Lean for Healthcare
An Overview

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Lean Healthcare West

Lean does not light a fire under people…it lights a fire within them

Matthew May

Why Lean?

- It is a philosophy – a set of principles
- It's a great fit for healthcare
- It produces meaningful, useful, important results
- It provides the power to change an organization's culture

You must ask…

Is there a better way?

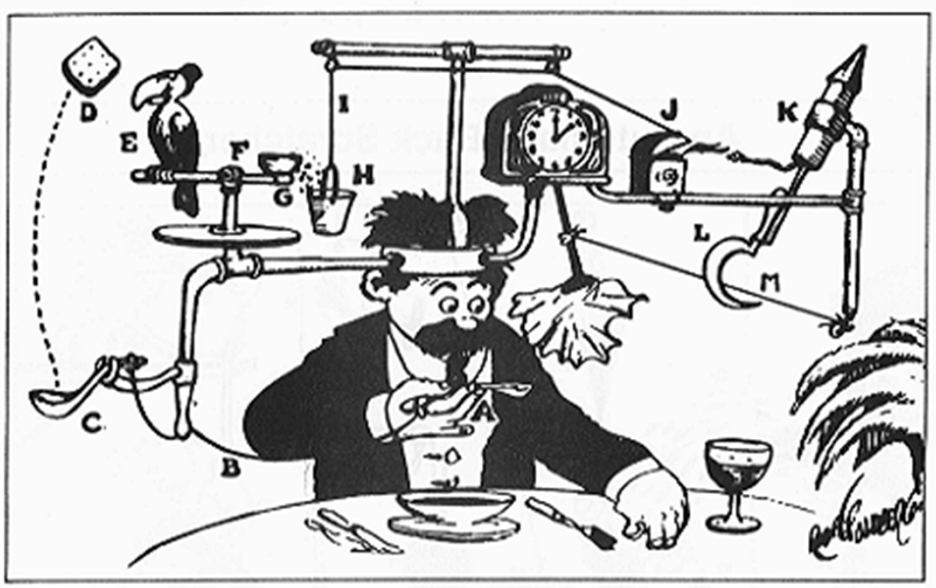


Image: Wikimedia. Public Domain.

Lean is

- The systematic pursuit of perfection
- A discipline of incremental changes

Image: Wikimedia. Delwing. CC BY-SA

Lean transformation happens over time – 4, 5, 6 years or more

- There is no quick, easy way
- Lean is learned through experiences
  - Clinical and Operational
- It takes practice, practice, and more practice

In order for Lean to succeed

- The entire healthcare team has to own it
  - Administrators
  - Middle Managers
  - Staff
- It must be evident in everyday work
- It must be embraced and practiced by everyone in the organization
- It must be expected
- It is not just one or two activities

“The significant problems we face cannot be solved at the same level of thinking we were at when we created them.”

Albert Einstein

Why the Toyota Production System Model?

- Most successful auto manufacturer in the world
  - But, can it work for healthcare?
- Best record of introducing new technology
  - Healthcare has a technological imperative
- Best record of employee satisfaction
  - Important to have good employee retention in hc
- Relentless commitment to eliminating waste
  - We have LOTS of waste in healthcare
- One million suggestions a year/ 90% implemented
  - Who better to tell us what needs fixing than healthcare's front line workers?

Features of TPS

- Management is not top-down
  - The traditional healthcare model is "command and control"
- Employees are on the value side of the ledger (no lay-offs)
  - When there are budget issues in healthcare, usually the first thing that is cut is positions

Very few long meetings!

Recognize people who do the work as experts and allow them to create!

Image courtesy of Lean Healthcare West. Used with permission.

Imagine what would happen if a hospital empowered all of it's employees

- to identify problems/issues
- to identify barriers to good work
- to allow them to make the needed changes

The power of 1000!! 2000!!! More!!

Lean gives employees

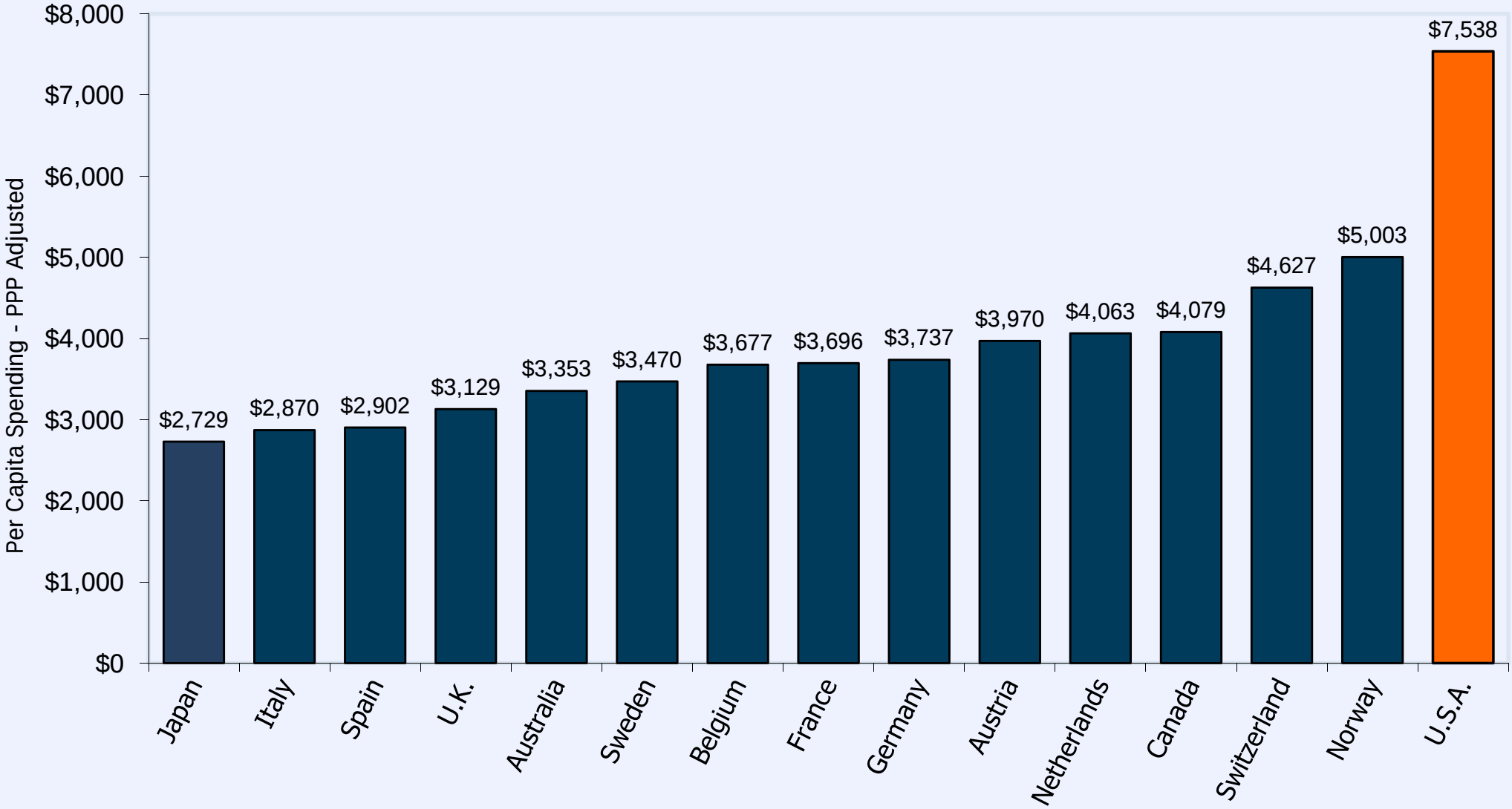
- A purpose
- A direction
- A sense of belonging
- A sense of contributing
- A different way to think and work
- An opportunity to build a better work environment

Why Lean for healthcare?

- **Largest industry in America**
  - Cost in 2002: $1.76 trillion
  - Cost in 2009: $2.5 trillion
  - Projected to be $4.5 trillion in 2019* (19.3% of GDP)

*Due to job losses and increased Medicaid recipients and growth in Medicare recipients as Baby Boomers retire. Medicare spending will grow 7.4% annually from 2011 to 2019

Total Health Expenditure per Capita, U.S. and Selected Countries, 2008



Source: Organisation for Economic Co-operation and Development (2010), "OECD Health Data", *OECD Health Statistics* (database). doi: 10.1787/data-00350-en (Accessed on 14 February 2011).

Notes: Data from Australia and Japan are 2007 data. Figures for Belgium, Canada, Netherlands, Norway and Switzerland, are OECD estimates. Numbers are PPP adjusted.

Demographics

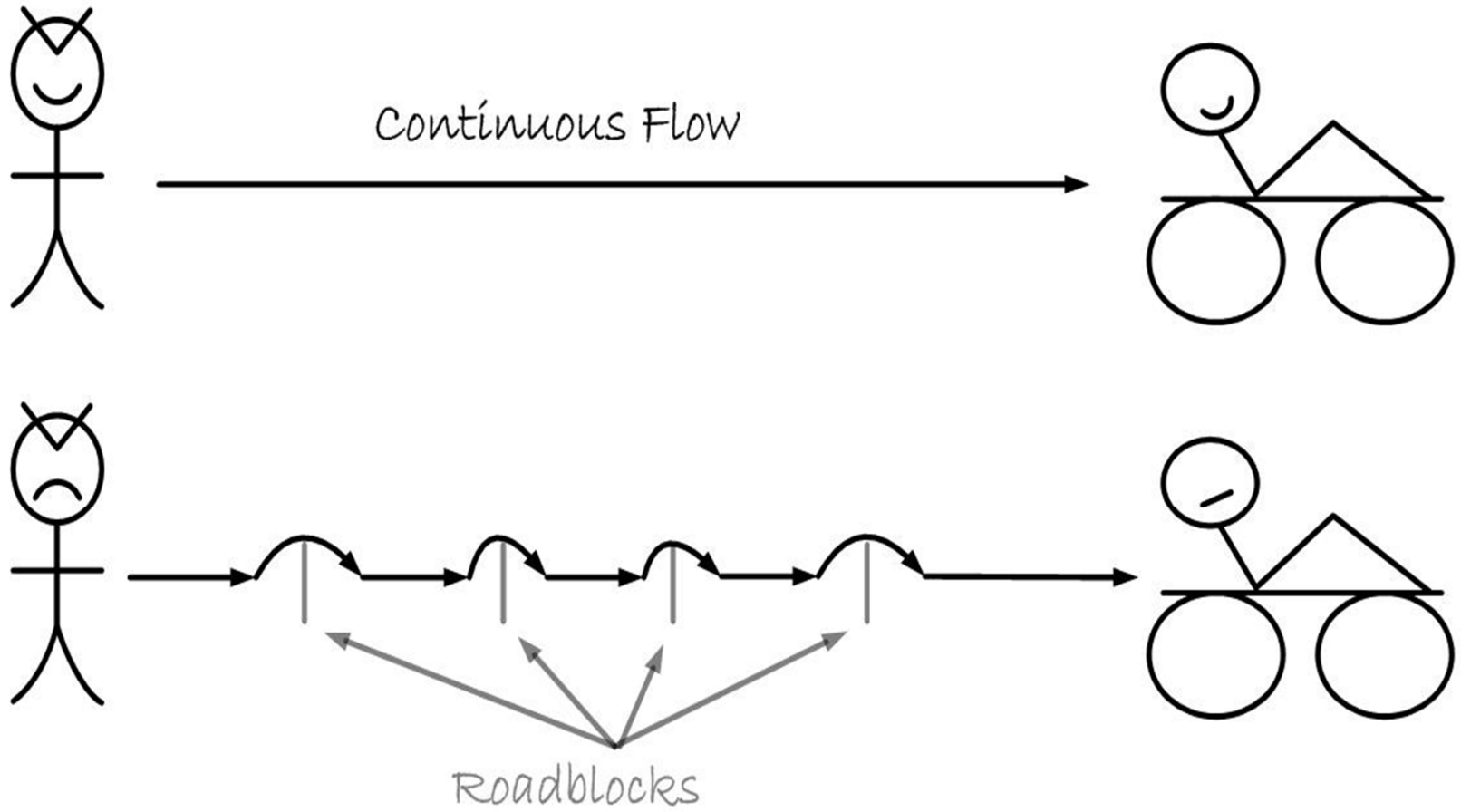
- 76 million Baby boomers
- 42 million Gen-Xers
- Millenials
- Digital Natives

Why does Lean work for healthcare?

