Improving the reliability of care

An Introduction to lean methodology

“not just a gap, but a chasm”

Objectives

1. Review four relevant risks to Healthcare
2. Discuss three levels of reliability and approaches/interventions for achieving each level
3. Describe the five cultural principles of High Reliability Organizations

Risk #1: Quality & Safety

"Reliability"

- **probability of performing without failure** a specified function under given conditions for a specified period of time
  - Quality Control Handbook, Joseph Juran editor
- **capability of a process, procedure or health service to perform its intended function** in the required time under existing conditions
  - CHSPS

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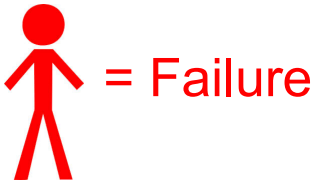


Reliability Levels

Chaotic process

(3 or greater failures out of 10 opportunities)
≤79% Reliable

Level 1

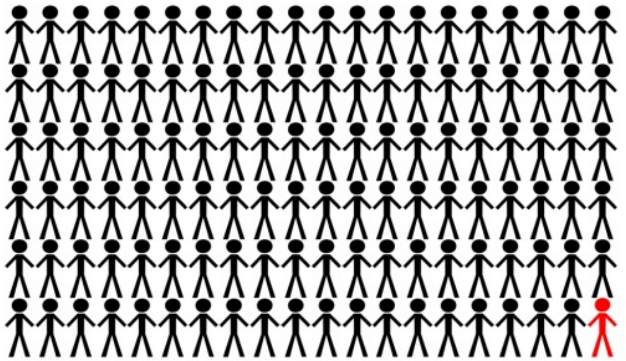
10^{-1} (1-2 failures out of 10 opportunities)
80-90% Reliable

Level 2

10^{-2} (<5 failures out of 100 opportunities)
≥90% Reliable

Level 3

10^{-3} (<5 failures out of 1000 opportunities)
~99% Reliable



Where does patient care typically fall?

Risk #2: Burden on Staff

How much burden is placed on staff?

Waste comes cleverly disguised as real work

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How much burden is placed on staff?

Supplies out of stock…

Or over-stocked…

Staff is having to invent workarounds…
adding to cost, frustration, and risk to patients

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Risk #3: Access

Access to care

What's the average wait time for a doctor in the U.S.?

- 15 Large metro areas studied, 15 mid-sized metro areas studied
- 5 specialties studied (Cardiology, Derm, Orthopedic Surg, Ob

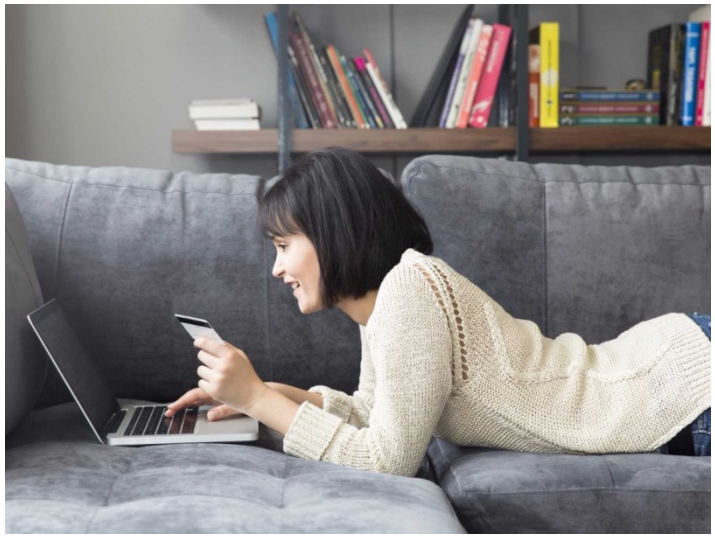
Metro area	Average Wait Time until scheduled appointment with doctor 2017	Aver until appo with 2014
Large	24 days	18.5
Mid	32 days	

Metro Area	Metro Area
Boston	Yakima
Philadelphia	Cedar Rapids
Portland	Albany
Seattle	Manchester
Denver	Evansville
Los Angeles	Hartford
Detroit	Savannah
San Diego	Fort Smith
Atlanta	Fargo
Houston	Odessa
Minneapolis	Temecula
New York	Dayton
Miami	Lafayette
Washington, D.C.	Hampton
Dallas	Billings

Source: Merritt Hawkins, 2017

Consumer Expectations

- What consumers are adjusted to in 21st century society is “instant gratification”
- Competitive edge



minute clinic®

Your neighborhood **medical clinic**

- Quality medical care on your schedule
- Most insurance accepted

care

Amazon Care is healthcare built around you, your life, and your schedule.

“Our connectedness is constant. There’s very little patience required.
- Neil Patel, *Entrepreneur*.

Risk #4: Cost (of errors)

Cost of errors

- Total costs of medical errors resulting in injury are estimated to be between **$17-29 billion**, with healthcare costs comprising over 50%.

- In 2003, Medicare paid hospitals an **additional $300 million per year** (0.3% of annual Medicare hospital spending) for 5 types of adverse events. These extra payments **covered less than one third of the extra costs that hospitals incurred** in treating these adverse events.

Data referenced in Children's Mercy Continuous Quality and Practice Improvement

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Cost of Hospital-Acquired Conditions

HACs…

✓longer length of hospital visits

✓painful symptoms + serious complications (could include death)

The estimated hospital cost for each pediatric HAC event:

ADE …… $5,000
Falls ……..... $13,000
PU …….. $33,000
VTE ……..... $ 8,000
CA-UTI ……. $1,000
OB-AE ……. $3,000

SSI …….. $27,000
UE …… $36,000
CLA-BSI …… $55,000
PIVIE …….. $50 - $3,000
VAP …….. $51,000

Source: Solutions for Patient Safety., Understanding Safety: HAC - Hospital Acquired Condition. Located at haccosts2015.pdf (cmh.edu). Accessed 1/25/20234

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How do we get better?

