Better, Faster, Cheaper

Eliminating waste in healthcare

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Administrative Director of Performance Improvement

November 6, 2015

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Learning Goals

Understand what lean transformation is.

Be able to describe an example outcome from lean transformation in healthcare.

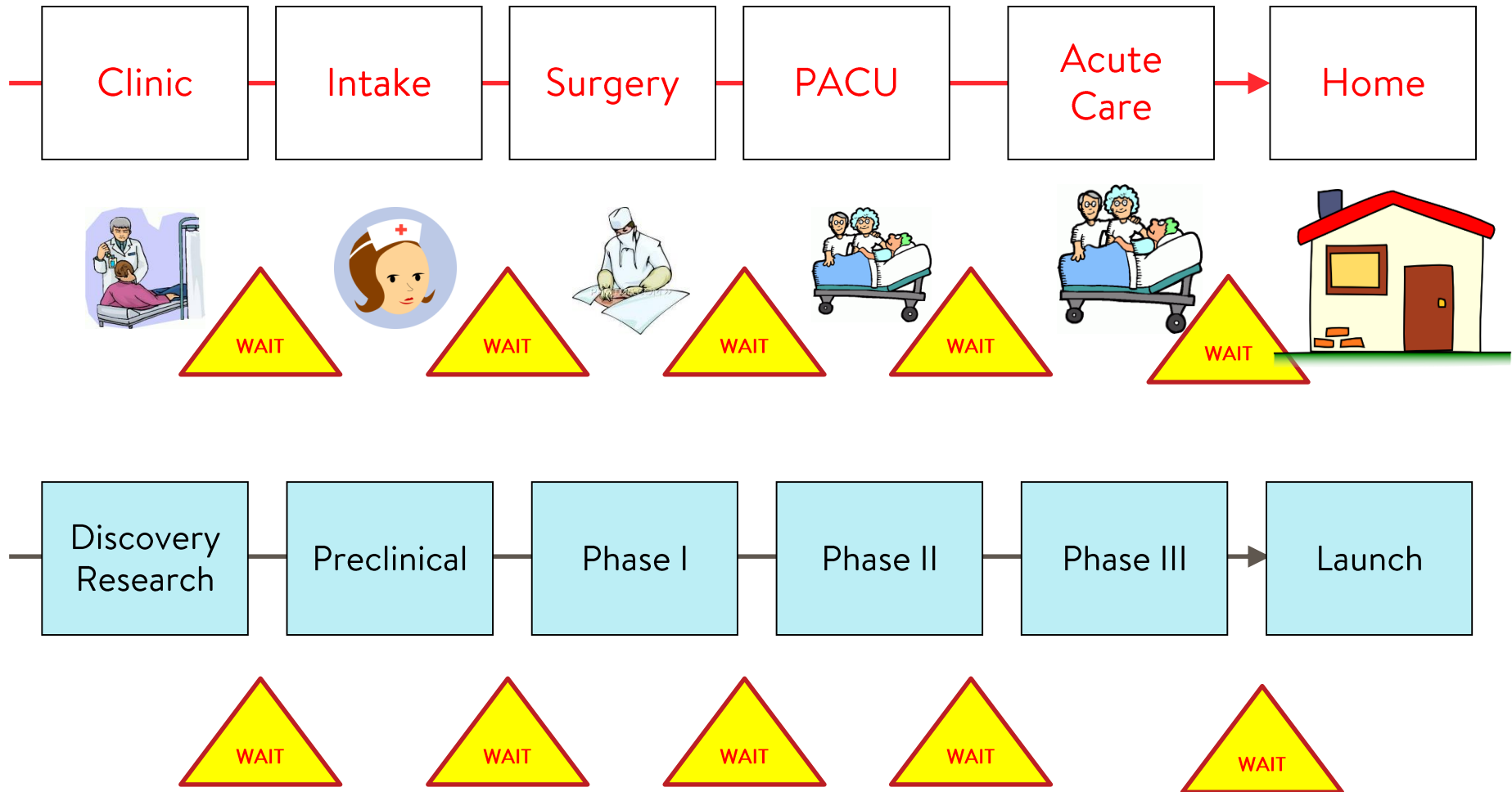*Consider* the application of lean management to drug development.

A Simple Idea

Agenda

1. Review: what lean is & is not.

2. Macro: The burning platform(s)!

3. Micro: perioperative services.

4. Meso: application to drug *development*

What is lean?

The relentless pursuit of waste elimination.

What is lean?

Lean is both a technical and social (*people development*) system that uses standards to "see" abnormalities so that they can be eliminated through enterprise-wide continuous improvement efforts.
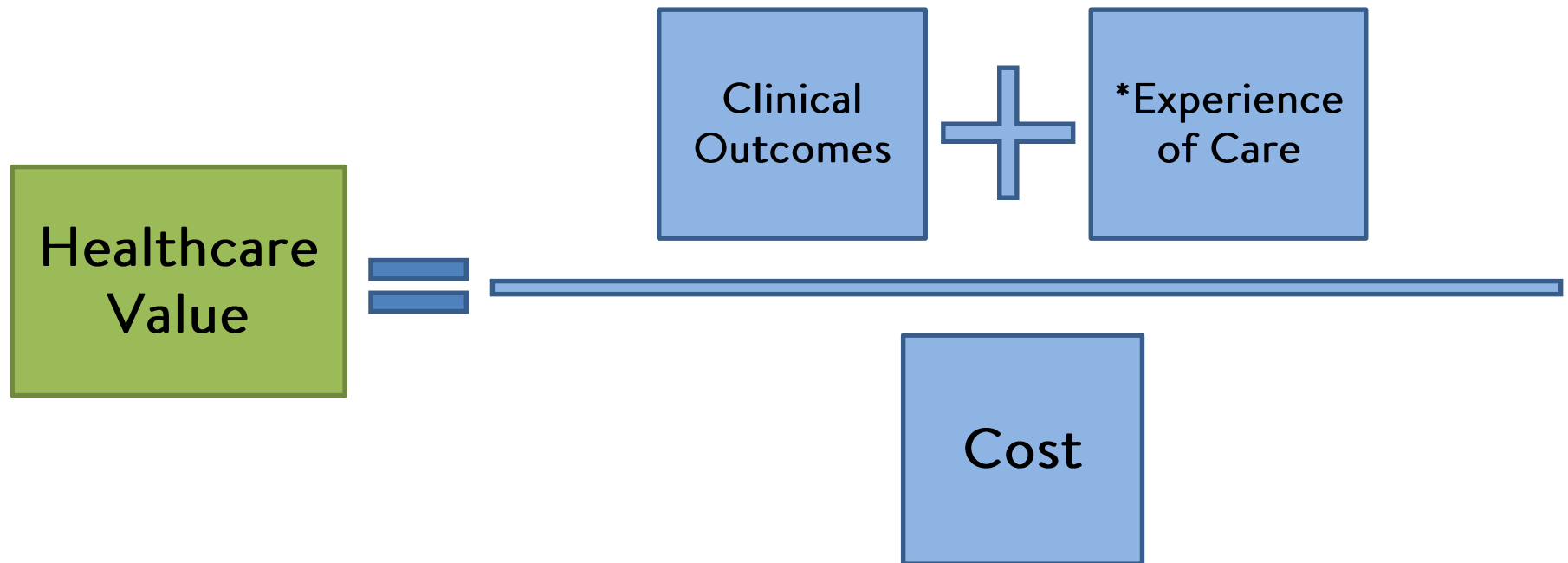
Key Terms

It is a business **system** (*methods, mindset, management*), not an initiative.

People development: employees at all levels are trained in improvement, empowered and motivated to improve. Part of everyone's work is improving the work.

What is lean?

Healthcare reform and consumers are demanding:
Cheaper, faster, better, safer, kinder for individuals and populations
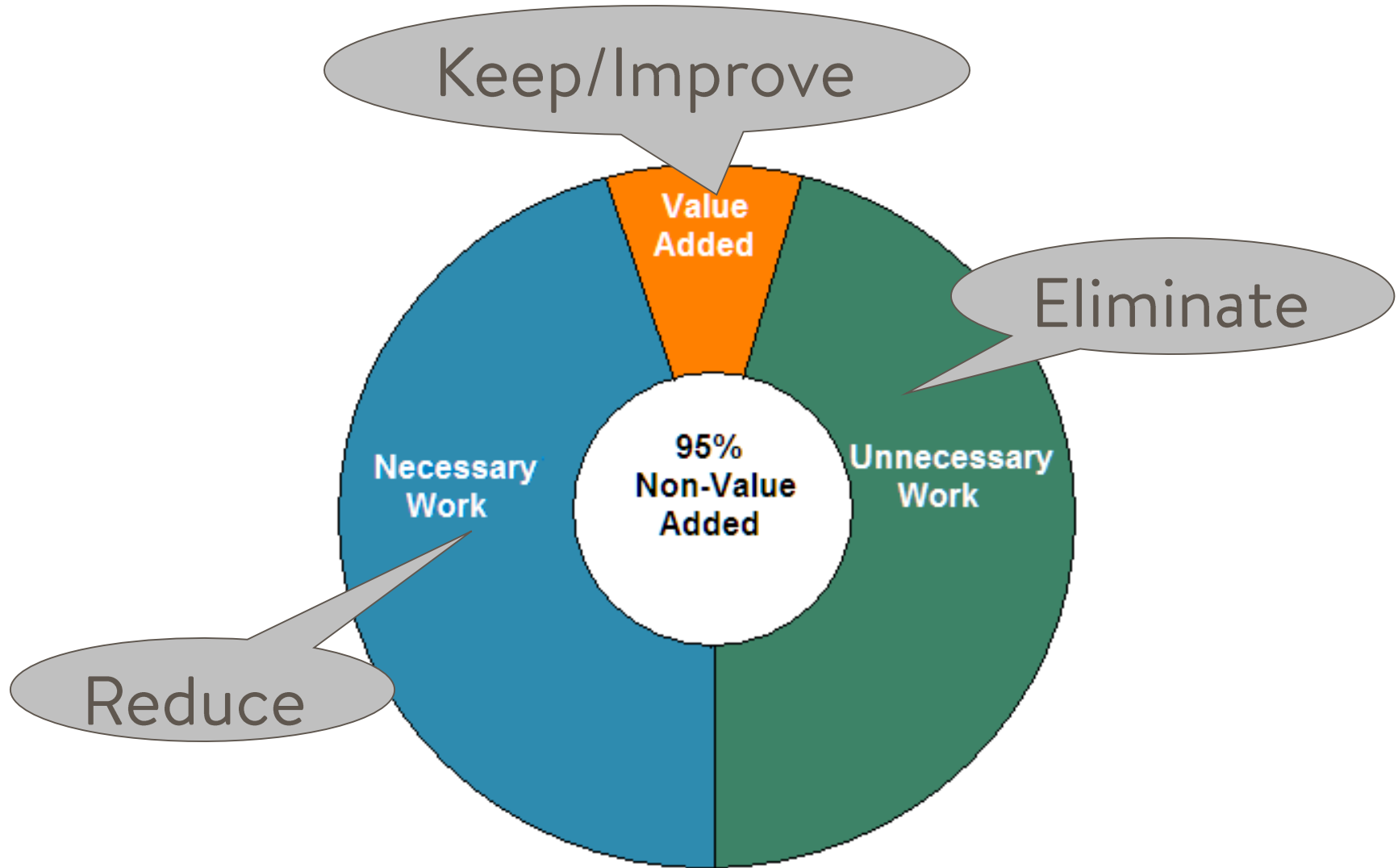
$$\text{Healthcare Value} = \frac{\text{Clinical Outcomes} + \text{*Experience of Care}}{\text{Cost}}$$

