AMITY HEALTHCARE GROUP

Safe medication administration practices, general

Revised: May 19, 2022

Introduction

An *adverse drug event* (ADE) occurs when a medication error results in harm to the patient, including mental harm, physical harm, and loss of function. A *medication error* refers to a mistake that occurs during the medication administration process. If a mistake occurs, it doesn't matter whether the patient suffered harm or there was a potential for injury—it's still considered a medication error.[1] An ADE is a more direct measure of harm to the patient than a medication error.[1]

Further classification of an ADE is *preventable* or *nonpreventable.* A *preventable* ADE occurs as a result of a clinician error or a systematic error, which a provider could have prevented. A *nonpreventable* ADE results from a drug's pharmacologic properties.[1]

A *potential ADE* is also known as a *near miss* or *close call,* because the patient didn't suffer harm but there was potential for risk or harm that was averted because of actions taken by the patient or clinician.[1]

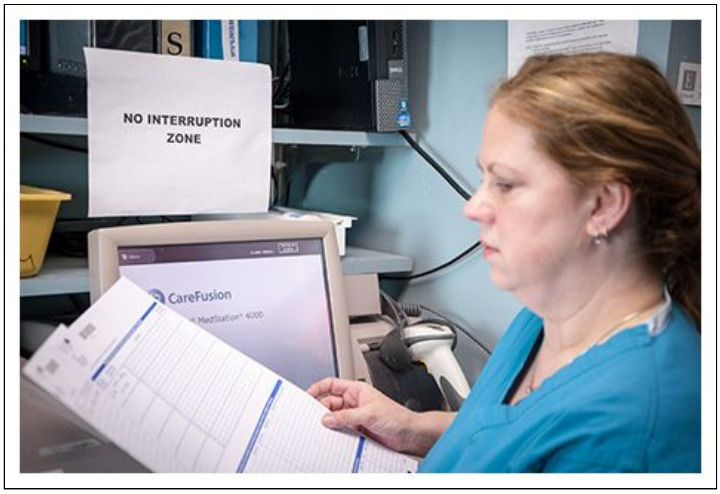
To promote a culture of safety and prevent medication errors, avoid distractions and interruptions when preparing and administering medications and adhere to the "five rights" of medication administration.[2][3] These "rights" are: Identify the right patient by using at least two patient-specific identifiers, select the right medication, administer the right dose, administer the medication at the right time, and administer the medication by the right route. Recent literature identifies nine rights of medication administration—which, in addition to the five rights, includes the right documentation, the right action (or appropriate reason for prescribing the medication), the right form, and the right response.[4][5]

Equipment

- Patient's medical record
- Patient's medication reconciliation form or listing
- Medication order sheets—preprinted or plain
- Medication administration record (MAR) or electronic medication administration record (EMAR)
- Optional: conversion weight chart

Implementation

- Avoid distractions and interruptions, as shown below, when preparing and administering medication *to prevent medication errors.*[2][3]



Verifying the medication order

- Follow a written or typed order or an order entered into a computer order-entry system, *because these types of orders are less likely to result in error or misunderstanding.*
- Make sure that the practitioner's order contains a diagnosis, a condition, or an indication for the medication.[4][6][7][8]
- Verify that other essential elements of the medication order are present, including the patient's name, age, and weight (in kilograms); the date and time that the practitioner wrote the order; the name of the drug you're administering; the dosage of the drug; the route of administration of the drug; the frequency of administration of the drug; dose calculation requirements (when applicable); the exact strength or concentration of the drug (when applicable); the quantity of the drug or duration of administration (when applicable); specific instructions for use (when applicable); and the signature of the person writing the information.[4][6][7][8][9]
- Review the practitioner's order *to make sure that the prescribed infusion solution or medication, dose, rate, and route of administration are appropriate for the patient's age, condition, and access device (if applicable).* Address concerns about the order with the practitioner, the pharmacist, or your supervisor and, if necessary, the risk management department or as directed by your facility.[10]
- Reconcile the patient's medications when the practitioner orders a new medication *to reduce the risk of medication errors, including omissions, duplications, dosing errors, and drug interactions.*[11] (See the "Medication reconciliation" procedure).

