

There's an App for That, But Does It Work?



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With the widespread use of smartphones, the digital health marketplace has exploded in recent years.¹ As of the first quarter of 2019, 2.1 million apps are available for Android users and 1.8 million apps are available for Apple users.² Demonstrating the tremendous potential value of digital health apps for patients, providers, and health systems, AppScript on Fast Healthcare Interoperability Resources (FHIR) on Epic App Orchard was recently developed to aid clinicians in finding and prescribing digital health apps for their patients from Epic, the electronic record for more than 250 million patients.³ The App Orchard store currently has 119 apps available to Epic users, with numerous smaller developers interested in publishing.⁴ Thus, mobile health apps are about to be more easily prescribed and will play an important role in clinical care.

Given that asthma affects 300 million people in the world and that it is a chronic disease that can be improved with medications and interventions, many apps for asthma have been developed.⁵ Since our review of mobile health applications for asthma 4 years ago,⁵ the number of apps available for asthma management has doubled. Despite the surge of mobile health applications for asthma management, few guidelines exist to help individuals and clinicians to identify which apps are effective and evidence-based. A review of the effects of a wide range of information and communication technology for asthma, including but not limited to apps, found that they did not improve asthma control and quality of life, and they did not decrease asthma exacerbations.⁶ Most apps have not been studied for effectiveness and benefits, and no standard criteria for quality exist.⁷ A review of mobile apps for 11 chronic diseases, including asthma and diabetes, found that consistent evidence of benefit was seen only with apps for diabetes, measured by the outcome of decreased glycosylated hemoglobin levels, but not asthma.⁷

A previous meta-analysis demonstrated that interventions targeting asthma self-care that include behavior change techniques reduce asthma symptoms, decrease unscheduled health care use, and increase adherence to preventive asthma medications.⁸ Thus, the goal of the Ramsey et al⁹ study in this issue was

to systematically evaluate the content of free, publicly available asthma apps using the taxonomy of behavior change techniques. The authors found that of 23 apps reviewed, only 2 apps, KissmyAsthma and AsthmaMD, had high quality ratings and used at least 8 behavioral change techniques. To help providers determine which apps to recommend to patients, Ramsey et al suggest that reviewing the evidence-based behavior change techniques included within mHealth apps can aid physicians while large-scale randomized controlled trials are being conducted. Moreover, the Mobile App Rating Scale (MARS) was developed as a simple, objective, and reliable tool for classifying and assessing the quality of mobile health apps, and Ramsey et al determined quality ratings using the MARS for the asthma apps in their study. Interestingly, the top 2 asthma apps based on MARS mean score, Asthma Health Storylines and Wizdy Pets: Kids' Asthma Game, were not ranked as highly using the codes for behavioral change technique. Specifically, Asthma Health Storylines included 5 behavioral change techniques, whereas Wizdy Pets' Kids' Asthma Game only had 2 behavioral change techniques, according to scoring by Ramsey et al. Thus, quality rating is not synonymous with self-management interventions as measured by behavioral change techniques.

A few frameworks for evaluating apps have been presented in the literature. The Institute of Medicine developed standards to guide what interventions have good and sufficient evidence, including 2 high-quality efficacy trials, 2 high-quality effectiveness trials, and dissemination research, to meet the standards for widespread dissemination.¹⁰ Nevertheless, no mobile health interventions, including mobile apps, meet these standards currently,¹¹ suggesting that alternative methods of evaluation are needed. Few, if any, results of randomized trials of asthma apps have been published. One study examining the Applying Interactive Mobile health to Asthma Care in Teens study was described in the literature and will assess outcomes after a 4-month period, but the completed study results have not been published.¹² Although the criterion standard for evaluating efficacy of apps may be randomized controlled trials, this is not always feasible.

The AppScript Essentials Value Model, which evaluates the cost/benefits of apps, including apps for asthma, has been proposed for evaluating apps.³ A study concluded that apps for diabetes, asthma, chronic obstructive pulmonary disease, and cardiac rehabilitation for myocardial infarction could save the US health care system \$7 billion per year.³ Although evaluating apps on the basis of economic benefits has advantages on a population level for policymakers and health systems, the provider needs additional metrics for deciding when and which apps to recommend. Another framework for evaluating apps for providers and patients includes the concept of "prescribable" apps, defined as apps that are available, effective, and stand-alone, and do not require an additional central server or continuous

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monitoring by a medical professional.¹³ Despite the description of some frameworks for apps, none are commonly used or comprehensive.

Because anybody can develop and publish health and medical apps, the number of available apps will continue to increase, and providers will increasingly have the challenge of choosing which apps to prescribe to patients. Although evaluating the efficacy and effectiveness of apps may be the key to prescribability, randomized controlled trials and other evidence-based studies may not be feasible to keep up with the rapid pace of app development. However, some of the technology that has enabled the proliferation of app development and is allowing providers to prescribe apps through the electronic health record may also be the key to future rigorous assessments of effectiveness. For example, one could imagine that if providers have the ability to prescribe an asthma app through the electronic health record with AppScript, use of the app could be linked to outcomes data, such as the asthma control test or asthma-related exacerbations, enabling assessment of effectiveness on a large scale. In summary, mobile health apps for asthma and other conditions will without doubt become embedded in medical practice. Studies such as the one by Ramsey et al point to the need for systematic evaluations of apps without the need for randomized trials, which are expensive, time-consuming, and impractical.

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