Instructor Dr. Elie Geisler,

Unubold Chinzorig *Kendra Johnson*  
Carolyn Kos Hazel Michael * Nicole  
Valio
Diabetes

- An estimated 285 million people, corresponding to 6.4% of the world's adult population, will live with diabetes in 2010.
  - 25.8 million children and adults in the United States—8.3% of the population—have diabetes.
- Diabetes was the 5th leading cause of death in 2005
- Diabetes costs $185 billion dollars in 2010 (U.S.)
  - 2/3 of this cost is for in-patient care
- Patients can monitor diabetes treatment by periodically checking their blood glucose levels
Mount Sinai Hospital is located on the west side of Chicago.

The hospital facilities include a main building and a rehabilitation center.

Approximately 600 beds.

It primarily serves underprivileged patients in the surrounding community.
The Problem

• Telemedicine allows patients to send glucose readings to doctors via mobile devices

• IIT C.A.R.E.S. is collaborating with Mount Sinai hospital to decrease the costs and increase the quality of care for diabetes patients

• Target audience are underrepresented and low-income patients of Mount Sinai Hospital
First Phase Objectives

1. Study the feasibility of implementing mobile devices
   - Clinical Path
   - Administrative Path
2. Research recent technological developments for monitoring of chronic diseases
3. Utilize all team members skills
Research various medical devices to collect blood glucose readings and transmit to Mount Sinai

• Investigated stand alone devices and also mobile phone applications

Criteria:

• Easy to use interface
• Automatic transmission
• Online database
• Measures other vitals
At Home Care

Blood glucose device confirms reading to patient

Patient enters data into mobile phone application

Glucose device automatically collects vitals

Vitals transmitted to DESC

Clinician provides feedback to patient

At Home Care

Mt. Sinai Hospital

Patient measures vitals
## Blood Glucose Devices

<table>
<thead>
<tr>
<th>Devices</th>
<th>HealthPal</th>
<th>Glucotel</th>
<th>Telcare</th>
<th>Bayer Contour USB Blood Glucose meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measures other vitals</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Under 3 clicks</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>FDA approval</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Online database</td>
<td>HealthCOM</td>
<td>BodyTel Center</td>
<td>MyTelecare</td>
<td>Glucofacts Deluxe</td>
</tr>
<tr>
<td>Data availability</td>
<td>Patients &amp; Clinician</td>
<td>Patients &amp; Clinician</td>
<td>Patients &amp; Clinician</td>
<td>Patients</td>
</tr>
<tr>
<td>Our Choice</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
# Mobile Phone Applications

<table>
<thead>
<tr>
<th>APPS</th>
<th>Glucool</th>
<th>Log for Life</th>
<th>Glucose Meter</th>
<th>Glucose Buddy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Features</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platform</td>
<td>Android</td>
<td>iOS</td>
<td>Android</td>
<td>iOS</td>
</tr>
<tr>
<td>Online Database Sync</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Auto-Sync with Blood glucose meter devices</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Under 5 taps (to add data)</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Other features (++++)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Our choice</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
User Needs
Product Concept

DECS: Diabetes Electronic Support Center

Communication and Access to information

Clinician – Clinician Communication
- Establishes a clinician network
- Exchange information with other healthcare facilities
- Better patient diagnosis

Clinician – Patient Communication
- Comprehensive patient data
- Reduce visitation cost and time for patients
- Better patient diagnosis

Patient-Relatives Communication
- Establish familial support network
- Delivering positive reinforcement
Patient measures vitals

At Home

DESC

Vitals logged into patient record

System evaluates data

Alert patient of danger

No danger alert

Mount Sinai Hospital

Administered by a clinician

At Home

Patient measures vitals

DESC

Vitals logged into patient record

System evaluates data

Alert patient of danger

No danger alert

Mount Sinai Hospital

Administered by a clinician
<table>
<thead>
<tr>
<th>Description</th>
<th>DESC</th>
<th>Google Health</th>
<th>Cerner</th>
<th>Atrius</th>
<th>Versus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simplify &amp; Manage Official Medical Records</td>
<td>✔</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Simplify &amp; Manage Medical Information</td>
<td>✔</td>
<td>✔</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Connect Patients to Clinicians</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Connect Clinicians to Clinicians</td>
<td>✔</td>
<td>X</td>
<td>✔</td>
<td>X</td>
<td>✔</td>
</tr>
<tr>
<td>Home Access of Medical Information</td>
<td>✔</td>
<td>✔</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Remote Patient data tracking</td>
<td>✔</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Demo

www.wix.com/hmichae2/DESC
Overall Vision

Diabetes Electronic Support Center (DESC)

HOSPITAL SERVER
Integrate with Hospital's existing EMR database

Create an effective Network of Doctors

Allow for medical records to be mobile and transferable

Allow to accurately transcribe patient medical records for patient

Allow to effectively track patients
DESC outcomes

- Reduction in hospital visits by diabetic patients
- Cost reduction in diabetes treatment
- Improved quality of care
- Increased communication between clinician and patient
- Shift from paper records to electronic medical records
Ethics

- Started IRB requirement
- During the course of this IPRO, students will follow HIPAA policy to ensure privacy and security of patient information
- The Belmont Report
  - Respect for Persons
  - Beneficence
  - Justice
Obstacles

- Unable to meet with Mount Sinai Hospital during the summer 2011 semester
- Small group size
- Large amount of research
- Limited amount of time
Accomplishments

- Acquired knowledge about basic healthcare technology management for chronic diseases
- Solid foundation for Fall 2011 IPRO
- Completed project ethical evaluation
- Work in a multi-disciplinary team
Future of IIT C.A.R.E.S.

PHASE 1 - Summer 2011
• Research available technologies

PHASE 2 - Fall 2011
• Interview Mount Sinai administrators
• Perform trial experiment of chosen device to a group of 25 diabetic patients

PHASE 3 - Spring 2012 to Summer 2012
• Implement diabetic support center at Mount Sinai
• Administer devices to Mount Sinai diabetic patients
Citations

- http://www.medapps.com/HealthPAL.html
- http://www.telecarecorp.com/
- http://bayercontourusb.us/
- http://www.glucosebuddy.com/
- https://sites.google.com/site/glucosemeterandroid/home
- https://www.logforlife.com/
- http://www.glucool.com/
Questions?