**STUDY POPULATION.** Data were analyzed from the anaphylaxis registry of German-speaking countries, which included 197 reported anaphylactic reactions from children and adolescents between 2006 and 2009. This database is based on an online questionnaire for providers of allergy specialty care in Germany, Austria, and Switzerland.

**METHODS.** The questionnaire included demographic data, clinical symptoms, the cause of reaction, accompanying or possible aggravating factors, history of previous reaction, and treatment. To focus on reactions that involved life-threatening symptoms, only children who experienced reactions with at least 1 pulmonary or cardiovascular symptom were included in the analysis.

**RESULTS.** The most frequently affected organ systems involved in anaphylaxis cases of children and adolescents were the skin (89%) and respiratory tract (87%). Cardiovascular (47%) and gastrointestinal manifestations (43%) were noted less frequently. The most common triggering allergens were foods (58% of cases), followed by insect venoms (24%) and drugs (8%). Peanut was the most frequent food allergen provoking anaphylaxis, followed by tree nuts, cow’s milk, and egg. Accompanying or aggravating factors, such as exercise, drug use, coexisting infection, psychological stress, and menses, were noted in 18% of all cases. Only 26% had a history of a previous reaction. Treatment data demonstrated that antihistamines were given 87% of the time and corticosteroids were given 85% of the time, but epinephrine was given only 22% of the time.

**CONCLUSIONS.** Use of registry data can provide insight into the features of children presenting with anaphylaxis. Food allergens were the most common triggers for anaphylaxis and possible aggravating factors were noted in nearly 1 in 5 cases, with exercise being the most common. The low frequency of epinephrine administration suggests ongoing need for education for both families and physicians.

**REVIEWER COMMENTS.** This study aimed to characterize children with life-threatening anaphylactic reactions by selecting those with cardiovascular and/or pulmonary involvement. Consistent with other studies, food allergens (most commonly peanut) were the most frequent trigger for reaction. The rate of accompanying or aggravating factors suggests that these should be considered in evaluation of all children with anaphylaxis. The low rate of epinephrine use is concerning, especially given that this study focused on more severe reactions, although this is consistent with most other studies of anaphylaxis from around the world.

**The Use of Adrenaline Autoinjectors by Children and Teenagers**


**PURPOSE OF THE STUDY.** To evaluate the rate at which adrenaline autoinjectors are used during anaphylactic reactions by patients who have had them prescribed, and to assess the number of devices used for each reaction.

**STUDY POPULATION.** Participants (N = 969) were children and teenagers aged 18 years or less who had been prescribed an adrenaline autoinjector for at least 1 year, recruited from 14 pediatric allergy clinics throughout the United Kingdom. The mean age of participants was 8 years, and approximately half had coexistent asthma.

**METHODS.** Subjects had been given an allergy management plan by an allergy physician and/or nurse instructing them when adrenaline should be administered. They were trained in administration with an appropriate trainer device. Participants completed a questionnaire for demographic data, atopic status, and details of allergic reactions.

**RESULTS.** Overall, 466 participants (48.1%) experienced an allergic reaction in the previous year. A total of 97 (10.1%), 41 (4.3%), 28 (2.9%), and 59 (6.2%) had experienced 2, 3, 4, or more than 4 reactions, respectively. The most common triggers were peanuts, tree nuts, egg, milk, shellfish, seafood, or fruits. Of 245 subjects experiencing anaphylaxis, only 41 (16.7%) received adrenaline. Of the participants who had reactions that did not meet the study definition of anaphylaxis, 6 (2.7%) used their adrenaline. Only 15.3% of participants with wheeze used their autoinjector. Of the 41 participants who experienced anaphylaxis and used their autoinjector, 13 (32%) received more than 1 dose of adrenaline. Of the 204 participants who did not use their adrenaline autoinjector, the most common reasons given for the lack of use were that they thought it was unnecessary (54.4%) or were unsure whether it was necessary (19.1%).

**CONCLUSIONS.** This study found that adrenaline autoinjector use is still widely underused. The study also found that 32% of those who used their autoinjector received a second dose.

