January 2014

Exploring Social Networking Technologies As Tools For Hiv Prevention For Men Who Have Sex With Men In Connecticut

Jorge Augusto Ramallo
Yale School of Medicine, jorge.ramallopardo@yale.edu

Exploring Social Networking Technologies as Tools for HIV Prevention for Men Who Have Sex with Men in Connecticut

A Thesis Submitted to the
Yale University School of Medicine
In Partial Fulfillment of the Requirements for the
Degrees of Doctor of Medicine
and Masters in Public Health

By
Jorge A. Ramallo
2014

ABSTRACT

EXPLORING SOCIAL NETWORKING TECHNOLOGIES AS TOOLS FOR HIV PREVENTION FOR MEN WHO HAVE SEX WITH MEN IN CONNECTICUT

Jorge A. Ramallo, Tashuna Albritton, Thomas Kidder, and Trace Kershaw. Department of Social and Behavioral Science, Yale School of Public Health, New Haven, CT.

This study examined the use of social networking technologies (SNTs) and their potential utilization in HIV prevention interventions among HIV positive and HIV negative men who have sex with men (MSM). We conducted 5 focus groups and 1 individual interview of HIV positive and HIV negative individuals (total 34). All participants were recruited with the help of a local non-profit organization and through a Facebook event advertised in neighboring LGBT establishments.

MSM tend to compartmentalize and separate their gay social networks. SNTs are the main way in which MSM meet new sexual partners. Young MSM are high users and early adopters of new technologies. The most important obstacle to behavioral interventions using SNTs is concerns for privacy. Interventions must abide by an SNTs' unwritten etiquette rules to gain legitimacy and support. Disclosure of HIV status is uncommon and often avoided; some HIV positive MSM now identify as being undetectable after successful viral load suppression, leading to an increase in risky sexual behaviors. HIV is simplified as a chronic disease that is easily manageable, creating problems for prevention. Overall, prevention messages using SNTs must be positive, upbeat, and transmitted through multiple modalities. The messages must go beyond a gay audience in order to reach the rest of the MSM population; this can be achieved by mixing the message with larger more acceptable marketing strategies.

SNTs can be promising tools for HIV prevention but future interventions must consider the main themes outlined in this study in order to ensure the success of their programs.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

BACKGROUND

NEW ALARMING TRENDS

Even though men who have sex with men (MSM) make up a small fraction of the general public estimated to be between 3-5% of the US population (1), MSM accounted for 52% of all people living with HIV in 2009 (2). In 2010 MSM accounted for 78% of new HIV infections among males and 63% of new infections in all populations. Currently, the HIV incidence worldwide is decreasing in all countries and segments of the population except in MSM. Researchers describe this phenomenon as a "reemerging HIV epidemic in MSM" (3). Gay and bisexual men in the U.S. are 44–86 times more likely to be diagnosed with HIV compared to heterosexual men (4). Concurrently a CDC report showed that only one quarter of the 1.1 million Americans living with HIV have appropriate access to care and a suppressed viral load (2). A subsequent study found that more than half of HIV positive young MSM in large U.S. cities were unaware of their HIV status. This statistic is associated with HIV complacency, underestimation of personal risk, and recent infection (5). All of these alarming facts highlight the need to develop effective strategies to improve testing and healthcare utilization among MSM.

HIV RISK FACTORS

The risk factors associated with HIV acquisition have been well documented and include a high number of male sexual partners, unprotected insertive anal intercourse with sexual partners of unknown HIV status, insertive anal intercourse with HIV positive partners, and substance use prior to sexual encounters (6). For young MSM, the CDC reports that in the 25-34 age group only 71% know their HIV status and only 15% is virally suppressed by effective treatment (5). Therefore, this is an important group to target in

HIV prevention efforts, and the best way to reach them is through innovative technology tools.

SOCIAL NETWORKING TECHNOLOGIES (SNTs)

Social networking technologies (SNTs) are tools that allow users to create formal connections with people they know, communicate, and share interests online (7). SNTs encompass all technological tools used for communication within networks including websites, mobile applications, video, and other media. To date there is no consensus in the literature regarding a definition for Social Networking Technologies (SNTs). The term is used interchangeably with social networking sites, social networking media, sociable technologies, etc.

SOCIAL MEDIA

A national survey in 2012 found that Facebook is the unquestionable leader of all social networking sites in the United States with 67% of all social networking users reporting to have a Facebook account (8). Even though younger populations are more likely to be Facebook users, the prevalence of this social networking technology in older groups is also quite high. The main reasons people attribute for participating in social media sites included staying in touch with friends (67%), staying in touch with family members (64%), and connecting with older friends (50%) (8). Currently, the only significant factors correlated to internet use are age (younger > older), education level, and socioeconomic status (9).

Concurrently, the rapid expansion of cell phone use is correlated with increased use of text messaging, which is calculated to have increased from 31% in 2007 to over 65% in 2010 (8). This increased use provides an opportunity for social and behavioral

researchers to disseminate health messages and implement interventions to curve behavior change using these new technologies.

LGBT POPULATIONS AND SOCIAL MEDIA USE

Over the years, membership to social networking sites such as Facebook has increased more rapidly in lesbian, gay, bisexual, and transgender (LGBT) populations than in the general public. For instance, Facebook membership in 2009 (five years after its creation in 2004) for gay men was 50% vs. 46% in the heterosexual population. In 2010 the use in MSM increased to 74% vs. 65% in the heterosexual population, demonstrating that gay men are "higher users" of online social networking sites. This trend remained persistent for other up and coming networking sites like Twitter (10). Gay and lesbian populations are more likely to be on Twitter, with 29% reporting Twitter use vs. 15% of the general population (11). More recently, a 2013 survey showed that 67% of gay men reported having visited an LGBT website or blog demonstrating an increase of 34% in the past 12 months alone (11).

Generally speaking, the LGBT population has seen a more accelerated growth in smartphone ownership over the past few years with 91% gay males vs. 63% of heterosexual males owning a smartphone device. The use of LGBT mobile apps increased 17% in the last year alone (10).

There was a 16% increase in social media use among gay men, saying they visit social networking sites "at least once a week" between 2009 and 2010 (10). Recent surveys show that MSM are increasingly using social networking technologies to meet new potential partners. A survey in 2012 found that 46% of men used the internet to meet new

sexual partners (12) mostly through the use of mobile apps, which has increased in the gay men population by 17% in 2013 alone (11).

Concurrent to the widespread increase in mobile phone ownership, mobile phone applications increased exponentially. The most prominent mobile application described in the literature is Grindr. Since 2009, this mobile app introduced the use of geolocation features to communicate with nearby individuals and facilitate finding a romantic or sexual partner, targeting specifically MSM. Ever since, similar mobile apps targeting sub-segments of the MSM population (e.g. Scruff, Mister, Recon, Adam4Adam Mobile, ManHunt Mobile, Dudes Nude, etc.) are also gaining popularity among MSM worldwide. Unfortunately, because of the newness of these mobile apps, there are no official estimates on their use and prevalence in the literature, although some studies have already referred to their existence and popularity (13, 14). Mobile apps have revolutionized the way in which MSM are able to find new sexual partners, with a clear link between social media use and increased sexual risk behaviors in MSM (15).

Interestingly, a potential contributor to risk taking behaviors is the increase of such behaviors expressed through visual media in the internet. A recent study looking at a representative cohort of adult gay pornography showed high prevalence of behaviors such as unprotected anal intercourse (34%) and the practice of ejaculation into and/or around the anus (7%). A previous study in 2009 estimated the prevalence of unprotected anal intercourse to be at 18%, signifying a significant increase of this high risk behavior (16).

PREVENTION USING SNTs FOR LGBT POPULATIONS

The use of social media technologies for HIV prevention is a recent phenomenon. The rapidly changing media platforms are challenging for researchers using new technologies for interventions. This is especially applicable for LGBT populations because they are more likely to be considered "early adopters" of new technologies (17), rendering interventions in older platforms obsolete before their effects can be fully studied. To date, there have been several interventions targeting the MSM population using new social technologies. A systematic review found that technology based interventions for people living with HIV helped with medication adherence, sexual risk reduction, decreased drug use, increase health literacy, and improvements in depressive symptoms. The study focused mostly on text messaging interventions and was unable to draw clear conclusions about web based interventions due to the lack of randomized controlled trials conducted at the time (18).

