

Running head: AUSTRALIAN PARENTS FOOD ALLERGY KNOWLEDGE

Food Allergy Knowledge, Attitudes and Beliefs among Australian Parents

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Being a report of an investigation submitted as a partial requirement for the award of  
Bachelor of Science (Honours), majoring in Psychology.

Date of submission: 4<sup>th</sup> November 2016

Statement of Originality

This report contains no material offered for the award of any other degree or diploma, or material previously published, except where due reference is made in the text.

Signed: \_\_\_\_\_

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### Acknowledgements

To Dr Michelle Adamson, thank you for such an amazing and adventurous year. I am so grateful and honoured to have had you as my supervisor. Your kindness, understanding, patience, expertise, and enthusiasm have inspired me and kept me going. In looking back over the year, I am so very amazed at what I have achieved and the journey in doing so. I have far surpassed any learning expectation I had set for myself and I am blessed to have had your guidance. Thank you again!

To Kenneth Askin, thank you for all your assistance in adjusting our survey to meet our needs. I know it was challenging at times. I am so very grateful for your prompt replies to my emails and your willingness to adjust the survey, ensuring that the programming flowed perfectly beyond the visual that we could see.

To Dr Erich Fein and all my other stats lecturers throughout my undergraduate studies, I want to thank you for instilling in me such a passion for statistics. Of my whole thesis, the statistics was the easiest to get my head around and I owe my level of understanding to your expertise in teaching such a diverse topic.

To my 2016 honours university friends, without your support and friendship throughout the year, it would have been a tough road. Thank you for all the laughs and lunch chats throughout workshops and to those of you who have completed your honours now; congratulations and I wish you the best of luck. We will keep in touch.

To my neglected friends, thank you for your understanding and willingness to take a raincheck catch-up. I have so missed our texts, chats and coffee mornings and look forward to coming back to the land of the living for a few months.

To my Mum and Dad, thank you! Thank you for all your support to Julian, Oliver and Eli and myself. For your understanding when I have been so busy, and your willingness to listen to my rattling's over my thesis time and time again. Mum, thank you for sailing alone at work

and understanding my workload and pressure I put myself under and for your daily calls to check in. I look forward to spending more time with you both.

To my dearest husband Julian and my most precious boys Oliver and Eli, I am so grateful for the love, support and understanding that you have given me throughout this year and the years previous while I worked so hard to reach my goal of admission into honours. This has been such a challenging year, far surpassing anything else I have endured; I could not have done it without the three of you and your friendly faces morning and night. I look forward to spending quality family time with you all again, to watch a movie and play the Wii. I have missed you all.

To all the on-line forums, support groups, schools, USQ faculties and lecturers and everyone who passed my survey on, thank you. I would like to especially thank Geraldine from Allergy and Anaphylaxis Australia, Joanne from Anaphylaxis Network Australia, and Howard from Food Intolerance Network. I am truly grateful to you for advertising my survey; the response from your members was overwhelming.

Finally, I want to thank all my survey participants. I have been blown away by the amount of respondents to my survey and I feel truly empathetic and compassionate to the hardship you must endure having a child with food allergy. To those without food allergy, thank you also as your understanding and kindness shone through, you are a blessing to our food allergic children and their families. May we continue to work together to support each other and I hope that someday soon we find the answers that we are looking for in our quest to help our food allergic children.

### Abstract

Childhood food allergies are increasingly prevalent with Australia having one of the highest rates in the world. Approximately 1 in 20 children exhibit allergic reactions to egg, cow's milk, peanut, tree nuts, seafood, sesame, soy, fish and/or wheat. This study aimed to investigate food allergy knowledge, attitudes and beliefs in Australian parents of children with and without food allergy. This study also aimed to conduct a cross-cultural comparison between parents from Australia, the United States, and the Netherlands. Furthermore, predictors of overall Australian knowledge scores were investigated. The Chicago Food Allergy Research Surveys for parents of children with food allergy and the general public were administered to 463 parents of children aged 0-18 years with ( $n=274$ ) and without ( $n=189$ ) food allergies. Results indicated that there is no significant difference in food allergy knowledge between Australian parents of children with ( $M=15.26$ ,  $SD=2.81$ ) and without food allergy ( $M=17.61$ ,  $SD=2.90$ ). Attitudes and beliefs of Australian parents were varied with most acknowledging the severity and implications for the food allergic child. Overall Australian knowledge scores were greater than those obtained from the United States and the Netherlands. Parents' exposure to food allergy awareness or training at work, but not child allergy status, parent, partner or spouse history of allergy or parents education level, was found to predict food allergy knowledge. Findings suggest Australians have a strong food allergy knowledge base with some misconceptions. Education is vital to ensure the safety of the food allergic child.

