

# U=U: From Science to Practice

Presented by:

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California PTC





Poll Everywhere

# POLLEVERYWHERE

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# Acknowledgments

**Robert M. Grant, M.D., M.P.H.**

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Endowed Investigator

**Anthony S. Fauci, M.D., NIAID Director**  
**PAETC/AETC**

For the development of this presentation.

**GLADSTONE**  
INSTITUTES



**UCSF**

## I have been working in HIV field for:

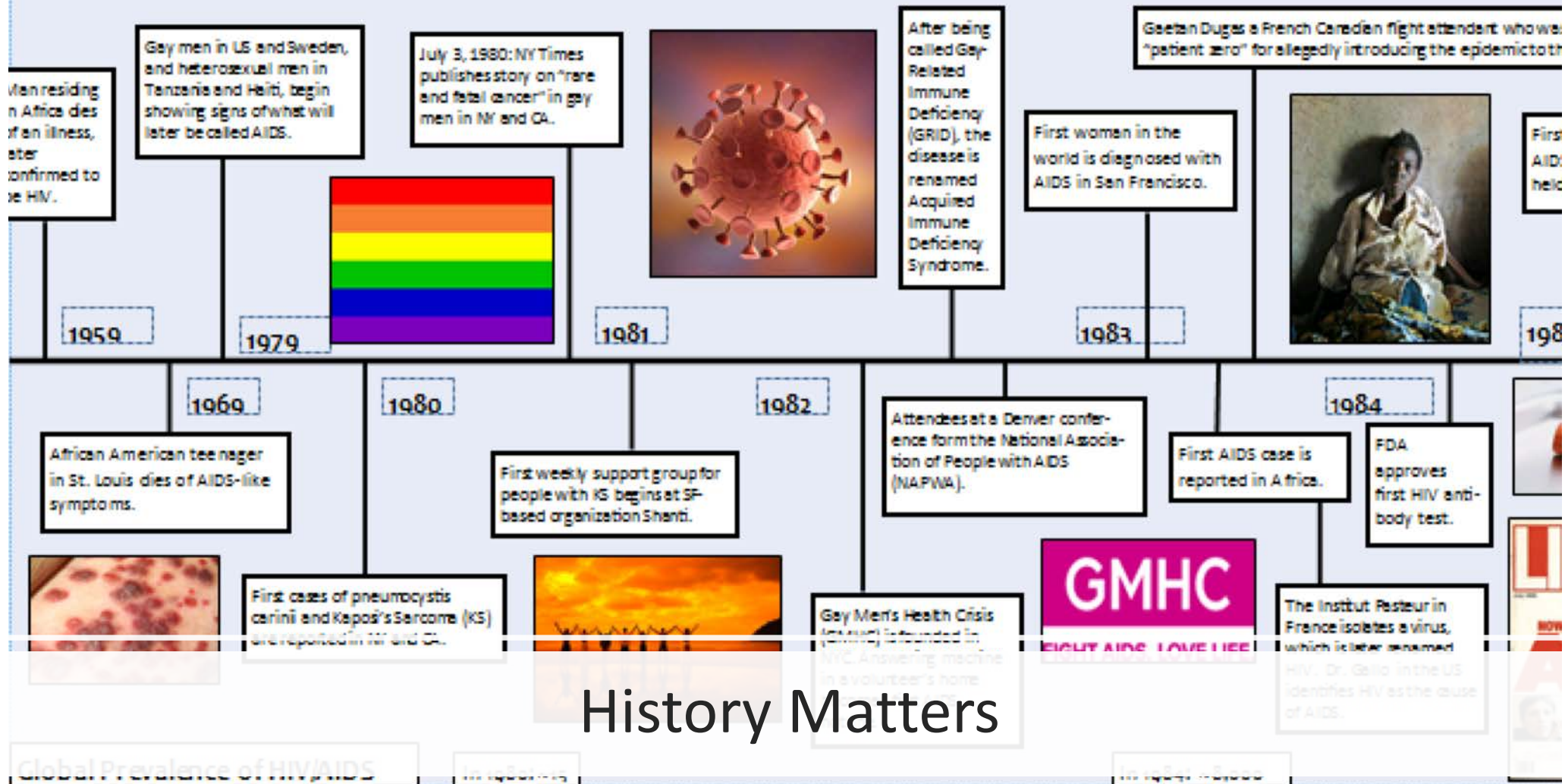
0- 2  
years

2- 5  
years

5-10  
years

10-20  
years

# HIV/AIDS Timeline 1959 - 1985



History Matters





U=U

UNDETECTABLE = UNTRANSMITTABLE

# How knowledgeable are you on $U=U$

Extremely

Somewhat

A little bit

Not at all

# I believed decreased viral load related to lower transmission

Since the beginning  
of my work

Past 10 years or  
more

Since the success  
of ARTs

In the past 1-2  
years

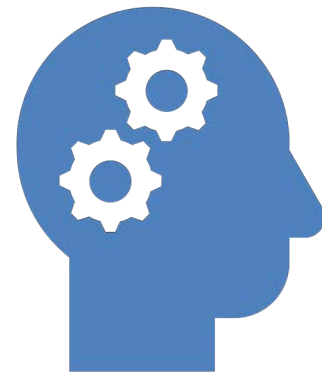
Don't know if I  
believe it



U=U

## Science and Policy

- **HIV Transmission**
- **Pre- ART era**
- **ART era**
- **HPTN 052 and subsequent studies**

