LEAN, “A3 Problem Solving” and Supply Chain Management in Health Care

Volunteer Leadership Workshop
October 17, 2010
Las Vegas, Nevada

Presented by: John S. Pennington
“LEAN” in Health Care
Factory Efficiency Comes to the Hospital

Susanne Matthews, a nurse at Seattle Children’s Hospital, uses a supply system based on factory methods. In the past, nurses had makeshift stockpiles.

*The New York Times, Published: July 9, 2010, By Julie Weed*
Two Bin System Used in Hospital Setting

- There are two bins of each item; when one bin is empty, the second is pulled forward. Empty bins go to the central supply office and the bar codes are scanned to generate a new order. The hospital storeroom is now half its original size, and fewer supplies are discarded for exceeding their expiration dates.

*The New York Times, Published: July 9, 2010, By Julie Weed*
What is Lean and Key Principles?

• Lean Thinking was introduced by Toyota in the 1960’s as a systematic approach to identifying and eliminating waste or non-value-add activities in an organization through continuous improvement with the goal of creating value.

• The key principles of Lean are based on identifying 'waste' from the customer perspective, and determining how to eliminate it.
  – Waste is defined as the activity or activities that a customer would not want to pay for, and that do not add value to the product or service from the customer's perspective.
Lean Thinking as Applied to Health Care is to:

• Eliminate waste through understanding the value to the patient and how to deliver that value
• Create an efficient and waste-free continuous flow system built on a pull vs. ‘batch and queue’ approach
• Continually pursue a perfect system
# Kinds of Waste

<table>
<thead>
<tr>
<th>Targeted in the TPS</th>
<th>Targeted in Health Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Waiting (of operator or machine)</td>
<td>1. Waiting (employee, patient, machine, and information)</td>
</tr>
<tr>
<td>2. Transporting</td>
<td>2. Material Movement</td>
</tr>
<tr>
<td>3. Processing Itself</td>
<td>3. Processing</td>
</tr>
<tr>
<td>4. Inventory (raw material)</td>
<td>4. Inventory (material, or patient)</td>
</tr>
<tr>
<td>5. Motion (of operator or machine)</td>
<td>5. Motion (unnecessary staff movement)</td>
</tr>
<tr>
<td>6. Defects (rework &amp; scrap)</td>
<td>6. Correction</td>
</tr>
<tr>
<td>7. Over-production</td>
<td>7. Overproduction (unnecessary labs/visit)</td>
</tr>
<tr>
<td></td>
<td>8. Underutilization</td>
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</tbody>
</table>
The 5 Steps of Lean Thinking

Applied to Health Care

1. Specify **value from customer’s perspective**
2. Identify the **value stream** for each product and **remove the waste**
3. Make value **flow** without interruptions from beginning to end
4. Let the customer **pull** value from our process
5. Pursue **perfection** - continuous improvement
   – **Do this every day in all our activities**

Source: Womack & Jones: *Lean Thinking*
How is it **Harder** to Use Lean Thinking in Health Care Than Manufacturing?

• Who is “customer” and what do they value?
  – Patient/family vs. Employer, Payer, Government
  – *But* patient and doctor insulated from cost of choices
    • A “distortion of value”
    • As if the driver didn’t pay for the car

• Lots of invisible work
  – Patient encounter often involves a process or decision as the outcome -- not a tangible “product”
  – Examples: decision to operate, clinic scheduling, lab results ordering & reporting

• More privacy issues
How Does Health Care Differ From Manufacturing?

• Organizational and professional culture issues
  – Physicians, some world renowned
  – Nurses, many irreplaceable
  – Other health professionals

• Professional autonomy
  – versus teamwork and systems thinking

• Mission-driven (at least some)
  – Non-profit orientation
  – Production of social goods
How is Health Care Similar to Manufacturing?

