Florida: Preventing Medical Errors for PTs and PTAs (311)

Course Introduction

This course meets the two-unit requirement on prevention and reporting of medical errors for initial licensure or biennial renewal for PTs and PTAs in Florida.

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Target Audience: FL PTs and PTAs Education Level: Introductory

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No commercial support was received for this activity.

Course Summary

Outlines seven types of medical errors and the Florida laws related to them. Describes factors that increase the risk of committing a medical error and populations that are especially vulnerable to such errors. Presents five commonly used approaches that have been effective in reducing medical errors.

A score of 80% or higher on the post test, a completed evaluation form, and payment where required. No partial credit will be awarded.

Course Objectives

When you finish this course you will be able to:

1. Name several landmark pieces of legislation that have attempted to reduce medical errors.
2. Summarize Florida laws and requirements related to medical errors and describe the impact of the Patient Safety Quality and Improvement Act on healthcare practices in the United States.
3. Outline the seven main classifications of medical errors.
4. Identify factors and practices that increase the risk of committing a medical error.
5. Discuss populations that are particularly vulnerable to the effects of medical errors.
6. State several healthcare practices that will reduce medical errors and create a culture of patient safety.
7. State several measures the public can do to help reduce medical errors.
8. Explain the systems approach to medical errors and assess commonly used systems approaches shown to be effective.

1. Overview of Medical Errors

> Human beings, in all lines of work, make errors. Errors can be prevented by designing systems that make it hard for people to do the wrong thing and easy for people to do the right thing.
>
> Institute of Medicine,* 1999
> *To Err Is Human: Building a Safer Health System*

* The Institute of Medicine (IOM) is now called the National Academy of Medicine. Because their quotations here predate the name change, we have chosen to leave them as is. You will see the traditional [sic] or "thus," following the old name to indicate it is no longer as it is now.

Twenty years ago, the Institute of Medicine (IOM) released its landmark report *To Err is Human: Building a Safer Health System*, and with it, raised the consciousness of medical errors within the nation's healthcare system (IOM, 1999). Since that report was published, the patient safety movement has grown and helped raise awareness not only among healthcare professionals but also among the general public. In many healthcare settings, greater attention is being paid to "the possibility of error and a better understanding of the fact that most medical errors result from faulty systems, not from bad or incompetent people" (IOM, 1999).

A more recent study from the National Patient Safety Foundation (NPSF), however, indicates that the improvements made so far have not been what many hoped for and suggests the need for a new emphasis on a total systems approach to improvement (Gandhi, 2016; NPSF, 2015).

Scope of the Problem

The original IOM report estimated 44,000 to 98,000 deaths each year in the United States, or at least 120 deaths per day, because of human error related to the delivery of healthcare (IOM, 1999). The report spurred debate and further studies, which have placed the actual figure for deaths in a range from 130,000 to 575,000, with those numbers said to be based on definitions of "medical error" that are both too broad and too narrow (Myhre & Sifris, 2017).

A 2016 study by Johns Hopkins University took an entirely different approach by arguing that the compilation of death rate statistics used to arrive at these numbers is flawed. The JHU study formulated a specific definition of **medical error** as one or more of the following:

- An unintended act (either the result of omission or action)
- An act that does not achieve its intended outcome
- The failure of a planned action (an error of execution)
- The use of a wrong plan to achieve an outcome (an error planning)
- The deviation from a process of care that may or may not cause harm

Researchers then compared national in-patient death statistics with hospital admission rates to arrive at a formula producing a conclusion that almost 10% of all deaths in the United States are a result of "medical care gone awry." When applied to the data available for 2013 of 35,416,020 admissions, the number of deaths from medical errors would have been 251,141, making medical errors the third leading cause of death behind only heart disease and cancer and well ahead of accidents, chronic lower respiratory disease, and stroke (Myhre & Sifris, 2017).

The most recent data from the CDC suggests that within this scenario medical errors would still be the third leading cause of death in both the United States overall and in Florida (CDC, 2017).

Further debate continues over both definitions and data collection and additional studies are underway. But it is clear that medical errors continue to occur at unacceptable levels, making continued vigilance an imperative for both healthcare workers and the public. A new perspective for achieving "total systems safety" based on the eight recommendations from the NPSF study holds promise:

1. Ensure that leaders establish and sustain a safety culture.
2. Create centralized and coordinated oversight of patient safety.
3. Create a common set of safety metrics that reflect meaningful outcomes.
4. Increase funding for research in patient safety and implementation science.
5. Address safety across the entire care continuum.
6. Support the healthcare workforce.
7. Partner with patients and families for the safest care.
8. Ensure that technology is safe and optimized to improve patient safety. (Gandhi, 2016; NPSF, 2015)

PSOs and The Patient Safety Act of 2005

Congress enacted the Patient Safety and Quality Improvement Act of 2005 (PSQIA) (Public Law 109-41) in response to the IOM report and the concerns it brought to the forefront over preventable medical errors. The privilege and confidentiality protections conferred on providers who work with Federally listed patient safety organizations (PSOs) were intended to promote shared learning to enhance quality and safety nationally (PSOP, n.d.; Howie, 2009).

Patient safety organizations (PSOs) are organizations **"**that attest to having expertise in identifying the causes of, and interventions to reduce the risk of, threats to the quality and safety of patient care." The primary activity of a PSO is to conduct activities to improve patient safety and healthcare quality. A PSO's workforce must have expertise in analyzing patient safety events, such as the identification, analysis, prevention, and reduction or elimination of the risks and hazards associated with the delivery of patient care. There are a total of 82 PSOs in the United States and currently 55 PSOs serve Florida, with 6 domiciled in the Sunshine State (all PSOs can operate nationally regardless of their home state) (PSOP, n.d.-a, n.d.-c).

An additional federal regulation in 2009—the Patient Safety and Quality Improvement Final Rule "establish[ed] a framework by which hospitals, doctors, and other healthcare providers may voluntarily report information to Patient Safety Organizations (PSOs), on a privileged and confidential basis, for the aggregation and analysis of patient safety events." It also delineates the requirements to be met to become a PSO and how applicants will be reviewed and certified (PSOP, n.d., n.d.-b).

The CMS Prospective Payment Rule

In an effort to improve patient safety and curb costs, the Centers for Medicare and Medicaid (CMS) since 2008 no longer reimburses hospitals for care nor allows the hospital to charge the patient for care due to

certain medical errors. The initial list comprised “10 hospital-acquired conditions” (later); in 2013, the CMS expanded the list to 14, where it has remained:

- Foreign object retained after surgery
- Air embolism
- Blood incompatibility
- Stages III and IV pressure ulcers
- Falls and trauma
- Manifestations of poor glycemic control
- Catheter-associated urinary tract infection (UTI)
- Vascular catheter-associated infection
- Surgical site infection, mediastinitis, following coronary artery bypass graft (CABG)
- Surgical site infection following bariatric surgery for obesity
- Surgical site infection following certain orthopedic procedures
- Surgical site infection following cardiac implantable electronic device (CIED)
- Deep vein thrombosis (DVT)/pulmonary embolism (PE) following certain orthopedic procedures
- Iatrogenic pneumothorax with venous catheterization (CMS, 2018)

Note: Updates to the details of this list are made each year and can be obtained here: https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/icd10_hacs.html.

Provisions like the CMS non-payment for preventable errors appear to be having a positive effect, at least in Florida. A 2013 study using the discharge data from the Florida Agency for Healthcare Administration from 2007 to 2011 suggested “Medicare nonpayment policy is associated with both a decline in the rate of hospital-acquired vascular catheter-associated infections (HA-VCAI) per quarter, and the probability of acquiring HA-VCAI post-policy.” Concurrent infection control practices, however, could have also affected the results (Peasah et al., 2013).

A study of CMS data after 2008 found no positive effects of non-payment incentives but a later, longer study of CMS data did note positive effects, and an early analysis of 2013 Medicare data showed a steadily declining rate of hospital readmissions within 30 days. Many factors can come into play when analyzing date on error reduction including the monetary value of disincentives, initial coding of patient conditions upon admission, specific conditions or errors, and other error prevention programs already in place. Continued monitoring and analysis remain critical (Phillips, 2015; Delbanco, 2014; Lowenfels, 2013; Lee et al, 2012; Tucker, 2012)

CMS maintains an active Hospital-Acquired Conditions Reduction Program (HACRP) and data on specific hospitals is posted to the “Hospital Compare” website (CMS, 2018a). In June 2018, CMS announced a plan to no longer make public information on hospital-acquired infection (HAI), medical errors, and injuries, but backlash from patient safety advocates led to a reversal of that position two months later (PSHQ, 2018). The fact that CMS continues to put medical errors under scrutiny—along

with their financial ramifications—is another indication of the serious and pervasive nature of these preventable events.

The Affordable Care Act of 2010 (ACA)

Reducing medical errors and adverse events in healthcare continues to be an important topic in today's legal landscape. A major theme of the landmark legislation Patient Protection and Affordable Care Act of 2010 (ACA) is improving the quality of the nation's healthcare. The act has many provisions supporting programs that reduce medical errors and governance on their reporting. For example, ACA "in awarding [demonstration grants for alternatives to medical tort litigation], the Secretary shall give preference to States . . . that make proposals that are likely to enhance patient safety by detecting, analyzing, and helping to reduce medical errors and adverse events" (U.S. House, 2010; KFF, 2013/2018).

In 2012 provisions in ACA required providers to begin moving toward electronic health records in an effort to reduce medical errors. Another ACA program also began in 2012 that offered financial incentives to hospitals that meet certain quality criteria.

A variety of programs mandated by ACA and implemented by Medicare and others were designed to improve the numbers for medical errors. It appears that there has been improvement, although there is disagreement on what exactly the data mean (Bihari, 2018).

Error Reporting: Fear and Finger Pointing

Traditionally, patient safety improvement efforts have been hampered by fear of discovery, resulting in under-reporting of medical errors and an inability to collect sufficient data for analysis of adverse events.

Although prior to publication of the IOM report virtually all healthcare organizations engaged in investigations of events that caused harm to patients, few took a system-based approach to solving problems. The focus was on individuals and mistakes, rather than on the events that combined to cause an incident to occur. "Based on a 'name and blame' culture, the emphasis of such investigations was not on prevention, but on punishment" (USDVA, 2015).

The trend in developing programs has moved away from a solely regulatory function toward both regulatory and patient safety improvement goals. Many states have developed electronic methods for data collection and reporting, and there is a push toward standardization to make data comparisons more meaningful.

In an effort to provide a framework as well as a level playing field, the National Quality Forum, a nonprofit organization focused on systemic healthcare quality improvement, in 2002 developed a list of reportable events. First called **never events** because they were things that should never happen, the term has come to be used to describe adverse events that are:

- Unambiguous (clearly identifiable and measurable)
- Serious (resulting in death or significant disability)
- Usually preventable

Revised a number of times, the list now encompasses 29 **serious reportable events** that can be grouped into the following seven categories:

- Surgical or procedural events
- Product or device events
- Patient protection events
- Care management events
- Environmental events
- Radiologic events
- Criminal events (PSNet, 2019; NQF, 2011)

Since 1995 the Joint Commission has recommended that hospitals report "sentinel events," which it defines as "an unexpected occurrence involving death or serious physiological or psychological injury, or the risk thereof." All "never events" are considered sentinel events. The Joint Commission requires that a **root cause analysis** (RCA) be performed after any sentinel event, and the Leapfrog Group recommends that an organization also disclose the error, apologize to the patient, report the event, and waive all associated costs (PSNet, 2019).

When *To Err Is Human* was released in 1999, thirteen states were collecting information on medical errors. The National Academy for State Health Policy conducted surveys in 2000, 2007, and 2014 and found the number of states to be 15, 27, and 27 respectively. The 27 includes Florida and the District of Columbia (Hanlon et al., 2015). Texas initiated a reporting system on January 1, 2015.

While this is an improvement since the IOM study's release, there is still a long way to go. A persistent problem remains with the under-reporting of events despite statutory measures intended to address the problem (Hanlon et al., 2015; Yale, 2008).

2. Florida Reporting Requirements

> More people die in a given year as a result of medical errors than from motor vehicle accidents, breast cancer, or AIDS.
>
> Institute of Medicine [sic], 1999
> *To Err Is Human: Building a Safer Health System*

Historical Error Reporting

In 2004, largely in response to the 1999 IOM report, the Florida legislature established the Florida Patient Safety Corporation (FPSC), whose purpose was to monitor patient safety throughout the state. An important goal of the FPSC was to establish a voluntary Near Miss Reporting System, based on a successful system used in the commercial aviation industry. The system was intended to provide immunity from legal penalties and sanctions (Florida Statutes, 2004; FL OPPAGA, 2006).

In 2004 two amendments to the state constitution were passed by Florida voters: The Patients' Right-to-Know About Adverse Medical Incidents Act (known at the time as Amendment 7, but now Article 10, Section 25 of the Florida Constitution); and the Three Strikes and You Are Out Act (Amendment 8) (Florida Senate, 2007).

Writing the following year for *AHRQ: Morbidity and Mortality Rounds on the Web*, Paul Barach noted that Amendment 7 had eliminated the confidentiality provisions, allowing full access to all patient records, meetings, morbidity and mortality conferences, root cause analyses, and any other professional exchanges of information related to a patient's injury or death. Barach noted that risk management professionals said that Amendment 7 had done immense harm to quality assurance and peer-review protections developed over the previous twenty years and caused an immediate decline in the reporting of adverse events throughout the state. Amendment 8 also had an unintended chilling effect on the reporting of near misses and adverse events (Barach, 2005).

The two amendments to the state constitution did indeed introduce a great deal of confusion and uncertainty into the Florida medical errors situation and they exacerbated an already recognized issue with under-reporting of adverse events. Approximately three dozen court cases were filed in the four years following the passage of Amendment 7, with lower-court decisions ruling both for and against the release of information. In 2008 two cases eventually found their way to the Florida Supreme Court, which rendered its decision in favor of Amendment 7 in both cases (Florida Senate, 2008).

The FPSC had followed its legislative mandate to establish itself as a working entity from 2004 until it was repealed in 2009. It acquired preliminary certification as a Patient Safety Organization (PSO) from the Agency for Healthcare Research and Quality (AHRQ) and created the Near Miss Reporting System.

In 2008 the FPSC officially endorsed a private program called SorryWorks!, an independent disclosure consultancy firm, as an effective method for addressing medical errors. According to the Sorry Works! website, Florida is one of thirty-six states with an "apology law" on the books, but these vary widely from state to state (SorryWorks!, n.d.).

State funding for the FPSC ended after the 2007–2008 fiscal year, and the first casualty was the Near Miss Reporting System. Part of its establishing legislation required it to obtain grants and other private

funding to fully support itself. It was never able to do so; and, in fact, the FPSC believed that some funding should always come from the state as a show of support for its mission (Florida Senate, 2008).

Although the state Office of Program Policy Analysis and Government Accountability (OPPAGA) recommended the corporation continue and extend the exceptions allowing confidentiality of reports, it was unclear how the latter would fit with the Florida Supreme Court decisions regarding Amendment 7. On January 29, 2009, the FPSC board of directors voted to seek repeal of the statutes establishing the corporation and this was accomplished in May 2009 (Florida Senate, 2009; FL OPPAGA, 2006; Florida House, 2009; Florida Senate, 2009a; Laws of Florida, 2009).

The Florida General Counsel's Office, on July 1, 2008, notified risk managers that information reported to the Florida Agency for Healthcare Administration under state law was exempt from Amendment 7 mandates. For PSOs, such as the Patient Safety Organization of Florida Inc., formed in 2009, federal law supersedes state law in providing confidentiality for records (CBS Local Media, 2011; Florida General Counsel, 2008).

It appears that the Patients' Right-to-Know About Adverse Medical Incidents Act in the 2018 Florida Statutes remains unchanged. The law says, in part:

- Patients have a right to have access to any records made or received in the course of business by a healthcare facility or healthcare provider relating to any adverse medical incident.
- This section does not repeal or otherwise alter any existing restrictions on the discoverability or admissibility of records relating to adverse medical incidents otherwise provided by law
- Except as otherwise provided by act of the Legislature, records of adverse medical incidents, including any information contained therein, obtained under s. 25, Art. X of the State Constitution, are not discoverable or admissible into evidence and may not be used for any purpose, including impeachment, in any civil or administrative action against a healthcare facility or healthcare provider. This includes information relating to performance or quality improvement initiatives and information relating to the identity of reviewers, complainants, or any person providing information contained in or used in, or any person participating in the creation of the records of adverse medical incidents. (Florida Statues, 2018)

Several relevant court cases are wending their way through the legal system, with one already decided in January 2017 by the Florida Supreme Court in favor of the intent of Amendment 7; the situation will continue to evolve (Aebel & West, 2017; Ivanushko, 2017; Justia, 2017; Noa, 2017).

Current Reporting Requirements

Florida requires that all licensed healthcare facilities establish an internal risk management program that includes:

- The investigation and analysis of the frequency and causes of general categories and specific types of adverse incidents to patients
- The development of appropriate measures to minimize the risk of adverse incidents to patients

- The analysis of patient grievances that relate to patient care and the quality of medical services
- A system for informing a patient or an individual identified pursuant to state law that the patient was the subject of an adverse incident
- The development and implementation of an incident reporting system . . . [that requires all agents and employees to report] . . . adverse incidents to the risk manager . . . within 3 business days after their occurrence (Florida Statutes, 2018a).

Details of these sections contain requirements for licensing and training; any specific limitations, definitions of reportable events; and the encouragement of innovative solutions to the problem of medical errors. Additional sections of state law stipulate facility reporting requirements, and requires that the Agency for Healthcare Administration (AHCA) post summary reports and trend analyses, covering the eight most serious adverse incidents at least quarterly as well as an annual report of all adverse incidents (Florida Statutes, 2018a).

In addition, a separate section of state law requires the Florida Agency for Healthcare Administration to collect data on **hospital-acquired infections** (**HAIs**) (Florida Statues, 2018b; FDOH, 2018).

In 2011 the Florida Department of Health announced it received funding from the American Recovery and Reinvestment Act to develop a Healthcare-Associated Infection Prevention Program intended to help monitor and prevent these infections. Data and information through 2015 is available from the CDC at: https://www.cdc.gov/HAI/stateplans/state-hai-plans/fl.html (CDC, 2015). Newer information can be accessed here: https://gis.cdc.gov/grasp/PSA/HAIreport.html.

Florida acute care hospitals showed improvement between 2015 and 2016 with significant decreases in and lower SIRs compared to national baselines for CLABSIs, CAUTIs, C. *difficile* events, VAEs, and SSIs with colon surgery. However, while there was a significant decrease in MRSA bacteremia, the SIR is still 12% higher than the national baseline and with abdominal hysterectomy there was no change in either number or SIR compared to baseline. The numbers in long-term acute care hospitals and inpatient rehabilitation facilities reflect little change or improvement.

Note: SIR, or standardized infection ratio, is a summary statistic that can be used to track HAI prevention progress over time.

3. Types of Medical Errors

> Error is defined as the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim.
>
> Institute of Medicine [sic], 1999
> *To Err Is Human: Building a Safer Health System*

There are many ways that medical care can go wrong. Errors can occur around the administration of medications, during laboratory testing, when infections occur within the healthcare setting, as a result of surgery, in an environment that contributes to pressure sores or a patient fall, or even in documentation or data entry tasks.

A number of healthcare organizations and government agencies have lists of medical errors on which they focus, but the seven discussed here appear across lists from most oversight organizations and are the ones most commonly encountered:

1. Medication events (including adverse drug events/reactions)
2. Healthcare-associated infections (HAIs)
3. Surgical errors
4. Laboratory errors
5. Patient Falls
6. Pressure sores
7. Documentation/computer errors (NQF, 2011; AHRQ, 2018; CMS, 2018; Joint Commission, 2016; NHSN, 2019)

Medical errors are everyone's business and everyone's responsibility. Whether you are a healthcare professional, a family caregiver, or a patient, the more you know, the better you can protect yourself and others. How much you need to know varies with your situation.

Nursing professionals need a wider range of information about medication errors, for example, but every occupational or physical therapist will be better able to observe and protect their patients if they possess an appropriate understanding of the effects and symptoms of medication problems. The same is essentially true across all categories of medical errors.

An individual may not need to know as much detail as the healthcare professional, but the bottom line is that we each must be advocates for our own healthcare. We need to be prepared to recognize potential problems and ask questions of our healthcare providers, and to know when to act.

Our culture has not always been one that promotes questioning of authority figures but, as with all things human, errors can happen in healthcare and those errors can have life changing or life ending consequences. In late November 2018, a lengthy investigation by the *Tampa Bay Times* into a pattern of deadly errors at All Children's Heart Institute in Tampa, Florida, brought to light the many ways in which error can creep in and be compounded and we may not be prepared to question and report soon enough to prevent tragedy (McGrory & Bedi, 2018).

Medication Events

Eighty-two percent of American adults take at least one medication and 29% take five or more—and the potential for medication events is likely to grow.

Medication Errors

The National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) defines a **medication error** as:

> **any preventable event that may cause or lead to inappropriate medication use or patient harm** while the medication is in the control of the healthcare professional, patient, or consumer. Such events may be related to professional practice, healthcare products, procedures, and systems, including prescribing; order communication; product labeling, packaging, and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use (NCCMERP, 2019; USFDA, 2018).

Medication errors can occur throughout the medication-use system, such as when prescribing a drug; upon entering information into a computer system; when the drug is being prepared or dispensed; or when the drug is given to or taken by a patient. The U.S. Food and Drug Administration (FDA) receives more than 100,000 U.S. reports each year associated with a suspected medication error (USFDA 2018).

Common causes of such errors include:

- Poor communication,
- Ambiguities in product names, directions for use, medical abbreviations or writing,
- Poor procedures or techniques, or
- Patient misuse because of poor understanding of the directions for use of the product.

In addition, job stress, lack of product knowledge or training, or similar labeling or packaging of a product may be the cause of, or contribute to, an actual or potential error (USFDA, 2017).

Not all medication errors result in harm to the patient. For example, if the dosage or route were prescribed incorrectly but the error was caught prior to administration (often called a “near miss”), there was no patient harm. That said, any type of medication error must be tracked so preventions can be developed, regardless of whether a patient was harmed.

Adverse Drug Events (ADEs)

Adverse drug events are harms resulting from the use of medication and include allergic reactions, side effects, overmedication, and medication errors (CDC, 2018).

Adverse drug events (ADEs) cause an estimated 1.3 million emergency department visits each year and $3.5 billion is spent on excess medical costs of ADEs annually. The CDC notes that the numbers of ADEs will likely grow, due to development of new medications, discovery of new uses for older medications, an aging American population, increase in the use of medications for disease prevention, and increased coverage for prescription medications (CDC, 2018a).

According to the federal Office of Disease Prevention and Health Promotion, ADEs are responsible for a staggering number of harmful patient impacts.

In inpatient settings, ADEs:

- Account for an estimated 1 in 3 of all hospital adverse events
- Affect about 2 million hospital stays each year
- Prolong hospital stays by 1.7 to 4.6 days
- In outpatient settings, ADEs account annually for:
- Over 3.5 million physician office visits
- An estimated 1 million emergency department visits
- Approximately 125,000 hospital admissions (ODPHP, 2019)

In addition, the CDC notes that ADEs are responsible for $3.5 billion in extra medical expenses as well as 40% of preventable ambulatory care costs (CDC, 2018).

A large majority of ADEs are preventable. It is believed that reducing ADEs will have numerous benefits including safer and higher quality healthcare services, reduced healthcare costs, more informed and engaged consumers, and improved health outcomes (ODPHP, 2019).

