



Exploring PrEP health promotion amongst London's Black African community

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Abstract

'Pre-Exposure Prophylaxis' (PrEP) offers multiple advantages to users, with its individually-controlled uptake in singular daily pill form offering a surreptitious alternative to traditional HIV prevention measures, alongside being highly effective in blocking virus transmission. However, its promotion has largely neglected the Black African community as an at-risk group, generating resistance to PrEP uptake which is attributable to poor messaging in prior campaigns which negatively stigmatises them with HIV, causing subsequent dissociation from perceiving themselves as eligible PrEP candidates. The current study explored a literature-guided approach to designing an informational PrEP message series which manipulated content based on assigned psychosocial variables under the 'Health Belief Model'. Participants ($N = 30$) were from London's Black African community, rating messages on 5 measures of effectiveness in 'Qualtrics', with the aim being to locate the best and worst performing for each. Results implied best-performing message content centred around PrEP uptake being empowering for users by giving them control in their sexual partnerships, particularly overcoming pressures of condom use and HIV transmission fears to unborn children. Poorly-performing messages touched upon affixed concepts like PrEP use being vital in areas of high geographical HIV risk, conspiracy-related mistrust and side-effects from medicinal PrEP. Implications include offering major direction in tailoring future messaging, to resolve PrEP inequity amongst this underserved population.



Introduction

Since the HIV epidemic's onset, protective behaviours to curb infection spread have been strongly advocated. One biomedical prevention regime known as 'Pre-Exposure Prophylaxis' (PrEP) is of major significance. Consistent prophylactic adherence can hugely reduce HIV-positive seroconversion risk by 99%, whilst remaining a discrete method independent of a sexual partner's cooperation (Fonner et al., 2016). However, inequality in PrEP adoption shows White 'Men who have sex with Men' (MSM) benefitting most over other at-risk groups, who are disadvantaged by minimal community normalisation regarding HIV prevention (Eaton et al., 2017).

Black African communities are majorly overlooked in PrEP communication efforts despite being at-risk, constituting 42.1% of newly emerging HIV heterosexual adult diagnoses but 3% of the UK's population (Nakasone et al., 2019). Since NHS England's PrEP IMPACT trial initiation in October 2017, controversies around Black African groups' invisibility from ambiguous eligibility criteria have been raised. Recruitment was affixed to 3 groups classified 'high-risk' if engaging in condomless sex: a) transgender women or MSM, b) those with high virally-loaded HIV positive partners, and c) those of 'similar risk' assessed by clinicians (Nagington & Sandset, 2020). Lack of relatability and conceptual rigour with criterion c) perpetuated racial PrEP inequity against Black Africans via institutional bias. White MSM and couples aware of partners' HIV positive status benefit most from clearer, relatable criteria which boost self-candidacy perceptions. Activist groups like 'iwantPrEPnow' reported disproportionately encouraging ineligible Black Africans wanting free PrEP to privately purchase costly alternatives from online providers, implying covert institutional PrEP rationing at play (Nwokolo et al., 2017). However, as this gap persists despite NHS England's official 2020 commissioning of free and widely-available PrEP, other micro-level factors propagating inequity of PrEP uptake need examining.

Poor Messaging: Issues Related to Unequal PrEP Uptake

A major community-level obstacle to British Black African groups' PrEP uptake surrounds low informational awareness and access, with inconsistencies in PrEP-based knowledge (Bond & Gunn, 2016; Flash et al., 2017). Firstly, Giuseppe, Kasoka, and Dunkley (2019) found Black Africans from East London perceived condom use as the single most efficacious HIV prevention measure, with unawareness of self-initiated alternatives like PrEP. HIV-related concepts defining viral suppression ('Undetectable=Untransmissible') were also misunderstood. Secondly, PrEP is misperceived as MSM-focused from culturally unidentifiable campaigns,



with PrEP's functionality in sexual healthcare routines deemed futile (Hirschhorn et al., 2020). Nakasone and colleagues (2019) corroborate this,

noting the combination of absent culturally-responsive PrEP promotion materials and NHS professionals' coercion of Black females in particular towards alternative contraception reduces overall self-candidacy perceptions. Thirdly, studies indicate British Black African groups dissociate HIV as a geographically distant African-centric epidemic, subsequently showing distrust for PrEP's relevance to themselves as potential candidates (Draper et al., 2017; Patel et al., 2018). To resolve PrEP knowledge gaps, informational messaging geared towards highlighting the utility of PrEP for Black Africans as users with specific cultural needs is vital, to counteract MSM PrEP-associations currently hindering its normalisation (Bond & Ramos, 2019).

However, a caveat introduced from previous attempts at culturally-targeted HIV messaging is that Black-Africans often felt the imagery, language, and themes used heavily alienated and stigmatised their community (Drumhiller et al., 2018; Fields et al., 2020). Chandler et al. (2020) found Black African American females' experiences with former PrEP educational interventions were condescending and often vague, leaving them mistrusting of PrEP-provision in the community as they felt like an 'after-thought'. To counteract this, neutral PrEP messaging approaches are preferred by Black-African groups, factually addressing HIV as a disease that does not discriminate and can pose risk to entire populations (Giuseppe et al., 2019).

An Approach to Messaging: The 'Health Belief Model' (HBM)

Collectively, the need for more effective PrEP promotion amongst the Black African community as an underserved population is evident. For instance, Mansergh et al. (2019) found Black African American MSM categorised as 'PrEP-unaware' positively endorsed PrEP after exposure to messages on its efficacy rates. However, this study did not manipulate the type of content presented or compare differences in message effectiveness.

Using the 'Health Belief Model' (HBM) in a framework-guided approach can offer utility in designing a series of messages to be quantitatively evaluated on their efficacy, as undertaken by the current study. Commonly employed in health promotion, the HBM predicts health-seeking behaviours change as a function of an individual's disease risk perceptions, modifying factors like ethnicity, and perceived utility offered by the behavioural action to alleviate a health threat (Sheppard & Thomas, 2021).



By assigning novel psychosocial content variables using the model's well-defined subcomponents, a literature search will inform message formulation. Furthermore, London as an under-researched location will be targeted for its significance as a 'HIV hotspot' that has simultaneously achieved the UN's '95-95-95' targets for HIV elimination by 2030 (Duncombe et al., 2019). Figure 1 contextualises HBM components to designed PrEP messages being tested for their effectiveness in this study.

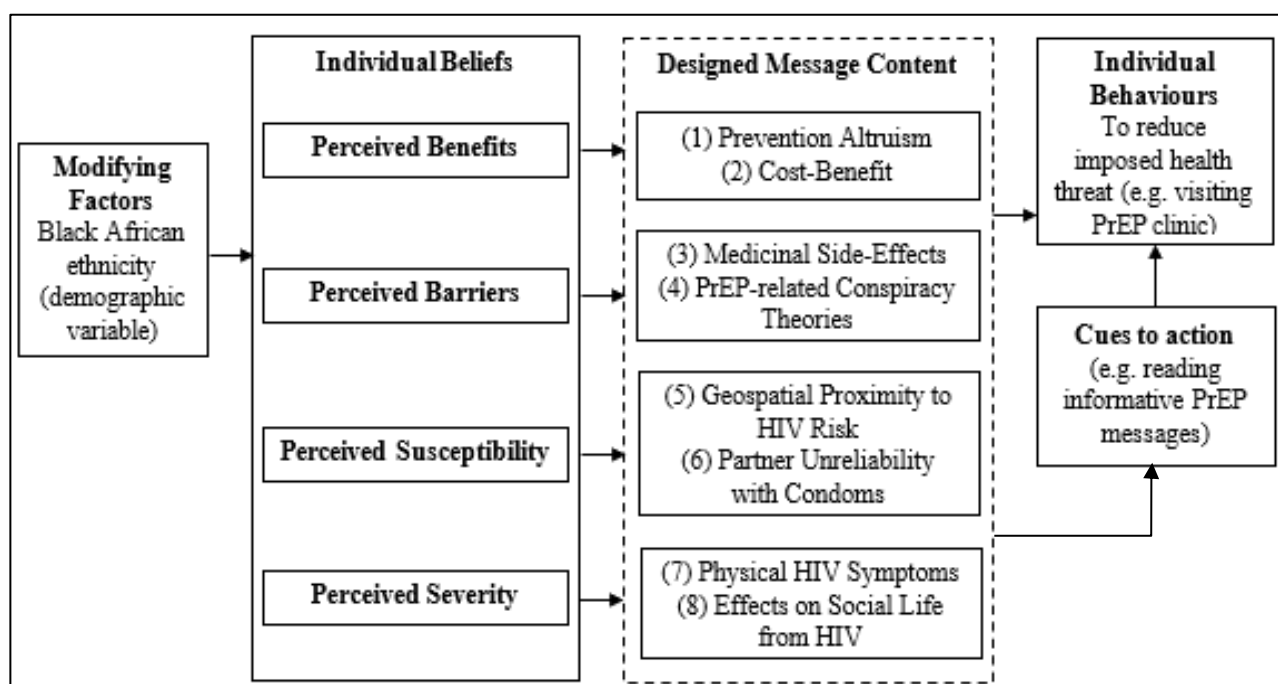


Figure 1. HBM components mapped onto current literature-guided PrEP message content, adapted from Ghorbani-Dehbalaei et al. (2021). Two messages were designed per subcomponent to provide enough variety in informational content, aligning with the study's exploratory approach.

In designing various informative PrEP messages, the HBM offers advantages. Firstly, it enables identification of adaptable precursors to PrEP adoption via its main 4 non-overlapping psychosocial constructs ('Individual Beliefs' in Figure 1) (Cao et al., 2014). For instance, Ndabarora and Mchunu (2014) found 'Perceived Barriers' to available HIV prevention options most significantly predicted opposition of their use. Some studies reveal Black-Africans overwhelmingly come into contact with campaign information highlighting perceived barriers of PrEP like costliness and false myths surrounding its formulation (Chandler et al., 2020; Winggood et al., 2016; Danielson et al., 2014). In correspondence with Ndabarora and Mchunu, this could suggest biased PrEP content circulation in the Black-African community, having implications on behavioural inaction towards PrEP uptake.



This strengthens the proposition of designing and comparing message content under all HBM constructs to assess whether they predict different PrEP endorsement outcomes, currently absent in literature. Furthermore, the HBM has proven itself to be a reliable predictor framework in similar sexual health behaviour promotion contexts like condom usage for STI prevention (Asare et al., 2013) and so offers high relevance.

