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Review

Mental health in 2020 for men who have sex with men in the United States

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Abstract. Despite continued advances in HIV prevention and treatment, gay and bisexual men and other men who have sex with men (MSM) remain the population most impacted by HIV/AIDS in the US and many other Western countries. Additionally, MSM are disproportionately affected by various psychological problems, including depression, distress, trauma and substance use. These challenges frequently co-occur, and are associated with higher rates of behaviours related to HIV acquisition and transmission, HIV infection, and, for those living with HIV/AIDS, lower levels of treatment engagement. Moreover, racial disparities exist among MSM in the US; for example, young African American MSM bear a disproportionate burden of the continuing HIV epidemic, likely related to disparate HIV prevalence in partner pools as well as long-standing structural inequities. In this review, the mental health challenges facing MSM primarily in the US, related to HIV and STI prevention and across the HIV care cascade, including HIV diagnosis, engagement and retention in care, and antiretroviral adherence, are illustrated. Disparities among MSM including racial and ethnic, age-related and structural barriers associated with HIV prevention and treatment, as well as current interventions, are also described. Moving forward towards 2020, resources will be needed to assess and implement scalable intervention strategies to address psychological and social barriers to HIV and STI risk reduction and treatment for MSM, with a particular focus on the most vulnerable subpopulations. As access to prevention and treatment strategies expand, and new breakthroughs continue to emerge, behavioural strategies will continue to be needed to reduce risk and increase uptake and engagement among MSM most at risk through 2020 and beyond.

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Introduction

Despite continued advances in HIV prevention and treatment, including treatment as prevention (TasP) and pre-exposure prophylaxis (PrEP), gay and bisexual men continue to represent two-thirds of new HIV infections annually in the US.[1,2] Gay and bisexual men and other men who have sex with men (MSM) experience significant mental health disparities, including depression, distress, trauma and substance use compared with heterosexual men.[3–6] For example, compared with heterosexual men, rates of depression and distress are estimated to be 17% higher among MSM,[7] and rates of post-traumatic stress disorder (PTSD) and substance use are twice or greater among gay and bisexual men and other MSM compared with heterosexual men.[8,9] The relative high frequency of mental health problems among MSM seems to be even higher among MSM living with HIV/AIDS. For example, in a sample of over 500 gay and bisexual men living with HIV in primary care, 47% met diagnostic criteria for an anxiety disorder, 22% for depressive mood disorder and 25% had elevated substance abuse symptoms, including 20% of participants endorsing symptoms of alcohol abuse.[6] These problems are not only distressing and interfering in and of themselves, but they also are associated with health concerns, such as higher risk of HIV or other sexually transmissible infection (STI) acquisition and, for MSM living with HIV/AIDS, suboptimal engagement in and adherence to HIV and STI treatment uptake and care. Accordingly, no matter what new biomedical or behavioural HIV prevention or treatment tools emerge as we approach 2020, those at highest risk for HIV acquisition or worse HIV treatment outcomes are likely to be those affected by comorbid mental health problems.

The high prevalence of these types of mental health problems among MSM, particularly gay and bisexual men, compared with heterosexual men has been attributed to sexual minority stress.[10,11] Meyer's sexual minority stress model was the first to specifically posit that mental health problems in lesbian, gay, bisexual and transgender (LGBT) populations arise from minority stress.[10,11] Accordingly, mental health problems are consequences of distressing environments, including stigma, prejudice and discrimination, which result in negative psychological outcomes including expectations of rejection, hiding and concealing, internalised homophobia or homonegativity and problematic coping strategies. Hatzenbuehler subsequently added to this, specifying that sexual minorities may have difficulties regulating emotions and coping with stigma, social or interpersonal problems, and maladaptive cognitive constructs resulting from experienced minority stress.[12] As 2020 approaches, it is likely that sexual minority stress will continue to be a problem for gay and bisexual men, particularly with various states in the US continuing to propose or enact legislation that does not protect the rights of LGBT individuals and other individuals who may practice same-sex sexual behaviours and not identify as LGBT.

To consider what 2020 holds regarding mental health for MSM with respect to HIV and HIV prevention, we describe mental health challenges facing MSM related to HIV and STI prevention and across the HIV care cascade, including HIV diagnosis, engagement and retention in HIV care and antiretroviral therapy (ART) adherence. We then describe disparities among MSM, including racial and ethnic disparities, age-related disparities and unique needs, as well as structural barriers or social determinants of health associated with HIV prevention and treatment, and we conclude with a description of current interventions. Ultimately, as access to prevention and treatment expand and new breakthroughs in biomedical prevention or treatment continue to emerge (e.g. HIV vaccines, microbicides, etc.), behavioural strategies will continue to be needed to reduce risk and increase uptake and engagement in treatment among MSM through 2020 and beyond.

