The Lean Hospital: What does it mean?

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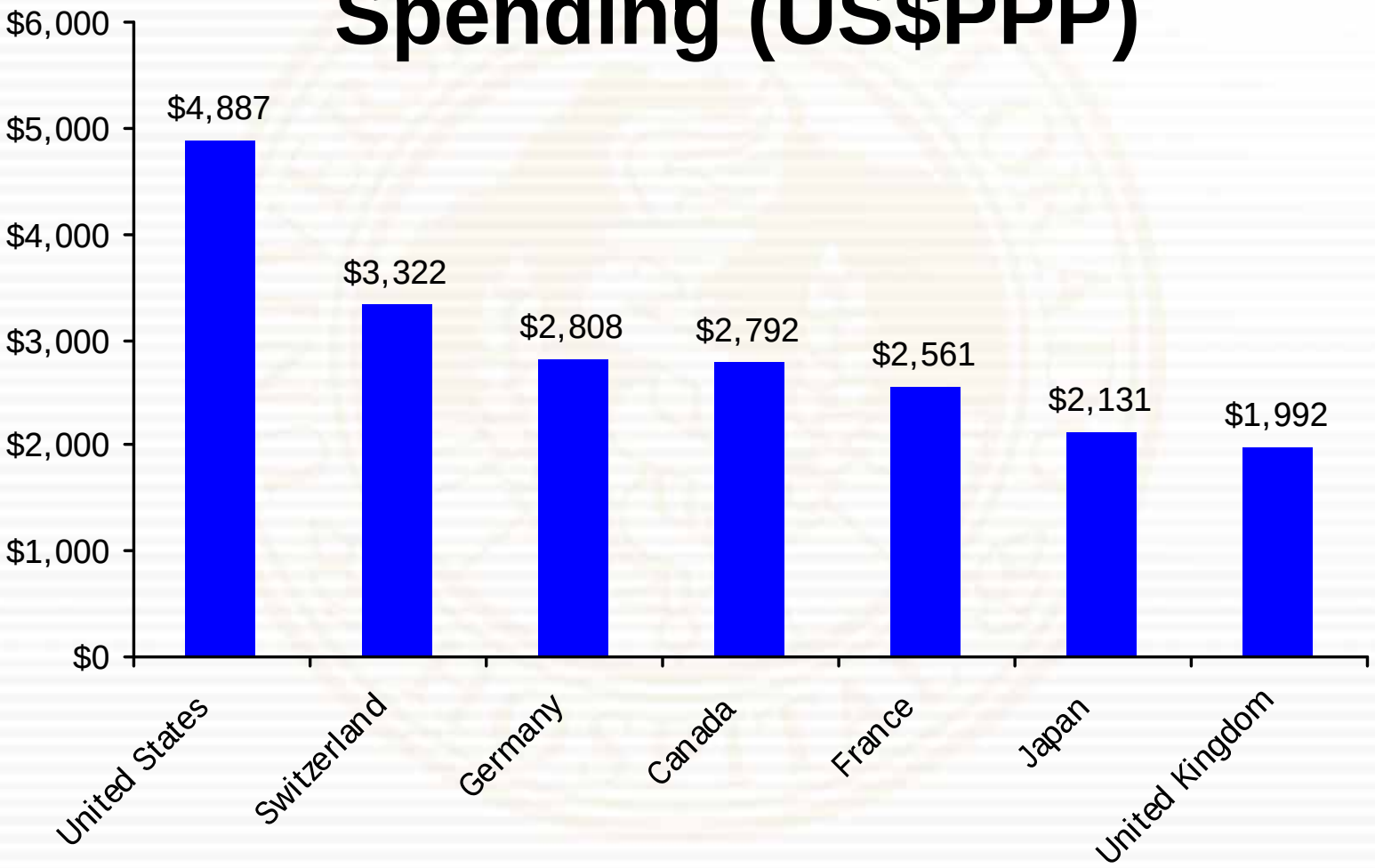
Outline

- Waste in the US Health Care System
- Lean principles: The Toyota Method
- Application to hospital medicine
- Discharge throughput: A UH example

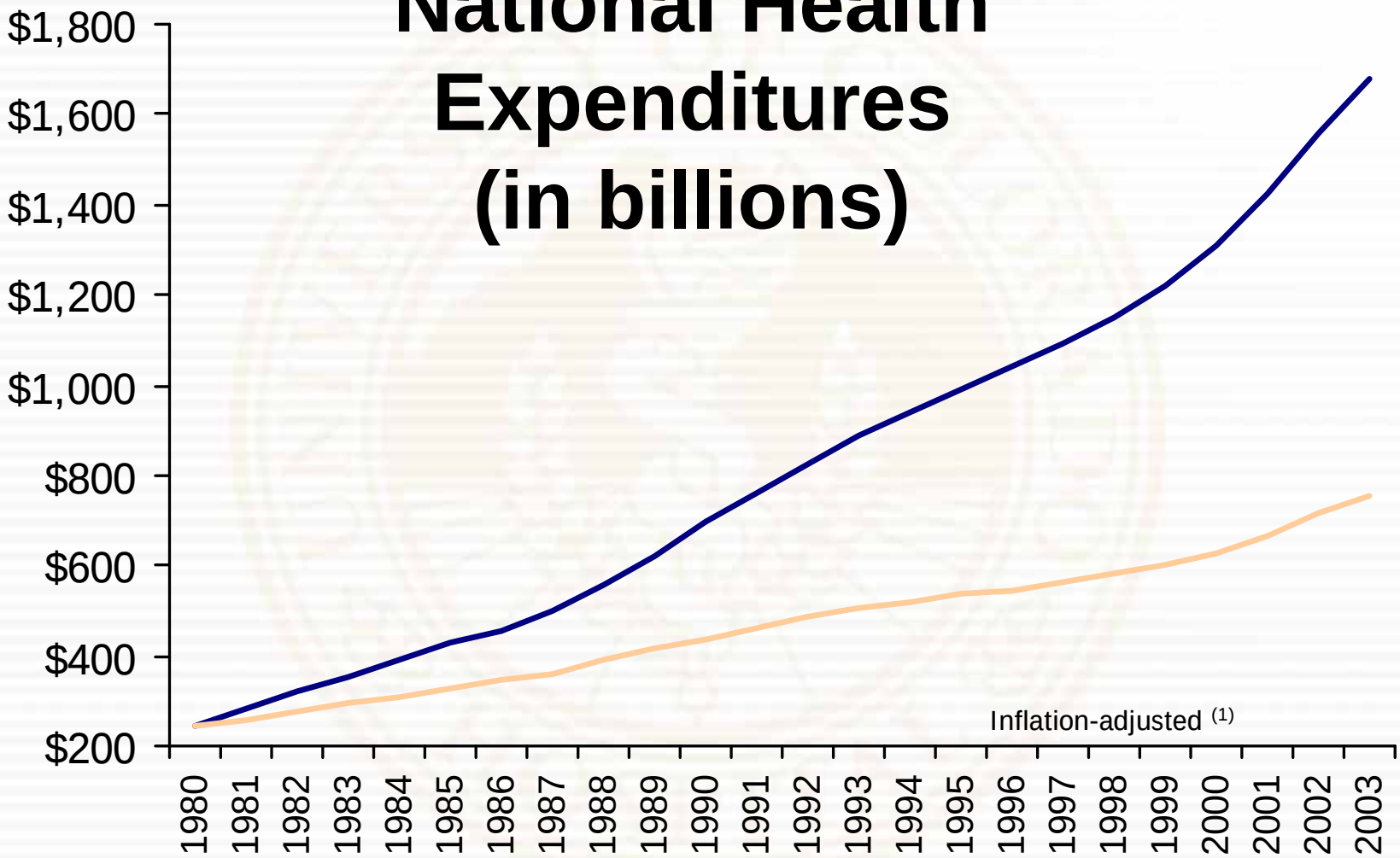
Disclaimers

Per Capita Health Care Spending (US$PPP)



