HIV Diagnosis and Preexposure Prophylaxis (PrEP) Prescription Among Commercially Insured Persons With Bipolar Disorder

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Abstract

Background: Bipolar disorder (BD) is a severe and chronic mental illness characterized by periods of mania/hypomania and depression. Both disease phases are associated with increased risk of acquiring HIV. Despite this, use of highly effective preexposure prophylaxis (PrEP) for HIV prevention among people with BD is poorly understood.

Methods: We performed a retrospective cohort study using the Merative MarketScan Claims Database from 2010-2022 to identify people with BD. Additional clinical variables including outpatient encounters for sexually transmitted infections (STIs), use of long-acting injectable agents, psychiatric hospitalizations, and outpatient encounters with primary care providers (PCPs) and psychiatrists were included.

Results: There were 333,867 people with BD (61.9% female) in the cohort. A total of 435 new HIV diagnoses were identified, with diagnoses more common among males (adjusted odds ratio [aOR] [95% CI] = 5.30 [4.22–6.65], $P < .001$) and those with comorbid stimulant use disorder (aOR [95% CI] = 2.40 [1.71–3.39], $P < .001$). A total of 1,337 people with BD were prescribed PrEP, and 909 were prescribed at least 3 months of PrEP. Among people with ≥4 encounters for STIs, 3.53% (n = 246) were prescribed PrEP of any duration, and 2.73% (n = 190) were prescribed PrEP for at least 3 months. People with BD who had outpatient encounters only with psychiatrists had greater odds of HIV diagnosis compared to those who had follow-up encounters with PCPs only (aOR [95% CI] = 1.58 [1.11–2.27], $P = .01$) and lower odds of receiving PrEP prescription (aOR [95% CI] = 0.74 [0.56–0.98], $P = .03$).

Conclusions: PrEP use among commercially insured people with BD was critically low, with <1% prescribed PrEP. Even among those with multiple encounters for STIs, <4% were prescribed PrEP, despite this being an indication for prescription. Engagement of people with BD in the PrEP care continuum is essential for ending the HIV pandemic, and integration of PrEP prescription with psychiatric care may represent an efficient method for increasing PrEP use.

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The HIV epidemic in the US is ongoing, with over 31,000 new diagnoses in 2022.[1] Bipolar disorder (BD) is a serious mental illness (SMI) with a chronic pattern of alternating, discrete periods of mania/hypomania and depression.[2] BD is associated with elevated risk of HIV, with estimates suggesting 2 to 11 times greater odds of acquiring HIV.[3–9] Periods of mania/hypomania are characterized by mood elevation, increased energy, impulsivity, grandiosity, and hypersexuality, all of which are associated with increased risk of HIV and sexually transmitted infections (STIs).[2] The depressive phase of BD also carries increased HIV risk.[10–12] BD is also associated with increased mortality from infectious diseases, including HIV.[13]

People with BD are also disproportionately affected by social determinants of health such as housing instability, poverty, sexual violence victimization, justice system involvement, and stigma/discrimination.[14,15] These social factors impede overall access to care and specifically increase risk of HIV among people with BD.[16–20] Elevated incidence of HIV among people with BD is occurring despite availability of several highly effective, preexposure prophylaxis (PrEP) regimens for HIV prevention.

Clinical Points

- People who are diagnosed with bipolar disorder face elevated risk of acquiring HIV.
- Preexposure prophylaxis (PrEP) is highly effective in preventing HIV, but use among people with bipolar disorder is not known.
- Between 2010 and 2022, there were over 400 new HIV diagnoses and low use of PrEP (<1%), even among people with bipolar disorder who had multiple sexually transmitted infections (<4%).

Emtricitabine/tenofovir disoproxil fumarate (TDF/FTC) was approved by the US Food and Drug Administration (FDA) as PrEP in 2012, followed by emtricitabine/tenofovir alafenamide (TAF/FTC) in 2019.[21,22] Long-acting injectable (LAI) cabotegravir was approved as PrEP in 2021, representing the first nondaily pill regimen.[23] PrEP is up to 99% effective at preventing sexual acquisition of HIV and 74% effective at preventing HIV acquisition from injection drug use.[24] Centers for Disease Control and Prevention (CDC) guidelines recommend PrEP prescription for any patient who, in the past 6 months, had (1) at least 1 known HIV-positive partner, (2) an STI diagnosis, (3) sex with ≥1 partner of unknown HIV status, (4) injection drug use with shared needles, and finally (5) a patient request to receive PrEP.[24] The fifth criterion was added to the CDC guidelines to broadly expand access to PrEP. All PrEP regimens are approved for adults ≥18 years of age, TAF/FTC is approved only for people assigned male at birth, and TDF/FTC and cabotegravir are indicated for adolescents ≥13 years of age. However, the CDC estimates that only 36% of people with a PrEP indication actually received the regimen in 2022.[25]

Despite elevated HIV incidence, PrEP use among people with BD is poorly understood. One study found that approximately 0.3% of people with SMI were prescribed PrEP between 2013 and 2018 but did not stratify by psychiatric diagnoses.[26] Accordingly, expansion and integration of PrEP prescription in nontraditional settings, like psychiatric care, are prioritized by the US Ending the HIV Epidemic plan and the National HIV/AIDS Strategy.[27,28]

Large, administrative claims databases are useful for identifying population-level trends in HIV diagnosis and PrEP use among people with BD.[29] For example, a recent claims-based analysis found that <1% of people with stimulant use disorder (StUD) were prescribed PrEP, including 0.15% of people likely using intravenously.[30] To the best of our knowledge, no previous work has specifically explored PrEP use among people with BD, a critical gap in understanding and in the ongoing efforts to end the HIV epidemic. The goals of the present study were to (1) identify demographic and clinical correlates of HIV diagnosis among people with BD, (2) determine PrEP use among people with BD, and (3) characterize demographic and clinical correlates of any PrEP use and sustained (3-month) PrEP use among people with BD. Identification of population-level clinical and demographic factors associated with HIV and PrEP use among people with BD will provide foundational data to inform intervention development to scale PrEP prescription to this underserved patient group. We hypothesized that PrEP use among people with BD will be below the national rate (36%)[25] and HIV incidence will be elevated among this group relative to the general US population.

METHODS

Data Source

We performed a retrospective cohort study in the Merative MarketScan Commercial Claims Database between 2010 and 2022. This database includes the health services of employees, dependents, and retirees in the US with primary coverage through commercial health insurance plans. The database contained approximately 151 million unique enrollees between 2010 and 2022.

Cohort Identification

The cohort included people aged ≥14 years with BD (type I or II; independent variable) between 2010 and 2022. Diagnosis of BD was defined by either 2 outpatient claims on separate dates or 1 inpatient claim with a diagnosis code corresponding to BD (Supplementary Table 1). Cohort entry was the earliest of the second outpatient or first inpatient claim date. We began the analysis in 2010 as that year was when the first clinical trial establishing efficacy of TDF/FTC as PrEP was published.[21] While FDA approval occurred in 2012, off-label prescription likely occurred, and a similar approach has been used previously.[30]

We excluded people who had HIV diagnosed prior to their BD diagnosis. Diagnosis of HIV was defined by either (1) 2 outpatient claims on separate dates or 1 inpatient claim with a diagnosis code corresponding to HIV (Supplementary Table 1) or (2) 1 antiretroviral prescription of ≥28 days, excluding prescriptions for TDF/FTC or TAF/FTC without a third antiretroviral (postexposure prophylaxis [PEP]). Prescription claims were identified using FDA National Drug Codes corresponding to antiretrovirals (Supplementary Tables 2 and 3).[31] Furthermore, we excluded people with BD who had hepatitis B (HBV; Supplementary Table 1), as both TDF/FTC and TAF/FTC are also FDA-approved for HBV treatment. Finally, eligibility was restricted to enrollees with ≥6 months of continuous medical and prescription drug coverage *prior* to cohort entry. The observational period was the period between cohort entry (BD diagnosis) through either an HIV diagnosis or the last date in the database.

