

Antiviral Marketing: The Informationalization of HIV Prevention

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ABSTRACT

Background Leveraging the affordances of technology to enhance human immunodeficiency virus (HIV) prevention efforts has become an increasing public health priority. Grounded in a case study examining the role of networked information technologies in reshaping the HIV prevention landscape for gay men in San Francisco and Vancouver, this article proposes that HIV prevention has become informationalized.

Analysis The informationalization of HIV prevention is a convergent and participatory process where networked information technologies not only mediate but also produce HIV risk subjectivities, discourses, and practices in ambivalent ways.

Conclusion and implications This article argues that although informationalization creates many important opportunities to revitalize HIV prevention, the binary logic of data and code can unwittingly reproduce hierarchies of guilt/innocence and perpetrator/victim that pose challenges for community-based HIV advocacy efforts.

Keywords Network society; HIV prevention; Cultural studies; Promotional culture; Critical studies of health

RÉSUMÉ

Contexte L'utilisation des dernières technologies pour contrer le virus de l'immunodéficience humaine (VIH) est devenue de plus en plus prioritaire en santé publique. Cet article se fonde sur une étude de cas portant sur comment les technologies de l'information en réseau ont modifié la prévention du VIH parmi les hommes gais à San Francisco et Vancouver. L'étude suggère que dans ces circonstances la prévention du VIH est devenue informationnalisée.

Analyse Cette informationnalisation est un processus convergent et participatif où les réseaux informationnels ne font pas que transmettre les subjectivités, pratiques et discours relatifs au risque du VIH mais aussi produisent ceux-ci de manières ambivalentes.

Conclusions et implications Cet article soutient que, bien que l'informationnalisation crée de nombreuses occasions pour améliorer la prévention du VIH, la logique binaire de « données » et « codes » peut par inadvertance reproduire certaines hiérarchies (culpabilité/innocence, agresseur/victime) qui entravent les efforts de la communauté pour prévenir le VIH.

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Mots clés *Société en réseaux; Prévention du VIH; Études culturelles; Culture de la promotion; Études critiques de la santé*

Introduction

We are living in interesting scientific times when it comes to human immunodeficiency virus (HIV) prevention. Over the past decade, advances in HIV treatment and care mean that an HIV diagnosis is no longer an automatic death sentence but a manageable condition for many. Although poverty, racism, mental health, and substance use play a significant role in shaping outcomes, those able to adhere to medication and receive quality care can now expect to live well into their senior years. This has also boded well for their sex lives, particularly for people living with HIV who become virally suppressed (also known as “undetectability” or “being undetectable”)—which occurs when a person’s adherence to anti-retrovirals has lowered the level of HIV in the body to the point that the chance of transmission during condomless intercourse is effectively zero (Cairns, 2014).¹ These biomedical changes also have implications at the population and policy level. Cities such as Vancouver and San Francisco have worked to scale up access to advanced HIV testing technologies and Treatment as Prevention (TasP), encouraging newly diagnosed people to begin treatment immediately (as opposed to the previous practice of waiting until someone becomes immunocompromised). The goal of these efforts is to reduce the time between seroconversion, diagnosis, and linkage to care.

There is also good news for seronegative people. Studies have shown that anti-retrovirals can also be used to prevent HIV transmission. Although this has long been the case for those seeking emergency post-exposure prophylaxis (PEP) after an occupational exposure or episode of condomless intercourse, pre-exposure prophylaxis (PrEP) is now available and often subsidized for groups disproportionately affected by HIV—such as men who have sex with men, trans women, and Indigenous peoples. Barriers to access, adherence issues, and occasional failures may limit PrEP’s ability to fully stem the tide of the epidemic (though some researchers do attribute gay men’s declining rates of HIV to this innovation), but it has nevertheless helped individuals from disproportionately affected groups reclaim some of the joys of sex stolen from them by the AIDS epidemic.

For gay men in particular, these biomedical changes have occurred against the backdrop of another important technoscientific development: the rise of digitally networked sexuality (Campbell, 2004; Mowlabocus, 2010). While gay men have always found creative ways to leverage communication technologies for intimate purposes (see Duyves, 1993; Meeker, 2004), there is no question that the proliferation of gay chat rooms, websites, and location-based dating apps over the last 25 years has made gay men’s sexual cultures more visible and accessible (for a review, see Grov, Breslow, Newcomb, Rosenberger & Bauermeister, 2014). This legibility has been somewhat ambivalent for gay men, as the potential benefits it bestows to users (e.g., privacy through pseudo-anonymity, enhanced access to a greater pool of sexual partners, the decentralization of intimate sociability, uncensored communication) can also subject them to greater surveillance and scrutiny. This is particularly evident when it comes to sexual

health, with some early public health and media reports characterizing sexual networking platforms as potential risk environments for sexually transmitted infections (STIs) (e.g., Confessore, 2005; Klausner, Wolf, Fisher-Ponce, Zolt & Katz, 2000; McFarlane, Bull & Reitmeijer, 2000). Research suggesting that gay men who seek sex online tend to have more sex partners and engage in higher-risk activities than men who seek sex in analogue ways positions users and behaviours as needing public health intervention. While the evidence is by no means conclusive—contradictory findings suggest that gay men who seek high-risk sex do so regardless of venue (e.g., Bolding, Davis, Hart, Sherr & Elford, 2005; Chiasson, Hirschfield, Remien, Humberstone, Wong & Wolitski, 2007; Garofalo, Herrick, Mustanski & Donenberg, 2007; Horvath, Rosser & Remafedi, 2008)—most researchers in the field will agree that the internet can play an important role in *supporting* HIV prevention (e.g., Holloway, Rice, Gibbs, Winetrobe, Dunlap & Rhoades, 2014; Rosenberger, Reece, Novak & Mayer, 2011; Sullivan, Grey & Rosser, 2014). The very affordances that some argue may *confer* HIV risk— anonymity, accessibility, and affordability (Cooper, 1998)—may also play a vital role in *reducing* it.

In the past 15 years, there has been a noticeable shift to retool digital environments to support the HIV prevention needs of users. Mobile health platforms allow users to seek out testing centres or even order at-home testing kits that allow them to access their lab results online. Many gay sexual networking platforms have integrated HIV prevention content as part of their brand by offering fields for users to disclose their serostatus (i.e., HIV status) and creating awareness and advocacy campaigns. The internet and social media allow users, providers, public health actors, and activists to distribute and interact with HIV prevention content rapidly and at a much lower cost than in the analogue era. This also bodes well for public education efforts at a time when pharmacological advances in HIV prevention need to be translated and disseminated to lay publics. The digital realm and the world of HIV prevention are converging in significant ways that invite us to consider how these sociotechnical systems inform each other, and what it means for our cultural understandings of health and illness.

This article does that by exploring the role of networked information technologies, such as the internet, in not only mediating but actively producing some of the subjectivities, discourses, and practices that underpin HIV prevention in the digital age. Referring to this process as the informationalization of HIV prevention (see Castells, 2010, 2004a; Chow-White, 2008), this article examines it as a *convergent* and *participatory* process that introduces a corresponding set of opportunities and *vulnerabilities*. Powered by digital databases, algorithms, and interfaces, the informationalization of HIV prevention is contradictory in that it empowers individual actors while simultaneously individualizing health and illness. Set against the backdrop of informational capitalism, it allows private sector actors and market discourse to shape action in ways that serve both community and commercial interests. And it demonstrates that in spite of the tremendous progress technoscience has made in terms of HIV testing, treatment, and prevention, it introduces new vulnerabilities and tensions that keep the pendulum of progress swinging back and forth. At a time when HIV is simultaneously framed as both a “liveable” and a prosecutable condition, it is important to examine how these contradictions shape the way we think and talk about HIV in contemporary society.

The informationalization of HIV prevention

Manuel Castells' (2010) network society thesis suggests that networked information technologies have played a fundamental role in shaping production, power, experience, and culture (p. 14). Castells places the information technology revolution of the 1970s on par with the Industrial Revolution (p. 29), arguing that the accumulation of information and its digital "generation, processing, and transmission" have eclipsed industrialism as the primary mode of social and economic development (p. 21). He refers to this mode of development as "informationalism" and attributes it to the affordances of computing that: 1) enhance the speed, scale, and complexity of information involved; 2) are able to recombine data; and 3) support ubiquity through decentralization (Castells, 2004a, p. 9). Castells suggests that informationalism creates a link between culture and production, bringing about "historically new forms of social interaction, control, and social change" (2010, p. 18). Informationalism does not replace capitalist modes of production. Instead, it facilitates capitalism's reconfiguration, "expansion[,] and rejuvenation" (p. 19) as accumulation and consumerism become driving cultural forms (pp. 213–214). Although Castells' (2010) work mainly emphasizes the economic implications of informationalism under globalization, his model also takes into account the implications for human health when he identifies genetic engineering as one outcome of the network society. The convergence and interaction of biomedicine and networked information technologies make it possible to describe gene therapy and cloning as a site of the "decoding, manipulation, and reprogramming of living matter" (p. 29). Castells' network society thesis opens the door for us to examine the cultural implications of bio-digital formations in other health-related fields.