Source: Organization for Economic Cooperation and Development, *OECD Health Data 2002*

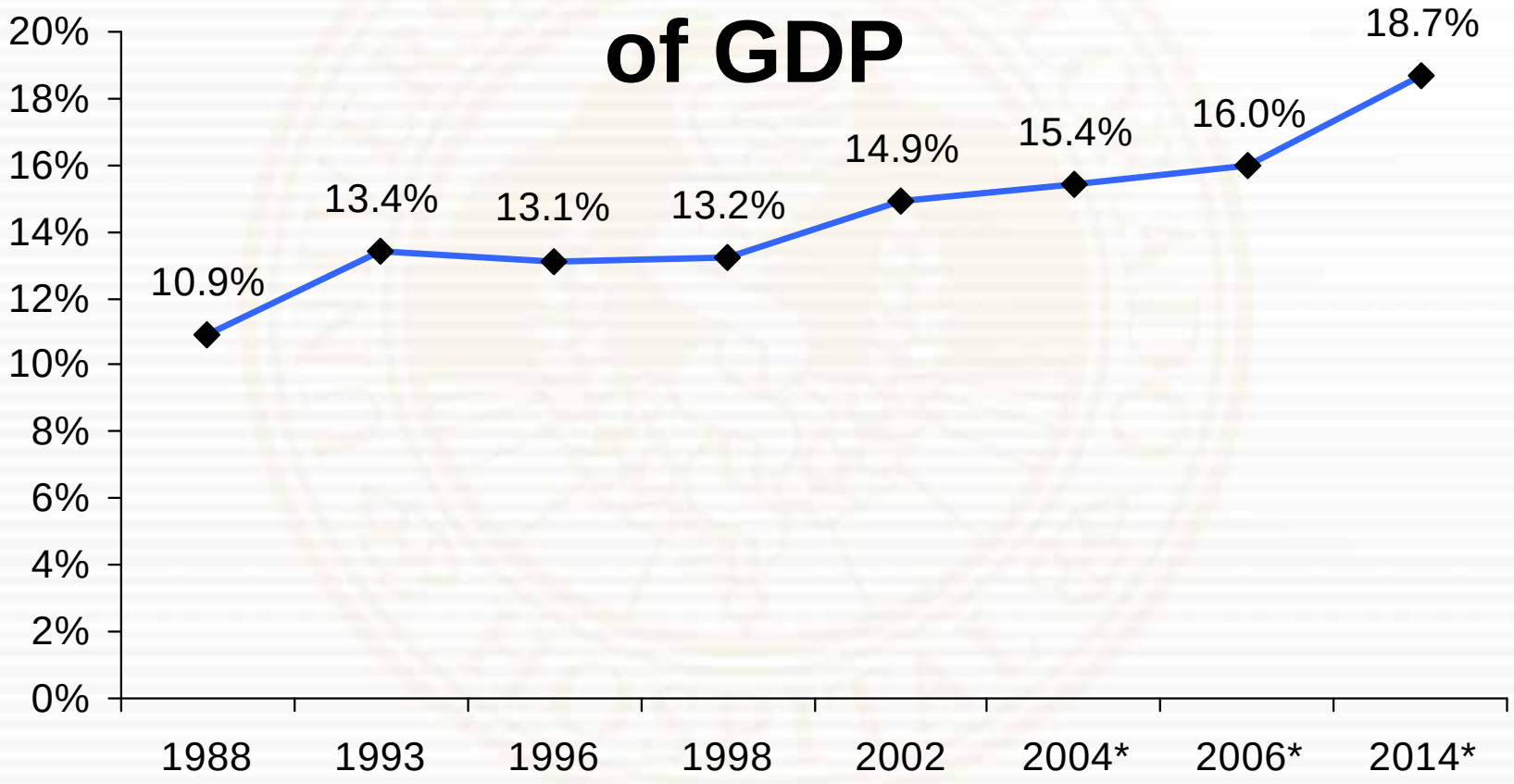
National Health Expenditures (in billions)



Source: Centers for Medicare & Medicaid Services, Office of the Actuary

(1) Expressed in 1980 dollars; adjusted using the overall Consumer Price Index for Urban Consumers

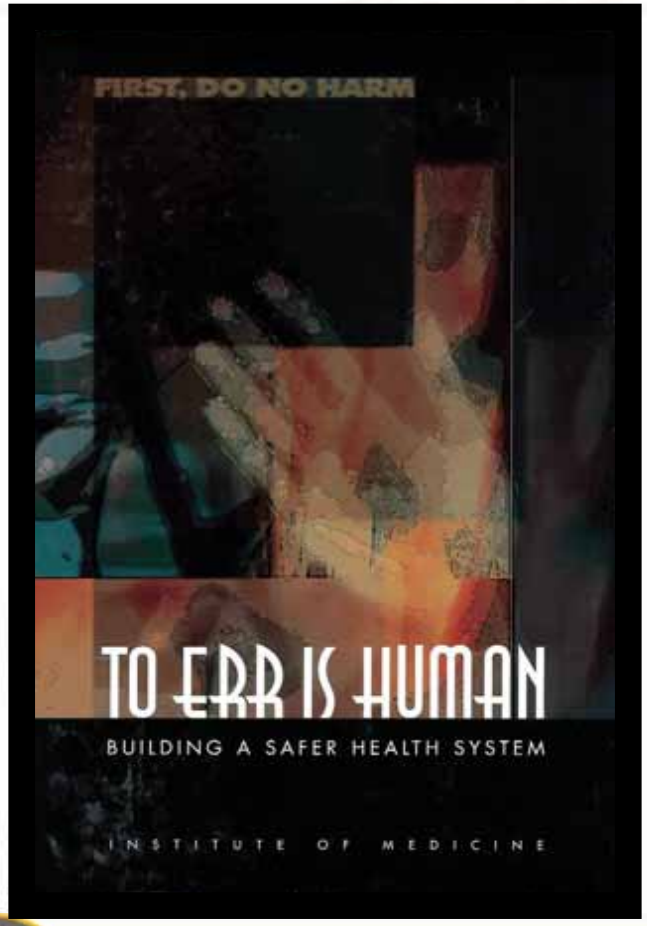
National Health Care Expenditures as a Percent of GDP



*Projected

Source: Heffler et al., "Health Spending Projections for 2004–2014," *Health Affairs* (February23, 2005).