Regardless, the strategies for social media technology have proven to have moderate to low success in most populations (19, 20). One randomized controlled trial showed that interventions using social networking sites such as Facebook are acceptable and can be both effective in changing behaviors and increasing testing rates among participants (21). However, a different randomized trial using Facebook showed that behavioral change was present in the short term but returned to baseline in the long run (22). For this reason, we require a better understanding of the way in which MSM use social networking technologies and how they may be used effectively in prevention programs.

STATEMENT OF PURPOSE

1) To explore how MSM and their social networks interact using social networking technologies.

2) To uncover the perceived barriers to prevention programs using social networking technologies.

3) To explore ways in which a behavioral HIV intervention can be successfully implemented among MSM using social networking technologies.

MATERIALS AND METHODS

STUDY PROCEDURES
Participants were recruited from the Circle Care Center, a local non-profit organization in Norwalk, Connecticut that has a highly predominant LGBT patient population. Researchers also posted flyers in local LGBT bars and establishments in the neighboring city of New Haven to recruit new participants. Additionally, a Facebook event was advertised through a local dance club's Facebook page and former participants helped recruit new ones by "liking" and recommending the event on their own Facebook newsfeeds (Appendix B). Interested clients contacted clinic staff members for further information about the study and enrollment.

The focus groups were led by two moderators who were part of the research team and helped develop the interview script. Most of the interviews were conducted in the city of Norwalk and one in the city of New Haven to accommodate participant's preferences. All sessions were audio recorded using a digital recorder. The focus groups lasted approximately 90 minutes. The participants received a $30 incentive for their participation at the end of the group. Procedures for the focus groups were approved by the Yale University Institutional Review Board.

PARTICIPANTS
For this study, we conducted five focus groups and one individual interview. The individual interview was conducted after all but one of the participants cancelled a scheduled a focus group. Four focus groups of 8-10 MSM--two for HIV positive MSM groups and two for HIV negative MSM groups. Both types of groups were recruited

because they helped provide insight into factors that influence testing and engagement in care in each population.

Inclusion criteria were as follows: men who have sex with men, 18-35 years of age, and English speaking. Because of a limited number of HIV positive participants available, we allowed MSM over 35 years of age to be part of our focus groups. The focus groups were conducted over a course of six months. Research staff began recruitment approximately four weeks prior to each group meeting. The research staff and staff from the local agency recruited participants according to the inclusion criteria stated above. All participants were informed during recruitment of the type of group that they would join (i.e., HIV positive vs. HIV negative only).

MEASURES

The research team developed an interview schedule for the focus groups (appendix A). The interview questions focused on four main themes: (1) participant's social networks, (2) technology practices, (3) HIV knowledge and communication, and (4) prevention as it relates to all three previous categories. The interview transcript consisted of 24 questions total, with 8 pertaining to social networks, 9 pertaining to HIV knowledge and communication, and 7 pertaining to technology use. Most questions were open ended and meant to encourage open and honest participation by focus group members.

In this study we use the term social networking technologies (SNTs) to represent all new emerging that allow for the creation and maintenance of social networks. These include both web-based technologies (e.g. Facebook, Twitter) as well as mobile phone based apps (e.g. Grindr). In the transcript excerpts, we identify participants of the HIV negative group as "negative" and HIV positive groups as "positive."

DATA ANALYSIS TECHNOLOGIES

All transcripts were transcribed by a member of the research team. Halfway through the data gathering phase, the entire research team read all available transcripts to identify main topics and preliminary themes. Grounded theory and the constant comparative method (23, 24) were used as our main theoretical frameworks. The coding scheme was developed using an inductive approach (25). Using this theoretical framework, a coding tree was created based on preliminary group reports. The coding tree was revisited after all transcripts were completed to add any new relevant themes before transcript coding began. After all interviews were completed, two investigators independently coded the transcripts using the consensus coding tree and used NVIVO 10 qualitative research software for data analysis. An inter-rater-reliability test was performed using specific transcripts, which showed 94-100% agreement between coders.

RESULTS

The main themes that emerged can be grouped into four categories: social networks, technology practices, HIV knowledge and communication, and prevention (Figure 1). There was extensive overlap among all categories and the goal of prevention. There were also many connections among all categories.
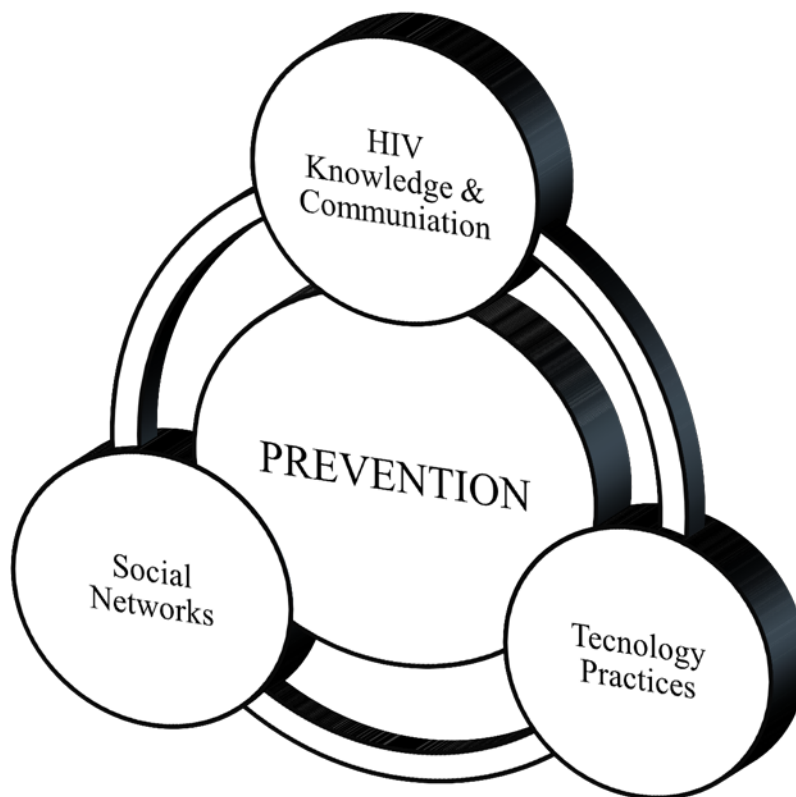
FIGURE 1: CORRELATION OF MAIN THEMES AND PREVENTION GOAL

DESCRIPTION OF PARTICIPANTS

There were a total of 34 participants, predominantly Caucasian. The age range for the HIV positive groups was 28-55, the age range for the negative focus groups was 18-41. Overall, 44% of our focus groups participants were HIV positive and 56% were HIV negative. No further demographic characteristics were collected from the participants.

SOCIAL NETWORKS

We asked the participants to describe their social networks extensively, including the composition and common communication topics. The main themes that arose included the following:

COMPARTMENTALIZATION OF SOCIAL NETWORKS

Participants often described their social networks as separate or compartmentalized. There was some overlap between their networks, but generally they were kept separate:

> …when I have different groups of friends…I feel like you associate yourself differently and you view yourself differently when you are around different people. Like I have friends who I can be a little more immature with and I have friends who I can have adult conversations with, and then I have friends who I can go out and party with…I have different social networks that kind of encapsulate these different parts of my personality…it's like kind of off-putting to blend those two groups because then you kind of never know how to act (negative participant).

For some participants, this compartmentalization was due to perceived lack of empathy, specifically from heterosexual members of different social networks, such as work and /or school. One HIV positive participant described it in the following manner: "Almost none of my friends are HIV positive; most of my friends are heterosexual so it's hard for me to say that they are similar to me. I mean we may share common interests but we are not similar" (positive participant). The following interaction in one of the groups also describes the disconnection between gay and heterosexual circles:

> *Participant A:* I'm sure everyone feels this way, my gay friends, I really relate to them on a completely different level because they're able to understand and connect with me in a different way because we have…shared experiences sexually and in a deeper way than my straight friends know me

> *Participant B:* I don't really have any straight friends any more. I eliminated straight people from my life with the exception of coworkers and people I know professionally (negative participants).

