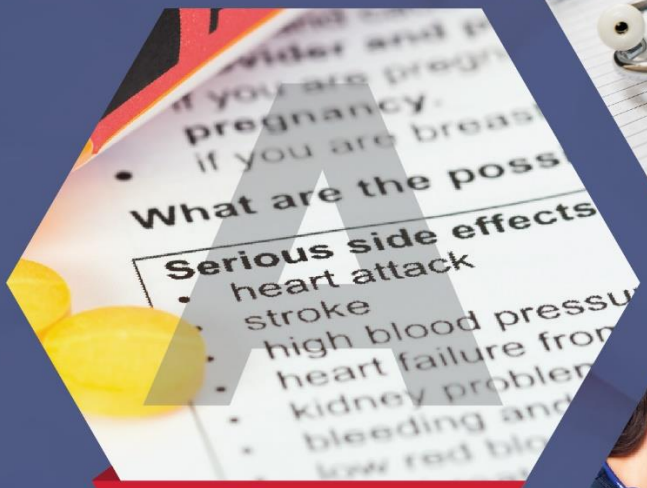
# PHARMACOLOGY NOTES

## NURSING IMPLICATIONS FOR CLINICAL PRACTICE

Administration

Therapeutic Effects




Adverse Effects

Teaching

GLORIA VELARDE

# PHARMACOLOGY NOTES

## NURSING IMPLICATIONS FOR CLINICAL PRACTICE

### Overview

**There are currently nine (9) units comprising this *Pharmacology Notes* resource. Units are broken down by body system and published individually for ease of retrieval:**

Unit A: Autonomic Nervous System (ANS)

Unit B: Cardiovascular (CV) System

Unit C: Hematological System

Unit D: Central Nervous System (CNS)

Unit E: Skeletal System: Bone and Joints

Unit F: Immune System

Unit G: Digestive System

Unit H: Endocrine Pharmacology

Unit I: Respiratory System




Last edited May 16, 2019

# Author's Biography and Acknowledgements

**Gloria Velarde** is an Emeritus Nursing Faculty member from Washtenaw Community College, Ann Arbor, Michigan. During a span of nearly 28 years as a full-time nursing instructor, Ms. Velarde has taught in all areas of medical-surgical nursing and pharmacology. Their nursing program, which started as a laddered LPN-to-RN program, later transitioned into an Associate in Applied Science: RN program. She has served in academic leadership positions at WCC as Course Coordinator for their first level medical-surgical nursing course and nursing pharmacology during her time as a full-time nursing faculty member. Additionally, Ms. Velarde held the Department Chair position for the WCC Nursing and Health Sciences Department for 13 years.

Ms. Velarde began teaching pharmacology in 1999 and credits the origins of the A-T-A-T framework as a team effort with her former colleagues: Sr. Judy VanderVeen, Sherry MacGregor, and Lorraine Chiappetta. Over the years, WCC nursing students have endorsed pharmacology handouts using the A-T-A-T framework as a helpful and effective learning tool.

Ms. Velarde received her BSN from Eastern Michigan University and a MSN in Advanced Medical-Surgical Nursing from Wayne State University. She is a Certified Nurse Educator (CNE) through the National League for Nursing since 2010. Ms. Velarde maintains active membership in Sigma Theta Tau, Inc. – Eta Rho Chapter and is a sustaining member of the National Student Nurses' Association as a former Faculty Advisor for the WCCSNA chapter.

A special thanks to Debra Shillington, Word Processing Specialist from WCC, for her skills in typing and organizing this resource.

# Dedication

This Open Education Resource is dedicated to my former Washtenaw Community College nursing students and all future nursing students who wish to master the area of pharmacology for nurses. *Over the years I have learned SO much from my students. This is my gift to you….*

– Gloria A. Velarde, MSN, RN, CNE

# Comments/Feedback

Every effort was made to ensure the information in the resource is accurate and current. I appreciate all comments and feedback, especially if errors are discovered. Please send comments and discoveries to: ***Gloria.Velarde.RN@gmail.com***; Subject line: Pharmacology Notes OER.

