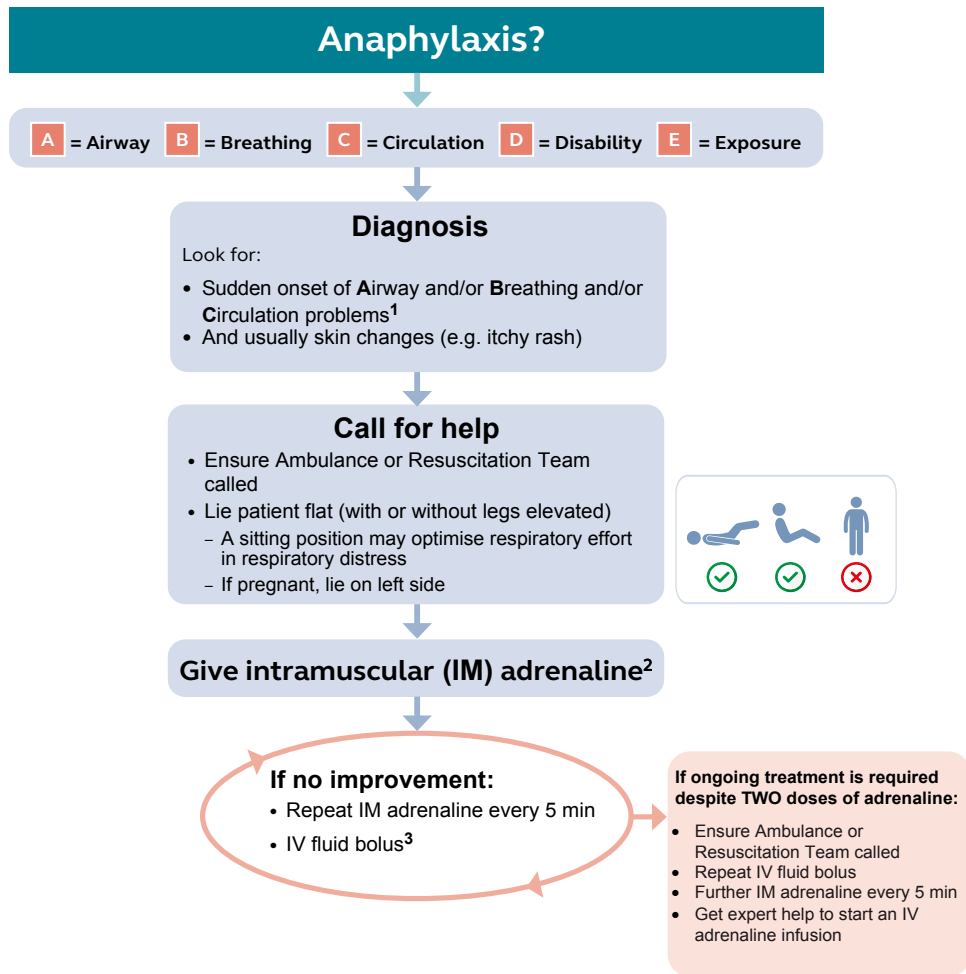


MANAGEMENT OF ANAPHYLAXIS IN THE VACCINATION SETTING

This guidance has been extracted from the Resuscitation Council UK (RCUK) Anaphylaxis guideline (2021) and Public Health England (PHE) advice in the Green Book. It has been approved by RCUK, PHE, the British Society for Allergy and Clinical Immunology (BSACI) and the Royal College of General Practitioners. Further information at www.resus.org.uk



- Establish airway
- Give high flow oxygen
- Apply monitoring: pulse oximetry, ECG, blood pressure

1. Life-threatening problems

Airway
Swelling, hoarseness, stridor

Breathing
Rapid breathing, wheeze, fatigue, cyanosis, SpO₂ <94%, confusion

Circulation
Pale, clammy, low blood pressure, faintness, drowsy/coma

2. IM adrenaline

IM doses of 1 mg in 1 mL (1:1000) adrenaline

Adult and child >12 years: 500 micrograms IM (0.5 mL)

Child 6–12 years: 300 micrograms IM (0.3 mL)

Child 6 months to 6 years: 150 micrograms IM (0.15 mL)

Child <6 months: 100–150 micrograms IM (0.1–0.15 mL)

(Adrenaline IV to be given only by experienced specialists)

3. IV fluid bolus

Use crystalloid

Adults: 500–1000 mL

Children: 20 mL/kg

Vaccines stimulate an immune response to cause protection. Most adverse events after vaccination are due to this immune response and are not allergic. Allergic reactions can happen after vaccination, but these are uncommon. Anaphylaxis following vaccination is rare, occurring at less than 1 per million doses for vaccines in the UK. “COVID-19 vaccines” are new, so it is uncertain if the risk of anaphylaxis is higher compared to other vaccines.

