



Webcast 1.2

# Beyond the Basics: The Science of PrEP

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# Overview

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- The Data Behind PrEP
- PrEP Research
- Key Points Related to PrEP
  - Adherence
  - Side Effects
  - Ongoing Risk

# Evolution of HIV Therapies Related to PrEP

- Highly active antiretroviral therapy (HAART)
- Prevention of mother-to-child transmission (PMTCT)
- Post-exposure prophylaxis (PEP)
- Treatment as prevention (TasP)
- Pre-exposure prophylaxis (PrEP)

# PEP and PrEP

- **PEP:** Utilizing antiretroviral HIV medications to prevent HIV infection following an exposure to HIV
- **PrEP:** Utilizing antiretroviral HIV medications to prevent HIV infection before an exposure to HIV

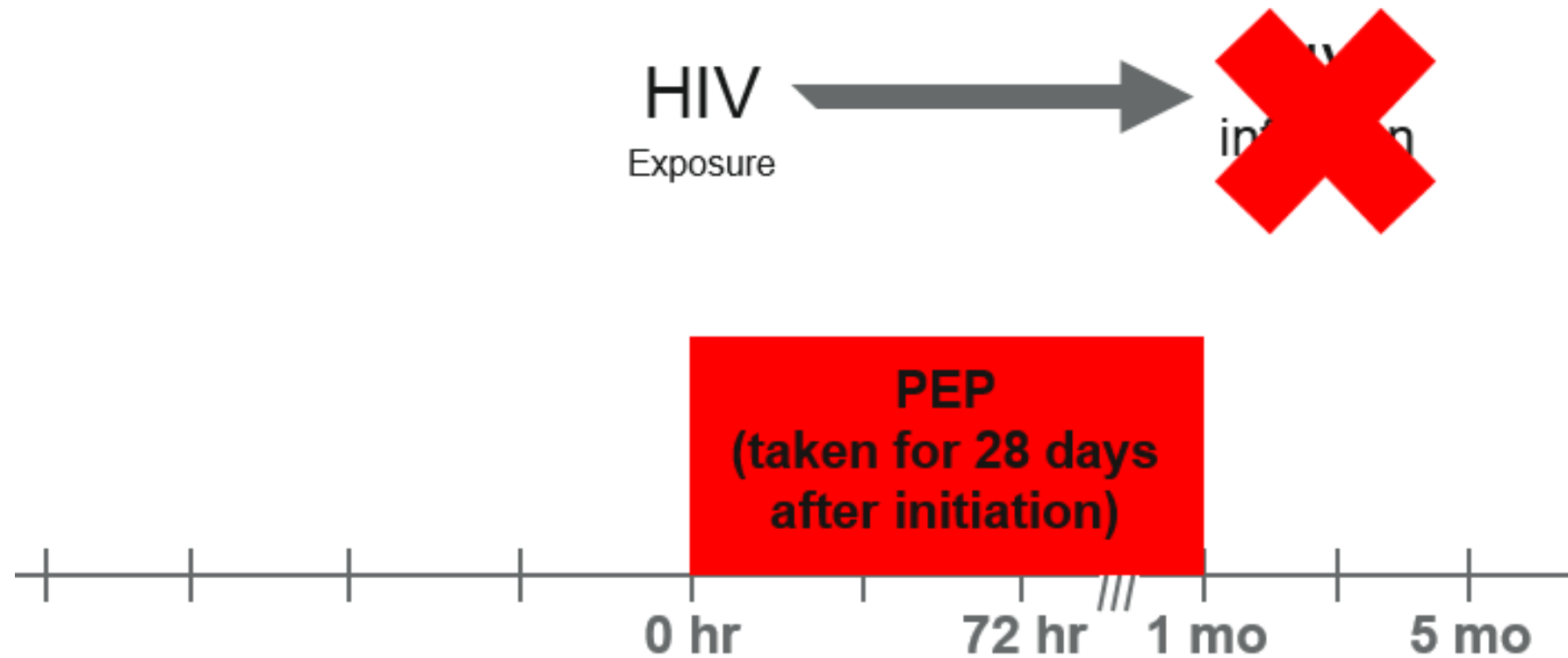
# PEP: Isolated HIV Exposure

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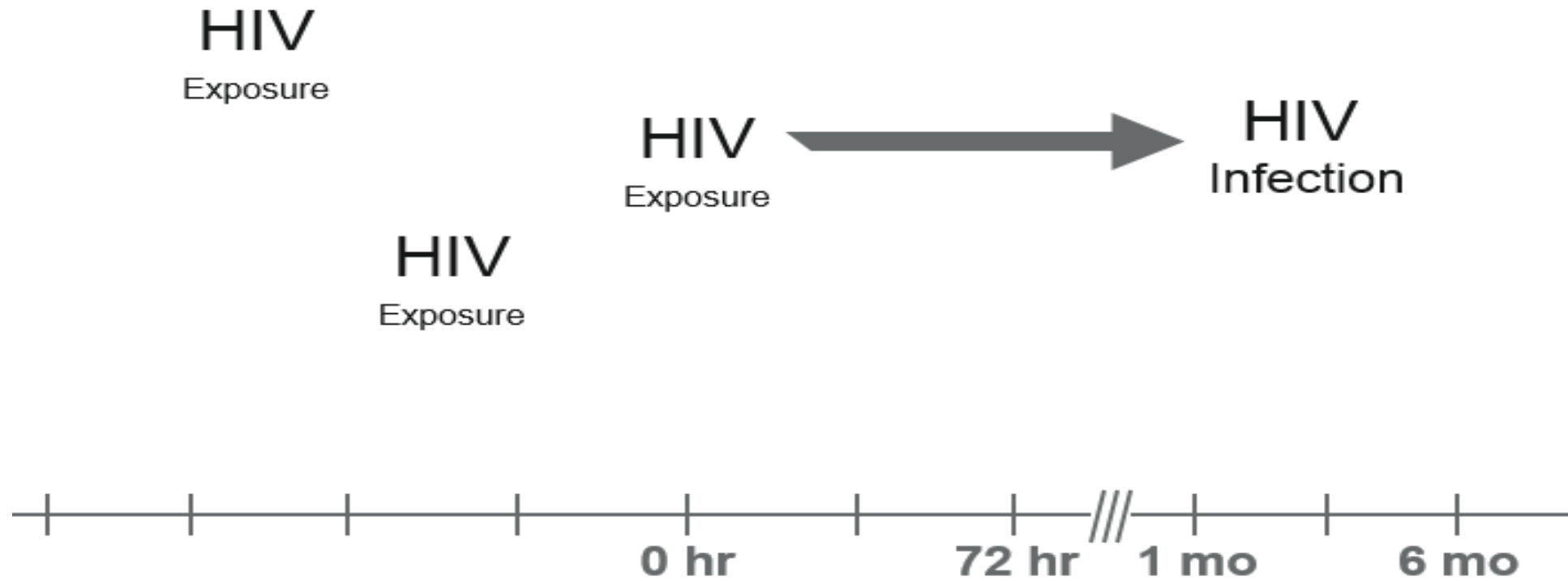
# PEP: Prevents Infection After Isolated Exposure

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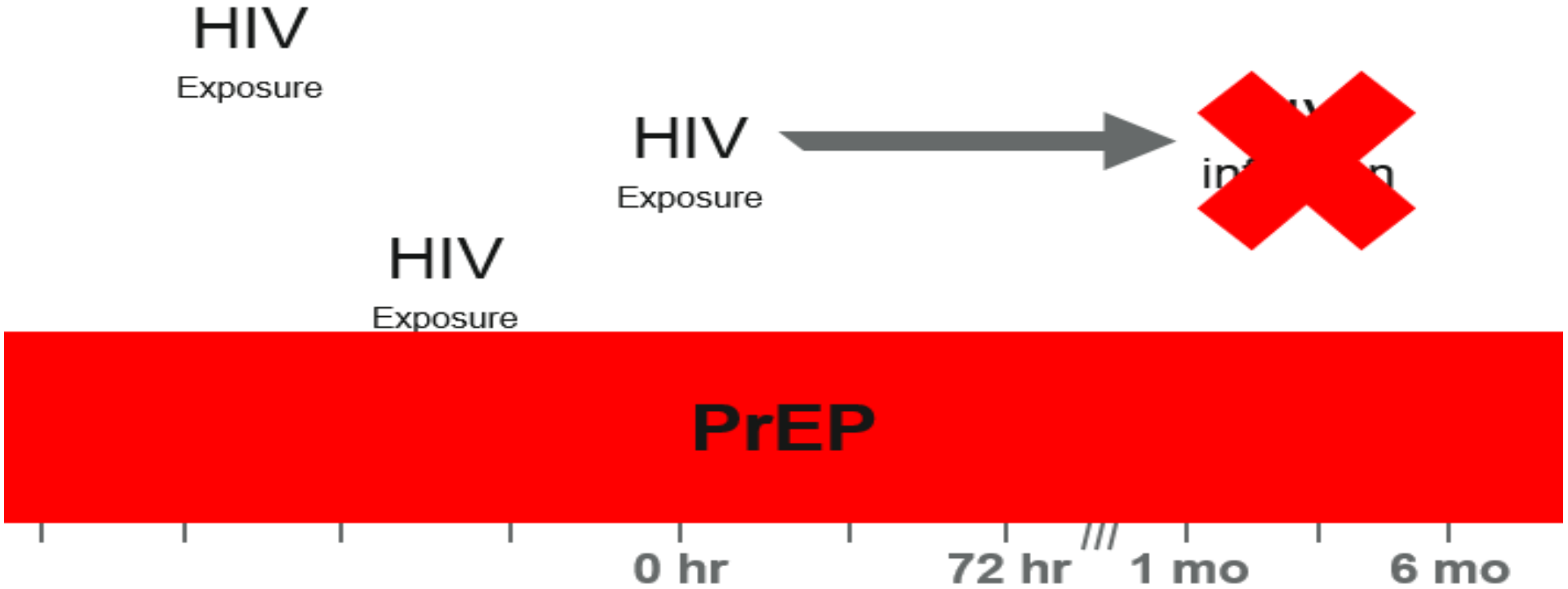
# PrEP: Multiple Exposures