Mental health and sexual HIV transmission and acquisition risk behaviours

Relationships between sexual risk and depression, distress, trauma and substance use are well established, and the co-occurrence of these issues has been conceptualised as a syndemic, or set of co-occurring epidemics that synergistically perpetuate disease burden among vulnerable populations.[13] The first articulation of syndemic theory as it relates to HIV risk behaviour (in this case, defined as condomless anal sex, as PrEP was not yet introduced and treatment-as-prevention was not yet established) and being diagnosed with HIV among MSM is from a large telephone survey of MSM published in 2003 by Stall *et al.*[14] Accordingly, the co-occurrence of depression, interpersonal violence, history of childhood sexual abuse and polysubstance use were both associated with each other, but also additively associated with HIV risk behaviour sex and HIV status. These findings have been replicated in different samples of gay and bisexual men and other MSM in the US and internationally, both cross-sectionally and longitudinally.[15–20]

Interventions that do not address these mental health and substance use vulnerabilities produce modest effects that seem to diminish over time.[21–23] Conversely, emerging interventions that address co-occurring mental health or substance use issues may yield better results.[24–26] Recently, Pachankis called for, and initially tested, transdiagnostic interventions to address interrelated psychological and social, or syndemic, challenges facing MSM by addressing their shared basis in minority stress.[27] Interventions that similarly address the presumed underlying minority stress in conjunction with co-occurring mental health and substance use vulnerabilities may do best to address those in the greatest need as we approach 2020 and beyond.

Depression and sexual risk

Depression has been linked to transmission and acquisition risk behaviour; however, the relationship may be non-linear and inconsistent over time.[28–30] Depression is thought, by some, to drive HIV risk behaviours, hindering assertiveness and capacity to initiate safe sex.[31] In a longitudinal sample of MSM living with HIV, a non-linear relationship was identified between depression severity and condomless anal sex, such that moderate depression was associated with greater odds of condomless anal sex compared with low or high levels of depression.[32] Accordingly, it is likely that more severe depression may result in a loss of interest in sex; this potential symptom of depression may be protective against sex risk and account for the non-linear relationship.

Within the context of depression, levels of risk may not remain constant over time. In one study, the sexual risk trajectories of over 400 HIV-negative MSM indicated that those with a history of depression as well as sub-threshold distress were more likely to engage in long-term patterns of condomless anal sex.[30] As the authors articulate, this work suggests that distress and depression should be assessed in relation to risk-reduction efforts such as PrEP administration. As 2020 approaches, depression is likely to remain a mental health issue linked to HIV and STI risk, as well as poor engagement in self-care; it will continue to need to be assessed and addressed in order to reduce risk and enhance engagement in care.

Trauma and sexual risk

The relationship between trauma history and engagement in sexual risk among MSM with and at risk for HIV is complex, and various psychological pathways have been proposed.[33–36] Trauma, including childhood sexual abuse, is consistently associated with increased condomless anal sex among gay and bisexual men and other MSM living with and without HIV.[14,33,37,38] The mechanism through which childhood sexual abuse results in higher rates of condomless anal sex continues to be explored. In a sample of both MSM and women living with HIV with histories of childhood sexual abuse, condomless anal sex with HIV-negative or serostatus-unknown partners was significantly associated with trauma symptoms, as well as shame, fewer active coping strategies, and more substance use.[39] Among a sample of gay and bisexual men living with HIV, internalised stigma was found to mediate the

relationship between trauma-related symptoms and sexual risk behaviour with HIV-negative or unknown serostatus partners.[40] It is likely that trauma interferes with various psychological and social factors relating to health-promoting behaviours, and will continue to interfere with the health of MSM through 2020. We are hopeful that these relationships will be further delineated in the coming years in order to more effectively intervene on these pathways as we approach 2020.

Substance use and sexual risk

As with other syndemic conditions, substance use is associated with higher HIV risk behaviours among HIV-negative MSM and HIV transmission among MSM living with HIV; however, some evidence indicates the causal pathway may need further investigation.[41–43] Some specific substances (i.e. crystal methamphetamine, cocaine, crack, and inhalants including poppers) have been identified as being particularly associated with condomless anal sex among MSM living with HIV, while other studies have found effects for use of 'any' substance to be associated with condomless anal sex.[43–46] Polysubstance use has also been associated with condomless anal sex among MSM living with HIV.[47,48] Further, the number of substances and frequency of use is also associated with condomless anal sex among HIV-negative substance-using MSM.[49] As has been the case, approaching 2020, we do not yet have sufficient interventions for reducing HIV risk behaviours in the context of ongoing active substance use.