Anaphylaxis is a serious allergic reaction that is usually rapid in onset and may cause death. Severe anaphylaxis is characterised by life-threatening compromise in airway, breathing and/or the circulation, but **may occur without typical skin features or circulatory shock being present.**

Anaphylaxis is likely when all of the following 3 criteria are met:

- ✓ Sudden onset and rapid progression of symptoms
- ✓ **A**irway and/or **B**reathing and/or **C**irculation problems
- ✓ Skin and/or mucosal changes (itching, flushing, urticaria, angioedema)

Remember:

- ✓ Skin or mucosal changes alone are not a sign of anaphylaxis
- ✓ **Skin and mucosal changes can be subtle or absent in 10-20% of reactions** (e.g. some patients can present with only bronchospasm or hypotension)

| Airway problems | Breathing problems: | Circulation problems: |
|---|--|--|
| <ul style="list-style-type: none"> > Airway swelling e.g. throat and tongue swelling causing difficulty in breathing and/or swallowing. Patients may feel their throat is closing. > Hoarse voice > Stridor (a high-pitched inspiratory noise caused by upper airway obstruction) | <ul style="list-style-type: none"> > Shortness of breath – increased respiratory rate > Wheeze (bronchospasm) and/or persistent cough > Patient becoming tired with the effort of breathing > Confusion due to hypoxia > Cyanosis (a late sign) > Respiratory arrest | <ul style="list-style-type: none"> > Signs of shock: pale, clammy > Significant tachycardia > Arrhythmia > Hypotension – feeling faint (dizziness), collapse > Decreased conscious level or loss of consciousness > Cardiac arrest |

Fainting is relatively common following vaccination. Symptoms should resolve rapidly on lying flat. **If rapid recovery does not happen, treat as anaphylaxis and give IM adrenaline.**

| | Faint | Anaphylaxis |
|-----------------|--|--|
| Onset | Before, during or within minutes of vaccination | Usually within 15 minutes, but can occur later |
| Features | <ul style="list-style-type: none"> • Generalised pallor, cold clammy skin • Normal respiration – may be shallow, but not laboured • Bradycardia, but with strong central pulse; Hypotension usually transient and responds to lying the patient down • Sense of light-headedness/dizziness, improves once lying down. Transient jerking of the limbs and eye-rolling which may be confused with seizure. | <ul style="list-style-type: none"> • Itchy skin rash / urticaria (wheals) or swelling (angioedema) e.g. lips, face • Airway/Breathing symptoms (see above) • Tachycardia, with weak/absent central pulse; hypotension – sustained • Sense of “impending doom”; loss of consciousness – with no improvement once supine or head down position |

Treatment of anaphylaxis is based on general life support principles:

- ✓ Call for help immediately.
- ✓ Use the **A**irway, **B**reathing, **C**irculation approach to recognise and treat problems.

Intramuscular adrenaline is the first-line treatment for anaphylaxis (even if intravenous access is available). IV adrenaline bolus outside the context of cardiac arrest is dangerous.

- > Give intramuscular (IM) adrenaline to treat Airway/Breathing/Circulation problems.
- > Do not delay initial treatment if the diagnosis is unclear: a single dose of IM adrenaline is well-tolerated and poses minimal risk.
- > Repeat IM adrenaline every 5 minutes if features of anaphylaxis do not resolve.

Further treatment of anaphylaxis depends on:

1. Location

Treating a patient with anaphylaxis in the community will not be the same as in an acute hospital. Dial 999 urgently for ambulance support and clearly state "ANAPHYLAXIS".

2. Training of rescuers

All clinical staff should be able to recognise anaphylaxis, call for help and start treatment. Staff who give immunisations should have annual updates in anaphylaxis management.

3. Number of responders

A single responder must always ensure that help is coming. If there are several rescuers, several actions can be undertaken simultaneously.

