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Harnessing Social Media for Health Promotion and Behavior Change

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Rapid and innovative advances in participative Internet communications, referred to as “social media,” offer opportunities for modifying health behavior. Social media let users choose to be either anonymous or identified. People of all demographics are adopting these technologies whether on their computers or through mobile devices, and they are increasingly using these social media for health-related issues. Although social media have considerable potential as tools for health promotion and education, these media, like traditional health promotion media, require careful application and may not always achieve their desired outcomes. This article summarizes current evidence and understanding of using social media for health promotion. More important, it discusses the need for evaluating the effectiveness of various forms of social media and incorporating outcomes research and theory in the design of health promotion programs for social media.

Keywords: *social media; behavior change; consumer health; health promotion; evaluation methods; program planning and evaluation; social marketing; mass media; health communication; Internet; electronic interventions; technology; behavior change theory; theory*

Social media, known as the “participative Internet” (Jones & Fox, 2009), encompass a broad set of Internet-based communications, tools, and aids. These online communications offer easy, cost-effective access to large numbers of people across geographic distances. Technologies that expand interactivity and

collaborative content sharing, referred to as “Web 2.0 social media,” include Internet-based social networking services such as Facebook and MySpace, Twitter, wikis for collaborative content development, blogs, and two-way mobile messaging platforms that connect people through cell phones and personal digital assistants. Health promotion professionals have been quick to recognize the potential of social media for reaching broad audiences in social marketing campaigns and enabling and empowering consumers in their health and health care–related interactions (Thackeray, Neiger, Hanson, & McKenzie, 2008).

The widespread public engagement with social media creates a ready platform for its application in the health field. At the end of 2008, 74% of U.S. adults went online, including men and women in nearly equal percentages; more than half of Whites, African Americans, Hispanics, and individuals aged 65 years and older; and individuals across the income spectrum (Fox & Jones, 2009). A vast majority of those online adults are searching for health information—80% in 2010, according to the Pew Internet and American Life Project (Fox, 2011). Deloitte’s 2010 *Survey of Health Care Consumers* confirms this trend: More than half of consumers said they looked online for health information, including 53% of seniors, 57% of Generation X (born between approximately 1961 and 1981), and 56% of Generation Y (born between 1982 and 2001). In fact, searching for health information is the most popular online activity for adults after e-mail and using search engines (Fox, 2011).

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Studies of social media as a channel for health promotion have been limited; however, evidence is growing as interest in and experience with new media increase. Research now shows that some online communications are effective at improving knowledge and understanding of specific health topics and that certain conceptual models and features are more likely than others to produce desired results (Bennett & Glasgow, 2009; Evers et al., 2003; Portnoy, Lori, Sheldon, Johnson, & Carey, 2008). Studies have also found that social media can successfully encourage health improvement and behavior change (Webb, Joseph, Yardley, & Michie, 2010). Some approaches appear to be more effective than others in addressing short- or long-term goals.

This article offers a synthesis of what works and what does not and how these emerging communication methods can be most effectively used for health promotion and behavior change. We address the following:

- What types of social media are currently employed for health promotion and education?
- Who uses social media, and what types of social media do they prefer for health information?
- Which features of social media affect health knowledge, behaviors, and outcomes?
- What types of social media applications show most promise for health promotion and education, and how can we measure their effect and optimize their use?

► **METHOD**

We conducted a broad environmental scan and reviews of evidence that included a search and review of academic, peer-reviewed studies, systematic reviews, and meta-analyses; white papers and reports from foundations, federal and state public health agencies, and organizations involved with social media and health issues; and websites and online and print media from public, private, and nonprofit organizations. Evidence was drawn from several disciplines, reflecting social media's increasing application in multiple fields. Studies of social media and Internet-based approaches to health promotion and behavior change were identified in the fields of psychology and behavioral sciences, library and information sciences, health communications, and health education and promotion. Inconsistent and interchangeable use of terms and definitions for social media, social networking, participative Internet, and web-based interventions was common. In this review, we have attempted to define, describe, and reconcile these differences. The scan and research reviews also build on related work and experience of the study team.

