ASHRM AMERICAN SOCIETY FOR HEALTHCARE RISK MANAGEMENT

Monograph

# Tackling patient safety taxonomy: A must for risk managers

## FOREWORD

**The language of healthcare is difficult and complex – not unlike the environment in which patient care is delivered. And, if the rapid pace of communication in the 21st century is any indication, the language used in healthcare will only continue to be complex and, at times, confusing.**

There has long been a call for a common language that practitioners, providers and patients can speak and understand. Some progress has been made since the Institute of Medicine's (IOM) release of *To Err Is Human, Building a Safer Health System* in 1999(1). However, years later, disparities in defining such terms as "medical error," "adverse event" and "near miss" persist.

To facilitate progress toward development of a common patient safety language, the American Society for Healthcare Risk Management (ASHRM) assigned its Data for Patient Safety Taxonomy Task Force with the evaluation of existing patient safety taxonomies. What follows is a monograph that explores why the risk management profession should be aware of taxonomies for patient safety and how risk managers can contribute their knowledge and experience in making healthcare safer to their organizations' patient safety efforts.

As the role of the risk management professional continues to evolve in an ever-changing healthcare environment, it is imperative to stay current on the latest developments within the field. ASHRM is pleased to share the first in a series of monographs exploring the interrelated concepts of patient safety taxonomy, development of adverse event reporting systems, benchmarking and actionable knowledge.

This monograth explores the drivers for today's developing taxonomies and the challenges in the design of patient safety taxonomies, and offers tips for consideration as risk managers participate in or lead patient safety efforts in their organizations.

## A PATIENT SAFETY TAXONOMY PRIMER

A key development in the patient safety movement in the past decade has been the call for a common language – a taxonomy – for categorizing medical events. Serving as a foundation for this call are three landmark studies on medical errors: The Harvard Medical Practice Study,(2, 3) the Colorado and Utah Hospital Discharge Study(4) and the Quality in Australian Health Care Study.(5) Each of these studies found alarming rates of medical errors in the delivery of healthcare.

In 1999, the IOM drew upon these studies in its analysis of medical error and concluded that up to 98,000 patients die each year as the result of "medical error" in the United States. Subsequent press reports and board room discussions debated the definition of "medical error." One of the report's key recommendations was a national agenda aimed at understanding and reducing medical errors, while preventing associated disabilities and deaths. The report emphasized that future healthcare models needed to actively pursue specific key elements aimed at reducing the burden of medical errors and improving patient safety. In addition, the report included recommendations advocating the development of a consistent approach for the management of patient safety data. To achieve this, a standard language and classification schema for medical errors and various patient safety issues would be critical.(1)

Today, there are several efforts underway to develop a common language for medical events. Multiple sources, including state and federal agencies, healthcare providers and payers, are collecting information about the incidence and cause of medical errors. Healthcare organizations, especially acute care facilities, are attempting to proactively identify and report medical errors and to complement event information with additional data that can drive safety improvement activities.

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In general, medical event taxonomies have evolved over the years to incorporate various components and best practices from stakeholders in healthcare (such as healthcare organizations, vendors and public entities). While there is variation among public and organizational efforts, these taxonomies are similar in that they formed around the most common and frequent event types encountered in healthcare. For the most part, existing taxonomies are an amalgamation of features established by groups such as U.S. Pharmacopeia's MEDMARX®, Institute for Healthcare Improvement, and the National Quality Forum-endorsed Patient Safety Event Taxonomy™ (PSET) created by the Joint Commission, to name a few.

Stepping in again, the IOM Committee on Data Standards for Patient Safety published a report in 2004 on safety data standards. The report acknowledged the lack of an established framework and taxonomy for medical errors and described a need for understanding and disseminating patient safety information. The report indicated that a standard vocabulary and classification schema would provide the healthcare industry with a better framework to:

- Allow for the development of reliable organization-based, regional and national event reporting systems;
- Better execute research projects and compare safety research findings;
- Allow for enhanced internal and external comparative safety data analysis and benchmarking within and across healthcare organizations;
- Allow for interoperability of computer data systems that collect information about these incidents for analysis, public reporting and policy making;
- Allow for components of the taxonomy to drive additional investigative processes.(6)

The lack of a universal taxonomy has complicated the debate on patient safety. With the release of *To Err Is Human, Building a Safer Health System,* there was a sudden increase in public awareness of the incidence of medical error. And though it took five years to pass, the Patient Safety and Quality Improvement Act of 2005 was a direct response to the IOM report's call to place more accountability on healthcare systems to collect, analyze and learn from patient safety data.

