

Anaphylaxis: the facts

The aim of this fact sheet

Anaphylaxis (pronounced ana-fill-ax-is) is a severe and potentially life-threatening allergic reaction characteristically affecting more than one body system such as the airways, heart, circulation, gut and skin. Symptoms can start within seconds or minutes of exposure to the food or substance you are allergic to and usually will progress rapidly. On rare occasions there may be a delay in the onset of a few hours. Sometimes you will hear anaphylaxis referred to as an 'anaphylactic reaction'.

If you or your child has suffered anaphylaxis, this fact sheet will help you understand the condition. We aim to provide you with a clear explanation of what anaphylaxis is, what causes it to occur, the symptoms, treatments and other vital facts.

You will also find this information useful if you have suffered an acute allergic reaction that suggests to your doctor that you are now at risk of anaphylaxis, even if you have not had anaphylaxis in the past (an **acute** reaction is one where the symptoms occur suddenly). If you think or know you are in that category, it is important that your case is thoroughly investigated. If you believe this fact sheet is relevant to you, we advise that you see your GP and ask for a referral to an allergy clinic.

A diagnosis of anaphylaxis can be daunting at first but by becoming well-informed, thinking ahead and employing daily coping strategies, people affected find that life can return, almost, to normal.

Throughout the text you will see brief medical references given in brackets. Full references to these documents are listed at the end of the Factsheet.

What are the causes of anaphylaxis?

The common causes of anaphylaxis include foods such as peanuts, tree nuts, milk, eggs, shellfish, fish, sesame seeds and kiwi fruit, although many other foods have been known to trigger anaphylaxis. Very small amounts can cause a reaction in some cases. Non-food causes include wasp or bee stings, natural latex (rubber), and certain drugs such as penicillin. In some people exercise can trigger a severe reaction – either on its own or in combination with other factors such as food or drugs (e.g. aspirin).

Sometimes the cause of the reaction is not found and is then labelled as "idiopathic anaphylaxis" (cause unknown). This does not mean the condition is psychological, though emotional stress can sometimes worsen a reaction.

What are the symptoms of anaphylaxis?

You may notice any of these severe symptoms:

- Swollen tongue
- Hoarse voice
- Difficulty swallowing
- Difficult or noisy breathing, wheeze, persistent cough

There may also be a dramatic fall in blood pressure (anaphylactic shock). The person may become weak and floppy and may have a sense of something terrible happening. This may lead to collapse, unconsciousness and – on rare occasions – death.

In addition to those severe symptoms listed above, there may also be:

- Widespread flushing of the skin
- Nettle rash (otherwise known as hives or urticaria)
- Swelling of the skin (known as angioedema) anywhere on the body.
- Swelling of the lips
- Abdominal pain, nausea and vomiting

These symptoms can also occur on their own, without the more severe ones. Where that is the case, the reaction is likely to be less serious but you should watch carefully in case any of the more severe ones develop.

Why does anaphylaxis occur?

Any allergic reaction (including anaphylaxis) occurs because the body's immune system reacts inappropriately in response to the presence of a food or substance that it wrongly perceives to be a threat. When this happens, chemicals including histamine are released from stores within specialised cells in the blood and tissues. These can cause swelling in the skin, lips, mouth, throat or lower airway causing difficulty in swallowing and/or breathing.

What should I do if I'm worried that my allergy may be severe?

See your GP as soon as possible. Some GPs are well informed about allergy and can make a thorough diagnosis. In most cases, the GP will need to refer you to an NHS allergy clinic.

If your child is the person with the allergy and the trigger is a food, your GP should be guided by the clinical guideline issued by NICE (the National Institute for Health and Care Excellence) on the subject of "Food allergy in children and young people" (CG116). This makes it clear which cases should be referred. The guidance can be accessed here: <http://guidance.nice.org.uk/CG116>

Your GP can find information about the nearest children's allergy clinic from the website of the BSACI (British Society for Allergy and Clinical Immunology): www.bsaci.org.

If you are unsure about the potential severity of your allergy, don't let that deter you from seeking your doctor's advice. It's better to be safe than sorry.

What will an allergy clinic do?

There is no perfect way to judge whether someone's allergy is severe, but the clinic can do several things that will provide clues. Most importantly, they will take a detailed history of previous reactions and other allergic conditions you may have, such as asthma, eczema or hay fever.

