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Using a Structural-Ecological Model to Facilitate Adoption of Preexposure Prophylaxis Among Latinx Sexual Minority Men: A Systematic Literature Review

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Abstract

Research has consistently shown that individual, interpersonal, community and structural factors influence the degree to which individuals' access and utilize health care services, and these factors may play a role in explaining racial and ethnic differences in health care outcomes. Differences in HIV prevalence and treatment between Latinx adults and white adults in the U.S. must be considered in the context of these factors. However, much of the existing research connecting these factors and HIV/AIDS outcomes in Latinxs remains disparate, limited in scope, and has yet not been applied to the use of biomedical HIV preventions. The following systematic literature review examined research related to PrEP in Latinx sexual minority men (SMM) to build a structural-ecological framework of the existing research, while identifying gaps in the literature and areas for future research. We searched two electronic databases using a systematic review protocol, screened 71 unique records, and identified 23 articles analyzing data from Latinx SMM and intended and/or actual PrEP-use in the United States. Based on the present review, disparities in PrEP uptake by Latinx SMM could be explained, in part, by examining how all levels of the structural-ecological framework uniquely contributes to how Latinx SMM engage with HIV prevention measures and come to understand PrEP. It is clear from the existing literature base that some of the most prominent barriers deterring Latinx SMM from seeking PrEP services are the lack of information surrounding PrEP and HIV/gay stigmas. However, higher order structural-level risks can facilitate or reduce access to PrEP. We propose a structural-ecological model to help visualize multi-level domains of unique stressors that limit the implementation of PrEP among Latinxs. At this stage, the available literature provides little guidance beyond suggesting that culturally adapted interventions can be effective in this population. The model developed here

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provides that needed specificity regarding targeted interventions that will fit the needs of this population.

Abstract

Las investigaciones han demostrado sistemáticamente que los factores individuales, interpersonales, comunitarios y estructurales influyen en el grado en que las personas acceden y utilizan los servicios de atención médica. Estos factores pueden ayudar a explicar las consecuencias diferenciadas por raza y etnia. Las diferencias en la prevalencia y el tratamiento del VIH entre Latinxs y blancos en los Estados Unidos deben considerarse en el contexto de estos factores. Sin embargo, gran parte de la investigación existente que conecta estos factores y los resultados del VIH/SIDA en los Latinxs sigue siendo dispar, de alcance limitado y aún no se ha aplicado al uso de la prevención biomédica del VIH. La siguiente revisión sistemática de la literatura examinó la investigación relacionada con la PrEP en hombres Latinxs de minorías sexuales (SMM) para construir un marco estructural-ecológico de la investigación existente, al tiempo que identifica brechas en la literatura y áreas para futura investigación. Se realizaron búsquedas en dos bases de datos electrónicas mediante un protocolo de revisión sistemática, se seleccionaron 71 registros únicos y se identificaron 23 artículos que analizaban datos de Latinx SMM y el uso intencionado y/o real de la PrEP en los Estados Unidos. Según la presente revisión, las disparidades en la adopción de la PrEP por Latinx SMM podrían explicarse, en parte, examinando cómo todos los niveles del marco ecológico contribuyen de manera única a cómo los Latinx SMM se involucran con las medidas de prevención del VIH y llegan a comprender la PrEP. De la literatura existente, se desprende claramente que algunas de las barreras más importantes que disuaden a los Latinx SMM de buscar servicios de PrEP son la falta de información sobre la PrEP y los estigmas del VIH y por orientación sexual. Sin embargo, los riesgos de orden superior a nivel estructural pueden facilitar o reducir el acceso a la PrEP. Proponemos un modelo ecológico-estructural para ayudar a visualizar dominios multinivel de factores estresantes únicos que limitan la implementación de PrEP entre Latinxs. Hasta el momento, la literatura disponible proporciona poca orientación más allá de sugerir que las intervenciones para prevención adaptadas culturalmente pueden ser efectivas en esta población. El modelo desarrollado en el presente trabajo proporciona la especificidad necesaria con respecto a las intervenciones específicas que se ajustarán a las necesidades de esta población.

Keywords

PrEP; HIV/AIDS; Latinx; Public Health

Introduction

HIV is a significant public health concern affecting Latinos/Hispanics (henceforth: Latinxs) in the U.S., with infection rates three times higher than among non-Hispanic Whites (Rao et al., 2016). According to recent epidemiological survey by the Centers for Disease Control and Prevention, Latinxs comprise 26% (10,292) of the 40,324 new HIV diagnoses in the U.S. (CDC, 2017). Sexual minority men (SMM) are at particularly high risk for infection, and Latinx SMM comprise nearly 19% of infection rates among all sexual minorities (CDC, 2017). Among all Latinxs diagnosed with HIV, Latinx SMM represent

81% of new infections. Once infected, Latinxs also experience disproportionately poorer clinical outcomes compared with non-Hispanic Whites (Levinson et al., 2018). In particular, predominantly Spanish-speaking Latinx SMM are at increased risk for HIV infection (Johnson et al., 2002). Despite important advances in behavioral and biomedical treatment to prevent HIV infection, HIV rates among Latinx SMM continue to rise. Between 2010 and 2015, the incidence rate of HIV infection increased by 21.5% for Latinx SMM, decreased by 13.4% for White SMM, and remained stable for Black SMM (CDC, 2018).

Today, one of the most effective and innovative HIV prevention tools available is Pre-exposure prophylaxis (PrEP). PrEP involves the use of antiretroviral medications among persons who are currently HIV-uninfected, but at risk for HIV infection. Currently, the only HIV PrEP regimen supported by the CDC (2020) is once-daily use and regular clinical follow-up. However, recent international PrEP guidelines and the International Antiviral Society-USA recommend that gay and other SMM may consider an alternative option for on-demand PrEP dosing (Saag et al., 2018). On-demand PrEP offers the advantage of a lower pill burden than daily PrEP, with potential benefits that include lower financial cost and fewer adverse effects (Cornelisse et al., 2019). Nonetheless, the effectiveness of once-daily use and PrEP on-demand is dependent on identifying key barriers to and facilitators of PrEP use.

It is estimated that there is up to 99% reduction in HIV risk for HIV-negative individuals who take the medication daily, as directed (Grant et al., 2010). In 2012, the CDC recommended that individuals at substantial risk for HIV infection consider using PrEP. This can include individuals who have HIV-positive sex partners, men who have sex with men, and individuals who practice commercial sex work (see 2012 CDC report for PrEP fact sheet for complete recommendations). While there have been some notable successes in PrEP implementation, uptake among Latinx SMM is considerably lower compared to non-Hispanic Whites (Holloway et al., 2017; Kuhns et al., 2018). Research on factors associated with PrEP awareness, uptake, and adherence is urgently needed among Latinx SMM to reduce their heightened risk for HIV. It has been well established that engaging in health enhancing services such as participating in HIV testing and PrEP is not only a matter of an individual's decision but also influenced by physical and social variables in the environment (Wilkinson & Marmot, 2003). A growing body of research in public health has found the application of a Social Ecological Model (SEM) as a useful organizational framework to understand the environmental causes of behavior and environmental interventions for those behaviors (Golden & Earp, 2012; McLeroy et al., 1988). To date, much of the research surrounding the use of PrEP among Latinx SMM in the U.S. remains disparate and has not been comprehensively reviewed. Therefore, the purpose of this review was to identify and synthesize findings from the current literature that have explored factors affecting the use of PrEP among Latinx SMM in the general construct of the SEM, while identifying gaps in the literature and areas for future research and applied benefits.

