LEAN Process Improvement

ROBERT WOOD JOHNSON
UNIVERSITY HOSPITAL

Anthony N. Cascio
November 8, 2013

Agenda

- Disclosures
- Introduction
- The State of Healthcare
- Process Improvement and Lean Philosophy Overview
- Type of Waste
- Lean Tools
- The Project Journey: A Case Study

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Disclosure: Anthony N. Cascio

With respect to the following presentation, there has been no relevant (direct or indirect) financial relationship between the party listed above (and/or spouse/partner) and any for-profit company in the past 24 months which could be considered a conflict of interest.

About me…

Emergency!

Cadet (Explorer)

UMBC Emergency Health Services

Montgomery County, Maryland

Newark, NJ

Native Air

STAT Flight

Robert Wood Johnson University Hospital

About RWJUH…

- Flagship hospital of the RWJ Health System
- Primary Teaching Hospital for the Rutgers/RWJMS
- Level 1 Trauma Center
- Comprehensive Stroke Center
- Primary Angioplasty with CT Surgery
- International Center for Terror Medicine
- University Center for Disaster Preparedness and Emergency Response

RWJUH Campus
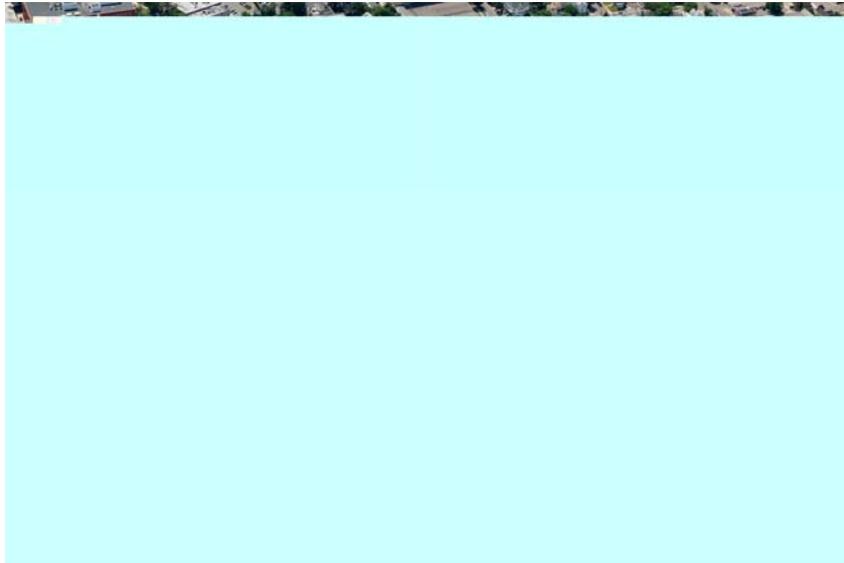
RWJ Mobile Health Service

Comprehensive system

- Regional Communications
- Tiered System
  - BLS
  - ALS
  - SCT
- Education
- Research

RWJ Mobile Health Service

BLS
- Non-Emergency Transports
- 4 municipalities
- 112 square miles
- 266,000 residents
- 13 units at peak
- 20,000 responses annually

ALS
2 Counties

230 square miles

440,000 residents

7 units at peak

19,000 responses annually

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Research

Special Events

TEMS Unit

NJ EMS Task Force
- Central Host Agency

NJ EMS Task Force

"To provide New Jersey and the region with a highly trained, equipped and *specialized* EMS resource to support operations at major incidents and pre-planned events using a well coordinated, robust all-hazards approach through the State's Emergency Management System"
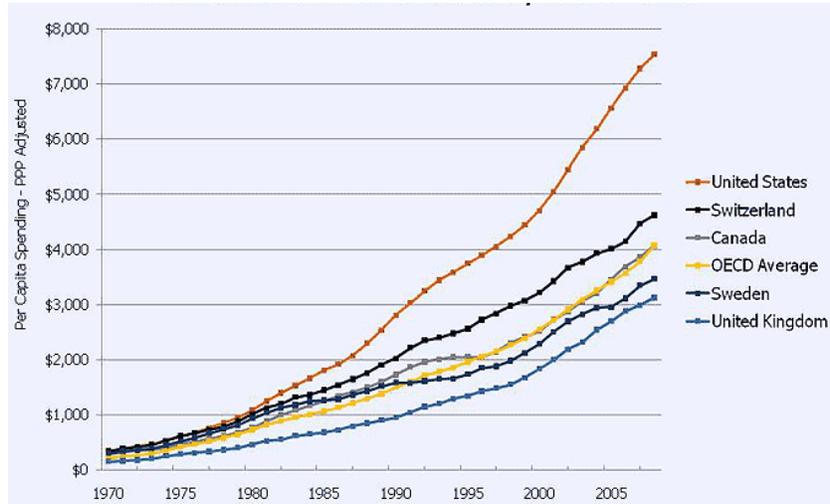
Today Objectives

- Introduce the basics of **Lean Philosophy**

- Increase ability to *__identify Lean opportunities__*

- Emphasize importance of involvement and **benefit** of using Lean Methodology

- Learn and have **fun**

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The State of Healthcare….

