# Medication: Safety

## What's the Risk?

Approximately 1.3 million emergency department visits and 350,000 hospitalizations occur every year because of an adverse drug event (ADE). These can result from allergic reactions, side effects, overmedication, or a medication error.[1] The National Coordinating Council of Medication Error Reporting and Prevention defines medication error as follows:

> A medication error is any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in control of the health care professional, patient, or consumer. Such events may be related to professional practice, health care products, procedures, and systems, including prescribing, order communication, product labeling, packaging, and nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use.[2]

In older adults, medications that require frequent monitoring, such as warfarin, insulin, and opioids, are frequently associated with errors that require hospital admission.[3] In patients younger than 50, antibiotics are responsible for the most emergency department visits. Four out of five of these emergency department visits are from an allergic reaction.[4]

Given the number of medication errors that occur annually, it's no surprise that medication errors are the fourth most common cause of Coverys medical professional liability (MPL) claims. Forty-two percent of medication error claims occurred in an office or outpatient setting. Thirty-eight percent involved a patient's death. Most claims occurred during the following three steps in the medication process:

- Ordering (35% of claims, 29% of indemnity paid).
- Administering (31% of claims, 34% of indemnity paid).
- Monitoring and management (31% of claims, 36% of indemnity paid).

The most common medications involved were anticoagulants, opioids, antibiotics, anti-anxiety medications, and antidepressants.[5]

## When Is This Risk an Issue?

This chapter reviews issues associated with the key steps in the medication process, including ordering, administering, and monitoring and management. In addition, issues associated with high-alert medications, high-risk populations, and medication storage are explored. For more information on dispensing, see ***Medication: Dispensing***. Specific issues related to monitoring





Updated: May 2019

and management of anticoagulants and opioids can be found in ***Medication: Anticoagulants*** and ***Medication: Prescribing Opioids***.

**High-Alert Medications**

The Institute for Safe Medication Practices (ISMP) defines high-alert medications as "drugs that bear a heightened risk of causing significant patient harm when used in error."[6] In addition to ISMP's high-alert medication list, Coverys claims data supports considering anti-anxiety medications and antidepressants as high risk. These high-alert medications, as well as medications with potentially significant and serious side effects, require the patient's informed consent. For more information on informed consent, see ***Informed Consent: Process***.

ISMP defines the following high-alert medication classes/categories in the community/ambulatory healthcare setting:

- Antiretroviral agents.
- Chemotherapeutic agents (excluding hormonal agents).
- Hypoglycemic agents, oral.
- Immunosuppressant agents.
- Insulin, all formulations.
- Opioids, all formulations.
- Pediatric liquid medications that require measurement.
- Pregnancy category X drugs.[6]

Specific high-alert medications in the community/ambulatory healthcare setting include:

- CarBAMazepine.
- Chloral hydrate liquid, for sedation of children.
- Heparin, including unfractionated and low molecular weight heparin.
- MetFORMIN.
- Methotrexate, nononcologic use.
- Midazolam, for sedation of children.
- Propylthiouracil.
- Warfarin.[6]

The following strategies are advocated by ISMP, Institute for Healthcare Improvement, National Quality Forum, and The Joint Commission to reduce high-alert medication errors:

- Improving access to information.
- Limiting access to personnel trained and credentialed in their use.
- Using auxiliary labeling and electronic alerts.
- Standardizing prescribing, storage, preparation, and administration.
- Employing redundancies in processing.

- Enforcing mandatory monitoring guidelines.
- Educating patients with training techniques such as “teach back” or “repeat back.”
- Reading back phone and other verbal orders.
- Prescribing by generic name.
- Using electronic prescribing with safety alert software.
- Learning, reporting, and sharing error information associated with the use or prescribing of these medications.[7]

To help with patient education, ISMP has developed learning guides that are available at http://www.consumermedsafety.org/tools-and-resources/medication-safety-tools-and-resources/high-alert-medications.

## High-Risk Populations

*Geriatric Patients*

Elderly patients are at greater risk of an ADE because they take more medications and are more susceptible to the adverse effects of medication.[8] Two tools, Beers Criteria and the Screening Tool of Older Person’s Inappropriate Prescriptions (STOPP), have been studied for their potential to reduce adverse drug events in elderly patients.[9] While the Beers Criteria tool has been utilized for a number of years to assess medication safety in geriatric patients, STOPP has been found to be a better predictor of a medication error.[10]

Another method to decrease the number of adverse drug events in elderly patients is to deprescribe, which is the process of “tapering or stopping drugs, aimed at minimizing polypharmacy and improving outcomes.”[11] For more information on the deprescribing process, see https://psnet.ahrq.gov/resources/resource/28785.

*Pediatric Patients*

Neonates, infants, and children are the most vulnerable population to serious and sometimes fatal adverse drug events.[12] Dosing errors are common medication errors among pediatric patients and are more likely to occur if an accurate weight is not obtained prior to prescribing or administering medications.[8]

In addition to medication errors, pediatric patients rely on parents to make the right decisions about the types of medications administered. Nothing is more troubling to a physician than when a parent makes a decision that could jeopardize the child’s health, such as when a parent refuses to vaccinate a child. Ultimately, the parent has a right to make this decision for the child. When parents refuse to vaccinate a child, it is important to educate them of the importance of vaccines and address any questions or concerns they have about vaccine administration. The Centers for Disease Control and Prevention (CDC) offers guidance to healthcare professionals having vaccine conversations with parents.

When the parents still refuse to vaccinate, an informed refusal discussion is necessary, along with corresponding documentation of this discussion in the medical record. Be sure to also document any educational materials you may have given to the parents. For more information on informed refusal, see ***Informed Consent: Process***.

The CDC, the American Academy of Family Physicians, and the American Academy of Pediatrics do not recommend terminating the physician-patient relationship when a parent refuses to vaccinate, as the child needs continued care. Instead, they recommend that practitioners advise parents to call before bringing the child to the office or any other healthcare facility so that the office or facility can implement precautions to prevent contact with other patients.[13]

*Patients Taking Antidepressants*

Mood disorders such as depression are among the most common causes of hospitalization for both adults and youths,[14] and suicide is the 10th leading cause of death.[15] Almost a quarter of suicide decedents test positive for antidepressants.[16] When a patient who is treated with antidepressants commits suicide, it is difficult to defend a prescriber who fails to assess suicide risk. The Suicide Prevention Resource Center recommends the use of the SAFE-T card. This tool guides clinicians through a comprehensive assessment to estimate suicide risk level and to develop a treatment plan and interventions responsive to the patient's level of risk.