Reporting an Adverse Drug Event

MedWatch, the FDA's safety information and adverse event reporting program, plays a critical role in the agency's post marketing surveillance—the process of following the safety profile of medical products after they've begun to be used by consumers. Through MedWatch, a voluntary program, health professionals report adverse reactions, product problems, and use errors related to drugs, biologics, medical devices, dietary supplements, cosmetics, and infant formulas (USFDA, 2016).

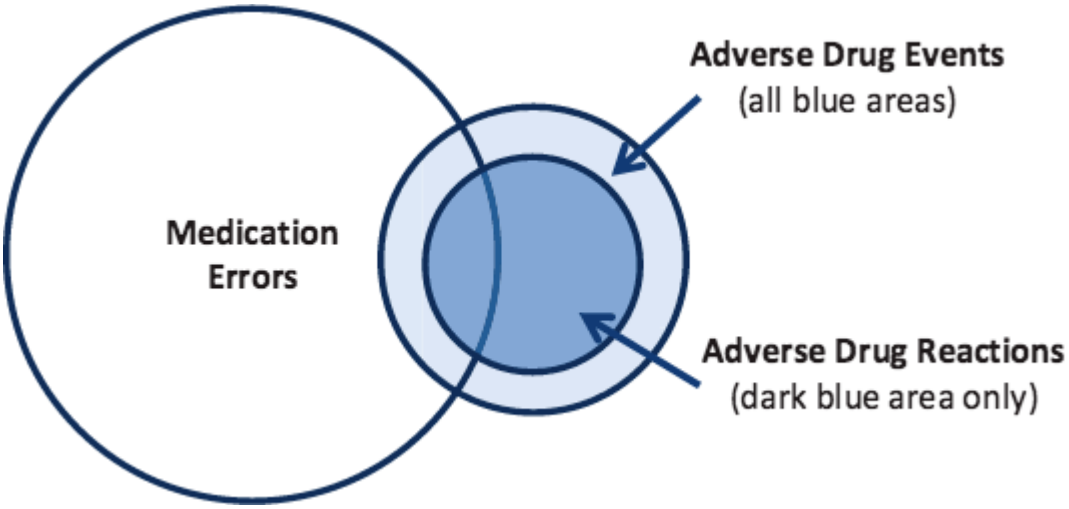
The MedWatch program has two main goals:

- Facilitate the reporting of problems
- Get safety information out to the public (USFDA, 2016)
- There are three ways to report an adverse event to MedWatch:
- Complete the voluntary Form FDA 3500 online here.
- Call 800 FDA 1088 to report by telephone.
- Download a reporting form: Form FDA 3500 or 3500B (consumer/patient form) and either fax it to 800 FDA 0178 or mail it (USFDA, 2018b).

Adverse Drug Reactions (ADRs)

While all adverse drug reactions are adverse drug events, not all adverse drug events are adverse drug reactions. A patient given the wrong medication is an adverse drug event but not an adverse drug reaction because the medication in question was not used as it was intended. The figure below helps to clarify how the medication-related errors differ and relate to one another.

Adverse Drug Reactions (ADRs)



Source: ODPHP, 2014.

Adverse drug reactions are a leading cause of injury and death; it is estimated they cause 100,000 deaths annually in the United States (USFDA, 2018).

More than 2 million serious ADRs occur each year, 350,000 in nursing homes alone. In recent years the number of medications prescribed to patients has increased dramatically and, not surprisingly, adverse drug reactions have also increased (USFDA, 2018).

There are three main causes for adverse reactions:

- As many as two-thirds of all patient visits to a doctor result in a prescription, and there are more drugs and combinations of drugs being used than ever before.
- More than 4 billion prescriptions were filled in 2017 at retail pharmacies alone, nearly 10 prescriptions per person in the United States.
- ADRs increase exponentially when a patient is taking four or more medications (USFDA, 2018; KFF, 2018).

The drug approval process may also play a role in the increase of adverse drug reactions. A drug that is tested in only a few thousand people may have an excellent safety profile in those patients, but some drugs require many more exposures to detect an adverse reaction—particularly reactions that occur with low frequencies.

According to the FDA learning module *Preventable Adverse Drug Reactions: A Focus on Drug Interactions*, most drugs are approved for use by the FDA with an average of only 1,500 patient exposures and tested for a relatively short period of time. A few million patients may take a new drug before the low-frequency adverse reactions are identified. For drugs that cause rare toxicity, the toxicity will only be detected after use by many more thousands of patients (USFDA, 2018a).

Reducing Adverse Drug Reactions Through Technology

Adverse drug reactions can be detected and prevented through systems intervention. Tools such as computerized physician orders and prescription entry (CPOE) and barcoding systems have taken the guess work out of reading written prescriptions for nurses and pharmacists. Medication errors can be

reduced potentially through the use of electronic health records (EHRs) as well as drug-interaction screening software that detects and alerts the physician and pharmacist to potentially serious drug interactions.

The HITECH Act's meaningful use policy has specific medication management measures:

- Using computerized provider order entry (CPOE) systems for medication orders
- Implementing decision support systems to check for drug–drug and drug–allergy interactions
- Having the capability to electronically exchange key clinical information (such as medication lists, medication allergies, and test results) with other providers
- Maintaining an active medication list, and
- Maintaining an active medication allergy list (Murphy & White, 2014)

Closer to home, a study funded by AHRQ found Florida hospitals that adopted all five core measures of meaningful use for medication management in 2010 had the lowest rate of adverse drug events of all hospitals in the state. Intriguingly, hospitals where physicians objected to adopting HITECH's meaningful use measures for medication management saw their adverse drug events *increase* by 14%, compared to a 52% *reduction* at hospitals where physicians supported the medication management meaningful use measures (Murphy & White, 2014).

The AVOID Mnemonic

Clinicians cannot rely solely on technology to prevent errors in prescribing and administering of medications. Frequent consultation with other members of the healthcare team is invaluable.

Use of an organized, step-wise approach also helps prevent drug interactions. The **AVOID** mistakes mnemonic can be used to collect all necessary information for the medication history (see table below).

Keyword	What to Ask
Allergies	Ask the patient if there is any drug that should not be prescribed for any reason.
Vitamins or herbs	Ask the patient whether the patient is taking or has a reaction to any herb, vitamin, or "alternative" or "natural" product.
Old drugs and over the counter (OTC) drugs…in addition to all current drugs	Ask about old drugs (prescription and OTC) as well as current drugs the patient is taking. Some of these drugs may have relatively long-lasting effects (either toxicity or potential for drug interactions).
Interactions	Evaluate the potential for adverse drug interactions. Consider a behavioral contract between the physician and the patient in an effort to help the patient reach the therapeutic goal, either in the case of drug dependence or adherence to a therapeutic regimen, with a clear plan.
Dependence potential	Is the patient drug dependent or at risk of dependence on, for example, opioids, benzodiazepines, alcohol, or other substances of abuse. Consider a behavioral contract

Keyword	What to Ask
	between the physician and the patient in an effort to help the patient reach the therapeutic goal, both in the case of drug dependence and in adherence to a therapeutic regimen.
Mendel (genetics)	Genetics: Is there a family history of benefits from or problems with any drugs?

Specific Preventive Measures

Naming, Labeling, Packaging, and Abbreviations

The FDA looks for ways to prevent medication errors. Before drugs are approved for marketing, it reviews the drug name, labeling, packaging, and product design to identify and revise information that may contribute to medication errors. For example, the FDA reviews:

- Proposed proprietary (brand) names to minimize confusion among drug names. Using simulated prescriptions and computerized models, it determines the acceptability of proposed proprietary names to minimize medication errors associated with product name confusion.
- Container labels to help healthcare providers and consumers select the right drug product. If a drug is made in multiple strengths the labels of each container should be easy to differentiate. The label design may use different colors or identify the strength in large bold numbers and letters.
- Prescribing and patient information to ensure the directions for prescribing, preparing, and use are clear and easy to read.

After drugs are approved for marketing in the United States, the FDA monitors and evaluates medication error reports. It may require a manufacturer to revise the labels, labeling, packaging, product design or proprietary name to prevent medication errors. The FDA may also issue communications alerting the public about a medication error safety issue with a variety of communications (FDA, 2018).

The FDA recommends that clinicians review the Institute for Safe Medical Practices' *List of Error-Prone Abbreviations, Symbols and Dose Designations* as shown in the following tables.

Source: ISMP, 2017.

Abbreviation	Intended Meaning	Misinterpretation	Correction
µg	Microgram	Mistaken as "mg"	Use "mcg"
AD, AS, AU	Right ear, left ear, each ear	Mistaken as OD, OS, OU (right eye, left eye, each eye)	Use "right ear," "left ear," or "each ear"

Source: ISMP, 2017.

Abbreviation	Intended Meaning	Misinterpretation	Correction
OD, OS, OU	Right eye, left eye, each eye	Mistaken as AD, AS, AU (right ear, left ear, each ear)	Use “right eye,” “left eye,” or “each eye”
BT	Bedtime	Mistaken as “BID” (twice daily)	Use “bedtime”
cc	Cubic centimeters	Mistaken as “u” (units)	Use “mL”
D/C	Discharge or discontinue	Premature discontinuation of medications if D/C (intended to mean “discharge”) has been misinterpreted as “discontinued” when followed by a list of discharge medications	Use “discharge” and “discontinue”
IJ	Injection	Mistaken as “IV” or “intrajugular”	Use “injection”
IN	Intranasal	Mistaken as “IM” or “IV”	Use “intranasal” or “NAS”
HS	Half-strength	Mistaken as bedtime	Use “half-strength” or “bedtime”
hs	At bedtime, hours of sleep	Mistaken as half-strength	Use “half-strength” or “bedtime”
IU**	International unit	Mistaken as IV (intravenous) or 10 (ten)	Use “units”
o.d. or OD	Once daily	Mistaken as “right eye” (OD-oculus dexter), leading to oral liquid medications administered in the eye	Use “daily”
OJ	Orange juice	Mistaken as OD or OS (right or left eye); drugs meant to be diluted in orange juice may be given in the eye	Use "orange juice"
Per os	By mouth, orally	The “os” can be mistaken as “left eye” (OS-oculus sinister)	Use “PO,” “by mouth,” or “orally”
q.d. or QD**	Every day	Mistaken as q.i.d., especially if the period after the “q” or the tail of the “q” is misunderstood as an “i”	Use “daily”

Source: ISMP, 2017.

Abbreviation	Intended Meaning	Misinterpretation	Correction
qhs	Nightly at bedtime	Mistaken as “qhr” or every hour	Use “nightly”
qn	Nightly or at bedtime	Mistaken as “qh” (every hour)	Use “nightly” or “at bedtime”
q.o.d. or QOD**	Every other day	Mistaken as “q.d.” (daily) or “q.i.d. (four times daily) if the “o” is poorly written	Use “every other day”
q1d	Daily	Mistaken as q.i.d. (four times daily)	Use “daily”
q6PM, etc	Every evening at 6 PM	Mistaken as every 6 hours	Use “daily at 6 PM” or “6 PM daily”
SC, SQ, sub q	Subcutaneous	SC mistaken as SL (sublingual); SQ mistaken as “5 every;” the “q” in “sub q” has been mistaken as “every” (e.g., a heparin dose ordered “sub q 2 hours before surgery” misunderstood as every 2 hours before surgery)	Use “subcut” or “subcutaneously”
ss	Sliding scale (insulin) or ½ (apothecary)	Mistaken as “55”	Spell out “sliding scale;” use “one-half” or “½”
SSRI	Sliding scale regular insulin	Mistaken as selective-serotonin reuptake inhibitor	Spell out “sliding scale (insulin)”
SSI	Sliding scale insulin	Mistaken as Strong Solution of Iodine (Lugol’s)	Spell out “sliding scale (insulin)”
i/d	One daily	Mistaken as “tid”	Use “1 daily”
TIW or tiw	3 times a week	Mistaken as “3 times a day” or “twice in a week”	Use “3 times weekly”
U or u**	Unit	Mistaken as the number 0 or 4, causing a 10-fold overdose or greater (e.g., 4U seen as “40” or 4u seen	Use “unit”

Source: ISMP, 2017.

Abbreviation	Intended Meaning	Misinterpretation	Correction
		as “44”); mistaken as “cc” so dose given in volume instead of units (e.g., 4u seen as 4cc)	
UD	As directed (“ut dictum”)	Mistaken as unit dose (e.g., diltiazem 125 mg IV infusion “UD” misin- terpreted as meaning to give the entire infusion as a unit [bolus] dose)	Use “as directed”

Source: ISMP, 2017.

Dose Designations and Other Information	Intended Meaning	Misinterpretation	Correction
Trailing zero after decimal point (e.g., 1.0 mg)**	1 mg	Mistaken as 10 mg if the decimal point is not seen	Do not use trailing zeros for doses expressed in whole numbers
“Naked” decimal point (e.g., .5 mg)**	0.5 mg	Mistaken as 5 mg if the decimal point is not seen	Use zero before a decimal point when the dose is less than a whole unit
Abbreviations such as mg. or mL. with a period following the abbreviation	mg mL	The period is unnecessary and could be mistaken as the number 1 if written poorly	Use mg, mL, etc. without a terminal period
Drug name and dose run together (especially problematic for drug names that end in “l” such as Inderal40 mg; Tegretol300 mg)	Inderal 40 mg, Tegretol 300 mg	Mistaken as Inderal 140 mg, Mistaken as Tegretol 1300 mg	Place adequate space between the drug name, dose, and unit of measure
Numerical dose and unit of measure run together (e.g., 10mg, 100mL)	10 mg, 100 mL	The “m” is sometimes mistaken as a zero or two zeros, risking a 10- to 100-fold overdose	Place adequate space between the dose and unit of measure
Large doses without properly placed commas (e.g., 100000 units; 1000000 units)	100,000 units;	100000 has been mistaken as 10,000 or 1,000,000; 1000000 has been mistaken as 100,000	Use commas for dosing units at or above 1,000, or use words such as 100 "thousand" or 1

Source: ISMP, 2017.

Dose Designations and Other Information	Intended Meaning	Misinterpretation	Correction
	1,000,000 units		"million" to improve readability

Source: ISMP, 2017.

Drug Name Abbreviations	Intended Meaning	Misinterpretation	Correction
To avoid confusion, do not abbreviate drug names when communicating medical information. Examples of drug name abbreviations involved in medication errors include:			
APAP	acetaminophen	Not recognized as acetaminophen	Use complete drug name
ARA A	vidarabine	Mistaken as cytarabine (ARA C)	Use complete drug name
AZT	zidovudine (Retrovir)	Mistaken as azathioprine or aztreonam	Use complete drug name
CPZ	Compazine (prochlorperazine)	Mistaken as chlorpromazine	Use complete drug name
DPT	Demerol-Phenergan-Thorazine	Mistaken as diphtheria-pertussis-tetanus (vaccine)	Use complete drug name
DTO	Diluted tincture of opium, or deodorized tincture of opium (Paregoric)	Mistaken as tincture of opium	Use complete drug name
HCl	hydrochloric acid or hydrochloride	Mistaken as potassium chloride (The “H” is misinterpreted as “K”)	Use complete drug name unless expressed as a salt of a drug

Source: ISMP, 2017.

Drug Name Abbreviations	Intended Meaning	Misinterpretation	Correction
HCT	hydrocortisone	Mistaken as hydrochlorothiazide	Use complete drug name
HCTZ	hydrochlorothiazide	Mistaken as hydrocortisone (seen as HCT250 mg)	Use complete drug name
MgSO4**	magnesium sulfate	Mistaken as morphine sulfate	Use complete drug name
MS, MSO4**	morphine sulfate	Mistaken as magnesium sulfate	Use complete drug name
MTX	methotrexate	Mistaken as mitoxantrone	Use complete drug name
NoAC	novel/new oral anticoagulant	No anticoagulant	Use complete drug name
PCA	procainamide	Mistaken as patient controlled analgesia	Use complete drug name
PTU	propylthiouracil	Mistaken as mercaptopurine	Use complete drug name
T3	Tylenol with codeine No. 3	Mistaken as liothyronine	Use complete drug name
TAC	triamcinolone	Mistaken as tetracaine, Adrenalin, cocaine	Use complete drug name
TNK	TNKase	Mistaken as “TPA”	Use complete drug name
TPA or tPA	tissue plasminogen activator, Activase (alteplase)	Mistaken as TNKase (tenecteplase), or less often as another tissue plasminogen activator, Retavase (retaplase)	Use complete drug name

Source: ISMP, 2017.

Drug Name Abbreviations	Intended Meaning	Misinterpretation	Correction
ZnSO4	zinc sulfate	Mistaken as morphine sulfate	Use complete drug name

Source: ISMP, 2017.

Stemmed Drug Names	Intended Meaning	Misinterpretation	Correction
“Nitro” drip	nitroglycerin infusion	Mistaken as sodium nitroprusside infusion	Use complete drug name
“Norflox”	norfloxacin	Mistaken as Norflex	Use complete drug name
“IV Vanc”	intravenous vancomycin	Mistaken as Invanz	Use complete drug name

Source: ISMP, 2017.

Symbols	Intended Meaning	Misinterpretation	Correction
ʒ	Dram	Symbol for dram mistaken as “3”	Use the metric system
♏	Minim	Symbol for minim mistaken as “mL”	Use the metric system
x3d	For three days	Mistaken as “3 doses”	Use “for three days”
> and <	More than and less than	Mistaken as opposite of intended; mistakenly use incorrect symbol; “< 10” mistaken as “40”	Use “more than” or “less than”
/ (slash mark)	Separates two doses or indicates “per”	Mistaken as the number 1 (e.g., “25 units/10 units” misread as “25 units and 110” units)	Use “per” rather than a slash mark to separate doses
@	At	Mistaken as “2”	Use “at”

Source: ISMP, 2017.

Symbols	Intended Meaning	Misinterpretation	Correction
&	And	Mistaken as “2”	Use “and”
+	Plus or and	Mistaken as “4”	Use “and”
°	Hour	Mistaken as a zero (e.g., q2° seen as q 20)	Use “hr,” “h,” or “hour”
Φ or Ø	zero, null sign	Mistaken as numerals 4, 6, 8, and 9	Use 0 or zero, or describe intent using whole words

High-Alert Medications and Black Box Warnings

High-alert (or high-hazard) medications are those that are “most likely to cause significant harm to the patient even when used as intended.” However, some of these medications also have a higher volume of use than other medications. Though medication mishaps with these high-alert drugs are no more frequent than with other drugs, the consequences can be devastating (USDVA, 2015a; IHI, 2012).

High-alert drugs fall into as many as 19 categories and improved management of all of them is important, but four categories are more frequently associated with harm:

- Anticoagulants
- Narcotics and opiates
- Insulins
- Sedatives (IHI, 2012)

The types of harm most frequently associated with these drugs include hypotension, bleeding, hypoglycemia, delirium, lethargy, and over-sedation (IHI, 2012).

The FDA’s Black Box Warning System alerts healthcare providers and consumers to drugs with increased risks for those taking them. These warnings are meant to be the strongest labeling requirement for drugs and drug products that can have serious adverse reactions or potential safety hazards, especially those that may result in death or injury. The black box—a heavy black line surrounding the warning—appears on the prescription label to alert patient and provider about safety concerns.

The FDA (www.fda.gov) does not issue an itemed list of these high-alert drugs but does provide detailed information about each of them, which is constantly updated with new information. Some commonly used black box–warning drugs include heparin, warfarin, insulin, Avandia, Ritalin, estrogen-containing contraceptives, and most antidepressants. Although a large percentage of patients are prescribed medications with black box warnings, many do not understand the warnings or receive the advised laboratory monitoring (Hughes & Blegen, 2008).

Healthcare-Associated Infections (HAIs)

Healthcare-associated infections (HAIs) are some of the most common complications associated with hospital care in the United States.

In the most recent HAI prevalence survey using 2015 data, researchers from the CDC found that about 1 in 31 hospital patients had at least one healthcare-associated infection. Patients in the 2015 survey were 16% less likely than patients in the 2011 survey to have an HAI. There were an estimated 687,000 HAIs in U.S. acute care hospitals in 2015 and about 72,000 hospital patients with HAIs died during their hospitalization (AHRQ, 2019a; CDC, 2018b).

A 2013 study found that just five types of infections account for some $9.8 billion annually (Zimlichman et al., 2013) and the costs of HAIs are everywhere into the multi-millions of dollars—for events that are widely known to be largely preventable.

The *National Action Plan to Prevent Healthcare-Associated Infections: Road Map to Elimination* by the federal Office of Disease Prevention and Health Promotion (ODPHP) and a broad consortium of other federal agencies, including the U.S. Department of Health and Human Services (HHS) and CDC, adopted the following **six priority areas with reduction targets**:

- Catheter-associated urinary tract infection
- *Clostridium difficile* Infection (now *Clostridioides difficile*)
- Central line–associated bloodstream infection
- MRSA (Methicillin-resistant *Staphylococcus aureus*) infection
- Surgical site infection
- Ventilator-associated pneumonia (now ventilator-associated events) (US ODPHP, 2013)

Surgical Site Infections (SSIs)

Surgical site infections (SSIs) are those that occur after surgery in the part of the body where the surgery took place. SSIs can sometimes be superficial, involving only the skin, but others are more serious and can involve tissues under the skin, organs, or implanted material.

Common symptoms of an SSI include:

- Redness and pain near the surgical wound
- Drainage of cloudy fluid from the surgical wound
- Fever (CDC, 2010)

SSIs are the most common hospital-acquired infection, according to the CDC, accounting for more than 30% of all inpatient HAIs. While there have been advances in infection control practices and decreases in some SSIs, they remain a substantial cause of morbidity, prolonged hospitalization, and death. In addition, they are the mostly costly HAI type, with an estimated annual cost of $3.3 billion, and are associated with 1 million additional inpatient-days annually (NHSN, 2019).

SSIs are not only a national issue, but a local one as well. A 2012 study of 851 patients at nine hospitals in Jacksonville, Florida, found 51 had HAIs, 18 with surgical site infections. These accounted for the largest type of HAI in the study, or 35% among the patients with HAIs (Magill et al., 2012). As noted earlier, the most recent data for Florida shows no significant change from 2015 to 2016 in SSIs related to abdominal hysterectomy surgery but a significant decrease in SSIs associated with colon surgery (CDC, 2018).

Preventing SSIs

New detailed guidelines for prevention of SSIs were released by the CDC in 2017. They and related information are contained in the National Healthcare Safety Network (NHSN) Patient Safety Component Manual updated in January 2019 and in the JAMA Surgery Special Communication on the guidelines issued in August 2017 (see NHSN, 2019, and Berríos-Torres et al., 2017, in Resources).

Central Line–Associated Bloodstream Infections

A central line (also known as a central venous catheter) is a catheter (tube) often placed in a large vein in the neck, chest, or groin to give medication or fluids or to collect blood for medical tests. Unlike more familiar IVs, central lines access a major vein that is close to the heart and can remain in place for weeks or months and be much more likely to cause serious infection. Central lines are commonly used in intensive care units but are used in other situations as well (CDC, 2011).

A central line-associated bloodstream infection (CLABSI) is a serious infection that occurs when germs (usually bacteria or viruses) enter the bloodstream through the central line. They result in thousands of deaths each year and billions of dollars in added costs to the U.S. healthcare system, yet these infections are preventable (CDC, 2016, 2011).

