

# **Peanut Related Incidents in Health Statistics, Prevalence, and Impact**

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**Compiled for**

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## Statistics

It is estimated that about 30,000 food-induced anaphylactic events are seen in American emergency departments each year, approx. 200 of which are fatal. Either peanuts or tree nuts cause more than 80% of these reactions.

Burks W. Peanut allergy: a growing phenomenon. *J Clin Invest.* 2003 Apr;111(7):950-2. Review. PMID: 12671042 [PubMed - indexed for MEDLINE]

Approximately one third of emergency-room visits for anaphylaxis may be due to peanut sensitivity.

Sampson HA, Ho DG.: Relationship between food-specific IgE concentrations and the risk of positive food challenges in children and adolescents. *J Allergy Clin Immunol* 1997 Oct;100(4):444-451.

Bush RK: Management of peanut allergy. *Can J All & Clin Imm* 1996 Nov;1(5):178-183.

Immediate hypersensitivity to peanuts is a frequent cause of anaphylactic reactions and deaths in children and adults.

Nelson HS, Lahr J, Rule R, Bock A, Leung D: Treatment of anaphylactic sensitivity to peanuts by immunotherapy with injections of aqueous peanut extract. *J Allergy Clin Immunol* 1997 Jun;99(6 Pt 1):744-751.

Peanuts are the food most likely to produce allergic and anaphylactic reactions. The major allergen is a protein that does not partition into Peanut Oil, Hydrogenated Peanut Oil, Peanut Acid, and Peanut Glycerides.

[No authors listed] Final report on the safety assessment of Peanut (*Arachis hypogaea*) Oil, Hydrogenated Peanut Oil, Peanut Acid, Peanut Glycerides, and Peanut (*Arachis hypogaea*) Flour. *Int J Toxicol.* 2001;20 Suppl 2:65-77. Review.

Severe allergic reactions caused by foodstuffs have been reported in Sweden since 1993, 60 cases, five of them fatal, occurring during the first 3-year period. More than 70 % of all reactions reported were caused by peanuts, soya beans, nuts or almonds. In only 13% of reported cases were the patients over 17 years of age...with extremely severe reactions including asthma.

Foucard T, Edberg U, Malmheden Yman I.: [Fatal and severe food hypersensitivity. Peanut and soya underestimated allergens]. *Lakartidningen* 1997 Jul 23;94(30-31):2635-2638.

Allergies to these foods [peanut and tree nut] are common, frequently have an onset in the first years of life, generally persist, and account for severe and potentially fatal reactions. Furthermore, the ubiquity of these foods in the diet makes avoidance difficult and accidental ingestions, with reactions, common.

Sicherer SH, and Sampson HA: Peanut and tree nut allergy: Current opinion in *Pediatrics* 2000;12:567-573

Food anaphylaxis is now the leading known cause of anaphylactic reactions treated in emergency departments in the United States. It is estimated that there are 30,000 anaphylactic reactions to foods treated in emergency departments and 150 to 200 deaths each year. Peanuts, tree nuts, fish, and shellfish account for most severe food anaphylactic reactions...the mechanistic details responsible for symptoms of food-induced anaphylaxis are not completely understood, and in some cases, symptoms are not seen unless the patient exercises within a few hours of the ingestion."

Sampson HA. Anaphylaxis and emergency treatment. *Pediatrics.* 2003 Jun;111(6 Pt 3):1601-8.

An evaluation of 142 observations of allergy to peanuts in France. The clinical features included:

- atopic dermatitis [eczema] (40%)
- angioedema (37%)
- asthma (14%)
- anaphylactic shock (6%)
- digestive symptoms (1.4%)

Moneret-Vautrin DA, Rance F, Kanny G, Olsewski A, Gueant JL, Dutau G, Guerin L: Food allergy to peanuts in France--evaluation of 142 observations. *Clin Exp Allergy* 1998 Sep;28(9):1113-9

An evaluation of 132 observations of pediatric allergy to peanuts in France.

