Sysmex America, Inc.

Balancing Lean and Automation Solutions to Maximize Your Gains

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Presentation Objectives

- Review process improvement tools
- Share how Lean and Six Sigma apply to a *complete* hematology lab solution
- Demonstrate the key considerations in balancing Lean and Six Sigma initiatives to maximize your performance gains

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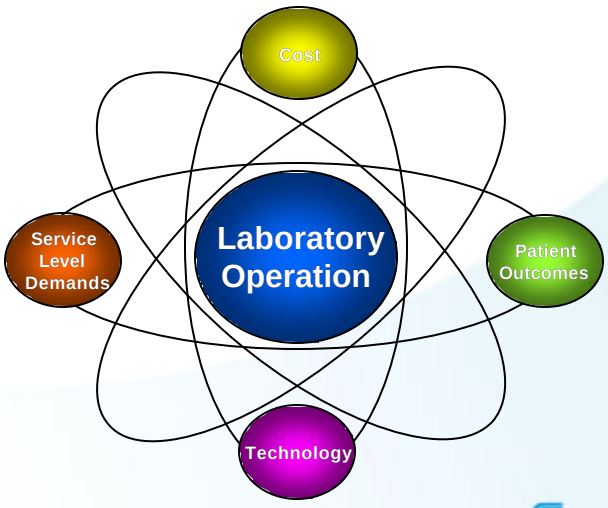
Laboratory Operation Model



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LEAN in the Lab Operation Model

- **Lean In the Laboratory** –
  - **The Goal** is to meet or exceed customer demands of quality test results by the most efficient, cost effective means possible, i.e. the elimination of waste, standardized work, zero defects, on-piece flow.
    - Reduce human effort and interaction
    - Utilize less inventory
    - Take less time to produce test results
    - Use less space

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LEAN in the Lab Operation Model (continued)

- **Lean In the Laboratory** –
  - **Basic Principles of a Lean Laboratory**:
    - All specimens analyzed as STAT – no waiting time
    - Inventory of supplies kept to minimum - near zero
    - Scheduling – to meet service level demands vs. coverage
    - Reduce or eliminate batch testing to flow testing (cut batch sizes)
    - Balance of testing to distribute over time and instruments
    - Decrease process times

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Is Automation the Answer?

- **Automation -** A system in which a workplace or process has been converted to one that replaces or minimizes human labor with mechanical or electronic equipment.
  - *Taking a manual process or test and having it performed automatically by a machine/instrument with electronic delivery of results.*

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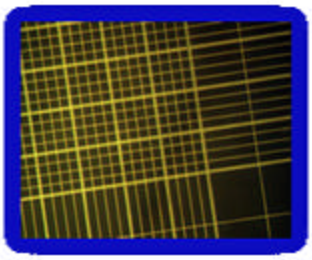
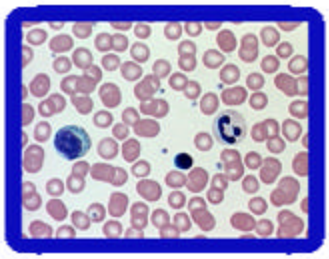
Is Automation the Answer?

- CBC production
  - Manual Hgb & Hct with Hemocytometer vs. CBC Analyzer
  - Manual Slide Making and Staining (SMS) vs. Automated SP-1000i





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Laboratory Comparisons
Automation vs. Stand Alone

Stand Alone	Vol/Day	Hours	FTE/ Analyzer	Number of Analyzer	CBC/FTE/D	Peak CBC/Hr/ Analyzer	Ave CBC/Hr Analyzer
Lab 1	6,686	10	7.3	7 - Advia 120	916	108	96
Lab 2	7,221	10	8.3	8 - GenS	870	118	90
Lab 3	4,143	10	7.4	7 - LH750	560	100	59
Lab 4	15,642	15	16.0	17 - CD3500	978	100	61
Lab 5	6,649	10	8.0	10 LH - 750	831	108	66
Lab 6	6,279	10	6.7	10 - LH750	937	103	63
Lab 7 Pre	5,224	16	7.9	5 - LH750	661	90	52
Lab 8	1,917	10	8.5	7 - Advia 120	226	90	82
Lab 9	1,366	9	2.1	2 - XE2100	666	130	76
Automated							
Lab 5 Post	4,143	8	2.5	Custom HST	1,657	138	129
Lab 7 Post	5,502	10	4.6	2 HST 302	1,196	133	138
Lab 10 Pre	5,044	7	11.0	6 SE 9500	459	116	120
Lab 10 Post	6,000	7	5.0	Custom HST	1,200	140	125
Lab 9 HST 410	4,023	9	2.0	4 XE2100	2,012	146	112
Lab 9 Current Toal	5,389	9	4.1	HST 410 + 2 XE2100	1,314	146	100
Lab 9 Proposed Toal	5,389	8	3.0	Custom HST- 6XE	1,796	146	112

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Is Automation the Answer?

