

20th ANNUAL HIV CONFERENCE
of the Florida/Caribbean AIDS Education and Training Center

May 13-14, 2011
Orlando, FL

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Management of Antiretroviral naïve HIV Infected patient

Ernesto J. Lamadrid, MD, AAHIVS
Faculty Florida/Caribbean AIDS Education and Training Center

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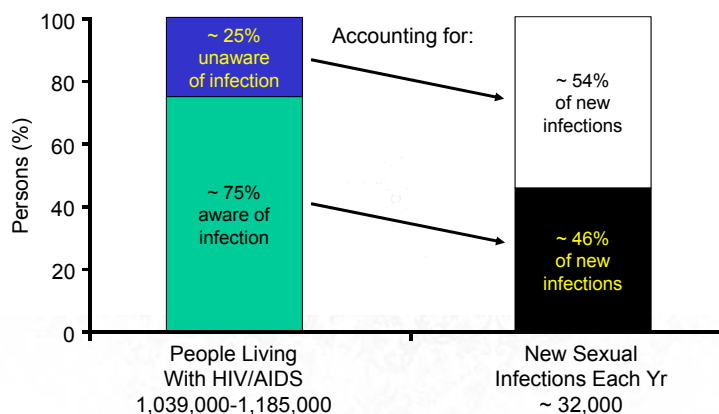


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Scope of the Problem: Burden of HIV Infection in the United States



Marks G, et al. AIDS. 2006;20:1447-1450.
Campsmith ML, et al. J Acquir Immune Defic Syndr. 2010;53:619-624.

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Goals of Treatment

- Improve quality of life
- Reduce HIV-related morbidity and mortality
- Restore and/or preserve immunologic function
- Maximally and durably suppress HIV viral load
- Prevent HIV transmission

Coffey S. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents: Initiation of Therapy [PowerPoint]. AIDS Education and Training Centers, National Resource Center; January 2011

DHHS. Available at: <http://aidsinfo.nih.gov/contentfiles/AdultandAdolescentGL.pdf>.

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Tools to Achieve Treatment Goals

- Selection of ARV regimen
- Maximizing adherence
- Pretreatment resistance testing

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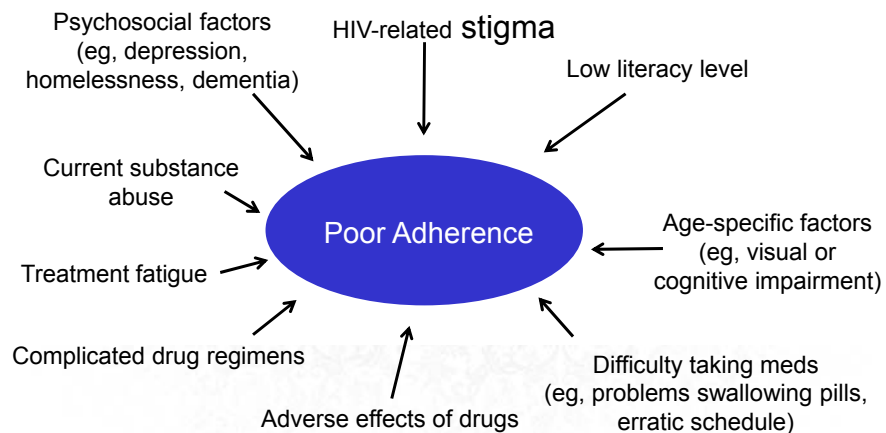
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Factors Associated With Poor Adherence



DHHS. Available at: <http://aidsinfo.nih.gov/contentfiles/AdultandAdolescentGL.pdf>.



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TO START OR NOT TO START? THAT IS THE QUESTION



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Potential Benefits of Early Therapy (CD4 count >500 cells/ μ L)

- Cohort study data show survival benefit if ART initiated at CD4 count >500 cells/ μ L
- Earlier ART may prevent HIV-related end organ damage; deferred ART may not reliably repair damage acquired earlier
 - Increasing evidence of direct HIV effects on various end organs and indirect effects via HIV-associated inflammation
 - End organ damage occurs at all stages of infection

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Potential Benefits of Early Therapy

(CD4 count >500 cells/ μ L) (2)

- **Potential decrease in risk of many complications, including:**
 - HIV-associated nephropathy
 - Liver disease progression from hepatitis B or hepatitis C
 - Cardiovascular disease
 - Malignancies (AIDS defining and non-AIDS defining)
 - Neurocognitive decline
 - Blunted immunological response owing to ART initiation at older age
 - Persistent T-cell activation and inflammation

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Potential Benefits of Early Therapy

(CD4 count >500 cells/ μ L) (3)

- **Prevention of sexual and bloodborne transmission of HIV**
- **Prevention of mother-to-child transmission of HIV**

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Potential Limitations of Early Therapy (CD4 count >500 cells/ μ L)

- ARV-related toxicities
- Drug resistance
- Nonadherence to ART
- Cost

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Recommendations for Initiating ART

Clinical Category or CD4 Count	Recommendation
<ul style="list-style-type: none"> ▪ History of AIDS-defining illness ▪ CD4 count <350 cells/μL ▪ CD4 count 350-500 cells/μL ▪ Pregnant women ▪ HIV-associated nephropathy (HIVAN) ▪ Hepatitis B (HBV) coinfection, when HBV treatment is indicated* 	Initiate ART

* Treatment with fully suppressive drugs active against both HIV and HBV is recommended.

