

Design and Validation of Pictograms in a Pediatric Anaphylaxis Action Plan

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Conflicts of Interest:

No member of this study team has any conflict of interest to declare

Abstract

Background: Current anaphylaxis action plans (AAP's) are based on written instructions without inclusion of pictograms.

Objectives: To develop an AAP with pictorial aids and to prospectively validate the pictogram components of this plan.

Methods: Participants recruited from the Emergency Department and Allergy Clinic participated in a questionnaire to validate pictograms depicting key counseling points of an anaphylactic reaction. Children ≥ 10 years of age and caregivers of children < 10 years with acute anaphylaxis or who carried epinephrine auto-injector for confirmed allergy were eligible. Guessability, translucency, and recall were assessed for 11 pictogram designs. Pictograms identified as correct or partially correct by at least 85% of participants were considered valid. Three independent reviewers assessed these outcome measures.

Results: Of the 115 total participants, 73 (63%) were female, 76 (66%) were parents/guardians, and 39 (34%) were children aged 10-17. Overall, 10 pictograms (91%) reached $\geq 85\%$ for correct guessability, translucency, and recall. Four pictograms were redesigned to reach the preset validation target. One pictogram depicting symptoms management (5 min wait time after first epinephrine treatment) reached 82% translucency after redesign. However, it reached 98% and 100% of correct guessability and recall respectively.

Conclusions: We prospectively designed and validated a set of pictograms to be included in an AAP. The incorporation of validated pictograms into an AAP may potentially increase comprehension of the triggers, signs and symptoms, and management of an anaphylactic reaction.

Introduction

Anaphylaxis is a severe, life-threatening hypersensitivity reaction that is rapid in onset and may be fatal (1).

The population-based prevalence of anaphylaxis from all triggers is unknown (1, 2). However, the lifetime prevalence estimates range from 0.05% to 2% and seems to be globally increasing, particularly among children (3-5). Anaphylactic reactions account for approximately 2- 4 per 1000 pediatric Emergency Department (ED) visits in North America, as well as an annual fatality rate of 1- 5 per million (3, 6-8).

Furthermore, there is a higher frequency of anaphylactic episodes among patients with higher socioeconomic status (SES) (9, 10).

Current anaphylaxis management has focused on acute episodes with less attention given to the long-term management of patients (11). While there is limited evidence for the use of anaphylaxis action plans (AAPs), a systematic review by Nurmetov et al found that AAPs may reduce the frequency and severity of further reactions, improve knowledge of food avoidance techniques, improve the use of epinephrine auto injectors (EAI)s and reduce anxiety (12). Therefore, individualized AAP's are recommended by both national and international anaphylaxis guidelines in order to mitigate gaps in anaphylaxis long-term care (1, 2, 11, 13). Although multiple versions of AAPs exist in literature, these plans vary in their contents and treatment recommendations. Further, there are currently no prospectively validated AAPs. The International consensus on anaphylaxis by the World Allergy Organization (WAO) acknowledges these gaps and emphasizes the need for an evidence-based AAP (14).

Based on our previous work on an Asthma Action Plan, we hypothesized that the integration of pictorial aids into an AAP may facilitate management of anaphylaxis in the pediatric population (15). Literature has shown that the inclusion of pictograms, which are symbols or drawings that are representative of a concept or idea, may help overcome poor treatment comprehension (16-18). One rationale supporting pictograms is based on the Dual Coding Theory, where information is processed based on a verbal and a non-verbal system (19). A second theory based on the effectiveness of redundancy, maintains that pictures and words portray information independent of one another; if two stimuli are presented concomitantly, the subject would be able to extract information more effectively (20). Therefore, the purpose of this study was to develop an AAP with pictorial aids and to prospectively validate the pictogram components of this plan.

Methods

Pictogram Design

The research team utilized literature reviews and a consensus approach to determine key counseling points in the development of an AAP. Next, the team decided which pictures would be required to illustrate these points. To start, Google Images™ was used where the clip art and safe search filters were enabled (21). Inclusion criteria were cartoon and caricature-type images, while exclusion criteria were real-life human and animals, textual, annotated, graphic, stick figures, emoticons, diagrams, and irrelevant images. For repeat images, only the original was included.

