

The most important things you need to know about hiv therapy in the whole world



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AIDS Research and Treatment Center

HIV: Where are we?

GOOD NEWS

- Lots of HIV meds
 - Easier to take
 - More powerful
 - Better tolerated
 - Generally free or low cost*
- Long term survival with HIV
- More people getting tested

BAD NEWS

- Many people do not take care of themselves
- New infections continue
- Accelerated aging of HIV+ people

Current Antiretroviral Medications

NRTI

- | | |
|-----------------|-----|
| □ Abacavir | ABC |
| □ Didanosine | DDI |
| □ Emtricitabine | FTC |
| □ Lamivudine | 3TC |
| □ Stavudine | D4T |
| □ Zidovudine | ZDV |
| □ Tenofovir | TDF |

NNRTI

- | | |
|---------------|-----|
| □ Delavirdine | DLV |
| □ Efavirenz | EFV |
| □ Nevirapine | NVP |
| □ Etravirine | ETV |

Integrase Inhibitor

- | | |
|---------------|-----|
| □ Raltegravir | RAL |
|---------------|-----|

PI

- | | |
|-----------------|-----|
| □ Amprenavir | APV |
| □ Atazanavir | ATV |
| □ Darunavir | DRV |
| □ Fosamprenavir | FPV |
| □ Indinavir | IDV |
| □ Lopinavir | LPV |
| □ Nelfinavir | NFV |
| □ Ritonavir | RTV |
| □ Saquinavir | SQV |
| □ Tipranavir | TPV |

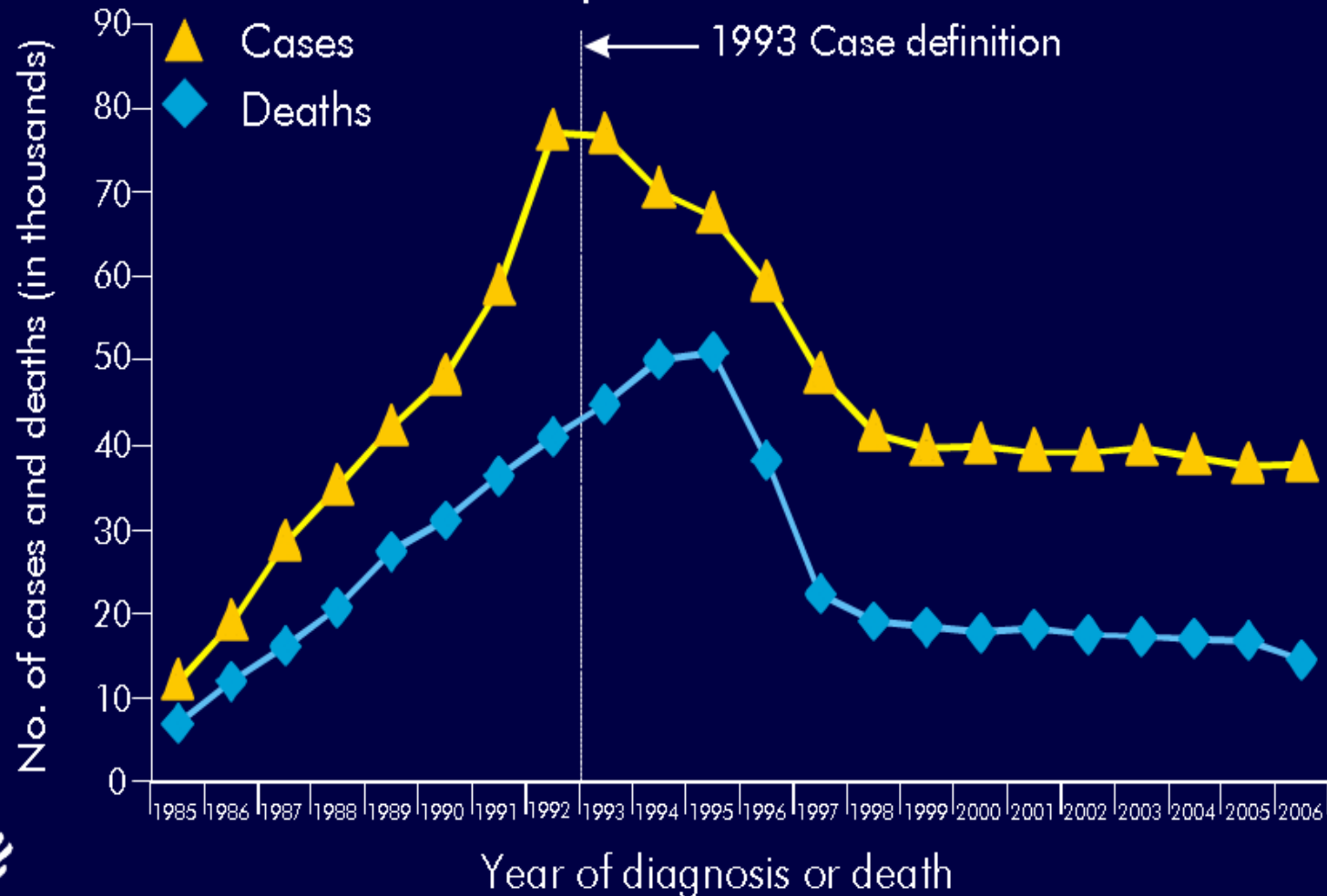
Entry Inhibitor

- | | |
|---------------|------|
| □ Enfuvirtide | T-20 |
| □ Marviroc | MVC |

Therapy is Easier, more Potent, and less Toxic



Estimated Number of AIDS Cases and Deaths among Adults and Adolescents with AIDS, 1985–2006—United States and Dependent Areas



Note. Data have been adjusted for reporting delays.



A 35 yo man, non-IDU, diagnosed with HIV starting HIV therapy at CD4>200 can expect to live into his 70's

	Men	Women	Injecting drug users	Non-injecting drug users
Life expectancy (years; adjusted)				
Exact age 20 years	42.8 (SE 0.45)	44.2 (SE 0.55)	32.6 (SE 1.06)	44.7 (SE 0.34)
Exact age 35 years	31.7 (SE 0.24)	32.5 (SE 0.44)	23.4 (SE 0.60)	33.0 (SE 0.22)
Percent surviving from 20 to 44 years	80.2%	83.1%	66.5%	84.1%

	<100 cells per μ L	100–199 cells per μ L	$\geq$ 200 cells per μ L
Life expectancy (years; adjusted)			
Exact age 20 years	32.4 (SE 1.09)	42.0 (SE 0.62)	50.4 (SE 0.41)
Exact age 35 years	27.0 (SE 0.37)	30.4 (SE 0.45)	37.2 (SE 0.33)
Percent surviving from 20 to 44 years	59.8%	80.6%	89.9%

Estimated HIV Incidence*—United States, 2006

56,300 new HIV
infections
in 2006

95% Confidence Interval:
48,200 to 64,500

*Based On Stratified Extrapolation Approach

Ref: *JAMA*, Vol 300, No. 5, August 6, 2008



Note: Data have been adjusted for reporting delay and cases without risk factor information were proportionately redistributed.

Estimates of New HIV Infections in the United States

CDC HIV/AIDS FACTS

AUGUST 2008

Accurately tracking the HIV epidemic is essential to the nation's HIV prevention efforts. Yet monitoring trends in new HIV infections has historically posed a major challenge, in part because many HIV infections are not diagnosed until years after they occur.

Now, new technology developed by the Centers for Disease Control and Prevention (CDC) can be used to distinguish recent from long-standing HIV infections. CDC has applied this advanced technology to develop the first national surveillance system of its kind that is based on direct measurement of new HIV infections. This new system represents a major advance in HIV surveillance and allows for more precise estimates of HIV incidence (the annual number of new infections) than ever before possible.

CDC's first estimates from this system reveal that the HIV epidemic is—and has been—worse than previously known. Results indicate that approximately 56,300 new HIV infections occurred in the United States in 2006 (95% CI: 48,200–64,500). This figure is roughly 40% higher than CDC's former estimate of 40,000 infections per year, which was based on limited data and less precise methods (see box on page 5, "Historical Challenges in Tracking HIV Infections"). It is important to note that the new estimate does not represent an actual increase in the annual number of new HIV infections. In fact, CDC's analysis suggests that the epidemic has been roughly stable since the late 1990s, though the number of new HIV infections remains unacceptably high. These findings underscore the ongoing challenges in confronting

this disease and the urgent need to expand access to effective HIV prevention programs.

Breakthrough Technology Allows Clearest Picture to Date

CDC's new HIV surveillance system is based on an approach known as STARHS (serologic testing algorithm for recent HIV seroconversion), which uses innovative testing technology to determine, at the population level, which positive HIV test results indicate new HIV infections (those that occurred within approximately the past 5 months). Before the widespread availability of this technology, HIV diagnosis data provided the best indication of recent trends in key populations. However, diagnosis data indicate when HIV infection is diagnosed, not when a person becomes infected (infection can occur many years before a diagnosis).

Definitions

HIV incidence: The number of people who become newly infected with HIV in a given period.

HIV diagnoses: The number of HIV diagnoses during a given period, regardless of when the persons became infected.

