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Impact of HIV Pre-exposure Prophylaxis Prescriptions on HIV Diagnoses in New York City

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ABSTRACT

Background: HIV pre-exposure prophylaxis (PrEP) has proven to be efficacious and effective in preventing HIV infections, but few studies have reported its impact in the real world.

Methods: We conducted an ecological analysis and compared the trends in HIV PrEP prescriptions with the trends in age-adjusted HIV diagnosis rates in New York City (NYC). Joinpoint regression analyses were used to identify any temporal trends in HIV diagnosis rates in NYC.

Results: The number of people filling at least one PrEP prescription in NYC increased from 2,551 in 2014 to 35,742 in 2022. The overall age-adjusted HIV diagnosis rate steadily decreased from 48.1 per 100,000 in 2003 to 17.1 per 100,000 in 2022. After the rollout of PrEP, accelerated decreases were detected in some subpopulations including white males (2014-2019 annual percentage change [APC]: -16.6%; 95% confidence interval [CI]: -22.7, -10.0), Asian/Pacific Islander males (2016-

2022 APC: -9.8%), males aged 20 to 29 years (2017-2020 APC: -9.4%) and 40 to 49 years (2014-2020 APC: -12.2%), Latino/Hispanic people aged 40 to 49 years (2015-2020 APC: -13.0%), white people aged 20 to 29 years (2012-2022 APC: -11.4%) and 40 to 49 years (2014-2018 APC: -27.8%), and Asian/Pacific Islander people aged 20 to 29 years (2017-2022 APC: -13.0).

Conclusions: With a high coverage, PrEP can have a long-term impact in reducing HIV infections in a population, but if pre-existing social determinants that contribute to racial, ethnic, and gender inequities are not well addressed, the implementation of PrEP can exacerbate these inequalities.

Keywords: HIV, pre-exposure prophylaxis, diagnosis, public health surveillance

Efficacy measures how well an intervention prevents infection or disease under ideal and controlled circumstances. The efficacy of pre-exposure prophylaxis (PrEP) with tenofovir disoproxil/alafenamide fumarate plus emtricitabine in preventing HIV acquisition has been demonstrated in randomized clinical trials. When adherence to daily oral administration is high, the efficacy of PrEP exceeds 90% in men who have sex with men (MSM) and heterosexuals and 70% in participants who inject drugs.[1-3] Based on these findings, the United States and many other countries have approved and encouraged the use of PrEP in populations vulnerable to HIV infection.[4,5]

Effectiveness measures how well an intervention prevents infection or disease in the real world. Two implementation studies conducted at sexual health clinics in San Francisco and Seattle showed that PrEP reduced 60% to 79% of HIV infections.[6,7] One large national population-based cohort study from France reported an overall effectiveness of 60%, with reduced effectiveness in people younger than 30 years of age and also in people who were receiving complementary universal health insurance via *couverture maladie universelle complémentaire*, a system that provides free access to health care for people with an annual income below 50% of the French poverty threshold.[8]

Impact measures the scale at which an intervention prevents infection or disease in the real world. To be impactful, an intervention needs both effectiveness and coverage, i.e., a substantial proportion of the population receiving the effective intervention.[9] Few studies have reported the impact of PrEP on population-level HIV incidence or diagnoses.[10,11] One study from New South Wales, Australia, reported that the number of HIV diagnoses among MSM dropped 25.1% in the 12 months after PrEP roll-out,[10] but diagnoses remained relatively stable thereafter until the COVID-19 epidemic in 2020.[12] Prior to the National Health Service approval of PrEP in the United Kingdom in early 2020, there was a 40% drop in HIV diagnoses at four London sexual health clinics in 2016 compared with 2015, and some experts believed it was due to PrEP obtained online;[13,14] however, no formal evaluations were reported. More recently, an ecological analysis of PrEP across U.S. States suggested those with higher PrEP coverage have experienced greater declines in HIV diagnoses.[15]

HIV diagnoses in New York City (NYC) had been steadily decreasing before the Food and Drug Administration (FDA) approved the use of Truvada (emtricitabine and tenofovir disoproxil fumarate) for HIV PrEP in the United States in 2012, with 5,815 people newly diagnosed with HIV in 2001 and

3,096 in 2012.[16,17] The purpose of this analysis is to assess the impact of PrEP prescriptions on HIV diagnoses in NYC after its introduction, as seen through an accelerated decrease in HIV diagnoses beyond the ongoing trend, overall and within subpopulations by age, sex and race or ethnicity.

Methods

We conducted an ecological analysis using HIV PrEP prescription and registry data. We obtained the number of people in NYC filling at least one prescription for PrEP, in the form of Truvada or Descovy (emtricitabine and tenofovir alafenamide, approved by the FDA for PrEP in October 2019), in each calendar year overall and by age, sex, and race or ethnicity between 2014 and 2022 from Symphony Health's Integrated Dataverse (IDV) and the New York State Medicaid Data Warehouse via a publicly available website, the Ending the HIV Epidemic Dashboard.[18] The IDV contains longitudinal patient data sources that capture adjudicated prescription, medical, and hospital claims across the United States for all payment types, including commercial plans, Medicare Part D, cash, assistance programs, and Medicaid. New York State (NYS) uses the IDV data to extract PrEP prescription data for all payors with the exception of Medicaid. For Medicaid, an algorithm was developed and applied to Medicaid fee-for-service claims and encounter data submitted by Medicaid managed care plans that are housed in the NYS Department of Health Medicaid data warehouse. This algorithm included diagnosis and prescription drug coding that was intended to monitor the number of HIV-negative Medicaid recipients who filled prescriptions for Truvada for PrEP, excluding treatment of chronic hepatitis B infection.[18,19]

We obtained the number of new HIV diagnoses in NYC overall and by age, sex, and race or ethnicity between 2003 and 2022 from the NYC HIV registry, which contains data on all persons diagnosed and reported in NYC with AIDS since 1981 and HIV since 2000.[20] To calculate the HIV diagnosis rate, we obtained annual estimates on the NYC population overall and by age, sex, and race or ethnicity from the intercensal population estimates updated in 2023 by the NYC Department of Health and Mental Hygiene (DOHMH).

We calculated annual age-adjusted HIV diagnosis rates by sex and race or ethnicity using the U.S. 2000 standard population, and annual age-specific HIV diagnosis rates by sex and race or ethnicity excluding people aged 60 or older.[21] To approximate HIV incidence, we also calculated annual HIV diagnosis rates by sex and race or ethnicity among people aged 20 to 29 years. All HIV diagnosis rates were calculated using SAS version 9.4 (SAS Institute, Cary, NC). We then conducted joinpoint regression analyses to identify any temporal trends in HIV diagnosis rates in NYC using the Joinpoint software (version.4.9.1.0) developed by the Surveillance Research Program of the U.S. National Cancer Institute.[22,23] The Joinpoint software implements a segmented regression model in which segments of the trend are identified and joined by "joinpoints." The software allows users to identify trends in data, estimate the magnitude of trends, and calculate annual percentage change (APC) for each segment of the trend.