For HIV positive participants, the fear of discrimination and stigma can partially drive this compartmentalization. "I had a huge fight with my mother when it came out about my status to the entire world to see…it's a dance you have to manage everyday on how to have that conversation" (positive participant). This is also driven by the lack of empathy, best exemplified by the following exchange:

> These are smart girls [I go to school with] and they want to be doctors and when I told them I was positive one of them just said "Don't you just take a f***g pill for that?" She's like "Big deal, you're not getting any sympathy from me," and I'm like "I'm not looking for sympathy" (positive participant).

This compartmentalization of networks led to concerns for privacy from people outside of the main circle of the participants.

> I used to have a blog, you know right after I first got sober and it was just about like trying to date and dealing with my status…now my partner works in the medical field and…there are restrictions about going into [medicine] if you're already positive...so that creates a problem. And he doesn't want his family all over the place knowing that I have a blog (positive participant).

Another participant described his partners' family as an obstacle for open disclosure of his HIV positive status:

> I actually, I have an ex…and I know his sister pretty well, and it's hard enough for her to deal with [him being gay]…she doesn't need to know that the whole time we were together I was HIV positive...and I don't hide it, but I actually really pay attention to everything that I put [on social media] (positive participant).

Several of the participants in both HIV positive and HIV negative groups shared the same concerns for privacy, especially regarding HIV related posts because of the apparent message it might send to unintended people through social media technologies.

MEETING NEW PEOPLE

The topic of meeting new people was extensively discussed in the interviews because it related to all parts of our main framework regarding technology and communication. Social networking technologies were the main way by which participants met new people and kept in touch with current members of their social networks. In terms of meeting new people, even though the use of certain sites was meant for sexual encounters, many participants revealed how interactions that were initially sexual in nature turned into friendships. "I made a couple of friends through those hook up sites, people I only met with the intension of hooking up with but turned into a friendship" (positive participant). Another participant from the same group also acknowledged this unintended consequence:

> I've used it for both purposes: friends and looking for sex…and the line gets very blurred. Sometimes I just want to chat...and get into these deep conversations and they will go on for a couple of days and then they'll tell me....do you want to f**k? So I kind of just stay away from all that stuff (positive participant).

Even though a lot of the participants showed some disdain towards these platforms, their potential value was not lost.

> I have a sort of cyclical or undulating relationship with these gadgets. But the thing is I met some really nice people in the likes of manhunt and Facebook and some of them turned into great friendships so I think it's important not to discount them (negative participant).

The use of social networks for friendships was especially useful for some participants when traveling: "Especially when you travel, it's fun for me. If you are going to a place alone on a business trip you can have someone show you around...it's great!" (negative participant). But some expressed how, especially in more suburban areas, SNTs might be their only option: "when we moved here it was a big deal because we didn't know people and it was like where do you go, because there's really no bars here…"(positive participant). emphasizing the need for an online medium in places with no gay establishments or neighborhoods.

SOCIAL NETWORK TECHNOLOGY PRACTICES

All groups endorsed frequently using SNTs to communicate with members of their social networks and described several important themes.

DEMOGRAPHIC DIFFERENCES IN USE
A theme that emerged was demographic differences in social networking technology use based on age, location, and HIV status. Younger participants described their use of new SNTs and the trends they see regarding older and more established ones like Facebook:

Participant D: Twitter and Tumbler, I'll use ten trillion times more than Facebook

Participant E: I think that the younger generation is using Twitter.

Participant D: Don't you feel like Facebook for our generation is kind of dying?

Participant F: It's totally dying. I think what happened is that Facebook got really popular for about 4 or 5 years, which is generally the lifespan of a social media website

Participant E: [like it happened to] My Space

(negative participants).

The participants showed great insight into current technology trends and expressed their opinions as to why such rapid change happens:

As a [younger] generation we demand content quickly and rapidly and that's just something that comes with being somebody in a technological age…I think platforms like Twitter and Instagram are used more where you can get instant information in a way where, Facebook is a little more stalky. Like Facebook you have to do your homework. You have to click around. You have to actively be wanting to see a person. Whereas Twitter and Instagram [do not] (negative participant).

One of the participants pointed out the marked differences in technology use and SNTs variety were based on geography and population size:

In New Haven, there are a lot less people on the other apps. Whereas in New York there are tons of people on everything. So you can get more specialized…in New York, my favorite [app] by far is Dudes Nude. I find that the guys on it are

just more open minded and more thoughtful…They tend to be more conscious about a bunch of things. I think that's the site where you would most likely find people who would sleep with positive guys that they know are positive as long as they're being safe about it (negative participant).

The difference between HIV positive and negative individuals was also discussed; a person's status seemed to drive them to specific sites that also happened to be for people undertaking risky sexual behaviors:

…there are certain sites where you gravitate towards depending on your status. Like when I was single BBRT [Bareback Right Now] was just starting to become big and there was a positive button you could click for an icon basically everybody has that icon already clicked, or non-disclosure which basically means safe to assume what they are [positive] (positive participant).

This participant implied that the non-disclosure button was an invitation not only to assume an HIV positive status but also to approach the person for risky sexual behaviors such as barebacking (i.e. anal sex without the use of condoms).

SOCIAL MEDIA ETIQUETTE
The idea of media etiquette is a concept that was raised in many groups. This concept describes the ways in which people should behave in specific SNTs and also how an initial interaction can lead to a transition of media from one SNT to another, which eventually leads to an in person encounter. The way in which people first introduce themselves in SNTs was explored in one of the HIV negative groups:

Everyone does that "oh I'm just looking for friends" and I'm like really? 'cause you're a headless torso or you're shirtless, showing your body and you're just like "yeah looking for friends" but you won't respond to everyone, you'll just respond to attractive men…so you aren't just looking for friends you're looking for attractive men that you are eventually going to f*** so stop saying you're looking for friends (negative participant).

A sexual undertone is commonly assumed when meeting someone in a gay forum, even if the person is not looking for a sexual encounter. This creates a problem for participants looking for long term partnerships or simple friendships:

I remember there would be a lot of people who would reply to me when I said "whoa, what are you looking for" and I would say friends or chatting. They would get pissed, and they would say "you know this is for hooking up?" and "what are you doing out here?" (negative participant).

The participants describe the process of media transition in one of the HIV negative groups: "There's a hierarchy. Like you'll start off on Grindr, and then text, and then you get to know them, and then here's my Facebook…I'd like to learn more about you" (negative participant). Variability in levels of comfort of how quick the transition takes place and whether certain content and interactions should be specific for certain platforms also pertains to the types of exchanges seemed as acceptable in different media:

Participant M: That's probably like my biggest pet peeve. When someone comes at me really directly and sexually on any kind of social media. It's like hey here's a picture of my d*** and I'm like cool. I could have found a much better one

online…

Participant N: Even in text messaging it's like that. It's like awful. Oh my G-d get over yourself

Participant O: That's why I stopped using Grindr people start conversations with pictures of their penises.

Participant P: Or guys that have a picture of their abs as their profile picture

Participant Q: that's why I like Grindr, it's real

(negative participants).

The direct and sexually charged exchanges are seen as inappropriate by some while others welcomed them. Nonetheless, most groups agreed that websites which granted a greater degree of anonymity (e.g., Grindr) allowed for people to be more sexual and direct when contacting others. Participants identified a similar direct approach to conversations regarding risk taking behaviors. "I think that conversation escalatesa lot quicker as far as...'Hi how are you; What are you looking for? What are you into?' Then it goes right into condoms or no condoms" (positive participant).

This also applies to uses of prevention, as one participant summarizes: "…it's a place for people to meet other people; it's not a place for you to be an activist about HIV or gay rights…" (positive participant). Etiquette and appropriateness of such messages were cited next to privacy concerns as barriers for possible interventions.

