

InterFaith Health Clinic

IE 422: Senior Design II Final Report

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Problem Statement

This report explains and documents our team's project work done in partnership with InterFaith Health Clinic located in Knoxville, Tennessee. The semester project was undertaken in conjunction with the IE 404: Senior Design & IE 422: Senior Design II courses focusing on project management and implementation. InterFaith Health Clinic is a non-profit health center whose mission is to "provide accessible, affordable & quality health care services to the low-income working uninsured & underserved."[1] With this in mind, InterFaith has chosen to move forward by implementing the use of electronic health records replacing the current paper record system used at the clinic. Their goals for the new system is to increase patient flow, offer more convenience, and provide a faster documentation process. InterFaith being primarily volunteer based, only having around 20 full-time staff members, poses a real challenge when implementing and training for a new system such as this one. So this semester, our project management team stepped in and provided the initiation and planning processes required to achieve fully integrated electronic records as well as Standard Work Instructions to accommodate for the flow of volunteer doctors and nurses.

Background

Electronic Health Records have been a trend in the medical industry since the late 2000s. This trend is based on two legislative rulings - the HITECH Act of 2009 and the 21 Century Cures Act of 2016. Both of these rulings improved the flow and exchange of health information through private and secure electronic health record databases.[2] In addition, the Center for

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[1] "Interfaith Health Clinic," *Interfaith Health Clinic*. [Online]. Available: http://www.interfaithhealthclinic.org/. [Accessed: 14-Oct-2018].

[2] "Health IT Legislation," *HealthIT.gov*. [Online]. Available: https://www.healthit.gov/topic/laws-regulation-and-policy/health-it-legislation. [Accessed: 14-Oct-2018].

Medicare and Medicaid Services (CMS) released its new rulings for Electronic Medical Records in October, 2016. MACRA (Medicare Access & CHIP Reauthorization Act of 2015) aims to create a new framework for rewarding providers for better lower-cost, patient-centered care[3]. MACRA is a requirement for clinics that have a high level of Medicare Patients and has penalties for clinics that do not comply. Community Hospitals and healthcare facilities have seen the most issues as they have lower profit margins and difficulty securing capital[4]. Complying with the mandates has become difficult for clinics with low capital and small staff. In addition, the implementation ICD-10 Coding (a system that allows diseases and systems to be classified through a combination of numerical and alphabetic symbols) is a challenge for clinics that cannot afford the cost and staff time required to transition and ensure no quality errors[4]. As such, many clinics in the greater Knoxville area have effectively adopted electronic health record systems to improve their practices. InterFaith Health Clinic seeks to match the standards of other non-profit hospitals by implementing an electronic health record system called Athena, an electronic medical record system (EMRS) to aid with the compliance to federal regulations, such as MACRA. InterFaith elected to use Athena based on their experiences with other hospitals who used the software. The expectations of this software is that it will be more efficient as well as more robust than the current paperwork system at InterFaith. Additionally, it is expected that Athena will allow collaboration for all sectors of InterFaith (Medical, Dental, and Mental Health) for instantaneously shared patient data. Athena is a popular electronic health record system that is meant to help clinics and hospitals increase clinical efficiency through ease of access to

[3] "MACRA Proposed Rule | Knowledge Hub," *athenahealth*, 16-Nov-2018. [Online]. Available: https://www.athenahealth.com/knowledge-hub/macra/macra-proposed-rule.

[4] "Community Hospital Challenges and Problems | Knowledge Hub," *athenahealth,* 16-Nov-2018. [Online]. Available: https://www.athenahealth.com/knowledge-hub/community-hospitals/challenges

information and faster documentation.[5] In addition to the benefits offered via their software, Athena also provides technical support experts during the implementation stages to ensure proper software installation and training. These 24/7 experts are assigned to a case for the first 3 weeks of a clinic's launch. After the initial 3 weeks, the clinic is moved into the standard, on-call, customer service pool. These implementation features made Athena a good choice for InterFaith. For further training, Athena offers beneficial video modules to learn features of the software. Some of these modules, however, can take up to six hours or more. It is also worth mentioning that Athena had already been selected as the software to be used prior to the beginning of our project, as it was purchased with a grant.

Needs Analysis

Upon meeting with our project sponsor, a key stakeholder in the project, we determined the needs of the clinic that our industrial engineering project management team could aid with. The main challenge that InterFaith faces is the nature of its staffing model. Being largely volunteer based, the doctors and nurses coming and going do not necessarily have the time to learn a new electronic health record system. In addition, there are many health record systems being used at other health centers, and so, the volunteer doctors and nurses may forget Athena in their time away from InterFaith Health Clinic. In order to help with this problem, our team determined that we could create standard work instructions. The goal of these work instructions would need to be very simple, straightforward and robust enough to cover a variety of functions within the clinic. While InterFaith Health Clinic has multiple departments (medical, mental health, and dental), our work instructions will focus solely on the the medical portion as this was

[5] "Hospital EHR," *athenahealth*. [Online]. Available: https://www.athenahealth.com/hospital-software/hospital-management-systems. [Accessed: 10-Sep-2018].

predetermined in the scope of our project. In order create the instructions, our team will need to fully understand both the patient and information flow throughout the clinic. This knowledge will be obtained through the creation of a flowchart and observations. From there we will be able to compile the different information paths in order to create multiple focused iterations of work instructions. The needs of the project are subject to change as they will be reassessed following the implementation of Athena to discern where work instructions are necessary.

Requirements Analysis

The requirements for this project were discussed and clarified throughout the semester by members of the Senior Design project team and the key stakeholders. The key stakeholders in this project were identified in our scope baseline (see Appendix B) as the Executive Director of Interfaith, Project Sponsors, and other workers at InterFaith Health Clinic. After discussing with these stakeholders, we determined that our main requirement is to create simple and comprehensive work instructions for data entry into Athena which will be used for the stable processes within the system. These documents must be simple enough to serve as re-training documents for those who have already done the Athena modules, but comprehensive enough to serve as the initial training documents for new volunteers. The scope of these documents are limited to the medical portion of the clinic and will be subject to change pending feedback from the volunteers. In addition, the clinic will need access to our base documentation as they seek to expand the work instructions to the other two departments in the future. The final work instructions will be compiled into a master guidebook at the end of the project and will be subject for continuous review by the stakeholders.

Technical Performance Measures

In order to measure the success of our project, three main performance metrics were determined. These metrics include compliance, user satisfaction, and patient flow.

