Lean Healthcare Scheduling to Reduce Delays for Patients

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How can we make patient scheduling more lean?

- Two different settings:
  - 1. Radiology
  - 2. Behavioral Health

- Common problems and behaviors that incur waste

- Whose behavior?
Setting 1: Scheduling Blues in a Radiology Department

- **Patient 1:** CU60
  Needs 60 minutes of therapy once in the morning and afternoon

- **Patient 2:** CU20
  Needs 20 minutes of therapy

- **Patient 3:** PA10
  Needs 10 minutes of therapy

Emotion based scheduling
- Patient relationship
- Machine preference by therapists
  - E.g. M2 is a new machine, and patients that can be scheduled on M4 are still scheduled on M2
Mixed integer programming paves the way to the Optimal Schedule

**Objective:** Maximize machine utilization (serves more patients, reduces hourly therapists costs, reduces overtime)

**Decision Variables:** What type of patient to schedule on which machine

**Constraints:**
- CU20 and PA10 can be scheduled on M2, M3, M4
- CU60 can only be scheduled on M2 and M3, and must be scheduled once in the morning and once in the afternoon
- 1 machine can serve only 1 patient at any given slot

**Number of patient types**
- CU60 patients: Min: 1, max 2 per day
- CU20 patients: Min: 20, max 60 per day
- PA10 patients: Min: 20, max 60 per day

<table>
<thead>
<tr>
<th></th>
<th>With M4</th>
<th>Without M4</th>
<th>Util M4</th>
<th>Util XM4</th>
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</table>
Implications

Therapists being scheduled into overtime because of machine constraints

But machines are reasonably under utilized

Money Wasted

Unhappy Employees
Research Focus

- Optimal patient scheduling incorporating behavioral variations (Setting 1)
- Applying Lean to Patient Scheduling and Service
- How to change patient and provider behaviors? (Setting 2)
Lean Literature in Healthcare

Identifying Waste - Waiting

Waiting is idle time brought on by a lack of material, people, or equipment. This impacts both patients and organizations.

Example:

• Patients waiting to be accepted for treatment, waiting to obtain an appointment, to be seen, waiting for test results, waiting for physician…
• Waiting for availability of equipment / assets (rooms, beds)
• Waiting for all/appropriate resources to perform needed treatment

Waste of Waiting is the cost of an idle resource.

Slide: Courtesy Alacer Corporation, Seattle
Lean Promotes Respect for People

- Consumers are respected when:
  - Timely access
  - Providers show up and are on time for appointments
  - Provider listens and respects consumer desires
  - The service experience is helpful and effective
Respect for People

- Providers are respected when:
  - Consumers show up and are ready to engage
  - Consumers participate in treatments
  - Time and skills are utilized well
  - Work conditions are predictable and manageable
  - Able to deliver high-quality services
Focus: Creating More Capacity

- Lean Approaches (Setting 2, Behavioral Health)
  - Hire and onboard clinical staff more quickly to have servers ready and available (Two Lean events completed, December, 2012)
  - Monitored and changed behavior of consumers and providers
  - Reduced no-shows and cancellations
  - Reduced non-productive documentation time and enhanced the service experience
- How?
First Call to First Contact Across All Services

How long is it taking to reach each point of contact?
Staff Kept and Consumer No Show Rate

**Staff Kept Rate:**
- Reduce Staff Cancellations, which tend to increase Consumer Cancellations and No-shows

**Consumer No Show Rate:**
- Reduce Consumer No-show rate, which reduces provider utilization and number of consumers served

Goal 90% or Above

Goal 10% or Below
Leaning toward *Lean when*…

- By offering Same Day services, could get people in when they are ready for treatment.
- Show rates go up.
- Positive experience for the people involved.
- Eliminate delays in starting next appointment.
- More face-to-face time (value-added co-production), less documentation overhead (non-value-added)
- Valued clinical expertise in designing new scheduling process
How to *double* or *triple* the capacity for intakes

- 13 Clinicians, 125 consumers participated in 2-month pilot of *Collaborative Documentation*
- Clinicians do clinical notes *with consumer present* and have them review notes.
- More informative, inclusive for consumer as well as reduce non-value added after the consumer departed.
- Partnership between clinician and consumer.
- Required training of clinicians
  - Technology, electronic medical record system
  - Clinical and communication
New Consumers Admitted Increased 16%

Intakes by Month Past Year

*Apr 12-Aug 12 Pre NC and Same Day Access Implementation
*Aug 12-Apr 13 Post NC and Same Day Access Implementation

Changes from April 12’ to April 13’ Intakes per Month (Oct being 7th month or halfway point)

<table>
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<tr>
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<th>Apr 12-Oct 12 Avg</th>
<th>Oct 12-Apr 13 Avg</th>
<th>% Increase</th>
<th>Consumers Per Month Increase (on Avg)</th>
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<tbody>
<tr>
<td>Intakes</td>
<td>210 Intakes/Month</td>
<td>244 Intakes/Month</td>
<td>16%</td>
<td>34</td>
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Consumers Loved Collaborative Documentation

Consumer Responses to Survey

- 100% felt clinician did well introducing system.
- 98% felt more involved compared to past system.
- 96% would like to use this again.
- 90% felt it was helpful to review notes with clinician.
Staff Responded Positively

Staff Responses

- 92% felt that collaborative documentation was helpful to the treatment process, involved consumers more, improved paperwork proficiency.
- 77% felt it was easy to learn and 62% felt it impacted workplace satisfaction.
Results from Same-Day Access Project

- Average time from first call to intake was reduced
  - Appointments offered 6 days earlier on average
  - 9-day lead time reduced to 3 days (67% improvement)
  - Actual arrival for intake occurred 7 days earlier on average
  - 12-day lead time reduced to 5 Days (58% improvement)
- Staff kept rate is ideal (92% overall)
- Target no-show rate (better but currently 17% overall).
- Capacity appears to have increased
- 34 consumers more per month from Oct 2012 to Apr 2013 compared to previous 7 month period.

Successful pilot. Try with more staff.
Continued Research

- Experiment with models that incorporate behavior and preferences
- Radiology models: Add variables, validate with providers, incorporate realistic preferences, increase provider engagement
- Behavioral Health: Incorporate simulation to experiment before reconfiguring clinics, introduce additional modeling and projection techniques
It’s about Access and Effectiveness

- Key Lean principles
  - Reduce waste
  - Respect for people
- Applying models and projections in real-world clinical practice

- Part 1: Lean approaches (this session)
- Part 2: Healthcare Systems and OM/DS
  - Sunday, November 17, 1:30 -3:00, Room: Chasseur
  - Healthcare Practitioners View,
  - Mental Health Center of Denver
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