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Reducing Medical Errors:
State of Florida Mandatory Training

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Answer Sheet: Reducing Medical Errors: *State of Florida Mandatory Training*

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Objectives/Learning Outcomes

- To provide nurses and other healthcare professionals with current evidence-based information related to the prevention of medical errors and to comply with Florida Law for continuing education.

Upon completion of this course, the learner will be able to:

- Discuss the extent of the problem of medical errors in healthcare.
- Discuss a Culture of Safety and contrast it with a culture of blame.
- Identify patient safety organizations working on the issue of prevention of medical errors and promotion of patient safety.
- Describe 10 priority high risk situations in which patient safety can be compromised.
- Identify 5 patient safety interventions that have been effective in promoting safety and reducing errors.
- Identify current Safety goals in 2016.

Introduction

The safety of the patients in our care and treatment is an important goal during all healthcare encounters. Early studies in the 1960s already pointed to healthcare related errors as a problem for healthcare consumers. However, it was the startling report in 1999, from the Institute of Medicine (IOM) *To Err is Human,* that served as a wake-up call for healthcare professionals, multiple public and private healthcare and healthcare-related organizations, state legislatures and the federal government. The IOM report, now 15 years old, estimated that between 44,000 and 98,000 deaths annually are a result of medical errors; more than half of the adverse medical events occurring each year are due to **preventable** medical errors, causing the death of tens of thousands. The cost associated with these errors in lost income, disability, and healthcare cost $29 billion annually back in 1999.

Since the above costs of medical errors come from the IOM report issued in 1999, in 2012 (Andel, et al, 2012) estimated that approximately 200,000 Americans die from preventable medical errors including facility-acquired conditions and millions may experience errors. Currently, it is estimated that the cost of medical errors is $735 billion to $980 billion. This is due to direct costs, ancillary services, increased mortality rates, lost productivity from missed work and disability claims.

In a study on hospital pneumonia rates and sepsis rates (Eber, et. al , 2010), researchers looked at data from 59 million discharges, covering 40 of the 50 US states between 1998 and 2006. Patients who developed sepsis after surgery had to stay in the hospital on average nearly 11 days extra, at a cost of $32,900 per patient; just under 20% of these patients died. Pneumonia patients stayed in the hospital an extra 14 days after surgery, at a cost of $46,400, and more than 11% of those patients died.

Clearly the problem of medical errors in healthcare requires diligent attention and intervention. Unfortunately, "medical errors" is a complex set of biological, technological, professional, consumer, interpersonal, etc. factors that interact and influence each other to undermine patient safety.

In the State of Florida, registered nurses, licensed practical nurses and other healthcare professionals must complete 2 hours of continuing education related to the Prevention of Medical Errors in each 2-year licensure renewal period. **Access Continuing Education, Inc.** is a Florida-approved provider of continuing education for nurses, provider # 50-7628. Successfully completing this course will meet the Florida Board of Nursing requirement.

Scope of the Problem

Patient safety has long been a focus in healthcare, however, since the 1999 IOM report was issued, the issue of patient safety has been in the forefront of the healthcare literature, with multiple healthcare organizations putting significant resources into identifying safety issues and safety interventions.

According to the **national** study, *HealthGrades Patient Safety in American Hospitals Study* (2011, pp. 2-3):

From 2007 through 2009:

- There were 708,642 total patient safety events affecting 667,828 **Medicare** beneficiaries.

- There were 79,670 patient deaths among patients who experienced one or more patient safety events.

- One in ten surgical patients died after developing one of the following serious but treatable complications: pulmonary embolism or deep vein thrombosis; pneumonia; sepsis; shock or cardiac arrest; or gastrointestinal bleeding.

- The 13 patient safety events (Patient safety indicators will be discussed later in this course) were associated with $7.3 billion of excess cost.

- The excess cost associated with patient safety events means that for every hospitalization, from 2007 through 2009, there was an additional $181.17 added to the cost of every Medicare hospitalization to treat just these 13 preventable patient safety lapses.

- Of all Medicare inpatients 52,127 developed a hospital-acquired bloodstream infection. Of these patients*, 8,114 did not survive their hospitalization*.

- Hospital-acquired bloodstream infections cost the federal government an estimated $1.2 billion.

- Four of 13 indicators, iatrogenic pneumothorax, post-operative respiratory failure, post-operative pulmonary embolism or deep vein thrombosis, and post-operative abdominal wound dehiscence, were included in the proposed rule for the hospital value-based purchasing program for Medicare inpatient services. These four patient safety events:

    o Accounted for 229,664 in-hospital events.
    o Accounted for 29,917 deaths among patients experiencing one or more of the four indicators.
    o Cost the federal government an estimated $3.7 billion in excess costs.

Errors in healthcare are multi-factorial. An error is generally the end result of a series of missteps and mistakes. Improving patient safety requires an improvement in multiple domains.

In July, 2006 the IOM issued another report on errors in healthcare. This report, *Preventing Medication Errors*, focused specifically on the high rates of medication errors. Most Americans have taken medication at one time or another. It's estimated that in any given week four out of every five U.S. adults will use prescription medicines, over-the-counter drugs, or dietary supplements, and nearly one-third of adults will take five or more different medications (IOM, 2006).

Some of the harm done by medications can be anticipated, as they are the potential side effects that may be caused by the medications. The potential benefit of using the medication is determined by the patient and prescriber to be worth the risk of the side effects which may be possible with the use of a particular medication. However, some adverse drug events (ADEs) occur as injuries that happened because of an error in prescribing, dispensing or administering a medication. Such errors can be prevented. Some of the harm done by medications can be anticipated, as they are the potential side effects that may be caused by the medications. The potential benefit of using the medication is determined by the patient and prescriber to be worth the risk of the side effects which may be possible with the use of a particular medication. However, some adverse drug events (ADEs) occur as injuries that happened because of an error in prescribing, dispensing or administering a medication. Such errors can be prevented. In 2008 the actor Dennis Quaid and his wife became celebrity spokespersons regarding medication errors after their twin infants, in November, 2007, were given 1,000 times the dosage of heparin than was ordered-twice! In that situation, according to their 60 Minutes television interview (March 16, 2008), the error occurred because a pharmacy technician stored the higher heparin doses in the wrong place and a nurse who administered the drug to the babies failed to verify the amount. Additionally, the Quaids then also sued Baxter Healthcare Corp., accusing the company of negligence in packaging different doses of Heparin in similar vials with blue backgrounds. This situation with the Quaids illustrates how multiple missteps and mistakes all along the process allowed for the final error of the infants being given the wrong dosage of medications.

The findings of the IOM study are that medication errors are quite common - and that they are very costly to the population. At least 1.5 million preventable ADEs occur in the U. S. each year. The true number may be much higher. ***A hospitalized patient in the US can expect to be subjected to more than one medication error per day!***

Defining Medical Errors

Complicating the picture of patient safety is that the US has no centralized reporting of medical errors or adverse outcomes. Even the definition of a medical error and/or patient safety varies from agency to agency. Additionally, much of the reporting is voluntary. In countries where there is a single payer system, tracking errors is more systematic than in the US. The information that we have about medical errors is limited, at best.

There is no universal definition of medical errors. The many healthcare organizations that are currently focused on healthcare errors do not all define medical errors in the same way. Sometimes medical errors are called something other than an "error". Other terms or words used to identify a medical error include (Kizer, 2003):

- Adverse event, adverse outcome;
- Medical mishap, unintended consequences;
- Unplanned clinical occurrence; unexpected occurrence; untoward incident;
- Therapeutic misadventure; bad call;
- Peri-therapeutic accident;
- Sentinel event;
- Iatrogenic complication; iatrogenic injury;
- Hospital acquired complication.

The National Patient Safety Foundation (NPSF), provided the following definitions:

Patient safety is the prevention of healthcare errors, and the elimination or mitigation of patient injury caused by healthcare errors.

A **healthcare error** is an unintended healthcare outcome caused by a defect in the delivery of care to a patient. Healthcare errors may be errors of commission (doing the wrong thing), omission (not doing the right thing), or execution (doing the right thing incorrectly). Errors may be made by any member of the healthcare team in any healthcare setting.

