

Racial/Ethnic Differences in Food Allergy



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KEYWORDS

• Food allergy • Racial and ethnic differences • Prevalence • Disparities

KEY POINTS

- Food allergy prevalence varies by race and ethnicity in North America, with increasing evidence of racial differences in food allergy outcomes from the United States.
- Racial and ethnic differences in food allergy-related psychosocial outcomes, economic burden, and knowledge/education also exist.
- Because the concept of race is socially constructed, it is important also to consider the impact of socioeconomic status in studying differences in food allergy outcomes.

INTRODUCTION

In recent decades, immunoglobulin E (IgE)-mediated food allergy (FA) increasingly has been acknowledged as a major public health concern across the globe.¹ In the United States, the most recent epidemiologic data indicate that FA affects approximately 1 in 13 children² and 1 in 10 adults,³ resulting in substantial physical, psychosocial, and economic burden. Previous research has indicated, however, that the impact of FA is remarkably heterogeneous, varying substantially by age,⁴ sex,^{5,6} geography,^{7,8} and race/ethnicity.^{9,10} This review aims to describe what currently is known about the differential burden of FAs among different racial/ethnic groups in North America, particularly in the United States and Canada.

Race is defined as a sociopolitically constructed, nonbiological categorization system based on a combination of personal identity and phenotypical indicators. Ethnicity is a separate but related social construct, which refers to a shared cultural origin.¹¹ The US Census Bureau separates Hispanic/Latino ethnicity from race, defining Hispanic/Latino origin as the heritage, nationality, lineage, or country of birth of the person or the person's parents or ancestors before arriving in the United States.¹² Individuals who

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identify as Hispanic/Latino may identify as being from any race.¹³ In recent years, *Latinx* has emerged as a gender-neutral term to identify ethnicity, relating to persons of Latin American origin or descent.¹⁴ When identifying the link between race and health outcomes, race should be viewed in the context of social constructs, because many observed racial differences in health outcomes are reducible to other socioenvironmental factors.¹⁵ In addition, race must not be misconstrued as having a biological or genetic basis, because race is better understood in the context of social factors that drive health outcomes. Race and ethnicity are constructed in a specific way based on national context, and, as such, analyses of racial/ethnic health disparities among specific groups are limited in their applicability across international boundaries.¹⁶ Historical patterns of migration, racism and discrimination, however, particularly in the US context, have made race/ethnicity a significant indicator of health outcomes, with significant disparities in numerous health conditions.^{15,17}

RACIAL/ETHNIC DIFFERENCES IN FOOD ALLERGY PREVALENCE

A close examination of major US population-based epidemiologic studies conducted over the past 2 decades reveals a consistent pattern of a higher estimated burden of food-allergic disease among black Americans, relative to their white counterparts. The disparate burden FA appears to place on black Americans is consistent with epidemiologic research on other allergic diseases comprising the atopic march (eg, asthma,^{18,19} eczema,^{20–23} and environmental allergies²⁴). These observations, however, which include higher FA prevalence and more frequent health care utilization among particular racial/ethnic groups, run counter to public perception and media narratives that have framed FAs as having a disproportionate impact on white populations.

The first series of US population-based studies designed to estimate national prevalence of specific FAs were conducted by Sicherer and colleagues^{25–28} via random-digit telephone dialing in 1997, 2002, and 2008. Although the 1997 survey did not assess race,²⁵ the 2002 survey of approximately 15,000 Americans found that rates of probable FA to seafood were dramatically higher among black children and adults relative to their white counterparts (3.7% vs 1.9%, respectively), yet the relative frequency of physician-diagnosed shellfish allergy among these probable cases was almost identical (40% vs 38%, respectively).^{26,27} This suggested that the observed differences in prevalence may not entirely be attributable to systematic racial differences in health care access—a well-known phenomenon in other chronic conditions, such as asthma.²⁹ Updated prevalence estimates from more recent random-digit dial telephone surveys have identified similar disparities and are suggestive of a growing burden of FAs among black Americans. For example, the reported prevalence of probable peanut and/or tree nut allergies rose from 0.7% to 1.9% among black Americans from 2002 to 2008, versus a rise from 1.2% to 1.4% among white Americans.^{26,28} Again, similar rates of physician diagnoses were reported (41% of black patients and 44% of white patients with probable FA).²⁶ These surveys, however, did not assess other common top 8 allergens, including cow's milk, egg, wheat, and soy.