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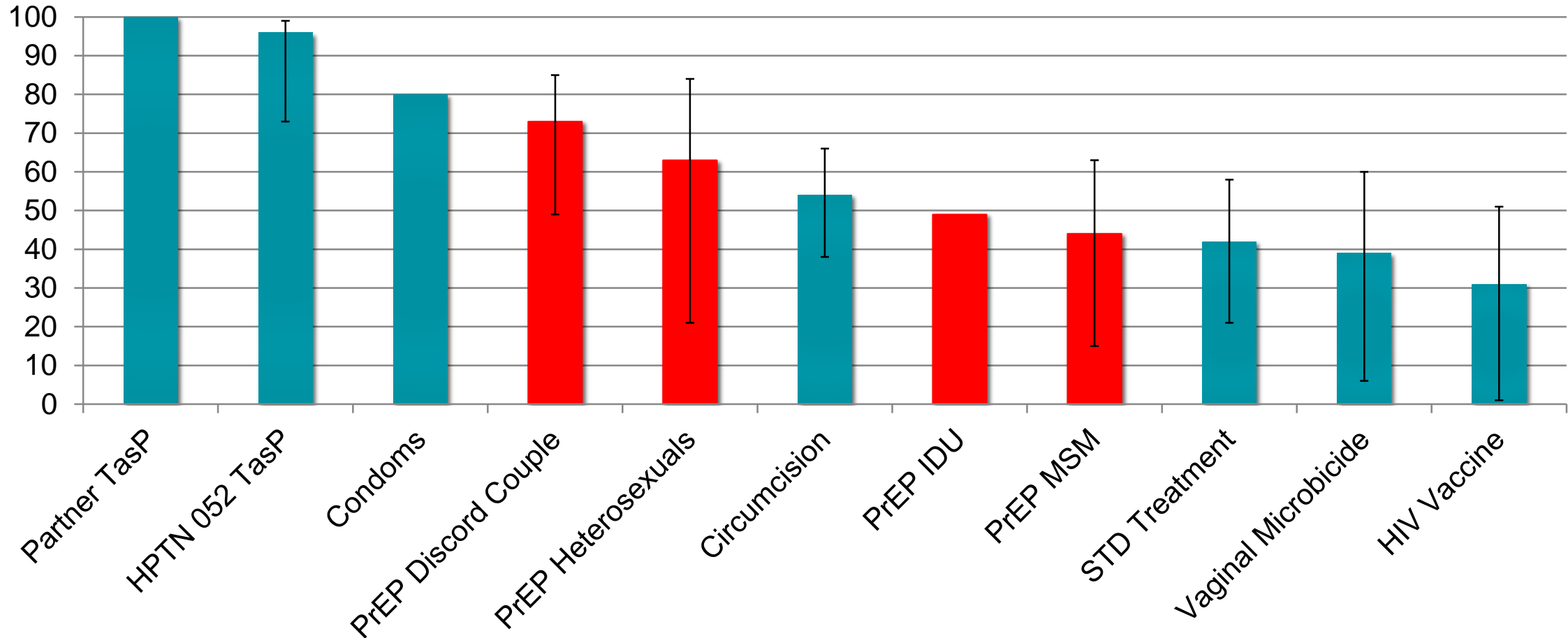
# PrEP: Prevents Infection Before Exposure

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# Prevention Science Overview: Biomedical Intervention Efficacy

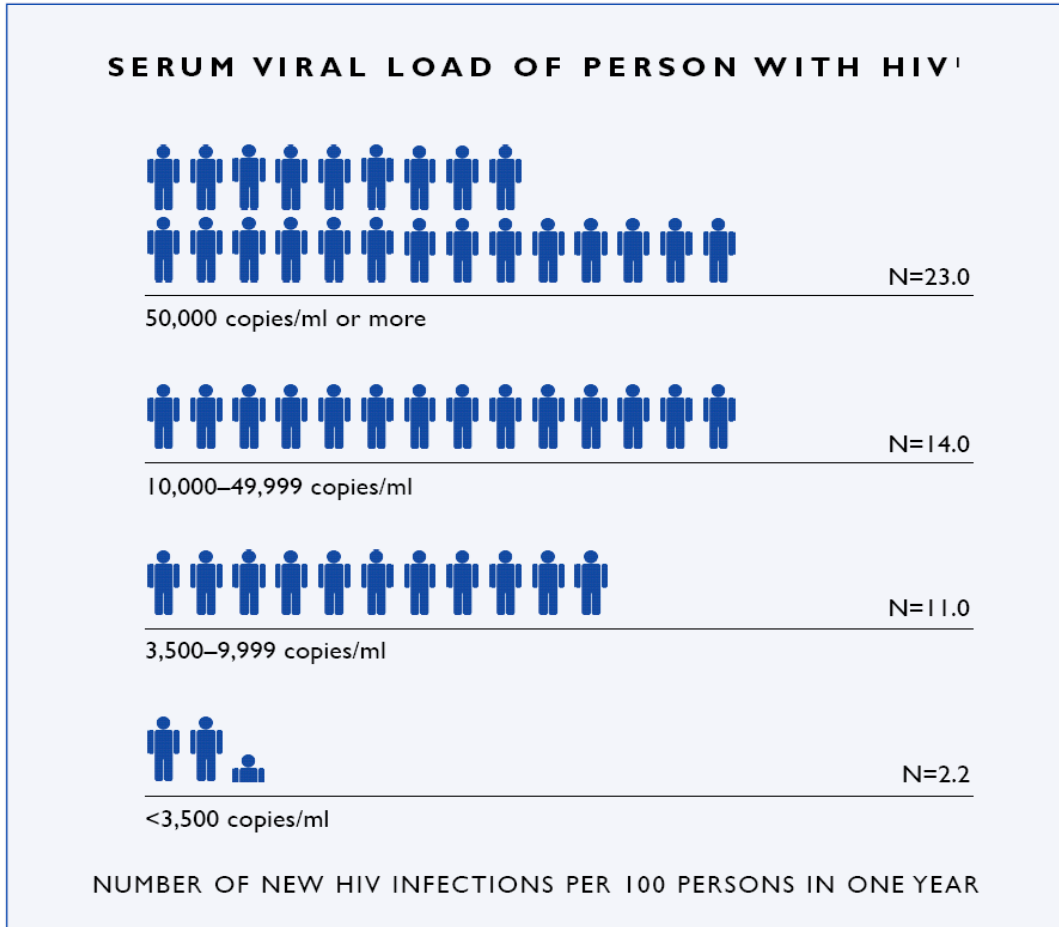


# Treatment as Prevention

- People living with HIV use antiretroviral medications to reduce their viral load to undetectable levels.
- With an undetectable viral load, the likelihood of passing the virus on to another person is greatly reduced.

