

# Medication and Drug Interactions



## OBJECTIVES

At the end of this unit, participants will be able to:

- Understand drug-drug, drug-condition, drug-food, and drug-alcohol interactions
- Explain polypharmacy and related issues
- Discuss how the body processes drugs
- Discuss drugs that may interact with HIV drugs
- Discuss how to avoid drug interactions
- Use online resources to check for drug interactions



## INSTRUCTIONS

1. Welcome participants.
2. Review the unit objectives.
3. Review slides 3–13 on types of drug interactions, polypharmacy, HIV-specific drug interactions, and facilitate discussion throughout as indicated in slide notes.
4. Facilitate conversation on what participants can do to avoid drug interactions. Ask participants to name a few ways CHW could help a client avoid interactions. Record responses on flipchart. Then review slide 14.
5. Review slide 16 and provide a demonstration of how to use a drug interaction checker.
6. Close with a quiz to review key concepts and review the answers with participants.
7. Wrap up. Review the final slide with list of resources and references with participants. Remind CHWs to advise clients to talk with their health care providers if they have any questions about their medications, any unanticipated reactions to food, and always share with their health care provider if they are taking any additional medications, vitamins or herbal remedies for their health.



## Related C3 Roles

All

## Related C3 Skills

All



## Method(s) of Instruction

Lecture, quiz, online practice with HIV drug interaction checker



## Estimated time

1.25 hours



## Key Concepts

Drug interaction, polypharmacy



## Materials

- Computer with internet access and projector
- PowerPoint slides
- Pens and paper for participants
- Online drug interaction checker: <https://reference.medscape.com/drug-interactionchecker>

## Handout

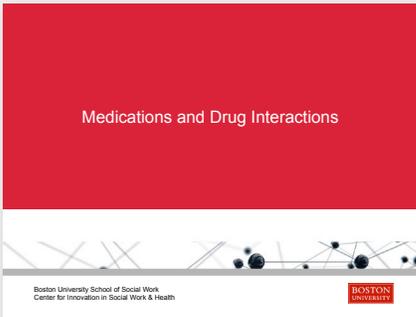
- What's PK (Pharmacokinetics) Got to Do with It? Understanding Medicine Options and Treatment (Answer Key)



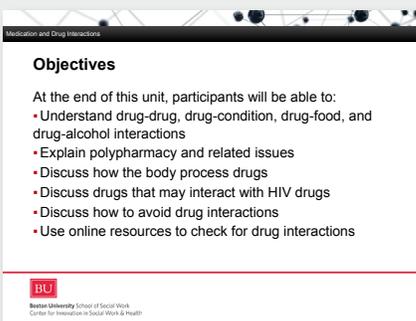
## Resources

- Positively Aware. 2019 HIV Drug Guide. <https://www.positivelyaware.com/issues/march-april-2019-2019-hiv-drug-guide>
- Anderson, P.L. (2005). The ABC's of Pharmacokinetics: What's PK got to do with it? Positively Aware.
- Positively Aware—<http://www.thebody.com/content/80958/understanding-drug-interactions.html>
- The Well Project—<http://www.thebody.com/content/58994/drug-interactions-and-hiv-aids.html>
- AIDSinfo—<http://www.thebody.com/content/79250/what-is-a-drug-interaction.html>

# Medication and Drug Interactions

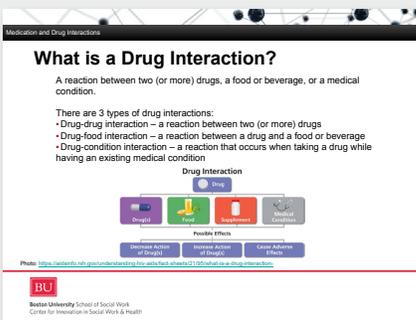


## SLIDE 1



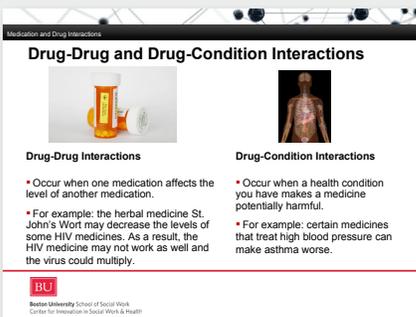
## SLIDE 2

Review the slide.