PRIVACY CONCERNS
Privacy was a frequently cited concern for participants as we asked about their use of SNTs: "say you are head of a company and you're hiring and I've been with people that

go to Facebook to check the person out. And when you post something, whether you are (HIV) positive or not, it's ....you know...I wonder about this person." (positive participant). This concern for privacy was related to people within their social networks, best expressed in one of the HIV positive groups:

> Earlier in my life…I was very open and honest, I was OK with having that conversation about my status, but I'm a relationship with someone who tries to be very anonymous and doesn't want his business out there. So I keep my s**t on lockdown…I try not to have my Facebook and Twitter...I mean I won't even do a four square [app] check-in when I'm at the gay and lesbian center because I don't need people knowing why I'm there or asking why (positive participant).

This concern for privacy was directly correlated to HIV prevention posts and how HIV messages are spread within a social network using SNTs.

HIV KNOWLEDGE AND COMMUNICATION

The main themes that surfaced around HIV communications included disclosure of HIV status, stigma, HIV as a chronic disease, and undetectable/risk taking behaviors.

DISCLOSURE OF HIV STATUS
The topic of HIV status and disclosure when meeting new potential sex partners was an important theme. As expected, the HIV positive group was very vocal about their experience. Some participants expressed it as a non-issue, as most of the people in their circle were positive already: "I guess you could say people who I used to socialize with most of them were positive so the conversation never needed to come up because they knew my status and I knew my status" (positive participant). They also indicated that

when meeting people and discussing the possibility of engaging in risky sexual acts, the assumption of a positive status was often made:

> I have to say I don't even bring it up unless someone brings it up because 9 out of 10 times anybody that's coming down to my house to do the things that I want to do...they're going to be positive anyway. It's just a different culture (positive participant).

Some participants expressed frustration when sites asked them for their status in their profiles, best expressed in one of the positive groups: "that bothers me, that whole thing. In those sites where you have to put your status, I put negative because I don't want everybody to know because it's not their business at that point" (positive participant). The rationale behind this belief was that most would wait until the very last possible moment before they became intimate with someone before disclosing their status in order to decrease their chances for rejection, which at the same time led to anxiety:

> Somewhere around the fourth or fifth date…they wanted to move in a certain direction it was very uncomfortable for me so I've just been avoiding the situation and I don't know how I can balance that. Date one seems way too early but if you don't do it on date one when do you [disclose]? There's got to be sometime before we are naked in bed together that I'm going to have that conversation with someone (positive participant).

The positive participants expressed disbelief that they were penalized for doing what they considered be the right thing, and that negative men would rather sleep with someone who possibly lied about their status rather than someone with control over their disease.

This is the experience from a positive participant: "I mean when this is what you get...and it was hard, people were uninterested, if you disclosed people would not hook up with you" (positive participant). Participants in some of the negative groups expressed understanding of the difficult situation positive men face when disclosing online:

> I think it would be hard to say you're positive to somebody and I've asked people and they've actually just said it's none of your f***ng business. It's nothing but my business, and I'm glad I get that response now cause I'm like, ok move on don't waste my time (negative participant).

This participant described the types of negative interactions people sometimes face when asking this question. Other negative participants expect the status question to be part of the SNT platform they are using to meet new people and tend to readily believe what they read: "I have never asked. If you're disease free, it will be on their little blurb [in the phone app]…" (negative participant). Still, for negative participants the conversation was avoided mainly because it was considered to be a "mood killer" that would potentially ruin any new interaction with a potential sexual partner:

> I wouldn't ask because it's just awkward. I feel like it would ruin the conversation. If you are trying to just meet someone with the goal of hooking up with them I feel like asking them, being up front with him would be a turn off and they would [look for] other options on Grindr (negative participant).

Overall, avoidance of the "status conversation" was prevalent in both HIV positive and HIV negative participants.

STIGMA

Another salient theme that developed from the interviews was that of stigma, both in general towards LGBT people and towards HIV positive people. One of the groups described its origin from a sense of uneasiness with HIV positive people:

> But is that *skeeve* [repellant] thing again, there are a lot of guys that I meet that I tell…and they're well versed [on HIV knowledge]…but yet, when it comes down to it, it's that thing that...."OMG I just can't do it." I don't know that if I were negative, if I met a guy that was online, if he was positive....I don't know if I would have sex with him... I don't think I would...and I'm ashamed to say that. And I don't know why I feel that way... (positive participant).

This sense of uneasiness was shared by many of the participants and seems to be especially prominent among the HIV positive groups. Another positive participant shared his struggle:

> I'm actively seeking to be a very different person than the person who I was when I contracted HIV. And that's part of the reason why I have trouble conversing with potential partners. I got it by sticking a needle in my arm while having tawdry sex in San Francisco. Having that open dialogue with a person doesn't make me sound very normal. So I wouldn't expect a reaction from someone to be "Oh, if I haven't gotten to know you and saw that you were normal"....my past probably would frighten a lot of people, it frightens me when I think about it now. I'm not, by any means proud or pleased with how I've spent the past 5-6 years of my life. So I'm coming to terms with all of that in addition of coming to terms with the fact that

I'm HIV positive and trying to change the direction of my life (positive participant).

The sense of shame about past behaviors and fear of rejection was present in all of the HIV positive groups. The assumptions about how a person contracted the disease and the possible negative repercussions that accompany it stigmatize these men. For this reason, many of them wait until later in the courtship to reveal their HIV status, which is best described by this participant:

There are also people who are positive and they want to clarify how they got it. Oh yeah, I was in a long term relationship and he [cheated] that's how I got it...they make it into this blaming...thing so they are not seen as this "raging prostitute" (positive participant).

Two participants in the positive group concurred with this opinion and described the type of stigma they see:

Participant Q: I think people place judgment on HIV people. They place judgment saying "well, what type of person are you to get HIV? How did you get that?
what did you do?"

Participant R: It's like the mind starts going imagining the situation of how they contracted the disease and how they could even to this day continue to do that (positive participants).

Some groups commented on the perceived ignorance of the younger generation of gay men who have the wrong idea of what an HIV positive person looks like and their true risk for HIV infection:

> There is also a misconception of what a person with HIV looks like. Often times they assume that if you look strong and healthy that you obviously don't have HIV, so you're clear to have sex with them. Because the only people with HIV are wasting and are sick (positive participant).

This outdated view of people with HIV seemed to enhance the negative reactions people received when they disclosed their positive status to negative partners. This negative reaction created a greater level of stigma, which ultimately led to a general trend to avoid these disclosure conversations.

UNDETECTABLE STATUS

The theme of having extremely low viral loads, also known as being "undetectable", came up several times during our discussions. This "new HIV status" seemed to enhance people's rationalizing of risk taking behaviors:

> Participant A: You know what scares me the most? What I see really prevalent these days more than I've ever seen are people who are undetectable…that frightens me, because in their mindset they feel that they are not positive. They truly do, I've asked people…I'm good I'm fine, oh so you're negative, well yeah no…
>
> Participant B: [sarcastically] "I'm undetectable"

Participant A: and…no are you [positive] or not. I'm not one of those in the gray areas its either a yes or a no, and I find that coming up more and more, "well I'm undetectable." So then you're positive, but you're just in a good place. I say which I'm happy for you, but I said there's no difference you c*** inside me, I'll still get it. It's possible you can still transmit (negative participants).

This dialogue encapsulates the way in which people present their undetectable status and rationalize risky behaviors. One participant mentioned that the undetectable status has also increased on a number of websites:

People in those websites now have the option of saying, instead of positive, undetectable...and that bothers me because I know a lot of people that say they are undetectable and ...they could be... but I've also spent 3 to 4 days with them and the only drugs that I've seen them put into their bodies are done recreationally…(positive participant).

Even for undetectable men engaging in risky behaviors the easier alternative was to pretend to be negative since the stigma associated with an HIV diagnosis is still clearly present:

In Chicago there were so many guys that were like "you f*** raw?" ok, yeah I'm undetectable, healthy...here's the information...yeah I do. And then next thing is like "yeah, oh no I'm sorry" and then…do you really think that the next guy who tells you "oh I'm negative and you can come to my house in the next five minutes and f*** me raw" is negative?! (positive participant).