- Massive waste in healthcare
- Rock solid common sense
- Easy to learn/teach to frontline workers
- Easy to apply at the frontline where the work is <u>really</u> happening
- Improvement occurs with the first application

"Everything must be made as simple as possible…but not one bit simpler"

A. Einstein



Lean Healthcare West
Lean Legacy LLC

What can we do with Lean in healthcare?

- Produce more DEFECT FREE healthcare
- Reduce/eliminate WASTE and have more time to take care of patients
- Improve WORKPLACE APPRECIATION → better staff retention
- STRENGTHENS LEADERSHIP

Lean Strengthens Leadership

- Consistent and reliable tools for middle and senior management
- Consistent communication of improvement efforts

Ask yourself…

- Are there things happening to patients that should not be happening?
- Are there things not happening to patients that should be happening?

Defect Free

- *Exactly* what the patient needs when s/he needs it
- Without errors
- Safe for everyone

The 7 Mudas

- Confusion
- Motion
- Waiting
- Processing
- Inventory
- Defects
- Overproduction

Confusion

Clarifying physicians orders
Medication reconciliation
Wrong site surgery

Motion

Looking for supplies
Trying to find a chart
Multiple tests in various locations
Nonsensical staffing assignments
Not having all the equipment you need

Waiting

Waiting for appointments
Waiting for transport to arrive
Waiting for the surgeon to arrive so the case can start
Waiting in an ED waiting room
Waiting for discharge orders
Waiting for meds to arrive

Processing

Not having meds you need in the Pyxis
Complex and redundant paperwork
Insurance nuiances

Inventory

Too much
Too little
Not the right things
Not in the right places

To Err Is Human
Building a Safer Health System
Linda T. Kohn, Janet M. Corrigan,
and Molla S. Donaldson, Editors
Committee on Quality of Health Care
in America
INSTITUTE OF MEDICINE
NATIONAL ACADEMY
PRESS Washington, D.C.

Defects a.k.a. ERRORS

Over 100,000 hospital deaths due to errors each year

Medication errors
Failure to rescue errors
Incorrect identifications
Wrong site surgeries
Falls

Errors

Two large studies, one conducted in Colorado and Utah and the other in New York, found that adverse events occurred in 2.9 and 3.7 percent of hospitalizations, respectively.

Overproduction

Different people asking the same questions
Multiple forms requesting similar information

IDEAL HEALTHCARE

- Exactly what the patient needs – no more, no less
- On demand, exactly as requested
- No waste
- An immediate response to problems or changes
- Physically, professionally, emotionally safe for patients and staff

4 Rules in Use

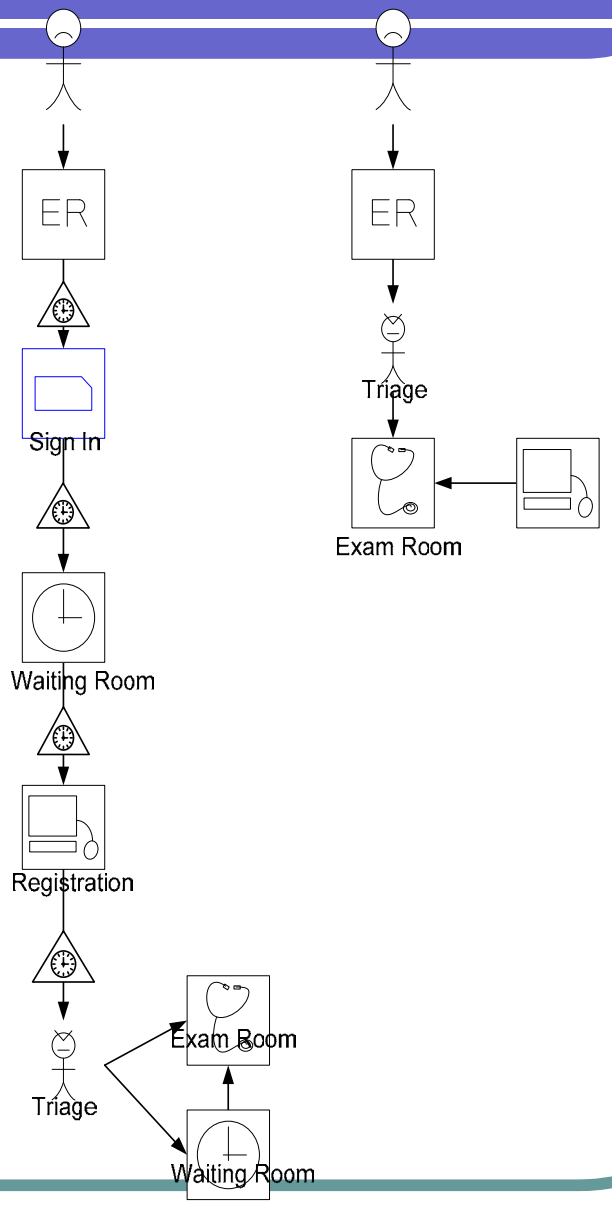
Rule 1: All activities of work are specified according to:

- Content
- Timing
- Sequence
- Outcome

4 Rules in Use

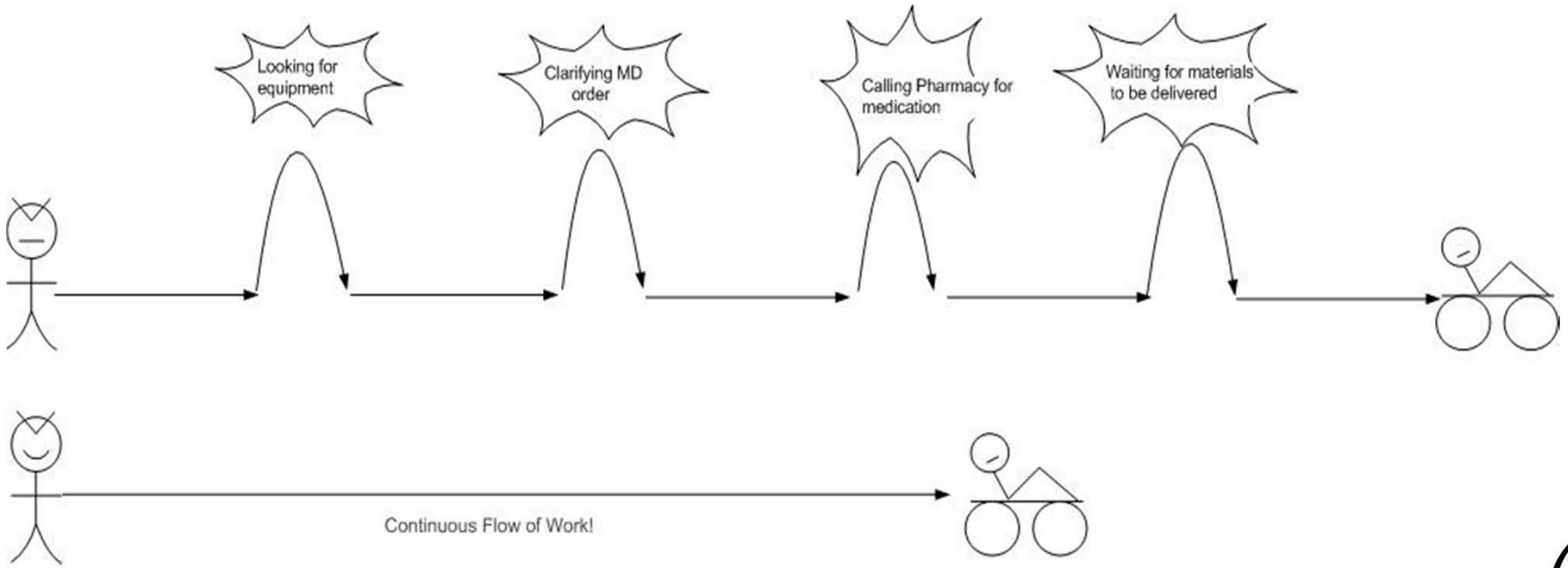
Rule 2:

All connections in the request for a service or activity are simple and direct



4 Rules in Use

Rule 3: Pathways in the process of delivering the request are simple and involve as few steps and people as possible



4 Rules in Use

Rule 4: Improvement

- Direct response to a problem
- As close to the problem as possible (in time and person)
- All change is first tested as an experiment
- All redesign is done by those doing the work
- Supported by a coach

The Scientific Method

- All work redesign is based on DIRECT OBSERVATION OF THE WORK
- Changes done first as experiments

Socratic Method

- **Observation includes asking the worker many questions:**
  - How do you know how to do your work?
  - Are there clear signals that cue the work?
  - Do all workers do a task the same way?

A Basic Tenet of TPS

Deeply understanding how work currently happens is essential before trying to fix it!

To understand deeply, you must observe

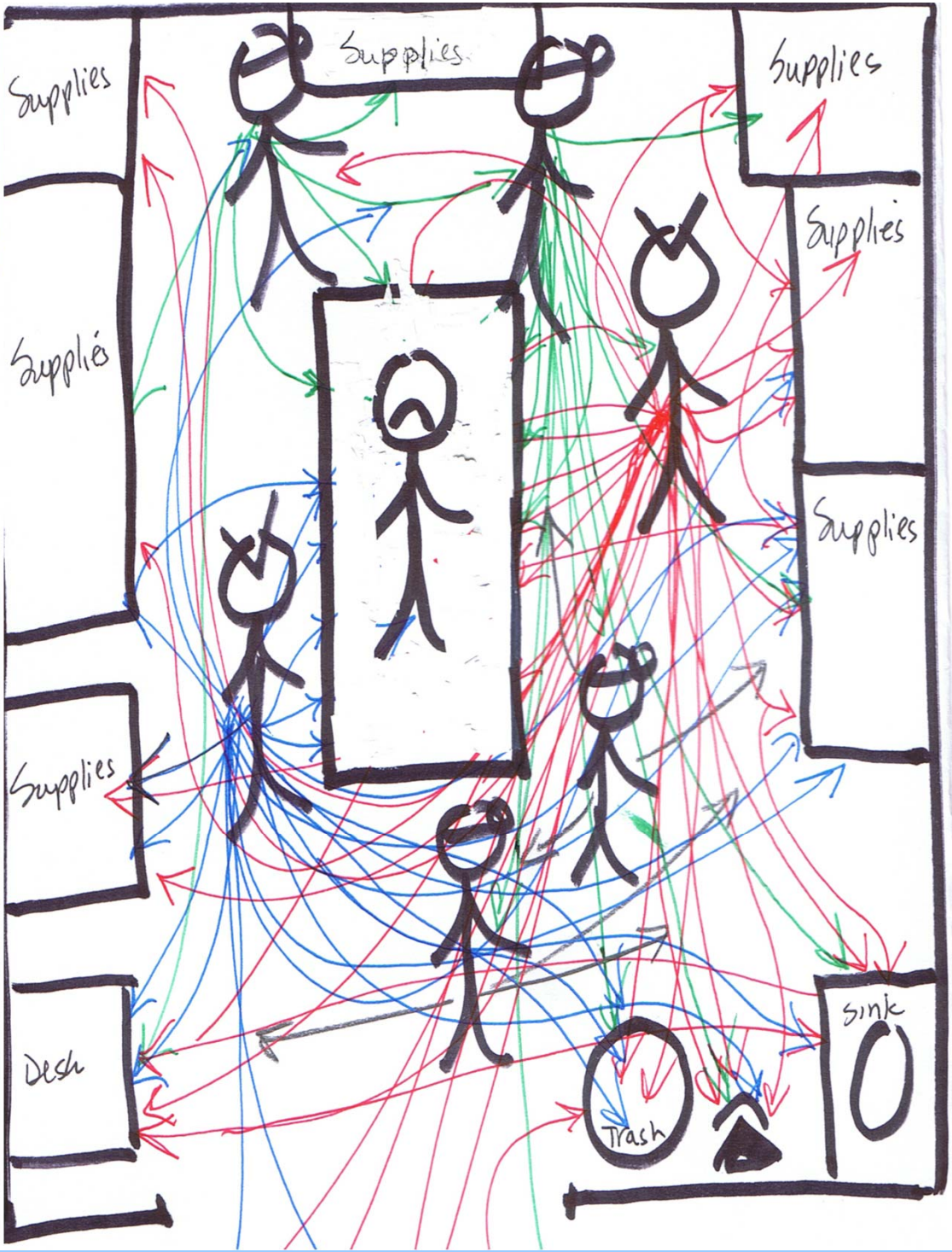
GEMBA* WALKS – GO LOOK AND SEE

- See the situation with your own eyes
- Use your senses to absorb the qualitative side of the problem
- Experience the environment
- Immerse yourself in the issue