# Introduction

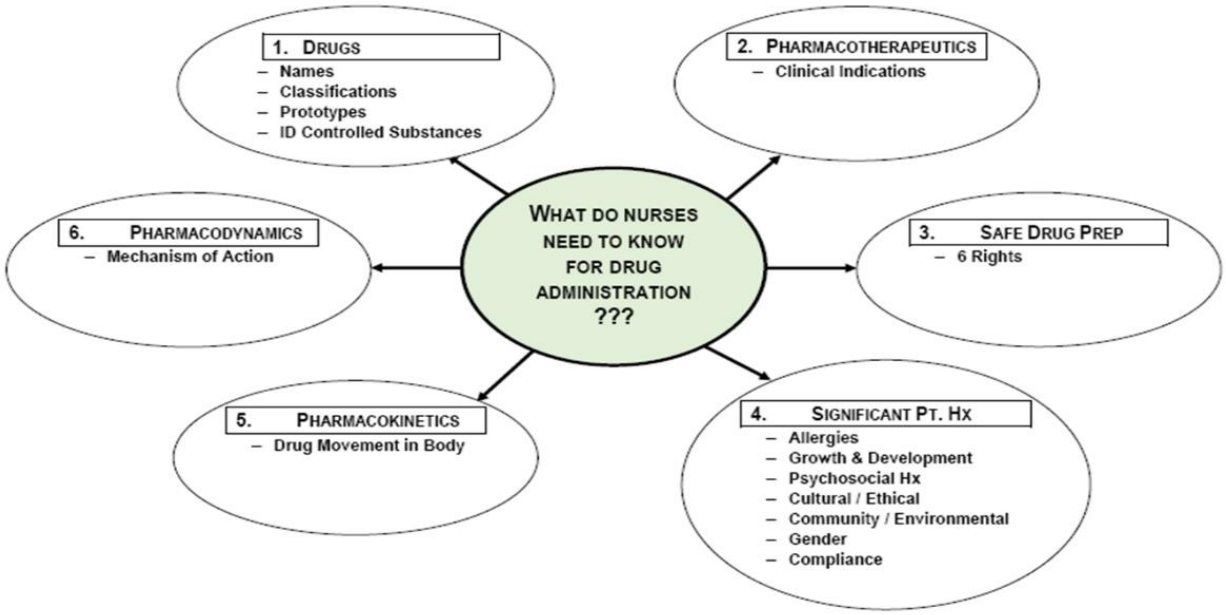
Medication administration is a vital role of the nurse in all health care settings. According to the 2019 NCLEX-RN Test Plan, the percentage of test questions in the subcategory of Pharmacological and Parenteral Therapies is 12-18 percent of the NCLEX-RN Examination. Nurses are responsible for providing care related to the administration of medications and parenteral therapies. These include:

- Adverse Effects/Contraindications/Side Effects/Interactions
- Dosage Calculation
- Expected Actions/Outcomes of Medication Administration
- Parenteral/Intravenous Therapies
- Pharmacological Pain Management

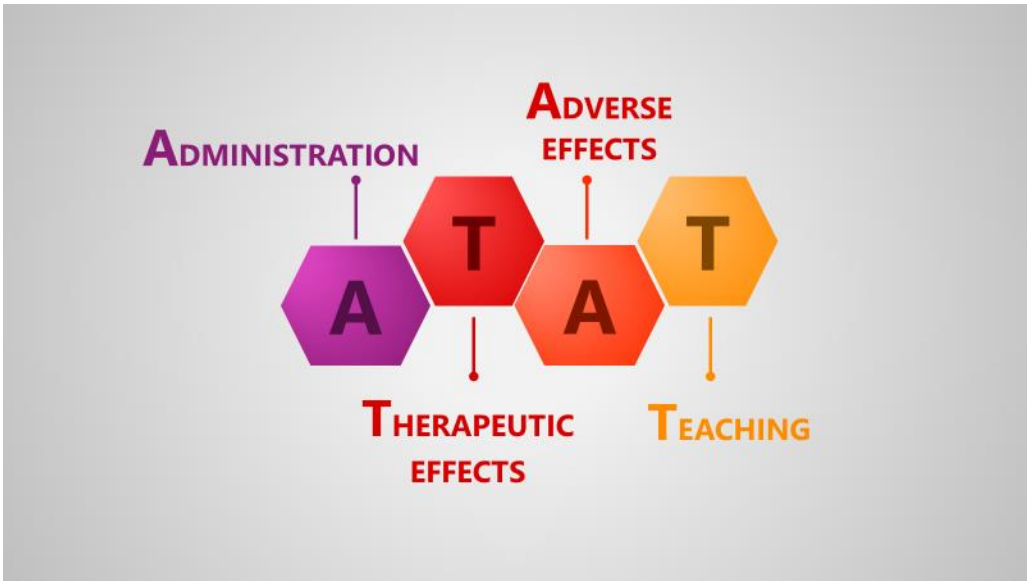
Statistics related to medication errors are staggering. A medication error refers to an error (of commission or omission) at any point from the time the drug is prescribed to the time the drug is administered to the patient. An adverse drug event (ADE) follows the patient's ingestion of the drug. According to the Agency for Healthcare Research and Quality (AHRQ), ***"Nearly five percent of hospitalized patients experience an ADE, making them one of the most common types of inpatient errors."***