- of 132 pediatric cases of peanut hypersensitivity, aged between 6 months and 15 years, confirmed by food challenge, more than half were diagnosed before age three.
- the most common symptom was atopic dermatitis (43.1% of cases). Others were: hoarseness (34.8%), asthma (13.6%), anaphylaxis (6%), gastro-intestinal symptoms (1.5%), and oral syndrome [itchy mouth, lips, throat] (0.7%).
- all patients had positive skin tests, with a mean wheal diameter of 8mm (range: 2 to 25mm); wheal diameter was significantly smaller in the youngest children (mean 4.5mm for children < 1 yr of age).
- peanut-specific IgE concentration was < 0.75 IU/ml in 16 cases (14.3%), the mean for the entire group being 30.9 IU/ml (range: 0.75 to 100 IU/ml).
- food challenges were not performed in three of the children with a history of anaphylaxis.
- labial food challenge [simple contact of food with lips] was positive in 85 cases (64.8%)
- an oral food challenge was carried out in 45 children (34.3%) and the mean reactive dose was 850 mg (range: 1 mg to 7gm).
- labial food challenge with peanut oil was positive in 2 cases of 50 tested (4%) and 17 of 63 children (29.9%) tested by oral food challenge were also found to be sensitive to peanut oil.
- half the children were also allergic to other foods, as demonstrated by food challenge (53.7%) or to airborne allergens (62.8%).

Hypersensitivity in the very youngest children raises questions about how sensitization occurs. Diagnosis was confirmed by food challenge. Peanut products are very difficult to eliminate from the diet because of inadequate labeling of food products. An ELISA test, available in a number of countries, can be used to detect peanut in foods.

Rance F, Dutau G.: Peanut hypersensitivity in children. *Pediatr Pulmonol Suppl* 1999;18:165-7.

After a retrospective review of all food-sensitive children who underwent food challenges at the Children's Hospital of Philadelphia in a 5 year period, authors concluded that "Patients will typically experience similar reaction on re-exposure to the initial reaction. However, multiple-organ system reactions can occur after any initial clinical presentation, with milk, egg, and peanut having more multiple-organ reactions than other foods."

Spiegel JM, Beausoleil JL, Fiedler JM, Ginsberg J, Wagner K, Pawlowski NA. Correlation of initial food reactions to observed reactions on challenges. *Comment in: Ann Allergy Asthma Immunol.* 2004 Feb;92(2):195-7.

## Prevalence

The exact prevalence of food allergy, specifically peanut sensitivity, is not known. Reports vary.

'Canadian'

Our prevalence study is the first in North America to corroborate history with confirmatory testing and the largest worldwide to incorporate these techniques. We have shown that, even with conservative assumptions, prevalence exceeds 1.0%.

Kagan RS, Joseph L, Dufresne C, Gray-Donald K, Turnbull E, Pierre YS, Clarke AE. Prevalence of peanut allergy in primary-school children in Montreal, Canada. *J Allergy Clin Immunol*. 2003 Dec;112(6):1223-8.

A study was conducted on 33,110 persons who answered a questionnaire addressed to a sample of the French population. 1129 persons with food allergy selected during phase I received a second questionnaire. Results:

- the reported prevalence of food allergy is 3.52%: 3.24% evolutionary and 0.12% now asymptomatic due to avoidance of the food, and 0.17% cured.
- 80% were city dwellers
- 63% were female
- 11% were health-care workers
- 57% presented with atopic diseases
- food allergy was often persistent, lasting more than 7 years in 91% of the adults
- most frequent allergens:
  - rosaceae (peach, plum, pear, cherries, apple) fruit sensitivities in some pollen sensitive individuals 14%
  - vegetables 9%
  - milk 8%
  - crustaceans 5%
  - fruit cross-reacting with latex 4%
  - tree nuts 3%
  - peanut 1%
- food allergy was 4 times more frequent in patients with latex allergy
- the main manifestations of food allergy were:
  - atopic dermatitis for children under 6 yrs of age
  - asthma for subjects 4 and 6 yrs of age,
  - anaphylactic shock in adults over 30 yrs of age. Shocks were correlated with alcohol or non-steroidal anti-inflammatory drug (NSAID) intake.

