Safer Care Victoria

How can we better manage anaphylaxis in Victoria?

A report from the Victorian Paediatric Clinical Network Anaphylaxis Expert Group

VICTORIA State Government

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Authorised and published by the Victorian Government, 1 Treasury Place, Melbourne.

ISBN/ISSN <number>
Available at https://www2.health.vic.gov.au/hospitals-and-health-services/quality-safety-service/clinical-networks/clinical-network-paediatric
(1705050)

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Executive summary

The Victorian Chief Medical Officer of Quality and Safety has identified the need for a system-wide view on how acute anaphylaxis is managed in Victorian hospitals. In common with other states, Victoria is experiencing increasing emergency department admission rates of anaphylaxis, which present a challenge for acute management and appropriate follow-up. Between 2014 and 2015 there was a 16.21 per cent increase in emergency department anaphylaxis presentations. Forty-eight per cent of these presentations were reported as food-related.

The purpose of the Victorian Paediatric Clinical Network (VPCN) Anaphylaxis Expert Advisory Group is to advise Safer Care Victoria on the resources and guidelines required to realise a consistent system-wide view on managing anaphylaxis in Victorian hospitals. The group reviewed how anaphylaxis is currently managed in hospitals and assessed existing resources and policies, identifying strengths, weaknesses and opportunities for improvement. The guiding principle applied by the expert advisory group was that guidelines and resources developed by the recognised leaders in the field should be referenced.

Key findings

- The incidence of anaphylaxis in Victoria is increasing on a yearly basis, with the predominant number of presentations being food-related. The number of food related anaphylaxis deaths in Victoria has increased in recent years.
- Children with food-related anaphylaxis are transitioning to adult care in growing numbers.
- There is limited evidence available to improve our understanding of the rise in food-related or drug-related anaphylaxis.
- There is no single anaphylaxis guideline exclusively used by all healthcare services in Victoria.
- The Australasian Society of Clinical Immunology and Allergy (ASCIA) guideline is the most commonly used guideline and crosses all sectors.
- Information contained in guidelines varies considerably, and information gaps exist from guideline to guideline.
- The ASCIA anaphylaxis management guidelines and the statewide paediatric guidelines contain sufficient information for continued promotion.
- There are service access constraints to followup/review appointments with paediatric and adult allergy specialists.
- Food safety programs in hospitals are not well understood by clinical staff.
- Food-related anaphylaxis incidents are potentially preventable if clear management plans are adhered to and managed well in the community.
- The education of relevant professionals across the continuum of care where the recognition, response and review of anaphylaxis is concerned needs to be improved.
- The confidence of health professionals and community providers in using intramuscular adrenaline needs to be improved.
- Lessons can be learnt from the Department of Education and Training's approach to minimising the risk of anaphylaxis in schools.

Summary of recommendations

To be completed 2017

- It is recommended that the VPCN Anaphylaxis Expert Group works with ASCIA and the Statewide Paediatric Clinical Practice Guidelines Governance Group to ensure the guidelines:
  - indicate that consideration be given to early treatment for anaphylaxis in patients presenting with severe asthma where there is a history of anaphylaxis
  - comply with the latest evidence regarding posture and adrenaline escalation guidelines (intramuscular, intravenous infusion) and present this information in an unambiguous manner
  - provide simplified adrenaline infusion and dose guidelines
  - provide advice on discharge procedures that includes completing an ASCIA action plan, prescribing an adrenaline autoinjector for food-related/insect/idiopathic anaphylaxis incidents and confirming a referral to a specialist allergy clinic.
- It is recommended that Safer Care Victoria write to the Australian Commission for Safety and Quality in Healthcare requesting the prioritisation of a clinical care standard for the management of anaphylaxis.
- It is recommended that Safer Care Victoria formally requests that Ambulance Victoria and St John's Ambulance review their guidelines to ensure compliance with the ASCIA guidelines (with emphasis placed on transport posture).
- It is recommended that the Anaphylaxis Expert Group advises the National Asthma Council Australia (NAC) of its findings in relation to the need for better recognition of anaphylaxis including in people with asthma, and requests that the NAC ensures that recognition and early treatment of anaphylaxis is addressed in its asthma first aid protocol, asthma action plan template and asthma clinical guidelines (*Australian asthma handbook*).
- It is recommended that the Anaphylaxis Expert Group advises the Australasian College for Emergency Medicine (ACEM) of its findings in relation to the need for training in recognition, response and review of anaphylaxis. The ACEM should be requested to address the education gap in relation to anaphylaxis.
- It is recommended that Safer Care Victoria requests that hospitals ensure all staff serving food to patients attend food handling training that includes information specific to food allergen management.
- It is recommended that the VPCN Anaphylaxis Expert Group supports the work currently being undertaken by the department's Food Safety Unit to clarify and convey, as appropriate, how food safety laws extend to hospitals and hospital staff, outside of the kitchen. It is further recommended that Safer Care Victoria request Victorian hospitals' develop food allergy policies and procedures in line with advice from the Food Safety Unit.

To be completed 2018–2020

- It is recommended that the challenges and opportunities to hospitals introducing policies in relation to patients' own use of emergency medicine in hospital are better understood. A time-limited cross-sectoral expert group led by Safer Care Victoria inclusive of the Poisons Regulation Unit, hospital pharmacy representatives, emergency care representatives, ward representatives and public hospital insurers should be established as a matter of priority to better understand the issues.
- It is recommended that Safer Care Victoria explores the opportunities presented by the Murdoch Childrens Research Institute 'Allergy in the Community' trial in which 25 community-based paediatricians have been trained to diagnose and manage food allergy.
- It is recommended that Safer Care Victoria requests that the Department of Health and Human Services Acute Programs area launch an awareness campaign aimed at staff who have a clinical interaction with patients in hospitals to recognise, respond and review anaphylaxis. Intramuscular adrenaline must be emphasised.
- It is recommended that Safer Care Victoria requests hospitals consider embedding anaphylaxis training in resuscitation education which is regularly provided to hospital staff.
- It is recommended that the VPCN works with the Department of Education and Training to continue to build awareness of appropriate adrenaline administration into existing training offered to schools and childcare organisations.
- It is recommended that Safer Care Victoria support adherence to a clinical care standard for the management of acute anaphylaxis.
- It is recommended that the Anaphylaxis Expert Group continues to keep identifying system-related issues that must be addressed to improve the management of anaphylaxis in Victoria. Areas include, the transition of children to adult care and improved data collection.

Background

In December 2013, 10-year-old Melbourne boy Ronak Warty died after consuming a coconut drink that contained milk. Ronak was allergic to milk; however, the product's labelling failed to declare its presence. The June 2016 release of the coronial inquiry into Ronak's death focused attention on how anaphylaxis was managed in Victoria. In her findings, the Victorian Coroner noted that the hospital that treated Ronak did not report the offending product to the Food Safety Unit at the Department of Health and Human Services because they didn't know they could, which meant the product remained on the shelves for six weeks before being recalled.

In response to this and other cases, Victoria's Chief Medical Officer of Quality and Safety reviewed sentinel events and several allergy and anaphylaxis clinical incidents in Victorian hospitals. Ryan's story provides a picture of the systemic issues identified by the review.

Ryan's story

Ryan is a 16-year-old unstable asthmatic who is allergic to egg, fish, shellfish and dairy. Since Ryan was six months old he has been visiting hospitals as an emergency patient, inpatient and outpatient. During hospital visits and hospital stays Ryan has been frequently offered inappropriate food by hospital staff and/or volunteers, despite wearing a red wristband to indicate his allergies.

To protect Ryan, his mother Susan has been vigilant with his food. She checks food labels and has educated Ryan to do the same. A change in school canteen suppliers contributed to Ryan's last anaphylactic episode. A previously 'safe' item was subject to a change of ingredients. The ordering website for the school's canteen was operated by an external provider and there was no capacity to list ingredients on the site. When Ambulance Victoria attended to Ryan he had been administered adrenaline via an Epipen. They walked him to the ambulance, contrary to the current recommendation that the patient remains supine following treatment for an anaphylaxis episode.

Ryan and Susan want to see the following improvements made:

- No patient has a food-related anaphylaxis episode caused by a hospital.
- All hospital staff with direct patient exposure are aware of anaphylaxis, its risk factors and its consequences.
- All retrieval and health service staff with clinical patient exposure are aware of the correct posture for transporting patients and the latest evidence in clinical practice guidelines.
- All anaphylaxis patients have unrestricted access to their adrenaline autoinjector in hospital.

Ryan and Susan have worked with Monash Health to introduce an allergen-free paediatric menu.

The Quality and Safety office has identified the need for a system-wide view on how acute anaphylaxis is managed in Victorian hospitals. Recognising the importance of a consistent approach, the Chief Medical Officer of Quality and Safety approached the Victorian Paediatric Clinical Network (VPCN) to convene an expert group to provide advice to Safer Care Victoria on managing acute anaphylaxis in Victorian hospitals.

Purpose

This work is being undertaken to advise Safer Care Victoria on the resources and guidelines required to realise a consistent system-wide view on managing anaphylaxis in Victorian hospitals. While not the focus of this report, many of the issues raised will be relevant to the management of anaphylaxis in contexts other than hospitals – for example, in general practice and schools.

Part 1 of this report introduces anaphylaxis, providing:

- an overview of how anaphylaxis is currently managed in hospitals, its prevalence and trajectory
- a brief review of jurisdictional arrangements in Australia to understand funding and resources
- a mapping of existing guidelines and action plans in use in Victoria, focusing on risk factors
- an assessment of existing resources and policies, identifying strengths, weaknesses and opportunities for improvement.

Part 2 presents experiential evidence from the expert group and provides the group's findings and recommendations for managing anaphylaxis in Victoria.

Please note: Mandatory reporting of anaphylaxis in hospitals is not within the scope of this report. Mandatory reporting of anaphylaxis is currently being investigated by the Department of Health and Human Services and will be subject to a separate report.

Part 1: Anaphylaxis in 2017

1.1 About anaphylaxis

1.1.1 Definition

The Australasian Society of Clinical Immunology and Allergy (ASCIA) defines anaphylaxis as an acute allergic reaction involving the widespread release of histamine and other mast cell mediators, resulting in clinical findings such as cardiorespiratory compromise (tachycardia, hypotension, stridor and wheeze), gastrointestinal muscle contraction (vomiting and/or diarrhoea) and skin or mucosal findings (such as urticaria or angioedema).

Anaphylaxis is a potentially life-threatening, severe allergic reaction and should always be treated as a medical emergency. Adrenaline injected into the outer mid-thigh muscle is the first-line treatment for anaphylaxis. Adrenaline is a natural hormone released in response to stress. When injected, adrenaline rapidly reverses the effects of anaphylaxis by reducing throat swelling, opening the airways and maintaining heart function and blood pressure.

Adrenaline autoinjectors are designed to administer a single fixed dose of adrenaline into the muscle of the outer mid-thigh. Patients assessed as having a significant risk of anaphylaxis are prescribed an adrenaline autoinjector to carry. The only brand currently available in Australia is EpiPen (although a second device is expected to be available from mid-2017).

1.1.2 Diagnosis

Within the hospital setting, anaphylaxis can be diagnosed in emergency departments, radiology departments, on the ward or in surgery. In the community, anaphylaxis can be recognised by retrieval and transfer services, by general practitioners, at schools, by first aid providers, in maternity and child health settings, in childcare organisations and in the home. Anaphylaxis is considered a medical emergency. If someone has anaphylaxis in the community they are transported to hospital or to a general practitioner, whether or not adrenaline has been administered by an autoinjector. Following presentation to an emergency department or general practitioner, if the individual's history and examination suggest a severe allergic reaction (anaphylaxis) then referral to an allergy specialist is indicated.

1.1.3 Prevalence

Food-related anaphylaxis accounts for approximately 48 per cent of anaphylaxis presentations to Victorian emergency departments.[1] Anaphylaxis hospital admissions are increasing in all age groups, with the average year-on-year increase in anaphylaxis presentations to Victorian emergency departments at 13.69 per cent over the past five years.

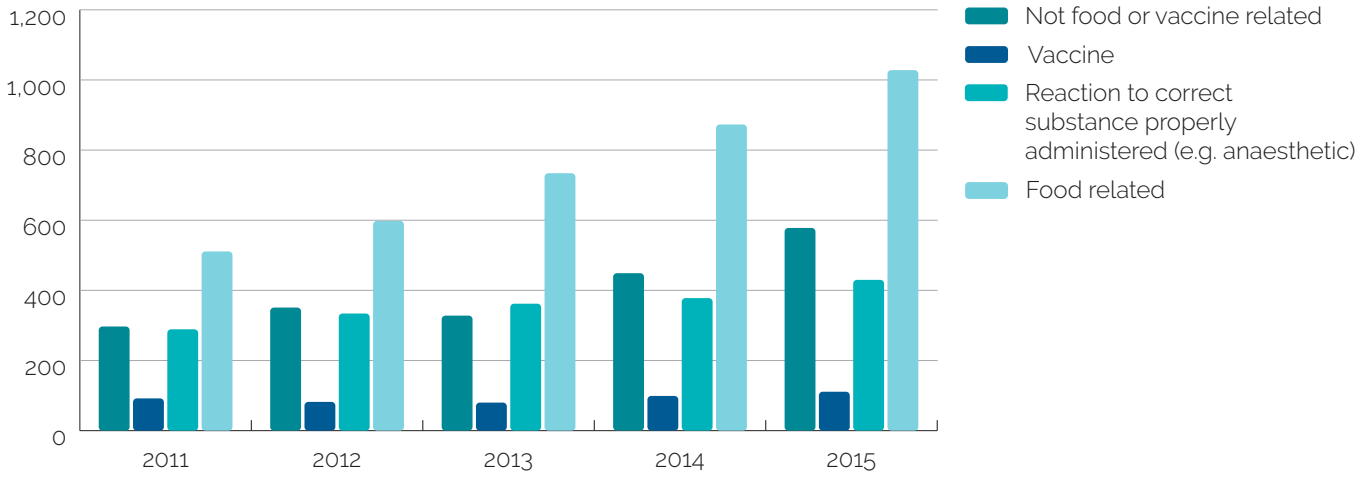
Food-induced anaphylaxis is most common in children. The majority of hospitalisations occur in children under four years of age; however, the incidence in the five to 14-year age group is also increasing.[2] Allergies are more frequently continuing into the late teens, creating an additional health burden.