For this ecological analysis, we compared the trends in PrEP prescriptions in NYC in 2014-2022 against the trends in HIV diagnosis rate in NYC in 2003-2022, overall and by age, sex, and race or ethnicity.

Results

The number of people filling at least one PrEP prescription in NYC increased from 2,551 in 2014 to 35,742 in 2022. PrEP prescriptions increased among all groups when measured by sex, age, and race or ethnicity (Table 1).

The overall age-adjusted HIV diagnosis rate decreased from 48.1 per 100,000 in 2003 to 17.1 per 100,000 in 2022 (Figure 1), with an accelerated decrease starting before the rollout of PrEP (2007-2020 APC: -7.3%; 95% confidence interval [CI]: -7.7, -7.0). The rate among males decreased from 68.0 to 28.3 per 100,000, with an accelerated decrease starting before the rollout of PrEP (2007-2020 APC: -6.6%), and among females, the rate decreased from 30.1 to 6.4 per 100,000, with no accelerated decreases.

We found decreases across all groups when we measured the age-adjusted HIV diagnosis rate by sex and race or ethnicity, but accelerated decreases were only detected among white (2014-2019 APC: -16.6%) and Asian Pacific Islander males (2016-2022 APC: -9.8%) after the rollout of PrEP (Figure 2).

We also found decreases across all groups when we measured age-specific HIV diagnosis rates by sex and age, but accelerated decreases were only detected among males aged 20 to 29 years (2017-2020 APC: -9.4%) and 40 to 49 years (2014-2020 APC: -12.2%) after the rollout of PrEP (Figure 3).

By race or ethnicity and age, accelerated decreases were detected among Latino/Hispanic people aged 40 to 49 years (2015-2020 APC: -13.0%), white people aged 20 to 29 years (2012-2022 APC: -11.4%) and 40 to 49 years (2014-2018 APC: -27.8%), and Asian/Pacific Islander people aged 20 to 29 years (2017-2022 APC: -13.0) after the rollout of PrEP (Supplemental Figure 1, http://links.lww.com/QAD/D214).

Among people aged 20 to 29 years, an accelerated decrease was detected among white males (2012-2022 APC: -11.8%) (Figure 4). The annual HIV diagnosis rate among Asian/Pacific Islander males aged 20 to 29 years changed from an increase before the rollout of PrEP (2003-2016 APC: 6.7%) to a decrease afterwards (2016-2022 APC: -11.0%).

There was a large drop in HIV diagnosis rates across most of the groups in 2020 attributable to the emergence of COVID-19 in NYC; rates subsequently rebounded in 2021 and 2022.

Discussion

HIV diagnoses in NYC had steadily decreased before the FDA's approval of Truvada as PrEP in 2012. We examined whether there was an accelerated decrease after the rollout of PrEP beyond the ongoing trend. Overall, our ecological analysis suggests that in NYC the increasing number of people prescribed PrEP from 2014 to 2022 did not appear to accelerate the overall decrease in HIV diagnosis rate. The impact of PrEP prescriptions on HIV diagnoses depends on both the effectiveness and coverage of PrEP. Previous studies have shown that PrEP is effective in preventing HIV

infections.[6-8] The limited impact of PrEP prescriptions on overall HIV diagnoses in NYC could be due to the inadequate coverage of PrEP across all populations most vulnerable to HIV.

We did observe accelerated decreases in HIV diagnoses after the rollout of PrEP in some subpopulations, such as Asian/Pacific Islander and white males and males aged 20 to 29 years, of whom a large proportion were MSM. This suggests that PrEP was effective and can reduce HIV infections if enough people at increased risk of HIV acquisition are prescribed PrEP. PrEP users in NYC are overwhelmingly male (93% in 2022), aged 20 to 39 years (66% in 2022), and white (53% of PrEP users with a known race or ethnicity in 2022). We also observed that white people had an earlier accelerated decrease than other populations (e.g., 2014 for white males and 2016 for Asian/Pacific Islander males) after the rollout of PrEP, suggesting that white males were more likely to be early PrEP adopters or to have greater access to PrEP.

We did not observe the same level of impact on HIV diagnoses in other populations during the analysis period. The most likely reason for this was that the number of people at increased risk of acquiring HIV who were prescribed PrEP within these subpopulations was not sufficiently high to achieve the coverage needed to generate an accelerated decrease in HIV diagnoses. Studies have shown that women and Black and Latino/Hispanic people are less likely to be prescribed PrEP.[24-26] Generally, those who might most benefit from PrEP might not be prescribed or using PrEP due to a variety of factors including structural, economic, provider limitations and biases, and individual-level influences such as stigma and medical mistrust.

Our analysis has limitations. First, there is a possibility of ecological fallacy. Regarding the observed accelerated decrease in HIV diagnoses after the rollout of PrEP in some subpopulations, other initiatives could have influenced this. One could be the treatment as prevention effect (TasP) on the incidence of HIV infection from the recommendation of treating all people with HIV regardless of their CD4 count released by the NYC DOHMH in December 2011.[27-29] If that was the case, we should expect accelerated decrease in HIV diagnoses in all subpopulations regardless of PrEP coverage, as they all had a similar degree of improvement in HIV viral suppression (NYC DOHMH unpublished data). Given that in NYC, 1) white people were more likely to be prescribed PrEP and white males had an accelerated decrease in HIV diagnoses after the rollout of PrEP, and 2) younger population had a bigger increase in PrEP prescriptions and an accelerated decrease in HIV diagnoses after the rollout of PrEP,[30] we believe that PrEP was likely the cause of the accelerated decrease in HIV diagnoses in some subpopulations in NYC. Our findings are consistent with those from Australia, England, and France,[10,13,31]

Second, we reported a negative association between PrEP prescriptions and HIV diagnoses in some subpopulations, but were unable to quantify the association, because of lack of data to calculate the PrEP-to-need ratio.[32] If we had all the data, we would have reported coefficients from linear regression models showing that with every percentage point of increase in PrEP prescriptions there were additional percentage points of decrease in HIV diagnoses.

Third, we did not have population-based PrEP prescription data in specific priority populations who are highly affected by HIV, including MSM, transgender people, and people who inject drugs, given

that the data source is not able to provide such information. While the impact of PrEP has the potential to be high among these groups, we were unable to conduct a side-by-side comparison of PrEP prescriptions and HIV diagnoses among them. There was also a large amount of missing data by race or ethnicity in the PrEP data available, a limitation of many current administrative datasets.

Fourth, we used the number of HIV diagnoses as a proxy for HIV incidence to evaluate the impact of PrEP, as have most other studies evaluating the effectiveness of PrEP in the real world.[10,33] To counter this limitation, we conducted an analysis restricting diagnoses to those aged 20 to 29 years, who were more likely to be recently infected, and found an association of PrEP prescription with accelerated decrease in HIV diagnoses in Asian/Pacific Islander and white males but not in other groups.

