

# Medical Errors Prevention



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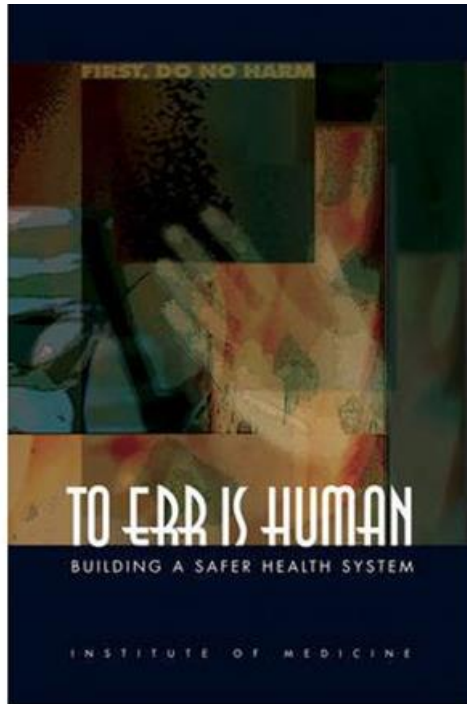
Patricia Moore, PhD, RN

# Objectives

**At the conclusion of this activity, participants will be able to:**

1. Discuss the definitions of medical errors and the types of medical errors that occur.
2. Describe the history of medical errors and the cost to healthcare delivery, providers, and patients.
3. Identify Joint Commission reportable events including which adverse incidents must be reported to the Florida Agency for Healthcare Administration (ACHA).
4. Describe the root cause analysis process used to identify factors of medical errors.
5. Evaluate and discuss the most misdiagnosed conditions recognized by the Florida Board of Medicine and the Florida Board of Osteopathic Medicine.
6. Evaluate and discuss the six factors for APRNs identified by the Florida Board of Nursing.
7. Discuss what factors Joint Commission requires for a meaningful root cause analysis.
8. Discuss emerging areas of potential error and how healthcare providers facilitate patient safety.

# Institute of Medicine Report: Building a Safer Health System Through Prevention of Medical Errors



## ***“To Err is Human” (1999)***

44,000 – 98,000 deaths  
from medical errors

Inspired healthcare change  
to patient safety

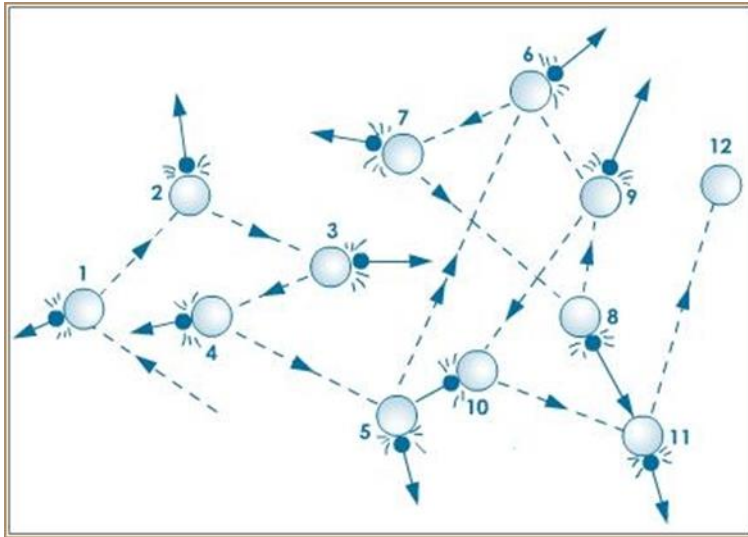
Institute of Medicine Report

*“The majority of medical errors do not result from individual recklessness or the actions of a particular group- this is not a “bad apple” problem. More commonly, errors are caused by faulty systems, processes, and conditions that lead people to make mistakes or fail to prevent them.”*

# Medical Errors Resulting within Complex Systems: Healthcare

**“[E]rrors occurring within complex systems are rarely a result of individual failure, but rather multifactorial system failures [...] flaws within the systems that lead to downstream errors. Understaffing, time pressure, fatigue, and inexperience, while not errors by themselves, create an environment that is prone to error”**

**-James Reason  
*Human Error*, 1990**



# Medical Errors: Definitions

## The Institute of Medicine's Committee on Quality of Healthcare

*“The failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim.”*

## The American Medical Association

*“An unintended act or omission, or a flawed system or plan, that harms or has the potential to harm a patient.”*

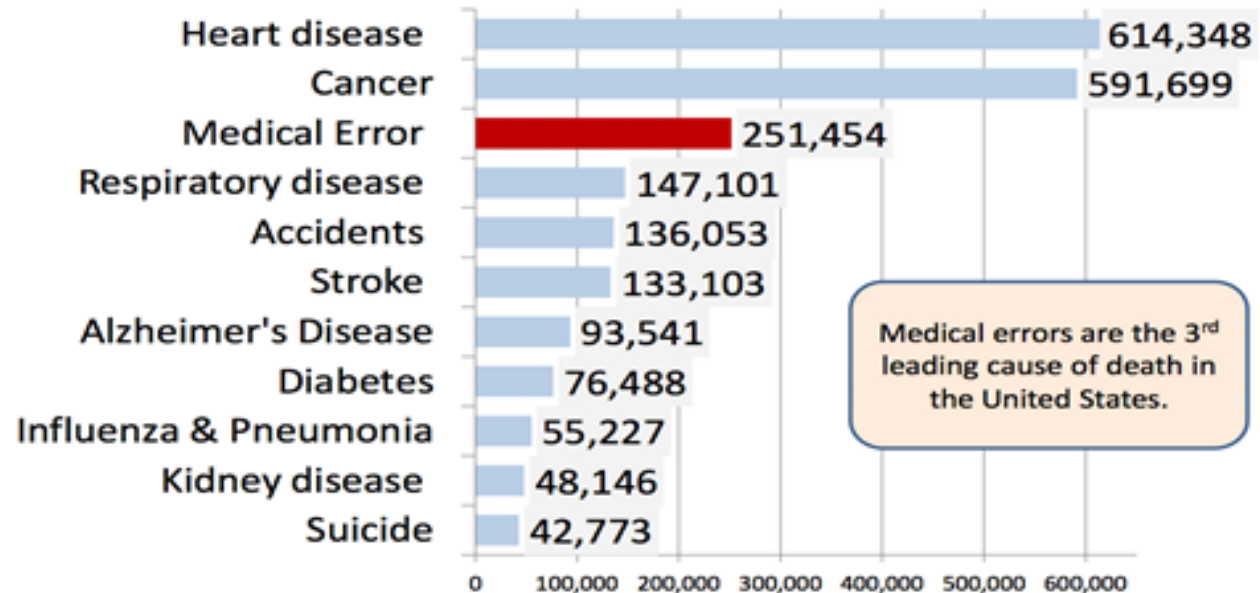
Examples	
Adverse Drug Event	Surgical injuries & wrong-site surgery
Restraint-related injuries or death	Falls Pressure Ulcers

***Not defined as intentional acts of wrong doing; not all medical errors rise to the level of medical malpractice or negligence.***

# Medical Errors: Types

1. ***Error of execution***: The correct action doesn't proceed as intended,  
Example: misread prescription dosage, miscommunication  
or
2. ***Error of planning***: The original intended action is not correct  
Example: incorrect medication prescribed

# Medical Errors: 2016 BMJ Study Results



Sources: CDC. National Center for Health Statistics. Number of deaths for leading causes of death, 2014.

A 2016 *BMJ* data-quality analysis study published March 2017 shows that there are approximately 200,000 preventable hospital-related deaths each year in the United States and that contention is “not unreasonable”, however the study also concludes that difficulty in accurately measuring the actual number of preventable hospital-related deaths remains an issue.

Kavanagh, K.T., et al. (2017), Estimating hospital-related deaths due to medical error: A perspective from patient advocates. *Journal of Patient*



# Medical Errors: Agency for Health Care Administration (ACHA) 2021 Report

Number of Adverse Incidents

Year	Outcome Text Short	HOSPITAL				Grand Total
		Q1	Q2	Q3	Q4	
2021	Brain Damage	7	16	10	10	43
	Death	43	53	42	46	184
	Disfigure	1	2	1	2	6
	Fracture Dislocation	40	36	32	38	146
	Limit Function	3	8	4	10	25
	Medically Unnecessary		3	5	1	9
	No Consent	11	5	7	6	29
	Remove Foreign Objects	26	18	23	21	88
	Spinal Damage	1	1	2		4
	Surgical Repair	1	5	3	5	14
	Transfer	33	55	40	33	161
	Unrelated Surgery	30	14	18	27	89
	Wrong Patient Surgery	1	3		1	5
	Wrong Site Surgery	7	10	6	14	37
	Wrong Surgery	8	2	7	2	19
Grand Total		212	231	200	216	859

**Total of 859 Adverse Incidents Reported by Hospitals**  
**184 Resulted in death**  
**37 Wrong Site Surgery**  
**19 Wrong Surgery**  
**88 Foreign Object Removal**  
**14 Surgical Repair**  
**9 Medically Unnecessary**



# Medical Errors: Causes

- Poor/Inadequate written and verbal communication
  - Can lead to serious medical errors in areas, such as prescriptions, History & Physicals, EMR documentation, ambiguous and incomplete instructions
- Negative/ Arrogant/Casual attitude
  - Occurs when providers believing they're always right and/or they know everything
  - Could occur when taking patients' history and conducting patients' examinations, which may often lead to vital points being missed, thereby resulting in misdiagnosis
- Misinterpretation of laboratory and radiological test results
- Delay with interpretation of diagnostic laboratory and radiological readings
- Multiple ambiguous/conflicting diagnostic and/or treatment guidelines
- Poor medical judgement in selecting patients for surgical and other procedural interventions

# Medical Errors: Patient Handoffs

## Patient hand-off

Defined as transfer and acceptance of patient care responsibility between nurses and/or other healthcare team members. Involves reporting specific patient information to another healthcare team member for the purpose of ensuring continuity and safety of patients' care

- Approximately *80% of serious medical errors* occurs during patient hand-offs and involve miscommunication between healthcare team members
  - Medical errors occur when the receiving healthcare team member is provided inaccurate, incomplete, not-timely, misinterpreted, or otherwise what is needed patient information from the sender
    - The healthcare team member transferring a patient is responsible for providing patient information to the receiving healthcare team member, who will be providing care to the patient
- Patient handoffs typically fail because: healthcare team members are not properly trained in patient hand-off procedures; language barriers and cultural and/or ethnic factors are not considered in the patient-handoff process; and there is inadequate, incomplete or nonexistent documentation relative to the patient being handed-off causing chaos in the hand-off/transfer process
- Patient hand-offs should be face-to-face between both the sending healthcare team member and the receiving healthcare team member in a location free from interruptions.

