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## A Commentary on the Role of Sexually Explicit Media (SEM) in the Transmission and Prevention of HIV among Men who have Sex with Men (MSM)

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After almost 30 years of prevention, leading researchers have concluded that HIV is now resurgent among MSM and that HIV prevention for this population in Western countries has “faltered”.(1) Widespread reversals in safer sex, new outbreaks of syphilis and other STIs, and increases in HIV transmission are well documented and increasing in MSM.(2) In the US, 57% of the estimated 56,300 new infections in 2009 were attributed to male-to-male sexual contact.(3) With transmission rates among most other risk groups in decline, MSM represent an increasing percentage of infections.(3, 4) The problem appears most acute in young MSM and MSM of Color.(3, 4)

Starting in about 1994, the decrease in safer sex among MSM and increase in HIV/STI transmission has coincided with increase in pornography consumption, or sexually explicit media (SEM). Some researchers assume the relationship is causal. For example, Tydén and Rogala,(5) in the Swedish study of men and pornography, noted, “All the [HIV prevention] efforts to modify sexual behaviour by increasing condom use and increasing risk awareness may be jeopardized by the global pornography industry through its efficient distribution channels, such as internet, cable television and videos, where amongst others, ‘unsafe sex’ is promoted.” (p. 590). However, research on what relationship, if any, exists between SEM consumption and sexual risk behavior is sparse. Hence, the aim of this paper is to review the available evidence and relevant studies, to identify gaps in existing knowledge, and to make recommendations for future research.

Researchers studying online risk factors for HIV should consider the effects of cyber-SEM consumption, including its influence on risky sexual behavior. In the last decade, Americans’ SEM use has increased exponentially(6) as a result of advances in technology that have made SEM very accessible, affordable, and anonymous.(7) Yet, as Stulhofer, Busko, and Landripet(8) note, this “accelerated rise in the SEM supply and the related increase in SEM exposure... has not been met by adequate scholarly response.”

Though there has been a history of claims that SEM influences a number of behaviors, evidence regarding usage and its effects on MSM represents a gap in current knowledge. If SEM use can influence sexual behavior in MSM, then SEM could be used to create new, innovative approaches to online HIV prevention.

### Background

#### Definitions

No satisfactory scientific definition of pornography exists.(9) Webster's dictionary defines pornography as “the depiction of erotic behavior intended to cause sexual excitement.”

However, this definition appears culturally-specific, ambiguous, and highly subjective. Complicating matters further is that some areas of study (e.g., sex therapy) appear to have drawn a distinction between pornography and erotica, while others (e.g., art history) differentiate between pornography, erotica, and art.

To some audiences, *pornography* has a highly negative connotation. Particularly in the US and US, the term has an unfortunate political history when applied to gay pornography. In both countries, the term *pornography* has been used to ban information on homosexuality and HIV/AIDS and to prosecute gay bookstores.(10) Consequently, in order to avoid prejudice regarding the subject, political analysts have cautioned against using the term(10) and researchers have begun to use more neutral descriptions such as *sexually explicit material*,(11) or in the new technology context, *sexually explicit media* (SEM).(12, 13) For the purpose of this review, *pornography* and *SEM* will be used interchangeably. For a working definition, we recommend Hald and Malamuth's(14) general description: “any kind of material aiming at creating or enhancing sexual feelings or thoughts in the recipient and, at the same time, (1) containing explicit exposure and/or descriptions of the genitals and (2) clear and explicit sexual acts such as vaginal intercourse, anal intercourse, oral sex, masturbation, bondage, etc.”

Under this broad heading, SEM can be further described by its specific qualities. One differentiation of SEM is by level of explicitness. *Hardcore* is defined as the explicit depiction of sexual acts, while *softcore* refers to the depiction of genitals only. Hald and Malamuth's(14) definition emphasizes the former and, since HIV prevention researchers are interested in the relationship between SEM and sexual behavior, examination of hardcore SEM allows for the exploration of the relationship between depicted and enacted sexual behavior.

SEM has also been subtyped as normophilic or paraphilic, while Brown(15) recommends further analyzing the components by genre, sexual fantasy, and cultural objects. We propose that normophilic SEM, within a gay context, be defined as media depicting common sexual acts between men such as mutual masturbation, oral sex, anilingus and anal sex (both with and without condoms). Conversely, paraphilic SEM would be defined as depictions of sexual behaviors that are less common or considered *kink* by the community, including fetishism, sadomasochism, uroagla and coprophilia (watersports and scat), and uncommon sexualized activities (e.g., bondage when undertaken as part of sex play or foreplay).(15)

Finally, for the purpose of HIV prevention research, we propose to expand Brown's(15) typology to differentiate between behaviors with varying levels of HIV transmission risk. For HIV specifically, we define “bareback SEM” as SEM depicting any behavior documented to transmit HIV, including unprotected anal intercourse (UAI), ingestion of another man's semen in oral sex, depictions of ejaculation inside the anus and/or ejaculate in or on the anus, and UAI with multiple men. Conversely we define “safer sex SEM” as the depiction of all anal sex with condoms, no ingestion of semen in oral sex, and no ejaculation inside the anus.

While historically the distinction between pornography and actually engaging in sex seemed obvious, in cyber-SEM, the boundary between observer sex and participant is far less clear. For example, if one considers four activities -- watching porn online, watching live sex online, watching live sex where one can instruct the actor(s), and engaging in cyber sex with a partner – it is far from clear where pornography ends and sex begins. This is a linguistic and conceptual challenge for researchers studying the relationship between the two. To advance precise terminology, Ferree(16) has distinguished non-interactive SEM from virtual exchanges between two or more individuals. Using this typology, videostreaming of

commercial SEM sites that offer live (but not user-interactive) sex via webcam would be included as SEM, while live video sex, e-mails, and erotic chat, where the user can influence what is viewed, would be defined as sex. Similarly, it is important to distinguish between *sex*, and *sexual risk* in new technology contexts, since many interactive forms of “sex” may be free of any physical contact or risk (e.g., video sex, email exchange, erotic chat), and/or promote behaviors at no or minimal risk for HIV (e.g., mutual masturbation, erotic massage).