Primary Outcomes

This study investigated 3 primary outcomes. The first was incident HIV diagnosis. The definition of incident HIV diagnosis mirrored that as described above, except the antiretroviral definition required 2 antiretroviral prescriptions of ≥28 days duration within 60 days. This stricter definition excluded patients who may have received a single month of antiretrovirals (PEP).

The second outcome was any PrEP prescription, defined as ≥28 days of TDF/FTC or TAF/FTC (latter in 2019–2022 only). The third outcome was PrEP prescription of *at least* 3 months duration, defined as ≥84 days of TDF/FTC or TAF/FTC. Prescriptions for TDF/FTC or TAF/FTC as PrEP must have occurred in isolation (ie, without other antiretrovirals) to exclude PEP, following a previously applied, similar process.[32–34] The 3-month PrEP prescription outcome was included to assess sustained PrEP use because a single, 30-day supply may not be continued due to the need for repeat HIV testing and follow-up.[29,35]

Clinical Covariates

STI. A count of outpatient encounters with a diagnosis code corresponding to 1 or more bacterial or viral STIs was calculated (0, 1, 2, 3, ≥4). We included diagnoses for *C. trachomatis*, *N. gonorrhoeae*, *T. pallidum* (syphilis), *T. vaginalis* (trichomoniasis), venereal warts, bacterial prostatitis, or other venereal diseases (Supplementary Table 1).

High-risk sexual behavior. A binary variable indicating whether an enrollee had claim(s) with a diagnosis code corresponding to "high-risk" heterosexual, homosexual, or bisexual activity was created (Supplementary Table 1).

LAI therapies. A binary variable indicating whether an enrollee was treated with at least 3 LAI antipsychotics (LAIAPs) was created. Both outpatient medical and prescription claims were queried for LAI agents given the variation in insurance coverage and billing (Supplementary Table 4).

Psychiatric hospitalization. A count of psychiatric hospitalizations for each enrollee was calculated (0, 1, 2, 3, ≥4). Psychiatric hospitalizations were identified via an inpatient claim with a psychiatric diagnosis code and a provider specialty code of psychiatry.

Outpatient encounters. The types of outpatient encounters were analyzed to characterize health care system engagement of each enrollee. Provider specialty codes were used to identify encounters with psychiatrists and primary care providers (PCPs), including family medicine physicians and general internists. For female enrollees, outpatient encounters with obstetrician/gynecologists were also counted as primary care encounters. For analysis, outpatient encounters were coded as psychiatry only (no PCP encounters), PCP only (no psychiatry encounters), both PCP and psychiatry encounters, or other provider encounters (only clinicians other than psychiatry or PCPs).

Substance use disorders. Binary variables indicating whether an enrollee was diagnosed with comorbid StUD, opioid use disorder (OUD), alcohol use disorder, or cannabis use disorder (CUD) were created. These disorders were identified using the same criteria of 2 outpatient claims on separate dates or 1 inpatient claim with corresponding diagnosis code(s) (Supplementary Table 1).

Statistical Analyses

First, descriptive statistics and frequencies were calculated for all study variables. Plan types were collapsed based on benefit design structure (Supplementary Table 5). A series of 3 multivariable logistic regression models was used to evaluate the association between the independent variables and outcomes (HIV diagnosis, any PrEP prescription, at least 3-month PrEP prescription). Multivariable models adjusted for all clinical and demographic covariates in addition to the year of cohort entry (categorical) to control for time trends and the number of years of follow-up to adjust for follow-up duration. Adjusted odds ratios (aORs) with 95% confidence intervals (CIs) are reported. Incidence of HIV and PrEP prescription per 100 person-years, per year, was calculated to describe trends.

MarketScan data are deidentified, and as such, the study was granted exempt status by the University of Chicago Institutional Review Board. Data analysis was conducted with SAS (v9.4) and Stata (v18) between November 2024 and September 2025. A P value < .017 was established for statistical significance using the Bonferroni correction for multiple tests (3). We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.[36]

RESULTS

Demographics

A total of 333,867 people with BD were identified (Table 1). The mean duration of the observational period was 3.02 (SD: 2.69) years. There were more females in the cohort (n = 206,642; 61.9%), and most enrollees were not married (n = 226,951; 68.0%). The largest individual percentages were age between 14–24 years (n = 99,254; 29.7%), lived in the Western US (n = 143,943; 43.1%), and lived in an urban area (n = 277,654; 83.2%). Regarding substance use disorders, 3.78% (n = 12,631) were diagnosed with comorbid StUD and 4.92% (n = 16,423) with comorbid OUD.

HIV Diagnosis

There were 435 new HIV diagnoses identified within the cohort between 2010 and 2022. In adjusted analysis, odds of HIV diagnosis were greater among males

Table 1.
Cohort Characteristics

Characteristic	n (%[a])
Year of cohort entry	
2010	36,965 (11.1)
2011	38,596 (11.6)
2012	35,955 (10.8)
2013	30,950 (9.27)
2014	31,639 (9.48)
2015	24,166 (7.24)
2016	21,429 (6.42)
2017	22,621 (6.78)
2018	23,344 (6.99)
2019	21,777 (6.52)
2020	19,009 (5.69)
2021	15,131 (4.53)
2022	12,285 (3.68)
Married	
No	226,951 (68.0)
Yes	106,916 (32.0)
Sex	
Male	127,225 (38.1)
Female	206,642 (61.9)
Age group	
14–24 y	99,254 (29.7)
25–34 y	74,304 (22.3)
35–44 y	68,529 (20.5)
45–54 y	56,385 (16.9)
55+ y	35,395 (10.6)
Geography	
Rural	40,554 (12.2)
Urban	277,654 (83.2)
Missing	15,659 (4.69)
Region	
Northeast	52,569 (15.8)
North Central	72,281 (21.7)
West	143,943 (43.1)
South	61,961 (18.6)
Unknown	3,113 (0.93)
Plan type	
FFS	230,321 (69.0)
HDHP	52,223 (15.6)
MC	39,684 (11.9)
Unknown	11,639 (3.49)
Relation to policyholder	
Self (employee)	163,441 (49.0)
Spouse	77,861 (23.3)
Child/other dependent	92,565 (27.7)
High-risk sexual behavior claim(s)	
No	326,882 (97.9)
Yes	6,985 (2.09)
STI encounters	
0	320,193 (95.9)
1	2,979 (0.89)
2	2,155 (0.65)
3	1,568 (0.47)
≥4	6,972 (2.09)
Outpatient follow-up care	
Primary care only	114,438 (34.3)
Psychiatry only	24,921 (7.46)
Psychiatry and primary care	159,168 (47.7)
Other providers	35,340 (10.6)
Psychiatric hospitalizations	
0	275,315 (82.5)
1	7,471 (2.24)
2	6,669 (2.00)
3	6,638 (1.99)
≥4	37,774 (11.3)
LAI antipsychotic use[b]	
No	333,110 (99.8)
Yes	757 (0.2)
Comorbid stimulant use disorder	
No	321,236 (96.2)
Yes	12,631 (3.78)
Comorbid opioid use disorder	
No	317,444 (95.1)
Yes	16,423 (4.92)
Comorbid cannabis use disorder	
No	302,028 (90.5)
Yes	31,839 (9.5)
Comorbid alcohol use disorder	
No	293,663 (88)
Yes	40,204 (12)

(continued)

[a]Column percentage.
[b]Indicates at least 3 prescriptions for long-acting injectable antipsychotics.
Abbreviations: FFS = fee-for-service, HDHP = high deductible health plan, LAI = long-acting injectable, MC = managed care, PrEP = preexposure prophylaxis, STI = sexually transmitted infection.

