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National Trends in Drug Payments for HIV Preexposure Prophylaxis in the United States, 2014 to 2018:

A Retrospective Cohort Study

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Abstract

Background: Use of HIV preexposure prophylaxis (PrEP) has increased nationwide, but the magnitude and distribution of PrEP medication costs across the health care system are unknown.

Objective: To estimate out-of-pocket (OOP) and third-party payments using a large pharmacy database.

Design: Retrospective cohort study.

Setting: Prescriptions for tenofovir disoproxil fumarate with emtricitabine (TDF-FTC) for PrEP in the United States in the IQVIA Longitudinal Prescriptions database, which covers more than 90% of retail pharmacy prescriptions.

Measurements: Third-party, OOP, and total payments were compared by third-party payer, classified as commercial, Medicaid, Medicare, manufacturer assistance program, or other. Missing payment data were imputed using a generalized linear model to estimate overall PrEP medication payments.

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Results: Annual PrEP prescriptions increased from 73 739 to 1 100 684 during 2014 to 2018. Over that period, the average total payment for 30 TDF-FTC tablets increased from $1350 to $1638 (5.0% compound annual growth rate) and the average OOP payment increased from $54 to $94 (14.9% compound annual growth rate). Of the $1638 in total payments per 30 TDF- FTC tablets in 2018, OOP payments accounted for $94 (5.7%) and third-party payments for $1544 (94.3%). Out-of-pocket payments per 30 tablets were lower among Medicaid recipients ($3) than among those with Medicare ($80) or commercial insurance ($107). Payments for PrEP medication in the IQVIA database in 2018 totaled $2.08 billion; $1.68 billion (80.7%) originated from prescriptions for persons with commercial insurance, $200 million (9.6%) for those with Medicaid, $48 million (2.3%) for those with Medicare, and $127 million (6.1%) for those with manufacturer assistance.

Limitation: The IQVIA database does not capture every prescription nationwide.

Conclusion: Third-party and OOP payments per 30 TDF-FTC tablets increased annually. The $2.08 billion in PrEP medication payments in 2018 is an underestimation of national costs. High costs to the health care system may hinder PrEP expansion.

Primary Funding Source: Centers for Disease Control and Prevention.

Protecting persons at risk for HIV with preexposure prophylaxis (PrEP) is a foundational pillar of the U.S. strategy on Ending the HIV Epidemic (1). Extensive clinical trial data demonstrate that PrEP with daily oral tenofovir disoproxil fumarate with emtricitabine (TDF-FTC) reduces risk for HIV among persons at risk from sexual or injection practices (2-5). In October 2019, the U.S. Food and Drug Administration also approved tenofovir alafenamide with emtricitabine (TAF-FTC) for use as PrEP for men and transgender women (6). Both medications are manufactured by Gilead Sciences. Despite the high effectiveness of PrEP, uptake remains suboptimal, especially among populations most affected by HIV (7, 8). The cost of the medication and the barriers patients face in getting coverage for PrEP may contribute to its uneven uptake by women, persons living in the South, and Black and Hispanic persons (9-12).

In 2018, the average wholesale price of a 30-day supply of TDF-FTC was $2011 (340B price, $1024) (13). Patients using PrEP typically have much lower out-of-pocket (OOP) costs for medication because insurance companies, public insurance, or medication assistance programs pay most of the cost (14). Copay assistance programs and coupons that cover patient OOP costs can further insulate patients from the cost of the medication (15). Gilead Sciences, the manufacturer of TDF-FTC, has both a copay assistance program that covers OOP costs for commercially insured patients and a medical assistance program that pays for the medication for uninsured patients who make less than 500% of the federal poverty level. The cost of PrEP among Medicare Part D recipients was recently described (16), but the overall cost of TDF-FTC for PrEP by different payers has not been previously quantified.

The cost of TDF-FTC is estimated to be the largest driver of the cost of providing PrEP care (17). Economic modeling of PrEP cost-effectiveness in the United States has resulted in estimates that vary widely from cost saving to $160 000 per quality-adjusted life-year, owing in part to the variability in the cost of TDF-FTC for PrEP used in the models (18-22).

