Adrenaline

Adrenaline is the emergency medicine used to treat serious allergic reactions (**anaphylaxis**). It is also known as epinephrine. If you are at risk of anaphylaxis, you may be prescribed adrenaline to use in an emergency.

The following factsheet is written to give people who are at risk of serious allergic reactions basic knowledge on how adrenaline works, what emergency adrenaline devices are available, who should be prescribed adrenaline, how many devices should be carried, when to use adrenaline and other important information.

If you are prescribed adrenaline, it should be available at all times – with no exceptions. After it is administered, someone should call the emergency services immediately as the person must be observed in case there is a secondary reaction (known as biphasic anaphylaxis) and further treatment may be needed. If you are at risk of serious allergic reactions, you may want to purchase and wear a medical alert bracelet or pendant.

This factsheet is for general information only and you should always be guided by your GP or allergy specialist.

What is anaphylaxis?

Anaphylaxis (pronounced ana-fil-ax-is) is a serious whole-body allergic reaction. It can occur when someone is exposed to something they are allergic to (known as an allergen). Reactions usually begin within minutes and rapidly progress but can occur up to 2-3 hours later.

Anaphylaxis is potentially life-threatening, and always requires an immediate emergency response.

The common causes of anaphylaxis include foods such as peanuts, tree nuts, milk, eggs, shellfish, fish and sesame seeds, although many other foods have also been known to trigger anaphylaxis. Some people can react to even tiny amounts of the food.

Non-food causes include wasp or bee stings, natural latex (rubber), and certain drugs such as antibiotics. In some people exercise can trigger a serious allergic reaction – either on its

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own or in combination with other factors such as food or drugs (for example, aspirin).

Sometimes the cause of the reaction is not found. This is called "idiopathic anaphylaxis" (cause unknown). Read our Idiopathic Anaphylaxis factsheet for more information.

What are the symptoms of anaphylaxis?

Most healthcare professionals consider an allergic reaction to be anaphylaxis when it involves **airway** or **breathing** or **circulatory** symptoms. Any one or more of the following symptoms may be present – these are often referred to as the '**ABC**' symptoms:

- **AIRWAY:** swelling in the throat, tongue or upper airways, hoarse voice, difficulty swallowing
- **BREATHING:** sudden onset wheezing, breathing difficulty, noisy breathing, persistent cough
- **CIRCULATION:** dizziness, feeling faint, sudden sleepiness, confusion, pale clammy skin, loss of consciousness or collapse

A significant drop in blood pressure may cause weakness, sudden limpness, or a feeling of impending doom. This can lead to collapse, unconsciousness, and, in rare cases, death. When anaphylaxis results in a serious drop in blood pressure, it is referred to as **anaphylactic shock**.

Any of the **ABC** symptoms could lead to anaphylactic shock if they are not treated quickly.

Other possible symptoms

Mild to moderate symptoms may include:

- a red raised itchy rash (known as hives or urticaria) anywhere on the body
- swelling of the face, lips and/or eyes
- a tingling or itchy feeling in the mouth
- mild throat tightness
- stomach pain, vomiting or diarrhoea

These symptoms can also happen on their own. If you **don't** have the **ABC** symptoms, the reaction is likely to be less serious and is not the same as anaphylaxis, but watch carefully in case **ABC** symptoms develop.

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How does adrenaline work?

Adrenaline is the emergency medicine used to treat anaphylaxis. It acts quickly to reverse the symptoms of anaphylaxis by:

- reducing swelling
- relaxing the airway muscles
- improving breathing
- raising blood pressure

Early administration is crucial. Although some may use antihistamines first, adrenaline should always be given as soon as anaphylaxis is suspected.

What prescribed adrenaline devices are available?

Because anaphylaxis can happen very quickly, adrenaline is available in different forms that are designed to be easy to use. It's important to know exactly how and when to use your prescribed adrenaline. Healthcare professionals can show you how to use it, and there are also resources such as practice devices and videos on manufacturer websites.

