Lessons Learned in Harvesting Continual Savings and Improved Quality During Our Multi-Site Lab's Eight Year Journey

Rita D' Angelo
D'Angelo *Advantage*

Learning Objectives

Be able to:

- Understand the importance of Lean principles applicable to any environment
- Identify redundancy and waste within all manufacturing processes
- Define and recognize cost saving strategies

The Critical Elements of Lean

1. Leadership ✸
2. Structure
3. Training and education
4. Worker Empowerment
5. Process Improvement
6. Sustainability

✸ Leadership is KEY

Leadership

Managing for Quality

Top Down

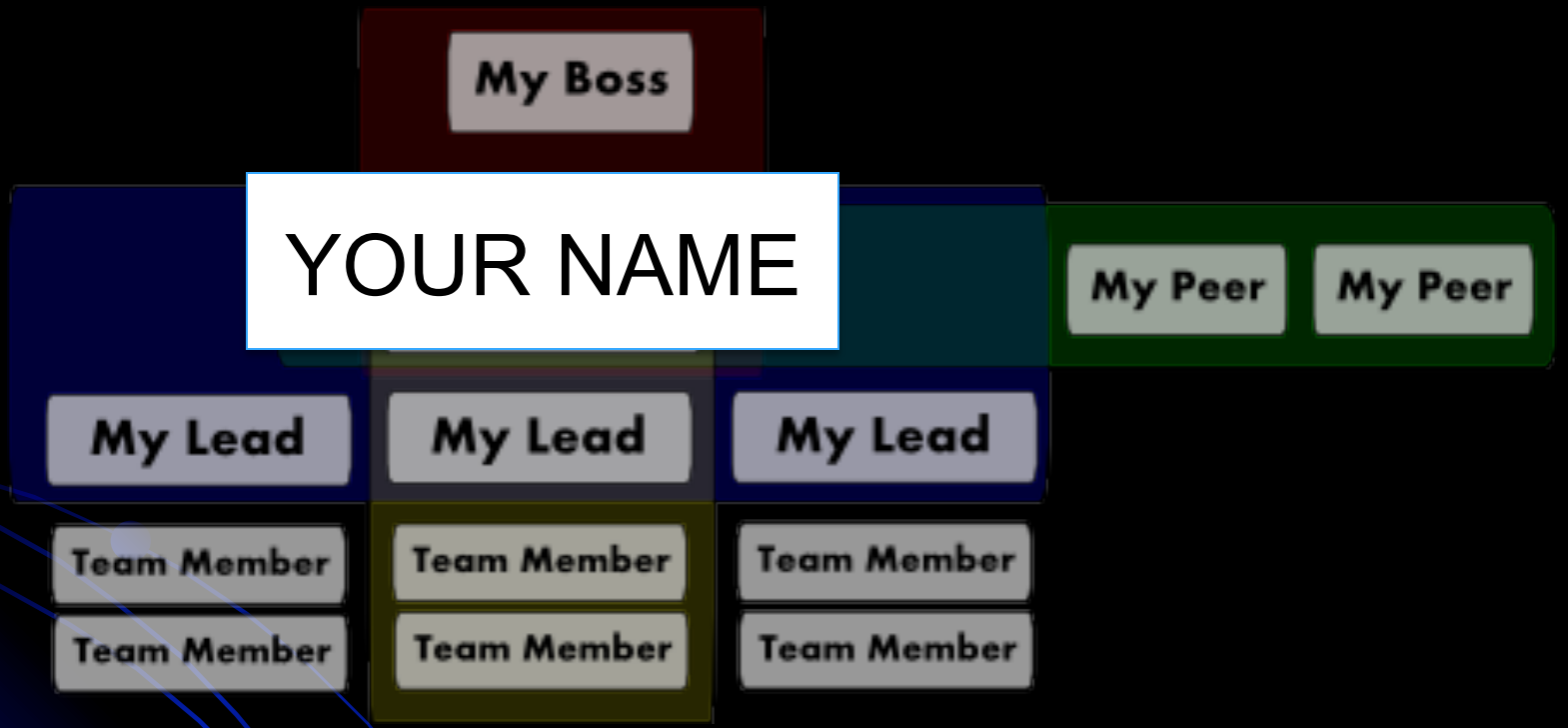
System-wide Leadership
Strategic Planning
Integrated Key Performance Indicators
PDCA Planning

Process Improvements

Bottom Up

Entire System-wide Workforce
Daily Kaizen Improvements
Level of the Work
PDCA A3 Improvements

The Structure

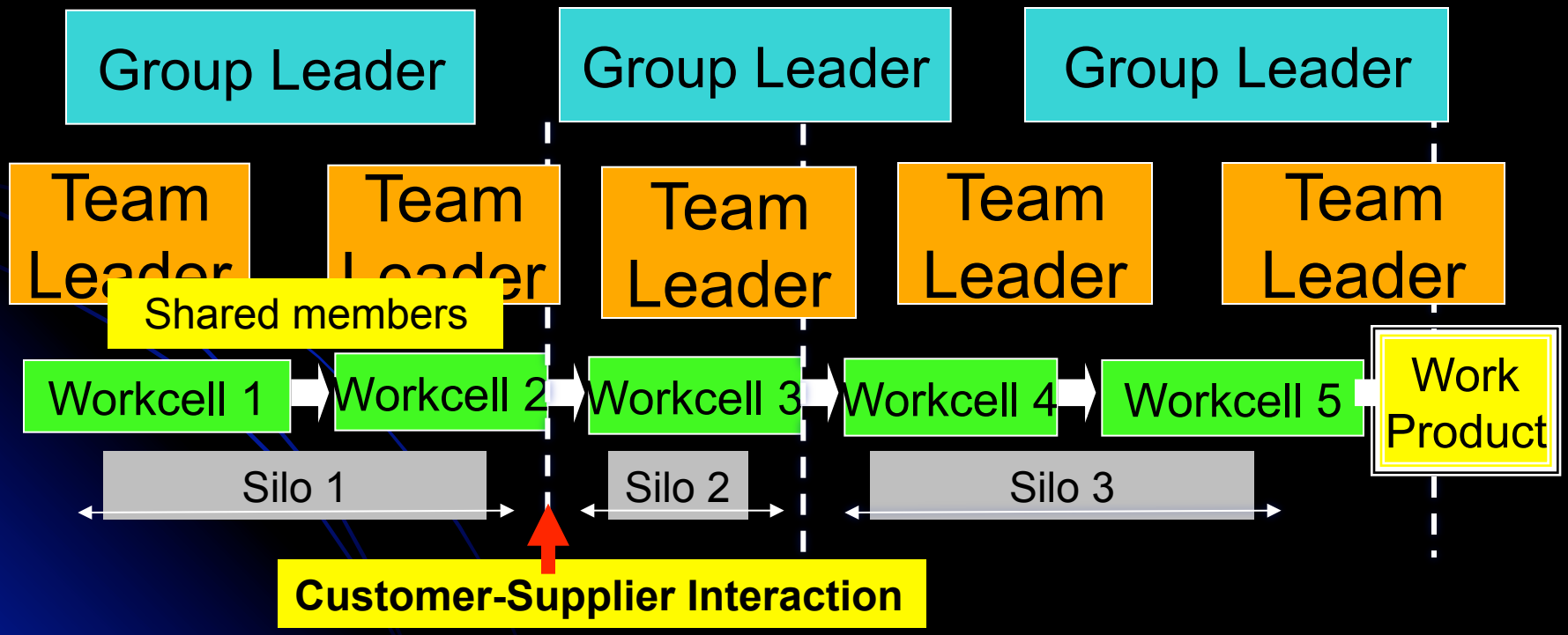


QUALITY SYSTEM STRUCTURE ORGANIZATION CHART

For Worker Driven Continuous Improvement

How is change authorized and made?

Find Your Role



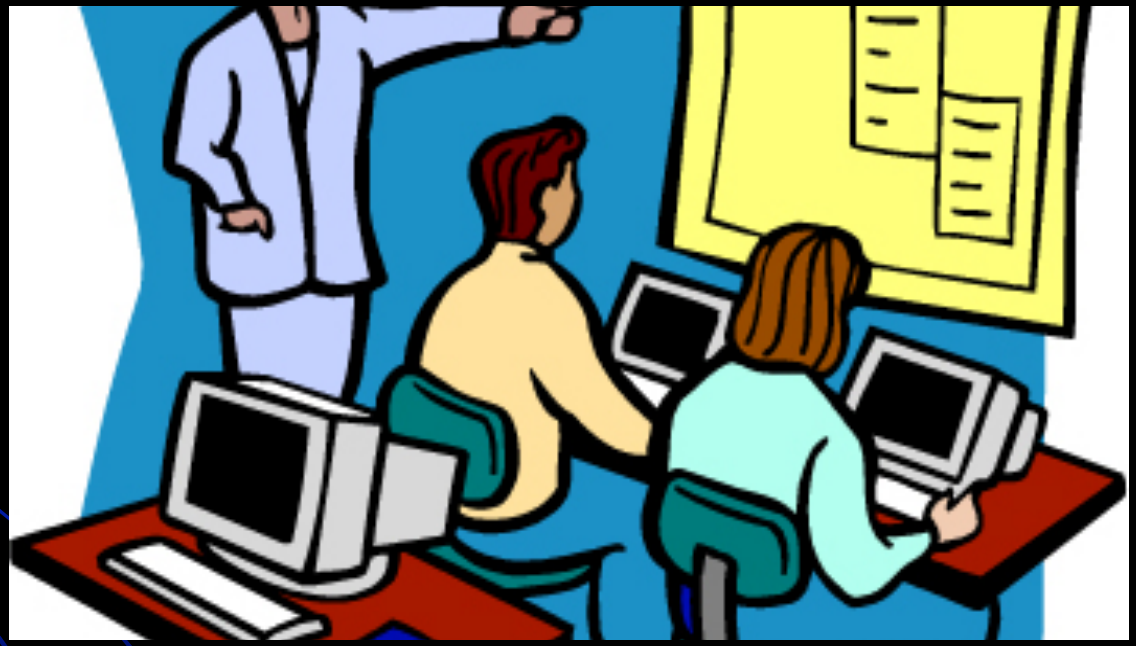
Long Term Philosophy

Base your management decisions on a long term philosophy, even at the expense of short-term financial goals

Kick off meetings to share

mission, vision& goals

Training and Education



Standardized and provide annual education for all employees on all shifts

Employee Empowerment

Share the Vision with the Team

To Motivate & Move the team

The Engaged Worker

Never accept, make or pass a defect!

Transform approach to work

- Not just showing up for work, but arriving to do the work better

Culture

Empowered workers who see their daily work in the context of-

-Continually learning

-Constantly communicating

-Making effective process improvements

-Designed and tested by scientific method

Worker Empowerment

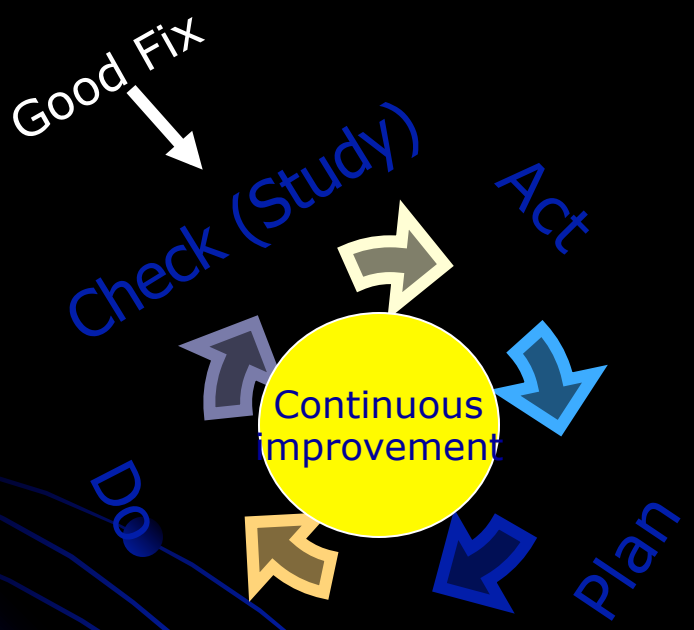
Blameless Environment

SO those who do the work will take responsibility, freely to identify daily defects and problem-solve within their teams

Daily Maintenance Kaizen from "the shop floor"

NO FEAR

Problem Solving Process



Implement

- Plan
- Do
- Check (Study)
- Act/Adapt/Adopt
- Watch to see if it is a good fix

The Scientific Basis of Making Change

The IDEAL Condition

Delivery of products & services should pursue the Ideal

- Production that is
  - Defect Free
  - On demand
  - Immediate
  - One–by-one (single piece flow)
  - Minimal waste
  - Safe
    - Physical, emotional, professional

Fundamentals of Lean

- Waste
- 14 Principles
  - (Liker- The Toyota Way)

Focus of Lean?

