

# Anaphylaxis 2022

## Guideline Update and Best Practices

### AAPA Indianapolis

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# ANAPHYLAXIS

*Practice parameter*

## **Anaphylaxis—a 2020 practice parameter update, systematic review, and Grading of Recommendations, Assessment, Development and Evaluation (GRADE) analysis**



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Anaphylaxis is an acute, potential life-threatening systemic allergic reaction that may have a wide range of clinical manifestations. Severe anaphylaxis and/or the need for repeated

doses of epinephrine to treat anaphylaxis are risk factors for biphasic anaphylaxis. Antihistamines and/or glucocorticoids are not reliable interventions to prevent biphasic anaphylaxis,

# ***ANAPHYLAXIS***

**In a few seconds it was extremely ill; breathing became distressful and panting; it could scarcely drag itself along, lay on its side, was seized with diarrhea, vomited blood and died in twenty-five minutes.**

Charles Richet 1902

# ***ANAPHYLAXIS***

Instead of inducing tolerance (prophylaxis),

**Richet's** experiments in dogs injected with

sea anemone toxin resulted in lethal

responses to doses previously tolerated.

He coined the word 'ana' (without) 'phylaxis

(protection). He won the Nobel prize for this

work.



1901<sup>er</sup> DECOUVERTE 1901

DE  
L'ANAPHYLAXIE



2<sup>F</sup>

POSTES MONACO

CHAMBERLAIN

1901

# *Definition of Anaphylaxis*

- An acute allergic reaction resulting in widespread allergic symptoms which involves two or more organ systems, and is potentially life-threatening, resulting from an **IgE**-mediated mechanism.
- Anaphylactoid – term falling into disuse but meant to describe anaphylaxis without **IgE** involvement ie a non-allergic mechanism.
- Anaphylaxis now describes a clinical event, regardless of mechanism

## ***Current Definition of Anaphylaxis***

Two or more of the following that occur rapidly after exposure to a likely allergen for the patient:

- (i) involvement of skin-mucosal tissue
- (ii) respiratory involvement
- (iii) reduced blood pressure or associated symptoms
- (iv) gastrointestinal symptoms

Also - reduced blood pressure as a result of exposure to a known allergen trigger.

# *Current Definition of Anaphylaxis*

## **Couple thoughts –**

Histamine (and others) are driving this. How much is going to be released?

What volume of histamine is needed to cause anaphylaxis? Will this happen?

Meeting Criteria NOT needed to administer epinephrine

Let these thoughts help you and your patients



# ***IS THIS ANAPHYLAXIS?***

12 YO MALE with an insect sting (stung once) at a park. Had the following:

Hives, tongue felt thick but did not look swollen

Cough, a bit of a wheeze and chest felt tight

Runny nose and sneezed once

Felt nausea and like

“he was going to throw up”

Hands and feet felt swollen

# ***IS THIS ANAPHYLAXIS?***

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# ***IS THIS ANAPHYLAXIS?***

12 YO MALE with an insect sting (stung once) at a park. Had the following:

Hives, tongue felt thick but did not look swollen

# ***WHO ARE THE PLAYERS?***

What brings this on?

# Mast Cells

- **Mast cells** are abundant in the mucosa of the respiratory, gastrointestinal tracts and in the skin
- **Mast cells** release mediators that cause the pathophysiology of the immediate and late phases of atopic diseases.
- Histamine is the major player but there are many others

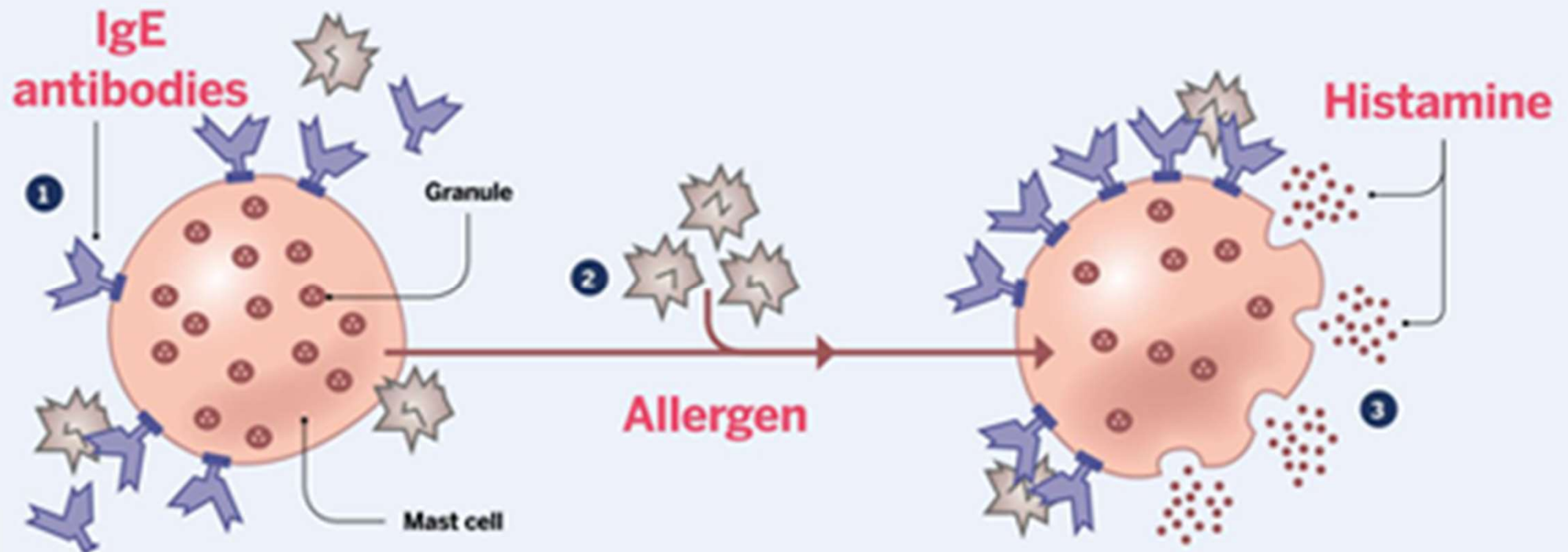


# Mechanism

- While first-time exposure may only produce a mild reaction, repeated exposures may lead to more serious reactions. Once a person is sensitized (has had a previous sensitivity reaction), even a very limited exposure to a very small amount of allergen can trigger a severe reaction.
- Most occur within seconds or minutes after exposure to the allergen, but some can occur after several hours, particularly if the allergen causes a reaction after it is partially digested. In very rare cases, reactions develop after 24 hours (alpha-gal and scombroid) .

# The allergic response

The three stages of an IgE-mediated allergic reaction



# ***ACTIONS OF HISTAMINE***

- ***Peripheral vasodilation***
- ***Increased vascular permeability***
- ***Increased heart rate***
- ***Bronchial/intestinal smooth muscle contraction***
- ***Nerve stimulation-Cutaneous pruritus/pain***
- ***Increased glandular mucus secretions***

# ***CLINICAL MANIFESTATIONS OF ALLERGY***

- ***Vasodilation – erythema, nasal congestion, hypotension***
- ***Increased vascular permeability – urticaria, hypotension***
- ***Smooth muscle spasm – asthma, intestinal cramps, diarrhea***
- ***Mucus secretion – allergic rhinitis, asthma***
- ***Nerve stimulation-itch, sneeze***

