

EDITORIAL COMMENT

Leveraging Mobile Technology to Reduce Resource-Related Health Care Disparities

Challenges and Opportunities*



Mariana Mirabel, MD, PhD,^{a,b,c} Luigi P. Badano, MD, PhD^d

Medical practice remains a daily challenge, as history taking and clinical examination alone do not, in many cases, allow precise cardiac diagnoses (1). Point-of-care echocardiography has left the imaging laboratory, thereby improving the diagnosis of heart valve disease in outpatient clinics (1) and allowing widespread use by nonexperts at the bedside (2). In combination with telemedicine, it has the potential to further increase sensitivity and specificity in the detection of structural heart disease (3). Mobile health (mHealth) is an emerging field that provides health services and manages patient information by using portable electronic devices with software applications, including point-of-care echocardiography (4). mHealth can also support the performance of health care workers through the dissemination of clinical updates, learning materials, and reminders (5).

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In this issue of *JACC*, Bhavnani et al. (6) demonstrate that a composite use of point-of-care echocardiography, wireless electrocardiography, point-of-care brain natriuretic peptide assessment, and 6-min walking tests reduced the time to treatment and improved long-term outcomes compared with standard care in patients with rheumatic and other structural heart diseases referred to a tertiary-care teaching hospital in Bangalore, India. These findings

are of the utmost importance because they show how wireless technologies may improve health care delivery. Point-of-care assessment enables better triage of patients according to their disease severity in a more objective manner. This study is, to the best of our knowledge, the first to report improved outcomes in patients undergoing point-of-care diagnosis (6). In current practice, many patients may be lost in translation through the referral system, especially in underserved and remote regions. This study therefore adds an important piece to the puzzle in the emerging field of mHealth.

The advantages of mHealth would indeed be particularly relevant in low- and middle-income countries (LMICs), where the prevalence of non-communicable diseases (NCDs) is increasing rapidly (5). Triage of patients by means of point-of-care echocardiography has the potential to improve access to health care without overwhelming these fragile systems (7). Systematic reviews focusing on the use of mHealth interventions for the care and management of NCDs in LMICs reported overall positive outcomes (8,9). Technology holds the promise for better care for hundreds of millions of people living in remote and/or underserved regions. The World Health Organization has therefore recommended mHealth interventions for the prevention, management, and treatment of NCDs and their risk factors as part of its global action plan for NCD prevention and control (10).

Lower cost and high portability make these devices more accessible to a wide range of practitioners in different settings, in hospitals and in the community.

However, ways to implement mHealth in LMICs still need to be addressed (11). The study by Bhavnani et al. (6) was performed at a tertiary-care teaching institution. Local physicians supervised by American Society of Echocardiography level III sonographers undertook point-of-care echocardiographic examinations according to a pre-defined acquisition protocol.

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From ^aINSERM U970, Paris Cardiovascular Research Center, PARCC, Paris, France; ^bUniversité Paris Descartes, Sorbonne Paris Cité, Paris, France; ^cCardio-Oncology Unit, Assistance Publique-Hôpitaux de Paris, Hôpital Européen Georges Pompidou, Paris, France; and the ^dDepartment of Cardiac, Thoracic and Vascular Sciences, University of Padova School of Medicine, Padova, Italy. Both authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Therefore, these results may not be translated to settings in which a less skilled and trained workforce is available. According to the World Health Organization, the global deficit of health professionals exceeds 4 million, with severe shortages in 57 countries (12). Strikingly, the number of health professionals who leave LMICs to practice abroad has never been so high (13). Providers who stay in LMICs are often poorly trained for the growing challenge of preventing and managing cardiovascular diseases, and their willingness and motivation to embrace new technologies should be assessed (14). Task shifting from medical doctors to other health care professionals may be an option in resource-limited settings (15). The potential of point-of-care echocardiography-based screening for rheumatic heart disease in endemic regions either by doctors (16) or nurses (15) has led to the publication of free-of-charge Web-based training material that could be broadened to structural heart disease (17,18). Tools to train nonphysician health workers in the use of point-of-care echocardiography may be crucial. By reducing the need for expert readers through telemedicine, point-of-care echocardiography may be used at the bedside, allowing immediate decision making.

Another issue of mHealth in LMICs may be additional cost to the patient. Patients with NCDs in LMIC often face out-of-pocket health care costs that are prohibitive given their limited incomes. A World Health Organization survey of >256,000 respondents

in 70 countries found that health care accounted for 13% to 32% of household expenditures, and cost barriers were a frequently cited reason for inadequate chronic disease care (19). Although mHealth is thought to be less costly than conventional care, affordability for both patients and local (national or regional) health care systems has not been explored.

Finally, the study by Bhavnani et al. (6) raises a series of questions. 1) What would the curriculum required to ensure proficiency with point-of-care technologies, especially echocardiography, be? 2) How can cost-effectiveness be assessed across different health care systems? 3) How would some countries ensure a standard of care when severe heart valve disease or other NCDs are diagnosed (i.e., access to secondary prophylaxis in case of rheumatic heart disease or heart valve intervention) (20)?

mHealth is a promising tool to ensure rapid and appropriate delivery of cardiac care that may help in filling the gap of fractured health care systems. Answering the aforementioned questions before launching any complex public health intervention could make the difference between the success or the failure of mHealth in LMICs.

ADDRESS FOR CORRESPONDENCE: Dr. Mariana Mirabel, Assistance Publique Hôpitaux de Paris, Hôpital Européen Georges Pompidou, 20 rue Leblanc, Paris, 75015, France. E-mail: mariana.mirabel@aphp.fr.

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