

HIV Prevention and Care in the Digital Age

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Objectives: To describe the technologic advances in the digital media, including computers, mobile phones, and the Internet, that have greatly expanded opportunities to deliver evidence-based HIV education, prevention, and treatment programs.

Methods: This article examines the use of digital media in the United States and its potential role in HIV prevention and care.

Results: Although the “digital divide” is shrinking, access varies by age, race/ethnicity, and education. The Internet is an important medium for delivering universal and targeted HIV education and prevention, especially for men who have sex with men, who report going online to seek health information online and for social and sexual networking. Online and off-line behavioral interventions using digital media range from computerized multimedia interventions that take into account individual behaviors to brief untailed video interventions. Numerous Web sites facilitate access to care by providing a variety of services, including location of and linkage to HIV testing and treatment sites. HIV treatment and adherence programs that use online medical records text messaging, paging, and tablet computer-based counseling tools are also being developed.

Conclusions: HIV prevention and care programs using digital media have great potential to cost-effectively meet the complex needs of diverse and often underserved populations living with or at high risk of HIV.

Key Words: HIV, Internet, prevention, sexually transmitted infection, computer technology, MSM

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INTRODUCTION

Technologic advances in digital media, including computers, mobile phones, and the Internet, have revolutionized the way we communicate with each other, both personally and

professionally. The transformation of the Internet from Web 1.0 as a unidirectional information source to the interactive and participatory Web 2.0 has important implications for HIV transmission, HIV education and prevention, and medical management of HIV. The Internet's borderless geographic and demographic social networks and equally limitless possibilities for interventions have the potential to change both community norms and individual behavior cost-effectively.

DISCUSSION

Who's Online

In 2010, most adults (77%) and nearly all teenagers (93%) in the United States are online.^{1,2} Overall, 41% of Americans use social networking sites with the greatest use (75%) reported by those between 18 and 29 years of age.¹ This group also leads in the use of mobile phones (94%) and texting: 88% text, and of these, 80% texted a median of 20 times during the past 24 hours.¹ Yet even within this group, there are variations by race/ethnicity and education, despite the high usage levels. Whites are more likely to use the Internet (95%) than blacks (91%) or Hispanics (73%), and those with some college (96%) are more likely to be online than those without (83%),¹ suggesting that the digital divide is closing. However, disparities are still seen among 18–29 year olds who create profiles on a social networking site: whites (83%), blacks (71%), Hispanics (52%), and those with some college (86%), compared with only 59% of those with no college.¹ The limited data available on Internet access among those living with HIV show similar disparities by race/ethnicity and education but far lower overall rates. Only about the half report ever using the Internet (P. Messeri, MD, personal communication, June 21, 2010).³ Not surprisingly, active drug use, poverty, and homelessness are associated with very low rates of Internet access⁴; text messaging may be an effective way to contact such difficult-to-reach populations.⁵

Seeking Sex Online and HIV Risk

Most studies of the relationship between Internet use and sexual behavior have focused on gay, bisexual, and other men who have sex with men (MSM) because they account for the majority of newly reported HIV-infected population in the United States⁶ and frequently seek sexual partners online.⁷ Most population-based studies do not compare the prevalence of seeking sex online by gender and sexual orientation.⁸ Community-based studies have found that MSM are more likely to seek sex partners online than gay women and heterosexual men and women.^{9–12} High-risk sexual behavior observed in online studies largely reflects the risk-taking profile of individuals who choose to seek sex partners both online and

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off-line and is not associated with the Internet per se.^{10,12–17} Manhunt (www.manhunt.net) and Adam4Adam (www.adam4adam.com) are 2 of the largest Web sites for MSM seeking sex partners in the United States and abroad. Manhunt members can send e-mails, text messages, and instant video messages to potential partners. Adam4Adam members can locate potential partners through “Plan-a-Trip” before they reach their destination. MSM who meet sex partners online report more sex partners,^{18–21} sex with casual partners,^{18–21} and more unprotected anal intercourse,²² although their behavior is similarly risky with partners met off-line.^{14–16,23} Thus, those meeting partners online can expand their sexual networks, thereby increasing the potential for transmission of HIV and other sexually transmitted infections (STIs).^{7,24,25}

Health Education Online

Many Americans search for health information online, with 75% of all adults and 28% of all teens online reporting this activity.² At best, the Internet may provide access to the most current and most scientifically accurate information available on all aspects of HIV/AIDS, from risk factors for transmission and acquisition to early signs and symptoms to HIV testing and treatment. There are numerous sites targeting both professional and lay audiences. Two recently published studies provide comprehensive assessments of national and international HIV/AIDS resources online for clinicians and researchers that include sources for treatment guidelines, disease management, and continuing medical education.^{26,27}

Web sites such as The Body (www.thebody.com) and POZ (www.poz.com) are dedicated to education and clinical information on HIV/AIDS testing, diagnosis, treatment, and prevention for consumers and include access to experts, forums, blogs, and other digital media. In addition to traditional informational Web sites, a number of interactive safer sex educational Web sites, many targeted to teens,²⁸ and non-traditional sites, such as “Kicesie’s Sex Ed—What They Don’t Teach You In School” on YouTube,²⁹ have been developed. For young gay men, the Internet fills an important unmet need for sexual health education and support during the coming out process, although it can also expose them to homophobic messages.³⁰ Despite this ready access to information, separating disinformation from scientific fact can be difficult even for the most experienced searcher. Unsurprisingly, therefore, the Internet is also a fertile field for AIDS denialists (those who deny that HIV causes AIDS) and proponents of unproven treatments for HIV.