**Ordering**

Coverys data reveals that ordering is the riskiest step in the medication process. Ordering was identified as the root cause in 35% of Coverys' medication-related claims. Twenty-nine percent of claims with ordering as the root cause resulted in indemnity payments. Some common ordering issues include:

- Patient assessment.
- Drug choice.
- Drug schedule.
- Medical record documentation.
- Order (written, verbal, and electronic).
- Patient education.[5(p4)]

*Patient Assessment*

Adverse drug events can occur when practitioners have insufficient information about a patient before prescribing, dispensing, and/or administering medications. Incomplete assessment and/or documentation of allergy status can result in patients receiving medications to which they have known allergies.

*E-prescribing*

Several studies have demonstrated that using a computerized physician order entry in conjunction with clinical decision support can help eliminate prescribing errors by providing dosing recommendations, checking for drug allergy interactions, and providing alerts for any potential contraindications or adverse drug-drug interactions. The most successful systems require users to justify the reason why the user is overriding CDS advice.[17]

E-prescribing systems typically autopopulate the medication list screen for ongoing medication reconciliation and may also have printable drug handouts that can help with educating patients about medications. E-prescribing systems provide maximum value when all medications ordered by other physicians, over-the counter medications, and herbal medications are included in the medication list screen.

*Prescription Renewals*

Some prescribing errors can be attributed to improper prescribing practices in physician offices. An example is allowing staff members who are unauthorized to prescribe medication to become involved in the prescription ordering process. Many times this is because the prescription ordering and renewal process is viewed more as an administrative or clerical process than the practice of medicine. A prescription is a medication order. To be valid, a prescription must be issued by a practitioner authorized to prescribe medication. Those authorized to prescribe medication in a physician's office typically include physicians and advanced practice professionals (APPs), for example, nurse practitioners and physician assistants. Documenting a prescription or prescription renewal in the medical record is documentation of this medication order. This order can only be signed by someone authorized to prescribe medication.

*Abbreviations*

Using ambiguous medical abbreviations is a common but preventable source of medication errors. Error-prone abbreviations, symbols, or dose designations can lead to a delay in therapy or a misinterpretation that results in patient harm.[18] In response to the delays and errors associated with the misinterpretation of ambiguous medication abbreviations, ISMP developed a list of error-prone abbreviations, symbols, and dose designations that should never be used in medical communication, available at https://www.ismp.org/recommendations/error-prone-abbreviations-list.

*Look-Alike or Sound-Alike Drug Names*

Drug names that look alike or sound alike may be confusing. ISMP recommends the following strategies to reduce the risk of errors with look-alike and sound-alike names:

- Using both the brand and generic names on prescriptions and labels.
- Including the purpose of the medication on prescriptions.

- Configuring computer selection screens to prevent look-alike names from appearing consecutively.
- Changing the appearance of look-alike product names to draw attention to their dissimilarities, [for example, by using tall man (mixed case) letters].[19]

While using tall man letters can help distinguish similar names, inconsistency and not standardizing which letters to present in uppercase has led to difficulties in implementing the use of mixed case letters.[20] ISMP utilizes the CD3 rule.

> [The CD3 rule] methodology suggests working from the left of the word first by capitalizing all the characters to the right once two or more dissimilar letters are encountered, and then, working from the right of the word back, returning two or more letters common to both words to lowercase letters. When the rule cannot be applied because there are no common letters on the right side of the word, the methodology suggests capitalizing the central part of the word only.[21]

*Verbal Orders*
Verbal orders, whether they are spoken aloud in person or by telephone, are prone to errors because of difficulties in interpreting speech and because the verbal order must be transcribed, which adds additional risk to the prescribing process.[21]

*Patient Weights*
Weight-based dosing errors occur in both pediatric and adult patients.[22] One study found that "dosing errors represented 47 percent of all pediatric medication errors and 28 percent of all nonpediatric drug errors." Further, high-alert medications, such as anticoagulants, dobutamine, and insulin, are often involved in weight-based dosing errors.[21] The Pennsylvania Patient Safety Authority's analysis of 1,291 medication errors associated with patient weights found that 74.8 percent of errors reached the patient. The most common factors included weights too high or too low, and confusion between pounds and kilograms.[23]

Weighing a patient in pounds often requires conversion to metric units (kilograms, grams) when calculating the dosage, which may lead to a dosage calculation error. Weighing a patient in metric units eliminates the potential for error in converting pounds to metric units.[24]

*Patient Education*
Educating patients in the correct use of medications is crucial to avoiding adverse drug events. An accurate medication list is a useful way to educate the patient and family. Further, failing to educate and warn a patient that a medication can cause drowsiness and to refrain from operating a motor vehicle may result in an MPL claim if, for example, the patient is in a motor vehicle accident while impaired by the medication.

## Administering

Coverys data reveals that administering is another risky step in the medication process. Administering errors accounted for 31% of Coverys' medication-related claims.[5(p4)]

Administration errors occur if the wrong patient, wrong drug, wrong dose, wrong route, wrong site, or wrong time is selected. Injections administered in an office practice can cause an error if the medication is not verified prior to administration and completely documented in the medical record.

### *Labeling*

When an injectable medication is drawn but not immediately administered in the office setting, there is an increased risk for a medication error. The correct medication and dose are critical to patient safety, yet based on Coverys risk assessments, medications are sometimes found in the office setting in unlabeled syringes, increasing the chance of a medication error and harm to the patient.

### *The Five Rights*

The "five rights" are a fundamental tenant of medication safety. Nurses learn early in training that medication is safely administered when adhering to the following five rights:

- Right Medication.
- Right Dose.
- Right Time.
- Right Route.
- Right Patient.[25]

ISMP refers to the five rights as "broadly stated goals or desired outcomes of safe medication practices that offer no procedural guidance on how to achieve these goals." ISMP believes that both "human factors and system weaknesses" contribute to error.[25] Ideally, organizations design and implement systems to achieve the five rights; for example, requiring verification of two unique patient identifiers prior to administration and requiring that the label be read prior to administration.[26]

When medication safety procedures are not followed because of systems issues, the staff member who administered the medication has a responsibility to report the incident. Ideally, the organization reviews the incident and makes changes to the system to prevent the same error from recurring. This requires the organization to have a strong culture of safety in place.[27] For more information, see ***Risk Management: Event Reporting***.

