



## NORTHWEST AIDS EDUCATION AND TRAINING CENTER

# Pediatric HIV Update

Christian B. Ramers, MD, MPH

Assistant Medical Director, Family Health Centers of San Diego

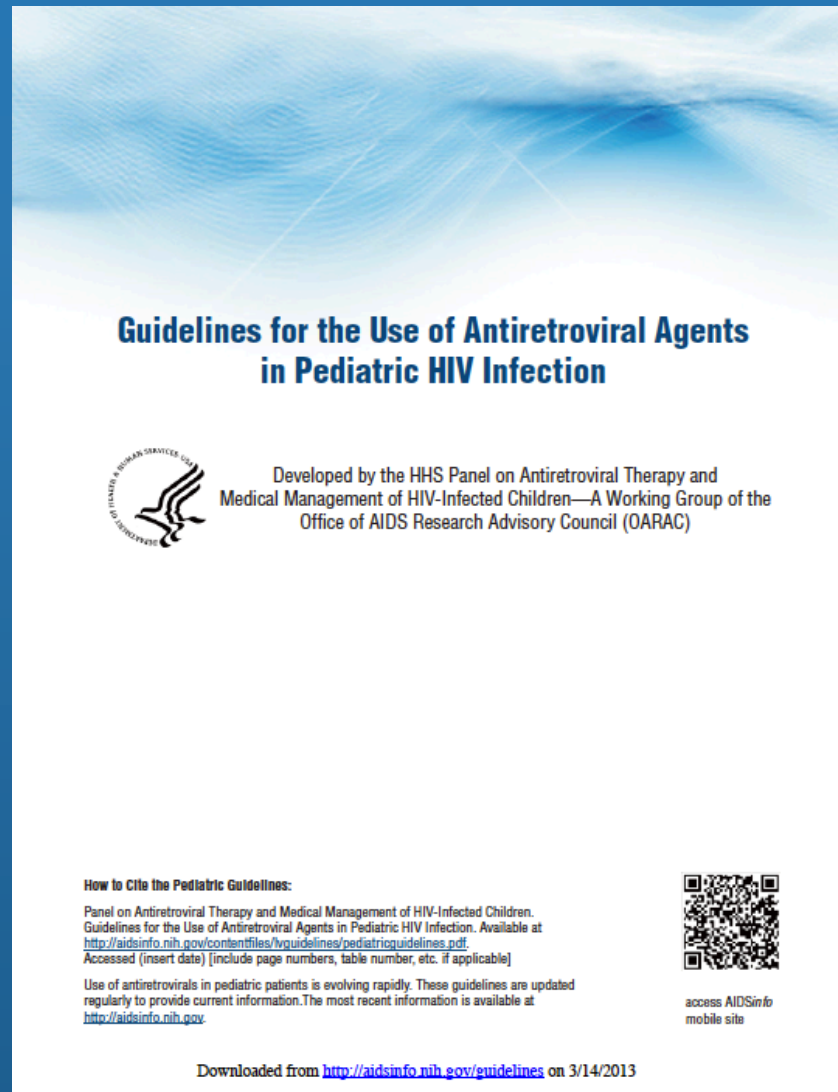
HIV/HCV Distance Education Specialist - NWAETC, University of Washington

Presentation Prepared by:

Christian B. Ramers, MD, MPH

Last Updated: April 3, 2013

# US Department of Health and Human Services (DHHS) November 5, 2012 Pediatric Antiretroviral Therapy Guidelines



Source: 2012 DHHS Pediatric Antiretroviral Therapy Guidelines. ([aidsinfo.nih.gov](http://aidsinfo.nih.gov))

