Team Announcements
and
First team assignment

BIOE 435

Jenny Amos
Inputs to the Problems

- Observations
  - Videos
  - Shadowing

- Literature Review
  - PubMed

- Interviews
  - Doctors
  - Patients
  - Nurses
  - Engineers

Problem Identification
Resources for Clinic Preparation

• OR Live
  Surgery videos
  www.orlive.com

• Educate yourself
  – Anatomy
  – Procedure
  – Terminology

• Be prepared before you shadow
  – Eat food beforehand, often no time for breaks
  – Know who you contact is
  – Be punctual
The Patient Perspective

The patient

- What did the patient have to undergo in terms of pre-operative tests, appointments, etc., prior to the procedure?
- What time did the patient have to get up to prepare for the procedure?
- Was s/he allowed to eat the night before?
- What sort of preparation was required?
- Did the preparation have any negative or unintended side effects?
- What did the patient experience when s/he arrived at the hospital?
- How long did s/he have to wait?
- Was the patient taken to the operating room in a wheelchair or on a gurney?
- How long did the procedure take?
- What were the steps of the procedure and how long did each one take?
- Did the procedure require a general anesthetic?
- How much pain (or discomfort) did the patient experience during the procedure? Post-operatively? After discharge?
- What was involved in the post-operative process?
- What sort of bandage did the patient receive?
- Did the wound require dressing changes or drains?
- How often was the bandage changed/wound drained?
- Was a urinary catheter required?
- Was intravenous (IV) access required?
- Were there any complications that resulted from these procedures?
- How long was it before the patient could discontinue the drain, catheter, or IV?
- Are there any variations in the ways patients are prepared for, treated during, or cared for after a procedure, depending on the environment?
- Did the patient need to stay in the hospital overnight? For how many nights?
- Did the patient need any assistance after hospital discharge?
- What was the time required before the patient could resume normal activities?
The Provider Perspective

The provider
(physician, nurse, physician’s assistant, etc.)

- Who prepares the patient for the procedure?
- How many people are present in the operating room?
- What are their various roles?
- Does the same person perform the procedure from start to finish?
- Are practitioner staffing levels and roles the same across different environments?
- Why is work allocated across practitioners in this way?
- How long has this been the standard of care?
- How was the procedure performed before the current standard?
- What are the accepted primary limitations or difficulties associated with the current procedure?
- Do the devices (or other tools used in the procedure) perform as the providers want/need them to?
- How does the provider use the device?
- Does the provider appear confident using the device? Did the provider have difficulties using the device? Operating? Implanting it? How many hands were required to operate/implant/use the device properly (i.e., did the provider need assistance operating the device)?
- Did the provider make any errors while using the device?
- How much follow-up is required of the surgical provider(s) following the procedure?
- What are the most common complications associated with the procedure?
- Who treats the complications?
- How (and where) are they treated?
Other Perspectives

Others in the healthcare system (facility, payer, etc.)

- How much does the procedure cost?
- At what rate is the procedure reimbursed?
- Is the procedure profitable?
- What factors are most likely to drive up (or down) costs?
- How long does the procedure take to perform?
- What aspect(s) of the procedure take the longest to complete?
- How many resources are tied up as the procedure is being performed?
- What facilities (e.g., rooms) are tied up as a result of the procedure?
- Is the procedure performed in only one setting (e.g., operating room) or can it be performed in other venues (e.g., outpatient procedure or radiology lab)?
- What devices, equipment, or supplies are required to support the procedure?
- How much do the devices, equipment, and supplies cost?
- To what extent do they affect the profitability of a procedure?
- What risks do complications from the procedure present to the system?
- If there are complications to the procedure, who bears the cost?
Industry Methods

- Voice of Customer (VOC)
  - Voice of all Stakeholders
- Focus groups
- Personal interviews
- Observations
- Surveys
- Complaints/Requests
- Competition
- Thought leaders
- Summary data (such as incidence, prevalence, morbidity, & mortality)
- Basic Research (publications)
- Marketing data (such as features, price, benefits & differences)
  - Laws, standards, and regulations
  - Support groups
  - Intellectual property landscape
Resources