Further, the cost of TDF-FTC has increased annually above the rate of inflation, so the $10 000 annual cost of TDF-FTC used by several cost-effectiveness models may not reflect the actual cost to the health care system (13, 18, 19, 21). This study therefore sought to describe both third-party and OOP payments for TDF-FTC for PrEP using a national pharmacy database.

Methods

Data Source

The Centers for Disease Control and Prevention conducts PrEP surveillance by estimating the number of persons prescribed PrEP annually using the IQVIA Real World Data Longitudinal Prescriptions database (7). The IQVIA database captures prescriptions from all types of payers and represents approximately 92% of all prescriptions dispensed from retail pharmacies and 60% to 86% of those dispended from mail-order outlets in the United States. It does not capture prescriptions from closed health care systems, such as Kaiser Permanente, or federal health systems, such as the Veterans Health Administration.

Prescriptions in the IQVIA database are linked with medical claims and demographics databases using a deidentified patient number, allowing for the measurement of multiple prescriptions for a single patient over multiple years. The medical claims database contains International Classification of Diseases, Clinical Modification, codes. A previously validated algorithm using these codes was applied to TDF-FTC prescriptions among persons aged 16 years or older in the IQVIA database (23). The algorithm identified person-level use of other antiretroviral medications; use of TDF-FTC for 28 days or less; and medical claims with International Classification of Diseases, Clinical Modification, codes for HIV or hepatitis B treatment. It used these data to exclude prescriptions used for HIV treatment, HIV postexposure prophylaxis, or hepatitis B treatment. The remaining prescriptions were interpreted to represent PrEP prescriptions.

The OOP and third-party payments were recorded for each TDF-FTC prescription, and the sum was considered to be the total payment for TDF-FTC for PrEP. We used the term “payments,” as opposed to “costs,” to describe these financial transactions because discounts or bulk reimbursement mechanisms may be applied separately from the pharmacy transaction and lower the cost. The overall payment for TDF-FTC for PrEP in a given year was the sum of the total payments for TDF-FTC for all PrEP prescriptions.

Prescription Selection

Prescriptions for TDF-FTC in each year between 2014 and 2018 that were not excluded by the PrEP algorithm were included in the study. Prescriptions that were ordered, not picked up, and returned to inventory were excluded in this analysis because they did not generate a payment transaction. The total payment for the prescription was divided by the number of TDF-FTC tablets prescribed to calculate the total payment per tablet. Fewer than 1% of the prescriptions had a total payment per tablet greater than $100 (150% of the average wholesale price), usually because the third-party payment had been duplicated into the OOP

payment entry. These payments were assumed to be data errors, and their payment data were considered missing.

The third-party payer for each prescription was classified as commercial, Medicaid (including the Children's Health Insurance Program), Medicare, Gilead Sciences, cash payment (no third-party payer), or other. The "Gilead Sciences" category included their copayment assistance program that pays for commercial insurance copays and their medication assistance program that covers the drug for uninsured patients. The "other" category included patients who used coupons or had another federal or state third-party payer.

Statistical Analysis

The total numbers of TDF-FTC prescriptions, tablets, and payments were counted for the years 2014 through 2018. Compound annual percentage growth calculates the annualized rate of change between the base year and final year amounts, and this formula was used to assess annual growth in drug payments for 2014 to 2018 (24). Compound annual percentage growth rates were calculated for OOP, third-party, and total payments. For prescriptions with complete payment data, the mean OOP, third-party, and total payments per 30 tablets of TDF-FTC were stratified by age, sex, U.S. Census geographic region, and third-party payer type for 2018. Analysis of payments by race/ethnicity was not possible because of the limited availability of these data in the IQVIA database.

Because of data reliability issues from a single vendor, IQVIA changed 30% of the third-party payments in its database to null to preserve the validity of the remaining payment data for the years 2016 to 2018 (Appendix Table 1 [available at Annals.org] shows missingness of the data set). Payment data missingness was similar across third-party payer type but was slightly higher for prescriptions supported by Gilead Sciences and lower for Medicaid prescriptions (Appendix Table 2, available at Annals.org). To generate estimates of TDF-FTC payments across the health care system, the total payments for prescriptions with missing payment data were multiply imputed using a generalized linear model with 50 imputations; assuming a monotonic missing-at-random pattern; using an identity link function; and regressing year, patient age and sex, region, third-party payer type, total prescription days, pharmacy type, and patient OOP payment (25). Prescriptions with a total payment greater than $100 per pill that were assumed to be data errors were also imputed in the regression. The postimputation data were then used to calculate the overall payments represented in the IQVIA database by age, sex, geographic region, and third-party payer type for the years 2014 to 2018. In sensitivity analyses, overall payment for each year was estimated with a crude approach in which low ($1400) and high ($2000) payments per 30 pills were assigned to all missing prescriptions, as well as with a simple imputation approach that used the same identity link function and missing-at-random assumption. All statistical analyses were done using SAS statistical software (SAS Institute).

