Lean Six Sigma:
Redesigning the Cancer Care Delivery Process

2014 Community Oncology Conference
Disclosure

- Medical Directorship, The US Oncology Network, compensated
A Typical Oncology Clinic
(Does this sound familiar?)

- **8:00**: 5 Treatment Nurses on site, 2 Scheduled Chemo Starts
- **8:00**: 1 Phlebotomist, 10 patients waiting to be drawn
- **9:00**: 2 Admix Techs, 30 Admixtures queued
- **9:15**: 6 Scheduled OVs, 2 Roomed Patients
- **10:00**: 5 Treatment Nurses, 6 Scheduled Chemo Starts, 9 Patients waiting
- **11:00**: 5 Physicians, 4 more than 30 minutes behind
- **12:00**: 5 Hungry Treatment Nurses, 1 able to take a lunch break
- **16:00**: 20 Chemo Chairs, 3 Patients being treated
2007 Baseline Study Results from two US Oncology Network Clinics

Complete Medical Record Available for Physician = 88%
Lab Report Available On Time for Physician = 44%
Complete Physician Order Available – Admixture = 71%
Complete Physician Order Available – Chemo = 82%

Processes are Defective an average of 1 Out of 5 Times, creating…
### Staff Inefficiency (lost productivity)

#### Distribution of Activities

<table>
<thead>
<tr>
<th>Role</th>
<th>VA</th>
<th>VE</th>
<th>NVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Oncologist</td>
<td>62%</td>
<td>3%</td>
<td>35%</td>
</tr>
<tr>
<td>Infusion Nurse</td>
<td>46%</td>
<td>21%</td>
<td>33%</td>
</tr>
<tr>
<td>Medical Assistant</td>
<td>17%</td>
<td>11%</td>
<td>72%</td>
</tr>
</tbody>
</table>

**VA = value add, VE = value enabling, NVA = non-value add**

**Significant Non-Value Added Activity of “Waiting And Searching”**
# Patient Frustration

## Clinic Wait Times as % of Total Time

<table>
<thead>
<tr>
<th>Type of Encounter</th>
<th>Wait Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection only patient</td>
<td>75%</td>
</tr>
<tr>
<td>Lab patient</td>
<td>67%</td>
</tr>
<tr>
<td>Office visit</td>
<td>62%</td>
</tr>
<tr>
<td>Chemo treatment</td>
<td>28%</td>
</tr>
</tbody>
</table>

**For Most Encounters, Greater Than 50% Of Time In The Clinic Is Spent Waiting**
Lean Six Sigma defined...

✔ A methodology to systematically improve the reliability and speed of processes by controlling the variables that create variation and slow execution

✔ “Six Sigma processes” will have no more than 3.4 errors per million opportunities

✔ Humans (even physicians!) typically operate around 3 Sigma, resulting in 68,600 errors per million opportunities
A Structured Approach to Problem Solving

1. Define
   - Define the process and/or problem

2. Measure
   - Measure current performance

3. Analyze
   - Statistically find root causes

4. Improve
   - Mobilize change

5. Control
   - Sustain Improvements
An Unmeasured Process Is An Uncontrolled Process
“The Chief Complaint”

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How do we **Diagnose** and **Treat** these problems and **Restore the Good Health of this patient (clinic)?**
Diagnosis

1. Collect Data!
   - Determine where your clinic’s bottlenecks are.
   - Where do patients spend the most time waiting?

2. Determine the root cause(s)
   - Channel your inner toddler... ask Why? Why? Why? Why?
   - Is the lab draw a bottleneck? (extremely common)
   - Treatments delayed by patients coming late from their OV?
   - Do physicians double-book? Arrive hours late from rounds?
   - Do patients often arrive/check-in late to their appointment?
Treatment

- **Ensure lab is never a bottleneck**
  - Have sufficient draw chairs and phlebotomists to match demand throughout the day

- **Balance physician schedules across times of day and days of the week**
  - Make physician schedules reflect reality
  - Stagger physician start times
  - Strategically place new patient consults

- **Smooth the chemo schedule to achieve a similar balance**
  - Schedule new infusion patients on non-peak days
  - Use shorter and/or less variable treatments to balance daily treatments
  - Use dedicated resource to handle injection only patients

- **De-couple Office Visits and chemotherapy treatments when possible**
  - Considering the burden on the patient, offer de-coupled visits for more predictable visit duration, less waiting, better care.
Outcomes & Surveillance

- **Outcomes**
  - Reduce wait times and realize the potential for one-on-one care from the nurses
  - Increased patient satisfaction leading to greater growth potential through increased referrals and patient retention
  - Optimize clinical staff capacity to allow for current volumes as well as potential growth
  - Improve employee satisfaction by eliminating re-work and creating a balanced and safe workload throughout the day

- **Surveillance**
  - Find simple and attainable metrics to track indefinitely
  - Add the metrics to manager’s performance objectives
  - Report and discuss them on a regular cadence

Do something with the data…
Resolve issues when you find them.
Tales from the Process Improvement Files
Case Study #1: No Vacancy…

9 oncologists are sharing 11 exam rooms. They want to improve efficiency by building an additional 7 rooms.