Social Ecological Model

Engaging in HIV health care services is a complex issue because it is multifaceted and affected by many factors to varying degrees (Kaufman et al., 2014). These can include

both personal and social environmental factors, from an individual's knowledge, attitudes, to accessibility of services and economic inequalities (Seeley et al., 2012). To address this complex problem, Baral and colleagues (2013) developed the Modified Social Ecological Model (MSEM) that has become a useful clinical and public health tool for exploring the multiple factors involved in HIV health care engagement. The MSEM suggests that HIV health care engagement is determined by the following five levels or groups of factors: 1) individual, 2) network, 3) community, 4) policy, and 5) HIV epidemic stage. In addition to clarifying the specific role of different levels on HIV health behavior, Baral and colleagues (2013) described possible interventional strategies at varying levels of impact for SMM, and suggested that interventions at the (1) individual level aim to address biologic or behavioral characteristics associated with vulnerability to acquire or transmit HIV; (2) at the social and sexual network level aim to address formal and informal social networks that provide increased opportunities for exposure, including the density and size of networks; (3) at the community level can identify factors concerning environmental norms that stigmatize same sex practices and sexually diverse populations; (4) at the public policy level involve creating local, state, and national policies that promote HIV health care; and finally (5) it is the stage of the epidemic, or the HIV incidence and HIV prevalence within a particular community that can create infectious disease, not the individual behavior or community determinant (Baral et al., 2013).

The MSEM provides a visual representation to better understand the interactive characteristics of the individual and the environment that form the basis of HIV health outcomes among SMM (Baral et al., 2013). The MSEM is based on prior framework(s) that have been adapted to describe the combination of individual, social, and physical environmental factors that explain participation with HIV health care resources (Mugavero et al., 2011). Given that these variables are ultimately shaped by the HIV incidence within a community, that is within the context of a high burden of HIV infection and viral load, and not individual behavior, the MSEM incorporates an important level of focus on the epidemic stage of HIV that prior framework(s) did not describe.

Social-Ecological Perspective on Latinx Health

From the available research with Latinxs, the social ecological model of health has been applied to the prevention of diabetes (Chang et al., 2013; Veazey & Lackner, 2017) obesity (Williams, Kabukuru, Mayo & Griffin, 2011) and similar chronic health outcomes (Coatsworth, Maldonado-Molina, Pantin, & Szapocznik, 2005; Elder, Ayala, Parra-Medina, & Talavera, 2009), but not HIV prevention/PrEP. Yang and Hwang (2016) expanded the social ecological model to account for both general and immigrant variables to explain disparities in health service utilization. As with prior framework(s), Yang and Hwang (2016) highlighted the overall influence of the contextual level but specified immigration status and assimilation in the host country as salient and specific variables that explain health service differences for immigrants compared with native-born persons. This model, however, does not apply specifically to HIV treatment and/or prevention, but rather is a general theoretical model for explaining health service utilization. Studies that have used a social-ecological perspective have shown that there are unique and complex variables that account for different health outcomes in the Latinx population (Solorio et al., 2012; Solorio et al., 2016;

Trujillo et al., 2019). For instance, one study that investigated obesity among Latinxs using a social-ecological perspective found there are distinct cultural processes from other ethnic minority groups that impact health outcomes. This includes the process of adapting to a new culture and environment and the physiological and psychological state as a direct result of this integration (Berry, 1997). This stress has been found to increase the occurrence of depression, anxiety, feelings of alienation, increased psychosomatic symptoms, and identity confusion (Berry, 2001; Diaz et al., 2001; Keitner, Fodor, Ryan, & Miller, 1991; Mena, Padilla, & Maldonado, 1987; Vega, Kolody, & Valle, 1987).

To date, no model has been adapted to account for these cultural variables within the Latinx population and the use of PrEP. Most importantly, research has almost exclusively investigated Latinx culture and HIV prevention as fixed variables that occur independently of the environmental contexts (Gonzalez et al., 2009). Until recently, HIV studies on Latinx SMM focused on individual behavior to decrease the occurrence of HIV or to build general awareness of PrEP-use. However, as demonstrated by the modified social-ecological model (Baral et al., 2013), a comprehensive paradigm must consider the multiple environmental dimensions that interact with the individual to effectively address the interconnectedness of systems.

Disparities in PrEP Implementation: SEM

Despite its remarkable effectiveness at preventing HIV transmission and the CDC's endorsement, awareness, and uptake of PrEP as a prevention strategy has been slow to take hold, even among SMM, the population with highest HIV prevalence and incidence rates in the U.S. Among SMM in the U.S., there are some notable successes in PrEP implementation, particularly among SMM of higher educational and socioeconomic status (Huang et al., 2018). However, awareness and uptake of PrEP among Latinx SMM is markedly lower compared to non-Hispanic Whites. Research on factors associated with differential PrEP uptake among Latinx SMM is urgently needed to reduce their lifetime HIV risk.

Regarding PrEP implementation, few studies have closely examined the stressors faced by Latinxs or the challenges associated with being Latinx and seeking PrEP. The available studies on PrEP in Latinxs suggest that willingness to adopt PrEP is as high as (if not higher than) rates reported by non-Hispanic White and other SMM (Cohen et al., 2015). Yet actual rates of uptake of PrEP among Latinxs are low (Gupa, Lounsbury, & Patel, 2017).

Given that the decision to use PrEP is an individual behavior that is influenced by physical and social variables in the environment, the SEM is particularly relevant for studying PrEP. PrEP research in the U.S. has largely focused on (1) individual-level barrier(s), such as PrEP-related knowledge, awareness, and acceptability (Crosby et al., 2014; Eaton et al., 2015; Elopre et al., 2017). The intent to use PrEP has also been related to no perceived primary or secondary (i.e., long-term) side effects (Sowicz et al., 2014). At the individual level, there have also been concern over rates of PrEP adherence and retention (Chan et al., 2016). At the (2) interpersonal level, research has primarily focused on specific interaction(s) with formal and informal social support networks, including with friends, family members, and sexual partners (Philbin et al., 2016). At the (3) community level,

research surrounding PrEP implementation has highlighted medical mistrust (Carnevale et al., 2020; Zapata et al., 2020), and finally (4) at the structural level, research has suggested that perceived discrimination and/or enacted stigma and access to LGBT affirmative healthcare (Philbin et al., 2016). It should also be noted that these level(s) inform and shape each other. That is, there is an interaction of each level(s) with each other that can have a cumulative effect on promoting or hindering the use of PrEP. For example, education and access to PrEP are ultimately shaped by access to affirmative healthcare and medical trust within the community.