According to the World Health Organization (WHO), there is at least one death every day due to medication errors and another 1.3 million people who suffer from injuries related to medication-related adverse events. In March 2017, WHO launched a global effort to **"reduce severe, avoidable medication-associated harm in all countries by 50 percent over the next five years."** It is important that nurses do their part in improving patient safety associated with medication administration.

The pharmacology content that is taught as part of a pre-licensure nursing program, is nothing less than challenging. There are numerous drug classifications that must be learned and memorized based on their therapeutic use or pharmacological action. Pharmacokinetics (drug movement throughout the body), pharmacodynamics (drug's mechanism of action), and pharmacotherapeutics (clinical indications for use) are very important concepts to understand. Nurses are expected to maintain competence in all aspects of drug preparation, including major routes of administration, which usually starts in the nursing student's foundational or fundamental nursing course. It is also important to recognize the uniqueness of each individual patient that may impact on how their body responds to a drug. This can seem to be a daunting task.

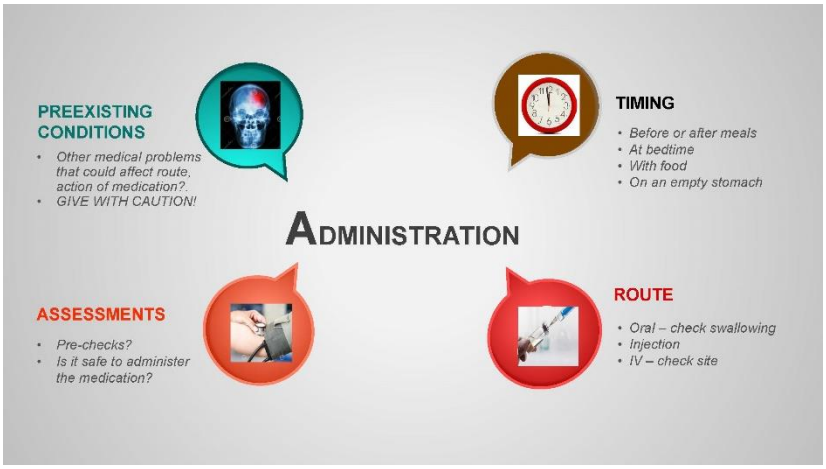



However, taking all of this information and applying it to the clinical setting, is the most important part – these are the ***Nursing Implications***. **Pharmacology Notes: Nursing Implications for Clinical Practice** is intended to strengthen the connection between key pharmacological concepts and the nurse's responsibility during drug therapy. These notes utilize the framework, **A-T-A-T**, to assist in understanding nursing implications related to medication administration.



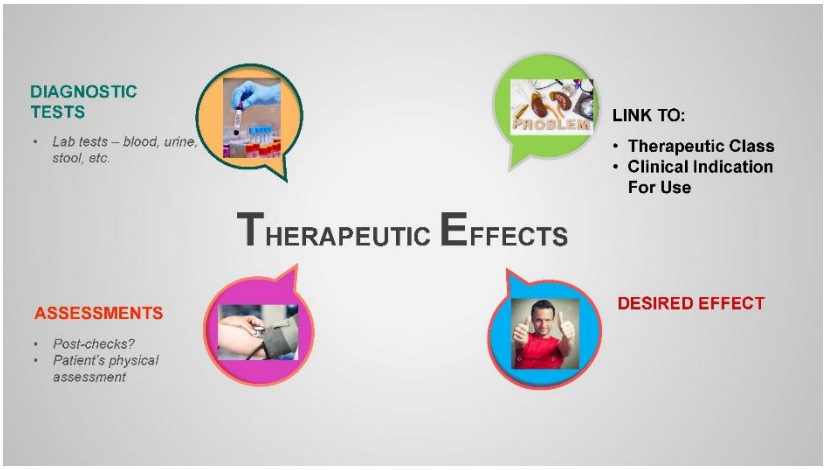
**A = Administration**

- How should the nurse **prepare** to administer the drug?
- What are the **common routes** of administration?
- Are there **timing considerations** for drug administration (e.g. before meals, with meals, at bedtime)?
- Are these **preexisting conditions** that require added caution and closer monitoring after administration (i.e. **contraindications**)?



