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The Persistent and Evolving HIV Epidemic in American Men who have Sex with Men

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Summary

American Men who have sex with men (MSM) were the first population to be identified with AIDS, and continue to be at very high risk for HIV acquisition. A systematic literature search was conducted to identify the factors that explain the reasons for the ongoing epidemic in this population, using an eco-social perspective, focusing on the most recent pertinent studies. Common features of the HIV epidemic in US MSM include biological factors, such as the enhanced susceptibility of rectal mucosa to HIV transmission and acquisition and role versatility; social/structural factors, e.g. high prevalence networks and poverty, particularly in Black and Latino MSM; as well as individual factors, e.g. concurrent sexual partnerships. The high prevalence networks of some racial and ethnic minority men are further concentrated because of assortative mixing (i.e. increased likelihood of sex with culturally congruent partners) and adverse life experiences, including high rates of incarceration, as well as avoidant behavior because of adverse experiences with the health care system. Young MSM have additional risks for HIV because of less developed impulse control, the invisibility of HIV among their peers, and being less familiar with serostatus and other risk mitigation discussions. They may benefit from prevention efforts that utilize digital technologies where they often meet partners and obtain health-related information. Older MSM remain at risk for HIV, and are the largest population of

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Americans with chronic HIV, requiring culturally-responsive programs that address longer term co-morbidities. Transgender MSM are an understudied population, but emerging data suggests that some are at great risk for HIV, and require specifically-tailored HIV prevention information. In the PrEP and Undetectable=Untransmissable (U=U) era, training of health care providers to create culturally competent programs for all MSM is vital, since the use of antiretrovirals is foundational to optimizing HIV care and prevention. Effective control of the HIV epidemic among American MSM will require scaling up programs that address their common vulnerabilities, but are sufficiently nuanced to address the specific socio-cultural, structural and behavioral issues of diverse subgroups.

Introduction

American gay men and other men who have sex with men (MSM) were the first population associated with what came to be known as AIDS when the epidemic was initially described in 1981 (1). Since then, close to half a million HIV-infected American MSM have died, and male-to-male anal intercourse remains associated with the largest number of new HIV infections diagnosed annually in the US (2). Although the absolute number of incident infections among American MSM has not substantially changed over the past decade, major sociodemographic shifts have occurred. A greater proportion of new cases are detected in MSM who are younger, of color, poorer and/or living in the Southern US. HIV in American MSM is increasingly becoming a disease of the most disenfranchised individuals and under-resourced communities (Figure One). The reasons for the disproportionate HIV burden among MSM are heterogeneous, and include: biological factors (3), internalized stigma leading to behavioral challenges (most commonly, depression) (4), disinhibiting substance use (5), as well as anticipated and experienced mistreatment by health care providers (6). For some racial and ethnic minority MSM, assortative mixing (i.e. being more likely to choose sex partners from one's identified subgroup) potentiates HIV risk by increasing the likelihood that any new partner will be selected from a high HIV prevalence pool (7).

A unique confluence of biological, socio-cultural, epidemiological and behavioral determinants amplify HIV spread in diverse subgroups of American MSM. The current review focuses on the multi-level factors that explain the disproportionate HIV epidemic among American MSM. This paper will utilize an eco-social model (8) to review how the interactions of persistent and new factors have potentiated one of the most persistent and dense global HIV epidemics, and will assess recent promising approaches to intervene in order to attenuate ongoing retroviral transmission in American MSM.

Search Strategy and Selection Criteria

We searched PubMed (MEDLINE) and Embase for English-language manuscripts published between January 1, 2010 through August 30, 2019, focusing on the HIV epidemic among cis-and trans-men who have sex with men in the United States. Search strategies were based on a combination of controlled vocabulary, including medical subject headings [MESH] and related keywords. We searched for the keywords "men who have sex with men," "gay men," "bisexual men," ""transgender men who have sex with men," – and related commonly used terms – in combination with "HIV" [MESH], "human immunodeficiency virus" [MeSH],

and “United States” or “US.” We focused on publications from the past 5 years, but did not exclude commonly referenced and influential older publications. Additional references from seminal articles were reviewed to ensure that important contributions were not inadvertently excluded.

Biological and social amplification

The concentrated HIV epidemic among American MSM is a result of the confluence of biological, structural, social and behavioral factors that enhance the risk for HIV acquisition and transmission (Table One). Anal intercourse has been particularly important in facilitating HIV spread in MSM, given that colonic mucosa are highly susceptible to HIV acquisition and transmission (9, 10). The efficiency of rectal and urethral HIV transmission is further amplified by common, frequently asymptomatic, rectal and urethral sexually transmitted infections, which can cause inflammation or ulcerations, which increase the efficiency of HIV transmission or acquisition (11–13). MSM may engage in specific practices that may further increase the risk of HIV transmission, including the use of hypertonic douches before and after intercourse, which may increase asymptomic mucosal inflammation and alter the rectal microbiome. Natal males who engage in anal sex with other males are unique compared to other humans who engage in sex, since their opportunities for sexual role versatility may potentiate HIV spread, because they can become infected through receptive intercourse (the most efficient way to acquire HIV sexually), and then transmit infection to others when being the insertive partner (the most efficient way to transmit HIV sexually) (14).

The biological amplification of HIV transmission in MSM is further intensified through limited sexual networks, because by definition, MSM are having sex with other male partners, a small, concentrated subgroup of the general population (15, 16). The more constrained partner choice can enhance the likelihood that for any level of infection that is present in a community, the risk of transmission from any new sexual partner will be greater for an MSM compared to a demographically matched male heterosexual counterpart. Because of limited social mobility and assortative mixing (chosing partners from within one’s subgroup), the partner pool is often even more constrained for many racial and ethnic minority MSM (7,17, and and Millett et al article in this issue), further amplifying efficient HIV spread within these subgroups. Because of the high HIV prevalence among MSM throughout the United States, any new sexual relationship has the potential to confer a substantial risk for HIV acquisitition. In settings where knowledge of partner serostatus may be suboptimal, and/or the couple may not be monogamous, a substantial percent of HIV transmissions occur in the context of primary partnerships (18). This finding is a consequence of partners not disclosing their HIV status to each other and/or not undergoing HIV regular testing after contact with external partners (which has been described as “sero-guessing”). Culturally-tailored interventions designed to engage MSM couples to develop mutually acceptable agreements to decrease their risk of HIV transmission within and outside of the primary relationship offer another opportunity for HIV prevention. (Textbox 1) MSM also have developed venues which can uniquely serve to increase the likelihood of meeting new sexual partners, and which have been linked to HIV transmission. In the digital era, many non-monogamous MSM can meet partners through the internet (19), though

historically dedicated meeting places, such as bars, sex clubs, and bath houses, continue to provide MSM opportunities to meet multiple partners efficiently. These venues also may create opportunities for prevention interventions, including on site health education, HIV and STI screening, and triage to clinical services (20).

