Section II

When you are finished with this section, you will be able to:

- Define “medication” (p 2)
- Describe how medications work (p 3)
- List the different medication effects (p5)
- List the ways that medications can affect the body (p 6)
- Describe the importance for medication blood levels and other blood tests (p 9)
- Describe the medication cycle (p 11)
- Define the different categories of medications (p 12)
- Describe why medications may have more than one name (p 13)

What is Medication?

A medication is a substance that is taken into or placed on the body that does one of the following things:

Most medications are used to cure a disease or condition.
For example, antibiotics are given to cure an infection.

Medications are also given to treat a medical condition.
For example, anti-depressants are given to treat depression.

Medications are also given to relieve symptoms of an illness.
For example, pain relievers are given to reduce pain.

Vaccinations are given to prevent diseases.
For example, the Flu Vaccine helps to prevent the person from complications of having the flu.

How Do Medications Work?

Medications get into the body in a number of different ways. The way the medication enters the body is called the "route".

The most common "route" for medications is orally (by mouth) in the form of pills, capsules or liquids.

However, if the person is unable to take medications in this way, or if the medication is not available in oral form, medications can enter the body by other routes.

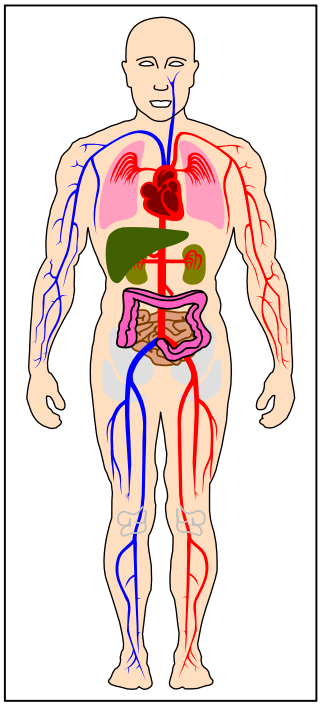
Here are some of the different routes:

Oral: when medications are taken by mouth, in pill, capsule or liquid form, they are swallowed and pass into the digestive system.

The medications are then broken down in either the stomach or the intestines and are absorbed in the same way as food.

They then pass through the liver before entering the bloodstream. Once a medication enters the bloodstream, it circulates to the site where its action is needed.

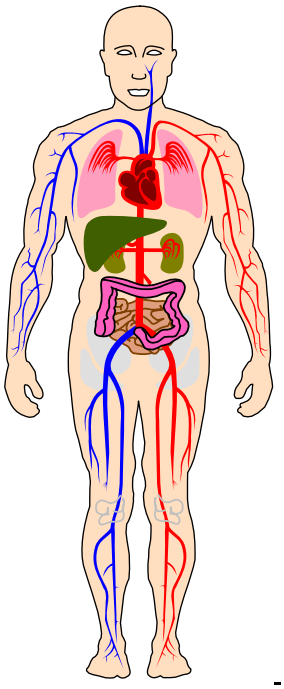
Nasal (into the nose), **buccal** (placed in the cheek) and **sublingual** (placed under the tongue) medications are absorbed through the thin mucous membrane that lines the inside of the nose and mouth and enters the bloodstream in this way.



Eye drops and ear drops are applied directly and are typically used to treat specific problems or symptoms within the eye or the ear.

However, some eye drops, such as those used to treat glaucoma, can be absorbed into the bloodstream.

Transdermal (through the skin) medications are applied to the skin either by patch or in creams or lotions and pass through the skin into the blood vessels.



Topical medications can be applied directly to the skin and tend to have a very localized effect. They do not usually enter the bloodstream in significant amounts.

Subcutaneous medications are injected into the fatty tissue just below the skin and travel from the fatty tissue into the bloodstream.

Enteral medications, those given through a G tube or a J tube go directly into the stomach or intestine and pass into the digestive system and then through the liver and into the bloodstream.

Some medications that are given by mouth cannot be given via G tube or J tube. Always routinely check with the pharmacist about this.

Rectal and **vaginal** medications, such as suppositories, enemas and creams are inserted into the rectum or the vagina and absorbed by the blood vessels in the rectal or vaginal wall.

Inhaled medications have a direct effect on the lungs.

Medication Effects

Local Effect: Some medications, such as eye drops or topical skin creams or ointments, are applied directly to the area that needs treatment.

These applications tend to have a very **localized effect** and do not usually enter the bloodstream in significant quantities.

For example: antibiotic ointment is applied to a scrape on the skin. The ointment stays on the surface of the skin, where the medication effect is needed.

Systemic Effect: Some medications, such as pills or liquids given orally, rectal suppositories, Transdermal patches and subcutaneous injections end up in the bloodstream and act on a specific organ or system within the body.

These medications are said to have a **systemic effect.**

For example: anti-depressant medications taken orally are circulated through the bloodstream and work by increasing the amount of certain chemicals in the brain.

