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Perspectives on unhealthy alcohol use among men who have sex with men prescribed HIV pre-exposure prophylaxis: A qualitative study

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ABSTRACT

Unhealthy alcohol use is a common, often unaddressed behavior associated with increased risk for acquisition of HIV and may also be associated with decreased adherence to oral pre-exposure prophylaxis (PrEP) among gay, bisexual, and other men who have sex with men (MSM) living in the United States. To inform future alcohol-reduction interventions among individuals engaging in PrEP care, we sought to explore perspectives on alcohol use, PrEP adherence, and the acceptability of alcohol use treatment options for MSM prescribed oral formulations of PrEP in the Northeastern United States. Between February 2019 and July 2020, we conducted semi-structured interviews with 15 MSM without HIV who were prescribed PrEP and screened positive for unhealthy alcohol use with AUDIT-C $\geq$ 4 and were receiving care in Providence, Rhode Island or New Haven, Connecticut. Interviews were coded and analyzed using thematic analysis. Three themes emerged: 1) Consequences of fluctuations in drinking 2) Alcohol use negatively impacts health and relationships; and 3) Desire for a multimodal approach to treatment of unhealthy alcohol use. Our findings support the need to raise awareness of potential alcohol-related harms, address the spectrum of unhealthy alcohol use among MSM prescribed PrEP, and the acceptability and preferences for alcohol reduction interventions within PrEP programs.

1. Introduction

Of the approximately 34,800 new HIV infections that occur annually in the United States (U.S.), 71 % are among gay, bisexual, or other men who have sex with men (MSM), even though they represent only 4 % of the U.S. male population (Centers for Disease Control and Prevention, 2020). If current infection rates persist, it is estimated that one in six MSM in the U.S. will be diagnosed with HIV during their lifetime (Hess et al., 2017).

HIV pre-exposure prophylaxis (PrEP), including the Food and Drug Administration approved antiretroviral medications emtricitabine and tenofovir disoproxil fumarate (FTC/TDF), emtricitabine and tenofovir alafenamide (FTC/TAF), and recently approved injectable cabotegravir (CAB), have the potential to significantly reduce HIV incidence among MSM (Grant et al., 2010; Grohskopf et al., 2013; Stahlman et al., 2017; Volk et al., 2015). Adherence to recommended PrEP regimens, however, is critical for optimal effectiveness; nonadherence has emerged as a major obstacle to PrEP's impact on HIV incidence (Chan et al., 2016). Estimates suggest declines in PrEP prescriptions since the onset of the COVID-19 pandemic (Hong, 2023). Substance use (alcohol use being the most common), a prevalent behavior among individuals who take PrEP, can affect medication adherence as well as engagement in HIV care and prevention (Ogbuagu et al., 2019).

Specifically, unhealthy alcohol use, the spectrum of alcohol use that

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includes at-risk alcohol use and alcohol use disorder (AUD) (Saitz, 2005), is common among MSM. In a national sample of MSM, nearly 60 % reported unhealthy alcohol use (Finlayson et al., 2008) and unhealthy alcohol use is an independent risk factor for HIV acquisition (Baliunas et al., 2010). Further, unhealthy alcohol use interferes with medication adherence (Hendershot et al., 2009), and increasing data demonstrate that unhealthy alcohol use interferes with PrEP adherence and retention in PrEP care (Krakower et al., 2019; Marcus et al., 2016; Storholm et al., 2017). Efforts to address modifiable risk factors for poor adherence, such as unhealthy alcohol use, are needed.

Interventions for unhealthy alcohol use could potentially be integrated with PrEP care, including in primary care (Jonas et al., 2014; Jonas et al., 2012; Oldfield and Edelman, 2021; Padwa et al., 2016), sexual health clinics, (Yu et al., 2016; Yu et al., 2008) and HIV clinics (Edelman et al., 2014; Edelman et al., 2016; Fiellin et al., 2011). The Centers for Disease Control and Prevention (CDC) recommends screening for unhealthy alcohol use with appropriate referral for treatment as part of PrEP care (US Public Health Service, 2014). Yet, to date there have been limited efforts to integrate interventions to address unhealthy alcohol use with PrEP care and in a manner tailored for the specific needs of MSM (George et al., 2021).

