Chapter 35: Administration of Oral, Topical, and Inhalant Inhalant Medications

Nursing Responsibilities in Medication Administration

Learning Objective: Summarize nursing responsibilities in medication administration.

MEDICATION ERRORS & PREVENTION

Medication errors can occur at any step; most common at ordering/prescribing (Tariq et al., 2023). Nurses must interpret orders correctly and ensure the correct medication is given to the patient.

PATIENT ASSESSMENT & EDUCATION

Assess after administration for effectiveness and to guide education. Patients need written info on how to take each drug, expected effects, side effects, and missed dose protocols (The Joint Commission, 2022).

THE NURSE'S CRITICAL ROLE

Legally responsible for knowing correct dose, route, desired effects, side effects, interactions, and contraindications.

SAFETY PROTOCOLS & REPORTING

Follow procedures exactly to avoid errors. Report any error promptly, even if no harm occurs. Question any unclear, incomplete, or ambiguous order to protect patient safety.

Box 35.1 Safe Medication Administration Guidelines

KNOWLEDGE & PREPARATION

- Ask yourself why this drug is prescribed. Know the drug, patient, and conditions.
- Become familiar with the "high-alert drug list" and nursing implications.
- Review special precautions for children and older adults.
- Check drug references before crushing a medication or opening a capsule.

VERIFICATION & SAFETY CHECKS

- Always record a verbal order clearly and "read back" for verification.
- Become familiar with the do-not-use list of abbreviations; ask for verification.
- If >3 tablets/capsules, check with pharmacist for safe dosage range.
- Check two patient identifiers every time before administering.

AT BEDSIDE & REPORTING

- Do not unwrap unit-dose drug before being at the patient's bedside.
- Report every medication error for safety improvement.
- Be alert for look-alike or sound-alike medications; advocate for safe storage.
- Label all medications if removed from the original container.
- Be alert for anticoagulant medication complications.

Medication Orders

- Learning Objective: Explain medication orders.

The primary care provider prescribes the type of treatment in a series of instructions written in the health record. The written prescription for a drug is called the the drug order. Provider's orders are part of the patient health record.

- Medication orders must meet certain standards specified by state law and a complete drug order must include patient, the name of the drug, the dosage be given, the route of administration, how often it is to be given, the date and time written, and the prescribr also specify the total number of doses that are to be given.

Table 35.1 Examples of Drug Orders

Digoxin 0.25mg PO daily

Meaning: Digoxin 0.25mg PO daily

Methylprednisolone 4mg PO

Meaning: Methylprednisolone 4mg PO qid

Acyclovir 200mg PO q4h

Meaning: Acyclovir 200mg PO q4h (five times daily) when awake

Types of Orders

- **Learning Objective:** Compare types of medication orders.

ROUTINE / SCHEDULED ORDERS

Carried out until canceled or prescribed doses are finished.

Example: "Cefuroxime 250mg PO bid for 10 days".

PRN (AS NEEDED) ORDERS

Written for specific symptoms on an as-needed basis. Must specify frequency and symptom.

Table 35.2 Examples of PRN Orders

Oxycodone HCl 5mg PO q6h PRN moderate pain (4-7 on pain scale)	Oxycodone (analgesic) 5mg by mouth every 6 hours as needed for moderate pain.
Magnesium hydroside 30mL PO at bedtime PRN constipation	Magnesium hydroxide (laxative) 30mL by mouth at bedtime as needed for constipation.

Types of Orders (Continued)

ONE-TIME (SINGLE) ORDERS

For a drug to be given once at a specific time (e.g., before surgery).

Example: "diazepam 10mg IM on call to G.I. lab."

STAT (IMMEDIATE) ORDERS

Single dose to be given immediately (within 15 min) for emergencies.

Example: "diphenhydramine 50mg IM stat".

RENEWAL ORDERS

Required to continue certain medications with time limits (e.g., Opiates: 48-72h, Antibiotics: 5-7 days).

Contact provider for a new order, do not just hold.

PROTOCOL ORDERS

For specialty units (e.g., ED, ICU) for specific situations.

Students should recognize emergencies and report, not carry out protocols.

Regularly Scheduled or Routine Medication Orders

- **Learning Objective:** Recognize considerations of medication schedules.

To maintain the desired level of medication in the bloodstream, the drug may be given several times a day. The The primary care provider's order specifies how often the medication is t be given, such as three times a day (tid), every 4hours (q4h), and so forth.

Each health care agency has policies that designate the time of day corresponding to the frequency ordered. It is imperative that agency policy be followed. For example, on agency policy be followed, and protocols.