### A Brief History of SEM in the United States

Prior to the widespread availability of SEM, the US adult entertainment industry was largely relegated to sex cinemas and adult bookshops.(6) In 1970, the total retail value of hardcore SEM in the United States was estimated at between \$5 and \$10 million.(6) Since then, rapid technological innovation removed the major barrier to access. Once VCRs became available in 1985, private SEM consumption became more common in the United States.(17) By 2000, there were 711 million rentals of hardcore sex films, or an average of 2.37 videos for every person in the United States.(6)

The role of the Internet in revolutionizing the pornography industry parallels its influence in most other areas of life. SEM was established early online. By the mid-to-late 1990s, there were over 60,000 sex sites on the Web, and the industry was growing by 300 sites a day(18) and \$700 million per annum.(19) In 2011, 12% of all websites (representing 4.2 million sites and an estimated 420 million pages) are estimated to be or contain pornography.(20) Fortune 500 companies such as General Motors (DirectTV), AT&T (Hot Network), Time Warner (EchoStar), Liberty Media, Marriott International, Hilton, On Command, LodgeNet Entertainment, and the News Corporation, have overtaken companies such as Playboy and Hustler as major stakeholders in SEM distribution.(6)

The US is the top producer of both video and Internet SEM. Sales in this industry currently match Hollywood's annual domestic tickets sales and the annual revenue of professional sports combined.(17) In 2006, the SEM industry generated an estimated \$100 billion worldwide per year; \$13 billion from the United States alone.(21) Of this, \$3.62 was estimated to come from video sales and rentals, \$2.84 billion from Internet SEM, \$2.00 billion from cable, mobile, and pay-per-view, and the remainder from exotic dance clubs, novelties and magazines.(20) Since then, Internet sales of SEM have continued to increase to \$4.9 billion in the US(20) For cyber-SEM, the US is also the top producer of pornographic web pages with 244,661,900 pages (or 89% of the industry) generated in the US(20)

The increase in SEM consumption in the US, from 5-10 million in 1970 to \$13 billion in 2006, represents a staggering 1300% increase in revenue. Since this increase has occurred across a time period when SEM production costs have dramatically decreased, and both amateur SEM and free SEM have become widely available, the economic figures likely underestimate the real behavioral increase in SEM consumption. While the economic size of gay SEM in the US is not reported separately, in the early 2000s it was estimated to be 10-25% of all SEM.(22, 23) By 2007, that estimate rose to 33-50% of SEM.(24) By these figures, in the United States alone, the gay SEM market generates \$1.3 to \$6.5 billion annually. MSM are estimated to be 4-15% of the adult male population(25-27) but consume 33-50% of SEM. We caution the reader that these economic estimates are from industry and secondary reports; hence the quality of these data cannot be independently verified. Further, we note that several estimates have wide confidence intervals. With these limitations specified, we speculate that greater acceptance of SEM, greater consumption, and more disposable income by MSM are some of the factors that may account for the disproportionate market share of gay SEM.

## Use of SEM in the General Population

In the Internet era, SEM consumption appears common. Approximately 40 million adults in the United States visit Internet SEM sites regularly, and the variety of locations where individuals use SEM has expanded. For example, between 20-25% of American workers with online access admit having visited porn sites during the work day.(20, 28) Each day, 25% of all search engine requests (68 million) and 8% of all emails (2.5 billion) are pornography-related.(20)

While studies of MSM's SEM consumption are few, there have been many studies that have focused on SEM consumption by the general public and by youth, both in the United States(29-40) and abroad(7, 14, 41-51). Although some variation in the reported prevalence rates of SEM consumption is evident across studies,(47) comparable international studies have, with few exceptions, reported consumption rates in the range of 86-96% among men and 54-85% among women.(52, 53) For example, among a representative sample of 688 heterosexual Danes aged 18-30, those reporting having ever viewed hardcore pornography was high (98% of males and 80% of females).(47) In 2002, in a random representative sample of 998 Norwegians aged 15-91, SEM exposure was again high (97% of males and 83% of females).(54) In a recent meta-analysis, Petersen and Hyde(55) found that gender differences in pornography use were greater than in most other areas of sexual behavior, with men reporting consistently higher SEM consumption.

### SEM Consumption among Men

Studies of SEM use among men show SEM consumption among young men is common. For example, 86% of a sample of US male college students admitted viewing SEM in the last 12 months, and 72% reported using the Internet for sex-related purposes.(21) Similarly, in Sweden, 98% of a sample of young men (Mean age: 18 years, Range: 17-21) had consumed SEM.(45) Among male SEM consumers, 6.5% of male Internet users in Europe reported high SEM consumption, defined as 6 hours per week or more engaged in cyber-SEM and cybersex activities. In cross-sectional studies, younger persons, men in lower social classes, and single men reported the highest SEM consumption.(56)

In one of the few longitudinal studies published on SEM use, Peter and Valkenburg compared two nationally representative samples of Dutch adolescents (aged 12-17;  $n=1,445$ ) and adults (18+ years;  $n=833$ ).<sup>(57)</sup> Overall they report adolescents' and adults' cyberSEM use was similar. When differences were observed, adults reported using SEM more than adolescents. In both groups, males, sensation seekers and non-exclusively heterosexual participants reported greater cyber-SEM consumption.