Therefore, we conducted an exploratory analysis to characterize perspectives on unhealthy alcohol use among MSM prescribed to inform future interventions to enhance HIV prevention and reduce alcohol use.

2. Methods

2.1. Study overview

Guided by the Consolidated Criteria for Reporting Qualitative Research (Tong et al., 2007), we chose a qualitative research design to elicit multiple perspectives on a complex topic that involves social interactions and stigma, which are difficult to measure quantitatively (Malterud, 2001; Pope and Mays, 1995). Building on prior collaborations (Edelman et al., 2013; Edelman et al., 2014; Edelman et al., 2016; Oldfield et al., 2019; Israel et al., 1998), this study, informed by community-engaged research principles (Bradley et al., 2007), was conducted by a team including academic and community partners diverse in age, gender, occupation, sexual orientation, and alcohol use. Members of the team have expertise in HIV prevention and treatment, addiction medicine, MSM health, community-based participatory research methods, and qualitative methods. Data were collected from February of 2019 through July of 2020.

2.2. Study design and sampling

Participants were recruited from New Haven, Connecticut and Providence, Rhode Island, two urban settings in the U.S. northeast via a community-based organization (CBO) and medical center, respectively, utilizing advertisements, word-of-mouth, and clinician referrals. Individuals were eligible for the study if they met the following criteria: 1) aged $\geq$ 18 years old, 2) identified as being either a cisgender man or transgender woman and has sex with men, 3) had been prescribed PrEP, 4) screened positive for unhealthy alcohol use based on the Alcohol Use Disorder Identification Test-Consumption (AUDIT-C) >4 (Bush et al., 1998), 5) self-reported HIV-negative status, 6) spoke English or Spanish and 7) provided verbal informed consent. Individuals were excluded if they met any of the following criteria: 1) had a psychiatric condition that affected their ability to provide informed consent or 2) were enrolled in a formal alcohol treatment program (excluding mutual help groups). Recruitment occurred until 15 participants were interviewed, the point at which thematic saturation is typically reached.[47] Participants were reimbursed with a $30 gift card for study participation. This study was approved by the Yale School of Medicine Human Investigation Committee and The Miriam Hospital Institutional Review Board.

2.3. Data collection and analysis

An interview guide (see **Text Box**) was developed by the multidisciplinary team. Once written consent was obtained, semi-structured, individual interviews were conducted in English by staff affiliated with the CBO and medical center, respectively. The interviews were digitally recorded, professionally transcribed, and reviewed for accuracy. Identifying information was removed prior to analysis. Upon completion of the interview, participants filled out a brief survey that included demographic and risk behavior information, including sexual practices and sexually transmitted infection (STI) testing practices. All interviews were conducted in-person prior to March 2020 after which they were completed over the telephone due to the COVID-19 pandemic.

Text Box. Interview grand-tour questions (bolded) and probes (unbolded).

Interview Guide Questions

- **Tell me about your alcohol use.**
  - What type of alcohol do you typically drink?
  - How much alcohol do you typically drink?
  - When do you normally drink alcohol?
  - What motivates you to drink alcohol?
  - Why might you cut down on your alcohol use?
  - Tell me about any previous alcohol use treatment you've gone through in the past (inpatient, outpatient, 21-day program, medications, counseling, AA/NA/peer support groups). What did you think of those experiences?
- **To avoid problems from alcohol use, it is recommended that men do not drink more than 4 drinks per day or 14 drinks per week. What are your thoughts about what might motivate you to decrease your alcohol use?**
  - What would make it important for you to cut down on your alcohol use?
  - What would you need to cut down on a regular basis?
  - What do you think about going to counseling to address your motivation for decreasing alcohol use? How about four sessions of counseling? Would this be too many sessions? Too few?
  - What would be helpful to talk about during these sessions? Who would you like to see for these counseling sessions? And where should this take place?
  - What do you think about taking medications to help with alcohol cravings? Would you be open to a monthly injection? A daily pill? Where would you prefer to receive this treatment?
  - Tell me about what kind of treatment would be you most open to trying – counseling? groups? medication? Other? What kind of treatment would you want to try first?
- **What are the barriers or risks you foresee in seeking treatment to decrease your alcohol use?**
  - How do others who are important in your life view seeking treatment for alcohol use?
  - What, if anything, are you worried about regarding seeking treatment for alcohol use?
  - What can health care providers (e.g., doctors, nurses) do to best support you in treating your alcohol use?
- **How do you think your alcohol use impacts your risk of getting HIV?**
  - How do you think drinking alcohol impacts your risk for HIV?
- **How do you think your alcohol use impacts your use of PrEP?**
  - How long have you been on PrEP? What has your experience with PrEP been like? Positives? Negatives? Challenges? Successes?
  - How do you think drinking alcohol or your plans to go out impacts how you take PrEP?
  - Do you ever miss your PrEP because of drinking? Why? What about missing medical visits?
  - What might have helped you take your medication instead?
- **What are the barriers or risks you foresee in taking PrEP consistently?**
  - How do others who are important in your life view taking PrEP?
  - What can health care providers (e.g., doctors, nurses) do to best support you in taking PrEP?
- **Where do you get your health information?**
  - Are their online networks that could help you cut down on your alcohol use?
  - What do you think about getting text messages?