Table 35.3 **Standard Medication Schedule Times (Agency Policy)**

daily (0900)	**qid** (0900, 1300, 1700, 2100)
bid (0900, 1700)	**q4h** (0100, 0500, 0900, 1300, ...)
tid (0900, 1300, 1700)	**q8h** (0800, 1600, 0000)

Think Critically

Can you correctly interpret the following medication orders?

- Cefprozil 500mg PO q12h×10 days
- Ferrous sulfate 300 mg tabs PO bid
- Digoxin 0.125mg PO daily

Dosage and Routes of Medication Administration

Dosage of Medications

- **Learning Objective:** Recognize considerations of medication dosages.
- Use of the apothecary system is discouraged. Consult a pharmacist for proper conversion.
- Checking calculations for a divided dose with another colleague is a recommended safety measure.
- Consult pediatric textbooks for confirming dosages for infants and children.

Routes of Oral and Topical Administration

- **Learning Objective:** Recognize considerations of medication routes.
- Route depends on patient's condition, drug nature, and absorption rate.
- **Oral (PO):** Simplest, most convenient. Difficulty swallowing may require liquid form.
- **Topical:** Applied to skin or mucous membranes (e.g., eye/ear drops, ointments).
- **Rectal:** Used for children or vomiting patients.
- **Inhalants:** Given for respiratory system effects.

Review Chapter 31 for enema procedures. See Table 35.4 for more oral/topical forms.

Medication Administration Systems and Safety

Think Critically

What are the advantages and disadvantages of the electronic medication administration record (eMAR)?

Unit-Dose System

- **Learning Objective:** Describe the unit-dose system...

Definition: Premeasured, prepackaged, prelabeled single doses.

Logistics: Mobile carts (24h supply), LTC bubble packs, Automated Dispensing Machines (ADM) with patient profiles.

Medication Administration Systems

- **Learning Objective:** Compare medication administration systems.

Three Types: Stock Supply ( ), Individual Prescription ( ), Unit-Dose Method (– Most Used).

Unit-dose is safest and most popular, replacing stock supply.

Medication Safety Alert & Benefits

Alert: Unit-dose helps avoid errors. If ≥3 packages needed, recheck order/calculations.

Benefits: Enhances patient safety, reduces errors, saves nurse time, patient charged only for used meds, minimum supply kept on hand.

Prescription and Controlled Substance Systems

Prescription System

- **Learning Objective:** Recall the prescription system of medication administration, including its advantages and disadvantages.

Similar to unit-dose, but pharmacy supplies multiple doses for several days.

Used in community pharmacies and outpatient clinics.

Pharmacist fills individual containers for multi-day supply.

Advantage: Limited supply stored in clinic. Home care patients use prescription-prepared drugs.

Preparation of Oral Controlled Substances From a Dispenser

- **Learning Objective:** Describe the use of dispensing systems for distributing oral controlled substances.

For opiate analgesics/hypnotics; must be locked.

Automated Dispensing Machines (ADMs) used for monitoring/control.

Security: Username/password or biometric identification (fingerprint).

Advantage: Eliminates key hunts, increases efficiency.

Procedure: Count remaining meds; count must match computer. Discrepancies must be investigated.

Application of the Nursing Process: Assessment

Assessment (Data Collection)

- **Learning Objective:** Relate the administration of oral and topical medications to the nursing process.
- **Learning Objective:** Describe factors to assess concerning oral and topical medication administration.

Recognize Cues

- **Check order:** Patient name, drug, dosage, route, time, date.
- **Assess:** Allergies, therapeutic effect, interactions, lab values, contraindications.
- **Evaluate:** Patient knowledge, learning needs, side effects, route effectiveness (e.g., nausea).
- **Determine:** Timing with food/empty stomach, NPO status, pending procedures.
- **Inspect:** Topical sites for inflammation, swelling, redness, discharge.

Application of the Nursing Process: Analysis

Lifespan & Data Analysis

- **Lifespan Considerations (Older Adults):** Assess manual dexterity. Use a clean towel for shaky hands to prevent dropped pills.
- **Data Analysis/Problem** Identification
- **Learning Objective:** Identify problem **Learning Objective:** Identify problem statements for prescribed drug classes.

Analyze Cues and Prioritize Hypotheses

- Look at medication classification to determine problem statements.
- Address chronic problems unrelated to primary hospitalization.
- Examples of problem statements:
  - Acute pain (analgesics)
  - Altered peripheral tissue perfusion (antihypertensives)
  - Potential for decreased myocardial tissue perfusion (antiarrhythmics)
  - Altered skin integrity (antibiotics)
  - Weight: below recommended BMI (antiemetics)
  - Insufficient knowledge
- **Lifespan Considerations (Older Adults):** Older adults often have multiple ailments and providers.