Role of the Funding Source

No funding external to the Centers for Disease Control and Prevention was provided for this study.

Results

The PrEP algorithm identified 2 833 945 TDF-FTC prescriptions between 2014 and 2018 as PrEP prescriptions. Among these, 184 045 were ordered but not picked up and were therefore excluded. The analysis ultimately included 2 649 900 paid prescriptions representing 90 994 854 TDF-FTC tablets. The number of persons dispensed PrEP increased from 20 315 in 2014 to 204 720 in 2018, and the number of PrEP prescriptions in the IQVIA database increased from 73 739 in 2014 to 1 100 684 in 2018 (Table 1). Over that period, mean total payments for TDF-FTC per 30 tablets increased from $1350 to $1638, representing a 5.0% compound annual growth rate. Average OOP payments per 30 TDF-FTC tablets increased from $54 in 2014 to $94 in 2018 (14.9% compound annual growth rate), and average third-party payments per 30 tablets increased from $1296 in 2014 to $1544 in 2018 (4.5% compound annual growth rate).

For prescriptions with complete payment data in 2018, mean OOP payments were lower for women ($72 per 30 tablets) than men ($95 per 30 tablets) and lower for adolescents ($37 per 30 tablets) than persons aged 65 years or older ($117 per 30 tablets) (Table 2). Mean OOP payments also differed by geographic region: The Northeast ($82 per 30 tablets) and West ($79 per 30 tablets) had lower OOP payments than the Midwest ($121 per 30 tablets) and South ($111 per 30 tablets). Finally, mean OOP payments differed by third-party payer, with Medicaid having the lowest ($3 per 30 tablets) and private insurance the highest ($107 per 30 tablets). Some of the variation in OOP PrEP payments by age and sex was related to underlying differences in third-party payer type, but regional differences in OOP payments persisted among persons with commercial insurance or Medicare (Appendix Table 3, available at Annals.org). Third-party and total payments did not differ by a large magnitude and were relatively consistent across age, sex, region, and third-party payer type for persons covered by commercial insurance, Medicaid, and Medicare.

Payment data were available for 99% of prescriptions from 2014 to 2015, compared with 69% of prescriptions from 2016 to 2018. Using multiply imputed payment data, we found that overall PrEP medication payments approximately doubled each year from 2014 to 2018, increasing from $114 million in 2014 to $2.08 billion in 2018 (Table 3). In 2018, persons aged 25 to 44 years accounted for $1.16 billion (55.8%) of overall PrEP medication payments, whereas men accounted for $1.99 billion (95.8%). Payments were largest in the South ($606 million [29.2%]), followed by the West ($569 million [27.4%]), Northeast ($543 million [26.2%]), and Midwest ($337 million [16.2%]). Finally, overall PrEP medication payments were $1.68 billion (80.7%) for persons with commercial insurance, $200 million (9.6%) for those with Medicaid, $48 million (2.3%) for those with Medicare, and $127 million (6.1%) for those covered by Gilead Sciences programs.

In sensitivity analyses, the results using values derived from crude imputations and single imputation were similar to those using multiple imputation to estimate missing payment values (Appendix Table 4, available at Annals.org).

Discussion

In this study, the overall cost of PrEP medication to the health care system was estimated to be $2.08 billion in 2018. By contrast, the Centers for Disease Control and Prevention estimates that only 18.1% of persons with an indication for PrEP were covered during this same year (8). Further, approximately half of persons receiving PrEP do not persist throughout the entire year (14). Increasing PrEP coverage to 50% of the population at risk for HIV with a PrEP indication is part of the federal Ending the HIV Epidemic initiative (1, 8). Therefore, reaching and sustaining this coverage goal and ensuring persistence in use of PrEP will entail even higher health care expenditures.