Patient Safety Organizations

The Patient Safety and Quality Improvement Act of 2005 (Patient Safety Act) authorized the creation of Patient Safety Organizations (PSOs) to improve the quality and safety of U.S. health care delivery. The Patient Safety Act encourages clinicians and healthcare organizations to voluntarily report and share quality and patient safety information without fear of legal discovery. Despite the many terms used to describe medical errors, patient safety is the focus of multiple patient safety organizations. Their task is to collect data, assess it for trends, and make recommendations to hospitals and others about ways to prevent future mistakes. The US Department of Health and Human Services collates the data and is charged with disseminating best practices. Some patient safety organizations are:

- **National Patient Safety Foundation (http://www.npsf.org/)**

  The National Patient Safety Foundation's vision is to create a world where patients and those who care for them are free from harm. A central voice for patient safety since 1997, NPSF partners with patients and families, the health care community, and key stakeholders to advance patient safety and health care workforce safety and disseminate strategies to prevent harm. NPSF is an independent, not-for-profit 501(c)(3) organization.

- **Agency for Healthcare Research and Quality**

  The Agency for Healthcare Research and Quality (AHRQ) is a federal agency whose mission is to improve the quality, safety, efficiency, and effectiveness of healthcare for all Americans. They provide a listing, with direct links, to a variety of federally recognized PSOs.

- **National Quality Forum**

  The National Quality Forum (NQF) is a private, not-for-profit membership organization created to develop and implement a national strategy for healthcare quality measurement and reporting. It is a unique public-private partnership with broad participation from more than 260 organizations that represent all sectors of the healthcare industry, including healthcare providers, consumers, employers, insurers, and other stakeholders. Among its members are the AARP, AFL-CIO, the American Hospital Association, the American Medical Association, the American Nurses Association, the American Society of Health-System Pharmacists, the Ford Motor Company, and General Motors.

- **Institute of Safe Medication Practices**

  The Institute for Safe Medication Practices (ISMP) is a nonprofit organization that works closely with healthcare practitioners and institutions, regulatory agencies, professional organizations and the pharmaceutical industry to provide education about adverse drug events and their prevention.

- **Institute of Medicine**

  The Institute of Medicine (IOM) is a nonprofit organization of the National Academies for science-based advice on matters of biomedical science, medicine, and health.

- **Centers for Medicare and Medicaid Services**

  The Centers for Medicare and Medicaid Services (CMS) is a government agency that administers the Medicare program and is responsible for the administrative simplification standards from the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and quality standards in healthcare facilities through its survey and certification activity.

- **Joint Commission**

  The Joint Commission, previously known as the Joint Commission for Accreditation of Healthcare Organizations (JCAHO), evaluates and accredits more than 15,000 healthcare organizations and programs in the United States. An independent, not-for-profit organization, the Joint Commission is the nation's predominant standards-setting and accrediting body in healthcare.

- **Institute of Healthcare Improvement**

  The Institute for Healthcare Improvement (IHI) is a not-for-profit organization driving the improvement of health by advancing the quality and value of healthcare.

Interventions: Promoting Safety

Many of the Patient Safety Organizations (PSO) identified above have released goals for patient safety and have promoted particular interventions for the improvement of patient safety, many with best practice guidelines supported by research. Some of these organizations have educational programs that focus on safety, have researched best practices and issued guidelines for components of patient safety. This course provides an overview of some of the recommendations of a sampling of safety organizations. Some of the safety issues focus on the high risk procedure or even while other focus on interventions that promote safety.

> Exercise #1
>
> Consider the healthcare organization where you work. Think about safety in your particular organization. Have you thought about safety much in your practice? Are there practices that you have observed that make you uncomfortable? Have you identified safety issues? Make a note of your safety concerns.   Likely, your organization has identified areas of focus for patient safety. You are urged to review the safety goals that are specific to your practice setting and employer.

Interventions from The Patient Safety Network (PSNet)/Agency for Healthcare Research and Quality (AHRQ) have identified specific areas of focus for patient safety. For more information for each patient safety primer can be found at https://psnet.ahrq.gov/search?topic=Patient-Safety-Primers&f_resource_typeID=220&f_topicIDs=656. Safety Culture

High-reliability organizations consistently minimize adverse events despite carrying out intrinsically hazardous work. Such organizations establish a culture of safety by maintaining a commitment to safety at all levels, from frontline providers to managers and executives.

The concept of **safety culture** originated outside healthcare, in studies of high reliability organizations, organizations that consistently minimize adverse events despite carrying out intrinsically complex and hazardous work. High reliability organizations maintain a commitment to safety at all levels, from frontline providers to managers and executives. This commitment establishes a "culture of safety" that encompasses these key features:

- acknowledgment of the high-risk nature of an organization's activities and the determination to achieve consistently safe operations
- a blame-free environment where individuals are able to report errors or near misses without fear of reprimand or punishment
- encouragement of collaboration across ranks and disciplines to seek solutions to patient safety problems
- organizational commitment of resources to address safety concerns

Improving the culture of safety within healthcare is an essential component of preventing or reducing errors and improving overall healthcare quality. Studies have documented considerable variation in perceptions of safety culture across organizations and job descriptions. In prior surveys, nurses have consistently complained of the lack of a blame-free environment, and providers at all levels have noted problems with organizational commitment to establishing a culture of safety. The underlying reasons for the underdeveloped healthcare safety culture are complex, with poor teamwork and communication, a "culture of low expectations," and authority gradients all playing a role (AHRQ, 2014).

Safety culture is generally measured by surveys of providers at all levels. Available validated surveys include AHRQ's Patient Safety Culture Surveys (See Appendix A.) Then can you provide a copy of the survey in the appendix? http://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/patientsafetyculture/hospital/resources/hospscanform.pdf and the Safety Attitudes Questionnaire. These surveys ask providers to rate the safety culture in their unit and in the organization as a whole, specifically with regard to the key features listed above. Versions of the AHRQ Patient Safety Culture survey are available for hospitals and nursing homes, and AHRQ provides yearly updated benchmarking data from the hospital survey (AHRQ, 2014).

Exercise 2.
How would you describe your work organization's safety culture? Consider your insights from exercise 1. Go to Appendix A (http://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/patientsafetyculture/hospital/resources/hospscanform.pdf)and complete AHRQ's Patient Safety Culture Surveys. Consider your practice area or place of employment. Complete the survey with your workplace in mind. It may not be entirely applicable to your setting, but the goal is to reflect on safety in your own work setting. After completion, consider what you learned about safety at your workplace? How would you describe your work organization's safety culture now?

Safety culture has been defined and can be measured, and poor perceived safety culture has been linked to increased error rates. However, achieving sustained improvements in safety culture can be difficult. Specific measures, such as teamwork training, executive walk rounds, and establishing unit-based safety teams, have been associated with improvements in safety culture measurements but have not yet been convincingly linked to lower error rates. Other methods, such as rapid response teams and structured communication methods such as SBAR (Situation, Background, Assessment, Recommendation) are

being widely implemented to help address cultural issues such as rigid hierarchies and communication problems, but their effect on overall safety culture and error rates remains unproven (AHRQ, 2014).

The culture of individual blame still dominant and traditional in healthcare undoubtedly impairs the advancement of a safety culture. One issue is that, while "no blame" is the appropriate stance for many errors, certain errors do seem blameworthy and demand accountability. In an effort to reconcile the twin needs for no-blame and appropriate accountability, the concept of "just culture" is being introduced. A just culture focuses on identifying and addressing systems issues that lead individuals to engage in unsafe behaviors, while maintaining individual accountability by establishing zero tolerance for reckless behavior. It distinguishes between human error (eg, slips), at-risk behavior (eg, taking shortcuts), and reckless behavior (eg, ignoring required safety steps), in contrast to an overarching "no-blame" approach still favored by some. In a just culture, the response to an error or near miss is predicated on the type of behavior associated with the error, and not the severity of the event. For example, reckless behavior such as refusing to perform a "time-out" prior to surgery would merit punitive action, even if patients were not harmed (AHRQ, 2014).

Safety culture is fundamentally a local problem, in that wide variations in the perception of safety culture can exist within a single organization. The perception of safety culture might be high in one unit within a hospital and low in another unit, or high among management and low among frontline workers. Research also shows that individual provider burnout negatively affects safety culture perception. These variations likely contribute to the mixed record of interventions intended to improve safety climate and reduce errors. Therefore, organizational leadership must be deeply involved with and attentive to the issues frontline workers face, and they must understand the established norms and "hidden culture" that often guide behavior. Many determinants of safety culture are dependent on interprofessional relationships and other local circumstances, and thus changing safety culture occurs at a microsystem level. As a result, safety culture improvement often needs to emphasize incremental changes to providers' everyday behaviors (AHRQ, 2014).

Specific High Risk Practices or Events

Research has repeatedly shown that some practices and events in healthcare carry a higher risk of error than others. These high risk practices and events are the focus of many of the Safety organizations' efforts. An overview is provided, but the healthcare professional is urged to obtain further information on those areas of interest or those that are a focus for your healthcare workplace.

