



Food-related Anaphylaxis in New York City, 2006-2010

Anaphylaxis is an unusual but life-threatening allergic reaction to ingested foods, to ingested, inhaled or injected medicines or to insect stings. Anaphylaxis can result in airway obstruction, difficulty breathing and shock. Immediate treatment with an epinephrine autoinjector* can be lifesaving.

- As many as 2% of the population will have anaphylaxis at least once over their lifetime.¹
- People with asthma or previous anaphylaxis are more likely than others to have an allergic reaction that results in anaphylaxis.²
- Food ingestion is thought to be the trigger for approximately one third of all anaphylaxis episodes.³
- Although death is rare, concern about peanut and other food-related anaphylaxis in schoolchildren has lead school systems in New York City (NYC) and other jurisdictions to develop policies for prevention, recognition and management of food-related anaphylaxis.⁴
- Between 2006 and 2010 nearly all deaths (11 of 12) from food-related anaphylaxis in NYC were in adults.

Emergency department visits and hospitalizations for anaphylaxis in NYC

- There were an average of 327 emergency department (ED) visits (persons treated and then released) and 252 hospitalizations per year for food-related anaphylaxis from 2006 to 2010 in NYC. Children had a marked increase in ED visits and but only a slight increase in hospitalizations over the five years.
- Children were at higher risk for food-related anaphylaxis than adults for both ED visits and hospitalizations.
 - Children zero to four years old were 4.7 times as likely as adults to have an ED visit and were 4.5 times as likely to have been hospitalized.
 - Children five to 17 years old were 2.4 times as likely as adults to have visited an ED and nearly three times as likely to have been hospitalized.

Definitions:

*An **epinephrine autoinjector** is an injection device preloaded with epinephrine (also known as adrenaline) that is used to treat acute severe allergic reactions wherever they may occur to delay progression to anaphylaxis until medical care can be obtained. Persons with severe allergic reactions to food or insect stings may be prescribed an autoinjector to carry with them at all times. Epinephrine autoinjectors are available in most schools in NYC.

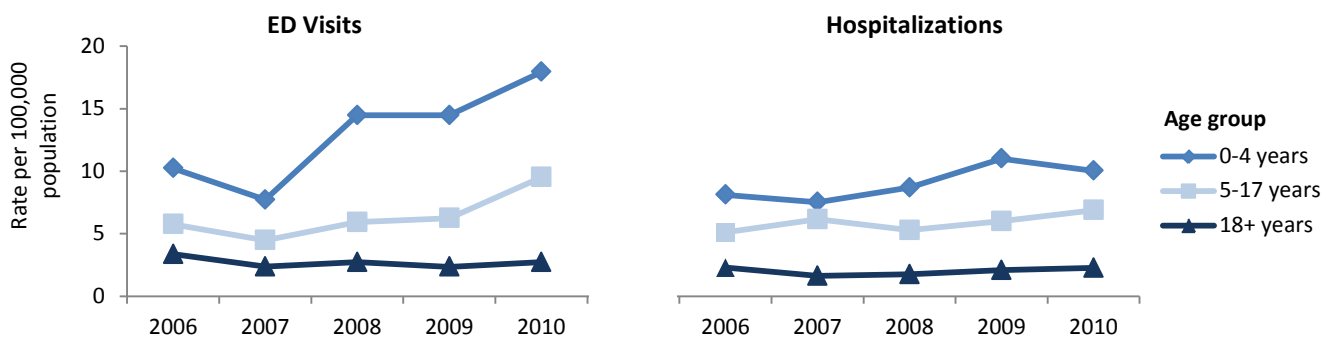
^**Crustaceans** include shellfish such as shrimp and lobster, but do not include mollusks such as oysters and clams.