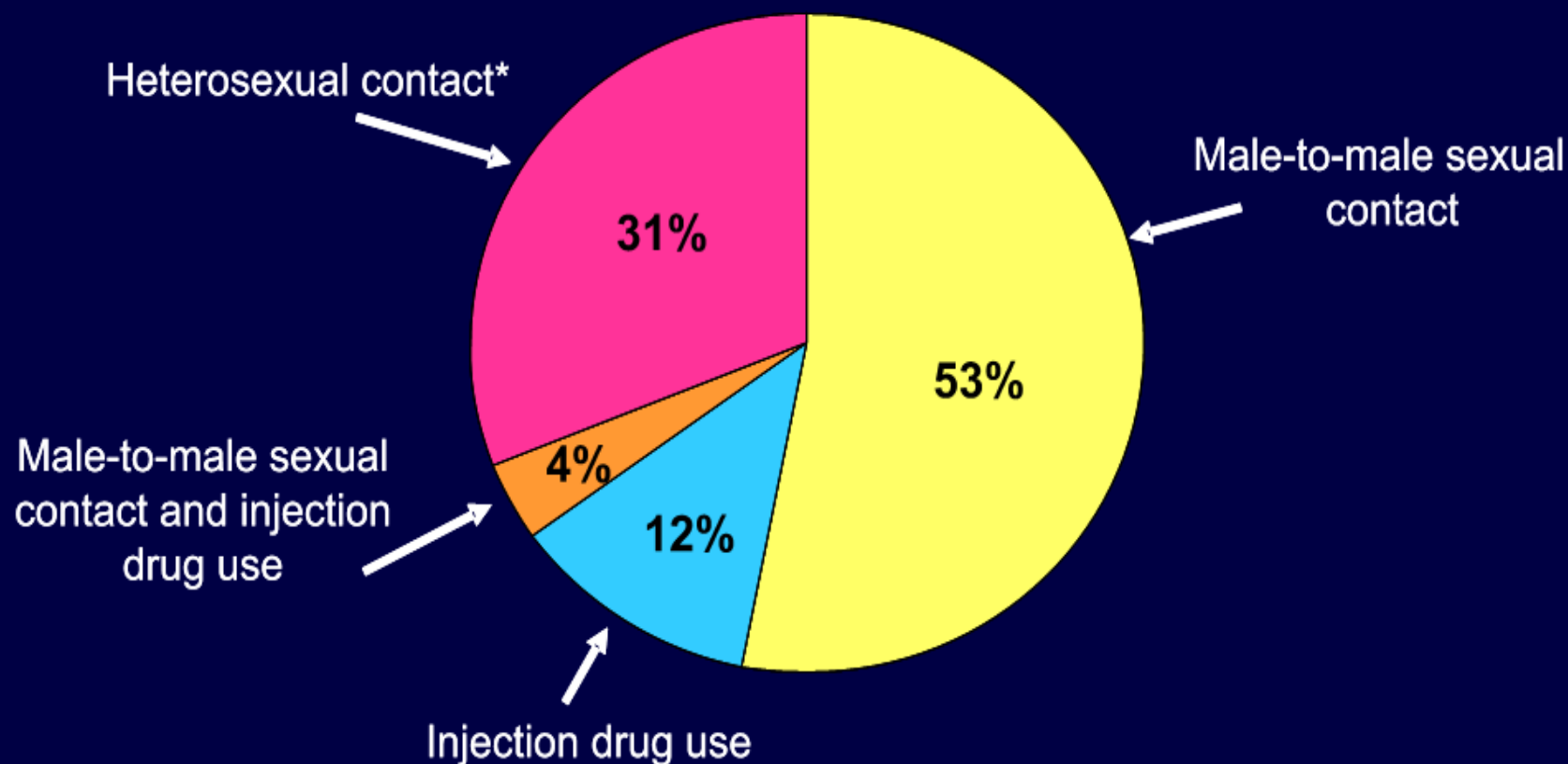
AIDS diagnoses: The number of AIDS diagnoses during a given period. AIDS is diagnosed when an HIV-infected person's immune system becomes severely compromised (measured by CD4 cell count) and/or the person becomes ill with an opportunistic infection. In the absence of treatment, AIDS usually develops 8 to 10 years after initial HIV infection. With early HIV diagnosis and treatment, an AIDS diagnosis may be delayed by many years.



1-800-CDC-INFO (232-4636)
In English, or Español
24 Hours/Day
toll-free@hhs.gov
<http://www.cdc.gov/hiv>



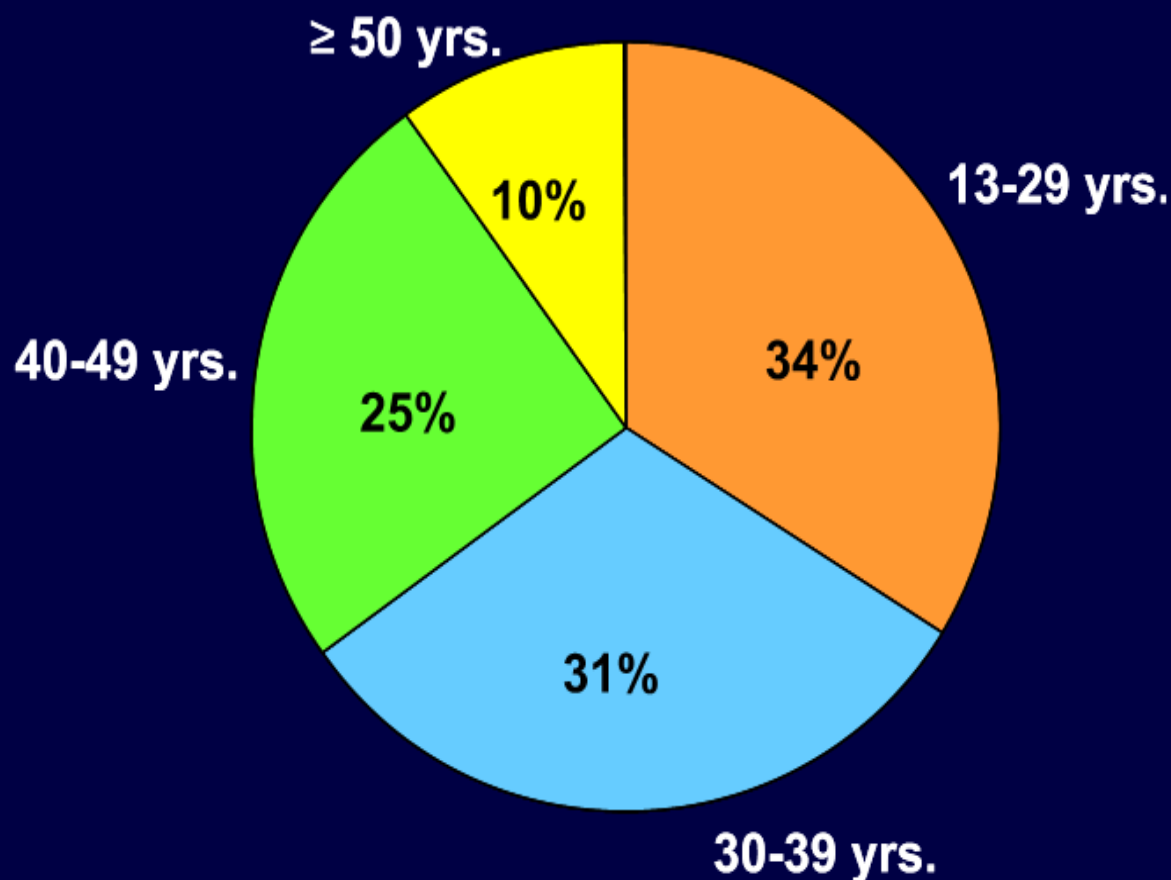
Estimated Percentage of New HIV Infections by Transmission Category—United States, 2006



*Heterosexual contact with a person known to have, or to be at risk for, HIV infection.
Note: Data have been adjusted for reporting delay. Cases without risk factor information were proportionately re-distributed.



Estimated Percentage of New HIV Infections by Age—United States, 2006



Note: Data have been adjusted for reporting delay.



Awareness of Serostatus Among People with HIV and Estimates of Transmission

~25%
Unaware
of
Infection

Accounting for:

~54%
of New
Infections

~75%
Aware of
Infection

Marks, et al
AIDS 2006;20:1447-50

~46%
of New
Infections

People Living with HIV
/AIDS:
1,039,000-1,185,000

New Sexual Infections
Each Year: ~32,000



Washington, DC

Routine HIV Testing Scale up in DC

**Come Together DC
Get Screened For HIV**
Ask your doctor. Ask your neighbor.

COMING TOGETHER TO STOP HIV IN DC

1) June 2006, Testing Campaign:
>50 Provider Partners
Rapid Test Expansion
DC Jail

2) Focus on Medical Settings:
Ask for the Test
Offer the Test

TEST RESULTS
 YOUR HIV TEST RESULT IS PRELIMINARY REACTIVE.

This means:

- That you have likely been infected with HIV.
- HIV can be managed with proper treatment. You can still live a long, healthy life.
- You have been given an appointment to see an HIV specialist.

ASK FOR THE TEST

When I visit my doctor, I Ask For The Test.

It's not just for me. It's because I care about my neighborhood.