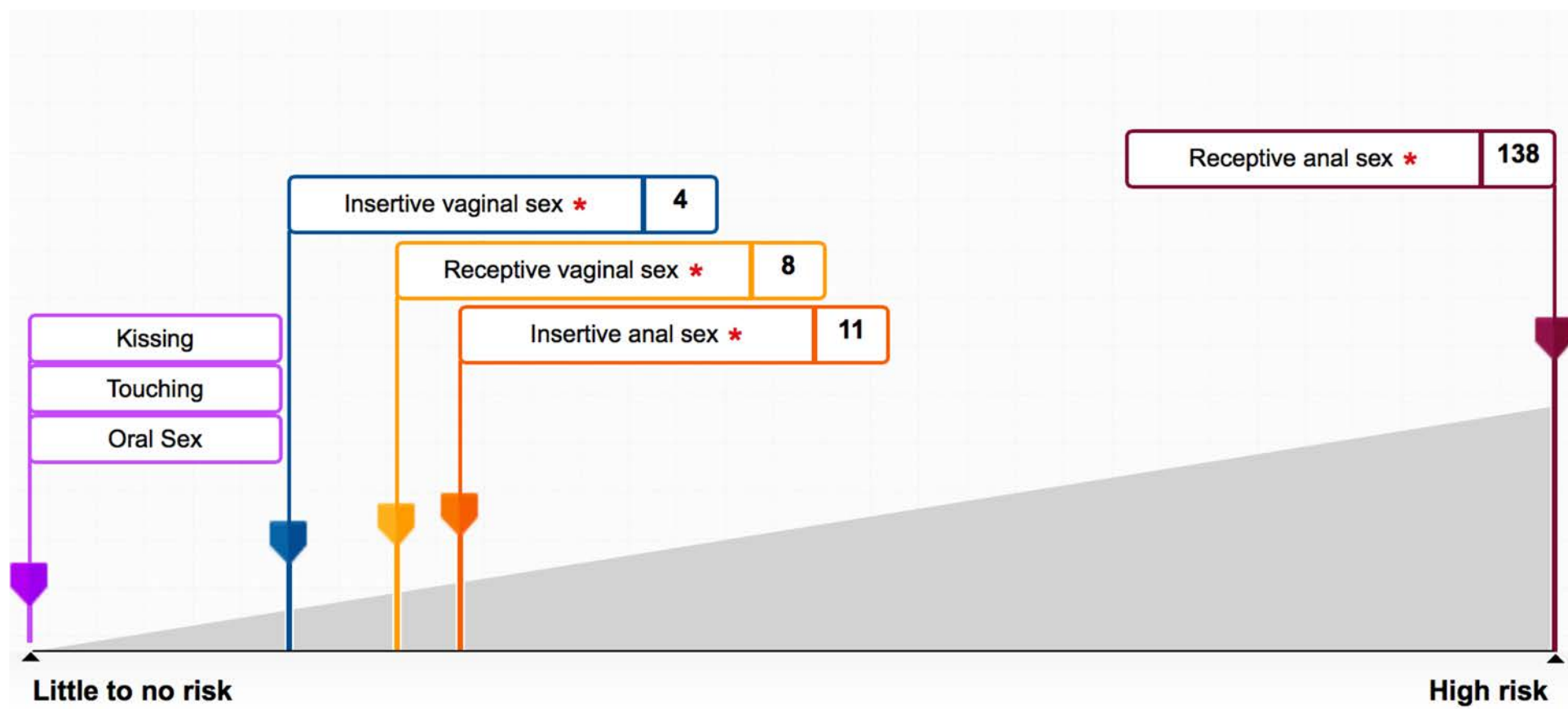


# Probability of Transmission of HIV

Sexual	
Receptive Anal Intercourse	138
Insertive Anal Intercourse	11
Receptive Penile-Vaginal Intercourse	8
Insertive Penile-Vaginal Intercourse	4
Receptive Oral Intercourse	Low
Insertive Oral Intercourse	Low