…in a changing environment

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Healthcare Costs
Per Capita Spending

Source: OECD Health Data 2010 (June 2010).

Penalties

- "penalizes hospitals if patients are **re-admitted** to the hospital within one month of a visit for a condition that should have been dealt with on the first trip"

- "When a hospital does not meet a performance standard for the performance period, the DRG **payment is decreased**"

- "**Reduced Medicare payment** to certain hospitals for hospital-acquired conditions (effective FY 2015)"

Health Reform
Means cuts to Reimbursement
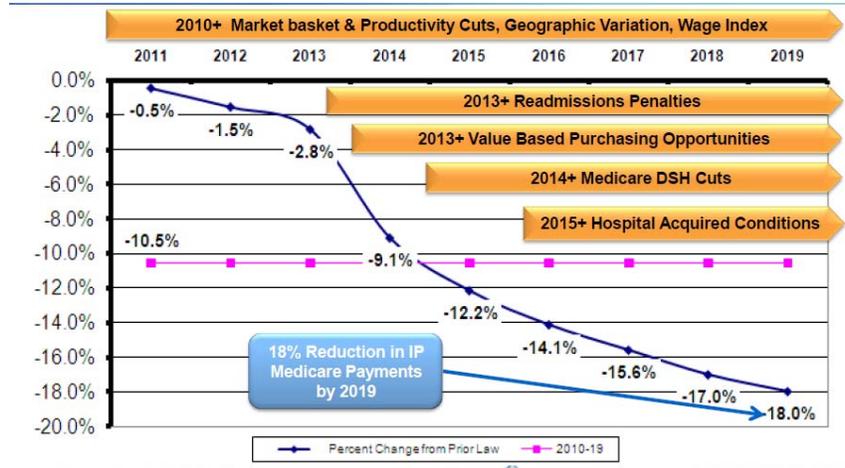
Sample figures for a 500 bed hospital
Courtesy of: Premier

Industry Snapshot

Opportunity

THE WALL STREET JOURNAL.
ONLINE
WSJ.com

April 9, 2004

PAGE ONE

To Fix Health Care, Hospitals Take Tips From Factory Floor

Adopting Toyota Techniques Can Cut Costs, Wait Times; Ferreting Out an Infection

- **"Potentially serious medication errors occur in 6.7 of every 100 patients"** – Journal of the American Medical Association

- "$4700 in Medical errors per preventable adverse drug event" – Journal of the American Medical Association

- "3.7% of Hospital admissions result in injury as a result of care" – The New England Journal of Medicine

Industry Imperatives

➢Grow the business

➢Control costs

➢Drive outcomes

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Have you heard about the new pirate movie?

- It's rated AARRRRRGGH!

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Process Improvement Overview

What is Process Improvement

Process Improvement is the **proactive task** of *identifying, analyzing and improving* upon existing business processes for optimization and to meet standards of quality

What is Process Improvement

- It means **setting aside** the customary practice of **blaming people** for problems or failures.

- Structured, systematic problem-solving approach to fix what's not working well.

It is a way of looking at how we can do our work better

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Improvement Methodologies used at RWJ

- **Lean**
- **Lean Six Sigma**
- **Waste Walk**

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Lean …

…the relentless pursuit of the perfect process through waste elimination

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Lean: Myth vs. Reality

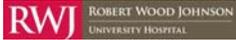| Myth What Lean Is Not	Reality What Lean Is
A Tangible Recipe for Success	A Way of Thinking
A Management Project or Program	A Total Management Philosophy
Not just a Set of Tools for Implementation	Focus on Total Customer Satisfaction
A System for Production Floor Only	An Environment of Teamwork and Improvement
Can implement in a Short or Mid-term Period	**A Never Ending Search for a Better Way**
	Quality Built in Process
	Organized, Disciplined Workplace
	Evolutionary
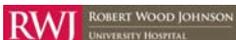
What is Lean?

•Increasing customer value by eliminating waste throughout the value stream*

We Spend 75-95% of Our Time Doing Things That Increase Our Costs and Create No Value for the Customer!

* Based on definition in the book <u>Lean Thinking</u>, Womack & Jones, Simon & Schuster

Focus on the Patient

What does the patient need from our process?

How would the patient like our process to perform?

How is our process' performance from the patient's perspective?

How does the patient measure our process?

What can we do better?

How does the patient view our process?
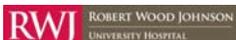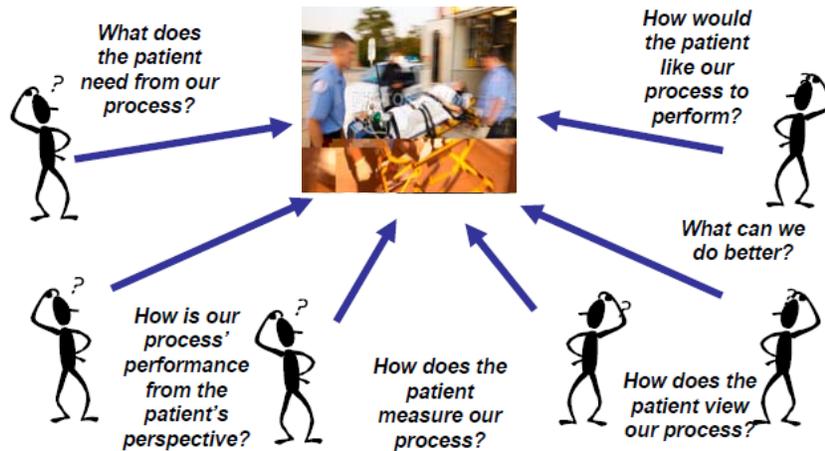
Patient Experience Equation

$$\text{Value} = \frac{\text{Quality} + \text{Patient Experience}}{\text{Cost}}$$

How do you define a quality experience?