Valuable information can also be provided by means of skin prick tests and blood tests. These are not perfect because there can be false negatives and false positives but they help form a better overall picture. It is important to note that the test results can predict the likelihood that a specific food, or substance, will cause an allergic reaction but they do **not** predict how severe such a reaction might be.

Occasionally a "food challenge" may be offered to confirm diagnosis of allergy to a specific food or to rule out food allergy. The person will be asked to eat small amounts of the suspect allergen, gradually increasing the amount until it is clear that he or she is not allergic, or else a reaction occurs. A "food challenge" where a severe, acute reaction is a possibility must **only** be done in an allergy clinic under controlled conditions.

Similarly a challenge, under carefully supervised conditions, may be needed if you are suspected to be allergic to a prescribed drug. This is because standard allergy tests may often not provide a reliable diagnosis.

In our opinion, any allergy diagnosis using questionable techniques such as those advertised on the Internet should be viewed with caution (see Royal College of Pathologists' report, 2002, and NICE guideline CG 116 on the diagnosis and assessment of food allergy in children and young people). The NICE guideline specifically warns against Vega testing, applied kinesiology and hair analysis in the diagnosis of food allergy.

What is the treatment for a severe reaction?

Pre-loaded auto-injectors (sometimes referred to as 'pens') containing adrenaline are prescribed for people believed to be at risk of a severe reaction to foods, latex or stings, or when the cause of the reactions is unknown. Adrenaline is referred to in some countries as epinephrine, which is the internationally recognised term for adrenaline.

Because severe allergic reactions can occur rapidly, the prescribed adrenaline auto-injector must be readily available at all times. The injection must be given as soon as a severe reaction is suspected to be occurring.

An ambulance must be called immediately following the use of the first device, even if there is immediate improvement or if further devices are available. The emergency service operator must be told the person is suffering from anaphylaxis and needs to be attended by paramedics.

If the person's condition deteriorates after making the initial 999 call, a second call to the emergency services should be made to ensure an ambulance has been dispatched.

The matter of how many auto-injectors you should carry is addressed later in this fact sheet ("How many auto-injectors should I carry?").

How does adrenaline work?

Adrenaline acts quickly to open up the airways, stop swelling and raise the blood pressure. To allow it to work most effectively, it should be administered with minimum of delay as soon as a severe reaction is suspected to be occurring.

It is difficult to prove categorically that adrenaline saves lives. Setting up clinical studies with anaphylaxis patients is ethically unacceptable and would be fraught with difficulties because of the speed with which anaphylaxis occurs. This uncertainty was acknowledged in a major review of the medical literature on the use of adrenaline for anaphylaxis (Sheikh et al, Cochrane Collaboration, 2011). Nevertheless, we are aware of a large amount of anecdotal evidence showing that most people dying from anaphylaxis did not receive prompt treatment with adrenaline and further evidence showing that people have recovered quickly when adrenaline was given. In our opinion, this provides strong evidence for the effectiveness of adrenaline.

What auto-injectors are available?

Pre-loaded adrenaline auto-injectors – Emerade®, EpiPen® or Jext® – are available on prescription for those thought to be at risk of a severe reaction.

Emerade® is the most recent single use adrenaline auto-injector to become available. It has a needle guard to protect against needle stick injury. Visit www.emerade-bausch.co.uk

EpiPen® has a spring-loaded concealed needle. The built-in needle protection keeps the needle covered during and after use. Visit www.epipen.co.uk.

Jext® has a locking needle shield which engages after use, designed to protect against needle injury. Visit www.jext.co.uk.

If you carry adrenaline you should check the expiry dates of your auto-injector at regular intervals. The three injector companies listed above all send out expiry date reminders to anyone who registers for this.

In the case of children, you should check whether a growth spurt means the child should move up from a "Junior" device (0.15mg) to a standard strength one (0.3mg). This is necessary once the child reaches 30kg for Jext and Emerade and 25kg for EpiPen.

How many auto-injectors should I carry?

The UK's Medicines and Healthcare Products Regulatory Agency (MHRA) advised in June 2014 that anyone who is at risk of suffering anaphylaxis should always have at least two adrenaline auto-injector devices immediately available for use. The MHRA report said: "It is acknowledged that in some cases, a single injection is not sufficient to achieve a response for a number of reasons, including severity of attack as well as the possibility that a dose has not been effectively administered; a second injection may therefore be needed." The Anaphylaxis Campaign supports this view.