► **BACKGROUND**

Social media include a broad spectrum of online communications tools and work through several mechanisms. Social media can provide a channel for social support and facilitate a sense of connectedness among individuals. These online tools let users share information that is consumer-centric and consumer controlled, enabling anonymity or personal connection as preferred, and can be an inexpensive way to reach large audiences over great distances. Perhaps most important, social media have become firmly established across sociodemographic groups. All of these features make social media well suited and popular tools for health promotion. Table 1 describes different online tools and gives examples of their use in health promotion.

Web 2.0 is a term used to distinguish the current iteration of the Internet that is shaped by interactive, user-generated, and user-controlled content and applications, from the original, more static Internet. Reports on Web 2.0 trends show widespread use of social media tools and applications throughout the general population. Although online content sharing has been largely an activity of younger users, adults are picking up the pace: 30% of adult online users reported sharing content in 2009, compared with 38% of teens (Lenhart, Purcell, Smith, & Zickuhr, 2010). Social networking sites are one of the most popular forms of social media, used by 35% of adult (18 years and older) Internet users in the United States (Lenhart, 2009), including general social networking sites, such as Facebook and MySpace, and health-specific sites that focus on health conditions and services. These direct-to-consumer sites encourage people to use online networks to discuss and ask about health and to find others with the same conditions at the same stage of treatment.

► **WHAT DO WE KNOW ABOUT WHAT WORKS?**

Social media are becoming preferred methods of health promotion as evidence builds showing their effectiveness in reaching public audiences. But how effective are these approaches as tools for health promotion and public health education? What do we know about what works and how best to use social media for health promotion?

Social Media Audiences and Health Information Preferences

More than half of U.S. adults across all age and ethnic/racial groups use the Internet to search for health

TABLE 1
Social Media Tools for Health Promotion and Education

<i>Tool</i>	<i>Definition/Use</i>	<i>Examples</i>
Weblogs (blogs)	Online journals where the author can write about any topic of interest, receive comments, and share posts across multiple platforms	www2.mdanderson.org/cancerwise/
Content syndication/ RSS feeds	RSS feeds enable users to subscribe to and receive online text, video, and other media updates	Health.com, mayoclinic.com, cancer.org
e-Games	Interactive games played through the Internet, a video game console, or a mobile phone	CDC.gov, healthgamesresearch.org (Robert Wood Johnson Foundation), and others have developed a variety of e-games
Message boards	Synchronous and asynchronous platforms where users can post messages and questions and receive responses from other users	Everydayhealth.com, Healthboards.com (hosts more than 150 message boards)
Microblogs	Length-restricted blogs	Twitter and Twitter-specific applications, Tumblr
Short message service (SMS)/texting	Also known as texting, SMS can be sent and received by anyone with a mobile phone	Text4baby
Social networking sites: general	Vehicle for people to create online communities and allow users to add friends, send messages and share content	Facebook, MySpace, LinkedIn
Social networking sites: health specific	Health- and condition-specific sites allow users to share information and experiences with others online	dLife.com, stickK.com
Video file sharing	Users create and upload video files for sharing and commenting	Youtube.com, health-related channels include youtube.com/plannedparenthood.org
Widgets	Widgets are web applications that display featured content from one site directly to a user's web page or another website	Cdc.gov, widgetbox.com
Wikis	Allow multiple users to create and post content as a community	Wikihealth.com, wikiph.org

information (Fox, 2011). Social media were used to obtain information about health and wellness by 34% of online health information seekers in one study, whereas Wikipedia and online forums and message boards were reported as the most important individual tools for adults (Elkin, 2008). General social networking services are secondary to these sources for adults but are important information vehicles for the more than 70% of adolescents and young adults online who use them, according to one Pew study (Lenhart, Purcell, Smith, & Zickhur, 2010).