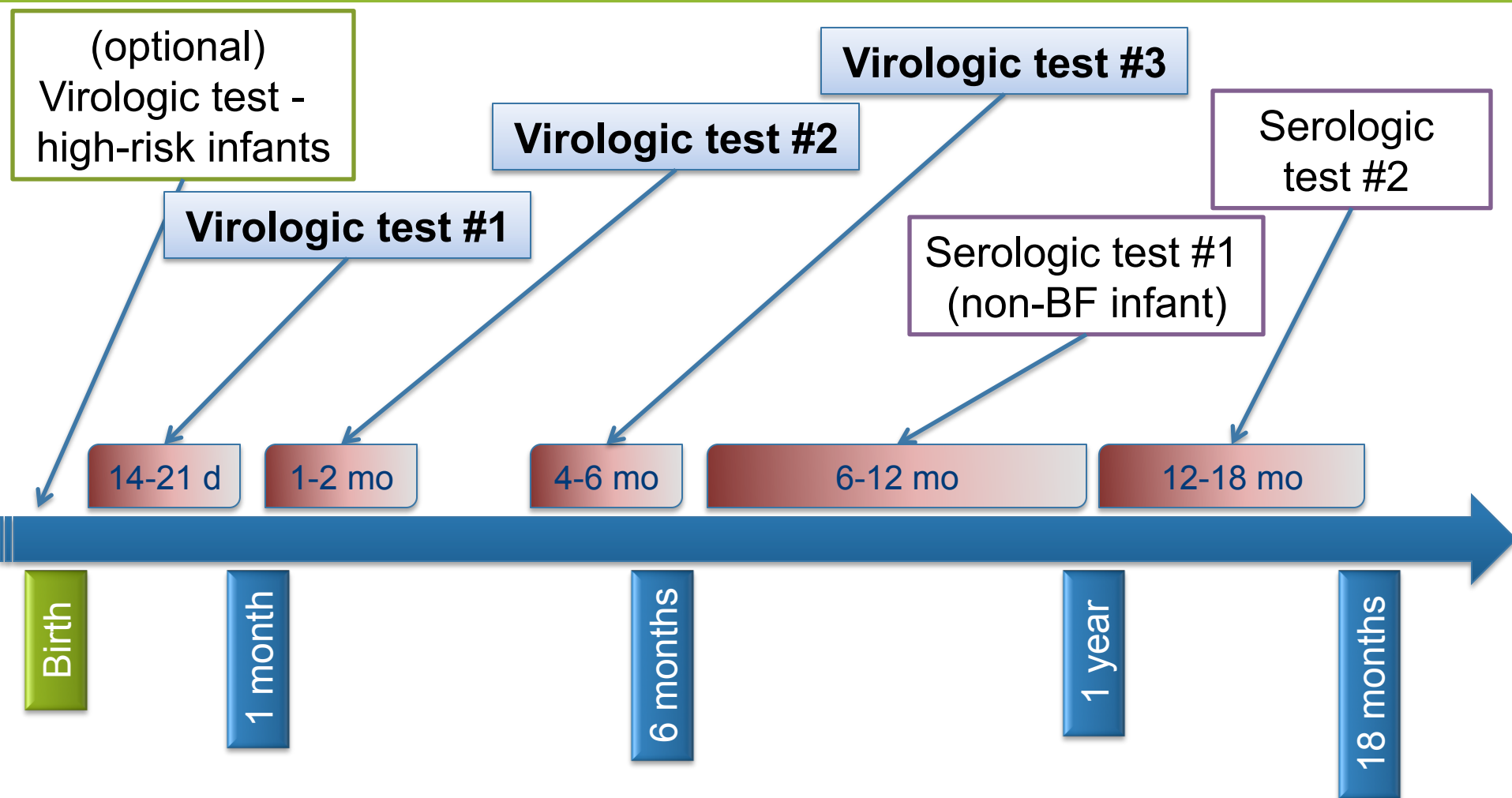
# Outline

- How to diagnose or exclude HIV in an exposed infant
- When to start ART?
- What to start?
- The Mississippi Miracle...what does it mean?

# DIAGNOSTIC TESTING OF HIV-EXPOSED INFANTS

# DHHS Antiretroviral Therapy Guidelines: November 2012

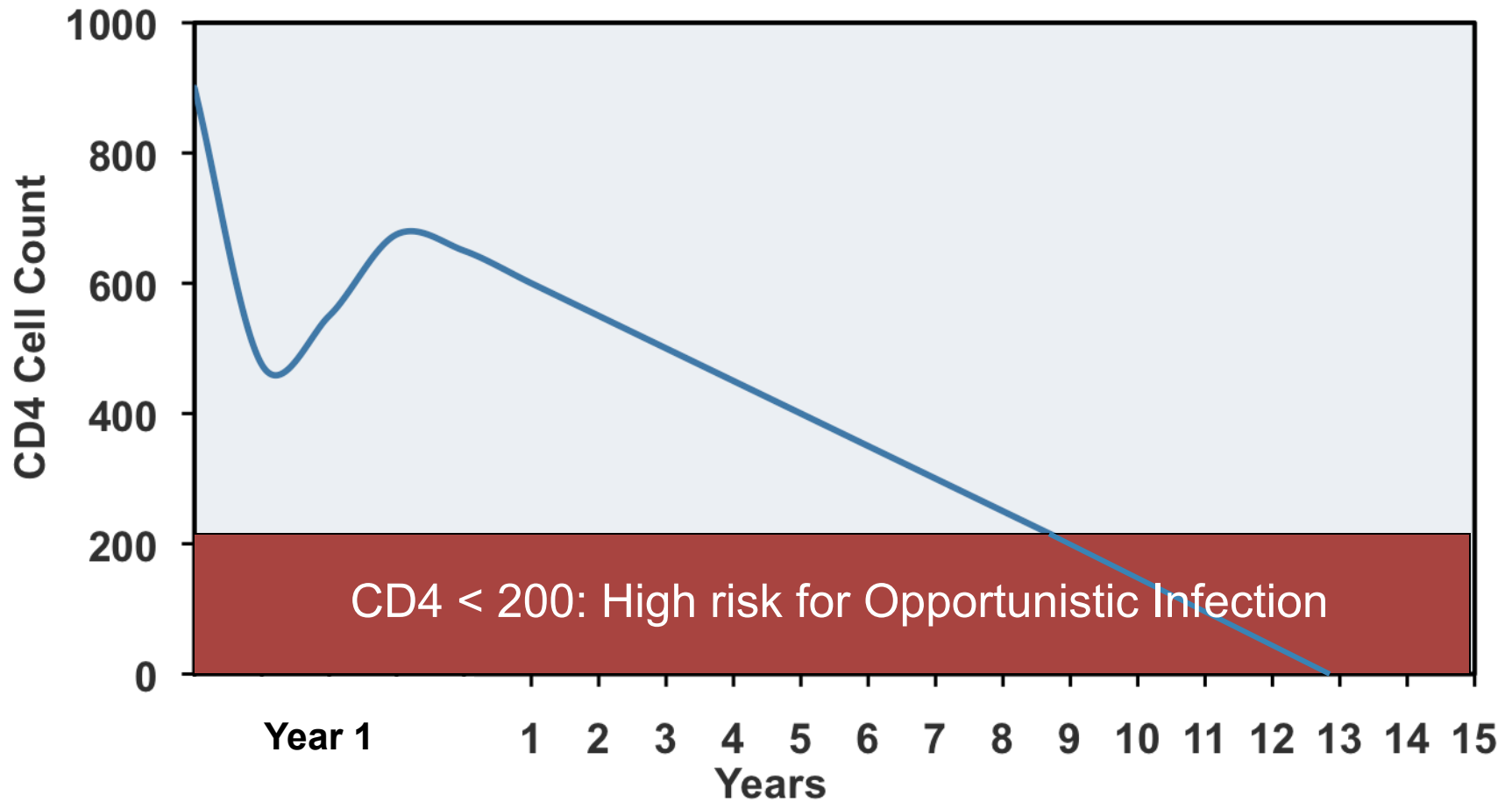
## Diagnostic testing of HIV-exposed Infants



# WHEN TO START

- Supporting Evidence Base
- November 2012 DHHS Guidelines

# Natural History of Untreated HIV Infection



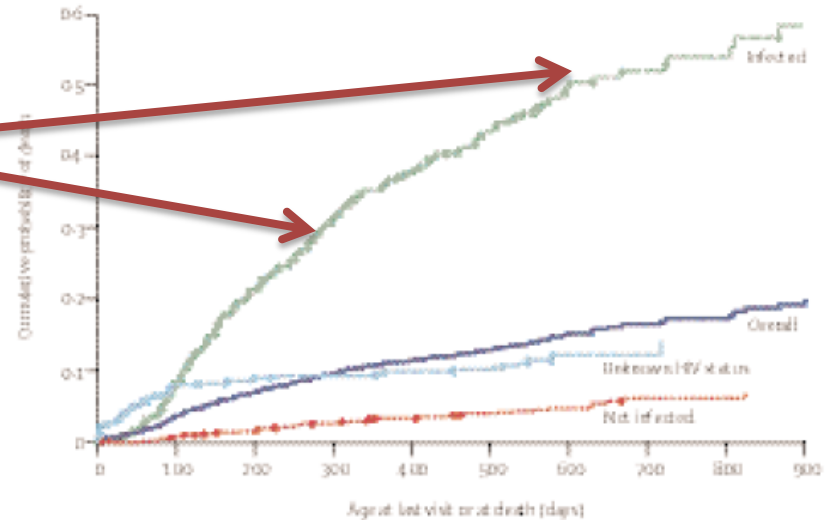
# Pediatric AIDS – A Very Different Disease

Very High early Mortality!!