Fifth, because of multiple stratified analyses, it could be chance rather than heterogeneity that explains the accelerated decrease in HIV diagnoses in some subpopulations, but not others. We believe that it is unlikely to be chance based on the facts that, 1) the data included in our analysis were from HIV surveillance, 2) previous studies have shown that PrEP is effective in preventing HIV infections in the real world,[6-8] 3) previous studies have shown that white people were more likely to be prescribed PrEP,[24-26] and 4) in our analysis, we found accelerated decrease in HIV diagnoses among white people.

In conclusion, PrEP is an effective prevention method, and when enough people are prescribed PrEP, PrEP can have a population-level impact on HIV incidence. Our ecological analysis showed that PrEP accelerated the annual decrease in HIV diagnoses in some populations in NYC, but not overall. We also observed that during the rollout of PrEP, existing racial and gender inequities in HIV diagnoses in NYC were highlighted, in that PrEP had the greatest impact on young white males. To end the HIV epidemic in the U.S., we need to increase the accessibility and use of PrEP and address the many pre-existing social determinants that contribute to racial, ethnic, and gender inequities.[34-37] Local NYC efforts to increase access to PrEP—such as availability via municipal-funded sexual health clinics, funding to local community-based organizations and clinics, and support for provider-based interventions as well as State and Federal efforts—should continue to pursue increased PrEP uptake and particularly those that address inequities, so that PrEP's impact can be maximized across all groups.[36,38]

References

1. 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(27):2587-2599.

2. Baeten JM, Donnell D, Ndase P, et al. Antiretroviral prophylaxis for HIV prevention in heterosexual men and women. *N Engl J Med.* 2012;367(5):399-410.

3. 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(9883):2083-2090.

4. AIDS Vaccine Advocacy Coalition. The Global PrEP Tracker. https://data.prepwatch.org/. Accessed May 1, 2023.

5. Smith D, Thigpen M, Nesheim S, et al. Interim guidance for clinicians considering the use of preexposure prophylaxis for the prevention of HIV infection in heterosexually active adults. *MMWR Morb Mortal Wkly Rep.* 2012;61(31):586-589.

6. Johnson KA, Hessol NA, Kohn R, et al. HIV seroconversion in the era of pharmacologic prevention: a case-control study at a San Francisco STD clinic. *J Acquir Immune Defic Syndr.* 2019;82(2):159-165.

7. Pagkas-Bather J, Khosropour CM, Golden MR, Thibault CS, Dombrowski JC. Population-level effectiveness of HIV pre-exposure prophylaxis among MSM and transgender persons with bacterial sexually transmitted infections. *J Acquir Immune Defic Syndr.* 2021;87:769 - 775.

8. Jourdain H, de Gage SB, Desplas D, Dray-Spira R. Real-world effectiveness of pre-exposure prophylaxis in men at high risk of HIV infection in France: a nested case-control study. *Lancet Public Health.* 2022;7(6):e529-e536.

9. Jenness SM, Goodreau SM, Rosenberg E, et al. Impact of the Centers for Disease Control's HIV preexposure prophylaxis guidelines for men who have sex with men in the United States. *J Infect Dis.* 2016;214(12):1800-1807.

10. Grulich AE, Guy R, Amin J, et al. Population-level effectiveness of rapid, targeted, high-coverage roll-out of HIV pre-exposure prophylaxis in men who have sex with men: the EPIC-NSW prospective cohort study. *Lancet HIV.* 2018;5(11):e629-e637.

11. Keane A, Regan SO, Quinn L, et al. Evaluation of the impact of human immunodeficiency virus pre-exposure prophylaxis on new human immunodeficiency virus diagnoses during the COVID-19 pandemic. *Int J STD AIDS.* 2022;33(1):99-102.

12. Centre for Population Health. NSW HIV Strategy 2021-2025: Second Quarter Data Report 2022. https://www.health.nsw.gov.au/endinghiv/Pages/tools-and-data.aspx. Published 2022. Accessed May 1, 2023.

13. Wilson C. Massive drop in London HIV rates may be due to internet drugs. https://www.newscientist.com/article/2117426-massive-drop-in-london-hiv-rates-may-be-due-to-internet-drugs/. Published 2017. Accessed May 1, 2023.

14. Kirby T. PrEP finally approved on NHS in England. *Lancet.* 2020;395(10229):1025.

15. Sullivan PS, Dubose S, Brisco GL, Juhasz M. Association of state-level PrEP coverage and state-level HIV diagnoses, US, 2012-2021. Conference on Retroviruses and Opportunistic Infections 2024; March 3-6, 2024; Denver, CO.

16. Food and Drug Adminstration. Truvada for PrEP fact sheet. https://www.fda.gov/files/drugs/published/Truvada-for-PrEP-Fact-Sheet--Ensuring-Safe-and-Proper-Use.pdf. Published 2012. Accessed May 1, 2023.

17. HIV Epidemiology Program. *HIV Surveillance Annual Report, 2021.* New York, NY: New York City Department of Health and Mental Hygiene;2022.

18. CUNY Institute for Implementation Science in Population Health. PrEP Utilization (NYC). https://etedashboardny.org/data/prevention/prep-nys/ Published 2024. Accessed April 1, 2024.

19. Laufer FN, O'Connell DA, Feldman I, Zucker HA. Vital Signs: Increased medicaid prescriptions for preexposure prophylaxis against HIV infection--New York, 2012-2015. *MMWR Morb Mortal Wkly Rep.* 2015;64(46):1296-1301.

20. Torian LV, Henning KJ, Kellerman SE, Frieden TR. Striving toward comprehensive HIV/AIDS surveillance: the view from New York City. *Public Health Rep.* 2007;122 Suppl 1:4-6.

21. Klein RJ, Schoenborn CA. Age adjustment using the 2000 projected U.S. population. *Healthy People 2010 Stat Notes.* 2001(20):1-10.

22. *Joinpoint Regression Program* [computer program]. Version 4.9.1.0. Bethesda, MD: Statistical Methodology and Applications Branch, Surveillance Research Program, National Cancer Institute; 2022.

23. Kim HJ, Fay MP, Feuer EJ, Midthune DN. Permutation tests for joinpoint regression with applications to cancer rates. *Stat Med.* 2000;19(3):335-351.

24. Centers for Disease Control and Prevention. Core indicators for monitoring the Ending the HIV Epidemic initiative (preliminary data): National HIV Surveillance System data reported through June 2021; and preexposure prophylaxis (PrEP) data reported through March 2021. *HIV Surveillance Data Tables 2021.* 2021;2(4):1-28.

25. Centers for Disease Control and Prevention. HIV infection, risk, prevention, and testing behaviors among transgender women—National HIV Behavioral Surveillance, 7 U.S. Cities, 2019–2020. *HIV Surveillance Special Report* 2021(No. 27):1-33.

26. Kanny D, Jeffries WLt, Chapin-Bardales J, et al. Racial/ethnic disparities in HIV preexposure prophylaxis among men who have sex with men - 23 urban areas, 2017. *MMWR Morb Mortal Wkly Rep.* 2019;68(37):801-806.

