CALIFORNIA HIV / AIDS POLICY RESEARCH CENTERS
UCSF Center for AIDS Prevention Studies Division of Prevention Sciences
Berkeley Public Health
ALAMEDA HEALTH SYSTEM

A Decade of PrEP: Overcoming Access Barriers in the U.S. Through Expanded Delivery

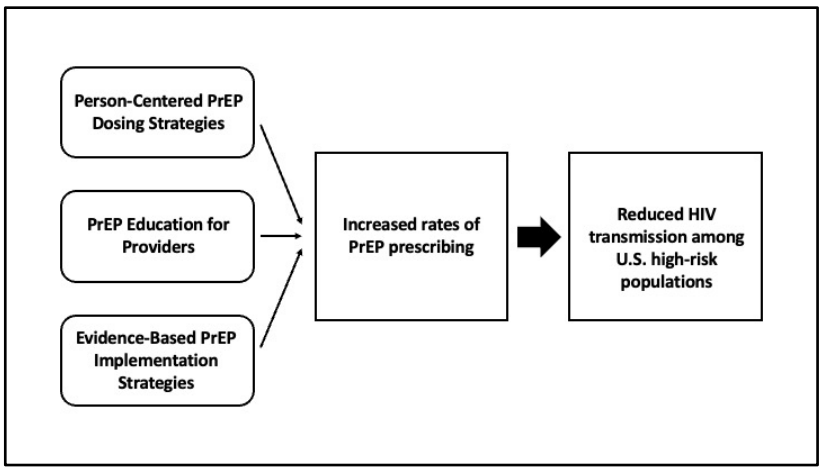
In July 2012, the United States (U.S.) Food and Drug Administration (FDA) approved the first medication for use as HIV pre-exposure prophylaxis (PrEP).[1] For the first time in 40 years, an effective HIV prevention option – in the form of a daily antiviral medication – became available for the millions of Americans at risk for acquiring HIV. The rollout of this highly effective tool meant that contemporary HIV prevention methods could rely on two primary approaches: achieving sustained viral suppression through the use of antiretroviral therapy (ART) for people living with HIV and the use of PrEP among HIV-negative individuals at risk for HIV. Together, these strategies reduce or eliminate the possibility of HIV transmission among individuals potentially vulnerable to HIV.

There are also important social and cultural benefits to PrEP availability. For the millions of gay, bisexual, transgender, and other higher-risk groups living in the U.S. under in the grim shadow cast by an epidemic that began four decades prior, PrEP meant – for the first time – moving past much of the fear, shame, and stigma that accompanied sexual encounters and HIV tests. Consequently, PrEP has become the centerpiece of HIV prevention in the U.S. and some parts of the world. Recent estimates suggest there are approximately one million active PrEP users worldwide as of 2019.[2] While PrEP uptake has increased over time, recent estimates suggest that only 25% of Americans who might benefit from PrEP have been prescribed one of the – now three – combination prescription antiviral medications approved for use as PrEP by the U.S. FDA.[3] More disheartening, rates of PrEP use and PrEP awareness among Black and Latinx men who have sex with men (MSM) remain disproportionately low, while new cases of HIV remain disproportionately high in these populations.[4, 5]

A goal central to the U.S. "Ending the HIV Epidemic" (EHE) initiative is to increase PrEP utilization to at least 50% of the estimated 1.2 million Americans at risk for HIV by 2030.[3,6] In light of the disparities in PrEP prescribing and PrEP access in the U.S., meeting this goal will require changing how both clinicians, healthcare administrators, and policymakers conceptualize HIV prevention and approach PrEP delivery.

PrEP Access: Opportunities and Pitfalls

Following the FDA approval of PrEP in 2012, cost and insurance coverage were initially significant barriers to PrEP uptake. Gilead, the manufacturer and original patent holder of the first combination medication approved for use as PrEP, offered many patients copayment and financial assistance to support patient uptake. Section 2713 of the Affordable Care Act (ACA) contains specific recommendations pertaining to private health plans' coverage for preventative health services that are relevant to patients' use of PrEP as an HIV prevention method.[7] Following the 2019 U.S. Preventative Services Task Force recommendation statement and evidence report granting PrEP an 'A rating' as an HIV prevention strategy, most U.S. health plans were – pursuant to Section 2713 of the ACA – required to cover PrEP with no additional out of pocket cost incurred by plan beneficiaries.[8,9] Unfortunately, however, this decision does not benefit the individuals in the U.S. who might benefit from PrEP and lack prescription insurance coverage.



Although health insurance coverage is integral to PrEP's success as an HIV prevention strategy in the U.S., it is only one piece of the PrEP access conundrum. Even with widespread insurance coverage of PrEP, only a fraction of PrEP-eligible Americans are currently receiving PrEP, but *why*? The answer to this question requires careful examination of a variety of patient, provider, and organizational factors. In order to achieve EHE 2030 goals, we posit that three interrelated processes are essential to increasing PrEP uptake in the U.S.: person-centered PrEP regimens, PrEP education for clinicians, and evidence-based implementation approaches that increase PrEP access (see ***Figure***).

