CONCLUSIONS. Increased empowerment scores directly correlated with increased parental comfort with EpiPen use. Although increased knowledge scores did not prove to be a significant contributor to parental comfort, training on EpiPen use is an important component in improving parental comfort. The authors question the impact of other psychological factors, such as fear, that may contribute to underuse of the EpiPen.

REVIEWER COMMENTS. Previous studies of parental EpiPen administration have reported incorrect use of autoinjectors despite training at the time of prescription. This study suggests that factors beyond parental knowledge are critical for proper administration of this potentially life-saving medication. The importance of hands-on training to increase caregiver comfort is underscored by this study. Demonstration units and training videos are available free of charge through the manufacturers for EpiPen and the Twinject, another epinephrine self-injection unit not discussed in this study.

Before the seminar, 24% of child care centers would administer intramuscular epinephrine for a severe allergic reaction. After the seminar, 77% of centers stated they would administer intramuscular epinephrine (P < .001). In addition, center staff significantly improved their knowledge of symptoms of allergic reactions and the correct methods of intramuscular epinephrine administration.

CONCLUSIONS. There is a knowledge deficit in anaphylaxis education at child care centers for children 1 to 6 years old. Intervention with individual education seminars can significantly increase the ability of child care center staff to recognize, evaluate, and treat anaphylaxis.

REVIEWER COMMENTS. Although it is encouraging that the staffs at child care centers seem to be able to learn how to recognize and treat allergic reactions and anaphylaxis, it is at the same time discouraging that such a small percentage would have done so correctly before the seminar. Most child care centers receive their education from discussions with parents. However, studies have shown that only 50% of parents could identify all the critical steps for proper usage of epinephrine. Therefore, I agree with the authors that it is critical that health care professionals become more involved in the education of parents and the staffs of child care centers. In addition, detailed treatment plans should be written to help guide centers in the proper care of allergic reactions.

Recognition, Evaluation, and Treatment of Anaphylaxis in the Child Care Setting

PURPOSE OF THE STUDY. Although many young children with a history of allergic reactions or anaphylaxis spend considerable time in child care centers, little is known about the centers’ knowledge of, experience with, and capacity to treat anaphylaxis. The purpose of this study was to evaluate the ability of child care centers to recognize, evaluate, and treat anaphylaxis episodes.

STUDY POPULATION. Children aged 1 to 6 who attended child care center in the suburbs of Chicago, Illinois.

METHODS. Eighty-five independent child care centers in suburbs of Chicago were selected randomly. They were contacted by telephone and asked to join the study by completing an initial questionnaire about allergic reactions and anaphylaxis. The center directors and teachers were then offered an allergy seminar on anaphylaxis avoidance, recognition, evaluation, and treatment. After the seminar, center directors were given a posttest that included some of the questions from the original questionnaire.

RESULTS. Of the 85 centers, 44 agreed to participate. Forty-two centers completed the surveys before the seminar and 39 after the seminar. On average, each center had up to 7 children with an identifiable food allergy. The most commonly reported source of education concerning allergies was information provided by the parents.

Differences in Race, Ethnicity, and Socioeconomic Status in Schoolchildren Dispensed Injectable Epinephrine in 3 Massachusetts School Districts

PURPOSE OF THE STUDY. To analyze the demographic characteristics of schoolchildren dispensed injectable epinephrine in 3 school districts with widely diverse socioeconomic, racial, and ethnic populations.

STUDY POPULATION. Students (prekindergarten to grade 12) from 3 school districts in Massachusetts (n = 21 875) were evaluated. Two of the school districts were affluent, suburban towns outside of Boston (5855 students). The third district (16 020 students) was also a Boston suburb but with a very low per-capita income, with 23% of the school-age population living below the poverty line. The 2 suburban districts were 92% and 95% white, respectively, and the third district was 60% nonwhite.

METHODS. All school districts in Massachusetts are required to report the number of students using daily or as-needed prescription medications to the Department of...
Public Health. Data were taken from reports filed by school nurses monthly for all students from the 2003–2004 school year for these 3 school districts.