If the Air Travel Worked Like Health Care

Value and Waste in Healthcare

IMPROVE

MINIMIZE

VALUE

NECESSARY WASTE

UNNECESSARY WASTE

ELIMINATE
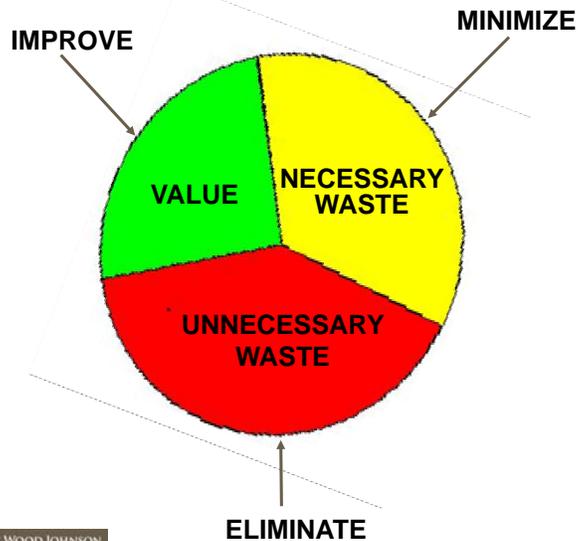
Activity

- What is waste?
  - Give examples of waste in the EMS service

Benefits of Lean

Any process or value stream

←——— Lead Time/Cycle Time ———→

Before

After

◼ **Work …**
Value Add Time

◼ **Wait / Waste…**
Non Value Add Time

Lean attacks inefficiencies here

Higher customer satisfaction

- **Reduced cycles**
- **Better delivery**
- **More capacity**
- **Better quality**
- **Productivity**
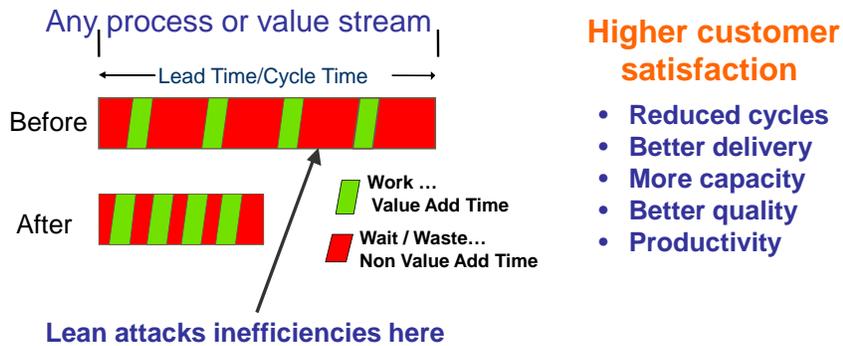
Examples of Where Lean is Used

Flow of materials, products, etc.
- Dispatch
- Materials Management and Make Ready,
- Clinical

Flow of Patients
- MCI
- ED Triage

Flow of Information
- Dispatch
- ePCR
- Billing

Spatial Planning
- Dispatch
- Ambulance
- HPCPR

Lean methods can be applied effectively in any environment dependent on people and processes

There are 7 Types of Waste

Waiting

Inventory

Defects

Extra Processing

Transportation

Overproduction

Motion

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Why identify and Eliminate Waste?

- Improve patient care and safety

- Reduce cost

- Reduce wait time between processes

- Improve productivity

- Improve quality

- Make the agency more competitive

- Encourage teamwork and staff involvement

- Improve staff satisfaction

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Waste - *Waiting*

- Waiting for anything, be it people, equipment, signatures, supplies or information.

Typical causes:

- Idle time due to lack of standard operations
- Waiting for decisions (dispositions, inspections, materials, etc.)
- Waiting for shared equipment
- Work flow not level or planned for

Eliminate waiting. Create smooth flow.

Waiting - Examples are:

Waiting for a bed at the Emergency Department

Excessive signatures or approvals

What are some of examples of *waiting* in your agency?

Waste - *Inventory*

Excess stock, work piles, and supplies. Inventory in the value stream is non-value-added.

Typical causes:
- Push production
- Over-ordering
- Too many shelves
- Too much floor space
- "Just-in-case" inventory

Inventory hides problems.

Inventory – Examples are:

Supply cache - ambulance

Insufficient cross-training of staff

What are some examples of *inventory* waste in your agency?

