Kaizen Events:
Achieving Rapid Improvement in Healthcare Settings

Society for Health Systems
Orlando, FL
February 21, 2008
Building a Lean Enterprise

Optimal Organizational Performance

Customer Loyalty

FLOW

Performance Metrics | Value Stream Alignment
Setup / Batch Size Reduction | Pull Systems | Work Balancing & Level Loading
Multi-functional Workers | Co-location / Cells
Visual Management & 5S | Standard Work | Quality at the Source
Root Cause Analysis | Metrics-Based Process Mapping

Motivated Workforce

Daily Kaizen & Kaizen Events

Value Stream & Waste Identification

Customer-Defined Value

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KAIZEN

Kai
Break apart
To change

Zen
Study
Make better

EVENT
Rapid Improvement
Improvement Roles

Who? Accountability Tool

Strategic

Leadership "What has to happen" Value Stream Mapping / A3

Middle Management

Tactical

Workforce "How it will happen" Kaizen Events
**Value Stream Defined**

**Value Stream**: All of the activities, required to satisfy a customer need from request to receipt.
Typical Healthcare Value Stream

**Start**

- Need Determined
- Appointment or Admission Scheduled

**“Pre-Production”**

- Patient Arrival / Admission
- Evaluation & Testing
- Diagnosis & Treatment
- Patient Discharged

**“Production”**

- Payment Received

**End**

- Claim Submitted
- Patient Follow-up

**“Post-Production”**
Individual vs. System Performance

Systems focus = Optimal value stream performance

Isolated pockets of excellence = sub-optimization risk
**Current State** Value Stream Map
Outpatient Imaging Services

Customer Demand:
15 patients per Day
(Takt Time = 32 minutes)
8 hours per day

**Lead Time** = 5 mins.
% C&A = 75%

Customer Demand:
15 patients per Day
(Takt Time = 32 minutes)
8 hours per day

**Lead Time** = 10 days

**Value Stream Champion**: Paul Scanner
Created July 19, 2005
Key Metrics: Time

- **Process time (PT)**
  - The time it takes to actually perform the work, if one is able to work on it uninterrupted
  - Includes “think” time if process is analytical in nature
  - aka “touch time,” work time, cycle time

- **Lead time (LT)**
  - The elapsed time from the time work is made available until it’s completed *and passed on* to the next person or department in the chain
  - aka throughput time, turnaround time, elapsed time
Value Stream Lead Time vs. Process Time

\[
LT = PT + \text{Delays}
\]
Process Block Lead Time vs. Process Time

Lead Time

Process Time

The time it takes to do the work

Work passed to next step

Work Received

LT = PT + Delays
Key Metrics: Quality

- %Complete and Accurate (%C&A)
  - % time downstream customer can perform task without having to “CAC”:
    - Correct information or material that was supplied
    - Add information that should have been supplied
    - Clarify information that should have been clear
Activity Ratio (AR)
- The percentage of time work is being done to the product passing through the process
- \( AR = \frac{PT}{LT} \times 100 \)
- \( 100 - AR \) = Idle time

Rolled First Pass Yield (RFPY)
- \( \%C&A \times \%C&A \times \%C&A \times \ldots \)
- Out of 100 occurrences, what percentage of the time does the product pass through the entire process error-free?
Future State Value Stream Map
Outpatient Imaging Services

Customer Demand:
15 patients per Day
(Takt Time = 32 minutes)
8 hours per day

Lead Time = 45 mins.
Cycle Time = 3 mins.
% C&A = 90%

Pre-register
Cycle Time = 1 mins.
% C&A = 98%

Schedule appr.
Pre-register
Cycle Time = 1 mins.
% C&A = 98%

Risk Reduction
(Joint Commission)

Refer Patient
(Physician)
% C&A = 85%

Receive
Reports
Cycle Time = 1 mins.
% C&A = 98%

Outpatient Imaging Services

Schedule appr
Pre-register
Cycle Time = 1 mins.
% C&A = 98%

Prep Patient,
Conduct Exam,
Transmit Images
Cycle Time = 28 mins.
% C&A = 95%

Check-in
Patient
(Imaging)
Cycle Time = 5 mins.
% C&A = 98%

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Cycle Time = 5 mins.
% C&A = 98%
## Outpatient Imaging Improvement Results