Behavioral health syndemics

American (and other) MSM experience substantially greater levels of adverse mental health conditions compared to heterosexual men, including anxiety, depression, and substance use (21, 22). A major underlying reason for these disparities stems from the internalization of societal stigma as a result of growing up in non-affirming environments, leading to minority stress and suboptimal health outcomes in reaction to these adverse experiences (23). MSM internalize stigma after exposure to culturally-ingrained structural inequalities, such as discriminatory legal and social policies, negative community and familial attitudes, and hate crimes, which adversely affect their mental health (24). Studies have found that early childhood trauma, including childhood sexual abuse, is common in MSM, and has been associated with depression, substance use and condomless anal sex (25, 26). The downstream effects of day-to-day stigmatizing events, ranging from overt discrimination to microaggressions, cumulatively negatively affect mental health in American MSM, which in turn, impede HIV prevention and treatment efforts (27). The behaviors that increase MSM risks for HIV acquisition and transmission often occur in the context of intertwined mental health and social-structural synergistic epidemics, termed syndemics (4, 28–31). The effects of syndemic conditions are at least additive, i.e. those who experience more conditions are more likely to report condomless anal sex, as well as medication non-adherence (32). The effects of syndemics on sexual behaviors and HIV-related self-care may be direct (e.g. substance use leading to poor self-care, including non-adherence), but also may disrupt psychological processes associated with the ability to enact or maintain health behavior change. e.g. by decreasing self-efficacy, the sense that one is in control of his environment (33). Thus, prevention efforts focusing on the HIV epidemic in American MSM must address common co-prevalent mental health and structural precipitants in order to “Get to Zero” (new infections).

Substance use potentiation

Studies have long found that MSM report higher rates of recreational drug and alcohol abuse compared to the general population (34), with high levels of stimulant and other party drug use (i.e. methylenedioxymethamphetamine (MDMA/ecstasy), gamma hydroxybutyric acid (GHB), and ketamine) (35). Alcohol abuse is also common among MSM, and linked to condomless anal sex (36). The high prevalence and clinical importance of drug and alcohol use in potentiating the HIV epidemic among American MSM cannot be overstated, since substance using MSM are most likely to engage in behaviors that increase HIV transmission, are more likely to engage in serodiscordant sex, and are less likely to be adherent to medications (22). Recent studies suggest that problematic stimulant use has not declined in American MSM over the past few decades, and is a major driver of HIV transmission, as stimulant users report higher numbers of sexual partners and more condomless anal sex than non-stimulant using peers (37–39). Effective treatments for stimulant dependency have been limited, with a paucity of interventions tailored for MSM. The mainstays of treatment for

stimulant use disorder are behavioral modification strategies such as cognitive behavioral therapy (CBT) (40) and contingency management designed to decrease stimulant use (41). However, although reductions in substance use and sexual risk accrue almost immediately, these effects are generally not sustained over time. Behavioral activation therapy (BAT), developed to treat depressed mood, but applied to other related mental health challenges, has shown promise for HIV risk reduction efforts for MSM with problematic stimulant use (42). BAT is designed to help MSM learn strategies to re-engage in life by identifying and actively participating in pleasurable, goal-directed activities (e.g. exercising).

Diverse pharmacotherapies for stimulant use disorders are also under study, which are designed to alter the effects of the drugs on the brain's appetitive systems. Clinical trials have assessed antidepressants, antipsychotics, dopamine agonists, and anticonvulsants (43–46). Currently, there are no FDA-approved medications specifically indicated for the management of stimulant use disorders. Findings from clinical studies have been mixed, though a recently completed placebo-controlled clinical trial of mirtazapine plus substance use counseling demonstrated some efficacy in decreasing amphetamine use and some HIV risk taking behaviors among MSM (46). However, further research is needed to develop optimally effective pharmacotherapies to address the diverse patterns of stimulant abuse in MSM. Ultimately, approaches that integrate culturally-tailored behavioral interventions, like CBT, contingency management or BAT, with pharmacotherapy seem to offer the greatest promise. Part of the complexity of scaling up public health responses to the high rates of substance use in MSM is that polypharmacy is common (so that interventions need to be tailored to the diverse patterns of drug and alcohol abuse), and unlike opioid dependency, chronic sustained party drug use among MSM may be less common than episodic use (e.g. weekend binging), requiring strategies that address the precipitating factors that lead to episodic substance abuse by American MSM.

The concentrated epidemic in Black and Latino MSM

Black and Latino MSM continue to represent a disproportionate burden of new HIV infections in the US (47). While HIV incidence declined among Non-Hispanic White MSM and remained stable among Non-Hispanic Black MSM, incidence has increased among Latino MSM, particularly those less than 35 years old. Scaling up antiretroviral therapy among Black and Latino MSM can help to decrease the rates of new HIV infections; however, lower percentages of Black and Latino MSM are on treatment and have achieved virological suppression compared to White MSM. There are also large racial disparities in PrEP usage, with comparatively fewer Black and Latino MSM using PrEP than White MSM in the first years of its availability, and continued lower use in relation to the disproportionate rate of new infections occurring among Black and Latino MSM (48, 49). In addition to individual-level motivational and behavioral factors that may affect PrEP usage and HIV treatment adherence, there are structural and health systems-related factors that generate racial inequities in health outcomes (Figure Two). Racial biases affect clinical decision-making and serve as structural barriers to prevention by self-justifying health care providers' reduced willingness to prescribe PrEP to Black patients and intensifying minority MSM experienced stigma when interacting with the American health care system (50, 51). These biases limit the ability of PrEP to reduce racial disparities in HIV incidence among

MSM (52). For many Latino MSM, the intersection of racism, xenophobia, homophobia and HIV stigma in healthcare settings impede full access to culturally and linguistically appropriate clinical prevention and treatment services (53, 54).