# Medical Errors: Electronic Medical Records

Electronic Medical Records (EMRs) related errors:

- The convenience of copying and pasting providers' notes in patients' records should be approached with *extreme caution, since* research has shown that:
  - 66% to 90% of providers' notes in patients' records were copied and pasted<sup>1</sup>
  - Copying and pasting was a factor in 2.6% of documentation errors, notably in primary care <sup>2</sup>



1. Wang, M.D., et al.(2017, May 30). Characterizing the source of text in electronic health record progress notes. *JAMA Internal Medicine*. doi: 10.1001/jamainternmed.2017.1548

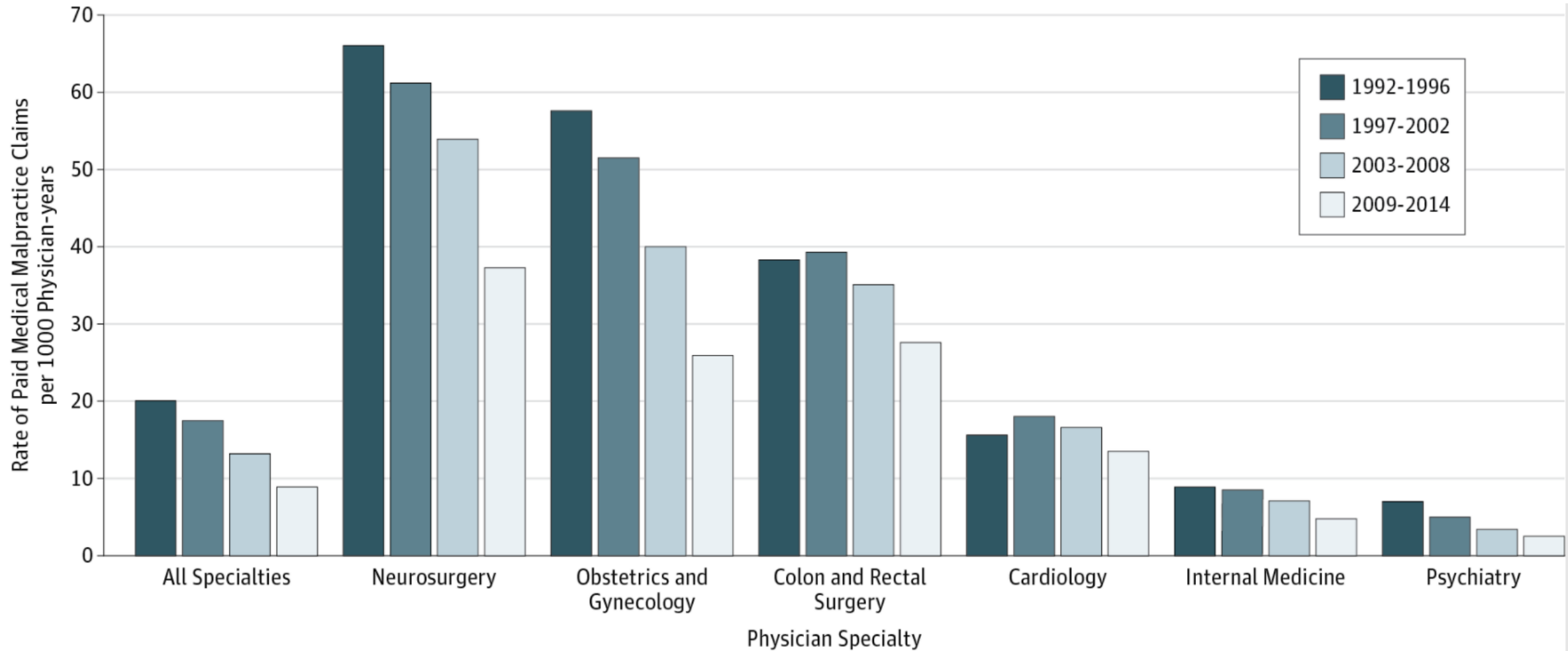
2. Tsou, A. Y., Lehmann, C. U., Michel, J., Solomon, R., Possanza, L., & Gandhi, T. (2017). Safe Practices for Copy and Paste in the EHR. *Applied Clinical Informatics*. doi: 10.4338/ACI-2016-09-R-0150

# Significant Medical Malpractice Claims



- In 2018, there were approximately \$4 billion paid to plaintiffs in medical malpractice lawsuits in the United States
- The average medical malpractice payout was \$348,065 in 2018
- Diagnosis-related medical malpractice claims made up 34.1% of total medical malpractice claims
- In terms of claims related to negative patient outcomes: 29.7% were due to patient death, 18.7% were major permanent injury related, and 12.3% were due to brain damage and/or quadriplegia-related claims and/or claims involving other injuries requiring lifelong care

# Top U.S. Medical Malpractice Claims by Specialty: 1992-2014



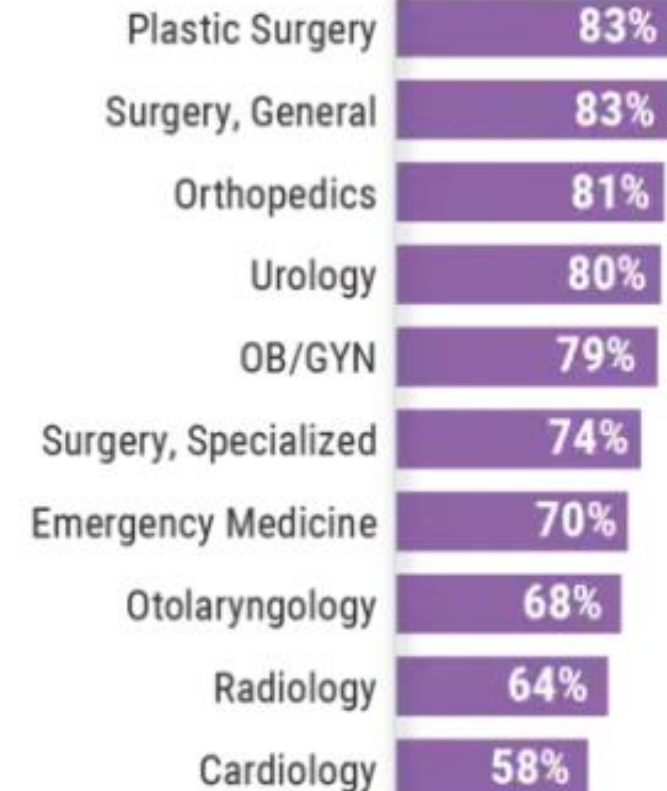
# U.S. Medical Malpractice Lawsuits: 2021

## Results from Medscape's Medical Malpractice 2019 Survey

### Most Common Reasons for Lawsuits



### Top 10 Specialties for Lawsuits





# Top 3 Allegations Involving OB/GYN Providers-2019

- Obstetric-related treatment allegations (52%) includes:
  - Inappropriate assessment of expectant mother
  - Failure to manage the pregnancy
  - Overlooking early signs of possible complications in the labor and delivery process
  - Disregarding postpartum symptoms , increasing health risk for the mother and baby
- Surgical treatment errors (40%)
  - Can stem from improper technique
  - Poor surgical team communication
  - Inadequate follow-up during the recovery process
  - Improperly consenting a patient; potential risk for dissatisfaction with the surgical outcomes
- Diagnosis-Related allegations (13%)
  - Missing the signs of cancer or another condition
  - Not properly following up on abnormal test results
  - Not effectively communicating with other providers to develop and oversee appropriate treatment plan

## Major Allegations in OB/GYN Cases

ALLEGATION CATEGORY	NUMBER OF CASES	TOTAL INCURRED LOSSES
OB-Related Treatment	2,181	\$657,678,676
Surgical Treatment	1,677	\$183,796,342
Diagnosis-Related	556	\$128,496,724



# Medical Errors: Medicare Patients

## Office of U.S. Inspector General Report:

An estimated 29 percent of Medicare beneficiaries experienced adverse or temporary harm events during their rehab hospital stays, resulting in temporary harm; prolonged stays or transfers to other hospitals; permanent harm; life-sustaining intervention; or death. This harm rate is in line with what we found in hospitals (27 percent) and in SNFs (33 percent). Physician reviewers determined that 46 percent of these adverse and temporary harm events were clearly or likely preventable.

We estimate that acute-care hospital admissions and emergency department visits resulting from adverse and temporary harm events for Medicare beneficiaries with rehab hospital stays ending in March 2012 cost Medicare at least \$7.7 million.<sup>24</sup> Assuming that Medicare spending on hospitalizations due to adverse and temporary harm events in rehab hospitals remained constant throughout the year, Medicare inpatient expenditures would amount to at least \$92 million annually.<sup>25</sup> These estimates do not include related costs paid by Medicare or other payers—including beneficiaries—for followup medical care needed as a result of an event.

# Effects of Preventable Medical Errors on Patients' Satisfaction/Perceptions of Their Care

Demographic factors associated with Americans' experience of medical errors in their own care.

		Percent who report personally experiencing a medical error
Gender	Men	17
	Women	25
Chronic condition	Being treated for a chronic condition	27
	Not being treated for a chronic condition	17
Socioeconomic status	Low socioeconomic status	17
	Higher socioeconomic status	22
Health literacy	Limited health literacy	17
	Adequate or proficient health literacy	23

*Question: Have you ever personally been involved in a situation where a medical error was made in your own medical care, or has that not happened?*

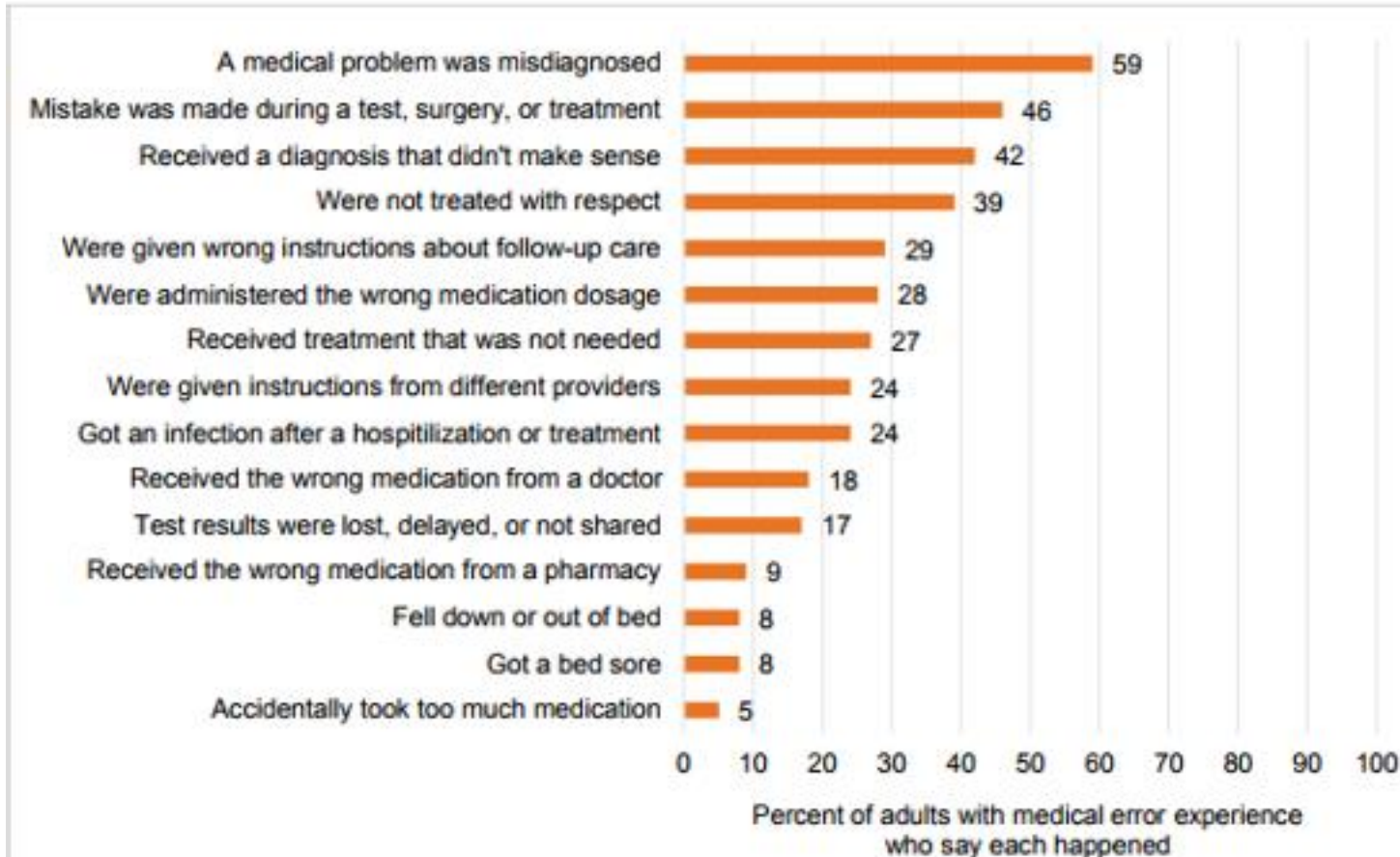
Overall, 2 in 5 Americans say they have either personally experienced a medical error or had a medical error occur in the care of someone close to them.