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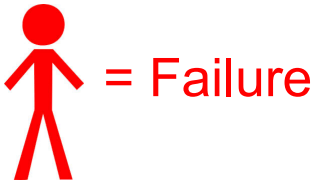
Expect imperfection

The average human makes __20__ mistakes per day



How to improve Reliability

Chaotic process

(3 or greater failures out of 10 opportunities)
≤79% Reliable

Level 1 Intent, vigilance, hard work

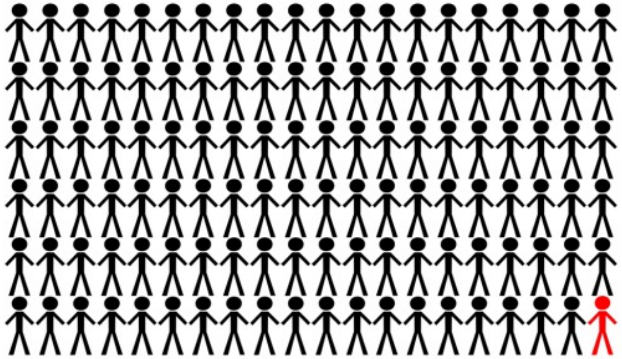
10^{-1} (1-2 failures out of 10 opportunities)
80-90% Reliable

Level 2 Design system informed by reliability science and human factors research

10^{-2} (<5 failures out of 100 opportunities)
≥90% Reliable

Level 3 Design of high reliability organizations

10^{-3} (<5 failures out of 1000 opportunities)
~99% Reliable



How to improve Reliability

Level 1

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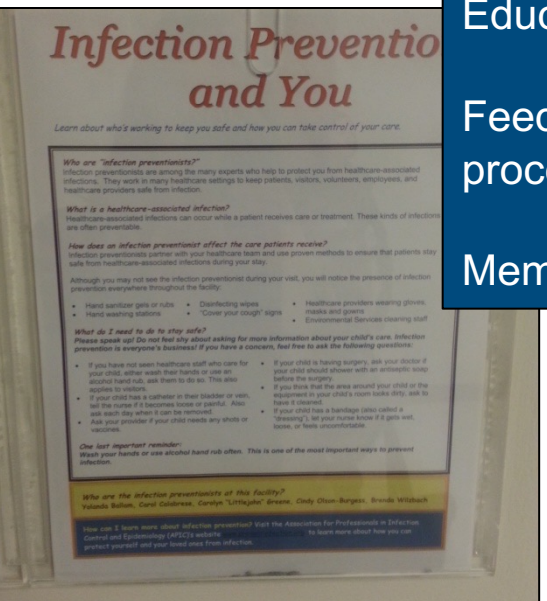
80-90% Reliable

Intent, vigilance, hard work

- Standardization
- Education and Awareness
- Feedback regarding compliance to process
- Memory Aids



How to improve Reliability

Level 2

10^{-2} (<5 failures out of 100 opportunities)
>90% Reliable

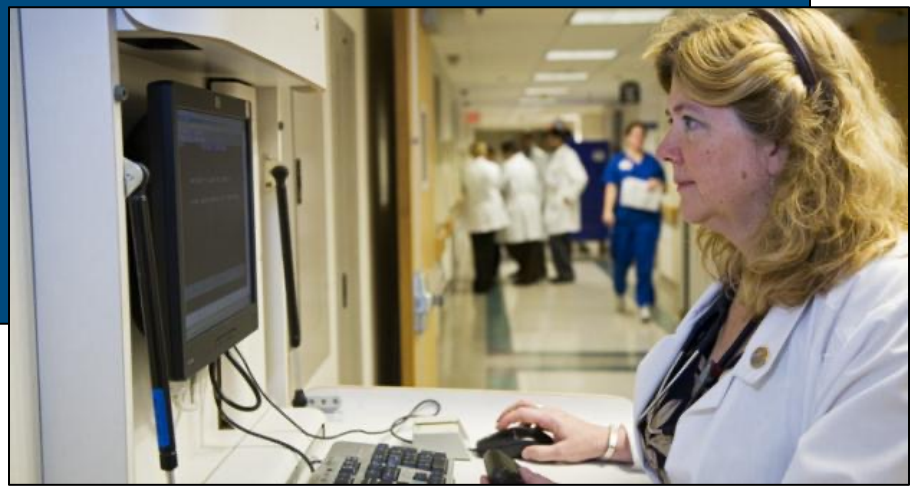
Design system informed by reliability science and human factors research

