VISUAL ABSTRACTS

HIV PrEP Studies

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ABOUT THIS INFORMATION GUIDE

This visual abstract study series is intended for health care professionals involved in care of persons who may benefit from receiving HIV preexposure prophylaxis (PrEP). These visual abstracts provide relevant information pertaining to major HIV PrEP studies. This guide has been created and produced by the University of Washington Infectious Diseases Education & Assessment Program (IDEA) as part of the federally-funded *National HIV PrEP Curriculum* project.

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ATN 110

HIV PrEP for Young MSM

Summary

HIV PrEP was overall acceptable and safe among young men who have sex with men (YMSM), though adherence and follow-up were imperfect and decreased over time

Study Design

Open-label, demonstration project and phase II safety study

Participants

200
HIV-seronegative YMSM

18 - 22
Years of age

≈ 50% Black youth
≈ 25% Latinx youth

Interventions

1
All participants were offered tenofovir DF-emtricitabine (TDF-FTC) 1 pill daily

2
Monthly study visits through week 12, then quarterly visits through week 48

3
Counseling, condoms, and STI screening at each visit

4
Adherence estimated using dried blood spot tenofovir diphosphate (TFV-DP) levels

Results

Acceptability	60% reported taking the TDF-FTC pill every day to be acceptable
Adherence	56% had TFV-DP levels suggesting ≥4 pills/week at week 4; major drop in adherence observed at week 24 and decreased to 34% by week 48
Behavior	High sexual activity and frequent bacterial STI diagnoses at baseline but stable throughout the study
Efficacy	4 HIV seroconversions (incidence 3.29/100 person-years of follow up)

Source: Hosek SG, Rudy B, Landovitz R, et al. An HIV Preexposure Prophylaxis Demonstration Project and Safety Study for Young MSM. J Acquir Immune Defic Syndr. 2017;74:21-9. [PMID: 27632233]

ATN 113

HIV PrEP for Adolescent MSM

Summary

HIV PrEP was overall acceptable and safe among adolescent men who have sex with men (MSM), though adherence and follow-up decreased over time

Study Design

Phase II, open-label, demonstration project in multiple U.S. cities

Participants

78
HIV-seronegative MSM

15 - 17
Years of age

29% Black youth
21% Latinx youth

Interventions

1
All participants were offered tenofovir DF-emtricitabine (TDF-FTC) 1 pill daily

2
Monthly study visits for 12 weeks, then quarterly visits through 48 weeks

3
Counseling, condoms, and STI screening at each visit

4
Adherence estimated using dried blood spot tenofovir diphosphate (TFV-DP) levels

Results

Acceptability	High acceptability – 64% participants completed 48 weeks of follow up
Adherence	54% with TFV-DP levels suggesting ≥4 pills/week at week 4, decreased to 22% at week 48 (striking decrease after follow-up visits moved to quarterly)
Behavior	Number of sex partners and sex acts did not change significantly over time; there was a trend towards fewer bacterial STIs later in the study
Efficacy	3 HIV seroconversions (incidence 6.4/100 person-years of follow up)
Safety	Overall well tolerated; bone mineral density z scores at the hip and spine did not change significantly; total body z score decreased

Source: Hosek SG, Landovitz RJ, Kapogiannis B, et al. Safety and Feasibility of Antiretroviral Preexposure Prophylaxis for Adolescent Men Who Have Sex With Men Aged 15 to 17 Years in the United States. JAMA Pediatr. 2017;171:1063-71. [PMID: 28873128]

BANGKOK TDF

HIV PrEP for Persons who Inject Drugs

Summary

Daily oral tenofovir DF (TDF) reduced the risk of HIV infection for persons who inject drugs

Study Design

Randomized, phase 3, double-blind, placebo-controlled trial conducted in Bangkok, Thailand

Participants

2,413
HIV-seronegative adults

20 - 60
Years of age

Used injection drugs during prior year

- Not pregnant
- Not breastfeeding
- No hepatitis B

Interventions

Placebo	TDF
One tablet daily	One tablet daily
n = 1,209	n = 1,204

All participants received risk-reduction counseling, bleach, and condoms.