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Recommendations for Initiating ART⁽²⁾

Clinical Category or CD4 Count	Recommendation
CD4 count >500 cells/ μ L, asymptomatic, without conditions listed above	50% of the Panel favors starting ART; 50% views ART as optional

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Consider More Rapid Initiation of ART

- Acute opportunistic infection
- Lower CD4 count (eg, <200 cells/ μ L)
- Rapid decline in CD4
- Higher viral load

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Consider Deferral of ART

- **Clinical or personal factors may support deferral of ART**
 - If CD4 count is low, deferral should be considered only in unusual situations, and with close follow-up
- **When there are significant barriers to adherence**
- **If comorbidities complicate or prohibit ART**
- **“Elite controllers” and long-term nonprogressors**

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Case study #1: AG

- **38 Y/O WM goes to your office for initial visit for newly diagnosed HIV infection three months ago at an STD clinic.**
- **Transmission: MSM with multiple partners**
- **PMH: genital warts, dyslipidemia, bipolar depression (controlled)**
- **Family Hx: father CAD, mother healthy**
- **Occupation: bartender**
- **Social Hx: smoker of 1 ppd for 15 years; no IVDU, occasional MJ.**



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Physical exam AG

- Well nourished, well developed, alert, NAD
- Temp=98.5 F; P=96 R=18 BP=138/88, Weight: 215 BMI=32
- Physical exam unremarkable except for multiple anal Condylomas



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AG Laboratory tests

- CBC WNL
- CMP: fasting gluc=102, GFR=75 otherwise normal
- Fasting lipids: LDL=135 HDL=38 TG=152
- Urinalysis: trace protein
- CD4=420 (25%), 396 (22%)
- HIV VL=39,852, 48,698
- HIV genotype=WT
- HBsAg (-) HBcAb (-), HBsAb (-) HCV Ab (-)
HAV Ab (+)
- HLA-B5701 (-)
- RPR=NR GC (-) CT (+)



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Would you recommend starting ART?

1. Yes
2. No



What to Start With?

Current ARV Medications

NRTI

- Abacavir (ABC)
- Didanosine (ddl)
- Emtricitabine (FTC)
- Lamivudine (3TC)
- Stavudine (d4T)
- Tenofovir (TDF)
- Zidovudine (AZT, ZDV)

NNRTI

- Delavirdine (DLV)
- Efavirenz (EFV)
- Etravirine (ETR)
- Nevirapine (NVP)

PI

- Atazanavir (ATV)
- Darunavir (DRV)
- Fosamprenavir (FPV)
- Indinavir (IDV)
- Lopinavir (LPV)
- Nelfinavir (NFV)
- Ritonavir (RTV)
- Saquinavir (SQV)
- Tipranavir (TPV)

Integrase Inhibitor (II)

- Raltegravir (RAL)

Fusion Inhibitor

- Enfuvirtide (ENF, T-20)

CCR5 Antagonist

- Maraviroc (MVC)

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Factors in Choosing an Initial Regimen

- **Regimen efficacy**
- **Comorbid conditions**
 - Tuberculosis, liver disease, depression, cardiovascular disease, chemical dependency, pregnancy
- **Presence of transmitted resistance mutations**
- **Adherence potential**
 - Pill burden, dosing frequency, food and fluid considerations
- **Potential adverse effects or drug-drug interactions**
- **Potential for development of drug resistance on failure**

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Additional Factors to Consider

- Patient age
- Patient readiness
- Likelihood of treatment adherence
- Potential impact of antiretrovirals on patient quality of life
- Additional comorbidities that could impact success of therapy including depression
- Concurrent drugs not compatible with antiretroviral agents
- Long-term nonprogressors or elite controllers

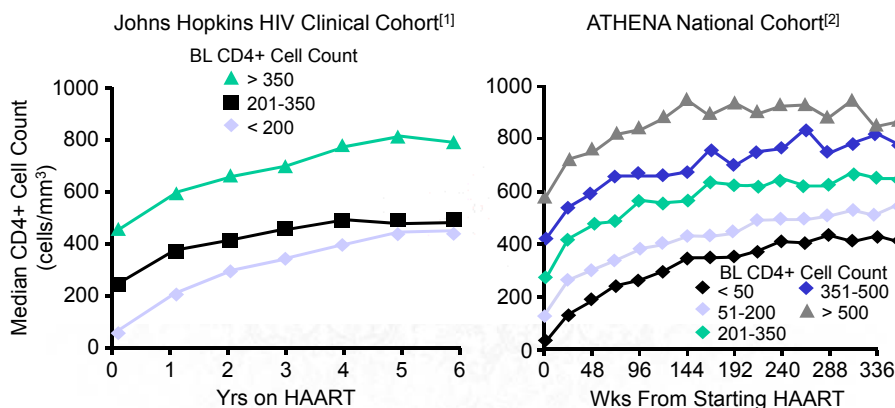
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Likelihood of Achieving Normal CD4+ Cell Count on ART Depends on BL Level



1. Moore RD, et al. Clin Infect Dis. 2007;44:441-446. Published by The University of Chicago Press. <http://www.journals.uchicago.edu/toc/cid/current>

2. Gras L, et al. J Acquir Immune Defic Syndr. 2007;45:183-192. Reproduced with permission.



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Initial ART Regimens: DHHS Categories