This new type of status gives a false sense of security to HIV positive individuals which in turn transmit this information to potential sexual partners. "I know someone who was going around saying that because he was undetectable, he couldn't pass the virus around...so he wasn't disclosing his status with anyone" (positive participant).

HIV AS A CHRONIC DISEASE
Another reason the prevalence of high risk behaviors was brought up included a sense of hopelessness for some negative members of the community because of on the high incidence and prevalence of HIV within their social networks. This was expressed by an HIV positive participant: "some people feel that eventually it's going to happen to them, since so many of their friends have it, they don't take steps and measurements to prevent it" (positive participant). This is also rationalized with the fact that many do not see it as a fatal disease anymore and know there are treatments for the disease. A positive participant explained: "I don't know if they're afraid of ever contracting HIV but they know they eventually will so they put themselves in that situation just to get it over with and say 'OK, I'm done...I know how to take care of it'" (positive participant). Some of the participants reported that this disregard for safety is problematic because people with HIV positive friends would willingly put themselves in situations that would increase their risk of contracting HIV in order to fit in with the rest of their friends.

> …what you said, it's not a death sentence...I find that a double edge sword. Because thirty years ago it was a death sentence, everyone saw it that way. These kids aren't seeing it that way, they think it's nothing. I've been hearing for the last three years "oh I can just take a pill, it's nothing " (positive participant).

.

The idea of HIV positive people as educators of the rest of the LGBT community came up frequently in the HIV positive groups:

> *Participant A:* Well, don't you feel like when you meet a negative guy you need to spend some time explaining it to them?
>
> *Participant B:* Yeah, of course! It's what I've had to do several times....and it's exhausting...but then I feel like I've done my part as a gay HIV positive citizen of America...but at the same time it's exhausting to try to educate and bring them to the realization that it is what it is, it's not a death sentence.
>
> (positive participants).

However, this can also be seen as a negative aspect of gay culture:

> Unfortunately, I think a lot of people who are positive are the ones who are educating the negative people, so if they are not educated correctly they are passing one a lot of this "well it's just one pill" sort of idea rather than all the stigma that you have to go through, all the testing that you have to go through, all the mental anguish that you have to go through...the idea of having to take this medication everyday for the rest of your life, there's the cost of the medication…there's a lot of stuff that's like "oh no, it's ok, I'm still normal...I just have to take a pill every night" So I think that's where a lot of this misconception [happens] (positive participant).

This simplified idea of HIV as a somewhat benign chronic disease was debated by some of the HIV positive participants, with explicit concern for this new trend and the danger with oversimplification:

Participant A: What I think I've heard is most people saying "it's not a death sentence anymore" even though I was already positive, they tell that to other people too and they'll be like "yeah, it's not a death sentence!"

Participant B: Some people just got lax with being HIV positive, they're like "it's not that big of a deal, I just take one pill at night and ....I'm undetectable....I'm healthy...

Participant C: Yeah, you just hear on the media all the time "it's a manageable disease just like diabetes" (positive participants).

At the same time, others participants warned against hiding the fact that with new treatments available, HIV is no longer the catastrophic terminal illness it once was and that there is hope out there:

…guess what kids…so many worse things are absolutely going to happen in your lives, worse things than finding out in 2013 that you're HIV positive. The only way this is going to be a horrible pain for you is if you don't get tested, you don't take your meds, you don't do what you're supposed to do to keep yourself healthy. That's the message we need to give to people, not morally police them (positive participant).

Still, others felt strongly that portraying HIV as a chronic disease sends an incomplete message about the disease. Rather, they felt that HIV remains prevalent and that this oversimplification does not cover the basic reality of what it is like to live with this diagnosis:

> Just because it is medically manageable does not mean that it's emotionally manageable...does not mean that is psychologically manageable. I mean yeah I can come here every month or three months and get a bottle of pills that will make it physically manageable for my body but none of those pills make it easy to deal with (positive participant).

PREVENTION INNOVATIONS

MESSAGE CONTENT

The tone of prevention messages was a point of contention during the groups' discussion, with some advocating for "scare tactics" such as the ones employed in anti-smoking campaigns while others explicitly calling for a more positive message. Here is what a positive participant expressed:

> Let them hear what it's really like...it's a pain in the ass to have to take all these pills, but as a young person who takes his medications and does what he's supposed to do, you know ten years later, I'm really not all the worst for it. So what, should I scare them and make up some s**t tell them that my mother sits around and cries, it's not true, none of it is (positive participant).

Many found a link between the negative messages and stigma against HIV positive people:

> I'm having a problem with the messages we're putting out there because we're perpetuating a state of fear...I thought I was going to die tomorrow, but you know you can actually have a normal life expectancy...where does it say that? It's

driving me crazy that we're perpetuating [stigma], like how the fear of homosexuality used to be in the 80s (positive participant).

This fear of stigma was prevalent in both HIV positive and negative groups. Participants agreed that scare tactics against HIV infection had failed and that new messages with a more positive nature are better received. "I think maybe we've done the scare tactic for a long time, I think that maybe it's time that we start changing how we start educating" (positive participant).

BEST STRATEGIES

Each group was asked about ways to improve HIV testing rates and stop the increasing HIV infections in the MSM community. The difficult task of behavioral modification seemed daunting to many participants and simply unrealistic. Instead they suggested a more direct and realistic approach:

I just don't believe that we're going to solve this problem by convincing everyone to modify their behaviors, [it] is never going to happen. Gay men are going to think with their d***s, they're going to have sex with way more people than straight people do...no matter what the doctor says, no matter what the TV says, no matter what happens...and they can be either scared and self-loathing about themselves...or they can just get the information that's given to them, and go get tested and get treated and deal with the fact that their lives are going to be different now (positive participant).

Others advocated for simply changing the way in which we talk about HIV within our community. A lot of participants mentioned that talking about the subject in a serious

manner was not part of the norm and not socially acceptable. For instance, one of the negative participants theorized what would happen if he were to post a status on a social media site related to HIV testing: "but I think if you put a post saying I just got tested, I think that would scare people" (negative participant). The way in which to make it "okay" to have this conversation, according to one of the positive participants, is saturation:

> Honestly, we have a safety net in our community and we do reach out on within our community so obviously having these conversations on the gay sites, on the gay websites, on any type of gay forum...how do we make it acceptable to have those conversations (positive participant).

This is especially true with groups of gay men hiding their sexual identity but still engaging in risky behavior with other men, sometimes referred to as being on the "down low."

> But its' a gay message…for a while I was only having sex with guys were in the closet or were married or had kids, had girlfriends whatever…so they don't get tested. They're not going to go to the Hartford gay and lesbian club and get a f*** HIV test. They're not going to do it…they're not going to go to their doctor's office and say: 'hey can you test me for HIV because I had sex with a man.' They're going to be like oh I'm just here for my physical…I'm putting myself at risk by having sex with these married men (negative participant).

Men on the down low do not consider themselves to be part of the gay community; therefore most outreach efforts targeting gay men fail to successfully reach them.

Another issue found with our current messages is that it focuses too specifically on HIV, as one positive participant mentioned: "It's not so much about HIV but HIV and STDs, so you're not marketing just HIV because some might just assume that 'you know, I don't really fit any of these risk categories, but you throw STDs into it and everyone is at risk for something" (positive participant). This was found as a way to broaden the appeal of the message so that all MSM react to behavioral interventions aimed at risk reduction.

USE OF TECHNOLOGY IN PREVENTION
The link between technology use and prevention strategies was carefully explored during the group discussions, and several technology tactics came forth. First, the participants made it clear that current prevention messaging through popular gay websites do not have the far reaching effect they intended. One negative participant commented on a mass email about HIV testing sent by one of these websites: "I'll be honest I've never read that email and I'm pretty sure that unless you've had a recent risky behavior you probably have not looked at those emails. They are easy to delete. So, again people who participate in risky behaviors are the ones that are suddenly interested in finding out about testing" (negative participant). Participants felt similarly towards group messages sent via mobile apps, describing them as poorly orchestrated efforts.

Many participants stated that an individualized message within a given social network would be the most effective way to change behaviors within that network. The more personal the message the better:

> Texting is more effective than emailing. Calling is more effective than texting. The only way that we really get through to people is by talking with them face to

face. I think this is generally applicable and that by far the most effective way would be to talk to somebody (negative participant).