Identifying the patient

- Check the patient's medical record *to make sure that all required documents, medication information, sensitivities, history and physical examination, diagnoses, and laboratory results are present and current.*[12]
- Perform hand hygiene.[13][14][15][16][17][18]
- Confirm the patient's identity using at least two patient identifiers *to minimize the potential for a medication error from administration to the wrong patient.*[19] Compare the information with the MAR or EMAR (shown below).

- Explain the name and purpose of each medication and when and how the patient will take it. Discuss important and common adverse effects of each medication and what to do if the patient experiences any symptoms. Discuss any possible drug-drug, drug-food, or drug-disease interactions.[4][7][8][20][21][22]

Obtaining an accurate medication listing

- Ensure that the admitting practitioner obtained a complete listing of the patient's current medications, including all prescription and over-the-counter medications and dietary supplements as well as a history of known drug or food allergies, when the patient arrived at the facility.[12][20] If possible, involve the patient in checking this list. If the patient can't participate, an immediate family member or another authorized person should help check the medication list. If you obtained the list before the patient's date of admission, update it *to provide the most accurate listing of the medications that the patient is taking.*[12]
- Ensure that the medication list is readily available in the patient's medical record and that the patient's practitioners have reviewed it. *This practice helps reduce the risk of drug interactions, allergic reactions, and dose-related errors and helps identify contraindications.*
- Send a copy of the patient's medication list and new medication orders to the pharmacy *to enable the pharmacy to check the appropriateness of the new medication against what the patient has been taking.*

Doing so helps prevent such problems as drug interactions, allergic reactions, improper routes of administration, duplication of medications, duplication of type or class of medications, or administration of a contraindicated medication.[23] [24]

Checking for medication contraindications

- Obtain and update the patient's allergy information and current medications during each admission or transfer *to ensure that all health care providers have access to the most up-to-date information.*[25]
- Communicate the patient's current allergy information to all members of the health care team.
- Send medication orders to the pharmacy before administering the medication so that the pharmacist can check them against the patient's current active medications.[23] [24]
- Have all health care providers review the list of current medications and allergies at each patient encounter *to determine the appropriateness of each medication for the intended condition.*[1] [20]
- If any health care team member has questions about a medication, whether it's a new drug or part of the patient's existing regimen, contact the pharmacist before administration.[1]

Ensuring accurate dosage calculations

- Make sure that the patient's most recent weight (in kilograms) is documented in the medical record *to enable accurate dosage calculations related to weight.*[9]
- Have a conversion chart readily available in case weight documentation uses only one unit of measurement.
- Calculate the correct dosage of ordered medications using weight-based dose schedules. Have two licensed practitioners verify these calculations.
- Use automated dosage calculations whenever possible, especially with IV infusion pumps, *to eliminate dosage calculation errors for drugs with narrow therapeutic dose ranges.*

Administering high-alert medications

- Identify high-alert medications based on your facility's approved list.[4] [26] Examples of high-alert medications are adrenergic agonists, adrenergic antagonists, anesthetic agents, antiarrhythmics, antidiabetic agents, antithrombotic agents, cardioplegic solutions, chemotherapeutic drugs, dialysis solutions, epidural or intrathecal medications, hypertonic glucose solutions, inotropic medications, liposomal forms of drugs, moderate sedation agents, opioids, neuromuscular blocking agents, parenteral nutrition preparations, radiocontrast agents administered IV.[1] [27]

◆ ***Clinical alert:*** If your facility requires it, before administering a high-alert medication, ask another nurse to perform an independent double-check *to verify the patient's identity and confirm that the right medication in the prescribed strength or concentration is on hand; the medication's indication corresponds with the patient's diagnosis; dosage calculations are correct and the dosing formula used to derive the final dose is correct; the prescribed route of administration is safe and proper for the patient; the prescribed time and frequency of administration are safe and proper for the patient; and, if giving an infusion, the pump settings are correct and the infusion line is attached to the correct port.*[6] ◆

- Monitor medication dosing carefully, especially if dosing adjustments are necessary because of narrow therapeutic windows.[1]
- Obtain and review any laboratory values required for dosing adjustments, collaborate with the practitioner if values are out of the therapeutic range, and watch for adverse effects.[1]