Options currently available on prescription in the UK include:

- **Adrenaline auto-injectors (AAIs)** – such as EpiPen® and Jext®.
- **Intranasal adrenaline -** EURneffy®, a needle-free nasal spray.

EpiPen®

- EpiPen has a spring-loaded concealed needle with built-in needle protection that keeps the needle covered before and after use.
- Available doses:
    - **0.3mg** of adrenaline – for adults and children weighing **25kg (3 st 13 lbs) and above.**
    - **0.15mg** of adrenaline – for children weighing **7.5kg – 25kg (1 st 3 lbs – 3 st 13 lbs)** *-there are circumstances where a specialist may prescribe a dose to a child weighing less than 7.5kg.*
- EpiPen offers free 'trainer pen' delivery, allowing people to practise using their EpiPen.
- More information: www.epipen.co.uk

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Jext®

- Jext has a locking needle shield that engages after use to help prevent needle injury.
- Available doses:
    - **300mcg (0.3mg)** of adrenaline – for adults and children weighing **25kg (3 st 13 lbs) or more.**
    - **150mcg (0.15mg)** of adrenaline – for children weighing **15kg – 24kg (2 st 5 lbs – 3 st 11 lbs)** - *there are circumstances when a specialist may prescribe a dose to a child weighing less than 15kg.*
- Jext also offers a mobile phone app with step-by-step instructions and tools for travelling abroad.
- Jext offers free 'trainer pen' delivery, allowing people to practise using their Jext.
- More information: www.jext.co.uk

You can find out more about EpiPen & Jext auto-injectors here: NICE: Adrenaline Guidance.

EURneffy® – An intranasal adrenaline spray

- EURneffy, has been developed as a nasal spray rather than an injection. It delivers adrenaline through the lining of the nose.
- Each spray contains a single ready-to-use dose.
- Available dose:
    - **2mg** of adrenaline – for adults and children weighing **30kg (4st 10lbs) or more.**
- EURneffy may be suitable for people who struggle with needle-based treatments.
- Training and a Patient Information Leaflet are provided with a prescription.
- More information: https://eurneffy.co.uk/

Important information about carrying adrenaline

- If you have been prescribed adrenaline, **you should carry two in-date devices with you at all times**. This is in case one device misfires or you require a second dose.
- It is **essential** that you are shown how to use your adrenaline correctly. The **prescribing medical professional** is responsible for ensuring you receive training. You can also request follow-up training at any time.
- Adrenaline has an **expiry date**. Always check this and ask your GP for a replacement **before** it expires.
- The manufacturers of your adrenaline device offer an **expiry alert service** — register your device and expiry date with them to receive a reminder when it's time for a replacement.

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Who should be prescribed adrenaline?

There has been some debate among medical experts about who should be prescribed adrenaline. However, most agree that **adrenaline should be prescribed for people at risk of anaphylaxis**. In some cases, long-term adrenaline use may not be necessary if the trigger can be completely avoided, such as certain oral or injectable prescription drugs, unless there are additional risk factors.

Identifying people who have never had a serious allergic reaction, but are at risk of anaphylaxis, can be difficult and requires the experience of an allergy specialist. If a GP lacks this expertise, they should refer the patient to an allergy clinic for assessment.

The most recent specialist advice in the UK comes from the 2023 guideline of the British Society for Allergy and Clinical Immunology (BSACI), 'Adrenaline auto- injector prescription for patients at risk of anaphylaxis: BSACI guidance for primary care', which recommend that adrenaline should be considered for people who:

- have had an anaphylactic reaction with no known cause (idiopathic anaphylaxis).
- have had an anaphylactic reaction where the trigger cannot be easily avoided.
- are allergic to high-risk allergens (e.g. peanuts or tree nuts) and have additional risk factors (e.g. asthma), even if their past reactions have been mild.
- have reacted to trace amounts of their allergen.
- have Food-Dependent Exercise-Induced Anaphylaxis (FDEIA) (anaphylaxis triggered by eating certain foods before exercise).
- have other significant risk factors (e.g. asthma combined with a food allergy).
- spend a significant amount of time in places without access to emergency medical care.