# Risk of HIV Transmission:

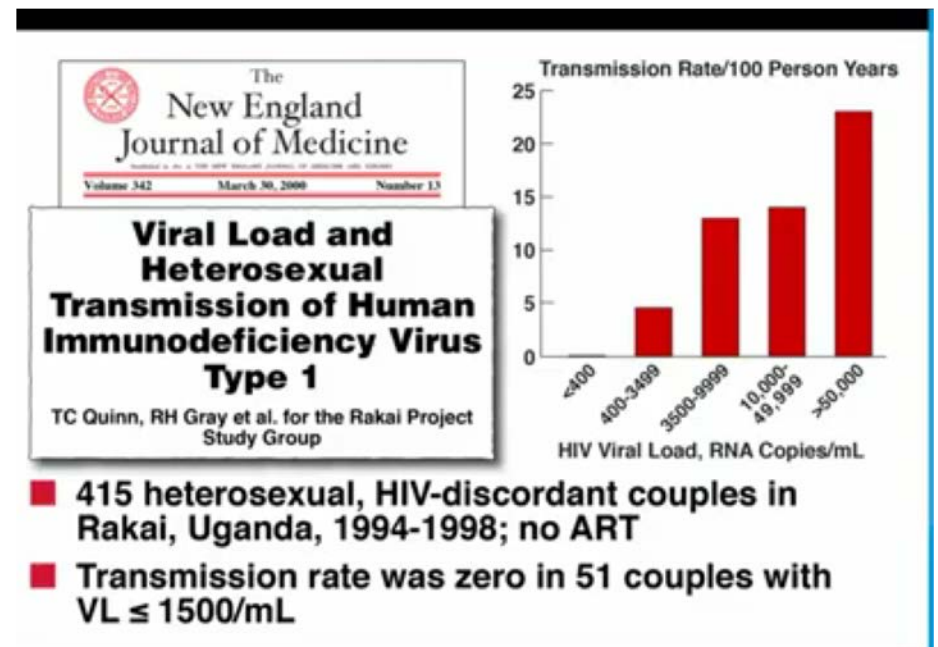
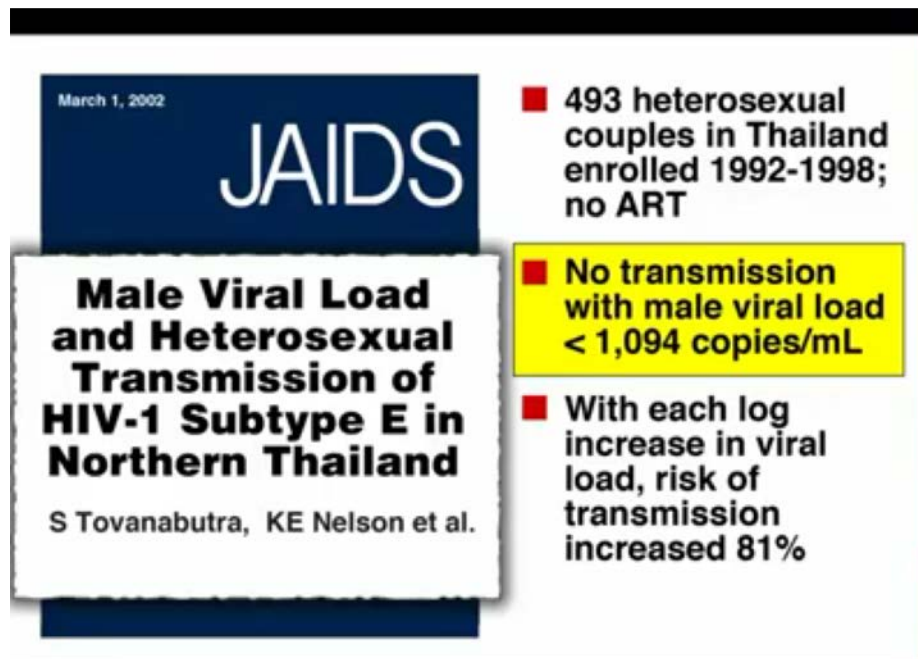
if no condoms, no PrEP, and no treatment,  
transmission per 10,000 sex acts



<https://wwwn.cdc.gov/hivrisk/estimator.html#-~sb>

Patel *et al* (2014). Estimating per-act HIV transmission risk: a systematic review. *AIDS*, 28(10), 1509-1519