Semiotic analysis, which is the breakdown and analysis of key components that make up an image, was performed for each key counseling point. As such, the first 20 images that fit the inclusion criteria were analyzed and elements present in at least 35% of images were “key graphic elements” to be considered for the initial pictogram design. A graphic designer was given artistic freedom when developing templates based on the key counseling points and the key graphic elements, which was then approved by the research team.

Pictogram Validation

This study was conducted through one-on-one interviews in a private room. Pictogram comprehension was assessed using the concepts of transparency, translucency and recall. Transparency refers to the guessability of the image when the significance or meaning is unknown to the patient (18). Translucency, looks at the strength of the relationship between the picture and its intended meaning (22). Recall refers to the retrieval of elements from memory and is related to the comprehension and interpretation of the word or picture being tested (23). To test short-term recall, there must be a distraction phase to ensure the test is measuring memory storage rather than working memory (24). According to the American National Standards Institute (ANSI), a pictogram is considered valid if its transparency is greater than 85% (25). For this study, a pictogram was considered valid if it was correctly identified by at least 85% of participants during guessability and recall, and received a translucency score of ≥ 5 by at least 85% of the participants.

To ensure randomization, pictograms were shuffled for every participant and between the three phases. To assess guessability, pictograms were shown to the participant and they were asked what they thought the illustration represented. Responses were written down verbatim, and later assessed by three independent evaluators as being correct, partially correct or incorrect. For responses scored differently, a discussion was had between the evaluators until consensus was formed.

After transparency, the pictograms were shuffled again and translucency was assessed. Participants were told the intended meaning of the pictogram and rated the degree to which the illustrations resembled that based on a 7-point visual analog scale (1 = no relationship, 7 = very strong relationship). Translucency scores and participants' comments on pictogram improvement were written down in the event of pictogram redesign.

Before recall was tested, a distraction phase was conducted that consisted of a Rapid Estimate of Adult Literacy in Medicine (REALM) test to assess literacy levels, as well as the collection of demographic data (24). Participants over the age of 17 completed the REALM short form version, while participants between 10 to 17 years of age completed a REALM-Teen test. Age, gender, date of initial visit, grade school levels/highest level of schooling completed, number of medications regularly taken (excluding vitamins), and years since diagnosis of anaphylaxis was also collected.

During recall, the pictograms were shuffled for randomization and the participants were asked the meaning of the pictogram. Responses were once again noted verbatim and later scored by the three evaluators.

Pictogram Redesign

Pictograms that failed to meet validation criteria were redesigned. The graphic designer utilized artistic freedom, key graphic elements and participants' comments for redesign. For the redesigned pictograms, new sets of patients were recruited.

Population and Setting

Patients between 10 to 17 years of age, or parents/guardians of patients (1 to 9 years of age) presenting with anaphylaxis requiring treatment with epinephrine or those with a history of confirmed allergy requiring the

prescription of an epinephrine auto-injector were recruited. A convenience sample of participants was recruited from the allergy clinic, the Emergency Department, or the in-patient units at the Children's Hospital of Eastern Ontario. Exclusion criteria consisted of children or adults who were unable to communicate in English or French at a grade 2 level. Verbal consent was obtained to participate in an interview session that would take approximately 20 minutes to complete. This study took place from June - August 2014 and was approved by the local Research Ethics Board.

Data Analysis

Responses were recorded on a standard data form then entered in a Microsoft Excel file, version 2011. Categorical variables were analyzed using frequencies and percentages. Normally distributed continuous variables were summarized using means and standard deviations. Non-normally distributed continuous variables were analyzed using medians and quartiles. Chi-square and Fisher's Exact test were performed using IBM SPSS version 22 to compare parents/guardian vs. children guessability; translucency; and recall of pictograms, with a p-value < 0.05 considered statistically significant.

Results

Demographic Data

A total of 115 participants were recruited during the study period. There were 76 (66%) parents/guardians aged 18 years and older, and 39 (34%) children aged 10 -17 years. According to the REALM-teen and REALM-SF scores, 67% of children 10 - 17 years old and 93% of parents/guardians in this study had at least a high school health literacy level respectively. There were no significant differences in terms of health literacy within the teen group (age 10 – 13 vs. 14 – 17). With respect to time of diagnosis, 72 (63%) of participants had been prescribed epinephrine within 0 – 5 years, 23 (20%) within 6 – 10 years, and 20 (17%) for more than 10 years. The demographic data is summarized in **Table 1**.