*Patient and Staff Experience

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Core Lean Concepts

- Relentless pursuit of *waste elimination*

- *Value* is defined by the customer

- Seeks to make *value flow*

- Creates a *culture of never-ending improvement* at all organization levels

- Improvement doesn't happen in the conference room, it happens in the workplace… *go to gemba*

- Lean is a *journey*, not an end state

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Focus On Waste

Types of Waste

Processing

Correction

Inventory

Wait Time

Search Time

Transportation

Space

Complexity

Value-Added Timeline

Discharge Medication Process

Value-Added (VA)

Non-Value-Added (NVA)

Discuss Discharge & Medication with Family

Give Medication & Education to Family

Decision to Discharge Patient

Search for Chart

Write Medication Order

Coordinate Chart

Tube Order to Pharmacy

Pull Order from Outpatient Bin

Enter Order Into Computer

Call Resident to Verify Info

Complete Order and Place in Bin

Prepare Medication Order

Check Medication Order

Walk Medication to the Unit

Total time = 185 minutes	VA time = 6.5 minutes	# of Process steps = 14	VA steps = 2	% of NVA time = 97%

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NOTE! Waste is not usually visible

Learning To See

- the biggest wastes are not visible
- value stream mapping

Waste masquerades

as real work.

Old approach:
look for a cost; cut it

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Addressing common misconceptions

Lean is <u>not</u> about belt tightening

Lean <u>can</u> address the "arts" of medicine, research & development

Looking for "rock star" doctors or drug developers is the <u>antithesis</u> of lean

Identify at least 1 significant waste in <u>your</u> processes.

Who? "I never said most of the things I said."

- Played 19 seasons in MLB
- Career batting average of .285
- Elected to the Baseball Hall of Fame
- Won the American League MVP three times
- 358 home runs
- 18-time All-Star
- 1,430 runs batted in
- 10-time World Series champion

Conditions for lean transformation

A burning platform.

Acknowledged need for change.

Hmm...what is lean?

Grit!

Macro-level: Healthcare System
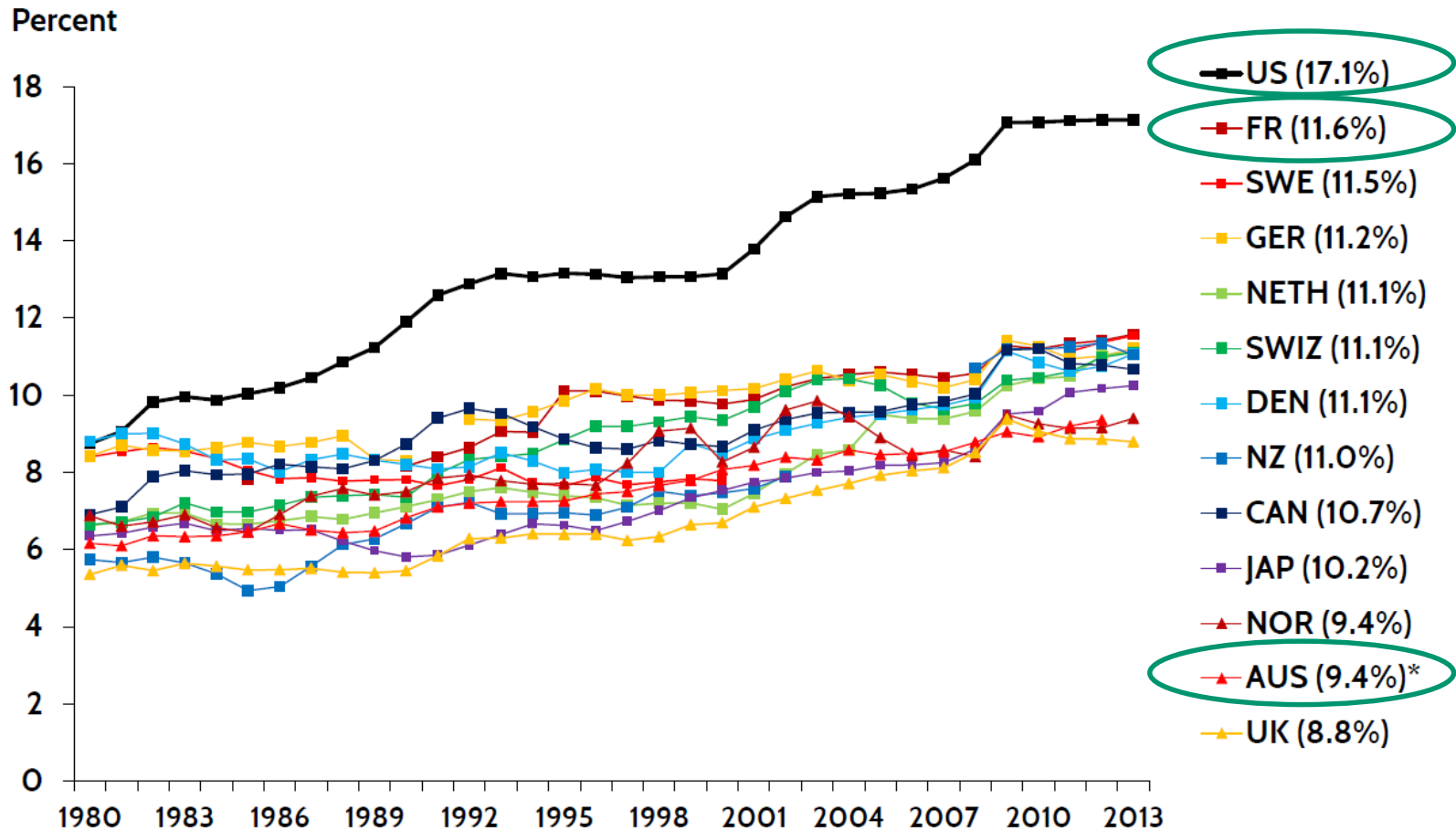
"The future ain't what it used to be."

How Much Are We Spending?

Exhibit 1. Health Care Spending as a Percentage of GDP, 1980–2013

Percent

US (17.1%)
FR (11.6%)
SWE (11.5%)
GER (11.2%)
NETH (11.1%)
SWIZ (11.1%)
DEN (11.1%)
NZ (11.0%)
CAN (10.7%)
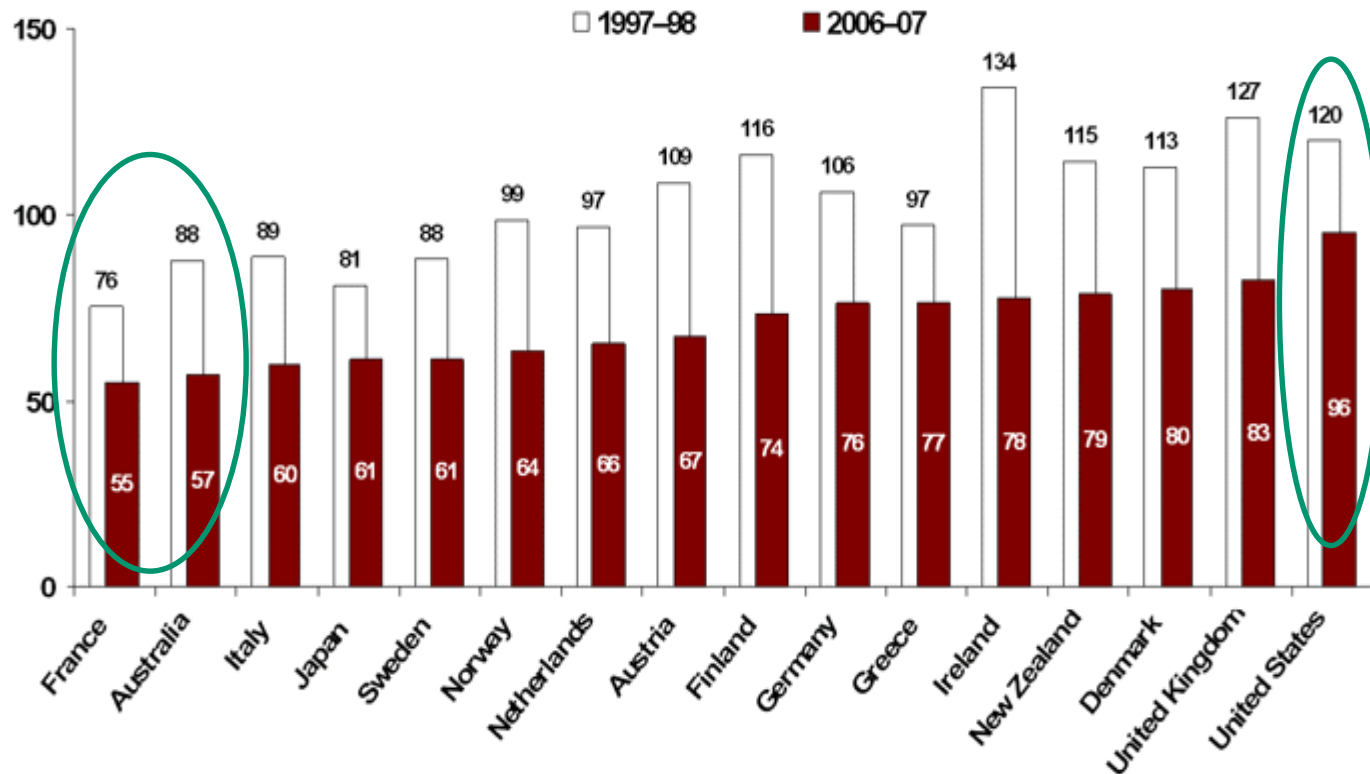JAP (10.2%)
NOR (9.4%)
AUS (9.4%)*
UK (8.8%)

* 2012.

Notes: GDP refers to gross domestic product. Dutch and Swiss data are for current spending only, and exclude spending on capital formation of health care providers.

Source: OECD Health Data 2015.

…but we get better outcomes, right?

