

**Royal Hospital for Women (RHW)**  
**BUSINESS RULE**  
**COVER SHEET**



**Health**  
South Eastern Sydney  
Local Health District

**Ref: T25/20349**

<b>NAME OF DOCUMENT</b>	Maternal Collapse
<b>TYPE OF DOCUMENT</b>	Clinical Business Rule
<b>DOCUMENT NUMBER</b>	RHW CLIN132
<b>DATE OF PUBLICATION</b>	14/4/2025
<b>RISK RATING</b>	Medium
<b>REVIEW DATE</b>	April 2028
<b>FORMER REFERENCE(S)</b>	T25/19883
<b>EXECUTIVE SPONSOR</b>	Maternity Co-Directors – Medical & Midwifery Co-Director of Anaesthetics and Women's Health and Gynaecological Services
<b>AUTHOR</b>	Dr M Doyle (JMO) Dr S Coogan (Obstetrician) Dr L Watterson (Co-Director of Anaesthetics and Women's Health and Gynaecological Services) M Anderson (Midwifery Educator) J Mossman (CNC CERS)
<b>SUMMARY</b>	The most common causes of collapse in the maternity woman are hypovolaemia and thromboembolism. However, eclampsia, intracranial haemorrhage and amniotic fluid embolism should also be considered if there is a collapse
<b>Key Words</b>	Maternal collapse, haemorrhage, thromboembolism, eclampsia, intracranial haemorrhage, amniotic fluid embolism, resuscitation, peri-mortem caesarean

---

**Maternal Collapse**

**RHW CLIN132**

---

*This Clinical Business Rule (CBR) is developed to guide safe clinical practice at the Royal Hospital for Women (RHW). Individual patient circumstances may mean that practice diverges from this Clinical Business Rule. Using this document outside RHW or its reproduction in whole or part, is subject to acknowledgement that it is the property of RHW and is valid and applicable for use at the time of publication. RHW is not responsible for consequences that may develop from the use of this document outside RHW.*

*Within this document we will use the term woman, this is not to exclude those who give birth and do not identify as female. It is crucial to use the preferred language and terminology as described and guided by each individual person when providing care.*

## **1 BACKGROUND**

The aim of this CBR is to recognise and manage the collapsed woman.

In the maternity woman hypovolaemia and thromboembolism are the most common causes of maternal collapse. Eclampsia, intracranial haemorrhage, amniotic fluid embolism should also always be considered<sup>2</sup>

The most common general causes of collapse can be divided into the '4 H's' and '4 T's':

- hypovolaemia
- hypoxaemia
- hyper/hypokalaemia and metabolic disorders
- hypo/hyperthermia
- tension pneumothorax
- tamponade
- toxins/poisons/drugs
- thrombosis-pulmonary/coronary<sup>1</sup>

In the maternity woman hypovolaemia and thromboembolism are the most common causes of maternal collapse. Eclampsia, intracranial haemorrhage, amniotic fluid embolism should also always be considered<sup>2</sup>

### **Definitions:**

<b>Maternal Patient</b>	Antenatal, intrapartum or postnatal woman (up to 6 weeks after birth)
<b>Maternal Collapse</b>	An acute event involving the cardiorespiratory systems and/or central nervous system, resulting in a reduced or absolute loss of consciousness and potentially cardiac arrest and death
<b>POWH</b>	Prince of Wales Hospital
<b>BLS</b>	Basic Life Support
<b>ANZCOR</b>	Australian and New Zealand Committee on Resuscitation
<b>ALS</b>	Advanced Life Support
<b>NRB</b>	Non-rebreather mask
<b>ROSC</b>	Return of spontaneous cardiac output

Maternal Collapse

RHW CLIN132

PMCS	Perimortem Caesarean section
ECMO	Extra Corporeal Membrane Oxygenation
ROTEM®	Rotational Thromboelastometry