Healthcare providers follow a strict protocol when inserting the line to make sure it remains sterile. In addition, they use stringent infection control practices each time they check the line or change the dressing. Patients who get a CLABSI have a fever and might also have red skin and soreness around the central line. If this happens, tests must be done to determine if there is an infection present (CDC, 2011).

The good news is that prevention measures of CLABSIs are having an impact. The CDC's 2016 HAI Progress Report, based on 2014 data, shows a significant decrease in CLABSIs between 2013 and 2014. Florida also saw a decrease in the same time period (CDC, 2016).

Preventing CLABSIs

Healthcare providers can take the following steps to help prevent CLABSIs:

- Perform hand hygiene.
- Apply appropriate skin antiseptic.
- Ensure that the skin prep agent has completely dried before inserting the central line.
- Use all five maximal sterile barrier precautions:
    - Sterile gloves
    - Sterile gown
    - Cap
    - Mask
    - Large sterile drape
- Once the central line is in place:
    - Follow recommended central line maintenance practices.

    - Wash their hands with soap and water or an alcohol-based hand rub before and after touching the line.

- Remove a central line as soon as it is no longer needed. The sooner a catheter is removed, the less likely the chance of infection. (CDC, 2011)

More detailed information and guidelines on CLASBI prevention is available from the CDC, the Joint Commission (2012), and the National Healthcare Safety Network (NHSN, 2019), and should be a part of all healthcare facility training protocols.

Ventilator-Associated Events (VAE) and Ventilator-Associated Pneumonia (VAP)

In 2011 an estimated 157,000 healthcare-associated pneumonias occurred in acute care hospitals in United States; 39% of these pneumonias were ventilator-associated (VAP). Patients receiving invasive mechanical ventilation are at risk for numerous complications, including pneumonia.

Ventilator-associated pneumonia (VAP) and other healthcare-associated pneumonias are important common healthcare-associated infections, but national surveillance for VAP has long been a challenge because of the lack of objective reliable definitions. Due to these challenges, in January 2013 the National Healthcare Safety Network (NHSN) replaced surveillance for ventilator-associated pneumonia (VAP) in adult inpatient locations with surveillance for ventilator-associated events (VAE). (NHSN, 2019).

Mechanical ventilation is an essential, life-saving therapy for patients with critical illness and respiratory failure. Studies have estimated that more than 300,000 patients receive mechanical ventilation in the United States each year. These patients are at high risk for complications and poor outcomes, including death. Ventilator-associated pneumonia (VAP), sepsis, acute respiratory distress syndrome (ARDS), pulmonary embolism, barotrauma, and pulmonary edema are among the complications that can occur in patients receiving mechanical ventilation; such complications can lead to longer duration of mechanical ventilation, longer stays in the ICU and hospital, increased healthcare costs, and increased risk of disability and death (NHSN, 2019).

Preventing VAP

To prevent ventilator-associated pneumonia, healthcare providers can do the following things:

- Keep the head of the patient's bed raised between 30 and 45 degrees unless other medical conditions do not allow this.
- Check the patient's ability to breathe on own every day so that the patient can be taken off of the ventilator as soon as possible.
- Clean hands with soap and water or an alcohol-based hand rub before and after touching the patient or the ventilator.
- Clean the inside of the patient's mouth on a regular basis.
- Clean or replace equipment between use on different patients. (CDC, 2010a)

Detailed current guidance on diagnosing and managing VAP and VAEs is available from NHSN (2019).

Catheter-Associated Urinary Tract Infections

Urinary tract infections (UTIs)—infection involving any of the organs or structures of the urinary tract, including urethra, bladder, ureters, and kidneys—are the most common type of healthcare-associated

infection reported to the National Healthcare Safety Network (NHSN). Some of the common symptoms of a urinary tract infection are burning or pain in the lower abdomen (that is, below the stomach), fever, burning during urination, or an increase in the frequency of urination.

Among UTIs acquired in the hospital, approximately 75% are associated with a urinary catheter. An indwelling urinary catheter is a drainage tube that is inserted into the urinary bladder through the urethra, is left in place, and is connected to a closed collection system.

Between 15% and 25% of hospitalized patients receive urinary catheters during their hospital stay, and the most important risk factor for developing a catheter-associated UTI (CAUTI) is prolonged use of the urinary catheter. Therefore, catheters should only be used for appropriate indications and should be removed as soon as they are no longer needed. (CDC, 2017a, 2015a; Lo et al., 2014).

Preventing CAUTIs

The CDC recommends that healthcare practitioners utilize the *Guideline for Prevention of Catheter-Associated Urinary Tract Infections, 2009* (updated 2017) found at https://www.cdc.gov/infectioncontrol/guidelines/CAUTI/index.html. The guideline emphasizes the proper use, insertion, and maintenance of urinary catheters in various healthcare settings. It also presents effective quality improvement programs that healthcare facilities can use to prevent CAUTIs. Links to additional guidelines are listed here.

In a December 2018 report, the AHRQ noted that Tampa General Hospital had lowered the CAUTI rate attributed to the emergency department by 75% and reduced the department's indwelling urinary catheter utilization ratio by 23%. This was accomplished by use of a broadly supported program that integrated tools from AHRQ (AHRQ, 2018e).

Hospital-Onset Clostridioides difficile *Infections*

Clostridioides difficile (formerly *Clostridium difficile*) is a bacterium that causes diarrhea that can be life threatening and colitis, an inflammation of the colon. It is usually a side effect of taking antibiotics. *Clostridioides difficile* is also called *C. difficile*, *C. diff*, CDI (*C. diff* infection), and CDAD (*Clostridioides difficile*-associated disease).

C. difficile can easily spread from person to person and is a major health threat. A CDC study in 2015 found that it caused almost half a million infections among patients in the United States in a single year. An estimated 15,000 deaths are directly attributable to *C. difficile* infections (CDC, 2019, 2019a).

Poor antibiotic prescribing practices put patients at risk for *C. diff* infections (CDI). More than half of all hospitalized patients get an antibiotic at some point during their hospital stay, but studies have shown that 30% to 50% of antibiotics prescribed in hospitals are unnecessary or incorrect (CDC, 2019).

Additional risk factors include:

- Being 65 or older
- Complicated medical care and extended stays in settings like hospitals and nursing homes
- Certain antibiotics, such as fluoroquinolones
- A weakened immune system

- Previous infection with *C. diff* or known exposure to the germs (CDC, 2019, 2019a, 2018c)

Symptoms, which might start within a few days or even several weeks after a patient begins taking antibiotics, include:

- Diarrhea including loose, watery stools or frequent bowel movements for several days
- Fever
- Stomach tenderness or pain
- Loss of appetite
- Nausea

C. difficile is carried from person to person in feces. Any surface, device, or material (eg, toilets, bathtubs, electronic rectal thermometers) that becomes contaminated with feces may serve as a reservoir for the spores. *C. difficile* spores are often transferred to patients via the hands of healthcare personnel who have touched a contaminated surface or item. *C. difficile* can live for long periods on surfaces (CDC, 2018c).

While *C. difficile* can be deadly, protocols put in place by multiple public and private healthcare organizations are having an effect on the spread of the disease. The *National and State Healthcare-Associated Infections Progress Report* showed an 8% decrease in hospital-onset *C. difficile* infections between 2011 and 2014 (CDC, 2016a).

C. DIFF FACTSHEET

Clostridioides difficile (formerly known as *Clostridium difficile*) is a bacterium that causes diarrhea and colitis (an inflammation of the colon). *C. diff* infections can be deadly.

IMPACT

C. diff causes close to half a million illnesses each year and can affect people of all ages.[1]

1 in 5 patients will get *C. diff* at least once more.[1]

One in 11 people over 65 diagnosed with a healthcare-associated *C. diff* infection die within a month.[1]

RISK

People on antibiotics are 7 to 10 times more likely to get *C. diff* while on the drugs and during the month after.[2]

Extended stays in healthcare settings, especially hospitals and nursing homes, also increase risk.

More than 80% of *C. diff* deaths occur in people 65 and older.

SPREAD

C. diff spreads when people touch surfaces that are contaminated with poop from an infected person.

Or when people don't wash their hands with soap and water.

It can also happen when one healthcare facility fails to notify another when it transfers a patient with *C. diff.*

Healthcare professionals can help PREVENT *C. diff by:*

Improving the way they prescribe antibiotics.

Using the tests that give the most accurate results.

Rapidly identifing and isolating patients with *C. diff.*

Wearing gloves and gowns when treating patients with *C. diff*—and remembering that hand sanitizer doesn't kill *C. diff.*

Cleaning surfaces in rooms where *C. diff* patients are treated with EPA-approved, spore-killing disinfectant (see List K).

cdc.gov/cdiff

[1] Table 3 from Lessa FC, Mu Y, Bamberg WM et al. N Engl J Med 2015;372:825-34. DOI: 10.1056/NEJMoa1408913
[2] Hensgens MPM, Goorhuis A, Dekkers OM, Kuijper EJ. J Antimicrob Chemother 2011. DOI: 10.1093/jac/dkr508

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CDC

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

C. Diff Factsheet available at https://www.cdc.gov/cdiff/pdf/Cdiff-Factsheet-508.pdf

Preventing *C. difficile* Infections

To prevent *C. difficile* infections, healthcare providers should:

- Use antibiotics judiciously.
- Use contact precautions for patients with known or suspected CDI:
    - Place these patients in private rooms. If private rooms are not available, they can be placed in rooms (cohorted) with other CDI patients.
    - Use gloves when entering patients' rooms and during patient care.
    - Perform hand hygiene after removing gloves.
- Because alcohol does not kill *C. diff* spores, use of soap and water is more effective than alcohol-based hand rubs. However, early experimental data suggest that, even using soap and water, the removal of *C. diff* spores is more challenging than the removal or inactivation of other common pathogens.
- Using gloves to prevent hand contamination remains the cornerstone for preventing *C. diff* transmission via the hands of healthcare personnel; any theoretical benefit from instituting soap and water must be balanced against the potential for decreased compliance resulting from a more complex hand hygiene message.
- If your institution experiences an outbreak, consider using only soap and water for hand hygiene after removing gloves while caring for patients with CDI.
- Use gowns when entering patients' rooms and during patient care.
- Dedicate or perform cleaning of any shared medical equipment.
- Continue these precautions until diarrhea ceases.
    - Because *C. diff*-infected patients continue to shed the organism for a number of days following cessation of diarrhea, some institutions routinely continue isolation and contact precautions for either several days beyond symptom resolution or until discharge, depending upon the type of setting and average length of stay.
- Implement an environmental cleaning and disinfection strategy.
    - Ensure adequate cleaning and disinfection of environmental surfaces and reusable devices, especially items likely to be contaminated with feces and surfaces that are touched frequently.
- Ensure daily and terminal cleaning of patient rooms.
    - Use an Environmental Protection Agency (EPA)-registered disinfectant with a sporicidal claim for environmental surface disinfection after cleaning in accordance with label instructions. (Note: Only hospital surface disinfectants listed on EPA's List K are registered as effective against *C. diff* spores.)
    - Follow the manufacturer's instructions for disinfection of endoscopes and other devices.

Recommended infection control practices in long-term care and home health settings are similar to those practices taken in traditional healthcare settings (CDC, 2018c).

Antibiotic/Antimicrobial Resistance (AR/AMR)

Antibiotic resistance is one of the biggest public health challenges of our time. Antibiotic resistance happens when germs like bacteria and fungi develop the ability to defeat the drugs designed to kill them.

Each year in the United States, at least 2 million people get an antibiotic-resistant infection, and at least 23,000 people die. Antibiotic resistance has the potential to affect people at any stage of life, as well as the healthcare, veterinary, and agriculture industries, making it one of the world's most urgent public health problems.

No one can completely avoid the risk of resistant infections, but some people are at greater risk than others (eg, people with chronic illnesses). If antibiotics lose their effectiveness, then we lose the ability to treat infections and control public health threats.

Many medical advances are dependent on the ability to fight infections using antibiotics, including joint replacements, organ transplants, cancer therapy, and treatment of chronic diseases like diabetes, asthma, and rheumatoid arthritis (CDC, 2018d).

Methicillin-resistant Staphylococcus aureus (MRSA), **vancomycin-resistant Enterococcus spp. (VRE)**, and certain gram-negative bacilli have increased in prevalence in U.S. hospitals over the last three decades, and have important implications for patient safety. There is concern about these **multidrug-resistant organisms (MDROs)** as options for treating patients with these infections are often extremely limited, and MDRO infections are associated with increased lengths of stay, costs, and mortality. Many of these traits have also been observed for *Clostridioides difficile* infection (CDI) (NHSN, 2019).

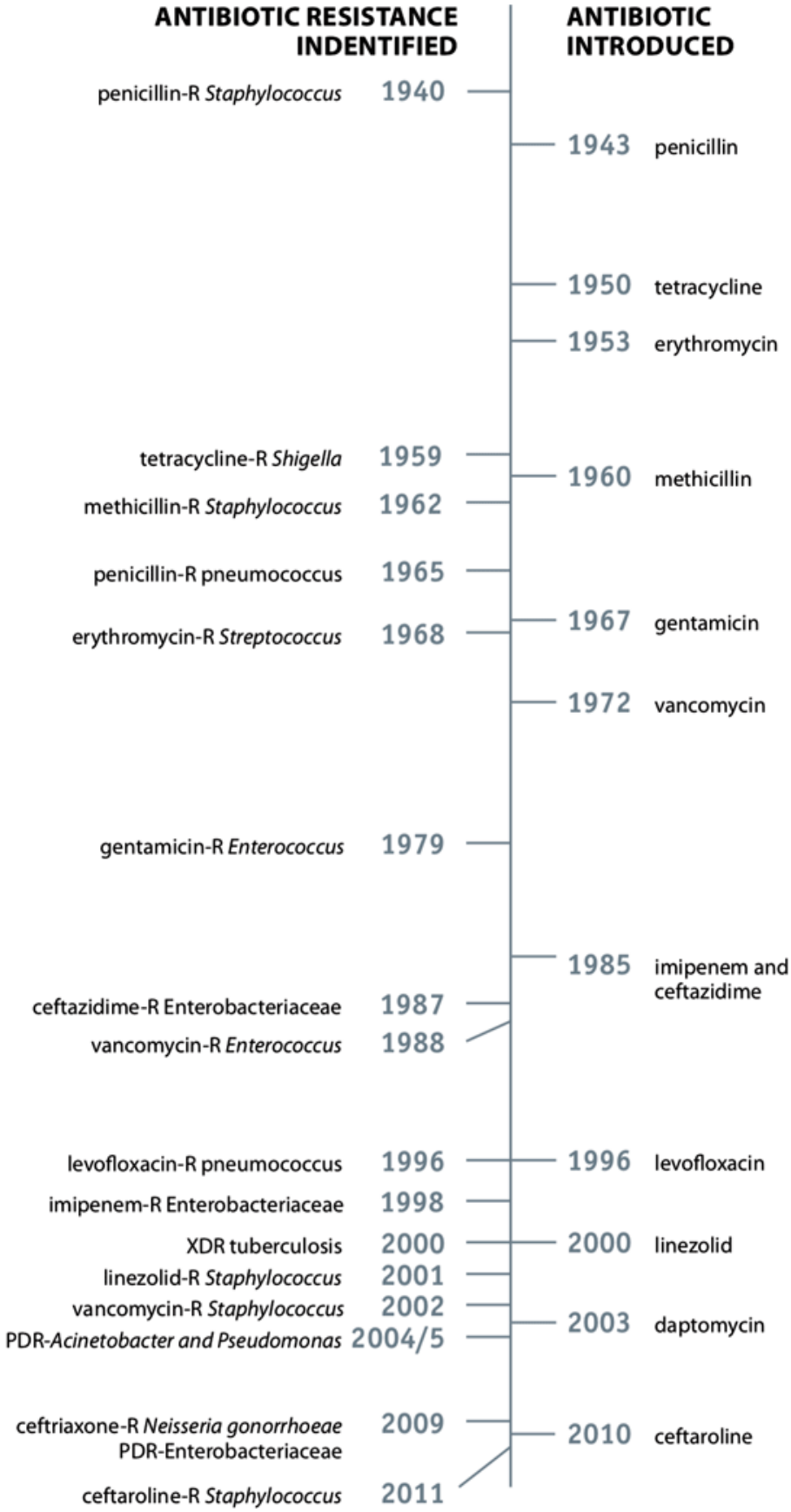
In the 2013 CDC report *Antibiotic Resistance Threats in the United States, 2013* (AR Threats Report) the threat level of certain MDROs was different than has been identified currently. The CDC is planning to release an updated Threats Report in Fall 2019. In the meantime, the *Patient Safety Component Manual* (NHSN, 2019) and the CDC AR/AMR website present more current information, and the guidelines for managing MDROs updated in 2017 (CDC, 2017c) are available here.

Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a staph bacterium that is resistant to many antibiotics. In a healthcare setting, such as a hospital or nursing home, MRSA can cause severe problems such as bloodstream infections, pneumonia, and surgical site infections. If not treated quickly, MRSA infections can cause sepsis and death (CDC, 2018e).

MRSA is usually spread by direct contact with an infected wound or from contaminated hands, usually those of healthcare providers. Also, people who carry MRSA but do not have signs of infection can spread the bacteria to others. CDC recommends the use of Contact Precautions (CP) in inpatient acute care settings for patients known to be colonized or infected with epidemiologically important MDROs including MRSA (CDC, 2018e).

MRSA is preventable, and the CDC offers numerous guidelines and tools for healthcare professionals on its website, https://www.cdc.gov/mrsa/healthcare/clinicians/materials-hcp/index.html.


ANTIBIOTIC RESISTANCE INDENTIFIED
ANTIBIOTIC INTRODUCED
penicillin-R Staphylococcus 1940
1943 penicillin
1950 tetracycline
1953 erythromycin
tetracycline-R Shigella 1959
1960 methicillin
methicillin-R Staphylococcus 1962
penicillin-R pneumococcus 1965
1967 gentamicin
erythromycin-R Streptococcus 1968
1972 vancomycin
gentamicin-R Enterococcus 1979
1985 imipenem and ceftazidime
ceftazidime-R Enterobacteriaceae 1987
vancomycin-R Enterococcus 1988
levofloxacin-R pneumococcus 1996
1996 levofloxacin
imipenem-R Enterobacteriaceae 1998
XDR tuberculosis 2000
2000 linezolid
linezolid-R Staphylococcus 2001
vancomycin-R Staphylococcus 2002
2003 daptomycin
PDR-Acinetobacter and Pseudomonas 2004/5
ceftriaxone-R Neisseria gonorrhoeae 2009
PDR-Enterobacteriaceae
2010 ceftaroline
ceftaroline-R Staphylococcus 2011

Source: CDC, 2018d.

Vancomycin-resistant *Enterococcus* spp. (VRE)

Vancomycin-resistant Enterococci (VRE) are specific types of antimicrobial-resistant bacteria that are resistant to vancomycin, the drug often used to treat infections caused by enterococci. Enterococi are bacteria that are normally present in the human intestines and in the female genital tract and are often found in the environment. These bacteria can sometimes cause infections and most vancomycin-resistant Enterococci infections occur in hospitals (CDC, 2011a).

VRE can live in the human intestines and female genital tract without causing disease (this is often called *colonization*). However, sometimes VRE can cause infections of the urinary tract, the bloodstream, or of wounds associated with catheters or surgical procedures. (CDC, 2011a).

VRE is often spread from person to person by the contaminated hands of caregivers who have had contact with people with VRE or contaminated surfaces, or it can be spread directly to a person from a contaminated surface. It is **not** spread through the air by coughing or sneezing (CDC, 2011a).

Hospitalized patients are at an increased risk of VRE infection, especially those:

- Receiving antibiotic treatment for long periods of time
- With weakened immune systems
- Who have had surgical procedures, such as abdominal or chest surgery
- Who have medical devices, such as catheters, in place for some time
- Who are colonized with VRE (CDC, 2011a)

Hand Hygiene: Best Practice to Prevent HAIs

Healthcare-associated infections—as dangerous and even deadly as they are—can be mitigated by one of the simplest methods of infection control, good hand hygiene.

Practicing hand hygiene is a simple yet effective way to prevent infections. Cleaning your hands can prevent the spread of germs, including those that are resistant to antibiotics and are becoming difficult, if not impossible, to treat. On average, healthcare providers clean their hands less than half of the times they should. Healthcare providers might need to clean their hands as many as 100 times per 12-hour shift, depending on the number of patients and intensity of care. Know what it takes to keep your patients safe! (CDC, 2018f, 2016b).

Healthcare providers should practice hand hygiene at key points in time to disrupt the transmission of microorganisms to patients. These include:

- Before eating
- Before and after having direct contact with a patient's intact skin (taking a pulse or blood pressure, performing physical examinations, lifting the patient in bed)
- After contact with blood, body fluids or excretions, mucous membranes, non-intact skin, or wound dressings
- After contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient

- If hands will be moving from a contaminated-body site to a clean-body site during patient care
- After glove removal
- After using a restroom (CDC, 2018g)

Two Methods for Sentinel Event

Which is preferred: alcohol-based hand sanitizer or washing with soap and water? In 2019, CDC offered the following advice:

- Alcohol-based hand sanitizers are the most effective products for reducing the number of germs on the hands of healthcare providers. Antiseptic soaps and detergents are the next most effective and non-antimicrobial soaps are the least effective.
- When hands are not visibly dirty, alcohol-based hand sanitizers are the preferred method for cleaning your hands in the healthcare setting.
- Soap and water are recommended for cleaning visibly dirty hands.

During routine patient care:

Wash with soap and water

- When hands are visiUse an alcohol-based hand sanitizerbly dirty
- After known or suspected exposure to *Clostridioides difficile* if your facility is experiencing an outbreak or higher endemic rates
- After known or suspected exposure to patients with infectious diarrhea during norovirus outbreaks
- If exposure to *Bacillus anthracis* is suspected or proven
- Before eating
- After using a restroom

Use an alcohol-based hand sanitizer

- For everything else (CDC, 2018g)

Additional guidelines for hand washing techniques to use in both situations are available on the CDC website here.

Surgical Errors

According to an AHRQ-supported study, wrong-site surgery occurred at a rate of approximately 1 per 113,000 operations between 1985 and 2004. In July 2004 the Joint Commission enacted the Universal Protocol, which requires performing a time-out prior to beginning surgery, a practice that has been shown to improve teamwork and decrease the overall risk of wrong-site surgery. Developed through expert consensus on principles and steps for preventing wrong-site, wrong-procedure, and wrong-person surgery, the Universal Protocol applies to all accredited hospitals, ambulatory care, and office-based surgery facilities.

Wrong-site, wrong-procedure, and wrong-patient errors are all now considered *never events* (medical errors that should never occur) by the National Quality Forum (NQF) and sentinel events (events resulting in death, permanent harm, or severe temporary harm and intervention required to sustain life) by the Joint

Commission. CMS has not reimbursed healthcare providers for any costs associated with these surgical errors since 2009 (PSNet 2019; 2003; Joint Commission, 2017).

In 2011, NQF and other agencies added "unintended retention of a foreign object in a patient after surgery or other procedure" to its list of never events for surgeries, and this is also among the hospital-acquired conditions for which CMS will not reimburse (CMS, 2015).

Another serious, not to say disastrous, case of medical error is the following.

A 53-year-old man presented to Hospital A with abdominal pain and hematuria. Computed tomography (CT) imaging revealed a suspected renal cell carcinoma in the right kidney. He was transferred to Hospital B for surgical management.