Waste - *Defects*

Mistakes, work that requires extra processing to correct the mistake; excessively checking work

Typical causes:
- Variation in processes, non-standardized work
- Collecting unnecessary inspection data
- Poor information
- Poor communication
- Lack of cross-training

The worst form of waste. Results in rework.

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Defect – Examples are:

Re-reporting (i.e. Trauma Team)

Medication errors

Wrong patient information

Missing information

How about your agency?

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Waste - *Extra Processing*

Putting more work or effort into things that a patient, physician, healthcare provider, etc does not want or ask for

Typical causes:

- Work is not standardized
- Tasks/steps are not coordinated between individuals
- Operations are not understood
- Non-value added steps

> Eliminate excess work!

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Extra Processing – Examples are:

Blood tubes

Requesting and processing information that will never be used

What are some examples of *extra processing* from your agency?

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Waste - *Transportation*

Excess movement of work, **products, information or patients that does not add value**

Typical causes:

- Unnecessary inventory
- Poor layout
- Poor scheduling or planning
- Excess materials
- Lack off automation
- Excessive record retention

Movement does not equal work!

Transportation – Examples are:

Moving a patient from one side of the Emergency Department and then to the other side.

Improper posting plan.

What are some examples of *transportation* in your agency?

Waste - *Over-Production*

Unnecessary service; providing a service prior to it being required or requested. Production of items beyond what is needed for immediate use.

Typical causes:

- Production schedules & push production
- Cost justification for expensive equipment
- Working on the wrong parts at the wrong time
- Poor quality
- Excess paperwork

> Overproduction creates inventory.
> Inventory needs to be managed.

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Overproduction – Examples are:

Entering repetitive information on documents or forms
   -CAD/ePCR interface

What are some examples of *overproduction* in your agency?

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Waste - *Motion*

Any excess movement of people, equipment, paper information, or electronic exchanges (e-mails)

Typical causes:
- Poor equipment or office layout
- Materials are in storage
- Work supplies or equipment not where work occurs

Minimize wasteful movements.
Movement ≠ work

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Motion – Examples are:

Communications Center Layout

What are some examples of *motion* from your agency?

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Lean as a Philosophy

Create And Standardize Operating Mechanisms

BELIEFS
•Follow Standard
•Stop on Defect
•Solve Problem

THINKING
•Self Continuous Improvement

Lean Behavior + Culture

Lean is not BORN from WHAT we SEE
Lean is BORN from HOW we THINK

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What kind of socks does a pirate wear?

AARRRRGGHyle!

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Lean Tools

Lean Toolkit - Improvement methodologies

Process Stabilization - 5S + 1

Visual Management – VSM, e/white boards, signaling devices.

Process Analysis – Time Value Analysis/Circle of Work

Motion Analysis – Spaghetti Mapping,

Standardization – Standard Work

Heijunka – Line Balancing/Work Sequencing

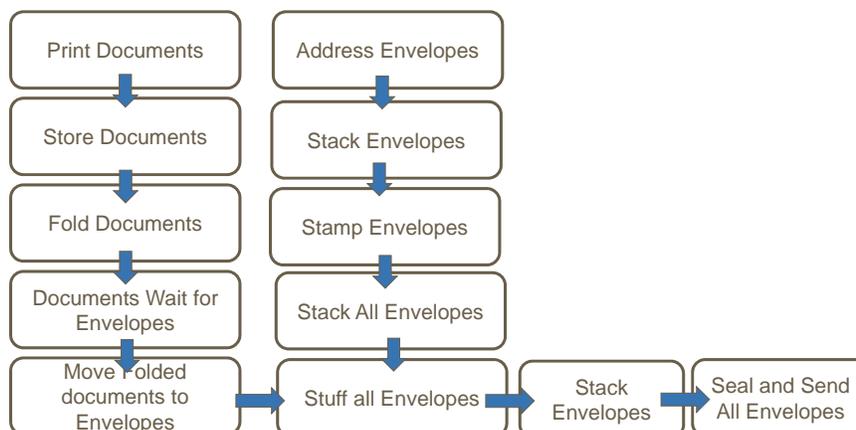**Just in Time** (JIT) – Flow, Replenishment, Kanban, Water Spiders

Jidoka – Mistake proofing, autonomation, electronic systems and informatics
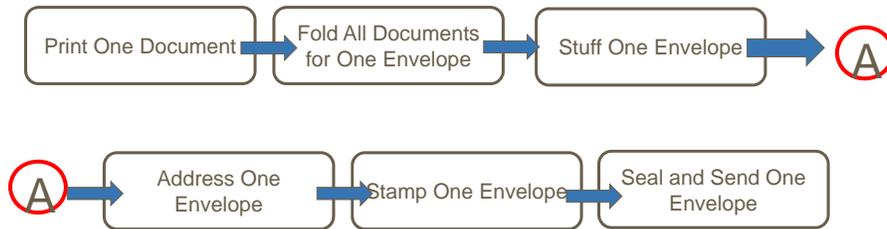
Kaizen – Rapid Cycle Improvement

Batching v. First in First Out (FIFO)

- Batching versus Single Piece Processing
- Avoid Batching at all times….
- "Maximized" First In – First Out processing