• Process dependence
• Huge variability, often unjustified
  – Aversion to standardization
• Pressure to innovate and use new technology
• Need for high reliability systems
  (patient safety leaders learn from airlines, nuclear power industry)
• Lack of embedded testing
  – No “instant awareness of every error”
• Trillion dollar industry
• Continuous Quality Improvement orientation
What **Advantages** Does Lean in Health Care Have **Over** Manufacturing?

- Health care Professionals **expect change**: new treatments, drugs, devices
- Health care Professionals (mostly) accept **standardizing treatment** of common conditions:
  - “evidence-based medicine” and practice guidelines
- Health care Professionals accept **standardization** to improve patient safety
- Health care Professionals use **root cause analysis** in safety and quality
- Health care Professionals have **external pressures** for efficiency, safety and quality
  - Pay for performance
  - Public reporting
Perceived (and Real) Barriers to Application of Lean in Health Care

“Who can lead this?”
• Lack of expertise/clinical champions
Perceived (and Some Real?) Barriers to Application of Lean in Health Care

and,

**People are not automobiles...**
A3 Problem Solving

A DISCIPLINED, SYSTEMATIC REPEATABLE, APPROACH TO PROCESS IMPROVEMENT
What is A3?

• Toyota Motor Corporation is famed for its ability to relentlessly improve operational performance.

• Central to this ability is the training of employees in a **structured problem-solving approach** that uses a tool called the A3 Problem-Solving Report.
What is A3?

• Why is the method called A3? In Europe, the nearest metric equivalent to 11" x 17" paper is designated "A3."

• The A3 problem-solving method and document offers a standardized approach to solving problems.
  – At Toyota, it evolved to become the standard format for problem-solving, proposals, plans, and status reviews.
What is A3?

- What is important is not the format, but the process and thinking behind it, and the conversations it facilitates.
- An A3 lays out an entire plan, large or small, on one sheet of paper.
- It should be visual and extremely concise.
- It should tell a story, laid out from upper left-hand side to lower right, which anyone can understand.
The A3 Approach

A disciplined approach to a perceived problem comprised of steps with concurrent discussions and approvals throughout the process:
Why Use A3’s?

Most problems that arise in organizations are addressed in superficial ways, what some call "first-order problem-solving." That is, we work around the problem to accomplish our immediate objective, but do not address the root causes of the problem to prevent its recurrence.

– By not addressing the root cause, we face the same problem or same type of problem again and again, and performance does not improve.
Why Use A3’s?

The method confines a team to what will fit on that size sheet of paper, forcing simplicity and quick communication.

– This assures the work can be realistically completed within this constraint.
– It demonstrates successful change and motivates workers to do even more problem solving.
The Elements of the A3 Report for Knowledge Sharing

<table>
<thead>
<tr>
<th>Improvement Focus: What are we trying to do?</th>
<th>Date: ____________________________</th>
</tr>
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<tbody>
<tr>
<td>PI Team Leader: ____________________________</td>
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<table>
<thead>
<tr>
<th>Background:</th>
<th>Desired Performance Process:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Background of problem</td>
<td>• Diagram of proposed new process</td>
</tr>
<tr>
<td>• Context required for full understanding</td>
<td>• Value Stream Map</td>
</tr>
<tr>
<td>• Importance of the problem</td>
<td>• Countermeasures noted as fluffy clouds</td>
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</table>

