observations

On October 14th the team observed a department huddle in the Cardiovascular Center (CVC) Clinic. The IOE 481 team coordinators recommended observing the CVC huddle board because its design has been used as a model for other hospitals in the country.

Methods

Prior to observing the huddle, the team met with a lean specialist who helped design the CVC clinic huddle board to obtain context about the huddle structure and huddle board.

The lean specialist presented the team with a copy of the ‘Huddle Leader of the Week’ packet given to an individual prior to the week they are responsible for running the huddle. The packet consisted of instructions on how the huddle leader should update the huddle board before the huddle and what they are expected to do during the huddle. The CVC rotates their huddle leader each week to keep the team engaged in the huddle and allow individuals an opportunity for leadership.
The lean specialist walked the team through the different sections of the huddle board. A picture of the CVC huddle board can be found in Appendix C. The team learned that UMHS emphasizes five main themes: Safety, Quality, Delivery, Engagement, and Financial Stewardship. The CVC huddle board incorporates all five of these areas.

**Findings: CVC huddle board is a great LEAN example**

The CVC huddle board was meticulously planned over months of discussion between management and lean specialists to fit the department’s needs. The student team noted many best practices used in the CVC clinic:

1. A new person led the huddle each week.
2. Attendance was recorded on the huddle board.
3. The huddle was standardized and followed the same schedule every day.
4. The CVC clinic utilized everyday lean ideas (ELIs) and tracked the progress visually on the huddle board.
5. The visibility of progress was clear from the huddle board, but still addressed during the huddle.

The team noted these behaviors as best practices since these practices were identified as behaviors missing from the MAT huddle during the MAT huddle observations. Thorough discussion with the lean specialist about all the different aspects of the board also helped the team identify these behaviors as best practices. Having a different person in the department lead the huddle each week keeps the team engaged and provides a leadership opportunity. Recording attendance on the board holds the employees accountable for attending the huddles, since the purpose of the daily huddle is to relay important information in the department to its employees. The visibility of progress on the huddle board allows the employees to clearly identify the current status at all times. The metrics are displayed as a reminder to keep striving for improvement, since some of their metrics, such as hand washing, can reach 100%.

Every day lean ideas (ELIs) are small problems written down on a form that are discussed during the huddle to generate ideas to solve the problem. ELIs are tracked through the following stages: Problem, Idea, Do It, Doing It, and Done; this can be seen in the picture of the CVC huddle board in Appendix C. The utilization of ELIs by the CVC clinic has been effective in solving many small issues their team encounters, such as a shortage of blood pressure cuffs. The MAT previously utilized ELIs in past huddles, but discontinued the practice due to confusion about the definition of an ELI; the main problem was that members of the MAT were suggesting projects too large to be considered an ELI. Initially the IOE 481 team wanted to bring back the incorporation of ELIs into the daily huddle, however, after discussion decided it was best to simplify the transition to the new huddle structure by not including ELIs and instead recommend including them as a future addition.

**Urology Clinic Huddle Observations**

The IOE 481 team observed the UMHS Urology Clinic huddle board on November 10, 2015. The team coordinators suggested the Urology huddle.
Method

A physician’s assistant (PA) presented the Urology huddle board and huddle structure to the team. A picture of the Urology Clinic huddle board can be found in Appendix D. The team walked through each step of the huddle structure and the huddle board with the PA, and discussed which metrics the department tracked and how they tracked them.

The Urology Clinic used a racecar theme to track metrics. On the huddle board, there is a racecar representing each day of the month. The metric tracked on the left wheel of the race car is the percent of all appointments that day that lasted one hour or less in duration. The metric tracked on the right wheel of the racecar is the percent of patients placed in an exam room within 15 minutes of the appointment time. The metric tracked in the circle in the center of the car is the average number of minutes of an appointment. The Urology Clinic’s goals are to complete 80% of all patient visits within one hour and to place 90% of patients in an exam room within 15 minutes of their appointment time. The charts to the left of the huddle board display the metric values from the previous months to show progress. The clinic also tracks the volume of patients each doctor sees each day and the average length of their patient visits to measure productivity.

