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UNIVERSITY OF CALIFORNIA

Los Angeles

The_InstaPrEP_Project: A Social Marketing Intervention on Instagram to Increase Oral HIV
Prophylaxis in Black Men Who Have Sex with Men

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of
Nursing Practice

by

James Quincy Simmons

2020

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ABSTRACT OF THE DISSERTATION

The_InstaPrEP_Project: A Social Marketing Intervention on Instagram to Increase Oral HIV
Prophylaxis in Black Men Who Have Sex with Men

by

James Quincy Simmons

Doctor of Nursing Practice

University of California, Los Angeles, 2020

Professor Dorothy Wiley, Chair

Purpose: Incidence of HIV diagnoses is higher in Black men who have sex with men (BMSM) than any other socio-demographic population in the United States. BMSM account for 26% of all new HIV diagnoses in the U.S. yet make up an estimated 1% of the U.S population. In 2017, Centers for Disease Control and Prevention (CDC) predicted 50% of BMSM would be diagnosed with HIV in their lifetime. Oral HIV pre-exposure prophylactic (PrEP) medications developed to prevent sexual transmission of HIV are 95-99% effective. However, Blacks represent only 10% of PrEP prescriptions. Targeted Social Marketing initiatives on Instagram need to be explored as a potential channel for informing BMSM about the benefits of PrEP and encouraging use.

Methods: To evaluate interest in a social marketing campaign to increase PrEP interest and use, we systematically deployed an advertisement on the online social media platforms Facebook and Instagram targeting user accounts that show high engagement with lesbian, gay, bisexual, transgender, and queer (LGBTQ), Black LGBTQ, queer-identified, and Black queer-identified (Instagram) accounts. Those accessing the ad by either tapping on the link through their mobile device or clicking the link with their computer mouse and agreeing to participate in the survey, completed up to 26 sociodemographic and sexual behavior questions adapted from other surveys of men who have sex with men. Thereafter, respondents were separately invited to follow @The_InstaPrEP_Project on Instagram where followers received 31 educational images developed by the U.S. Centers for Disease Control and Prevention released individually over six weeks. Followers that engaged the Instagram account (@The_InstaPrEP_Project) could view the 31 social marketing interventions as they became available and throughout the intervention. Followers were asked to complete a post-test survey at completion of the intervention. Descriptive, and parametric and non-parametric statistics explored associations between race, age, geography, and sexual-behavioral characteristics and in relationship to engagement of and perceptions of PrEP-specific social marketing campaign materials distributed on Instagram. The study protocol was evaluated as not representing human research by the UCLA Institutional Review Board (IRB#20-000123, South Campus) and declared exempt.

Results: Fifteen users completed the pre-intervention survey. Of the 550 followers gained through the six-week intervention, six (1%) completed the post-intervention survey. Among pre-survey respondents, fewer than half reported themselves as African American (27%, 4/15) or non-white (20%, 3/15), but most stated they were cis-males (93%, 14/15) who have sex with men or mostly men (80%, 12/15)). Most reported their age to be between 18 and 39 years (73%)

and the majority stated they never used PrEP to prevent HIV (60%). Overall, most reported being HIV-uninfected (73%) at the outset of the intervention.

The intervention account generated 550 followers, 19,601 content views by unique user accounts, and 1,326 indications of a favorable opinion (likes) over the six-week intervention. Post-survey data suggested the intervention should be recommended to *people like me*, is a *good addition to regular health care*, and *increased access to care*. Interestingly, the intervention did not invade personal privacy, daily routines, or cause feelings of discomfort.

Conclusion: Greater engagement in the content, given the absence of robust survey participation, suggests Instagram may be an effective tool to engage MSM at high risk for primary HIV infection to use PrEP. Optimized content and engagement strategies may allow for primary prevention strategies using Instagram to improve PrEP uptake and adherence.

The dissertation of James Quincy Simmons is approved.

Catherine L. Carpenter

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2020

Dedication

This project is dedicated to DeMarco and all of the gay Black men who have died and continue to die from the HIV/AIDS epidemic.

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Thank you to Dr. Nancy Jo Bush and Dr. Suzette Cardin. This project simply would not have been possible without your fearless leadership and tireless advocacy. The University of California, Los Angeles School of Nursing and the profession of Nursing are indebted to you both.

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Thank you Dr. Tom Granoff. Your patience, coaching, and humor were invaluable and impeccably timed.

Thank you Dr. Ryan Freedman. Your important contributions to this project were amazing and you embody what it means to be a true friend.

Thank you to my entire cohort. It is honestly difficult to put into words what you mean to me. You each contributed significantly to what and how I learned through this process. Between being the inaugural cohort to finishing our doctoral work during a global pandemic, we've been through something no one else will ever understand. Because of that you are forever family.

Thank you to my parents. Your unwavering and unconditional love has lifted me from the darkest of places and now brought me here. I hope you know how incredibly grateful I am for all you have given me. I love you more than I can put into words.

Finally, a special thank you to my partner and biggest cheerleader, Christopher. You bring me joy, laughter, unwavering support and most importantly love beyond measure.

Vita

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Keynote Speaker, LATCC Nursing Graduation, 2019

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Introduction

Incidence of Human Immunodeficiency Virus (HIV) diagnoses is higher in Black men who have sex with men (BMSM) than any other socio-demographic population in the United States (United States Centers for Disease Control and Prevention [CDC], 2019c; Crepaz, Hess, Purcell, & Hall, 2019; Mayer et al., 2014). The most recent studies available in the literature from 2011 estimate the number of BMSM at approximately 635,000 (Lieb et al., 2011). However, there is no consensus regarding the true number of men who have sex with men (MSM) or BMSM in the U.S., therefore true estimates of HIV prevalence among BMSM are difficult (CDC, 2018a). Between 2010 and 2016, the CDC reported that BMSM aged 13 to 34 account for 51.5% of all infections among BMSM and 37% of all incident infections among MSM (CDC, 2019b). As of 2018, BMSM accounted for 26% of all new HIV diagnoses in the U.S. yet make up an estimated 1% of the U.S population (CDC, 2019b; CDC, 2019c; Lieb et al., 2011).

Problem Statement

In 2017, CDC predicted that 50% of all BMSM would be diagnosed with HIV in their lifetimes (CDC, 2019c). At the end of 2016 an estimated 225,000 BMSM were infected with HIV and incidence was increasing (CDC, 2019b, CDC, 2019c). Yet two oral HIV prophylaxis medications exist, Emtricitabine and Tenofovir Disoproxil Fumarate and Emtricitabine and Tenofovir Alafenamide, that are up to 99% effective preventing HIV through sexual contact when taken as prescribed (CDC, 2019d; Grant et al., 2010). CDC estimates PrEP would benefit 500,000 BMSM based on national prevention guidelines (CDC, 2018a). However, survey data obtained by Gilead, the manufacturer of Truvada and Descovy, reports only 13,500 prescriptions have been filled by BMSM (Gilead Sciences, 2018a). The level of need may be even greater as

CDC estimates far less Blacks have filled PrEP prescriptions, reporting only 7,000 prescriptions for PrEP filled at retail or mail order pharmacies by Black patients from September 2015 to August 2016 (CDC, 2019e). The literature exposes institutional racism, significant homophobia, discrimination, anticipated stigma, and lack of consistent access to quality care as some of the significant barriers for BMSM initiating PrEP. According to recent analysis of the National Behavioral Health Survey by CDC, awareness of PrEP is high for all racial and ethnic groups: White 95%, Hispanic 87%, Black 86% (CDC, 2018a). However, fewer BMSM had used PrEP: White 42%, Hispanic 30%, Black 26% (CDC, 2018a; Kanny et. al, 2019). Also, fewer BMSM discussed PrEP with a health care provider: White 58%, Hispanic 44%, Black 43% (CDC, 2018a; Kanny et. al, 2019).

Clinical Question

This was an observational, pre-intervention and post-intervention survey clinical inquiry and social marketing project. The specific aim of the project was to evaluate among 18-35 year-old Black men who have sex with men whom are HIV negative and not currently taking oral HIV pre-exposure prophylaxis (PrEP), whether participation in a social marketing educational intervention on Instagram represents an effective mechanism for increasing functional knowledge about and use of PrEP.

Purpose and Objectives

Reducing new HIV infections to fewer than 3,000 U.S. residents per year by 2030 is an important national public health goal (AIDS United, n.d.; Health Resources & Services Administration, 2019). In 2018, 37,832 people received a diagnosis of HIV in the United States, 69% of which were among the community of men who have sex with men (CDC, 2018a). New and innovative approaches to reaching marginalized and disproportionately impacted

communities like BMSM must be initiated to reach this goal. One approach aimed at increasing awareness of PrEP incorporates social media to increase awareness and change behavior. However, few social marketing campaigns employ Instagram, the second most popular and fastest growing social media platform among Americans under the age of 35 (Pew Research Center 2019; Smith & Anderson, 2018). Thus, to examine published research and apply social marketing to evidence-based interventions on social media to increase functional knowledge, and potentially, uptake of PrEP in 18 to 35 year-old BMSM. Functional knowledge specifically refers to knowledge of the dosing schedule, costs, side-effect profile, efficacy, route of administration, methods of procurement, and other specific details about PrEP. This paper will discuss the methodology, results, lessons learned, future project implications, and provide recommendations based on this project's innovative strategy of deploying an evidence-based social marketing campaign to this target population using Instagram.

Background

Daily oral HIV pre-exposure prophylaxis (PrEP) medications are efficacious and prevent 95% to 99% of sexually transmitted HIV infections when taken as prescribed (CDC, 2019d; Grant et al., 2010). Currently two daily oral medications are approved by the Food and Drug Administration (FDA) and available to U.S residents for use as PrEP. These two medications are the combination of emtricitabine and tenofovir disoproxil fumarate, or trade name Truvada (FTC/TDF), and the combination of emtricitabine and tenofovir alafenamide, trade name Descovy (FTC/TAF) (Gilead Sciences, 2016). FTC/TDF was approved by the FDA in 2012 for HIV prophylaxis. FTC/TAF is the combination of and approved for sexual contact HIV prophylaxis excluding those who have receptive vaginal sex. In the 96-week DISCOVER phase three trial conducted in 2016 and 2017, 5,387 participants were randomized one-to-one to take

either FTC/TDF or FTC/TAF, with HIV incidence as the primary outcome. Incidence rate ratio within a 95% confidence interval for FTC/TDF was 0.34%, and 0.16% for FTC/TAF (Hare et al., 2019). FTC/TAF was shown to be noninferior to FTC/TDF for HIV prevention, though when suspected prevalent infections are removed from baseline, the 95% upper range of the confidence interval is 1.55 demonstrating FTC/TAF could have statistically fared 55% worse than FTC/TDF (Hare et al., 2019). The study was sponsored by Gilead, maker of both FTC/TDF and FTC/TAF.

Instagram now has nearly one billion monthly active users globally (Statista, 2019). Approximately 111 million Americans regardless of race, gender, or sexual orientation have an active Instagram account (Statista, 2019). It is difficult to discern the exact use of Instagram by 18-35-year-old BMSM as Instagram does not ask the race, ethnicity, or sexual orientation of its users during the registration process. However, some data suggest Blacks may be high users of the platform. The Pew Research Center (2019) found 43% of Black respondents report daily Instagram use, a greater proportion than reported by otherwise similar White and Hispanic respondents. Instagram's current accelerated rate of growth across socioeconomic strata makes it a valuable platform to study the impact of social media on attitudes, perceptions, beliefs about and intention to initiate PrEP in the BMSM community. Especially given that in one recent study, 57% of MSM surveyed report having heard about PrEP through social media channels (Holloway et al., 2017b).

This clinical-based inquiry project was developed to evaluate use of a social marketing intervention on Instagram called The_InstaPrEP_Project. As this paper will discuss, the literature demonstrates improvement in functional knowledge about PrEP may lead to an increase in intent to use. This project will ultimately serve to assist public health officials in better understanding among 18 to 35 year-old HIV-uninfected BMSM who are not currently taking PrEP, what

strategies can optimize functional knowledge, perceptions, attitudes, and beliefs about PrEP and whether Instagram can be effective for dissemination of targeted, PrEP-specific social marketing materials.

Theoretical Framework

Social marketing is a central feature of evidence-based interventions supporting the scope and practice of Public Health Nursing (PHN) and explicated in the Public Health Nurse Practice Model (PHNPM) framework (County of Los Angeles Public Health, n.d.). Together, professional practice principles identified by the Quad Council of Public Health Nursing Organizations, the 10 essentials of public health practice, and the broad categories of evidence-based interventions define the scope, practice, and tools for system, community, and individuals and family public-health nursing care (Smith & Bazini-Barakat, 2003). The Los Angeles County PHNM (LACPHNM) is based on multiple frequently researched and utilized public health care delivery models including the Minnesota Public Health Nursing Interventions Model, the Healthy People Project, and the Standards of Public Health Nursing Practice (Smith & Bazini-Barakat, 2003).

Reasons for the disproportionate incidence and prevalence of HIV in the BMSM community are complex and require culturally sensitive research, clinical practice, policymaking, and translation of evidence through the advanced practice nursing process (McFarland & Eipperle, 2008). Institutionalized bias traditionally prevents BMSM from conducting research rather than being the subjects of research. These systems failures ultimately cost lives and disproportionately burden BMSM in addition to other marginalized persons across the spectrum of care, policy and research.

Research misconduct has generated significant mistrust of healthcare and research institutions (Jaiswal & Halkitis, 2019). These injustices lead to high suspicion of medical

therapies, and under-representation in the research that generates unexpected frequencies of adverse outcomes and efficacy among under-represented populations. For example, Brooks et al., report that BMSM with low intention to use PrEP (40%) also report a high suspicion that long-term adverse health events are uncertain and important to them (76%) (Brooks, Landovitz, Regan, Lee, & Allen, 2015). Thus, their continued under-representation in research drives mistrust and poor acceptance of PrEP as an intervention to promote health and wellbeing.

Culturally sensitive, linguistically appropriate care is a central tenet of LACPHNM interventions. The utilitarian underpinning of the LACPHNM considers all levels of prevention with an emphasis on primary prevention and resource allocation to support maximum health gain (Smith & Bazini-Barakat, 2003). Assess, Diagnose, Identify Outcomes, Plan, Act, and Evaluate are expansions of the LACPHNM that provide a guideline for using social media as a new outlet for delivering clinical inquiry-based Social Marketing initiatives.