All of the medical records from Hospital A documented a left-sided tumor—the wrong side. The CT scan from Hospital A was not available at the time of the transfer and repeat imaging was not obtained by the providers at Hospital B.

At the time of surgery, the surgeon was asked if the absence of an available image should preclude progressing with the surgery. He decided to proceed and, based on the available information, removed the left kidney.

The day following the surgery, the pathologist contacted the surgeon to report no evidence of cancer. The surgeon then reviewed the initial CT scan and realized his mistake. The patient underwent a second surgical procedure to remove the right kidney (which was found to have renal cell carcinoma). Having lost both kidneys, the patient was then dependent on dialysis, and because of the cancer, he was not a candidate for kidney transplant.

Discussion

A total of four errors resulted in this sentinel event. The first was a documentation error on the medical records from Hospital A (identifying the tumor on the wrong side), which most likely originated from the original CT report.

The second error occurred during the patient transfer, when only the records, but not the imaging, accompanied the patient.

The third error occurred as the patient was posted for the surgical suite without preoperative imaging. In most cases, when imaging does not accompany a patient in transfer, the patient is reimaged to confirm the diagnosis and for preoperative planning, particularly if there is no emergent reason to proceed. These three errors occurred before the patient was rolled into the surgical suite. At this point, though, the error still could have been prevented.

The fourth error occurred once in the operating room—implementation of the Universal Protocol could have been effective, but only if completely implemented by the surgical team. The protocol suggests having the labeled radiology images present and available in the operating room at the time of the surgery. Once the surgeon decided he did not need the imaging to proceed with surgical treatment, the proverbial cat was out of the bag. This is because the Universal Protocol does not differentiate between

types of cases requiring imaging and those that do not. Many surgical cases do not require preoperative imaging, and the presence or absence of imaging is left to the discretion of the surgeon. While this flexibility may be useful at times, it can give rise to human error, as it did in this case.

Source: AHRQ, 2015. Commentary by John G. DeVine, MD.

Universal Protocol: Best Practice to Prevent Surgical Errors

To address the problem of preventable surgical errors, the Joint Commission issued its Universal Protocol on July 1, 2004, and it has become a mandatory patient safety standard in healthcare ever since. The protocol consists of the following three components:

1. A pre-procedure verification process
2. Surgical site marking
3. Surgical "time out" immediately prior to starting the procedure

The surgical site must be marked and visible after prepping and draping of the patient. Using the surgical time-out as "reflective pause or a preoperative briefing" involves the surgeons, anesthesiologists, nurses, quality control specialists, and administrators. Recent studies show the surgical time-out is an effective quality control measure (Altpeter et al, 2007; Stahel et al., 2009; Joint Commission, 2019a).

Laboratory Errors

An estimated 13 billion laboratory tests are performed each year in over 250,000 certified laboratories in the United States. Laboratory services account for 2.3% of healthcare expenditures (2% of Medicare expenditures), and these services are integral to patient care (AACC, 2015).

In fact, emergency departments order clinical laboratory tests in more than 41% of all visits, family physicians order tests in 29% of visits, and general internists in 38% of visits (Epner et al., 2013). Up to 70% of clinician decisions are influenced by laboratory tests, indicating that clinical laboratories have an important role in helping to reduce avoidable medical errors and improve both patient safety and outcomes (Tieman, 2017).

CLIA and Laboratory Errors

Thirty years ago, the CDC, CMS, and FDA developed the **Clinical Laboratory Improvement Amendments of 1988 (CLIA)**, a sweeping set of regulations for all U.S. facilities or sites that test human specimens for health assessment or to diagnose, prevent, or treat disease. A critical component of these regulations was quality control. Final regulations were published in 2003 (CDC, 2018h).

CLIA urges laboratories to develop an individualized quality control plan addressing five areas for assessing risk: specimen, test system, reagents, environment, and testing personnel (CLIA, 2014).

Laboratory testing is often broken into three stages: pre-analytic, analytic, and post-analytic (CLIA, 2014). Studies have shown nearly 70% of errors occur in the pre-analytic phase, encompassing test requests, patient and specimen identification, specimen collection, transport, accessioning, or processing (Osborne, 2018; Tieman, 2017; Kaushik & Green, 2014).

Poor communication between laboratory and healthcare professionals is the main issue affecting quality in the pre- and post-analytic phases, and researchers note few in either group receive specific training in good communication techniques. Issues of test choice, patient information, specimen adequacy (in pre-phase), and values and interpretation (in post-phase) can involve many different healthcare professionals, and poor communication among them can result in errors, patient harm, and "inefficient and ineffective use of healthcare resources." Errors also occur when clinicians choose and order tests; during specimen collection, including mislabeling, improper collection, and specimen contamination; in laboratory processing; and in results analysis and reporting (Wolcott et al., 2008).

Impact of Waived Tests on Laboratory Testing

As part of CLIA, some simple low-risk tests were waived from laboratory quality requirements and performed with no routine regulatory oversight in physicians' offices and various other locations.

In 1993, CLIA waived nine such tests; today there are more than 5,400 waived test systems and 119 analytes, according to the Commission on Office Laboratory Accreditation (COLA), an independent laboratory accreditation agency recognized by both CMS and the Joint Commission (COLA, 2015).

Although by law waived tests should have insignificant risk for erroneous results, these tests are not completely error-proof and are not always used in settings that employ a systems approach to quality and patient safety. Errors can occur anywhere in the testing process, particularly when the manufacturer's instructions are not followed, and when testing personnel are not familiar with all aspects of the test system and how testing is integrated into the facility's workflow (CDC, 2018j; COLA, 2015).

Although data have not been systematically collected on patient outcomes with waived testing, adverse events can occur. Some waived tests have potential for serious health impacts if performed incorrectly. For example, results from waived tests can be used to adjust medication dosages, such as prothrombin time testing in patients undergoing anticoagulant therapy or glucose monitoring in diabetics. In addition, erroneous results from diagnostic tests, such as those for human immunodeficiency virus (HIV) antibody, can have unintended consequences (CDC, 2018j).

Preventing Laboratory Errors

Although laboratory medicine has had long a history of formalized approaches of mitigating errors, most laboratory quality control programs focus on reducing testing errors as opposed to a systems approach preventing diagnostic harm to patients (Epner et al., 2013).

Several studies are reviewing an outcomes-based approach to reducing and preventing errors. Epner and colleagues suggest five causes that, taken together, may explain all important sources of diagnostic error and harm related to the testing process (see box below). "While occurrences of the five causes will not *always* result in diagnostic error, patient harm related to diagnostic testing is highly likely to stem from one of these five causes" (Epner et al., 2013).

Five Causes of Diagnostic Error and Harm

Five causes taxonomy of testing-related diagnostic error:

- An inappropriate test is ordered.

- An appropriate test is not ordered.
- An appropriate test result is misapplied.
- An appropriate test is ordered, but a delay occurs somewhere in the total testing process.
- The result of an appropriately ordered test is inaccurate.

Source: Epner, Gans, & Graber, 2013.

Helping to reduce errors in lab testing is another area where education and personal advocacy can improve outcomes. It has been observed that many people have the tendency to think that "laboratory tests are always correct and useful." This is not true and all tests have their limitations. A consumer's best protection is to be informed: know where problems can arise and what to ask or do to help avoid those problems. This includes the following:

- Make sure it is the right test: ask why it is or is not being ordered and what the results will add to your care, are there any risks, and why has your doctor ordered the test.
- Use the right sample: if the test relies on a patient provided sample, be sure you understand how to correctly collect the sample, what to put it in, and how to handle it after you collect it.
- Understand that errors can happen even under the best of conditions: your best defense is using a reputable lab that employs verified methods, and understanding the test's performance. If the results don't make sense, ask questions.
- Understand your results in context: use trusted information sources for details on the meaning and use of your results, and, again, ask questions! (Haymond, 2016)

Patient Falls

> No clinician working alone, regardless of how talented, can prevent all falls. Rather, fall prevention requires the active engagement of many individuals, including the multiple disciplines and teams involved in caring for the patient.
>
> AHRQ, 2013
> *Preventing Falls in Hospitals*

According to AHRQ a patient fall is defined as "an unplanned descent to the floor with or without injury to the patient." Such falls can result in fractures, lacerations, or internal bleeding, requiring additional healthcare. Research has shown that close to one-third of falls are preventable (AHRQ, 2018b).

Falls happen for a number of reasons including:

- Person is weak, tired or ill.
- Person is not physically fit.
- Person may have problems seeing.
- Medicines may cause weakness, sleepiness, confusion or dizziness.
- Slippery or wet floors or stairs.
- Obstructed pathways.
- Darkness. (Joint Commission, 2018)

Treating fall injuries is very costly. In 2015, total medical costs for falls totaled more than $50 billion. Because the U.S. population is aging, both the number of falls and the costs to treat fall injuries are likely to rise. Every year 3 million older people are treated in emergency departments because of falls and over

800,000 patients are hospitalized because of a fall injury—most commonly broken hips and head injuries (CDC, 2017d, 2016c).

The average hospital cost for a fall injury is more than $30,000 and the costs go up with age. In 2015 total medical costs for falls were more than $50 billion and Medicare and Medicaid shouldered 75% of these costs (CDC, 2017d).

Source: CDC.

Preventing Patient Falls

Falls within care settings are especially concerning. The Joint Commission Center for Transforming Healthcare notes that hundreds of thousands of patients fall in hospitals every year and 30% to 35% experience an injury. The estimated average cost for a fall with injury is about $14,056 (JCC, 2019).

Hospital staff have a complex and potentially conflicting set of patient care goals. They need to treat the problem that prompted the patient's admission, keep the patient safe, and help the patient to maintain or recover physical and mental function. Thus, fall prevention must be balanced against other priorities (AHRQ, 2013).

Fall prevention involves managing a patient's underlying fall risk factors (eg., problems with walking and transfers, medication side effects, confusion, frequent toileting needs) while working within the hospital's

physical design and environment. A number of practices have been shown to reduce the occurrence of falls, but these practices are not used systematically in all hospitals (AHRQ, 2013).

Fall prevention requires an interdisciplinary approach to care. Some aspects of fall prevention care are highly routinized, while others must be tailored to each patient's specific situation. Fall prevention requires the active engagement of all the multiple disciplines and teams involved in caring for the patient. This sort of coordination for high-quality prevention requires an organizational culture and operational practices that promote teamwork and communication, as well as individual expertise (AHRQ, 2013).

Fall prevention activities also need to be balanced with other considerations, such as minimizing restraints and maintaining patients' mobility, to provide the best possible care to the patient. Therefore, improvement in fall prevention requires a system focus to make needed changes (AHRQ, 2013).

What can individuals do to reduce their risk of falls? The Joint Commission provides guidelines targeted toward patients at home and in hospitals or nursing facilities.

At home guidelines include:

- Turn on the lights when you enter a room. Do not walk in the dark.
- Make sure your pathway is clear.
- Use the handrails on staircases.
- Sit in chairs that do not move and have arm rests to help when you sit down and stand up.
- Wear shoes that have firm, flat, non-slip soles. Do not wear shoes that do not have backs on them.
- Replace the rubber tips on canes and walkers when they become worn. (Joint Commission, 2018)

For in-patient settings guidelines include:

- Use your call button to ask for help getting out of bed if you feel unsteady.
- Ask for help going to the bathroom or walking around the room or in hallways.
- Wear non-slip socks or footwear.
- Lower the height of the bed and the side rails.
- Talk to your doctor if your medicine makes you sleepy, light-headed, sluggish or confused. Ask how to reduce these side effects or if you can take another medicine (Joint Commission, 2018).

Online Resource

Speak Up™ To Prevent Falls

https://www.jointcommission.org/topics/speak_up_reducing_your_risk_of_falling.aspx

Agency for Healthcare Research and Quality

The AHRQ's text, *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*, released in 2008, includes a chapter specific to patient falls in different care settings, with a discussion of fall risk assessment tools and prevention strategies (see table below) (Currie, 2008).

Source: Currie, 2008.

Evidence-based practice recommendations

Fall Prevention

Educate staff about safety care.

Train medical team fall-injury risk assessment.

Use alarm devices.

Monitor medication side effects.

Adjust environment to promote safety.

Provide exercise interventions for long-term care patients.

Provide toileting regimen for confused patients.

Monitor and treat calcium and vitamin D levels.

Treat underlying disorders.

Injury Prevention

Audit restraints use.

Lower bedrails.

In addition to fall rates, monitor injury rates.

Provide hip protectors for geriatrics and long-term care.

Use floor mats.

Monitor prothrombin time, international normalized ration (PT/INR) for patients at risk for falling.

Also, updated in 2018, AHRQ published *Preventing Falls in Hospitals: A Toolkit for Improving Quality of Care*, which discusses the development of a complete program for hospitals, including such practices as rounding protocols (AHRQ, 2018b).

Joint Commission Center for Transforming Healthcare

The Joint Commission released its *Targeted Solutions Tool for Patient Falls with Injury*, in August 2015. The tool is an innovative application that guides healthcare organizations through a step-by-step process to accurately measure their organization's actual performance, identify their barriers to excellent performance, and direct them to proven solutions that are customized to address their particular barriers. According to the Commission, organizations that followed its standardized approach reduced the rate of patient falls by 35% and falls with injury by 62% (JCC, 2019).

Tens of thousands of patients fall in healthcare facilities every year and many of these falls result in moderate to severe injuries. Find out how the participants in the Center for Transforming Healthcare's seventh project are working to keep patients safe from falls.

Keeping Patients Safe from Falls
Source: The Joint Commission (2012).
https://www.youtube.com/watch?v=Lu5XcEdnqrY

CDC's STEADI: Older Adult Fall Prevention

CDC created the evidence-based STEADI (Stopping Elderly Accidents, Deaths, and Injuries) initiative to help healthcare providers incorporate fall prevention into routine care for older adults. STEADI provides screening tools, educational materials and resources, and online trainings for healthcare providers. Information can be accessed on the CDC's STEADI website (CDC, 2016d).

Pressure Ulcers

Pressure ulcers, sometimes called *decubitus ulcers*, pressure sores, or bedsores, are areas of damaged skin caused by staying in one position for too long. They commonly form where bones are close to the skin, such as ankles, back, elbows, heels, and hips. Patients are at risk if they are bedridden, use a wheelchair, or are unable to change their position. Pressure sores can cause serious infections, some of which are life-threatening (MedLine Plus, 2018).

The Institute for Healthcare Improvement (IHI) notes that

> Because muscle and subcutaneous tissue are more susceptible to pressure-induced injury than skin, pressure ulcers are often worse than their initial appearance. Pressure ulcers cause considerable harm to patients, hindering functional recovery, frequently causing pain and the development of serious infections. Pressure ulcers have also been associated with an extended length of stay, sepsis, and mortality. (IHI, 2019)

Pressure sores have a variety of treatments. Advanced sores are slow to heal, so early treatment is important (MedLine Plus, 2018).

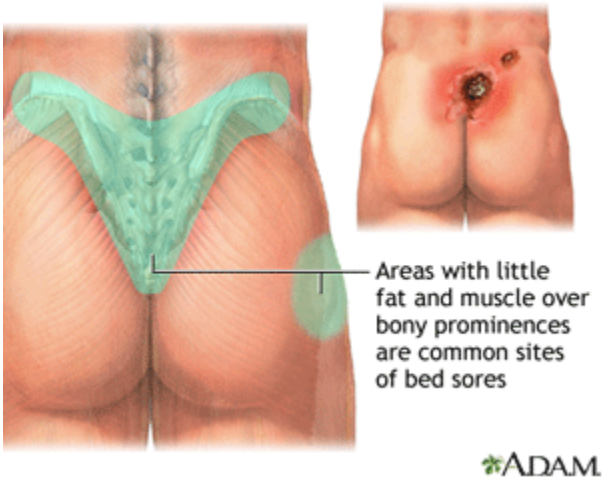
Pressure ulcers are often associated with nursing homes and long-term skilled care facilities, but some 60,000 deaths occur each year from complications due to hospital-acquired pressure ulcers (Sullivan & Schoelles, 2013).

Unlike many other medical errors, however, the incidence of pressure ulcers has done more rising than falling. Data from 1995 to 2008 showed a climb by perhaps by as much as 80% in the incidence of

pressure ulcers (Sullivan & Schoelles, 2013). And, while they increased again from 2014 to 2015, they decreased somewhat from 2015 to 2016 and 2017 (AHRQ, 2019e).

Preventing Pressure Ulcers

An Area Where Pressure Ulcers are Common



Source: MedLine Plus.

"Preventing pressure ulcers entails to two major steps: first, **identifying patients** at risk; and second, reliably **implementing prevention strategies** for all patients who are identified as being at risk" (IHI, 2019). The IHI *How-to Guide: Prevent Pressure Ulcers* (IHI, 2011) (recommended through the AHRQ pressure ulcer prevention site) is available from the IHI website.

Basic preventions for pressure ulcers involve:

- Keeping skin clean and dry
- Changing position every two hours
- Using pillows and products that relieve pressure (MedLine Plus, 2018)

In healthcare settings, key changes recommended by the IHI *How-to Guide* include:

- Inspect skin daily
- Manage moisture on skin
- Conduct a pressure ulcer admission assessment for all patients
- Minimize pressure
- Optimize nutrition and hydration
- Reassess risk for all patients daily (IHI, 2019, 2011)

Positioning in Bed to Prevent Pressure Sores [1:17]
https://facingdisability.com/expert-topics/whats-the-most-important-thing-to-do-to-prevent-pressure-sores/mary-zeigler-ms

Mary Ziegler, the nurse who appeared in the previous video, is a clinical nurse specialist at the Rehabilitation Institute of Chicago (facingdisability.com. 2019), makes this her final word:

> Adhere to the pressure relieving schedule like a religion!

In their large literature review, researchers Sullivan and Schoelles found evidence of that several key elements improved care and reduced pressure ulcer rates. These prevention measures include simplification and standardization of pressure ulcer–specific interventions and documentation, involvement of multidisciplinary teams and leadership, use of designated skin champions, ongoing staff education, and sustained audit and feedback (Sullivan & Schoelles, 2013).

Recent studies suggest that facilities implementing these kinds of system-wide improvements are reducing the incidence of pressure-ulcers in patients (Ackroyd-Stolarz, 2018; Englebright et al., 2018).

Documentation Errors

Central to many types of medical errors are issues with documentation. While illegible physician handwriting is often regarded as a humorous cliché, it can have ramifications that are anything but humorous. Charting errors or omissions can have serious consequences.

Electronic medical records (EMRs) and more comprehensive systems known as electronic health records (EHRs) have grown exponentially in the last two decades, bolstered by several game-changing pieces of legislation. For all their efficiencies, electronic records are still subject to documentation and informational errors.

High-risk copy-and-paste errors, which are defined as mistakes with high potential risk for patient harm, fraud, or tort claim, have been reported in 10% of patient EMRs. Such errors can result in inaccuracies that can carry forward throughout the patient's record (Hirschtick, 2012).

Cho and colleagues, in a study at a 950-bed teaching hospital, found that more than 50% of medication orders entered through a computerized physician order/entry system had at least one error. Further, documentation errors occurred in 205 (82.7%) of 248 correctly performed administrations. When tracking incorrectly entered prescriptions, 93% of the errors were intercepted by nurses, but two-thirds of them were recorded as prescribed rather than administered (Cho et al., 2014).

Another study found a small but concerning error rate of as much as 0.05% in patient-note mismatches, where a clinical note pertaining to one patient was included in the electronic record of another patient (Wilcox et al., 2011).

Preventing Documentation Errors

Accurate documentation—written or electronic—is one of the most fundamental components in the medical record and is threaded through all quality indicators. For example, NQF has specific mentions of documentation as part of a number of its measures including:

- 0045. Communication with the physician or other clinician managing on-going care post fracture for men and women aged 50 years and older
- 0092. Emergency Medicine: Aspirin at Arrival for Acute Myocardial Infarction

- 0419e. Documentation of Current Medications in the Medical Record (NQF, 2019)

Despite important improvements brought by electronic medical records, such as no longer needing to decipher illegible handwriting and having faster access, there are challenges—both technological and human—to be identified and resolved. And, not every aspect of care has the same issues; what is needed in the emergency department may differ from what is needed elsewhere in a hospital (Luthra, 2016; PSNet, 2019b).

A 2015 article in the Journal of the American Health Information Management Association identified the top four documentation errors ("disasters") as:

- Mixed messages from a physician vis á vis misunderstood dictation or illegible handwriting
- Misuse of copy-and-paste or copy forward functions in the electronic health record (EHR)
- Incomplete or missing documentation
- Misplaced documentation (Butler, 2015)

After identification of the most frequent errors, the next step is putting procedures in place to prevent them. In response to the need for increased patient safety, changes to pay-for-performance programs, and closer monitoring by outside agencies, clinical documentation improvement (CDI) programs are growing. Making changes and training healthcare professionals in new habits is challenging but critical (Butler, 2015).

For all the improvements brought by EHR systems and their required use, there is no getting around "Garbage in, garbage out." Electronic systems will not fix problems caused by poor training, inattention to detail, typos, mistakes using copy-and-paste, and other human errors. Continued improvements in technology and training of those who use it are essential (PSNet, 2019b).

A 78-year-old man with hypertension and diabetes presented to an emergency department (ED) with new-onset chest pain. The ED physician reviewed the patient's electronic medical record (EMR) and noted "PE" listed under past medical history, which raised his suspicion for the possibility of a new pulmonary embolus (PE). After initial testing excluded a cardiac etiology, a computed tomography (CT) scan of the chest was ordered to rule out a PE. When the physician approached the patient to explain why he was ordering the diagnostic test, the patient denied ever having a PE or being treated with blood thinners.

Puzzled by the conflicting reports, the ED physician returned to the EMR and noted that this mistaken history of PE dated back several years. It even appeared in the "problem list" section of his EMR. Investigating further back, the ED physician discovered that the letters "PE" were first noted nearly a decade earlier where it was clearly intended to reflect a "physical examination" rather than a "pulmonary embolus." A physician likely copied and mistakenly pasted "PE" under "past medical history," after which this history of pulmonary embolism was carried forward time and time again.

The patient, who was ultimately discharged from the ED, never suffered any harm from the documentation error. The EMR was updated to say "This patient never had a pulmonary embolism."

Source: Hirschtick, 2012.

4. Factors Increasing the Risk of Medical Errors

> Studying human performance can result in the creation of safer systems and the reduction of conditions that lead to errors.
>
> Institute of Medicine [sic], 1999
> *To Err Is Human: Building a Safer Health System*

There are many systemic factors that increase the likelihood of a medical error. Some of the most important factors are risky behaviors by healthcare workers, staffing issues, sleep deprivation, and environmental factors.

Risky Behaviors by Healthcare Workers

At-risk behaviors are actions by healthcare providers that compromise patient safety. Healthcare personnel may engage in risky behaviors because the rewards are immediate and the risk of patient harm seems remote. They may engage in risky behaviors when they become comfortable and competent with a task and lose the perception of risk. These behaviors often result in convenience, comfort, and saved time (NCCMERP, 2014).

The perceived benefits of taking a risky shortcut leads to repeated at-risk behaviors, despite the healthcare provider's possible knowledge, on some level, that patient safety could be at risk. In addition, as one healthcare worker has apparent success with an at-risk behavior, they will likely influence fellow workers until that behavior becomes a standard practice (NCCMERP, 2014).

