

The Magnitude of Human Error and Patient Safety in Health Care Facilities

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Abstract

Patient Safety considered one of the most important issues in medical field, millions of patients suffer harmful injuries or death every year due to medical errors.

And behind these numbers lie the stories of many damaged lives and billions of dollars are spent on prolonged hospital stay, corrective procedures, income loss, disability and litigation, resulting from unsafe care.

Keywords: Patient Safety; Medical Errors; Harm

Introduction

What is patient safety?

It is the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of health care.

What is adverse event (or adverse effect) AE?

It is an unexpected medical problem, that happens during treatment with a drug or other therapy, AE may be mild, moderate or severe.

In one study the average of adverse events in PICUs is 28.6 to each 100 patient days. But be careful that not all adverse events are due to medical error and preventable.

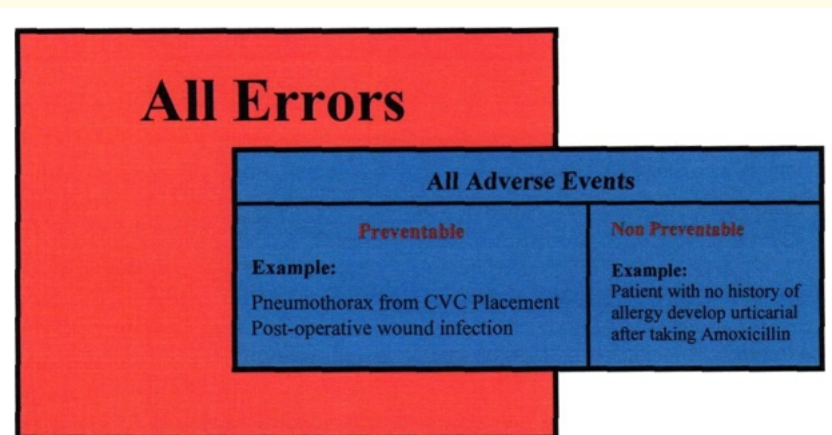


Figure 1

Since the US IOM “Institute of Medicine” report to Err is Human in 1999, which mentioned that around 44,000 to 98,000 death every year happened from medical error, the health care authorities start to give the patient safety the priority in all health care facilities.

Discussion

Dr. Lucian Leape said “the single greatest impediment to error Prevention in the medical industry is that we punish people for making mistake”.

What is the definition of human error?

It is a failure of a planned sequence of mental or physical activities to achieve its intended outcome, and have two kinds:

1. An act of commission: Doing something wrong.

Example: Ordering a medication for a patient with a documented allergy to that medication.

2. An act of omission: Failing to do the right thing.

Example: Not giving a low dose of unfractionated Heparin as prophylaxis for VTE for a patient after Hip Replacement surgery.

Error of omission are more difficult to recognize, but likely represent a larger problem.

Also we can divide medical error into two types.

Type I: Error in execution: Failure of a planned action to be completed as intended.

Example: You want to intubate the trachea and instead you intubate the Esophagus.

Also, this type can be divided into two subtypes:

1. Slip: Which is an observable action that deviates from what was planned Example: You put a wrong medication in an infusion pump
2. Laps: Represent a memory failure.

Example: A nurse wants to insert an NGT, but fails to follow all of the steps of the policy, and placement in the trachea is unrecognized until respiratory distress develop.

Type II: Error of planning- use of wrong plan to achieve an aim.

Example: Treatment of a patient with Pneumonia caused by *Enterobacter*, by an antibiotic that cover only gram positive bacteria.

And one subtype is called mistake: which is a knowledge-based failure, where the planned action is wrong for the situation but the plan is carried out correctly.

In Summary: If 1. The intended action is the wrong one. It is a mistake. 2. The action didn't go as intended. It is a slip or laps.

Also, the medical error has two ends:

1. The sharp-end or (active error): Typically occur in a patient care area by front line provider, and the effect is almost immediately apparent.

Example: A nurse gives a wrong high dose of insulin to the patient so that the patient immediately will develop Hypoglycemia and decrease Level of Consciousness.

2. The blunt-end or (latent error): Are usually a system based problems which may be related to poor design, incorrect installation, look-alike packaging, sound-alike names, faulty maintenance, or bad management decisions.

Latent errors are usually more difficult to be recognized and usually develop over days, weeks, months, or even years, and are often hidden within the organization, structure, computer programs, or care process. Health Care Workers (HCW) frequently develop “work around” for these remote system problems, which leads to generalized acceptance that the “work around” is normal.