1 Victorian Emergency Minimum Dataset, 2011 to 2016.

2 Mullins RJ, Dear KB, Tang ML 2015, 'Time trends in Australian hospital anaphylaxis admissions in 1998–1999 to 2011–12', *Journal of Allergy and Clinical Immunology*, vol. 136, no. 2, pp. 367–375.

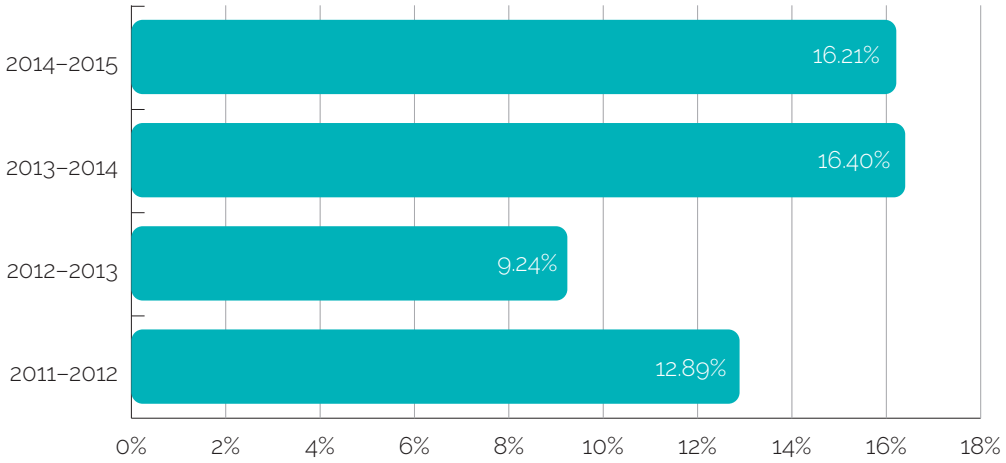
The Victorian Emergency Minimum Dataset (VEMD) comprises de-identified demographic, administrative and clinical data detailing presentations at Victorian public hospitals with designated emergency departments. VEMD data shows that the number of presentations for anaphylaxis is increasing (see Figure 1).

Figure 1: Anaphylaxis presentations to Victorian emergency departments



The VEMD data relating to anaphylaxis presentations suggests an increase of 16.21 per cent between 2014 and 2015 (see Figure 2).

Figure 2: Year-on-year increase – total anaphylaxis presentations in Victoria



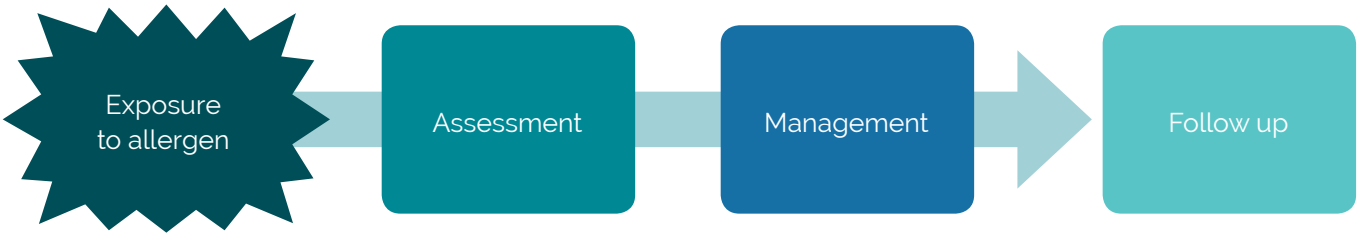
The VEMD data relating to food-related anaphylaxis presentations suggests an increase of 15.08 per cent between 2014 and 2015.

A recent study of children presenting to three Victorian emergency departments found that approximately half of those meeting accepted clinical diagnostic criteria for anaphylaxis were given an alternative, less serious, diagnosis. The majority of these cases had improved prior to hospital attendance. The study found that anaphylaxis is less likely to be diagnosed if symptoms resolve prior to arrival at an emergency department. The study further found that emergency department assessment has a low sensitivity but high specificity for paediatric anaphylaxis. Referral to a specialist allergy service, provision of an appropriate action plan and prescription of adrenaline autoinjectors are all less likely in those not diagnosed with anaphylaxis.[3,4] Despite the increasing prevalence, anaphylaxis fatalities are low. Between 1997 and 2005, 112 Australian fatalities were a result of anaphylaxis, with seven (six per cent) related specifically to food. In Victoria, the Council of Obstetric and Paediatric Mortality and Morbidity reports that seven Victorian food anaphylaxis deaths were recorded between 2012 and 2016. Asthma was active in all fatal food-related anaphylaxis cases where data was available. The leading causes of fatal anaphylaxis were medication or insect stings, most commonly in adult males over 50 years of age with multiple comorbidities.[5] Between 2002 and 2004 there were approximately 10 deaths per year in Australia. Between 2002 and 2004, fatalities increased to 20 deaths per year.

1.1.4 Managing acute anaphylaxis

The typical care pathway of a person suffering an acute anaphylactic episode is depicted in Figure 3.

Figure 3: Flowchart illustrating the general pathway of a patient from exposure to follow-up



3 Thomson H, Seith R, Craig S 2017, 'Inaccurate diagnosis of paediatric anaphylaxis in three Australian emergency departments, *Journal of Paediatrics and Child Health*. doi:10.1111/jpc.13483.
4 Thomson H, Seith R, Craig S, 2015, 'Paediatric anaphylaxis: Are we following current guidelines?' ACEM Annual Scientific Meeting, November 2015, Brisbane.
5 Mullins RJ, Wainstein BK, Barnes EH, Liew WK, Campbell DE 2016, 'Increases in anaphylaxis fatalities in Australia from 1997 to 2013', *Clinical and Experimental Allergy*, vol. 46, no. 8, pp. 1099–1110.

The care pathway begins at the assessment of a person who may have been exposed to an allergen. If it is identified that an allergen is present, the allergen is removed (if still present) and the person exposed is then treated to manage the reaction. An intramuscular injection of adrenaline is administered without delay using an adrenaline autoinjector or adrenaline ampoules and syringe. Some patients may require more serious intervention. Those who have an allergic reaction severe enough to require adrenaline will require further follow-up by a clinical immunology/allergy specialist to ensure appropriate risk reduction and symptom management. Evidence-based clinical practice guidelines (CPGs) guide best practice decision making across the care pathway, from recognition of anaphylaxis to follow-up care. CPGs translate findings from health research into recommendations for clinical practice and, when implemented, can improve health outcomes.[6] Currently, Australian CPGs are produced by disparate groups including government agencies, health services and professional societies. One key rationale for developing CPGs is the rapid growth in research knowledge in some clinical areas, which means that recommendations for best practice may change as the results of important studies or new treatments become available. The value of evidence-based guidelines depends on the extent to which guideline recommendations reflect current knowledge. High-quality CPGs provide an opportunity to close the gaps between current clinical practice and the best available evidence.

1.2 The national context

1.2.1 Funding arrangements

As part of the *National medicines policy*, the Pharmaceutical Benefits Scheme (PBS) provides reliable and affordable access to necessary medicines for Australians. In relation to adrenaline autoinjectors, the PBS states that the initial PBS authority prescription is provided by or in consultation with a specialist (typically an allergy/immunology specialist, paediatrician or respiratory physician). Patients assessed as having a significant risk of anaphylaxis are prescribed an adrenaline autoinjector. A prescription can (and should) be provided at discharge from hospital following treatment for anaphylaxis with adrenaline. A prescription can be provided at discharge from hospital when treatment for anaphylaxis has not required adrenaline administration after discussion with a relevant specialist(listed above). Continuing PBS authority prescriptions for adrenaline autoinjectors can be provided by a general practitioner. Adrenaline autoinjectors are available on PBS authority prescription, with a maximum of two adrenaline autoinjectors per patient at any one time. No repeats can be issued. Renewal is required prior to the device's expiry or after use of the device. If required, additional devices can be purchased at full price over the counter from a pharmacy.

Food-related allergy testing

Medicare rebates are available for skin-prick tests (item numbers 12000 and 12003) or blood tests for allergen-specific IgE (formerly known as RAST) in Australia. There is currently no Medicare Benefit Scheme (MBS) item number for physician supervised oral food challenge, however, a Medical Services Advisory Committee (MSAC) application for this is currently in process.

6 Buchan HA, Currie KC, Lourey EJ, Duggan GR 2010, 'Australian clinical practice guidelines – a national study', *The Medical Journal of Australia*, vol. 192, no. 9, pp. 490–494.

1.2.2 Education

Childcare settings

Under the Education and Care Services National Regulations 2011, the National quality framework requires education and care services to follow the requirements of this regulation. More specifically regarding anaphylaxis training, centre-based services must have at least one educator who has undertaken current approved anaphylaxis management training. Family day care centres must ensure that each family day care educator and family day care assistant engaged or registered with the service has undertaken anaphylaxis training approved by the Australia Children's Education and Care Quality Authority. The centres are required to have at least one person working at the centre at any given time who has had anaphylaxis training.

General practice

First aid training is a requirement of all staff working in general practice. The Royal Australasian College of General Practitioners (RACGP) Standards for general practices (standard 3.2 Education and training) specifies that this must include training in cardiopulmonary resuscitation (CPR). CPR training for administrative staff may be conducted by medical staff or other clinical staff who feel competent to train colleagues. Alternatively, CPR training for administrative staff may be conducted by an accredited training provider.

CPR training does not, however, include a module on anaphylaxis.

1.3 The Victorian context

1.3.1 The Duckett Review

The report *Targeting zero: supporting the Victorian hospital system to eliminate avoidable harm and strengthen quality of care* was released in October 2016. One of the report's key findings is that the oversight of quality and safety arrangements in Victoria needs to be significantly improved. The report found substantial variation in clinical practice, management, systems and outcomes, recommending that:

> … where clinical networks or the proposed Office of Safety and Quality Improvement (OSQI) identify a need for standardisation, the CEO of OSQI should issue authoritative guidance with the expectation (or requirement) that it be adopted throughout Victoria, drawing on the findings of clinical networks, best practice in Victorian and other Australian hospitals, and the work of the National Health and Medical Research Council Advanced Health Research and Translation Centres (p. 154).

These new oversight arrangements would have implications for managing anaphylaxis in hospitals given the potential for non-vigilance to cause avoidable harm.

1.3.2 Food allergy testing

The Royal Children's Hospital (RCH) offers Victoria's only publicly funded paediatric non-admitted allergy service. At the time of publication there were about 2,500 patients on the RCH waiting list. Approximately fifty per cent have been referred for evaluation of food allergy. A significant delay in review of these patients with food-related allergy can occur. Patients who have been referred following potential anaphylaxis are triaged as urgent and are seen within four weeks. Urgent triage requires identification of potential anaphylaxis and a referral needs to indicate this.

The Murdoch Childrens Research Institute is currently running the 'Allergy in the Community' controlled trial. During the trial, 25 community-based paediatricians have been trained to diagnose and manage food allergies. Regional sites including Latrobe Regional Hospital and Albury-Wodonga Paediatric Group are involved in the trial, along with inner and outer metropolitan Melbourne sites. The trial is due to finish in late 2018. (relevance) Children with likely anaphylaxis continue to be treated at the Royal Children's Hospital.

Physician supervised oral food challenges to determine the development of tolerance to foods to which a patient has had previously documented allergy or sensitisation is performed publically at RCH (the current waitlist exceeds 6 months). Food challenges can also be procured (out of pocket gap fees apply) from private allergy challenge clinics.

There is limited access to anaesthetic allergy testing clinics. The Royal Melbourne Hospital and The Alfred both offer two lists a week.

1.3.3 Food safety arrangements

Local government is predominantly responsible for food regulation in Victoria through administration of the *Food Act 1984* and, as a consequence, the Australia New Zealand Food Standards Code (the Code).

Under the Food Act all businesses, organisations, individuals and community groups selling food or drinks must be registered with or notified to their local council, and must comply with the requirements of the Act and the Code. The requirements vary according to the premises type, but high risk premises such as hospitals must have a food safety program, a trained food safety supervisor and are subject to third party food safety audits.

As part of its statutory role, the department's Food Safety Unit is involved in food recalls, the investigation of certain food complaints including those pertaining to food allergens, incidents involving outbreaks of food-borne illness and responding to public health emergencies. It also has a significant role in developing regulations, policies and strategies that support a safe food system and in informing and educating businesses and the community on food safety issues.