Looking specifically at the field of genomics, Peter Chow-White's (2008) case study of the Human Genome Project's HapMap Project (HMP) used Castells' model of informationalism to explain how genomics technologies have become implicated in an ambivalent recoding of race as both biological and cultural. Identifying this process as the *informationalization of race*, Chow-White (2008, pp. 1169–1172) suggests that the HMP's use of networked information technologies to encode and classify genetic variation among different populations mobilizes colour-blind discourses while presenting new "regimes of racial knowledge" (p. 1169) as neutral. Informationalization "[reimagines] the body as code and information" (p. 1181; see also Gilroy, 2000; Nelkin & Tancredi, 1989) as networked information technologies become a new site of struggle. Creating systems where ideas about race are not only mediated but "created, transformed, and destroyed" (Chow-White, 2008, p. 1171; Omi & Winant, 1994), informationalization invites us to engage in critical discussions of technology and the various subjectivities, discourses, and practices that surround it.

The informationalization of HIV prevention occurs through platforms that allow actors—users, public health groups, and internet entrepreneurs—to input, upload, access, and share HIV-related content online. Examples include online partner notification tools such as inSPOT or Let Them Know, platforms designed to enhance clinical practice by allowing recently diagnosed patients to anonymously notify sexual partners through email or text message. Data recombination occurs through platforms' classification, sorting, and filtering abilities, with the interface of many gay sexual network-

ing profiles allowing users to tailor their search results according to HIV risk-reduction practices (or even serostatus, in some cases). Decentralized, portable, and ubiquitous, the informationalization of HIV prevention makes data and users accessible to anyone, anywhere, and at any time. In many countries, legislative changes to health information policies now allow patients to access lab results online. As a result, HIV prevention becomes a data-driven process, where communication technologies, codes, algorithms, and databases play an increasing role in its mediation and cultural production. Already, scientific actors use digital metaphors to describe gay men's HIV seroadaptive practices in light of the convergence between biomedicine and networked information technologies. Consider how scientists, public health actors, and some community health actors have recoded the once-taboo practice of barebacking (also known as condomless anal sex) into *serosorting* (Race, 2010), while new treatment modalities have given rise to practices like *biomed-matching* (Newcomb, Mongrella, Weis, McMillen, & Mustanski, 2015) and *biomed-sorting* (Groves, Rendina, Patel, Kelvin, Anastos, & Parsons, 2018) in both analogue and digital venues. The same can be said for HIV-related subjectivities, as platforms permit modes of self-expression that allow users to identify themselves as members of a *poz* (a term some people living with HIV use to describe themselves) "tribe," as undetectable, or even as a #TruvadaWhore² (see Race, 2015). The internet may not have invented the concept of seropositivity or viral suppression (although "Truvada whore" is certainly a digital neologism), but these biosocial identities have certainly taken on new form online and off (see also Mowlabocus, 2010).

The commercial imperatives of social media mean that the informationalization of HIV prevention must also be understood within the framework of consumer culture. The data-driven push to modernize prevention efforts through mobile health platforms comes at a time when technology entrepreneurs are seeking new opportunities to innovate in an arena where progress is slow. Sexual networking platforms that support HIV prevention efforts are often sincere in their efforts and do so knowing that corporate social responsibility is part of maintaining one's brand in this day and age (Banet-Weiser, 2012). Social media users are able to hold companies and organizations to greater account than analogue publics, as they are able to quickly organize and mobilize to push for change. Later, this article will discuss how Grindr users were able to push back on the company's efforts to allow users to filter partners based on serostatus. Companies and organizations also understand the power of social media to help them earn good publicity and facilitate crowdsourced promotion. This will be explored in terms of how the pharmaceutical company Gilead's medication Truvada went viral in the gay blogosphere long before the company began officially marketing its product. In a world where treatment advocacy and awareness campaigns become virtually indistinguishable from marketing ones, the implications of these sociotechnical arrangements warrant discussion.

Critical HIV scholars have already begun to interrogate these configurations. Scholars have considered how the push to digitize sexual health may be just as much about empowering users and improving health outcomes as it is about enforcing compliance. Deborah Lupton (2015) identifies these digital practices as corresponding to Foucault's (1988) notion of technologies or practices of the self, where health technolo-

gies are leveraged for “self-care, management, or improvement” (Lupton, 2015, p. 446). Such platforms become “disciplinary,” “[taming] the sexual ... body by rendering it amenable” to datafication, classification, and division (Lupton, 2015, p. 449). Data and algorithms thus configure a constrained approach to embodiment and subjectivity where “the messy and multiple complexities, sensual experiences, perversities and quirky contradictions of sexual and reproductive desires and capacities are rendered flat, one-dimensional and dull, subjected as they are to rigid normalized categories” (Lupton, 2015, p. 449).

Deborah Lupton (2015) and Mark Davis (2015) also understand the shift to digital health as driven by economic and political considerations. Economic imperatives and neoliberalism emphasize citizens’ personal behaviour and responsibility while government support for society and health declines (Lupton, 2015, p. 449). Health behaviours and responsible conduct become moral issues, and, therefore, those who fail to comply with the discourse of the responsible healthy citizen risk subjecting themselves to stigma and discrimination (Lupton, 2015, p. 449; Mello & Rosenthal, 2008). Davis (2015, p. 399) explains how these technologies align with the imperatives of surveillance medicine (Armstrong, 1995) and managed consumerism (Bury & Taylor, 2008), where “economic rationalism, risk management, market-like economic efficiency ... [commodification], and the framing of the patient as a volitional consumer” (Davis, 2015, p. 403) become dominant ways to understand health and illness. Davis (2015) contrasts public health models defining sexual health as the “absence of disease” with social justice models emphasizing the right to knowledge, safety, and pleasure (p. 400; see also Davis, 2009). Although Davis acknowledges that the two may coexist, he views some sexual health apps as an expression of the former.

Scholars have also considered how changes in technology have specifically affected gay men, particularly those living with HIV. Kane Race (2001) has written about how viral suppression has created anxieties about and divisions among gay men living with HIV, while the cultural emphasis on serostatus as a biosocial object in gay men’s sexual cultures (codified through both the scientific emphasis on serosorting and the introduction of the HIV status field on sexual networking platforms) coincides with “new investments in status disclosure” (Race, 2010, p. 11) that perpetuate a “disabling and frustrating affective climate” (p. 13) of avoidance among gay men. These divisions also surround the expanded use of pharmacological innovations such as viral suppression and pre-exposure prophylaxis, as their uptake creates biomedical hierarchies at the community level. As Daniel Grace, Sarah A. Chown, Michael Kwag, Malcolm Steinberg, Elgin Lim, and Mark Gilbert (2015) note in their study of virally suppressed gay men, those who “fail” to become virally suppressed may risk “further stigmatization and in-group marginalization” (p. 346). It is, therefore, crucial to explore the opportunities, contexts, and challenges that encode the informationalization of HIV prevention through digital technologies and biomedicine.

This article comes from a larger study of the role of networked information technologies in shaping gay men’s sexual cultures and the social world of HIV prevention. The findings are based on semi-structured interviews conducted with gay men, public health actors, and internet entrepreneurs based mainly in San Francisco, California,

and Vancouver, British Columbia, from 2013 to 2014 ($n = 31$)³. Participants were recruited through personal networks as well as snowball sampling. The findings are also based on a critical analysis of sexual health apps, gay sexual networking platforms, on-line discourse related to digital HIV prevention efforts, and gay media coverage of three court cases involving HIV non-disclosure or transmission among gay male users of sexual networking platforms. Although it is worth acknowledging my subjectivity as a seronegative heterosexual woman researching gay men and HIV as well as some of the debates and challenges conducting outsider research (see Biddulph, 1999; Bridges, 2001, 2009; Loxley & Seery, 2008; Tinker & Armstrong, 2008), this project was inspired by my personal relationships with gay men and my lived experience with medicalization in other contexts. My aim is not to speak for or over the community but instead to illustrate the importance of this specific case in contextualizing our broader understanding of technology, sexuality, and health in contemporary society.