Institute of Medicine Report on Medical Errors



50,000-100,000 deaths annually

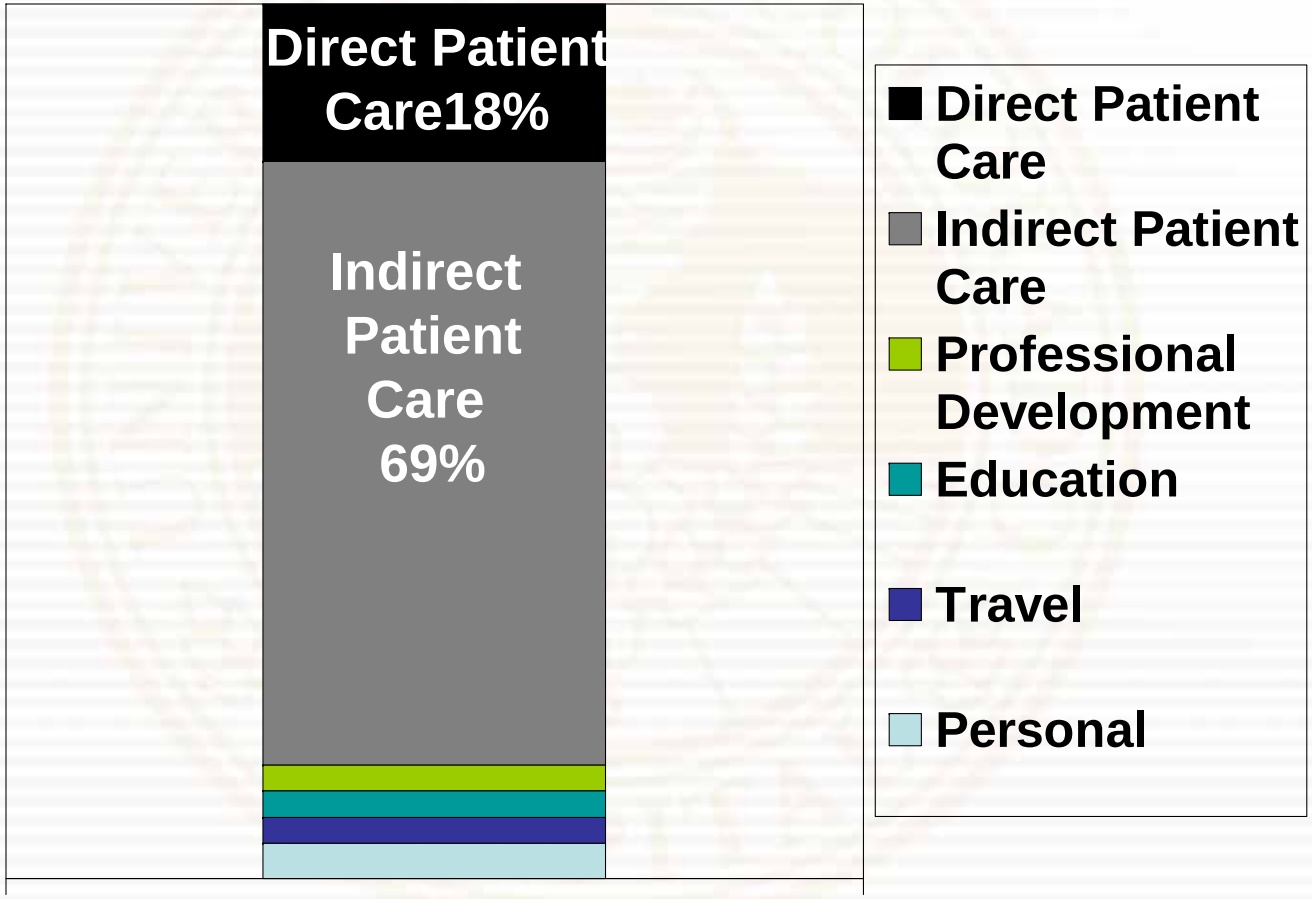
950,000 patients injured annually

$15 billion-$30 billion in cost

Care Setting	Every Hour of Patient Care Requires:
Emergency Department Care	1 Hour of Paperwork
Surgery and Inpatient Acute Care	36 Minutes of Paperwork
Skilled Nursing Care	30 Minutes of Paperwork
Home Health Care	48 Minutes of Paperwork

Source: PricewaterhouseCoopers survey of hospitals and health systems, 2001.

Wasted Time for Hospitalists



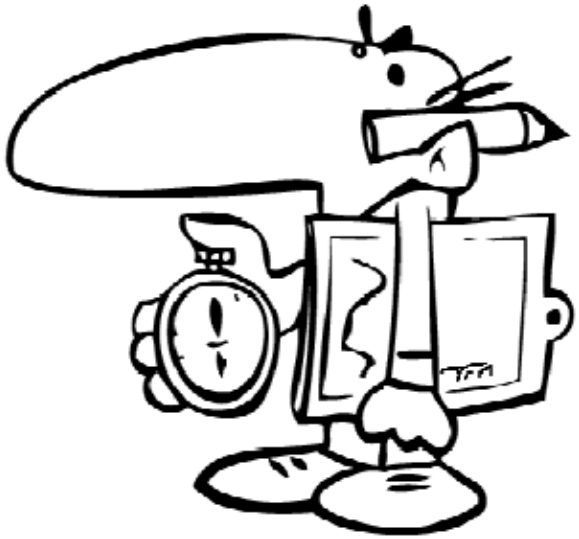
Percentage Breakdown of Time

Waste in healthcare

"The national numbers for waste in healthcare are between 30% and 40% but the reality of what we've observed by minute-to-minute observation over the last three years is closer to 60%....

It's everywhere: patient care and non-patient care alike."

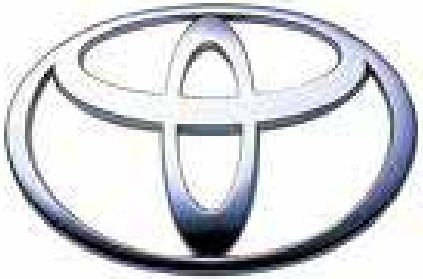
The Problem



- Too little efficiency
- Too much waste

Toyota Production System

- Largest manufacturer in the world
- Eight times more profitable than the industry average
- Produced 40% of the “most reliable” car models on the market in the last decade



Toyota Production System

- Taiichi Ohno: Father of the TPS
- Developed his ideas from observing:
  - The Indianapolis 500
  - The River Rouge plant
  - American supermarkets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Toyota in Healthcare

- Creating an environment of stability
- Elimination of waste
- Rapid identification and correction of errors

What is Lean Thinking?

- A methodology to produce the **highest quality** product in the **shortest amount of time**, at the lowest possible cost by eliminating the “seven wastes.”
- Fosters a culture which encourages all employees to continually look for improvement

The “Seven Wastes”

- Waste of Overproduction
- Waste of Time (waiting)
- Waste of Product Transport
- Waste in Excess Processing
- Waste in Inventory
- Waste in Movement
- Waste in Producing Defects

The “Seven Wastes”

- Waste of overproduction
  - Separate intern, resident, attending, social services rounding cycles
  - Entering repetitive information on multiple documents or forms

- Waste of time on hand (waiting)
  - Primary team waiting for support services
  - Patients waiting to make followup appointment
  - Delays for bed assignments

- Waste of processing
  - Multiple computer programs to document patient care information
  - Ordering more diagnostic tests than the diagnosis warrants
  - Retesting

- Waste of stock on hand (inventory)
  - Duplicate medications and supplies in excess of normal usage
  - Unnecessary instruments in operating room kits
  - Obsolete charts, files, equipment, paperwork

- Waste in transportation
  - Primary team traveling to different floors to see patients
  - Waiting for transportation to arrive to take patient to testing, surgery, discharge

- Waste of movement
  - Nurses leaving patient rooms for common supplies
  - Searching for charts, patients, medications