Can you think of an example of a medication that has:

1. **A local effect:**

2. **A systemic effect:**

How Medications Affect You

A medication may have several types of effects on your body:

- Desired Effect
- Side Effect
- Tolerance and Dependence
- Interactions
- No Apparent Effect
- Paradoxical Effect

The **desired effect** is also called the **therapeutic effect**. This means that the medication is doing what it is supposed to.

Almost all medications that have a systemic effect on the body will cause **side effects**. Some medications that have a localized effect on the body can also cause **side effects**.

Side effects are the symptoms that result from a normal dose of a medication. Most side effects are not serious and some may decrease as the body becomes used to a medication. **For example,** some blood pressure medications, because of the way that they act on the heart, can cause the person to feel tired. Other medications can cause side effects such as dry mouth, stomach upset or headache. **Side effects** to anti-psychotic medications can include severe extrapyramidal reactions and tardive dyskinesia. These symptoms mimic Parkinson's disease and are caused by damage to the brain.

Other side effects such as **adverse effects** can be much more serious.

An **adverse effect** may be related to an increased dosage of a medication or when a medication accumulates in the body, causing **toxicity**. Toxicity can damage tissues and organs and can also, in some cases, lead to death**. For example,** some seizure medications and some psychiatric medications require monitoring for adverse physical symptoms and monitoring through blood tests to make sure that the level of medication in the body is not **toxic**. For instance, lithium toxicity can occur at doses close to therapeutic levels AND CAN RESULT IN DEATH.

It is also very important to think about an individual's fluid intake. If a person becomes dehydrated and is taking lithium or other drugs such as Tegretol or Depakote, the levels of these medications in the blood will increase and can

possibly cause toxicity, and can result in death. Additionally, lithium interferes with the regulation of sodium and water levels in the body, and can cause dehydration and result in increased lithium levels. There are several drugs that when taken require regular monitoring of blood levels. For example, **those who use lithium should receive regular blood tests and should monitor thyroid function annually and kidney function for abnormalities.**

Severe allergic reactions to medications can occur, sometimes called "anaphylactic reactions" or "anaphylaxis," and can be life-threatening.

Medication **tolerance** can happen when, over time or with repeated dosages, the individual's response to the medication is decreased.

For example: Certain medications that are taken for a long time can cause the body to adapt to them. Tolerance is good when it means that the body has adapted to the minor side effects of the medications. Tolerance can be a problem if it makes the medication less effective so that a higher dose of the medication is needed.

Medication **dependence** is when an individual develops a physical or psychological need for a medication.

For example: People who take laxatives for a long time can become physically dependent on the laxatives in order to have a bowel movement because the body loses the ability to work without it. A person can also develop a psychological dependence on anti-anxiety medications and think that they cannot function without taking the medication on a regular basis.

Interactions can occur between medications or between medications and food.

For example: Two or more medications given together can produce a stronger response. Sometimes this is intended, and purposely ordered by the health care provider. Other times, it is not intended and can be harmful.

Two or more medications given together can reduce or cancel out the effect of one or more medications. Sometimes this is intended; other times it is not and can be harmful.

The two types of medication interactions noted above are most likely to occur when the health care provider is not aware of all of the medications that the individual is taking.

Some medications are specifically given with food or with milk. Other medications are specifically ordered to be taken before meals. Some medications must be given with a full glass of water. It is important to ask the pharmacist if certain liquids should be given with the medication.

If you believe that the medication is showing **no apparent effect** (that it is not working) because the individual's symptoms have not improved or gone away, the health care provider should be notified.

Sometimes medications work in an opposite way. This is called a **paradoxical effect.**

For example: Benadryl usually causes a person to become tired or drowsy. An example of a paradoxical effect to Benadryl might be that the individual becomes hyperactive or agitated.

Any symptom that is unexpected or unusual must be reported immediately following your agency's policy or procedure.

It is not your responsibility to figure out what is wrong with the individual. This is the responsibility of the health care provider.

It is your responsibility to observe the individual carefully and to document and report all medication effects.

Give an example of:

1. A medication side effect:

2. An adverse medication effect:

3. A medication interaction:

Medication Monitoring: Blood Levels and Other Blood Tests

As mentioned previously, some medications require careful monitoring through blood levels or monitoring of other blood tests: this is done by the laboratory or doctor's office by taking a blood sample from the individual. It is very important that you understand what medications require blood level monitoring!

Things to remember about medication blood levels and other blood tests:

- Drugs such as lithium, Depakote, and Tegretol can reach toxic levels in a person's blood stream and even cause death.
- Ask the prescribing practitioner if a blood level or other blood test is needed for the medication(s) that the individual is taking.
- Ask if there is a certain time of day that the blood sample should be taken.
- Ask if medication should be given before the blood sample is taken. Some medication blood levels require that you "hold" the medication until after the blood sample has been taken.
- If you have been asked to "hold " the medication until after the blood sample has been taken, don't forget to give the medication after the blood test is done.
- Document in the individual's record when blood levels have been ordered.
- Document in the individual's record when you take the person to the laboratory or doctor's office to have the blood sample taken.
- Ask if it is OK for the individual to have food or liquids before the blood test is done. Sometimes it is necessary for the individual to "fast" (have nothing to eat or drink) until after the blood test has been done.