Participants understood that personal messages had a more profound effect than any behavior campaign out there:

> One of my friends just recently became HIV positive, and he's a close friend of mine…and I'm like oh crap it can happen to anyone. So that's when [it] lit a fire under my ass. Be more safe go get tested. It has to hit you at home, because if it doesn't no one is going to care. These little 17-18 year olds that are going to a club…they're not going to care (negative participant).

Several other participants related similar ideas, expressing the power of message communication within their social networks as greater influencers in shaping their behaviors.

Many participants showed hesitation to reach out to others directly because of privacy concerns. For example, this is what a participant said about making his Facebook posts private:

> For me personally, I'm too lazy to do that. I'm just going to be blunt. I'd rather go through my phone list and message those [rather] than create a group. That's my own personal preference. If someone put me in one of those groups and I felt comfortable with everybody in there I would, but when I have different people from various walks of life, family and what not, I wouldn't feel comfortable doing that piece of my personal life (positive participant).

The overlap of social networks and possible breach of privacy through technology appeared daunting for some participants. However, they had some ideas on how to resolve the issue--masking it. They suggested embedding the prevention message in to something that would not only be more appealing but also more attractive to the intended audience:

> If you were to do something that is masked...that somehow can [engage others in] the education of different topics, like transmission, and risk activities, and mask it like some kind of survey where like..."oh your friend took this survey and failed, why don't you see if you pass it"...and it can kind of go viral (positive participant).

Using this strategy would open the doors for people to more widely share this type of content. Participants also mentioned the need for wide broadcasting of the message through multiple types of media: "I do have a Facebook and Twitter account which I don't even know really how to use, but I feel like the message needs to be broadcast among all channels of media, not just social media...you know radio, TV...often and frequent too" (positive participant). Saturation and variety would increase the likelihood of reaching the target audience and increasing the message's impact.

DISCUSSION

There are many applicable lessons that can be extracted from our data about approaches to prevention in this new technological era. Compartmentalization of gay networks, which has been previously observed in the literature (26), is an important theme because it both affects the way in which interventions are targeted and how wide the prevention message can travel within a given network. Young people's preference for newer

technologies has been previously described in the literature (27, 28) and correlates well with the observed differences in technology use by age and HIV status in MSM. The theme of social media etiquette must be carefully evaluated as it can jeopardize future interventions by violating the unwritten rules of a given platform and decreasing user participation. Disclosure of HIV status in social networking platforms is precluded by fear and stigma associated with the disease (29). There were only few platforms which allowed for HIV status disclosure in online profiles, but in general the disclosure conversation was avoided altogether. This data is consistent with studies showing high rates of partial to complete non-disclosure to new sexual partners by HIV positive individuals (30).

HIV as a chronic disease and an undetectable HIV status were prominent themes in our results. These messages are readily transmitted through electronic social media while meeting new sexual partners in an effort to minimize the stigma associated with their HIV status. Studies show a reported undetectable status is correlated with increased sexual risk taking (31). At the same time, complacency with HIV/AIDS by infected individuals due to effective treatments has been correlated with increased number of sexual partners, greater rates of unprotected anal intercourse with partners of unknown or positive HIV status, and greater risk of acquiring HIV (32). These ideas are transmitted through social media and lead to risk underestimation by negative MSM. This highlights the need for accurate messages to permeate these networks. Our results show that most participants would prefer campaigns with a more optimistic approach using humor and innovation. Other qualitative studies describe similar preferences for upbeat and positive

messages by MSM (33). Many participants feared that a negative message would augment to the discrimination and stigma HIV positive individuals already face.

Participants were quick to point out the poor reception to mass produced messages and emails found in many gay themed sites. They looked at these efforts as poorly thought out and ineffective. All groups recognized the importance of personalized messages and the correlated increase in message effectiveness. Concurrently, a deep concern for privacy remained as the primary obstacle for any intervention employing SNTs. The issue of privacy with online interventions has been raised in several studies, each providing creative solutions but ultimately avoiding involvement with the participant's personal SNTs (21, 34, 35). Protection of confidentiality was recognized as the single biggest obstacle against prevention efforts within social networking technologies. Without assurances about anonymity, most of the participants expressed great reluctance in transmitting messages related to HIV awareness and prevention. Participants also advised to go beyond self-identified gay populations and increase outreach to closeted individuals engaging in risky behaviors as an imperative part of any intervention. For this reason, technology platforms used to find sexual partners are ideal to reach this population. A multimedia approach was also suggested and is supported by other studies (36).

CONSIDERATIONS FOR FUTURE INTERVENTIONS

The resulting themes from this study show many relevant lessons that should be implemented when developing a behavioral intervention using SNTs targeting MSM. We propose an approach that systematically touches on the domains of social networks, technology practices, HIV knowledge and communication, and prevention (see Figure 2).

This allows for much needed continuity and flow of ideas to promote the development of the most optimal prevention strategy possible. It starts with social networks, exploring their composition and main communication avenues. This is where issues regarding network compartmentalization and concerns for privacy must be explored and addressed. Next, technology practices should be carefully considered emphasizing how one's social network communicates and expands using technology tools. Adopting popular SNTs depending on the population (e.g. young, HIV negative, etc.) will dictate how the intervention should tailor their message in order to abide by social media etiquette and gain the most user acceptability possible. Subsequently, programs must integrate HIV communication using the SNTs chosen for the intervention, always addressing concerns for privacy and stigma. Awareness of an undetectable HIV status as well as misconceptions regarding the simplification of HIV as a chronic disease must guide future interventions to ensure the elucidation of such ideas for optimal study results. Lastly, all of these elements must be implemented into a final prevention strategy which guides our interventions and allows messages that have a greater chance of reaching people within a given network using far reaching SNTs. We propose the use of theory of diffusion of innovation for such an intervention.
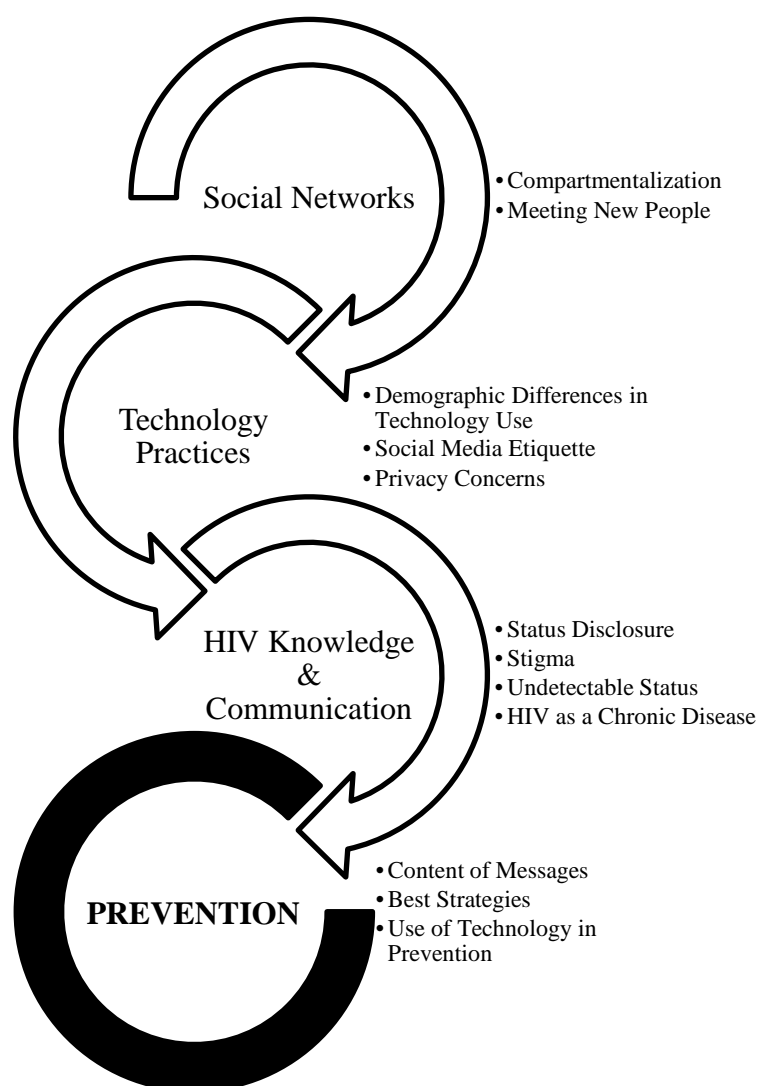
FIGURE 2: RECOMMENDED INTERVENTION DEVELOPMENT

Diffusion of innovation theory suggests that early adopters, who make up a relatively small segment of the population, need to initiate a new behavior for it to spread throughout the population (24). Diffusion of innovation is the process by which an innovation is communicated through certain channels over time among the members of a social system. An innovation is an idea, practice, or object perceived as new by an individual or other unit of adoption (37). This makes it an ideal theoretical model for this

type of intervention as it would employ early adopters with wide access to a given social network in disseminating messages about HIV testing and prevention.