# Viral Load and Transmission





The  
**New England  
Journal of Medicine**

VOLUME 341

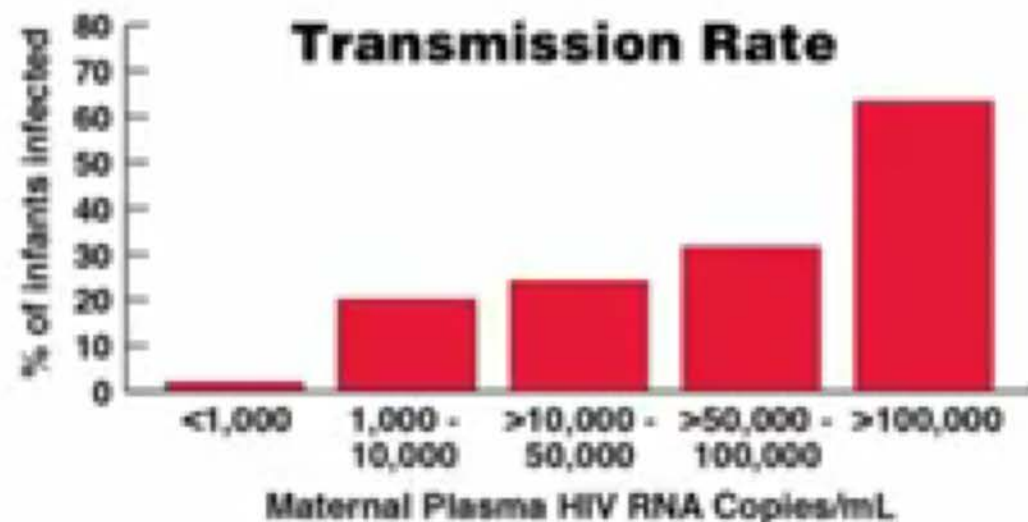
AUGUST 5, 1999

NUMBER 6

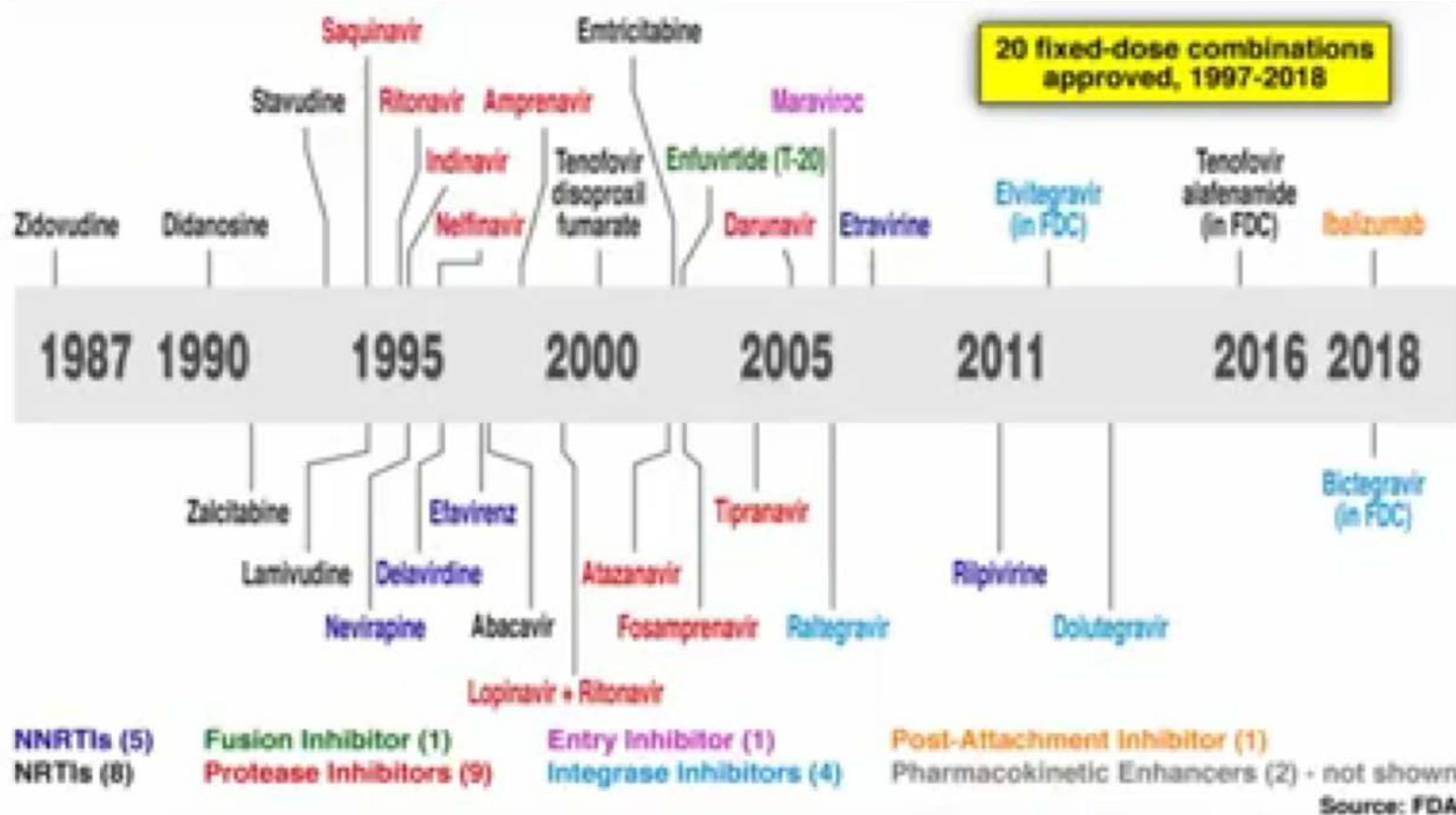
## **Maternal Levels of Plasma Human Immunodeficiency Virus Type 1 RNA and the Risk of Perinatal Transmission**

PM Garcia, JF Lew et al. for the Women and Infants Transmission Study Group

- 321 HIV-infected women with singleton pregnancies 1990-1995; no AZT during pregnancy



# Antiretroviral Drugs Approved by FDA, 1987-2018







**Therapy is Easier, More  
Potent, and Less Toxic in  
Single-Tablet Regimens**

## **Viral Loads Lowered by ART are Associated with Reduced Risk of HIV Transmission**

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- Mother-to-child transmission
- Discordant couples
- Cohort studies of “community viral load”



