



Published in final edited form as:

J Dual Diagn. 2013 ; 9(1): 101–103. doi:10.1080/15504263.2012.750105.

The Role of Technology in Health Care Innovation: A Commentary

Lisa A. Marsch, Ph.D.¹ and David H. Gustafson, Ph.D.²

Lisa A. Marsch: Lisa.A.Marsch@dartmouth.edu; David H. Gustafson: dhgustaf@wisc.edu

¹Center for Technology and Behavioral Health, Dartmouth Psychiatric Research Center, Geisel School of Medicine at Dartmouth, Hanover, NH

²Center for Health Enhancement Systems Studies, University of Wisconsin-Madison, Madison, WI

Information and communication technologies offer the opportunity for tremendous innovation in healthcare. Technology-based therapeutic and care coordination systems, that embrace web-, mobile-, sensing-, computing, and bioinformatics technologies, offer considerable promise for enabling entirely new models of healthcare both within and outside of formal systems of care and offer the opportunity to have a large public health impact.

In a recent article, Linda Rosenberg highlights three primary changes she sees evolving within U.S. healthcare policy and practice, including increasing: (1) consumer engagement in their own care management, (2) integration of physical care and mental healthcare within care settings, and (3) data-driven care that measures outcomes and is responsive to performance metrics (Rosenberg, 2012).

We propose that technology can play a key role in all three of these evolutions, plus more. First, technology affords a new model for enabling consumers to play a central role in selecting and helping to define the course of their own healthcare. A wide array of tools exist to monitor and capture real-time data about individuals' behavioral and physiological states (e.g., via user input into mobile applications, wearable sensors and/or smartphone sensors). Additionally, there has been an explosion of research and development activities leading to the creation of self-directed tools that provide on-demand, educational or therapeutic support anytime/anywhere to help individuals manage their own health behavior. These tools may also provide individuals with the option to engage an extended support network in their own healthcare management (e.g., by sharing their health behavior data with family and friends to both empower and support them; by participating in virtual supportive communities, etc.). Further, decision support tools are increasingly being developed to help individuals better understand, access, and make choices about treatment.

Second, although integration of behavioral healthcare into care settings that have largely managed physical health holds great promise for increasing coordination, quality, and impact of care, this evolution also creates a scenario in which already overburdened

Contact Information for Corresponding Author: Lisa A Marsch, Ph.D., Director, Center for Technology and Behavioral Health, Dartmouth Psychiatric Research Center, Department of Psychiatry, Geisel School of Medicine at Dartmouth, Dartmouth College, Rivermill Commercial Center, 85 Mechanic Street; Suite B4-1, Lebanon, NH 03766, Lisa.A.Marsch@Dartmouth.edu, Voice: 603-448-0263, ext. 147, Fax: 603-448-3976.

DISCLOSURES

The authors report no financial relationships with commercial interests with regard to this commentary. Dr. Marsch is affiliated with HealthSim, LLC, a small business that developed a web-based psychosocial intervention for substance use disorders. This relationship is extensively managed by Dr. Marsch and her academic institution.

clinicians may not feel like they have the expertise, time, or resources to effectively address the behavioral health (e.g., substance use, mental health) needs of their clients. Technology offers tremendous opportunity to facilitate integrated care. Technology-based care systems, grounded in science-based approaches to promote health behavior, offer the potential to concurrently address an array of chronic illnesses and behavioral health issues in a manner that is optimally responsive to each patient's needs. In this way, technology may reduce disease-specific, siloed care and offer countless opportunities for tailoring behavioral monitoring and intervention delivery for each individual and in response to changing health behavior trajectories over time.

Third, embracing technology as part of the fundamental infrastructure for healthcare delivery allows for detailed data capture that can enable a careful examination of outcomes, including at the patient, provider, organizational and system levels. In some cases, this may optimally occur when electronic health records containing data captured within the care setting are integrated with data captured via other electronic media used by patients to monitor their health behavior outside of care settings. And, in other cases, detailed data capture can help individuals identify meaningful patterns in their own behavioral health.

A growing body of research has demonstrated the acceptability, effectiveness, and cost-effectiveness of technology-based therapeutic tools (e.g., Marsch & Ben-Zeev, 2012). The widespread reach and 'just-in-time' therapeutic support they provide may help to prevent escalation of symptoms and promote sustained support for health behavior. Additionally, given the ubiquity of technology, including rapidly growing access to the Internet and smartphones among diverse communities, an approach to healthcare that embraces technology may play a key role in reducing healthcare disparities.