This article proposes that the informationalization of HIV prevention is a sociotechnical process characterized by 1) convergence, 2) participation, and 3) vulnerability. The first section examines how informationalization *converges* medical and consumer discourses under the framework of empowerment by interpellating patient-consumers as smart shoppers in a health marketplace. The second section examines how the informationalization of HIV prevention broadens who *participates* in HIV prevention by considering the entrance of commercial actors, such as owners of gay sexual networking platforms. Platform owners' participation can be seen as an expression of corporate social responsibility discourses, where efforts to encode platforms with HIV prevention materials invite users to brand themselves and their advocacy. The third section suggests that although many of these affordances confer important benefits for users, public health actors, and internet entrepreneurs, informationalization also brings *vulnerabilities*. By considering three court cases involving HIV non-disclosure or transmission among gay men who use sexual networking platforms, this article outlines some of the ways that our cultural reliance on digital data creates dilemmas and tensions between public health and social justice understandings of HIV (see Davis, 2009).

In the palm of your hand: Empowering the sexual subject

The informationalization of HIV prevention is a convergent process that combines market logic with medicine. Sexual health platforms are one venue where this occurs, as the informationalization of HIV prevention mobilizes empowerment discourses to promote uptake and use. The notion of empowerment has multiple connotations in HIV/AIDS, oscillating between collectivist and individualist orientations. Collectivist models draw from the work of Brazilian educational theorist Paulo Freire (1983), who constructed empowerment as a collective process where people take control over their lives and effect change (Wallerstein & Bernstein, 1988). Freire's model relies on critical education frameworks where knowledge comes not just from experts but also emerges organically through consciousness-raising and dialogue. Affected groups are involved in every step of the process—from defining the problem, to developing strategies, to overcoming obstacles. When it comes to HIV prevention, this model of empowerment is just as much about disease prevention as it is about values such as community connection, quality of life, and social justice. The objective of empower-

ment in this case is to help people transform themselves into engaged actors ready to organize for change.

An example of this model of empowerment emerged during mobilizations by people with AIDS in the 1980s. People with AIDS defined what empowerment meant for them and mobilized it in their interactions with medical and legal systems, challenging the totalizing categories of “AIDS patients” and “AIDS victims.” They used empowerment to assert their expertise through lived experience, demanding autonomy with respect to medical decision-making. Given the lack of legal frameworks to support people with AIDS at the time, self-empowerment movements helped generate a type of political infrastructure that remains a cornerstone of HIV activism and advocacy. This model of empowerment appears in many group-level interventions developed for people living with HIV today. While reducing risk behaviour remains one goal, the aims are broader. One participant made this clear when asked about what HIV prevention meant to them in their work with gay men living with HIV:

When we talk about prevention, we often think of negative people becoming positive. That is what prevention in the grand scheme of things looks like. But we ... focus on guys who are already [seropositive]. It would be prevention in the sense that we are trying to help poz guys make healthier decisions and therefore not transmit the virus. But we know that statistically, that guys who are aware of their status don't transmit the virus. So that's not really prevention. It's—overall, the project is to empower. It's to create a safe space for poz guys to talk. Because [there's] no other spaces. [There's] no spaces really for any sexual group to talk. But when you add on being poz on top of being gay, there is so much societal stigma and discrimination that there's literally nowhere. (Interviewee 006)

For this participant, it was clear that although they recognized the instrumental aim of empowerment and HIV prevention in terms of programmatic requirements (“help poz guys make healthier decisions, not transmit the virus”), empowerment in the context of the group also had the political aim of raising critical consciousness through dialogue in community.

This can be compared with individualist models of empowerment that dovetail with neoliberal politics and its emphasis on surveillance medicine and managed consumerism (Armstrong, 1995; Bury & Taylor, 2008; Davis, 2015; Lupton, 2015). This is evident in nations such as the United States, where a lack of universal healthcare has facilitated the commodification of health while shifting responsibility from the state to the individual—although this certainly emerges in Canada as well. Health becomes a private, personal matter that configures citizens into health entrepreneurs. In this case, people become empowered by co-operating with expert systems and adjusting their behaviours accordingly. Empowerment becomes a way to encourage people to keep themselves in good health, with the hope that it will ultimately reduce demand on the public health system (Harris, 1994). With an “ounce of prevention worth a pound of cure,” empowerment becomes a means to an end.

Empowerment discourse plays out vis-à-vis the informationalization of HIV prevention by converging the discourses of the informed patient and the patient con-

sumer. Initially borne from patient advocacy groups, the informed patient is a political figure who uses self-education to challenge medicine's paternalistic control over knowledge and care (Feenberg, 2010). Through access to information, informed patients disrupt the patient-provider hierarchy by making demands for transparency and participatory decision-making in their healthcare (Horton, 2003). The patient-consumer emerges as an effect of the privatization of health. Patient-consumers are the medicalized version of citizen-consumers, politicizing their access to and participation in the medical marketplace through consumption (Banet-Weiser, 2012; Mold, 2010). In this case, patient-consumers become empowered through networked information technologies that allow them ubiquitous access to data at their fingertips.

The empowered patient-consumer is the imagined user of online sexual health apps and platforms. Toronto's Eve Medical sells Eve Kit, a mail-in vaginal/near-cervix self-collection kit for chlamydia/gonorrhea (\$99) and HPV (\$129) that delivers online results to users. On their About Us page, Eve Medical states that they believe in "empowering choice" (par. 5) in a "way that would be convenient, eliminate the awkwardness and stigma, and give people control over their own bodies and healthcare" (par. 3). The U.S.-based digital health platform Healthvana, which began as a STI/HIV testing locator, clinic review, and health data app, states that it is "built to empower" (par. 1) patients by offering "personalized health insights based on [their] lab results" (par. 4). Permitting automatic check-ins, online scheduling, and private messaging features at Healthvana-partnered clinics, Healthvana users can access an archive of past tests and results—"similar to what you'd see in your 'Order History' on online food ordering app Seamless or 'Past Classes' on the group fitness app ClassPass" (Flynn, 2015, par. 7). Responding to the deficits of the public health system, sexual health platforms give patients a sense of power when it comes to navigating the healthcare system.

Empowerment discourse is intertwined with consumerist narratives of choice, convenience, customization, and control. "[It's] consumer empowerment," one tech founder explained. "Once you have access to your data, you'll see your latest results. You Google it. ... You smarten up and gain control" (Interviewee 013). Here emerges the notion that enhancing people's access to information is the key to empowering them vis-à-vis the medical system (see also Balka, Rodje, & Bush, 2007). Sharing common scenarios where such access might be useful—such as when visiting multiple physicians or tracking one's fitness regime—this participant suggested that it could potentially enhance public health by helping providers make more specific recommendations to patients. This statement sounded very similar to how online retailers such as Amazon track consumer activity as a way to enhance their marketing practices, which was confirmed when another participant explained that the "dream" situation would be for health platforms to "know you as well as Amazon knows you" (Interviewee 011)⁴. With health platforms drawing inspiration from other consumer apps, such as Amazon, Uber, and ClassPass, empowerment discourse works in the context of the digital healthcare marketplace. Users become "smarter" shoppers regarding their sexual health.

Branding and promotion: Participating in informationalization

The informationalization of HIV prevention is also a process that allows market actors and strategies to participate in efforts. Consider the efforts of owners of gay sexual net-

working platforms, many of whom “build” HIV prevention into their brand. This is a crucial activity for owners, as supporting HIV prevention efforts becomes a marker of corporate social responsibility. Although owners’ attitudes can vary in terms of how much responsibility they are willing to assume—some understandably resent being blamed for disease transmission and have had frustrating experiences collaborating with public health departments—many express an ethical duty to support the health of other gay men. As one owner noted,

as website and app owners—where a good percentage of our users are using the apps as a place to meet each other, whether that’s to have a date, to hook up and have sex—I feel like we have a role to play. An important role to play in trying to both educate our [users], keep them safe and informed, and also help them make good choices when it comes to risk reduction. (Interviewee 010)

The chief product officer at SCRUFF, Jason Marchant, echoed this claim: “We at SCRUFF feel that we definitely have a social responsibility to do what we can to make our users informed not only of potential risks but also of the resources that are available to them, be it for testing, prevention, treatment or support—be it for HIV or any other STIs” (Edmunds, 2015). Discussing Grindr’s partnership with Gilead and the Center for Disease Control to promote PrEP awareness, former CEO Joel Simkhai explained, “we have this opportunity to speak to our users, and we can do this and we should be doing this ... Our guys are on the app all the time. We are probably one of their most-engaged mediums that they pay attention to. So why not promote sexually transmitted infection prevention?” (Jaafari, 2015). Recognizing that their platforms have a great deal more reach and influence than most HIV prevention organizations, owners who participate in efforts have the opportunity to both support the health of their communities and earn good publicity in the process.

