

An AI-aided stethoscope can improve home monitoring of asthma in very young children

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Adults and older children with asthma can take objective measures of symptoms such as peak expiratory flow (PEF), the volume of airflow in one forced exhalation, at home. This provides a more complete picture

of their disease and helps them detect asthma exacerbations or negative changes to their condition at the onset.

However, a 2022 report by the Global Initiative for Asthma (GINA) identifies continuous respiratory sounds such as wheezes, rhonchi, as the best indicators of [asthma](#) exacerbation, especially in children under 5 years of age. Assessment of these symptoms, still primarily done by doctors using stethoscopes in face-to-face visits, can be largely subjective, especially when judged by those who are not [medical professionals](#). There is no objective tool currently recommended for parents to monitor their young children's symptoms at home.

Researchers conducted a six-month [observational study](#) on 149 home-monitored asthma patients of various ages in Poland. They investigated which symptoms are crucial to measure in detecting exacerbation. To what extent could an AI-aided home stethoscope support detection, especially in young children? The findings have been published in *Annals of Internal Medicine*.

Standard certified [medical devices](#) were used to take objective measures of certain asthma symptoms (pulse oximeters for peripheral capillary oxygen saturation, and peak flow meters for expiratory flow) in study participants over 5 years old but not for participants under 5 years old. For more subjective, auditory symptoms, a Conformité Européenne-certified StethoMe, an AI-based home stethoscope, recorded auscultatory sounds from standard chest points of all study participants and transferred the sound files to a cell phone app.

The recordings were automatically analyzed by an AI module and the generated results (pathological auscultatory sound intensities, [heart rate](#), respiratory rate, inspiration-to-expiration duration ratio) were displayed in the app. All data were analyzed by physicians via an online platform to identify exacerbation occurrences. Ultimately, results suggest that,

while taking multiple measures is preferable, AI analysis of home stethoscope recordings alone can efficiently detect asthma exacerbation in patients of all ages, including children under 5 years old.

Asthma is the most common chronic childhood disease and is prevalent in adults as well. Although asthma can be controlled with medication, the disease can worsen, and timely identification of asthma exacerbation is essential for proper management and symptom relief.

One way to identify exacerbation is by measuring peak expiratory flow (PEF). Home monitoring tests for PEF are available for adults and [school-aged children](#), though none are currently recommended for children under 5 years of age. Assessing more subjective, auditory symptoms such as coughing and wheezing, while recommended, is less reliable when done at home.

The results of this study indicate that, while combining multiple measurements of asthma is ideal, the parameters measured by the StethoMe AI-aided home stethoscope can help detect asthma [exacerbation](#) more effectively than peak expiratory flow measurements. It can be a useful tool for optimizing patient-doctor collaboration via telemedicine. For children under 5, an AI-aided home stethoscope could significantly facilitate asthma monitoring by their parents and caregivers.

More information: Home Monitoring of Asthma Exacerbations in Children and Adults With Use of an AI-Aided Stethoscope, *Annals of Internal Medicine* (2023). [DOI: 10.1370/afm.3039](https://doi.org/10.1370/afm.3039).
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