*Unlicensed Assistive Personnel*

In the office setting, unlicensed assistive personnel (UAP) are often responsible for medication administration. Regulations allowing administration of medications by UAP vary by state. In some states, only certified medical assistants who follow very specific rules may administer injections. In other states, medical assistants are prohibited from administering injections. It is imperative that practices know the scope of practice laws for medical assistants in the state where the practice is located. The American Association of Medical Assistants (AAMA) provides links to some state scope of practice laws at http://www.aama-ntl.org/employers/state-scope-of-practice-laws.

*Allergy Injections*

Reactions to allergy injections can occur immediately or several hours after administration. The typical reaction is redness and swelling at the injection site, but may include increased allergy symptoms such as sneezing, nasal congestion, or hives. Serious reactions to allergy shots are rare. They typically occur within 30 minutes after the injection is administered and require immediate medical attention; patients who receive an allergy injection must be monitored for a serious reaction in the physician's office for 30 minutes after the injection.[27]

Because of the risk of a serious reaction, allergy injections must be given in a practice that is prepared to identify and treat adverse reactions. This includes properly trained staff members and properly maintained equipment and medications. For more information on preparing for a medical emergency, see ***Emergencies: Medical***.

Ideally, allergy shots are given in an allergist/immunologist's practice. However, this is not always possible. When allergy shots are administered in a nonallergist/nonimmunologist setting, the allergist/immunologist needs to communicate a comprehensive treatment plan to the supervising physician. Conversely, the supervising physician needs to communicate any allergic reactions to the allergist/immunologist so that appropriate adjustments to the treatment plan may be made.[27]

*Allergen Immunotherapy Policy and Training*

Because allergen immunotherapy carries a significant risk for life threatening anaphylaxis, a written policy and procedures along with stringent competency training for both nursing personnel and physician supervisors is paramount. A variety of extracts in various packaging and labeling formats further increase the risk for incorrect dosing, making a written policy and training all the more crucial.

Although USP developed scaled-back recommendations for allergen extracts (as compared to the requirements for drug compounding pharmacies), appropriate measures must be taken to be in compliance.[28]

## Monitoring and Management

According to Coverys data, monitoring and management is the second riskiest step in the medication process. These errors accounted for more than 31% of Coverys' medication-related claims. One reason for these errors is a failure to reconcile medications.[5(p4)]

### *Medication Reconciliation*

ADEs are common when medication has not been reconciled, which makes discrepancies more likely to occur. Common discrepancies include omitted medications, duplicated medications, or incorrect dosages. These discrepancies continue to persist in organizations with a fully integrated electronic health record.[29] Medication reconciliation is intended to improve communication among healthcare professionals during transitions in care and to minimize the risk of a medication error. In the outpatient setting, medication reconciliation involves comparing current medications with newly ordered or changed medications and reconciling any differences to ensure that any deletions, changes, and/or additions to medications, including dose and frequency, are due to deliberate clinical judgment rather than oversight or errors.[30]

A complete and comprehensive medication list that is kept current assists practitioners in reconciling the patient's medications at each visit and also helps determine the patient's response to medication therapy. Coverys claims data has shown that an incomplete medication list may result in errors that may be difficult to defend in a medical professional liability claim.

## Storage

Medications requiring refrigeration or freezing must be stored properly from the time they are manufactured until they are administered. Storage and handling errors can reduce the medication's potency and efficacy and cost thousands of dollars in unusable medications. The CDC provides specific recommendations for storing and handling vaccines in its Vaccine Storage and Handling Toolkit. Of note, the CDC explains that dormitory-style refrigerators exhibit severe temperature control and stability issues and should never be used to store vaccines. Further, the CDC recommends using a digital data logger (DDL) with a current and valid Certificate of Calibration Testing to continuously monitor and record vaccine temperature. The temperature is taken and recorded no less than every 30 minutes.[31(pp15-16)] For DDL users, the CDC recommends checking and recording minimum and maximum temperatures at the start of each day. For all others, the CDC recommends checking and recording the current temperature at minimum at the start and end of each workday.[31(p25)]

Many physician practices store sample medications. For more information on sample medications, see ***Medication: Dispensing***.

Storing controlled substances and/or prescription pads can place a practice at risk for diversion when adequate security measures are not in place. For more information, see ***Medication: Diversion***.

**Disclosure**
When a medication error occurs, disclosure and appropriate communication is crucial. For more information on how to conduct a disclosure discussion, see ***Disclosure***.

*Corrective Action*
In some cases, correcting a medication error may simply involve giving the patient the originally intended medication. In other cases, the patient may need an antidote and further treatment to counteract the effects of the incorrect medication or dose they received.

## How Can I Reduce Risk?

Use the following strategies to improve medication safety and reduce the risk of a medication error.

| Develop Policies and Procedures | |
|---|---|
| **Implement policies and practices** | • Implement policies and practices governing the way medications are handled in the office to minimize the risk of preventable medication errors. Include the following:<br>○ Prescriptions and prescription refills.<br>○ The ordering, storing, and disposing of samples.<br>○ Record-keeping, including charting and logging samples in and out.<br>○ Medication storage and handling that include:<br>▪ Appropriate spacing and positioning for maximizing air circulation and maintaining consistent temperatures.<br>▪ Clearly labeled shelves and containers holding the medications.<br>▪ Separate shelf locations for similar named medications or pediatric and adult formulations.<br>▪ Medications and diluents rotated to ensure those with the earliest expiration dates are used first.<br>▪ Procedures to follow when a power failure occurs or if the temperature is out of range. |