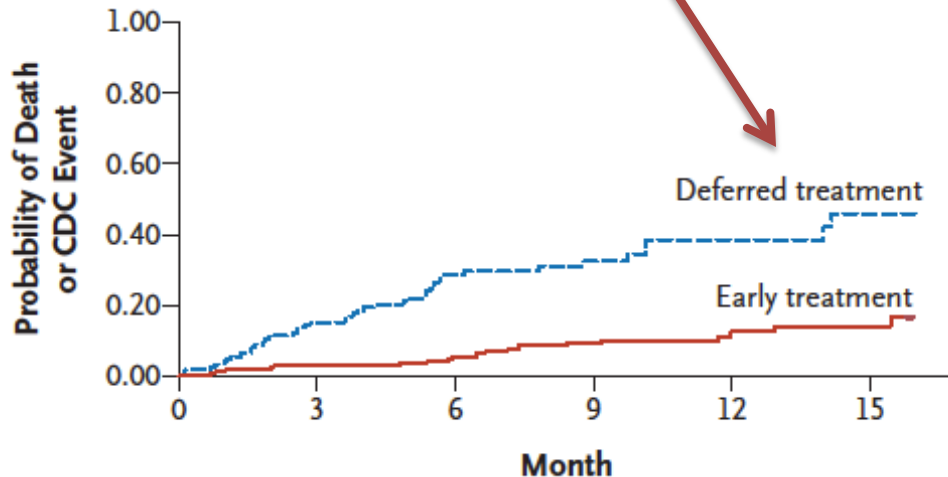
35.2% by 1 yr

52.5% by 2 yrs

75% Reduction in Death/AIDS  
with early ART



Newell ML et al. Lancet 2004; 364: 1236-43

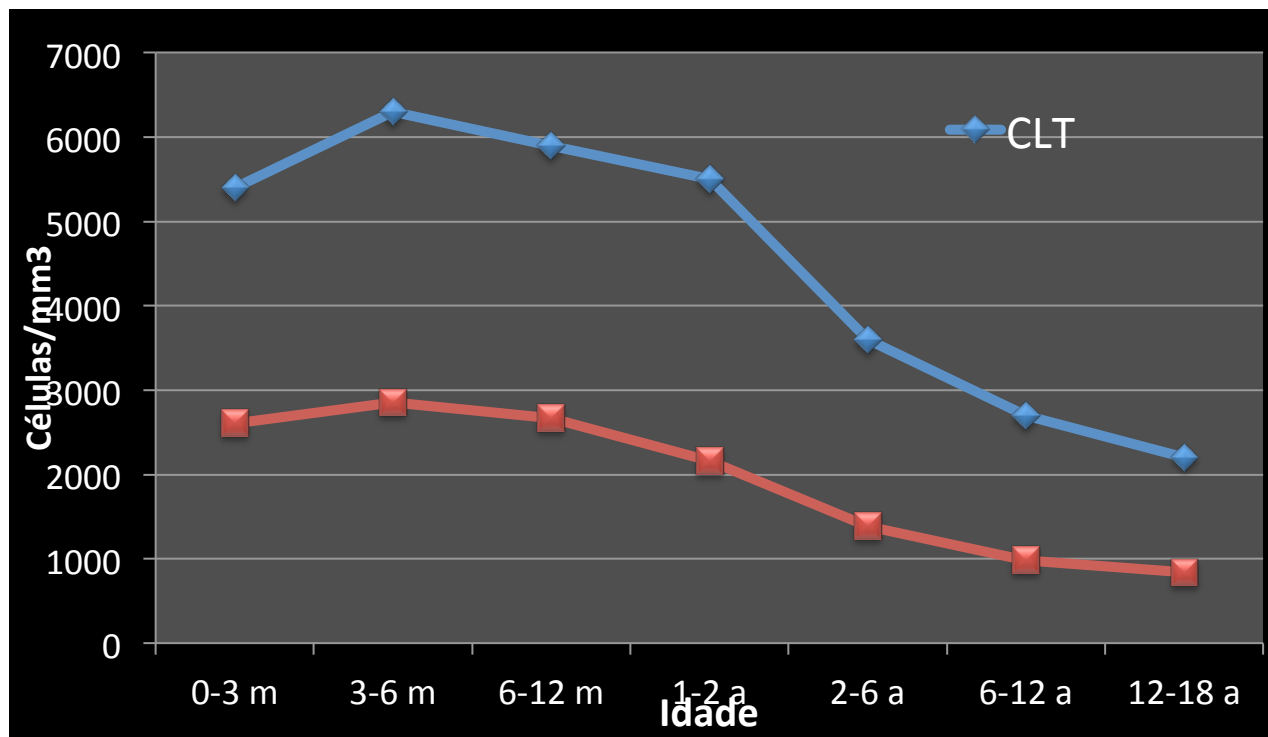


Violari A et al. (CHER Study) N Engl J Med 2008; 359: 2233-44



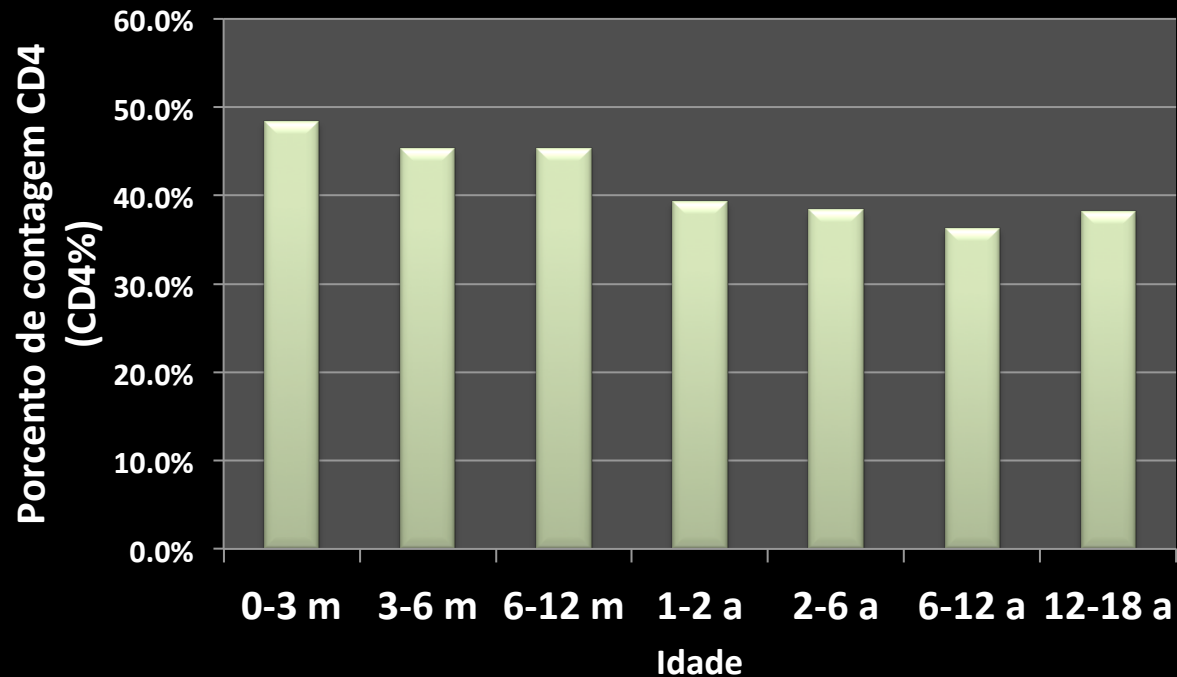
# DHHS Pediatric Antiretroviral Therapy Guidelines: 11/2012

“Although CD4 percentage had been preferentially used to monitor children aged <5 years, recent analyses show that CD4 cell counts provide greater prognostic value than CD4 percentage for short-term disease progression”



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# DHHS Pediatric Antiretroviral Therapy Guidelines: 11/2012

“In addition to recommending treatment for all children with AIDS or significant HIV-related symptoms (**AI\***), the Panel also generally recommends treatment for all children aged  $\geq 1$  year with minimal or no symptoms, with the strength of recommendation based on age and CD4 cell count or percentage.”