Regarding huddle structure, the huddles last between 5 and 10 minutes and are run by a different nurse or PA each day. Either the huddle leader or anyone in the department, including the office desk staff, updates the board itself each day.

Findings: Huddle Developed Using LEAN Principles

The Urology clinic huddle board is large, colorful, and engaging. The metrics are filled out using dry erase marker, allowing the board to be quickly updated each day. This method of filling out the metrics was incorporated into the new huddle board design for the MAT.

The Urology clinic records huddle attendance on a separate whiteboard. Since the behavior of recording huddle attendance was also included in the CVC huddle structure, the idea of taking attendance at the MAT huddles was presented to the MAT during a weekly meeting. The MAT expressed that taking attendance was a behavior they utilized in the past that was discontinued because they believe it added little value to their huddle. The student team decided not to include attendance in the new huddle structure based on the MAT’s feedback.

A second separate whiteboard to the right of the huddle board was utilized to define how the department is addressing the service excellence areas of Quality, Safety, Accuracy, and Efficiency. A daily quote is also included at the bottom of the white board. These areas are similar to sections included on the CVC huddle board.

A main contrast between the CVC and Urology huddle boards is that the Urology clinic uses multiple white boards spaced apart on different walls to display information for the huddle. The team felt the design of the CVC huddle board was more efficient and easier to comprehend because all of the information was on one board.
Interview With Custom Huddle Board Expert

On November 3, 2015 the IOE 481 team met with a lean coach, Marianne Pilat, who is an expert in creating custom huddle boards. The team coordinators suggested the meeting.

Methods

The team began the meeting by discussing the project objectives and the ideas expressed by the MAT. The lean coach helped the team brainstorm methods to translate the ideas into the huddle board design. A main concern of the MAT was deciding which metrics to track on the huddle board.

The lean coach walked the team through a role-play exercise with an old UMHS Pharmacy huddle board to give the team context for both how a huddle should be structured and how a huddle board should be organized. A picture of the huddle board used for the role play exercise can be found in Appendix E. The lean coach suggested that the team go through the role play exercise with the MAT to teach them about using a custom huddle board during a daily huddle.

Findings: New Huddle Board Design should be user-friendly

The lean coach suggested making the new huddle board design as simple as possible so the MAT could easily transition into using the new huddle board. The laminated Pharmacy huddle board used for the role-play exercise had blank graphs and charts to track metrics. These charts were to be filled out with dry erase marker during each huddle. The point of this is to prevent the extra work of printing off graphs before the huddle or having to teach someone how to create the desired graphs that does not know how. Thus, making the board more user-friendly. When the team created the design for the new MAT huddle board, this idea of using markers to fill in the progress of the metrics instead of using printed graphs was incorporated.

The team performed the role-play exercise with the MAT using the Pharmacy huddle board. This helped the MAT determine what topics they wanted to cover during each huddle and how they wanted the information presented. The MAT decided they want to start rotating who leads the huddles, which was done in the Pharmacy role-play exercise, as well as the CVC and Urology huddles. The MAT also expressed desire for sections on the board for a quote of the day, announcements, and celebrations, similar to the role-play huddle board and CVC huddle board. Overall, performing the lean coach’s role-play exercise with the MAT greatly helped the team finalize plans for the new MAT huddle board design.

Remedy Data Analysis

The team obtained past Remedy data from the MAT manager of approximately 18,092 maintenance requests, from September 2012 to October 2015.

Methods

To develop a methodology for setting target dates for enhancement requests, the team performed a statistical analysis on the Remedy data. Because the scope of this project included only
enhancement requests and not Remedy tickets, the data was filtered to reflect that. The data was also filtered to include only the item types of enhancement requests handled by the MAT and only closed enhancement requests (i.e., all enhancement requests that have been resolved). Once the Remedy data was filtered for these categories, 3,752 enhancement requests remained in the data set.