Our model uses an approach created specifically for MSM populations that takes into consideration unique aspects of their culture and circumstances within society as a stigmatized population that suffers from vast health disparities. Currently there are only a handful of interventions that have used SNTs for behavioral change. Most trials using social networking sites like Facebook have faced problems with retention and decreased efficacy longitudinally, but demonstrated great promise for future interventions if the barriers of privacy and retention are addressed (15, 22). To our knowledge, this is the only study that examines the use of SNTs by HIV status and their use in behavioral programs.

CONCLUSION

Social networking technologies have the potential to be effective tools for behavioral interventions. Their wide and exponentially use make them ideal tools for far reaching prevention programs. Understanding how target populations adopt these new technologies and use them is crucial as new behavioral interventions are created. We learned that HIV positive and HIV negative men are both high technology users. SNTs are a primary tool by which they meet new sexual partners and expand their networks. The prevalence of stigma towards LGBT individuals and HIV are the main obstacles in prevention efforts. The lack of anonymity and privacy are the main factors which impede the transmitting of potential HIV prevention messages through a given social network. A positive and upbeat message is more likely to resonate with the intended populations. Using SNTs that are used to meet sexual partners is ideal for reaching out to most MSM,

whether they self-identify as gay or not. Finally, personal messages that involve an individual's entire social network and are able to be disseminated freely across all sub-groups would be the most effective.

REFERENCES

1. Purcell, D.W., Johnson, C.H., Lansky, A., Prejean, J., Stein, R., Denning, P., Gau, Z., Weinstock, H., Su, J., and Crepaz, N. 2012. Suppl 1: Estimating the Population Size of Men Who Have Sex with Men in the United States to Obtain HIV and Syphilis Rates. *The open AIDS journal* **6**:98.

2. Centers for Disease Control and Prevention. 2012. HIV in the United States: at a glance. *Atlanta: Centers for Disease Control and Prevention*.

3. Beyrer, C., Baral, S.D., van Griensven, F., Goodreau, S.M., Chariyalertsak, S., Wirtz, A.L., and Brookmeyer, R. 2012. Global epidemiology of HIV infection in men who have sex with men. *The Lancet*.

4. Centers for Disease Control and Prevention. 2010. HIV surveillance in men who have sex with men. *Atlanta: Centers for Disease Control and Prevention*.

5. Centers for Disease Control and Prevention. 2010. HIV surveillance in adolescents and young adults. *Atlanta: Centers for Disease Control and Prevention*.

6. Koblin, B.A., Husnik, M.J., Colfax, G., Huang, Y., Madison, M., Mayer, K., Barresi, P.J., Coates, T.J., Chesney, M.A., and Buchbinder, S. 2006. Risk factors for HIV infection among men who have sex with men. *AIDS* **20**:731-739.

7. Gunawardena, C.N., Hermans, M.B., Sanchez, D., Richmond, C., Bohley, M., and Tuttle, R. 2009. A theoretical framework for building online communities of practice with social networking tools. *Educational Media International* **46**:3-16.

8. Chernis, A. 2012. DMA 2012 Statistical Fact Book: The Definitive Source for Direct Marketing Benchmarks.

9. Zickuhr, K., and Smith, A. 2012. Digital differences. *Pew Internet & American Life Project*.

10. Community Marketing Inc. 2009. Gay & Lesbian Consumer Index Study: American Report.

11. Community Marketing Inc. 2013. LGBT Community Survey: U.S. Overview Report. **7**.

12. Grov, C., and Crow, T. Attitudes about and HIV risk related to the "most common place" MSM meet their sex partners: comparing men from bathhouses, bars/clubs, and Craigslist.org.

13. Landovitz, R.J., Tseng, C., Weissman, M., Haymer, M., Mendenhall, B., Rogers, K., Veniegas, R., Gorbach, P.M., Reback, C.J., and Shoptaw, S. 2013. Epidemiology, sexual risk behavior, and HIV prevention practices of men who have sex with men using GRINDR in Los Angeles, California. *Journal of Urban Health* **90**:729-739.

14. Rendina, H.J., Jimenez, R.H., Grov, C., Ventuneac, A., and Parsons, J.T. 2014. Patterns of lifetime and recent HIV testing among men who have sex with men in New York city who use Grindr. *AIDS and Behavior* **18**:41-49.

15. Young, S.D., Szekeres, G., and Coates, T. 2013. The Relationship between Online Social Networking and Sexual Risk Behaviors among Men Who Have Sex with Men (MSM). *PloS one* **8**:e62271.

16. Downing Jr, M.J., Schrimshaw, E.W., Antebi, N., and Siegel, K. 2013. Sexually Explicit Media on the Internet: A Content Analysis of Sexual Behaviors, Risk, and Media Characteristics in Gay Male Adult Videos. *Arch. Sex. Behav.*:1-11.

17. Interactive, H. 2008. *Gays, lesbians and bisexuals lead in usage of online social networks.2007*.

18. Noar, S.M., and Willoughby, J.F. 2012. eHealth interventions for HIV prevention. *AIDS Care* **24**:945-952.

19. Gold, J., Pedrana, A.E., Sacks-Davis, R., Hellard, M.E., Chang, S., Howard, S., Keogh, L., Hocking, J.S., and Stoove, M.A. 2011. A systematic examination of the use of online social networking sites for sexual health promotion. *BMC Public Health* **11**:583.

20. Herbst, J.H., Sherba, R.T., Crepaz, N., DeLuca, J.B., Zohrabyan, L., Stall, R.D., and Lyles, C.M. 2005. A meta-analytic review of HIV behavioral interventions for reducing sexual risk behavior of men who have sex with men. *JAIDS J. Acquired Immune Defic. Syndromes* **39**:228-241.

21. Young, S.D., Cumberland, W.G., Lee, S., Jaganath, D., Szekeres, G., and Coates, T. 2013. Social Networking Technologies as an Emerging Tool for HIV PreventionA Cluster Randomized Trial. *Ann. Intern. Med.* **159**:318-324.

22. Bull, S.S., Levine, D.K., Black, S.R., Schmiege, S.J., and Santelli, J. 2012. Social media–delivered sexual health intervention: a cluster randomized controlled trial. *Am. J. Prev. Med.* **43**:467-474.

23. Strauss, A., and Corbin, J. 1994. Grounded theory methodology. *Handbook of qualitative research*:273-285.

24. Stacks, D.W., and Salwen, M.B. 2008. *An integrated approach to communication theory and research.* Routledge.

25. Thomas, D.R. 2006. A general inductive approach for analyzing qualitative evaluation data. *American journal of evaluation* **27**:237-246.

26. Rosenmann, A., and Safir, M.P. 2007. Gay identity nonendorsement and the role of dissociative characteristics in a culturally diverse online sample of men who have sex with men. *Sexuality Research & Social Policy* **4**:18-26.

27. Delli Carpini, M.X. 2000. Gen. com: Youth, civic engagement, and the new information environment. *Political communication* **17**:341-349.

28. Bachmann, I., Kaufhold, K., Lewis, S.C., and Gil de Zuniga, H. 2010. News platform preference: Advancing the effects of age and media consumption on political participation. *International Journal of Internet Science* **5**:34-47.

