The SAGE Encyclopedia of the Internet

e-Health

First introduced by medical industry leaders and marketers, the term *e-health* has been used to convey the optimistic promise of using Internet-related technology to improve health. There remains a great deal of ambiguity with regard to what *e-health* means. Part of the uncertainty in finding a precise definition lies in the word *health*, which generally refers to an outcome rather than a specific object or activity. According to the World Health Organization (1948), "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (p. 1). The term *e-health* does not lend itself to a common definition, and scholars have liberally defined it in a variety of ways specific to the function that the term serves in the context of its use. This variety of definitions contributes to the ambiguity as well as to the richness and complexity of the concept.

This entry does not attempt to provide a specific definition for e-health. Rather, it serves to provide a broad overview of what e-health can mean in a variety of contexts. e-Health can refer to (a) traditional health care enabled through Internet-related technologies, (b) health-related information and support available online, and (c) behavioral health interventions designed to be transmitted via Internet-related technologies. However, these categories are not exhaustive as the concept continues to evolve to encompass newer forms of technology.

Traditional Health Care Enhanced Through Internet-Related Technologies

Thus far, the dominant way in which e-health has been conceptualized, understood, and studied is through the perspective of the various ways by which Internet-related technologies have enhanced traditional health care as a *process*. The focus is on the various Internet-related technologies, their affordances, and their impacts on the traditional health care process such as cost-effectiveness, efficiency, and patient health outcomes. Three main categories of e-health technologies have been implemented and assessed: (1) storage, management, and transmission of data; (2) clinical decision-making support; and (3) facilitation of health care over distances.

In the first category, the technologies that enable the storage, management, and transmission of data consist mainly of electronic health records and picture-archiving systems. Electronic health records refer to a system where patient health care information is collected, sometimes over time, and shared through an integrated information system. Picture-archiving systems refer to information systems that allows for the archival and distribution of digitized medical images, such as radiographs.

The second category encompasses technologies that support clinical decision making. These include computerized provider order entries, such as e-prescribing, and computerized decision support systems. For instance, computerized order entry systems can refer to technological frameworks that enable physicians to communicate with laboratories and other clinicians to facilitate the exchange of laboratory test results, radiographs, and referrals. Likewise, e-prescribing allows physicians to transmit prescriptions to pharmacies. Last, computerized decision support systems refer to software applications that help physicians diagnose and treat patients. These applications allow physicians either to have easy access to the latest relevant medical information for accurate diagnoses and treatments (passive computerized decision support system) or to input patient-specific data, logical mechanisms, and outputs, in order to generate patient-specific diagnoses and treatments (active computerized decision support system).

Finally, the use of technologies to facilitate health care and clinical consultation remotely, also

called *telemedicine*, is another way to augment traditional health care. According to Joseph Kvedar, Molly Joel Coye, and Wendy Everett, telemedicine is a cost-effective health care option, compared with face-to-face care. The operationalization of telemedicine can take several different forms, such as the use of interactive and live videos, live and asynchronous chats, and emails, all of which can be used for physicians to provide consultation and diagnoses, recommend treatment plans, and prescribe medicine. Patients can also send health indicators such as blood pressure and heart rate to health care providers through specialized devices. Unlike the previous two categories of e-health technological frameworks, which focus on streamlining information flow on the health care providers' end, telemedicine is focused on achieving desired health outcomes on the patient end. Telemedicine services include gap service coverage such as nighttime radiology, urgent services such as stroke or burn services, as well as regular consultation over distances.

Health-Related Information and Usability Support

In addition to e-health being understood from the perspective of technological enhancements to existing structures of health care provision, it also involves the increasing amount of health information being made available online on websites such as MedlinePlus, WebMD, healthfinder.gov, and LIVESTRONG.COM. This increase in health information is equaled by the demand for online health information. A 2007 study of seven countries in Europe by Hege Andreassen and colleagues found that 71% of Internet users had used the Internet for health purposes, with 52% having read about health or illnesses online, 37% having looked up information to prepare for a doctor's appointment, and 44% having looked up information after an appointment. The Pew Research Center reported in 2014 that 72% of Internet users in the United States have searched for health information online.

Social support networks enabled through online support groups have also been garnering greater use. Specifically, 16% of Internet users in the United States have looked online for others who have similar concerns, according to the Pew Research Center. One of the reasons why users utilize online social support networks for health is that it helps people better cope with various health conditions that they may suffer from. Online social support is especially promising in helping patients suffering from mental health illnesses. Some researchers have found that information provided on these online forums tends not to be based on science but on social media sources, including opinions and personal experience. Scholars have called for greater participation by health professionals to increase the reliability of health information found online.