Definitions

Compliance: the number of doctors who are willing to use our instructions during their patient visit; this includes following the standards we set - compliance is critical in Electronic Health Records, as they require a connected and well-updated model to be effective

User Satisfaction: the ease of use of the standard operating procedure as an initial training document

Patient Flow: the amount of time it takes patients to flow through the clinic - length of appointment times from check in until check out

Data Collection

Compliance: In order to measure compliance, observations will be taken by both industrial engineering students and nursing students to determine how often the work instructions are used. Additionally, a survey (a draft of this survey is in the appendix) will be available to doctors and nurses to gauge their perceived use of the documents as well as to give feedback to improve the documents. This feedback will be used to determine the usefulness of the created documents as well as help us determine how many doctors/nurses/volunteers are actively using our work instructions. As of now, the record software and training documents have not yet been implemented at InterFaith

Health Clinic, therefore current compliance is 0%. Our goal is to achieve compliance of over 60% by the end of the project.

User Satisfaction: User satisfaction will be measured by sending surveys both to the volunteers and staff at InterFaith as well as people unfamiliar with health documenting processes. The volunteers and staff will use an open-ended survey (which will be developed by students in the IE 202 course). A more general survey, which will ask questions regarding familiarity with medical documentation and ease of location of information on the standard work instructions, will be sent to a small population of college students.

Patient Flow: One of the key stakeholders in this project is the patients who will be affected by the implementation of Athena. As customer satisfaction is always a concern in the health industry, we hope that the use of our work instructions will decrease the time a patient has to to stay in the clinic due to issues with paperwork or payment. We will measure this by timing how long it takes patients to flow through the clinic. This of course will be dependent on patient agreement as well as the type of appointment the patient is receiving. We will however, be able to come up with a general idea of the amount of time an appointment should take. We can then determine how long it takes nurses and doctors to input data into Athena and see if this improves throughout the semester or determine if Athena is the bottleneck in the newly implemented system.

Design Alternatives

There were several major setback that the team encountered throughout this design project. The first one involving the proposed timeline put in place by the project sponsor. It was anticipated that Athena would be fully implemented at the clinic by mid-November. This set goal would have given us approximately a month to create initial documentation for the work instructions and take baseline data. However, multiple health complications among leaders of the project as well as technical issues with the initial installation of the Athena software heavily altered our project schedule. This led to our team delaying the project until spring semester 2019. During the times that we were unsure of what the software installation status was, we created alternative projects based on our previous observations at InterFaith Health Clinic. These project ideas included implementing a better system to organize the triage desk payment paperwork - which would be unhelpful if Athena is implemented. Also a simulation project was proposed to analyze patient flow and optimize the current processes. Soon after, we met with our project sponsor to verify that Athena and its implementation was still the best project for us.

Generation of Alternatives

As we progressed through the semester and our project began to stall, it became necessary for our team to come up with alternate ideas that would benefit InterFaith while still providing an educational experience for our team. The list of alternative is as follows:

1. A new system for the organization of payment paperwork at the triage desk
2. Becoming the project management team for implementing Athena at InterFaith
3. Shifting the Athena implementation schedule to our spring semester and continuing with the original project

Feasibility Analysis of Alternatives

After meeting with Executive Director Melissa Knight for our change review process, we were able to determine which alternatives were realistic options moving forward with our project. Our change review process meeting with Mrs. Knight made it clear that InterFaith was still moving forward with integrating Athena. With the decision to move forward with the implementation of Athena, we were able to cut out some of the alternate projects. We were able to cut out the new system for organizing payment paperwork at the InterFaith triage desk since Athena will be taking care of this issue. Athena records payments electronically and sorts the necessary paperwork into the appropriate payment avenues. While implementing a new payment paperwork organization system would be beneficial to InterFaith, this project would prove futile in the long run as our system would be phased out with the implementation of Athena. Our next alternate idea of becoming the project managers of the Athena project was also resolved at the end of the fall semester. At the time of our proposal to become the project managers, the installation of Athena was done incorrectly and caused an uproar between InterFaith and the installation group. Our team was offering to serve as new project managers to lead the Athena project and solve many of their issues. When we sat down to have our change review process meeting, Ms. Knight informed our team that the installation issues with Athena had been smoothed out and the trial period was to begin in early January. Since Athena was properly re-installed, we no longer needed to serve as the project managers for the installation of Athena. Following the implementation of Athena, there were slight changes which needed to be made to our project scope. While we had initially intended to create standard operating procedures for nurses and doctors, this became unrealistic as the processes that they used were not stable. It was

determined that creating such standard operating procedures would be a waste of our efforts and the volunteers time. Instead, we decided to focus on stable processes, which included the testing of standard work for the front desk. We decided that if we could show success in a stable process, it may lead to better engagement among the volunteer doctors to want to participate in the project.

Comparison of Alternatives

After meeting with our sponsor and completing the formal change review process, we determined that continuing with the original implementation of Athena, while also taking control of the project management process was the best action plan moving forward. As such we revised the original production schedule to reflect the dates and milestones for Spring Semester 2019. The project schedule is as follows in *Figure 1*.

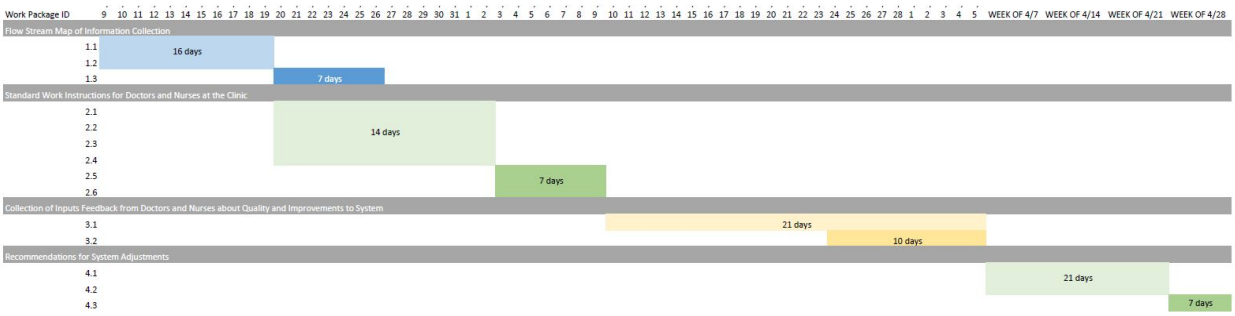


Figure 1

Week of January 6th: Meet with Project Sponsor to confirm project charter and final authorizations

