

Susan R. Fox¹, Aame Betty Andy-Nweye¹, Mahboobeh Mahdavinia¹, Mary C. Tobin¹, Perry A. Catlin², Annika Chura², Amal H. Assa'ad², Adam C. Robinson³, Iman Abdikarim³, Amaziah Coleman³, Hemant P. Sharma³, Jamie L. Fierstein⁴, Jialing Jiang⁴, Pamela J. Newmark⁴, Lucy A. Bilaver⁴, Alexandria Bozen⁴, Aneet S. Chadha⁴, Olivia Negris⁴, Jacqueline A. Pongracic^{4,5}, Ruchi S. Gupta^{4,5}

¹Rush University Medical Center, Division of Allergy/Immunology; ²Cincinnati Children's Hospital Medical Center, Division of Allergy & Immunology;

³Children's National Health System, Division of Allergy and Immunology; ⁴Northwestern University, Feinberg School of Medicine;

⁵Ann & Robert H. Lurie Children's Hospital of Chicago

Abstract

Introduction: Pollen Food Allergy Syndrome (PFAS), allergic rhinitis (AR) and asthma have not been well documented in the pediatric population with reference to race. The aim is to identify the prevalence of PFAS, AR and asthma by race in children with food allergies. **Methods:** FORWARD is a prospective multi-center cohort study, recruiting black and white children 0-12 years of age with allergist-diagnosed IgE-mediated food allergies. Guardians of enrolled participants completed an intake survey, which assesses food allergy in association with PFAS, AR and asthma.

Results:

641 children with completed race information at intake, (407 White, 234 Black), 8.9% had PFAS. (11.1% of Blacks, 7.7% of Whites). There was no observed association between race and PFAS ($p > 0.05$). However, there was a significant association between age and PFAS ($p < 0.001$) in Whites, with older (>5 yrs) more likely than younger (<5 yrs). There was no significant findings between age and PFAS in Black children ($p > 0.05$). Black children who are allergic to tree nut ($p < 0.05$), soy ($p < 0.05$), and sesame ($p = 0.05$) were more likely to have PFAS. White children who are allergic to fin fish ($p < 0.01$), shellfish ($p < 0.01$), and sesame ($p < 0.05$) were more likely to have PFAS. Whites with PFAS were more likely to have AR ($p < 0.001$) and asthma ($p < 0.05$). Blacks with PFAS were more likely to have asthma ($p < 0.01$).

Conclusions: In this cohort, 8.9% of children with food allergy also have PFAS, but there was no association by race. PFAS was associated with older age in white children. Interestingly, specific food allergens associated with PFAS differed by race.

Background

Pollen food allergy syndrome is a common adverse reaction that may occur within minutes after ingesting certain raw fruits, vegetables, nuts in children and adults sensitized to certain pollens. While this has been studied in adolescents and adults, it has not been as well studied in children, especially with consideration to race and food allergy. Currently, the prevalence of PFAS in children has been estimated to be between 3-24% worldwide and is thought to be underreported.

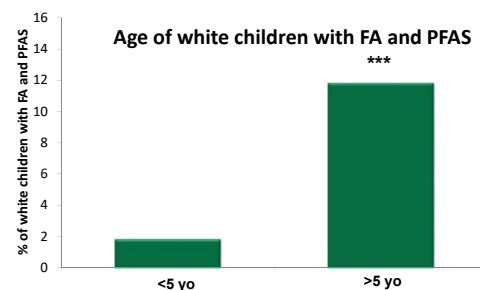
Objective

The aim is to identify the prevalence of PFAS as it relates to AR and asthma by race in children with food allergies.

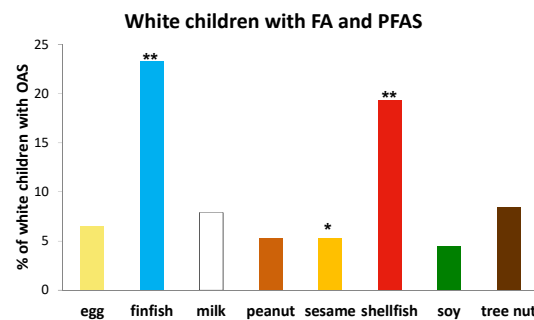
Methods

FORWARD is a prospective multi-center cohort study, recruiting black and white children 0-12 years of age with allergist-diagnosed IgE-mediated food allergies (FA). Guardians of enrolled participants completed an intake survey, which assesses food allergy in association with PFAS, AR and asthma.

