

# Epinephrine Auto-Injector Training

The Auto-Injector e-learning course is an interactive tool developed to educate, assist, and support our local school boards, schools, and staff who have direct contact with students at risk for anaphylaxis. This course assists schools with the implementation of Sabrina's Law (Sabrina's Law– An Act to Protect Anaphylactic Pupils, 2006).

**Course material supplied by the Windsor-Essex County Health Unit.**

The course content increases knowledge of the issues surrounding anaphylaxis and prepares staff to respond appropriately in the event of an emergency.



Understanding Anaphylaxis



Signs and Symptoms of Anaphylaxis



Prevention and Emergency Protocol



Administering an Auto-Injector



Conclusion

# Understanding Anaphylaxis

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Anaphylaxis is a serious allergic reaction that is rapid in onset and may cause death.

Because of the unpredictability of reactions, early symptoms should never be ignored, especially if the person has suffered an anaphylactic reaction in the past. If a person with allergies expresses any concern that a reaction might be starting, they should be taken seriously. When a reaction begins, it is important to respond immediately.

Select the statement that is **NOT** correct:

Anaphylaxis is a serious allergic reaction that:

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- ☐ Is slow in onset and is not life threatening.
- ☐ Is a medical emergency.
- ☐ In rare cases may occur several hours after exposure to the allergen.
- ☐ Is rapid in onset and may cause death.

SUBMIT



## **What Causes Anaphylaxis?**

An allergen is a substance capable of causing an allergic reaction. Upon first exposure, the immune system treats the allergen as something to be rejected and not tolerated. This process is called sensitization.

Re-exposure to the same allergen in the now sensitized individual may result in an allergic reaction which, in its most severe form, is called anaphylaxis.

## The Path to Anaphylaxis

Although many substances have the potential to cause anaphylaxis, the most common triggers are foods and insect stings (e.g., yellow jackets, hornets, wasps, and bees). Medications and exposure to latex can also cause life-threatening allergic reactions. In some individuals, a food that wouldn't normally do so can trigger anaphylaxis if ingestion is followed by exercise. In others, anaphylaxis may be triggered by exercise alone. Occasionally the cause is unknown (idiopathic).



Gloves

An \_\_\_\_\_ or trigger is a substance in the environment that causes the allergic reaction.

- ☐ Anomaly
- ☐ Allergen

- ☐ Aroma
- ☐ Anaphylactic episode

SUBMIT

## Common Allergens

Common allergens (triggers) include certain foods, insect stings and bites, medications, and other causes.



Click on the + sign to read more !

### Foods



- Peanuts
- Tree nuts (almond, cashew, hazelnut, pistachio)
- Milk
- Egg
- Fish or Shellfish
- Sesame
- Soy
- Wheat

- Mustard

### Medications —

- Penicillin
- Sulfa antibiotics
- muscle relaxants

### Insect Stings/ Bites —

- bees
- hornets
- yellow jackets

### Other —

- latex
- exercise

Which of the following are the most common triggers for an allergic reaction.

- ☐ Latex
- ☐ Penicillin and muscle relaxants
- ☐ Peanuts and tree nuts

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## Food Allergens

**Note: It is the protein in a food, not the smell, which causes an allergic reaction.**

The odour of an allergenic food, such as peanut butter, will not cause an allergic reaction. However, inhaling a significant amount of airborne peanut protein, (e.g. the powder of food being blown into the air or the food entering the air from crushing/grinding) could potentially cause an allergic reaction (Upton, J, 2019).

## Prevalence of Anaphylaxis

While the exact prevalence is unknown, it has been estimated that about 700 000 (up to 2 percent) of Canadians are at risk of anaphylaxis from food and insect allergy (Canadian Society of Allergy and Clinical Immunology, 2016).



It is estimated that food allergies affect as many as 6% of young children in Canada (Heath Canada, 2021)

## Outgrowing Allergies

Do children outgrow food allergies? Many children outgrow food allergies, especially if the allergy started before age 3. Allergies to milk, for example, will usually go away.

However, some allergies, like those to nuts and fish, probably won't go away. ([Food allergy vs. food intolerance: What is the difference and can I prevent them? | Caring for kids](#))

True or False?