27. New York City Department of Health and Mental Hygiene. Recommendation to expand antiretroviral therapy to all persons living with HIV

https://www.nyc.gov/assets/doh/downloads/pdf/ah/nyc-hivart-faq-provider.pdf. Published 2011. Accessed May 1, 2023.

28. Rodger AJ, Cambiano V, Bruun T, et al. Sexual activity without condoms and risk of HIV transmission in serodifferent couples when the HIV-positive partner is using suppressive antiretroviral therapy. *JAMA.* 2016;316(2):171-181.

29. Bavinton BR, Pinto AN, Phanuphak N, et al. Viral suppression and HIV transmission in serodiscordant male couples: an international, prospective, observational, cohort study. *The Lancet HIV.* 2018;5(8):e438-e447.

30. Sullivan PS, Woodyatt C, Koski C, et al. A data visualization and dissemination resource to support HIV prevention and care at the local level: analysis and uses of the AIDSVu public data resource. *J Med Internet Res.* 2020;22(10):e23173.

31. Grulich AE, Jin F, Bavinton BR, et al. Long-term protection from HIV infection with oral HIV pre-exposure prophylaxis in gay and bisexual men: findings from the expanded and extended EPIC-NSW prospective implementation study. *Lancet HIV.* 2021;8(8):e486-e494.

32. Siegler AJ, Mouhanna F, Giler RM, et al. The prevalence of pre-exposure prophylaxis use and the pre-exposure prophylaxis-to-need ratio in the fourth quarter of 2017, United States. *Ann Epidemiol.* 2018;28(12):841-849.

33. Xia Q, Teixeira-Pinto A, Forgione LA, Wiewel EW, Braunstein SL, Torian LV. Estimated HIV Incidence in the United States, 2003–2010. *JAIDS Journal of Acquired Immune Deficiency Syndromes.* 2017;74(1):10-14.

34. Salcuni P, Smolen J, Jain S, Myers J, Edelstein Z. Trends and associations with PrEP prescription among 602 New York City (NYC) ambulatory care practices, 2014–2016. *Open Forum Infectious Diseases.* 2017;4(suppl_1):S21-S21.

35. Fauci AS, Redfield RR, Sigounas G, Weahkee MD, Giroir BP. Ending the HIV Epidemic: a plan for the United States. *JAMA.* 2019;321(9):844-845.

36. Pathela P, Jamison K, Blank S, Daskalakis D, Hedberg T, Borges C. The HIV pre-exposure prophylaxis (PrEP) cascade at NYC Sexual Health Clinics: navigation is the key to uptake. *J Acquir Immune Defic Syndr.* 2020;83(4):357-364.

37. Xia Q, Edelstein ZR, Blumenthal JS. Improving HIV preexposure prophylaxis implementation within healthcare settings. *AIDS.* 2022;36(13):1883-1885.

38. Wahnich A, Gandhi AD, Cleghorn E, et al. Public health detailing to promote HIV pre- and postexposure prophylaxis among women's healthcare providers in New York City. *Am J Prev Med.* 2021;61(5 Suppl 1):S98-s107.

Figure 1. Age-adjusted HIV diagnosis rate in New York City, 2003-2022, overall and by sex

