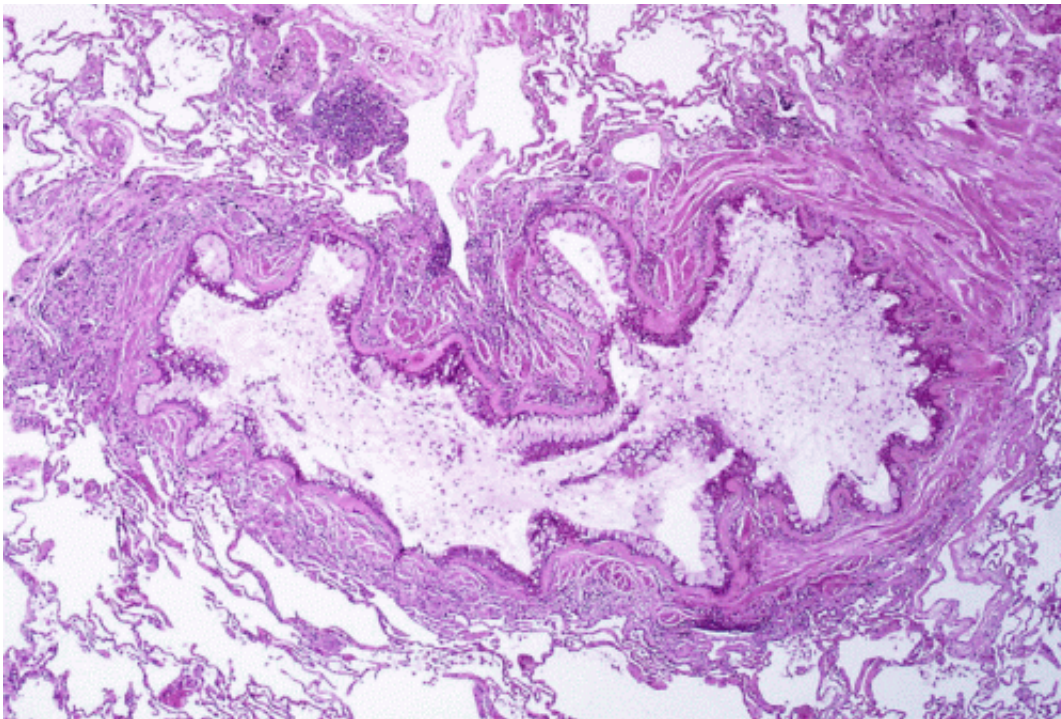


Researchers publish results of first-of-its-kind iPhone asthma study

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Obstruction of the lumen of a bronchiole by mucoid exudate, goblet cell metaplasia, and epithelial basement membrane thickening in a person with asthma. Credit: Yale Rosen/Wikipedia/CC BY-SA 2.0

Scientists from the Icahn School of Medicine at Mount Sinai today published results from a pioneering study of asthma patients in the U.S. conducted entirely via iPhone using the Apple ResearchKit framework and the Asthma Health app developed at Mount Sinai with collaborating

organizations. The results demonstrated that this approach was successful for large-scale participant enrollment across the country, secure bi-directional data exchange between study investigators and app users, and collection of other useful information such as geolocation, air quality, and device data. The publication appears today in *Nature Biotechnology*.

"The Asthma Mobile Health study represents the coming together of academia and industry to benefit from the ubiquity of smartphones and harness the power of citizen-science to modernize the clinical research process," said Eric Schadt, PhD, senior author on the paper and the Jean C. and James W. Crystal Professor of Genomics at the Icahn School of Medicine at Mount Sinai, and Founding Director of the Icahn Institute for Genomics and Multiscale Biology. "We now have the ability to capture rich research data from thousands of individuals to better characterize 'real world' patterns of disease, wellness, and behavior. This approach provides a more comprehensive and accurate view of our patients that was not feasible in the past due to logistical limitations and prohibitive costs."

The Asthma Mobile Health Study was launched in March 2015, and in the first six months, the app was downloaded by nearly 50,000 iPhone users. The study included regular surveys to understand how [asthma patients](#) were affected by and treating their condition over time. A total of 7,593 people completed the electronic informed consent process and enrolled in the study. Eighty-five percent of them completed at least one survey, with a core group of 2,317 robust users who filled out multiple surveys during the course of the six-month study. Results were compared to existing asthma patient studies and to external factors as a control for the reliability of patient-reported data. For example, scientists were able to correlate increased daily asthma symptoms among participants in Washington State with an outbreak of wildfires at the time. Similar factors that could be corroborated in the patient data included pollen

levels and heat. Data for commonly used [asthma](#) metrics, such as peak flow, matched what has been observed in other studies.

"We critically assessed the feasibility, strengths, and limitations of a smartphone-based study and found that this methodology is particularly suitable for studies of short duration that require rapid enrollment across diverse geographical locations, frequent data collection, and real-time feedback to participants," said Yvonne Chan, MD, PhD, Director of Digital Health and Personalized Medicine at the Icahn Institute for Genomics and Multiscale Biology at Mount Sinai and principal investigator of the study. "Our study demonstrates the power of [mobile health](#) tools to scale and accelerate clinical research so that we can derive the evidence needed to inform clinical practice and improve patient care."

In 2015, there were 3 billion smartphones in use globally, and that number is expected to double by 2020. Mobile health studies allow scientists to reach unprecedented numbers of participants around the world. Future directions for digital health at Mount Sinai include innovations in enterprise-level electronic informed consent and expansion to other diseases and health conditions.

"Mount Sinai has a long history of embracing new technologies to enhance patient care, and I'm delighted to see that tradition continuing with this mobile health study," said Dennis S. Charney, MD, Anne and Joel Ehrenkranz Dean, Icahn School of Medicine at Mount Sinai. "We look forward to building on this work to serve new patient populations and to dramatically increase the amount of research data we can mine for discoveries that will ultimately improve healthcare for people around the world."

More information: The Asthma Mobile Health Study, a large-scale clinical observational study using ResearchKit, *Nature Biotechnology*,

[nature.com/articles/doi:10.1038/nbt.3826](https://doi.org/10.1038/nbt.3826)

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