<table>
<thead>
<tr>
<th>Assessment Measure(s) Utilized?</th>
<th>Desired Outcome(s):</th>
</tr>
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<tbody>
<tr>
<td>Current Performance/Process:</td>
<td></td>
</tr>
<tr>
<td>• Diagram of current situation (or process)</td>
<td></td>
</tr>
<tr>
<td>• Value Stream Map</td>
<td></td>
</tr>
<tr>
<td>• Highlight problem(s) with storm bursts</td>
<td></td>
</tr>
<tr>
<td>• What about the system is not ideal?</td>
<td></td>
</tr>
<tr>
<td>• Extent of the problems(s), i.e., measures</td>
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<thead>
<tr>
<th>Root Cause Analysis:</th>
<th>Countermeasure(s) Selected to Improvement Process:</th>
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<tbody>
<tr>
<td>• List problems</td>
<td></td>
</tr>
<tr>
<td>• Fishbone Diagram</td>
<td></td>
</tr>
<tr>
<td>• Most likely (or root) cause</td>
<td></td>
</tr>
<tr>
<td>Why? Why? Why?</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Root Cause(s) Selected for Improvement:</th>
<th>Implementation Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desired Outcome(s):</td>
<td>What? Who? When? Notes</td>
</tr>
<tr>
<td></td>
<td>Actions to be taken Responsible person Times, dates</td>
</tr>
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<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Cost:</th>
<th>Actual Outcomes:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Follow-up Plan (Standardization)</td>
</tr>
<tr>
<td></td>
<td>• How will you check the effects?</td>
</tr>
<tr>
<td></td>
<td>• In red ink/pencil</td>
</tr>
<tr>
<td></td>
<td>• When will you check them?</td>
</tr>
<tr>
<td></td>
<td>• Date the check was done</td>
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<tr>
<td></td>
<td>• Results compared to the predicted</td>
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Excellence in the New Normal
Best Practices for Global Supply Chain and Operations Management
Tools That Have Been Used to Eliminate Waste and Streamline Efficient Services in Healthcare

- Process maps
- Value stream maps
- 5S methods/Visual Controls
- Kaizen Activities – Rapid cycle
- Mistake proofing
- Control Charts
- Standardized work

- Quick Hand-off/Changeover
- Cellular Layout (Batch sizing and facility layout)
- Kanban
- Fishbone Diagrams
- Brainstorming
Why Use A3’s in Health Care?

• The A3 Process helps people in the practice setting engage in collaborative, in-depth problem-solving.

• It drives problem-solvers to address the root causes of problems which surface in day-to-day work routines.

• The A3 Process can be used for almost any situation, and research has found that, when used properly (i.e., all of the steps are followed and completed), the chances of success improve dramatically.
Using the A3 to Solve Problems in Health Care

The A3 Problem Solving Method and Document (A3) has demonstrated to be of value in health care in every department that wishes to reduce waste and errors and retain good employees when implemented and made an integral part of the organization.
Case Study A3 Form

Pl CME A3 Implementation Plan

Date: Anytime

Improvement Focus: Diabetes Control

PI Team Leader: Dr. Griswold

Background: Four-person internal medicine practice. Junior partner advocates for standardizing diabetes patient care. Junior partner directs office staff to pull a sample of 60 charts from their adult diabetic patient encounters during the past six months and check the values for Hgb A1c, lipid profiles, feet and eye exams.


Assessment Measure(s) Utilized: 10 Medical Records Reviewed Utilizing AHA Consensus Guidelines

Current Performance/Process:
- The average Hgb A1c is 10.3%. The average total cholesterol is 257 mg/dl. The average LDL cholesterol is 152. The average triglycerides is 240 mg/dl. Inconsistent retinopathy screening, foot exams and patient education.

Countermeasures Selected to Improvement Process:
- Patient training in use of run chart to record FBS

Desired Outcome(s):
- 95% patient compliance in monitoring of FBS utilizing run chart
- Physician review of data with patients at each patient visit
- 10% improvement in average Hgb A1c levels in diabetic patient population

Implementation Plan

<table>
<thead>
<tr>
<th>What</th>
<th>Who</th>
<th>When</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop and print run charts</td>
<td>Office Manager</td>
<td>Week 1</td>
<td></td>
</tr>
<tr>
<td>Train receptionist and nurse</td>
<td>Griswold</td>
<td>Week 2</td>
<td></td>
</tr>
<tr>
<td>Receptionist &amp; Nurse pilot with 5 patients</td>
<td>Nurse</td>
<td>Week 3</td>
<td></td>
</tr>
<tr>
<td>Train patient and follow-up call</td>
<td>Nurse</td>
<td>Months 3-6</td>
<td></td>
</tr>
<tr>
<td>Re-measure patient population from months 2-6</td>
<td>Griswold</td>
<td>Month 10</td>
<td></td>
</tr>
<tr>
<td>Report results to CME Office</td>
<td>Office Manager</td>
<td>Month 11</td>
<td></td>
</tr>
</tbody>
</table>