From 2014 to 2018, OOP payments for TDF-FTC for PrEP increased faster than third-party payments. Although the OOP payment relative to the total payment was similar in 2014 ($54 of $1350 [4.0%]) and 2018 ($94 of $1638 [5.7%]), the absolute increase from $54 to $94 for 30 tablets of TDF-FTC is substantial at the patient level. The U.S. Preventive Services Task Force recently gave a grade A recommendation to offer PrEP to persons at risk for HIV, which may reduce patient OOP costs for this preventive service (26). However, our study shows that third-party payers already bear the largest burden of PrEP medication costs, so lowering the OOP costs alone will likely shift the cost to the third-party payer and not substantially reduce the overall cost. In late 2020, TDF-FTC is set to become generic, and the introduction of a generic PrEP option may reduce the overall cost of PrEP to the health care system (27). Unfortunately, generic antiretroviral drugs typically retain about 80% to 90% of their brand-name cost, so the savings may be limited (13).

With the recent approval of TAF-FTC for PrEP in men and transgender women, providers will have the option of prescribing generic TDF-FTC or brand-name TAF-FTC (6, 27); TAF-FTC has a more favorable profile of renal and bone adverse effects and was noninferior to TDF-FTC for PrEP in the DISCOVER trial (28). However, several clinical studies (29, 30) have shown that the frequency of severe renal and bone adverse effects with TDF-FTC is low. Further, TAF-FTC may be associated with small increases in weight, cholesterol levels, and blood glucose levels compared with TDF-FTC (28, 31, 32). A recent cost-effectiveness model concluded that the incremental safety benefit of TAF-FTC over TDF-FTC was worth no more than an additional $370 per person per year (33). Given the equal efficacy and overall low rates of adverse effects with both drugs, providers and health care systems may take cost into account when prescribing TDF-FTC or TAF-FTC for PrEP.

Like previous studies of persons using PrEP, this study shows lower use among youth, women, persons living in the South, and uninsured patients relative to the estimated number of persons at risk for HIV in these demographics (7, 34). In addition to cost barriers, disparities exist in knowledge about PrEP, awareness of HIV risk, access to health care, and persistence in use of PrEP among key populations (35). Although reducing cost addresses 1 barrier to PrEP use, additional efforts to reduce disparities along the PrEP continuum are still needed to increase use nationally.

This study has limitations. First, although the IQVIA database captures the majority (>90%) of commercial and retail pharmacy prescriptions, it does not capture prescriptions from

government systems, such as the Veterans Health Administration, or closed health care systems, such as Kaiser Permanente, resulting in an underestimation of national payments for PrEP medication. However, 1 study reported that 691 persons used PrEP in 2016 to 2017, suggesting that PrEP use at the Veterans Health Administration likely represents a small fraction of overall use (36). Second, the missingness of third-party payment data during 2016 through 2018 may skew the imputed overall payments higher or lower if the data are not missing at random. Third, the database does not include data on transgender identity or HIV risk factors and provides limited race/ethnicity data, preventing stratification of payments and imputation of overall costs by these variables. The database similarly does not capture if PrEP was taken daily or on demand–that is, relative to the time of sexual encounters, which can result in fewer tablets used compared with daily use (37). Finally, the IQVIA database collects payment data only for the primary third-party payer and cannot account for complex multipayer transactions for the few patients with multiple third-party payers. For instance, commercially insured patients whose uncovered portion of prescription costs was paid by Gilead Sciences copayment assistance may not be recorded as receiving this assistance. This may result in an underestimation of payments from Gilead copayment assistance programs and an overestimation of OOP costs for commercially insured persons, but it would not affect the estimate of overall PrEP payments. Further, certain government programs (such as Medicaid or the 340B Drug Pricing Program, which allows certain health care organizations providing care to medically underserved populations to purchase medications in bulk at a discount) may have discount or bulk reimbursement mechanisms outside each pharmacy transaction. These limitations together likely led to an underestimate of national PrEP costs.