Week of January 13th: (Week 1 of Athena Implementation) Take Observations of Patient Flow

- Patient Flow Information includes time spent in clinic as well as learning curve measurements without our documentation
- [WBS 1.1 & 1.2]

Week January 20th: (Week 2 of Athena Implementation) Continue Previous Week & add Athena inputs

- Continue gathering flow & learning curve information, begin to create a detailed process flow map of the inputs and outputs of Athena EHR
- [WBS 1.3 & 2.1-2.4]

Week of January 27th: (Week 3 of Athena Implementation) Continue Work from Previous two weeks

- [WBS 2.1 -2.4]

Week of February 3rd: Create Initial Work Instructions for the 2 Most Common Patient Flows

- [WBS 2.5-2.6]

Week of February 10th: Test 2 Initial Work Instructions - create more work instructions

- [WBS 3.1]

Week of February 17th: Continue Testing Initial Work Instructions and Gain Feedback

- [WBS 3.1-3.2]

Week of February 24th: Make Corrections to the Initial 2 Work Instructions, begin testing others

- [WBS 2.1-3.2]

Week of March 3rd: Create Final versions of the First 2 Work Instructions

- [WBS 3.1-3.2]

Week of March 10th-31st*: Repeat Creation → Test → Improve Cycle for Work Instructions

- [WBS 2.1 - 3.2]

Week of April 7th: Take Observations of Patient Flow & Learning Curve Measurements

- [WBS 3.1, 4.1-4.2]

Week of April 14th: Continue observations and making edits to work instructions

- [WBS 3.1 - 4.2]

Week of April 21st: Complete Analysis of Patient Flow Data and Learning Curve Data

- [WBS 4.1-4.2]

Week of April 28th: Compile Results into a final report; present data to key stakeholders

- [WBS 4.1-4.3]

*Week of March 17th is Spring Break - no classes

Design Development

Develop Design of Recommended Alternative

After discussions with the project sponsor and faculty advisor about alternatives and feasibility, the team agreed on the initial design with the corresponding technical performance measures. This design is outlined in the Project Charter (Appendix A) and includes, work instructions and a recommendation for changes to the system as deliverables. This design takes into account all the needs of the company as well as the capabilities within the constraints for both the sponsor and the project team.

Implementation

During the final semester of work with InterFaith Health Clinic, the team followed the updated weekly schedule and deliverable breakdown. This allowed for equal distribution of work activities over a well-distributed timeline. The team focussed on the goals and milestones outlined in the project charter (appendix --) which were agreed upon by the team, key stakeholders, and faculty adviser. There were often extraneous projects that were brain stormed as valuable future endeavors, but once considered, were found to be outside the project scope and merely possible facilitators of scope creep. These future projects will be expanded upon later in the report.

The main scope of this project detailed deliverables that would allow for standardized, best practices of use for the new electronic records system, Athena. To determine the most useful practices for the rotating volunteer staff, the team focused on stable, clinic processes. If a process is not already functioning, implemented, or currently in the process of a change, then a standard

operating procedure would be ineffective or become quickly outdated. Within InterFaith, due to project setbacks during both of our work semesters (see section ----), Athena was not fully operational in all aspects by the end of this project. Due to this, the team had to focus on processes within the organization that had Athena in stable working condition. Our main contact at InterFaith and a key project stakeholder directed us to focus on the check-in and check-out process in the front of the facility. This process had Athena accessible to them and the permanent operators had already established a tentative method of use. This allowed the team to observe and collect data on the best practices. From this data, network flow charts were created and Standard Operating Procedures were established.

Once the team was given the go-ahead to begin work within the facility, observations were the first step. This team consisted of both engineering and nursing major students. Since the nursing students were less conspicuous in the healthcare environment, they conducted most of the initial observations. Our communication proved to be a challenge as they were our eyes and ears in the facility. They took notes on our desired processes and received feedback from the fellow nurses that were much more comfortable around people in pursuit of their own profession.

The industrial engineering students analyzed this data for redundancies and optimal practices. This analysis was shared with the nursing students and all questions were discussed. From here a standard work template was created. (Appendix E) This template integrated visual and verbal instructions for the user. Screenshots and symbols were attached to the corresponding written instructions to reduce communication errors and further mistake-proof. The screenshots give a direct indication of what their screen should look like if they are following correctly, so the user can verify in case of uncertainty. Because of issues with receiving access to the software, it was

necessary to do research via YouTube to find video tutorials in order to access these screenshots. An example can be seen in the "Screenshot" column of *Figure 3*. The "Work Step" column of the template contains both a written explanation of the process step and a symbol. The team added symbols to the bottom right-hand corner of the "Work Step" column in the standard operating procedure (SOP) in order to further explain the type of action/reaction that is required. These symbols and their meanings are described in *Figure 2* below.

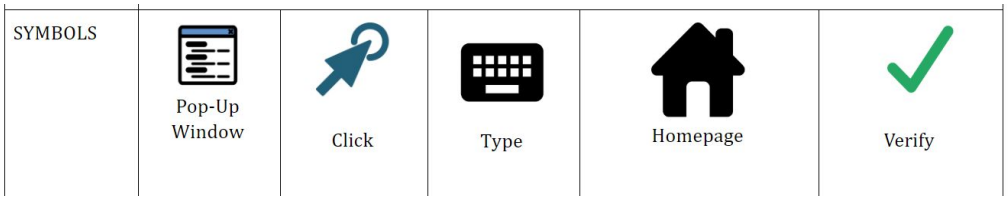


Figure 2: Symbols used in SOP Design

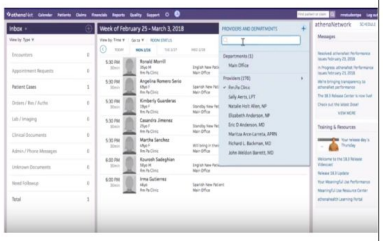
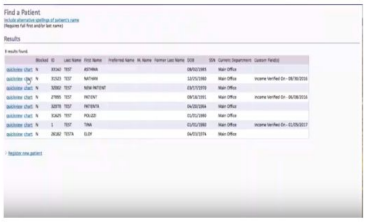
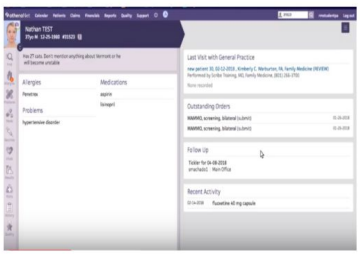
Step #	Work Step	Notes	Screenshot
1	Log into AthenaNet using "-----" as department		
2	Click Patient Name	A pop-up window will appear Status should read "ready for staff"	 