<table>
<thead>
<tr>
<th>Metric</th>
<th>Current State</th>
<th>Projected Future State</th>
<th>% Improvement</th>
</tr>
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<tbody>
<tr>
<td>Lead Time</td>
<td>32.5 hrs</td>
<td>11.4 hrs</td>
<td>65%</td>
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<tr>
<td>Process Time</td>
<td>56 Mins</td>
<td>49 Mins</td>
<td>13%</td>
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<tr>
<td>Activity Ratio</td>
<td>2.9%</td>
<td>7.1%</td>
<td>145%</td>
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<tr>
<td>RFPY</td>
<td>30%</td>
<td>59%</td>
<td>97%</td>
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<tr>
<td># steps</td>
<td>11</td>
<td>8</td>
<td>27%</td>
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<tr>
<td>Report rework</td>
<td>25%</td>
<td>10%</td>
<td>60%</td>
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<tr>
<td>Tech Morale</td>
<td>Poor</td>
<td>Good</td>
<td>Significant</td>
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## Future State Implementation Plan

<table>
<thead>
<tr>
<th>Block #</th>
<th>Goal / Objective</th>
<th>Improvement Activity</th>
<th>Type</th>
<th>Owner</th>
<th>Implementation Schedule (weeks)</th>
<th>Date Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Improve quality of referral</td>
<td>Implement standard work for referral process</td>
<td>KE</td>
<td>Sean O’Ryan</td>
<td></td>
<td>Complete</td>
</tr>
<tr>
<td>3, 4</td>
<td>Reduce lead time between scheduling and preregistration steps</td>
<td>Cross-train and colocate work teams</td>
<td>PROJ</td>
<td>Dianne Prichard</td>
<td></td>
<td>Complete</td>
</tr>
<tr>
<td>5, 6</td>
<td>Eliminate the need for two patient check-ins</td>
<td>Collect copays in Imaging</td>
<td>KE</td>
<td>Michael O’Shea</td>
<td></td>
<td>Complete</td>
</tr>
<tr>
<td>6</td>
<td>Eliminate bottleneck in waiting area</td>
<td>Balance work / level demand</td>
<td>KE</td>
<td>Dianne Prichard</td>
<td></td>
<td>Complete</td>
</tr>
<tr>
<td>9</td>
<td>Eliminate lead time associated with transcription step</td>
<td>Implement voice recognition technology</td>
<td>PROJ</td>
<td>Sam Parks</td>
<td></td>
<td>Complete</td>
</tr>
<tr>
<td>10</td>
<td>Eliminate batched reading</td>
<td>Reduce setup required</td>
<td>KE</td>
<td>Sam Parks</td>
<td></td>
<td>Complete</td>
</tr>
<tr>
<td>7</td>
<td>Reduce inventory costs, regulatory risk and storage needs</td>
<td>SS CT supplies area; implement kanban</td>
<td>KE</td>
<td>Michael O’Shea</td>
<td></td>
<td>Complete</td>
</tr>
<tr>
<td>12</td>
<td>Reduce delay in report delivery</td>
<td>Implement additional fax ports</td>
<td>PROJ</td>
<td>Martha Allen</td>
<td></td>
<td>Complete</td>
</tr>
<tr>
<td>12</td>
<td>Reduce delay in report delivery</td>
<td>Increase percentage of physicians receiving electronic delivery (rather than hard copy)</td>
<td>KE</td>
<td>Martha Allen</td>
<td></td>
<td>Complete</td>
</tr>
</tbody>
</table>

### Approvals

<table>
<thead>
<tr>
<th>Executive Sponsor</th>
<th>Value Stream Champion</th>
<th>Value Stream Mapping Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature:</td>
<td>Signature:</td>
<td>Signature:</td>
</tr>
<tr>
<td>Date:</td>
<td>Date:</td>
<td>Date:</td>
</tr>
</tbody>
</table>
A two- to five-day focused improvement activity during which a sequestered, cross-functional team designs and **fully implements** improvements to a defined process or work area, generating rapid results and learned behavior.

