*Interactive Training Activities for Clinicians*

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# Basic HIV Antiretroviral Medications Workshop

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# HIV ANTIRETROVIRAL MEDICATIONS WORKSHOP

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San Francisco Area PACIFIC AIDS Education and Training Center

# Introduction HIV Antiretroviral Medications Workshop:

# A Longitudinal Training Activity for Clinicians

## Introduction and Overview

HIV Antiretroviral Medications Workshop is an interactive group learning activity designed to give the participants a hands-on experience to be more familiar with HIV antiretroviral names, dosing, side-effects and drug-interactions. HIV Pharmacology is a complex area of expertise which can be daunting to the new HIV clinician. Traditional Powerpoint presentations tend to have huge amounts of information regarding medications, but it is unclear what the learner will truly "Take Home" from a one hour presentation. In addition, it is impossible to cover the full complexity of HIV Pharmacology and Antiretroviral Therapy (ART) in a 1 – 2 hour session. This activity is designed to allow learners to "Take Home" key messages regarding HIV Pharmacology and learn how to access HIV drug information to common questions.

Prior to coming to this workshop, it is helpful for learners to have a basic understanding of the HIV lifecycle and the different classes of antiretroviral (ARV) medications used to treat HIV infection. This basic training can be part of a longitudinal training program. Future trainings may go into further depth regarding management of adverse reactions, choosing ARV regimens, drug-drug interactions and HIV ARV resistance.

### This Workshop Instructor's Guide includes:

☑ Complete instructions for conducting the interactive workshop activity.

☑ Instructor's Notes and teaching points for each of the "Take Home Messages" covered in this activity.

☑ Tips for timing group activities and leading discussions.

☑ Handouts and reference materials for learners:

1. Antiretroviral Drug Chart that includes selected information from the most recent DHHS *Guidelines for the Use of Antiretroviral Agents Among HIV-Infected Adults and Adolescents*
2. Antiretroviral Poster blank Notes Page
3. Antiretroviral "Take Home Message" Poster Handout with Teaching Points

### Target Audience

This activity is best suited for a learner audience of clinicians (nurses, pharmacists, primary care providers) with some familiarity of HIV disease and antiretroviral therapy. This activity can work well with an audience with a varied background in HIV knowledge and skills.

## Instructor Requirements

This interactive training activity should be facilitated by an experienced HIV educator. HIV pharmacists, primary care providers or other clinicians with advanced knowledge of HIV antiretroviral therapy dosing, adherence, side-effect management and drug interactions.

## Learning Objectives

Participants completing this interactive training workshop session will be able to:

1) Identify HIV antiretroviral agents by class, generic name, brand name and co-formulated products.
2) Explain basic patient education regarding dosing of combination antiretroviral therapy.
3) Identify medications that must be dispensed with ritonavir and describe how the "boosting" effect can involve other drug-drug interactions.
4) Identify medications that should be avoided in pregnancy for HIV infected women.
5) Access and utilize readily available HIV drug information references to find dosing, side-effect and common drug interaction information regarding HIV antiretroviral agents.

## How the Workshop is Generally Structured

This interactive learning activity uses the concept of "Take Home Messages" regarding HIV antiretroviral agents to create the basic structure and learning environment for HIV Pharmacology learning. Learners will work in groups to actively place cards with the names of HIV antiretroviral medications on posters that describe these "Take Home Messages." Learners will have a drug table with some selected information from the most recent DHHS *Guidelines for the Use of Antiretroviral Agents Among HIV-Infected Adults and Adolescents*, along with some quick drug references to use in order to determine which "Take Home Message" poster their medication belongs to. Learners should work quickly, which can simulate clinical situations, and have little fear of error. "Best guesses" are encouraged.

Once all the cards have been placed on the posters, the facilitator will work with the entire audience to "correct" the cards placed on each of the posters. As the facilitator works through each poster, teaching points and clinical scenarios for each of the posters are highlighted. Learners are given a blank worksheet to take notes during this part of the discussion.