- Waste of producing defects
  - Iatrogenic illness
  - Medication errors

Understanding Value

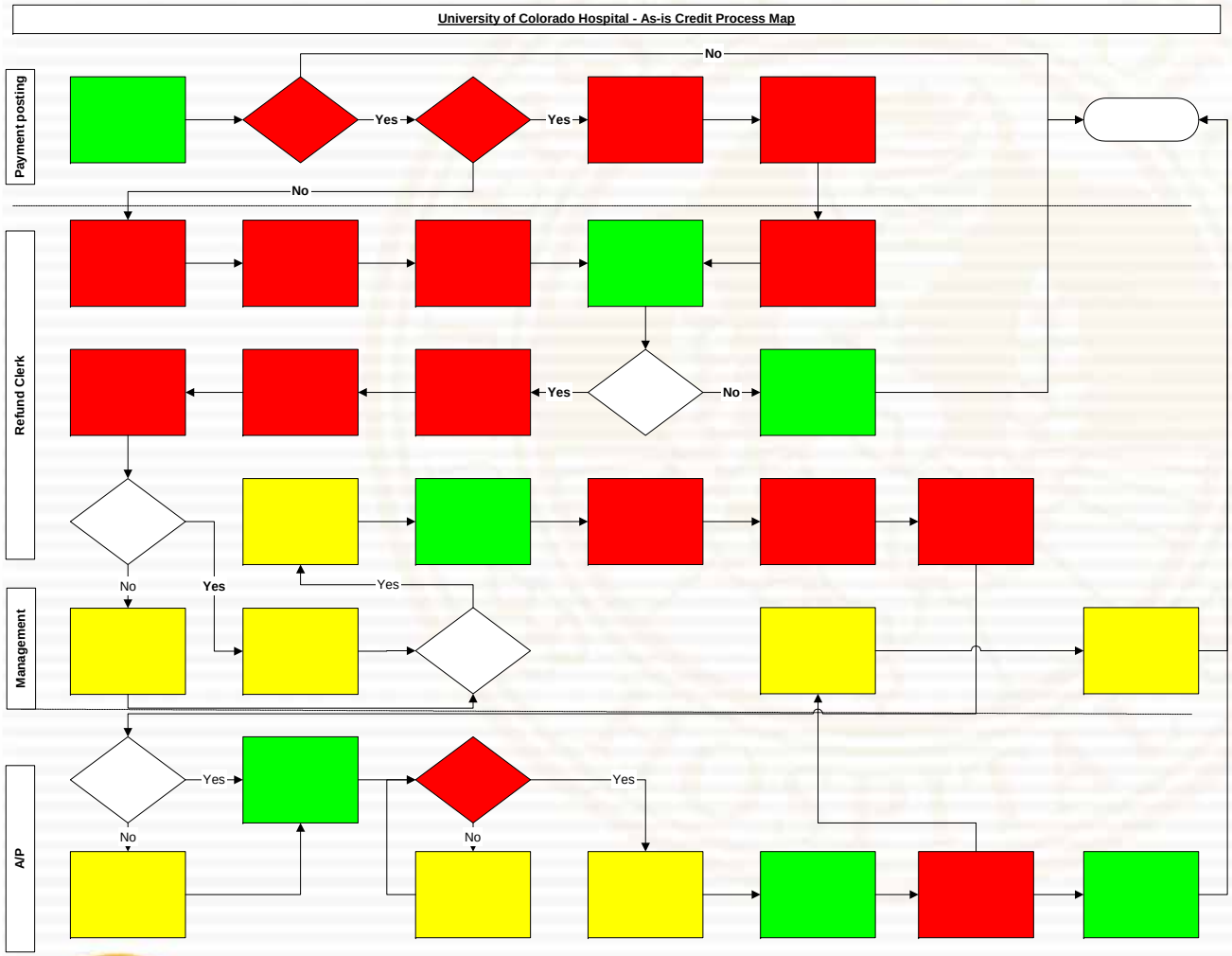
- Understand value as defined by our customers
  - Patients, families, payers, regulators
  - Physicians, nurses, hospitals

High-quality, safe, efficient, appropriate

Understanding Value: Lowry Clinic

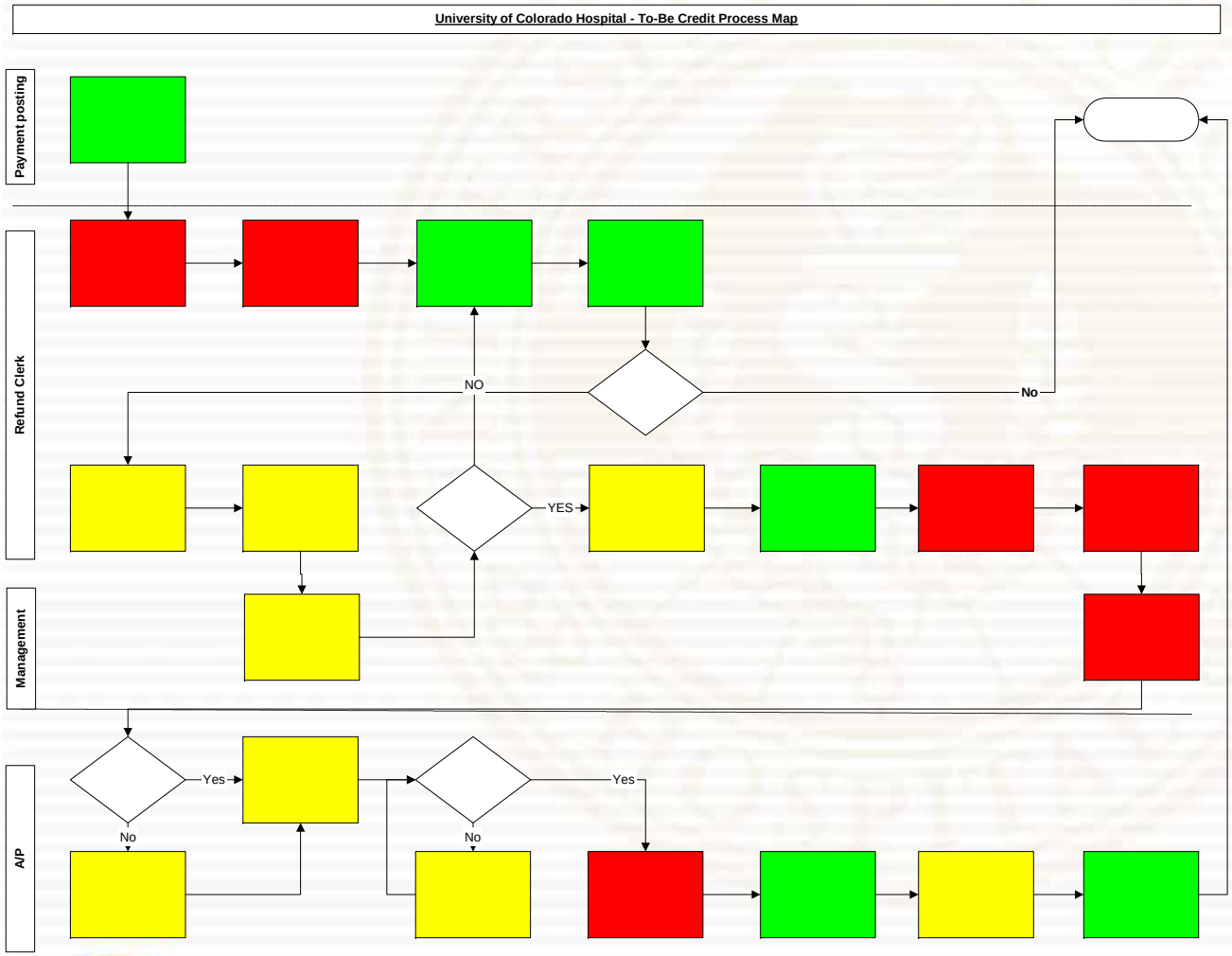
- Check in at front desk
- Wait in waiting room
- Walk with nurse to assessment room
- Nurse takes vitals
- Walk to exam room
- Wait for physician
- Physician exam
- Wait for physician to return
- Physician consult and treat
- Wait for nurse follow-up
- Walk to laboratory waiting room
- Wait for labs
- Get labs drawn
- Check out