As noted, new infections among Black and Latino men are highest in the southern US (see Sullivan et al in this issue). These regional concentrations reflect geographical and historical sociopolitical climates that undermine, rather than facilitate, access to, and full engagement, in HIV clinical prevention services. Most southern states have not enacted Medicaid expansion under the Affordable Care Act, thereby limiting access to medical care for low-income people (55). Black and Latino MSM communities have larger proportions of individuals who are unemployed or underemployed, and/or living in poverty, which places them at-risk for experiencing financial hardships impeding their access to health insurance. Economic hardships also directly potentiate HIV spread, since they are associated with condomless sex and higher numbers of sexual partners among Black and Latino MSM (56). The influence of economic hardships on HIV risks in racial and ethnic minority MSM is further complicated by legal hardships that result from their high vulnerability to arrest, conviction, and other adverse interactions with the federal and local correctional justice systems (57–59). The disproportionate exposure of Black and Latino men to the criminal justice system leads to disenfranchisement that restricts post-incarceration access to resources (e.g., housing, employment, food) that are known to be key social determinants of HIV infection (60).

Although there are similar drivers contributing to the HIV disparities seen in Black and Latino MSM, there are also notable differences. Latino MSM have been found to have more highly disassortative partner mixing practices (i.e. having non-Latino sex partners), and are more likely to report having older sex partners, and engaging in condomless anal intercourse more frequently than Black MSM (17, 61). In addition, the HIV epidemic among Latino MSM is uniquely influenced by immigration and a wide range of cultural norms (62), given the different patterns of Latino migration to the US. The significant differences in acculturation, economic and educational status require the development of tailored approaches that appropriately address the diverse experiences of Latino MSM.

Young MSM and the Next-Gen Epidemic

New HIV infections in the US are increasingly concentrated in young MSM (YMSM), particularly those who are from racial and ethnic minorities, particularly in the South (63). Multiple structural and psychosocial barriers impact YMSM engagement in HIV care and prevention services, which need to be adequately addressed in order to effectively halt this epidemic (Figure Three). Youth may lack resources (e.g. insurance, finances, transportation) to self-refer to HIV care and prevention services. They may not have disclosed their sexual orientation to parents or other adult guardians, who would become aware of any insurance charges for HIV testing or medication, limiting their ability to access services. Moreover, in many states, particularly in the South, accessing specific screenings and treatment require parental consent for minors under 18 years old. Additional impediments to care include low rates of HIV testing and serostatus awareness, as well as stigma, distrust, and competing priorities. After diagnosis, many YMSM do not fully engage in medical care, or achieve

viral suppression (62, 63). Further, despite scientific evidence of the efficacy, safety and acceptability of pre-exposure prophylaxis (PrEP) to prevent HIV infection in MSM (64), and demonstration of safety and acceptability in youth (65), PrEP uptake in YMSM has been limited. Moreover, the success of either antiretroviral therapy (ART) and PrEP requires sustained and consistent adherence, which pose challenges for youth.

Developmentally, youth often maintain perceptions of invulnerability, may act impulsively, often failing to consider the potential consequences of their actions, including engaging in behaviors that can contribute to HIV acquisition. Lack of support from family, peers, and other adults may compound feelings of isolation, making it harder to establish a comfortable sense of their own sexuality. Receipt of credible, relevant health information delivered without judgement or bias is critical. However, despite being supported by numerous health and medical organizations and backed by science, sex education programming varies widely across the US (66). Sex education is currently required in less than half of all states, and even when required, it is not necessarily comprehensive or medically accurate. While 12 states require discussion of sexual orientation, three of these states, all located in the Southern US, actually require only negative information about sexual and gender minority health be provided. Ironically, research supports the effectiveness of comprehensive HIV prevention interventions in improving youth knowledge and changing attitudes, behaviors and health-relevant outcomes (67).

Social and digital media are omnipresent in all aspects of adolescents' lives, from maintaining friendships, initiating dating and sexual relationships, to accessing sexual health information (68). (Textbox 2) Thus, it is essential that the potential for digital tools to address gaps in the HIV prevention and care cascade be optimized for YMSM (69). Strategies to engage youth in HIV prevention and care must address the structural conditions and intertwined psychosocial problems that magnify their risk. Finding the right mix of developmentally-sensitive behavioral and biomedical components that address multi-level risk factors, including individual, peer/partner, family, provider and community level barriers to uptake and use of prevention tools is critical. Technology-based platforms could augment prevention services by delivering integrated strategies in an engaging and culturally-congruent way for YMSM (70, 71). Optimal implementation of these tools in clinical and community-based settings will require engaging health care providers, educators, and parents/guardians, and may be facilitated through developing culturally-tailored approaches that interface with electronic health records and patient portals. Social media offer powerful tools that can reach, engage, and retain youth in HIV prevention and care interventions and deliver personalized, theory-based interventions and health education (72, 73). Machine learning and natural language processing algorithms may be able to be utilized to better understand online behaviors that foster risk (e.g. by analyzing sexual networking apps or stigma-related postings on social media) and may help to understand the types of content that can promote adherence to preventive behaviors.

Older MSM: Comorbidities and resilience

In 2016, nearly half of American PWH were aged 50 and older, with 2/3 being MSM, and although new HIV diagnoses are declining among older people, approximately 1 in

6 HIV diagnoses in 2017 were in people over 55 (74). Older Americans are more likely than younger PWH to present with late-stage HIV infection at the time of diagnosis (75), leading to worse clinical outcomes. Among people aged 55 and older who received an HIV diagnosis in 2015, 50% had been living with HIV for 4.5 years before they were diagnosed—the longest diagnosis delay for any age group. Delays in diagnoses may be due to older people not considering themselves to be at risk of HIV infection, and clinicians incorrectly presuming that older MSM are not sexually active, and/or thinking that HIV-related symptoms were manifestations of illnesses related to aging (76). Although older PWH tend to visit their providers more frequently, they are less likely than younger people to discuss their sexual or drug use behaviors with clinicians, who are less likely to ask older patients about these issues, creating a “conspiracy of silence” delaying HIV diagnoses, and creating missed opportunities for discussions about PrEP and other prevention modalities for at risk, uninfected older MSM (77).

