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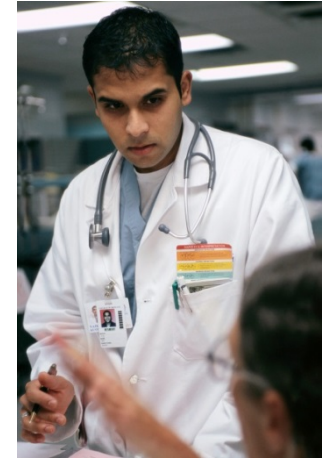
44th Annual Meeting
November 16 - 19, 2013


Lean Healthcare Scheduling to Reduce Delays for Patients

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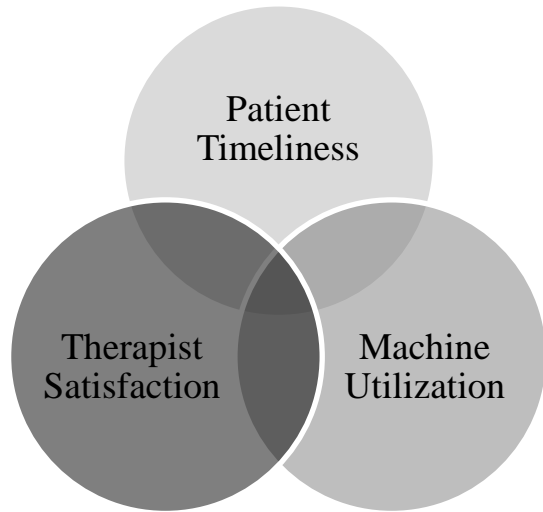
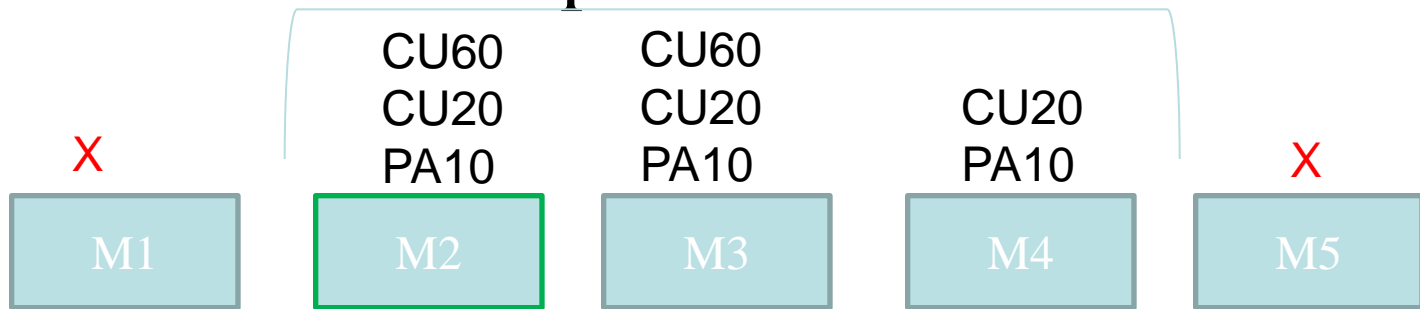


How can we make patient scheduling more lean?

- 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



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

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

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

With M4	Without M4	Util M4	Util XM4
102	102	0.596491	0.894737
113	Not possible	0.660819	NA
101	101	0.590643	0.885965
108	108	0.631579	0.947368

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

- Graban, M. (2011), *Lean Hospitals: Improving Quality, Patient Safety, and Employee Satisfaction*.
- Sayer, N. and Williams, B. (2012), *Lean for Dummies, 2nd Edition*.
- Homolo, R. and Fuller, J. (2008), Team admission: Changing the way we work, *American Journal of Nursing*.
- LaGanga, L.R. (2011). “Lean service operations: Reflections and new directions for capacity expansion in outpatient clinics”, *Journal of Operations Management*.
- Radnor, Z. (2011). Implementing Lean in Health Care: Making the link between the approach, readiness and sustainability. *International Journal of Industrial Engineering and Management*.

Identifying Waste - Waiting

Waiting

Overproduction

Rejects

Motion (Excess)

Processing (Over)