## 2 RESPONSIBILITIES

Medical, Midwifery and Nursing Staff:

recognise, respond, escalate and manage the collapsed maternal patient

## 3 PROCEDURE

### 3.1 Clinical Practice points

- Activate a Clinical Emergency Response System (CERS) adult code blue, (as [per Clinical Emergency Response System \(CERS\) – Management of the deteriorating patient](#) CBR) and commence adult BLS
- Escalate to POWH code blue team
- Manually displace uterus to the left, to reduce aortocaval compression<sup>1</sup> when attending adult BLS ensuring the woman's shoulders are flat to maximise effectiveness
- Notify the consultant in charge

#### No Return of Spontaneous Cardiac Output

- Proceed to Advanced Life Support immediately (the below steps can happen simultaneously)
- Perform a PMCS INSITU if ROSC is not achieved within four minutes at greater than 20 weeks gestation – See educational notes below for information and instruction
- Activate neonatal code blue
- Assess for suitability for ECMO. POWH Code Blue Team will assess and contact POWH ECMO team via 2222 if return of ROSC is not achieved within four minutes and where cause of cardiac arrest is NOT maternal haemorrhage (see Appendix 2)

#### Return of Spontaneous Cardiac Output

- Provide airway and breathing support if:
  - **Not breathing spontaneously**, provide breathing support with a manual self-inflated bag and mask attached to oxygen
  - **Breathing spontaneously** provide oxygen to maintain saturations >95% via nasal prongs, Hudson or NRB mask
- Ensure systematic A to I assessment
- Insert two large bore intravenous cannulas (minimum 16 gauge). If peripheral venous access is not possible, early consideration of central venous, intraosseous or venous cutdown access should be considered <sup>2</sup>

### Maternal Collapse

RHW CLIN132

- Take bloods for Electrolytes Urea Creatinine (EUC), Full Blood Count (FBC), coagulation profile (including fibrinogen), Group and Hold and Blood Sugar Level, venous blood gas and commence intravenous (IV) fluids
- Collect additional blue top blood tube for ROTEM guided management if suspicion of major coagulopathy and Activate Critical Bleeding Protocol (CBP). The senior medical officer in charge of the case is to arrange for blood bank to be contacted to activate the CBP (ext 23232)
- Perform where indicated (without impeding resuscitation):
  - Electro Cardio Graph (ECG) and collect arterial blood gas sample
  - Bedside ultrasound scan to assess for concealed haemorrhage
  - Fetal monitoring (not priority)
- Diagnose cause of collapse – modify management and consult with other teams as appropriate. See Appendix 3, educational notes and related CBRs and for management of specific conditions
  - If acute stroke is suspected escalate to POWH as per appendix 5
- Keep woman warm if haemorrhage is suspected, including warmed fluids
- Record fluid input and urine output

#### Communication and debriefing

- Ensure the next of kin is kept informed. A staff member may need to be assigned to support the family/baby until Social Worker is available (call social worker if required)
- After the event, ensure adequate counselling and debriefing for the woman and her family/support person(s) and for all staff involved

### 3.2 Documentation

- Adult resuscitation record
- Antenatal card
- Medical Record

### 3.3 Education Notes

- Early recognition of the deteriorating woman and the activation of appropriate CERS are essential components of safe quality patient care, with the understanding that maternal collapse may also occur without any warning signs
- All clinical staff must attend yearly mandatory Basic Life Support (BLS) training and Perinatal Safety education training
- Provide same defibrillation energy levels as non-pregnant woman if required
- **Perimortem Caesarean Section (PMCS)<sup>2,5</sup>**
  - also known as (Live) Resuscitative Hysterotomy
  - greater than 20 weeks gestation facilitates maternal resuscitation and should be performed regardless of fetal status.

