

Acute anaphylaxis: What to do in an emergency

It has been estimated that at least one quarter of school children in Europe are affected by allergies, which may affect quality of life and school performance and even put them at risk of severe allergic reactions.

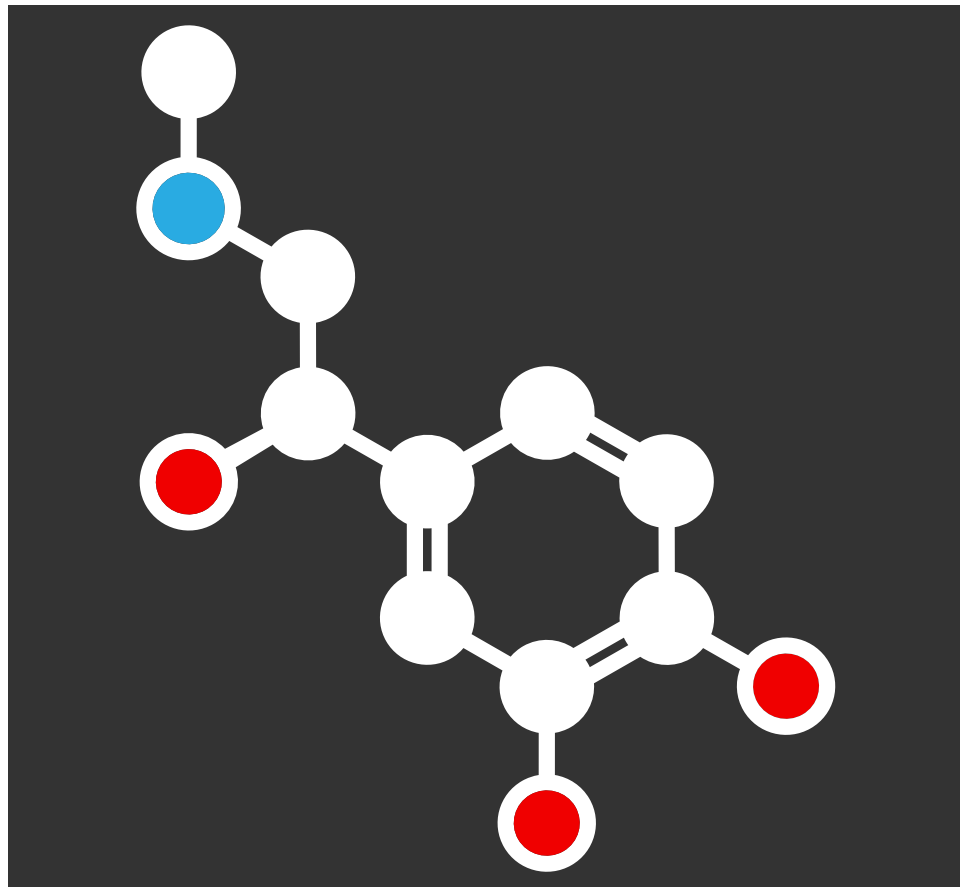
An estimated one quarter of European school children are affected by allergies, which can reduce quality of life and impair school performance and may put them at risk of severe reactions and even death, in rare cases (Muraro et al, 2010). Allergy is a multi-system disorder, and children may have several co-existing diseases, such as allergic rhinitis, asthma, eczema and food allergy. Muraro et al (2010) found that although severe food allergy reactions may occur for the first time at school, 20% of food allergy reactions occur in the school setting and up to two thirds of schools have at least one child at risk of anaphylaxis, many of them are poorly prepared. Furthermore, they stated that 'a cooperative partnership between doctors, community and school nurses, school staff, parents and the child is necessary to ensure allergic children are protected. Schools and doctors should adopt a comprehensive approach to allergy training, ensuring that all staff can prevent, recognise and initiate treatment of allergic reactions' (Muraro et al, 2010).

Clear precautionary measures and excellent liaison between primary health care staff, parents, school nurses and school staff means that anaphylaxis is usually well managed in schools and the vast majority of children affected are able to fully participate in all aspects of school and social life.

What is an allergic reaction?