Gemba – The actual place; the real place

- Use an Observation Sheet
- Draw Spaghetti Diagrams

- The more spaghetti, like the diagram, the clearer the need for redesigned work!
- Easy to see wasted time/travel when diagram is complete



Trauma Room Spaghetti Diagram

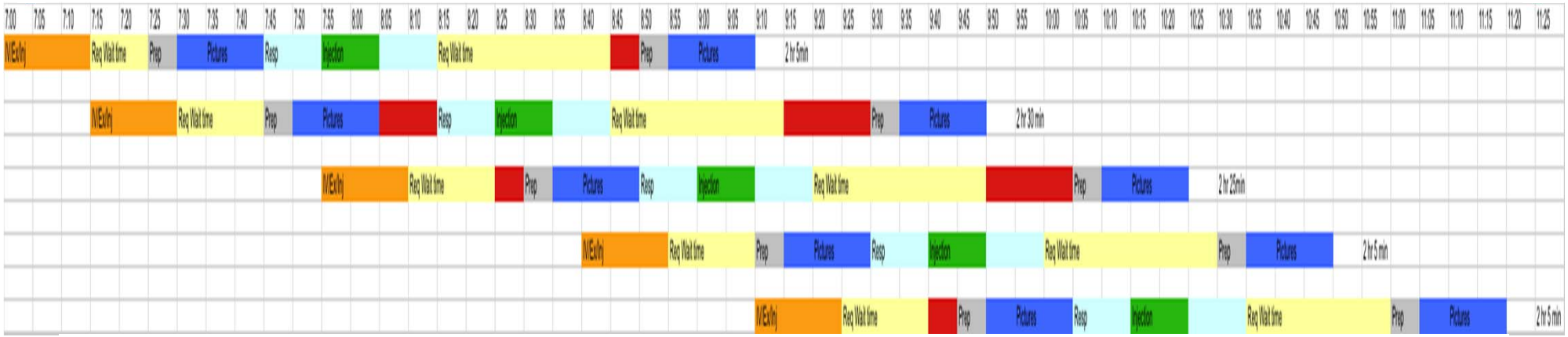
Nuclear Med - Treadmill

7:30 AM

The Old Way

11:15 AM

The New Way



Understanding the Work

Value Stream Mapping

- The view from 10,000 feet
- Looking at a specific process
- All activities are recognized as value added or non-value added
- Identifies *where* there are areas of inconsistency
- A springboard for a future state map

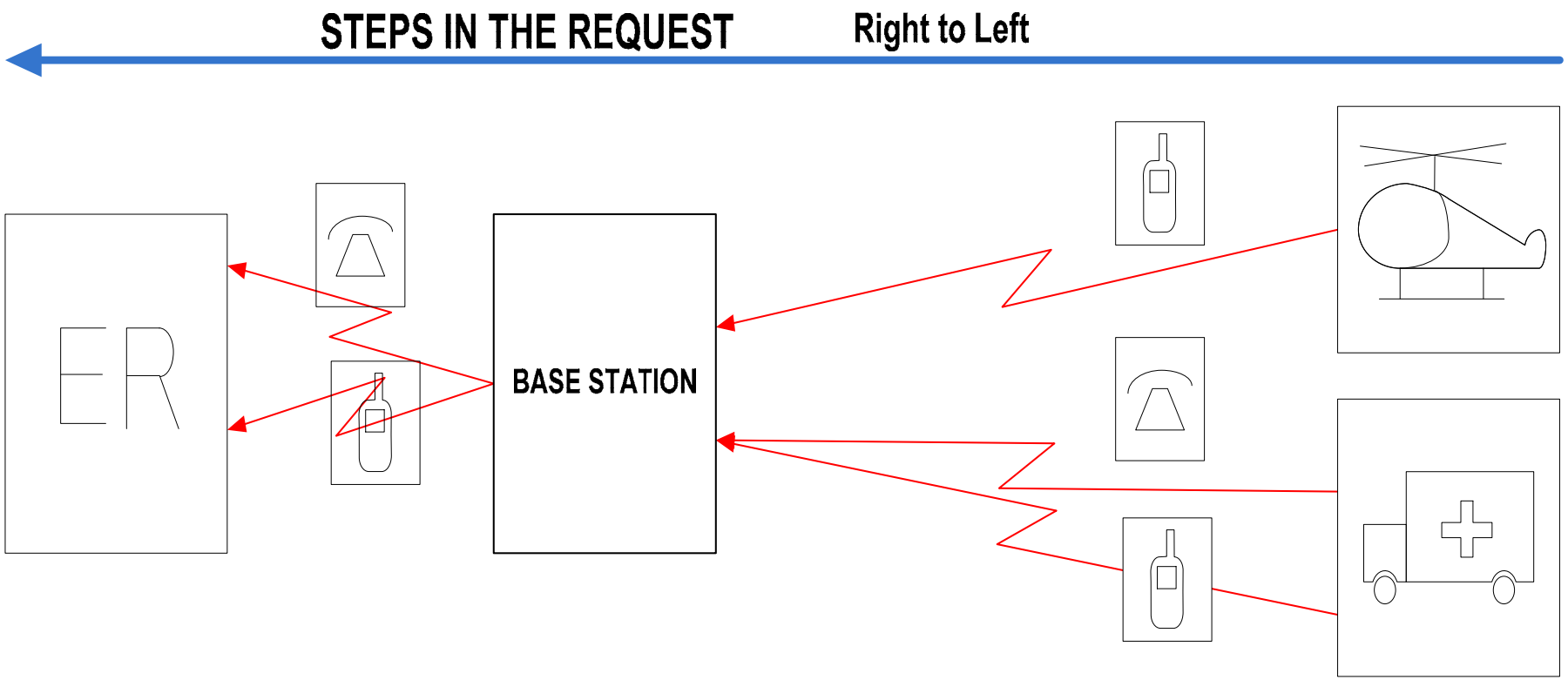
The Value Stream Map

- As soon as the request and process boxes are drawn we can start to see the *flow* of the work
- The objective is to fix problems with flow

The Value Stream Map

- VSMs identify *every* way that a request can be made

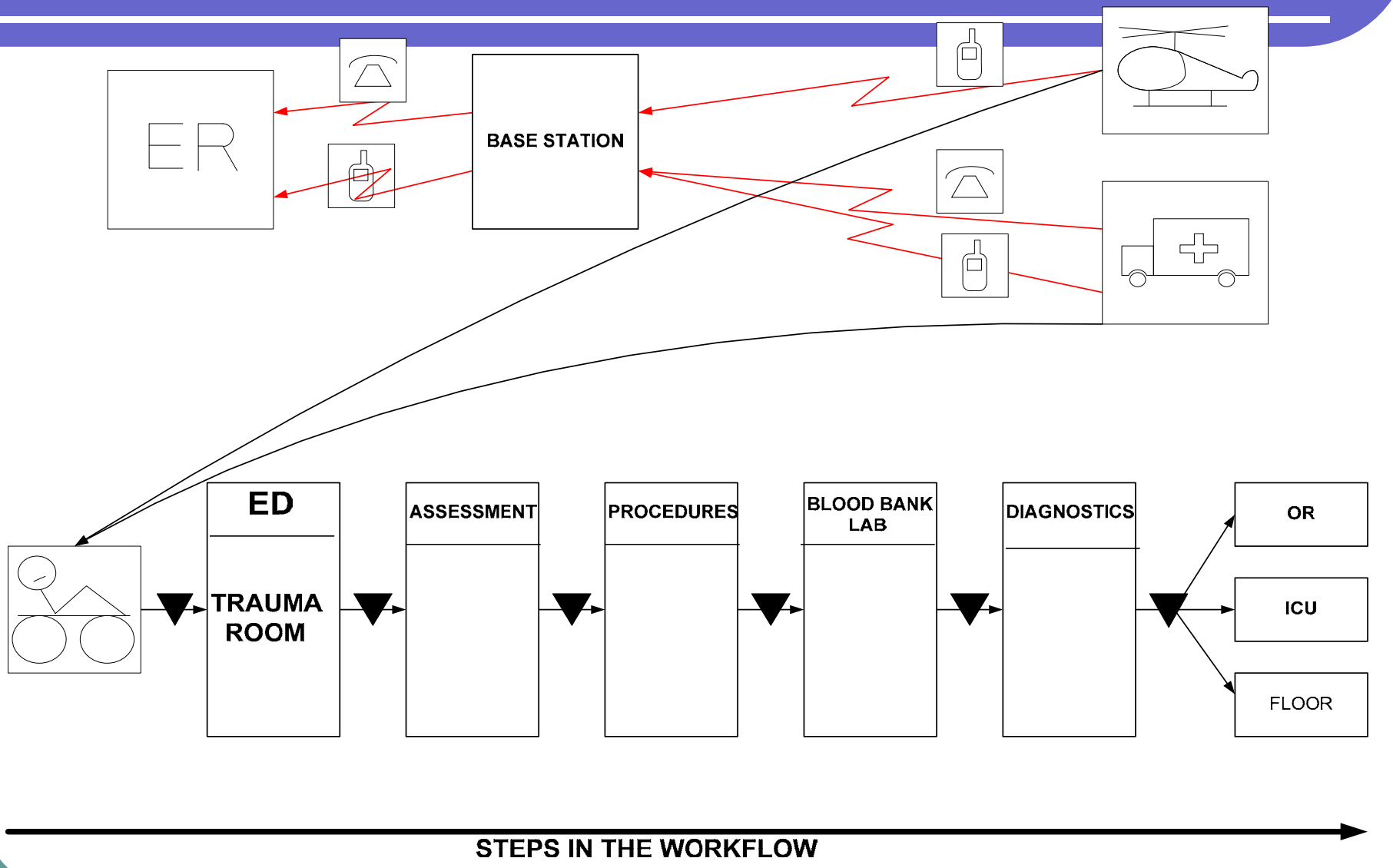
Trauma patient coming to ED



The Value Stream Map

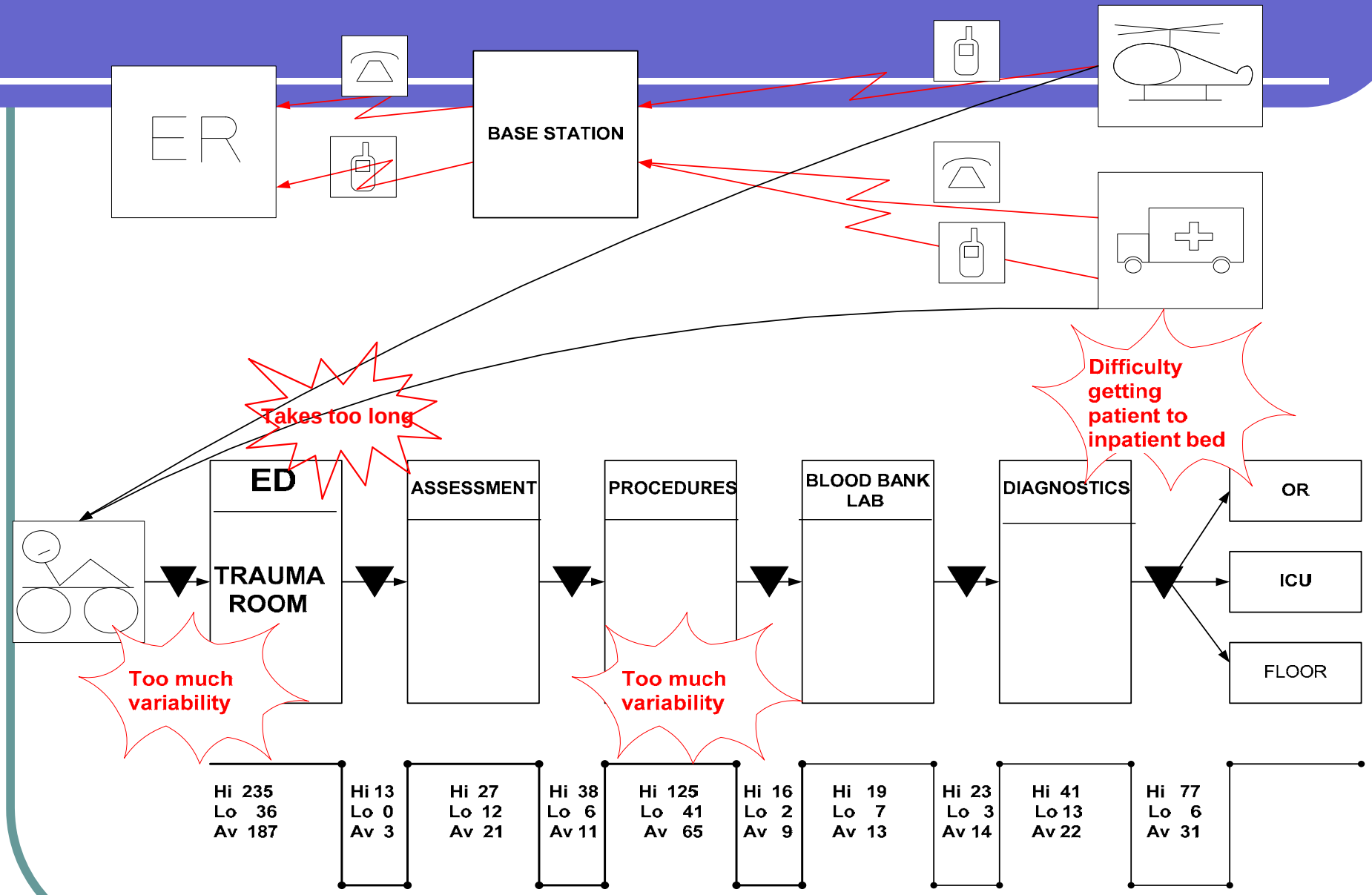
- When drawing a VSM, it is essential to follow the process at least once to understand how it really happens
- Validate your map with other workers to assure accurate mapping

Trauma Patient Flow in ED



Ways to use Value Stream Maps?