Confusion, headache  
or loss of consciousness

Wheezing, cough  
or difficulty  
getting air

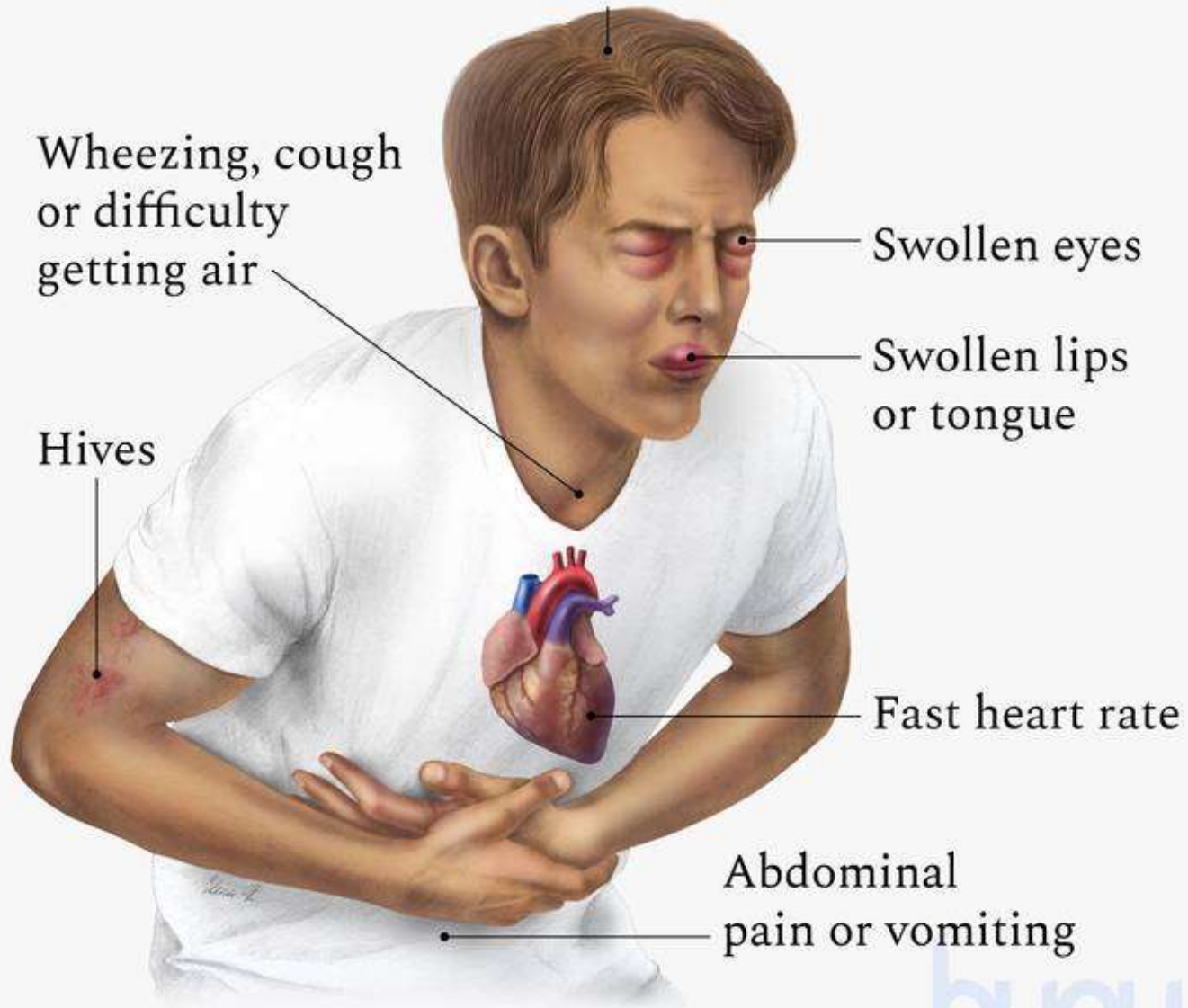
Swollen eyes

Swollen lips  
or tongue

Hives

Fast heart rate

Abdominal  
pain or vomiting



buoy



# ***URTICARIA***

- ***Raised central white or red wheals***
- ***Surrounding erythema or flare, with itch or burning***
- ***Histamine mediated***
- ***Varies in shape & size – circular, gyrate, linear, isolated or coalescent***
- ***Well demarcated, blanch with pressure***
- ***Predisposition to warm areas, pressure sites***
- ***Lasts hours, max 24 - 48***



# ***ANGIOEDEMA***

- **Diffuse skin colored subcutaneous swelling**
- **Pathology similar to urticaria except it occurs in deeper subcutaneous tissues**
- **Not itchy or painful, unless in confined site**
- **Can be histamine, bradykinin etc mediated**
- **Can last hours or days**
- **Not very responsive to antihistamines**
- **Approx 40% of urticaria cases**



# ***ANAPHYLAXIS: OVERVIEW***

- Anaphylaxis is a **severe**, potentially fatal systemic allergic reaction that occurs suddenly (minutes to hours) after contact with an allergy-causing substance
- Death can occur in **minutes**, usually due to closure of airways
- Allergic reaction affects many body systems : rash & swelling, breathing difficulties, vomiting & diarrhea, heart failure & low blood pressure  
→ ANAPHYLACTIC SHOCK



# Girl, 14, dies after sampling sauce

Undetected allergy  
to peanuts fatal

By Tony Lofaro  
*Citizen staff writer*

Christiane Guay enjoyed most foods, though like many teenagers she balked at eating broccoli or Brussels sprouts. But the thing she hated most was the smell and taste of peanuts, and purposely avoided them.

The 14-year-old student at Lester B. Pearson High School in Gloucester had no inkling a normal meal made with peanut sauce, prepared by her mother, Jacqueline, would prove to be deadly.

At the family dinner table Wednesday night, Christiane sat with her mother, her sister, Marie-Lyne, 17, and brother, Mathieu, 16, and sampled a mere teaspoon of a peanut sauce dish.

It was enough to bring on an immediate violent reaction. Her throat swelled and blocked her breathing before she passed out on the kitchen floor of her Ogilvie Road home.

She was rushed to the Children's Hospital of Eastern Ontario and was placed on a life-support system. She died a few days later after her heart stopped. Christiane, an asthma sufferer, had an anaphylactic reaction to the peanut sauce. CHED doctors told the family.

On average, three children per year in Ontario die from an allergic reaction to food, although there could be more because many deaths are probably not reported that way, says a local pediatric allergist. The most serious kinds of allergic reactions affect about 150,000 Canadians.

After Christiane's death, her family acted quickly and donated her heart, lungs and kidneys to two patients in London, Ont.

The girl's father, Jacques Guay, was working in Thunder Bay when the accident happened.

**GIRL** continued on page A2



Christiane Guay disliked peanuts and avoided them, but her family never had any reason to believe she had an allergy

## Peanut, other allergies can surface at any time

*Chow and*

Peanut and other allergies can suddenly become life-threatening long after infancy, an Ottawa pediatric allergist says.

The fact that a person did not have a serious reaction in the past does not rule out a life-threatening reaction later, Dr. Antony Ham Pong warned on Monday. And, in a fact sheet he has prepared for parents, Ham Pong says that in cases where mild allergic reactions have occurred in the past, severe reactions can occur later with the same

amount of food.

Ham Pong said that in recent years, he has been seeing more cases of children developing a reaction to peanuts.

The influx of patients at his Russell Road practice is largely due to a greater public awareness of the dangers of peanut allergies, he said.

While the bulk of his patients are children under five, the biggest increase is among children under three years of age.

**PEANUT** continued on page A2

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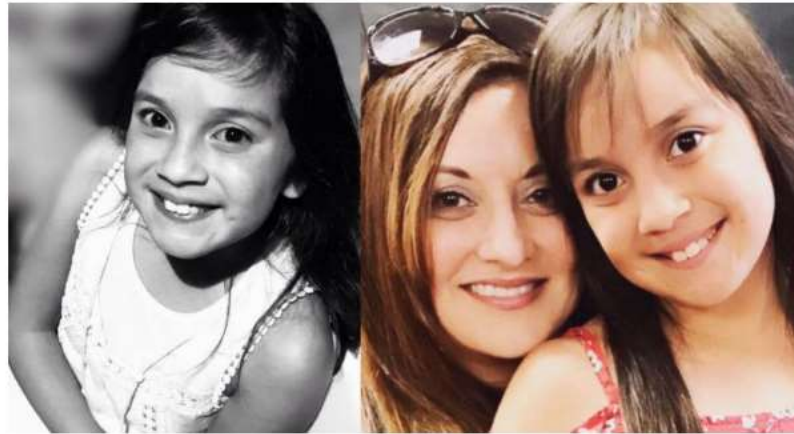
Life

## Mom's heartbreaking warning after 11-year-old daughter dies from allergic reaction to toothpaste



Elizabeth Di Filippo  
Yahoo Canada Style April 17, 2019

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Denise Saldate and her mother, Monique Altamirano. Image via Facebook.

