Safe medication administration practices, long-term care

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Revised: May 19, 2025

Introduction

To promote a culture of safety and prevent medication errors, nurses must adhere to the "five rights" of medication administration.[1][2] These rights are to identify the right resident by using at least two resident-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—include the right documentation, action (or reason for prescribing the medication), form, and response.[3]

An *adverse drug event* (ADE) is defined as harm to a resident—including mental harm, physical harm, or loss of function—that results from a medication error.[4] The term *medication error* refers to a mistake that occurs during the medication administration process. When a mistake occurs, it's considered an error regardless of whether it harmed a resident.[5] Federal regulations require that long-term care residents remain free from any significant medication errors.[6]

A medication error that doesn't cause resident harm is referred to as a *potential adverse drug event (ADE)*, because the actions of the resident or clinician averted the error before it affected the resident.[5] A potential ADE is also referred to as a *near miss* or *close call*.[4]

Equipment

- Medication administration record (MAR) or electronic medication administration record (EMAR)
- Practitioner's order sheets (preprinted, plain, or electronic)
- Resident's medication reconciliation form or listing

Implementation

- Avoid distractions and interruptions when preparing and administering medication *to prevent medication errors.*[1][2]
- Check the resident's medical record to make sure that all required documents, medication information, sensitivities, history and physical examination findings, diagnoses, and laboratory results are present and current.
- Perform hand hygiene.[7][8][9]
- Confirm the resident's identity using at least two resident identifiers.[10]

Obtaining an accurate medication listing

- When a resident is admitted to the facility, obtain a complete listing of the resident's current medications, including all prescription medications, over-the-counter medications, and dietary supplements as well as known drug and food allergies.[6] Review the list with the resident. If the resident is unable to participate in the review, ask an immediate family member or another authorized person to participate in verifying the medication list.[11] If the list was created before admission, update it, as necessary.
- Ensure that the medication list is readily available in the resident's medical record and that the resident's health care providers review 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 resident's medication list to the pharmacy along with any new medication orders *to enable the pharmacy to check the appropriateness of any new medication against the resident's current medication regimen.*[6] *Doing so helps to prevent such problems as drug interactions, allergic reactions, improper routes of administration, duplication of medications, duplication of type or class of medications, and administration of contraindicated medications.*[12]

Checking for medication contraindications

- Obtain and update the resident's allergy information and current medication list during each admission or transfer *to ensure that all health care providers have access to the most up-to-date information.*[13]
- Document the resident's current allergy information and communicate it to all members of the health care team.
- Send medication orders to the pharmacy before administering a medication *so that the pharmacist can check them against the resident's current active medications.*[12]
- Ensure all health care providers review the listing of current medications and allergies at each resident encounter *to determine the appropriateness of each medication for the intended condition.*[5]
- If any health care team member has questions about a medication, whether it's a new drug or part of the resident's existing regimen, contact the pharmacist on duty before administering it.[5]

Ensuring accurate dosage calculations

- Ensure documentation of the resident's most recent weight (in kilograms) in the medical record *to enable accurate calculation of dosages related to weight.*[14]
- Calculate the correct dosage of each prescribed medication using weight-based dosing schedules. Have two licensed practitioners verify these calculations.
- Use automated dosage calculations whenever possible, especially with IV 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.[15] High-alert medications include anticoagulants, hypoglycemics, insulin, opioids, parenteral nutrition, digoxin, EPINEPHrine (parenteral), iron dextran (parenteral), and chemotherapeutic agents.[5] [16]
- Carefully monitor medication dosing, especially if dosing adjustments are necessary based on narrow therapeutic windows.[5]

- Obtain and review any laboratory values that are necessary for dosing adjustments. If any values are out of their therapeutic range, collaborate with the practitioner and watch for adverse effects.[5]

◆ ***Older adult alert:*** If your facility requires it, before administering a high-alert medication, ask another nurse to perform an independent double-check *to verify the resident's identity and make sure you have the correct medication in the prescribed strength or concentration, the medication's indication corresponds with the resident's diagnosis, the dosage calculations and formula used to derive the final dose are correct, the prescribed route of administration is safe and proper for the resident, the prescribed time and frequency of administration are safe and proper for the resident and, if an infusion, the pump settings are correct and the infusion line is attached to the correct port.*[17] ◆

Handling verbal orders

- Minimize the use of verbal orders, *because they're especially susceptible to error.*[18]
- Have the prescriber repeat and verify a verbal order.[19]
- Read back the order to the prescriber as you've written it down *to confirm correct documentation.*[19]
- Record the order in the resident's medical record as soon as possible.[19]

Ensuring timely administration of scheduled medications

- Establish a standard schedule for maintenance medication doses that require administration every 4 hours or three times per day.[20]
- Be sure to administer medications identified as "time-critical" within 30 minutes of the intended administration time.[20]
- Be sure to administer daily, weekly, and monthly medications (considered not time-critical) within 2 hours of the scheduled administration time.
- Be sure to administer medications that require more frequent administration than daily but not more frequently than every 4 hours (two or three times per day, for example) within 1 hour of their scheduled administration time.[20]
- Before administering a medication, become familiar with the indication, administration route, dosage, adverse reactions, and possible drug-drug, drug-food, and drug-disease interactions.
- Explain the name, purpose, administration method, and schedule of each medication; discuss important and common adverse effects for each medication as well as actions to take if any occur; and discuss possible drug-drug, drug-food, and drug-disease interactions.[21]