➢ Handoffs and Signouts

Discontinuity is an unfortunate but necessary reality of hospital care. No provider can stay in the hospital around the clock, creating the potential for errors when clinical information is transmitted incompletely or incorrectly between clinicians.

The Joint Commission requires all healthcare providers to "implement a standardized approach to handoff communications including an opportunity to ask and respond to questions" (2006 National Patient Safety Goal 2E). The Joint Commission National Patient Safety Goal also contains specific guidelines for the handoff process, many drawn from other high-risk industries:

- interactive communications
- up-to-date and accurate information
- limited interruptions
- a process for verification
- an opportunity to review any relevant historical data

➢ Physician Work Hours and Patient Safety

Long and unpredictable work hours have been a staple of medical training for centuries. In fact, the term "resident" is a relic of times when physicians in postgraduate training literally lived at the hospital. However, little attention was paid to the patient safety effects of fatigue among residents until March 1984, when Libby Zion died due to a medication-prescribing error while under the care of residents in the midst of a 36-hour shift.

In 2003, the Accreditation Council for Graduate Medical Education (ACGME) implemented new rules limiting work hours for all residents, with the key components being that residents should work no more than 80 hours per week or 24 consecutive hours on duty, should not be "on-call" more than every third night, and should have 1 day off per week. (Some fields, principally surgical specialties, received partial exemption from the regulations.) A landmark study (Landragin, et. al., 2004) found that reducing medical residents' work hours during rotations in the intensive care unit resulted in a significant reduction in medical errors, lending support to the regulations.

A systematic review (Fletcher, et. al., 2011) found that while resident well-being improved after implementation of the 2003 work hour regulations, there was no clear effect on patient safety or clinical outcomes. This may be because burnout and fatigue—known risk factors for poor job performance—remain common among residents, despite reduced duty hours. Moreover, any potentially beneficial effects of duty hour reductions may have been attenuated because of the increased number of patient handoffs, which may result in more safety hazards.

➢ Missed Nursing Care

Missed nursing care is linked to patient harm including falls and infections. Organizations can prevent missed nursing care by ensuring appropriate nurse staffing, promoting a positive safety culture, and making sure needed supplies and equipment are readily available.

The most consistent predictors of missed nursing care are staffing levels, work environment, and teamwork, though few interventions to address missed care have been evaluated. Thus missed nursing care can today be best understood as a common safety and quality threat for which there is not yet strong evidence regarding effective solutions. However, several conclusions can be drawn based upon the predictors of missed nursing care.

First, missed nursing care is primarily a problem of time pressure and competing demands, and adequate nurse staffing is needed to prevent it. Evaluation of organizational nurse staffing plans should include not just the average needs of nursing units, but also careful assessment of how frequently surges in demand or patient complexity affect the adequacy of staffing. Creativity and careful analysis may be required to develop mechanisms to nimbly deploy appropriately skilled nursing staff to clinical areas experiencing an influx of admissions, unexpectedly high numbers of complex patients, or unusually depleted staff.

Second, organizational and unit culture influence missed nursing care. Improvements in the work environment, unit safety climate, organizational culture, and teamwork skills should reduce the pressures that lead to missed nursing care. Qualitative research has found that adaptable teams can help mitigate missed care. In times of resource pressures and scarcity, such teams tend to orient themselves toward caring for the whole group of patients, mostly by assisting each other to complete needed care rather than focusing only on their own patient assignments. Cultivating cross-monitoring and cooperative problem-solving skills among staff may decrease the frequency of missed nursing care.

Third, the organization of nursing work and the organization of the supply chain that supports nursing work may contribute to preventing missed care. A well-organized, reliable supply chain

for medications, clinical supplies, and equipment may contribute to nurses' capacity to complete all required care. Some authors suggest that moderate or radical rethinking of responsibilities may be required in nursing to meet the needs of patients and the profession. Specific to preventing missed nursing care, ambulation and turning—two aspects of care that are frequently missed—may be best addressed by reconfiguration of the medical–surgical nursing team to include full-time ambulation and turning assistants to ensure that patients are assisted to the bathroom and turned or repositioned every 2 hours. This has not been tested, but it might be an effective component of programs to eliminate missed nursing care.

> Alert Fatigue

Computerized warnings and alarms are used to improve safety by alerting clinicians of potentially unsafe situations. However, this proliferation of alerts may have negative implications for patient safety as well.

The term alert fatigue describes how busy workers (in the case of health care, clinicians) become desensitized to safety alerts, and as a result ignore or fail to respond appropriately to such warnings. This phenomenon occurs because of the sheer number of alerts, and it is compounded by the fact that the vast majority of alerts generated by computerized provider order entry (CPOE) systems (and other health care technologies) are clinically inconsequential—meaning that in most cases, clinicians *should* ignore them. The problem is that clinicians then ignore both the bothersome, clinically meaningless alarms *and* the critical alerts that warn of impending serious patient harm. In essence, a proliferation of alerts that are intended to improve safety actually results in a paradoxical increase in the chance patients will be harmed. Although little discussed prior to the widespread use of electronic medical records, alert fatigue is now recognized as a major unintended consequence of the computerization of health care and a significant patient safety hazard.

> Health Care–Associated Infections (HAIs)

Although long accepted by clinicians as an inevitable hazard of hospitalization, recent efforts demonstrate that relatively simple measures can prevent the majority of health care–associated infections. As a result, hospitals are under intense pressure to reduce the burden of these infections.

According to a study by the CDC (Magill, et. al, 2014), at any given time, approximately 1 of every 25 hospitalized patients in the United States has an HAI, meaning that nearly 650,000 patients contract one of these infections annually. More than one million HAIs occur across the United States health care system every year. These infections can lead to significant morbidity and mortality, with tens of thousands of lives lost each year. HAIs are estimated to cost billions of dollars annually. Such infections were long accepted by clinicians as an inevitable hazard of hospitalization. However, it is now understood that relatively straightforward approaches can prevent many common HAIs. As a result, hospitals and clinicians are prioritizing efforts to reduce the burden of these infections. Fortunately, considerable progress has been made in preventing specific HAIs through federally sponsored programs from the AHRQ, CDC, and the CMS).

Surgical site infections (SSIs) and infections associated with indwelling devices—ventilator-associated pneumonia (VAP), central line–associated bloodstream infections (CLABSIs), and catheter-associated urinary tract infections (CAUTIs)—have historically account for a large proportion of HAIs, and recent data indicates that the epidemiology of HAIs is evolving. The CDC's 2011 data (Magill, et. al, 2014) indicate that infections associated with specific indwelling devices (CLABSI, CAUTI, and VAP) and SSIs account for approximately half of all HAIs. Infections caused by the bacterium *Clostridium difficile* have rapidly become more common in hospitals, and *C. difficile* is now responsible for more than 12% of all HAIs. Preventing

transmission of *C. difficile* and antibiotic-resistant bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA) is therefore an increasing focus of attention.

➢ Medication Reconciliation

Unintended inconsistencies in medication regimens occur with any transition in care. Medication reconciliation refers to the process of avoiding such inadvertent inconsistencies by reviewing the patient's current medication regimen and comparing it with the regimen being considered for the new setting of care.

Patients often receive new medications or have changes made to their existing medications at times of transitions in care—upon hospital admission, transfer from one unit to another during hospitalization, or discharge from the hospital to home or another facility. Although most of these changes are intentional, unintended changes occur frequently for a variety of reasons. For example, hospital-based clinicians might not be able to easily access patients' complete pre-admission medication lists, or may be unaware of recent medication changes. As a result, the new medication regimen prescribed at the time of discharge may inadvertently omit needed medications, unnecessarily duplicate existing therapies, or contain incorrect dosages. These discrepancies place patients at risk for ADEs, which have been shown to be one of the most common types of ADE after hospital discharge. Medication reconciliation refers to the process of avoiding such inadvertent inconsistencies across transitions in care by reviewing the patient's complete medication regimen at the time of admission, transfer, and discharge and comparing it with the regimen being considered for the new setting of care.

The evidence supporting patient benefits from reconciling medications is relatively scanty. Most medication reconciliation interventions have focused on attempting to prevent medication errors at hospital admission or discharge, but the most effective and generalizable strategies remain unclear.

As of July 2011, medication reconciliation has been incorporated into National Patient Safety Goal #3, "Improving the safety of using medications." This National Patient Safety Goal requires that organizations "maintain and communicate accurate medication information" and "compare the medication information the patient brought to the hospital with the medications ordered for the patient by the hospital in order to identify and resolve discrepancies."