Toyota Production System



- Non Value
- Value Enabling
- Value Add

Toyota Production System



- Non Value
- Value Enabling
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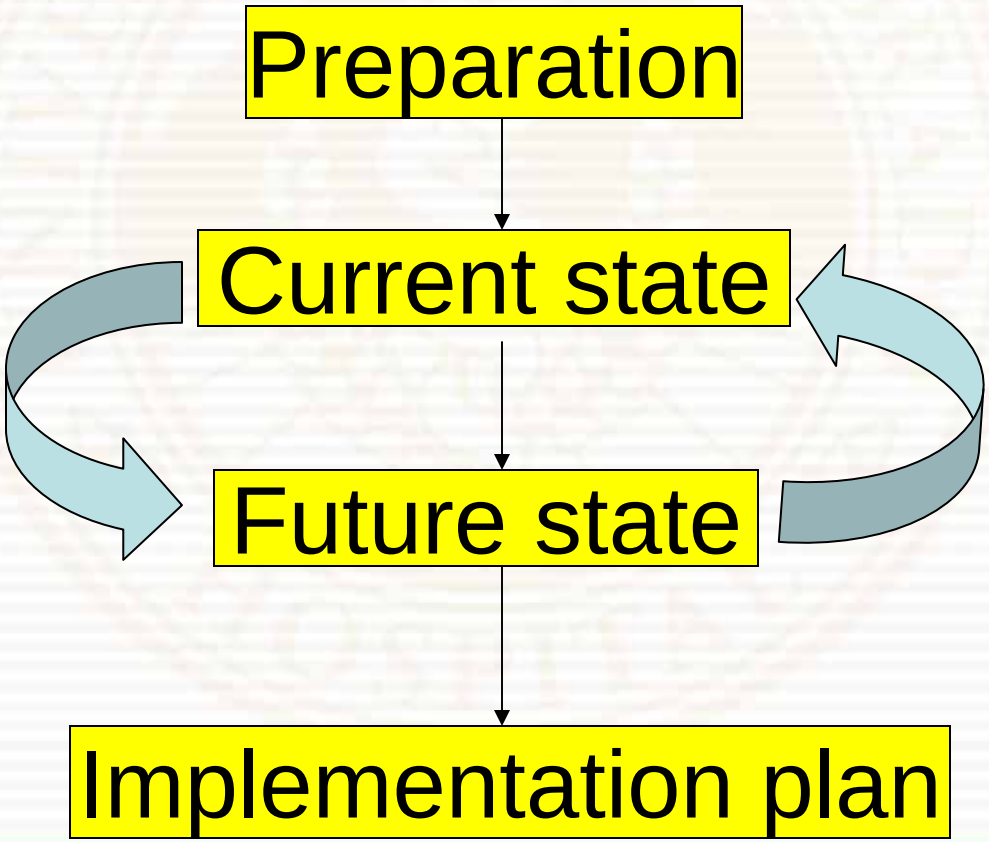
Process Improvement



Kaizen

Kai: “Take Apart”

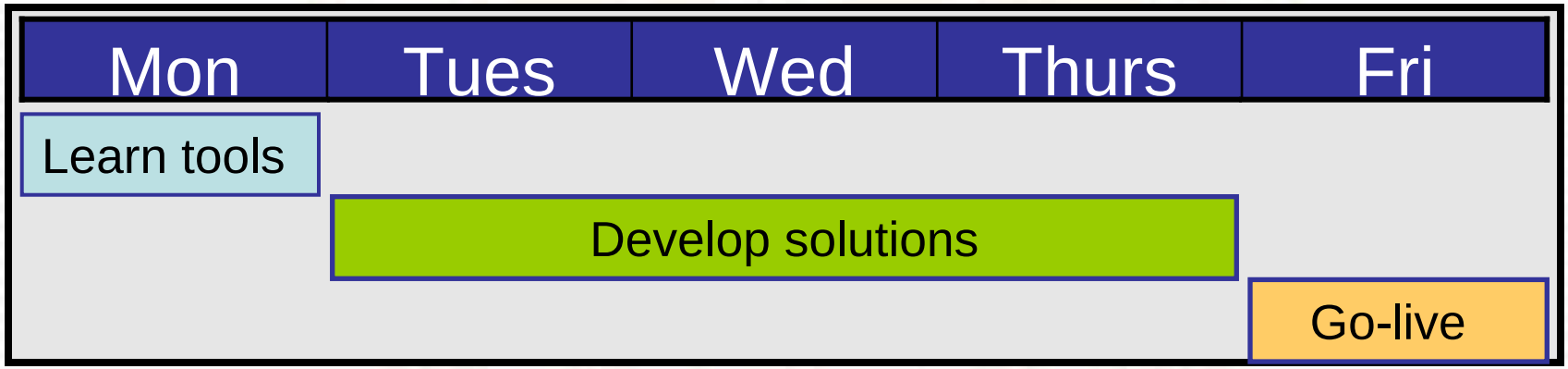
Zen: “Make Good”

The Lean Week

Pre-Lean

Identify, map and measure current process

Lean Week



Post-Lean

Monitor, measure, control, close

Standardization

- Standardization is the basis for continuous improvement and quality
  - Repeatable, stable methods provide a predictable, regular output
  - Creates a safe culture to point out problems and a standard way to fix them

Standard Work

- The technique of achieving consistent performance by creating a consistently applied method of doing a task
- The creation of the method by the people doing the work
- Should lead to continual improvement

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PATIENT CARE ORDERS

SUBCUTANEOUS INSULIN: GLARGINE & LISPRO

INDICATED for patients receiving po meals, bolus tube feedings or NPO.
NOT INDICATED for renal patients with creatinine > 3 mg/dL unless customized for patient.

dispensing by non-proprietary name under formulary system is permitted, unless checked here: ☐

Date / / Time:

Attending Physician: **UPI #** ***Note: Admission Order Form must be completed***

Ordering Healthcare Provider: **GME /UPI #** **Pager:**

Service:

Condition of Patient: **Allergies:**

Primary Diagnosis:

Also Designate: ☐**Diabetes Type 1 OR** ☐**Diabetes Type 2 AND if applicable** ☐ **DM Uncontrolled (see guidelines)**
☐**Steroid Induced Hyperglycemia** ☐**Stress Hyperglycemia** ☐**Other/Unspecified** _____

1. ORDER GLARGINE (Lantus®) LONG-ACTING BASAL INSULIN DOSE:

☐____ units Glargine subcutaneous in abdomen at ☐0800 daily **OR** ☐2200 daily **OR**

☐Patient's weight _____kg x 0.2 units = _____units Glargine subcutaneous in abdomen at ☐0800 daily **OR** ☐ 2200 daily

☐No Glargine dose. Use Rapid Acting Insulin only. (Patients with Type 1 Diabetes always need basal insulin)

Total Daily Dose of insulin is best allocated as 50% long acting and 50% rapid acting for most patients.

DO NOT MIX GLARGINE IN THE SAME SYRINGE WITH OTHER ISULIN OR MEDICATIONS .

2. ORDER ONE OF THE FOLLOWING CATEGORIES FOR LISPRO (HumALOG®) ADMINISTRATION:

☐Patient eating po meals:

- Check blood glucose just before meals and at 2200. Send BG to lab if meter reading less than 50 mg/dl or greater than 450 mg/dl, or if clinical picture does not correlate with meter reading.
- Administer Lispro immediately after meal to assure calories are consumed (approximately 0800-1230-1730)
- At BREAKFAST, LUNCH AND DINNER, administer Lispro from the ordered table below for "Receiving Calories"
  - If less than ¼ of the meal was consumed, administer Lispro from the ordered table for "No Calories"
  - If patient is temporarily NPO (e.g. for a procedure) administer Lispro from the ordered table for "No Calories" for the missed meal.
- If 2200 blood glucose is > 250mg/dL, administer **HALF** the Lispro dose from the ordered table for "No Calories" and round up to the nearest whole unit as needed.

☐Patient receiving bolus tube feedings ☐Every 4 hours OR ☐Every 6 hours

- Check blood glucose before each scheduled tube feeding.
- Administer Lispro ONLY with the tube feeding, following the ordered table below for "Receiving Calories"

☐Patient NPO or on clear liquids:

- Check blood glucose every 6 hours at 2400 – 0600 – 1200 – 1800.
- Administer Lispro from the ordered table below for "No Calories" at 2400 – 0600 – 1200 – 1800 ONLY.
- At 2400 administer **HALF** the Lispro dose from the ordered table for "No Calories" (to avoid nocturnal hypoglycemia). Round up to the nearest whole unit as needed.