(n = 334) than among females (n = 101; aOR = 5.30 [4.22–6.65], $P < .001$), those with a high-risk sexual behavior claim (aOR = 2.66 [1.85–3.83], $P < .001$), and those with comorbid StUD (aOR = 2.40 [1.71–3.39], $P < .001$) (Table 2). Having any STI encounter was associated with greater odds of HIV diagnosis including 1 (aOR = 2.81 [1.53–5.17], $P < .001$), 2 (aOR = 4.30 [2.44–7.55], $P < .001$), 3 (aOR = 3.46 [1.69–7.08], $P < .001$), or ≥4 (aOR = 4.01 [2.87–5.62], $P < .001$) encounters. Enrollees with 1 psychiatric hospitalization during the observation period had greater odds of HIV diagnosis (aOR = 2.23 [1.46–3.39], $P < .001$). Finally, people with BD who had outpatient encounters with psychiatrists only had greater odds of HIV diagnosis compared to those who had follow-up encounters with PCPs only (aOR = 1.58 [1.11–2.27], $P = .01$). HIV incidence per 100 person-years increased from 0.54% in 2010 to 1.08% in 2022 (Figure 1).

PrEP Prescription

There were 1,337 people with BD (0.40%) prescribed PrEP of any duration between 2010 and 2022. Males (n = 1,120) had greater odds of PrEP prescription than females (n = 217; aOR = 11.6 [10.0–13.5], $P < .001$)

Table 2.

HIV Diagnosis Among People With Bipolar Disorder, 2010–2022[a]

Characteristic	HIV n (%[b])	HIV diagnosis aOR (95% CI)	HIV diagnosis *P*
Married			
Yes	83 (0.08)	Ref	
No	352 (0.16)	0.39 (0.30–0.53)	**<.001**
Sex			
Female	101 (0.05)	Ref	–
Male	334 (0.26)	5.30 (4.22–6.65)	**<.001**
Age			
14–24 y	122 (0.12)	Ref	–
25–34 y	109 (0.15)	0.99 (0.63–1.56)	.96
35–44 y	94 (0.14)	0.98 (0.61–1.57)	.92
45–54 y	77 (0.14)	1.02 (0.62–1.66)	.94
55+ y	33 (0.09)	0.80 (0.46–1.40)	.44
Relation to policyholder			
Self	260 (0.16)	Ref	–
Spouse	66 (0.08)	1.15 (0.84–1.58)	.38
Child/other dependent	109 (0.12)	0.50 (0.32–0.79)	**<.001**
Plan type			
FFS	281 (0.12)	Ref	–
HDHP	73 (0.14)	1.17 (0.90–1.53)	.24
MC	72 (0.18)	1.40 (1.07–1.82)	**.01**
Unknown	9 (0.08)	0.73 (0.37–1.44)	.37
Geography			
Urban	390 (0.14)	Ref	–
Rural	27 (0.07)	0.52 (0.35–0.78)	**<.001**
Missing	18 (0.11)	0.93 (0.55–1.57)	.80
Region			
Northeast	78 (0.15)	Ref	–
North Central	75 (0.10)	0.74 (0.54–1.02)	.07
West	204 (0.14)	1.09 (0.84–1.42)	.53
South	76 (0.12)	0.87 (0.63–1.20)	.41
Unknown	2 (0.06)	0.53 (0.12–2.37)	.41
STI encounters			
0	357 (0.11)	Ref	–
1	11 (0.37)	2.81 (1.53–5.17)	**<.001**
2	13 (0.6)	4.30 (2.44–7.55)	**<.001**
3	8 (0.51)	3.46 (1.69–7.08)	**<.001**
≥4	46 (0.66)	4.01 (2.87–5.62)	**<.001**
Follow-up encounters			
PCP only	127 (0.11)	Ref	–
Psychiatry only	43 (0.17)	1.58 (1.11–2.27)	**.01**
Psychiatry and primary care	195 (0.12)	0.85 (0.68–1.08)	.19
Other providers	70 (0.20)	2.23 (1.64–3.03)	**<.001**
Psychiatric hospitalizations			
0	339 (0.12)	Ref	–
1	25 (0.33)	2.23 (1.46–3.39)	**<.001**
2	10 (0.15)	0.98 (0.52–1.86)	.95
3	11 (0.17)	1.13 (0.61–2.08)	.70
≥4	50 (0.13)	0.88 (0.64–1.22)	.45
High-risk sexual behavior claim(s)		2.66 (1.85–3.83)	**<.001**
No	397 (0.12)	Ref	–
Yes	38 (0.54)		
LAI antipsychotic use[c]			
No	433 (0.13)	Ref	…
Yes	2 (0.26)	1.71 (0.42–6.92)	.45
Stimulant use disorder			
No	380 (0.12)	Ref	–
Yes	55 (0.44)	2.40 (1.71–3.39)	**<.001**
Opioid use disorder			
No	402 (0.13)	Ref	–
Yes	33 (0.20)	0.75 (0.50–1.12)	.16
Cannabis use disorder			
No	364 (0.12)	Ref	–
Yes	71 (0.22)	1.01 (0.74–1.37)	.96
Alcohol use disorder			
No	339 (0.12)	Ref	–
Yes	96 (0.24)	1.19 (0.92–1.55)	.18

(continued)

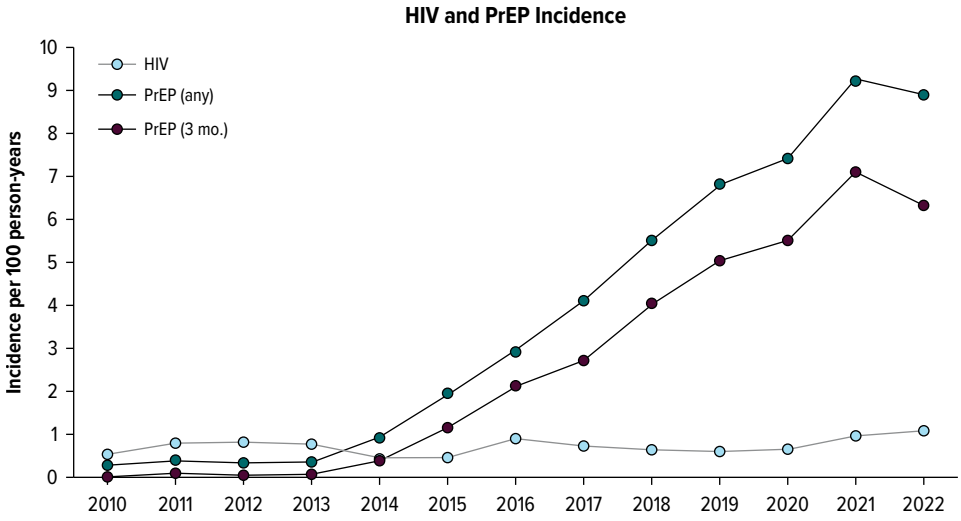
[a]Frequencies of new HIV diagnosis and multivariable analyses of new HIV diagnosis among patients with bipolar disorder. Reference categories are indicated. All analyses control for the year of cohort entry and total duration of time in the cohort. Results of year and duration are provided in Supplementary Table 6. Boldface text indicates statistical significance at the corrected, $P < .017$ level.
[b]Percentage of sample in each category of all demographic variables.
[c]The LAI variable indicates at least 3 prescription/medical claims for LAI antipsychotics.
Abbreviations: FFS = fee-for-service, HDHP = high deductible health plan, LAI = long-acting injectable, MC = managed care, PCP = primary care provider, PrEP = preexposure prophylaxis, STI = sexually transmitted infection.