Food allergy only occurs in children, not adults.

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☐ True

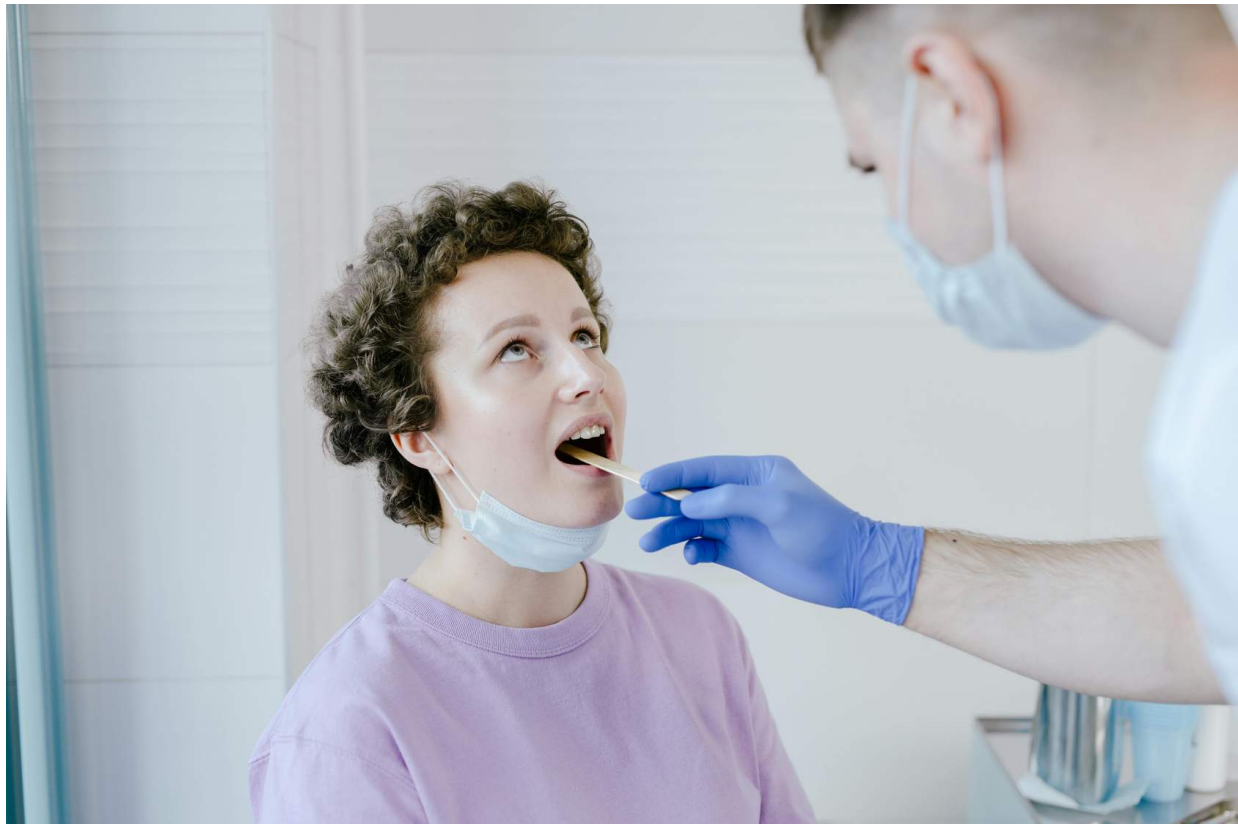
☐ False

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How is a Diagnosis made?

Often the first to identify the allergic patient are family physicians and emergency room doctors. They will:

- Discuss anaphylaxis.
- Discuss avoidance strategies.
- Prescribe epinephrine auto-injector.
- Refer to an allergist who will:
- Complete a detailed personal history.
- Confirm via skin and/or blood tests.



## What to do?

Patients diagnosed as being at risk for anaphylaxis are instructed that absolute avoidance of the allergenic substance is necessary to avoid future reactions. They should

carry an epinephrine auto-injector at all times and should wear medical identification such as a **MedicAlert** bracelet.