3. ORDER A RAPID-ACTING INSULIN TABLE: LISPRO (HumALOG®) Subcutaneous injection.

Blood Glucose mg/dL	☐ **Insulin Sensitive** BMI ≤ 25 or normal body weight		☐ **Insulin Resistant** BMI ≥ 26 or overweight, obese		☐ **Customized**	
≤ 70	Implement Hypoglycemia orders		Implement Hypoglycemia orders		Implement Hypoglycemia orders	
	Receiving Calories	**No Calories**	**Receiving Calories**	**No Calories**	**Receiving Calories**	**No Calories**
71-124	3 units	No Insulin	6 units	No Insulin	__ units	__ units
125-149	3 units	No Insulin	7 units	1 unit	__ units	__ units
150-199	4 units	1 unit	8 units	2 units	__ units	__ units
200-249	5 units	2 units	10 units	4 units	__ units	__ units
250-299	6 units	3 units	12 units	6 units	__ units	__ units
300-349	7 units	4 units	14 units	8 units	__ units	__ units
350-399	8 units	5 units	16 units	10 units	__ units	__ units
≥ 400	Call MD		Call MD		Call MD	

Physician Signature / Title / GME # / UPI #	Transcribed by:	Title:	Date:	Time:
	Verified by:	Title:	Date:	Time:

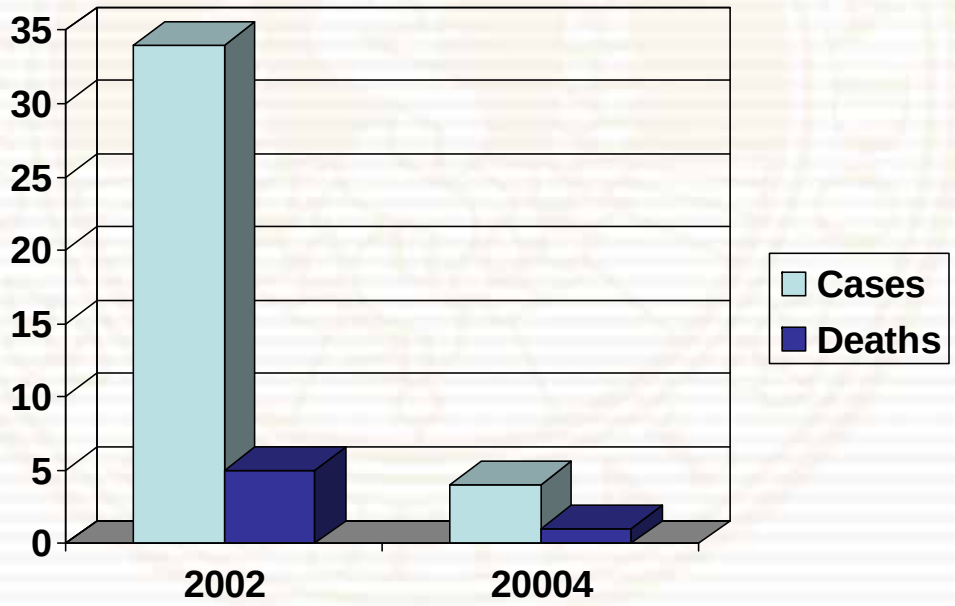
Standardization

"Today's standardization…is the necessary foundation on which tomorrow's improvements will be based. If you think of standardization as the best you know today but which is to be improved on tomorrow—you get somewhere. But if you think of standards as confining, then progress stops."