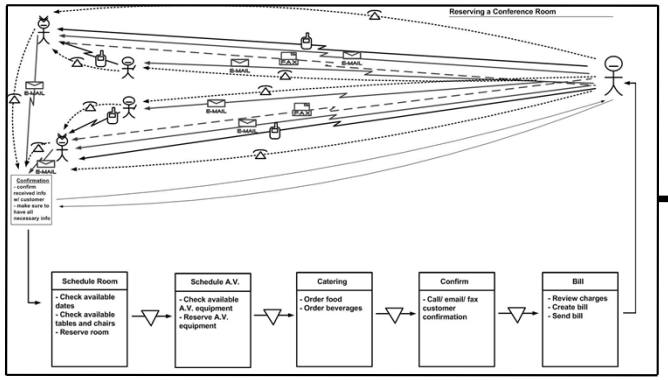
- To understand each step of a process
- To identify *where* there are problems
- To launch specific problem solving
- To orient new staff to the process
- To clearly describe the process to other departments/authorities



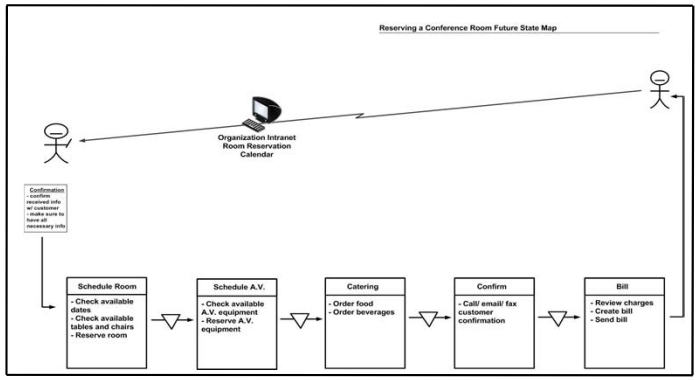
Future State Map

- Use your **CURRENT STATE VSM** as a springboard for drawing your **FUTURE STATE VSM**
  - What do you <u>want</u> the process to look like?

Project Management

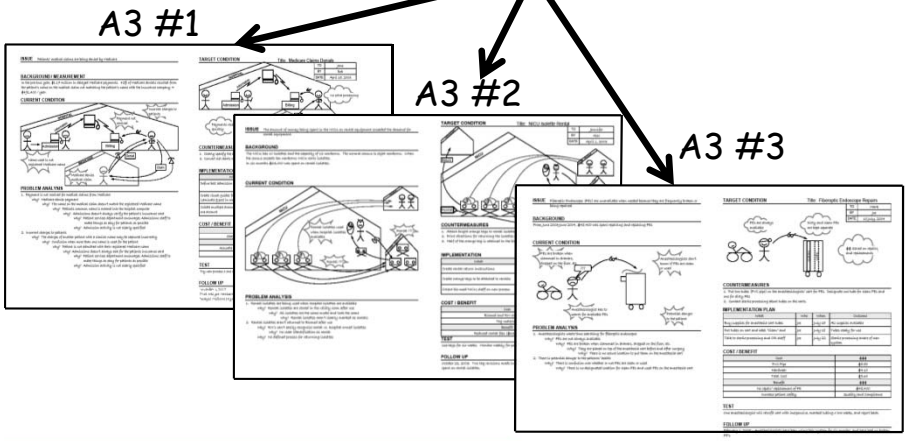


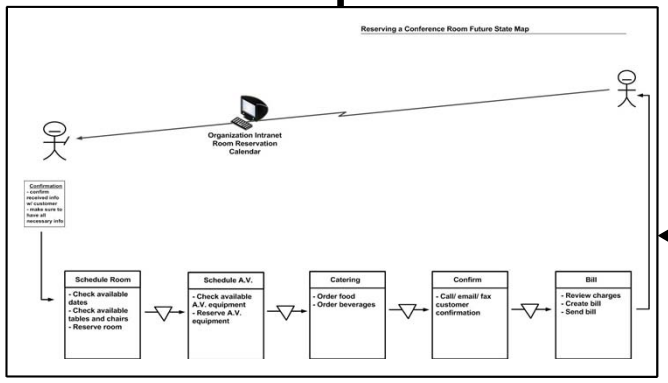
Current state map



Future State Map

Future State Plan





New current state map

A3s

Image: Wikimedia. Fir0002/Flagstaffotos. CC BY-NC.

Learning to see the trees for the forest

A3 Problem-Solving

"If you can't get your thinking on one page, you haven't really done your thinking."

M May

Ask the right questions and the answers will come **easily**

Sue Sheehy

The Jefferson Memorial Story

Image: Wikimedia. Joe Ravi. CC BY-SA 3.0.

Frontline Workers and A3S

- Allows your organization to experiment more
- Get faster, meaningful results
- Learning occurs in the course of work
- Generator of ideas → clusters and possibilities
- Opportunities to cluster ideas into bigger ones
- A3s can be organization-changing

Selecting A3 Topics

- Select first priority area from value stream (current state) map
- Observe!
- Identify specific issues
- Prioritize and begin!

The A3 Process

- A view with a microscope
- A tool for "drilling" down into variation in the process
- Documentation of problem solving activity
- It tells the story visually

Common sense may be your enemy

- Always temper immediate "knee jerk" action with root cause analysis
- Resist drawing conclusions based on emotions
- Question hear-say
- Draw from experience, but do not rely on it

Taiichi Ono,
Toyota

The A3 and The Pencil

- Lead is erasable. It gives you the opportunity to look at what you drew and make changes quickly
- You can focus on problem solving - not on how to use the tool
- It's non-threatening when used as a boundary tool

Selecting A3 Topics

- Select from your ***current state map***

  or…
- As soon as possible after a problem occurs

ISSUE

BACKGROUND

CURRENT CONDITION

PROBLEM ANALYSIS

TARGET CONDITION

TITLE

TO
BY
DATE

COUNTERMEASURES

IMPLEMENTATION PLAN

what	who	when	outcome

COST

COST BENEFIT/WASTE RECOGNITION

TEST

FOLLOW UP

The Issue

Always state the issue through the eyes of the customer/patient

ISSUE	Fiberoptic Endoscopes (FEs) are unavailable when needed because they are frequently broken or being repaired.

Background

Explain why this is an issue

Include some measurements

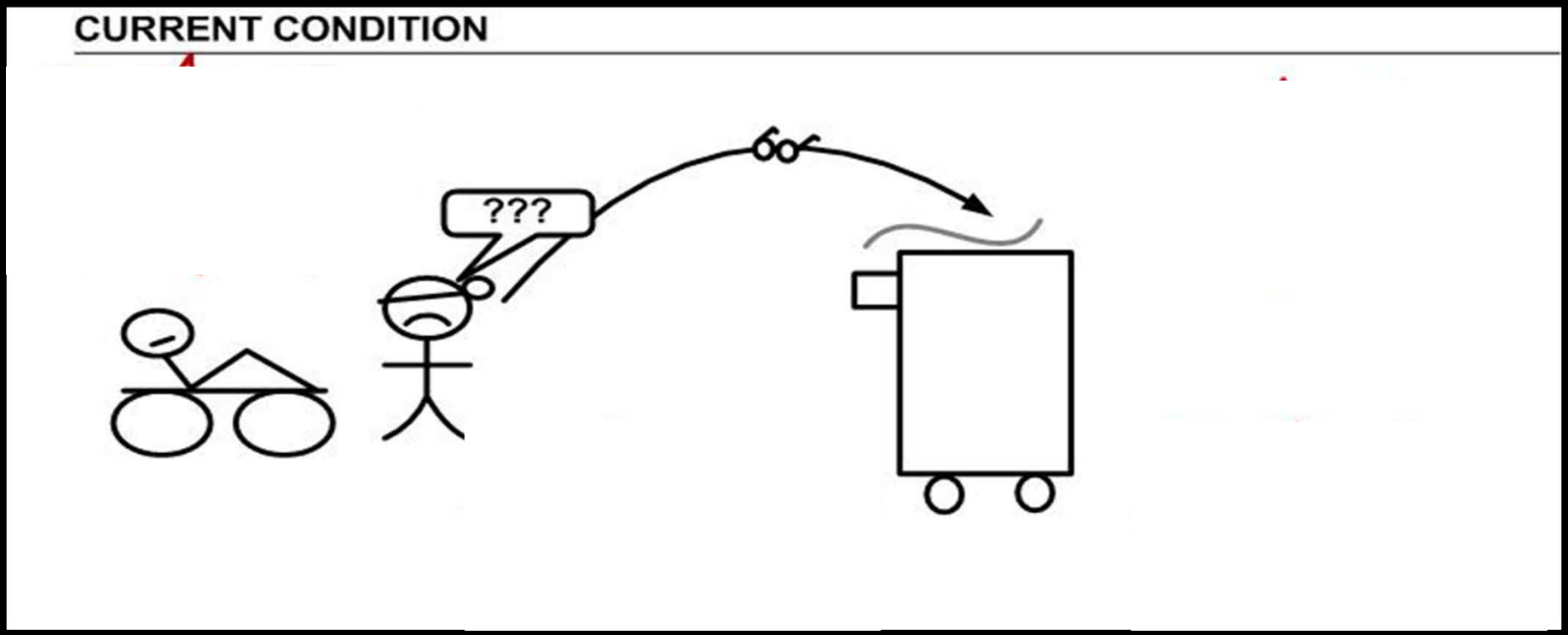
BACKGROUND

From June 2003-June 2004, $48,400 was spent repairing and replacing FEs

The Current Condition

Draw how the work happens now, from your observations

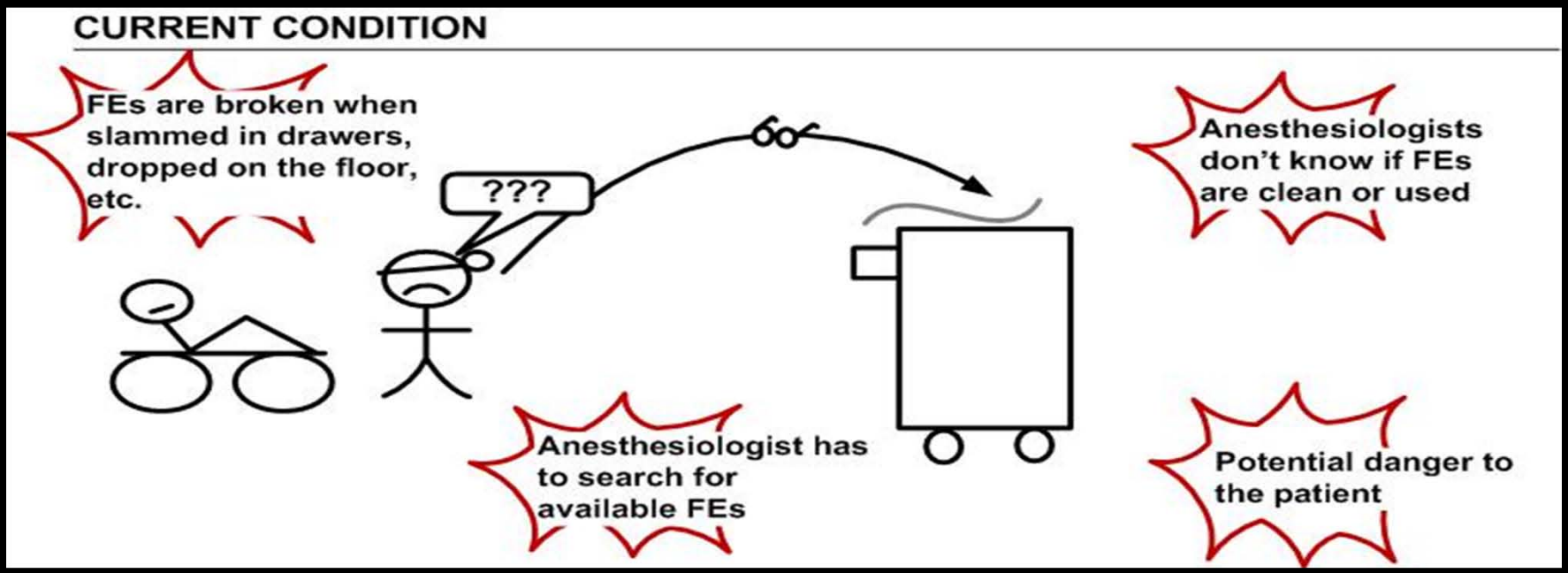
Validate your drawing with affected parties for accuracy and buy-in



Add storm clouds as close as possible to where they appear on the graphic

Waste

What's wrong with the way this work happens now?
What about this work is not Ideal?