U.S. Lags Other Countries: Mortality Amenable to Health Care

Deaths per 100,000 population*

Legend: □ 1997–98 ■ 2006–07

Country	1997–98	2006–07
France	76	55
Australia	88	57
Italy	89	60
Japan	81	61
Sweden	88	61
Norway	99	64
Netherlands	97	66
Austria	109	67
Finland	116	74
Germany	106	76
Greece	97	77
Ireland	134	78
New Zealand	115	79
Denmark	113	80
United Kingdom	127	83
United States	120	96

* Countries' age-standardized death rates before age 75; including ischemic heart disease, diabetes, stroke, and bacterial infections. Analysis of World Health Organization mortality files and CDC mortality data for U.S.
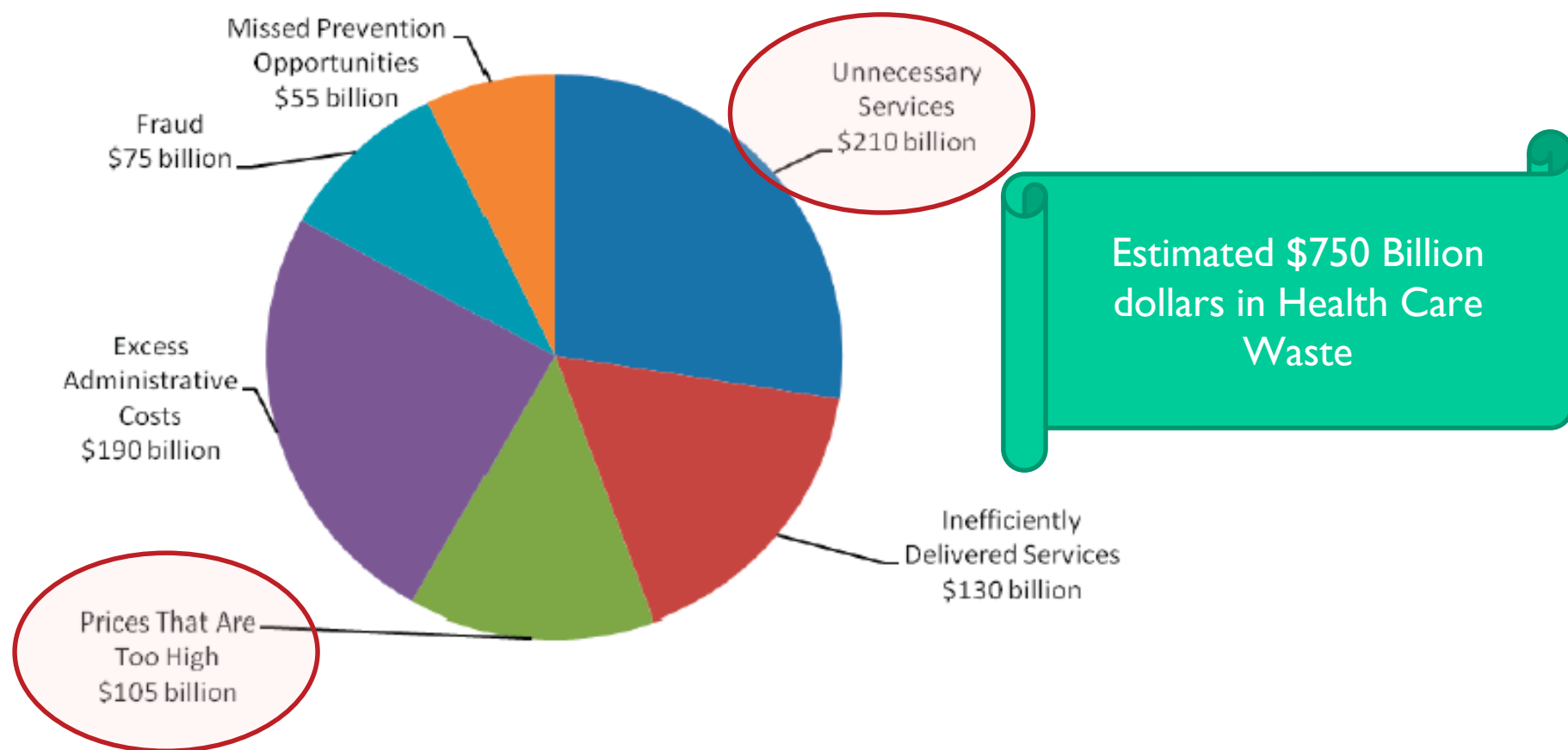
Source: Adapted from E. Nolte and M. McKee, "Variations in Amenable Mortality—Trends in 16 High-Income Nations," *Health Policy*, published online Sept. 12, 2011.

THE COMMONWEALTH FUND

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Sources of Waste and Excess Costs in Health Care

ACHIEVING AND REWARDING HIGH-VALUE CARE

Missed Prevention Opportunities $55 billion

Fraud $75 billion

Unnecessary Services $210 billion

Excess Administrative Costs $190 billion

Prices That Are Too High $105 billion

Inefficiently Delivered Services $130 billion

Estimated $750 Billion dollars in Health Care Waste

FIGURE 8-1 Sources of waste and excess costs in health care.
SOURCE: Data derived from IOM, 2010b.

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44,000-98,000 Unnecessary Deaths Annually

To Err Is Human, Building A Safer Health System
Institute of Medicine 1999

Courtesy: Amy Perry

Preventable injuries from care affect 3%- 4% of hospitalized patients.

To Err Is Human, Building A Safer Health System
Institute of Medicine 1999
Courtesy: Amy Perry

Where Are We Today?

Results Across Studies

North Carolina Harm Study

18% of patients experienced preventable adverse events

25/100 admissions with harm

Institute for Healthcare Improvement (IHI) Trigger Tools

33% of patients experienced preventable adverse events

49/100 admissions with harm

Office of Inspector General Study

28% of patients experienced preventable adverse events

36/100 admissions with harm

1 Landrigan CP, Parry GJ, Bones CB, Hackbarth AD, Goldmann DA, Sharek PJ. Temporal trends in rates of patient harm resulting from medical care. New England Journal of Medicine. 2010 Nov; 363(22):2124-2134.

2 Classen DC, Resar R, Griffin F, et al. *Global Trigger Tool shows that adverse events in hospitals may be ten times greater than previously measured.* Health Affairs. 2011 Apr;30(4):581-589.

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Hospital Acquired Conditions at LPCH

A chart was presented that showed data on actual HACs for LPCH in control chart form.

Prioritizing our HAC problems (2012)

Legend: ■ # (12mos) — Cumulative %

Bar values:
- Central Line Associated BSI: 35
- Post-Partum Hemorrhage: 32
- Surgical Site Infection: 21
- Catheter Associated UTI: 6
- Hospital Acquired Pressure Ulcers: 6
- Adverse Drug Event (level 6 or greater): 0
- Ventilator-Associated Pneumonia: 0
- Falls (mod harm or greater): 0
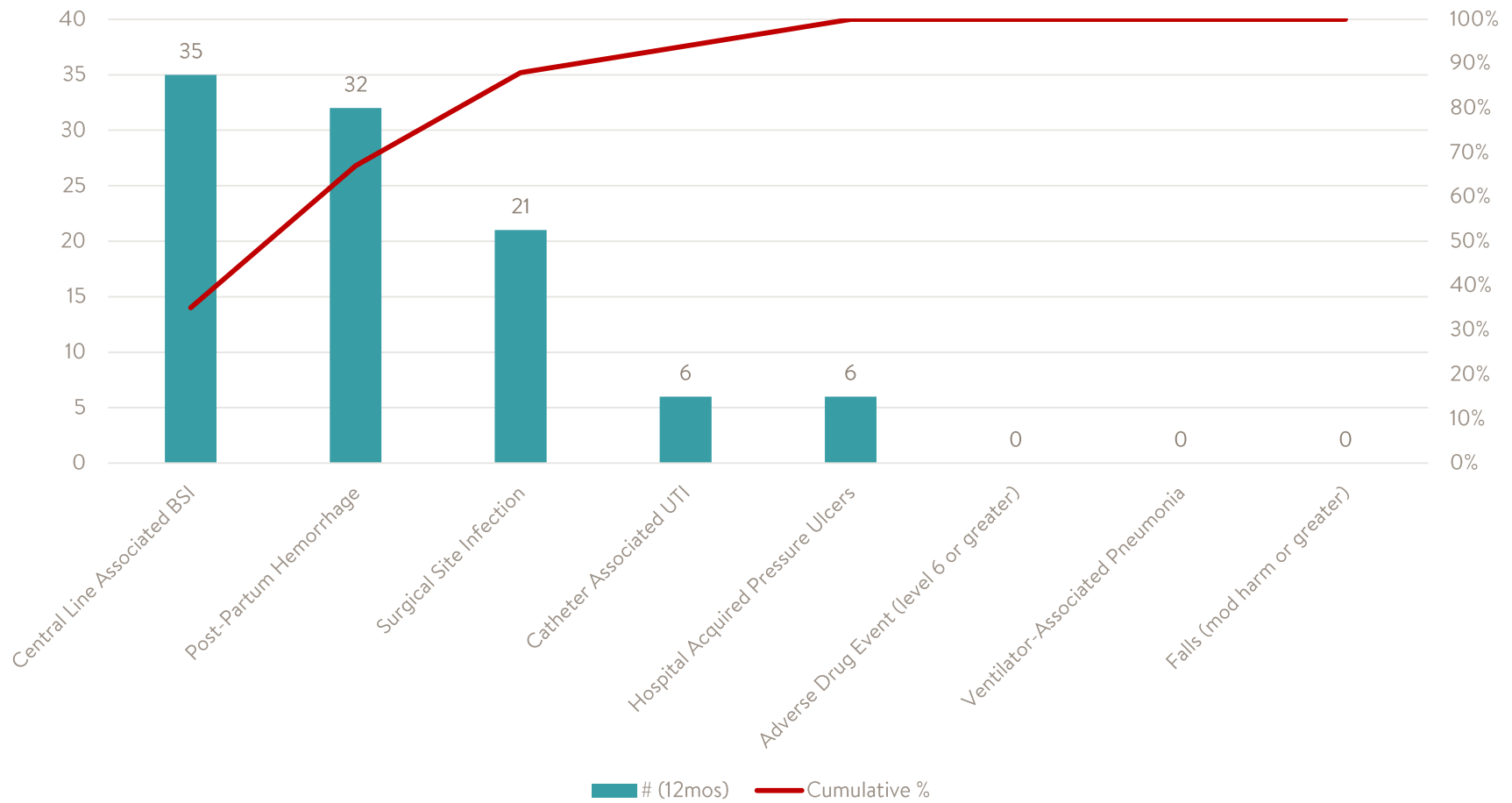
Alexion's $569,000 Drug Draws Data Demand From U.K. NICE

Clinton targets high drug prices

Skyrocketing drug prices leave cures out of reach for some patients

Valeant hit with two federal subpoenas as drug-price controversy rages on

12 drugs approved by FDA in 2012 cost >$100,000 pa

Cancer Drug Shows Promise, at a Price That Many Can't Pay

Meso-level:

- Healthcare providers

- Drug developers

"You should always go to other people's funerals, otherwise, they won't come to yours."