In a 2011 survey, parents of a nationally representative sample of approximately 40,000 US children demonstrated that the odds of any probable FA were approximately double among black children relative to white children, adjusting for gender, age, household income, census region, and multiple FAs.³⁰ Additionally, black children with reported FA, as well as children with reported FA from families earning less than \$50,000/y, were significantly less likely to report receiving a

physician diagnosis—highlighting a possible disparity in access to specialist allergy care, discussed later.

A 2014 analysis of previously published FA prevalence data sets,³¹ which presented stratified prevalence estimates, including the aforementioned national surveys conducted by Sicherer²⁵⁻²⁸ and Gupta³⁰, calculated that overall FA prevalence among the general US population had increased by 1.2 percentage points during the prior 2 decades, and by 2.1 percentage points each decade among black Americans.³¹ More recent data from national population-based surveys have reported that current FA prevalence is now higher among black Americans compared with white Americans. These data suggest that this is the case for each of the top 8 FAs besides wheat and soy and also is the case for sesame allergy.³² On a somewhat promising note, these recent US epidemiologic data indicate that on average black children no longer are less likely to report receiving a physician diagnosis for parent-reported “convincing” FA than they were in the 2011 survey. Socioeconomic disparities remain, however, with families earning less than \$50,000/y significantly less likely to report obtaining a physician diagnosis.

FOOD ALLERGY OUTCOMES AMONG HISPANIC POPULATIONS IN THE UNITED STATES

Recent epidemiologic data also suggest that FAs may disproportionately affect other racial/ethnic minority groups as well. An estimated 8.4% of the US Hispanic pediatric population are food-allergic, compared with 7% of white children.² Similarly, an estimated 11.6% of the US Hispanic adult population is food-allergic versus 10.1% of the US white adult population.³ This marks a shift from previous studies, which indicated that Hispanic children may be less likely to report FA relative to their white counterparts.^{15,16} In a US multisite clinical study, observed rates of seafood allergy (both shellfish and finned fish) were significantly higher in Hispanic (and non-Hispanic black) children relative to their white peers.¹⁰ As seen in [Fig. 1](#), race/ethnicity-stratified prevalence estimates from a recent national US survey also are consistent with this finding of greater risk of seafood allergy risk among black and Hispanic children, a finding that extends to US adults.^{2,3} To date, little attention has been paid to the possible heterogeneity in FA status outcomes within the Hispanic population, depending on region of origin. In the related field of asthma, for example, there are differences in asthma prevalence between Hispanic individuals of Puerto Rican descent (16% prevalence per Centers for Disease Control and Prevention [CDC] data)³³ versus Mexican-Americans (5.4% prevalence).³⁴ Therefore, future epidemiologic studies of FA outcomes among Hispanic/Latinx should strongly consider collecting data regarding country of origin and examining possible interactions. Such work has the potential to identify the racial/ethnic subpopulations who may be at highest risk.

FOOD ALLERGY AMONG NORTH AMERICAN NATIVE AND FIRST NATIONS COMMUNITIES

In the United States, little is known about the prevalence of FA among Native American populations. In contrast, numerous Canadian population-based epidemiologic studies have aimed to determine the burden of disease among First Nations/Aboriginal populations, with equivocal findings. The 2011 Surveying Prevalence of Food Allergy in All Canadian Environments study surveyed 5734 Canadian households and deliberately oversampled vulnerable populations, including those of Aboriginal identity.³⁵ In contrast to their study hypothesis, however, which posited the existence of environmental factors that would be protective against atopic disease, they found that rates of FA were similar among Aboriginal and non-Aboriginal Canadians. This