Substance use and co-occurring mental health problems and sexual risk

Additionally, specific mental health problems and psychological and social profiles may be associated with unique substances in MSM living with HIV. For example, in one study of MSM living with HIV, attention deficit hyperactivity disorder (ADHD) was associated with increased risk of using tranquilizers, depressant drugs, multiple drugs, and having problems with drug abuse. Whereas depression was associated with stimulant use.[46] Further, MSM who engaged in transmission risk behaviour and had a history of childhood sexual abuse were more likely to endorse marijuana use and had increased odds of opiate use. Mimiaga *et al.* identified distinct patterns of psychological and behavioural health, including substance use, among men living with HIV, using latent class analysis.[48] Specifically, of the three latent classes that emerged (internalising, externalising and low distress), externalising classification, which included high probability of alcohol and drug or poly-drug use during sex, was associated with higher sexual transmission risk than either internalising or low distress classes.

While substance use tends to increase the different types of risky sex behaviours, with the most data examining condomless anal sex, and thereby increase HIV acquisition and transmission, the directionality of substance use and HIV risk remains unclear. In a sample of gay, bisexual and other MSM with and without HIV who endorsed active methamphetamine use, of those who were living with HIV, the majority (65%) reported initiating methamphetamine use after seroconverting. Among those who endorsed methamphetamine use before seroconverting, the average time between initial use and seroconversion was 9 years.[50] Additional work is needed to determine how substance use and condomless anal sex are causally related in order to better intervene.

Ultimately, psychological problems including depression, trauma, substance use, as well as their co-occurrence are associated with HIV and STI-related risk behaviours, including condomless anal sex. However, the pathways accounting for these relationships, as well as their trajectories, require further investigation. As we approach 2020, we will need continued investigation of these pathways in order to better understand and address how these relationships contribute to HIV and STI acquisition and transmission among MSM.

Mental health and HIV prevention, engagement and care

Prevention/PrEP

Pre-exposure prophylaxis (PrEP) has high levels of demonstrated efficacy for HIV prevention, especially among MSM;[51] however, uptake rates vary by geographic location.[52] Accordingly, Hood *et al.* found a substantial increase from 5% in 2012 to 31% in 2015 of MSM in the Seattle area self-reporting lifetime PrEP usage in a cohort study.[53] Applying a continuum of care to PrEP, researchers estimated that only 15% of MSM in Atlanta who could benefit from PrEP would likely achieve protection from HIV with PrEP, given the many barriers to uptake and adherence.[54] In addition to structural barriers (e.g. access) to uptake, various psychological and social issues also function as barriers to PrEP among MSM. These include HIV-related stigma,[55,56] worries that taking PrEP would cause others to perceive them as being too promiscuous,[57] and living in regions with greater state-level stigma (e.g. low density of same sex couples and the dearth of laws protecting LGBT individuals).[52]

Effective HIV prevention from PrEP requires sustained usage and adequate adherence, which is particularly challenging for those grappling with mental and behavioural health issues, including substance use. Qualitative studies have identified a relationship between substance use and PrEP non-adherence among MSM.[56,58] Quantitative work indicates that among MSM, type of substance use in the context of condomless anal sex may be differentially associated with perceptions of PrEP and PrEP usage. For example, in the context of condomless anal sex, MSM who used stimulants were more likely than MSM who used alcohol to be concerned with substance use effecting PrEP non-adherence. Whereas MSM who used alcohol in the context of condomless anal sex were more likely to cite PrEP stigma as a deterrent to PrEP usage.[59] As additional PrEP-related research is conducted leading up to 2020, we can expect to learn more about the psychological barriers to PrEP uptake and adherence, including substance use and stigma.

Because PrEP protects against HIV but not other STIs, some have noted the potential for increases in condomless anal sex as a result of having protection when taking PrEP.[60] In San Francisco, PrEP's introduction and scale-up seems to have coincided with a decrease in condom use and increase in STIs.[61] Given the high levels of bacterial STIs (*Neisseria*

gonorrhoeae, *Chlamydia trachomatis* and syphilis) among MSM in the US, including the increasing incidence of HIV and syphilis co-infection,[62] some have worried about the unintended consequences of PrEP use.[63] Thirty-five per cent of respondents in one study reported believing that PrEP use would decrease their likelihood of using a condom during intercourse.[64] However, despite these concerns, recent trials suggest that PrEP status is not associated with increased condomless anal sex among the majority of participants.[65,66] PrEP represents one of the greatest available tools to substantially reduce the incidence of HIV. In order to reap the full benefits of PrEP across geographic locations, studies leading up to 2020 for MSM should address mental health barriers to uptake and adherence, as well as address the relationships between PrEP use, condomless anal sex and STI incidence.