Uncovering latent errors is more likely to result in the development of a better system than in focusing on active error.

One of the method for this [System Investigation] is pneumatic DEPOSE Design, Equipment, Procedure, Operator, Supplies an] Materials and Environment.

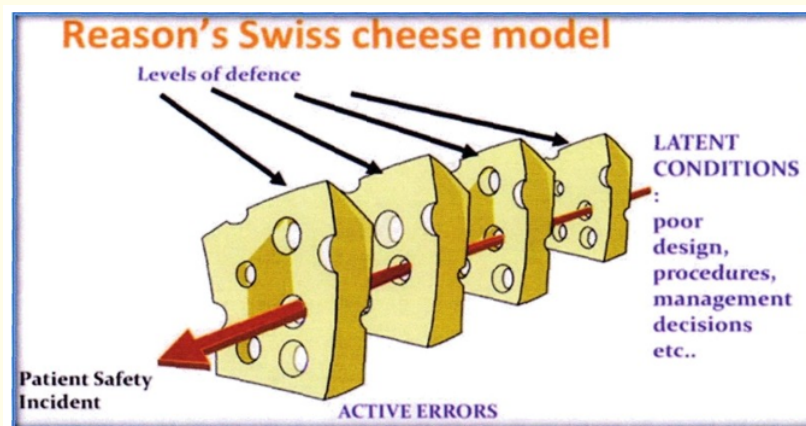


Figure 2

Some important facts about human error:

1. Can't be eradicated, because error is part of the human condition.
2. Learn from error.
3. Consequences of error can be mitigated, through anticipate predictable error, build safe processes, and enhance communication skills and team work.
4. We can't prevent all errors, but we can reduce the risks that can lead to harm.
5. Accountability for error: Don't simply punish people because of their actions, but always hold them accountable for their decisions.

- 6. Just Culture: In just culture a safeguards exist that allow the identification of individuals who repeatedly fail to follow policies or who act with malicious intent, while protecting those who report error and near misses.
- 7. Second Victim: Dr. Albert W. Wue M.D. said “health care P roviders are the second victims of medical errors”. And so we need to console him/her.
- 8. If a three other caregiver with similar skills and knowledge, would do the same error in similar circumstance, this leads to the conclusion.

First: The system supports error and requires fixing.

Second: The system leaders are accountable and should apply an error-proofing improvement.

Human error and the system

Error occur when cognitive process converges with three other elements, nature of the task and its environmental circumstances, mechanisms that govern performance, and the nature of the individual who produced the failure.

Hospitals considered as a complex tightly coupled systems.

Complex Systems means interact with many other component, in both predictable and unexpected ways, are specialized, interdependent, nonlinear, and serve multiple functions.

Note: Non /iHenrf/y means that small changes can lead to big effects.

Tightly coupled means no buffer between actions and difficult to change.

“One action quickly give rise to other action such that it is impossible to recognize failure or intercede and prevent the failure from reaching a patient”. So that the best effective way for thinking and preventing the error to reach the patient in Complex System is Swiss Cheese Model.

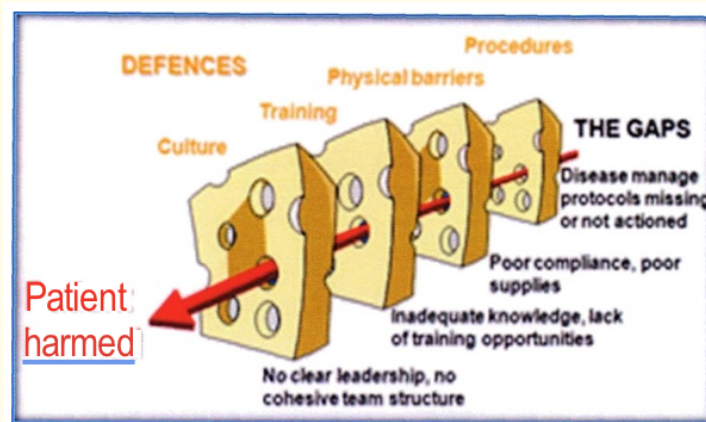


Figure 3

So that the characteristics of safe complex systems are:

1. Simplification: remove unnecessary steps from the process whenever possible.
2. Standardization of processes: creating predictability and consistency of the process.
3. Redundancy and back up: checklist, bundles of care.
4. Many checks and balances.
5. Automation whenever possible.