These studies have almost exclusively focused on general access to PrEP by SMM, with little data on uptake for SMM of color (Elopre et al., 2017; Philbin et al., 2016). Although Latinx SMM are disproportionally affected by HIV, very few efficacious behavioral HIV/STD preventions have been identified in the Compendium of Evidence-Based HIV Prevention Interventions (CDC, 2018). These preventions have examined behavioral and structural barriers to HIV care and testing, including unprotected anal intercourse and immigration status obstacles to accessing health services (Rhodes et al., 2015). With the introduction of PrEP as an effective biomedical method to prevent HIV, there is an imminent need for prevention research to be conducted with Latinx SMM to explore factors pertaining to individual PrEP use and broader determinants of health within this population that impact PrEP-use.

Unfortunately, the development of such a prevention is currently hampered by the limited existing theoretical frameworks that explain how factors at the individual, interpersonal, community, and structural levels and their cumulative effect on PrEP use for Latinx SMM.

Current Review

Given the broad range of individual and interpersonal factors that impact HIV vulnerability for Latinx SMM, this review applied the MSEM (Baral et al., 2013) to frame our analytic approach of factors that shape Latinxs' engagement with PrEP. Although different social ecological model(s) may have their limitations, the MSEM by Baral and colleagues (2013) is unique insofar as it is based on the premise or the stage of the epidemic. With respect to PrEP for Latinx SMM, the stage of the epidemic is determined by the high prevalence of HIV infection within Latinx communities and their limited engagement with PrEP (CDC, 2017; Levinson et al., 2018). Because at this point less research has been done among Latinx SMM and their engagement with PrEP, the current review will use different broader level(s) than those proposed by Baral and colleagues (2013) to highlight the current evidence base. To give an example, no research has shown how PrEP may be driven by policy-driven changes or differences in care services/health insurance that limit engagement with PrEP among Latinx SMM (Carnevale et al., 2020). It is also important to note that cultural-specific variables, such as immigration and language acquisition are not embedded in the MSEM. Therefore, using the overlying heuristic developed by Baral and colleagues (2013), while also integrating the limitations in the literature and the MSEM, this review applied the following organizational framework: individual, interpersonal, community, and structural. Like the MSEM our model focuses on (1) individual-related factors that limit/promote the use of PrEP, such as behavioral characteristics associated with an individual's engagement

with PrEP; (2) interpersonal, or the involvement of different relationships that operate within defined boundaries that impact the use of PrEP; (3) on the role of community services and the general accessibility of PrEP services; (4) and finally, structural factors that frame and constrain individual, interpersonal, and community level responses, such as stigmas or cultural-specific variables that influence PrEP among Latinx SMM. For the purposes of our review, and to understand larger pervasive themes that may impact Latinxs and their health care, structural-level variables will also include findings that are culture specific, such as immigration, gender, or family norms. As noted, each level within the MSEM is influenced by the interaction of each level with one another. For the purposes of our review, we discussed each level separately, however, there is a clear interaction between each level and factors within levels that are discussed further in our discussion. Given the need to increase the use of PrEP among Latinx SMM and to understand their unique involvement with PrEP, this review aimed to address knowledge gaps in the literature through identifying and synthesizing findings from the current literature that have investigated the use of PrEP among Latinx SMM into a visual framework.

Methods

This protocol was written and guided with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols (PRISMA-P) checklist (Shamseer et al., 2015). A comprehensive review was conducted to assess awareness, willingness to use, and barriers and facilitators for PrEP acceptability in Latinx SMM. We included studies that were relevant to the implementation and maintenance of PrEP among Latinxs. Given our conceptual focus on the experience of Latinxs in the United States and their involvement with HIV prevention, we excluded studies that targeted Latinxs in other geographical areas. While these studies are important to understand within the context of PrEP implementation and global HIV prevention, experiences of SMM vary across cultures and geographic locations, and as such, these studies should be considered in another review. Studies could target a variety of Latino male sub-populations that fall under the larger umbrella category SMM, including gay, bisexual, or heterosexually identified men who have had sexual contact with other men. Given that PrEP was only approved in 2012 by the FDA, our search focused on studies published between 2012 and 2019.

Search Strategy

On June 14, 2019, we searched two electronic data bases: PubMed and PsycINFO. These databases contain published manuscripts in the disciplines of health and biomedical sciences, social sciences, psychology, and public health. We used the following representative keyword(s) and medical subject headings (MESH) terms to identify relevant articles to PrEP-use for Latinxs: Latino, Hispanic, HIV/AIDS, PrEP (see Table 1 for example PubMed search strategy). Studies were included if they were peer-reviewed, presented primary data (qualitative or quantitative) for Latinx SMM, and examined at least one of the following: 1) PrEP awareness; 2) willingness to use PrEP; or 3) barriers and facilitators to PrEP acceptability. Articles could be randomized controlled trials, longitudinal research, correlational research, meta-analyses, or experimental research. Non-academic “think pieces” and government articles were not included in the main analysis and were

considered only to contextualize the data presented in this paper as necessary. The first author independently screened each article, which was then verified by the second author. Considerations about the inclusion or exclusion of published reports were discussed with a doctorate-level researcher who has extensive experience with HIV clinical and research practice in a medical setting. Articles returned by the initial search were screened by reading the title and the abstract to determine if they were likely to meet the inclusion criteria. Main areas of interest were selected using a list of key terms: “knowledge,” “awareness,” “willingness,” “barriers,” and “facilitators.” After the initial articles were examined, an additional full reading of articles was conducted to determine if all inclusion criteria were met. Articles that met the inclusion criteria are summarized in the appendix.

Data Extraction

Data were extracted by a single coder using a standard form. As recommended to the PRISMA statement (Shamseer et al., 2015), the following information was gathered for each study: year, study location, design, aim(s), and result(s) (Table 2). For the purposes of our review and to present a visual framework, each study was classified according to the following social ecological level: 1) individual, 2) interpersonal, 3) community, 4) structural. As shown in Table 2, each study was reviewed extensively according to their outcome variable(s) and then assigned a level. Guided by the larger theoretical framework, all explanatory factors were examined individually, then jointly reviewed with other variables of the same social ecological level to determine influence and overlap between similar variables of the same level. Many of these studies included findings that met criteria for more than one social ecological level, and therefore, results for these studies were discussed separately. For example, the individual level encompasses research related to knowledge, awareness, and attitudes related to PrEP, but these findings must also be considered within larger social and institutional environments that also impact PrEP implementation. The model assumes that interactions between individuals and their environment are reciprocal, implying that an individual is influenced by one’s environment and the environment is influenced by the individual.