Healthcare providers

↓ Preventable harm

↓ Wait times

Healthcare Value	=	Clinical Outcomes	+	*Experience of Care

Cost ↓ Length of stay
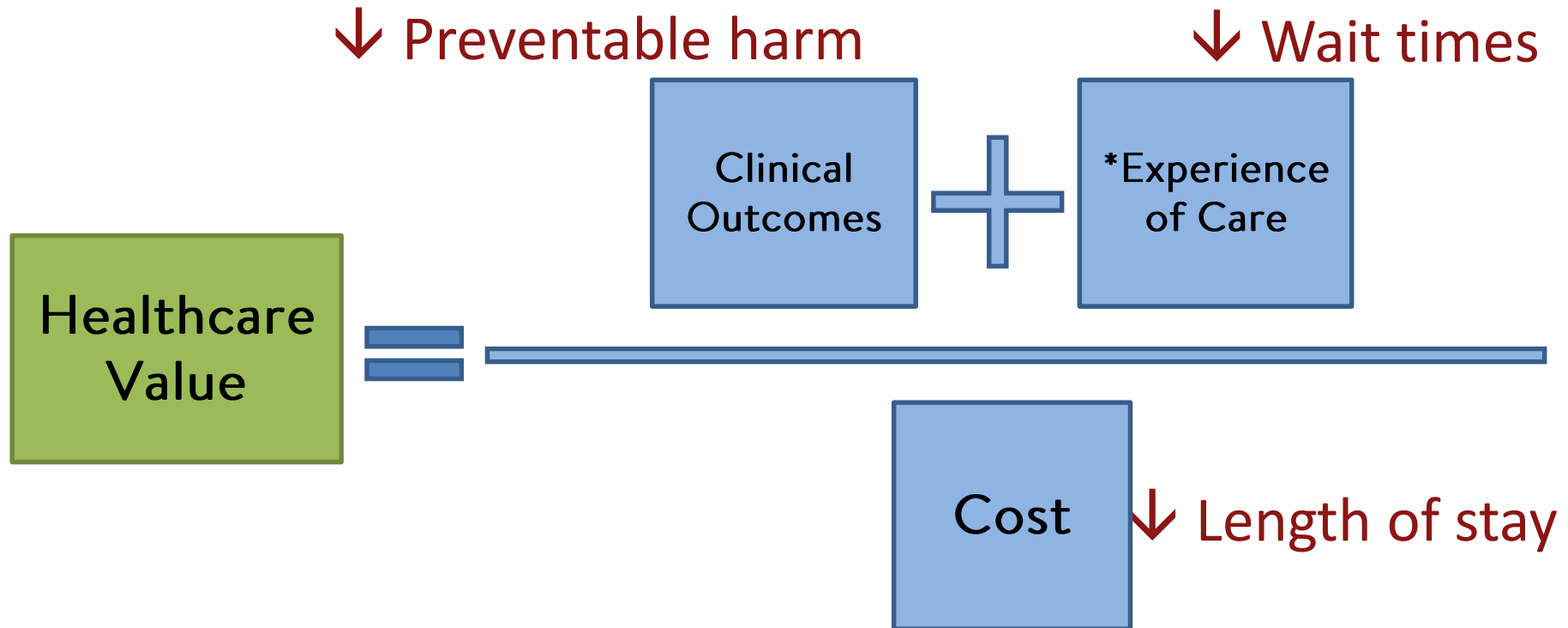
Relevance?

California Life Sciences Association Nov. 17:

THE REIMBURSEMENT DECISION: THE PAYER'S POINT OF VIEW

"the decision makers will focus on what outcomes payers are expecting to see from clinical trials, how they define 'value,' how they see mechanisms like bundled payments…"

Bio/Pharma drug providers

↑ Efficacy   ↓ Safety
                                                         signals

$$\text{Healthcare Value} = \frac{\text{Clinical Outcomes} + \text{*Experience of Care}}{\text{Cost}}$$

↓ Price
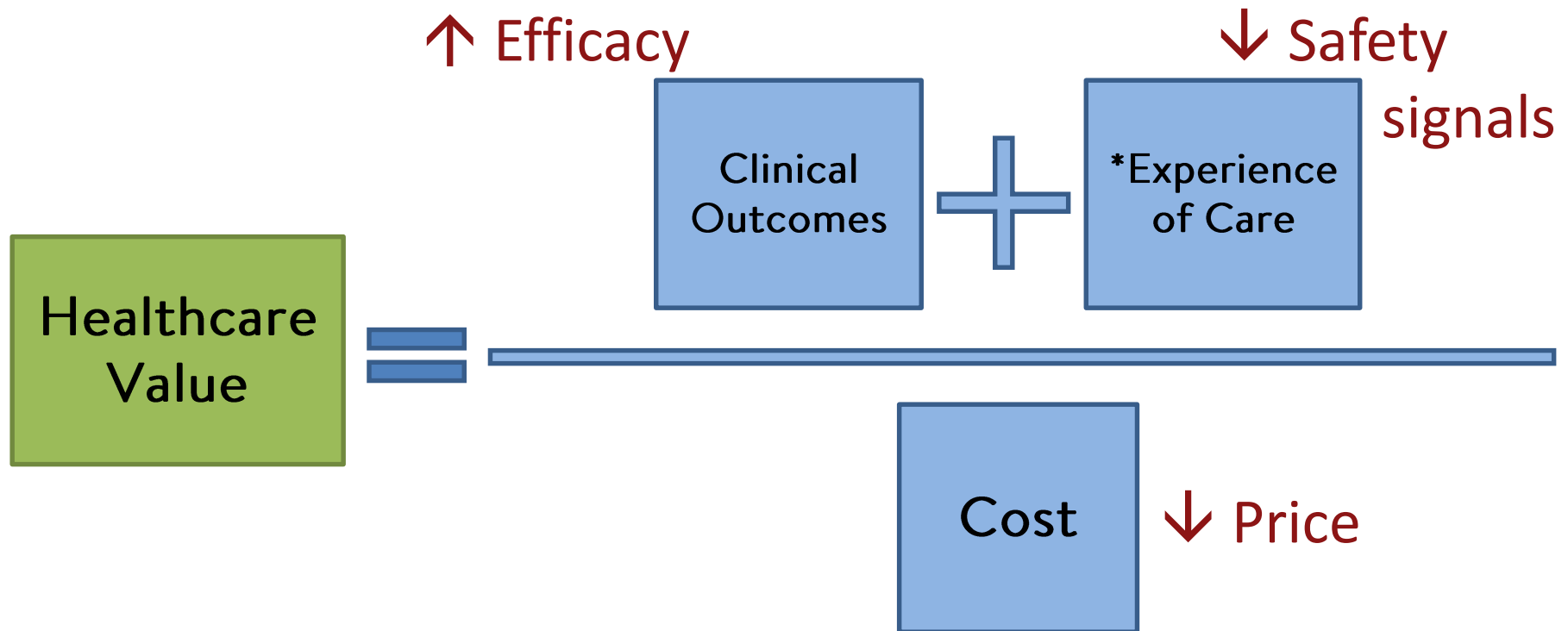
Micro: Perioperative Services

" Lean   is 90 percent mental. The other half is physical."

Our **Current** Vision, Mission, Promise and Values

Our Vision
To drive **innovation** in the most challenging areas of pediatrics and obstetrics to improve the quality of life for children and expectant mothers and those who love and care for them.

Our Mission
To serve our communities as an internationally-recognized pediatric and obstetric hospital that advances **family-centered care**, fosters **innovation**, **translates discoveries**, **educates** health care providers and leaders and advocates on behalf of children and expectant mothers.

Our Values
Stanford Children's Health CARES by aligning people and resources to provide extraordinary patient & family-centered care.

Collaborate
Advance
Respect
Educate
Serve

Our Brand Promise
Nurturing care, extraordinary outcomes for healthier, happy lives

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Organization

Medical Staff

Faculty MDs	768
Community MDs	348
Allied Health Professionals	110
Total	*1,226*
Medical Students:	464
Pediatric Residents:	225
Total Fellows:	150
Employees:	3,054

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7 Centers of Excellence

- Brain & Behavior (Psychiatry/Neuro)
- Johnson Center (OB/Neonatology)
- Bass Cancer Center
- CF & Pulmonary Disease Center
- Heart Center
- Transplant & Tissue Engineering
- Pediatric Orthopedics (*coming soon*)

2 Regional Programs of Excellence

- Surgical sub-specialties
- Medical sub-specialties

Partnerships and Joint Ventures

- John Muir Health
- California Pacific Medical Center
- El Camino Hospital (30 Medical beds)
- Dominican Hospital (Neonatology)
- Salinas Valley Hospital (Neonatology)
- Sequoia Hospital (Neonatology)
- Watsonville Community Hospital (Neonatology)
- Central California Children's Hospital (Heart)
- Sutter Memorial (Heart)
- Oakland Children's (Heart)