At the conclusion of the exercise, a completed version of the worksheet for each "Take Home Message" poster should be distributed. This will have all the accurate drug names for each poster as well as the highlighted teaching points.

# HIV Antiretroviral Medications Workshop

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| **Purpose:** | To highlight basic principles and key "take home messages" of HIV Pharmacology and Antiretroviral Therapy in an interactive environment that engages learners and help them learn how to find and use this information on their own. |
| **Time Required:** | 90 minutes is best. Can vary time based on group size, knowledge/experience level. |
| **Materials Needed:** | ▪ Drug Chart with Pictures/Names – copies for participants<br>▪ Color-coded cards with names of ARV medications<br>▪ 6 ARV Posters labeled with "Take Home Messages"<br>▪ Participant Notes Worksheet – copy for each participant<br>▪ Teaching Points Handout - copy for each participant<br>▪ Markers<br>▪ Tape for Posters<br>▪ Tape or stickers for cards<br>▪ Flip Chart & Pens for Notes |

## Instructions for Trainer/Facilitator

**Preparation**

**Prior to Training**

1. Prepare deck of ARV drug cards and set of posters according to instructions.
2. Review the "Take Home Messages" Posters and the accompanying teaching points with each one. Highlight those teaching points most important for your audience.
3. Review handouts, make sure there have not been any recent updates to the list (i.e. newly approved medications or new formulations of medications).
4. Familiarize yourself with most recent DHHS ARV Guidelines for Adults & Adolescents.
5. Make copies of worksheets, handouts and drug information tables, one per person.

**Set Up Room**

1. Evenly divide the ARV cards among the tables. Use your best attempt to avoid duplication of medication names within each group. Some duplications may be unavoidable – that is okay. Each table should have enough copies of drug charts and worksheets for each learner.
2. Use tape or self-adhesive posters to keep the "Take Home Message" posters on the walls around the room.
3. Include a poster titled "Parking Lot" to use when correcting the posters. You can also use a blank area in the room (i.e. podium front to stick cards).
4. Place pieces of tape in central area for each table member to access as needed.
5. Welcome learners and complete any introductory or housekeeping tasks required before the start of the training session.
6. Quickly divide learners into small-group teams, preferably sitting in round tables. If you can integrate learners from varied background and HIV experience level at each table, that is best. Avoid tables that hold all the knowledge/experience and those that have very little.

**Opening and Instructions**

**15 minutes**

1. Ask learners to quickly introduce themselves one at a time to their small groups: name, profession or discipline, organization they are representing and current job role.
2. Ask group what are their learning goals from this session
    *a.* "*What were you hoping to learn when you reminded yourself about this training this morning?"*
    *b.* Write responses on Flip Chart.
    *c.* Acknowledge those questions that are likely to be answered.
    *d.* For those questions unlikely to be addressed, offer additional reference or trainings to learners before they leave.
3. Review for each group the materials in front of them.
    a. Cards with medication Names
    b. Drug Chart
4. Describe how to use the Drug Chart
    a. Ask questions about how to know if a medication can be used daily.
    b. Consider leaving most recently approved medication blank (i.e. rilpivirine & fixed-dose combination Complera) and fill in the information with the group

5. Describe their task:
    a. *Read the name of each poster around the room*
        1. *Once Daily Dosed Medications*
        2. *Co-formulated medications*
        3. *Avoid in Pregnancy*
        4. *Must be Dispensed with ritonavir*
        5. *Significant interactions with Proton-Pump Inhibitors*
    b. *Find a poster around the room describes your medication*
    c. *Place the card on that poster with tape/stickers.*
    d. *If your drug card has multiple medicines on it or in it (i.e. a co-formulated product), then the poster should apply to at least one of the medicines on the card.*
6. Participants may use the references available to them as well as each other's expertise to learn information about the medicines on their cards.
7. Review the "Rules" of the exercise:
    a. *If the poster already has the medicine name on it, you cannot put it there a second time.*
    b. *This duplication includes use of generic/brand names (i.e. if the brand name is on the poster, then you cannot place the generic name on the poster and vice-versa).*
    c. *Use whatever materials you need to find where your medicine card belongs.*
    d. *If you are confident that your medicine belongs on a particular poster, place the card near the top of the poster. If you are less confident, you can place it near the bottom of the poster. Best guesses are encouraged.*
    e. *Work as quickly as possible. This is not a race, but each group will need to find a place for all of their cards in the allotted time.*

