

Medical Errors Prevention



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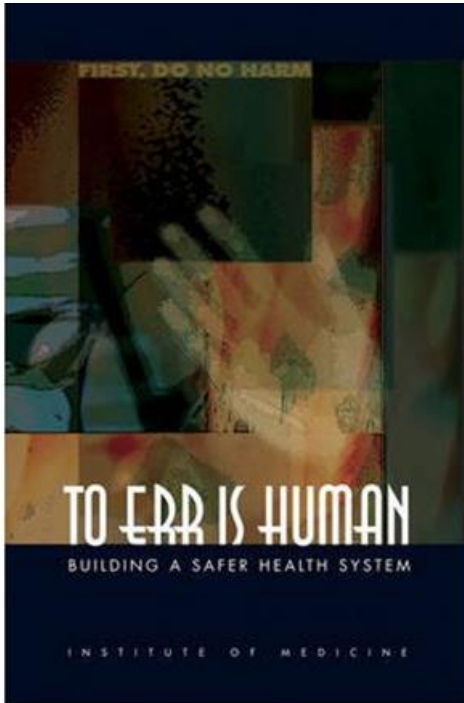
Patricia Moore, PhD, RN

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 related to prevention of medical errors for APRNs identified by the Florida Board of Nursing.
7. Discuss factors required by the Joint Commission 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

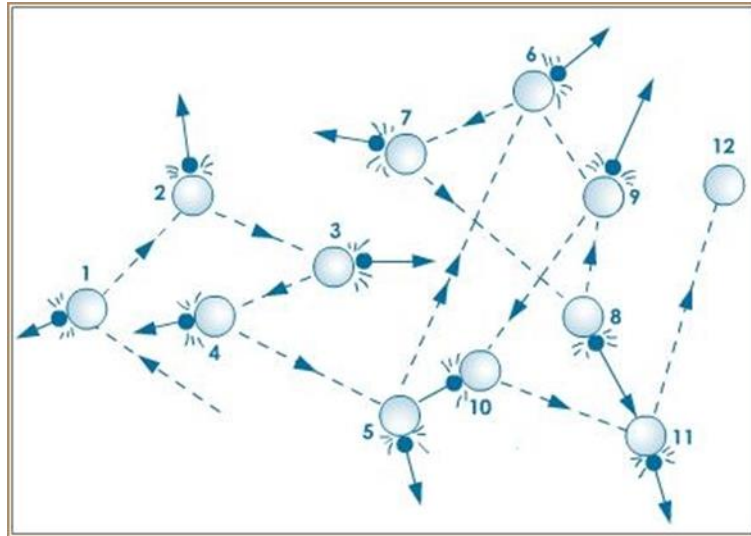
Institute of Medicine Report

“ The majority of medical errors do not result from individual recklessness of 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.”

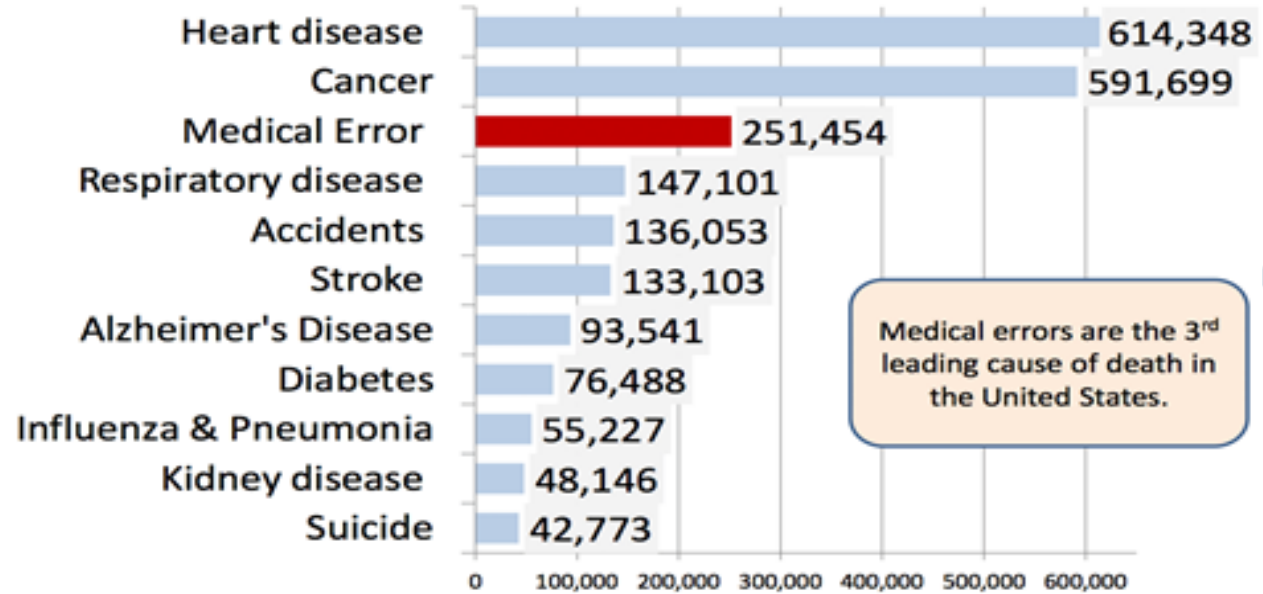
Examples	
Adverse Drug Event	Surgical injuries & wrong-site surgery
Restraint-related injuries or death	Falls Pressure Ulcers

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.