## TREATMENT as PREVENTION

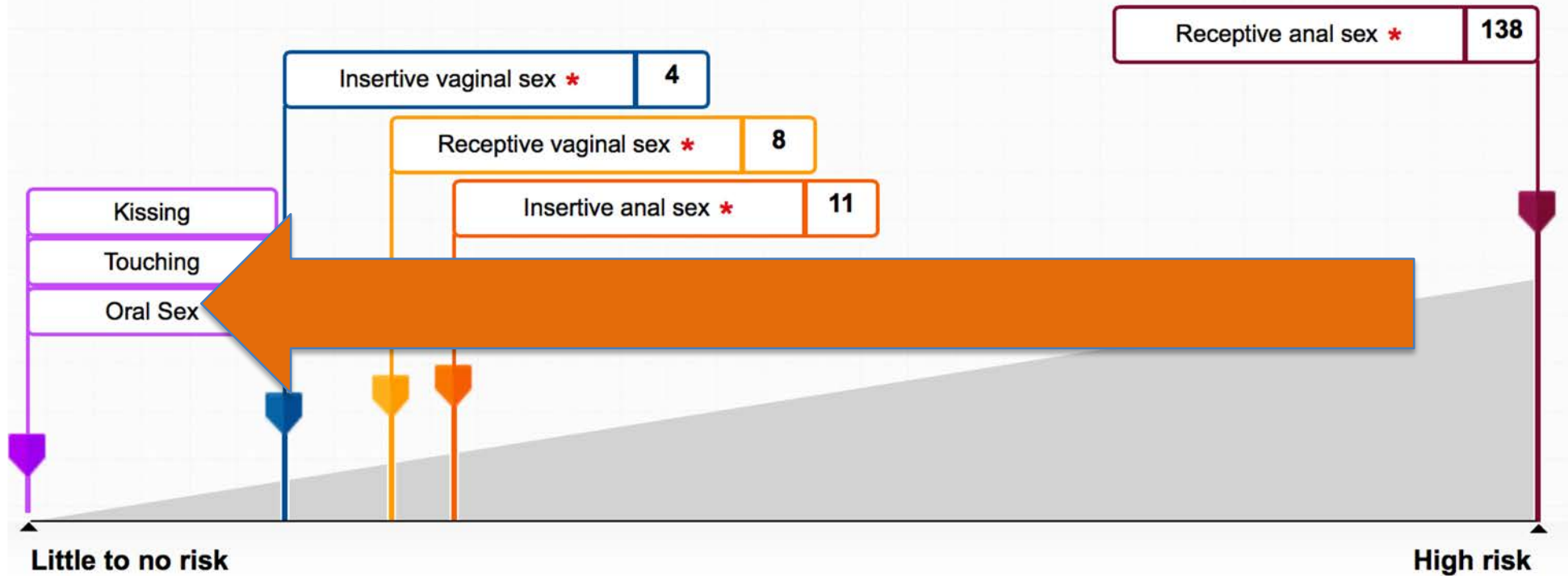


# CDC Estimates of Efficacy

Treatment >96%

PrEP for MSM >92%, heterosexuals 90%

Condoms 63% to 80%



<https://wwwn.cdc.gov/hivrisk/estimator.html#-~sb>

Patel *et al* (2014). Estimating per-act HIV transmission risk: a systematic review. *AIDS*, 28(10), 1509-1519



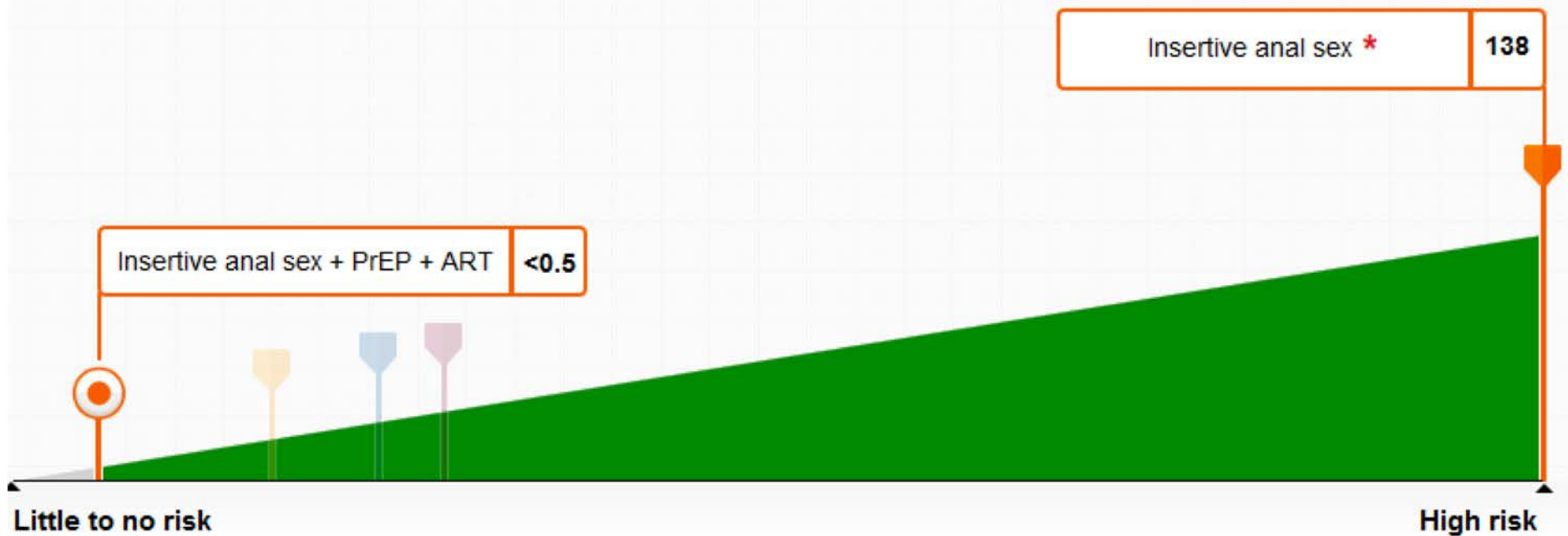
# The probability for HIV+ insertive anal sex with HIV- on ART/PrEP is



## Risk of Transmitting HIV



Insertive anal sex + PrEP + ART is about **312 times less risky** than Insertive anal sex



Show numbers

Yes

Show all pins

No

Start over

Compare sexual activities ►

[About the Data](#)



# RISK CALCULATOR

## Know the HIV Risk

Learn the HIV risk of different sexual activities when one partner is HIV positive and one partner is HIV negative (a discordant partnership)

### Person 1

**Status** ☐ HIV - ☒ HIV +

**Activity** Insertive anal sex 

**Factor** Condom ☐ No ART ☒ Yes STD ☒ Yes Acute HIV ☐ No

### Person 2

**Status** HIV-

**Activity** -- Receptive anal sex --

**Factor** Condom ☐ No PrEP ☒ Yes STD ☐ No

### Risk of Transmitting HIV

 Insertive anal sex + PrEP + ART + STD is about **121 times less risky** than Insertive anal sex