➢ Medication Errors

Adverse drug events are likely the most common source of preventable harm in both hospitalized and ambulatory patients, and preventing ADEs is a major priority for accrediting bodies and regulatory agencies. Medication errors can occur at any stage of the medication use pathway, and a growing evidence base supports specific strategies to prevent ADEs.

Prescription medication use is widespread, complex, and increasingly risky. Clinicians have access to an armamentarium of more than 10,000 prescription medications, and nearly one-third of adults in the United States take 5 or more medications. Advances in clinical therapeutics have undoubtedly resulted in major improvements in health for patients with many diseases, but these benefits have also been accompanied by increased risks. An adverse drug event (ADE) is defined as harm experienced by a patient as a result of exposure to a medication, and ADEs account for nearly 700,000 emergency department visits and 100,000 hospitalizations each year. ADEs affect nearly 5% of hospitalized patients, making them one of the most common types of inpatient errors; ambulatory patients may experience ADEs at even higher rates. Transitions in care are also a well-documented source of preventable harm related to medications.

As with the more general term adverse event, the occurrence of an ADE does not necessarily indicate an error or poor quality care. A *medication error* refers to an error (of commission or omission) at any step along the pathway that begins when a clinician prescribes a medication and ends when the patient actually receives the medication. *Preventable adverse drug events* result from a medication error that reaches the patient and causes any degree of harm. It is generally estimated that about half of ADEs are preventable. Medication errors that do not cause any harm—either because they are intercepted before reaching the patient, or by luck—are often called *potential ADEs.* An *ameliorable ADE* is one in which the patient experienced harm from a medication that, while not completely preventable, could have been mitigated. Finally, a certain percentage of patients will experience ADEs even when medications are prescribed and administered appropriately; these are considered *adverse drug reactions* or *non-preventable ADEs* (and are popularly known as *side effects*)

The Institute for Safe Medication Practices maintains a list (see Appendix B). of high-alert medications—medications that can cause significant patient harm if used in error. These include medications that have dangerous adverse effects, but also include look-alike, sound-alike (See Appendix C). medications, which have similar names and physical appearance but completely different pharmaceutical properties..

Table. Strategies to prevent adverse drug events

STAGE	SAFETY STRATEGY
Prescribing	• Avoid unnecessary medications by adhering to <u>conservative prescribing</u> principles • <u>Computerized provider order entry</u>, especially when paired with <u>clinical decision support systems</u> • <u>Medication reconciliation</u> at times of transitions in care
Transcribing	• <u>Computerized provider order entry</u> to eliminate handwriting errors
Dispensing	• <u>Clinical pharmacists</u> to oversee medication dispensing process • Use of "tall man" lettering and other strategies to minimize confusion between look-alike, sound-alike medications
Administration	• Adherence to the "<u>Five Rights</u>" of medication safety (administering the Right Medication, in the Right Dose, at the Right Time, by the Right Route, to the Right Patient) • <u>Barcode medication administration</u> to ensure medications are given to the correct patient • <u>Minimize interruptions</u> to allow nurses to administer medications safely • <u>Smart infusion pumps</u> for intravenous infusions • <u>Patient education</u> and revised <u>medication labels</u> to improve patient comprehension of administration instructions

Preventing ADEs is a major priority for accrediting and regulatory agencies. The Joint Commission has named improving medication safety as a <u>National Patient Safety Goal</u> for both hospitals and ambulatory clinics.

➢ Human Factors Engineering

Human factors engineering is the discipline that attempts to identify and address safety problems that arise due to the interaction between people, technology, and work environments.

An obstetric nurse connects a bag of pain medication intended for an epidural catheter to the mother's intravenous (IV) line, resulting in a fatal cardiac arrest. Newborns in a neonatal intensive care unit are given full-dose heparin instead of low-dose flushes, leading to three deaths from intracranial bleeding. An elderly man experiences cardiac arrest while hospitalized, but when the code blue team arrives, they are unable to administer a potentially life-saving shock because the defibrillator pads and the defibrillator itself cannot be physically connected.

Busy health care workers rely on equipment to carry out life-saving interventions, with the underlying assumption that technology will improve outcomes. But as these examples illustrate, the interaction between workers, the equipment, and their environment can actually increase the risk of disastrous errors. Each of these safety hazards ultimately was attributed to a relatively simple, yet overlooked problem with equipment design. The bag of epidural anesthetic was similar in size and shape to IV medication bags, and, crucially, the same catheter could access both types of bags. Full-dose and prophylactic-dose heparin vials appear virtually identical, and both concentrations are routinely stocked in automated dispensers at the point of care. Multiple brands of defibrillators exist that differ in physical appearance as well as functionality; a typical hospital may have many different models scattered around the building, sometimes even on the same unit.

Human factors engineering is the discipline that attempts to identify and address these issues. It is the discipline that takes into account human strengths and limitations in the design of interactive systems that involve people, tools and technology, and work environments to ensure safety, effectiveness, and ease of use. A human factors engineer examines a particular activity in terms of its component tasks, and then assesses the physical demands, skill demands, mental workload, team dynamics, aspects of the work environment (e.g., adequate lighting, limited noise, or other distractions), and device design required to complete the task optimally. In essence, human factors engineering focuses on how systems work in actual practice, with real—and fallible—human beings at the controls, and attempts to design systems that optimize safety and minimize the risk of error in complex environments.

➢ Wrong-Site, Wrong-Procedure, and Wrong-Patient Surgery

Few medical errors are as terrifying as those that involve patients who have undergone surgery on the wrong body part, undergone the incorrect procedure, or had a procedure intended for another patient. These "wrong-site, wrong-procedure, wrong-patient errors" (WSPEs) are rightly termed never events. While much publicity has been given to these high-profile cases of WSPEs, these errors are in fact relatively rare.

Early efforts to prevent WSPEs focused on developing redundant mechanisms for identifying the *correct* site, procedure, and patient, such as "sign your site" initiatives, that instructed surgeons to mark the operative site in an unambiguous fashion. However, it soon became clear that even this seemingly simple intervention was problematic. An analysis of the United Kingdom's efforts to prevent WSPEs (Rhodes, et. al. 2008) found that, although dissemination of a site-marking protocol did increase use of preoperative site marking, implementation and adherence to the protocol differed significantly across surgical specialties and hospitals, and many clinicians voiced concerns about unintended consequences of the protocol. In some cases, there was even confusion over whether the marked site indicates the area to be operated on, or the area to be avoided. Site marking remains a core component of The Joint Commission's Universal Protocol to prevent WSPEs.

According to an AHRQ-supported study (Kwan, et. al., 2006), 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 a Universal Protocol that was 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. The protocol 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. This Web site includes a number of resources and facts related to the Universal Protocol. Wrong-site, wrong-procedure, and wrong-patient errors are all now considered never events by the National Quality Forum and sentinel events by The Joint Commission. The Centers for Medicare and Medicaid Services have not reimbursed for any costs associated with these surgical errors since 2009.

Root cause analyses of WSPEs consistently reveal communication issues as a prominent underlying factor. The concept of the surgical timeout—a planned pause before beginning the procedure in order to review important aspects of the procedure with all involved personnel—was developed to improve communication in the operating room and prevent WSPEs. The Universal Protocol also specifies use of a timeout prior to all procedures. Although initially designed for operating room procedures, timeouts are now required before any invasive procedure. Comprehensive efforts to improve surgical safety have incorporated timeout principles into surgical safety checklists; while these checklists have been proven to improve surgical and postoperative safety, the low baseline incidence of WSPEs makes it difficult to establish that a single intervention can reduce or eliminate WSPEs.

➢ Radiation Safety

Greater availability of advanced diagnostic imaging techniques has resulted in tremendous benefits to patients. However, the increased use of diagnostic imaging poses significant harm to patients through excessive exposure to ionizing radiation.

Population-based studies show that the use of diagnostic imaging has exploded over the past two decades, with one population-based study showing that the number of CT scans per 1000 adult patients nearly tripled between 1996 and 2010 (Smith-Bindman, et. al, 2012). More than 85 million CT scans were performed in the United States in 2011. This has led to a dramatic increase in ionizing radiation exposure to individual patients and the general population. While other imaging techniques also use radiation, CT is estimated to account for half of all medical radiation exposure, partly because more CT scans are being performed, but also because the radiation dose per scan has increased. Newer multidetector CT scanners produce much higher resolution images, which can aid in diagnosis, but also expose patients to 30%–50% more radiation than older scanners. Since ionizing radiation is a known carcinogen, it is likely that some patients who undergo CT scans with high doses of radiation, or patients who undergo many CT scans, will develop cancer as a result of the scans.