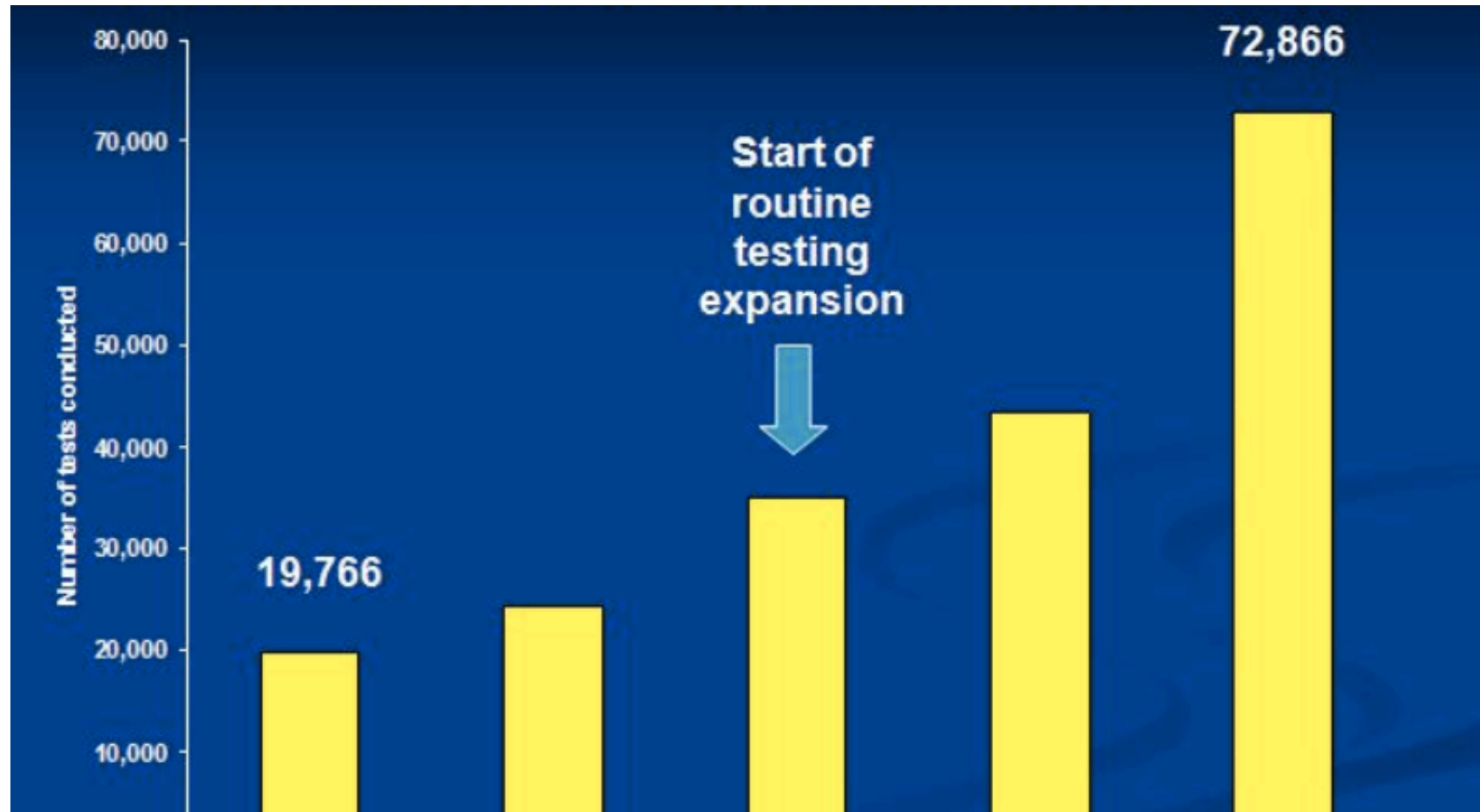
To find out more about getting an HIV test, visit your doctor. You can also call 202-442-4343 or visit www.doh.dc.gov for more information.

The Test

NEW INDICATION

DC TAKES ON HIV

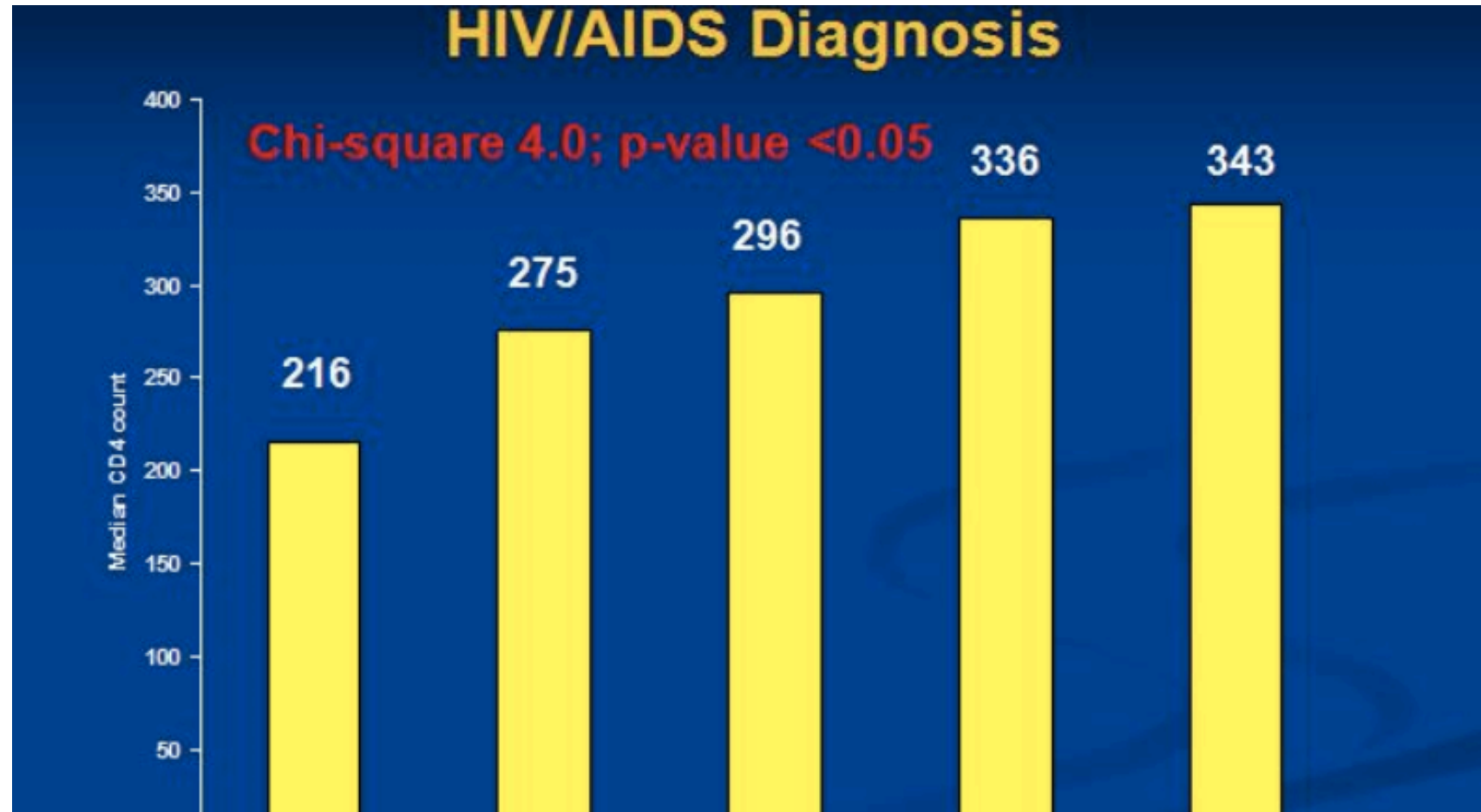
Washington, DC



Washington, DC



Washington, DC

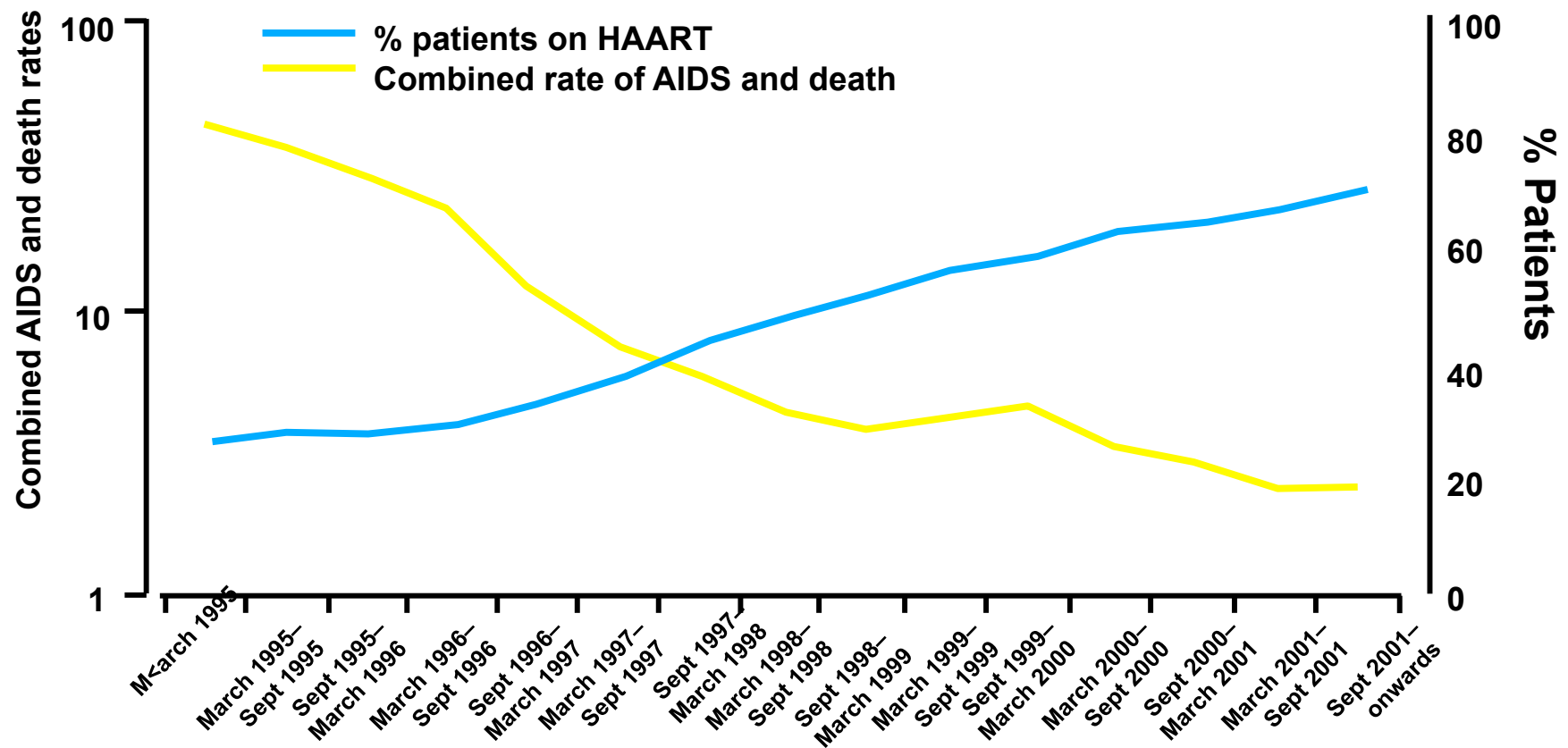


Your Medicines



- HIV medications work
- We know a lot about them

People with HIV are living longer and longer but only where HIV meds are available



