

E-HEALTH

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Abstract--e-health is the use of information and communication technologies (ICT) for health. Examples include treating patients, conducting research, educating the health workforce, tracking diseases and monitoring public health.

INTRODUCTION

Everybody talks about e-health these days, but few people have come up with a clear definition of this comparatively new term. Barely in use before 1999, has this term now seemed to serve as a general "buzzword," used to characterize not only "Internet medicine", but also virtually everything related to computers and medicine? The term was apparently first used by industry leaders and marketing people rather than academics. They created and used this term in line with other "e-words" such as e-commerce, e-business, e-solutions, and so on, in an attempt to convey the promises, principles, excitement (and hype) around e-commerce (electronic commerce) to the health arena, and to give an account of the new possibilities the Internet is opening up to the area of health care. Intel, for example, referred to e-health as "a concerted effort undertaken by leaders in health care and hi-tech industries to fully harness the benefits available through convergence of the Internet and health care." Because the Internet created new opportunities and challenges to the traditional health care information technology industry, the use of a new term to address these issues seemed appropriate. These "new" challenges for the health care information technology industry were mainly (1) the capability of consumers to interact with their systems online (B2C = "business to consumer"); (2) improved possibilities for institution-to-institution transmissions of data (B2B = "business to business"); (3) new possibilities for peer-to-peer communication of consumers (C2C = "consumer to consumer").

So, how can we define e-health in the academic environment? One JMIR Editorial Board member feels that the term should remain in the realm of the business and marketing sector and should be avoided in scientific medical literature and discourse. However, the term has already entered the scientific literature (today, 76 Medline-indexed articles contain the term "e-health" in the title or abstract). What remains to be done is - in good scholarly tradition - to define as well as possible what we are talking about. However, as another member of the Editorial Board noted, "stamping a definition on something like e-health is somewhat like stamping a definition on 'the Internet': It is defined how it is used - the definition cannot be pinned down, as it is a dynamic environment, constantly moving." It seems quite clear that e-health encompasses more than a mere technological development. I would define the term and concept as follows:

e-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology. This definition hopefully is broad enough to apply to a dynamic environment such as the Internet and at the same time acknowledges that e-health encompasses more than just "Internet and Medicine". As such, the "e" in e-health does not only stand for "electronic," but implies a number of other "e's," which together perhaps best characterize what e-health is all about (or what it *should* be). Last, but not least, all of these have been (or will be) issues addressed in articles published in the Journal of Medical Internet Research.

- **THE ESSENTIAL THINGS IN "E-HEALTH"**
- **Efficiency** - one of the promises of e-health is to increase efficiency in health care, thereby decreasing costs. One possible way of decreasing costs would be by avoiding duplicative or unnecessary diagnostic or therapeutic interventions, through enhanced communication possibilities between health care establishments, and through patient involvement.
- **Enhancing quality of care** - increasing efficiency involves not only reducing costs, but at the same time improving quality. E-health may enhance the quality of health care for example by allowing comparisons between different providers, involving consumers as additional power for quality assurance, and directing patient streams to the best quality providers.

- **Evidence based** - e-health interventions should be evidence-based in a sense that their effectiveness and efficiency should not be assumed but proven by rigorous scientific evaluation. Much work still has to be done in this area.
- **Empowerment** of consumers and patients - by making the knowledge bases of medicine and personal electronic records accessible to consumers over the Internet, e-health opens new avenues for patient-centered medicine, and enables evidence-based patient choice.
- **Encouragement** of a new relationship between the patient and health professional, towards a true partnership, where decisions are made in a shared manner.
- **Education** of physicians through online sources (continuing medical education) and consumers (health education, tailored preventive information for consumers)
- **Enabling** information exchange and communication in a standardized way between health care establishments.
- **Extending** the scope of health care beyond its conventional boundaries. This is meant in both a geographical sense as well as in a conceptual sense. e-health enables consumers to easily obtain health services online from global providers. These services can range from simple advice to more complex interventions or products such as pharmaceuticals.
- **Ethics** - e-health involves new forms of patient-physician interaction and poses new challenges and threats to ethical issues such as online professional practice, informed consent, privacy and equity issues.
- **Equity** - to make health care more equitable is one of the promises of e-health, but at the same time there is a considerable threat that e-health may deepen the gap between the "haves" and "have-nots". People, who do not have the money, skills, and access to computers and networks, cannot use computers effectively. As a result, these patient populations (which would actually benefit the most from health information) are those who are the least likely to benefit from advances in information technology, unless political measures ensure equitable access for all. The digital divide currently runs between rural vs. urban populations, rich vs. poor, young vs. old, male vs. female people, and between neglected/rare vs. common diseases.

THE HEALTH DATA ECOSYSTEM AND BIG DATA

Globally, the evolution of the health data ecosystem within and between countries offers new opportunities for health care practice, research and discovery. There are new stakeholders and new capabilities as technologies, analytical methods and policy change and adapt in order to realize the potential of big data in health. This environment opens new possibilities and challenges, and requires innovative responses across the spectrum.

EXPANDING SOURCES OF DATA

Beyond traditional sources of data generated from health care and public health activities, we now have the ability to capture data for health through sensors, wearable and monitors of all kinds.

GROWING CAPABILITIES

New analytical methods allow us to link to other, dissimilar data such as environmental, geospatial, life style and behavioural data. New technological capabilities allow generation, storage and exploitation of data across many aspects of human health.