Person-Centered Dosing Strategies and New Routes of Administration

Emtricitabine (FTC)/tenofovir disoproxil fumarate (TDF) or "TDF/FTC" was the first medication approved for use as PrEP in the U.S. When taken as prescribed, several studies have shown that this daily oral regimen is nearly 100% effective in preventing HIV transmission among MSM[10-13] and is also an effective HIV prevention strategy in other high-risk populations.[14-15] However, for some people, a daily PrEP regimen may not be appealing, feasible, and/or practical. While not currently CDC recommended nor FDA approved, trials exploring the efficacy of on-demand or "event driven" oral PrEP dosing strategies appear promising. For example, a 2+1+1 regimen (e.g., taking two TDF/FTC tablets 2-24 hours prior to sexual intercourse and a daily TDF/FTC tablet for two days thereafter) may be an effective HIV prevention strategy among MSM.[16] Event driven PrEP addresses the practical reality that sexual risk is often dynamic, many people can anticipate sexual activity and plan accordingly, and adherence to daily oral therapy can be a challenge. The newest ARV addition to the global HIV prevention toolkit, cabotegravir, is a long-acting injectable administered on a bimonthly schedule.[17] For individuals unlikely or unable to reliably take a daily medication or for whom an on-demand or "event driven" approach to PrEP is not suitable, long-acting injectable cabotegravir might be a more acceptable HIV prevention strategy.

The expanding toolbox of PrEP options increases the likelihood that people at risk for HIV will eventually be able to choose from a "menu" of highly effective PrEP options tailored to their personal needs and preferences. As we have learned from 40 years of the epidemic, HIV prevention - similar to HIV care - is not a one-size-fits-all endeavor; a prevention strategy that works for one individual may be impractical for another individual. With a pipeline of new PrEP formulations on the horizon, providers must remain abreast of the available and emerging PrEP strategies in order to provide patients with HIV prevention option(s) that will be most successful within the context of their day-to-day lives and overall HIV risk.

In addition to the growing number medications and dosing strategies available for patients interested in PrEP, the U.S. CDC (2021) PrEP Clinical Practice Guidelines support same day PrEP prescribing – a strategy poised to further decrease barriers to access and increase patient uptake and convenience.[18] Some patients may face time constraints that make returning to clinic a week or two after an initial evaluation burdensome. To minimize the time between an initial visit, awaiting diagnostic test results, and starting PrEP, these updated clinical practice guidelines support same-day initiation of PrEP in patients for whom same-day HIV and renal function testing is feasible.

Opportunities for Provider Education

Combatting the "Purview Paradox"

While PrEP uptake has increased over time in the U.S., there remains some question about *which* clinicians should be responsible for PrEP prescribing in clinical practice. This phenomenon, referred to as the "purview paradox," was first described by Krakower (2014) and refers to ambiguity surrounding which providers should or could screen patients for PrEP eligibility and prescribe PrEP.[19] Infectious disease practitioners likely have the most experience with HIV treatment and prevention, but these providers are in limited supply and it is unreasonable to expect the estimated 9,000 practicing infectious disease physicians in the U.S.[20] could be capable of providing PrEP to the approximately 1.2 million Americans who might benefit.[3]

Viewed through a lens of disease prevention, it might seem that PrEP would be well suited to the primary care setting. Currently, there are more than 120,000 active primary care or internal medicine physicians in the U.S., and disease prevention is a cornerstone of primary care practice.[21] However, some primary care providers – including providers who serve high-risk populations – remain reluctant to approach the topic of PrEP with their patients or start patients on PrEP. Commonly cited reasons for this reluctance include: a lack of knowledge or awareness about PrEP, feeling uncomfortable prescribing a 'new' medicine or discussing HIV risk behaviors with patients, perceived cost and/or insurance coverage, and competing clinical priorities.[22-24] However, while PrEP is currently *far* from universally available in the primary care setting in the U.S, some primary care practices have made a concerted effort to offer PrEP to patients.[25] Some health systems, such as Kaiser Permanente, have integrated PrEP clinics and developed a streamlined referral process to these clinics into their model of care delivery to ensure patients have access to PrEP services.[26] However, there may be opportunities for expanded PrEP access beyond the primary care setting. Some intrepid providers are exploring alternative models for PrEP delivery including in women's health (OB-GYN) clinics,[27] pharmacies, the emergency department (ED),[28] and outpatient substance use treatment centers.[29]

Risk vs. Benefit: Combatting Compensatory Risk

There is a growing body of evidence suggesting that U.S. health care providers might be reluctant to prescribe PrEP due to personally held beliefs pertaining to PrEP and the notion that offering their patients PrEP might somehow encourage patients to engage in or seek out risky sexual behaviors.[30-32]

The notion that individuals alter their behavior(s) or make choices in response to their perceptions of the risk(s) of their actions is known as "compensatory risk."[33,34] Risk compensation theory posits that people may increase risk taking if they are offered an intervention that somehow mitigates perceived risk.[33] In the context of PrEP and HIV prevention, this theory might suggest that offering patients PrEP could encourage greater sexual risk taking as a result of perceived mitigated risk of HIV transmission. However, multiple randomized PrEP efficacy trials have found no self-reported increases in sexual risk-taking among study participants.[35,36] A 2021 retrospective study of self-reported sexual behaviors among MSM found that PrEP use was associated with lower rates of condom use but was not associated with an increased number of sexual partners or substance use.[37] However, recent studies of MSM and transgender women have suggested that rates of bacterial sexually transmitted infections (STI) are higher among PrEP users, while other studies report that PrEP users are at no greater risk for STI transmission following initiation of PrEP.[38-42] Given these inconsistent findings, it is unclear whether and/or how the mitigated risk of HIV offered by PrEP may contribute, if at all, to rising rates of STIs in the U.S., perhaps via declining rates of condom use among PrEP users. There are emerging data to support the notion that the quarterly STI testing required of PrEP users may actually, over time, result in stabilization or even declines in STI rates.[43]

