Anaphylaxis is a serious, acute, and potentially fatal allergic reaction.

Incidence of anaphylactic events among children is increasing, particularly those due to food allergies.

Anaphylactic events due to food may result in emergency care by ambulance.

Of the anaphylactic events with known triggers (73%, 675/919), food was the most common trigger (78%, 529/675).

20% (187/919) of reported anaphylactic events occurred in individuals with no known allergies; the survey did not distinguish between cases in which the allergy was unknown or misdiagnosed.

Nearly half of anaphylactic events treated with EAIs used the school’s stock EpiPen.

Of the anaphylactic events for which treatment was noted (93%, 851/919), most were treated by administering epinephrine with EAIs (75%, 636/851; Figure 2).

A disparity exists between the number of participating schools, with New York having the largest number of participating schools (1520, 13.4%), followed by Illinois (1282, 11.8%) and Massachusetts (1238, 11.3%).

Relative frequency of each characteristic was calculated by dividing the total number of respondents for each characteristic by the total number of respondents and multiplying by 100.

Data analysis

Descriptive statistics were used to report the characteristics of participating schools (eg, state, grade level, geographic region, grades levels of responding schools, type and source of EAIs stocked) and of anaphylactic events (eg, individual who experienced the anaphylactic event, previously known allergies, the trigger that initiated the anaphylactic event, treatment administered).

Relative frequency of each characteristic was calculated by dividing the total number for each response category of the relevant variable across all the schools for the combined source and treatment of anaphylactic events.

Descriptive statistics were unweighted and therefore do not account for potential variation in individual school populations.

Respondents

Surveys were submitted from all four major US census regions; almost half of the surveys were from the Northeast (47%, 2025/4344), 24% (1048/4344) from the Midwest, 21% (922/4344) from the South, and 9% (385/4344) from the West.

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Of the 6001 submitted surveys with available grade level information, 36% (n=2146) were from kindergarten, 34% (n=2048) were from elementary, 27% (n=1626) were from middle, and 13% (n=783) were from high school.

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Anaphylactic events

Of the 919 total anaphylactic events, the status of the individual (eg, student, staff member, visitor) was indicated for 852 events.

A majority of the anaphylactic events reported occurred in schools in Ohio (28%, 446/1572), Texas (24%, 368/1572), and Georgia (19%, 298/1572).

The percentage of anaphylactic events (relative to responding schools) by region is shown in Figure 1.

Conclusions

Anaphylactic events were reported in US schools that participated in the EpiPen4Schools program.

The majority of anaphylactic events (75%) were treated using EAIs; of these events, 49% were treated with stock Epipen Auto-Injectors from the EpiPen4Schools program.

The percentage of US schools in which most staff were permitted to recognize the signs and symptoms of anaphylactic events ranged from 13% to 100%.

The timing of survey distribution at the end of the school year may have impacted response rates.

Survey results were not adjusted for potential confounding factors such as regional variations in the size of the student populations and types of schools.

Anaphylaxis in children has increased in the United States, particularly those due to food allergies. Anaphylactic events due to food may result in emergency care by ambulance.

Of the anaphylactic events with known triggers (73%, 675/919), food was the most common trigger (78%, 529/675).

20% (187/919) of reported anaphylactic events occurred in individuals with no known allergies; the survey did not distinguish between cases in which the allergy was unknown or misdiagnosed.

Nearly half of anaphylactic events treated with EAIs used the school’s stock EpiPen auto-injector from the EpiPen4Schools program (49%, 310/636).

The proportion of schools in which most or all school staff were permitted to recognize the signs and symptoms of anaphylaxis, which may differ from the overall number of staff who were trained to recognize anaphylaxis.

The percentage of anaphylactic events was calculated as the number of anaphylactic events in a given state divided by the number of schools in that state that responded to the survey question about staff training to recognize the symptoms of anaphylaxis, which may differ from the overall number of schools in that state.

Anaphylactic events were reported in US schools that participated in the EpiPen4Schools program.

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Study strengths and limitations

This pilot survey is the first comprehensive analysis of anaphylactic events and use of EAIs in US schools, providing details of >900 events.

Survey methodology has inherent limitations that may limit survey power, inclusive of measurement errors and variance related to interpretation of the questions’ meaning.

Another limitation is response bias, as the level of detailed information related to anaphylaxis differs and may vary among schools and staff reliant on respondents’ recollection.

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Table. Staff and percent of anaphylactic events treated with epinephrine auto-injectors.

Table of anaphylactic events treated with epinephrine auto-injectors.

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