

ORIGINAL ARTICLE

Food allergy management in Early Childhood Education and Care Services in Australia

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Aim: To assess Australian Early Childhood Education and Care Services (ECEC) staff on their preparedness to manage children with food allergy (FA) and anaphylaxis.

Methods: An online survey addressing training, knowledge, skills and staff confidence to manage FA and anaphylaxis was emailed to 5956 ECEC services nationally (excluding Western Australia, where this survey had been previously implemented); 494 surveys were completed and analysed.

Results: One in 10 (9.5%) ECEC services did not require staff to undertake anaphylaxis training, indicating non-compliance with current legislation. Staff felt confident in managing FA and anaphylaxis, regardless of their level of training. Against recommendations, 37% of participating ECEC services stored adrenaline autoinjectors (AAI) in a locked location. Only 51.4% of ECEC services reported having an AAI trainer device. Victoria reported the highest level of anaphylaxis management training ($P < 0.05$), and staff were significantly less likely to store their AAI devices in a locked location compared to New South Wales and Queensland ($P < 0.001$). New South Wales and Queensland had a significantly lower proportion of services with AAI training devices than Victoria ($P < 0.001$).

Conclusions: ECEC staff self-reported high levels of training, knowledge, skills and confidence in FA and anaphylaxis management. However, we identified gaps in staff knowledge and skills, particularly in how to correctly store and administer an AAI device. Compliance with appropriate FA and anaphylaxis policies and emergency response plans need to be prioritised.

Key words: anaphylaxis management; child care; food allergy.

What is already known on this topic

- 1 The number of children with food allergies (FA) is rapidly increasing in Australia.
- 2 It is crucial for Australian Early Childhood Education and Care Services (ECEC) to develop and implement an appropriate FA policy and emergency response plan to manage children with FA.
- 3 There were some gaps in ECEC staff knowledge and skills to manage FA and anaphylaxis in Australia.

What this paper adds

- 1 Most ECEC self-reported a high level of training, knowledge, skills and confidence in FA and anaphylaxis management.
- 2 ECEC staff had insufficient knowledge and confidence to appropriately store and administer an adrenaline autoinjectors device.
- 3 Free, easily accessible, online anaphylaxis training was a preferred training format, but there was a lack of awareness about currently available online anaphylaxis training resources.

The number of children with food allergies (FA) is rapidly increasing in Australia, with 11% of infants having a confirmed FA.^{1,2} Anaphylaxis is the most severe form of allergic reaction, and the incidence of food-induced anaphylaxis in Australia has risen rapidly over the last decade.² Children aged 0–5 years attending Early Childhood Education and Care (ECEC) services may experience food-induced anaphylaxis. ECEC services should have appropriate FA policies and emergency response plans to

manage children with FA and anaphylaxis risk, and ECEC staff should be familiar with policies and guidelines for FA and anaphylaxis management.³

An Australian study examined the level of staff knowledge and confidence in food-induced allergy management in 24 early childhood facilities.⁴ The findings demonstrated that the knowledge and confidence of staff in these facilities to protect children who experienced food-induced allergic reactions was relatively poor and is likely to increase the risk of food-induced anaphylaxis and potentially fatal outcomes. A previous study in Western Australia found that most (96%) of the participating ECEC services reported having an anaphylaxis policy and action plan for anaphylaxis management.⁵ However, these findings also suggested that recommended guidelines regarding anaphylaxis management may not be appropriately implemented in some instances, especially in

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recognising symptoms of anaphylaxis and correctly using adrenaline autoinjectors (AAIs) to treat anaphylaxis.

Anaphylaxis management guidelines and policies have been developed by various stakeholders to protect children at risk of anaphylaxis. The Education and Care Services National Regulations stipulate a minimum requirement for ECEC services to have at least one educator who has completed anaphylaxis management training be on site when children are attending,⁶ and the Australian Children's Education & Care Quality Authority (ACECQA) is responsible for determining which anaphylaxis training courses meet the requirements to be ACECQA approved.⁷ The Australasian Society of Clinical Immunology and Allergy (ASCIA), the peak body in Australia and New Zealand, has developed guidelines and training resources to help schools and child care staff effectively manage FA and anaphylaxis.⁸ The ASCIA guidelines, considered best practice, recommend all staff in ECEC services undertake anaphylaxis training, including the prevention and management of anaphylaxis.⁹

It remains unclear if Australian ECEC staff are sufficiently prepared to appropriately manage FA and anaphylaxis in young children. This study examined the skills, policy, knowledge, training and confidence of staff in ECEC services regarding FA management.