While the presence and magnitude of compensatory risk among PrEP users is unresolved and likely dependent on the population and setting, there is a growing body of evidence suggesting that some U.S. health care providers might be reluctant to prescribe PrEP due to personally held beliefs about sexual risk compensation.[44-46] In some U.S. communities, the deleterious effects of providers' personally held beliefs regarding PrEP may be further magnified by other personal beliefs grounded in homophobia or racism, or both.[47]

For context, providers routinely recommend harm-reduction services and prescribe treatments, medications, or lifestyle modifications to patients for health conditions or behaviors that could carry risk compensatory effects. Providers who object to the provision of PrEP and/or limit access to PrEP jeopardize the health and wellbeing of the communities they serve. Provider bias against PrEP must be addressed via policy change at the institutional level to support practices such as universal PrEP eligibility screening and comprehensive sexual health history taking. Additionally, provider education is necessary to ensure that providers are equipped to have effective and non-judgmental conversations about sensitive topics with their patients.

Implementation Models to Enhance PrEP Access

PrEP Prescribing in Inclusive, Person-Centered Environments

Discussions about HIV and HIV risk typically requires an open dialogue about sensitive, often stigmatized behaviors between patients and their healthcare providers. Fostering this dialogue requires the provision of healthcare services in an environment where patients feel comfortable discussing not only their sexual histories, but other aspects of their identity that might increase their risk for HIV transmission such as injection drug use, sex work, violence, food security, and housing status.

Many of the well-established sexual health and LGBTQIA+ specialty clinics in the U.S., often considered "safe spaces" by members of the LGBTQIA+ community, were early proponents of PrEP, including organizations such as the San Francisco AIDS Foundation (San Francisco), Callen-Lorde (New York City), and the Fenway Institute (Boston). These well-established health centers are typically viewed as safe spaces because they implement best practices for the provision of culturally competent primary and specialty care to the sexual and gender community members they serve.[48]

While LGBTQIA+ community trust is undoubtedly an essential component for the delivery of sexual health and HIV prevention services in this population, it is also important to note that not all individuals at risk for HIV seek out or desire to seek out healthcare in these environments. For example, MSM who are reluctant to disclose their sexuality or who do not identify as MSM despite having sexual encounters with male-identifying persons, may be unlikely to frequent these clinics for fear of being "outed." As such, relegating the provision of PrEP only to these clinical practice environments could risk limiting who has access to this invaluable HIV prevention tool. Ensuring that all people at risk for HIV have access to PrEP means offering PrEP in a diverse range of clinical environments frequented by cisgender, heterosexual individuals *and* specialty practices serving subgroups like LGBTQIA+ community members and persons who inject drugs (PWID).

Telehealth and TelePrEP

The COVID-19 pandemic jettisoned telehealth services into the lives of both healthcare consumers and providers. At the height of the pandemic, virtual care and telehealth visits were among the only methods for receiving routine healthcare services in some settings. Increased institutional support and infrastructure to support telehealth visits, relaxed licensing requirements to provide telehealth services across state lines, and changes to reimbursement policies certainly motivated providers to adopt

telehealth technology amidst the COVID-19 pandemic.[49] Just as telehealth has become more prevalent in many primary care settings and medical subspecialties, telehealth has become a method used to make PrEP available to patients from the comfort of their home or office.

Several internet based providers provide PrEP services remotely via telehealth.[50,51] Unlike the in-office HIV/STI testing typically performed during most in-person PrEP visits, patients evaluated via telehealth are given the option to visit a local laboratory or are sent a home test kit to self-test for HIV and STIs. Patients repeat this process quarterly while they remain on PrEP in accordance with current clinical practice guidelines. Some of these "TelePrEP" services will mail patients' PrEP medication to their homes in discreet packaging, eliminating the need to visit a retail pharmacy in their communities. Taken together, there are many reasons why TelePrEP may be appealing to people at risk for HIV.

At the same time, like all implementation strategies, TelePrEP has limitations. For example, it is unreasonable to expect that all telehealth providers could contract with all third-party insurance providers in the U.S. Thus, not all patients have equal access to this care delivery model. Similar to the financial barriers affecting patients of conventional brick-and-mortar practices, TelePrEP practices might elect to see uninsured patients on a fee-exempt or a reduced, sliding-scale fee schedule; however, the cost of medication and quarterly HIV testing remain barriers to PrEP access. In addition, sexual and gender minority individuals, transgender and gender non-conforming individuals in particular, are disproportionately affected by poverty and homelessness in the U.S. These individuals may not have access to the internet or a private space to have a telehealth visit.[52] While telehealth certainly makes PrEP access more convenient, it is unclear how or if these services connect patients to PrEP who would otherwise not have had access via conventional means (e.g., a primary care provider, STI clinic, LGBTQIA+ specialty practice). Nevertheless, TelePrEP remains a valuable implementation strategy that can expand the reach of PrEP given the convenience and/or discretion associated with this delivery method.