# DHHS Pediatric Antiretroviral Therapy Guidelines: 11/2012

## When to Start ART in Pediatric HIV Patients

Age	CD4 count	CD4 %	Recommendation
< 12 mo			<b>Treat All (AI)</b>
1-2 years	< 1,000	< 25%	<b>Treat (All)</b>
	≥ 1,000	≥ 25 %	Consider (BIII)*
3-4 years	< 750	< 25%	<b>Treat (All)</b>
	≥ 750	≥ 25 %	Consider (BIII)*
≥ 5 years	< 350		<b>Treat (AI)</b>
	< 500		<b>Treat (BII)*</b>
	≥ 500		Consider (BIII)*

\*In children with lower-strength (B level) recommendations for treatment, plasma HIV RNA levels >100,000 copies/mL provide stronger evidence for initiation of treatment (BII).

# DHHS Pediatric Antiretroviral Therapy Guidelines: 11/2012

## Indications for TMP/SMX in Pediatric HIV Patients

Age	CD4 count	CD4 %	Recommendation
< 12 mo	any	any	Prophylaxis
1-5 years	< 500	< 15%	Prophylaxis
≥ 6 years	< 200	< 15%	Prophylaxis

## WHAT TO START

- Regimens for Pediatric Patients
- Recently approved formulations

# DHHS Antiretroviral Therapy Guidelines: March 2012

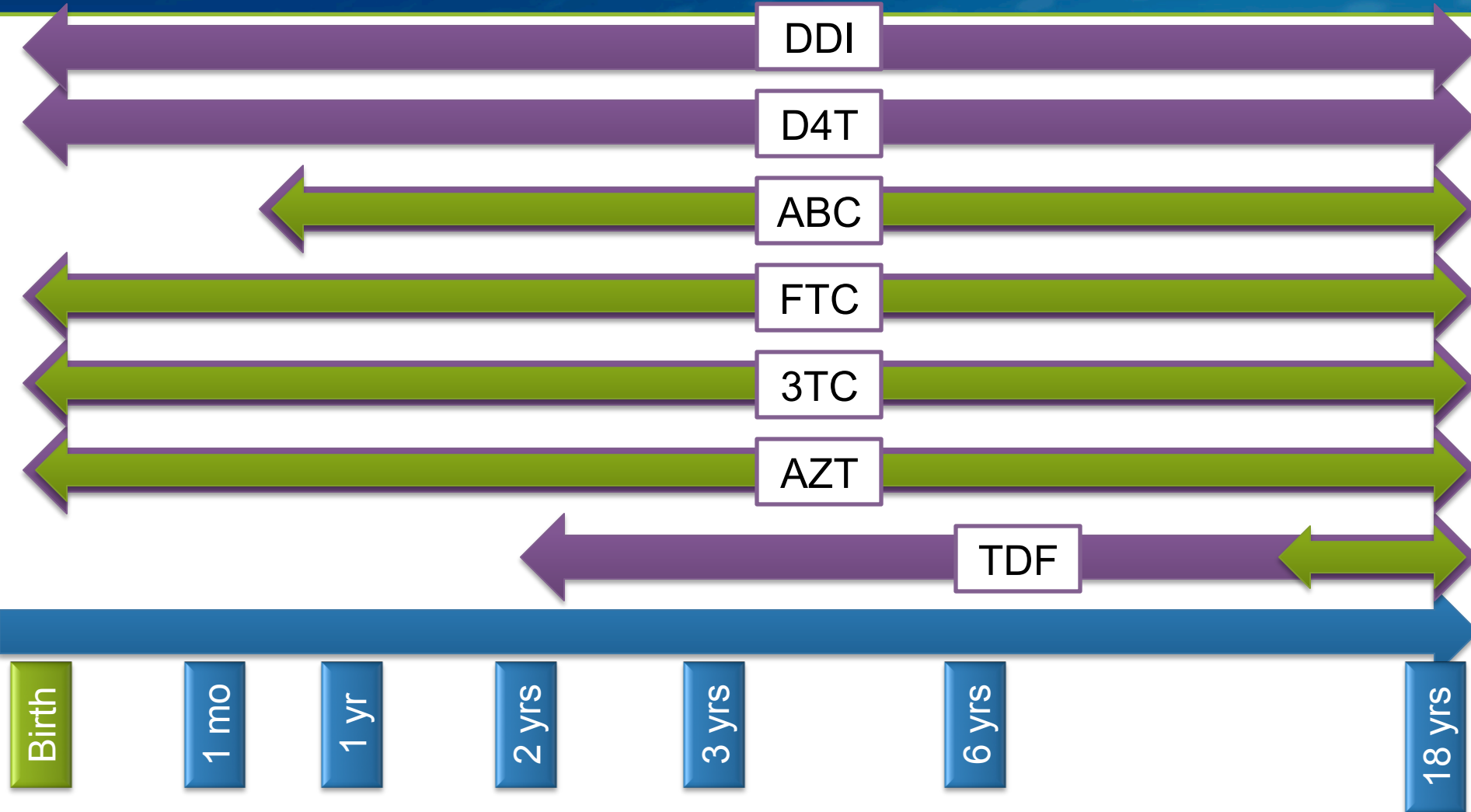
## Preferred Regimens for ARV-Naïve Children