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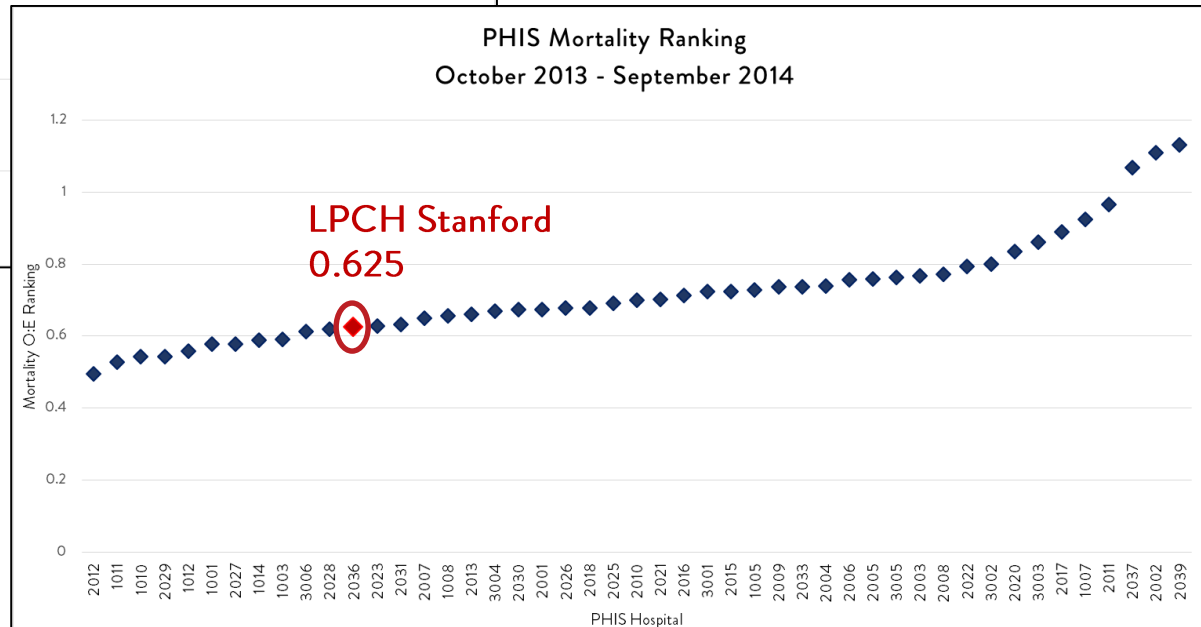# Context for Children's Hospitals
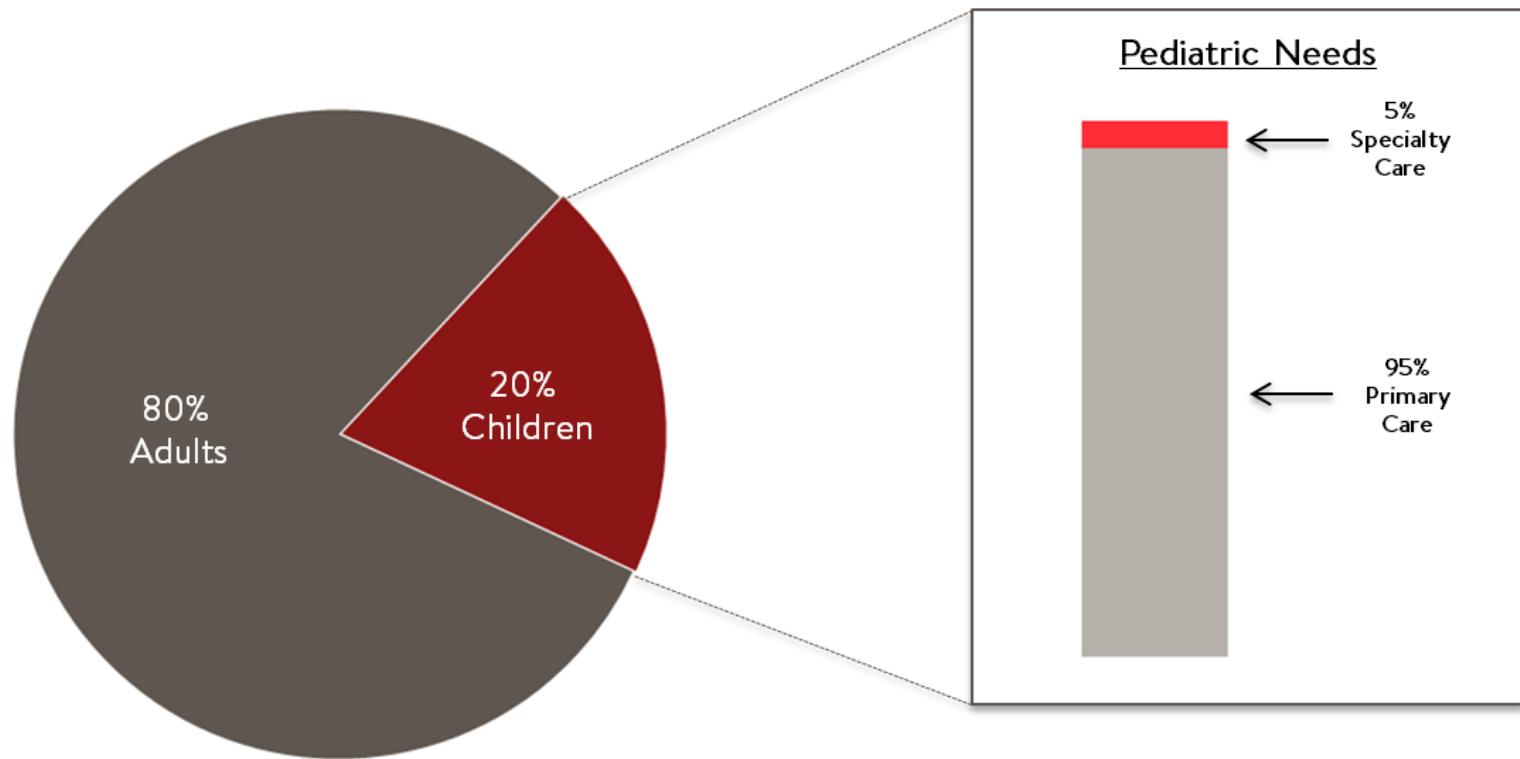
Our Essential Role

We care for children with the greatest severity and complexity of illness...

LPCH Stanford
2.15

PHIS Peds Case Mix Index Comparison
October 2013 - September 2014

Case Mix Index

PHIS Hospital
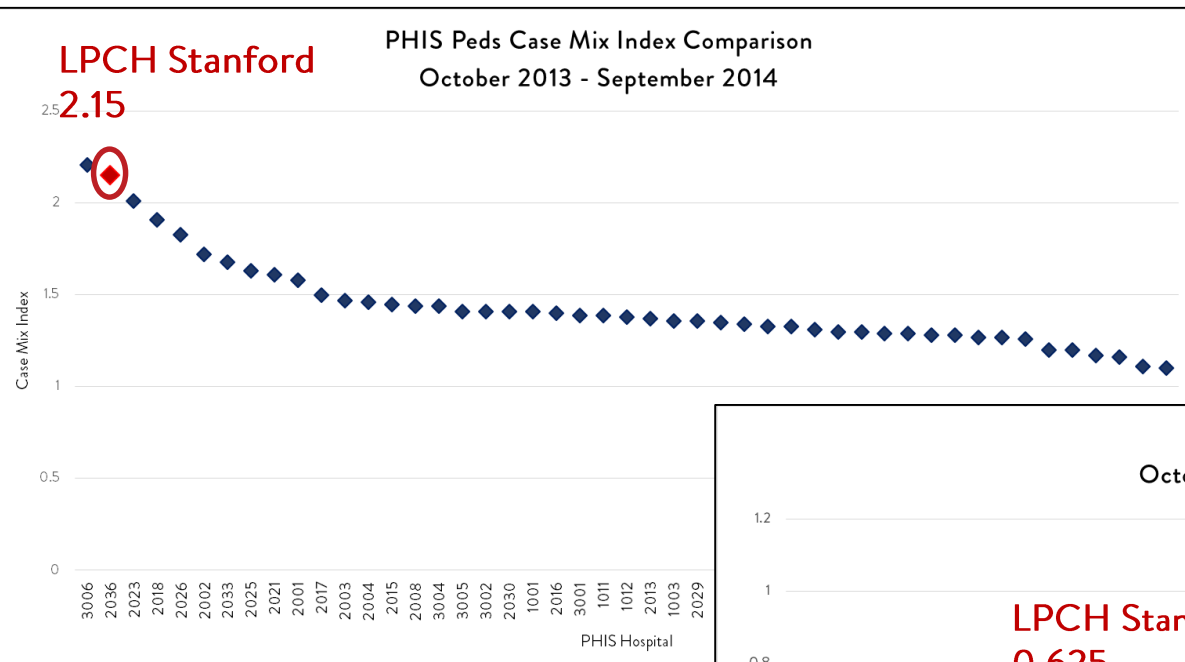
... and achieve exceptional outcomes.

PHIS Mortality Ranking
October 2013 - September 2014

LPCH Stanford
0.625

Mortality O:E Ranking

PHIS Hospital

PHIS = Pediatric Health Information System

Lean-based improvement
Quality Example

"We made too many wrong mistakes."

Surgical Site Infection Prevention

Background

- \>16 million surgeries/year in US
- SSI is the most common hospital acquired condition (31% of total)
- National Healthcare Safety Network report an overall rate of 1.9%
- Associated with a mortality rate of 3%
- Solutions for Patient Safety collaborative recommends a "best practice bundle" for SSI reduction

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Surgical Site Infection Prevention

A chart was presented that showed the rate of SSIs at LPCH in control chart form.

Protected by CA Evidence Code 1157

Surgical Site Infection Prevention Standard Work "Bundle"

Bundle Element	Peds Surgery
Pre-op	
1. Night before surgery	Regular bath with soap & water
2. Night before surgery; 1 hour after regular bath	CHG wipe
3. Morning of surgery	CHG wipe
Intra-op	
1. No razor (clippers only)	-
2. Appropriate skin antisepsis	CHG, povidone, etc
3. Appropriate antibiotic timing	0-60 minutes prior to incision
4. Appropriate antibiotic redosing	Dependent on type of antibiotic (see BPA)
Post-op	
1. 1st post-op antibiotic dose timing	Appropriate interval within 8 hours from last intra-op dose
2. Type of dressing	Dressing (eg. Mepilex) required unless Dermabond used to close incision.
3. Bathing instructions	No bathing until dressing is removed.
3. Removal of dressing	Change dressing if saturated. Remove dressing after 48hours.

CHG = Chlorhexidine gluconate

Daily Management System for HACs

Understand problem, agree on standards
- Make visible at points of highest use

Ensure area readiness
- Organize supplies/equipment
- Provide standard at supplies

Provide training
- TWI, simulation, or other structured training
  - "Lucile CLABSI" training doll

Develop andon response system
- For problems encountered while performing standards

Check standard daily
- Add to standard work
- Do problem solving

Develop tiered huddles
- Find and escalate problems

Make outcomes visible
- For staff
- For families

Do structured problem solving
- Involve everyone

Escalating Safety Problems

Tier 2: 10:15
Managers and Directors

Tier 1a: 0700/1900
Charge RN and staff

Tier 1b: ~0800
Charge nurse(s) and managers

Tier 3: 10:30
Directors and VPs

Protected by CA Evidence Code 1157

Immediate Issue (Andon) Response
SSI bundle rounds not completed

Immediate response is triggered when staff are unable to meet standards.