Technology may increase our ability to pursue the World Health Organization's definition of health, which embraces complete mental, physical and social well-being and not merely the absence of disease and infirmity (WHO, 1948). We may not get all the way there, but we may get closer than ever before. Unlike traditional medical care, which is simply a periodic visitor in the lives of people, technology can be there every minute of every day. It can measure, analyze, and intervene at any time and do so in virtually all aspects of life (many of which are outside the traditional purview of healthcare but which affect wellbeing). Technology in cars can prevent one from turning left into an oncoming truck. It can be used to measure gait to determine whether a person's balance or cognitive well-being has deteriorated. It can offer games to relax, information to guide, or warnings to prepare individuals when weather becomes dangerous. Technology can relieve loneliness and isolation, speed productivity, and drive and park a car. All these things are not dreams; they are operational right now. Of course, the use of technology must be tailored to the needs and assets of individuals, families, and communities and be under their control. But, if offered in this way, technology allows for the potential to touch virtually every part of life that affects wellbeing.

In order to fully realize this potential, however, a number of key challenges need to be tackled. First, although a large number of technology-based therapeutic tools have been developed, a unified, coordinated, and scalable technology-based system has not yet been fully developed. In order for this approach to have a large impact on population health, an understanding of the optimal combination of tools to include in a technology-based care delivery system is needed. Additionally, an understanding of the best model for integrating and deploying such a system, in a manner that brings value to all relevant stakeholders, is critical.

Relatedly, the cultural divide between healthcare specialists and technology specialists needs to be bridged. A number of groups have already launched initiatives to facilitate coordinated efforts among a diverse group of health specialists and technologists, but an ongoing and focused dialogue is needed to achieve the end goal product.

Additionally, current reimbursement models are not yet structured to accommodate many technology-based therapeutic tools in their payer models. The way in which these reimbursement models are structured over time will undoubtedly have a substantive impact on the adoption and sustained use of this approach.

There are reasons to be both excited and cautious about this evolution. Although technology targeting behavioral health can offer valuable tools to behavioral health specialists, it will likely also force a transition in care delivery models. As mentioned above, there are already hundreds of research articles demonstrating that technology-based behavioral interventions, such as those targeting depression, anxiety disorders and substance use disorders, can be as effective as clinicians who treat these disorders. With increasing consumer access and demand for technology-based therapeutic tools, behavioral health specialists will need to embrace this evolution and evolve along with it. Professionals will need to view technology as a powerful partner in improving quality and productivity of behavioral healthcare.

We recognize that there will be resistance by some to this change. But we see evidence of similar trends in virtually every labor-intensive profession, including our own. Faculty members at universities are finding they need to adjust to the prospect that hundreds of thousands of people can (for many topics) learn as effectively from computers as they can in a classroom. Researchers are finding that, by leveraging technology, mega research studies can be conducted in much less time, include more diverse participant representation, and address many more research questions than ever before. Statisticians may find that data mining and machine learning, along with massive volumes of data, can change the need for inferential statistics.

In many ways, it is difficult to envision an evolution in healthcare, including the realization of the goals of the Affordable Care Act of 2010, without centrally embracing technology as a key part of a new model of healthcare. This is an exciting time of tremendous opportunity to transform healthcare delivery models. And, this is a time to seek out new horizons. We have the opportunity to broaden our goals and models of care to help people really understand the complex issues of our time and make decisions that are in their best interests and can help them meet their goals. Although much work is still needed, we look forward to the launch of innovative service delivery models at a population level that leverage the numerous, effective, technology-based tools we have available to optimize the reach, impact, and cost-effectiveness of healthcare.

Acknowledgments

Preparation of this Commentary was partially supported by a P30 “Center of Excellence” grant from the National Institute on Drug Abuse (NIDA; P30DA029926; Principal Investigator: Lisa A. Marsch, PhD; www.c4tbh.org), a P50 “Center of Excellence” grant from the Agency for Healthcare Research and Quality (AHRQ; P50 HS019917; Principal Investigator: David Gustafson, Ph.D.) as well as NIH grants #R01 AA017192 and R01 DA034279.

References

Marsch LA, Ben-Zeev D. Technology-based assessments and interventions targeting psychiatric and substance use disorders: Innovations and opportunities. *Journal of Dual Diagnosis*. 2012; 8(4) [Special issue].

Rosenberg L. Are healthcare leaders ready for the real revolution? *The Journal of Behavioral Health Services & Research*. 2012; 39(3):215–219.10.1007/s11414-012-9285-z

World Health Organization. Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference; New York. 19–22 June, 1946; 1948. signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. Available online at: <http://www.who.int/about/definition/en/print.html>