Figure 3

It was determined that four standard operating procedures should be created for processes located in the front desk area. These four SOP packages included the Check-In Process, Nurse Charting Process, Nurse Charting Process, and Scheduling process. The process of observation and template described above was used to create one standard operating procedure at a time. Once an SOP was created, it was distributed to the nursing staff for usage and feedback. This feedback was instrumental to SOP revisions. Once the team considered the changes that would improve the documents, they were redistributed for use. This was repeated for each of the four types of SOPs created. These SOPs were printed in color and provided to the project sponsor for continued use, as well as the ability to use whiteboard markers to trace steps for those new to the system. In addition, digital copies and templates of the SOPs were provided to the project sponsor so that they could be replicated by future teams or volunteers in the clinic.

The testing of our project required more observation as well as explicit feedback from the users. Around this time, the team was ready to begin testing the effectiveness of our SOP implementation, and coincidently the team was assigned a group of IE 202 students to work with. They were to create a separate project charter, consulting with us and our project needs to help with the final completion aspects. In their case, we needed observations and feedback from the appropriate InterFaith Clinic staff. The deliverables, our testing feedback, and execution plan were all outlined in their project charter. Once the charter was created, they conducted the leg-work for our final part while completing their deliverables.

Feedback about the project required resolving and aligning our finished products with the deliverables we projected in our scope.

The main questions that we were analyzing were:

- “Are the standard operating procedures being used?”
- “Is Athena being utilized?”
- “Do the SOPs make the process easier/simpler to explain to a volunteer?”

These questions were compiled into a survey for the appropriate SOP users, that the IE 202 students distributed and collected. Errors in using the software were targeted as a metric that would be reduced with our instructions and improved training processes. To determine whether the SOPs created were reducing error inputs, the error numbers were tracked and recorded by the team. The results of testing and evaluating the effectiveness of our solution is discussed in the following section.

Evaluation

Final Measurements of System

For the final measurements of our project, we wanted to focus on compliance and the number of errors made before and after using our implemented SOPs. Compliance was measured using a survey given to a sample population of the appropriate SOP users. Another measure that we focused on was the "straight forwardness" of our created SOPs. We measured how easy our SOPs were to understand by a survey administered through a survey platform provided by UTK, QuestionPro. We uploaded images from our SOPs (each of the SOP sysmbols and images of the SOPs themselves) and then asked questions such as "indicate the icon for a click action" and "locate the description of the SOP." (a full copy of our survey can be found in Appendix **F).** We administered this survey to engineering and nursing students. The idea behind our selected population is that they had varying exposure to an electronic medical record system previously and we wanted to see if a person could learn the basic concepts through our SOPs. Observed in Figure 4, most of the participants were either unfamiliar with Medical Charting or were only slightly familiar.

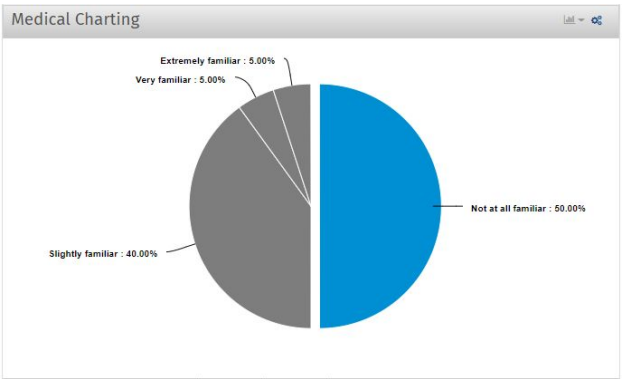


Figure 4: Example Demographic Information
50% of respondents were not at all familiar with medical charting processes

The data from the surveys indicated that greater than 95% of survey participants were able to correctly identify the input processes involved in Athena. Observed in heat map below, most of the survey participants were also able to correctly identify the key areas of the SOPs.

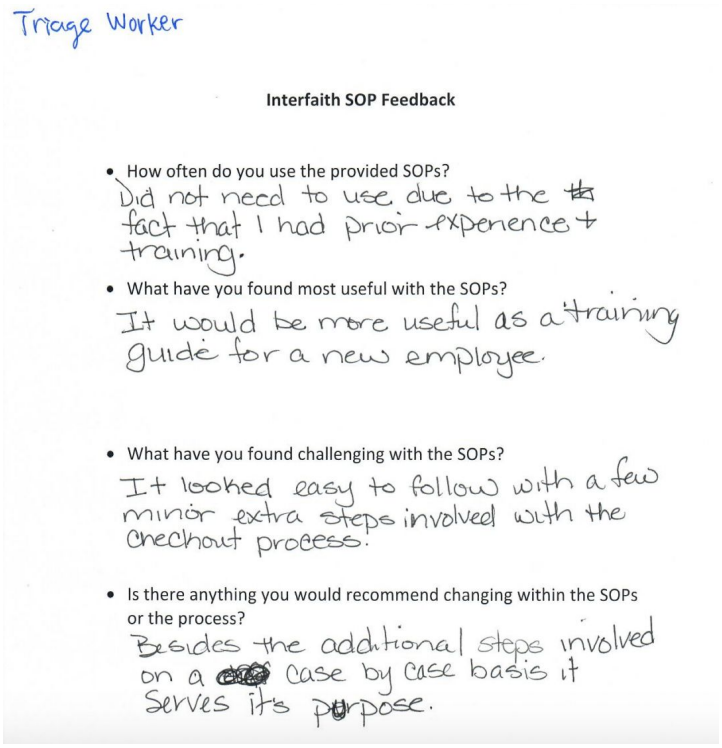


Figure 5: Heat Map Image Detailing that Respondents knew where to find appropriate information

Then for the number of errors, we were unable to retrieve a baseline of error data, but our sponsor kept track of the major errors before the SOP integration and the minor errors after. We have reports of an estimated 75% decrease in errors from the beginning. This is an estimation as error data was not collected prior to the implementation of our SOPs and so there is no baseline data of which to compare. In addition, we are unsure of whether this data is directly related to our SOP implementation or rather the increased familiarity of users with the system. The data was an observation from the only employee at the clinic with the necessary clearances to correct errors in the Athena system

Evaluation of Implemented Solution

Our team started evaluating our standard operating procedures through surveys. So, in order to gauge the effectiveness and usefulness of our created SOP's, we gave surveys to our IE 202 team that would be distributed to the InterFaith nurses and doctors. An example survey and response is shown in Figure --.



