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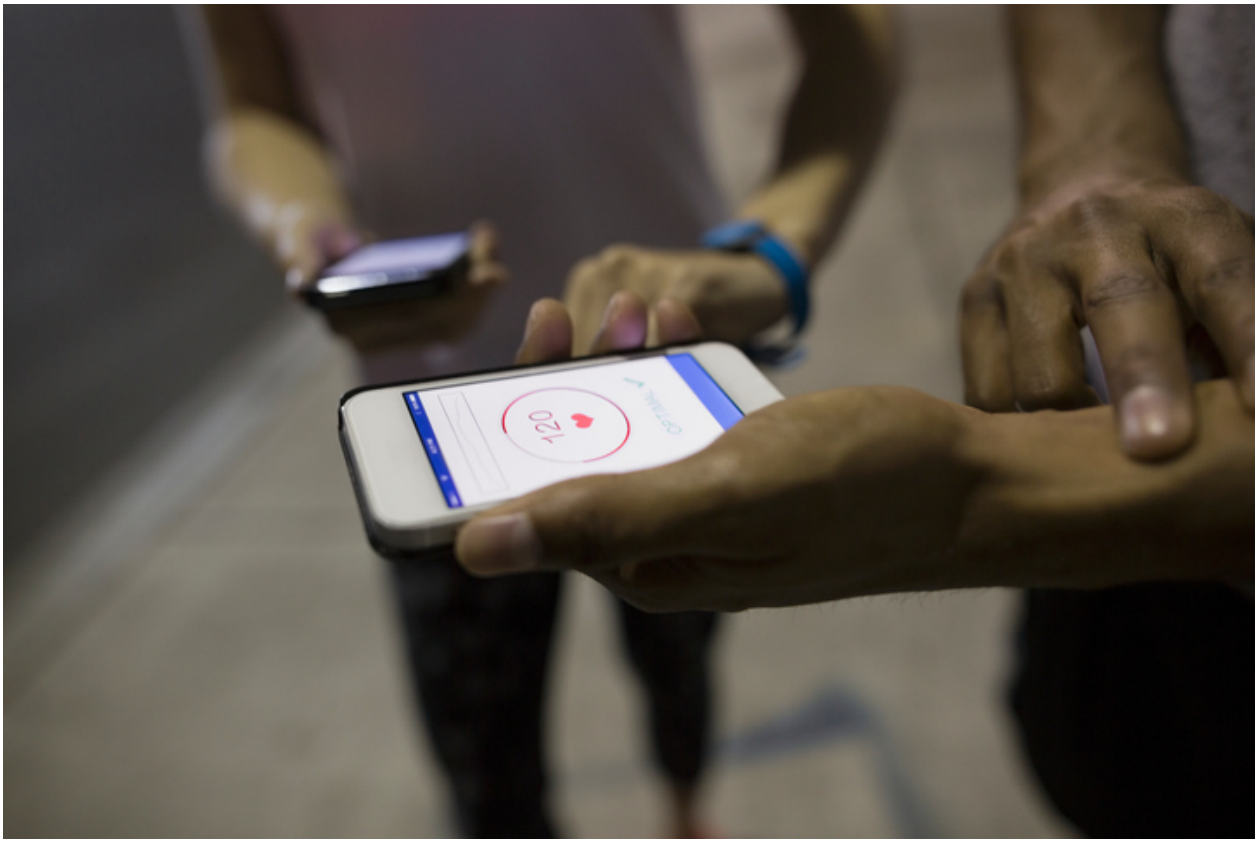
Five ways digital health technology will change cardiovascular disease

Of an estimated 16 million annual deaths under the age of 70 from non-communicable diseases, 37% are due to CVD. Explore 5 ways digital health will change cardiovascular disease.



Globally, cardiovascular disease (CVD) – including heart disease (coronary arteries and muscle), cerebrovascular disease (involving arteries of the neck and brain), and peripheral artery disease (arteries supplying blood to arms and legs) – is the leading cause of death. Of an estimated 16 million annual deaths under the age of 70 from non-communicable diseases, 37% are due to CVD. On a more positive note, most CVDs are preventable and the emergence of digital health technologies will play a pivotal role in how CVD is approached and prevented by some of the stakeholders in healthcare: providers, patients, caregivers, and technology companies.

1. Start by getting a handle on health data

Gordon Gekko, the protagonist in the iconic 1987 movie Wall Street, rightfully proclaimed that the most valuable commodity in the world is information. The problem with Big Data in healthcare is that it is hard to harness due to existing business models and regulatory restrictions. Much of the data is retrospectively collected and/or available only *after* an encounter or hospitalization (for example, via insurance claims data) rather than helping to prevent CVD.