We support this advice and believe the decision to prescribe adrenaline should be based on a thorough risk assessment. This should ideally be carried out at a specialist allergy clinic or by a GP trained in allergy management.

What to do if you have had an allergic reaction

If you have experienced an allergic reaction, speak to your GP. They can assess your risk and refer you to a specialist allergy clinic if necessary. A list of allergy clinics is available through the British Society for Allergy and Clinical Immunology (BSACI).

Even if your symptoms were mild, it's important to get a referral because future reactions

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could be more serious.

If there is a long wait to see an allergy specialist, your GP may prescribe adrenaline as a precaution. After your specialist assessment, your doctor will determine whether you need to continue carrying adrenaline long-term.

If you are prescribed adrenaline, you should **always carry two in-date devices with you in case of an emergency.**

How is adrenaline administered?

1. Administering adrenaline without delay
    - If anaphylaxis is suspected, administer adrenaline without delay:
    - **If using an AAI (EpiPen or Jext):**
        - Inject the adrenaline into the middle of the outer thigh (upper leg), through clothing, if necessary, but avoid clothing seams.
        - Hold the auto-injector in place for 10 seconds to ensure the full dose is delivered, following the instructions for your specific device
    - **If using an intranasal adrenaline spray (EURneffy):**
        - Insert the nozzle into a nostril until your fingers touch your nose. Keep the nozzle straight into the nose pointed toward your forehead.
        - Press the plunger up firmly until it snaps up and sprays liquid into the nostril.
2. After administering adrenaline
    - Call 999 immediately and state that the person is experiencing anaphylaxis (pronounced ana-fil-ax-is).
    - Note the time when the first adrenaline dose was administered.
    - If symptoms do not improve or return, a second dose of adrenaline can be given after 5 minutes.
3. Positioning the person
    - If the person is conscious, they should lie flat with their legs raised to help blood flow to vital organs.
    - If they are struggling to breathe or vomiting, they may need to be propped up briefly, but this should be for as short a time as possible.
    - Avoid sudden changes in posture. Do not let them stand or sit, even if they feel better, as this could cause a dangerous drop in blood pressure.
    - If the person is unconscious, place them in the recovery position (on their side with their head tilted back and body supported by their legs). This helps

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keep their airway clear and prevents choking in case of vomiting.
- Continuously monitor their breathing and pulse.

4. Additional advice
    - It is important to discuss the correct use of adrenaline with your GP or allergy specialist to ensure you are fully informed.
    - Family members, colleagues, school staff, and nursery staff should also be trained on how to administer adrenaline in case of an emergency.
    - The recommended injection site for AAIs is the mid-outer thigh (vastus lateralis). There is no evidence to suggest that administering a second dose in the opposite thigh is more effective; using the same thigh is perfectly acceptable—even in a patient with a single leg. Whichever thigh is the easiest to access for proper AAI administration is the best choice. In rare cases where the thigh is inaccessible (such as in a double leg amputee), an injection into the upper arm (deltoid) may be considered.

For more information, visit the website relevant to the adrenaline device you carry:

- **EpiPen:** www.epipen.co.uk
- **Jext:** www.jext.co.uk
- **EURneffy:** https://eurneffy.co.uk/

When should adrenaline be administered?

This is something that should be discussed with your allergy specialist. As a general rule, you should administer your adrenaline **without delay** if you believe your allergic reaction is serious or worsening. Call for an ambulance immediately or get someone else to call for you. They should clearly state that the person is suffering from **anaphylaxis (pronounced ana-fil-ax-is).**

The BSACI highlights the following symptoms that should help you recognise a potentially life-threatening reaction, they are often referred to as the **ABC** symptoms:

- **AIRWAY** - swelling in the throat, tongue or upper airways, hoarse voice, difficulty swallowing
- **BREATHING** - sudden onset wheezing, breathing difficulty, noisy breathing, persistent cough
- **CIRCULATION** - dizziness, feeling faint, sudden sleepiness, confusion, pale clammy skin, loss of consciousness or collapse

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A **steady deterioration** is also a warning sign that adrenaline may be needed. If you are in doubt, **use your adrenaline**—it is always safer to act early. Your allergy specialist should help you understand what symptoms signal a serious reaction.