Triage Worker

Interfaith SOP Feedback

- How often do you use the provided SOPs?
  Did not need to use due to the fact that I had prior experience + training.
- What have you found most useful with the SOPs?
  It would be more useful as a training guide for a new employee.
- What have you found challenging with the SOPs?
  It looked easy to follow with a few minor extra steps involved with the checkout process.
- Is there anything you would recommend changing within the SOPs or the process?
  Besides the additional steps involved on a case by case basis it serves its purpose.

Figure 6

Looking at the results of our surveys and responses, we found that the staff at InterFaith believes the SOPs that our team created are very valuable training documents but do not serve a purpose to current InterFaith staff. Given that the current staff at InterFaith has already had extensive training on Athena through the provision of training modules, the staff does not need to look at the SOPs. Our team's intentions for the documents were to be for new hires or new volunteers that by using our SOPs experience reduced training time for learning Athena. They were also

written for volunteers, as opposed to the full time employees who work in the front desk area. As only one of our standard works in the beta test was written for this demographic, there is little data from the intended audience about our SOPs. During our final semester at InterFaith, however, a new employee was hired. According to our sponsor and the new employee was successfully able to apply our created SOPs which reduced their Athena training time down to a third of what a normal training time would be. Our team views this an accomplishment.

Recommendations for Future Work

As mentioned in our constraints, one of the main limitations of our project was that we were unable to interact with doctors directly. We relied heavily upon the nursing students who could interact with the doctors at InterFaith. If work was to continue at InterFaith, it would be ideal if our team could meet with some of the doctors for periodic check in meetings or be able to shadow them as they input data into Athena. In addition, access to the software would need to be available to students as opposed to solely researching Athena online.

Our team produced four SOP's for InterFaith; Patient Check-In, Nurse Charting, Patient Check-Out, and Patient Scheduling. We believe that rolling out the SOP's in packages was the best implementation plan because it allowed the nursing staff to adjust and learn the new method of inputting data. This allowed the nursing staff to observe what worked and what did not work with the SOPs were produced.

If we were to continue working at InterFaith Health Clinic, we would move on to developing SOPs for the rest of the processes that utilize Athena. It would be ideal to create SOPs for most, if not all, of the processes involving Athena at InterFaith, specifically those directly involving volunteers. Once SOPs were created for all of the processes, the future team

would then compile these SOPs into a quick reference guide for new employees learning Athena. Having this supplemental training guide could help reduce training time on Athena by more than a third and could save InterFaith valuable man hours spent on training.

Another future project at InterFaith could be eliminating the bottleneck in the referrals department. One unintended outcome of our project that could lead to a future project was the current process for recording referrals has become extremely backlogged since the conversion to Athena. The goal here would be to focus on streamlining this process through analyzing the referral process, locating the bottleneck, and then standardizing the process.

If we were to continue working at InterFaith Health Clinic, our team would need to spend some time redefining the problem. Our implemented SOP's do exactly what they were intended to do very well, but have proven to not be the solution to many of InterFaith's current problems. Our current projects results show that our SOP's are useful but not necessary. .It is our belief that the problems that InterFaith faces with the implementation of Athena is the lack of volunteer buy-in and engagement. It is our opinion that a project more heavily involved in this aspect would prove to be much more useful to the clinic. Overall, our project was successful but may have targeted the wrong issue. While we moved toward a solution to help with the stabilization of front desk processes, InterFaith sees the most issues with volunteer buy-in to learn a new electronic record system. Before this buy-in occurs, success needs to be shown within the clinic setting, which we accomplished. By successfully implementing the four SOPs, we should have made doctors and volunteers more comfortable with the idea that the system can be simple and easily learned in short amounts of time.

Appendix

Appendix A: Project Charter

Project Charter - InterFaith Health Clinic
Payton Garland, Clark Legac, Emily Diehl, Josh Presnell

Background (Why are you doing the project?)

- Other non-profit hospitals have already converted to Athena (new electronic filing system) and have proved its effectiveness
- Athena is more efficient. Saves time and money by reducing time spent searching through paper files
- Convenient, eventually will be easily accessible and robust
- Collaborative, all sectors of Interfaith (Medical, Dental, Mental) will be able to communicate gathered information instantly and wholly

Goals (What are you going to achieve and when?)

- Full electronic records integration by the end of this semester
- Standard Work Instructions for integrated electronic records use by the end of this semester designed for nurse and doctor use

Scope (What product, service, or result do you expect to get for this project? What actions will the team take to undertake the project?)

- Flow stream map of information collection
- Collection of inputs from nurses and doctors about quality and improvements of the system
- Recommendations for system adjustments
- Standard work instructions for volunteer doctors Medical ONLY (not Dental or Mental)

Key Stakeholders (List of people involved in your project)

- Melissa Knight (Executive Director)
- Other InterFaith Directors
- Front office workers
- Nurses/Nurse Practitioners
- Doctors
- Volunteers
- Patients
- Outside contractors (ex. lab technicians)
- Industrial Engineer Students

Project Milestones (Establish significant dates of your project: start date, end date, invoicing dates, guesses, do not have firm dates yet)
**Must work around implementation schedule of doctors, recommend/work as implemented

- Week of September 17th and 24th: All nurses trained on new Athena system
- End of September: 99% of clinic trained on Athena
- October 1st: Mock trials of new system to begin
- November 1st: Go live and begin conversion to Athena using patients (doctors will have reduced patient schedules in order to accomodate learning curve for Athena)
- End of December: All incoming patients converted to Athena (full patient schedule for doctors resumed)

Project Budget (Main project expenses, rough estimates)

- 8 hours a week for both on-site and off-site work
- $0 for Student project work
- Much more $ for the record system, but that is already been bought

Constraints (Limiting factors)

- Meeting times, doctors/volunteers time in between patients
- Student work time/class schedules
- Speed that Athena worker implements change recommendations
- Training and implementation schedule for location

Assumptions (Factors we are relying on)

- Technical workers from Athena implementing recommendations in a timely manner
- Input from key stakeholders
- Our team will have access to training documents for Athena to better understand how nurses/ doctors will input data

Risks (Anything that could get in the way)

- Timeframe - our final deadline is solid and cannot be moved for any unforeseen incidents
- Participation - doctors at InterFaith are working on a volunteer basis. This could result in some push-back or lack of enthusiasm for our involvement.