Deloitte's *2010 Survey of Health Care Consumers* reports that older consumers including seniors, baby

boomers, Generation X-ers, and those with chronic conditions were more likely to participate in online wellness programs than younger, Generation Y consumers. Chou, Hunt, Beckjord, Moser, and Hesse (2009) reported generational differences in their study of online information preferences, which found that younger groups were more likely to participate in social networking and blogging sites, regardless of health status.

Generational differences in social media use. Internet users' information preferences and use of online tools also differ by gender, race/ethnicity, education, and income

TABLE 2
Social Media Use by Audience Segment

<i>Audience</i>	<i>Social Media Use</i>
Generation Y (~18-29 years)	<p>14% of web users 18-29 years old downloaded podcasts in 2006 (Centers for Disease Control and Prevention [CDC], 2007)</p> <p>76% watch online video in 2007 (CDC, 2007)</p> <p>23% are interested in using a mobile device for accessing their personal health records (Deloitte, 2010)</p> <p>56% say they look up treatment information online (Deloitte, 2010)</p> <p>As of 2010, 90% of this age-group own a cell phone, using them to send text messages, take and send pictures, and access the Internet (Smith, 2010)</p>
Generation X (~30-49 years)	<p>57% watched online video in 2007 (CDC, 2007)</p> <p>37% of cell phone users 30-49 years old sent text messages in 2006 (CDC, 2007)</p> <p>28.9% of 35- to 54-year-olds downloaded mobile applications in 2009 (Smith, 2010)</p> <p>44% of 18- to 49-year-olds played computer or video games in 2006 (CDC, 2007)</p> <p>22% are interested in using a mobile device for accessing their personal health records online (Deloitte, 2010)</p> <p>57% say they are interested in using the Internet to find treatment information (Deloitte, 2010)</p>
Baby boomers (50-65 years)	<p>46% watched online video in 2007 (CDC, 2007)</p> <p>13% of cell phone users 50-64 years old sent text messages in 2006 (CDC, 2007)</p> <p>12.1% of Internet users 55-69 years old downloaded apps in 2009 (CDC, 2007)</p> <p>25% of users >50 years played computer or video games in 2006 (CDC, 2007)</p> <p>15% are interested in using a mobile device to access their personal health records online (Deloitte, 2010)</p> <p>55% say they use the Internet to find treatment information (Deloitte, 2010)</p>
Seniors (>65 years)	<p>39% watched online video in 2007 (CDC, 2007)</p> <p>8% of cell phone users >65 years sent text messages in 2006 (CDC, 2007)</p> <p>4.3% of seniors >70 years downloaded mobile applications in 2009 (Zogby, 2009)</p> <p>17% are interested in using a mobile device to access their personal health records (Deloitte, 2010)</p> <p>53% say they use the Internet to find treatment information (Deloitte, 2010)</p>

characteristics. For example, women are reportedly more likely than men to search for information about symptoms, treatments, diseases and conditions, and medications; men are more likely than women to conduct topical searches about vitamins and supplements, health insurance providers, and physicians; both men and women were equally likely to search for wellness-related topics; and men were more likely than women to use social media (Elkin, 2008).

Chou et al. (2009) found that people of any ethnicity, regardless of education level, used social networking sites at a higher rate than all non-Hispanic

Whites, noting that these differences are likely explained by age.

Using Social Media to Influence Health Knowledge, Behavior, and Outcomes

Evidence about social media's impact on health knowledge, behavior, and outcomes shows these tools can be effective in meeting individual and population health needs. Most research addresses specific interventions and approaches, which vary widely in focus, target population, theoretical foundations, mode of

delivery, functionality, and usability. This variation makes it difficult to find out what works and how, and it complicates efforts to compare approaches.

