


**ThinkAskLearn**  
Health Professional Education

**Anaphylaxis Anxiety**  
**Calming the Nervous**

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[www.thinkasklearn.com.au](http://www.thinkasklearn.com.au)



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**Could you do it?**

- You are working in an isolated nursing post
- 200 kms from a rural hospital
- There is a volunteer ambulance service available in town (Not paramedic)
- No other clinical staff available
- A doctor is available by phone – GP from Hospital
- You are at home relaxing....



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**Could you do it?**

- You get a call at 2000hrs to attend severe respiratory distress
- You arrive in less than 5 mins
- On arrival
  - 20 year old girl
  - Severe respiratory distress
  - Audible wheeze and stridor
  - Pale,
  - Cyanotic



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### Could you do it?

- Unable to speak – “unable to breathe”
- Restless, Agitated
- Tachycardic P 128
- O<sub>2</sub> Sats 80%, RR 36
- Boyfriend presents- states she Hx asthma and is allergic to peanuts,
- Just been to the local café for dessert – Sticky date pudding with pistachio nuts



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### Could you do it?

- Oxygen provided
- Given neb – ventolin, atrovent and adrenaline
- Gives IM adrenaline 0.3mg, IM promethazine
- First 5-10 minutes little change
- Then pt deteriorates Sats 90% down to 45%
- 2040hrs - Calls GP from Hospital (200kms away)
- Recommends continue nebs, get IV access and administer hydrocortisone



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### Could you do it?

- 20:55hrs – Sats 65%, Increase in stridor, Bradycardia, worsening distress
- Advised to give 2<sup>nd</sup> dose of adrenaline - 1mg
- Slight improvement
  - Able to gain access
  - Gave hydrocortisone
- 21:25 – Deteriorates again
  - Sats 75%, HR 45
- Advised 1mg IV Adrenaline – Same given



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### Could you do it?

- No real improvement
- Dr advises - Attempt to perform surgical airway
- 4 attempts are made
- 5<sup>th</sup> attempt with biro
- Patient unable to be resuscitated further
- Resuscitation ceased at 21:50



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### What did we learn?

- Most health care professionals under prepared for situations
- Avoidance (Scared) of adrenaline use in anaphylaxis
- Increase education to patients with anaphylaxis when presenting to ED's
- Encourage use of Epi Pen by patients with previous anaphylactic reactions ('too bulky')



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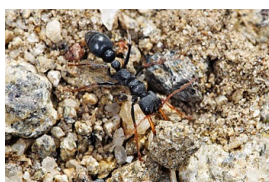
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### Which kills more people?



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### How common is Anaphylaxis?

- 'Uncommon but not rare'
- 8.4- 21 per 100 000 patient years
- High as 1 in 50 in specific areas
- 1 in 170 school children (self report)
- Death 1 per 3 million people per year
- In ED, 1 death in 200-300 patients treated with anaphylaxis

McLure et al, 2022



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### Causes of Anaphylaxis in a Nutshell

- Insect stings: most commonly honeybee, Australian native ants, wasps
- Foods: most commonly peanuts, tree nuts, egg, seafood, cows milk, dairy products, seeds
- Medications: most commonly antibiotics, non-steroidal anti-inflammatory drugs
- Unidentified (no cause found)



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### Less common but still real

- Physical triggers (eg, exercise, cold)
- Biological fluids (eg, transfusions, immunoglobulin, antivenoms, semen)
- Latex
- Tick bites
- Hormonal changes: breastfeeding, menstrual factors
- Dialysis membranes (haemodialysis- associated anaphylaxis)
- Hydatid cyst rupture
- Aeroallergens: domestic/laboratory animals, pollen
- Food additives: monosodium glutamate, metabisulfite, preservatives, colours, natural food chemicals
- Topical medications (eg, antiseptics)



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## Pathophysiology of Anaphylaxis

- Allergen sensitisation – Allergy antibody (IgE) produced
- IgE attaches to Mast cells in skin, GI tract, resp system and peripheral blood basophils
- Subsequent exposure – Rapid mast cell activation
- Histamine release and other inflammatory mediators released
- Causes increased vascular permeability, smooth muscle spasm, mucosal oedema and inflammation



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## Defining Anaphylaxis

- Any **acute onset illness** with **typical skin features** (urticarial rash or erythema/flushing, and/or angioedema), **PLUS** involvement of **respiratory** and/or **cardiovascular** and/or persistent severe **gastrointestinal** symptoms. OR
- Any **acute onset** of **hypotension** or **bronchospasm** or **upper airway obstruction** where anaphylaxis is considered possible, even if typical skin features are not present.