Like their heterosexual counterparts, gay men are also frequent consumers of SEM.(14, 54, 58) In the Hald and Malamuth(14) study in Denmark, gay men reported the same high SEM exposure as other males, including high cyber-SEM exposure (73%). Most (85%) reported cyber-SEM use within the last 12 months. In Norway, cross-sectional studies indicated that gay and bisexual-identified Norwegians are at *higher* odds than their heterosexual counterparts to view cyber-SEM ( $OR=2.40$ ,  $p<.05$ ).<sup>(58)</sup> If the international findings regarding heterosexuals' SEM use generalize to MSM in the United States, younger, less-educated, lower-SES, and single MSM should report equal or greater SEM consumption than either other MSM, heterosexual men, or women.(14, 47, 56, 58)

### Effects of SEM Use on Men

The last 50 years of SEM research in the United States has focused mainly on identifying potential negative effects of SEM consumption. In 1967, the US Congress funded research

on pornography and obscenity declaring them a “matter of national concern.”(59) Based on reviews of over 80 scientific studies, the US Commission on Obscenity and Pornography concluded early that the evidence did not point toward significant links between pornography and criminal behavior.(60) In fact, in examining the relationship between SEM and sexual offenses, findings have been mixed due at least in part to the variety of study designs(61) which suffer from issues that cloud their interpretation.(62) Experimental studies comparing men's rape myth acceptance and appeal of sexual aggression before and after SEM exposure yielded no significant differences (with one exception noted below). (63) Ecological studies have not found that more circulation of pornography in a society is related to greater prevalence of sex crimes. Indeed, some report evidence of a potential inverse relationship.(64)

In addition to null or questionable findings, some associations with SEM do not seem inherently positive or negative. For instance, SEM consumption has been associated with a greater variety of acceptable sexual acts, such as greater appeal of group sex, anal sex, and, among gay men, sex toys.(65) More context is needed in order to determine how these attitudes and behaviors relate to sexual health.

### Potential Negative Effects

Although experimental studies in the general population have not found a link between SEM and sexual aggression, it appears that, for a subgroup of users who choose to watch it, paraphilic SEM, particularly violent paraphilic depictions, is associated with attitudes supporting violence against women and sexually aggressive behavior. A 1995 meta-analysis of studies examining pornography exposure on aggressive behavior concluded that SEM exposure reduces aggressive behavior except for a small but significant relationship between exposure to sexually violent SEM and aggressive behavior.(66) Similarly, in a recent study of 650 young Croatian men (18-25), early exposure to SEM failed to show any negative effects, except among users of paraphilic SEM, where sexual satisfaction was lower.(8) If this body of research generalizes to MSM, then it would predict that most MSM will not report negative effects associated with their SEM consumption. However, a subgroup of paraphilic MSM, especially those who watch sexually violent SEM and aggressive behavior, may find their paraphilic SEM consumption reinforces attitudes supporting violence against other men and sexually aggressive behavior.

Regarding potential negative effects on HIV risk behavior, in cross-sectional surveys of young adults, recent SEM consumption appears to positively predict number of recent sex partners.(35, 56, 67) Similarly, of a sample of adolescents in New York City, those who had visited a sexually explicit website were at greater odds of having had multiple lifetime sexual partners ( $OR=1.8, p<.05$ ) and multiple partners in the last three months ( $OR=1.8, p<.05$ ).(35). The odds were also greater that they had engaged in anal sex ( $OR=2.0, p<.05$ ) and used alcohol or other substances during sex ( $OR=2.8, p<.05$ ).(35) Among young heterosexual male STI clinic attendees in Sweden, qualitative research indicates that some clients report copying behavior, for example, wanting to try anal sex because they viewed it in SEM.(5) Research has also indicated a positive relationship between access to SEM and age of first sexual intercourse.(68) These findings on partner number and age of intercourse appear adolescent-specific; similar research in adult males failed to find evidence of a relationship.(65)

### Potential Positive Effects

Men have reported moderate positive effects of viewing SEM, including increased sexual functioning, sexual pleasure, relationship enhancement, improved sleep, and psychosexual health benefits.(14, 47) In addition to higher prevalence of SEM use,(55) men also report

more positive and fewer negative effects than women.(14, 47) Visiting pornographic Web sites was associated with better academic performance in mathematics and reading amongst low-income adolescents, although the reason for this is unclear.(33)

### Effects on Gay Men

There have been few studies examining effects of SEM on gay men. An iterative search of “sexually explicit material,” “sexually explicit media,” “pornography,” or “erotica” yielded 1,311 articles in English for our review. Combining these results with either the term “gay” or the acronym “MSM” yielded only 48 articles. Of these, we could find only five studies that focused on the effects of gay SEM. Two examine its effects on how MSM perceive their bodies, (24, 69) one examines it as a trigger for sexual compulsive behavior(70) and only two examine its relationship to HIV risk behavior.(24, 71)

Generalizing from the heterosexual studies, greater recent SEM consumption might correlate with increased number of male partners among young gay men (but not adult MSM).(65) Sexually explicit images are highly acceptable to MSM(72), SEM is ubiquitous in the gay community,(24) and a Dutch study employing representative sampling identified higher cyber-SEM consumption among “non-heterosexually identified” adolescents and adults as compared to their heterosexual counterparts.(57) Producers of gay SEM claim its role in validating homosexuality, creating an outlet for desire and exploration, and strengthening community.(73) Researchers have similarly proposed that SEM may play a positive role in young MSM's development and sexual education. In a mixed-methods study of young MSM, pornography was described as a major source of sexual information.(74, 75) Many of the men state they were unaware of the “mechanics” involved in sex between men, particularly anal sex, before seeing this in SEM, and SEM provided confirmation of sexual attraction and desire. Adult gay men have also suggested the importance of pornography in validating their attraction to men when they were younger.(76) If these observations are true, with improved access to SEM, young MSM may be recognizing their same sex attractions earlier and ultimately may be initiating sex, including anal sex, at younger ages.