Results

The search terms initially yielded 71 results. Following inclusion criteria and careful review of each title and abstract, 35 articles that did not match study protocol were excluded. For example, articles were excluded if they focused on PrEP implementation outside of the U.S. or lacked relevance to the implementation of PrEP (e.g., editorials on the promise of PrEP alone and cost-effectiveness). This screening yielded 36 articles that potentially met study criteria. Of these, 13 were eliminated for only describing a treatment protocol or case study and did not include analyses on Latinx SMM. This left a total of 23 articles meeting inclusion criteria. The 23 included articles are summarized in Table 2.

There were 13 quantitative studies, 6 qualitative, and 4 mixed-methods studies. The studies were published between 2013 and 2019. Most were conducted in larger U.S. cities in California and New York. The sample size of each study varied markedly from 29 to 3,363. Most of the studies focused on the general health care seeking experiences of Latinx SMM

and their experiences with PrEP and similar health care services. Experiences related to stigma, language, and similar variables were also briefly discussed. One study addressed the distribution of PrEP providing clinics in the U.S. Details of the characteristics and key findings of these studies are summarized in Table 2.

Discussion

All the 23 studies included in this review described the barriers encountered by Latinx SMM to seeking PrEP or their experiences using PrEP. These findings are discussed according to individual, interpersonal, community, and structural levels. Using the social-ecological framework, a model (Figure 1) was developed to visualize the variety of phenomena investigated as these exist within 4 levels.

Individual Level

Fifteen studies described specific barriers to accessing PrEP at the individual level for Latinx SMM. These included the lack of information about HIV preventative health care, available services, the fear of medical treatment, financial costs, and concerns about side effects (Barreras, Linnemayr, & MacCarthy, 2019; Bauermeister et al., 2013; Brooks et al., 2019; Kubicek et al., 2015; Mimiaga et al., 2016).

PrEP Awareness.—These studies show that at the individual level awareness and willingness to use PrEP among Latinx SMM are significant factors that prevent PrEP acquisition in this population. Existing studies show that Latinx SMM are less aware of PrEP as a potential HIV prevention in comparison with Black and White SMM (Kubicek, Arauz-Cuadra, & Kipke, 2015). In a similar study that investigated knowledge gaps and culturally sensitive messaging about PrEP among HIV-negative Latinx SMM, many participants had heard of PrEP, but they often confused PrEP with other HIV-related protocols (i.e., post-exposure prophylaxis, antiretroviral medications) (Barreras & Linnemayr, 2019). Many participants were also unaware of how to access PrEP-related services with or without insurance. Similarly, compared to non-Hispanic White SMM, Latinx SMM were also generally unaware about the drug regime necessary for PrEP to be effective (e.g., should the medication be taken daily, once a week, or only before a sexual encounter). Related to potential PrEP-use, Latinx SMM were also generally unaware of how long they needed to take PrEP before achieving optimal protection and the percent reduction in risk of HIV transmission as a result of taking PrEP (Lelutiu-Weinberger & Golub, 2016).

As evidenced in the data presented, lower awareness about PrEP among Latinx SMM is a significant barrier to PrEP and the prevention of HIV. According to CDC (2018) estimates based on current guidelines, approximately 300,000 people who are eligible for PrEP are Latinx (roughly 25% of the total population who could benefit from PrEP). Yet only 7,600 (or 3%) Latinxs filled a prescription for PrEP between September 2015 and August 2016 (Smith et al., 2015; Smith, 2018). This imbalance between Latinx SMM who may benefit from PrEP and those that are currently on PrEP indicates that there are significant barriers that may limit PrEP use in this population.

PrEP Acceptability.—In one qualitative study investigating the experiences of anticipated and enacted PrEP stigma among Latinx SMM in Los Angeles, the decision to not use PrEP was associated with the negative perception that PrEP users engage in risky sexual behaviors (Brooks et al., 2019). PrEP was also often associated with the assumption that users prefer condomless sex or have multiple sexual partners (Mansergh et al., 2015). Another factor that affects willingness to use PrEP among Latinx SMM is provider trust based on their hesitancy to discuss their own sexual health (Braksmajer et al., 2018). This was also related to concerns that others will notice they are taking a pill and would want to know why or will think they are HIV positive (Lelutiu-Weinberger & Golub, 2016).

PrEP Adherence.—Overall PrEP effectiveness is dependent on daily use or a specific timeline (PrEP on-demand) following possible HIV exposure (Marcus et al., 2016). Studies have shown that Latinx SMM are less likely to take a daily pill for PrEP (Kubicek et al., 2015; Lelutiu-Weinberger & Golub, 2016). A study with Latinx SMM on PrEP in Texas, reported that less than half were taking the pill on a daily basis, and even fewer reported having an HIV test done recently (Garcia & Harris, 2017). Compared to non-Hispanic White SMM, Latinx SMM were also more likely to state they would avoid using PrEP due to side effect concerns (Bauermeister et al., 2013) and were significantly more likely to indicate concerns that PrEP does not provide complete protection against HIV (Lelutiu-Weinberger & Golub, 2016). Consistent with the peer reviewed literature, these studies demonstrate that there are significant concerns about side-effects, especially longer-term effects, and PrEP effectiveness. Such concerns, in addition to other barriers must be addressed in order to increase the use of PrEP in Latinx SMM.

Individual Challenges.—As previously noted, one major barrier to PrEP implementation among Latinx SMM, is the lack of culturally adapted information and awareness surrounding this biomedical prevention (Barreras & Linnemayr, 2019; Garcia & Saw, 2019). This is particularly relevant for Latinx SMM who face additional barriers associated with lower socioeconomic status (SES) (Garcia & Saw, 2019). Garcia and Saw (2019) document that overall, Latinx SMM with lower SES were more likely to be severely underserved and uninformed on PrEP. At the individual level, Latinx SMM who were primarily Spanish-speaking were also significantly less likely to be aware of PrEP (Brooks et al., 2019; Mansergh et al., 2019). However, many studies have demonstrated that once this gap is closed and Latinx SMM are provided appropriate information and resources, they are not only more likely to want to pursue PrEP but are also more likely to become agents of social change in their communities by promoting the use of PrEP to community members (Martinez et al., 2016; Mimiaga et al., 2016; Shover et al., 2018).

Interpersonal Level

Five studies described specific barriers to accessing PrEP at the interpersonal level for Latinx SMM. Variables included a lack of social support and peer influence, and family and partner disapproval (Brooks et al., 2019a; Martinez et al., 2016; Schnarrs et al., 2018). Much of the research on PrEP at the interpersonal level has focused almost exclusively on who would approve or not approve of PrEP. These data suggest that compared to White SMM, Latinx SMM are less likely to report a positive or supportive individual who would approve

of their use of PrEP, suggesting that the social networks of this group may be less accepting of PrEP compared to White SMM (Schnarrs et al., 2018). Encouragingly, one recent study found that compared to a normative sample, Latinx SMM who were involved in an LGBT community-based organization were more likely to want to share their experience with PrEP and their knowledge with their social support (Barreras, Linnemayr, & MacCarthy, 2019).