- **Preferred**
 - Randomized controlled trials show optimal efficacy and durability
 - Favorable tolerability and toxicity profiles
- **Alternative**
 - Effective but have potential disadvantages
 - May be the preferred regimen in individual patients
- **Acceptable**
 - Less virologic efficacy, lack of efficacy data, or greater toxicities
- **May be acceptable but more definitive data are needed**

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Initial Treatment: Preferred

NNRTI based	▪ EFV/TDF/FTC ^{1,2}
PI based	▪ ATV/r + TDF/FTC ² ▪ DRV/r (daily) + TDF/FTC ²
II based	▪ RAL + TDF/FTC ²
Pregnant women	▪ LPV/r (BID) + ZDV/3TC ²

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Choose EFV-Based Therapy?

- **Why?**
 - Long track record
 - Unbeaten in clinical trials
 - Convenience
 - Forgiving of missed doses
- **Why not?**
 - CNS adverse effects
 - Teratogenicity in first trimester
 - Risk of resistance with treatment interruption
 - Lower CD4+ cell count increase than with other drug classes
 - Lipids?
 - Vitamin D?

Gallant, J. Old School vs. New School: the Role of New Agents.

<http://www.clinicaloptions.com/HIV/Treatment%20Updates/Novel%20First-line%20Therapy.aspx>



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Choose Boosted PI-Based Therapy?

- **Why?**
 - Long track record
 - Greater CD4+ cell count increase than with EFV
 - ATV/RTV as good as EFV with less resistance risk at failure
 - Forgiving of nonadherence
 - Preferred in pregnancy (LPV/RTV)
- **Why not?**
 - GI adverse effects
 - Less convenient—no single-pill regimens
 - Lipids?
 - Lipohypertrophy?
 - Increased TDF renal toxicity?

Gallant, J. Old School vs New School: the Role of New Agents.

<http://www.clinicaloptions.com/HIV/Treatment%20Updates/Novel%20First-line%20Therapy.aspx>

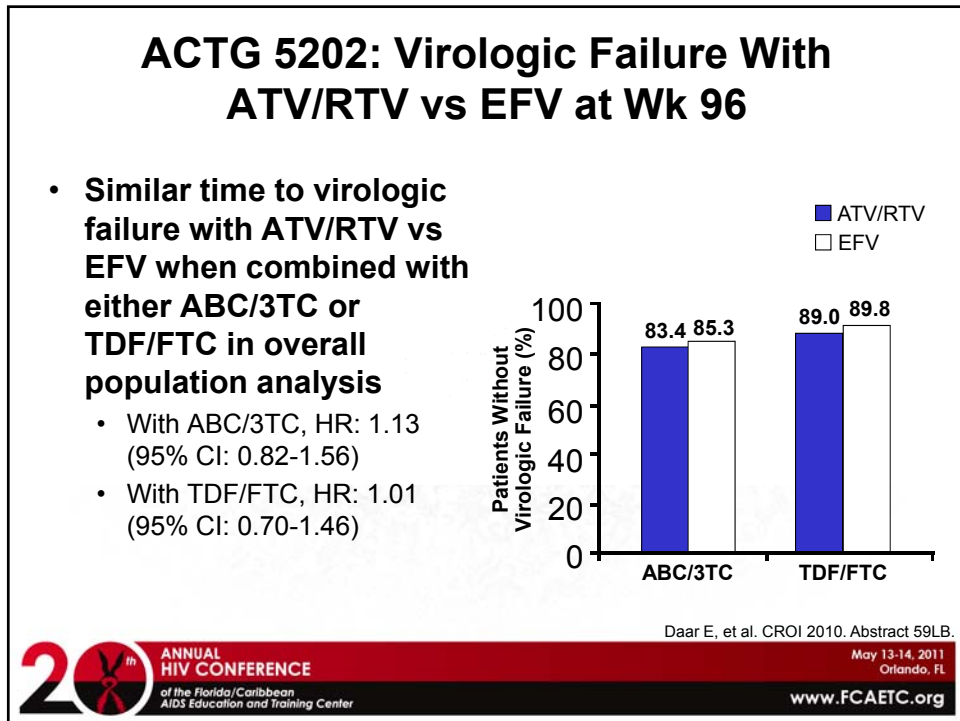
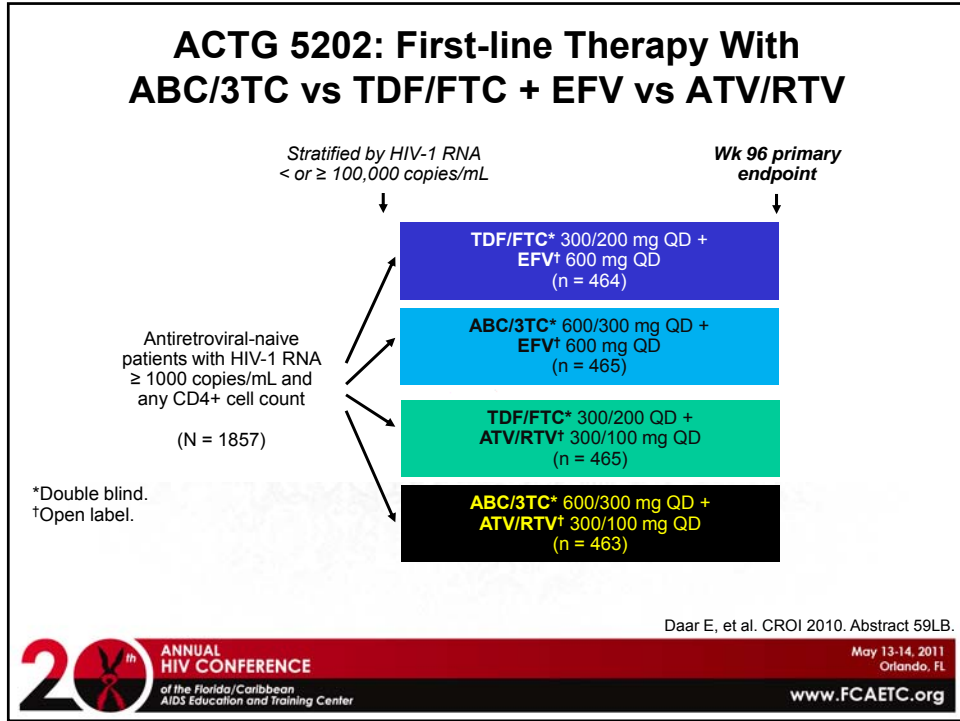