Outcomes of interest are to gain a better understanding of optimal strategies for maximizing engagement with PrEP social marketing materials on Instagram and to increase knowledge of and the ultimate intention to take PrEP among 18-35-year-old BMSM. The LACPHN model encourages public health nurses to use all available resources when planning an intervention. Social media applications, particularly Instagram, may better engage BMSM, a group which has been frequently omitted by traditional oral HIV prophylaxis public health initiatives (CDC, 2018a; Highleyman, 2016; Huang, Marlin, Young, Medline, & Klausner 2016; van den Berg et al., 2018). Therefore, this project was created to evaluate how a social marketing intervention on Instagram can impact functional knowledge and intention to take PrEP in 18-35-year-old BMSM. Outcomes are evaluated by measuring change in validated survey responses from pre to post-project intervention. The outcomes are shared publicly to aid in the foundational

knowledge of social marketing public health initiatives on Instagram and to improve upon other social media-based healthcare interventions.

Synthesis of Evidence

Evidence Search

Articles were selected for review primarily based on relevancy of addressing PrEP educational interventions aimed at 18 to 35-year-old BMSM and included a social media component. Given the limited amount of research regarding this specific intervention for the population of the project, research studies identifying any social media intervention involving the population of interest and PrEP, evaluation of HIV stigma within the population, identification of or attempts at dispelling myths regarding PrEP in the population of interest, and novel use of social media platforms were included. Primary literature searches were conducted using the UCLA Online Library Articles Plus search tool powered by Summon search engine from ProQuest, which searches millions of scholarly articles, newspaper articles, e-books, government documents, and more (About Articles Plus, 2018). This tool produces relevancy-ranked results from health science databases like PubMed, PsychInfo, and Web Science among others. Cinahl Plus and EMBASE search engines were also used. Search terms used included Black, men who have sex with men, gay, msm, bmsm, pre-exposure prophylaxis, PrEP, HIV, HIV prevention, HIV prophylaxis, social media, and Instagram. These search terms were used in varying combinations.

There is a growing amount of research using Instagram as an experimental or knowledge improvement platform. However, exhaustive searching led to only a few studies related specifically to knowledge improvement about pre-exposure prophylaxis in the BMSM community using Instagram. Therefore, social media was used as a primary search term. Black

also used in addition to African-American as in some search strategies Black is often used more predominantly to describe the African-American population. Men who have sex with men was often substituted for gay or homosexual in searches to capture research studying men who do not identify as either gay or homosexual.

Synthesis of Literature

Approximately 1.2 million adults are considered high risk for potentially acquiring HIV and would therefore benefit from taking PrEP. However as of 2017 only about 70,000 individuals had active prescriptions for PrEP (range across states 26/100,000) (Beymer, Holloway, Pulsipher, & Landovitz, 2019; Siegler, et al., 2018; Smith, Van Handel, & Huggins, 2017). General knowledge of HIV prophylaxis is increasing; however, PrEP awareness is poorly associated with intended use among BMSM. Some data suggest self-reported knowledge of PrEP side effects, dose schedule, and efficacy positively affect the perception of PrEP among MSM, which translates to a higher intention to use or adhere to PrEP (Brooks et al., 2015; Highleyman, 2016; Holloway et al., 2017a; Kahle, Sullivan, Stephenson, 2018; Quinn et al., 2019; Thomann, Grosso, Zapata, & Chiasson, 2018).

Understanding why there are gaps in knowledge about PrEP and correcting those gaps by deploying and scaling interventions based on the best available research is paramount. Of 573 MSM surveyed, Kahle, Sullivan, and Stephenson (2018) found 92% had a working general knowledge of PrEP, but only 44% of respondents correctly answered all four PrEP knowledge questions correctly. Kahle, Sullivan, and Stephenson (2018) also found those who self-identified as non-White were significantly more likely to have worse PrEP knowledge scores (adjusted Odds Ratio (adjOR) 0.56, 95% CI 0.34-0.84, P=.005).

Simple awareness of PrEP does not drive high-risk populations to take the medication, however increasing the functional knowledge of PrEP appears to promote taking PrEP. Men reporting an awareness of PrEP side effects and positive perceptions are consistently independent predictors of high intention to use PrEP. Survey data for 761 California MSM who report using geosocial networking applications found that increased functional knowledge of PrEP correlated to a statistically significant increase in those willing to take PrEP (33%) and those not willing to take PrEP (20%, $p < 0.001$) (Holloway et al., 2017b). They did not find a statistically significant association between simply having prior knowledge of PrEP and intention to take the medication. These researchers also found associations between concerns about the medication's side effects, stigma of use, mistrust of medical institutions, perceived risk, and unwillingness to initiate or adhere to PrEP (Holloway et al., 2017b). Conversely, those surveyed who had more robust knowledge of PrEP also maintained a higher perceived benefit of and were more likely to take and adhere to the medication (Holloway et al., 2017b).

Barriers to increasing PrEP knowledge in the BMSM community are multifactorial. Several publications have noted that public health narratives are outdated and counterproductive, particularly with regard to the sexual networks of the BMSM community being primarily responsible for the discordant incidence and prevalence of HIV (Alexovitz et al., 2018; Matthews, Smith, Brown, & Malebranche, 2016). Several studies counter the previous public health hypotheses that pointed to a combination of tightly held BMSM sexual networks and possible co-occurrence of high-risk sexual behavior may explain discordance (Alexovitz et al., 2018; Matthews et al., 2016; McNair et al.). A meta-analysis of BMSM sexual behavioral characteristics by Millet et al. (2012) identify no difference in sexual risk-taking behavior between BMSM and other MSM groups. However, Millet et al. reports significant differences

related to poorer health outcomes for BMSM in the three countries studied, Canada, the United Kingdom, and the U.S.

It is incumbent upon nursing, public health, and medical researchers to look critically at traditional and potentially biased public health education delivery systems to assess the contribution these systems may be playing in the disproportionate incidence and prevalence of HIV in the BMSM community. New and innovative approaches which don't just simply target BMSM but actually include BMSM in the development of community appropriate, linguistically accurate, and culturally relevant educational outreach initiatives must be employed (CDC, 2018a; Highleyman, 2016; Huang, et al., 2016; Matthews et al.; 2016; van den Berg et al., 2018) Instagram is a readily available social media application with the potential to help stem the incidence and reduce the prevalence of HIV in the BMSM community. Evaluating the outcomes of delivering sexual health information to the HIV-negative BMSM community on Instagram to specifically influence behavior change has never been done. Young adults regardless of race, ethnicity, or socioeconomic status use the Internet to obtain sexual health information more than any other source (Buhi, Daley, Fuhrmann, & Smith, 2009). Sexual health information is available on other platforms and on the Internet at large at the tap of a smartphone screen, anonymously, and whenever the information is desired. Instagram has the ability to incorporate visually compelling imagery reflective of the target population and combine that imagery with concise, easily readable question and answer formatted text to educate hard to reach communities about PrEP. Research suggests this is an effective educational strategy for reaching young people and hard to reach populations who may be interested in sexual health information on Instagram (Jones et al., 2019; O'Donnell, Nelson, Ramirez, & Carey, 2017).

Methods

Research and clinical-inquiry projects using social media are pervasive in the literature. Language once considered jargon specific only to social media is now more commonly used throughout the literature. However, there remains a strong need to reinforce commonly accepted definitions of social media terminology to facilitate understanding of project findings for all interested readers. A table of social media terminology with corresponding definitions was developed using recommendations from CDC,, the Media Rating Council Social Media Measurement Guidelines, the International Association for the Measurement and Evaluation of Communications New Valid Metrics Framework, Merriam-Webster Dictionary, and multiple references used in the literature (Klassen, 2018; Guillory et al., 2018) (Table 1). The Media Rating Council is a non-profit organization established in 1963 at the direction of the U.S. Congress to establish accuracy of audience measurement metrics for radio and television (Media Ratings Council, 2015). The agency has since expanded to establish audience measurement standards that are valid, reliable, and effective for multiple media platforms, including social and digital media metrics (Media Ratings Council, 2015).

Table 1

Social Media Terminology

Terminology	Definition
Impression	The aggregated published or acknowledged readership numbers for all content in which a brand or organization receive published content. (International Association for the Measurement and Evaluation of Communication, 2020)
Reach	A disaggregated number of people (or percentage of an audience) that have been exposed to content. ((International Association for the Measurement and Evaluation of Communication, 2020)

Frequency	The amount of times that an event occurs. Often used in conjunction with reach (see Reach and Frequency). ((International Association for the Measurement and Evaluation of Communication, 2020)
Reach and Frequency	A common metric quantifying campaign success predominantly used and accepted in advertising. It couples the reach metric with frequency which is the average number of times that each person has been reached, or exposed, to the content (International Association for the Measurement and Evaluation of Communication, 2020)
Post	Something (such as a message) that is published online. (Post, n.d.)
Like	To electronically register one's approval of (something, such as an online post or comment) for others to see (as by clicking on an icon designed for that purpose.) (Like, n.d.)
Comment	An observation or remark expressing an opinion or attitude (Comment, n.d.)
Engagement	Generally a spectrum of consumer activities and experiences (interactions and interest)—cognitive, emotional, and physical. Engagement assumes active participation but may also describe a cognitive or emotional connection ... in addition to a physical action.” (Media Ratings Council, 2015)

Most definitions of common social media terms are not specific to social media platform. Terms like page, post, impressions, reach, likes, and comments have the same definition across social media platform. For example, CDC defines *Page* for Facebook as “an organization’s professional presence on Facebook” (CDC, 2019e). This same definition applies to Instagram as “an organization’s professional presence on Instagram.” Every attempt will be made throughout this paper to use the social media terminology (in parenthesis), the established definitions of social media terminology when needed, and common language found in the literature to facilitate learning and ensure understanding of this project’s methodology, results, and discussion for all readers.

Internal Review Board Statement

The study protocol was reviewed by the UCLA Institutional Review Board (IRB#20-000123, South Campus), and evaluated as not consistent with human subject research, making the protocol exempt from Board review.

Project Design

The *_InstaPrEP_Project* is a pilot quality-improvement project aimed at better understanding whether CDC-developed PrEP social marketing images and messaging using Instagram will increase engagement and intention to use PrEP to prevent HIV infection. Anonymized data and metrics related to end user account interactions and expressed interest with the intervention account (engagement) provided by Instagram were evaluated. While viewing of the images was unrestricted, an explanation of the project's aims and a waiver of informed consent were required to participate in a pre- and post-intervention survey.

Setting

Instagram is the social media platform that is popular among U.S. BMSM. Business relationships between Facebook and Instagram and require advertisers employ Facebook Business Ads Manager accounts to develop and distribute advertisements using either platform. Facebook also requires creation of a Facebook business profile to distribute advertisements on Instagram. Thus, a Facebook business profile account was created and named *The_InstaPrEP_Project*. The account was directly linked to the Instagram account using the same name.

Sampling

To attract Black male Instagram and Facebook users, the project advertisement was created from two images. First, an image of two Black men in a non-sexual, inviting interaction,

and a second, close-up photo of a Truvada tablet were paired with the ad “Love it? Hate it? Don’t get it? What do you really think about PrEP? Your opinion matters. Take this quick survey” (Figure 1, Figure 2, and Figure 3).

Figure 1

Recruitment Advertisement As It Appeared on Facebook



Figure 2

Recruitment Advertisement As It Appeared on Instagram Feed

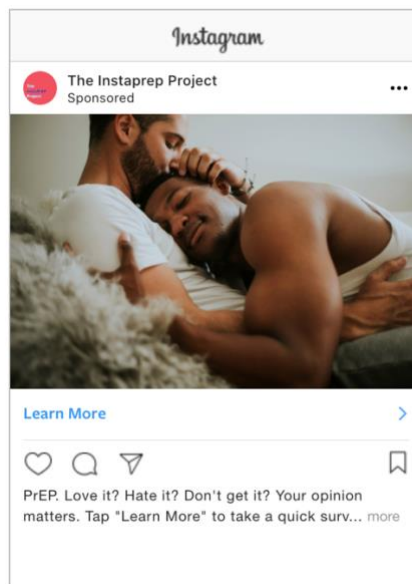
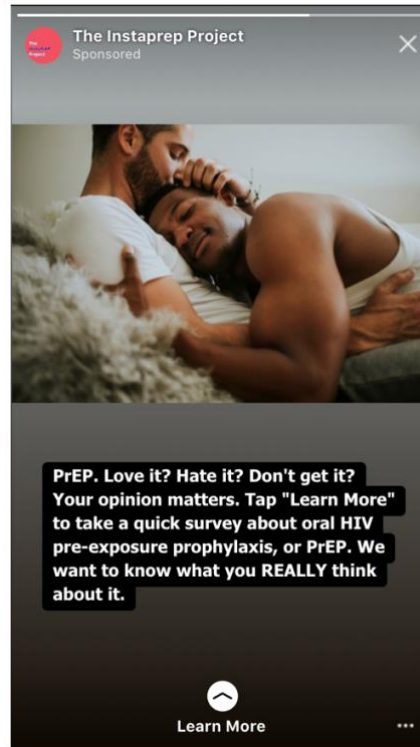


Figure 3

Recruitment Advertisement As It Appeared in Instagram Stores



The advertisement image rights for unlimited use and distribution was purchased from a private vendor, Shutterstock. The image did not meet Shutterstock’s criteria for editorial content, meaning the use of the photo did not need to be credited in the advertisement or cited here.

The advertisement was targeted to appear for Instagram and Facebook user accounts showing high engagement, as defined by Facebook and Instagram, with self-identified MSM, LGBTQ, Black LGBT, queer-identified, and Black queer-identified accounts. The project used the Facebook and Instagram advertising cost-per-impression algorithm which was optimized to generate the greatest number of impressions (views) of the advertisement by end user accounts. This distribution model included the potential for 230,000,000 end user accounts to have seen the advertisement if this project had a much larger budget and longer duration. As is the case with

most mass media advertisements, the number of unique individuals viewing an advertisement is highly dependent on how long an advertisement is scheduled to appear and how much money is budgeted. Across all advertisements using this algorithm on Facebook and Instagram, 0.52% is the typical percent of unique end user accounts that accessed the ad by either tapping on the link through their mobile device or clicking the link with their mouse.