The team developed a coding structure using systematic, inductive procedures to identify concepts (codes) grounded in participants' words. Two team members then independently coded transcripts line-by-line, and met to negotiate coding consensus and refine code definitions until a final, comprehensive, agreed-upon code structure was achieved

that encompassed all concepts in the data (Glaser, 1965). We used the constant comparative method to identify novel concepts, classify emerging themes, refine existing themes, and complete coding (Harris et al., 2019). Dedoose, a qualitative research software, was used for data organization and retrieval. Data from the surveys was entered into a REDCap electronic database (Tan, 2017).

2.4. Role of the funding source

The project was funded by the Yale Fund for Lesbian and Gay Studies. The funders had no role in the study design, data collection, data analysis or interpretation, in writing of the report, or decision to submit these findings for publication.

3. Results

We achieved thematic saturation following the completion of 15 interviews. Participant characteristics are reported in Tables 1 and 2. All participants identified as MSM; none identified as transgender women.

The following themes emerged among the interviews regarding the impact of unhealthy alcohol use on health, including HIV risk and PrEP care: 1) Consequences of fluctuations in drinking; 2) Alcohol use negatively impacts health and relationships 3) Desire for a multimodal approach to treatment of unhealthy alcohol use.

3.1. Theme 1: Consequences of fluctuations in drinking

Participants reported a range of patterns of alcohol use and perceived consequences from fluctuations in drinking and recurrent unhealthy alcohol use. Many participants shared that their alcohol use often varied based on social context, life circumstances, and stressful events in their lives, including the COVID-19 pandemic. One participant explained that drinking typically increases when life becomes hectic:

> I'm a social drinker, once in a while, definitely…I'd say on average maybe 12 times a year. I might go two or three months without touching a drop, and then there might be a month where there's a lot going on and every week or every other week I'm drinking enough to get buzzed or enough to get really drunk.

Another participant shared that his life circumstances as an educator led to seasonal changes in his alcohol use where daily drinking increased during the summer months when he was off from school but decreased weekdays during the school year:

> I drink socially with my friends during the summers a lot. We'll have a couple of beers in a sitting or an evening……. During the school year, it's just a lot less on weekdays.

Other participants reported alcohol use that increased due to work-related stress, but that use was restricted to when they were able to drink without impacting their overall job performance, for example:

> I go in [to work] usually at 6:00 a.m. I wouldn't drink on the nights before because like, 'I gotta get up at 6:00. I'll just not have alcohol [then].

Another participant proposed a causative relationship between alcohol use and symptoms of low mood:

> I feel like sometimes I am a little bit down. I think it might have to do with alcohol. That's whom I'm gonna see at 1:00 is a psychologist because I feel like maybe that's making me have a little bit of depression or something.

A different participant described how COVID-19 circumstances led to increases in his alcohol use:

> Well, before COVID it would be about five or six drinks a week, all consumed at the same time once a week at a bar with a couple of friends. Now that COVID hit us it's now two or three drinks a day just 'cause there's really nothing else to do.

3.2. *Theme 2: Alcohol* ***use negatively impacts health and relationships***

Many participants self-reported that they improve PrEP adherence with self-initiated behavioral interventions. Many were able to identify specific concerns regarding the impact of alcohol use on their physical and mental health. Several participants also referenced heavy alcohol use and condomless sex as a precursor to their decision to initiate PrEP.

