TDF/FTC Pre-Exposure Prophylaxis (PrEP) from 2012 to 2018 in the OPERA Cohort

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Background

- Since 2012, pre-exposure prophylaxis (PrEP) with tenofovir disoproxil fumarate and emtricitabine (TDF/FTC) has been approved for use in HIV negative, at-risk populations for the prevention of HIV acquisition
- Numerous studies have shown reasonable levels of protection; a few others, however, have questioned the true effectiveness of this intervention in non-adherents

OBJECTIVE

To characterize HIV-negative individuals prescribed PrEP in the OPERA Cohort and compare them to HIV-negative individuals not prescribed PrEP who seroconverted to HIV-positive

Methods

Study populations derived from the OPERA cohort

- PrEP recipients
  - HIV- and HBV-negative persons ≥13 years of age
  - Initiating TDF/FTC PrEP for the first time between 16JUL2012 and 31MAY2018
  - Never used any other ART
  - Observation period: from baseline (date of PrEP initiation) until 30NOV2018
- New HIV+
  - HIV- and HBV-negative persons ≥13 years of age
  - Seroconverting between 16JUL2012 and 31MAY2018 (i.e. tested HIV-positive after a negative test result)
  - Never exposed to PrEP or PEP
  - Observation period: from baseline (date of first positive HIV test) until 30NOV2018

Table 1. Definitions of outcomes

	Population	Definition
PrEP discontinuation	PrEP recipients	>45 days without a new PrEP prescription
New HIV infection	PrEP recipients	Diagnosis of HIV, detectable viral load, or initiation of antiretroviral therapy
New Sexually Transmitted Infection (STI)	PrEP recipients & new HIV+	Diagnosis of Syphilis, Gonorrhea, Chlamydia, Trichomoniasis, Chancroid, LGV, *Mycoplasma genitalium*, HCV, Hepatitis B virus (HBV)

Statistical analyses

- Baseline characteristics and STI incidence proportions compared between PrEP recipients and new HIV+: Wilcoxon Rank-Sum test or Pearson's chi-square test
- HIV and STI Incidence rates (IR) defined as a new diagnosis over the total person-time at risk: Poisson regression

Results

Figure 1. Calendar year of PrEP initiation or HIV diagnosis

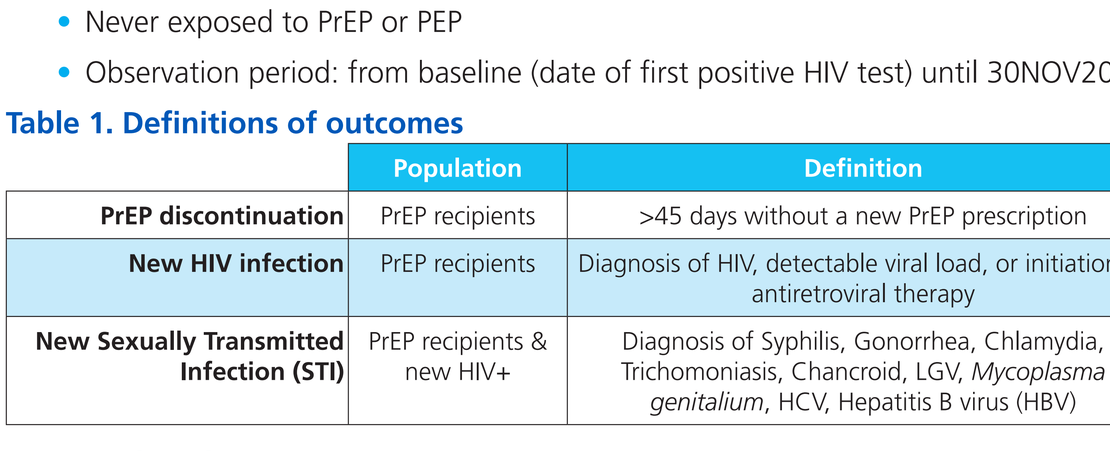


Table 2. Baseline demographic characteristics

		PrEP (n = 8,307)	New HIV+ (n = 1,798)
Age	**Median (IQR)**	33.1 (26.8, 42.9)	29.9 (25.1, 40.1)*
Sex	**Female**	538 (6.5%)	157 (8.7%)*
Gender	**Transgender**	96 (1.2%)	28 (1.6%)
Race†	**Black**	1488 (17.9%)	586 (32.6%)*
Ethnicity‡	**Hispanic**	1774 (21.4%)	619 (34.4%)*
Region**	**Northeast**	1934 (23.3%)	60 (3.3%)*
	South	3024 (36.4%)	1032 (57.4%)
	Midwest	146 (1.8%)	75 (4.2%)
	West	3203 (38.6%)	631 (35.1%)

*p-value <0.05

†Unknown race: 1081 PrEP recipients, 141 new HIV+; ‡Unknown ethnicity: 1185 PrEP, 43 new HIV+

**Northeast: CT, MA, ME, NH, NJ, NY, PA, RI, VT; South: AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV; Midwest: IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI; West: AK, AZ, CA, CO, HI, ID, MT, NM, MT, OR, UT, WA, WY

- 59% of PrEP initiators returned for a follow-up visit 60-120 days later; 11% never returned for follow-up
- 42% discontinued PrEP with median time to discontinuation 12 months (IQR 11, 19)

Results, Cont.