Twenty-one percent of Americans say they have experienced a medical error in their own care, and 31 percent have been involved in a situation where an error occurred in someone else's care.

# Research on Patients' Experiences with Medical Errors and Views on Patient Safety: Results

*Question: Again, thinking about the most recent time a medical error was made in [your care/the care of someone close to you], for each of the following, please indicate whether or not it is the sort of medical error that occurred.*

Six in 10 adults with medical error experience say a medical problem was misdiagnosed and 4 in 10 say they weren't treated with respect.

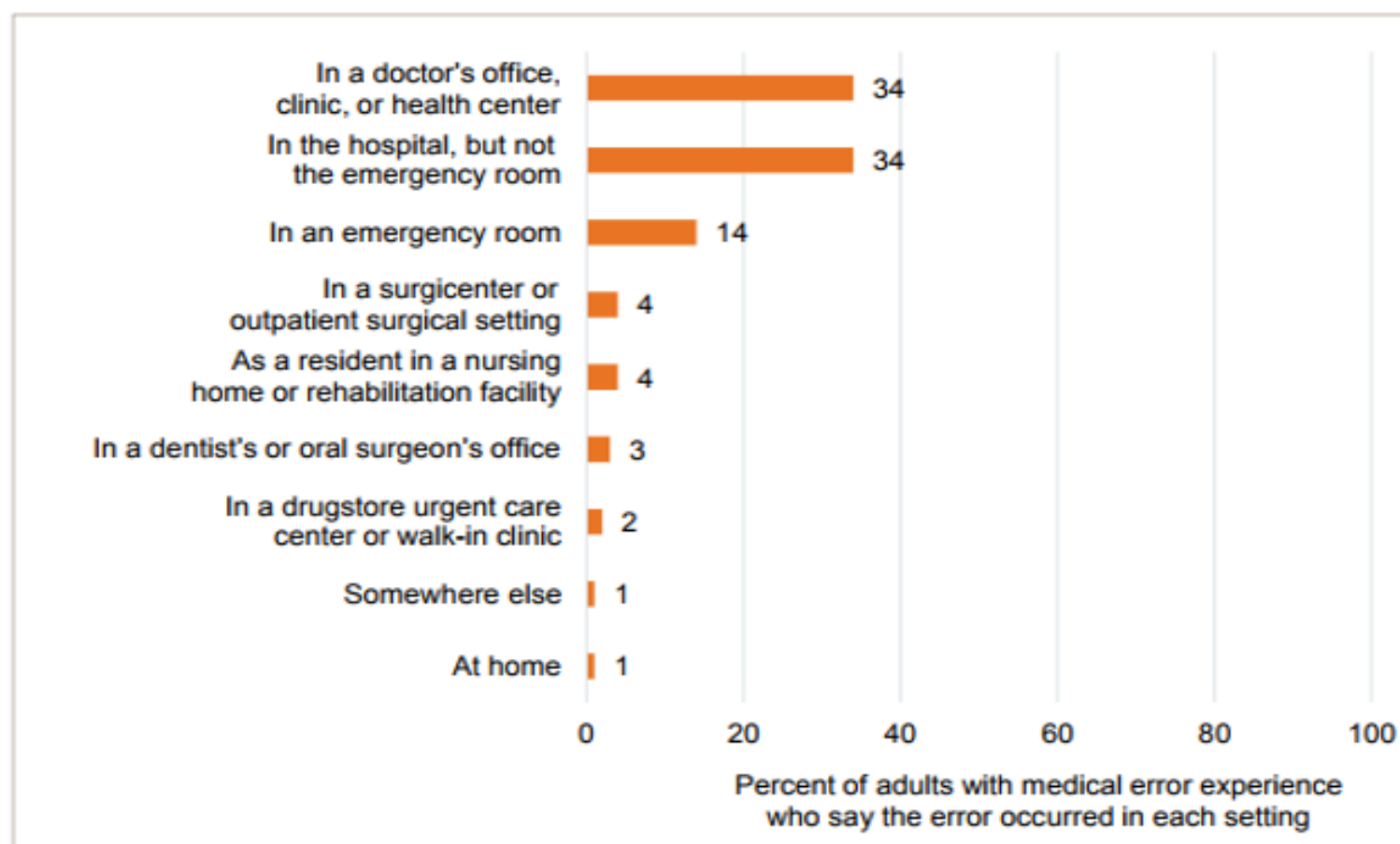


NORC at the University of Chicago and IHI/NPSF Lucian leap institute. (2017). *Americans' Experiences with Medical Errors and Views on Patient Safety*. Chicago:IL. Retrieved from [http://www.ihl.org/about/news/Documents/IHI\\_NPSF\\_Patient\\_Safety\\_Survey\\_2017\\_Final\\_Report.pdf](http://www.ihl.org/about/news/Documents/IHI_NPSF_Patient_Safety_Survey_2017_Final_Report.pdf)

# Research on Patients' Experiences with Medical Errors and Views on Patient Safety: Results

*Question: In this most recent time when a medical error was made in [your care/the care of someone close to you], where did this error take place?*

More than half of adults with medical error experience say the error occurred in an outpatient setting.



NORC at the University of Chicago and IHI/NPSF Lucian leap institute. (2017). *Americans' Experiences with Medical Errors and Views on Patient Safety*. Chicago:IL. Retrieved from [http://www.ihi.org/about/news/Documents/IHI\\_NPSF\\_Patient\\_Safety\\_Survey\\_2017\\_Final\\_Report.pdf](http://www.ihi.org/about/news/Documents/IHI_NPSF_Patient_Safety_Survey_2017_Final_Report.pdf)

# Research from Twitter Regarding Perceptions of Medical Errors

**Approximately 1000 tweets analyzed with following results:**



- 83% identified the type of error
  - procedural errors
  - medication errors
  - diagnostic errors
  - surgical errors
- 84% identified source of the tweet
  - patient
  - family member
- 52% identified an emotional response
  - expressed anger or frustration
  - expressed humor or sarcasm
  - expressed sadness or grief
  - mentioned intent to pursue malpractice litigation



# Medical Errors: Barriers to Reporting

- Lack of proper reporting system
- Lack of proper reporting form(s)
- Lack of peer support for individuals who commit medical error(s)
- Lack of knowledge/awareness related to importance of identifying medical error(s)
- Lack of education/training about how to report medical error(s)
- Using the excuse of “not enough time” to report medical error(s)
- Fear of consequences when reporting the medical error(s)

Asgarian, A., Mahjour, P., Heidari, H., Khademi, N., Ghassami, K., & Mohammadbeigi, A. (2021). Barriers and facilities in reporting medical errors: A systematic review study. *Advances in Human Biology*. Doi:10.4103/AIHB.AIHB\_80\_20

Poorolajal, J., Rezaie, S., & Aghighi, N. (2015). Barriers to medical error reporting. *International Journal of Preventive Medicine*. Doi:10.4103/2008-7802.166680

# Florida Law Mandates Reporting of Medical Errors

Sentinel Events/Adverse Incidents Reporting

↓ 3 Days

Risk Management

↓ 15 Days

ACHA

- Sentinel Events/Adverse Incidents are mandated to be reported to Florida's Agency for Health Care Administration (ACHA)
- Reports of sentinel events/adverse incidents must be submitted to Risk Manager(s) within 3 business days of the sentinel event/adverse incident and depending on the type of sentinel event/adverse incident must file a full report to ACHA within 15 days.



# Florida Statute 395.0197-Adverse Incident Reporting



(5) For purposes of reporting to the agency pursuant to this section, the term “adverse incident” means an event over which health care personnel could exercise control and which is associated in whole or in part with medical intervention, rather than the condition for which such intervention occurred, and which:

(a) Results in one of the following injuries:

1. Death;
2. Brain or spinal damage;
3. Permanent disfigurement;
4. Fracture or dislocation of bones or joints;
5. A resulting limitation of neurological, physical, or sensory function which continues after discharge from the facility;
6. Any condition that required specialized medical attention or surgical intervention resulting from nonemergency medical intervention, other than an emergency medical condition, to which the patient has not given his or her informed consent; or
7. Any condition that required the transfer of the patient, within or outside the facility, to a unit providing a more acute level of care due to the adverse incident, rather than the patient’s condition prior to the adverse incident;

(b) Was the performance of a surgical procedure on the wrong patient, a wrong surgical procedure, a wrong-site surgical procedure, or a surgical procedure otherwise unrelated to the patient’s diagnosis or medical condition;

(c) Required the surgical repair of damage resulting to a patient from a planned surgical procedure, where the damage was not a recognized specific risk, as disclosed to the patient and documented through the informed-consent process; or

(d) Was a procedure to remove unplanned foreign objects remaining from a surgical procedure.

# The Joint Commission Reportable Events

Sentinel events are defined as ***events that cause injury to patients*** from medical intervention or inaction on the part of the healthcare provider whereby ***the injury cannot reasonably be related to the patient's underlying medical condition(s)***.

Medical errors that result in injury are referred to as ***preventable adverse events***, or ***sentinel events*** because they signal the need for immediate investigation and response.

The event has resulted in an unanticipated death or major permanent loss of function, not related to the natural course of the patient's illness or underlying condition.