| Develop Policies and Procedures | |
|---|---|
| | ○ Documentation, including an abbreviation policy.<br>○ Narcotics.<br>○ The use and abuse of Drug Enforcement Administration (DEA) and state public health department registration numbers.<br>• Ensure that the policies for dispensing and prescribing drugs address the control and security of prescriptions pads, controlled substances, product samples, and DEA registration numbers. |
| **Develop written policies and procedures for preparing allergy immunotherapy** | • Develop written policies and procedures for preparing allergy immunotherapy. Make sure that the policies and procedures follow evidence-based guidelines and include but are not limited to the following:<br>○ Documentation of training and competency of personnel in allergen immunotherapy and the treatment and prevention of anaphylaxis.<br>○ Documentation of the training and competency of personnel in extract preparation.<br>○ Utilization of appropriately trained health professionals (e.g., licensed practical nurses, registered nurses, physician assistants, advanced practice nurses).<br>○ Demonstration of understanding infection prevention and control guidelines and techniques (e.g., hand hygiene, personnel protective equipment, disinfection of mixing surfaces, aseptic technique, sanitation before entering vials or ampules, visual inspection for physical integrity of vials/ampules, avoiding direct contact contamination of sterile needles, syringes, and other drug administration devices).<br>○ Demonstration of personnel competency in performing each step of the process for identifying, labeling, preparing, mixing, and storing the preparations.<br>• Designate a specific clean area for preparing the preparations, ensuring that personnel traffic is restricted and activities that increase the risk of contamination are prohibited (e.g., eating, placement of used diagnostic equipment/supplies and soiled linen). Keep a mixing log with the appropriate |

| Develop Policies and Procedures | |
|---|---|
| | information (patient's name, extract used for mixing, mixing date, expiration date, and lot numbers). |
| **Educate staff members** | • Ensure that staff members are familiar with and have ready access to all medication-related policies and procedures. Educate staff members about changes as they occur. |
| **Maintain professional literature and references** | • Maintain professional literature and references on all drugs prescribed in the practice. Keep them up to date and make them readily accessible to all healthcare providers in the practice setting. |
| **Conduct a Patient History & Reconcile Medications** | |
| **Obtain a patient history** | • Obtain a complete medication history. Also conduct a thorough patient history prior to furnishing medications to determine the existence of any current and past medical conditions and the potential for a drug interaction with current medications, allergies, or other contraindications. |
| **Document medication history** | • Document the history appropriately. Ascertain all relevant information regarding:<br>○ Current use of medications prescribed or furnished by other physicians.<br>○ Current use of over-the-counter medications.<br>○ Current use of herbal supplements.<br>○ Current use of vitamins.<br>○ Current use of recreational drugs or alcohol.<br>○ Prior allergies and other reactions to drugs or classes of drugs.<br>○ Pregnancy status.<br>○ Liver or kidney disease that is significant enough to interfere with the metabolism or excretion of the planned medication. |
| **Assess allergies** | • Assess and document each patient's allergy status at the time of initial contact.<br>• Include the severity of the allergy and the patient's response, for example: "Penicillin – anaphylaxis, NSAIDs – nausea." |

| Conduct a Patient History & Reconcile Medications | |
|---|---|
| | • Note an absence of allergies as NKDA or NKA to indicate that an assessment has occurred. Reassess allergy status at least annually and when a new medication is prescribed.<br>• Ensure that practitioners confirm and update allergy status entries that are auto-populated into each progress note at each visit with a notation such as "reviewed, no changes." |
| **Assess intolerances** | • Assess intolerances to medications and the patient's reaction.<br>• Separate intolerances from allergies to differentiate between an intolerance and an allergy. |
| **Maintain a medication list** | • Ensure that an up-to-date medication list for monitoring a patient's prescription and over-the-counter medications is in place and being utilized. In an electronic medical record (EMR) system, use the dedicated medication list screen.<br>• Ensure that the following information is included in the medication list:<br>o Allergy status – allergies and reactions.<br>o All medications prescribed and/or dispensed by the practice (for example, sample medications).<br>o Prescription start and end dates, dose, frequency, quantity, and number of refills.<br>o Medications prescribed by other clinicians.<br>o Over-the-counter medications that the patient regularly takes, including vitamins and supplements.<br>• When using an EMR, consider contacting the EMR vendor to investigate whether fields in the medication list can be autopopulated. When fields in the list are autopopulated, confirm and update the information in the medication list at each patient visit.<br>• See the sample ***Medication List***. |
| **Reconcile medications** | • Develop and implement a formal medication reconciliation process. |

## Conduct a Patient History & Reconcile Medications

- Ask patients at every encounter what medications they are currently taking, including over-the-counter medications, sample medications, herbal supplements, vitamins, and illicit drugs; and if they have experienced any side effects or any difficulty taking medications, for example, timing or swallowing. Document the patient's response in the medical record.
- Ensure that the prescribing practitioner reviews the medication list and notes any updates and/or discrepancies at each office visit.
- Consult the original prescriber if it is unclear whether or not a medication on the list needs to be changed.[30]
- Give the patient an up-to-date medication list after each patient encounter so the patient may use it for ongoing care at other healthcare entities.
- Do not rely on the patient to provide this information when seeking services from another healthcare facility. Ensure that a process is in place to communicate all medications patients are receiving (including name, dose, frequency, route, and purpose) when they are admitted to a healthcare facility such as a hospital or nursing home.
- Request that patients bring the list to each appointment and then reconcile the patient's medication list against the medications documented in the patient's medical record.

## Implement Safe Prescribing Practices

**Know medications**

- Know or become familiar with all medications prescribed. Check a medication reference or call a pharmacist about a medication if you have any questions about its use.

**Review the patient's other medications**

- Before prescribing a new medication, review the patient's existing medication regimen to rule out any adverse drug interactions.