PrEP Access Via Community-Based Pharmacies

Approximately 90% of Americans live within five miles of at least one pharmacy.[53] This is, at least in part, why retail pharmacies have become popular venues for preventative care services, such as immunizations. Recognizing the need for increased PrEP access, as of 2021, legislation has been passed or introduced in at least 11 U.S. states that would allow pharmacists the ability to dispense a defined quantity of PrEP medication to a patient – covered by third-party prescription coverage, if applicable – without a physician prescription.[54] For example, signed into law in California in October 2019, SB 159 allows California pharmacists to dispense PrEP for 60 days and post-exposure prophylaxis (PEP) to patients without a prescription.[55] This process extends an existing policy framework granting California pharmacists the ability to dispense hormonal contraception and naloxone hydrochloride without a prescription.

Differentiated PrEP delivery through community pharmacies could be convenient for patients and expand PrEP access to individuals who might otherwise not know about or have access to PrEP when provided in primary care. However, there may be impediments to the successful implementation of this PrEP model that might negatively affect the ability of pharmacists to provide PrEP to patients who would benefit. Among the most significant barriers to initiating PrEP in a retail pharmacy environment are the staffing needs, resources, and time required to screen patients for PrEP eligibility and/or perform any necessary HIV testing. Furthermore, these services may or may not be eligible for reimbursement and may not generate revenue. Furthermore, in some communities, there may not be a straightforward referral pathway from the community pharmacist to a prescriber beyond the initial 60-day supply furnished by a pharmacist, heightening concerns about patient support and the prospects for "prevention effective" use.

PrEP… In the Emergency Department?

The emergency department (ED) has emerged as an important venue for disease screening and prevention initiatives in some U.S. healthcare facilities – particularly since many Americans do not have an established relationship with a primary care provider and, as of 2021, nearly one in 10 Americans lack health insurance coverage.[56] With respect to HIV, a number of EDs across the U.S. have adopted an "opt-out" approach to HIV screening,[57,58] which is a well-documented strategy to identify people with undiagnosed HIV infection and to link or re-link people living with HIV to care. In this model, all patients (or patients meeting specific criteria) who undergo a blood draw in the context of their ED visit undergo serologic testing for HIV. Opt-out HIV screening has proven to be an effective strategy to diagnose HIV infections in ED populations, which serve many patients who may not have access to routine preventative healthcare services or who would not otherwise independently seek out HIV screening.[58]

In EDs with HIV testing and linkage-to-care programs, PrEP screening and delivery is a logical programmatic expansion for people at risk of HIV who are HIV-uninfected. A recent systematic review conducted by Gormley and colleagues (2022) suggests that several U.S. EDs have trialed PrEP initiatives.[27] Interestingly, many of these programs adopted different patient screening criteria for PrEP candidacy. For example, some studies included in the review relied on a personal history of a recent STI to be considered for a PrEP referral; very few studies in this review screened for risk factors such as sex work or having a person living with HIV or a PWID as a sexual partner. No studies examined PrEP initiation on the same day of an ED visit. All EDs with PrEP initiatives in the Gormley et al. (2022) review identified a large proportion of patients they screened to be at high risk for HIV acquisition and to be eligible for PrEP, demonstrating the potential value of the approach.

The provision of PrEP in the ED faces several implementation challenges that could undermine organizational and ED providers' willingness to adopt this strategy. Emergency medicine providers' knowledge and familiarity with PrEP is one such limiting factor. However, other factors that might limit the ability to provide PrEP in this fast-paced clinical setting include: the lack of efficient, reliable PrEP screening tools, a lack of requisite laboratory data (as many PrEP-eligible patients may not have baseline labs, including renal function, available), and a lack of reliable, established referral networks for patients to follow-up with for PrEP continuation.

Most EDs have established infrastructure for contacting patients about diagnostic test results and placing aftercare referrals. Leveraging this existing infrastructure to connect patients to PrEP services could make the ED a viable setting to reaching a population that may or may not have health insurance or access to routine medical care and, as a result, may not otherwise be offered PrEP. Conversely, there are established barriers to patient follow-up following an ED visit; one recent study found that nearly 30% of patients evaluated in U.S. EDs lacked follow-up one month after being evaluated.[59] In this regard, discharging patients with an established HIV risk from the ED with a prescription for PrEP (e.g., same-day PrEP) without a reliable follow-up plan or scheduled follow-up appointment may limit the success and feasibility of initiating PrEP in the ED.

Conclusions

PrEP is a highly effective HIV prevention strategy that has gained significant attention from many Americans at risk for HIV. However, we are still far from connecting all Americans who might benefit from PEP to PrEP services. Disparities persist among high-risk subgroups that have less access to healthcare services and, in turn, less access to PrEP due to a constellation of personal and structural factors. HIV prevention science is a dynamic field with new HIV prevention methods and additional PrEP trials underway; person-centered PrEP formulations and strategies such as event-driven PrEP or injectable PrEP may further mitigate some individual level factors such as adherence among PrEP users. Institutional and

structural level factors such as TelePrEP, expanded venues for PrEP initiation, provider education, and some of the other innovative approaches to PrEP delivery presented could improve patient access to PrEP in the U.S. and should be the focus of future implementation science research.

About the Authors

Kristopher Jackson, PhD, MSN (kristopher.jackson@ucsf.edu) is a Postdoctoral Fellow at the Center for AIDS Prevention Studies (CAPS) at the University of California, San Francisco.