" What is needed is the transformation of Big Data into relevant data. "

Real-time curation and analysis of patient health data sets over periods of time across disparate electronic health record systems is critical. In addition, patient reported outcomes must be included. This type of data collection and analysis, if performed with incorporated practice guidelines can facilitate changes to prevent CVD.

There are numerous high quality cardiovascular disease databases in use today. The role of registries in cardiology include quality assurance, source of development of research hypotheses, and a resource for information about patients who fall outside of clinical trials from which evidence based medicine guidelines were developed. Developing registries with the above attributes (interoperability, customizable analytics, PROs) will give Big Data meaning and utility.

2. Make healthcare participatory not passive

There is no question that digital health technologies will penetrate the healthcare market with the blurring of lines between consumers and patients. Lifestyle modification lies at the core of prevention of CVD and other chronic diseases, which utilize the vast majority of healthcare resources. Obesity, physical inactivity, diet, and cigarette smoking should be the critical targets of preventive measures. With the advent of value-based payment models which incorporate patient outcomes, digital technologies offer an attractive source of quality care via potential for increased patient engagement.

A common myth among many healthcare stakeholders and technology companies is that successful digital health strategies are dependent upon sophisticated technologies. Many successful digital interventions globally have involved simple text messaging. A recently published review of mobile text messaging interventions (TMIs) in health concluded that *"…the majority of published TMIs were effective at addressing diabetes self-management, weight loss, physical activity, smoking cessation, and medication adherence for antiretroviral therapy…"* In addition to text messaging, consumer-facing digital tracking tools like Fitbit, Jawbone, smart watches, and others have the potential to penetrate the traditional healthcare market. Increasing physical activity and tracking food intake have implications with regards to obesity and thus downstream diseases of hypertension, diabetes, and CVD.

3. Transform points of living into points of care

The promise of digital health is a vision of redefining points of care from the clinic or hospital to the patient's home. The future importance of health technology at home was the focus of a March, 2016 report by the United States President's Council of Advisors on Science and Technology. The report "Independence, Technology and Connection in Older Age" discusses technologies for social connectivity and emotional health. Though not speaking directly to CVD, the holistic approach proposed addresses the use of technology at home and in activities of daily living which will ultimately make an impact on prevention and management of CVD and its risk factors, particularly for older patients living with CVD.

In similar governmental support of technology use at home, Simon Stevens, the chief executive of NHS England in a public forum expressed his support for wearable technologies in healthcare. He discussed

a technology and innovation tariff and said that worthy and selected technology will be reimbursed by the NHS. Wearable technologies combined with video encounters with healthcare professionals create non-traditional, convenient and more realistic points of care.

4. Remote monitoring

It is not coincidental that many of the game-changing mobile devices reviewed in a piece I wrote in 2014 are targeted for patients with CVD. The magnitude of the impact of CVD on the utilization of human and financial resources begs for innovation in ways of monitoring patients at home. Remote patient monitoring sounds easy to accomplish. It is in fact a very complex process. The ideal remote monitoring system needs to be unobtrusive and deliver useful and only actionable data (that will result in a change in treatment plan). Remote monitoring has been demonstrated to reduce hospital readmissions of patients with congestive heart failure and reduced mortality in patients with implanted cardiac rhythm devices.

5. Personalized medicine: Connecting the dots of genomics, lifestyle, and treatments

We have always known that the same treatment for any disease will not be successful for all patients. Variations in therapeutic response have been demonstrated according to the genome of the patient and sometimes the genome of the diseased tissue.

The use of genomics in CVD has lagged significantly behind compared to other diseases such as cancer. However, strides have been made in determining specific genetic predispositions to certain CVD and even response (or lack thereof) to certain therapies. Combining raw digital data sets from genomics, pathology, imaging, and common text and data is possible today. Layering analytics with some artificial intelligence for clinical decision support on top of this depth of data will take the prevention and treatment of CVD where it needs to be, that is, where oncology already is. Many evidence-based guidelines in medicine bolstered by ‘large’ clinical trials (of a few thousand patients) have already demonstrated significant vulnerabilities.

While there is aggregated evidence from multiple clinical trials that digital health interventions can improve CVD outcomes with a positive impact on risk factor reduction, there is much more work to do. There has long been evidence of gender and racial bias in the care of patients with CVD. Furthermore, the use of mobile technology to bridge gaps in healthcare is not a new concept. It is this author’s hope that simple, easy to use digital health technologies with easy to interpret data layered with artificial intelligence will have a significant impact in the prevention, management, and research into CVD.

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