

# HIV Care Update

**Michael Para, MD**  
**Division of Infectious Diseases**  
**Ohio State University**

## Global summary of the AIDS epidemic

### Number of people living with HIV in 2008

Total	33.4 million	
Adults	31.3 million	<15yr = 2.1million
Women	15.7 million	

### People newly infected with HIV in 2008

Total	2.7 million
Adults	2.3 million
Children under 15 yrs	430 000

### AIDS-related deaths in 2008

Total	2.0 million
Adults	1.7 million
Children under 15 yrs	280 000

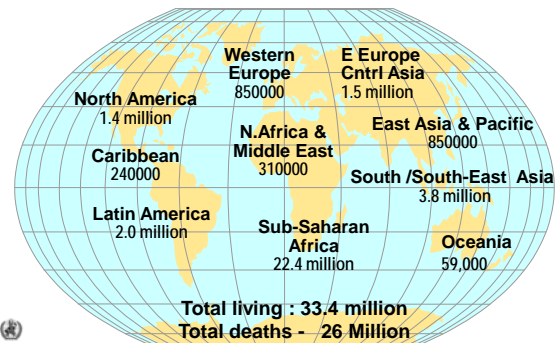
December 2009

## About 7400 new HIV infections a day in 2008

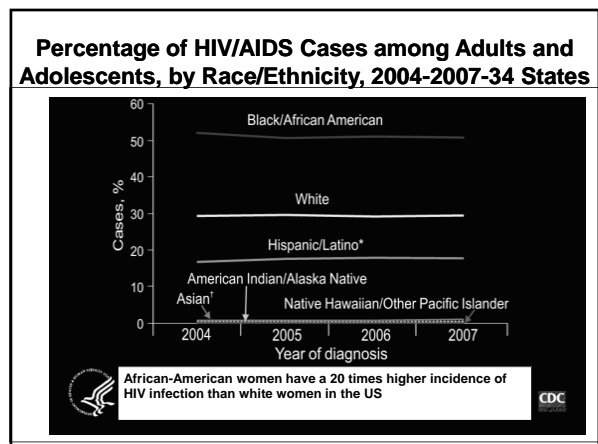
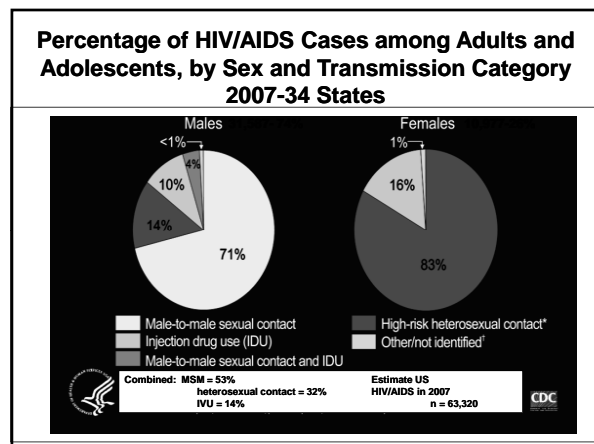
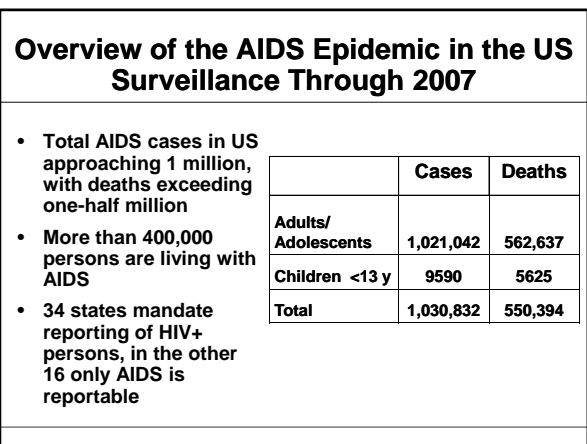
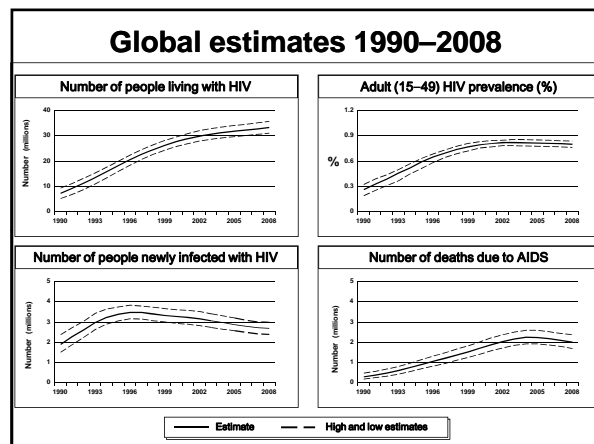
- More than 97% are in low & middle income countries.
  - ✓ Most unaware of infection
- About 6,200 are in persons aged 15 to 49 years, of whom:
  - 50% are in women
  - about 40% are 15–24 years old
  - in sub-Saharan Africa women 61%
- Almost 1200 are in children under 15 yrs of age