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Acknowledgements:

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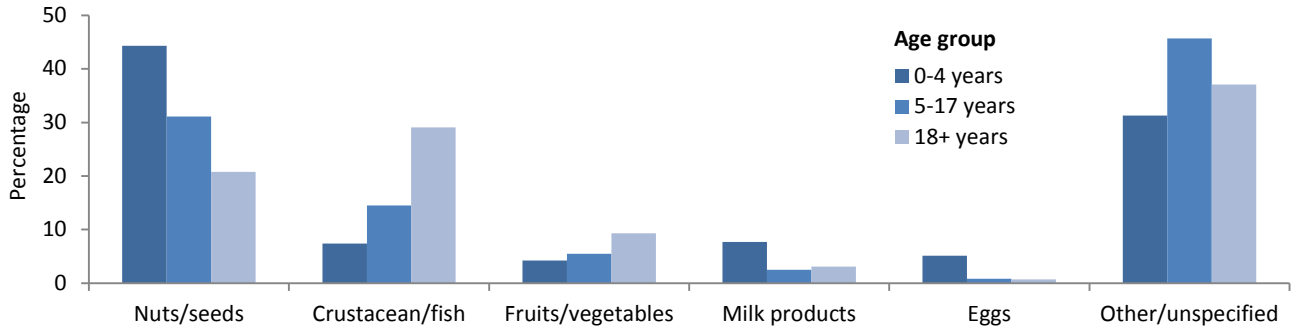
Rates of food-related anaphylaxis emergency department (ED) visits and hospitalizations by age group, New York City, 2006 - 2010



Source: Statewide Planning and Research Collaborative System, 2006-2010; US Census Bureau

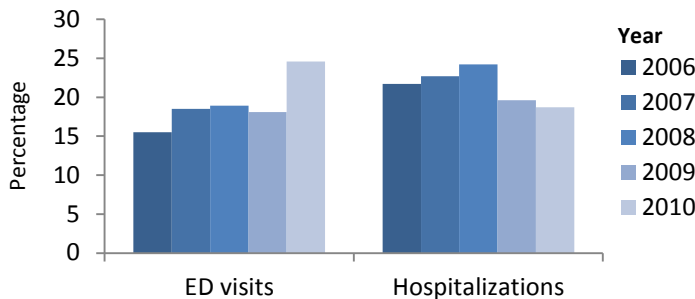
Food items that most commonly triggered anaphylaxis

Percentage of anaphylaxis emergency department visits by food trigger and age groups, New York City, 2006 - 2010



Source: Statewide Planning and Research Collaborative System, 2006-2010

Percentage of emergency department (ED) visits and hospitalizations for food-related anaphylaxis triggered by peanuts, New York City, 2006-2010



Source: Statewide Planning and Research Collaborative System, 2006-2010

- Nuts or seeds ingestion was the most common reason for ED visits (44%) and hospitalizations (49%) for anaphylaxis among young children. Crustacean or fish ingestion was the most common reason for ED visits (29%) and hospitalizations (27%) among adults.
- While the percentage of ED visits for anaphylaxis from peanuts increased during the five years (16% in 2006 to 25% in 2010), the percentage of hospitalizations for anaphylaxis from peanuts did not (22% in 2006 to 18% in 2010).

Deaths from anaphylaxis in New York City

- Deaths from food-related anaphylaxis in NYC were rare, averaging two to three per year from 2006 to 2010.
- Most deaths (11 of 12) occurred in adults (mean age 52 years), not children, with ingestion of crustaceans accounting for 58% of deaths and nuts, including peanuts, accounting for 17%.
- The ratio of anaphylaxis death to hospitalization (per 100) increased with increasing age from zero deaths in zero to four year olds to 4.21 per 100 in adults 65 years and older, and was highest for those with crustacean exposure (8.33 per 100) and lowest for those with nut or seed exposure (0.52 per 100).

Number and ratio of deaths to hospitalizations for food-related anaphylaxis, by age group and food category, New York City, 2006-2010

	Deaths	Hospitalizations	Ratio of deaths per 100 hospitalizations
Total	12	1,259	0.95
Age group (years)			
0-4	0	235	0
5-17	1	373	0.27
18-44	2	314	0.64
45-64	5	242	2.07
65+	4	95	4.21
Food category			
Nuts/seeds	2	383	0.52
Crustacean	7	84	8.33
Fish	1	163	0.61
Other	0	552	0
Not specified	2	77	2.60

Sources: NYC Health Department Bureau of Vital Statistics; Statewide Planning and Research Collaborative System, 2006-2010

Preventability of food-related anaphylaxis deaths in New York City, 2006-2010

Circumstances leading to death were examined by the Medical Examiner's Office for seven of the 12 deaths.