Methods

An online survey developed in a previous Western Australian study⁵ was applied to all other Australian states and territories. The survey collected data about knowledge, skills, training and confidence of staff to manage FA and anaphylaxis and barriers to implementation of policy and guidelines in ECEC services. Study participants were staff members recruited from ECEC services registered with the ACECQA. The survey was distributed via the survey platform Qualtrics (Qualtrics, Provo, UT, USA) to 5956 ECEC services, and 494 complete surveys were received (response rate 8.3%). The minimum sample size required was calculated with a margin of error of $\pm 5\%$ and a desired level of confidence of 95%. Using these parameters, the minimal sample size was calculated to be 363 using Sample Size Calculator provided by National Statistical Service.¹⁰

The survey data were analysed using descriptive statistics and test of significance (χ^2 for proportions) with SPSS (version 24; IBM SPSS Inc.; International Business Machines (IBM) Corporation, Armonk, NY, USA). This study was approved by the Human Research Ethics Committee, Edith Cowan University (# 19292).

Results

Demographics

Of the respondents, most ($n = 407$, 82.4%) were centre directors or managers, others included educators ($n = 22$, 4.4%), food co-ordinators/cooks ($n = 16$, 3.2%), owners ($n = 10$, 2.0%), administrators ($n = 14$, 2.8%), licensee ($n = 10$, 2.0%) and other staff member ($n = 15$, 3.0%). Almost 60.0% of respondents had worked in their role for more than 6 years and 40.0% for 5 years or less. The size of the participating services ranged from 12 to 1000 children, with a median size of 80 child enrolments. The participating services employed between 3 and 150 staff members with a median of 14 staff members.

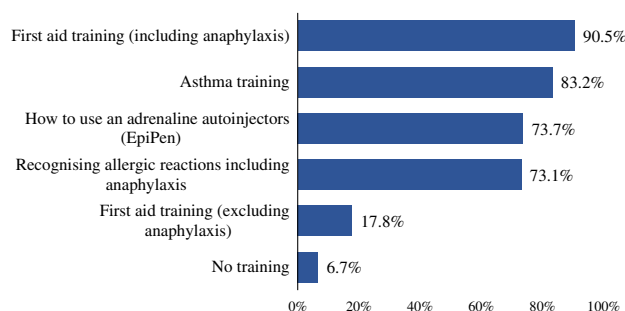


Fig. 1 Percentage of Australian Early Childhood Education and Care Services requiring staff to undertake food allergy management training.

FA and anaphylaxis training

Participants were asked what type of training staff were required to undertake. First aid training (including anaphylaxis) was listed as the most common training required (90.5%), followed by asthma training (83.2%). Training in the use of AAIs (e.g. EpiPen) and recognising allergic reactions including anaphylaxis were also required by the majority of participating services (73.7 and 73.1%, respectively) (Fig. 1). Thirty-three services (6.7%) indicated that no anaphylaxis prevention training was required of staff.

Some services required staff to attend multiple training sessions (Fig. 1). Most services ($n = 406$, 82.2%) required staff members to attend both first aid training (including anaphylaxis) and asthma training (Table 1). Of concern, nine ECEC services did not require their staff to attend first aid (including anaphylaxis) training or asthma management training. Half the participants ($n = 254$, 51.4%) reported that their service had an AAI trainer device available for staff to practice with, while 47% ($n = 232$) reported no trainer device or participants were unsure if one was available ($n = 7$, 1.4%).

When asked what types of training and/or information they would like to receive, most ($n = 349$, 70.6%) survey participants indicated they would prefer to receive a list of online resources for anaphylaxis training (Fig. 2).

