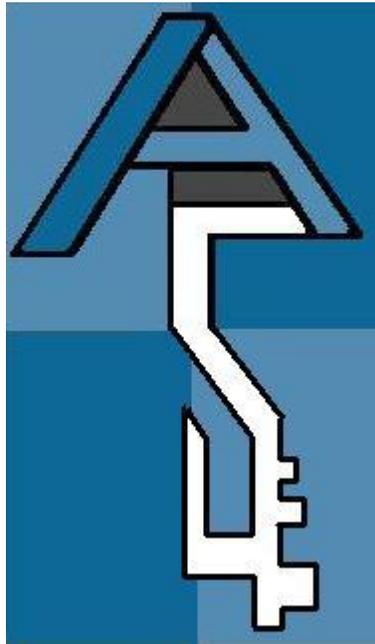


# **IPRO 340**

Design of a “Green” Community  
Healthcare Center

## **Sponsor Report**



**Team Access Success**

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## **1. Abstract**

Access Community Health Network provides medical services for the underinsured and uninsured public in the Chicago-land area. Three ACCESS facilities, Booker, Brandon, & Hawthorne, were investigated to see what can be done to improve the patient experience. Using two prototype floor plans and research material provided to us from the past two semesters' IPRO 340, the goal of this IPRO 340 was to improve the conditions of the three sites. The first part of the semester was dedicated towards researching what can be done to the current facilities. We then drafted new floor plans applying design principles from last semester's prototype along with those of sustainability, a healing environment, implementation of technology, lean principles and open communication. All of which mean to address the improvement of the patient experience as well as the overall efficiency of daily operation.

## **2. Background**

Access Community Health Network is the nation's largest association of community health centers, operating in over 50 locations in the medically underserved communities of the greater Chicagoland areas as well as Cook and DuPage counties. ACCESS serves over 210,000 patients annually, of which 76,000 are children. One third of these patients are completely uninsured, 50% have Medicaid, 11% have Medicare, and the remaining 7% have commercial insurance.

ACCESS services include general health care for families, medicinal, internal, and pediatric services. ACCESS also provides services involving schools, sports, and immigration physicals. Along with these services immunizations, Obstetric/Gynecologic care, and midwifery are available. ACCESS offers management of chronic disease such as diabetes, asthma, and high blood pressure. Low cost breast and cervical cancer screenings, mental health services, substance abuse treatment programs, HIV/AIDS counseling, testing, and primary care are also available through ACCESS.

ACCESS's mission is to provide high quality, cost effective, safe, and comprehensive primary and preventative health care for the underserved communities of Chicago. One problem that ACCESS faces is inadequate space for the services currently being provided, and for those that will hopefully be provided at all of these facilities in the future. Space constraints in the waiting area make it difficult to accommodate a large number of patients during peak daytime hours. This can result in extremely time consuming waiting periods that potentially extend visits to over an hour.

ACCESS is in the process of expanding their options for the delivery of care within their network. They look forward to cooperating with more hospitals and providing new services and space for new medical procedures currently under development. The ACCESS facilities of the future must be able to address the issues previously mentioned. As the geriatric population in the United States continues to grow there will be an increasing need for adequate services to provide patients within this age group, as well as continued care for children.

IPRO 340 began the semester with research of the previous semesters' final presentation of two building plans designed to allow for the best possible flow throughout the facilities, while meeting the needs for open communication between ACCESS employees. This semesters' IPRO 340 went about implementing those past two designs specifically into the three ACCESS facilities visited while also conducting more research on new medical technologies and previously unused technology in creative ways that were thought to be of great benefit to the ACCESS community. Research on the 'greening' of the centers through sustainable materials for floors, walls, furnishings, and skylights was focused on as well. The work conducted throughout

the semester focused on what can immediately be addressed, standards that must be met for each facility at their different locations, as well as the research that was conducted to allow ACCESS centers to continue providing for its patients the best quality health care while keeping LEAN principles in consideration with the new designs.

### **3. Objectives**

- Research the three current ACCESS sites at hand for improvements
  - o Witness firsthand the various issues present at each of the three ACCESS facilities
- Improve patient experience & overall efficiency of daily operation
  - o Renovate existing ACCESS sites by applying design principles from last semester's prototype along with sustainability, a healing environment, implementation of technology, lean principles, and open communication

### **4. Methodology**

Our updated Gantt Chart can be found in the appendix. As the semester progressed, it was constantly updated to match tasks needed to be completed and accomplished.

### **5. Team Structure & Assignments**

In the early phases of this project all members of the group dedicated many hours to research of both past IPRO 340 progress and final designs, as well as new ideas that were thought to be useful. Once underway with research conducted and information gathered every member contributed to all of the presentations conducted by the class. Once the final Project Plan was completed it was only a matter of designating group members to the different subgroups and assigning new tasks as they came up to the developed chart of the project breakdown. Listed below are the members of this team with a description of their group work, individual endeavors, and IPRO seminars attended.