*Keywords:* Australian, parents, food allergy, knowledge, attitudes, beliefs

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## Chapter 1: Introduction

Food is an element essential to life. Defined as any nutritious substance that is used and absorbed by the body in order to sustain life, provide energy and promote growth (Dictionary.com, 2016), food is also central to many events, celebrations, festivals, and part of our daily rituals. Yet food can be a poison to some. Food allergy is an immune reaction arising when a foreign food substance is introduced to an individual (Australasian Society of Clinical Immunology and Allergy [ASCIA], 2016). This immune response results from the production of allergy antibodies or proteins in the immune system which identifies with and reacts to the foreign substance (ASCIA, 2016). Individuals with allergy antibodies develop symptoms of varying degrees following exposure to the allergen; some experience a symptomatic reaction whilst others show no symptoms at all (ASCIA, 2016). Symptomatic reactions such as eczema, hives and stomach problems may range from mild to moderate and to some cause no major problem; to others they could become extremely irritating and uncomfortable (ASCIA, 2016). Asthma and more severely anaphylaxis can also occur causing breathing difficulties, heart and blood pressure problems, and can be life threatening (ASCIA, 2016). Food allergy is distinct from food intolerances, food aversions or irritation from skin contact with certain foods, in that the latter does not involve the immune system and does not cause severe allergic reactions such as anaphylaxis (ASCIA, 2016). These reactions are often mistaken as food allergy, resulting in a widespread impression that all adverse reactions to food are allergy-based (ASCIA, 2016). Confirmation of allergy by medical means is required to differentiate between intolerance and allergy.

Further implications resulting from food allergy include the psychological and social effects of impaired quality of life, stress, anxiety and depression (Brantlee Broome, Lutz, & Cook, 2014; Gupta et al., 2011; Herbert, Shemesh & Bender, 2016). Importance needs to be placed on the psychosocial effects of food allergy for both the affected child and the parents



as parents are often challenged by a diagnosis of food allergy (Brantlee Broome et al., 2014; Gupta et al., 2010). This includes depression at the point of diagnosis, anxiety at the prospect of accidental ingestion including whilst at school, and limiting family activities, for example eating out, meeting friends, or having a play date (Cummings, Knibb, King, & Lucas, 2010). Furthermore, the primary caregiver is often placed at odds with their community, family and spouse due to the heightened threat and fear of the repercussions from food allergies yet differing attitudes and beliefs of those around them (Gupta et al., 2010).

As the introduction, monitoring and elimination of food allergens from a child's diet and environment is the sole responsibility of the child's parents and carers, parents must be hypervigilant in the quality of care provided for their food allergic child to prevent accidental ingestion of the food allergic substance; this involves a heightened knowledge requirement of parents, carers and the general public. However, there is limited research on the knowledge base of parents, carers and the general public related to food allergy knowledge, attitudes and beliefs. Preliminary findings are limited to the United States (Gupta et al., 2010), and the Netherlands (Goossens et al., 2013). More recent research has investigated food allergy knowledge, attitudes and beliefs in Australian parents; though this was limited to children aged 0-2 years (Staff, 2015). The present study aims to establish a baseline measure of food allergy knowledge, attitudes and beliefs within an Australian context, including of parents with and without food allergic children aged 0-18 years. This will broaden our understanding of Australians' food allergy knowledge, attitudes and beliefs, and potentially inform the development of effective knowledge-enhancing programs on food allergy knowledge for the Australian population.

This literature review will commence with an introduction to food allergy. It will then present an overview of current research findings related to food allergy knowledge,

attitudes and beliefs. An outline of the measures currently available to assess food allergy knowledge, attitudes and beliefs will then be presented.

