

# Patient Safety and Human Factors Concepts

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# Objectives

- Review of Culture of Safety
- Review of Human Factors and Error
- Explain importance of reporting near misses, systems failures, work-arounds and adverse events

# Healthcare Error in United States

*99% of errors are system related, not human failure.*

## DFCI Experience

- In 1994 2 patients received an overdose of chemotherapy – resulting in death and permanent cardiac damage.

### Root Cause

- *Multiple systems failures that allowed the incorrect doses to be ordered, dispensed and administered.*

# Patient Safety

- Actions undertaken by individuals and organizations to protect healthcare recipients from being harmed by the effects of health care services.

# Patient Safety Impediments

- Latent errors – “accidents waiting to happen”
  - Poorly designed systems
- Human Error
- Reluctance to discuss and report errors, harm or systems problems – so they recur
- Communications
- Multiple hand-offs
- Multiple interactions with complicated technology
- Fast-paced, high pressure environment that is prone to interruptions
- Barriers unique to each institution

# Patient Safety Impediments

## DFCI Specific

- Complex relationships with inpatient facilities
- Multiple information systems that don't always communicate
- Complex research protocols
- High acuity ambulatory center

# Culture of Safety in Health Care

- Patients should not be harmed by the care that is intended to help them
- Safety is NOT just the prevention of errors, but the avoidance of adverse events to the patient
  - Includes error prevention, accident prevention, minimization of adverse drug events and systems improvement

# Components of a Culture of Safety

- Environment of learning, not blaming
- Non-punitive or fair and just culture
  - Culture that supports the open discussion of errors, failures and potential or actual harm
  - Individuals not held responsible for flawed systems
  - System and individual accountability.
- Atmosphere of trust and respect
  - Reporting encouraged, rewarded

# Components of a Culture of Safety

- Involvement of front-end staff in systems evaluations and incident investigation
  - Front –line staff are the task experts
- Belief in prevention as a safety tool

# Human Factors

- Human factors discovers and applies information about human behavior, abilities, limitations, and other characteristics to the design of tools, machines, systems, tasks, jobs, and environments for productive, safe, comfortable, and effective human use.
- Why things don't work right!

# Basic Tenets of Human Factors

- Everyone commits errors
  - Slips and mistakes
- Errors are often beyond our conscious control

*Systems that depend on perfect human performance are fatally flawed.*

# Error vs. Accident

- What is an error?
  - Failure to perform an intended action (omission or commission)
- What is an accident?
  - An unplanned, unexpected and undesired event that reaches a patient
- Error is not defined by adverse outcome
  - Most errors do not cause harm

# Error vs. Accident

- Errors not discovered can lead to accidents
- Identifying errors that do not reach a patient is essential to patient safety
- Identifying errors that do not reach a patient reveals potentially harmful failures

# Contributing Factors to Error

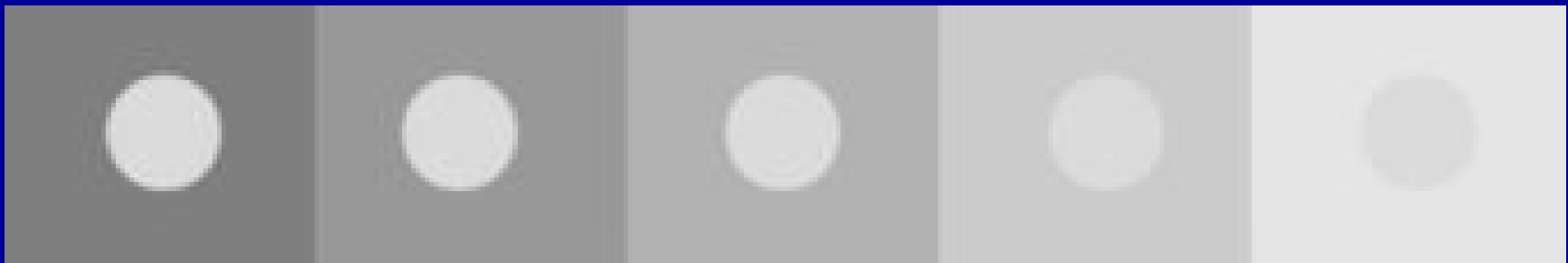
- Environment
  - Noise, lighting, distractions
- Equipment/Technology
  - Design, training, labeling
- Human
  - Cognitive, communications, fatigue, teamwork, emotions, habit, bias
- Systems
  - Experience, training, P&Ps, hand-offs, supervision

# Examples

<u>Human Factor</u>	<u>"Real Life"</u>	<u>Healthcare</u>
Sleep Deprivation	Driving	24 hour shifts
Perception	Accident "witness"	Reading an x-ray
Learning Curves	Piano playing	"see one, do one, teach one"
Motor control	Computer mouse	Laparoscopic surgery
Confirmation bias	Big Dig route changes	Transcribing Q18 to be administered every 8 hours.