Of the negative effects of SEM, the relationship between exposure to gay pornography and poorer body image in gay men has been investigated. SEM consumption appears related to body dissatisfaction and anxiety,(77) negative eating attitudes,(77) and a drive for thinness(77) and muscularity(24, 77) in gay men. However, there have been only two published studies, casting the generalizability of these findings in some doubt. Since body image appears related to sexual risk among MSM,(78) research is needed examining the relationships between SEM consumption, body image and HIV risk.

For HIV prevention, we could find only two studies which examined the association between SEM exposure and HIV sexual risk behavior among MSM. Morrison, Morrison, and Bradley(24) did not find an association between SEM exposure and unsafe sex or safer sex beliefs, although limited sample size ( $n=66$ ) likely meant the study was insufficiently powered to detect any difference.

Stein, Silvera, Hagerty and Marmor(71) recently published the first adequately powered study to examine whether viewing SEM depicting unprotected anal intercourse (UAI) is a risk factor for MSM. In an online study of 751 high risk MSM, 99% reported viewing SEM within the last 3 months, 95% reported seeing depictions of protected anal intercourse and 94% depictions of UAI. The media time spent viewing SEM per week was 60 minutes (Range: 0-1400; IQR: 30-120). Watching UAI was correlated with engaging in UAI. In particular, those who reported 75-100% of their SEM use depicted UAI were most likely to report UAI. Compared to those report 0-24% of their SEM depicting UAI, the 75-100% group reported significantly more unprotected insertive anal intercourse ( $OR=4.4$ ,  $p<.05$ ),

unprotected receptive anal intercourse ( $OR=3.5, p<.05$ ) or both ( $OR=8.1, p<.05$ ). Limitations of the study include that the study was restricted to New York City, the sample was recruited using a variety of strategies (including directly off specific pornography sites), excluded monogamous MSM and only included high risk MSM (defined as >1 casual male partner and >1 instance of anal intercourse, last 3 months). As any of these factors or a combination may bias findings, the generalizability of the findings is not known. The measure of risk behavior, frequency of UAI, may also be problematic since it did not distinguish those with a regular partner of same HIV status. And as a cross-sectional study, causality cannot be inferred. Nevertheless, the size of the relationship between viewing UAI and engaging in it suggests this is a promising area for HIV prevention researchers to explore. Given the study's limitations and the lack of other studies to address replicability, the major question for HIV prevention of what relationship, if any, exists between SEM consumption and HIV sexual risk behavior between MSM, remains unanswered.

## Recommendations for Future Research

Based on the above review of the literature, we have identified several areas for research regarding SEM consumption in MSM to advance HIV prevention in this area. In almost every area, more research is needed regarding SEM exposure, effects, and potential uses in the epidemiology and prevention of HIV in MSM. Each research domain is discussed in the sections that follow.

### SEM Exposure

Although we might expect MSM in the United States to have high exposure to SEM based on studies from other countries, (14, 47, 58) prevalence estimates do not currently exist for MSM in the United States. Researchers have noted that use of SEM is widespread and acceptable among gay men,(24, 72) but new studies with adequate sample sizes are needed to document current both prevalence and incidence of SEM consumption.

Beyond prevalence of SEM use in the gay community, measuring other variables related to SEM exposure, including medium, venue, and genre, would provide useful context of the type(s) of SEM. Specific to medium, the majority of SEM consumption is shifting from DVD to online. It is likely that Internet access has increased MSM's exposure to and consumption of SEM as it has with heterosexual men, particularly if the findings of previous studies conducted in Scandinavia generalize to US MSM.(14, 47, 58) Furthermore, now that Internet access is available on mobile devices, SEM exposure is likely higher than prior estimates.

Venue of SEM use is also of interest to researchers. While we assume that most MSM access SEM from their homes, gay SEM is also available in community venues such as gay bars, clubs, hotels and bathhouses. Additionally, recent findings have indicated that more men are accessing porn in the workplace.(28) With the widespread availability of Internet access on cell phones and other mobile devices, it may be that men, and MSM in particular, are accessing SEM more frequently and in venues outside of their homes. In bars, clubs, hotels, bathhouses, and other venues where men meet for sex, SEM may play a more proximal role in sexualizing the environment and setting behavioral expectations. For this reason, gay environment research should capture SEM access and visibility.

The genres of SEM that MSM use most frequently is perhaps the largest gap in the literature regarding SEM use and MSM. In order to examine the effects of SEM on sexual behavior, it is important to know the range of behaviors that men watch as well as relevant sub-genres, such as kink or bareback, and their popularity. It is possible that the effects of SEM on HIV risk behavior differ by the safety of sex acts depicted or other characteristics. In particular,

we recommend that future research, in addition to measuring SEM use, also estimate exposure to bareback and safer sex SEM, separately, as it is plausible that the former may be a risk factor but the latter is protective factor for sexual risk.

Given that the identification of high-risk subgroups is a common practice in the epidemiology of HIV, differential SEM use (frequency and content) across distinct groups of MSM is also important to document. While we anticipate that younger, less-educated, and single MSM of lower-socioeconomic status would report greater consumption, differences across other demographics, including race, ethnicity and HIV status, may be critical to consider.(14, 47, 58)

### **SEM Effects**

Along with gay bars, clubs, bathhouses, and public sex environments, gay SEM, both as a multibillion dollar industry and as a cultural phenomenon, represents a structural factor that could influence MSM's risk behavior in ways that are not yet identified. The Internet has transformed gay communities worldwide through the emergence of large online sex seeking sites for men which in turn have reduced the centrality of physical venues and the relevance of community-based programs.(79) Research in understanding the community and structural effects of cyber-SEM is also needed. For example, while gay youth describe SEM as helpful education in the mechanics of gay sex, cyber-SEM has made viewing of hardcore SEM, including anal sex, a normative experience for MSM.(65) Ultimately, this may be increasing the prevalence of anal sex; similarly, we speculate that watching hours of safer sex SEM or bareback SEM may increase or decrease the prevalence of safer sex.