Application of the Nursing Process: Planning

Planning & Generate Solutions

- **Learning Objective:** Identify planning considerations, goals, and expected outcomes.
- **Plan** medication times into daily schedule.
- Coordinate with meals (e.g., juice/crackers for meds with food).
- Assist with swallowing (sit upright, coach).
- **Plan** to assess for side effects before next dose.
- Overall goals: Safe, timely administration; quick identification of side effects; effectiveness; no allergic reactions; patient understanding and adherence.

Expected Outcomes & Lifespan

- Expected outcomes examples:
  - Pain relieved for 3 hours (analgesic).
  - BP controlled within 1 week (antihypertensive).
  - Heart rate regular and strong (antiarrhythmic).
  - Wound culture negative (antibiotic).
  - Meal eaten without nausea (antiemetic).
  - Patient verbalizes reason and side effects.
- **Lifespan Considerations (Older Adults)**: Check for 'cheeking' (holding medication in buccal area).

Application of the Nursing Process: Implementation

Think Critically

- One patient requires 15 different morning medications.
- One medication must be cut in half.
- Question: What could you do to remind yourself that the tablet must be cut in half at the bedside?

Implementation & Take Action

- Learning Objective: Implement procedures, considerations, and documentation for medication administration.
- Check the label three times.
- Follow the Six Rights of medication administration.
- Always check for patient allergy before giving.
- Document immediately after administering.
- Patient education is an integral part.

Lifespan & Cultural Considerations in Medication Administration

Lifespan Considerations: Older Adults

- **Visual Acuity:** Use large, dark letters on a white background for charts (name, dose, time, purpose). Tape sample pill if needed.

- **Oral Medication:** Use a tablet splitter for cutting; do not break by hand. Offer sufficient water.

- **Swallowing:** Instruct to sip water, place pill at back of tongue, tilt chin down, swallow. Consider crushing or liquid form.

- **Liquid Medication:** Read dose at the lowest point of the meniscus at eye level. Pour away from the label.

Cultural & Infant Considerations

- **Cultural Beliefs:** Patients may associate pill size, color (e.g., red), or dose with efficacy.

- **Infants:** Measure oral liquid with an oral syringe. Cuddle upright. Use Medibottle as alternative.

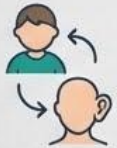
- **Sublingual/Buccal:** Place under tongue (sublingual) or in cheek pouch (buccal). Do not swallow.

Eye and Ear Medications

- **Ophthalmic (eye) medications:** Forms include drops, ointment, or eye disk.
- **Safety is Paramount:** Check the label for ‘ophthalmic’ and ensure the medication is not expired.
- **Procedure & Sterility:** Follow steps for instillation (Skill 35.2). Maintain sterility; perform hand hygiene.
- **Contact Lenses:** Must be removed. Some medications can stain or destroy lenses.

Otic (Ear) Medications

- **Primary uses:** Decrease **otitis media pain** (children), treat **external otitis**, **soften cerumen** (earwax).
- **Administration:**



<3 years: Pull earlobe downward to straighten canal.
Adult: Pull top of pinna out and upward.

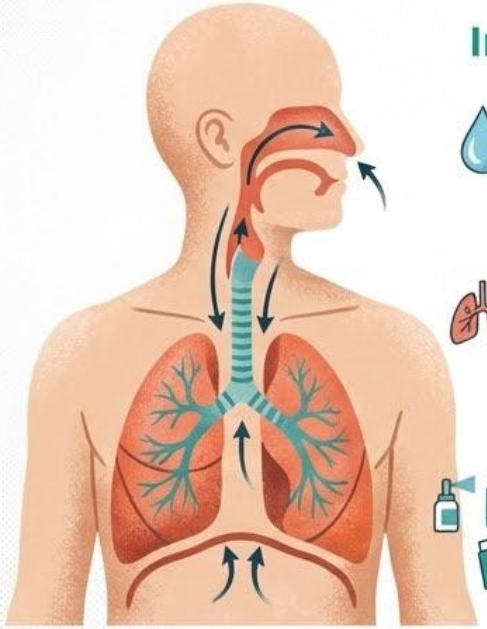
Nasal Medications

- **Forms:** **Atomizers** (decongestant, antihistamine, antibiotic, steroid) or **dropper bottles**.

- **Atomizer Use:** Clear nose, occlude one nostril, insert tip in other, squeeze while inhaling. 1-2 squirts. Wipe clean.