## SLIDE 3

Review the slide.



## SLIDE 4

Review the slide.

# Medication and Drug Interactions

Medication and Drug Interactions

## Drug-Food and Drug-Alcohol Interactions

**Drug-Food/Beverage Interactions**

- Occur when a food or beverage affects how a medicine gets into the blood. A medicine can also change how the body uses a food/beverage.
- For example, certain drugs that treat osteoporosis (thinning of the bones) are not properly absorbed unless they are taken on an empty stomach.
- On the other hand, some drugs need to be taken with food so they break down more slowly or to reduce their side effects.
- It's important to follow food instructions carefully.

**Drug-Alcohol Interactions**

- Occur when alcohol affects the level of a medicine or increases its side effects.
- For example, people who take certain antidepressants should avoid alcohol because they can make side effects worse.



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## SLIDE 5

Review the slide.

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## What is Polypharmacy?

**Polypharmacy is when people take several medications.**

- The practice of administering many different medicines, especially concurrently for the treatment of a single disease; also
- The concurrent use of multiple medications by people to treat usually coexisting conditions, which may result in adverse drug interactions.



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## SLIDE 6

Review the slide.

A drug interaction is a reaction between two (or more) drugs, a reaction between a drug and a food or beverage, or a reaction between a drug and an existing medical condition.

Medications make us feel better and stay healthy, but sometimes drug interactions can cause problems. Drug interactions can reduce or increase the action of a medicine or cause adverse (unwanted) side effects. For example, taking a nasal decongestant if you have high blood pressure may cause an unwanted reaction.

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## Issues Related to Polypharmacy

Healthcare providers are concerned about Polypharmacy because more medications can mean:



More side effects



A higher likelihood of different medications interacting with each other (drug interactions)

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## SLIDE 7

Polypharmacy is when people take several medications concurrently.

The practice of administering many different medications at the same time—the use of five or more medications, especially for the treatment of a single disease.

The concurrent use of multiple medications to treat coexisting conditions, which may result in adverse drug interactions.

For example, people with diabetes can have several health conditions such as heart problems, high blood pressure, and kidney damage. These conditions could cause a person to take additional medications.

This also includes herbs, supplements, and over-the-counter medicine, all of which we'll discuss in more detail.

The likelihood of polypharmacy increases with age.

People with hypertension, diabetes, and hyperlipidemia have increases risks of adverse drug events.

The number of drugs prescribed predicts the number of drug interactions.

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## HIV Medicines Can Cause Drug Interactions

- Treatment for HIV requires a combination of HIV medications to be taken to keep HIV under control; this combination can be a single-tablet-regimen (STR) or multiple pills.
- Drug-drug interactions between HIV medications, and between HIV medications and other medications are common; drug interaction can complicate HIV treatment.
- Prescription drug dosages need to be high enough to fight a specific disease but not so high that it causes a lot of side effects.
- Possible results of drug interactions include:
  -  Medication levels go down, so the medicine may not work as well.
  -  Medication levels go up, which may lead to worse or new side effects.
- *Individuals should discuss drug interactions with providers when choosing new HIV drug combinations, adding, or removing any drug from a regimen.*

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## SLIDE 8

Ask, “Has anyone has experience caring for an adult with health concerns that involved polypharmacy?”

Take responses then review slide.

Healthcare providers are concerned about polypharmacy because more medications can mean:

- More side effects
- A higher likelihood of different medications interacting with each other (drug interactions)

Ask, “What do we know about people who have side effects from medication?”

Take responses.

Ask, “Are they more inclined to continue taking the medication?”

No, many will discontinue.

Medication and Drug Interactions

## How Does the Body Process Drugs?

The main ways the human body handles drugs are:

- Step 1. Drug absorption
- Step 2. Drug distribution
- Step 3. Drug metabolism
- Step 4: Drug elimination

Anderson, P.L. (2005). The ABC's of Pharmacokinetics: What's PK got to do with it? *Pharmacy Today*.

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## SLIDE 9

All people with HIV who are on treatment take more than one HIV drug, even if they only take one pill. Some pills contain more than one drug; for example, Truvada is a pill that contains the HIV drugs Emtriva (emtricitabine) and Viread (tenofovir). Many people with HIV take other types of medications as well.