SEM has both positive and negative effects and associations in the general population, but the few studies of its effects on MSM do not satisfactorily address the questions most relevant to HIV prevention. Among the most urgent priorities is research to assess how SEM might change MSM's expectations with respect to safer sex or whether there is a relationship between gay SEM consumption and HIV risk behavior in MSM. It is possible that SEM influences subjective peer norms and intentions for entering sexual liaisons, particularly since young MSM use SEM in order to learn about sex.(73, 74) Both norms and intentions are predictors of HIV risk behavior,(80-82) so those who watch bareback SEM might normalize barebacking and see barebacking as more common, while men who watch safe sex SEM might normalize condom use and safer sex.

### **SEM Uses: Intervention**

Once researchers determine whether SEM plays a role in HIV risk behavior, research into its potential to promote safer sex among MSM and to reduce HIV risk behavior is needed. One approach is to integrate SEM into HIV prevention efforts to re-engage MSM. SEM depicting safer sex and/or harm-reduction techniques could be integrated into both existing and new interventions for MSM.(39, 47, 83-87) For online interventions, SEM appears highly acceptable to MSM;(72, 88) descriptive studies to assess acceptability across subcategories of MSM and experimental studies to identify what amount of exposure to SEM is optimal for HIV prevention are still needed. Interventionists should consider using the positive effects of SEM reported in the literature,(14, 47, 73) to re-engage and re-energize MSM in HIV prevention.

A second approach is to use findings from research in this area to influence what SEM is produced. Findings from research on SEM, MSM, and sexual behavior need to be disseminated to the gay SEM industry to enhance their awareness of the potential impact of their products on MSM. This has the potential to influence gay SEM producers to change SEM, which, given the widespread exposure to and acceptability of SEM among MSM,(24,



72) may ultimately yield changes in risk behavior. We note this approach has already been tried successfully. In the early 1990's, the gay SEM industry self-imposed a standard to only film anal sex with condoms. However, since 1995, an explosion in amateur cyber-SEM and perceived demand for bareback SEM has eroded the industry standard.(89)

Is watching hundreds of hours of bareback SEM a risk factor for HIV, or is it protective, by permitting MSM to enjoy vicariously behavior they choose not to engage in? Will making HIV prevention interventions more sexually explicit re-engage MSM, or is there an optimal level of explicitness beyond which community norms and boundaries get crossed and it becomes counterproductive? Should gay (and, potentially, straight) bars, clubs, and bathhouses show gay SEM, or in the interests of HIV prevention limit it? These questions are important since they hold significant potential to re-define and re-invigorate HIV prevention for MSM. We caution researchers, community members, and policy makers against making premature conclusions or assumptions in this area. We lack the empirical foundation needed to inform interventions and policy.

## Conclusion

In both the United States and abroad, HIV incidence is resurgent among MSM, while traditional approaches to HIV prevention for MSM have lost efficacy.(1) These changes have coincided with an explosion of gay SEM online. Research is needed that holds high potential to re-engage MSM in prevention by taking HIV prevention in genuinely new directions. As suggested by the literature, MSM are likely to be high consumers of SEM, particularly Internet-mediated SEM, and hence finding ways to integrate HIV prevention into SEM, and SEM into HIV prevention, should be prioritized.

Future MSM HIV prevention research should take into consideration the size of the online community and the enormous role the Internet now plays, and will undoubtedly continue to play, in mediating sexual liaisons between MSM.(90) At least for Internet-using MSM, going online is the most common way MSM seek sex, eclipsing all offline methods and other venues combined.(72) Furthermore, the Internet appears to increase risk principally by increasing the efficiency of sex seeking.(91) Many sites offer men the opportunity to both access SEM and seek sex, highlighting one avenue by which SEM could influence sexual practices.

Few studies of gay SEM exist, and researchers are only beginning to study the potential link between SEM consumption, genre of SEM (depicting bareback or safer sex), and HIV risk behavior. Furthermore, none appears to have assessed ways of using SEM to reinforce safer sex. Therefore, the field of HIV prevention would benefit from measuring the exposure to and consumption of SEM by MSM and examining the relationship between SEM consumption and HIV risk behavior. Furthermore, knowing how the relationship might be moderated by SEM genre could yield useful information for the creation of interventions to promote HIV prevention and sustain low risk behavior. The benefit to public health practice lies in the potential to advance a new area of HIV prevention for MSM based on strengthening safer sex depictions in SEM.