4. Equipment and drugs available

An anaphylaxis pack normally contains at least:

- > Two ampoules of adrenaline (epinephrine) 1mg/mL (1:1000)
- > Four 23G needles and four graduated 1mL syringes
- > Oxygen supply, with face masks suitable for children and adults and tubing.

A pack should be immediately available in each location where vaccines are being given, and should not be stored in a locked cupboard or trolley. Check packs regularly to ensure the contents are within their expiry dates.

Antihistamines and steroids are no longer recommended for the immediate management of anaphylaxis, and do not need to be included in the emergency anaphylaxis pack.

In all healthcare settings, giving adrenaline by ampoule/needle/syringe is preferred, since auto-injectors will only deliver a maximum of 300micrograms adrenaline while **the appropriate dose in older children and adults is 500micrograms**. Some settings may prefer to use an auto-injector for the first dose used to treat anaphylaxis, for speed and ease. If further doses of adrenaline are needed, give these by ampoule/needle/syringe.

Patient positioning

Death can occur within minutes if a patient stands, walks or sits up suddenly. Patients must NOT walk or stand during acute reactions. Use caution when transferring patients who have been stabilised.



- > Patients with Airway and Breathing problems may prefer to sit up.
- > Lying flat with or without leg elevation is helpful for patients with a low blood pressure (Circulation problem).
- > Patients who are breathing normally and unconscious should be placed on their side (recovery position). Monitor breathing and intervene if needed.
- > Pregnant patients should lie on their left side to prevent aortocaval compression.



Other supportive measures:

- ✔ Give further repeat doses of IM adrenaline every 5 minutes if symptoms do not resolve.
- ✔ Give oxygen and apply pulse oximetry (if available), to achieve oxygen saturations of 94-98%, but do not delay giving oxygen while waiting for a pulse oximeter. Severe upper airways obstruction is uncommon.
 - > Seek urgent expert help if there is airway obstruction.
 - > Nebulised adrenaline (5mL of 1mg/mL adrenaline) can be used to treat upper airways obstruction but **must not be prioritised over further IM adrenaline every 5 minutes.**
- ✔ Bronchospasm - consider further inhaled bronchodilator therapy with salbutamol and/or ipratropium, but must not be prioritised over IM adrenaline.
- ✔ A reduction in blood flow is common in anaphylaxis, even in the absence of obvious circulatory compromise. Give a fluid bolus if there is an inadequate response to initial IM adrenaline, to support tissue perfusion and drug delivery.

Possible cross-reactivity between vaccines and drugs

Antihistamines and steroids are no longer recommended for management of anaphylaxis. Some oral medicines used to treat more mild reactions contain the same substances found in some vaccines (and which can cause allergic reactions). Caution is recommended following allergic reactions to vaccines. In the UK, use an oral liquid antihistamine (e.g. liquid cetirizine). Chlorphenamine tablets can also be used, but these can cause drowsiness and therefore mimic symptoms of anaphylaxis.

CARDIAC ARREST:

Recognise cardiac arrest has occurred if the person becomes unresponsive or unconscious, and breathing is absent or abnormal.

- ✔ Start chest compressions as soon as cardiac arrest is suspected.
- ✔ Ensure expert help (resuscitation team or ambulance) has been called.
- ✔ Follow standard cardiac arrest guidelines (use IV/IO adrenaline in preference to IM route, as per protocol), available at www.resus.org.uk.

BLOODS:

The specific test to help confirm a diagnosis of anaphylaxis is measurement of mast cell tryptase. Ideally, three timed samples (serum or plasma, e.g. yellow top bottle) are needed:

1. An initial sample as soon as feasible, but do not delay starting resuscitation.
 2. A second sample at 1-2 hours (but no later than 4 hours) from the onset of symptoms.
- If possible, take 5-10mL extra for serum store to facilitate further investigations.**

A convalescent sample should be obtained at least 24 hours after complete resolution (e.g. at follow-up allergy clinic), to provide a baseline tryptase value.

SURVEILLANCE:

- ✔ Report all suspected vaccine-induced adverse drug reactions (ADRs) via the MHRA's Yellow Card scheme: <https://coronavirus-yellowcard.mhra.gov.uk>
- ✔ All patients with suspected anaphylaxis should be referred to an allergy clinic – see bsaci.org for details of clinics.

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