Devising New Messaging: HBM constructs and literature guiding PrEP message design

Construct 1: Perceived Benefits

This surrounds beliefs held by individuals on an advised preventative health behaviour's effectiveness in attenuating a health risk (Tarkang & Zotor, 2015). Instead of merely considering avoidance of undesirable health consequences (achieved by the remaining 3 threat centred components), 'Perceived Benefits' emphasises the accumulated gains from behavioural action (Hiltabiddle, 1996).

Message 1: Prevention Altruism

One 'Perceived Benefit' potentially motivating endorsement of PrEP to lower HIV infection risk at both personal and interpersonal levels is 'Prevention Altruism'. Relating to HIV, this surrounds motivators, values or actions that achieve the goal of protecting others (independent of self-interest) and eliminating anticipated regret of HIV transmission from risky sexual activity (Nimmons & Folkman, 1999; Dubov, Altice, & Fraenkel, 2018). Emphasising 'Prevention Altruism' has proven effective in other contexts, e.g. encouraging protected sex amongst HIV serodiscordant couples (O'Dell et al., 2008). In a Ugandan study of HIV infected adults, King and colleagues (2009) found altruistic tendencies for HIV prevention were formed from perceptions of social gain, with a sense of responsibility achieved from blocking community transmission and fostering family health. Unborn children were considered 'innocent' and undeserving of physical pain associated with HIV's opportunistic infections or death, with feelings of guilt and parental responsibility expressed. Relationships with a sexual partner were less prioritised, taking precedence when the importance of not leaving a child orphaned from HIV-positive parents was considered. High collectivism amongst Ugandans also influenced altruistic tendencies. Self-protection was perceived as boosting collective wellbeing of the wider 'clan' (not viewed as an anonymous general population), by stopping the viral chain of transmission at themselves.

However, this study is potentially confounded by social desirability biases in participants' expressed altruism. Respondents were presented statements containing strongly emotive consequences of inaction with HIV prevention, e.g. child "murder" (Wolitski et al., 2003). The present message design avoids intense emotive language when linking PrEP adoption's 'Perceived Benefit' of offering altruistic gain, centring descriptions more neutrally on unborn children, sexual partners, and the wider community.

Message 2: Cost-Benefit

Previous literature posits Black Africans see PrEP uptake's monetary cost as restrictive, with prescriptions, regular HIV testing and health insurance hindering their ability for longer term continuation (Eaton et al., 2015; McKenney et al., 2017; Doblecki-Lewis et al., 2017; Chen & Dowdy, 2014; Arnold et al., 2017).

This is largely spurred by inadequate policy infrastructure in eliminating cost related concerns for eligible PrEP candidates (Kay & Pinto, 2020). Intriguingly, an educational intervention with Black African women grouped as initially PrEP-unaware found that alerting them to costs associated with PrEP uptake as being non-existent increased their ratings of the medication's importance and desire to use it (Auerbach, Kinsky, Brown, & Charles, 2015).

A limitation of the discussed studies is their confinement to American samples where ecological validity outside of the experimental setting is questionable. Offering PrEP in experimental intervention settings is free and independent of participant's health insurance status, meaning perceptions of cost and effectiveness would differ and possibly not generalise onto PrEP continuation in a costly private healthcare system (Dubov et al., 2018; Hojilla et al., 2016). This offers an opportunity in the present study to design a message framing cost-benefit as a personal gain (i.e. a free medicinal resource with high 99% rates of efficacy) in a generalisable healthcare context with the NHS' free PrEP provision to all eligible people.

Construct 2: Perceived Barriers

This centres around beliefs about physical or psychological costs incurred with performing a preventative health action (Tarkang & Zotor, 2015). Increase in the number or intensity of 'Perceived Barriers' decreases predicted likelihood of engaging with and maintaining the required behaviour change (Champion & Skinner, 2008). Being presented with the realisation that an individual has the capacity to revert the influence of barriers reduces their prohibitive influence. The following messages centre on two subcomponents of 'medical mistrust' as a 'Perceived Barrier' (Bond et al., 2022).



Message 3: Medicinal Side-Effects

A recent qualitative study assessing young Black women's PrEP views found reluctance in taking a purely optional medication as a key theme (Bond et al., 2022). Perspectives mirrored vaccine hesitancy, e.g. anxieties over longer-term side-effects of PrEP interfering with kidney function of a pregnant mother and child were most frequently mentioned.

Fears over counterproductively manipulating one's immunity and becoming more HIV susceptible were also expressed. Jaiswal et al.'s (2019) earlier study corroborates this, with optional intake of medicinal PrEP hindering behavioural action due to the 'Perceived Barrier' of potentially seeing greater complications to health from short-term side-effects for someone that is otherwise HIV negative. Furthermore, Chandler and colleagues (2020) report Black African females believed side effects to be worse than the medication itself.

However, to reverse negative implications of side-effects as a 'Perceived Barrier' in hindering PrEP initiation, a Zimbabwean study suggests framing side-effects in a manner that dilutes the frequency of adverse complications arising (i.e. emphasising their rarity) and directly providing ways to avoid them spiralling into seriousness, referring to tangible services offered by trusted healthcare providers (e.g. kidney function tests) helping deal with this medicinal PrEP anxiety (Busza et al., 2021; Pilkington et al., 2018). This recommendation is applied to the current message.

Message 4: PrEP-related Conspiracy Theories

In relation to HIV/PrEP, prominent conspiracies amongst Black African populations include genocidal intentions behind a governmentally 'man-made' virus to eliminate ethnic minorities, with medicines like antiretrovirals or PrEP being a treatment façade and secretly toxic – these form a 'Perceived Barrier' if not evaluated for informational accuracy, stifling uptake of PrEP and other HIV prevention measures (Bogart et al., 2019).

However, previous studies into HIV/PrEP conspiracies within Black African communities are limited in their proposed recommendations to counteract negative effects. Ojikutu et al. (2020) suggest conspiracy endorsement may be a rational 'Perceived Barrier', as it involves protective behaviour performance (here, PrEP avoidance) for the wider community as a reaction to racism within medical institutions.

Interestingly, Parent et al. (2020) found that individual PrEP endorsement could be increased in Black African MSM by presenting them with the



realisation that PrEP inaction from conspiracy perpetuation in '*vulnerable communities*' increases many individuals' HIV risk. Hence, the corresponding message designed for this construct will describe conspiracies as a PrEP uptake barrier, alongside making a reference to risks for *vulnerable communities* from unintended consequences that a seemingly protective behaviour like PrEP avoidance has from the racially-motivated medical mistrust fuelling these beliefs.

Construct 3: Perceived Susceptibility

This covers beliefs about the likelihood of an individual contracting a threatening disease like HIV, touching on personal relevance from activities that increase the odds of one reasonably experiencing adverse health outcomes (Carpenter, 2010).

Message 5: Geospatial Proximity of HIV Risk

Distancing the personal relevance and susceptibility of a disease threat is known as 'othering'; perceivers in vulnerable groups develop false security from associating HIV risk with 'other' foreign communities unrelated to their own (Petros et al., 2006). Giuseppe and colleagues (2019) supplement this, where Black African Londoners geographically disconnected themselves from HIV as African-centred, holding misinformed assumptions of lower local UK-based risk as a far-removed and distant country of residence. To amplify HIV threat perceptions to a more personally susceptible level, the opposite of 'othering' will be used in message design for this psychosocial variable, instead zooming into more proximal HIV risk.

In an American context, research suggests some predominantly Black African neighbourhoods are classed as 'PrEP deserts' where minimal clinics are present to communicate local HIV risk information, subsequently reducing awareness and motivations for seeking PrEP (Siegler et al., 2018; Phillips et al., 2019). Phillips and colleagues (2020) more recently assessed dissemination of the 'PrEP4Love' ad campaign in Chicago (an urban 'PrEP desert' due to large distances between available clinics), which took advantage of contextualising HIV risk statistics in the local infrastructure (e.g. gay bars to target Black African MSM). 80% of exposed individuals took further action to learn about PrEP.

For the current study, geospatial proximity of risk that could increase 'Perceived Susceptibility' to oneself will involve referencing London as a HIV hotspot (Duncombe et al., 2019), tying in statistics on PrEP's utility in lowering this personally and geographically relevant risk.



Message 6: Partner Unreliability with Condom Use

Although condoms are a highly efficacious barrier method to preventing HIV transmission, their largest limitation behind usage is 'dyadic decision making' in sexual partnerships (Dubov et al., 2018). Whilst PrEP use can be somewhat impacted by partnership dynamics, it poses the advantage of being individually controlled and highly covert in its pill form (Tetteh et al., 2017; Braksmajer, Senn, & McMahon, 2016). A body of research suggests 'condom fatigue' reliably predicts intentions to adopt PrEP in one's sexual routine, fuelled by negative opinions towards condoms and desires to utilise condomless HIV prevention measures (Brooks et al., 2015; Grov et al., 2016). This validates tapping into intimacy based motivations when communicating biomedical PrEP adoption in messaging interventions (Christensen, Moran, & Wiebe, 1999).

However, current PrEP messaging can be criticised for being male centric when communicating intimacy motivations (particularly with aforementioned condomless preferences). In the current study context, PrEP is especially preferable by Black cisgender women as a solution for uncooperative partners (Van Damme et al., 2012). Linking the 'Perceived Susceptibility' concept, Nydegger and colleagues (2022) found through longitudinal interviewing that some Black women developed PrEP interest after receiving increasing amounts of information from the researchers on HIV transmission with condomless sex after initially not realising personal relevance of HIV risk from their engagement with an uncooperative partner surrounding consistent condom use.

Hence in the current message, comparative references are made between inconsistent use of condoms (popular barrier method for preventing HIV, likely increasing personal relevance and 'Perceived Susceptibility' to HIV threat) and PrEP as a newer solution, also emphasising empowerment of a user otherwise made HIV vulnerable by imbalanced dyadic power relationships.

Construct 4: Perceived Severity

This refers to beliefs surrounding the consequences of having contracted a disease if preventative action is not taken (Tarkang & Zotor, 2015). It governs an individuals' motivations to impede experiencing the seriousness of posed health threats. Perceptions on seriousness are particularly informed by disruptions to physical and social elements of life, covered by the following messages.



Message 7: Physical HIV Symptoms

One way to emphasise the severity of HIV infection would be to reference its progressive stages if left untreated (e.g. increasing opportunistic infections like tuberculosis), with eventual conversion into AIDS. However, Camlin et al. (2020) found with young adults from Kenya and Uganda, the increased knowledge of developments to HIV treatment (in particular, ART) led to downplaying 'Perceived Severity' of HIV disease threat. Views centred on HIV's bettered curability but overlooked the more demanding and regimental multiple pill dosage of ART to control HIV symptoms compared to available prevention measures like PrEP's singular daily pill.