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| **Small-Group Work Placing Cards on Posters**<br><br>**10 minutes** | 1. Ask for and respond to any questions or need for clarification about the exercise.<br>2. Provide encouragement for those working well as a group and placing cards quickly.<br>3. Consider helping any groups that are struggling with using the references or giving an example of where a card might go.<br>4. Move around the room to ensure participation by all. |

**Large-group Processing Discussion**

**60 minutes**

1. Reconvene the large group.
2. Ask the large group how they felt during this exercise.
    a. How did you feel?
    b. What did you like best?
    c. What was your biggest challenge?
    d. Any surprises?
    e. Write responses on a flip chart
3. Often groups mention some of the following: "Confusion, Fun, Challenging, Interesting, Learned Something New".
    a. Welcome them to HIV Care – what they often describe is the same that all clinicians feel and find challenging when working in an HIV Clinic.
    b. Acknowledge that working with these medications is confusing and that the names of the medications are a huge source of that confusion. This is true for both providers as well as patients.
4. Go around the room to the first poster (i.e. once daily dosed medications) and review the following:
    a. *Are there any duplication in the names of the medicines?*
    b. If so, what other poster would be appropriate for that medicine?
5. The learners then are each assigned a poster to "correct" as they see fit. For a large audience, this may not be feasible.
6. As the groups reseat themselves after "correction", return to the first poster, which ought not have any duplication of names.
    a. *Are all the medicines on this poster correct for the "Take Home Message"?*
    b. *Are there any medications missing from this poster that need to be added?*
7. Ask questions to the group to start discussions that get to the teaching points for each of the posters.
    a. **Once Daily Dosed Medications**
        i. *Did you notice the color coding of the cards?* (Yellow is PI, Blue is NRTI, Green is NNRTI, Orange is multi-class co-formulated)
        ii. *Given that there are medications from each class able to be dosed once a day, we can improve adherence and use effective combination therapy.*

8. Some posters may take a longer time than others. Consider starting with a "simple" but important concept to review. For example, starting with "Co-Formulated Products" is a helpful place to again review the names and confusion and start other teaching points, including adherence benefits.
9. Do not worry if you do not cover each teaching point associated with each "Take Home Message" poster – keep engaged discussions with the audience.
10. Ask group which poster they would like to do next.
    a. *Why do you think this is an important "Take Home Message" for you as you care for HIV patients?*
11. Provide each participant with a copy of the "Teaching Points" handout when you have completed the discussion.

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**Wrap-Up & Conclusion**

**5 minutes**

1. Thank participants for their hard work
2. Return to the flip chart of "learning goals" noted at the beginning of the session to determine which questions answered.
3. For those not answered, offer future trainings or other resources to learn that information.
4. Remind them to utilize treatment guidelines, peers and other resources to support their continued learning about antiretroviral medications.

# Key Concepts to Highlight When Teaching about HIV Antiretroviral Medications

- ☑ Names of medicines are confusing. Try to be consistent in your teaching and use generic names, but offer the brand names as well. Invite questions or clarification about names or abbreviations from the audience.
- ☑ It is impossible to learn everything you need to know about HIV antiretroviral medications in 90 minutes. Learners should try to think about general concepts and keep the "Take Home Messages."
- ☑ Information about antiretroviral medications continues to change frequently, including formulation, dosing and side-effects. Be open to adjusting this activity as new information becomes available. Give learners resources for accessing up-to-date information: Websites, Expert Consultation Phone Numbers (national and local), Further Training Opportunities.

# Tips for Leading Poster Discussions

**One Poster Has All The Cards On The Bottom:**

- ➢ If you see this on a poster, go to that poster first for discussion. This implies that the concept is not clear to the audience.