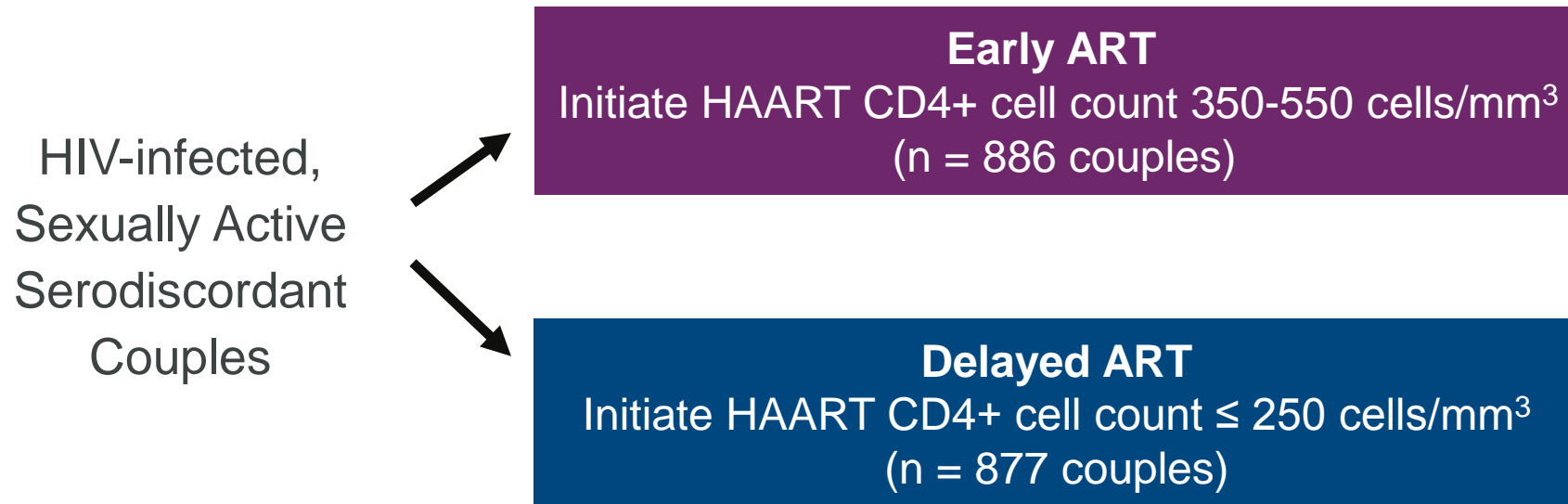
# Relationship Between HIV Viral Load and HIV Transmission

- HIV viral load is closely associated with HIV transmission
- The lower the viral load, the less likely HIV is to be transmitted



# HPTN 052: Immediate vs. Delayed ART for HIV in Serodiscordant Couples

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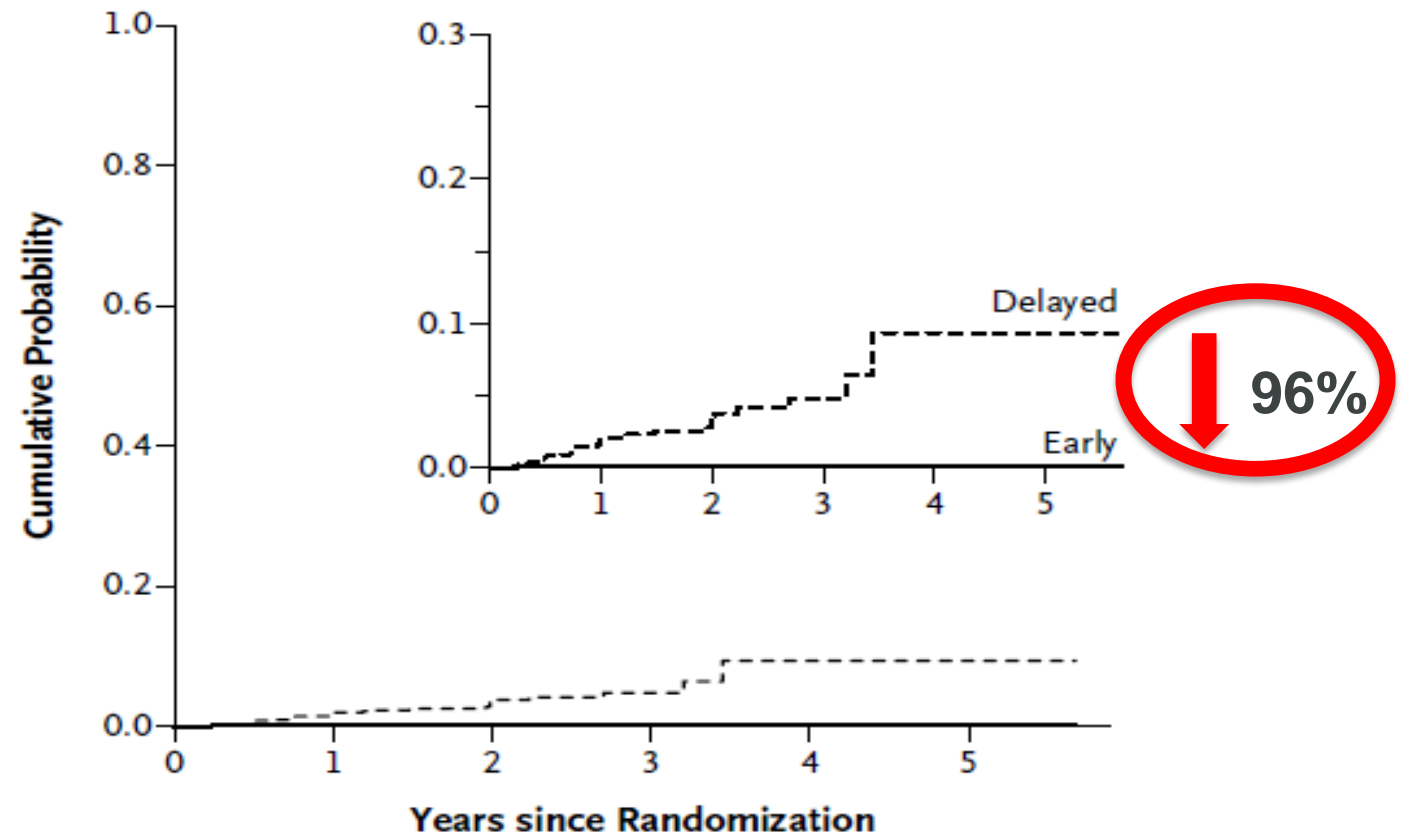


Primary efficiency endpoint: virologically linked HIV transmission

# HPTN 052: Results

- 96% reduction in HIV risk for partners of those randomized to early initiation of ART

**A** Linked HIV Transmission



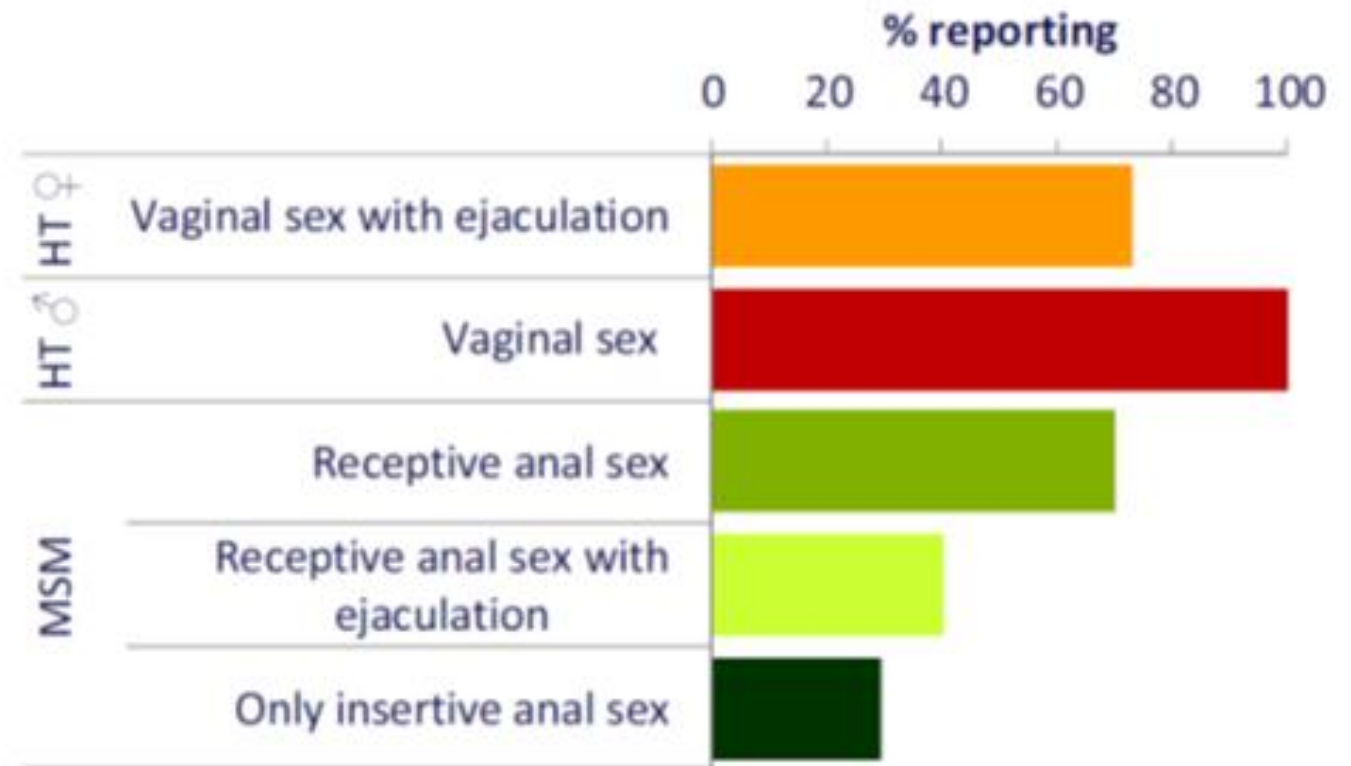
# PARTNER Study

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- 1,100 serodiscordant couples in Europe where:
  - Person with HIV was on ART and had an undetectable viral load
  - Condomless sex was occurring already
- Results from 767 couples who have collectively 894 couple-years of follow-up (CYFU) thus far:
  - 586 couple-years in heterosexual couples
  - 308 couple-years in gay couples (just 2% MSM in HPTN 052)