Karen Martin & Mike Osterling

*The Kaizen Event Planner, 2007*
Kaizen Events: Defining Characteristics

- Typically linked to a value stream map
- Aggressive, *measurable* objectives
- Sequestered cross-functional team (100% focus)
- Short duration: 2-5 *consecutive* days
- Professionally facilitated
- Emphasis on the elimination of unnecessary *non-value-adding* activities
- Low cost
  - Define and exploit the “technical boundaries” of existing resources
  - “Creativity before capital” thinking
- *Rapid Implementation* (*during the event*)
  - Not simply planning for change
ACTION!
Examples of Healthcare Kaizen Events

- Patient flow
  - Imaging
  - Emergency Department
  - Surgery
  - OB/GYN
  - Cardiac

- Ancillary services
  - Lab / pathology turnaround

- Administrative
  - Payroll
  - Recruiting/hiring process
  - Claims
  - Medical Records
  - Physician Credentialing

- Space
  - 5S Nursing areas
  - 5S Laboratory
## 5-Day Kaizen: Sample Structure

<table>
<thead>
<tr>
<th>Day 1 &amp; 2</th>
<th>Plan</th>
<th>Analyze current state and perform root cause analysis; design future state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 3 &amp; 4</td>
<td>Do, Check</td>
<td>Design &amp; test improvements using Lean tools; obtain buy-in</td>
</tr>
<tr>
<td>Day 5</td>
<td>Check, Act</td>
<td>Finalize improvements; train process workers and affected stakeholders; provide closeout briefing; CELEBRATE!</td>
</tr>
</tbody>
</table>
Interim Briefings to Leadership

- Every day or two
- Team presents their ideas; leadership assures team has considered all options and thought through all implications
- Leadership’s role – not to say “no”
  - To say “Have you considered this?” “How would we handle…?” “What if…?”
- Workforce grows stronger as they learn how to identify and eliminate waste
- Leadership grows stronger as they’re able to shift their focus to strategic planning, performance monitoring, and coaching staff.
Kaizen Event Phases

Planning  4-6 Weeks Prior

Execution  2-5 Days

Follow Up  4-8 Weeks Post
<table>
<thead>
<tr>
<th>Event Scope</th>
<th>Leadership</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value Stream</strong></td>
<td><strong>Executive Sponsor</strong></td>
<td><strong>Dates</strong></td>
</tr>
<tr>
<td><strong>Event Name</strong></td>
<td><strong>Value Stream Champion</strong></td>
<td></td>
</tr>
<tr>
<td>Outpatient Imaging</td>
<td>Sally McKinsey</td>
<td></td>
</tr>
<tr>
<td><strong>Specific Conditions</strong></td>
<td><strong>Facilitator</strong></td>
<td></td>
</tr>
<tr>
<td>CT Scans</td>
<td>Dave Parks</td>
<td></td>
</tr>
<tr>
<td><strong>Process Trigger</strong></td>
<td><strong>Team Lead</strong></td>
<td></td>
</tr>
<tr>
<td>Referring physician</td>
<td>Sean Michaels</td>
<td></td>
</tr>
<tr>
<td><strong>First Step</strong></td>
<td><strong>Event Coordinator</strong></td>
<td></td>
</tr>
<tr>
<td>Referring physician</td>
<td>Ann Marie</td>
<td></td>
</tr>
<tr>
<td><strong>Last Step</strong></td>
<td><strong>Event Boundaries &amp; Limitations</strong></td>
<td></td>
</tr>
<tr>
<td>S1,000 budget</td>
<td>No major program changes to Medi-Tech</td>
<td></td>
</tr>
<tr>
<td><strong>Event Drivers / Current State Issues</strong></td>
<td><strong>Team Members</strong></td>
<td></td>
</tr>
<tr>
<td>1. Losing patients to new outpatient imaging center</td>
<td>Function</td>
<td>Name</td>
</tr>
<tr>
<td>2. Referring physician complaints re: slow report turnaround</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3. Patient dissatisfaction re: &quot;hassle factor&quot;</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4. 100% tech turnover in 6 months</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Event Goals and Objectives</strong></td>
<td><strong>Potential Deliverables</strong></td>
<td></td>
</tr>
<tr>
<td>1. Improve quality of referral from 65% to 90% (38% improvement)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2. Eliminate patient check-in at admitting</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>3. Reduce LT for report sign-off from 16 hrs to 7 hrs (65% improvement)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>4. Reduce waiting area time from 3 hrs to 30 mins (83% improvement)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Potential Deliverables</strong></td>
<td><strong>On-Call Support</strong></td>
<td></td>
</tr>
<tr>
<td>1. Standard work for referral process / patient education piece</td>
<td>Function</td>
<td>Name</td>
</tr>
<tr>
<td>2.</td>
<td>1</td>
<td></td>
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<tr>
<td>3.</td>
<td>2</td>
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<td>4.</td>
<td>3</td>
<td></td>
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<tr>
<td>5.</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Possible Obstacles</strong></td>
<td><strong>Approvals</strong></td>
<td></td>
</tr>
<tr>
<td>1. Potential Joint Commission surprise audit</td>
<td><strong>Executive Sponsor</strong></td>
<td></td>
</tr>
<tr>
<td>2. No backup if a non-team member tech calls in sick</td>
<td>Allen Ward</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td><strong>Value Stream Champion</strong></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Sally McKinsey</td>
<td></td>
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<tr>
<td>5.</td>
<td><strong>Facilitator</strong></td>
<td></td>
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<tr>
<td>6.</td>
<td>Dave Parks</td>
<td></td>
</tr>
</tbody>
</table>