- **Dropper Use:** Lie face up, head hyperextended off bed. Instill drops into nostril, remain in position.

Inhalation Medications



Inhalation Therapy

- Used for **respiratory conditions** (nasal to deep lungs).
- Drugs are **water-soluble** for quick absorption and to prevent inflammation.
- Devices: **Atomizers**, **sprays**, and **handheld metered-dose inhalers** (**MDIs**).

Metered-Dose Inhalers (MDIs)

- MDI releases a spray into a **chamber** (**spacer**) to be inhaled.
- Using a **spacer** enhances delivery deeper into the bronchioles.
- MDI drugs include: **antispasmodics**, **bronchodilators**, **mucolytic agents**, **proteolytic enzymes**, **anti-inflammatory medications**.
- Patients must be taught proper use. Do not mix drugs from different groups.

Vaginal Medications

Vaginal Irrigation (Douche)

- Cleanses vagina for surgery
- Supplies antiseptics to reduce bacterial growth
- Removes odors/foul discharge
- Applies heat/cold to soothe or reduce oozing
- Normal secretions are acidic; irrigation is a clean procedure
- **Solutions**: 2% sodium bicarbonate, diluted H_2O_2, povidone-iodine, weak acetic acid (vinegar)
- Amount: 1500–2000mL, slowly over 10–15 min. Body temp or 110°F (43.3°C) for heat.

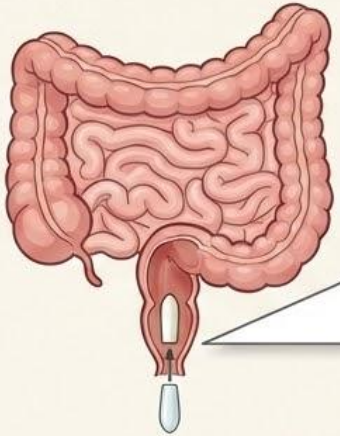
Other Topical Medications

- Forms: **Suppositories**, ointments, creams (treat infections/inflammation)

- **Applicator** used for suppositories and ointments
- After use, wash applicator with soap and water (or discard)

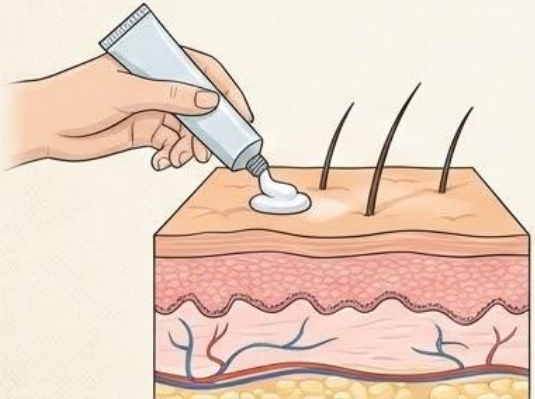
- Patient may be instructed on self-administration
- Small pad/panty shield worn to prevent soiling

Rectal Medications



- Prevent vomiting
- Soothe hemorrhoids
- Prevent bladder spasms
- Promote bowel evacuation
- Reduce fever

Topical Skin Medications



- Lotions, ointments, creams (rubbed into skin)
- Transdermal patches (sustained release)
- Examples: Nitroglycerin, Scopolamine, Nicotine, Fentanyl

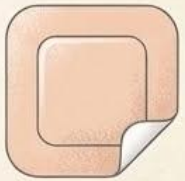
Safety Alert & Care Coordination

Dangers of Topical Medications

- Applied externally, but are potent medicine
- Serious adverse reactions, even deaths reported (Wang et al., 2021)
- Varying strengths; double-check dosage

Coordinating Hygienic Care & Application

- Coordinate with AP; hygiene should not interfere with absorption
- Remove old patch, wash area, then apply new after bathing
- Cover new medication with plastic if applied before hygiene



- Nitroglycerin paste: use measuring applicator, do not rub in
- Rotate application sites on clean, hairless skin
- Home use: cover applicator with plastic wrap to prevent staining

Evaluation

- **Learning Objective:** Describe ways to evaluate the effectiveness of medication administration.

Evaluation Statements (Adverse/Unexpected)

- Experienced nausea within 30minutes of taking antibiotic.

- Refused antihistamine; itching has subsided.

- White blood cell count is 7000/mm3; temperature 99°F (37.2°C); states, “I feel better.”

- Red rash on chest possibly from antibiotic; primary care provider notified.

- Verbalizes that they will take antihypertensive even if they feel well.