Personal Relationships.—What emerged from the data was also the overarching perception or concern that potential PrEP use would introduce conflict in intimate relationships. A study by Brooks and colleagues (2019a) provides important insights into the relationship between PrEP use and interpersonal complexities. It is one of the few studies that has directly measured current experiences of Latinx SMM on PrEP. In their study, Latinx SMM experienced judgement from their partner, often resulting questioning the commitment or level of trust of the other partner. Another source of contention was the expressed desire for some participants to continue using PrEP, even if in a committed relationship, as a way of maintaining their autonomy and control over their sexual health.

Latinx Family.—Overall, there were also additional difficulties with the use of PrEP in Latinx SMM and their level of comfort with disclosing their use of PrEP to their family (Brooks et al., 2019; Schnarrs et al., 2018). More specifically, there was a general anticipation among participants that PrEP disclosure would lead to heightened tensions in family relationships that were already tenuous (Brooks et al., 2019). In fact, in a similar study, that investigated differences between Black, Latinx, and White SMM about who would approve or disapprove of their beginning to take PrEP found that compared to White and Black SMM, no Latinx participant identified family as approving of PrEP. The existing research in this area has yet to examine parental/family perception of PrEP, nor has it fully assessed PrEP within this interpersonal level. Regarding future research directions beyond those previously noted, it is critical that research in this field begins to recognize the role of family in HIV prevention. Indeed, future research that directly assesses the influence of parents' view on PrEP is particularly needed to inform the future development and dissemination of PrEP within this population. Understanding Latinx family is critically important now given the recent expansion of FDA eligibility requirements for PrEP to include at-risk adolescents (Gilead Sciences, 2018).

Community Level

Seven studies described specific barriers to accessing PrEP at the community level for Latinx SMM. Variables included data on community awareness and engagement with PrEP, geographical disparities in PrEP resources, and provider willingness to work with Latinxs (Copeland et al., 2017; Lelutiu-Weinberger & Golub, 2016; Lopez, Cocohoba, Cohen, Trainor, Levy, & Dong, 2019; Martinez et al., 2018; Zucker, 2018). The findings relating to community-level barriers to the use of PrEP were noteworthy. To maximize the efficacy of PrEP as a form of HIV prevention, a person must be aware of PrEP, willing to use it, able to use it, and able to successfully adhere to the treatment regimen. Individual awareness and disposition to successfully use PrEP may however be hindered by the lack of community awareness and engagement.

Community Awareness.—Only a handful of studies have measured the role of community variables and PrEP implementation. For instance, in one study that investigated PrEP-related knowledge and familiarity within a community sample of HIV non-medical workers, Latinx respondents had significantly lower average knowledge scores on PrEP than non-Hispanic Whites (Copeland et al., 2017). It is also crucial to highlight those respondents from states with the highest HIV prevalence, especially in the South, tended to score below average for overall knowledge related to PrEP. Similarly, non-Hispanic Whites were more likely to have positive attitudes toward biomedical HIV preventions. The largest disparities in attitudes and beliefs were observed for respondents who took the survey in Spanish. Within this sample, Spanish-speaking respondents were not only more likely to have a negative attitude toward PrEP, but they were also more likely to believe that PrEP did not have the potential to decrease the prevalence of HIV in the United States.

PrEP Providers.—As with all biomedical strategies, PrEP is dependent on whether health care providers believe that these preventions are needed. A study by Martinez and colleagues (2016) provides important insights into provider experiences with PrEP in the Latinx community. Their study found that providers were enthusiastic for biomedical prevention strategies. However, providers were primarily concerned about the overall lack of awareness of PrEP among Latinx SMM and insisted that resources be provided along with culturally appropriate information. For example, one provider elaborated that written materials, community campaigns, and other PrEP educational materials for SMM are often in English language only. Similarly, providers identified language and cultural challenges as among the major obstacles to obtaining care. Providers further insisted that beyond speaking Spanish, providers must be culturally competent while being able to navigate issues around documentation status, stigma associated with HIV, and homophobia within and outside the Latinx community. Unfortunately, there is minimal information about whether providers can meet these needs while also being able to discuss PrEP effectively with Latinx SMM.

Medical Mistrust.—As previously noted, one major barrier to PrEP implementation among Latinx SMM is medical mistrust (Barreras, Linnemayr, & MacCarthy, 2019; Bauermeister et al., 2013; Lelutiu-Weinberger & Golub, 2017). Although provider mistrust for the purposes of this review has been identified as an individual-level barrier, it is important to note that to address and mitigate medical mistrust, a community-based approach must be integrated. The existing research in this area suggests that Latinx SMM are more likely to report skepticism of the medical establishment in comparison to White SMM (Lelutiu-Weinberger & Golub, 2017). More specifically, Latinx SMM were more apprehensive about having to talk to their doctor about their sex life as a significant barrier to PrEP as compared to the rest of the sample. Interestingly enough, having more access to counseling at the community level was found to be more positively correlated with PrEP use among Latinx SMM. As one prevention step for the immediate future, one way to reduce medical mistrust among the Latinx population may be to increase the use of community-based agencies and counseling services to promote PrEP. Lastly, in the provider-based study by Martinez and colleagues (2016), providers suggested that PrEP should be made more available to Latinx SMM using non-traditional care settings to avoid or reduce barriers to providing PrEP in hospitals and medical clinics.

Geographical Disparities.—It is important to highlight the need to find an appropriate provider and/or clinic as a major barrier at the community level for Latinx SMM. According to a recent study (Siegler et al., 2018) that investigated the distribution of publicly listed PrEP-providing clinics in the U.S., there are several disparities in PrEP access, including different numbers of clinics compared to region, income, and ethnicity. As was previously noted, there are notable disparities with risk and access, that is, there are fewer resources available for HIV prevention for population groups with higher levels of HIV transmission. Overall, Siegler and colleagues (2018) found that southern states and areas with higher Latinx populations all represent areas disproportionately impacted by new HIV diagnoses and are conversely underrepresented in PrEP clinic density.

Community Prevention.—The existing research in PrEP has yet to adequately examine community-based approaches to increase the use of PrEP in Latinx SMM. To our knowledge, only one study has attempted to integrate PrEP within a community-based approach. In partnership with the San Francisco Department of Public Health, Lopez and colleagues (2019) investigated the implementation of a community pharmacy-initiated PrEP program in a predominantly Latinx neighborhood. As part of a concerted effort to develop a community-based initiative to increase the use of PrEP, Lopez and colleagues recruited and trained an interdisciplinary team of pharmacists, pharmacy personnel, public health physicians, and community advocates. In developing this community-initiated PrEP program, nearly every individual who completed a PrEP initiation visit, filled their prescription. Approximately 50% of clients who started PrEP self-identified as Latinx, and nearly 90% identified as SMM. Data collection for this program is still ongoing, however, preliminary data suggests that these individuals were successfully adherent to PrEP.