Table 1 Percentage of Australian Early Childhood Education and Child Care Services requiring staff to undertake food allergy management training and other trainings

Required staff training	<i>n</i> (%)
First aid training (including anaphylaxis) and asthma training	406 (82.2)
First aid training (including anaphylaxis) only, no asthma training	41 (8.3)
No training	33 (6.7)
Others (no first aid training) (including anaphylaxis), no asthma training	9 (1.8)
Asthma training only, no first aid training (including anaphylaxis)	5 (1.0)
Total	494 (100)



Fig. 2 Types of resources to support training for Australian Early Childhood Education and Child Care Services staff.

FA and anaphylaxis training across jurisdictions

Participating services in Victoria (VIC) reported the highest level of staff training requirements on FA and anaphylaxis management, while New South Wales (NSW) reported the lowest level (Table 2). Specifically, 87.3% of participating services in VIC indicated they required staff to undertake training on *recognising allergic reactions including anaphylaxis* compared to 75.0% for Queensland (QLD) and 66.1% for NSW ($\chi^2(2, n = 441) = 17.24, P < 0.001$). The difference was similar for training on *how to use an AAI* ($\chi^2(2, n = 441) = 18.23, P < 0.001$) and *asthma training* ($\chi^2(2, n = 441) = 6.27, P = 0.044$).

Staff confidence in FA and anaphylaxis management

Confidence about staff ability and skills to manage FA and anaphylaxis was compared between services that required staff to attend anaphylaxis training and those that did not. There was no significant difference, except for confidence to *provide appropriate/safe food for a child with a food allergy* ($\chi^2(2, n = 486) = 6.05, P = 0.048$). A slightly higher proportion (82.9%) of participating services that did not require staff to attend anaphylaxis training were *very confident* in providing appropriate/safe food for a child with FA compared to participating services (79.8%) that did require staff to attend anaphylaxis training (Table 3).

Storing and using AAIs

This study also found that 97.3% of participants knew the location of the AAI, and 95.7% had access. More than one third

Table 3 Comparison of confidence between Australian Early Childhood Education and Care services that required staff to attend anaphylaxis management or first aid training and services that did not

Confidence	Staff was required training		P value
	Yes (n = 461), %	No (n = 33), %	
Your centre, at all times, has access to trained staff who can appropriately respond to an anaphylaxis emergency including administering an adrenaline autoinjector			0.640
Very confident	76.5	82.9	
Confident	22.0	14.3	
Not very confident	1.3	2.9	
Not at all confident	0.2	0.0	
I provide appropriate/safe food for a child with a food allergy			0.048*
Very confident	79.8	82.9	
Confident	20.0	14.3	
Not very confident	0.2	2.9	
Not at all confident	0.0	0.0	
I manage daily a child with a food allergy			0.214
Very confident	77.1	77.1	
Confident	20.9	22.9	
Not very confident	1.1	0.0	
Not at all confident	0.9	0.0	
I recognise the signs and symptoms of an allergic reaction including anaphylaxis			0.255
Very confident	72.1	80.0	
Confident	26.8	17.1	
Not very confident	1.1	2.9	
Not at all confident			
I am clear about my role in responding to an anaphylaxis incident			0.815
Very confident	78.7	77.1	
Confident	20.4	22.9	
Not very confident	0.9	0.0	
Not at all confident	0.0	0.0	

* $P < 0.05$ (statistically significant).

Table 2 Comparison of proportion of participating Australian Early Childhood Education and Care services requiring staff to undertake training between different states

Training	State			P value
	New South Wales (n = 227), %	Queensland (n = 104), %	Victoria (n = 110), %	
Recognising allergic reactions including anaphylaxis	66.1	75.0	87.3	0.001*
How to use an adrenaline autoinjector (EpiPen)	65.6	76.0	87.3	0.001*
First aid training (including anaphylaxis)	86.3	95.2	92.7	0.025
First aid training (excluding anaphylaxis)	14.5	22.1	20.9	0.159
Asthma training	78.4	84.6	89.1	0.044*
No training	10.1	4.8	4.5	0.093

* $P < 0.05$ (statistically significant).