The mother of an 11-year-old girl who died after an allergic reaction to toothpaste is sharing her story.

The family of Denise Saldate is in mourning after her sudden death caused by a reaction to a milk protein in prescription toothpaste.

The West Covina, Calif. girl died on April 6, just two days after she received a prescription for MI Paste One brand of medicated toothpaste to help strengthen her tooth enamel.

**ALSO SEE:** [Mum urges parents to vaccinate their children, shares photos of her newborn with measles](#)



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# Univ. of Maryland puts EpiPens in campus dining halls



**13** WTHR.COM STAFF

PUBLISHED: APR 22ND, 2019 - 5:34AM (EDT) UPDATED: APR 23RD, 2019 - 3:39AM (EDT)

COLLEGE PARK, Md. (WTHR) — With food allergies on the rise in America, the University of

# **Anaphylaxis:**

**Rapid** recognition and treatment

# Fatal anaphylaxis

Minutes to cardiac arrest		
	Median	Range
55 iatrogenic	5	1 – 80
37 food	30	6 – 360
32 venom	15	4 – 120

Pumphrey RSH, Clinical and experimental allergy, 2000

Anaphylaxis:

Rapid **recognition** and treatment

# *Recognition*

- Underrecognized, undertreated
- Most important diagnosis marker is **trigger**
- Over 40 symptoms and signs described

cutaneous	>80%
respiratory	up to 70%
gastrointestinal	up to 40%
cardiovascular	up to 35%

# *Anaphylaxis: clinical features*

- **Skin** **85%**
- **Upper respiratory** **56%**
- **Lower respiratory** **47%**
- **Cardiovascular** **33%**  
(30% of adults, 5% of children)
- **Gastrointestinal** **30%**
- **Rhinitis** **16%**
- **BIPHASIC ANAPHYLAXIS** **5 - 8%**



# ***Anaphylaxis: triggers***

**Adults – Medications and stinging insects**

**Children – Food and stinging insects**

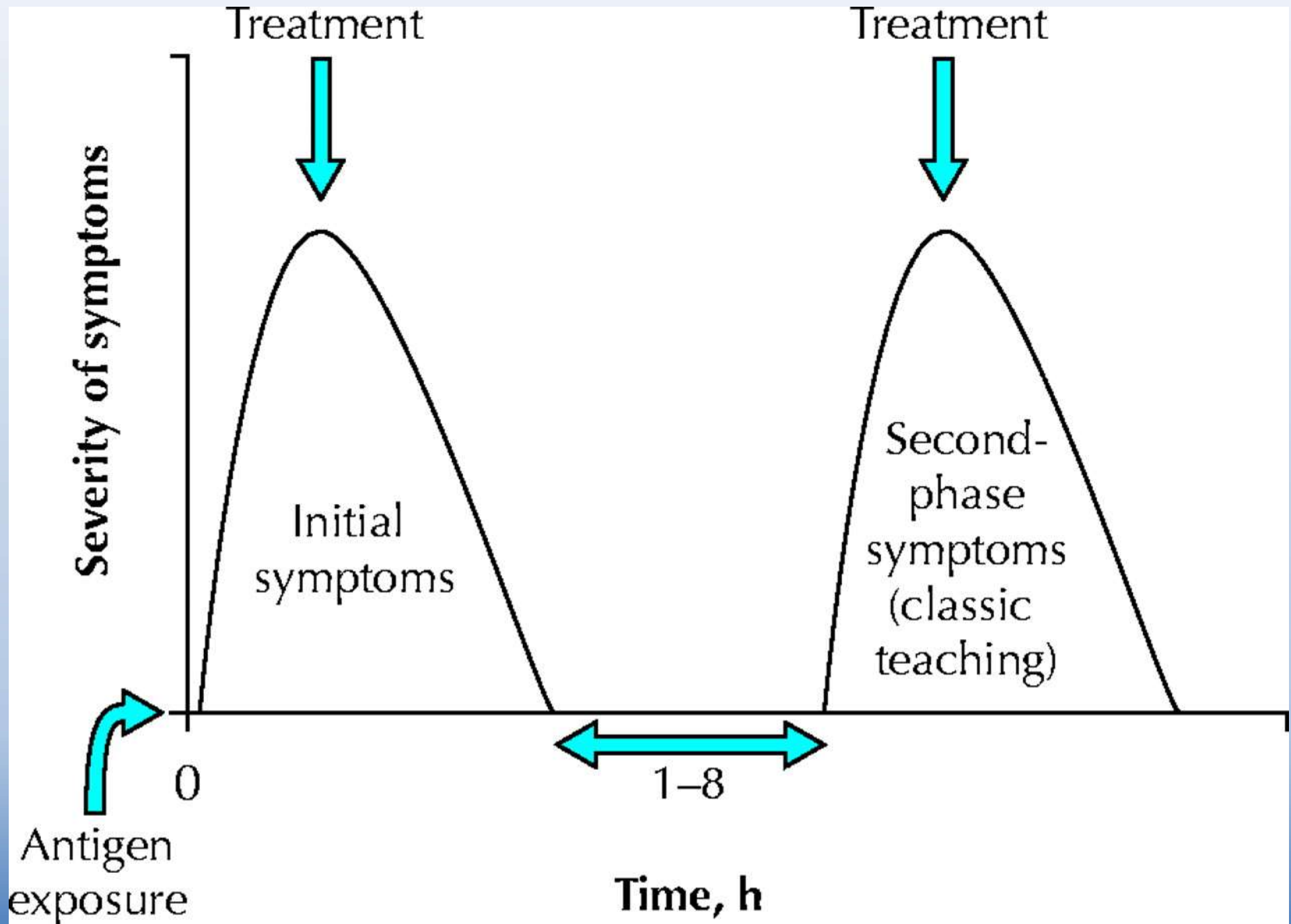
# ***Anaphylaxis: Causes of Death***

- Upper and/or Lower Airway Obstruction (70%)***
- Cardiac Dysfunction (24%)***

- My quick “Jimmy” biphasic story -



# ***BIPHASIC ANAPHYLAXIS***



# ***BIPHASIC ANAPHYLAXIS***

- Biphaseic anaphylaxis is a recurrence of anaphylaxis after appropriate treatment and complete resolution of symptoms.
- It happens with no additional exposure to the allergen.

# ***BIPHASIC ANAPHYLAXIS RATES***

<b>Study</b>	<b># Biphasic</b>	<b># Total</b>	<b>% Biphasic</b>	<b>Notes</b>
Popa & Lerner, 1984	3	N/A	N/A	coined term biphasic anaphylaxis
Stark & Sullivan, 1986	5	25	20%	epinephrine was given SQ
Douglas et al, 1994	6	103	5.8%	
Brady et al, 1997	2	67	3%	first to include return ED visits
Brazil & MacNamara, 1998	6	34	18%	range 4.5 - 29.5 hours, biphasic group initially required mean 1.2mg vs 0.6mg epinephrine
Lee & Greenes, 2000	6	105	6%	first study of children
Forrest-Hay et al, 2003	9	91	9%	8 within 6 hours, 1 at 35 hours
Ellis & Day, 2004	20	103	19.4%	40% occurred 10+ hours later, 55% biphasic never received epi (compared to 82% uniphasic)
Smit et al, 2005	15	282	5.3%	Hong Kong, mean 7.6 hours (range of 1.2 - 22.5 hours)

***Accepted numbers – 5-8%***

# ***BIPHASIC ANAPHYLAXIS***

- Million-dollar question – who is at high risk of this?

