

Adrenaline (Epinephrine) Injector Prescription

The aim of these guidelines is to outline the appropriate prescription of adrenaline (epinephrine) injectors for use in non-medical settings for the emergency/first aid treatment of potentially life-threatening severe allergic reactions (anaphylaxis).

Adrenaline injectors are used to treat severe symptoms, reduce the risk of serious morbidity (e.g. cerebrovascular damage) and prevent fatalities due to anaphylaxis.

Adrenaline rapidly reverses the effects of anaphylaxis and should be considered the emergency medication for anaphylaxis. Adrenaline injectors:

- Are automatic injector devices for emergency/first aid treatment of anaphylaxis.
- Contain a single fixed dose of adrenaline to be administered intramuscularly for safer, rapid absorption of adrenaline.

Adrenaline ampoules and syringes are not considered by ASCIA to be suitable for non-medical settings such as schools, children's education/care centres and workplaces.

These guidelines consider currently available evidence on the:

- Epidemiology of allergic reactions triggers that may be difficult to avoid.
- Frequency of allergic reactions including anaphylaxis.
- Relatively rare risk of fatal anaphylaxis.
- Risk factors that have been associated with fatal anaphylaxis.

Adrenaline injector prescription is recommended for patients with:

- **History of anaphylaxis** - If the patient is considered to be at continuing risk from allergic reactions to identified triggers (confirmed allergen/s) or unidentified triggers (idiopathic anaphylaxis).
- **Food allergy (excluding oral allergy syndrome) and co-existing unstable or moderate to severe, persistent asthma.** Rationale: Most food allergy related fatalities occur in those with unstable asthma.
- **Underlying mast cell disorders** (e.g. systemic mastocytosis or elevated baseline serum tryptase concentrations) together with any previous systemic allergic reactions to insect stings, including patients undergoing venom immunotherapy.

Adrenaline injector prescription is sometimes recommended for patients with a history of a generalised allergic reaction, with one or more of the following additional risk factors:

- **Age**
 - **Teenagers and young adults with food allergy.** While food allergy is most common in young children aged five years or less, the majority of recorded fatal reactions to foods (~90%) occur in teenagers and young adults. This may in part relate to greater risk taking behaviour in this age group, but may also reflect greater likelihood of accidental exposure to food allergens when eating away from home, or while not under parental supervision.

- **Specific allergic triggers**

- **Peanut, tree nuts and seafood.** Fatal anaphylaxis may arise from any food, but most fatalities arise from food allergy that persists into adolescence and adult life (e.g. peanut, tree nut, sesame seed and seafood allergies). Allergic reactions to these foods may occur following ingestion of relatively small amounts, and the risk of reaction is unlikely to be reduced by cooking or food processing.
- **Generalised urticaria alone without anaphylaxis following insect stings** (e.g. bee, wasp or Jack Jumper ant stings) or following tick bites is not a routine indication for adrenaline injector prescription, but may be considered (in conjunction with allergen specific immunotherapy if available) in selected cases. Decisions regarding immunotherapy will take into consideration factors such as the risk of progression to anaphylaxis (based on follow-up studies), patient age (more likely in adults than children), co-morbidity (significant cardiorespiratory disease) or living or working in remote areas (where access to emergency medical care may be more problematic) or occupational (e.g. bee keeping) or even recreational exposure to stinging insects (e.g. hiking in areas where Jack Jumper ants are endemic).

- **Co-morbid conditions**

- **Asthma.** Unstable or moderate to severe, persistent asthma increases the risk of respiratory compromise in those allergic to food. Treatment to control asthma symptoms is important in this group (e.g. medication, allergen immunotherapy).
- **Cardiovascular disease** (hypertension, ischaemic heart disease or arrhythmia) is associated with a relatively greater risk of fatal anaphylaxis from insect stings.
- **Systemic mastocytosis**

This list is not comprehensive and if there is a concern, patients should be referred to a clinical immunology/allergy specialist for assessment.

