

## Advances in pediatric asthma management: Integrating digital monitoring and precision therapy

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Pediatric asthma remains one of the most prevalent chronic conditions in children, contributing to frequent hospital visits, reduced quality of life, and significant socioeconomic impact. Traditional asthma management relies heavily on symptom-based monitoring and standardized treatment pathways; however, the increasing availability of digital health tools and advances in precision medicine are transforming this landscape. This study explores the combined use of digital monitoring technologies—such as smart inhalers, wearable respiratory trackers, and mobile-based symptom diaries—and individualized treatment strategies tailored to genetic and environmental profiles. The findings highlight the advantages of real-time monitoring, enabling early detection of exacerbations, improved medication adherence, and enhanced communication between families and healthcare providers. Digital tools also support data-driven adjustments to therapy, reducing emergency visits and hospitalization rates. Parallel advancements in biomarker-based phenotyping and pharmacogenomics further allow clinicians to personalize treatment regimens, improving response rates and minimizing unnecessary medication exposure. This integrated approach emphasizes a shift from reactive to proactive asthma management. The study also identifies challenges, including technology affordability, digital literacy, and data-privacy concerns, particularly in resource-limited settings. Addressing these barriers is critical to ensuring equitable access to digital health innovations.

Overall, combining precision therapy with digital monitoring offers a promising strategy for optimizing asthma care, supporting early intervention, and improving long-term outcomes in pediatric populations worldwide.

### Biography

Hannah Collins is a pediatric pulmonologist and researcher at Stanford University, specializing in childhood asthma, respiratory disorders, and digital health innovation. Her work focuses on integrating advanced monitoring technologies with precision-based treatment strategies to enhance disease management. She has published extensively on pediatric respiratory care and collaborates with global research networks to improve chronic disease outcomes in children through evidence-based and technology-driven approaches.

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