In cases where the risk of anaphylaxis is thought to be low, there is a difference of opinion among members of the medical community. While some allergy specialists agree that two auto-injectors must **always** be immediately available (in line with the MHRA report), others believe it is sufficient to have one device available, arguing that one injection is likely to be enough to treat the symptoms until emergency medical help arrives.

This is a matter that you should discuss thoroughly with your allergy specialist. Advice from the MHRA which may assist you in making the case for additional devices to be prescribed is available from the Campaign website: www.anaphylaxis.org.uk/2015/07/20/anaphylaxis-campaign-welcomes-the-new-mhra-recommendations-regarding-the-use-of-adrenaline-auto-injectors/

In June 2015 The European Medicines Agency (EMA) recommended several measures, including the introduction of more effective educational material, to ensure that patients and carers use adrenaline auto-injectors successfully. The recommendation includes information for patients and for healthcare professionals. The information for healthcare professionals includes a recommendation to prescribe two auto-injectors, which patients should carry at all times. Read the EMA recommendation on their website: www.ema.europa.eu/ema/index.jsp?curl=pages/news_and_events/news/2015/06/news_detail_002351.jsp&mid=WC0b01ac058004d5c1

What increases the risk of a severe reaction?

Although it does not necessarily follow that each reaction is worse than the one before, there are times when you may be particularly vulnerable and at increased risk of a severe reaction. Times when you need to be particularly careful to avoid the culprit allergen include:

- If you have asthma that is poorly controlled
- If you are suffering from an infection, or have recently had one
- If you exercise just before or just after contact with the allergen
- If you are also suffering from aeroallergen symptoms, such as hay fever (see Vetander et al 2011)
- During times of emotional stress
- If you have been drinking alcohol

If you are allergic to a food, the amount eaten is also important as the more you consume, the worse the reaction is likely to be.

Make sure you remain vigilant on special occasions including holidays or times of celebration, such as weddings, parties or religious festivals.

What can I do to protect myself?

1. **If you have asthma** as well as allergies, make sure your asthma is well managed. If you have poorly controlled asthma, there is a higher likelihood of any allergic reaction becoming severe, (Pumphrey and Gowland, 2007, and Noimark et al, 2012). You can take control of your asthma by knowing what medicines to take, how much to take and when to take them. See your GP or asthma nurse for advice on this crucial point and to obtain an asthma management plan to help you self-manage.
2. **If you have been prescribed adrenaline**, carry it at all times – no exceptions.

Whatever you are allergic to, think ahead and write out an emergency allergy action plan. Make sure those around you know how and when to administer the adrenaline. Practise regularly with a trainer device. The BSACI has [Allergy Action Plans](#) for children available to download from its website.

What should I do if I think I am having a severe reaction?

Use your adrenaline device without delay if you believe the reaction is severe, or becoming severe. Dial 999 immediately or get someone else to do it.

The Resuscitation Council (UK) highlights the following symptoms as some of those that should help you recognise a potentially life-threatening reaction (Resuscitation Council, 2008):

Airway: swelling, hoarseness, stridor (a high pitched wheezing sound)

Breathing: rapid breathing, wheeze, fatigue, confusion

Circulation: pale, clammy, faintness, drowsiness

The Resuscitation Council (UK) also points to steady deterioration as a warning sign that may mean an injection of adrenaline is vital. However, variations in symptoms do occur. Your allergist should help you understand in advance what symptoms provide a signal that a severe reaction is occurring. Some people worry that adrenaline may be harmful, but evidence supports the safety of prescribed adrenaline devices so long as they are used correctly (Sheikh et al, Cochrane Collaboration, 2011).

Biphasic anaphylaxis

If you have an anaphylactic reaction, you will need an observation period in hospital after you have recovered. This is because a secondary reaction could possibly occur – known as biphasic anaphylaxis. Most biphasic reactions occur within hours of the initial reaction but rarely they can be more delayed (Lee et al, 2015). The length of the observation period would be for your treating doctor to decide.

Does the risk of anaphylaxis recede over time?

The chances of outgrowing your allergy will depend on many factors including the food or substance you are allergic to. A specialist at an allergy clinic should be able to advise on your particular case.

What is Mastocytosis?