**Use an e-prescribing system, when possible**

- Utilize an e-prescribing system with clinical decision support that identifies:
  - Allergies.
  - Contraindications to a given medication.

| Implement Safe Prescribing Practices | |
|---|---|
| | ○ Drug interactions with other medications the patient is taking.<br>○ Correct dosage. |
| **Ensure prescribers authorize prescriptions** | • Ensure that the prescribing practitioner authorizes prescription renewals and refills. |
| **Reduce the risk of similar drug names** | • Review ISMP's *List of Confused Drug Names*, available at http://www.ismp.org/Tools/confuseddrugnames.pdf.<br>• Change the appearance of look-alike product names to draw attention to their dissimilarities by using tall man letters.[32]<br>• Use both the brand and generic name on prescriptions and labels.[32]<br>• Include the purpose of the medication in prescriptions.[33]<br>• Configure computer selection screens to prevent look-alike names from appearing consecutively.[34] |
| **Avoid abbreviations** | • Develop and implement a policy that standardizes the use of approved abbreviations and disallows the use of unapproved abbreviations in prescriptions and medical record documentation.<br>• Review ISMP's *List of Error-Prone Abbreviations, Symbols and Dose Designations*, available at https://www.ismp.org/recommendations/error-prone-abbreviations-list.<br>• Train staff members to avoid the use of ambiguous abbreviations.<br>• Prohibit the use of error-prone abbreviations, symbols, and dose designations when communicating any medical information, including:<br>○ Internal communications.<br>○ Telephone/verbal prescriptions.<br>○ Computer-generated labels.<br>○ Labels for drug storage bins.<br>○ Medication administration records.<br>○ Pharmacy and prescriber computer order entry screens.[34] |

| Implement Safe Prescribing Practices | |
|---|---|
| | • Always write out the complete drug name, as drug name abbreviations can easily be confused.<br>• Always use metric units, as apothecary units are unfamiliar to many practitioners. |
| **Take care with decimal points** | • Recognize that decimal points may be easy to miss.<br>• Do NOT use a decimal point to create a "trailing zero." For example, 5.0 mg can be mistaken for 50 mg.<br>• Always use a zero before a decimal point when the dose is less than a whole unit; for example, 0.5 mg could be mistaken for 5 mg if a leading zero is not used. |
| **Limit verbal orders** | • Limit verbal prescription medication orders to urgent situations in which immediate written or electronic communication is not feasible.[20]<br>• If a verbal order is absolutely necessary, ensure that the prescribing practitioner relays the order, enunciates clearly, includes the purpose of the drug, specifies the dose, and spells unfamiliar drug names.[21] Ensure that the recipient writes down the complete order, reads it back, and receives confirmation from the prescribing practitioner.[7(p11)] |
| **Obtain accurate metric weight** | • Weigh patients in metric units at every visit.<br>• Use the current measured weight rather than any verbally offered, historical, or estimated weight when calculating a medication dosage.[24]<br>• Ensure that the dosage calculation is accurate before prescribing or administering a medication.<br>• Use e-prescribing with clinical decision support that has a hard stop for weight-based medications when weight is missing or inconsistent with expected value.[23] |
| **Document prescribed medications** | • Ensure that documentation of prescribed medication includes the following:<br>○ Medication name (generic and brand name).<br>○ Strength (for example, lisinopril 10 mg).<br>○ Dosage (for example, lisinopril 20 mg – two 10 mg tablets).<br>○ Frequency with which the medication is to be taken, including time medication is taken (for |

| Implement Safe Prescribing Practices | |
|---|---|
| | example, twice a day at 9 a.m. and 4 p.m. or once a week on Monday).<br>○ Route (for example, oral, transdermal, inhalation, subcutaneous).<br>○ Indication for the medication.<br>○ Amount prescribed.<br>○ Number of refills.<br>○ Patient education.<br>○ Prescriber's signature.[7(p11)] |
| **Add faxes to the medical record** | • Retain copies of prescriptions that are faxed to a pharmacy. |
| **Prescribe only for patients** | • Do NOT write prescriptions "on demand" for friends or acquaintances who are not patients. |
| **Obtain Informed Consent** | |
| **Identify high-alert medications** | • Review ISMP's *List of High-Alert Medications in Community/Ambulatory Healthcare*, available at https://www.ismp.org/sites/default/files/attachments/2017-11/highAlert-community.pdf. Identify which high-alert medications are prescribed in the practice. In addition to ISMP's list, identify what other high-alert medications are prescribed or administered in the practice (e.g., antidepressants, anti-anxiety, stimulants). |
| **Obtain informed consent for high-risk medications** | • Develop and implement a process for obtaining informed consent when practitioners prescribe or administer medications with a known degree of high risk. |
| **Obtain written consent for some medications** | • Obtain informed consent before prescribing:<br>○ Anticoagulants.<br>○ Opioids.<br>○ Long-term steroids.<br>○ Antipsychotics.<br>○ Medications whose side effects would suggest a need to restrict activities such as driving and/or drinking alcohol.<br>○ Medications used for off-label purposes. |

| Obtain Informed Consent | |
|---|---|
| **Develop a review process for off-label use** | • Develop a review process for the off-label use of medications, particularly for pediatric patients, elderly patients, and patients with high-risk or chronic conditions. |
| **Document discussion** | • Document the informed consent discussion in the medical record.<br>• Consider having the patient sign an informed consent form as an adjunct to this documented discussion. |

| Educate Patients | |
|---|---|
| **Inform patients** | • Ensure that patients receive the following information for every medication they are given, as appropriate:<br>○ Name, dosage, frequency, and timing of administration.<br>○ Expected effects of the medication.<br>○ Possible side effects.<br>○ When to notify the practice if the medication is ineffective or if a serious side effect is experienced.<br>○ Other medications (prescription and over-the-counter) that are contraindicated.<br>○ Contraindications related to alcohol and food.<br>○ How long to continue the medication or when to use it if it is ordered as needed (PRN).<br>○ How to use aerosols, suppositories, sublingual medications, etc. |
| **Inform patients of risks** | • Take special care in informing patients of the major risks, and specifically, the serious risks of each and every medication they are taking.<br>• When available, consider using an ISMP high-risk medication learning guide in the patient education process. These guides are available at http://www.consumermedsafety.org/tools-and-resources/medication-safety-tools-and-resources/high-alert-medications. |
| **Provide written instructions** | • Minimize the risk of misunderstanding verbal instructions by providing written instructions to patients who can read. Be sure to include warnings about potential side effects. |
| **Use teach-back method** | • Ensure that patients know how to administer their medications, when to notify the practice, and any |