# Perception

- Which is brightest center dot?



From [www.visualexperts.com](http://www.visualexperts.com)

# Perception

- What color is the words?



From [www.visualexperts.com](http://www.visualexperts.com)

# See What You Expect to See



# See What You Expect to See

- Holmes, Karen DFCI147892 F 11/15/48
- Holmes, Karl DFCI245943 M 12/13/38
- Holmes, Karla DFCI314593 F 12/01/42
- Holmes, Kristin DFCI304562 F 10/09/67
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# Error (Perception)

## Example:

*1000 mg* is read by a RN as *100 mg*.  
The drug is administered into the patient's IV.  
The patient receives the wrong dose.

## Error (Mistake)

### Example:

*1000 mg* is read *correctly* as *1000 mg* by the RN.

The RN *incorrectly* decides to administer as a bolus rather than an IV drip.

## Error (Slip)

### Example:

*1000 mg* is read as *1000 mg*. The RN *correctly* decides it should be administered as an IV drip.

The RN is distracted while hanging the drug and, *from habit*, administers as a bolus.

# Systems Error

- Vulnerability in a process that allows a result that is not intended.
- Systems Errors allow human errors to line up to become a failure or accident.

# Systems Error

## Examples in everyday life:

- Florida voting system (ballots)
- Cars lurching forward when starting

## Examples in health care

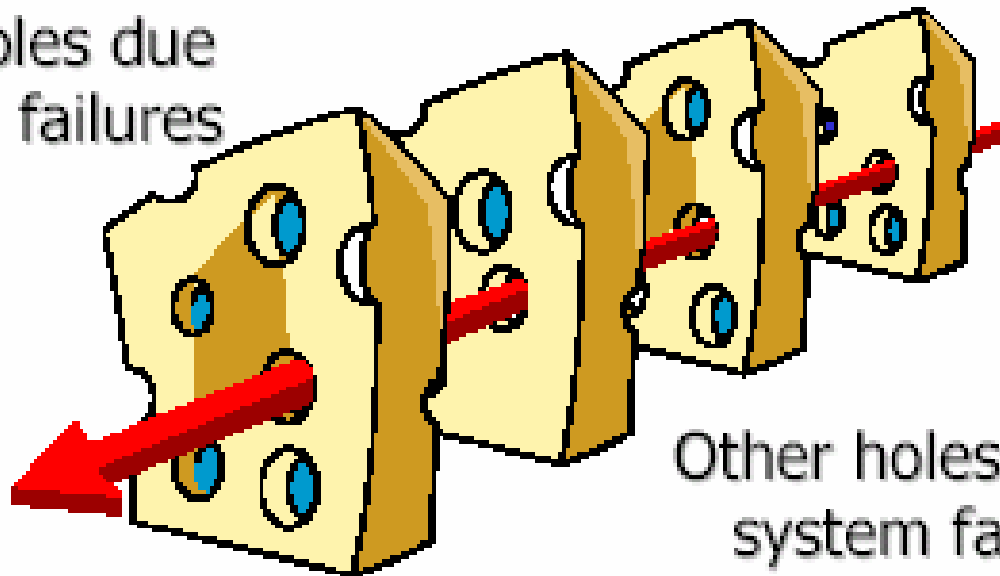
- Oxygen and other medical gasses with same attachment heads
- Legibility of handwritten orders (prescriptions)
- Allowing 100 mg to be administered if 1000 mg was ordered.

# Systems Failures

## The 'Swiss cheese' model of accident causation

Some holes due to active failures

Error



Accident

Other holes due to system factors

Successive layers of defenses, barriers, & safeguards

# Accident Waiting to Happen "Real Life"



# Accident Waiting to Happen Healthcare



# Accident Waiting to Happen Healthcare



# Systems Improvements

- Forcing functions
  - Something built into a process to either prevent or force a certain action to take place
- Redundancy
  - Built in procedures to insure an action has occurred
- Simplification
  - Eliminate steps rather than add steps
- Standardization
  - Medication doses / administration times
- Automation and computerization
  - Bar-coding