Reduce & Eliminate **Waste**, Continually

Overproduction
Time waiting
Transportation
Processing
Stock on hand
Movement
Defective products

The seven wastes

14 Principles

1. **Long Term Philosophy-** Base your management decisions on a long term philosophy, even at the expense of short-term financial goals

LEAN PROCESSES

2. Create **continuous process flow**
3. Use the **"Pull System"**
4. **Level out the workload**
5. **Build a culture of continuous improvement** by stopping to fix problems to get quality right the first time. Every hand-off is correct EVERYTIME
6. **Standardization of tasks** are the foundation for continuous improvements & employee empowerment
7. Use **visual controls** so no problems are hidden

Liker: The Toyota Way, 2004.

14 Principles of HFPS (cont)

8. Use only **reliable thoroughly tested technology** that serves your people and processes

PEOPLE & PARTNER RELATIONSHIPS

9. **Grow Leaders**
10. **Develop People**
11. **Respect your suppliers, challenge & help improve**

PROBLEM SOLVING & CONTINUOUS IMPROVEMENT

12. **Go and See for yourself to thoroughly understand**
13. **Decide carefully by consensus, Implement Rapidly**
14. Become a **Learning Organization, through relentless reflection & continuous improvement**

Liker: The Toyota Way, 2004.

What is Lean all about?

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Identifying the NON -Value in our work

Value – added

▪Non value-added

Eliminate Waste

Non value-added, but necessary

Non Value Added Work $$

Missing customer information
Poor quality
Redundant paperwork
Lost Work

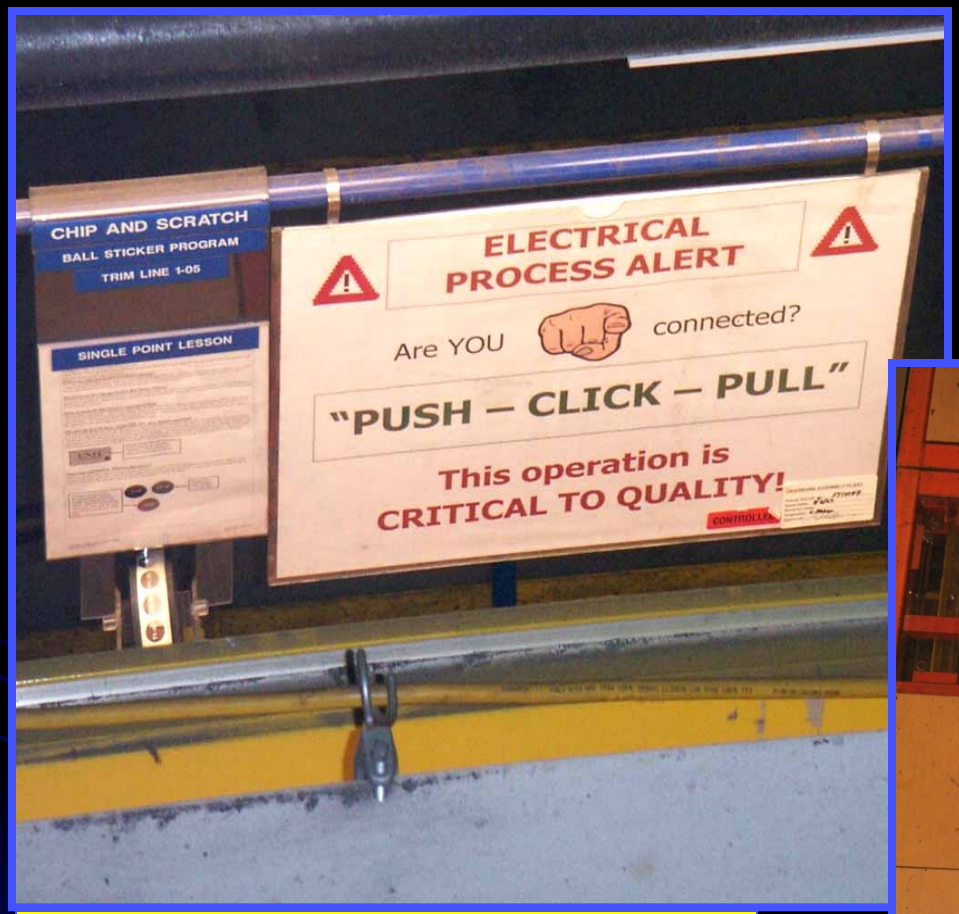
REWORK

Handling Waste Calculator $$

- Total waste per hour: 14 min 40 sec (11 bags/hour)
- Total waste per shift: 2 hrs 24 min
- Time wasted in a 40 hr week: 9 hrs 36 min
- Time wasted per year: 499 hrs 12 min

Above data is for ***only*** 1 shift !!

Get it Right the First Time



Ford F-150 Truck Factory

Standard Work
Critical to Quality
Wiring harness assembly

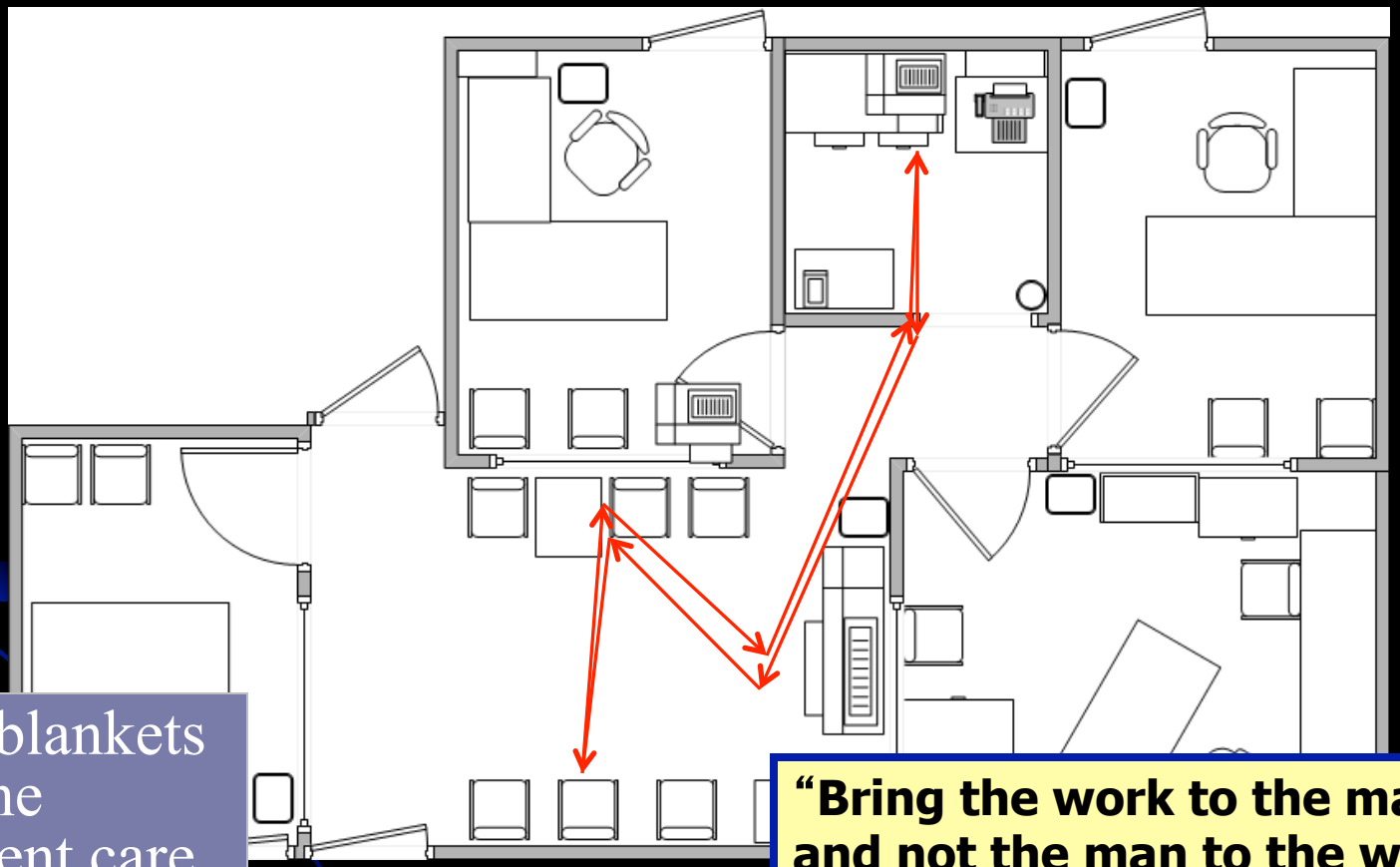
Principle 2: $$

- Create continuous process flow

Using only items that are needed for the next step in production

Principle 2:

Trail of operating room nurses search for blankets



No blankets in the patient care area

"Bring the work to the man and not the man to the work"
-Henry Ford

Principle 2:

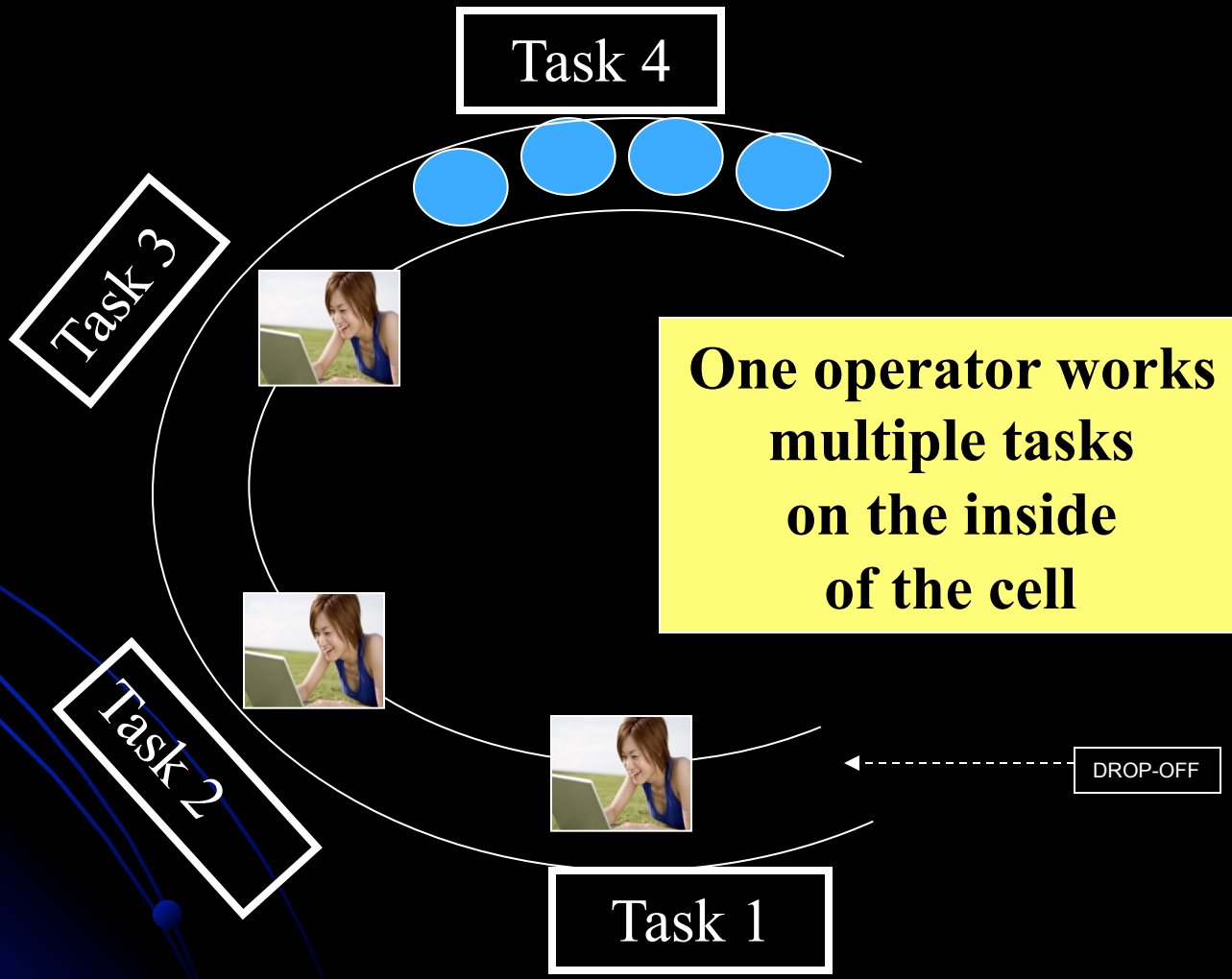
Trail of operating room nurses search for blankets