# ***BIPHASIC ANAPHYLAXIS***

- Anaphylaxis to an unknown trigger – OR 1.6
- More than one dose of epinephrine to stop the first round of symptoms – OR 4.6
- Wide Pulse Pressure – OR 2.1
- Significant skin symptoms OR 2.4
- Time to first epinephrine dose – OR 2.2  
*(Ave 130 min for the biphasic group, 53 min monophasic)*
- Kids – drug cause, risk higher. Food cause, risk lower?
- Severe Anaphylaxis OR 2.1 – *highly variable in the literature but hypotension and 3 organ systems good indicators*



# ***BIPHASIC ANAPHYLAXIS***

- Second million-dollar question – how long to hold patients?
- Recommendations are:
  - If you are in a facility that is comfortable treating this then keeping a low risk patient till they are free of symptoms and then d/c is reasonable. About 1-2 hours.
  - This assumes epinephrine on hand, reliable patients/parents, good transportation, comfort with epinephrine auto injection

# ***BIPHASIC ANAPHYLAXIS***

- Second million-dollar question – how long to hold patients?
- Recommendations are:
  - For high risk patients, the golden number is 6 hours. At this point 90% of the biphasic reactions will have occurred.

# ***BIPHASIC ANAPHYLAXIS***

- Give steroids and antihistamines to prevent biphasic reactions?
- No.
- Not for this.
- You can give them, and should.
- But not for this. Just don't say this is why. Keep that to yourself. Don't chart it.

*Changing Gears – lets diagnose  
and treat*



**KEEP  
CALM**

**AND**

**CARRY  
EPIPENS**

Anaphylaxis:

Rapid recognition and **treatment**

# ***GENERAL MANAGEMENT OF ANAPHYLAXIS***

- **Airway**
- **Breathing**
- **Circulation**
- **But use epinephrine promptly**

# Fatal anaphylaxis: risk factors

- **Concomitant asthma**
- **No epinephrine**
- **Non effective epinephrine**
- **Other cardiopulmonary disease**

# ***Initial Anaphylaxis Treatment***

- **Epinephrine (adrenaline) is first line treatment**
- **Epinephrine IM**
- **Antihistamines & bronchodilators are not first line treatment but may be given after epinephrine.**
- **Once epi is given then throw everything else you have at them . . . .**



# ***Initial Anaphylaxis Treatment***

- **We give kids 5-20 mg prednisone PO for 2 days**
- **Adults 40 mg PO for 2 days**
- **Cetirizine 10 mg BID for 2 days**
- **Ranitidine 150 mg BID for 2 days**
- **Step up inhaler therapy if indicated, move SABA to Q4H instead of PRN**
- **Refill their epinephrine auto injectors**
- **This is highly customizable. . . .**

# ***Management of anaphylaxis: Initial***

- **Epinephrine 0.01mg/kg (max 0.5mg) IM X3, every 5-20min as needed. In severe cases epinephrine IV**
- **H1 antagonists Diphenhydramine (Benadryl) 25-100mg**
- **H2 antagonists eg ranitidine**
- **IV fluids, O2 etc if in hospital**
- **Corticosteroids**

# ***Management of anaphylaxis: Bronchospasm***

- **SVN albuterol**
- **Oxygen**
- **Intubation and ventilation if needed**

# *Management of anaphylaxis: Hypotension*

- **Trendelenberg position**
- **Volume expansion with crystalloid**
- **Vasopressors eg dopamine, norepinephrine, vasopressin**
- **Glucagon if on beta-blocker**

# ***Treatment of Anaphylaxis in Beta Blocked Patients***

- **Give epinephrine initially.**
- **If patient does not respond to epinephrine and other usual therapy:**
- **Glucagon 1 mg IV over 2 minutes**

# ***EFFECTS OF EPINEPHRINE***

- **Increases BP, reverses peripheral vasodilation , ( alpha-adrenergic activity)**
- **Reduces urticaria and angioedema by vasoconstriction (alpha)**
- **Bronchodilation – relaxes bronchial smooth muscle (beta-2 adrenergic activity)**
- **Increases cardiac contractility – force and volume, increasing heart rate & BP (beta-1)**
- **Prevents further mast cell degranulation (beta)**

# ***SIDE EFFECTS OF EPINEPHRINE***

- Epinephrine reverses just about all the harmful aspects of anaphylaxis
- It can take a few minutes but normally you can watch this happen before your eyes

***If you (heaven forbid) should give  
epi when you didn't need to. .  
What bad stuff happens to the  
patient???***



# Who needs to carry an epinephrine autoinjector?


Cleveland Clinic Journal of Medicine. 2019 January;86(1):66-72

Author(s): T. Ted Song, DO, FAAAI, FACP; Phil Lieberman, MD

Author and Disclosure Information

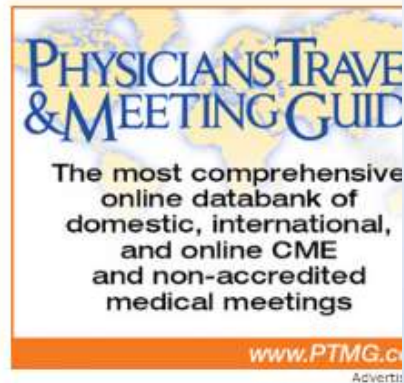
## ABSTRACT

Patients who have had anaphylaxis or who are at risk of it (eg, due to food allergy or *Hymenoptera* hypersensitivity) should carry an epinephrine autoinjector at all times. However, the risks and benefits must be considered on an individual basis, especially in patients with atherosclerotic heart disease, elderly patients on polypharmacy, patients receiving allergen immunotherapy, those with large local reactions to insect stings, and individuals with oral allergy syndrome.

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## KEY POINTS

- Based on current data, there is no absolute contraindication to epinephrine for anaphylaxis. And failure to give epinephrine promptly has resulted in deaths.
- Clinicians concerned about adverse effects of epinephrine may be reluctant to give it during anaphylaxis.
- Education about anaphylaxis and its prompt treatment with epinephrine is critical for patients and their caregivers.



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## KEY POINTS

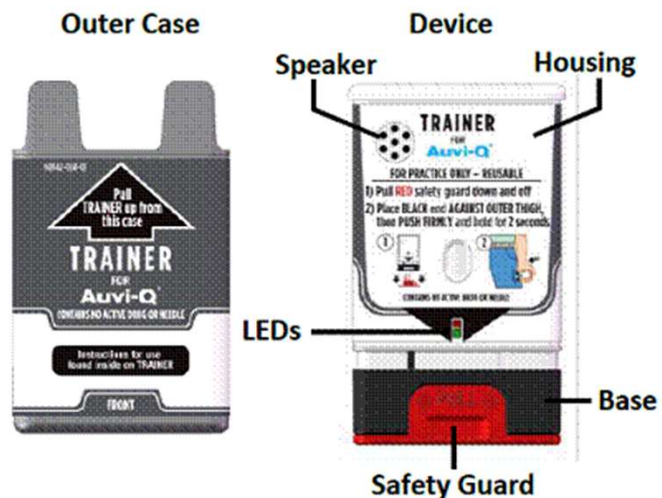
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- Education about anaphylaxis and its prompt treatment with epinephrine is critical for patients and their caregivers.

# Epinephrine Auto-Injectors

- Epinephrine Auto-injectors are easy to use
- Come with instructions
  - Trainers available for practice use
- Websites have video demonstrations – know how to administer your auto-injector!