CONTINUE

# Signs and Symptoms of Anaphylaxis

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## What are the Signs and Symptoms of Anaphylaxis?

An anaphylactic reaction can include a number of symptoms, which may appear alone or in any combination regardless of the triggering allergen.

Symptoms vary from person to person and even from episode to episode in the same person.

Symptoms of anaphylaxis generally include two or more of the following body systems:

- 1 Skin
- 2 Respiratory system
- 3 Gastrointestinal system
- 4 Cardiovascular system
- 5 Other

- Hives
- Welts
- Swelling (face, lips, tongue)
- Itching
- Warmth
- Redness
- Rash



\* It is important to note that anaphylaxis can occur without hives.

## Respiratory Symptoms

- Nasal congestion
- Hay fever-like symptoms (runny itchy nose, watery eyes, sneezing)
- Coughing
- Hoarseness
- Trouble swallowing or speaking
- Throat tightness
- Wheezing
- Shortness of breath

- Chest pain/tightness

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3

### **Gastro-Intestinal Symptoms**

- Nausea
- Vomiting
- Diarrhea
- Abdominal pain or cramps

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### **Cardiovascular Symptoms**

- Pale or blue skin colour
- Drop in blood pressure
- Weak or rapid pulse
- Dizzy or light-headed
- Cold or clammy skin
- Passing out
- Shock

## Other Symptoms

- Itching or tingling sensation in mouth
- Metallic taste
- Anxiety
- Feeling of 'impending doom'
- Headache
- Uterine cramps

## Warning: Most Dangerous Symptoms

The most dangerous symptoms of an allergic reaction involve:

**Breathing difficulties** caused by swelling of the airways (including a severe asthma attack in those who have asthma).

**A drop in blood pressure** indicated by dizziness, lightheadedness, feeling faint or weak, or passing out.

**Either can lead to death if untreated.**



Heavy breathing

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## Allergies and Asthma

Asthma sufferers who are also diagnosed with life-threatening allergies are more susceptible to severe breathing problems when experiencing an anaphylactic reaction. It is extremely important for asthmatic patients to keep their asthma well controlled.



In cases where an anaphylactic reaction is suspected but there's uncertainty whether or not the person is experiencing an asthma attack, **epinephrine should be used first**. Epinephrine can be used to treat life-threatening asthma attacks as well as anaphylactic reactions.

True or False?

Those who suffer from both asthma and allergy are at increased risk of a severe reaction.

When anaphylaxis is suspected in someone who also has asthma, epinephrine should be given first.

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☐ True

☐ False

SUBMIT

## Epinephrine

Epinephrine is the drug of choice to treat an anaphylactic reaction and needs to be given early in the course of a reaction.

## Sabrina's Law: An Act to Protect Anaphylactic Pupils

One notable case was Sabrina Shannon who died when epinephrine administration was delayed. Her death resulted in *Sabrina's Law: An Act to Protect Anaphylactic Pupils*, which

calls for comprehensive anaphylaxis management plans in schools along with staff training.

True or False?

Risk of a severe reaction is increased when use of epinephrine is delayed.

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☐ True

☐ False

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### Know the Signs and Symptoms

It is extremely important that all patients, parents, teachers, and caregivers know the signs and symptoms of anaphylaxis and the correct use of emergency medication.

True or False?

Anaphylaxis is a severe allergic reaction with multiple symptoms involving one or more body systems (e.g., skin, respiratory, gastrointestinal, and cardiovascular).

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☐ True



False

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## Heart Disease and High Blood Pressure

People with heart disease or high blood pressure should speak to their doctors about their medications and their need for epinephrine. Some blood pressure and cardiac medications (e.g., beta-blockers, ACE inhibitors) may interfere with the action of epinephrine and worsen the allergic reaction.



## How Does Epinephrine Work?

Epinephrine reverses symptoms of an anaphylactic reaction by:

- Decreasing mucous production.
- Opening the airways.
- Improving blood pressure.
- Accelerating the heart rate.

