

: Can mHealth help physicians manage patients and reduce their own cognitive workloads?

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mHealth is an umbrella term for any use of mobile devices and telecommunications to support the practice of medicine and public health. Using mobile technology to help people achieve improved health goals is an important aspect of mHealth. We have much to learn about how new information and smart technologies will impact patients and healthcare providers. Some argue patients can be more involved with their own care and hence take personal responsibility for health outcomes. Supposedly, healthcare providers can do less "busy work" and spend more time assessing new and novel situations and practice a more deliberative, patient-centered medicine. More research can help develop the best tools and can help identify positive and negative consequences and with hope minimize the negative consequences.

mHealth is a broad term that is evolving. Care Innovations(R) President Randy Swanson explains that "in a broad sense, mHealth is a set of apps, devices, connections that allow the user to be mobile, or reach out in a variety of ways." mHealth is user-directed health technology. mHealth apps also collect data and provide advice and decision support for patients. Potentially real-time data from mHealth apps can alert healthcare professionals to impending crises and can track chronic conditions. The hype surrounding mHealth during a time of health crisis suggests caution and skepticism, but the pressures to change encourage rapid innovation, cf. LexisNexis Risk Solutions (2020).

Even the smartest person can only attend to a finite number of complex tasks at one time. Cognitive workload is defined as the level of measurable mental effort put forth by an individual in response to one or more cognitive tasks. Evidence shows individuals have different cognitive capacities. We argue that mHealth can be an enhancer of cognitive activity for patients and can help physicians manage and reduce their cognitive loads. Cognitive overload also known as task saturation can increase stress, reduce performance, and lead to burnout. Poorly structured tasks with ambiguous and even incorrect data and facts create unnecessary load. Overall, preliminary evidence suggests mHealth can reduce cognitive load and help physicians cope with the increasing complexity and rapid change in medical practice. Our hypotheses are expansive, but it seems mHealth can:

1) Provide physicians and other healthcare providers with better and more extensive data for making decisions and recommendations

2) Help patients monitor and make decisions regarding their own care, fitness, and health

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- 3) Provide feedback to patients about health goals
- 4) Send alerts and warnings to patients, caregivers, and emergency room staff
- 5) Alter the frequency of patient visits to healthcare providers
- 6) Enhance personal responsibility of patients for health outcomes
- 7) Improve interactions of patients with a healthcare provider by reducing the need for guesses by a patient about sleep habits, exercise, glucose levels, and many other vital signs.

The wide variety of mHealth technologies can and should be a key component of data-based care programs, cf., Heavin and Power (2019). Preliminary evidence suggests mHealth can expand the scope, reach and equity of healthcare while improving health outcomes, cf., Emerson, Heavin, and Power (2020). Innovative decision support and expert systems applications can use new data streams to monitor chronic conditions and predictively diagnose healthcare needs. Phaneuf (2019) asserts "The use of mobile devices and wireless technology to monitor symptoms and deliver care allows physicians to make diagnoses quicker and with fewer errors."

The emerging research area known as digital health involves studying the use of digital technologies to assist with personal health, healthcare delivery, and public health initiatives to enhance the efficiency of healthcare delivery and to make medicine more personalized and precise. We are at an early stage in what could be along development process.

mHealth, telehealth, Artificial Intelligence and Machine Learning can actually make healthcare more human by reducing the routine work of healthcare providers and by providing more time for personal interaction. AI-based and data-based mHealth can complement and enhance the work of healthcare professionals, cf., Siwicki (2018). Many vendors provide mHealth applications, including Aetna (ITriage), Cerner (CareAware Connect) and Epic Systems (MyChart Mobile), Beaton (2017). Greater use of mHealth tools holds the promise of improving healthcare outcomes.

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Much research is needed to confirm and verify benefits from specific technologies and tools, to identify unintended side effects, and to insure positive user experiences for patients and especially physicians.

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