Decision aids and reminders built *into* the system

Scheduling

Desired action (based on evidence) = the default

Redundancy

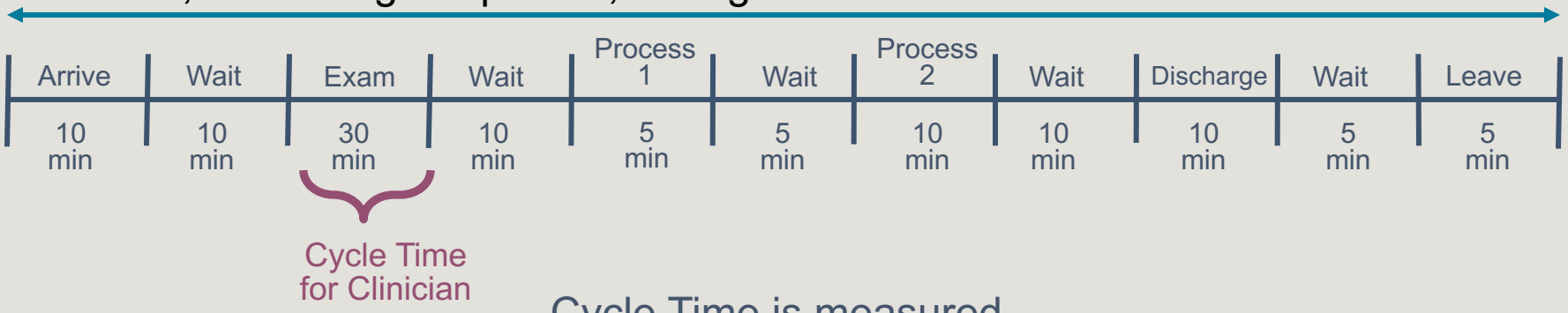


Another benefit of standardizing the process…

1. Standardize the process → create predictable "cycle times"
2. Sum the cycle times, divide by takt…result is the MINIMUM number of staff members needed

$$\text{Takt} = \frac{\text{Available Work Hours}}{\text{Demand}}$$

Example: Exam time, while clinician is working with the patient: reviewing charts, examining the patient, calling the nurse



Cycle Time is measured

How to improve Reliability

Level 3

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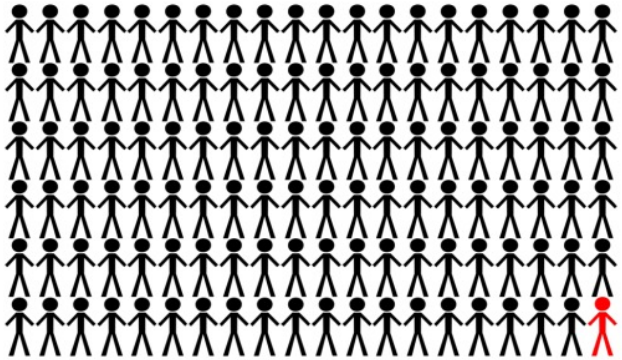
~99% Reliable

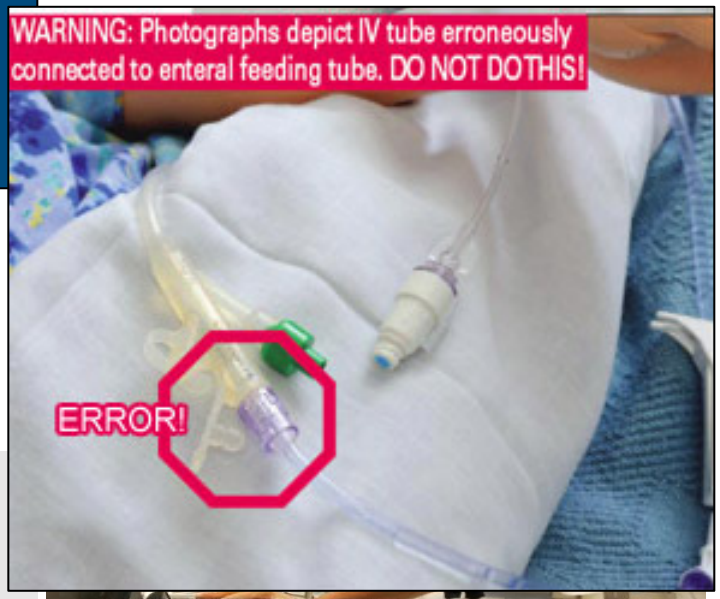


Design of high reliability organizations

Take advantage of habits and patterns

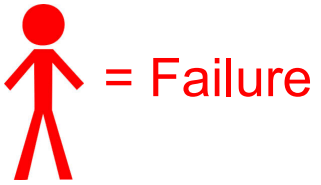
Make the system visible

Clear and unambiguous communication



"This patient is not allergic to penicillin, right?"

"Yes"



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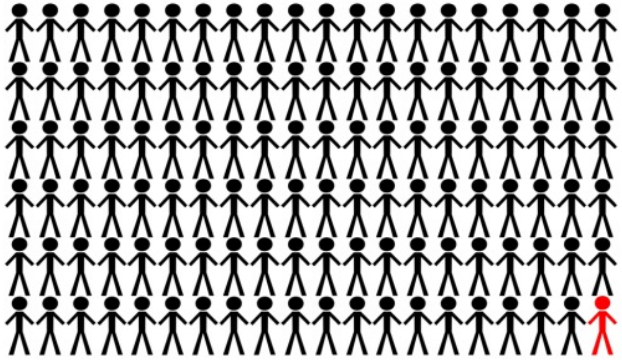

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Clear and unambiguous communication

High Reliability *Culture…*

1-2 clarifying questions → 2.5x fewer errors

-Johnson, K. (2014)

High Reliability Organizations

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- Preoccupation with Failure
  - Recognizing small, inconsequential errors as a symptom that something's wrong
- Sensitivity to Operations
  - Staying aware of front-line operational efficiency
- Reluctance to Simplify
  - Encouraging diversity in experience, perspective