Studies of Internet-based interventions for weight loss, tobacco cessation, and physical activity were among the first to identify positive effects and provide some quantitative evidence of impact (Portnoy et al., 2008). Meta-analyses have examined Internet-based interventions and tools and have found positive impacts of web-based interventions, although these studies have been limited in the populations and intervention types they have studied. A meta-analysis by Murray, Burns, See Tai, Lai, and Nazareth (2005) of interactive health communication applications showed that they improved users' knowledge, social supports, health behaviors and clinical outcomes. Wantland, Portillo, Holzemer, and Slaughter's (2004) study of web-based and non-web-based interventions also showed positive impacts of online applications, although these were typically small improvements over non-web-based approaches. Further research is needed in these areas.

Use of behavioral change theory and techniques. Behavioral change theories have proven important in developing successful online health promotion activities. One of the most comprehensive investigations we identified is a recent meta-analysis of 85 studies by Webb et al. (2010) that found interventions that were strongly based in theory had greater impact than those that were not, and interventions that incorporated more behavior change techniques tended to have larger effects than interventions that incorporated fewer techniques. These findings underscore the importance of using a validated theoretical framework as a road map for program design and development. Still, many health behavior change websites are not theory driven and fail to incorporate proven, evidence-based approaches. A study by Evers et al. (2003) found that of 37 public health behavior change sites, few were theory driven or used evidence-based approaches.

Feeling empowered in decision making about one's health can play an important role supporting individuals as they seek positive health behavior and lifestyle change. Several studies have shown that web-based interventions had a significant positive effect on empowerment, although results are small. A recent review to evaluate the effectiveness of web-based interventions in increasing patient empowerment compared with usual care or face-to-face interventions found significant positive effects on empowerment as measured on self-efficacy scales and mastery scales (Samoocha, Bruinvels, Elbers, Anema, & van der Beek, 2010). Other studies show that

patients may experience empowerment in decision making about their health through online learning, finding they have increased confidence in asking questions of providers and information to help them manage their conditions (Fleisher et al., 2002, as cited in Jacobson, 2007; Fox, Ward, & O'Rourke, 2005, as cited in Jacobson, 2007). However, this does not always translate to their feeling empowered in the clinical encounter, for fear of challenging the physician's authority (Lupton, 1997, as cited in Jacobson, 2007).

Delivering the message. Social media can be customized and tailored to the needs and preferences of different audiences. Several themes about what works to optimize messaging are beginning to emerge from early studies. Using tailored messaging, repurposing and applying multiple complementary delivery modes to reinforce key themes, and encouraging users to engage with web-based applications as well as with other users are among the most promising. Webb et al. (2010) found that tailored text messages are highly effective to promote interaction with the intervention, to send motivational messages (e.g., reminders of the benefits of exercise), to challenge dysfunctional beliefs, or to provide a cue to action. Use of communicative functions, especially access to an advisor to request advice, also tends to be effective, and personal contact via e-mail, online, or text message helps support behavior change. Similarly, Fry and Neff (2009) found positive results from tailoring prompts through regular contact with a counselor, especially when compared with groups not receiving personal contact.

Repurposing content through cross-platform communications strategies expands messaging opportunities at the same time reinforcing messages through multiple channels. This long-established advertising approach has readily translated to social media as blogging, "tweeting," and posting on social networking sites such as LinkedIn.com and Facebook.com. Effectiveness studies in this area are few, although anecdotal reports are encouraging. As the number of sites and messaging channels expand, finding ways to engage users to visit, participate in, and return to social media sites becomes more challenging. Sites that succeed tend to be highly dynamic and flexible and change content and approach often in order to stay entertaining and engaging. Developing active user communities is one way to keep content fresh and interaction alive.

Evaluating the Effects of Social Media

Health promotion evaluations typically seek to understand *who receives* the intervention, *what impact*

the messaging has (by audience subgroup), and *what changes* in health behavior and health outcomes can be attributed to the intervention. Many health promotion professionals are questioning the cost and comparative effectiveness of social media approaches. This information is crucial when assessing tradeoffs of one social media tool versus another.