Frontline Manager: Bundle rounds not completed

Escalate to Director: Managers "in the count"

Escalate to CNO: insufficient staff for census

Escalate to COO: budget approved; slow recruiting

Escalate to CEO: address talent acquisition process
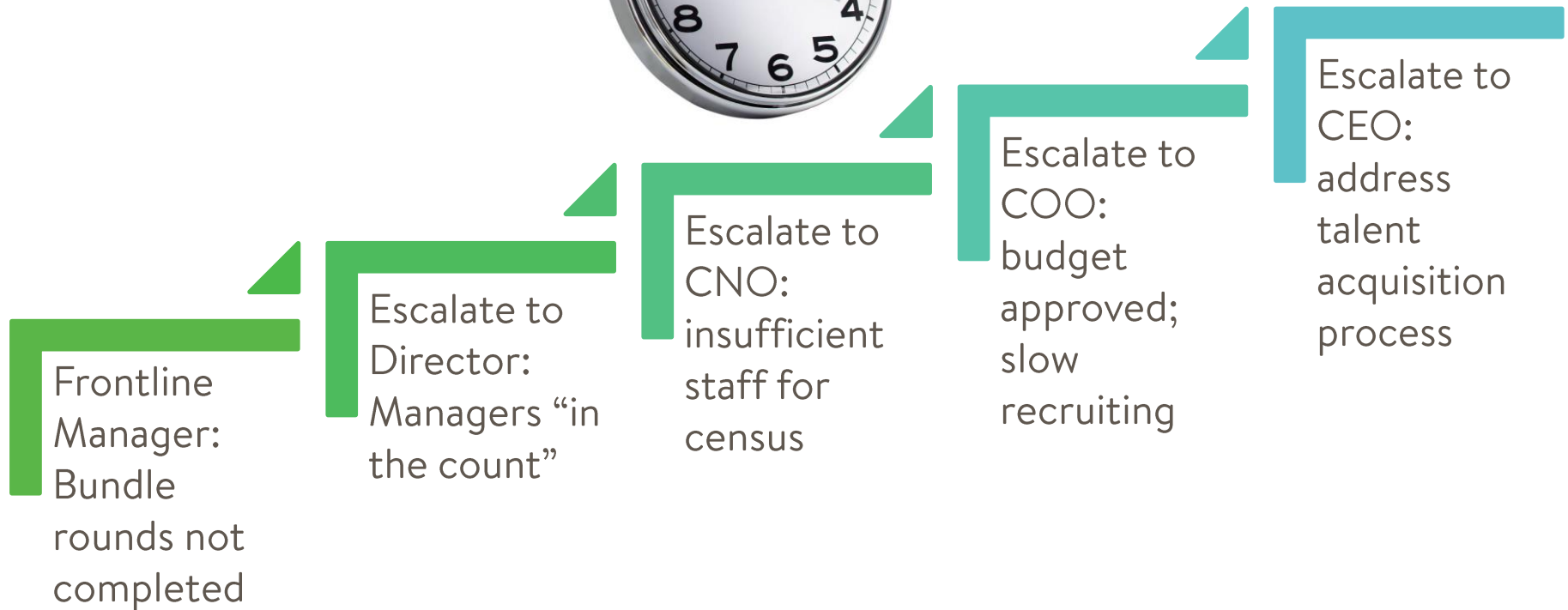
SSI Prevention – Intra-Operative

New SSI Process Check Bundle

Intraop SSI Bundle	Date:	Unit:		
Role Observed:				
Process Checker's Role:	Process Checker's Name:			
Element of Performance			**Met**	**Not Met**
First Scrub of the day performed (for first cases only) **OR** Proper technique used for subsequent cases				
Appropriate Scrub Attire donned before entering OR				
Appropriate skin prep technique performed: a. Chlorhexidine (Clear)- back and forth motion b. Betadine (dark) - circular motion from site of incision				
Skin prep agent allowed to dry completely prior to incision				
Coaching provided? YES/NO				

Lean-based improvement
Service & Cost Example

"You can observe a lot by watching."

Example: Perioperative Services

Operational Flow Clinic	Operational Flow Intake	Operational Flow Surgery	Operational Flow Post Anesthesia Care Unit (PACU)

By focusing on the value stream, everyone's performance improves

Operation #1	Operation #2	Operation #3	Operation #4

WAIT WAIT WAIT WAIT WAIT

Patient Flow = Value Stream

Our Goal: Produce Level Consistent Flow Throughout the System

Example: Perioperative Services

Operational Flow Clinic	Operational Flow Intake	Operational Flow Surgery	Operational Flow Post Anesthesia Care Unit (PACU)

By focusing on the value stream, everyone's performance improves

Operation #1 → Operation #2 → Operation #3 → Operation #4

Patient Flow = Value Stream

Anesthesia   Operation   Recovery

Example: Perioperative Services

Operational Flow **Clinic**	Operational Flow **Intake**	Operational Flow **Surgery**	Operational Flow **Post Anesthesia Care Unit (PACU)**

By focusing on the value stream, everyone's performance improves

Anesthesia   Operation   Recovery

Anesthesiologist
Anesthesia Tech.
Nurse
Equipment
Supplies…

Surgeon
Anesthesiologist
Fellow/Resident
Nurse
Equipment – procedure cart
Supplies
Open OR…

Anesthesiologist
Nurse
Equipment
Supplies
Open PACU bed…

Example: Perioperative Services

| Operational Flow **Clinic** | Operational Flow **Intake** | Operational Flow **Surgery** | Operational Flow **Post Anesthesia Care Unit (PACU)** | **To ICU or acute care bed** |

Anesthesia   Operation   Recovery

Anesthesiologist
Anesthesia Tech.
Nurse
Equipment
Supplies…

Surgeon
Anesthesiologist
Fellow/Resident
Nurse
Equipment – procedure cart
Supplies
Open OR…

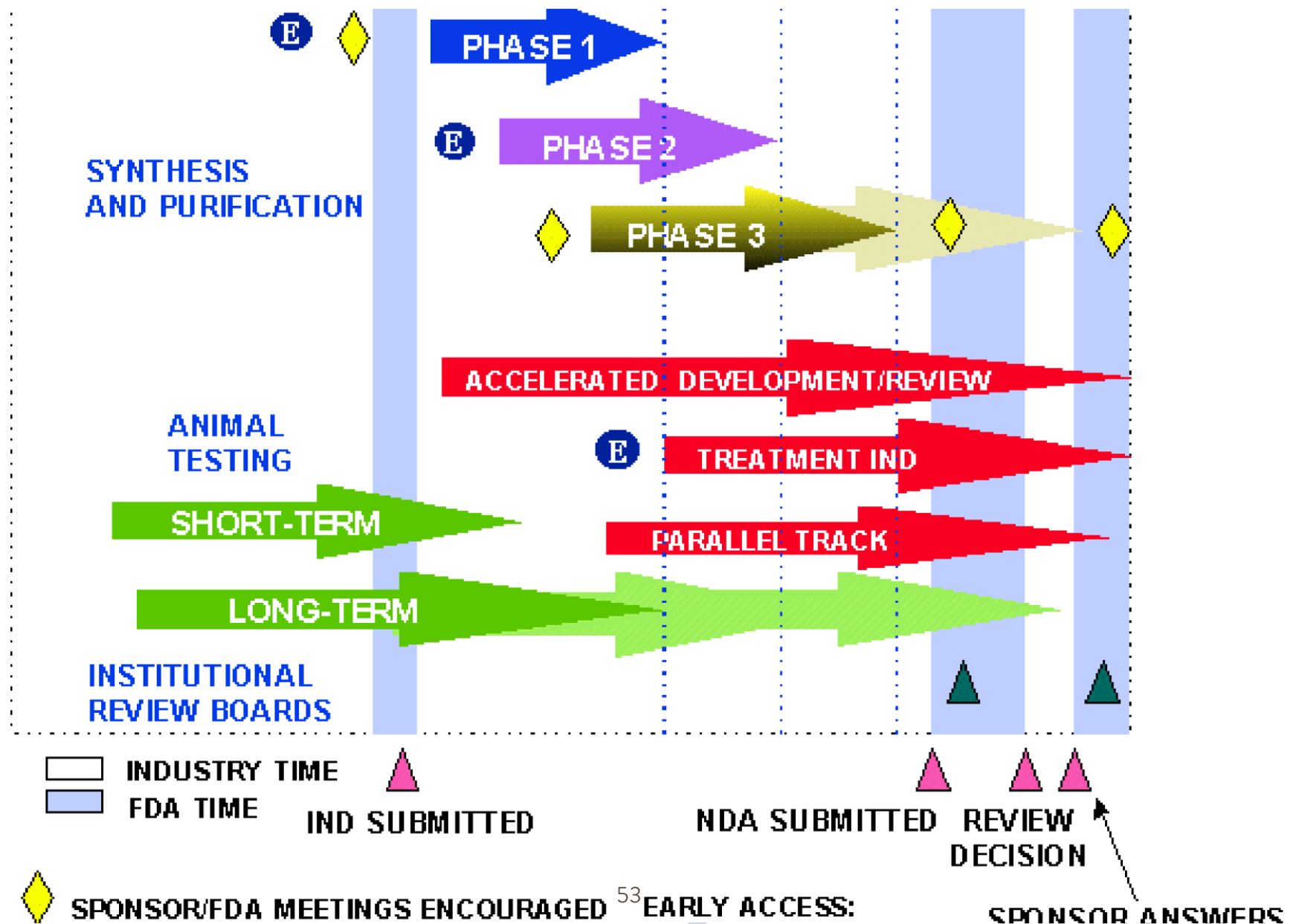Anesthesiologist
Nurse
Equipment
Supplies
Open PCAU bed…