Interactions between medicines can reduce or increase the concentration of a medicine in the blood. The change in concentration can make a medicine less effective, more effective, or so strong that it causes dangerous side effects.

For example: A person may take Triumeq, an HIV drug known to have very few side effects. However, if the person adds calcium or calcium and magnesium supplements to their daily regimen, those minerals could lower the level of Triumeq, making the HIV medicine less effective.

In order for a drug to work properly, a person must take the correct dose at the correct time so that the right amount of drug enters the bloodstream. Before an HIV drug is approved, researchers study different doses and choose one that is both safe and effective. The dose has to be high enough to stop HIV from making copies of itself, but not so high that it causes a lot of side effects.

Tell clients that it is important to discuss the possibility of drug interactions with their health care provider when choosing a new HIV drug combination, or when adding or removing any drug or supplement from their regimen.

Medication and Drug Interactions

## How the Body Metabolizes Drugs

This process involves the liver and kidneys:

- Liver makes chemicals called **enzymes** to break drugs down
- Kidneys filter drugs out of bloodstream and into urine
- Drug is removed from the body in urine or feces

Sometimes, one drug affects the way another drug is metabolized

- Speeds up or slows down action of liver enzymes
- Can cause changes in blood levels of other drugs that are broken down by the same enzyme

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Medication and Drug Interactions

## Drugs That May Interact with HIV Drugs

Prescription, over-the-counter and complementary therapies **may have major interactions** with HIV drugs:

- **Birth control pills** with ethinyl estradiol (form of estrogen) can interact with HIV meds, making birth control pills less effective, increasing chance of pregnancy

• **Complementary therapies**

- Most vitamins and herbs have not been studied with HIV drugs
- St. John's Wort (herbal anti-depressant) and garlic supplements should NOT be taken with any PIs or NNRTIs


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## SLIDE 10

Distribute the handout “What’s PK (Pharmacokinetics) Got to Do with It?”.

Tell participants “When you swallow a pill, the drug goes from the stomach to the intestine and then into the liver before circulating to the rest of the body.” There are several steps on how the body processes drugs. Ask for a volunteer to read each step.

### Step 1. Drug absorption:

How the drug enters the blood, usually through tablets or capsules in the stomach and intestines. This where food requirements come in, and why some drugs have warnings not to take antacids.

### Step 2. Drug distribution:

How the drug travels in the blood-stream and how it goes into and comes out of other areas of the body. Some areas of the body like the brain and reproductive organs are protected from chemicals; it’s difficult to measure drug levels in those areas.

### Step 3. Drug metabolism:

How the body chemically changes a drug, usually in the intestines and liver. Metabolism involves breaking a drug down or adding a chemical that makes it easier to pass it into urine.

### Step 4: Drug elimination:

How the body gets the drug out, usually by passing the drug into the urine (via the kidneys) or stool via the liver. Some people have kidney or liver illness. In these cases, the blood level of some drugs may build to very high levels if the drug dose is not reduced.

## SLIDE 11

The body metabolizes (breaks down) the drugs you take. This process involves the liver and kidneys. Review slides.

Drugs that slow down metabolism inhibit the metabolism of drugs. This causes other drugs to be metabolized and removed from the system more slowly, which:

- Increases the amount of other drugs in the body
- Increases how long other drugs stay in bloodstream

Individuals taking drugs that slow down liver enzymes should talk to their providers about adjusting doses of other medications.

Drugs that speed up metabolism get rid of drugs faster. This can be useful in HIV treatment, for example, Norvir (ritonavir), a PI, makes liver enzymes work more slowly. It boosts levels of other PIs like Reyataz (atazanavir); the amount of Reyataz in the blood becomes higher than it would be without Norvir. This reduces the chance of developing resistance. However, Norvir can cause other types of drugs to have higher levels in the blood. These increased blood levels of drugs can cause overdoses or increase side effects including:

Enducer = causes or induces breakdown/reduces concentration

Inhibitor = stops/slows down a drug from breaking down so drug concentration builds up

Medication and Drug Interactions

## Other Drugs That May Interact with HIV Drugs

Classes of drugs that are more likely to interact with HIV drugs (not a complete list):