<b>Epi-Pen<sup>®</sup> video</b>	<a href="http://www.epipen.com/how-to-use-epipen">http://www.epipen.com/how-to-use-epipen</a> <a href="http://Epipen4schools.com">Epipen4schools.com</a>
<b>Auvi-Q<sup>®</sup> video</b>	<a href="https://www.auvi-q.com/">https://www.auvi-q.com/</a>
<b>Adrenaclick<sup>®</sup></b>	<a href="http://www.adrenaclick.com/about-adrenaclick/adrenaclick-training.aspx">http://www.adrenaclick.com/about-adrenaclick/adrenaclick-training.aspx</a>
<b>Generic</b>	<a href="http://www.epinephrineautoinject.com/">http://www.epinephrineautoinject.com/</a>

## TRAINER for AUVI-Q



### Top view



## AUVI-Q



AUVI-Q 0.3 mg is **orange**



AUVI-Q 0.15 mg is **blue**



AUVI-Q 0.1 mg is **white and lavender**

< Previous Article

**May–June, 2013** Volume 1, Issue 3, Pages 266–272. e3

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## Auvi-Q Versus EpiPen: Preferences of Adults, Caregivers, and Children

[Carlos A. Camargo Jr.](#), MD, DrPH, FAAAAI<sup>a,\*</sup> , [Adriana Guana](#), MD<sup>b</sup>, [Sheldon Wang](#), PhD<sup>b</sup>, [F. Estelle R. Simons](#), MD, FRCPC, FAAAAI<sup>c</sup>

PlumX Metrics

DOI: <https://doi.org/10.1016/j.jaip.2013.02.004>

Article Info

Abstract **Full Text** Images References Supplemental Materials

### Article Outline

- I. [Methods](#)
  - A. [Test centers](#)
  - B. [Participants](#)
  - C. [Study design](#)
  - D. [Procedures](#)
  - E. [Statistical analysis](#)
- II. [Results](#)
- III. [Discussion](#)
- IV. [Appendix](#)
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### Background

Auvi-Q is a novel epinephrine autoinjector (EAI) that provides audio and visual cues for patients at risk for life-threatening allergic reactions.

### Objective

We tested the preference for Auvi-Q or EpiPen with regard to method of instruction, preference to carry, device

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Rouzairre, Paul et al.



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## Epinephrine (EpiPen)

Generic EpiPen, EpiPen JR

Epinephrine ([EpiPen](#), [EpiPen Jr](#)) is an expensive drug used for the emergency treatment of [severe allergic reactions](#). You should keep this medicine with you at all times. This drug is slightly more popular than comparable drugs. It is available in brand and generic versions. Alternate brands include [Adrenaclick](#). Generic epinephrine is covered by most Medicare and insurance plans, but pharmacy coupons or cash prices may be lower. The lowest GoodRx price for the most common version of epinephrine (EpiPen) is around \$118.07, 69% off the average retail price of \$388.14. Compare [catecholamines](#).

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2 auto-injectors of 0.3mg ▾

1 package ▾

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📄 Drug Info

⚠️ Side Effects

🖼️ Images

Walmart

\$373  
est retail price

**\$118.07**  
with free discount

GET FREE DISCOUNT

Rite Aid

\$413  
est retail price

**\$121.50**  
with free coupon

GET FREE COUPON

Walgreens

\$376  
est retail price

**\$126.13**  
with free coupon

GET FREE COUPON

Target (CVS)

\$340

**\$134.27**

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## Auvi-Q

EPINEPHRINE is used for the emergency treatment of [severe allergic reactions](#). You should keep this medicine with you at all times. The lowest GoodRx price for the most common version of Auvi-Q is around \$4,859.40, 20% off the average retail price of \$6,105.81. Compare [catecholamines](#).

Prescription Settings

brand ▾

package ▾

2 auto-injectors of 0.3mg ▾

1 package ▾

🔗 SHARE ▾

### Prices and coupons for 1 package (2 auto-injectors) of Auvi-Q 0.3mg

🏷️ Prices

🏠 Medicare

📄 Drug Info

⚠️ Side Effects

🖼️ Images

📍 Set your location for drug prices near you

Costco

\$4,859.40  
with free coupon

GET FREE COUPON

Albertsons

\$5,007.50  
with free coupon

GET FREE COUPON

Safeway

\$5,007.50  
with free coupon

GET FREE COUPON

Smith's

\$5,021.05  
with free coupon

GET FREE COUPON



## Epinephrine (Adrenaclick)

Generic Adrenaclick

Epinephrine ([Adrenaclick](#)) is an expensive drug used for the emergency treatment of [severe allergic reactions](#). You should keep this medicine with you at all times. This drug is slightly less popular than comparable drugs. It is available in brand and generic versions. Alternate brands include [EpiPen](#) and [EpiPen Jr](#). Generic epinephrine is covered by most Medicare and insurance plans, but pharmacy coupons or cash prices may be lower. The lowest GoodRx price for the most common version of epinephrine (Adrenaclick) is around \$109.99, 58% off the average retail price of \$267.77.

Prescription Settings

generic ▾

package ▾

2 auto-injectors of 0.3mg ▾

1 package ▾

SHARE ▾

### Prices and coupons for 1 package (2 auto-injectors) of epinephrine (Adrenaclick) 0.3mg

Prices



Set your location for drug prices near you

Medicare

Drug Info

Side Effects

Images

Target (CVS)

\$109.99

retail price

LEARN MORE

Costco

\$142.48

with free coupon

GET FREE COUPON

Walgreens

\$146.99

retail price

LEARN MORE

Walmart

\$430

est retail price

\$202.49

with free discount

GET FREE DISCOUNT



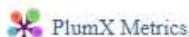
Product	Strengths Available	Price Estimate (2-pack)	Ways to Save
<b>EpiPen; EpiPen Jr.</b> (epinephrine auto-injector)	0.15 mg; 0.3 mg	About \$650-\$700 cash price (two auto-injectors).	Possibly <b>save \$300</b> on EpiPen or EpiPen Jr from Mylan.
<b>Authorized Generic</b> for EpiPen and EpiPen Jr. (epinephrine auto-injector) from Mylan	0.15 mg; 0.3 mg	About \$150 to \$300; possibly higher priced at other pharmacies; call ahead.	Coupon may be needed.
<b>epinephrine</b> (generic for EpiPen, EpiPen Jr.) from Teva	0.15 mg; 0.3 mg	Price not yet available.	Expected to be low cost but coupon may still be beneficial.
<b>Adrenacllick</b>	0.15 mg; 0.3 mg	Roughly \$450 to \$500; price varies among pharmacies.	Drugs.com <b>Discount Card</b>
<b>Authorized Generic</b> for Adrenacllick (epinephrine auto-injector) from Impax	0.15 mg; 0.3 mg	\$109.99 at CVS Pharmacy; higher at other pharmacies.	No coupon needed; possibly save \$50 from Impax at <a href="http://epinephrineautoinject.com">epinephrineautoinject.com</a>
<b>Auvi-Q</b>	0.1 mg (coming in 2018), 0.15 mg; 0.3 mg	\$0 copay for insured patients and for families with income of less than \$100,000/year without insurance. One prescription includes two auto-injectors. Has voice instructions.	AUVI-Q AffordAbility Patient Assistance
<b>Symjepi</b>	0.3 mg	Price not yet available; launch date unknown. One prescription includes two syringes.	See <b>manufacturer's website</b> for patient assistance.

# Autoinjector Lacerations



# The TEN study: time epinephrine needs to reach muscle

Troy W. Baker, DO<sup>\*</sup>,<sup>\*</sup>,<sup>\*</sup>,<sup>\*</sup>, Christopher M. Webber, MD<sup>\*</sup>, Adrienne Stolfi, MSPH<sup>†</sup>, Erika Gonzalez-Reyes, MD<sup>\*</sup>



DOI: <https://doi.org/10.1016/j.anaai.2011.06.001>



Article Info

Abstract Full Text Images References

## Background

An epinephrine autoinjector (EAI) is designed to deliver epinephrine into the vastus lateralis muscle. Several studies have demonstrated both patient and physician difficulties in correctly using EAI, specifically premature removal of the device from the thigh.