HIV diagnosis

Given the importance of early diagnosis and treatment for optimal health outcomes and reduced transmission rates, psychological barriers to HIV testing and diagnosis will be a key area for MSM in 2020. Although the United Nations Program on AIDS (UNAIDS) aims for 90% of people living with HIV to know their diagnoses by 2020,[67] only an estimated 73% of MSM living with HIV in the US were aware of their HIV status in 2016.[68] In a 14 study review, Deblonde *et al.*[69] identified that among MSM, the most prevalent barriers to HIV testing were low-risk perception, fear of HIV disease, fear of disclosure and limited access to health services, which is consistent with the Center for Disease Control and Prevention (CDC)-reported barriers to testing.[70] These findings indicate that low HIV testing rates may be attributable to low HIV-risk perception, fear of a HIV diagnosis and disclosure, as well as limited access to health services among MSM, and are exacerbated among young MSM between the ages of 18–19[70]

Additionally, constructs related to sexual minority stress, such as greater MSM-related stigma, have been associated with low rates of HIV testing and diagnosis. Specifically, internalised homonegativity, HIV testing stigma and experienced provider discrimination have been associated with lower rates of HIV testing among MSM.[71,72] Consistently, countries with high MSM stigma have lower HIV testing rates compared with countries with lower stigma against MSM.[73] Together, findings indicate that low HIV testing rates among MSM may be proximally or distally attributable to experienced and internalised minority stress and stigma, including homonegativity, as well as low HIV-risk perception and fear of a HIV diagnosis.[74–76] These psychological and social barriers to HIV testing and diagnosis (e.g. low-risk perception, fears related to HIV and sexual minority stress) will need to be addressed through 2020 in order to provide optimal HIV treatment and reduce HIV transmission among MSM.

Engagement and retention in care

Understanding and addressing psychological and behavioural barriers to engagement and retention in HIV care are important priorities for MSM living with HIV, as engagement and retention in care improves medical outcomes, including reducing viral load, which reduces chances of disease transmission (i.e., TasP). Mental health challenges such as depression, substance use and stigma have been identified as barriers to engagement and retention in HIV care across vulnerable populations.[77,78] Among MSM specifically, identified barriers to engagement in HIV care include mental health issues, such as depression, trauma and substance use.

People living with HIV, including MSM, who have comorbid mental health or substance use disorders are thought to be more likely to have highly variable patterns of accessing services.[79] Among MSM living with HIV specifically, depression and post-traumatic stress severity account for significant variation in health-care utilisation.[80] However, Magnus *et al.* found that among a mostly African-American young sample of MSM living with HIV ($n = 224$), history of depression was associated with greater retention in care.[81] More work is needed to better understand psychological barriers to engagement and retention in HIV care among MSM living with HIV and comorbid mental health and substance use disorders.

In addition to mental health and substance use disorders, psychological and social challenges are associated with lower levels of engagement in HIV care. Experienced stigma related to racial and sexual orientation from health-care providers, as well as mistrust of medical establishments, are associated with longer intervals between medical visits and poorer ART adherence among African-American men living with HIV (86% MSM).[82,83] In one study including 544 African-American MSM living with HIV, global medical mistrust mediated the relationship between experienced stigma and engagement in care.[82] Among young African-American gay, bisexual and other MSM living with HIV, having a negative self-image, a component of HIV stigma, was negatively associated with early care-seeking after HIV diagnosis and with adherence to medical visits.[84] Similarly, gay and bisexual adolescents living with HIV who endorsed more negative attitudes towards gay and bisexual people were more likely to have missed a medical appointment in the past 3 months.[85]

Integrated treatment models that support ongoing engagement in care and address mental health, substance use and stigma are needed to better engage MSM in HIV treatment, particularly MSM living with HIV who experience comorbid psychological and social problems. Engagement in HIV may be maximised when an individual's barriers are addressed, there is open and accepting patient–provider communication, and coordinated services are available (e.g. mental health and substance use treatment).[78] Concerted efforts are needed to enhance engagement and retention in HIV care, with particular emphasis on addressing the psychological and social context and/or co-occurring psychological problems that interfere with engagement in care among MSM through 2020. Further, social challenges such as stigma, and their related psychological processes, including internalised stigma, require additional research moving forward in order to determine how best to intervene individually and systemically.

Medication adherence and viral suppression

As HIV viral load suppression and reduced transmission risk (i.e., TasP) depends on high levels of adherence, it is important

to continue to identify and address psychological and behavioural barriers to this important aspect of self-care, and address these barriers in interventions for adherence as we approach 2020. Depression, trauma (including childhood trauma) and other psychological challenges have been associated with lower levels of ART adherence among people living with HIV,[86–89] and are known to disproportionately affect MSM.[4] For example, among a sample of 603 individuals living with HIV (NIMH Healthy Living Project, 80% male and 70% LGBQ-identified), elevated affective symptoms of depression predicted ART discontinuation and a 50% higher mean viral load when controlling for self-reported adherence and baseline CD4 count.[90] In the Coping with HIV/AIDS in the South-East (CHASE) Study, an observational cohort study designed to explore the associations between psychological characteristics, health behaviours and outcomes among people living with HIV (64% MSM),[91] non-adherence to ARTs was associated with trauma experienced in childhood and childhood sexual abuse in particular.[92] Other psychological challenges have also been associated with ART non-adherence. Among a sample of people living with HIV (10% LGB), body image distress is prevalent and has been associated with ART non-adherence through elevated depressive symptoms.[93,94] These concerns may be associated with, or exacerbated by, changes in body fat composition associated with ART (e.g. lipodystrophy).[95] In addition, other anxiety disorders (such as Generalised Anxiety Disorder), while understudied, appear prevalent among gay, bisexual and other MSM,[4] and have been associated with poor ART adherence among people living with HIV.[96]