Aging with HIV infection presents other special challenges for MSM along with other PWH, since chronic HIV increases the risks for cardiovascular and pulmonary disease, bone loss, and certain cancers (78, 79), which also tend to be more prevalent in older individuals, independent of HIV serostatus. Older patients and their providers need to carefully monitor interactions between the medications used to treat HIV and those used to treat common age-related conditions such as hypertension, diabetes, elevated cholesterol, and obesity. Older MSM face may encounter some unique challenges not experienced by heterosexual people with HIV. Older MSM may face social isolation due to illness and/or loss of family and friends like other aging adults, but not have optimal supports. Unlike younger MSM, older MSM did not grow up in an era when marriage equality was sanctioned, so they may be less likely to live in long term, stable partnerships and have children. Some older MSM may have experienced ostracism from their birth families because of their sexual orientation, further exacerbating their isolation as they age. In a society that highly values certain norms of physical beauty, aging MSM may find that meeting new partners difficult. The resultant loneliness may be associated with depression, lead to “self-medication” with substances, and complicate optimal health maintenance, which is less likely to happen when insufficient social supports are present.

Aging with HIV should not be seen as a decifit-based experience for MSM. As PWH (and other LGBT people) are living longer, an increasing array of organizations like SAGE (Seniors Aging in a Gay Environment, www.sageusa.org) and the LGBT Aging Project (https://fenwayhealth.org/the-fenway-institute/lgbt-aging-project/) have been developed to provide supportive services and activities that can help prevent social isolation and adverse health consequences for aging MSM and other sexual and gender minority individuals. Older MSM living with and without HIV have experienced the brunt of the HIV epidemic, and their responses, ranging from the creation of the globally influential ACT-UP to the development of myriad local services, provide lessons and cautionary tales for coming generations of MSM, growing up in a world that has experienced gay liberation and the development of HAART and PrEP, but remains replete with other emerging challenges.

Transgender MSM: Understudied and at high risk

Transgender men or trans masculine people – who may identify as men, transgender men, trans males, or another gender identity, and who were assigned a female sex at birth (hereafter referred to as trans men) – have been hidden and ignored until recently (80). Researchers have more recently begun to evaluate partnership patterns and behaviors of trans men (81, 82). In a 2018 systematic review of US studies, HIV infection prevalence was estimated to be 3.2% in trans men (95% CI=1.4%, 7.1%; 8 studies) (83), 10 times greater than the general US population. Several studies have found that many trans men identify as gay, bisexual, or queer, and engage in sexual activity with cisgender males, as well as partners of other genders. For example, of 366 sexual partnerships reported in a study of 122 trans men in San Francisco, 44.8% involved cisgender women, 23.8% cisgender men, 20.8% with trans men, and 10.7% with trans women (84), similar to findings noted in a Massachusetts study (85).

Trans MSM may be at-risk for HIV infection when they have condomless receptive anal and/or frontal/vaginal sex with cisgender male partners, or when they share needles for hormone or recreational drug injection. Few studies have been conducted to understand and characterize HIV risks and prevention needs of trans MSM (86). In addition to sexual minority stigma stressors due to being MSM, trans MSM may experience gender minority-related stigma exposures such as those resulting from having a non-binary gender identity. Trans MSM may feel pressure from cis male sex partners to engage in risky sexual behaviors to validate their male/MSM identity (87–89). Psychosocial syndemics have been found to be associated with HIV risk among trans MSM, suggesting that multi-level prevention interventions are needed to effectively address their unique needs (90). There have been few evidence-based HIV prevention interventions for trans men, though one behavioral health pilot tailored for young trans MSM (LifeSkills for Men) has appeared promising (91). Although many trans men might benefit from PrEP, recent studies have found low levels of awareness and knowledge, and barriers to access (92). In an online national sample of more than 800 HIV-negative American trans MSM, 55.2% had behavioral indications for PrEP using modified CDC criteria (93). Because of the lack of attention to the unique HIV prevention needs of trans MSM, there are no specific data regarding PrEP efficacy or effectiveness for this population, but pharmacological studies in other populations would suggest that adherence to daily PrEP would protect trans men against HIV. Further research is needed to better identify and educate trans MSM who may benefit from PrEP, and the providers who care for them, and to develop programs to facilitate their access.

Professional responsibility in the U=U and PrEP era

MSM have been the focus of public health programming designed to decrease HIV transmission and disease outcomes since the beginning of the epidemic. From early condom strategies to recent antiretroviral-based prevention interventions, public messaging has been a delicate balance between scaling personal prevention methods into viable and sustainable public health interventions while avoiding further stigmatizing an often marginalized group. Unfortunately, the right balance has not always been achieved. Early days of HIV prevention messaging during the pre-ART era often vilified MSM sexual activity as disease spreaders, introducing HIV to the general population. MSM sexuality was reframed by HIV into

episodes of risk with associated odds of transmission rather than an expression of normal and healthy human desire. The divide between people living with HIV and those "at high risk" created a level of stigma and duality that resulted in HIV positive MSM being looked at as vectors of disease and HIV negative MSM who were sexually active reduced to irresponsible risk-takers. More recently, the dawn of effective antiretroviral-based HIV prevention, coupled with convincing data from well-designed studies, has begun to change this serological divide. Extensive data demonstrating that people living with HIV who take antiretrovirals and maintain an undetectable viral load cannot transmit their virus, referred to as "Undetectable=Untransmittable" or "U=U" (94–96), and the demonstration of PrEP efficacy for MSM (65) has facilitated progressive public health interventions to dismantle the duality between HIV negative and positive, to create more integrated sexual health programs. One leading example is the New York City Department of Health and Mental Hygiene "status neutral" framework for prevention and treatment interventions (Figure Four). At the core of this strategy is the aspirational vision that services and programming must be approached in a patient-centric way that is agnostic to HIV status, dismantling the institutional silos that propagate the divide between positive and negative (97, 98). The desired result of shifting public health into a "status neutral" frame is to counter institutionalized stigma by positioning the person living with HIV whose virus is suppressed and who cannot pass HIV, and the HIV negative person on PrEP who is nearly uninfectable, to a place where they and public health treat them similarly based on the result of their HIV test. With an increasing number of jurisdictions adopting "U=U"-focused programming and messaging and upscaling PrEP, strides are being made to accelerate a "status neutral" approach for public health messaging and programming. Funding streams, however, have not matured to address this new framework. Governmental support is often siloed by status, creating deep administrative hurdles that often prevent truly "status neutral" programming by the inadvertent generation of administrative burden that blocks good public health practice.