Problem (Root Cause) Analysis

- Review the storm clouds; Consolidate the ones that are related to each other
- Use outline format and ask *WHY?* 5 times to get to the root cause

PROBLEM ANALYSIS

1.Anesthesiologists waste time searching for fiber optic endoscopes
  a. Why? Fiber optic endoscopes are not always available
    Why? FEs broken when slammed in drawers, dropped on floor, etc.
      Why? No designated place for endoscopes
  b. Why? They are placed on top of cart before and after procedures
    Why? There is no way to tell if they are clean or dirty
      Why? No designated location for clean scopes and dirty scopes

2. Potential danger to patients
  Why? Confusion as to which endoscopes are clean and which are dirty
    Why? No designated location for clean scopes and for dirty scopes

Root Causes

Root causes are *actionable* items

Most of the time root causes can be attributed to something not being specified (Lean Rule #1)

Why the left side is completed first

- Stupidity is having and answer for everything
- Wisdom is having a question for everything

Thousands of people saw the apple fall…

Image: Library of Congress. Public Domain.

only Newton asked "Why?"

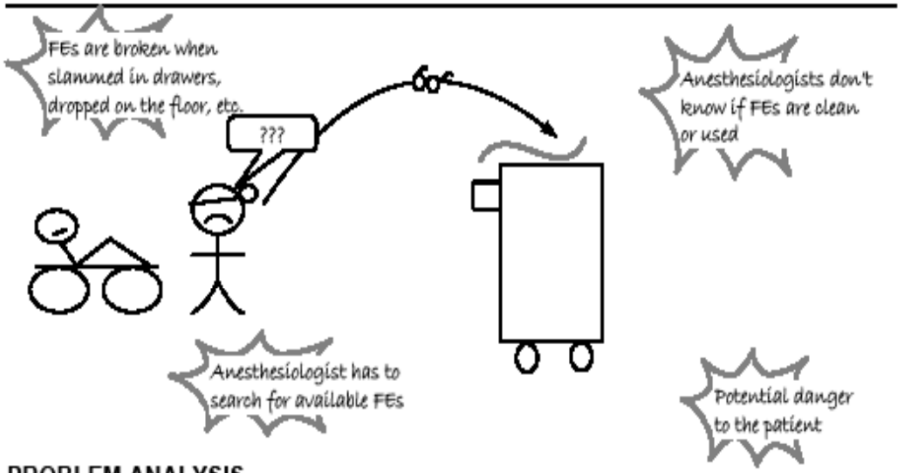
ISSUE

Fiberoptic Endoscopes (FEs) are unavailable when needed because they are frequently broken or being repaired.

BACKGROUND

From June 2003-June 2004, $48,400 was spent repairing and replacing FEs

CURRENT CONDITION



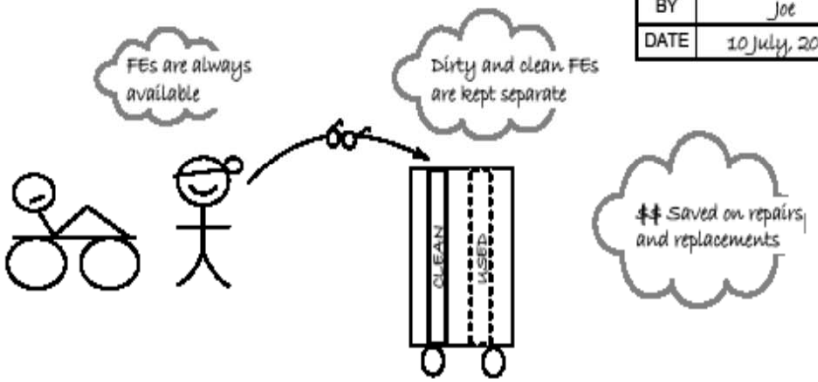
PROBLEM ANALYSIS

1. Anesthesiologists waste time searching for fiberoptic endoscopes
   - Why? FEs are not always available
     - Why? FEs are broken when slammed in drawers, dropped on the floor, etc.
       - Why? They are placed on top of the anesthesia cart before and after surgery
         - Why? There is no secure location to put them on the anesthesia cart
2. There is potential danger to the patients' health
   - Why? There is confusion over whether or not FEs are clean or used
     - Why? There is no designated location for clean FEs and used FEs on the anesthesia cart

TARGET CONDITION

Title: Fiberoptic Endoscope Repairs

TO	Mark
BY	Joe
DATE	10 July, 2004



COUNTERMEASURES

1. Put two tubes (PVC pipe) on the anesthesiologists' cart for FEs. Designate one tube for clean FEs and one for dirty FEs
2. Contact sterile processing about tubes on the carts.

IMPLEMENTATION PLAN

What	Who	When	Outcome
Buy supplies for anesthesia cart tubes	Joe	July 15	All supplies available
Put tubes on cart and label "Clean" and	Joe	July 18	Tubes ready for use
Talk to sterile processing and OR staff	Joe	July 22	Sterile processing aware of new system

COST / BENEFIT

Cost	$$$
PVC Pipe	$5.50
Hardwear	$4.10
Total Cost	$9.60
Benefit	**$$$**
No repair/ replacement of FE	$48,400
Increase patient safety	Quality and Compliance

TEST

One anesthesiologist will retrofit cart with inexpensive, marked tubing x two weeks, and report back.

FOLLOW UP

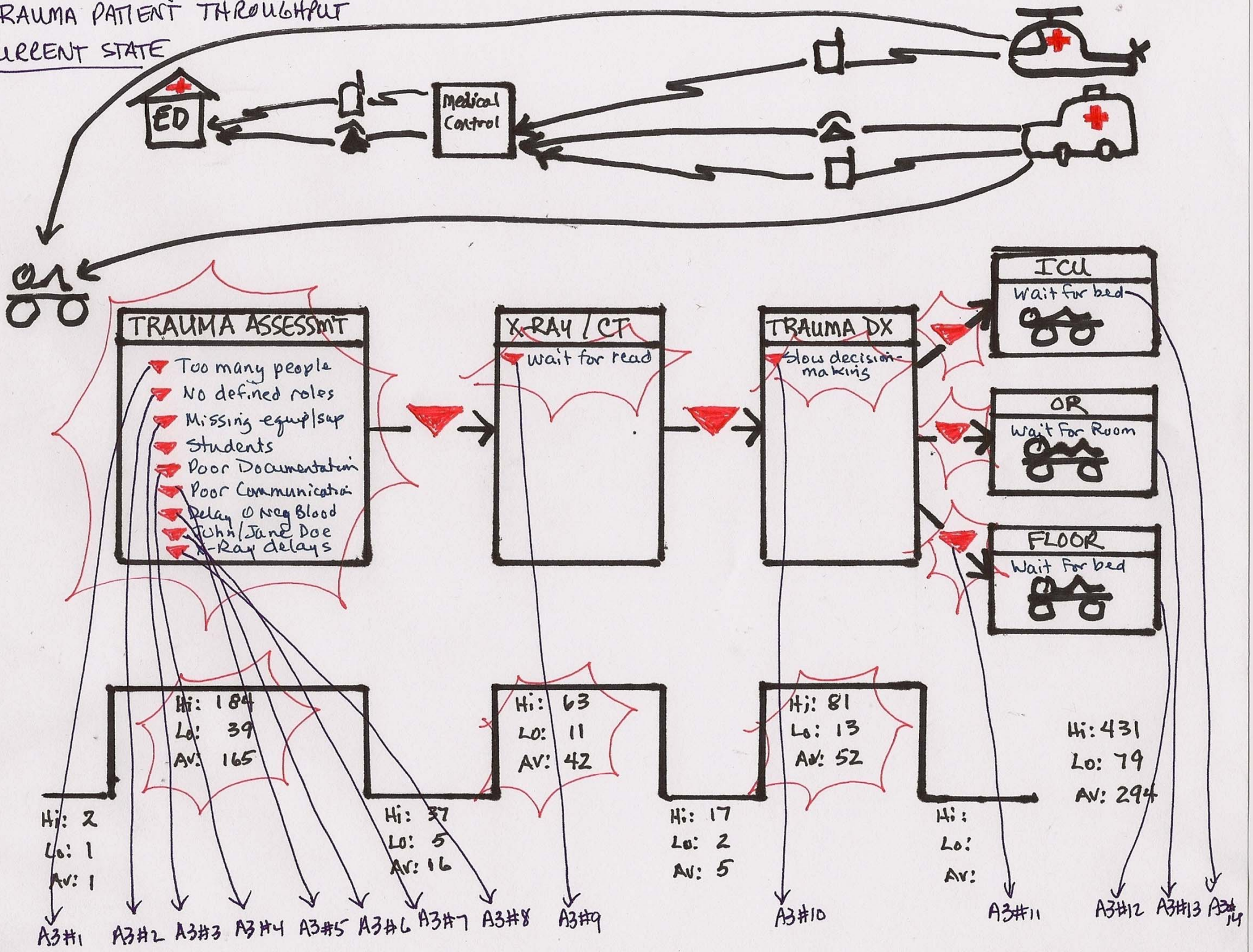
February 1, 2005 – Anesthesiologists have been using this system for six months, and have had no FE's