Several participants cited incidents of condomless anal sex while under the influence of alcohol as an impetus for them and/or their partners initiating PrEP:

> I've been in numerous occasions where I've had risky sex with people under the influence [of alcohol], so I needed to find a way to protect

Table 1
Sociodemographic and behavioral characteristics of the sample (N = 15).

Characteristic	
Age, mean (SD)	35.8 (7.79)
Ethnicity, N (%)	3 (20.0)
Hispanic	12 (80.0)
Non-Hispanic	
Race, N (%)*	3 (20.0)
Black/African American	10 (66.7)
White/Caucasian American	1 (6.7)
Multiracial/Other	
Education, N (%)	3 (20.0)
High school or less	2 (13.3)
Some college	6 (40.0)
College	4 (26.7)
Graduate degree	
Relationship Status, N (%)	8 (53.3)
Single	7 (46.7)
Married/Living with a partner	
Insurance Status, N (%)	7 (46.7)
Private	5 (33.3)
Medicaid	1 (6.7)
Medicare	2 (13.3)
None	

* One participant did not respond.

Table 2
Sexual behaviors and substance use (N = 15).

Behavior	
Sexual Behaviors, Median (IQR†)	
Receptive Anal Sex	2 (2)
Insertive Anal Sex	1 (3)
Both Receptive and Insertive Anal Sex	0 (1)
Oral Sex	3 (4)
Condomless Anal Sex (Insertive & Receptive)	2(2)
Partners known to be HIV positive	0 (0)
Partners known to be PrEP	1(3)
Number of months on PrEP, Median (IQR)	12 (45)
Last time tested for HIV, N (%)*	
Fewer than 3 months ago	11 (73.3)
3-6 months ago	1 (6.7)
Alcohol and other Substance Use	
AUDIT-C§ Score, Median (IQR†)	6 (3)
Drug use reported in the past 12 months, N (%)	
Marijuana	10 (66.7)
Inhalants/Poppers	5 (33.3)
Opioids	3 (20.0)
Stimulants	2 (13.3)
Prescription Benzodiazepines	2 (13.3)

† Interquartile range.
* Three participants did not respond to this question.
§ Alcohol Use Disorders Identification Test - Concise.

myself and that came through the conclusion of finding the drug PrEP.

A different participant clarified that his need for PrEP became evident after a night of drinking and condomless sex with an unknown partner:

> You don't know somebody's status and my husband bottomed for him without a condom. We didn't know at the time what his status was…—'cause we had gone out that night and had more drinks than we would normally.

Participants indicated that unhealthy alcohol use did not have a significant impact on their adherence to PrEP, with one exception. That specific participant shared that they used their mobile phone to set reminders to take their PrEP every day for oral formulations:

> Well, just recently, I missed a few days 'cuz my phone was broken, and I was off and runnin' in the races drinkin'. Alcohol—when I start to drink, I can't stop. I have no off button when I drink.

The most common reason cited by participants for missing doses of their PrEP was forgetfulness. Many participants indicated that PrEP was the only medication they took daily and that over time their adherence improved, often in conjunction with simple behavioral changes, such as placing their prescription bottle in a place where it would be easily seen. One participant explained:

> At one point, yes, that was an issue because I was taking my medicine at night. I was taking the pill. You go have a drink or somethin', and then you get caught up in that, and forget. Not recently, because I've started takin' my pill in the morning. I'm not a morning drinker, so that's been what's kept me up with that.

Many participants shared that they were more likely to engage in condomless sex while intoxicated, putting them at higher risk for HIV and other STIs. When asked how he thought alcohol impacted his risk of HIV transmission one participant shared:

> Whenever I do have alcohol in my system, I tend to make more bad decisions, I guess. Drinking, I'm more into—willing to do a random hookup, which is usually putting yourself more at risk when you're having homosexual sex and randomly hooking up with a stranger.

Several participants identified weight management as one reason why they consider reducing their alcohol intake:

> I could do with losing a few pounds, and that's definitely one area where I could cut back. I know that alcohol is high in caloric content and just really isn't healthy for the body, so those would all be good reasons.

A different participant talked about their use of a calorie tracking app and their decision to cut back on his alcohol intake as a result:

> I just had put on about 10 more pounds than I was really comfortable with. I was just trying to lose some weight. Then started tracking calories and starting to pay more attention to how many calories I was drinking.