## Maternal Collapse

RHW CLIN132

- It should be performed where maternal collapse has occurred and resuscitation is taking place, ideally achieved in 5 minutes
- Current practice is to commence PMCS after 4 minutes of absent circulation of the woman. However recent data suggests waiting until 4 minutes of resuscitation efforts is inadequate as birth of the fetus is uncommon in less than 1 minute, so therefore once the decision has been made for birth, it should proceed immediately<sup>5</sup>
- BLS should continue throughout PMCS
- Manual displacement of the uterus should be stopped immediately prior to incision
- A midline abdominal and classical (vertical) uterine incision will give the most rapid access, alternative entries may be used if operator is more familiar with different approach<sup>2</sup>
- Immediately following birth of the fetus and placenta, the uterus and abdomen should be packed and resuscitation continued
- Prompt transfer to theatres as soon as practically possible for sedation, anaesthesia and close of the uterus and abdomen<sup>2</sup>
- Click here for simulation of a [Perimortem caesarean section](#)
- A perimortem caesarean kit is available on all resuscitation trolleys across RHW including the Emergency Department, this should include a fixed blade scalpel and two cord clamps
- The commonly used medications in obstetric practice for treatment of therapeutic drug toxicity are<sup>2</sup>:
- Magnesium sulphate toxicity. The antidote is: 1 gram in 10mL, ( $\approx$ 10 ml 10%) calcium chloride. Administer 10mL given by slow intravenous injection over 3 minutes (in arrest trolley)
- Local anaesthetic (LA) agents. Lipid rescue should be used in cases of collapse secondary to local anaesthetic toxicity. (The protocol and medication are in the arrest trolley)
- Anaphylaxis as per Australian prescriber flowchart. See appendix 4. The ANZCOR ALS algorithm overrides this advice when there is no spontaneous cardiac output.

### 3.4 Related Policies/procedures

- [Clinical Emergency Response System \(CERS\): Management of the deteriorating patient](#)
- [Eclampsia Management](#)
- [Sepsis in Pregnancy and Postpartum](#)
- [Intralipid - Management and Treatment of Severe Local Anaesthetic Toxicity \(Adult Only\)](#)
- [Adrenaline infusion](#)
- [Basic Life Support - Adult](#)
- [Recognition and management of patients who are Deteriorating](#) MoH PD2020\_015
- [Acute Stroke – Management of Patients with Acute Stroke Symptoms](#) POWH CLIN045
- [Extracorporeal Membrane Oxygenation \(ECMO\)](#) POWH CLIN094

---

Maternal Collapse

RHW CLIN132

---

- [Critical Bleeding Protocol](#) POWH CLIN072
- [Prevention of Venous Thromboembolism](#) MoH PD2019\_057
- ANZCOR Guideline 11.2 – Protocols for Adult Advanced Life Support
- Adult Advanced Life Support - ANZCOR Guideline 11.2
- Cardiopulmonary Resuscitation (CPR) - ANZCOR Guideline 8

### 3.5 References

1. Australian Resuscitation Council. ANZCOR guideline 11.10: Resuscitation in Special Circumstances. 2016 [cited 2024 August]. Available from: <https://www.anzcor.org/home/adult-advanced-life-support/guideline-11-10-resuscitation-in-special-circumstances/>
2. RCOG (Green-top Guideline No.56) Maternal Collapse in Pregnancy and the Puerperium 2019
3. NSW Health Policy Directive PD2020\_010 Recognition and management of patients who are deteriorating Clinical Handover: Implementation of ISBAR Framework and Key standard Principles 2018 SESLHDPR/303
4. NSW Health, Clinical Handover – Standard Key Principles, PD2019\_020
5. Benson MD, Padovano A, Bourjeily G, Zhou Y. Maternal collapse: Challenging the four-minute rule. EBioMedicine. 2016 Apr;6:253–7.