OR

The event is one of the following, even if the outcome was *not* death or major permanent loss of function unrelated to the natural course of the patient's illness or underlying condition:

# Examples of The Joint Commission Reportable Events

- Suicide of any patient receiving care, treatment, and services in a staffed around-the-clock care setting or within 72 hours of discharge
- Unanticipated death of a full-term infant
- Abduction of any patient receiving care, treatment, and services
- Discharge of an infant to the wrong family
- Rape, assault (leading to death or permanent loss of function), or homicide of any patient receiving care, treatment and services
- Rape, assault (leading to death or permanent loss of function), or homicide of any staff member, licensed independent practitioner, visitor, or vendor while on site at the healthcare organization
- Hemolytic transfusion reaction involving administration of blood or blood products having major blood group incompatibilities (e.g. ABO, Rh other blood groups)
- Invasive procedure, including surgery, on the wrong patient or wrong site
- Unintended retention of foreign object in a patient after surgery or other invasive procedures

# Example of The Joint Commission Reportable Events (continued)

- Severe neonatal hyperbilirubinemia ( Bilirubin >30)
- Prolonged fluoroscopy with cumulative dose >1500 rads to a single field or any delivery of radiotherapy to the wrong body region or >25% above the planned radiotherapy dose
- Fire, flame, or unanticipated smoke, heat, or flashes occurring during direct patient care caused by equipment operated and used by the hospital. To be considered a sentinel event, equipment must be in use at the time of the event; staff do not need to be present.
- Any intrapartum (related to the birth process) maternal death
- Severe maternal morbidity (not primarily related to the natural course of the patient's illness or underlying condition) ....
- Fall resulting in any of the following: any fracture; surgery, casting, or traction; required consultant/management or comfort care for a neurological (e.g., skull fracture, subdural or intracranial hemorrhage) or internal (e.g., rib fracture, small liver laceration) injury; a patient with coagulopathy who receives blood products as a result of the fall; or death or permanent harm as a result of injuries sustained from the fall (not from physiologic events causing the fall)

# Joint Commission's Top 10 Sentinel Events in 2021

## Top 10 most frequently reported sentinel events in 2021

- Fall — 485
- Delay in treatment — 97
- Unintended retention of a foreign object — 97
- Wrong-site surgery — 85
- Suicide — 79
- Self-harm — 45
- Fire — 38
- Medication management — 35
- Assault — 34
- Clinical alarm response — 22

# Flagler Hospital: Disclosure of Medical Errors/Adverse Events Policy



## **IV. Policy**

### **a. Events that ought to be disclosed**

i. Incidents in which patients are significantly harmed to include:

1. Poor outcomes of healthcare that were not expected or intended and that have an evident measurable negative impact upon a patient's life, or
2. Errors that do not harm patients and do not have the potential to do so (insignificant or minor incidents) do not require disclosure to patients.

### **b. To whom the disclosure should be made**

Disclosure of the adverse event should be made to the affected patient; however, if the patient is deceased or deemed incapable of understanding a discussion of this nature, then the patient's substitute decision maker should be informed.

### **c. When the disclosure should take place**

Disclosure of the adverse event should take place as soon as practically possible after the adverse event has occurred or been identified. Disclosure to the patient should occur when the patient is stable and/or able to comprehend the information. Disclosure to the patient's substitute decision maker may occur before then depending on the incident's severity and their need to know this information

# Flagler Hospital: Disclosure of Medical Errors/Adverse Events Policy (continued)

## **d. Who should disclose events to patients**

The responsibility for disclosing adverse events generally rests with the most responsible clinician, usually the patient's attending physician. In certain cases, the adverse event may be most associated with non-physician staff, such as nursing or other health care professionals. In such cases, the duty of disclosure will rest with those who are responsible for the staff and who have the most thorough knowledge of the adverse event (such as the patient care manager or the attending physician). This person should also be someone known to and trusted by the patient/family. If uncertain regarding an incident, and/or the obligation to disclose in particular circumstances or if the most responsible clinician finds it difficult to disclose the event, the concerned clinician should discuss the event with the Risk Manager or Chief Medical Officer. The hospital through the Risk Management Office will have the responsibility to disclose information regarding an adverse event to a patient, if a clinician cannot or does not inform the patient in a timely way.

## **e. Documentation in Medical Record**

Document the adverse event in the patient's chart in an objective, factual and narrative way, including the circumstances leading up to it, and the sequelae for the patient. This should be done as soon as possible after the event has occurred or has been recognized.

## **f. Involve Hospital Resources**

When an adverse event occurs or is identified, the practitioner responsible for that patient should contact the Risk Manager, Chief Medical Officer, and should consider notifying his/her professional insurer or regulatory college. They can provide assistance to clinicians prior to disclosure.

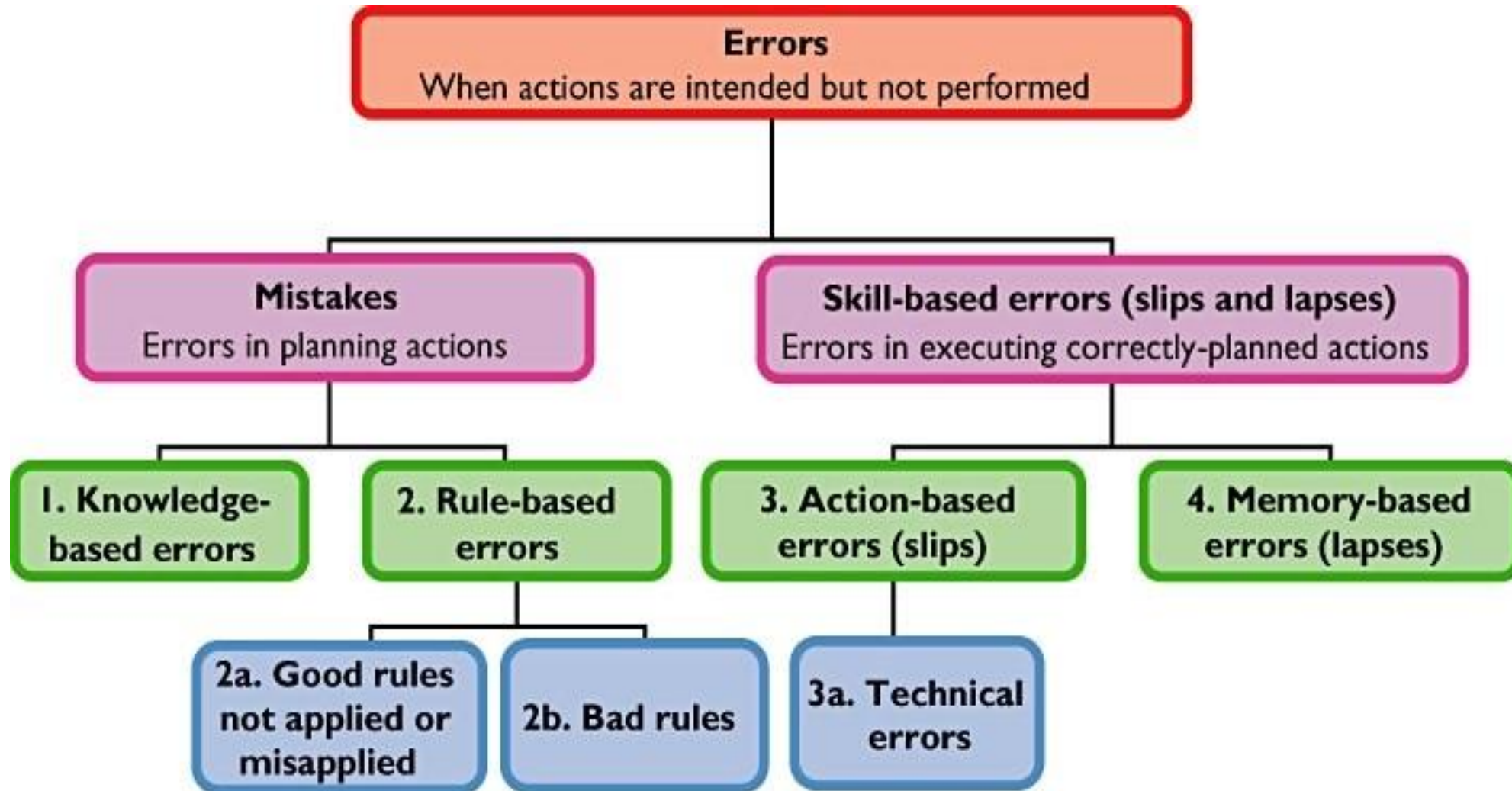
## **h. Guidelines for Disclosure**

- i. The involved practitioner should meet with the patient/family as promptly as other duties permit and as appropriate given the patient's clinical condition.
- ii. The nature, severity and cause (if known) of the adverse event should be presented in straightforward/non-judgmental fashion.
- iii. Avoid attributing blame to specific individuals as serious adverse events and errors are rarely solely due to the action or inaction of a single individual.
- iv. An apology or an expression of sorrow is often appropriate and not necessarily an admission of guilt. Doing so soon after an adverse outcome can help promote confidence in hospital staff and prevent unnecessary formal proceedings.



# Medical Errors: Root Cause Analysis

A process for identifying the factors that underlie variation in performance, including the occurrence or near miss of a sentinel event.



# Medical Errors: Root Cause Analysis

## Root Cause Analysis must Include:

1. A determination of the human factors, processes, and systems most directly associated with the sentinel event and its occurrence
2. Analysis of the underlying systems and processes through a series of “why” questions to determine where redesign might reduce risk
3. Inquiry into all areas appropriate to the specific type of event
4. Identification of risk points and their potential contributions to this type of event
5. A determination of potential improvement in processes or systems that would tend to decrease the likelihood of such events in the future
6. The organization’s leadership and individuals most closely involved in the process and systems under review must participate in the analysis
7. The analysis must be internally consistent: it must not contradict itself or leave obvious questions unanswered
8. The analysis must provide an explanation for all findings of “not applicable” or “no problem”
9. The analysis must include considerations of any relevant literature

# Definition of Diagnostic Error

The National Academies of Sciences, Engineering, and Medicine define diagnostic error as:

*“The failure to (a) establish an accurate and timely explanation of the patient’s health problem(s) or (b) communicate that explanation to the patient.”*



# Over Diagnosis versus Diagnostic Errors

- Over diagnosis is *NOT* a diagnostic error

“ This isn’t misdiagnosis – the erroneous diagnosis of a disease. This is the correct diagnosis of a disease that is never going to bother you in your lifetime.”

-Atul Gawande, 2015

While over diagnosis can lead to overtreatment, causing patient distress and cost, it’s not faulty medical practice. It is merely an area where clinicians can and should practice appropriate professional judgment.

# Analysis of Malpractice Claims for Diagnostic Errors 1986-2010

- Leading type of medical error at 28.6%
- More often resulted in death
- More prevalent outpatient than inpatient
- Inpatient often more lethal

## Original research

### 25-Year summary of US malpractice claims for diagnostic errors 1986–2010: an analysis from the National Practitioner Data Bank

Ali S Saber Tehrani<sup>1</sup>, HeeWon Lee<sup>2</sup>, Simon C Mathews<sup>2</sup>, Andrew Shore<sup>3</sup>, Martin A Makary<sup>3</sup>, Peter J Pronovost<sup>4</sup>, David E Newman-Toker<sup>1</sup>

[Author affiliations](#) +

## Abstract

**Background** We sought to characterise the frequency, health outcomes and economic consequences of diagnostic errors in the USA through analysis of closed, paid malpractice claims.

**Methods** We analysed diagnosis-related claims from the National Practitioner Data Bank (1986–2010). We describe error type, outcome severity and payments (in 2011 US dollars), comparing diagnostic errors to other malpractice allegation groups and inpatient to outpatient within diagnostic errors.

**Results** We analysed 350 706 paid claims. Diagnostic errors (n=100 249) were the leading type (28.6%) and accounted for the highest proportion of total payments (35.2%). The most frequent outcomes were death, significant permanent injury, major permanent injury and minor permanent injury. Diagnostic errors more often resulted in death than other allegation groups (40.9% vs 23.9%, p<0.001) and were the leading cause of claims-associated death and disability. More diagnostic error claims were outpatient than inpatient (68.8% vs 31.2%, p<0.001), but inpatient diagnostic errors were more likely to be lethal (48.4% vs 36.9%, p<0.001). The inflation-adjusted, 25-year sum of diagnosis-related payments was US\$38.8 billion (mean per-claim payout US\$386 849; median US\$213 250; IQR US\$74 545–484 500). Per-claim payments for permanent, serious morbidity that was 'quadriplegic, brain damage, lifelong care' (4.5%; mean US\$808 591; median US\$564 300), 'major' (13.3%; mean US\$568 599; median US\$355 350), or 'significant' (16.9%; mean US\$419 711; median US\$269 255) exceeded those where the outcome was death (40.9%; mean US\$390 186; median US\$251 745).