In most cases of anaphylaxis there is a trigger such as a food, drug, insect sting or some other agent, but anaphylaxis can also occur in people who have a very rare condition called Mastocytosis, which is caused by too many 'mast cells' gathering in the tissues of the body. These are the main cells that release histamine and other chemicals involved in allergic reactions, causing symptoms such as a skin rash, itchy skin and anaphylaxis. If you have this very rare condition, it's important that your doctor identifies Mastocytosis as the cause of your symptoms. Further information:

<http://www.nhs.uk/conditions/Mastocytosis/Pages/Introduction.aspx>

Anaphylaxis: the key messages

Anaphylaxis is serious but, in our view, it is manageable. With a calm but committed attitude you will certainly cope. **Remember these important points:**

- If you are at risk, see your GP and ask for a referral to an allergy clinic. Guidelines have been issued by NICE showing what should be expected from your doctor. See www.nice.org.uk/guidance/cg134.
- If you are prescribed an adrenaline injector, learn how to use it and carry it everywhere at all times.
- Do your research. If the allergen that affects you is a food, read food labels scrupulously and ask direct questions wherever food is served.

References

Lee, S., Bellolio, M.F., Hess, E.P., Erwin, P., Murad, M.H., Campbell, R.L. (2015) Time of Onset and Predictors of Biphasic Anaphylactic Reactions: A Systematic Review and Meta-analysis. *J Allergy Clin Immunol Pract.* 3 (3). p. 408-416

Medicines & Healthcare Products Regulatory Agency (2014) 'Adrenaline auto-injectors: a review of clinical and quality considerations' Available from www.mhra.gov.uk/home/groups/comms-ic/documents/websiteresources/con423091.pdf accessed 12 June 2014.

Noimark, L., Wales, J., Du Toit, G., Pastacaldi, C., Haddad, D., Gardner, J., Hyer, W., Vance, G., Townshend, C., Alfaham, M., Arkwright, P.D., Rao, R., Kapoor, S., Summerfield, A., Warner, J.O., Roberts G. (2012) The use of adrenaline auto-injectors by children and teenagers. *Clinical and Experimental Allergy.* 42 (2). p.284-292.

Pumphrey, R.S. & Gowland, M.H (2007). Further fatal allergic reactions to food in the United Kingdom. *Journal of Allergy and Clinical Immunology.* 119. (4). 1018-1019.

Resuscitation Council (UK) (2008) Emergency treatment of anaphylactic reactions: Guidelines for healthcare providers. <http://www.resus.org.uk/pages/faqAna.htm>

Lay Advisory Committee. (2002). Allergy and Allergy Tests: A Guide for Patients and Relatives. *The Royal College of Pathologists (London) June*, 1-10

Sheikh, A., Shehata, Y.A., Brown, S.G.A., Simons, F.E.R. (2011) Adrenaline (epinephrine) for the treatment of anaphylaxis with and without shock (review). *The Cochrane Collaboration*

Vetander, M., Helander, D., Flodstrom, C., Ostblom, E., Alfven, T., Ly, D.H., Hedlin, G., Lilja, G., Nilsson, C., Wickman, M. (2012) Anaphylaxis and reactions to foods in children: a population-based case study of emergency department visits. *Clinical and Experimental Allergy*. 42 (4):p.568-577.

NICE guidelines

NICE (2011). Diagnosis and assessment of food allergy in children and young people in primary care and community settings (CG116). <http://guidance.nice.org.uk/CG116>

NICE (2014). Anaphylaxis: assessment to confirm an anaphylactic episode and the decision to refer after emergency treatment for a suspected anaphylactic episode (CG134). www.nice.org.uk/guidance/cg134

Reviewers

This document has been peer-reviewed by Dr Trevor Brown, Consultant in Paediatric Allergy, The Ulster Hospital, Northern Ireland; and Dr Paul Williams, Consultant Clinical Immunologist, Department of Immunology, University Hospital of Wales. Neither of our expert reviewers has cited any conflicts of interest in relation to the help they provided with this fact sheet.

Disclaimer – The information provided in this Factsheet is given in good faith. Every effort has been taken to ensure accuracy. All patients are different, and specific cases need specific advice. There is no substitute for good medical advice provided by a medical professional.

About the Anaphylaxis Campaign: Supporting people at risk of severe allergies

The Anaphylaxis Campaign is the only UK wide charity to exclusively meet the needs of the growing numbers of people at risk from severe allergic reactions (anaphylaxis) by providing information and support relating to foods and other triggers such as latex, drugs and insect stings. Our focus is on medical facts, food labelling, risk reduction and allergen management. The Campaign offers tailored services for individual, clinical professional and corporate members.

Visit our website www.anaphylaxis.org.uk and follow us on Twitter [@Anaphylaxiscoms](https://twitter.com/Anaphylaxiscoms).