Dependencies (Constraint based or professional relationship between two activities or tasks such that the completion or the initiation of one is reliant on the completion of another)

- The nurses and doctors being trained on Athena and understanding how to input data into the program
- Communication between our team members, nurses, and doctors is vital for success of the project and making sure all participants understand the goal of the new electronic system

Appendix B: Scope Management Plan

Scope Management Plan

InterFaith Senior Design

Payton Garland, Clark Legac, Emily Diehl, Josh Presnell

10.15.2018

Project Scope Statement. The project scope statement includes the product scope description, and the project deliverables, and defines the product user acceptance criteria.

Objectives/Scope Description

The project will achieve full electronic record integration at InterFaith Health Clinic by the end of this semester. Students will have designed a preliminary draft of the Standard Work Instructions for integrated electronic records (Athena) by the end of the semester. These standard work instructions will be designed for nurse and doctor use. At the end of the project, students will make recommendations for system adjustments to further streamline the process in the future.

Deliverables

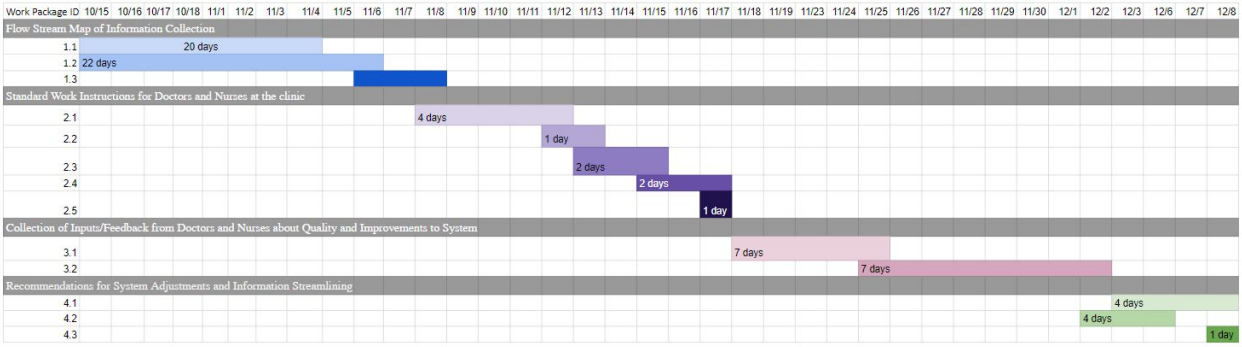
The deliverables of this project are clear and precise instructions for using the electronic medical records in the healthcare management software Athena. Students will also identify relevant documented information to be stored and continuously input into the new system.

The Deliverables include:

- **Flow Chart:** Create a Flow Chart from the observational analysis, connecting all process loops and critical points
- **Process Flow Map:** Develop the flow chart by adding detail such as inputs and outputs of each process step to create a more detailed map of the purposes for each step
- **Standard Work Instructions:** Streamline, standardize, and outline the procedures for current doctors, nurses, staff, and volunteers when using the electronic charting forms
- **Stakeholder Opinions and Complaints:** Complied opinions and complaints from Melissa Knight, InterFaith Directors, InterFaith staff, Doctors, and Volunteers about Standard Work Instructions created by our team
- **Information Storage Parameters:** Audit internal data storage systems and create recommendations for relevant data storage needs

- **Process Flow Recommendations:** Compile and present team recommendations for cutting down inefficiencies in data flow processes

Dependency Flow Chart



Constraints

The identified constraints on this project include Melissa and the student's available time to meet. Interfaith Health Clinic is open between 8AM and 8PM Monday through Thursday, 8AM and 5PM on Friday, and is closed on Saturday and Sunday. Available time for students to effectively shadow doctor/nursing staff. Students have limited access to training documents and limited access to Interfaith computers. Our final deadline is solid and cannot be moved for any unforeseen incidents. Participation of doctors at InterFaith are working on a volunteer basis therefore this could result in some push-back or lack of enthusiasm for our involvement.

Assumptions

Technical workers from Athena will implement recommendations in a timely manner. Our team will have access to training documents for Athena to better understand how nurses and doctors will input data into Athena. Our team will be able to access the Interfaith facility with lack of supervision given unique time schedules of those involved.

Boundaries

This project will not deal with the installation or training of Athena or issues regarding the software package. We will only be looking at how information is collected, inputted, and transferred to relevant parties.

Schedule Milestones

- October 16th: Begin shadowing doctor/nursing staff and creating process flow
- November 4th: Data collected and observations complete
- November 15th: Begin implementing work instructions

Cost Estimate/Fund Limitation

The current budget for the project is eight student hours of work a week for both on and off-site work. No monetary funds will be given to our team for the completion of this project.

WBS. The WBS defines each deliverable and the decomposition of the deliverables into work packages.

Deliverables for this project include:

1.0 Flow Stream Map of Information Collection

- 1.1 Data Collection and Observation
- 1.2 Data Documentation and Analysis
- 1.3 Create Flow Chart

2.0 Standard Work Instructions for Doctors and Nurses at the clinic

- 2.1 Use Flow Stream Map to create a Process Flow Map
- 2.2 Determine any flaws in the process
- 2.3 Simplify Process with respect to observed flaws
- 2.4 Document Process
- 2.5 Update Training with new Standard Work details
- 2.6 Present Preliminary Documents to Melissa for Review

3.0 Collection of Inputs/Feedback from Doctors and Nurses about Quality and Improvements to System

- 3.1 Following release of Standard Work Instructions, Observe Clinic
- 3.2 Document any comments

4.0 Recommendations for System Adjustments and Information Streamlining

- 4.1 Analyze Process Flow Map
- 4.2 Analyze Information Collected from Doctors
- 4.3 Present Findings to Key Stakeholders

WBS dictionary.