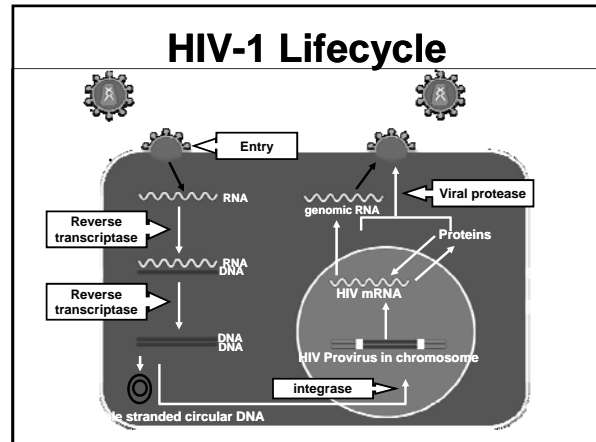
## Adults and children estimated to be living with HIV/AIDS Dec 2008



UNAIDS 8/2008



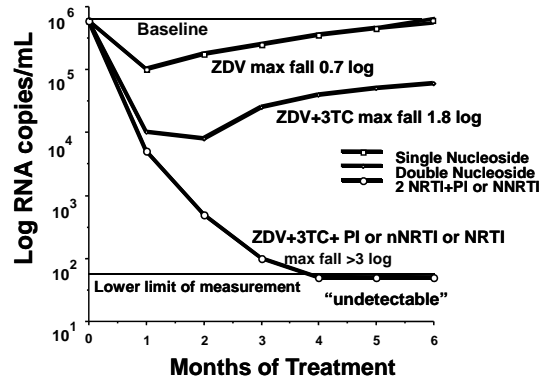
# HIV Treatment



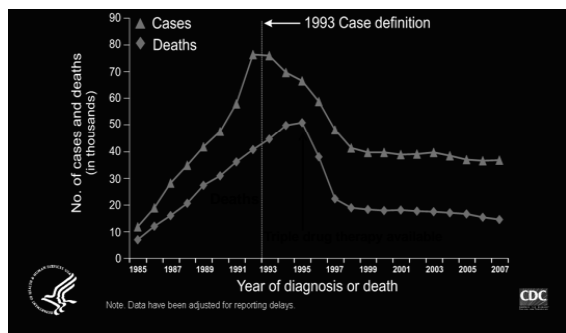
## Antiretroviral Medications - 2010

<b>Nucleoside Rev. Transcriptase Inhibitor</b>	<b>Protease Inhibitor</b>	<b>Fusion Inhibitor</b>
Abacavir	Atazanavir	Enfuvirtide
Didanosine	Darunavir	
Emtricitabine	Fosamprenavir	
Lamivudine	Indinavir	
Stavudine	Lopinavir	
Tenofovir	Nelfinavir	
Zidovudine	Ritonavir	
	Saquinavir	
	Tipranavir	
<b>NonNRTI</b>		<b>CCR5 Antagonist</b>
Delavirdine		Maraviroc
Efavirenz		
Etravirine		
Nevirapine		
	<b>Integrase Inhibitor</b>	
	Raltegravir	
	<b>Combinations</b>	
	Atripla	
	Trizivir	
	Truvada	
	Epzicom	