◆ ***Clinical alert:*** For patients receiving IV opioid medication, frequently monitor respiratory rate, sedation level, and oxygen saturation level by continuous pulse oximetry or exhaled carbon dioxide by continuous capnography *to decrease the risk of adverse reactions associated with IV opioid use.* If adverse reactions occur, respond promptly *to prevent treatment delays.*[5] ◆

Handling verbal orders

- Minimize the use of verbal orders, *because they're especially susceptible to error.*[4] [6]
- Have the practitioner repeat and verify the verbal order.[28] [29]
- Record the verbal order in the patient's medical record, and make sure to include the date and name of the practitioner who gave the verbal order, your name as the person who received and recorded the order, and the name of the person who implemented the order.
- Read back the order to the practitioner as you've written it down *to confirm correct documentation.*[4] [30]

Administering scheduled medications in a timely manner

- Administration of maintenance doses according to a standard repeated cycle of frequency, such as every 4 hours or three times per day, is a scheduled medication.[31]
- Identify a time-critical list of common scheduled medications specific to the patient population of the facility unit, such as the oncology unit.[31]
- Identify a time-critical list for scheduled medications that all units might use. Examples of time-critical scheduled medications are antibiotics, anticoagulants, insulin, anticonvulsants, immunosuppressive agents, non-IV pain medications, medications prescribed for administration within a specific time of the medication order, medications that require administration apart from other medications for optimal therapeutic effect, and medications with more frequent administration than every 4 hours.[4] [31]
- Establish guidelines to facilitate the administration of time-critical medications for administration 30 minutes before or after the scheduled time.[8] [31]
- Establish guidelines to facilitate the administration of daily, weekly, and monthly medications that are not time-critical for administration 2 hours before or after the scheduled time.[8] [31]
- For medications that require administration more frequently than daily but less frequently than every 4 hours (for example, twice daily, three times per day), administration should occur no more than 1 hour before or after the scheduled time.[8] [31]

Completing the procedure

- Monitor and document the effectiveness of all medications you administered.[32] [33] [34] [35]
- Document any medication errors or adverse effects according to your facility's event-reporting system.[4] [36]
- Dispose of all containers *to avoid any cross-contamination issues.* After removal of a medication from its original container, you should use it for one patient only.
- Perform hand hygiene.[13] [14] [15] [16] [17] [18]

Evaluating the medication management process

- Make sure that there's a defined method for the review and an update of any preprinted order sheets or standing orders.[37] Routinely review this process *to look for failure points that could contribute to a medication error.*[38]
- Make sure that the pharmacy annually reviews the high-risk medications and look-alike and sound-alike medications in storage and in use. You should remove medications if they aren't in use.[39] [40] [41]
- Ensure that a regularly updated list of "Do Not Use" abbreviations, symbols, and acronyms is posted prominently where medication preparation occurs. (See *"Do not use" list of abbreviations and symbols* and *Additional abbreviations*.)[38]

"DO NOT USE" LIST OF ABBREVIATIONS AND SYMBOLS

The table below outlines the Joint Commission's official "Do Not Use" list of abbreviations, along with its associated issue and what to use instead of that abbreviation or symbol.[42]

Official "Do Not Use" List

Do not use	Potential problem	Use instead
U, u (unit)	Mistaken for "0" (zero), the number "4" (four), or "cc"	Write "unit"
IU (International Unit)	Mistaken for IV (intravenous) or the number 10 (ten)	Write "International Unit"
Q.D., QD, q.d., qd (daily)	Mistaken for each other	Write "daily"
Q.O.D., QOD, q.o.d., qod (every other day)	Period after the Q mistaken for "I" and the "O" mistaken for "I"	Write "every other day"
Trailing zero (X.0 mg)*	Decimal point is missing	Write "X mg"
Lack of leading zero (.X mg)	Decimal point is missing	Write "0.X mg"
MS	Can mean morphine sulfate or magnesium sulfate	Write "morphine sulfate" or "magnesium sulfate"
MSO_4 (morphine sulfate) and $MgSO_4$ (magnesium sulfate)	Mistaken for each other	Write "morphine sulfate" or "magnesium sulfate"

This list applies to all orders and all medication-related documentation that is handwritten (including free-text computer entry) or on preprinted forms.