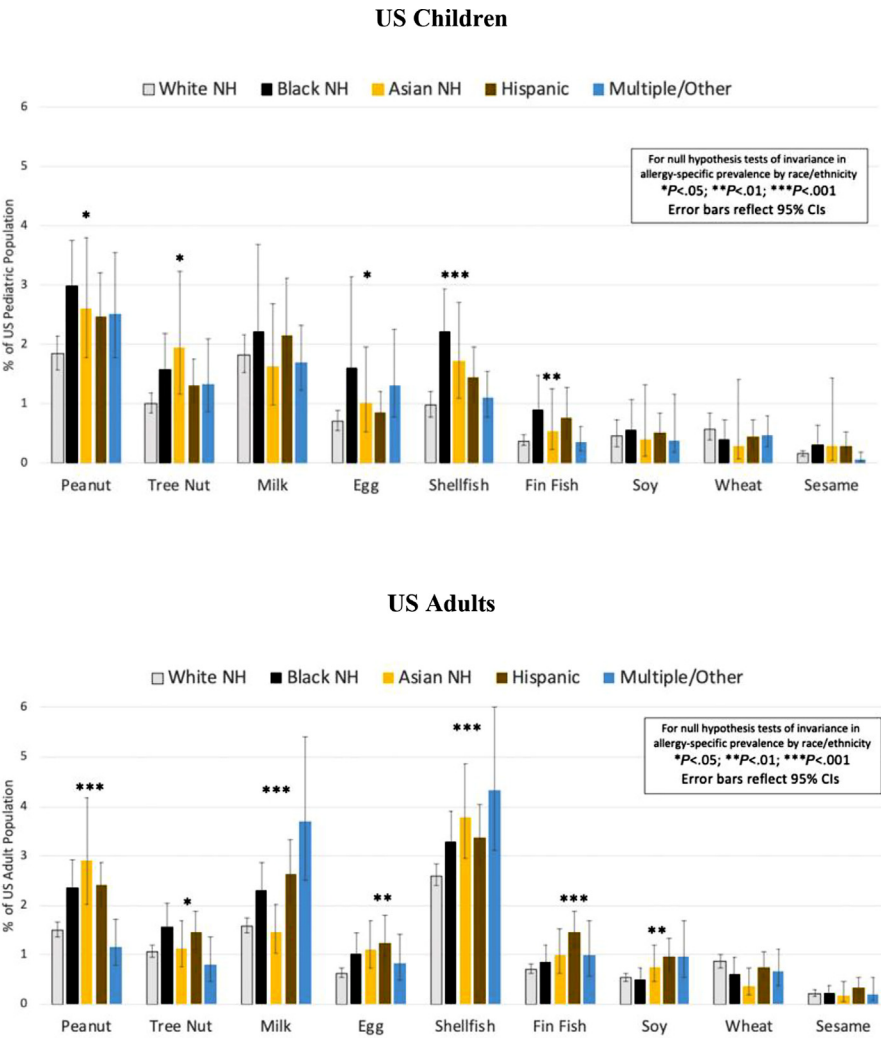


Fig. 1. Allergen-specific prevalence of convincing FA by race. (Data from Gupta RS, Warren CM, Smith BM, et al. The Public Health Impact of Parent-Reported Childhood Food Allergies in the United States. *Pediatrics* 2018;142(6):e20181235; and Gupta RS, Warren CM, Smith BM, et al. Prevalence and Severity of Food Allergies Among US Adults. *JAMA Netw Open* 2019;2(1):e185630-e185630.)

was in contrast to an earlier analysis of the 2006 Canadian Aboriginal Children’s Survey, which found that Aboriginal children living off-reserve were less likely to be food-allergic (2.9% prevalence) than the general Canadian population.³⁶

RACIAL/ETHNIC DIFFERENCES IN FOOD-ALLERGIC SENSITIZATION

Recent data from the Boston-area Project Viva prebirth cohort (N = 1148) found that non-Hispanic black adolescents were at increased risk of peanut-allergic symptomatology (odds ratio [OR] 2.41; 95% CI, 1.12–5.17) versus non-Hispanic white adolescents.³⁷ Non-Hispanic black adolescents also had higher rates of sensitization to

peanut, milk, egg, soy, and wheat—all 5 common food allergens evaluated in this study—although these associations were significant only for peanut and wheat after adjustment for maternal education, maternal smoking during pregnancy and infant exposure to environmental tobacco smoke, household income, and census tract median income. In general, inverse associations were identified between maternal education and allergen sensitization, whereas relationships were less clear with respect to household income. Household income was significantly associated only with higher odds of sensitization to soy, and lower maternal educational attainment was associated with higher odds of sensitization to milk and wheat.