DEMONSTRATION
of
WASTED TIME
REWORK

Thanks to Angie Williams

U- Shaped Cell

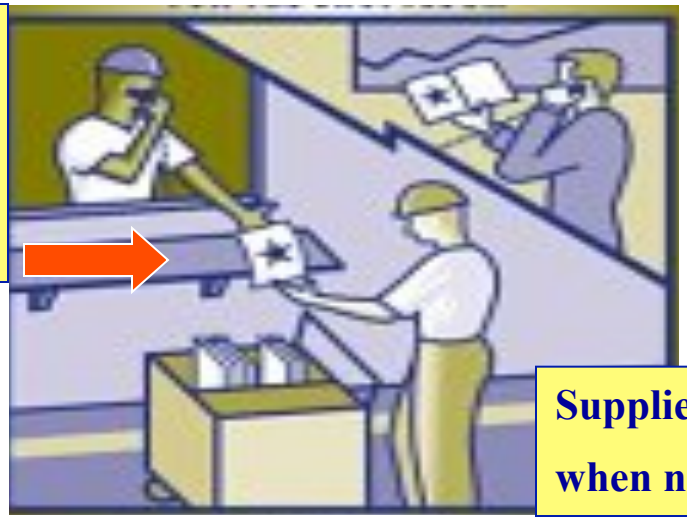
Reduce excess travel and motion



One operator works multiple tasks on the inside of the cell

Principle 3: Use the Pull System

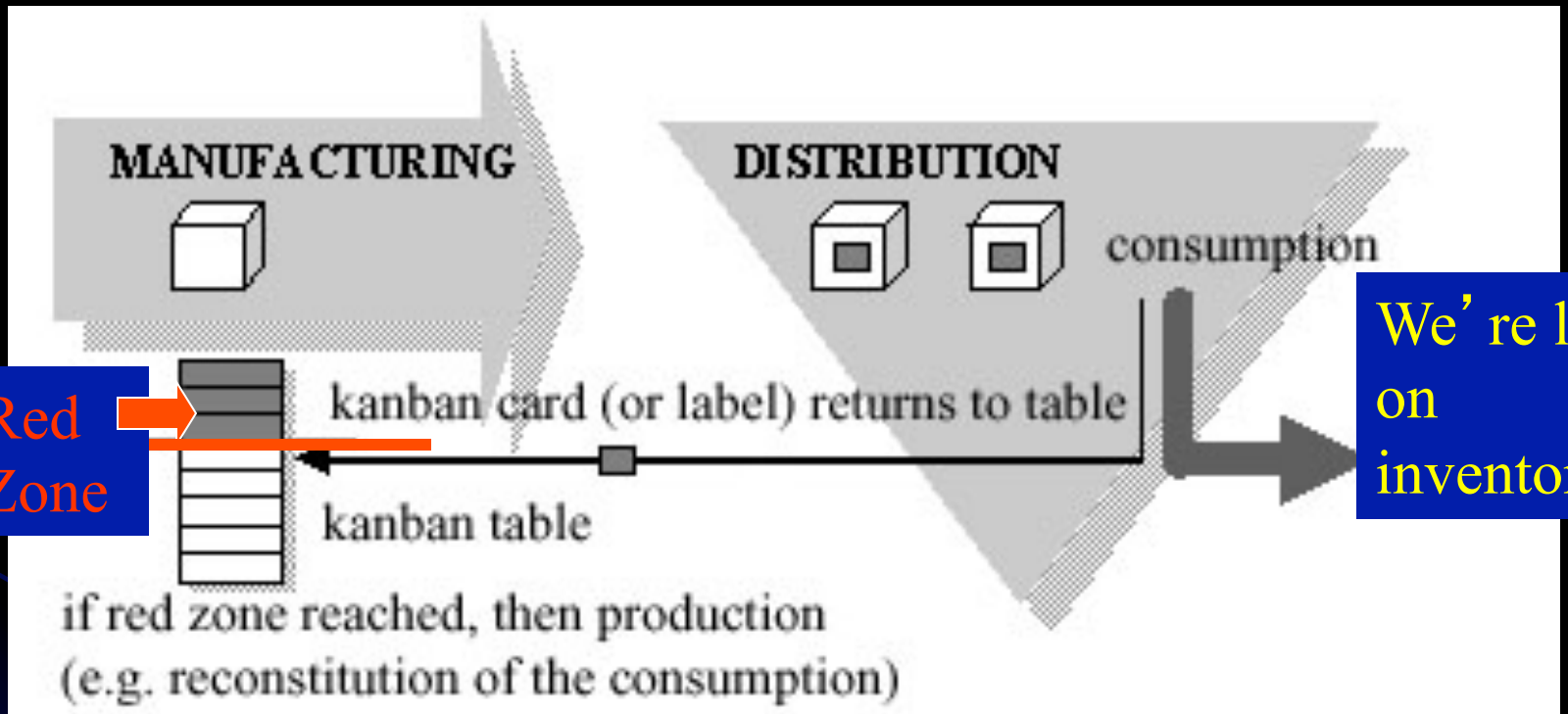
Operator displays Kanban card for supply delivery



Supplier delivers what's needed, when needed

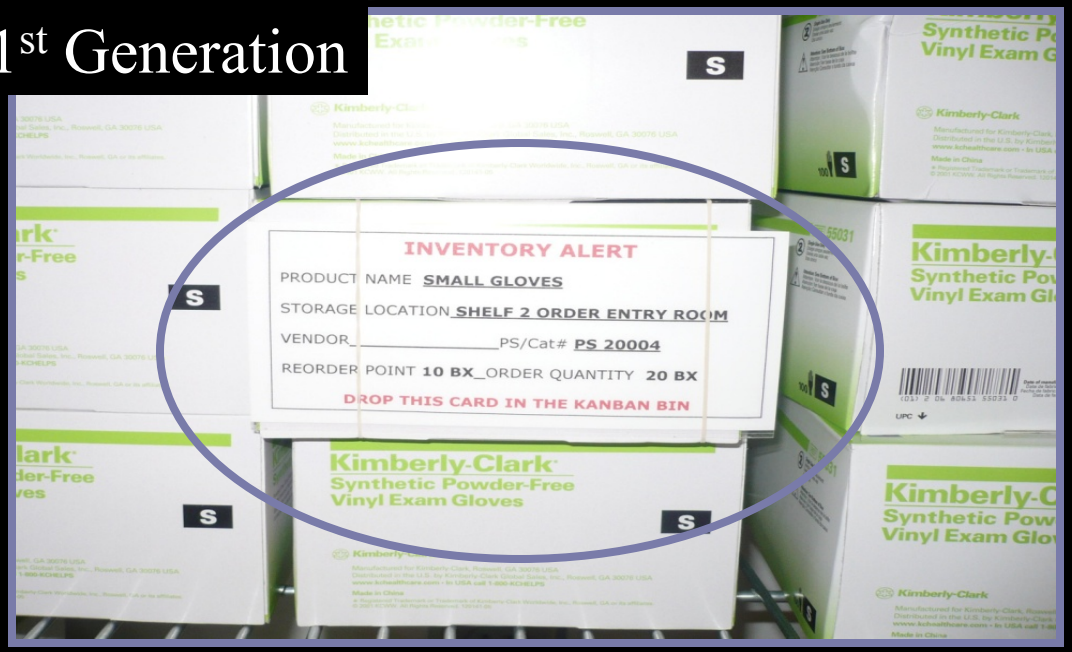
Kanban $$

Signaling device that gives instruction
Trigger orders to restock inventory



Inventory Kanban

1st Generation



Kanban inventory can be applied anywhere

2nd Generation

Item

Vendor:

Name

(0000000000)

Part #:

0000-00

People Soft #:

N/A

Cart Count #:

N/A

Reorder At:

#, Unit

Quantity to Order:

#, Unit

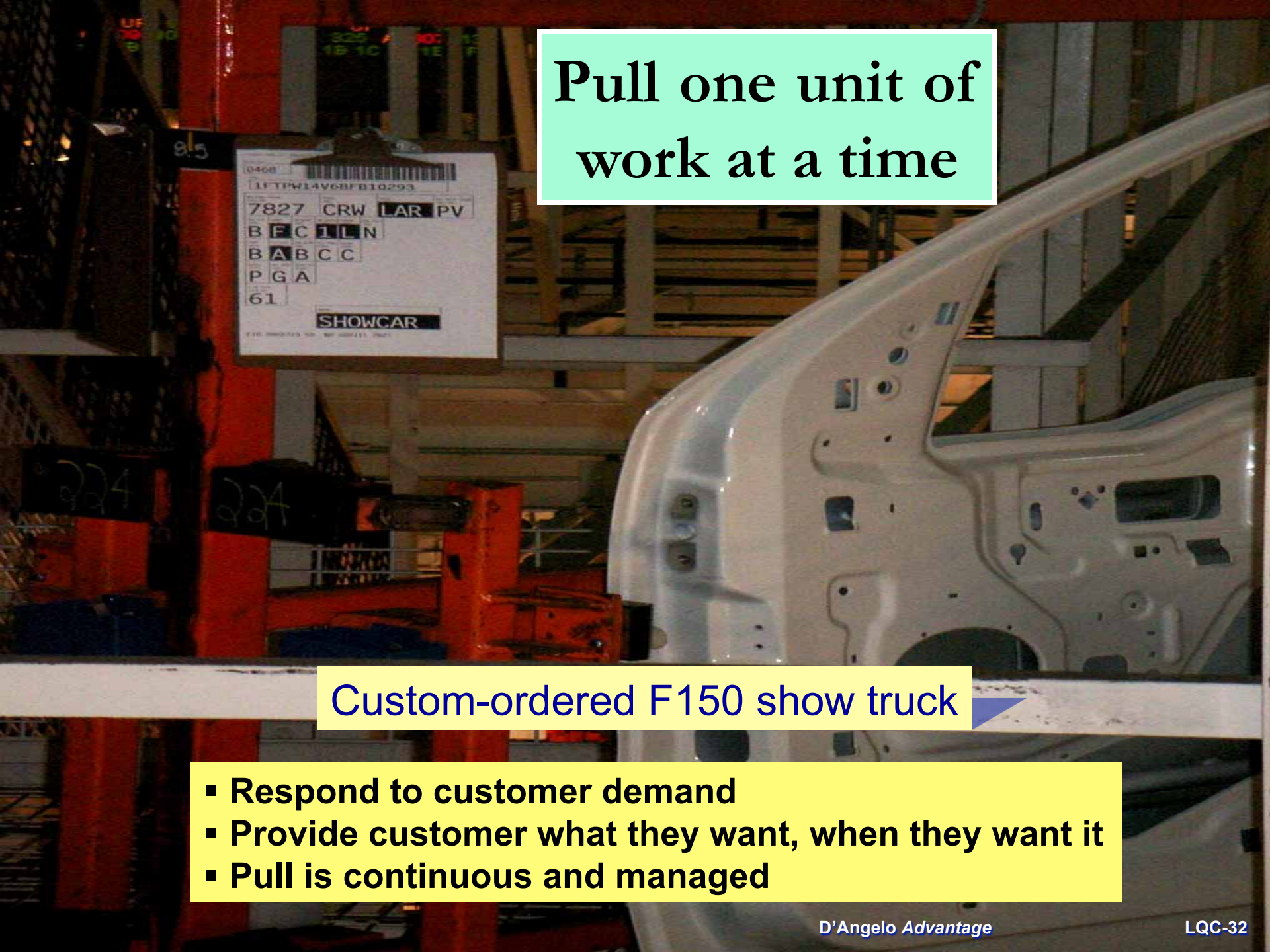
Price

$0.00

Histology

Product Organization

Pull one unit of work at a time



Custom-ordered F150 show truck

- **Respond to customer demand**
- **Provide customer what they want, when they want it**
- **Pull is continuous and managed**

Steps to Create Pull Production

- Step 1: Create a process map and identify your current process
- Step 2: Design work cells for efficient flow
- Step 3: Rearrange equipment according to your new process
- Step 4: Shift to one-piece flow, one unit at a time, determined by the need of the costumer
- Step 5: Use kanbans to serve as an order production system to identify next step in production