Ernest Bellamy 5<sup>th</sup> year Architect: LEAN principles research and review, Hawthorne site visits, midterm presentation research and slides, cost estimations for Hawthorne, final brochures for IPRO day, slides for final presentation

Loren Bo 5<sup>th</sup> year Architect: State of the art research and review, sustainability research, slides for midterm presentation, Brandon site visits, scanning the floor plans, digitizing floor plans, cost estimation and phasing for Brandon, slides for final presentation

Lawrence Chung 3<sup>rd</sup> year Biomedical Engineer: State of the art research and review, project management workshop, project plan, information technology research, group logo design, Gantt charts for project plan, Booker site visits, Midterm presentation presenter, Booker site visits, continued updates of the Gantt chart, Booker site slides for final presentation, final presentation speaker

Danielle Di Pego 5<sup>th</sup> year Architect: State of the art research and review, Booker site visits, business planning workshop, picked up plans from Access, sustainability and patient experience research, code of ethics, provided lumicor sample for presentation, cost estimation and phasing for Booker, final poster

Pankti Gala 3<sup>rd</sup> year Biomedical Engineer: Reorganization & Implementation research, code of ethics, business planned workshop, Hawthorne site visits, analyses of timesheets,

timesheet slides for presentation, aesthetics group study and slides, time study research, abstract, final Sponsor Report

Crystal Glover 4<sup>th</sup> year Architect: Reorganization & Implementation research, LEAN process/process maps, Brandon site visits, midterm presentation presenter, proposed floor plans, bubble diagram analysis, Brandon flow diagrams, Gantt Chart updates, Brandon 3D rendering

Phaedra Howe 3<sup>rd</sup> year Biomedical Engineer: Reorganization & Implementation research, Project Plan, facility types research for presentation, aesthetics group research, furniture for renderings, flooring research and slides for final presentation, final Sponsor Report

Goldey Khanna 2<sup>nd</sup> year Chemical Engineer: State of the Art Technology research, questions for site visits, Hawthorne site visits, extensive Code of Ethics work, midterm presentation presenter, final presentation presenter

Jongpil Park 4<sup>th</sup> year Architect: Reorganization & Implementation research, LEAN research, Hawthorne site visit presentation, Code of Ethics, Booker floor plans, Booker 3D renderings, collection of furniture models for renderings, LEAN principle slides for presentation, Booker construction phasing, Booker flow diagrams, final presentation compilation

Sarah Wahlstrom Helgren 4<sup>th</sup> year Biomedical Engineer: IPRO 340 team leader, LEAN principles research and review, meeting plans & daily agendas, food planning, project plan, Brandon new design research, aesthetics research, final presentation presenter

Mary Yu 3<sup>rd</sup> year Biomedical Engineer: State of the Art Technology research, Infection control research and slide presentation, Team Charter, Hawthorne site visits, Hawthorne Time studies, final presentation presenter

Sungano Ziswa 5<sup>th</sup> year Architect: State of the art research and review, Infection control research, zbooker site visits, letter to Equipment Planner, CAD plan creation for Hawthorne, creating floor plans, Brandon floor plan renderings, final presentation creation & compilation

## **6. Budget**

A budget was required from the IPRO office to be estimated and requested at the beginning of the semester. The schedule for the semester was incomplete at the time the budget was due. Because the costs that would be spent by the IPRO 340 team were as yet unknown the budget was a blind guess. The team was worried about final presentation costs at the end of the semester, as well as the transportation for site visits. Due to these worries the transportation budget submitted was quite high. As the efforts to obtain an I-Go membership for the entire team were unsuccessful, the IPRO office suggested taxis instead. Most of the transportation budget therefore was used for individual team members' gas and one taxi ride for site visits.

The budgetary expenses, gas for individual members omitted, is listed below.

\$120 – food for the first sponsor visit following the midterm presentation.

\$50 – site visit to Brandon, via taxi.

\$42.84-student's current I-Go membership was used.

## **7. Results**

The results that were presented at IPRO day and to ACCESS are listed below. While some may belong in a specific category, for example technology or healing environment,

most of the resulting ideas from this IPRO were tied together and contain qualities from multiple, if not all of, the design designated design principles.

#### Technology:

- HEMOCUE B-Hemoglobin Photometer
  - This is a Hemoglobin A1C that is used to test patients for diabetes. A question posed at site visits asked what the most common ailment of patients at ACCESS was. A common and steadfast answer was diabetes, so the IPRO 340 team proposed this test for a cost effective and useful tool for ACCESS facilities.
- Originatics Smartleaf Computer
  - This computer is wall mounted with the ability to swing out on an extendable arm. This computer will be introduced in 2009 for production, and there is a model specifically designed for health care centers. A stainless steel keyboard would allow for easy wipe down and help repel bacteria, there are no buttons for bacteria growth, a smooth cover for the screen, and security measures to ensure only access to those who are permitted it. This computer would be useful for ACCESS to help with the transition from paper to electronic medical records and would allow for a patient to be shown records, images, and other information directly from the doctor.

