Montana
Chronic Disease Prevention
& Health Promotion Bureau

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Mobile 'apps,' their growing availability, and their role in asthma care

The rise in smartphone popularity has created a growing market known as mHealth, defined by the World Health Organization's (WHO's) Global Observatory for eHealth (GOe) as "*medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices*."[1] Mobile application, or 'app,' developers have found financial incentives to develop health-related programs that may ultimately provide a solution to chronic disease self-management.

These new tools are empowering patients to share information with providers, educate themselves, and connect with others in a way they haven't been able to before.[2] In fact, mHealth technology has so much potential that the UK Department of Health has suggested that apps be prescribed as part of care for long-term conditions, and hospital systems in New York City are allowing physicians to prescribe health-oriented apps. In the near future, apps could even be paid for by health payers.[3,4]

While some evidence supports the potential benefits of adopting apps capable of delivering healthcare information and providing clinical decision support to healthcare professionals, some researchers also advise caution. Questions have arisen such as:

- How rigorously should they be monitored?
- Should they be subject to the same pre– and post-implementation assessments as traditional healthcare interventions, especially if they have direct impact on clinical decision-making, like medication dosage, adjustment of therapy, or diagnosis?
- How can we provide protection and safe access to patient-level data?

Further research is needed to show exactly how beneficial, safe, and effective the transition to mHealth could be for patients in the future. [3,4,5,6,7,8]

Growing use of mobile technology

- 80% of the world has a mobile phone, and about 20% of those are smartphones. [1]
- Estimates suggest that by 2018 half of over 3 billion smartphone and tablet users will have downloaded mHealth apps.[9]
- Pew Research Center's Internet & American Life Project survey results from 2012 indicate that 49% of Hispanics, 47% of African Americans, and 42% of whites own smartphones, suggesting health-related apps could help address racial and socio-economic disparities.[8]

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The role of the Food and Drug Administration (FDA)

The FDA issued the *Mobile Medical Applications Guidance for Industry and Food and Drug Administration Staff* in September 2013, and the agency continually updates and clarifies the guidelines. Specifically, apps that are intended to be used as an accessory to an existing regulated medical device or transform a mobile platform into a regulated medical device will be overseen. However, the FDA will not review a device that poses minimal risk to patients. Included in this category is any app that:

- Helps patients self-manage their condition(s) without providing specific treatment suggestions;
- Provides patients with tools for tracking health information, whether it be for personal use, for sharing with a provider, or for uploading to a cloud database or personal or electronic health record;
- Provides access to information related to health conditions or treatments;
- Helps document and communicate conditions to providers;
- Automates simple tasks for providers;
- Helps track or manage patient immunizations;
- Provides drug-drug interactions and relevant safety information based on demographic data, clinical information, and current medications; and
- Enables a health care provider to access a patient's personal health record hosted on a web-based or other platform, or enables patients to interact with personal or electronic health records similarly.

This means the majority of apps available will not be reviewed.[9] You can find the full FDA guidance document at www.fda.gov.

Current state of mHealth research

A 2013 report from The Commonwealth Fund found that clinical management apps could improve health outcomes, reduce health disparities, and control costs.[8] However, while the interfaces come across as likeable and user friendly, there is still some doubt as to the reliability of the information they provide and their ability to affect behavior change.

In 2012, 103 asthma-related apps in English were identified.

- 56 were sources of information and 47 were tools for asthma self-management (none of the apps did both)
- 32 apps made "unequivocal recommendations about strategies for asthma control or prophylaxis that were unsupported by current evidence."
- 4 apps recommended avoiding conventional medical management because of risk of side effects, addiction, and worsening of the condition.[3]

Reviews of mHealth interventions show various results. For example, while patient satisfaction of mHealth tools was high, and barriers to uptake were low, other indicators such as self-management, lung function, quality of life, medication use, symptoms and asthma control, missing school, emergency department visits, hospitalizations, and primary care visits showed a mix of positive outcomes and no change. None of the trials had participants over age 65, and only one trial included participants over the age of 50. Socioeconomic status and education level of participants were not addressed in any trial. Therefore, researchers determined there is *inconclusive evidence* to support what they termed "digital interventions."[6]

Currently available asthma-related apps

Healthcare professionals should *exercise caution* in their recommendations. Research supporting the use of apps in asthma management is limited; no current app will meet the need of every patient, most apps are not regulated by the FDA for content and could contain information that is unsupported by current guidelines, and some with functions like medication dose calculators could be unsafe. There are many available apps beyond those listed on the following page, in the table. The apps chosen as examples here have been recommended by various sources, including independent researchers and organizations like the American Lung Association (ALA).