(37.0%) of participating services stored the AAI in a locked location. The most common storage locations for general use AAIs (non-prescribed devices) were reported as first aid kits, the kitchen or the administration area (27.7, 18.0 and 17.6%, respectively). Nearly half (47.6%) the participating services had one or two general use AAIs, yet the remaining centres ($n = 205$) did not have general use AAIs at the service.

Discussion

Staff training and confidence of FA and anaphylaxis management

Staff play a vital role in reducing the risk of food-induced anaphylaxis among children attending ECEC services. Anaphylaxis training is key to improving staff knowledge and skills to prevent exposure to known allergens and ensure appropriate staff responses in the event of an allergic reaction, including anaphylaxis. This study found that about 90% of participating services were compliant with the training requirements of the Education and Care Services National Regulations. A Western Australian study conducted in 2007 found less than half (46.5%) of staff in ECEC services had undertaken specific anaphylaxis training.⁴ Our study suggests a significant increase in staff training since the introduction of the Education and Care Services National Regulations and ASCIA guidelines, beyond 2007.

However, about 1 in 10 participating services reported no requirement for staff to undertake anaphylaxis training, non-compliant with national regulations. This finding is concerning as non-compliance with legislation may result in life-threatening anaphylaxis outcomes among children at risk. Furthermore, nearly 7% of participating services reported no requirement for staff to undertake any first aid, asthma management or anaphylaxis management training, which again is of concern as these staff do not have any basic first aid skills to assist children attending the service.

The VIC *Children's Services Regulations* (2009)¹¹ recommends all staff members practice using AAI devices quarterly regardless of whether a child with anaphylaxis is enrolled. Our study found that services in VIC reported the highest level of anaphylaxis management training, while NSW reported the lowest. Specifically, compared to services in NSW and QLD, a significantly higher percentage of VIC services indicated that staff were required to undertake first aid training (including anaphylaxis), training on recognising allergic reactions including anaphylaxis and training on using an AAI.

A significantly lower percentage of ECEC services in VIC perceived availability of face-to-face training with an accredited provider to be a barrier for staff accessing anaphylaxis training compared to services in NSW and QLD, although the VIC *Children's Services Regulations*¹¹ required all staff in ECEC services to have completed an accredited anaphylaxis training course. Furthermore, compared to services in NSW and QLD, a significantly lower percentage of services in VIC reported that online training would assist staff in accessing anaphylaxis training. These findings may indicate that it was easier for VIC services to access accredited face-to-face training than services in NSW and QLD. The legislation and regulation differences between states may also drive the difference in compliance.

Free, easily accessible, online anaphylaxis training was reported as a preferred training format for staff members in nearly half the participating ECEC services. However, a lack of awareness about currently available online anaphylaxis training resources was evident in this study. When asked what kind of training or information participants would like to receive, approximately 70% wanted a list of online resources regarding anaphylaxis training, and about a third wanted either training sessions by video/podcast or in person. This highlighted the importance of promoting existing online anaphylaxis training resources, which could potentially improve staff engagement with anaphylaxis training and therefore improve service compliance with legislated training requirements.

Previous research on childhood FA and anaphylaxis in Australia³ has demonstrated that anaphylaxis training increases staff confidence about FA and anaphylaxis management, especially regarding accurate recognition of anaphylaxis. However, our findings did not show a significant relationship between service training requirements and participants' confidence. Staff confidence about FA and anaphylaxis management was high regardless of whether they had undertaken training, indicating that perceptions of their confidence are not reflective of their skill set to manage FA and anaphylaxis within services. If untrained staff were confident, they may not perceive the need for training and thus may lead to a lack of skills to recognise and respond appropriately to anaphylaxis.