Support is growing for a way to aggregate, analyze and standardize medical event data. Standardized vocabulary and classification schema could provide a comparison of research findings, facilitate better benchmarking across healthcare enterprises, allow for better analysis regionally or nationally, and allow for interoperability of software applications used to collect information about patient safety events for analysis, policy making and public reporting.(7)

### The importance of taxonomies to risk management

Achieving significant reductions in healthcare errors and the identification of risk are among the key contributions of a risk management professional to a healthcare organization. To improve safety and contribute to organizational success, risk managers need better information about the medical events that injure or cause the death of patients. In order to analyze medical event data, risk managers need to classify events. A standardized taxonomy guides the principles of classification and aids the risk manager in understanding why an event happened, how it happened and what the impact of that event is on patients and providers.

**Effective use of a taxonomy also supports data analysis that can be leveraged for action and drive patient safety efforts.**

A consistently applied taxonomy is an important part of any comprehensive patient safety program by providing a structure for the healthcare organization's event reporting system.(8) An event reporting taxonomy can be a hierarchy of processes, error classification, contributing factors, patient impact or other parameters. It establishes a common language for use in and across a healthcare organization and promotes a reliable comparison of information. Effective use of a taxonomy also supports data analysis that can be leveraged for action (opportunities to improve safety through learning and process improvement efforts) and drive patient safety efforts (reduction of events and severity of harm).

## INNOVATION: EXAMPLES OF TAXONOMY DEVELOPMENT

Not surprisingly, especially in healthcare, there are pockets of innovation both nationally and internationally when it comes to medical event taxonomies. The following are brief descriptions of existing taxonomies:

### Patient Safety Event Taxonomy (PSET)

In 2005, the National Quality Forum, a private, not-for-profit membership organization created to develop and implement a national strategy for healthcare quality measurement and reporting, endorsed a taxonomy created by the Joint Commission. PSET provides a structure to

categorize and analyze occurrences that threaten patient safety. It suggests a common framework for organizations to work with in aggregating, classifying and reporting patient safety event data.

The PSET categorizes homogeneous elements from different models in use today into five complementary root nodes or primary classifications. These proposed five primary classifications have 21 sub-classifications that in turn are subdivided into more than 200 categories and an indefinite number of non-coded text fields. The PSET report is available from the NQF Web site, www.qualityforum.org/publications/reports/taxonomy.asp.

These broad classification categories were developed using human factors research, root cause analyses findings and event type specific classification schemes that were widely accepted and common. The PSET laid the foundation for future taxonomy work, interoperability of reporting systems and comparability of data across systems, over time. It is also the platform for the development of an international taxonomy, known as the International Classification for Patient Safety (v.1) (ICPS), by the World Health Organization (WHO).

## The World Health Organization patient safety taxonomy initiative

The WHO is developing an internationally acceptable terminology for key patient safety terms and concepts. It has identified "key action areas" to improve specific aspects of patient safety and hopes to "create source[s] of learning within countries and across the world to help make healthcare safer." The ICPS "aims to define, harmonize and group patient safety concepts into an internationally agreed classification" that will help elicit, capture and analyze factors relevant to patient safety in a manner conducive to learning and system improvement. The classification aims to be adaptable yet consistent across the spectrum of health care and across cultures and languages. It has been available for download for field testing purposes at www.who.int/patientsafety/taxonomy/icps_form/en/index.html. It is likely, according to the WHO Web site, that revisions will be made to some of the technical content contained within the ICPS.

## Health Level 7 (HL7) – Patient Safety Interest Group

Health Level 7 (HL7) is a volunteer not-for-profit organization whose mission is to provide standards for the "exchange, management and integration of data that supports clinical patient care and the management of healthcare services." The HL7 Patient Safety Interest Group is currently developing the Individual Case Safety Report, which will form the backbone of interoperability between point-of-care data systems, transaction systems and safety report data repositories. HL7 is one of several American National Standards Institute (ANSI) accredited Standards Developing Organizations (SDOs) operating in the healthcare arena. Health Level Seven's domain is clinical and administrative data.

HL7 refers to the highest level of the International Organization for Standardization (ISO) communications model for Open Systems Interconnection (OSI) – the application level. The application level addresses definition of the data to be exchanged, the timing of the interchange and the communication of certain errors to the application. The seventh level supports such functions as security checks, participant identification, availability checks, exchange mechanism negotiations and, most importantly, data exchange structuring.