The Joint Commission issued a Sentinel Event Alert in 2011 that highlighted the risks of diagnostic imaging and outlined specific strategies organizations should take to minimize the risks of radiation. The alert emphasized the importance of educating physicians on appropriate test utilization and standardizing equipment and radiation dosage as two key interventions. These guidelines call for ordering physicians, radiologists, and technologists to establish a system that prioritizes using the *right test* and the *right dose* of radiation to achieve the desired diagnostic objective. Since implementing processes for monitoring the safety of imaging equipment, establishing standards for test ordering, and standardizing radiation dosages will require considerable leadership support, The Joint Commission also emphasized the role of an overall culture of safety in addressing radiation safety specifically.

➢ Never Events

The list of never events has expanded over time to include adverse events that are unambiguous, serious, and usually preventable. While most are rare, when never events occur, they are devastating to patients and indicate serious underlying organizational safety problems.

The National Quality Forum's Health Care "Never Events" (2011 Revision)
Surgical events

- Surgery or other invasive procedure performed on the wrong body part
- Surgery or other invasive procedure performed on the wrong patient
- Wrong surgical or other invasive procedure performed on a patient
- Unintended retention of a foreign object in a patient after surgery or other procedure
- Intraoperative or immediately postoperative/postprocedure death in an American Society of Anesthesiologists Class I patient

Product or device events
- Patient death or serious injury associated with the use of contaminated drugs, devices, or biologics provided by the health care setting
- Patient death or serious injury associated with the use or function of a device in patient care, in which the device is used for functions other than as intended
- Patient death or serious injury associated with intravascular air embolism that occurs while being cared for in a health care setting

Patient protection events
- Discharge or release of a patient/resident of any age, who is unable to make decisions, to other than an authorized person
- Patient death or serious disability associated with patient elopement (disappearance)
- Patient suicide, attempted suicide, or self-harm resulting in serious disability, while being cared for in a health care facility

Care management events
- Patient death or serious injury associated with a medication error (e.g., errors involving the wrong drug, wrong dose, wrong patient, wrong time, wrong rate, wrong preparation, or wrong route of administration)
- Patient death or serious injury associated with unsafe administration of blood products
- Maternal death or serious injury associated with labor or delivery in a low-risk pregnancy while being cared for in a health care setting
- Death or serious injury of a neonate associated with labor or delivery in a low-risk pregnancy
- Artificial insemination with the wrong donor sperm or wrong egg
- Patient death or serious injury associated with a fall while being cared for in a health care setting
- Any stage 3, stage 4, or unstageable pressure ulcers acquired after admission/presentation to a health care facility
- Patient death or serious disability resulting from the irretrievable loss of an irreplaceable biological specimen
- Patient death or serious injury resulting from failure to follow up or communicate laboratory, pathology, or radiology test results

Environmental events
- Patient or staff death or serious disability associated with an electric shock in the course of a patient care process in a health care setting

- Any incident in which a line designated for oxygen or other gas to be delivered to a patient contains no gas, the wrong gas, or is contaminated by toxic substances
- Patient or staff death or serious injury associated with a burn incurred from any source in the course of a patient care process in a health care setting
- Patient death or serious injury associated with the use of restraints or bedrails while being cared for in a health care setting

Radiologic events

- Death or serious injury of a patient or staff associated with introduction of a metallic object into the MRI area

Criminal events

- Any instance of care ordered by or provided by someone impersonating a physician, nurse, pharmacist, or other licensed health care provider
- Abduction of a patient/resident of any age
- Sexual abuse/assault on a patient within or on the grounds of a health care setting
- Death or significant injury of a patient or staff member resulting from a physical assault (i.e., battery) that occurs within or on the grounds of a health care setting

➤ Diagnostic Errors

Thousands of patients die every year due to diagnostic errors. While clinicians' cognitive biases play a role in many diagnostic errors, underlying health care system problems also contribute to missed and delayed diagnoses.

While cognitive biases on the part of individual clinicians play a role in many diagnostic errors, underlying health care system problems also contribute to missed and delayed diagnoses. Missed or delayed diagnoses (particularly cancer diagnoses) are a prominent reason for malpractice claims, and much of the research into systems causes of diagnostic error arises from studies of closed malpractice claims in primary care, pediatrics, emergency medicine, and surgery. Poor teamwork and communication between clinicians have been identified as predisposing factors for diagnostic error in emergency medicine and surgery. Lack of reliable systems for common outpatient clinical situations, such as triaging acutely ill patients by telephone and following up on test results, also increases the likelihood of diagnostic error.

Given that many diagnostic errors are caused by subtle biases in clinicians' thought processes, some diagnostic errors may be prevented by systems to mitigate the effect of these biases and provide physicians with objective information to assist with decision-making. Clinicians are frequently unaware of diagnostic errors that they have committed, particularly if they do not have an opportunity to see how their diagnoses turned out over time. Therefore, regular feedback to clinicians on their diagnostic performance is essential.

➤ Adverse Events after Hospital Discharge

Being discharged from the hospital can be dangerous for patients. Nearly 20% of patients experience an adverse event in the first 3 weeks after discharge, including medication errors, health care–associated infections, and procedural complications.

Adverse drug events are the most common postdischarge complication, with hospital-acquired infections and procedural complications also causing considerable morbidity. More subtle discharge hazards arise from the fact that nearly 40% of patients are discharged with test results pending, and a comparable proportion are discharged with a plan to complete the diagnostic workup as an outpatient, placing patients at risk unless timely and complete follow-up is ensured.

As nearly 20% of Medicare patients are rehospitalized within 30 days of discharge, minimizing post-discharge adverse events has become a priority for the US health care system.

➢ Disruptive and Unprofessional Behavior

Popular media often depicts physicians as brilliant, intimidating, and condescending in equal measures. This stereotype, though undoubtedly dramatic and even amusing, obscures the fact that disruptive and unprofessional behavior by clinicians poses a definite threat to patient safety. Although there is no standard definition of disruptive behavior, most authorities include any behavior that shows disrespect for others, or any interpersonal interaction that impedes the delivery of patient care.

Such behavior is common: in a survey of nurses and physicians at more than 100 hospitals (Rosenstein & O'Daniel, 2008), 77% of respondents reported witnessing physicians engage in disruptive behavior (most commonly verbal abuse of another staff member), and 65% reported witnessing disruptive behavior by nurses. Most respondents also believed that unprofessional actions increased the potential for medical errors and preventable deaths. Disruptive and disrespectful behavior by physicians has also been tied to nursing dissatisfaction and likelihood of leaving the nursing profession, and has been linked to adverse events in the operating room. Physicians in high-stress specialties such as surgery, obstetrics, and cardiology are considered to be most prone to disruptive behavior. These concerns should not obscure the fact that no more than 2%-4% of health care professionals at any level regularly engage in disruptive behavior.

Fundamentally, disruptive behavior by individuals subverts the organization's ability to develop a culture of safety. Two of the central tenets of a safe culture–teamwork across disciplines and a blame-free environment for discussing safety issues–are directly threatened by disruptive behavior. An environment in which frontline caregivers are frequently demeaned or harassed reinforces a steep authority gradient and contributes to poor communication, in turn reducing the likelihood of errors being reported or addressed. Indeed, a workplace culture that tolerates demeaning or insulting behavior is likely to be one in which workers are "named, blamed and shamed" for making an error. The seriousness of this issue was underscored by a 2008 Joint Commission sentinel event alert, which called attention to this problem.

Effective Patient Safety Interventions

Some interventions have been identified that promote safety and reduce errors.

➢ High Reliability

High reliability organizations are organizations that operate in complex, high-hazard domains for extended periods without serious accidents or catastrophic failures. High reliability is an ongoing process of cultivating organizational mindfulness; standardization is necessary but not sufficient for achieving resilient and reliable health care systems.

It is important to recognize that standardization is necessary but not sufficient for achieving resilient and reliable health care systems. High reliability is an ongoing process or an organizational frame of mind, not a specific structure. AHRQ has outlined practical strategies for health care organizations aiming to become highly reliable in their report of practices employed by hospitals in the High Reliability Organization Learning Network. The Joint Commission suggests that hospitals and health care organizations work to create a strong foundation before they can begin to mature as high reliability organizations. Such foundational work includes developing a leadership commitment to zero-harm goals, establishing a positive safety culture, and instituting a robust process improvement culture. The Joint Commission also provides

metrics for assessing the maturity of an organization's leadership, safety culture, and process improvement culture as preconditions to high reliability.