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## References

1. Jaffe HW, Valdiserri RO, De Cock KM. The re-emerging HIV/AIDS epidemic in Men who have Sex with Men. *JAMA*. 2007; 298:2412–4. [PubMed: 18042919]
2. UNAIDS. [2011 July 22] UNAIDS Policy Brief: HIV and Sex Between Men. 2006. Available from: [http://data.unaids.org/pub/BriefingNote/2006/20060801\\_Policy\\_Brief\\_MSM\\_en.pdf](http://data.unaids.org/pub/BriefingNote/2006/20060801_Policy_Brief_MSM_en.pdf)
3. Centers for Disease Control and Prevention. HIV/AIDS Surveillance Report, 2009. U.S. Department of Health and Human Services; Atlanta, GA: 2011.
4. Centers for Disease Control and Prevention. HIV/AIDS and Men who have Sex with Men (MSM). 2008. (August 29): Available from: <http://www.cdc.gov/hiv/topics/msm/index.htm>
5. Tydén T, Rogala C. Sexual behaviour among men in Sweden and the impact of pornography. *Int J STD AIDS*. 2004; 15:590–3. [PubMed: 15339365]
6. Egan T. Erotica Inc. -- A special report: Technology sent Wall Street into market for pornography. *NY Times*. Oct 23.2000
7. Cooper A, Delmonico DL, Burg R. Cybersex users, abusers, and compulsives: New findings and implications. *Sex Addct Compls*. 2000; 7:5–29.
8. Stulhofer A, Busko V, Landripet I. Pornography, sexual socialization and satisfaction among young men. *Arch Sex Behav*. 2008; 39(1):168–78. [PubMed: 18561012]
9. Janssen, E. Why people use porn. *Frontline* [serial on the Internet]. 2008. Available from: [www.pbs.org/wgbh/pages/frontline/shows/porn/special/why.html](http://www.pbs.org/wgbh/pages/frontline/shows/porn/special/why.html)
10. Watney, S. *Policing Desire - Pornography, AIDS and the Media*. 3rd Edition. University of Minnesota Press; Minneapolis, MN: 1996.
11. Linz D. Exposure to sexually explicit materials and attitudes towards rape. *J Sex Res*. 1989; 26:50–84.
12. Atwood F. What do people do with porn? Qualitative research into the consumption, use and experience of pornography and other sexually explicit media. *Sex Cult*. 2005; 9:65–86.
13. Brown JD, L'Engle KL. X-rated: Sexual attitudes and behaviors associated with U.S. early exposure to sexually explicit media. *Communication Research*. 2009; 36:129–51.
14. Hald GM, Malamuth NM. Self-perceived effects of pornography consumption. *Arch Sex Behav*. 2008; 37(4):614–25. [PubMed: 17851749]
15. Brown, B. Watney, S., editor. *A feminist interest in pornography - some modest proposals.. Policing Desire*. 1981.
16. Feree MC. Women and the web: Cybersex activity and implications. *Sex Relat Thera*. 2003; 18(3): 385–93.
17. Escoffier J. Gay-for-Pay: Straight men and the making of gay pornography. *Qual Sociol*. 2003; 26(4):531–55.
18. Chen W. Web 547 is launched to combat pornography in cyberspace. *China Times*. Jul 22.1999 Sect. 7.
19. Hapgood F. Sex sells, Inc. *Technology*. 1996; 4:45–51.
20. Ropelato, J. [2011 July 21] Internet pornogrpahy statistics. 2011. Available from: <http://www.internet-filter-review.toptenreviews.com/internet-pornography-statistics.html>
21. Carroll JS, Padilla-Walker LM, Nelson LJ, Olson CD, Barry CN, Madsen SD. Pornography acceptance and use among emerging adults. *J Adolescent Res*. 2008; 23(1):6–30.
22. Rich F. Naked capitalists. *NY Times Mag*. May 20.2001 Sect. 51-5, 80-1, 92.
23. Thomas, JA. Gay male video pornography: Past, present and future.. In: Weitzer, R., editor. *Sex for sale: Prostitution, pornography, and the sex industry*. Routledge; New York, NY: 2000. p. 49-66.
24. Morrison TG, Morrison MA, Bradley BA. Correlates of gay men's self-reported exposure to pornography. *Int J Sex Hlth*. 2007; 19(2):33–43.
25. Purcell, DW.; Johnson, C.; Lansky, A., et al. Calculating HIV and syphilis rates for risk groups: Estimating the national population size of Men who have Sex with Men. Abstract# 22896.. Presented at the 2010 National STD Prevention Conference; Atlanta, GA. 2010;