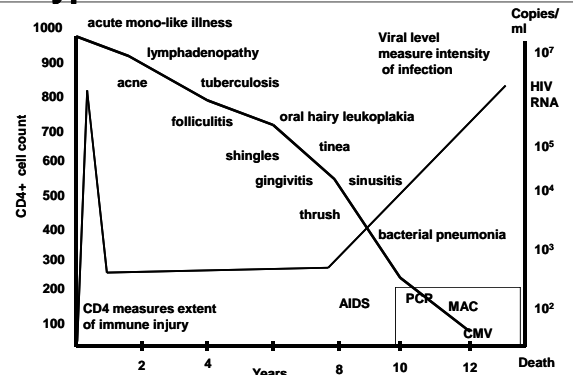
## Effect of Treatment on HIV Viral Load



**Estimated Numbers of AIDS Cases and Deaths among Adults and Adolescents with AIDS 1985-2007  
United State and Dependent Areas**



**“Typical” Course of Untreated HIV**



**Guidelines for the Use of Antiretroviral  
Agents in HIV-1-Infected  
Adults and Adolescents**

<http://www.aidsinfo.nih.gov>

**December 1, 2009**

Developed by the DHHS Panel on  
Antiretroviral Guidelines for Adults  
and Adolescents – A Working Group of the  
Office of AIDS Research Advisory Council (OARAC)

**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

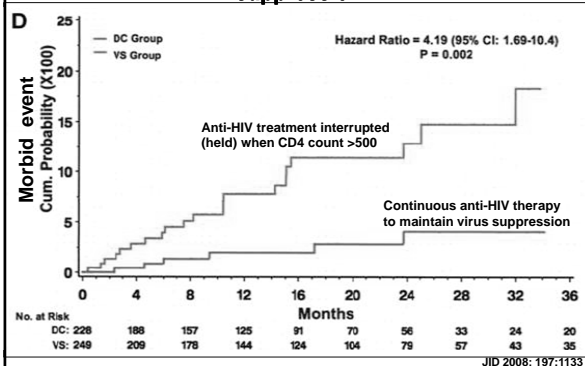
### Characterization of HIV disease status Baseline Diagnostic Studies

- HIV serology – if needed confirm diagnosis
- CD4 cell count, CD4% - extent of immune injury
  - ✓ Key factor in decision to start ART or OI prophylaxis
- Plasma HIV RNA – severity of infection
  - Critical in determining response to ART, goal < 50
- Antiviral drug resistance test (genotype)

### When to Start Anti-Retroviral Therapy (ART)

- ✓ Exact CD4 count at which to initiate therapy not known, but evidence points to starting at higher count
- ✓ ART may improve/preserve immune function in most patients with virologic suppression, regardless of baseline CD4 count
  - Earlier ART may result in better immunologic responses, outcomes
  - Reduction in AIDS & non-AIDS-associated morbidity and mortality
  - Reduction in HIV-associated inflammation and associated complications
  - Reduction in HIV transmission
- ✓ Current recommendation: ART for all with CD4 <500 cells/ $\mu$ L

### SMART trial of HIV treatment strategies drug sparing vs continuous therapy with viral suppression



### Limitations of Early Therapy

(CD4 count >500 cells/ $\mu$ L)

- Development of treatment-related short term side effects, and long term toxicities
- Another \$15,000-\$20,000/yr of cost
- Premature use of therapy before the development of more effective, less toxic, and/or better studied combinations of antiretroviral drugs
- Development of drug resistance from incomplete viral suppression, resulting in loss of future treatment options
- Transmission of drug-resistant virus in patients who do not maintain full virologic suppression

### What HIV medications to start? Initial Treatment: Preferred Regimens

<b>NNRTI based</b>	▪EFV/TDF/FTC (one pill - Atripla)
<b>Protease Inhibitor based</b>	▪ATV/rtv + TDF/FTC (3 pills once daily) ▪DRV/rtv (QD) + TDF/FTC
<b>Integrase based</b>	▪RAL + TDF/FTC
<b>Pregnant Women</b>	▪LPV/rtv (BID) + ZDV/3TC