Work Package ID	Work Package Name	Description	Assigned to	Date Assigned	Date Due	Predicted Cost	Actual Cost
Flow Stream Map of Information Collection							
1.1	Data Collection and Observation	Follow Information streams as they enter the facility to document where they lead	Payton, Clark, Emily G, Corrinne	10.15.2018	11.4.2018	20 Days	
1.2	Data Documentation and Analysis	Analyze the major hubs of the collected data and its resulting paths, notating any inconsistencies and consulting others as needed	Payton, Clark	10.15.2018	11.6.2018	20 Days	
1.3	Create Flow Chart	Create a Flow Chart from the analysis, connecting all process loops and critical points	Payton, Clark	11.6.2018	11.8.2018	2 Days	
Standard Work Instructions for Doctors and Nurses at the clinic							
2.1	Use Flow Stream Map to create a Process Flow Map	The Process Flow Map starts with the flow chart, and adds detail such as inputs and outputs of each process step	Emily, Josh	11.8.2018	11.12.2018	4 Days	
2.2	Determine any flaws in the process	Inconsistencies, inefficiencies, over-documentation of information, and flow problems should be identified	Emily, Josh	11.12.2018	11.13.2018	1 Day	
2.3	Simplify Process with respect to observed flaws	Simplify the observed process into it's simplest most streamlined form	Payton, Clark	11.13.2018	11.15.2018	2 Days	
2.4	Document Process	Compile these reccomended proceses and document them in a user-friendly way	Payton, Clark	11.15.2018	11.17.2018	2 Days	
2.5	Update Training with new Standard Work details	Integrate training with new standard work instructions	Payton, Clark, Emily, Josh	11.17.18	11.18.2018	1 Days	
2.6	Preliminary Document to Melissa	Present preliminary standard work instructions to Melissa as evidence of progress	Payton, Clark, Emily, Josh	11.18.2018	11.18.2018		

Collection of Inputs/Feedback from Doctors and Nurses about Quality and Improvements to System							
3.1	Following release of Standard Work Instructions, Observe Clinic	Shadow Nurses and Doctors once the system is fully integrated. Shadow both full-time and volunteers to observe ease and integration of systems	Emily G, Corrine	11.18.2018	11.25.2018	7 Days	
3.2	Document any comments	Document any comments made about the current process so we are able to include changes in the revised work instructions	Emily G, Corrine	11.25.2018	12.2.2018	7 Days	
Recommendations for System Adjustments and Information Streamlining							
4.1	Analyze Process Flow Map	Streamline observed ineffieciencies and create reccomendations for new process flow	Payton, Clark	12.2.2018	12.6.2018	4 Days	
4.2	Analyze Information Collected From Doctors	Take into account doctor reccomendations for needed information as well as insurance needs and uncommon to commonly useful doccumented information to elliminate useless data storage	Emily, Josh	12.2.2018	12.06.2018	4 Days	
4.3	Present Findings to Key Stakeholders	Present all findings to Melissa, Athena Technical Advisor, Mr.Ostrowski, and any other parties that would need to approve changes to system flow and information storage	Payton, Clark, Emily, Josh	12.07.2018	12.07.2018		

Appendix C: Communications Management Plan

Communication Management Plan

InterFaith Senior Design

Payton Garland, Clark Legac, Emily Diehl, Josh Presnell

12.12.2018

Collection and Filing

The team will utilize time at InterFaith Health clinic to observe and collect data by note-taking. The observations will be done on paper but will later be transferred into photos and distributed to the project team. These photos will be stored in the team Google drive to be retrieved and utilized as needed. One on one interviews will be conducted as well to ascertain stakeholder satisfaction and recommended alterations. These will be documented by notation and transcribed into Google documents to be shared with the team through the team drive. Doctor usage compliance will be documented through accumulation of online vs paper charts accumulated throughout the work day. This will be recorded and charted through Google sheets as to be shareable.

On top of these more specific instances, as other information is gathered it will be stored and shared through Google's platforms and the team drive. This will ensure easy, constant access to relevant, updated information at all times. The team will also share updates and verbally communicated information through weekly meetings and email updates that will be documented and stored as notes and saved emails throughout the semester.

Distribution

The distribution of information is detailed in the following chart. Depending on information that is needed, the recipient, method, frequency, and initiating responsibility differ greatly.

What Needs to Be Communicated	Why	Between Whom	Method for Communication	Responsibility for Initiating	When and Frequency
Project Information	Avoid Redundancy and Support Progress	Project Team	Team Meeting, GroupMe, Email Updates	Team Leader	As Needed
Project Status	Promote Team Accountability and Quick Responses to Project Changes	Faculty Advisor, Project Sponsor, and Team	Weekly Meeting and Email	Team Leader	Monday at 2:30, Weekly
Timeline Update	Team Accuracy and Punctuality	Project Sponsor, Faculty Advisor, and Project Team	Weekly Meeting and Email	Team Leader	As Needed
Project Update Action Item Status	Keep Team Leader Updated so Communications are Smooth between all Involved Parties	Project Team and Team Leader	Team Meeting, GroupMe, Email Updates, and Text Messages	Project Team	As Needed
Project Risks	Have all Stakeholders Understand Problems that may Impeded Project Completion	Project Sponsor, Faculty Advisor, and Project Team	Risk Documentation in Charter, Weekly Meeting, Email	Team Leader	As Needed

Information to be Distributed

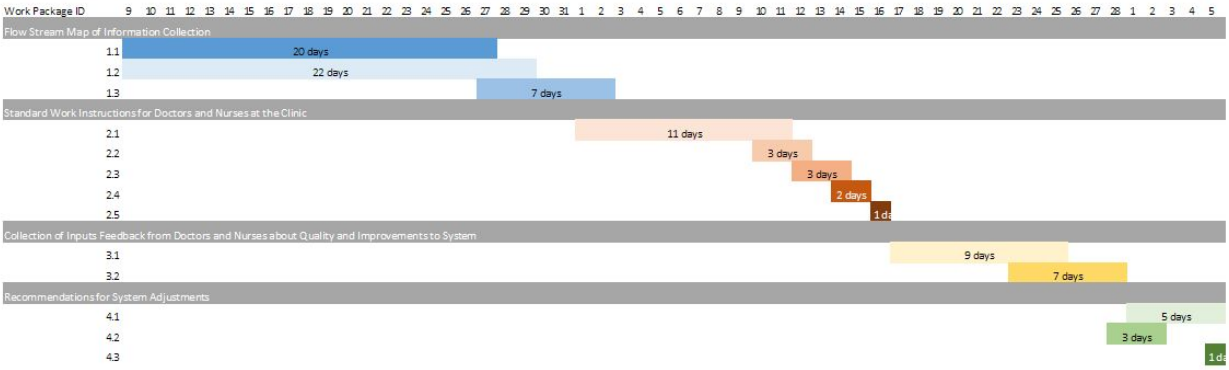
As the year progresses, updates and information will need to be distributed. The overarching information subjects that will need to be communicated are outlined in the above chart. The format of all of these updates include email communication as the team's key stakeholder and project sponsor is the Director of InterFaith Health Clinic and has many day-to-day activities that keep her very busy. Emails will contain the most relevant and direct information that is needed, while face to face meetings will contain more detailed descriptions of the information to be conveyed. Between the team project members, informal communications will suffice as information carriers. The back and forth nature of text messages and Groupme updates allow for instant feedback and the most inclusive, interactive communication.