Medical Errors: Agency for Health Care Administration (ACHA) 2022 Report

Number of Adverse Incidents

Year	Outcome Text Short	HOSPITAL				Grand Total
		Q1	Q2	Q3	Q4	
2022	Brain Damage	6	10	12	8	36
	Death	53	44	50	38	185
	Fracture Dislocation	49	45	45	39	178
	Limit Function	10	9	2	4	25
	Medically Unnecessary	3	3		6	12
	No Consent	2	6	5	3	16
	Remove Foreign Objects	28	15	18	18	79
	Spinal Damage	1	3	1	5	10
	Surgical Repair	4	2	3	5	14
	Transfer	35	42	41	30	148
	Unrelated Surgery	30	30	15	9	84
	Wrong Patient Surgery	1	1	1	2	5
	Wrong Site Surgery	13	6	13	8	40
Wrong Surgery	3	2	1	4	10	
Grand Total		238	218	207	179	842

Total of 842 Adverse Incidents Reported by Hospitals
185 Resulted in death
40 Wrong Site Surgery
10 Wrong Surgery
79 Foreign Object Removal
14 Surgical Repair
12 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

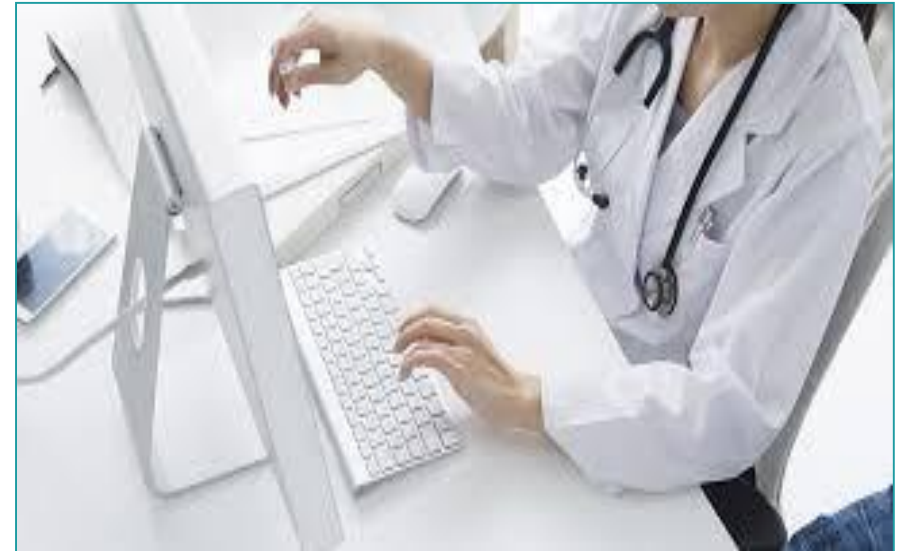
Defined as transfer and acceptance of patient care responsibility between nurses and/or other healthcare team members. Involves reporting specific patient information to another healthcare team member for the purpose of ensuring continuity and safety of patients' care

- 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 pasted¹
 - Copying and pasting was a factor in 2.6% of documentation errors, notably in primary care²



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

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.²⁴ 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.²⁵ 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?

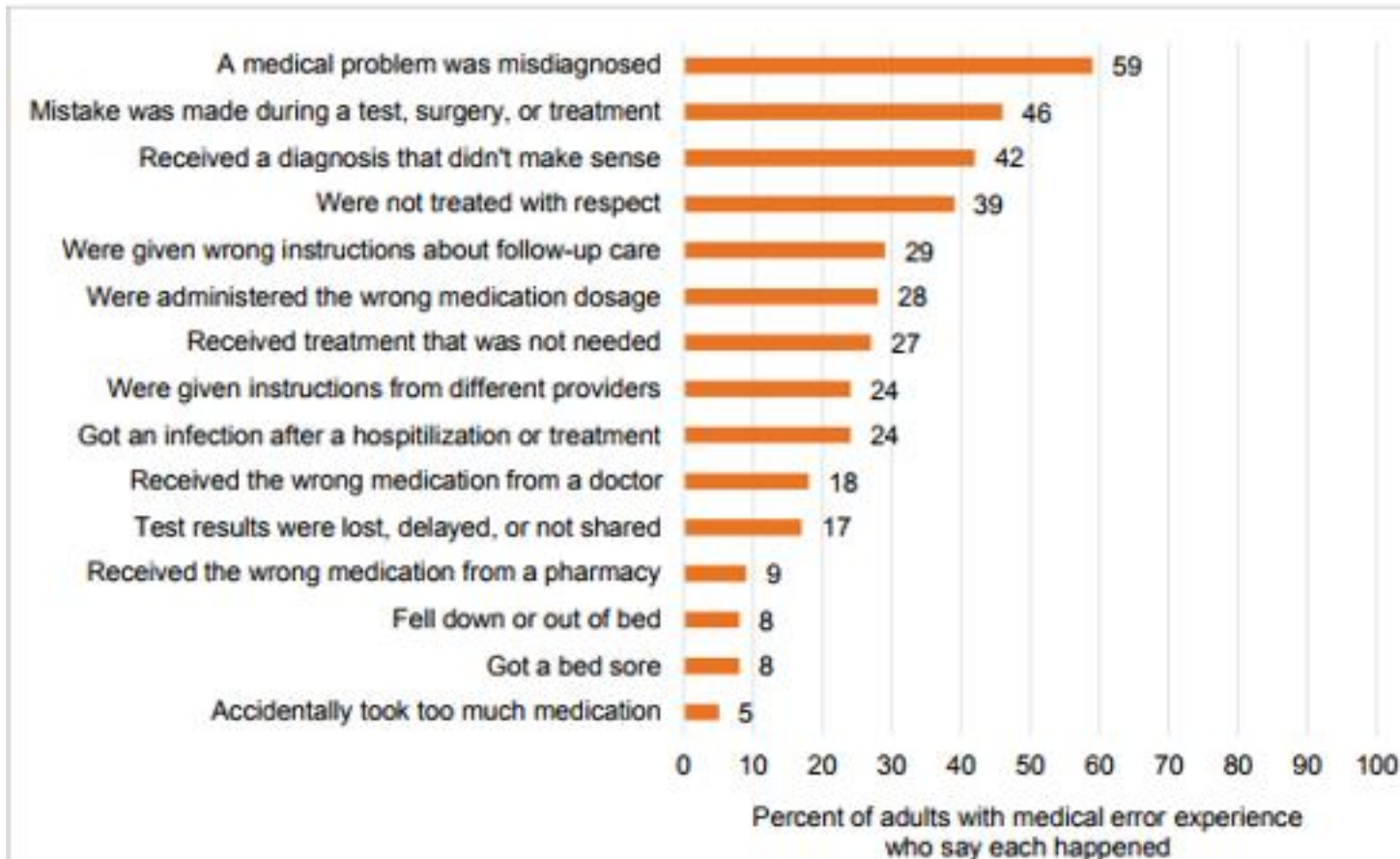
Overall, 2 in 5 Americans say they have either personally experienced a medical error or had a medical error occur in the care of someone close to them.