Principle 4: Level the Workload

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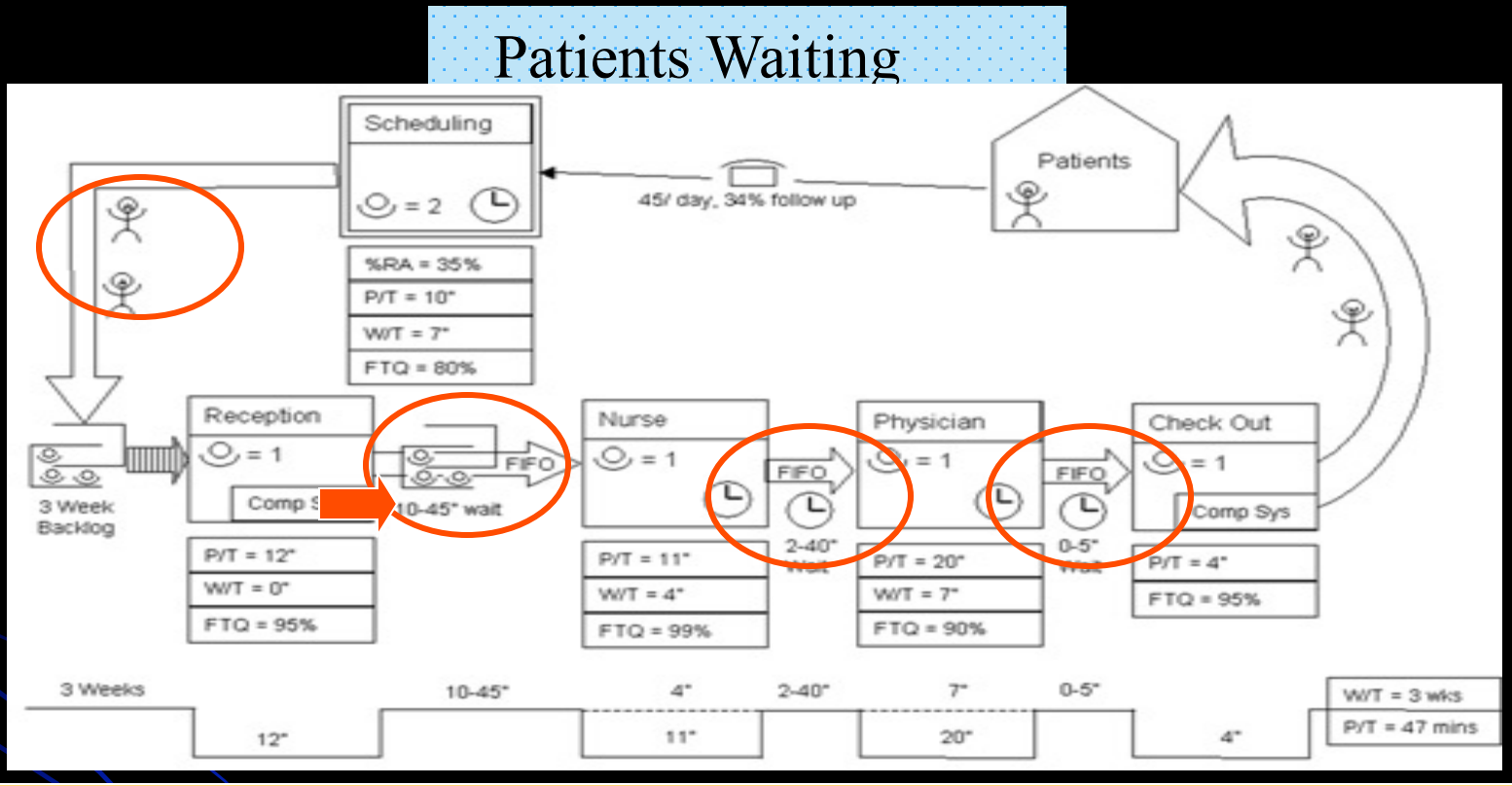


Elimination of Waiting: LOSS OF CUSTOMER BASE

1. **Create fast track streams to separate cases**
2. **Redesign staff schedules to more closely follow the work**
3. **Redesign appointment to distribute patient load**

People Waiting $$

Losing the Customer Base

Principle 5: Build a culture of continuous improvement

Kaizen

Stop to fix problems to get quality right the first time

Case Rework Box

Defect Driven Continuous Improvement

- QC person of the Day designated in each area
- Identified by name & photo
- Resolves defects using standard protocol

Reworking F-150 Truck

$$

1100 Trucks a day are manufactured

1% are defective

= 11 trucks per day are reworked

Stopping the Line

Every employee is an inspector

Inspect, STOP, and FIX at the source

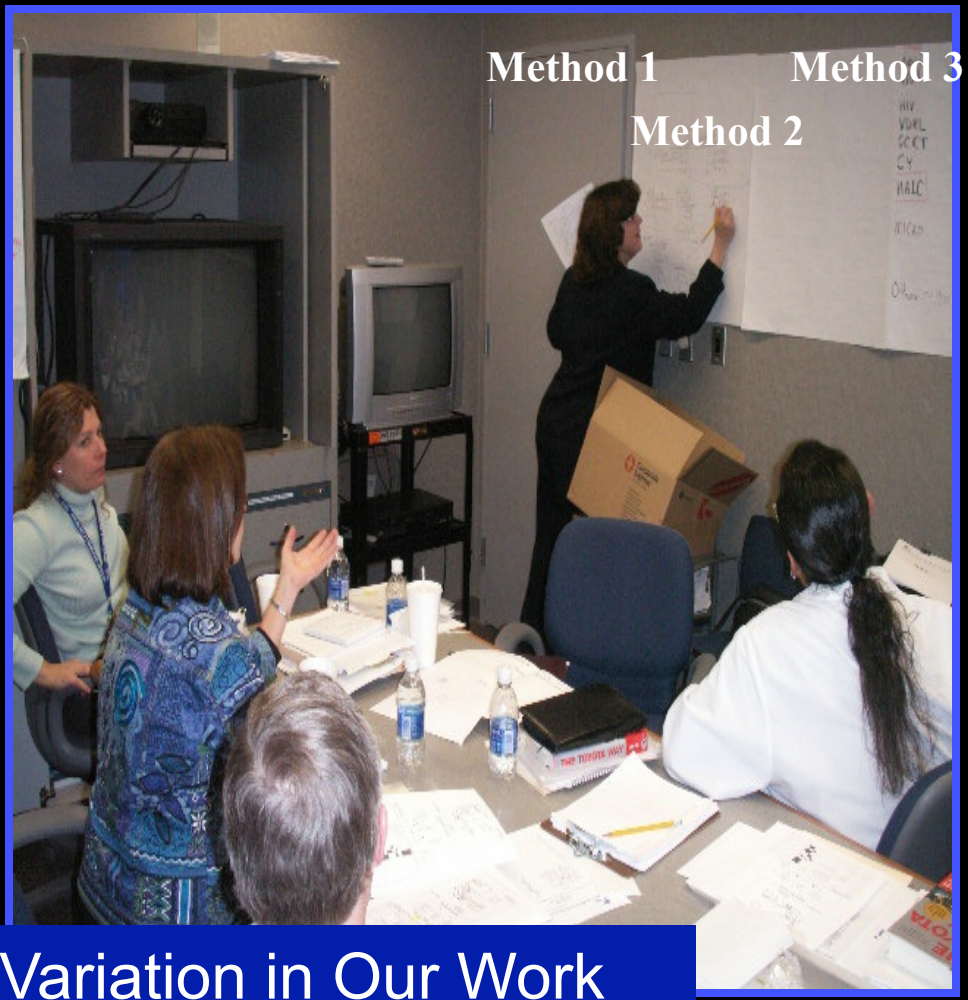
It is important to stop the line:

- **To prevent defective products**
- **To make improvements**
- **To develop a line that is strong & rarely needs to be stopped**

Develop a culture of not passing defects

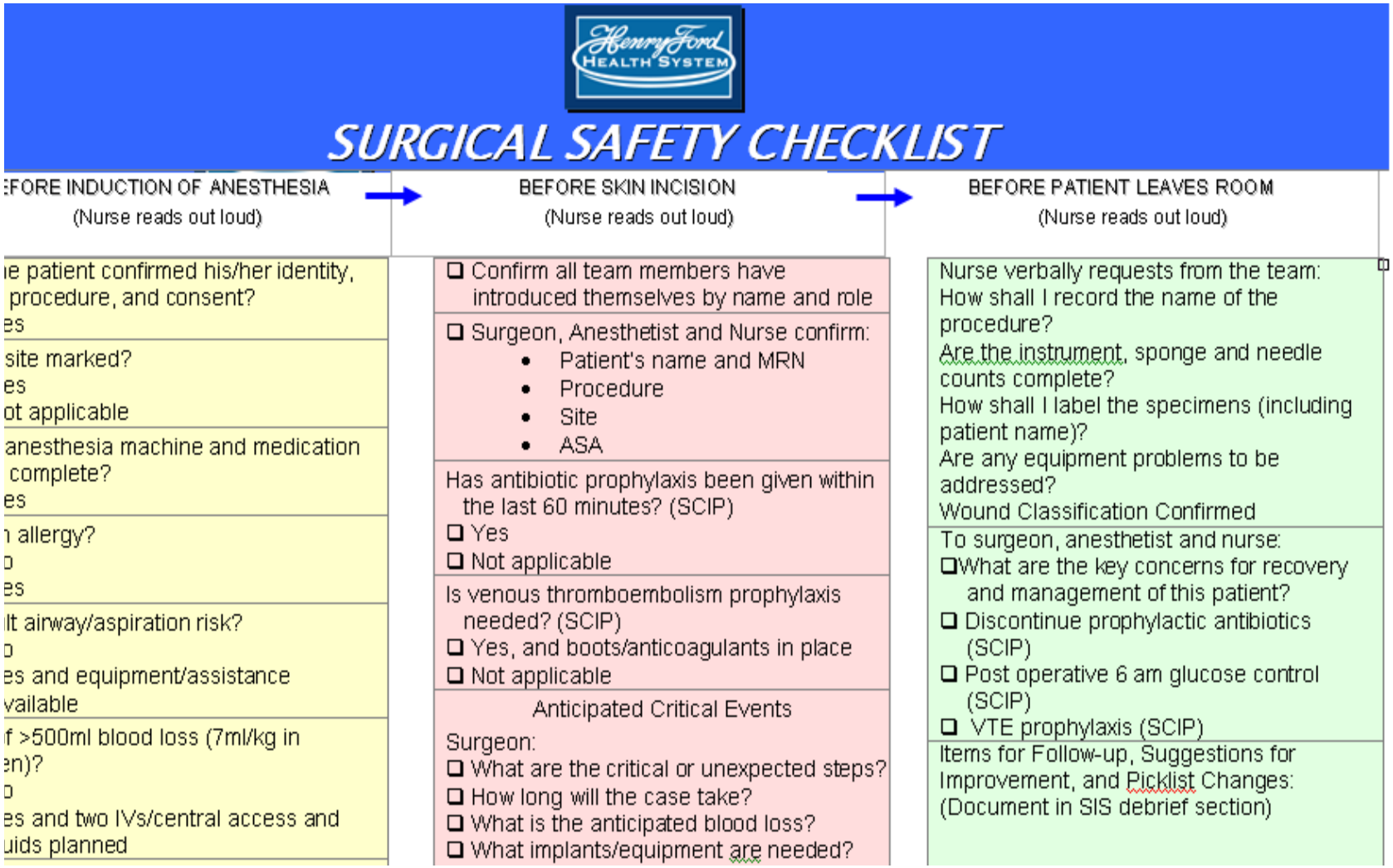
Principle 6: $$

Standardization of tasks is the foundation for continuous improvements & employee empowerment



Reducing the Variation in Our Work

Standardization



Henry Ford Health System

SURGICAL SAFETY CHECKLIST

EFORE INDUCTION OF ANESTHESIA (Nurse reads out loud)	BEFORE SKIN INCISION (Nurse reads out loud)	BEFORE PATIENT LEAVES ROOM (Nurse reads out loud)
ıe patient confirmed his/her identity, procedure, and consent? es	❑ Confirm all team members have introduced themselves by name and role	Nurse verbally requests from the team: How shall I record the name of the procedure? Are the instrument, sponge and needle counts complete? How shall I label the specimens (including patient name)? Are any equipment problems to be addressed? Wound Classification Confirmed
site marked? es ot applicable	❑ Surgeon, Anesthetist and Nurse confirm: • Patient's name and MRN • Procedure • Site • ASA	To surgeon, anesthetist and nurse: ❑What are the key concerns for recovery and management of this patient? ❑ Discontinue prophylactic antibiotics (SCIP) ❑ Post operative 6 am glucose control (SCIP) ❑ VTE prophylaxis (SCIP)
anesthesia machine and medication complete? es	Has antibiotic prophylaxis been given within the last 60 minutes? (SCIP) ❑ Yes ❑ Not applicable	Items for Follow-up, Suggestions for Improvement, and Picklist Changes: (Document in SIS debrief section)
ı allergy? o es	Is venous thromboembolism prophylaxis needed? (SCIP) ❑ Yes, and boots/anticoagulants in place ❑ Not applicable	
lt airway/aspiration risk? o es and equipment/assistance vailable	Anticipated Critical Events Surgeon: ❑ What are the critical or unexpected steps? ❑ How long will the case take? ❑ What is the anticipated blood loss? ❑ What implants/equipment are needed?	
f >500ml blood loss (7ml/kg in en)? o es and two IVs/central access and uids planned		