One way that platforms support efforts is by codifying HIV prevention into their user interfaces. This often occurs through the inclusion of a field for users to passively disclose their serostatus alongside other characteristics such as age, race/ethnicity, body type, and sexual role. Users often also classify themselves according to traditional serologic categories such as (HIV) negative and positive and even specify if they are using pre-exposure prophylaxis (“on PrEP”) or are virologically suppressed (“undetectable”). This comes from the recognition that serostatus and viral load have become crucial aspects of online sexual negotiation for many gay men (Interviewee 023), and that providing menu options for disclosure can help support choice, informed decision-making, and risk-reduction. Both Grindr and Hornet also give users the option of adding the date of their last test to their profiles. This could be an important part of boosting gay men’s sexual health literacy, as focusing on serostatus alone can compromise the efficacy of risk-reduction practices—especially in scenarios where people presume their partners are seronegative:

You know, I’ve definitely hooked up with a lot of guys and a lot of the time I’ll ask them what their status is, and they’ll be like “oh I’m negative,” and I’ll ask, “oh when was your last test?,” which is a question that I think a

lot of people don't ask. And they're like "2 years ago." I mean if they say that, its like "ok, well your result is not valid." (Interviewee 014)

Often, I think a lot of people don't know to ask those other questions. And they don't know, "oh, there's that window period" or, as far as they're concerned, they're like "ok he's negative; he's tested recently so he must be negative." But I think that's what driving a lot of new infections. (Interviewee 023)

I think the idea or the problem is that a lot of the science gave kind of a false sense of security to negative guys saying "I don't need to be protected because this guy is also negative." Without really going through the discussion of "when was your last test?" or "what did you do since then?" (Interviewee 021)

Presuming a partner's serostatus without asking further questions can certainly compromise the efficacy of serosorting among HIV-negative people, especially given that many researchers now believe that a number of infections happen at the early or acute stage of HIV infection. Resembling the practice of stamping an expiry date onto a consumer good, digital timestamps on dating profiles become an educational intervention tacitly reminding users that a declared HIV status is only as valid as the date of the result.

Online advertising is another way platform owners participate in HIV prevention efforts. Given that most sexual networking platforms' terms and conditions prohibit third parties from initiating contact with users (as a way to ward off spam and minimize user interruptions), providing advertising space to HIV prevention researchers and groups becomes a less invasive way to reach out to users—some of whom expressed frustration ("I don't really want to see that stuff on Grindr") or skepticism ("it's kind of a mood killer") regarding conventional online outreach efforts. Users appear to have a greater tolerance for advertising, even if they may not necessarily engage with it or find it obnoxious. As one participant said, "if someone messaged me, or had a profile, I think it would be good if I needed to ask questions I'd know where to go. But online, [users] might not be interested in getting it on Grindr. I don't see the problem in having an ad. I think that's not a huge deal" (Interviewee 026). While some public health informants acknowledged that online distribution had greatly decreased the costs of their outreach efforts (compared to printing materials, for example) (Interviewee 017), purchasing online advertising can still be cost-prohibitive for many (Chan et al., 2016). In response, platforms such as SCRUFF have offered free or reduced-cost advertising for nonprofits through the Benevolads program. In cases of serious outbreaks or other major community concerns, a number of platforms also augment the reach of public health groups by sending notifications to their members (Interviewee 019). This becomes a standard part of corporate social responsibility practices, which allow companies to "do well" by "doing good" (Banet-Weiser, 2012).

Users also participate in the informationalization of HIV prevention, where digital and commercial imperatives coexist (see Davis, 2015). One area this is visible is in the field of HIV treatment advocacy, where social media gives rise to new forms of promo-

tion (see McClelland, 2019). The early discourse surrounding pre-exposure prophylaxis (PrEP) is a prime example. Although some of its early critics expressed good-faith concerns regarding its efficacy, necessity, sustainability, and side effects (see Patton & Kim, 2012), such critiques were often muted by the online noise surrounding PrEP's moral criticisms (see Race, 2016). Inflammatory characterizations of PrEP as a "party drug" (Crary, 2014) and PrEP users as "Truvada whores"²⁻⁵ (Duran, 2012) became buzzwords that attracted a great deal of attention and further polarized discussion.

The controversy understandably offended gay male Truvada users and advocates, while also setting the stage for an important grassroots advocacy campaign. With one informant understanding the use of slurs as an "attack" and form of "slut-shaming" gay men for having condomless sex (Interviewee 014), some gay men began politicizing their PrEP use by proudly branding themselves "Truvada whores" both online and off. San Francisco PrEP-advocate and HIV-testing counsellor Adam Zebloski turned online outrage into activism by creating his own online advocacy and fundraising campaign. Donating the profits to local HIV/AIDS organizations, Zebloski began selling powder blue T-shirts printed with the hashtag #TruvadaWhore online. Zebloski explained to a reporter that he selected the colour to match Gilead's Truvada tablet, and he thought a social media campaign would be an effective way to disseminate his message (Glazek, 2014). Zebloski's #TruvadaWhores campaign, which sold some 200 shirts but also influenced the discourse of countless people online, helped create a type of brand awareness attached to advocacy, with the internet playing a crucial role.

Participants in this study regularly shared the importance of the internet in supporting HIV-related community discussion, education, and advocacy. Stand-alone websites such as PrEPFacts, created through a partnership between Gilead, HIV/AIDS advocacy groups, health agencies, community providers, and advocates, played an official role. One participant attributed PrEPFacts' emergence to the "misperception or information gaps about what PrEP was and what PrEP wasn't" as well as "a lot of negativity surrounding this HIV prevention strategy that hadn't even officially left the door yet" (Interviewee 009). Noting that much of the available information "wasn't consumer-friendly or digestible," they observed that PrEP was a "game changer" and that publics "didn't have the language ... didn't know how to talk about it" (Interviewee 009). PrEPFacts thus became an official way for scientific and public health actors to cut through the controversy and translate complex findings to lay publics.

Yet arguably, social media and its users played an even more important role. One participant from a community-based organization shared their observation that Facebook had become an informal advocacy platform for some of PrEP's early adopters, suggesting that "the conversation about PrEP on Facebook has changed pretty radically. Where it used to be more shame-based. Or like, 'oh there's so many barriers—that would never happen'" (Interviewee 002). This participant attributed the shift to social media giving PrEP advocates and service providers an opportunity to personally engage with gay men and help them make informed decisions.

Informationalization's convergence of advocacy, education, and marketing becomes both clearer and more complex in light of the outcome of social media efforts. Although there is obviously an important public health benefit to enhancing online

sexual health literacy, it is also true that pharmaceutical companies benefit from this free promotion. Until the fall of 2016, Gilead had not done any direct-to-consumer advertising for PrEP. It had donated funds to various groups to develop consumer-friendly Web portals, such as PrEPFacts, but had no official marketing campaign in place at the time. Instead, early promotion came in the form of word-of-mouth marketing by enthusiastic social media users who shared stories about PrEP and discussed it with their friends and colleagues online. It is worth mentioning that the actual tone of the content users posted did not matter in this regard. Whether users posted messages in favour or against PrEP use, their online contributions played an integral role in promoting Truvada awareness among gay men (Pulsipher, Montoya, Plant, Curtis, Holloway, & Leibowitz, 2016). In this situation, perhaps it is true that there is no such thing as bad publicity.

PrEP is one example of how education and advocacy can exist alongside commercial logics (see Davis, 2015), the branding of undetectability is another. In recent years, HIV/AIDS advocates and nonprofit organizations have been actively rebranding undetectability from a status to a political identity as a way to enhance HIV literacy and challenge stigma. This is important in a landscape where, for some, the concept of viral suppression remains poorly understood (Grace et al., 2015). A few participants expressed some of the practical challenges associated with assimilating undetectability in gay men's everyday understandings of sexuality, health, and risk:

So the new age of undetectable—what does undetectable mean? Is it the new negative? Is it the new “in remission”? ... If someone decides to Google undetectable, what does that mean? There will be one article that will say “oh, so undetectable is no risk.” “Undetectable is HIV negative.” Undetectable is, you know, like blah blah blah ... Just as much good information as there is online is there's tons of misinformation. (Interviewee 016)

We literally have guys coming in [to our organization] and saying, “so my boyfriend is HIV-positive and he is undetectable. And I would like to start bottoming without a condom. And I'm on PrEP. Can I do that?” (Interviewee 002)

Yeah, I think there's still a lot of guys in this city who don't know a lot about HIV. And so there's still a lot of stigma around that. So even if someone is undetectable, they'll still be like “sorry, you're still positive so I'm not fucking with you.” (Interviewee 023)

A lot of people are saying undetectable is the new HIV negative ... and there's like lots of new things happening but not everyone is aware of things. Especially if you're a young gay guy and where you grew up and what information you have. Getting this information, like it's available online but you don't know where to look. So how do you get people to look? (Interviewee 026)

The digital environment can be particularly challenging in this regard, as its decentralized nature means that past information is not always so easy to revise or update. Eye-

catching headlines are helpful in generating Facebook likes and Twitter retweets, but they do not guarantee that audiences read and understand the content. As one participant observed:

I think we process so much information on the Internet and our phones. A lot of this stuff gets lost. Like the signal is so temporal. So most everything you process is noise. So the signal might be like, “be safe, wear condoms, etc.” But that might resonate with you, but just for a sheer second because you have 85 emails coming in and tweets.” (Interviewee 007)

Therefore, even when the information is accurate and accessible, the online format can make it difficult to ensure people will invest their time consuming it.