| Educate Patients | |
|---|---|
| | contraindications. Ask patients to repeat back instructions and advice. |
| **Warn patients of potential danger of driving** | • Warn patients, when appropriate, against engaging in activities, such as driving, that might result in harm to themselves or others while taking certain medications, especially if coupled with alcohol. Document this discussion in the medical record.<br>• Consider obtaining a signed agreement when prescribing such medications, noting that the patient has been warned about the side effects and potential danger of driving. |
| **Document patient education** | • Document all medication-related education provided to the patient in the patient's chart in a timely and thorough manner. Include education about the risks, side effects, and precautions. |
| **Monitor Patients** | |
| **Develop written protocols for lab monitoring** | • Develop written protocols for medications that require laboratory monitoring. Be sure to address the frequency with which monitoring is to occur. Establish a tracking system to monitor patient compliance.<br>• Ensure that patients know the frequency of laboratory testing and their responsibility to keep appointments.<br>• Do NOT provide refills if laboratory testing has not been completed and/or appointments have not been kept. |
| **Track serum levels** | • Develop and implement a system for tracking the serial serum levels of patients taking medications with a potential for toxicity. |
| **Monitor side effects** | • Develop and implement systems for closely monitoring the response of patients to any medications with potentially serious side effects, such as long-term steroids. |
| **Use Caution With High-Risk Populations** | |
| **Be aware of polypharmacy in geriatric patients** | • Be aware of all prescription and over-the-counter medications the patient is taking and be alert to their possible interactions in a geriatric patient before |

## Use Caution With High-Risk Populations

| | |
|---|---|
| | prescribing a medication. Consider other steps that might be taken:<br>○ Use nonpharmacologic approaches when possible, rather than immediately resorting to medication.<br>○ Use only medications that are absolutely essential.<br>○ Limit prescribing medications to be taken as needed (PRN).<br>○ Have a pharmacist perform a periodic review of each patient's medication.<br>○ Try to minimize the number of pharmacies filling the prescriptions.<br>○ Inform the patient or a family member of the reasons for discontinuing or changing a medication.<br>○ Notify other practitioners of any changes to a patient's drug regimen.<br>• Coordinate care or designate someone to coordinate medical care to make sure there are no duplications or working-at-conflicting purposes. |
| **Monitor geriatric patient drug levels** | • Monitor levels of certain drugs in the elderly to minimize the possibility of toxicity. Create and implement a system to ensure that serum levels, bleeding time, and other clinical indicators are tracked, reviewed, and addressed, as appropriate. |
| **Use STOPP criteria for geriatric patients** | • Consider using STOPP criteria to assess medication safety in geriatric patients. |
| **Consider deprescribing for elderly patients** | • Minimize polypharmacy in elderly patients. Follow the five-step deprescribing process. When possible, taper or stop medications. |
| **Obtain informed refusal when necessary** | • Educate parents who refuse to vaccinate a child. Consider providing vaccine information developed by the CDC, which is available at https://www.cdc.gov/vaccines/hcp/conversations/conv-materials.html.<br>• Obtain informed refusal when a parent refuses to vaccinate a child. Consider having the parent sign an informed refusal form. The American Academy of Pediatrics has such a form tailored to parents who refuse to vaccinate a child which is available at |

| Use Caution With High-Risk Populations | |
|---|---|
| | https://www.aap.org/en-us/Documents/immunization_refusaltovaccinate.pdf. |
| **Assess suicide risk when prescribing antidepressants** | • Conduct and document thorough ongoing assessments of a patient's response to prescribed antidepressant medication and/or therapy.<br>• Assess the patient's suicide risk using an evidence-based suicide risk assessment tool. Develop appropriate treatment plans and interventions responsive to the patient's risk level. |
| **Administer Injections Safely** | |
| **Ensure medications are safely administered** | • Develop medication safety procedures that help staff members achieve the five rights of medication administration each and every time a medication is administered to a patient.<br>• Encourage staff members to report any and all instances in which they were unable to follow the five rights of medication administration. Consider a poster to remind staff members to report. See the sample poster titled<br>• Examine systems issues when the five rights of medication administration are not achieved.<br>• Make adjustments to existing medication safety procedures to prevent the same error from recurring. |
| **Determine who may give injections** | • Comply with state regulations for the administration of medication by UAP.<br>○ In states where UAP may administer injections:<br>▪ Identify which medications may be administered by UAP and those that must be administered by licensed staff members. For example, medical assistants in Rhode Island may administer medications orally, subcutaneously, or intramuscularly, but they may not administer controlled substances or prescription eye drops or insert an intravenous catheter.[35]<br>▪ Implement a formal system for reviewing competency. Document the competency |

## Administer Injections Safely

| | |
|---|---|
| | review in personnel files and review competency on an annual basis.<br>○ In states where UAP may not administer injections, ensure that licensed staff members administer injections. For example, the state of Connecticut prohibits injection administration by unlicensed staff members.[36] |
| | • Create a written policy defining who within the practice is authorized to administer medications by injection. When UAP are permitted by both state law and by the practice to give injections, define which injections are permitted, where, and via what route(s). |
| **Certify UAP when necessary** | • Recognize that some states require certification before a UAP is permitted to give injections. Check state regulations to see if certification is required. |
| **Document all injections** | • Document all injections administered in the office, including local anesthetics and joint injections. Include the name of the drug, dosage, route of administration, site of injection, time, results/response (when indicated), and the signature of the person who administered the medication. Recognize that certain agents, for example, allergy serums and vaccines, require that the lot number and expiration date also be documented. |
| **Establish a waiting period following allergy injections** | • Develop and implement a process requiring patients to remain in the office for a defined period of time after receiving an allergy injection.<br>• Ask patients prior to administration if they understand the monitoring time requirement and are able to wait the entire time. Reschedule when patients are unable to wait the required monitoring time.<br>• When a patient refuses to wait the recommended period of time after receiving an allergy injection, document the patient's refusal to wait. Ensure that a clinician explains the potential consequences of refusing to wait to the patient and documents this informed refusal discussion in the medical record. |
| **Document allergy injection reactions** | • Be sure to include a description of any signs and symptoms, treatment initiated (if any), and the patient's condition upon discharge. If allergy shots are not administered in an allergist's/immunologist's office, |

