

## Markers that predict treatment response to inhaled corticosteroids in children with asthma

Asthma is a common chronic condition caused by inflammation in the tubes that pass air in and out of the lungs. When asthma is poorly controlled, children cannot breathe normally, cannot play and exercise, and may have an attack bad enough to need emergency care. Fortunately, there are medications to treat asthma. Inhaled corticosteroids, when taken every day, reduce inflammation in the lungs and allow children with asthma to breathe and play normally with little risk of having an asthma attack. However, requiring a child to take a prescription medication every day is inconvenient, expensive, and may cause side effects. Our study set out to identify markers that predict which children with asthma might receive the most benefit from treatment with inhaled corticosteroids. This information could help parents and physicians make better treatment decisions.



Fig. 1. Hazard Ratio of Time to First Exacerbation among participants treated with a daily inhaled corticosteroid as compared with placebo stratified by skin test result status.

For one year, 288 children 6 to 18 years of age with mild asthma were treated with either an inhaled corticosteroid or a placebo. Their asthma control was monitored by measuring the amount of time before their first asthma attack and by measuring their asthma symptoms every day. Children who had a history of significant allergies (a prior positive allergy skin test) took much longer to have their first asthma attack when treated with an inhaled corticosteroid versus a placebo. This difference was large enough, a little more than twice as long, for us to be confident that it was not simply due to chance (Fig. 1). However, a similar improvement was not found among children without a history of allergies. While it is possible that inhaled corticosteroids did not work as well, it is also possible that there were too few children without allergies in the study, that other markers interfered with our ability to find a difference, or that children without allergies

had less severe asthma than those with allergies. No other marker besides a history of allergies predicted who would take longer to have their first asthma attack when treated with an inhaled corticosteroid.

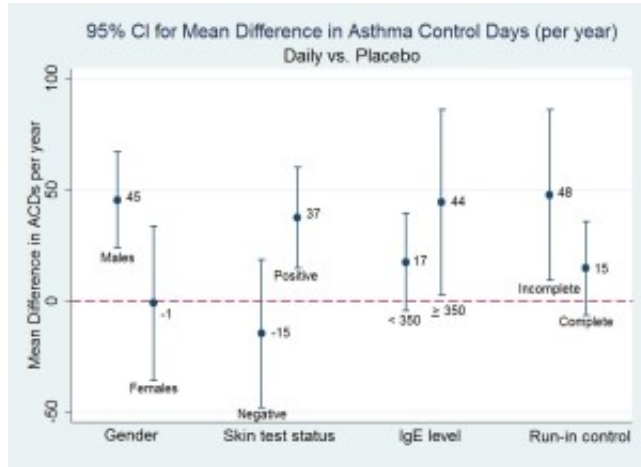


Fig. 2. Mean change in Asthma Control Days among participants treated with a daily inhaled corticosteroid as compared with placebo stratified by sex, skin test result status, IgE level, and run-in asthma control.

When changes in asthma control were tested, four markers predicted who would receive the most benefit: boys, children who had a history of allergies, children who had elevated levels of asthma-specific antibodies in their blood, or children who had lots of asthma symptoms prior to the study (Fig. 2). Again, these differences, about 15-45 fewer symptom days a year, were large enough for us to be confident that the findings were not simply due to chance. While these markers predicted who would receive the most benefit, we cannot definitively say that children without these markers would not benefit.

When parents and physicians must decide when inhaled corticosteroids are needed, they can be most confident that a child will obtain a large benefit when he or she has a history of significant allergies, has elevated asthma-specific antibodies in the blood, has lots of asthma symptoms, or is male. Nevertheless, treatment should never be withheld just because a child does not have one of these markers. Instead, parents and physicians should consider each child's unique situation and decide when treatment is likely to improve the child's ability to breathe well, to participate fully in all of life's activities, and to reduce their risk of an asthma attack. While this study provided important clues about which children receive the most benefit from treatment with inhaled corticosteroids, there is still much to be learned.

**Joe K Gerald**  
*Assistant Professor of Public Health Policy and Management*

*Mel and Enid Zuckerman College of Public Health  
The University of Arizona*

## **Publication**

### [Markers of Differential Response to Inhaled Corticosteroid Treatment Among Children with Mild Persistent Asthma.](#)

Gerald JK, Gerald LB, Vasquez MM, Morgan WJ, Boehmer SJ, Lemanske RF Jr, Mauger DT, Strunk RC, Szeffler SJ, Zeiger RS, Bacharier LB, Bade E, Covar RA, Guilbert TW, Heidarian-Raissy H, Kelly HW, Malka-Rais J, Sorkness CA, Taussig LM, Chinchilli VM, Martinez FD.

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