Principle 7: $$

Work segregation

Use Visual Controls so Process is visual

Principle: Color Code Your Work

Color Coded Tools by Work Station

Color the Work Load

- Color coded identify and expedite patient care

Principle 12: Go and See

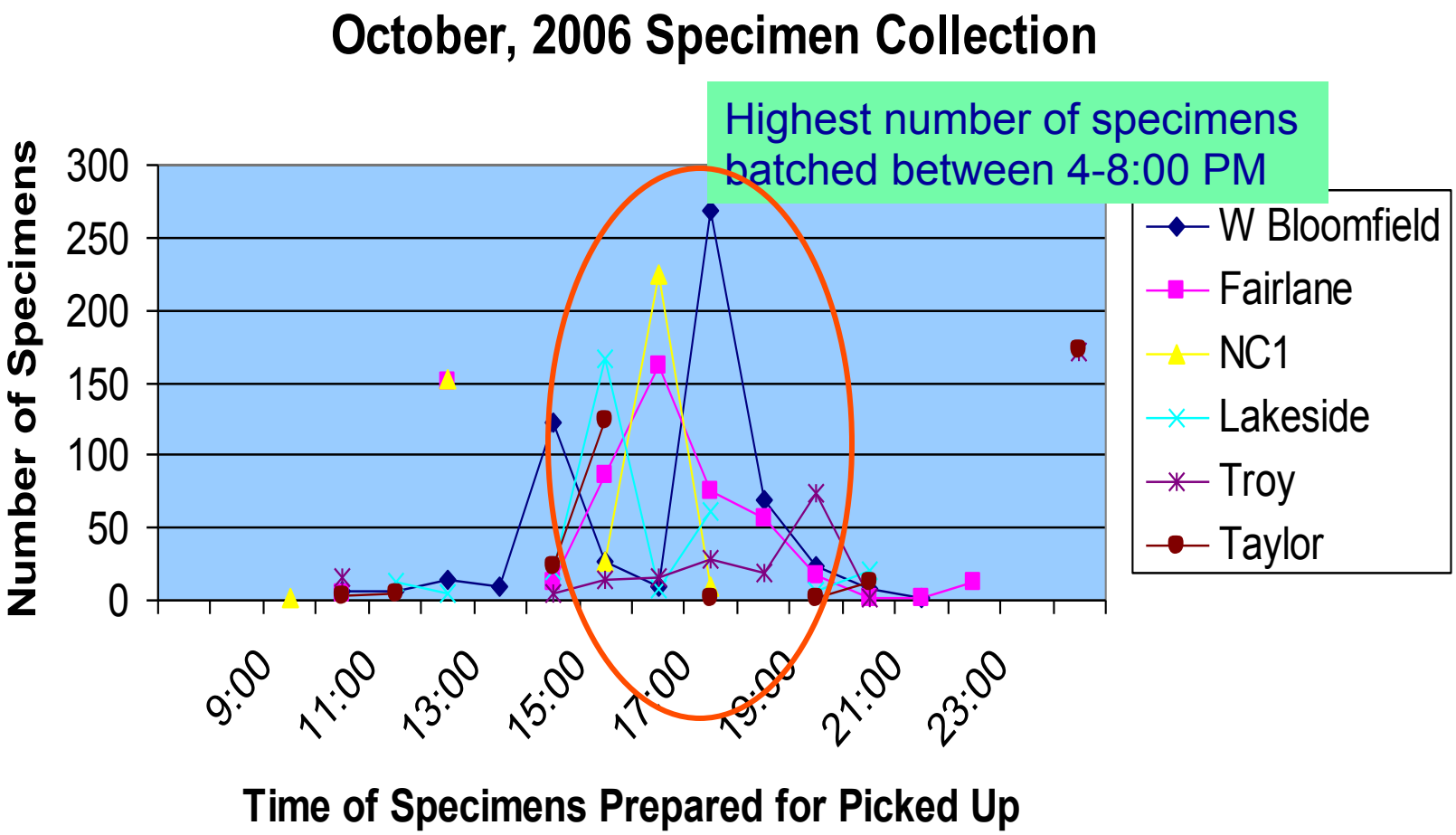
Go where the defect occurs, and ask why?
Assume nothing, verify everything.
Don't rely on other reports.

Observe the Process

- Is there a process in place
- How are defects handled?
- Who supplies whom?
- Who is the supplier?
- Is there waiting?
- Are there defects?
- Redundant paths?

Principle 13: Decide Carefully, Implement Rapidly

Extensive data collection to know source of problems



Current State Map

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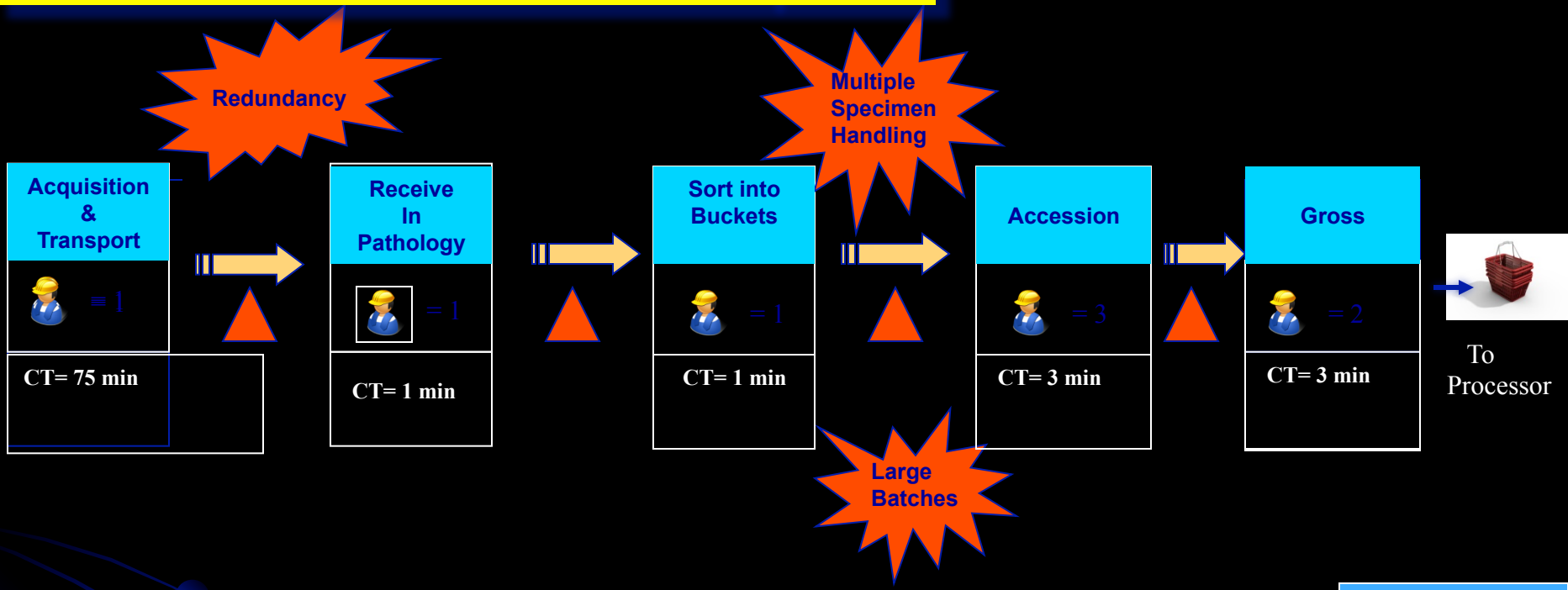
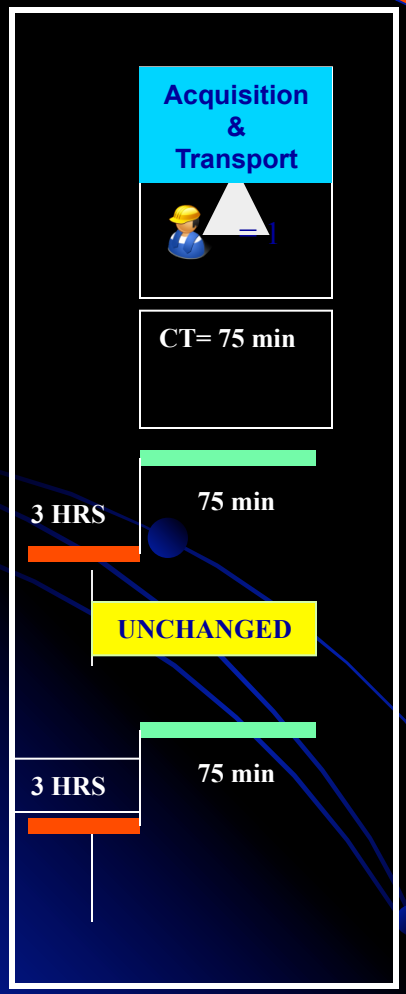


$$\frac{VA}{NVA} = 8.13\ \%$$

Current State Map



Waiting

1. Customer/Supplier meetings with customers to expedite work
2. Standardize work pick up to every hour with sign off
3. Installed pickup boxes in the walls
4. Redesign pick up schedules to more closely follow the work
5. Added 2 more runs

Expediting Specimen Movement from Clinics to Lab

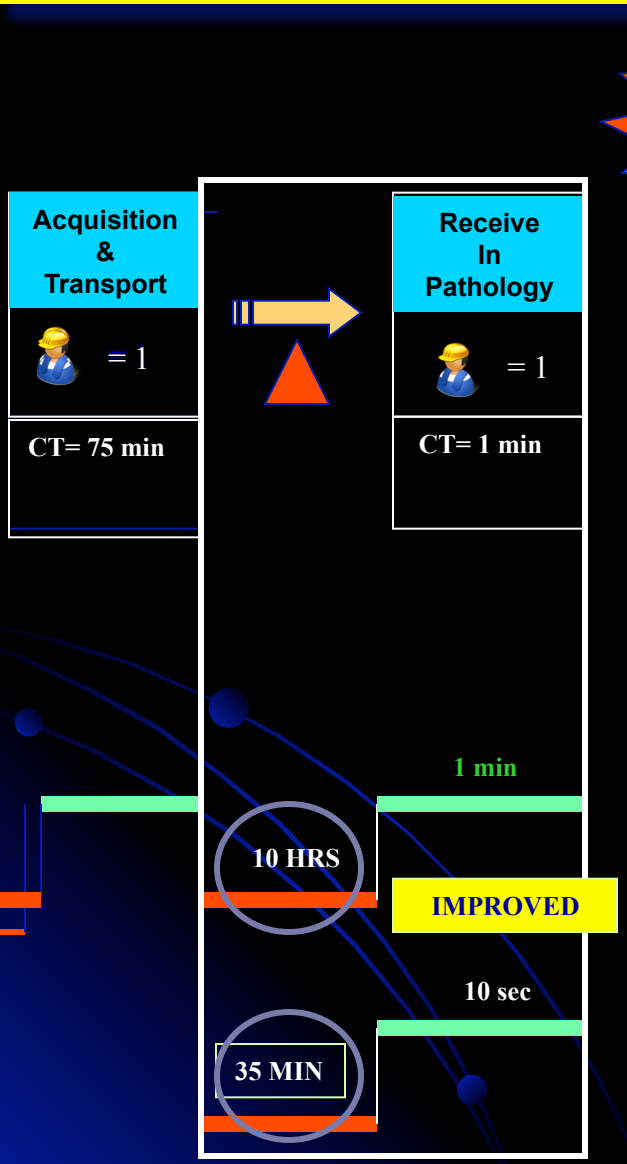
Process Simplification

Hourly specimen pick up

NEW Process: Visual specimen drop-off boxes at each clinic entrance doorway, recessed into the wall. Easy to see & collect.