This justifies avoiding ART references in the design of a message on HIV's physical symptoms, as this would attenuate the disease's 'Perceived Severity'. Instead, Camlin and colleagues suggest that to increase PrEP's perceived importance as a preventative measure, the message should emphasise lower demands of *prevention* versus *control* of HIV (if acquired as a severe disease with the listed physical symptoms).

Message 8: Effects on Social Life from HIV Infection

'Fear of rejection' concerns the stigma linked to being HIV positive and can include relationship exclusion from peers, parents, partners and family (Goparaju et al., 2017). HIV positive Black African women particularly note an intersection with cultural factors, where trying to conduct HIV care after acquiring the disease stigmatises their identity further amongst social networks, e.g. regular testing making treatment less discrete (Young & Bendavid, 2010). This is in part fuelled by infidelity assumptions. Bond & Gunn (2016) note fears of partner rejection counterproductively increase sexual risk taking behaviours via condom disuse and PrEP avoidance. Worries within HIV negative individuals taking PrEP are also rooted in this being wrongly associated as ART by a mistrusting partner, limiting negotiation abilities within personal high value social relationships (Gamarel & Golub, 2019; Sauermilch, 2020).

However, to overcome PrEP avoidance after reading about associated stigma in the current message out of fears of mislabelling oneself as HIV positive, Nakasone and colleagues' (2019) stress the help of a 'cover' (i.e. healthcare professional, currently offered by the NHS as an option at PrEP providing clinics) in helping disclose and persuade intimate partners about PrEP uptake. This is incorporated as a key point in the message.



Measuring Message Effectiveness: Outcome Measures

To measure effectiveness of designed messages, 4 out of our 5 outcome measures were adapted from Hong (2021), deemed appropriate due to similar aims of evaluating PrEP messages (albeit testing a different theoretical framework).

The final measure ('Perceived Self Efficacy') was designed using its definition as another HBM component outlined by Tarkang and Zotor (2015). Aligning with other HBM literature, measurement involved Likert Scales (Buglar, White, & Robinson, 2010).

Firstly, 'Persuasiveness' provided a direct measure of participant quality perception for each message's PrEP reasoning. Whilst Hong and colleagues assessed this alongside other quality markers (e.g. 'credibility'), these were excluded to refine focus and avoid overlapping responses from measures sharing similarities.

Secondly, 'Presumed Influence' derives from one's pre-existing perceptions about how media message reach is achieved (e.g. from message strength, predicted audience size, etc) and can be thought of as an indirect estimation of each presented PrEP messages' normative influence on the wider local Black African population (Noelle Neuman, 1974). It can impact one's intentions to publicly endorse a health view if rated highly (Cho & Salmon, 2006; Dillard & Shen, 2005).

Thirdly, 'Intentions for PrEP-related Prosocial Behaviour' assessed individuals' intent for community health advocacy after reading each message. Previous literature suggests importance for underserved communities, who express willingness to publicly disseminate PrEP information after learning about it to others, as it counteracts personal feelings of frustration around exclusion from PrEP compared to highly served groups benefitting from its positive effects (Dutta et al., 2013; Auerbach et al., 2015).

Fourthly, 'Intentions for PrEP Information Seeking' explored participants' active, goal-oriented willingness, as PrEP's unique feature is the need to communicate with a doctor or sexual health practitioner about one's eligibility (Griffin et al., 2013).

Lastly, 'Perceived Self-Efficacy' measured confidence in understanding and motivating oneself to initiate the PrEP-related action mentioned in each presented message to control individual HIV risk.



Current Study: Research Question & Aims

The present research question surrounds whether promoting PrEP as an effective HIV prevention measure via literature-guided messaging can influence PrEP adoption views in London's Black African community. Taking an exploratory approach, the aim was to investigate which novel PrEP message from a series of 8 (covering different psychosocial content variables) designed to offer reasons for uptake served as the *best* and *worst* message across 5 independent outcome measures of effectiveness.



Methods

Participants

Thirty participants aged between 19-56 years ($M = 27.27$ years, $SD = 7.99$) were recruited (18 women, 8 men, 4 non-binary). Appendix A completely summarises the remaining demographic data. Recruitment involved distributing study adverts hyperlinked to an anonymous 15 minute 'Qualtrics' survey. Incentivisation operated on optional entry into a £20 retail voucher prize draw, with personal email address provision signalling consent to opt-in (needed to inform the winning participant). Eligibility criteria for participation specified being of Black African heritage and aged 18+. Recruitment channels were decided alongside Hackney Public Health and included: social media channels of partnered charitable organisations working with London's Black Africans ('Positive East', 'PrEPster'); a 20 second 'pop-up' advert designed for www.shl.uk; and the researcher's personal social media and promoting via 'word of mouth' (mainly on student WhatsApp groups). An information sheet, consent and confidentiality form was presented upon survey initiation, emphasising that terminating one's browser session at any time indicates withdrawal of consent. Ethical approval was obtained from UCL's Research Ethics Committee, Project ID 21415/001.

Design

A within-subjects design was used to ensure all participants' equal exposure to message content. The categorical independent variable 'PrEP message type' was manipulated to create 8 categories (i.e. 'Prevention Altruism', 'Cost-Benefit', 'Medicinal Side-Effects', 'PrEP-related Conspiracy Theories', 'Geospatial Proximity of HIV Risk', 'Partner Unreliability with Condoms', 'Physical HIV Symptoms', and 'Effects on Social Life from HIV'). Five dependant variables measured participants' level of agreement on 6-point Likert Scales but were treated as continuous data upon analysis. These were: 'Persuasiveness' ($\alpha = .67$), 'Presumed Influence' ($\alpha = .70$), 'Perceived Self-Efficacy' ($\alpha = .73$), 'Intentions for PrEP-related Prosocial Behaviour' ($\alpha = .66$), and 'Intentions for PrEP Information Seeking' ($\alpha = .71$).

Materials

To create the 8 messages (see Appendix B), the HBM guided literature searching by helping assign the breadth of available PrEP related information to novel psychosocial constructs. These could be grouped under the model's components using its definitions. Control of message length was maintained between 60-130 words to mirror typical short paragraphs.



Aside from 'Perceived Benefits' in Figure 1, the remaining HBM components guiding message design contain negative threat-based reference frames on HIV's consequences, potentially inducing participant fear, distress, or anxiety. To ethically resolve this, any message content lending itself to threat was counteracted with PrEP's positive influence in preventing HIV acquisition altogether, emphasising 'healthy lifestyle' attainment.

As aforementioned literature pointed to weaknesses of prior PrEP campaigns as being condescending by making repeated stigmatising references to Black African communities, neutral language was used throughout (i.e. avoiding ethnicity references, using alternatives like 'some groups'). Representatives from Hackney Public Health further sense checked messages.

Lastly, all 5 dependent variables were measured on 1-6 Likert Scales, (1 = strongly disagree, 6 = strongly agree). Utilising even numbered scales via midpoint omission aimed to minimise social desirability biases, likely associated with ratings for behavioural intentions which could skew towards positive responding (Johns, 2005). With PrEP being a topic where the participant majority show low-moderate awareness towards (seen in Appendix A, with 36.6% having no awareness and 56.6% showing moderate levels), midpoint omission can motivate deeper thought when responding rather than giving easy neutral opt-outs (Krosnick, 1991; Garland, 1991).

Procedure

Participants could access 'Qualtrics' via either mobile phone or personal computer, with the hyperlinked study advert initiating our survey. Study expectations were outlined in the information sheet and consent webforms. Full informed consent was obtained, giving instructions on participant right to withdrawal (via browser session termination at any point).

A demographics question block followed, with the option for 'I prefer not to say' given throughout due to sensitivities surrounding HIV/PrEP as a sexual health topic. Voluntary opt-in for prize draw entry ended this block, giving an open text box to input email addresses.

Subsequently, a preliminary information block briefly outlined PrEP's beneficial functions in protection against HIV for certain risk groups, equipping all participants with similar baseline knowledge before starting the main study. This preceded a task instructions block, assigning randomised 5 digit IDs for participant anonymisation.

Following this, the main block of 8 PrEP messages appeared onscreen with randomised presentation to minimise order effects' biasing influence on



responses. Figure 2 shows an example message block with its 5 subsequent Likert Scale questions. Figure 3 summarises the procedure schematically.

Message: PrEP is available free of charge in NHS sexual health clinics across England, for people who are deemed to be at higher risk of being infected by HIV. It comes as a single pill taken daily, proven 99% effective in preventing HIV infection when taken consistently. Anyone who is eligible – no matter their immigration status – can access PrEP, and your GP does not have to be informed.

Please select your level of agreement with the five statements below:

"After reading this message, I think..."

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
It is persuasive about why PrEP should be used by more people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It makes me understand what I can do to feel in control of reducing risk to myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It could make people in my local community want to start taking PrEP, or find out more about it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It would make me want to persuade other people from my local community to attend PrEP education events, if I had the opportunity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I intend to consult with my doctor or a sexual health clinic to get more information about PrEP, if this becomes relevant for me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 2. Example PrEP message (here, 'Cost-Benefit') with 6-point Likert Scale question layout covering all 5 dependent variables

Upon completing the main PrEP message questions, a debrief screen followed. This covered charity PrEP information websites, details on local STI testing and contraception services, and mental health helplines for any incurred distress or anxiety.

Reminders on exercising rights to withdraw consent along with confidentiality and anonymity maintenance of response data were given. Downloadable PDFs for all documents (information sheet, debrief and consent form) were all made available for participant' future reference.