# HPTN 052 Final Results, 2016



The  
New England  
Journal of Medicine

Founded in 1812 • A peer-reviewed journal of medicine and surgery

Vol. 375

September 1, 2016

No. 9

## **Antiretroviral Therapy for the Prevention of HIV-1 Transmission**

MS Cohen, TR Fleming et al. for the HPTN 052 study team

- After 5+ years of follow-up, protective effect of early ART was sustained (93% lower risk)
- No linked infections when HIV was stably suppressed by ART (i.e. undetectable viral load) in HIV+ partner

# Partner Study

## Sexual Activity Without Condoms and Risk of HIV Transmission in Serodifferent Couples When the HIV-Positive Partner Is Using Suppressive Antiretroviral Therapy

Alison J. Rodger, MD; Valentina Cambiano, PhD; Tina Bruun, RN; Pietro Vernazza, MD; Simon Collins; Jan van Lunzen, PhD; Giulio Maria Corbelli; Vicente Estrada, MD; Anna Maria Geretti, MD; Apostolos Beloukas, PhD; David Asboe, FRCP; Pompeyo Viciano, MD; Félix Gutiérrez, MD; Bonaventura Clotet, PhD; Christian Pradier, MD; Jan Gerstoft, MD; Rainer Weber, MD; Katarina Westling, MD; Gilles Wandeler, MD; Jan M. Prins, PhD; Armin Rieger, MD; Marcel Stoeckle, MD; Tim Kümmerle, PhD; Teresa Bini, MD; Adriana Ammassari, MD; Richard Gilson, MD; Ivanka Krznaric, PhD; Matti Ristola, PhD; Robert Zangerle, MD; Pia Handberg, RN; Antonio Antela, PhD; Sris Allan, FRCP; Andrew N. Phillips, PhD; Jens Lundgren, MD; for the PARTNER Study Group

**CONCLUSIONS AND RELEVANCE** Among serodifferent heterosexual and MSM couples in which the HIV-positive partner was using suppressive ART and who reported condomless sex, during median follow-up of 1.3 years per couple, there were no documented cases of within-couple HIV transmission (upper 95% confidence limit, 0.30/100 couple-years of follow-up). Additional longer-term follow-up is necessary to provide more precise estimates of risk.

*JAMA*. 2016;316(2):171-181. doi:10.1001/jama.2016.5148



# Opposites Attract Study – No HIV Transmissions When HIV<sup>+</sup> Partner Had Undetectable Viral Load

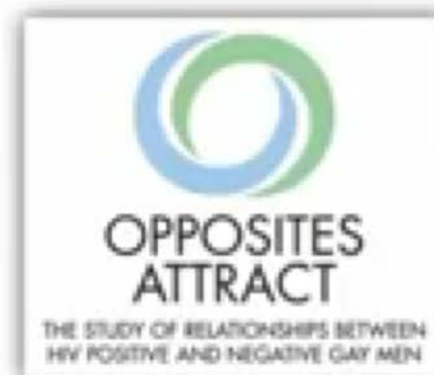
THE LANCET  
HIV

Published online July 16, 2018

**Viral Suppression and HIV Transmission in Serodiscordant Male Couples: An International, Prospective, Observational, Cohort Study**

BR Bavinton, AE Grulich et al. for the Opposites Attract Study Group

- 343 HIV-serodiscordant MSM couples in Australia, Thailand and Brazil
- 16,800 acts of condomless anal intercourse
- No linked HIV transmissions in 588 couple-years of followup



- Between the PARTNER and Opposites Attract studies, nearly 35,000 acts of condomless anal intercourse were reported in gay male couples when the HIV-positive partner had an undetectable viral load and the HIV-negative partner was not taking PrEP
- Zero linked transmissions

Source: BR Bavinton et al., *Lancet HIV*, July 16, 2018.

Dear Colleague: September 27, 2017



## Dear Colleague

INFORMATION FROM CDC'S DIVISION OF HIV/AIDS PREVENTION

When ART results in viral suppression, defined as less than 200 copies/ml or undetectable levels, it prevents sexual HIV transmission. Across three different studies, including thousands of couples and many thousand acts of sex without a condom or pre-exposure prophylaxis (PrEP), no HIV transmissions to an HIV-negative partner were observed when the HIV-positive person was virally suppressed. ***This means that people who take ART daily as prescribed and achieve and maintain an undetectable viral load have effectively no risk of sexually transmitted the virus to an HIV-negative partner.***

*Emphasis Added*



## My message would be on U=U

Limited Risk

Effectively No Risk

Cannot Transmit  
HIV

There is no risk

You can't always  
be sure you are U

I would state it  
another way

# Benefits and Challenges



## Psychological Consequence of U=U

- Replaces fear of contagion with a focus on relationships and engagement with other partners
- Replaces danger as part of sexual encounters with a personal connection
- Replaces self-doubt in sexual encounters with self efficacy
- Replaces worry about risk of transmission with more peace of mind
- Replaces risk with minimizing risk to others
- Replaces choosing only HIV + partners with both HIV+ and HIV- partners
- Replaces self perception of a vector of disease with positive self image