OLD Process: Buckets throughout internally located clinics, non-standard

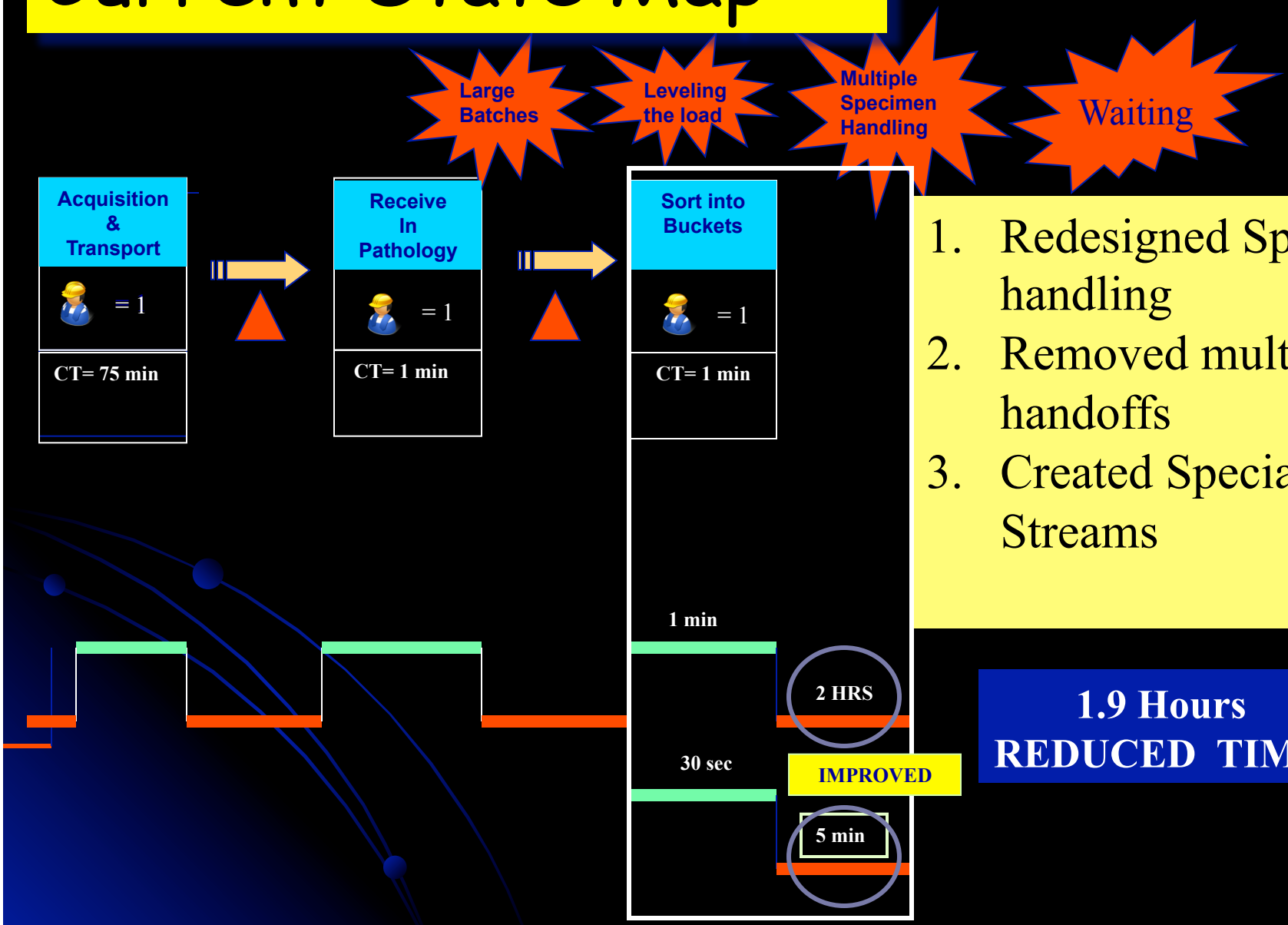
Current State Map



Added 2nd Accession Shift til 11PM

9.5 Hours
REDUCED TIME

Current State Map



1. Redesigned Special handling
2. Removed multiple handoffs
3. Created Specialty Streams

1.9 Hours REDUCED TIME

Production Re-Design

Workflow Leveling

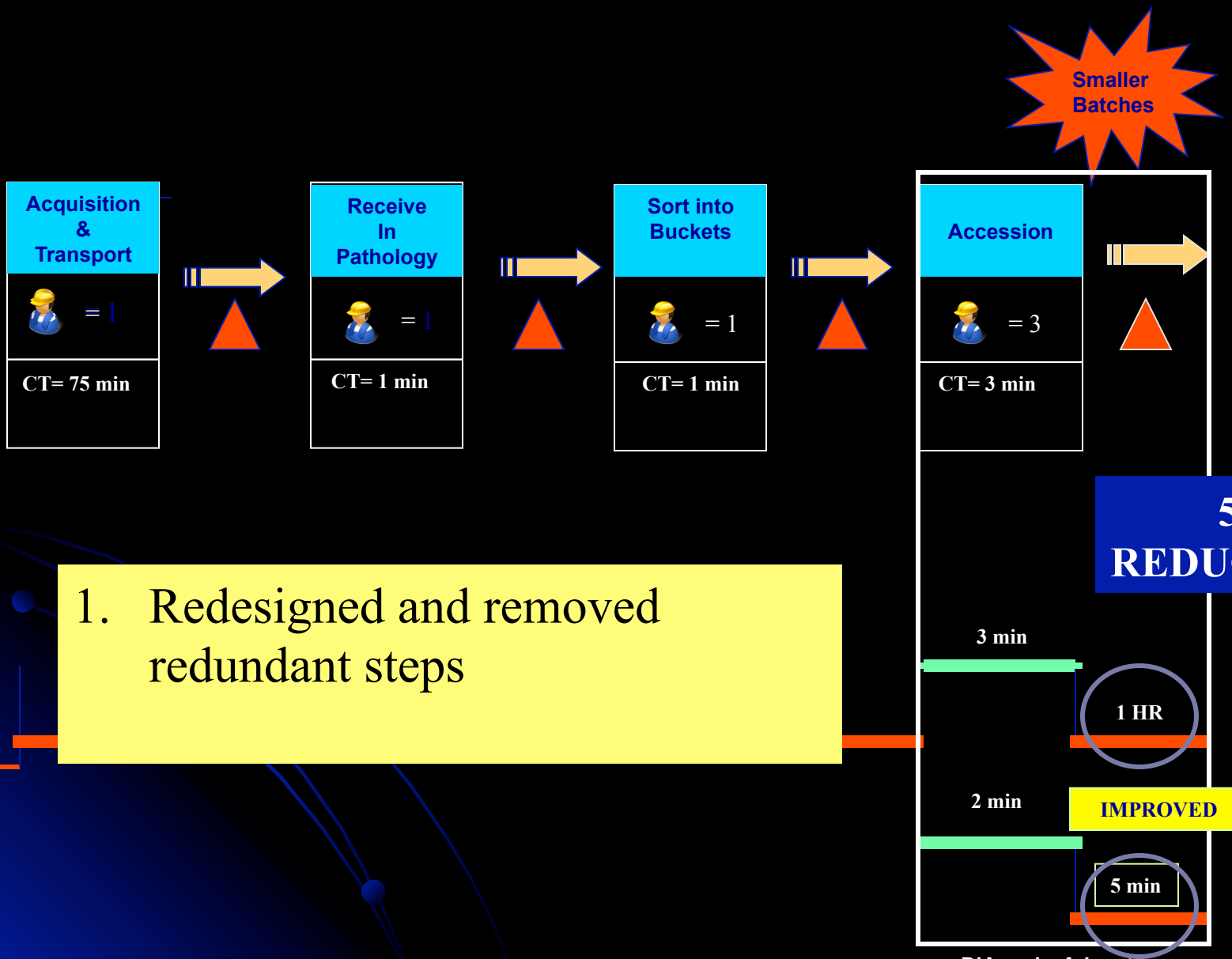
Buckets

Level the Work Load

Standardization of Work

8 min

Trays contain variable number of containers



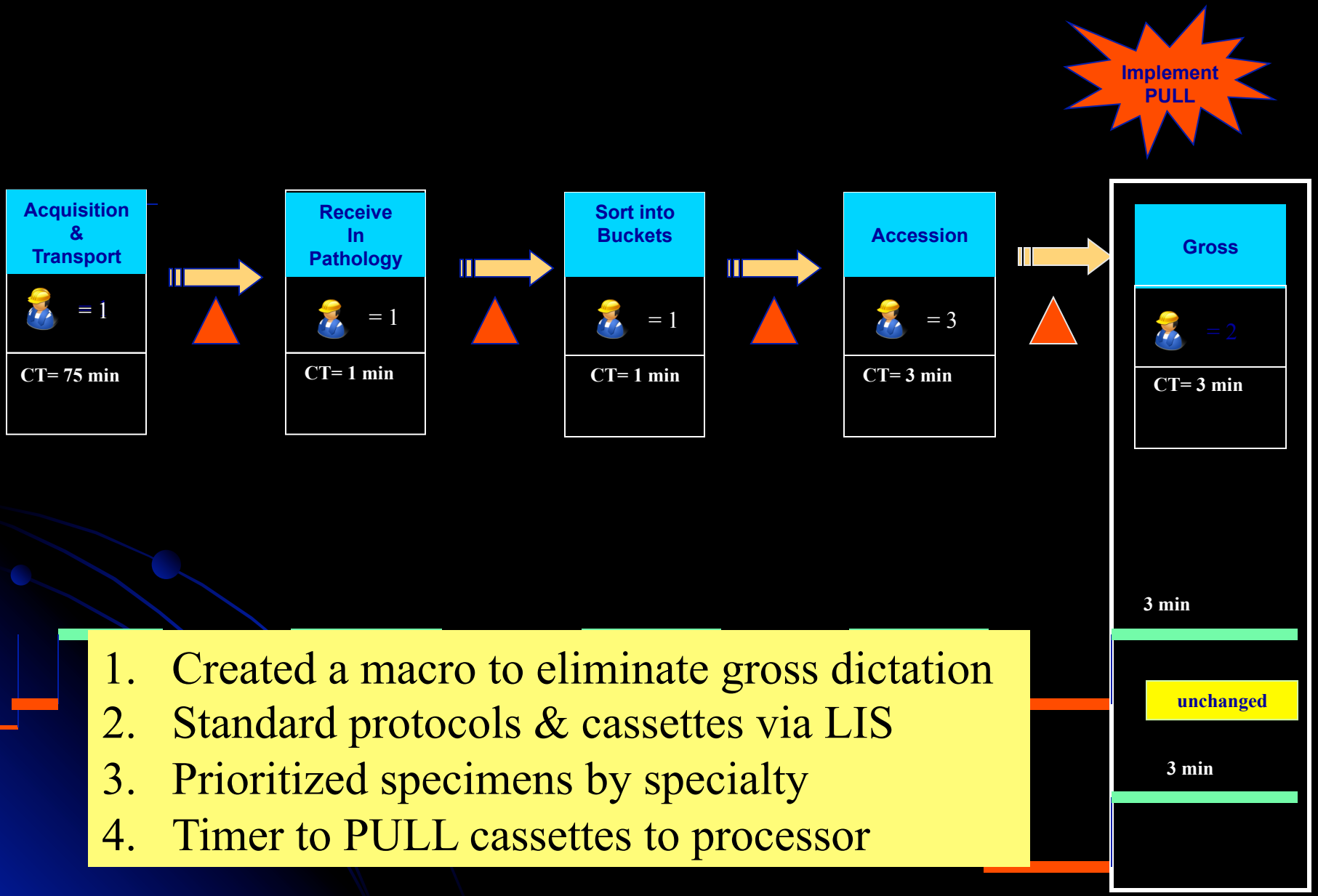
1. Redesigned and removed redundant steps