Age	Preferred NRTI backbone
Any	Zidovudine + (3TC or FTC) <b>(AI)</b>
≥ 3 months	Abacavir + (3TC or FTC) <b>(AI)</b>
Adolescents (Tanner 4-5)	Tenofovir + (3TC or FTC) <b>(AI)</b>

Age	Preferred Regimen (NNRTI or PI)
≥ 14 days to < 3 years	2 NRTI's + Lopinavir/ritonavir <b>(AI)</b>
≥ 3 years	2 NRTI's + Efavirenz <b>(AI)</b>
	2 NRTI's + Lopinavir/ritonavir <b>(AI)</b>
≥ 6 years	2 NRTI's + Atazanavir + ritonavir <b>(AI)</b>
	2 NRTI's + Efavirenz <b>(AI)</b>
	2 NRTI's + Lopinavir/ritonavir <b>(AI)</b>

# DHHS Antiretroviral Therapy Guidelines: November 2012

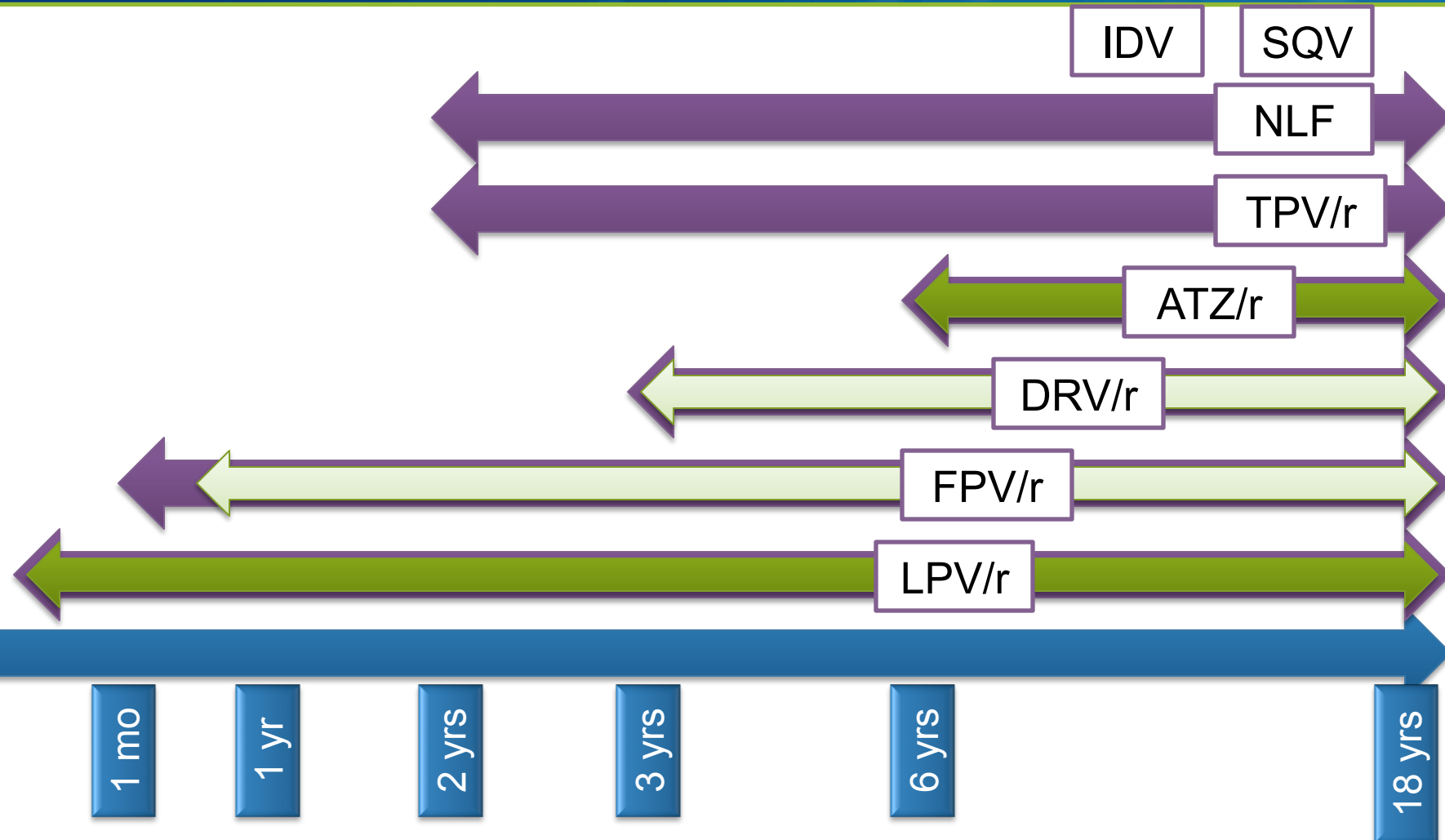
## FDA Approval/DHHS Recommendations: NRTI's