Preexposure prophylaxis is a powerful tool to prevent HIV transmission, but its cost to the health care system must be fully understood. Although the cost per person may decrease with the debut of generic TDF-FTC, the overall health care cost of PrEP will likely increase as more persons gain access to and continue to use PrEP. The high cost of PrEP does not diminish its central role in the Ending the HIV Epidemic initiative. Rather, it should promote action around ways to lower PrEP costs to the health care system to prevent coverage denials, eliminate prior authorization requirements, and increase access.

Appendix

Appendix Table 1.

Missingness of PrEP Prescription Payments and Patient Age, Sex, Region, and Payer Type, 2016-2018

Year	Total Prescriptions, *n*	Total Payment		OOP Payment		Sex		Region		Third-Party Payer Type	
		n	%	*n*	%	*n*	%	*n*	%	*n*	%
2014	73 739	542	0.73	88	0.12	68	0.09	920	1.25	243	0.33
2015	232 003	2593	1.11	30	0.01	56	0.02	1608	0.69	281	0.12
2016	487725	151 950	31.15	55	0.01	181	0.04	9238	1.89	950	0.19
2017	755 749	235 793	31.16	559	0.07	187	0.02	10 204	1.35	1267	0.17

Year	Total Prescriptions, *n*	Total Payment		OOP Payment		Sex		Region		Third-Party Payer Type	
		n	%	*n*	%	*n*	%	*n*	%	*n*	%
2018	1 100 684	341 275	30.91	401	0.04	280	0.03	8247	0.75	2728	0.25
Total	2 649 900	732 153	27.63	1133	0.04	772	0.03	30 217	1.14	5469	0.21

OOP = out-of-pocket; PrEP = preexposure prophylaxis.

Appendix Table 2.

PrEP Prescriptions Missing Payment Data in the IQVIA Database, by Payer Type, 2016-2018

Payer Type	Total Prescriptions 2016–2018, *n*	Missing	
		n	%
Commercial	1 856 276	587 249	31.6
Medicaid/CHIP	249 695	58 871	23.6
Medicare	54 444	16 671	30.6
Gilead Sciences			
Medication assistance	28 335	10 802	38.1
Copay assistance	100 475	45 750	45.5
Cash payment	15 135	3909	25.8
Other	36 496	4730	13.0
Unknown	3302	1036	31.4
Total	2 344 158	729 018	31.1

CHIP = Children's Health Insurance Program; PrEP = preexposure prophylaxis.

APPendix Table 3.

Demographic Differences in Mean OOP PrEP Payments, by Third-Party Payer Type, 2018

Variable	Mean Commercial OOP Payment (SD), *$*	Mean Medicaid OOP Payment (SD), *$*	Mean Medicare OOP Payment (SD), *$*
All	107 (272)	3 (45)	80 (200)
Age			
16-17 y	77 (224)	0 (0)	-
18-24 y	118 (290)	2 (31)	49 (163)
25-34 y	114 (284)	3 (35)	39 (166)
35-44 y	103 (264)	4 (62)	43 (179)
45-54 y	98 (259)	3 (39)	46 (154)
55-64 y	94 (254)	5 (67)	67 (200)
≥65 y	86 (239)	4 (31)	148 (236)
Sex			
Male	107 (272)	3 (43)	86 (204)
Female	100 (274)	3 (56)	34 (165)
Region			
Northeast	94 (258)	5 (53)	54 (159)
Midwest	130 (309)	3 (60)	95 (231)

Variable	Mean Commercial OOP Payment (SD), $	Mean Medicaid OOP Payment (SD), $	Mean Medicare OOP Payment (SD), $
South	120 (287)	3 (41)	99 (223)
West	94 (246)	1 (21)	76 (187)

OOP = out-of-pocket; PrEP = preexposure prophylaxis.

Appendix Table 4.