Allergic reactions occur because the body's

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The administration of adrenaline is part of first-line treatment of anaphylaxis

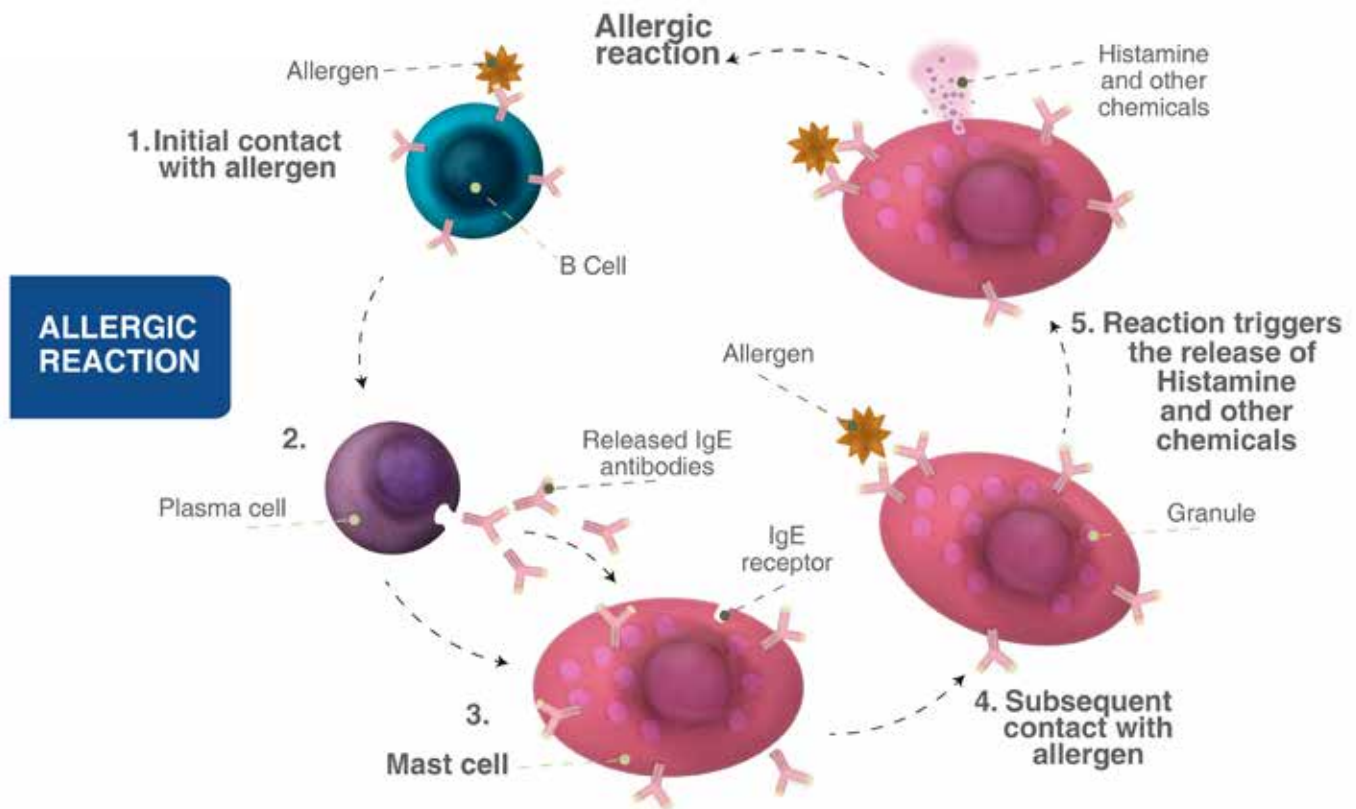
immune system reacts inappropriately to the presence of a substance that it wrongly perceives as a threat. The body does not react to the irritant directly, but reacts to the histamine produced by the body to fight the irritant (Figure 1).

An acute allergic or anaphylactic reaction is caused by the sudden release of chemical substances, including histamine, from cells in the blood and tissues where they are stored (Anaphylaxis Campaign, 2017). 'The release is triggered by the reaction between the allergic antibody (IgE) and the substance (allergen) causing the anaphylactic reaction. This mechanism

is so sensitive that minute quantities of the allergen can cause a reaction' (Anaphylaxis Campaign, 2017) (see Figure 2).

While small amounts of histamine in our system are important for various vital functions of the body, larger amounts of histamine being released lead to symptoms such as sneezing, blocked nose, itching etc. These are the sort of symptoms often associated with hay fever and mild allergies.