**REVIEWER COMMENTS.** This study is alarming in that despite the use of emergency management plans and the use of autoinjector training devices in clinic, adrenaline is still widely underused by patients experiencing anaphylaxis. This has been a long-standing problem in our field, and we need to consider new options on how patient training and support can be improved. One such option may be an educational curriculum for parents designed by the Consortium of Food Allergy Research, available free of charge on their Web site (http://www.cofargroup.org/), that showed improved technique of using epinephrine.
Epinephrine Auto-Injector Use in Adolescents at Risk of Anaphylaxis: A Qualitative Study in Scotland, UK


**PURPOSE OF THE STUDY.** Adolescents with allergies are at high risk of fatal anaphylactic reactions. The current study explores barriers to epinephrine auto-injector use among at-risk adolescents in Scotland and investigates strategies to improve anaphylaxis management.

**STUDY POPULATION.** Twenty-six adolescents aged 13 to 19 years and 28 of their parents participated in this qualitative study. Participants were recruited through school nurses, primary care physicians, allergy specialists, and a patient support group and via a press release. Forty-five adolescents were identified as potential participants, 29 met inclusion criteria, and 3 declined to participate. Inclusion criteria included anaphylaxis within the past 5 years, an earlier reaction, and/or testing indicating high risk.

**METHODS.** This qualitative study involved in-depth, semistructured interviews that explored adolescents’ accounts of anaphylactic reactions and issues related to epinephrine use. Interview topics included accounts of reactions, emergency management, and what might improve management. Eight adolescents and 10 parents participated in subsequent focus groups.

**RESULTS.** The majority of adolescents had neither self-administered nor been given epinephrine, despite reactions that warranted this medication. Eighteen adolescents reported anaphylactic reactions during which epinephrine was available; 11 of those reported not using their autoinjector. Barriers to epinephrine use included failure to recognize anaphylaxis, uncertainty about technique and when to administer epinephrine, and fear. Most adolescents reported carrying autoinjectors some of the time. Several participants found it inconvenient to carry autoinjectors. One reported not using an autoinjector because it was not carried.

**CONCLUSIONS.** Adolescents and parents reported underuse of epinephrine autoinjectors. Barriers to epinephrine use are complex and include inadequate training, motivation and self-discipline to carry the medication, ability to identify a reaction, knowledge of when to use the device, and preparation for managing the challenging emotions that accompany emergencies.

**REVIEWER COMMENTS.** Previous studies have identified suboptimal use of epinephrine autoinjectors in the adolescent population. Delayed recognition and treatment of anaphylaxis can be fatal. This study explores multiple barriers to epinephrine use and explores potential interventions. Suggested interventions include education regarding recognition of anaphylaxis, aggressive use of autoinjectors, and training on proper autoinjector technique. Other future strategies may include improved autoinjector design and alternative epinephrine administration routes. The current study underscores the importance of education and training regarding anaphylaxis management for providers, patients, and families.

Anaphylaxis as an Adverse Event Following Immunisation in the UK and Ireland


**PURPOSE OF THE STUDY.** To estimate the incidence and clinical presentation of anaphylaxis as an adverse event after immunization through prospective active surveillance.

**STUDY POPULATION.** Children under age 16 years in the United Kingdom and Ireland with suspected anaphylaxis as an adverse event after immunization were reported to the British Pediatric Surveillance Unit (BPSU) over a 13-month period.

**METHODS.** Pediatricians in the United Kingdom and Ireland were sent monthly cards inquiring about rare disorders including cases of children who may have had anaphylaxis after receiving an immunization. The cards were sent to BPSU. For those who did report a possible case, the physicians were asked to complete a more complete questionnaire (online or paper) about the presentation, diagnosis, management, and outcome of the case.

**RESULTS.** Overall, return rates for the monthly cards inquiring about rare disorders were 93.2% in the United Kingdom and 91.8% in Ireland. In all, 15 reports of possible anaphylaxis were made to the BPSU. Seven cases met the criteria for anaphylaxis as an adverse event after immunization. For 3 cases, the onset of symptoms occurred within 15 minutes of immunization; whereas 4 cases occurred 30 minutes or longer post immunization, with 1 case occurring 120 minutes later. The majority of...
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