Principles of Containment

- Commitment to Resilience
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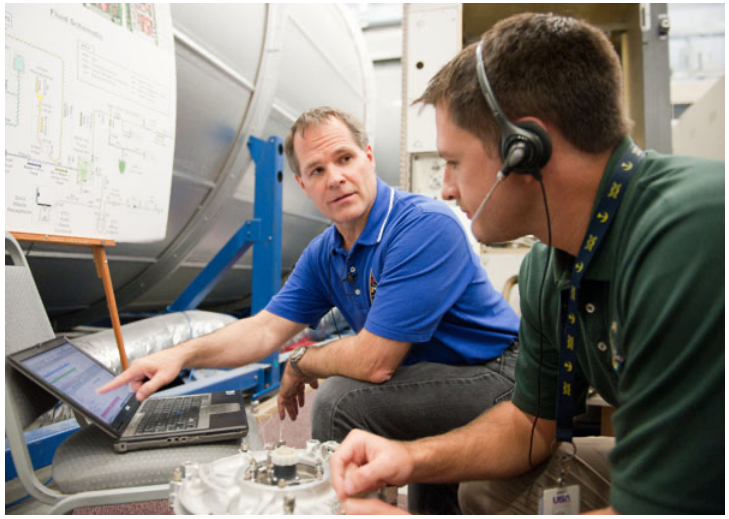
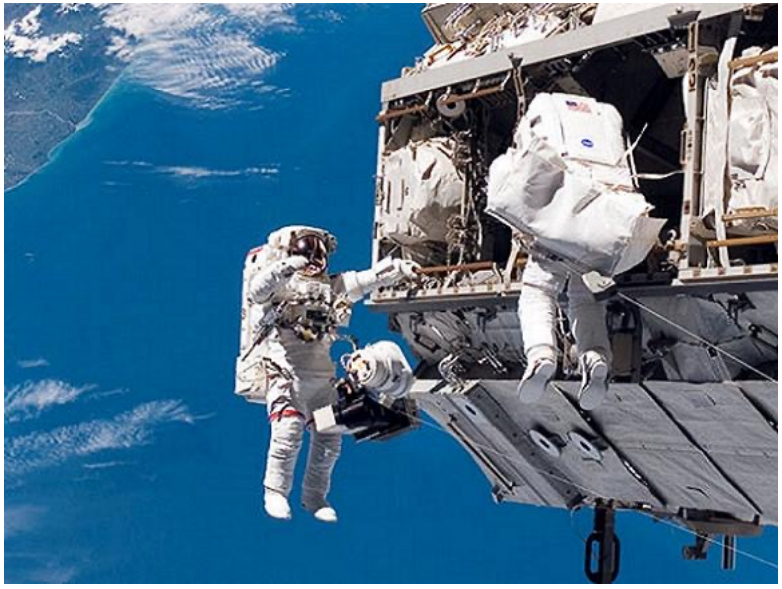


Crew notifies Mission Control of errors when executing a task…

- Pre-brief
- Stop-the-line
- STAR
- Time-out

So that no crewmember in the future makes a mistake.

Same reason to do cause analysis



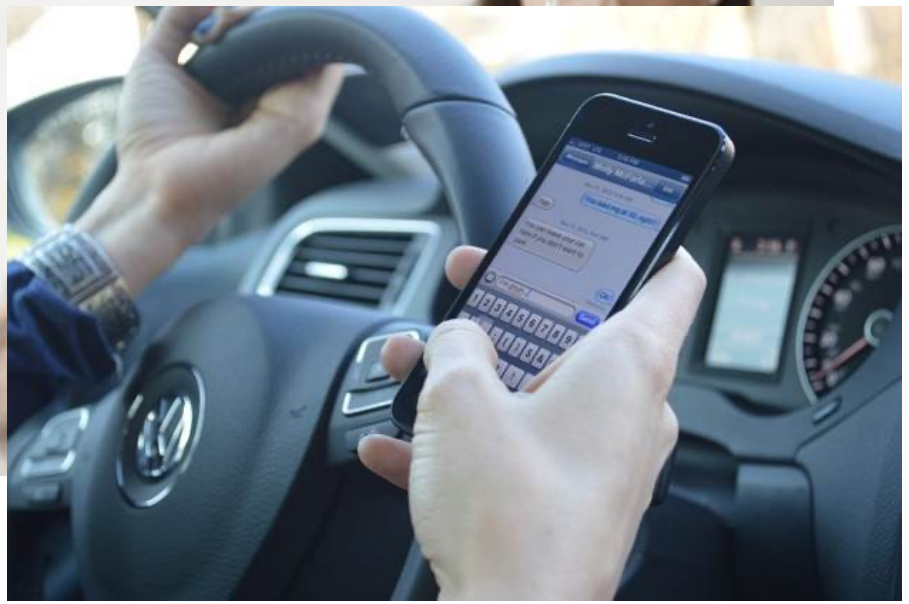
new clinician

16 years old

today

Mr. Benz, 1886

today



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For every 1

“Serious Safety” event

there are 1,000

“Near Miss” events

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JOHNS HOPKINS MEDICINE

What a Real Preoccupation With Failure Could Look Like

Peter J. Pronovost, MD, PhD; Lori Paine, DrPH, MS, RN; Eileen M. Kasda, DrPH, MHS; Melinda D. Sawyer, DrPH, MSN, RN

The Joint Commission is guiding health systems toward becoming high-reliability organizations (HRO), similar to oil and gas, naval aviation, and nuclear power industries. These industries perform with a remarkable degree of safety, despite working in dynamic and hazardous conditions.