HL7 focuses on the interface requirements of the entire healthcare organization. On an ongoing basis, HL7 develops a set of protocols on the fastest possible track that is both responsive and responsible to its members. The group addresses the unique requirements of already installed hospital and departmental systems, some of which use mature technologies. HL7 supports all groups, including several international groups, as they make important contributions to the quality of the organizations in their countries. For details about HL7 activities, go to www.hl7.org.

## Medical event reporting systems

In addition to local, national and international work on medical event taxonomies, there are commercially available solutions that may be used wholesale or as hybrids depending on the organization. **Table 1** (on the following page) includes a brief description of three orientations for the development of a taxonomy:

**Internally developed taxonomies**
Internally developed taxonomies are created by individual healthcare organizations to collect medical event information and to facilitate quality and performance improvement initiatives. The reporting fields are generally designed to capture information about what happened, when, where, who was involved, why the event occurred and what could be done to prevent future occurrence(s).

**Government/public entity taxonomies**
Government/public entity taxonomies are created by state, national or even international entities. The objective of these taxonomies varies, but generally allows for data capture and reporting that supports benchmarking, comparative analysis, trend identification and analysis, performance improvement, and research. These entities tend to be focused on macro-level analysis and communication of general trends rather than specific remedies.

State level reporting of medical events is most often the result of a state mandate for the collection and analysis of event data to create accountability and transparency with regard to medical events. The National Academy for State Health Policy (NAHSP) first collected information about state adverse event reporting systems in 2000. They collected information about all state adverse event reporting systems (defined as those systems authorized and operated by state governments to collect reports from hospitals about adverse events). In 2000, they found 15 mandatory reporting systems in place.

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**Table 1: Orientations for the development of a taxonomy**

| Orientation | Description | Example |
|---|---|---|
| Internally developed | Created by individual healthcare facilities<br>Usually contain patient identification data<br>Vary in level of complexity and information collected<br>Involves granular data that focuses on specific interventions or remedies | Dana-Farber Taxonomy |
| Public entity (government) | Created by state or federal government agencies (regional, state or federal) or other national/international organizations<br>Usually developed for compliance or statutory reporting<br>Generally does not contain any patient identification data<br>Wide variation in the complexity and amount of data collected<br>Focus on the macro level | PA-PSRS; Wyoming |
| Commercial | Offered by commercial vendors<br>Utilizes some key concepts from regulatory bodies or government agencies<br>Wide variation and may be specific to a type of patient safety incidents | MEDMARX® |

Another study was conducted in 2007 using criteria including systems authorized and implemented by state governments to collect reports from hospitals about adverse events with the intent of improving patient safety. They identified 26 states plus the District of Columbia that had adverse event reporting systems. For a copy of the report, go to: www.nashp.org and search for "2007 Guide to State Adverse Event Reporting Systems." Another excellent resource is provided by NAHSP at www.pstoolbox.org.

**Commercial (vendor-based) taxonomies**

Commercial taxonomies are typically offered by software vendors and industry consultants. They are an outgrowth of organizations' desires to optimize their service and software offerings by standardizing a taxonomy that can be adopted by multiple clients. This standardized taxonomy helps organizations offer value-added services such as benchmarking, trend analysis and quality improvements because they are able to collect information in a consistent format.

Each commercial vendor has its unique taxonomy, but many utilize concepts and structures from taxonomies developed by regulatory bodies, government agencies or international organizations. Vendors often have comprehensive taxonomies that capture an array of patient safety events and are developed to meet the diversified needs of many different clients.

In recent years, with the increased flexibility and capabilities of IT systems, some commercial vendors have been able to offer clients the ability to change or modify the standard taxonomy. This flexibility provides organizations a means to use a customized taxonomy that is uniquely suited to their own needs and yet can be transformed or "mapped" to other taxonomies, like those required by state adverse event reporting systems.

## What is right for an organization?

A key tenet of any risk management program is an incident reporting system. Most organizations have formal medical event reporting systems and many of these have evolved from paper-based forms to electronic/Web-based systems that include many bells and whistles.

When approaching the adoption of a medical event reporting system, the organization must first decide whether to develop an internal language for the system or look to the marketplace. The standardization and application of any taxonomy can be challenging – it requires a willingness to evaluate systems and processes for what they are and a commitment to adhere to new practices to ensure the value and validity of the information collected, analyzed and applied for patient safety decision-making.