The Food Safety Unit has identified food allergens, and their identification and management in relation to food businesses and food manufacturers (including hospitals), as a priority area for policy and resource development over the next two to three years. Factsheets for hospitals were distributed in December 2016. The factsheets are expected to help staff identify food containing undeclared food allergens and to play their part in having the food removed from the marketplace through reporting to the Food Safety Unit.

As part of this food allergen program, the Unit is currently in the process of undertaking some work to clarify how food safety laws extend to hospitals and hospital staff outside of the kitchen, specifically with respect to food allergens, with a view to conveying this to the relevant stakeholders, including hospitals, council environmental health officers and food safety auditors.

1.3.4 Education

In July 2008 there was an amendment to the *Children's Services Act 1996* and the *Education and Training Reform Act 2006* – the *Children's Services and Education Legislation Amendment (Anaphylaxis Management) Act 2008* – that governs licensed children's services in Victoria. This amendment led to a Ministerial Order (MO706) making it mandatory for anaphylaxis management policies to be in place for all child health services and schools. Children's services that fall under the Children's Services Regulations 2009 are required to meet a minimum training standard of first aid and anaphylaxis training provided by an approved organisation. In addition to this, all staff on duty are required to have completed training on administering an adrenaline autoinjector device.

Schools

Under the Children's Services and the Education and Training Reform Acts, any school that has enrolled a student or students at risk of anaphylaxis must have an anaphylaxis management policy in place. All policies must include:

- a statement that the school will comply with MO706 and associated guidelines
- a statement that in the event of an anaphylactic reaction the school's first aid and emergency management response procedures and the student's individual anaphylaxis management plan must be followed
- the development and regular review of individual anaphylaxis management plans for affected students
- prevention strategies to be used by the school to minimise the risk of an anaphylactic reaction
- the purchase of 'backup' adrenaline autoinjector(s) as part of the school first aid kit(s), for general use
- the development of a communication plan to raise staff, student and school community awareness about severe allergies and the school's anaphylaxis management policy
- regular training and updates for school staff in recognising and responding appropriately to an anaphylactic reaction, including competently administering an adrenaline autoinjector
- the completion of an annual anaphylaxis risk management checklist.

The Victorian Department of Education and Training provides online and facilitated education on recognising and treating anaphylaxis for public school-based and early learning centre staff. The department has contracted the Asthma Foundation to deliver training in the Course in Verifying the Use of Adrenaline Autoinjector Devices 22303VIC. Schools are asked to register two staff per school or campus to attend. Training in this course is current for three years.

A parent's information factsheet on anaphylaxis is available via the Better Health Channel at <https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/anaphylaxis>.

Hospitals

The National Allergy Strategy project is developing a hospital food handlers food allergy course. The course is expected to be available from June 2017.

Although food safety management and training is overseen by the Food Safety Unit, there are no legislative requirements for hospitals to provide training to staff on anaphylaxis.

1.4 Anaphylaxis management guidelines

The Australian Commission on Safety and Quality in Health Care (ACSQHC) does not recommend using a specific guideline for managing anaphylaxis in hospitals but advises that agencies analyse the risks of nominated guidelines prior to adopting a standard. The ACSQHC confirmed (March 29th 2017) that to date no decision has been made by the commission to undertake work on anaphylaxis.

A recent Monash Health Centre for Clinical Effectiveness project (commissioned by the VPCN) analysed current anaphylaxis management guidelines (see Appendix 1). Key findings include the following.

- The ASCIA guidelines are widely referred to in community services, primary healthcare, retrieval services and hospitals.
- All states have recommended anaphylaxis guidelines for schools in line with state legislation. Victoria recommends the ASCIA guidelines.
- First aid service providers are not bound by state or national policy regarding assessing or managing anaphylaxis.
- Transfer and retrieval services are not bound by state or national policy regarding assessing or managing anaphylaxis.
- Primary care settings are not bound by state or national policy regulations regarding anaphylaxis.

Victorian hospitals are not bound by state or national policy regulations regarding anaphylaxis. Instead, hospitals may publish specific internal institution policies that regulate the assessment, management and follow-up of patients who present with anaphylaxis.

Table 1 provides a summary of Victoria's anaphylaxis-related policies, guidelines and training providers.

Table 1: Summary of each service area and its overarching policy, guidelines and training providers of anaphylaxis education

Area	Policy/legislative environment	Guideline	Education
Childcare	Children's Services Regulations 2009 *Children's Services and Education Legislation Amendment (Anaphylaxis Management) Act 2008*	ASCIA	Accredited courses: • Course in Anaphylaxis Awareness (10313NAT) • Course in First Aid Management of Anaphylaxis (22099VIC) or (22300VIC) • Apply Advanced First Aid (HLTFA412A) • Provide an Emergency First Aid Response in an Education and Care Setting (HLTAID004) • Course in Emergency Asthma and Anaphylaxis Management (80969ACT) • Course in Anaphylaxis Management (30728QLD) • Ensure the Health and Safety of Children (CHCCN301B), (CHCCN301C) or (CHCECE002) • Anaphylaxis E-Training for Australasian Childcare provided by ASCIA • Anaphylaxis training for NSW Childcare or WA Childcare provided by ASCIA • Course in Anaphylaxis Management in WA Education and Care Services provided by the Department of Education WA • Management and Prevention of Allergy and Anaphylaxis provided by the Royal Children's Hospital Melbourne • Anaphylaxis E-Learning Program provided by the NSW Department of Education and Communities
Schools	Ministerial Order no. 706: *Anaphylaxis management in Victorian schools, Education and Training Reform Act 2006*	ASCIA	ASCIA Anaphylaxis e-training for Victorian Schools; Asthma Foundation (22300VIC); Asthma Australia (10312NAT); St John's First Aid (22300VIC)
First aid service providers	Internal policy	Australian Resuscitation Council, ASCIA	Training is conducted in-house using the 22300VIC Course in First Aid Management of Anaphylaxis and ASCIA e-Learning

continued...

Area	Policy/legislative environment	Guideline	Education
Ambulance Victoria	Internal policy	World Allergy Organization	Training through degree, or internal
Primary care		Australian Prescriber wallchart, ASCIA	Training through degree and thereafter on own initiative
Hospitals	Internal policy	ASCIA, AAAAI, Statewide paediatric guideline, internal guidelines	Training through degree, or internal

AAAAI = The American Academy of Allergy, Asthma and Immunology

National Allergy Strategy

The National Allergy Strategy is an initiative of ASCIA and Allergy & Anaphylaxis Australia (A&AA). In 2016–17, the National Allergy Strategy received funding from the Australian Government for specific projects relating to drug allergy management in hospitals: resources for teens/young adults at risk of anaphylaxis; and developing an online food allergy course for the food service sector. The goals of the National Allergy Strategy are to:

- develop **standards of care** to improve the health and quality of life of people with allergic diseases
- ensure timely **access** to appropriate healthcare management for people with allergic diseases
- improve access to best practice, evidence-based and **consistent information, education and training** on allergic diseases for health professionals, people with allergic diseases, consumers, carers and the community
- promote patient-focused **research** to prevent the development of allergic diseases and improve the health and quality of life of people with allergic diseases
- gain recognition of allergic diseases as a **prioritised chronic disease** and National Health Priority Area.

The National Allergy Strategy endorses the use of the ASCIA guidelines. The National Allergy Strategy has prioritised the development of clinical care standard for anaphylaxis and has approached ACSQHC in relation to this. The National Allergy Strategy, ASCIA and Allergy & Anaphylaxis Australia believe that a clinical care standard for anaphylaxis will ensure that ASCIA e-training courses, guidelines, action plans, clinical updates and other resources for food allergy and anaphylaxis management are used appropriately, to improve patient outcomes.

A comparison of the ASCIA guidelines and other commonly used guidelines is contained in Part 2 of this report.

1.5 Variations in clinical guidance

In 2016 the VPCN commissioned the Monash Health Centre for Clinical Effectiveness to:

- consider the latest evidence to determine best practice anaphylaxis management advice
- gain consensus on the gap between current practice in managing anaphylaxis in Victoria and best practice advice
- develop an approach for migrating from current practice to best practice anaphylaxis management in Victoria.

Commonly referred to anaphylaxis guidelines were assessed against an agreed risk criteria that included pre-existing asthma, posture when treating a patient with anaphylaxis, the medication escalation pathway, discharge referral or follow-up recommendations and adrenaline dose information.

Please refer to Appendix 1 for the full Monash Health Centre for Clinical Effectiveness report. Two summary tables are also included below. Key findings from the project include the following.

- There are a number of CPGs and resources that exist in the literature and are used in practice.
- There is no single best practice CPG for anaphylaxis.
- There is no single guideline exclusively used by all healthcare services in Victoria.
- The information contained in the identified guidelines varies considerably, and information gaps exist from guideline to guideline.
- A limited evaluation of guideline quality suggests the quality is mixed; however, all resources were informed by systematic evidence searches.
- The ASCIA anaphylaxis management guidelines and the statewide paediatric anaphylaxis CPG contain sufficient information to continue to be promoted.

The VPCN also commissioned Western Health to review guidance provided in commonly used adult CPGs and those used in statewide paediatric CPGs to ensure paediatric patients were not put at risk when adult guidelines were used in their care. Please see Attachment 2 for the comparison report for anaphylaxis. The report concluded that:

> The published paediatric and adult guidelines show a degree of consistency with both stating the importance of supine positioning, oxygen therapy and early use of intramuscular adrenaline. Both the statewide CPGs and ASCIA guidelines go into enough depth to allow the practitioner to adequately resuscitate and manage a case of acute anaphylaxis with guidance given on drug dosing, as well as admission criteria. If the physician relies solely on the ANZCOR [Australian and New Zealand Committee on Resuscitation] guidelines obtained from the Australian Resuscitation Council there is potential for harm in that anaphylaxis may not be recognised, leading to delayed treatment, inadequate fluid resuscitation and inadequate referral and ongoing care.

Tables 2 and 3 on the following pages summarise the guidelines currently available in primary and non-primary care settings.

Table 2: Summary of primary care setting guideline details (as at December 2016*)

Clinical detail	ASCIA	Ambulance Victoria	Canadian Paediatric Society	Melbourne Health	NICE	Queensland Ambulance	Resuscitation Council UK	Ring et al.	RCH	AAAAI[1]	AAAAI[2]	World Allergy Organization
Adult/paediatric	Both	Both	Paed	Both	Both	Both	Both	Both	Paed	Both	Both	Both
Definition	×	×	✓	×	✓	✓	✓	✓	×	✓	×	×
Risk factors	×	×	×	×	×	✓	×	✓	✓	✓	✓	✓
Causes/triggers	×	×	✓	×	×	✓	✓	✓	✓	✓	✓	✓
Assessment (signs/symptoms)	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓
Diagnosis	×	×	✓	✓	×	×	✓	✓	✓	✓	×	×
Treatment	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓
Asthma	✓	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓
Posture	✓	×	×	✓	×	×	✓	✓	✓	✓	✓	✓
Adrenaline dose	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓
Medication escalation	✓	✓	✓	×	×	✓	×	✓	✓	✓	✓	×
Observation period	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	×
Discharge	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓
Referral	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓

Symbols: × = no information provided in resource; ✓ = Information provided in resource.

Abbreviations: AAAAI = The American Academy of Allergy, Asthma and Immunology; ASCIA = Australian Society of Clinical Immunology and Allergy; NICE = National Institute for Health and Clinical Excellence; RCH = The Royal Children's Hospital Melbourne

For more information, see Appendix 1. The ASCIA guidelines have been updated to include a definition and signs/symptoms.

Table 3: Summary of non-primary care setting guideline details

Clinical detail	ASCIA *Action plan for allergic reactions*	ASCIA *Action plan for anaphylaxis*	ANZCOR	Canadian Society of Allergy and Clinical Immunology
Adult/paediatric	Both	Both	Both	Paediatric
Definition	×	×	×	✓
Risk factors	×	×	×	✓
Causes/triggers	✓	✓	✓	✓
Assessment (signs/ symptoms)	✓	✓	✓	✓
Diagnosis	×	×	×	✓
Treatment	✓	✓	✓	✓
Asthma	✓	✓	✓	✓
Posture	✓	✓	✓	✓
Adrenaline dose	×	×	✓	✓
Medication escalation	×	×	×	×
Observation period	✓	✓	×	×
Follow-up	×	×	×	×
Referral	×	×	×	✓

Symbols: × = no information provided in resource; ✓ = Information provided in resource
Abbreviations: ANZCOR = Australia New Zealand Committee on Resuscitation; ASCIA = Australian Society of Clinical Immunology and Allergy

For more information, see Appendix 1.

Part 2: Evidence, findings and recommendations

2.1 Experiential evidence from the expert group

The VPCN Anaphylaxis Expert Group held meetings on:

- Thursday 22 September 2016
- Monday 24 October 2016
- Monday 28 November 2016
- Monday 30 January 2017.

The group was represented by a diverse group of stakeholders including consumers, school nurses, general practitioners, Ambulance Victoria, St John's Ambulance, the Department of Education and Training (DET), paediatricians, allergy and immunology specialists, emergency physicians, anaesthetists, ward nurses, the Food Regulations Unit, the Office for Public Health, ASCIA, Allergy and Anaphylaxis Australia, National Asthma Council Australia, the NPS MedicineWise, the National Allergy Strategy and the Department of Health and Human Services. For a full list of members see Attachment 3.

The group considered the following aspects of managing acute anaphylaxis and made a number of observations.