(Table 3). Compared to the 14–24-years age group, all other age groups had lower odds of receipt of any PrEP (all $P < .001$) except for those in the 25–34-years age group. Claims for high-risk sexual behavior (aOR = 16.9 [14.7–19.4], $P < .001$) or comorbid StUD (aOR = 1.49 [1.19–1.87], $P < .001$) were associated with greater odds of PrEP prescription. Any STI encounter was associated with PrEP prescription compared to having no STI encounters (all $P < .001$). Comorbid OUD was associated with lower likelihood of PrEP prescription (aOR = 0.67 [0.52–0.87], $P < .001$), as was comorbid CUD (aOR = 0.69 [0.57–0.83], $P < .001$).

People with BD living in the North Central (aOR = 0.50 [0.41–0.60], $P < .001$) and Western (aOR = 0.65 [0.56–0.76], $P < .001$) US had lower odds of PrEP prescription relative to the Northeastern US. Finally, people with BD and only encounters with providers other than PCPs or psychiatrists (aOR = 0.68 [0.52–0.88] $P < .001$) were less likely to receive PrEP prescription relative to people with PCP encounters only. People with BD who had outpatient encounters with both psychiatrists and PCPs had higher odds of PrEP prescription (aOR = 1.38 [1.21–1.57], $P < .001$).

There were 909 people with BD (0.27%) prescribed PrEP for at least 3 months duration between 2010 and 2022. Similar results were observed for odds of receiving at least 3-month PrEP prescription and *any* PrEP prescription (Table 3). More males (n = 862)

Figure 1.
HIV and PrEP Incidence Over Time[a]



[a]Incidence of HIV, prescription of any PrEP duration (≥1 month), and at least 3 months of PrEP among people with bipolar disorder during the observational period, represented per 100 person-years.
Abbreviation: PrEP = preexposure prophylaxis.

received 3 months of PrEP than females (n = 47). Among people with BD who had ≥4 encounters for STIs, 3.53% (n = 246) were prescribed PrEP of any duration, and 2.73% (n = 190) were prescribed at least 3 months of PrEP. Incidence of any PrEP prescription and of prescription of at least 3 months of PrEP per 100 person-years increased from 0.27% and 0.00% in 2010 to 8.94% and 6.34% in 2022, respectively (Figure 1).

DISCUSSION

HIV is an ongoing public health emergency. In this analysis of commercially insured people with BD, there were 435 new HIV diagnoses, representing an estimated rate of 130.3 per 100,000 over the period of analysis, over 10 times the US rate of 11.3 in 2022.[1] PrEP for HIV prevention has been available in the US for over 10 years, and evidence has consistently supported its effectiveness, safety, and centrality in ending HIV.[24,37,38] Similarly, real-world evidence has consistently supported the increased incidence of HIV among people with BD.[3–6] Despite this, no research has specifically investigated use of PrEP among people with BD.

In this study, we found that PrEP use among people with BD was critically low, with less than 0.5% of people with BD prescribed PrEP. Even among those with multiple encounters for STIs, <4% were prescribed PrEP, despite this being a CDC indication for prescription.[24] Both percentages are well below the national rate of 36% of eligible patients prescribed PrEP.[25] Our finding that 1.1% of people with BD and comorbid StUD were prescribed any PrEP (0.67%, at least 3 months) is similar to previous work finding that 0.09% of people with StUD were prescribed PrEP between 2010 and 2019.[30]

While PrEP use did increase during the analytic period, so did incidence of HIV. This suggests that the modest increases in PrEP prescription have not reached all people with BD who may be at increased odds of acquiring HIV. Better and more specific methods of identifying PrEP eligibility and HIV vulnerability among people with BD are needed. This also includes further study to identify additional, intra- and interpersonal factors that are related to HIV incidence and PrEP use as claims- and other records-based analyses do not include this type of data.[26,30]

An important finding in the current results is that people with BD who only had outpatient encounters with psychiatrists were more likely to be newly diagnosed with HIV and less likely to be prescribed PrEP relative to those with only outpatient PCP encounters. Mental health complaints (including BD) represent some of the most common reasons for PCP visits, and nonpsychiatrist providers like PCPs prescribe a majority (>60%) of all psychotropics in the US.[39–42]

Previous work has found that a majority of PrEP prescriptions are managed by PCPs.[43] However, access and utilization of primary care are highly variable among people with BD and may not be a regular point of contact. This is especially true for young adults for whom encounters with a psychiatrist for BD may be their most frequent health care system touchpoint.[44] PrEP prescription would require at least 4 annual PCP visits for laboratory testing and PrEP refills, or at least 6 injection

Table 3.

PrEP Prescription Among People With Bipolar Disorder, 2010–2022[a]