Figure 2. Incidence rates of new HIV infection among PrEP recipients (N=8,307)

		# HIV	Person-Years	IR (95% CI) per 100 py
	Overall	58	10711.1	0.54 (0.42, 0.70)
Black	**13-25 y.o.**	12	584	2.05 (1.17, 3.62)
Black	**26-49 y.o.**	4	846.1	0.47 (0.18, 1.26)
Black	**>50 y.o.**	1	134.8	0.74 (0.10, 5.26)
Non-Black	**13-25 y.o.**	11	1215.9	0.90 (0.50, 1.63)
Non-Black	**26-49 y.o.**	27	6637.9	0.41 (0.28, 0.59)
Non-Black	**>50 y.o.**	3	1292.3	0.23 (0.07, 0.72)

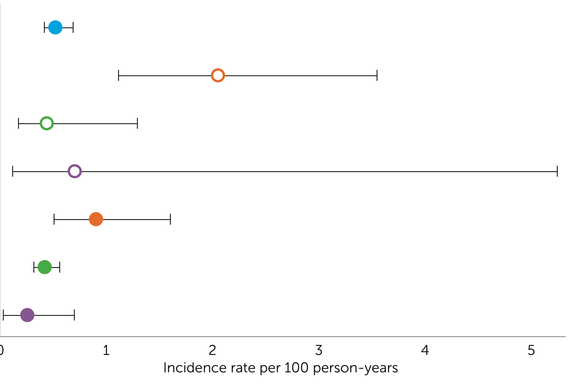


Table 3. Specific STI history† and incidence proportions

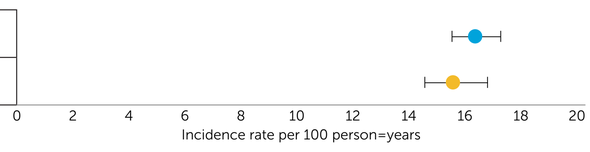
	History of STIs at baseline†		Incident STIs during follow-up	
	PrEP n = 8,307	New HIV+ n = 1,798	PrEP n = 8,307	New HIV+ n = 1,798
Syphilis	975 (11.7%)	508 (28.3%)*	481 (5.8%)	315 (17.5%)*
Gonorrhea	724 (8.7%)	243 (13.5%)*	860 (10.4%)	251 (14.0%)*
Chlamydia	603 (7.3%)	182 (10.1%)*	804 (9.7%)	240 (13.3%)*
Trichomoniasis	6 (0.1%)	0	3 (0.0%)	8 (0.4%)*
Chancroid	9 (0.1%)	2 (0.1%)	9 (0.1%)	8 (0.4%)*
***Lymphogranuloma venereum* (LGV)**	3 (0.0%)	0	4 (0.0%)	3 (0.2%)
Mycoplasma genitalium	0	0	0	0
Hepatitis C (HCV)	106 (1.3%)	26 (1.4%)	48 (0.6%)	57 (3.2%)*
Hepatitis B (HBV)	NA	NA	40 (0.5%)	45 (2.5%)*

* p-value <0.05

†History defined as a diagnosis of a given infection on or up to 3 months before start of PrEP or diagnosis of HIV

Figure 3. Incidence rates of any new STI* among PrEP recipients (N=8,307) and new HIV+ (N = 1,798)

	# STI	Person-Years	IR (95% CI) per 100 py
PrEP	1759	10703.9	16.43 (15.68, 17.22)
New HIV+	680	4337.5	15.68 (14.54, 16.90)



*STI defined as any diagnosis of syphilis, gonorrhea, chlamydia, trichomoniasis, chancroid, *Lymphogranuloma venereum, Mycoplasma genitalium*, HCV, or HBV

Discussion

- Those prescribed PrEP tended to be older and less likely to be Black or Hispanic than persons newly diagnosed with HIV without PrEP during the same time period
- Over 57% of new HIV was in the South compared to only 36% of PrEP users
- PrEP discontinuation was common (42%) and 11% never returned for a follow-up appointment after initiating PrEP
- The highest incidence for seroconversion among PrEP users was among black individuals 13-25 years of age
- STI incidence rates did not differ between PrEP users and new HIV+ individuals; observed STI incidence may be affected by provider interventions, patient receptivity to risk modification, and/or other factors that may impact PrEP effectiveness
- Strengths: large, geographically diverse population, extensive follow up, comparison to individuals seroconverting during the same calendar period
- Limitations: STI screening was not described, large gaps in PrEP prescriptions were not evaluated, and individuals acutely infected at PrEP start cannot be ruled out

KEY FINDINGS

- PrEP use was associated with a low rate of seroconversion in a real-world population in the U.S.
- PrEP recipients between 13-25 years of age had the highest incidence rate of seroconversion, suggesting extra support is needed in this vulnerable age group

About the OPERA Cohort

The OPERA cohort follows 941,528 individuals cared for in 17 US states and territories at over 81 locations through their electronic health records as of December 4, 2018. Out of this population, 94,145 are people living with HIV representing about 7% of the US HIV population.

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