Expanding Access to Care

The Internet can facilitate the diagnosis and treatment of HIV and other STIs through Web sites that provide education and information about the location of community-based testing and clinic-based HIV and STI services (eg, www.hivtest.org). Web-based,^{31–33} text,³⁴ and instant messaging³⁵ programs have also been developed to educate and encourage testing through clinic referrals, preprinted laboratory requisition slips, and provision of online access to STI test results.³⁶ In addition, Internet sex partner notification for STI exposure is proving to be acceptable to MSM,³⁷ and Internet-based

partner notification programs have been developed,³⁸ although the effectiveness of the latter has not been demonstrated.^{39,40}

Self-collection kits for mail-in testing for HIV⁴¹ and a number of other STIs and home test kits can be purchased online, although the cost of kits from commercial sites can be high.⁴² Self-collection kits for mail-in STI testing are also available from public health Web sites in some geographic areas.⁴³ HIV and STI self-collection kits for mail-in testing and home testing are appealing to many for reasons of both privacy and convenience.^{41,44,45} However, a recent study found that consumer services available from commercial Web sites may be poor and testing accuracy may be variable: Although mail-in specimen test results were highly accurate, home tests were often inaccurate.⁴²

Improving HIV Treatment and Adherence

The Internet and development of Web-based applications have had a major impact on medical record keeping and access to medical records by patients. Web-based electronic records can be shared easily by all who need access, including medical care providers and the patient. Using industry-standard software to protect the confidentiality of information, Web-based electronic medical records offer the timely and active sharing of test results. The sharing of STI test results online is a promising development that not only enhances patients’ access to their test results but also may improve treatment outcomes.^{31,36} Likewise, the provision of HIV viral load and CD4 test results online, including trends over time, could provide the patients with important tools in managing their illness. Because adherence to antiretroviral treatment is critically important in adequately suppressing HIV in infected individuals and preventing the emergence of resistant HIV strains, there has been considerable interest in developing adherence interventions. One such intervention used an Internet-based paging system to improve adherence among patients who had failed more traditional off-line adherence systems⁴⁶; another piloted the use of a tablet computer-based counseling tool to improve adherence and to reduce secondary transmission of HIV in an HIV-infected population with mixed computer use experience.⁴⁷

Behavioral Interventions Off-line and Online Using Digital Media

HIV/STI behavioral interventions using digital media have been developed in many forms, ranging from complex computer-tailored multimedia interventions that take into account individual behaviors and stages of change to brief untailored video interventions.^{28,48–50} Interventions using digital media are appealing because they can be delivered consistently either alone or in combination with more traditional counseling modalities and in a variety of settings, either in person via computer or video in clinics, social service agencies, and schools^{51–57} or electronically via text messaging,⁵⁸ handheld computers,² or online.^{59–68} Effective HIV prevention interventions that use digital media are likely to be highly cost-effective because they are easily replicated after development, require minimal staffing, and have unlimited geographic reach.⁶⁹

The development of online HIV prevention interventions of proven efficacy is an area of intensive research,

although it lags far behind online interventions for smoking,⁷⁰ obesity,⁷¹ and mental⁷² and physical health problems.⁷³ Of the 7 published randomized trials of intensive individual-level online HIV behavioral interventions primarily targeted to MSM, 5 have demonstrated some reduction in 1 or more HIV risk behaviors,^{60–62} an increase in HIV testing,⁶³ or short-term increases in knowledge, self-efficacy, and outcome expectancies.⁶⁴ Two trials reported no changes in behavior,^{65,66} attributable to a variety of factors, including loss to follow-up, participant fatigue, technical problems, Internet connection speed, single-session intervention, and content not tailored to all outcomes or study populations. Preliminary efficacy studies using soap opera video delivery to handheld computers,² online dramatic video,^{59,67} chat room,⁶⁸ and mobile phone texting⁵⁸ interventions have also been published in addition to findings from a brief physician e-mail intervention to reduce at-risk adolescents' display of risk behavior on a social networking Web site.⁷⁴

FUTURE DIRECTIONS

A new generation of HIV prevention interventions is needed to stem the tide of infections in the United States. Digital media are increasingly being used in all aspects of HIV prevention and care to meet the complex needs of diverse and often underserved, vulnerable populations worldwide.⁷⁵ Effective evidence-based approaches using digital media have the potential to play an important role in achieving the goals of the National HIV/AIDS Strategy for the United States⁷⁶ in the future; translation of existing evidence-based interventions into digital media formats and development of new effective interventions that capitalize on the technologic advances in digital media are both a priority.

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