### **Food Allergy**

Food allergy is an unusual response to a food resulting from the body's immune system, which can sometimes cause serious illness or even death (ASCIA, 2016). The foods causing 90% of allergic reactions in children are cow's milk, egg, peanut, tree nuts, sesame, soy, fish, shellfish and wheat. Peanut, tree nuts, shellfish, fish, sesame and egg are the most common food allergens amongst older children and the adult population (Allen, Hill, & Heine, 2006; ASCIA, 2016). Other triggers have been noted such as herbal medicines (Mullins & Heddle, 2002), fruits and vegetables (ASCIA, 2016; Choi, 2015; Zuidmeer et al., 2008) and food additives (Chen & Bahna, 2011; Vally & Misso, 2012). As children age, most allergic reactions to cow's milk, soy, wheat or egg are outgrown, however reactions to peanut, tree nuts, sesame and seafood can persist throughout an individual's life and are associated with an increased risk of anaphylaxis (ASCIA, 2016; Mullins, Dear, & Tang, 2009; Liew, Williamson & Tang, 2009). Peanuts, tree-nuts, shellfish, milk and egg are the most common foods to cause life-threatening anaphylaxis (ASCIA, 2016). Food allergy may also develop in adulthood, and is associated with an increased risk of anaphylaxis and persistence of the allergy through later life (ASCIA, 2016; Mullins, Dear, & Tang, 2009; Liew, Williamson, & Tang, 2009).

Both developed and developing countries are challenged by the diagnosis of food allergy. This paediatric health issue is advancing at an alarming rate (Prescott et al., 2013). Australia has one of the highest rates of food allergy world-wide with approximately 1 in 20 children affected including 10% of children under one year of age (Allen & Koplin, 2015; ASCIA, 2016). In Australia, the food allergy prevalence rate of children aged up to 5 years is 4-8% and approximately 2% of adults are food allergic (ASCIA, 2016). Over the last decade

hospital admissions for severe allergic reactions such as anaphylaxis have doubled in Australia; admissions for food allergic anaphylaxis in children aged 0 to 4 years in particular have increased five-fold (ASCIA, 2016). Numerous theories have been proposed to explain the rapid increase in food allergy in young children (including the hygiene hypothesis - reduction in early childhood infections may hinder the development of early immune responses, delayed introduction of allergenic foods, and methods of food processing (Allen & Koplin, 2015; ASCIA, 2016; Sicherer & Sampson, 2010) however to date no consensus has been reached.

Food allergy can present with a host of symptoms, both physical and psychosocial. Physical symptoms include hives, swelling of the lips, eyes or face, vomiting, wheezing or more severely anaphylaxis (ASCIA, 2016). Anaphylaxis is a form of Immunoglobulin E-mediated food allergy that is potentially life threatening (Allen, Hill & Heine, 2006). Anaphylaxis is of sudden onset with rapid progression of symptoms such as: respiratory responses, circulation problems, skin and/or mucosal changes including flushing, hives and angioedema, gastrointestinal symptoms including vomiting, abdominal pain, and incontinence (Plumb, Bright, Gompels, & Unsworth, 2016; Fenton et al., 2011). Fatalities from anaphylaxis primarily occur due to delayed treatment with epinephrine (Sicherer & Sampson, 2010). Less commonly symptoms such as infantile colic, stomach reflux, eczema, chronic diarrhoea and infantile failure to thrive through malnourishment present in response to food allergy (ASCIA, 2016). Malnourishment is of a heightened risk in food allergic individuals when more than one food allergy is developed (Berry et al., 2015; Hobbs, Skinner, Burks, & Vickery, 2015).

Food allergy can have a profound psychological and social effect on the daily living of the food allergic child and their families. The management of childhood food allergy impacts the quality of life of parents and families of food allergic children (Gupta et al.,

2010). Poor quality of life was significantly more likely in caregivers of children who had frequented the emergency department for food allergy throughout the past year, had multiple food allergies, or those allergic to specific foods (Springston et al., 2010). A multitude of parental perceptions can be noted regarding the implications of food allergy on the food allergic child, their parents and family. Perceptions such as: the challenges of food allergy and adapting to a food allergic lifestyle including restrictions on food and activities; emotions such as frustration, anger, embarrassment, sadness, fear, overwhelm, worry, depression, anxiety, stress and confusion; social isolation; and psychological distress of having to cope with a lifestyle based on food allergy (Cummings, Knibb, King, & Lucas, 2010; Galvin & Hourihane, 2016). The negative life experiences implicate the perception of food allergy as stressful, difficult, or embarrassing to manage and live with on a daily basis (Galvin & Hourihane, 2016). Parental anxiety can easily be transmitted to the child, this is important to address whilst also providing clear unambiguous information to parents and encouraging parents to maintain calmness especially when uncertainty is evident (Galvin & Hourihane, 2016).