The **BSACI recommends** that every patient at risk of anaphylaxis should have a **written Allergy Action Plan** provided by their doctor or allergy specialist. This plan should be tailored to the individual and clearly outline when to use adrenaline.

For more information on Allergy Action Plans, visit:
BSACI: Allergy Action Plans

How many adrenaline devices should I carry?

Over the past few years several guidelines have addressed this question.

MHRA, NICE and EMA guidelines

Anaphylaxis UK supports the view of the UK's Medicines and Healthcare Products Regulatory Agency (MHRA), the National Institute for Health and Care Excellence (NICE) and European Medicines Agency (EMA). Their guidelines include a recommendation that medical professionals should prescribe **two** adrenaline devices, which patients should carry **at all times**. This is because some people can require more than one dose of adrenaline or the device can be used wrongly or occasionally misfire.

Depending on their age and level of understanding, children should carry their adrenaline on their person at all times or they should be quickly and easily accessible at all times.

You can read the MHRA Report (updated in November 2021) here: Recommendations to support the effective and safe use of adrenaline auto-injectors

You can read the NICE guidelines here: Anaphylaxis: assessment and referral after emergency treatment

You can read the EMA recommendation here: Adrenaline auto-injectors - referral

BSACI guidelines

In June 2023, the BSACI published updated guidelines:

Adrenaline auto-injector prescription for patients at risk of anaphylaxis: BSACI guidance for

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primary care (BSACI 2023 Guidance).

This latest guidance supersedes the 2016 advice and **recommends that patients at significant risk of anaphylaxis should be prescribed two adrenaline devices and advised to carry them at all times.**

This reflects:

- the **possibility of a serious reaction requiring more than one dose** before emergency services arrive.
- the **potential for device failure** or misplacement of the first auto-injector.

As a result, the previous 2016 statement that **"normally only one auto-injector is needed"** is no longer the recommended guidance.

The 2017 legislation covering 'spare' adrenaline

Adrenaline is a **prescription-only** medicine, meaning it can only be accessed if prescribed by a doctor. Unlike defibrillators, adrenaline is not freely available in public places for emergency use. This means that if someone experiences anaphylaxis and does not have their prescribed adrenaline—or if they are having their first reaction—there may not be one immediately available.

However, in 2017, **UK legislation** was introduced allowing **schools** to purchase adrenaline without a prescription for **emergency use**. The purpose of this law is to ensure that schools can hold spare adrenaline as a backup to treat anaphylaxis in an emergency.

When can a 'spare' adrenaline be used?

A school's spare adrenaline can be administered only if:

- the child has been diagnosed with a serious allergy and is at risk of anaphylaxis.
- medical authorisation has been provided, for example through an allergy care plan.
- written parental consent has been given.

What about unexpected reactions?

A legal exemption under **Regulation 238** allows a school's spare adrenaline to be used in exceptional, **life-threatening** situations—**even if**:

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- the individual has **not been previously diagnosed** with an allergy.
- there is **no medical authorisation or written consent** in place.

This means that a spare adrenaline device **can** be used on a pupil or visitor experiencing an **unexpected** allergic reaction. However, this provision is intended only for **rare, unforeseeable emergencies**.

Are 'spare' adrenaline devices a replacement for prescribed devices?

No. Official guidance states that **spare adrenaline devices are not a substitute** for a child's own prescribed devices. They are only for **emergency use** when a child's own device is unavailable, expired, or in cases of unexpected anaphylaxis.

Can someone else's adrenaline be used in an emergency?