- **Limited access to emergency medical care**

- **Remote residential locations.** In some remote residential locations (e.g. remote rural areas), access to medical care and early administration of adrenaline may not be possible unless an adrenaline injector is provided to the patient or their carers for administration. It is important to distinguish this situation of permanent risk from those at short-lived risk (e.g. bushwalking, school camps).
- **Prolonged travel abroad.** Consideration of temporary availability to patients considered at lower risk, who are travelling abroad may also be considered, where language barriers and lesser control over food preparation may increase the risk of accidental exposure and access to medical care may also be limited.

These factors should be considered when deciding whether an adrenaline injector is prescribed, as they are known risk factors for more severe or fatal allergic reactions.

Adrenaline injector prescription is not normally recommended as follows:

- **Asthma without a history of anaphylaxis or generalised allergic reactions.**
- **If known allergen can be successfully avoided** (e.g. drug allergy, latex allergy). Under these circumstances the wearing of medical identification jewellery is strongly recommended.
- **Oral allergy syndrome** - The likelihood of progression to anaphylaxis is very low.
- **Elevated specific IgE only (positive blood or skin allergy test) without a history of clinical reactivity** - A positive allergy test without a history strongly suggestive of allergy is an indication for

specialist allergy assessment, which will include assessment of the risk of allergy and anaphylaxis, and sometimes include challenge testing.

- **Family (rather than personal) history of anaphylaxis or allergy** - Whilst the risk for allergic disease such as asthma, allergic rhinitis and atopic eczema is in part inherited, there is not a substantial genetic contribution to food, sting or drug allergy risk, and the risk of anaphylaxis is not inherited.
- **Local reactions to insect stings in adults and children** - Follow up studies demonstrate that these rarely progress to anaphylaxis.
- **Generalised skin rash (only) to bee or wasp stings in children** - Follow up studies of subsequent bee stings in children presenting with local reactions or generalised skin rash (only) show that these children are at a very low risk of experiencing anaphylaxis with subsequent stings.
- **Resolved food allergy** - This should be established by a clinical immunology/allergy specialist.
- **Isolated angioedema** - The risk of fatal angioedema (unrelated to food or insect sting allergy, hereditary angioedema or use of ACE inhibitor medication) is very low. If there is a concern, patients should be referred to a clinical immunology/allergy specialist for assessment.

Adrenaline injector dose recommendations

The following dosage recommendations are based on expert opinion regarding recommended dose for weight and clinical trials of injected adrenaline in children, which is currently at variance with the product information leaflet.

Adrenaline injectors available in Australia and New Zealand include EpiPen[®] Jr (0.15 mg), EpiPen[®] (0.3 mg), Anapen[®] 150, Anapen[®] 300 and Anapen[®] 500.

Children over 20 kg and adults

Adrenaline injectors 0.3 mg (e.g. EpiPen[®] or Anapen[®] 300) are recommended for adults and children over 20 kg.

Adrenaline injectors 0.3mg or 0.5 mg (e.g. EpiPen[®] or Anapen 300[®] or Anapen 500[®]) are recommended for adults and children over 50 kg.

Children 7.5-20 kg

Adrenaline injectors 0.15 mg (e.g. EpiPen[®] Jr, Anapen[®] 150) are recommended for children between 7.5 and 20 kg. Whilst the previous weight guide for a 0.15mg adrenaline injector device was for 10-20 kg, health professionals who have made a considered assessment of an infant who weighs 7.5 kg-10 kg, may prescribe a 0.15mg device. Use of a 0.15mg device for treatment of infants weighing 7.5 kg or more should pose less risks than using adrenaline ampoules and syringes, particularly when used without medical training.

Children less than 7.5 kg

Adrenaline injectors are not usually recommended for children less than 7.5 kg as the risk of fatal anaphylaxis in children this age is very low. While the 'optimal' dose of adrenaline is unknown there is a risk that the lower dose adrenaline injector could provide a significant overdose.

ASCIA does not recommend the use of adrenaline ampoules and syringes for children less than 7.5 kg as they are inappropriate for non-medical settings (e.g. early childhood education/care centres). Even if they are administered by 'trained' non-medical personnel (e.g. parents) there may be a risk of a serious dosing error.

If there is a concern regarding the requirement for an adrenaline injector for an infant under 7.5 kg, patients should be referred to a clinical immunology/allergy specialist for assessment. The issues

should be discussed with the parents based on a risk assessment. Where it is felt that it is essential for emergency adrenaline to be prescribed for a child less than 7.5 kg, the risk of administering a 'fixed' overdose via a 0.15mg device is considered to be lower than the risk of a dose error with an adrenaline ampoule and syringe.