Parents of food allergic children are particularly vulnerable to the fallout from their child's food allergy as they are accountable for the risk assessment and management of the allergy, with the onus on parents to seek and receive relevant information (Gupta et al., 2010). This is likely informed by the parent's knowledge, attitudes and beliefs towards food allergy (Gupta et al., 2010). Furthermore, parental perceptions of food allergy influence the way both parents and the food allergic child react to their health and well-being, and contributes to the child's perception of their allergy (Greenhawt, 2016; Gupta et al., 2010). Additionally, the child's emotional well-being needs to be cared for so as to minimise the risk of social isolation (Vale, Smith, Said, Mullins & Loh, 2015). Evidence implicates childhood food allergy with avoiding restaurants, restricting social activities with other children and/or

avoiding travel with some parents reducing work hours due to the child's food allergy (Springston et al, 2010). Further social isolation is evident through the increased risk of bullying in food allergic children. Muraro et al. (2014) found that food allergic students have an increased probability of being bullied with figures at approximately two times greater than in their non-allergic peers. It was suggested that the findings be interpreted with caution as the possibility existed for the younger food allergic child to interpret general bullying as bullying associated to their food allergy (Muraro et al., 2014). Teasing, harassment or bullying may increase the food allergic child's anxiety and distress levels when peers threaten the child with exposure to the food allergen (Cummings et al., 2010; Klinnert & Robertson, 2008).

Parents of food allergic children adopt numerous daily management tasks to diligently accommodate their child's food allergy, tasks such as monitoring for cross-contamination, maintaining readiness for emergencies to prevent exposures to the allergen/s, providing alternative foods for school and social occasions, and fastidious label reading (Cummings, et al., 2010; Herbert, Shemesh, & Bender, 2016; Springston et al., 2010; Williams, Parra & Elkin, 2009). All of these practices place a great strain on the family unit especially the parents of the food allergic child. The general public's knowledge and perceptions may also influence the food allergic individual's management of their allergy; for example, the patient may show less vigilance in checking food ingredients if friends believe this ritual is not important (Lyons & Forde, 2001). Parents experience major frustrations eventuating from the general public's lack of understanding and unwillingness of others to accommodate the food allergic child (Cummings et al., 2010).

The stress, anxiety, and depression that may result from managing childhood food allergy may arise from the constant vigilance, fear and anxiety implicated with the anticipated threat of a fatal food allergic reaction (Klinnert & Robinson, 2008; Vargus et al., 2011).

Whilst many of the anticipated threats and effects of food allergy are a normal and expected response due to having a child with a chronic, demanding health condition, a substantial proportion of families experience significant psychological distress and/or maladaptive coping responses that can contribute to the child's psychological, social development and optimal functioning of the family unit (Klennert & Robinson, 2008). Furthermore, whilst parents express concern towards their child's psychological adjustment due to food allergies, this concern extends to the impact on relationships with spouses, siblings and extended family members (Klennert & Robinson, 2008). The constant adaptation to living with a severely chronic condition may be traumatic for all family members of the food allergic child. Parents and children can be left feeling anxious and traumatised by the allergic reaction, by the memories of the reaction and the constant fear of reoccurrence, and more severely the fear of near death of the food allergic child in addition to having to inject with EpiPen in the case of anaphylactic reaction (Evans & Rouf, 2014).

In addition research found that one in four parents reported that their child's food allergy had caused marital strain and the downfall of their professional career (Gupta et al., 2010). Furthermore, parents have previously reported experiencing hostility or difficulty from relatives and other parents when trying to accommodate the child's food allergy (Gupta et al., 2010). Interpersonal relationships such as social support and social negativity appear to be influential for caregivers to adapt to their child's food allergy with interventions targeted at support and negativity in these social relationships possibly helping with improved quality of life (Williams & Hankey, 2014).

### **Food Allergy Knowledge**

There is currently no cure nor prophylactic treatment for food allergic reactions, with management restricted to avoidance of the offending food, emergency treatment with injectable epinephrine for symptoms such as anaphylaxis from accidental ingestion (Choi, Ju,

& Chang, 2015; Cummings et al., 2010; Sicherer & Sampson, 2010). Information on food allergy is therefore vital to provide children, parents, and the general public with the tools necessary to prevent accidental ingestion of food allergens and thereby anaphylactic events and food allergic symptoms. Many authors assert that lack of knowledge regarding food allergy is jeopardising the well-being and safety of the food allergic child (Choi, Ju, & Chang, 2015; Goossens et al., 2013; Gupta et al., 2010; Shafie & Azman, 2015; Springston et al., 2012; Staff, 2015).