- Frank, 2018

# Additional Benefits of U=U

Improves Adherence Motivation



Improved Adherence

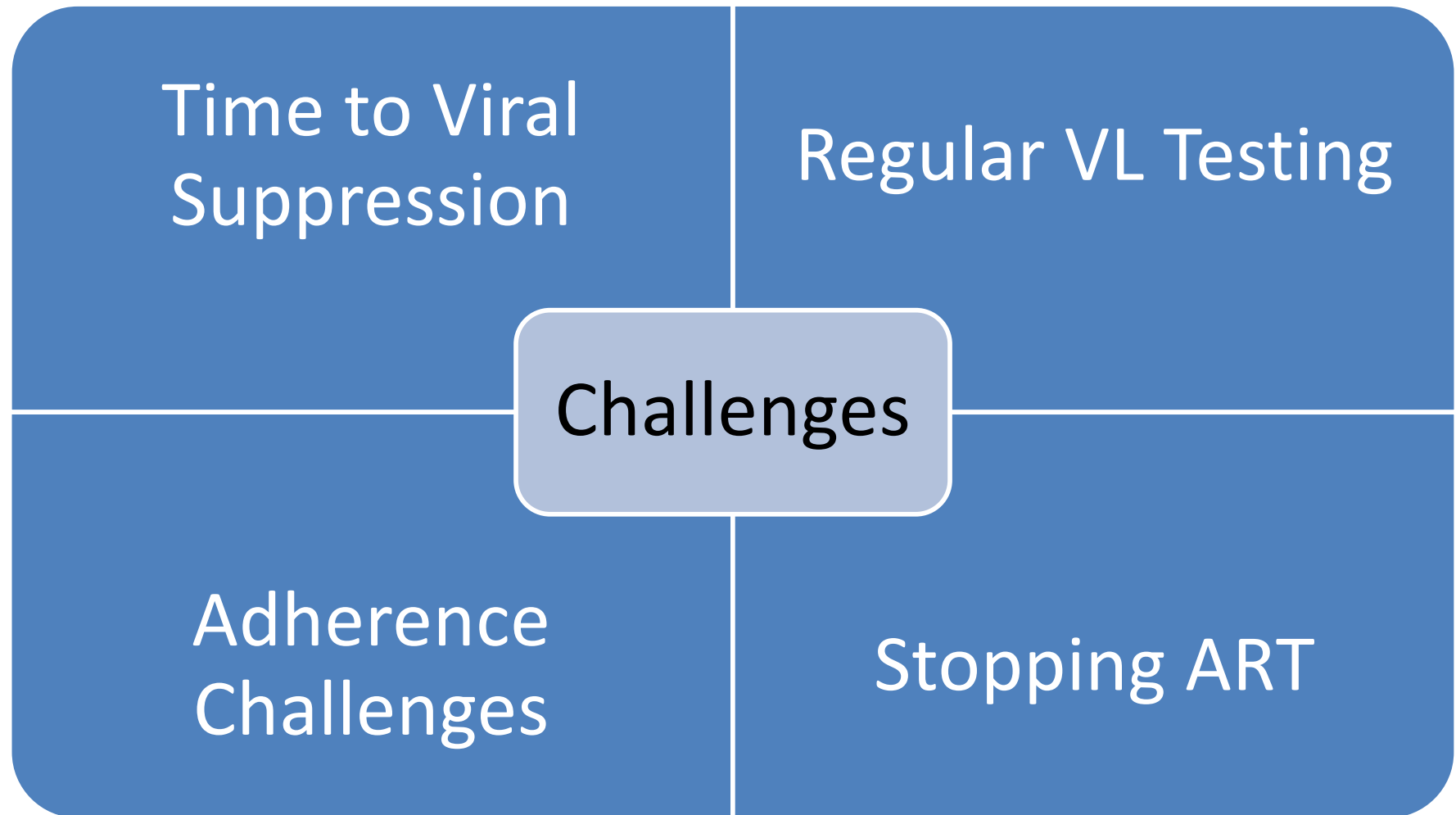


Virally Suppression- Better Individual Clinical Outcomes



Improved Public Health Outcomes- Reduced Incidence

# Maintaining Undetectable Viral Load



# Risk Compensation

- Risk “homeostasis” is defined as “a system in which individuals accept a certain level of subjectively estimated [or “perceived”] risk to their health in exchange for benefits they expect to receive from the behavior.
- In accepting a particular level of risk of an adverse event, individuals maintain an approximate risk set point.
- However, introduction of an intervention that reduces the perceived risk of the behavior or activity may cause a person to increase risky behavior—**this is called “risk compensation”** [8] so that the discrepancy between the level of risk he or she takes and the perceived risk increases.
- Risk Compensation in PrEP: An Old Debate Emerges Yet Again- Blumenthal, J, Haubrich, R.