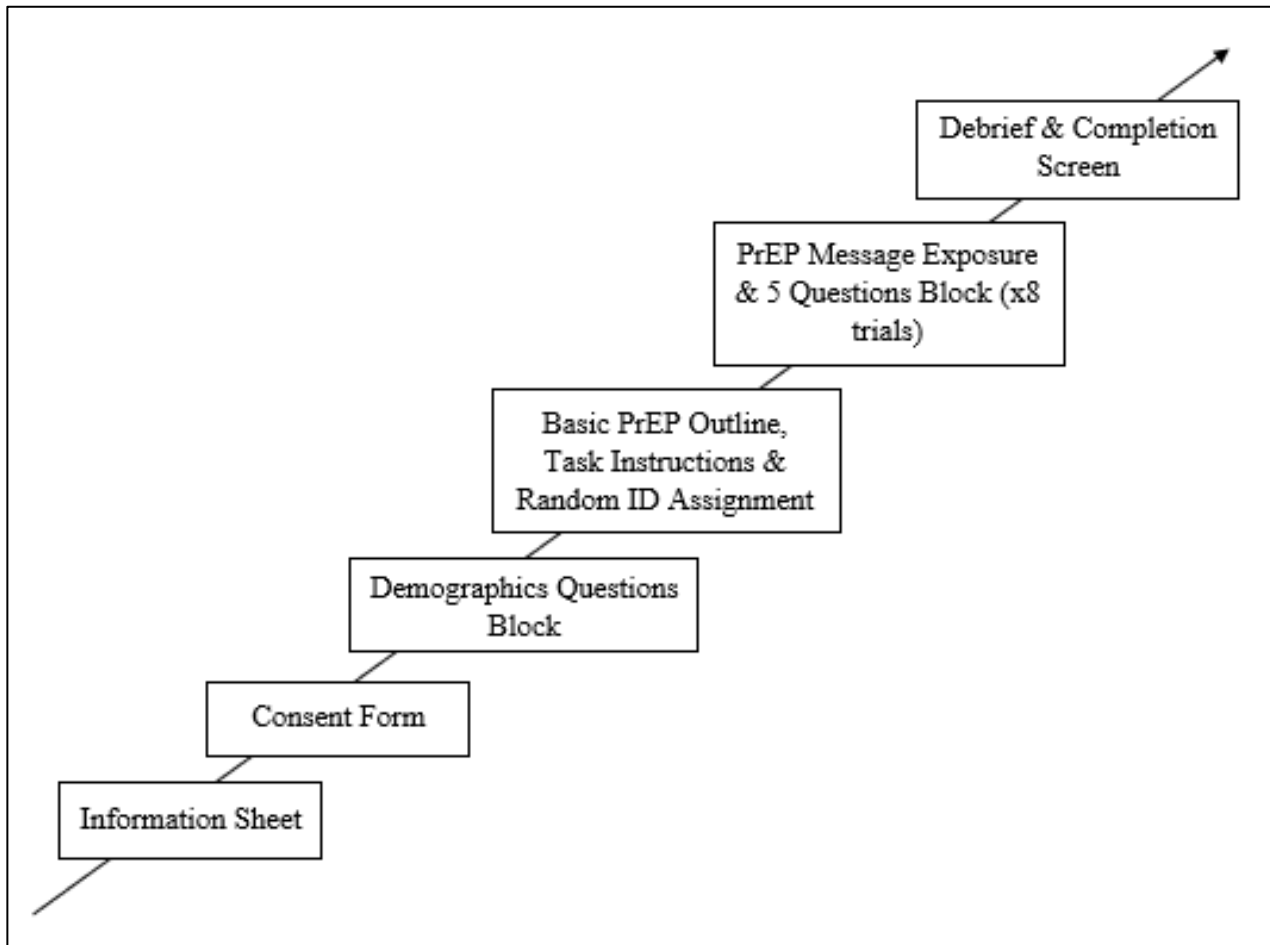


Figure 3. Flowchart summarising Qualtrics survey pathway

Planned Analyses

Two simple regression models will be run per outcome measure. These cover research aims by predicting highest- and lowest-rated PrEP message content across each of the 5 outcomes (assumed independent from one another).

All 5 Likert Scale outcome measures were treated as continuous variables for regression analysis purposes. Upon interpretation, 'higher' ratings will be regarded as generating greater agreement, whilst 'lower' ones show greater disagreement (aligning with Likert Scale directions).

As 'PrEP Message Type' was a categorical predictor in all regression models constructed, this underwent a dummy coding procedure. Two dummy coding variations were created per dependent variable (i.e. for their two regression models). One set the highest mean-rated 'PrEP Message Type' category as the reference condition, encoding all others as dummy variables for



comparison. The reverse approach was applied to the second models, setting the lowest mean-rated message category as reference. Comparisons can thus be made between all 'PrEP Message Type' categories and a reference condition to ascertain the significance of 'highest' and 'lowest' predictors for each dependent variable.

In case regression coefficients proved unable to differentiate which message predicts 'highest' or 'lowest' ratings for a dependent variable, post-hoc pairwise comparisons using Bonferroni-corrected paired *t*-tests were performed.



Results

Overview

Overall, 'Partner Unreliability with Condoms' proved the most consistently highest-rated message followed by 'Prevention Altruism'. An exception surrounded 'Intentions for PrEP Information Seeking', where 'Physical HIV Symptoms' and 'Effects on Social Life from HIV' were additionally highly rated.

Comparatively, 'Medicinal Side-Effects' was most consistently lowest rated. Exceptions were on 'Perceived Self-Efficacy' where 'PrEP-related Conspiracy Theories' and 'Geospatial Proximity to HIV Risk' were similarly lowest, and 'Intentions for PrEP Information Seeking' with 'Geospatial Proximity to HIV Risk' additionally rated low.

Dummy Coding Approach

Seen in Figure 4, to test the first exploratory question of what 'PrEP Message Type' category predicted 'highest' ratings, Message 6 ('Partner Unreliability with Condoms') was assigned as the reference category across all dependent variables as it produced the highest mean throughout.

To predict what 'PrEP Message Type' category gave 'lowest' ratings, Figure 4 shows the dependent variable 'Intentions for PrEP Information Seeking' was the only one assigning Message 5 ('Geospatial Proximity of HIV Risk') as reference, due to its lowest mean value. The remainder dictate Message 3 ('Medicinal Side-Effects') be set as reference in each individual regression model.

All remaining categories of the predictor variables were encoded as dummies. Appendix C offers the exact descriptive mean and standard deviation values across all messages and dependent variables in tabular form.

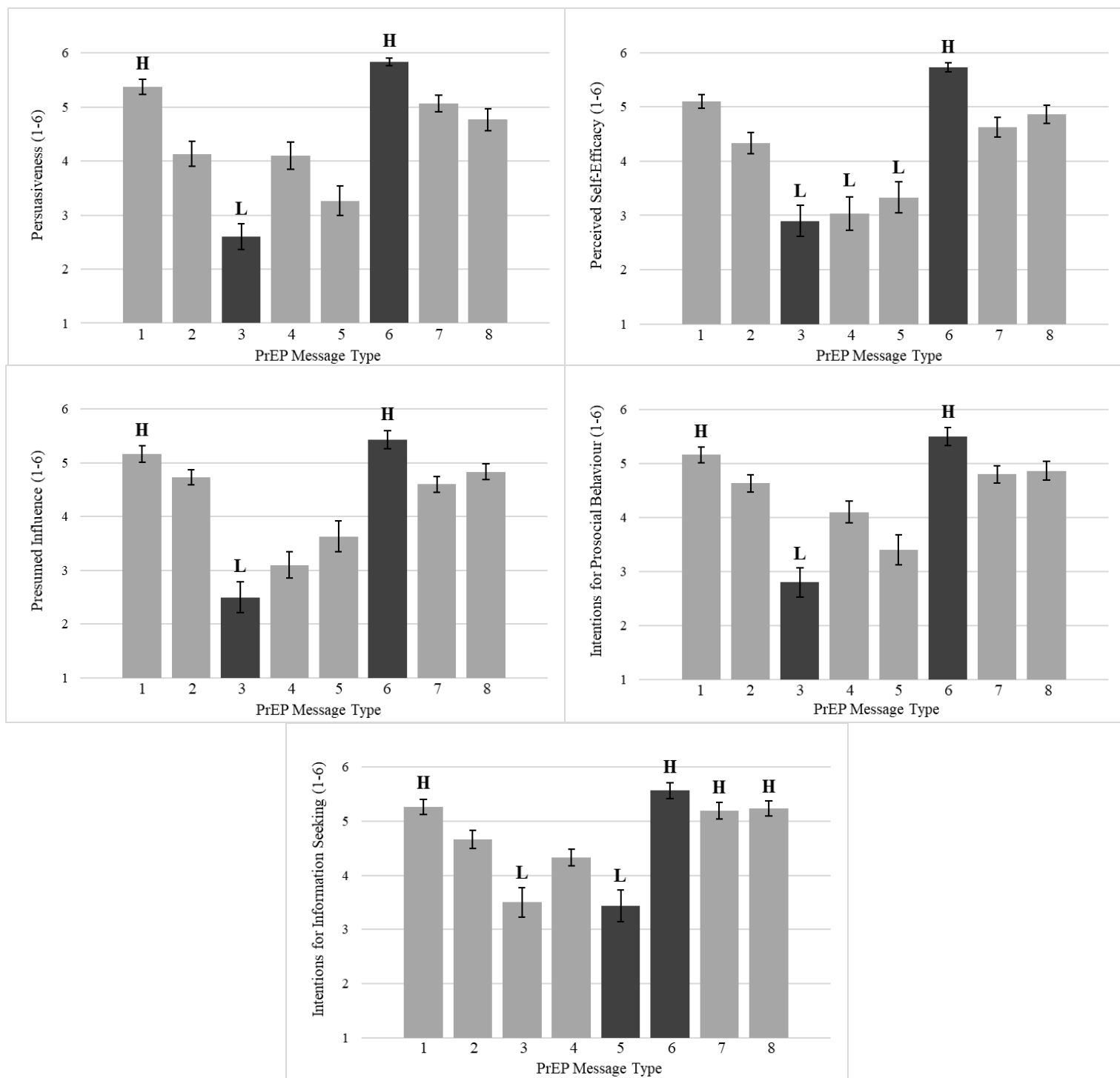


Figure 4. Bar graphs depicting descriptive means and standard error bars for 'PrEP Message Type' categories across all 5 dependent variables. Darker bars show the reference categories used in the 'highest' and 'lowest' regression models based on dummy coding procedures. Bars labelled H/L show 'highest' and 'lowest' messages as per concluded interpretations of statistical significance from regression analyses by comparing coefficients.

Regression Analysis

Persuasiveness

'PrEP Message Type' statistically significantly predicted 'Persuasiveness' for both regression models labelled 'highest' and 'lowest', $F(7, 232) = 27.03$, $p < .001$, and accounted for $R^2 = 44.9\%$ % of variance with $R^2_{\text{adjusted}} = 43.3\%$.

The prediction equation for these models was written as:

$$\begin{aligned} \text{Persuasiveness} &= 5.833 + (B \times \text{'PrEP Message Type'}) \\ \text{Persuasiveness} &= 2.600 + (B \times \text{'PrEP Message Type'}) \end{aligned}$$

In line with Table D1 (Appendix D), the intercepts for the above equations comprise of the coefficients for messages used as the 'highest' reference category, 'Partner Unreliability with Condoms' ($B = 5.833$, 95% CI[5.422, 6.245], $t(232) = 27.930$, $p < .001$) and 'lowest' reference category, 'Medicinal Side-Effects' ($B = 2.600$, 95% CI[2.189, 3.011], $t(232) = 12.449$, $p < .001$).