## 4 ABORIGINAL HEALTH IMPACT STATEMENT DOCUMENTATION

- Considerations for culturally safe and appropriate care provision have been made in the development of this Business Rule and will be accounted for in its implementation.
- When clinical risks are identified for an Aboriginal and/or Torres Strait Islander woman or family, they may require additional supports. This may include Aboriginal health professionals such as Aboriginal Liaison Officers, health workers or other culturally specific services

## 5 CULTURAL SUPPORT

- For a Culturally and Linguistically Diverse CALD woman, notify the nominated cross-cultural health worker during Monday to Friday business hours
- If the woman is from a non-English speaking background, call the interpreter service: [NSW Ministry of Health Policy Directive PD2017\\_044-Interpreters Standard Procedures for Working with Health Care Interpreters.](#)

## 6 NATIONAL STANDARDS

- Standard 8 – Recognising and Responding to Acute Deterioration
- Standard 7 – Blood Management
- Standard 6 – Communicating for Safety
- Standard 5 – Comprehensive Care
- Standard 4 – Medication Safety
- Standard 2 - Partnering with Consumers

## 7 REVISION AND APPROVAL HISTORY

Date	Revision No.	Author and Approval
	1	Maternity CBR Committee
Nov 2011	2	Endorsed Obstetrics LOP Group
15/12/2011	3	Approved Quality & Patient Safety
Aug 2019	4	Amended: change PACE to CERS
19/5/2020	5	Reviewed & endorsed: Maternity Services LOP
31/03/2025	5	BRGC