AIDS Drugs Have Saved 3 Million Years of Life in the United States

July 1, 2006
Volume 194

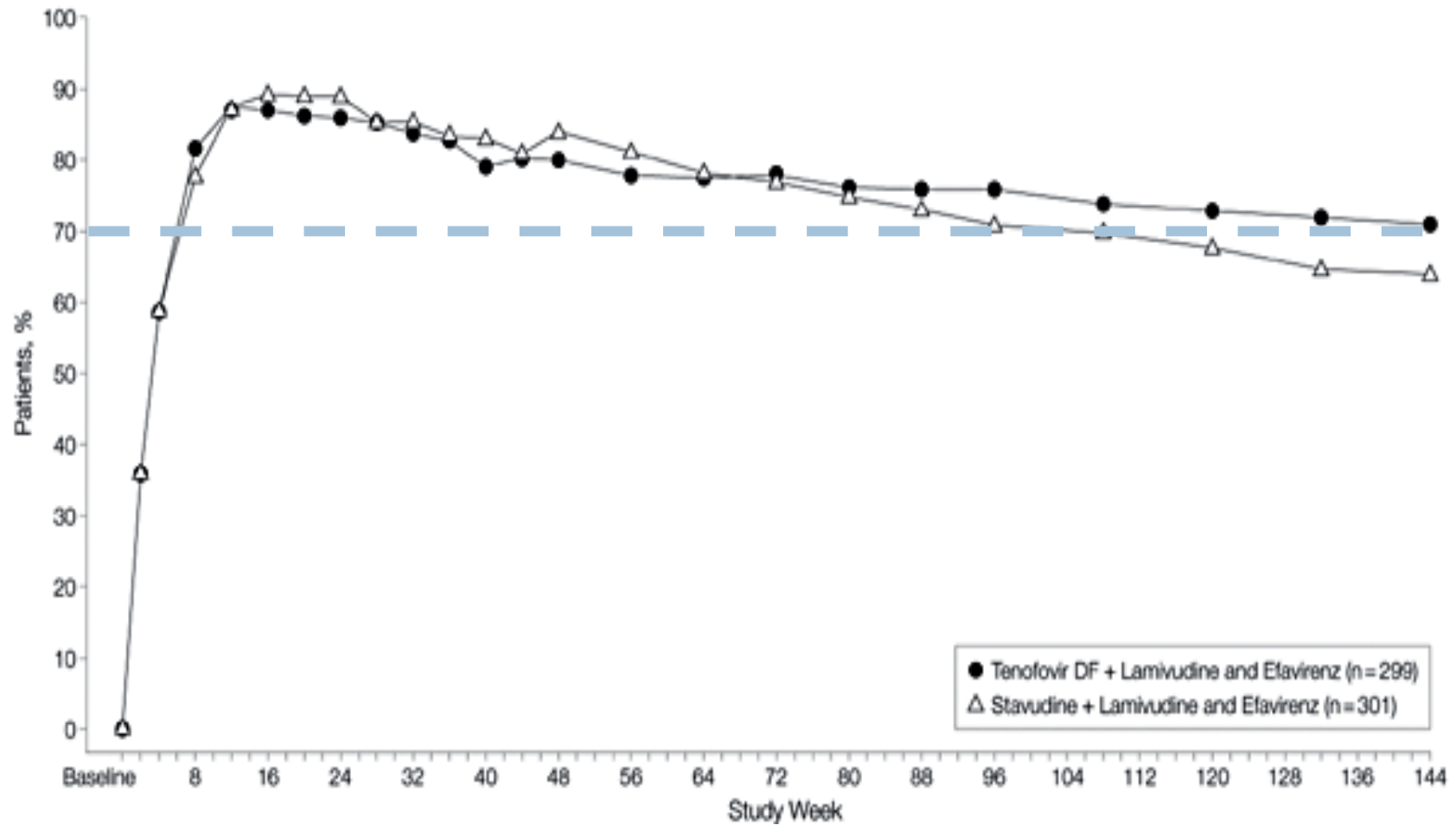
The Journal of
Infectious
Diseases

The Survival Benefits of AIDS Treatment in the United States

RP Walensky et al.

TDF/3TC/EFV compared to d4T/3TC/EFV

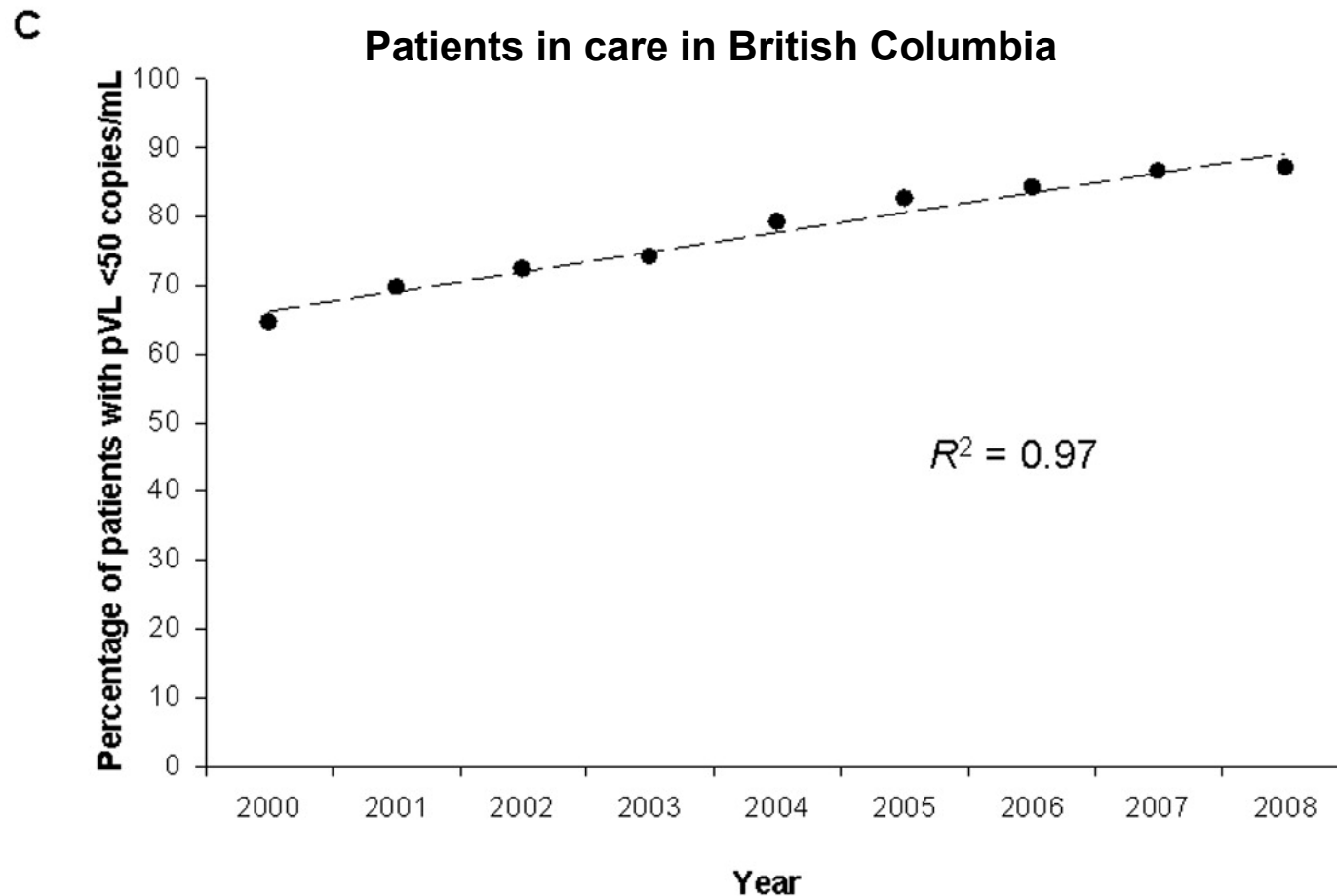
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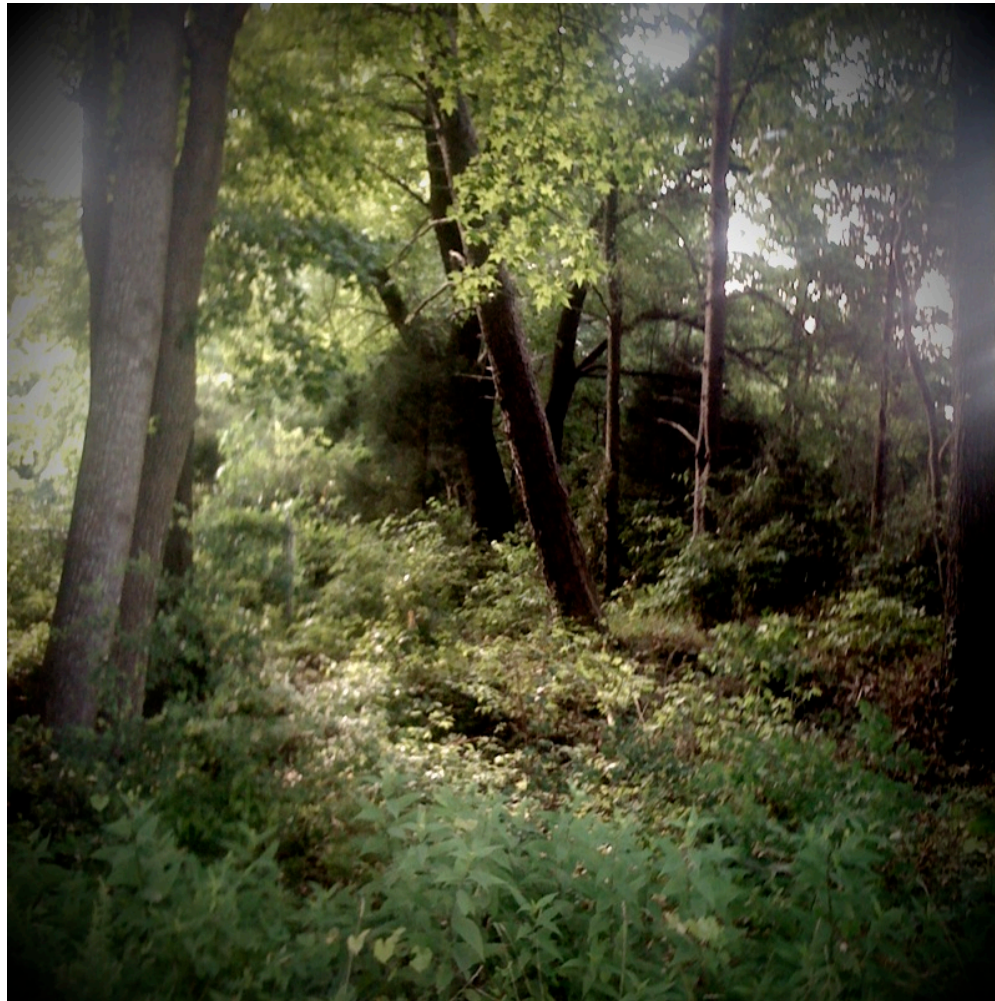
Gallant, J. E. et al. JAMA 2004;292:191-201.