Root Cause(s) Selected for Improvement: Patient Involvement in monitoring FBS

Actual Outcome: 90% pt compl, 12% reduction Hgb A1c at month 9 in 30 of original 30 patients

Follow-up Plan: Mandate run chart protocol for all diabetic patients. Start A3 on common care protocol. Plan for A3 on use of medication in all diabetic patients.
Health Care Supply Chain
What is the Health Care Supply Chain?

The health care supply chain is a network of information and logistics within the broad spectrum of U.S. health care. In addition to direct health care providers such as acute-care hospitals and long-term facilities, surgical and diagnostic centers, physicians' clinics, pharmacies and other facilities, the health care supply chain includes laboratories, equipment manufacturers, suppliers and distributors. Group-purchasing organizations, which are businesses within the health care supply chain formed to increase purchasing or bargaining power for bulk supplies, also play an integral role in the health care supply chain.
Recent Research in Health Care Supply Chain

“The State of Health Care Logistics: Cost and Quality Improvement Opportunities,” a report published by the University of Arkansas and the Association for Health Care Resource and Materials Management. In short, researchers found the health care supply chain to be immature, collaborative, strategic, expensive, information poor, and talent rich.

The study’s authors, Heather Nachtmann, Ph.D., and Edward Pohl, Ph.D., write the following in their foreword: “We do not know where the fundamental inefficiencies and associated costs subsist within the complex supply chain. We also do not know where the opportunities for the greatest increases in quality exist within the health care supply chain. This lack of knowledge contributes to health care supply chain inefficiency.”
Recent Research in Health Care Supply Chain

The comprehensive survey reveals that the American health care supply chain is an immature and expensive system with significant barriers to efficiency. Specifically, stakeholders - manufacturers, distributors, group purchasing organizations and providers such as hospitals, surgical centers and long-term care facilities - lack good and accurate information because they have not implemented universal standards for data, despite a recent movement in this direction.
Recent Research in Health Care Supply Chain

"In short, the health care supply chain is starved for accurate and accessible data, which are the primary barriers to efficiency, collaboration and standardization. Perhaps, needless to say, this is an extremely expensive problem. In our survey, the average health care provider spends nearly one-third of their annual operating budget on supply-chain functions."
Projected Supply Chain Trends for the U.S. Health Care Sector:

1. Continued growth in overall supply chain costs.
2. Increasing focus on supply chain costs from payers.
3. Competition surrounding services will increase between organizations such as Group Purchasing Organizations (GPOs) and distributors.
4. More attention will be paid to the return on investment (ROI) supply chain information technologies.
5. Supply chain metrics will be redefined.
6. Role conversion will continue within the supply chain department in organizations from transactional to strategic.
7. Executive suite focus and involvement.

Opinion by Eugene Schneller, director of the Health Sector Supply Chain Research Consortium at the W. P. Carey School of Business, Arizona State University
Change

Supportive structure

– Effective supply chain management structures are extremely rare across the industry. Most health care organizations still have materials management and purchasing departments. While some have changed the name to 'Supply Chain', they are still acting like a traditional materials management operation. Few materials management departments are positioned well to take advantage of leading supply chain practices.
So Where Does APICS Fit In and Can It Add Value In Healthcare

Do we have the Foundation?