Pull Smaller Batches

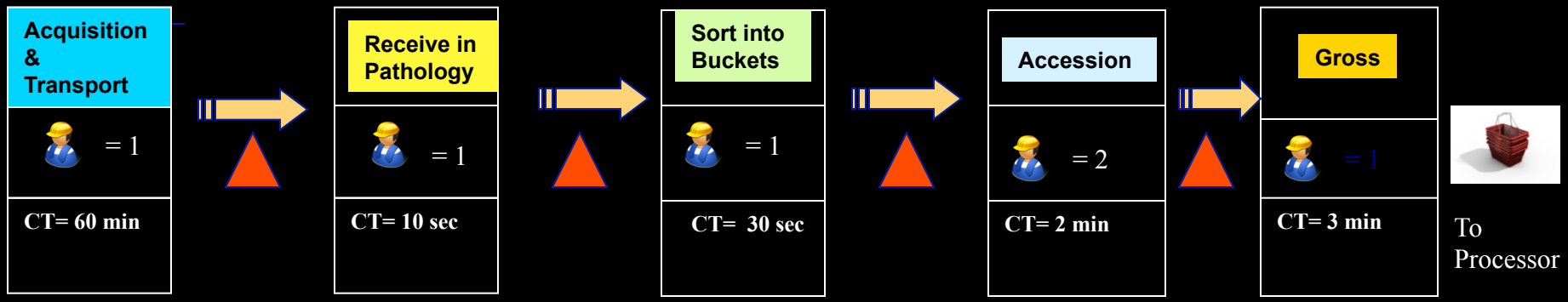
Reduce Steps

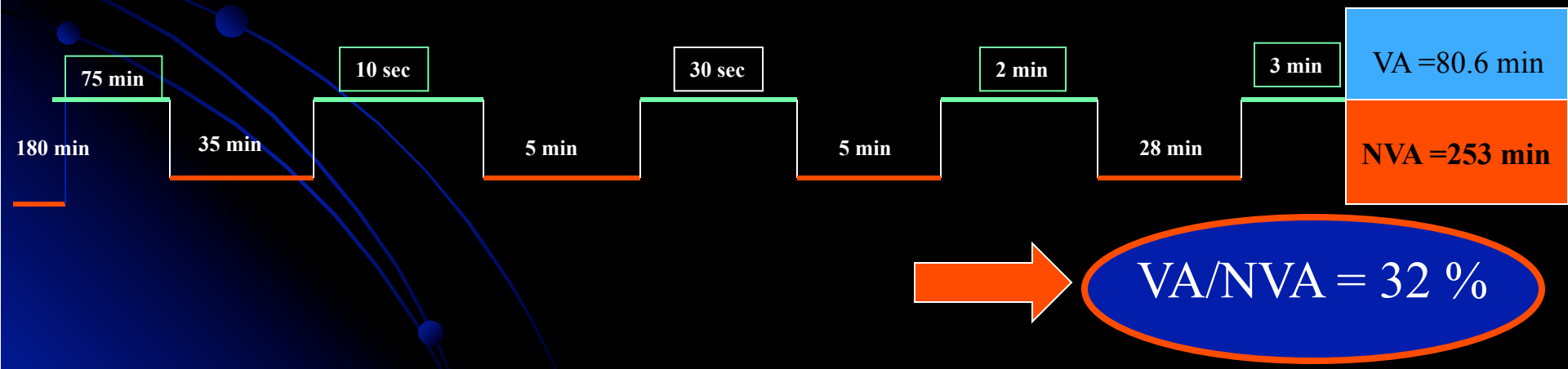
60% time reduction

= FASTER & Fewer Defects



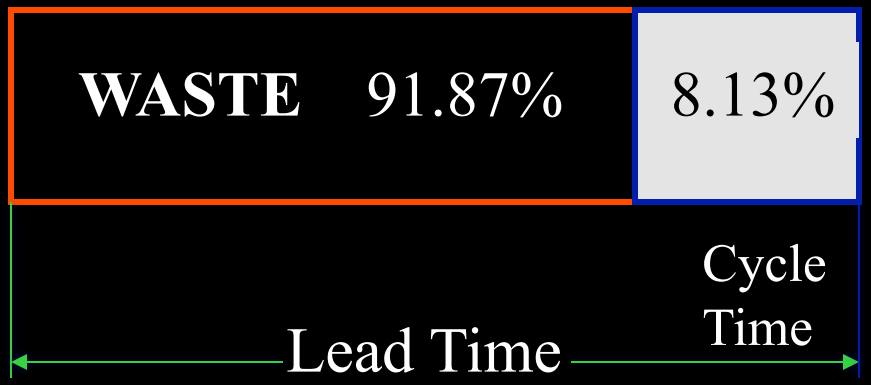
1. Created a macro to eliminate gross dictation
2. Standard protocols & cassettes via LIS
3. Prioritized specimens by specialty
4. Timer to PULL cassettes to processor


Acquisition & Transport
= 1
CT= 60 min
Receive in Pathology
= 1
CT= 10 sec
Sort into Buckets
= 1
CT= 30 sec
Accession
= 2
CT= 2 min
Gross
= 1
CT= 3 min
To Processor

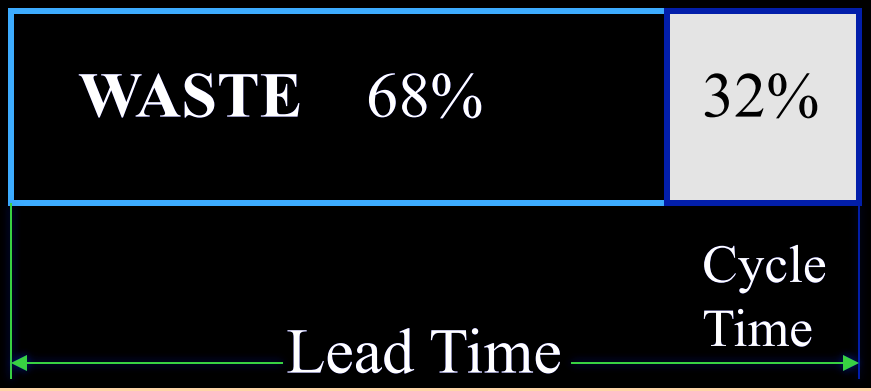

75 min
10 sec
30 sec
2 min
3 min
180 min
35 min
5 min
5 min
28 min
VA =80.6 min
NVA =253 min
VA/NVA = 32 %

Non Value Added Work

Before



After

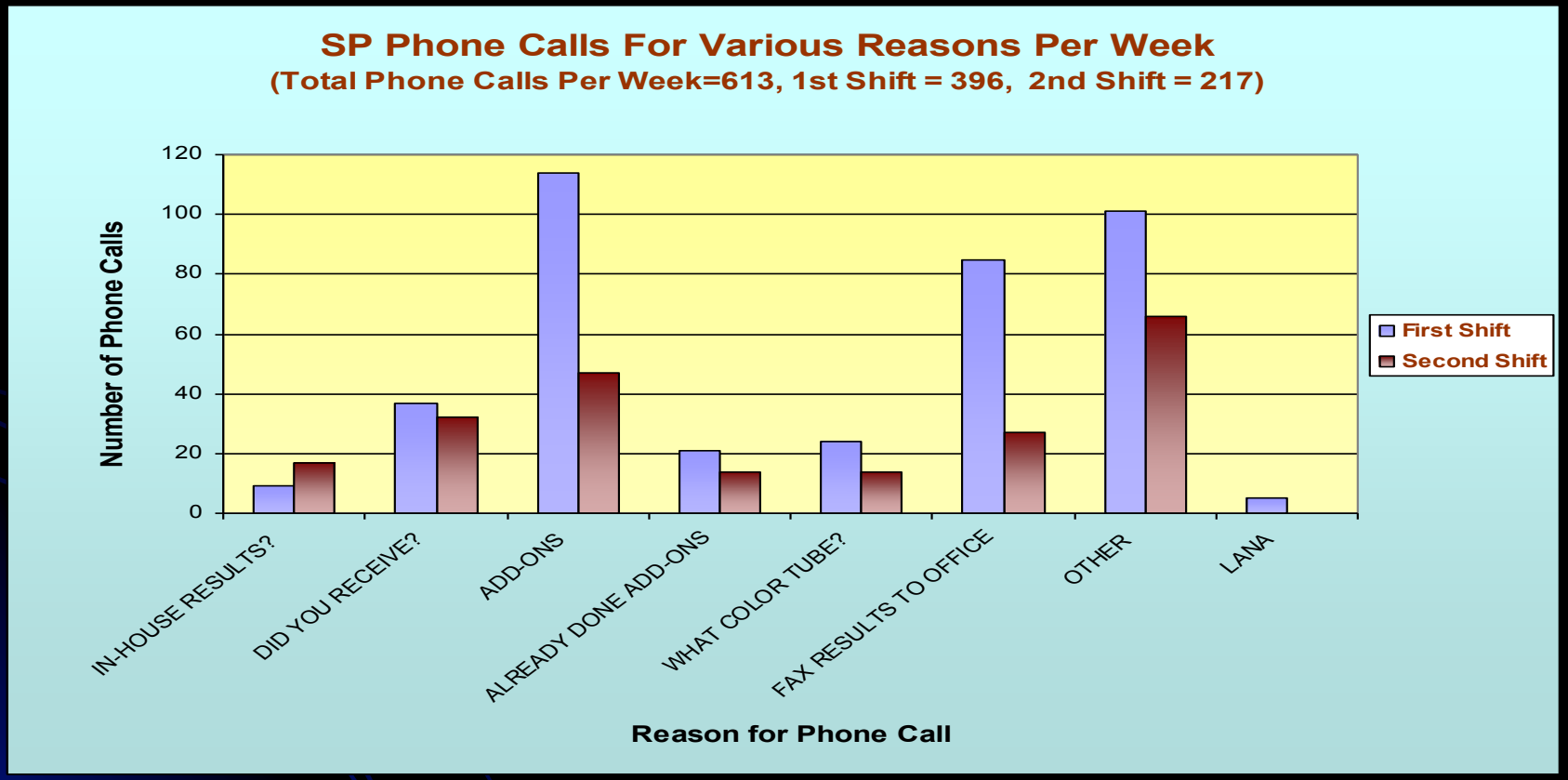


- **Focusing on eliminating waste is the best leverage for an improvement effort.**

Getting Started

$ $

Pick reasonable defects to eliminate

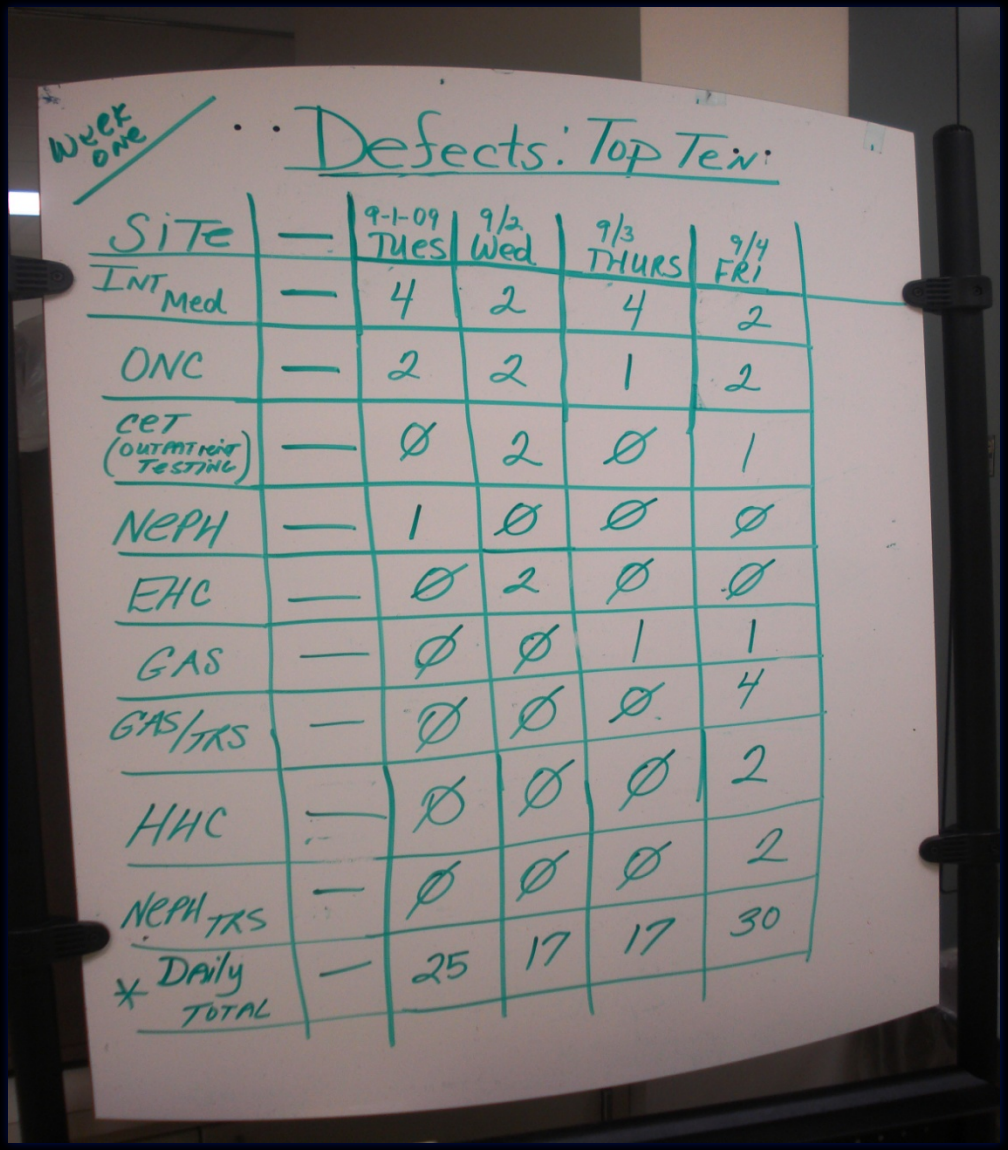


Measuring Current State

- Sensing the pulse of the "machine"
  - If you can't measure it, you can't fix it
- Develop indicators critical to quality
- Adapting data collection & analysis
  - Real-time, visual, publicly displayed
  - Captured at point of worker detection
  - Create measurement tools, Andon-like