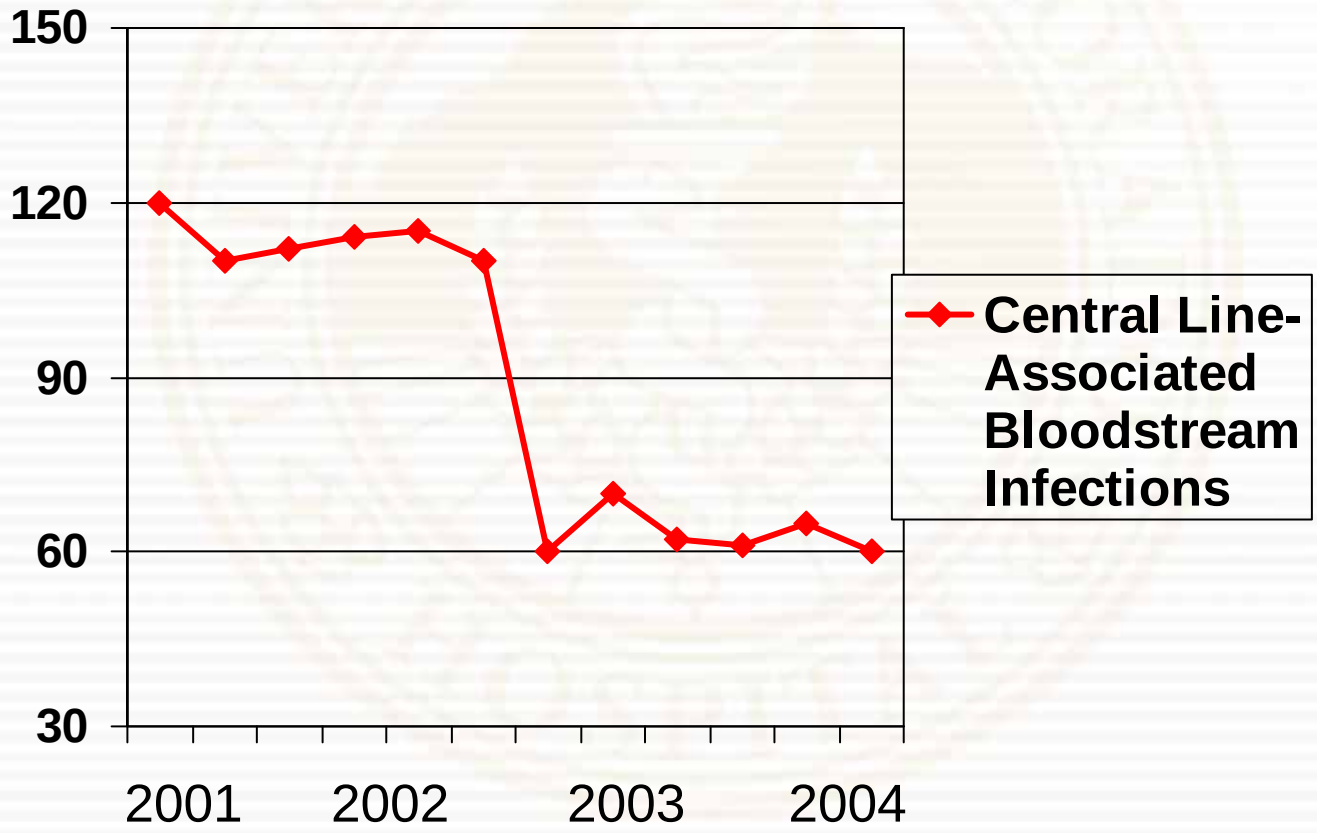
Henry Ford, 1921

Virginia Mason Medical Center

- Ventilator-associated pneumonia



Pittsburgh Regional Healthcare Initiative



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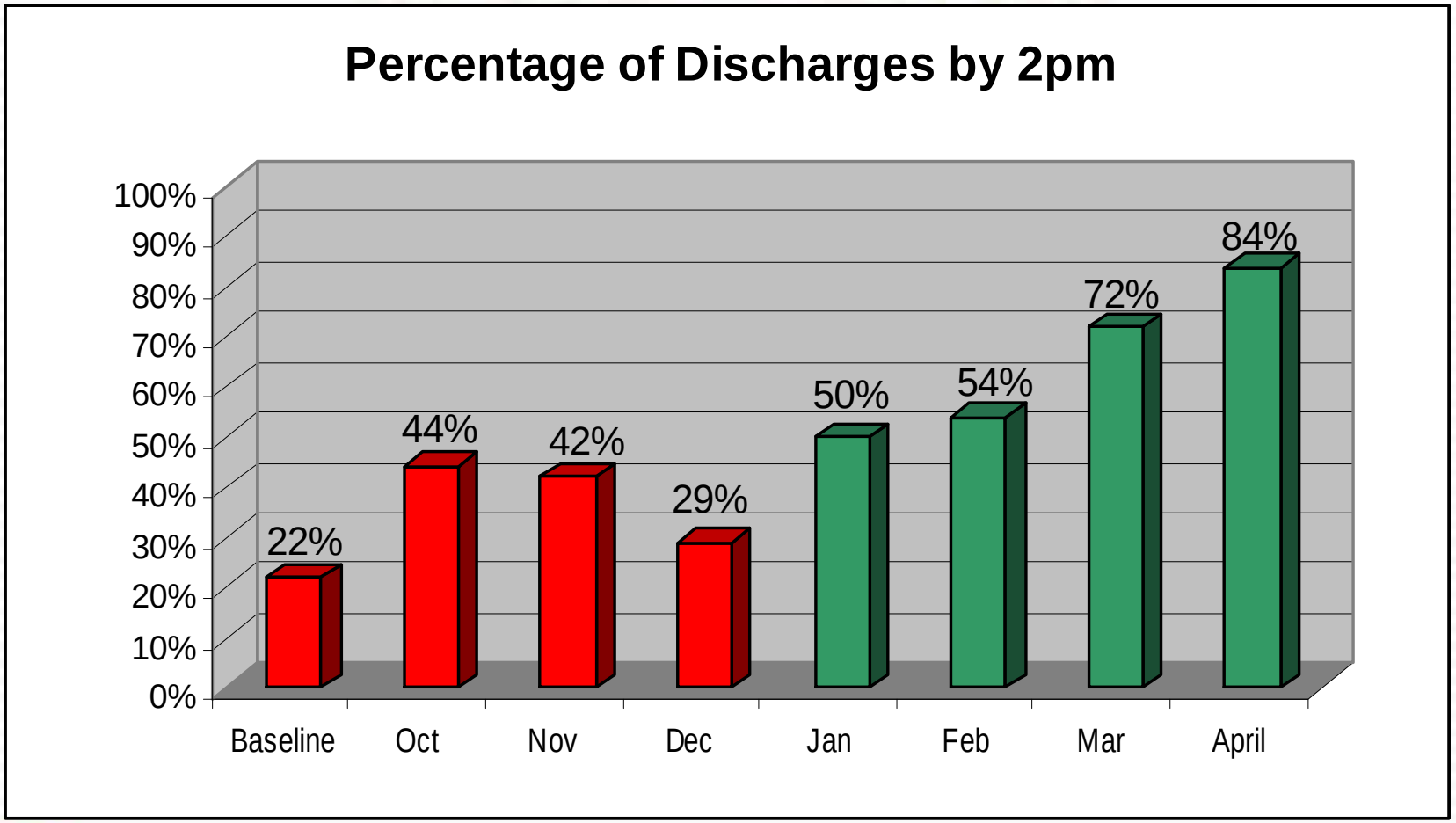
- PICC lines placed within 24 hours of request:
  - Initially: 50%-70%
  - After Lean: 90%-95%

Overall 36% decrease in average time to placement

12 West Lean Outcome Data

October 2008-April 2009



Opportunities

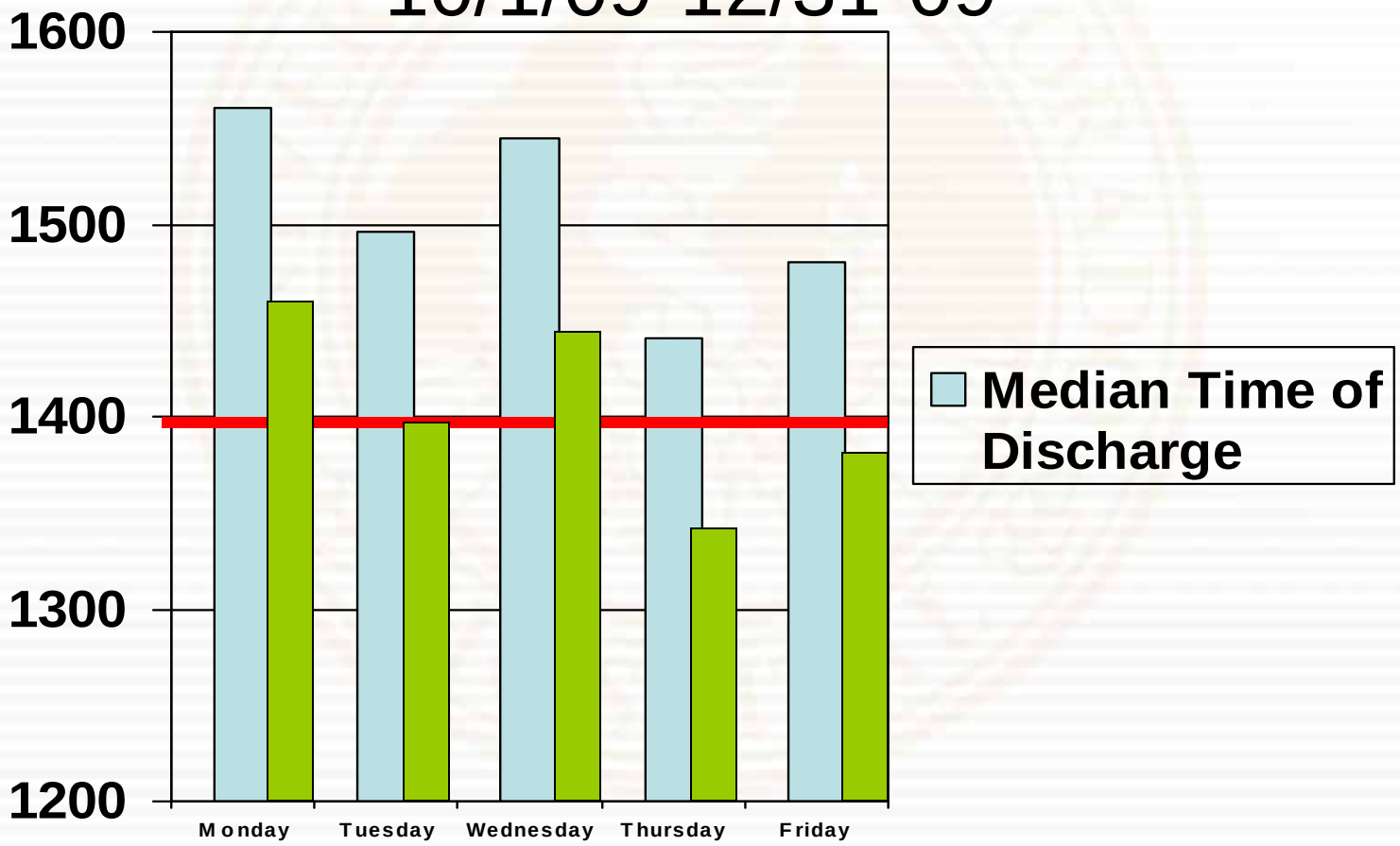
- Identify and reduce waste in the 7E discharge process
- Identify hospital system throughput delays
- Recommend process improvements for hospital-wide discharge process barriers
- Understand how efficiency of the discharge process affects patient satisfaction

Goals

- Reduced time from room empty to room occupied
- Double the percentage “clean to occupied bed time” in less than 60 minutes from 22% to 44%
- Improve daily median discharge time by 1 hour for Monday through Friday discharges
- Create a control plan to monitor and sustain improvements

