t seems like everyone nowadays has a smartphone, and that is not far from the truth. Latest reports have roughly three-quarters of Americans (~220 million) with smartphones demonstrating ownership in persons aged 50-64 years old and 65+ years old at 74% and 42% respectively. Dependent upon them, people use their phones for a variety of everyday tasks: directions, organizing their calendar, checking the weather, updating to-do lists, using social media platforms, and so on. An emerging use of smartphones has been the concept of mHealth (also referred to as eHealth), the idea of using mobile or electronic devices in the healthcare space to support and improve patient care.

The cornerstones of mHealth include: monitoring and surveillance, delivery of information, and knowledge or information exchange. Techniques used to implement mHealth include patient-doctor communication through portals, web-based education modules, promotion of healthcare practices, monitoring disease status, patient coaching techniques, and even attempting to modify habits through active participation in one's own care by app and device engagement; all in an attempt to complement the traditional healthcare system. The public has taken to this with almost one-third of American smartphone owners having a health app on their phone as of a 2014 report.

mHealth and Diabetic Self-Management

With close to 30 million persons in the United States diagnosed with diabetes mellitus (DM) and potentially one in three adults with pre-diabetes, this group would be one to target with mHealth technologies. There are many advantages of integration of mHealth, especially how it relates to DM.

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Peoples’ constant attachment to their phones, often keeping it close by if not on their person at all times, allows instant access to health-related content. Through the use of smartphones and applications (apps), it has been hypothesized that patients with chronic diseases such as DM could use these apps to increase patient adherence to treatment regimens and self-management of their disease, which in turn may achieve better health outcomes, increase patient quality of life, and decrease healthcare costs.

The American Association of Diabetes Educators and the American Diabetes Association define the following behaviors as the skills required for diabetes self-management and what these apps hope to correct: healthy eating, being active, monitoring, taking medication, risk reduction, problem solving, and healthy coping. By having all this information in one place, an app, we can create smarter, more proactive, and healthier patients. Physicians see the benefit in this. A New England Journal of Medicine 2015 survey revealed that biometric devices and apps were felt to be the best technology to achieve patient engagement through patient support and patient-provider interaction by monitoring metrics tracked by the app and app predictive analytics to alert physicians to perform intervention when necessary.

In the Apple and Google App stores there are many programs one can download to assist in mHealth as it pertains to DM (+1000 reported apps), whether diabetes-specific, food calorie/carbohydrate counters, educational applications, or exercise and activity-related. Most of the di-
Peripheral Integration

To make something as simple as monitoring BSL easier, some apps have peripheral integration to the smartphone. The Accu-Check® (Roche Diabetes Care, Inc., Roche Holding AG, Basel, Switzerland) Aviva Connect BGL monitor sends results directly to your phone using Bluetooth, while the iHealth® Align BGL monitor (iHealth Labs Inc., Mountain View, CA) inserts directly into the headphone port on the phone, using the smartphone screen as its display. While most of these apps are free or of minimal cost, some do have higher prices or annual subscription costs. Insurers seeing chronic disease states studied, the literature shows "potential" positive effects of mHealth utilization and implementation. Hamine, et al. (2015) performed a large systematic review to evaluate the effectiveness of mHealth in adherence (coined mAdherence) to chronic disease management in DM, cardiovascular disease, and chronic lung diseases from 1980 to 2014. Of the 27 randomized control trials (RCTs) measuring mAdherence, 14 pertained to DM resulting, 7 (50%) studies having a significant effect, 5 having no significant effect, and 2 having mixed results. Twenty-six RCTs evaluated mAdherence on clini-
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itoring, and apps not being all-encompassing for a single disease state. For example, while there are many apps to pick from, none meets all the needs of a diabetic. The Internet provides a plethora of information reviewing apps and making recommendations based on the users’ goals in using the app. These goals range from BSL monitoring, weight control, calorie counting, reminders, or community support. As stated, the issue can become more complex when patients have multiple chronic diseases (e.g., cardiovascular disease, hypertension, lung disease), needing a different app for each in addition to their DM one.

When considering how this relates to podiatry, patients can use these apps to help monitor and track various metrics. One thing we harp on with patients is to be active and to exercise. Common ways to track activity level can be through apps or other technologies (i.e., digital pedometers, either app-based or wearable such as a Fitbit) to monitor steps and count calories burned. Furthermore, a new technology of smart insoles with feedback to monitor pedal pressure and prevent ulcer formation has been developed by Orpyx Medical Technologies, Inc., Boston, MA), as well as the Re- sensing mat) by Tekscan (Tekscan, Somerville, MA). Currently, plan-...
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