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Process Map: A Mailing Process - Batch

```
Print Documents          Address Envelopes
      ↓                          ↓
Store Documents          Stack Envelopes
      ↓                          ↓
Fold Documents           Stamp Envelopes
      ↓                          ↓
Documents Wait for       Stack All Envelopes
Envelopes                        ↓
      ↓                          ↓
Move Folded      →       Stuff all Envelopes  →  Stack      →  Seal and Send
documents to                                        Envelopes      All Envelopes
Envelopes
```

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Process Map: A Mailing Process
Single Piece Flow

Print One Document → Fold All Documents for One Envelope → Stuff One Envelope → **A**

A → Address One Envelope → Stamp One Envelope → Seal and Send One Envelope

---

Optimizing flow

- Movement of product/transaction down the value stream

- Continuous… any stop or reverse is waste

- Flow reduces processing time and good things happen

→ **Time** ←

Quality | Delivery | Cost ↓

Management by Sight

"Management by Sight" assures that what is "supposed" to happen, "does" happen, on time every time.

• The work area should be:
  – Self-explaining
  – Self-regulating
  – Self-improving

Visual Management

- Prevent and Detect Defects
  - Automobile lights that automatically turn off

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Visual Management – EMS Examples

- Monitor - out of range values

- Automated alert in CAD - LVAD

- IV Pump malfunctioning

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Visual Controls

- Built in Standards
  - Traffic lights

Visual Displays

- Communicate Information
  - Bulletin Boards

MemO

Visual Displays – EMS Examples

- Dynamic Gauges
- Key Performance Indicators

What is 5S?

- A structured process for creating and maintaining an <u>organized, clean, safe and high performance work place.</u>

- The foundation for continuous improvement, like zero defects, cost reduction, and safe work area.

- A system that allows anyone to distinguish between normal and abnormal conditions at a glance.

5S reduces waste

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5S: Workplace Organization

The 5S's are the foundation blocks upon which **visual management** is established:

5S

Sort — to separate the needed items from the un-needed items which are then removed to a "red-tagged" location

Set In Order — to arrange in a way for how the remaining items will be used

Shine — to maintain the work area for the already sorted and set-in-order items

Standardize — to ensure sort, set-in-order, and shine are consistently followed across all users