CONTINUE

# Prevention and Emergency Protocol

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## Avoidance strategies include:

- adult supervision of young children at meals.
- avoiding foods that are triggers.
- avoiding the use of food as a reward.
- proper hand washing.
- not sharing food or utensils.
- always reading food labels as well as craft supply labels.
- requiring an ingredient list for foods brought into the school.
- being aware of possible cross contamination.
- keeping desks and work surfaces clean.
- precautions during special events or field trips.
- monitoring the school yard for insect nests.
- keeping outdoor garbage cans covered.



avoiding use of latex products such as bandages or gloves in first aid kits.

Strategies to use in the prevention of an allergic reaction should include all BUT (select one):

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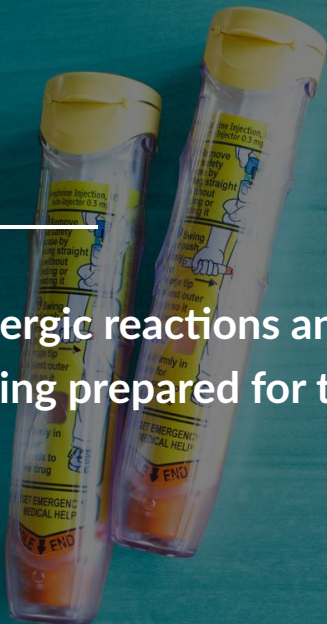
- ☐ No sharing of food, utensils, or containers.
- ☐ Requiring ingredient lists for foods brought into the school.
- ☐ Using food as a reward.
- ☐ Allowing children adequate time to wash their hands before and after eating.
- ☐ Adult supervision of young children at meals.

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## Be Prepared

Despite best avoidance efforts, allergic reactions can and do happen. Treatment protocols including an Emergency Treatment Plan and training in the use of an epinephrine auto-injector need to be in place. All persons at risk for anaphylaxis and

their relatives, caregivers and school personnel must be prepared to respond in an emergency.



Allergic reactions and anaphylaxis are not always predictable. Being prepared for the unexpected is crucial.

### Be “allergy-safe” vs. “allergen-free.”

The Emergency Treatment Plan serves to reduce the risk of exposure to allergenic substances and helps school communities prepare for an emergency situation. It should not imply a guarantee (e.g., peanut-free environment) or that there is zero risk. School communities should strive to create an environment that is described as "allergy-safe" vs. "allergen-free."

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## Emergency Treatment Plans

Emergency Treatment Plans should:

- Help create safer environments for allergic individuals.
- Help reduce the risk of exposure to allergens.
- Prepare school communities for an emergency situation.
- Be updated on a regular basis.

True or False?

A school anaphylaxis plan should provide an allergen-free environment to guarantee zero risk.

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☐ True

☐ False

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## Use Epinephrine First

In studies of individuals who have died as a result of anaphylaxis, epinephrine was underused, not used at all, or administration was delayed.



The course of an anaphylactic episode cannot be predicted with certainty and may differ from one person to another and from one episode to another in the same person.

It is recommended that epinephrine be given at the start of a known or suspected anaphylactic reaction.

While they will do no harm when given as additional or secondary medication, antihistamines have not been proven to stop an anaphylactic reaction.

The main benefit of antihistamines is in treating hives or skin symptoms.

**Epinephrine is the only treatment shown to stop an anaphylactic reaction.**

True or False?

Antihistamines and asthma medications should be used as the first line treatment for an anaphylactic reaction, and epinephrine should only be used when other medications have proven to be ineffective.

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☐ True

☐ False

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## Seek Medical Attention

Patients should be transported to hospital by paramedics or local emergency medical services. While epinephrine is usually effective after one injection, the symptoms may recur and further injections may be required to control the reaction.

Repeat attacks have occurred hours later without additional exposure to the allergen. Therefore, it's recommended that a patient suffering from an anaphylactic reaction be observed in an emergency facility for an appropriate period because of the possibility of either a "biphasic" reaction (a second reaction) or a prolonged reaction.

A four hour period of observation is advised, though this time may vary depending on the judgment of the attending physician.

True or False?

Individuals who have received epinephrine should go home for the rest of the day.

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☐ True

☐ False

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## A Second Dose of Epinephrine

A second dose should be given in situations where the allergic reaction isn't under adequate control; that is, the reaction is continuing or getting worse. Signs that the reaction is not under control are that the patient's breathing becomes more difficult or there's a decreased level of consciousness. Ideally, patients should have access to a back-up auto-injector in the event that a second dose is required.