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.

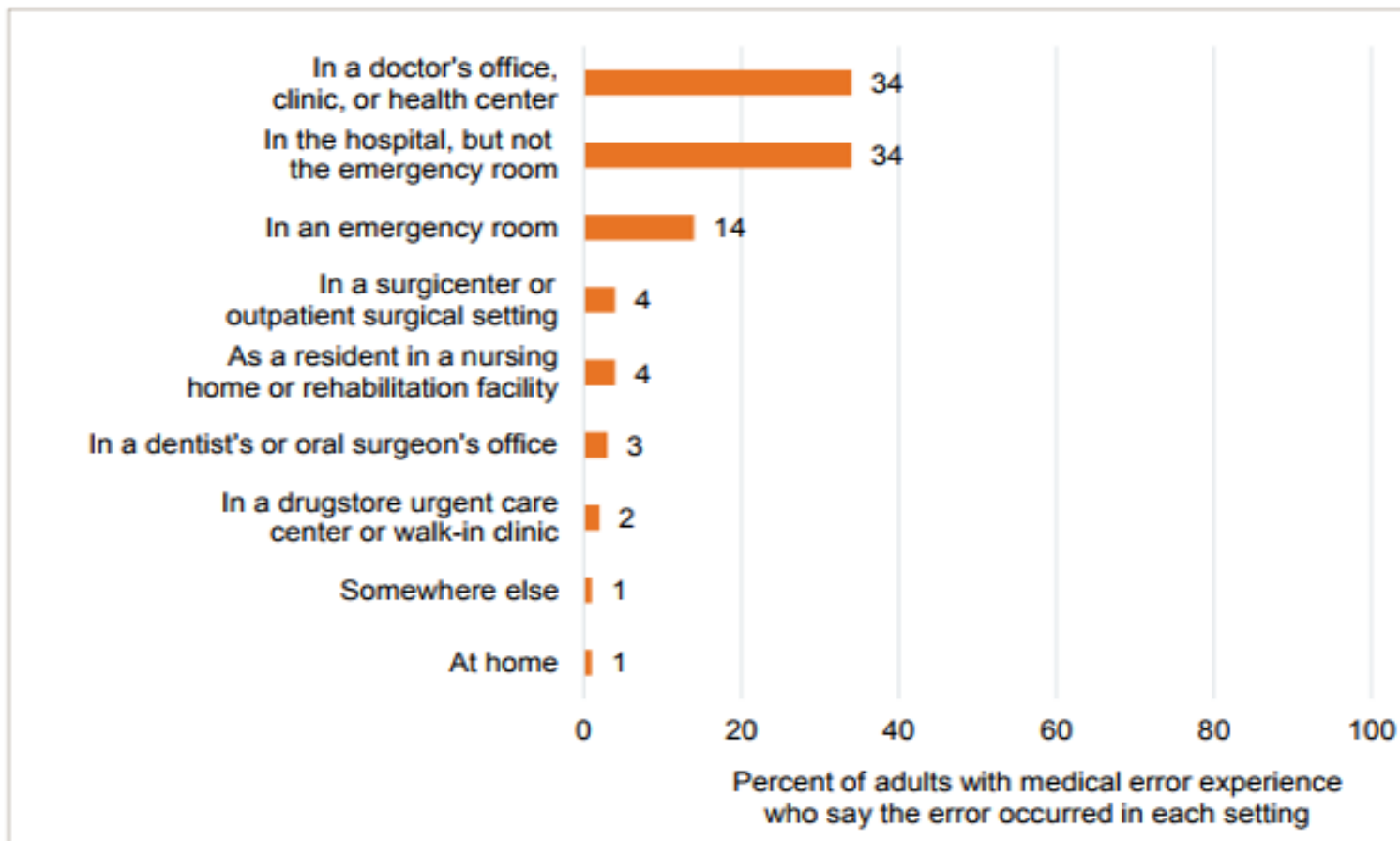


NORC at the University of Chicago and IHI/NPSF Lucian leap institute. (2017). *Americans' Experiences with Medical Errors and Views on Patient Safety*. Chicago:IL. Retrieved from http://www.ihl.org/about/news/Documents/IHI_NPSF_Patient_Safety_Survey_2017_Final_Report.pdf