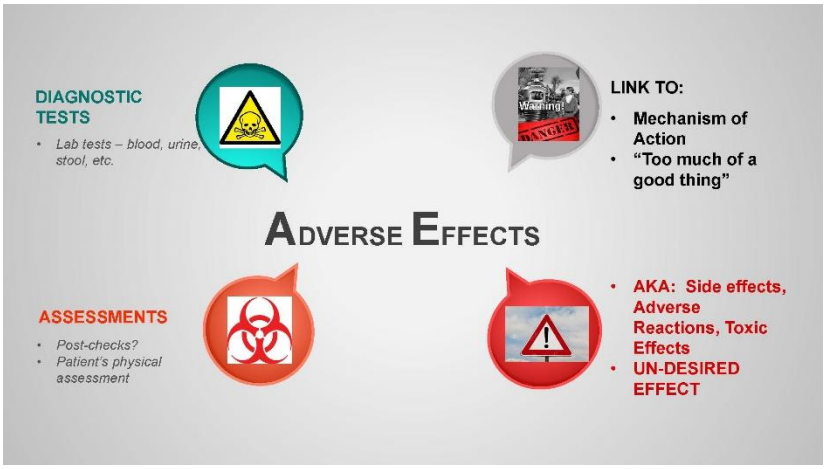

**T = Therapeutic Effect**

- How will the nurse monitor the **therapeutic or desired effect** of the drug?
- What would be key areas of the **physical assessment** based on its pharmacotherapeutics (clinical indications for use)?
- Are there specific **labs or other diagnostic tests** that will be affected and serve as a way to measure the drug's positive effect?



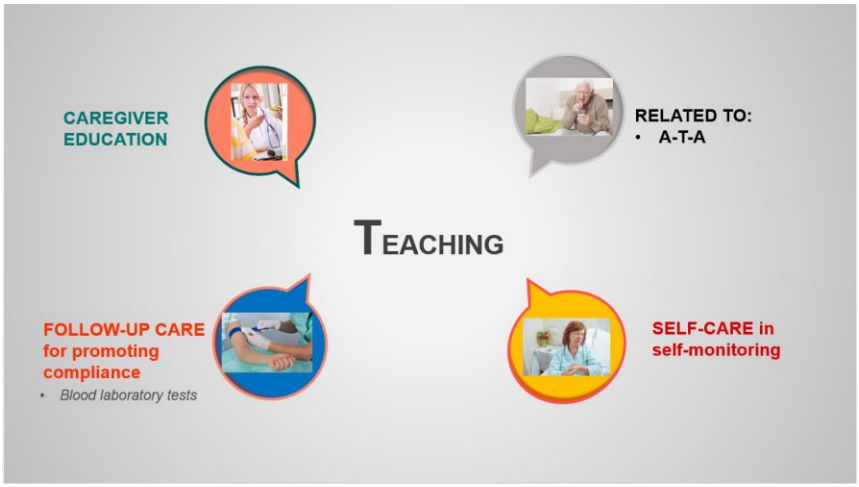
**A = Adverse Effect(s)**

- How will the nurse determine whether the drug is producing an **adverse or undesirable effect(s)** – sometimes referred to *side effects* (common, usually mild), *adverse reactions* (less common, more intense/greater discomfort) or *toxic effects* (rare, life-threatening)?
- What would be key areas of the **physical assessment** based on its pharmacodynamics (mechanism of action)?
- Are there specific **labs or other diagnostic tests** that will be affected and serve as a way to measure the drug's negative effect?



