

# Correlation of physical activity and pulmonary function collected via a non-invasive trial@home platform to traditional endpoints to differentiate between healthy and asthmatic children

MD Kruizinga<sup>1,2</sup>, E Essers<sup>1,2</sup>, N van der Heide<sup>1,2</sup>, M Nuijsink<sup>2</sup>, AJ Sprij<sup>2</sup>, I Groothuis<sup>2</sup>, A Zhuparris<sup>1</sup>, FE Stuurman<sup>1</sup>, AF Cohen<sup>1</sup>, GJA Driessen<sup>2</sup>

<sup>1</sup>Centre for Human Drug Research, Leiden, The Netherlands; <sup>2</sup>Juliana Children's Hospital, HAGA teaching hospital, The Hague, The Netherlands

## INTRODUCTION

- Pediatric clinical trial data is collected during visits at a hospital in predefined time intervals.
- These visits capture only a snapshot of disease-activity.
- Extra visits and invasive tests increase burden.
- In asthma, additional home-measurements can improve trial data and clinical care.
- The trial@home platform CHDR MORE® allows for home-monitoring with several devices.
- In the future, trials as well as clinical care could be conducted at home.

## AIMS

Use home-monitoring of physical activity and pulmonary function to discriminate healthy children from asthmatic children

Correlate activity and FEV1 with clinical endpoints.

## METHODOLOGY

- Patients aged 6-16 with controlled or uncontrolled asthma were recruited at the Juliana Children's Hospital.
- For four weeks, they were monitored with:
  - A smartwatch (*Withings Steel HR*)
  - Daily pulmonary function tests (*NuvoAir AirNext*)
  - Daily symptom diary (*Asthma Control Diary*)
- Healthy subjects from the same region were monitored for three weeks with:
  - The smartwatch
  - Biweekly pulmonary function tests

