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Smartphone apps: Are they ready for mainstream diabetes care?

The slogan “There’s an app for that” is now in the lexicon of clichés. There are already more than 1200 smartphone applications that have been created for people with diabetes, mainly focusing on self-management tasks and with remarkable similarities between them. However, despite the plethora of apps available, few have been cleared by the US Food and Drug Administration or other regulatory authorities, and few have outcome data published in peer-reviewed medical journals. The use of apps to support diabetes care has not yet become mainstream, although this may change as pharmaceutical companies form alliances with technology companies.

The slow pace of progress in the “technological revolution” has also led people with diabetes to take matters into their own hands. As an example, Nightscout (aka CGM [continuous glucose monitoring] in the Cloud) was created by parents of youngsters with type 1 diabetes with the aim of allowing remote monitoring of their children’s glucose levels. Nightscout is an open-source, DIY project that allows real-time access to glucose data via a personal website, smartwatch viewers, and smartphone apps and widgets (available at: www.nightscout.info). Since its creation in 2014, the Nightscout project has acquired more than 18 000 members.

Poorly designed apps, those that do not function as intended, unevaluated recommendations and overuse of disclaimers damage confidence and pose a significant risk to users. Whilst education and tracking apps often do not adhere to defined standards of care from learned organisations and may lead to incorrect beliefs and ineffective behaviours, they are unlikely to be directly harmful. However, apps supporting insulin dose calculations have been shown to put users at risk of “catastrophic overdose” (Huckvale et al, 2015).

In addition, app developers are often not transparent in terms of defining their target population(s) and metrics of success *a priori*. The tendency in many technology companies is to view people with diabetes as a homogeneous group rather than as individuals – a view often perpetuated by investors in start-up companies,

who traditionally look for short-term financial returns based on the enormous number of people with or at risk of developing diabetes. Going forward, the ability of an app to personalise diabetes care and support self-management may turn out to be the unique selling point. For a diabetes-related smartphone application to be accepted into routine healthcare, five important hurdles need to be overcome (Klonoff and Kerr, 2016):

1. Privacy, to satisfy legal regulators of personal information.
2. Security, to preserve safety and satisfy product safety regulators.
3. Clinical benefit, to satisfy clinicians.
4. Usability (which can be defined as a combination of effectiveness, efficiency and user satisfaction), to satisfy users.
5. Economic benefit, to satisfy payers.

In healthcare, much of the decision-making processes, as well as reimbursement for new therapies and devices, are evidence-based. As mentioned earlier, there is a paucity of data from clinical trials to encourage prescribers and payers to support the use of smartphone apps as part of routine diabetes care. In defence, creators of diabetes apps often claim that the technology is being updated at such a pace that it would be almost impossible to undertake a traditional randomised controlled clinical trial. Furthermore, start-up companies invariably do not have the financial muscle to fund clinical research, and the pharmaceutical industry is only just beginning to dip its collective toes in the digital diabetes health waters. The diabetes community needs to work together to create a template for digital technologies, both to prove value and to make sure that potential game-changing technologies do not crash and burn before their impact on people with diabetes is realised.

Huckvale K, Adomaviciute S, Prieto JT et al (2015) Smartphone apps for calculating insulin dose: a systematic assessment. *BMC Med* **13**: 106

Klonoff DC, Kerr D (2016) Digital diabetes communication: there’s an app for that. *J Diabetes Sci Technol* **10**: 1003–5

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