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Antiretroviral Therapy is Highly Successful in Suppressing Viremia



When to Start



DHHS 2009

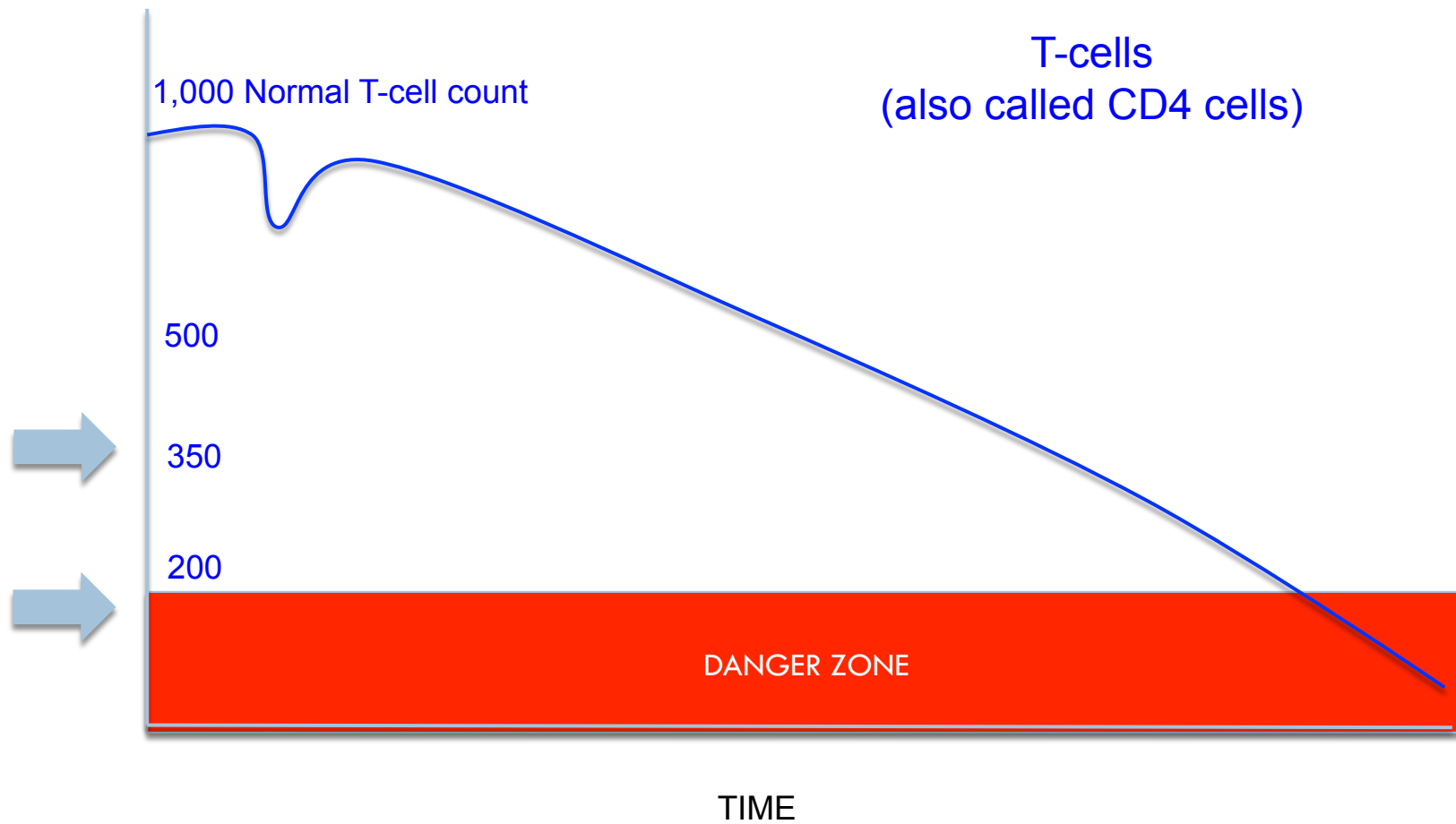
□ When to Start:

- ART should be initiated in all patients with a history of an AIDS-defining illness or with a CD4 count <350 cells/mm³ (AI).
- ART should also be initiated, regardless of CD4 count, in patients with the following conditions: pregnancy (AI), HIV- associated nephropathy (AII), and hepatitis B virus (HBV) coinfection when treatment of HBV is indicated (AIII).
- ART is recommended for patients with CD4 counts bet 350 and 500 cells/mm³. The Panel was divided on the **strength** of this recommendation: 55% voted for strong recommendation (A) and 45% voted for moderate recommendation (B) (A/B-II).
- For patients with CD4 counts >500 cells/mm³, the Panel was evenly divided: 50% favor starting ART at this stage of HIV disease (B); 50% view initiating ART at this stage as optional (C) (B/C-III).

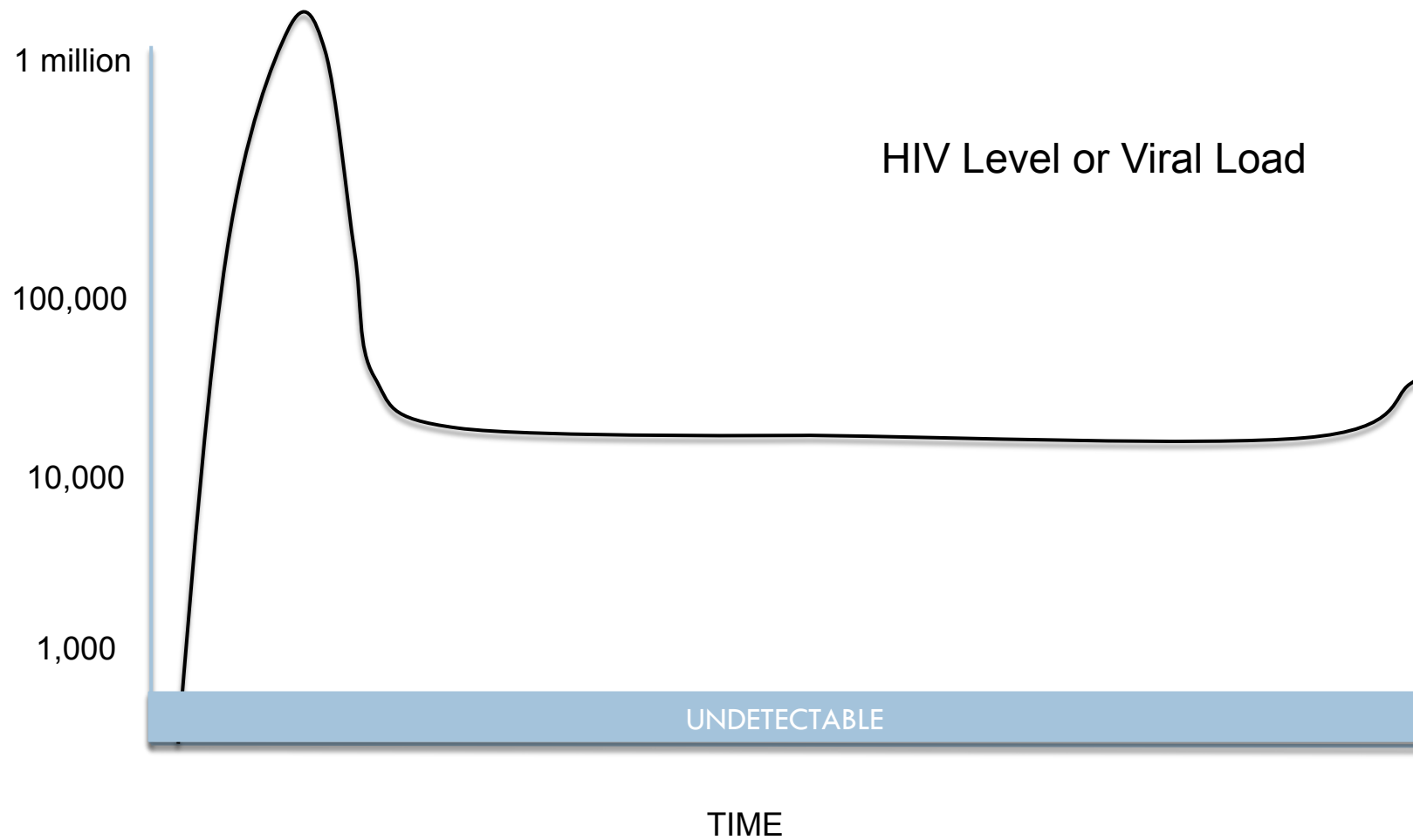
IAS-USA 2010: Guidelines for When to Start ARV Therapy

Measure	Recommendation
Specific conditions	ART recommended regardless of CD4 cell count
Symptomatic HIV disease	
Pregnancy	
High HIV-1 RNA Level (>100,000 copies/mL)	
Rapid CD4 count decline (>100 cells/mm ³ per year)	
Active hepatitis B or C* virus co-infection	
Active or high risk for cardiovascular disease*	
HIV-associated nephropathy	
Symptomatic primary HIV infection*	
Age >60 years	
Risk for secondary HIV transmission is high*	
CD4 cell count ≤500 cells/mm ³	ART recommended
CD4 cell count >500 cells/mm ³	ART should be considered [§]

