food allergy, followed by a group discussion. Child life specialists led the groups for children, which were aimed at providing a safe environment for children to express their feelings regarding food allergies and increasing confidence in management skills.

RESULTS. Sixty-one children and their parents were included in the study sample. Seventy-eight percent of participants showed improvement in competence scores from before the workshop to after the workshop ($P < .001$), and 74% showed improvement from before the workshop to the follow-up evaluation ($P < .001$). In addition, 63% of participants demonstrated a significant decrease in parent-perceived burden from before the workshop to after the workshop ($P = .002$).

CONCLUSIONS. This study provides preliminary support for the effectiveness of a half-day workshop in reducing parent-perceived burden and increasing parent-perceived competence in coping with children with food allergies.

REVIEWER COMMENTS. This study is a good start in identifying factors that can improve the quality of life of our families with food allergies. We need larger studies with more-diverse patient populations and control groups to identify which factors are most helpful and to determine whether the findings are clinically significant.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2009-1870J

Theresa A. Bingemann, MD
Rochester, NY

Use of Multiple Doses of Epinephrine in Food-Induced Anaphylaxis in Children

PURPOSE OF THE STUDY. Data from mixed or adult populations indicate that 16% to 35% of anaphylactic reactions from various causes require >1 dose of epinephrine. This study sought to determine the prevalence and risk factors for administration of repeated doses of epinephrine in food-induced anaphylaxis in children.

STUDY POPULATION. Questionnaires ($N = 542$) were distributed to parents or caregivers of consecutive patients up to 18 years of age presenting for initial or follow-up evaluation for food allergy. The study was conducted at a hospital-based, pediatric, allergy clinic and a private practice-based, pediatric, food-allergy, referral clinic at Mount Sinai Hospital (New York, NY).

METHODS. An anonymous 2-page questionnaire regarding details of as many as 2 anaphylactic reactions was administered. Data collected from the past 2 reactions requiring epinephrine included suspect food, onset of symptoms, and timing of treatment with single or multiple doses of epinephrine. The Mann-Whitney rank-sum test was used to compare medians and the $t$ test to compare means.

RESULTS. Overall, 413 questionnaires were included in the analysis. A total of 78 children reported 95 reactions for which epinephrine was administered. Of the 95 reactions, 77 (81%) required a single dose, 12 (13%) required 2 doses, and 6 (6%) required 3 doses of epinephrine. Peanut, tree nut, and cow’s milk were responsible for >75% of the reactions requiring epinephrine. Children receiving >1 dose of epinephrine more often had asthma ($P = .27$), compared with those receiving 1 dose. The amount of food allergen ingested and the delay in administering the initial epinephrine dose were not risk factors for receiving multiple doses of epinephrine. Of the second doses of epinephrine, 94% were administered by a health care professional.

CONCLUSIONS. Nineteen percent of food-induced anaphylactic reactions in this referral population required >1 dose of epinephrine. Additional studies are required to identify risk factors for severe anaphylaxis and to aid in establishing guidelines for prescribing multiple doses of epinephrine autoinjectors for children with food allergies.

REVIEWERS COMMENTS. The retrospective design and selected referral-based population with multiple food allergies are limitations to this study. These results, however, contribute to a body of evidence that suggests 2 doses of epinephrine may be required for our at-risk food-allergic patients. It is hoped that with additional studies we will improve our ability to identify those food-allergic patients most at risk for severe anaphylaxis.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2009-1870K

Timothy Andrews, MD
James R. Banks, MD
Arnold, MD

Epinephrine Auto-injectors: First-Aid Treatment Still Out of Reach for Many at Risk of Anaphylaxis in the Community

PURPOSE OF THE STUDY. Epinephrine is a life-saving medication for the treatment of anaphylaxis, and epinephrine auto-injectors (EpiPen [Dey, Napa, CA] or Twinject [Sciele Pharma, Inc., Atlanta, GA]) are universally recommended as essential first-aid treatment for anaphylaxis. A survey conducted in 2003 at the World Allergy Organization (WAO) raised concerns regarding lack of universal availability and affordability of epinephrine auto-injectors in many countries. This study was conducted at the WAO meeting as a follow-up study to determine whether availability and affordability of epinephrine auto-injectors had improved worldwide between 2003 and 2007.
Use of Multiple Doses of Epinephrine in Food-Induced Anaphylaxis in Children
Timothy Andrews and James R. Banks

Pediatrics 2009;124;S128
DOI: 10.1542/peds.2009-1870KK

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Pediatrics 2009;124:S128
DOI: 10.1542/peds.2009-1870KK

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