In this day and age, using technology to capture medical events can certainly have advantages. Those organizations with ample IT resources have developed their own reporting systems using their own or modified taxonomy for classifying events. Other organizations with more modest means

have used common desktop solutions to track and analyze events. Still others have chosen commercial off-the-shelf (COTS) solutions to address the reporting needs.

Regardless of the solution chosen, the risk manager needs to be engaged in the evaluation, development, selection, implementation and education of the system for reporting medical events. Consider the following:

- The taxonomy should include existing and proposed classification models that are available, in use and widely adopted or accepted.
- The taxonomy should meet regulatory and statutory requirements for reporting of patient safety events data, if applicable.
- The taxonomy should be designed to provide data-driven decision support with relative ease for both clinical and business decision-makers via enhanced report generation and data mining capabilities.
- The taxonomy should have the capability to integrate with current coding systems in use, where applicable (i.e., ICD-9-CM, SNOMED, CPT, Drug Database, and Biomed Device Databases).
- The taxonomy should be easy to integrate with other computer-based data management systems.

**Regardless of the solution chosen, the risk manager needs to be engaged in evaluation, development, selection, implementation and education.**

For organizations interested in developing their own event reporting system, those created by or at the direction of a public entity may be a prudent starting place, especially if the organization reports into the public entity's system or anticipates doing so. State-level taxonomies are generally easily accessible and are generic enough to capture a broad range of adverse events. Using these taxonomies as a foundation will ensure that an individually developed taxonomy will be able to address common events that may occur within organizations. Familiarity with and incorporation of specific taxonomy elements required by a regulatory or agency is also important from a compliance perspective.

Though a public taxonomy can provide a starting point, it may not provide the granularity needed to address organizations' unique needs and objectives. Additional taxonomy elements can be added to accommodate an organization's needs and objectives. A simple search on the Internet will uncover taxonomy documents and resources to assist in the development of a taxonomy.

## KEY CONSIDERATIONS

When creating a system for use throughout the organization, consider the following two points:

### 1. Design

- The taxonomy should be capable of classifying all events and not be restricted to specific medical specialties or type of facility.
- The taxonomy should be structured with the end-user in mind, and how information will be extracted and aggregated for analysis.
- The classifications should be generic, mutually exclusive and not refer to specific diagnoses.
- Terminology should be clearly defined and, to the extent possible, commonly used.
- Taxonomies should be capable of evolving and accommodating changes in medical practice as patient safety evolves.

**Hurdles to development**

Weingart(7) describes the hurdles to consider when developing a specific taxonomy.

- **The taxonomy must demonstrate the "usability" of the approach.** It must be easily understood, used by practitioners in a variety of settings and require relatively inexpensive training. It should also be easily translated by external users, such as malpractice insurers, researchers, and accreditation and regulatory bodies.
- **Different users of the taxonomy should generally classify the same event in the same way.** While independent reviewers generally agree on whether an event occurred, reliability dramatically drops when analyzing the degree of patient harm. (9) The problem may be exacerbated when coding decisions are based on imperfect data from typical incident reports.
- **A classification schema alone cannot reliably capture the full story of the event and how it unfolded.** An ideal taxonomy needs to accommodate or at least allow the indexing of the narrative account of incidents. Without the context and texture of the story, key learning points regarding the event may be lost. It needs to facilitate the opportunity for improvement while accommodating patterns and trends from diverse settings.

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- **The use of a new taxonomy within an organization may be challenging and costly.** It is difficult to convince users to adopt the taxonomy in everyday practice and workflow. The new classification system must offer each stakeholder something improved from the old coding system. New approaches can offer opportunities for benchmarking, the possibility of early access to technology with embedded taxonomies, and recognition as early adopters by regulatory and accrediting agencies.

## 2. Structure, attributes and organization

By definition, a taxonomy is a multi-level method for organizing information. The structure should be designed to facilitate both the assignment of events (the coding) and the extraction of useful actionable information. **Table 2** contains key attributes to consider during taxonomy development.

### Table 2: Key Taxonomy Attributes

A categorization and classification schema is comprehensive and consistent with domain needs of risk management if it:

- Accommodates patient, employee and visitor safety domains;
- Accommodates and includes categories for various patient care settings (e.g., acute, long-term, ambulatory);
- Crosses medical domains (e.g., medicine, surgery and OB/GYN);
- Includes non-medical domains/services (e.g., executive suite, security, facility services);
- Captures actual and near miss events;
- Includes patient information (e.g., age, gender, ethnicity, race, primary language, primary diagnoses, procedures, co-morbid conditions);
- Includes care provider information as it relates to the event (e.g., attending physician, surgeon);
- Describes where in the care process the event happened and at what point it was discovered;
- Captures causal/contributory factors (e.g., underlying failures in knowledge and culture, physical structure, business processes, human behavior and factors, hazardous conditions);
- Includes severity of impact or potential impact;
- Captures patient functioning after corrective actions;
- Includes the likelihood for recurrence.