Key Counseling Points and Pictogram Design

Figure 1 summarizes the key counseling points that were included in the AAP. The key counseling points chosen included: signs and symptoms; avoiding allergens; and actions to take when symptoms develop. The pictures for EpiPen and Allerject were not tested, as they were not considered pictograms.

Table 2 summarizes the intended pictogram meaning, key graphic elements and the pictograms designed for the study. A total of 15 pictograms were designed, with 11 being the initial pictogram design and 4 being redesigned pictograms.

Validation of Initial Designed Pictograms: Guessability, Translucency and Recall

Guessability, translucency and recall results are summarized in **Table 2**. Of the original 11 pictograms, 10 (90.9%) achieved correct guessability by at least 85% of participants. The only pictogram that did not reach this minimum cutoff point was dizziness/lightheadedness. Common misinterpretations for this pictogram included: headache, bump on head, and concussion.

For translucency, 8 out of 11 original pictograms (72.7%) received a score of 5 or greater by 85% of participants. Pictograms for insect allergens (bees and wasps), allergies to medications, and wait 5 minutes did not achieve this mark. When short-term recall was tested, all 11 pictograms were identified correctly by at least 85% of participants.

In total, 7 out of 11 original pictograms (64%) passed the standards for guessability, translucency and recall and were considered validated.

Validation of Redesigned Pictograms: Guessability, Translucency and Recall

Four out of eleven pictograms (36%) did not meet the standards and needed to be redesigned. Of these, one depicted signs and symptoms (dizziness/lightheaded,), one depicted symptom management (5-minute wait time), and two depicted allergen avoidance (medication allergens and insect allergens).

All 4 re-designed pictograms achieved 85% guessability. Three pictograms (75%) achieved the standard for translucency, but the pictogram for 5-minute wait time did not. All 4 pictograms (100%) were identified correctly on short-term recall by at least 85% of participants. Thus, the redesigned pictograms depicting dizziness/lightheaded, insect allergens (bees and wasps) and allergy to medications met standards and were validated. The changes made and the results comparing the original vs. the re-designed pictograms are summarized in **Table 3**.

Children vs. Parent/Guardians: Guessability, Translucency and Recall

Parents/guardians answered correctly or partially correctly (96%) for guessability significantly more than children (85%) for the pictogram depicting rash/hives ($p\text{-value}=0.03$). There were no other significant differences between children and parents/guardians for the other pictograms. These data are summarized in **Table 4**.

Discussion

The most recent guidelines published by the European Academy of Allergy and Clinical Immunology (EAACI) advocates the inclusion of an AAP in the long-term management of anaphylaxis (13). However, currently there is no AAP that incorporates pictorial aids, nor one that targets the pediatric population. This study sets to validate the use of pictograms, and incorporate them into an AAP that will target pediatric patients with anaphylaxis.

We prospectively validated ten of the eleven pictograms to be included in an AAP. Only the 5-minutes wait time pictogram did not meet the predetermined standards as it was below the minimum translucency score. However, the high guessability and recall scores show adequate understanding of the pictogram to be included in the AAP. As summarized in **Table 2**, it can also be seen that each pictogram (original and redesign) improved from guessability to short-term recall. This suggests that even if a pictogram is not adequately understood upon guessability, the pictogram can still be comprehended if used in conjunction with verbal instructions. This finding reinforces the importance of counseling patients on pictograms to enhance

understanding and reduce potentially harmful misinterpretation. Furthermore both children and adults had sufficient understanding of the pictograms' intended meanings, as both groups scored greater than 85% for guessability and recall for all 11 pictograms. This result is particularly relevant since the future AAP will target both these populations. Moreover, as evident by the high translucency scores, the pictograms in this study were seen as having a strong relationship to its intended meaning. Having a high translucency score also helps to limit misinterpretation of the pictogram.

Previously published AAPs utilize text to explain the various signs and symptoms, as well as the actions to take during an anaphylactic reaction. To our knowledge, there are currently no AAPs that include the use of pictograms to depict the key counseling points of an anaphylactic reaction. Furthermore, unlike previous action plans, our proposed AAP includes not just the signs/symptoms and actions, but also focuses on management through avoidance of allergens (food, insects and medications). As such, this action plan serves to fill an information gap left by previous AAPs.