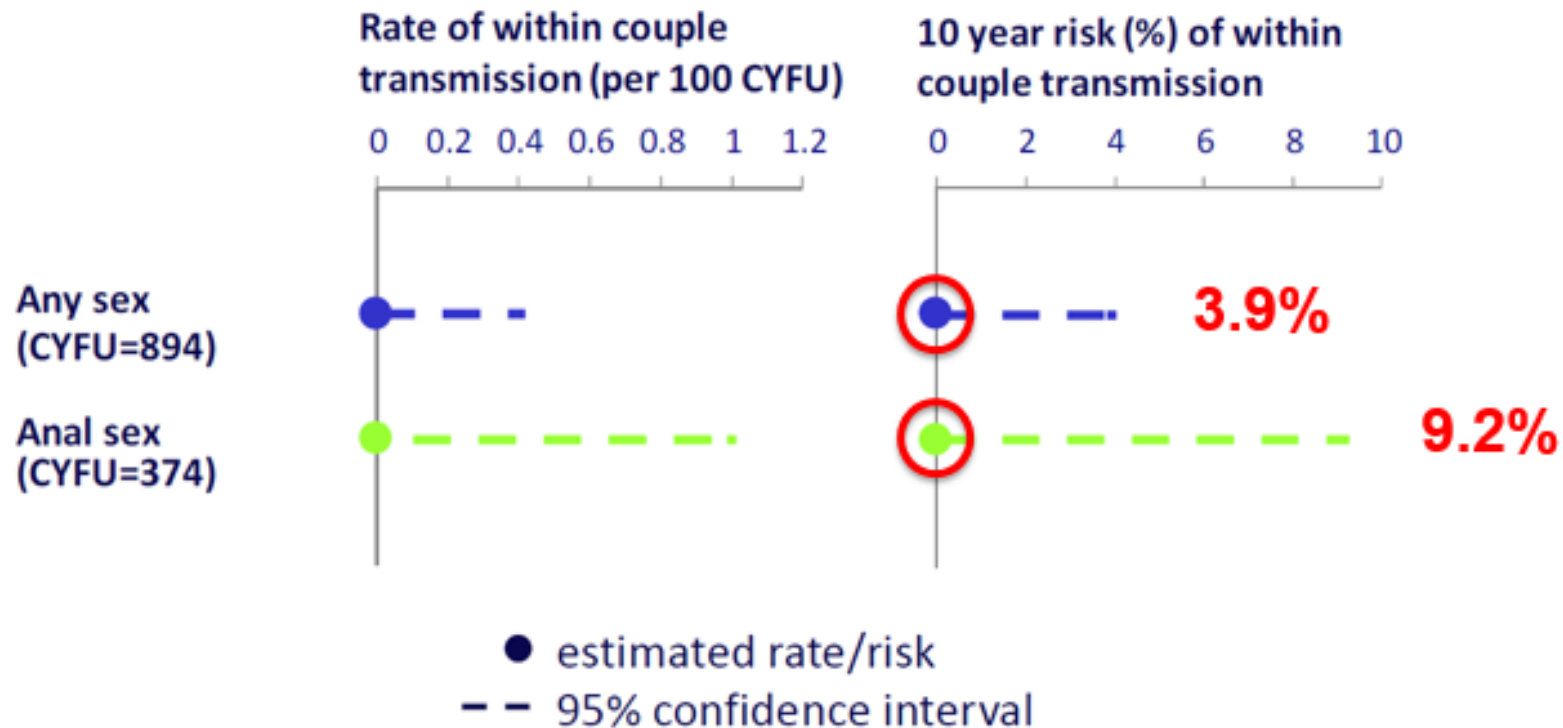
# PARTNER Study

- Study participants were at high-risk for HIV
- HIV-negative partners reporting condomless penetrative sex during eligible CYFU