Characteristic	Any PrEP			Sustained (3-mo) PrEP		
	n (%[b])	aOR (95% CI)	*P*	n (%[b])	aOR (95% CI)	*P*
Married						
Yes	187 (0.17)	Ref	–	130 (0.12)	Ref	–
No	1,150 (0.51)	0.45 (0.37–0.55)	**<.001**	779 (0.34)	0.40 (0.32–0.50)	**<.001**
Sex						
Female	217 (0.11)	Ref	–	47 (0.02)	Ref	–
Male	1,120 (0.88)	11.6 (10.0–13.5)	**<.001**	862 (0.68)	44.5 (33.0–60.1)	**<.001**
Age						
14–24 y	507 (0.51)	Ref	–	285 (0.29)	Ref	–
25–34 y	397 (0.53)	0.80 (0.62–1.02)	.07	287 (0.39)	0.76 (0.56–1.02)	.07
35–44 y	259 (0.38)	0.66 (0.51–0.86)	**<.001**	199 (0.29)	0.68 (0.49–0.93)	.02
45–54 y	144 (0.26)	0.50 (0.37–0.66)	**<.001**	113 (0.20)	0.53 (0.37–0.74)	**<.001**
55+ y	30 (0.08)	0.19 (0.13–0.30)	**<.001**	25 (0.07)	0.23 (0.14–0.38)	**<.001**
Relation to policyholder		Ref	–			
Self	788 (0.48)	Ref	–	601 (0.37)	Ref	–
Spouse	110 (0.14)	0.82 (0.65–1.04)	.10	76 (0.10)	0.85 (0.64–1.13)	.26
Child/other dependent	439 (0.47)	0.47 (0.37–0.60)	**<.001**	232 (0.25)	0.34 (0.25–0.46)	**<.001**
Plan type						
FFS	883 (0.38)	Ref	–	604 (0.26)	Ref	–
HDHP	250 (0.48)	0.94 (0.81–1.09)	.43	169 (0.32)	0.92 (0.76–1.11)	.39
MC	182 (0.46)	1.31 (1.11–1.56)	**<.001**	123 (0.31)	1.34 (1.09–1.66)	**.01**
Unknown	22 (0.19)	0.78 (0.50–1.22)	.28	13 (0.11)	0.69 (0.38–1.25)	.22
Geography						
Urban	1,205 (0.43)	Ref	–	820 (0.30)	Ref	–
Rural	63 (0.16)	0.46 (0.36–0.60)	**<.001**	40 (0.10)	0.44 (0.32–0.62)	**<.001**
Missing	69 (0.44)	0.71 (0.54–0.93)	**.01**	49 (0.31)	0.71 (0.51–0.98)	.04
Region						
Northeast	286 (0.54)	Ref	–	185 (0.35)	Ref	–
North Central	213 (0.29)	0.50 (0.41–0.60)	**<.001**	131 (0.18)	0.46 (0.36–0.59)	**<.001**
West	546 (0.38)	0.65 (0.56–0.76)	**<.001**	387 (0.27)	0.70 (0.58–0.85)	**<.001**
South	287 (0.46)	0.97 (0.82–1.16)	.74	203 (0.33)	1.07 (0.86–1.33)	.54
Unknown	5 (0.16)	1.03 (0.40–2.62)	.96	3 (0.10)	1.30 (0.39–4.32)	.67
STI encounters						
0	964 (0.3)	Ref	–	625 (0.2)	Ref	–
1	49 (1.64)	3.13 (2.28–4.29)	**<.001**	36 (1.21)	3.50 (2.39–5.13)	**<.001**
2	35 (1.62)	2.61 (1.79–3.79)	**<.001**	24 (1.11)	2.45 (1.53–3.92)	**<.001**
3	43 (2.74)	3.96 (2.79–5.61)	**<.001**	34 (2.17)	4.57 (3.02–6.90)	**<.001**
≥4	246 (3.53)	4.69 (3.95–5.56)	**<.001**	190 (2.73)	5.13 (4.18–6.30)	**<.001**
Follow-up encounters						
PCP only	393 (0.34)	Ref	–	273 (0.24)	Ref	–
Psychiatry only	62 (0.25)	0.74 (0.56–0.98)	.03	39 (0.16)	0.74 (0.52–1.05)	.10
Psychiatry and primary care	811 (0.51)	1.38 (1.21–1.57)	**<.001**	555 (0.35)	1.46 (1.24–1.72)	**<.001**
Other providers	71 (0.20)	0.68 (0.52–0.88)	**<.001**	42 (0.12)	0.63 (0.45–0.89)	**.01**
Psychiatric hospitalizations						
0	1,072 (0.39)	Ref	–	766 (0.28)	Ref	–
1	38 (0.51)	1.00 (0.70–1.41)	.98	27 (0.36)	1.08 (0.71–1.65)	.71
2	34 (0.51)	1.02 (0.70–1.48)	.93	23 (0.34)	1.03 (0.65–1.65)	.89
3	26 (0.39)	0.80 (0.53–1.21)	.30	15 (0.23)	0.71 (0.41–1.22)	.22
≥4	167 (0.44)	0.93 (0.77–1.12)	.44	78 (0.21)	0.68 (0.52–0.89)	**<.001**
High-risk sexual behavior claim(s)						
No	872 (0.27)	Ref	–	538 (0.16)	Ref	–
Yes	465 (6.66)	16.9 (14.7–19.4)	**<.001**	371 (5.31)	24.4 (20.6–28.7)	**<.001**
LAI antipsychotic use[c]						
No	1,334 (0.4)	Ref	–	908 (0.27)	Ref	–
Yes	3 (0.4)	0.56 (0.18–1.81)	.33	1 (0.13)	0.30 (0.04–2.25)	.24

(continued)

Table 3 (continued).

Characteristic	Any PrEP			Sustained (3-mo) PrEP		
	n (%[b])	aOR (95% CI)	*P*	n (%[b])	aOR (95% CI)	*P*
Stimulant use disorder						
No	1,198 (0.37)	Ref	–	824 (0.26)	Ref	–
Yes	139 (1.10)	1.49 (1.19–1.87)	**<.001**	85 (0.67)	1.57 (1.18–2.10)	**<.001**
Opioid use disorder						
No	1,250 (0.39)	Ref	–	866 (0.27)	Ref	–
Yes	87 (0.53)	0.67 (0.52–0.87)	**<.001**	43 (0.26)	0.51 (0.36–0.74)	**<.001**
Cannabis use disorder						
No	1,119 (0.37)	Ref	–	791 (0.26)	Ref	–
Yes	218 (0.68)	0.69 (0.57–0.83)	**<.001**	118 (0.37)	0.57 (0.45–0.73)	**<.001**
Alcohol use disorder						
No	1,045 (0.36)	Ref	–	724 (0.35)	Ref	–
Yes	292 (0.73)	1.16 (0.99–1.36)	.07	185 (0.46)	1.08 (0.88–1.31)	.47

[a]Frequencies of prescription of PrEP of any duration and use of at least 3 months of PrEP and multivariable analyses of each, among patients with bipolar disorder. Reference categories are indicated. All analyses control for the year of cohort entry and total duration of time in the cohort. Results of year and duration are provided in Supplementary Table 7. Boldface text indicates statistical significance at the corrected, $P < .017$ level.

[b]Percentage of sample in each category of all demographic variables.

[c]The LAI variable indicates at least 3 prescription/medical claims for LAI antipsychotics.

Abbreviations: FFS = fee-for-service, HDHP = high deductible health plan, LAI = long-acting injectable, MC = managed care, PCP = primary care provider, PrEP = preexposure prophylaxis, STI = sexually transmitted infection.

visits per year if using LAI cabotegravir as PrEP. For a patient with BD, this follow-up schedule likely represents a similar frequency to their psychiatric follow-up.

Many people with BD are treated with mood stabilizers like lithium and valproic acid, both of which require regular monitoring of blood levels during titration and maintenance treatment phases. The laboratory studies needed to manage PrEP, including monitoring of kidney function, lipids, and HIV status, may be seamlessly integrated into this ongoing pharmacologic management of BD. Thus, integration of PrEP prescription and management with psychiatric care may represent an efficient method for increasing PrEP use and preventing HIV among people with BD. However, training for psychiatrists to integrate PrEP prescription will be needed. In a previous national study of psychiatrists, over 50% were interested in prescribing PrEP, but 76% indicated that limited knowledge was the most significant barrier to prescription.[45]

There are numerous existing resources for psychiatrists interested in training about PrEP prescription. The University of Washington, CDC, and Health Resources and Services Administration collaborated to produce the National PrEP Curriculum.[46] The freely available Curriculum contains numerous modules about PrEP prescription, sexual health, and management of all forms of PrEP. Additionally, the University of California, San Francisco, operates the National Clinician Consultation Center,[47] which provides free, clinician-to-clinician consultation to support PrEP prescribers of all disciplines. These resources may be useful for psychiatrists who wish to integrate PrEP prescription into their practice. Incorporation of training about PrEP prescription into psychiatry residency will also be an important step to close knowledge gaps and support PrEP prescription within psychiatric care.