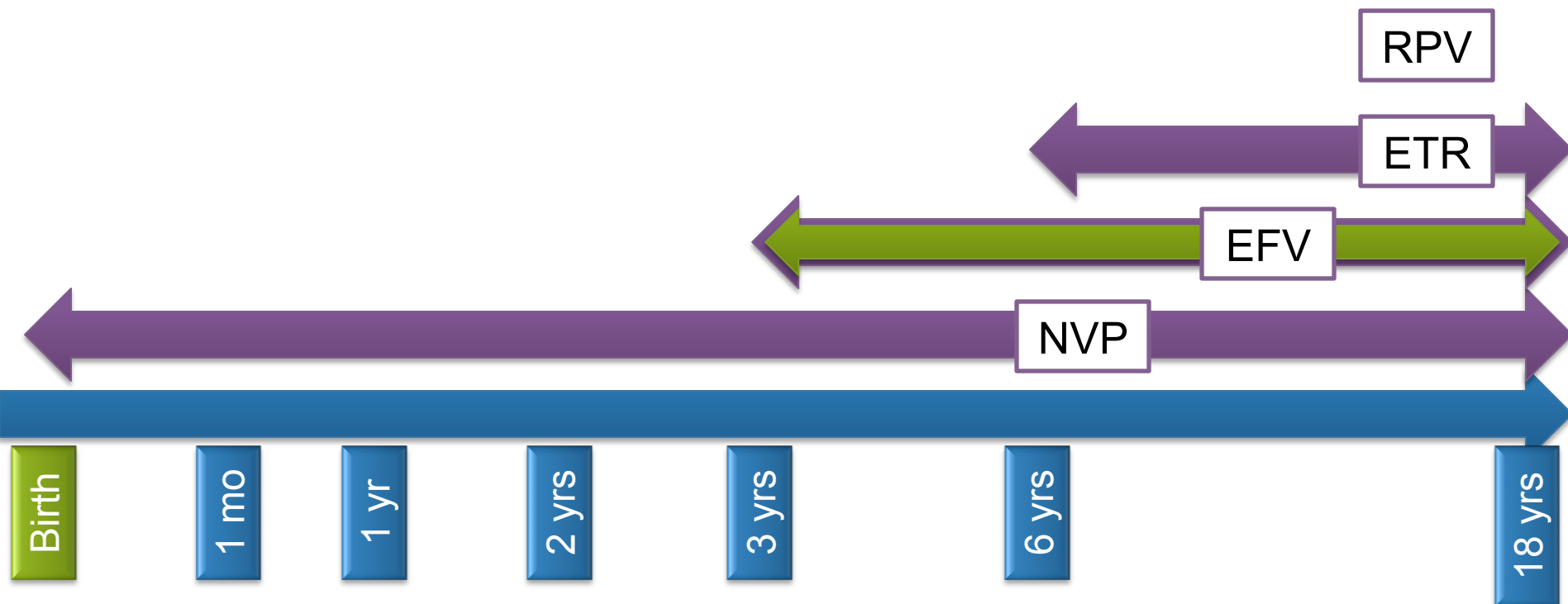
# DHHS Antiretroviral Therapy Guidelines: November 2012

## FDA Approval/DHHS Recommendations: PI's



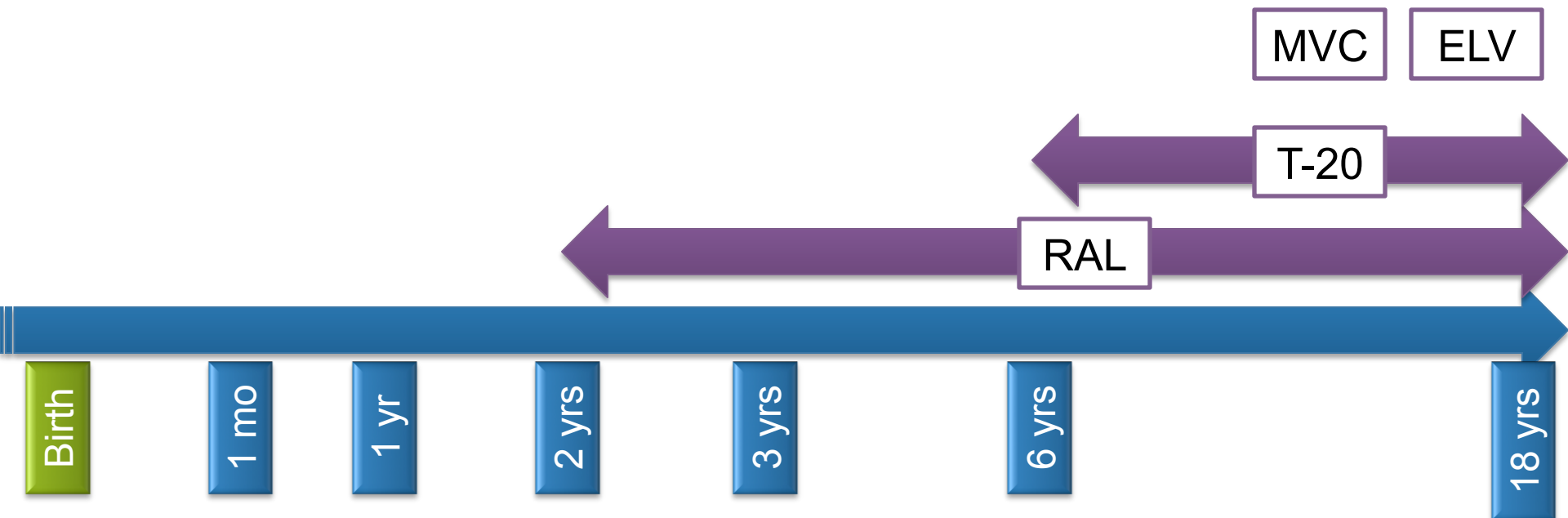
# DHHS Antiretroviral Therapy Guidelines: November 2012

## FDA Approval/DHHS Recommendations: NNRTI's



# DHHS Antiretroviral Therapy Guidelines: November 2012

## FDA Approval: INSTI's, Entry Inhibitors



Source: 2012 DHHS Antiretroviral Therapy Guidelines. ([aidsinfo.nih.gov](http://aidsinfo.nih.gov))

# THE MISSISSIPPI MIRACLE

- And what this means for the adults in the room

# HIV 'cure' in toddler offers 'global hope'

By **Jen Christensen**, CNN  
updated 10:44 AM EST, Tue March 5, 2013



## shots HEALTH NEWS FROM NPR

your health treatments & tests health inc. policy-ish public health

treatments

# Scientists Report First Cure Of HIV In A Child, Say It's A Game-Changer

by **RICHARD KNOX**  
March 03, 2013 4:41 PM

## The New York Times

March 3, 2013

# In Medical First, a Baby With H.I.V. Is Deemed Cured

By **ANDREW POLLACK** and **DONALD G. McNEIL Jr.**

Doctors announced on Sunday that a baby had been cured of an H.I.V. infection for the first time, a startling development that could change how infected newborns are treated and sharply reduce the number of children living with the virus that causes AIDS.

The baby, born in rural Mississippi, was treated aggressively with antiretroviral drugs starting around 30 hours after birth, something that is not usually done. If further study shows this works in other babies, it will almost certainly be recommended globally. The United Nations estimates that 330,000 babies were newly infected in 2011, the most recent year for which there is data, and that more than three million children globally are living with H.I.V.

