

Introduction

In 1998 Access Community Health Network was founded to address the lack of primary health care services for people in the Chicago-land area. An on-site outreach team made up of a mid-level health provider (a nurse practitioner or physician assistant) and a case manager provides care. Some of the services the team provides are: preventive health care, HIV testing and counseling, STD screening, wound care, referrals to other social services, and health education. They also assist clients in obtaining primary care at the nearby ACCESS clinic site. ACCESS wishes to be a leader in building innovative responses to Chicago's health care problems through medical interventions, education programs, social services, and linkages to substance abuse and mental health treatment. ACCESS' Mission is to provide high quality, cost effective, comprehensive primary health care, including preventive care in Chicago-land communities. ACCESS is the largest network of community health centers in the nation, operating 42 health centers serving over 175,000 individuals through 475,000 medical visits annually. After choosing the perinatal treatment plan, our task was to find and focus on areas that can be better improved to enhance the quality of healthcare.

ACCESS offers a full-range of pregnancy related health care services both during and after a woman's pregnancy. Our objective is to enhance the perinatal treatment program in either the field of revenue or quality of care.

Project Background

This project is an on-going project that was started in the fall semester of 2004. It seeks to continue research, develop and demonstrate new information system designs for the perinatal program at ACCESS. The perinatal treatment program is inclusive of treatment for women from the time they walk in and test positive on their pregnancy test, through their nine months of

pregnancy, and until their child is two years old. Additionally, the new objective is to gather data and analyze the immunization process at ACCESS health centers.

Although the perinatal treatment program is successful in generating revenue, it could be more successful and efficient in several ways. ACCESS health centers are affiliated with Mt. Sinai Hospital, and ACCESS patients are expected to deliver at Mt. Sinai. However, many women do not return to Mt. Sinai to deliver their babies, causing ACCESS to lose revenue. Next, some women take their UCG (pregnancy urine dipstick test) at ACCESS health centers, and after they test positive, they do not return to ACCESS for their perinatal care. Since patients' information is recorded on paper, it is hard to follow up on patients who do not show up after testing positive for the UCG test.

As mentioned earlier, ACCESS patients are expected to deliver at Mt. Sinai Hospital. There is a form called the Hollister Form, which is filled out for each pregnancy, and it is used through out the entire prenatal program (which includes total 22 visits). The Hollister form is a primary form for an obstetrician (OB) to refer to patient's history before any kind of examinations. A copy of this Hollister form is mailed to Mt. Sinai Hospital, but sometimes it does not reach there successfully or it gets misplaced once there. Under these circumstances, it becomes more difficult for an OB to provide care for the pregnant woman who is about to deliver. Thus, both mother's and baby's lives can be endangered in this situation. Thus, this project challenged our team to find solutions that can both increase the quality of healthcare at ACCESS and also enhance their revenue by making the information more easily accessible.

Project Purpose

The perinatal treatment program is offered at thirty-three of ACCESS' community health centers and generates 2/3rds of the revenue for ACCESS health care. Thus our objective is to

enhance the perinatal treatment program in either the field of revenue or quality of care. Our main focus will be on the perinatal care treatment procedures and the technology that corresponds to these procedures. The main objective of this project is to improve ACCESS' perinatal treatment program by enhancing the information systems at ACCESS health centers.

The manual logs are a major problem in that the information is manually entered in logs, and this becomes quite tedious as the same demographics information is often entered in multiple locations. Maintaining these manual logs is also time-consuming, as it affects the efficiency of workers, the company's revenue, and the quality of healthcare. Currently, it is difficult and tiresome for ACCESS health center managers to produce monthly reports for their superiors. The complexity in producing reports makes it difficult for the administration to formulate meaningful statistics. To combat this problem, our team decided to create an automated information system that will allow employees to easily input and output the required information. Also, the system will have a feature that can produce reports on daily, weekly or monthly basis. Following the development of the system is the creation of users manual, training manuals and program, which are essential in helping the staff at ACCESS realize the value of the tool that this IPRO team will have created by the end of the semester.