Evaluation framework and metrics. Analytic frameworks for evaluation of online health promotion are in their early stages. Many researchers adapt established, proven approaches used in traditional health promotion efforts (Glasgow, 2007; O'Grady et al., 2009). Kaiser Permanente researcher Russell Glasgow (2007) recommends the 1999 RE-AIM framework for evaluating population-based impacts of online health promotion interventions and behavior change programs. The framework addresses Reach (participation rate and representativeness of participants), Effectiveness (on primary outcomes and quality-of-life/negative consequences), Adoption (participation rate and representativeness among settings and staff-implementing program), Implementation (consistency of program delivery), and Maintenance (sustainability at patient and setting levels). This framework has been used "to translate research into practice and to help plan programs and improve their chances of working in 'real-world' settings" and incorporates the formative, summative, and outcome components of traditional evaluation frameworks (RE-AIM, 1999).

Selecting and applying appropriate metrics present additional hurdles for evaluating health promotion interventions that use social media. Most forms of social media—blogging, social networking sites, and others—are not designed with evaluation or assessment in mind, challenging evaluators to use basic analytics generated by the sites themselves. Google Analytics and other free-to-the-public sites are widely used to provide information on items including number of hits, time spent on a page, audience location, and more, although these approaches are not always appropriate evaluation tools. To address these limitations O'Grady et al. (2009) propose a novel evaluation framework for evaluating interactive media that ties together five dimensions: people, content, technology, computer-mediated interaction, and health systems integration. This framework incorporates criteria such as interactivity, platforms/portability, users' e-health literacy, and use of open-source technology to capture the social, interactive nature of collaborative, adaptive, and interactive technology.

Putting evaluation frameworks into action requires objective measures, for both qualitative and quantitative assessment. DeBar et al.'s (2009) study of website use and behavioral outcomes used an automated tracking

system and self-reports to collect information about website visits as an overall measure of use and page-specific hits to obtain information about content-specific use. Measurements were recorded within each of six 4-month follow-up intervals. Geocoding software let the researchers determine distance from the main intervention site, hypothesized to be related to participants' choice of in-person or online sessions, using participants' reported zip codes. The study used clinical health measures, in-person interviews, and focus groups to validate data across sources.

Evaluation design and methods. The design and methods used to evaluate health promotion interventions are similar for programs delivered through social media and those delivered through more conventional media and outreach. The main differences lie with study design and execution using Web 2.0 technologies rather than conventional paper and pencil and in-person tools and with difficulties in designing and maintaining study rigor. These issues emerge as evaluators consider design issues such as whether an experimental or quasi-experimental design will be used, how study participants will be recruited or randomized, how survey design can yield best response rates, and how to control for the influence of other interventions and confounding factors that might affect study results. Attrition, when participants stop usage or are lost to follow-up, has also been identified as a fundamental issue for evaluation of online interventions (Eysenbach, 2005).

Experimental and quasi-experimental designs can be difficult to implement because randomization to the intervention—critical to avoid selection bias—and even recruitment of participants, is extremely difficult. Dansky, Thompson, and Sanner (2006) note that mailings to providers, community organizations, and other gatekeepers or radio or other traditional media are often used to meet recruitment goals. However, because by design many social media tools allow consumers anonymous access and use, follow-up and linkage are often not viable.

Identification of effects of specific interventions also presents problems because social media is often used as one of several health promotion tools. For example, consumers often use health information websites as an adjunct to visits with their provider, sharing information with friends and family or using other social or traditional media outlets, making it difficult to determine the relative influence of each.

► DISCUSSION

Much of what works using social media for health promotion can be found in the theories and approaches

used for traditional health promotion program design, implementation, and evaluation. Understanding target audiences and their information preferences, developing tailored messaging for different audience segments, basing program design and evaluation on theories of social-behavioral change, and defining process and outcome measures to assess intervention impacts, intermediate outcomes, and health status outcomes are priorities for all health promotion initiatives.

