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EDITORIAL

Towards a digital health future

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This editorial refers to 'Barriers to and facilitators of the uptake of digital health technology in cardiovascular care: a systematic scoping review', by S. Whitelaw *et al.* on page 62.

History shows that adopting innovation is exceedingly difficult and indeed medicine initially resisted some of the greatest innovations, which we now take for granted. To think that Semmelweis' proposal of washing your hands to prevent the spread of infection was once ridiculed is hard to believe especially in light of the current pandemic. Indeed such was the resistance, that Semmelweis was thrown into an asylum against his will.[1] The adoption of Semmelweis' suggestion has led to countless lives being saved but it took decades for it to be adopted, as did Dr Barry Marshall's work to show that Helicobacter pylori causes gastric ulceration. Finally, however, this was acknowledged resulting in a Nobel Prize in 2005. Cardiology is no exception, as Andreas Gruntzig struggled to gain acceptance of coronary angioplasty in 1976; Dr Spencer King famously saying, 'It'll never work'. The suggestion too that beta-blockers could treat heart failure was dismissed at first and the concept that physiological assessment of a coronary stenosis was superior to the 'oculo-stenotic reflex' assessment of a coronary stenosis was challenged despite De Bruyne and Pijls proving its value.[2] In the current issue, Whitelaw *et al.* provide us with many reasons why clinicians and patients have difficulty in adopting digital healthcare technologies (DHTs). This is a vast topic and indeed many before have explored the reasons why the adoption of new practices in medicine is challenging.[3] Such is the magnitude of this topic that we can only begin to discuss a few areas.

Digital healthcare technologies can include biosensors and wearables, digital healthcare applications ('health apps' and 'chatbots'), remote clinical management tools, integrated machine learning algorithms supporting decision-making, immersive technologies, virtual reality/augmented reality (VR/AR), electronic medical records and perhaps visual analytics/dashboards, and other digital tools. All DHTs typically require networks to allow for the flow of data so that decisions can be made by and for the end-users, both patient and doctor. These terms are increasingly heard on the media, but are poorly understood by clinicians and patients, thereby leading to low rates of adoption. Sections of society even see DHT as a threat, citing that it facilitates automation, which in turn threatens jobs. Increasing evidence, however, suggests that rather than jobs being lost, jobs will be created or simply change as part of the 4th Industrial Revolution as they did in the previous three.[4]

They say 'Digital will not replace Doctors, instead Digital Doctors will replace Doctors'. The AliveCor™ KardiaMobile device pioneered by a digital doctor, David Albert, is an example of a DHT that took several years to clear regulatory hurdles. Such is the length of time to achieve regulatory approvals that many companies with digital solutions avoid this process, instead selling into the non-regulated market. Choosing the path of least resistance means that the vast majority of healthcare applications have no clinical validation. The time is nigh for the regulators to hasten the process of approval such that industry is encouraged to achieve clinical validation. Action is needed to discourage doctors from promoting applications without appropriate clinical validation, and software developers from adding to an already saturated market that has almost 400 000 health applications. At present, neither patient nor clinician knows which application is validated and which performs best. The Organization for the Review of Care and Health Apps (ORCHA) is a solution that solves a number of these problems by providing accreditation and an independent assessment of health apps in the form of a 'score'.[5] The ORCHA provides a means whereby healthcare professionals can feel more confident about recommending or 'prescribing' certain healthcare apps. The ORCHA helps but the lack of comparative studies to ascertain the benefits of DHTs remains a major barrier, which must be addressed.

They also say that, 'Data is the new oil' and like oil, data, and specifically healthcare data are hard to access by doctors, industry, academia, and indeed patients. A digital paradox arises from the simple fact that the cohorts we intend to deploy DHT into, come from our ever growing, ageing population and from the lowest socioeconomic sections of society. These groups, however, have limited access to

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DHT, and to internet, both of which are necessary. Affordability is another crucial barrier for these groups and levels of 'digital literacy' are proportionately lower not to mention the lack of 'health literacy'.[6] It seems that raising the digital and health literacies of the population would increase the likelihood of adoption and acceptance of DHT, whilst increasing digital health inclusivity. To realize the greatest benefits we need to see significant investment, by the political establishment. COVID-19 has thankfully shone a spotlight on this issue with maybe a glimmer of hope that this will progress faster than ever before.[7]

Previous work suggests many ways to improve adoption including, the establishment of champions, the development of dissemination programs, establishment of networks, key opinion leaders, organizational buy in, and patient involvement to mention a few.[3] Much of our effort should therefore focus on identifying digital champions, lobbying politicians, spreading the message through effective networks supported by healthcare organizations and ultimately patients. Some industries have developed 'Solution Centres' to help clinicians and patients to visualize the out workings of DHT, which may also help.

Digital healthcare technology depends on the appropriate secondary use of data and this remains a major issue despite the various updated data protection policies. Anecdotally, most medical professionals complain about their inability to access data easily but companies face even greater challenges in the digital healthcare space and their expertise will be necessary to make all of this work. Industry yearns for the opportunity to test their newest digital solution but recent improprieties from high profile public data breaches have not helped their cause.[8] Until such times that healthcare and industry become trusted partners to allow clinicians to use or evaluate digital solutions within standard clinical pathways the uptake of DHTs will remain low. To facilitate this, intervention is needed from politicians, regulators, and health services and if COVID-19 has done anything positive it has shown us over the past 12 months that 'where there's a will there's a way'. Furthermore, the lack of understanding around the 'do's and do not's' of the secondary use of data is a major problem. Therefore, education of the masses is urgently needed to facilitate progression of the digital health agenda. Development of academies for digital literacy is crucial so that many of these barriers relating to data governance can be overcome. Possibly, modular teaching should begin at medical school or in postgraduate training programmes facilitated by our Computer Science colleagues throughout the world.

It is remarkable that it has taken a worldwide pandemic for people to realize that DHT and data access are needed to provide optimal care.[9] It is vital to maintain the momentum to prevent the return to old ways termed the 'hedonic treadmill'. Not only will DHT save lives as 'data saves lives' but also the economic benefits are likely to be enormous. The US Healthcare App market alone is predicted to be worth $189 billion by 2025 representing only one aspect of DHT. Countries that drive this agenda will undoubtedly have healthy economies as well as healthier patients.

The greatest progress for all things digital and the power of data to help has come during the ongoing COVID19 pandemic.[9] We will, however, need to maintain that 'can do' attitude and not let society go back to old ways when so many things were supposedly impossible. Maintaining that momentum will lead to greater adoption of DHT, providing closer connections with patients, which will ultimately lead to better cardiovascular care. We look back with disbelief at the treatment of Simmelweis. Let's hope that clinicians of the future do not look back at us and marvel at missed opportunities to embrace DHT.

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