## Taxonomy as a way of life?

The adoption and implementation of medical event taxonomy requires continuous monitoring. Data entered without respect for a standardized terminology and classification schema will make the information unreliable. The risk manager must create a process for reviewing and modifying the taxonomy elements as needed and over time to ensure the reliability of the data.

No taxonomy will be everlasting. It is the responsibility of the risk manager to stay current on the development of taxonomies. Risk managers have the responsibility of ensuring categories within the taxonomy are well-defined and end-users are educated. The integrity of the taxonomy requires ongoing review, re-enforcement and revision. As processes and systems change, an organization's taxonomy must be scrutinized to determine its integrity and alignment with the organization's changing needs.

## Benchmarking and 'actionable knowledge'

Defining, measuring and tracking specific indicators using credible medical event taxonomy will provide a framework for valuable benchmarking. Clarity of the definitions and procedures for gathering data-gathering will be enhanced by patient safety taxonomy. By establishing taxonomy and utilizing benchmarks in the patient safety arena, there is much to be shared between healthcare entities to further the journey toward preventable patient injury or death. Applying a taxonomy will help to organize the wealth of information about medical events in an organization into "actionable knowledge" that can be used to improve clinical practice, patient safety and reduce risk.

## CONCLUSION

To better understand medical events, a common language to classify medical errors is needed. The development and widespread application of patient safety taxonomies are very much in their infancy.

Now is the time for risk management professionals to elevate their engagement in defining what needs to be collected, as well as why and how. Through the use of taxonomy, risk management professionals can make informed conclusions that lead to the prevention of harm in patient care settings. It will further allow risk managers to better analyze safety data so that evidence-based improvement of healthcare for individuals and populations served can become an intrinsic property of the healthcare systems. Further, it will allow collaboration across healthcare systems and stakeholders to act on common threats to patient safety.

**Accident:** Event that involves damage to a defined system that disrupts the ongoing or future output of the future.(9)

**Active error:** Error that occurs at the level of the frontline operator and whose effects are felt almost immediately.(9)

**Active failure:** An error that is precipitated by the commission of errors and violations; these are difficult to anticipate and have an immediate adverse impact on safety by breaching, bypassing, or disabling existing defenses.(10)

**Adverse drug event (ADE):** Injury resulting from the use of a drug.(11)

**Adverse drug reaction (ADR):** Response to a drug which is noxious and unintended, and which occurs at doses normally used in man for the prophylaxis, diagnosis or therapy of disease, or for the modification of physiological function.(12)

**Adverse event:** An injury caused by medical management rather than the underlying condition of the patient.(9)

**Compliance error:** Inappropriate resident behavior regarding adherence to a prescribed medication regimen.(13)

**Deteriorated drug error:** Administration of a medication when the physical or chemical integrity of the dosage form has been compromised, such as expired medications, medications not properly stored or medications requiring refrigeration that are left out at room temperature.(13)

**Dispensing error:** Failure to dispense a medication upon physician order (omission error) or within a specified period of time from receipt of the medication order or reorder (time error); dispensing the incorrect drug, dose, dosage form; failure to dispense correct amount of medication; inappropriate, incorrect or inadequate labeling of medication; incorrect or inappropriate preparation, packaging or storage of medication prior to dispensing; dispensing of expired, improperly stored or physically or chemically compromised medications.(13)

**Error:** Failure of a planned action to be completed as intended (error of execution) or the use of a wrong plan to achieve an aim (error of planning).(9)

**Error of commission:** Error that occurs as a result of an action taken (examples: a drug is administered at the wrong time, in the wrong dosage or using the wrong route; surgery is performed on the wrong side of the body; and a transfusion error involves blood cross-matched for another patient).(10)

**Error of omission:** Error that occurs as a result of an action not taken (examples: a delay in performing an indicated Cesarean section results in a fetal death, a nurse omits a dose of a medication that should be administered or a patient suicide is associated with a lapse in carrying out frequent patient checks in a psychiatric unit); errors of omission may or may not lead to adverse outcomes.(10) (Also see **Omission error**)