Inventory

Transportation

Skills

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

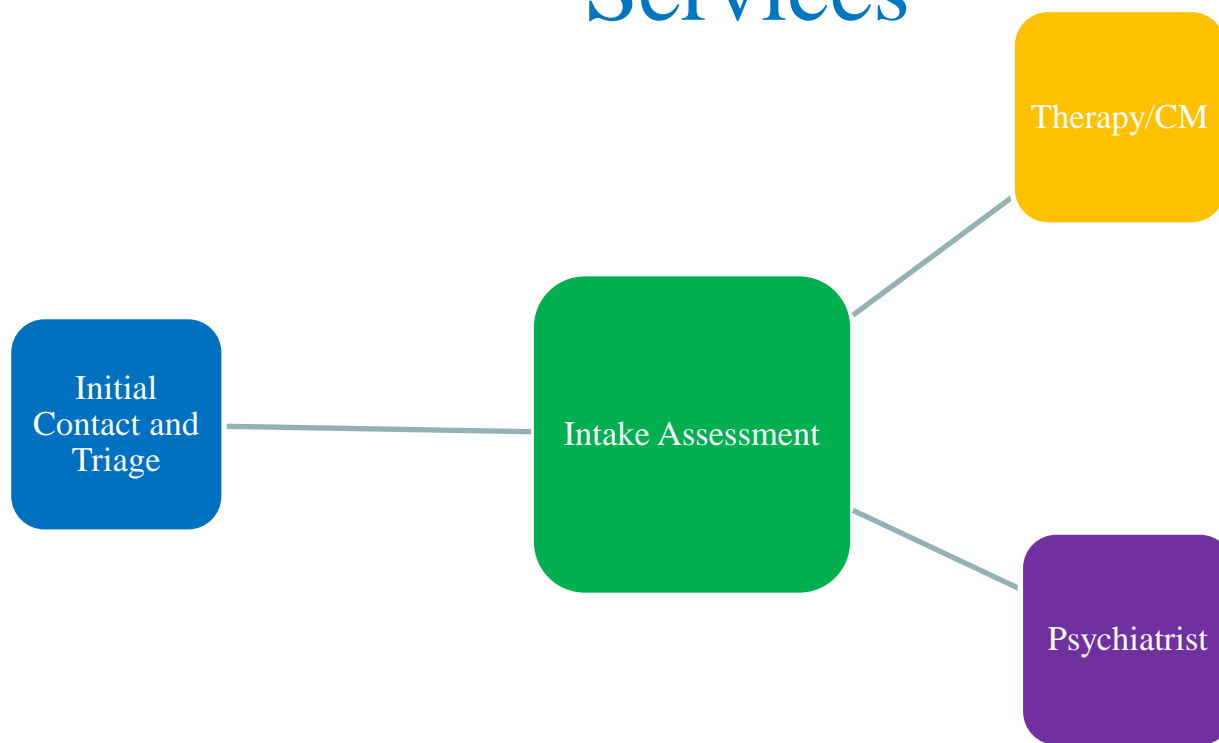
- Providers are respected when:
 - Consumers show up and are ready to engage
 - Consumers participate in treatments
 - Time and skills are utilized well
 - Work conditions are predictable and manageable
 - Able to deliver high-quality services



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)
 - Same-day Scheduling National Learning Collaborative (August, 2012 – July, 2013)
 - 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?

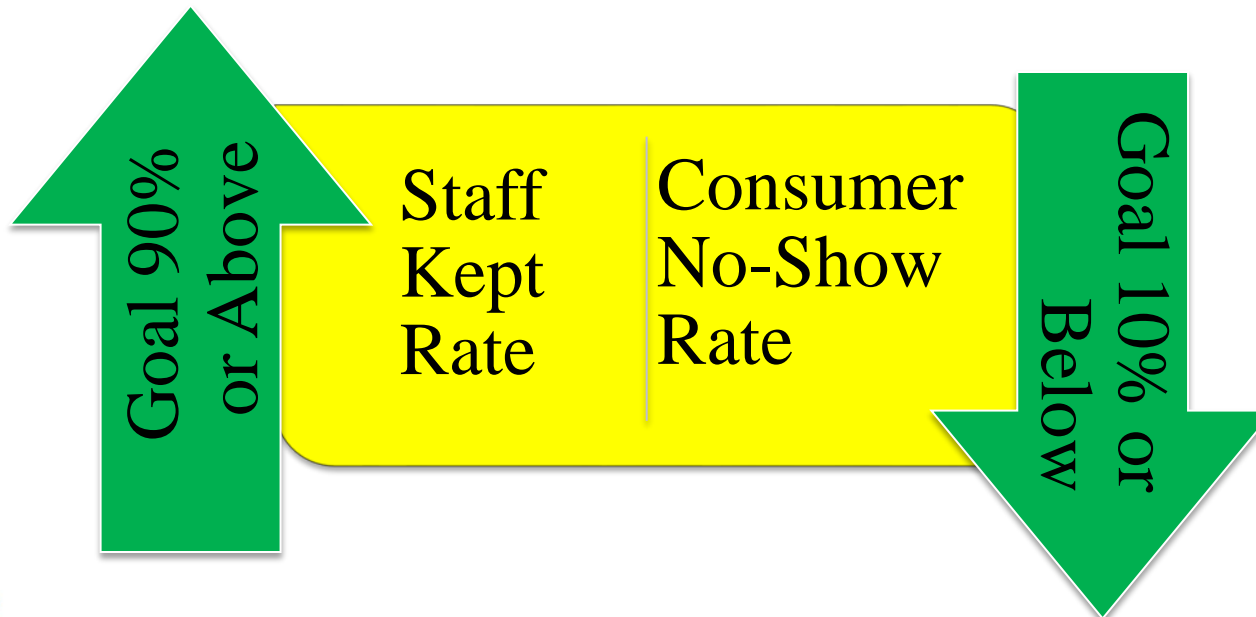
Staff Kept and Consumer No Show Rate

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





Leaning toward *Lean* when...

