STUDY POPULATION: 327 pediatric patients with persistent asthma followed at 11 ambulatory clinics owned by a regional not-for-profit integrated health care system were included in the study.

METHODS: The e-AT, an asthma symptom tracker for children, was developed by a team of 6 parents and 7 community stakeholders on an electronic platform. From January 2014 to December 2015, children aged 2 to 17 years with National Institutes of Health–defined persistent asthma were recruited from the 11 participating clinics to adopt the e-AT, with a target sample size of 30 patients per clinic. Patients who adopted the e-AT recorded asthma symptoms weekly. In turn, patients, parents, and primary care providers received real-time alerts for early signs of impaired asthma control. QoL scores were measured at baseline, 3 months, 6 months, and 12 months. The patient’s rates of emergency department (ED) visit, hospital admission, and treatment with oral corticosteroid (OCS) were also measured for 1 year after e-AT initiation and analyzed against a control group of age-matched persistent asthma patients from 42 non-participating ambulatory clinics in the same health care system and geographic region.

RESULTS: 318 patients and primary caregivers who adopted the e-AT completed baseline assessments and were included in the analysis. At 12 months from e-AT initiation, adherence with weekly use of the tracker was 65%. Self-monitoring with the e-AT was associated with an average increase in QoL score from 79.1 at baseline to 90.6 at 12 months, and an average increase in asthma control questionnaire (ACQ) score from 18.8 to 22.9 over the same time period. Among e-AT adoptees, ED and hospital admission rates were reduced by 59% over 12 months post-initiation, whereas no change was seen in controls. Notably, however, baseline admission rates were higher among cases than controls. A similar pattern was observed when OCS treatment, a surrogate for asthma control, was compared: patients who adopted e-AT showed a mean reduction of 35% in OCS treatment while no improvement was found in the control population. Finally, implementation of the e-AT was associated with improved school and work attendance from baseline to 12 months.

CONCLUSIONS: Despite relatively modest weekly adherence, pediatric asthma patients who initiated an electronic self-monitoring tool had improved quality of life, fewer visits to the ED or hospital, fewer courses of systemic steroid, and fewer days of lost productivity. The e-AT may represent a promising proactive management model for children with asthma and their caregivers.

REVIEWER COMMENTS: Successful asthma management relies on understanding symptoms and continual monitoring. Traditionally, asthma control is assessed at periodic outpatient visits with such tools as the ACT score. The advent of the digital era has opened the door to personal health technologies, which in the case of an in-home symptom tracker enable more frequent self-evaluation. Self-monitoring allows providers to “fill in the gaps” of an asthmatic patient’s clinical course by generating more data points. It can also help avoid recall bias and may promote timely intervention when symptoms deteriorate. It is always fascinating to see how most randomized controlled asthma studies identify improvement in the control groups, largely attributed to frequent contact with study personnel and bringing asthma more to the forefront of people’s minds. The findings in this study demonstrate that adherence with any monitoring system will likely always be an issue, but for those patients amenable to mobile health applications, self-monitoring tools may be empowering and lead to positive outcomes.

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Telehealth Delivery of Adherence and Medication Management System Improves Outcomes in Inner-City Children With Asthma
Lin NY, Ramsey RR, Miller JL, et al. Pediatr Pulmonol. 2020;55(4):858–865

PURPOSE OF THE STUDY: This pilot study assessed feasibility and efficacy of a video telehealth based school program to deliver a medical and behavioral interventional program to improve asthma outcomes in inner city children with asthma.

STUDY POPULATION: Twenty-one children with physician-diagnosed and uncontrolled asthma in past 12 months (ACT score <20, ≥1 emergency department visits/hospitalizations or ≥2 systemic steroid bursts) were enrolled.

METHODS: Over a 6 month period, enrolled children completed 7 video-based telehealth (VBT) visits conducted by an asthma specialist and 5 VBT school-based self-management visits with an adherence psychologist. All visits were done at school with the help of a school nurse or study coordinator. Electronic inhaler monitors recorded medication data and a composite asthma severity index (CASI) score with daytime, nighttime symptoms and exacerbation domains were assessed (CASI ≥ 4 severe asthma). During the monthly VBT clinical visits, physical examinations, the ACT score, asthma TreatSmart program (a computer-based decision support tool), and modified CASI were reviewed to make medication adjustments as needed. Additionally, during the self-management visits, the adherence data, barriers to
adherence were reviewed and personalized support was provided to assist with text messages and reminders.