Drug Development

"You don't have to swing hard to hit a home run. If you got the timing, it'll go."
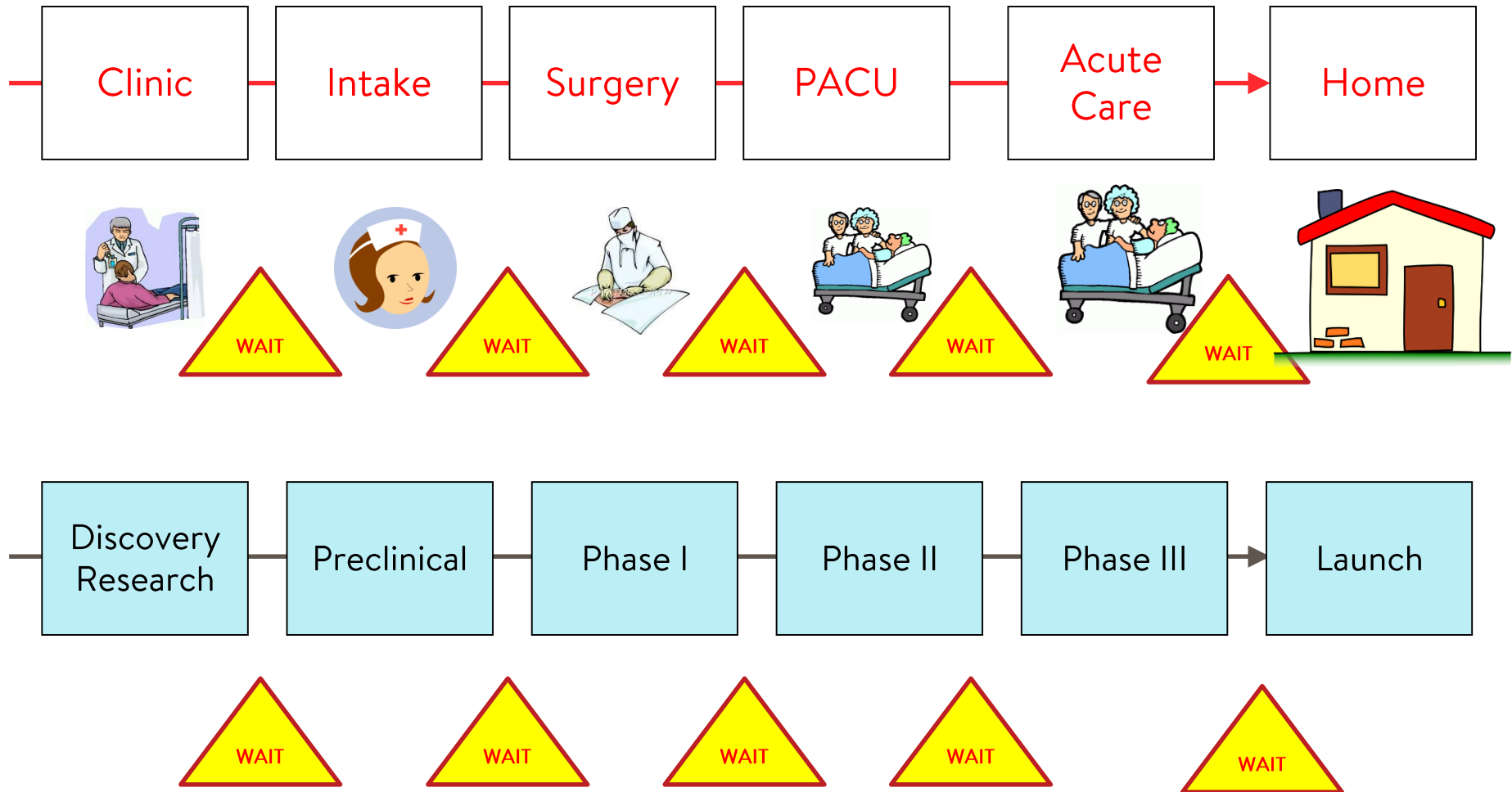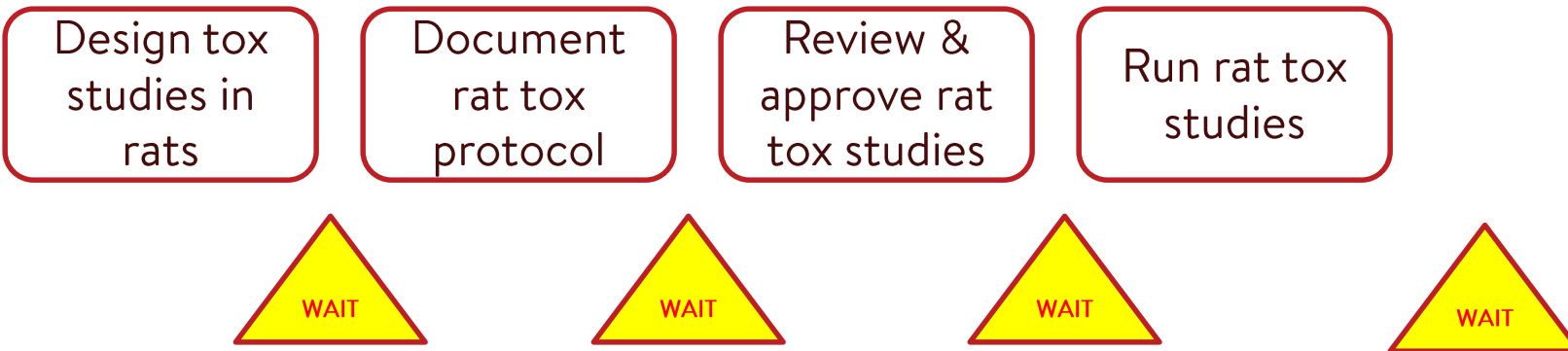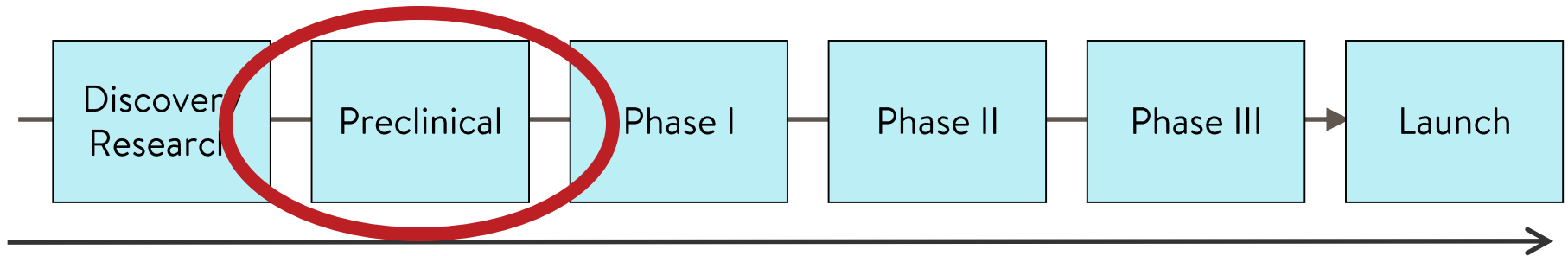
From CDER handbook

Lean in drug development

- Who is the customer?
  - What do they value?
- What processes (costs) are non-value added but necessary?
  - Minimize these
- Work to eliminate all others.

A Simple Idea

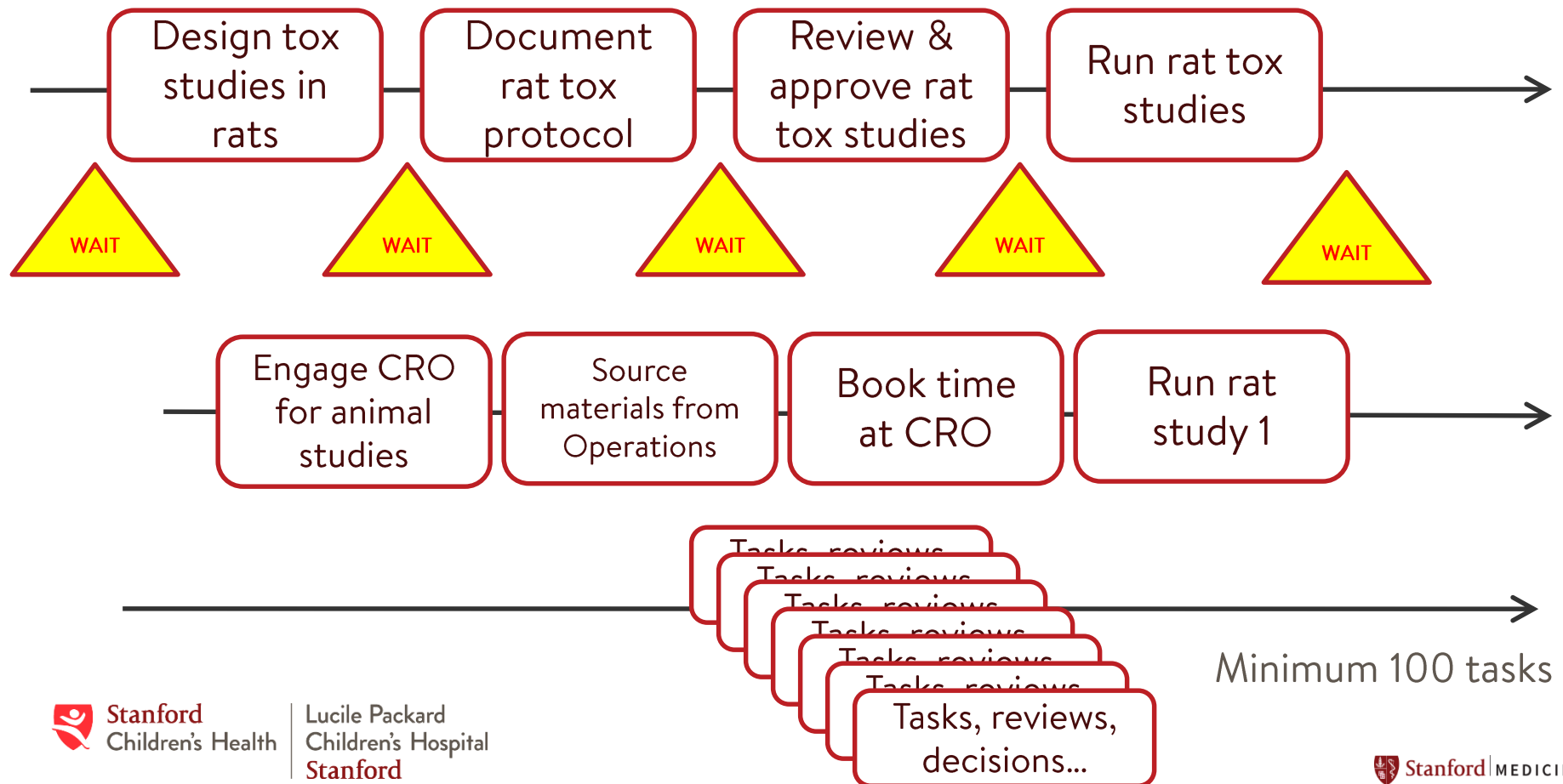| Clinic	Intake	Surgery	PACU	Acute Care	Home