Baseline Data

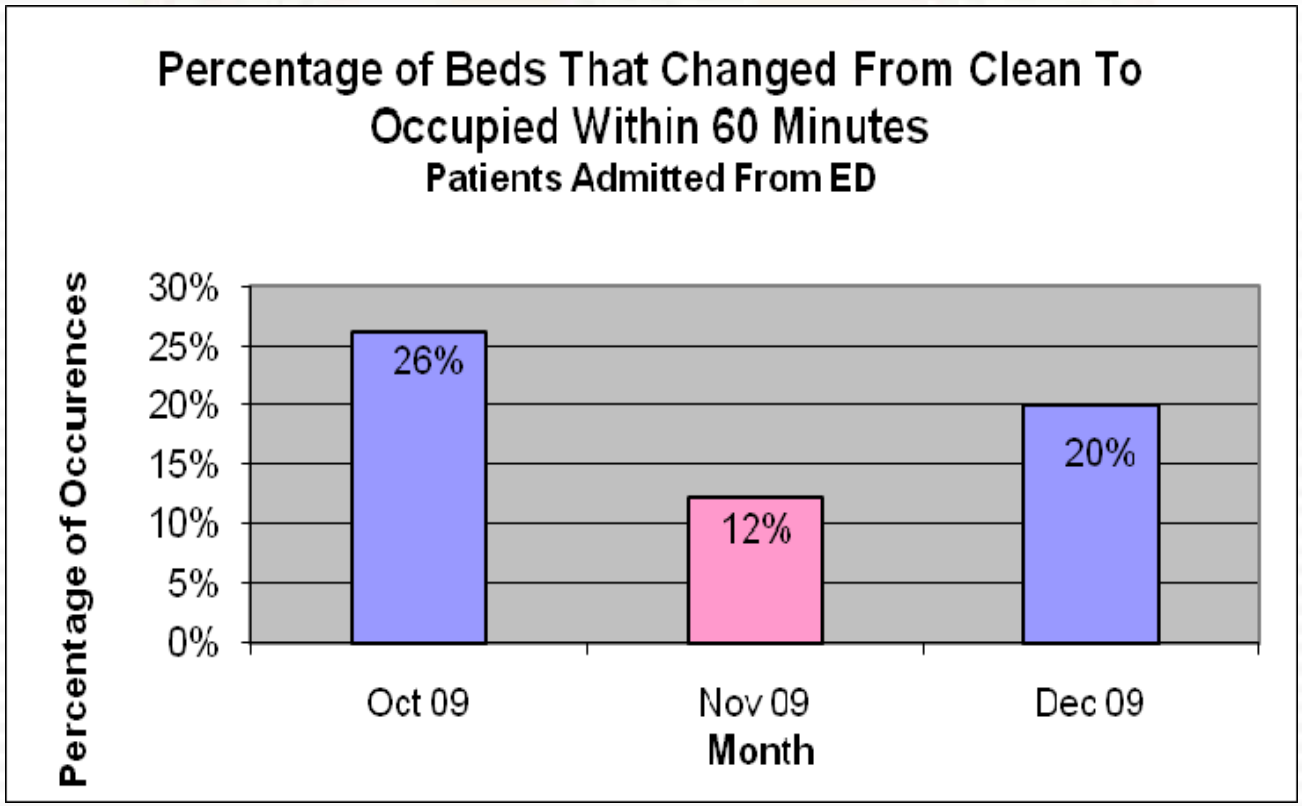
Median Discharge Time by Day of Week: 10/1/09-12/31-09

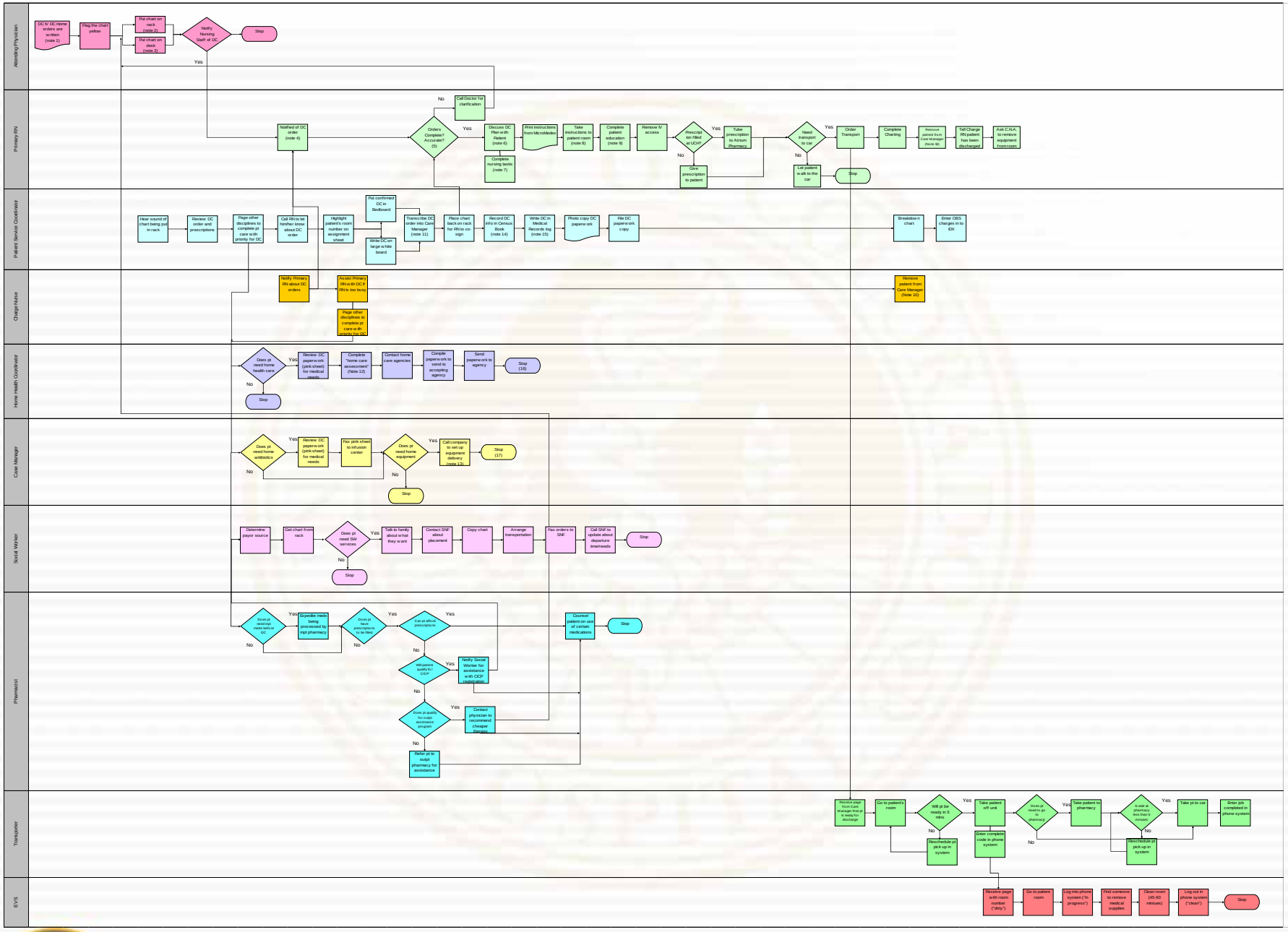


Baseline Data

Clean to Occupied Bed Time:

10/1/09 – 12/31/09





Phase II

- Compare staff interview and observation process maps
- Meet with 7E staff to identify wastes in the process and determine Kaizen events
- Implement solutions
- Monitor data compared to baseline/goals
- Create plan for sustainability of project

References

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Questions?