FA training for food service staff in ECEC services

Food service staff have a particular responsibility for FA management as they prepare and handle food for children attending ECEC services. While ECEC educators are required to attend anaphylaxis training, there is no requirement for food service staff to attend either FA or anaphylaxis training.⁶ The Allergen Collaboration, established by Food Standards Australia New Zealand, recommends that food service/preparation staff in ECEC services be trained by appropriately qualified people in food allergen risks, management and communication to minimise a child's exposure to allergens.¹²

At the time of conducting this study, the National Allergy Strategy had recently released a free online course for food service staff ('All about Allergens online training'), the first freely available course aiming to standardise FA training for food service staff Australia-wide. Our study found that 10% of participating services reported awareness of this free online training, and about 5% of services indicated that staff had completed this training. This finding indicates that the promotion of this free online training to food service staff in ECEC services is necessary to raise awareness and increase utilisation. While over half of participating services reported that all staff members received anaphylaxis training, only one-fifth indicated that food co-ordinators/cooks also received this training, suggesting that legislated training requirements need to be specifically outlined at a national level to ensure that all staff members are included in the training recommendation statement.

Storing, training and using AAIs

Although most participating services indicated they knew the location and had access to the AAI, and more than one third

(37%) reported the AAI was stored in a locked location, inconsistent with ASCIA guidelines (which recommends AAI should be kept in an unlocked, easily accessible location, out of reach of children¹³). As prompt treatment with intramuscular adrenaline is critical for anaphylaxis treatment, easy access to AAI is vital if staff are to respond in a timely manner; recommendations from the peak body in Australia and New Zealand, ASCIA,¹⁴ support this as 'best practice'.

Practical experience in AAI administration is important to improve staff skills and confidence to use these devices in an anaphylaxis emergency, yet in our study, only half of participating services reported that an AAI trainer device was available for staff practice. Although most services required staff to undertake anaphylaxis training, including how to administer an AAI, lack of opportunity to practice with AAI training devices may result in delayed AAI administration in an anaphylaxis emergency, increasing fatality risk.¹⁵ A recent study in ECEC settings demonstrated that hesitation about the timing of AAI administration was the most frequent reason reported for non-administration.¹⁶ This highlights the need to provide opportunities for ECEC staff to gain hands-on experience in administering AAI training devices to enable prompt response to children experiencing anaphylaxis.

General use AAIs are not currently mandated by the Education and Care Services National Regulations. However, ASCIA guidelines state that ECEC services should have a general use AAI in addition to the prescribed AAI for children at risk of anaphylaxis⁸ as, in some cases, a child with anaphylaxis may need more than one AAI administered. A previous study found more than one dose of adrenaline was used in 19% of food-induced anaphylactic reactions.¹⁷ In a recent incident of food-induced anaphylaxis at an ECEC service in Western Australia, a toddler with known cows milk allergy required three doses of adrenaline after accidental exposure to cows milk while at child care.¹⁸ However, our study found that more than 40% of participating services did not have a general use AAI stored at the service, higher than those reported in the pilot Western Australian study (32%).⁵

Limitations

This study relies on the perception of respondents on behalf of other staff. The respondents were assumed to be representative of the ECEC sector, and as such, this study relies on self-reported data, which might be subject to a social desirability bias.

Public health implications

The findings from this research have several public health implications, and our general recommendations are as follows:

- All ECEC services should prioritise approved anaphylaxis staff training as a matter of urgency to prevent exposure to known allergens and potential fatalities.
- A review of current legislation regarding the number of staff required to undertake anaphylaxis management training is required. It is suggested that the ASCIA recommendation, that all staff undertake anaphylaxis training, be considered.
- Ongoing promotion of existing approved online anaphylaxis training resources is necessary to increase ECEC staff engagement in anaphylaxis training.
- All ECEC services should have AAI trainer devices available for regular staff practice.
- Mandatory adoption of ASCIA training guidelines is required for anaphylaxis management that recommends regular practice with AAI training devices by all staff.
- Legislation should state prescriptive storage guidelines for AAI to ensure devices are stored in an easily accessible, unlocked location, out of reach of children.
- All food service/preparation staff should undertake the National Allergy Strategy's food allergen management training.

Conclusions

The findings from this study highlight the importance and urgency for ECEC services in Australia to ensure compliance with appropriate FA and anaphylaxis policies and emergency response plans to protect children with food-induced anaphylaxis. This study identified gaps in ECEC staff knowledge and skills, especially in how to correctly store and administer AAI devices. Some general recommendations have been provided to improve the FA and anaphylaxis management in ECEC services for Australian setting.

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