**Conclusions** Among malpractice claims, diagnostic errors appear to be the most common, most costly and most dangerous of medical mistakes. We found roughly equal numbers of lethal and non-lethal errors in our analysis, suggesting that the public health burden of diagnostic errors could be twice that previously estimated. Healthcare stakeholders should consider diagnostic safety a critical health policy issue.

<http://dx.doi.org/10.1136/bmjqs-2012-001550>

# Malpractice Insurance Claims Related to Diagnostic Errors as of 2019



Research<sup>1</sup> related to malpractice insurance claims in the national Comparative Benchmarking System database found:

- Most common diagnostic errors:
  - Misdiagnosed cancers – 37.8% (lung cancer top condition)
  - Missed Vascular events – 22.8% (stroke and cardiovascular top conditions)
  - Misdiagnosed Infections – 13.5% (sepsis top condition)
- Most common diagnostic errors occurring in young adults and children under 20 years related to :
  - Infections (27.6%)
  - Cancers (9.1%)
  - Vascular events (2.1%)
- Researchers<sup>2</sup> have shown that 71% of diagnostic errors occurred in:
  - Outpatient clinics (cancer-related errors)
  - Emergency departments (missed infections and/or vascular events)

1. Newman-Toker, D.E., Schaffer, A.D., Yu-Moe, W., Nassery, N., Saber Tehrani, A. S., Clemens, G. D., et al. (2019). Serious misdiagnosis-related harms in malpractice claims: The “big three”- vascular events, infections, and cancers. *Diagnosis* 6(3), 227-240. PMID31535832

2. Commins, J. (2019, July 11). ‘Big Three’ diagnostic errors account for nearly 75% of all serious harm. HealthLeaders. Retrieved from <https://www.healthleadersmedia.com/clinical-care/big-three-diagnostic-errors-account-nearly-75-all-serious-harm>



# No-fault Diagnostic Errors

- Common causes:
  - Atypical disease presentation
  - Patient self-report limitations
  - Incomplete patient records



Image credit: Koren Shadmi



# Systems-Related Diagnostic Errors

Common causes:

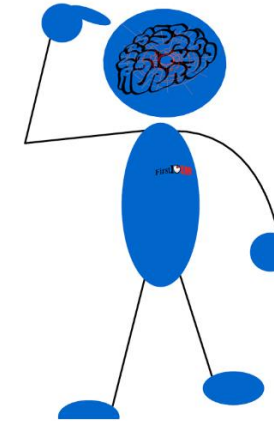
- Inter-departmental communication
- Technological difficulties
- Lack of care coordination



# Cognitive Diagnostic Errors

Human Judgement and Performance Factors:

- Errors of execution resulting from errors in planning
- Errors in reasoning and judgement (critical thinking)
- Clinical skill-set competency errors
- Documentation skill-set competency errors
- Diagnostic errors resulting from physical and/or cognitive impairment
- Inaccurate and/or missed diagnosis resulting from bias/stigmatizing/stereotyping



## Cognitive Errors

<https://first10em.com/cognitive-errors/>

# Prevention of Medical Errors – Five Most Misdiagnosed Conditions for Physicians and Physician Assistants Identified by:

## Florida Board of Medicine Rule 64B8-13.005

1. Cancer related issues
2. Gastroenterology related conditions
3. Cardiac/Stroke related issues
4. Neurological related
5. Missed spinal cord compression

## Florida Board of Osteopathic Medicine Rule 64B15-13.001

1. Inappropriate prescribing of controlled substances
2. Failure to monitor the safety of prescribed medications
3. Retained foreign objects in surgery and wrong site/patient surgery
4. Failure to accurately diagnose neurological & brain related conditions
5. Failure to accurately diagnose cancer-related conditions

# Prevention of Medical Errors – Six Factors for Advanced Practice Registered Nurses Identified by:

Florida Board of Nursing  
64B9-5.011

1. Factors that impact the occurrence of medical errors
2. Recognizing error-prone situations
3. Processes to improve patient outcomes
4. Responsibilities for reporting
5. Safety needs of special populations
6. Public education

# Misdiagnoses Related to Cancer

- Cancer patients are often mis/under diagnosed in different areas of the body:
  - Lung (14% misdiagnosed) <sup>1,2</sup> – misreading x-ray, lack of follow-up
  - Breast (12% misdiagnosis) <sup>3</sup> – misreading diagnostic exams, poor documentation, failure to consider importance of biopsy
  - Prostate (17% misdiagnosis) <sup>4</sup> – failure to diagnose (PSA), lack of follow up, inappropriate treatment
  - Colon/rectum (17% misdiagnosis) <sup>5</sup> – failure to diagnose, poor documentation
  - Skin (Melanoma - underdiagnosed) <sup>6</sup> – failure to diagnose due to lack of body scan or incomplete body scan

1. Walker, A.E., et al. (2016), Chest radiographs and the elusive lung cancer. Digital medicine, 2(3)

2. Armato, S.G., et al. (2007), The lung image database consortium (LIDC). Academic Radiology, 14(11)

3. Elmore, J.G., et al.(2015), Diagnostic concordance among pathologists interpreting breast biopsy specimens. JAMA, 313(11)

4. Tan, N., et al. (2015), Characteristics of detected and missed prostate cancer foci on 3-T multiparametric MRI using an endorectal coil correlated with whole-mount thin-section histopathology. . American Journal of Roentgenology, 205(1)

5. Than, M., et al. (2015) Diagnostic miss rate for colorectal cancer: an audit. Annals of Gastroenterology, 28(1)

6. Russo, T., Brancaccio, G., Piccolo, V., Alfano, R., & Argenziano, G. (2019). No one should die of melanoma: time for this vision to be realized? Dermatology Practical & Conceptual. PMID:30775138

# Case: Misdiagnosed Breast Cancer

**Patient:** Adele

**Chief complaint & Diagnosis:** Adele found a lump in her left breast. She had all the tests and thankfully it was found to be a fatty non-malignant lump. Five years later, Adele found a lump in her right breast. She followed up with her GP and was referred to a breast clinic specialist. Adele underwent a physical examination, a mammogram, an ultrasound, and a fine needle aspiration. Adele was informed by the doctor that she had breast cancer and would need surgery. The specialist provided her two options of a mastectomy or a lumpectomy. Adele opted for the lumpectomy.

**Treatment:** The operation was carried out without incident. The lump and surrounding tissue was removed along with five lymph nodes from her right armpit. She was released four days later, although she remained bedbound.

Adele's recovery was significantly slowed by a post-operative infection diagnosed three weeks after the procedure. She remained in significant pain, required a course of antibiotics and had to be seen every day by a district nurse for four months to change the packing and dress the wound.

**Pathology & Surgery Results:** A few weeks after the operation, Adele was having a routine check-up at the hospital when she was asked to see the consultant. He informed her that the lump and lymph nodes and the pathology report showed another non-malignant lump. She was misdiagnosed with breast cancer.

**Personal Ramifications:** The lumpectomy, post-operative infection and misdiagnosis was traumatic for Adele. She subsequently required reconstructive surgery to correct the breast deformity. Adele suffered loss of self-esteem causing her the inability to return to work. Consequently, she had to claim benefits for the first time in her life.





# Misdiagnoses Related to Gastroenterology Conditions

- Commonly misdiagnosed Gastroenterology-related conditions<sup>1</sup>:
  - Exocrine pancreatic insufficiency (EPI)
  - Inflammatory bowel disease (IBD)
  - Irritable bowel syndrome (IBS)
  - Diverticulitis
  - Ischemic colitis
  - Pancreatic cancer
- Common causes of misdiagnoses related to Gastroenterology-related conditions <sup>2</sup>:
  - Non-specific patient complaints related to gastrointestinal conditions
  - Lack of definitive diagnostic tests
  - Similarities in symptoms among many gastrointestinal conditions

1. Pietrangelo, A. (2019). Commonly misdiagnosed gastrointestinal (GI) conditions. Retrieved from <https://www.healthline.com/health/epi/commonly-misdiagnosed>

2. Mechcatie, E. (2015). Study finds pancreatic cancer misdiagnosis rate at 31%. GI&Hepatology MDedge News. Retrieved from <https://www.mdedge.com/gihepnews/article/101026/gastroenterology/ddw-study-finds-pancreatic-cancer-misdiagnosis-rate-31>

# OB/GYN Patient Safety-Related Areas for Potential Misdiagnoses &/or Adverse Events

## ACOG: Obstetrics & Gynecology

- Wrong-patient medication or diagnostic orders <sup>1</sup>
- Healthcare provider fatigue <sup>4</sup>
- Congenital heart disease <sup>5</sup>
- New medical devices <sup>6</sup>
- Distractions in the obstetric operating room <sup>7</sup>
- Mothers' substance use <sup>8</sup>
- COVID-19 <sup>9</sup>

## AJOG: American Journal of Obstetrics & Gynecology

- Wrong-patient orders <sup>2</sup>
- Maternal measures: death, uterine rupture, unplanned ICU admission, unplanned return to OR, fourth degree laceration, erythrocyte transfusion  $\geq 4$  units, venous thromboembolism, unplanned hysterectomy) <sup>3</sup>
- Neonatal measures: early term elective delivery, brachial plexus injury, pathological umbilical blood acidemia, 5-minute Apgar score  $<4$ ) <sup>3</sup>
- Hypertensive disorders <sup>10</sup>
- Prescription medications during pregnancy <sup>11</sup>

1. Kern-Goldberger, A., Kneifati-Hayek, J., Fernandes, Y., et al. (2020). 623: patient safety challenges during pregnancy hospitalizations: wrong-patient orders on obstetric vs. non-obstetric units. American Journal of Obstetric and Gynecology, 224(2), S390-S391.
2. Kern-Goldberger, Adelman, A.R., Applebaum, J. et al. (2020). Wrong-patient ordering errors in peripartum mother-newborn pairs: a unique patient-safety challenge in obstetrics. Obstetrics & Gynecology, 136(1), 161-166
3. Dildy, G., Kelly, F., Timmins, A. et al. (2017). 169:Developing a comprehensive quality and patient safety program to effectively reduce obstetrical adverse events in an integrated children's hospital system. American Journal of Obstetrics and Gynecology, 216(1), S113.
4. ACOG Committee Opinion No. 730: Fatigue and Patient Safety. (2018). Obstetrics & Gynecology, 131(2), e78-e81
5. Steiner, J., Lokken, E., Buber, Y., et al. (2020). Obstetric and cardiac outcomes of pregnant women with congenital heart disease by functional class[25N]. Obstetric & Gynecology, 135, 152S
6. Assessing and adopting new medical devices for obstetric and gynecologic care: ACOG Committee Opinion, Number 801. (2020). Obstetrics & Gynecology, 135(4), e160-e166
7. Curico, E., Baum, J., Sommer, B, et al. (2018). Distractions in the obstetric operating room. Obstetrics & Gynecology, 131, 71S.
8. Krans, E., Campopiano, M., Cleveland, L. Goodman, D., et al., (2019). National partnership for maternal safety, consensus bundle on obstetrics care for women with opioid use disorder. Obstetrics & Gynecology, 134(2), 365-375
9. Andrikopoulou, M., Madden, M., Nigel, W. et al. (2020). Symptoms and critical illness among obstetric patients with coronavirus disease 2019 (COVID-19) infection. Obstetric & Gynecology, 136(2), 291-299.
10. Gibson, K.S. & Hameed, A. B. (2020). Society for maternal-fetal medicine special statement: checklist for postpartum discharge of women with hypertensive disorders. American Journal of Obstetrics and Gynecology, 223(4), B19-B21
11. Wesley, B.D., Sewell, C.A., Change, C.Y. et al. (2021). Prescription medications for use in pregnancy – perspective from the US Food and Drug Administration. American Journal of Obstetrics and Gynecology, 225(1), 21-32