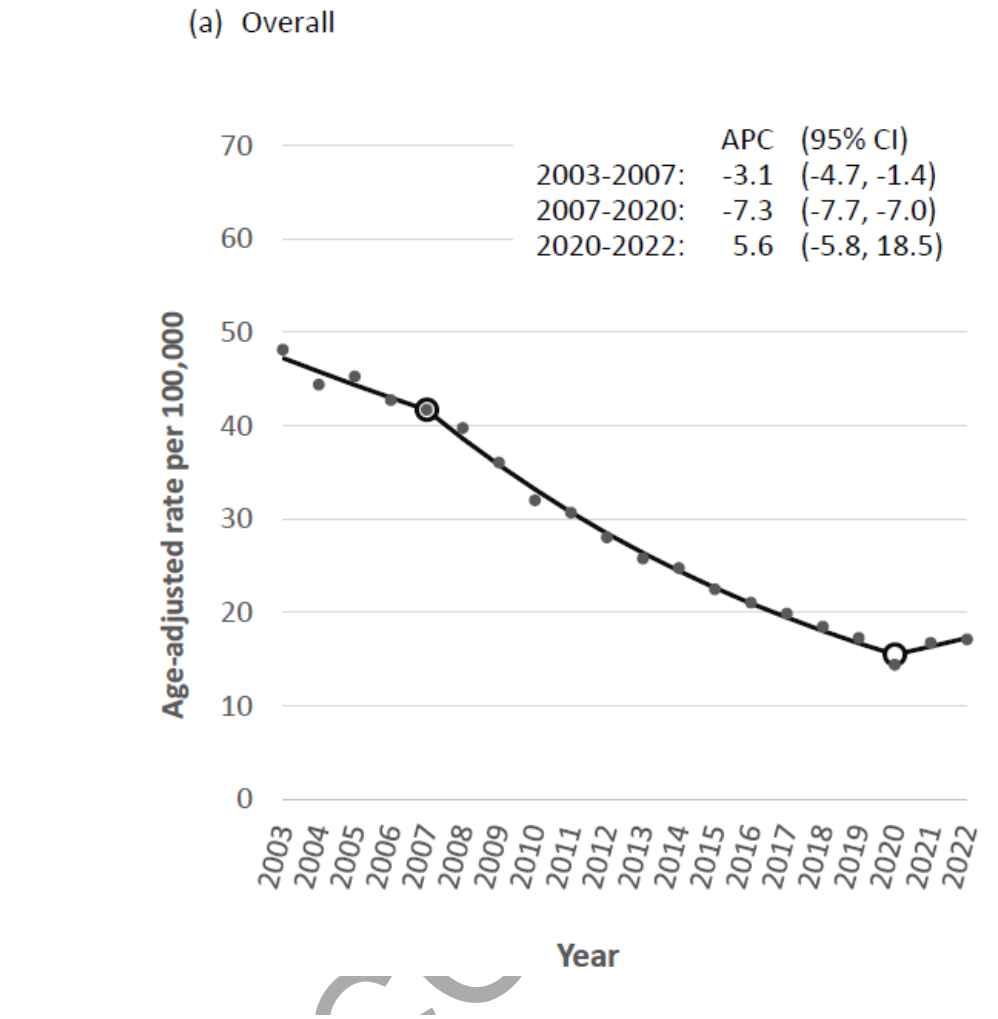
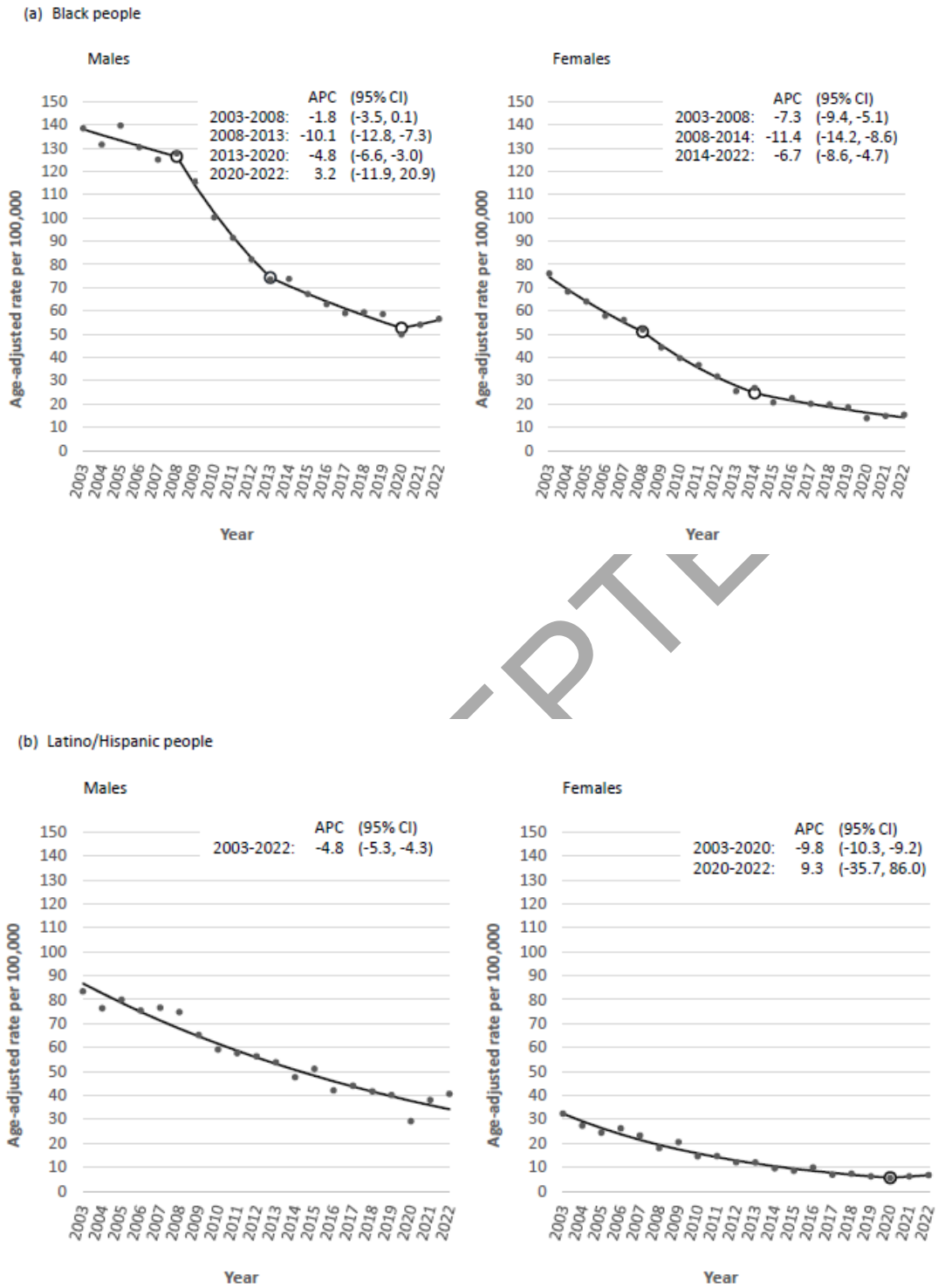
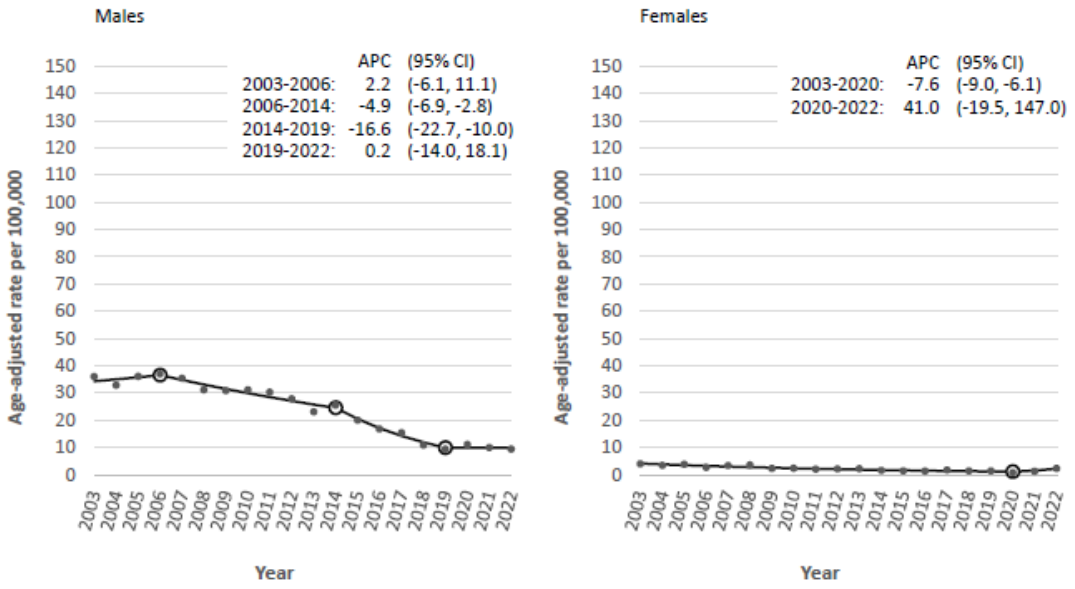


Figure 2. Age-adjusted HIV diagnosis rate in New York City, 2003-2022, by sex and race/ethnicity