Online social marketing campaigns become one way of educating publics and generating conversations about undetectability (see also Guta, Murray & Gagnon, 2016). An example is AIDS Vancouver’s “The New Face of HIV” campaign (see also Lloyd, 2018). Attempting to raise awareness about virological suppression, the campaign’s logo features an animated red HIV/AIDS ribbon that gradually turns white. With the changing colours depicting the effects of anti-retrovirals on one’s immune system, the campaign refers to this as a “powerful visual metaphor for our project’s goal of rebranding HIV for the post-treatment era” (par. 3). West Hollywood grassroots organization The Stigma Project uses similar branding strategies in its work, creating eye-catching educational memes as well as an “HIV Neutral” campaign. The anti-stigma campaign addresses the biomedical realities of living with HIV in the twenty-first century, as well as the shame, fear, ignorance, prejudice, and discrimination that remain (for a review of other HIV stigma campaigns, see MacAulay & Wang, 2016). Similarly, the Connecticut-based Circle Care Center hosts the “HIV Equal” social media campaign to challenge stigma and promote HIV testing by “creating a social art movement that changes the way people talk about HIV and which reopens the national dialogue about HIV” (par. 1). The group invites celebrity spokespeople and community members to pose for glamour shots, hosting HIV testing events where they invite participants to be featured in the campaign. Posters feature the tagline, “Everybody has an HIV status. We are all HIV equal.” Undetectability performs both a scientific and social function in this regard, becoming both a *legitimizing identity* (Castells, 2004b) to prove the efficacy of virological suppression, as well as a *project identity* (Castells, 2004b) that challenges stigmatizing social discourses of contagiousness and danger imposed upon people living with HIV. In this situation, the internet becomes the terrain where rebranding becomes *both* a mode of public education *and* a way to “sell” anti-stigma messages to publics.

It is worth acknowledging the active role users can play in the process of informationalization. The case of user filters is an excellent example. Although filters on sexual networking platforms have long allowed users to select possible matches based on criteria such as age, height, weight, body type, and even race/ethnicity (Strudwick, 2016), serostatus has also emerged as a filterable option in some contexts. On Hornet, for example, users who disclose that they are living with HIV are able to filter their results according to people of the same status (Robbins, 2014). This affordance incentivizes online serostatus disclosure and potentially enhances the user experience for people living

with HIV by facilitating serosorting. When applied across an entire population of users, however, it takes on a different meaning. In 2016, Grindr courted controversy when a survey soliciting user opinions about adding a serostatus filter to its interface went viral. Much of the gay blogosphere responded with concern over how such a feature could exacerbate and normalize HIV stigma by digitally redlining users living with HIV (Reeders, 2016; Robbins, 2016; Rodriguez, 2016). Some also expressed concern that such a feature might give seronegative men a false sense of security, as serosorting is less error-prone among partners who have already been diagnosed as seropositive. User feedback convinced Grindr not to add this feature, and they instead provided more options for users to disclose their HIV status and their “default” sexual position (e.g., top or bottom). This episode illustrates an important point with respect to social media and the informationalization of HIV prevention: although commercial platforms can constrain users, the two-way affordances of media can be valuable in supporting democratic technological interventions (Feenberg, 2010). The informationalization of HIV prevention is neither a one-way street nor are its outcomes pre-determined. The terms and conditions are always subject to reinterpretation and remaking.

So far, this article has explored some of the benefits of the informationalization of HIV prevention. Sexual health and sexual networking platforms can potentially empower users to become “smart(er) shoppers” by increasing their ability to access and interact with personal health data. This also allows private actors to support prevention efforts in more decentralized ways. Networked information technologies such as the internet allow HIV-related communication to become more cost-effective, more widely distributed, and more personalized, allowing prevention groups, advocates, and users to collaborate and advance worthy causes such as health literacy, treatment advocacy, and stigma reduction. Gay men are incorporating aspects of informationalization into some of their sexual practices, where classification, sorting, and filtering can play an important role. And yet, some of these promising aspects of informationalization also introduce new vulnerabilities to consider—particularly when it comes to legal matters affecting people living with HIV.

Digital vulnerability

The final aspect of the informationalization of HIV prevention to consider is *vulnerability*. Although it stands that informationalization will empower some people in some situations, it may exacerbate vulnerabilities and tensions in others. The legal system is one example where networked information technologies play a more ambivalent role. This is particularly evident when it comes to HIV disclosure and transmission, where the moral or ethical imperative to disclose one’s status and/or avoid transmitting the virus to others is codified in the laws of many regions. In countries or state with HIV disclosure laws, people living with HIV are legally obligated to inform their sexual partners of their serostatus before sexual activity begins. As a prosecutable offence modelled after violent crimes such as sexual assault and murder, HIV non-disclosure nullifies consent, as proponents of these laws argue that people living with HIV have a legal responsibility to notify sexual partners so they can make an informed choice prior to intercourse. Legislators designed these laws in the 1980s, when HIV posed a considerably greater health threat than it does today. Courts rarely enforced

them until the advent of effective therapies, which helped shift the social meaning of HIV from a death sentence to a manageable condition. Despite tremendous scientific advancements in HIV treatment and care, some courts have taken a more punitive approach to HIV non-disclosure—regardless of whether or not transmission even occurred (Mykhalovskiy, 2015; Mykhalovskiy & Betteridge, 2012)⁴. This has recently shifted in some parts of North America. In 2018, Canada moved to limit prosecutions of non-disclosure to situations where there is a realistic risk of transmission while reducing the severity of punishment (Brown, 2018), while California reduced the charge of knowingly exposing someone to HIV from a felony to a misdemeanour (putting it in line with exposure to other contagious, infectious, or communicable diseases). Many jurisdictions, however, still treat non-disclosure and exposure as serious crimes (see CDC, 2018), and it is unclear how federal directives will be implemented at the provincial level (see McClelland, 2018). In some places, people criminally charged with HIV non-disclosure or transmission can legally be classified as sex offenders or murderers, even if the sexual activity was otherwise consensual and no physical violence occurred. The logic of the legal system is similar to that of digital technologies. Structured according to the binary framework of innocence/guilt and victim/perpetrator, it has limited room for ambiguities and grey areas. Interestingly, it also labels non-disclosure and exposure in highly transactional terms: as *sexual fraud*.

These vulnerabilities become clear when considering gay male users of sexual networking platforms who have been the subject of court cases involving HIV non-disclosure and transmission. In 2009, an Iowa court charged 33-year-old hotel administrator Nick Rhoades with criminal transmission of HIV and sentenced him to 25 years in prison—despite the fact that no transmission occurred. Rhoades maintained an undetectable viral load and used condoms, although he admitted that he misrepresented his HIV status on his Gay.com user profile. Despite his explanation that disclosing a stigmatized condition online opened him up to discrimination and scrutiny, prosecutors used his profile as evidence of willful deceit (Hernandez, 2013). Rhoades served a year in jail before the courts released him on probation and ordered him to register as a sex offender. His sex offender status prohibited him from using social media platforms, forced him to wear a tracking device, and left him unable to travel without state permission. The state eventually overturned his conviction in 2014, but not without the publicity and stress of the situation negatively affecting his career and personal life.

The following year, public attention turned to a Missouri case in which 23-year-old African-American college student Michael Johnson was sentenced to 30.5 years for recklessly exposing and transmitting HIV to partners he met on Grindr and Adam4Adam (Thrasher, 2015a). Johnson claimed that he disclosed to his partners before engaging in condomless sex, while his accusers claimed he did not. Johnson's digital footprints rendered him vulnerable to scrutiny, with stills from his laptop-filmed sex tape used as evidence in the trial, and his shirtless selfies used to racialize him as a hyper-sexualized Black man in the media and court of public opinion (Thrasher, 2015b; see also Collins, 2006; hooks, 2004). The narrative pendulum of HIV swung back and forth, as the prosecution countered the defence's medical expert testimony

that HIV is a stigmatized yet manageable condition with their version of HIV as “terminal” (Thrasher, 2015, par. 50). In 2017, evidence of prosecutorial misconduct led to a plea deal reducing Johnson’s sentence to 10 years. He was granted parole in 2018, however, he will not be released until 2019 and will be supervised until 2023. Although Johnson’s parole and release represents a victory for anti-criminalization advocates, the implications of using digital data to assign blame and construct guilt raise ethical questions.