- CBC production
  - HST - Hematology Analyzer, SMS, Rerun, Archive/Sort and Auto-validation
  - Manual Differential vs. Digital Imaging (DM96)

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Predicted Outcomes

Previous vs. expected vs. actual

	Ave Billed/Day	Peak Day	Process Steps	Motion Steps	Autovalidation
April-06	287	306	43	12	0%
Estimated	N/A	400	8	8	70%
8-Jul	328	394	8	8	63%

	TAT (min)	STAT (min.)	Slide Review	Rerun	QC	Staff
April-06	50	60	40%	5%	11.5%	5.6
Estimated	40	21	30%	3-5%	N/A	4.6
8-Jul	N/A	27	35%	2.6%	5.6%	4.6

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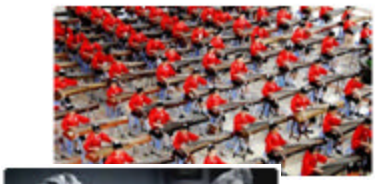
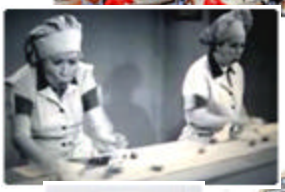
Is Automation the Answer?





Automation meets Leans four basic principles to a degree!

1. Standardized - precision with above automation vs. manual methods
2. One Piece Flow - load and unload specimens
3. Reduction in Error – less human touches and reduction of random error
4. Elimination of waste – Tech focus on *positive* results

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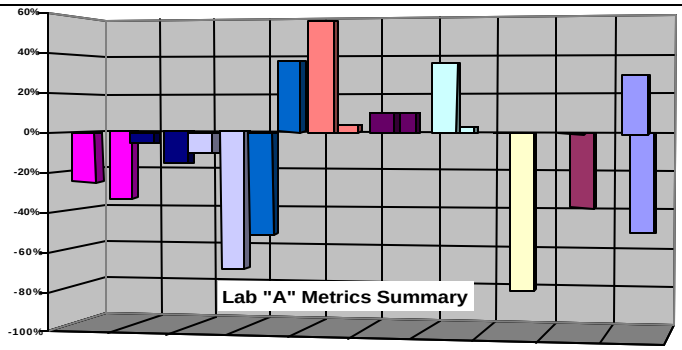
Lab "A" Metrics Summary



	Sep-06	Apr-08
FTE's	28%	-51%
Work Flow	0%	-38%
Flow Chart	0%	-81%
Volume	34%	2%
Slide Prep	10%	10%
Man Diff	55%	4%
SCAN	-51%	38%
TAT (min)	-10%	-72%
Cost/Billable	-5%	-17%
Productivity	-25%	-35%

Year	FTE's	Work Flow	Flow Chart	Volume	Slide Prep	Man Diff	SCAN	TAT (min)	Cost/Billable	Productivity
Jun-02	8.5	13	102	205,920	65,335	36,865	28,835	20	$ 3.08	0.15556
Sep-06	10.9	13	102	276,305	71,905	57,305	14,235	18	$ 2.92	0.11668
Apr-08	5.3	8	19	283,029	79,101	59,512	19,589	5	$ 2.42	0.07533

TAT Impact & Improvements
CellaVision™ DM96

Hands on Time (minutes)	Manual	DM96	% Improvement
100 Cell Count Differential	5.5	1.3	76%
Morphology/SCAN	2.5	1.3	48%
Validation of Auto Diff	5.5 or 2.5	0.3	95% or 88%

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How do I decide what fits?

- Next Step - Establish a plan or goal.
  - Strategic plan for laboratory

    (if you don't know where you're going, how can you get there?)
    - Increase non-patient business
    - Reduce operating costs while expanding business
    - Potentially move client and non-urgent hospital testing offsite.

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How do I decide what fits?

- Align laboratory goals and plans with your institution.
  - Required support outside of laboratory
  - Ability to withstand organizational change

How do I decide what fits?

- Instrument goals
  - Automate hematology
  - Decrease review rate
  - Reduce rerun rate
  - Decrease FTE hands-on time
  - Improve workflow
  - Reduce space needs
  - More reliable analyzers

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Compare Potential Solutions

- **Impacts include, but are not limited to:**
  - Improved TAT
  - Reduced operating costs
  - Productivity improvement
    (Paid FTE hours per billed procedures)
  - Physician, nursing, and patient satisfaction via surveys
  - Impact on length of stay

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Compare Potential Solutions

- Each impact should be weighted in the solution
- If the desired impact is not achieved
  - Re-analyze the problem see if you missed something
  - Modify it – the scope could be wrong
  - Stop – It may not be achievable for now

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Factors for a Complete Analysis

- Basic considerations:
  1. Some expenses are considered fixed and will not change regardless of the implementation of the solution.
  2. Some expenses and savings are so small that it takes more effort to measure them and potentially dilutes the impact of the real gains
     i.e.: diminishing returns
  3. Get the ground rules from your CFO.

     What is most important to them on:
     - a global basis?
     - a micro-analysis basis?

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Thank you!

Questions?

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