These findings are consistent with data from the younger Detroit-area Wayne County Health, Environment, Allergy, and Asthma Longitudinal Study (WHEALS) birth cohort of black and white children, which was established to examine the environmental determinants of childhood atopy. Findings at year 3 of follow-up indicated that sensitization to milk, egg, or peanut was significantly more common among black children relative to their white peers and that household income, Medicaid insurance status, and maternal education were not confounders of this association.³⁸ Black race, however, was not significantly associated with milk, egg, or peanut allergy status—as determined by a physician panel—at 3 years of age. A previous study reported higher rates of atopic dermatitis, wheeze, and sensitization to a panel of 10 food or environmental allergens and total IgE among black infants in this same cohort versus their white counterparts.²⁴ At the 10-year follow-up, allergic sensitization still was more common among black versus white children in the WHEALS cohort, even after adjusting for socioeconomic indicators (eg, income, maternal education, and difficulty making housing payments) and a variety of lifestyle variables (eg, presence of pets, siblings, and antibiotic use). Black children also were more likely to have atopic dermatitis and asthma, but FA status was not reported. Because most established racial differences in FA phenotypes between black and white patients are with respect to seafood allergies, in particular, shellfish, it will be interesting to determine if these differences eventually emerge within the WHEALS cohort.

The WHEALS study findings of racial differences in food-allergic sensitization are consistent with previous findings from the CDC National Health and Nutrition Examination Survey (NHANES) III (1991–1994), which found substantial racial heterogeneity between food-allergic sensitization to peanut, egg, milk, and shrimp in a nationally representative sample of greater than 2500 US children ages 6 years to 19 years.³⁹ The greatest differences in sensitization (specific IgE ≥ 0.35 kU/L) between black and white children were to shrimp (20.6% vs 6.6%, respectively) and milk (12.8% vs 5.6%, respectively), although significant differences in egg sensitization also were present (4.9% vs 3.0%, respectively). Wegienka and colleagues⁴⁰ provide a review of previous work in this area.

RACIAL/ETHNIC DIFFERENCES IN INTRODUCTION OF ALLERGENIC SOLIDS

Preliminary analyses of greater than 750 participants from the Food Allergy Management and Outcomes Related to White and African American Racial Differences (FORWARD) study have identified racial differences in FA outcomes and disease phenotypes, in addition to mechanistic insights—such as recent reports of substantial delays in the timing of dietary introduction of egg, peanut, and milk among black infants relative to their white counterparts—irrespective of household income strata.⁴¹ This delay in allergenic food introduction among nonwhite populations is consistent with a recent secondary analysis of the Enquiring About Tolerance (EAT) study, which found nonwhite ethnicity to be independently and strongly associated with overall

nonadherence to the prescribed “early introduction protocol” among those randomized to the early introduction group.⁴² In the EAT study, 85% of participants were white and, due to the low number of black participants, Asian and black participants were pooled together compromising only 6% of the sample comprised only 6% of the sample. Given the disproportionate impact of FAs on black families in the United States, and the evidence for the effectiveness of early introduction of allergenic solids observed among the predominantly white, British Learning Early About Peanut Allergy and EAT trial participants, data from the FORWARD study and other similar efforts will provide valuable context for the generalizability of these approaches to more diverse populations.