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## Signs and Symptoms

- **Mild or moderate allergic reactions**
- Swelling of lips, face, eyes
- Hives or welts
- Tingling mouth
- Abdominal pain, vomiting (these are signs of a severe allergic reaction to insects)



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Urticarial Rash



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Urticarial Rash



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17

Urticarial Rash



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18

Peanut urticarial rash



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19

Severe Allergic Reaction



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Ace inhibitor Allergic Reaction



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More Significant Signs

- Watch for any one of the following signs of anaphylaxis:
- Difficult/noisy breathing
- Swelling of tongue
- Swelling/tightness in throat
- Difficulty talking and/or hoarse voice
- Wheeze or persistent cough
- Persistent dizziness or collapse
- Pale and floppy (young children)



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Severe Hypotension



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Severe Hypotension



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## Anaphylaxis and Death

- Linked to poorly controlled asthma who delay treatment of adrenaline
- Death occurs within 30 mins of food based trigger
- Insect stings within 10-15 mins
- Drug interaction with 5 mins
- No deaths occur after 6 hrs of contact with trigger

Nolan et al, ERC 2020



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## Treatment

- ABCDE approach for all
- Principles of management are essentially the same for all age groups
- All patients should be monitored in a high care environment
- Min monitoring includes:
  - NIBP, SpO<sub>2</sub>, 3 lead ECG,



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## First line Treatment

- Patient positioning
  - Avoid standing if possible
  - Airway problems may prefer to sit up
  - Lying flat may improve circulation
  - Raised legs \*\*\*\* STOP!!!!



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## First Line Treatment

- Remove the trigger
  - Stop the medication/bloods
  - Remove the bee sting



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## First Line Treatment

- If in cardiac arrest
  - Start CPR
  - Usual protocol
- Airway obstruction
  - BVM with Hi Flow oxygen
  - Cricothyroidotomy
  - Call for help early



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## First Line Treatment

- Adrenaline
  - No randomised controlled trials
  - Consistent anecdotal evidence / End of needle effect
- Alpha-receptor agonist,
  - Peripheral vasoconstriction
  - Reduces oedema.
- Beta-receptor activity
  - dilates the bronchial airways
  - increases the force of myocardial contraction
  - suppresses histamine and leukotriene release
- Beta-2 adrenergic receptors on mast cells
  - that inhibit activation and attenuates the severity of IgE-mediated allergic reactions



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### First Line Treatment

- Adrenaline seems to work best when given early after the onset of the reaction
- But it is not without risk, particularly when given intravenously.
- Adverse effects are extremely rare with correct doses injected intramuscularly (IM)



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### First Line Treatment

- Problems with IV adrenaline in the non arrest patient
  - Crushing chest pain
  - Myocardial vasoconstriction & damage
  - Tachycardia
  - Arrhythmia
  - Severe hypertension
  - Intra-cerebral bleed



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### First Line Treatment

- Intramuscular Adrenaline
  - There is a greater margin of safety
  - It does not require intravenous access
  - The IM route is easier to learn
- Use anterolateral thigh muscle



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## First Line Treatment

- 10mcg/kg up to 500mcg of 1:1000
- 1 EpiPen or 1 AnaPen

Nolan et al, ERC 2023 ASCIA 2023



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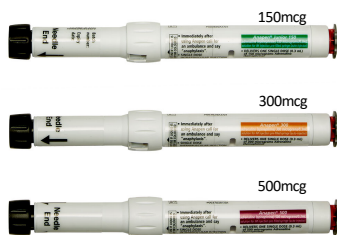
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## Anapen vs EpiPen

150mcg EpiPen® Jr 300mcg EpiPen®



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## First Line Treatment

- 10mcg/kg up to 500mcg of 1:1000
- 1 EpiPen or AnaPen
- Repeat the IM adrenaline dose if there is no improvement in the patient's condition
  - About 10% will need 2 doses
- Give 2<sup>nd</sup> dose after 5mins
  - Set a watch, don't hesitate

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www.aspacia.com  
www.aspiatras.com

# ACTION FOR ANAPHYLAXIS





Photo:


Name	Date of birth: 00/00/0000
Confidential (signature)	
Emergency contact(s)	
1	Mobile
2	Mobile
Plan prepared by the person in charge, in consultation with the person responsible, according to the plan	Medicines or some premedication to be given
Signature	Date: 00/00/0000
Additional notes	

### How to give adrenaline (epinephrine) injectors


**Epipen®**



Hold the pen at the base  
with your thumb and index  
finger. Hold the cap with  
your thumb. Pull the cap  
off the needle.




Push the needle into the  
thigh. Push the button  
down. Hold the pen for  
10 seconds.




Remove the needle from  
the thigh. Push the  
button down. Hold the  
pen for 10 seconds.  
Dispose of the pen in a  
sharps container.

### MILT to moderate allergic reactions

**ADRENALINE INJECTOR**




Hold the injector at the  
base with your thumb and  
index finger. Push the  
button down. Hold the  
injector for 10 seconds.




Remove the needle from  
the thigh. Push the  
button down. Hold the  
injector for 10 seconds.  
Dispose of the injector in  
a sharps container.