WAIT WAIT WAIT WAIT WAIT

Discovery Research	Preclinical	Phase I	Phase II	Phase III	Launch

WAIT WAIT WAIT WAIT WAIT

Preclinical Value Stream

Discovery Research | Preclinical | Phase I | Phase II | Phase III | Launch

Design tox studies in rats

Document rat tox protocol

Review & approve rat tox studies

Run rat tox studies

WAIT   WAIT   WAIT   WAIT

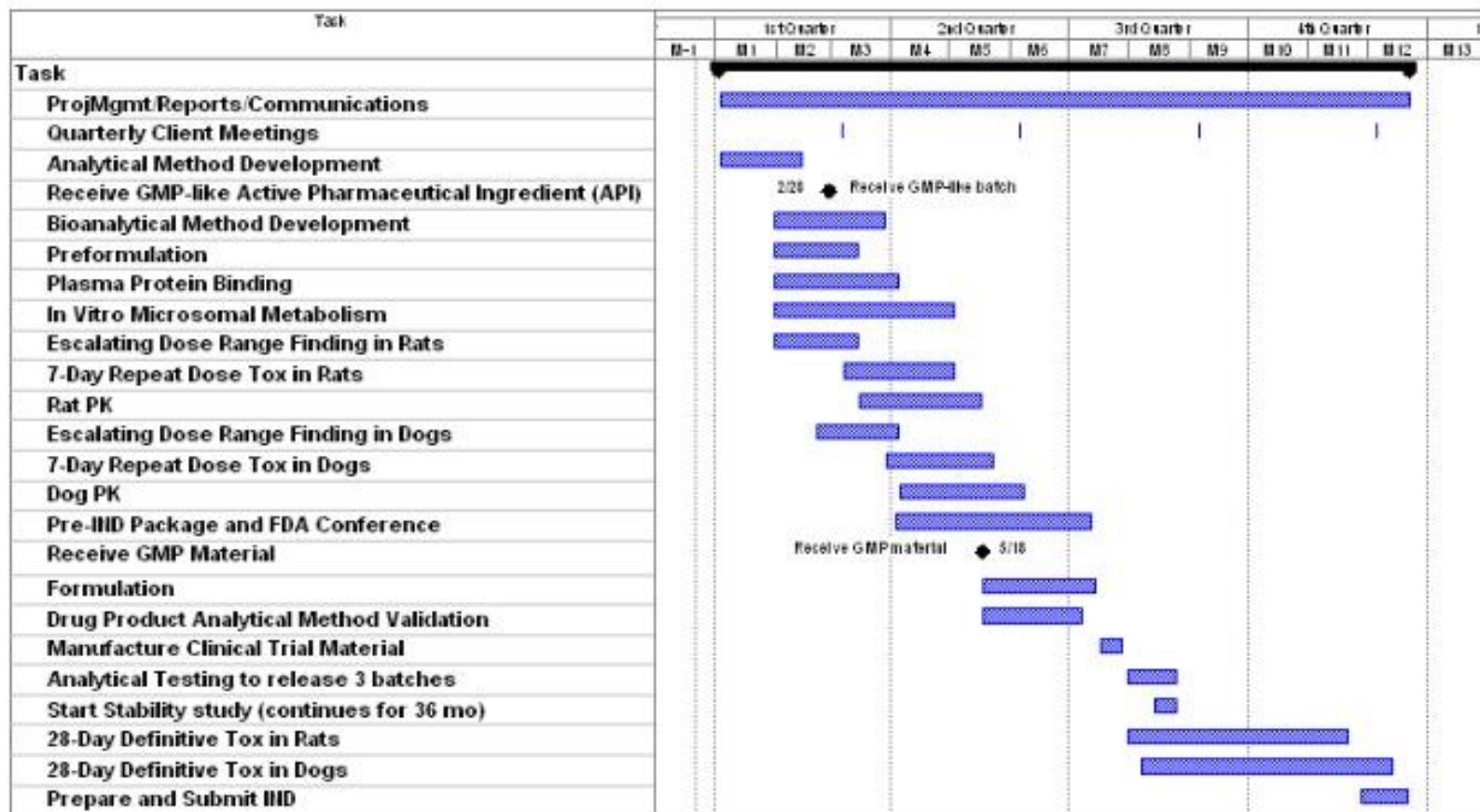**Our Goal: Produce Level Consistent Flow Throughout the System**

Preclinical Value Stream

Early Development Gantt Chart

Development Plan Timeline
The Gantt chart

Industry average = 3 years
(18-24 months is reasonable)

Different blind spots

- Healthcare
  - Strong: patient clinical care, empathy, "system" = biological...
  - Weak: lean management systems, project management, scheduling, production planning, science of problem solving

- Biotech/Pharma
  - Strong: project & team management, statistics, study design & execution...
  - Weak: lean management systems, science of problem solving

Types of Waste

Processing

Correction

Inventory

Wait Time

Search Time

Transportation

Space

Complexity

Identify at least 1 significant waste in <u>your</u> processes.

"Pair up in threes."
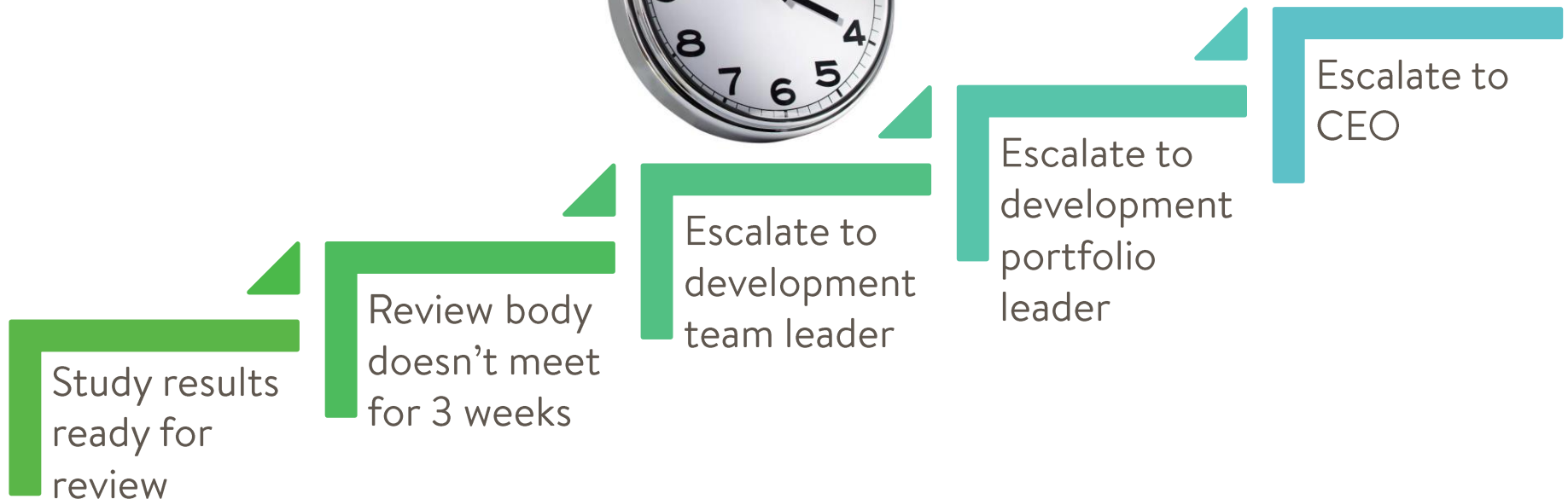
Immediate Issue (Andon) Response
Waiting for next review committee

Immediate response is triggered when team is unable to meet project milestones.

Study results ready for review

Review body doesn't meet for 3 weeks

Escalate to development team leader

Escalate to development portfolio leader

Escalate to CEO

Lean in drug development

- Who is the customer?
  - What do they value?
- What processes (costs) are non-value added but necessary?
  - Minimize these
- Work to eliminate all others.

A Simple Idea

Clinic	Intake	Surgery	PACU	Acute Care	Home

Discovery Research	Preclinical	Phase I	Phase II	Phase III	Launch
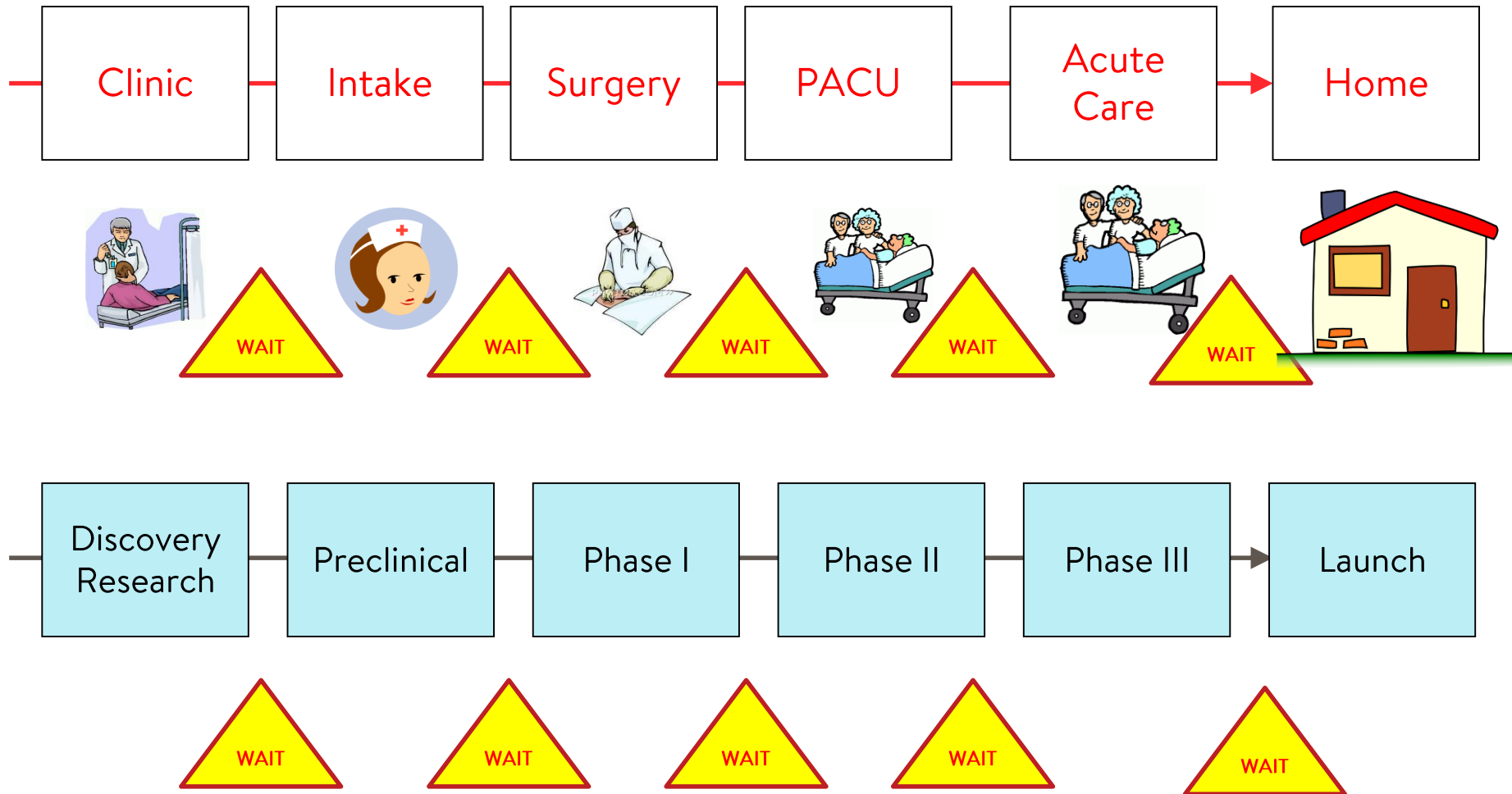
P.S. Not addressed...but important

- Culture change
- Lean leadership
- Where to start
- Shared values
- Strategy deployment, goal alignment

Thank you!

"When you come to a fork in the road, take it."

Mike Spencer
mspencer@stanfordchildrens.org