| Administer Injections Safely | |
|---|---|
| | report the reaction to the patient's allergist/immunologist. Document this communication with the allergist/immunologist in the patient's medical record. |
| **Follow safe injection practices** | • For more information on safe injection practices, see ***Infection Prevention***. |
| **Label medication when not immediately used** | • Label all medications that are prepared and not immediately administered. Remember, "if it hits that table, it needs a label."<br>• Establish guidelines for label placement on syringes, including specific directions on how to avoid interfering with the ability to view the gradations on the syringe barrel and the syringe contents or with the syringe use/function.<br>• Apply the label directly below the gradation lines so that the scale, name, and drug strength/dose remains visible during administration.<br>• Orient the label in a manner that facilitates viewing when a right-handed person holds the syringe.<br>• Include:<br>  ○ Medication name.<br>  ○ Strength.<br>  ○ Amount if not apparent from the container.<br>  ○ Medication preparation date or time (if used within 24 hours).<br>• Medication expiration date or time (if used within 24 hours). |
| **Implement a policy on administering medications via IV** | • Develop and implement a written office practice policy that addresses the following:<br>  ○ Who within the practice may administer IV medications.<br>  ○ Which medications may be administered.<br>  ○ Where IV medication administration should take place.<br>  ○ Who should monitor a patient receiving IV medication.<br>  ○ How IV medication administration is recorded in the medical record. |

| Store Medications Safely | |
|---|---|
| **Log all medications** | • Log all medications received in the practice. Ensure that the log includes the medication's name, lot number, and quantity. Log out all expired medications when they are discarded. |
| **Follow guidelines** | • Follow the manufacturer's guidelines when storing and handling medications. For vaccines, follow the CDC's Guidelines for Storage and Temperature Monitoring of Refrigerated Vaccines. |
| **Maintain the cold chain** | • Establish a system for monitoring the temperature.<br>• Be familiar with and require strict staff adherence to the recommendations of vaccine manufacturers concerning uninterrupted cold storage. Maintain the appropriate temperature.<br>• Store medications requiring refrigeration in a separate refrigerator at 2-8 degrees Celsius (36-46 Fahrenheit).<br>• Store medications requiring freezing at a temperature between -50 and -15 Celsius (-58 and +5 degrees Fahrenheit) in a separate standalone freezer.<br>• Use a continuous monitoring and recording digital data logger (DDL) with a current and valid Certificate of Calibration Testing for each unit in addition to manually checking temperatures if vaccines are being stored.[31]<br>• Ensure someone is responsible for responding to alerts when the office is closed.<br>• Recognize that dorm-style refrigerators exhibit severe temperature control and stability issues and are not intended for medication storage. |
| **Log temperatures** | • Maintain a log to record the temperature checks on a daily basis or more often, according to CDC guidelines and/or state requirements. |
| **Refrigerate separately** | • Do NOT store injectables and other medications that need refrigeration in a refrigerator that holds food (including Glucola) or in which blood and urine specimens are kept. |
| **Follow storage guidelines** | • In the interest of patient safety, follow these guidelines when storing medications:<br>  ○ Clearly label all medications.<br>  ○ Store different drugs with similar names or similar packaging separately. |

## Store Medications Safely

- Use tall man lettering when labeling two medications with similar sounding names.
- Store different doses of the same drug separately.
- Separate oral medications from topical medications.
- Store potentially lethal agents, such as potassium chloride, away from all routine medications.

## Develop and Implement a Written Policy for Renewals and Refills

**Develop and implement a renewal/refill policy**

- Develop and implement a written policy that addresses which persons within the practice are authorized to order a prescription renewal/refill.
- Ensure that the prescribing physician and/or APP authorizes all renewals/refills.

**Determine need for office visit**

- Maintain a list of medications that require either an office visit or a serum level before a prescription is refilled.

**Establish time frame for call-in of refills**

- Consider establishing certain hours during the workweek to handle prescription renewal/refills, as patients who know ahead of time that their prescription renewals will be handled at a specific time are less likely to request an emergency refill late at night or on the weekends.

**Document renewals/refills**

- Document prescriptions, renewals, and refills in the patient's medical record. Include the following:
  - Date.
  - Medication name.
  - Dosage, including number of tablets to be taken.
  - Frequency.
  - Quantity to be dispensed.
  - Number of refills.
  - Prescriber's signature.

## Disclose Medication Errors

**Inform patient**

- Inform patients if they are given the wrong medication or the wrong dose of the correct medication, even if they experience no side effects or adverse outcome from the error.

| Disclose Medication Errors | |
|---|---|
| **Take corrective action** | • Correct a medication error as soon as possible after the error is discovered. |
| **Document** | • Objectively document in the medical record what occurred, what was told to the patient, and any ensuing care or treatment, if any, that was undertaken to address the error. Do NOT include an explanation of why the error was made. |
| **Seek additional information** | • See the ***Disclosure*** chapter for additional information on how to conduct a disclosure discussion. For more information on reporting errors, see ***Risk Management: Event Reporting***. |

## References:


1. U.S. Department of Health & Human Services, Centers for Disease Control and Prevention (CDC). Medication Safety Basics. Page last reviewed September 28, 2010. https://www.cdc.gov/medicationsafety/basics.html#ref2
2. National Coordinating Council for Medication Error Reporting and Prevention. About Medication Errors. n.d. https://www.nccmerp.org/about-medication-errors
3. CDC. Adverse Drug Events in Adults. Page last reviewed October 11, 2017. https://www.cdc.gov/medicationsafety/adult_adversedrugevents.html
4. CDC. Adverse Drug Events from Specific Medicines. Page last reviewed: April 4, 2018. https://www.cdc.gov/medicationsafety/adverse-drug-events-specific-medicines.html
5. Robert Hanscom, JD; Maryann Small, MBA; Ann Lambrecht, RN, BSN, JD, FASHRM. A Dose of Insight: Diagnostic Accuracy: Room for Improvement. https://coverys.com/PDFs/Coverys_Diagnostic_Accuracy_Report.aspx%20riskey
6. Institute for Safe Medication Practices (ISMP). ISMP List of High-Alert Medications in Community/Ambulatory Healthcare. 2011. https://www.ismp.org/sites/default/files/attachments/2017-11/highAlert-community.pdf
7. Health Research & Educational Trust (HRET), Institute for Safe Medication Practices (ISMP) and Medical Group Management Association (MGMA) Center for Research, pp. 28-29.
8. U.S. Department of Health & Human Services, Agency for Healthcare Research and Quality (AHRQ), "Medication Errors," AHRQ PSNet Patient Safety Primers, Last updated January 2019 http://psnet.ahrq.gov/primer.aspx?primerID=23
9. American Geriatrics Society 2019 Updated AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults. The 2019 American Geriatrics Society Beers Criteria Update Expert Panel. JAGS 00:1-21, 2019. https://onlinelibrary.wiley.com/doi/epdf/10.1111/jgs.15767?referrer_access_token=62ZmNjSqHfGprHjtaN0IFYta6bR2k8jH0KrdpFOxC67yDCFN_AD0SMCamloXgL91a4vaIxxEnHtq1NZiUFsIW_q9ROWyF_pj5fxfPxD2nAzNbNRE3jnFJW1EY7vdCsJP
10. H. Hamilton, P. Gallagher, C. Ryan C, et al., "Potentially Inappropriate Medications Defined by STOPP Criteria and the Risk of Adverse Drug Events in Older Hospitalized Patients," Archives of

