

Independent clinical study shows Adherium's Smartinhaler™ dramatically improves clinical outcomes and medication adherence in children with asthma

Study at UK's Sheffield Children's Hospital showed unequivocal evidence that adherence monitoring impacts on clinical outcomes

- Five-fold reduction in asthma-related hospitalisations observed in patients using Adherium's Smartinhaler™
- Smartinhaler™ use resulted in sustained increase in medication adherence and significant reduction in asthma exacerbations
- Days off school and doctor visits also reduced
- Clinical benefits increased over time, particularly at nine and 12 months

17 November 2016: Adherium Limited (ASX : ADR), a global leader in digital health technologies that address sub-optimal medication use in chronic disease, announces the publication of results from an independent, randomised controlled trial of its respiratory disease management tool, Smartinhaler™. The study, in children with poorly controlled asthma, revealed a significant reduction in hospital admissions over the course of 12 months as well as substantial other health and quality of life benefits.

The year-long STAAR study was carried out at Sheffield Children's Hospital in the UK, led by the University of Sheffield's Dr Robert Morton and colleagues. Their findings were published online in the prestigious peer-reviewed medical journal *Thorax* this month [1]. The aim of the study was to assess whether introducing digital adherence monitoring into routine practice could improve clinical outcomes in children with poorly controlled asthma.

Dr Robert Morton, lead investigator at Sheffield Children's Hospital said: "This study provides good evidence that adherence monitoring with feedback can significantly improve clinical outcomes when used in the management of children with poorly controlled asthma. The benefits of the intervention were sustained over a prolonged period of time, and we have shown that this approach can be effectively administered in a clinically practical way. We would recommend this approach to be integrated into the standard care of children with poorly controlled asthma."

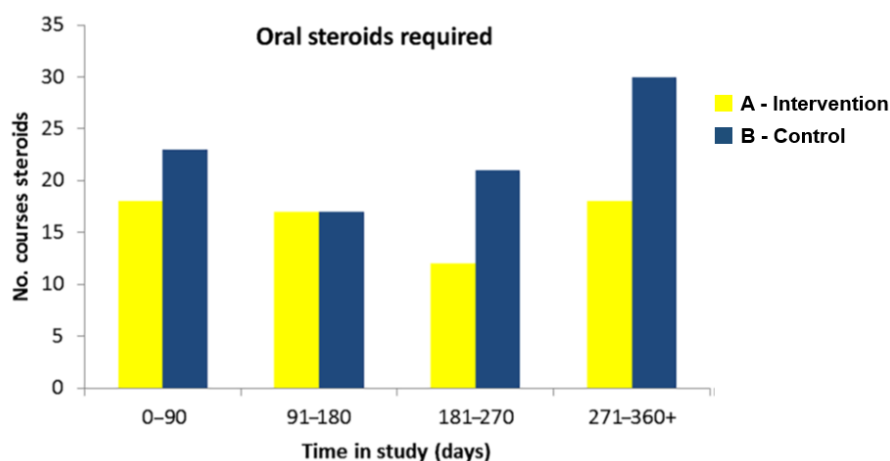
The very positive findings from this study are welcomed in the context of the 'Connected Asthma' report published by Asthma UK in August 2016, which highlighted that a child is admitted to hospital every 20 minutes because of an asthma attack. It concluded that existing digital technologies should be introduced to patients to improve asthma care and that more should be done to ensure that people with asthma are able to benefit from a connected way of managing their condition [2].

77 of the 90 recruited children completed the STAAR study. 38 children were in the intervention group using Smartinhaler™ adherence monitoring with medication reminders and feedback in the clinic, and 39 children received usual care as part of a control group. Drug use data were collected and children's health outcomes were assessed at each three-month follow-up.

Adherence to prescribed medication averaged 70% in the intervention group, compared to 49% in the control group ($p < 0.001$). Patient adherence to prescribed medications is a major problem in chronic disease management. Approximately 50% of adults and children on long-term therapy for asthma fail to take medications as directed at least part of the time [3]. The use of the Smartinhaler™ significantly increased medication adherence and this was maintained over the 12-month period. Nearly half of the children in the Smartinhaler™ intervention group maintained average adherence rates of $>80\%$ over the 12 months.

The adherence improvement was associated with significant reduction in asthma exacerbations - episodes of progressively worsening shortness of breath, coughing, wheezing and chest tightness - which can be life threatening. The need for a course of oral steroids, a marker of severe exacerbations, was 53% more common in the usual care group compared to the intervention group ($p = 0.008$). Furthermore, the hospitalization rate was five times greater in the control compared to the Smartinhaler™ intervention group ($p < 0.001$). This approximates to the prevention of 12 hospitalizations in one year among the children in the intervention group, making a cost-saving argument for introducing Smartinhaler™ into routine practice.

Through the course of the study, the clinical benefits observed within the intervention group increased compared to the usual care group, particularly at nine and 12 months; with the intervention group requiring fewer courses of oral steroids, hospital admissions, days off school and GP/emergency department visits.



Garth Sutherland, CEO of Adherium said: “Seeing a significant increase in medication adherence and reduction in asthma exacerbations combined with a reduction in children being admitted to hospital is proof of the clinical effectiveness of our Smartinhaler™ technology. The impact of adherence monitoring on the health of patients is clear and we continue to work with our partners to make it accessible to all those who would benefit.”

The data from the Sheffield Children’s Hospital’s study builds on a study published in January 2015 in The Lancet Respiratory Medicine [4] which showed the use of the Smartinhaler™ platform increased adherence to preventative medication by 180% and reduced use of reliever medication by 45%.

[1] Published online: *Thorax* doi:10.1136/thoraxjnl-2015-208171

[2] <https://www.asthma.org.uk/globalassets/get-involved/external-affairs-campaigns/publications/connected-asthma/connected-asthma---aug-2016.pdf>

[3] Boulet L-P, Vervloet D, Magar Y, Foster JM. Adherence: the goal to control asthma. *Clin Chest Med* 2012;33:405- 17

[4] Chan AHY, Stewart AWS, Harrison J, Camargo C, Black PN, Mitchell EA. The effect of an inhaler with ringtones on asthma control and school attendance in children. *Lancet Respir Med*. 2015;3:210-219

ABOUT ADHERIUM

Adherium (ASX:ADR) is an Australian Securities Exchange listed company which develops, manufactures and supplies digital health technologies which address sub-optimal medication use and improve health outcomes in chronic disease. Adherium operates globally from bases in the USA, Europe and Australasia.

Adherium is a provider of digital health solutions to patients, pharmaceutical companies, healthcare providers and contract research organizations. The Company's proprietary Smartinhaler™ platform has been independently proven to improve medication adherence and health outcomes for patients with chronic respiratory disease. Adherium has the broadest range of "smart" medication sensors for respiratory medications globally.

The Smartinhaler™ platform has so far been used in more than 65 projects (clinical, device validation or other) and has been referenced in 56 peer reviewed journal articles. Clinical outcomes data has proven that the Smartinhaler™ platform can improve adherence by up to 59% in adults and 180% in children and reduce severe episodes by 60% in adults, leading to improved quality-of-life and demonstrating a substantial gain over current best practice treatment. The Company has received FDA 510(k) notifications for clearance to market and CE Marks for its devices and software, which allows it to sell these devices into international markets.

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