In 2018, media attention shifted to the United Kingdom, where courts issued a life sentence to 27-year-old hairdresser Daryll Rowe for inflicting grievous bodily harm by exposing and intentionally transmitting HIV to men he met on Grindr. This case was particularly shocking because Rowe had refused treatment and embarked on a “cynical and deliberate” campaign to infect others during his yearlong run from authorities. Rowe’s accusers told authorities that he had either coerced them into condomless intercourse (stating that he was “clean”) or sabotaged condoms without their knowledge (Rawlinson, 2018, par. 7). The pendulum of contradictory HIV narratives again swung back and forth, as prosecutors emphasized the harm Rowe’s transmission caused for his victims, while the defence stressed that HIV was a stigmatized yet liveable condition. Digital data helped establish intent and directionality. In media coverage and in the courts, Rowe’s taunting text message to victims (e.g., “I have HIV. LOL. Whoops!”) were used to establish intentionality (Rawlinson, 2018), while phylogenetic analysis confirmed that Rowe’s HIV strain closely matched that of his accusers (BBC, 2017). Although the judge in this case emphasized that her decision was not about stigmatizing people living with HIV but about accounting for Rowe’s malicious actions (Sherman, 2018), this case raises several debates regarding the contradictions in public understanding of HIV, the efficacy of the criminal justice system in dealing with HIV-related offences (Giles, 2018; Weait, 2017), the use of phylogenetics in establishing directionality of HIV transmission (cf. McClelland, Guta & Gagnon, 2019), social views on “failed” patients (cf. Guta et al., 2016; Rosengarten, 2010), and the viral divide between those virally suppressed and unsuppressed (Grace et al., 2015).

These debates take place online, as a cursory look at user comments in gay press coverage of the Rowe case suggests that public opinion mainly oscillates among understanding it as an example of: 1) justice served (even among those otherwise opposed to HIV criminalization efforts, as Rowe’s case was highly unique), 2) backlash against decriminalization efforts, 3) concern over the unintended consequences for people living with HIV, and 4) why all gay men should use PrEP. While the first three positions are expected with any public case of HIV non-disclosure or transmission, the latter may be indicative of new modes of responsabilization in this phase of the epidemic. As was the case with the advent of treatment and the increased culpability assigned to gay men living with HIV in the 1990s, this part of the twentieth century may become one where PrEP’s availability will mean that newly diagnosed seropositive gay men will now shoulder additional blame for their seroconversion. Arguably, the three cases cited here—though very unique in terms of their details, politics, and outcomes—serve as a cautionary tale for other gay men who use sexual networking platforms. They warn seropositive men about the consequences of medical non-adherence and

non-disclosure, reminding them that their partners and the public may turn against them if they fail. The ethical practice of disclosure can then become a compelled act, where listing one's status on social media serves as documentation, even while making users vulnerable to harassment and discrimination. For seronegative men, these cases can augment a sense of vulnerability and distrust where sexual networking platforms become sites of danger and deception. In either situation, adhering to a medical treatment becomes one's only protection against a life sentence, whether in the courts or in the HIV clinics. *Caveat emptor* (Adams, 2005) becomes the moral of this digital story.

Conclusion

This article discusses how the informationalization of HIV prevention converges the logics of computing and commerce to produce HIV risk discourses, subjectivities, and practices in the digital age. Does the informationalization of HIV prevention create new opportunities to revitalize public health practice, or is this rhetoric from enterprising internet start-ups? The answer to both questions is yes. In neoliberal societies that emphasize individual freedom and choice, the informationalization of HIV prevention mobilizes empowerment discourses to construct networked information technologies as tools that will help people exercise control over their sexual health and make more informed decisions. This resonates with a marketplace mentality toward health, where patients gain power as consumers vis-à-vis the medical system. The ability to use tailored platforms to find culturally competent providers, make clinic appointments online, and receive and share verified test results certainly appeals to everyone, but is especially important for gay men and other minority groups who often experience unique obstacles in the context of receiving adequate and respectful care.

This article also examines how the informationalization of HIV prevention involves actors and strategies from the private sector. Many owners of online dating sites have jumped on board to publicly support such efforts as a way of enacting corporate social responsibility. Interfaces and features codifying serostatus disclosure are examples. Users of gay sexual networking and social media platforms also participate in these practices when it comes to education and treatment advocacy. Activists played a vital role in promoting PrEP online, while rebranding has been a key strategy in mobilizing awareness of virological suppression. Set against a commercial backdrop where treatment activism converges with the marketing interests of pharmaceutical corporations, it becomes apparent how the informationalization of HIV prevention presents contradictions that must be considered as inseparable from the networking of public health in the digital age.

This is especially important when considering the *vulnerabilities* associated with the informationalization of HIV prevention. Informationalization may level the playing field for some, while further stigmatizing and marginalizing those who lack the resources and capacity to participate. Recent court cases involving HIV non-disclosure and transmission among gay men demonstrate how the same digital tools that may empower users in some contexts may disempower them in others. It is important to consider the contexts and implications of efforts to modernize HIV prevention through digital technology. As HIV technoscience continues to evolve, perhaps it is time for our social understandings of health and illness to catch up.

Notes

1. Research estimates that approximately half of the people living with HIV in the U.S. and Canada are virologically suppressed (49% and 54%, respectively; see Arkell, 2017; Ryan, 2017).
2. Truvada is the drug company Gilead's brand name for the HIV drug Tenofovir. Truvada treats HIV, and it can also effectively prevent HIV transmission as a form of Pre-Exposure Prophylaxis (PrEP).
3. All but one quotation comes from interviews conducted in 2013–2014.
4. This quotation comes from a follow-up interview conducted in 2018.
5. The originator of this term has since changed his stance.
6. An example: there were only three known Canadian court cases involving HIV transmission between 1989–1999; by 2009, this number jumped to 45 (Mykhalovskiy & Betteridge, 2012).

Websites

Adam4Adam, <https://adam4adam.com>
AIDS Vancouver, <https://aidsvancouver.org/undetactable>
Evekit, <https://evekit.com/pages/about-us>
Grindr, <https://grindr.com>
Hornet, <https://hornet.com>
Healthvana, <https://healthvana.com/for-patients>
HIV Equal, <http://hivequal.org/campaign>
InSpot, <https://inspot.org>
Let Them Know, <https://letthemknow.org.au>
PrEPFacts, <https://prepfacts.org>
Scruff, <https://scruff.com>
The Stigma Project, <http://blog.thestigmaproject.org>

References

- Adam, Barry. (2005). Constructing the neoliberal sexual actor: Responsibility and care of the self in the discourse of barebackers. *Culture, Health & Sexuality*, 7(4), 333–346.
- Arkell, Camille. (2017). Getting to undetectable: Population differences in Canada. CATIE. URL: www.catie.ca/en/pif/fall-2017/getting-undetactable-population-inequities-canada [April 14, 2019].
- Armstrong, David. (1995). The rise of surveillance medicine. *Sociology of Health and Illness*, 17(3), 393–404.
- Balka, Ellen, Rodje, Kjetil & Bush, Corlann Gee. (2007). Rose-coloured glasses: The discourse on information technology in the Romanow Report. *Canadian Journal of Communication*, 32(3), 475–494.
- Banet-Weiser, Sarah. (2012). *Authentic TM: Politics and ambivalence in a brand culture*. New York, NY: NYU Press.
- BBC. (2017, October 30). Brighton hairdresser's HIV strain "closely related" to victims. *BBC News*. URL: <https://www.bbc.com/news/uk-england-sussex-41804567> [April 14, 2019].
- Biddulph, Max. (1999). Can only Dorothy's friends speak for Dorothy? Exploring issues of biographical positioning in qualitative research with gay/bisexual men. *Journal of Critical Inquiry into Curriculum and Instruction*, 1(3), 28–29.
- Bolding, Graham, Davis, Mark, Hart, Graham, Sherr, Lorraine, & Elford, Jonathan. (2005). Gay men who look for sex on the internet: Is there more HIV/STI risk with online partners? *AIDS*, 19(9), 961–968.
- Bridges, David. (2001). The ethics of outsider research. *Journal of the Philosophy of Education*, 35(3), 371–386.
- Bridges, David. (2009). Education and the possibility of outsider understanding. *Ethics and Education*, 4(2), 105–123.

