Medication errors: Causes, Types and Prevention

According to the **National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP)** , a **medication error** is:

> *"Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer."*

These errors can occur at any stage of the medication use process: **prescribing** , **transcribing** , **dispensing** , **administering** , **monitoring** , and **documentation** .

Categories of Medication Errors

1. By Type of Error

- **Omission error:** Failure to administer a prescribed dose before the next scheduled dose.
- **Wrong dose error:** Administering a dose that differs from the prescribed dose by more than ±5%.
- **Extra dose error:** Administering a dose not authorized by the prescriber.
- **Wrong dosage form error:** Using an incorrect formulation (e.g., giving oral instead of intramuscular).
- **Wrong time error:** Administering a drug ?30 minutes early or late.

2. By Causal Factor

- **Human error:** Non-compliance, poor communication, inattentiveness.
- **Technical error:** Equipment malfunction or automation failure.
- **Organizational error:** Faulty systems, staffing issues, poor protocols.

Causes of Medication Errors

Cognitive and Environmental Factors

- **Assumption errors** – Acting without verifying critical information.
- **Selection errors** – Choosing an incorrect option among multiple similar ones.
- **Capture errors** – Distractions that lead to bypassing correct steps.

Patient-Specific Factors

- **Genetic differences** – e.g., G6PD deficiency increasing drug toxicity.
- **Physiological variation** – Age, renal/hepatic function.
- **Non-compliance** – Due to cost, misunderstanding, or forgetfulness.
- **Unpredictable responses** – Due to unique patient characteristics.

Systemic and Communication Issues

- Look-alike/sound-alike drugs (e.g., *quinidine vs. clonidine*).
- Dangerous abbreviations (e.g., *qid* vs. *qod*).
- Illegible handwriting.
- Labeling/packaging confusion.
- Misplaced orders (wrong chart, patient).
- Failure to document prior administration.
- Poor patient assessment/history.
- Inadequate drug knowledge or lab result interpretation.
- Environmental stressors – noise, heat, interruptions.
- Staffing issues – burnout, high workload.
- Unauthorized drug access.
- Incomplete or outdated patient/drug data.

Root Cause Analysis (RCA)

RCA is a structured approach used post-incident to determine the underlying **"what, how, and why"** an error occurred. It aims to implement **system-based corrective actions** and **prevent recurrence**.

Medication Error Prevention Strategies

Educational and Behavioral

- Educate patients and caregivers on drug use.
- Encourage patients to advocate for their safety.

Environmental and Technological

- Maintain organized, well-lit, and clean medication areas.
- Use barcoding, automated systems, and computer-based order entry (CPOE).

Communication and Practice Standards

- Repeat and verify verbal orders.
- Avoid non-standard abbreviations.
- Use both **generic** and **brand names**.
- Employ the **Five Rights** of medication administration:
    - Right patient
    - Right drug
    - Right dose
    - Right route
    - Right time
- Read labels **three times** before administration.
- Avoid trailing zeros (e.g., use "25" not "25.0").
- Seek clarification— **never guess** unclear orders.
- Promote open communication for patient concerns.

What to Do After a Medication Administration Error

1. **Assess the Patient:**
    - Monitor vitals and look for adverse effects.
2. **Document the Event:**
    - Report to the physician and nurse-in-charge.
    - Complete an institutional medication error report.
3. **Monitor Continuously:**
    - Observe for delayed effects or complications.
4. **Correct the Error Safely:**
    - Use critical thinking to adjust care as needed.
5. **Prevent Recurrence:**
    - Reflect on the event and improve practice.
6. **Avoid Unsafe Practices:**
    - Never leave medications at bedside.
    - Use standardized formulas for dose calculations.
    - Exercise caution in high-risk populations: elderly, pediatric, pregnant women.