- Antifungal drugs
- Antibiotics
- Antacids
- Drugs that prevent seizures
- Drugs to treat high cholesterol
- Drugs to treat depression
- Antihistamines (allergy medications)
- Drugs to control heart rhythm
- Opium-based pain killers (narcotics)
- Drugs that increase bowel activity
- Sedatives (medications to calm your nerves)
- Blood thinners
- Drugs to treat erectile dysfunction
- Drugs to treat tuberculosis
- Drugs to treat hepatitis C

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## SLIDE 12

There is a long list of prescription, over-the-counter, complementary, and recreational drugs that may have major interactions with HIV medications. Food and beverages can also change the way HIV drugs are broken down in the body. Here are a few examples:

Birth control pills containing ethinyl estradiol (a form of estrogen) can interact with HIV drugs. This can make the birth control pills less effective and increase the chances of pregnancy. Clients may need to talk with their provider about switching to or adding another form of birth control.

Many people with HIV use complementary therapies such as vitamins or herbs. While most of these have not been studied with HIV drugs, St. John's Wort (an herbal antidepressant) and garlic supplements have been shown to affect the levels of some HIV drugs. St. John's Wort and garlic supplements should not be taken with any PIs or NNRTIs. Clients should discuss any vitamins, herbs, or supplements they take with their health care provider.

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## Substances That May Interact with HIV Drugs

- **Recreational drugs and alcohol**
  - Reports of overdoses caused by taking recreational drugs and HIV drugs
  - Interactions between ecstasy or amphetamines (crystal meth, speed) and PIs are particularly dangerous
  - Alcohol affects body processes, can cause drug interactions
  - Combining alcohol and some HIV drugs (e.g., Videx) can increase risk for developing pancreatitis
- **Methadone and buprenorphine**
  - Can interact with many HIV drugs

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## SLIDE 13

Review the slide. There are certain classes of drugs used to treat some medical conditions that are more likely to interact with HIV drugs. Not all drugs in these classes will cause problems. Note: this is not a complete list; other classes of drugs may also cause interactions.

There is no way that the average person can keep up with all of these possible medication interactions.

Ask, "What should a client do?"

They should always talk to their doctor and pharmacist to discuss any potential interactions.

# Medication and Drug Interactions

Medication and Drug Interactions

**Things You Can Do to Avoid Drug Interactions:**

**Keeping a current list of all your medications and taking it to every healthcare visit.** Include all prescription and over-the-counter medications, vitamins, herbs, and supplements. It's important for health care providers and patients to review medications together.

**Use the same pharmacy for all your prescription medications.**

- The pharmacist can have access to all medications you are taking and can check for possible drug interactions.

**Asking questions when you receive a new medicine.**

- Should I take the new medication in the morning/evening or at bedtime?
- Should I take the new medication with food or on an empty stomach?
- Does this medication have any interactions with alcohol, food, or other drugs that I should know about?
- Ask if you need all the medications you are taking?
- Ask if there are ways to simplify your treatment regimen?
- Providers may need to adjust doses or change drugs based on possible interactions.

**Other tips:**

- Show which medications you take and what they do.
- Take each of your medications as directed by your healthcare provider.
- Refill prescriptions on time so you never run out of medication.

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## SLIDE 14

Review the slide.

There have been reports of overdoses, some fatal, caused by taking recreational drugs (street drugs) and HIV drugs. Interactions between ecstasy or amphetamines (crystal meth, speed) and PIs are particularly dangerous.

Alcohol affects body processes and is often responsible for drug interactions. Combining alcohol and certain HIV drugs like Videx can increase the risk of developing pancreatitis (inflammation of the pancreas).

Methadone and buprenorphine can interact with many HIV drugs. It is important that the opioid treatment program and the HIV health care provider know what medications a patient is taking. This way necessary adjustments can be made to ensure the person receives enough methadone or buprenorphine to prevent withdrawal symptoms, and enough HIV drugs to fight the virus effectively.

People are not always ready to get treatment for their substance use. Ask, "What can we tell them, or how can we encourage them?"

Use harm reduction principles

Encourage them to be honest with their doctor so they can be placed on the right regimen

Offer to assist them with resources (connecting them to in-patient services, support groups, etc.)

Ask, "What are some ways to avoid drug interactions?"

Take answers, then review the next slide.