Sensitivity Analysis of Overall PrEP Payments Using Crude, Single, and Multiple Imputation From Prescriptions With Complete Payment Data, 2014-2018

Variable	2014	2015	2016	2017	2018
IQVIA base data set					
IQVIA overall sample payments, $	113 239 331	373 870 150	562 251 605	942 316 930	1 460 054 998
IQVIAsample completeness, %	99.3	98.9	68.8	68.8	69.0
Crude imputation, $					
Using $1400 forall missing total payments	114 009 378	377 549 677	786 751 965	1 295 615 937	1 985 126 445
Using $2000 forall missing total payments	114 339 398	379 126 617	882 966 405	1 447 029 797	2 210 157 065
Single imputation, $*					
Overall payments	113 858 036	377 720 405	796 480 451	1 337 044 949	2 084 113 989
Multiple imputation, 50 times, $*					
Mean overall payment	113 978 754	377 828 569	795 085 311	1 333 358 057	2 076 567 589
SD	4977	8879	91 936	126 549	161 857
Median overall payment	113 978 380	377 827 446	795 080 980	1 333 361 145	2 076 541 565
Minimum overall payment	113 965 462	377 814 539	794 927 253	1 333 034 461	2 076 154 738
Maximum overall payment	113 990 274	377 852 681	795 286 344	1 333 660 128	2 076 903 514

PrEP = preexposure prophylaxis.

* Imputation model predictor variables: out-of-pocket payment amount, tablets dispensed, third-party payer type, pharmacy type, geographic region, patient sex, and year.

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Table 1.

Number of PrEP Prescriptions, Tablets, and Payments Represented in the IQVIA Database, 2014-2018

Variable	2014	2015	2016	2017	2018
All dispensed prescriptions, *n*					
Patients receiving PrEP	20 315	51 544	94 277	141 080	204 720
Prescriptions	73 739	232 003	487 725	755 749	1 100 684
TDF-FTC tablets	2 534 309	7 965 375	16 616 618	25 890 065	37 988 487
Prescriptions with payment data					
Patients receiving PrEP, *n* (%)	20 046 (98.7)	50 779 (98.5)	68 460 (72.6)	100 775 (71.4)	145 001 (70.8)
Prescriptions, *n* (%)	73 197 (99.3)	229 410 (98.9)	335 775 (68.8)	519 956 (68.8)	759 409 (69.0)
TDF-FTC tablets, *n* (%)	2 517 808 (99.3)	7 886 528 (99.0)	11 805 896 (71.0)	18 319 372 (70.8)	26 736 956 (70.4)
Overall annual TDF-FTC payments, *$*	113 239 331	373 870 150	562 251 605	942 316 930	1 460 054 998
Mean total payments per 30 tablets (SD), *$*	1350 (301)	1422 (309)	1428 (325)	1543 (236)	1638 (255)
Mean OOP payments per 30 tablets (SD), *$*	54 (186)	62 (205)	80 (249)	84 (246)	94 (270)
Mean third-party payments per 30 tablets (SD), *$*	1296 (352)	1360 (367)	1348 (395)	1459 (340)	1544 (370)

OOP = out-of-pocket; PrEP = preexposure prophylaxis; TDF-FTC= tenofovir disoproxil fumarate with emtricitabine.

Table 2.

Mean OOP, Third-Party, and Total PrEP Medication Payments With Complete Payment Data, by Age, Sex, Region, and Payer Type, 2018

Variable	Prescriptions, *n*	Mean OOP Payment per 30 Tablets (SD), *$*	Mean Third-Party Payment per 30 Tablets (SD), *$*	Mean Total Payment per 30 Tablets (SD), *$*
All prescriptions	759 409	94 (271)	1544 (370)	1638 (255)
Age				
16-17 y	711	37 (187)	1596 (247)	1632 (187)
18-24 y	69 132	94 (277)	1531 (371)	1625 (252)
25-34 y	292 770	99 (281)	1532 (373)	1631 (250)
35-44 y	192 584	92 (265)	1551 (360)	1643 (250)
45-54 y	131 441	89 (260)	1558 (365)	1647 (260)
55-64 y	62 144	86 (256)	1565 (373)	1651 (272)
≥65 y	10 627	117 (263)	1513 (451)	1631 (341)
Sex				
Male	723 483	95 (270)	1543 (370)	1639 (256)
Female	35 653	72 (275)	1561 (356)	1633 (247)
Unknown	273	303 (667)	1352 (692)	1656 (161)
Region				
Northeast	225 846	82 (255)	1570 (327)	1651 (204)
Midwest	94 861	121 (316)	1521 (418)	1642 (286)
South	218 768	111 (286)	1540 (360)	1651 (217)
West	212 130	79 (244)	1530 (395)	1609 (317)
Unknown	7804	84 (304)	1562 (430)	1646 (242)
Third-party payer				
Commercial	594 871	107 (272)	1549 (334)	1655 (181)
Medicaid/CHIP	91 305	3 (45)	1583 (289)	1586 (285)
Medicare	18 510	80 (201)	1583 (320)	1662 (184)
Gilead Sciences				
Medication assistance	32 976	0 (27)	1720 (46)	1721 (37)
Copay assistance	6595	31 (177)	1272 (849)	1303 (849)
Cash payment	4619	1902 (268)	0	1902 (268)
Other	10 073	384 (749)	387 (635)	771 (808)