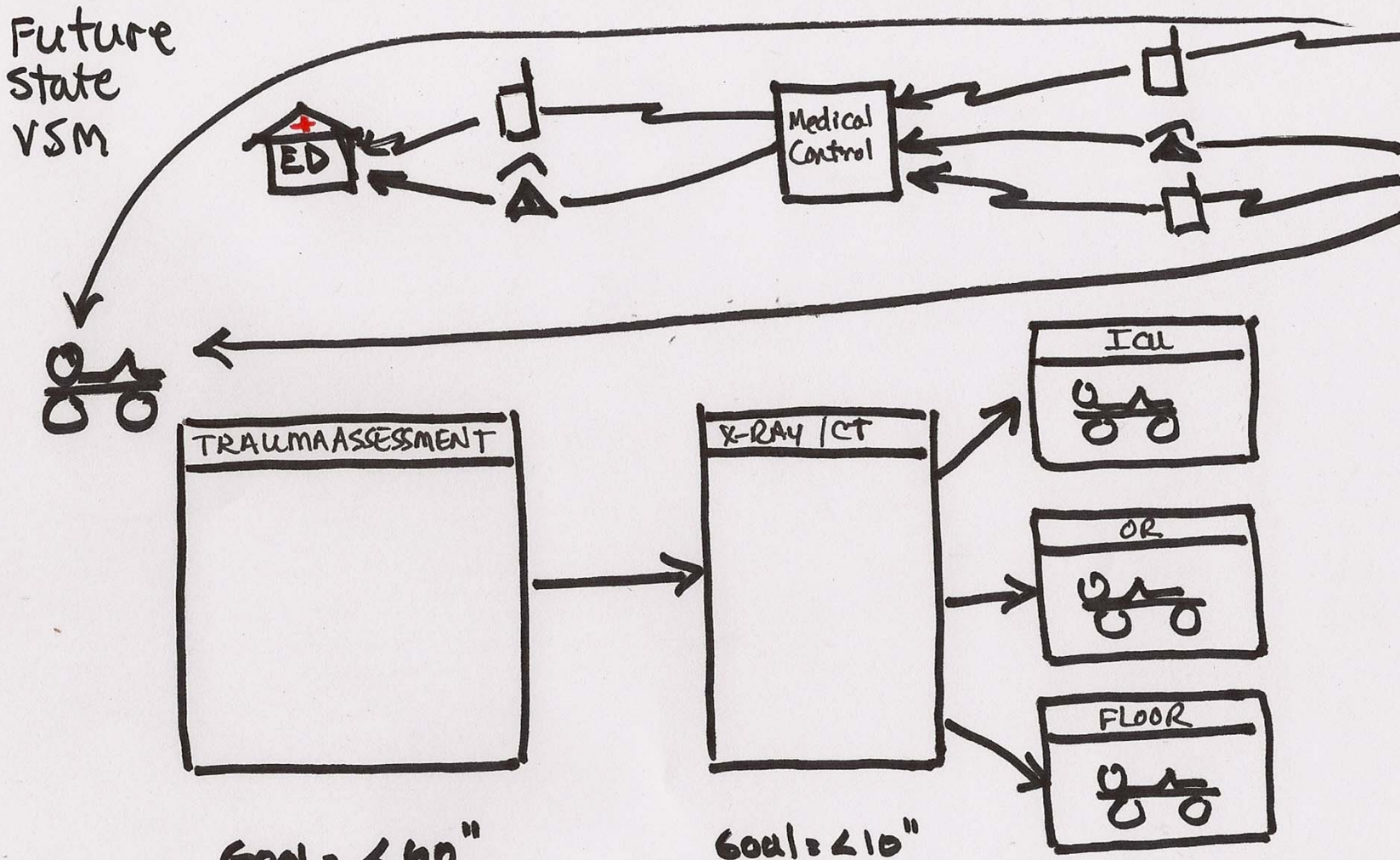
Where you can use A3 thinking

1. Specific problem-solving
2. Process redesign
3. Documentation of changes for regulatory bodies
4. Capital equipment purchase justification
5. Lean meetings
6. Employee evaluations
7. ????

TRAUMA PATIENT THROUGHPUT

CURRENT STATE




Future state VSM
ED
Medical Control
ICU
TRAUMA ASSESSMENT
X-RAY / CT
OR
FLOOR
Goal = < 60"
Goal = < 10"
TOTAL TIME = 70" or less
No extra people
All roles defined
Scribe
X-Ray Tech role integrated into team roles
OR Room always ready
Students have video view
Exchange Carts
Extra phones + intercom
Real time Reads
All transport equipment available
ICU + Floor beds always ready
ONE blood in room
Pre-numbered John/ Jane Doe MRs
No return to ED / Decision in Radiol.

ISSUE
Delay registering John/Jane Doe Trauma patients

BACKGROUND
Major trauma patients often arrive without identification. Lack of identification causes major delay in registering patient. Without hospital registration number, lab, blood bank, x-rays, etc. cannot be completed. Occurs 50+x/year

CURRENT CONDITION

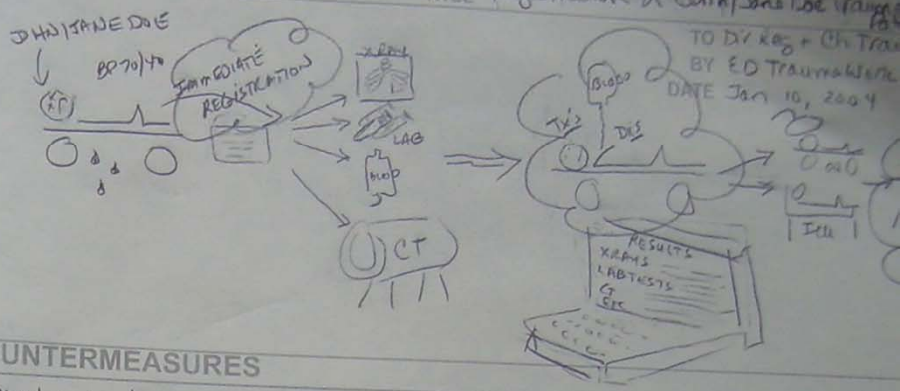
PROBLEM ANALYSIS

1. Delayed ursently needed dx + tx
   Why? Pt. has no ID, therefore unable to register
   Why? Hospital policy – all patients must be registered
   Why? To assure right patient getting right dx + tx

2. Unable to register patient due to patient being John/Jane Doe
   Why? Hospital requires all patients have identification in order to register
   Why? To assure right patient getting right dx's + tx's

TARGET CONDITION

TITLE Registration of John/Jane Doe Trauma



TO DX Dx + Tx
BY ED Trauma Nurse
DATE Jan 10, 2004

COUNTERMEASURES

1. Develop way to urgently register patient when pt i.d. not available → Initiate "Trauma Numbers" to sequentially register/id patients

IMPLEMENTATION PLAN

	what	who	when	outcome
①	Arrange for a sequence of "trauma numbers" ~~to be used for patient I.D.~~ to be made available	Director of Registration/ E.S.	Feb 15, 2004	Sequence of "trauma numbers" be available use for pt registra
②	Prepare trauma packets that contain trauma #, ~~&~~ pre numbered arm band, + all hosp paperwork	Trauma Nurse Coordinator	Feb 27, 2004	Complete, labeled packets available at all time
③	Purchase ~~storage~~ container for packets + ID location for container	Trauma Nurse Coordinator + ED Nurse Mgr	Feb. 15, 2004	Container purchased + placed in defined loca
④	Orient ED staff + trauma team re. use of trauma #'s	Trauma Nurse Coordinator	Feb. 27, 2004	Everyone on team un stands trauma # syst
⑤	Cross-reference pt's name (+SSAN when known) with trauma number	Registration personnel	As soon as pt name/SSAN known	All trauma patients who arrive as Jane/John Doe's have medical records # that matches both trauma # + patient's name/SSAN

COST
1 hr. time for Dir of Admin
6 hr. time for Trauma Nurse
Container – $7.99

COST BENEFIT/WASTE RECOGNITION
- Expedites patient care
- Allows for urgent Dx + Tx of critical pts
- May reduce morbidity + mortality

TEST
Feb 23 → March 23 – Document time's from pt arrival to first Dx test

FOLLOW UP
8/04 – Review all John/Jane Doe trauma cases with both trauma # + pt name/SSAN to assure all information documented correctly.

Delay registering John/Jane Does

ISSUE Too many people in Trauma Room

BACKGROUND Many people respond to a trauma I page/alert. Not everyone who responds have a specific role in the resuscitation. Occurs every time there is a trauma alert → difficult to dx + tx pt.

CURRENT CONDITION

PROBLEM ANALYSIS

1. Too many people in trauma room
   - Why? Overhead page when trauma alert
     - Why? Need to notify many people
       - Why? "Everyone wants to know" (?)
2. Roles not defined
   - Why? No one has taken time to define team roles
     - Why? No agreement on team member roles
3. Students want to see
   - Why? Students may learn by watching
     - Why? Difficult to learn otherwise
       - Why? No other method to learn
4. Noise level high
   - Why? Too many people in room
     - Why? No defined roles
5. Confusion + Delays
   - Why? Same as #4

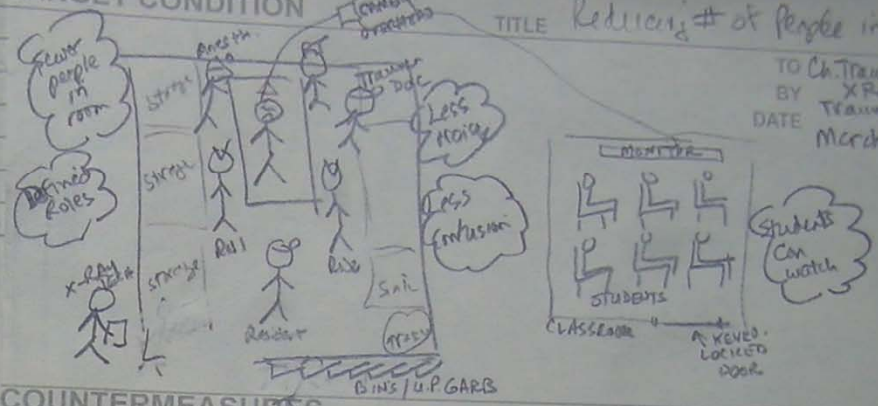
TARGET CONDITION

TITLE Reducing # of People in Trauma

TO Ch. Trauma, Surg, ED, X-Ray, RT

BY Trauma Committee

DATE March 21, 04



COUNTERMEASURES

1. Trauma team members carry trauma pagers; no overhead pages
2. a. Define roles of all trauma team members
   - b. Mount bin's outside of trauma room, labeled with each trauma role; bins contain universal gown; each team member dons u.p. garb; when bin empty, role is filled; no one in room without a role
   - c. Trauma Captain wears red vest indicating "Captain"
3. Mount overhead video camera in trauma room + monitor in ED classroom where students can watch

IMPLEMENTATION PLAN

	what	who	when	outcome
1.a	Trauma team members ~~trauma pagers~~ pagers	Communications	April 15, 04	All trauma team members have pagers
b.	Pagers tested daily	Communications	Begin April 15, 04	Daily pager test
2.a	Develop trauma team roles	Trauma Committee	April 30, 04	Roles defined
b.	Order bin's for outside room	Tr. Nurse Coord.	April 15, 04	Bins obtained
c.	Mount + fill bins w/ u.p. gear	Maintenance + Tr. Coord.	April 20, 04	Bins mounted
c.	Purchase red vest	Tr. Nurse Coord	April 15, 04	Vest available
3.	Purchase overhead camera + monitor	AV Dept	April 30, 04	Camera purchased
4.	Install overhead camera + monitor	AV Dept + Engineering	May 5, 04	Camera + monitor functional

COST

No cost for pagers - in stock
Bins - $80 Camera $250 Installation $250
Vest - $18 Monitor already have Total $598

COST BENEFIT/WASTE RECOGNITION

- Better delivery of care
- Reduced risk of errors
- Better patient outcomes
- Less time in ED - further to OR/ICU

TEST

Trauma Nurse Coordinator observe next 5 trauma cases

FOLLOW UP

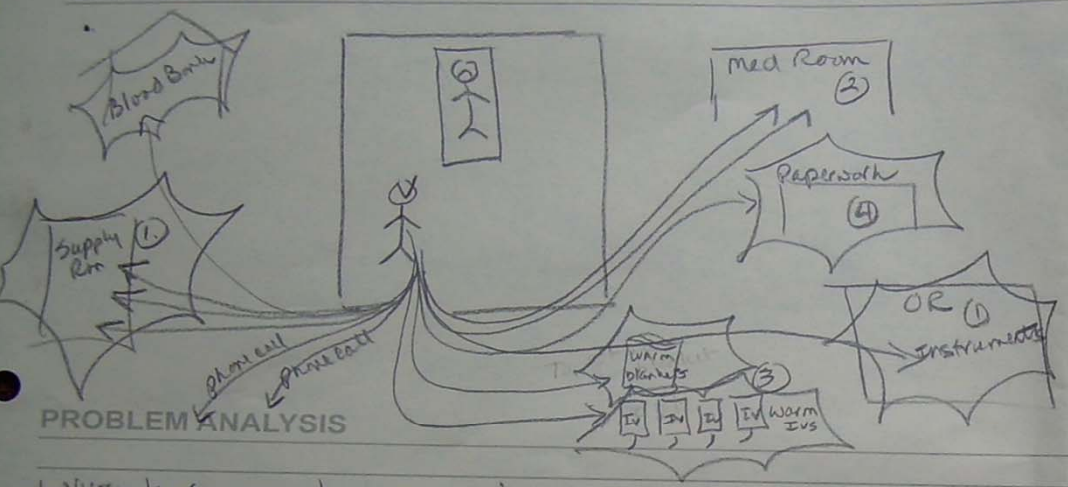
Monthly review/input at Trauma Conference

Too many people in trauma room

ISSUE Needed supplies & equipment not in trauma room

BACKGROUND In most major trauma cases, the nurse must leave the trauma room to retrieve needed supplies. 10-14 major trauma cases per week

