

# Cystic Fibrosis Research News

**Title:**

AI-Facilitated Home Monitoring for Cystic Fibrosis Exacerbations across Pediatric and Adult Populations

**Lay Title:**

AI-Powered Home Monitoring for Cystic Fibrosis Flare-Ups in Kids and Adults

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## What was your research question?

Can an AI-powered home stethoscope, designed for patients and caregivers with no medical training, help detect cystic fibrosis flare-ups (called exacerbations) at home?

## Why is this important?

Cystic fibrosis (CF) is a serious lung disease that requires continuous monitoring to detect worsening symptoms early. An AI-powered home stethoscope may offer several key benefits:

- Easier Home Monitoring: Patients can track their lung health at home and share data with doctors remotely, reducing the need for frequent clinic visits.
- Better Treatment Decisions: Doctors receive more detailed data, allowing them to adjust treatments more accurately.
- For All Ages: This technology benefits both children and adults.
- Lower Healthcare Costs: Remote monitoring can help prevent hospitalizations, making care more affordable for patients and healthcare providers.

## What did you do?

Over six months, 129 CF patients (85 children, 44 adults) used an AI-aided home stethoscope at least once a week to record lung sounds, breathing rate, and heart rate while completing health surveys. Each examination included multiple recordings from different chest areas, similar to a doctor's stethoscopic check-up. In total, doctors reviewed over 5,000 examinations to detect worsening symptoms. The AI system was trained to recognize early signs of flare-ups (exacerbations), helping patients monitor their condition.

## What did you find?

From those 5,000 examinations, doctors diagnosed 522 examinations as exacerbated. The AI system correctly identified 415 of these cases, meaning it detected nearly 80% of worsening conditions while maintaining high accuracy (89% specificity).

Certain lung sounds that can be automatically detected by AI-powered home stethoscope were particularly useful for detection:

- In young children, coarse crackles (a type of abnormal lung sound) were a strong indicator.
- In older children and adults, fine crackles (another type of abnormal lung sound) were even more effective.

Moreover, the AI system achieved over 90% accuracy when combining different parameters, including patient-reported symptoms.



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## **What does this mean and reasons for caution?**

The study shows that AI-powered home stethoscopes can reliably detect CF flare-ups, often more accurately than patients themselves. This technology could help catch problems early, leading to faster treatment and preventing serious complications. However, it may not always detect every symptom. If you feel worse, notice unusual symptoms, or have any doubts about your condition, it's important to contact your doctor or go to the hospital immediately.

## **What's next?**

AI-powered home stethoscopes are a promising tool for managing cystic fibrosis. By making it easier to detect worsening symptoms (exacerbations) early, this technology could improve care and quality of life for patients while helping doctors make better treatment decisions.

## **Original manuscript citation in PubMed**

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