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ACTG 5202: Virologic Failure With ABC/3TC vs TDF/FTC at Wk 96

In pts with BL VL \geq 100,000 copies/mL

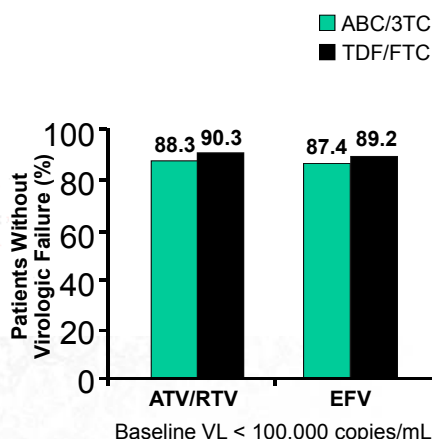
- Shorter time to virologic failure with ABC/3TC vs TDF/FTC regardless of EFV or ATV/RTV

- With EFV, HR: 2.22 (1.19-4.14)
- With ATV/RTV, HR: 2.46 (1.20-5.05)

In pts with BL VL < 100,000 copies/mL

- Similar time to virologic failure with ABC/3TC vs TDF/FTC regardless of ATV/RTV or EFV

- With ATV/RTV, HR: 1.26 (0.76-2.05)
- With EFV, HR: 1.23; (0.77-1.96)



Daar E, et al. CROI 2010. Abstract 59LB.



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ACTG 5202: Safety, Tolerability, and Resistance for ATV/RTV vs EFV

- Poorer safety and tolerability with ABC/3TC + EFV
 - Shorter time to grade 3/4 safety event with EFV than ATV/RTV when combined with ABC/3TC ($P = .05$) but no difference when combined with TDF/FTC ($P = .44$)
 - Shorter time to treatment modification with EFV than ATV/RTV when combined with ABC/3TC ($P = .0008$) but no difference when combined with TDF/FTC ($P = .17$)
- Major resistance mutations at VF more frequent with EFV vs ATV/RTV plus either ABC/3TC or TDF/FTC ($P < .001$ for both NRTI arms)
- Higher median CD4+ increases at Wks 48 and 96 with ATV/RTV vs EFV when combined with TDF/FTC but no difference with ABC/3TC
 - 252 vs 221 cells/mm³ for ATV/RTV vs EFV (+ TDF/FTC) at Wk 96 ($P = .002$)
- Greater lipid increases with EFV vs ATV/RTV ($P < .05$)
 - No significant difference in TC:HDL ratio between arms

Daar E, et al. CROI 2010. Abstract 59LB.



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Choose Raltegravir-Based Therapy?

- **Why?**
 - Very well tolerated
 - As effective as EFV with better tolerability
 - No lipid effects
 - Not known to be teratogenic
 - Rapid virologic suppression (clinical significance unknown)
 - Greater CD4+ cell count increase than with EFV
- **Why not?**
 - No long-term data
 - Twice-daily dosing
 - Resistance risk at VF similar to EFV

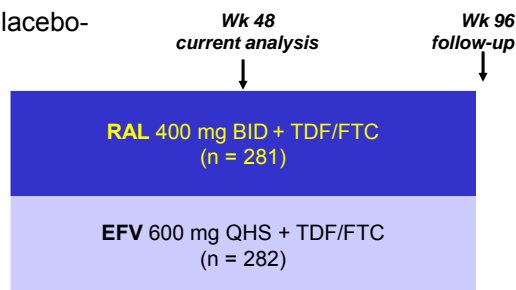
Gallant, J. Old School vs New School: the Role of New Agents.
<http://www.clinicaloptions.com/HIV/Treatment%20Updates/Novel%20First-line%20Therapy.aspx>