RESULTS. A total of 181 schoolchildren (0.83%) in the 3 districts were dispensed injectable epinephrine during the school year studied. Diagnoses listed for the prescription of epinephrine included peanut/tree nut allergy (65%), stinging-insect allergy (19%), seafood allergy (6%), and egg or dairy allergy (3%). A miscellaneous group (7%) included diagnoses for latex, chocolate, pollen, fruit, cold air, and ibuprofen allergy. Males were more likely to be dispensed epinephrine than females (odds ratio [OR]: 1.44; \( P < .02 \)). White students were nearly 5 times more likely to have been dispensed epinephrine for peanut and tree nut allergy (OR: 4.5; \( P < .001 \)) and almost 9 times more likely for stinging-insect allergy (OR: 8.7; \( P < .001 \)). Seventy-five percent of students dispensed epinephrine for peanut or tree nut allergy were enrolled in prekindergarten through grade 5.

CONCLUSIONS. Significant racial and socioeconomic differences for prescribing self-injectable epinephrine was seen in 3 school districts in Massachusetts.

REVIEWER COMMENTS. This study describes the racial and socioeconomic demographics of children prescribed injectable epinephrine but does not address the reasons for the disparity between affluent and nonaffluent or white and nonwhite populations. This study suggests that minority, socioeconomically disadvantaged students are being either underdiagnosed or undertreated for potential anaphylactic reactions that require epinephrine. Other studies have not shown racial differences in the incidence of food allergies, suggesting that other factors are involved in the lower rate of epinephrine dispensed to disadvantaged minority students.

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**DRUG ALLERGY**

Immediate Allergic Reactions to Cephalosporins and Penicillins and Their Cross-Reactivity in Children


PURPOSE OF THE STUDY. To evaluate the frequency of anaphylactic reactions to cephalosporins and penicillins and their cross-reactivity in a pediatric population.

STUDY POPULATION. A prospective survey was conducted in a group of 1170 children with suspected immediate allergic reactions to cephalosporins and/or penicillins, which were examined during a period of 8 years.

METHODS. In vivo (skin tests and challenges) and in vitro tests (for specific immunoglobulin E) were performed with a standard concentration of penicillins and cephalosporins.

RESULTS. When 1170 children with a clinical history of allergy to penicillins and/or cephalosporins were tested in vivo for immediate hypersensitivity to \( \beta \)-lactams, 58.3% of cases overall were found to be skin- or challenge-test–positive. Among them, 94.4% of patients were positive to penicillins and 35.3% to cephalosporins. The frequency of positive reactions in the in vivo testing was in the range of 36.4% to 88.1% for penicillins and from 0.3% to 29.2% for cephalosporins. However, 31.5% of the penicillin-allergic children cross-reacted to some cephalosporin. If a child was allergic to a cephalosporin, the frequency of positive reactions to penicillin was 84.2%. The cross-reactivity between cephalosporins and penicillins varied between 0.3% and 23.9%. The cross-reactivity among different generations of cephalosporins varied between 0% and 68.8%, being the highest for first- and second-generation cephalosporins and 0% for third-generation cephalosporins.

CONCLUSIONS. The frequency of immediate allergic reactions to cephalosporins is considerably lower compared with penicillins, and the degree of cross-reactivity between cephalosporins and penicillins depends on the generation of cephalosporins, being higher with earlier-generation cephalosporins. The cross-reactivity among cephalosporins is lower compared with cross-reactivity between penicillins and cephalosporins.

REVIEWER COMMENTS. Penicillins and cephalosporins are common antibiotics inducing immunoglobulin E–mediated reactions in children. This large pediatric prospective study revealed that more than half of the children with a history of drug reaction to penicillin and/or cephalosporins were skin- or challenge-test–positive, unlike adults in whom the majority of those with a history of penicillin allergy are found to be skin test–negative. Almost one third of penicillin-allergic children are sensitized to cephalosporins. However, this sensitization was only to first- and second-generation cephalosporins; there was no cross-reactivity seen with third-generation cephalosporins. Interestingly, there was less cross-reactivity among the different cephalosporins. The results of this study can help guide antibiotic choices for penicillin-allergic children.

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Hypersensitivity Reactions to Paracetamol in Children: A Study of 25 Cases

## Differences in Race, Ethnicity, and Socioeconomic Status in Schoolchildren Dispensed Injectable Epinephrine in 3 Massachusetts School Districts

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