Structural Level

Eleven studies described specific barriers to accessing PrEP at the structural level for Latinx SMM. Variables included data on health insurance, social institutions, cultural and political structures (Barreras et al., 2019; Brooks et al., 2018; Garcia & Harris, 2017; Garcia & Saw, 2018; Marks et al., 2017; Martinez et al., 2018; Mustanski et al., 2018). As previously noted in this review, there are unique individual-level cognitive barriers, including beliefs about PrEP, concerns about taking PrEP and its side effects that impact the implementation of PrEP among Latinx SMM (Barreras et al., 2019; Bauermeister et al., 2013; Brooks, Landrian, Nieto, & Fehrenbacher, 2019). These factors must be considered within the broader structural context of pervasive social and cultural inequalities. Specifically, this includes lack of health insurance/inability to pay for it, immigration status, as well as stigma associating PrEP with promiscuity and HIV (Mustanski et al., 2018; Garcia & Harris, 2018; Schnarrs et al., 2018).

PrEP Stigma.—Research related to PrEP implementation in Latinx SMM has primarily focused on limited access, awareness and unfavorable patient and community attitudes about PrEP (Krakower et al., 2012). One possible explanation for these barriers is contextual factors such as stigma and homophobia (Garcia & Harris, 2017). For example, one recent study of experiences of anticipated and enacted PrEP stigma among Latinx SMM in Los Angeles suggests that PrEP-related stigma is significantly associated with

PrEP discontinuation, suboptimal medication adherence, and unwillingness to use PrEP (Brooks et al., 2019). Only a handful of studies have investigated actual experiences of Latinx SMM currently on PrEP. According to Brooks and colleagues (2019), Latinx SMM using PrEP frequently experienced disapproving judgement, negative labels and attitudes, and rejection. These experiences of stigma occurred across various settings and came from several different sources, such as friends/peers, family, sex partners, and medical providers. Specifically, for some Latinx SMM their decision to use PrEP was associated with being HIV-positive. Because of these misattributions, disclosure of PrEP was thought to unintentionally reveal personal information and lead to judgement about one's sexual behaviors. There was also a consensus among Latinx SMM that PrEP was a source of negative labeling and discrimination. These experiences were particularly heightened with disclosing PrEP to family members. The men in this study referred to pressures tied to traditional gender roles and related cultural attitudes and the idea of *familismo*, which places an added emphasis on prioritizing the family unit (Gil, Wagner & Vega, 2000). Specifically, there was a general anticipation and fear that PrEP disclosure would further alienate them from their family. In addition, those who were not yet open to their family about their sexual orientation also expressed a concern of being rejected and disowned.

Structural Policies.—Another significant limitation to note is related to health insurance and policies relevant to health care and documentation status (Lelutiu-Weinberger & Golub, 2016; Page et al., 2017; Schnarrs et al., 2018). Compared to White SMM, Latinx SMM are more likely to receive health care from public agencies and are less likely to be insured (Lelutiu-Weinberger & Golub, 2016; Marks et al., 2017). For Latinx SMM who are undocumented or come from mixed legal status families, access to healthcare may be especially limited (Page et al., 2017). Presently, undocumented Latinxs are expressly excluded from Medicaid, the primary option for many low-income citizens (Sommers et al., 2013). This makes PrEP inaccessible to many Latinxs who could benefit and may be at elevated risks as recent immigrants (Page et al., 2017). Few studies have examined the familial and societal stresses faced by undocumented Latinx with being undocumented and seeking PrEP in the U.S.

Integration and Future Directions

This review has proposed a framework to guide studies of HIV in collecting the data needed to enhance the use of PrEP by Latinx SMM. As depicted in Figure 1, the factors that influence the implementation of PrEP in this population can be categorized under the structural ecological model as individual, interpersonal, community, and structural level factors. The results of this review suggest that barriers at multiple levels need to be addressed to improve access to PrEP by Latinx SMM. This model can function as a useful framework with which to visualize and characterize the various challenges for PrEP implementation. Each level provides a context in which to understand why PrEP has been unable to reduce the incidence of HIV in the Latinx community, while also addressing the level of the epidemic that Baral and colleagues (2013) introduced in their model.

Although the structural-ecological model addresses the complexities of the PrEP-seeking behaviors of Latinx SMM and offers strategies to improve their access to HIV prevention,

the model also has limitations. It fails to specify how factors at each level influence health-seeking behaviors. One of the unique challenges in conceptualizing this model is the porous nature of these levels. Future investigators should aim to statistically define overlap between themes and subthemes to continue furthering research related to PrEP implementation and structural themes within the Latinx population. Our model is also hindered by the limited studies that have been published. Much of the evidence was drawn from convenience samples, and the size of the samples varied considerably from study to study, which could limit the generalizability of the findings. While our model was developed from a systematic review, we acknowledge that in doing so we categorized Latinxs as a large monolithic ethnic group. One of the challenges in calculating HIV risk by ethnic group is the survey terminology that attempts to group together heterogeneous individuals of Latinx origin, often resulting in inaccuracies. To date, much of the research on HIV and PrEP uptake have grouped together different ethnic groups among Latinxs, whereas percentages differ greatly among Latinxs who vary in both culture and socioeconomic background (Zea, Reisen, & Díaz, 2003). This was evident in our review, as there were generally no data on specific Latinx origin group(s), and their different experiences with PrEP. Therefore, a necessary step toward developing theories and methodologies for conducting research on Latinx SMM is to attempt to capture the heterogeneity that exists within the Latinx population to understand the imbalance more adequately in HIV/AIDS outcomes compared to different nationalities and experiences in this population. Given the wealth of empirical support on the unique cultural challenges in coping with HIV, it is important to understand differences in the Latinx population. That is, future research should attempt to measure how these variables differ based on nation of origin, level of acculturation, experiences with racism, homophobia, and other forms of marginalization. This model may serve as an initial framework to examine these variables and their relationship to PrEP.

It is important to reiterate, that for the purposes of this review and for clarity, each level was described separately, but there is a clear interaction between each level and factors within levels that merit further discussion. To draw an example, there is an important relationship between the community and structural level in the model. Providing more accessible facilities require changes at a higher level to increase access to health care by creating additional policies that support immigrants compared with native-born persons. While our review did not find studies specific to the impact of Latinx cultural values, such as *respeto* or *machismo* on PrEP, individual and interpersonal-related differences must be considered within these larger cultural values that shape engagement with health care among Latinxs (Levison et al., 2017). Since our review was completed, one study has been published on cultural differences in PrEP awareness, willingness, use, and adherence among Latinx SMM (Rivera et al., 2021). According to this study, traditional machismo was associated with low willingness to engage with PrEP, whereas *caballerismo*, measured as the degree of chivalry and familial ties was found to facilitate PrEP awareness, willingness, use, adherence, and emotional connectedness. As can be summarized within this section, these individual differences are nested within larger cultural structures that therefore require a more holistic approach to increase the use of PrEP among Latinx SMM. Several principles from this model, as outlined by this review, can also serve as useful guides for developing clinically sensitive preventions and programs for Latinx SMM. For instance, this model may

serve as a useful framework to build the techniques utilized in cognitive behavioral therapy (CBT) (Hofmann et al., 2012). Using CBT with Latinx SMM to increase the use of PrEP may focus on assisting them to cope constructively with discriminatory experiences and lower their mistrust of the medical system.