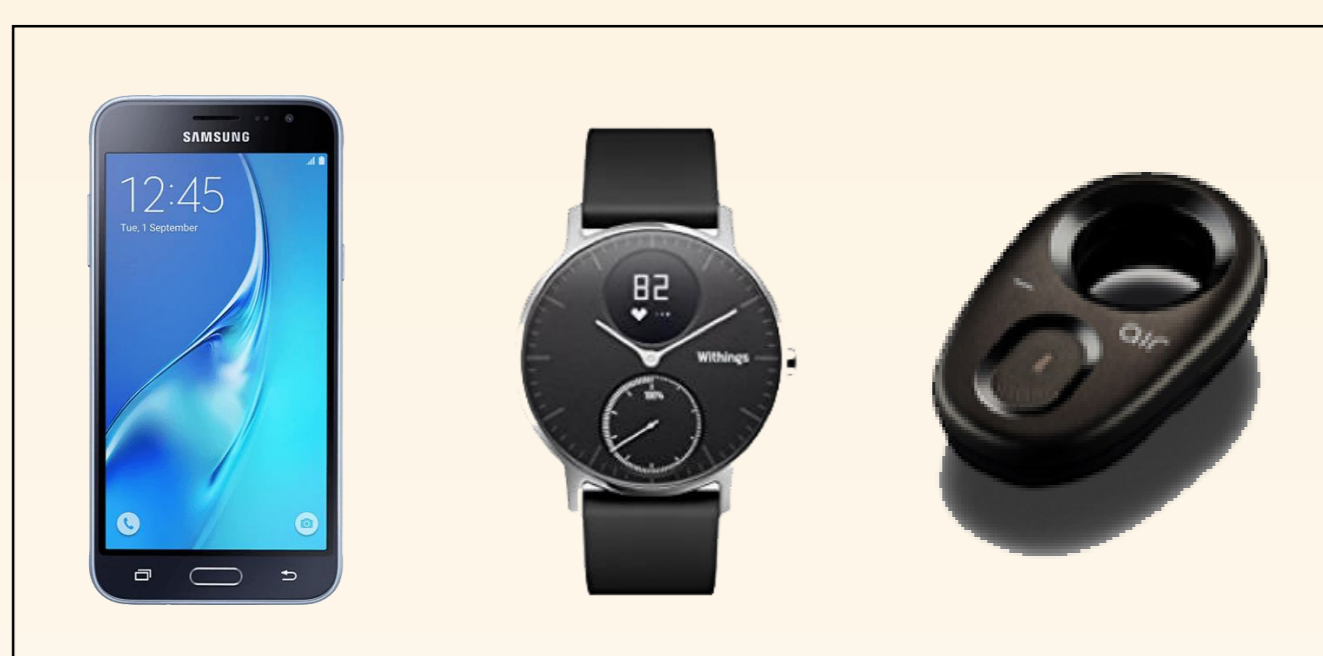


Figure 1. Devices used during the study

## RESULTS

- 64 subjects (18 with controlled asthma, 15 with uncontrolled asthma, 31 controls) were included
- Subjects with uncontrolled asthma have lower activity levels compared to healthy subjects.
- Asthma control for uncontrolled asthmatics showed an association with physical activity.
- Asthma symptom score showed a negative correlation with daily physical activity for subjects with uncontrolled asthma.
- Home-measured pulmonary function tests were associated with asthma diary symptom scores.