Respondents who indicated interest and accessed the advertisement by either tapping the link on their device or clicking the link with their mouse were connected to Qualtrics, a Health Insurance Portability and Accountability Act (HIPPA) and Federal Educational Rights and Privacy Act (FERPA)-compliant online survey, data analytics, and data reporting intermediary organization (University of California Los Angeles Digital Technology, n.d.). Qualtrics is approved as an intermediary by the UCLA Office of Human Subjects Research for research and quality improvement project initiatives. The waiver of consent, pre-intervention survey and post-intervention survey were all developed and hosted on the UCLA Qualtrics website.

The waiver of consent was delivered to the user after the interested user account accessed the survey link through the advertisement. Participants indicated understanding and agreement by checking the box: “I agree to the above terms and conditions” located at the bottom of the project information form. Users who did not agree to the waiver of consent could not complete the survey. However, this did not preclude those who accessed the ad by either tapping on the link through their mobile device or clicking the link with their mouse, or anyone with an active Instagram account, from viewing the social marketing materials delivered on The_InstaPrEP_Project account. No compensation was offered for survey participation. Once respondents who agreed to waiver of consent submitted their survey responses, a message appeared stating “Please follow @The_InstaPrEP_Project on Instagram to learn more about oral

HIV pre-exposure prophylaxis, or PrEP. Thank you for completing this survey!” No Instagram account or user information was collected and survey respondent engagement and survey responses were not tracked. Pre-and post-intervention survey data held by Qualtrics remained unlinked to any activity by any end user account that might have occurred on The_InstaPrEP_Project Instagram profile account.

Instagram was the focus of this intervention, however given the required interconnected nature of the Facebook and Instagram platforms, the recruitment advertisement was seen on both Facebook and Instagram. The advertisement was unable to be forwarded outside of the Instagram or Facebook applications. However, end users were able to forward the advertisement to other Instagram or Facebook users, or use the method of tagging other users in the comments by including the users profile name with the @ symbol, thereby drawing more attention to the advertisement.

Intervention

The_InstaPrEP_Project account was managed directly by this author. An invitation to follow The_InstaPrEP_Project was posted once on Tuesday, February 18, 2020 and remained visible on the profile throughout the intervention. The social marketing intervention began on March 2, 2020 and completed on Sunday, April 19, 2020. The intervention consisted of 31 total social marketing posts. The combined images and text which comprise a single post (Appendix A) were delivered at regular intervals over the duration of the intervention to foster consistency, pattern recognition, and expectation building. The intervention posts combined visual images and targeted messaging placed in the caption section of each post. In total, 29 of the 31 posts were CDC-developed educational social media marketing posts and three posts developed by the

project coordinator featured facts about PrEP use, dosing, side-effects, efficacy, and availability designed to challenge commonly held stigmas about the medication.

Hashtags are words or phrases added to posts on the Instagram platform that make the individual posts (and therefore the user account) searchable. Hashtags are also representative of a theme or specific topic of interest to the end user using the hashtag. End users have the option of searching for specific hashtags of interest, and Instagram ranks each post using the hashtag based on a proprietary, unknown, and ever-evolving algorithm. For instance, if an end user is interested in finding posts about Golden Retrievers, they would search “#goldenretriever.” Instagram then retrieves all posts that have included the hashtag #goldenretriever. These posts are displayed to the end user based on the unknown Instagram algorithm, though typically posts with higher engagement are seen first. Although Instagram is notoriously secretive about their hashtag algorithm, hashtags do consistently improve the engagement metrics of most posts. It is generally considered better to use hashtags if improving engagement is desired.

Hashtags used on each post on The_InstaPrEP_Project account included:

#theinstaprepproject #prep101 #preexposureprophylaxis #truvada #Blackgaymen #Blackgay #Blackgaycouples #gayBlackmen #gayBlack #gayBlackcouples #gayBlackmale #gayBlacklove #gayBlackpride #gayBlackboy #Blackqueer #Blacklgbtq #Blacklgbt #Blacklgbtlivesmatter #Blackgayslay #Blackgaylove #hivprevention #hivprep #hivawareness #hivtesting #preptalk #stophivstigma and #starttalkinghiv. The theme #Blackbrunch was added and included for all subsequent posts beginning on post #5, posted on Monday, March 9, 2020.

The posts were also added to The_InstaPrEP_Project story. Instagram stories are a feature within Instagram that allows users to post images and/or video of content in a 15 second slideshow format. The 15-second slideshow of posts is available only to those end user accounts

who follow The_InstaPrEP_Project account. Instagram stories can be paused by the participant for additional scrutiny and interaction. Each post was added to the account's story immediately after being placed and at completion of the intervention. Each story posted remained in the stories section for 24 hours after which it is deleted permanently by Instagram from the story, however stories were additionally saved on the home page of The_InstaPrEP_Project under a highlight where they will live in perpetuity.

The_InstaPrEP_Project account actively followed a median of 65 new targeted Instagram user accounts after each new social marketing post. Accounts followed were all either publicly visible accounts that had already consented to exposure on the public domain of Instagram or were sent a "request" to follow if the accounts were listed as private.

Data Collection

User generated survey information obtained using Qualtrics was de-identified and reported in aggregate. Survey data was obtained at project initiation and collected throughout the intervention. These survey responses and the collection of variables of interest were generated from responses to the advertisement and if followers accessed the survey by tapping on the link through their mobile device or clicking the link with their mouse in the biography of The_InstaPrEP_Project account profile. After tapping on the advertisement and agreeing to the terms of participation, respondents completed the pre-intervention tree-response survey. Henceforth for discussion purposes, the individuals responding to this initial survey will be referred to as Cohort 1. Survey data, including variables of interest, were also collected at the conclusion of the six-week intervention. For discussion purposes the individuals responding to the second survey, administered at the end of the six-week intervention, will be referred to as Cohort 2.

An image with a corresponding caption (Appendix A, Post #31) was placed on the final day of the intervention encouraging end user accounts who interact with The_InstaPrEP_Project to tap the survey link in the biography section of the profile's home page. Followers were also sent an individualized email-like communication (direct message) once at project initiation and once at completion of the six-week intervention.

To align with National Institutes of Health (NIH) standards, ethnicity of participants was collected as Hispanic/Non-Hispanic. Age was collected as a singular whole positive number. Self-reported race for American Indian or Alaska Native, Asian or Asian-American, Black or African-American, Hispanic or Latinx, Middle Eastern or North African, Native Hawaiian or Pacific Islander, and White/Caucasian. Sex assigned at birth (female or male) and self-identified gender (female, male, neither exclusively female or male) were collected separately. Sexual partnership over the three months prior to the survey including having sex with men only, women only, transgender men, transgender women, with men and women equally, mostly men, mostly women, without sexual partners over the period, and other, not specified (Appendix B).

Engagement is defined as the frequency, type, and duration of interaction with individual Instagram accounts, typically as a means of estimating the potential monetary value of each account (Klassen, 2018; Guillory et al., 2018). Instagram measures engagement using multiple metrics. Those individual metrics, how they are collected, and how they will be reported will be evaluated.

Analysis

The goals of this social marketing, social media-based, public health intervention was to increase functional knowledge of PrEP in 18-35 year-old BMSM. We analyzed measurable perceptions, attitudes, and beliefs about PrEP among BMSM and all survey respondents from the

pre-intervention survey (cohort 1) and again as post-intervention survey (cohort 2) from those individuals who follow The_InstaPrEP_Project on Instagram. Descriptive statistics, frequencies, and percentages were used to evaluate demographic variables and use patterns relative to gender identity, sex partner characteristics (e.g., male only, men and women, women only), race, geographic location, HIV-infected or uninfected status, and age based on cohort.

Descriptive graphical and tabular analysis explored relationships between variables and the outcomes of interest: interaction with The_InstaPrEP_Project Instagram account (engagement), self-reported sexual behaviors (receptive vs. not receptive intercourse, condom use, frequency of sexual partners), HIV testing (most recent testing occurrence, most recent test result), attitudes (favorable, fearful) and beliefs (effectiveness) about PrEP. Parametric statistics and non-parametric statistics compared the continuous and categorical variables and the outcomes of interest. Finally, we used tabular and descriptive analysis, including survey response standard deviation (SD), to discuss attitudes of The_InstaPrEP_Project followers towards a social marketing educational intervention about PrEP on Instagram.

Facebook and Instagram advertising results were explored using figures and tables provided by The_InstaPrEP_Project (Facebook Ads Manager Account, version May 2020). Survey data were collected and reports were generated using Qualtrics (Qualtrics, Provo, UT). Survey data were analyzed using SPSS software, version 26.0 (IBM Corporation, Armonk, NY).

Instagram engagement metrics (Table 9) were obtained through manual frequency count from data provided by Instagram, a subsidiary of Facebook Incorporated, last updated version May 2020, and manually entered into Microsoft Excel for Mac, version 16.37. Linear regression and ANOVA procedures assessed associations between reach and impressions and engagement measured by likes and compared mean values likes across posts, respectively (The R Foundation

for Statistical Computing, version 3.6.1, Vienna, Austria). Linear regression models and analysis of variance evaluated the association increased reach and impressions from hashtags and likes and impressions from hashtags (Figure 5). General Linear Models from "GLM: Time, Class, and the interaction of the two" (Figure 4 and Figure 5) are built with 'Stats' Package (Version 3.6.1 Copyright (C) 2001-2015 The R Core Team).

Figure 5 used a linear model with a polynomial fit using the variable of unique individual views by end user accounts (reach) as predictor for the overall number of end user accounts viewing a poster including repeat views (impressions). Using Aikakes Information Criterion, multiple models were compared for best fit, however using the variable of reach alone is the best predictor for the engagement measure of an action taken by an end user generally indicating a favorable opinion of the post (like).

A general linear model with Julian Date, a factor defining the where impressions were generated from, (Hashtags, Home, Profile, Other) (Figure 4), and the interaction between these two variables was used in R to predict the count parameter of Impressions.

Results

Instagram Recruitment Advertisement

Distribution of the advertisement generated 47,431 impressions. Facebook provides a very broad estimate of the number of unique Facebook and Instagram accounts that could potentially see an advertisement if the advertisement ran at the maximized algorithm dollar cost for an unlimited amount of time. This number is 230,000,000 unique end user accounts. Facebook does however provide the specific number of end user accounts that viewed the advertisement, including possible repeat viewers, which is called impressions. The_InstaPrEP_Project advertisement generated 47,431 impressions (Table 2). Of these, 34,537

unique accounts suggested the advertisement *reach* was 1.37 (Table 2). Of the overall end user accounts viewing the advertisement (impressions), 5.1% (2426/47431) expressed interest by linking to the survey on one or more occasions. However, among unique users, 7.02% (2426/34537) linked to the survey.

Table 2

Recruitment Advertisement by Impressions, Reach, and Frequency



The advertisement was distributed on three distinct channels; Instagram, Facebook, and through the Facebook Audience Network. The amount of money spent on the advertisement across all three channels totaled \$700.00. The advertising costs per interested subject was \$0.29 (Table 3). Similarly, the cost per 1000 impressions was \$14.76 (Table 4).

Table 3

Cost Per Click (Accessing By Tap on Device or Click Using A Computer Mouse)

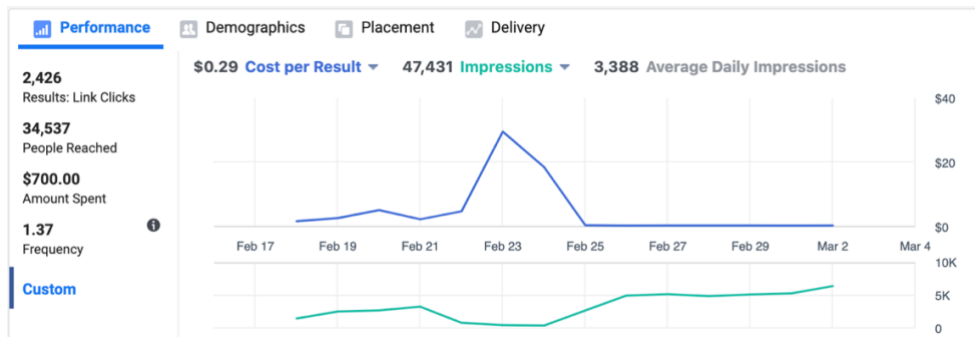
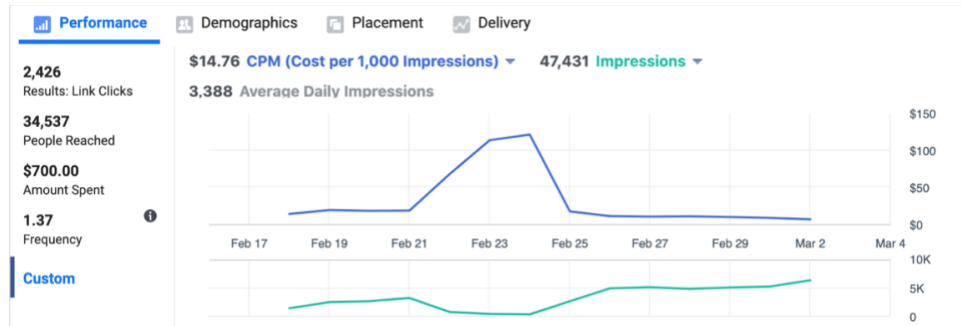


Table 4

Cost Per 1,000 Impressions



The InstaPrEP Project advertisement was viewed specifically on the Instagram platform by 11,912 end-user accounts, and of these 92 individual accounts linked to the survey (0.77%). The cost of the advertisement on Instagram specifically was \$369.37 (\$4/click). The advertisement on Facebook reached 20,120 end-user accounts and 2,191 of those accounts linked to The_InstaPrEP_Project survey (0.10%). The cost of the advertisement on Facebook was \$314.91 (\$0.14/click). The third end user audience reached by the advertisement was through the Facebook Audience Network, which yielded 2,592 views of the advertisement, from which 143 unique accounts linked to The_InstaPrEP_Project survey (0.05%). The cost of the advertisement distributed on the Facebook Audience Network was \$15.12 (\$0.11/click).