Under the regression model labelled 'highest' in Table D1, the negative direction of all individual predictor regression coefficients implies lower 'Persuasiveness' ratings than the reference. From these, 'Prevention Altruism' is the next highest predictor, with a predicted mean value of 5.366 from the regression equation; however, this proves to have no significant difference from the reference ($B = -0.467$, 95% CI[-1.049, 0.115], $t(232) = -1.580$, $p = .115$). Therefore, as there is no evidence to discern that one predicts a higher 'Persuasiveness' rating than the other, both 'Partner Unreliability with Condoms' and 'Prevention Altruism' can be regarded as highest-rated PrEP messages (i.e. greater agreement that these messages are persuasive in promoting PrEP uptake).

Under Table D1's regression model labelled 'lowest', 'Geospatial Proximity of HIV Risk' is the second lowest predictor of 'Persuasiveness' with a predicted mean of 3.266 and is significantly higher than the reference, as seen from the positive direction of its regression coefficient ($B = 0.667$, 95% CI[0.085, 1.249], $t(232) = 2.257$, $p = .025$). Hence, this model predicts 'Medicinal Side-Effects' as the message producing lowest 'Persuasiveness' ratings (i.e. greater disagreement with this message being persuasive at promoting PrEP uptake).



Perceived Self-Efficacy

'PrEP Message Type' statistically significantly predicted 'Perceived Self-Efficacy' for both regression models labelled 'highest' and 'lowest', $F(7, 232) = 23.178$, $p < .001$, and accounted for $R^2 = 41.2\%$ of variance with $R^2_{\text{adjusted}} = 39.4\%$.

The prediction equation for these models was written as:

$$\begin{aligned} \text{Perceived Self-Efficacy} &= 5.733 + (B \times \text{'PrEP Message Type'}) \\ \text{Perceived Self-Efficacy} &= 2.900 + (B \times \text{'PrEP Message Type'}) \end{aligned}$$

In line with Table D2, the equation intercepts reflect coefficients for messages used as the 'highest' reference category, 'Partner Unreliability with Condoms' ($B = 5.733$, 95% CI[5.307, 6.160], $t(232) = 26.491$, $p < .001$) and 'lowest' reference category, 'Medicinal Side-Effects' ($B = 2.900$, 95% CI[2.474, 3.326], $t(232) = 13.400$, $p < .001$).

Assessing Table D2, 'Prevention Altruism' can be deemed the second 'highest' predictor as validated by its coefficient's negative direction, ($B = -0.633$, 95% CI[-1.236, -0.030], $t(232) = -2.069$, $p = .040$), with this being statistically significantly lower than the 'highest' rated reference group. Therefore, 'Partner Unreliability with Condoms' as the reference category can be regarded as being the highest-rated message for 'Perceived Self-Efficacy' (i.e. rated by participants with highest agreement that this message helps them understand what they can do to feel in control of reducing personal risk of HIV).

As for the 'lowest' rated predictor of 'Perceived Self-Efficacy', from Table D2 it would appear that as the coefficients for 'PrEP-related Conspiracy Theories' ($B = 0.133$, 95% CI[-0.470, 0.736], $t(232) = 0.436$, $p = .664$) and 'Geospatial Proximity to HIV Risk' ($B = 0.433$, 95% CI[-0.170, 1.036], $t(232) = 1.416$, $p = .158$) are both not statistically significantly higher than the reference, all 3 messages can be considered performing the same. This is further corroborated by a post-hoc pairwise t -test comparison between these two predictors, suggesting that the difference in means of 0.300 between 'PrEP-related Conspiracy Theories' ($M = 3.033$, $SD = 1.671$) and 'Geospatial Proximity to HIV Risk' ($M = 3.333$, $SD = 1.539$) is non-significant, $t(29) = 1.027$, $p = .313$. Hence, neither of these messages predicted any significantly different ratings for 'Perceived Self-Efficacy' and can all be regarded as performing the 'lowest' as predictors, including the reference category message (i.e. all produce greatest respondent disagreement about these messages helping them understand how they can feel in control of reducing HIV risk to themselves).



Presumed Influence

'PrEP Message Type' statistically significantly predicted 'Presumed Influence' for both regression models labelled 'highest' and 'lowest', $F(7, 232) = 25.878$, $p < .001$, and accounted for $R^2 = 43.8\%$ % of variance with $R^2_{\text{adjusted}} = 42.2\%$.

The prediction equation for these models was written as:

$$\begin{aligned} \text{Presumed Influence} &= 5.433 + (B \times \text{'PrEP Message Type'}) \\ \text{Presumed Influence} &= 2.500 + (B \times \text{'PrEP Message Type'}) \end{aligned}$$

Seen in Table D3, the equation intercepts reflect coefficients for messages used as the 'highest' reference category, 'Partner Unreliability with Condoms' ($B = 5.433$, 95% CI[5.027, 5.840], $t(232) = 26.350$, $p < .001$) and 'lowest' reference category, 'Medicinal Side-Effects' ($B = 2.500$, 95% CI[2.094, 2.906], $t(232) = 12.124$, $p < .001$).

'Prevention Altruism' next appears as the second 'highest' predictor in Table D3 from its coefficients' negative direction but shows no significant difference from the reference ($B = -0.267$, 95% CI[-0.841, 0.308], $t(232) = -0.914$, $p = .361$). This suggests that with its predicted mean of 5.166 from the above equation, 'Prevention Altruism' as a message cannot be disambiguated as predicting a higher or lower 'Presumed Influence' rating than Partner Unreliability with Condoms' (i.e. highest agreement equally given for both messages in being able to indirectly influence PrEP uptake in the local community with their individually given reasons).

'PrEP-related Conspiracy Theories' can be regarded as the second 'lowest' predictor from the corresponding model in Table D3, which is confirmed by the significance of its positive coefficient, $B = 0.600$, 95% CI[0.025, 1.175], $t(232) = 2.058$, $p = .041$. Hence, 'PrEP-related Conspiracy Theories' as a message gives a higher predicted mean 'Presumed Influence' rating of 3.100 than the reference, 'Medicinal Side-Effects' (which as the 'lowest' rated produces greatest disagreement with this message's ability to indirectly influence community PrEP uptake).



Intentions for PrEP-related Prosocial Behaviour

'PrEP Message Type' statistically significantly predicted 'Intentions for PrEP-related Prosocial Behaviour' for both regression models labelled 'highest' and 'lowest', $F(7, 232) = 21.211$, $p < .001$, and accounted for $R^2 = 39.0\%$ of variance with $R^2_{\text{adjusted}} = 37.2\%$.

The prediction equation for these models was written as:

$$\text{Intentions for PrEP-related Prosocial Behaviour} = 5.500 + (B \times \text{'PrEP Message Type'})$$

$$\text{Intentions for PrEP-related Prosocial Behaviour} = 2.800 + (B \times \text{'PrEP Message Type'})$$

Corresponding to Table D4, the equation intercepts reflect coefficients for messages used as the 'highest' reference category, 'Partner Unreliability with Condoms' ($B = 5.500$, 95% CI[5.108, 5.892], $t(232) = 27.639$, $p < .001$) and 'lowest' reference category, 'Medicinal Side-Effects' ($B = 2.800$, 95% CI[2.408, 3.192], $t(232) = 14.071$, $p < .001$).

Table D4 shows 'Prevention Altruism' as being the second 'highest' predictor as determined by its coefficients' negative direction but is not significantly different from the reference ($B = -0.333$, 95% CI[-0.888, 0.221], $t(232) = -1.184$, $p = .237$). This implies that there is no evidence to suggest that either one of 'Prevention Altruism' (with a predicted mean of 5.167) or 'Partner Unreliability with Condoms' as messages produced the higher 'Intentions for PrEP-related Prosocial Behaviour' (i.e. both produced similarly greatest agreement in respondents' self-reported intentions to persuade others to attend PrEP education events).

Table D4 also determines that 'Geospatial Proximity to HIV Risk' is the next 'lowest' predictor after the reference, as validated by the significance of its positive coefficient ($B = 0.600$, 95% CI[0.046, 1.154], $t(232) = 2.132$, $p = .034$). Therefore, this message gives a significantly higher predicted mean 'Intentions for PrEP-related Prosocial Behaviour' rating of 3.400 when compared to the reference, 'Medicinal Side-Effects' (which as the 'lowest' rated message produces greatest disagreement by respondents in their intentions to persuade others to attend PrEP education events).



Intentions for PrEP Information-Seeking

'PrEP Message Type' statistically significantly predicted 'Intentions for PrEP Information-Seeking' for both regression models labelled 'highest' and 'lowest', $F(7, 232) = 18.542$, $p < .001$, and accounted for $R^2 = 35.9\%$ of variance with $R^2_{\text{adjusted}} = 33.9\%$.

The prediction equation for these models was written as:

Intentions for PrEP Information-Seeking = 5.567 + (B x 'PrEP Message Type')
 Intentions for PrEP Information-Seeking = 3.433 + (B x 'PrEP Message Type')

The equation intercepts reflect coefficients for messages used as the 'highest' reference category, 'Partner Unreliability with Condoms' ($B = 5.567$, 95% CI[5.189, 5.944], $t(232) = 29.048$, $p < .001$) and 'lowest' reference category, 'Geospatial Proximity of HIV Risk' ($B = 3.433$, 95% CI[3.056, 3.811], $t(232) = 17.916$, $p < .001$), highlighted in Table D5.

From Table D5, 'Prevention Altruism' appears to be the second highest predictor from its negative coefficient but proves not significantly different to the reference ($B = -0.300$, 95% CI[-0.834, 0.234], $t(232) = -1.107$, $p = .269$). Continuing this approach, 'Effect on Social Life from HIV' seems to be the next highest predictor below the reference, yet also shows no significant difference from it ($B = -0.333$, 95% CI[-0.867, 0.201], $t(232) = -1.230$, $p = .220$). This is followed by 'Physical HIV Symptoms' which again shows no significant difference from the reference ($B = -0.367$, 95% CI[-0.901, 0.167], $t(232) = -1.353$, $p = .177$).

To further disambiguate whether any of these messages are significantly higher than the others on ratings given for 'Intentions for PrEP Information-Seeking', 3 post-hoc pairwise t-test comparisons applying a Bonferroni correction to the alpha level ($0.05/3 = 0.016$) were performed. The difference in means of 0.333 between 'Prevention Altruism' ($M = 5.267$, $SD = 0.740$) and 'Effects on Social Life from HIV' ($M = 5.233$, $SD = 0.774$) was not significant, $t(29) = 0.215$, $p = .831$. 'Prevention Altruism' showed a difference in mean of 0.667 from 'Physical HIV Symptoms' ($M = 5.200$, $SD = 0.847$) but was also non-significant, $t(29) = 0.215$, $p = .831$. Lastly, 'Effects on Social Life from HIV' and 'Physical HIV Symptoms' showed also a non-significant difference in means of 0.333, $t(29) = 0.215$, $p = .831$. Therefore, there is no evidence to suggest that either one of these messages predicted any significantly different ratings on 'Intentions for PrEP Information Seeking' than the reference (i.e. all can be deemed as predicting 'highest' ratings, otherwise interpreted as greater agreement with these messages influencing respondent intentions to consult with a doctor or clinic about PrEP in future).