CURRENT CONDITION



PROBLEM ANALYSIS

1. Nurse leaves room to get required instruments
   Why? Needed instruments not in room
   Why? Not replaced after last case
   Why? No time between cases

2. Nurse leaves room to get refrigerated meds
   Why? Meds in refrigerator in med station
   Why? No refrigerator in room

3. Nurse leaves room to get warm blankets & warm IV solutions
   Why? Warmer down the hall
   Why? Only one in department used by all

4. Nurse leaves room to get paperwork
   Why? Paperwork at main desk

5. Nurse leaves room to make phone calls
   Why? One phone in room – in use

TARGET CONDITION

TITLE All trauma supplies in trauma room

TO Ch. Trauma | Dir C.S.
BY Trauma Committee
DATE March 30, 2004

COUNTERMEASURES

1. Exchange trauma supply carts | one cart use per patient
2. Small refrig for trauma meds that must be refrigerated
3. Small blanket warmer
4. Small IV warmer
5. Nurse carries portable phone; also, intercom on wall to ED UC, OR, Blood Bank

IMPLEMENTATION PLAN

what	who	when	outcome
1.a Determine contents of carts	Trauma Committee	April 1, 04	All trauma equip on carts
b Meet with Central Stores to plan cart restock + charges	Tr. Nurse Coord + Dir C.S.	April 15	Agreement on restock + charges
c. 3 carts in ED, 2 in C.S.	Dir. C.S.	April 30	5 available carts
d. Page for C.S. when trauma paged, bring cart	Dir C.S.	April 30	Always have replacement
e Dirty supplies in bin on bottom of cart	Tr. Nurses	each case	Dirty supplies in one place
f. Charges done by C.S when replacing	C.S staff	each case	All charges captured
2, 3. Sm refrig + 2 warmers for trauma rm	Tr. Coord	May 1	warmers for blankets + IVs, Refrig for meds

COST
1. Carts already available
   paper already available
2. Small Refrig $200
3. 2 small warmers $400
TOTAL $600

COST BENEFIT/WASTE RECOGNITION
1. Better ability to deliver care to patient
2. Reduced time in ED
3. Always prepared for next patient

TEST
Monitor 5 trauma cases to assure all plans working

FOLLOW UP
Review is at monthly Trauma Committee Meeting

4. Trauma paperwork packs in room – See A3 on Registration

5. Assign nurse phone – ED Dir 4/30 nurse has phone
6. Intercom – see Blood Bank A3

Needed supplies/equipment not in room

ISSUE A lot of excessive movement in trauma room

BACKGROUND Physicians, nurses, others traveling to numerous spots in trauma room to find supplies, perform procedures, throw away trash, etc on every trauma case. 10-14 major trauma cases/wk

CURRENT CONDITION

PROBLEM ANALYSIS

1. Too much movement in trauma room
   - Why? Supplies, equipment, meds not near staff
     - Why? Staff not assigned roles
     - Why? Equipment not organized to roles

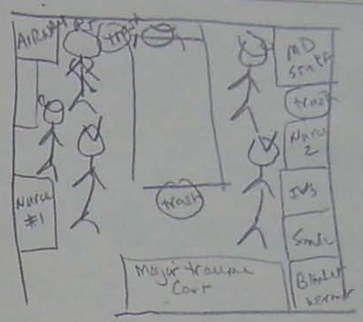
TARGET CONDITION

TITLE Reduce staff travel in trauma

TO ED staff / Trau

BY Trauma Team

DATE May 5, 04



COUNTERMEASURES

1. a Roles defined (See A3 - Reducing # people in trauma room)

   b Organize equipment location based on location of staff performi

IMPLEMENTATION PLAN

what	who	when	outcome
1. a Define roles	(See A3 - Reducing # of people in trauma ro		
b. Based on roles, identify specific equipment needed to perform role	Tr. Doc, Tr Nurse	April 30, 04	Roles defined, e in proper locati
c Determine placement of equipment in trauma room	Tr Nurses Tr Committee	April 30, 04	All equipmen proper places

COST

No cost

COST BENEFIT/WASTE RECOGNITION

- Reduce wasted movement
- ↓ patient time in ED → better outc

TEST Tr Nurse Coordinator draw spaghetti maps on next 5 trauma pt #1 - Nurse 1; #2 - nurse 2; #3 - trauma doc; #4 - Resident; #5 ET

FOLLOW UP

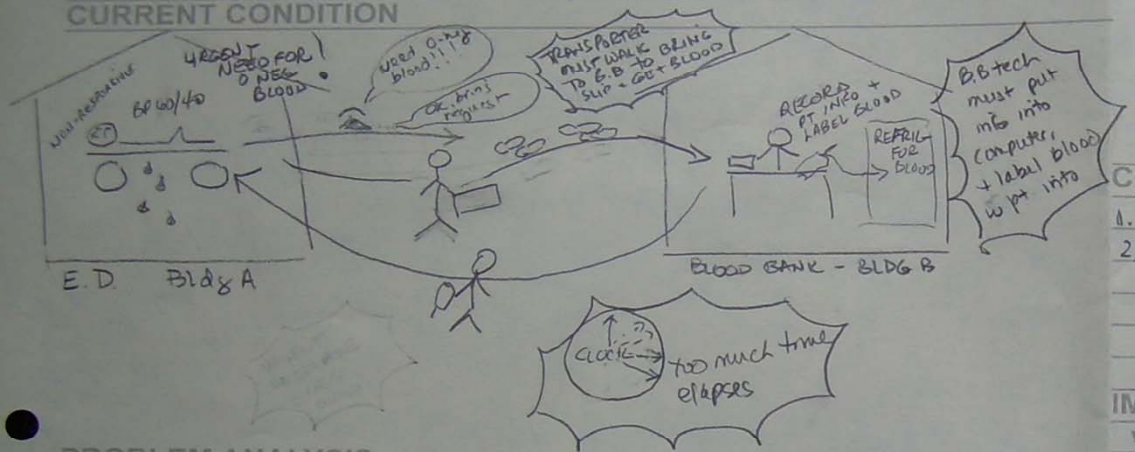
Tr Nurse Coordinator spot observes over period of 6 mo

Much excessive movement in room

ISSUE Delay in obtaining O negative blood for critical trauma patients

BACKGROUND Because this is a very busy, inner city, Level 1 trauma center, we often receive critically injured trauma patients who are severely hypotensive and in need of immediate infusion of O-negative blood. It often takes >20" to get the blood

CURRENT CONDITION



PROBLEM ANALYSIS

1. Transporter must bring blood slip to Blood Bank & wait to bring back O Neg blood to ED
   Why? No pneumatic tube to Blood Bank
   Why? In another building
2. Blood Bank Tech must put info into computer & label blood with patient's info
   Why? Can't enter pt into & release blood until pt. info received
   Why? Patient safety reasons
3. Too much time elapses
   Why? Someone must walk paperwork to Blood Bank and must wait until B.B. tech releases blood
   Why? No rapid way to obtain blood

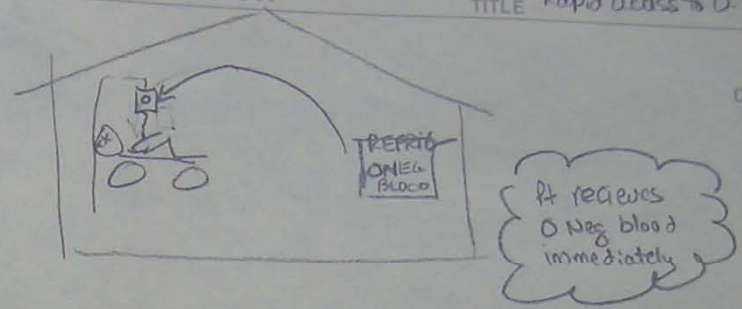
TARGET CONDITION

TITLE Rapid access to O neg blood for critical trauma patients

TO Pts w trauma/Dr Bs

BY ED Trauma workers

DATE Jan. 17, 2004



COUNTERMEASURES

1. Store O Neg blood in ED.
2. Have pre-labeled "trauma number" blood slips (in packet with all other pre-numbered material for one patient).

IMPLEMENTATION PLAN

what	who	when	outcome
1. Place small refrig in ED trauma room	Blood Bank Director	Feb. 17, 2004	BB Refrig in ED Tra
2. Place 4 units O neg blood in refrig.	Blood Bank Tech	Feb 18, 2004	4 Units O Neg blood available in ED
3. Place + maintain plastic lock on refrigerator	Blood Bank Tech	Begin Feb 18, 2004 @ lock daily	B.B. refrig in ED ha plastic lock on st
4. Blood close to expiration date rotated into BB stock + replaced	Blood Bank Tech	Begin monitor Feb. 18, 2004	All O Neg blood in ED current; close to exp used by main B.B.
5. Intercom in ED Trauma Room to BB - OR	ED Director	Feb 18, 2004	Able to notify BB of O neg blood from tra

COST

- Sm. refrigerator – B.B has one/knows to buy
- Intercom in ED Trauma Room #1500

TEST

Monitor use over 1 month

COST BENEFIT/WASTE RECOGNITION

- O Neg blood immediately available; may prevent morbidity + mortality
- Direct communication ↕ Blood Bank for urgent ↓ delay time
- O Neg blood to pt reduced from 20" to 0"

FOLLOW UP

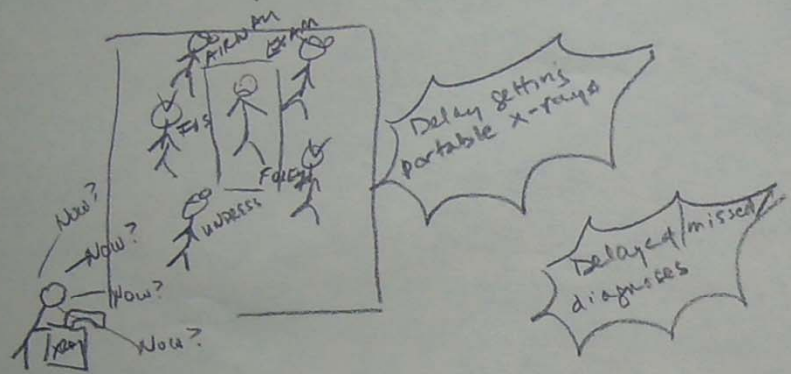
Keep log in ED Trauma Refrig at all times to ID any problems.

Delays in obtaining O-negative blood

ISSUE Delay obtaining portable trauma films – CXR, CTL, KUB

BACKGROUND Radiology Techs are usually standing by, But have difficulty integrating obtaining x-rays with other trauma procedures occuring

CURRENT CONDITION



PROBLEM ANALYSIS

1. Delay getting portable x-rays
   Why? Staff all around pt. doing things
   Why? Trying to Dx + Tx
   Why? To provide appropriate care

2. Delayed or missed diagnosis
   Why? Portable x-rays not done in timely manner
   Why? Radiology tech cannot get close to patient
   Why? Staff all around patient doing things

TARGET CONDITION

TITLE Delay obtaining portable x-rays
TO Ch. Trauma
BY TNC + Dir Radiology
DATE April 13, 04

COUNTERMEASURES

1. Integrate x-rays into early assesment routine so appropriate dx can be don

IMPLEMENTATION PLAN

what	who	when	outcome
1. Obtain 2 4"x4"x3ft boards for under head + foot of backboard to allow for easy x-ray film placement	Carpentry	April 10	Available for use in
2. Work with x-ray techs to determine appropriate time + sequence for x-rays	TNC	April. 20	xRay techs know when films should b
3 Inform trauma team that x-ray tech will be agressive in obtaining films	TNC	April. 10–20	All trauma team members aware

COST
- 2 4"x4"x3ft boards $14.98
- varnish for boards 6.00
TOTAL $20.98

COST BENEFIT/WASTE RECOGNITION
- X Rays done in timely manner
- Timely diagnoses based on x-rays

TEST
monitor 5 trauma cases to assess for timelyness of x-rays

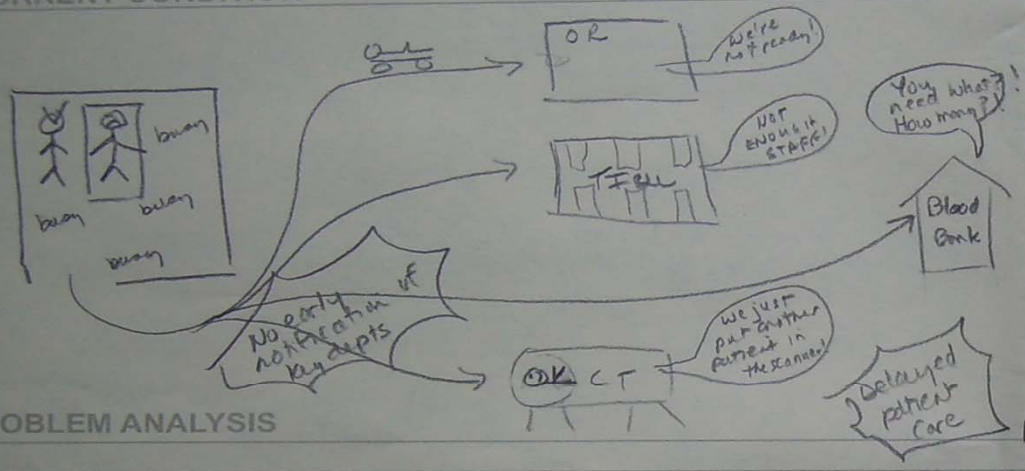
FOLLOW UP
Over 6 month period, monitor timeliness of x ray results

Delays obtaining portable x-rays - CTL, CXR, KUB

ISSUE Anotherie breakdown in communication regarding critical trauma patient between ED and OR; ICU; Blood Bank; CT scan

BACKGROUND During busy trauma case, sometimes very short notice to OR, TICU, Blood Bank, CT Scan regarding urgent needs → Communication breakdown + delayed patient care

CURRENT CONDITION



PROBLEM ANALYSIS

1. No early notification of key departments
   Why? ED/Trauma staff busy with patient care
   Why? No system in place to notify other departments
2. Delayed patient care
   Why? Key departments receive little notice patient is coming to them – may not be prepared
   Why? No system in place to notify other departments.