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.ihl.org/about/news/Documents/IHI_NPSF_Patient_Safety_Survey_2017_Final_Report.pdf

Research from X (Previously Twitter) Regarding Perceptions of Medical Errors

Approximately 1000 posts (tweets) analyzed with the following results:

- 83% identified the type of error
 - procedural errors
 - medication errors
 - diagnostic errors
 - surgical errors
- 84% identified source of the post (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



Reported Top 3 Allegations Involving OB/GYN Providers: 2019

- Obstetric-related treatment allegations 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:
 - 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:
 - 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

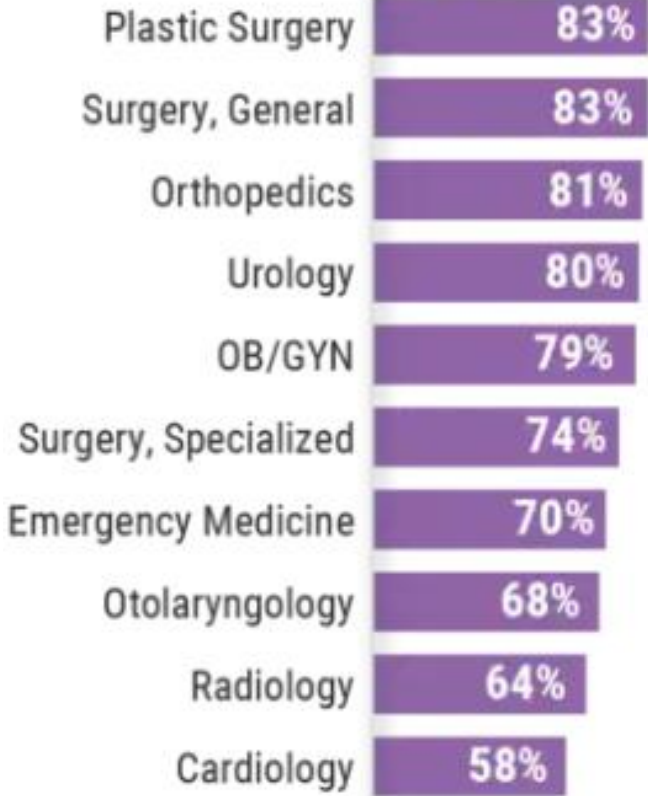
Reported U.S. Medical Malpractice Lawsuits: 2021

Results from Medscape’s Medical Malpractice Survey Conducted in 2019

Most Common Reasons for Lawsuits



Top 10 Specialties for Lawsuits



Reported Medical Malpractice Claims: 2022

- In 2022, there were approximately \$3.8 billion paid to plaintiffs in medical malpractice lawsuits in the United States ¹
- The average medical malpractice payout was \$385,599 in 2022 ¹
- Medical malpractice claims resulted from: patient death, missed or incorrect diagnosis, major permanent injury, and brain damage and/or quadriplegia-related claims and/or claims involving other injuries requiring lifelong care ²

1. National Practitioner Data Bank. (2022). Medical Malpractice. Retrieved from <https://www.npdb.hrsa.gov/analysisstool/>

2. Cappellino, A. (2020). Medical malpractice payout report 2020. Expert Institute. Retrieved from <https://www.expertinstitute.com/resources/insights/medical-malpractice-payout-report-for-2018/>

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

Top 10 most frequently reported sentinel events in 2021 ¹

- Fall — 483
- Delay in treatment — 97
- Unintended retention of a foreign object — 97
- Wrong surgical site — 85
- Patient suicide — 79
- Assault/rape/sexual assault of a patient — 55
- Patient self-harm — 45
- Fire/burns — 38
- Medication management — 35
- Clinical alarm response — 22

*Wrong surgery includes wrong site, wrong procedure, wrong patient and wrong implant

Top 10 most frequently reported sentinel events in 2022 ²

- Fall — 611
- Delay in treatment — 89
- Unintended retention of a foreign object — 88
- Wrong surgery* — 85
- Patient Suicide — 73
- Assault/rape/sexual assault/homicide — 60
- Fire/burns — 49
- Perinatal event — 33
- Self-harm — 30
- Medication management — 30

1. Sentinel Event Data Released for 2021. (2022). The Joint Commission. Retrieved from <https://www.jointcommission.org/resources/news-and-multimedia/newsletters/newsletters/joint-commissiononline/march-9-2022/sentinel-event-data-released-for-2021/#.YwjdpnbMLIU>

2. Sentinel Event Data 2022 Annual Review. (2023). The Joint Commission. Retrieved from [https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/sentinel-event/03162023_sentinel-event-_annual-review_final-\(002\).pdf](https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/sentinel-event/03162023_sentinel-event-_annual-review_final-(002).pdf)