Under Table D5, 'Medicinal Side-Effects' appears to be the next 'lowest' predictor, but its positive coefficient shows no significant difference from the reference, $B = 0.067$, 95% CI[-0.467, 0.601], $t(232) = 0.246$, $p = .806$. Therefore, this implies that with its mean predicted value of 3.500, 'Medicinal Side-Effects' as a message cannot be discerned as being any different to the 'lowest' message used as the reference, 'Geospatial Proximity to HIV Risk' (i.e. both can be deemed as the 'lowest' rated message, giving greatest disagreement by respondents when asked whether the message influences their intentions to consult with a doctor or clinic about PrEP in future).



Discussion

The present study explored effectiveness of a series of 8 PrEP-promoting messages, each covering different novel psychosocial variables, across 5 independent outcome measures. With the exploratory approach taken, the main aim was to ascertain which messages were highest and lowest predictors of each measure, specific to a Black African sample.

Results imply that the best performing messages across all outcome measures centred around themes of: inter-relationship gains, PrEP use as an empowering action, alignment with intimacy norms on condomless sex, and direct comparisons of PrEP's benefits against condoms. Namely, these were: 'Partner Unreliability with Condoms' and 'Prevention Altruism', with 'Physical HIV Symptoms' and 'Effects on Social Life from HIV' additionally performing well on only 'Intentions for PrEP Information-Seeking'. Contrastingly, worst performing messages were those revolving around affixed concepts, and losses associated with side-effects despite their rarity. Namely, these were: 'Medicinal Side-Effects', 'PrEP-related Conspiracy Theories' (only for 'Perceived Self-Efficacy') and 'Geospatial Proximity to HIV Risk' (only for 'Perceived Self-Efficacy' and 'Intentions for PrEP Information-Seeking'). These findings are subsequently discussed.

PrEP Message Themes of Interrelationship 'Gain' are Highly Persuasive

'Partner Unreliability with Condoms' and 'Prevention Altruism' frame 'gain' on inter-relationship levels, making common references to intimacy motivations between both messages. Both were significantly high predictors of 'Persuasiveness'.

Firstly, Nakku-Joloba and colleagues (2019) found that altruistic tendencies in heterosexual couples to protect future children from HIV transmission often relates to sexual anxiety with unprotected sex. Exposing individuals to PrEP promotion centred on messages of restoring sexual pleasure whilst also enabling for conception increased ratings of persuasiveness in their study, as this 'gain' coincided with altruistic motivations and simultaneously removed guilt (similar to the current 'Prevention Altruism' message design). Secondly, 'Partner Unreliability with Condoms' makes references to removing condoms as physical barriers. Longer term PrEP users in the literature report this being their most persuasive motivator, increasing emotional 'sexual satisfaction' and physical closeness (Prestage et al., 2019; Mabire et al., 2019; Devarajan et al. 2020).



Messaging that Frames PrEP's Side-Effects as a Rare 'Loss' Performs Poorly

'Loss' frames in persuasion literature are usually devised with intentions of highlighting negative consequences arising *from non-compliance with a specified health behaviour* (O'Keefe & Jensen, 2007). In condom promotion contexts, loss-framed messages negatively convey direct HIV susceptibility as a threat from non-adherence (condomless sex), showing persuasion capability via boosting condom compliance (Foley et al., 2021).

With 'Medicinal Side-Effects' as the lowest-rated predictor of 'Persuasiveness' however, one attributable reason is that side-effects are framed as a loss incurred to healthiness directly from *complying with the health behaviour being promoted*, rather than intuitively from non-compliance. Mentioned earlier, Busza et al.'s (2021) Zimbabwean study population revealed fear-mongering was common surrounding side-effects, expressing the importance of realistic reflection of risk in PrEP side-effect warning information as a persuasive feature overcoming PrEP's associated 'losses' on short-term health. However, the current results imply fears linked to side-effects override attempts to circumvent their unpersuasive reasoning for PrEP adoption using rarity descriptions (included in the present message's design).

Deep-rooted medical mistrust linked to side-effects as a 'Perceived Barrier' may explain this. Freeman et al. (2017) suggest that for Black Africans, medicinal side-effects impose emotional barriers to taking antiretrovirals and PrEP from racial associations. Suspicion and resistance to persuasion attempts targeting HIV medication acceptance offers a sense of individual level responsibility in salvaging the wider community's safety.

Hence, realistically diluting the seriousness of side-effects by emphasising their rarity in 'loss' frames for persuasiveness appeals may be insufficient in promotional PrEP messages, as racially rooted medical mistrust for Black Africans is difficult to overcome. Instead, gain-based frames leveraging motivations of interrelationship intimacy can amplify PrEP's 'Persuasiveness'.

Comparing PrEP's Advantages over Condoms Boosts Black Africans' Understanding of HIV Prevention

'Partner Unreliability with Condoms' being the single highest-rated message on 'Perceived Self-Efficacy' may stem from using a well-known STI prevention method as a comparator for discussing PrEP's extended benefits.

Underhill and colleagues (2016) found exposing individuals to success rate comparisons between condoms and PrEP enhanced reports of self-efficacy in



initiating continued HIV prevention regimes. This is of particular significance as their participants reported high baseline condom knowledge.

Black African women (forming our sample's majority) are reported to possess high awareness of condoms (Caldwell & Mathews, 2015; Paxton et al., 2013). Combined with this potentially high pre-existing condom knowledge, comparing limitations of condoms to PrEP as a pragmatic solution to overcome these may explain our results.

Messages Covering Affixed, Hard-to-Change Themes when Promoting PrEP Perform Poorly

'Medicinal Side-Effects', 'PrEP-related Conspiracy Theories', and 'Geospatial Proximity to HIV Risk' were all rated equally as low for 'Perceived Self-Efficacy', arguably due to their comparisons with PrEP linking affixed and difficult-to-change concepts.

The former two messages collectively comprise 'medical mistrust' as an issue hindering acceptance of traditional HIV prevention measures, giving PrEP as a newer solution needing uptake by more individuals. However, these issues are likely perceived as forms of deeply-ingrained resistance over fears of exploitation and malice towards Black populations as aforementioned, thereby impacting 'Perceived Self-Efficacy' views (Freeman et al., 2017).

Low ratings associated with 'Geospatial Proximity of HIV Risk' may be explained by literature into geographically high-risk HIV areas. Gwadz et al. (2018) found offering individuals information on testing sites and infection prevalence rates in their locality did not facilitate feelings of being able to adhere to regular HIV testing regimes, out of worries about being automatically associated with stereotypes of the geographic area. This could be a possibility in the present message's design, as London was named a 'HIV hotspot'.

Messages Aligning with Intimacy Norms on Condomless Sex are Perceived More Effective in Influencing Other Black Africans

Perceptions about sexual and HIV protective practices occurring within the wider group have a normative influence on individuals themselves, serving as possible predictors of PrEP adoption (Parent et al., 2020).

'Partner Unreliability with Condoms' being highly-rated on 'Presumed Influence' (an indirect measure of message effectiveness perceptions on the wider community) may add to prior literature suggesting pervasiveness of media imagery on condomless sexual behaviour in Black African groups.



Nelson, Eaton, and Gamarel (2017) found preferences for condomless activity in a Black African American MSM sample were heavily normalised from consumption of explicit media amongst the majority of participants and correlated with their perceptions of peer condom use as being low. This latter perception (resembling our 'Presumed Influence' measure) modelled their own behaviours.

Combined with the concept of 'condom fatigue' discussed in the introduction, our findings may be explained by these studies suggesting condomless norms as being highly salient to perceivers of PrEP promotion messages, serving as motivational models to one's own sexual behaviour (Brooks et al., 2015) when PrEP's advantages are highlighted.

'Prevention Altruism' shows similar high ratings possibly due to normative influences around conceiving children. This has strong cultural influence in Black African's descriptions of motivators underlying (condomless) sex (King et al., 2009). 'Medicinal Side-Effects' lack of reference to such normative influences may explain this message's low ratings.

Centring PrEP Messages around Empowerment rather than Vulnerability Positively Impacts Black African Participants' Behavioural Intention Ratings

Prior studies suggest PrEP uptake intentions can be boosted when individuals are presented with the notion that dyadic power imbalances can compensate one's own *health* from a partner's unnegotiated sexual decision making. Malone et al. (2018) found individuals self-reporting as not diligently exercising HIV prevention practices in their relationships were more interested in exploring PrEP when alerted to *health risks they may unknowingly impose to themselves* from a partner 'slipping up'.

This is a common thread of reference made in our study's highest-rated messages on 'Intentions for PrEP Information-Seeking'. 'Partner Unreliability with Condoms' touches upon PrEP giving individual users control over protecting their health, especially in cases of dyadic inequalities and social control of one's health from an interrelationship dynamic where intimacy (and condom neglect) compromises health. 'Prevention Altruism' ties into empowering the user to exercise their sense of responsibility over their children's health. 'Physical Symptoms of HIV' weaves empowerment in the form of early action evading damage to health in the unfortunate event of potential HIV exposure. 'Effects on Social Life from HIV' touches on PrEP's covert way of providing health benefits (HIV protection), and evading promiscuity stereotyping from committed or casual partners via maintenance of sexual intimacy (Auerbach & Hoppe, 2015; Marcus & Snowden, 2020).



Regarding 'Intentions for PrEP-related Prosocial Behaviour', Busza et al.'s (2021) study on early PrEP using Zimbabwean women found many expressed willingness to proactively mentor, educate and spread empowerment messages as 'community PrEP champions' to other vulnerable women facing partner resistance to HIV barrier methods and simultaneously desired conceiving children. Our present study corroborates this, as 'Prevention Altruism' and 'Partner Unreliability with Condoms' were rated highly, possibly explained by the overwhelmingly female sample which boosts self-relevance of message content.

Comparatively however, vulnerability-oriented content in PrEP messaging was least capable of boosting intentions, explaining poor ratings given to 'Medicinal Side-Effects' (for both intention ratings) and 'Geospatial Proximity to HIV Risk' (additionally only on 'Intentions for PrEP Information-Seeking'). Foley et al. (2021) note that HIV vulnerable populations find vulnerability-based content like side-effects to be 'preachy', lowering their willingness to engage with a presented health behaviour.