Expected Outcomes (Therapeutic)

- Pain is relieved for 3½ hours by analgesic.

- Blood pressure 120/80 to 130/80mm Hg while patient is taking antihypertensive medication.

- Heart rate regular and 70 to 85 beats/minute while patient is taking antiarrhythmic medication.

- Wound culture negative after 5 days of antibiotic therapy.

- No complaints of nausea when antiemetic taken 30minutes before eating a meal.

- Patient verbalizes medication “controls my blood pressure.”

Documentation

Documentation of medication administration is largely done on the eMAR. PRN medications, one-time doses, and preoperative medications also may be documented in the nurse's notes (according to agency policy). Data to be documented include:

- Medication name, dosage, route, and time administered

- Blood pressure and pulse before administration of antihypertensives and beta blocker drugs

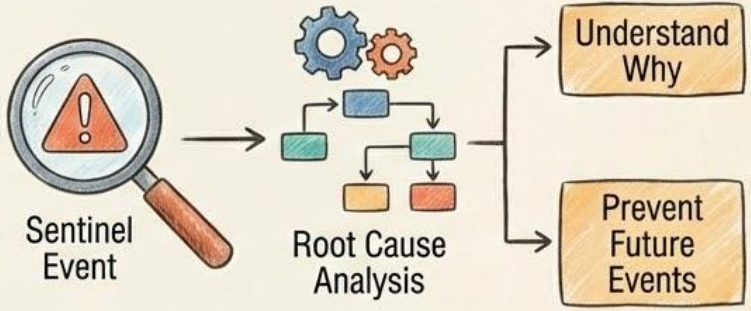
- The reason for administration of a PRN medication

Reporting and Learning

Medication Error Reporting

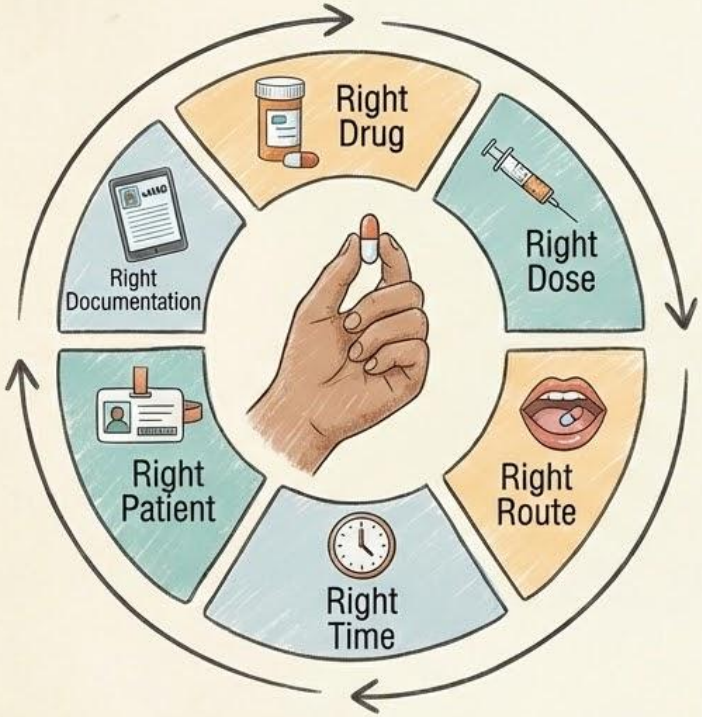
- Report all errors immediately, regardless of harm.
- Complete incident/occurrence form.
- Follow agency policy & safeguard the patient.

Root Cause Analysis & Learning



- Supports tracking & monitoring adverse events (National Patient Safety Goals).
- Joint Commission requires root cause analysis for sentinel events.
- Purpose: understand why the event occurred and how to prevent it.

Key Points: The Six Rights



- All medications must be administered carefully following the Six Rights.

Medication Orders & Timing

- Administer only if the order is legally complete.

- Most narcotic orders good for 3 days, then must be renewed.

- Orders stopped for surgery/general anesthesia.

- **Routine**: Scheduled times (e.g., daily, BID, TID, QID).

- **PRN**: As needed, at ordered intervals. Never give less than ordered.

- **Stat**: Carry out immediately.

Routes & Special Considerations

Topical: Lotions, ointments, creams, etc., lotion, ointments, creams, etc.)

Sublingual/Buccal: Do not swallow.

Ophthalmic: Use surgical asepsis.

Transdermal: Remove old patch before applying new.

Feeding Tubes: Irrigate between meds (15-30mL) and after (30-60mL). Clamp for 30-60 min.

Error Reporting: Report promptly, take action for safety & improvement.