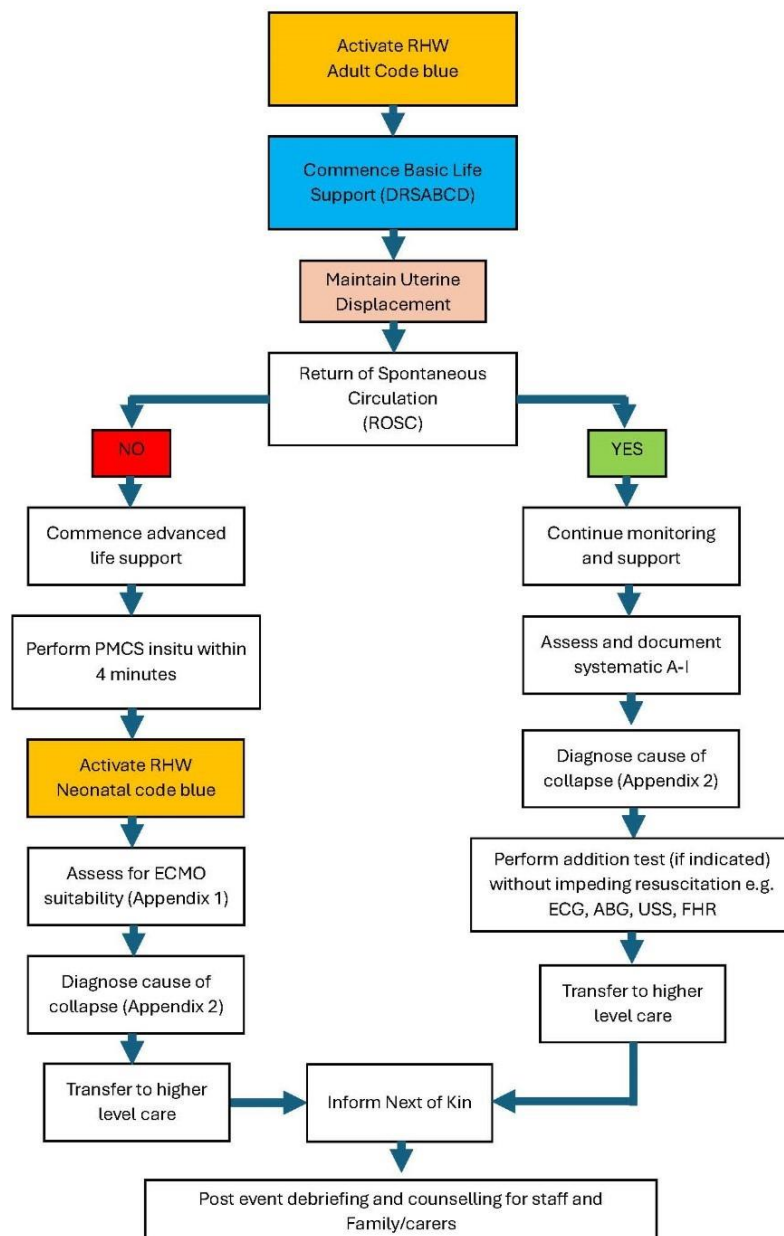
**BUSINESS RULE**

**Maternal Collapse**

**RHW CLIN132**

**Appendix**

**Appendix.1 Maternal Collapse Flowchart**





## BUSINESS RULE

---

### Maternal Collapse

RHW CLIN132

---

#### Appendix 2. ECMO at the Royal Hospital Women (Adult)

- The Prince of Wales ECMO Service will provide emergency ECMO for adult patients at the Royal Hospital for Women
- These patients may present with conditions specific to the peri-partum period that are acute and reversible, therefore amenable to ECMO support. These include:
  - Peri-partum cardiomyopathies
  - Amniotic fluid embolus
  - Pulmonary embolus
  - Acute exacerbations of chronic conditions
- Haemorrhagic shock or arrest is a **contraindication to ECMO**
- The activation pathway for ECMO is via – the resuscitation team leader. Activated via the emergency number '2222'
- The operating theatres at the RHW is the most suitable ECMO Location. If the woman is already in theatre the ECMO team should bring equipment and staff to the operating theatres.
- Women in any other location at the RHW should be moved to the suitable ECMO Location using the POWH [Extracorporeal Membrane Oxygenation \(ECMO\)](#) Business Rule Location Algorithm see appendix 3. For directions to Cath Lab from RHW see appendix 4 (Map of Royal Hospital for Women to Cath Lab.)