STARTMRK: RAL vs EFV in Treatment-Naive Patients

- Randomized, phase III placebo-controlled trial

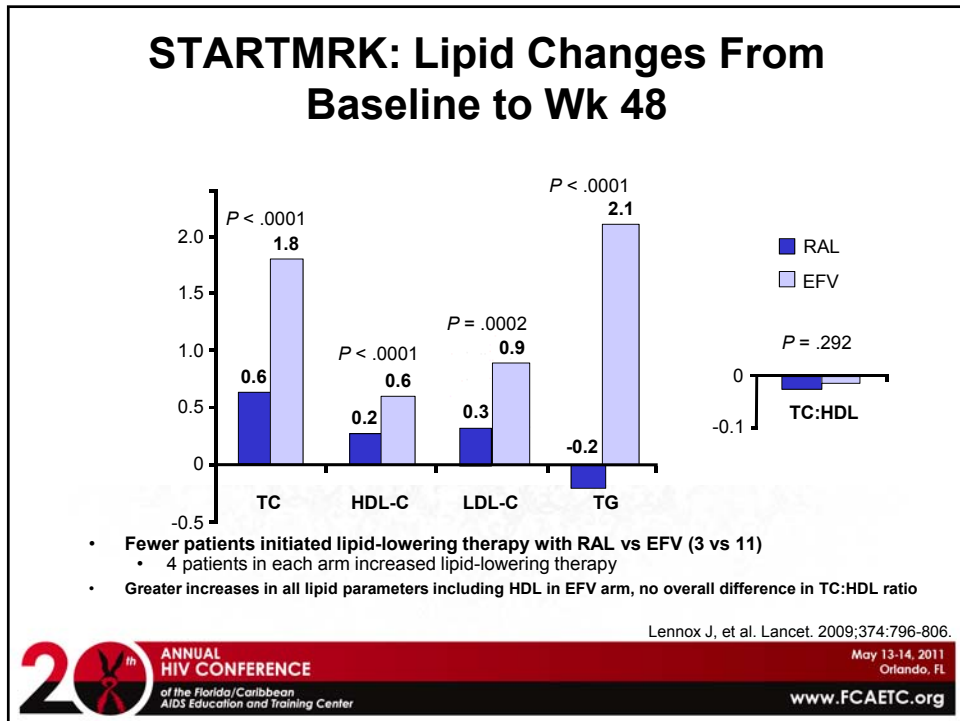
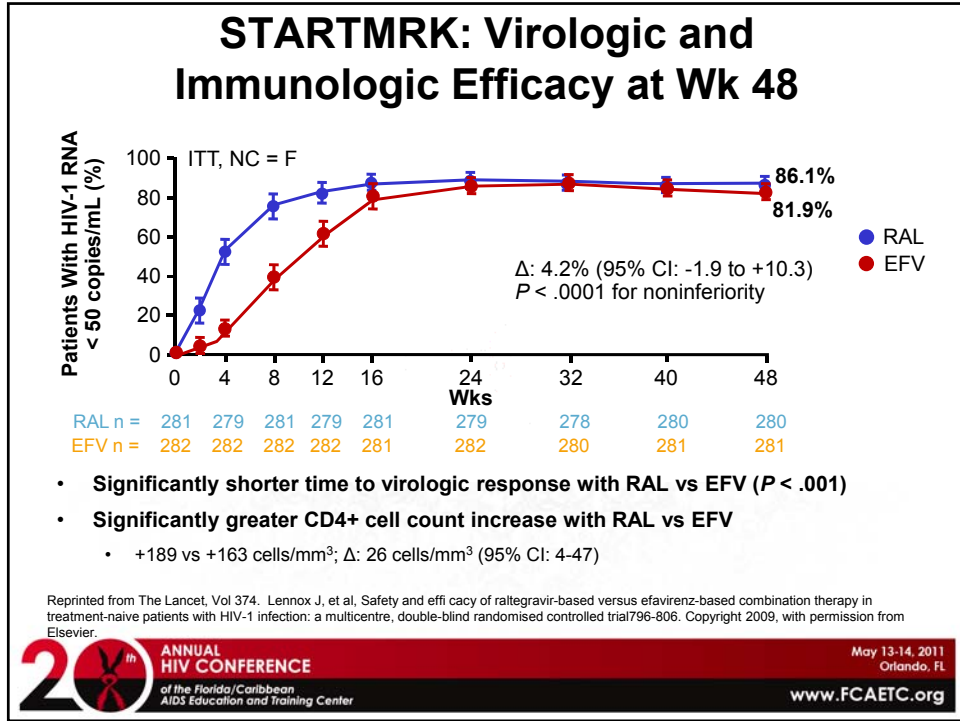
HIV-infected, treatment-naive patients with HIV-1 RNA > 5000 copies/mL and no resistance to EFV, TDF, or FTC (N = 563)



- Primary endpoint: HIV-1 RNA < 50 copies/mL at Wk 48
- Secondary endpoints: CD4+ cell count, HIV-1 RNA < 400 copies/mL
- 53% of patients had HIV-1 RNA > 10⁵ copies/mL; 48% had CD4+ cell counts < 200 cells/mm³ at baseline

Lennox J, et al. Lancet. 2009;374:796-806.