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

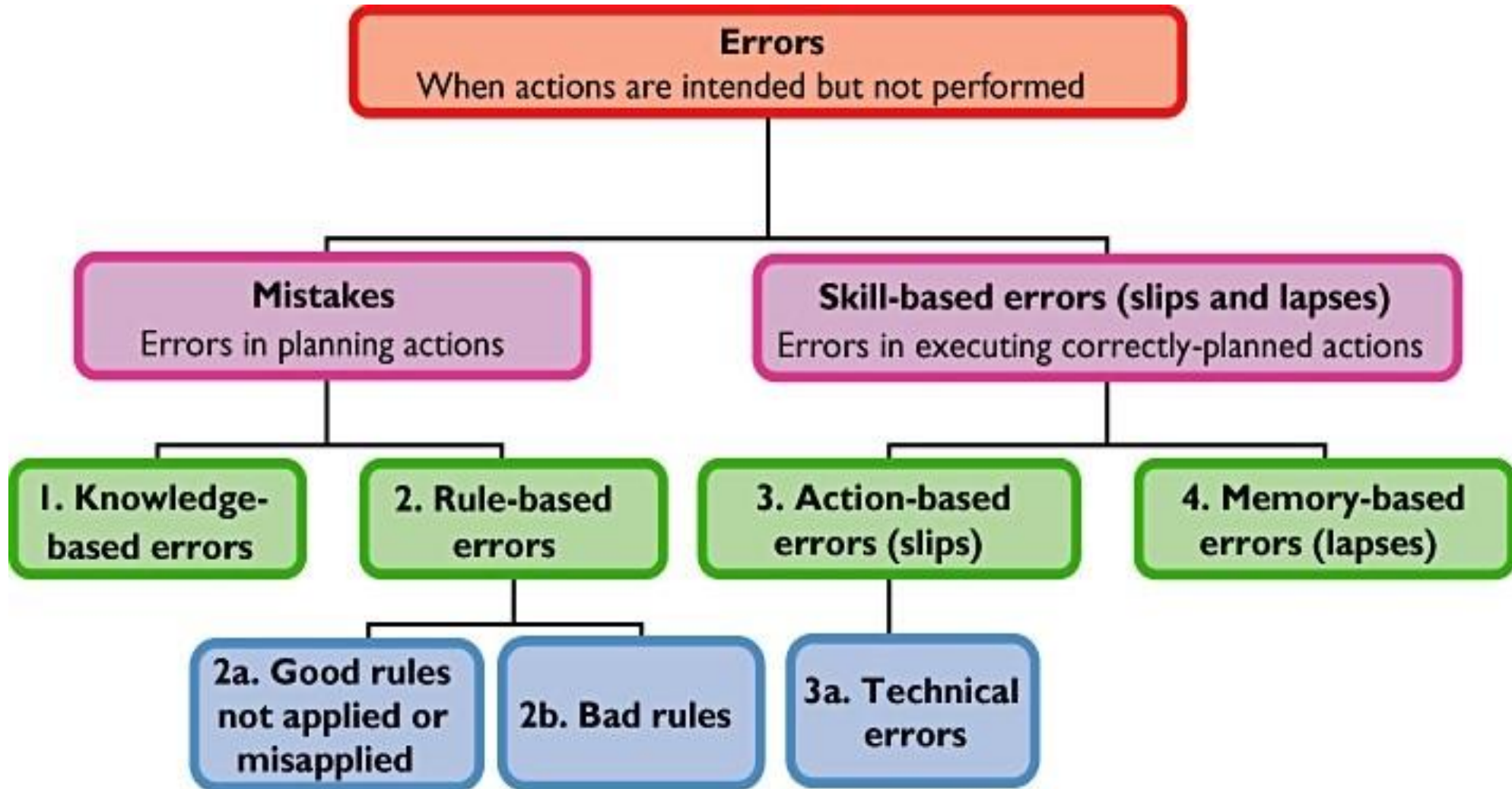
- i. The involved practitioner should meet with the patient/family as promptly as other duties permit and as appropriate given the patient's clinical condition.
- ii. The nature, severity and cause (if known) of the adverse event should be presented in straightforward/non-judgmental fashion.
- iii. Avoid 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: 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)

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.

Reported Malpractice Insurance Claims Related to Diagnostic Errors: 2019

Research¹ 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%)
- Researchers² 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:

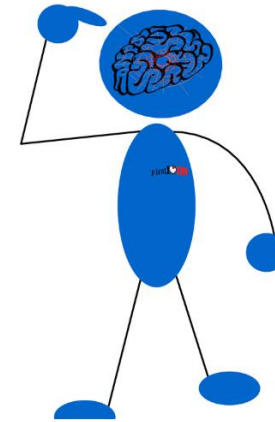
- Inter-departmental communication
- Technological difficulties
- Lack of care coordination



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. Neurological/spine related issues
3. Cardiac/Stroke related issues
4. Infectious/communicable diseases
5. Pulmonary related issues

Florida Board of Medicine (2023) Rule 64B8-13.005. Retrieved <https://www.flrules.org/gateway/ruleNo.asp?id=64B8-13.005>

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. Wrong site/patient surgery
4. Failure to accurately diagnose neurological & brain related conditions
5. Failure to accurately diagnose cancer-related conditions

Florida Board of Osteopathic Medicine. (2023). Rule 64B15-13.001. Retrieved from <https://www.flrules.org/gateway/ruleNo.asp?id=64B15-13.001>

Prevention of Medical Errors

Florida Board of Dentistry

64B5-12

(2) Prevention of Medical Errors and CPR Certification: During each biennium or for reactivation of a license the dentist and dental hygienist shall complete the following specific continuing education, training and certification:

- (a) A board-approved two (2) hour continuing education course on the prevention of medical errors. To be approved by the board, the course shall include a study of root cause analysis, error reduction and prevention, and patient safety. This course shall count towards the requirement of subsection (1). In addition, a two (2) hour prevention of medical errors course approved by the Board of Medicine pursuant to paragraph 64B8-13.005(1)(c), F.A.C., (effective 3-2-22), which is hereby incorporated by reference and available at <https://www.flrules.org/gateway/ruleno.asp?id=64B8-13.005>, shall also fulfill the requirements of subsection 64B5-12.013(2), F.A.C.