Identifying Daily, Monthly, or Annual Trends in the Arrival of Enhancement Requests

The team created column charts of the number of enhancement requests categorized by day of the week or month to look for correlations in arrival rates (i.e., if more Remedy tickets are created on a certain day of the week or time of the year). Figure 1 shows the number of enhancement request arrivals by day of the week. Figure 2 shows the number of enhancement request arrivals by day of the week, categorized by year. Figure 3 shows the total number of enhancement request arrivals on each day of the week. Figure 4 shows the number of enhancement requests created in each month, categorized by year. The team used these figures to look for daily, monthly, or annual trends in the arrival of enhancement requests.

Figure 1: Enhancement request daily arrival rates highest on Monday and Thursday
n = 3752, Collection Period: 6/2012-10/2015, Source: Remedy

Figure 2: Enhancement request daily arrival patterns approximately same year over year
n = 3752, Collection Period: 6/2012-10/2015, Source: Remedy
Figure 3: Enhancement request arrivals highest during summer months (June-August)
n = 3752, Collection Period: 6/2012-10/2015, Source: Remedy

Figure 4: Enhancement request arrivals by month and year.
n = 3752, Collection Period: 6/2012-10/2015, Source: Remedy

A month over month column chart (Figure 5) was created to visualize any monthly or annual trends in the arrival of enhancement requests at a high-level glance.

Figure 5: Number of enhancement requests has increased over the past 3 years
n = 3752, Collection Period: 6/2012-10/2015, Source: Remedy
Analyzing the Number of Enhancement Requests by Item Type

The MAT is responsible for 34 different enhancement request item types. The number of enhancement requests for each item type (with \( n > 15 \)) is displayed in Figure 6.

Figure 6: Number of enhancement requests by item-type.
\( n = 3703, \) Collection Period: 6/2012-10/2015, Source: Remedy

The team identified from Figure 6 that some enhancement request types have a much larger volumes than others.

Analyzing the Length of Time Required to Resolve an Enhancement Request

The team calculated the average and standard deviation for the number of days it took to resolve the enhancement requests for each item type. The 80th percentile value was also calculated for each item type (with \( n > 15 \)). These values are displayed in Table 1.
Table 1: Number of days open to resolved: Average vs. 80th Percentile  
n = 3703, Collection Period: 6/2012-10/2015, Source: Remedy

<table>
<thead>
<tr>
<th>Enhancement Request Item Type</th>
<th>Number</th>
<th>80th Percentile</th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Content/Documentation/Dictation Request</td>
<td>1083</td>
<td>100.8</td>
<td>54.23</td>
<td>76.61</td>
</tr>
<tr>
<td>Inbasket Request</td>
<td>561</td>
<td>33.4</td>
<td>28.62</td>
<td>50.02</td>
</tr>
<tr>
<td>Patient Portal Request</td>
<td>409</td>
<td>71.6</td>
<td>39.34</td>
<td>59.58</td>
</tr>
<tr>
<td>Reports Request</td>
<td>305</td>
<td>116.6</td>
<td>58.71</td>
<td>82.25</td>
</tr>
<tr>
<td>Referrals Request</td>
<td>262</td>
<td>38</td>
<td>30.75</td>
<td>46.61</td>
</tr>
<tr>
<td>BPA/Health Maintenance Request</td>
<td>167</td>
<td>176.2</td>
<td>87.39</td>
<td>103.22</td>
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<td>Letters Request</td>
<td>165</td>
<td>101.8</td>
<td>50.90</td>
<td>63.11</td>
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<td>Navigator Request</td>
<td>149</td>
<td>118.8</td>
<td>56.41</td>
<td>66.90</td>
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<tr>
<td>Question/User Education Request</td>
<td>104</td>
<td>15.2</td>
<td>10.21</td>
<td>15.09</td>
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<td>Charge Capture Request</td>
<td>88</td>
<td>26.4</td>
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<td>Patient List Request</td>
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</tr>
<tr>
<td>Flowsheets/VS/Growth Chart Request</td>
<td>34</td>
<td>79.2</td>
<td>48.39</td>
<td>41.70</td>
</tr>
<tr>
<td>Chart Review Request</td>
<td>33</td>
<td>7.6</td>
<td>5.81</td>
<td>7.20</td>
</tr>
<tr>
<td>Care Everywhere Request</td>
<td>33</td>
<td>57.4</td>
<td>32.67</td>
<td>40.55</td>
</tr>
<tr>
<td>Chief Complaint Request</td>
<td>32</td>
<td>22</td>
<td>13.50</td>
<td>15.34</td>
</tr>
<tr>
<td>EpicCare Link Request</td>
<td>26</td>
<td>6.2</td>
<td>4.40</td>
<td>4.48</td>
</tr>
<tr>
<td>Smartform Request</td>
<td>26</td>
<td>2.2</td>
<td>2.65</td>
<td>3.36</td>
</tr>
<tr>
<td>Downtime Request</td>
<td>19</td>
<td>75</td>
<td>43.08</td>
<td>37.98</td>
</tr>
</tbody>
</table>