Risky behaviors often emerge because of system-based problems in healthcare organizations. Common at-risk behaviors include:

- Engaging in "grab and go" with a medication without fully reading the label before it is dispensed, administered or restocked
- Intimidation or reluctance to ask for help or clarification
- Failure to educate patients
- Using medications without complete knowledge of the medication
- Failure to double check high-alert medications before dispensing or administering
- Not communicating important information such as patient allergies, diagnosis/co-morbid conditions, weight, and so on (NCCMERP, 2014)

When patient harm occurs, an organization often focuses on the "sharp end" of the medication-use process—the front-line healthcare workers involved in the event or engaged in the at-risk behavior. However, punishment based only on the outcome when other instances of at-risk behavior by an individual or group go unnoticed is often ineffective and can send the wrong signal to staff (NCCMERP, 2014).

Risky behaviors can emerge because of system-based problems within a healthcare organization, for example, an organizational culture with a high tolerance of such behaviors. Healthcare managers should review organizational behaviors regularly. Unnecessary complexity in processes provides many opportunities for workers to take risks when providing care to a patient.

The National Coordinating Council on Medication Error Reporting and Prevention (NCCMERP) makes the following recommendations to reduce medication errors associated with at-risk behaviors:

- Eliminate organizational tolerance of risk.
- Increase awareness of at-risk behaviors.
- Determine system-based reasons for risk-taking behavior.
- Eliminate system-wide incentives for at-risk behaviors.
- Motivate through feedback and rewards.
- Involve patients and families in the processes of safe medication administration and monitoring (NCCMERP, 2014)

Understaffing, Sleep Deprivation, and Environmental Factors

The risky behaviors discussed above as they relate to patient safety are especially focused on their contribution to medication errors but in some cases those behaviors and other factors contribute to other errors. While studies have been done that look single factors, such as understaffing or sleep deprivation or environmental factors as they affect patient safety, these may also be seen as a complex of factors that can feed off of each other.

Understaffing and Sleep Deprivation

Recent research has found that understaffing is directly related to a higher risk of adverse events for patients, including medication errors. It has also been argued that, while hospitals tend to blame understaffing on a nursing shortage, research has shown that "We have more nurses in the United States than we've ever had before" and the real problem is a failure to budget effectively for the nursing staff required for patient load (Jacobson, 2015).

A research study on hospitals worldwide showed that higher nurse-to-patient ratios correlate with lower patient deaths in intensive care units, while another study showed that an increase of one patient in a nurse's workload increased the risk of death of one patient in that hospital was 7% (Jacobson, 2015).

Minimum staffing ratio laws have been proposed in some states but encounter stiff resistance. However, California did pass such a law in 2004 and has seen improvement in patient adverse events. In one study of hospitals across the United States it was found that hospitals with higher staffing ratios had a 25% lower likelihood of being penalized under ACA rules for excessive readmissions when compared with those with lower staffing ratios. A related study found that each additional patient per nurse raised readmission rates 6% to 9% (Jacobson, 2015). An interesting side benefit is that occupational injuries for nurses also decline when nurse-to-patient ratios increase.

Sleep deprivation is another factor affecting healthcare professionals and, while it is an issue on its own—many things can contribute to one becoming sleep deprived—it can also be related to staffing issues if workers are asked or required to work overtime or additional shifts and simply are unable to obtain enough sleep. Sleep deprivation has been shown to affect executive-level function and mood and also increase irritability, which can negatively affect team functioning in healthcare settings and lead to burnout. The Joint Commission has issued several reports regarding the potential for adverse effects of sleep deprivation (AHRQ, 2019b).

A 2013 Kronos Inc. survey of nurses found that two-thirds had nearly made a mistake at work due to fatigue while 25% said they *had* made a fatigue-related error. Additional findings included significant

numbers of nurses reporting inadequate or unsatisfactory staffing levels, fatigue both at the beginning and end of shifts, facility disregard of rest periods, and facility failure to manage extended shift issues and scheduling problems (Bird, 2013).

Environmental Factors

The environment in which healthcare workers practice can also contribute to medical errors. Studies show that healthcare workers were:

- Almost 3 times more likely to report a more hectic working environment in the 30 minutes before the error compared to the rest of the error shift
- Nearly 2 times as likely to report a more hectic working environment when comparing the error shift to the prior shift
- Four times more likely to report a more hectic working environment when comparing the 30 minutes before the error to the prior shift worked (Grayson et al., 2005)

Not only can working conditions increase the chances for errors, but the design of items in that environment can also. For instance, AHRQ cited a study examining the design of the computerized physician order enter (CPOE) interface that required about 10 clicks per order, thus significantly increasing time needed to enter orders. The poor usability of the CPOE system and its lack of integration with clinician workflow contributed to delays in patient care that were a major factor in the increased mortality rate after CPOE implementation (AHRQ, 2013a).

Medication and product packaging can look similar and result in errors choosing the correct item. The design of medical devices, even the drawers of medication carts, can affect medical errors—both negatively and positively. In one instance a redesigned drawer resulted in shorter medication retrieval time and fewer wasteful actions (AHRQ, 2013a).

Sentinel Event Alert: Healthcare Worker Fatigue and Patient Safety [1:22]
https://www.youtube.com/watch?v=ada7WOR7Fi8

5. Vulnerable Populations

> Children are at particular risk of medication errors . . . this is attributable primarily to incorrect dosages.
>
> Institute of Medicine [sic], 1999
> *To Err Is Human: Building a Safer Health System*

Anyone who takes medication has some risk of a harmful effect. There are some groups, however, that have an increased risk of adverse medication events. Children, elders, and those with limited English skills and/or poor health literacy are at a high risk for adverse events.

Children

Approximately 200,000 children (17 years old or younger) visit emergency departments each year because of adverse drug events. Children less than 5 years old are more likely than older children to visit the emergency department for an adverse drug event (approximately 60,000 each year), and each year 1 in every 150 two-year-olds visits an emergency. Nearly 70% of emergency department visits for unsupervised medication ingestions by young children involve 1- or 2-year-old children (CDC, 2018k).

Pediatric patients face four distinct issues that set them apart from the rest of the hospital population, making it a high-risk environment for hospitalized children:

- **Development**. As children mature both mentally and physically, their needs for healthcare goods and services change.
- **Dependency**. Hospitalized children are dependent on caregivers and parents to convey key information and their care must be approved by parents or their surrogates during all encounters.
- **Different epidemiology**. Most hospitalized children require acute episodic care, not care for chronic conditions as with adults.
- **Demographics**. Children are more likely to live in poverty and experience racial and ethnic disparities in healthcare, and they are more dependent on public insurance (Hughes & Blegen, 2008).

Medication errors are the most common adverse event experienced by pediatric inpatients. Often pediatric indications and dosage guidelines aren't included with a medication, necessitating weight-based dosing or dilution, which in turn creates more opportunity for error (PSNet, 2015; Hughes & Edgerton, 2005; AHRQ, 2009).

In a study published in *Pediatrics* in August 2018 a review of data from 2007–2012 concluded that adverse event rates in pediatric inpatients are high and did not improve from 2007 to 2012. In addition, the rates were substantially higher in teaching hospitals and in patients with more chronic conditions (Stockwell et al., 2018).

In the same issue commenters noted that, while some collaboratives have made gains in addressing the problem, there is concern that adverse events in children are underreported. This may be because most reporting is passive and voluntary while in the Stockwell study uses tools known as “triggers,” which actively detect AEs and detect errors at a higher rate than do passive methods (Quinonez & Schroeder, 2018; Walker, 2018).

Preventing Medical Errors for Pediatric Inpatients

Children are not simply little adults; their physiology and mental development are vastly different from adults. While many of the same medical error prevention techniques for adults are perfectly acceptable for pediatric patients (eg, hand hygiene), others need more consideration.

In January 2019 the Child Patient Safety Organization (PSO) published their 2018 annual report identifying

Patient Care Vulnerabilities for Hospitalized Children

- NG Tube Misplacement
- MRI Safety
- Retained Foreign Objects
- Communication Failures
- Behavioral Health
- Diagnostic Safety and Cognitive Bias
- Wrong-Site Surgeries and Procedures
- Medication Safety
- Thermal Injuries
- Diabetes Care Management (CHPSO, 2019)

The report provides additional information and links to resources, including those offered by the PSO itself.

Elders

Elderly patients are prescribed more than 30% of all prescription drugs. Adverse drug events or reactions to medicines are implicated in 5% to 17% of inpatient admissions (Alexander & Wang, 2014).

Elders in the Community

For many older adults in the community, the ability to remain independent in their homes depends on the ability to manage a complicated medication regimen. Non-adherence to medication regimens is a major cause of nursing home placement in older adults. In the United States, an estimated 3 million older adults are admitted to nursing homes due to drug-related problems, at an annual cost of more than $14 billion (Hughes & Blegen, 2008).

As people age, they typically take more medicines. Older adults (>65 years) come to emergency departments almost 450,000 each year, more than twice as often as younger people, and they are nearly 7 times more likely to be hospitalized after an emergency visit (CDC, 2018m).

Most of these hospitalizations are due to just a few drugs that require careful monitoring to prevent problems. These include blood thinners such as warfarin, diabetes medications like insulin, seizure medications such as phenytoin and carbamazepine, heart medicine such as digoxin, and opioid analgesics (CDC, 2018m).

Poor cognition is associated with inability to follow medication regimens. **Forgetting** is a major reason medication doses are missed. The most common type of noncompliance is dose omission, but over-consumption is also a mistake frequently made by older people (Hughes & Blegen, 2008).

Older adults have narrow therapeutic windows and require close monitoring, especially when on multiple medications. A review of emergency department visits of patients 65 years and older found that more than 10% of the visits were related to an adverse drug event and more than 30% had at least one potential adverse drug interaction in their medication regimen (Hughes & Blegen, 2008).

Poor vision and decreased manual dexterity are also problems for elders. It is common for medication bottle caps to be left off or not properly closed so the patient can access the medicine. One study showed that almost one-half of older patients stated that they were not able to read the labels on the bottles due to poor eyesight, inability to read English, or small writing on the bottles (Hughes & Blegen, 2008).

Another cause of non-adherence in elders is difficulty with medication procurement. In a study of elders at 15 days after hospitalization, 27% had not filled their new prescriptions (Hughes & Blegen, 2008).

Preventing Medical Errors for Elders in the Community

Medication reconciliation is the first step in helping older adults with medication management. Multiple studies have shown discrepancies as high as 66% in medications that were ordered and those actually being taken (Hughes & Blegen, 2008).

Pharmacy resources, such as medication reviews and computerized medication interactions programs, are effective tools to reduce adverse drug events in older patients. Patients who participate in pharmacy delivery programs and refill reminders have higher compliance than those who do not (Hughes & Blegen, 2008).

Hospitalized Elders

The older patient has increased risk for functional decline during hospitalization due to decreased mobility and other risks of hospitalization. They may also experience delirium due to a medical condition, leading to cognition issues in compliance with care. Beyond medication errors, frail elders in the hospital have a higher risk for falls, hospital-acquired infections, and pressure ulcers (Hughes & Blegen, 2008).

Preventing Medical Errors for Hospitalized Elders

The elderly acute-care patient will benefit from the same medical error preventions as the rest of hospital population, but particular attention should be paid to falls, pressure ulcers, and hospital-acquired infections. Those older than 65 with cognitive issues have the greatest risk for falls in the acute-care setting (Hughes & Blegen, 2008). (see Medical Errors, Patient Falls section)

Elders are also among those at highest risk for pressure ulcers. Interventions for preventing pressure ulcers can include good skin hygiene and frequent position changes (see earlier section, Medical Errors, Pressure Ulcers) (MedLine Plus, 2018).

Patients with Limited Health Literacy

Health literacy is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions." It includes the ability to understand instructions on prescription bottles, appointment slips, medical education brochures, doctors' directions, and consent forms, and the ability to negotiate complex healthcare systems (NN/LM, n.d.).

More than 90 million adults in the United States have low health literacy (MedlinePlus, 2018a). The burden of health literacy on those who have difficulty understanding English is enormous. Nearly 25 million people in the United States (8.6%) are defined as limited English proficient, meaning that they speak English less than "very well." Therefore, at least 8.6% of the U.S. population is at risk for adverse events because of barriers associated with their language ability (Betancourt et al., 2012).

The Joint Commission notes that "health literacy issues and ineffective communications place patients at greater risk of preventable adverse events." Studies have shown that lower health literacy is linked to a lower likelihood of getting flu shots and of understanding medical labels and instructions, and a greater likelihood of taking medicines incorrectly. It is also linked with poorer health status, less use of preventive care, more likelihood of hospitalization, and bad disease outcomes. The annual cost to the U.S. economy of low health literacy is estimated to be between $106 billion and $238 billion (NN/LM, n.d.).

Populations most vulnerable to poor health literacy include:

- Older adults
- Immigrant populations
- Minority populations
- Low income populations (NN/LM, n.d.).

Preventing Medical Errors in Those with Limited Health Literacy

The AHRQ recommends use of its Health Literacy Universal Precautions Toolkit. The Universal Precautions approach involves:

1. Creating a shame-free environment
2. Simplifying information
3. Listening carefully
4. Confirming comprehension
5. Improving support for navigating healthcare contexts
6. Supporting patients in their health management efforts (PSNet, 2019c; AHRQ, 2015)

The toolkit with accompanying resources can be downloaded from AHRQ here:

https://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/healthlittoolkit2.html.

Other similar tools are available from CDC and Health Resources & Services Administration (HRSA).

6. Reducing Errors and Increasing Patient Safety

> Healthcare organizations must develop a culture of safety such that an organization's care processes and workforce are focused on improving the reliability and safety of care for patients.
>
> Institute of Medicine [sic], 1999
> *To Err Is Human: Building a Safer Health System*

Governments, healthcare personnel, patients, and the public must work together to create a culture of safety, decrease the effects of medical errors, and improve the safety of healthcare. Each has a role to play.

Creating a Culture of Safety

For decades, the healthcare industry, along with a myriad of agencies and stakeholders, has sought a way to curb medical errors. This has resulted in a major shift in philosophy from one of blame to one of changing cultures across the continuum of care.

Garrouste-Orgeas and colleagues (2012) wrote,

> Errors are caused by combinations of human factors and system factors, and information must be obtained on how people make errors . . . . Preventive strategies are more likely to be effective if they rely on a system-based approach, in which organizational flaws are remedied, rather than a human-based approach of encouraging people not to make errors. The development of a safety culture . . . is crucial to effective prevention and should occur before the evaluation of safety programs, which are more likely to be effective when they involve bundles of measures.

While the researchers were speaking in terms of the intensive care unit, the lessons can be applied to many care settings (Garrouste-Orgeas et al., 2012).

Garrouste-Orgeas and colleagues (2012) suggested that

> . . . a safety culture arises from a combination of a **room-for-improvement model**, in which problems are identified, plans are made to resolve them, and the results of the plans are measured; and the **monitoring model**, in which quality indicators are defined as relevant to potential problems and then monitored periodically. Indicators that reflect structures, processes, or outcomes have been developed by medical societies. Surveillance of these indicators is organized at the hospital or national level. Using a combination of methods improves the results. (Garrouste-Orgeas et al., 2012)

This video vignette shows a fictional scenario in which a positive culture of safety overcomes multiple commonly seen barriers to infection prevention in dialysis facilities.

Fostering a Culture of Safety [4:03]
Source: http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/esrd/fosteringsafetyvid.html

Implementing Electronic Health Records (EHR)

The report that served as the clarion for efforts to prevent medical errors—IOM's "To Err is Human"—noted that electronic systems are an "effective remedy" to combat them (IOM, 1999). The use of electronic health records (EHRs) has grown since the IOM report, bolstered by several game-changing pieces of legislation.

HIPAA, 1996

The central theme of the Health Insurance Portability and Accountability Act (HIPAA) was to protect healthcare coverage and privacy for workers and their families as they changed jobs, it also called for the development of health information systems and standards for electronic data interchange, the methodology whereby patient information is transmitted electronically (GPO, 1996).

HITECH Act, 2009

Enacted as part of the American Recovery and Reinvestment Act of 2009, it was called the Health Information Technology for Economic and Clinical Health Act (HITECH), and it authorized Medicare and Medicaid to provide incentive payments for eligible professionals, hospitals, and critical access hospitals as they adopt, implement, upgrade, or demonstrate "meaningful use" of EHR technology.

Meaningful use is defined as using certified electronic health record (EHR) technology to improve quality, safety, efficiency, and reduce health disparities; engage patients and family; improve care coordination, and population and public health; and maintain privacy and security of patient health to improve patient care. The meaningful use incentive program has now been transitioned into the MACRA program and ONC is engaging with HITECH on a number of other programs (US HHS, 2017a; USONC, 2015; USONC, 2015a).

Affordable Care Act (ACA), 2010

Perhaps the most broad-reaching piece of healthcare legislation in American history is the Patient Protection and Affordable Care Act of 2010 (ACA). As part of the legislation's timed roll-out, ACA mandated technologic reforms in 2012 in the use of electronic health records to improve efficiencies (US HHS, 2017). These and other accomplishments will persist despite numerous political efforts to scuttle the ACA.

7. Public Awareness and Education

> Although the risk of dying as a result of a medical error far surpasses the risk of dying in an airline accident, a good deal more public attention has been focused on improving safety in the airline industry than in the healthcare industry.
>
> Institute of Medicine [sic], 1999
> *To Err Is Human: Building a Safer Health System*

As health insurers have moved toward shifting more healthcare costs to the patient, the public has never been more aware of their role of taking charge of their own care.

Public Awareness of Safety

Patients have greater access to health information than ever before to make sound decisions. Consequently, patients and their families also have a role to play in improvement healthcare quality and safety by being a partner with providers.

AHRQ's *Guide to Patient and Family Engagement in Hospital Quality and Safety* (2017) provides a detailed framework of how hospitals and patients can work together to make care safer. The comprehensive guide makes a number of recommendations, including:

- Invite two or three patient and family advisors to a hospital staff or committee meeting to discuss their hospital stay. Advisors can share what went well, what could have been done better, and any ideas they have for changes and improvements.
- At each shift change, shift report happens at the patient's bedside, and the nurses invite the patient and family or friends to take part in the report.
- Include the patient and family as full partners in the discharge planning process, reviewing medications, highlighting warning signs and problems, and suggesting what life will be like at home (AHRQ, 2017)

Public Education on Medical Errors

AHRQ has also developed a list of 20 tips patients can follow to prevent medical errors (see below). Research shows that patients who are more involved with their care tend to get better results.

20 Tips to Help Prevent Medical Errors (AHRQ)

Medicines

1. **Make sure that all of your doctors* know about every medicine you are taking.**
   This includes prescription and over-the-counter medicines and dietary supplements, such as vitamins and herbs.
2. **Bring all of your medicines and supplements to your doctor visits.**
   "Brown bagging" your medicines can help you and your doctor talk about them and find out if there are any problems. It can also help your doctor keep your records up to date and help you get better quality care.

3. **Make sure your doctor knows about any allergies and adverse reactions you have had to medicines.**
   This can help you to avoid getting a medicine that could harm you.
4. **When your doctor writes a prescription for you, make sure you can read it.**
   If you cannot read your doctor's handwriting, your pharmacist might not be able to either.
5. **Ask for information about your medicines in terms you can understand—both when your medicines are prescribed and when you get them:**

   - What is the medicine for?
   - How am I supposed to take it and for how long?
   - What side effects are likely? What do I do if they occur?
   - Is this medicine safe to take with other medicines or dietary supplements I am taking?
   - What food, drink, or activities should I avoid while taking this medicine?
6. **When you pick up your medicine from the pharmacy, ask: Is this the medicine that my doctor prescribed?**
7. **If you have any questions about the directions on your medicine labels, ask.**
   Medicine labels can be hard to understand. For example, ask if "four times daily" means taking a dose every 6 hours around the clock or just during regular waking hours.
8. **Ask your pharmacist for the best device to measure your liquid medicine.**
   For example, many people use household teaspoons, which often do not hold a true teaspoon of liquid. Special devices, like marked syringes, help people measure the right dose.
9. **Ask for written information about the side effects your medicine could cause.**
   If you know what might happen, you will be better prepared if it does or if something unexpected happens.

Hospital stays

1. **If you are in a hospital, consider asking all healthcare workers who will touch you whether they have washed their hands.**
   Handwashing can prevent the spread of infections in hospitals.
2. **When you are being discharged from the hospital, ask your doctor to explain the treatment plan you will follow at home.**
   This includes learning about your new medicines, making sure you know when to schedule followup appointments, and finding out when you can get back to your regular activities. It is important to know whether or not you should keep taking the medicines you were taking before your hospital stay. Getting clear instructions may help prevent an unexpected return trip to the hospital.

Surgery

1. **If you are having surgery, make sure that you, your doctor, and your surgeon all agree on exactly what will be done.**
   Having surgery at the wrong site (for example, operating on the left knee instead of the right) is rare. But even once is too often. The good news is that wrong-site surgery is 100 percent preventable. Surgeons are expected to sign their initials directly on the site to be operated on before the surgery.

2. **If you have a choice, choose a hospital where many patients have had the procedure or surgery you need.**
   Research shows that patients tend to have better results when they are treated in hospitals that have a great deal of experience with their condition.

Other steps

1. **Speak up if you have questions or concerns.**
   You have a right to question anyone who is involved with your care.
2. **Make sure that someone, such as your primary care doctor, coordinates your care.**
   This is especially important if you have many health problems or are in the hospital.
3. **Make sure that all your doctors have your important health information.**
   Do not assume that everyone has all the information they need.
4. **Ask a family member or friend to go to appointments with you.**
   Even if you do not need help now, you might need it later.
5. **Know that "more" is not always better.**
   It is a good idea to find out why a test or treatment is needed and how it can help you. You could be better off without it.
6. **If you have a test, do not assume that no news is good news.**
   Ask how and when you will get the results.
7. **Learn about your condition and treatments by asking your doctor and nurse and by using other reliable sources.**
   For example, treatment options based on the latest scientific evidence are available from the Effective Healthcare website (http://www.effectivehealthcare.ahrq.gov/options). Ask your doctor if your treatment is based on the latest evidence.

*The term "doctor" is used to refer to the person who helps you manage your healthcare.
Source: AHRQ, 2018c.

8. Systems Approaches to Reducing Medical Errors

> Safety is a global concept that encompasses efficiency, security of care, reactivity of caregivers, and satisfaction of patients and relatives.
>
> *Garrouste-Orgeas, 2012*

Modern systems approaches to reduce errors and improve efficiency have their roots in the manufacturing quality and process control principles developed by renowned statistician W. Edwards Deming, engineers Joseph M. Juran and Kaoru Ishikawa, and former Secretary of Commerce and quality management champion Malcolm Baldrige, among others.

When a manufacturing process is standardized, it often leads to greater efficiency and fewer mistakes. It's no wonder than some of these same processes (systems) for finding, analyzing, and preventing manufacturing errors are being applied to healthcare.

An important contributor to medical errors is lack of communication between co-workers, departments, shifts, and even among different organizations and levels of care. Doctors, nurses, and others see a particular patient through their own professional prisms and attend to different aspects of the patient's care. This makes creating a culture of safety a huge organizational challenge, one that needs to be evaluated constantly and systematically. According to the IOM [sic], most medical errors are the result of systems failures that require analysis on a systems level to understand their cause and to promote corrective action.

Indeed, Garrouste-Orgeas and colleagues (2012) wrote,

> Preventive strategies are more likely to be effective if they rely on a system-based approach, in which organizational flaws are remedied, rather than a human-based approach of encouraging people not to make errors.

Root Cause Analysis

Root cause analysis (RCA) is a systems approach that asks three questions that provide the framework for information collection?