**Extra dose error:** Administration of duplicate doses to a resident or administration of one or more dosage units in addition to those that were ordered; may include administration of a medication dose after the order was discontinued (which also could be considered an **Unauthorized drug error).**(16)

**Injury:** Untoward harm occurring to a patient.

**Latent error:** Error in design, organization, training or maintenance that lead to operator errors and whose effects typically lie dormant in the system for lengthy periods of time.(9)

**Latent failure:** Error precipitated by a consequence of management and organizational processes and poses the greatest danger to complex systems; cannot be foreseen but, if detected, can be corrected before it contributes to a mishap.(10)

**Medication error:** 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.(14)

**Monitoring error:** Failure to review a prescribed regimen for appropriateness, or failure to use appropriate clinical or laboratory data for adequate assessment of response to prescribed therapy.(13)

**Near miss.** See **Potential adverse event.**

**Omission error:** Failure to administer an ordered dose to a patient or resident by the time the next dose is due, assuming there has been no prescribing error; exceptions would include a refusal to take the medication and failure to administer the dose because of recognized contraindications. (13) (Also see **Error of omission)**

**Potential adverse drug event:** Incident with potential for injury related to a drug.(15)

**Potential adverse event:** Error of medical management that does not result in injury (a **Near miss**).(9)

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**Potential error:** Mistake in prescribing, dispensing or planned medication administration that is detected and corrected through intervention before actual medication administration.(13)

**Prescribing error:** Inappropriate selection of a drug (based on indication, contraindications, known allergies, existing drug therapy and other factors); dose; dosage form; quantity; route of administration; concentration; rate of administration; or inappropriate or inadequate instructions for use of a medication ordered by a physician or other authorized prescriber.(13)

**Preventable adverse drug event:** ADE due to an error or preventable by any means currently available.(15)

**Preventable adverse event:** Adverse event attributable to an error.(9)

**Safety:** Freedom from accidental injury.(9)

**Sentinel event:** Unexpected occurrence involving death or serious physical or psychological injury or the risk thereof. Serious injury specifically includes loss of limb or function. The phrase "or the risk thereof" includes any process variation for which a recurrence would carry a significant chance of a serious adverse outcome. Such events are called "sentinel" because they signal the need for immediate investigation and response.(16)

**Type A:** [ADEs] related to a drug's pharmacological characteristics and are usually dose-dependent, predictable and preventable.(17)

**Type B:** [ADEs] that are idiosyncratic or allergic in nature and are not dose-dependent or related to a drug's pharmacological characteristics.(17)

**Unauthorized drug error:** Administration of a medication to a patient for which the physician did not write an order (includes a dose given to the wrong patient, dose given that was not ordered, administration of the wrong drug or a discontinued drug and dose given outside a stated set of clinical parameters or protocols).(13)

**Unpreventable adverse drug event:** Adverse [drug] event that is not attributable to an error [adapted].(9)

**Unpreventable adverse event:** Adverse event that is not attributable to an error.(9)

**Wrong administration technique error:** Use of an inappropriate procedure or improper technique in the administration of a drug (examples: incorrect manipulation of inhalers, failure to maintain sanitary technique with medications, not wiping an injection site with alcohol, failure to use proper technique when crushing medications, failure to check nasogastric tube placement or flushing tube before and after administration of medication, failure to wash hands or improper hand washing technique used).(13)

**Wrong dosage form error:** Administration of a medication in a dosage form different from the one ordered by the prescriber. Includes crushing a tablet prior to administration without an order from the prescriber.(13)

**Wrong dose error:** When the resident receives an amount of medication that is greater than or less than the amount ordered by the prescriber.(13)

**Wrong drug preparation error:** Medication incorrectly formulated or manipulated before administration, such as incorrect or inaccurate dilution or reconstitution, failure to shake suspensions, crushing medications that should not be crushed, mixing drugs that are physically or chemically incompatible, and inadequate product packaging.(13)

**Wrong rate error:** Incorrect rate of administration of a medication to a resident. May occur with intravenous fluids or liquid enteral products.(13)

**Wrong route error:** Administration of a medication to a patient or resident by a route other than that ordered by the physician or doses administered via the correct route but at the wrong site (e.g., left eye instead of right eye).(13)

**Wrong time error:** Failure to administer a medication to a patient or resident within a predefined interval from its scheduled administration time. Interval should be established by each facility and clearly stated in the facility's policies. Different intervals may be established for different drugs or drug classes, based on the therapeutic importance of dosing.(13)

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