Lean Six-Sigma to Reduce Cycle Time and Inventory
### PSC Day Time Testing

#### Business Case

Patient samples are drawn during the day at patient service centers. The lab to continue to drive down operating costs. The lab has the opportunity to surpass the competition in the Long Island market place by offering same day testing to our clients.

#### Problem Statement

- 37% of our clinical requisitions are collected at the patient service centers.
- Only 7% of our routine clinical requisitions are entered in the lab system by 5:00 pm. 30% of our employees work the 2nd & 3rd shifts.
- Lab space and equipment are under utilized during the 1st & 2nd shifts.

#### Define: Team Charter

#### Scope

| Start: | When a patient has their sample taken at a patient service center |
| Stop:  | When the specimen is resulted. |

#### Goal

Collect, process and result 90% of the patient service center clinical work by 6:00 pm.
Voice of the Customer

Client: Specimens collected today need to be reported to the doctor by tomorrow morning at 8am for routine testing.

Patient: I don’t want to wait more than 15 minutes for my specimen to be collected.
<table>
<thead>
<tr>
<th>Phase Description</th>
<th>PSC Daytime Testing Phase 1</th>
<th>Accessioning in the PSC Pilot</th>
<th>Accessioning in the PSC Roll Out</th>
<th>PSC Daytime Testing Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1 (Nov 2004 - Sept 2005)</td>
<td>Focus on Getting PSC Specimens Delivered and Accessioned by 5 pm</td>
<td></td>
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<tr>
<td>Phase 2 (Sept 2005 - Jan 2006)</td>
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<td>Pilot Accessioning in the PSC</td>
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<tr>
<td>Phase 3 (April 2006 - July 2006)</td>
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<td>Roll Out Accessioning in the PSC to all PSCs</td>
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<tr>
<td>Phase 4 (June 2006 - Oct 2006)</td>
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<td></td>
<td></td>
<td>Focus on Testing and Reporting of PSC Specimens by 6 pm</td>
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</tbody>
</table>

Multi-Generational Plan to Accomplish Day Time Testing
PSC Day Time Testing

Measure – Current State Value Stream Map
Improvement – Future State Value Stream Map

Collect Pat Paperwork
Collect Specimen
Specimen Processed
Computer System Entry
Specimen Pick Up
Lab Sys Entry
Lab Testing

Current State could take 12 hours for the specimen to get processed

Future State would ensure better flow, QC earlier in the process and shorter TAT
Most of our PSCs open by 6am. By 2:00 pm 89% of patients have signed in at the PSC. These specimens can be tested and resulted the Same Day!
Typical PSC Patient Sign in Volume by Hour.
Volume in the PSCs are the heaviest in the first half of the day.
PSC Day Time Testing

Innovative Improve – PSC Changes

Specimens being processed at the PSC in the second half of the day!!
Need to have ready earlier for pickup by courier.

Analyze - Challenges

- Computer System
  - Becomes rate limiting step when PSC is busy
  - Varying levels of proficiency by PSC employees

- Staffing
  - High Turnover/Too long to fill positions
  - 6 day/10 hour operating hours

- Communication
  - 36 different locations

Innovative Improvements

- Process Change - Every patient must be entered in Computer prior to draw
- Evaluation of Skills of Clerical and Phlebotomy staffing – Added additional Computer units and training
- Replace positions with clerical employees in large PSCs
- E-Mail made available to all PSCs for communication
- Individual patient service center level measures on specimens available at pickup
Analyze - Challenges

- **Flow**
  - Need multiple pick ups at the 36 locations in order to level flow into accessioning

- **Service**
  - Need to maintain service level on STAT testing service

- **Communication**
  - Ability to be flexible depending on PSC Readiness
  - Need to identify differences in STAT testing and routine PSC samples

Innovative Improvements

- Shared Goals created – Goalsharing targets for daytime testing impact all employees
- Accessioning staffing moved earlier to handle new volume
- Nextel phones in all PSCs for checkpoint prior to pickup.
- 2 additional daytime routes added for sweeps of the PSCs and STAT pickups
PSC Day Time Testing

Analyze: Flow

Cedarhurst to Riverhead approximately 65 miles

Long routes with large amounts (batches)

Dense Geographic Region of Patient Service Centers
PSC Day Time Testing

Cedarhurst to Riverhead approximately 65 miles

Shorter routes with smaller amounts coming in more often – Continuous Flow
PSC Day Time Testing