Sustain — to maintain and improve sort, set-in-order, shine, and standardize

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5s – Supply Room

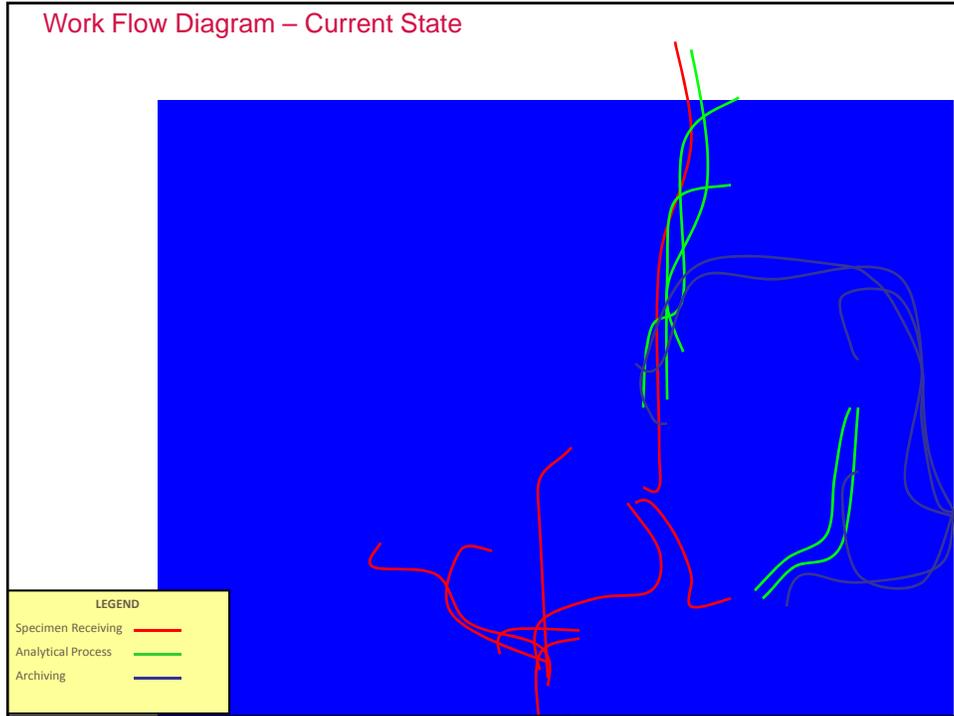**Before**   **After**

Spaghetti Diagram (Motion Analysis)
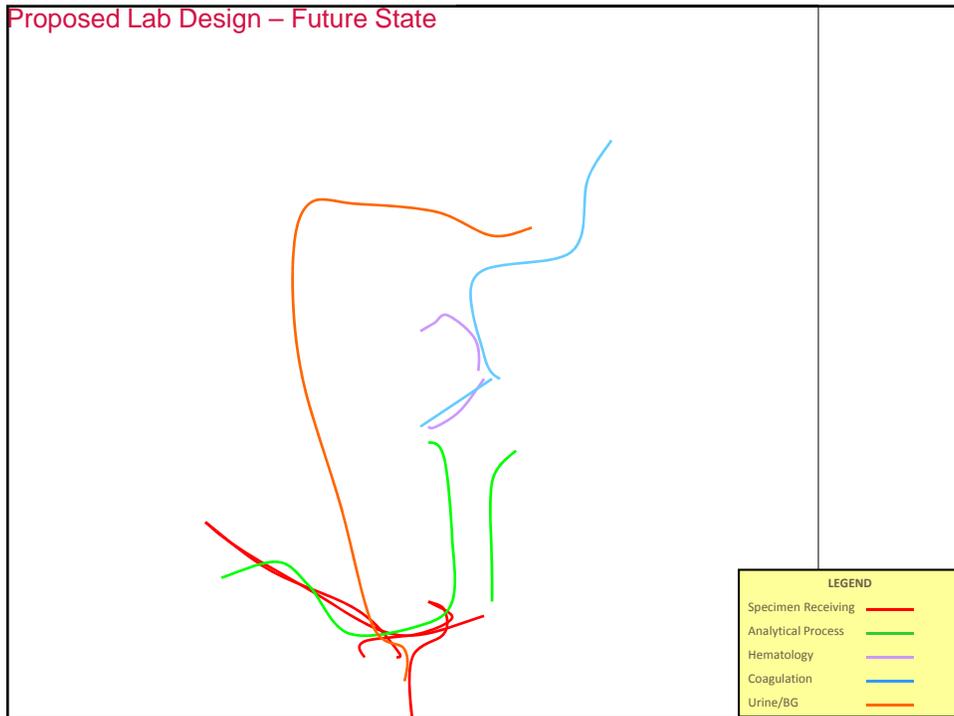
- Focus on area layout

- Used to identify waste of travel and motion

- Keep flow within a process

Work Flow Diagram – Current State

LEGEND
Specimen Receiving
Analytical Process
Archiving

Proposed Lab Design – Future State

LEGEND
Specimen Receiving
Analytical Process
Hematology
Coagulation
Urine/BG

Awareness Tools

Walk the Process (Gemba – Go to where the work is done)

Observations

Voice of the Customer

Observations

Lean Process Observation Template

1. Date: _1/1/2011_ Observation Start Time: _8:00am_ Observation End Time: _9:00am_
2. Department Expert Name: _John Smith_ Title: _CCT_
3. What process (Stream) you are observing : _Taking a call_
4. What is the initiation step of process (Step 0): _Phone ring_
5. High Level Process Flow: Major Process Step:
6. Observation Capture – What process (step) is happening :

Process Step / Sub Step	Time	Step Time	Value Added	Waste
Phone Rings	8:00:00	0.5MIN	VA / NVA / NVAE	W I D E T O M
John Picks up the Phone	8:00:30	5 MIN	VA / NVA / NVAE	W I D E T O M
John puts the patient on hold	8:05:30	0.5 MIN	VA / NVA / NVAE	W I D E T O M
John searches for papers	8:06:00	4 MIN	VA / NVA / NVAE	W I D E T O M
John takes patients off hold	8:10:00	0.5 MIN	VA / NVA / NVAE	W I D E T O M
John answers patient's question	8:10:30	1.5 MIN	VA / NVA / NVAE	W I D E T O M
Hangs up phone	8:12:00		VA / NVA / NVAE	W I D E T O M
			VA / NVA / NVAE	W I D E T O M
			VA / NVA / NVAE	W I D E T O M
			VA / NVA / NVAE	W I D E T O M
			VA / NVA / NVAE	W I D E T O M

Voice of the Customer

A process used to capture the requirements or feedback from the customer (internal or external) to provide customers with the best service/product quality.

This process is proactive and constantly innovative to capture the changing requirements of the customer with time.

➤ Survey/comments
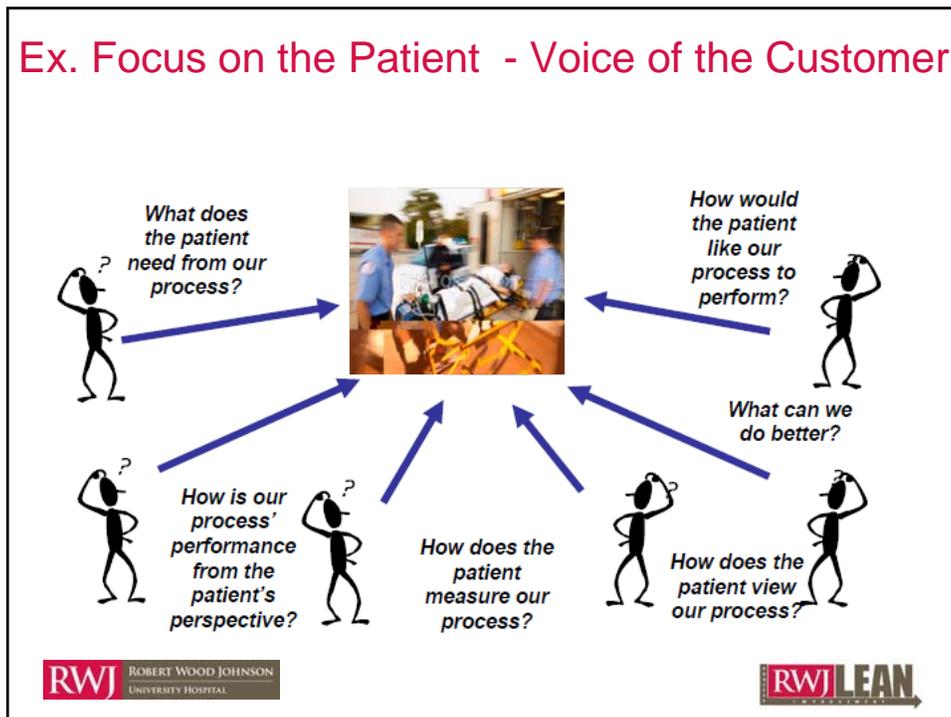➤ Patient and family participation in teams
➤ Interviews