# OB/GYN Conditions with Potential for Misdiagnoses

- Ectopic pregnancy: symptom presentation is similar to other conditions, i.e. appendicitis, ovarian cyst, urinary tract infection<sup>1</sup>
- Endometriosis: wide variety of presenting symptoms may delay accurate diagnosis for years <sup>2</sup>
- Adolescent polycystic ovary syndrome: symptom presentation similar to menstrual irregularities caused by variability of hormones <sup>3</sup>

1. Robertson, J.J., Long, B., Koyfan, A. (2017). Emergency Medicine Myths: Ectopic pregnancy evaluation, risk factors, and presentation. *Journal of Emergency Medicine*. PMID 29110976

2. Kiesel L., & Sourouni, M. (2019) Diagnosis of endometriosis in the 21<sup>st</sup> Century. *Climacteric: the Journal of International Menopause Society*. PMID:30905186

3. DiVall, S., & Merjane, L. (2019). Adolescent polycystic ovary syndrome: an update. *Pediatric annals*. PMID:31426098

# Misdiagnosis Related to Cardiac Conditions

- Acute Coronary Syndrome (ACS) is the most prevalent life-threatening cause of chest pain presented to emergency departments<sup>1</sup>
- Up to 17% of ACS cases are missed <sup>2</sup>
- Gender disparities in symptom presentations may result in ACS misdiagnosis

MEN: Classic symptoms include tightness, sensation of pressure, heaviness, crushing, vise-like, aching pain <sup>1</sup>



Women and older patients: may present with atypical symptoms, like numbness, tingling, burning, stabbing, prickling, jaw pain, epigastric pain <sup>1, 3</sup>



1. Up To Date, accessed through <https://www.uptodate.com/contents/evaluation-of-the-adult-with-chest-pain-in-the-emergency-department>

2. Kwok, C.S., & Mallen, C. D. (2021). Missed acute myocardial infarction: an underrecognized problem that contributes to poor patient outcomes. *Coronary Artery Disease*. 32(4), 345-349. PMID: 33196583

3. Araujo, C., Laszcynska, O., Viana, M., Melao, F., et al. (2018). Sex differences in presenting symptoms of acute coronary syndrome: the EPIHeart cohort study. *BMJ Open*. PMID:29476027

# Misdiagnosis Related to Cardiac Conditions

Additional reasons for missed ACS diagnosis include failure in:

- Interpretation of history and physical and/or atypical symptoms
- Interpretation and/ or performance of electrocardiogram
- Ordering and/or interpretation of proper cardiac enzyme test

1. Daraswhe, A. et al. (2007) Misdiagnoses ACS: characteristics of patients with acute coronary syndrome discharges from the emergency department. Israeli Journal of Emergency Medicine. 7(3):3-10.

2. Kwok, C.S., & Mallen, C. D. (2021). Missed acute myocardial infarction: an underrecognized problem that contributes to poor patient outcomes. Coronary Artery Disease. 32(4), 345-349. PMID: 33196583

# Misdiagnosis Related to Pulmonary Conditions

## Pulmonary embolism (PE)

- Delayed diagnosis/Misdiagnosis<sup>1</sup>
  - Prompt recognition of pulmonary embolism (PE) remains a challenge. Patients with acute PE often have nonspecific symptoms, and as a result, the diagnosis is sometimes delayed
  - Patients with PE are often misdiagnosed due to higher prevalence of prior cardiopulmonary disease (coronary artery disease, COPD, asthma or heart failure), and unspecific presenting symptoms like dyspnea, cough, or fever.



# Misdiagnosis Related to Neurological & Brain Related Conditions

- Stroke
  - Most commonly missed or delayed diagnosis, reducing survival rates<sup>1</sup>
  - Diagnosis missed in 14-22% of patients presenting with atypical symptoms like disorientation, focal weakness, and dizziness<sup>2,3</sup>
  - Due to short tPA stroke treatment window, suspected stroke or transient ischemic attack diagnoses should be triaged immediately<sup>5</sup>
- Bell's Palsy
  - Confused with stroke
- Seizures
  - Misdiagnosis among epilepsy, syncope and nonepileptic seizures may occur due to similar presenting symptoms
  - Incomplete history and over interpretation of EEG results may result in misdiagnosis of epilepsy
- Multiple Sclerosis (MS)
  - Misdiagnosis of MS may occur due to the over-reliance on MRI abnormalities with nonspecific neurologic symptoms<sup>6</sup>
- Dementia
  - Confused with depression
- Migraines/Headaches
  - Confused with rhinosinusitis

1. Schiff, G.D., et al.(2009), Diagnostic error in medicine: Analysis of 583 physician-reported errors. Archives of Internal Medicine, 169(20)

2. Arch, A.E., et al (2016), Missed ischemic stroke diagnosis in the emergency department by emergency medicine and neurology services. Stroke, 47(3)

3. Madsen, T.E., et al. (2016), Potentially missed diagnosis of ischemic stroke in the emergency department in the greater Cincinnati/northern Kentucky stroke study.

4. Academic Emergency Medicine, 23(10).

5. Flagler Hospital Policy I-QM-Alteplase/t-PA Administration for Stroke

6. Wilner, A. (2016). Diagnostic error in patients with neurologic symptoms. Retrieved from <https://www.medscape.com/features/slideshow/diagnostic-errors/neurologic#page=1>

7. Raam, R., Tabatabai, R.R. (2021) Headaches in the Emergency Department. Emergency Medicine Clinics of North America. 39(1), 67-85

# Misdiagnosis Related Spinal Cord Compressions

- Failure to recognize or address patient's complaints of urinary difficulties or motor weakness in a timely manner (or failure to notice complaints in notes from EMS, triage, or nurses)
- Failure to believe patients when he/she says they're unable to walk
- Failure to document the patient can actually walk
- Failure to adequately examine patient including neurological exam of the lower extremities or perineum
- Failure to ascertain if the patient has urinary retention; no post-void residual measured if urinary complaints
- Failure to obtain an MRI in a timely manner
- Failure to consult with an appropriate specialist or transfer patient to an appropriate faculty/specialist
- Failure to provide information regarding complications, particularly urinary difficulties or motor weakness, and explain the necessity of immediate medical reevaluation

# Misdiagnosis Related to Spinal Cord Compressions

Symptoms include:

- Loss of feeling in limbs
- Loss of feeling in hands and feet
- Loss of feeling around the pelvic region including the bowel, bladder, and sexual organs
- Loss of control of muscles in all regions, leading to loss of mobility and incontinence
- Burning sensation in the arms or legs
- Weakness in the limbs or problems with coordination

# Misdiagnosis Related to Spine Conditions

## Red Flags for Acute Lower Back Pain

Table 1 Clues in the history that raise a “red flag” in the evaluation of low back pain	
Red Flags	Possible Cause
Duration >6 wk	Tumor, infection, rheumatologic
Age <18 y	Congenital defect, tumor, infection, spondylolysis, spondylolisthesis
Age >50 y	Tumor, infection, intra-abdominal process (abdominal aortic aneurysm, pancreatitis, kidney stone)
Major trauma, or minor trauma in elderly	Fracture
Cancer	Tumor
Fever, chills, night sweats	Tumor, infection
Weight loss	Tumor, infection
Injection drug use	Infection
Immunocompromised status	Infection
Recent genitourinary or gastrointestinal procedure	Infection
Night pain	Tumor, infection
Unrelenting pain	Tumor, infection
Pain worsened by coughing, sitting, or Valsalva maneuver	Herniated disc
Pain radiating below knee	Herniated disc or nerve root compression below the L3 nerve root
Incontinence	Epidural compression syndrome
Saddle anesthesia	Epidural compression syndrome
Severe or rapidly progressive neurologic deficit	Epidural compression syndrome

# Misdiagnosis Related to Infectious Conditions

Key causes:

- Incomplete History & Physical relative to sexual history
- Lack of consistency in follow up with culture interpretations:
  - UTI in geriatric patients
  - Diagnosis of Tuberculosis (TB)
- Over or inappropriate Antibiotics prescribing

# Misdiagnosis Through Failure in Timely Diagnosis of Sepsis

## U.S. Sepsis Statistics <sup>1</sup>

**Any patient can get an infection, and almost any infection, including COVID-19, can lead to sepsis.** In a typical year:

- 1.7 million people diagnosed with sepsis
- Approximately 270,000 patients die from sepsis
- 1 in 3 patients who die in a hospital have sepsis
- Sepsis, or the infection causing sepsis, starts outside of the hospital in nearly 87% of cases

### **Independent Reading:**

1. Gauer, R., Forbes, D., & Boyer, N. (2020). Sepsis: diagnosis and management. *American Family Physicians* 101(7), 409-418. PMID 32227831
2. Prasad, P., Fang, M., Abe-Jones, Y., Et al. (2020). Time to Recognition of Sepsis in the Emergency Department Using Electronic Health Record Data: A Comparative Analysis of Systematic Inflammatory Response Syndrome, Sequential Organ Failure Assessment, and Quick Sequential Organ Failure Assessment. *Critical Care Medicine*, 48(2), 200-209. PMID 31939788

1. CDC. (2020). Sepsis: Clinical information. Retrieved from <https://www.cdc.gov/sepsis/clinicaltools/index.html>



# Preventable Healthcare Associated Infections

Common healthcare-associated infections include:

- Central line associated (CLABSI)
- Catheter-associated UTI (CAUTI)
- Surgical site infections (SSI)
- Clostridium difficile (C. difficile)
- Hospital-onset methicillin-resistant Staphylococcus aureus (MRSA)

## Strategies in Prevention of Healthcare-Associated Infections



Image: <https://infectionsinsurgery.org/7-strategies-to-prevent-healthcare-associated-infections/>

# Processes to Improve Patient Outcomes: Preventing Transmission of Infection

- Use Universal Precautions/Standard Precautions <sup>1</sup>
  - Hand washing- before touching patient, before clean/aseptic procedures, after body fluid exposure risk, after touching patient, after touching patient surroundings
  - Wear gloves, masks, gowns appropriately
- Proper, safe disposal of sharps in appropriate designated containers



Medical asepsis (safety in the healthcare facility. (n.d.). Retrieved from <http://what-when-how.com/nursing/medical-asepsis-safety-in-the-healthcare-facility-nursing-part-1>

# Processes to Improve Patient Outcomes: Preventing Transmission of Infection (continued)

## Don't Work Sick



**4 in 10 healthcare professionals (HCPs)**  
work while experiencing influenza-like illness (ILI), according to findings  
published in the *American Journal of Infection Control*.