*Exception: A "trailing zero" may be appropriate only where it's necessary to demonstrate the level of precision of the value in the report, such as for laboratory results, imaging studies that report lesion size, and catheter/tube sizes. It isn't permissible to use a trailing zero in medication orders or in other medication-related documentation.

ADDITIONAL ABBREVIATIONS	
Do not use	**Use instead**
>	Write "greater than"
<	Write "less than"
Abbreviations for drug names	Write full drug name
Apothecary units	Use metric units
@	Write "at"
cc	Write "mL" or "ml" or "milliliters" (mL is preferable)
µ	Write "mcg" or "micrograms"

Special Considerations

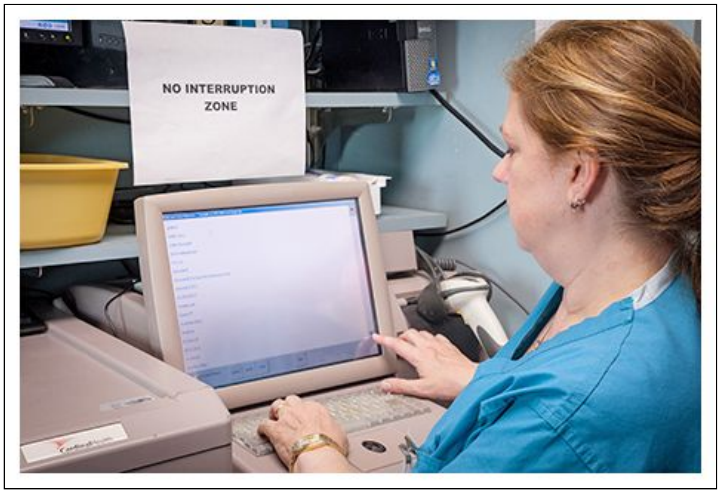
- Maintain a nonpunitive culture for the reporting of medication errors *to encourage reporting compliance.*[43]
- Be aware that dosage adjustments may be necessary, based on the patient's age or in a case of renal insufficiency. Pediatric patients, patients with identified renal dysfunction, and patients older than age 80 are at higher risk for ADEs.[1] [20]
- Perform a medication reconciliation at transition points, such as during admission, at discharge, and during transfer between units.[6] [44]
- Your facility should establish standards for a medication delivery process and ways to ensure ongoing review and evaluation.[45]
- Use smart pump technology and standardized medication concentrations when available *to reduce the risk of IV medication infusion errors.*[9] Smart pumps with dose-error reduction software and interoperability with electronic health records are preferable.[46]
- Make sure that infusion pump alarm limits are set according to the patient's current condition and that alarms are turned on, functioning properly, and audible to staff.[47] [48] [49] [50]
- Use bar-code technology, if available, to scan bar codes on medications and on the patient's bracelet in addition to verifying the practitioner's order entry and EMAR *to reduce medication administration errors and as a final step to intercept a medication error before drug administration.*[20] [51] (See *Using bar-code technology*.)

EQUIPMENT

USING BAR-CODE TECHNOLOGY

If your facility uses bar-code technology, scan the bar code on the medication label and the bar code on the patient's identification bracelet (shown below), or use the technology as your facility directs. The bar code provides an additional check *to ensure that you're administering the medication to the right patient.*

- If indicated, be sure to include the patient's age and weight (in kilograms).[9]
- Practitioners should prescribe medications electronically when possible.[1] [20] [51]
- Handle medications brought by the patient from home as directed by your facility.[4] [52]
- Collaborate with the practitioner or pharmacist if there are questions about a prescribed medication.[4] [6] [7] [8] [22]
- Be especially alert during high-risk situations, such as when you're stressed, tired, or angry or when supervising inexperienced personnel. Monitor and modify work schedules *to minimize work- or fatigue-related medication errors.*
- If you're using an automated dispensing cabinet (as shown) to dispense medications, follow the manufacturer's instructions for use.