# PARTNER Study: No Linked Transmissions Occurred

## Rate of HIV Transmission According to Sexual Behavior Reported by Negative Partner

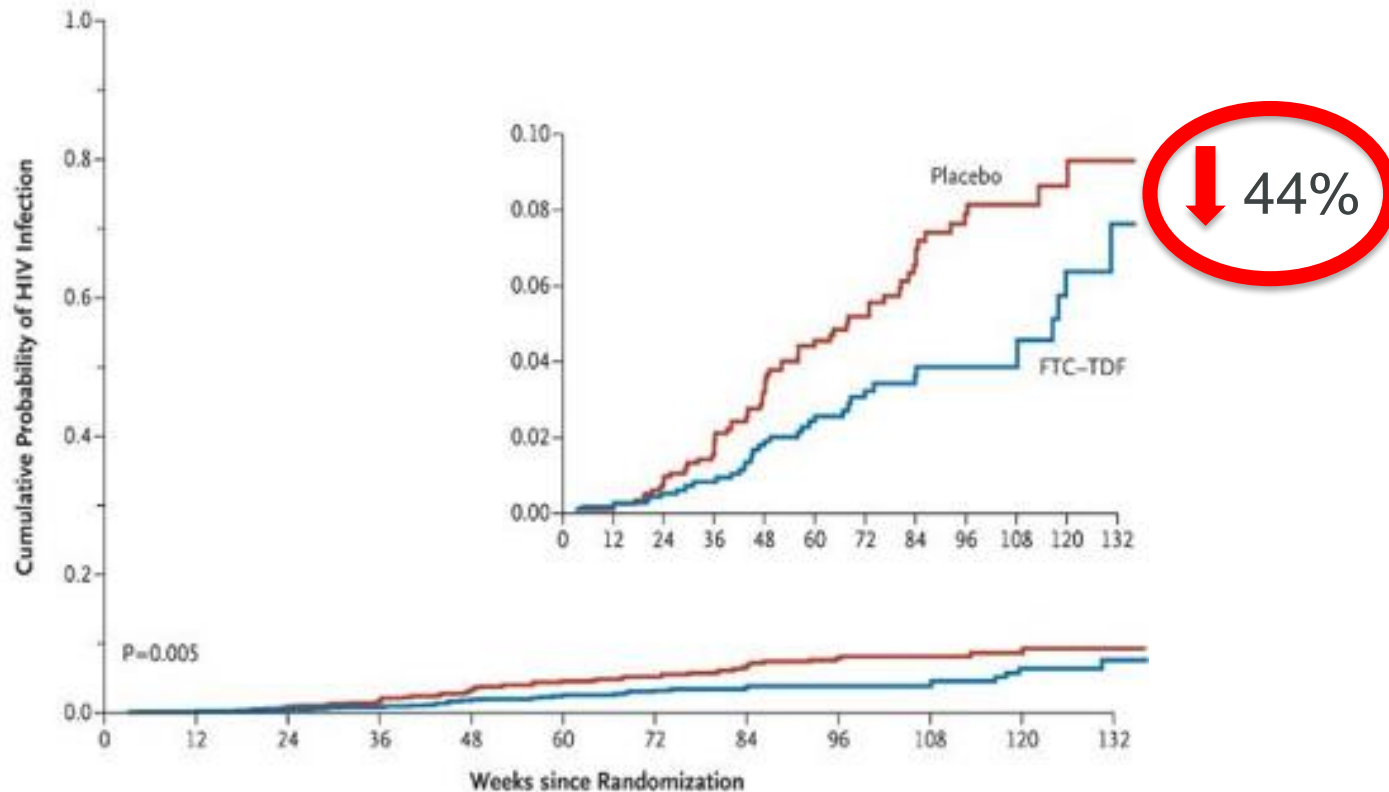




# PrEP

- Treatment before exposure to HIV

# iPrEx Study: PrEP in MSM

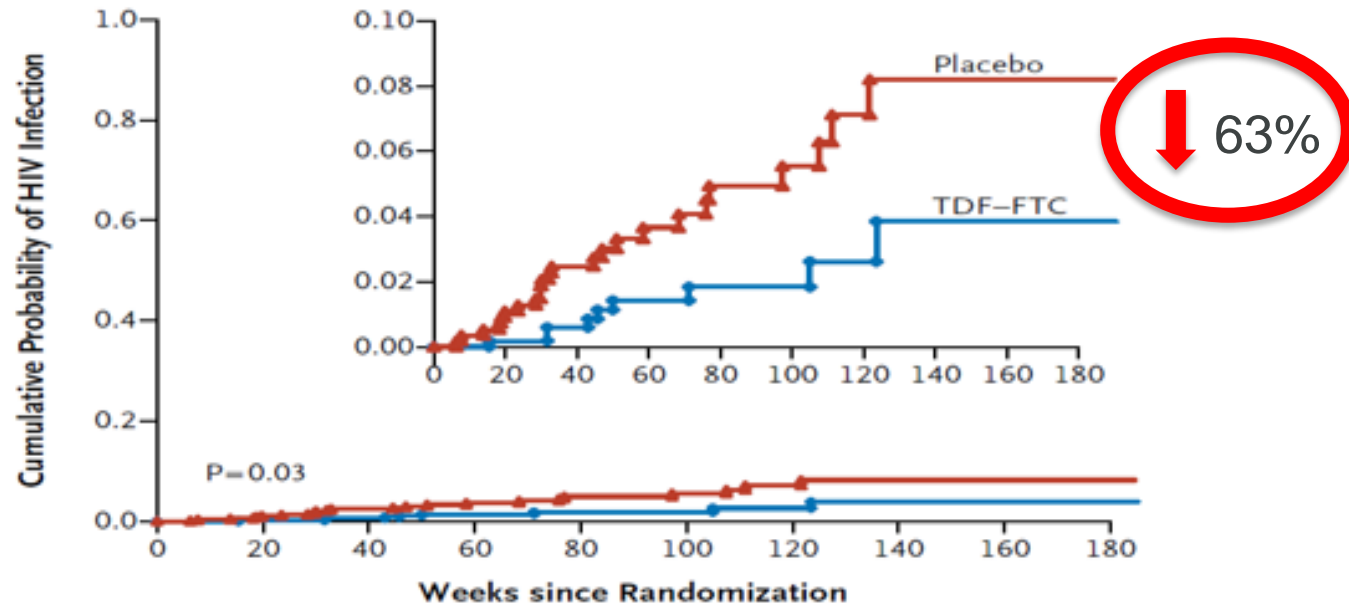


No. at Risk	0	12	24	36	48	60	72	84	96	108	120	132	HIV Infection
Placebo	1248	1194	1108	1005	852	647	546	444	370	258	137	60	64
FTC-TDF	1251	1188	1097	988	848	693	558	447	367	267	147	65	36

Among the men with detectable levels of medicine in their blood (meaning they had taken the pill consistently), PrEP reduced the risk of infection by as much as 92%.

# TDF2: Heterosexual PrEP Study

**A Modified Intention-to-Treat Analysis**



**No. at Risk**

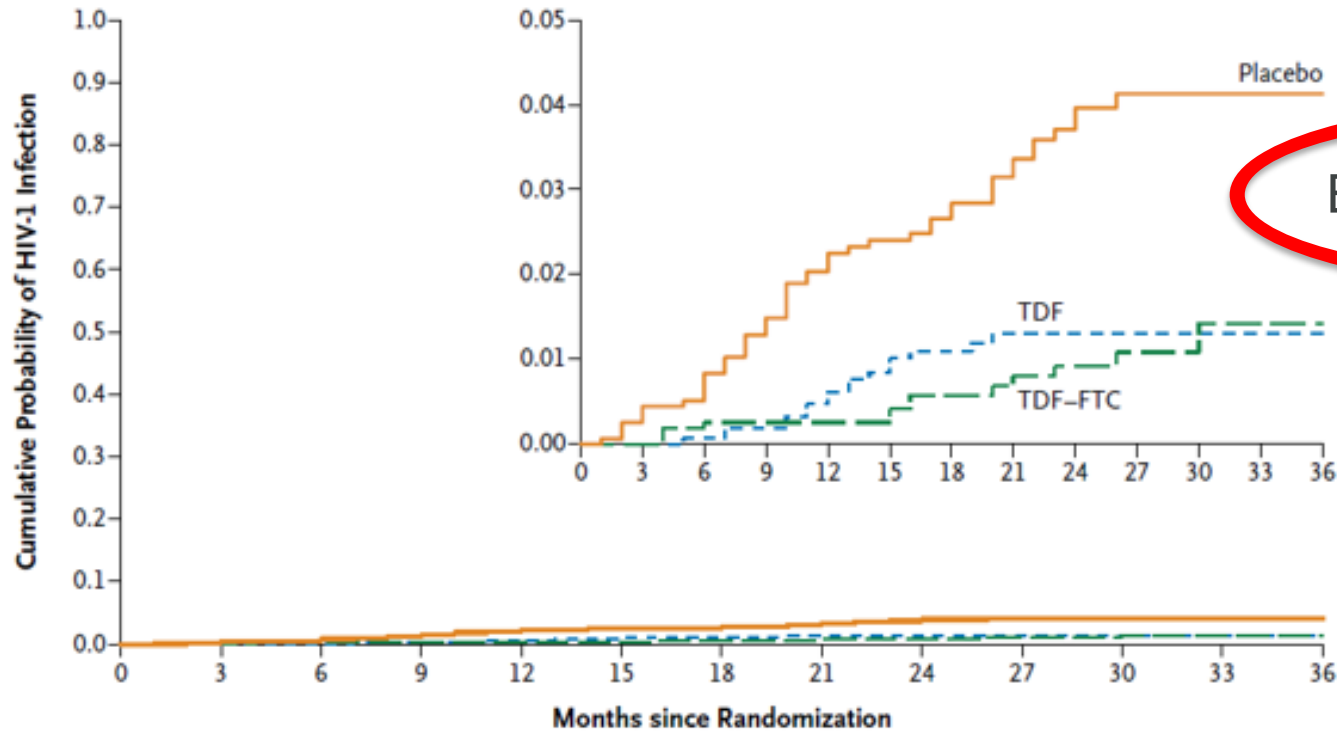
Placebo	606	529	403	275	208	147	86	44	9	1
TDF-FTC	610	534	406	276	210	142	81	43	7	1

**Cumulative No. of HIV Infections**

Placebo	0	6	13	17	20	21	23	24	24	24
TDF-FTC	0	1	3	6	7	7	8	9	9	9

Participants who became infected had far less drug in their blood, compared with matched participants who remained uninfected.