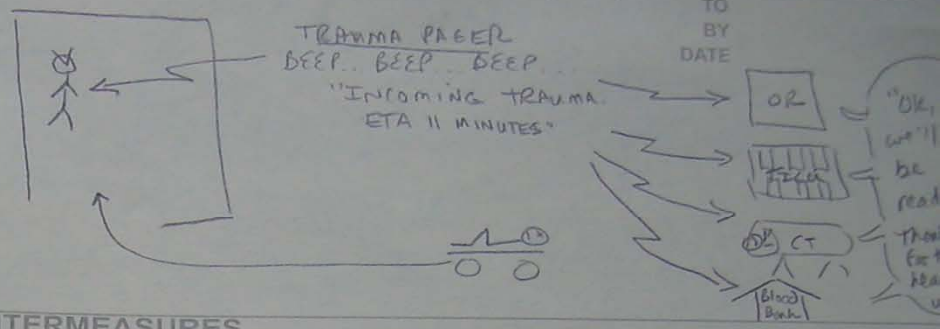
TARGET CONDITION

TITLE Improved communication with OR, BB, TICU, CT

TO

BY

DATE



COUNTERMEASURES

1. Assign trauma pagers to key departments – OR, ICU, CT, BB so they receive notification of incoming trauma patients

IMPLEMENTATION PLAN

what	who	when	outcome
a. Meet with dept directors	TICU, OR, CT, BB	May 1, 04	Decision as to who will carry pagers dept responses # Pagers needed in ha
b. Obtain ___ # pagers	Tr. Nurse Coord	May 2, 04	
c. Email to Dir Communications re: adding TICU, OR, CT, BB to trauma page + daily check	Tr. Nurse Coord	May 2, 04	All added to Trau page group
2. Prepare instructions to pagercarriers not to call ED but to come if need info	Tr. Nurse Coord	May 2, 04	All pagercarriers understand process

COST

4 pagers @ $90 = $360

COST BENEFIT/WASTE RECOGNITION

- Rapid response to trauma pt needs
- More rapid care
- May ↓ M + M

TEST

TNC to follow up one wk after implementation to verify receipt of pager + to solicit feedb

FOLLOW UP Beginning May 15, 04
Reps from TICU, OR, BB, CT invited to monthly Trauma Meeting for information purposes + to resolve issues

Breakdown in communication between ED and OR, ICU, Blood Bank, CT

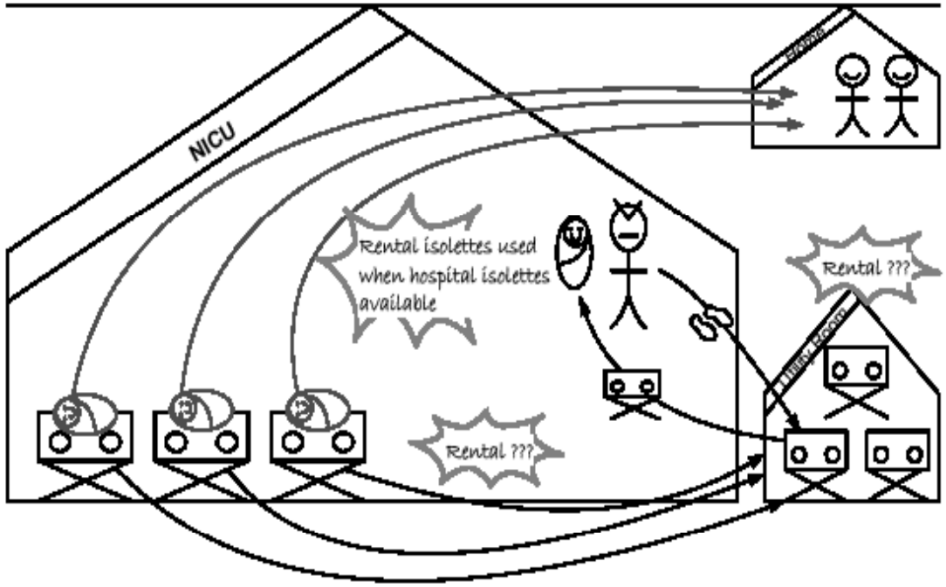
ISSUE

The amount of money being spent in the NICU on rental equipment exceeded the demand for rental equipment.

BACKGROUND

The NICU has 10 isolettes and the capacity of 12 newborns. The normal census is eight newborns. When the census exceeds ten newborns NICU rents isolettes.
In six months $63,000 was spent on rental isolettes.

CURRENT CONDITION



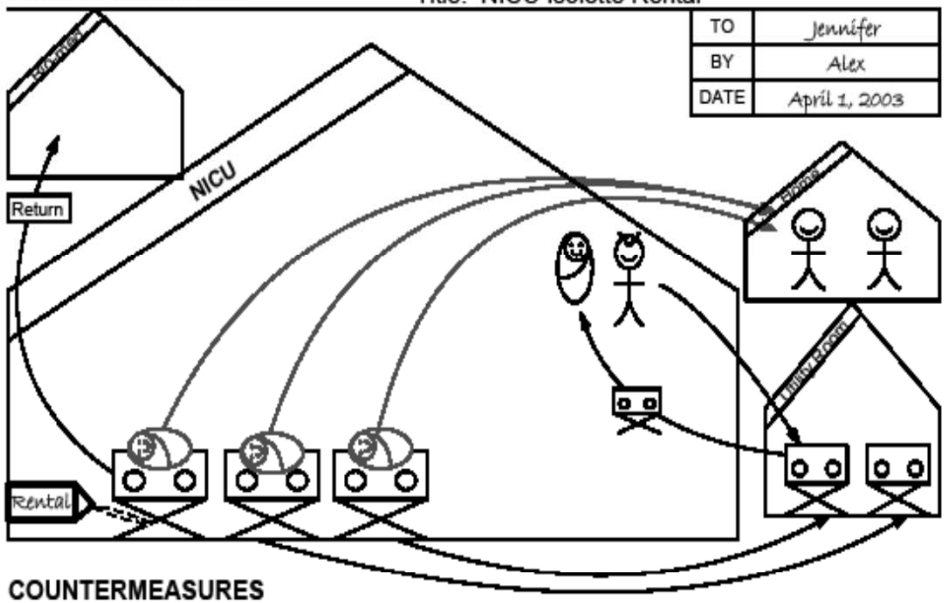
PROBLEM ANALYSIS

1. Rental isolettes are being used when hospital isolettes are available
   - why? Rental isolettes are stored in the utility room after use
     - why? All isolettes are the same model and look the same
       - why? Rental isolettes aren't clearly marked as rentals
2. Rental isolettes aren't returned to Biomed after use
   - why? RN's can't easily recognize rental vs. hospital owned isolettes
     - why? No clear identification as rental
   - why? No defined process for returning isolettes

TARGET CONDITION

Title: NICU Isolette Rental

TO	Jennifer
BY	Alex
DATE	April 1, 2003



COUNTERMEASURES

1. Attach bright orange tags to rental isolettes when checked out of the bio-med department
2. Print directions for returning the isolettes on the orange tag
3. Half of the orange tag is retained in the bio-med department to track the rental equipment

IMPLEMENTATION

What	Who	When	Outcome
Create rental return instructions	Bio-med /RN	4/5/06	Instructions ready to print on tag
Create orange tags to be attached to rentals	Bio-med /RN	4/10/06	Tags ready for use
Orient bio-med/NICU staff on new process	Bio-med /NICU	4/15/06	New process implemented

COST / BENEFIT

Cost	$$$
Biomed and RN staff time	4 hours
Tag materials	$60
Benefit	**$$$**
Reduced rental fees ($63,000 - $27,800)	$35,200

TEST

Use tags for six weeks. Monitor weekly for possible revisions.

FOLLOW UP

October 22, 2003: Two tag revisions made in six weeks. In the six months after implementation, $ spent on rental isolettes.

Using Lean for Facility Design

Experience: Process

PLAN: LEAN Process Application Examples

Image: Wikimedia. Arnfern. CC BY-SA.

EMERGENCY DEPARTMENT

CURRENT STATE PROBLEMS	OPERATIONAL ISSUES	POTENTIAL FACILITIES SOLUTIONS
Door-to-doctor wait times	No patient beds available	Transition-to-Admission Unit
Diagnostic testing and result delivery wait times	Waiting for diagnostic results	Chair-centric waiting (in both Nursing Units for discharges and in ED for diagnostic results)
Boarding of patients in the Emergency Department	Inpatient discharge scheduling	Teleconferencing for consultations to reduce turn-around
Leaving without seeing a doctor (due to unacceptable wait times)	Waiting for specialist consultation	Real-time bed tracking to identify ready rooms
Infection control	Equipment availability	Selection of finishes to expedite cleaning / patient room turn around

Experience: Process

PLAN: LEAN Process Application Examples

Image: Wikimedia. Arnfern. CC BY-SA.

PERIOPERATIVE

CURRENT STATE PROBLEMS	OPERATIONAL ISSUES	POTENTIAL FACILITIES SOLUTIONS
Delayed start times	Anesthesia not ready for next case	Proximity of lounge and office space to Pre-operative unit and Operating rooms
Case cart picks	Unsure if room is available for housekeeping / turn-around procedures	Flow / proximity of Pre-operative unit to Operating rooms
Room turn-around	Equipment set-up for next case	Flow / proximity of Family Waiting to Operating rooms
Pre-operative to post-operative transitioning	Patient transfer from Pre-operative unit	
Operating room to PACU transitioning	Housekeeping procedural efficiency	

Encourage Your Staff to Be Innovative

"Try to figure out a way to do something better that is has ever been done before."

Dan Needham
Former CEO Jet Blue

Identify Leadership Champions

- Senior Leadership Team member responsible for Lean activities
  - Who on your team will *own* this work?
- Physician champions
  - An Individual? A Committee?
- Informal Leaders
  - Managers, Supervisors, Staff

The Ideal Lean Coordinator

- Coordinates all Lean activities
- Based in the Quality/PI Department
- Has a deep understanding of the organization's philosophy, strategic plan, administration and management styles
- Communicates to SLT/Middle Managers/Staff
- Has great coaching and interpersonal skills

Instead of saying

Say, "No one knows this job better than you do! How can I help?"

Ideal Leadership Behaviors

- Coach and engage in the work
- Respect for all people
- Focus on the process
- Recognize and reward staff
- Lead by example
- Create a vision and make it happen!
- Commit to achievement of Ideal
- Stick to it for the long run
- Ignite a culture change in the organization

Healthcare

Where "good enough" never is

Lean does not light a fire under people … it lights a fire within them

M May

“It’s kind of fun…

to do the impossible”

Walt Disney

So let's attempt the impossible…

Let's fix what's wrong with Healthcare!!!

16.660J / ESD.62J / 16.853 Introduction to Lean Six Sigma Methods
IAP 2012