➢ Support for Clinicians Involved in Errors and Adverse Events (Second Victims)

The first priority following a medical error or adverse event is to attend to the patient and family. However clinicians can also be deeply affected by errors and adverse events and may need structured follow-up to ensure adaptive coping and organization learning.

Scott and colleagues (2009) define second victims as health care providers who are involved in an unanticipated adverse event, medical error, or patient injury and "become victimized in the sense that the provider is traumatized by the event." Across studies, clinicians involved in these events report feelings of responsibility for the patient outcome, shame, anger, failure, depression, inadequacy, and loss of confidence; some report symptoms of post-traumatic stress disorder. One systematic review found that women were more likely to experience emotional distress, feelings of guilt and inadequacy, and loss of reputation following an adverse event compared to men in similar circumstances.

➢ The Role of the Patient in Safety

Efforts to engage patients in safety efforts have focused on three areas: enlisting patients in detecting adverse events, empowering patients to ensure safe care, and emphasizing patient involvement as a means of improving the culture of safety.

Hospitalized patients are routinely surveyed about their satisfaction with the care they received, and recent research has examined whether patient surveys may be used as an error detection mechanism. Studies in the inpatient setting (Weingart, et. al., 2005) have found that patients often report errors that were not detected through traditional mechanisms such as chart review; indeed, patient-reported errors formed the basis of landmark studies of adverse events after hospital discharge. Concerns have been raised, however, that patient complaints may center on poor service quality rather than on clinical adverse events.

➢ Systems Approach

Medicine has traditionally treated errors as failings on the part of individual providers, reflecting inadequate knowledge or skill. The systems approach, by contrast, takes the view that most errors reflect predictable human failings in the context of poorly designed systems (e.g., expected lapses in human vigilance in the face of long work hours or predictable mistakes on the part of relatively inexperienced personnel faced with cognitively complex situations). Rather than focusing corrective efforts on punishment or remediation, the systems approach seeks to identify situations or factors likely to give rise to human error, and change the underlying systems of care in order to reduce the occurrence of errors or minimize their impact on patients.

A key insight in the systems approach, one that sadly remains underemphasized today, is that human error is inevitable, especially in systems as complex as health care. Simply striving for perfection—or punishing individuals who make mistakes—will not appreciably improve safety, as expecting flawless performance from human beings working in complex, high-stress environments is unrealistic. The systems approach holds that efforts to catch human errors before they occur or block them from causing harm will ultimately be more fruitful than ones that seek to somehow create flawless providers.

➢ Detection of Safety Hazards

Healthcare organizations use a variety of established and emerging methods to prospectively identify safety hazards before errors have occurred and to retrospectively analyze errors to prevent future harm.

An unacceptably large proportion of patients experience preventable harm at the hands of the health care system, and even more patients experience errors in their care that (through early detection or sheer chance) do not result in clinical consequences. Considerable effort has been devoted to optimizing methods of detecting errors and safety hazards, with the goal of prospectively identifying hazards before patients are harmed and analyzing events that have already occurred to identify and address underlying systems flaws. Despite much effort, health care institutions are still searching for optimal methods to identify underlying system defects before patients are harmed and, when errors do occur, methods to recognize them as rapidly as possible to prevent further harm. There are both prospective and retrospective methods to identify safety hazards that can lead to errors and adverse events.

The Joint Commission currently requires all hospitals to conduct one prospective risk assessment every 18 months and also requires performance of a root cause analysis under certain circumstances (such as when a sentinel event occurs). All hospitals are also mandated to maintain a voluntary error reporting system. Beyond these requirements, however, there are no consensus standards on how hospitals or clinics should assess their safety hazards, either prospectively or retrospectively.

➢ Nursing and Patient Safety

Nurses play a critical role in patient safety through their constant presence at the patient's bedside and regularly interact with physicians, pharmacists, families, and all other members of the healthcare team. Of all the members of the healthcare team, nurses therefore play a critically important role in ensuring patient safety by monitoring patients for clinical deterioration, detecting errors and near misses, understanding care processes and weaknesses inherent in some systems, and performing countless other tasks to ensure patients receive high-quality care.

However, staffing issues and suboptimal working conditions can impede nurses' ability to detect and prevent adverse events.

The nurse-to-patient ratio is only one aspect of the relationship between nursing workload and patient safety. Overall nursing workload is likely linked to patient outcomes as well. Needleman, et. al., (2011) showed that increased patient turnover was also associated with increased mortality risk, even when overall nurse staffing was considered adequate. Determining adequate nurse staffing is a very complex process that changes on a shift-by-shift basis, and requires close coordination between management and nursing based on patient acuity and turnover, availability of support staff and skill mix, and many other factors.

➢ Simulation Training

Simulation-based training has been successful in other industries, such as aviation, and is emerging as a key component of the patient safety movement. Simulation is increasingly being used to improve clinical and teamwork skills in a variety of health care environments.

➢ Improving Communication Between Clinicians

Clear and high-quality communication between all staff involved in caring for a patient is essential in order to achieve situational awareness. Breakdowns in communication are closely tied to preventable adverse events in hospitalized and ambulatory patients.

The dynamic environment in which health care is delivered requires clinicians to maintain situational awareness. The concept of situational awareness refers to the ability to access and track data relevant to the task at hand, comprehend the data, forecast what may happen based on the data, and formulate an appropriate plan in response. In a clinical context, maintaining situational awareness requires information sharing and open dialogue among clinicians in order to achieve a shared mental model—the "big picture" of the patient's condition and immediate priorities for care.

➢ Computerized Provider Order Entry

Computerized provider order entry systems ensure standardized, legible, and complete orders, and—especially when paired with decision support systems—have the potential to sharply reduce medication prescribing errors.

Computerized provider order entry (CPOE) refers to any system in which clinicians directly enter medication orders (and, increasingly, tests and procedures) into a computer system, which then transmits the order directly to the pharmacy. These systems have become increasingly common in the inpatient setting as a strategy to reduce medication errors. A CPOE system, at a minimum, ensures standardized, legible, and complete orders and thus has the potential to greatly reduce errors at the ordering and transcribing stages.

➢ Rapid Response Systems

Rapid response teams represent an intuitively simple concept: when a patient demonstrates signs of imminent clinical deterioration, a team of providers is summoned to the bedside to immediately assess and treat the patient with the goal of preventing adverse clinical outcomes.

Such teams have become a widely used patient safety intervention. Patients whose condition deteriorates acutely while hospitalized often exhibit warning signs (such as abnormal vital signs) in the hours before experiencing adverse clinical outcomes. In contrast to standard cardiac arrest or "code blue" teams, which are summoned only after cardiopulmonary arrest occurs, rapid response teams are designed to intervene during this critical period, usually on patients on general medical or surgical wards.

➢ Error Disclosure

Many victims of medical errors never learn of the mistake, because the error is simply not disclosed. Physicians have traditionally shied away from discussing errors with patients, due to fear of precipitating a malpractice lawsuit and embarrassment and discomfort with the disclosure process.

Surveys have helped to define the components of disclosure that matter most to patients. These include:

- Disclosure of all harmful errors
- An explanation as to why the error occurred
- How the error's effects will be minimized

- Steps the physician (and organization) will take to prevent recurrences

➢ Voluntary Patient Safety Event Reporting (Incident Reporting)

Patient safety event reporting systems are ubiquitous in hospitals and are a mainstay of efforts to detect safety and quality problems. However, while event reports may highlight specific safety concerns, they do not provide insights into the epidemiology of safety problems.

Incident reporting is frequently used as a general term for all voluntary patient safety event reporting systems, which rely on those involved in events to provide detailed information. Initial reports often come from the frontline personnel directly involved in an event or the actions leading up to it (e.g., the nurse, pharmacist, or physician caring for a patient when a medication error occurred), rather than management or patient safety professionals. Voluntary event reporting is therefore a *passive* form of surveillance for near misses or unsafe conditions, in contrast to more *active* methods of surveillance such as direct observation of providers or chart review using trigger tools.

Key Components of an Effective Event Reporting System

- Institution must have a supportive environment for event reporting that protects the privacy of staff who report occurrences.
- Reports should be received from a broad range of personnel.
- Summaries of reported events must be disseminated in a timely fashion.
- A structured mechanism must be in place for reviewing reports and developing action plans.

➢ Patient Safety in Ambulatory Care

The vast majority of health care takes place in the outpatient, or ambulatory, setting, and a growing body of research has identified and characterized factors that influence safety in office practice, the types of errors commonly encountered in ambulatory care, and potential strategies for improving ambulatory safety.