Prevalence of food allergy is estimated at 3.24% in France. The study emphasized the increasing risk of food allergy in well-developed countries, drawing attention to certain risk factors, such as the intake of drugs (NSAID, beta-blockers, and angiotensin-converting enzyme inhibitors) or alcohol, intolerance of latex gloves, and socioprofessional status.

Kanny G, Moneret-Vautrin DA, Flabbee J, Beaudouin E, Morisset M, Thevenin F. Population study of food allergy in France. 1: *J Allergy Clin Immunol* 2001 Jul;108(1 Pt 1):133-40

The apparent increase in the prevalence of peanut allergy has been difficult to explain, although it parallels an overall increase in allergic diseases in childhood.

Lack G, Fox D, Northstone K, Golding J; Avon Longitudinal Study of Parents and Children Study Team. Factors associated with the development of peanut allergy in childhood. *N Engl J Med* 2003 Mar 13;348(11):977-85

Peanut allergy is characterized by more severe symptoms than other food allergies and by high rates of symptoms on minimal contact. In a questionnaire study of 622 self-reported allergic subjects, a total of 406 patients (66%) reported symptoms on contact with peanut. Only 121

(19%) had been knowingly exposed to peanut before the first documented reaction implying a high frequency of occult sensitization.

Hourihane JO, Kilburn SA, Dean P, Warner JO: Clinical characteristics of peanut allergy. Clin Exp Allergy 1997 Jun;27(6):634-639.

The incidence of food allergy in children is approximately 1.3% and among adults 0.3%.

Chandra RK.: Food hypersensitivity and allergic disease: a selective review. Am J Clin Nutr 1997 Aug;66(2):526S-529S.

True food allergies are much less prevalent than is generally believed. They are more common in infants and children under age three than in older children and adults. Infant colic generally is not caused by a food allergy. In infants, urticaria, eczema or gastrointestinal bleeding may be due to foods such as milk and eggs, but clinical tolerance usually develops within a few years. Peanuts, tree nuts, seafood and seeds, as well as milk and eggs, can cause anaphylaxis in highly allergic children, and re-exposure to such foods presents the risk of life-threatening reactions.

Anderson JA: Milk, eggs and peanuts: food allergies in children. Am Fam Physician 1997 Oct 1;56(5):1365-1374.

Approximately 5% of children younger than 3 years and 1.5% of the general population experience food allergic disorders, indicating that about 4 million Americans suffer from food allergies.

Sampson HA.: Food Allergy. JAMA 1997 Dec 10;278(22):1888-1894.

A dichotomy exists between perceived food allergy and that confirmed by appropriate challenge procedures. Only 40% of suspected food allergy has been confirmed by double-blind, placebo-controlled food challenges. In a recent survey of 5000 American homes, the percentage of individuals reporting peanut allergy was 7.2%.

Altman DR, Chiaramonte LT.: Public perception of food allergy. J. Allergy Clin Immunol 1996;97:1247-1251.

Allergy to peanuts represents 28% of food allergies and occurs under 1 year of age in 46% of cases, under 15 years of age in 93%.

Moneret-Vautrin DA, Rance F, Kanny G, Olsewski A, Gueant JL, Dutau G, Guerin L: Food allergy to peanuts in France--evaluation of 142 observations. Clin Exp Allergy 1998 Sep;28(9):1113-9

62 cases of peanut and/or nut allergy evaluated in a one year period. Peanuts accounted for nearly half of the allergies, with 55% of the allergies presenting by age 2 years and 92% by age 7 years.

Ewan PW. Clinical study of peanut and nut allergy in 62 consecutive patients: new features and associations. BMJ 1996;312:1074-78

Prevalence of peanut and tree nut (TN) allergy in the US determined by a random digit dial telephone survey. Findings:

- A total of 4374 households contacted by telephone participated (participant rate, 67%), representing 12,032 individuals.)
- Peanut or TN allergy was self-reported in 164 individuals (1.4%). . . the prevalence of reported allergy in adults (1.6%) was higher than that found in children under 18 years of age (0.6%).
- In 131 individuals, details of the reactions were obtained. When applying criteria requiring reactions to be typical of IgE-mediated (allergic) reactions (hives, angioedema, wheezing, throat tightness, vomiting, and diarrhea) within an hour of ingestion, 10% of these subjects were excluded.