Sandra McCoy, PhD, MPH (smccoy@berkeley.edu) is a Professor of Epidemiology at the University of California, Berkeley School of Public Health.

Douglas White, MD (dwhite@alamedahealthsystem.org) is an Emergency Medicine physician, Assistant Residency Director, and Director of HIV Screening at Highland Hospital in Oakland, CA.

Disclaimer: This brief was prepared by the authors in a personal capacity. The opinions expressed in this article are the authors and do not necessarily reflect the views of their affiliated institutions or employers.

References

1. U.S. Food and Drug Administration (2012, July 16). *FDA approves drug for HIV prevention*. [Press release]. https://www.cdc.gov/nchhstp/newsroom/2012/fda-approvesdrugstatement.html

2. Schaefer, R., Schmidt, H.-M. A., Ravasi, G., Mozalevskis, A., Rewari, B. B., Lule, F., Yeboue, K., Brink, A., Mangadan Konath, N., Sharma, M., Seguy, N., Hermez, J., Alaama, A. S., Ishikawa, N., Dongmo Nguimfack, B., Low-Beer, D., Baggaley, R., & Dalal, S. (2021). Adoption of guidelines on and use of oral pre-exposure prophylaxis: a global summary and forecasting study. *The Lancet HIV*, 8(8). e502–e510). https://doi.org/10.1016/s2352-3018(21)00127-2

3. U.S Centers for Disease Control and Prevention (2021, November 23). PrEP for HIV Prevention in the U.S. Retrieved from: https://www.cdc.gov/nchhstp/newsroom/fact-sheets/hiv/PrEP-for-hiv-prevention-in-the-US-factsheet.html

4. Kanny, D., Jeffries, W. L., IV, Chapin-Bardales, J., Denning, P., Cha, S., Finlayson, T., Wejnert, C., Abrego, M., Al-Tayyib, A., Anderson, B., Barak, N., Beckford, J. M., Bolden, B., Brady, K. A., Brandt, M.-G., Brantley, M., Braunstein, S., Buyu, C., … Cano, R. (2019). Racial/Ethnic disparities in HIV preexposure prophylaxis among men who have sex with men — 23 urban areas, 2017. *Morbidity and Mortality Weekly Report*, *68* (37), pp. 801–806). https://doi.org/10.15585/mmwr.mm6837a2

5. U.S. Centers for Disease Control and Prevention (2020, May 7). Diagnoses of HIV infection in the United States and dependent areas, 2018: Gay, bisexual, and other men who have sex with men. Retrieved from: https://www.cdc.gov/hiv/library/reports/hiv-surveillance/vol-31/content/msm.html#race

6. U.S. Centers for Disease Control and Prevention. (2022, June 13). Ending the HIV Epidemic in the U.S. Retrieved from: https://www.cdc.gov/endhiv/prevent.html

7. Kaiser Family Foundation. (2022, October 26). Preventive services covered by private health plans under the Affordable Care Act. Retrieved from: https://www.kff.org/health-reform/fact-sheet/preventive-services-covered-by-private-health-plans/

8. United States Preventive Services Task Force. (2019, June 11). Prevention of Human Immunodeficiency Virus (HIV) Infection: Preexposure prophylaxis. Retrieved from: https://www.uspreventiveservicestaskforce.org/uspstf/document/RecommendationStatementFinal/prevention-of-human-immunodeficiency-virus-hiv-infection-pre-exposure-prophylaxis

9. Keith, K. (2021, July 28). New guidance on PrEP: Support services must be covered without cost-sharing. *Health Affairs.* Retrieved from: http://healthaffairs.org/do/10.1377/forefront.20210728.333084/

10. Grant, R. M., Anderson, P. L., McMahan, V., Liu, A., Amico, K. R., Mehrotra, M., Hosek, S., Mosquera, C., Casapia, M., Montoya, O., Buchbinder, S., Veloso, V. G., Mayer, K., Chariyalertsak, S., Bekker, L.-G., Kallas, E. G., Schechter, M., Guanira, J., Bushman, L., … Glidden, D. V. (2014). Uptake of pre-exposure prophylaxis, sexual practices, and HIV incidence in men and transgender

women who have sex with men: A cohort study. *Lancet Infectious Diseases, 14*(9), 820–829. https://doi.org/10.1016/s1473-3099(14)70847-3

11. Liu, A. Y., Cohen, S. E., Vittinghoff, E., Anderson, P. L., Doblecki-Lewis, S., Bacon, O., Chege, W., Postle, B. S., Matheson, T., Amico, K. R., Liegler, T., Rawlings, M. K., Trainor, N., Blue, R. W., Estrada, Y., Coleman, M. E., Cardenas, G., Feaster, D. J., Grant, R., … Kolber, M. A. (2016). Preexposure prophylaxis for HIV infection integrated with municipal- and community-based sexual health services. *JAMA Internal Medicine, 76*(1), 75.