# Partners PrEP Study: Heterosexual Serodiscordant Couples



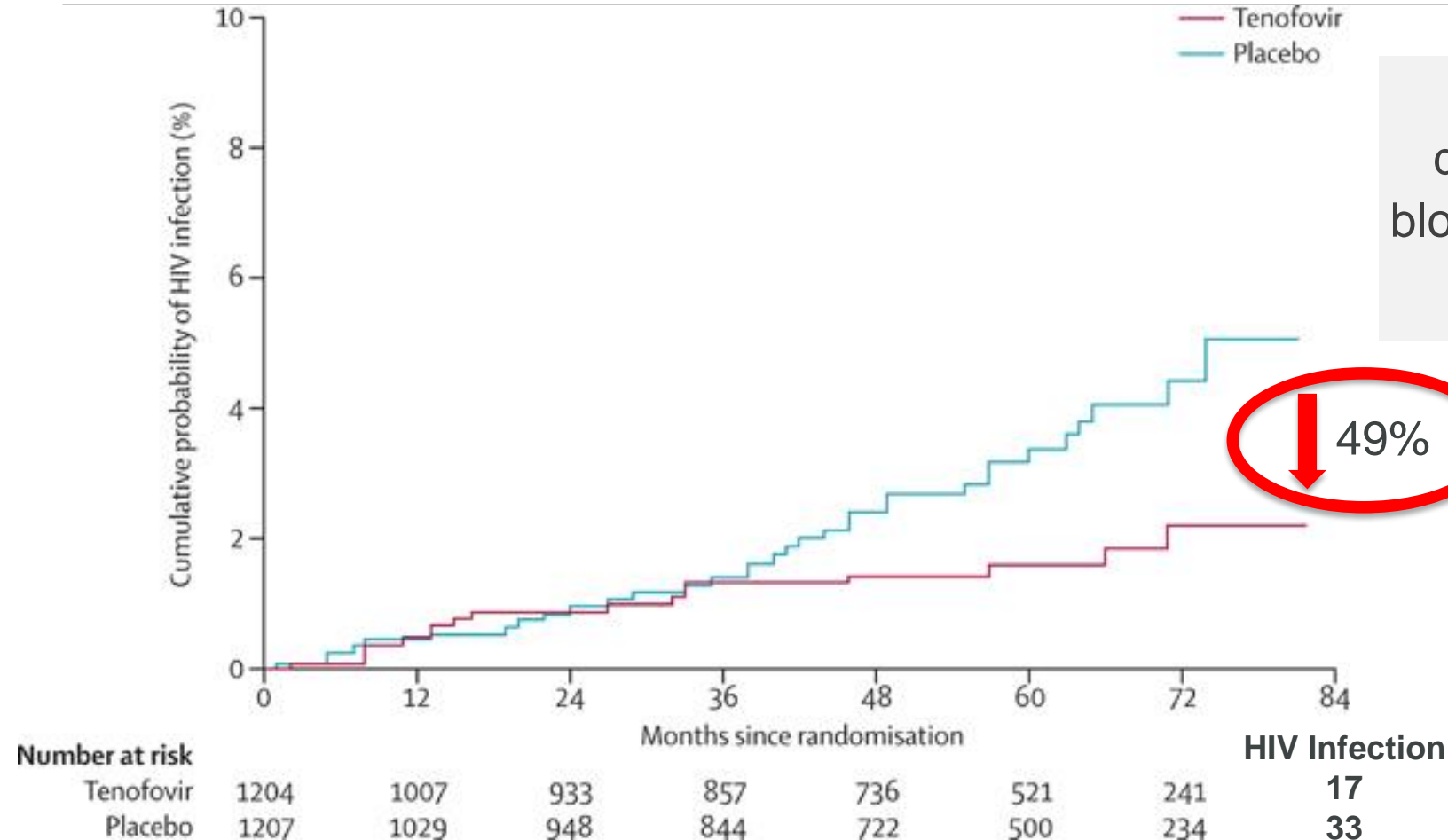
Efficacy: 62 – 73%

Among those with detectable levels of medicine in their blood, PrEP reduced the risk of HIV infection by up to 90%.

No. at Risk	0	3	6	9	12	15	18	21	24	27	30	33	36
TDF	1572	1559	1547	1498	1350	1223	1062	902	735	510	287	108	15
TDF-FTC	1568	1557	1546	1493	1371	1248	1059	901	743	525	291	114	16
Placebo	1568	1557	1544	1487	1347	1224	1061	902	744	523	295	120	18

New Infection
17
13
52

# Bangkok Tenofovir Study: PrEP in Injection Drug Users



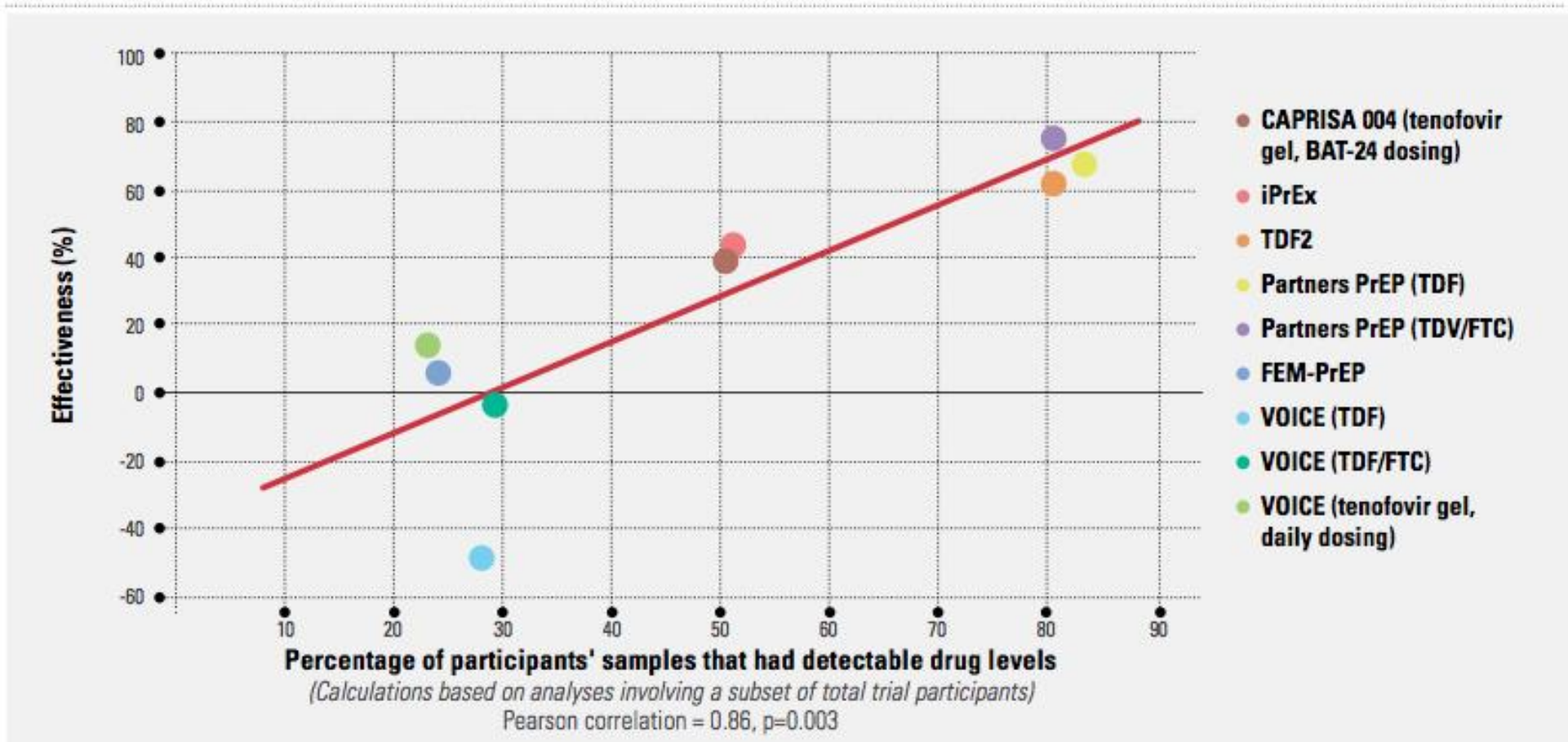
For participants who had detectable tenofovir in their blood, PrEP reduced the risk of infection by 74%

# What else have the PrEP studies shown?

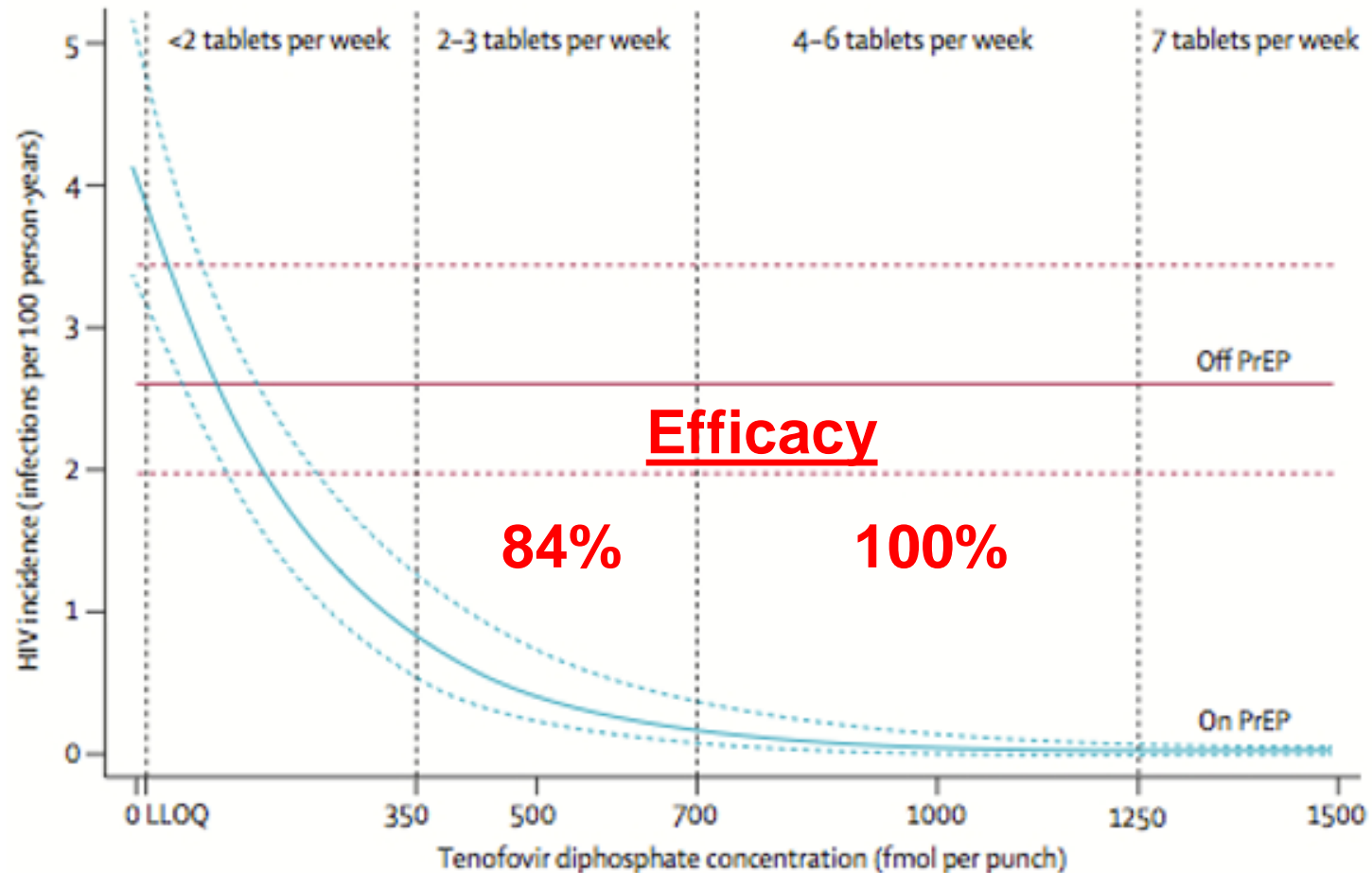
## Key points to remember about PrEP:

- Adherence is closely associated with PrEP efficacy
- Though rare, side effects are possible
- Undertake ongoing behavioral risk discussions

# Increased Adherence Associated with Increased Efficacy

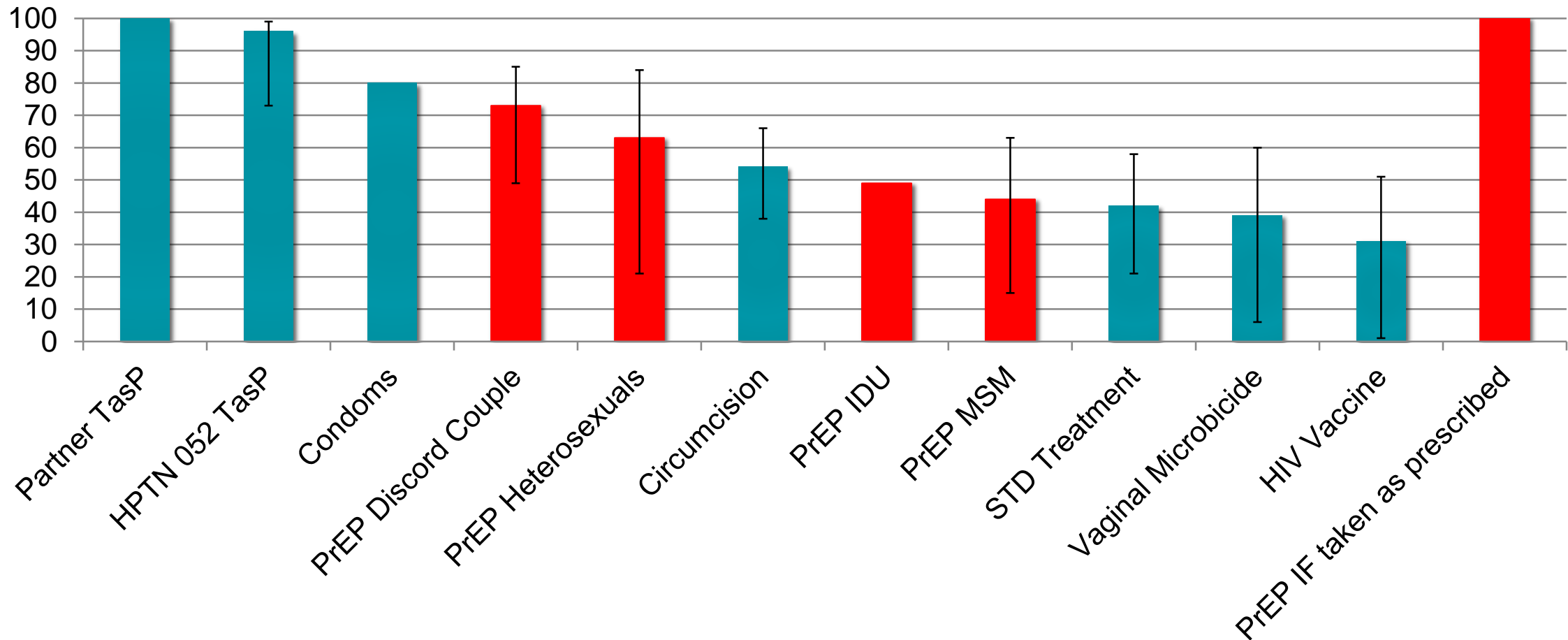


# Increased Adherence Associated with Increased Efficacy





# Prevention Science Overview: Biomedical Intervention Efficacy



# Side Effects

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Similar to those seen following years of antiretroviral use in persons living with HIV:

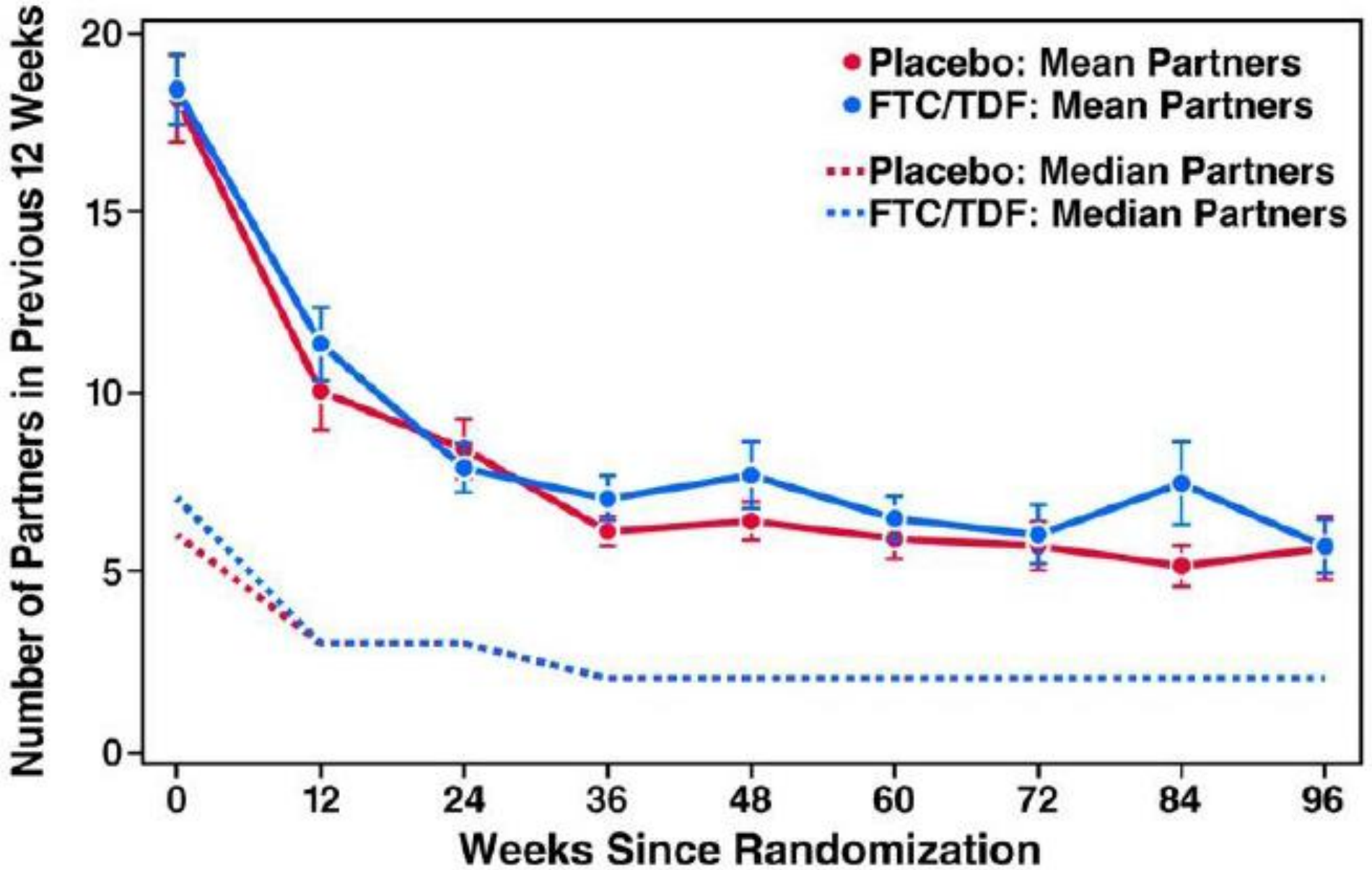
- Diarrhea
- Headache
- Nausea
- Renal dysfunction
- Antiretroviral resistance
- *Bone mineral density loss (has been noted in persons living with HIV, but not yet seen in persons taking PrEP)*