Since face-to-face interactions between providers and patients in the ambulatory setting are limited and occur weeks to months apart, patients must assume a much greater role in and responsibility for managing their own health. This elevates the importance of including the patient as a partner and ensuring that patients understand their illnesses and treatments. The need for outpatients to self-manage their own chronic diseases requires that they monitor their symptoms and, in some cases, adjust their own lifestyle or medications. For example, a patient with diabetes must measure her own blood sugars and perhaps adjust her insulin dose based on blood sugar values and dietary intake. A patient's inability or failure to perform such activities may compromise safety in the short term and clinical outcomes in the long term. Patients must also understand how and when to contact their caregivers outside of routine appointments, and they must often play a role in ensuring their own care coordination (e.g., by keeping an updated list of medications).

The nature of interactions between patients and providers—and between different providers—may also be a source of adverse events. Patients consistently voice concerns about coordination of care, particularly when one patient sees multiple physicians, and indeed communication between physicians in the outpatient setting is often suboptimal.

Improving outpatient safety will require both structural reform of office practice functions as well as engagement of patients in their own safety. Patient engagement in outpatient safety involves

two related concepts: first, *educating* patients about their illnesses and medications, using methods that require patients to demonstrate understanding (such as "teach-back"); and second, *empowering* patients and caregivers to act as a safety "double-check" by providing access to advice and test results and encouraging patients to ask questions about their care. Success has been achieved in this area for patients taking high-risk medications, even in patients with low health literacy at baseline.

➤ Root Cause Analysis

Initially developed to analyze industrial accidents, root cause analysis is now widely deployed as an error analysis tool in health care. A central tenet of RCA is to identify underlying problems that increase the likelihood of errors while avoiding the trap of focusing on mistakes by individuals.

RCA thus uses the systems approach to identify both active errors (errors occurring at the point of interface between humans and a complex system) and latent errors (the hidden problems within health care systems that contribute to adverse events). It is one of the most widely used retrospective methods for detecting safety hazards.

The Joint Commission has mandated use of RCA to analyze sentinel events (such as wrong-site surgery) since 1997.

➤ Checklists

Though a seemingly simple intervention, checklists have played a leading role in the most significant successes of the patient safety movement, including the near-elimination of central line–associated bloodstream infections in many intensive care units.

Checklists are a remarkably useful tool in improving safety, but they are not a panacea. As checklists have been more widely implemented, it has become clear that their success depends on appropriately targeting the intervention and utilizing a careful implementation strategy.

➤ Teamwork Training

Providing safe health care depends on highly trained individuals with disparate roles and responsibilities acting together in the best interests of the patient. The need for improved teamwork has led to the application of teamwork training principles, originally developed in aviation, to a variety of health care settings.

Growing recognition of the need for teamwork has led to the application of teamwork training principles, originally developed in aviation, to a variety of health care settings. While there is no single standardized teamwork training program for health care, all programs stress several key concepts. Teamwork training attempts to minimize the potential for error by training each team member to respond appropriately in acute situations. Teamwork training thus focuses on developing effective communication skills and a more cohesive environment among team members, and on creating an atmosphere in which all personnel feel comfortable speaking up when they suspect a problem. Team members are trained to cross-check each other's actions, offer assistance when needed, and address errors in a nonjudgmental fashion. Debriefing and providing feedback, especially after critical incidents, are essential components of teamwork training.

Interventions from the Joint Commission

In 2002, The Joint Commission established its National Patient Safety Goals (NPSGs) program; the first set of NPSGs was effective January 1, 2003. The NPSGs were established to help accredited organizations address specific areas of concern in regard to patient safety. These patient safety goals have been updated annually. These goals are consistent with the proven patient safety practices described previously. The National Patient Safety Goals that follow are for use in hospitals. However, the Joint Commission also includes National Patient Safety Goals for the following:

- Ambulatory Health Care
- Behavioral Health Care
- Critical Access Hospital
- Home Care
- Hospital

2016 National Hospital Patient Safety Goals

Identify patients correctly	Use at least two ways to identify patients. For example, use the patient's name and date of birth. This is done to make sure that each patient gets the correct medicine and treatment. Make sure that the correct patient gets the correct blood when they get a blood transfusion.
Improve staff communication	Get important test results to the right staff person on time.
Use medicines safely	Before a procedure, label medicines that are not labeled. For example, medicines in syringes, cups and basins. Do this in the area where medicines and supplies are set up. Take extra care with patients who take medicines to thin their blood. Record and pass along correct information about a patient's medicines. Find out what medicines the patient is taking. Compare those medicines to new medicines given to the patient. Make sure the patient knows which medicines to take when they are at home. Tell the patient it is important to bring their up-to-date list of medicines every time they visit a doctor.
Use alarms safely	Make improvements to ensure that alarms on medical equipment are heard and responded to

	on time.
Prevent infection	Use the hand cleaning guidelines from the Centers for Disease Control and Prevention or the World Health Organization. Set goals for improving hand cleaning. Use the goals to improve hand cleaning.
	Use proven guidelines to prevent infections that are difficult to treat.
	Use proven guidelines to prevent infection of the blood from central lines.
	Use proven guidelines to prevent infection after surgery.
	Use proven guidelines to prevent infections of the urinary tract that are caused by catheter.
Identify patient safety risks	Find out which patients are most likely to try to commit suicide.
Prevent mistakes in surgery	Make sure that the correct surgery is done on the correct patient and at the correct place on the patient's body.
	Mark the correct place on the patient's body where the surgery is to be done.
	Pause before the surgery to make sure that a mistake is not being made.

Patient Safety Indicators

The Patient Safety Indicators (PSIs) are a set of indicators providing information on potential in hospital complications and adverse events following surgeries, procedures, and childbirth. The PSIs were developed by AHRQ after a comprehensive literature review, analysis of coding, review by a clinician panel, implementation of risk adjustment, and empirical analyses (AHRQ, 2015).

The PSIs can be used to help hospitals identify potential adverse events that might need further study; provide the opportunity to assess the incidence of adverse events and in hospital complications using

administrative data found in the typical discharge record; include indicators for complications occurring in hospital that may represent patient safety events; and, indicators also have area level analogs designed to detect patient safety events on a regional level.

The PSIs (AHRQ, 2015):

- Can be used to help hospitals and healthcare organizations assess, monitor, track, and improve the safety of inpatient care.

- Can be used for comparative public reporting, trending, and pay-for-performance initiatives.

- Can identify potentially avoidable complications that result from a patient's exposure to the health care system.

- Include hospital-level indicators to detect potential safety problems that occur during a patient's hospital stay.

- Include area-level indicators for potentially preventable adverse events that occur during a hospital stay to help assess total incidence within a region.

- Are publicly available at no charge to the user.

- Include risk adjustment where appropriate.

Patient Safety Indicators (AHRQ, 2015)

Provider-Level Indicators

- PSI 02 - Death rate in low-mortality diagnosis related groups (DRGs)

- PSI 03 - Pressure ulcer rate

- PSI 04 - Death rate among surgical inpatients with serious treatable conditions

- PSI 05 - Retained surgical item or unretrieved device fragment count

- PSI 06 - Iatrogenic pneumothorax rate

- PSI 07 - Central venous catheter-related blood stream infection rate

- PSI 08 - Postoperative hip fracture rate

- PSI 09 - Perioperative hemorrhage or hematoma rate

- PSI 10 - Postoperative physiologic and metabolic derangement rate

- PSI 11 - Postoperative respiratory failure rate

- PSI 12 - Perioperative pulmonary embolism or deep vein thrombosis rate

- PSI 13 - Postoperative sepsis rate

- PSI 14 - Postoperative wound dehiscence rate

- PSI 15 - Accidental puncture or laceration rate

- PSI 16 - Transfusion reaction count

- PSI 17 - Birth trauma rate – injury to neonate

- PSI 18 - Obstetric trauma rate – vaginal delivery with instrument

- PSI 19 - Obstetric trauma rate-vaginal delivery without instrument

- PSI 20 - Patient Safety for Selected Indicators

Area-Level Indicators

- PSI 21 - Retained surgical item or unretrieved device fragment rate

- PSI 22 - Iatrogenic pneumothorax rate

- PSI 23 - Central venous catheter-related blood stream infection rate

- PSI 24 - Postoperative wound dehiscence rate

- PSI 25 - Accidental puncture or laceration rate

- PSI 26 - Transfusion reaction rate

- PSI 27 - Postoperative hemorrhage or hematoma rate

Status of Patient Safety Goals in Nationally and in the State of Florida

The *National and State Healthcare-Associated Infections Progress Report* (2015)

The HAI Progress Report describes significant reductions reported at the national level for nearly all infections. Central line associated blood stream infections (CLABSI) and surgical site infections (SSI) show the greatest reduction, with some progress shown in reducing hospital-onset MRSA bacteremia and hospital-onset *C. difficile* infections.