- Brown, Desmond. (2018, December 2). Justice Department issues new guidelines on prosecution for non-disclosure of HIV status. *CBC News*. URL: <https://www.cbc.ca/news/canada/toronto/canada-prosecutions-hiv-non-closures-cases-1.4929292> [April 14, 2019].
- Bury, Michael, & Taylor, David. (2008). Towards a theory of care transition: From medical dominance to managed consumerism. *Social Theory & Health*, 6(3), 201-219.
- Cairns, Gus. (2014, March 4). No-one with an undetectable viral load, gay or heterosexual, transmits HIV in first two years of PARTNER study. URL: <http://www.aidsmap.com/No-one-with-an-undetectable-viral-load-gay-or-heterosexual-transmits-HIV-in-first-two-years-of-PARTNER-study/page/2832748> [February 24, 2017].
- Campbell, John Edward. (2004). *Getting it on online: Cyberspace, gay male sexuality, and embodied identity*. New York, NY: Harrington Park Press.
- Castells, Manuel. (2004a). Informationalism, networks, and the network society: A theoretical blueprint. In M. Castells (Ed.), *The network society: A cross-cultural perspective* (pp. 3-45). Cheltenham, UK: Elgar.
- Castells, Manuel. (2004b). *The power of identity* (2nd ed). Malden, MA: Blackwell Publishers.
- Castells, Manuel. (2009). *The rise of the network society*. Malden, MA: Blackwell Publishers. (Originally published in 1996)
- CDC. (2018). HIV and STD criminal laws. URL: <http://www.cdc.gov/hiv/policies/law/states/exposure.html> [Accessed April 14, 2019].
- Chan, Phillip A., Towey, Caitlin, Poceta, Joanna, Rose, Jennifer, Bertrand, Thomas, Kantor, R., Harvey, Julia, Santamaria, E. Karina, Alexander-Scott, Nicole & Nunn, Amy. (2016). Online hookup sites for meeting sexual partners among men who have sex with men in Rhode Island, 2013: A call for public health action. *Public Health Reports*, 131(2), 264-271.
- Chiasson, Mary Ann, Hirshfield, Sabina, Remien, Robert, Humberstone, Mike, Wong, Tom, & Wolitski, Richard (2007). A comparison of on-line and off-line sexual risk in men who have sex with men: An event-based on-line survey. *JAIDS-Journal of Acquired Immune Deficiency Syndromes*, 44(2), 235-243.
- Chow-White, Peter. (2008). The informationalization of race: Communication technologies and the human genome in the digital age. *International Journal of Communication*, 2, 1168-1194.
- Confessore, Nicholas. (2005, February 12). Health alert in New York: Risks; Among gays grown complacent and often careless, fear returns. *New York Times*. URL: <https://nyti.ms/2r2oaiD> [April 14, 2019].
- Cooper, Al. (1998). Sexuality and the internet: Surfing into the new millennium. *CyberPsychology & Behavior*, 1(2), 187-193.
- Collins, Patricia Hill. (2006). *Black sexual politics: African Americans, gender, and the new racism*. New York, NY: Routledge.
- Crary, David. (2014, April 7). Truvada, HIV prevention drug, divides gay community. *Huffington Post Gay Voices*. URL: https://www.huffingtonpost.ca/entry/truvada-hiv-prevention-drug-divides-gay-community_n_5b55cedde4b0cf38668f7e45 [April 14, 2019].
- Davis, Mark. (2009). *Sex, technology and public health*. Houndmills, UK: Palgrave.
- Davis, Mark. (2015). After the clinic? Researching sexual health technology in context. *Culture, Health & Sexuality*, 17(4), 398-411.
- Duran, David. (2012, November 12). Truvada whores. *Huffington Post Gay Voices*. URL: http://www.huffingtonpost.com/david-duran/truvada-whores_b_2113588.html [April 14, 2019].
- Duyves, Mattias. (1993). The Minitel: The glittering future of a new invention. *Journal of Homosexuality*, 25(1-2), 193-203.
- Edmunds, Simon. (2015, October 21). AIDS foundation praises Scruff on STD stance after controversial billboard ads. *Global Dating Insights*. URL: <https://www.globaldatinginsights.com/uncategorised/21102015-aids-foundation-praises-scruff-on-std-stance-after-controversial-billboard-ads/> [April 14, 2019].
- Feenberg, Andrew. (2010). *Between reason and experience: Essays in technology and modernity*. Cambridge, MA: MIT Press.

- Flynn, Kerry. (2015, June 11). HIV, STD testing clinics adopt mobile app Healthvana for fast results. *International Business Times*. URL: <https://www.ibtimes.com/hiv-std-testing-clinics-adopt-mobile-app-healthvana-fast-results-1961053> [April 14, 2019].
- Foucault, Michel. (1988). Technologies of the self. In L. Martin, H. Gutman & P. Hutton (Eds.), *Technologies of the self: A seminar with Michel Foucault* (pp. 16–49). London, UK: Tavistock.
- Freire, Paulo. (1983). *Education for critical consciousness*. New York, NY: Continuum.
- Garofalo, Robert, Herrick, Amy, Mustanski, Brian, & Donenberg, Geri Rachel. (2007). Tip of the Iceberg: Young men who have sex with men, the internet, and HIV risk. *American Journal of Public Health*, 97(6), 1113–1117.
- Giles, Cameron. (2018, April 18). Daryll Rowe's sentence could change the law's approach to HIV transmission. *The Conversation*. URL: <http://theconversation.com/daryll-rowes-sentence-could-change-the-laws-approach-to-hiv-transmission-95307> [April 14, 2019].
- Gilroy, Paul. (2000). *Against race: Imagining political culture beyond the color line*. Cambridge, MA: Belknap Press of Harvard University Press.
- Glazek, Christopher. (2014, May 20). *Why I am a Truvada whore*. URL: <http://www.out.com/entertainment/popnography/2014/05/20/why-i-am-truvada-whore> [April 14, 2019].
- Grace, Daniel, Chown, Sarah A., Kwag, Michael, Steinberg, Malcolm, Lim, Elgin, & Gilbert, Mark. (2015). Becoming “undetectable”: Longitudinal narratives of gay men's sex lives after a recent HIV diagnosis. *AIDS Education and Prevention*, 27(4), 333–349.
- Grov, Christian, Breslow, Aaron S., Newcomb, Michael E., Rosenberger, Joshua G., & Bauermeister, Jose A. (2014). Gay and bisexual men's use of the Internet: Research from the 1990s through 2013. *Journal of Sex Research*, 51(4), 390–409.
- Grov, Christian, Rendina, H. Jonathan, Patel, Viraj V., Kelvin, Elizabeth, Anastos, Kathryn, & Parsons, Jeffrey T. (2018). Prevalence of and factors associated with the use of HIV serosorting and other biomedical prevention strategies among men who have sex with men in a US nationwide survey. *AIDS and Behavior*, 22(8), 2743–2755.
- Guta, Adrian, Murray, Stuart J., & Gagnon, Marilou. (2016). HIV, viral suppression and new technologies of surveillance and control. *Body & Society*, 22(2), 82–107.
- Harris, Patricia. (1994). *Expert knowledge and everyday life* [Ph.D. dissertation]. Perth, AU: Murdoch University.
- Hernandez, Sergio. (2013, December 1). *Sex, lies and HIV: When what you don't tell your partner is a crime*. URL: <http://www.propublica.org/article/hiv-criminal-transmission> [April 14, 2019].
- Holloway, Ian W., Rice, Eric, Gibbs, Jeremy, Winetrobe, Hailey, Dunlap, Shannon, & Rhoades, Harmony. (2014). Acceptability of smartphone application-based HIV prevention among young men who have sex with men. *AIDS and Behavior*, 18(2), 285–296.
- hooks, bell. (2004). *We real cool: Black men and masculinity*. New York, NY: Routledge.
- Horton, Richard C. (2003). *Second opinion: doctors, diseases, and decisions in modern medicine*. London, UK: Granta.
- Horvath, Keith J., Rosser, B. R. Simon., & Remafedi, Gary. (2008). Sexual risk taking among young internet-using men who have sex with men. *American Journal of Public Health*, 98(6), 1059–1067.
- Jaafari, Joseph. (2015, December 1). Grindr convinced me to take an HIV test. *Vice Magazine*. URL: https://motherboard.vice.com/en_us/article/gv5pd7/grindr-convinced-me-to-take-an-hiv-test [Accessed April 14, 2019].
- Klausner, Jeffrey D., Wolf, Wendy, Fischer-Ponce, Lyn, Zolt, Ilene, & Katz, Mitchell H. (2000). Tracing a syphilis outbreak through cyberspace. *JAMA*, 284(4), 447–449.
- Lloyd, Karen C. (2018). Centring ‘being undetectable’ as the new face of HIV: Transforming subjectivities via the discursive practices of HIV treatment as prevention. *BioSocieties*, 13(2), 470–493.
- Loxley, Andrew, & Seery, Aidan. (2008). Some philosophical and other related issues of insider research. In Pat Sikes & Anthony Potts (Eds.), *Researching education from the inside: Investigations from within* (pp. 15–33). London, UK: Routledge.
- Lupton, Deborah. (2015). Quantified sex: A critical analysis of sexual and reproductive self-tracking using apps. *Culture, Health & Sexuality*, 17(4), 440–453.