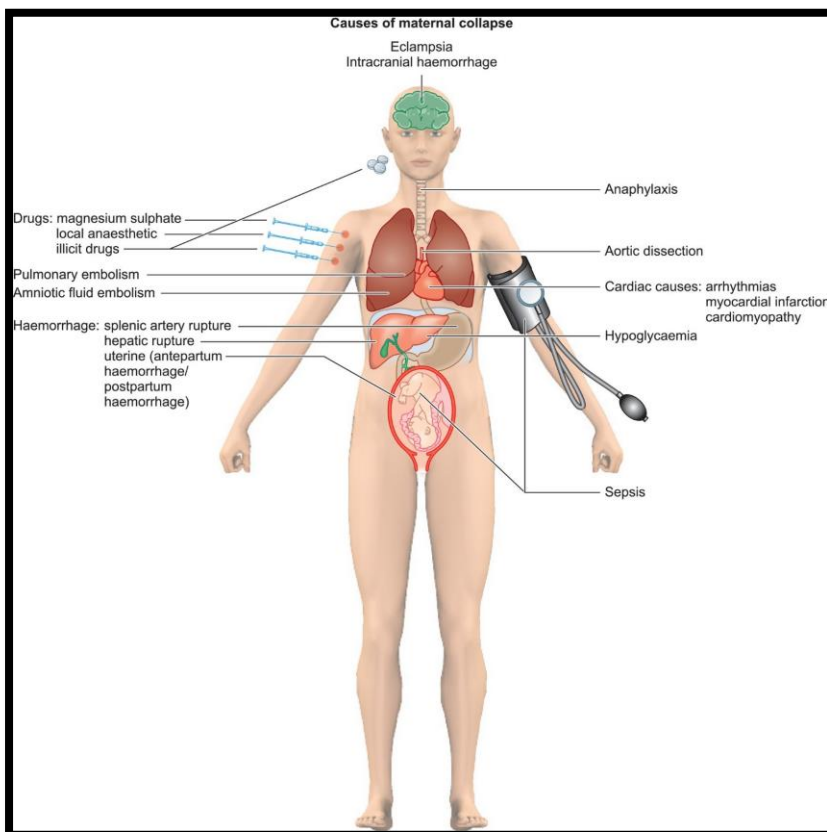
## BUSINESS RULE

### Maternal Collapse

RHW CLIN132

#### Appendix 3. Causes of maternal collapse

Reversible cause	Cause in pregnancy
<b>4H's</b>	
Hypovolaemia	Bleeding (obstetric/other; may be concealed) or relative hypovolaemia of dense spinal block, septic or neurogenic block
Hypoxia	Pregnant women can become hypoxic more quickly.  Cardiac events – peripartum cardiomyopathy, myocardial infarction, aortic dissection, large vessel aneurysms
Hypo/hyperkalaemia and Hyponatraemia	Hypo and hyperkalaemia are no more likely. Hyponatraemia may be caused by oxytocin use
Hypothermia	No more likely
<b>4T's</b>	
Thromboembolism	Amniotic fluid embolus, pulmonary embolus, air embolus, myocardial infarction
Toxicity	Local anaesthetic, magnesium, other
Tension pneumothorax	Following trauma/suicide attempts
Tamponade	Following trauma/suicide attempts
Eclampsia and pre-eclampsia	Includes intracranial haemorrhage




## BUSINESS RULE

### Maternal Collapse

RHW CLIN132

#### Appendix .4



## Anaphylaxis: emergency management for health professionals

**Clinical features**


Any acute onset of hypotension or bronchospasm or upper airway obstruction where anaphylaxis is considered possible, **even if typical skin features are not present**

OR

Any acute onset illness with typical skin features (urticarial rash or erythema/flushing, and/or angioedema) **PLUS** involvement of respiratory, cardiovascular, or persistent severe gastrointestinal symptoms

**1 Immediate action**

- Call for assistance
- Lay the patient flat – do not allow them to stand or walk. If unconscious or pregnant, place in recovery position (left lateral if pregnant) and maintain airway. If breathing is difficult, allow the patient to sit with legs outstretched. Hold young children flat, not upright.



**2 Give INTRAMUSCULAR ADRENALINE (EPINEPHRINE) into mid-lateral thigh without delay**

**Adrenaline dose chart (1:1000 ampoules containing 1mg adrenaline per 1 mL)**

Age (years)	Weight (kg)	Adrenaline volume 1:1000
<1	5-10	0.05-0.1 mL
1-2	10	0.1 mL
2-3	15	0.15 mL
4-6	20	0.2 mL
7-10	30	0.3 mL
10-12	40	0.4 mL
>12 and adult	>50	0.5 mL

**Repeat adrenaline every 5 minutes as needed**  
If multiple doses are required, consider adrenaline infusion if skills and equipment available (see step 5).

**Autoinjector**  
An adrenaline autoinjector, e.g. EpiPen or Anapen, may be used instead of an adrenaline ampoule and syringe.

- 150 microgram (0.15 mg) device for children 7.5-20 kg (aged ~1-5 years)
- 300 microgram (0.3 mg) device for children over 20 kg (aged ~5-12 years) and adults
- 300 microgram (0.3 mg) or 500 microgram (0.5 mg) device for children over 50 kg (aged ~>12 years) and adults

Instructions are on device labels and ASCIA Action Plans.

Remove allergen (if still present): flick out insect stings, freeze ticks with liquid nitrogen or ether-containing spray (if available) and allow to drop off.  
**ALWAYS give adrenaline FIRST, then asthma reliever puffer**, if someone with known asthma and allergy to food, insects or medicine has SUDDEN BREATHING DIFFICULTY (including wheeze, persistent cough or hoarse voice) even if there are no skin symptoms.

**3 Call ambulance to transport patient to hospital**  
Keep the patient flat and transfer to ambulance via stretcher. Do not allow them to stand or walk even if they appear to have recovered following administration of adrenaline.

**4 Supportive management**  
When skills and equipment are available:

- monitor pulse, blood pressure, respiratory rate, pulse oximetry
- give oxygen and airway support if needed
- obtain intravenous access in adults and hypotensive children
- if hypotensive, give intravenous normal saline (20 mL/kg rapidly) and consider additional wide-bore intravenous access.