In order for pictograms to be effectively designed, they must be able to capture the users' attention, improve their comprehension, increase their awareness and consider the context of use (26). In this study, we employed a multifaceted approach for the pictogram design involving identification of key counseling points, picture selection, and semiotic analysis. Furthermore, for pictograms that needed to be redesigned, we combined semiology along with subjective information from the targeted population. This unique design allowed for the development of effective pictograms, as evident by the high guessability, translucency and recall scores.

One limitation was that our study was comprised of a highly literate population, as the majority of the participants had at least a high school health literacy level. As such, the results may not necessarily be generalizable to a lower literacy population, as they were not adequately represented within our study sample. However, literature has shown that anaphylaxis is more common in higher literacy and higher SES populations (9, 10). Thus, this group could potentially have the greatest benefit from an AAP. Second while this study examined short-term recall, we did not access long-term recall. As such, there was no way to validate

participants' understanding of the pictograms following the testing. Further research including both long term recall and a low literacy population will be necessary in the future.

The validated illustrations have been incorporated into an AAP to be employed in a clinical setting (see Figure 1). The majority of pediatric anaphylaxis cases are diagnosed and managed in the emergency department, thus our proposed AAP is primarily designed to assist health professionals working in emergency and urgent care settings (27, 28). In addition to the inclusion of validated pictograms, our proposed written plan takes into consideration several aspects of post anaphylaxis emergency care, including the proper steps of anaphylaxis management, the use of EAls, and teaching about anaphylaxis and allergen avoidance. We also designed it to serve as a standard pre-filled prescription form for EAls. The overall efficacy and impact of these design aspects on anaphylaxis care need to be assessed by future research.

Conclusion

We prospectively designed and validated a set of anaphylaxis pictograms to be included in an AAP. The incorporation of validated pictograms into an AAP has the potential to increase comprehension of the triggers, signs and symptoms, and management of an anaphylactic reaction.

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Table1: Demographic Data

Demographic data	Criterion	Number of participants (n=115)	Percentage (%)
Gender	Female	73	63
	Male	42	37
Age	10-17	39	34
	18+	76	66
Number of medications taken by the child (excluding vitamins)	> 3	13	11
	< 3	102	89
Years since diagnosis of anaphylaxis	0 – 5	72	63
	6 – 10	23	20
	>10	20	17
REALM-SF grade level n = 76	<grade 3(score 0)	0	0
	Grade 4-6(score 1-3)	0	0

	Grade 7-8(score 4-6)	5	7
	High school(score 7)	71	93
REALM-teen grade level n = 39	<grade 3(score 0-37)	1	3
	Grade 4-5(score 38-47)	1	3
	Grade 6-7(score 48-58)	6	15
	Grade 8-9(score 59-62)	5	13
	>grade 10(score 63-66)	26	67
Level of schooling completed	<grade 6	8	7
	Grade 7 – 10	23	20
	Grade 11 – 12	18	16
	College, University or higher	66	57

Table 2: Intended pictogram meaning, key graphic elements, pictogram design, guessability, translucency and recall

Intended Pictogram meaning	Key graphic elements (≥35 %) based on semiology	Pictograms	Guessability			Translucency ≥5 %	Recall		
			C	PC	C + PC %		C	PC	C + PC %
Flash or hives on skin	Spots on skin (spread) Red spots (spread) face Closed mouth Eyes open Closed eyes Front view Side/diagonal view	 n = 115	76	30	92%	97%	97	16	98%
Coughing	Worried eyebrows "Tight" eyes Closed eyes Open mouth Lines coming from mouth Normal shoulders Leaning forward	 n = 115	100	2	89%	96%	113	1	99%

	Bags under eyes Hands in front of mouth								
Choking, labile breathing	Tongue in Hand(s) on neck Hands on side Lop-sided eyes Open mouth Worried eyebrows Leaning forward Open eyes	 n = 115	97	9	92%	95%	109	3	97%
Emitting	Open eyes Vomit No particles Leaning forward Eyes wide open Eyes closed Front view Side view	 n = 115	105	8	98%	98%	113	1	99%