Variable	Prescriptions, *n*	Mean OOP Payment per 30 Tablets (SD), $	Mean Third-Party Payment per 30 Tablets (SD), $	Mean Total Payment per 30 Tablets (SD), $
Unknown	460	189 (544)	760 (701)	949 (715)

CHIP = Children's Health Insurance Program; OOP =out-of-pocket; PrEP = preexposure prophylaxis.

Table 3.

Overall PrEP Medication Payments, by Age, Sex, Region, and Payer Type, Using Multiply Imputed Payment Data, 2014-2018

Variable	Payments (SD), *$ (thousand)*				
	2014	**2015**	**2016**	**2017**	**2018**
Overall imputed payment *	113 979 (5)	377 829 (9)	795 085 (92)	1 333 358 (127)	2 076 568 (162)
Age					
16-17 y	172 (0.4)	253 (0.3)	556 (2)	882 (3)	1573 (3)
18-24 y	6707 (2)	26 086 (4)	59 737 (18)	108 761 (37)	176 336 (39)
25-34y	35 813 (3)	136 551 (5)	296 012 (57)	506 405 (82)	800 761 (115)
35-44 y	32 502 (3)	103 808 (5)	213 941 (41)	349 755 (60)	537 072 (77)
45-54 y	24 735 (3)	78 649 (4)	157 462 (32)	249 492 (52)	361 191 (61)
55-64 y	10 508 (2)	26 580 (2)	56 604 (21)	100 598 (30)	170 698 (43)
≥65 y	3542 (1)	5900 (1)	10 773 (10)	17 465 (13)	28 937 (23)
Sex					
Male	103 759 (4)	359 437 (9)	762 240 (89)	1 279 937 (129)	1 990 135 (162)
Female	10 124 (2)	18 314 (3)	32 542 (16)	53 076 (19)	85 904 (24)
Unknown	95 (2)	77 (0.3)	303 (0.3)	344 (0.6)	529 (0.5)
Region					
Northeast	26 990 (2)	95 859 (5)	207 115 (45)	356 537 (41)	543 392 (52)
Midwest	20 916 (2)	67 900 (5)	128 250 (44)	215 218 (69)	337 212 (87)
South	27 260 (4)	91 936 (6)	207 385 (41)	353 868 (66)	606 258 (83)
West	36 327 (3)	118 017 (5)	230 259 (48)	373 304 (71)	569 283 (77)
Unknown	2486 (0.9)	4116 (1)	22 076 (3)	34 433 (4)	20 423 (4)
Third-party payer					
Commercial	75 690 (3)	316 837 (9)	666 517 (92)	1 093 379 (122)	1 676 166 (144)
Medicaid/CHIP	9904 (2)	35 436 (1)	74 320 (27)	130 707 (28)	199 722 (41)
Medicare	4468 (0.7)	8885 (0.7)	17 131 (15)	29 251 (19)	47 653 (23)
Gilead Sciences					
Medication assistance	3076 (0.3)	2444 (0.2)	14 536 (12)	49 475 (22)	104 348 (37)
Copay assistance	0	0	3751 (8)	14 754 (14)	22 619 (29)
Cash payment	3762 (3)	10 637 (4)	7726 (8)	9556 (7)	14 814 (12)

Variable	Payments (SD), $ *(thousand)*				
	2014	**2015**	**2016**	**2017**	**2018**
Other	623 (0.7)	3094 (1)	9504 (10)	5432 (7)	9472 (9)
Unknown	16 455 (2)	495 (0.5)	1600 (2)	804 (2)	1775 (7)

CHIP = Children's Health Insurance Program; PrEP = preexposure prophylaxis.

* Includes the imputed payments from all dispensed prescriptions.