**5 Additional measures**  
**Adrenaline (epinephrine) infusion**  
If inadequate response or deterioration, start an intravenous adrenaline infusion as follows:  
Give only in liaison with an appropriate specialist. Phone .....  

- Mix 1 mL of 1:1000 adrenaline in 1000 mL of normal saline
- Start infusion at 5 mL/kg/hour (0.1 microgram/kg/min)
- Titrate rate according to response
- Monitor continuously

**If adrenaline (epinephrine) infusion is ineffective or unavailable, also consider:**

- For upper airway obstruction**
  - nebulised adrenaline (5 mL, i.e. 5 ampoules of 1:1000)
  - intubation if skills and equipment are available
- For persistent hypotension/shock**
  - give normal saline (maximum 50 mL/kg in the first 30 min)
  - in patients with cardiogenic shock (especially if taking beta blockers) consider an intravenous glucagon bolus of 1-2 mg in adults (in children: 20-30 micrograms/kg up to 1 mg). This may be repeated or followed by an infusion of 1-2 mg/hour in adults
  - in adults, selective vasoconstrictors metaraminol (2-10 mg) or argipressin (vasopressin) (10-40 units) only after advice from an appropriate specialist
- For persistent wheeze**
  - bronchodilators: salbutamol 8-12 puffs of 100 micrograms using a spacer or 5 mg salbutamol by nebuliser
  - oral prednisolone 1 mg/kg (maximum 50 mg) or intravenous hydrocortisone 5 mg/kg (maximum 200 mg)

**6 Observation**  
Prolonged and biphasic reactions may occur.  
Observe the patient for at least 4 hours after last dose of adrenaline.  
Observe longer (overnight) if the patient:

- had a severe reaction (hypotension or hypoxia), or
- required repeated doses of adrenaline, or
- has a history of asthma or protracted anaphylaxis, or
- has other concomitant illness, or
- lives alone or is remote from medical care, or
- has known systemic mastocytosis.

Document food, medicine, sting/bite exposure in the 2-4 hours before anaphylaxis.

**7 Follow-up treatment**  
**Corticosteroids**  
The role of corticosteroids is unknown. It is reasonable to prescribe a 2-day course of oral steroid (e.g. prednisolone 1 mg/kg, maximum 50 mg daily) to reduce the risk of symptom recurrence after a severe reaction or a reaction with marked or persistent wheeze. Corticosteroids should only be administered after adrenaline and resuscitation.  
**Adrenaline (epinephrine) autoinjector**  
Prescribe an autoinjector, pending specialist review. Train the patient in autoinjector use and give them an ASCIA Action Plan for Anaphylaxis - [www.allergy.org.au](http://www.allergy.org.au).  
**Allergy specialist**  
Refer patients with anaphylaxis for review.  
**Antihistamines**  
Antihistamines have no role in treating respiratory or cardiovascular symptoms of anaphylaxis. Oral non-sedating antihistamines treat itch and urticaria. Injectable promethazine should NOT be used in anaphylactic shock as it can worsen hypotension.

Originally published in the April 2018 edition of *Australian Prescriber* (vol. 41, no. 2), and updated in 2022. <https://doi.org/10.18773/austprescr.2018.014>  
Endorsed by the Australasian College for Emergency Medicine, the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists, the Australasian Society of Clinical Immunology and Allergy (ASCI), the Australian College of Rural and Remote Medicine, the Australian Dental Association, the Internal Medicine Society of Australia and New Zealand, and the Royal Australasian College of Physicians.  
This Anaphylaxis Walkchart has been officially recognised as an Accepted Clinical Resource by the Royal Australian College of General Practitioners.

**BUSINESS RULE**

**Maternal Collapse**

**RHW CLIN132**

**Appendix .5 Management of patients with suspected or identified acute stroke symptoms at RHW**