**Keeping Track Of Where The Cards Should Go:**

- ➢ Do not get too worried that all the cards that should be on the poster are there. It is more important to exclude medicines that do not belong. Engage the audience in a discussion about why this medicine might have been put on this poster in error and what is different about the "wrong" medicine from those that are there correctly.
- ➢ It is also more important to discuss the teaching points associated with each poster. Use probing questions to move the learners toward understanding and discussing the teaching points.

## "TAKE HOME MESSAGES" POSTER DISCUSSION and TEACHING POINTS

***(Please note that the cards are color-coded by class of antiretroviral therapy)***

**Co-Formulated (Combination) Products (>1 Medicine In One Pill)**

**Cards that should appear on the poster (7):**

zidovudine/lamivudine (Combivir)
abacavir/zidovudine/lamivudine (Trizivir)
tenofovir/emtricitabine (Truvada)
lopinavir/ritonavir (Kaletra)
efavirenz/tenofovir/emtricitabine (Atripla)
abacavir/lamivudine (Epzicom)
rilpivirine/tenofovir/emtricitabine (Complera)

**Teaching Points:**

- ☑ Need to recall individual components in order to consider interactions and side-effects, and in order to educate patients.
- ☑ Some patients prefer lower bottle burden to improve adherence, more than pill burden or frequency of dosing.
- ☑ Can affect co-pays (decrease cost) by prescribing combination products.
- ☑ Each combination pill above (except lopinavir/ritonavir) is also available in its individual components.
- ☑ Multiple names per medication can invoke confusion. Patients may be more familiar with the brand name of a combination pill.
- ☑ If there is renal or hepatic insufficiency, dose-adjustment of some of the individual components of combination pills will become necessary. In order to accomplish this, you will need to discontinue the combination pill, and then write new prescriptions for individual components at appropriate doses to adjust for renal or hepatic insufficiency.

## Once Daily Dosing FDA Approved

**Cards that should appear on the poster (16):**

Atripla (efavirenz/tenofovir/emtricitabine)
Epzicom (abacavir/lamivudine)
Epivir (lamivudine)
Viread (tenofovir)
Sustiva (efavirenz)
Reyataz/Norvir (atazanavir/ritonavir)
Emtriva (emtricitabine)
Truvada (tenofovir/emtricitabine)
Videx (didanosine)
Edurant (rilpivirine)
Viramune XL (nevirapine XL)
Complera (rilpivirine/tenofovir/emtricitabine)

FDA approved once Daily in treatment naïve patients:
Kaletra (lopinavir/ritonavir)
Lexiva/Norvir (fosamprenavir/ritonavir)
Reyataz (atazanavir)
Prezista/Norvir (darunavir/ritonavir)

**Teaching Points:**

☑ Adherence rates differ between once daily vs. twice daily vs. 3x daily regimens in all chronic disease conditions, including HTN & DM. Adherence is improved with fewer dosing intervals.

☑ Given that we have so many medications that are dosed once a day, we are able to effectively combine different classes of once daily antiretroviral regimens.

- Note: Two ARVs, saquinavir(Invirase) and etravirine (Intelence), do not appear on this list but some HIV experts prescribe once daily. These are not FDA-approved for once daily dosing, however pharmacokinetic data suggest that once daily dosing may be effective. Given the adherence advantages to once-daily dosing, some experts will use this preliminary data to adjust the dose of medications. When reviewing medication lists and new prescriptions, it is important to review with colleagues and websites, and confirm dosing with prescribers if you see prescriptions that do not follow FDA-approved dosing recommendations. Some may be errors while others may be off-label dosing which may be still appropriate for specific patients.

- ☑ Some once daily regimens are FDA-approved for use in ARV naïve patients, but not for "treatment experienced" patients. "Treatment experienced" concerns become important as there may be resistance to prior regimens. Patients who have previously documented resistance may need higher drug levels to overcome low-level resistance or to prevent development of resistance to other classes of medications being considered. However, if there is no history of resistance to the drug class being considered, then daily dosing of medications as would be done for treatment-naïve patients is appropriate. Many guidelines have adjusted dosing recommendations to reflect the presence of resistance and treatment experience of patients. For example, darunavir/ritonavir is dosed 800mg/100mg once a day for treatment-naïve patients and those without any darunavir-related mutations, but dosed 600/100mg twice daily for treatment experienced with evidence of some darunavir mutations.