Adrenaline is prescribed for **named individuals only**. Legally, adrenaline prescribed to one person **cannot** be used on another person unless administered by a **qualified prescriber** (e.g., a doctor) under the **Human Medicines Act**.

If someone is experiencing anaphylaxis and no spare adrenaline devices are available—only another person's prescribed device—the advice is to:

1. **call 999 immediately** and explain the situation.
2. inform them that another person's adrenaline is available.
3. ask the emergency operator for guidance on whether it can be used.

Who can purchase 'spare' adrenaline?

- Schools in **England, Wales, and Scotland** (including local authority-maintained nurseries, academies, and independent schools) **can legally purchase spare adrenaline** from any pharmacy. This requires a **letter from the headteacher on school-headed paper**.

- In **Northern Ireland**, the legislation applies to **grant-aided and independent schools** under the **Education and Libraries (NI) Order 1986**.

- **Businesses** (e.g., theme parks, offices, hotels, restaurants, airports) **can only purchase spare adrenaline if they have an Occupational Health Scheme (OHS) in place**. If anaphylaxis is identified as a workplace risk, businesses may obtain a **written letter from a doctor** stating the need for adrenaline.

- **Can you obtain adrenaline for healthcare settings (e.g. dentist)?** In clinical

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environments, trained professionals generally use adrenaline ampoules over AAIs or intranasal adrenaline sprays, because ampoules allow for more accurate dosing and controlled administration via syringe. While easy-to-use adrenaline devices are indispensable for community and pre-hospital emergency care, hospitals and clinics typically use ampoules due to the expertise of their staff in handling and administering medication. That said, some healthcare settings may include spare adrenaline devices in their emergency kits, depending on local protocols and supplier agreements. It's best to check with your clinic's administration or pharmacy department for specific guidelines on this matter.

Further resources

Department of Health Guidance (2017) – *Using Emergency Adrenaline Auto-Injectors in Schools*
Read the official guidance
Clarification on AAI Use in Schools – Additional guidance
Read document
Anaphylaxis UK Safer Schools Programme – Supporting schools with allergy management
View the Safer Schools Programme
Spare Pens in Schools – Practical information on implementing the legislation
Visit Spare Pens in Schools

Does adrenaline carry any risk?

Some people worry that adrenaline may be harmful, but evidence supports the relative safety of prescribed adrenaline devices so long as they are used correctly. Taking this evidence into account, we advocate that if you are unsure whether an allergic reaction is serious enough to require adrenaline, then it **should** be administered.

The potential benefits of early administration in preventing serious anaphylactic reactions outweigh the risks associated with its use. Prompt action is crucial, as delayed treatment can result in life-threatening complications.

Drug interactions and contraindications in anaphylaxis

In general, adrenaline should be administered without hesitation in cases of anaphylaxis, even if the patient has other medical conditions or is taking medications that may pose risks.

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While there may be caution advised in individuals with pre-existing heart conditions (Ischaemic Heart Disease, for example) due to the potential cardiovascular effects of adrenaline, the life-threatening nature of anaphylaxis typically outweighs these concerns.

If someone is experiencing anaphylaxis, adrenaline should be used unless otherwise advised by a medical professional. If you are in doubt about whether to use adrenaline in a patient with existing conditions, you can ask a medical professional when you call an ambulance.

If you have concerns or are unsure about how adrenaline may interact with other medications or conditions, **consult your GP or allergy specialist** for guidance.

This approach ensures that timely administration of adrenaline, which can be lifesaving, is prioritised during anaphylaxis.

Storage of adrenaline

Storage of AAIs

EpiPen and Jext AAIs should be stored properly to ensure they remain effective when needed, and both come with the following advice:

- **keep the auto-injector in its original container** to protect it from light exposure.
- **store at temperatures below 25°C**, but **do not freeze**. Extreme temperatures can affect the medication's effectiveness.
- **do not refrigerate** EpiPen devices, as this can also compromise the device's function.

It's important to **regularly check** the AAI to ensure the solution is **clear and colourless**. If the liquid appears discoloured or contains particles, the device should be **replaced** immediately.