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Table: Current popular asthma-related apps recommended by research or organizations like the ALA

App Name	Description	iOs	Android	Website
Propeller Health	The only app system currently approved by the FDA. A small device attaches to the top of an inhaler and records time and place of use to track symptoms and adherence. It connects via Bluetooth to the Propeller mobile app, and is available in English and Spanish. It responds to an increase in rescue medication use to help patients avoid exacerbations and intervene early. Includes reminders, notifications, education, and coaching on topics such as proper inhaler technique.	x	x	www.propellerhealth.com
AsthmaMD	The AsthmaMD Peak Flow Meter can be purchased in retail pharmacies across the U.S. It works with an app and cloud portal to track symptoms and medication use in a log that can be sent to a physician.	x	x (coming soon)	www.asthmamd.org
AirSonea/ AsthmaSense	The AirSonea Wheeze Monitor analyzes breathing sounds to identify the presence of wheezing and uses Bluetooth to transmit the data to your phone. AsthmaSense uses action plans, records triggers and medication use, and schedules reminders.	x	x	www.airsonea.com www.asthmasense.com
PraxisHealth	Currently in development, this app is undergoing research with Columbia University and Harvard Medical School. It is an evidence-based online training tool with access to instructional videos on inhaler technique, an app that schedules reminders, helps identify and remove triggers, and uses your asthma action plan. The company hires certified asthma educators to provide you with live support. Patients can sign up for the beta program as of August 2014, before the full release.			www.praxishealth.org
WellaPets	A game about a fire-breathing dragon that needs help with asthma self-management. Players learn about inhaler technique, the difference between controller and rescue medicines, what asthma triggers are, and how to identify asthma symptoms.	x	x	www.wellapets.com
SPARX	A game similar in look and feel to World of Warcraft designed to help manage chronic conditions using Cognitive Behavioral Therapy. Developers hope to have iOS and Android platforms by end of the year.			www.sparx.org.nz
Assist Me with Inhalers	Teaches a patient how to use 11 different types of inhalers using both audio and visual aides. Includes a basic reminder system.	X		www.use-inhalers.com
AsthmaBuddy	Utilizes asthma action plans and allows you to record peak flow values, medication use, symptoms, and triggers. Monitors up to 5 people's asthma action plans, and the plans can be emailed to people such as your physician. Allows access to how-to videos that demonstrate correct inhaler technique.	x	x	www.nationalasthma.org.au
STAT Asthma NHLBI Guidelines	A tool for healthcare providers to navigate the NHLBI guidelines. Allows the user to check off symptoms in order to classify severity and initiate therapy.	x		

References

1) Martinez-Perez, B., de la Torre-Diez, I., & Lopez-Coronado, M. (2013). Mobile health applications for the most prevalent conditions by the World Health Organization: Review and analysis. *Journal of Medical Internet Research, 15 (6)*:e120. doi:10.2196/jmir.2600
2) Friedman, L., Gyr, H., & Gyr, A. (2009). The changing patient in the digital era: A typology for guiding innovation in healthcare. *International Journal of Innovation Science, 1 (4),* 39-46.
3) Huckvale, K., Car, M., Morrison, C., & Car, J. (2012). Apps for asthma self-management: A systematic assessment of content and tools. *BMC Medicine, 10:*144. doi:10.1186/1741-7015-10-144
4) Dayer, L., Heldenbrand, S., Anderson, P., Gubbins, P.O., & Martin, B.C. Smartphone medication adherence apps. *Journal of American Pharmacists Association, 53 (2),* 172-181.
5) Charani, E., Castro-Sanchez, E., Moore, L.S.P., & Holmes, A. (2014). Do smartphone applications in healthcare require a governance and legal framework? It depends on the application! *BMC Medicine, 12*:29.doi:10.1186/1741-7015-12-29
6) Morrison, D., Wyke, S., Agur, K., Cameron, E.J., Docking, R.I., MacKenzie, A.M.,...Mair, F.S. (2014). Digital asthma self-management interventions: A systematic review. *Journal of Medical Internet Research, 16 (2)*:e51. doi:10.2196/jmir.2814
7) Belisario, M., Huckvale, K., Greenfield, G., Car, J., & Gunn, L.H. (2013). Smartphone and tablet self management apps for asthma. *Cochrane Database System Review*. Doi:10/1002/14651858.CD010013.pub2
8) Slabodkin, G. (2013, November 18). Clinical management apps hold promise for managing asthma, diabetes. *Fierce Mobile Healthcare*. Retrieved from http://www.fiercemobilehealthcare.com/story/clinical-management-apps-hold-promise-managing-asthma-diabetes/2013-11-18
9) Food and Drug Administration. (2014). *Mobile medical applications*. Retrieved from http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/ConnectedHealth/MobileMedicalApplications/ucm255978.htm
10) Hartzler, M.L. *iAsthma: Bringing your practice to the 21st century* [PDF Document]. Retrieved from http://www.asthmaeducators.org/_resources/documents/events/2013_convention/iasthma%20hartzler.pdf

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Talk to your patients about assessing app reliability and how to safely integrate the apps they may be already using into their asthma care. Almost all apps are not regulated for content, and should be used with caution.

Questions to help determine app reliability:[10]

- Is the purpose clearly stated?
- How often is it updated?
- Is the information referenced?
- Is confidentiality protected?
- Is funding/conflict of interest clearly stated?
- Is the device available (Android, iOS, BlackBerry, etc.)?
- Is the interface user-friendly and cost-effective?

Comprehensive education materials should have:[10]

- Basic facts about the nature of the condition
- Treatment and proper medication use
- Allergen and trigger avoidance
- Self-monitoring and assessment skills
- The role of a written, personalized action plan
- Recognizing and responding correctly to exacerbations
- Personalize the definition of good asthma control

Report Highlights: Asthma Apps

- Overview of the growing market for health-related and clinical management mobile applications, or 'apps'
- A review of the current state of research on the effectiveness of asthma-related apps
- The role of the FDA in regulating the growing health-related app industry
- Some currently available asthma apps on the market

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