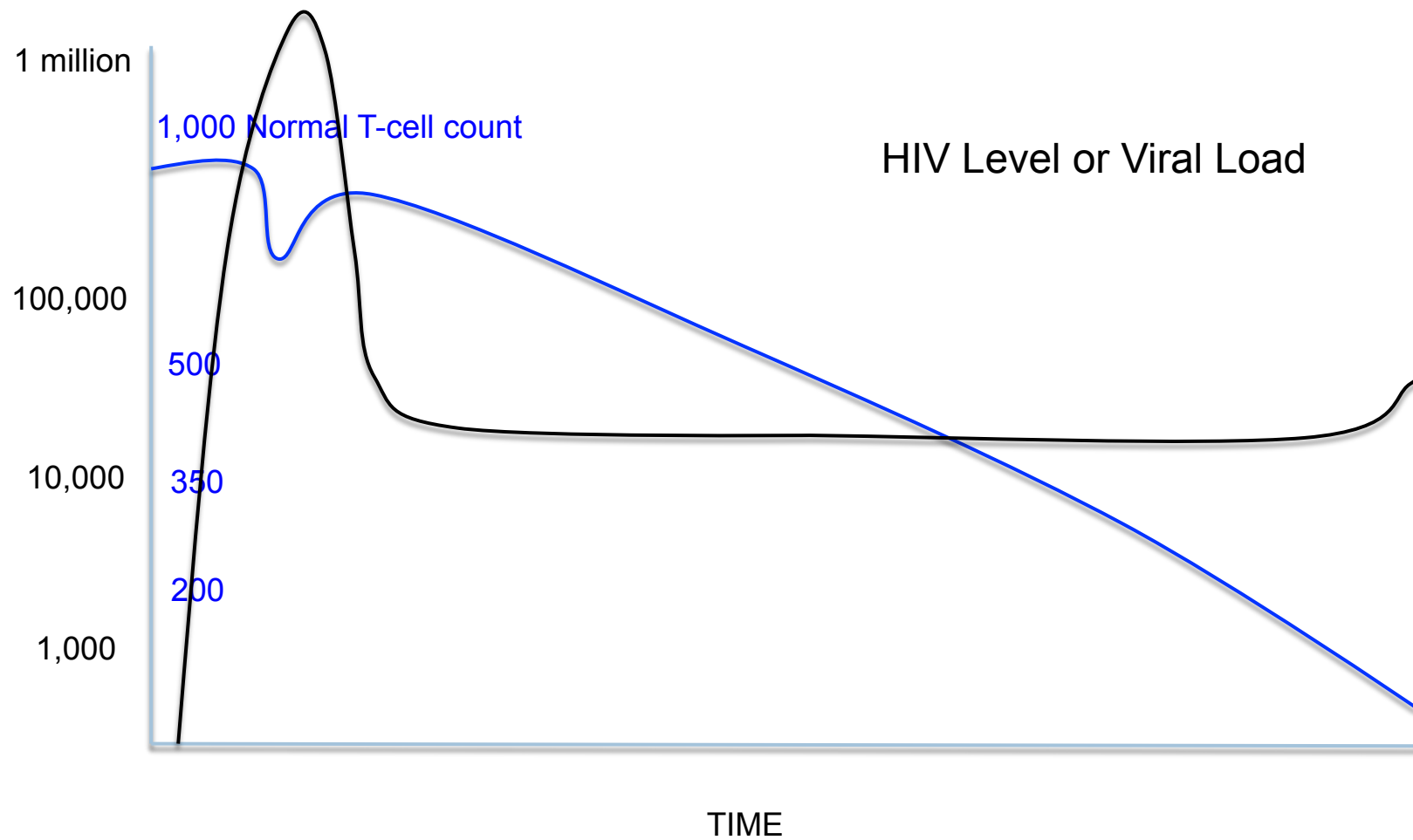
HIV in a nutshell



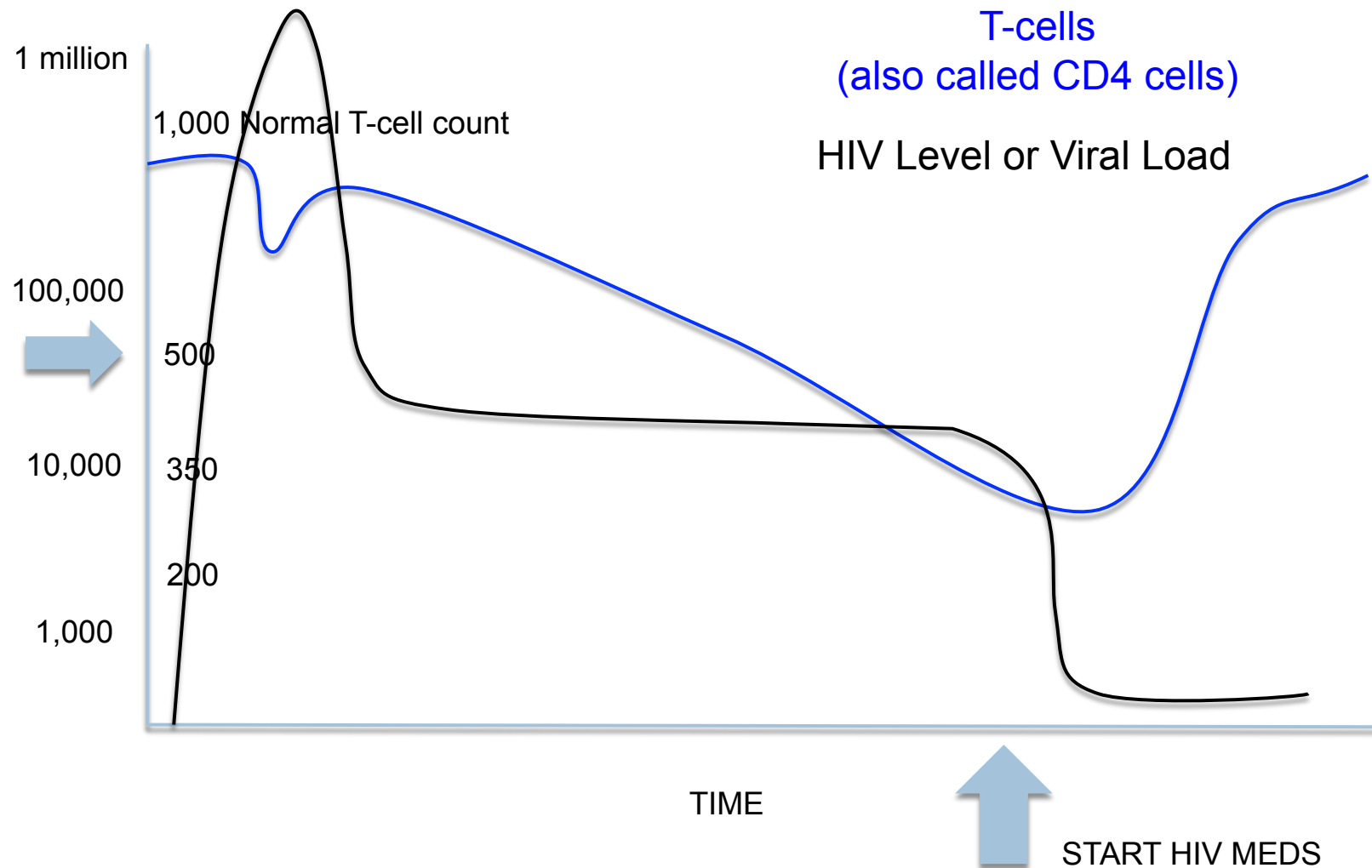
HIV in a nutshell



HIV in a nutshell



HIV in a nutshell



The case for starting HIV meds sooner rather than later

- Some studies suggest those with lower CD₄ cell counts at greater risk of heart disease, cancers and dementia
- No study shows more harm with early start of HIV medications
- Bad things are generally rarer among those with more normal CD₄ cell counts
- Therapy is easier and better tolerated
- Treatment can also reduce infectiousness

SMART Study

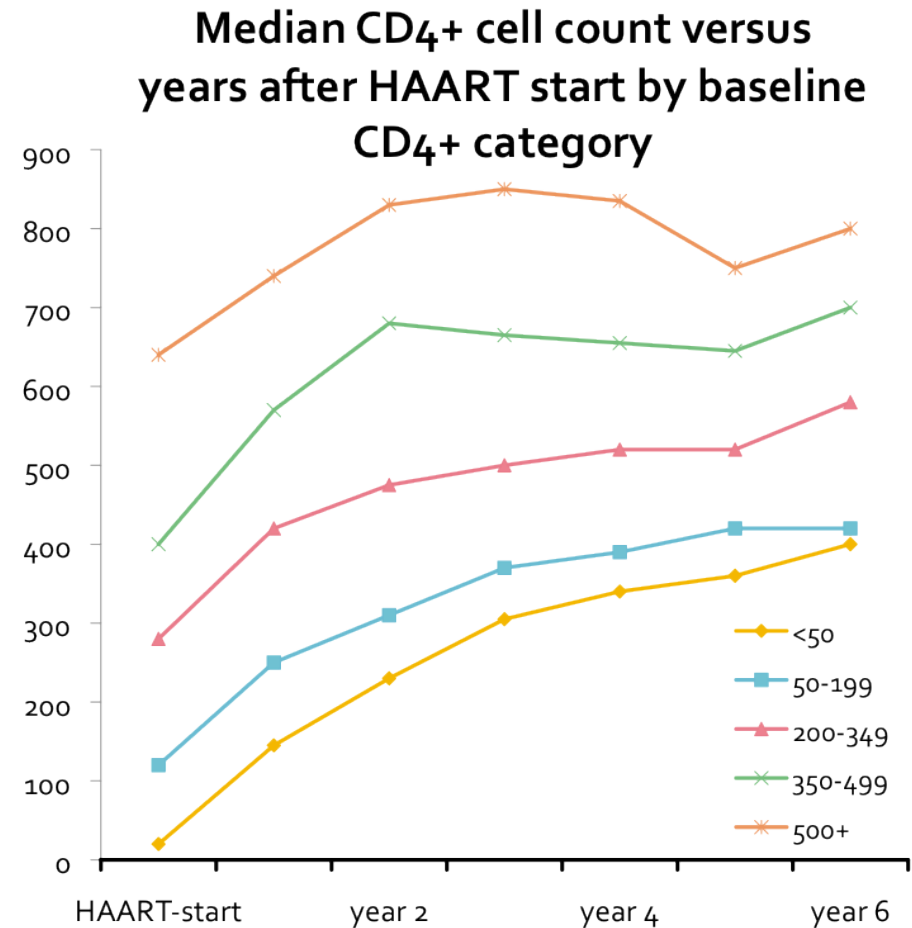
- >5500 HIV+ people, most on HAART
 - Continue meds until CD4 >350 then stop and restart at 250 or
 - Stay on meds
- Results:
 - More heart attacks, kidney disease, liver disease and death among those stopping their HIV meds!
 - People who did poorly had higher levels of inflammatory and clotting factors in their blood

Nadir CD₄ cell count: How low can you go?