Survey Data Reported by Cohort

Fifteen participants completed the pretest assessment with another six completing the posttest. Individuals who took the pre-test survey could have also taken the post-test survey. To account for this, comparisons of self-reported zip codes were conducted between both survey response groups and showed none of the initial 15 participants shared a zip code with one another or with any of the six posttest participants. Thus, these were treated as two independent unlinked samples and were therefore labeled “cohort 1” and “cohort 2.” Instagram limited the

number of direct messages the intervention account could send within a given number of days. Because of this, only 310 of the 550 follower accounts received direct invitations to complete the post-intervention survey. In addition, due to the small sample sizes, no statistical tests will be used to compare the two cohorts but rather the frequencies and percentages will be addressed qualitatively.

Table 5
Frequency Counts for Demographic Variables Based on Cohort

Variable	Category	Cohort 1		Cohort 2	
		<i>n</i>	%	<i>n</i>	%
Age	18 to 20 years	3	20.0	0	0.0
	21 to 29 years	3	20.0	1	16.6
	30 to 39 years	5	33.3	4	66.7
	41 to 73 years	4	26.7	1	16.7
Sex at birth	Male	14	93.3	6	100.0
	Female	1	6.7	0	0.0
Considered gender	Male	14	93.3	5	83.3
	Neither exclusively Female or Male	1	6.7	1	16.7
Racial / ethnic background	White	8	53.3	0	0.0
	Black	4	26.7	5	83.3
	Asian	1	6.7	0	0.0
	Multicultural	2	13.3	1	16.7

Note. Cohort 1 *N* = 15, Cohort 2 *N* = 6

Table 5 displays the frequency and proportional distribution of demographic characteristics for each survey sample. Those in cohort 2 tended to be older with 83.3% of the sample being over 30 years old compared to 60.0% of the first cohort. All but one in the first cohort (93.3%) and 100.0% in the second cohort were male at birth. Currently, all but one in each group considered their gender to be male. Five of six (83.4%) in the second cohort were black while in cohort 1, the largest racial/ethnic category was white (53.3%) (Table 5).

Table 6 displays the frequency counts and proportional distributions for the sexuality variables based on cohort.

Table 6
Frequency Counts for Sexuality Variables Based on Cohort

Variable	Category	Cohort 1		Cohort 2	
		<i>n</i>	%	<i>n</i>	%
Taken medication to prevent HIV	Yes	6	40.0	0	0.0
	No	9	60.0	6	100.0
Last HIV test	I have never been tested for HIV	4	26.7	0	0.0
	Within the past month	2	13.3	0	0.0
	1-3 months ago	6	40.0	3	50.0
	4-6 months ago	0	0.0	1	16.7
	7-12 months ago	0	0.0	1	16.7
	More than 12 months ago	3	20.0	1	16.7
Last HIV test result	HIV-positive	0	0.0	2	33.3
	HIV-negative	11	73.3	4	66.7
	Never tested	4	26.7	0	0.0
Current romantic status	Single. I am not in a romantic relationship	6	40.0	5	83.3
	Partnered. I am in a committed relationship	6	40.0	0	0.0
	It's complicated	3	20.0	1	16.7
Current sexual relationship	I am single and have sexual relationships with whomever I chose	6	40.0	3	50.0
	I am partnered and we do NOT have sexual relationships with anyone but each other	3	20.0	0	0.0
	I am partnered and we OCCASIONALLY have sexual relationships with people outside of our relationship	3	20.0	1	16.7
	I am partnered and we have a completely open sexual relationship	1	6.7	0	0.0
	Other	2	13.3	2	33.3

Table 6 *Continued*

Table 6 *Continued*

Variable	Category	Cohort 1		Cohort 2	
		<i>n</i>	%	<i>n</i>	%
Sexual partners	Men only	11	73.3	5	83.3
	Others	4	26.7	1	16.7
Exchanges money for sex	Yes	2	13.3	0	0.0
	No	13	86.7	6	100.0
Different people have you had anal sex with in the last 3 months?	20-29	0	0.0	1	16.7
	5 to 9	2	13.3	0	0.0
	1 to 4	9	60.0	5	83.3
	None	4	26.7	0	0.0
Used condoms in past three months	I never use condoms	4	26.7	1	16.7
	I always use condoms	7	46.7	2	33.3
	Most of the time I use condoms	1	6.7	3	50.0
	Sometimes I use condoms	3	20.0	0	0.0
Anal sex phase	I am always the receptive (bottom) partner	3	20.0	2	33.3
	I am always the insertive (top) partner	0	0.0	1	16.7
	I am equally the receptive (bottom) or insertive (top) partner	3	20.0	1	16.7
	I am mostly the receptive (bottom) partner, but sometimes I am the insertive (top) partner	5	33.3	1	16.7
	I am mostly the insertive (top) partner, but sometimes I am the receptive (bottom) partner	4	26.7	1	16.7

Note. Cohort 1 *N* = 15, Cohort 2 *N* = 6

When queried as to whether they had taken medication to prevent HIV, 40.0% of cohort 1 compared to none in cohort 2 answered that they had. As for the recency of their last HIV test, four in cohort 1 (26.7%) have reported that they had never been tested for HIV and similar amounts of respondents (53.3% versus 50.0%) had an HIV test within the past three months. Two of six in cohort 2 (33.3%) compared to none (0.0%) in cohort 1 were HIV-positive. For current romantic status, five of six in cohort 2 reported that they were single and not in a romantic relationship while in cohort 1, equal numbers were single and not in a romantic relationship

(40.0%) or had partners in a committed relationship (40.0%). As for their current sexual relationship, half in cohort 2 reported being single and having sexual relationships with whomever they chose. Forty percent of cohort 1 reported similarly. As for sexual partners, 73.3% of cohort 1 and 83.3% of cohort 2 reported only having men as their sexual partners. Two (13.3%) in cohort 1 reported having exchanged money for sex while none in cohort 2 reported the same. Those in cohort 2 reported having more different partners for anal sex in the last three months. As for condom use, 53.4% of cohort 1 compared to 83.3% of cohort 2 reported using condoms either always or most of the time. As for anal sex, a wide variety of responses were reported by both cohorts (Table 6).

Table 7

Descriptive Statistics for InstaPrEP Perceptions Sorted by Most Agreement (Cohort 2)

Perception	<i>M</i>	<i>SD</i>
46. The InstaPrEP Project should be recommended to people like me.	1.17	0.41
48. The InstaPrEP Project can certainly be a good addition to my regular health or social care.	2.50	1.05
38. The InstaPrEP Project increased my access to care (health and/or social care professionals).	2.83	2.14
45. I am satisfied with the information I received through The InstaPrEP Project.	2.83	2.40
41. The InstaPrEP Project was explained to me sufficiently.	3.00	2.76
39. The InstaPrEP Project helped me to improve my health.	3.33	1.75
44. The InstaPrEP Project made me more actively involved in my health or social care.	3.33	1.97
34. The Instagram account called . The InstaPrEP Project saved me time because I did not have to visit my healthcare provider or clinic or other health and social care professional as often	4.00	2.51
47. The InstaPrEP Project can be a replacement for my regular health or social care.	4.00	0.63
49. The InstaPrEP Project is not as suitable as regular face to face consultations with the people helping me manage my health.	4.67	2.42
40. The InstaPrEP Project invaded my privacy.	5.67	2.34
36. The InstaPrEP Project interfered with my everyday routine.	6.17	1.17
43. The InstaPrEP Project allowed me to be less concerned about my health.	6.17	0.98
42. The InstaPrEP Project made me feel uncomfortable, e.g. physically or emotionally.	6.67	0.52

Note. *N* = 6.

Note. Perceptions were based on a seven-point scale: 1 = *Strongly Agree* to 7 = *Strongly Disagree*.

Table 7 displays the descriptive statistics for The_InstaPrEP_Project perceptions sorted by most agreement. These perceptions were based on a seven-point scale: 1 (*Strongly Agree*) to 7 (*Strongly Disagree*). The highest level of agreement was for survey item 46, The_InstaPrEP_Project should be recommended to people like me ($M = 1.17$). The lowest level of agreement was for survey item 42, The_InstaPrEP_Project made me feel uncomfortable, e.g. physically or emotionally ($M = 6.67$) (Table 7).

Table 8

Frequency Counts for Location of Respondent Variables by CDC Reporting Region

Variable	Category	<i>n</i>	%
Region	Northeast	5	23.8
	South	8	38.1
	Midwest	3	14.3
	West	2	9.5
	Missing data	3	14.3
Environment	Urban	12	57.1
	Suburban	5	23.8
	Rural	1	4.8
	Missing data	3	14.3

Note: N = 21 This table combines the regional location data for Cohort 1 and Cohort 2

Table 8 displays the frequency counts and proportional distributions for the location of the respondent variables (region and environment). The most common regions were South ($n = 8, 38.1\%$) and Northeast ($n = 5, 23.8\%$). Over half the respondents ($n = 12, 57.1\%$) lived in an urban environment and another five respondents (23.8%) lived in the suburbs (see Table 5).

The_InstaPrEP_Project Engagement

Over the six-week intervention, 550 unique end user accounts took the specific action of following The_InstaPrEP_Project account. During the same time, 2,077 unique individual Instagram end user accounts were followed by The_InstaPrEP_Project. The number of unique accounts that viewed at least one post on The_InstaPrEP_Project account throughout the intervention (reach) was 19,601. The total number of times at least one post was seen by an end user account, including possible repeat views (impressions), was 20,621 (Table 9). The source of end user views of each post including repeated views (impressions) by post is also highlighted in Table 9.

The majority of impressions (65%, 13,326/20,621) were generated from followers seeing the post because they follow a specific topic or theme (hashtag) that was attached to that specific post (Table 9). There was a total of 1,326 likes and 29 comments (Mean likes 41.4/ post, Median likes 24, Mean 0.90 comments). The number of times The_InstaPrEP_Project profile was viewed (profile visits) totaled 155 (Mean 4.84). The number of end user accounts that tapped the share button to forward a post to an individual or group within the Instagram application (share) totaled 14 (Mean 0.43 shares/post). The act of saving a post for future reference (bookmark) totaled 59 (Mean 1.84 bookmarks/post). Additional evaluation of engagement metrics including sum, mean, and median of specific measures is indicated in (Table 9).