The Medication Cycle

Providers who are authorized to administer medications play a key role in the use of medications for individuals.

You must observe individuals and determine if the medication appears to be working.

Your determinations are based on knowledge of why the medication is being given, what the desired effect is and what to do if that effect is not achieved.

The medication cycle shows the basic steps for monitoring, reporting and following up on symptoms and medications.

The cycle does not end. It is continuous which means that you are constantly observing, monitoring and reporting to the appropriate persons the effects of medications on individuals.

Some changes can be very obvious; others are not.

The only way to make sure that all changes are noted is to carefully observe the individual and document and report any changes that you see.

1. Can you think of a situation where you have used the medication cycle in your own health care or in the care of someone else? Perhaps a situation where the whole cycle was completed, but the medication did not work and you had to start through the cycle again? What did you do?

2. Can you think of some physical and/or behavioral changes that you might see in the individuals that you work with? Write them down here:

The Medication Cycle

Observation: look  **for changes in physical and behavioral conditions**

Report any changes to the right person at the right time

Work with prescribing practitioners and pharmacists and notify the guardian and the nurse trainer when medication changes are ordered

Record  **medication information on appropriate forms**

Administer medications As ordered

Categories of Medications

Two basic categories: Prescription and Non-Prescription Medications

Prescription Medications

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Controlled Medications (also called "narcotics" or "scheduled" medications.)
These are prescription medications that have the potential for abuse or dependence.
There are special procedures that you have to follow when controlled medications are prescribed.

Non-Controlled Medications
These are all other prescription medications that are not controlled medications.

Non-Prescription or "Over-the-counter" (OTC) medications

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These are medications that you can typically get at the pharmacy without a prescription or medication order.

Whenever a prescribing practitioner orders any medication, whether it is a prescription medication, a PRN medication, or an over-the-counter medication (non-prescription), you must get a written prescription or medication order.

Medications given to individuals, regardless of whether they are prescription medications, PRN medications or OTC medications (non-prescription) can **only** be given to individuals when there is a medication order, with the following exceptions:

1) **Bugspray/Sunscreen:** Doctor's orders should be obtained for these substances only if the individual's health condition indicates the need for a specialized product and/or physician evaluation (i.e.: in the case of an individual with a skin condition or history of allergic reaction or sensitivity to topical preparations or pesticides).
2) **Non-prescription lotions:** Doctor's orders should be obtained for these substances only if the individual's health condition indicates the need for a specialized product and/or physician evaluation (i.e.: in the case of an individual with a skin condition or history of allergic reaction or sensitivity to topical preparations).
3) **Non-prescription medicated shampoos**: Doctor's orders and/or protocols should be obtained for these substances only if the individual's health condition indicates the need for a specialized product and/or physician evaluation (i.e.: in the case of an individual with a scalp condition or history of allergic reaction or sensitivity to topical preparations).

Medication Names

What do the following medications, shown in the boxes below, have in common?

Prinivil & Zestril	**Pamelor & Aventyl**	**Motrin & Advil**

Each list gives an example of a medication that has several different names

Prinivil = Lisinopril **Zestril = Lisinopril** **These are different names for the same medication!**	**Pamelor = Nortriptyline** **Aventyl = Nortriptyline** **These are different names for the same medication!**	**Motrin = Ibuprofen** **Advil = Ibuprofen** **These are different names for the same medication!**

Why is this?

Because many medications have at least two names: a generic name and a manufacturer's brand name.

In general the brand name is the more common/most familiar name for the medication.

In general, the brand name is also the more expensive medication.

There may be many different generic brands of the same medication.

What does this mean to you?

Often, because of cost or insurance restrictions, the pharmacist is required to fill the prescription with the least expensive form of the medication (unless the prescribing practitioner has specifically indicated that the medication cannot be substituted with a generic brand.) In most cases you will receive generic medications.

Why is this important?

This is important because you may, for example, receive a prescription or order for Motrin and be given a pharmacy labeled supply of ibuprofen.

In most cases, the label will specify that you have been given ibuprofen in place of Motrin, but not always.

If you are not sure if you have received the correct medication, 

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Do not administer the medication until you have checked with the pharmacist or the nurse.

You may also find that a medication or pill will look different if a new or different generic brand of the medication has been given to you.
On the other hand, you may have been given the wrong medication.

<u>ALWAYS</u> double check with the nurse or pharmacist if you are not sure you have the correct medication or if a pill looks different <u>BEFORE</u> you give the medication.

REMEMBER – all medications, including prescription, PRN, and over-the-counter (OTC) medication MUST have a prescribing practioner's order!! REMEMBER – even when medications are discontinued you need an order too!