Regarding the objective on the immunization process, ACCESS has been experiencing several problems. One of these problems is that guardians often fail to bring their children back to ACCESS centers for follow-up. This failure on the patient's behalf potentially leads to improper immunization of children. Improper immunization is late shots, identical shots offered to many times, or the most detrimental consequence, total lack of immunization. Therefore, the purpose of the immunization sub-team is to gather data and find the reasons why children are under and over immunized. With the data in hand, the sub-team will create ideal models for the

immunization process in the form of flowcharts and provide suggestions/recommendation on improving the process at ACCESS health centers.

Project Research Methodology

Following the work of last semester project and the new objective as mentioned above, the team was divided into two groups: computer science group (CS group) and immunization group. The goal of the CS group was to create a prototype of an automated perinatal care log. The group went to several ACCESS sites to gather all the forms used in the perinatal program. Then, the group learned what the perinatal process is and how each form is used and/or filled out. Afterwards, the group created some data models that represented each of the fields on all forms which would end up being the backend database. Then, the group investigated the different reports that would be generated. Adjustments were then made to the data models so that the group can capture all the information needed to generate all the reports. The Estimated Date of Confinement (EDC) report or delivery date report, which is the main report, was actually in the process of being updated within ACCESS. This made it hard to finalize the data models since the required input fields were changing. Once we had good idea of how the database was to be done, the screen interfaces were created. Adjustments on the look of each page were made in accordance to ACCESS's representatives. In addition, more information on the data fields was obtained so that the interface could use the dropbox input. We then refined the data model for the fields that had a limited range and/or a finite number of results. After the interfaces was refined and the database was built, the coding, which links the database with the interfaces, began. The databases included the following functionalities: patient search, case selection, patient information, lab logs and lab log report. With the prototype developed, a user manual was created to help users at ACCESS use the system more effectively. In addition, a training

manual was created to train users. The automated log system along with the manuals are to be tested at an ACCESS center before being distributed to all clinics.

The goal of the immunization group was to analyze the immunization process at several ACCESS centers and come up with recommendations for improvement of the process. The group decided to gather data on the immunization process by visiting as many clinics as possible. The data gather was used to create flowcharts describing the immunization process, starting from when the patient enters the clinics to when he/she leaves. Using these flowcharts from ten centers that we visited, we compared all the centers and presented their similarities and differences in a chart. Based on the analysis of the similarities and differences, we suggested an immunization process that we thought would be ideal for all centers to use. As we stated earlier, an ideal immunization process is one where all immunized children are properly entered into the record and they are followed-up properly and they are guaranteed to complete the follow-ups. Based on the data and analysis, we identified several problems that exist in the immunization processes at most ACCESS centers:

- 1. The Usage of TOTS*

The usage of Tracking Our Toddler's Shots (TOTS) software at ACCESS health centers has not reached its maximum potential. TOT is an immunization record sharing system developed by the Illinois Department of Public Health (IDPH). The system allows public and private health care providers to share the immunization records of Illinois residents. Besides keeping track of the shots a child has already received, TOTS forecasts immunization due dates based on the nationally recognized "Recommended Childhood Immunization Schedule." TOT is designed to help health care providers record, track and report their patients' immunizations. The

registry allows physicians to access patient records for information about immunizations administered outside their practices.

At all ten ACCESS health centers that we visited, TOTS is seldom used. From interviews of the site managers, we realized that the medical assistants, nurses and managers at the sites were still in the process of learning how to use TOTS as they enter their patient record. This lead to the incomplete entry of patient data and, consequently, ACCESS was unable to track all the vaccinations that a certain child received prior to that visit. In addition, as busy as the staff at these centers was, they found it hard to enter the record of every patient. To remedy this problem, we suggested the following:

- a. ACCESS nurses, medical assistants and site managers should be more familiarized with TOTS. This can be done by compiling a condense users manual based on the one supplied by the department of public health. The condense manual allows user to learn the most important features of the software, eliminating the tediousness of flipping through a hundred pages to find the right instructions.
- b. Most of the health centers that we went through had the TOTS computer in an area where it is out of the reach of the MAs or nurses. We proposed that the TOTS computer be put in the room where the shots were prepared for easier access.
- c. We proposed that one person should be in charge of the usage of TOTS per site so that all information is being entered correctly. This could help the patients immensely especially in the case of visiting multiple health centers. And to make sure that the person in charge of TOTS per site is doing their job, another person

in charge of the overall daily operations of the TOTS for all the centers was recommended.