## Objective

To evaluate the correlation between duration of injection with an EAI and amount of epinephrine absorbed into muscle tissue.

## Methods

Twenty-one EAI devices (0.3 mL) were used to determine the amount of epinephrine injected into marbled beef during 7 time periods. A digital scale was used to record preinjection and postinjection weights of EAI and beef. The weight difference between the preinjection and postinjection periods of the EAI was used to calculate the total amount of epinephrine released and available for absorption into the marbled beef. The difference between the preinjection and postinjection beef weight was used to determine the amount of epinephrine absorbed into the meat.

## Results

The correlation with duration of injection for both the amount of epinephrine absorbed and released was 0.321 ( $P = .48$ ). At all intervals, 95.9% or more of epinephrine was absorbed into the marbled beef. The correlation with duration of injection and percent of epinephrine absorbed was 0.464 ( $P = .29$ ). There were no time periods that were significantly different from the percentage of epinephrine absorbed by the marbled beef at 10 seconds (analysis of variance  $P = .16$ ).

## Conclusion

No linear relationship between time and amount of epinephrine injected or absorbed into muscle tissue was demonstrated. These data suggest that holding the device in place for 1 second is as effective as 10 seconds.

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## Conclusion

No linear relationship between time and amount of epinephrine injected or absorbed into muscle tissue was demonstrated. These data suggest that holding the device in place for 1 second is as effective as 10 seconds.

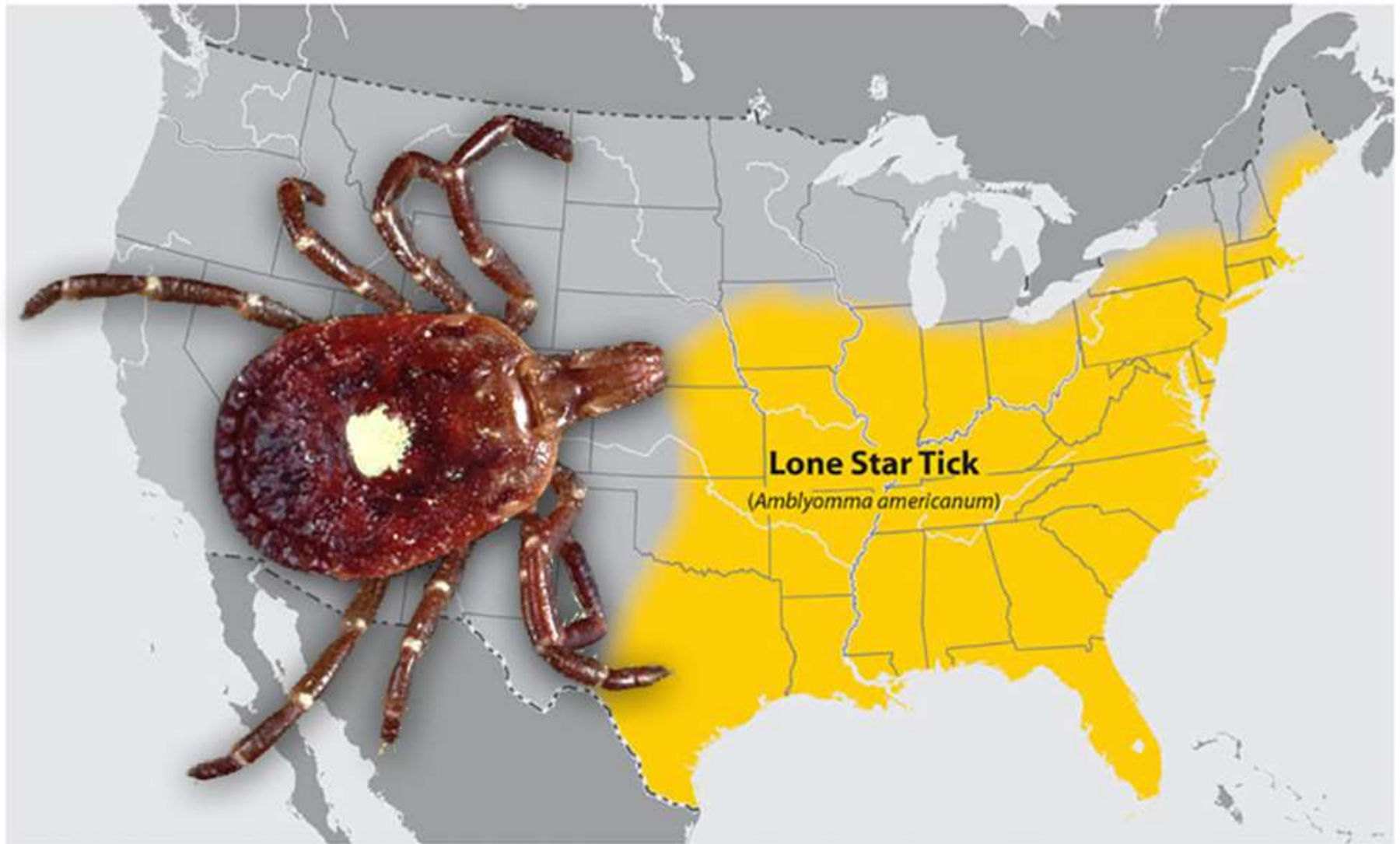
So hold it down as long as it takes to hear the click and register that it's in.