2.1.1 Recognising anaphylaxis

The potential for a wheeze to be misdiagnosed as asthma was recognised as a potential risk in underdiagnosing anaphylaxis. Awareness of anaphylaxis and its symptoms would address this. The group noted that general practitioners and hospital staff have limited mandatory training regarding the recognition and management of anaphylaxis.

Patients presenting with severe asthma who have a history of anaphylaxis should receive early administration of adrenaline. Written asthma action plans should include the use of an adrenaline autoinjector where appropriate. Likewise, anaphylaxis plans should include the use of short-acting bronchodilators for wheeze that is not responsive to intramuscular adrenaline. The group considered it was necessary to have questions asked of patients admitted with severe asthma to aid early recognition of anaphylaxis.

2.1.2 Medication escalation

The group was unclear whether hospital policies addressed the issue of self-administration of adrenaline. There was inconsistency in the approach to recording self-administration of adrenaline in emergency department systems. Patients requiring more than one adrenaline dose was raised as a complicating factor.

The group reviewed the adrenaline dose information contained in common guidelines. There was a consensus that simplified weight and associated dosage guidance was required. The escalation should call for intramuscular adrenaline first, consideration of commencement of an adrenaline infusion if more than two doses of adrenaline are required without improvement or progression of signs and intravenous bolus adrenaline as a final option if required.

The NPS MedicineWise medication escalation wall chart that has been promoted to general practitioners and pharmacies is not current. The chart should be simplified to encourage usage, preferably as a flowchart in line with ASCIA guidelines.

The group noted two commonly used resources in Victorian health services when treating children: the statewide paediatric clinical practice guidelines and the Monash Children's Paediatric emergency medication book. Both of these resources are currently being updated to incorporate the latest evidence in line with current ASCIA recommendations, and it is planned that the two resources will provide identical advice regarding medication doses and escalation of treatment.

2.1.3 Managing acute anaphylaxis

Despite training delivered to school nurses, the group noted that there is still some reluctance among community providers to administer adrenaline. The group also noted that there was also some reluctance among some health professionals across various settings (ambulance, general practice, health services), to administer adrenaline. It was suggested that there is a fear of the potential adverse effects of adrenaline and that education is required to explain that intramuscular adrenaline is both safe and potentially life-saving.

The group noted that important aspects of acute anaphylaxis management such as posture (laying the patient flat) was inconsistent across all guidelines. This was considered a priority area for action. **The recognition of pre-existing asthma as a risk factor for anaphylaxis was emphasised by the group as another priority area for action.**

2.1.4 Follow-up

There was consensus among the group that prior to discharge from an emergency department after the administration of adrenaline for an episode of anaphylaxis patients should be prescribed an adrenaline autoinjector and instructed on how and when it should be used, provided with an ASCIA anaphylaxis action plan, and referred to an allergist. The group agreed that these steps were inconsistently practised.[7]

2.1.5 Guideline usability

The group agreed that the ASCIA guidelines and ASCIA Action Plans were the most commonly used for allergy sufferers across all care providers. The expert group agreed to endorse the ASCIA guidelines but requested usability issues be addressed – in particular, improving online search results for the ASCIA management guidelines and making relevant information more accessible.

2.1.6 Hospital food safety programs

The group was unclear whether food prepared by nursing staff on the ward was subject to the same regulations as food handlers. It was generally assumed by the group that when a hospital serves food it does so in line with legislative requirements, regardless of who is serving the food. The group did not know the extent to which their hospitals had implemented a food safety program. The group endorsed supporting the work of the department's Food Safety Unit.

7 Burnell F, Keijzers G, Smith P 2015, 'Quality of follow-up care for anaphylaxis in the emergency department', *Emergency Medicine Australasia*, vol. 27, pp. 387–393.

2.1.7 Variation in school management of anaphylaxis

The group provided feedback to DET on the implementation of anaphylaxis guidelines for schools. It was noted that the Ministerial Order ensured that anaphylaxis was given attention and a profile within schools. Access to education and the reach of the education offered was considered to be very positive. Of particular concern was the current focus on nut allergies, the lack of requirements for school canteens to advertise their ingredients, variation in the quality and currency of ASCIA Action Plans prepared by general practitioners and inconsistency in reviewing action plans after 12 months (at the time of adrenaline autoinjector prescription renewal).

2.1.8 Sustainability issues

Children with food-related allergies are now becoming adults with food allergies. Transition programs need to be considered.

There is limited data available to explain the year-on-year rise in food-related or drug-related anaphylaxis.

2.2 Findings and implications

2.2.1 Summary of findings from the systematic review

1. A number of CPGs and resources exist in the literature.
2. There is no single best practice CPG for anaphylaxis.
3. There is no single anaphylaxis guideline exclusively used by all healthcare services in Victoria.
4. The ASCIA guideline is the most commonly used guideline and crosses all sectors.
5. Information contained in guidelines varies considerably, and information gaps exist from guideline to guideline.
6. The ASCIA anaphylaxis management guidelines and the statewide paediatric guidelines contain sufficient information for continued promotion.
7. If a clinician relies solely on the ANZCOR guidelines obtained from the Australian Resuscitation Council there is potential for harm. Anaphylaxis may not be recognised, leading to delayed treatment, inadequate fluid resuscitation and inadequate referral and ongoing care.

2.2.2 Summary of findings from a review of the VAED and VEMD datasets and COPMM data

8. Children with food-related anaphylaxis are transitioning to adult care in growing numbers.
9. The number of food related anaphylaxis deaths in Victoria has grown in recent years.
10. The incidence of anaphylaxis in Victoria is increasing on a yearly basis, with the predominant number of presentations being food-related.
11. There is limited evidence available to improve our understanding of the rise in food-related or drug-related anaphylaxis.
12. Optimal follow up care for anaphylaxis patients is inconsistently practiced.

2.2.3 Summary of experiential evidence from the expert group

13. Food-related anaphylaxis incidents are potentially preventable if clear management plans are adhered to and managed well in the community.
14. Accessibility and usability issues with the ASCIA guideline need to be addressed in order for it to be endorsed as a statewide guideline.
15. The education of relevant professionals across the continuum of care where the recognition, response and review of anaphylaxis is concerned needs to be improved.
16. The confidence of community providers in using intramuscular adrenaline needs to be improved.
17. The administration of adrenaline in the hospital setting – understanding of medication escalation, intramuscular first, then infusion and, if necessary, intravenous – needs to be reiterated.
18. Adrenaline infusion and dose guidelines must be simplified to minimise error and to ensure usability across all settings, particularly those locations with minimal resources.
19. Food safety programs in hospitals are not well understood by clinical staff.
20. Lessons can be learnt from DET's approach to minimising the risk of anaphylaxis in schools.
21. Consideration should be given to creation of a single asthma action plan that indicates use of an adrenaline autoinjector for acute severe asthma in a patient with known food allergy.
22. There are service access constraints to followup/review appointments with paediatric and adult allergy specialists.

2.3 Recommendations

Anaphylaxis clinical guidelines

1. It is recommended that the VPCN Anaphylaxis Expert Group works with ASCIA and the Statewide Paediatric Clinical Practice Guidelines Governance Group to ensure the guidelines:
   a) indicate that consideration be given to early treatment for anaphylaxis in patients presenting with severe asthma where there is a history of anaphylaxis
   b) comply with the latest evidence regarding posture and adrenaline escalation guidelines (intramuscular, infuse, intravenous) and present this information in an unambiguous manner
   c) provide simplified adrenaline infusion and dose guidelines
   d) provide advice on discharge procedures that includes completing an ASCIA Action Plan, prescribing an autoinjector for food-related anaphylaxis incidents and confirming a referral to a specialist allergy clinic.
2. It is recommended that Safer Care Victoria write to the Australian Commission for Safety and Quality in Healthcare requesting the prioritisation of a clinical care standard for the management of anaphylaxis.
3. It is recommended that, based on the review of guidelines by the Monash Health Centre for Clinical Effectiveness, the Anaphylaxis Expert Group requests the ASCIA Anaphylaxis Committee to update the anaphylaxis guidelines and management plan for accessibility to all relevant information.
4. It is recommended that the recommendations made in the VPCN/Western Health report on the comparison of adult and paediatric anaphylaxis clinical practice guidelines be forwarded to ANZCOR for immediate action with a cover letter from the VPCN Anaphylaxis Expert Group.
5. It is recommended that Safer Care Victoria formally requests that St John's Ambulance review its guidelines to ensure compliance with the ASCIA guidelines (with emphasis placed on transport posture).
6. It is recommended that Safer Care Victoria formally requests Ambulance Victoria to review its clinical practice guidelines in line with the ASCIA guidelines on indicators for adrenaline and transport posture.
7. It is recommended to simplify adrenaline infusion and dose guidelines to minimise error and to ensure usability across all settings, particularly those with minimal resources. It is recommended the VPCN Anaphylaxis Expert Group advise the statewide paediatric CPG group and the *Monash Children's Paediatric Emergency Medication Book* developers of the groups findings in relation to the need for consistent, clear and simplified guidance on the dosing and administration of intramuscular adrenaline and intravenous adrenaline infusions. The NPS MedicineWise medication chart is a suitable resource for general practice and pharmacies; however, it needs to be updated to align with latest evidence contained in the ASCIA guidelines and the findings of the Anaphylaxis expert group in relation to the need for consistent, clear and simplified guidance on the dosing and administration of intramuscular adrenaline and intravenous adrenaline infusions.
8. It is recommended that the Anaphylaxis Expert Group advises the National Asthma Council Australia (NAC) of its findings in relation to the need for better recognition of anaphylaxis including in people with asthma, and requests that the NAC ensures that recognition and early treatment of anaphylaxis is addressed in its asthma first aid protocol, asthma action plan template and asthma clinical guidelines (*Australian asthma handbook*).
9. It is recommended that Safer Care Victoria support adherence to a clinical care standard for the management of acute anaphylaxis.

Patient care

10. It is recommended that the challenges and opportunities to hospitals in introducing policies in relation to patients' own use of emergency medicine in hospital are better understood. A time-limited cross-sectoral expert group led by Safer Care Victoria inclusive of the Poisons Regulation Unit, hospital pharmacy representatives, emergency care representatives, ward representatives and public hospital insurers should be established as a matter of priority to better understand the issues.
11. It is recommended that Safer Care Victoria explores the opportunities presented by the Murdoch Childrens Research Institute's 'Allergy in the Community' trial in which 25 community-based paediatricians have been trained to diagnose and manage food allergy.

Training

12. It is recommended that the Anaphylaxis Expert Group advises the Australasian College for Emergency Medicine (ACEM) of its findings in relation to the need for training in recognition, response and review of anaphylaxis. The ACEM should be requested to address the education gap in relation to anaphylaxis.
13. It is recommended that the Anaphylaxis Expert Group advises the RACGP to include the ASCIA anaphylaxis and allergy Active Learning Module (ALM) for 2017–19 Continuing Professional Development triennium. This ALM will assist general practitioners to recognise and deal with anaphylaxis and also increase their knowledge of allergies that can potentially lead to anaphylaxis. In addition emphasis must be placed on the importance of identification and management of concomitant asthma in food allergic patients.
14. It is recommended that the Anaphylaxis Expert Group advises the Royal Australasian College of Physicians (RACP) of its findings in relation to the need for training in recognition, response and review of anaphylaxis. The RACP should be requested to address the education gap in relation to anaphylaxis for paediatricians.
15. It is recommended that Safer Care Victoria requests that the Department of Health and Human Services Acute Programs area launch an awareness campaign aimed at staff who have a clinical interaction with patients in hospitals to recognise, respond and review anaphylaxis. Intramuscular adrenaline and early escalation must be emphasised.
16. It is recommended that Safer Care Victoria requests hospitals consider embedding anaphylaxis training in resuscitation education which is regularly provided to hospital staff.
17. It is recommended that Safer Care Victoria requests that health services ensure all staff serving food to patients attend food handling training that includes information on food allergen management.
18. It is recommended that the VPCN works with DET to continue to build awareness of the appropriateness of administering adrenaline into existing training offered to schools and childcare organisations.

Food Safety

19. It is recommended that the VPCN Anaphylaxis Expert Group supports the work currently being undertaken by the department's Food Safety Unit to clarify and convey, as appropriate, how food safety laws extend to hospitals and hospital staff, outside of the kitchen. It is further recommended that Safer Care Victoria request Victorian hospitals' develop food allergy policies and procedures in line with advice from the Food Safety Unit.

Continuous improvement

20. It is recommended that the Anaphylaxis Expert Group continues in order to develop an evaluation plan, an implementation plan for the above recommendations, and to keep identifying system-related issues that must be addressed to improve the management of anaphylaxis in Victoria. Areas include the transition of children to adult care and improved data collection.
21. It is recommended that the Anaphylaxis Expert Group works with the Safer Care Victoria Director of Quality Safety Support towards mandatory reporting of anaphylaxis that leverages off DET's implementation approach.

Table 4 lists the short-term deliverables against these recommendations, the agency or group responsible and the resource implications.

