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Racial and Socioeconomic Differences in School Peanut-Free Policies

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To the Editor

Some schools have adopted peanut-free policies to attempt to reduce allergen exposure; however, this may not decrease allergic reactions.¹ Few studies have evaluated the impact of race and socioeconomic status (SES) on school food allergy management.² This is important given increased food allergy among black compared to white children² and that epinephrine autoinjectors are less likely to be found in low SES schools.^{3, 4} Whether health inequities exist in school peanut-free policies has not been studied. We sought to determine the association of race and SES with school peanut-free policies in Massachusetts public schools.

In 2013, all 379 school nurses in the Massachusetts Department of Public Health database were surveyed by email (see Figure E1) to retrospectively report their schools' peanut-free policies in academic year (AY) 2010–2011.¹ Survey responses were compared to epinephrine administration and publicly available school demographics from AY 2010–2011. All Massachusetts school nurses are required to submit a standardized data collection form after administering epinephrine.¹ Although our survey evaluated peanut-free policies,

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given difficulty correctly identifying peanuts and tree nuts,⁵ risk of cross-contamination,⁶ and use of “nut” in the form,¹ analysis of epinephrine administration was based on “peanut or tree nut” exposure.

Descriptive statistics were used to characterize the sample. School demographics were compared for schools that did and did not respond to the policy survey; statistical significance was calculated by Wilcoxon rank sum test for school size, class size and income and by logistic regression for racial composition. Racial and socioeconomic data were compared for schools with and without peanut restrictive policies; statistical significance was calculated by Wilcoxon rank sum test. Rates of epinephrine administration were compared to racial and socioeconomic data; statistical significance was calculated by Poisson regression. *P* value <0.05 was considered statistically significant. The study was approved by the Boston Children’s Hospital Institutional Review Board.

55.1% (209/379) of nurses responded to the survey, representing 484 schools (244,483 students). The number of schools was larger than nurses surveyed, as many nurses oversaw multiple schools. Table 1 shows school demographics. Public schools in rural, suburban and urban settings throughout Massachusetts were represented. Schools ranged from pre-kindergarten through special education beyond grade 12. Some nurses were unable to provide information on all policies, so those schools were excluded from analysis of a given policy.

10.3% (35/340) of schools surveyed did not permit peanuts to be brought from home, 56.6% (189/334) did not allow peanuts to be served in school, 91.1% (400/439) had peanut-free tables and 65.6% (282/430) had peanut-free classrooms. School policies were compared to demographics (Figure 1). Schools with peanut-free tables and classrooms compared to without had higher proportions of low-income (31.7% v. 16.8%, *p*=0.0015 and 44.0% v. 21.0%, *p*<0.0001, respectively) and minority students (24.6% v. 11.1%, *p*<0.0001 and 42.3% v. 15.4%, *p*<0.0001, respectively). Schools banning compared to those permitting peanuts from home had a higher proportion of minority students (18.0% v. 13.2%, *p*=0.0456). Schools banning compared to those permitting peanuts being served in schools had a higher proportion of low-income students (24.3% v. 10.3%, *p*<0.0001).

Epinephrine administration data was available for all 1,824 Massachusetts public schools (955,563 students). During AY 2010–2011, epinephrine was administered 168 times for any indication and 45 times for peanut/tree nut reactions. Demographics were compared to epinephrine administration for all causes and for peanut/tree nut reactions (see Table E1). Epinephrine administration was not associated with race or SES for all causes or peanut/tree nut reactions.

This is the first study correlating race and SES with school food restrictive policies. We found that schools with more restrictive policies had higher proportions of racial minority and low-income students. While many assume that more restrictive policies may reduce rates of allergic reactions,⁷ we showed that while schools with peanut-free tables had lower epinephrine administration rates, other peanut-restrictive policies did not affect epinephrine administration rates, suggesting difficulties enforcing school-wide bans.¹ In a survey of

school nurses, financial considerations, limited staff, and parent and administrative/staff resistance were barriers to implementing school food allergy policies.⁸ Further research is needed to understand how these aspects of school food allergy management may impact policies.