# Alpha Gal – the story of the tick that keeps on biting!

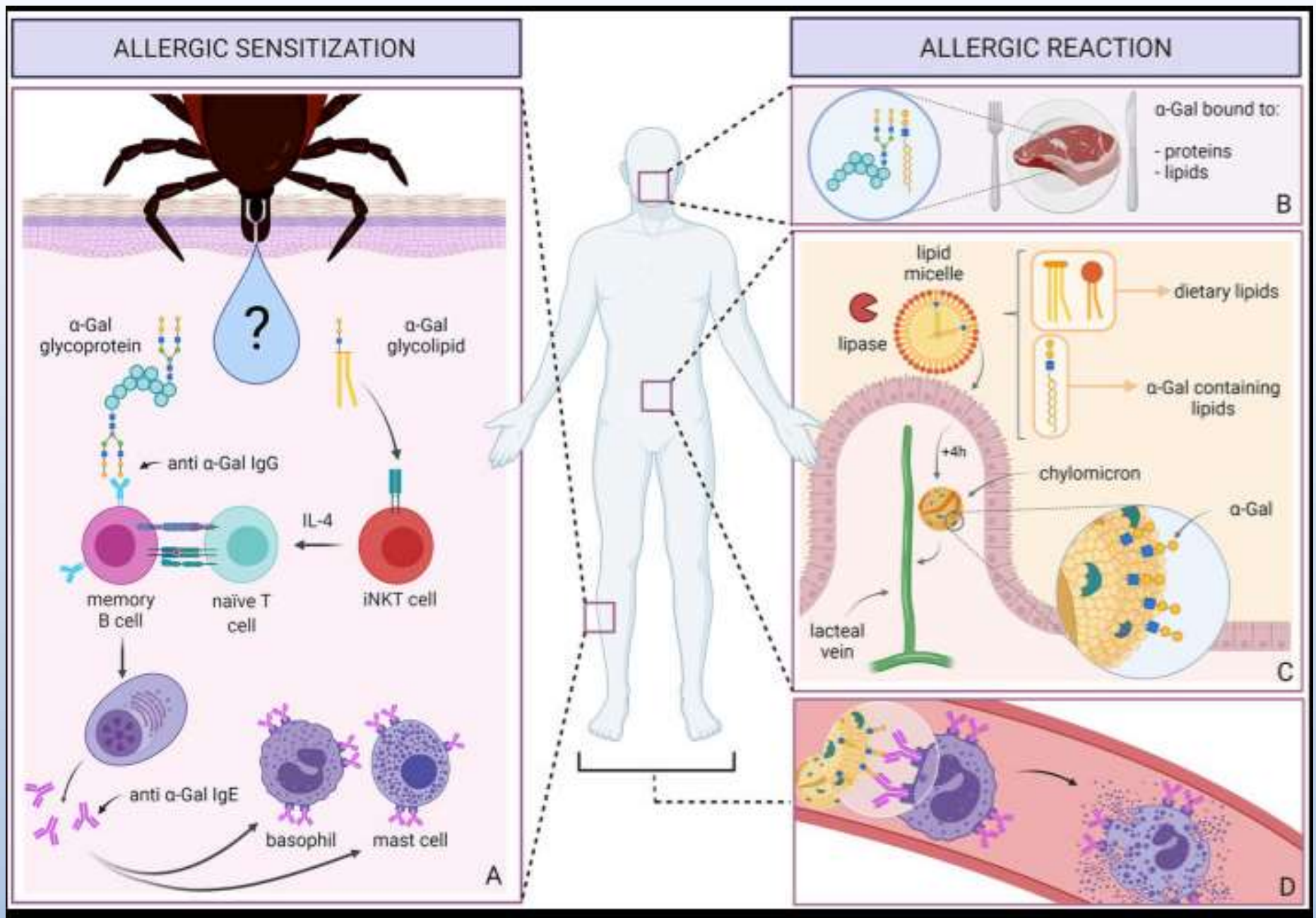


galactose- $\alpha$ -1,3-galactose ( $\alpha$ -Gal)



Following one (or more?) tick bites the saliva of the tick transfers proteins and possible fats coated in alpha-gal that are then recognized by memory B cells





Digestion, absorption and transport to the lymphatic system via the lacteal takes about 4 hours.  
This is when the reaction starts



# 5 EASY WAYS TO INTRODUCE PEANUT FOODS TO YOUR INFANT



[preventpeanutallergies.org](http://preventpeanutallergies.org)



## MIX WITH WATER, FORMULA OR BREAST MILK

Thin 2 tsp. of peanut butter with 2-3 tsp. hot water, formula or breast milk. Allow to cool before serving.



## MIX WITH PRODUCE

Stir 2 tsp. of powdered peanut butter into 2 Tbsp. of previously tolerated pureed fruits or vegetables.



## TEETHING BISCUITS

Teething infants who are older and self-feeding may enjoy homemade peanut butter teething biscuits. Find a recipe for teething biscuits at [nationalpeanutboard.org](http://nationalpeanutboard.org)



## MIX WITH FOOD

Blend 2 tsp. of peanut butter into 2-3 Tbsp. of foods like infant cereal, yogurt (if already tolerating dairy), pureed chicken or tofu.



## PEANUT SNACKS

Give your baby a peanut-containing teething food, such as peanut puffs.



### Remember:

The recommended way to introduce baby-friendly peanut foods depends on each child's individual risk factors. Depending on your child's risk, peanut foods should be introduced according to NIAID guidelines after they've already started other solid foods. Whole nuts should not be given to children under 5 years of age. Peanut butter directly from a spoon or in lumps/dollops should not be given to children less than 4 years of age. This content is not intended to be a substitute for professional medical advice, diagnosis or treatment.

Always seek the advice of your pediatrician.



# 10 FAACTs *about* Food Allergies

- 1** Food allergies affect **15-32 million** Americans, including 6 million children. Studies report that **1 in 13** children and up to **1 in 10** adults in the United States have a food allergy. For children, this averages to **two** children per classroom.
- 2** A food allergy is an **immune system response** to a food that the body mistakenly believes is harmful.
- 3** Eight foods account for 90% of all food allergy reactions: **Peanuts, Tree nuts, Milk, Egg, Wheat, Soy, Fish, & Shellfish**. However, almost any food can cause a reaction.
- 4** There is **no cure** for food allergies and **strict avoidance** is the only way to prevent an allergic reaction.  
**Trace amounts** of an allergen can trigger an allergic reaction in some individuals.
- 5** Past reactions to a food allergy **do not predict future reactions!** Someone can still have a life-threatening reaction to a food they are allergic to, even if they have never had a serious reaction before.
- 6** Symptoms can **develop rapidly** after exposure to an allergen, often within minutes and usually within 30 minutes. However, it can take up to 2 hours for symptoms to occur after exposure to a food allergen.
- 7** Anaphylaxis is a **serious allergic reaction** that comes on quickly and has the potential to become life-threatening. Anaphylaxis requires immediate medical treatment, including an injection of epinephrine and a visit to the emergency room.
- 8** It is important to be deliberate and not hesitate when you have to use epinephrine. The device is **potentially life-saving**. A call to 9-1-1 and a trip to the emergency room should always follow epinephrine administration.
- 9** Individuals at risk should carry **two epinephrine auto-injectable devices** with them at all times AND an **Allergy and Anaphylaxis Emergency Care Action Plan** signed by a board-certified allergist.
- 10** **Food allergies continue to rise** and are a safety and public health concern across the United States. You can get free resources and find out how to help keep those with food allergies safe at:

[www.FoodAllergyAwareness.org](http://www.FoodAllergyAwareness.org)

# SafeFARE: Chef Card Template

**How to use your chef card:** In addition to asking a lot of questions about the ingredients and preparation methods, carry a "chef card" that outlines the foods you must avoid. Present the card to the chef or manager for review.

Fold your card in half, then tape it together and store in your wallet. You can even laminate it to make it more durable. Be sure to make several copies in case you forget to retrieve it from the restaurant or to store in multiple locations.

*This is an interactive PDF that will allow you to type your allergens directly onto the chef card.*

<p><b>Food Allergy Alert</b></p> <p>I have severe food allergies. In order for me to avoid a <b>life-threatening</b> reaction, I <b>must avoid</b> all foods that contain:</p> <p>FOLD HERE</p>	<p><b>Food Allergy Alert</b></p> <p>I have severe food allergies. In order for me to avoid a <b>life-threatening</b> reaction, I <b>must avoid</b> all foods that contain:</p> <p>FOLD HERE</p>
<p><b>Food Allergy Alert</b></p> <p>Please make sure that my food does not contain any of the ingredients on the front of this card, and that any utensils and equipment used to prepare my meal, as well as prep surfaces, are fully cleaned immediately before using. <b>THANK YOU for your help.</b></p> <p>© 2014 Food Allergy Research &amp; Education   <a href="http://www.foodallergy.org">www.foodallergy.org</a></p>	<p><b>Food Allergy Alert</b></p> <p>Please make sure that my food does not contain any of the ingredients on the front of this card, and that any utensils and equipment used to prepare my meal, as well as prep surfaces, are fully cleaned immediately before using. <b>THANK YOU for your help.</b></p> <p>© 2014 Food Allergy Research &amp; Education   <a href="http://www.foodallergy.org">www.foodallergy.org</a></p>

# ACTION PLAN FOR Anaphylaxis

Name: \_\_\_\_\_

Date of birth: \_\_\_\_\_



Allergens to be avoided: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Family/carer name(s): \_\_\_\_\_  
\_\_\_\_\_

Work Ph: \_\_\_\_\_

Home Ph: \_\_\_\_\_

Mobile Ph: \_\_\_\_\_

Plan prepared by: \_\_\_\_\_

Dr \_\_\_\_\_

Signed \_\_\_\_\_

Date \_\_\_\_\_

## How to give EpiPen® or EpiPen® Jr



1. Form fist around EpiPen® and **PULL OFF** grey cap.



2. Place black end against outer mid-thigh (with or without clothing).



3. Push down **HARD** until a click is heard or felt and hold in place for 10 seconds.



4. Remove EpiPen® and be careful not to touch the needle. Massage the injection site for 10 seconds.

## MILD TO MODERATE ALLERGIC REACTION

- swelling of lips, face, eyes
- hives or welts
- tingling mouth, abdominal pain, vomiting