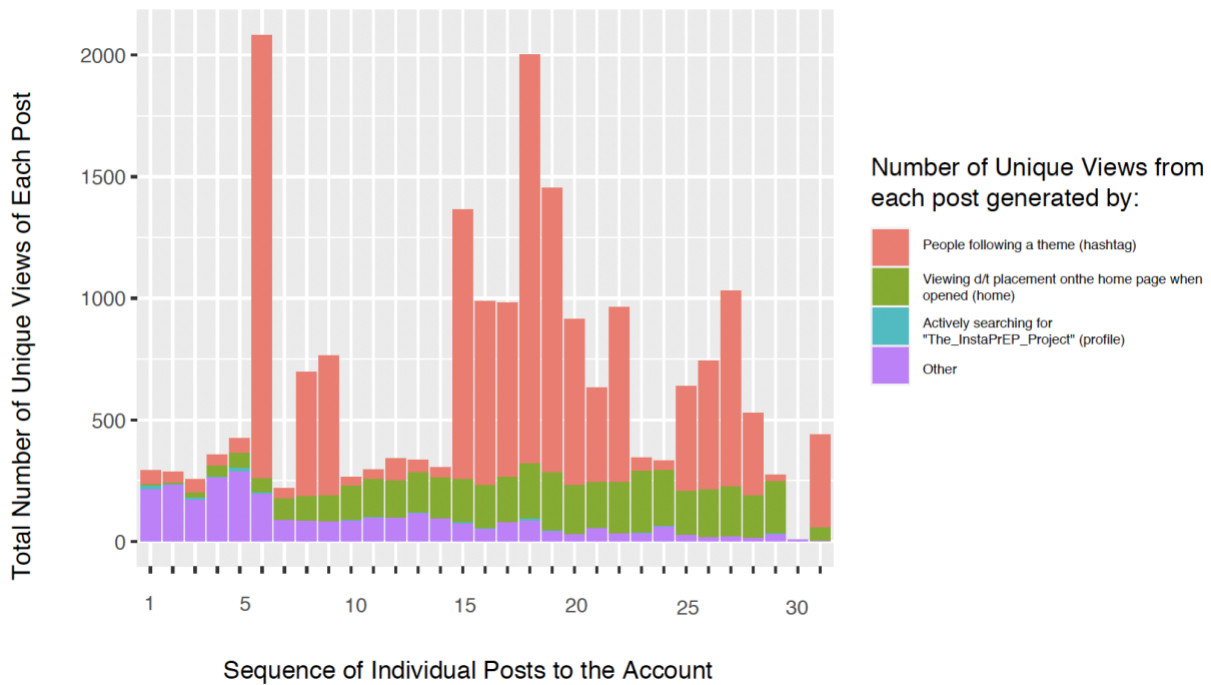
Table 9

Frequency, Mean, and Median Instagram Engagement Metrics by Post

Post Number	Date Posted	Post Image	Number of Likes	Number of Comments	Reach	Impressions	Impressions from: Hashtags	Impressions from: Home	Impressions from: Profile	Impressions from: Other	Post shares	Post Bookmarks
1	Tuesday, February 18	Couple from advertisement	32	2	268	293	59	7	15	212	0	1
2	Monday, March 2	Doctor John (video)	12	0	265	286	44	8	4	230	1	0
3	Tuesday, March 3	Smiling on Street	30	1	235	255	56	20	8	171	0	1
4	Wednesday, March 4	Blue Pill	22	1	337	357	46	45	4	262	0	0
5	Friday, March 6	Workout Buddies	49	1	392	423	60	61	17	285	0	1
6	Monday, March 9	Couples Brunch	199	9	1,988	2,081	1,822	59	7	193	2	10
7	Tuesday, March 10	Prep Basics	14	0	210	219	43	88	0	88	0	0
8	Thursday, March 12	How Does It Work (red)	18	0	651	698	513	101	0	84	0	1
9	Tuesday, March 17	How Does It Work (Side Effects)	16	0	733	765	578	105	1	81	1	3
10	Friday, March 20	How Does It Work (Calendar Yellow)	11	0	246	264	36	140	3	85	0	0
11	Monday, March 23	How Does It Work (92%)	14	0	272	297	41	156	5	95	0	0
12	Tuesday, March 24	Video (Start talking PrEP)	11	0	319	342	91	156	0	95	0	0
13	Saturday, March 28	Are you ready for PrEP? (Shirtless)	52	0	328	336	52	167	3	114	0	0
14	Sunday, March 29	Karamo Announcement	25	0	290	305	42	170	1	92	0	0
15	Tuesday, March 31	Provider Explanation	104	1	1,345	1,365	1,110	178	4	73	0	4
16	Thursday, April 2	Phone (texts)	39	1	932	989	758	178	3	50	0	5
17	Saturday, April 4	Karamo Talk Prevention	24	0	934	982	717	186	2	77	1	4
18	Sunday, April 5	Couple in Red	232	6	1,910	2,002	1,683	226	9	84	1	10
19	Monday, April 6	"When you ask boo ... " meme	109	3	1,386	1,453	1,170	239	3	41	0	2
20	Thursday, April 9	Karamo Talks Prep	15	1	603	634	390	191	1	52	0	0
21	Thursday, April 9	4 Quadrants (condoms, prep, hiv)	55	0	875	913	681	202	1	29	1	8
22	Saturday, April 11	Prep is 99% effective	15	0	615	639	433	181	0	25	0	1
23	Saturday, April 11	Alex Newel Video (2)	21	0	270	345	55	256	1	33	0	2
24	Saturday, April 11	Are you ready for PrEP? (Shirtless)	43	0	314	332	40	230	3	59	0	1
25	Saturday, April 11	Cartoon - #HIV can affect anyone	48	1	953	965	722	212	0	31	3	2
26	Monday, April 13	Prep Locator	11	0	506	529	341	174	1	13	1	0
27	Monday, April 13	How Can I Start PrEP?	20	0	702	742	530	195	0	17	0	0
28	Monday, April 13	Talk Prep (couple)	32	1	261	274	26	216	2	30	2	1
29	Monday, April 13	How Do I Pay for PrEP?	37	1	990	1031	806	206	0	19	1	2
30	Sunday, April 19	The InstaPrEP Project	6	0	63	66	0	57	3	9	0	0
31	Tuesday, April 21	Take the Survey	10	0	408	439	381	56	0	2	0	0
		Sum	1326	27	19601	20621	13326	4466	101	2731	14	59
		Mean	42.8	0.9	632.3	665.2	429.9	144.1	3.3	88.1	0.5	1.9
		Median	24.0	0.0	408.0	439.0	341.0	170.0	2.0	77.0	0.0	1.0

Figure 4

Total Number of Unique Views by Source



The number of views of a post by unique end user accounts not counting repeat views (reach) is generally directly proportional to the amount of time that a post has been present on the platform. Figure 4 is a bar graph representation of reach and where from where that reach was generated by category. As previously discussed, 65% of reach was generated from end users finding a post or The_InstaPrEP_Project account by following a specific topic or them (hashtag).

Figure 5

Linear Correlation Between Unique Views and Likes by Post

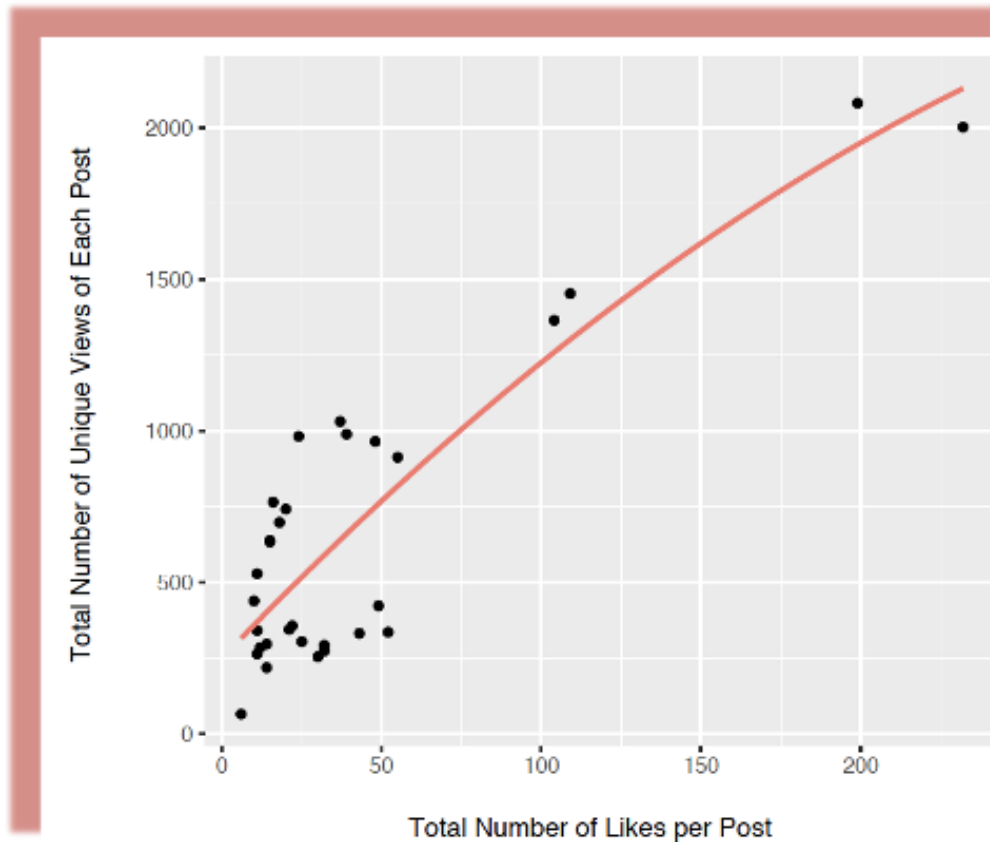


Figure 5 represents the positive linear relationship between an increase in unique end user views of a post (reach) and an increase in total number of actions indicating a favorable opinion of the post (likes) per post. This correlation increased rapidly for the first approximately 750 unique end user views then the distribution widens and the linear correlation begins to flatten.

Discussion

This discussion will compare what was found in the synthesis of literature with findings from this project, evaluate qualitative variables influencing project outcomes, draw associations and implications, and make a series of recommendations based on findings. It is important to

note that the end product of the project did not meet the exact outcome as originally designed. There were also unforeseen technical issues with data gathering that forced a change in focus from the original intent of this project. Specifically, the measurement of intent to begin using PrEP taken before the intervention and then measured again after the intervention to assess for a measurable change in intention that could potentially be associated with the project intervention was the initial desire for this project. This did not occur because of a technical error in Qualtrics which caused omission of the intention-focused questions from both the pre and post intervention surveys. However, significant and fruitful data were collected that will influence future quality improvement projects and research on social marketing interventions conducted on social media for this community.

The InstaPrEP Project was a short quality improvement project aiming to address in 18 to 35-year-old HIV-uninfected BMSM who are not currently taking PrEP, what strategies can optimize functional knowledge, perceptions, attitudes, and beliefs about PrEP and about the use of Instagram for dissemination of targeted, PrEP-specific social marketing materials.

Understanding these strategies is critically important to reduce the incidence of HIV in the BMSM community. Effectively utilizing the ubiquity of social media platforms like Instagram may be a cost-effective tool to increase functional knowledge, and potentially uptake and adherence, of PrEP in the community most disproportionately impacted by HIV.

Recruiting Strategy

The rate at which end user accounts accessed the survey in the advertisement on Facebook interestingly was on par with the typical access rates of similarly positioned advertisements on the platform (0.77%/\$4 per click). Only slightly more than half of the pre-intervention survey respondents were from the targeted demographic. There may be several

explanations for this. Facebook ultimately determined the placement of the advertisement, so while this advertisement was supposed to appear to the aforementioned interest groups, there is no way to verify what percentage of the advertisement reached those groups and with what frequency. These metrics are available to advertisers on Facebook but at a higher cost point than what was spent by this project. It may be worthwhile for future projects to procure the necessary budget to obtain this level of detail from Facebook. The targeted interest groups also may not have felt the advertisement to be trustworthy or may have perceived the advertisement as inappropriate. Finally, unsolicited advertisements on Facebook and Instagram are sometimes not well received by end users as they are considered intrusive and a potential invasion of privacy.

Comparisons with the Literature

Pre- and post-intervention survey questions were the same except for the final 15 questions in the post-intervention survey, which was administered only to cohort 2 (Appendix A and Appendix B). Therefore, survey questions that apply to both cohort 1 and cohort 2 will be discussed together for a combined N of 21. When appropriate, discussion of survey results will be differentiated by cohort.

Many aspects of this study agree with the current literature. It was previously thought that a combination of entrenched sexual networks, more promiscuity, and riskier sexual behavior like transactional sex contributed to higher rates of HIV in the community of BMSM (Alexovitz et al., 2018; Matthews, Smith, Brown, & Malebranche, 2016). Two of 21(10%) respondents discuss ever exchanging money for sex. Limited research on this specific population suggests between 10% to 20% of BMSM have engaged in transactional sex (Bauermeister, Eaton, & Stephenson, 2016; Bond et al., 2019; Stevens et al., 2017;), suggesting that survey responses are equivalent to the research, though some respondents may have felt uncomfortable disclosing this

information. In terms of the number of sexual partners in the last three months, 18 of 21 respondents report having sex with four or less individuals. The categorical options for the survey question pertaining to the number of sexual partners in the last three months were zero (4), 1 to 4 (14), 5 to 9 (2), 10 to 19 (0), 20 to 29 (1), and more than 30 (0). This is in line with the current literature which demonstrates that promiscuity is not as prevalent in the BSM community as previously reported.

All respondents in cohort 2 identified as Black or African-American. Although only six persons responded, 5 of 6 respondents report either most of the time or always using a condom during anal sex. This aligns with Millet et al. (2012) who found that condom use among BSM was consistently equal to or more frequent than their White counterparts so. Low levels of promiscuity and self-reported consistent condom use do not support the previously accepted theory that entrenched sexual networks, promiscuity, and unsafe sex practices can account for the disproportionate incidence of HIV in the BSM community.

Some data suggest cursory knowledge of PrEP does not encourage uptake, while more functional knowledge like understanding specific side effects, dosing schedule, and potency positively impact the perception of prep among MSM may translate to higher intention to use or adhere (Brooks et al., 2015; Highleyman, 2016; Holloway et al., 2017a; Kahle, Sullivan, Stephenson, 2018; Quinn et al., 2019; Thomann, Grosso, Zapata, & Chiasson, 2018). Though, as previously discussed we were not able to directly measure a change in intention, the majority of individuals from cohort 2 found the project useful and strongly agree it should be recommended for “other people like me” (Table 7). Kahle et. al (2018) demonstrate that a willingness to use PrEP correlates with higher accuracy of PrEP functional knowledge testing (adjOR= 3.38, 95% CI 2.44-4.69, P<.001). While this project was not able to specifically evaluate if a brief social

marketing intervention conducted on Instagram directly correlated to an increase in intention to take or adhere to PrEP, the findings suggest that an intervention focused on increasing functional knowledge was well received by the target community. Findings from this project are in agreement with previous results suggesting those with more robust knowledge of PrEP subsequently maintain a higher perceived benefit of the medication. This elevated level of knowledge and perceived benefit translates in the literature to individuals possibly being more likely to take oral HIV prophylaxis medication (Holloway et al., 2017b).

Cohort 2 agreed, mostly agreed, or strongly agreed that The_InstaPrEP_Project was a positive supplementation to their current healthcare needs. This is in line with current research suggesting that younger individuals use the Internet to obtain sexual health information and visually-based, compelling, concise, consistent electronic based sexual education may be a good strategy for reaching populations not traditionally targeted in sexual health education (Buhi et al., 2009; Jones et al., 2019; O'Donnell et al., 2017).

BMSM have previously been labelled a population difficult to reach with traditional public health initiatives (CDC, 2018a; Highleyman, 2016; Huang et al., 2016; van den Berg et al., 2018). The findings from this project disagree with this assertion. Gaining 550 new followers in approximately six weeks using positive, affirmative prep educational materials demonstrated that BMSM are not difficult to reach on the Instagram platform. The majority of followers of this account by visual representation on their own end user accounts are Black and many self-identify as part of the LGBTQ community.

In contrast to current literature findings, cohort 2 indicated that The_InstaPrEP_Project did not allow respondents to feel less concerned about their health. The findings from this small

clinical-based inquiry project suggest the community of BMSM do not perceive an intervention like The_InstaPrEP_Project as an adequate replacement for regular health or social care.

A significant difference in this project versus other types of similar interventions in the literature is the depersonalized nature of this intervention. Other social media public health interventions involving the population of BMSM conducted online, primarily using Facebook, incorporated either an in person face-to-face visit or dissemination of educational information on social media by individuals who were well-established in the community. The_InstaPrEP_Project did not use individuals who are well-known outside of social media to disseminate PrEP educational materials. While the social marketing posts were generally well received, there were several instances of individuals sending an email-like communication (direct message) to the The_InstaPrEP_Project account asking who the specific individual was coordinating the project. This information was provided without hesitation, though points to the potential need for a more humanistic element to the intervention. This is supported by the fact that posts which were shared by follower accounts to other user accounts on Instagram also tended to be the posts that garnered the most engagement.

Engagement

Instagram intentionally does not reveal the details of how the hashtag algorithm works to prevent spam accounts from targeting end users. Up to 30 unique hashtags are allowed per post, however, great debate in the community of Instagram influencers exists as to what the optimal number of hashtags that should be used per post because there is no specific guidance from Instagram regarding how many hashtags to use to gain the most amount of engagement.

Hashtags were generated through modeling of hashtags used by CDC HIV/PrEP campaigns and common hashtags used by other end user accounts representative of the target

demographics. Consistent use of hashtags provided an opportunity to understand how well hashtags worked across all posts. Interestingly, the hashtag #blackbrunch was added to the post delivered on Monday, March 9, 2020. Within 24 hours of posting with this added hashtag, the post had garnered more engagement and more likes than all previous posts. Therefore, the project coordinator opted to add this hashtag to the current list of hashtags in an effort to drive increased engagement to subsequent posts. Hashtags generated four times more unique views by end user accounts including repeat views (impressions) than the closest other source over the course of the project. This is not customary for typical Instagram accounts and suggests a well-researched hashtag strategy could be very important for audience targeting and development of future social marketing projects using Instagram.