Completing the procedure

- Monitor and document the effectiveness of all medications you administered.[22]
- Document any medication errors and adverse effects, as directed by your facility.[23]
- Dispose of all containers *to avoid cross-contamination.* After removal of a medication from its original container, use it for only one resident.
- Perform hand hygiene.[7] [8] [9]

Evaluating the medication management process

- Make sure that your facility has a defined method for the review and update of any preprinted order sheets or standing orders. Routinely review this process to look for failure

points that could contribute to medication errors.[24]
- Make sure that, on a monthly basis, the pharmacy consultant reviews the high-risk medications and look-alike and sound-alike medications in storage and use.[6] Remove medications that aren't in use and place them in a secure area.[6] [25] [26]
- Ensure that a regularly updated list of "Do Not Use" abbreviations, symbols, and acronyms is prominently posted where medication preparation occurs. (See *Abbreviations to avoid*.)[24] [27] Notify the ordering prescriber if one appears and ask the prescriber to change and clarify the order *to prevent misunderstanding and possible medication errors*.

ABBREVIATIONS TO AVOID

To reduce the risk of medical errors, The Joint Commission has created a "Do Not Use" list of abbreviations. This list applies to all orders and medication-related documentation that's handwritten, part of a free-text computer entry, or on preprinted forms.[27]

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.0mg)*	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"

*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 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.[27]

Special Considerations

- Maintain a nonpunitive culture for the reporting of medication errors *to encourage reporting compliance.*[28]
- Adjust dosages, as necessary, based on a resident's age and condition (for example, if you identify kidney insufficiency). Residents older than age 80 and those with identified kidney dysfunction are at higher risk for ADEs.

- Perform medication reconciliation at transmission points, such as during admission and discharge and when a resident is transferred from one unit to another.[11]
- Be aware that the facility should have established standards for the medication delivery process (see the "Medication delivery, long-term care" procedure) and ways to ensure ongoing review and evaluation.[29]
- Use bar codes on medications and resident identification bands in addition to computerized practitioner order entries and an EMAR *to serve as a final step to intercept a medication error before drug administration and to prevent ADEs.*[5]
- Ensure electronic prescription of medications when possible *to reduce the risk of medication administration errors.*[5]
- If the resident brings medications from home, follow the process identified by your facility for using these medications.[30]
- Consult with the practitioner or pharmacist if you have unresolved concerns related to prescribed medications.[18]
- Report all medication errors, potential medication errors, and adverse effects.[18] [31]
- Familiarize yourself with all medications that you administer and be aware of potential ADEs that might occur. Also be familiar with required antidotes if indicated. Know where to obtain resources to confirm potential ADEs if you aren't familiar with the medications in use.[23]
- If an error occurs, note that your facility may require you to submit a medication error report to the national Medication Errors Reporting Program (MERP) operated by the Institute for Safe Medication Practices, a resident 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.[31]

Resident Teaching

Teach the resident and family (if appropriate) to keep a current list of medications. This list should include all prescription medications, over-the-counter and nonprescription medications, herbal supplements, vitamins, and minerals that the resident takes. The resident should become familiar with the list and should understand directions for the proper use of each medication, the purpose of each medication, possible adverse effects and actions to take if any occur, and possible drug-drug, drug-food, and drug-disease interactions.

Encourage the resident and family to ask questions about any medication, especially a newly prescribed one. Encourage the resident not to take any medication without knowing its purpose. Provide the resident with written instructions about medications *to use as a reference.* Before administering a new medication, inform the resident and family of potential clinically significant adverse drug reactions and other concerns regarding the drug's administration.[32]

Complications

Complications associated with safe medication administration practices may include:

- medication error
- potential for an ADE.

Documentation

Documentation associated with safe medication administration practices includes:

- medications administered (documented in the resident's MAR or EMAR)
  - medication name
  - medication strength
  - dose
  - rate of administration
  - date and time of administration
  - any access site for the medication
  - administration devices used
  - rate of administration (if applicable)[33]
- if a medication was not administered
  - the reason for not administering the medication
  - name of the practitioner (if notified)
  - interventions performed
  - response to those interventions.
- ADE or a medication errors (as directed by your facility)
- teaching provided to the resident and family (if appropriate)
  - understanding of that teaching
  - follow-up teaching needed.

Related Procedures

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

Related UpToDate Patient Teaching Handouts

- Caregiver-Controlled Analgesia Discharge Instructions

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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 adapted from *Evidence-Based practice in nursing & healthcare: A guide to best practice,* Fifth edition, by Bernadette Mazurek Melnyk and Ellen Fineout-Overholt (2023).

Level I	Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs)
Level II	Evidence from well-designed single RCTs (experimental)

Level III	Evidence from well-designed nonrandomized controlled trials (quasi-experimental), systematic reviews of a complete body of evidence, and intervention studies using mixed methods
Level IV	Evidence from well-designed case-control and cohort studies (observational)
Level V	Evidence from systematic reviews of qualitative and descriptive studies
Level VI	Evidence from single descriptive and qualitative studies, evidence-based practice implementation, and quality improvement projects
Level VII	Evidence from expert opinion, expert committee reports, and literature reviews

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