**Signature:**

**Name:**

**Date:**
Scoping: Refining the Focus

Imaging

Outpatient

Nuc Med
MRI
CT
X-Ray

Inpatient

Nuc Med
MRI
CR
X-Ray
Kaizen Event Facilitator Traits

- **Skills / Knowledge**
  - Lean tools
  - Root cause analysis
  - Project & time management
  - Team building / facilitation
  - People effectiveness – from front line workers to execs

- **Authority / Respect**
  - Designated change agent / influence leader
  - Trustworthy
  - Comfortable removing obstacles & reaching out to senior leadership

- **Personality / Energy**
  - Challenging, yet supportive
  - Positive, upbeat, energetic
  - Pushy without irritating 😊

- **Objectivity / Fairness**
  - No attachment to outcome
The Kaizen Team

- The single greatest determinant of event success
- No more than 10
- Cross-functional composition
  - Process workers
  - Upstream suppliers (internal)
  - Downstream customers (internal)
  - Subject matter experts
  - Outside eyes
  - External suppliers / contractors
  - External customers
  - Administrative support (if needed)
  - Union representatives (if relevant)
  - Maintenance / facilities representatives
  - Management (limited representation)
- Sequestered; Must be relieved of regular duties

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Kaizen Event Phases

Planning
4-6 Weeks Prior

Execution
2-5 Days

Follow Up
4-8 Weeks Post
Team Dynamics

Forming → Storming → Norming → Performing → Adjourning

Tuckman Model
Bruce Tuckman, 1965
Kaizen Commandments – “Top Twelve”

1. No interruptions from outside the Event.
2. No veto power from outside the team.
3. Rank has no privilege.
4. Abandon departmental / silo thinking.
5. Finger-pointing has no place.
6. Avoid scope creep.
7. Use creativity before capital.
8. Think “yes, if…” instead of “no, because…”
9. Get good data, then add experience and “instinct” to the mix.
10. Seek the wisdom of ten rather than the knowledge of one.
12. Improvements implemented today are better than planning to implement in the future.
Execution Phase Activities

- Document the Current State
- Perform Root Cause Analysis
- Brainstorm and Prioritize Improvements
- Design the Improvement(s)
- Test the Design(s)
- Finalize the Design(s)
- Implement the Improvement(s)
Execution Phase Activities

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Go to Gemba

Spaghetti Diagrams
  - Calculate motion / transportation costs and productivity losses

MBPM

Videotape

Product samples

Floor plans / blueprints

Photos

Process measurements
What to Look for at Gemba

- “Waste walk”
- Workplace organization
- Variation in how the work is performed
- Work-in-process
  - Quantity, oldest in queue, “problem” work, etc.
- Layout
  - Where people are located relative to their upstream suppliers and downstream customers
  - Where people, equipment, and supplies are located relative to each other
- Ergonomic concerns
- Environmental issues – noise, temperature, air quality, etc.
First, Seek to Understand: Go to Gemba
The Cost of Unnecessary Motion

- Distance traveled to printer
  - Work Group A = 92 ft. per occurrence
  - Work Group B = 696 ft. per occurrence
- 120 occurrences / day = 4,656 miles/year
- Walk pace = 1 mile per hour = **582 days/year** of unproductive, non-value-adding time = **2.2 FTEs**
Understand the Current State:
Metrics-Based Process Mapping (MBPM)