This degree of safety performance is no accident. Two researchers studied HROs and found repeatable practices that helped ensure safety.[1] These organizations function under 2 sociocultural conditions. Organization leaders profoundly respect all employees, and all employees want to learn and improve safety and operations. They also operationalize 2 logics: (1) anticipate mistakes because all systems are fallible and

it involves thinking about and seeing risks and behaving to improve safety. The same sense of altruism can move every level of a health care organization to practice this preoccupation with failure every day—make it a habit.[2]

FRONTLINE CLINICIANS

Clinicians can incorporate risk assessments into daily processes of care, such as patient rounds or care transitions. Ask the simple questions: How might this patient suffer harm and how can we defend against those risks? For example, a patient with swallowing difficulties may be at risk for aspiration and could be

tion precautions. When transferring

another unit or on discharge to a skilled

home care, the sending care team can

ir knowledge of the patient's risks to

team. By incorporating a risk assess-

ndoff, information can be shared be-

g and receiving care teams that will

care needs are met.

linicians should approach tasks with

k for errors rather than assuming

them is correct. For example, when

high-risk intravenous medication dou-

cond nurse should assume the first

take, hunt for it, and correct it, rather

intravenous pump is working or pro-

and the medication is right. By en-

dset, clinicians can develop a preoc-

re.

vers can also perceive near misses

nt in the scheme of event reporting.

defects that could cause harm and

e an adverse event occurs.

NAGERS

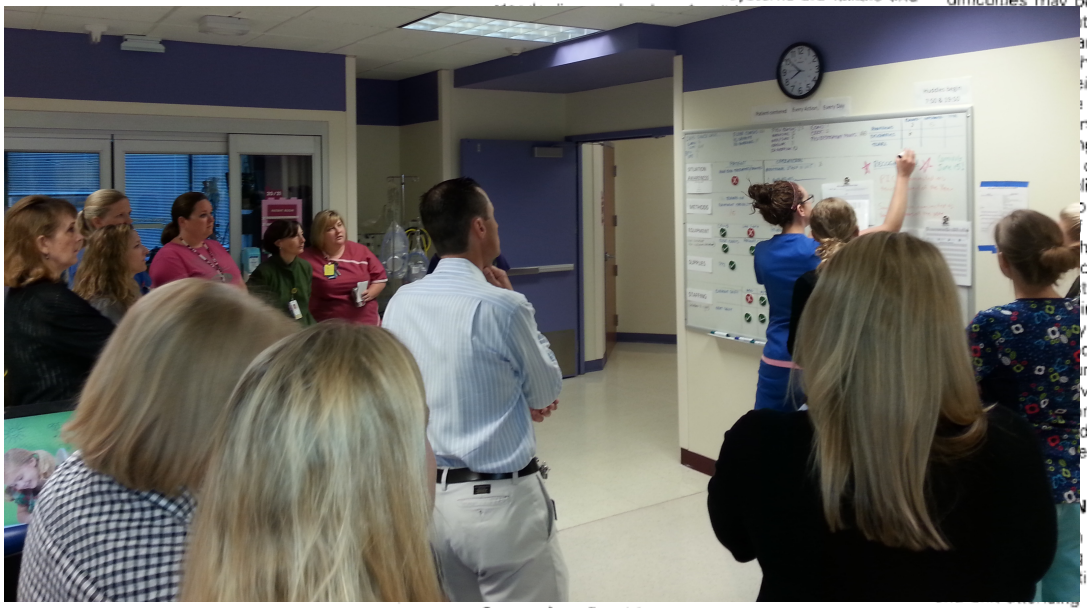
conduct huddles or briefings one or

the day to discuss clinical or oper-

tients. For example, a charge nurse

might discuss which patients they are most worried about, how they will manage the demand for beds, and what may happen in the evening when nurse staffing is reduced.

Managers can also ask frontline staff that thought-provoking question, how will the next patient be harmed, and use their responses to proactively identify and mitigate those risks. This question is asked



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The authors declare no conflicts of interest.

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Photo courtesy of Children's Mercy

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Say “thank you”

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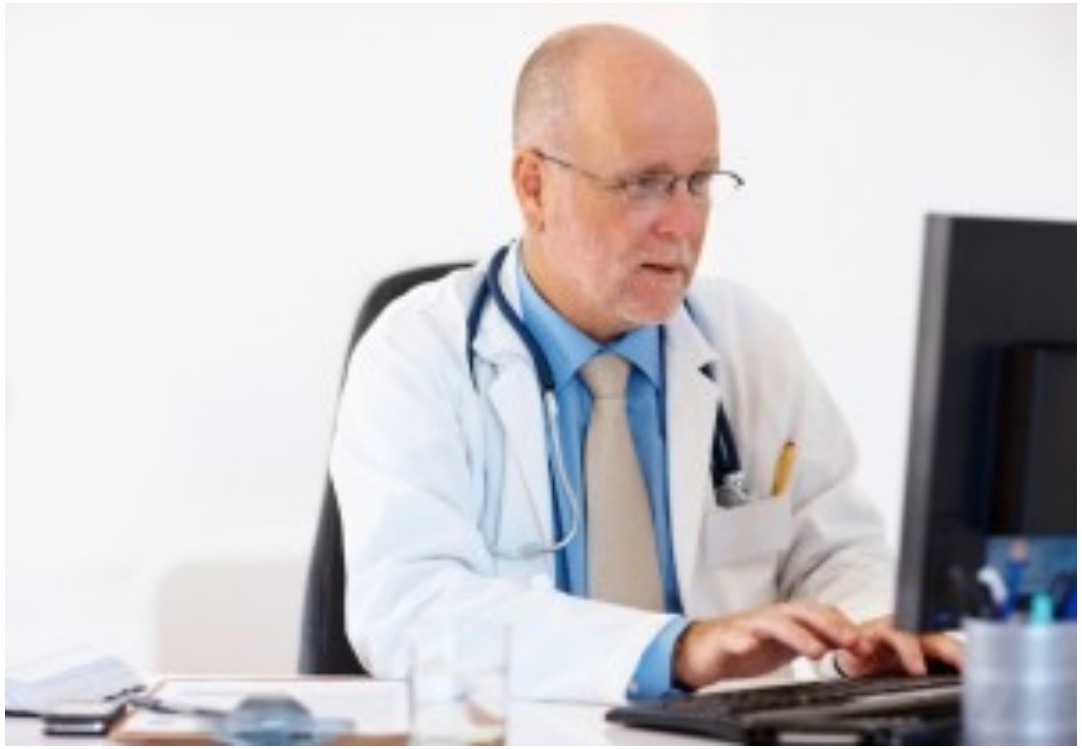
…Maximize and properly allocate resources at front-line



