Outpatient Scheduling for an Endocrinology Clinic

Moses Y. H. Chan, M.S.E.
Outpatient Scheduling for an Endocrinology Clinic

Moses Y. H. Chan, MSE
Amy Rothberg, MD
William Herman, MD, MPH
Amy Cohn, PhD
Collaborators

Faculty and Staff
Amy Cohn, PhD\textsuperscript{1,2}
Amy Rothberg, MD\textsuperscript{3}
William Herman, MD, MPH\textsuperscript{3}
Luis Garcia-Guzman, PhD\textsuperscript{2}
Rodney Capps III\textsuperscript{2}

Students
George Tam, MSE\textsuperscript{1,2}
Henry Ballout\textsuperscript{1}
Nathan Janes\textsuperscript{1,2}
Madalina Jiga\textsuperscript{1}
Anna Munaco\textsuperscript{1,2}
Nina Scheinberg\textsuperscript{1,2}
Eli Sherman\textsuperscript{1}
Jonathan Zhou\textsuperscript{1}

\textsuperscript{1} Center for Healthcare Engineering and Patient Safety, University of Michigan, Ann Arbor
\textsuperscript{2} Department of Industrial and Operations Engineering, University of Michigan, Ann Arbor
\textsuperscript{3} Department of Internal Medicine, University of Michigan Health System
Background

• 14.5% US adults moderately or severely obese (NHANES 2011 – 2012)
• High risk of chronic diseases
  – Diabetes, hypertension, coronary artery disease
• High cost
  – $245 billion for diagnosed diabetes (ADA 2012)
  – Over 1 of 5 health care dollars in US
Weight Management Program (WMP)

- 2-year program led by Amy Rothberg, MD
- Partnership with Blue Care Network
- Eligibility
  - BMI $\geq 32$ kg/m$^2$ with 1 or more comorbidities
  - BMI $\geq 35$ kg/m$^2$
WMP Protocol

- Regimented recurrent MD and Dietitian visits
  - Intensive caloric restriction for 12 weeks
  - Weight maintenance for rest of program
- Strict visit schedule for effectiveness
Current Scheduling Procedure

• Schedule one appointment at a time
• Schedule next appointment at check out
Challenges of Scheduling

- MDs booked 3 weeks out
- Patients not seen according to protocol

Goal

Ensure timely access

AND

Provide adequate capacity for patients to adhere to the program
Solution Approach

• Collected snapshots of appointment calendar
  – Since 07/2014

• Designed relational database

• Dynamically captured progression of patient appointments
# Database Design

<table>
<thead>
<tr>
<th>Appointment</th>
<th>View Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Time</td>
</tr>
<tr>
<td>6/2</td>
<td>09:00</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>New Patient</td>
</tr>
<tr>
<td>09:15</td>
<td></td>
</tr>
<tr>
<td>09:30</td>
<td>B</td>
</tr>
<tr>
<td>09:45</td>
<td>B</td>
</tr>
<tr>
<td>10:00</td>
<td></td>
</tr>
<tr>
<td>10:15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Return Visit</td>
</tr>
</tbody>
</table>
Average Provider Capacity to Accept New Patient
(01/01/2015 – 04/06/2015)
How many patients can follow the protocol schedule for the first two visits?

Open NP 119

RV available at booking NP appt 65 (54.6%)

RV still available at NP appt 9 (13.8%)

NP: New Patient
RV: Return Visit
(Data: 08/01/2014 – 02/01/2015)
Goal

Ensure timely access

AND

Provide adequate capacity for patients to adhere to the program
# Tag-on Scheduling

<table>
<thead>
<tr>
<th>Visit 1</th>
<th>Visit 2</th>
<th>Visit 3</th>
<th>Visit 4</th>
<th>Visit 5</th>
<th>Visit 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cancellations?**
Ongoing Research/Next Steps

• Understand dynamics of proposed scheduling guidelines
  – Simulation and Analysis
• Develop scheduling guideline
  – Covering cancellation and no-show
• Develop training materials
• Provide training to schedulers
• Implement proposed scheduling model
Acknowledgements

• Bonder Foundation
• The Doctors Company Foundation
• The Metabolism, Endocrinology & Diabetes (MEND) Clinic
• Blue Cross Blue Shield Michigan
• Center for Healthcare Engineering and Patient Safety (CHEPS)
• UM College of Engineering Summer Undergraduate Research in Engineering (SURE) Program
THANK YOU!

Contact Info:

mosesyhc@umich.edu
amycohn@umich.edu