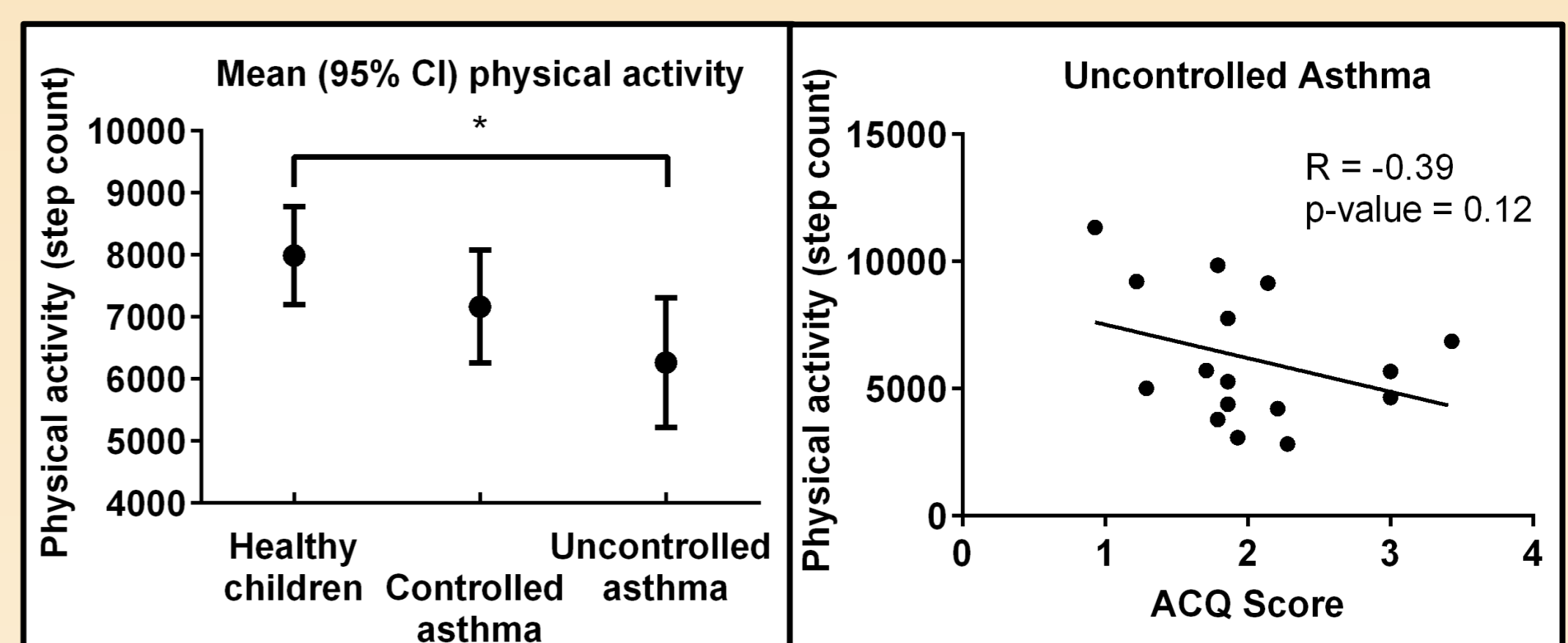


Figure 2. Mean physical activity and ACQ - Activity correlation

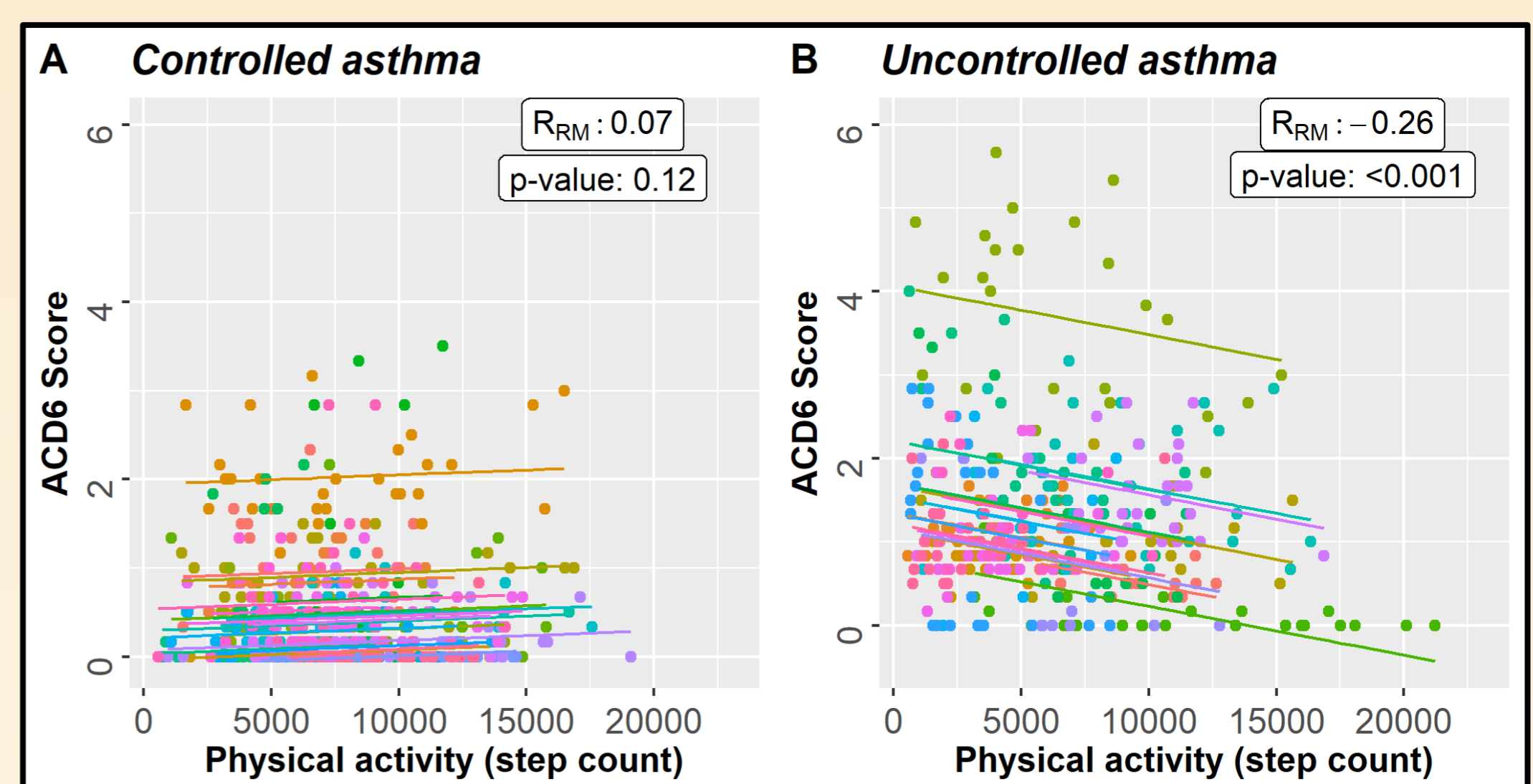


Figure 3.  $R_{RM}$  correlations of ACD6 score and physical activity

## CONCLUSION

Physical activity can discriminate healthy children from children with uncontrolled asthma and is associated with traditional endpoints.

Physical activity is a potential new endpoint

**To do:** Study completion, more advanced analyses, a longer follow-up period.

## ACKNOWLEDGEMENTS

This study was funded by the Centre for Human Drug Research R&D budget. The authors thank all study participants, their parents and all CHDR and Juliana Children's Hospital support staff involved in the conduct of this study.