There have been few studies published since our initial search and the review of this study for print related to Latinx SMM and PrEP. Much of these studies have continued to investigate general awareness, and attitudes related to the use of PrEP for HIV prevention (Kimball et al., 2020; Olansky et al., 2020). Additional studies, however, have also begun to look at PrEP engagement through a syndemics framework and found that structural barriers (e.g., unstable housing) serve as greater impediments to being aware of PrEP, whereas once on PrEP, psychosocial indicators (e.g., polysubstance use, depression) account for greater variance in long term PrEP-use and adherence (Blashill et al., 2020). As previously noted, our search did not yield any information/data related to the direct impact of public policy, both state and federal, on PrEP access among Latinx men. The association between the use of PrEP and policy-driven changes in immigration, health care and social service is critical given the overshadowing impact of these policies, such as the Affordable Care Act (ACA) and the directives of the CDC (CDC Division of HIV/AIDS Prevention Strategic Plan) on the entire structural-ecological model. From research related to health-care coverage policies and disparities in HIV testing, there is evidence to suggest that policy-driven changes influence rates of HIV testing and connection to care (Biener et al., 2018; Simon et al., 2017). Given the role of structural factors that underlie individual healthcare utilization, it is essential for our model to consider public policy on the use of PrEP. This is especially important to consider in the context of both policy-driven changes in immigration enforcement levels and fluctuations in anti-immigrant sentiment (Martinez et al., 2015; Nwadiuko et al., 2021). However, to date there remains a limited evidence base in the peer-reviewed literature supporting the role of public policy on PrEP.

In sum, the development of this model may serve as a useful framework to guide studies of PrEP in this population and in collecting the data needed to decrease the incidence of HIV. The model includes four distinct, yet interrelated levels: individual, interpersonal, community, and structural. Based on the present review, it is evident that to change individual differences in PrEP uptake, there must be a collected effort to address broader barriers in the structural-ecological framework. This comprehensive framework is in line with the high-impact prevention approach set forth by the CDC, to increase the impact of prevention efforts within communities that are at a heightened risk of HIV infection. Ensuring that studies for PrEP among Latinx SMM characterizes structural factors will likely result in more actionable data that can have a significant population level impact.

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Appendix

Table 1.

Sample search term strategy: PubMed, searched on June 14, 2019

ID	Search
#1	"Hispanic Americans" [MeSH Terms] OR Latino[tiab] OR Latinos[tiab] OR Hispanic[tiab] OR Hispanics[tiab]
#2	Male [MeSH] OR gay[tiab] OR gays[tiab] OR homosexual OR bisexual OR "men who have sex with men" or MSM OR LMSM; OR "sexual minority men" OR SMM OR "sexual minority" OR "sexual minorities"
#3	PrEP OR pre-exposure prophylaxis [MeSH] OR "PrEP for HIV" OR "Truvada" and HIV

Table 2.

Evidence for HIV Pre-Exposure Prophylaxis (PrEP) Implementation among Latinx SMM

Citation	Design	Sample	Social Ecological Level(s)	Variables Investigated
Barreras, Linnemayr, MacCarthy, 2019	Qualitative	Gay and Bisexual Latinx SMM and Latina transgender women in California; 52 Latinx SMM and 39 transgender women	Individual Interpersonal Structural	Explore knowledge gaps and culturally sensitive messaging about PrEP among HIV-negative Latinx men who have sex with men (LSMM) and Latina transgender women (LTGW)
Bauermeister, Meanley, Pingel, Soler, & Harper, 2013	Cross-Sectional	Single young SMM, ages 18–24, in the United States; 1,507 young SMM	Individual	Examine PrEP awareness and perceived barriers among single young SMM
Braksmajer, Fedor, Chen, Corales, Holt, Valenti, & McMahon, 2018	Cross-Sectional	Gay and Bisexual Latinx and Black SMM in New York; 385 Black and Latinx SMM	Individual	Explore the moderating effect of race/ethnicity on trust in one's primary care provider (PCP) on PrEP willingness
Brooks, Landrian, Nieto, & Fehrenbacher, 2019	Qualitative	Adult Gay/Bisexual Latinx SMM in California; ages 21–49	Individual Interpersonal Structural	Examine experiences of perceived and enacted PrEP-related stigma
Brooks, Nieto, Landrian, & Donohoe, 2019	Qualitative	Adult Gay/Bisexual Latinx SMM in California; ages 21–49	Individual Interpersonal	Explore the experiences of using PrEP among Latinx SMM
Copeland, Wilson, Betancourt, Garcia, Penner, Abravanel, Wong, & Parisi, 2017	Cross-Sectional	US-based employees, contractors, and volunteers working in AIDS service organizations, state/local health departments, and other community-based organizations in a non-medical capacity	Community	Measure knowledge of HIV science and treatment within the HIV non-medical workforce, evaluate workers' familiarity with and attitudes toward PrEP, and identify factors that may affect HIV knowledge and attitudes
Garcia & Harris, 2017	Cross-Sectional	Gay and bisexual men in San Antonio, Texas; ages 21–30; 159 self-administered Latinx SMM	Individual Structural	Develop an instrument that measured Latinx attitudes and beliefs toward PrEP, identify associations between demographic factors, and PrEP related factors and to suggest culturally appropriate strategies for the promotion of PrEP among the Latinx SMM population.

