

## Question

In children with persistent asthma, does an internet platform providing in-home asthma monitoring, management, and education improve disease control outcomes compared with usual office-based care?

## Methods

**Design:** Randomized controlled trial (Asthma In-Home Monitoring trial).

**Allocation:** Unclear allocation concealment.

**Blinding:** Unblinded.

**Follow-up period:** Mean 11 months.

**Setting:** Pediatric clinic at Tripler Army Medical Center, Oahu, Hawaii, USA.

**Patients:** 120 children 6 to 17 years of age (mean age 10 y, 63% boys) who had persistent asthma based on the National Heart, Lung, and Blood Institute Expert Panel Report 2 guidelines, were dependents of active or retired US military personnel, and planned to stay in Oahu for 12 months.

**Intervention:** Internet-based care at home ( $n = 60$ ) or office-based care ( $n = 60$ ). The internet group was provided with computers, cameras, and internet access. Patients attended 3 clinic visits (0, 26, and 52 weeks); all other visits were virtual and included asthma education, video recording of peak flow meter and inhaler use, daily asthma diaries, and electronic communication with a case manager. Videos were to be saved and sent twice a week for 6 weeks, then weekly thereafter (store and forward).

The office group visited the clinic at 0, 2, 6, 12, 26, and 52 weeks based on an ambulatory care clinical pathway. Case managers, who were available 24/7, contacted all patients twice a week for 6 weeks, and weekly thereafter by telephone (office-based group) or e-mail (internet group) to review plans and remind patients to record measurements and symptoms.

**Outcomes:** Disease control measures included spirometry, peak flow, forced expiratory volume in 1 second, and use of rescue therapy ( $\beta$ -receptor agonist refills, oral prednisone use). Other outcomes included adherence to treatment and diary entry, and correct use of inhaled medication.

**Patient follow-up:** 85%.

## Main results

Disease control outcomes did not differ between the groups (Table). At study end, proper use of the metered-dose inhaler was better in the internet group compared with the office-based group; dry powder inhaler technique scores were similar between groups (Table). Overall adherence to inhaler treatment was good. Symptom diary recording was poor in both groups but significantly higher in the virtual group compared with the office group (35% vs 21%,  $P < 0.01$ ).

Internet-based care at home vs office-based care in children with persistent asthma

Outcomes at a mean 11 months	Internet-based care at home	Office-based care	P-value
Final FEV <sub>1</sub> *	97.4	92.7	Not significant
Mean peak flow (% of personal best)	92	100	Not significant
$\beta$ -receptor agonist refills/patient-month	0.49	0.45	Not significant
Prednisone bursts/patient-month	0.21	0.18	Not significant
Average peak flow technique score†	87.2	86.6	Not significant
Average dry powder inhaler score†	97	93	Not significant
Average metered-dose inhaler with valved holding chamber score†	94	89	<0.05

\* FEV<sub>1</sub> = forced expiratory volume in 1 second.

† Scores ranged from 1 to 100.

## Conclusion

Asthma monitoring, management, and education provided over the internet resulted in disease control similar to office-based care in children with persistent asthma.

**Source of funding:** US Army Medical Research Acquisition Activity.

**Structured abstract based on:** Chan DS, Callahan CW, Hatch-Pigott VB, et al. **Internet-based home monitoring and education of children with asthma is comparable to ideal office-based care: results of a 1-year asthma in-home monitoring trial.** Pediatrics. 2007;119:569-78. 17332210

1. A pediatric general practice in an urban area is interested in developing an Internet-based home care component to supplement face-to-face visits for the children with asthma in their practice. They believe that this program will improve care by increasing contact time between the health care team and the patient. Which of the following study features is most likely to bias the results?
  - (A) Broad age range of patients
  - (B) Lack of blinding
  - (C) Loss to follow-up
  - (D) Short duration of follow-up
  - (E) Small sample size
  - (F) Use of multiple outcomes

**Answer: B**

2. The practice is considering an Internet approach to patient education. Which of the following is most likely to improve as a result of the study intervention being adopted by the practice?
  - (A) Appropriate use of dry-powder inhaler
  - (B) Appropriate use of metered-dose inhaler
  - (C) FEV<sub>1</sub>
  - (D) Need for prednisone bursts
  - (E) Peak flow technique

**Answer: B**

3. The practice is contacted by a pharmaceutical company that makes metered-dose inhalers with valved holding chambers. They recommend the use of an adjunct Internet-based program to improve the appropriate use of the inhaler and patient outcomes in children with asthma. Which of the following most limits confidence in the company's recommendation?
  - (A) The company recommendation is supported by the study results
  - (B) The study found no significant impact on asthma outcomes
  - (C) The study results cannot be generalized to children with asthma
  - (D) The study was not blinded
  - (E) The study was underpowered

**Answer: B**