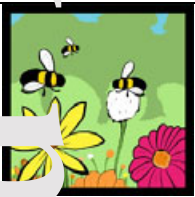
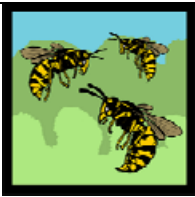
Dizziness / lightheaded	Eyes different directions	 Original n = 66	50	1	77%	91%	61	1	94%
	Spirals coming from head								
	Stars around head								
	"Worried" eyebrows								
	Hands raised	 Redesign n = 49	43	0	88%	96%	47	0	96%
	Closed mouth								
	Falling back								
Administer epinephrine	Injected in thigh	 n = 115	110	4	99%	99%	115	0	100%
	Thigh visible								
	Thigh clearly shown								
	Injection through clothes								
	Injection on skin								
	1 thigh visible								
	2 thighs visible								
	Self-injection								
	Injection 90 degree angle								
	Side view								

	Front view Only hand and thigh visible								
9-1-1 or local emergency services	Phone Stethoscope Doctor Carrying medical box	 n = 115	114	1	100%	94%	113	2	100%
Food allergens	1 food Multiple foods Prohibited sign Nuts/peanuts Gluten	 n = 115	106	7	98%	96%	113	1	99%
Insect allergens (bees/wasps)	Bee/wasp/hornet Free flying Sitting on something	 Original n = 66	53	6	89%	80%	65	1	100%
		 Redesign n = 49	45	3	98%	100%	49	0	100%

Energy to medications	Pills Syringes Prescription bottles	 Original n = 66	65	0	98%	86%	65	1	100%
		 Redesign n = 49	45	2	96%	92%	49	0	100%
Wait 5 minutes	Sitting Standing Bored look	 Original n = 66	55	6	92%	76%	66	0	100%
		 Redesign n = 49	44	4	98%	82%	49	0	100%

* Correct (C), partially correct (PC)

Table 3: Changes made to unvalidated pictograms

Original	New	Comments by Participants	Changes made
		Eyes look like he got hit in the head (the black eyes) Don't put colour in the eyes	Having both hands raised Trying to balance oneself from falling back Hands not touching head Eyes different direction, but not showing a black eye
		Could have included mosquitos and other insects (include broader insects) I would put insects and pollen separately Stinging insect not as obvious Make bees bigger Have someone getting stung	Removed the flowers Emphasized stingers and size of wasps
		I think kids recognize	Remove medication box Use a pill box instead
		Maybe just write the word "wait" Use "min" for minutes instead of "m" Don't know 5 minutes for what Put epi-pen on both sides	Changed the text and added Epi-pens to mark 5 minutes

		Put 0 and 5 Would put mini epi-pen between the 5 minutes It's not specific enough Show someone waiting	
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Table 4: Children vs. Parents/Guardian Guessability, Translucency and Recall

	Hives, rash 	Coughing, trouble breathing 	Choking, trouble breathing 	Vomiting 	Dizziness, lightheadedness, pale/blue colour 	Epi-pen 
Parents (children 1 – 9 years of age)						
Participants (n)	76	76	76	76	33	76
Guessability PC, C, n(%)	96%**	89%	92%	100%	85%	99%
Translucency						
Median (min - max)	7 (3 – 7)	7 (2 – 7)	7 (3 – 7)	7 (3 – 7)	7 (4 – 7)	7 (4 – 7)
Score ≥ 5 , n (%)	99%	95%	96%	99%	97%	99%
Recall PC, C, n(%)	100%	100%	99%	100%	97%	100%
Children (10 – 17 years of age)						
Participants (n)	39	39	39	39	16	39
Guessability PC, C, n(%)	85%**	87%	92%	95%	94%	100%
Translucency						
Median (min - max)	7 (4 – 7)	7 (4 – 7)	7 (2 – 7)	7 (4 – 7)	7 (4 – 7)	7 (5 – 7)
Score ≥ 5 , n (%)	95%	97%	92%	97% ¹	94%	100%
Recall PC, C, n(%)	95%	97%	95%	97%	94%	100%

