Webcast 1.2

Beyond the Basics:
The Science of PrEP

PRESENTED BY:

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Overview

• The Data Behind PrEP
• PrEP Research
• Key Points Related to PrEP
  o Adherence
  o Side Effects
  o 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

HIV Exposure → HIV Infection

0 hr 72 hr 1 mo 5 mo
PEP: Prevents Infection After Isolated Exposure

PEP (taken for 28 days after initiation)
PrEP: Multiple Exposures

HIV Exposure → HIV Exposure → HIV Infection

0 hr    72 hr    1 mo    6 mo
PrEP: Prevents Infection Before Exposure
Prevention Science Overview: Biomedical Intervention Efficacy

Modified from Abdool Karim, Lancet, 2011
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

**Early ART**
Initiate HAART CD4+ cell count 350-550 cells/mm$^3$  
(n = 886 couples)

**Delayed ART**
Initiate HAART CD4+ cell count ≤ 250 cells/mm$^3$  
(n = 877 couples)

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
PARTNER Study

• 1,100 serodiscordant couples in Europe where:
  o Person with HIV was on ART and had an undetectable viral local
  o Condomless sex was occurring already

• Results from 767 couples who have collectively 894 couple-years of follow-up (CYFU) thus far:
  o 586 couple-years in heterosexual couples
  o 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

Rodger, CROI, 2014
PARTNER Study: No Linked Transmissions Occurred

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

- Any sex (CYFU=894)
  - Rate of within couple transmission (per 100 CYFU): 0.2%
  - 10 year risk (%): 3.9%

- Anal sex (CYFU=374)
  - Estimated rate/risk: 9.2%
  - 95% confidence interval
PrEP

- Treatment *before* exposure to HIV
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%.
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%.

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

Effectiveness (%) vs. Percentage of participants' samples that had detectable drug levels

(Calculations based on analyses involving a subset of total trial participants)

Pearson correlation = 0.86, p=0.003

Abdool Karim, CAPRISA, 2013
Increased Adherence Associated with Increased Efficacy

Efficacy

84%  100%

Grant, Lancet, 2014
Prevention Science Overview: Biomedical Intervention Efficacy

Modified from Abdool Karim, Lancet, 2011
Side Effects

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

- 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

- 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

• 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

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

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


Module 3

Increasing PrEP Awareness and Knowledge in Your Jurisdiction
Incorporating PrEP into Comprehensive HIV Prevention Programs

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