Number of devices to be prescribed

EpiPen® and Anapen® adrenaline injector devices are:

- Available on PBS authority prescription in Australia.
- Not currently Pharmac funded in New Zealand.
- Available without prescription in Australia and New Zealand.

Two devices per prescription are routinely recommended. This allows one device to be with the patient (or for parental use at home for younger children), and one device to be available for use at the child's school or children's education/care centre.

Additional devices (if desired) may be purchased privately without prescription in Australia, since more than two devices at a time are not PBS subsidised in Australia. There is currently no Pharmac subsidy for adrenaline injectors in New Zealand, therefore all devices need to be purchased privately.

In adults and older high school students, two devices are strongly recommended in those with:

- Previous hypotensive or near fatal anaphylaxis.
- Need for more than one adrenaline dose to treat previous anaphylaxis episodes.
- Limited access to medical care (e.g. travel or residence in remote areas).
- Patients with systemic mastocytosis.
- Where high body mass indicates that the routine 0.3mg or 0.5mg adrenaline dose will provide an insufficient dose for adequate treatment.

Anaphylaxis Management Plan

An adrenaline injector should only be prescribed within the context of a comprehensive Anaphylaxis Management Plan that includes the following:

1. Referral to a clinical immunology/allergy specialist

Review by a clinical immunology/allergy specialist should occur to:

- Ascertain if the correct trigger(s) have been identified.
- Determine whether the allergy persists.
- Advise on specific management, including suitability for allergen immunotherapy (if available).
- Advise on co-factors that may increase the risk of more serious reactions (e.g. use of beta blockers, NSAID, exercise, asthma control).

2. Identification of anaphylaxis trigger(s)

This should include a comprehensive history, clinical examination, appropriate use and interpretation of allergy testing and under some circumstances, deliberate challenge to prove or disprove allergy.

3. Education on the avoidance of trigger(s)

This is particularly important with food allergy induced anaphylaxis.

4. Provision of an ASCIA Action Plan for Anaphylaxis (emergency response plan)

This documents the following;

- Name of patient.
- Confirmed allergens.
- Parent/guardian contact details.
- Symptoms and signs indicating when to use the adrenaline injector.
- Instructions on how to use the adrenaline injector.
- Doctor's name and signature.

ASCIA Action Plans for Anaphylaxis are available from www.allergy.org.au and contain electronic fields to allow online completion of patient information. The Action Plan must be signed by the prescribing doctor.

5. Appropriate follow-up

Yearly review by a patient's medical practitioner (normally their GP) should occur to:

- Review any allergic reactions that have occurred since their last review.
- Examining co-factors (such as poorly controlled or persistent asthma) that may increase the risk of more serious reactions.
- Examining the need for the provision of an adrenaline injector for those who do not currently have one available.
- Provide re-education on adrenaline injector use (using a trainer device) including information about positioning of patient (e.g. not standing or walking when experiencing anaphylaxis).
- Renew ASCIA Action Plan.
- Provide ASCIA Travel Plan if required.
- Ensure the adrenaline injector has not expired.
- Determine whether specialist review is required to ascertain if the allergy persists, new allergies have developed or if review is required.

Definitions

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**.

Symptoms/signs of respiratory/cardiovascular involvement are listed below.

Respiratory:

Difficult or noisy breathing

Swelling of tongue

Swelling or tightness in throat

Difficulty talking or hoarse voice
Wheeze or sudden persistent cough

Cardiovascular:

Persistent dizziness or collapse
Pale and floppy (in young children)
Hypotension
Loss of vision

Generalised allergic reaction

A generalised allergic reaction is characterised by one or more symptoms or signs of skin and/or gastrointestinal tract involvement without respiratory and/or cardiovascular involvement.

Skin:

Generalised pruritus
Generalised Urticaria/erythema
Angioedema

Gastrointestinal:

Abdominal pain
Vomiting
Loose stools

Note: While vomiting and abdominal pain are common features of mild to moderate allergic reactions to food, they are signs of a severe allergic reaction to insect stings and tick bites.

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