Interaction by End Users on Instagram

While hashtags explain the overwhelming majority of Impressions on individual posts, there are likely other factors at play. Organic, personalized engagement on Instagram through The_InstaPrEP_Project account conducted directly by the project coordinator resulted in more significant engagement with the targeted demographic. The intervention posts containing images of Black men in non-sexual but loving and affirmative situations outperformed posts that were more sexual in nature or did not include images of people. Four posts (of 31) generated 35% of the total number of views from unique end user accounts, each representing at least 1,300 views by unique end user accounts. These four posts far out-paced the other educational posts through the duration of the intervention in the metrics of reach and impressions.

Post number 5 placed March 9, 2020 (1,988, 11%) (Figure 6) was the post with the highest amount of reach. The post featured a couple having brunch, smiling, enjoying themselves and holding hands with the corresponding caption “Are you thinking about #PrEP but aren’t sure

if it's right for you? What are the biggest questions you or your friends have about #PrEP? Let us know in the comments below! #theinstapreproject.”

Figure 6

Intervention Post #5



A concerted effort was made to use affirmational, positive messaging and images throughout the intervention. The post receiving the second highest amount of engagement was post number 17 (Figure 7) placed on April 5, 2020 (1,910 10%) featuring two Black men holding hands and posing for the camera with the caption on the picture “Start Talking. Stop HIV.” This imagery was originally used by CDC for an HIV prevention-themed Valentine’s Day post but repurposed for this intervention. The corresponding caption under the picture said “Listen ya’ll we gotta talk about this. Black men who have sex with men make up less than 1% of the overall population but account for 26% of ALL new HIV infections in the US. We have to fix this, and it starts with being open, honest, and un-afraid of talking about HIV in the community. #theinstapreproject.”

Figure 7

Intervention Post #17



Both of the top performing posts featured men who are engaging with one another in a positive way, smiling, enjoying themselves with affirmational captions under the pictures. The post with the third best engagement by reach, post number 18 placed on April 6, 2020 (1,386, 7%), featured a medical provider appearing to be in conversation with someone about PrEP (Figure 8). The post with the fourth highest amount of engagement, posting 14 placed on March 31, 2020, was a humorous meme featuring a handsome but puzzled young man (Figure 9).

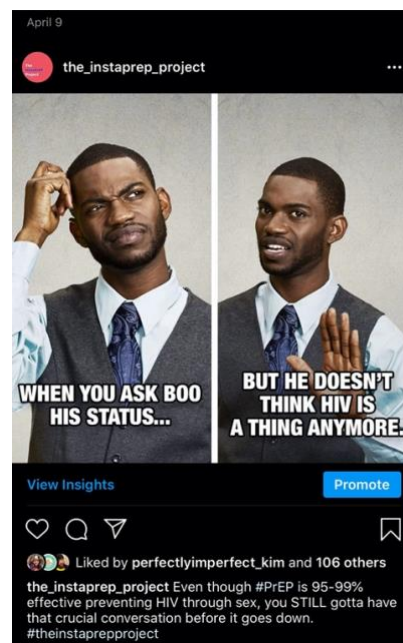
Figure 8

Intervention Post #18



Figure 9

Intervention Post #14



Of the top ten performing posts, only two did not feature a person. It is also interesting to note that popular musician Alex Newell and popular actor and host Karamo

Brown were both featured respectively in multiple separate posts. None of the posts featuring Newell or Brown were among the highest performing posts, possibly suggesting that celebrity status did not have a significant impact on engagement.

Of the 31 posts over the duration of the intervention, the post with the lowest reach (65) was the penultimate post featuring only words encouraging followers to take the survey (Figure 10).

Figure 10

Intervention Post #30



Alignment with Theoretical Framework

Culturally sensitive, linguistically appropriate care is foundational for all interventions using the LACPHNM theoretical underpinnings. The theory is also built on an assumption of population-based primary care interventions which should focus on entire populations possessing similar health concerns, a thorough assessment of a population's health status, considerations for

broader determinants of health, and a strong preference for primary prevention (County of Los Angeles Public Health, n.d.). The_InstaPrEP_Project aligns well with this theoretical model in terms of the projects affirmational approach to protecting against a very specific health threat to a specific population. The theory also encourages using primary prevention models that reach out to all who might benefit and not just those who present themselves. This was a significant motivator for the aggressive and unsolicited following of user accounts on Instagram. The entire impetus of The_InstaPrEP_Project was to be able to use Instagram as a tool to discuss oral HIV prophylaxis in the most disproportionately impacted community. It is incumbent upon nursing and public health to involve the community directly and not just by passive means.

Conclusion

The existing body of research suggests social media can play an important role in PrEP educational social marketing. This project reinforces those findings. Given the rapidly growing nature of Instagram there still exists a dearth of evidence in the literature to support effective strategies for utilization of Instagram as a social marketing and public health tool. A possible explanation is simply the newness of Instagram as a platform. The explosive growth of Instagram and its current popular rate of use are less than 10 years old. There are yet to be developed specific recommendations for conducting social marketing campaigns on Instagram. This project is a first step towards understanding what types of strategies do and do not work for increasing functional knowledge of oral HIV prophylaxis in the community of BMSM.

Future projects should focus on a longer, more extended campaign with a significantly larger budget. Six weeks did not appear to be long enough to establish a trusting relationship with account followers, especially given the lack of a specific human with whom to connect the project. Advertisement placement in future projects should be targeted as closely to Instagram

only as possible rather than including Facebook end user accounts. This requires a change in the advertisement placement strategy and thus a larger budget. Facebook and Instagram do have philanthropic divisions and future projects would benefit from reaching out to the philanthropic arms of these organizations to better understand how those platforms can provide free or reduced cost advertising for a public health intervention of this nature.

Intention to use PrEP after completing the intervention was the initial metric of greatest interest for this project. An error occurred in the survey collection that caused five questions addressing intention of PrEP use to be omitted from both surveys. Future projects would benefit from incorporating ways to measure change of intention that are either incorporated into other questioning or don't rely solely on survey questions that could unintentionally fail as is the case in this project.

The InstaPrEP Project was designed to evaluate the role Instagram can play in deploying a targeted social marketing campaign to increase functional knowledge of PrEP in the BMSM community. Nursing and public health officials must use all means necessary to optimize social marketing techniques on social media to reach disadvantaged populations. Those efforts must include a robust, targeted, affirmational, and well thought out Instagram component. The community of BMSM continues to be disproportionately impacted by HIV and AIDS. It would be an abject failure of public health officials, CDC, nursing, medicine and the global health community as a whole to allow this to continue. Instagram is a simple, innovated tool which, as demonstrated in this project, can play a crucial role in any effort to increase functional knowledge of and therefore possibly intention to take PrEP. These innovative strategies using Instagram must also be expanded to include other marginalized communities like transgender women of color and undocumented persons. The InstaPrEP Project demonstrates Instagram can

potentially be a vital tool for increasing functional knowledge and potentially the uptake and adherence of PrEP in the BMSM community.

Appendix A

Instagram PrEP Educational Posts in Chronological Order

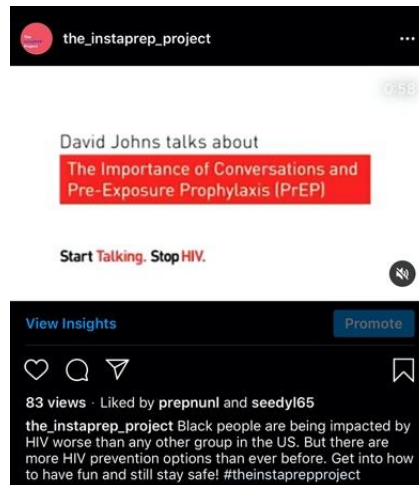
Post #1

Couple from advertisement



Post #2

David Johns (video)



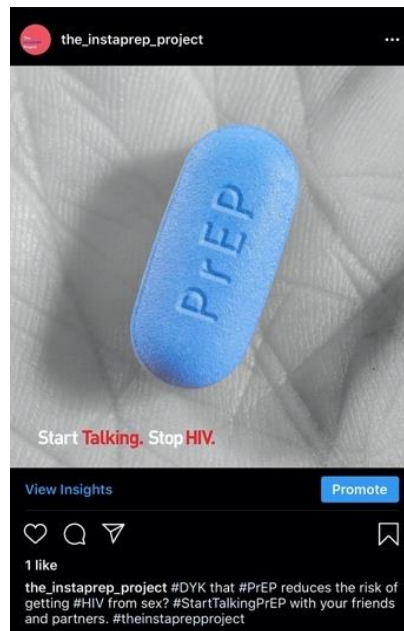
Post #3

Smiling on Street



Post #4

Blue Pill



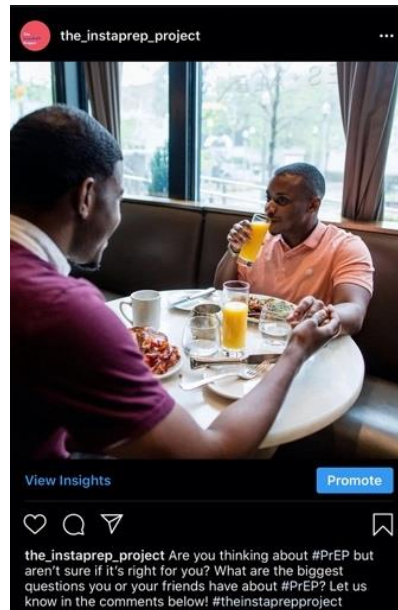
Post #5

Workout Buddies



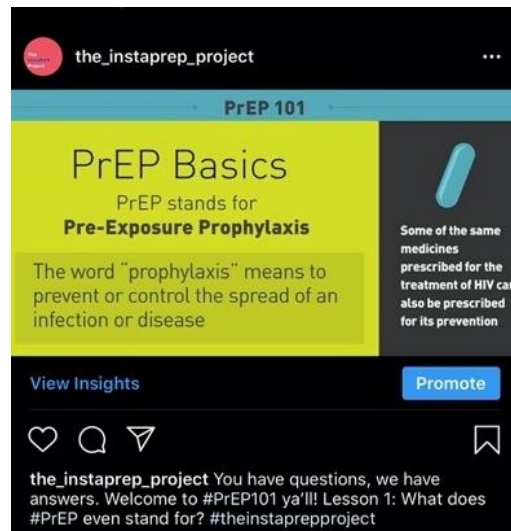
Post #6

Couples Brunch



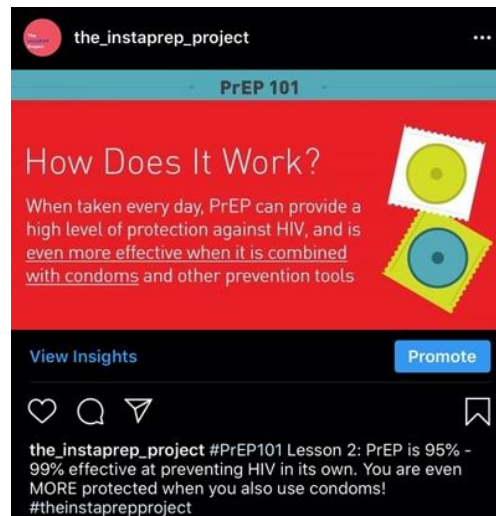
Post #7

Prep Basics (Infographic)



Post #8

How Does It Work (Red Infographic)



Post # 9

How Does It Work (Side Effects Infographic)



Post # 10

How Does It Work (Calendar Infographic)



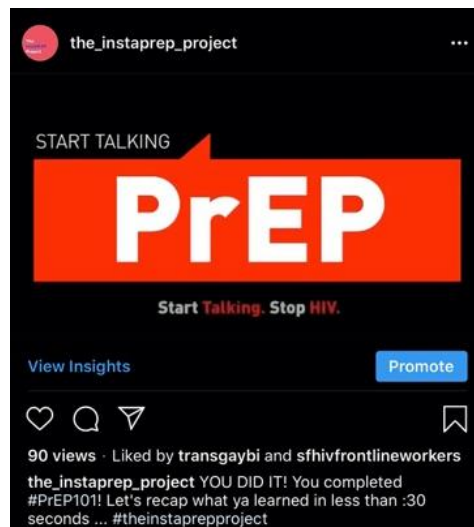
Post # 11

How Does It Work (92% Infographic)



Post # 12

Video (Start Talking PrEP)



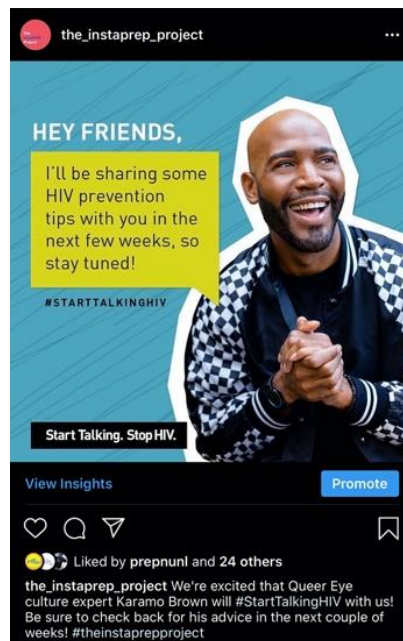
Post # 13

Are you ready for PrEP? (#1)



Post # 14

Karamo Brown Announcement



Post # 15

Provider Explanation



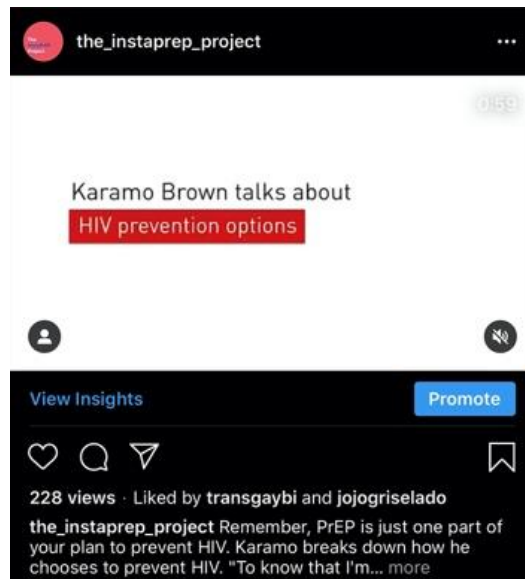
Post # 16

Texting on iPhone



Post # 17

Karamo Brown Talks Prevention (Video)