(c) White people



(d) Asian/Pacific Islander people

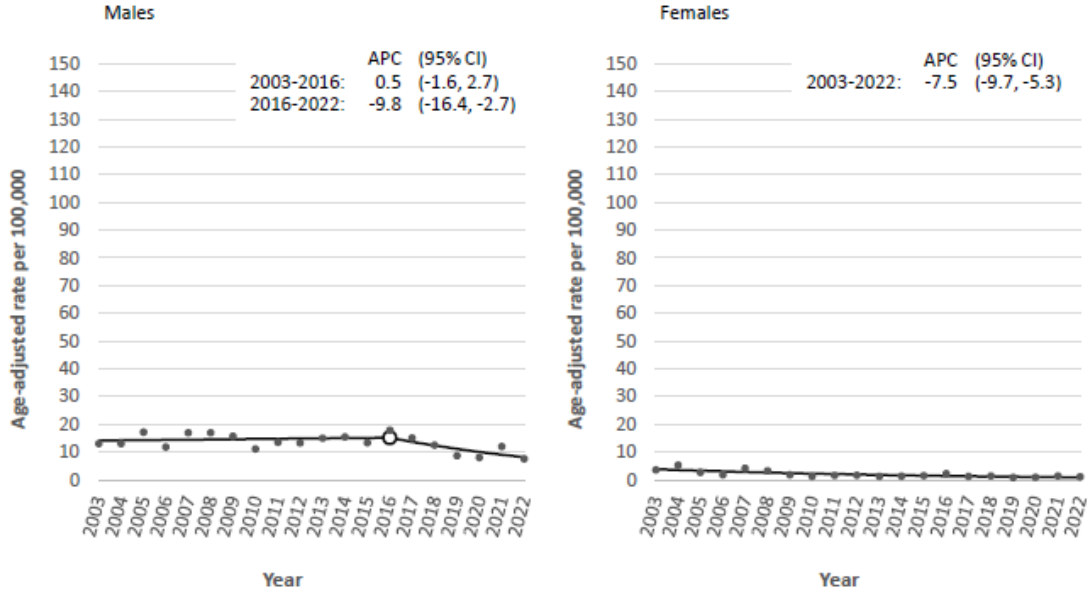
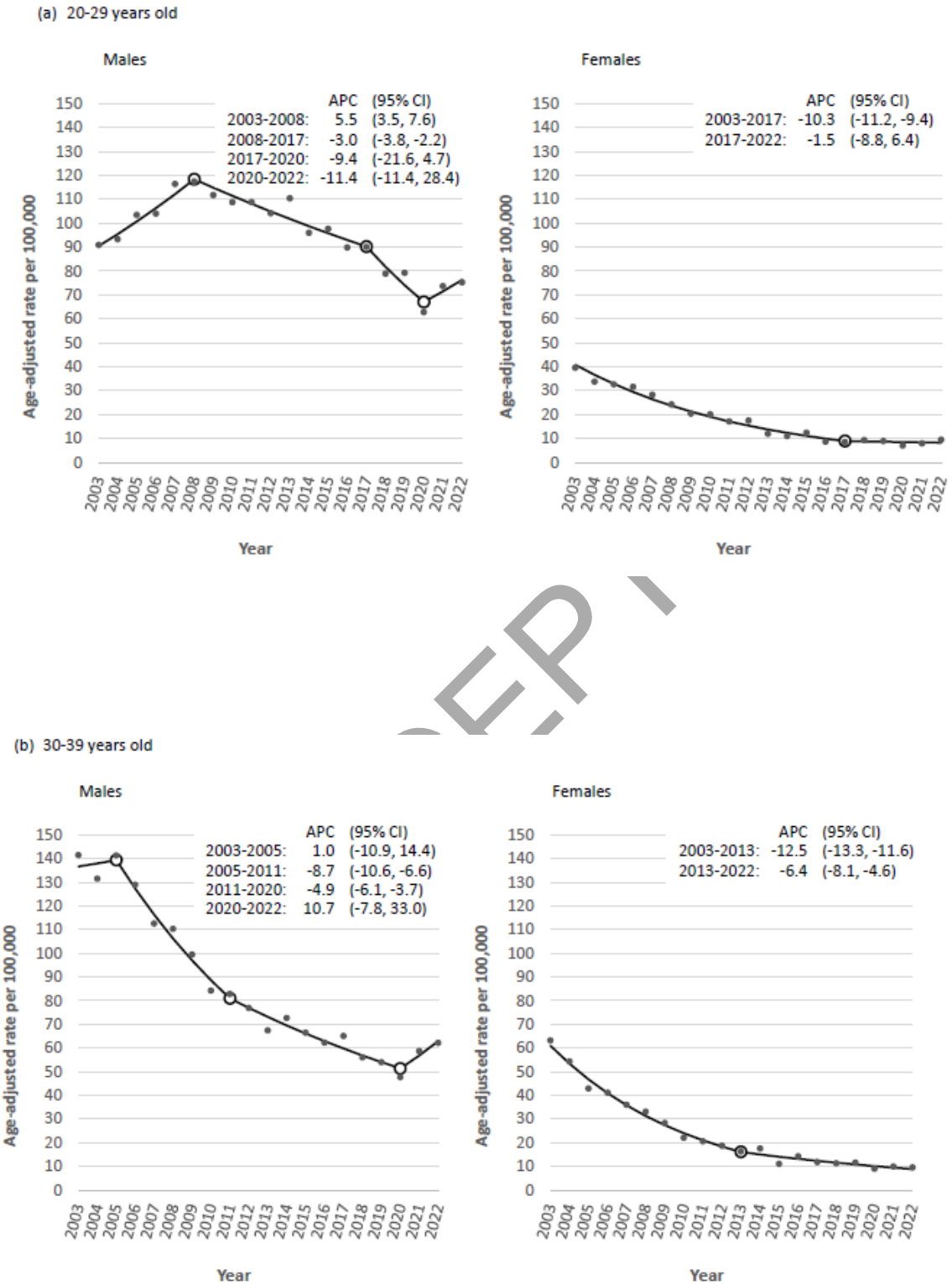
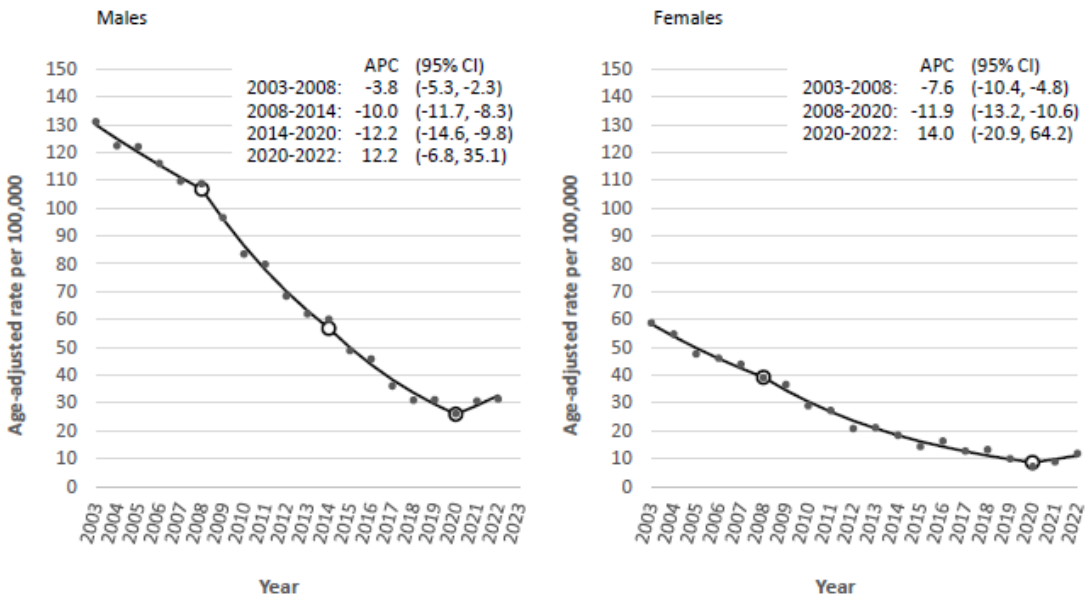