Individual and partner substance use has been associated with ART non-adherence among MSM living with HIV.[97] Specific substances, such as methamphetamine and alcohol, are known to impact ART adherence among MSM living with HIV. Among a sample from the Healthy Living Project, a multisite randomised controlled trial of a behavioural intervention designed to reduce HIV transmission risk behaviour (80% male, 70% LGBQ), weekly or more frequent stimulant use was associated with intermittent ART utilisation, predicting a 137% higher mean viral load when controlling for self-reported adherence and baseline CD4 count.[90] In addition to personal substance use, among a separate sample of men in same-sex relationships, partner stimulant use was associated with lower odds of perfect ART adherence and greater odds of having a detectable viral load; whereas, partner alcohol use was associated with greater odds of perfect adherence over the past 30 days and lower odds of detectable viral load.[98]

The effects of psychological (mental health and substance use) and interpersonal problems on ART non-adherence and viral load are thought to be interrelated. The Multicenter AIDS Cohort Study (MACS), a prospective HIV/AIDS cohort study of 766 MSM living with HIV across four US cities (Los Angeles, Pittsburg, Chicago and Baltimore), found relationships between the number of syndemic conditions (including depression symptoms, substance use and sexual risk behaviour) and lower ART adherence, as well as higher viral load.[99] Similarly, among a sample of MSM living with HIV in Latin America, the number of psychological and behavioural health problems experienced was associated with self-reported ART adherence in a dose–response relationship.[15]

The co-occurrence of these, as well as related stressors such as intimate partner violence (IPV), has also been associated with ART non-adherence and higher viral load values. Pantalone *et al.* identified that among sexual minority men living with HIV, IPV and mental health problems (i.e. depression, anxiety, PTSD and suicidal ideation) were associated with poor ART adherence, higher viral load, worse health-related quality of life and increased emergency room visits.[100] Within this sample, all relationships between IPV and health outcomes, besides IPV and emergency room visits, were mediated by mental health problems, thus suggesting a pathway from IPV to mental health problems to negative health outcomes.

Taken together, various studies have documented that individual-level syndemic problems (such as depression, substance use, other mental health problems and major life stressors) interfere with engagement in care and adherence among MSM living with HIV/AIDS. Additionally, these problems are interrelated and can be additively associated with worse health outcomes when more than one problem is experienced. As we approach 2020, for MSM impacted by co-occurring psychological, behavioural and interpersonal barriers, including IPV, these interrelated problems will continue to need to be addressed in order to optimise ART adherence among MSM.

Disparities among MSM

Racial and ethnic disparities

In addition to mental health disparities between MSM and heterosexual men, there are substantial disparities within the MSM population; African-American MSM are disproportionately impacted by HIV/AIDS.[101,102] However, this disparity does not appear to be attributable to differences in HIV risk behaviour.[103] Sullivan *et al.* found no discrepancy in HIV risk behaviours between white and African-American MSM in Atlanta, and attributed seroconversion discrepancy to higher HIV prevalence within partner pools.[104] More work focused on reducing disparities in rates of STIs, HIV and unknown serostatus among African-American MSM, including psychological factors consistent with broad racial health inequity, will undoubtedly be needed through 2020 and beyond.[101,105–107]

The intersection of minority status, or double minority status, can exacerbate mental health disparities among MSM. Within the MACS, which included 766 MSM living with HIV across four USA cities, African-American MSM experienced worse HIV-related outcomes compared with white MSM, and higher rates of syndemic conditions.[99] Similarly, in a sample of African-American MSM, Reisner *et al.*[108] observed that moderate depressive symptoms among African-American MSM were associated with risk factors for HIV contraction, such as serodiscordant condomless anal sex and past year STI diagnosis. In the General Social Survey, African-American and Hispanic respondents endorsed greater negative attitudes towards homosexuality than white respondents.[109] Choi *et al.* found in a sample of nearly 1200 African-American, Asian/Pacific Islander and Latino MSM in the US that experiencing

racism from the greater community in the past year, in conjunction with perceived homophobia within heterosexual friend networks, was positively associated with depression and anxiety.[110]