At the time of this study, there was no stock epinephrine legislation in the US. The 2013 School Access to Emergency Epinephrine Act is a federal law encouraging states to implement policies requiring schools to have stock epinephrine for emergency use. However, the majority of states, including Massachusetts, still do not require stock epinephrine in schools.⁹ Therefore, inequities in epinephrine access likely persist.

We relied on school nurse reports of policies and epinephrine administration, which could introduce recall bias. However, school nurses, with their integral role in managing food-allergic children, should provide an acceptable representation.¹ Sociodemographics, food allergy policies and rates and treatment of allergic reactions may differ between public and private schools, which may impact the generalizability of our findings, which were limited to public schools. Schools with more minority and low SES students may have higher peanut/tree nut allergy rates, which might prompt more restrictive policies. However, we found that epinephrine administration rates were not associated with school racial or socioeconomic make-up. This study uses real-world epinephrine administration data as part of a quality improvement program through the Massachusetts School Health Unit. While mandatory tracking of all allergic reactions, rather than epinephrine administration, may provide a more representative measure of allergic reactions in schools, to our knowledge no such dataset currently exists.

Our findings raise important considerations regarding development and implementation of evidence-based strategies and policies for preventing food allergic reactions in schools. Based on our study and others, there are demographic factors associated with school peanut-free policies and anaphylaxis preparedness and management.^{3, 4} It is unclear what the drivers of instituting specific peanut-free policies are: school personnel, the families of students with food allergies, or both. Schools may be adopting restrictive policies due to a higher population of students with peanut allergy. In contrast, it would be disheartening if lower SES schools were implementing restrictive policies due to lack of resources such as financial constraints, diminished epinephrine availability, or shortage of school nurses and other properly-trained personnel. Future research should focus on identifying evidence-based policies for preventing food allergic reactions and anaphylaxis that can be easily adopted by all schools, regardless of student demographics and school financial and administrative resources.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Clinical implications

We sought to determine the association of race and socioeconomic status with school peanut-free policies. We found that schools with more restrictive policies had higher proportions of racial minority and low-income students

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Figure 1. School Policies Compared to Demographics.

Racial minority was defined as nonwhite. The Massachusetts Department of Education defined low-income as students eligible for free or reduced-price lunch, receiving Transitional Aid to Families benefits or eligible for food stamps. Percentage of racial minority (**A**) and low-income (**B**) students by specific school policy. Number of schools with a given policy are indicated. Data are presented as median values.

Table 1.

Characteristics of Schools.

Characteristic	Schools Responding to Survey (n=484)	Schools Not Responding to Survey (n=1340)	P-value
No. students in school, median (IQR)	428 (295,625)	466 (314,631)	0.0651
Average class size, median (IQR)	18.9 (16.6,21.2)	19.6 (17.2,22.1)	0.0003
Low income %, median (IQR)	28.5 (10.7,68.6)	25.3 (10.5,57.1)	0.1707
Race %, median (IQR)			<0.0001
African American	3.4 (1.2,16.8)	2.6 (1.1,6.9)	
Hispanic	7.1 (2.8,30.4)	5.3 (2.6,17.4)	
White	78.5 (28.4,90.7)	81.9 (55.6,91.1)	
Multi-race/Other	5.3 (3.0,8.8)	5.7 (3.4,9.9)	

Demographic data available for 95.6% (1,744/1,824) of schools (914,086 students). Data available for 99.0% (484/479) of schools responding to the survey and 94.4% (1,265/1,340) of schools not responding. Massachusetts Department of Education defined low-income as students eligible for free or reduced-price lunch (family income <133% or 133–185% of federal poverty level, respectively), receiving Transitional Aid to Families benefits or eligible for food stamps. IQR=interquartile range