Life-threatening and systemic allergic reactions are caused by the body producing even more histamine, which dilates small blood vessels and causes them to leak,



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Figure 1. Allergic reaction

resulting in swelling in areas such as the lungs—leading to severe breathing problems. Sufferers may have a rash and be flushed due to the increased blood supply to the skin. Their blood pressure could drop dramatically and they may collapse.

The more times someone is exposed to the substance they react to, the quicker and more severe the reactions may be (MedlinePlus, 2016).

Risk factors

Risk factors for anaphylaxis can include:

- People who have had a severe reaction in the past, such as swelling in the throat, breathing difficulties (even mild) or faintness—whatever the cause. This may make them prone to further more severe reactions.
- People with asthma as well as allergies, particularly if that asthma requires regular preventer treatment—this is now recognised as a major risk for anaphylaxis.
- People who have had an allergic reaction

to a tiny amount of peanut or a tree nut, or a reaction has occurred with just skin contact, this could indicate that they are extremely sensitive to this particular allergen and greater contact could lead to a more severe attack.

The age of the person with the allergy could also be a risk factor. Fatal reactions are very rare, but are more likely to occur between the ages of 17–27 years (Pumphrey, 2004). This is thought to be due to young people gaining independence managing their allergies themselves; possibly being less cautious or subject to peer pressure.

Common triggers

Nuts are the most common triggers for serious allergic reactions. Research has indicated that as many as one in 70 UK children may be allergic to peanuts (Anaphylaxis Campaign, 2015). The peanut is a legume, related botanically to foods such as peas, beans and lentils. Tree nuts are in a different botanical category and include almonds, hazelnuts, walnuts,

cashew nuts, pecans, Brazil nuts, pistachios and macadamia nuts.

Individuals can react to pretty much anything. However, most common causes include foods: such as nuts, sesame, fish, shellfish, dairy products and eggs. Non-food causes can include wasp or bee stings, natural latex, penicillin or any other drugs or injections—including local anaesthetic.

Exercise can also trigger an allergic reaction sometime after the person has been exposed to something that they are allergic to.

Recognising a severe allergic reaction

A reaction can take a variety of forms. People who have reacted one way when exposed to a particular allergen can react differently when exposed to the same trigger again, which is why it is very difficult to predict what a reaction might look like.

Common symptoms include (see Figure 3) (Anaphylaxis Campaign, 2017):

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- Generalised flushing of the skin
- A rash or hives anywhere on the body
- A feeling of anxiety or 'sense of impending doom'
- Swelling of the throat and mouth, and difficulty swallowing/speaking
- Alterations in the heart rate
- Severe asthma attack which isn't relieved by the inhaler
- Acute abdominal pain, violent nausea and vomiting
- A sudden feeling of weakness followed by collapse and unconsciousness.

A patient is unlikely to experience all of the above symptoms. If they don't have a rash associated with the symptoms it could still be an anaphylactic reaction (Allergy UK, 2015). If there is a rapid onset of symptoms in the patient and he or she may have been exposed to an allergen, treat as an anaphylactic reaction (Hammett, 2015).

How to treat anaphylaxis

Acute allergic reactions can be life-threatening and it is vital that all relevant professionals are trained to recognise the problem and know what to do quickly. The Resuscitation Council (UK) (2008)

provides a detailed anaphylaxis algorithm for the treatment of an anaphylactic reaction (see *Further information*).

Adrenaline auto-injectors are prescribed to people believed to be at risk of anaphylaxis. 'Adrenaline acts quickly to constrict blood vessels, relax smooth muscles in the lungs to improve breathing, stimulate the heartbeat and help to stop swelling around the face and lips' (Anaphylaxis Campaign, 2017).

Adrenaline is part of first-line treatment for an acute anaphylactic reaction and works best if it is given as soon as you recognise that someone is having a reaction. To work effectively, it should be administered as quickly as possible.

You should administer the auto-injector, or help the patient administer it him- or herself as quickly as possible. Call for an ambulance stating clearly that the person is having an acute anaphylactic reaction.

An ambulance should be called as soon as an auto-injector has been given. Another injector can be given 5 minutes after the first if there is no improvement (Resuscitation Council [UK], 2008).