Table 4: Deliverables and budget implications associated with the recommendations

	Recommendation	Deliverables by 2017	Deliverables by 2020	Lead entity	Budget required
1	VPCN Anaphylaxis Expert Group works with ASCIA and the Statewide Paediatric Clinical Practice Guidelines Governance Group to ensure the guidelines reflect best practice.	Updated statewide paediatric anaphylaxis CPG published and promoted Updated ASCIA guidelines published and promoted		VPCN / Royal Children's Hospital ASCIA	Nil Nil
2	The Anaphylaxis Expert Group requests the ASCIA Anaphylaxis Committee to update the anaphylaxis guidelines and management plan for accessibility to all relevant information.	The number of 'clicks' to key elements of the ASCIA guidelines and management plan is reduced		VPCN Anaphylaxis Expert Group	Nil
3	Forward anaphylaxis comparison report to ANZCOR for immediate action with a cover letter from the VPCN Anaphylaxis Expert Group.	Letter and report sent to ANZCOR ANZCOR guidelines updated		VPCN Anaphylaxis Expert Group ANZCOR	Nil
4	Formally request St John's Ambulance review its guidelines to ensure compliance with the ASCIA guidelines (with emphasis placed on transport posture).	Letter from Euan Wallace, CEO of Safer Care Victoria, sent to St John's Ambulance St John's Ambulance guidelines updated		VPCN St John's Ambulance	Nil

continued...

	Recommendation	Deliverables by 2017	Deliverables by 2020	Lead entity	Budget required
5	Formally request Ambulance Victoria to review its clinical practice guidelines in line with the ASCIA guidelines on transport posture.	Letter from Euan Wallace, CEO of Safer Care Victoria, sent to Ambulance Victoria Ambulance Victoria's guidelines updated		VPCN Ambulance Victoria	Nil
6a	Simplify adrenaline infusion and dose guidelines to minimise errors and to ensure usability across all settings, particularly those with minimal resources.	Monash Children's *Paediatric Emergency Medication Book* and statewide paediatric anaphylaxis CPG updated with simplified infusion and dose guidelines	Current Monash Children's 'Paediatric Emergency Medication Book edition reviewed and updated.	Monash Children's Hospital VPCN / Royal Children's Hospital	Nil Nil
6b	Update the NPS MedicineWise medication chart to align it with the latest evidence contained in the ASCIA guidelines.	NPS MedicineWise medication chart updated to reflect latest evidence	Updated chart in circulation and current chart decommissioned	NPS MedicineWise	NPS MedicineWise to resource
7	Advise the National Asthma Council Australia (NAC) of the expert group's findings in relation to the need for better recognition of anaphylaxis including in people with asthma, and request that the NAC ensures that recognition and early treatment of anaphylaxis is addressed in its asthma first aid protocol, asthma action plan template and asthma clinical guidelines (*Australian asthma handbook*).	A formal letter from the VPCN Anaphylaxis Expert Group to the National Asthma Council Release of updated *Australian asthma handbook*		VPCN Anaphylaxis Expert Group National Asthma Council	Nil NAC to resource

continued...

	Recommendation	Deliverables by 2017	Deliverables by 2020	Lead entity	Budget required
9	A time-limited cross-sectoral expert group led by Safer Care Victoria inclusive of the Poisons Regulation Unit, hospital pharmacy representatives, emergency care representatives, ward representatives and public hospital insurers should be established as a matter of priority to better understand the issues of patient use of own medication in the hospital setting.	Terms of reference for the group accepted	Report to the Chief Medical Officer approved (early 2018)	VPCN / Chief Medical Officer	SCV to assist in sourcing funding for a literature search and review, data analysis and reporting SCV to assist in sourcing funding to action recommendations from the group
10	Explore the opportunities presented by the Murdoch Childrens Research Institute's 'Allergy in the Community' trial. Consider the implications of this trial for primary care.	Written advice on the type of agreement that may be put in place with Murdoch Childrens Research Institute provided to the Chief Medical Officer??	Agreement with Murdoch Childrens Research Institute	VPCN / Chief Medical Officer	SCV to assist in sourcing funding to support the agreement

continued...

	Recommendation	Deliverables by 2017	Deliverables by 2020	Lead entity	Budget required
11–13	Anaphylaxis Expert Group advises the Australasian College for Emergency Medicine (ACEM), the Royal College of General Practitioners and the Royal Australasian College of Physicians of its findings in relation to the need for training in recognition, response and review of anaphylaxis. The colleges should be requested to address the education gap in relation to anaphylaxis.	Written advice provided to the ACEM, RACGP and RACP	ACEM, RACGP, RACP addressing the education gap in relation to anaphylaxis	VPCN Anaphylaxis Expert Group	Nil
14	Safer Care Victoria requests that the Department of Health and Human Services Acute Programs area launch an awareness campaign aimed at staff who have a clinical interaction with patients in hospitals to recognise, respond and review anaphylaxis. Intramuscular adrenaline must be emphasised.	Written request to the program area to include an anaphylaxis awareness campaign in its 2017–18 work plan	Awareness campaign launched (early 2018)	VPCN	SCV to assist in securing a funding source for the campaign

continued...

	Recommendation	Deliverables by 2017	Deliverables by 2020	Lead entity	Budget required
15	Safer Care Victoria requests health services to consider embedding anaphylaxis training in resuscitation education routinely given to new hospital staff.	Written request to health service CEOs requesting the inclusion of anaphylaxis in resuscitation education.		VPCN	SCV to assist in securing improvement project funding sources to assist health services to amend training packages
16	Safer Care Victoria requests health services ensure all staff involved in preparing food for patients attend food handling training (including those preparing food on the ward).	Written request to health service CEOs requesting food handling training for all staff involved in preparing food for patients			
17	The VPCN works with DET to continue to build awareness of the appropriateness of administering adrenaline into existing training offered to schools and childcare organisations.				

continued...

	Recommendation	Deliverables by 2017	Deliverables by 2020	Lead entity	Budget required
18	The VPCN Anaphylaxis Expert Group supports the work currently being undertaken by the department's Food Safety Unit to clarify and convey, as appropriate, how food safety laws extend to hospitals and hospital staff, outside of the kitchen. Safer Care Victoria request Victorian hospitals' develop food allergy policies and procedures in line with advice from the Food Safety Unit.	Advice provided to the department and to hospitals on the boundaries of food handling regulations and its applicability on the ward. Letter sent to hospital CEOs advising them of the Food Units advise.	Early 2018 – advice provided to the department and health services on requirements for consideration in policies and procedures	VPCN Anaphylaxis Expert Group Food Safety Unit	SCV to assist in securing funding to support the Food Safety Unit's project.
19	Anaphylaxis Expert Group continues in order to develop an implementation plan for the above recommendations and to keep identifying system-related issues that must be addressed to improve the management of anaphylaxis in Victoria. Areas include expansion of currently limited public paediatric allergy service;the transition of children to adult care and improved data collection.	New terms of reference for the Anaphylaxis Expert Group approved		VPCN	SCV to assist in securing funding to support improvement initiatives

continued...

	Recommendation	Deliverables by 2017	Deliverables by 2020	Lead entity	Budget required
20	The Anaphylaxis Expert Group works with the Safer Care Victoria Director of Quality Safety Support towards mandatory reporting of anaphylaxis that leverages off the DET's implementation approach.	Position paper released		Safer Care Victoria, Quality Safety Support	

Appendix 1: Centre for Clinical Effectiveness review of anaphylaxis clinical practice guidelines

Anaphylaxis: A Systematic Review of Clinical Practice Guidelines

Prepared by Corey Joseph, PhD. Evidence Analyst, Centre for Clinical Effectiveness, Monash Health.
November 2016, *with the support of the Victorian Paediatric Clinical Network*.

Supervised by Angela Melder, Manager, Centre for Clinical Effectiveness, Monash Health.

Executive summary

Using an evidence-based approach, the best available evidence regarding anaphylaxis guidelines was canvassed. This evidence will be used to support the expert group in reviewing the current state-wide anaphylaxis guideline. This evidence-based approach is targeted to identify the gap between widely utilised state-wide anaphylaxis resources, and best-practice guidelines. This gap analysis will then be used to determine the appropriateness of current and proposed resources to health service and community settings.

Using an evidence-based approach, the most up-to-date anaphylaxis guidelines were identified. These resources were further strengthened by the inclusion of other key guidelines used by expert group members. The collated guidelines identified will be used to support the expert group in reviewing the current state-wide anaphylaxis guideline, and to determine the appropriateness of current and proposed resources in the health service and community settings.

A systematic search for guidelines was carried out in the following databases using the term 'anaphylaxis': NHMRC Clinical Practice Guidelines, NICS, BMJ Best Practice, the National Guideline Clearinghouse and TRIP database. Google searches were also conducted using the terms 'anaphylaxis' and 'guidelines'. Only evidence based guidelines were included, that is, they addressed 2 key criterion of a guideline appraisal tool.* Guidelines published in English and between 2011 and the current date were included. Any guidelines that were older than 2011, were not in English, or did not detail the acute management of anaphylaxis were excluded.

Members of the expert group were also consulted regarding guidelines that they use in their respective settings. These have been included in this review.

Data from each of the guidelines were extracted and entered into an evidence table for the following variables: author, country published or written, year published, guideline reach, setting, scope, risk factors and asthma, posture, medication escalation, discharge, referral or follow-up recommendations, and adrenaline dose information. Each guideline was assessed to determine if it contained information that was evidence-based. In addition to this, root cause analysis results were also used to identify gaps in the evidence and expert in resources.

Twenty three guidelines were identified in this review. Of these, 17 guidelines were deemed to be evidence-based and were summarised. Guidelines were categorised as either being primary-care or non-primary care setting guidelines and were summarised accordingly.

- The majority of guidelines were set in primary care general medical setting (Table 2).
- There were 2 international, 8 national, 3 state-level guidelines, 2 consensus statements and 1 hospital-based guideline (Table 3).
- There were 7 guidelines from Australia, 2 from the United Kingdom, 2 from America, 2 from Canada, 1 from Germany, and 1 was a global guideline (Table 3). One guideline was a partnership between Australia and New Zealand (Table 3).
- Assessment, treatment and adrenaline dose were the clinical topics most commonly provided in the primary care setting guidelines (Table 4).
- Assessment, treatment, asthma and posture were commonly reported in non-primary care guidelines (Table 5).
- The Royal Children's Hospital state-wide guideline (1) and the American Academy of Allergy, Asthma and Immunology Practice Parameter (10) included the most clinical topics in the primary care setting.
- The Canadian Society of Allergy and Clinical Immunology (17) included the most clinical topics in the non-primary care setting.
- The ASCIA guideline (8) contains gaps with respect to included clinical topics specifically regarding anaphylaxis definition, risk factors, causes/triggers, assessment, diagnosis, asthma as a risk factor, and allergy testing.

* An internationally recognised appraisal tool, AGREE II, was used to determine if each guideline was developed using an evidence-based approach. Two key criteria were used to appraise each guideline on their evidence-based process and content. In the first instance, The AGREE II criteria included: Criterion 7: 'Were systematic methods used to search for evidence? And Criterion 12: Is there an explicit link between the recommendations and the supporting evidence?

Full report

1. Background in brief

Using an evidence-based approach, the best available evidence regarding anaphylaxis guidelines was canvassed. Additional guidelines were also sourced from the expert group. Collectively, this evidence will be used to support the expert group in reviewing the current state-wide anaphylaxis guideline. The resulting, revised guideline will therefore, be one that is based on best available evidence and acceptable to patients and parents, and relevant to community healthcare practitioners and health services. This evidence-based approach is targeted to identify the gap between widely utilised state-wide anaphylaxis resources, and best-practice guidelines, and to determine the appropriateness of current and proposed resources to health service and community settings.

2. Objectives of review

The objective of this review is to provide the most current guidance for acute anaphylaxis management.

3. Process of searching and summarising evidence

To identify current guidelines about the management of anaphylaxis in paediatric patients, a search of local and international guideline repositories was conducted in October 2016.

The following data bases were searched using the term 'anaphylaxis': National Health and Medical Research Council (NHMRC) Clinical Practice Guidelines, National Institute for Health and Care Excellence (NICE), British Medical Journal (BMJ) Best Practice, the National Guideline Clearinghouse and the Trip database.

Google searches were also conducted using the terms 'anaphylaxis' and 'guidelines'.

Members of the expert group were also consulted regarding guidelines that they use in their respective settings. Additional resources used by members of the expert group have also been incorporated into this review.

The collated guidelines were reviewed to determine their relevance. Those guidelines that were produced more than 5 years ago were excluded as it is deemed the evidence behind them is out of date. Additionally, the state-wide VPCN guideline (1) was also included to provide as a comparison. The inclusion/exclusion criteria are provided in the following table (Table 1).

