

# Bullet Point Nursing

## Pharmacology –Introduction

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### Routes:

- Parenteral:
  - Intravenous (IV), subcutaneous (SC), intramuscular (IM), intraosseous (IO)
  - Buccal, sublingual (SL), rectal (PR), vaginal
  - Transdermal (TD), inhalation, topical, intranasal (IN), ophthalmic, otic, intradermal
- Enteral:
  - Oral (PO), nasogastric tube (NG), orogastric tube (OG), oral disintegrating tablets (ODT)
- IV push (IVP) vs IV infusion
- Parenteral will have a quicker onset versus enteral
- IO and IV route are the only two interchangeable routes
- Most routes are able to have systemic effects. Topical, otic, and ophthalmic are all local routes
- Extravasation (infiltration) is where the IV contents enter the local tissue
- Central venous line (CVL) is a method of IV access that is placed in deeper veins

### Terminology:

- Drug and medication are interchangeable terms
- Prescription refers to any provider order, not just medication
- Pharmacotherapeutics
  - Using medications for improving health
- Pharmacokinetics
  - How medications move through the body
- Pharmacodynamics
  - The way a drug affects changes in the body
- Pharmacogenomics
  - The study of how a person's genetic makeup affects their response to medications
- Mechanism of action (MOA)
  - What a drug does that leads to the drugs desired effects
- Trade/brand name
  - What the company markets the drug as
- Generic name
  - What is most often used in healthcare
- Combination drug
  - A single pill or solution that contains multiple medications
- Drug class
  - Most common classification of drugs
    - Drugs within a class have the same MOA as well as similar uses, side effects, and more

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- Drugs within a class can still have major disparities
- Over the counter (OTC) drugs
  - Drugs that are FDA approved, they are deemed safe for the public to regulate consumption
    - In the hospital setting these cannot be given without a prescription
- Onset
  - How quickly the medication takes effect
- Duration
  - How long the medication lasts
- Indications
  - What the medication is used for
- First pass
  - A reduction in the medication by the liver for medications taken enterally
- Blood-brain barrier
  - This is a barrier that protects the brain from potentially harmful entrants
- Excretion
  - Elimination from the body, primarily via the kidneys
- Metabolism
  - Metabolism or biosynthesis of a drug, primarily via the liver
- Half-life
  - How long until the medication level drops by half
- Loading dose
  - When a large dose is given to quickly bring the drug to therapeutic levels
- Maintenance dose
  - When a dose is given to maintain the current levels
- Potency
  - How strong a medication is
- Efficacy
  - How effective a medication is
- Agonist
  - When a medication stimulates the effects of a receptor or substance
- Antagonist
  - When a medication inhibits the effects of a receptor or substance
- Off-label use
  - When a medication is used for an effect other than what it is FDA approved for
- Taper
  - Slow decrease of a medication dose
- Titrate
  - Slow increase of a medication dose
- No known drug allergies (NKDA)
  - Applies only to drugs
- No known allergies (NKA)
  - Applies to everything

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- Refractory
  - Is when a patient does not respond to a medication or treatment
- Black Box warning
  - An alert of potential risk with a medication
- Consideration
  - An alert to consider the risk versus benefit of a medication
- Contraindication
  - An alert to not give the medication in the circumstance where it is contraindicated
- Multi-dose vial (MDV)
  - A vial that has more than one dose in it (i.e. insulin)
- Minimum effective concentration
  - The lowest concentration where the medication is effective
- Toxic concentration
  - The concentration where the medication is toxic
- Therapeutic range
  - The area between effective and toxic concentrations
  - Peak and trough are related terms addressing the highest and lowest medication levels
- Reversal agent (antidote)
  - Is a medication or substance used to counteract the effects of another drug, toxin, or poison
- Side effect
  - An unintended reaction to a medication
- Adverse effect
  - An undesirable adverse reaction to a medication
- Tolerance
  - Is when a set dose has decreased efficacy due to previous exposures
- Discontinue
  - The medical term for stopping a medication (provider action, not nursing)
- Complementary and alternative medications (CAM)
  - Substances that are taken for health that are not regulated like medications by the FDA
    - Echinacea for cold and flu
    - Chamomile for anxiety, insomnia, and other uses
    - Ginkgo is used for many purposes, most notably memory
    - St John's wart is used for mental health such as depression
    - Ginger is used for nausea
  - Educate patients on safety and to inform their provider about these