Limitations & Future Research

Firstly, skewing towards a largely women-oriented sample limits generalisability of current findings. For instance, the most outperforming messages rated highest across the 5 outcomes, 'Partner Unreliability with Condoms' and 'Prevention Altruism', both touch on empowerment and sexual motivations in ways more relatable to women (e.g. references to pregnancy, dyadic power imbalances from intimacy motivations of male partners). John et al., (2018) found for bisexual men, PrEP was viewed just as negatively as condoms due to perceived intimacy disruptions, indicating lack of mutual monogamy with a sexual partner. Covarying patterns between PrEP and alternative STI prevention techniques like condom use need exploration in studies raising conclusions about intimacy and empowerment motivations, due to often gender oriented stigmatisation arising from initiating newer HIV prevention regimes like PrEP. For example, MSM are more subjected to stereotypes like the 'Truvada whore' which stems from higher PrEP knowledge in the gay community and individual level fears of being stigmatised for cessation of condom use in replacement of PrEP for sexual pleasure reasons (Calabrese & Underhill, 2015). This likely impacts expression of true attitudes towards PrEP use in self-report questionnaires (Peng et al., 2018). Furthermore, women are more heavily influenced by adverse effects to reproductive and overall health, potentially confounding results on the consistently low ratings attributed to 'Medicinal Side-Effects' (Glick et al., 2020). Therefore, different PrEP message preferences may be produced in Black African samples with a higher proportion of men and MSM.



Secondly, the format of message presentation potentially interfered with recruitment difficulties. The mundane layout of multiple PrEP message paragraphs followed by Likert Scale questions in Qualtrics' 'matrix table' functionality (displaying multiple questions with shared answering scales) may have been information heavy for participants (Cui et al., 2021). This explains the high attrition rates of our study, with 60 accessing the Qualtrics link but only 30 completing the entire survey. Evidence suggests Black Africans undergoing educational interventions on HIV prevention prefer interactive media, boosting acceptability of proposed regimes, e.g. video-based formats with culturally-identifiable speaking actors as PrEP users delivering information increases relatability (Hill et al., 2018).

Future research from our findings should consider assessing whether leveraging intimacy-based motivations for PrEP use (linking condom cessation) as an empowering sexual decision increases sexual risk compensation amongst Black Africans (Alaei, Paynter, Juan, & Alaei, 2016; Curley et al., 2022). Some studies suggest new PrEP users see HIV as the most dominantly threatening STI, e.g. chlamydia is viewed as not causing significant mortality (da Silva-Brandao & Iannini, 2020). PrEP helps cope with this threat, simultaneously benefitting through condomless sexual activity (Reyniers et al., 2020). At present, the interaction of Black Africans' risk perceptions between HIV and other STIs are not understood in our study as potential motivation for PrEP endorsement views, particularly as 'Partner Unreliability with Condoms' most outperformed across all 5 outcome measures.

Conclusion

This study explored what type of message content could prove effective in boosting PrEP endorsement for HIV prevention amongst London's Black African community. Notably, messages covering empowerment themes such as controlling one's own sexual health risk in dyads where partners show condom unreliability and taking altruistic control of a future child's health showed most effectiveness across 5 types of ratings. Contrastingly, those messages covering hard to change vulnerabilities like geographical location, deep rooted racial mistrust from conspiracies and medicinal side effects were least effective. Overall, these findings can help influence future promotional messaging interventions to increase PrEP uptake in the capital.



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Appendix A

Table A1
Sociodemographic Characteristics of Participants

Demographic characteristic	<i>n</i>	%
Sexual Orientation		
Heterosexual	17	56.7
Gay/Lesbian	5	16.6
Bisexual	3	10.0
Other/Prefer not to say	5	16.6
Marital status		
Single	21	70.0
Cohabiting	5	16.6
Married/Civil Partnership	3	10.0
Prefer not to say	1	3.3
African Heritage		
Ghana	5	16.6
Nigeria	9	30.0
Sierra Leone	2	6.7
Uganda	6	20.0
Don't know/Prefer not to say	8	26.6
Education		
GCSE's or Equivalent	1	3.3
A-Levels or Equivalent	8	26.6
Undergraduate Level	17	56.7
Postgraduate Level	4	13.3
Immigration Status		
British Citizen	23	76.6
Dual National Citizen	2	6.7
EU Citizen	3	10.0
Prefer not to say	2	6.7

HIV Awareness Level		
Nothing at all	2	6.7
A moderate amount	23	76.6
A lot	5	16.6
PrEP Awareness Level		
Nothing at all	11	36.6
A moderate amount	17	56.6
A lot	2	6.6

Note: N = 30. Column labelled % lists number of participants in each subset of

sociodemographic characteristics as a percentage of the total sample.



Appendix B

Perceived Benefits

Message 1 (Prevention Altruism): PrEP can be highly effective in preventing sexual partner(s) becoming HIV infected, along with reducing the spread of HIV in the local community. It also reduces the risk of unborn children being transmitted HIV during pregnancy from 25% to under 1%. This also applies later on during birth or breastfeeding. Therefore, PrEP can help keep yourself and others healthy, by remaining HIV negative.

Message 2 (Cost-Benefit): PrEP is available free of charge in NHS sexual health clinics across England, for people who are deemed to be at higher risk of being infected by HIV. It comes as a single pill taken daily, proven 99% effective in preventing HIV infection when taken consistently. Anyone who is eligible – no matter their immigration status – can access PrEP, and your GP does not have to be informed.

Perceived Barriers

Message 3 (Medicinal Side-Effects): Some people are hesitant taking PrEP due to potential side effects, as with any type of medication. These can include: fatigue, nausea, diarrhoea, headaches, and bloating, but are usually very minor and disappear once your body adjusts to taking PrEP daily. Very rarely, kidney and bone function can be affected in the long-term. However, these are monitored regularly by clinicians and usually detected early on. The majority of people on PrEP do not experience serious side effects, and everyone wishing to take up PrEP must undergo a kidney function test first.

Message 4 (PrEP-related Conspiracy Theories): Some groups of people who are at higher risk of HIV infection may be hesitant to take PrEP due to misinformation. There are, for example, conspiracy theories about HIV being a ‘man-made’ virus, with ideas that medicines (like PrEP) treating HIV are ‘poisonous’. However, scientific research proves such claims from conspiracy theories to be false. Instead, these false theories cause more harm, with low PrEP uptake exposing more vulnerable communities to otherwise preventable HIV infection risks.

Perceived Susceptibility

Message 5 (Geospatial Proximity of HIV Risk): London is known to be a hotspot for new HIV infections, compared with elsewhere in England. 40% of all people seeking care for HIV in the country are found in London. However, London has recently become one of the first cities in the world to meet the United Nations “95-95-95” target for 2025. This means 95% of Londoners with HIV are aware of their status, with 98% on treatment, of which 97% have successfully achieved an ‘undetectable viral load’ (i.e. they can no longer pass HIV onto others). A rise in Londoners taking PrEP will further help eliminate new HIV cases.

Message 6 (Partner Unreliability with Condoms): Although condoms are highly effective barrier methods of contraception and can reduce chances of catching HIV, they rely on a sexual partner’s cooperation in using them. Inconsistent (or no) use of condoms is risky and can still spread HIV to people at high-risk from their sexual partner(s). PrEP can overcome part of this problem. It can help to empower people who may be more vulnerable to HIV infection, such as some women, to feel in



control of protecting themselves, without being disadvantaged by their partner's decisions on condom use.

Perceived Severity

Message 7 (Physical HIV Symptoms): HIV symptoms usually start with a brief flu-like illness lasting for 1-2 weeks. Often many HIV-positive individuals will not experience symptoms after this first illness. However, if left untreated, the virus begins weakening the immune system and progresses through stages of serious infections to become 'Advanced HIV' or even AIDS. This increases the risk of catching dangerous diseases, e.g. pneumonia or tuberculosis. Risk of cancers such as lymphoma can increase by 100 times compared to HIV-negative people. However, PrEP can prevent these outcomes happening in the first place if taken early, allowing more people to live a healthy life.

Message 8 (Effects on Social Life from HIV): Living with HIV can have many negative social impacts for an individual. Firstly, there may be worries about telling current and former sexual partners about your HIV status and concerns around transmitting the virus to them. Secondly, there might be fears about using condoms consistently for HIV prevention, as this can affect intimacy for some people in long-term relationships. PrEP can prevent these problems completely, as it blocks the spread of HIV to a person before being exposed to the virus. As PrEP is taken once a day, it will not necessarily be obvious to a partner that you are taking it. Also, if you would like, sexual health clinic staff or your GP can contact your sexual partners on your behalf, and let them know you are taking PrEP



Appendix C

Table C1

Descriptive Statistics for 'PrEP Message Type' categories across dependent variables

'PrEP Message Type' Category	Persuasiveness		Perceived Self-Efficacy		Presumed Influence		Intentions for PrEP-related Prosocial Behaviour		Intentions for PrEP Information-Seeking	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
(1) Prevention Altruism	5.366	0.765	5.100	0.712	5.166	0.874	5.166	0.791	5.266	0.740
(2) Cost-Benefit	4.133	1.279	4.333	1.093	4.733	0.785	4.633	0.850	4.666	0.922
(3) Medicinal Side-Effects	2.600^b	1.329	2.900^b	1.539	2.500^b	1.570	2.800^b	1.494	3.500	1.480
(4) PrEP-related Conspiracy Theories	4.100	1.398	3.033	1.671	3.100	1.348	4.100	1.094	4.333	0.844
(5) Geospatial Proximity of HIV Risk	3.266	1.530	3.333	1.539	3.633	1.542	3.400	1.522	3.433^b	1.591
(6) Partner Unreliability with Condoms	5.833^a	0.379	5.733^a	0.449	5.433^a	0.935	5.500^a	0.900	5.566^a	0.817
(7) Physical HIV Symptoms	5.066	0.868	4.633	0.999	4.600	0.814	4.800	0.847	5.200	0.847
(8) Effects on Social Life from HIV Infection	4.766	1.135	4.866	0.899	4.833	0.791	4.866	0.937	5.233	0.774

Note. ^a Reflects the message category used as a 'highest' reference group, whilst ^b shows the 'lowest' reference group in dummy coding procedures for the 2 regression models per 5 dependent variables.