- Time to 1st appt >10 days
- MD schedules as low as 11 patient slots/day
- Lab cycle >30 minutes
- Patients routinely miss financial counseling due to long wait times

- Add 2 exam rooms
- 21 slots/day open on MD schedules
- Stagger physician clinic days and times
- Optimize staffing in critical areas

- Time to 1st appt <6 days
- 100% seeing financial counselor
- Lab cycle time < 15 minutes

New patient volume up 6%
Labor cost/visit down 4%
Case Study #2: Too Much Vacancy…

Define

Radiation Clinic with 3 Linacs has relatively poor productivity

- Productivity - 1.07 treatments/RTT labor hour
- Capacity 55%
- Patient wait time – 5 to 12 minutes
- Patient cycle time – 9 to 22 minutes
- Circle of Work – 29% VA, 45% VE, 26% NVA

Measure

Analyze

- Computer model a 2 Linac scenario, and various process improvements
- Projected capacity 82.8%

- Mothball oldest Linac
- Standardize Linac treatment scheduling
- Implement flexible staffing schedules
- Upgrade Linac to improve throughput

Improve

- Reduce staff
- Reduce maintenance contract costs
- $474,000 cost savings
Case Study #3: Too Many Cooks...

Define

Scheduling, registration and patient flow are slow and frustrating for patients and staff

- Multiple people involved in scheduling a visit
- 5 minute wait for check-in
- 20 minute wait for Lab
- 50 minute average wait for office visit
- Patients often leave without scheduling Next Appointment

Measure

- Eliminate steps and hand-offs in patient flow
- Single person schedules entire appointment for a single visit
- Re-deploy scheduling staff to other processes

Analyze

- Patient wait time decreased by 31%
- No wait at Check-In
- Consistent Next Appointment process

Improve

- Improved productivity
- Patient visits/FTE up 17%
Accumulated Knowledge Base

**Care Delivery**
- Medical records / incoming records
- Patient intake
- Patient availability (i.e., appt definition)
- Scheduling, unit & logic
- Physician capacity & utilization
- Physician orders

**Revenue Cycle**
- Patient intake
- Financial counseling process
- Patient eligibility
- Charge capture

**Referral Development**
- New patient slot availability
- Issue resolution
- Targeted sales planning (Tier A, B, C customers)
- New patient intake process

**Drug Management**
- Timely physician order
- Establish par level / drug
- Document waste
- Daily charge reconciliation

THE "Critical Few" Variables to be Controlled
Documented Best Practices

- Patient intake process
- Definition of an appointment
- Scheduling
- Medical record process
- Lab capacity optimization
- Lab scheduling
- Report delivery
- Physician templates
- Physician order
- Chemo room scheduling
- Care Delivery Model
- Physician capacity tool
- Nurse capacity tool
LSS Improves Practice Efficiency and Value

Practice Financial Value Driven or Supported by LSS

<table>
<thead>
<tr>
<th>Year</th>
<th>Dollars in Millions</th>
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<tbody>
<tr>
<td>2007</td>
<td>$6</td>
</tr>
<tr>
<td>2008</td>
<td>$18</td>
</tr>
<tr>
<td>2009</td>
<td>$30</td>
</tr>
<tr>
<td>2010</td>
<td>$26</td>
</tr>
<tr>
<td>2011</td>
<td>$15</td>
</tr>
<tr>
<td>2012</td>
<td>$23</td>
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The Formula for Success…

Trust in the methodology

Labor intensive

Commitment of time, effort, and resources

A lot of Lean Six Sigma jargon

Wait for the Conclusion

More secure, safe, and productive future for our patients and our practices
Success Factors

 Key leadership elements – MD leadership is ESSENTIAL

 PLUS…a core TEAM of leadership from management and clinical staff combined with participation and input from ALL levels of the staff

 Process Improvement is COMPREHENSIVE – Quality and Efficiency are inseparable

 Process Improvement is a JOURNEY – There are goals and successes, but there is NO ENDPOINT

 Process Improvement requires a commitment to CHANGE, and change is never popular unless everyone thinks it is their idea!
To learn more about Lean Six Sigma:

[Image of Lean Six Sigma book]

[Image of Lean Healthcare Transformation Summit 2014]

[Image of Lean Enterprise Institute]

[Image of Integrative Systems + Design, University of Michigan]