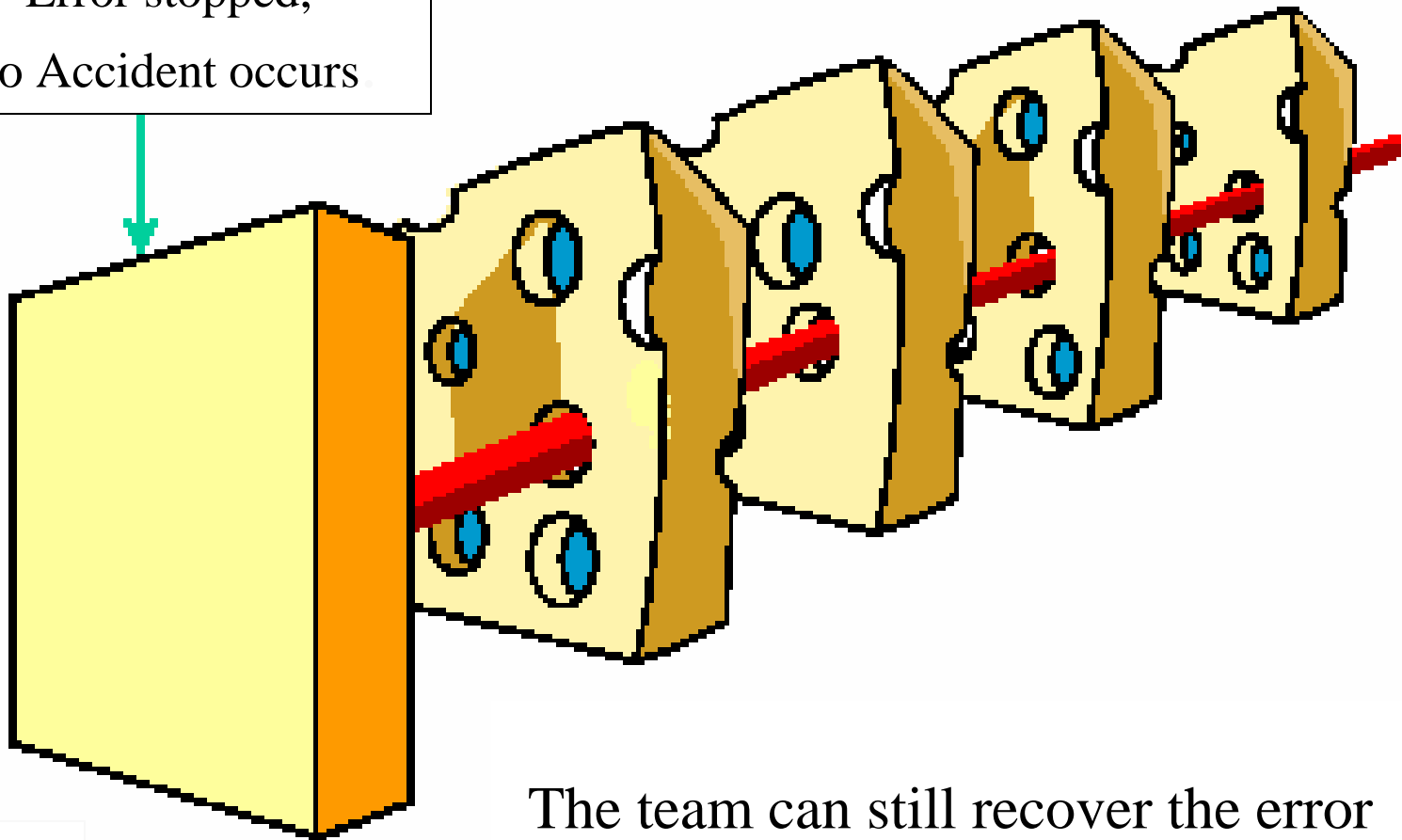
## Systems Improvements (cont.)

- Reduce number of hand-offs
- Improve access to information
- Decrease reliance on memory

*In other words, develop systems and processes to prevent errors/accidents from happening and that can manage them when/if they occur.*