Table 1. Inclusion/exclusion criteria

Inclusion	Exclusion
Paediatric and adult	
Acute management	Risk management, discharge process, referral process.
Any setting	
English	Non-English
Human	Non-human
2011–current	Older than 2011

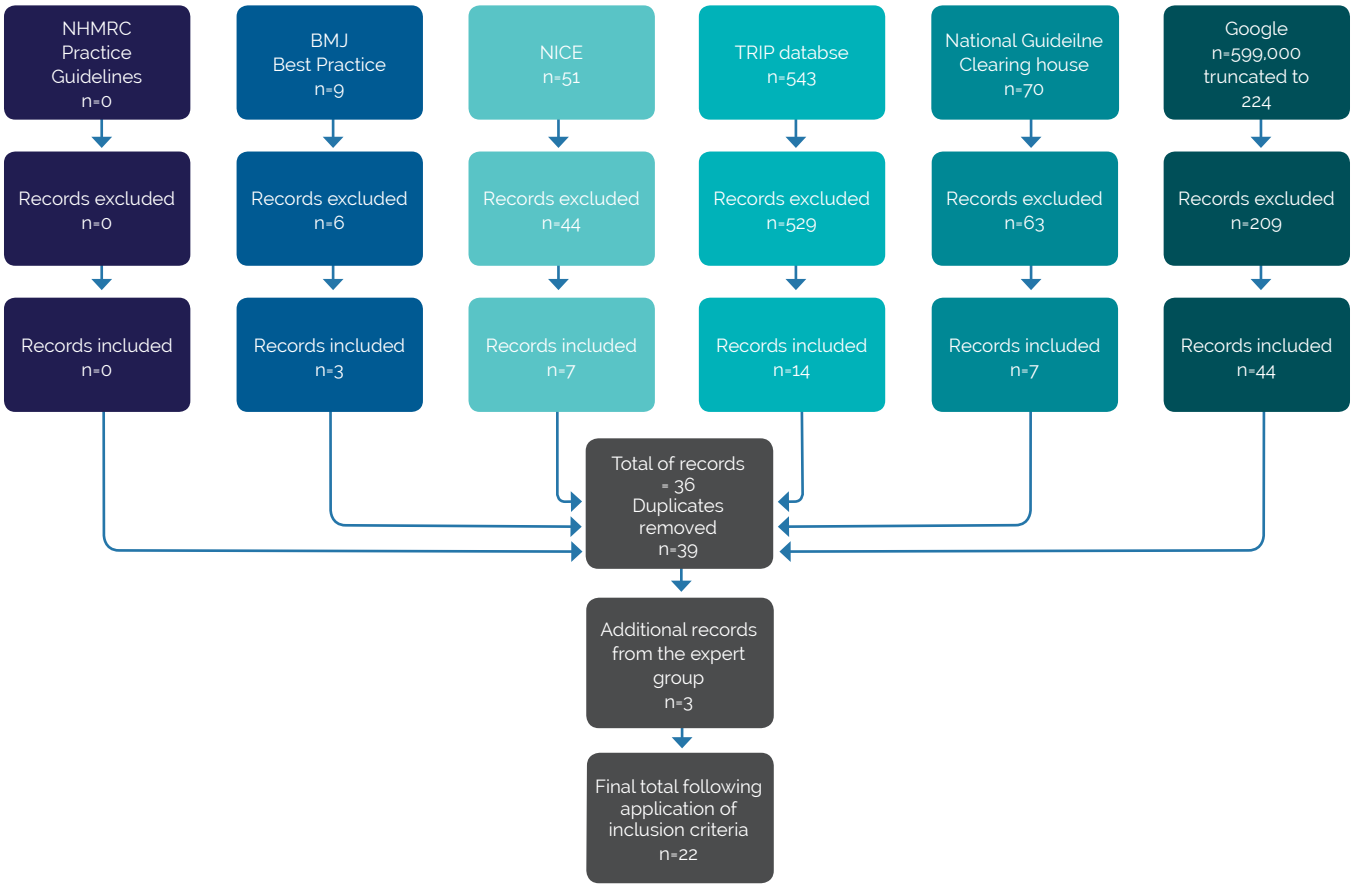
Following the extraction of guideline data from to the evidence table, the following information was summarised: author, country published or written, year published, guideline reach, setting, scope, risk factors and asthma, posture, medication escalation, discharge, referral or follow-up recommendations, and adrenaline dose information.

Each guideline was then assessed for its evidence-based content and appraised using 2 key criteria from the AGREE II tool (2). The Agree II is an internationally validated guideline appraisal tool (2).

4. Search results

Details of the search results and process of inclusion/exclusion is shown in Figure 1. Following all results being downloaded and screened for inclusion, 36 guidelines were identified as being relevant. Of the 36, 19 were excluded because they did not meet the inclusion/exclusion criteria due to the date they were published (older than 4 years), or not containing guideline information regarding the acute management of anaphylaxis. In addition to this, two guidelines had been since updated and these updates were captured in the search. As a result, the older versions of the guidelines were excluded. Three additional guidelines were identified by the expert group and these were added. Subsequently, a total of 22 guidelines were identified in this review.

Figure 1. Flow diagram outlining the number of results from each database search, the number included, excluded, and deleted, and the final number included.



5. Sentinel event data

Following review of Root Cause Analysis data from a single incident, the following relevant recommendations were reported:

- Develop a policy for the management of inpatients who have experienced anaphylaxis and carry an EpiPen in the community.
- Develop an accessible flow chart (to go on resuscitation trolleys) for anaphylaxis management according to best practice which meets the needs of the particular clinical area.

There were also other key points regarding anaphylaxis identified. A subtle sign of anaphylaxis in young patients may include the preservation of systolic blood pressure, with a decline in diastolic blood pressure. In addition to this, there are features of anaphylaxis that may overlap with other causes therefore, placing importance on education.

6. Comparison with ASCIA guidelines

The Australian Commission on Safety and Quality in Health Care does not currently have a program of work that focuses on anaphylaxis.

The Australian Society of Clinical Immunology and Allergy (ASCIA) are a peak professional body that brings together allergists and clinical immunologists from Australia and New Zealand. ASCIA is a member society of the World Allergy Organization (WAO) and the Asia Pacific Association of Allergy, Asthma and Clinical Immunology (APAAACI). ASCIA is affiliated with the Royal Australasian College of Physicians (RACP) as a specialty society. ASCIA are key co-partners of the National Allergy Strategy, a project co funded by the Commonwealth Department of Health. ASCIA is a major influence in Clinical Immunology and Allergy in Australia with a membership of over 600 including 250 allergy/immunology specialists.

ASCIA Action Plans were first released in 2003 and are regularly reviewed and updated. The action plans have been endorsed by Victorian schools. *The Education and Training and Reform Act 2006* and specifically in *Ministerial Order 706 – Anaphylaxis Management In Victorian Schools* states that an up-to-date ASCIA Action Plan for Anaphylaxis must be completed by the student's medical practitioner. This has led to wide usage of the action plans by General Practice and community health organizations, as well as child care centres and schools. ASCIA guidelines were also released in 2003 and are openly accessible to all health services and health practitioners. ASCIA promote and support the use of evidence-based healthcare, as highlighted through their key objectives, one of which is to promote and fund original research. Moreover, ASCIA have a strong governance structure, regularly review their procedures. ASCIA are an evidence-based organisation, as highlighted through their key objectives, one of which is to promote and fund original research. Moreover, ASCIA have a strong governance structure, regularly review their procedures.

Subsequently, this report will use the ASCIA clinical practice guidelines and action plans to compare and contrast all other resources against. It should also be noted that previous work commissioned by the VPCN has identified that the ASCIA guidelines are applicable to adult and paediatric populations (3).

7. Summary

Details from these guidelines regarding the location, reach, setting, scope and appraisal have been extracted and summarised below (Tables 2, 3, 4, and 5). Six guidelines were not summarised as they were not evidence-based according to the appraisal (see below), or they exclusively referred to other guidelines. Therefore the remaining 16 guidelines have been included and analysed (Table 3). A summary of the guidelines excluded due to the absence of evidence, or direct referral to other guidelines can be found in Appendix A Table 1.

7.1 Are the guidelines evidence-based?

An internationally recognised appraisal tool, AGREE II, was used to determine if each guideline was developed using an evidence-based approach. Two key criteria were used to appraise each guideline on their evidence-based process and content. The AGREE II criteria includes:

- *Criterion 7: Were systematic methods used to search for evidence?*
- *Criterion 12: Is there an explicit link between the recommendations and the supporting evidence?*

Each guideline was given one point for each criteria, with a possible total of 2 points. If the guideline did not meet the criteria, it was given a zero. If required, a full appraisal using all criteria can be conducted for the future.

NOTE: Where required, all guidelines and their background documentation were searched to determine if an evidence-based approach was used in the development process. It should also be noted that if the guideline did not meet Criteria 7 or 12, that does not necessarily mean that the recommendations in the guideline were not informed by evidence, but that, an explicit evidence-based method was not used or information explaining this process could not be explicitly determined.

7.2 Setting

The majority of guidelines were based in primary care settings, and in general medicine (Table 2). Resources were separated into two 'General setting' categories:

1. Primary care – those resources that are clinical practice guidelines used in primary care settings only; and
2. Non-primary care – those that are action plans, or are resources intended for use by a range of people that are not exclusively in primary care (e.g. bystanders, carers, teachers, parents, etc.).

The reason for separating the resources is so that clear comparisons can be made regarding the details within each resource whilst being sensitive to the setting the resource was intended to be used. The category 'Specific setting' refers to the professional or clinical setting that the resources was design to be used in.

Table 2. Summary of guideline settings

General setting	Number of guidelines	References
Primary care	12	(1,4–14)
Non-primary care	4	(15–18)
Specific setting		
General Medical	6	(1,6,8–11)
General Medical and Community	3	(4,12,14)
Education	1	(17)
Ambulance	2	(7,13)
Other setting	4	(5,15,16,18)

7.3 Reach

There were 2 international (14,18), 8 national (4,8,9,11,12,15–17), 3 state-level guidelines (1,7,13), 2 consensus statements (5,10), and 1 hospital-based guideline (6).

Table 3 describes the guidelines identified and included in this review.

Table 4 provides guidelines that are removed from the main table (Table 3) as they either referred to other guidelines (e.g. ASCIA), and did not provide independent management information on anaphylaxis, or they did not meet either of the appraisal criteria.

7.4 Location

Of the guidelines included, 7 were from Australia (1,6–8,13,15,16), 2 from the United Kingdom (4,9), 2 from America (5,10), 2 from Canada (12,17), 1 was a global guideline (14), and 1 from Germany (11) (Table 3). One guideline was a partnership between Australia and New Zealand (18).

Table 3. Summary of guideline details

Authors	Country	Year	Reach	Setting	Evidence-based?	
					Item 7	Item 12
Primary care setting						
ASCIA Acute Management of Anaphylaxis* (8)	Australia	2016	National	General Medicine	Yes	No
Royal Children's Hospital Melbourne* (1)	Australia	2016	State	General Medicine	Yes	No
Ambulance Victoria* (19)	Australia	2016	State	Ambulance	Yes	No
Canadian Paediatric Society (12)	Canada	2016	National	Gen Med & community	Yes	Yes
Melbourne Health* (6)	Australia	2016	Hospital	General Medicine	Yes	No
National Institute for Health and Clinical Excellence (9)	United Kingdom	2013	National	General Medicine	Yes	Yes
Queensland Ambulance (13)	Australia	2016	State	Ambulance	Yes	Yes
Resuscitation Council UK (4)	United Kingdom	2016	National	Gen Med & community	Yes	Yes
Ring et al. (11)	Germany	2014	National	General Medicine	Yes	Yes
The American Academy of Allergy, Asthma and Immunology (10)	America	2015	Consensus statement	Physician	Yes	Yes
The American Academy of Allergy, Asthma and Immunology (5)	America	2014	Consensus statement	Emergency	Yes	Yes
World Allergy Organization (14)	Global	2012	International	Gen Med & community	Yes	Yes
Non-primary care setting						
ASCIA Allergy Action Plan (15)	Australia	2016	National	Any	Yes	No
ASCIA Anaphylaxis Action Plan (16)	Australia	2016	National	Any	Yes	No
Australia New Zealand Committee on Resuscitation (18)	Australia and New Zealand	2016	International	Emergency	Yes	Yes
Canadian Society of Allergy and Clinical Immunology (17)	Canada	2014	National	Education	Yes	Yes

Setting = Specific setting; * = Guideline that was not identified in the systematic search and an internal organisation document.
Abbreviations: Ax = Assessment, Tx = Treatment, Epi = Epinephrine (Adrenaline) dosage information.

7.5 Risk factors and asthma

Of the resources used in the primary care setting, 9 (75%) refer to asthma as being a risk factor for anaphylaxis (1,4–6,10,11,13,14). All resources used in non-hospital settings identify asthma as being a risk factor (15–18).

7.6 Posture

Eight (67%) primary care resources make comment on posture when treating a patient with anaphylaxis (1,4,5,8,10,11,14,20). All resources used in non-primary care settings comment on the posture of the person and ensuring they lay down or sit and do not walk or stand (15–18).

7.7 Medication escalation

Seven (58%) resources in the primary care setting include a medication escalation pathway (1,5,10–13,19). There is no mention of medication escalation in any of the non-primary care resources.

7.8 Discharge, referral or follow-up recommendations

Of the primary care resources, 10 (83%) include recommendations regarding either patient information at discharge, relevant referral recommendations, or follow-up requirements (1,4,5,8–12,14). Only one non-primary care resource provided information regarding discharge (17). Ten (83%) of resources recommended that patients are provided relevant information about anaphylaxis on discharge (1,4,5,8–12,14).

7.8.1 Allergist referral

Ten (83%) primary care resources provided specific comment on referring patients to an allergist (1,4,5,8–12,14). Only one non-primary care resource recommended an allergist referral (17).

7.8.2 Prescription of EpiPen

Six primary care resources provided recommendations for the prescription of an Epi pen (1,4,8,11,12,14). Only one non-primary care resource provided information regarding the prescription of an EpiPen (17).

7.9 Adrenaline dose information

All (92%) (1,4,5,8–12,14,19,20), bar one (13), primary care resource provided information regarding adrenaline dose. Two (17,18) non-primary care resources provided adrenaline dose information, one (17) only specifically refers to the patients action plan and does not provide dose figures.