| Overall Average | 65.05 | 36.96 | 45.94 |

The team created a column chart to visually compare the averages and 80th percentiles of the number of days from open to resolved for each enhancement request item type (Figure 7).
Fig. 7: Number of days open to resolved: Average vs. 80th Percentile
n = 3752, Collection Period: 6/2012-10/2015, Source: Remedy

Findings

The Remedy data analysis resulted in multiple findings.

Monthly and Annual Trends in the Arrival of Enhancement Requests

The team identified seasonal trends in enhancement request arrivals. During the summer months of June and July approximately 100 more requests are created than in the winter months (Figure 3). During the weekdays, Thursday had the highest number of enhancement requests at 804, and Friday had the lowest number at 634 (Figure 1).

Number of Enhancement Requests Varies by Item Type

Some enhancement request item types have a significantly higher volume than others (Figure 6). For instance, the data shows Inbasket Requests have a volume of approximately 500, whereas patient list requests are less than 100. The top 5 item types with the largest volumes are:

- Clinical Content/Documentation/Dictation Request
- Inbasket Request
- Patient Portal Request
- Reports Request
- Referrals Request
Length of Time Required to Resolve an Enhancement Request Varies

Some enhancement request types take a longer amount of time to close, on average, than others. For instance, Patient List Requests take approximately 20 days to close, however Faxing Requests take approximately 100 days. The 80th percentiles for the number of days open to resolved are all larger than the averages. For the item type with the highest number of occurrences, Clinical Content/Documentation/Dictation Request, the 80th percentile is 100.8 days but the average is 54.23 days. The item type with the second highest number of occurrences, Inbasket Request, has an 80th percentile of 33.4 days and an average of 28.62 days. The 80th percentiles of the number of days open to resolved is higher due to large variability in the data. The standard deviations of the number of days open to resolved for all enhancement request item types are quite large. Because of this, the team decided that using averages to set target dates is not a good representation of the actual amount of time it takes to close an enhancement request. Thus, the 80th percentile values will be used in the target date forecasting methodology.

Remedy Utilization

More than 67% of previously closed enhancement requests did not have a target date assigned. Currently, the managing AC can change any target date that is assigned to an enhancement request in Remedy; the MAT manager identified this as a common behavior. A downfall of the Remedy system is that there is no way to track if a target date was changed or how many times it was changed. This is problematic because if a target date forecasting methodology is put in place and the ACs are allowed to alter the initial target date set, there is no way to track the accuracy and usefulness of the model.