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Look for "Waste"

- Waste = activity that consumes resources but adds no value to the service or product from the *customer's* perspective

  (Also referred to as a non-value-added activity)

- Value-added Activity = activity which changes the form or function of a product or service in a way that enhances value from the *customer's* perspective

Value Added Criteria:

1) **Patient cares**
2) **Changes status**
3) **Done correctly**

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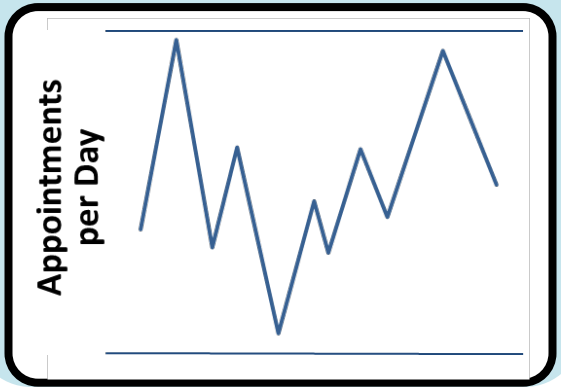
Three Categories of Waste

Non-Value Added Activities

8 types of waste

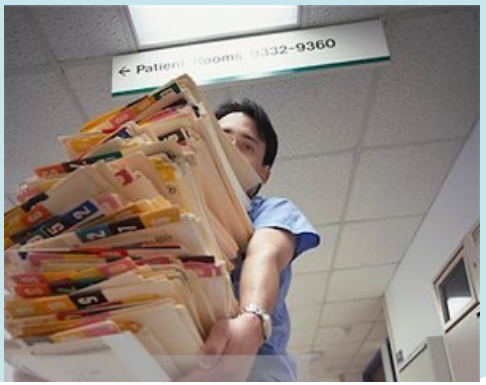
Unevenness

Demand not level; high variation in amount of work to do



Overburden

Overburdening people or equipment



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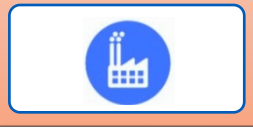
8 types of waste – “Downtime”

Defects

Time spent doing something incorrectly. Rework.

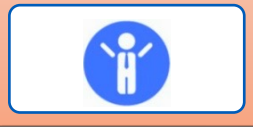


Overproduction

Doing more than what is needed

Waiting

Waiting for the next event to occur or next work activity



Non-utilized intellect

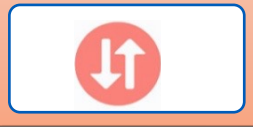
Underutilizing people’s talents, skills, & knowledge

Transportation

Unnecessary movements of products (patients, specimens, materials)

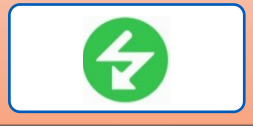
Inventory

Excess products & materials: processing, storage, spoilage



Motion

Unnecessary movements by employees



ality than required

Click for Race Car Video

What waste do you see?

What wastes do you see in your work?

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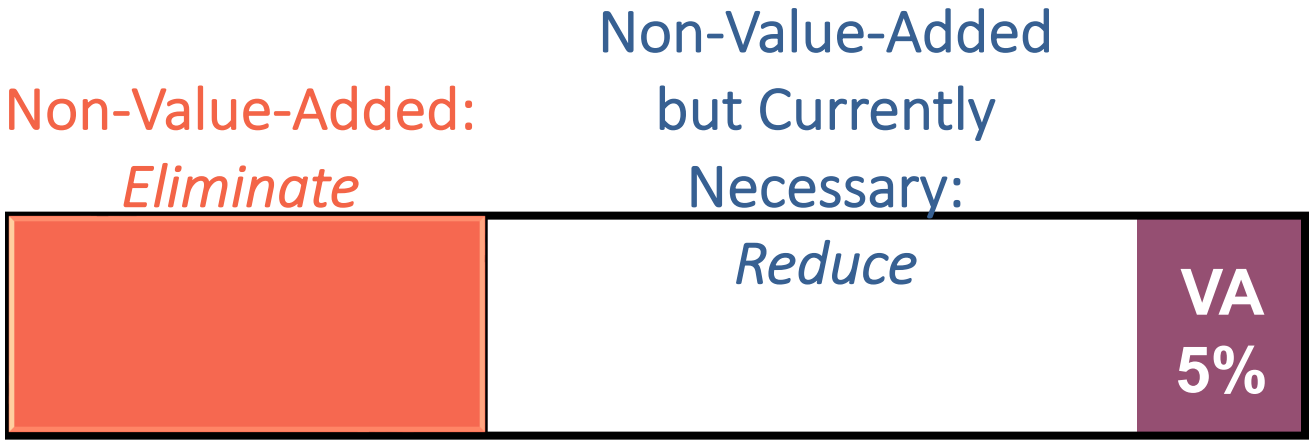
Some Waste is Currently Required

Most processes are 95–99% non-value-added; eliminating waste is the best leverage for improvement



Examples:

- *A regulatory requirement*
- *An audit required by accounting*
- *An inspection step that is needed to ensure safety*

Source: Children's Mercy Lean System Fundamentals

Why do we have so much waste?