Table 4. Summary of primary care setting guideline details

	Primary care guideline											
	ASCIA(8)	Ambulance Victoria (19)	Canadian Paediatric Society (12)	Melbourne Health (6)	NICE (9)	Queensland Ambulance (13)	Resuscitation Council UK (4)	Ring et al (11)	RCH (1)	AAAAI[1] (10)	AAAAI[2](5)	World Allergy Organization (14)
Adult/Paed	Both	Both	Paed	Both	Both	Both	Both	Both	Paed	Both	Both	Both
Definition	×	×	✓	×	✓	✓	✓	✓	×	✓	×	×
Risk Factors	×	×	×	×	×	✓	×	✓	✓	✓	✓	✓
Causes/Triggers	×	×	✓	×	×	✓	✓	✓	✓	✓	✓	✓
Assessment (Signs/ Symptoms)	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓
Diagnosis	×	×	✓	✓	×	×	✓	✓	✓	✓	×	×
Treatment	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓
Asthma	✓	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓
Posture	✓	×	×	✓	×	×	✓	✓	✓	✓	✓	✓
Adrenaline Dose	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓
Medication Escalation	✓	✓	✓	×	×	✓	×	✓	✓	✓	✓	×
Observation Period	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	×
Discharge	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓
Referral	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓

Symbols: × = no information provided in resource; ✓ = Information provided in resource. Abbreviations: ASCIA = Australian Society of Clinical Immunology and Allergy; NICE = National Institute for Health and Clinical Excellence; RCH = Royal Children's Hospital Melbourne; AAAAI = The American Academy of Allergy, Asthma and Immunology

Table 5. Summary of non-primary care setting guideline details

	Non-primary care guideline			
Clinical detail	ASCIA Allergy Action Plan (15)	ASCIA Anaphylaxis Action Plan (16)	ANZCOR (18)	Canadian Society of Allergy and Clinical Immunology (17)
Adult/Paed	Both	Both	Both	Paed
Definition	×	×	×	✓
Risk Factors	×	×	×	✓
Causes/Triggers	×	×	✓	✓
Assessment (Signs/ Symptoms)	✓	✓	✓	✓
Diagnosis	×	×	×	✓
Treatment	✓	✓	✓	×
Asthma	✓	✓	✓	×
Posture	✓	✓	✓	×
Adrenaline Dose	×	×	✓	✓
Medication Escalation	×	×	×	×
Observation Period	×	×	×	×
Follow-up	×	×	×	×
Referral	×	×	×	✓

Symbols: × = no information provided in resource; ✓ = Information provided in resource. Abbreviations: ASCIA = Australian Society of Clinical Immunology and Allergy; ANZCOR = Australia New Zealand Committee on Resuscitation.

8. References

1. Royal Children's Hospital Melbourne. Clinical Practice Guidelines: Anaphylaxis [Internet]. 2016. Available from: http://www.rch.org.au/clinicalguide/guideline_index/anaphylaxis/
2. Brouwers MC, Kho ME, Browman GP, Burgers JS, Cluzeau F, Feder G, et al. AGREE II: advancing guideline development, reporting and evaluation in health care. CMAJ [Internet]. 2010 Dec 14 [cited 2016 Oct 10];182(18):E839-42. Available from: http://www.ncbi.nlm.nih.gov/pubmed/20603348
3. Tagg A. Comparison of commonly used anaphylaxis adult and paediatric clinical guidelines. 2016.
4. Resuscitation Council UK. Emergency treatment of anaphylactic reactions: Guidelines for healthcare providers [Internet]. 2016. Available from: https://www.resus.org.uk/anaphylaxis/emergency-treatment-of-anaphylactic-reactions/
5. Campbell RL, Li JTC, Nicklas RA, Sadosty AT, Members of the Joint Task Force, Practice Parameter Workgroup. Emergency department diagnosis and treatment of anaphylaxis: a practice parameter. Ann Allergy Asthma Immunol [Internet]. 2014 Dec [cited 2016 Oct 10];113(6):599–608. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25466802
6. Melbourne Health. Anaphylaxis. 2016.
7. Ambulance Victoria. Clinical Practice Guidelines Ambulance and MICA Paramedics – Anaphylaxis. 2016. p. 111–3.
8. Australian Society of Clinical Immunology and Allergy. Acute management of anaphylaxis [Internet]. 2016 [cited 2016 Oct 27]. Available from: http://www.allergy.org.au/images/stories/pospapers/ASCIA_Guidelines_Acute_Management_Anaphylaxis_2016.pdf
9. NICE. Anaphylaxis Evidence Update March 2013. 2013;
10. Lieberman P, Nicklas RA, Randolph C, Oppenheimer J, Bernstein D, Bernstein J, et al. Anaphylaxis--a practice parameter update 2015. Ann Allergy Asthma Immunol [Internet]. 2015 Nov [cited 2016 Oct 10];115(5):341–84. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26505932
11. Ring J, Beyer K, Biedermann T, Bircher A, Duda D, Fischer J, et al. Guideline for acute therapy and management of anaphylaxis. Allergo J Int [Internet]. 2014;23(3):69–112. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4479483/
12. Cheng A. Emergency treatment of anaphylaxis in infants and children. Paediatr Child Health [Internet]. 2011 Jan [cited 2016 Oct 10];16(1):35–40. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22211074
13. Queensland Ambulance Service – Clinical guidelines [Internet]. Available from: https://ambulance.qld.gov.au/CPGtable.html
14. Simons FER, Ardusso LRF, Bilò MB, Dimov V, Ebisawa M, El-Gamal YM, et al. 2012 Update: World Allergy Organization Guidelines for the assessment and management of anaphylaxis. Curr Opin Allergy Clin Immunol [Internet]. 2012 Aug [cited 2016 Oct 10];12(4):389–99. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22744267
15. Australian Society of Clinical Immunology and Allergy. Action plan for allergic reactions. 2016;
16. Australian Society of Clinical Immunology and Allergy. Action plan for anaphylaxis. 2016;
17. Canadian Society of Allergy and Clinical Immunology. Anaphylaxis in Schools & Other Settings. 2015;
18. Australia New Zealand Committee on Resuscitation. ANZCOR Guideline 9.2.7 – First Aid Management of Anaphylaxis – Australian Resuscitation Council [Internet]. 2016. Available from: https://resus.org.au/wpfb-file/anzcor-guideline-9-2-7-anaphylaxis-aug16-pdf/
19. Ambulance Victoria. Clinical Practice Guidelines [Internet]. 2016. Available from: http://ambulance.vic.gov.au/paramedics/clinical-practice-guidelines/
20. Melbourne Health. Anaphylaxis. 3 steps for Recognition & Management. 2016.

Appendix 1: Literature review

Appendix Table 1. Guidelines that refer exclusively to other guidelines

Authors	Country	Year	Reach	Setting	Evidence-based?	
					Item 7	Item 12
ACT Ambulance	Australia	2012	State	Ambulance	No	No
Allergy NZ	New Zealand	2011	National	Education	Refers to ASCIA	Refers to ASCIA
Health Service Executive	Ireland	2015	National	Community, first responders	Not stated	No (Refers to out of date info)
South Australian Paediatric Practice Guidelines	Australia	2014	State	General Medicine	Refers to ASCIA	Refers to ASCIA
St John's Ambulance	Australia	2014	National	First aid	No	No
Victorian Government Education & Training	State	2016	State	Education	Refers to ASCIA	Refers to ASCIA

Abbreviations: Ax = Assessment, Tx = Treatment, Epi = Epinephrine (Adrenaline) dosage information.

Appendix 2: Resource survey and results

Survey link: https://www.surveymonkey.com/r/Paediatric_CPGs

VPCN Anaphylaxis Expert Group Guideline Survey	
Answer Options	Response Count
	2
answered question	**2**
skipped question	**2**

Number	Response Date	Response Text	Categories
1	Oct 19, 2016 9:58 PM	http://allergy.org.au/images/stories/pospapers/ASCIA_Guidelines_Acute_Management_Anaphylaxis_2016.pdf	
2	Oct 18, 2016 4:18 AM	http://ambulance.vic.gov.au/paramedics/clinical-practice-guidelines/	

Appendix 2: Comparison of adult versus paediatric anaphylaxis guidelines

Executive summary

Making the diagnosis of anaphylaxis may be challenging. Both the RCH CPG and ASCIA guidelines give concrete examples of symptoms and signs but the ANZCOR guidelines are deficient in this area.

Once it has been identified there appears to be some discrepancy between doses of the first-line treatment, adrenaline, recommended. The literature suggests that although the diagnosis of anaphylaxis is made adrenaline is not always initiated with physicians preferring to prescribe corticosteroids and antihistamines.

Only the RCH CPG and ASCIA guidelines give recommendations regarding the need for admission and ongoing monitoring.

If a health care practitioner relies solely on the ANZCOR guidelines there is a greater chance of incorrect treatment.

Author

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Western Health were commission by the VPCN to compare CPGs used in emergency departments for common paediatric conditions against the statewide paediatric CPGs developed by Royal Children's Hospital. Anaphylaxis is the first of the comparison reports developed.

Background

In 2011, the Victorian Paediatric Clinical Network (VPCN) commenced a project to adapt a number of clinical practice guidelines (CPGs) produced by the Royal Children's Hospital (RCH) for use across the state. Reducing inappropriate variation in clinical care is one of the Victorian Paediatric Clinical Network's (VPCN) strategic objectives. One mechanism to assist in achieving this objective is the endorsement and promulgation of state-wide guidelines for the best-practice clinical management of low-complexity high-volume conditions. The VPCN provided funding to cover the costs associated with adapting the guidelines. As of April 2016, 40 CPGs have been adapted for use in all Victorian paediatric hospital and emergency settings. The conditions targeted are typically low-complexity, high-volume conditions.

It is generally accepted that adult CPGs are not appropriate for paediatric patients. The risk factors and management of paediatric and adult patients for particular high volume/low complexity conditions is thought to differ. The difference in guidance offered through adult CPGs which are often supported by national standards and the RCH Paediatric CPGs have not been evaluated to identify the risk of supporting paediatric patients with adult CPGs. There are differing views to the extent of the risk involved in treating paediatric patients with guidelines developed for adult patients.

Introduction

The Royal Children's Hospital (RCH) clinical practice guidelines (CPGs) were first developed by the Department of Clinical Medicine and the Centre for Community Child Health and Ambulatory Paediatrics in 1996. The aim was to develop evidence or consensus based guidelines for the management of common paediatric problems as well as enhancing the knowledge of clinically important conditions. These guidelines are problem-based, diagnosis-based, or procedure-based. Whilst the RCH guidelines encompass more than 500 conditions, over 50 have been ratified for statewide distribution for use outside the tertiary hospital setting. This process is governed by the Victorian Paediatric Clinical Network (VPCN). These guidelines are regularly updated and thus more likely to be current than textbooks or local handbooks.[1]

Children commonly present to non-tertiary hospitals and may be managed by clinicians with little paediatric experience. The statewide guidelines arm the physician with enough knowledge to manage a number of important conditions. A number of cases have been identified, however, in which clinicians use adult based guidelines instead of the more appropriate paediatric ones. This may cause unnecessary risk to the child.

Methods

The identified statewide guidelines were accessed from http://www.rch.org.au/clinicalguide/.

Key search terms were identified and where a national adult guideline has been established this was used as for comparison. In cases where there is no adult consensus a search was made of the key terms within the Victorian Health network. Whilst it may be that different health care facilities might have different guidelines for the management of various conditions it is this heterogeneity that leads to error and increased clinical risk.

Guidelines

The statewide guidelines for management of acute anaphylaxis in children were accessed from http://www.rch.org.au/clinicalguide/guideline_index/Anaphylaxis/ on 10th July 2016.[2] The key points from this guideline (last updated in November 2015) were compared with the Australian Resuscitation Council Guidelines – 9.2.7 First Aid Management of Anaphylaxis (accessed 10th July 2016)[3] last updated January 2016 as well as the ASCIA guidelines on the acute management of anaphylaxis.[4] Whilst dated UK guidelines are easy to source[5] practitioners may be wary to base their treatment on something nearly 10 years old.

Definition of anaphylaxis

The statewide paediatric guidelines define anaphylaxis a multi-systemic allergic reaction characterised by:

- at least one respiratory or cardiovascular feature *and*
- at least one gastrointestinal or skin feature
- the ANZCOR guidelines are less specific and define it as a severe form of allergic reaction that often involves more than one body system.

Common triggers

All sets of guidelines agree that anaphylaxis usually occurs within 20–30 minutes of the triggering exposure and go on to list a variety of causes, including:

- *food* – the most common cause including peanut, tree nuts, cow's milk, eggs, wheat, seafood, fish, soy, sesame
- *bites/stings* – bee, wasp, jumper ants
- *medications* – penicillin
- *other*.

The children's guidelines give further examples of sensitizing agents that the clinician may be exposed to including exercise induced anaphylaxis, idiopathic anaphylaxis and latex anaphylaxis as well as anaphylaxis to biological fluid additives (blood transfusions or anti-venom). These are much less common. Regardless of the cause the pathophysiological principles end in a common pathway – the release of histamine from degranulated mast cells.