True or False?

A second dose of epinephrine may be administered within 5 to 15 minutes after the first dose IF symptoms have not improved.

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☐ True

☐ False

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## Keep the Blood Circulating

To improve blood circulation, caregivers should lift the person's legs above the level of the heart. The person should be lying down until first responders arrive. If the person feels nauseated or is vomiting, lay them on their side in recovery position. Those who are having trouble breathing should be kept in a sitting position. If the individual is lying down, DO NOT have them sit up or stand suddenly. It is very important that they DO NOT sit up or stand suddenly during an anaphylactic reaction, even after receiving epinephrine. Sudden changes of position may lower their blood pressure and actually worsen their condition, and be life-threatening (Food Allergy Canada, 2023).

True or False?

Individuals experiencing anaphylaxis should lie down with their feet elevated above their heart.

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☐

True

☐

False

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## Assistance from Others is Crucial

Individuals may not be physically able to self-administer epinephrine when experiencing a reaction. They may be anxious about the injection, downplay the seriousness of a reaction, or may not want to draw attention to themselves. They may also be confused. Assistance from others is crucial in these circumstances.

True or False?

The individual should NOT be responsible for self-administration of their epinephrine auto-injector.

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☐ True

☐ False

SUBMIT

## General Recommendations

- Schools must have a comprehensive emergency plan in writing.
- Parents should educate children on avoidance strategies.
- Parents must provide school with an up-to-date epinephrine auto-injector.

- Labelled auto-injectors should be kept in a readily accessible location (unlocked).
- Children should carry their own auto-injector when age appropriate (usually age six or seven).
- Children should wear medical identification which clearly identifies their allergy.
- Staff should have a minimum of annual training with a mid-year refresher training if possible.

CONTINUE

# Administering an Auto-Injector

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## Take Action

What to do in an Emergency:

- Administer epinephrine auto-injector
- Call 911. Tell them someone is having a life-threatening allergic reaction
- Give a second dose (if available) in 5-15 minutes if the reaction continues or worsens
- Tell emergency personnel what was given and the time it was administered
- Give any used auto-injectors to emergency personnel
- Assure that the individual is transported safely to the hospital
- Call the individual's parent, guardian or emergency contact person

## Remember

- Symptoms during a reaction are not predictable.
- Warning signs are not always present before serious reactions occur.
- Epinephrine should be given at the first sign of a known or suspected anaphylactic reaction.
- Epinephrine can be used to treat potentially life threatening allergic reactions and severe asthma attacks.

Which statement is INCORRECT when treating a severe allergic reaction?

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- ☐ Administer epinephrine right away.
- ☐ Have the student lie down unless vomiting or having trouble breathing.
- ☐ A student should be taken to the hospital following a severe allergic reaction.
- ☐ Leave the student alone in a quiet room to recover following the reaction.
- ☐ Call 9-1-1.

SUBMIT

### What is Epinephrine?

Epinephrine is the drug form of the hormone adrenaline that the body produces naturally.



Pfizer Canada reports that they have supply of both EpiPen 0.3 mg and EpiPen Jr (0.15 mg) auto-injectors, but there are manufacturing challenges which may result in tighter supplies.

Epinephrine is the drug form of the hormone adrenaline that the body produces naturally.