In June 2025, subcutaneous lenacapavir administered twice yearly as LAI-PrEP received FDA approval, joining cabotegravir as the second LAI-PrEP option.[48,49] These LAI-PrEP options represent a significant advance in the effort to end the HIV epidemic, especially for people who struggle to adhere to a daily oral regimen. LAIAPs have long been a feature of psychiatric care, with over 10 LAIAPs available, including LAI aripiprazole and risperidone, which carry specific indications for BD.[50] Psychiatric practices have experience in prescription of these agents and in management of large panels of patients who are prescribed LAIAPs.[51] Thus, comanagement of LAI-PrEP and LAIAPs may represent another point of efficient colocation for people with BD within psychiatric care. Many LAIAPs are administered at 4- or 8-week intervals with paliperidone available at up to 6-month intervals. These overlap with the cadence of 8-week cabotegravir injections or 6-month lenacapavir injections for PrEP, staggering administration to coordinate with LAIAPs. Use of LAIAP in clinical practice is low,[52,53] but for patients accustomed to this medication mechanism, coadministration may be feasible and acceptable. In a recent survey study, oral and LAI PrEP were found to be equally acceptable to patients with a diversity of

psychiatric diagnoses, and psychiatrists were acceptable PrEP prescribers to approximately 50%.[54]

While the present study focused on BD, the results may have implications for people with other SMI diagnoses with common features with BD. There is a paucity of data on PrEP use among people with SMI, and these findings may inform ongoing research to further develop a transdiagnostic evidence base to scale up PrEP prescription. Psychiatric care is a fundamental point of health care contact for people with SMI, and the clinical steps of PrEP prescription coincide with many aspects of routine psychiatric care. Focused research centering PrEP use among people with all forms of SMI is critically needed to end the HIV epidemic.

Limitations

Study findings should be interpreted in the context of several limitations. First, MarketScan only includes people with commercial insurance, which is typically tied to employment. Thus, results may not be fully generalizable to all people with BD, especially those with severe disease that limits ability to work and access to commercial, employer-based insurance. Similarly, reliance on *ICD* codes to identify BD may not be as accurate as diagnoses confirmed by structured interviews following *DSM* criteria; however, the large size of the dataset likely mitigates this concern. Second, use of administrative claims data only allows for identification of PrEP prescriptions that were provided through clinical care and thus does not include PrEP from self-pay or charitable organizations. Further research, including active data collection from people with BD, for example, symptomatology, disease duration, treatment regimen, adherence, and other relevant details, is needed to contextualize population-level claims data on HIV and PrEP and design interventions to increase uptake. Such research should purposely measure HIV risk factors among people with BD stratified by PrEP use to determine whether there are gaps between eligibility and uptake. Claims data do not allow for individual-level assessment of HIV risk, PrEP eligibility, or discrepancies between these. Third, MarketScan does not include race/ethnicity, which limits the ability to investigate disparities in PrEP use, an important area of future work given persistent racial disparities in HIV incidence and PrEP uptake.[25] Additionally, the high-risk sexual behavior diagnosis codes are variably used in clinical practice due to possible stigma.[55] Similarly, the use of diagnosis codes for STIs may be imperfect, as these codes may be used before laboratory evidence of a confirmed infection is received; however, presence of the code represents a baseline level of STI exposure risk. We also did not include claims evidence of intravenous drug, as previous work has found that claims-based indicators are often inaccurate with identifying intravenous use.[56] Finally, the cohort structure assumes that characteristics do not change significantly over time, but in our large, national sample, we did not observe significant changes in cohort composition over time.

CONCLUSIONS

Scale-up of PrEP for HIV prevention is a pillar of domestic and global strategies to end the HIV epidemic. Inclusion of people with SMI like BD is critical to achieve this ambitious public health goal. Despite well-documented HIV incidence, PrEP use among people with BD is very low (<0.5%), even among those with multiple STI encounters (<4%). Urgent and concerted efforts are needed to better understand and implement strategies for increasing PrEP use among people with BD, and psychiatric care may represent an opportunity for expansion of PrEP prescription to prevent HIV.

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Supplementary Material

Article Title: HIV Diagnosis and Pre-Exposure Prophylaxis (PrEP) Prescription Among Commercially Insured Persons with Bipolar Disorder

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LIST OF SUPPLEMENTARY MATERIAL FOR THE ARTICLE

DISCLAIMER

Supplementary Table 1: Diagnosis Codes

Diagnosis	***ICD-9* Codes**	***ICD-10* Codes**
Bipolar Disorder	Bipolar Disorder: 296.0x, 296.4x, 296.5x, 296.6x, 296.7, 296.80, 296.81, 296.89 Manic Episode: 296.1x	Bipolar Disorder: F31.x Manic Episode: F30.x
Opioid Use Disorder	304.0x, 304.7x, 305.5x	F11.x
Stimulant Use Disorder	304.2x, 304.4x, 305.6x, 305.7x	F14.x, F15.x
Alcohol Use Disorder	291.x, 303.0x, 303.9x, 305.0x	F10.x, O99.31
Cannabis Use Disorder	304.3x, 305.2x	F12.x
HIV	042, 043, 044, 079.53, 795.71, V08	B20.x-B23.x, B24, B97.35, O98.7x, Z21
Hepatitis B	070.2x, 070.3x, 070.42, 070.52, V02.61	B16.x, B17.0, B18.0, B18.1, B19.1x
High-Risk Sexual Behavior	V69.2	Z72.51, Z72.52, Z72.53
Gonorrhea	098.x, 647.1	A54.x, O98.2x
Chlamydia	078.88, 078.98, 099.5x, 099.41	A56.x
Syphilis	091.x-097.x	A50.x-A53.x, O98.1x
Other Venereal Diseases	099.0-099.4, 099.40, 099.49, 099.8, 099.9	A55, A57, A58, A60.x, A63.8, A64
Venereal Warts	078.11	A63.0
Trichomoniasis	131.x	A59.x
Bacterial Prostatitis	131.03	N41.x

Supplementary Table 2: Generic Names for Antiretrovirals

Generic Names
abacavir, adefovir, atazanavir, bictegravir, cabotegravir, cobicistat, darunavir, delavirdine, didanosine, dolutegravir, doravirine, efavirenz, elvitegravir, emtricitabine, enfuvirtide, entecavir, etravirine, fosamprenavir, fostemsavir, indinavir, lamivudine, lenacapavir, lopinavir, maraviroc, nelfinavir, nevirapine, raltegravir, rilpivirine, ritonavir, saquinavir, stavudine, tenofovir, tipranavir, zidovudine

Supplementary Table 3: National Drug Codes for Truvada and Descovy

Drug	**National Drug Codes**
Truvada (TDF/FTC)	00093760756, 00093770456, 00378193093, 00904717207, 16714053401, 31722056030, 33342010607, 35356007003, 35356007006, 35356007030, 42291043930, 42385095330, 42543071904, 50090087000, 50090087002, 50090087003, 50436070101, 51407011230, 52959096903, 54569558800, 54569558802, 54569558803, 54868514100, 55045348103, 60505420203, 61919066902, 61958070101, 65862035430, 66336003203, 68071211203, 68180028706, 68258198303, 69097020902, 69097074102, 69238209503, 70710136703, 72189015602, 72189031203, 76282067730
Descovy (TAF/FTC)	61958200201, 61958200202

Notes: Descovy is only approved for HIV prevention for people assigned male at birth.