E-HEALTH AT WHO

e-health is the use of information and communication technologies (ICT) for health. The e-health unit works with partners at the global, regional and country level to promote and strengthen the use of information and communication technologies in health development, from applications in the field to global governance. The unit is based in the Department of Service Delivery and Safety in the cluster of Health Systems and Innovation.

IMPACT ON PATIENT-PHYSICIAN INTERACTIONS

E-technology has the power to significantly strengthen patient-physician relationships. While additional research is needed to determine specific outcomes, preliminary studies and surveys have reported positive results. Providing patients with the tools to manage their own care allows them to enjoy a sense of increased confidence in their physicians and be more comfortable dealing with their conditions. When patients have e-health resources available at their fingertips, they're better equipped to ask their physicians more pointed questions to understand their conditions and better manage their health. People are more likely to complete treatment plans recommended by physicians when they can research outcomes to learn the benefits of prescriptions, exercises and other health activities designed to improve their conditions. Sharing the burden of their own care increases patient satisfaction, as people are able to gain a deeper understanding of exactly what their physician is doing to help them.

E-HEALTH AND HEALTH INFORMATICS

Health informatics focuses on developing tools to improve healthcare, while e-health is designed to make it easier to share this valuable information. The two can work in conjunction to provide patients with top-quality care, in a much more efficient manner.

For example, researchers are working to develop a process to automatically validate EHR documents to determine whether they conform to necessary standards. In the future, this will help to simplify the overall validation process. Researchers are also working to determine how simulation can be used to strengthen prediction models for infectious diseases. **Careers in eHealth and Health Informatics on the Rise** The future of the healthcare industry is undergoing a massive restructuring as a result of eHealth and health informatics. Professionals searching for work in these fields enjoy plenty of job prospects. Major initiatives such as the Affordable Care Act and the implementation of ICD-10 created a demand for workers skilled in health information technology. Many healthcare organizations have been forced to delay the onset of certain systems, due to a lack of talent to implement the changes. The U.S. Bureau of Labour Statistics predicts that employment of health information professionals will increase by 22% through 2022. In fact, experts predict this employment trend will continue on even longer. Healthcare and related industries are home to the fastest-growing job sectors in the country and, according to experts, that trend will continue well past 2020. Many of those jobs will be in health information technologies (HIT). According to the Bureau of Labour Statistics, employment of health information professionals is expected to grow 22% from 2012 to 2022, outpacing the average for other occupations. The tremendous growth is creating a dearth in the job pool: According to one survey, 34% of leaders in the healthcare industry say they "cancelled or delayed a key strategic initiative" due to lack of available talent. Initiatives such as the shift to electronic health and medical records and ICD-10, which encompasses the addition of more than 130,000 new medical codes, will make professionals with HIT experience more employable than ever.

Some job paths to pay particular attention to when considering a future in HIT include:

- Electronic medical or health record (EMR,EHR) development and maintenance – “From design and implementation of systems to ensuring information integrity, collating meaningful use data, and introducing patients to portals, the EHR has opened new doors for health information management (HIM) in the traditional and non-traditional settings,” according to ADVANCE for Health Information Professionals.
- Analytics – Once all the data has been collected, professionals are needed to read, analyze and offer suggestions for program improvements. Hospitals build care protocols from collected data and staffing projections come from analyzing patient admission and diagnosis trends. Insurance companies, pharmaceutical companies and medical supply manufacturers all study healthcare data when making production and payment decisions. This also contributes to the discipline of population health management at large.
- Coding – Coding experts are needed to help healthcare providers shift to a new, international standard coding system called ICD-10 (the 10th revision of the International Statistical Classification of Diseases and Related Health Problems). ICD-10 is a medical classification list used to classify diseases and other health problems. It increases the number of medical codes from about 18,000 to more than 150,000. By Oct. 1, 2015, every doctor’s office, health clinic, long- and short-term care facility and will be required to diagnose and by the more detailed ICD-10 system. Healthcare providers will likely need additional staff to become and stay compliant.
- Education and Research – For there to be an expanding employee pool there must be colleges teaching them. Opportunities in the education sector
- Will likely grow to meet student demands. Meaningful Use Specialist – The Medicare and Medicaid EHR Incentive Programs provide financial incentives for the “meaningful use” of certified Electronic Health Record (EHR) technology. There are three stages with increasing requirements for participation. Meaningful use refers to using electronic health records to improve quality, safety and care coordination among healthcare providers, as well as maintaining privacy and security of patient health information and more. It is hoped that meaningful use compliance will lead to better clinical outcomes, improved population health outcomes, increased transparency and efficiency and more robust research data. Specialists in this field access ensure that a medical facility, employees and its affiliates comply with HITECH requirements and deadlines for Meaningful Use.

CONCLUSION

Health, as used in these definitions, usually referred explicitly to health care as a process, rather than to health as an outcome. This is as expected;” to the all-encompassing World Health Organization's “health is a state of complete physical, mental, and social well-being and not just the absence of disease or infirmity”. In the definitions of e-health we found, technology was viewed both as a tool to enable a process/function/service and as the embodiment of e-health itself (eg, a health website on the Internet). We were pleased to note that technology was portrayed as a means to expand, to assist, or to enhance human activities, rather than as a substitute for them. Surprisingly few of the published definitions referred explicitly to the commercial aspects of e-health.

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