With the availability of antiretrovirals that can dramatically improve individual health and curtail the epidemic, the role of clinicians has become increasingly important as part of a comprehensive strategy to "Get to Zero." Unfortunately, many clinicians remain uncomfortable eliciting a sexual history, which is foundational to determine whether a patient is at risk for HIV, and getting them tested, the first part of any effective treatment or prevention cascade. Studies have shown that heterosexual, as well as sexual and gender minority, patients are comfortable being asked about their sexual orientation and gender identity (99), so the onus is on health care professionals to understand how their own implicit biases, ranging from homophobia to racism to being uncomfortable discussing sexual behavior, impede the optimal delivery of health care services. Fortunately, there are an increasing array of educational materials, including texts and web resources, such as www.lgbthhealtheducation.org that can enhance provider knowledge and facilitate cultural competency in the delivery of health services for MSM and other sexual and gender minority patients (Figure Five).(Textbox 3) Another positive development is the commitment of medical education professional credentialing bodies (e.g. the American Association of Medical Colleges) to ensure that sexual and gender minority health is a routine part of training curricula (100). This may auger well for increased training leading to more

culturally competent care that can better engage MSM in HIV treatment and preventive services.

Conclusions

This review has identified several common factors that potentiate the HIV epidemic among all American MSM, including biological vulnerability, unique network characteristics, and internalization of societal stigma leading to behavioral syndemics, enhanced by the disinbiting effects of substance use. Growing up in non-affirming environments has health consequences. But this review has also established that diverse subgroups of MSM exist, with unique racial, ethnic, age-related, and gender identities and needs. Institutional racism and cultural insensitivity will potentiate the increasing disparities in HIV incidence and access to optimal treatment and prevention services. Interventions that can take advantage of advances in antiretroviral-based treatment and prevention to curtail the domestic epidemic in US MSM will need to attend to the common themes (e.g. integrate behavioral health services with biomedical interventions), but will need to understand and develop culturally-tailored programs to address the specific drivers of HIV risk in these different, but similarly vulnerable, populations. These interventions will need to attend to structural issues, including racism, poverty, homophobia, and transphobia, and understand the differences in how different age cohorts meet partners and access health information, e.g. being attentive to how to educate and engage MSM in the digital era. Although great progress has been made in recent years, almost half of American PWH are not currently virally suppressed on HAART, and less than ¼ of US MSM who might benefit from PrEP are using it, so much work remains to be done to develop effective, culturally congruent programs to addresss these challenges. In the face of many adversities, American MSM have demonstrated resilience, so there are reasons for optimism in this era of effective treatment and prevention modalities, if associated structural and societal issues (e.g. access to health insurance, culturally appropriate care, etc) are appropriately addressed).

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Textbox 1:

MSM Couples

A large proportion of new HIV infections occur in the context of serious or primary partnerships among gay, bisexual and other men who have sex with men (MSM) in the United States (estimated 35-68% of new infections), and this proportion is estimated to be higher among young MSM under age 25. Incident infections in primary partnerships are driven by multiple factors, including lower rates of protective behaviors in relationships (i.e., condom use, pre-exposure prophylaxis), a higher likelihood of receptive anal sex, and a high rate of undiagnosed HIV infection, particularly among young MSM. HIV prevention in primary partnerships is also complicated by various relationship dynamics, including engagement in various types of non-monogamy arrangements, which can help to enhance sexual satisfaction but may also introduce HIV risk into the dyad. However, romantic relationships provide myriad health benefits to individuals, and entry into a romantic relationship is associated with improved mental health and wellbeing in both different-sex and same-sex couples. Thus, providing relationship education to male couples may serve as an impactful platform through which to optimize relationship functioning and reduce HIV acquisition and transmission. For example, Newcomb and colleagues developed the 2GETHER program, an integrated relationship education and HIV prevention program for young male couples that is currently being evaluated for efficacy in two randomized trials in the United States (https://isgmh.northwestern.edu/about/impact/2gether/). The goal of this program is to improve couples' ability to communicate effectively and resolve conflict in order to enhance relationship satisfaction, after which HIV prevention content tailored to the needs of male couples can most effectively be integrated into participants' lives. More specifically, couples then have the skills to establish and maintain mutually agreed upon monogamy or non-monogamy arrangements and incorporate the biomedical and behavioral HIV prevention strategies that are most appropriate for their specific arrangement.

Textbox 2:

Mobile Technology to Reach Young MSM

Mobile technologies and social media offer powerful tools to reach, engage, and retain youth in HIV prevention and care interventions and deliver personalized, theory-based intervention components and health content.[1–3] Technology use is ubiquitous among youth, and plays a key role in each stage of the prevention and care continua. In the US in 2018, 89% of US adults use the internet and 77% owned a smartphone, including 94% of young adults (age 18-29) and 65% of those living in rural areas.[4,5] There is a growing body of literature exploring how youth use mobile technologies to facilitate education about HIV prevention and treatment,[6] provide knowledge about sexual health,[7] and engage at-risk youth groups.[8] Technology-based platforms offer a potential way to deliver integrated behavioral and biomedical strategies that address multi-level risk factors, including individual, peer/partner, family, provider and community level barriers to uptake and use of prevention tools.

Youth, specifically sexual and gender minority (SGM) youth, are receptive to HIV-related internet and mobile phone delivered interventions.[2,9,10] The research team led by Lisa Hightow-Weidman has been on the forefront of creating flexible, scalable mHealth platforms to deliver both biomedical and behavioral prevention to SGM youth[11] The UNC/Emory Center for Innovative Technology across the Care Continuum (iTech, www.itechnetwork.org), funded by the NIH through the Adolescent Trials Network (ATN) for HIV Interventions, is which is currently supporting 11 technology-focused research studies addressing the prevention and care continuum among adolescents and young adults in the United States. iTech represents a collaborative center that creates an infrastructure to share and disseminate best practices in technology-based HIV interventions to other projects and programs serving youth.