<table>
<thead>
<tr>
<th>Role</th>
<th>Actions</th>
<th>PT (min)</th>
<th>LT (hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales Rep</td>
<td></td>
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<tr>
<td>Warehouse</td>
<td></td>
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</tr>
<tr>
<td>Account Manager</td>
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<td>Order Entry</td>
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<table>
<thead>
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<th>Action</th>
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## Future State Projected Results

<table>
<thead>
<tr>
<th>Metric</th>
<th>Pre-Defined Performance Metrics</th>
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<tbody>
<tr>
<td></td>
<td>Current State</td>
<td>Projected Future State</td>
<td>Desired Direction</td>
<td>Projected Improvement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value</td>
<td>Units</td>
<td>Value</td>
<td>Units</td>
<td>Up</td>
</tr>
<tr>
<td>Critical Path PT Sum</td>
<td>140.0 minutes</td>
<td></td>
<td>65.0 minutes</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>Critical Path LT Sum</td>
<td>2325.0 minutes</td>
<td></td>
<td>405.0 minutes</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>Activity Ratio</td>
<td>6.0 %</td>
<td></td>
<td>16.0 %</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>Rolled First Pass Yield</td>
<td>23.8 %</td>
<td></td>
<td>75.3 %</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td># of Activities</td>
<td>16 activities</td>
<td></td>
<td>8 activities</td>
<td></td>
<td>☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Metric</th>
<th>Staffing Metrics</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current State</td>
<td>Projected Future State</td>
<td></td>
<td>Projected Change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value</td>
<td>Units</td>
<td>Value</td>
<td>Units</td>
<td></td>
</tr>
<tr>
<td>Sum of Total PTs</td>
<td>155.0 minutes</td>
<td></td>
<td>65.0 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occurrences per Year</td>
<td>37500 occurrences</td>
<td></td>
<td>37500 occurrences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staffing Requirements</td>
<td>46.6 FTEs</td>
<td></td>
<td>19.5 FTEs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Execution Phase Activities

- Document the Current State
- **Perform Root Cause Analysis**
- Brainstorm and Prioritize Improvements
- Design the Improvement(s)
- Test the Design(s)
- Finalize the Design(s)
- Implement the Improvement(s)
Root Cause Analysis
Waste is a symptom.
Causes often lie very deep.
Must discover the root cause to:
  - Avoid band-aid fixes
  - PERMANENTLY eliminate the waste.
Key Root Cause Analysis Tools

- Five Whys
- Cause-and-Effect diagrams (aka Fishbone or Ishikawa diagrams)
- Check Sheets / Pareto Charts
Execution Phase Activities

- Document the Current State
- Perform Root Cause Analysis
- **Brainstorm and Prioritize Improvements**
- Design the Improvement(s)
- Test the Design(s)
- Finalize the Design(s)
- Implement the Improvement(s)
Execution Phase Activities

- Document the Current State
- Perform Root Cause Analysis
- Brainstorm and Prioritize Improvements
- Design the Improvement(s)
- Test the Design(s)
- Finalize the Design(s)
- Implement the Improvement(s)
Standardize Work

Order Entry

1. Find Order Received from Machine
2. Go to Sales Order Entry Screen
   a. Start the entry process by clicking on the new page symbol in the upper left-hand corner.
   b. Find Customer Number by clicking onto the magnifying glass next to customer name. A list will then appear giving customer names and numbers. Pick the appropriate customer from this list.
   c. To ensure that you have the correct customer account, click on the FT Address tab on the Sales Order Entry page, and the Bill To Address will appear. Verify that this matches the Bill to on the PO.
   d. Enter PO number and then hit the Green Check to accept the data.
3. At this point the account could go on Hold. (The words Credit Hold will appear at the top of the page)
   a. If you are on the phone with the customer, inform them of the problem and let them know that it can be cleared up by contacting the Accounts Payable Department.
   b. If this is a faxed order contact Accounts Payable to find out why the customer might be on hold and then notify the customer of the problem.

Outpatient Procedures Guidelines

Florida Hospital
Install Kanban

OK

Time to Replenish
Organize the Workplace

BEFORE

AFTER
Execution Phase Activities

- Document the Current State
- Perform Root Cause Analysis
- Brainstorm and Prioritize Improvements
- Design the Improvement(s)
- Test the Design(s)
- Finalize the Design(s)
- **Implement the Improvement(s)**
- Celebrate!
Training must occur **within the Kaizen Event itself**.