- Among the remaining 118 subjects, reactions related to: peanut (58), walnut (24), cashew (8), Brazil nut (8), almond (7), pecan (7), hazelnut (3), Macadamia nut (2), unspecified mixed nuts (6) (Only four [all adults] reported both peanut and TN allergy, and 5 reported reactions to more than one TN). Allergic reactions involved:
  - 1 organ system (skin, respiratory, or gastrointestinal systems) in 50 subjects (42%),
  - 2 in 45 subjects (38%),
  - and all 3 in 23 subjects (20%).
  - Forty-five percent of these 118 respondents reported more than 5 lifetime reactions. . .
  - 51% had other food allergies
  - 35% had atopic dermatitis (eczema)
  - 34% had asthma
  - 33% had allergic rhinitis. . . [94% of the subjects reported at least one of these atopic diseases (eczema, asthma or rhinitis).

Conclusions: Peanut and/or tree nut allergy affects approximately 1.1% of the general population, or about 3 million Americans, representing a significant health concern. Despite the severity of reactions, about half of the subjects never sought an evaluation by a physician, and only a few had epinephrine available for emergency use.

Sicherer SH, Munoz-Furlong A, Burks AW, Sampson HA: Prevalence of peanut and tree nut allergy in the US determined by a random digit dial telephone survey. *J Allergy Clin Immunol* 1999;103:559-62

According to Statistics Canada, there were 6 deaths due to food anaphylaxis in 1997 and 8 in 1998 in Canada.

- Attempts to obtain figures from Statistics Canada for subsequent years were unsuccessful because coding of deaths following WHO guidelines no longer specifies any deaths caused by anaphylaxis related to foods or other causes.

In the UK, of the 20 fatal reactions recorded each year, 5 are due to food.

Pumphrey RS.: Lessons for management of anaphylaxis from a study of fatal reactions. *Clin Exp Allergy* 2000 Aug;30(8):1144-50.

107 reported cases of serious anaphylactic reactions due to food allergy in 2002 (in 33 children and 74 adults), including two fatalities due to soy and peanut. (France).

- The prevalence of food allergy in the French population is estimated to be 3.24%.
- Anaphylactic shock was reported in 59.9% of the cases involved (one fatal to peanut), other systemic reactions: 18.7%, laryngeal oedema:15.9%, serious acute asthma: 5.6% (one fatal, to soy),
- The most frequent allergens were: peanut (14), nuts (16), shellfish (9), latex-fruit group (9), lupine flour (7), wheat flour (7), celeri (5), and snails (5).

M. Morisset, M. Boulègue, E. Beaudouin, F. Pirson, F. Rancé, C. Gallen et al. Anaphylaxie alimentaire sévère et léthale : cas rapportés en 2002 par le réseau d'allergovigilance Revue française d'allergologie et d'immunologie clinique 2003 - Volume 43 - Numéro 8 - pp: 480-485.

This study was also published in the Feb. 2004 *Allerg Immunol (Paris)* : Severe food anaphylaxis: 107 cases registered in 2002 by the Allergy Vigilance Network. The authors conclude "Setting up such a network in other countries would lead to a significant advance in knowledge of the peculiarities of allergies....The aims are to record cases of severe anaphylaxis, to establish an epidemiological data bank from prospective multicenter studies, and to monitor the allergic risk of novel foods."

Moneret-Vautrin DA, Kanny G, Morisset M, Rance F, Fardeau MF, Beaudouin E. Severe food anaphylaxis: 107 cases registered in 2002 by the Allergy Vigilance Network. *Allerg Immunol (Paris)*. 2004 Feb;36(2):46-51.

