Streamlining Process Improvement
10 Essential Ingredients

Richard Ouellette, FACHE CLSSMBB MT(ASCP)H
Management Decision Systems, Inc.

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A portion of this presentation based on…

- Major Academic Pediatric Medical Center
- 1.5 Million tests annually
- STAT TAT - 4 to 11 Hrs. 20% <= 1 Hr.
- 60% of all testing ordered STAT
- High variability for routine TAT > 24 Hrs.
- Misplaced specimens
- High physician dissatisfaction
- Staffing vacancies (core lab ~ 35%)
- 70% testing drawn by nursing
- New Cerner Millennium install
- Major laboratory reorganization
#1 Organization & Leadership

“Understand dynamics, priorities, urgency & politics!”

- No such thing as "Just A Lab Project"
- Silos & Matrix Management
- Money & Budget
- Executive Sponsorship
- Project Leadership
- Role of Lab Management & Staff
- Goal Congruency
#1 Organization & Leadership

“Goal Congruency!”

Executive Management
Project Leader
Staff
Resources
Organization Participants

Hospital Department Silo

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#2 Understand The Customer

**SIPOC**

- Clarify High Level Process Structure
- Ties to Value Stream
- Understanding & Awareness

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#2 Understand The Customer

**House of Quality**

“Must understand customer’s needs & priorities!”
#2 Understand The Customer  
House of Quality – Critical To Quality  

**CTQ Tree – Typically in problem or measure phase of DMARIC project**  
- Identify customer  
- Identify customer's need  
- Identify initial set of basic customer requirements  
- Progress further with more levels as required  
- Validate requirements with customers  

**CTQ Issues**  
- Not understanding the customer requirements  
- Not having infrastructure to support the process  
- Not having qualified human resources  
- Absence of following established standards
“Unfortunately control & sustain are often forgotten”

**DMAIC (Six Sigma)**
- Define
- Measure
- Analyze
- Improve
- Control

**PCDA (Deming)**
- Plan
- Check
- Do
- Act

Project management

Process improvement requires project management. Need to use a tool such as MS Project to track majors initiatives, tasks, responsibilities, dates and deliverables.
#4 Understand Testing Demand

“Critical to have LIS support and that the data is validated!”

- Test Flows - Inpatient, Outpatient, Outreach
- Priority - Note if STAT > 25% = Service Issues
- 30 Days Billable Test Detail
  - Day of Week (DOW)
  - Hour of Day (HOD)
  - Priority, Times, Location, Who
- Pareto - 40 of 1,000 = 85%
#5 Design Space to Optimize Production

“Can have significant cost ramifications…”

- Core Concept
  - Benefits
    - 2\textsuperscript{nd}, 3\textsuperscript{rd} & Weekend Shifts
    - Efficiency
  - Costs
    - Cross Training
    - Job Enrichment
    - Ratio - Flexibility vs. Training & Competencies

#5 Design Space to Optimize Production

continued

“Can have significant cost ramifications…”

- Pareto - 40 of 1,000 = 85%
- Queuing - Grocery Store
  - Bar Coding
  - Cashier
  - Waiting Lines
- 5S - Sort, Straighten, Sweep, Standardize, and Sustain
"Can have significant cost ramifications..."

- Proximity
  - Specimen Type
  - Instrument Location
  - LIS – Printers & Terminals
  - Staff Travel – Pre & Analytic
  - Automation Lines
  - Specimen Drop Off – Visible
  - STAT Monitors - Visible
Laboratory Design – Core Focus

A Black Belt Examines a Silo
#6 Instrumentation

“Optimal test throughput & required staffing is usually established by the manufacturer”

- Throughput - Manufacturer Specification
- Input Requirements
- Bar Coding
- Importance of LIS/HIS
- Location & Support Space
#7 Eliminate Process Bottlenecks
“Need involvement of staff performing the work”

Process Diagramming
& Value Stream Mapping
- Modeling - KISS
- Takt Time - Customer Demand
- Process Breakdown - Pre-Analytic, Analytic
- Workload Balancing
- Staff Involvement - Stakesmanship

Total Testing Process – 3 Phases/13 Steps

Source: Adapted from Boone, J. Presentation at the 2007 Institute on Critical Issues in Health Laboratory Practice: Managing for Better Health, Atlanta, September 23 – 26, 2007
#7 Eliminate Process Bottlenecks
Total Testing Process – 3 Phases/13 Steps

8 Key Steps

Source: Adapted from Boone, J. Presentation at the 2007 Institute on Critical Issues in Health Laboratory Practice: Managing for Better Health, Atlanta, September 23 – 26, 2007
#7 Eliminate Process Bottlenecks

“Value Stream Mapping”

![Value Stream Mapping Diagram]

- **Current State**
  - Lead Time = 137 Minutes
  - VA/T = 26.2 Minutes

- **Future State**
  - Lead Time = 75.8 Minutes
  - VA/T = 23.1 Minutes

**Lead Time Reduction**: 45%

**VA/T Reduction**: 12%
#8 Establish Performance Metrics

“Deming offered fourteen key principles for management for transforming business effectiveness; 3 key principles are…”

- #7 Institute leadership
- #8 Drive out fear
- #9 Break down department barriers

#8 Establish Performance Metrics continued

“Metrics provide focus & direction, otherwise you are a ship without a rudder”

- Ownership - Lab’s… Like it or not
- Communication - Customer & Staff
- Measurement
- Frequency
- Actual Performance - Sharing & Follow-up
Few have been bitten by an elephant…

but almost everyone…

has been bitten by a mosquito.

#8 Establish Performance Metrics

- Use tests on STAT list for major metrics
- Usually 40 of about 700 orderable tests
- Commit to a reasonable TATs
  
  Better to under commit and over deliver
  
  - STAT 1 hour from order to report
  - Routine 4 hour from order to report
  - AM reported by 6 AM/7 AM

- Send-Out – Published SO Lab’s TAT
- Inter Laboratory Transfers
#8 Establish Performance Metrics

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#9 Reduce Error & Variation

- Measurement - Metric & Frequency
- Daily Monitoring - Dashboard & Scorecards
- Drive Performance - *With a passion!*

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#9 Reduce Error & Variation

“Don’t assume everyone knows how to interpret”

Customer demand vs. laboratory supply
#10 Performance Visualization

“Quickening through visualization”

- Leadership - Religion… big picture & result
- "People do what you watch"
- Train, train, train
- Communication... Feedback
- Share successes & failures with customers
#10 Performance Visualization

“Quickening through visualization”

Silo Process Improvement

No such thing as "Just A Lab Project"
Summary Remarks

- Process improvement is dynamic, involves the entire organization and leadership
- Process improvement is a team effort
- Fair, or unfair you have full responsibility for a test from the time of order until it is complete
- Improving costs & service is an ongoing effort
- The laboratory is a detailed oriented business

Thank you!