RACIAL DIFFERENCES IN FOOD ALLERGY-RELATED HEALTH CARE UTILIZATION

Data indicate that black populations are at increased risk of fatal food-induced anaphylaxis relative to their white peers. An analysis of annual US mortality data from 1999 to 2010 found that rates of fatal food-induced anaphylaxis increased from 0.06 deaths per million (1999–2001) to 0.21 deaths per million (2008–2010) in black boys and men, but were stable among US white, Hispanic, and black girls and women during the same time.⁴³ Little is known, however, about the extent to which these trends have continued over the past decade.

Data from the CDC 2011 and 2012 National Health Interview Surveys reported significant racial/ethnic disparities in access to health care for food-allergic patients, which persisted after adjusting for income and education.⁴⁴ In general, compared with survey respondents without FA, respondents with FA were more likely to report difficulty accessing health care and food. Parents/caregivers of black and/or Hispanic children with FA, however, were significantly more likely to report difficulty affording medical care and medications and low food security compared with parents of white children with FA. Although these associations were somewhat attenuated after adjusting for household income and parental educational attainment, black survey respondents with FA still were significantly more likely to report low food security (OR 2.15; 95% CI, 1.30–3.53), problems affording medical care and prescriptions.

Analysis of more recent national survey data indicate that pediatric black and Hispanic FA patients are more likely to report receiving FA care in the emergency department (ED) than their white peers, with 47.3% of black and 49.2% of Hispanic patients reporting at least 1 FA-related ED visit during their lifetime versus 37.3% of white patients. More dramatic racial differences were found with respect to the reported frequency of FA-related ED visits. Specifically, black and Hispanic patients were at least 40% more likely to report receiving FA treatment in the ED within the past year compared with white patients.

Among US adults, black and Hispanic patients also were more likely to report a history of “severe” food-allergic reaction symptoms (indicated by multiple organ system involvement) and multiple FAs, each of which is likely to contribute to the aforementioned increased rates of ED visits among these racial/ethnic groups. Similarly, rates of reported lifetime epinephrine autoinjector use for food-allergic reaction treatment were greater among black (19.2%) and Hispanic (21.7%) US adults with FAs versus their white peers (17.5%). Rates also were greater among black (28.5%) and Hispanic (25.6%) US children with FAs versus their white peers (23.7%), despite comparable reported rates of current epinephrine prescription possession among black versus white versus Hispanic (38.5% vs 40.7% vs 41.0%, respectively) populations. Aforementioned data are limited, however, by possible bias due to self/parent-proxy report and an inability to validate reported health care utilization against chart review or follow-up allergy testing.^{2,45}

Data gleaned from chart reviews of 817 food-allergic patients in Chicago and Cincinnati provide further evidence that black children may be disproportionately

burdened by their allergic disease (Fig. 2).¹⁰ Specifically, rates of food-induced anaphylaxis and FA-related ED visits were much higher among black relative to white patients (33.9% and 39.7% vs 16.4% and 18.2%, respectively), despite the fact that these populations had similar age distributions and white patients received follow-up allergy care for significantly longer (3.2 years vs 4.3 years, respectively). This multisite study also identified significant racial differences in FA outcomes between Hispanic and white patients, with Hispanic patients approximately 2 times as likely to report food-induced anaphylaxis (35.4% vs 16.4%, respectively) and FA-related ED visits (34.3% vs 18.2%, respectively) versus their white counterparts. Owing to disparities in health care access, however, comparing ED utilization is an imperfect proxy for FA severity, because individuals without access to specialty allergy care may be more likely to receive treatment in the ED even with similar reaction symptomatology.

RACIAL DIFFERENCES IN THE SOCIOECONOMIC BURDEN OF FOOD ALLERGY

In a 2013 study by Gupta and colleagues,⁴⁶ the economic burden of FA was estimated to be \$24.8 billion annually, exceeding \$4000/y per affected child. A follow-up study identified significant socioeconomic disparities in the economic burden of childhood FA, families earning less than \$50,000/y spending more than twice as those from higher income families on FA-related ED and hospitalization costs.⁴⁷ In contrast, greater household income was associated with greater spending on out-of-pocket medication costs (eg, for epinephrine autoinjectors). This is consistent with previous work, which identified cost as the single most common barrier among adult FA patients of all racial/ethnic backgrounds who reported not filling their prescription for an epinephrine autoinjector.⁴⁸ This study, however, did not evaluate the economic burden of FA among adults.