Initial Treatment: Alternatives

NNRTI based	<ul style="list-style-type: none"> ▪ EFV¹ + [(ABC/3TC)^{2,3} or (ZDV/3TC)²] ▪ NVP⁴ + ZDV/3TC²
PI based	<ul style="list-style-type: none"> ▪ ATV/r + [(ABC/3TC)^{2,3} or (ZDV/3TC)²] ▪ FPV/r (daily or BID) + [(ABC/3TC)^{2,3} or (ZDV/3TC)² or (TDF/FTC)²] ▪ LPV/r (daily or BID)⁵ + [(ABC/3TC)^{2,3} or (ZDV/3TC)² or (TDF/FTC)²]

1. EFV should not be used during the first trimester of pregnancy or in women trying to conceive or not using effective and consistent contraception.
2. 3TC can be used in place of FTC and vice versa.
3. ABC should not be used in patients who test positive for HLA B*5701; caution if HIV RNA >100,000 copies/mL, or if high risk of cardiovascular disease.
4. NVP should not be started if pre-ARV CD4 >250 in women or >400 in men.
5. Once daily LPV/r is not recommended in pregnant women.

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Initial Treatment: Acceptable

NNRTI based	▪ EFV ¹ + ddI + (3TC or FTC)
PI based	▪ ATV ⁴ + [(ABC/3TC) ^{2,3} or (ZDV/3TC) ²]
CCR5 Antagonist based	▪ MVC ⁵ + ZDV/3TC ²

1. EFV should not be used during the first trimester of pregnancy or in women trying to conceive or not using effective and consistent contraception.
2. 3TC can be used in place of FTC and vice versa.
3. ABC should not be used in patients who test positive for HLA-B*5701; caution if HIV RNA >100,000 copies/mL, or if high risk of cardiovascular disease.
4. ATV/r generally preferred over ATV; consider unboosted ATV if RTV boosting not possible.
5. Tropism testing required before treatment with MVC; use only if CCR5-tropic virus is present.

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Initial Treatment: May Be Acceptable but More Definitive Data Needed

PI based	▪ DRV/r + (ABC/3TC) ^{1,2} or (ZDV/3TC) ²
II based	▪ RAL + (ABC/3TC) ^{1,2} or (ZDV/3TC) ²
CCR5 Antagonist based	▪ MVC ³ + TDF/FTC ² or ABC/3TC ^{1,2}

1. 3TC can be used in place of FTC and vice versa.
2. ABC should not be used in patients who test positive for HLA-B*5701; caution if HIV RNA >100,000 copies/mL, or if high risk of cardiovascular disease.
3. Test tropism before treatment with MVC, use MVC only in those with exclusively CCR5-tropic virus.

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Initial Treatment: Use with Caution (1)

NNRTI based	▪ NVP + ABC/3TC ^{1,2,3,4} ▪ NVP + TDF/FTC ^{1,3,4,5}
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1. 3TC can be used in place of FTC and vice versa.
2. ABC should not be used in patients who test positive for HLA-B*5701; caution if HIV RNA >100,000 copies/mL, or if high risk of cardiovascular disease.
3. NVP and ABC both can cause hypersensitivity reaction in first few weeks of treatment.
4. NVP should not be started if pre-ARV CD4 >250 in women or >400 in men.
5. Early virologic failure in some patients; larger studies under way.

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Initial Treatment: Use with Caution (2)

PI based	<ul style="list-style-type: none"> ▪ FPV + (ABC/3TC) or (ZDV/3TC) or TDF/FTC^{1,2,3,4} ▪ SQV/r + TDF/FTC^{2,4} ▪ SQV/r + ABC/3TC or ZDV/3TC^{2,3,4}
-----------------	--

1. FPV/r generally preferred over unboosted FPV. Virologic failure may select mutations that confer cross-resistance to DRV.
2. 3TC can be used in place of FTC and vice versa.
3. ABC should not be used in patients who test positive for HLA-B*5701; caution if HIV RNA >100,000 copies/mL, or if high risk of cardiovascular disease.
4. SQV/r associated with PR and QT prolongation. Do baseline ECG; avoid SQV/r if risks prolonged QT or risk factors for PR and QT prolongation or AV block.

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ARVs Not Recommended in Initial Treatment

High rate of early virologic failure	<ul style="list-style-type: none"> ▪ ddI + TDF
Inferior virologic efficacy	<ul style="list-style-type: none"> ▪ ABC + 3TC + ZDV as 3-NRTI regimen ▪ ABC + 3TC + ZDV + TDF as 4-NRTI regimen ▪ DLV ▪ NFV ▪ SQV as sole PI (unboosted) ▪ TPV/r
High incidence of toxicities	<ul style="list-style-type: none"> ▪ d4T + 3TC ▪ ddI + TDF ▪ IDV/r ▪ RTV as sole PI

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ARV Medications: Should Not Be Offered at Any Time

- **ARV regimens not recommended:**
 - Monotherapy with NRTI*
 - Dual-NRTI therapy
 - 3-NRTI regimen (except ABC + 3TC + ZDV or possibly TDF + 3TC + ZDV, when other regimens are not desirable)

* If ZDV monotherapy is being considered for prevention of mother-to-child transmission, see Public Health Service Task Force Recommendations for the Use of Antiretroviral Drugs in Pregnant HIV-Infected Women for Maternal Health and Interventions to Reduce Perinatal HIV Transmission in the United States.