1. What is the problem?
2. Why did it happen?
3. What can be done to prevent it from occurring again?

According to the book *Internal Bleeding*, "RCA attempts to write a second story about the actions that led to error—to look past the obvious . . . scapegoats and find the other culprits, however deeply they may be embedded in the system" (Wachter & Shojania, 2004).

In 1997 the Joint Commission (then called the Joint Commission on the Accreditation of Healthcare Organizations, or JCAHO) mandated the use of root cause analysis in the investigation of sentinel events or medical errors in accredited hospitals. There are two main categories of error:

1. **Active error**, errors occurring at the point of interface between humans and a complex system

2. **Latent error**, the hidden problems within healthcare systems that contribute to adverse events (AHRQ, 2019c)

RCAs should generally follow a prespecified protocol that begins with data collection and reconstruction of the event in question through record review and participant interviews. A multidisciplinary team should then analyze the sequence of events leading to the error, with the goals of identifying how the event occurred (through identification of active errors) and why the event occurred (through systematic identification and analysis of latent errors). The ultimate goal of RCA, of course, is to prevent future harm by eliminating the latent errors that so often underlie adverse events. (AHRQ, 2019c).

The term *root cause analysis*, or RCA, is widely used but can be considered misleading. Often there will be multiple errors or system flaws that converge for a critical incident to impact the patient, and labeling one or even a few of them as "causes" can put undue emphasis on them and obscure the overall relationship among all of them. For this reason, it has been suggested that the term *root cause analysis* should be replaced with "system analysis" (AHRQ, 2019c).

Although one of the most widely used approaches to making patient safety improvements, the effectiveness of root cause analysis has been questioned for not providing sustainable system-level solutions and other problems (AHRQ, 2019; Kellogg et al., 2017; Peerally et al., 2017).

Plan-Do-Study-Act Cycle

Another system approach to eliminating medical errors is called Plan-Do-Study-Act (PDSA) approach, devised by the Institute for Healthcare Improvement. This strategy has been widely used by the Institute and many other healthcare organizations. One of the unique features of this strategy is the acknowledgement that change is cyclical in nature and benefits from small and frequent PDSAs rather than big and slow ones, before changes are made system-wide (IHI, 2017).

The PDSA cycle tests a change by "developing a plan to test the change (Plan), then carrying out the test (Do), observing and learning from the consequences (Study), and determining what modifications should be made to the test (Act)" (IHI, 2017).

IHI Open School: Whiteboard: PDSA in Everyday Life (Part 1) [4:45]
https://www.youtube.com/watch?v=_-ceS9Ta820
Published March 28, 2012

The TeamSTEPPS Approach

Another systems approach to the problem of medical errors is the Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) approach. A key point is that, even though the delivery of care requires teamwork, members of these teams are rarely trained together and they often come from separate disciplines and diverse educational programs (King et al., 2008).

Given the interdisciplinary nature of healthcare and the necessity for cooperation among those who perform it, teamwork is critical to ensure patient safety. Teams make fewer mistakes than individuals, especially when each team member knows his or her responsibilities. Simply conducting training or installing a team structure does not ensure that the team will operate effectively (King et al., 2008).

There are three phases to the TeamSTEPPS approach:

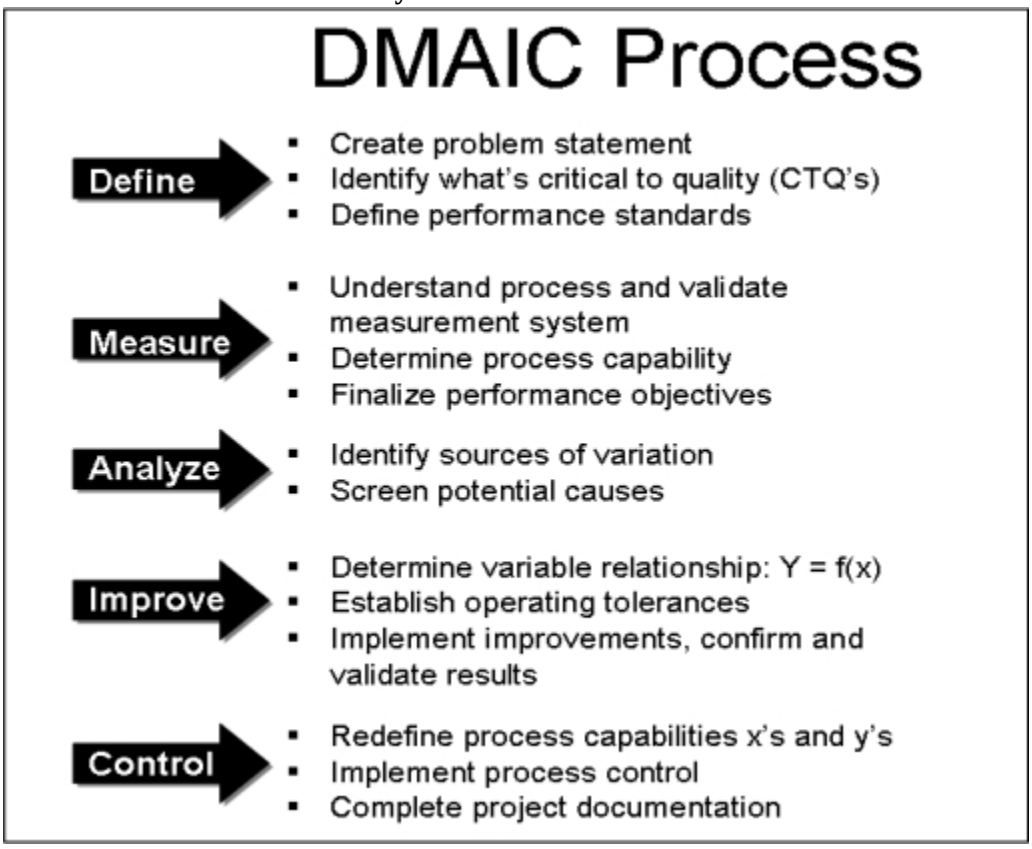
- Phase I involves assessment and setting the stage.
- Phase II includes planning, training, and implementation.
- Phase III sustains and spread improvements in teamwork performance, clinical processes, and outcomes. (King et al., 2008)

Lean Six Sigma for Healthcare

Lean Six Sigma is the combination of two methodologies, Lean and Six Sigma. **Lean** attempts to eliminate waste within a process, and **Six Sigma** (named for six standard deviations from the mean — three above and three below) attempts to reduce variation and defects (AHRQ HIT, 2008).

Central to Lean Six Sigma is the Define, Measure, Analyze, Improve, and Control (DMAIC) lifecycle (see below).

Lean Six and the DMAIC Lifecycle



Source: Meliones et al., 2008.

Lean Six Sigma is the gold standard manufacturing system for many Fortune 500 companies; however, it is a large, complicated process requiring extensive training to implement.

Nevertheless, Lean Six Sigma can be used to decrease medical errors and improve outcomes. In one example, North Mississippi Medical Center reduced the number of prescription instruction errors in discharge documents by 50% using Lean Six Sigma, according to American Society for Quality (ASQ,

n.d.). In fact, Six Sigma programs incorporating some Lean principles were shown to have positive results on:

- Surgery turnaround time
- Clinic appointment access
- Hand hygiene compliance
- Antibiotic prophylaxis in surgery
- Scheduling radiology procedures
- Catheter-associated bloodstream infections
- Meeting CMS cardiac indictors
- Hospital-acquired urinary tract infections
- Operating room throughput
- Coagulation testing in the laboratory
- Handoff communications with high-risk patients (Vest & Gamm, 2009; Hurley et al., 2008)

9. Conclusion

> To err is human, but errors can be prevented.
>
> Institute of Medicine [sic], 1999
> *To Err Is Human: Building A Safer Health System*

It has been twenty years since publication of the Institute of Medicine's landmark report "To Err Is Human," which brought the serious problem of medical errors into the spotlight for healthcare institutions and their staff members, oversight agencies, and individual consumers of healthcare. Since then a great deal of additional research has taken place or is in process, and a broad range of agencies are working together to foster standardization in data collection, meaningful research, and the creation of effective broad-based tools for addressing all the different categories of medical errors.

Coming to understand that medical errors are seldom the responsibility of one isolated "bad" employee who can be terminated, we have learned to focus on the clusters of events that come together in an unfortunate sequence to allow an error to occur—a system approach. That approach has allowed us to better understand the causes of errors and to create effective training and tools to reduce and, ultimately, eliminate medical errors.

Success stories like the Tampa General Hospital emergency department's reducing CAUTI's by 75% can inspire and encourage others. Utilizing a program that had support and participation that started at the top with ED leadership and included other departments and a variety of staff members utilizing tools developed by AHRQ resulted in a significant improvement in patient safety and increased skill and morale among staff (AHRQ, 2018e).

The AHRQ just released in late January 2019 preliminary data indicating that for the period 2014–2017 there was an overall 13% decline in hospital-acquired conditions (HACs). HACs include the medical errors discussed in this course, along with obstetric adverse events and a few other conditions. AHRQ notes that this decline meant that 20,500 deaths were prevented and $7.7 billion in related medical costs were saved in the time between 2014 and 2017 (AHRQ, 2019d,e). An infographic that presents HACs vividly is available here; it is too large to fit the parameters of this course.

There is still plenty to be done to save even more lives and more money but this is encouraging news.

10. Resources and References

Resources

Florida Agency for Healthcare Administration (AHCA)
Office of Risk Management & Patient Safety
http://ahca.myflorida.com/SCHS/RiskMgtPubSafety/RiskManagement.shtml

Institute for Safe Medicine Practices (ISMP)
A non-profit organization devoted entirely to medication errors and safe medication use. The Institute "collects and analyzes reports of medication hazardous conditions, near-misses, errors, and other adverse events." ISMP also "disseminates timely medication safety information, risk reduction tools, and error-prevention strategies."
https://www.ismp.org

References

Note: The Institute of Medicine (IOM) has changed its name to the National Academy of Medicine. Because many of our references predate the name change, you will find IOM used here.

Ackroyd-Stolarz S. (2018). Improving the prevention of pressure ulcers as a way to reduce healthcare expenditures. CMAJ. 2014 Jul 8; 186(10): E370–E371. doi:10.1503/cmaj.131620. Retrieved January 25, 2019, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4081234/.

Aebel ES, West JS. (2017). Client Alert: Florida Supreme Court Broadens Patient Access to Adverse Incident Reports. Retrieved January 12, 2019, from https://www.slk-law.com/NewsEvents/Publications/162511/Client-Alert-Florida-Supreme-Court-Broadens-Patient-Access-to-Adverse-Incident-Reports.

Agency for Healthcare Research and Quality (**AHRQ**). (2019). Never Events. Patient Safety Primer, Patient Safety Network. Retrieved January 12, 2019, from https://psnet.ahrq.gov/primers/primer/3.

Agency for Healthcare Research and Quality (**AHRQ**). (2019a). Healthcare-Associated Infections. Patient Safety Primer, Patient Safety Network. Retrieved January 17, 2019, from https://psnet.ahrq.gov/primers/primer/7.

Agency for Healthcare Research and Quality (**AHRQ**). (2019b). Fatigue, Sleep Deprivation, and Patient Safety. Patient Safety Primer, Patient Safety Network. Retrieved January 24, 2019, from https://psnet.ahrq.gov/primers/primer/37/
Fatigue-Sleep-Deprivation-and-Patient-Safety.

Agency for Healthcare Research and Quality (**AHRQ**). (2019c). Root Cause Analysis. Patient Safety Primer. Retrieved January 25, 2019, from https://psnet.ahrq.gov/primers/primer/10/Root-Cause-Analysis.

Agency for Healthcare Research and Quality (**AHRQ**). (2019d). AHRQ Analysis Finds Hospital-Acquired Conditions Declined by Nearly 1 Million from 2014-2017: HHS Initiatives Continue to Improve Patient Safety. Press Release. January 29, 2019. Retrieved January 30, 2019, from https://www.ahrq.gov/news/newsroom/press-releases/hac-rates-declined.html.

Agency for Healthcare Research and Quality (**AHRQ**). (2019e). AHRQ National Scorecard on Hospital-Acquired Conditions. Updated Baseline Rates and Preliminary Results 2014–2017. Retrieved January 30, 2019, from

https://www.ahrq.gov/sites/default/files/wysiwyg/
professionals/quality-patient-safety/pfp/hacreport-2019.pdf.

Agency for Healthcare Research and Quality (**AHRQ**). (2019f). Declines in Hospital-Acquired Conditions. Infographic. Retrieved January 30, 2019, from
https://www.ahrq.gov/sites/default/files/wysiwyg/data/infographics/hac_rates_2019.pdf.

Agency for Healthcare Research and Quality (**AHRQ**). (2018). QI Guide on Improved Nursing Care: My Quality Improvement (MyQI). Retrieved January 12, 2019, from
http://www.ahrq.gov/professionals/systems/monahrq/myqi/nursing.html. was 2015

Agency for Healthcare Research and Quality (**AHRQ**). (2018a). AHRQ National Scorecard on Hospital-Acquired Conditions: Updated Baseline Rates and Preliminary Results 2014–2016. Retrieved January 17, 2019, from
https://www.ahrq.gov/professionals/quality-patient-safety/pfp/index.html AND
https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/pfp/natlhacratereport-rebaselining2014-2016_0.pdf.

Agency for Healthcare Research and Quality (**AHRQ**). (2018b). Preventing Falls in Hospitals: A Toolkit for Improving Quality of Care. Content last reviewed July 2018. Retrieved January 19, 2019, from
https://www.ahrq.gov/professionals/systems/hospital/fallpxtoolkit/index.html.

Agency for Healthcare Research and Quality (**AHRQ**). (2018c). 20 Tips to Help Prevent Medical Errors. Retrieved January 25, 2019, from http://www.ahrq.gov/patients-consumers/care-planning/errors/20tips/index.html.

Agency for Healthcare Research and Quality (**AHRQ**). (2018d). Making Healthcare Safer II: An Updated Critical Analysis of the Evidence for Patient Safety Practices. Retrieved January 24, 2019, from
http://www.ahrq.gov/research/findings/evidence-based-reports/ptsafetyuptp.html.

Agency for Healthcare Research and Quality (**AHRQ**). (2018e). Tampa Hospital Uses AHRQ Tools to Reduce Emergency Department CAUTI Rates by 75 Percent. Patient Safety Impact Case Studies. December 2018. Retrieved January 30, 2019, from https://www.ahrq.gov/news/newsroom/case-studies/201808.html.

Agency for Healthcare Research and Quality (**AHRQ**). (2017). Guide to Patient and Family Engagement in Hospital Quality and Safety. Retrieved January 21, 2019, from
https://www.ahrq.gov/professionals/systems/hospital/engagingfamilies/guide.html.

Agency for Healthcare Research and Quality (**AHRQ**). (2015). Health Literacy Universal Precautions Toolkit, 2nd Edition. Retrieved January 24, 2019, from http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/healthlittoolkit2.html.

Agency for Healthcare Research and Quality (**AHRQ**). (2013). Preventing Falls in Hospitals: A Toolkit for Improving Quality of Care. Retrieved July 27, 2015, from
http://www.ahrq.gov/professionals/systems/hospital/fallpxtoolkit/index.html.

Agency for Healthcare Research and Quality (AHRQ). (2013a). Making Health Care Safer II: An Updated Critical Analysis of the Evidence for Patient Safety Practices. Retrieved August 8, 2015, from
http://www.ahrq.gov/research/findings/evidence-based-reports/ptsafetyuptp.html.

Agency for Healthcare Research and Quality (**AHRQ**). (2009). Infants are at the Highest Risk for Errors Involving Cardiovascular drugs. *Research Activities* 2009; 351:3. Retrieved January 25, 2019, from http://archive.ahrq.gov/news/newsletters/research-activities/nov09/1109RA.pdf.

Agency for Healthcare Research and Quality Health IT (**AHRQ HIT**). (2008). Lean Six Sigma. Retrieved January 25, 2019, from http://healthit.ahrq.gov/health-it-tools-and-resources/workflow-assessment-health-it-toolkit/all-workflow-tools/lean-six-sigma.

Alexander CA, Wang L. (2014). Medication Errors: Preventing Untimely Deaths. *International Journal of Research in Nursing* 2014; 5(2):52-60. doi: 10.3844/ijrnsp.2014.52.60. Retrieved January 25, 2019, from http://thescipub.com/pdf/10.3844/ijrnsp.2014.52.60.

American Association of Clinical Chemistry (**AACC**). (2015). Laboratory Medicine: Advancing Quality in Patient Care. Retrieved January 19, 2019, from https://www.aacc.org/health-and-science-policy/aacc-policy-reports/2015/laboratory-medicine-advancing-quality-in-patient-care#2.

American Society for Quality (**ASQ**). (n.d.) Lean Six Sigma in Healthcare. Retrieved January 25, 2019, from http://asq.org/healthcaresixsigma/lean-six-sigma.html.

Barach P. (2005). The Unintended Consequences of Florida Medical Liability Legislation. *AHRQ: Patient Safety Network, Perspectives on Safety*. Retrieved January 12, 2019 from https://psnet.ahrq.gov/perspectives/perspective/14/The-Unintended-Consequences-of-Florida-Medical-Liability-Legislation.

Berríos-Torres SI, Umscheid CA, Bratzler DW, et al. (2017). Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017. JAMA Surg. 2017;152(8):784–791. doi:10.1001/jamasurg.2017.0904. https://jamanetwork.com/journals/jamasurgery/fullarticle/2623725.

Berry SD, and Kiel DP. (2018). Falls, Updated July 2018. Geriatrics Review Syllabus. Retrieved January 19, 2019, from https://geriatricscareonline.org/FullText/B023/B023_VOL001_PART001_SEC004_CH032.

Betancourt J, Renfrew M, Green A, et al. (2012). Background on Patient Safety and LEP Populations. In: Improving patient safety systems for patients with limited English proficiency: A Guide for Hospitals. Rockville (MD): Agency for Healthcare Research and Quality. AHRQ Publication No. 12-0041. Retrieved January 25, 2019, from http://www.ahrq.gov/professionals/systems/hospital/lepguide/lepguide1.html.

Bihari M. (2018) Health Insurance—Medical Errors and Health Reform: Affordable Care Act May Improve Patient Safety. verywellhealth.com. Retrieved January 12, 2019, from https://www.verywellhealth.com/medical-errors-and-health-reform-1738919.

Bird J. (2013). Survey: Nurse understaffing, fatigue threatens patient safety. Retrieved January 24, 2019, from https://www.fiercehealthcare.com/healthcare/survey-nurse-understaffing-fatigue-threatens-patient-safety#ixzz2PJOGqw2x.

Butler, Mary. (2015, July). Preventing healthcare's top four documentation disasters. Journal of **AHIMA** 86(7):18–23. Retrieved January 25, 2019, from http://library.ahima.org/doc?oid=107687.

CBS Local Media. (2011). I Team: Ignoring Patients' Right to Know. May 23, 2011. Retrieved January 21, 2019, from http://miami.cbslocal.com/2011/05/23/i-team-ignoring-patients-right-to-know/?sms_ss=facebook&at_xt=4de937af5b9c4b03%2C0.

Centers for Disease Control and Prevention (**CDC**). (2019). *Clostridioides difficile* Infection. Healthcare-associated Infections (HAI). Retrieved January 16, 2019, from https://www.cdc.gov/hai/organisms/cdiff/cdiff_infect.html.

Centers for Disease Control and Prevention (**CDC**). (2019a). What is C. diff? *Clostridioides difficile* (*C. diff*). Retrieved January 16, 2019, from https://www.cdc.gov/cdiff/what-is.html.

Centers for Disease Control and Prevention (**CDC**). (2018b). Data Highlights. Healthcare-Associated Infections (HAIs). Retrieved January 15, 2019, from https://www.cdc.gov/hai/data/portal/index.html.

Centers for Disease Control and Prevention (**CDC**). (2018c). Information for Clinicians about *C. diff*. *Clostridioides difficile* (*C. diff*). Retrieved January 16, 2019, from https://www.cdc.gov/cdiff/clinicians/index.html AND https://www.cdc.gov/cdiff/clinicians/faq.html.

Centers for Disease Control and Prevention (**CDC**). (2018d). Antibiotic/Antimicrobial Resistance (AR/AMR). Retrieved January 17, 2019, from https://www.cdc.gov/drugresistance/ AND https://www.cdc.gov/drugresistance/about.html.

Centers for Disease Control and Prevention (**CDC**). (2018e). Methicillin-resistant Staphylococcus aureus (MRSA). Retrieved January 17, 2019, from https://www.cdc.gov/mrsa/index.html AND https://www.cdc.gov/mrsa/healthcare/index.html.

Centers for Disease Control and Prevention (**CDC**). (2018f). Hand Hygiene in Healthcare Settings. Retrieved January 18, 2019, from https://www.cdc.gov/handhygiene/index.html.

Centers for Disease Control and Prevention (**CDC**). (2018g). Healthcare Providers. Hand Hygiene in Healthcare Settings. Retrieved January 18, 2019, from https://www.cdc.gov/handhygiene/providers/index.html.

Centers for Disease Control and Prevention (**CDC**). (2018h). Clinical Laboratory Improvement Amendments (CLIA). Retrieved January 19, 2019, from https://wwwn.cdc.gov/clia/About.aspx and https://wwwn.cdc.gov/clia/Regulatory/default.aspx.

Centers for Disease Control and Prevention (**CDC**). (2018j). Waived Tests. Clinical Laboratory Improvement Amendments (CLIA). Retrieved January 21, 2019, from https://wwwn.cdc.gov/clia/resources/waivedtests/default.aspx#.

Centers for Disease Control and Prevention (**CDC**). (2018k). Medication Safety Program: For Parents: Young Children and Adverse Drug Events. Retrieved January 24, 2019, from https://www.cdc.gov/MedicationSafety/parents_childrenAdverseDrugEvents.html.

Centers for Disease Control and Prevention (**CDC**). (2018m). Adverse Drug Events in Adults. Medication Safety Program. Retrieved January 25, 2019, from https://www.cdc.gov/MedicationSafety/Adult_AdverseDrugEvents.html.

Centers for Disease Control and Prevention (**CDC**). (2017). Leading Causes of Death. Retrieved January 11, 2019, from http://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm AND https://www.cdc.gov/nchs/data/dvs/LCWK9_2015.pdf.

Centers for Disease Control and Prevention (**CDC**). (2017a). Catheter-Associated Urinary Tract Infections (CAUTI). Healthcare-Associated Infections. Retrieved January 16, 2019, from https://www.cdc.gov/hai/ca_uti/uti.html.

Centers for Disease Control and Prevention (**CDC**). (2017b). Guideline for Prevention of Catheter-Associated Urinary Tract Infections (2009) (last updated 2017). Retrieved January 16, 2019, from https://www.cdc.gov/infectioncontrol/pdf/guidelines/cauti-guidelines.pdf.

Centers for Disease Control and Prevention (**CDC**). (2017c). Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006 (last updated 2017). Retrieved January 16, 2019, from https://www.cdc.gov/infectioncontrol/pdf/guidelines/mdro-guidelines.pdf.

Centers for Disease Control and Prevention (**CDC**). (2017d). Important Facts about Falls. Older Adult Falls. Home & Recreational Safety. Retrieved January 19, 2019, from https://www.cdc.gov/homeandrecreationalsafety/falls/adultfalls.html.

Centers for Disease Control and Prevention (**CDC**). (2016). Central Line-associated Bloodstream Infections. Healthcare-Associated Infections (HAI). Retrieved January 16, 2019, from https://www.cdc.gov/hai/bsi/bsi.html.