On the **national** level, the report found:

- A 46 percent decrease in central line associated blood stream infections (CLABSI) between 2008 and 2013
- A 19 percent decrease in surgical site infections (SSIs) related to the 10 select procedures tracked in the report between 2008 and 2013
- A 6 percent increase in catheter associated urinary tract infections (CAUTI) between 2009 and 2013; although initial data from 2014 seem to indicate that these infections have started to decrease
- An 8 percent decrease in hospital-onset MRSA bacteremia between 2011 and 2013
- A 10 percent decrease in hospital-onset *C. difficile* infections between 2011 and 2013

In this same report, for the same time frame, **Florida** mostly did better than the national baseline, with exceptions:

- CLABSIs was **41% lower** than the national baseline.
- CAUTIs were **6% lower** than the national baseline;
- Surgical site infections in colon surgeries were **21% lower** than the national baseline
- Surgical site infections in hysterectomies were **10% lower** than the national baseline
- C. difficile infections were **11% lower** than the national baseline
- MRSA infections were **11% higher** than the national baseline

Conclusion

Medical errors have always been a component of healthcare. But the growing awareness of its impact on the health of patients, the welfare of providers and rising costs has led to research on safety goals as well as multiple interventions. The PSOs focus on evidence based practice that aims to reduce medical errors is imperative for good patient care.

Providers must remain knowledgeable and skilled in the various goals of patient safety and the numerous interventions that can help to reduce medical errors and promote patient safety. This course addresses just a few of the interventions that exist to make healthcare safer for all.

Appendices

Appendix A. Provider Safety Culture Survey

http://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/patientsafetyculture/hospital/resources/hospscanform.pdf

Appendix B. Institute for Safe Medication Practices List of High Alert Medications in Acute Care Settings

http://www.ismp.org/Tools/highalertmedications.pdf

Appendix C. Institute for Safe Medication Practices

http://www.ismp.org/Tools/confuseddrugnames.pdf

Appendix D. Patient Fact Sheet

20 Tips to Help Prevent Medical Errors: Patient Fact Sheet			
What You Can Do			
1	**Be Involved in Your Health Care**	**The single most important way you can help to prevent errors is to be an active member of your health care team.**	That means taking part in every decision about your health care. Research shows that patients who are more involved with their care tend to get better results. Some specific tips, based on the latest scientific evidence about what works best, follow.
2	**Medicines**	**Make sure that all of your doctors know about everything you are taking. This includes prescription and over-the-counter medicines, and dietary supplements such as vitamins and herbs.**	At least once a year, bring all of your medicines and supplements with you to your doctor. "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, which can 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 avoid getting a medicine that can harm you.
4		**When your doctor writes you a prescription, make sure you can read it.**	If you can't 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 receive 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**	A study by the Massachusetts College of Pharmacy and Allied Health Sciences found that 88 percent of

		the medicine that my doctor prescribed?	medicine errors involved the wrong drug or the wrong dose.
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 doses 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. Also, ask questions if you're not sure how to use it.	Research shows that many people do not understand the right way to measure liquid medicines. For example, many use household teaspoons, which often do not hold a true teaspoon of liquid. Special devices, like marked syringes, help people to measure the right dose. Being told how to use the devices helps even more.
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 instead. That way, you can report the problem right away and get help before it gets worse. A study found that written information about medicines can help patients recognize problem side effects and then give that information to their doctor or pharmacist.
10	Hospital Stays	If you have a choice, choose a hospital at which many patients have 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.
11		If you are in a hospital, consider asking all healthcare workers who have direct contact with you whether they have washed their hands.	Handwashing is an important way to prevent the spread of infections in hospitals. Yet, it is not done regularly or thoroughly enough. A recent study found that when patients checked whether healthcare workers washed their hands, the workers washed their hands more often and used more soap.
12		When you are being discharged from the hospital, ask your doctor to explain the treatment plan you will use at home. This includes learning about your medicines and finding out when you can get back to your regular activities.	Research shows that at discharge time, doctors think their patients understand more than they really do about what they should or should not do when they return home.

13	Surgery	If you are having surgery, make sure that you, your doctor, and your surgeon all agree and are clear on exactly what will be done.	Doing 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. The American Academy of Orthopaedic Surgeons urges its members to sign their initials directly on the site to be operated on before the surgery.
14	Other Steps You Can Take	Speak up if you have questions or concerns.	You have a right to question anyone who is involved with your care.
15		Make sure that someone, such as your personal doctor, is in charge of your care.	This is especially important if you have many health problems or are in a hospital.
16		Make sure that all health professionals involved in your care have important health information about you.	Do not assume that everyone knows everything they need to.
17		Ask a family member or friend to be there with you and to be your advocate (someone who can help get things done and speak up for you if you can't).	Even if you think you don't need help now, you might need it later.
18		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.
19		If you have a test, don't assume that no news is good news.	Ask about the results.
20		Learn about your condition and treatments by asking your doctor and nurse and by using other reliable sources.	For example, treatment recommendations based on the latest scientific evidence are available from the National Guidelines ClearinghouseT at http://www.guideline.gov. Ask your healthcare provider if your treatment is based on the latest evidence.
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Florida Medical Errors Test

1. Medical errors have long existed. But it was the IOM report in 1999 To Err is Human that highlighted the extent of the problem of medical errors and served as a "call to action".

   A. True
   B. False

2. It is known that medical errors occur with frequency. However, the extent of the impact of them is negligible, that is, rarely do serious consequences or death occur.

   A. True
   B. False

3. All of the following terms are currently used to describe medical errors:

   - Adverse event, adverse outcome;
   - Medical mishap, unintended consequences;
   - Unplanned clinical occurrence; unexpected occurrence; untoward incident;
   - Therapeutic misadventure; bad call;
   - Peri-therapeutic accident;
   - Sentinel event;
   - Iatrogenic complication; iatrogenic injury;
   - Hospital acquired complication.

     o True
     o False

4. A **healthcare error** is an unintended healthcare outcome caused by a defect in the delivery of care to a patient. Healthcare errors may be errors of commission (doing the wrong thing), omission (not doing the right thing), or execution (doing the right thing incorrectly). Errors may be made by any member of the healthcare team in any healthcare setting.

   A. True
   B. False

5. All the following are true about Patient Safety Organization **EXCEPT**:

   A. Were authorized as a result of the Patient Safety and Quality Improvement Act of 2005 (Patient Safety Act).
   B. Are charged with investigating charges of unsafe patient conditions and providing censure.
   C. They are tasked to collect data, assess trends and make recommendations about prevention of errors.
   D. The recommendations of the Patient Safety Organizations are disseminated as best practices by the US Department of Health and Human Services.

6. A culture of safety

    A. The concept originated in high reliability organizations outside of healthcare.
    B. These high reliability organizations consistently minimize adverse events despite carrying out intrinsically complex and hazardous work.
    C. There is a commitment to safety at all levels in the organization, from frontline workers to managers and executives.
    D. All of the above.

7. Organizations with a Culture of Safety

    A. Acknowledge the high-risk nature of the organization's activities and have the determination and commitment of resources to address and to achieve consistently safe operations.
    B. Create a blame—free environment where individuals are able to report errors or near misses without fear of reprimand or punishment.
    C. Encourage collaboration across ranks and disciplines to seek solutions to patient safety problems.
    D. All of the above.

8. Identify which of the following is a high risk practice or event in healthcare. Choose the best answer.

    A. Hand-offs and sign-outs, healthcare associated infections and "never" events.
    B. Long physician hours, missed nursing care related to staffing, alert fatigue, medication errors, medication reconciliation.
    C. Wrong-site, wrong-procedure, wrong-patient surgeries, radiation safety, human factors engineering.
    D. All of the above.

9. Which of the following is the best choice for patient safety interventions?

    A. The use of checklists, rapid response systems and improving communication between clinicians.
    B. The use of computerized provider order entry, disruptive, unprofessional behavior, and a systems approach.
    C. Support for clinicians involved in errors/adverse events (second victims), high reliability organizations and adverse events after discharge from hospitalization.
    D. Diagnostic errors, root cause analysis and simulation training.

10. In The *National and State Healthcare-Associated Infections Progress Report* (2015) described in this course, the state of Florida had a lower rate of infections in many common organisms than the national baseline. Which organism had infections 11% **higher** than the national baseline?

    A. CLABSI
    B. MRSA
    C. E. Coli
    D. C. Difficile