Production Schedule

The specific deliverables determined by this project's key stakeholders and project team, and outlined in the project scope determine the production schedule. As the schedule is susceptible to risks and timeline adjustments, the production schedule will need to be updated as the others are. Below is an initial production schedule of specific deliverable that fall under the overarching subject headings outlined in the above chart.

Assessing Information

Between regular communications, information will need to continue to be gathered and assessed. It will be up to the team member gathering the necessary information and the team as a whole to determine the urgency of the conveyance. The team member should continuously update the team leader and the project team anyway so as to keep everyone on the same page. If the information is found to be of the utmost importance, then the next level of the hierarchy will be contacted immediately. Otherwise, the



team will decide and deal with the gathered information as the team determines fit.

Updating

The Communications Management Plan, similar to the Scope Management Plan and the Project Timeline, is a living document. As the next semester progresses, the document will be updated as needed. Updating and refining will come at the consensus of the project team and the faculty advisor. Updates could include changes to the weekly meeting as schedules change and frequency of updates to key stakeholders. This could also include adding communications with the nurses and doctors that work at InterFaith as they could intend to be more involved than is currently determined. Flexibility and persistence is key in accomplishing this projects goals.

Appendix D: Project Schedule

Project Schedule

InterFaith Senior Design

Payton Garland, Clark Legac, Emily Diehl, Josh Presnell

Updated: 12.12.2018

WEEKLY SCHEDULE

Week of January 6th: Meet with Project Sponsor to confirm project charter and final authorizations

Week of January 13th: (Week 1 of Athena Implementation) Take Observations of Patient Flow

- Patient Flow Information includes time spent in clinic as well as learning curve measurements without our documentation
- [WBS 1.1 & 1.2]

Week January 20th: (Week 2 of Athena Implementation) Continue Previous Week & add Athena inputs

- Continue gathering flow & learning curve information, begin to create a detailed process flow map of the inputs and outputs of Athena EHR
- [WBS 1.3 & 2.1-2.4]

Week of January 27th: (Week 3 of Athena Implementation) Continue Work from Previous two weeks

- [WBS 2.1 -2.4]

Week of February 3rd: Create Initial Work Instructions for the 2 Most Common Patient Flows

- [WBS 2.5-2.6]

Week of February 10th: Test 2 Initial Work Instructions - create more work instructions

- [WBS 3.1]

Week of February 17th: Continue Testing Initial Work Instructions and Gain Feedback

- [WBS 3.1-3.2]

Week of February 24th: Make Corrections to the Initial 2 Work Instructions, begin testing others

- [WBS 2.1-3.2]

Week of March 3rd: Create Final versions of the First 2 Work Instructions

- [WBS 3.1-3.2]

Week of March 10th-31st*: Repeat Creation → Test → Improve Cycle for Work Instructions

- [WBS 2.1 - 3.2]

Week of April 7th: Take Observations of Patient Flow & Learning Curve Measurements

- [WBS 3.1, 4.1-4.2]

Week of April 14th: Continue observations and making edits to work instructions

- [WBS 3.1 - 4.2]

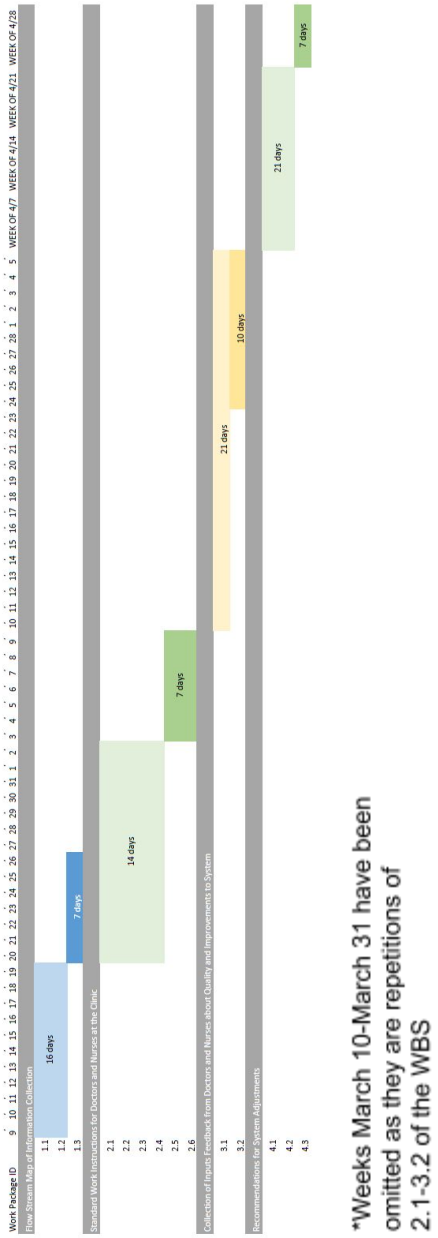
Week of April 21st: Complete Analysis of Patient Flow Data and Learning Curve Data

- [WBS 4.1-4.2]

Week of April 28th: Compile Results into a final report; present data to key stakeholders

- [WBS 4.1-4.3]

*Week of March 17th is Spring Break - no classes



*Weeks March 10-March 31 have been omitted as they are repetitions of 2.1-3.2 of the WBS

Appendix E: Standard Operating Procedures

Standard Operating Procedures were created for four of the processes for the medical division of InterFaith Health Clinic:

- Patient Check-In Procedure
- Nurse Charting Process
- Patient Check-Out Procedure
- Patient Scheduling Process

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Appendix F: Ease of Use/Satisfaction Survey

17 Questions
21 Complete Responses
27 Total Responses
78% Completion Rate