Pediatric asthma telemonitoring: Improving health while reducing costs

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Background

The financial burden of chronic diseases, including asthma, is staggering. Currently, 78% of U.S. dollars can be attributed to chronic conditions. By 2040, the number of Americans over 65 is expected to double, which will result in an estimated 25% increase in healthcare spending. Innovative strategies for managing chronic diseases are needed. Telemonitoring is one such strategy, and this project examined the use of a Smartphone app among a pediatric asthma population.

FAST FACTS:

- **7 out of every 10 deaths** are caused by chronic diseases
- Chronic diseases account for **3 out of every 4 dollars** spent on health care
- **25%** of all patients with chronic diseases have significant functional impairment
- Health care costs for patients with chronic diseases are **5 times higher** than for other patients.
- **1 in 12** Americans have asthma
- Asthma costs the U.S. approximately **$56 billion** annually.
- **1 in 2** people with asthma have an attack each year, and **most are preventable**.

Asthma Control

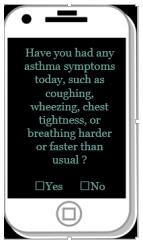
- Peak flow is NOT a reliable indicator of asthma control in children.
- Symptom indicators on Asthma Action Plans may be vague.
- According to the EPR-3, asthma control can be defined in patients aged 5-11 based on **quantifiable symptoms.**

- **Indicators that asthma is NOT WELL-CONTROLLED in children aged 5-11**
  - **Symptoms greater than twice per week**
  - **More than one nighttime awakening per month**
  - **Need for rescue inhaler more than twice per week**
  - **Any limitation to normal activities**

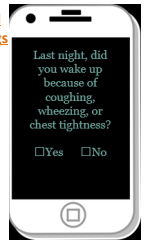
- **Why does control matter?**
  - Appropriate management depends upon correct definition of the patient's asthma control and severity.
  - If providers identify early signs of poor control, exacerbations can be avoided.
  - Preventing exacerbations can result in:
    - Fewer ER visits and hospitalizations
    - Less exposure to corticosteroids
    - Fewer lost school days
    - Preservation of lung elasticity

The App

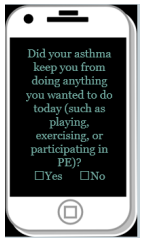
Symptoms



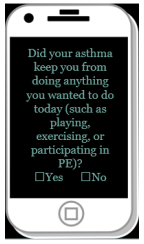
Nocturnal Awakenings



Activities



Need for Rescue Inhaler



The app keeps a running tally of the previous days' responses. The final screen (not pictured) tells the patient whether or not, based on his responses, his asthma is **"Well-Controlled"** or **"Not Well-Controlled"**. On the "Not Well-Controlled" screen, the patient is encouraged to **CLICK HERE** to automatically dial the clinic and speak with the nurse practitioner. In this way, the patient, parent, and NP can all be alerted to intervene at the earliest sign of an exacerbation.

The Health

Telemonitoring applications, such as the AsthmaChecker app, hold promise as a novel technique for managing chronic diseases. Pediatric asthma, in particular, presents unique challenges to patients, caregivers, and health care providers in terms of providing timely, effective, and evidence-based interventions. Improved collaboration among all those involved in managing a child's asthma is sure to improve costs, quality of care, and health outcomes. Apps provide an accessible and useful tool for facilitating this type of communication.

The Care

This app was trialed in a private allergy and asthma practice in middle Tennessee. Survey data showed that children with asthma and their caregivers saw a benefit to using the app. They found it easy to use and helpful in understanding their fluctuating symptoms. The study revealed that a moderate amount of uncertainty concerning symptoms and symptom management existed in parent/child dyads, and the app helped to mitigate that uncertainty.

The Cost

The cost-effectiveness of this particular app has not yet been formally measured. However, the investigator did conduct a synthesis of the literature concerning the cost-effectiveness of other asthma telemonitoring modalities, which revealed mixed results. The research suggests that cost-effectiveness of asthma telemonitoring is highly variable and depends largely upon the cost of the hardware that is used. Nevertheless, there is at least a theoretical potential for health care savings. Telemonitoring has the ability to catch problems, such as asthma exacerbations, early. This, in turn, can prevent higher acuity visits which invariably cost more than preventive care.

*Please see handout for references.