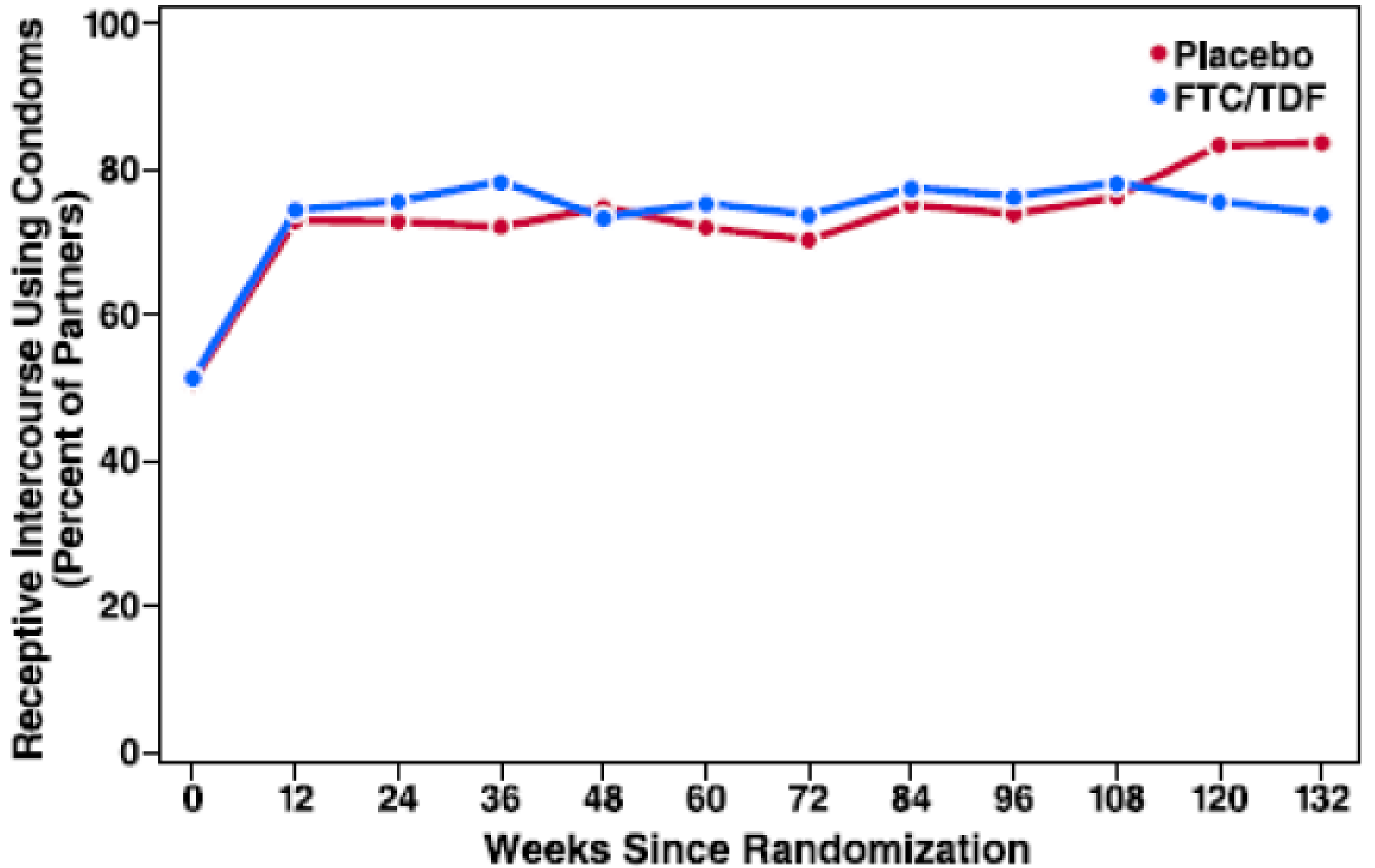
# Behavioral Risk Discussions

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- PrEP is a biomedical AND a behavioral intervention
- Adherence is closely associated with efficacy
- Behavioral disinhibition – though not seen in the studies – could potentially negate PrEP benefits in real world use settings
- Ongoing risk discussions and risk reduction planning should be an integral component to PrEP

Number of partners actually decreased





Condom use increased

# Ongoing and Planned PrEP Trials and Demonstration Projects

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- HPTN 073: Daily PrEP in black MSM
- HPTN 067: Intermittent oral PrEP
- Sustainable Healthcenter Implementation of PrEP Pilot Study
- Assessment of PrEP Administered at STD Clinics
- PrEP in combination with other HIV prevention
- Project PrEPare – Youth

# Questions to Answer and Challenges to Address

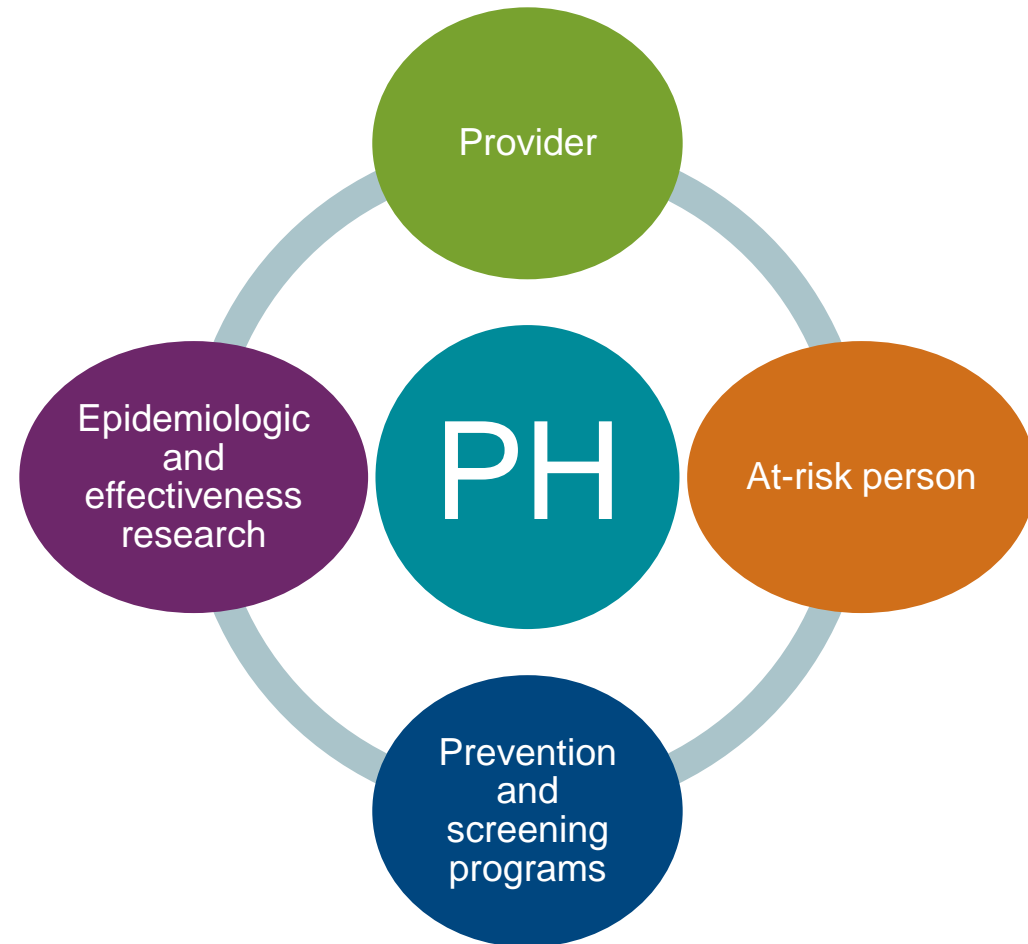
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- How will PrEP be translated from research to practice?
- How can the full promise of PrEP be best achieved?
- Patients: Only 27% young MSM had heard of PrEP (Bauermeister, 2013)
- Providers: Though 43% of HIV clinicians had received a request for PrEP, only 19% had prescribed (Maznavi, IDSA 2011)
- Health Department: Only 8 of 55 report a PrEP program; 43/55 report inadequate funding to support PrEP programs (NASTAD, 2014)

# Public Health and PrEP

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Local public health (PH) serves an ideal role as a connector between many parts of a broader network.





# NACCHO's Educational Series on PrEP and Local Health Departments

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## Module 1

PrEP for HIV Prevention: An Introduction

**Beyond the Basics: The Science of PrEP**

US Public Health Service Clinical Practice Guidelines for PrEP

## Module 2

Who Might Benefit from PrEP: Population-level Risk Assessments

Who Might Benefit from PrEP: Individual-level Risk Assessments

## Module 3

Increasing PrEP Awareness and Knowledge in Your Jurisdiction

Incorporating PrEP into Comprehensive HIV Prevention Programs