- ☑ This poster can lead to a discussion about the therapeutic window of medications: peak concentrations should invoke toxicity considerations, while minimum concentrations have efficacy implications. Due to once daily dosing of some medications, the minimum concentration near the end of the dosing interval can approach "subtherapeutic" levels, especially in patients who may have some drug resistance present.. In addition, with once daily dosing, some medications achieve much higher peak concentrations, increasing risk of adverse effects (i.e. lopinavir/ritonavir increased diarrhea with once daily dosing).

- ☑ This poster can also lead to discussions regarding the consequences of missed doses:
  - o What is the significance of missing a dose in a once-a-day regimen vs. a twice-a-day regimen?
  - o The consequence of missing doses with a regimen that has a low genetic barrier to resistance (i.e. NNRTI, Integrase Inhibitors) can be more significant than those with a higher genetic barrier to resistance (i.e. boosted protease inhibitor). With regimens that have a low genetic barrier to resistance, there is a higher potential to acquire resistance with even one missed dose.

## Avoid In Pregnancy (Or Avoid Component If Co-Formulated)

**Cards that should appear on the poster (3):**

Sustiva (efavirenz)
Zerit/Videx (stavudine/didanosine)
Atripla (efavirenz/tenofovir/emtricitabine)

**Teaching Points:**

- ☑ We are able to use most ARVs safely during pregnancy. Use of ARVs in a highly active antiretroviral regimen in pregnancy decreases risk of transmission to <1%. HIV-infected women who are pregnant should be recommended to start antiretroviral therapy as soon as possible.

- ☑ Some of the newly approved medications (i.e. raltegravir, rilpivirine, darunavir) have not been studied extensively in pregnancy. In general, we prefer to use regimens with supportive safety and efficacy data for use in pregnancy, unless the benefits of continuing an established regimen for a patient who becomes pregnant outweighs the risks.

- ☑ Efavirenz is a teratogen. It is contraindicated for use in the first-trimester of pregnancy. Most recent guidelines suggest that efavirenz can be safely used in the second and third trimester of pregnancy if alternate therapy is not tolerated.

- ☑ Women desiring pregnancy and/or not using effective birth control should avoid efavirenz.

- ☑ Stavudine/didanosine is on this list due to increased risk of pancreatitis and lactic acidosis when used in pregnancy. These risks also exist outside of pregnancy for individuals taking this combination, or with either individual medication alone. This is likely related to the high risk of mitochondrial toxicities with each of these medicines, which is substantially increased when they are used in combination. As a result, these medications are rarely used in current ARV regimens.

- ☑ Pharmacokinetics of antiretroviral (ARV) medicines can be affected by pregnancy – requiring dosing adjustments or increased side-effects. The best pharmacokinetic data are for lopinavir/ritonavir dosing in pregnancy, which suggests increasing dose to 3 tabs BID during the second and third trimester. Once daily dosing is not recommended in pregnancy.

- ☑ Guidelines have reviewed some of the pharmacokinetic data regarding the use of atazanaivr in pregnancy. Currently, the only dose adjustment in pregnancy is that atazanavir/ritonavir dose should be increased to 400mg/100mg daily (from usual 300mg/100mg daily) for pregnant women who are also taking tenofovir or H-2 blockers (do not take both).