Supplementary Table 4: Drug Names and Procedure Codes for Long-Acting Injective Antipsychotic and Anticraving Medications

Class	Medication	Generic or Brand Drug Name	Procedure Code
Antipsychotic	Paliperidone palmitate	[Invega Sustenna, Invega Trinza, Invega Hafyera]	J2426, J2427
	Aripiprazole monohydrate	Abilify Maintena, Abilify Asimtufii	J0401
	Aripiprazole lauroxil	[Aristada; Aristada Initio]	J1942, J1943, J1944
	Risperidone microspheres, suspension	Risperdal Consta, Perseris, Uzedy, Rykindo	J2794, J2798
	Haloperidol decanoate	haloperidol decanoate	J1631
	Fluphenazine decanoate	fluphenazine decanoate, fluphenazine enanthate	J2680
	Olanzapine pamoate	olanzapine pamoate [Zyprexa Relprevv]	J2358
Anticraving	Naltrexone	Vivitrol	J2315
	Buprenorphine	Brixadi, Sublocade	Q9991, Q9992

Supplementary Table 5: Insurance Plan Categorizations

Insurance Plan	Categorization
Basic/Major Medical Plan	Fee-for-Service
Comprehensive Plan	Fee-for-Service
Exclusive Provider Organization Plan	Fee-for-Service
Health Maintenance Organization Plan	Managed Care
Non-Capitated Point-of-Service Plan	Fee-for-Service
Preferred Provider Organization Plan	Fee-for-Service
Capitated or Partially Capitated Point-of-Service Plan	Managed Care
Consumer-Driven Health Plan	High-deductible Health Plan
High-Deductible Health Plan	High-deductible Health Plan

Supplementary Table 6.

	HIV	HIV Diagnosis	
Year of Cohort Entry (2010)	*n* (%[b])	aOR (95%CI)	*p*
2010	37 (0.10)		
2011	61 (0.16)	1.74 (1.15,2.63)	**.01**
2012	42 (0.12)	1.34 (0.86,2.10)	.20
2013	45 (0.15)	1.58 (1.02,2.45)	**.04**
2014	46 (0.15)	1.56 (1.00,2.42)	**.05**
2015	29 (0.12)	1.19 (0.73,1.95)	.49
2016	23 (0.11)	1.10 (0.64,1.86)	.74
2017	42 (0.19)	1.98 (1.25,3.15)	**<.001**
2018	30 (0.13)	1.48 (0.90,2.45)	.12
2019	32 (0.15)	1.74 (1.06,2.87)	**.03**
2020	26 (0.14)	1.74 (1.02,2.95)	**.04**
2021	16 (0.11)	1.42 (0.76,2.64)	.27
2022	6 (0.05)	0.63 (0.26,1.54)	.31
Follow Up Duration (yrs)	-	1.13 (1.09,1.18)	**<.001**
Married			
Yes	352 (0.16)	*Ref.*	
No	83 (0.08)	0.39 (0.30,0.53)	**<.001**
Sex			
Female	334 (0.26)		
Male	101 (0.05)	5.30 (4.22,6.65)	**<.001**
Age			
14-24 yrs.	122 (0.12)		
25-34 yrs.	109 (0.15)	0.99 (0.63,1.56)	.96
35-44 yrs.	94 (0.14)	0.98 (0.61,1.57)	.92
45-54 yrs.	77 (0.14)	1.02 (0.62,1.66)	.94
55+ yrs.	33 (0.09)	0.80 (0.46,1.40)	.44
Relation to Policyholder (Self)			
Self	27 (0.07)		
Spouse	390 (0.14)	1.15 (0.84,1.58)	.38
Child/Other Dependent	18 (0.11)	0.50 (0.32,0.79)	**<.001**
Plan Type			
FFS	78 (0.15)		
HDHP	75 (0.10)	1.17 (0.90,1.53)	.24
MC	204 (0.14)	1.40 (1.07,1.82)	**.01**
Unknown	76 (0.12)	0.73 (0.37,1.44)	.37
Geography	2 (0.06)		
Urban			
Rural	281 (0.12)	0.52 (0.35,0.78)	**<.001**
Missing	73 (0.14)	0.93 (0.55,1.57)	.80
Region	72 (0.18)		
Northeast	9 (0.08)		
North Central		0.74 (0.54,1.02)	.07
West	260 (0.16)	1.09 (0.84,1.42)	.53
South	66 (0.08)	0.87 (0.63,1.20)	.41
Unknown	109 (0.12)	0.53 (0.12,2.37)	.41
STI Encounters			
0	397 (0.12)		
1	38 (0.54)	2.81 (1.53,5.17)	**<.001**
2		4.30 (2.44,7.55)	**<.001**
3	357 (0.11)	3.46 (1.69,7.08)	**<.001**

≥4	11 (0.37)	4.01 (2.87,5.62	**<.001**
Follow-Up Encounters	13 (0.6)		
PCP only	8 (0.51)		
Psychiatry Only	46 (0.66)	1.58 (1.11,2.27)	**.01**
Psychiatry and Primary Care		0.85 (0.68,1.08)	.19
Other Providers	127 (0.11)	2.23 (1.64,3.03)	**<.001**
Psychiatric Hospitalizations	43 (0.17)		
0	195 (0.12)		
1	70 (0.20)	2.23 (1.46,3.39)	**<.001**
2		0.98 (0.52,1.86)	.95
3	339 (0.12)	1.13 (0.61,2.08)	.70
≥4	25 (0.33)	0.88 (0.64,1.22)	.45
High Risk Sexual Behavior	10 (0.15)	2.66 (1.85,3.83)	**<.001**
No	11 (0.17)		
Yes	50 (0.13)		
LAI Agent Use[a]			
No	433 (0.13)		
Yes	2 (0.26)	1.71 (0.42,6.92)	.45
Stimulant Use Disorder			
No	380 (0.12)		
Yes	55 (0.44)	2.40 (1.71,3.39)	**<.001**
Opioid Use Disorder			
No	402 (0.13)		
Yes	33 (0.20)	0.75 (0.50,1.12)	.16
Cannabis Use Disorder			
No	364 (0.12)		
Yes	71 (0.22)	1.01 (0.74,1.37)	.96
Alcohol Use Disorder			
No	339 (0.12)		
Yes	96 (0.24)	1.19 (0.92,1.55)	.18

Results of HIV analyses including effects of year of cohort entry and duration of time in cohort.

Supplementary Table 7.