RACIAL DIFFERENCES IN FOOD ALLERGY-RELATED QUALITY OF LIFE AND PSYCHOSOCIAL BURDEN

Even after adjusting for parental income and education, black food-allergic patients are more likely to describe challenges with food insecurity and inability to pay for necessary medication⁴⁴—both likely determinants of greater FA-related psychosocial burden.

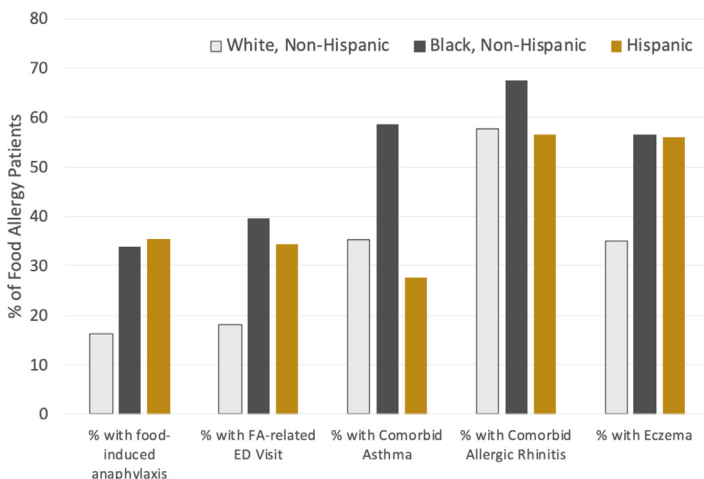


Fig. 2. Burden of food allergy by race and ethnicity. (Data from Mahdavinia M, Fox SR, Smith BM, et al. Racial Differences in Food Allergy Phenotype and Health Care Utilization among US Children. *J Allergy Clin Immunol Pract* 17;5(2):352-357.e351.)

Despite the importance of FA-related quality of life as a patient-reported outcome, there are no published epidemiologic studies that have attempted to systematically compare FA-related psychosocial burden and/or quality of life across major racial/ethnic strata in the United States. For example, the only large ($N > 1000$) published study to date administering a validated instrument (the FA quality of life questionnaire–parent form) to a national sample of US families did not assess participant race.⁴⁹

One notable study of 103 caregivers of food-allergic children recruited from an urban, mid-Atlantic FA clinic did observe remarkable racial/ethnic heterogeneity in FA perceptions and parent-proxy-reported psychosocial burden⁵⁰—with African American caregivers reporting the lowest perceived risk of allergen exposure, but the highest FA-related worry of all racial groups. In contrast, Asian-American caregivers reported the highest perceived risk of allergen exposure and Hispanic caregivers reported the greatest perceived FA severity, while also reporting the lowest perceived burden with respect to the day-to-day management of their child's FA. Another recent study of FA-related quality of life found that Asian patients and parents reported significantly worse pediatric FA-related quality of life relative to their white and black counterparts.⁵¹ At the same time, no differences were observed in patient/parent-reported pediatric FA-related quality of life when comparing patients/parents of children insured through Medicaid compared with privately insured patients. More work is needed, however, to better contextualize these apparent racial differences in patient/caregiver perceptions and determine to what extent they can be generalized to adult patients.