Results

	Placebo	TDF
New HIV Infections	33	17
Incident HIV Infection (per 100 person-years)	0.68	0.35
HIV Risk Reduction	49% reduction in HIV incidence with oral TDF compared to placebo (95% CI 9.6 to 72.2; p=0.01)	

Source: Choopanya K, Martin M, Suntharasamai P, et al. Antiretroviral prophylaxis for HIV infection in injecting drug users in Bangkok, Thailand (the Bangkok Tenofovir Study): a randomised, double-blind, placebo-controlled phase 3 trial. Lancet. 2013;381:2083-90. [PMID: 23769234]

DISCOVER TRIAL

TDF-FTC versus TAF-FTC for HIV Prevention

Summary

Daily tenofovir alafenamide-emtricitabine (TAF-FTC) is non-inferior to tenofovir DF-emtricitabine (TDF-FTC) for HIV prevention; TAF-FTC had more favorable effects on bone mineral density and renal function

Study Design

Randomized, double-blind, multicenter, active-controlled, phase 3, noninferiority trial

Participants

5,387
HIV-seronegative adults

5,313
Cisgender MSM

74
Transgender women

Interventions

TDF-FTC one tablet daily
(Tenofovir DF-emtricitabine)
n = 2,693

TAF-FTC one tablet daily
(Tenofovir alafenamide-emtricitabine)
n = 2,694

Results

	TDF-FTC	TAF-FTC
Incident HIV Infection (per 100 person-years)	0.34 (95% CI 0.19 to 0.56)	0.16 (95% CI 0.06 to 0.33)
Hip Bone Mineral Density (median change from baseline)	-0.99%	0.18%
Serum Creatinine (median change from baseline)	-0.88 µmol/L	0.88 µmol/L

Source: Mayer KH, Molina JM, Thompson MA, et al. Emtricitabine and tenofovir alafenamide vs emtricitabine and tenofovir disoproxil fumarate for HIV pre-exposure prophylaxis (DISCOVER): primary results from a randomised, double-blind, multicentre, active-controlled, phase 3, non-inferiority trial. Lancet. 2020;396:239-54. [PMID: 32711800]

HPTN 083

Cabotegravir for HIV Prevention in Cisgender Men and Transgender Women

Summary

Long-acting injectable cabotegravir (CAB-LA) was superior to daily oral tenofovir DF-emtricitabine (TDF–FTC) in preventing HIV infection among cisgender men who have sex with men (MSM) and transgender women (TGW) who have sex with men

Study Design

Randomized, double-blind, double-dummy, noninferiority trial

Participants

Overall

4,566
HIV-seronegative adults

Subgroups

3,992
Cisgender MSM

570
TGW who have sex with men

Interventions

Cabotegravir
Oral cabotegravir lead-in followed by CAB-LA

n = 2,282

TDF-FTC
Daily oral tenofovir DF-emtricitabine

n = 2,284

Results

	Cabotegravir	TDF-FTC
New HIV Infections	13	39
Incident HIV Infection (per 100 person-years)	0.41 Overall	1.22 Overall
	0.39	1.14
	0.54	1.80

Results were readjudicated, demonstrating 58 observed infections overall: 16 with CAB and 42 with TDF-FTC, resulting in HIV incidence of 0.37 in CAB group (95% CI 0.19 to 0.65)

Source: Landovitz RJ, Donnell D, Clement ME, et al. Cabotegravir for HIV Prevention in cisgender men and transgender women. N Engl J Med. 2021;385:595-608. [PMID: 34379922]

HPTN 084

Cabotegravir for HIV Prevention in Cisgender Women

Summary

Long-acting injectable cabotegravir (CAB-LA) was superior to daily oral tenofovir DF-emtricitabine (TDF-FTC) for preventing HIV infection among cisgender women