Centers for Disease Control and Prevention (**CDC**). (2016a). National and State Healthcare Associated Infections: 2016 Progress Report. Retrieved January 16, 2019, from https://www.cdc.gov/HAI/pdfs/progress-report/hai-progress-report.pdf.

Centers for Disease Control and Prevention (**CDC**). (2016b). Show Me the Science. Hand Hygiene in Healthcare Settings. Retrieved January 18, 2019, from https://www.cdc.gov/handhygiene/science/index.html.

Centers for Disease Control and Prevention (**CDC**). (2016c). Costs of Falls Among Older Adults. Home and Recreational Safety. Retrieved January 19, 2019, from https://www.cdc.gov/HomeandRecreationalSafety/Falls/fallcost.html.

Centers for Disease Control and Prevention (**CDC**). (2016d). Keep Them STEADI: Preventing Older Adult Falls in Hospital-Based Settings. Retrieved January 19, 2019, from https://www.cdc.gov/steadi/stories/hospital.html.

Centers for Disease Control and Prevention (**CDC**). (2015). State-based HAI prevention: Florida. Retrieved January 12, 2019, from https://www.cdc.gov/HAI/stateplans/state-hai-plans/fl.html. (No data updates since 2015. More current data at CDC, 2018 above.)

Centers for Disease Control and Prevention (**CDC**). (2015a). Frequently Asked Questions about Catheter-associated Urinary Tract Infections. Healthcare-Associated Infections (HAI). Retrieved January 16, 2019, from https://www.cdc.gov/hai/ca_uti/cauti_faqs.html.

Centers for Disease Control and Prevention (**CDC**). (2011). Resources for Patients and Healthcare Providers. Central Line-Associated Bloodstream Infections. Healthcare-Associated Infections (HAI). Retrieved January 16, 2019, from https://www.cdc.gov/HAI/bsi/CLABSI-resources.html.

Centers for Disease Control and Prevention (**CDC**). (2011a). VRE in Healthcare Settings. Retrieved January 17, 2019, from https://www.cdc.gov/HAI/organisms/vre/vre.html.

Centers for Disease Control and Prevention (**CDC**). (2010). Frequently Asked Questions About Surgical Site Infections. Healthcare-Associated Infections. Retrieved January 15, 2019, from https://www.cdc.gov/HAI/ssi/faq_ssi.html.

Centers for Disease Control and Prevention (**CDC**). (2010a). Frequently Asked Questions About Ventilator-Associated Pneumonia. Healthcare-Associated Infections (HAIs). Retrieved January 16, 2019, https://www.cdc.gov/HAI/vap/vap_faqs.html.

Centers for Medicare and Medicaid Services (**CMS**). (2018). Hospital-Acquired Conditions. Retrieved January 11, 2019, from https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/Hospital-Acquired_Conditions.html AND https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/icd10_hacs.html. **AND** HAI Data. Select your healthcare-associated infection (HAI) data for various healthcare settings. Retrieved January 12, 2019, from https://gis.cdc.gov/grasp/PSA/HAIreport.html.

Centers for Medicare and Medicaid Services (**CMS**). (2018a). Hospital-Acquired Condition Reduction Program (HACRP). Retrieved January 15, 2019, from https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/HAC-Reduction-Program.html. **AND** Medication Safety Basics. Retrieved January 14, 2019, from https://www.cdc.gov/medicationsafety/basics.html.

Center for Medicare/Medicaid Services (**CMS**). 2015). FY 2013, FY 2014, and FY 2015 Final HAC List. 2015, no changes have been made. Retrieved March 28 2019 from https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/Downloads/FY_2013_Final_HACsCodeList.pdf.

Child Health Patient Safety Organization (**CHPSO**). (2019). 2018 Annual Report. Retrieved March 28, 2019 from https://www.childrenshospitals.org/Site-Search?query=CHPSo+2018+Report.

Cho I, Park H, Choi Y, et al. (2014). Understanding the Nature of Medication Errors in an ICU with a Computerized Physician Order Entry System. *PLoS ONE* 9(12): e114243. doi:10.1371/journal.pone.0114243. Retrieved January 25, 2019, from http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0114243.

Clinical Laboratory Improvement Amendments (**CLIA**). (2014). CLIA: Individualized Quality Control Plan: What is an IQCP? November 2014. Retrieved January 19, 2019, from https://www.cms.gov/Regulations-and-Guidance/Legislation/CLIA/Downloads/CLIAbrochure13.pdf.

Commission on Office Laboratory Accreditation (**COLA**). (2015). A COLA White Paper: Federal Government Questions Quality in Waived Testing. Retrieved January 21, 2019, from https://www.cola.org/wp-content/uploads/2015/07/COLA_13147-White-paper_v5.pdf.

Currie L. (2008). Fall and Injury Prevention, Chapter 10. In Hughes RG, (ed.*), Patient Safety and Quality: An Evidence-Based Handbook for Nurses.* Rockville (MD): Agency for Healthcare Research and Quality. Retrieved January 19, 2019, from https://www.ncbi.nlm.nih.gov/books/NBK2653/.

Delbanco SF. (2014). The Payment Reform Landscape: Non-Payments. Health Affairs Blog September 4, 2014. R DOI: 10.1377/hblog20140904.041220. Retrieved January 21, 2019, from https://www.healthaffairs.org/do/10.1377/hblog20140904.041220/full/.

Devine JG. (2015). Two Wrongs Don't Make a Right (Kidney). Commentary. Spotlight Case. Retrieved January 25, 2019, from https://psnet.ahrq.gov/webmm/case/341/Two-Wrongs-Dont-Make-a-Right-Kidney?q=documentation+errors.

Englebright J, Westcott R, McManus K, Kleja K, et al. (2018). A Comprehensive Program to Reduce Rates of Hospital-Acquired Pressure Ulcers in a System of Community Hospitals. *Journal of Patient Safety* 14(1):54–59, MAR 2018. DOI: 10.1097/PTS.0000000000000167. Retrieved January 25, 2019, from https://insights.ovid.com/crossref?an=01209203-201803000-00010.

Epner P, Gans J, Graber M. (2013). When Diagnostic Testing Leads to Harm: A New Outcomes-Based Approach for Laboratory Medicine. *BMJ Quality & Safety* 2013; 22(Suppl 2):ii6-ii10. doi:10.1136/bmjqs-2012-001621. Retrieved January 19, 2019, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3786651/.

facingdisability.com. (2019). Video from Rehabilitation Institute of Chicago. Retrieved March 29 2019 from https://facingdisability.com/expert-topics/whats-the-most-important-thing-to-do-to-prevent-pressure-sores/mary-zeigler-ms.

Florida Department of Health (**FDOH)**. (2018). Healthcare-Associated Infections (HAI). Retrieved January 12, 2019, from http://www.floridahealth.gov/diseases-and-conditions/health-care-associated-infections/index.html.

Florida General Counsel's Office (**Florida General Counsel**). (2008). Memo to Risk Managers re: Amendment 7 (July 1, 2008). Retrieved January 21, 2019, from http://www.fdhc.state.fl.us/SCHS/RiskMgtPubSafety/docs/articles/amendment7.pdf.

Florida House. (2009). Governmental Affairs Policy Committee Meeting packet. (March 4, 2009). Retrieved January 12, 2019, from http://www.flhouse.gov/SEctions/Documents/loaddoc.aspx?PublicationType=Committees&CommitteeId=2476&Session=2009&DocumentType=Meeting%20Packets&FileName=GovAffairsPolicyCom%2003-04-09.REVISED%20ONLINEpdf.pdf.

Florida Legislature, Office of Program Policy Analysis and Government Accountability (**FL OPPAGA**). (2006). *Patient Safety Corporation Has Made Progress; Needs to Continue Developing Its Infrastructure.* Report No. 06-87, December 2006. Retrieved January 12, 2019, from www.oppaga.state.fl.us/MonitorDocs/Reports/pdf/0676rpt.pdf.

Florida Senate. (2007). Florida Patient Safety Corporation. Interim Project Report 2008-136, November 2007. Retrieved January 21, 2019, from http://archive.flsenate.gov/data/Publications/2008/Senate/reports/interim_reports/pdf/2008-136hr.pdf.

Florida Senate. (2009). Bill Analysis and Fiscal Impact Statement (SB1896). Retrieved January 21, 2019, from http://archive.flsenate.gov/data/session/2009/Senate/bills/analysis/pdf/2009s1896.hr.pdf.

Florida Senate. (2009a). House of Representatives Staff Analysis (HB7023). Retrieved January 21, 2019, from www.flsenate.gov/data/session/2009/House/bills/analysis/pdf/h7023b.EDCA.pdf.

Florida Senate. (2008). Open Government Sunset Review of Section 381.0273, F.S., Public Records and Meetings Exemptions for the Florida Patient Safety Corporation. Retrieved January 21, 2019, from http://archive.flsenate.gov/data/Publications/2009/Senate/reports/interim_reports/pdf/2009-212hr.pdf.

Florida Statutes. (2018). The 2018 Florida Statutes. 381.028: Adverse Medical Incidents. Retrieved January 12, 2019, from http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=0300-0399/0381/Sections/0381.028.html.

Florida Statutes. (2018a). The 2018 Florida Statutes. 395.0197: Internal Risk Management Program. Retrieved January 12, 2019, from http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0300-0399/0395/Sections/0395.0197.html AND for details of changes in 2018: http://laws.flrules.org/2018/24.

Florida Statutes. (2018b). The 2018 Florida Statutes. 408.061: Data Collection. Retrieved January 12, 2019, from http://www.leg.state.fl.us/statutes/index.cfm?mode=View%20Statutes&SubMenu=1&App_mode=Display_Statute&Search_String=hospital-acquired+infections&URL=0400-0499/0408/Sections/0408.061.html.

Florida Statutes. (2004). The 2004 Florida Statutes. 381.0271: Florida Patient Safety Corporation. Retrieved January 12, 2019, from http://www.leg.state.fl.us/statutes/index.cfm?App_Mode=Display_Statute&Search_String=&URL=Ch0381/Sec0271.htm&StatuteYear=2004.

Gandhi TK. (2016). Patient Safety is Public Health. CDC Safe Healthcare Blog. Retrieved January 11, 2019, from https://blogs.cdc.gov/safehealthcare/patient-safety-is-public-health/.

Garrouste-Orgeas M, Philippart F, Bruel C, et al. (2012). Overview of Medical Errors and Adverse Events. *Annals of Intensive Care* 2012; 2:2. doi:10.1186/2110-5820-2-2. Retrieved January 25, 2019, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3310841/.

Grayson D, Boxerman S, Potter P, et al. (2005). Do Transient Working Conditions Trigger Medical Errors? Advances in Patient Safety, Vol. 1. AHRQ Publication No. 05-0021-1. Retrieved July 29, 2015, from http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/advances-in-patient-safety/vol1/grayson.pdf **AND** https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/patient-safety-resources/resources/advances-in-patient-safety/vol1/Grayson.pdf.

Government Publication Office (**GPO**). (1996). Health Insurance Portability and Accountability Act of 1996. Retrieved July 27, 2015, from http://www.gpo.gov/fdsys/pkg/BILLS-104hr3103enr/pdf/BILLS-104hr3103enr.pdf.

Hanlon C, Sheedy K, Kniffin T, et al. (2015). 2014 Guide to State Adverse Event Reporting Systems. Washington DC: National Academy for State Health Policy. Retrieved January 21, 2019, from https://nashp.org/wp-content/uploads/2015/02/2014_Guide_to_State_Adverse_Event_Reporting_Systems.pdf.

Haymond S. (2016). What Everyone Should Know about Lab Tests: They aren't always correct and they aren't always useful. Guest Blog. Scientific American. May 9, 2016. Retrieved January 19, 2019, from https://blogs.scientificamerican.com/guest-blog/what-everyone-should-know-about-lab-tests/.

Hirschtick R. (2012). Sloppy and Paste. Web Morbidity & Mortality Rounds on the Web. July 2012. Agency for Healthcare Research and Quality. Retrieved January 25, 2019, from https://psnet.ahrq.gov/webmm/case/274.

Howie WO. (2009). Mandatory Reporting of Medical Errors: Crafting Policy and Integrating It into Practice. *Journal for Nurse Practitioners* 2009; 5(9):649–54. Retrieved January 12, 2019, from http://www.medscape.com/viewarticle/712828_2.

Hughes RG, Blegen M. (2008). Medication Administration Safety, Chapter 37. In Hughes RG (ed.), *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. AHRQ Publication No. 08-0043. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved January 15, 2019 from https://www.ncbi.nlm.nih.gov/books/NBK2656/.

Hughes RG, Edgerton E. (2005). First, Do No Harm: Reducing Pediatric Medication Errors: Children Are Especially At Risk For Medication Errors. *American Journal of Nursing* 2005May; 105(5):79-84. Retrieved January 25, 2019, from http://www.nursingcenter.com/journalarticle?Article_ID=582832.

Hurley B, Levett JM, Huber C, et al. (2008). Using Lean Six Sigma Tools to Compare INR Measurements from Different Laboratories Within a Community. In: Henriksen K, Battles JB, Keyes MA, et al. (eds*.), Advances in Patient Safety: New Directions and Alternative Approaches* (Vol. 3: Performance and Tools). Rockville, MD: Agency for Healthcare Research and Quality. Retrieved January 25, 2019, from http://www.ncbi.nlm.nih.gov/books/NBK43669/.

Institute for Healthcare Improvement (**IHI**). (2012). How-to Guide: Prevent Harm from High-Alert Medications. Retrieved January 15, 2019, from http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventHarmfromHighAlertMedications.aspx.

Institute for Healthcare Improvement (**IHI**). (2019). Pressure Ulcers. Retrieved January 25, 2019, from http://www.ihi.org/topics/PressureUlcers/Pages/default.aspx.

Institute for Healthcare Improvement **(IHI**). (2017). Plan-Do-Study-Act (PDSA) Worksheet. Retrieved January 25, 2019, from http://www.ihi.org/resources/Pages/Tools/PlanDoStudyActWorksheet.aspx AND http://www.ihi.org/resources/Pages/HowtoImprove/ScienceofImprovementTestingChanges.aspx.

Institute for Healthcare Improvement (**IHI**). (2011). How-to Guide: Prevent Pressure Ulcers. Retrieved January 25, 2019, from https://www.ihi.org.

Institute for Safe Medical Practices. (2017). List of Error-Prone Abbreviations, Symbols and Dose Designations. Retrieved January 14, 2019, from https://www.ismp.org/recommendations/error-prone-abbreviations-list.

Institute of Medicine (**IOM**). (1999). Kohn L, Corrigan J, Donaldson M (eds.), *To Err Is Human: Building a Safer Health System.* Washington DC: The National Academies Press. Retrieved January 11, 2019 from https://www.nap.edu/catalog/9728/to-err-is-human-building-a-safer-health-system.

Institute of Medicine (**IOM**). (2007). Aspden P, Wolcott J, Bootman L, et al. (eds.), *Preventing Medication Errors: Quality Chasm Series. Institute of Medicine*. Washington, DC: The National Academies Press. Retrieved January 11, 2019, from https://www.nap.edu/read/11623/chapter/1.

Ivanushko O. (2017). Medical transparency and patients' right to know: A Florida law opens up new doors for patient access to adverse medical incidents. Campbell Law Observer. Retrieved January 12, 2019, from http://campbelllawobserver.com/medical-transparency-and-patients-right-to-know/.

Jacobson R. (2015). Widespread Understaffing of Nurses Increases Risk to Patients: Emerging data support minimum nurse-to-patient ratios, but hospital administrations are reluctant to adopt them. Scientific American. July 14, 2015. Retrieved January 24, 2019, from https://www.scientificamerican.com/article/widespread-understaffing-of-nurses-increases-risk-to-patients/.

James JT. (2013). A New, Evidence-Based Estimate of Patient Harms Associated with Hospital Care. *Journal of Patient Safety* 2013Sep;9(3):122–28. Retrieved January 11, 2019, from http://journals.lww.com/journalpatientsafety/Fulltext/ 2013/09000/A_New,_Evidence_based_Estimate_of_Patient_Harms.2.aspx.

Joint Commission, The. (2019). 2019 National Patient Safety Goals. Retrieved January 12, 2019, from https://www.jointcommission.org/standards_information/npsgs.aspx.

Joint Commission, The. (2019a). Hospital: 2019 National Patient Safety Goals. Retrieved January 12, 2019, from https://www.jointcommission.org/hap_2017_npsgs/.

Joint Commission, The. (2018). Speak Up. Reduce Your Risk of Falling. Retrieved January 24, 2019, from https://www.jointcommission.org/topics/speak_up_reducing_your_risk_of_falling.aspx AND https://www.jointcommission.org/assets/1/18/Speakup_falls_brochure.pdf.

Joint Commission, The. (2017). Sentinel Event Policy and Procedures. Retrieved January 12, 2019, from https://www.jointcommission.org/sentinel_event_policy_and_procedures/.

Joint Commission, The. (2016). Sentinel Events (SE): Comprehensive Accreditation Manual for Hospitals, Update 2, January 2016. Retrieved January 12, 2019, from http://www.jointcommission.org/assets/1/6/CAMH_24_SE_all_CURRENT.pdf.

Joint Commission, The. (2012). CLABSI Toolkit—Preventing Central Line–Associated Bloodstream Infections: Useful Tools, An International Perspective. Retrieved January 16, 2019, from https://www.jointcommission.org/topics/clabsi_toolkit.aspx AND https://innovations.ahrq.gov/qualitytools/clabsi-toolkit-preventing-central-line-associated-bloodstream-infections-useful-tools.

Joint Commission Center for Transforming Healthcare (**JCC**). (2019). Targeted Solutions Tool (TST) Preventing Falls. Retrieved January 24, 2019, from https://www.centerfortransforminghealthcare.org/what-we-offer/targeted-solutions-tool/preventing-falls. Fact Sheet available at this URL.

Justia US Law. (2017). Charles. v. Southern Baptist Hospital of Florida, Inc. Justia Opinion Summary. Retrieved January 12, 2019, from https://law.justia.com/cases/florida/supreme-court/2017/sc15-2180.html.

Kaiser Family Foundation (**KFF**). (2018). Number of Retail Prescription Drugs Filled at Pharmacies by Payer. Retrieved January 12, 2019, from https://kff.org/other/state-indicator/total-retail-rx-drugs/.

Kaiser Family Foundation (**KFF**). (2013, updated 2018). *Summary of the Affordable Care Act.* Retrieved January 12, 2019, from https://kff.org/health-reform/fact-sheet/summary-of-the-affordable-care-act/.

Kaushik N, Green S. (2014). Pre-Analytical Errors: Their Impact and How to Minimize Them. *Medical Laboratory Observer* 2014; 46(5):22-26. Retrieved January 19, 2019, from https://www.mlo-online.com/pre-analytical-errors-their-impact-and-how-to-minimize-them.php.

Kellogg KM, Hettinger Z, Shah M, et al. (2017). Our current approach to root cause analysis: is it contributing to our failure to improve patient safety? BMJ Qual Saf. 2017; 26: 381-387. Retrieved January 25, 2019, from https://qualitysafety.bmj.com/content/qhc/26/5/381.full.pdf.

King HB, Battles J, Baker DP, et al. (2008). TeamSTEPPS: Team Strategies and Tools to Enhance Performance and Patient Safety. In: Henriksen K, Battles JB, Keyes MA, et al., (eds.). Advances in Patient Safety: New Directions and Alternative Approaches (Vol. 3: Performance and Tools). Rockville (MD): Agency for Healthcare Research and Quality. Retrieved January 25, 2019, from http://www.ncbi.nlm.nih.gov/books/NBK43686/.

Laws of Florida. (2009). Chapter 2009-91, House Bill No. 7023. Retrieved January 24, 2019, from http://laws.flrules.org/files/Ch_2009-091.pdf.

Lee GM, Kleinman K, Soumerai SB, et al (2012). Effect of Nonpayment for Preventable Infections in U.S. Hospitals. N Engl J Med. 2012;367:1428-1437.

Lowenfels AB. (2013). Is Nonpayment Effective in Decreasing Rates of Hospital-Acquired Infections? Medscape Commentary. Retrieved January 21, 2019, from https://www.medscape.com/viewarticle/777438.

Lo E, Nicolle LE, Coffin SE, Gould C, et al. (2014). Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals: 2014 Update. *Infection Control and Hospital Epidemiology* 35, No. 5 (May 2014): 464-479. Retrieved January 16, 2019, from https://www.jstor.org/stable/10.1086/675718#metadata_info_tab_contents.

Luthra S. (2016). Electronic records in the ER: A breeding ground for error. Modern Healthcare. Produced by Kaiser Health News. Retrieved January 25, 2019, from https://www.modernhealthcare.com/article/20160227/MAGAZINE/302279829.

Magill S, Edwards J, Bamberg W, et al. (2014). Multistate Point-Prevalence Survey of Healthcare–Associated Infections. *The New England Journal of Medicine* 2014; 370(13):1198-1208. doi: 10.1056/NEJMoa1306801. Retrieved January 15, 2019, from https://www.nejm.org/doi/full/10.1056/NEJMoa1306801#t=article.

Magill S, Hellinger W, Cohen J, et al. (2012). Prevalence of Healthcare-Associated Infections in Acute Care Hospitals in Jacksonville, Florida. *Infection Control and Hospital Epidemiology* 2013; 33(3):283-291. doi: 10.1086/664048. Retrieved January 24, 2019, from http://www.jstor.org/stable/10.1086/664048.

McGrory K, Bedi N. (2018). Heartbroken: Johns Hopkins promised to elevate All Children's Heart Institute. Then patients started to die at an alarming rate. Nov. 28, 2018. Tampa Bay Times http://www.tampabay.com/projects/2018/investigations/heartbroken/all-childrens-heart-institute/.

Medline Plus. (2018). Pressure Sores. Retrieved January 24, 2019, from https://medlineplus.gov/pressuresores.html.

Medline Plus. (2018a). Health Literacy. Retrieved January 25, 2019, from https://medlineplus.gov/healthliteracy.html.

Meliones JN, Alton M, Mericle J, et al. (2008). The DMAIC Process—10-Year Experience Integrating Strategic Performance Improvement Initiatives: Can the Balanced Scorecard, Six Sigma, and Team Training All Thrive in a Single Hospital? In: Henriksen K, Battles JB, Keyes MA, et al. (eds.), *Advances in Patient Safety: New Directions and Alternative Approaches (Vol. 3: Performance and Tools).* Rockville, MD: Agency for Healthcare Research and Quality. Retrieved January 25, 2019, from http://www.ncbi.nlm.nih.gov/books/NBK43660/.

Mody L, Greene MT, Meddings J, et al. (2017). A national implementation project to prevent catheter-associated urinary tract infection in nursing home residents. *AMA Intern Med*. 2017;177:1154-1162. Retrieved January 17, 2019, from https://psnet.ahrq.gov/resources/resource/31122/A-national-implementation-project-to-prevent-catheter-associated-urinary-tract-infection-in-nursing-home-residents.

Murphy J, White J. (2014). Meaningful Use Makes Lower Adverse Drug Rates A Reality. Retrieved January 25, 2019, from http://www.healthit.gov/buzz-blog/meaningful-use/meaningful-adverse-drug-rates-reality/.

Myhre J, Sifris D. (2017) The Correlation Between Medical Errors and Death. verywellhealth.com. Retrieved January 12, 2019, from https://www.verywellhealth.com/how-many-deaths-are-caused-by-medical-error-4134166.