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relationship education and HIV prevention program for young male couples that is currently being evaluated for efficacy in two randomized trials in the United States (https://isgmh.northwestern.edu/about/impact/2gether/). The goal of this program is to improve couples' ability to communicate effectively and resolve conflict in order to enhance relationship satisfaction, after which HIV prevention content tailored to the needs of male couples can most effectively be integrated into participants' lives. More specifically, couples then have the skills to establish and maintain mutually agreed upon monogamy or non-monogamy arrangements and incorporate the biomedical and behavioral HIV prevention strategies that are most appropriate for their specific arrangement.

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Textbox 3:

Training the Workforce to Provide Culturally Appropriate Care

The National LGBT Health Education Center at The Fenway Institute (Education Center) has been funded by the U.S. Health Resources and Services Administration's Bureau of Primary Health Care since 2011. The Education Center provides training and technical assistance across all 50 U.S. states, Washington DC, and Puerto Rico, to implement health systems and services that are culturally responsive to the needs of sexual and gender minority (SGM) people, with the goals of advancing health equity, addressing and eliminating health disparities, improving quality of life and health outcomes, and optimize access to cost-effective health care

The Education Center's core activities include:

- Teaching SGM concepts and terminology through both didactic material and experiential activities to train front-line staff, core clinical teams, social workers, case managers, administrative staff, enabling staff, and members of governing boards.
- Addressing unique challenges in SGM health, based on cumulative evidence from population health research.
- Focusing attention on diverse SGM populations and their unique needs, such as those arising at the intersection of race, ethnicity, language, geography and age.
- Guiding organizations in collecting and harnessing data on sexual orientation and gender identity (SO/GI) via electronic health records (EHRs).
- Collaborating with partner organizations to create and sustain inclusive and affirming health care environments for SGM patients, students, and staff.
- Leading training and technical assistance focused on HIV prevention and treatment at U.S. federally qualified health centers (health centers) as part of the U.S. government's "Ending the HlV Epidemic: A Plan for America" initiative.

The Education Center's national expert faculty and staff have implemented health programs in many regions of the U.S. that have not traditionally had access to training on SGM health, such as Alaska, Arizona, Indiana, Maine, Mississippi, Puerto Rico, South Carolina, Tennessee, Texas, and South Carolina. Its website (www.lgbthealtheducation.org) is a resource-rich platform offering free access to a broad range of online programs and publications, with over 36,000 registered users who receive free continuing education credits by utilizing archived webinars or learning modules. The Education Center promotes its resources through the website's home page and calendar, as well as through the *LGBTQIA+ Health Line*, a bimonthly outreach e-newsletter that reaches a mailing list of >60,000 subscribers.

- Webinars: Since 2011, the Education Center has produced over 140 live webinars for health centers nationally. These webinars focus on SGM health

topics that respond to the emerging needs of health centers and LGBTQIA+ communities. National webinars are archived on the website for health center staff who cannot participate in the live events and have been viewed by over 110,000 people.

- National Publications: In order to support health care organizations in enhancing access to quality care for SGM people, the Education Center produce a variety of clinical best practice briefs, fact sheets, learning guides, and toolkits for the Bureau of Primary Health Care. All publications are available for free from the website, and the 81 publications currently on the website have been downloaded over 42,000 times, including an informational pamphlet on SO/GI data collection for patients in six languages.
- Transgender Health ECHOs: Project ECHO is an evidence-based learning model that connects resource-limited health care teams with clinical experts through videoconferencing. Participants develop knowledge and skills through brief didactics followed by participant-led case learning. The Education Center launched *Transgender Health ECHO* in 2016. After a successful first year, and in response to increasing demand for transgender health training, the Education Center now operates three concurrent year-long Transgender Health ECHO cohorts with over 70 health centers in parallel and has trained and implemented transgender health programs with a total of 129 U.S. health centers.
- Live Conferences: *Advancing Excellence in Transgender Health* is an annual three-day continuing medical educational conference on providing gender-affirmative health care for transgender and gender-diverse adults, adolescents, and children. Presented in collaboration with Harvard Medical School, the course is designed to train the whole health care team in primary medical care, behavioral health, gender-affirming hormone therapy, HIV prevention and treatment, and reproductive care. Participants have attended from 41 U.S. states, Washington DC, and Puerto Rico, as well as international participants from countries that included El Salvador and South Africa.

  Advancing Excellence in Sexual and Gender Minority Health is an annual three-day conference on providing affirmative health care for SGM people. Sessions are led by expert faculty specializing in patient care and include didactic presentations, interactive panels, and case discussions on SGM health equity, youth, older adults, behavioral health, HIV/STI treatment and prevention, collecting SO/GI data, and building inclusive health care environments. In 2018, the conference hosted attendees from 38 U.S. states, as well as international participants from countries that included the Phillipines and South Korea.

Key Points

1. American men who have sex with men (MSM) were the first individuals identified with AIDS in 1981, and continue to be the US population with the greatest disease burden and HIV incidence.
2. The drivers of HIV transmission are diverse, including social/structural, network, biological and individual behavioral factors, necessitating multi-faceted approaches to HIV prevention.
3. Internalization of societal homophobia and other stessors experienced by MSM can lead to depression, and other behavioral health challenges, including substance use, which are associated with increased sexual risk taking, decreased engagement in care, and decreased medication adherence, potentiating new transmission cycles.
4. The demographic and gender diversity of MSM require tailored approaches. The disproportionate HIV epidemic among Black and Latino MSM is potentiated by poverty, racism, and assortative mixing, requiring culturally appropriate engagement.
5. Younger MSM may be more prone to engage in risk and be more amenable to engagement with digital media, while older MSM may need specific programs since peer support may be limited, and the sequelae of chronic HIV infection may interact with age-associated morbidities. Transgender MSM have unique health challenges, ranging from obtaining optimal gender affirmative care to negotiating sex with cisgender MSM.
6. In the U=U and PrEP era, health care professionals can play a unique role in providing supportive and informed care, and preventive services, for MSM.