29. Derlega, V.J., Winstead, B.A., Greene, K., Serovich, J., and Elwood, W.N. 2004. Reasons for HIV disclosure/nondisclosure in close relationships: testing a model of HIV–disclosure decision making. *Journal of Social and Clinical Psychology* **23**:747-767.

30. Parsons, J.T., Schrimshaw, E.W., Bimbi, D.S., Wolitski, R.J., Gómez, C.A., and Halkitis, P.N. 2005. Consistent, inconsistent, and non-disclosure to casual sexual partners among HIV-seropositive gay and bisexual men. *AIDS* **19**:S87-S97.

31. Van de Ven, P., Mao, L., Fogarty, A., Rawstorne, P., Crawford, J., Prestage, G., Grulich, A., Kaldor, J., and Kippax, S. 2005. Undetectable viral load is associated with sexual risk taking in HIV serodiscordant gay couples in Sydney. *AIDS* **19**:179-184.

32. MacKellar, D.A., Hou, S.I., Whalen, C.C., Samuelsen, K., Valleroy, L.A., Secura, G.M., Behel, S., Bingham, T., Celentano, D.D., Koblin, B.A. et al. 2011. HIV/AIDS complacency and HIV infection among young men who have sex with men, and the race-specific influence of underlying HAART beliefs. *Sex. Transm. Dis.* **38**:755-763.

33. Blas, M.M., Menacho, L.A., Alva, I.E., Cabello, R., and Orellana, E.R. 2013. Motivating men who have sex with men to get tested for HIV through the Internet and mobile phones: a qualitative study. *PloS one* **8**.

34. Pachankis, J.E., Lelutiu-Weinberger, C., Golub, S.A., and Parsons, J.T. 2013. Developing an Online Health Intervention for Young Gay and Bisexual Men. *AIDS and Behavior*:1-13.

35. Pedrana, A., Hellard, M., Gold, J., Ata, N., Chang, S., Howard, S., Asselin, J., Ilic, O., Batrouney, C., and Stoove, M. 2013. Queer as F**k: reaching and engaging gay men in sexual health promotion through social networking sites. *J. Med. Internet Res.* **15**:e25.

36. Kingdon, M.J., Storholm, E.D., Halkitis, P.N., Jones, D.C., Moeller, R.W., Siconolfi, D., and Solomon, T.M. 2013. Targeting HIV prevention messaging to a new generation of gay, bisexual, and other young men who have sex with men. *J. Health Commun.* **18**:325-342.

37. Rogers, E. 2003. Diffusion of Innovations. *Diffusion of innovations* **5**.

APPENDIX

Appendix A: Original Interview Schedule for Focus Groups

Introduction: Hello and welcome. My name is Tom Kidder. I am a Clinical Social Worker working for the CIRCLE CARE CENTER with Dr. Gary Blick. This is Jorge Ramallo from Yale. We are coordinating an outreach project with CIRA (The Center for Interdisciplinary Research on AIDS at Yale) and the Yale School of Public Health. Thank you very much for agreeing to attend the focus group. We appreciate your contribution.

I would like to go around the room and have everyone introduce themselves and the town that you live in. Jorge will record your initials so that we can refer back to our notes for accuracy.

The purpose of the focus group is to learn more about what you think about HIV, HIV risk behaviors and transmission, HIV testing and knowing one's HIV status, the stigma associated with HIV and the reluctance to get tested and engage in care services.

We especially hope to learn more about how the social messages about HIV, personal safety, testing and care can be improved and communicated through a variety of social technologies so that individuals who are unaware of their HIV status and those who are aware of their positive status and afraid of engaging in care will be motivated to get tested and engage in care.

So I will ask questions to the entire group about relationships, HIV risk behaviors and prevention practices, HIV transmission, HIV testing, HIV stigma and fear of disclosure and, HIV care. The questions are very general and do not require any of you to share personal or sensitive information about yourself or your relationships. I want to encourage you all to participate and answer the questions to the best of your knowledge and, know that you may refuse to respond to any question at any time. Your responses are very important because they will help us to create the messages that will be used in the social technology outreach project to inform others about HIV and to motivate them to come in for free testing. Your input is extremely valuable for this project and important to the community that we will be texting, tweeting, and communicating with through a variety of social technologies. At the end of this focus group session, you will receive $30.00 for your participation (tonight). The focus group will last an hour to an hour and a half.

> **Note to Facilitators: [***Some of the questions will have a facilitator note about probing. <u>Only use probing if the participants do not respond to the questions or do not seem to understand the question. Probing should not be used for initiating responses from participants.</u>***]

FOCUS GROUP QUESTIONS: I will ask you questions about how you communicate with your friends and social networks. We encourage open sharing. There is no penalty for not responding to a particular question. We will be recording this focus group so that we can accurately refer to your responses when we develop our social messages. **All of your responses will be kept confidential.** We will **only** use the content of your shared ideas, beliefs and experiences to develop social messages for our outreach project. We thank you for your open, honest and insightful participation.

Does anyone have any questions?

> [*Facilitator Note: Pause 5 seconds to give time for any questions*.]

If there are no [more] questions, we will get started.

TRANSITION First I will ask about social networks.

A social network is a collection of the people, friends, and family that are the core group you interact with, give and receive support from, hang out and communicate with. Each of us has one or more social networks which may or may not overlap-with some people in common.

1. About how many people do you talk to regularly (3 or more times a week)?
    a. Who do you talk with regularly?
2. How many of these people are family members (mother, father, brother, sister, cousin, etc)
    a. How many are friends (of no relation)? Co-workers
3. Are these people similar or different than you? Men vs. Women?
    a. Are they similar ages?
    b. Sexual orientation?
4. Are there people you do certain things with and others that you don't?
    a. Why?
5. Do people in your network like each other?
    a. Why or why not?
    b. How does that influence the way you interact with your network?

TRANSITION: Now I ask you about your internet use.

6. Internet use has increased over the past decade,
    a. what are some of the most common things you use the internet for?

7. Now there are many online social network websites or apps that you can use,
    a. which ones do you use?
    b. Why do you use these social network platforms?

8. How do you currently use your phone to communicate with your social network (e.g., how, when, with who)?
    a. How do you use text messaging to communicate with your network?
    b. Do you have any applications you use to communicate with your network or interact with people?

TRANSITION:Now I will ask you about relationship.

9. Describe how you seek relationships.
10. Describe how you communicate with potential partners.
    a. What do you talk about with potential partners?
11. Describe how you communicate with your friends?
    a. What do you communicate with your friends about?

Transition: Now I will ask you about your communication about risk behavior.

12. What are the messages that you hear about HIV prevention?
13. What are the messages you hear about HIV testing?
14. Describe what gay men understand/believe about HIV transmission?
15. What messages about HIV, prevention and transmission would you propose communicating with members of your social network?
16. How would you suggest delivering messages about HIV, prevention and transmission?

17. What would prevent you from communicating about HIV, prevention,   and transmission using social network websites or apps?
17. Which social network platform would you use to deliver messages about HIV, prevention and transmission?
18. How should those messages be different for different social network platforms (e.g., Twitter, Facebook, text messages, GRINDR)
19. Describe how the fear of HIV disclosure affects decisions about communication in relationships.
20.   What other messages do you believe gay men need to hear with regard to HIV, prevention, testing and care? Would anyone like to share any final thoughts before we close our focus group?
21. In order to make our HIV testing message more appealing we might want to address broader topic that are of interest for all men who have sex with men.
    a.   What topics would draw their attention the most?
22. If instead of HIV testing we focused on broader men's health message, what topics within men's health would be most interesting or appealing for this audience.

Closing: Thank you so much for participating in this focus group. Your responses to the questions were great. This concludes the group. We will be conducting several more focus groups like this one in the next few weeks. Your insight and feedback will be extremely helpful in the development of messages about HIV and testing to be delivered to gay men and others through a variety of social technologies like Facebook, Twitter and email.

Does anyone have any questions?

If there are no further questions, please do not leave before we give you your stipend for participating. Thank you.

Appendix B: Facebook Group Event Page