12. McCormack, S., Dunn, D. T., Desai, M., Dolling, D. I., Gafos, M., Gilson, R., Sullivan, A. K., Clarke, A., Reeves, I., Schembri, G., Mackie, N., Bowman, C., Lacey, C. J., Apea, V., Brady, M., Fox, J., Taylor, S., Antonucci, S., Khoo, S. H., … Gill, O. N. (2016). Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): Effectiveness results from the pilot phase of a pragmatic open-label randomised trial. *Lancet, 387*(10013), 53–60. https://doi.org/10.1016/s0140-6736(15)00056-2

13. Volk, J. E., Marcus, J. L., Phengrasamy, T., Blechinger, D., Nguyen, D. P., Follansbee, S., & Hare, C. B. (2015). No new HIV infections with increasing use of HIV preexposure prophylaxis in a clinical practice setting. *Clinical Infectious Diseases, 61*(10), 1601–1603. https://doi.org/10.1093/cid/civ778

14. Choopanya, K., Martin, M., Suntharasamai, P., Sangkum, U., Mock, P. A., Leethochawalit, M., Chiamwongpaet, S., Kitisin, P., Natrujirote, P., Kittimunkong, S., Chuachoowong, R., Gvetadze, R. J., McNicholl, J. M., Paxton, L. A., Curlin, M. E., Hendrix, C. W., Vanichseni, S., & Bangkok Tenofovir Study Group (2013). 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*, *381*(9883), 2083–2090. https://doi.org/10.1016/S0140-6736(13)61127-7

15. Martin, M., Vanichseni, S., Suntharasamai, P., Sangkum, U., Mock, P. A., Leethochawalit, M., Chiamwongpaet, S., Curlin, M. E., Na-Pompet, S., Warapronmongkholkul, A., Kittimunkong, S., Gvetadze, R. J., McNicholl, J. M., Paxton, L. A., Choopanya, K., & Bangkok Tenofovir Study Group (2015). The impact of adherence to preexposure prophylaxis on the risk of HIV infection among people who inject drugs. *AIDS, 29*(7), 819–824. https://doi.org/10.1097/QAD.0000000000000613

16. Molina, J.-M., Ghosn, J., Assoumou, L., Delaugerre, C., Algarte-Genin, M., Pialoux, G., Katlama, C., Slama, L., Liegeon, G., Beniguel, L., Ohayon, M., Mouhim, H., Goldwirt, L., Spire, B., Loze, B., Surgers, L., Pavie, J., Lourenco, J., Ben-Mechlia, M., … Costagliola, D. (2022). Daily and on-demand HIV pre-exposure prophylaxis with emtricitabine and tenofovir disoproxil (ANRS PREVENIR): A prospective observational cohort study. *Lancet HIV, 9*(8), e554–e562. https://doi.org/10.1016/s2352-3018(22)00133-3

17. U.S. Food and Drug Administration (2021, December 20). *FDA approves first injectable treatment for HIV pre-exposure prevention*. [Press release]. https://www.fda.gov/news-events/press-announcements/fda-approves-first-injectable-treatment-hiv-pre-exposure-prevention

18. Centers for Disease Control [CDC]. (2021). Preexposure prophylaxis for the prevention of HIV infection in the United States. Retrieved from: https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2021.pdf

19. Krakower, D., Ware, N., Mitty, J. A., Maloney, K., & Mayer, K. H. (2014). HIV providers' perceived barriers and facilitators to implementing pre-exposure prophylaxis in care settings: a qualitative study. *AIDS and Behavior*, *18*(9), 1712-1721.

20. Hussaini, S. M. Q. (2020). Dearth of infectious diseases physicians as the USA faces a global pandemic. *The Lancet Infectious Diseases, 20*(6), 648–649. https://doi.org/10.1016/s1473-3099(20)30377-7

21. American Association of Medical Colleges [AAMC]. (2021). 2020 Physician Specialty Data Report [Executive summary]. Retrieved from: https://www.aamc.org/media/50476/download?attachment

22. Henny, K. D., Duke, C. C., Geter, A., Gaul, Z., Frazier, C., Peterson, J., Buchacz, K., & Sutton, M. Y. (2019). HIV-Related Training and Correlates of Knowledge, HIV Screening and Prescribing of nPEP and PrEP Among Primary Care Providers in Southeast United States, 2017. *AIDS and Behavior*, *23*(11), 2926–2935. https://doi.org/10.1007/s10461-019-02545-1

23. Turner, L., Roepke, A., Wardell, E., & Teitelman, A. M. (2018). Do you PrEP? A review of primary care provider knowledge of PrEP and attitudes on prescribing PrEP. *Journal of the Association of Nurses in AIDS Care, 29*(1), 83–92. https://doi.org/10.1016/j.jana.2017.11.002

24. Wilson, K., Bleasdale, J., & Przybyla, S. M. (2021). Provider-patient communication on pre-exposure prophylaxis (PrEP) for HIV prevention: An exploration of healthcare provider challenges. *Health Communication, 36*(13), 1677-1686.

25. Konstantinovsky, M. (2014, Nov 14). Can PrEP prevent HIV infection? *One Medical.* Retrieved from: https://www.onemedical.com/blog/newsworthy/prep-hiv-prevention/

26. Kaiser Permanente. (2022). HIV care and prevention. Retrieved from: https://thrive.kaiserpermanente.org/care-near-you/northern-california/sanfrancisco/departments/hiv-care-and-prevention/

27. American College of Obstetricians and Gynecologists. (2022, June). Preexposure prophylaxis for the treatment of Human Immunodeficiency Virus. Retrieved from: https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2022/06/preexposure-prophylaxis-for-the-prevention-of-human-immunodeficiency-virus