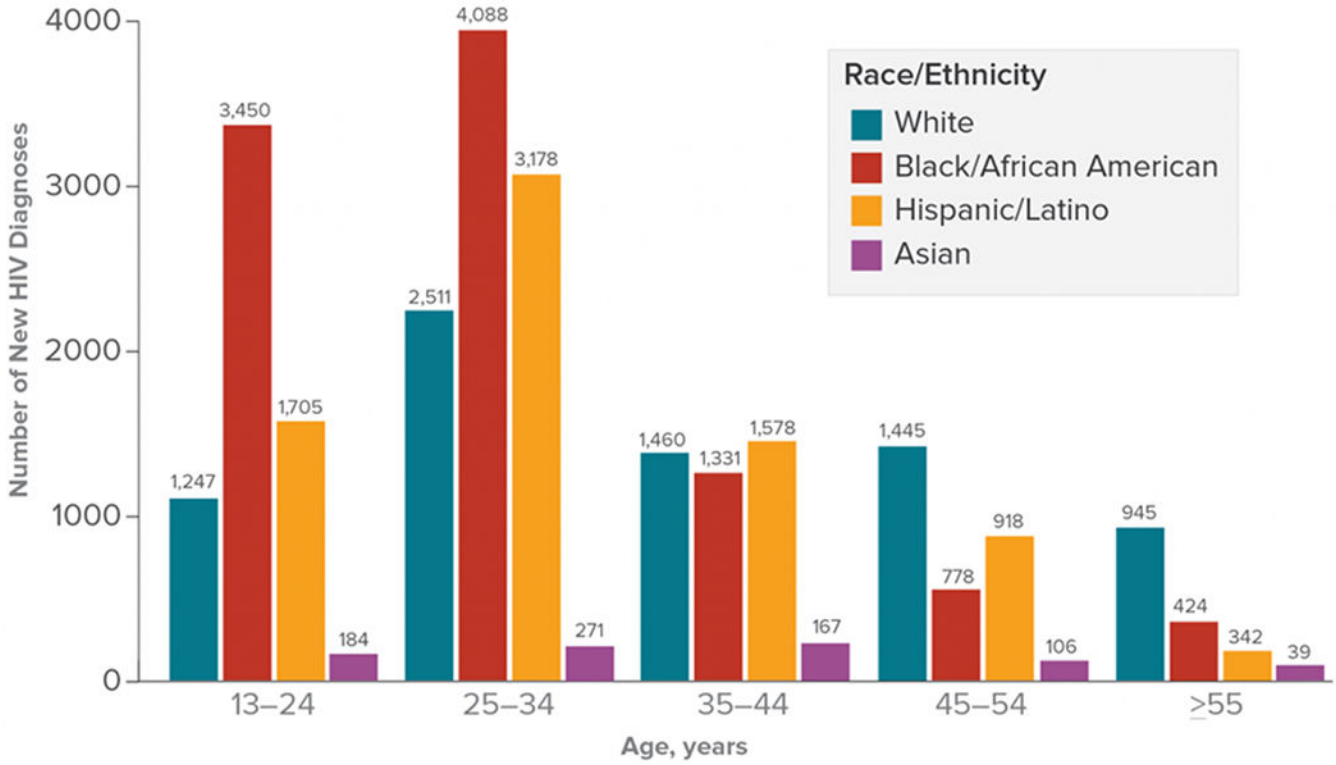

Figure 1: New HIV Diagnoses Among Gay and Bisexual Men in the US and Dependent Areas by Age and Race/Ethnicity, 2017

Subpopulations representing 2% or less of HIV diagnoses among gay and bisexual men are not reflected in this chart.

Source: CDC. Diagnoses of HIV infection in the United States and dependent areas, 2017 pdf icon[PDF – 6 MB]. *HIV Surveillance Report* 2018;29.

Figure 2:
Social and Structural Factors that Influence HIV Prevention Outcomes for Black and Latino MSM