## BUSINESS

The Washington Post  
with Bloomberg

# Infant born with HIV cured with early use of AIDS drugs, doctors say

By Shannon Pettypiece, March 03, 2013



HOT TOPICS: California Quake • DC Shooting • Visa

HOME > HEALTH

# Mississippi Baby Born With HIV 'Functionally Cured,' Doctors Say



Baby Born With HIV 'Functionally Cured,' Doctors Say

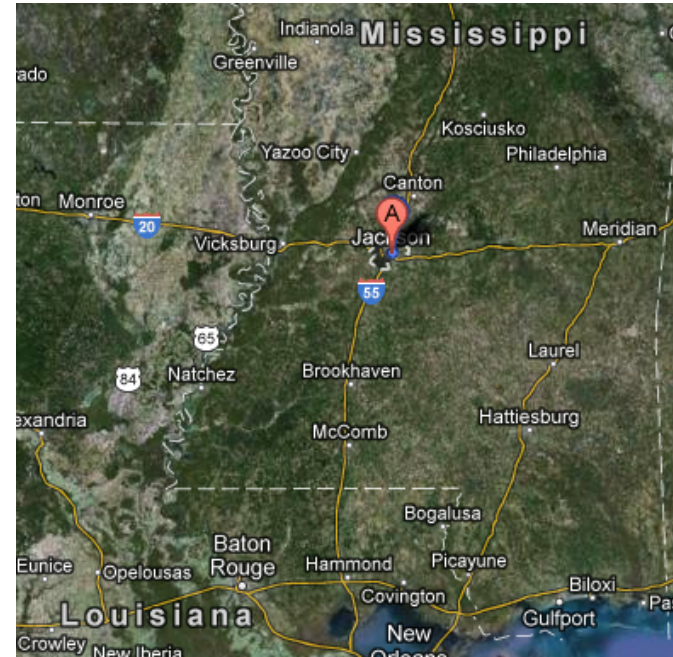
AUTO START: ON OFF

# HIV Cure #2: the 'Mississippi Baby'

Baby 'cured' of HIV with triple-drug therapy



Deborah Persaud from Johns Hopkins University School of Medicine at CROI 2013. © Liz Highleyman / hivandhepatitis.com.

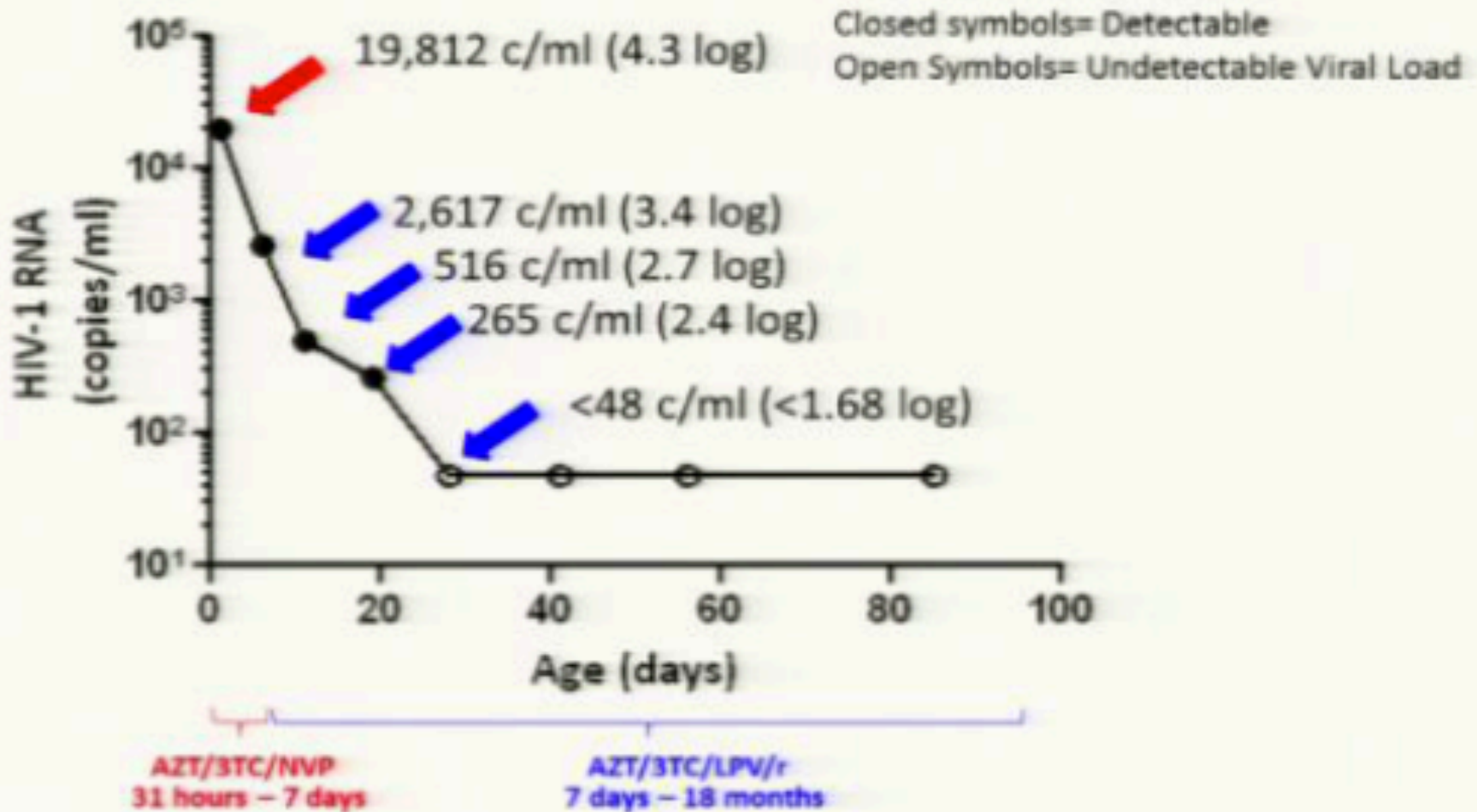


- Fall 2010: woman presented in labor at 35 wks gestation, no prenatal care
- Rapid HIV test positive
- Precipitous delivery with no PMTCT drugs given
- **Maternal ELISA +, Western Blot +, VL 2423 c/mL, CD4 644**