Another participant reported on how alcohol use was adversely impacting his mood and potential for new relationships:

> I guess on occasions I've gotten irritable, and I guess it affects how I relate with my grandmother…Maybe every few months. I think I probably want to reduce drinking because I think not only it is making me irritable, it's affecting how… I guess it's affecting my social opportunities to date….

3.3. *Theme 3: Desire* for multimodal approach to treatment of unhealthy alcohol use

Across levels of unhealthy alcohol use, participants identified a range of motivations to decrease their alcohol use such as concerns over long-term consequences of unhealthy alcohol use; these motivations, however, were undermined by some barriers including those preventing them from seeking treatment for unhealthy alcohol use.

One participant described long-term concerns about their alcohol use as they age:

> I'm getting older. I wanna keep my relationship healthy. I wanna keep my work relationship healthy. I wanna keep my body mostly healthy. Those are just my main reasons. Also, save money.

Several participants identified concerns about their increase in alcohol consumption as a main reason for seeking alcohol-related treatment services. One participant stated:

> Not so much concerned about drinking too much alcohol. More like concerned about how just in the last couple months it's increased so rapidly and my tolerance has built up too much…. For one, it's concerning my wallet when I go back out to the bars.

Other participants who were already taking steps to seek help for their alcohol use also expressed concerns about worsening consequences. One participant noted this as:

> I know the blackouts are getting worse, so I'm actually working on seeking help for that. 'Cause in retrospect, it's one of those, I shouldn't black out every single time I drink.

Another participant shared their hesitancy to engage in counseling and the time required to engage in substance use treatment:

> I don't know, time. I work a lot. Then, when I get out of work I wanna see my partner. It's mostly that. Also, sometimes—I don't know—I'm not really much of a—this type of setting—talking type person. I was a little nervous about this [study interview].

Of treatment options, participants were most favorable to behavioral interventions. Several participants shared that they had previously engaged in counseling, either to address current or previous substance use or other mental health issues. One participant talked about his past experiences with counseling:

> Oh, yeah. I get counseling every day. I go to my counselor. What I need is a psychiatrist. That's what I need.

Most participants were not open to the idea of taking medications to treat alcohol cravings, though their reasons were varied between hesitancy regarding prescription medication to concerns about efficacy and barriers to adherence.

> …I'll go buy Tylenol or something like that or an Aleve or whatever. Try to do any herbs or those teas, that sort of thing that can help sustain—the little band-aids so to speak. If I don't need a prescription, I'm not gonna seek it out. It's one of those, as far as taking a medicine to help stop drinking, I rather not and see what I can do rather than feed into that system.

Other participants who had experience with medications for unhealthy substance use expressed additional concerns, such as this participant who said:

> It is beneficial for some people. I used to get a shot in my tuchus [Yiddish for buttocks]. Very big needle. They also come in pill form. I forgot the name of it….Yeah, it didn't really work. Then again, some things work for some people. Some not. I think it's all in the person's mind and their willpower.

Participants with higher levels of alcohol use (AUDIT-C ($\geq$10) also reported attending meetings of Alcoholics Anonymous (AA) and talked

about the specific aspects of the meetings they found beneficial. One participant noted:

> Yeah. Maybe not 100 percent but at least parts of it, I could relate… One of the people there actually said this really great phrase. She goes, 'I wanted to be able to drink like a normal person. That's when I realized I never would be able to.'

Other participants shared their experiences attending AA meetings specifically for lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals.

> That's why I go to the rooms because I get that positive energy. I get that message from people that if you don't love yourself, we're here to love you for you, point blank.

Many participants noted that they would be willing to receive health-related communications including about alcohol use from their PrEP provider or the clinician's office. All of the participants who participated in this study shared a high degree of trust in their providers and the organizations where they received their PrEP. Participants described how these trusting relationships, starting with their initial PrEP appointments, might encourage them to partake in health-related programming, such as the following participant who stated that:

> If it was [my PrEP provider] I would feel really obligated to do it then.

A different participant noted that:

> I don't think I would feel too bad about that. I like [local clinic]. I really like the way that they have handled things. That would be probably a thing or a program that I would trust, because they've been spectacular through the whole process.