Figure 3. Age-specific HIV diagnosis rate among males and females in New York City, 2003-2022



(c) 40-49 years old



(d) 50-59 years old

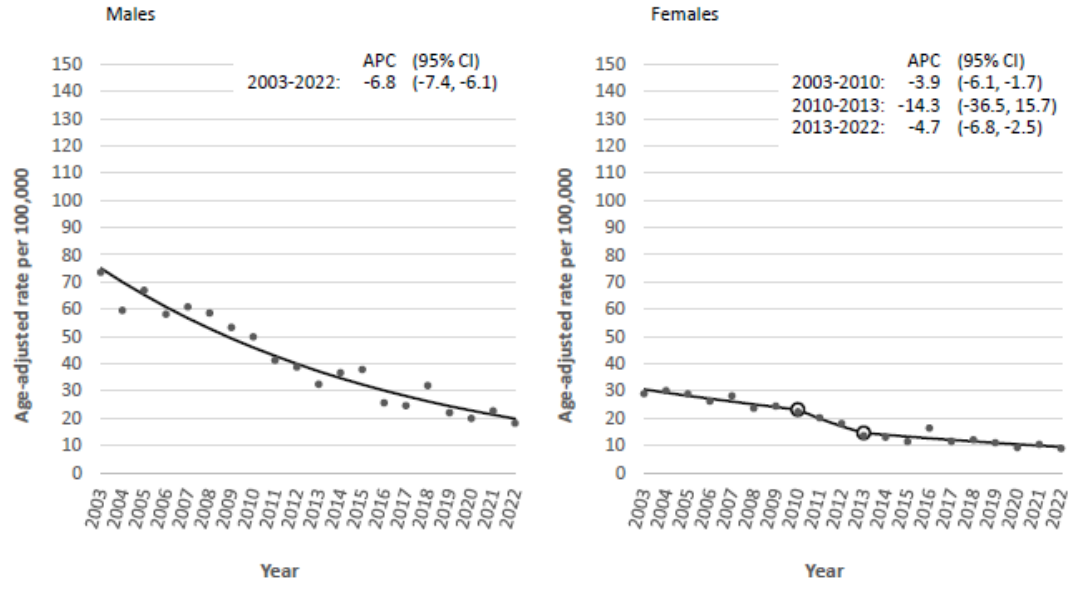
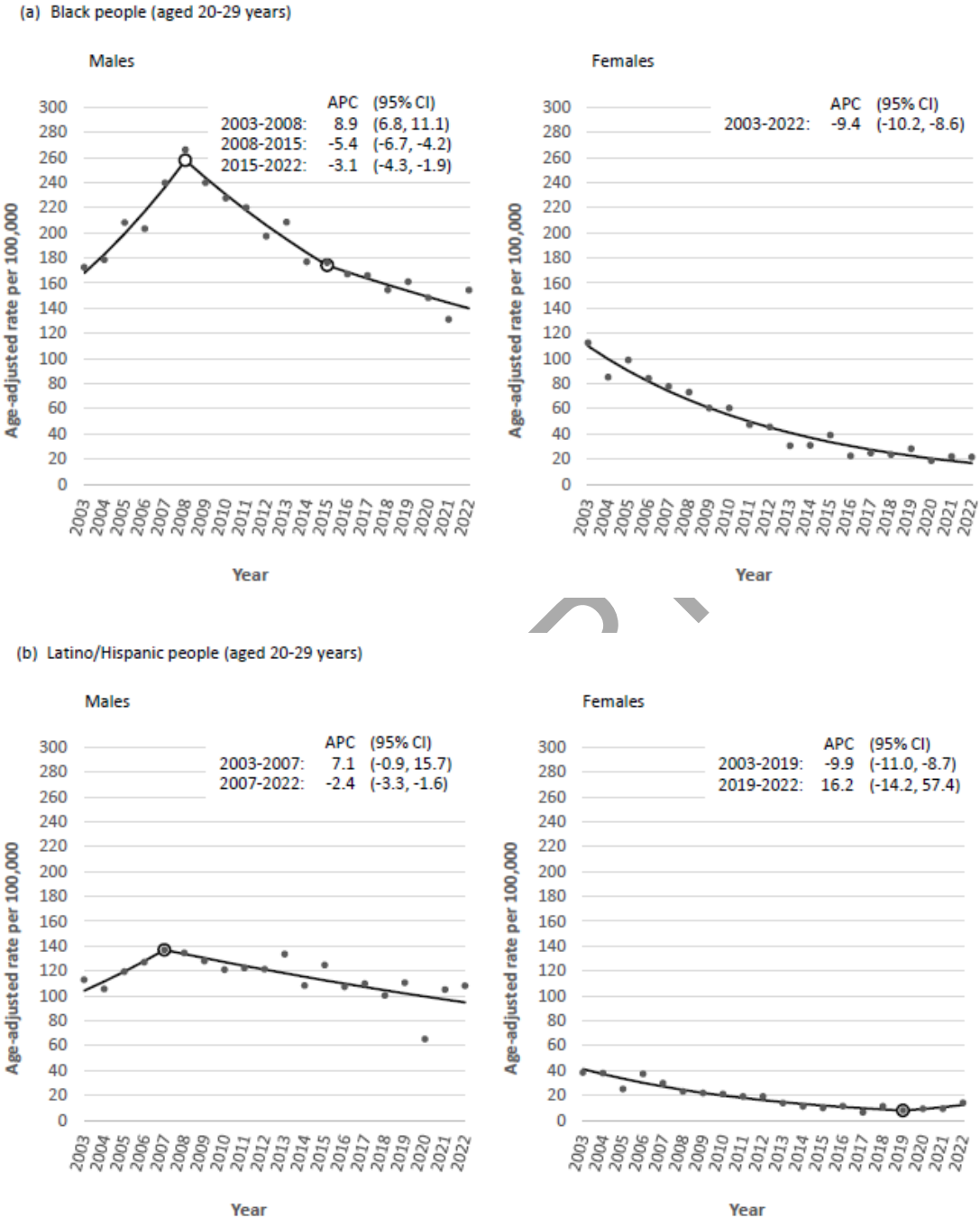
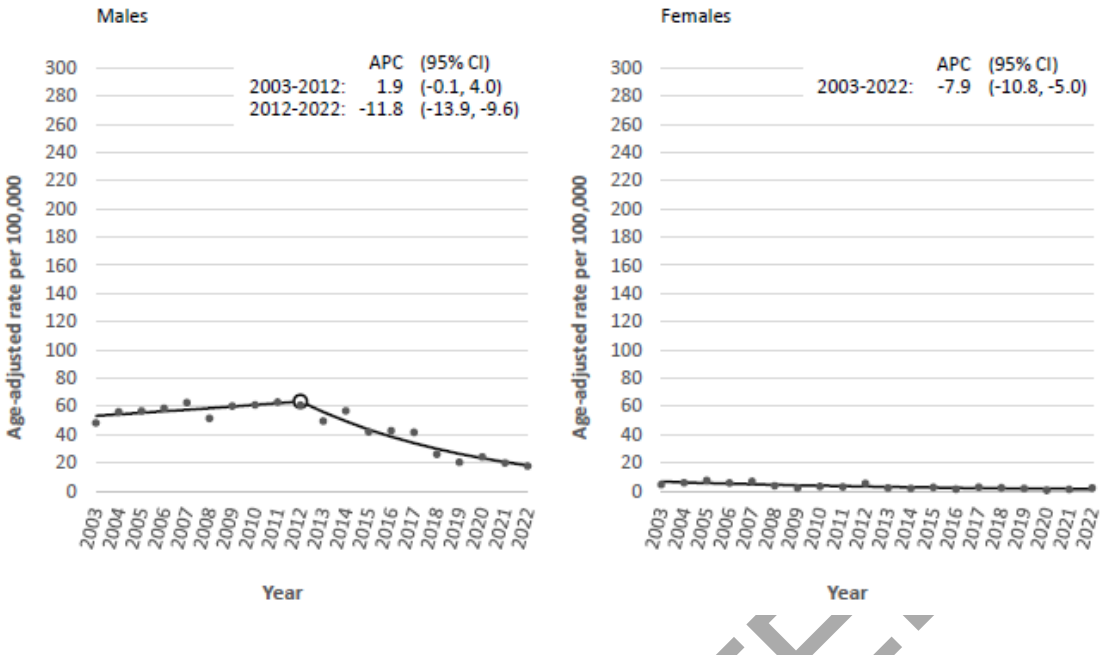