- Four (57%) had a previously known allergy to the ingested food, all to crustaceans.
- Four (57%) were exposed and had symptom onset in a restaurant (3) or long-term care facility (1), all to crustaceans. Three of these had a known allergy to crustaceans.
- Four of six with information on underlying conditions had asthma (2) or COPD (2, one treated with inhalers). All four ingested crustaceans, three had known crustacean allergy.
- No one was treated with an epinephrine autoinjector before an ambulance arrived. Only one person had been prescribed an epinephrine autoinjector, but was not carrying it at the time of inadvertent ingestion of shrimp.
- Two of the persons who died were exposed to the suspect food at home while alone and had no history of food allergies.
- As many as 57% of these adult deaths might have been prevented if those with known food allergies had avoidance and emergency treatment plans worked out in advance, carried an epinephrine autoinjector, and knew when and how to use it.

References:

1. Lieberman P, Camargo CA Jr, Bohlke K, Jick H, Miller RL, Sheikh A et al. Epidemiology of anaphylaxis: findings of the American College of Allergy, Asthma and Immunology Epidemiology of Anaphylaxis Working Group. *Ann Allergy Asthma Immunol.* 2006;97:596-602.
2. Sicherer SH, Simons FER. Quandaries in prescribing an emergency action plan and self-injectable epinephrine for first-aid management of anaphylaxis in the community. *J Allergy Clin Immunol.* 2005;115:575-583.
3. Decker WW, Campbell RL, Manivannan V, Luke A, St Sauver JL, Weaver A, Bellolio MF, Bergstralh EJ, Stead LG, Li JT. The etiology and incidence of anaphylaxis in Rochester, Minnesota: a report from the Rochester Epidemiology Project. *J Allergy Clin Immunol.* 2008;122:1161-1165.
4. Sicherer SH, Mahr T and the American Academy of Pediatrics Section on Allergy and Immunology. Management of food allergy in the school setting. *Pediatrics.* 2010;126:1232-1239.

Data sources:

Bureau of Vital Statistics/Office of the Chief Medical Examiner (OCME): Data on deaths that occurred in New York City between 2006 and 2010 are from the New York City Department of Health and Mental Hygiene's Bureau of Vital Statistics mortality data file. Details on food-related deaths are from OCME records.

Statewide Planning and Research Collaborative System (SPARCS) 2006-2010: SPARCS is an administrative database containing emergency department (ED) and hospital discharges reported by New York State (NYS) hospitals to the NYS Department of Health. Analysis was limited to NYC hospitals.

US Census Bureau: Rates were calculated using population counts from the 2010 US Census.

Methods:

Bureau of Vital Statistics anaphylaxis death data included death certificates with any cause/contributing cause ICD 10 codes of T50.9, T63.2, T63.4, T63.6, T63.9 (T63.x referring to animal/insect stings), T78.0 (food), T78.2(anaphylactic shock), T80.5(serum) and T88.6 (correct substance properly administered). All death certificates with these ICD-10 codes were manually reviewed for mention of food in the cause of death section. Additional data on seven of 12 anaphylaxis deaths that appeared food-related were collected through review of OCME records.

SPARCS hospital discharge data included all with a primary discharge diagnosis coded 995.0-995.69 (ICD-9) inclusive, from 2006-2010. These codes include anaphylactic shock due to unspecified food (995.60) and 9 broad categories of food (995.61-69). Data provided were by year, diagnostic code and age group (0-4, 5-17, 18-44, 45-64 and 65+ years).

SPARCS ED discharge data included all persons with an ED visit primary discharge diagnosis coded 995.0-995.69 (ICD-9) inclusive from 2006-2010. ED discharge data provided were ED discharges by year, diagnostic code and age group (0-4, 5-17, 18-44, 45-64 and 65+ years).

MORE New York City Health Data and Publications

- For complete tables of data prepared for this Brief, visit nyc.gov/html/doh/downloads/pdf/epi/datatable41.pdf
- Visit EpiQuery – the Health Department's online, interactive health data system at nyc.gov/health/EpiQuery

Data & Statistics at nyc.gov/health/data