On the contrary, some data suggests that white MSM report more substance use compared with African-American and Hispanic MSM. A nationally representative sample indicates that white MSM account for the highest prevalence of drug use, including a significantly greater rate of amphetamine use compared with African-American and Latino MSM in the US.[111] Given the popularity of methamphetamine use among white MSM and a decrease in injection drug use among African-American MSM, there is some suggestion that white MSM may continue to be disproportionately affected by certain types of substance use.[112,113]

The interaction of racism and sexual orientation discrimination appears to be associated with worse HIV-related outcomes among MSM, which may be related to cultural gender norms. Mizuno *et al.* identified that Latino MSM in the US exposed to both homophobia and racism were more likely than those exposed to neither to report condomless receptive anal sex with a casual partner.[114] However, studies examining the relationships between condomless anal sex and racial and sexual-orientation discrimination among MSM living with and without HIV found discrimination related to sexual orientation, but not race, was associated with condomless anal sex.[115,116] These potentially discrepant findings may be accounted for by conceptualisations of gender norms within cultures. Qualitative work has explored tension between homosexuality and cultural conceptualisations of gender roles within the African-American community and the resulting distress among African-American MSM ('gender role strain').[117] Fields *et al.* propose that anti-homosexual expectations of masculinity may cause young African-American MSM to become isolated, thus missing interpersonal attachment opportunities, resulting in greater risk for psychological distress and sexual risk taking compared with white MSM.[117]

While HIV disproportionately impacts African-American MSM, evidence indicates that this disparity is not attributable to differences in HIV risk behaviour. Emerging evidence reveals that intersecting stigmatised identities, or 'double minorities,' are associated with more syndemic conditions, including depression, and may be associated with the HIV racial disparity. Specifically, among African-American MSM living with HIV, intersecting racial and sexual prejudice has been associated with worse HIV outcomes. Given these findings, more culturally informed work will be needed to better understand and address how intersecting discrimination affects mental health, condomless anal sex and HIV outcomes among African-American and Hispanic MSM in 2020 and beyond.

Ultimately, the racial and ethnic HIV disparities among MSM appear to be attributable to differences in partner pools and historical systemic inequity, including divergent access to mental health care. More work will be needed through 2020 to explore the impact of intersecting stigmas and factors contributing to worse health outcomes experienced by African-American and Hispanic MSM.

Age disparities

Aging MSM

While there is a dearth of literature focused on aging gay, bisexual and other MSM,[118] this population faces specific challenges as well as many of the same barriers to HIV prevention and care as their younger counterparts, including depression and substance use.[17,68,119,120] Specific challenges faced by this growing population include psychological, social and medical problems associated with aging. The concept of 'internalised gay ageism' has been described as feeling denigrated or depreciated due to aging within the context of gay male identity, and has been positively associated with depressive symptoms.[121] Among midlife and older gay men, aging-related stress, persistent life course minority stress and increasing sexual minority stress have all been positively associated with depressive symptoms.[122] In a sample of 187 gay, bisexual and other MSM aged 50 years or older living with HIV, depression, HIV-related stigma and sexual compulsivity were associated with ART non-adherence; although, within the sample, older age was associated with better adherence.[123] The incorporation of treatment components related to aging, including psychological and social wellbeing and management of other chronic illnesses, into existing interventions designed for MSM would likely benefit this aging population.

One specific need for aging MSM is tobacco cessation and other substance use. Ompad *et al.* found in a sample of gay, bisexual and other MSM aged 50 years and over living with HIV that 35.7% endorsed current smoking and an additional 35.7% reported being former smokers.[124] Compared with individuals who never smoked, in this sample, current and former smokers were more likely to report opportunistic infections. Other work has identified that aging bisexual-identified MSM may be more likely to report cigarette use, as well as other substance use (i.e. cocaine, crack and heroin) compared with gay-identified MSM.[125] However, bisexual-identified participants were less likely to report the use of crystal methamphetamine, club drugs, poppers or erectile dysfunction medications compared with gay-identified men. As MSM age, additional targeted resources focused on improving the health and psychological wellbeing of this population will be needed.

Young MSM

Evidence indicates that young MSM are disproportionately affected by HIV and psychological problems compared with older MSM, and these disparities may be interrelated. Of the 47 500 Americans newly infected with HIV in 2010, 26% were between 13 and 24 years of age. Further, males 13–19 years old accounted for 93% of all diagnoses of HIV attributable to male-to-male sexual contact in 2011.[126] Reducing the incidence of HIV among young MSM is a high priority as we approach 2020.