Another study of 80 parent-child dyads found that the children with FA had significantly higher overall scores on the Multidimensional Anxiety Scale for Children as well as on the Humiliation/Rejection and Social Anxiety subscales.⁵² FA was not associated, however, with child depression symptoms nor was there a significant difference in anxiety or depression symptoms among caregivers of patients with and without FA. These data suggest that FA appears to be associated with greater social anxiety and greater anxiety overall, but not depressive symptoms, among low socioeconomic status (SES) racial/ethnic minority children. Although the aforementioned studies provide useful information, further research is needed to better characterize psychosocial burden within larger, more nationally representative cohorts of racially diverse FA patients, which can inform future psychosocial interventions. For example, a recent publication from the multisite FORWARD study found that although black children were approximately twice as likely to report bullying victimization for any reason compared with white children (39% vs 18%, respectively), there were no significant racial differences in the overall rates of FA-related bullying and rates of FA-related bullying were higher among white adolescents versus black adolescents greater than or equal to 11 years old. As the FORWARD cohort ages and additional patients are enrolled, including Latinx families, further insights from this National Institutes of Health-supported study are anticipated.⁵³

RACIAL DIFFERENCES IN FOOD ALLERGY KNOWLEDGE AND CLINICAL EDUCATION

To help ensure the health and safety of FA patients, it is crucial that they and those around them—especially parents/caregivers—are knowledgeable regarding FA management. Being knowledgeable about allergen avoidance and common routes of accidental exposures as well as signs/symptoms of anaphylaxis and its emergency treatment can empower patients and those around them to engage in more effective advocacy for their well-being, potentially reducing their risk of adverse outcomes. A 2020 qualitative review highlighted work indicating that lower levels of FA knowledge

have been associated with poorer FA-related quality of life.⁵⁴ Findings from a survey assessing FA knowledge administered in 2009 to members of the general adult public found that black and Hispanic survey respondents were less likely to identify common FA triggers relative to their white counterparts.⁵⁵ Black, Hispanic, and Asian adults also were less likely than white adults to identify signs of a milk allergy. Black and Hispanic survey respondents, however, were more likely to note the importance of food allergen avoidance. Additionally, preliminary data from the FORWARD study also suggest that FA knowledge differs by race among parents of children with FA.⁵⁶

A 2020 study by Luke and Flessner⁵⁷ surveyed parents of children with FA and found that FA knowledge was significantly lower among parents of racial/ethnic minority FA patients, as well as patients in low-income households. The investigators concluded that parents with low income and/or are of a racial/ethnic minority status may be at risk of FA mismanagement and may benefit from targeted educational interventions.⁵⁷

RACIAL DIFFERENCES IN NON-IMMUNOGLOBULIN E-MEDIATED FOOD ALLERGY

Although racial/ethnic differences in IgE-mediated FA increasingly have been studied, there is a paucity of literature on potential racial/ethnic variations in non-IgE-mediated FAs. Previously, food protein-induced enterocolitis syndrome (FPIES) primarily has been studied in white populations. Racial differences in FPIES phenotypes may exist, however, as suggested by a study of Japanese infants with FPIES.^{58,59} These infants presented with symptoms, including vomiting, bloody stool, and/or fever, whereas some also exhibited positive cow's milk-specific IgE antibody levels. Bloody stool and positive food-specific IgE antibodies reportedly are rare among FPIES patients in Western countries but in the aforementioned Japanese sample of infants with FPIES, bloody stool occurred among 47% of patients and milk-specific IgE antibodies were positive among 32% of patients.⁵⁹ Although further exploration of racial differences is necessary, a US population-based survey of FA prevalence also suggests that children with FPIES are more likely to be Asian.⁶⁰

Additionally, racial differences can be observed in other non-IgE-mediated FAs besides FPIES. In a prevalence study of celiac disease using data from NHANES from 2009 to 2012, the prevalence of celiac disease was 4-times to 8-times higher among white individuals compared with other races. Differences in eosinophilic esophagitis (EoE) outcomes by race also have been observed; however, there remains a gap in knowledge concerning reasons for these differences and population-level inferences of EoE by race. Previous studies suggest that EoE patients are more likely to be white,⁶¹ although EoE can occur among other racial/ethnic groups and African American children may have a larger EoE burden.⁶² EoE symptoms may differ by race because African American children have been previously more likely to report failure to thrive^{62,63} whereas dysphagia is more common among whites.⁶⁴ These studies note, however, that age of symptom presentation and diagnosis can have an impact on symptoms presented and noted that after accounting for age, racial differences in symptoms were not as apparent. Failure to thrive and vomiting are common among younger children, and African American children may present with EoE onset at a younger age, which could explain the racial differences initially observed.⁶²