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 Top Five Cancers

- Cancer patients are often missed or delayed diagnosis in different areas of the body:
 - Lung (22.5%)¹ – misreading x-ray, lack of follow-up ^{2,3}
 - Melanoma (13.6%)¹ – failure to diagnose due to lack of body scan or incomplete body scan ⁷
 - Colorectal (9.6%)¹ – failure to diagnoses, poor documentation ⁶
 - Breast (8.9%)¹ – misreading diagnostic exams, poor documentation, failure to consider importance of biopsy ⁴
 - Prostate (2.4%)¹ – failure to diagnose (PSA), lack of follow up, inappropriate treatment ⁵

1. Newman-Toker, D., Wang, Z., Nassery, N., et. Al. (2020). Rate of diagnostic errors and serious misdiagnosis-related harms for major vascular events, infections, and cancers: toward a national incidence estimate using the “Big Three”. *Diagnosis*, 8(1). Retrieved from <https://www.degruyter.com/document/doi/10.1515/dx-2019-0104/html#:~:text=Total%20cancers,PPR%3A%2010.1%E2%80%9320.9>

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

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

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

5. 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)

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

7. 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 conditions¹:
 - 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 ²:
 - 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 ¹
- Healthcare provider fatigue ⁴
- Congenital heart disease ⁵
- New medical devices ⁶
- Distractions in the obstetric operating room ⁷
- Mothers' substance use ⁸
- COVID-19 ⁹

AJOG: American Journal of Obstetrics & Gynecology

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

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.
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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.
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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 infection¹
- Endometriosis: wide variety of presenting symptoms may delay accurate diagnosis for years²
- Adolescent polycystic ovary syndrome: symptom presentation similar to menstrual irregularities caused by variability of hormones³

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 21st Century. *Climacteric: the Journal of International Menopause Society*. PMID:30905186

3. DiVall, S., & Merjaneh, 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 departments¹
- Up to 17% of ACS cases are missed ²
- Gender disparities in symptom presentations may result in ACS misdiagnosis

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



Women and older patients: may present with atypical symptoms, like numbness, tingling, burning, stabbing, prickling, jaw pain, epigastric pain ^{1, 3}



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/Misdiagnosis¹
 - 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 rates¹
 - Diagnosis missed in 14-22% of patients presenting with atypical symptoms like disorientation, focal weakness, and dizziness^{2,3}
 - Due to short tPA stroke treatment window, suspected stroke or transient ischemic attack diagnoses should be triaged immediately⁵
- 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 symptoms⁶
- 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

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
Unremitting 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

Top Five Types of Misdiagnosed Infections ¹:

- Spinal abscess – 62.1%
- Meningitis and encephalitis – 25.6%
- Endocarditis – 25.5%
- Sepsis – 9.5%
- Pneumonia – 9.5%

Key causes ²:

- 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

1. Newman-Toker, D., Wang, Z., Nassery, N., et. Al. (2020). Rate of diagnostic errors and serious misdiagnosis-related harms for major vascular events, infections, and cancers: toward a national incidence estimate using the “Big Three”. *Diagnosis*, 8(1). Retrieved from <https://www.degruyter.com/document/doi/10.1515/dx-2019-0104/html#:~:text=Total%20cancers,PPR%3A%2010.1%E2%80%9320.9>

2. Patterson, J.E. (2016). 5 diagnostic errors to avoid: the patient with infectious disease. Retrieved from <https://www.medscape.com/features/slideshow/diagnostic-errors/infectious-diseases#page=1>

Misdiagnosis Through Failure in Timely Diagnosis of Sepsis

U.S. Sepsis Statistics

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 ¹
- Approximately 350,000 patients who develop sepsis die during hospitalization or are discharged to hospice ¹
- 1 in 3 patients who die in a hospital have sepsis ¹
- Sepsis, or the infection causing sepsis, starts outside of the hospital in nearly 87% of cases ²

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. (2023). Sepsis: Clinical information. Retrieved from <https://www.cdc.gov/sepsis/what-is-sepsis.html>
2. Sepsis Alliance (2023). Retrieved from <https://www.sepsis.org/education/clinicians/sepsis-first-response/#:~:text=As%20many%20as%2087%25%20of,providers%20to%20reach%20these%20cases.>

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 ¹
 - **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



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



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 show¹:
 - Wrong-site surgery occurs 0.09-4.5 per 10,000 U.S. operations ¹
 - Retained surgical items occur in 1:5500 surgical procedures ²
 - 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 ³
 - Increased risk with procedures involving face and neck and/or when there is an open oxygen source