Health promotion interventions delivered online and through traditional field-based approaches are challenged to understand the most effective strategies for changing behaviors. Recent meta-analyses help identify features common to successful strategies. Developing and adapting frameworks for program design and metrics to guide health promotion using social media also challenge practitioners to consider how to meld novel Web 2.0 approaches and health promotion goals and objectives effectively.

Several key themes and implications for using social media for health promotion emerge from this review.

Audiences, messaging, and approaches: Experience with Web 2.0 suggests that audience targeting must consider demographic profiles of users together with their preferences for type of content and preferred technologies or tools. Message development should account for user characteristics, information preferences, and mode or type of social media. Several sources of information are available to guide these decisions, including the periodic surveys conducted by the Pew Internet & American Life Project. Customizing messages through iterative processes as individual users interact with the social media tools and interventions helps to sustain participation. Stages of change proposed by the transtheoretical model may also prove helpful in targeting messaging to audience needs.

Trends, transactions, and tools: Staying on top of the trends that shape and target social media is essential to effective use of these tools and technologies. New technologies and tools are introduced and adopted at a rapid pace as older approaches shift popularity with users. Blogging, for example, was popular among teens as recently as 5 years ago, but current participation rates have dropped whereas older users are increasing their use (Lenhart et al., 2010).

User-generated content: Health promotion activities that use social media can encourage users to generate and share content. This engagement is key to successful social media outreach. Monitoring content posted during its Facing AIDS Campaign for World AIDS Day 2008, AIDS.gov found that providing

incentives such as web badges for bloggers to post online and encouraging viewers to post photos of themselves wearing a red ribbon on their social network profiles and blogs improved participation and increased user-generated content (Anderson & Gomez, 2009).

Multipronged strategies: Repurposing and using several tools as complementary approaches can reinforce and increase the impact of messages. The World AIDS Day campaign found that an integrated Web 2.0 approach using social network services, blogs, Twitter, and free content was effective in expanding audience “reach,” as did continuing the outreach beyond World AIDS Day (Anderson & Gomez, 2009).

Theory-based interventions: Although there is considerable variation in the efficacy of individual interventions, evidence shows that those developed and guided by theories of social and behavioral change are more effective at promoting desired change than efforts that are not theory based (Webb et al., 2010). Theoretical models of behavior change, such as the widely used health belief model, the transtheoretical model, social cognitive theory, or others, help advance intervention efficacy for both social media and traditional health promotion approaches.

Evaluation to frame and measure change: Evaluation is important for monitoring, tracking, and providing formative input for Web 2.0 interventions. The health promotion field offers a rich base of proven frameworks to guide evaluation of field-based interventions, and these frameworks can often be adapted to evaluate online activities (Glasgow, 2007). New models that directly address the applications and technologies of Internet-based interventions are refining their approaches to incorporate assessment of specific Web 2.0 features (O’Grady et al., 2009).

Metrics: Online health promotion applications generate many of their own metrics as users approach and interact with the intervention. These metrics document website visitors, impressions and page views, time spent on specific activities, and more and can provide valuable information about reach and usability. Social media applications that build in activities that can track and be tracked are most successful at measuring intervention effects, such as recent public education interventions seeking to improve knowledge and willingness to register as an organ donor.

Scaling for broader impact: Much of the research about the efficacy of social media applications for health promotion reviewed here is based on studies applied to participants in wellness promotion and disease management programs in health plans and work sites. Some larger scale interventions at the community and national levels have also been implemented. Evaluation of these interventions shows

mixed results, but specific applications have demonstrated great promise and effect (Webb et al., 2010). Little is known about whether and to what extent these applications can be transferred and replicated to truly leverage the power of social media.

► CONCLUSION: LEVERAGING SOCIAL MEDIA TO ADVANCE PUBLIC HEALTH

This review summarizes current evidence and understanding of social media used for health promotion. Social media can be a powerful tool with expansive reach and interactivity that enables both anonymity and social networking according to participants' preferences. Still, despite its promise as a tool for health promotion, social media face difficult challenges ahead.