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Summary

- **Consider the patient's comorbidities, mental health and lifestyle.**
- **Educate, educate, educate:**
 - Adherence and ways to improve it
 - Side effects
 - Controlling comorbidities



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ARV Components in Initial Therapy: NNRTIs

ADVANTAGES

- Long half-lives
- Less metabolic toxicity (dyslipidemia, insulin resistance) than with some PIs
- PIs and II preserved for future use

DISADVANTAGES

- Low genetic barrier to resistance – single mutation
- Cross-resistance among most NNRTIs
- Rash; hepatotoxicity
- Potential drug interactions (CYP450)
- Transmitted resistance to NNRTIs more common than resistance to PIs

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ARV Components in Initial Therapy: PIs

ADVANTAGES

- Higher genetic barrier to resistance
- PI resistance uncommon with failure (boosted PI)
- NNRTIs and II preserved for future use

DISADVANTAGES

- Metabolic complications (fat maldistribution, dyslipidemia, insulin resistance)
- GI intolerance
- Potential for drug interactions (CYP450), especially with RTV

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ARV Components in Initial Therapy: Dual-NRTI Pairs

ADVANTAGES

- Established backbone of combination therapy
- Minimal drug interactions

DISADVANTAGES

- Lactic acidosis and hepatic steatosis reported with most NRTIs (rare)

Coffey S. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents: Initiation of Therapy [PowerPoint]. AIDS Education and Training Centers, National Resource Center; January 2011

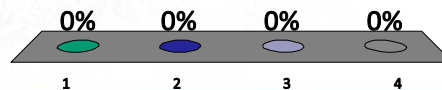
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What regimen would you choose to treat AG?

1. Tenofovir/emtricitabine/
efavirenz
2. Tenofovir/emtricitabine/
boosted atazanavir
3. Tenofovir/emtricitabine/
boosted darunavir
4. Tenofovir/emtricitabine/
raltegravir



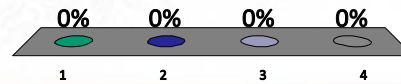
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Which of the following co-morbidities did you consider most in your regimen selection for AG?

1. Dyslipidemia
2. Bipolar depression
3. Smoker
4. Occupation



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Case study #2: MS

- 28 Y/O AAF goes to your clinic after a 14 months absence. She returns now due to fatigue and increased night sweats. HIV infected since 2006 through unprotected heterosexual transmission. ARV naïve.
- PMH: bipolar disorder will see psychiatrist in two weeks.
- Occupation: commercial sex worker
- Family Hx: noncontributory
- Social Hx: smoker of ½ ppd X 12 years. Hx IVDU. Now in a substance abuse program.



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MS Physical exam

- Well nourished, well developed, NAD
- Temp=97.5 F P=85 R=16 BP=112/68
Wt=112 BMI=22
- Physical exam normal. Pap smear done.
- Mental status: flat affect, depressed mood, no suicidal ideas.



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MS Laboratory results

- CBC: Hgb=10.8 g/dL Hct=32%
- CMP: GFR=110 AST=65 ALT=89 T. bili=0.6
- Urinalysis: normal
- HBsAb (+) HBcAb (+) HBsAg (-) HCV Ab (+)
HAV Ab total (+)
- CD4=320 (18%) VL=58,695. CD4=625 VL=2658 in
2006
- Genotype: wild type. Genotype 2006: K103N
- HLA-B5701 (-)
- RPR=NR Urine GC (-) CT (-)




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Would you recommend starting ART?

1. Yes
2. No

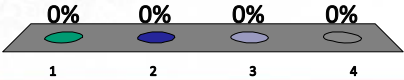


Response	Percentage
1. Yes	0%
2. No	0%

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Which of the following regimen options would not be appropriate to choose for MS?

1. **Tenofovir/emtricitabine/efavirenz**
2. Tenofovir/emtricitabine/boosted atazanavir
3. Tenofovir/emtricitabine/boosted darunavir
4. Tenofovir/emtricitabine/raltegravir



Regimen Option	Percentage
1. Tenofovir/emtricitabine/efavirenz	0%
2. Tenofovir/emtricitabine/boosted atazanavir	0%
3. Tenofovir/emtricitabine/boosted darunavir	0%
4. Tenofovir/emtricitabine/raltegravir	0%

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About This Slide Set

- Some of the slides were prepared using the slide set prepared by Susa Coffey, MD, for the AETC National Resource Center in January 2011.
- See the AETC NRC website for the most current version of this presentation:

<http://www.aidsetc.org>

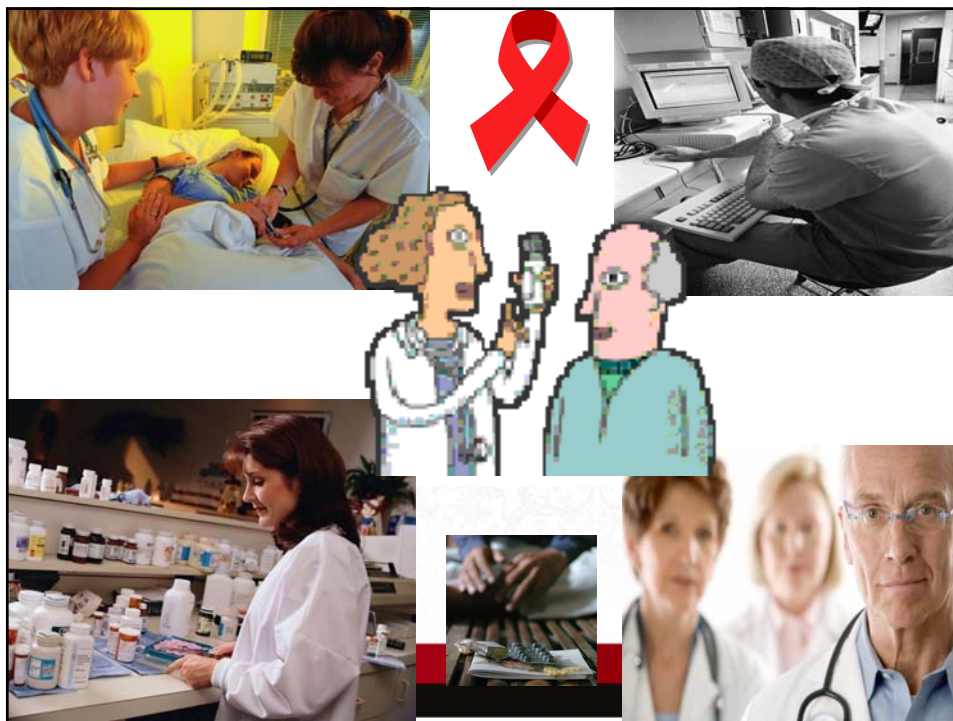


Websites to Access the Guidelines

- <http://www.aidsetc.org>
- <http://aidsinfo.nih.gov>



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This speaker has no significant financial relationships with commercial entities to disclose.

This slide set has been peer-reviewed to ensure that there are no conflicts of interest represented in the presentation.



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Laboratory tests



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Baseline labs

- **CBC, CMP, fasting lipids, urinalysis**
- **CD4 count**
- **HIV viral load**
- **HIV genotype**
- **RPR, urine Chlamydia and Gonorrhea GenProbe**
- **HLA-B5701**
- **Pap smear (cervical and anal)**



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Use of CD4 Cell Levels to Guide Therapy Decisions

- **CD4 count**
 - The major indicator of immune function
 - Most recent CD4 count is best predictor of disease progression
 - A key factor in decision to start ART or OI prophylaxis
 - Important in determining response to ART
 - Adequate response: CD4 increase 50-150 cells/ μ L per year
- **CD4 monitoring**
 - Check at baseline (x 2) and at least every 3-6 months*

* May consider every 6-12 months in clinically stable patients with sustained HIV RNA suppression and CD4 status well above threshold for opportunistic infection risk



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Use of HIV RNA Levels to Guide Therapy Decisions

- **HIV RNA**
 - May influence decision to start ART and help determine frequency of CD4 monitoring
 - Critical in determining response to ART
 - Goal of ART: HIV RNA below limit of detection (ie, <20-75 copies/mL, depending on assay)



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Use of HIV RNA Levels to Guide Therapy Decisions (2)

- **RNA monitoring**
 - Check at baseline (x 2)
 - Immediately before initiating ART
 - 2-4 weeks (not more than 8 weeks) after start or change of ART, then every 4-8 weeks until suppressed to <200 copies/mL
 - Every 3-4 months with stable patients; may consider every 6 months for stable adherent patients with VL suppression >2-3 years
 - Isolated “blips” may occur (transient low-level RNA, typically <400 copies/mL), are not thought to predict virologic failure
 - ACTG defines virologic failure as confirmed HIV RNA >200 copies/mL



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Testing for Drug Resistance

- **Before initiation of ART:**
 - Transmitted resistance in 6-16% of HIV-infected patients
 - In absence of therapy, resistance mutations may decline over time and become undetectable by current assays, but may persist and cause treatment failure when ART is started
 - Identification of resistance mutations may optimize treatment outcomes
 - Resistance testing (genotype) recommended for all at entry to care
 - Recommended for all pregnant women
- **Patients with virologic failure:**
 - Perform while patient is taking ART, or ≤ 4 weeks after discontinuing therapy
 - Interpret in combination with history of ARV exposure and ARV adherence



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Drug Resistance Testing: Recommendations

RECOMMENDED	COMMENT
Acute HIV infection, regardless of whether treatment is to be started	To determine if resistant virus was transmitted; guide treatment decisions. If treatment is deferred, consider repeat testing at time of ART initiation. Genotype preferred.
Chronic HIV infection, at entry into care	Transmitted drug-resistant virus is common in some areas; is more likely to be detected earlier in the course of HIV infection. If treatment is deferred, consider repeat testing at time of ART initiation. Genotype preferred to phenotype. Consider integrase genotypic resistance assay if integrase inhibitor resistance is a concern.



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Drug Resistance Testing: Recommendations ⁽³⁾

RECOMMENDED	COMMENT
Pregnancy	<p>Recommended before initiation of ART or prophylaxis.</p> <p>Recommended for all on ART with detectable HIV RNA levels.</p> <p>Genotype usually preferred; add phenotype if complex drug resistance mutation pattern.</p>

Other Assessment and Monitoring Studies

- **HLA-B*5701 screening**
 - Recommended before starting ABC, to reduce risk of hypersensitivity reaction (HSR)
 - HLA-B*5701-positive patients should not receive ABC
 - Positive status should be recorded as an ABC allergy
 - If HLA-B*5701 testing is not available, ABC may be initiated after counseling and with appropriate monitoring for HSR
- **Coreceptor tropism assay**
 - Should be performed when a CCR5 antagonist is being considered
 - Requires plasma HIV RNA $\geq 1,000$ copies/mL
 - Proviral DNA assay is available for use in samples with HIV RNA below limit of detection; not clinically validated
 - Consider in patients with virologic failure on a CCR5 antagonist (though does not rule out resistance to CCR5 antagonist)