The team noticed that 60% of the fields in Remedy are not consistently filled out for each enhancement request. The MAT is not required to fill out all the fields in the Remedy system for each enhancement request. The team identified the Remedy field ‘Total Time Spent Hours’ as beneficial to utilize in the future. Populating this field can better inform the MAT on how many hours are spent working on an enhancement request, since the the number of days an enhancement request is open can be skewed by vacations, holidays, etc. Additionally, it would be beneficial to utilize the fields of ‘TEST Actual’ and ‘PROD Actual’. By doing so, the MAT would get a more accurate estimate of the average number of days it takes an enhancement request to go into production/testing. All in all, utilizing these additional fields has the potential to better inform the MAT of how long each step takes, which can then enable more accurate target date setting.

Conclusions

The team used the findings previously mentioned to formulate multiple conclusions about the MAT huddle structure, MAT huddle board, target date forecasting methodology, and Remedy utilization.
MAT Huddle Structure

Through the huddle observations of the MAT as well as other hospital units in conjunction with the literature search it was determined that the MAT huddles lacked the organization and group involvement that was found to exist in both the Urology Clinic and Cardiovascular Center huddles. Additionally the team determined that the MAT huddle needed a new huddle board to integrate with the revised huddle structure because the interactive boards used by other teams fostered significant participation within the groups.

The new huddle structure has eight steps:

1. Write names for key roles and offsite
2. Inform the team of any current/urgent matters
3. Address issues from yesterday and resolutions for today
4. Metrics
5. Projects
6. Today’s Topic
7. Quote
8. Announcements/Celebrations

The goal is to keep the length of the huddle less than 15 minutes. Each step in the huddle structure is integrated with the huddle board to make the huddle more interactive.

MAT Huddle Board

The team used the findings previously mentioned to develop the new huddle board design. The different sections of the board were created specifically to fit the needs of the MAT. A picture of the new huddle board design can be found in Appendix E.

Quality

The first column of the left side of the board, titled ‘Quality’, was incorporated to track the MAT metrics. The first metric to be tracked is percent of target dates met each month. The metric will allow the team to track how well the target date forecasting methodology is working; meaning, if a large percentage of the target dates are being missed, obviously the methodology will need to be adjusted. This metric will also give a good overview of the team’s performance.

The second metric to be tracked is the number of enhancement requests open versus closed. This metric will be updated every week. An issue identified by the MAT manager during the weekly meetings was that the ratio of open to closed enhancement requests remained fairly constant over time, and that the MAT has been unable to improve that ratio. By updating this ratio weekly on
the huddle board the MAT can visibly see the current state and progress. A similar metric was tracked on the CVC huddle board relating to patient satisfaction where they measured the the number of ‘green cards’ versus the number of ‘red cards’ received each day. The CVC teamed aimed to have the highest percentage of green cards possible. For the metric of tracking the number of open versus closed enhancement requests, the metric should focus on enhancement requests opened during that year.

The third metric to be tracked focuses on the enhancement request item types with the highest occurrences:

- Clinical Content/Documentation/Dictation Request
- Inbasket Request
- Patient Portal Request

The 80th percentile value for number of days open to resolved calculated for these five item types (Table 1) from the Remedy data will be measured against the current 80th percentile value for these five item types during the current year. Based on the Remedy data and input from the MAT, tracking only the five item types with the highest volumes seemed more value-added than tracking all 34 item types the MAT is responsible for. This metric will allow the MAT to visualize in a second graph how well they are meeting the target dates set. A second goal of this metric is, if the team is not meeting the target dates, to also generate discussion as to how the MAT can decrease the number of days an enhancement request is open and make the MAT more efficient.

**Current Projects**

The current projects section was included based on feedback from the MAT that everyone was not always informed of the big projects in progress in the department. The five sections titled analysis, governance, build, testing, and production represent the necessary steps each project will go through. A person who is in charge of a project can fill out a laminated ‘shoe’ with the project description and target date, and move the shoe within the ‘Current Projects’ section as it progresses through the process steps.