National Coordinating Council for Medication Error Reporting and Prevention (**NCCMERP**). (2019). *About Medication Errors: What is a Medication Error?* Retrieved January 14, 2019, from https://www.nccmerp.org/about-medication-errors.

National Coordinating Council for Medication Error Reporting and Prevention (**NCCMERP**). (2014). Reducing Medication Errors Associated with At-Risk Behaviors by Healthcare Professionals. Retrieved January 24, 2019, from http://www.nccmerp.org/reducing-medication-errors-associated-risk-behaviors-healthcare-professionals.

National Healthcare Safety Network (**NHSN**). (2019). *Patient Safety Component Manual.* Retrieved January 12, 2019, from http://www.cdc.gov/nhsn/pdfs/pscmanual/pcsmanual_current.pdf.

National Network of Libraries of Medicine (**NN/LM**). (n.d.). Health Literacy. Retrieved January 25, 2019, from http://nnlm.gov/outreach/consumer/hlthlit.html.

National Patient Safety Foundation (**NPSF**). (2015). Free from Harm: Accelerating Patient Safety Improvement Fifteen Years after *To Err Is Human*. Retrieved January 11, 2019 from, http://www.ihi.org/resources/Pages/Publications/Free-from-Harm-Accelerating-Patient-Safety-Improvement.aspx.

National Quality Forum (**NQF**). (2019). Measures, Reports, and Tools. Retrieved January 25, 2019, from http://www.qualityforum.org/Measures_Reports_Tools.aspx.

National Quality Forum (**NQF**). (2011). Serious Reportable Events in Healthcare-2011 Update: A Consensus Report. Retrieved January 12, 2019, from http://www.qualityforum.org/Topics/SREs/List_of_SREs.aspx. The report, the 2011 Fact Sheet, and the current online List of SREs are all available at this URL.

Noa GK. (2017). Florida Supreme Court Rules That Patient's Right of Access to Adverse Medical Incident Reports is Not Limited by Federal Law. Retrieved January 12, 2019, from https://www.bucknermiles.com/florida-supreme-court-patients-right-access/.

Osborne J. (2018). Strategies to deliver better patient care and avoid unnecessary errors. Clinical Issues. Medical Laboratory Observer. Retrieved January 19, 2019, from https://www.mlo-online.com/strategies-to-deliver-better-patient-care-and-avoid-unnecessary-errors.

Patient Safety Network (**PSNet**). (2019). Never Events. Patient Safety Primer. Retrieved January 12, 2019, from https://www.psnet.ahrq.gov/primers/primer3.

Patient Safety Network (**PSNet**). (2019a). Reporting Patient Safety Events. Patient Safety Primer. Retrieved January 12, 2019, from https://psnet.ahrq.gov/primers/primer/13/Reporting-Patient-Safety-Events.

Patient Safety Network (**PSNet**). (2019b). Electronic Heath Records. Patient Safety Primer. Retrieved January 25, 2019, from https://psnet.ahrq.gov/primers/primer/43/Electronic-Health-Records?q=documentation+errors.

Patient Safety Network (**PSNet**). (2019c). Health Literacy. Patient Safety Primer. Retrieved January 25, 2019, from https://psnet.ahrq.gov/primers/primer/41/Health-Literacy?q=health+literacy.

Patient Safety Network (**PSNet**). (2015). Patient Safety Primers: Medication Errors. Retrieved July 31, 2015, from http://psnet.ahrq.gov/primer.aspx?primerID=23.

Patient Safety Network (**PSNet**). (2003). Universal Protocol for Preventing Wrong Site, Wrong Procedure, Wrong Person Surgery. Retrieved January 12, 2019, from https://psnet.ahrq.gov/resources/resource/3643.

Patient Safety Organization Program **(PSOP**). (n.d.). *About the PSO Program: A Brief History of the Program.* Retrieved January 11, 2019, from https://www.pso.ahrq.gov/about.

Patient Safety Organization Program (**PSOP**). (n.d.-a). Federally Listed PSOs. Retrieved January 11, 2019, from https://www.pso.ahrq.gov/listed.

Patient Safety Organization Program (**PSOP**). (n.d.-b). Patient Safety Rule. Retrieved January 11, 2019, from https://www.pso.ahrq.gov/legislation/rule.

Patient Safety Organization Program (**PSOP**). (n.d.-c). Frequently Asked Questions. Retrieved January 11, 2019, from https://www.pso.ahrq.gov/faq#WhatisaPSO,

Patient Safety & Quality Healthcare (**PSHQ**). (2018). CMS Reverses Plan to Cut Reporting of HAIs. Retrieved January 15, 2019, from https://www.psqh.com/news/cms-reverses-plan-to-cut-reporting-of-hais/.

Peasah S, McKay N, Harman J, et al. (2013). Medicare Non-Payment of Hospital-Acquired Infections: Infection Rates Three Years Post Implementation. *Medicare & Medicaid Research Review* 2013; 3:3. Retrieved January 19, 2019, from https://www.cms.gov/mmrr/Downloads/MMRR2013_003_03_a08.pdf.

Peerally MF, Carr S, Waring J, et al. (2017). The problem with root cause analysis. BMJ Qual Saf 2017;26:417–22. Retrieved January 25, 2019, from https://qualitysafety.bmj.com/content/qhc/26/5/417.full.pdf.

Phillips D. (2015). Medicare's Nonpayment Policy May Be Working. Medscape Medical News. Retrieved January 12, 2019, from https://www.medscape.com/viewarticle/837738.

Quinonez RA, Schroeder AR. (2018). "GAPPS" in Patient Safety. Commentary. *Pediatrics* 142, no. 2 (August 2018). Retrieved January 24, 2019, from http://pediatrics.aappublications.org/content/142/2/e20180954.

SorryWorks! (n.d.). States with Apology Laws. Retrieved January 11, 2019, from http://sorryworkssite.bondwaresite.com/apology-laws-cms-143.

Stahel P, Mehler P, Clarke T, et al. (2009). The 5th anniversary of the "Universal Protocol: Pitfalls and Pearls Revisited. *Patient Safety in Surgery* 2009, 3:14. doi:10.1186/1754-9493-3-14. Retrieved January 18, 2019, from https://pssjournal.biomedcentral.com/articles/10.1186/1754-9493-3-14.

Stockwell DC, Landrigan CP, Toomey SL, Loren SS, et al. (2018). Adverse Events in Hospitalized Pediatric Patients. *Pediatrics* 142, no. 2 (August 2018). Retrieved January 24, 2019, from http://pediatrics.aappublications.org/content/142/2/e20173360.

Sullivan N, Schoelles K. (2013). Preventing In-Facility Pressure Ulcers as a Patient Safety Strategy: A Systematic Review. *Annals of Internal Medicine* 2013; 158(5_Part_2):410-416. doi:10.7326/0003-4819-158-5-201303051-00008. Retrieved January 25, 2019, from https://annals.org/aim/fullarticle/1657885/preventing-facility-pressure-ulcers-patient-safety-strategy-systematic-review.

Tieman BF. (2017). The role of lab automation in reducing diagnostic errors. Lab Management. Medical Laboratory Observer. Retrieved January 19, 2019, from https://www.mlo-online.com/role-lab-automation-reducing-diagnostic-errors.

Tucker ME. (2012). Preventable Hospital Infections Not Reduced by Disincentives. Medscape Medical News. Retrieved January 21, 2019, from https://www.medscape.com/viewarticle/772425.

U.S. Department of Health and Human Services (**US HHS**). (2017). About the Affordable Care Act. Retrieved January 25, 2019, from https://www.hhs.gov/healthcare/about-the-aca/index.html.

U.S. Department of Health and Human Services (**US HHS**). (2017a). HITECH Act Enforcement Interim Final Rule. Retrieved January 25, 2019 from http://www.hhs.gov/ocr/privacy/hipaa/administrative/enforcementrule/hitechenforcementifr.html.

U.S. Department of Veterans Affairs (**USDVA**). (2015). VA's Approach to Patient Safety. Retrieved January 12, 2019, from https://www.patientsafety.va.gov/about/approach.asp.

U.S. Department of Veterans Affairs (**USDVA**). (2015a). High-Alert Medications. Retrieved January 15, 2019, from https://www.patientsafety.va.gov/media/highalertmeds.asp.

U.S. Food and Drug Administration (**USFDA**). (2018). Working to Reduce Medication Errors. Retrieved January 14, 2019, from https://www.fda.gov/Drugs/ResourcesForYou/Consumers/ucm143553.htm.

U.S. Food and Drug Administration (**USFDA**). (2018a). Preventable Adverse Drug Reactions: A Focus on Drug Interactions. Retrieved January 14, 2019, from https://www.fda.gov/Drugs/DevelopmentApprovalProcess/DevelopmentResources/DrugInteractionsLabeling/ucm110632.htm.

U.S. Food and Drug Administration (**USFDA**). (2018b). Reporting Serious Problems to FDA. Retrieved January 25, 2019, from https://www.fda.gov/Safety/MedWatch/HowToReport/default.htm.

U.S. Food and Drug Administration (**USFDA**). (2017). Medication Error Reports. Retrieved January 14, 2019, from https://www.fda.gov/drugs/drugsafety/medicationerrors/ucm080629.htm.

U.S. Food and Drug Administration (**USFDA**). (2016). MedWatch: Managing Risks at the FDA. Retrieved January 25, 2019, from https://www.fda.gov/Drugs/ResourcesForYou/Consumers/ucm143552.htm.

U.S. House of Representatives (U.S. House). (2010). Compilation of Patient Protection and Affordable Care Act. Retrieved January 12, 2019, from http://housedocs.house.gov/energycommerce/ppacacon.pdf.

U.S. Office of Disease Prevention and Health Promotion (**US ODPHP**). (2019). Overview. Adverse Drug Events. Retrieved January 14, 2019, from https://health.gov/hcq/ade.asp.

U.S. Office of Disease Prevention and Health Promotion (**US ODPHP**). (2019a). Overview. Healthcare-Associated Infections. Retrieved January 18, 2019, from https://health.gov/hcq/prevent-hai.asp.

U.S. Office of Disease Prevention and Health Promotion (US **ODPHP**). (2014). National Action Plan for ADE Prevention. Retrieved January 14, 2019, from https://health.gov/hcq/pdfs/ADE-Action-Plan-508c.pdf.

U.S. Office of Disease Prevention and Health Promotion (**US ODPHP**). (2013). National Action Plan to Prevent Healthcare-Associated Infections: Road Map to Elimination. Retrieved January 14, 2019, from https://health.gov/hcq/prevent-hai-action-plan.asp.

U.S. Office of the National Coordinator for Health Information Technology (**USONC**). (2018). Meaningful Use and MACRA. Retrieved January 25, 2019, from https://www.healthit.gov/topic/meaningful-use-and-macra/meaningful-use-and-macra.

U.S. Office of the National Coordinator for Health Information Technology (**USONC).** (2015). *Select Portions of the HITECH Act and Relationship to ONC Work.* Retrieved July 27, 2015, from http://www.healthit.gov/policy-researchers-implementers/select-portions-hitech-act-and-relationship-onc-work.

U.S. Office of the National Coordinator for Health Information Technology (**USONC**). (2015a). Meaningful Use Definition and Objectives. Retrieved August 5, 2015, from http://www.healthit.gov/providers-professionals/meaningful-use-definition-objectives.

Vest JR, Gamm LD. (2009). A Critical Review of the Research Literature on Six Sigma, Lean and Studer group's Hardwiring Excellence in the United States: The Need to Demonstrate and Communicate the Effectiveness of Transformation Strategies in Healthcare. *Implementation Science: IS* 2009; 4:35. doi:10.1186/1748-5908-4-35. Retrieved January 25, 2019, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2709888/.

Wachter TM, Shojania KG. (2004). *Internal Bleeding: The Truth Behind America's Terrifying Epidemic of Medical Mistakes.* New York: Rugged Land.

Walker M. (2018). No Drop in Adverse Events for Hospitalized Children: Rates varied between teaching and non-teaching hospitals. Pediatrics. MedPage Today. Retrieved January 24, 2019, from https://www.medpagetoday.com/pediatrics/generalpediatrics/74033.

Wilcox A, Chen Y, Hripcsak G. (2011). Minimizing Electronic Health Record Patient-Note Mismatches. *Journal of the American Medical Informatics Association* 2011; 18(4):511-514. doi:10.1136/amiajnl-2010-000068. Retrieved January 25, 2019, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3128397/.

Wittich CM, Burkle CM, Lanier WL. (2014). Medication Errors: An Overview for Clinicians. Mayo Clinic Proceedings 89, no. 8 (2014):1116–1125. Retrieved January 15, 2019, from https://www.mayoclinicproceedings.org/article/S0025-6196(14)00439-X/pdf.

Wolcott J, Schwartz A, Goodman C. (2008). Laboratory Medicine: A National Status Report. Retrieved January 18, 2019 from https://www.cdc.gov/labbestpractices/pdfs/2007-status-report-laboratory_medicine_-_a_national_status_report_from_the_lewin_group_updated_2008-9.pdf.

Wong C, Recktenwald A, Jones M, et al. (2011). The Cost of Serious Fall-Related Injuries at Three Midwestern Hospitals. *The Joint Commission Journal of Quality and Patient Safety* 2011Feb; 37(2):81-7. PMID: 21939135. Retrieved January 24, 2019, from http://www.ncbi.nlm.nih.gov/pubmed/21939135.

Yale Journal of Health Policy, Law, and Ethics. (2009). A National Survey of Medical Error Reporting Laws. *Yale Journal of Health Policy, Law, and Ethics* 2008; 9 (1):201–86. Retrieved January 11, 2019, from http://www.yale.edu/yjhple/issues/vix-i1-win09/docs/feature.pdf. https://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1161&context=yjhple

Zimlichman E, Henderson D, Tamir O, et al. (2013). Healthcare-Associated Infections: A Meta-Analysis of Costs and Financial Impact on the U.S. Healthcare System. *JAMA Internal Medicine* 2013; 173(22):2039–2046. doi:10.1001/jamainternmed.2013.9763. Retrieved January 15, 2019, from http://archinte.jamanetwork.com/article.aspx?articleid=1733452.

Quiz: FL Preventing Medical Errors (311)

Quiz

- **A passing score is 80% or above.**
- **You can take the test as many times as needed to pass.**
- **The system will remember your progress if you leave and return.**

Question 1

1. Since the 1999 IOM report, “To Err Is Human,” deaths from medical errors have been:

Choose one

- a. Shown to have likely been underestimated in the report.
- b. Reduced to almost nothing.
- c. Completely ignored by healthcare professionals.
- d. Fully addressed at every level of healthcare.

Question 2

2. A critical element of the federal 2005 Patient Safety and Quality Improvement Act is to:

Choose one

- a. Work around laws regarding confidentiality.
- b. Encourage the development of patient safety organizations (PSOs).
- c. Provide good quality, safe equipment to patients in need.
- d. Create a Near Miss reporting system.

Question 3

3. When the Florida legislature in 2004 amended the state constitution to add Patients' Right-to-Know and Three Strikes:

Choose one

- a. A year later, the legislation was seen as improving reporting of medical errors.
- b. Physicians and nurses reported satisfaction with the standards set forth.
- c. The unintended result was a chilling effect on the reporting of near misses and adverse results.
- d. There were fewer court cases as a result.

Question 4

4. As of 2010, Florida state law requires healthcare facilities to:

Choose one

- a. Report only adverse events resulting in death.
- b. Report all adverse events annually and certain events within 15 days of their occurrence.
- c. Report all adverse events twice a year.
- d. Report all adverse events within 3 days of their occurrence.

Question 5

5. Some of the most common causes of medication errors are:

Choose one

- a. Poor communication and ambiguities in names.
- b. Incomplete patient information and lack of appropriate labeling.
- c. Depending on the patient for information about allergies and other medications. Interventions of families in administering medicines.
- d. Deterioration of medications due to inappropriate storage.

Question 6

6. Which of these situations describes an Adverse Drug Reaction (ADR)?

Choose one

- a. A patient is accidently given the wrong medication.
- b. A patient develops hives after receiving antibiotics.

- c. A provider orders the wrong dosage of a medication.
- d. A nurse proceeds to give a patient an oral medication, but stops just short of administering it, finding the prescribed route is by injection.

Question 7

7. The use of ambiguous abbreviations in prescriptions:

Choose one

- a. Guarantees quick comprehension and enables faster service to patients.
- b. Saves space and crowding on complex forms.
- c. Can lead to misinterpretations and harmful mistakes.
- d. Is easier in this era of computer-generated instructions.

Question 8

8. The categories of high-alert medications more frequently associated with patient harm include:

Choose one

- a. Antidepressants and anticoagulants.
- b. Chlorides and fluorides.
- c. Narcotics and anxiolytics.
- d. Anticoagulants and insulins.

Question 9

9. What is the most common hospital-acquired infection?

Choose one

- a. Surgical site infection (SSI)
- b. Central line-associated bloodstream infection (CLABSI)
- c. Catheter-associated urinary tract infection (CAUTI)
- d. Ventilator-associated pneumonia (VAP)

Question 10

10. What is a recommended intervention for prevention of ventilator-associated pneumonia (VAP)?

Choose one

- a. Supine position with heavy sedation.
- b. Raising the patient's bed between 30 degrees and 45 degrees, unless contraindicated.
- c. Maximizing sedative administration but minimizing the duration of mechanical ventilation.
- d. Consistent sedation and avoiding the use of weaning protocols.

Question 11

11. The risk of CAUTI can be reduced by:

Choose one

- a. Using catheters routinely.
- b. Never employing intermittent catheterization in children.
- c. Ensuring that catheters are used only when needed and removed as soon as possible.
- d. Using catheters to manage incontinence.

Question 12

12. Hospital-acquired *C. difficile* infections are often spread through:

Choose one

- a. Sneezing.
- b. Animal vectors.
- c. Coughing.
- d. The hands of care providers.

Question 13

13. Multidrug-resistant organisms (MDROs) include:

Choose one

- a. MRSA and VRE.
- b. Insects that are resistant to pesticides.
- c. Bacteria with wide treatment options.
- d. Bacteria that do not pose a threat to patient safety.

Question 14

14. When hands are not visibly dirty, what is the preferred method for cleaning your hands in the healthcare setting?

Choose one

- a. Washing with soap and water.
- b. Use of alcohol-based hand sanitizers.
- c. Use of oil-based hand cleaning products to create an infection barrier on your hands.
- d. No special cleaning is needed.

Question 15

15. A surgical timeout is:

Choose one

- a. A conference by the surgical staff before meeting the patient to explain the procedure.
- b. A discussion with the patient to agree on what procedure is to be done.
- c. Taken immediately before beginning the procedure to conduct a final verification.
- d. Done after the procedure to verify that records are complete.

Question 16

16. The main issue affecting the quality of lab testing is poor communication between healthcare professionals and the laboratory.

Choose one

- True
- False

Question 17

17. Inpatient fall prevention is:

Choose one

- a. The sole responsibility of the patient's primary nurse.
- b. Always systematically addressed in hospitals.
- c. Not necessary in adult inpatient settings.
- d. Best approached as team problem.

Question 18

18. Recommended preventions for pressure ulcers include:

Choose one

- a. Managing skin moisture and minimizing pressure.
- b. Having the patient's bed at an incline.
- c. Encouraging the patient to drink fluids.
- d. Changing the patient's position every 5 hours.

Question 19

19. The various electronic record systems that have been adopted in healthcare facilities have reduced documentation errors to virtually zero.

Choose one

- True
- False

Question 20

20. Which of the following have been shown to adversely affect patient safety?

Choose one

- a. Rainy weather.
- b. Higher nurse-to-patient ratios.
- c. Sleep deprivation and understaffing.

- d. Low institutional tolerance for risky behaviors.

Question 21

21. The populations most vulnerable to poor health literacy include:

Choose one

- a. Children under 12 years of age.
- b. Members of the armed forces.
- c. People who live in rural areas.
- d. Adults over 65 and immigrants.

Question 22

22. What piece of legislation called for “meaningful use” of certified electronic health record (EHR) technology to improve patient care?

Choose one

- a. The Health Information Technology for Economic and Clinical Health (HITECH) Act
- b. The Health Insurance Portability and Accountability Act (HIPAA)
- c. Americans with Disabilities Act (ADA)
- d. Patient Protection and Affordable Care Act (ACA)

Question 23

23. If a patient cannot read the physician’s handwriting on a written prescription, it is not an issue because the pharmacist will always be able to read it.

Choose one

- True
- False

Question 24

24. The goal of root cause analysis is to:

Choose one

- a. Ascertain, analyze, and assign blame for a sentinel event.

- b. Identify problems when individual factors are the likely cause of a human error.
- c. Prevent future harm by eliminating the latent errors underlying adverse events.
- d. Ascertain the likelihood and outcomes of a mass-casualty event.

Question 25

25. Which of the following is **not** an approach to identifying medical errors?

Choose one

- a. TeamSTEPPS approach.
- b. Plan-Do-Study Act.
- c. Lean Six Sigma.
- d. Quality Circles.

Answer Sheet: FL Medical Errors for PTs and PTAs (311)

Name (Please print your name)_____

Date_____

Passing score is 80%

1. _____
2. _____
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25. _____

ATrain EDUCATION Continuing Education for Healthcare Professionals

Evaluation: FL Preventing Medical Errors for PTs and PTAs (311)

Evaluation: FL Preventing Medical Errors

Upon completion of the course, I was able to:
*

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Name several landmark pieces of legislation that have attempted to reduce medical errors.	○	○	○	○	○
Summarize Florida laws and requirements related to medical errors and describe the impact of the Patient Safety Quality and Improvement Act on healthcare practices in the United States.	○	○	○	○	○
Outline the seven main classifications of medical errors.	○	○	○	○	○
Identify factors and practices that increase the risk of committing a medical error.	○	○	○	○	○
Discuss populations that are particularly vulnerable to the effects of medical errors.	○	○	○	○	○
State several healthcare practices that will reduce medical errors and create a culture of patient safety.	○	○	○	○	○
State several measures the public can do to help reduce medical errors.	○	○	○	○	○
Explain the systems approach to medical errors and assess commonly used systems approaches shown to be effective.	○	○	○	○	○

Please rate the following statements:
*

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The author(s) are knowledgeable about the subject matter.	○	○	○	○	○
The author(s) cited evidence that supported the material presented.	○	○	○	○	○

Please answer Yes or No to these statements:
*

	Yes	No
This course contained no discriminatory or prejudicial language.	○	○
The course was free of commercial bias and product promotion.	○	○
As a result of what you have learned, do you intend to make any changes in your practice?	○	○

If you answered Yes above, what changes do you intend to make? If you answered No, please explain why.

please type response here

Do you intend to return to ATrain for your ongoing CE needs?
*

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○ Yes, during my next renewal cycle.
○ Maybe, not sure.
○ No, I only needed this one course.

Navigating the ATrain Education website was:
*

○ Easy.
○ Somewhat easy.
○ Not at all easy.

Would you recommend ATrain Education to a friend, co-worker, or colleague?
*

○ Yes, definitely.
○ Possibly.
○ No, not at this time.

What is your overall satsfaction with this learning activity?
*

○ Very satisfied
○ Satisfied
○ Neutral
○ Dissatisfied
○ Very dissatistied

How long did it take you to complete this course, posttest, and course evaluation?
*

○ 60 minutes (or more) per contact hour
○ 50–59 minutes per contact hour

- [ ] 40–49 minutes per contact hour
- [ ] 30–39 minutes per contact hour
- [ ] Less than 30 minutes per contact hour

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- [x] Other...

[ ]

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