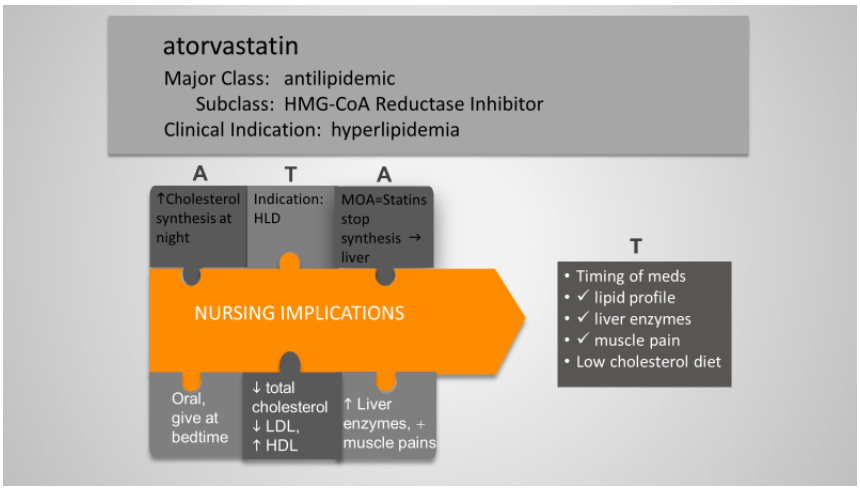

**T = Pertinent Patient Teaching**

- What does the patient (or caregiver) need to know to maintain compliance and adherence to the prescribed drug regimen?
- Are there any special considerations for administration (i.e. techniques based on route or timing) and self-monitoring for any positive or negative results?
- Is there any follow-up care during drug therapy (e.g. routine blood tests)?



The intent of this open educational resource is to organize pharmacological information in a meaningful manner that reveals and reinforces relevant nursing implications. Further, this information can be retrieved more easily when students are able to see connections with prior learning. The content starts coming together like pieces of a puzzle. For instance,

- The pharmacotherapeutics (purpose or clinical indication for use) of the drug **relates to** how the nurse monitors and determines whether the drug is working or not.
- The pharmacodynamics/pharmacokinetics (mechanism of action) **relates to** what the nurse assesses for the presence or absence of adverse effects.

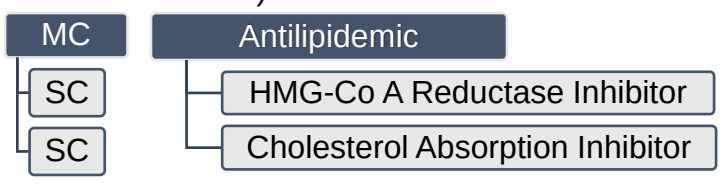



At the crux of prior learning is having a basic understanding of normal anatomy and physiology, and the pathophysiology of common diseases and disorders. Therefore, a brief review of these areas by body system will precede key connections to the pharmacology.

***** Important Information about the A-T-A-T Drug Sheets *****

It has been stated that recognizing a medication's **drug class(es)** is very important. For each unit, the ***Table of Contents*** will identify the drug classes covered within the formatted A-T-A-T drug sheets for that body system. The first sorting of drugs into classes is based primarily on their ***therapeutic use.*** For purposes of this resource, these will be referred to as **Major Classes (MC).** Within each Major or therapeutic class, there are **Subclasses (SC)** that are grouped by how the drug acts in the body, or its ***pharmacological action***. Using various drug classes helps to break down the drug information into manageable parts for study. For instance, knowing a drug's Major Class links to the pharmacotherapeutics, while the Subclass gives insight into the pharmacodynamics. Further, you can have multiple Subclasses under a specific Major Class.

Ex.)




+ others …

There is a limited selection of drugs included in the **Pharmacology Notes OER**. Those chosen were selected on the basis of their identification as ***prototype*** or representative drugs for a given drug class, found in various drug books and references. Generic and trade names are included for these prototype drugs. It has been this nurse educator's experience that inclusion of both names aids in the memory and recognition of these drugs. ***Although, both names are included, it is vitally important that nursing students know that only generic drug names are used on the NCLEX-RN exam.*** Therefore, it is highly recommended that ample time and attention be given for learning and recognizing the generic names.

Different pharmacology textbooks may label drug classes differently and even group drugs by other factors. However, it is the use of these classes or groupings for organizing drug information, that is most significant. One medication may fall under multiple drug classes due to its various clinical uses. When multiple drugs fall under the same major or therapeutic class, there are nursing implications similar to all drugs given for the same purpose. Additionally, when looking at each drug by its subclass, there may be different nursing observations based on their different mechanisms of action. ***When a group of drugs share common nursing implications, these will be noted with the shading of specific columns of the A-T-A-T drug sheets.*** These may include their administration, therapeutic and adverse effects, as well as areas of teaching. As a result, this will assist in recognizing additional drug information (i.e. specific adverse effects and teaching), based on the drug subclass.

It is not this author's intent that **Pharmacology Notes** *replace* the textbook of a nursing pharmacology course; but rather supplement and enhance its content.

Ultimately, a tool to improve the understanding of nursing implications will lead to a reduction of drug errors and adverse drug events. This in turn, will reduce medication-related injuries and deaths.