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**Which kind of drug interaction concerns you the most?**

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## SLIDE 15

Review the slide.

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**Examples of Online Interaction Practice**

The HIV Drug Interaction Checker by the University of Liverpool is an online resource that allows you to check drug-drug interactions between an HIV drug and any other prescription or over-the-counter medication.

There is also a mobile app, the HIV iChart (Note: for the app you'll need to use the generic, or scientific name, not the brand name).

<https://www.hiv-druginteractions.org/checker>

MedScape's Drug Interaction Checker is another resource.

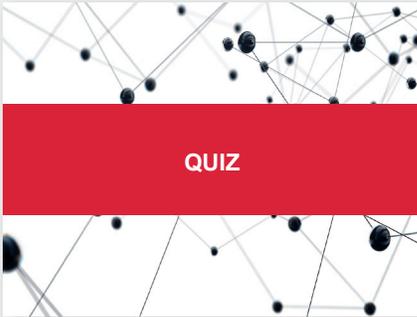
<https://reference.medscape.com/drug-interactionchecker>

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## SLIDE 16

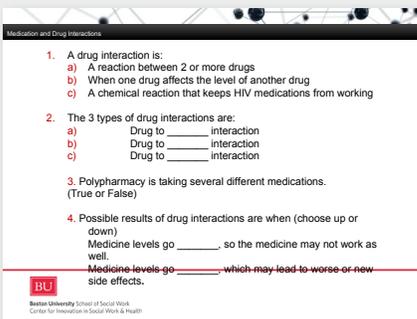
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# Medication and Drug Interactions



## SLIDE 17

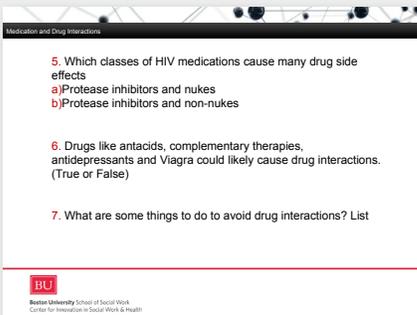
Review the slide.



## SLIDE 18

Ask, "Which kind of drug interaction concerns you the most?"

Take responses and discuss. Address any questions participants have about drug interactions.

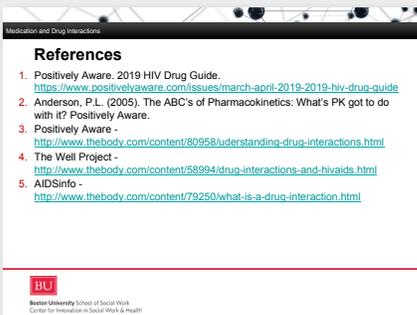


## SLIDE 19

The HIV Drug Interaction Checker by the University of Liverpool is an online resource that allows you to check drug-drug interactions between an HIV drug and any other prescription or over the counter medication.

MedScape's Drug Interaction Checker is another resource. Use this website to demonstrate with a couple of examples using an HIV drug along with an over-the-counter drug:

Triumeq + St. John's Wort  
Triumeq + Calcium Magnesium



## SLIDE 20

# What's PK (Pharmacokinetics) Got to Do with It?

The main ways the human body handles drugs are:

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Step 1. Drug absorption	This is how the drug enters the blood, usually from tablets or capsules in the stomach and intestines. This is where “food requirements” come in or why some drugs have warnings not to take antacids along with the drugs.
Step 2. Drug distribution	This is how the drug travels in the blood-stream and how it goes into and comes out of other areas of the body. Did you know that some areas of the body, like the brain and reproductive organs, are specifically protected from chemicals? It is hard to measure drug levels in those areas.
Step 3. Drug metabolism	This is how the body chemically changes a drug, usually in the intestines and liver. Metabolism involves breaking a drug down or adding a chemical that makes it easier to pass it into urine or stool.
Step 4. Drug elimination	This is how the body gets the drug out, usually by passing the drug into the urine (via the kidneys) or stool (via the liver). Sometimes people have kidney or liver illness. In these people, the blood level of some drugs may build to very high levels if the drug dose is not reduced.

Anderson, P. L. (2005, Winter). What's PK got to do with it? The ABCs of Pharmacokinetics. Retrieved from <http://www.thebody.com/content/art875.html>

# Acknowledgments

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