## ACTION

- stay with person and call for help
- give medications (if prescribed) .....
- locate EpiPen® or EpiPen® Jr
- contact family/carer



**Watch for any one of the following signs of Anaphylaxis**

## ANAPHYLAXIS (SEVERE ALLERGIC REACTION)

- difficult/noisy breathing
- swelling of tongue
- swelling/tightness in throat
- difficulty talking and/or hoarse voice
- wheeze or persistent cough
- loss of consciousness and/or collapse
- pale and floppy (young children)

## ACTION

- 1 Give EpiPen® or EpiPen® Jr
- 2 Call ambulance\*- telephone 000 (Aus) or 111 (NZ)
- 3 Lay person flat and elevate legs. If breathing is difficult, allow to sit but do not stand
- 4 Contact family/carer
- 5 Further EpiPen® doses may be given if no response after 5 minutes

### If in doubt, give EpiPen® or EpiPen® Jr

EpiPen® Jr is generally prescribed for children aged 1-5 years.

\*Medical observation in hospital for at least 4 hours is recommended after anaphylaxis.

Additional information \_\_\_\_\_  
\_\_\_\_\_





## For School Nurses

[Home](#) | [For Healthcare Partners](#) | [For School Nurses](#)

### Epinephrine in schools

Approximately 1 in 13 children are affected by food allergies<sup>1</sup>— and children at risk for anaphylaxis may be present in almost every classroom.<sup>1,2</sup> An estimated 13% to 23% of children with food allergies experience reactions at school.<sup>3</sup>

As a school nurse, you know that readily accessible epinephrine auto-injectors are integral to the emergency treatment of children with food allergies.<sup>4</sup> Epinephrine is the only first-line therapy for anaphylaxis, according to The National Institute of Allergy and Infectious Diseases guidelines.<sup>5</sup> But not all children at risk for anaphylaxis have received an epinephrine prescription or always carry their auto-injectors with them.<sup>6,7</sup>

That's where the *EpiPen4Schools*<sup>®</sup> program can help. EpiPen4Schools<sup>®</sup> is offered by Viatrix Inc., the marketer and distributor of EpiPen<sup>®</sup> (epinephrine injection, USP) and EpiPen Jr<sup>®</sup> (epinephrine injection, USP) Auto-Injectors, to help improve access to epinephrine in the school setting.

### How *EpiPen4Schools*<sup>®</sup> works

The *EpiPen4Schools*<sup>®</sup> program provides up to four free EpiPen<sup>®</sup> (epinephrine injection, USP) or EpiPen Jr<sup>®</sup> (epinephrine injection, USP) Auto-Injectors in the form of two EpiPen 2-Pak<sup>®</sup> cartons, two EpiPen Jr 2-Pak<sup>®</sup> cartons or one 2-Pak of each kind along with EpiPen<sup>®</sup> Trainers and a detailed training video, to qualifying public and private kindergarten, elementary, middle and high schools in the US. Schools may receive the authorized generic versions of EpiPen and EpiPen Jr.

To participate in *EpiPen4Schools*<sup>®</sup>, a school nurse or other authorized school representative must visit [www.EpiPen4Schools.com](http://www.EpiPen4Schools.com) to download the order and certification form, and then fax or email the form with a valid prescription to [1-973-718-4328](tel:1-973-718-4328) or [info@bioridgepharma.com](mailto:info@bioridgepharma.com). Alternatively, school representatives can call [1-973-845-7600](tel:1-973-845-7600) to speak with a live representative. There is no requirement for a school to purchase additional EpiPen<sup>®</sup> Auto-Injectors or any other Viatrix Inc. product.

### Patient Training Video

*How to Use EpiPen<sup>®</sup> (epinephrine injection, USP) Auto-Injector*

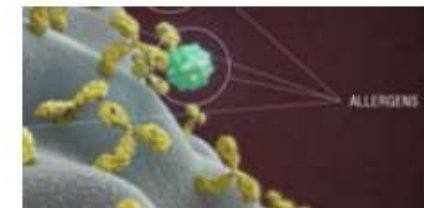
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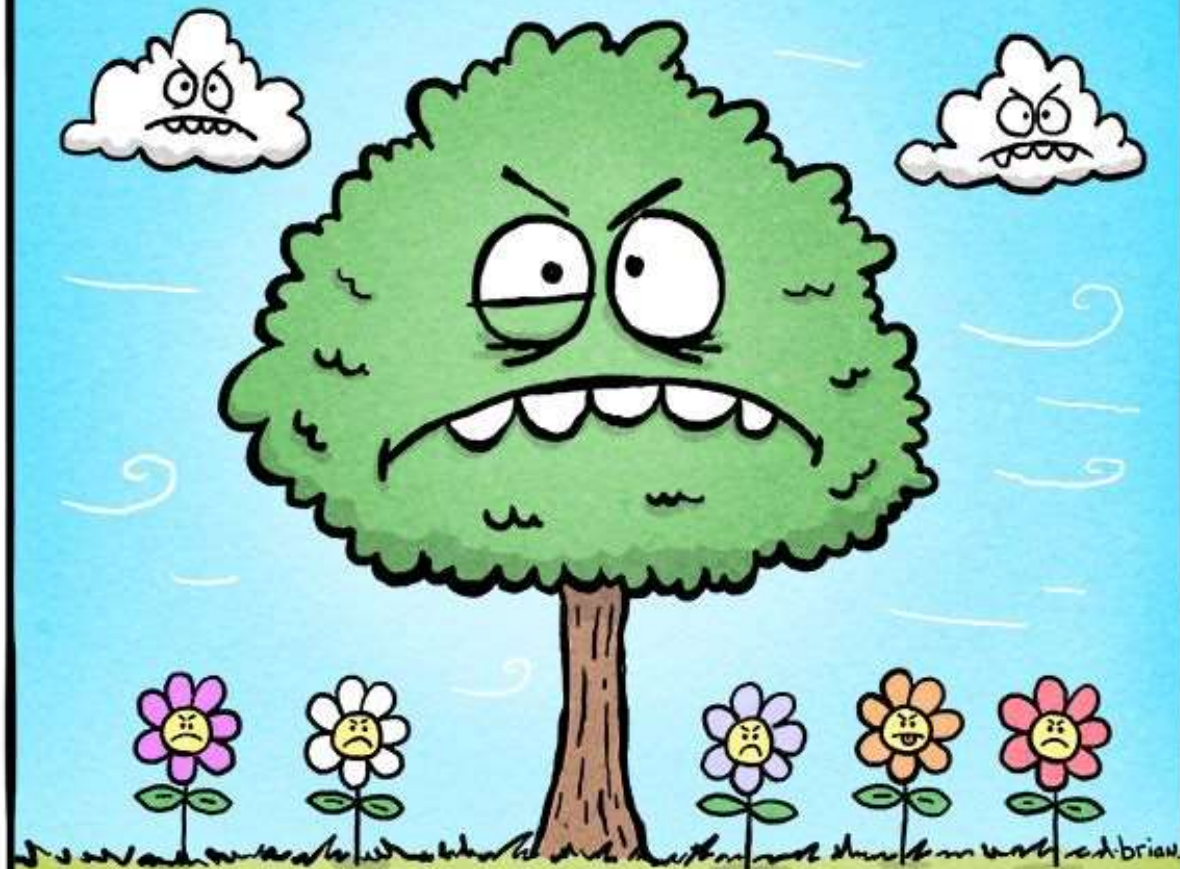
[Learn more here >](#)



There's only one recommended first line treatment for anaphylaxis.

[Epinephrine, not antihistamines >](#)

# ALLERGIES



BECAUSE NATURE  
KINDA HATES YOU