Internal Medicine, Vol. 171, 2011, pp. 1013-1019, http://psnet.ahrq.gov/resource.aspx?resourceID=22241.
11. Ian. A. Scott, Sarah N. Hilmer, Emily Reeve, et al., "Reducing Inappropriate Polypharmacy – The process of Deprescribing," JAMA Internal Medicine, Vol. 175, No. 5, 2015, pp. 827-834.
12. Robert L. Poole and Bruce C. Carleton, "Medication Errors: Neonates, Infants and Children are the Most Vulnerable," The Journal of Pediatric Pharmacology and Therapeutics, Vol. 13, No. 2, April-June 2008, pp. 65-67.
13. CDC, American Academy of Family Physicians and American Academy of Pediatrics, Talking with Parents about Vaccines for Infants, Revised March 2012, http://www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/talk-infants-color-office.pdf.
14. HCUP Fast Stats. Healthcare Cost and Utilization Project (HCUP). November 2017. Agency for Healthcare Research and Quality, Rockville, MD. https://www.hcup-us.ahrq.gov/faststats/NationalDiagnosesServlet
15. CDC. National Center for Health Statistics. Leading Causes of Death. Page last reviewed: March 17, 2017. https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm
16. CDC. Suicide Facts at a Glance 2015 National Center for Injury Prevention and Control Division of Violence Prevention. https://www.cdc.gov/violenceprevention/pdf/suicide-datasheet-a.pdf
17. Yasser K. Alotaibi and Frank Federico, "The Impact of Health Information Technology on Patient Safety," Saudi Medical Journal, 2017 Dec; 38(12): 1173–1180. doi: 10.15537/smj.2017.12.20631. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5787626/
18. ISMP. Recommendations: List of Error-Prone Abbreviations. October 2, 2017. https://www.ismp.org/recommendations/error-prone-abbreviations-list
19. ISMP, FDA and ISMP Lists of Look-Alike Drug Names with Recommended Tall Man Letters, November 20, 2016. http://www.ismp.org/Tools/tallmanletters.pdf.
20. "Improving the Safety of Telephone or Verbal Orders," Pennsylvania Patient Safety Advisory, Vol. 3, No. 2, 2006, pp. 1 and 3-7.
21. ECRI Institute, "Medication Safety: Inaccurate Patient Weight Can Cause Dosing Errors," Healthcare Risk, Quality and Safety Guidance – News, May 27, 2014.
22. Seth J. Bokser, "A Weighty Mistake," Agency for Healthcare Research and Quality. U.S. Department of Health and Human Services. March 2013. https://psnet.ahrq.gov/webmm/case/293/a-weighty-mistake
23. Pennsylvania Patient Safety Authority. Update on Medication Errors Associated with Incorrect Patient Weights. Pennsylvania Patient Safety Advisory, 2016 Jun;13(2):50-57. http://patientsafety.pa.gov/ADVISORIES/Pages/201606_50.aspx
24. "Getting Closer to the Bull's Eye: 2014-2015 Targeted Medication Safety Best Practices," Nurse AdviseERR®, Vol. 13, No. 3, March 2015.
25. ISMP, "The Five Rights: A Destination without a Map," Acute Care – ISMP Medication Safety Alert, January 25, 2007. http://www.ismp.org/newsletters/acutecare/articles/20070125.asp.
26. U.S. Department of Health & Human Services, Agency for Healthcare Research and Quality (AHRQ), "The Five Rights," AHRQ PSNet Glossary, n.d., http://psnet.ahrq.gov/popup_glossary.aspx?name=fiverights.

27. American Academy of Allergy Asthma & Immunology (AAAA&I), “Allergy Shots (Immunotherapy),” n.d., https://www.aaaai.org/conditions-and-treatments/library/allergy-library/allergy-shots-(immunotherapy).
28. J. Allen Meadows, Stephen Imbeau, Bill Finerfrock, Rebecca Burke, and James L. Sublett, USP's revisions to sterile compounding standards and FDA guidance; impacts on mixing of allergen extracts. January 2018. Vol 120 Issue 1, Pg 5-7. Annals of Allergy, Asthma & Immunology. DOI: https://doi.org/10.1016/j.anai.2017.11.007
29. Medication Reconciliation. Agency for Healthcare Research and Quality. PSNet Patient Safety Network. n.d. https://psnet.ahrq.gov/primers/primer/1
30. Institute for Healthcare Improvement. Reconcile Medications in Outpatient Settings. n.d. http://www.ihi.org/resources/Pages/Changes/ReconcileMedicationsinOutpatientSettings.aspx
31. CDC, Vaccine Storage and Handling Toolkit, January 2019, https://www.cdc.gov/vaccines/hcp/admin/storage/toolkit/storage-handling-toolkit.pdf
32. ISMP, List of Confused Drug Names, February 16, 2015, http://www.ismp.org/Tools/confuseddrugnames.pdf.
33. ISMP, List of Error-Prone Abbreviations, Symbols, and Dose Designations, October 2, 2017, http://www.ismp.org/tools/errorproneabbreviations.pdf.
34. ISMP, Eliminating Error-Prone Abbreviations, Symbols, and Dose Designations, Abbreviations Slide Set, Slide 12. Available at: http://www.ismp.org/tools/abbreviations
35. State of Rhode Island Department of Health. Information for Medical Assistants and Their Supervisors. http://www.health.ri.gov/for/medicalassistants/
36. Connecticut State Department of Public Health. Medical Assistant Information. https://portal.ct.gov/DPH/Practitioner-Licensing--Investigations/Medicalassistant/Medical-Assistant-Information