- **Nadir** means lowest
- Nadir CD₄ cell count found to be linked with dementia and artery stiffness (both are bad)
- Lower you start meds, the lower your peak CD₄ count

CD₄ at Initiation of ARV Therapy Predicts Extent of CD₄ Recovery

- 1,378 Patients at 10 US Clinics followed From 1996-2007
- Median Peak CD₄ was progressively higher for specific CD₄ strata ($P < 0.001$)
- Multivariate analysis: Increased mortality with CD₄ <50 (HR=4.6) and CD₄ 50-199 (HR=2.6) compared to 350 cells/mm³
- Lower BL CD₄ at initiation also associated with increased risk of death from non-AIDS-related causes



Another reason to start HIV meds

- When the viral load is low in the blood, it is generally low in the genital secretions
- That means that those on HIV meds with very low viral loads are probably less infectious
- This is no reason to throw away the condoms, but it may help slow the spread of HIV (may be a lot)



Arguments for waiting to start meds

- Unknown long term side effects of HIV meds
- Cost
- Take the drugs wrong and can get resistance
- Maybe no real health benefit if CD₄ is still normal

Side Effects

- ❑ HIV meds themselves may contribute to heart disease (abacavir?, protease inhibitors)
- ❑ Some HIV drugs can cause kidney problems (tenofovir, atazanavir?)
- ❑ HIV may contribute to bone loss but certain HIV medications may cause more loss (tenofovir)

What to Start

- Regimens
 - ▣ Preferred
 - ▣ Alternative
 - ▣ Acceptable
 - ▣ Do not use



What to Start



- Change to Preferred *Regimens* rather than Preferred *Drugs* within a class
 - ▣ **Efavirenz+tenofovir+emtricitabine (AI)**
 - ▣ **Ritonavir-boosted atazanavir+tenofovir+emtricitabine(AI)**
 - ▣ **Ritonavir-boosted darunavir + tenofovir + emtricitabine (AI)**
 - ▣ **Raltegravir+tenofovir+emtricitabine (AI)**
- ▣ For pregnant women: Ritonavir+lopinavir+ZDV+3TC (AI)

Your Medicines

- *First line* meds:
 - Easiest
 - Designed to work a long time
 - Studies have made clear their relative advantages and disadvantages
 - Work best when there is no drug resistance present. Your doc should check an HIV resistance test before you start medication.

ATRIPLA



Nothing beats it in getting virus down

Easiest

Single co-pay

Has to be taken at night

Weird dreams

Dizziness

If failure happens, drug resistance likely

May cause more fat wasting

REYATAZ/NORVIR



Once a day
Only 2 pills when taken with Norvir
Resistance very rare with failure

Norvir is separate
Certain stomach acid meds neutralize it
Can make some people yellowish
More diarrhea and nausea with Norvir
Rare kidney stones

REYATAZ/NORVIR



Once a day
Only 2 pills
Resistance very rare with failure

Diarrhea and nausea with Norvir
Can make some people jaundiced
2 co-pays
Rare kidney stones

PREZISTA/NORVIR



Always once a day

3 pills when taken with Norvir

Resistance very rare with failure

Diarrhea and nausea with Norvir

Rare rash

2 co-pays

TRUVADA



Once a day
Works well with other HIV meds

Can cause problems with kidney function
Can reduce bone density

Your Medicines

- First line meds:
 - They will all work
 - Major differences between preferred meds are in:
 - Pill counts
 - Pill size
 - Number of times a day need to be taken
 - Side effects
 - What happens if you fail
 - Cost

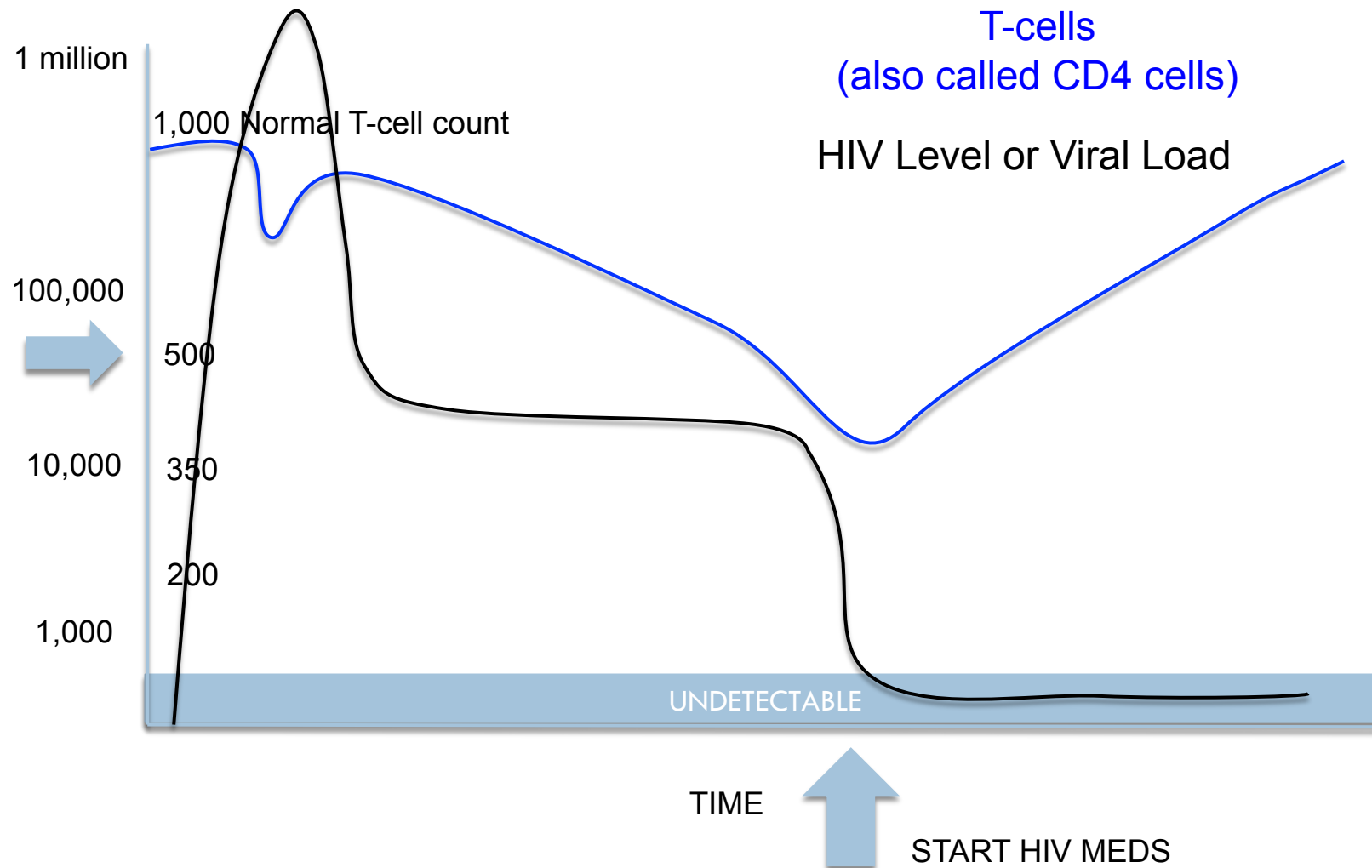
Your Medicines

- Choose your initial regimen carefully with your health care provider.
- Tailor the options to your needs.
- Be daring. If it starts to suck, it can be changed.
- Select something you feel best about based on all the factors.