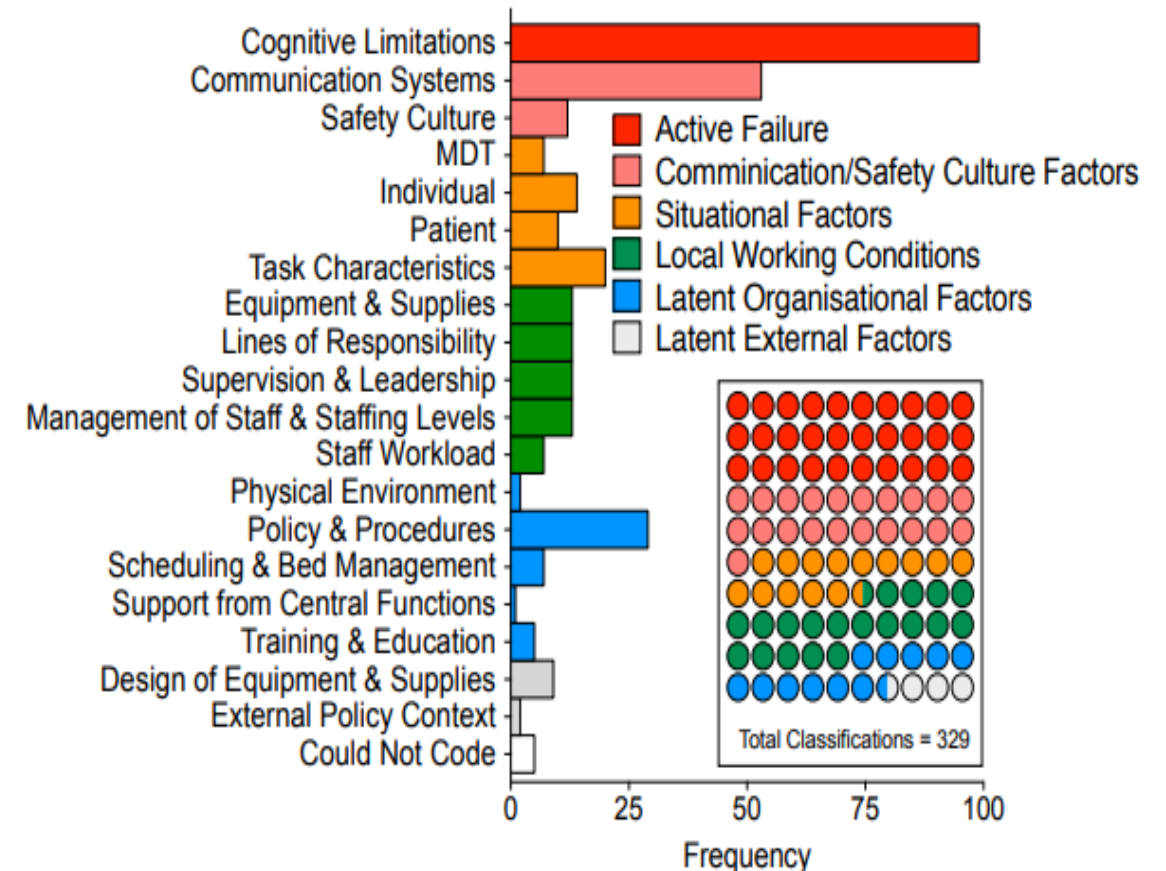
1. Zil-E-Ali, A., Laubscher, L., Kourampi, I., & Tsagkaris, C., (2023). Is Surgery on the right track? The burden of wrong-site surgery. Taylor & Francis. PMID:10443983

2. Acevedo, E., & Kuo, L.E. (2021). The economics of patient surgical safety. Surgical Clinics of North America 101(1), 135-148. PMID33212074

3. Stormont, G., Anand, S., & Delbert, C. (2023), Surgical Fire Safety. StatPearls. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK544303/>

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 ¹
- 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%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 ¹
- Adverse drug event (ADE) account for nearly 1.3 million ED visits and 350,000 hospitalizations yearly ²
- Errors in prescribing medications are due to a variety of causes³:
 - 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

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. ¹
- Physicians may prescribe more controlled substances/pain medications than recommended, at higher-than-necessary strengths. ²
- 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 ²
 - 42% to 49% of physicians prescribe higher dose than recommended ²



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)

U.S. Drug-Involved Overdose Deaths

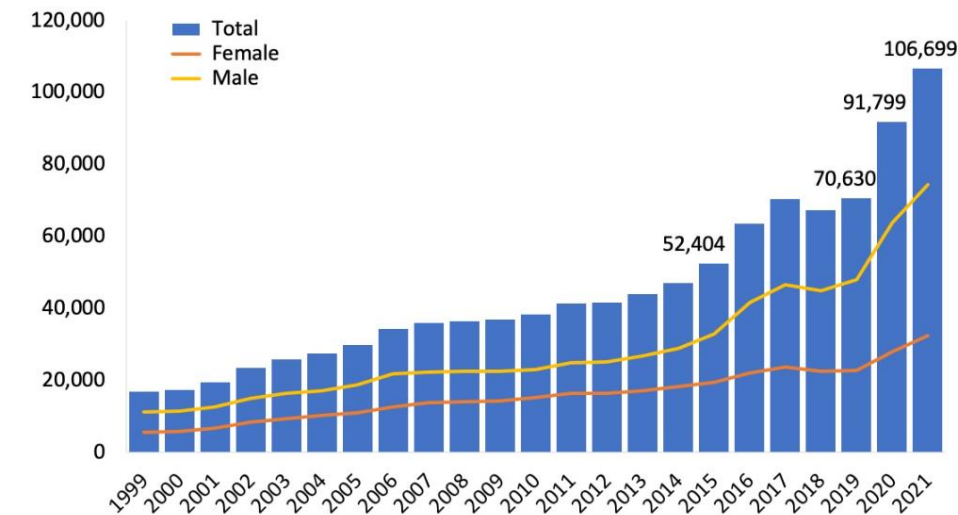
In the U.S., there were 106,699 drug overdose deaths reported in 2021 including illicit drugs and prescription opioids.^{1,2}

- Opioids were involved in 80,411 overdose deaths in 2021—nearly 75.4% of all overdose deaths.²
- Deaths involving synthetic opioids other than methadone (primarily fentanyl) rose from 68,630 reported in 2020 to 70,601 reported in 2021.¹
- The number of deaths involving prescription opioids totaled 16,706 in 2021 and those involving heroin dropped to 9,173 deaths.¹

Florida Drug-Involved Overdose Deaths

- Florida had 8,093 overdose deaths in 2021 with opioid related deaths totaling 6,442²

Figure 1. National Drug-Involved Overdose Deaths*, Number Among All Ages, by Gender, 1999-2021



*Includes deaths with underlying causes of unintentional drug poisoning (X40–X44), suicide drug poisoning (X60–X64), homicide drug poisoning (X85), or drug poisoning of undetermined intent (Y10–Y14), as coded in the International Classification of Diseases, 10th Revision. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2021 on CDC WONDER Online Database, released 1/2023.