In cold weather, special care is needed to protect your adrenaline auto-injector. **Avoid exposing the injector to freezing temperatures**, as this could affect its performance. If you're outside in freezing conditions, keep the AAI close to your body, such as in an inside pocket, to prevent it from becoming too cold. In addition, **do not store your auto-injector in a vehicle**, as the temperature inside cars can fluctuate widely, especially in colder and warmer months, which may render the medication ineffective.

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Storage of EURneffy

- Store EURneffy at room temperate between 20°C to 25°C
- Do not freeze. If EURneffy freezes, the device will not spray.
- Storage of EUFneffy at high temperatures is allowed for a few days.

Key messages

- **Adrenaline for anaphylaxis**: adrenaline is the first-line treatment for serious allergic reactions (anaphylaxis) and is available via prescription in easy-to-use devices called adrenaline auto-injectors (AAIs), such as EpiPen and Jext, or intranasal adrenaline sprays, including EURneffy.
- **How adrenaline works**: adrenaline quickly reverses symptoms of anaphylaxis by reducing swelling, relaxing airway muscles, improving breathing, and raising blood pressure. It should be administered immediately when serious allergic reactions are suspected.
- **Adrenaline available**: **EpiPen** and **Jext** are the primary AAI devices in the UK, with different doses for adults and children. **EURneffy** is available in the UK for children and adults over 30kg.
- **Carrying and using adrenaline**: People prescribed adrenaline should carry two in-date devices at all times in case of device malfunction or the need for a second dose. The devices should be used immediately during serious allergic reactions and should be followed by calling emergency services.
- **Who should be prescribed adrenaline**: Adrenaline should be prescribed to those at risk of anaphylaxis, such as individuals with serious allergies to high-risk allergens, those who have had an anaphylactic reaction, or those with additional risk factors like asthma.
- **Administration**: If experiencing anaphylaxis, a person should lie flat with their legs raised. They can be sat up if they are struggling to breath or are vomiting. After administration, emergency services should be called immediately, and a second dose can be given after 5 minutes if needed.
- **Guidelines and recommendations**: Two adrenaline devices should be prescribed for people at risk, following guidance from bodies like MHRA, NICE, and BSACI.
- **Schools and spare adrenaline**: Schools can legally purchase spare adrenaline for emergency use, even for students who haven't been diagnosed with allergies, under specific conditions.
- **Safety**: While adrenaline can seem intimidating, it is generally safe when used properly. It is recommended to act early if in doubt about the severity of a reaction.

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Feedback

Please help us to improve our information resources by sending us your feedback at: - https://www.anaphylaxis.org.uk/information-resources-feedback/

Sources

All the information we produce is evidence based or follows expert opinion and is checked by our clinical and research reviewers. If you wish to know the sources we used in producing any of our information products, please contact info@anaphylaxis.org.uk and we will gladly supply details.

Reviewers

The content of this Factsheet has been peer-reviewed by Dr Helen Evans-Howells, GP and Allergy Specialist Doctor.

Disclosures

Dr Helen Evans-Howells has received funding from ALK to attend the BSACI conference, deliver GP education, and serve on advisory boards, as well as from Viatris for GP education and participation in the Ready2React campaign, and has provided training for KITT Medica video productions.

Disclaimer

The information provided in this Factsheet is given in good faith. Every effort is 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 Anaphylaxis UK

Anaphylaxis UK is the only UK-wide charity solely focused on supporting people at risk of serious, life-threatening allergic reactions. We provide information and support to people living with allergies through our free national helpline and local support groups. We also campaign and fundraise to achieve our ultimate aim, to create a safer environment for all people at risk of serious allergies. Visit our website www.anaphylaxis.org.uk and follow us to keep up-to-date with our latest news. We're on Facebook @anaphylaxixUK, LinkedIn, Instagram @anaphylaxisUK, Twitter @AnaphylaxisUK and you can find our podcast here.

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