In all workplaces, contagious employees risk infecting others when they go to work. But with higher concentrations of older patients and individuals with immunosuppression or severe chronic diseases in healthcare facilities, ILI transmission by HCPs presents a **grave public health hazard**.

### Here's what the study found:



41.4% of HCPs reported  
working for a median  
duration of **3 days while sick**.



49.3% of hospital-based  
HCPs and 28.5% of HCPs  
in long-term care facilities  
reported working with ILI.

### Worked while sick

67.2%

### Worked while sick

67.2%

Pharmacists

63.2%

Physicians

40.8%

Assistants and aides

40.0%

Nonclinical HCPs

37.9%

Nurse practitioners/physician assistants



Of HCPs with  
self-reported ILI, **57.3%**  
visited a medical provider  
for symptom relief;

**25.2%** were told they  
had influenza.

### The most common reasons for HCPs to opt from taking sick leave:

Not feeling "bad  
enough" to stay home

Sensing a professional  
obligation to be present  
for coworkers

Feeling that s/he could  
still preform his/her  
job duties

Feeling as if s/he were  
not contagious

Difficulty finding a  
coworker to cover for  
the HCPs

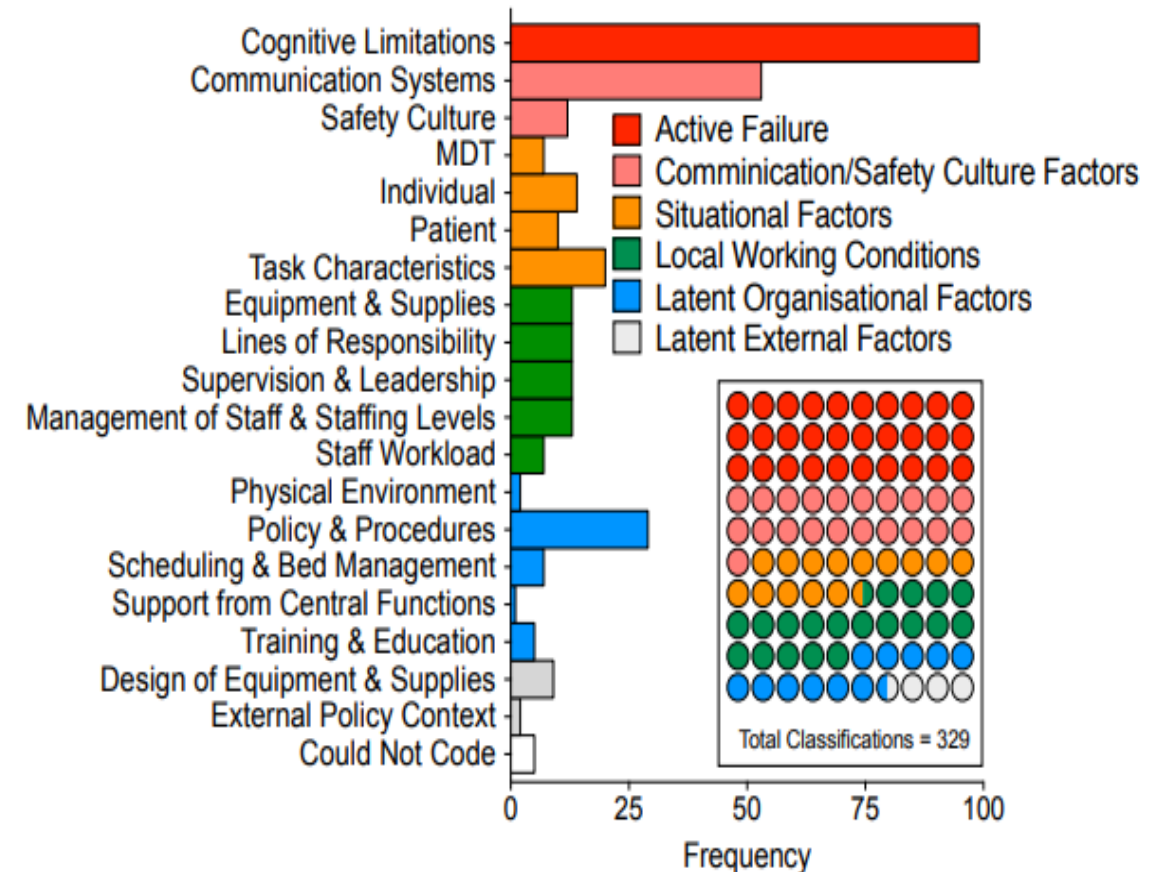
Feeling that they couldn't  
afford to lose the pay by  
not coming into work

# Medical Errors: Related to Surgical Procedures

- Current estimates show<sup>1</sup>:
  - Wrong-site surgery occurs in 1:112,000 surgical procedures
  - Retained surgical items occur in 1:5500 surgical procedures
    - Most common retained items are sponges and surgical instruments
    - Up to 88% of retained surgical items occur despite a reportedly accurate final count
  - 500-650 surgery-related fires occur yearly
    - Increased risk with procedures involving face and neck and/or when there is an open oxygen source

# Contributing Factors in Surgical Errors

- Cognitive limitations
- Communication failure
- Lack of adherence to established policies and procedures
- Lack of training and education
- Physical environment
- Inadequate staff workload and management





# Processes to Improve Patient Outcomes

## 64B8-9.007- Time Out Rule

(2) This rule is intended to prevent wrong site, wrong side, wrong patient and wrong surgeries/procedures by requiring the team to pause prior to the initiation of the surgery/procedure to confirm the side, site, patient identity, and surgery/procedure.

(a) Definition of Surgery/Procedure. As used herein, “surgery/procedure” means the removal, incision or curettage of tissue or an organ, insertion of natural or artificial implants, electro-convulsive therapy, endoscopic procedure or other procedure requiring the administration of anesthesia or an anesthetic agent. Minor surgeries/procedures such as excision of skin lesions, moles, warts, cysts, lipomas and repair of lacerations or surgery limited to the skin and subcutaneous tissue performed under topical or local anesthesia not involving drug-induced alteration of consciousness other than minimal pre-operative tranquilization of the patient are exempt from the following requirements. Paracentesis, thoracentesis, ocular surgery, liposuction, lipoplasty, and Mohs, are not minor surgeries/procedures.

(b) Except in life-threatening emergencies requiring immediate resuscitative measures, once the patient has been prepared for the elective surgery/procedure and the team has been gathered and immediately prior to the initiation of any procedure, the team will pause and the physician(s) or physician assistant(s) performing the procedure will verbally confirm the patient’s identification, the intended procedure and the correct surgical/procedure site. The operating physician or physician assistant(s) shall not make any incision or perform any surgery or procedure prior to performing this required confirmation. If the surgery/procedure is performed in a facility licensed pursuant to Chapter 395, F.S., or a level II or III surgery/procedure is performed in an office surgery setting, the physician(s) or physician assistant(s) performing the procedure and another Florida licensed health care practitioner shall verbally and simultaneously confirm the patient’s identification, the intended procedure and the correct surgical/procedure site prior to making any incision or initiating the procedure. The medical record shall specifically reflect when this confirmation procedure was completed and which personnel on the team confirmed each item.

(c) Confirmation of the patient’s identity shall be made by using two or more of the following corroborating patient identifiers:

1. Name.
2. Assigned identification number.
3. Telephone number.
4. Date of Birth.
5. Social security number.
6. Address.
7. Photograph.



# Interventions to Prevent Medical Errors During Surgical Procedures

- Implement pre-procedural verification process
- Mark operative/procedure site(s) with an indelible marker
- Take intentional, meaningful time-outs with all team members immediately before starting all surgical procedures
- Nursing and other surgical team members recommend that each member of the surgical team play an equal role in assuring accuracy of the counts. Manufacturers have made sponges with threads visible on x-rays, radiofrequency identifications systems, and bar coding to alert staff about missing sponges

## Goal: Universal Protocol

Time Out  
Prior to Incision



Bedside Invasive  
Procedures

Standardized List



OR Team Participation



Site Markers

# Medical Errors: Medication Errors

Medication errors can occur in one or all of the following areas:

- Ordering/prescribing of medications
- Dispensing of medications from pharmacy
- Administration of medications to patients
  - “five rights”: the right patient, the right drug, the right dose, the right route, and the right time <sup>1</sup>
- Transcribing/documentation that medications were given to patients

1. Federico, F. (n.d.). The five rights of medication administration. Institute for Health Improvement. Retrieved from <http://www.ihl.org/resources/Pages/ImprovementStories/FiveRightsofMedicationAdministration.aspx#:~:text=One%20of%20the%20recommenda,ions%20to,route%2C%20and%20the%20right%20time.>

# Medical Errors: Related to Prescribing and Administration of Medications

- 1 in 5 U.S. adults take 5 or more medications <sup>1</sup>
- Adverse drug event (ADE) account for nearly 1.3 million ED visits and 3500,000 hospitalizations yearly <sup>2</sup>
- Errors in prescribing medications are due to a variety of causes<sup>3</sup>:
  - Poor verbal and/or written communication among healthcare team members; e.g. medication reconciliation, discharge/transfer of patients
  - Ambiguity in product names, directions for use, medical abbreviations and/or illegibility in written or EMR produced prescriptions
  - Deficiencies in competency skills
  - Patient misuse of medications because of poor understanding due to multiple factors, e.g. lack of validation of patient understanding by healthcare team member(s)

1. Hales, C. M., Servais, J., Martin, C., & Kohen, D. (2019). Prescription drug use among adults aged 40-79 in the United States and Canada. Retrieved from <https://www.cdc.gov/nchs/products/databriefs/db347.htm>

2. Centers for Disease Control and Prevention. (2017). Adverse drug events in adults. Retrieved from [https://www.cdc.gov/medicationsafety/adult\\_adversedrugevents.html](https://www.cdc.gov/medicationsafety/adult_adversedrugevents.html)

3. FDA. (2017). Medication error reports. Retrieved <https://www.fda.gov/Drugs/DrugSafety/MedicationErrors/ucm080629.htm>

# Medical Errors: Inappropriate Prescribing of Controlled Substances

- Inappropriate prescribing typically includes not prescribing, under prescribing, overprescribing, and continuing to prescribe controlled substances (i.e. opioids) when they are no longer effective to patients. <sup>1</sup>
- Physicians may prescribe more controlled substances/pain medications than recommended, at higher-than-necessary strengths. <sup>2</sup>
- The CDC recommends prescribing no more than 3 days worth of controlled substances at a time.
  - 81% to 98% of physicians report that they prescribe more than recommended quantity <sup>2</sup>
  - 42% to 49% of physicians prescribe higher dose than recommended <sup>2</sup>



1. Dydyk, A. M., Sizemore, D. C., Fariba, K., Sanghavi, D., Porter, B. R. (2021). Florida controlled substance prescribing. StatPearls. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK566600/>

2. Kiang, M.V., Humphreys, K., Cullen, M.R., Basu, S. (2020). Opioid prescribing patterns among medical providers in the United States, 2003-17: retrospective, observational study. BMJ. Retrieved from <https://www.bmj.com/content/bmj/368/bmj.l6968.full.pdf>

3. Neuman, M. D., Bateman, B.T., & Wunsch, H. (2019). Inappropriate opioid prescription after surgery. The Lancet, 393(10180), 1547-1557. PMID: 30983590