There are currently three brands of

adrenaline auto-injectors on the market in the UK (Joint Formulary Committee, 2016):

- Emerade (available in 150µg, 300µg and 500µg doses, the auto-injector is also available with a longer needle length for larger patients)
- EpiPen (available in 150µg and 300µg doses)
- Jext (available in 150µg and 300µg doses).

If a child or young person is prescribed an adrenaline auto-injector, it should be carried with them at all times (or remain easily accessible) and it should be registered with the manufacturer to receive a reminder of when it is going out of date. If prescribed 2 adrenaline injectors as a duo pack, it is necessary to carry both at all times in case a second dose is needed. Family and school staff members should be taught what to do if someone is having an anaphylactic reaction. Videos showing how to use adrenaline auto-injectors are available on the manufacturers' websites.

Administering an auto-injector

Hold the injector in your dominant hand, with the other hand remove the cap, safety

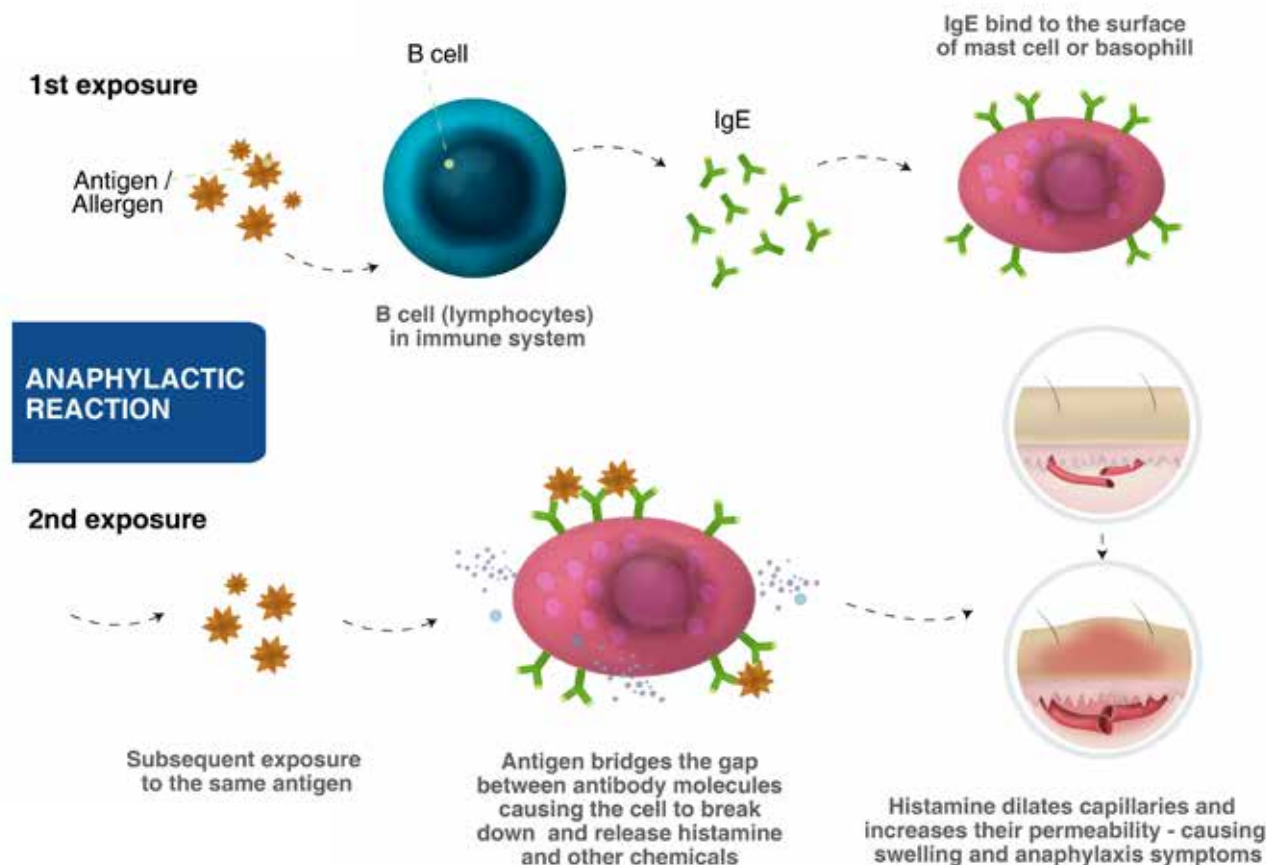


Figure 2. Anaphylactic reaction

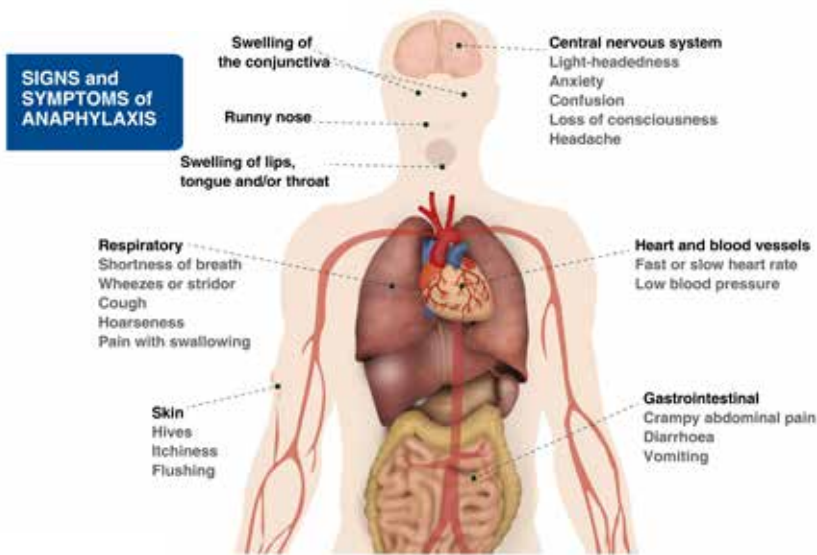


Figure 3. Signs and symptoms of anaphylaxis

release or needle shield. Put the injector firmly into the upper outer part of the person's thigh and hold it in place for 10 seconds. Remove it carefully and rub the injected area. If the person does not start to recover or there are signs that he or she is getting worse, you may need to administer another injector. Always phone an ambulance.

Patient positioning for anaphylaxis

Someone suffering from acute anaphylaxis is also likely to be showing signs of clinical shock. Reassuring the person and positioning him or her appropriately can make an important difference.

If the casualty is very short of breath, they should be encouraged to sit, in an upright position to help breathing, putting something under their knees to help increase circulation can be very helpful.