1. National Institute on Drug Abuse. (2023). Drug Overdose Death Rates. Retrieved from <https://nida.nih.gov/research-topics/trends-statistics/overdose-death-rates>

2. CDC. (2023). Drug overdose deaths. Retrieved from <https://www.cdc.gov/drugoverdose/deaths/index.html>

3. FL Health Charts. (2023). Substance Use Dashboard. Retrieved from <https://www.flhealthcharts.gov/ChartsDashboards/rdPage.aspx?rdReport=SubstanceUse.Overdose>

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

- Minimize use of Off-Label Drugs

- Off-Label Drugs are associated with a higher risk of Adverse Drug Events (ADEs) than on-label¹



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1. Eguale, T., et al. (2016). Association of off-label drug use and adverse drug events in an adult population. *JAMA Internal Medicine*, 176(1)

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

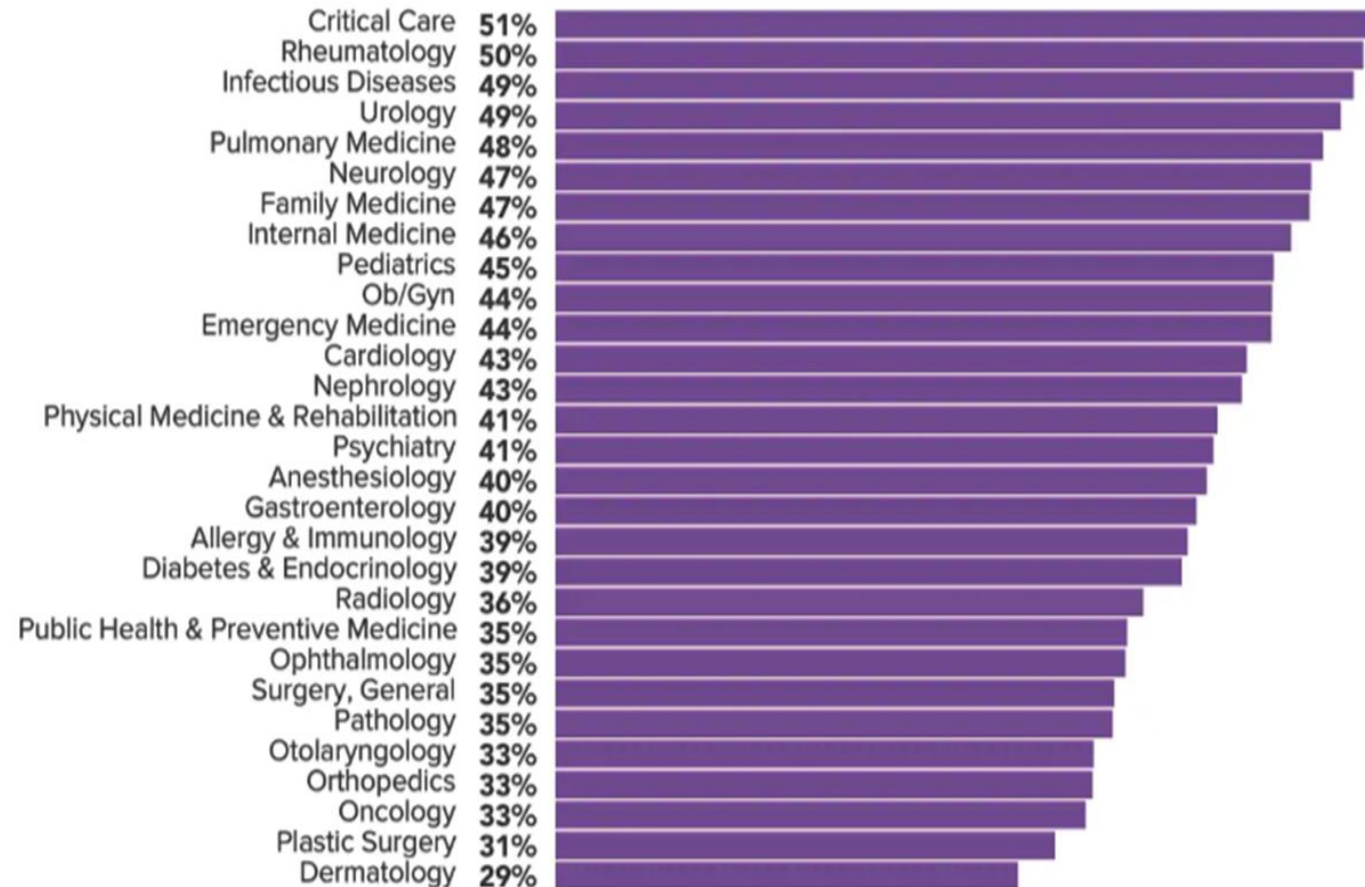
Do Not Use Problem Term	Potential Problem/Reason	Suggested Term
> (greater than) or < (less than)	Misinterpreted as the number “7” (seven) or the letter “L”. Confused for one another	Write “greater than” Write “less than”
Abbreviations for drug names	Misinterpreted due to similar abbreviations for multiple 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 errors¹

- Symptoms of burnout²:
 - Physical exhaustion
 - Emotional exhaustion
 - Depersonalization of relationships especially with patients and other healthcare team members
 - Feelings of low achievement
 - Decreased effectiveness

Burnout by Medical Specialty³



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.