## Impact

Given the considerable disruption in daily activities and family relations reported by the parents of peanut-allergic children, accurate diagnosis of peanut allergy is essential. Our work should make health care professionals dealing with children with confirmed peanut allergy more aware of the support that these families may require. Furthermore, we hope to motivate food industries to offer more 'peanut free' products to decrease the dietary restrictions of these patients while minimizing their potential for accidental ingestion."

Primeau M, Kagan R, Joseph L, Lim H, Dufresne C, Duffy C, Prhcal I, Clarke A: The psychological burden of peanut allergy as perceived by adults with peanut allergy and the parents of peanut-allergic children. *Clin Exp Allergy* 2000 Aug;30(8):1135-43.

Childhood food allergy has a significant impact on general health perception, on the parents, and limitation on family activities. Factors that influence reductions in these scales include associated atopic disease and the number of foods being avoided.

Sicherer SH, Noone SA, Munoz-Furlong A. The impact of childhood food allergy on quality of life. *Comment in: Ann Allergy Asthma Immunol.* 2001 Dec;87(6):443-4.

The quality of life (QoL) was measured in 20 children with peanut allergy (PA) and 20 children with insulin-dependent diabetes mellitus (IDDM) using two disease-specific QoL questionnaires. Cameras were given to the subjects to record how their QoL is affected over a 24-h. period. Mean ages of subjects was 9.0 and 10.4 years for PA and IDDM. Results:

- Children with PA reported a poorer quality of life than children with IDDM.
- PA children reported more fear of an adverse event and more anxiety about eating, especially when eating away from home.
- Most photographs related to food and management issues and revealed difficulties for both groups regarding food restrictions.
- PA subjects felt more threatened by potential hazards within their environment, felt more restricted by their PA regarding physical activities, and worried more about being away from home. However, they felt safe when carrying epinephrine kits and were positive about eating at familiar restaurants.

The authors concluded: The quality of life in children with PA is more impaired than in children with IDDM. Their anxiety may be considered useful in some situations, promoting better adherence to allergen avoidance advice and rescue plans.

Natalie J. Avery<sup>1</sup>, Rosemary M. King<sup>2</sup>, Susan Knight<sup>3</sup>, and Jonathan O'B. Hourihane<sup>1,2</sup> Assessment of quality of life in children with peanut allergy *Pediatric Allergy and Immunology* Volume 14 Issue 5 Page 378 - October 2003

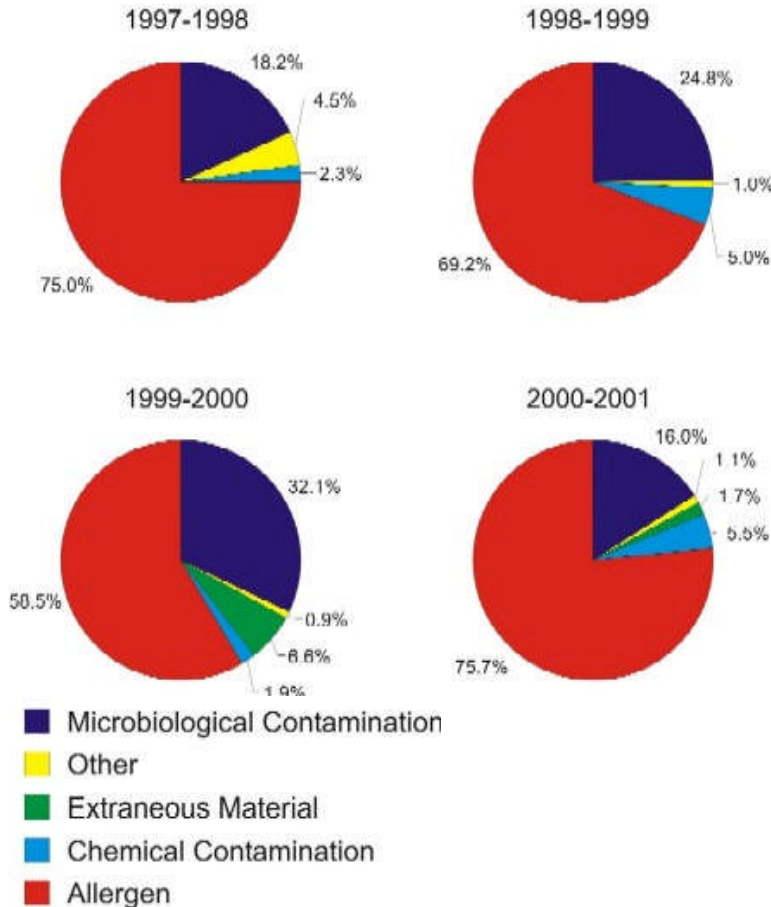


## Additional Materials from Health Canada

From the Paper on the Allergen Control Activities within the Canadian Food Inspection Agency