#### Sustainability:

- Tubular Skylights
  - These skylights allow for a burglar-proof solution to natural lighting in a medical setting. They evenly disperse light throughout a room while blocking harsh light and UV rays as well as insulating from any heat loss or gain. These skylights provide a source of energy free light which can help cut down on a facilities electric bill. The IPRO 340 team suggested these lights for ACCESS based on site visits to facilities that had a limited amount of windows and for their safety and sustainability components. Natural light creates a better working environment and has been shown to increase working productivity and mood, which would hopefully help to improve patient/worker relations.
- Roof Reflectivity
  - This eco-friendly paint was designed to improve the reflectivity of a roof while also extending the life of a roof by ten years and reducing a buildings cooling bill by 50%. Its primer is composed partly of recycled rubber while the top coat contains microscopic spheres of glass which give the paint its high reflectivity property. The paint was suggested to ACCESS as a cost efficient measure to increase the sustainability of the ACCESS facilities and providing a measure to cut down on everyday costs of the business to allow ACCESS to utilize this saved money in a helpful way for their community.

#### Healing Environment:

- Spa Therapy

-This theory was utilized when choosing the color scheme and fabrics for the facilities'. Spa Therapy was a Pebble Project performed by the Medical School of Cornell University. Six different health centers were visited during this experiment to study patient experiences. It was concluded that the staff felt better with a working environment that brought natural and spa elements into the work area. It was also shown to improve patient and worker moods as well as communication above the staff, which in turn could improve the patient experience through the staff. Overall patient satisfaction was shown to increase when these natural and spa elements were implemented into the health centers, which was the objective of IPRO 340.

- Biophilia Hypothesis

-The Biophilia Hypothesis, conducted by Edward O. Wilson, states that humans have a natural affinity with nature rooted within the genotype. This means that humans enjoy being in an environment that contains elements of nature, and further studies have shown that such natural elements within an environment are healing and calming to individuals. For these reasons a color palette of earth tones and neutrals was chosen to provide patients of ACCESS with these calming environments to improve their experience with each ACCESS visit.

- Nora Rubber Flooring

-All Nora Rubber Flooring is made of recycled natural rubber materials, which is a rapidly renewable material. They are PVC free and contain all-natural fillers. The manufacturing process is low-waste, and all materials are packaged in renewable and recyclable materials. The floors are seamless across the floor and also eliminate seams between floor and wall to inhibit any bacteria growth. These properties of the floor show definite sustainability qualities of the flooring. Along with those properties the floor is extremely comfortable to stand upon and absorb noise very well, providing another quality for improvement of patient care.

- CF Stinson Fabrics

-The fabrics from CF Stinson were chosen for their antimicrobial properties, long life and resistance to wear and tear, and their sustainable manufacture and production processes. Along with the paint and flooring, the fabrics were chosen in earth and neutral tones to provide a natural element into the patient environment.

- Lumicor Wall Partition

-This decorative resin panel is ecologically harvested from sustainable crops to create an ambient design that brings exotic elements of nature into a design. The particular Kenyan Reed design was chosen to be used as a wall separating the bathroom doors from the waiting area in the Booker facility. It was proposed to incorporate the natural and soothing elements for a healing environment, as well as to provide a useful barrier for privacy from the bathroom area.

#### LEAN Principles:

- Patient Visit Time

-The entire philosophy behind these proposed designs was to improve the patient experience. A large portion of a patient's visit has been shown to be taken up with waiting periods. Waiting for the doctor and waiting for vitals prove to be the longest periods in a patient's entire visit. The basis behind LEAN principles is eliminating waste and reducing unwanted steps within a process. The designs implemented into the visited sites were geared towards reducing these times to get a patient in and out of the facility as quickly as possible. Not only would reducing a patient's individual visit allow them to return to their life more quickly, it would allow ACCESS to see more patients within a given day and ultimately, help more people.