26. Laumann, EO.; Gagnon, JH.; Michael, RT.; Michaels, S. The social organization of sexuality: Sexual practices in the United States. University of Chicago Press; Chicago, IL: 1994.
27. Herbenick D, Reece M, Schick V, Sanders A, Dodge B, Fortenberry JD. Sexual behavior in the United States: Results from a national probability sample of men and women ages 14-94. *J Sex Med.* 2010; 7(255-266)
28. Kuchment A, Springen K. The tangled web of porn in the office. *Newsweek.* Dec.2008 8:14.
29. Zillmann D, Bryant J. Pornography, sexual callousness, and the trivialization of rape. *J Community Health.* 1982; 32(4):10–21.
30. Paul B. Predicting internet pornography use and arousal: the role of individual difference variables. *J Sex Res.* 2009; 46(4):344–57. [PubMed: 19219657]
31. Wolak J, Ybarra ML, Mitchell K, Finkelhor D. Current research knowledge about adolescent victimization via the Internet. *Adolescent Medicine State of the Art Review.* 2007; 18(2):325–41, xi.
32. Mitchell KJ, Wolak J, Finkelhor D. Trends in youth reports of sexual solicitations, harassment and unwanted exposure to pornography on the Internet. *J Adolesc Health.* 2007; 40(2):116–26. [PubMed: 17259051]
33. Jackson LA, Samona R, Moomaw J, et al. What children do on the Internet: domains visited and their relationship to socio-demographic characteristics and academic performance. *Cyberpsychol Behav.* 2007; 10(2):182–90. [PubMed: 17474834]
34. Albright JM. Sex in America online: an exploration of sex, marital status, and sexual identity in internet sex seeking and its impacts. *J Sex Res.* 2008; 45(2):175–86. [PubMed: 18569538]
35. Braun-Courville DK, Rojas M. Exposure to sexually explicit web sites and adolescent sexual attitudes and behaviors. *J Adolesc Health.* 2009; 45(2):156–62. [PubMed: 19628142]
36. Dowell EB, Burgess AW, Cavanaugh DJ. Clustering of internet risk behaviors in a middle school population. *J Sch Health.* 2009; 79(11):547–53. [PubMed: 19840232]
37. Mitchell KJ, Wells M. Problematic internet experiences: primary or secondary presenting problems in persons seeking mental health care? *Soc Sci Med.* 2007; 65(6):1136–41. [PubMed: 17566622]
38. Wolak J, Mitchell K, Finkelhor D. Unwanted and wanted exposure to online pornography in a national sample of youth Internet users. *Pediatrics.* 2007; 119(2):247–57. [PubMed: 17272613]
39. Ybarra ML, Mitchell KJ. Exposure to internet pornography among children and adolescents: a national survey. *Cyberpsychol Behav.* 2005; 8(5):473–86. [PubMed: 16232040]
40. Zillmann D. Influence of unrestrained access to erotica on adolescents' and young adults' dispositions toward sexuality. *J Adolesc Health.* 2000; 27(Supp 2):41–4. [PubMed: 10904205]
41. Odeyemi K, Onajole A, Ogunowo B. Sexual behavior and the influencing factors among out of school female adolescents in Mushin market, Lagos, Nigeria. *Int J Adolesc Med Hlth.* 2009; 21(1): 101–9.
42. Lofgren-Martenson L, Mansson SA. Lust, love, and life: a qualitative study of Swedish adolescents' perceptions and experiences with pornography. *J Sex Res.* 2009; 3:1–12. (Sept).
43. Hald GM, Malamuth NM, Yuen C. Pornography and attitudes supporting violence against women: revisiting the relationship in nonexperimental studies. *Journal of Aggressive Behavior.* 2010; 36(1):14–20.
44. Haggstrom-Nordin E, Tyden T, Hanson U, Larsson M. Experiences of and attitudes towards pornography among a group of Swedish high school students. *Eur J Contracept Reprod Health Care.* 2009; 14(4):277–84. [PubMed: 19526420]
45. Haggstrom-Nordin E, Hanson U, Tyden T. Associations between pornography consumption and sexual practices among adolescents in Sweden. *Int J STD AIDS.* 2005; 16(2):102–7. [PubMed: 15807936]
46. Haggstrom-Nordin E, Sandberg J, Hanson U, Tyden T. 'It's everywhere!' young Swedish people's thoughts and reflections about pornography. *Scand J Caring Sci.* 2006; 20(4):386–93. [PubMed: 17116147]
47. Hald GM. Gender differences in pornography consumption among young heterosexual Danish adults. *Arch Sex Behav.* 2006; 35:577–85. [PubMed: 17039402]

48. Lam CB, Chan DK. The use of cyberpornography by young men in Hong Kong: some psychosocial correlates. *Arch Sex Behav.* 2007; 36(4):588–98. [PubMed: 17186123]
49. Martin P. ‘These days virginity is just a feeling’: heterosexuality and change in young urban Vietnamese men. *Cult Health Sex.* 2010; 12(Supp 1):S1–S18. [PubMed: 20544445]
50. Palesh O, Saltzman K, Koopman C. Internet use and attitudes towards illicit internet use behavior in a sample of Russian college students. *Cyberpsychol Behav.* 2004; 7(5):553–8. [PubMed: 15667050]
51. Wallmyr G, Welin C, Wallmyr G, Welin C. Young people, pornography, and sexuality: sources and attitudes. *J Sch Nurs.* 2006; 22(5):290–5. [PubMed: 17172202]
52. Demare D, Lips H, Briere J. Sexually violent pornography, anti-women attitudes, and sexual aggression: a structural equation model. *J Res Pers.* 1993; 1993(27):3. 285-300.
53. Gunther A. Overrating the X-rating: the third-person perception and support for censorship of pornography. *J Commun.* 1995; 45(1):27–38.
54. Traeen B, Spinznoegle K, Beverfjord A. Attitudes and use of pornography in the Norwegian population 2002. *J Sex Res.* 2004; 41:193–200. [PubMed: 15326544]
55. Petersen JL, Hyde JS. A meta-analytic review of research on gender differences in sexuality, 1993-2007. *Psychol Bull.* 2010; 36(1):21–38. [PubMed: 20063924]
56. Lewin, B. Part 2: Pornography -- Attitudes and use.. In: Lewin, B., editor. *Sex in Sweden. On the Swedish sexual life.* National Institute of Public Health; Stockholm: 1997. p. 252-63.
57. Peter J, Valkenburg PM. The use of sexual explicit internet material and its antecedents: A longitudinal comparison of adolescents and adults. *Arch Sex Behav.* 2011; 40(5):1015–25. [PubMed: 20623250]
58. Traeen B, Nilsen TS, Stigum H. Use of pornography in traditional media and on the Internet in Norway. *J Sex Res.* 2006; 43(3):245–54. [PubMed: 17599247]
59. United States Council on Obscenity and Pornography. *Pornography: technical report of the Commission on Obscenity and Pornography.* Washington, DC: 1971.
60. United States Government. *The [U.S.] Report of the Commission on Obscenity and Pornography. Second Ed..* Bantam Books; New York, NY: 1970.
61. Bensimon P. The role of pornography in sexual offending. *Sex Addct Compl.* 2007; 14(2):95–117.
62. Fisher WA, Barak A. Pornography, erotica, and behavior: more questions than answers. *Int J Law Psychiatry.* 1991; 14(2):65–83. [PubMed: 2032763]
63. Isaacs CR, Fisher WA. A computer-based educational intervention to address potential negative effects of Internet pornography. *Commun Stud.* 2008; 59(1):1–18.
64. Kutchinsky B. Pornography and rape: Theory and practice? Evidence from crime data in four countries where pornography is easily available. *Int J Law Psychiatry.* 1991; 14:47–64. [PubMed: 2032762]
65. Weinberg MS, Williams CJ, Kleiner S, Irizarry Y. Pornography, normalization, and empowerment. *Arch Sex Behav.* 2010; 39(6):1389–401. [PubMed: 20127507]
66. Allen M, d'Alessio D, Brezgel K. A meta-analysis summarizing the effects of pornography II: Aggression after exposure. *Hum Commun Res.* 1995; 22:258–83.
67. He N, Detels R, Chen Z, et al. Sexual behavior among employed male rural migrants in Shanghai, China. *AIDS Educ Prev.* 2006; 18(2):176–86. [PubMed: 16649962]
68. Kraus SW, Russell B. Early sexual experiences: the role of internet access and sexually explicit material. *Cyberpsychol Behav.* 2008; 11(2):162–8. [PubMed: 18422408]
69. Duggan SJ, McCreary DR. Body image, eating disorders, and the drive for masculinity in gay and heterosexual men: The influence of media images. *J Homosex.* 2004; 47(3-4)(45-58)
70. Parsons JT, Kelly BC, Bimbi DS, Muench F, Morgenstern J. Accounting for the social triggers of sexual compulsivity. *J Addict Dis.* 2007; 26:5–16. [PubMed: 18018804]
71. Stein D, Silvera R, Hagerty R, Marmor M. Viewing pornography depicting unprotected anal intercourse: Are there implications for HIV prevention among men who have sex with men. *Arch Sex Behav.* 2011 online first: 14 July 2011.
72. Hooper S, Rosser BRS, Horvath KJ, Oakes JM, Danilenko G, Men's INternet Sex II (MINTS-II) Team. An online needs assessment of a virtual community: What men who use the Internet to seek