If the person is not having difficulty breathing, but is flushed and feeling dizzy and/or faint, he or she should lie down with raised legs to help increase circulation to vital organs. The head should be turned to one side if he or she is likely to vomit.

Resuscitation Council (UK) (2008) also recommends that patients who are breathing and unconscious should be placed on their side into the recovery position, and pregnant patients should lie on their left side to prevent caval compression

Patients should be kept warm and dry,

and in the appropriate position until the paramedics arrive.

After an anaphylactic reaction

An ambulance should always be called if someone is showing signs of anaphylaxis and they will usually be admitted overnight for observation in case they have a second reaction several hours after the first.

It is essential to ensure that adrenaline auto-injectors are replaced after use.

Conclusions

It is strongly advised that school staff members and professionals working with children and young people attend a first aid training course to understand what to do in a medical emergency and that their training is kept up to date. **BJSN**

Conflict of interest: Emma Hammett is the founder of First Aid for Life.

The author provides this information for guidance and it is not in any way a substitute for medical advice.

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Further information

First Aid for Life

First Aid for Life is a training provider and offers a number of free resources, including free posters, an emergency check list and advice on what to include in first aid kits available at: firstaidforlife.org.uk 0208 675 4036

Posters on anaphylaxis are available on request, email: emma@firstaidforlife.org.uk

The Anaphylaxis Campaign

<http://www.anaphylaxis.org.uk/>

Auto-injector user guides

Emerade: <http://www.emerade-bausch.co.uk/patient/how-to-use-emerade>

Epipen: <http://www.epipen.co.uk/patients/epipenr-user-guide>

Jext: <http://www.jext.co.uk/jext-video-demonstrations.aspx>

Anaphylaxis guidance

Resuscitation Council (UK) (2008) *Emergency treatment of anaphylactic reactions*. <https://www.resus.org.uk/anaphylaxis/emergency-treatment-of-anaphylactic-reactions/>