- Literature
  - PubMed, Harrison’s online, UpToDate, eMedicine
- Agency for Healthcare Research & Quality (AHRQ)
- Summary Data
  - HCUPnet, MEPS Data, US Census Bureau
- World Health Organization (WHO)
- Professional Societies
  - For example: American Heart Association
- Industry-specific news resources
  - Such as Medtech Insight, InVivo, Start-Up Magazine, and Qmed
Defining the Problem

• Evaluate problems based on the inputs
  – Why does the problem occur?
  – What are the possible explanations and causes?
  – What are the medical implications of the problem?
    • Anatomy, Physiology, Epidemiology, etc.
  – Who are the stakeholders? Who is impacted?
    – Patients? With what specific conditions?
    – Providers? What type, and in what specialties?
    – The overall healthcare system? In what ways? Other Stakeholders?
    • How are they negatively impacted?
      – Clinical outcomes, safety/risk, inconvenience, recovery time, ease-of-use, productivity, cost, etc.
      – How severe is the problem?
      – In what setting does the problem occur?
Defining the Problem

• Research the questions on the previous slide
• Also ask stakeholders for their perspective
  – Be particularly careful of potential biases
• Summarize the most important data gathered
  – Refine the Problem Statement as necessary
• IMPORTANT: It is too soon to begin thinking about solutions. Resist the tendency to allow solution biases to constrain your understanding of the problem
  • The problem statement should be a short narrative describing the problem, while staying free of solutions
Planning Exercises

• Define the current situation allowing for this project
  – Understand the process
  – Identify important variables
  – Quantify variables

• Identify areas for improvement
  – List and discuss each point
  – How will you address each point?
Now...teams!
About the Process

• Highest average rated project was BD then Innsight!

• There was one team that only made 2 people’s top 3...so we’re not doing it in this class
  – Illinois Disability Center Wheelchair Sensors
Carle Fall Risk

- Bara
- Janais
- Johannes
- Na-Teng
Jump Fracture Reduction Simulator

- Kunal
- Elizabeth W
- Samantha
- Drew Larson
OSF Neuro/ALS Trainer

- David K
- Varun
- Neal
- Jacob
Jump Pill Extractor

- Nick Pudik
- Tomasz K
- Ravi
- Nikhil
- Mallory
Siemens Catheter Lab

- Jackie
- Mariam
- Mia
- Partha
Siemens Physical Simulator

- Hiba
- Ida
- Sreyesh Satpahy
- Zeeshan
Bhargava Lab

- Madelyn
- Jennifer Z
- Miranda
- Graham Su
- Gali
Carle Strep Test

- Emilee
- Aashay
- Lauren S
- Andrew Carlson
- Hanway
BD Shunt

• Hannah
• Katherine
• Shreya
• Munim
• Alli LaHood
Carle PT Project

• Lily
• Ashok
• Jennifer M
• Ashley R
Insana Ultrasound

- Stanley
- Yoonho
- Pierce
- Ryan H
Dr Clare Breast Cancer

- Kareem
- Sherry
- Caroline
- Valeriya
- Gabrielle
Innsight

- Jasleena
- Nathaniel
- Daniel
- Cassie
- Thomas
Carle Gelfoam Imaging

- Paul
- Christian
- Kinsey
- Ryan
<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSEC</td>
</tr>
<tr>
<td>Qiaoyi</td>
</tr>
<tr>
<td>Kassidy</td>
</tr>
<tr>
<td>Jin</td>
</tr>
<tr>
<td>Daryl Drake</td>
</tr>
</tbody>
</table>
Get into your teams

1. Email your sponsor and set up meeting with client to interview

2. Upcoming lectures
   - 9/13 Needs Statements
   - 9/18 Inputs to Outputs/Product Specs

3. Component I: Presenting and Justifying a Problem and Solution Requirements Due 9/21

4. Team Schedule
   - Fill out your template as a team