Country Do

1895

Sensitivity to Operations…

…yet another benefit of Leaders' rounding

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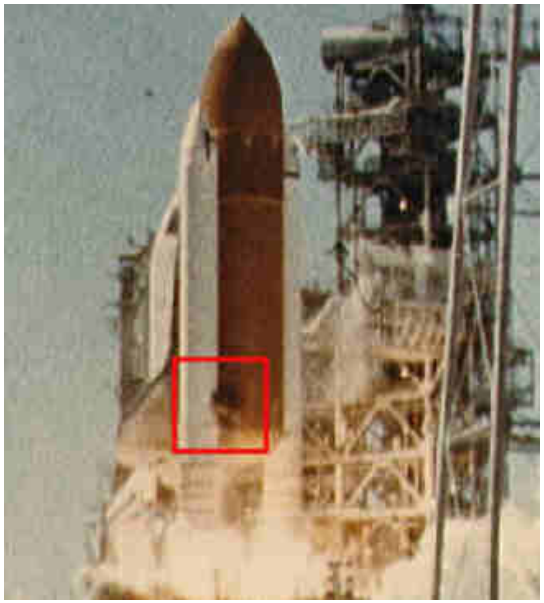
Code Blue Response

- Multiple disciplines respond
  - Each has a role
  - Each has a responsibility



Why?
Why?
Why?
Why?
Why?

“A3 thinking”

1. Clarify the Problem	5. Develop & Implement Countermeasures
2. Break Down the Problem	6. Check Results & Process
3. Set a Target	7. Standardize & Follow Up
4. Identify the Root Cause	

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Apollo 1 Fire

Jan 27, 1967

"The changes made to the Apollo module as a result of the tragedy resulted in a highly reliable craft"

Next mission…November of the same year!

"The eventual success
a tribute to Gus Grissc
Chaffee, three fine ast
loss was not in vain."

…Commitment to Resilience

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Feedback

5:1

Coaching is *needed*

High Reliability Organizations

Principles of Anticipation

- Preoccupation with Failure
  - Recognizing small, inconsequential errors as a symptom that something's wrong
- Sensitivity to Operations
  - Staying aware of front-line operational efficiency
- Reluctance to Simplify
  - Encouraging diversity in experience, perspective

Principles of Containment

- Commitment to Resilience
  - Developing capabilities to bounce-back from events
- Deference to Expertise
  - Pushing decision making down to the person with the most related knowledge and expertise

OCHSPS & Weick, Sutcliffe, Obstfeld. Organizing for high reliability: Processes of collective mindfulness. Res Organizational Behav. 1999; 21:81-123