Control – Monitor Daily PSC Delivery

PSC Samples Delivered By 5 pm
Logistic Count
February 2005 - Present

Source - Logistic courier count

Goal 90%

PSC Staffing
Stabilized

UCL=0.854174
CEN=0.836644
LCL=0.819115

Additional 2 Routes Added

Afternoon Ice/Snow Storm

PSC Staffing Crisis

PSC Staffing Stabilized

Continue to Improve on PSC Specimen to Lab Delivery-
Currently at 84% by 5pm!
PSC Day Time Testing

Sept & Feb Avg Mon-Fri PPC Data

Number of A & D entries

Volume Shift from Beginning of Project
Control Chart of Percent Accessioned by 5 pm
Increased from 8% to 18%!
PSC Day Time Testing

Innovative Improve – Laboratory Testing & Resulting

- PSC Draws Blood & Processes
- Logistics Picks Up & Delivers to Accessioning
- Accessioning Processes Specimens
- Lab Processes & Results

Measure Created to Evaluated % of Key Test TAT resulted by 6:00 pm. Testing and Reporting will be addressed in Phase 2 of Day Time Testing Project

Analyze Challenges

- Staffing
  - Technologist positions difficult to fill
  - Flow into laboratory

- Reporting
  - Need Information at client level to measure impact
  - VOC needed

Innovative Improvements

- Create Day Time testing TAT measure
- Monitor Key Test TAT by hour for accessioned and resulted
- Greenbelt project started on Reporting Mechanisms by Client
Control Chart of Chemistry & PT Testing
Accessioned by 5 pm and Resulted by 6 pm
Long Island has increased processed samples by 5:00 pm from 7% to 19% since September. The first milestone goal of 30% has moved up 3 hours.

<table>
<thead>
<tr>
<th>Time</th>
<th>Sep-04</th>
<th>Apr-05</th>
<th>% of total</th>
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<tbody>
<tr>
<td>Oct 25</td>
<td></td>
<td>4/25</td>
<td></td>
</tr>
<tr>
<td>Oct 26</td>
<td></td>
<td>4/26</td>
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<tr>
<td>Oct 27</td>
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<td>4/27</td>
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<tr>
<td>Oct 28</td>
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<tr>
<td>Oct 29</td>
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<tr>
<td>7:00-8:00</td>
<td>6</td>
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<tr>
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<tr>
<td>5:00-6:00</td>
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</tr>
</tbody>
</table>

Total: 10,959 10,719
Daily Lab Service Grid Includes Daytime Testing Measures

1. Delivered
2. Accessioned
3. Key Test Result
4. Accessioning in PSC

Business Unit Daily Metrics Indicates Prior Days Performance on Daytime Testing and Accessioning at the PSC
PSC Day Time Testing

Define Tools

- Charter
- Voice of the Customer
- Critical to Quality CTQ
- Multi Generational Plan
- Value Stream Mapping
PSC Day Time Testing

Measure Tools

- Data Collection Plan
- Bar Charts
- Control Charts
Analyze Tools

- Value Stream Map
- Box Plot
- Cause & Effect Diagram (Fishbone)
- Graphs, charts
- Value Stream Mapping
PSC Day Time Testing

Improvement Tools

• Brainstorming
• Employee Involvement
• Continuous Flow
• Reduction of Batches
• Reduction of Waste (Waiting/Inventory)
• Load Leveling
### Patient Service Center Daytime Testing Executive Summary

<table>
<thead>
<tr>
<th><strong>Problem Statement/Defect Definition:</strong></th>
<th><strong>Results:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROBLEM STATEMENT:</strong> 37% of our clinical requisitions are collected at our PSCs. Only 7% of our routine clinical requisitions are accessioned by 5:00 pm. 30% of our employees work the 2nd &amp; 3rd shifts. Lab space and equipment is under utilized during the 1st &amp; 2nd shifts</td>
<td><strong>Baseline</strong></td>
</tr>
<tr>
<td><strong>DEFECT DEFINITION:</strong> A specimen that is collected in our PSC that is not delivered to the laboratory by 5pm.</td>
<td>DPMO: 276,064</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Key Root Causes/Solutions:</strong></th>
</tr>
</thead>
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<tr>
<td><strong>Primary Root Causes</strong> - not entering into computer system upfront before patient is drawn. Logistics not delivering to lab during the day.</td>
</tr>
<tr>
<td><strong>Solutions:</strong> Process Changes in PSCs. Addt’l logistics routes. Balance of clerical to phlebotomist. Shift changes in processing department.</td>
</tr>
<tr>
<td><strong>Process Improvements:</strong> Nextel radios for PSC communication. Feedback to PSC on performance.</td>
</tr>
</tbody>
</table>

### Key Learnings/Issues Pending:

- Measures should be created before a project starts for a multi-departmental endeavor.
- Patient wait time was the primary inhibitor to PSC change.
- This stopped some of the progress made by other departments.