BEYOND RACIAL/ETHNIC DIFFERENCES—THE IMPORTANCE OF SOCIOECONOMIC STATUS

Although this review is intended to focus on racial/ethnic differences in FA, it is essential to note that the independent effects of ethnicity on the etiology of food-allergic

Table 1 Recommended practices for assessment of socioeconomic status in health research	
Socioeconomic Status	
Indicator	How to Assess
Education	• Measure in single years completed up to 5 or more years of college and also should include collection of information on whether the individual obtained a high school diploma or equivalent. • Surveys also should collect information on degree attainment.
Income	• Income should be asked for the individual survey respondent and for the respondent's entire family as well as household income. • Collected income information should include the measurement of total income, earned or unearned, from specific sources (wages and salaries, dividends and interest, Social Security, unemployment insurance, disability income, etc.)
Occupation	• Occupation should be measured at a minimum by a set of 2 standardized questions: 1 question to collect occupation and 1 question to collect industry. • Additional information about work tasks and employer also should be considered.
Family size and relationships	• Given that family size and household composition are required to calculate poverty, survey measures should collect information on family size and household composition in compliance with official federal poverty guidelines as issued and published each year.

Data from Statistics NCoVaH. Development of Standards for the Collection of Socioeconomic Status in Health Surveys Conducted by the Department of Health and Human Services. 2012; <https://www.nvcvhs.hhs.gov/wp-content/uploads/2014/05/120622lt.pdf>.

disease are difficult to disentangle from other frequently associated socioenvironmental factors. These include the putative environmental determinants of childhood atopy assessed by the aforementioned cohort studies (eg, environmental tobacco smoke, diet, air pollution, dust mite, and cockroach exposure) as well as SES, which is an important determinant of health care access and quality. SES also is highly correlated with the presence of both chronic and acute stressors (eg, adverse childhood experiences^{42,65}), which can have profound health effects including proinflammatory immunologic effects.⁶⁶

The National Committee on Vital and Health Statistics has issued a set of recommendations aiming to standardize the assessment of the following key indicators of SES: education, income, occupation, and family size/relationships. These recommendations are summarized in [Table 1](#).

Although education, income, and occupation are core elements of SES assessment, there are other complementary domains that also should be considered. The American Psychological Association Stop Skipping Class initiative has highlighted the potential importance of considering subjective social status, occupational prestige, absolute poverty, relative poverty, and additional resource-based SES measures beyond household income when assessing SES. Further detail regarding each of these is provided in a review by Diemer and colleagues⁶⁷ as well as resources available at the MacArthur Research Network on SES and Health.⁶⁸

SUMMARY

By improving and expanding assessment of SES in FA research, the social context of study participants can be contextualized better and therefore understanding improved

of the complex role of race/ethnicity as a determinant of FA outcomes. In this way, insights can be gained into the most promising and effective strategies for reducing the disproportionate burden that FA places on specific racial/ethnic minority communities.

CLINICS CARE POINTS

- This synthesis of the latest epidemiologic data suggests that the burden of FA falls disproportionately on North American racial/ethnic minority populations.
- Further research should focus on better characterizing psychosocial burden among larger nationally representative racial/ethnically diverse FA patient populations to inform interventions to improve FA management and outcomes among vulnerable populations.
- It is crucial that future epidemiologic and clinical research studies incorporate more rigorous, standardized assessment of SES—in addition to race/ethnicity—to inform interventions that can advance equity in FA management and outcomes.

DISCLOSURE

Dr R.S. Gupta received grants from the National Institutes of Health (NIH) during the conduct of the study and from Stanford Sean N. Parker Center for Allergy Research, UnitedHealth Group, Thermo Fisher Scientific, Genentech, and the National Confectioners Association as well as personal fees from Before Brands, Kaléo Inc, Genentech, Institute for Clinical and Economic Review, Food Allergy Research & Education, Aimmune Therapeutics, and DBV Technologies outside the submitted work. No other disclosures are reported.

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