The benefits of social media's inexpensive, broad reach can quickly become information overload. At what point will applications considered novel today lose the attention of the audiences they seek to target? Can social media interventions maintain *intention* as well as *attention*? Researchers report that consumers readily "game" online programs, especially when incentives such as gift cards or cash are offered. Although these activities can be tracked with analytics that identify respondents' IP addresses, getting around the rules is not difficult.

Intentional, theory-based program design and evaluation frameworks and metrics to track and provide feedback for program improvement can improve their odds of success. However, identification, development, and application of metrics to track and evaluate social media are still in their infancy. Limited availability of metrics and limited understanding of how to most effectively measure social media impacts continue to confound attempts to measure impact. Effective targeting and deployment of social media interventions requires a solid understanding of *what* to measure and *how* to do it. Metrics will need to capture the interactivity of Web 2.0 technology as well as behavioral responses to the new media that are not yet well understood.

Measuring meaningful engagement is another sticky problem for those using social media for health promotion. How can we determine whether participants are "just stopping by" a site or actually engaging with content as intended? Better understanding is also needed of our public behaviors and responses to anonymity, peer-to-peer consumer interaction and of how best to motivate behavior change in the Web 2.0 world.

Finally, more information is needed about social media costs, benefits, and effectiveness as a health promotion tool. Social media has been advanced as a relatively inexpensive way to deliver health promotion

messaging. Social media has proven potential for health promotion and behavior change. Now we need to know: more of what, for whom, how much, and at what price.

REFERENCES

- Anderson, J., & Gomez, M. (2009, August). From Flickr to a blogging call to action: User generated content lessons learned from AIDS.gov. Presentation at the CDC National Conference on Health Communication, Marketing and Media, Atlanta, GA. Retrieved from <http://www.slideshare.net/aidsgov/aidsgovs-usergenerated-content-presentation-for-cdcs-national-conference-on-health-communication-marketing-and-media-2009>
- Bennett, G. G., & Glasgow, R. E. (2009). The delivery of public health interventions via the Internet: Actualizing their potential. *Annual Review of Public Health, 30*, 273-292.
- Centers for Disease Control and Prevention. (2007). eHealth data briefs. Retrieved from <http://www.cdc.gov/healthmarketing/ehm/databriefs/>
- Chou, W. S., Hunt, Y. M., Beckjord, E. B., Moser, R., & Hesse, B. W. (2009). Social media use in the United States: Implications for health education. *Journal of Medical Internet Research, 11*, e48.
- Dansky, K. H., Thompson, D., & Sanner, T. (2006). A framework for evaluating e-health research. *Evaluation and Program Planning, 29*, 397-404.
- DeBar, L. L., Dickerson, J., Clarke, G., Stevens, V. J., Ritenbaugh, C., & Aickin, M. (2009). Using a Website to build community and enhance outcomes in a group: Multi-component intervention promoting healthy diet and exercise in adolescents. *Journal of Pediatric Psychology, 34*, 539-550.
- Deloitte. (2010). 2010 survey of health care consumers. Retrieved http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/US_CHS_2010SurveyofHealthCareConsumers_050610.pdf
- Elkin, N. (2008, January 14). How America searches: Health and wellness (iCrossing Report). Retrieved from <http://www.icrossing.com/articles/How%20America%20Searches%20-%20Health%20and%20Wellness.pdf>
- Evers, K. E., Prochaska, J. M., Prochaska, J. O., Driskell, M., Cummins, C. O., & Velicer, W. F. (2003). Strengths and weaknesses of health behavior change programs on the Internet. *Journal of Health Psychology, 8*, 63-70.
- Eysenbach, G. (2005). The law of attrition. *Journal of Medical Internet Research, 7*, e11. Retrieved from <http://www.jmir.org/2005/1/e11>
- Fox, S. (2011, February). Health Topics: 80% of users look for health information online. Washington, DC: Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org/Reports/2011/HealthTopics.aspx>
- Fox, S., & Jones, S. (2009, June). The social life of health information. Washington, DC: Pew Internet & American Life Project. Retrieved from http://www.pewinternet.org/~media/Files/Reports/2009/PIP_Health_2009.pdf
- Fry, J. P., & Neff, R. A. (2009). Periodic prompts and reminders in health promotion and health behavior interventions: Systematic review. *Journal of Medical Internet Research, 11*(2), e16.