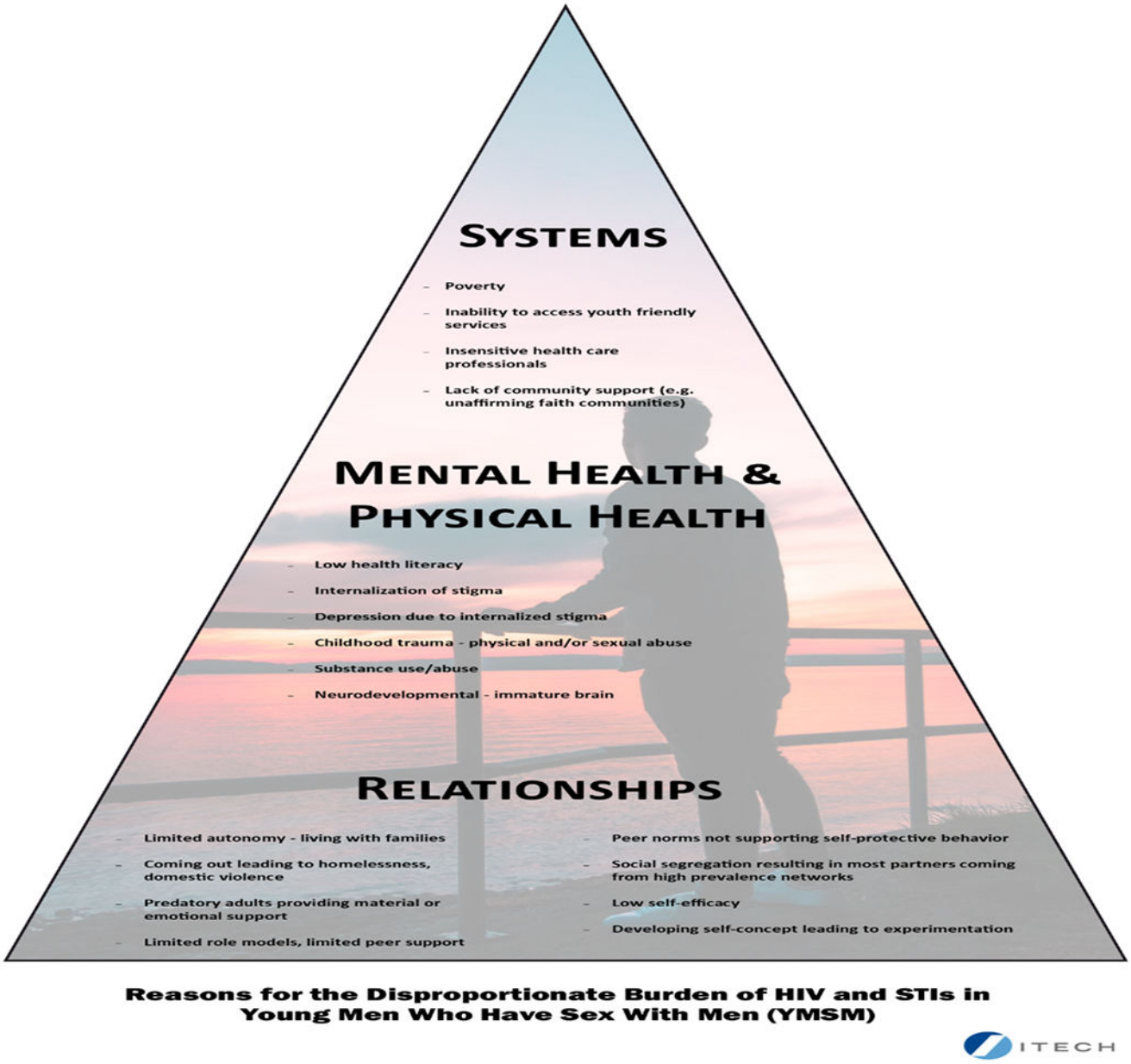

Figure 3:

Reasons for the Disproportionate Burden of HIV and STIs in Young Men who have Sex with Men

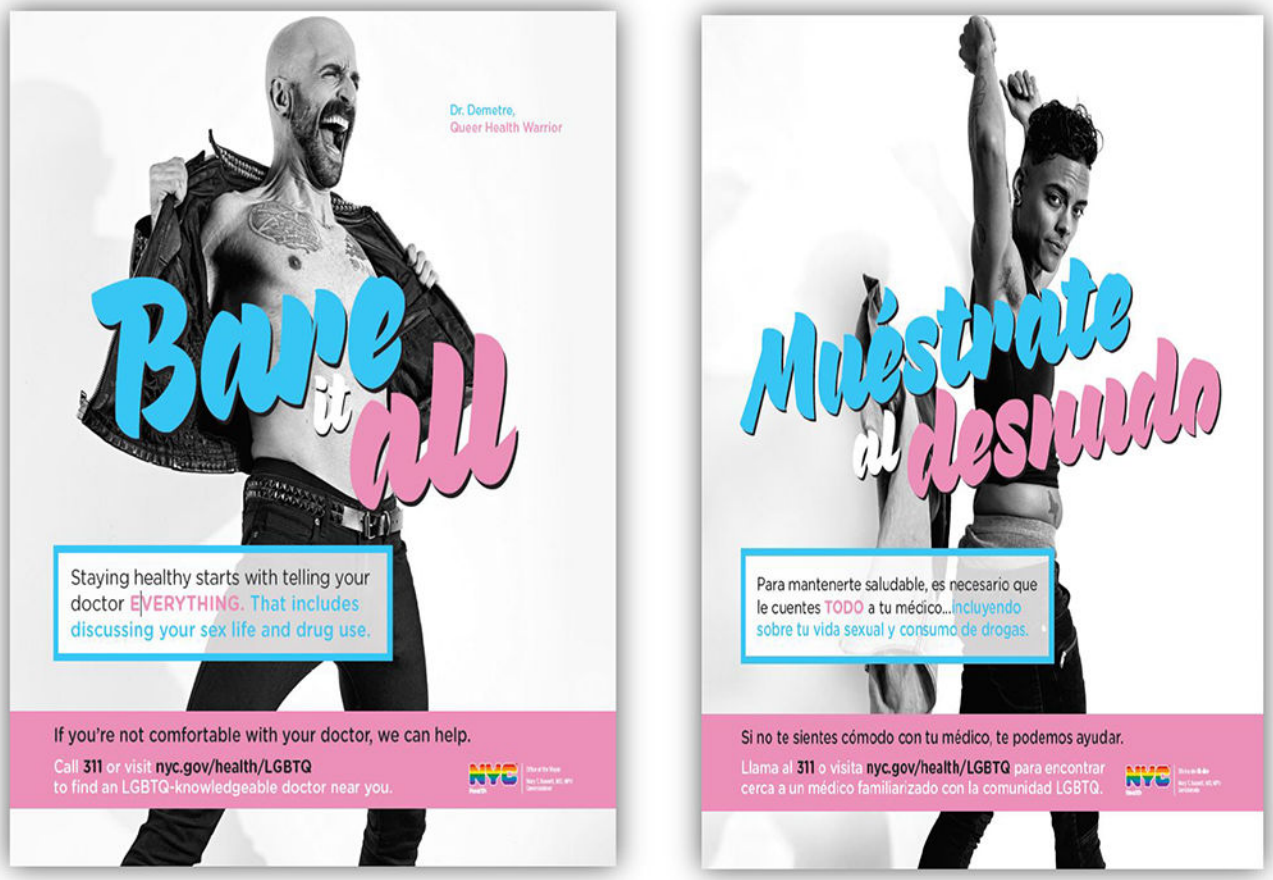

Figure 4:
Status Neutral Public Health Campaign, New York City Department of Health

Figure 5:
Patient and Clinician Resources to Enhance Culturally Competent Care

Table 1:

Multi-Level Drivers of HIV Risk in American MSM

Biology	• **Enhanced efficiency of anal intercourse** • **STI inflammation and ulceration** • **Role versatility (being able to be receptive and insertive)**
Individual behavior	• **Depression, and other affective disorders** • **Substance use** • **Avoidant health-related behavior delaying engagement in care** • **Condomless Sex**
Social Networks	• **Number of partners/time** • **Assortative mixing in high prevalence subgroups** • **Sexualized venues (e.g. bath houses, apps)**
Structural/Institutional	• **Societal discrimination: racism, xenophobia** • **Health system discrimination** • **Punitive laws and criminalization** • **Poverty** • **Violence/victimization**