Post # 18

Couple in Red



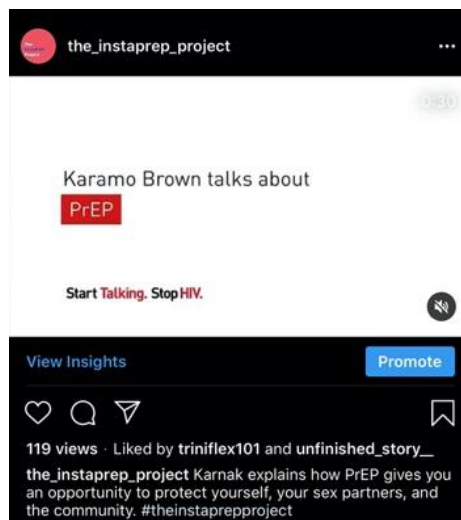
Post # 19

“When you ask boo ... “



Post #20

Karamo Brown Talks Prep (Video)



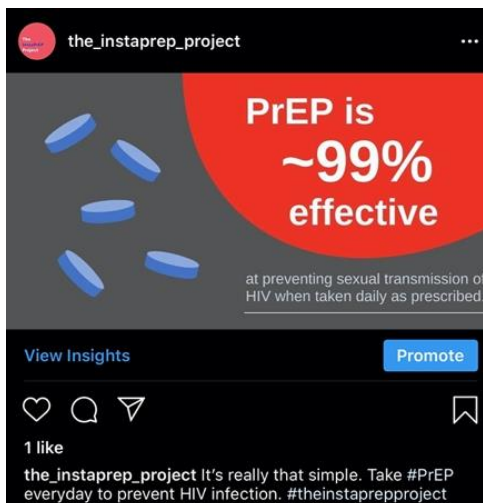
Post # 21

Condoms, PrEP, HIV Testing, Treatment (4 Quadrants)



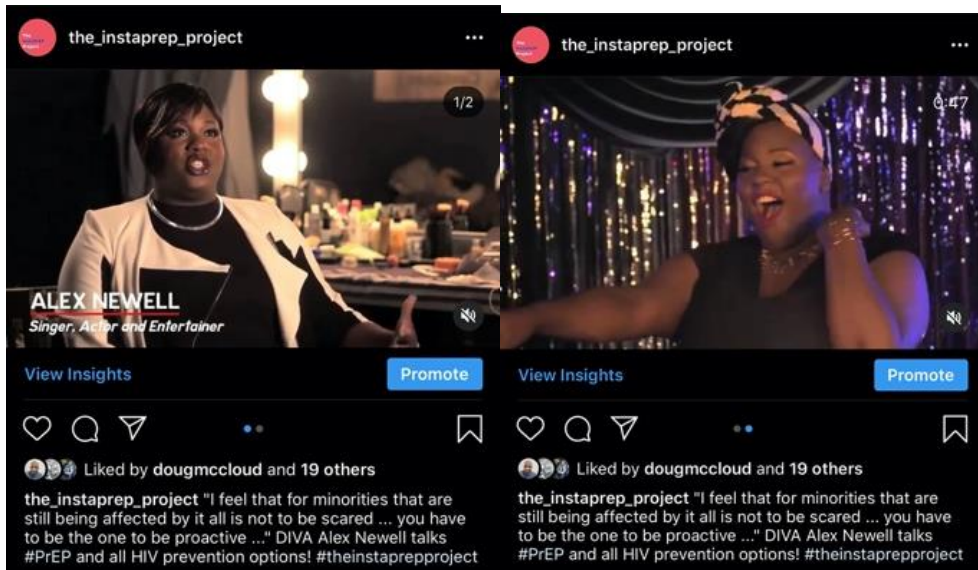
Post # 22

Prep is 99% Effective (Infographic)



Post #23 & #23a

Alex Newell Talks Prevention Video (2)



Post # 24

Are you ready for PrEP? (#2)



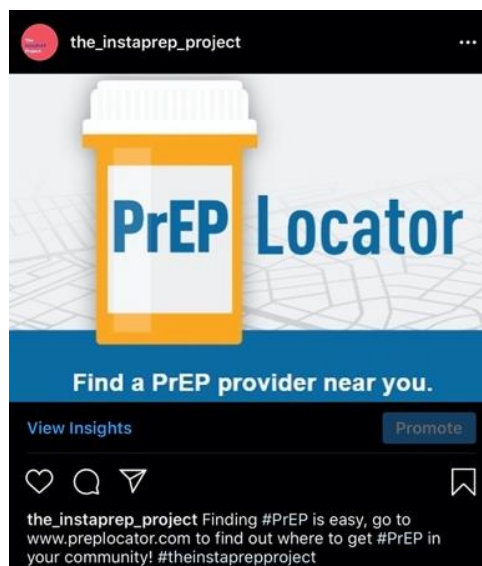
Post # 25

Cartoon #HIV can affect anyone (Infographic)



Post # 26

Prep Locator



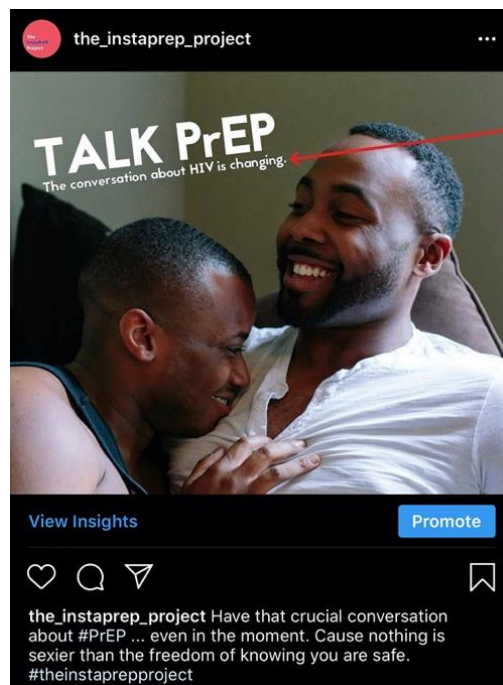
Post # 27

How Can I Start PrEP?



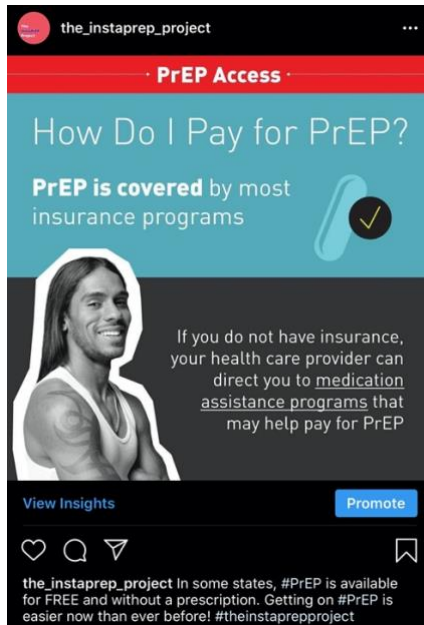
Post # 28

Talk Prep (Couple)



Post # 29

How Do I Pay for PrEP?



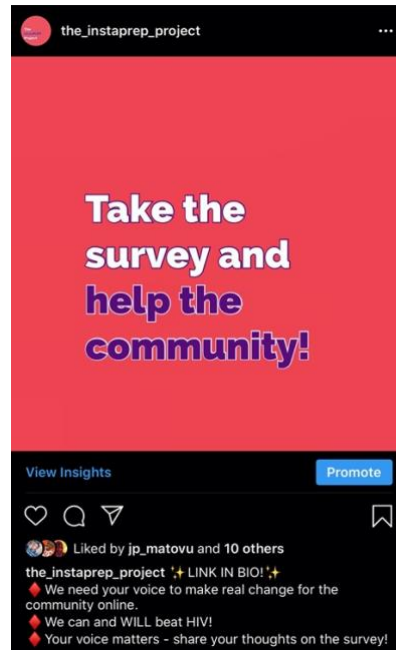
Post # 30

The InstaPrEP Project Survey (Completion Post)



Post #31

Survey Prompt #2



Appendix B

Pre-Intervention Survey (Cohort 1)

“In these first few questions we just want to understand a little bit about you”

1. What is your age?
2. What was your sex assigned at birth?
 - a. Female
 - b. Male
3. What gender do you consider yourself now?
 - a. Male
 - b. Female
 - c. Neither exclusively male nor exclusively female
4. With which race or races do you identify (choose all that apply)?
 - a. American Indian/Alaska Native
 - b. Asian /Asian-American
 - c. Black/African-American
 - d. Hispanic/Latinx
 - e. Middle Eastern/North African
 - f. Native Hawaiian/Pacific Islander
 - g. White/Caucasian
5. Have you ever taken a medication to prevent HIV (usually called pre-exposure prophylaxis, or PrEP)?
 - a. Yes
 - b. No
 - c. I don't remember
6. What is your zip code?
7. Do you have a long lasting or chronic medical condition that substantially limits one or more of your major life activities (like your ability to hear, see, speak, learn, remember, or concentrate?)
 - a. Yes
 - b. No
8. Which of the following have you been diagnosed with? (Check all that apply)
 - a. A sensory impairment (vision or hearing)
 - b. A mobility impairment
 - c. A learning disability (e.g. ADHD, dyslexia)
 - d. A mental health disorder (e.g. anxiety, depression, bipolar disorder)
 - e. A disability or impairment not listed here
9. When was your last HIV test?

- a. I have never been tested for HIV
 - b. Within the past month
 - c. 1-3 months ago
 - d. 4-6 months ago
 - e. 7-12 months ago
 - f. More than 12 months ago
10. What was the result of your last HIV test?
- a. HIV-positive
 - b. HIV-negative
 - c. *Indeterminant* (they told me to come back and be retested)
 - d. Sorry, I don't remember
11. What best describes your current *romantic* relationship?
- a. Single. I am not in a romantic relationship
 - b. Partnered. I am in a committed relationship
 - c. It's complicated
12. What best describes your current *sexual* relationship?
- a. I am single and have sexual relationships with whomever I chose
 - b. I am partnered and we do NOT have sexual relationships with anyone but each other
 - c. I am partnered and we OCCASSIONALLY have sexual relationships with people outside of our relationship
 - d. I am partnered and we have a completely open sexual relationship
 - e. Other
13. Who do you have sexual relationships with?
- a. Men only
 - b. Women only
 - c. Men and women equally
 - d. Mostly men
 - e. Mostly women
14. In the past 5 years have you ever, even once, exchanged sex for money, drugs, or a place to stay?
- a. Yes
 - b. No
15. With how many different people have you had anal sex in the last 3 months?
- a. 30 or more
 - b. 20-29
 - c. 10-19
 - d. 5-9
 - e. 1-4
 - f. 0

16. Think about the times you've had anal sex in the last 3 months. Describe how often you used condoms even if just for part of the time:
- I never use condoms
 - I always use condoms
 - Most of the time I use condoms
 - Sometimes I use condoms
 - Occasionally. It depends on the circumstance
17. Think about the times you've had anal sex in the last 3 months. Which phrase best describes you?
- I am always the receptive (bottom) partner
 - I am always the insertive (top) partner
 - I am equally the receptive (bottom) or insertive (top) partner
 - I am mostly the receptive (bottom) partner, but sometimes I am the insertive (top) partner
 - I am mostly the insertive (top) partner, but sometimes I am the receptive (bottom) partner

Questions specific only to respondents who answered "Yes" to question #5

- Please choose which PrEP medication you have taken at least once in the last month:
 - Truvada (Tenofovir/emtricitabine)
 - Descovy (Tenofovir alafenamide/emtricitabine)
 - My medication is not listed here
- Think about the last 7 days, how many times have you taken your PrEP medication daily? (1-7 as a radio button option)
- Think about the last month, How many times have you taken PrEP ?
 - Every day
 - 3 weeks out of 4
 - 2 weeks out of 4
 - 1 week out of 4
- Think about the last 3 MONTHS, which phrase best describes how often you have taken PrEP?
 - Every day or almost every day
 - Once or twice per week
 - Every week or two
 - Maybe once
 - Only a day or two before, the day of, and a day or two after I *know* I am going to have sex
- Think about a day or more when you did NOT take your PrEP over these last 3 MONTHS. Which phrases best describe the reason? (select all that apply)
 - I had side effects

- b. The cost
 - c. It was hard finding someone to prescribe it for me
 - d. I no longer have sexual relationships or drug use that puts me at risk
 - e. I use PrEP only periodically before sexual encounters, I don't take it everyday
 - f. I just forgot to take it and never started again
 - g. My prescription ran out and I never refilled it
 - h. I was tired of getting my blood tested every 3 months
6. Which phrases below best describe your concern about becoming infected with HIV?
- a. I am very concerned about becoming infected with HIV
 - b. I am somewhat concerned about becoming infected with HIV
 - c. I have a small amount of concern about becoming infected with HIV
 - d. I have no concern about becoming infected with HIV
7. From the list below, please tell us why you take PrEP. (Choose all that apply)
- a. I have insertive (top) anal sex with a partner of unknown HIV status WITHOUT using condoms
 - b. I have receptive (bottom) anal sex with a partner of unknown HIV status WITHOUT using condoms
 - c. I have insertive (top) anal sex with an HIV positive partner WITHOUT using condoms
 - d. I have receptive (bottom) anal sex with an HIV positive partner WITHOUT using condoms
 - e. I have vaginal sex with a partner of unknown HIV status WITHOUT using condoms
 - f. I have vaginal sex with an HIV positive partner WITHOUT using condoms
 - g. I always use condoms with whomever I'm having sex, but I still want the extra protection from HIV
 - h. I frequently use condoms with whomever I'm having sex, but I still want the extra protection from HIV
 - i. I occasionally use condoms with whomever I'm having sex, but I still want the extra protection from HIV
 - j. I may come into contact with blood or other potentially infectious material in a health care or work setting
8. Since starting PrEP, I use condoms for anal sex...: (select all that apply)
- a. ... less often than I did before starting PrEP
 - b. ... more often than I did before starting PrEP
 - c. ... never. Since starting PrEP I don't use condoms at all.
 - d. ... occasionally. I only use condoms in certain situations
 - e. ... about the same amount as I did before starting PrEP
 - f. I do not have anal sex
9. Since taking PrEP, has the number of sexual partners you have had:
- a. Increased