Table 1: Age-specific aetiology of anaphylaxis

	Children < 16	Infants < 1	Preschool 1–5	Junior 6–10	Adolescent 11–15
Food	41%	62%	48%	32%	26%
Drug	34%	27%	29%	36%	43%
Insect venom	10%	0%	13%	12%	12%
Other	14%	12%	10%	20%	19%

Source: Alves B, Sheikh A. Age specific aetiology of anaphylaxis. Archives of disease in childhood. 2001 Oct;85(4)

High-risk groups

The number of patients admitted to hospital with anaphylaxis has almost doubled between 1995 and 2005 to 10 per 100,000 population.[7] Fortunately, despite the increase in admission rate, the number of deaths due to anaphylaxis has remained constant at about 0.64 deaths per million population per year though this is double the rate of anaphylaxis fatalities in the UK. This may be due to a variety of factors including ecological factors, dietary exposure and differences in methods of data capture. The risk that a child with a known food allergy will have a fatal anaphylactic reaction is around 1 in 800,000.[8] Age is a major risk factor for death with adults over 35 being at greatest risk of death. In children the highest rate of fatal anaphylaxis occurs in children who have asthma presenting with a food allergy.[9] This would suggest that a child presenting with life threatening asthma should also be evaluated for the possibility of an anaphylactic reaction as to the cause of their presentation. UK data[10,11] showed that two thirds of the children in their dataset that died had received adrenaline prior to going to hospital.

The statewide CPGs list the following patients as belonging to a high risk group for the development of anaphylaxis.

- History of anaphylaxis
- Multiple allergy to food and drugs
- Poorly controlled asthma
- Pre-existing lung diseases
- No such discrimination is made in the ANZCOR guidelines.

Identifying anaphylaxis

Diagnosis of anaphylaxis is based on history and clinical findings. Whilst all sets of guidelines focus on the potential respiratory signs and symptoms the ANZCOR guidelines fail to mention cardiovascular features (palpitations, tachycardia, bradycardia or hypotension), gastrointestinal features (nausea, diarrhoea or pelvic pain), mucocutaneous features (conjunctival erythema/tearing and angioedema) as well as some general features including headache and confusion. It is important to recognise that life threatening hypotension may be the sole presentation of anaphylaxis and should be considered in all cases of hypotension unresponsive to normal measures. Skin features may, in fact, be absent in up to 20% of cases.[12] Up to 51% of cases may be under-diagnosed in the emergency department with anaphylaxis defined as a life threatening allergic reaction involving two or more body systems or a systolic blood pressure of less than 100 mmHg.[13] Children with a history of asthma, oro-pharyngoal or gastrointestinal symptoms are much more likely to be misdiagnosed.[14] It is even harder to make the diagnosis in infants with a diagnosis of anaphylaxis being ascribed in only 6% of patients who met diagnostic criteria.[15]

If the ANZCOR guidelines are used as a sole guide to the recognition of anaphylaxis they may lead to under-recognition if compared to the statewide CPGs. Even when it is identified there may be a number of barriers to giving the first-line treatment, adrenaline with clinicians giving anti-histamines and corticosteroids instead.[16,17]

Investigations

Anaphylaxis is a clinical diagnosis.

Acute management

Both guidelines highlight the importance of avoidance or removal of the potential allergen where applicable.

They also both highlight that injection of adrenaline is the first-line treatment in the management of anaphylaxis though there is some confusion as the appropriate dosing strategy.[18] US data has previously highlighted the knowledge gap in treatment of this rapidly fatal disease with only 54.8% of children who met criteria for the diagnosis of anaphylaxis, receiving adrenaline.[19]

The ANZCOR guidelines suggest:

Age < 5 years	**0.15 mg**
Age > 5 years	0.3 mg

The statewide CPGs suggest:

Age < 6	0.15 mg (0.15 mL)
Age 6–12 years	0.3 mg (0.3 mL)
Age > 12 years	0.5 mg (0.5 mL)

These guidelines are based on 0.01 mL/kg of 1 in 1000 adrenaline.[20] In order to reduce cognitive load at times of potential high stress the CPGs also provide the dose in millilitres of 1 in 1000 adrenaline. A second dose of adrenaline is suggested in both guidelines if the first is ineffective but no further treatment with adrenaline is suggested in the ANZCOR guidelines.

ASCIA has a more complex dosing table, based on millilitres of 1 in 1000 adrenaline given via the intramuscular route:

Age < 1	0.05–0.1 mL
Age 1–2	0.1 mL
Age 2–3	0.15 mL
Age 4–6	0.2 mL
Age 7–10	0.3 mL
Age 10–12	0.4 mL
Age > 12	0.5 mL

It also mentions use of an autoinjector device (0.15 mg for children under 5, and 0.3 mg for those older than 5) though there are concerns with the use of the 0.15mg autoinjector win children under 10 kg in weight.[21] Delay to injection of adrenaline has been linked with anaphylaxis-related fatalities with 23% of 92 individuals receiving the medication prior to cardiac arrest.[22] Nurse-initiated prescribing of adrenaline may increase use.[23,24]

The CPGs suggest consideration of an adrenaline infusion in consultation with anaesthetics/ICU but do not state how it should be constituted. The ASCIA guidelines go into more detail, reducing the potential error in such a critical situation. IM adrenaline either via autoinjector or traditional formulation has been associated with less adverse events (1%) as compared to IV adrenaline (10%)[25] and so should be considered the go to treatment.

No mention is made in the ANZCOR guidelines as to the possibility or management of distributive shock. The paediatric guidelines recommend repeated boluses of 20 mL/kg of 0.9% normal saline as do the ASCIA guidelines.

Beyond these immediate first aid steps the ANZCOR guidelines give no mention as to potential admission criteria or conditions for which the child might require transfer to a tertiary centre. Almost 15% of children presenting with anaphylaxis have a clinically significant biphasic reaction. Seventy-five per cent of these occurred within 6 hours of admission with the majority responding to a second dose of intramuscular adrenaline.

Clinicians who rely solely on these guidelines might be unaware as to the need for admission.

Conclusions

The published paediatric and adult guidelines show a degree of consistency with both stating the importance of supine positioning, oxygen therapy and early use of intramuscular adrenaline. Both the statewide CPGs and ASCIA guidelines go into enough depth to allow the practitioner to adequately resuscitate and manage a case of acute anaphylaxis with guidance given on drug dosing, as well as admission criteria. If the physician relies solely on the ANZCOR guidelines obtained from the Australian Resuscitation Council there is potential for harm in that anaphylaxis may not be recognised hence leading to delayed treatment, inadequate fluid resuscitation and inadequate referral and ongoing care.

References

1. Sniderman AD, Furberg CD. Why guideline-making requires reform. JAMA. 2009 Jan 28;301(4):429-31.
2. Royal Children's Hospital. Anaphylaxis clinical practice guidelines. 2016. Available at www.rch.org.au/clinicalguide/cpg.cfm?doc_id=5139[Accessed 10 July 2016]
3. Australian Resuscitation Council Guidelines – 9.2.7 First Aid Management of Anaphylaxis. Available at http://resus.org.au/guidelines/[Accessed 10th July 2016]
4. Australian Society of Clinical Immunology and Allergy – Acute management of anaphylaxis. Available at http://www.allergy.org.au/images/stories/pospapers/ASCIA_Guidelines_Acute_Management_Anaphylaxis_2016.pdf [Accessed 10th July 2016]
5. Soar J, Pumphrey R, Cant A, Clarke S, Corbett A, Dawson P, Ewan P, Foëx B, Gabbott D, Griffiths M, Hall J. Emergency treatment of anaphylactic reactions—guidelines for healthcare providers. Resuscitation. 2008 May 31;77(2):157-69.
6. Alves B, Sheikh A. Age specific aetiology of anaphylaxis. Archives of disease in childhood. 2001 Oct;85(4):348.
7. Liew WK, Williamson E, Tang ML. Anaphylaxis fatalities and admissions in Australia. J Allergy Clin Immunol 2009;123:434–42.
8. Macdougall CF, Cant AJ, Colver AF. How dangerous is food allergy in childhood? The incidence of severe and fatal allergic reactions across the UK and Ireland. Archives of disease in childhood. 2002 Apr 1;86(4):236-9.
9. Sampson HA, Mendelson L, Rosen JP. Fatal and near-fatal anaphylactic reactions to food in children and adolescents. N Engl J Med 1992;327:380–4
10. Sargant N, Erlewyn-Lajeunesse M, Benger J. Does anaphylaxis masquerade as asthma in children? Emerg Med J. 2015;32:83–4.
11. Pumphrey RS, Gowland MH. Further fatal allergic reactions to food in the United Kingdom, 1999-2006. Journal of Allergy and Clinical Immunology. 2007 Apr 30;119(4):1018-9.
12. Simons FE. Anaphylaxis. J Allergy Clin Immunol 2010;125:S161–81.
13. Sclar DA, Lieberman PL. Anaphylaxis: underdiagnosed, underreported, and undertreated. The American journal of medicine. 2014 Jan 31;127(1):S1-5
14. Brooks C, Coffman A, Erwin E, Mikhail I. Variability in the Recognition and Management of Food Induced Anaphylaxis in Pediatric Emergency Departments and Urgent Care Centers. Journal of Allergy and Clinical Immunology. 2015 Feb 1;135(2):AB202.
15. Simons FE, Sampson HA. Anaphylaxis: Unique aspects of clinical diagnosis and management in infants (birth to age 2 years). Journal of Allergy and Clinical Immunology. 2015 May 31;135(5):1125-31.
16. Abul MH, Orhan F, Karakas T, Topcu ZI, Baki A. Adherence to the Treatment Choices of Anaphylaxis: An Epidemiological View of the Pediatric Patients. Journal of Allergy and Clinical Immunology. 2015 Feb 1;135(2):AB210.
17. Song TT, Lieberman P. Epinephrine in anaphylaxis: doubt no more. Current opinion in allergy and clinical immunology. 2015 Aug 1;15(4):323-8

18. Alrasbi, M. and Sheikh, A. (2007), Comparison of international guidelines for the emergency medical management of anaphylaxis. Allergy, 62: 838–841. doi:10.1111/j.1398-9995.2007.01434.x
19. Aranez VT, Lennox MG, Relan M, Qiao H, Wrotniak B, Lehman HK. An Evaluation of the Treatment of Anaphylaxis in a Pediatric Emergency Room Setting. Journal of Allergy and Clinical Immunology. 2015 Feb 1;135(2):AB204.
20. Sheikh A, Shehata YA, Brown SG, Simons FE. Adrenaline for the treatment of anaphylaxis: Cochrane systematic review. Allergy. 2009 Feb 1;64(2):204-12.
21. Song TT, Lieberman P. Epinephrine in anaphylaxis: doubt no more. Current opinion in allergy and clinical immunology. 2015 Aug 1;15(4):323-8.
22. Xu YS, Kastner M, Harada L, Xu A, Salter J, Waserman S. Anaphylaxis-related deaths in Ontario: a retrospective review of cases from 1986 to 2011. Allergy Asthma Clin Immunol. 2014;10:38.
23. Manivannan V, Hess EP, Bellamkonda VR, Nestler DM, Bellolio MF, Hagan JB, et al. A multifaceted intervention for patients with anaphylaxis increases epinephrine use in adult emergency department. J Allergy Clin Immunol Pract. 2014;2:294–9. e1.
24. Simons FE, Ebisawa M, Sanchez-Borges M, Thong BY, Worm M, Tanno LK, Lockey RF, El-Gamal YM, Brown SG, Park HS, Sheikh A. 2015 update of the evidence base: World Allergy Organization anaphylaxis guidelines. World Allergy Organization Journal. 2015 Oct 28;8(1):1.
25. Campbell RL, Bellolio MF, Knutson BD, Bellamkonda VR, Fedko MG, Nestler DM, et al. Epinephrine in anaphylaxis: higher risk of cardiovascular complications and overdose after administration of intravenous bolus epinephrine compared with intramuscular epinephrine. J Allergy Clin Immunol Pract. 2015;3:76–80.
26. Alqurashi W, Stiell I, Chan K, Neto G, Alsadoon A, Wells G. Epidemiology and clinical predictors of biphasic reactions in children with anaphylaxis. Annals of Allergy, Asthma & Immunology. 2015 Sep 30;115(3):217-23.

Attachment 3: VPCN Anaphylaxis Expert Group membership

Representative	Representation
Assoc. Professor David Armstrong	VPCN Co-Clinical Lead (Co-Chair)
Professor Peter McDougall	VPCN Co-Clinical Lead (Co-Chair)
Dr Simon Craig	Emergency Physician
Dr Debra O'Brien	ECCN Emergency Practitioner
Dr Jo Smart	Director, Paediatric Allergist Immunologist, RCH
Professor Jo Douglass	Head of Clinical Immunology and Allergy, RMH
Ms Siobhan Brophy	National Asthma Council Australia
Dr Brynn Wainstein	ASCIA
Ms Sandra Vale	National Allergy Strategy Coordinator
Ms Fiona Jones	Manager Regulation and Incident Management, Food Safety Regulation Unit
Ms Sue Knight	Consumer
Dr Jill Thistlethwaite	NPS MedicineWise
Ms Wendy Cochrane	Eastern Health NUM
Ms Jenny Spiller	Austin Health NUM
Ms Rita Dawe	School nurse
Dr Vicki McWilliam	Dietician – Allergy and Immunology
Ms Maria Said	Allergy and Anaphylaxis Australia
Dr Simon Crouch	Public Health Medical Officer
Dr Steve Bernard	Ambulance Victoria
Mr Steve Passalis	Department of Education and Training
Dr Scott Parsons	General Practitioner
Dr Helen Kolawole	Anaesthetist
Mr Anthony Hasphall	St John's Ambulance Victoria

continued...

Representative	Representation
Dr Mike Starr	Royal Children's Hospital CPG group
In attendance	
Dr Paulette Kelly	Manager, VPCN
Dr Corey Joseph	Centre for Clinical Effectiveness, Monash Health