**RESULTS:** Among 21 children enrolled, median age was 13 years, 57% were males and majority (73%) were Black/African American. Most children were insured by Medicaid (85%), and 76% had a single parent in the home. Most prominent among the severe asthmatics, CASI score decreased soon after the intervention and was maintained for the duration of the study with no emergency department visits or hospitalizations during that time. ACT scores, inhaler adherence improved with reduced albuterol use in addition to reduced school absences over the study course.

**CONCLUSIONS:** A multi-component medical and behavioral VBT based intervention school program is both feasible and effective to improve adherence and asthma control among inner city children with asthma.

**REVIEWER COMMENTS:** Healthcare disparities with racial and ethnic and economic determinants result in increased morbidity and mortality in children with asthma. Lack of adequate access to care and poor medication adherence are substantial barriers to improving outcomes. Although small with no control group, this study shows that the application of a telehealth program potentially improves asthma adherence and outcomes, especially among children with severe asthma. Programs like this may complement successful school-based interventions, including stock school inhalers and in-school medication administration programs, to further improving asthma control and medication adherence. It would be important to apply these results to a larger population in different settings with control groups to assess efficacy and sustenance of the benefits. Furthermore, this study is timely given that the coronavirus disease pandemic has required the rapid adoption of telehealth visits and remote management, modalities which will likely become a fixture in how we monitor our patients in the future.

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**Association of a School-Based, Asthma-Focused Telehealth Program With Emergency Department Visits Among Children Enrolled in South Carolina Medicaid**

Bian J, Cristaldi KK, Summer AP, et al. *JAMA Pediatrics.* 2019;61(3):1177–1183

**PURPOSE OF THE STUDY:** To determine if access to school-based telehealth for children in a medically underserved community impacted number of all-cause emergency department (ED) visits, overall and among children with asthma.

**STUDY POPULATION:** Children age 3–17 years who were enrolled in Medicaid residing in 5 counties in South Carolina from 2012–2017. Participants were part of a natural experiment, in which a school-based telehealth program was implemented from 2015–2017 in one county (Williamsburg) but was not implemented in four neighboring counties, which served as the control. The final sample included 23,198 children from Williamsburg and 213,164 children from surrounding counties contributing a total 2,443,405 child-months.

**METHODS:** The authors used Medicaid claims data. The main exposure of interest was access to the telehealth program. The outcome was difference in rate of all-cause ED visits prior to (2012–2015) and after (2015–2017) implementation of the program in Williamsburg compared with the difference in rate in the four surrounding counties over the same time period. The authors adjusted for age, race/ethnicity, sex and fixed effects (to account for differences by county and temporal changes). Analysis was then performed in the subgroup of children with asthma.

**RESULTS:** Rate of all-cause ED visits was not different between the groups. However, among children with a diagnosis of asthma, access to school-based telehealth was associated with a statistically significant reduction in all-cause ED visits (a 21% relative decrease). This was only significant in the third year after implementation of the program. In the full sample, the program was associated with fewer all-cause ED visits among children age 8–12 and among white compared with African American children.

**CONCLUSIONS:** The authors conclude that there was a benefit of school-based telehealth for children with asthma from underserved areas. Benefits may extend to other chronic diseases and may be driven by improved monitoring and treatment modifications, adherence, involvement of trained nurses, and reimbursement through Medicaid. The program took 3 years to have a significant impact.

**REVIEWER COMMENTS:** There are limited data on impacts of telehealth programs in pediatric patients, and the authors used a novel design to address this important question that is challenging to study. The study, performed in a medically underserved population, demonstrates that school-based telehealth initiatives have the potential to improve health outcomes in children. The coronavirus disease pandemic, which has broadly restricted access to pediatric care for both well-child care and chronic disease management, has highlighted the need for integrating telehealth-based care into pediatrics. This study demonstrates a potential benefit, although more information is needed to identify which subgroups stand to benefit the most and why, and to modify
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