**Today’s Notes**

During the MAT huddle observations, the team observed that the huddles often get off topic, causing the huddles to last longer than they should. To resolve this issue, the team assigned a discussion question to each day of the week to keep the discussion focused on the necessary information. There is lots of blank space in this section on the huddle board for the huddle leader to write down any information discussed during this time.
**Engagement**

A quote of the day, announcements, and celebrations are all included in this section. The CVC clinic and Urology clinic also included these sections in their huddle boards. This section makes the huddle board more personal and ends the huddle on a positive note.

**Target Date Forecasting Methodology**

The team's completion of the value stream map analysis brought about the conclusion that employees need to have some accountability for completing enhancement requests by the proposed target date; currently target dates can be changed by anyone in the system and the changes cannot be tracked. More than 67% of past enhancement requests did not have an assigned target date.

Based on the Remedy data analysis, the team decided that the 80th percentile value of the number of days open to resolved was a good representation of the length it should take to resolve an enhancement request. Due to high standard deviations in the number of days open to resolved for each of the enhancement request types, using averages to set target dates would not be an accurate methodology. The 80th percentile value will account for variability based on the daily, monthly and annual trends in enhancement request arrival rates identified during the Remedy data analysis. The 80th percentile target dates are outlined in Table 2.

**Table 2: Values to set target dates**

<table>
<thead>
<tr>
<th>Enhancement Request Item Type</th>
<th>Target Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Content/Documentation/Dictation Request</td>
<td>101 days</td>
</tr>
<tr>
<td>Inbasket Request</td>
<td>33 days</td>
</tr>
<tr>
<td>Patient Portal Request</td>
<td>72 days</td>
</tr>
<tr>
<td>All Other Item Types</td>
<td>65 days</td>
</tr>
</tbody>
</table>

The target dates for the enhancement request item types with top 3 highest volumes will be set individually using the length of time outlined in Table 2. The target dates for all other item types will be set using the overall 80th percentile value. This methodology was decided upon after multiple discussions with the MAT. Focusing mainly on the item types with the top 3 highest volumes was determined to be the easiest transition for the MAT for incorporating a target date forecasting methodology. Once this methodology is put into practice, further analysis should be performed by the MAT to measure its accuracy.
**Remedy Utilization**

After finalizing the Remedy data analysis it was concluded that many fields including ‘Target Date’, are not being utilized when in fact their utilization would be helpful to track progress for the MAT team. One field in particular that is currently not utilized is ‘Total Time Hours Spent’. A helpful metric the MAT could track is the number of hours spent on an enhancement request from when it was opened to when it was resolved. If this Remedy field was utilized by the MAT, the results could be incorporated into the target date setting methodology. The number of days open to resolved for an enhancement request can vary based on non-work related factors like time off for holidays and vacation days. The total number of hours it took to complete an enhancement request would be a more accurate representation as to how long an AC would need to resolve the enhancement request.

**Recommendations**

In order to better manage the MAT’s approach to resolving maintenance issues the team observed huddles across various teams, sought to understand how target dates are created and maintained, and how Remedy is used. After completion of these tasks the team has come up with recommendations to use a new huddle board, restructure the current team huddle, and utilize a revised approach for setting target dates and how to use Remedy to more effectively meet the MAT team needs.

**MAT Huddle Structure**

Included on the Huddle board is a Huddle Structure section, this provides a detailed explanation as to what general guidelines each Huddle should follow. This will allow the leader of the Huddle for a particular week to know what exactly needs to be covered and how to do so.

**MAT Huddle Board**

The team designed and created a new huddle board for the MAT team to utilize during their daily huddles. The new design can be found in Appendix E. The team recommends that the MAT team implements and integrates this new board into their daily huddle as it addresses some of the organizational and structural issues currently experienced by members of the MAT.