4. Discussion

This is among the few studies to explore unhealthy alcohol use among MSM prescribed PrEP in conjunction with the appropriateness of integrating alcohol use treatment options into PrEP care settings (Oldfield and Edelman, 2021). Themes emerging from 15 semi-structured interviews with MSM prescribed PrEP both before and during the early waves of the COVID-19 pandemic suggest opportunities to address unhealthy alcohol use among MSM taking PrEP. Participants in this study expressed fluctuations in alcohol use that may inform optimal PrEP prescription choice by clinicians (Shuper et al., 2020). They self-identified problems with unhealthy alcohol use that impact their health, PrEP adherence, and relationships. Participants also trust their PrEP clinicians based on the perception that clinicians were non-judgmental and knowledgeable about PrEP. While MSM in this study did not perceive alcohol use to adversely impact PrEP adherence, despite some evidence that it may (Devarajan et al., 2020), participants reported a variety of concerns regarding their unhealthy alcohol use that presented opportunities for intervention. Further, participants reported alcohol-related problems despite limited insights and motivation for treatment.

Participants discussed treatment options beyond mental health counseling, such as medication to address cravings and the importance of AA meetings. Even participants who scored lower on the AUDIT-C talked about the importance of cutting back on their alcohol use for health and/or weight-related reasons. This may provide opportunities for brief intervention, such as a referral for behavioral health counseling or for a registered dietician or nutritionist to address issues related to weight management.

Similar to previous qualitative studies involving MSM on PrEP (Brooks et al., 2019; Quinn et al., 2020; Guest et al., 2020), many participants also alluded to the importance of LGBTQ + affirming resources for mental health and for substance use. Several participants discussed their willingness to consider attending AA meetings, especially if they were LGBTQ-specific groups, suggesting that potential referrals did not necessarily need to be clinical in nature but rather more of a support group, something especially important for those who are uninsured or underinsured who may have limited treatment options available to them. Our study adds to the findings of other qualitative work by demonstrating the unique trust that patients have in their PrEP clinicians and identifies some reachable moments for patients taking PrEP to engage in alcohol reduction that could be bolstered in importance due concerns for weight and concerns that alcohol compromises PrEP adherence.

5. Limitations

This was a small study with samples drawn from two New England metropolitan areas with two-thirds of the participants recruited from Providence, Rhode Island and the other third from New Haven, Connecticut. Interviews completed during the COVID-19 pandemic were not able to be conducted in person, which may have limited comfortability and sharing by participants. A qualitative approach, while optimal for eliciting multiple perspectives on complex topics, may not have captured all perspectives for all types of intersecting identities, including transgender women, whom we initially sought to include. In addition, most participants were non-Hispanic White and over the age of 30 years. While our sample size was modest (N = 15), this is consistent with standards in the field of qualitative research in studies seeking thematic saturation.[45] Finally, our study does not address individuals at risk for HIV who have unhealthy alcohol use but are not taking PrEP; these individuals are not reached by PrEP implementation efforts and should be reached for alcohol screening and treatment and preventive care.

6. Conclusion

Findings from this study suggest that there are opportunities to screen and intervene on alcohol use among MSM in a PrEP care setting. Participants in this study reported trust in their PrEP providers and noted a willingness to engage beyond PrEP services with their provider or healthcare organization where they receive their PrEP services. Study participants identified concerns about their mental and physical health that were salient points of intervention that could motivate them to make changes in their alcohol use and /or seek treatment. PrEP providers could help patients with identifying alcohol-related consequences and discuss their treatment options.

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CRediT authorship contribution statement

Sabrina H. Strong: Writing – original draft, Formal analysis, Data curation. **Benjamin J. Oldfield:** Participant recruitment, Manuscript review and editing. **Jacob J. van den Berg:** Writing – review & editing, Methodology, Formal analysis. **Christopher A. Cole:** Writing – review & editing, Methodology, Data curation. **Emma Biegacki:** Writing – review & editing, Methodology. **Onyema Ogbuagu:** Writing – review & editing, Methodology, Data curation. **Michael Virata:** Writing – review & editing, Methodology, Data curation. **Philip A. Chan:** Writing – review & editing, Methodology, Formal analysis, Conceptualization. **E. Jennifer Edelman:** Conceptualization, Funding acquisition, Supervision, Manuscript review and editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence

the work reported in this paper.

Data availability

Data will be made available on request.

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