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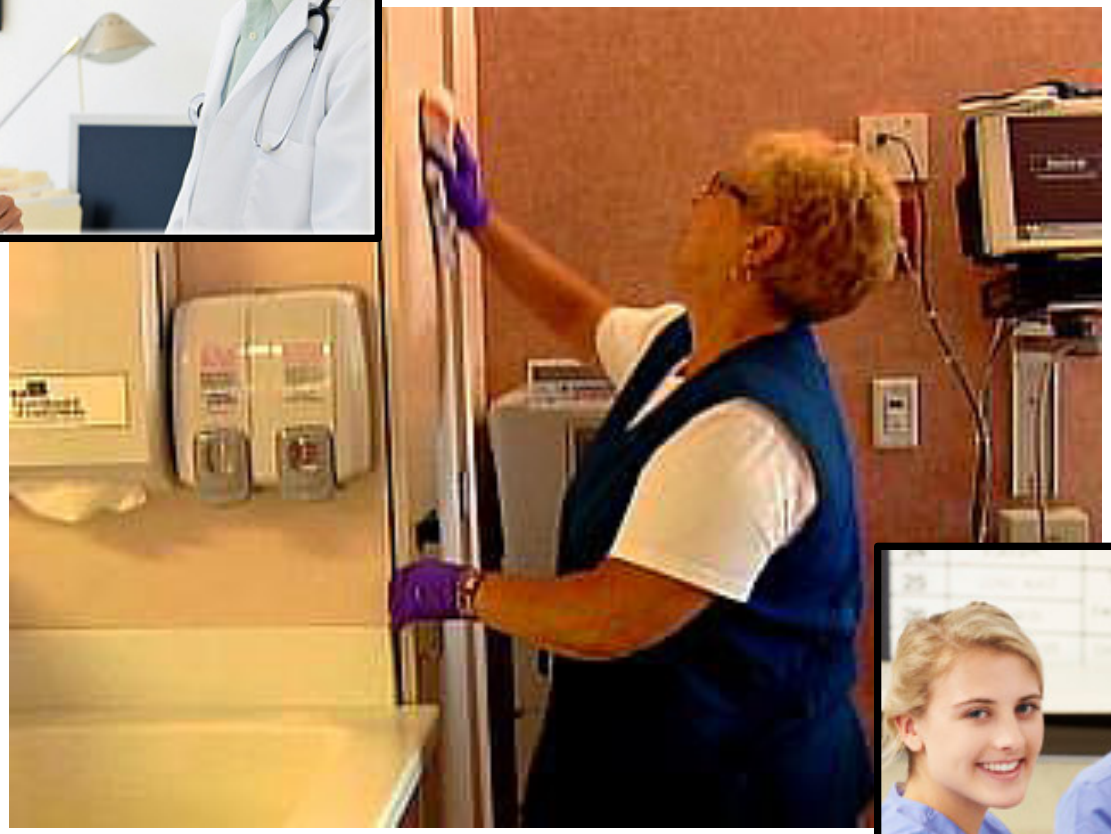
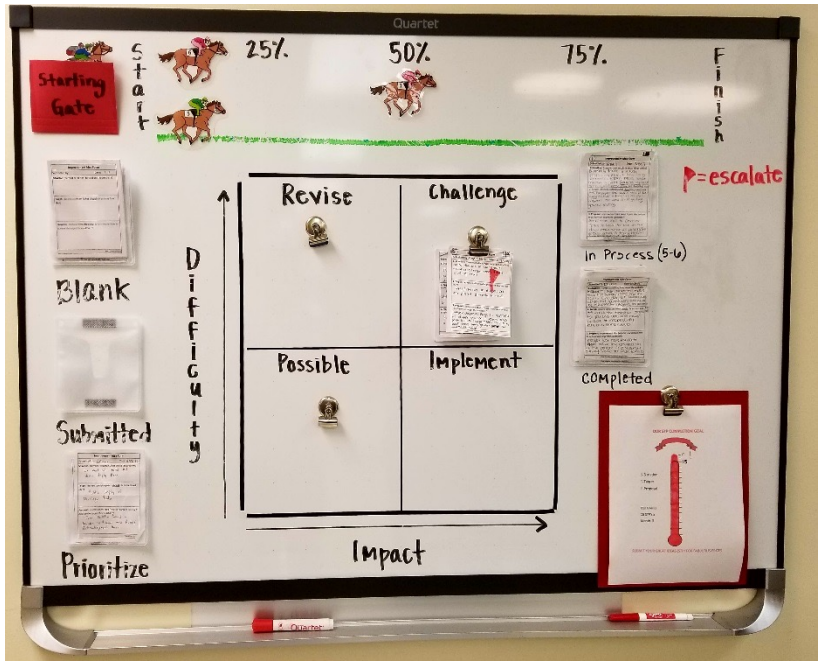
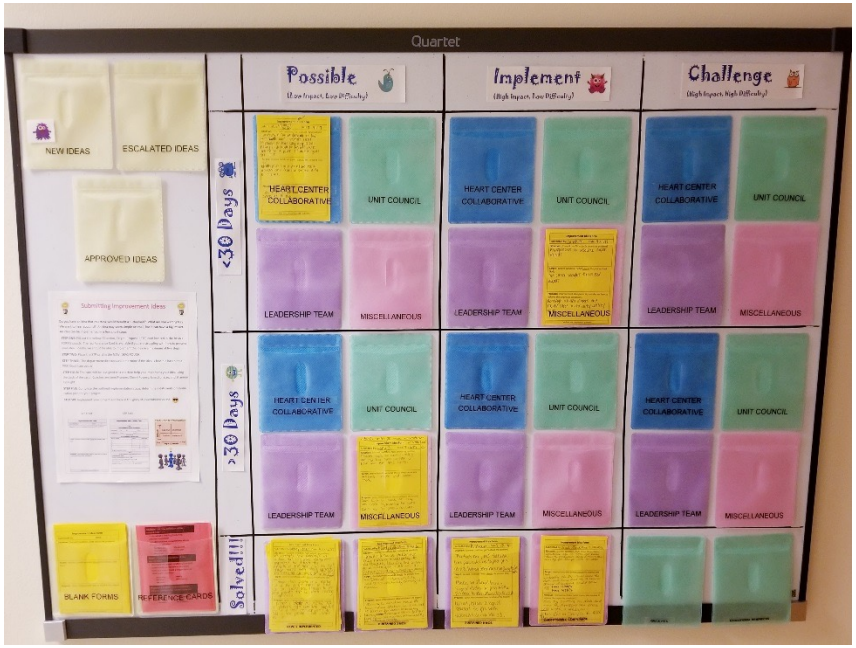
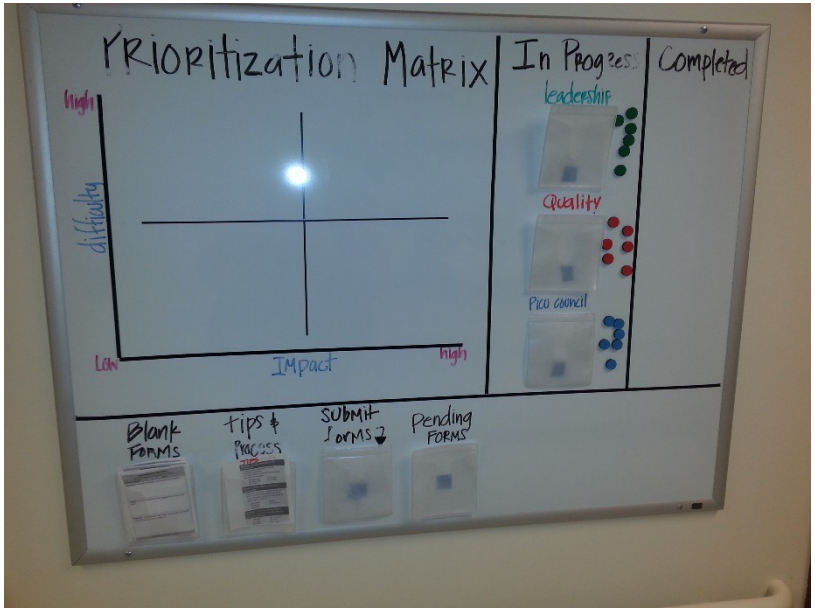


Garner ideas from all staff







All examples from Children's Mercy

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Questions?

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