28. Gormley, M. A., Nagy, T. R., Moschella, P., Lu, Z., Rodriguez, J., & Roth, P. (2022). HIV preexposure prophylaxis in the emergency department: A systematic review. *Annals of Emergency Medicine*. https://doi.org/10.1016/j.annemergmed.2022.07.015

29. Braun, H. M., Walter, C., Farrell, N., Biello, K. B., & Taylor, J. L. (2022). HIV exposure prophylaxis delivery in a low-barrier substance use disorder bridge clinic during a local HIV outbreak at the

onset of the COVID-19 pandemic. *Journal of Addiction Medicine, 16*(6), 678-683. https://doi.org/10.1097/adm.0000000000000991

30. Karris, M. Y., Beekmann, S. E., Mehta, S. R., Anderson, C. M., & Polgreen, P. M. (2014). Are we prepped for preexposure prophylaxis (PrEP)? Provider opinions on the real-world use of PrEP in the United States and Canada. *Clinical infectious diseases*, *58*(5), 704-712.

31. Krakower, D., Ware, N., Mitty, J. A., Maloney, K., & Mayer, K. H. (2014). HIV providers' perceived barriers and facilitators to implementing pre-exposure prophylaxis in care settings: a qualitative study. *AIDS and Behavior*, *18*(9), 1712-1721.

32. Mayer, K.H., Mimiaga, M.J., VanDerwarker, R., Goldhammer, H., Bradford, J.B. (2007). Fenway Community Health's model of integrated, community-based LGBT care, education, and research. In: Meyer, I.H., Northridge, M.E. (eds) *The Health of Sexual Minorities*. Springer, Boston, MA.

33. Masson, M., Lamoureux, J., & de Guise, E. (2020). Self-reported risk-taking and sensation-seeking behavior predict helmet wear amongst Canadian ski and snowboard instructors. *Canadian Journal of Behavioural Science, 52*(2), 121–130. https://doi.org/10.1037/cbs0000153

34. Thompson, D., Thompson, R. & Rivara, F. (2002). Risk compensation theory should be subject to systematic reviews of the scientific evidence. *Injury Prevention, 8*(e1), 1-7. https://injuryprevention.bmj.com/content/injuryprev/8/2/e1.full.pdf

35. Marcus, J. L., Glidden, D. V., Mayer, K. H., Liu, A. Y., Buchbinder, S. P., Amico, K. R., McMahan, V., Kallas, E. G., Montoya-Herrera, O., Pilotto, J., & Grant, R. M. (2013). No evidence of sexual risk compensation in the iPrEx trial of daily oral HIV preexposure prophylaxis, *PLoS ONE*, 8(12), e81997. https://doi.org/10.1371/journal.pone.0081997

36. Sagaon-Teyssier, L., Suzan-Monti, M., Demoulin, B., Capitant, C., Lorente, N., Préau, M., Mora, M., Rojas Castro, D., Chidiac, C., Chas, J., Meyer, L., Molina, J. M., Spire, B., & ANRS IPERGAY Study Group (2016). Uptake of PrEP and condom and sexual risk behavior among MSM during the ANRS IPERGAY trial. *AIDS Care*, *28*, 48–55. https://doi.org/10.1080/09540121.2016.1146653

37. Ayerdi Aguirrebengoa, O., Vera García, M., Arias Ramírez, D., Gil García, N., Puerta López, T., Clavo Escribano, P., Ballesteros Martín, J., Lejarraga Cañas, C., Fernandez Piñeiro, N., Fuentes Ferrer, M. E., García Lotero, M., Hurtado Gallegos, E., Raposo Utrilla, M., Estrada Pérez, V., Del Romero Guerrero, J., & Rodríguez Martín, C. (2021). Low use of condom and high STI incidence among men who have sex with men in PrEP programs. *Plos One, 16*(2). https://doi.org/10.1371/journal.pone.0245925

38. Chemtob, D., Weil, C., Hannink Attal, J., Hawila, E., & Noff Sadeh, E. (2021). HIV Pre-Exposure Prophylaxis (PrEP) purchase patterns and STI occurrence among Israeli men: A cohort analysis. In S. S. Lee (Ed.), *PLoS ONE, 16*(11), e0259168. https://doi.org/10.1371/journal.pone.0259168

39. McManus, H., Grulich, A. E., Amin, J., Selvey, C., Vickers, T., Bavinton, B., Zablotska, I., Vaccher, S., Jin, F., Holden, J., Price, K., Yeung, B., Cabrera Quichua, G., Ogilvie, E., McNulty, A., Smith, D., & Guy, R. (2020). Comparison of trends in rates of sexually transmitted infections before vs after

initiation of HIV preexposure prophylaxis among men who have sex with men. *JAMA Network Open*, *3*(12), e2030806. https://doi.org/10.1001/jamanetworkopen.2020.30806

40. MontaV±o, M. A., Dombrowski, J. C., Dasgupta, S., Golden, M. R., Manhart, L. E., Barbee, L. A., Duerr, A., & Khosropour, C. M. (2019). Differences in sexually transmitted infection risk comparing preexposure prophylaxis users and propensity score matched historical controls in a clinic setting. *AIDS*, 33(11), 1773-1780. https://doi.org/10.1097/qad.0000000000002281

41. Morgan, E., Dyar, C., Newcomb, M. E., D'Aquila, R. T., & Mustanski, B. (2019). PrEP use and sexually transmitted infections are not associated longitudinally in a cohort study of young men who have sex with men and transgender women in Chicago. *AIDS and Behavior, 24*(5), 1334-1341. https://doi.org/10.1007/s10461-019-02664-9