Data Collection

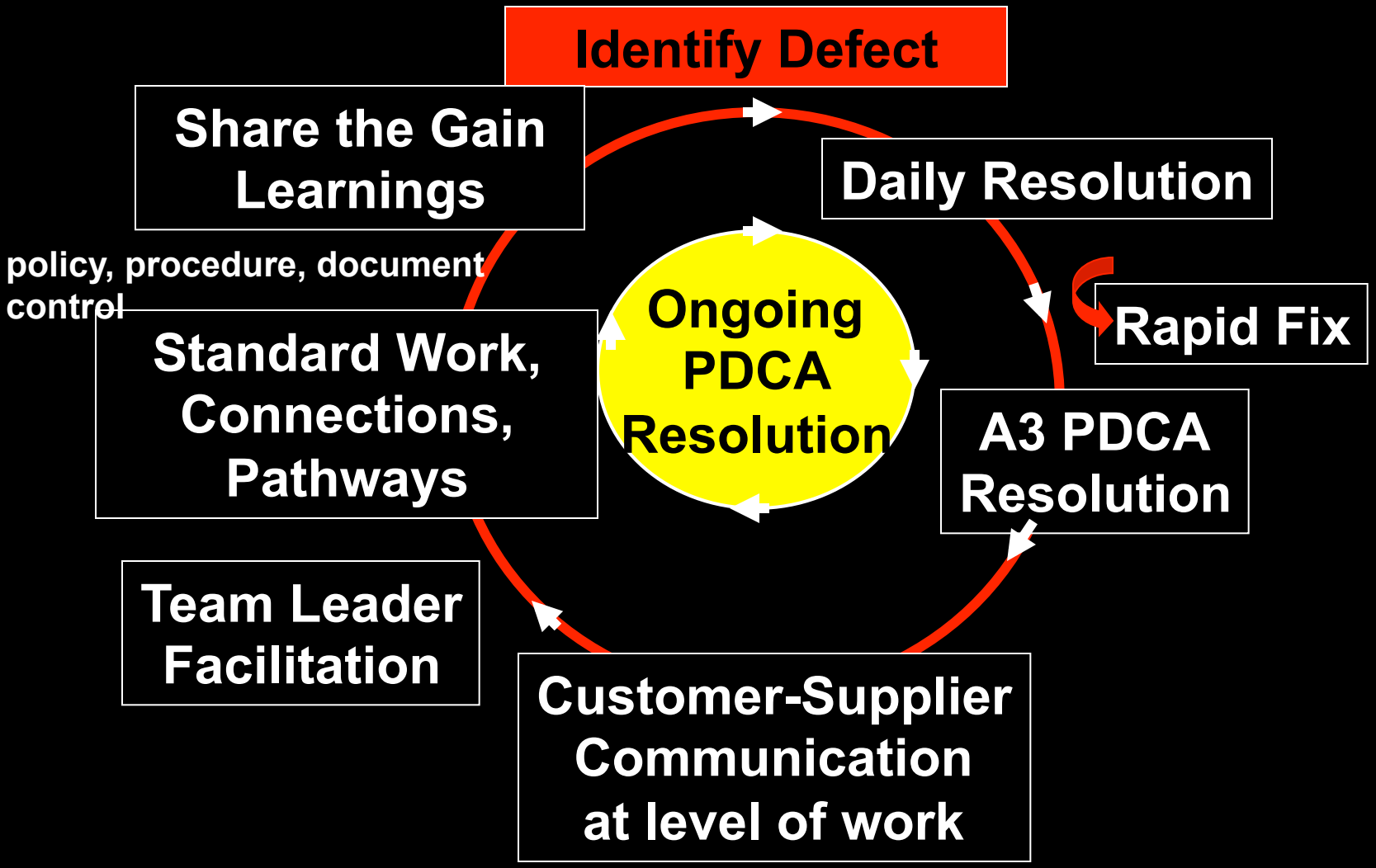
- Keep it Simple



Design Improvements

- Start Simple
- Define start and stop times
- Continue over all shifts
- Ensure blameless data capture
- Tabulate results

Our Process of Making Improvement Where the Work Is Done



Direct Connection

Customer-supplier relationship

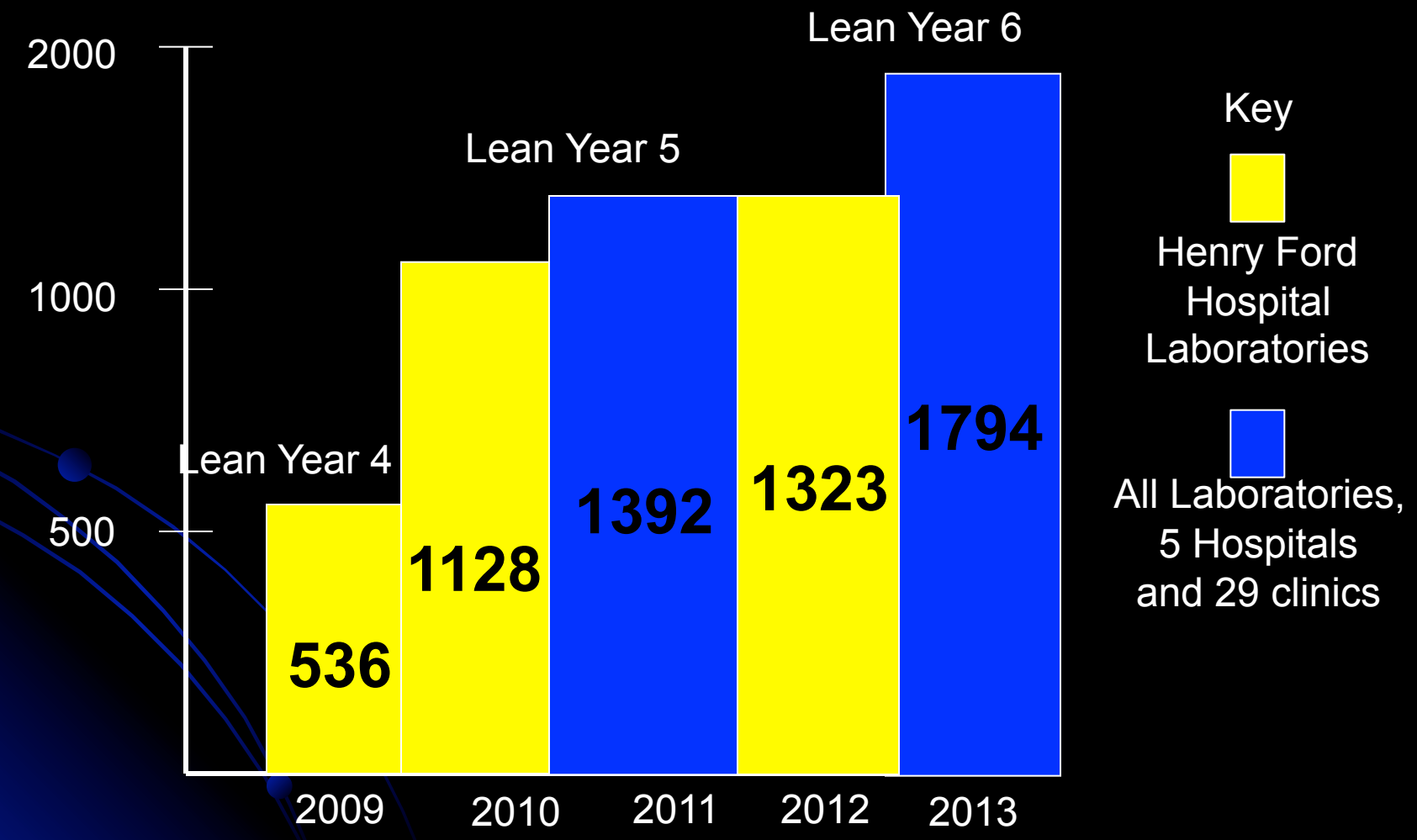
Customer states requirements and supplier responds by meeting those requirements

Where the Work is Done

Improvement discussions held
for 20 minutes a few days a week

Empowered Work Teams

Total Process Improvements

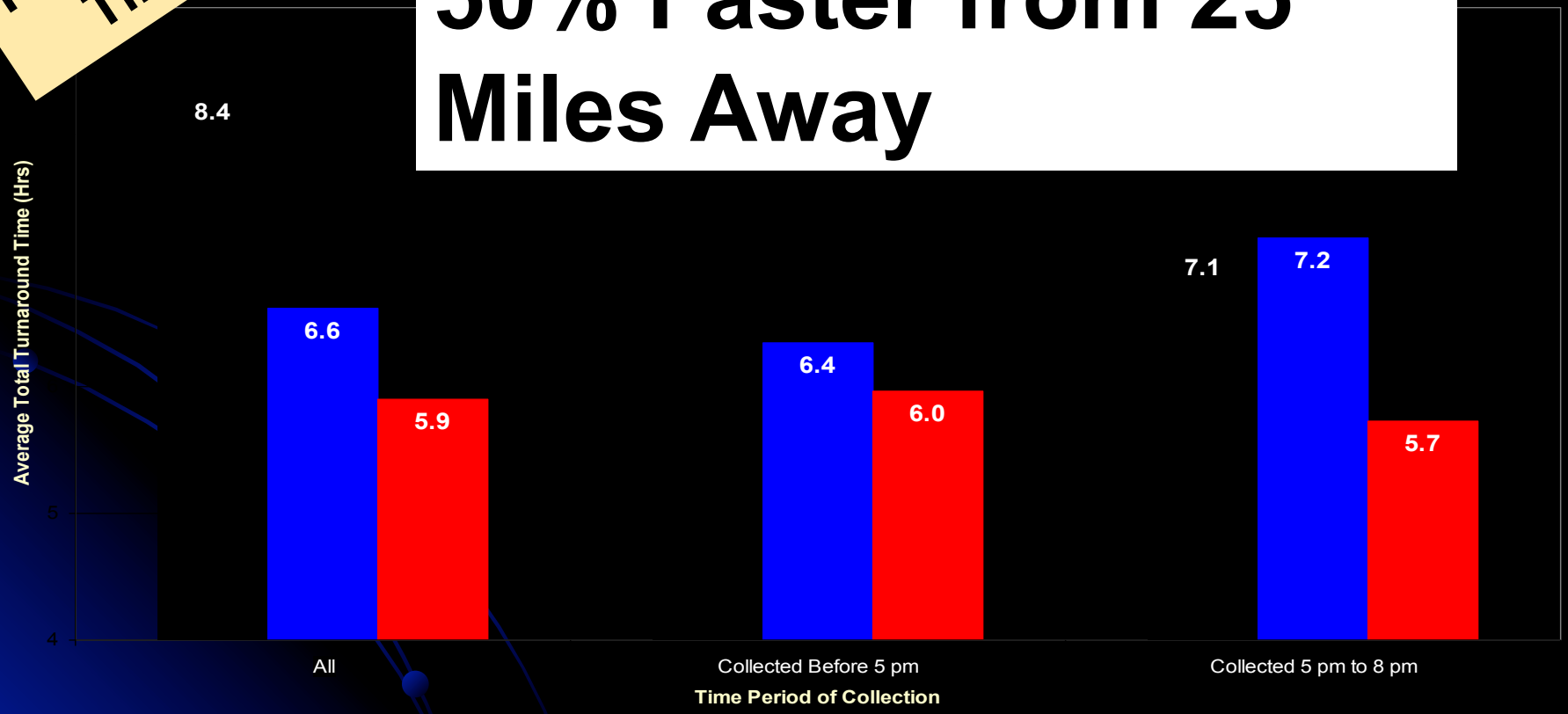


Largest Medical Center (Fairlane)- Biochemical Profiles

Reduce Supplier Time Waste

…ne BCPRO Panel Reporting: Average Turnaround Time

50% Faster from 25 Miles Away



Benefits of Kanban Inventory

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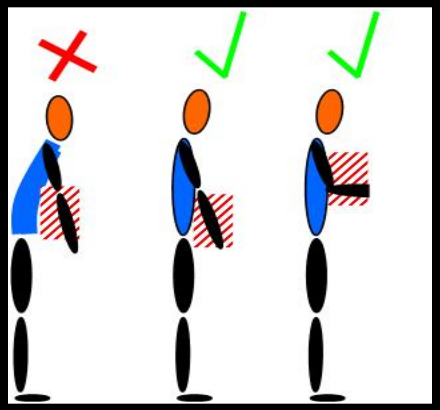
- Staff:
  - $25/hour + benefits ≈ $75,000/ year
  - 1% Lost time to inventory handling $750/year
  - 3-4 Individuals handling inventory $3000/year



- Yearly loss to managing inventory:
  - 65000 + 12000 + 3000 = **$80,000**

"Our invariable reply to 'it can't be done', is Just Do It!"
-Henry Ford

Questions & Answers