YES!!!!!!!!!!!!!!!!!!
APICS Can Assist in Solving These Issues

APICS has the tools, resources, and expertise to identify and overcome these challenges. Consider the drivers of supply chain performance, which are excerpted here from the *APICS Operations Management Body of Knowledge Framework (OMBOK)*:

- **Facilities**—Supply chain performance is often affected by the design and location of facilities.
- **Inventory**—Can improve supply chain flexibility by acting as a buffer to decouple supply from demand when appropriate.
- **Transportation**—Decisions can make major differences in both benefits and costs.
- **Information**—Another major influence on supply chain effectiveness is the ease with which information is shared up and down the chain.
- **Sourcing**—Decisions are important within the supply chain and rely on standards and policies being maintained.
- **Pricing**—Is perhaps the most important strategic decision. Whether price is set high, low, or in the middle sends a strong message to all members of the supply chain, competitors, customers, suppliers, and potential new entrants.
The APICS Lean Enterprise Series - The Lean Transformation Roadmap

1. Introduction
   • Educate Organization
   • Assess Readiness
   • Define Product Families

2. Lean Culture
   • Plan for Change
   • Create Teams
   • Select Pilot Product Family

3. Mapping
   • Map Current-State Value Stream
   • Map Future-State Value Stream
   • Plan Implementation

4. Stability
   • Stabilize Demand and Processes
   • Standardize Work
   • Improve Processes

5. Just-In Time
   • Calculate Customer Demand
   • Create Flow
   • Implement Pull
   • Develop Schedules

6. Measuring
   • Define Metrics
   • Deploy Lean Accounting

7. Sustaining
   • Design for Lean
   • Continuously Improve Quality
   • Sustain Lean

Excellence in the New Normal
Best Practices for Global Supply Chain and Operations Management
With a Few Changes

• You can use the existing LEAN Enterprise Series to enter and exploit the health care industry
  – Change examples to health care related
• Learn to speak their language
• Adopt the work already completed and being used
  – A3 Problem Solving
• Develop workshops specifically for health care professionals
Inventory Control Workshop Series

• Basics of Inventory Management
• Cycle Counting
• Distribution Inventory Management
• Materials Requirements Planning & Bills of Material
• Physical Inventory
The APICS CPIM has been organized into five modules. Below is the diagram that shows how these modules relate to each other and how they will help you to manage your business resources.
APICS CSCP

CSCP consists of four modules and provides you with a broad, encompassing view of global end-to-end supply chain management.

**M O D U L E 1**

**Supply Chain Management Fundamentals**
- Explore how successful supply chain management adds value to your organization
- Understand the supply chain management processes

**M O D U L E 2**

**Building Competitive Operations, Planning, and Logistics**
- Understand natural dynamics within the supply chain to optimize performance and increase profitability
- Assess the value of demands and reduce complexity in demand planning

**M O D U L E 3**

**Managing Customer and Supplier Relationships**
- Effectively use customer data to improve service performance and increase value to suppliers and customers
- Understand the strategic importance of purchasing and supplier relationships

**M O D U L E 4**

**Using Information Technology to Enable Supply Chain Management**
- Understand the role of data and information technology in support of the supply chain
- Learn how technology-enabled supply chains contribute to business strategies and operating plans
Good Books to Read

• Understanding A3 Thinking
  – Durward K. Sorbek II & Art Smalley

• A3 Problem Solving for Healthcare –
  A Practical Method for Eliminating Waste
  – Cindy Jimmerson

• Improving Healthcare Using Toyota Lean Production Methods
  – Robert Chalice
Good Books to Read

• **The Nun and the Bureaucrat —**
  How They Found an Unlikely Cure for America’s Sick Hospitals
  – Louis M. Savary & Clare Crawford-Mason

• **Managing to Learn —**
  Using the A3 management process to solve problems, gain agreement, mentor, and lead
  – John Shook

• **A Lean Guide to Transforming Healthcare —**
  How to implement Lean Principles in Hospitals, Medical Offices, Clinics, and Other Healthcare Organizations
  – Thomas G. Zidel