#### Open Communication:

- Booker – There were two main problems observed at the Booker facility. The first being the receptionist area. Four windows for receptionists were currently open to the public, while only two were ever utilized by receptionists. The other two were used as desks for medical assistants. The other was a lack of open communication between staff areas. To accommodate the design principles the receptionist area was curved towards the entrance from the parking lot, with only two windows. The other two windows were closed off and partitioned with a half wall for privacy in the desk area. Open communication was created at Booker by designing an open office area and rearranging exam rooms to create this space. This design would hopefully allow patients to decrease time spent waiting and increase their satisfaction with their visit.
- Brandon - The receptionist desk and the medical assistants and doctor's offices were on opposite sides of the building. Currently, the Brandon facility used an intercom system to communicate which added to the noise level of the facility and could be somewhat annoying to both the staff and patients. In the proposed floor plan the receptionist desk, medical assistant offices, and doctor's offices were all combined into a single space located in the center of the building. Communication between the staff would be much easier and would hopefully help to improve the patient experience.
- Hawthorne – The biggest issue with Hawthorne was the bottlenecking that was occurring in four-foot wide corridors where patients and medical assistants would enter/exit from. In our proposed layout, we created a race-track flow where patients would enter one way and exit another. The doctor's offices were also moved towards the center of the facility to increase the communication between the doctors and medical assistants.

While designing floor plans for the facilities, it was important to keep in mind the ethical and moral issues. For example, while we wanted to create an open communication environment, we also needed to keep in mind that the patients, doctors, medical assistants, etc, had enough privacy of their own.

## 8. Obstacles

Due to the vast scope of this project, it was necessary that IPRO 340 first understood and defined the specific problem at hand, by setting discrete objectives that would be accomplished by the end of the semester. While we addressed this obstacle fairly early on in the semester, we could have prevented it completely by defining discrete objectives even earlier. By mid-semester, many group members were tardy to class and were designated tasks that would not be completed in time. In addition, we experienced a difficulty in scheduling site visits that would allow us to witness firsthand the various issues present at each of the three ACCESS facilities. However, with consistent communication with the site managers and coordinating with student's schedules, we were finally able to schedule the site visits.

Following an arduous effort of trip coordination, transportation to get to and from the sites became an issue as not many group members had access to a car. Instead, we used our budgeted IPRO funds as cab fare to conduct our site visits. There was also a lack of coordination amongst group members with regard to assignment execution, as there appeared to be a disconnect between individuals and the team as a whole who were working on the same task series. This applies to not only the content of the work that lacked homogeneity, but also extended to the media used for generating deliverables. Often there would be situations in which people would be using different programs to create or modify the same product, this would eventually end in compilation or translation conflicts between programs.

## 9. Recommendations

This IPRO 340 continued on last semester's work by focusing honing its efforts on improving patient care. A cost estimate for each site was conducted; however it was by no means an extensive study. A continuing IPRO could help ACCESS implement these proposed designs from the current team by researching in-depth the cost analysis of the designs and changes.

A cost analysis would be beneficial to ACCESS in that it would provide an estimate of just how much such proposed changes would affect the business. Research on how such building renovations would increase patient numbers and the reduction in the time a patients visit and time spent waiting would provide ACCESS with a calculated benefit to them in making such changes.

By using the work that we accomplished this semester, future IPRO 340 teams could provide renovation plans for other ACCESS facilities. They can also look into new communities where ACCESS sites could be built and provide a new prototype clinic that embodies the important design principles we have laid out for them.

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## 11. Resources

This semester, besides the required deliverables by the IPRO office, we were able to create a few other deliverables that can benefit Access as well as future IPRO 340s. All of the group members put in a lot of time and effort to create these deliverables.

Project Plan – Phaedra Howe, Lawrence Chung

Midterm Review Presentation Slides – Ernest Bellamy, Loren Bo, Lawrence Chung, Danielle Dipego, Pankti Gala, Crystal Glover, Phaedra Howe, Omaditya Khanna, Jongpil Park, Jessica Patera, Sarah Wahlstrom Helgren, Mary Yu, Sungano Ziswa

Abstract – Pankti Gala

Brochure – Ernest Bellamy, Mary Yu

Poster – Loren Bo, Danielle Dipego

Final Presentation Slides – Loren Bo, Lawrence Chung, Omaditya Khanna, Jongpil Park, Sarah Wahlstrom Helgren, Mary Yu, Sungao Ziswa

Meeting Minutes - Lawrence Chung

Ethics - Danielle Dipego, Pankti Gala, Omaditya Khanna, Jongpil Park

Final Reports – Pankti Gala, Phaedra Howe

Booker Floor Plan - Jongpil Park

Booker Renderings - Jongpil Park

Brandon Floor Plan - Crystal Glover

Bandon Renderings - Crystal Glover

Hawthorne Floor Plan - Ernest Bellamy, Sungano Ziswa

Hawthorne Renderings - Sungano Ziswa

## **12. Acknowledgements**

Steven Glass – Our sponsor came in on a few accounts to check our progress. Initially, while starting the project, we all had many ideas and each started researching different things. Steven Glass was able to narrow it down and told us where we should put our focus on. He also gave us many tips on how to present the material in a fashionable, time-limited way.

Jessica Patera – While being part of IPRO 340 last semester, she helped us tremendously. Attending many classes, group meetings, and consistently offering feedback to our work are just a few things she contributed.