In addition to HIV incidence, there is an existing body of evidence indicating that young gay, bisexual and other MSM have a higher prevalence of depression, anxiety and experienced trauma, including higher rates of childhood sexual abuse and substance use disorders compared with young heterosexual men.[127–129] Mustanski *et al.* found that among young MSM, the co-occurrence of childhood sexual abuse and other psychological and social problems are associated with higher

rates of sexual risk behaviours, including having multiple anal sex partners and condomless anal sex, and HIV-positive diagnosis.[130] Additionally, substance use continues to be associated with condomless anal sex among young HIV-negative gay and bisexual men.[131] As young MSM are disproportionately impacted by HIV in the US, and as we approach 2020, we must systematically address interrelated mental health and substance use problems among young MSM, particularly young African-American MSM, who have the highest risk for contracting HIV.

Structural barriers

In addition to the aforementioned disparities, structural barriers such as systemic racism, poverty, incarceration and homelessness are associated with poor mental health,[110,132,133] as well as higher levels of HIV and STI acquisition and lower levels of access and utilisation of HIV care across the cascade generally and among MSM specifically.[134,135] While there is no evidence that minorities experience higher rates of mental health issues, there are disparities in mental health care.[136] These disparities may contribute to why African-American and Hispanic MSM are disproportionately affected by these structural barriers associated with HIV, consistent with longstanding social and economic inequity. In a sample of 2235 African-American and Latino MSM with and without HIV from three US cities (Los Angeles, New York City and Philadelphia), homophobia, racism, financial hardship and lack of social support were all associated with condomless anal sex with a serodiscordant or partner of unknown status.[137] In San Francisco, when HIV-negative African-American MSM, white MSM and transwomen (not separated by race) were compared, transwomen and African-American MSM were more likely to have lower socioeconomic status, to live in areas of lower income and to have higher HIV prevalence compared with white MSM.[138] African-American MSM were also more likely to report more serodiscordant partnerships and serodiscordant sex acts. Further, in the HPTN061 sample of African-American MSM ($n = 1553$), African-American MSM newly diagnosed with HIV were more likely than other African-American MSM to be unemployed, have bacterial STIs and engage in condomless receptive anal sex.[139]

Housing challenges exemplify the complex interrelationships between individual vulnerabilities and structural social determinants of health. Lack of stable, secure and adequate housing has been found to be a significant barrier to HIV medical care, access and adherence to ART, sustained viral suppression, as well as transmission risk among people living with HIV.[140] Housing is an important structural barrier to optimal HIV outcomes, for MSM and others living with HIV.

Incarceration is a structural barrier to HIV prevention and care that disproportionately affects African-American men in the United States. The national EnhanceLink project, a multisite demonstration project assessing the feasibility of HIV testing and linkage to HIV care in jail settings, found that of 1270 jail entrants living with HIV across 10 sites, 65% self-identified as African-American, and 22% of those self-identified as MSM.[141] In this study, African-American MSM experienced higher HIV infection rates and worse HIV health outcomes compared with non-African-American MSM. Vagenas *et al.* found that pre-incarceration, young African-American MSM had significantly less insurance and less access to HIV health care during incarceration.[142] Young African-American MSM were less likely to receive disease management and were less likely to be linked to HIV care post-incarceration.[142]

Together, these structural barriers interact with one another and with racial, ethnic and sexual minority disparities, as well as mental health and substance use issues.[110,132,133] Ultimately, these challenges contribute to inequity among African-American MSM, and to a lesser extent Hispanic MSM. It is imperative that we continue to invest resources to reduce these co-occurring barriers and inequities experienced by African-American and Hispanic MSM through 2020 and beyond.

Mental health interventions

To date, few, but emerging evidence-based intervention strategies exist for treating psychological problems facing MSM, including co-occurring mental health problems and underlying minority stress. Given the frequent co-occurrence of psychological and substance use problems among MSM, mounting evidence suggests that integrated interventions that address interrelated problems may be more beneficial than single-aimed behavioural interventions in reducing HIV risk and promoting HIV care.[143] For example, emerging evidence indicates that interventions may be more effective when cognitive therapy is integrated with risk-reduction counselling to address interrelated trauma (e.g. childhood sexual abuse) and sexual risk among MSM with and without HIV.[144,145] Interventions are also being tested that combine behavioural activation with HIV risk-reduction counselling among HIV-negative MSM who use crystal methamphetamine, as well as contingency management with affect regulation among MSM living with HIV who use stimulants.[98,146] Multi-aimed interventions have also been developed and implemented for improving HIV treatment adherence. Cognitive behavioural therapy (CBT) for depression has been integrated with ART adherence among people living with HIV and depression, including MSM.[26,147,148] Moving forward, integrated interventions may target multiple health behavioural outcomes in addition to multiple mental health or substance use challenges, such as several steps on the HIV care cascade.