- Report all medication errors and adverse effects, including preventable ADEs, close calls, and hazardous conditions.[4] [6] [43] [53]
- Investigate patient-reported medication errors and adverse events and verify them in a timely manner *to prevent dangerous consequences.*[54]

Patient Teaching

Teach the patient and family (if appropriate) to keep a current list of all medications. This list should include all prescription medications, over-the-counter or nonprescription medications, herbal supplements, vitamins, and minerals. The patient should be familiar with the list and directions for the proper use of the medications and understand any possible adverse effects and what to do if such effects occur.[20]

Encourage the patient and family or caregiver to ask questions about any prescribed medications, especially a newly prescribed drug. The patient shouldn't take any medication without knowing its purpose. Tell the patient that it's acceptable to ask for written instructions about medications *to use as a reference.*[20]

Complications

With any medication use, there's the potential for an ADE or medication error. Familiarize yourself with all medications that you administer and be aware of potential ADEs. Be familiar with the required antidotes if indicated. Resources should be readily available *to confirm any potential ADE if you aren't familiar with the medications that you're using.* Immediately report any medication errors, adverse drug reactions, and medication incompatibilities to the attending physician or clinical psychologist.[36]

Documentation

Document administration of all medications in the patient's MAR or EMAR. Documentation must include the medication strength, dose, route of administration, and date and time of administration.[55] The record should also include any access site for the medication, administration devices you used, and the rate of administration.[55] If you didn't administer a medication, document the reason why, any interventions you took, practitioner notification, and the patient's response to interventions.

If the patient experiences an ADE or medication error, document the event as your facility requires. Your facility may require that you submit a medication error report to the National Medication Errors Reporting Program (MERP) operated by the Institute for Safe Medication Practices, a patient safety organization certified by the Agency for Healthcare Research and Quality. The MERP is a confidential voluntary medication error reporting program that performs expert analysis of system-based causes of medication errors.[53] Document teaching you provided to the patient and family (if applicable), their understanding of that teaching, and any need for follow-up teaching.

This procedure has been reviewed by the Academy of Medical-Surgical Nurses.

AMSN Academy of Medical-Surgical Nurses

Related Procedures

- Chemotherapeutic drug preparation and handling
- Endotracheal drug administration
- Endotracheal drug administration, pediatric
- Epoprostenol continuous administration through a mechanical ventilator
- Hazardous drug preparation and handling
- Long-acting injectable antipsychotic medication administration
- Magnesium sulfate administration, obstetric patient
- Medicated eye disk application
- Medication delivery acceptance, long-term care
- Medication sample management, ambulatory care
- Mixing drugs in a syringe using a multidose vial and ampule
- Mixing drugs in a syringe using two ampules
- Mixing drugs in a syringe using two multidose vials
- Nasal drug administration, pediatric
- Nasal inhaler use
- Nebulized morphine administration, assisting
- Oral drug administration
- Oral drug administration, infant
- Oral drug administration, older child
- Oral drug administration, psychiatric patient
- Oral drug administration, toddler
- Safe medication administration practices, ambulatory care

- Safe medication administration practices, long-term care
- Safe medication administration practices, perioperative
- Transdermal patch application
- Translingual drug administration
- Tumor lysis syndrome, emergency patient care, oncology
- Vaccine storage and handling, ambulatory care

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(Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions)

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Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions

The following leveling system is from *Evidence-Based Practice in Nursing and Healthcare: A Guide to Best Practice* (2nd ed.) by Bernadette Mazurek Melnyk and Ellen Fineout-Overholt.

Level I:	Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs)
Level II:	Evidence obtained from well-designed RCTs
Level III:	Evidence obtained from well-designed controlled trials without randomization
Level IV:	Evidence from well-designed case-control and cohort studies
Level V:	Evidence from systematic reviews of descriptive and qualitative studies
Level VI:	Evidence from single descriptive or qualitative studies
Level VII:	Evidence from the opinion of authorities and/or reports of expert committees

Modified from Guyatt, G. & Rennie, D. (2002). Users' Guides to the Medical Literature. Chicago, IL: American Medical Association; Harris, R.P., Hefland, M., Woolf, S.H., Lohr, K.N., Mulrow, C.D., Teutsch, S.M., et al. (2001). Current Methods of the U.S. Preventive Services Task Force: A Review of the Process. American Journal of Preventive Medicine, 20, 21-35.