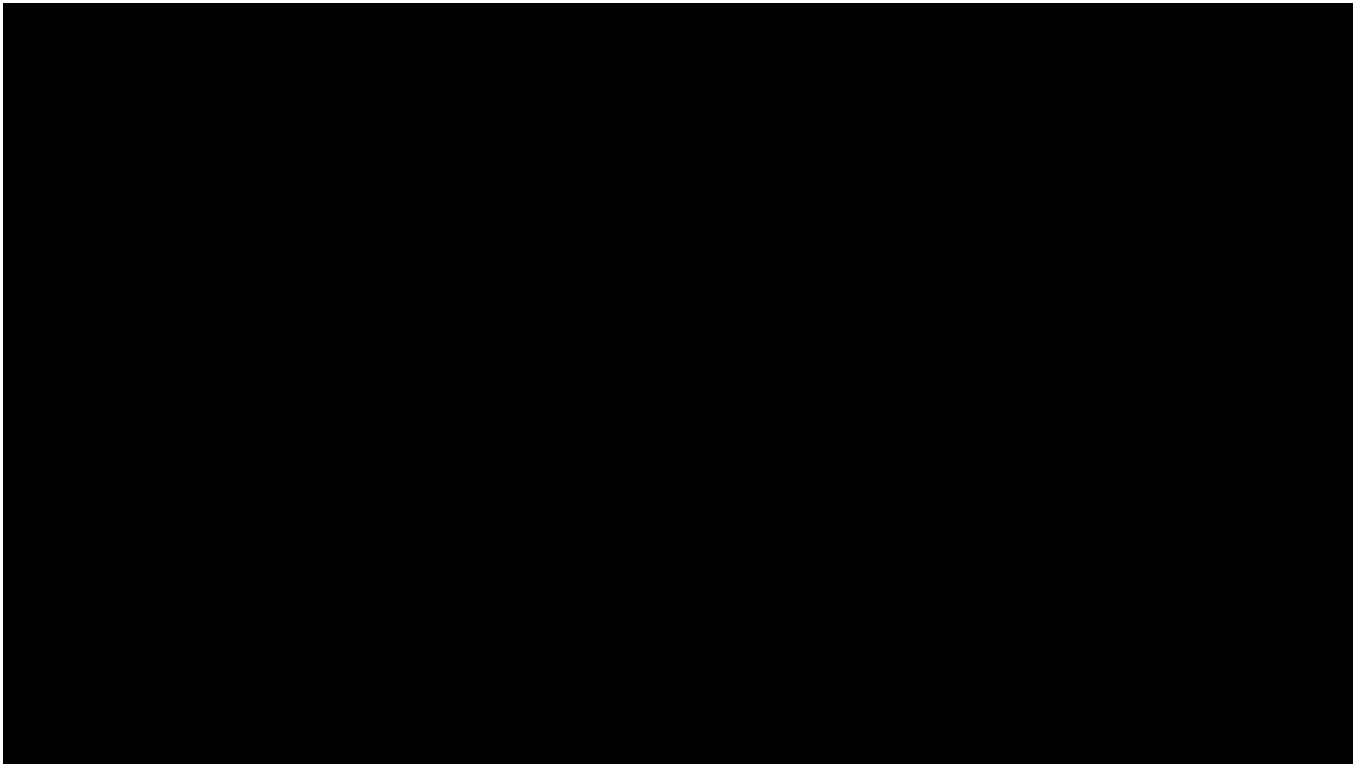
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☐ True

☐ False

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**How to Use EpiPen®**



- Do not remove the blue safety cap until ready to use
- When removing the blue safety cap, pull it straight up. DO NOT bend or twist it.
- Once the safety is removed, DO NOT touch the orange (injection) end.

The correct place to use the epinephrine auto-injector is:

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- ☐ In the thigh
- ☐ In the arm



In the hip

SUBMIT

## How to Use the EpiPen® or EpiPen® Jr. Auto-Injector

After removing the EpiPen® Auto-Injector from its carrier tube:

1. Hold firmly with orange tip pointing downward (do not place thumb over end of auto-injector).
2. Remove blue safety release.
3. Swing and push orange tip firmly into mid-outer thigh until you hear a “click.”
4. Hold on thigh for several seconds.
5. When the auto-injector is removed, the orange needle cover automatically extends to cover the injection needle.
6. Return auto-injector to its carrier tube.
7. Give any used auto-injectors to emergency responders

## After Administration of Epinephrine

- Patients should seek medical attention immediately or go to the emergency room (ER).
- Biphasic (or secondary) reactions may occur, so patients should remain under medical supervision for at least 4 hours after an episode of anaphylaxis.
- For the next 48 hours, patients must stay within close proximity to a healthcare facility or where they can call 911.
- Patients should have emergency medication available after discharge from the ER as biphasic reactions can occur up to 72 hours later.

CONTINUE

## Conclusion

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