Voice of the Customer

- Interviews

- Patient Surveys

- Other Surveys

- Patient/Family Groups Feedback

- Other Customers: physicians, other agencies, patient families

## Ex. Focus on the Patient - Voice of the Customer

What does the patient need from our process?

How would the patient like our process to perform?

What can we do better?

How is our process' performance from the patient's perspective?

How does the patient measure our process?

How does the patient view our process?

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Why did the pirate go on vacation?

He needed some AARRRRGGHH and AARRRRGGHH!

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The Project Journey :
Conception – Implementation – Sustainment

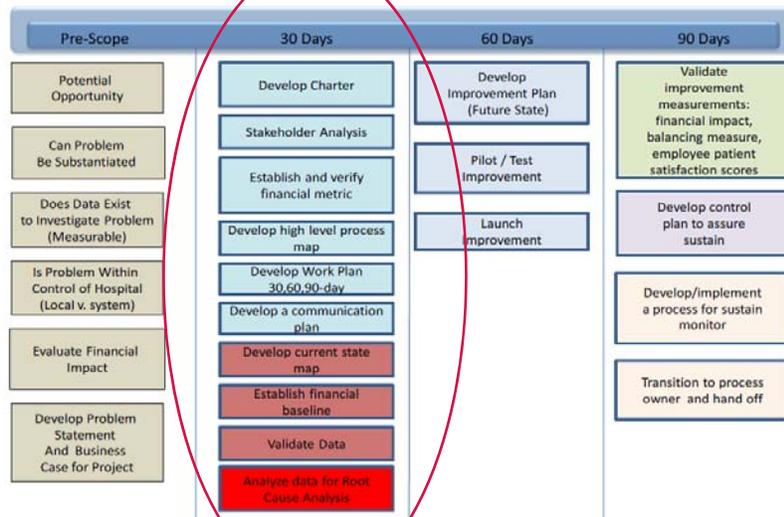- Case Study: Response Times

The Road Map
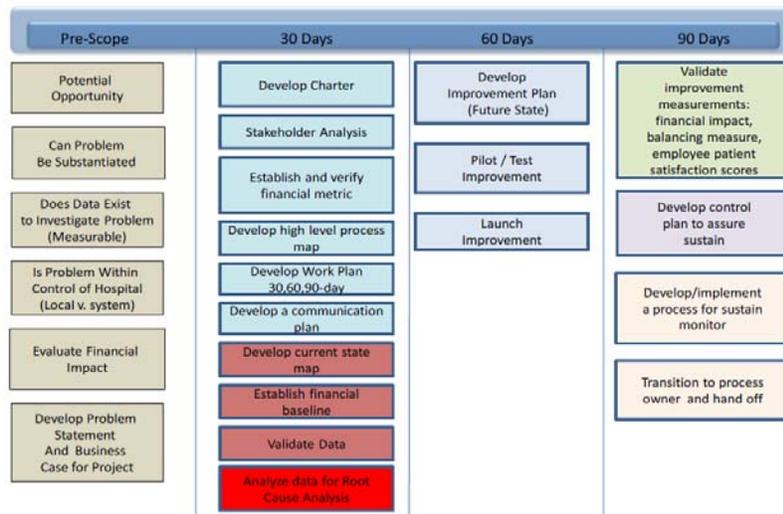
Scoping

- Current Response Times

- Financial impact of reducing response times

- What is the scope / Who are the team members

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30 Day

Project Charter for: Mobile Health Services (EMS) Response Time

Problem Statement: Current response times for RWJUH ALS and BLS units are above industry standards (ALS=15.9 and BLS= 14.4 :March 2013). Additionally, the TAT measure for "patient arrival to ED" to "unit back in service" is high (32 mins), therefore negatively impacting capacity.

Objectives:
- Improve ALS and BLS TAT times by decreasing the amount of time that a unit is out of service.