Citation	Design	Sample	Social Ecological Level(s)	Variables Investigated
Garcia & Saw, 2019	Cross-Sectional	Gay and bisexual Latinx men from San Antonio, Texas, 154 Latinx SMM	Individual Structural	Implications of socioeconomic status associated with awareness, access, and usage of PrEP
Huang, Zhu, Smith, Harris, & Hoover, 2018	IQVIA Longitudinal	2014–2016 data of the number of persons prescribed PrEP in the United States	Structural	Estimate the number of persons prescribed PrEP (users) in the United States and to describe their demographic characteristics, including sex and race/ethnicity
Kubicek, Arauz-Cuadra, & Kipke, 2015	Qualitative	6 focus groups were convened with 53 young SMM (23 Latinx and 30 African American)	Individual	Determine awareness and perceptions of PrEP
Lelutiu-Weinberger & Golub, 2016	Cross-Sectional	Black and Latinx SMM in New York; 491 Black and Latinx SMM	Individual Community Structural	Evaluate barriers and facilitators to PrEP at the systems-, provider-, and individual-levels
Lopez, Cocohoba, Cohen, Trainor, Levy, & Dong, 2019	Quantitative	Community pharmacy in San Francisco's Mission District, an urban, historically Latinx neighborhood	Community	Initiate PrEP and prevent HIV acquisition and increase uptake in the Latinx community
Mansergh, Herbst, Holman, & Mimiaga, 2019	Cross-Sectional	484 self-identified Latinx SMM in various U.S. cities	Individual	Determine the association of PrEP awareness and self-determined preference for Spanish instead of English language to complete a study on prevention messaging among Latinx SMM in three U.S. cities
Mansergh, Herbst, Mimiaga, & Holman, 2015	Cross-Sectional	HIV-uninfected (self-reported) Black and Latinx men who reported having sex with a man in the past year in Chicago, Fort Lauderdale, and Kansas City; 296 Black and 309 Latinx SMM	Individual	Behavioral intentions to use condoms, PrEP, or both methods
Marks, Merchant, Clark, Liu, Rosenberger, Bauermeister, & Mayer, 2017	Cross-Sectional	HIV-uninfected 18- to 24-year-old young SMM; 2297	Structural	Determine healthcare access, previous use of PrEP and sexual behavior among various SMM populations
Martinez et al., 2016	Qualitative	20 couples (n = 40) in two cohorts; a large number of participants were from Mexico, self-identified as gay, and were predominantly Spanish-speaking	Individual Interpersonal Community Structural	Insights into how to adapt and integrate social, cultural, and biomedical approaches in couples-based HIV behavioral prevention for Latinx SMM
Mimiaga et al., 2016	Qualitative	48 Black and Latinx mixed HIV serostatus SMM from Chicago, Ft. Lauderdale, and Kansas City	Individual	Explore audience reactions and receptivity to message concepts on PrEP as part of the development of prevention messages to promote PrEP awareness among Latinx and Black SMM
Mustanski, Ryan, Hayford, Phillips,	Cross-Sectional	HIV-uninfected 18- to 24-year-old young SMM and transgender women; 620	Structural	Examine the prevalence and types of PrEP stigma

Citation	Design	Sample	Social Ecological Level(s)	Variables Investigated
Newcomb, & Smith, 2018				and injunctive norm beliefs among young SMM
Raymond, Snowden, Guigayoma, McFarland, & Chen, 2019	Cross-Sectional	HIV-uninfected men in San Francisco; 399	Individual	Evaluate demographics, adherence, health care, and risk behaviors
Schnarrs et al., 2018	Mixed-Method	104 Gay and bisexual men; 49% self-identified as White, 41% Latinx, and 10% African American living in metropolitan regions of the coastal U.S.	Interpersonal Community Structural	Assess perceived social norms related to PrEP use
Shover et al., 2018	Cross-Sectional	19, 587 SMM and transgender people visiting a Los Angeles community clinic	Individual	Characterize uptake of HIV PrEP in a community setting and to identify disparities in PrEP use by demographic and behavioral factors associated with increased HIV risk
Siegler, Bratcher, Weiss, Mouhanna, Ahlschlager, & Sullivan, 2018	Quantitative	Data regarding 2094 PrEP-providing clinics	Community Structural	Explores the distribution of publicly listed PrEP providing clinics in the United States
Zucker et al., 2018	Quantitative	Medical records were reviewed at a large urban academic medical center that serves a large Latinx community	Community	Evaluated missed opportunities for HIV screening and linkage to PrEP from 2006 through 2017 at an urban academic medical center serving a predominantly minority community

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Public Significance:

Multi-level interventions that address barriers to HIV prevention at the level of the individual, interpersonal, community, and structural are most likely to improve HIV outcomes for Latinx SMM. PrEP for HIV prevention requires ongoing research about implementation, the model in our review proposes a useful approach to address the specific challenges facing Latinxs in addressing the disparities in HIV among Latinx SMM. As the Latinx SMM population continues to increase in the U.S. and, unfortunately, continues to bear a heavy burden of HIV, such framework could have a meaningful public health impact.

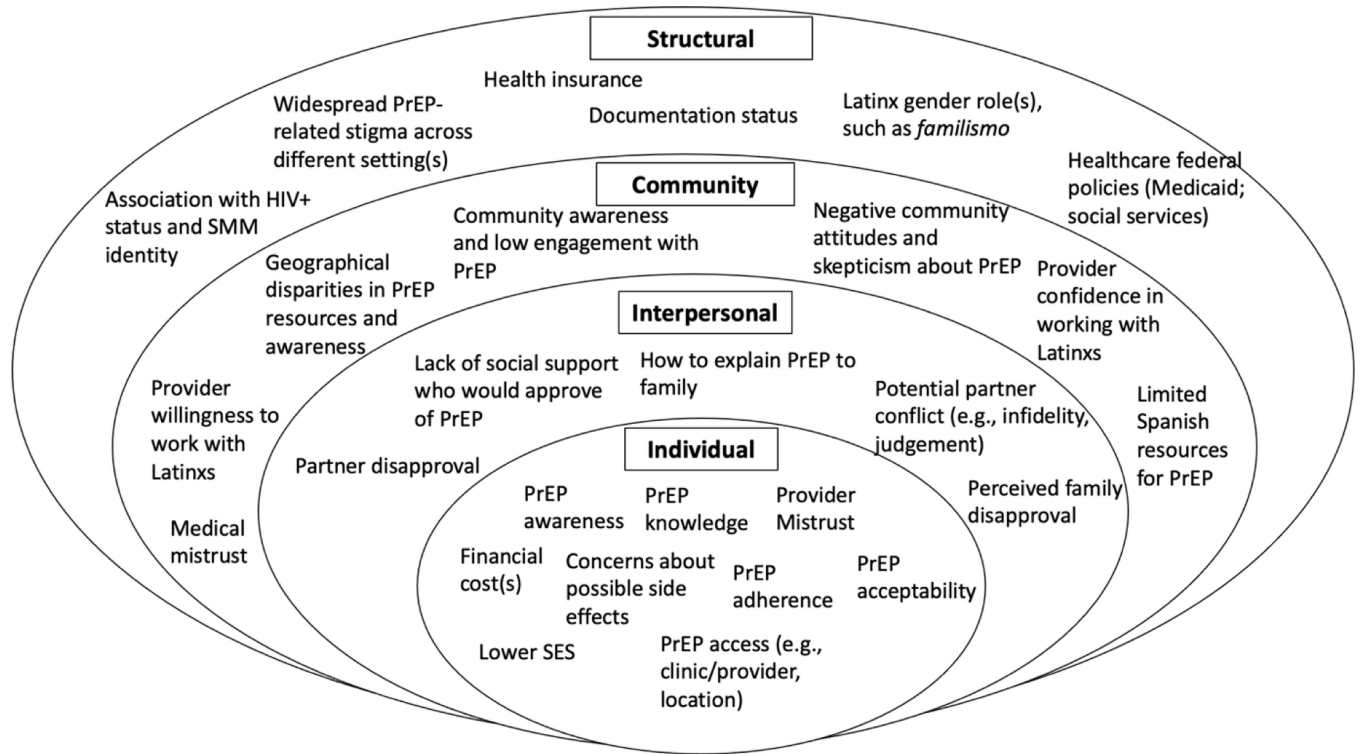


Figure 1.
SEGUIr: Structural Ecological Guide that Underlines and Illustrate PrEP Utilization