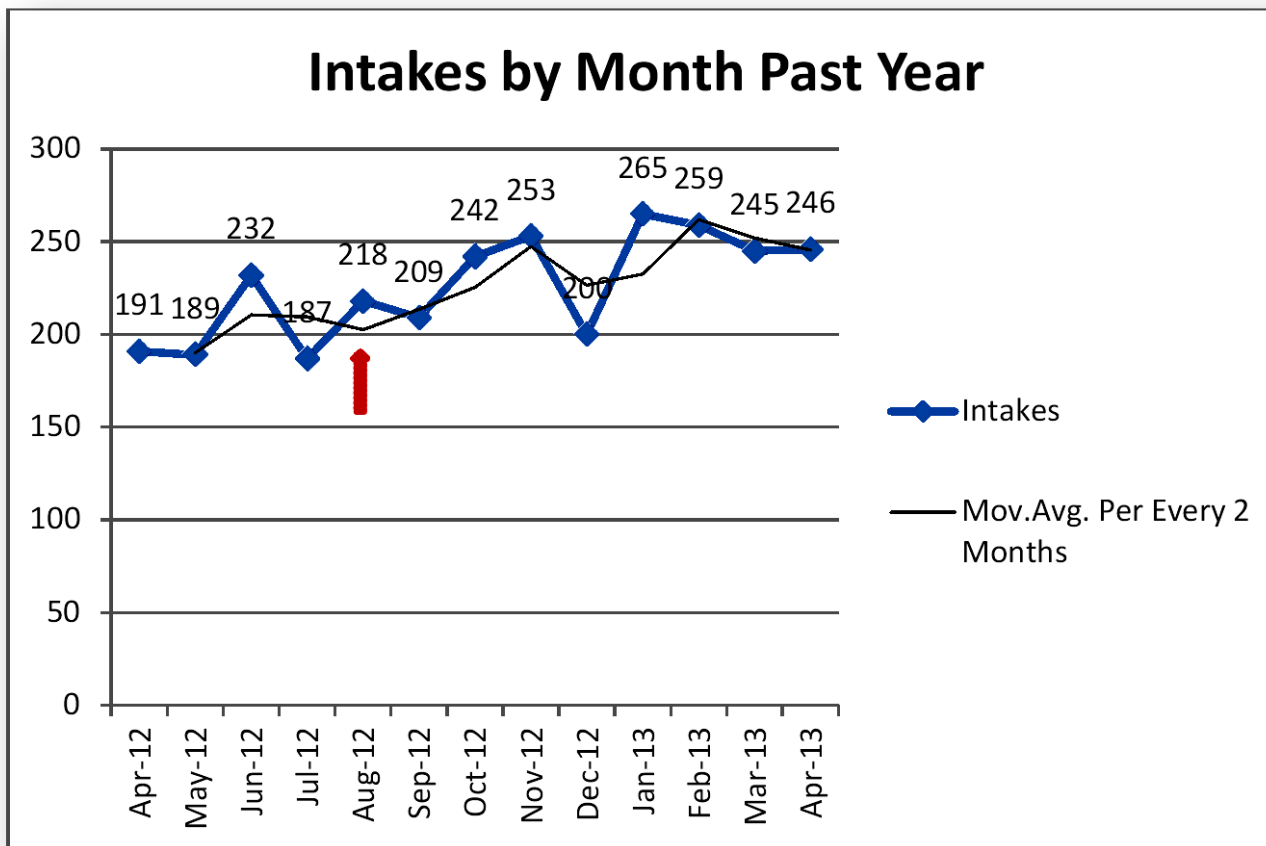
- By offering Same Day services, could get people in when they are ready for treatment.
- Show rates go up.
- Positive experience for the people involved.
- Eliminate delays in starting next appointment.
- More face-to-face time (value-added co-production), less documentation overhead (non-value-added)
- 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%



*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)

Apr 12-Oct 12 Avg	Oct 12-Apr 13 Avg	% Increase	Consumers Per Month Increase (on Avg)
210 Intakes/Month	244 Intakes/Month	16%	34

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Consumers Loved Collaborative Documentation

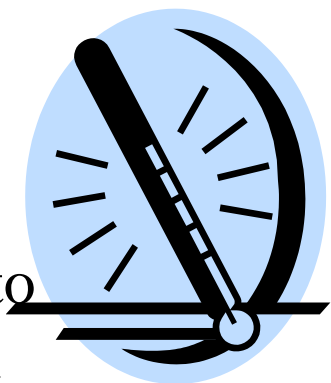
Consumer Responses to Survey



- 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 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



Questions?
Comments?

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