A relatively new direction in HIV-related interventions for MSM involves addressing both psychological and social syndemic challenges, as well as their theorised shared causative foundation in sexual minority stress. Pachankis[27] has initially tested a transdiagnostic intervention to address the presumed underlying psychological processes, hypothesised to be linked to causative or maintaining variables, linking minority stress to HIV risk behaviour, including maladaptive emotion regulation, negative thinking styles, low levels of self-efficacy and avoidance coping.[149,150] The specific transdiagnostic treatment that Pachankis utilised is called the Unified Protocol, a cognitive behavioural therapy that can be applied to a range of different psychological disorders and problems (e.g. various anxiety disorders as well as depression).[149] Transdiagnostic treatment aims to address basic underlying processes thought to be common across syndemic issues including mental health and

substance use disorders among MSM. In addition to interventions consistent with the minority stress theory, as expanded by Hatzenbuehler and Pachankis,[12,151] future interventions may benefit from addressing other underlying vulnerabilities common across mental health and substance use diagnostic categories, such as distress intolerance, interpersonal rejection sensitivity, post-traumatic reactions and internalised stigma.

Scalability versus accessibility

Despite these and other advances in intervention strategies for MSM, barriers remain to implementation, scalability and sustainability. While resource limitations are often a barrier to implementation, interventions must provide a sufficient dose in order to effectively address vulnerabilities. For example, evidence-based interventions such as CBT for adherence and depression requires 10–12 sessions.[26] With scalability in mind, dose level must be carefully considered, potentially using stepped care strategies to maximise resources. For example, lower dose or flexibly delivered interventions (e.g. drop in treatment centres, open groups and integrated case management) may work for certain populations and for certain goals (e.g. interventions to improve engagement in care among young MSM substance users), while higher dose interventions may be needed for MSM facing substantial comorbidities and inequities. Strategies utilising eHealth components such as text messaging and smartphone apps can also enhance scalability and acceptability.[152]

However, mental health issues, including substance use and other syndemic challenges, do not equally impact MSM with and at-risk for HIV. Rather, MSM grappling with co-occurring syndemic conditions (e.g. trauma and substance use *or* trauma, substance use and depression) are more likely to engage in condomless anal sex and are at greater risk for acquiring HIV.[14,33] It is the MSM most vulnerable to mental health, likely facing multiple syndemic conditions, that are most in need of evidence-based accessible interventions that address barriers to care.

To facilitate sustainability, interventionists may consider involving community therapists and non-professional interventionists via task shifting or task-sharing strategies, to reduce the cost. To do this, newer training models are needed so that evidenced-based treatments are not only delivered by the most highly trained professionals. In research studies, hybrid efficacy/effectiveness models may also be useful as well as cost-analyses, in supporting sustainability. In order to more effectively address the unmet mental health needs of MSM in the coming years and up to 2020, evidence-based interventions will need to balance the dual priorities of developing integrated interventions of sufficient dose to address underlying mental health and substance use disorder while also designing interventions that are sustainable in communities and other healthcare settings.

Conclusion

Notwithstanding the future developments of biomedical treatments, MSM who are managing mental health problems and racial and economic disparities will continue to struggle the most with HIV and STIs through 2020 and beyond. MSM experience higher risk of various mental health challenges, including depression, trauma and substance use compared with heterosexual men, which appear to be sequelae of minority stress or sexual minority stigma. This vulnerability to mental health problems appears to be exacerbated by longstanding racial and social inequities, resulting in African-American and Hispanic MSM experiencing greater HIV incidence and prevalence. Psychological and behavioural problems are associated with increased HIV acquisition and transmission risk, as well as lower rates of HIV testing and diagnosis, engagement and retention in care, and adherence among MSM. Additional work is needed to better understand how stigma-related stress results in disproportional prevalence of depression, trauma and substance use among MSM, particularly the subpopulations most affected. Evidence indicates that interventions that only address health behaviour change and not mental health or other co-occurring 'syndemic' problems, seem to be only moderately effective among MSM with the most complex challenges. We need empirically supported interventions with, at minimum, initial evidence of feasibility, acceptability and the ability of the intervention to impact outcomes, and ideally with randomised controlled evidence replicated across research programs and settings. Further, sustainability of these interventions is a priority, particularly for those impacted by co-occurring syndemic challenges (e.g. depression and substance use). Implementation science studies may help assess the best ways to disseminate these interventions in real-world settings, including reducing barriers to care, particular for those MSM living with two or more syndemic issues. In order to enhance scalability, these efforts may need to utilise Masters level clinicians trained in LGBT competent care, peer navigators to enable linkage to care, as well as stepped-care strategies. Further, while public health emphasises scalability, providing sufficiently dosed accessible interventions for those MSM facing co-occurring syndemic challenges in order to remove barriers to care is more critical than scalability for non-priority MSM. Moving forward as we approach 2020, scalable yet effective culturally competent intervention strategies will be needed to address the mental health disparities seen among the most vulnerable MSM and to maximise the benefits of current and emerging prevention and treatment initiatives for HIV and STIs.

Conflicts of interest

Dr Steven Safren receives royalties from Oxford University Press, Guilford Publications and Springer Publications. We have no other conflicts of interest to report.

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