The proliferation of health information available via health websites and online support groups points to a need to educate Internet users so that they can distinguish between websites with high-quality health information and those with information of poor quality. Traditionally, health literacy, as a set of health information processing skills, has been used to assess the competency of an individual with regard to assessing health information. However, other scholars have called for a different type of competency that addresses online health information specifically. e-Health literacy is a skill that is needed to successfully navigate and apply e-health resources to people's lives. Defined as the "ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem" (Norman & Skinner, 2006), e-health literacy is critical for individuals seeking valid and reliable health information in a web-based context. e-Health literacy is unique in that it is a specific form of literacy that arises from a number of core human competencies. These include context-independent literacies, such as traditional, media, and information literacy, and context-specific literacies, such as health, scientific, and

computer literacy.

e-Health as a Platform for Health Promotion Interventions

A final way to conceptualize e-health is to view it as a new medium for the communication of behavioral change programs. Traditionally, health behavior change interventions (e.g., public antismoking campaigns, healthier eating campaigns, and exercise campaigns) tended to be top-down, consisting of interest groups, experts, or the government disseminating messages to the public in hopes of changing behaviors that can help prevent the onset of various diseases. The arrival of Internet-related technologies has enabled greater customization, interactivity, and contextuality, which can lead to greater personal engagement, customized and on-demand information, extensive dissemination of messages, and social support networks. These affordances allow intervention designers to tap further into core psychological drivers in behavioral science such as self-efficacy, attitudes, and social norms, in order to encourage behavior change and adoption. Researchers are examining the efficacy of e-health interventions, with some studies having garnered promising evidence for its application in the context of managing somatic diseases.

See also Cyberwellness; Health Care and the Internet; Telemedicine

May O. Lwin Andrew Z. H. Yee

Further Readings

Andreassen, H., Bujnowska-Fedak, M., Chronaki, C., Dumitru, R., Pudule, I., Santana, S., & Wynn, R. (2007). European citizens' use of e-health services: A study of seven countries. BMC Public Health, 7(1), 53.

Beck, M. (2016, June 26). How telemedicine is transforming health care. Wall Street Journal. Retrieved from https://www.wsj.com/articles/how-telemedicine-is-transforming-health-care-1466993402

Berkman, N., Davis, T., & McCormack, L. (2010). Health literacy: What is it? Journal of Health Communication, 15(S2), 9–19.

Black, A., Car, J., Pagliari, C., Anandan, C., Cresswell, K., Bokun, T., & Sheikh, A. (2011). The impact of eHealth on the quality and safety of health care: A systematic overview. PLoS Medicine, 8(1), e1000387.

Elbert, N., van Os-Medendorp, H., van Renselaar, W., Ekeland, A., Hakkaart-van Roijen, L., Raat, H., & Pasmans, S. (2014). Effectiveness and cost-effectiveness of eHealth interventions in somatic diseases: A systematic review of systematic reviews and meta-analyses. Journal of Medical Internet Research, 16(4), e110.

Fox, S. (2014). The social life of health information. Washington, DC: Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/01/15/the-social-life-of-health-information/

Kreps, G., & Neuhauser, L. (2010). New directions in eHealth communication: Opportunities and challenges. Patient Education and Counseling, 78(3), 329–336.

Kvedar, J., Coye, M., & Everett, W. (2014). Connected health: A review of technologies and strategies to improve patient care with telemedicine and telehealth. Health Affairs, 33(2), 194–199.

Muellmann, S., Forberger, S., Möllers, T., Zeeb, H., & Pischke, C. (2016). Effectiveness of eHealth interventions for the promotion of physical activity in older adults: A systematic review protocol. Systematic Reviews, 5(1), 47.

Norman, C., & Skinner, H. (2006). e-Health literacy: Essential skills for consumer health in a

networked world. Journal of Medical Internet Research, 8(2), e9.

Nutbeam, D. (2008). The evolving concept of health literacy. Social Science & Medicine, 67(12), 2072–2078.

O'Grady, L., Bender, J., Urowitz, S., Wiljer, D., & Jadad, A. (2010). Promoting and participating in online health forums: A guide to facilitation and evaluation for health professionals. Journal of Communication in Healthcare, 3(3–4), 246–257.

Oh, H., Rizo, C., Enkin, M., & Jadad, A. (2005). What is eHealth (3): A systematic review of published definitions. Journal of Medical Internet Research, 7(1), e1.

Pagliari, C., Sloan, D., Gregor, P., Sullivan, F., Detmer, D., Kahan, J. P., & MacGillivray, S. (2005). What is eHealth (4): A scoping exercise to map the field. Journal of Medical Internet Research, 7(1), e9.

Pistrang, N., Barker, C., & Humphreys, K. (2008). Mutual help groups for mental health problems: A review of effectiveness studies. American Journal of Community Psychology, 42(1–2), 110–121.

Stellefson, M., Hanik, B., Chaney, B., Chaney, D., Tennant, B., & Chavarria, E. (2011). eHealth literacy among college students: A systematic review with implications for ehealth education. Journal of Medical Internet Research, 13(4), e102.

Sudau, F., Friede, T., Grabowski, J., Koschack, J., Makedonski, P., & Himmel, W. (2014). Sources of information and behavioral patterns in online health forums: Qualitative study. Journal of Medical Internet Research, 16(1), e10.

Tanis, M. (2008). Health-related on-line forums: What's the big attraction? Journal of Health Communication, 13(7), 698–714.

Weinstein, R., Lopez, A., Joseph, B., Erps, K., Holcomb, M., Barker, G., & Krupinski, E. (2014). Telemedicine, telehealth, and mobile health applications that work: Opportunities and barriers. American Journal of Medicine, 127(3), 183–187.

World Health Organization. (1948, June 19–22). Preamble to the Constitution of World Health Organization as adopted by the International Health Conference, New York. Retrieved from https://hero.epa.gov/hero/index.cfm/reference/details/reference_id/80385