Therefore, it must be innovative

- Stand-up sessions at the work site
- Multiple offerings in a conference room
- Conference call sessions
- Voice mail blasts
- Web-based support
- Email blasts (NEVER sole training method!)
- Designated mentors
## Kaizen Event Report

<table>
<thead>
<tr>
<th>Executive Sponsor</th>
<th>Allen Ward</th>
<th>Event Name</th>
<th>Purchase requisition review process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Stream Champion</td>
<td>Sally McKinsey</td>
<td>Event Dates</td>
<td>10/30 - 11/2/07</td>
</tr>
<tr>
<td>Facilitator</td>
<td>Karen Louise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team Lead</td>
<td>Sean Michaels</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Event Objectives

<table>
<thead>
<tr>
<th>Objective</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reduce lead time from time requisition is received until it is input to 1 - 2 days.</td>
</tr>
<tr>
<td>2</td>
<td>Reduce number of approval from 5 to no more than 2.</td>
</tr>
<tr>
<td>3</td>
<td>Department managers trained on approval process. Including need to engage IT group if purchasing application programs.</td>
</tr>
</tbody>
</table>

### Key Improvements Implemented

- Engineers and maintenance given access to ERP and trained on how to create requisitions.
- ERP coding changed so only Dept Manager authorization is required if total spend is <35000.

### Measurable Results

<table>
<thead>
<tr>
<th>Metric</th>
<th>Unit of Measure</th>
<th>Before Measurement</th>
<th>Projected After Measurement</th>
<th>Projected Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Time</td>
<td>Days</td>
<td>8.3</td>
<td>2.5</td>
<td>-72.7%</td>
</tr>
<tr>
<td>Process Time</td>
<td>Min</td>
<td>66.0</td>
<td>26.0</td>
<td>-64.5%</td>
</tr>
<tr>
<td>Rolled First Pass Yield</td>
<td>%</td>
<td>4.0</td>
<td>72.0</td>
<td>1700.0%</td>
</tr>
<tr>
<td>Handoffs</td>
<td>each</td>
<td>6.0</td>
<td>2.0</td>
<td>-66.7%</td>
</tr>
</tbody>
</table>

### Collateral Benefits

- Reduced equipment downtime due to waiting for parts - trickle down affect re: stress on maintenance department and inter-departmental conflict.
- Less frustration with the purchasing process.
- Less lost time due to waiting requisitions through the approval process.
- Should see less premium freight costs due to expediting of purchased parts and customer orders.

### Team Members

- Dianne O'Shea
- Ryan Austin
- Brian Utke
- Mary Townsend
- Sam Parks
- Tom Albin
- Paul Dampier
- Michael Frichard
<table>
<thead>
<tr>
<th>Agenda Item</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opening Comments</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 1 | • Team introductions  
• Agenda  
• "Rules" for attendees |
| **Scope and Objectives** | |
| 2 | • Process being addressed  
• First & last steps  
• Specific conditions  
• Event drivers / current state issues  
• Objectives  
• Boundaries & limitations |
| **"Before" Condition** | |
| 3 | • VSM and/or MBPM review  
• Relevant metrics  
• Photos (if relevant) |
| **Key Improvements Implemented** | |
| 4 | • Key improvements and accomplishments implemented during the event  
• Tools used |
| **"After" Condition** | |
| 5 | • New process description  
• Projected results (direct and collateral) |
| **Key Open Action Items** | |
| 6 | • 30-Day List |
| **Sustainability Plan** | |
| 7 | • Potential obstacles that could prevent attaining projected performance levels |
Kaizen Event Phases

- **Planning**: 4-6 Weeks Prior
- **Execution**: 2-5 Days
- **Follow Up**: 4-8 Weeks Post
Sustaining Improvement

- Hold weekly follow-up meetings
  - Full team presence highly desirable
  - Event Facilitator or VS Champion leads
  - Monitor process, refine if needed
  - Transition improvement oversight from Kaizen Team to area supervision/management

- Execute Sustainability Plan
- Update VSM
- Conduct 30-Day and 60-Day Audits
# Plan to Succeed – The Sustainability Plan

