

# Introduction to Focused Issue on mHealth Infrastructure: issues and solutions that challenge optimal deployment of mHealth products and services

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In 2013, when we began researching mHealth as a disruptive innovation in healthcare (1), we traced the origin of the term back more than two decades to a data communications professor, Dr. Robert Istepanian, now a visiting professor at the Imperial College, London, Institute of Global Health Innovation. Our conclusion at that time, and which currently holds, is that mHealth has yet to achieve industry-wide deployment of functional, sustainable products and services that consistently meet financial, quality, and patient satisfaction benchmarks. Although some impressive clinical and financial outcomes have been achieved, and many individuals have benefitted from access to healthcare made possible by mHealth applications, the scope of deployment across the industry and globally has not reached a ‘tipping point’ where mHealth is a ubiquitous component of the overall healthcare delivery system. We recognize that many factors contribute to this current state of unrealized potential, and many highly intelligent and skilled researchers, clinicians, innovators, and other professional groups continue their work to advance mHealth adoption.

The purpose of this focused issue is to draw attention to a specific inhibiting factor, infrastructure, a conundrum from any perspective considered—technology, regulation, business models, skills development. We do so by providing articles that address these topics head on. In *A Model for mHealth Skills Training for Clinicians: Meeting the Future Now*—Donna J. Slovensky and colleagues assess the current state of mHealth skills acquisition, education, and training available to clinical professionals in educational

programs and address an extant curricula gap; specifically, skills training to implement telemedicine services. The authors offer a model to guide the development of future training programs that incorporate effective training strategies across five domains: (I) digital communication skills; (II) technology literacy and usage skills; (III) deploying telehealth products and services; (VI) regulatory and compliance issues; and (V) telehealth business case. These domains are discussed within the context of interprofessional teams and broader organizational factors.

Varadraj Gurupur and Thomas T. H. Wan further contribute to the mHealth discussion with their article, *Challenges in Implementing mHealth Interventions: A Technical Perspective*. Because mHealth is an emerging area of healthcare applications that offers the potential to improve access to health services, the authors consider the many challenges involved in implementing mHealth and identify some of the key challenges and feasible solutions. Five major areas of technical challenges in implementing mHealth include: (I) usability; (II) system integration; (III) data security and privacy; (IV) network access; and (V) reliability.

The Wingo *et al.* original article, *Monitoring Intervention Fidelity of a Lifestyle Behavioral Intervention Delivered through Telehealth*, focuses on technology-based lifestyle behavioral interventions (i.e., telehealth, mHealth, eHealth, and/or digital health). These types of interventions are becoming an alternative standard of care and possess several advantages over traditional clinical settings such as convenience, cost, and the ability to tailor plans and feedback to a participant’s

individual needs. However, these technology-based interventions also present unique challenges to intervention fidelity due to extra elements involved in executing the intervention. This article describes the intervention fidelity protocol for the 24-START study, a behavior change intervention delivered through telephone and internet. The results of a pilot audit conducted to determine the feasibility of monitoring adherence to the fidelity protocol are also considered.

In *Global mHealth Policy Arena: Status Check and Future Directions*, the editors of this focused issue, Donna J. Slovensky and Donna M. Malvey, revisit and re-evaluate a number of the global health policy expectations they first wrote about in their book, *mHealth: Transforming Healthcare* (1). For example, they fully expected to see the rise of public-private partnerships that would benefit patients, governments, entrepreneurs, and developers. However, ensuing reality has not confirmed their expectations. It appears that health policy generally lags behind the potential for expansion of mobile health technologies and often is an impediment rather than a facilitator for optimization. The emerging question the authors explore is whether health policy ultimately will serve to unite nations in advancing global mHealth or, as Mars and Scott (2) suggested in 2010, keep nations isolated and ultimately making their policy decisions in “eHealth silos”.

Brian Loh and Patrick Then’s article, *Deep Learning for Cardiac Computer-aided Diagnosis: Benefits, Issues & Solutions*, focuses on cardiovascular diseases, one of the top causes of deaths worldwide. In developing nations and rural areas, difficulties with diagnosis and treatment often are exacerbated by the deficiency of healthcare facilities. The article provides an overview of heart disease diagnosis and management, especially within the context of rural healthcare and technology, and discusses issues and solutions of implementing deep learning algorithms to improve the efficacy of relevant medical applications. The integration of telemedicine, mHealth and computer-aided diagnosis systems with the fields of machine and deep learning has enabled the creation of effective services that are adaptable to a multitude of scenarios.

Recruitment and retention strategy investigations in mHealth clinical trials are rare. Angela Fidler Pfammatter and colleagues present us with what they believe to be the first study to describe a systematic evaluation followed by changes and further evaluation to recruitment, use of the mHealth application, adherence to study protocol, and participant retention during an mHealth clinical trial. Their

article, *Evaluating and Improving Recruitment and Retention in an mHealth Clinical Trial: An Example of Iterating Methods During a Trial*, demonstrates how technology offers an opportunity to intensely and remotely evaluate recruitment, use of mobile apps, and retention, leading to new insights for continuous improvement of mHealth trials. The authors recommend that other researchers adopt and explicitly study these processes to optimize both enrollment and retention in these types of trials to preserve validity and reliability of research results.

The final paper added to this focused issue, *Text-Mining Analysis of mHealth Research* by Ozaydin *et al.*, reports an extensive text-mining analysis designed to categorize major streams of research related to mHealth and to summarize the evolution of these streams over time as technology innovations and service delivery approaches influenced the field. The clarity of description of the analytical methods used for the study offers value to future researchers in addition to the knowledge gained from the findings of the analysis. Of particular interest, the researchers compare their findings from exploration of content patterns that emerged from their constructed literature corpus with a report published earlier this year based on classification of extant research reports into conceptually defined ontological dimensions (3). Their conclusions reinforce recommendations for continuing research efforts utilizing multiple and mixed methods to achieve robust, reliable findings.

The Ozaydin *et al.* conclusion that “mHealth research is expanding... (as underlying) technologies advance” offers an optimistic qualitative counterpoint to their more quantitative conclusion that, based on numbers of publications, mHealth remains in “infancy as a research field.” As stated previously, our goal with this focused issue is to draw attention to significant infrastructure issues that challenge optimal deployment of mHealth products and services. Exploration of these infrastructure issues by expert researchers can create a rich “innovation space” (4) to inform mHealth business development as well as spur clinical advancements using mHealth.

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## Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

## References

1. Malvey DM, Slovensky DJ. *mHealth: Transforming Healthcare*. New York, NY: Springer, 2014.
2. Mars M, Scott RE. Global e-health policy: a work in progress. *Health Aff (Millwood)* 2010;29:237-43.
3. Cameron JD, Ramaprasad A, Syn T. An ontology of and roadmap for mHealth research. *Int J Med Inform* 2017;100:16-25.
4. Willig, JH. The Many Lives of Data. In: Fottler MD, Malvey D, Slovensky DJ. editors. *Handbook of Healthcare Management*. Cheltenham, UK: Edward Elgar Publishing, 2015.

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