Appendix D

Table D1
Simple Regression Analyses: 'Persuasiveness' rating

Model and Predictors	B	SE	95% CI		t	p
			LL	UL		
Highest						
Intercept (Reference Category = (6))	5.833	0.209	5.422	6.245	27.930	<.001*
(1) Prevention Altruism	-0.467	0.295	-1.049	0.115	-1.580	.115
(2) Cost-Benefit	-1.700	0.295	-2.282	-1.118	-5.756	<.001*
(3) Medicinal Side Effects	-3.233	0.295	-3.815	-2.651	-10.974	<.001*
(4) PrEP-related Conspiracy Theories	-1.733	0.295	-2.315	-1.151	-5.868	<.001*
(5) Geospatial Proximity of HIV Risk	-2.567	0.295	-3.149	-1.985	-8.690	<.001*
(7) Physical HIV Symptoms	-0.767	0.295	-1.349	-0.185	-2.596	.010*
(8) Effects on Social Life from HIV	-1.067	0.295	-1.649	-0.485	-3.611	<.001*
Lowest						
Intercept (Reference Category = (3))	2.600	0.209	2.189	3.011	12.449	<.001*
(1) Prevention Altruism	2.767	0.295	2.185	3.349	9.367	<.001*
(2) Cost-Benefit	1.533	0.295	0.951	2.115	5.191	<.001*
(4) PrEP-related Conspiracy Theories	1.500	0.295	0.918	2.082	5.078	<.001*
(5) Geospatial Proximity of HIV Risk	0.667	0.295	0.085	1.249	2.257	.025*
(6) Partner Unreliability with Condoms	3.233	0.295	2.651	3.815	10.947	<.001*
(7) Physical HIV Symptoms	2.467	0.295	1.885	3.049	8.351	<.001*
(8) Effects on Social Life from HIV	2.167	0.295	1.585	2.749	7.336	<.001*

Note: * $p < .05$. LL = Lower Limit; UL = Upper Limit. Reference category in regression model labelled 'Highest' was set as Message 6 ('Partner Unreliability with Condoms'), and Message 3 ('Medicinal Side Effects') for regression model named 'Lowest'.

Table D2*Simple Regression Analyses: 'Perceived Self-Efficacy' rating*

Model and Predictors	<i>B</i>	<i>SE</i>	95% CI		<i>t</i>	<i>p</i>
			<i>LL</i>	<i>UL</i>		
Highest						
Intercept (Reference Category = (6))	5.733	0.216	5.307	6.160	26.491	<.001*
(1) Prevention Altruism	-0.633	0.306	-1.236	-0.030	-2.069	.040*
(2) Cost-Benefit	-1.400	0.306	-2.003	-0.797	-4.574	<.001*
(3) Medicinal Side Effects	-2.833	0.306	-3.436	-2.230	-9.257	<.001*
(4) PrEP-related Conspiracy Theories	-2.700	0.306	-3.303	-2.097	-8.822	<.001*
(5) Geospatial Proximity of HIV Risk	-2.400	0.306	-3.003	-1.797	-7.841	<.001*
(7) Physical HIV Symptoms	-1.100	0.306	-1.703	-0.497	-3.594	<.001*
(8) Effects on Social Life from HIV	-0.867	0.306	-1.470	-0.264	-2.832	.005*
Lowest						
Intercept (Reference Category = (3))	2.900	0.216	2.474	3.326	13.400	<.001*
(1) Prevention Altruism	2.200	0.306	1.597	2.803	7.188	<.001*
(2) Cost-Benefit	1.433	0.306	0.830	2.036	4.683	<.001*
(4) PrEP-related Conspiracy Theories	0.133	0.306	-0.470	0.736	0.436	.664
(5) Geospatial Proximity of HIV Risk	0.433	0.306	-0.170	1.036	1.416	.158
(6) Partner Unreliability with Condoms	2.833	0.306	2.230	3.436	9.257	<.001*
(7) Physical HIV Symptoms	1.733	0.306	1.130	2.336	5.663	<.001*
(8) Effects on Social Life from HIV	1.967	0.306	1.364	2.570	6.426	<.001*

Note: * $p < .05$. LL = Lower Limit; UL = Upper Limit. Reference category in regression model labelled 'Highest' was set as Message 6 ('Partner Unreliability with Condoms'), and Message 3 ('Medicinal Side Effects') for regression model named 'Lowest'.

Table D3
Simple Regression Analyses: 'Presumed Influence' rating

Model and Predictors	<i>B</i>	<i>SE</i>	95% CI		<i>t</i>	<i>p</i>
			<i>LL</i>	<i>UL</i>		
Highest						
Intercept (Reference Category = (6))	5.433	0.206	5.027	5.840	26.350	<.001*
(1) Prevention Altruism	-0.267	0.292	-0.841	0.308	-0.914	.361
(2) Cost-Benefit	-0.700	0.292	-1.275	-0.125	-2.400	.017*
(3) Medicinal Side Effects	-2.933	0.292	-3.508	-2.359	-10.059	<.001*
(4) PrEP-related Conspiracy Theories	-2.333	0.292	-2.908	-1.759	-8.001	<.001*
(5) Geospatial Proximity of HIV Risk	-1.800	0.292	-2.375	-1.225	-6.173	<.001*
(7) Physical HIV Symptoms	-0.833	0.292	-1.408	-0.259	-2.858	.005*
(8) Effects on Social Life from HIV	-0.600	0.292	-1.175	-0.025	-2.058	.041*
Lowest						
Intercept (Reference Category = (3))	2.500	0.206	2.094	2.906	12.124	<.001*
(1) Prevention Altruism	2.667	0.292	2.092	3.241	9.145	<.001*
(2) Cost-Benefit	2.233	0.292	1.659	2.808	7.659	<.001*
(4) PrEP-related Conspiracy Theories	0.600	0.292	0.025	1.175	2.058	.041*
(5) Geospatial Proximity of HIV Risk	1.133	0.292	0.559	1.708	3.886	<.001*
(6) Partner Unreliability with Condoms	2.933	0.292	2.359	3.508	10.059	<.001*
(7) Physical HIV Symptoms	2.100	0.292	1.525	2.675	7.201	<.001*
(8) Effects on Social Life from HIV	2.333	0.292	1.759	2.908	8.001	<.001*

Note: * $p < .05$. LL = Lower Limit; UL = Upper Limit. Reference category in regression model labelled 'Highest' was set as Message 6 ('Partner Unreliability with Condoms'), and Message 3 ('Medicinal Side Effects') for regression model named 'Lowest'.

Table D4

Simple Regression Analyses: 'Intentions for PrEP-related Prosocial Behaviour' rating

Model and Predictors	<i>B</i>	<i>SE</i>	95% CI		<i>t</i>	<i>p</i>
			<i>LL</i>	<i>UL</i>		
Highest						
Intercept (Reference Category = (6))	5.500	0.199	5.108	5.892	27.639	<.001*
(1) Prevention Altruism	-0.333	0.281	-0.888	0.221	-1.184	.237
(2) Cost-Benefit	-0.867	0.281	-1.421	-0.312	-3.080	.002*
(3) Medicinal Side Effects	-2.700	0.281	-3.254	-2.146	-9.594	<.001*
(4) PrEP-related Conspiracy Theories	-1.400	0.281	-1.954	-0.846	-4.975	<.001*
(5) Geospatial Proximity of HIV Risk	-2.100	0.281	-2.654	-1.546	-7.462	<.001*
(7) Physical HIV Symptoms	-0.700	0.281	-1.254	-0.146	-2.487	.014*
(8) Effects on Social Life from HIV	-0.633	0.281	-1.188	-0.079	-2.251	.025*
Lowest						
Intercept (Reference Category = (3))	2.800	0.199	2.408	3.192	14.071	<.001*
(1) Prevention Altruism	2.367	0.281	1.812	2.921	8.410	<.001*
(2) Cost-Benefit	1.833	0.281	1.279	2.388	6.515	<.001*
(4) PrEP-related Conspiracy Theories	1.300	0.281	0.746	1.854	4.619	<.001*
(5) Geospatial Proximity of HIV Risk	0.600	0.281	0.046	1.154	2.132	.034*
(6) Partner Unreliability with Condoms	2.700	0.281	2.146	3.254	9.594	<.001*
(7) Physical HIV Symptoms	2.000	0.281	1.446	2.554	7.107	<.001*
(8) Effects on Social Life from HIV	2.067	0.281	1.512	2.621	7.334	<.001*

*Note: *p <.05. LL = Lower Limit; UL = Upper Limit. Reference category in regression model labelled 'Highest' was set as Message 6 ('Partner Unreliability with Condoms'), and Message 3 ('Medicinal Side Effects') for regression model named 'Lowest'.*

Table D5*Simple Regression Analyses: 'Intentions for PrEP Information Seeking' rating*

Model and Predictors	<i>B</i>	<i>SE</i>	95% CI		<i>t</i>	<i>p</i>
			<i>LL</i>	<i>UL</i>		
Highest						
Intercept (Reference Category = (6))	5.567	0.192	5.189	5.944	29.048	<.001*
(1) Prevention Altruism	-0.300	0.271	-0.834	0.234	-1.107	.269
(2) Cost-Benefit	-0.900	0.271	-1.434	-0.366	-3.321	.001*
(3) Medicinal Side Effects	-2.067	0.271	-2.601	-1.533	-7.626	<.001*
(4) PrEP-related Conspiracy Theories	-1.233	0.271	-1.767	-0.699	-4.551	<.001*
(5) Geospatial Proximity of HIV Risk	-2.133	0.271	-2.667	-1.599	-7.872	<.001*
(7) Physical HIV Symptoms	-0.367	0.271	-0.901	0.167	-1.353	.177
(8) Effects on Social Life from HIV	-0.333	0.271	-0.867	0.201	-1.230	.220
Lowest						
Intercept (Reference Category = (5))	3.433	0.192	3.056	3.811	17.916	<.001*
(1) Prevention Altruism	1.833	0.271	1.299	2.367	6.765	<.001*
(2) Cost-Benefit	1.233	0.271	0.699	1.767	4.551	<.001*
(3) Medicinal Side Effects	0.067	0.271	-0.467	0.601	0.246	.806
(4) PrEP-related Conspiracy Theories	0.900	0.271	0.366	1.434	3.321	.001*
(6) Partner Unreliability with Condoms	2.133	0.271	1.599	2.667	7.872	<.001*
(7) Physical HIV Symptoms	1.767	0.271	1.233	2.301	6.519	<.001*
(8) Effects on Social Life from HIV	1.800	0.271	1.266	2.334	6.642	<.001*

Note: * $p < .05$. LL = Lower Limit; UL = Upper Limit. Reference category in regression model labelled 'Highest' was set as Message 6 ('Partner Unreliability with Condoms'), and Message 5 ('Geospatial Proximity of HIV Risk') for regression model named 'Lowest'.



Partners

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