### Exhibit 3

Class 1 Recalls (Comparison of Hazards)



Pie charts showing the percentage of Class 1 recalls that involve a particular type of hazard. The category of hazards depicted are microbiological, chemical, extraneous material, allergen and other. Each pie chart represents a year of Class 1 recalls - 1997 to 1998; 1998 to 1999; 1999 to 2000 and 2000 to 2001.

In 1997 to 1998, the percentage of Class 1 recalls involving a microbiological hazard was 18.2%, chemical was 2.3%, allergen was 75.0% and other was 4.5%. There were no Class 1 recalls involving extraneous material in 97/98.

In 1998 to 1999, the percentage of Class 1 recalls involving a microbiological hazard was 24.8%, chemical was 5.0%, allergen was 69.2% and other was 1.0%. There were no Class 1 recalls involving extraneous material in 98/99.

In 1999 to 2000, the percentage of Class 1 recalls involving a microbiological hazard was 32.1%, chemical was 1.9%, extraneous material was 6.6%, allergen was 58.5% and other was 0.9%.

In 2000 to 2001, the percentage of Class 1 recalls involving a microbiological hazard was 16.0%, chemical was 5.5%, extraneous material was 1.7%, allergen was 75.7% and other was 1.1%.

57. We also reviewed the same data in order to determine the key allergens that were implicated in the recalls. We found on average, a higher percentage of recalls involving peanuts/tree nuts, dairy, sulphites, and eggs compared to other allergens (see Exhibit 4). It is noted that CFIA only has analytical methods for peanuts/tree nuts, dairy, sulphites and eggs. There are no lab tests for the other possible allergens. Health Canada is in the process of developing further allergen analytical methods but they are not yet available for routine use.

58. At the time of our interviews and information gathering, the CFIA did not have any trend analyses completed for recalls. This capability to do trend analyses could be useful to CFIA program staff in developing strategies for reducing allergen recalls as they would provide information on the underlying or root causes for the recalls. The Agency indicated that it would analyze trends in allergen recalls as part of the environmental scan work it is doing in preparation for upcoming Science Committee meetings.

#### Exhibit 4

<b>Class 1 by Identified Allergen 1997-2001</b>						
<b>Allergens</b>	<b>1997-98</b>	<b>1998-99</b>	<b>1999-00</b>	<b>2000-01</b>	<b>Total Recalls</b>	<b>Overall %*</b>
<b>Peanuts &amp; Tree Nuts</b>	15	32	21	35	103	34
<b>Dairy</b>	1	2	7	70#	80	26
<b>Sulphites</b>	1	11	16	17	45	15
<b>Egg</b>	5	7	12	6	30	10
<b>Soya</b>	4	5	2	5	16	5
<b>Wheat</b>	0	2	1	4	7	2
<b>Seafood</b>	1	0	0	0	1	~1
<b>Sesame Seed</b>	1	0	0	0	1	~1
<b>Multiple Allergens</b>	5	11	3	0	19	6
<b>Total recalls by year</b>	<b>33</b>	<b>70</b>	<b>62</b>	<b>137</b>	<b>302</b>	<b>100</b>

\* percentages are estimates based on a review of CFIA's data

# increase could be due to improved method detection and targeted enforcement activity

Source

[http://www.hc-sc.gc.ca/food-aliment/fsa-esa/allergen\\_paper/e\\_allergen\\_paper-10.html](http://www.hc-sc.gc.ca/food-aliment/fsa-esa/allergen_paper/e_allergen_paper-10.html)