EFV/TDF/FTC = efavirenz + tenofovir + emtricitabine (Atripla - 1 pill daily)  
TDF/FTC = tenofovir+ emtricitabine (Truvada)

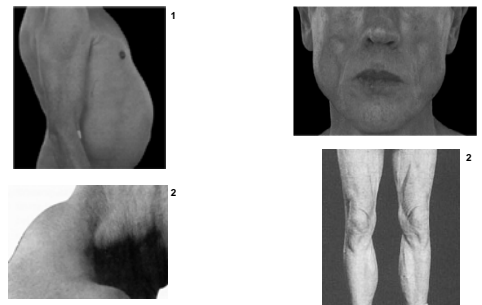
### Considerations in Choosing ART (Leave to HIV consultant)

- Results of drug resistance testing
- Co-morbidities (e.g., liver, psychiatric, CVD, TB)
- Pregnancy potential (efavirenz)
- Potential adverse effects
- Potential drug interactions (especially protease inhibitors)
- Adherence potential
- Specific ART issues
  - ❖ Gender and CD4 count, if considering nevirapine
  - ❖ HLA B\*5701 testing, if considering abacavir
  - ❖ Co-receptor tropism assay

### Adverse Effects: NRTIs

- All NRTIs:
  - ✓ Lactic acidosis and hepatic steatosis
    - Higher incidence with d4T  
(d4T > ddI = ZDV > TDF = ABC = 3TC = FTC)
  - ✓ Lipodystrophy
- ZDV (AZT; Retrovir) – Bone marrow suppression
- TDF (Viread) Renal impairment
- d4T (Zerit) - Peripheral neuropathy
- Abacavir (Ziagen) – severe hypersensitivity reaction
- ddI (Videx) - GI intolerance, Pancreatitis

### HIV-Associated Lipodystrophy



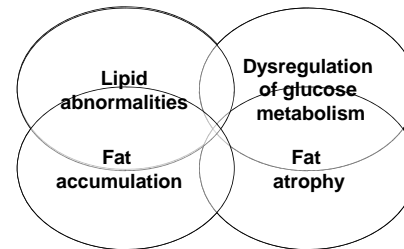
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<sup>2</sup>International Journal of STD and AIDS (1998;9:596). Copyright 1998, Royal Society of Medicine Press Ltd.

## Adverse Effects: Protease Inhibitors

- All PIs:
  - ✓ Hyperlipidemia
  - ✓ Insulin resistance and diabetes
  - ✓ Lipodystrophy
  - ✓ Elevated LFTs
  - ✓ Significant drug-drug interactions
- Always check for drug interactions in patients receiving HIV medications

## Metabolic Changes Associated With ART and HIV Infection

Unclear etiology



## Prevention of HIV infection

## HIV Transmission

- Virus found in blood, CSF, breast milk, semen, vaginal fluids
- Plasma viral level correlates infectivity via all modes
- Minimal virus in sweat, saliva, feces, urine & not considered infectious
  1. Sexual contact: M to F more likely than F to M, ? 1 in 1000
    - STDs especially genital ulcers predispose to transmission
  2. Inoculation of contaminated blood or blood products (needlestick exposure) e.g. IVDU, occupational exposure
    - Occupational exposure of HCW (rare; < 60 cases reported)
      - Risk from needlestick overall 1 in 300
    - Only one documented instance of HCW to patient spread,
  3. Perinatal spread: 30% without intervention
    - Intrauterine, peripartum, postpartum (breast milk)

## HIV Prevention Efforts: New Hope

- HIV testing – results do alter behavior
- Male Circumcision – clearly decreases acquisition
- Microbicides – like spermicides, recent +/- study
- HIV vaccines – recent study showing effectiveness
- Antiretroviral therapy – decreases transmission
  - ✓ Some data suggest broader use would limit epidemic
- Pre-exposure prophylaxis with ART for HIV negative
- Maternal to Child Transmission

