

'Smart' asthma inhaler sensors improve pediatric asthma control

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Children with asthma use inhalers to relieve some of their symptoms, which include coughing, wheezing, chest tightness and shortness of breath. Credit: Tradimus / Wikimedia commons / [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

Sensor-based inhalers integrated into health care providers' clinical workflows may help improve medication adherence and support children with asthma—and their families—to more effectively manage this condition, according to a new Northwestern and Lurie Children's study published in *Pediatrics*. The study, developed in collaboration with UnitedHealth Group, showed the use of sensor-based inhaler monitoring may help improve asthma symptom control and caregiver quality of life.

Connected inhalers, which use Bluetooth sensors that attach to participants' [asthma inhalers](#) to detect medication use and share the data with physicians, may promote adherence to recommended controller medication use and proactively detect worsening of asthma symptoms, according to the study. As a result, this may enable health care providers to intervene more rapidly—before patients become critically ill—and improve communication between patients,

caregivers and asthma care providers.

"Emerging connected technologies can help improve patient health, with this randomized-controlled clinical trial showing that pediatric asthma patients with access to inhaler sensors report better asthma control and quality of life than patients who only received a standardized asthma education curriculum," said study lead Dr. Ruchi Gupta, professor of pediatrics at Northwestern University Feinberg School of Medicine, physician at Ann & Robert H. Lurie Children's Hospital of Chicago and the Director of the Center for Food Allergy & Asthma Research (CFAAR).

Children participating in the study were evaluated based on an Asthma Control Test questionnaire, which measured their asthma symptom control on a scale from 0 (poor control) to 27 (well-controlled). Average scores among the intervention increased by 10.1% over the course of the study, with the greatest improvements among non-Hispanic Black participants.

Caregivers who participated in the study were assessed based on a Pediatric Asthma Caregiver's Quality of Life questionnaire, measuring how the sensor-based monitoring adherence affected their day-to-day involvement. Caregivers reported improvement to their [quality of life](#) after the first month of the study, which was sustained through the year-long trial, due to greater ease of asthma management.

"This study is another clear example that digital health is here to stay, as it allows for us to stay connected to patients living with chronic disease, provide a level of automated watchfulness, and intercept disease in a timely manner," said Deneen Vojta, MD, Chief Physician Executive for Optum Labs, part of UnitedHealth Group. "This is a terrific example of moving from the best care out there today to the best care possible."

More than 25 million Americans currently have asthma, most of whom are prescribed inhalers designed to prevent and treat asthma attacks. With appropriate management, most asthma patients can control their disease and live symptom-free. However, for patients with moderate-to severe disease, this generally requires daily use of "controller" medications—typically an inhaled corticosteroid—as well as occasional use of "rescue" medications (i.e. albuterol).

While previous studies have also explored the feasibility and effectiveness of using these sensor-based mobile interventions to improve asthma management, this study was the first to systematically evaluate its effectiveness in a large, racially/ethnically and socioeconomically diverse sample of children.

All 252 children enrolled in this study had moderate/persistent [asthma](#) and were recruited from five clinics (three [primary care](#), one allergy and one pulmonary). Participants were 24% non-Hispanic White, 23% non-Hispanic Black and 40% Hispanic, while 60% were on public insurance. The study lasted 12 months and included assessment at enrollment, three months, six months, nine months, and one year.

More information: Ruchi S. Gupta et al, Sensor-Based Electronic Monitoring for Asthma: A Randomized Controlled Trial, *Pediatrics* (2020).
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