Study Design

Randomized, double-blind, double-dummy, superiority trial

Participants

3,224
HIV-seronegative cisgender women

18 - 45
Years of age

20
Sites in Sub-Saharan Africa

Interventions

Cabotegravir
Oral cabotegravir lead-in followed by CAB-LA

n = 1,614

TDF-FTC
Daily oral tenofovir DF-emtricitabine

n = 1,610

Results

	Cabotegravir	TDF-FTC
New HIV Infections	4	36
Incident HIV Infection (per 100 person-years)	0.20 (95% CI 0.06-0.52)	1.85 (95% CI 1.3-2.57)
HIV Risk Reduction	88% lower risk of new HIV infections in CAB-LA arm; superiority of CAB-LA driven by adherence advantage over TDF-FTC	

Source: Delany-Moretlwe S, Hughes JP, Bock P, et al. Cabotegravir for the prevention of HIV-1 in women: results from HPTN 084, a phase 3, randomised clinical trial. Lancet. 2022;399:1779–89. [PMID: 35378077]

IPERGAY

On-Demand TDF-FTC as HIV PrEP for Cisgender MSM

Summary

On-demand (2-1-1) tenofovir DF-emtricitabine (TDF-FTC) was highly effective at preventing HIV infection for cisgender MSM

Study Design

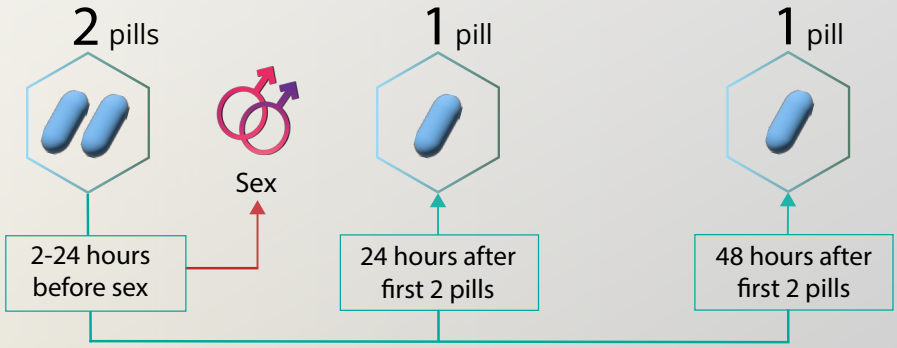
Randomized, phase 3, double-blind, placebo-controlled trial conducted in France and Canada

Participants

400
Adult HIV-seronegative cisgender MSM

- Condomless rectal sex in prior 6 months
- No hepatitis B
- Normal renal function

On-demand (2-1-1) TDF-FTC Dosing Example



Interventions

Placebo
On-demand (2-1-1) dosing
n = 201

TDF-FTC
On-demand (2-1-1) dosing
n = 199

Results

	Placebo	TDF-FTC
New HIV Infections	14	2
Incident HIV Infections (per 100 person-years)	6.60	0.91
HIV Risk Reduction	86% relative risk reduction in HIV incidence (95% CI 40 to 98; p=0.002)	

Source: Molina JM, Capitant C, Spire B, et al. On-demand preexposure prophylaxis in men at high risk for HIV-1 infection. N Engl J Med. 2015;373:2237-46. [PMID: 26624850]

IPREX

HIV PrEP with TDF-FTC for Cisgender Men and Transgender Women who have Sex with Men

Summary

Daily oral tenofovir DF-emtricitabine (TDF-FTC) significantly reduced the risk for new HIV infections compared to placebo

Study Design

Multinational, randomized, double-blind, placebo-controlled trial

Participants

2,499
HIV-seronegative adults

Cisgender men who have sex with men — 2,470

Transgender women who have sex with men — 29

Study Participant Characteristics

- Assigned male at birth
- Age ≥18 years
- High risk for HIV acquisition

Interventions

Placebo	TDF-FTC
One tablet daily	One tablet daily
n = 1,248	n = 1,251

Results

	Placebo	TDF-FTC
New HIV Infections	64	36
HIV Risk Reduction	44% reduction in incidence of HIV infection (95% CI 15 to 63; p<0.001)	
	92% reduction for those with detectable study-drug level	