# MMWR™

Morbidity and Mortality Weekly Report

Recommendations and Reports

September 22, 2006 / Vol. 55 / No. RR-14

**Revised Recommendations for HIV Testing  
of Adults, Adolescents, and Pregnant Women  
in Health-Care Settings**

## Issues in HIV testing – “Opt-out” testing

- CDC strategy: normalize HIV testing by making it a routine, voluntary part of care for everyone aged 13–64
  - ✓ Overall consent for medical care should include HIV test
  - ✓ Individual can decline test (opt-out)
- ACP
  - ✓ Recommends that clinicians adopt routine screening for HIV and encourage patients to be tested
  - ✓ Recommends that clinicians determine the need for repeat screening on an individual basis.
- Goals:
  - ✓ Identify ~252–312K HIV+ persons – including pregnant women – who are unaware of serostatus
  - ✓ Refer for care, preserve immune function, reduce transmission and stem US epidemic

## South African Circumcision Trial New HIV Infections

Arm	Month 0-3	Month 4-12	Month 12-21	Total
Circ n=1538	2	7	11	20
Control n= 1590	9	15	25	49
Total	11	22	36	69

### Incidence

Circumcision arm 0.85 / 100 person years

Control arm 2.10 / 100 person years

Risk ratio = 0.40

Protection = 60% trial stopped early !!

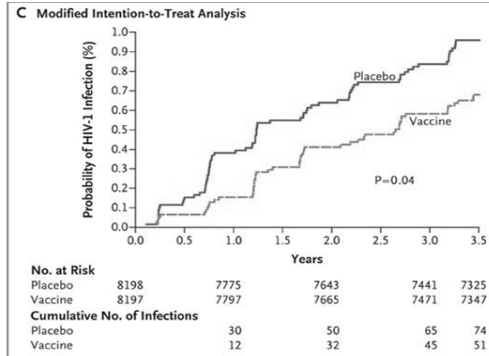


## Prevention - Vaccine

- The Sanofi – Pasteur / Vaxgen Trial with CDC and DOD
- This trial primed individuals with a sub-unit vaccine of recombinant gp120 (VaxGen) and then boosted the immune response with a recombinant canarypox vector expressing same gp120 (Clades B and E)

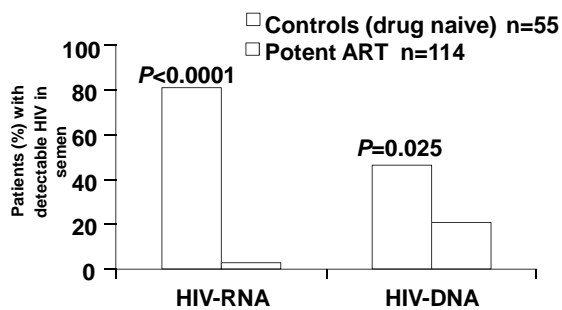
New Engl J Med Dec 3, 2009

## First Partially Effective HIV Vaccine Trial Cumulative Rates of Infection



## Antiviral Treatment as Prevention

ART-Induced Reduction in Plasma HIV RNA Associated with Decreased Levels in Semen



## Impact of Antiretroviral (ART) on HIV Transmission Among HIV Serodiscordant Couples

- ART offered in Kigali, Rwanda since 2003
- 1034 serodiscordant couples followed
- 248 “index cases” receiving ART (CD4<200)
- In spite of counseling, 42 seroconversions
- Only 2/42 seroconversions with partner on ART
- Persons on antiretroviral therapy had 80% less HIV infections than those on no therapy (OR=0.19 (95% CI 0.05-0.80))
- There are models suggesting this could work to decrease HIV spread within treated community

## New Challenges

1. Find better ways to achieve behavior modification to reduce transmission
2. Provide better access to care and make therapy available to the peoples of the developing world.
3. Find methods to get better drug adherence
4. Develop new antiretroviral agents that are better tolerated, more convenient, less toxic and active against resistant virus.
5. Develop vaccine, and vaccinate world



**Pennsylvania/MidAtlantic AIDS Education  
and Training Center**  
**[www.pamaaetc.org](http://www.pamaaetc.org)**

**National Resource Center [www.aidsetc.org](http://www.aidsetc.org)**