# Medical Errors: Inappropriate Prescribing of Controlled Substances (continued)

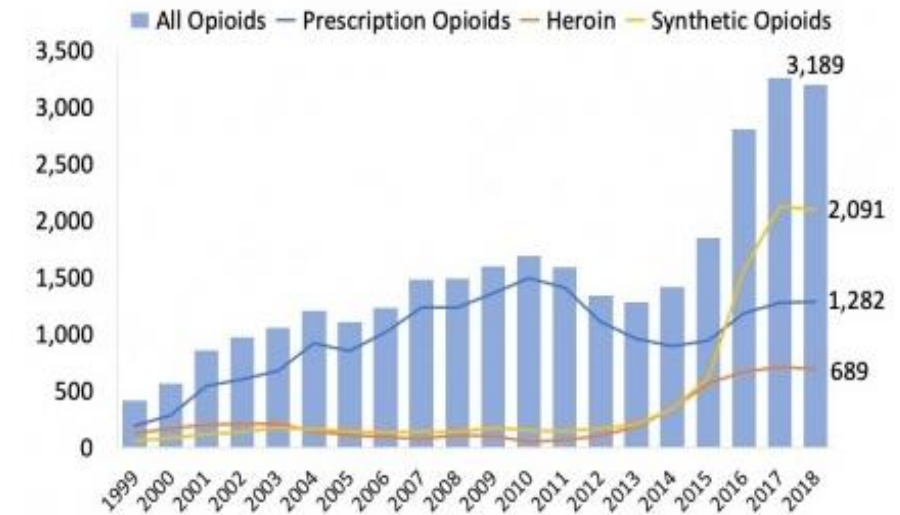
## Drug-Involved Overdose Deaths

In the U.S., there were 67,367 drug overdose deaths reported in 2018, 4.1% fewer deaths than in 2017.

- The age-adjusted rate declined by 4.6% to 20.7 per 100,000 standard population.<sup>1</sup> The decline follows an increasing trend in the rate from 6.1 in 1999 to 21.7 in 2017.
- Opioids were involved in 46,802 (a rate of 14.6) overdose deaths in 2018—nearly 70% of all overdose deaths.
- Deaths involving synthetic opioids other than methadone (including fentanyl and fentanyl analogs) continued to rise with more than 28,400 (a rate of 9.9) overdose deaths in 2018.
- The number of deaths involving prescription opioids declined to 14,975 (a rate of 4.6) in 2018 and those involving heroin dropped to 14,996 (a rate of 4.7)

Nearly 68% of the 4,698 reported drug overdose deaths in Florida involved opioids in 2018—a total of 3,189 fatalities (and a rate of 15.8)

- Deaths involving synthetic opioids other than methadone (mainly fentanyl and fentanyl analogs) remained stable but high with 2,091 in 2018 (a rate of 10.7).
- Deaths involving heroin and prescription opioids also remained steady with a respective 689 (a rate of 3.5) and 1,282 (a rate of 6.0) reported in 2018.<sup>3</sup>





# Interventions to Prevent Medication Errors in Prescribing

- Interventions

- Obtain complete medical H&P evaluation prior to treatment and document within medical record
- Develop written plan for assessing patient's risk of aberrant drug related behavior
- Provide on-going monitoring of drug-related behavior with drug testing as necessary
- Follow FDA Drug Schedule
- Use E-Forcse: [www.EFORCSE.com](http://www.EFORCSE.com)

- Minimize use of Off-Label Drugs

- Off-Label Drugs are associated with a higher risk of Adverse Drug Events(ADEs) than on-label<sup>1</sup>



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# Medication Errors: Abbreviations to Avoid When Writing Prescriptions

## Official “Dangerous Abbreviation” & “Do Not Use” Lists

Do Not Use Problem Term	Potential Problem/Reason	Suggested Term
U, u (unit)	Mistaken for “O” ( zero, the number “4” ( four) or “cc”	Write “Unit”
IU (International Unit)	Mistaken for IV (intravenous) or the number (ten)	Write “International Unit”
Q.D., QD, q.d., qd(daily) Q.O.D., QOD, q.o.d., qod (every other day)	Mistaken for each other Period after the Q mistaken for “I” and the “O” mistaken for “I”	Write “Daily” Write “Every other day”
Trailing Zero ( 2.0 grams)	Read as 20 grams	Write 2 grams
Lack of Leading Zero (.x mg)	Read as 5ml.	Write 0.5 ml
MS MSO4 and MgSO4	Can mean morphine sulfate or magnesium sulfate Confused for one another	Write “morphine sulfate” Write “magnesium sulfate”
cc	Mistaken for U (units) when poorly written	Write ‘mL’ or “ml” or milliliters” (“mL” is preferred)
ug	Mistaken for mg(milligrams) resulting in one thousand-fold overdose	Write “mcg” of “micrograms”
TIW	Interpreted as T/W (Tuesday & Wednesday); as twice a week; as TID (three times a day )	Three times a week



# Medication Errors: Terms to Use with Caution When Writing Prescriptions

## “Use With Caution” list

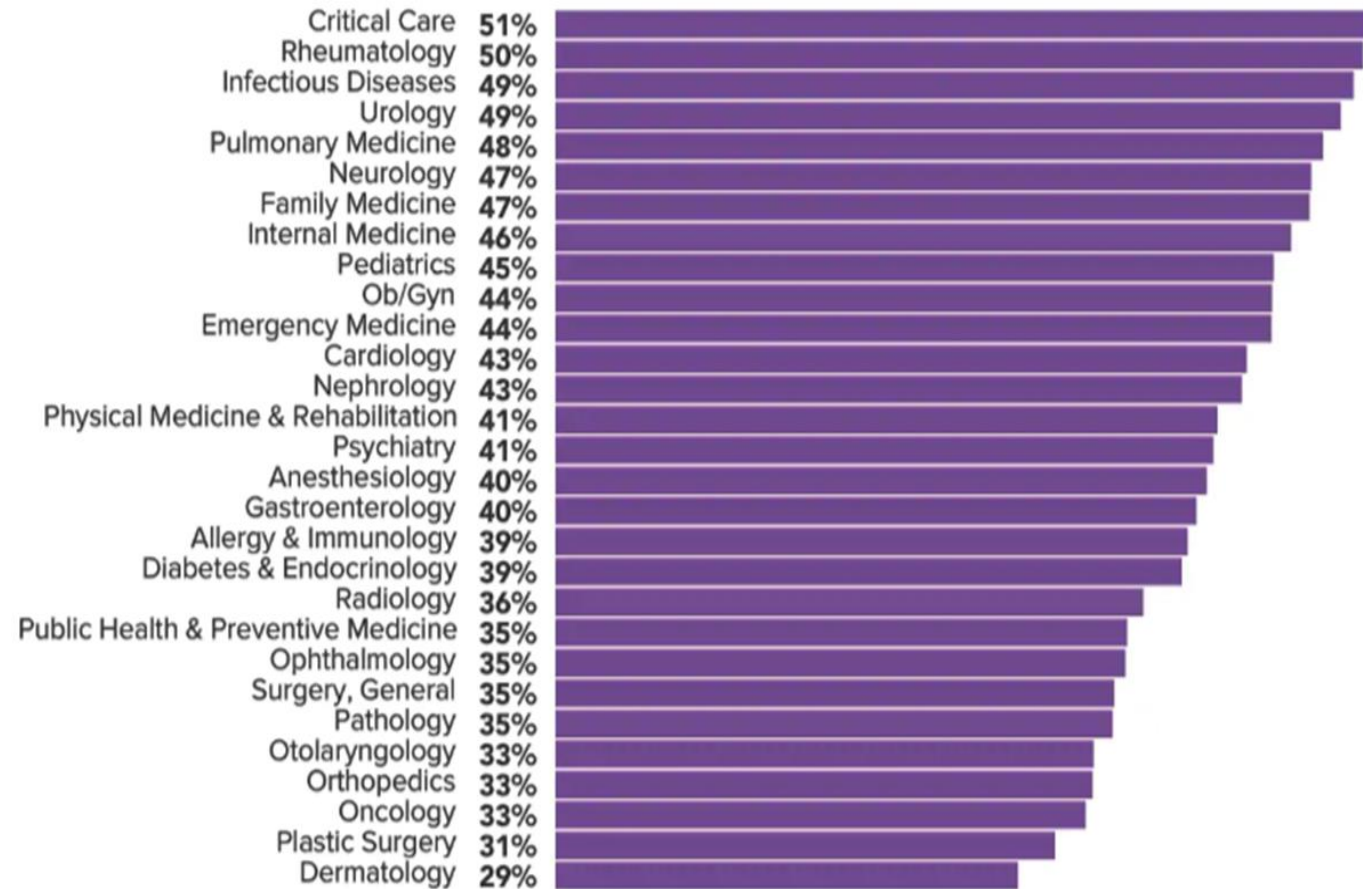
Do Not Use Problem Term	Potential Problem/Reason	Suggested Term
> (greater than) or < (less than)	Misinterpreted as the number “7” (seven) or the letter “L”. Confused for one another	Write “greater than” Write “less than”
Abbreviations for drug names	Misinterpreted due to similar abbreviations for multiple drugs	Write drug names in full
Apothecary Units	Unfamiliar to many practitioners. Confused with metric units	Use metric units
@	Mistaken for the number “2” (two)	Write “at”

# Medical Errors: Relationship to Provider Burnout

Provider burnout is prevalent in 30%-50% of physicians, physician assistants, nurse practitioners and often leads to medical errors<sup>1</sup>

- Symptoms of burnout<sup>2</sup>:
  - Physical exhaustion
  - Emotional exhaustion
  - Depersonalization of relationships especially with patients and other healthcare team members
  - Feelings of low achievement
  - Decreased effectiveness

## Burnout by Medical Specialty<sup>3</sup>



1. Lyndon, A. (2016). Burnout among health professionals and its effect on patient safety. *AHRQ patient safety network*. Retrieved from <https://psnet.ahrq.gov/perspectives/perspective/190/burnout-among-health-professionals-and-its-effect-on-patient-safety>

2. Noseworthy, J. et al. (2017). Physician burnout is a public health crisis: a message to our fellow health care CEOs. doi:10.1377/hblog20170328.059397

3. Survey demographics: 12,000 physicians in 29 specialties collected between 8/30/2020 and 8/5/2020

# Prevention of Medical Errors Through Educating and Involving Patients/Families

## Strategies:

- Include patients and their families as a part of the “care team” improves patient safety by reducing medical errors
- Remind patients to inform all providers about their current medications: prescriptions, over-the-counter medications, supplements, vitamins, and herbs
- Ask patients if one or more of their medication dosages have been missed
  - Only 50% of physicians, nurses, and pharmacists report regularly asking patients if they missed any medication doses
- Educate patients to notify providers of known allergies: ingested and topical
- Encourage patients to be engaged in their care

# Medical Errors: Conclusion

Medical errors can be prevented through:

- Identifying and reporting medical errors
- Analyzing medical errors using active participation in the root cause analysis process, understanding the goal is not to blame but rather to make process improvements
- Use results of root cause analysis to improve processes and measure improvements through evaluating outcomes

# Claiming CME Credit

- Thank you for reviewing the *Medical Errors Prevention* activity.
- Please complete post-test with passing score of 80% and CME evaluation before issuance of *2.00 AMA PRA Category 1 Credit*™ . CME/CE Credits will be reported to CE Broker and certificate will be provided as indicated within the evaluation.