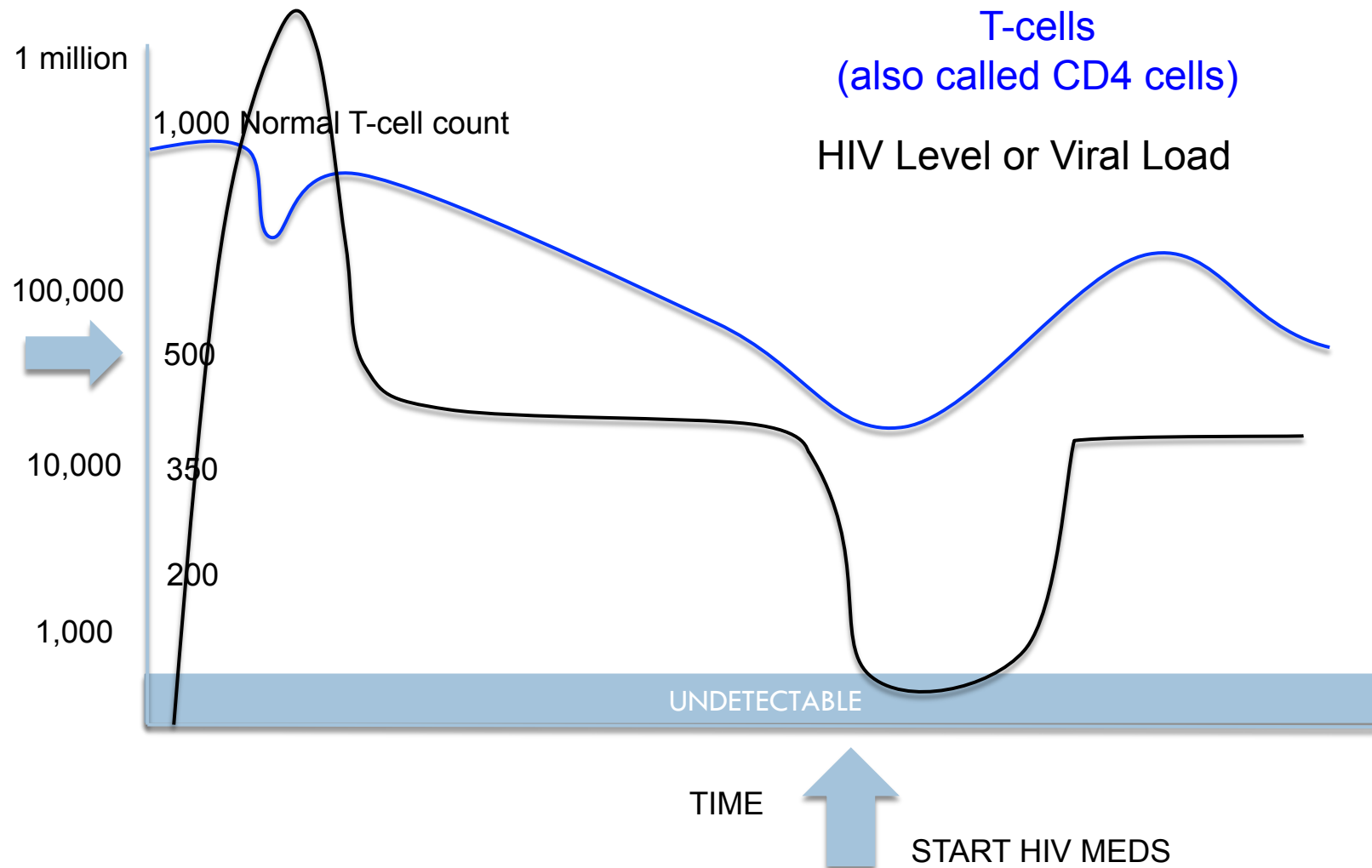
Your Medicines

- *Next line meds:*
 - Usually require more pills, may be twice a day
 - Designed to work against resistant virus
 - Studies suggest that longer term success is more challenging after first regimen fails.
 - New drugs that work against resistant HIV are constantly being developed.

HIV in a nutshell

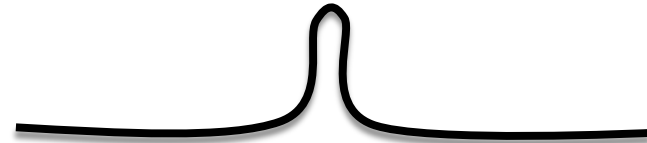


HIV in a nutshell



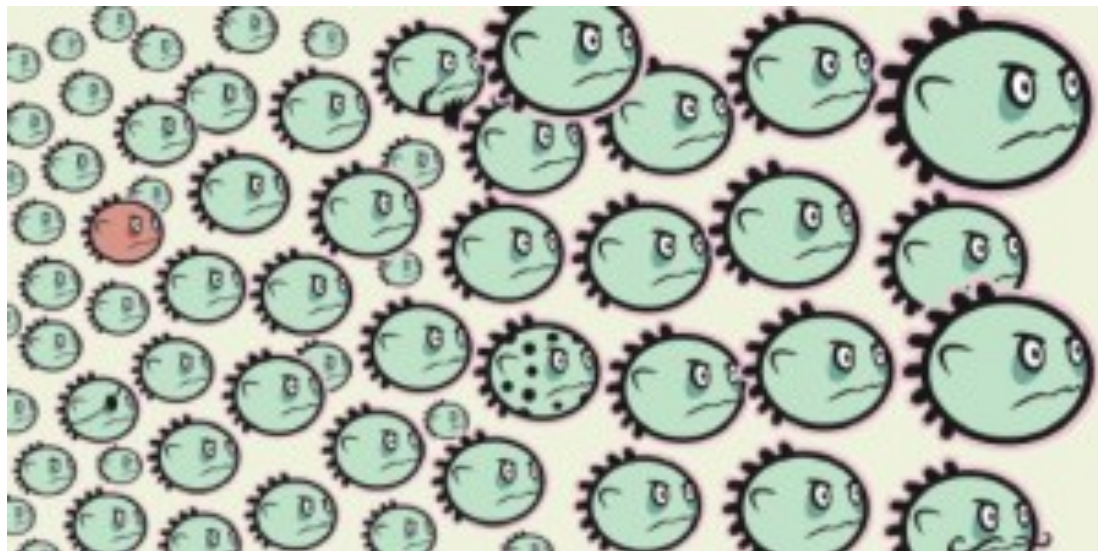
When to change meds

- Bad side effects
- When the viral load goes from undetectable to detectable and stays that way
- Some people get BLIPS
 - Not a big deal
 - Could be a lab error
- If viral load goes up and stays up, need a resistance test done to see what drugs may work against the virus

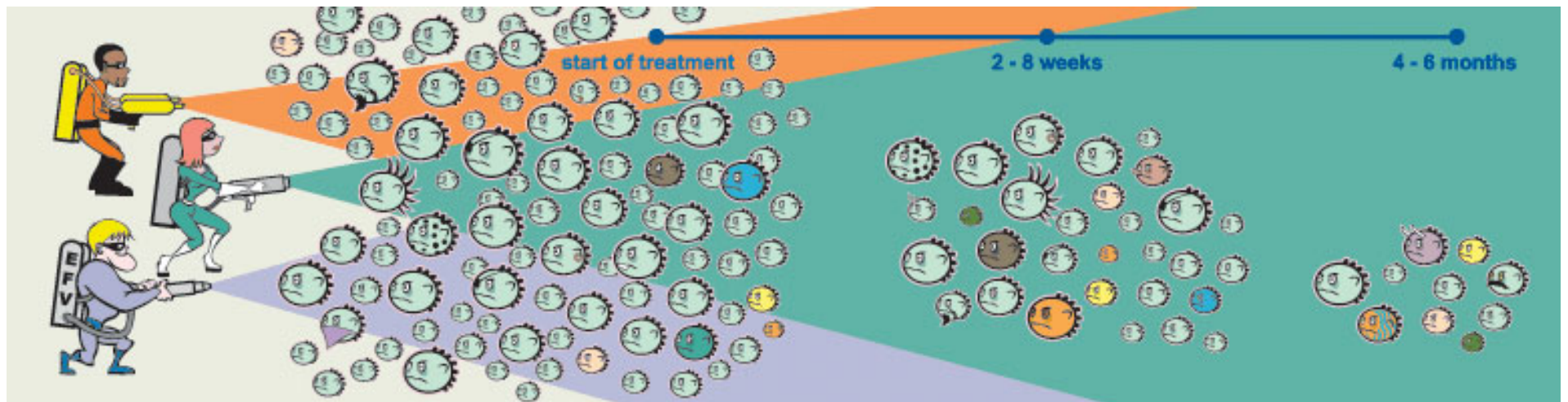


Resistance tests

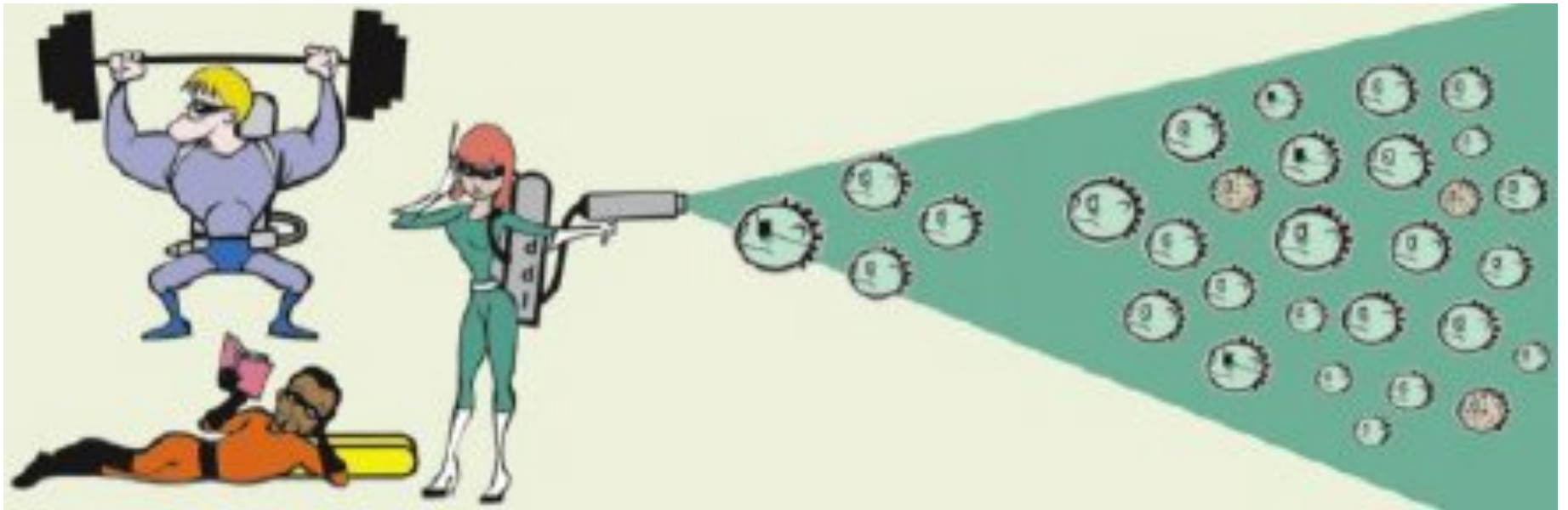
- Tests of the HIV virus itself that can help determine if the virus has developed resistance to HIV medications



Resistance tests



Resistance tests



Resistance tests



Conclusions

- DHHS Guidelines
 - ▣ Provide recommendations based on data and expert interpretation
 - ▣ Have swung toward earlier initiation of therapy
 - ▣ Recommend regimens based on efficacy, safety and convenience

- Despite these benefits we are challenged to provide HIV care for all who need it.