### ADRENALINE INJECTOR




Hold the injector at the  
base with your thumb and  
index finger. Push the  
button down. Hold the  
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injector for 10 seconds.



Remove the needle from  
the thigh. Push the  
button down. Hold the  
injector for 10 seconds.  
Dispose of the injector in  
a sharps container.

### SIGN OF ANAPHYLAXIS (SEVERE ALLERGIC REACTIONS)





Watch for **ANY ONE** of the following signs:

- Difficulty or noisy breathing
- Swelling of tongue
- Swelling of throat
- Swelling of face
- Wheezes or persistent cough

### ACTIONS FOR ANAPHYLAXIS

**1. Lay person (PEP) - Do NOT allow them to stand or walk**

- 1. If anemic/sick or pregnant, place in recovery position - on left side if pregnant
- 2. Breathing is difficult allow them to lie on their back
- 3. If not breathing, start CPR
- 4. Hold young children flat, not upright

### 2. GIVE ADRENALINE INJECTOR

- 2. Phone ambulance - 090 000 0000 or 112 (EU)
- 3. Phone family/emergency contact
- 3. Transfer to hospital as soon as response after 5 minutes
- 4. Transfer person to hospital for at least 6 hours of observation

### IF IN DOUBT GIVE ADRENALINE INJECTION


Commence CPR at any time if person is unresponsive and not breathing normally.

### ADRENALINE GEL ADRENALINE INJECTOR (FIRE) and those without access to a pharmacy

Adrenaline gel is available and acting in the same way as adrenaline solution. It is not a medicine, but a medicine. It is not a medicine, but a medicine. It is not a medicine, but a medicine.

### ADRENALINE GEL ADRENALINE INJECTOR (FIRE) and those without access to a pharmacy

Adrenaline gel is available and acting in the same way as adrenaline solution. It is not a medicine, but a medicine. It is not a medicine, but a medicine. It is not a medicine, but a medicine.



HEALTH CARE PROFESSIONAL, please print your name and position. Continue to fill the other part for the person with the allergic reaction.

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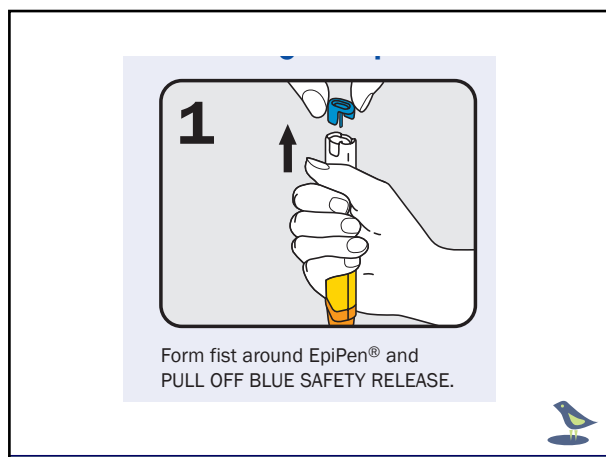
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### Problems with Autoinjectors

- Lack of use of epinephrine auto-injectors (common)
- Not available for purchase in many countries
- Not prescribed by physician
- Not affordable
- Prescription not filled or picked up
- Not accessible when anaphylaxis occurred
- Not used because:
  - Patient used another medication, e.g. H<sub>1</sub>-antihistamine or asthma puffer\*
  - Reaction seemed to be mild
  - Reaction seemed to improve quickly
  - Patient was unsure when to inject
  - Patient was afraid to inject
  - Epinephrine was past expiry date
  - Previous systemic allergic reaction improved quickly
- Apparent lack of response to epinephrine (uncommon)
  - Rapid progression of anaphylaxis
  - Empty ventricle syndrome
  - Patient taking another medication that interfered with epinephrine effect
  - Epinephrine injected too late
  - Epinephrine dose too low
    - On a mg/kg basis for body weight of patient
  - Due to auto-injector being past the expiry date
  - Delayed absorption
  - Route of injection not optimal
  - Site of injection not optimal
  - Epinephrine injected using incorrect technique, e.g. not enough force
  - Adverse reaction to sodium metabisulfite preservative in the epinephrine solution (rare)

Simmons et al 2010

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## Management of Digital Injection

- Adrenaline potent vasoconstrictor
- 'Fingers don't fall off' Fortuna
- Observe for pain, decreased cap refill, ischaemia
- If ongoing longer than 2 hrs, then consider treatment
  - GTN Paste, phentolamine



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## More info – Free E-learning

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## What did we learn?

- Most health care professionals under prepared for situations
- Avoidance (Scared) of adrenaline use in anaphylaxis
- Increase education to patients with anaphylaxis when presenting to ED's
- Encourage use of Epi Pen by patients with previous anaphylactic reactions ('too bulky')



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ASCIA – Free E-learning





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