At risk behavior (normalise deviance, work around, J-1 shortcuts)

By definition, it is a behavioral choice that increases risk, where risk isn't recognized or is mistakenly believed to be justified.

Example: Choosing to do something other than what is defined in policy, protocol, law or accepted safety norms, to try to meet objective of the work at hand.

Why does it happen?

Due to:

1. Fluctuations in situations within a complex environment.
2. Underestimate risk of drifting from safety procedures "believe likelihood of harm is minimal".
3. In competency and a poor teamwork.
4. Develop comfort with inherent risks/threats.
5. Personal motivation.
6. Micromanagement.

[Note that rules' violation are an early signals of system deficiencies].

What is the best action to treat this behavior?

1. Coach the provider.
2. He is accountable.
3. System modification.
4. Should participate in teaching others the lesson learned.

Reckless behavior

Defined as conscious behavior choice to disregard a substantial and unjustifiable risk "but no intention to cause harm".

What is the best action to treat this behavior?

1. Discipline the provider.
2. He is accountable.
3. Need retraining.
4. System study and modification.
5. Should participate in teaching others the lesson learned.

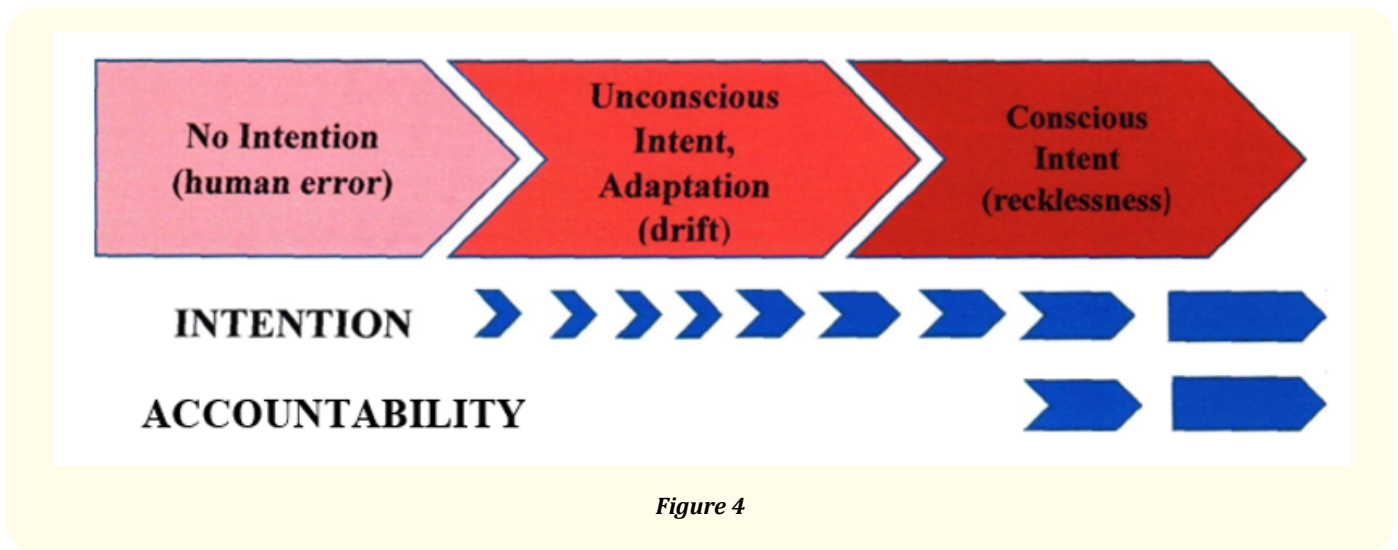


Figure 4

•• Malicious action

The caregiver wants to cause harm, and the action is to:

1. Discipline the provider + legal action.
2. The caregiver duties should be suspended immediately.

• Impaired judgement:

The caregiver thinking is impaired by illegal or legal substances, cognitive impairment or severe psychosocial stressors, and the best action is:

1. Help the health care provider.
2. Discipline him/her.
3. With/without temporary work suspension.

s• Error categories

Note that an error is a process while harm is an outcome.