- MacAulay, Margaret, & Wang, Skyler. (2016). *#ResistStigma: How Do We Get There? A Scoping Review*. Vancouver, BC: Community-Based Research Centre. URL: http://cbrc.net/sites/cbrc.net/files/resiststigma_EN_RGB_160815.pdf [April 14, 2019].
- McFarlane, Mary, Bull, Sheana S., & Rietmeijer, Cornelius A. (2000). The Internet as a newly emerging risk environment for sexually transmitted diseases. *JAMA*, 284(4), 443–446.
- McClelland, Alexander. (2018, December 10). Feds issue new directive on cases of HIV non-disclosure. *Now Toronto*. URL: <https://nowtoronto.com/news/hiv-non-disclosure> [June 4, 2019].
- McClelland, Alexander. (2019, March 28). Unprepared. *Maisonneuve*. <https://maisonneuve.org/article/2019/03/28/unprepared/> [April 14, 2019].
- McClelland, Alexander, Guta, Adrian, & Gagnon, Marilou. (2019). The rise of molecular HIV surveillance: Implications on consent and criminalization. *Critical Public Health*, 29, 1–7.
- Meeker, Martin. (2006). *Contacts desired: Gay and lesbian communications and community, 1940s–1970s*. Chicago, IL: University of Chicago Press.
- Mello, Michelle M., & Rosenthal, Meredith B. (2008). Wellness programs and lifestyle discrimination—the legal limits. *The New England Journal of Medicine*, 359(2), 192–199.
- Mold, Alex. (2010). Patient groups and the construction of the patient-consumer in Britain: An historical overview. *Journal of Social Policy*, 39(04), 505–521.
- Mowlabocus, Sharif. (2010). *Gaydar culture: Gay men, technology and embodiment in the digital age*. Burlington, VT: Ashgate.
- Mykhalovskiy, Eric. (2015). The public health implications of HIV criminalization: past, current, and future research directions. *Critical Public Health*, 25(4), 373–385.
- Mykhalovskiy, Eric, & Betteridge, Glenn. (2012). Who? What? Where? When? And with what consequences? An analysis of criminal cases of HIV non-disclosure in Canada. *Canadian Journal of Law and Society*, 27(01), 31–53.
- Nelkin, Dorothy, & Tancredi, Laurence. (1989). *Dangerous diagnostics: The social power of biological information*. New York, NY: Basic Books.
- Newcomb, Michael E., Mongrella, Melissa C., Weis, Benjamin., McMillen, Samuel J., & Mustanski, Brian. (2016). Partner disclosure of PrEP use and undetectable viral load on geosocial networking apps: Frequency of disclosure and decisions about condomless sex. *Journal of AIDS*, 71(2), 200–206.
- Omi, Michael, & Winant, Howard. (1994). *Racial formation in the United States: From the 1960s to the 1990s* (2nd ed.). New York, NY: Routledge.
- Patton, Cindy, & Kim, Hye Jin. (2012). The cost of science: Knowledge and ethics in HIV pre-exposure prophylaxis trials. *Journal of Bioethical Inquiry*, 9(3), 295–310.
- Pulsipher, Craig A., Montoya, Jorge A., Plant, Aaron., Curtis, Phil., Holloway, Ian. & Leibowitz, Arlene A. (2016). *Addressing PrEP disparities among young gay and bisexual men in California*. URL: https://aplahealth.org/wp-content/uploads/2016/09/APLA_PrEP_FullReport_WEB.pdf [April 14, 2019].
- Race, Kane. (2001). The undetectable crisis: Changing technologies of risk. *Sexualities*, 4(1), 167–189.
- Race, Kane. (2010). Click here for HIV status: Shifting templates of sexual negotiation. *Emotion, Space and Society*, 3(1), 7–14.
- Race, Kane. (2015). “Party and play”: Online hook-up devices and the emergence of PNP practices among gay men. *Sexualities*, 18(3), 253–275.
- Race, Kane. (2016). Reluctant objects: Sexual pleasure as a problem for HIV biomedical prevention. *GLQ: A Journal of Lesbian and Gay Studies*, 22(1), 1–31.
- Rawlinson, Kevin. (2018, April 18). Man jailed for life after deliberately infecting men with HIV. *The Guardian*. URL: <https://www.theguardian.com/uk-news/2018/apr/18/hairdresser-daryll-rowe-given-life-sentence-for-deliberately-infecting-men-with-hiv> [April 14, 2019].
- Reeders, Daniel. (2016, September 27). Grindr’s HIV-positive filter works just like Cerebro. URL: <https://badblood.wordpress.com/2016/09/27/grindr-hiv-positive-filter-works-just-like-cerebro/> [April 14, 2019].
- Robbins, Josh. (2014, December 13). Gay app, Hornet, promotes HIV awareness. *imstilljosh*. URL: <http://www.imstilljosh.com/gay-app-hornet-hiv-awareness/> [April 14, 2019].

- Robbins, Josh. (2016, July 7). Should Grindr filter by HIV status? *imstilljosh*. URL: <http://www.imstilljosh.com/should-grindr-filter-by-hiv-status/> [April 14, 2019].
- Rodriguez, Mathew. (2016, July 12). *Grindr asked users about filtering matches out by HIV status and people are pissed*. URL: <https://mic.com/articles/148457/grindr-asked-users-about-filtering-matches-out-by-hiv-status-and-people-are-pissed> [April 14, 2019].
- Rosenberger, Joshua G., Reece, Michael, Novak, David S., & Mayer, Kenneth H. (2011). The internet as a valuable tool for promoting a new framework for sexual health among gay men and other men who have sex with men. *AIDS and Behavior*, 15(S1), 88–90.
- Rosengarten, Marsha. (2010). *HIV Interventions: Biomedicine and the traffic between information and flesh*. Seattle, WA: University of Washington Press.
- Ryan, Benjamin. (2017, July 27). Nearly 50 percent of people with HIV in the U.S. are undetectable. *POZ*. URL: <https://www.poz.com/article/nearly-50-percent-people-hiv-us-undetectable> [April 14, 2019].
- Sherman, Carter. (2018, April 18). UK man who intentionally infected people with HIV sentenced to life in prison. *Vice News*. URL: https://news.vice.com/en_us/article/7xdjpg/uk-man-who-intentionally-infected-people-with-hiv-sentenced-to-life-in-prison [May 20, 2019].
- Strudwick, Patrick. (2016, February 9). The founders of this gay dating app won't stop you searching by race. *BuzzFeed News UK*. URL: <http://www.buzzfeed.com/patrickstrudwick/this-is-how-gay-dating-app-bosses-defend-racial-filtering> [April 14, 2019].
- Thrasher, Steven. (2015a, May 14). “Tiger Mandingo” found guilty in HIV case, faces life in prison. *BuzzFeed News*. URL: <http://www.buzzfeed.com/steventhrasher/tiger-mandingo-found-guilty-in-hiv-case-faces-life-in-prison> [April 14, 2019].
- Thrasher, Steven. (2015b, November 30). A black body on trial: The conviction of HIV-positive “Tiger Mandingo.” *BuzzFeed News*. URL: <http://www.buzzfeed.com/steventhrasher/a-black-body-on-trial-the-conviction-of-hiv-positive-tiger-m> [April 14, 2019].
- Tinker, Claire, & Armstrong, Natalie. (2008). From the outside looking in: How an awareness of difference can benefit the qualitative research process. *The Qualitative Report*, 13(1), 53–60.
- Weait, Matthew. (2017, November 16). Daryll Rowe guilty — but is criminal law the right way to stop the spread of HIV? *The Conversation*. URL: <http://theconversation.com/daryll-rowe-guilty-but-is-criminal-law-the-right-way-to-stop-the-spread-of-hiv-85488> [April 14, 2019].
- Wallerstein, Nina, & Bernstein, Edward. (1988). Empowerment education: Freire's ideas adapted to health education. *Health Education Quarterly*, 15(4), 379–394.