	Any PrEP			Sustained (3-mo) PrEP		
Year of Cohort Entry (2010)	*n* (%[b])	aOR (95%CI)	*p*	*n* (%[b])	aOR (95%CI)	*p*
2010	58 (0.16)			30 (0.08)		
2011	57 (0.15)	1.15 (0.78,1.68)	.48	33 (0.09)	1.49 (0.88,2.53)	.14
2012	53 (0.15)	1.24 (0.84,1.82)	.29	30 (0.08)	1.63 (0.95,2.79)	.08
2013	84 (0.27)	2.05 (1.44,2.92)	**<.001**	53 (0.17)	3.09 (1.90,5.02)	**<.001**
2014	99 (0.31)	2.39 (1.69,3.38)	**<.001**	55 (0.17)	3.04 (1.87,4.95)	**<.001**
2015	113 (0.47)	3.31 (2.36,4.66)	**<.001**	83 (0.34)	5.98 (3.76,9.52)	**<.001**
2016	124 (0.58)	4.62 (3.29,6.49)	**<.001**	85 (0.40)	7.80 (4.87,12.5)	**<.001**
2017	150 (0.66)	5.79 (4.14,8.11)	**<.001**	96 (0.42)	9.05 (5.64,14.5)	**<.001**
2018	168 (0.72)	7.74 (5.52,10.8)	**<.001**	127 (0.54)	16.1 (10.0,25.7)	**<.001**
2019	147 (0.68)	8.19 (5.78,11.6)	**<.001**	116 (0.53)	17.6 (10.9,28.6)	**<.001**
2020	130 (0.68)	10.2 (7.11,14.6)	**<.001**	103 (0.54)	23.2 (14.1,38.2)	**<.001**
2021	99 (0.65)	13.0 (8.86,19.0)	**<.001**	70 (0.46)	27.5 (16.2,46.6)	**<.001**
2022	55 (0.45)	12.2 (7.92,18.7)	**<.001**	28 (0.23)	19.1 (10.3,35.2)	**<.001**
Follow Up Duration (yrs)		1.18 (1.15,1.21)	**<.001**		1.23 (1.19,1.28)	**<.001**
Married						
Yes	1,150 (0.51)					
No	187 (0.17)	0.45 (0.37,0.55)	**<.001**		0.40 (0.32,0.50)	**<.001**
Sex						
Female	217 (0.11)			47 (0.02)		
Male	1,120 (0.88)	11.6 (10.0,13.5)	**<.001**	862 (0.68)	44.5 (33.0,60.1)	**<.001**
Age						
14-24 yrs.	507 (0.51)			285 (0.29)		
25-34 yrs.	397 (0.53)	0.80 (0.62,1.02)	.07	287 (0.39)	0.76 (0.56,1.02)	.07
35-44 yrs.	259 (0.38)	0.66 (0.51,0.86)	**<.001**	199 (0.29)	0.68 (0.49,0.93)	**.02**
45-54 yrs.	144 (0.26)	0.50 (0.37,0.66)	**<.001**	113 (0.20)	0.53 (0.37,0.74)	**<.001**
55+ yrs.	30 (0.08)	0.19 (0.13,0.30)	**<.001**	25 (0.07)	0.23 (0.14,0.38)	**<.001**
Relation to Policyholder						
Self	788 (0.48)			601 (0.37)		
Spouse	110 (0.14)	0.82 (0.65,1.04)	.10	76 (0.10)	0.85 (0.64,1.13)	.26
Child/Other Dependent	439 (0.47)	0.47 (0.37,0.60)	**<.001**	232 (0.25)	0.34 (0.25,0.46)	**<.001**
Plan Type						
FFS	883 (0.38)			604 (0.26)		
HDHP	250 (0.48)	0.94 (0.81,1.09)	.43	169 (0.32)	0.92 (0.76,1.11)	.39
MC	182 (0.46)	1.31 (1.11,1.56)	**<.001**	123 (0.31)	1.34 (1.09,1.66)	**.01**
Unknown	22 (0.19)	0.78 (0.50,1.22)	.28	13 (0.11)	0.69 (0.38,1.25)	.22
Geography						
Urban	1,205 (0.43)			820 (0.30)		
Rural	63 (0.16)	0.46 (0.36,0.60)	**<.001**	40 (0.10)	0.44 (0.32,0.62)	**<.001**
Missing	69 (0.44)	0.71 (0.54,0.93)	**.01**	49 (0.31)	0.71 (0.51,0.98)	**.04**
Region						
Northeast	286 (0.54)			185 (0.35)		
North Central	213 (0.29)	0.50 (0.41,0.60)	**<.001**	131 (0.18)	0.46 (0.36,0.59)	**<.001**
West	546 (0.38)	0.65 (0.56,0.76)	**<.001**	387 (0.27)	0.70 (0.58,0.85)	**<.001**
South	287 (0.46)	0.97 (0.82,1.16)	.74	203 (0.33)	1.07 (0.86,1.33)	.54
Unknown	5 (0.16)	1.03 (0.40,2.62)	.96	3 (0.10)	1.30 (0.39,4.32)	.67
STI Encounters						
0	964 (0.3)			625 (0.2)		
1	49 (1.64)	3.13 (2.28,4.29)	**<.001**	36 (1.21)	3.50 (2.39,5.13)	**<.001**
2	35 (1.62)	2.61 (1.79,3.79)	**<.001**	24 (1.11)	2.45 (1.53,3.92)	**<.001**
3	43 (2.74)	3.96 (2.79,5.61)	**<.001**	34 (2.17)	4.57 (3.02,6.90)	**<.001**
≥4	246 (3.53)	4.69 (3.95,5.56	**<.001**	190 (2.73)	5.13 (4.18,6.30)	**<.001**

Follow-Up Encounters						
PCP only	393 (0.34)			273 (0.24)		
Psychiatry Only	62 (0.25)	0.74 (0.56,0.98)	**.03**	39 (0.16)	0.74 (0.52,1.05)	.10
Psychiatry and Primary Care	811 (0.51)	1.38 (1.21,1.57)	**<.001**	555 (0.35)	1.46 (1.24,1.72)	**<.001**
Other Providers	71 (0.20)	0.68 (0.52,0.88)	**<.001**	42 (0.12)	0.63 (0.45,0.89)	**.01**
Psychiatric Hospitalizations						
0	1,072 (0.39)			766 (0.28)		
1	38 (0.51)	1.00 (0.70,1.41)	.98	27 (0.36)	1.08 (0.71,1.65)	.71
2	34 (0.51)	1.02 (0.70,1.48)	.93	23 (0.34)	1.03 (0.65,1.65)	.89
3	26 (0.39)	0.80 (0.53,1.21)	.30	15 (0.23)	0.71 (0.41,1.22)	.22
≥4	167 (0.44)	0.93 (0.77,1.12)	.44	78 (0.21)	0.68 (0.52,0.89)	**<.001**
High Risk Sexual Behavior						
No	872 (0.27)			538 (0.16)		
Yes	465 (6.66)	16.9 (14.7,19.4)	**<.001**	371 (5.31)	24.4 (20.6,28.7)	**<.001**
LAI Agent Use[a]						
No	1,334 (0.4)			908 (0.27)		
Yes	3 (0.4)	0.56 (0.18,1.81)	.33	1 (0.13)	0.30 (0.04,2.25)	.24
Stimulant Use Disorder						
No	1,198 (0.37)			824 (0.26)		
Yes	139 (1.10)	1.49 (1.19,1.87)	**<.001**	85 (0.67)	1.57 (1.18,2.10)	**<.001**
Opioid Use Disorder						
No	1,250 (0.39)			866 (0.27)		
Yes	87 (0.53)	0.67 (0.52,0.87)	**<.001**	43 (0.26)	0.51 (0.36,0.74)	**<.001**
Cannabis Use Disorder						
No	1,119 (0.37)			791 (0.26)		
Yes	218 (0.68)	0.69 (0.57,0.83)	**<.001**	118 (0.37)	0.57 (0.45,0.73)	**<.001**
Alcohol Use Disorder						
No	1,045 (0.36)			724 (0.35)		
Yes	292 (0.73)	1.16 (0.99,1.36)	.07	185 (0.46)	1.08 (0.88,1.31)	.47

Results of PrEP analyses including effects of year of cohort entry and duration of time in cohort.