# Probability with STD

100

50

25

5

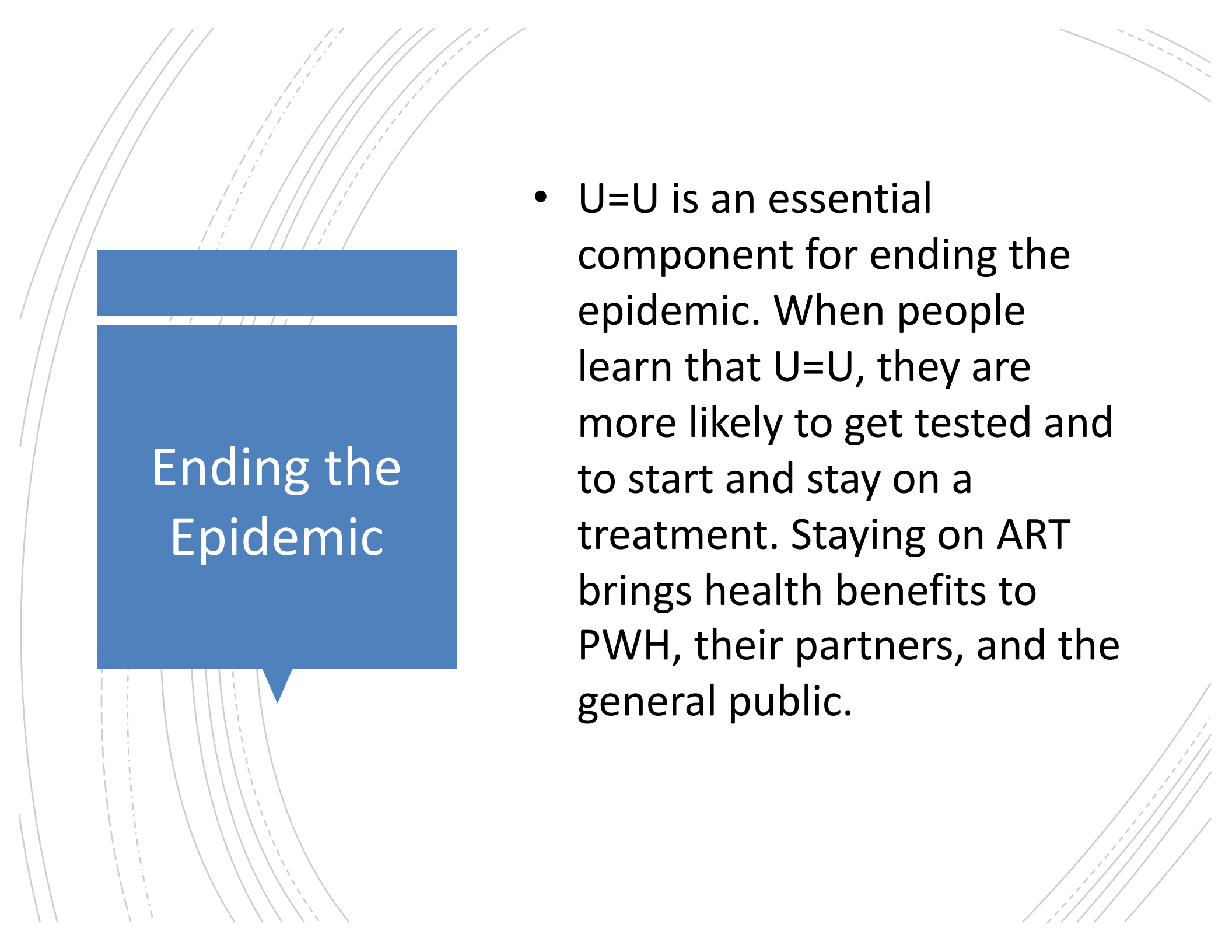
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# SCENARIO ACTIVITY





[Video link to the community talking about U=U](#)

The background of the slide features several sets of thin, curved lines in shades of gray, some solid and some dashed, creating a sense of movement and depth. A blue speech bubble is positioned on the left side, containing the title text.

## Ending the Epidemic

- U=U is an essential component for ending the epidemic. When people learn that U=U, they are more likely to get tested and to start and stay on a treatment. Staying on ART brings health benefits to PWH, their partners, and the general public.



# Transformation

- U=U is a game changer because it transforms the social, sexual, and reproductive lives of PWH. It enables PWH and their partners to be in a relationship without fear of transmitting HIV. PWH report no longer feeling “like a pariah” or “contaminated.”
- Furthermore, it changes the way health professionals, the public, employers, and policymakers see and make decisions related to PWH.



<https://www.preventionaccess.org/>



**HOUSINGWORKS**

### HOW DO YOU BECOME UNDETECTABLE?

You don't need to be a superhero to do something powerful for yourself and your community.

By regularly taking the right medicine, you can lower the amount of HIV in your blood (aka your **viral load**) to become Undetectable. **A low viral load is a good thing!**

**UNDETECTABLE = UNTRANSMITTABLE!**

People who are Undetectable cannot transmit the virus to others. When you're undetectable, you both protect your own health and prevent new HIV infections. And many **experts agree!**

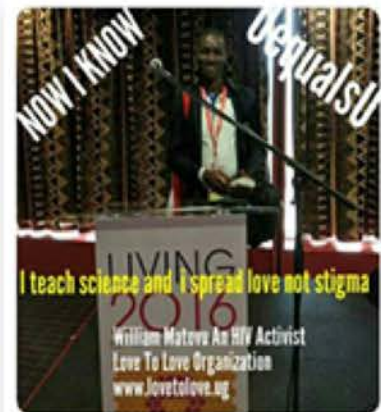
This doesn't mean you no longer have HIV—it means that by continuing your plan of treatment, you can live with HIV by managing your health on your own terms.

**UNDETECTABLES**

Having an undetectable viral load for at least six months and continuing to stay on medication means you are not putting your partner at risk. Consider having an open conversation with your partner or a friend you can trust. Let them know how you're feeling, what you're scared of, and how they might be able to help you continue making healthy choices. Becoming undetectable is a process – so be patient with yourself, and ask others to do the same for you.

**UNDETECTABLES**

Prevention Access Campaign



**U=U**

**UNDETECTABLE = UNTRANSMITTABLE.**

**PEOPLE LIVING WITH HIV, WHO ARE TAKING EFFECTIVE TREATMENT, CANNOT PASS ON HIV THROUGH SEX.**

**AID FOR AIDS**



# Thank You

**Tim Vincent**

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