- sex with men want in Internet-based HIV prevention. *AIDS Behav.* 2008; 12:867–75. [PubMed: 18401701]
73. Lucas M. On gay porn. *Yale Journal of Law and Feminism.* 2006; 18:299–302.
  74. Kubicek K, Beyer WJ, Weiss G, Iverson E, Kipke MD. In the dark: young men's stories of sexual initiation in the absence of relevant sexual health information. *Health Educ Behav.* 2010; 37(2): 243–63. [PubMed: 19574587]
  75. Kubicek K, Carpineto J, McDavitt B, Weiss G, Kipke M. Use and perceptions of the internet for sexual information and partners: a study of young men who have sex with men. *Arch Sex Behav.* 2010; 40(4):803–16. [PubMed: 20809373]
  76. Morrison TG. “He was treating me like trash, and I was loving it...”: perspectives in gay male pornography. *J Homosex.* 2004; 47(3-4):167–83. [PubMed: 15451709]
  77. Duggan S, McCreary DR. Body image, eating disorders, and the drive for muscularity in gay and heterosexual men: The influence of media images. *J Homosex.* 2004; 47(3/4):45–58. [PubMed: 15451703]
  78. Kraft C, Robinson BE, Nordstrom DL, Bocking WO, Rosser BRS. Obesity, body image and unsafe sex in men who have sex with men. *Arch Sex Behav.* 35:587–95. [PubMed: 17031588]
  79. Rosser BRS, West W, Weinmeyer R. Are gay communities dying or just in transition? An International consultation from the Eighth AIDS Impact Conference examining structural change in gay communities. *AIDS Care.* 2008; 20(5):588–95. [PubMed: 18484330]
  80. Sheeran P, Taylor S. Predicting intentions to use condoms: a meta-analysis and comparison of the Theories of Reasoned Action and Planned Behavior. *J Appl Soc Psychol.* 1999; 29(8):1624–75.
  81. Armitage CJ, Conner M. Efficacy of the theory of planned behaviour: a meta-analytic review. *Br J Soc Psychol.* 2001; 40(4):471–99. [PubMed: 11795063]
  82. Berg R. Barebacking among MSM internet users. *AIDS Behav.* 2008; 12(5):822–33. [PubMed: 17676278]
  83. Herbst JH, Sherba RT, Crepaz N, et al. A meta-analytic review of HIV behavioral interventions for reducing sexual risk behavior of men who have sex with men. *J Acquir Immune Defic Syndr Hum Retrovirol.* 2005; 39(2):228–41.
  84. Crepaz N, Lyles CM, Wolitski RJ, et al. Do prevention interventions reduce HIV risk behaviours among people living with HIV? A meta-analytic review of controlled trials. *AIDS.* 2005; 20:143–57. [PubMed: 16511407]
  85. Noar SM. Computer technology-based interventions in HIV prevention: state of the evidence and future directions for research. *AIDS Care.* 2011; 23(5):525–33. [PubMed: 21287420]
  86. Noar S, Black HG, Pierce LB. Efficacy of computer technology-based HIV prevention interventions: A meta-analysis. *AIDS.* 2009; 23:107–15. [PubMed: 19050392]
  87. Noar SM, Pierce LB, Black HG. Can computer-mediated interventions change theoretical mediators of safer sex? A meta-analysis. *Hum Commun Res.* 2010; 36(3):261–97.
  88. Rosser BRS, Wilkerson JM, Smolenski D, et al. The future of Internet-based HIV prevention: A report on key findings from the Men's INternet Sex (MINTS-I, II) Studies. *AIDS Behav.* 2011; 15(1):91–100.
  89. ChiChi LaRue. 2008. personal communication
  90. Chiasson MA, Parsons JT, Tesoriero JM, Carr P, Hirshfield S, Remein RH. HIV behavioral research online. *J Urban Health.* 2006; 83(1):73–85. [PubMed: 16736356]
  91. Rosser BRS, Oakes JM, Horvath KJ, Konstan JA, Danilenko GP, Peterson JL. HIV sexual risk behavior by men who use the Internet to seek sex with men: Results of the Men's INternet Sex Study-II (MINTS-II). *AIDS Behav.* 2009; 13(3):488–98. [PubMed: 19205866]