- b. Decreased
- c. Stayed the same

Questions specific only for respondents who answered “no” to Question #5 (these questions were developed in the original survey but ultimately omitted from pre and post intervention survey due to a technical error)

10. Below are some reasons we’ve heard why some people DO NOT take PrEP. (Select all of the reasons that also apply to you)
- a. I’m not able to take PrEP because I don’t have a doctor or healthcare provider
 - b. I’m not able to take PrEP because I don’t have health insurance
 - c. I don’t know how to enroll in health insurance so I can start taking PrEP
 - d. I can’t afford
 - e. I don’t know how to find a doctor who can give me a PrEP prescription
 - f. I don’t know where to go to get a PrEP prescription
 - g. I would be concerned about family members finding out if I started taking PrEP
 - h. I would be concerned about friends finding out if I started taking PrEP
 - i. I would be uncomfortable asking a doctor for PrEP prescription
 - j. I would be uncomfortable talking to a doctor about my sexual behavior
 - k. I would be concerned about sex partners finding out if I started taking PrEP
 - l. No one knows if there are long-term side effects of taking PrEP and that makes me very uncomfortable
 - m. I am concerned about side effects or feeling sick from taking
 - n. I am concerned that PrEP is only partially effective
 - o. I would be very uncomfortable taking HIV medicines when I don’t have HIV
 - p. I don’t need PrEP because I always use condoms
 - q. I don’t need PrEP because I’m not at risk for getting HIV
 - r. I don’t trust doctors or healthcare providers
 - s. I don’t trust drug companies
 - t. I don’t take PrEP because of the side effects
11. Think again about the people you know who are most like you. *Check all* of the reasons you’ve heard why they might not take PrEP. (Select all that apply)
- a. PrEP makes sex less spontaneous
 - b. People who take PrEP are promiscuous
 - c. Taking PrEP does not protect against HIV
 - d. People worry that PrEP will increase a person’s risk for HIV
 - e. People don’t think about the whole community, they are just thinking about themselves
 - f. HIV is no longer dangerous because we have good treatments for it now
12. Tell us how you feel about the following statements. (Non-takers)
- a. I could use condoms less if I started taking PrEP (strongly agree ---> strongly disagree)
 - b. I am concerned that I would take more sexual risks if I started taking PrEP (strongly agree --> strongly disagree)

- c. I think people who take PrEP also take more sexual risks (strongly agree ---> strongly disagree)
 - d. It would be difficult for me to remember to take PrEP every day (strongly agree --> strongly disagree)
 - e. I would find it difficult to see my doctor every 2–3 months for follow-up if I started taking
 - f. PrEP (strongly agree ---> strongly disagree)
13. Which statement best applies to you: “I plan to take PrEP...”
- a. Beginning next week
 - b. In the next month
 - c. Sometime in the next 3 months I am unsure I will ever take PrEP
 - d. ...never, not me!

Appendix C

Post-Intervention Survey (Cohort 2)

1. The InstaPrEP Project saved me time because I did not have to visit my healthcare provider or clinic or other health and social care professional as often.
 - a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

2. The InstaPrEP Project interfered with my everyday routine.
 - a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

3. The InstaPrEP Project increased my access to care (health and/or social care professionals).
 - a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

4. The InstaPrEP Project helped me to improve my health.
 - a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

5. The InstaPrEP Project invaded my privacy.
 - a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

6. The_InstaPrEP_Project was explained to me sufficiently.
 - a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

7. The_InstaPrEP_Project made me feel uncomfortable, e.g. physically or emotionally.
 - a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

8. The_InstaPrEP_Project allowed me to be less concerned about my health and/or social care.
 - a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

9. The_InstaPrEP_Project made me more actively involved in my health.
 - a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

10. I am satisfied with the information I received through The_InstaPrEP_Project.
 - a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

11. The_InstaPrEP_Project can be/should be recommended to people in a similar condition to mine.
 - a. Strongly Agree

- b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree
12. The_InstaPrEP_Project can certainly be a good addition to my regular health or social care.
- a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree
13. The_InstaPrEP_Project can be a replacement for my regular health or social care.
- a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree
14. The_InstaPrEP_Project is not as suitable as regular face to face consultations with the people helping me manage my health.
- a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree
15. The_InstaPrEP_Project has allowed me to be less concerned about my health status.
- a. Strongly Agree
 - b. Moderately Agree
 - c. Mildly Agree
 - d. Mildly Disagree
 - e. Moderately Disagree
 - f. Strongly Disagree

Table of Evidence

Author, Year	Purpose	Sample & Setting	Methods, Design, Interventions, Measures	Results
<p>Alexovitz, K. A., Merchant, R. C., Clark, M. A., Liu, T., Rosenberger, J. G., Bauermeister, J., & Mayer, K. H. (2018). Discordance of voluntary HIV testing with HIV sexual risk-taking and self-perceived HIV infection risk among social media-using Black, Hispanic, and White young men who have sex with men (YMSM). <i>AIDS Care</i>, 30(1), 81–85. https://doi.org/10.1080/09540121.2017.1381327</p>	<p>Associations between self-perceived risk for HIV, HIV testing patterns, and high-risk sexual behaviors</p>	<p>2,275 18-24-year-old English or Spanish speaking Black, White, or Hispanic MSM who self-report being HIV negative and have had sex with at least one same gender male in the last 6 months</p> <p>Setting: Various social media websites</p>	<p>Non-experimental survey</p> <p>Given voluntary HIV test and compensation as part of taking survey</p> <p>95% CI of results for participants not previously tested, those who reported condom less anal intercourse (CAI), those who perceived not being HIV positive</p> <p>Associations calculated based on two strata HIV (positive or negative) Cochran-Mantel-Haenszel testing to assess relationships between HIV test taking and risk behavior.</p> <p>Odds ratios with corresponding 95% CIs estimated.</p>	<p>Not previously voluntarily tested were generally younger, White, and rural.</p> <p>Lack of HIV testing was associated with less occurrence of CAI</p> <p>Self-perception of ability to contact HIV was not correlated with HIV testing status</p> <p>White MSM riskier behavior but were more likely to not perceive possibility of contracting HIV</p> <p>Black and Hispanics were more likely to have been tested and more likely to perceive they could possibly be infected with HIV</p>

Author, Year	Purpose	Sample & Setting	Methods, Design, Interventions, Measures	Results
<p>Huang, E., Marlin, R. W., Young, S. D., Medline, A., & Klausner, J. D. (2016). Using Grindr, a Smartphone Social-Networking Application, to Increase HIV Self-Testing Among Black and Latino Men Who Have Sex with Men in Los Angeles, 2014. <i>AIDS Education & Prevention</i>, 28(4), 341–350. https://doi.org/10.1521/aeap.2016.28.4.341</p>	<p>To understand the impact of targeted advertising on social networking sites (Grindr) on HIV self-testing requests and seeking of care after subsequent test results</p>	<p>Grindr, a smartphone social networking application used by MSM</p>	<p>A pop up and subsequent banner advertisement publicizing free HIV self-test kit on Grindr placed between April 17 and May 29, 2014. Geo-specific to users in zip codes corresponding to West Hollywood, CA or downtown Los Angeles, CA. Reached 11,939 unique users. Users who clicked on the advertisement were offered either free HIV test via US mail, a Walgreens voucher for the test, or free test from a vending machine.</p> <p>Intervention w/ post-intervention Likert-scale survey evaluating ease of test, comfort/convenience, overall satisfaction with experience. Also asked about linkage to care</p>	<p>Survey Monkey tool, collected over encrypted SSL connections. Coded with unique study ID</p> <p>111,939 unique visitors, 334 tests requested (224 mail, 99 vouchers, 11 vending machine)</p> <p>122 met eligibility criteria of being > 18, Black or Hispanic</p> <p>91% reported at least one CAI w/in 3 months with an of 2.8 CAI in past 3 months 57 completed survey, 55 stated testing was easy 39 would choose this over other methods in the future, 55 tested negative, 2 positive and both sought care</p>

Author, Year	Purpose	Sample & Setting	Methods, Design, Interventions, Measures	Results
<p>Patel, V. V., Z. Ginsburg, S. A. Golub, K. J. Horvath, N. Rios, K. H. Mayer, R. S. Kim & J. H. Arnsten (2018) Empowering With PrEP (E-PrEP), a Peer-Led Social Media-Based Intervention to Facilitate HIV Preexposure Prophylaxis Adoption Among Young Black and Latinx Gay and Bisexual Men: Protocol for a Cluster Randomized Controlled Trial. <i>Journal of Medical Internet Research</i>, 7e11375. d.o.i. 10.2196/11375</p>	<p>To design, pilot, and evaluate a social-media based, peer-led intervention designed to increase PrEP uptake in young Black and Latinx, gay, bisexual men who have sex with men – a population that historically has very poor uptake of PrEP for still unclear reasons.</p>	<p>Age, 18-29 (mean 23.8, SD 3.1) Black and Latino cisgender males who have sex with other cisgender males who are HIV negative or unknown and not taking PrEP in the 5 boroughs of New York City.</p> <p>Setting is Instagram and Facebook user groups.</p>	<p>Level IB 2-arm cluster Randomized Control Trial w/ pretest/posttest</p> <p>10 peer led intervention groups blinded and randomized</p> <p>152 total participants randomized into one of two groups, E-Health and E-PrEP. Both groups received Facebook posts on the same days at the same time over 6 weeks. Ehealth group received general health info w/out any PrEP info, E-PrEP group received PrEP specific info only.</p> <p>Intervention developed from Diffusion of Innovation and Information-Motivation Behavioral new skill development models</p>	<p>** Authors state “Analysis ongoing” as this is a protocol</p> <p>Impact of experimental arm covariates (significant in the bivariate analysis at $P < .15$)</p> <p>Age (years), mean (SD) t – E-PrEP (n=8124.28 (2.8), Control (n=71) 23.32 (3.4)</p> <p>Self-report survey at baseline, 6 weeks, 12 week assessing PrEP use or intention to use.</p> <p>Groups were compared for equivalence at baseline using chi-square test, tests, or nonparametric tests as appropriate</p> <p>Repeated measures mixed effects logistic models used to compare outcomes between arms over time.</p>

Author, Year	Purpose	Sample & Setting	Methods, Design, Interventions, Measures	Results
<p>Thomann, M., Grosso, A., Zapata, R., & Chiasson, M. A. (2018). "WTF is PrEP?": attitudes towards pre-exposure prophylaxis among men who have sex with men and transgender women in New York City. <i>Culture, Health & Sexuality, 20</i>(7), 772–786. https://doi.org/10.1080/13691058.2017.1380230</p>	<p>To evaluate the efficacy of two online social media campaigns focusing on PrEP use in MSM and Transgender women in NYC.</p> <p>To understand the range of perspectives individuals held about PrEP, PrEP users, the social media campaign, and PrEP overall.</p>	<p>24 gay and bisexual men and transgender women who were at least 18 years old, lived in NYC. Ages ranged from 21-50 and included 17 Black, three White, four Hispanic participants representing all 5 boroughs of NYC</p>	<p>Focus group protocol</p> <p>Watch videos about PrEP, then 90-minute social interaction and discussion w/ follow-up survey</p>	<p>There was high concern from participants that PrEP use would decrease condom use and therefore contribute to a rise in other STIs</p> <p>Possible side effects and lack of quality information about those side effects as a major barrier to PrEP adoption Motivated by a desire to have bareback sex</p> <p>Questions of those on PrEP being adherent</p> <p>Misconceptions about adherence linked to poor marketing and education of PrEP</p> <p>Perceptions that it's only for gay men or people who desire to be exceptionally promiscuous</p> <p>Concerns over side effect profile</p> <p>Concerns over commodification by drug companies</p>

Author, Year	Purpose	Sample & Setting	Methods, Design, Interventions, Measures	Results
<p>Young, S.D., Holloway, I., Jaganath, D., Rice, E., Westmoreland, D., & Coates, T. (2014). Project HOPE: Online Social Network Changes in an HIV Prevention Randomized Controlled Trial for African American and Latino Men Who Have Sex with Men. <i>American Journal of Public Health, 104</i>(9),1707–1712. https://doi.org/10.2105/AJPH.2014.301992</p>	<p>To examine how changes in social network ties cultivated through online social networks influence HIV prevention and testing behaviors in Black and Latino men who have sex with men.</p>	<p>N=112 Age 18 or older (no mean or SD reported overall; post-test mean 31 years) Living in Los Angeles, California, USA, Black or Latino cisgender males who have sex with other cisgender males who are current users of social media and interested in receiving health information via social media, primarily Facebook</p>	<p>Data collected from HOPE intervention study. 92-item questionnaire done as a pre/post test Facebook used to create 4 closed, invite-only groups: 2 HIV intervention group and 2 controls. Random assignment to one of the groups with 2 blinded peer leaders in each group. 12-week intervention Participants received group and individual chats, posts, direct messages. In HIV group, received HIV specific info. In control group, received general health and wellbeing info. Every 4 weeks both groups were told they</p>	<p>93.8% post-test completion Largest magnitude of “ties” was in experimental group 2, which ties increased from 69 to 117 at follow up (70%) increase. Significant. Significant number of cross ties between peer leaders and group members, researchers highlight nature of social media within this phenomenon. Larger values indicated greater cohesiveness. Ties are measured in number of isolates, nodes, isolates, nodes, centrality, path length, distance-based cohesion (Intervention group #1 0.454 0.484, IG #2 0.327 – 0.494 versus Control group #1 0.437 0.437, Control #2 0.351 to 0.518)</p>

			could receive HIV in-home test kits free. Measured response of control vs. experimental group on who requested free test.	
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