Source: Grant RM, Lama JR, Anderson PL, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. N Engl J Med. 2010;363:2587-99. [PMID: 21091279]

IPREX SUBGROUP ANALYSIS

HIV PrEP with TDF-FTC for Transgender Women who have Sex with Men

Summary

No HIV infections occurred for transgender women (TGW) who have sex with men if they took tenofovir DF-emtricitabine (TDF-FTC) 4 or more times per week, suggesting HIV PrEP is effective for TGW with good adherence

Study Design

Post-hoc analysis from multinational, randomized, double-blind, placebo-controlled iPrEx trial that enrolled cisgender MSM and transgender women

Participants

339
HIV-seronegative adults

Study Participant Characteristics

- Assigned male at birth
- Identify as women, or transgender, or taking feminizing hormone therapy
- Age ≥18 years

Interventions

Placebo
One tablet daily

TDF-FTC
One tablet daily

Results

	Placebo	TDF-FTC
New HIV Infections	10	11

Additional Results

No overall effectiveness demonstrated for TDF-FTC HIV PrEP, but 0 of 11 seroconverters in TDF-FTC arm had active drug detected in plasma or peripheral blood mononuclear cells at the time of acquisition.

There were no seroconversions for TGW who had drug levels consistent with taking 4 or more TDF-FTC tablets per week.

Source: Deutsch MB, Glidden DV, Sevelius J, et al. HIV pre-exposure prophylaxis in transgender women: a subgroup analysis of the iPrEx trial. Lancet HIV. 2015;2:e512-9. [PMID: 26614965]

PARTNERS PREP

HIV PrEP Among Heterosexual HIV Serodifferent Couples

Summary

HIV PrEP with daily, oral tenofovir DF-emtricitabine (TDF-FTC) or tenofovir DF (TDF) was highly effective at preventing HIV transmission among heterosexual HIV serodifferent couples

Study Design

Randomized, double-blind, placebo-controlled, 3-arm trial performed in Kenya and Uganda

Participants

4,747
Heterosexual HIV-serodifferent couples

Serodifferent: One partner is HIV-seropositive and the other is HIV seronegative

The HIV-seropositive partner was not taking antiretroviral therapy

Interventions

Placebo	TDF	TDF-FTC
One tablet daily	One tablet daily	One tablet daily
n = 1,584	n = 1,584	n = 1,579

Results

	Placebo	TDF	TDF-FTC
New HIV Infections	52	17	13
HIV Risk Reduction	Not applicable	67% reduction in HIV incidence compared to placebo (95% CI 44 to 81; P<0.001)	75% reduction in HIV incidence compared to placebo (95% CI 55 to 87; P<0.001)

Source: Baeten JM, Donnell D, Ndase P, et al. Antiretroviral prophylaxis for HIV prevention in heterosexual men and women. N Engl J Med. 2012;367:399-410. [PMID: 22784037]

PREVENIR

On-Demand TDF-FTC vs. Daily TDF-FTC for HIV PrEP

Summary

On-demand (2-1-1) and daily dosing of tenofovir DF-emtricitabine (TDF-FTC) were equally effective at preventing HIV acquisition in a trial of mainly men who have sex with men (MSM)

Study Design

Prospective, obervational cohort study conducted at 26 sites in the Paris region of France (participants could choose daily vs. on-demand dosing).