## **Pharmacology principles:**

- Six rights of medication administration
  - Patient, medication, time, dose, right, and documentation.
- Immediately assess, then report, any medication errors to the provider and charge RN
- Pharmacoeconomics is being considerate of costs in making medication decisions
- Factors of absorption impact the delivery of the medication

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- Examples are blood flow, route, and more
- The more doses per day the less likelihood of compliance
- Medications that are enteric coated, sustained release, or extended release cannot be crushed
  - Enteric coated is to protect the stomach from the drug, or the drug from the stomach
  - Many other medications can be crushed. Always verify before crushing a medication
- Parameters are guidelines that affect an order
  - Examples are “withhold for systolic less than 90”
  - Or “administer for a fever greater than 38 degrees Celsius”
- A valid medication order must include the patient, drug name, dose, route, & time (can be stat)

## Best practices:

- Most common healthcare error is medication related. (IOM report)
- Medications that require vital sign assessment should be obtained at time of admin, not from shift change
- Every medication administration by a healthcare professional includes assessment and reassessment
  - Prior assessment includes what you are treating, verifying allergies, and ANY contraindications
  - Post assessment includes what you are treating and side / adverse effects (SE/AE)
- Know your non-pharmacological interventions to use before and / or with medications
  - Examples include for pain relief using distraction and repositioning in addition to drugs
- Most IV medications are packaged as one vial is one dose
  - Always double check when needing multiple vials for a single patient dose
- Always ensure proper patient education
  - Assess for compliance in cases of a drug not working
- Always assess your patient after any change in condition
- Learn priorities of when to immediately assess versus taking an action vs notifying the provider

## Controlled substances:

- List of drugs that are high risk for abuse and dependency
- Divided into 5 classes, regulated by the DEA (Per the US CSA of 1970)
- Schedule one: No federally approved medical uses
  - Heroin, marijuana, LSD, and more
- Schedule two: Approved medical use and the highest-level risk of abuse and dependency
  - Hydromorphone, fentanyl, morphine, and more
- Schedule three: High risk for abuse and dependency but less than schedule I/II
  - Amphetamine, pentobarbital, and more
- Schedule four: Relatively low risk of dependency and abuse
  - Benzodiazepines and more
- Schedule five: Lowest relative risk of abuse and dependency
  - Products containing small amounts of codeine
- Drugs can be controlled regardless of whether or not they are narcotics
  - Examples are anabolic steroids

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- Educate your patients correctly on the risk of abuse and dependency
  - Nearly all of these include black box warnings for abuse and dependency

## Lifespan considerations

- Pediatrics
  - Infants have an underdeveloped blood-brain barrier
  - Medications are more likely to use weight-based dosing
  - Educated on safe storage around children
  - Do not refer to medication as candy to encourage a child to take it
  - Do not mix medication with juice or milk for children as this may cause future aversion
- Pregnancy
  - The FDA has moved away from using the pregnancy categories A, B, C, D, and X
  - Medications regarding pregnancy are now taught with information for decision making
    - Some are clearly accepted as teratogenic, others are weigh the risk versus reward
    - Teratogenicity is how toxic to a pregnancy a medication is
- Geriatrics
  - Risk of polypharmacy
  - Decreased renal and hepatic function
  - Increased sensitivity to certain medications

## CYP450

- Cytochrome P450 (CYP450) system is a group of liver enzymes responsible for metabolizing many drugs
- CYP3A4 is involved in the metabolism of roughly half of all drugs and is why these drugs require the avoidance of grapefruit juice (among other intricacies)
  - Examples are statins, calcium channel blockers, and more

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## References

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