**Target Date Forecasting Methodology**

The team suggests that the MAT team begins to provide their customer with an estimate through email as to when they can expect to have their request resolved, which will allow for more
accountability in the target date setting procedure. Providing the customer with a target date of completion will hopefully deter ACs from changing the target date in the Remedy system.

Additionally the team recommends that the MAT team utilizes the 80th percentile value for number of days open to production in order to set the target date. In order to measure the success of the target date setting the MAT team should track the highest occurring categories separately which includes ‘Inbasket Request’, ‘Patient Portal Request’ and ‘Clinical Content/Documentation/Dictation Request’.

**Remedy Utilization**

Within the Remedy system the MAT team is not required to fill out all the fields in the Remedy system for each enhancement request. The team identified seasonal trends in enhancement arrival requests that increased volume in the summer months. Additionally some request types took a longer time to close, on average, when compared to others. The team recommends that the MAT begins to make it mandatory to fill out the fields ‘Total Time Spent Hours’, ‘TEST Actual’ and ‘Target Date’ for all enhancement requests, which will help make Remedy a more robust tool and further facilitate the ability to accurately forecast target dates. This will help eliminate variability by making use of fields more reflective of the number of days for an enhancement request to go into production/testing.

**Expected Impact**

The recommendations provided by the team will improve and maximize the productivity within the MAT. Specifically, the recommendations will result in:

- Improved structure of daily huddles
- Improved method of target date setting and tracking
- Increased visibility of progress within the MAT
References


Appendix A: Remedy Enhancement Request Process Flow Diagram
Appendix B: Current MiChart Ambulatory Team Huddle Board
Appendix C: CVC Huddle Board

1. Roll Call: Place a hash mark in the correct date and work group for each respective work group present.
2. Review new sticky notes and/or EIIs placed on the board.
3. Discuss any new EI movements.
4. Review the number of cards received.
5. Review red-green card percentage.
6. Discuss “home run” comments.
7. Discuss “strike-out” comments.
8. Review daily communications.
9. Discuss staffing/day issues & updates.
10. Discuss daily safety question.
11. Discuss service excellence topic.
13. Review updates to side metrics.
Appendix D: Urology Clinic Huddle Board
Appendix E: Role Play Exercise - Pharmacy Huddle Board
Appendix F: Proposed MAT Huddle Board Design
Appendix G: Huddle Leader of the Week Instructions

Huddle Leader of the Week

The following are instructions for the Everyday Lean Huddle leader (position rotates between members of the MiChart Ambulatory Team weekly). Below describes what the Huddle Leader must cover, record, and prepare in order to lead the team huddle.

Before Huddle

Metrics: Acquire updated metrics to share in huddle. Metrics included in huddle are: number of target dates met each month, open/closed CSR’s, and average days open to resolved.

Enhancement Requests: Print enhancement requests with upcoming target dates

Quote: Choose a quote that resonates with you to share/discuss with the team

Daily Topics: Note the day you will be leading the huddle and make sure to prepare the corresponding topic. (Topics are found below)

During Huddle

At the beginning of the huddle, ask the team for a volunteer willing to be a scribe. This person writes the information on the huddle board.

1. Record the Clinical DC/AC, Triage AC, On Call AC, and any members who are off-site today.
2. Ask the team for any kudos they would like to share.
3. Inform team of the current status and any urgent matters
4. Share metrics and update the board.
5. Address the “Daily Topic”
6. Highlight current projects and any changes using the “Current Projects” section and subsections on the board.
7. Address issues from yesterday and resolutions for today.
8. Quote
9. Announcements/Celebrations
10. Questions/Comments from the team
Daily Topics

**Monday:** Stuck on anything?
**Tuesday:** Any production issues for tomorrow?
**Wednesday:** What is going into production today?
**Thursday:** How did production go yesterday? Lunch and Learn topic?
**Friday:** Barriers for upcoming target dates next week?

MiChart Ambulatory Team