Figure 4. HIV diagnosis rate among males and females aged 20 to 29 years in New York City, 2003-2022



(c) White people (aged 20-29 years)



(d) Asian/Pacific Islander people (aged 20-29 years)

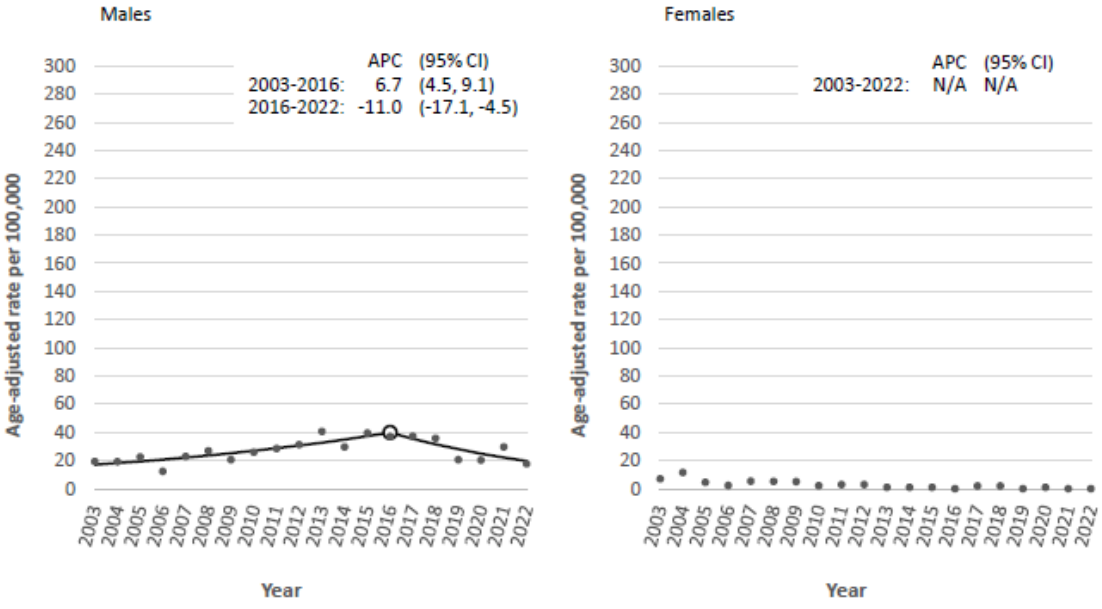


Table 1. Number of people prescribed HIV pre-exposure prophylaxis (PrEP) in New York City, 2014-2022

	2014		2015		2016		2017		2018		2019		2020		2021		2022	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Total	2,551	100.0	6,992	100.0	12,915	100.0	17,961	100.0	23,133	100.0	28,259	100.0	27,696	100.0	31,151	100.0	35,742	100.0
Sex																		
Male	2,285	89.6	6,428	91.9	11,911	92.2	16,574	92.3	21,159	91.5	25,831	91.4	25,421	91.8	28,804	92.5	33,221	92.9
Female	266	10.4	564	8.1	1,004	7.8	1,387	7.7	1,974	8.5	2,428	8.6	2,275	8.2	2,347	7.5	2,521	7.1
Age																		
0-19	26	1.0	54	0.8	132	1.0	231	1.3	335	1.4	361	1.3	304	1.1	301	1.0	377	1.1
20-29	479	18.8	1,759	25.2	3,728	28.9	5,705	31.8	6,809	29.4	7,887	27.9	6,631	23.9	7,568	24.3	8,040	22.5
30-39	1,056	41.4	2,863	40.9	5,131	39.7	6,858	38.2	8,903	38.5	11,137	39.4	11,571	41.8	13,305	42.7	15,675	43.9
40-49	599	23.5	1,432	20.5	2,412	18.7	3,130	17.4	4,138	17.9	5,075	18.0	5,205	18.8	5,723	18.4	6,881	19.3
50-59	296	11.6	702	10.0	1,217	9.4	1,669	9.3	2,345	10.1	2,999	10.6	3,072	11.1	3,231	10.4	3,459	9.7
60+	95	3.7	182	2.6	295	2.3	368	2.0	603	2.6	800	2.8	913	3.3	1,023	3.3	1,310	3.7
Race/ethnicity																		
Black	327	12.8	872	12.5	1,816	14.1	2,603	14.5	3,705	16.0	4,650	16.5	4,416	15.9	4,655	14.9	4,880	13.7
Hispanic	262	10.3	674	9.6	1,237	9.6	1,648	9.2	2,174	9.4	2,805	9.9	2,738	9.9	2,883	9.3	3,821	10.7
White	1,076	42.2	2,940	42.0	5,060	39.2	6,724	37.4	8,515	36.8	10,713	37.9	10,450	37.7	11,677	37.5	12,916	36.1
API	95	3.7	286	4.1	493	3.8	644	3.6	840	3.6	1,160	4.1	1,086	3.9	1,284	4.1	1,432	4.0
Other	71	2.8	228	3.3	392	3.0	532	3.0	659	2.8	870	3.1	810	2.9	992	3.2	1,420	4.0
Missing	720	28.2	1,992	28.5	3,917	30.3	5,810	32.3	7,240	31.3	8,061	28.5	8,196	29.6	9,660	31.0	11,273	31.5

API, Asian/Pacific Islander; HIV, human immunodeficiency virus.

Data source: Symphony Health's Integrated Dataverse (IDV) and the New York State Medicaid Data Warehouse.