- ☑ There can be significant drug-drug interactions with various contraceptive agents and antiretroviral medications, which may lead to decreased effectiveness of contraceptives. A careful review of possible interactions is important when discussing contraceptive options with HIV-infected women of child-bearing age. (www.hiv-druginteractions.org

## Significant Interactions With Proton-Pump Inhibitors (PPIs)

**Cards that should appear on the poster (4):**
Reyataz (atazanavir)
Reyataz/Norvir (atazanavir/ritonavir)
Edurant (rilpivirine)
Complera (rilpivirine/tenofovir/emtricitabine)

**Teaching Points:**

- ☑ Atazanavir and rilpivirine need an acidic environment for absorption and PPIs will decrease absorption, even with ritonavir boosted atazanavir.
- ☑ A good drug history is important, including over-the-counter (OTC) medications, due to availability of PPIs and H-2 blockers OTC.
- ☑ Shorter-acting antacids (i.e. calcium carbonate, TUMS) can be used safely if separated from administration of atazanavir and rilpivirine by 2 hours.
- ☑ PPIs (esomeprazole, lansoprazole, omeprazole, pantoprazole, rabeprazole) are contraindicated with rilpivirine.
- ☑ H2-blockers (famotidine, ranitidine, nizatidine, cimetidine) should be used with caution with rilpivirine. They should only be administered at least 12 hours before or at least 4 hours after rilpivirine.

- ☑ Atazanavir's FDA-approved package insert includes specific dosing recommendations for use of PPIs and H2-blockers in either antiretroviral treatment experienced vs. treatment naïve patients; this information is included below. This information is confusing as it is dependent on the treatment-experience of the patient. Many providers and patients will avoid atazanavir in patients who need these medications to avoid this complexity. All other protease inhibitors could be used safely with PPIs and H2-blockers for patients who need to continue those therapies.

The dose recommendations for THERAPY-NAÏVE PATIENTS receiving H2-receptor antagonists or proton pump inhibitors are the following:

H2-receptor antagonist: The H2-receptor antagonist dose should not exceed a 40mg dose equivalent of famotidine twice daily. Atazanaivr 300mg and ritonavir 100mg should be administered simultaneously with, and/or at least 10 hours after, the dose of the H2-receptor antagonist.

Proton-pump inhibitors: The proton-pump inhibitor dose should not exceed a 20mg dose equivalent of omeprazole and must be taken approximately 12 hours prior to the atazanavir 300mg and ritonavir 100mg dose.

The dose recommendations for THERAPY-EXPERIENCED PATIENTS receiving H2-receptor antagonists or proton pump inhibitors are the following:

Whenever an H2-receptor antagonist is given to a patient receiving atazanavir with ritonavir, the H2-receptor antagonist dose should not exceed a dose equivalent to famotidine 20mg twice daily, and the atazanavir and ritonavir doses should be administered simultaneously with, and/or at least 10 hours after, the dose of the H2-receptor antagonist.Atazanaivr 300mg with ritonavir 100mg once daily (all as a single dose with food) if taken with an H2-receptor antagonist.

Atazanavir 400mg with ritonavir 100mg once daily (all as a single dose with food) if taken with both tenofovir and an H2-receptor antagonist.

Proton-pump inhibitors should not be used in treatment-experienced patients receiving Reyataz.

## Recommended To Be Taken On Empty Stomach

**Cards that should appear on the poster (4):**

Videx (didanosine)
Sustiva (efavirenz)
Crixivan (indinavir)
Atripla (efavirenz/tenofovir/emtricitabine)

**Teaching Points:**

- ☑ Taking efavirenz with food does not affect efficacy. It is, however, recommended on an empty stomach to avoid INCREASED absorption, which would lead to increased possible side-effects. Higher fat content in food will further increase absorption and toxicity of efavirenz. Review the CNS side-effects with patients. If a patient is able to tolerate some of these effects, and if adherence is improved by taking efavirenz with food, then some patients may have improved adherence and success with that schedule.
- ☑ Reviewing auxiliary labels on prescriptions bottles can be important to patients as they may not always apply to individual patient situations.

- ☑ Indinavir (rarely used anymore due to toxicities and poor tolerance) was previously dosed at 8 hour intervals on an empty stomach for adequate absorption and efficacy. When unboosted with ritonavir, indinavir could be given with food and twice daily.