The definition of harm, is an impairment of physical, emotional or psychological function or structure of the body and/or pain resulting there from:

- Category A: Circumstances or events that have the capacity to cause error.
- Category B: Near miss or close call or averted event is an error occurred but didn't reach the patient.
- Category C: Or risk thereof is an error occurred, and reached the patient but didn't cause a patient harm.
- Category D: An adverse event that cause a patient harm, requiring monitoring.
- Category E: An adverse event that cause a patient harm, requiring intervention.
- Category F: An adverse event that cause a patient harm, requiring initial or prolonged hospitalization.
- Category G: An adverse event that cause a permanent patient harm (more than one year).
- Category H: An adverse event that cause a patient harm, requiring intervention to sustain life or "ICU admission".
- Category I: An adverse event that cause a patient death.

[Note that Category G, H, and I called Sentinel Events].

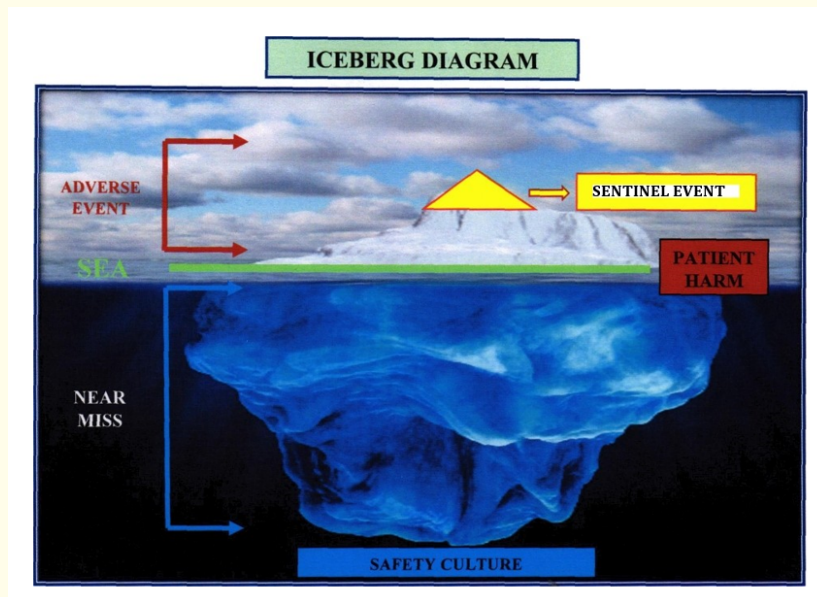


Figure 5

How to measure error

1. **By Incident Reporting: We have many types of reporting:**
 - a. Voluntary reporting and mandatory reporting: both considered as reactionary “the report is generated after an event has occurred”.
 - b. Concurrent surveillance: Review of the patients record to evaluate for an error which manifested as changes in signs and symptoms.
 - c. Automated surveillance: Is considered ideal for detecting events that require antidotes or specific laboratory monitoring.
 - d. Example: An order for Naloxone trigger for an error in opiate dosing.
2. **Chart review for evidence of error:** These two (1 and 2) need a trigger tools, which have a sensitivity of about 95% and a specificity of about 100%.

Examples of global trigger tools:

- i. A Care Module Trigger
 - ii. Any code or arrest
 - iii. Abrupt drop of >25% in Hematocrit
 - iv. Patient fall
 - v. Readmission within 30 days
 - vi. Transfer to higher level of care.
- a. Surgical Module Trigger
 - i. Return to surgery
 - ii. Intubation/Reintubation in post anesthesia care unit
 - iii. Intra or post-operative death
 - iv. Post-operative troponin >1.5 mcg/ml.
- b. A Medication Module Trigger
 - i. PTT > 100 secs
 - ii. INR > 6
 - iii. Rising BUN or Crea > 2 times baseline

- iv. Vitamin K administration
- v. Naloxone use
- vi. Abrupt medication stop.
- c. Intensive Care Module Trigger
 - i. Pneumonia onset
 - ii. Readmission to ICU
 - iii. Intubation/reintubation.
- d. Emergency Department “ED” Module Trigger
 - i. Readmission to ED within 48 hours
 - ii. Time in ED > 6 hours.
- e. Perinatal Module Trigger
 - i. 3rd or 4th degree laceration.
- 3. Patient safety indicators.
- 4. Hospital standardized mortality ratio.
- 5. Ask patient to identify instances of harm or error.

Conclusion

Decade of research, mostly from outside the healthcare, has confirmed our own medical experience, that most errors are made by good, but fallible people working in dysfunctional systems, which means that making care safer depend on buttressing the system to prevent or catch the inevitable lapses of morals [1-3].

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