2. *Patient Education*

We recognized throughout our research that patient education is most important in keeping children properly immunized regardless of how well TOTS is being utilized. Often, the guardians are not well informed about the seriousness of diseases like polio and measles because of insufficient patient education. Therefore, we put forth several proposal to improve patient education:

1. Since it is recognized that the Vaccine Information Statement (VIS), provided by the Center of Disease Control and Prevention, do not communicate to all the patients for various reasons such as illiteracy, not eye-catching, it is suggested that supplementary information be provided for them. For example, coloring books and a more colorful and less wordy information chart can be given to the patients and guardians at the time of visit.
2. If the doctor explains the importance of immunization with the help of pictures of diseases, the guardians will realize the grave consequences of lack of immunization.

There were more recommendations for the overall immunization process that were not included in this report

Team Organization

Throughout the semester our team was divided into two sub-teams to complete specific tasks. The CS sub-team members were Matthew Matute, Jason Resch, and Kumar Shah. They were assigned the task of developing the prototype of the Automated Log and Reporting system and implementing it at an ACCESS site for testing.

The immunization sub-team members were Clara Awosika, Reshma Marri, and Giang Vo. They were assigned the task of gathering data on the immunization process at various ACCESS centers and come up with an ideal model of the immunization process. This model will be recommended to the administration of ACCESS for implementation.

In addition, a training sub-team was created after midterm to focus on analyzing the TOTS training program provided by the Illinois Department of Public Health, development of the condensed TOTS users' manual and the users' manual for the Automated Log and Reporting System. Once the users' manual for the automated log system was developed, a training manual was created to help implementing the system at Hawthorne Family Health Center. The training sub-team members were Matthew Matute and Giang Vo.

Throughout the semester, we formed three sub-teams and focused on three objectives: developing a prototype for the Automated Log and Reporting System, analyzing the immunization process, and developing users and training manuals for the automated log system. By dividing into sub-teams, we were able to focus on the tasks and tackle them more effectively.

Barriers and Obstacles

The major obstacles our team faced involved the fact that the new members took time to settle and to learn what the project was about and what we were trying to accomplish. However, we were able to overcome this obstacle in a relatively short amount of time. This was possible by the experience of our team leader and the desire of new members to make a significant contribution. The other obstacle was that we were quite dependent on our sponsor for information, and although he was willing to meet with us whenever we needed him, there was lag time in between us realizing we needed certain information, and him returning to us with the information.

Results and Conclusions

Comparing to last semester when our project was first started, we have done a tremendous amount of work and obtained very good results. Our sponsor, team members, and faculty advisor were all quite proud of our accomplishments. Over the course of this IPRO we have developed the prototype of the Automated Log and Reporting System for the perinatal care program, the users and training manuals for it. We also gathered a significant amount of data on the immunization process and provide recommendations on how to improve this process so that children in the Chicago area can be better immunized. Our final deliverables included the prototype, immunization flowcharts, users and training manuals, as well as a presentation that details future objectives for this IPRO.

Recommended Next Steps

The next objective of the CS sub-team is to implement a working prototype at an ACCESS center as mentioned above. This objective is followed by testing, evaluating and improving the functional Automated Log System. If these two objectives are accomplished, the system will be implemented across all ACCESS centers. And with the training manual created, our next step is to create a training program. This training program is to ensure that a functional system is being utilized effectively by users at ACCESS.

As for the immunization sub-team, the recommendation will be presented to representatives of ACCESS and hopefully will be approved to be evaluated by their administration. We hope that the recommendations for improvement of the overall immunization process will be tested at a center.

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