42. Psomas, C. K., Penaranda, G., Retornaz, F., Khiri, H., Delord, M., Halfon, P., & Philibert, P. (2022). A cohort analysis of sexually transmitted infections among different groups of men who have sex with men in the early era of HIV pre-exposure prophylaxis in France. *Journal of Virus Eradication, 8*(1), 100065. https://doi.org/10.1016/j.jve.2022.100065

43. Jenness, S. M., Weiss, K. M., Goodreau, S. M., Gift, T., Chesson, H., Hoover, K. W., Smith, D. K., Liu, A. Y., Sullivan, P. S., & Rosenberg, E. S. (2017). Incidence of gonorrhea and chlamydia following Human Immunodeficiency Virus preexposure prophylaxis among men who have sex with men: A modeling study. *Clinical Infectious Diseases*, *65*(5), 712–718. https://doi.org/10.1093/cid/cix439

44. Hakre, S., Blaylock, J. M., Dawson, P., Beckett, C., Garges, E. C., Michael, N. L., ... & Okulicz, J. F. (2016). Knowledge, attitudes, and beliefs about HIV pre-exposure prophylaxis among US Air Force Health Care Providers. *Medicine*, *95*(32).

45. Karris, M. Y., Beekmann, S. E., Mehta, S. R., Anderson, C. M., & Polgreen, P. M. (2014). Are we prepped for preexposure prophylaxis (PrEP)? Provider opinions on the real-world use of PrEP in the United States and Canada. *Clinical infectious diseases*, *58*(5), 704-712.

46. Krakower, D., Ware, N., Mitty, J. A., Maloney, K., & Mayer, K. H. (2014). HIV providers' perceived barriers and facilitators to implementing pre-exposure prophylaxis in care settings: A qualitative study. *AIDS and Behavior*, *18*(9), 1712-1721.

47. Haubrick, K. K., Whiteley, L., Arnold, T., Leigland, A., Ward, L. M., Brock, J. B., & Brown, L. K. (2022). Impact of homophobia and racism on comfort receiving pre-exposure prophylaxis at various locations among black MSM in Mississippi. *AIDS and Behavior*. https://doi.org/10.1007/s10461-022-03918-9

48. Mayer, K.H., Mimiaga, M.J., VanDerwarker, R., Goldhammer, H., Bradford, J.B. (2007). Fenway Community Health's model of integrated, community-based LGBT care, education, and research. In: Meyer, I.H., Northridge, M.E. (eds) *The Health of Sexual Minorities*. Springer, Boston, MA. https://doi.org/10.1007/978-0-387-31334-4_28

49. U.S. Department of Health and Human Services. (2022, October 13). For providers. Retrieved from: https://telehealth.hhs.gov/providers/

50. Nurx. (2022). PrEP. Retrieved from: https://www.nurx.com/prep/

51. Mistr. (2022). Mistr – Prescribed online, delivered to your door. Retrieved from: https://heymistr.com/

52. Hamnvik, O. P. R., Agarwal, S., AhnAllen, C. G., Goldman, A. L., & Reisner, S. L. (2022). Telemedicine and inequities in health care access: The example of transgender health. *Transgender Health*, *7*(2), 113-116.

53. Chiara, A. (2019, March 26). The expanding role of pharmacists: A positive shift for health care. *Commonwealth Medicine.* Retrieved from: https://commed.umassmed.edu/blog/2019/03/26/expanding-role-pharmacists-positive-shift-health-care

54. National Alliance of State & Territorial AIDS Directions [NASTAD]. (2021, November). Pharmacist-initiated PrEP and PEP. NASTAD. Retrieved from: https://nastad.org/sites/default/files/2021-11/PDF-Pharmacist-Initiated-PrEP-PEP.pdf

55. California Pharmacists Association. (2019, October 8). SB 159 (Wiener) PrEP & PEP - Pharmacists' Authority to Furnish. Retrieved from: https://cpha.com/wp-content/uploads/2019/10/PrEP-PEP-Fact-Sheet-10-8-2019.pdf

56. Cohen, R., Martinez, M., Cha, A., & Terlizzi, E. (2021). Health insurance coverage: Early release of estimates from the National Health Interview Survey, January–June 2021. National Center for Health Statistics (U.S.). https://doi.org/10.15620/cdc:110854

57. Menon, A. A., Nganga-Good, C., Martis, M., Wicken, C., Lobner, K., Rothman, R. E., & Hsieh, Y. H. (2016). Linkage-to-care methods and rates in US emergency department–based HIV testing programs: A systematic literature review brief report. *Academic Emergency Medicine*, *23*(7), 835-842.

58. Haukoos, J. S., White, D. A., Lyons, M. S., Hopkins, E., Calderon, Y., Kalish, B., ... & National Emergency Department HIV Testing Consortium. (2011). Operational methods of HIV testing in emergency departments: A systematic review. *Annals of emergency medicine*, *58*(1), S96-S103.

59. Lin, M. P., Burke, R. C., Orav, E. J., Friend, T. H., & Burke, L. G. (2020). Ambulatory follow-up and outcomes among Medicare beneficiaries after emergency department discharge. *JAMA Network Open*, 3(10), e2019878. https://doi.org/10.1001/jamanetworkopen.2020.19878