- ☑ Didanosine enteric coated formulation (also rarely prescribed), needs to be taken on an empty stomach to achieve adequate absorption and efficacy. However, with tenofovir, didanosine dosage is reduced to 250mg once daily and can be taken with food. Currently, experts recommend avoiding didanosine and tenofovir combinations due to: 1) some evidence of early virologic failure, 2) rapid selection of resistant mutations 3) potential for blunted CD4 response and 4) increased didanosine-related toxicities (i.e. cytotoxicity).

- ☑ Most other ARV can be taken with or without food. Taking ARV with food can decrease nausea, which is a common side-effect for when first starting ARV therapy.

- ☑ Rilpivirine, however, **must** be taken with high-calorie (580 calorie) meals to ensure adequate absorption and efficacy. On an empty stomach or with low-calorie meals, absorption can be decreased by 40%.

**Must Always Be Dispensed With Ritonavir, no exceptions**

**Cards that should appear on the poster (3):**

Prezista (darunavir)
Aptivus (tipranavir)
Invirase (saquinavir)

**Teaching Points:**

- ☑ Protease inhibitors are commonly used in combination with ritonavir, but many have FDA-approved dosing without ritonavir. The three medications above are the only protease inhibitors that have no approved use without ritonavir
- ☑ When used at low doses (100 – 200mg/day), ritonavir is not considered an active part of effective combination antiretroviral therapy.

- ☑ Other protease inhibitors, which are often boosted, have FDA-approved doses without ritonavir-boosting.
  - o Atazanavir (Reyataz)
  - o Fosamprenavir (Lexiva)
  - o Indinavir (Crixivan) - rarely prescribed due to significant toxicities.

- ☑ Current DHHS guidelines offer unboosted atazanavir as an "alternative" regimen, but no longer list unboosted fosamprenavir or indinavir in their treatment options.

- ☑ Lopinavir is only ritonavir-boosted protease inhibitor available in co-formulation with ritonavir, and is called Kaletra.

- ☑ This poster can enhance a discussion regarding the "therapeutic window" and "forgivability" concepts a boosted protease inhibitor compared to an unboosted protease inhibitor. Efficacy (and "forgivability) of boosted protease inhibitors" are substantially improved compared with unboosted protease inhibitors. Pharmacokinetic principles of Cmax, Cmin, AUC and half-life can be reviewed.

- ☑ Ritonavir is a potent inhibitor of CYP3A4 and, when used for boosting protease inhibitors, it improves absorption and decreases metabolism of the active protease inhibitor. With ritonavir co-administration, there is increased drug exposure to the active protease inhibitor.

- ☑ Protease inhibitors act as substrates of the CYP3A4 system; they can be inhibitors and in some instances also inducers.

- ☑ Drug –drug interactions with other classes of medicines (i.e., antidepressants, statins, rifampin, fluticasone, anticonvulsants) are based on the effect of protease inhibitors on the CYP450 enzymes. Therefore, use of ritonavir can change the potential efficacy or toxicity of other medications. However, while ritonavir acts as an inhibitor of the metabolism for other protease inhibitors (increasing serum levels) for some other

medications in may be either an inhibitor (e.g. fluticasone) or an inducer (e.g. methadone). A careful review of possible drug interactions is important for patients on ritonavir-boosted regimens (www.hiv-druginteractions.org)

☑ If the above protease inhibitors are dosed twice daily, then ritonavir must also be dosed twice daily. This is an uncommon dosing strategy and requires dispensing of two ritonavir bottles. There have been instances of dosing/dispensing errors with this uncommon strategy.

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3. Coffey, S McNicholl, I. "Dosing for Ritonavir-Boosted Protease Inhibitors" July 2010, Available at: http://HIVInsite.ucsf.edu

## Instructions for Preparing ARV Cards and Posters

1. **Prepare cards:** Make "decks" of cards containing the names of antiretroviral medications and color-coded by drug class, the same color card for all drugs in each class. Write each drug name exactly as listed on the number of colored index cards indicated in parentheses in each chart below:

**Drug Class: Nucleoside/Tide Reverse Transcriptase Inhibitors (NRTIs)**
**Card color: Light blue** **Total Cards: 12**

(1) abacavir/lamivudine
(1) Combivir
(1) didanosine
(1) emtricitabine
(1) Epzicom
(1) lamivudine
(1) tenofovir
(1) tenofovir/emtricitabine
(1) Trizivir
(1) Truvada
(1) Videx
(1) Zerit/Videx

**Drug Class: Non- Nucleoside Reverse Transcriptase Inhibitors (NNRTIs)**
**Card color: Light green** **Total Cards: 6**

(2) efavirenz
(1) Sustiva
(1) Edurant
(1)Viramune XL
(1) rilpivirine

**Drug Class: Multiple Class Co-formulated**
**Card color: Light orange** **Total Cards: 7**

(2) Atripla
(2) Complera
(2) efavirenz/tenofovir/emtricitabine
(1) rilpivirine/tenofovir/emtricitabine

**Drug Class: Protease Inhibitors (PIs)**
**Card color: Light yellow** **Total Cards: 12**

(1) atazanavir
(1) atazanavir/ritonavir
(1) Crixivan
(1) darunavir
(1) darunavir/ritonavir
(1) fosamprenavir/ritonavir
(1) Kaletra
(1) lopinavir/ritonavir
(1) Reyataz
(1) Reyataz/Norvir
(1) tipranavir
(1) Invirase

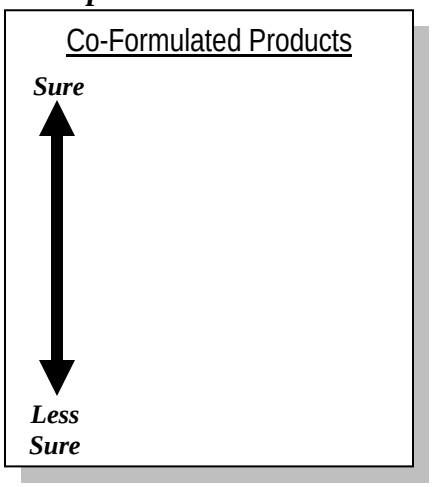
You may also prepare cards in a word processing program, using a template for Avery® 5389™ Laser Postcards and printing them on a color laser printer. The postcards can then be laminated for re-use multiple times.

2. **Prepare posters:** Use sheets of large easel/chart paper (preferably the self-sticking, "post-it"-type) to prepare posters like the example shown below.

   a) Write each of the following headings in large print at the top of a separate sheet of poster paper:

      1) Co Formulated Products
      2) Once Daily Dosing FDA-Approved
      3) Avoid in Pregnancy
      4) Significant Interactions with PPI
      5) Recommended To Be Taken on Empty Stomach
      6) Must Always Be Dispensed With Ritonavir, no exceptions

***Example:***




   b) On the left-hand side of the paper, draw a large arrow labeled "Sure" at the top and "Less Sure" at the bottom.

Basic HIV Antiretroviral Medications Workshop

PARTICIPANT NOTES WORKSHEET

1) **Co Formulated Products**

2) **Once Daily Dosing FDA-Approved**

3) **Avoid in Pregnancy**

4) **Significant Interactions with PPI**

5) **Recommended to be Taken on Empty Stomach**

6) **Must Always be Dispensed with ritonavir, no exception**

# abacavir / lamivudine

# Combivir

didanosine

emtricitabine

# Epzicom

# lamivudine

**tenofovir**

**tenofovir / emtricitabine**

**Trizivir**

**Truvada**

# Videx

# Zerit / Videx

efavirenz

efavirenz

# Sustiva

# Edurant

# Viramune XL

# rilpivirine

# Atripla

# Atripla

**Complera**

**Complera**

**efavirenz / tenofovir / emtricitabine**

**efavirenz / tenofovir / emtricitabine**

**rilpivirine / tenofovir / emtricitabine**

**atazanavir**

# atazanavir / ritonavir

# Crixivan

**darunavir**

**darunavir / ritonavir**

# fosamprenavir / ritonavir

# Kaletra

**lopinavir / ritonavir**

**Reyataz / Norvir**

# Reyataz

# tipranavir

# Invirase

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