- Glasgow, R. E. (2007). eHealth evaluation and dissemination research. *American Journal of Preventive Medicine*, 32(5 Suppl.), s119-s126.
- Jacobson, P. (2007). Empowering the physician-patient relationship: The effect of the Internet. *Partnership. Canadian Journal of Library and Information Practice and Research*, 2(1), 5. Retrieved from <http://www.criticalimprov.com/index.php/perj/article/view/Article/244/374>
- Jones, S., & Fox, S. (2009). *Generations online in 2009*. Washington, DC: Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org/Reports/2009/Generations-Online-in-2009.aspx>
- Lenhart, A. (2009). *Adults and social network sites*. Washington, DC: Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org/Reports/2009/Adults-and-Social-Network-Websites.aspx>
- Lenhart, A., Purcell, K., Smith, A., & Zickuhr, K. (2010, February). *Social media and young adults*. Washington, DC: Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org/Reports/2010/Social-Media-and-Young-Adults.aspx>
- Murray, E., Burns, J., See Tai, S., Lai, R., & Nazareth, I. (2005). Interactive health communication applications for people with chronic disease. *Cochrane Database of Systematic Reviews*, (4): CD004274. doi:10.1002/14651858.CD004274.pub4. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004274.pub4>
- O'Grady, L., Wittman, H., Bender, J. L., Urowitz, S., Wiljer, D., & Jadad, A. R. (2009). Measuring the impact of a moving target: Towards a dynamic framework for evaluating collaborative adaptive interactive technologies. *Journal of Medical Internet Research*, 11, e20.
- Pew Internet & American Life Project. (2009). *Demographics of Internet users*. Retrieved <http://www.pewinternet.org/Static-Pages/Trend-Data/Whos-Online.aspx>
- Portnoy, D. B., Lori, A. J., Sheldon, S., Johnson, B. T., & Carey, M. P. (2008). Computer-delivered interventions for health promotion and behavioral risk reduction: A meta-analysis of 75 randomized controlled trials, 1988–2007. *Preventive Medicine*, 47, 3-16.
- RE-AIM. (1999). *Overview of framework*. Retrieved from <http://www.re-aim.org/what-we-do/framework-overview.aspx>
- Samoocha, D., Bruinvels, D. J., Elbers, N. A., Anema, J. R., & van der Beek, A. J. (2010). Effectiveness of Web-based interventions on patient empowerment. *Journal of Medical Internet Research*, 12(2), e23.
- Smith, A. (2010). *Mobile access 2010*. Washington, DC: Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org/Reports/2010/Mobile-Access-2010/Summary-of-Findings.aspx>
- Thackeray, R., Neiger, B. L., Hanson, C. L., & McKenzie, J. F. (2008). Enhancing promotional strategies within social marketing programs: Use of Web 2.0 social media. *Health Promotion Practice*, 9, 338-343.
- Wantland, D. J., Portillo, C. J., Holzemer, W. I., & Slaughter, R. (2004). The effectiveness of Web-based and non-Web-based interventions: A meta-analysis of behavioral change outcomes. *Journal of Medical Internet Research*, 6(4), e40.
- Webb, T. L., Joseph, J., Yardley, L., & Michie, S. (2010). Using the Internet to promote health behavior change: A systematic review and meta-analysis of the impact of theoretical basis, use of behavior change techniques, and mode of delivery on efficacy. *Journal of Medical Internet Research*, 12(1), e4.