	Baseline (in minutes)	Goal (in minutes)
ALS Response	15.9	12
BLS Response	14.4	9
Back in Service TAT	32	15

Project Scope Information:
- In Scope: Priority 1 Responses, Units dispatched by Med Central
- Out of Scope: Cancelled calls prior to dispatch
- Process Begin: Call received in Med Central
- Process End: Unit back in service
- Key Milestone:
    - Kickoff June 6,2013
    - 30 Day check-in
        - Charter
    - 60 Day check-in
        - Improvement/pilot
    - Handoff /Control Plan

Start Date: June 6, 2013
Planned End Date: July 29, 2013

Executive Sponsor: Mike Antoniades

Project Owner: Anthony Cascio

Team Leader: Kamal Singh

PI Facilitator: Niki Irons, John Yanoschak **BB:** Achalanka Dalawella **GB:** Desiree Godleski

Team Members:
- Danielle Homza
- Paul Mikita
- Kamal Singh
- Jamie Chebra
- Scott Powers

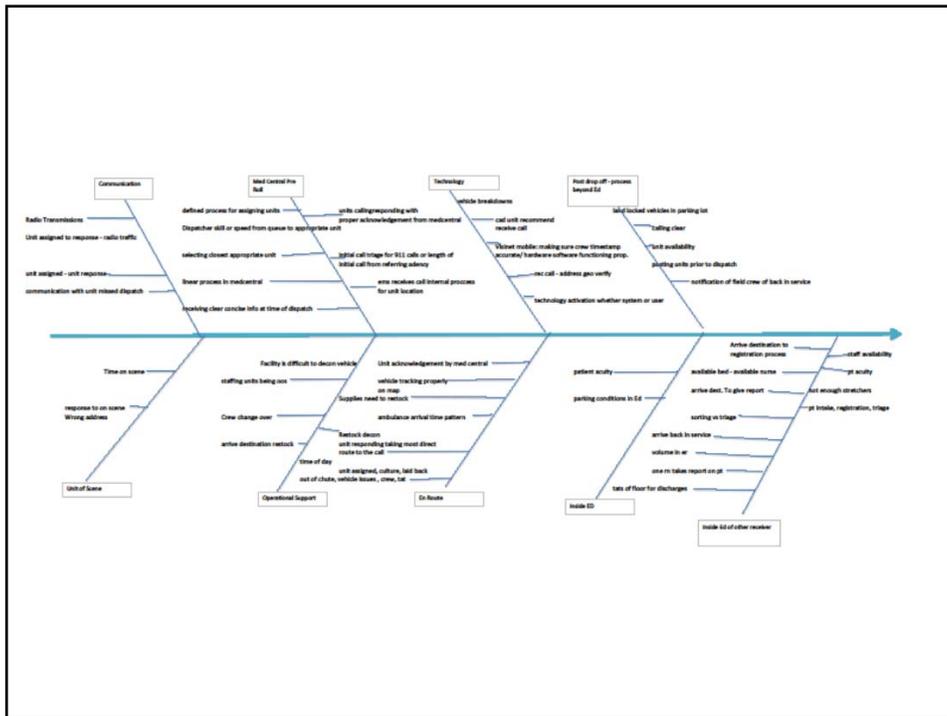**RWJ ROBERT WOOD JOHNSON** UNIVERSITY HOSPITAL

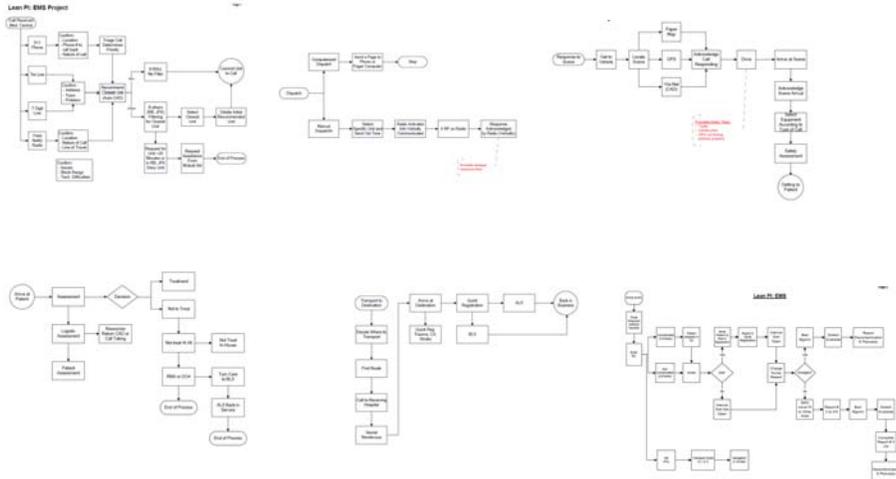**RWJ LEAN**

Project Owner Approval & Date   Executive Sponsor Approval & Date   Finance Approval & Date

Current State Map

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60 Days – Improvement / Pilot

- Use data from current state to develop improvements
- Pilot and test improvements to see if successful

90 Days – Control / Sustain

- Develop mechanisms to monitor and ensure sustained gains

- Hand off project to process owner

One last pirate joke…

What's me favorite letter?

One last pirate joke…

Most people think it's the AARRRRGGHH but its really the Sea!

Thank You!