<table>
<thead>
<tr>
<th>Executive Sponsor</th>
<th>Event Name</th>
<th>Event Dates</th>
<th>“Go Live” Date</th>
<th>“Go Live” Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen Ward</td>
<td>Purchase requisition review process</td>
<td>10/30 - 11/2/07</td>
<td>11/2/2007</td>
<td>ABC Building</td>
</tr>
<tr>
<td>Facilitator</td>
<td>Karen Louise</td>
<td>60-Day Audit Date</td>
<td>1/7/2008</td>
<td></td>
</tr>
<tr>
<td>Team Lead</td>
<td>Sean Michaels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-Day Audit Date</td>
<td>12/3/2007</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Communication / Training

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide training for those who missed initial training.</td>
<td>Sean to provide make-up training on 11/6 to 3 people absent on 11/2.</td>
</tr>
<tr>
<td>Integrate new process into ongoing department training.</td>
<td>Michael Pritchard to update departmental training (by 11/9) and liaise with human resources to integrate into new employee orientation / training package (week of 11/6).</td>
</tr>
<tr>
<td>Update Value Stream Map.</td>
<td>Value Stream Map updated during event.</td>
</tr>
<tr>
<td>Update training records to reflect who has been trained.</td>
<td>Michael Pritchard to forward training log sheet to HR.</td>
</tr>
<tr>
<td>Communicate to affected parties who were not advised during event.</td>
<td>Sam Parks to send email to all Corporate Purchasing Staff to advise of role changes and change in application programs being used (by 11/9).</td>
</tr>
<tr>
<td>Post the Event Report, 30-Day List, Sustainability Plan.</td>
<td>Sean Michaels to post all reports by 11/8; post in lunch rooms at field office and corporate.</td>
</tr>
<tr>
<td>Update SOPs and other ISO or regulatory documents impacted by changes.</td>
<td>All affected procedures were red-lined during event. Mary Townsend to follow-up to assure all approvals are received by 11/16 and on-line procedures are modified by 11/23.</td>
</tr>
<tr>
<td>Communicate and post 30-day and 60-day audit results.</td>
<td>Brian Utke - post in lunch room communication centers and in engineering and maintenance departments within 2 days of audits being completed.</td>
</tr>
<tr>
<td>Communicate audit results to stakeholders and leadership team.</td>
<td>Brian Utke - report at January 00 Operational Excellence Steering Committee meeting</td>
</tr>
<tr>
<td>Communicate process performance measurement plan.</td>
<td>Sally McKinsey - make sure flip-chart performance graphs are maintained in purchasing area</td>
</tr>
<tr>
<td>Requirement</td>
<td>Plan</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Identify process owner.</td>
<td>Sally McKinsey</td>
</tr>
<tr>
<td>Observe process one <strong>day</strong> after event is over. Talk with workers, assure they understand how process should be performed; see if there are problems.</td>
<td>Michael Prichard and Ryan Austin to observe process and requisitions on Monday and Tuesday (11/6 &amp; 11/7). Will also run second general ledger for tooling accounts to assure expenses being charge OK. Report to kaizen team on 11/8 @ 3:30 PM.</td>
</tr>
<tr>
<td>Put in place key metrics to measure process performance; post performance.</td>
<td>Metrics finalized during event. Tracking chart to be posted in corporate purchasing by Tuesday 11/7 (Sam Parks)</td>
</tr>
<tr>
<td>Observe process one <strong>week</strong> after event is over. Talk with workers, assure they understand how process should be performed; see if there are problems.</td>
<td>Michael Prichard and Ryan Austin to observe process and requisitions on Monday and Tuesday (11/13). Report to kaizen team on 11/15 @ 9:00 AM.</td>
</tr>
<tr>
<td>Monitor process performance frequently; post results put continuous improvement plans in place.</td>
<td>Sally McKinsey to monitor results, posting is self managed (SP to have in place by 11/7).</td>
</tr>
<tr>
<td>Conduct 30-day audit.</td>
<td>Brian Utke, Karen Louise audit by 12/4, audit findings posted by 12/7 and reviewed in team meeting on 12/6.</td>
</tr>
<tr>
<td>Conduct 60-day audit.</td>
<td>Brian Utke, Karen Louise audit by 1/7; audit findings posted by 11/7.</td>
</tr>
</tbody>
</table>
## 30-Day Audit Report