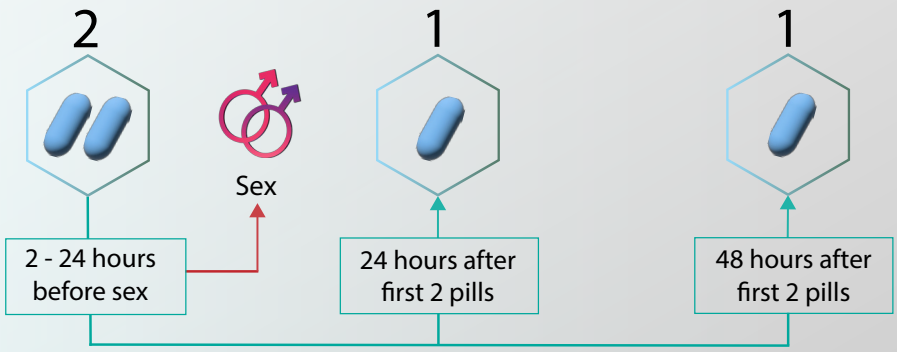
Participants

3,056
Adults

98.7% cisgender MSM

44.0% HIV PrEP naive

On-demand (2-1-1) Dosing Example



Interventions

TDF-FTC Daily	TDF-FTC On-demand (2-1-1) dosing
n = 1,540	n = 1,509

Results

	TDF-FTC Daily	TDF-FTC On-demand (2-1-1) dosing
New HIV Infections	3	3
Incident HIV Infections (per 100 person-years)	0.195	0.199
HIV Risk Reduction	No statistically significant difference (95% CI 0.13 to 7.49; p=0.99)	

Source: Molina JM, Ghosn J, Assoumou L, et al. Daily and on-demand HIV pre-exposure prophylaxis with emtricitabine and tenofovir disoproxil (ANRS PREVENIR): a prospective observational cohort study. Lancet HIV. 2022;9:e554-e562. [PMID: 35772417]

PROUD

Immediate vs. Delayed HIV PrEP for MSM at High Risk for HIV

Summary

HIV PrEP with daily, oral tenofovir DF-emtricitabine (TDF-FTC) was highly effective at preventing HIV for cisgender men who have sex with men (MSM) and are at high risk for HIV acquisition

Study Design

Randomized, open-label, phase 4 study conducted in England

Participants

544
HIV-seronegative cisgender MSM

Reported condomless anal sex during the 90 days prior to enrollment

Interventions

Defer PrEP for 1 year
Then daily, oral TDF-FTC
n = 269

Immediate PrEP
Daily, oral TDF-FTC
n = 275

Results

	Defer PrEP for 1 year	Immediate PrEP
New HIV Infections	20	3
Incident HIV Infections (per 100 person-years)	9.0	1.2
HIV Risk Reduction	86% relative reduction in HIV incidence with immediate TDF-FTC (90% CI 64 to 96; p=0.0001) Trial unblinded early and all participants offered HIV PrEP due to high efficacy	

Source: McCormack S, Dunn DT, Desai M, et al. Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial. Lancet. 2016;387:53-60. [PMID: 26364263]

TDF2

Daily TDF-FTC as HIV PrEP for Heterosexual Men and Women

Summary

Daily, oral tenofovir DF-emtricitabine (TDF-FTC) was highly effective at preventing HIV infection for heterosexual men and women at risk for HIV acquisition

Study Design

Phase 3, randomized, double-blind, placebo-controlled trial conducted in Botswana

Participants

1,219
HIV-seronegative adults

52.5% cisgender, sexually active adult men

45.7% cisgender, sexually active adult women

18 - 39
Years of age

Interventions

Placebo	TDF-FTC
One tablet daily	One tablet daily
n = 608	n = 611

Results

	Placebo	TDF-FTC
New HIV Infections	24	9
Incident HIV Infection (per 100 person-years)	3.1	1.2
HIV Risk Reduction	62.2% relative risk reduction with TDF-FTC (95% CI 21.5 to 83.4; p=0.03)	

Source: Thigpen MC, Kebaabetswe PM, Paxton LA, et al. Antiretroviral preexposure prophylaxis for heterosexual HIV transmission in Botswana. N Engl J Med. 2012;367:423-34. [PMID: 22784038]

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