# Effective Systems

Error stopped,  
no Accident occurs



The team can still recover the error

# Near Miss or Potential Error

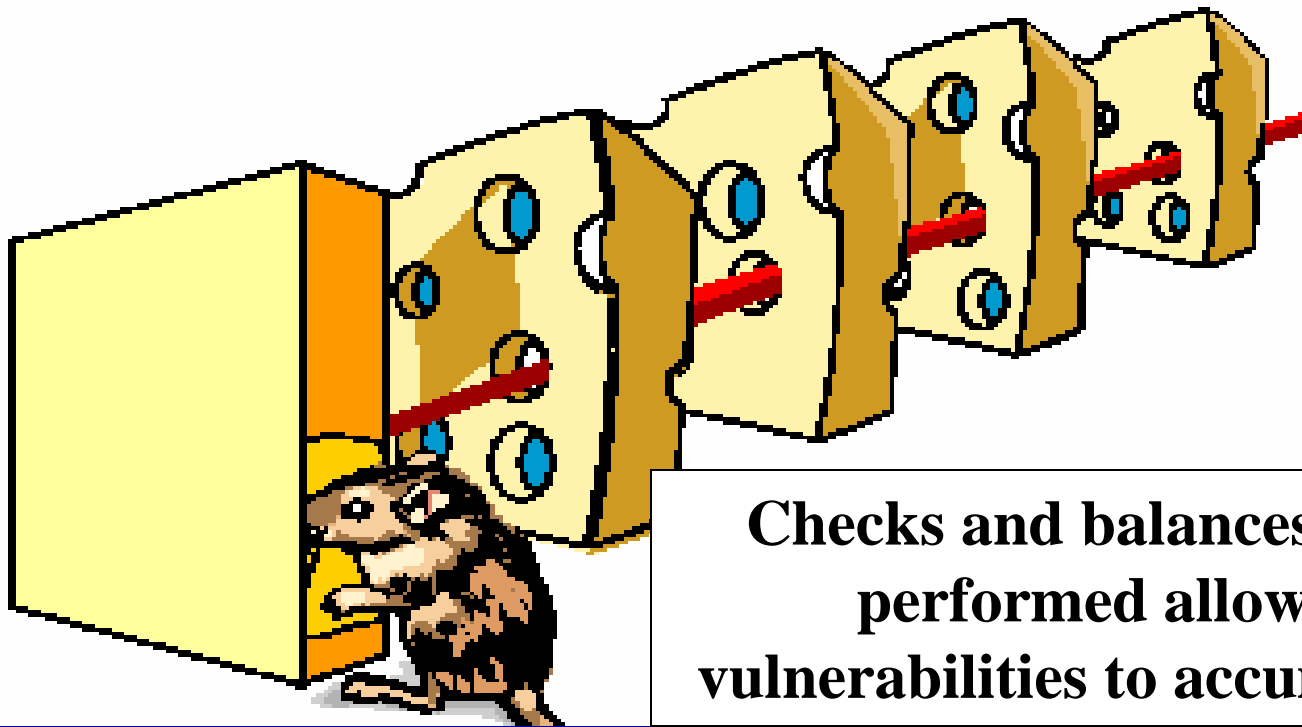
- What is a near miss (in healthcare)?
  - An error that occurs somewhere in the process, but does not reach the patient
  - An error that has not turned into an accident
- Could the recurrence of this event put another patient at risk in the future?

# Near Miss or Potential Error

- Examples:
  - Wrong drug dispensed, but not administered
  - Patient Jane Smith is wearing Joan Smith's ID wrist band, but correct patient ID is detected by hospital number prior to phlebotomy procedure

# Systems Require Monitoring

Limited systems resources  
get nibbled away.



**Checks and balances not  
performed allow  
vulnerabilities to accumulate**

# Moving Systems Towards Safety

- Eliminate “shame and blame” mentality from healthcare!
- Accept that our clinical staff will make errors and build systems to support their work
- Foster a culture of safety where people can speak up
- Organizational learning from errors and near-misses

# Moving Systems Towards Safety

- *The system must trust that you will monitor, you will identify, you will do your individual best.*
- *You must trust that the system will listen to your concerns.*

# Moving Systems Towards Safety

- An unreported error/vulnerability cannot be investigated
- However, it's not about counting the number of reports – it is about identifying vulnerabilities

*If we don't know about it, we can't investigate it and we can't fix it.*

# Barriers to Reporting

- Punitive culture
  - Get in trouble/someone else in trouble
- Don't know what to report
  - Don't think "near misses" have to be reported
- Time
- Cumbersome reporting systems

# Barriers to Reporting

- Poor feed-back of reported events/actions
- Belief that “reporting doesn’t make any difference”
- Belief that “work-arounds” are the normal way of doing business

# Patient Safety Rounds

- Incident reporting is a regulatory requirement
- Incident reporting program typically only tells us if something happens to the patient – only the “tip of the iceberg”
- Develop a “pro-active” approach to finding out what is going on – where we are vulnerable
  - Infection Control model

# Patient Safety Rounds

- An informal approach to talk with staff in action
- Make it easy, non-threatening, supportive

# Moving Forward

- How do you help your organization to move forward with patient safety?

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