<table>
<thead>
<tr>
<th>Executive Sponsor</th>
<th>Event Name</th>
<th>Event Dates</th>
<th>Audit Date</th>
</tr>
</thead>
</table>

| Value Stream Champion | Lead Auditor | |
|-----------------------|--------------|
| Sally McKinsey        | Brian Ulke   |

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Yes</th>
<th>No</th>
<th>Corrective Action Needed</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Are workers following the process as designed in the event (or authorized modifications made since the event)?</td>
<td>☑</td>
<td>☐</td>
<td>There were only 2 “old-style” requisitions observed in process, both of which were generated prior to kaizen event.</td>
<td>n/a</td>
</tr>
<tr>
<td>2 Is there evidence that all workers, including those new to the area, have been trained on the new process?</td>
<td>☑</td>
<td>☐</td>
<td>Everyone following process</td>
<td>n/a</td>
</tr>
<tr>
<td>3 Is process performance being measured and reported as set forth in the Sustainability Plan?</td>
<td>☑</td>
<td>☐</td>
<td>Two LT data points were missing - advised area manager. Should add a %&amp;A metric</td>
<td>Sally McKinsey</td>
</tr>
<tr>
<td>4 Is the area manager monitoring and supporting compliance to the new process?</td>
<td>☑</td>
<td>☐</td>
<td>Seems to be engaged, area workers reported that SM helps them make some adjustments to the process to ID how to track MTB budget performance. SM also pushed ERP team to provide additional training to requisitioners</td>
<td>n/a</td>
</tr>
<tr>
<td>5 Are consequences for not following the new process design in place?</td>
<td>☑</td>
<td>☐</td>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td>6 Have any unintended consequences (positive or negative) arisen? Check with downstream customers.</td>
<td>☑</td>
<td>☐</td>
<td>There were some issues at first since PT for requisitions increased (from 15 minutes to 20 minutes). PT for most users has improved since received additional training from ERP team. No “show stoppers”</td>
<td>n/a</td>
</tr>
<tr>
<td>7 Is anyone resisting the new process?</td>
<td>☑</td>
<td>☐</td>
<td>No evidence of resistance (once got ERP to provide training)</td>
<td>n/a</td>
</tr>
<tr>
<td>8 Are all aspects of the Sustainability Plan being followed?</td>
<td>☑</td>
<td>☐</td>
<td>New employee orientation package is not yet updated</td>
<td>Michael Pritchard</td>
</tr>
<tr>
<td>9 Are workers pleased with the improvements? Do they feel their work has been simplified?</td>
<td>☑</td>
<td>☐</td>
<td>Finance is still a little nervous, still getting used to the fact that the respective department manager can be / will be held accountable for performance to financial plan</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### 30-Day List Status

| Number of action items due by audit date | 7 |
| Number of action items completed | 6 |
| % of action items completed | 86% |

### Performance Metrics

<table>
<thead>
<tr>
<th>Metric / Activity Being Measured</th>
<th>Unit of Measure</th>
<th>Before Measurement</th>
<th>Projected After Measurement</th>
<th>Projected Change</th>
<th>Actual After Measurement</th>
<th>Actual Change from Before Measurement</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Time</td>
<td>Days</td>
<td>0.3</td>
<td>2.3</td>
<td>-72.7%</td>
<td>1.7</td>
<td>-79.4%</td>
<td>based on chart in purchasing</td>
</tr>
<tr>
<td>Process Time</td>
<td>Min</td>
<td>55.0</td>
<td>25.0</td>
<td>-64.5%</td>
<td>25.0</td>
<td>-54.5%</td>
<td>many doing even better</td>
</tr>
<tr>
<td>Rolled First Pass Yield</td>
<td>%</td>
<td>4.0</td>
<td>72.0</td>
<td>1700.0%</td>
<td>66.0</td>
<td>1550.0%</td>
<td>Estimated - SM to add tracking chart</td>
</tr>
<tr>
<td>Handoffs</td>
<td>each</td>
<td>6.0</td>
<td>2.0</td>
<td>-66.7%</td>
<td>2.0</td>
<td>-66.7%</td>
<td></td>
</tr>
</tbody>
</table>
Additional Questions

Karen Martin, Principal
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San Diego, CA 92122
(858) 677-6799
ksm@ksmartin.com