# HIV Cure #2: Post-Partum Management

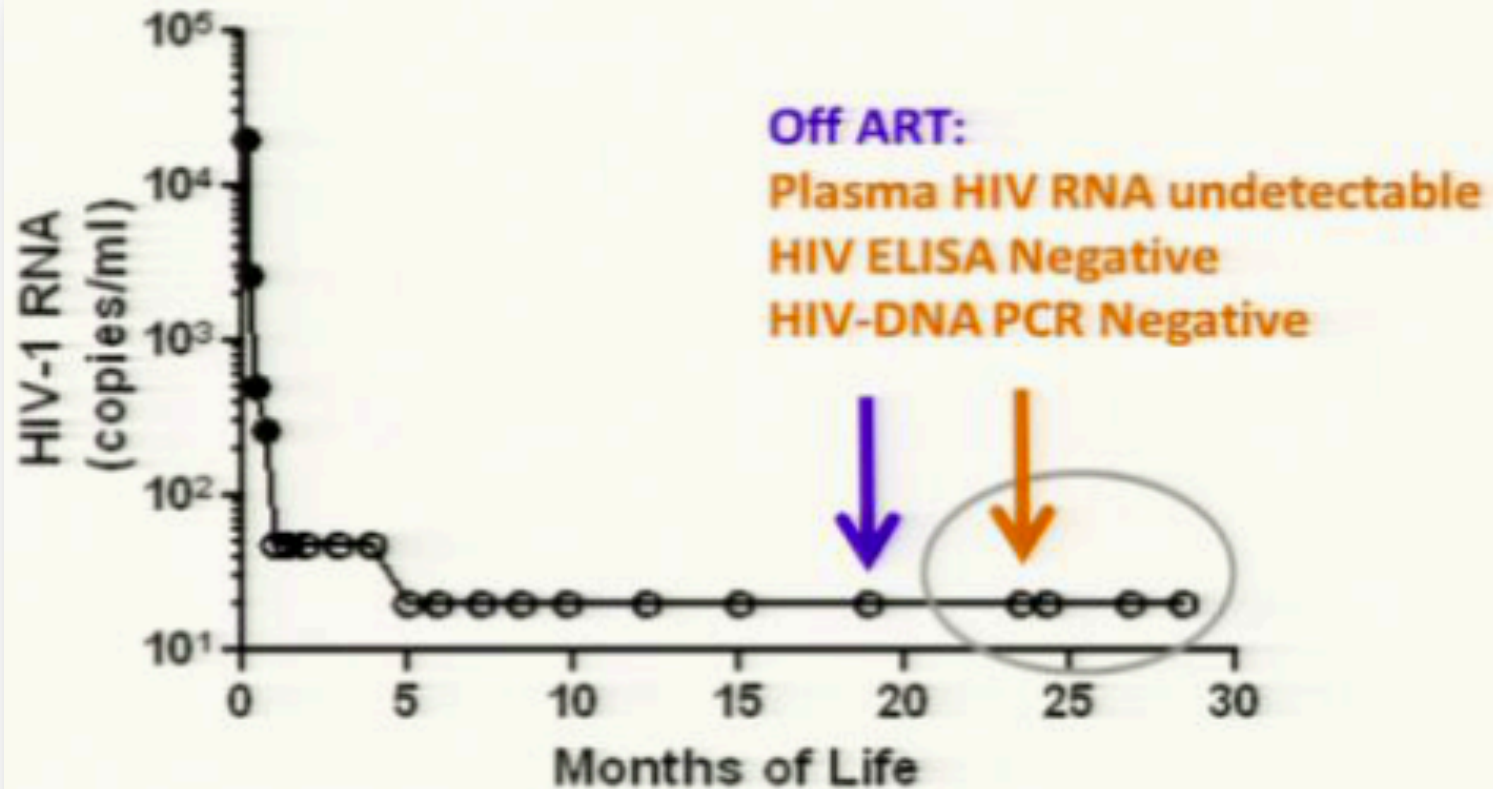
- Baby transferred to University of Mississippi by 30 hours of life
- Blood drawn for multiple studies:
  - Peripheral blood (hr 30) HIV DNA – POSITIVE
  - Peripheral blood (hr 31) HIV RNA – 19,812 copies/mL
- Baby given AZT/3TC + Nevirapine

# HIV Cure #2: Baby's Virologic Response on ART





# HIV Cure #2: All Testing off of ART still Negative



Regimen #1: AZT/3TC/NVP (31 hours-7 days of life)

Regimen #2: AZT/3TC/LPV/ritonavir (7 days-18 months of life)

# HIV Cure #2: Ultra-Sensitive Testing Shows Trace HIV

Measurement	Sample Type (amount of sample)	Age at Testing	Quantity (per 1 x 10 <sup>6</sup> cells)	#Cells Tested per well/ (No. Replicates positive)
<b>Total Proviral DNA</b>				
	PBMC	24-months	<2.7 [0]	122,000 (0/2)
		26-months	<b>4.2<sup>≠</sup></b> [0]	113,000 (1/6)
	Resting CD4+ T cells	24-months	<3.5 [0]	96,500 (0/3)
		26-months	<2.5 [0]	134,000 (0/6)
	Enriched for activated CD4+ T cells	24-months	<2.2 [0]	154,000 (0/6)
		26-months	<2.6 [0]	130,000 (0/6)
	Monocyte-derived adherent cells	24-months	<b>37.6<sup>*</sup></b> [0]	14,300 (1/3)
		26-months	<11.5[0]	29,000 (0/6)
<b>Residual Viremia</b>				
	Plasma	24-months	<b>1- copy/ml</b>	na
		26-months	<2 copies/ml	na
<b>Infectious Virus Recovery</b>	Resting CD4+ T cells	24-months	<1/ 22 x10 <sup>6</sup> IUPM (No HIV recovered)	na
<b>≠ =Limit of detection=2.9 copies/million cells; * =limit of detection=23.3 copies/million cells.</b>				

# HIV Cure #2: Key Points

- This case highlights a problem with systems of care, as Pediatric HIV is already virtually **100% preventable**
- If baby truly was infected, this case is very different from PMTCT which is current practice
- Baby given AZT/3TC + Nevirapine, which is slightly more aggressive than current practices
- Some debate whether the baby was truly infected because latent reservoir had not yet been established

# Pediatric HIV Infection - Summary

- With good pre-natal care and PMTCT, Pediatric HIV infection is rare in the developed world
- Diagnosing (or excluding) HIV infection in a neonate requires two separate nucleic acid-based tests
- Evidence supports initiating ART in all infants < 12 months old, and most other children
- Anti-retroviral agents have complex and variable ‘approved’ and ‘recommended age’ restrictions