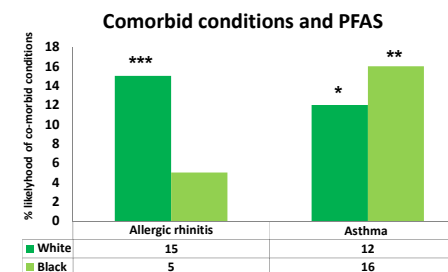
Results



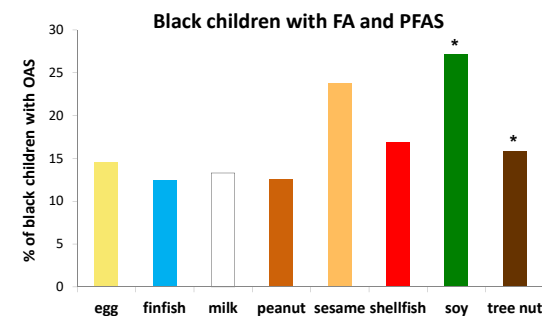
➤ **Fig 1 – There was a significant association between age and PFAS in whites (<0.001) with older (>5 yo) more likely than younger (5 yo). There was no significant findings between age and PFAS in black children**



➤ **Fig 3A – White children who are allergic to fin fish ($p < 0.01$), shellfish ($p < 0.01$), and sesame (*) ($p < 0.05$) were more likely to have OAS.**



➤ **Fig 2 – Whites with PFAS were more likely to have AR ($p < 0.001$) and asthma ($p < 0.05$). Blacks with PFAS were more likely to have asthma ($p < 0.01$).**



➤ **Fig 3B – Black children who are allergic to tree nut ($p < 0.05$), soy ($p < 0.05$), and sesame ($p = 0.05$) were more likely to have OAS.**

Summary

- As we learn more about how food allergies differ by race, it is important to consider PFAS in children with AR and asthma.

Conclusions

- In this cohort, 8.9% of children with food allergy also have PFAS, but there was no association by race.
- PFAS was associated with older age in white children.
- Specific food allergens associated with PFAS differed by race.

References

1. Dondi A, Tripodi S, Panetta V, Asero R, Businco ADR, Bianchi A, et al. Pollen-induced allergic rhinitis in 1360 Italian children: Comorbidities and determinants of severity. *Pediatr Allergy Immunol*. 2013 Dec;24(8):742-751.
2. Ludman S, Jafari-Mamaghani M, Ebling R, Fox AT, Lack G, Du Toit G. Pollen food syndrome amongst children with seasonal allergic rhinitis attending allergy clinic. *Pediatr Allergy Immunol*. 2016 Mar;27(2):134-140.
3. Asero R, Pravettoni V. Anaphylaxis to plant-foods and pollen allergens in patients with lipid transfer protein syndrome. *Curr Opin Allergy Clin Immunol*. 2013 Aug;13(4):379-385.
4. Mastroianni C, Tripodi S, Caffarelli C, Perna S, Di Rienzo-Businco A, Sfika I, et al. Endotypes of pollen-food syndrome in children with seasonal allergic rhinoconjunctivitis: a molecular classification. *Allergy*. 2016 Aug;71(8):1181-1191.
5. Sicherer SH. Clinical implications of cross-reactive food allergens. *J Allergy Clin Immunol*. 2001 Dec;108(6):881-890.
6. Webber CM, England RW. Oral allergy syndrome: a clinical, diagnostic, and therapeutic challenge. *Ann Allergy Asthma Immunol*. 2010; 104(2):101-108.
7. Brown CE, Katelaris CH. The prevalence of the oral allergy syndrome and pollen-food syndrome in an atopic paediatric population in south-west Sydney. *J Paediatr Child Health*. 2014 Oct;50(10):795-800.