- p-value = 0.03, df = 1, Pearson Chi-Square = 4.674

Table 4: Children vs. Parents/Guardian Guessability, Translucency and Recall

	Call doctor, 9-1-1, medical services 	Food allergens (shellfish, nuts, dairy, eggs, etc.) 	Insect allergies (stingers, bees, wasps, ants, etc.) 	Drug allergies (NSAIDs, β -lactams), medications 	Wait 5 minutes, 5 minutes 
Parents (children 1 – 9 years of age)					
Participants (n)	76	76	33	33	33
Guessability PC, C, n(%)	100%	99%	97%	97%	100%
Translucency					
Median (min - max)	7 (1 – 7)	7 (4 – 7)	7 (5 – 7)	7 (4 – 7)	7 (1 – 7)
Score ≥ 5 , n (%)	97%	97%	100%	88%	82%
Recall PC, C, n(%)	100%	100%	100%	100%	100%
Children (10 – 17 years of age)					
Participants (n)	39	39	16	16	16
Guessability PC, C, n(%)	100%	97%	100%	94%	88%
Translucency					
Median (min - max)	7 (3 – 7)	7 (3 – 7)	7 (5 – 7)	7 (5 – 7)	5.5 (3 – 7)
Score ≥ 5 , n (%)	87%	92%	100%	100%	81%
Recall PC, C, n(%)	100%	97%	100%	100%	100%

- p-value = 0.03, df = 1, Pearson Chi-Square = 4.67

Figure 1: Anaphylaxis Action Plan incorporating validated pictograms



ADDRESSOGRAPH

 Weight: _____ kg

Emergency Department
ANAPHYLAXIS ACTION PLAN & PRESCRIPTION

Signs and Symptoms:



Skin: Hives, swelling, itching, warmth, redness, rash



Breathing: Coughing, wheezing, shortness of breath, chest pain/tightness, throat tightness, hoarse voice, trouble swallowing



Stomach: Nausea, pain/cramps, vomiting



Heart: Pale/blue colour, weak pulse, dizzy/lightheaded

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If You Develop Any Symptoms:

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- Give epinephrine at the **first sign** of a known or suspected anaphylactic reaction.
- Call 9-1-1 or local emergency medical services. Tell them the child is having a life-threatening allergic reaction.
- If the reaction continues or worsens, give a second dose of epinephrine in 5 to 15 minutes.
- If the child is feeling lightheaded, have them lie on their back with their knees bent.

Medications:

Epinephrine **0.15 mg** autoinjector if between 10 and 25 kg:
 Brand: [] Epipen [] Allerject [] Twinject [] Other: _____ [] Referral to allergist

Epinephrine **0.3 mg** autoinjector if greater than 25 kg:
 Brand: [] Epipen [] Allerject [] Twinject [] Other: _____ [] Medic-Alert bracelet

Physician: _____ (print name) License #: _____ Signature: _____ Date: _____ (dd/mm/yyyy)

How to use Auto-Injectors:

EpiPen®:



- 1 • Hold firmly with orange tip pointing downward.
• Remove blue safety cap by pulling straight up. Do not bend or twist.



- 2 • Swing and push orange tip firmly into mid-outer thigh until you hear a "click."
• Hold on thigh for several seconds.

Allerject™:



1. Pull Allerject™ from the outer case. Do not go to step 2 until you are ready to use Allerject™. If you are not ready to use, put it back in the outer case.



2. Pull off RED safety guard. To reduce the chance of an accidental injection, do not touch the black base of the auto-injector, which is where the needle comes out. If an accidental injection happens, get medical help immediately.

NOTE: The safety guard is meant to be tight. Pull firmly to remove.



3. Place BLACK end AGAINST the MIDDLE of the OUTER thigh (through clothing, if necessary), then press firmly and hold in place for five seconds. Only inject into the middle of the outer thigh (upper leg). Do not inject into any other location.

NOTE: Allerject™ makes a distinct sound (click and hiss) when you press it against your leg. This is normal and indicates Allerject™ is working correctly.

4. Seek immediate medical or hospital care. Replace the outer case and take your used Allerject™ with you to your pharmacist or physician for proper disposal and replacement.

Avoiding Allergens:



Food: Avoid allergen containing foods. Read food labels. Bring own food to school. Avoid food swapping.



Insects: Cover up as much as possible. Wear shoes when outdoors. Use an insect repellent such as DEET. Avoid scents. Have nearby nests removed.



Medication: Let doctors, pharmacists, dentists and nurses know of any medication allergies. Wear medic-alert bracelet.

Controlling your Anaphylaxis

1. Avoid allergens.
2. Know how and when to use your epinephrine autoinjector.
3. Ensure you/your child **always** has an epinephrine autoinjector immediately available.
4. Ensure your autoinjector is not expired. Do not store in very hot or very cold place.
5. If you are a long distance from a hospital have a backup supply of an epinephrine autoinjector.
6. Wear a Medic Alert bracelet that tells what allergens you are anaphylactic to.

Note: Children with asthma are at higher risk for severe anaphylaxis