There is a vast amount of information available regarding the signs and symptoms of food allergy, risk factors, diagnosis, and treatments. This information comes from many sources including the internet and social media, television, family and friends, support groups, and professionals such as paediatricians, allergists and general practitioners. Unfortunately, not all of it is useful, relevant or accurate, and parents note considerable uncertainty regarding the reliability of the information attained (Klennert & Robinson, 2008; Vargus et al., 2011). A number of guidelines are available for the diagnosis and management of allergy (e.g., Jones & Burks, 2013; Lieberman et al., 2005; Muraro & Roberts, 2014) including in Australia those published by the Australasian Society of Clinical Immunology and Allergy (ASCIA, 2016) and the Allergy and Anaphylaxis Australia group (A&AA, 2016). It is not known, however, how much of this information is utilised nor what Australians know more generally about food allergy, with very little research conducted on food allergy knowledge.

Knowledge is vital in understanding consequently informing management of food allergy. According to the health belief model (Caltabiano et al., 2008); the likelihood of an individual taking preventative action or performing some type of health behaviour is dependent upon the evaluation made regarding the threat of a health problem and the pros and cons of taking the action. The perceived threat of the health problem is further

influenced by perceived seriousness of the health problem, perceived susceptibility to the health problem, and the individual's cues to action (e.g. public health campaigns, advice from others; Caltabiano et al., 2008). Knowledge about the health problem is implicated in the individual's perceived threat of illness, in addition to demographic variables such as age, sex, ethnicity (Caltabiano et al., 2008). While there is a paucity of research on demographic characteristics associated with food allergy knowledge specifically, Gupta Kim, Springston, Smith and colleagues (2009) found those with prior training in food allergy or who simply knew someone with food allergy had better knowledge of food allergy, rather than age, sex, ethnicity, income, being a parent or a college graduate predicting knowledge. Having more than one food allergic child and visiting an allergist more than three times a year also predicted higher knowledge of food allergy (Gupta et al., 2010). Goossens and colleagues (2013) found that food allergy knowledge was greater in parents with higher education, who were a member of a patient organisation, who visited an allergist and/or whose child had a history of anaphylaxis. Parenting knowledge is thought to guide parents' decisions about how to maintain child health, how to prevent illness, when to seek health care for children, and how to use medical services effectively (Hickson & Clayton, 2002; Melamed, 2002). Research indicates that older, more educated mothers possess more parenting knowledge (Bornstein, Cote, Haynes, Hahn, & Park, 2010).

### **Food Allergy Knowledge, Attitudes and Beliefs Research**

Research on food allergy knowledge, attitudes and beliefs are limited to the US and Netherlands, within the general public and parents of children with food allergies. Each will now be discussed in turn.

**Food allergy knowledge in the general public.** Limited food allergy knowledge, attitudes and beliefs research has been conducted on the general public. Gupta, Kim, Springston, Smith et al. (2009) provided the first comprehensive review of food allergy



knowledge, attitudes and beliefs in the general public. Participants from the general public in the United States completed the Chicago Food Allergy Research Surveys (CFARS; Gupta Kim, Springston, Smith et al. 2009). On average, participants answered 65% of food allergy knowledge items correctly, with scores ranging from 13% to 100% (Gupta Kim, Springston, Smith et al. 2009). This research recommended improving food allergy knowledge amongst the general public, and public awareness of challenges experienced by food allergic children thus keeping affected children safe from the effects of food allergy (Gupta, Kim, Springston, Smith et al. 2009). Goossens and colleagues (2014) investigated food allergy knowledge, attitudes and beliefs among the general public in the Netherlands and compared results with the previous United States sample. A median knowledge score of 8 out of 24 was reported, compared with 11 from the United States (Goossens et al., 2014), which were significantly higher. In an Australian first, Staff (2015) investigated food allergy knowledge in parents of children again using the CFARS. Parents of children without food allergies displayed median overall knowledge scores of 63%, ranging from 9% to 91% correct (Staff, 2015), though this sample was limited to parents of children under 2 years.

Knowledge by country differed by the domain of information. Scores within the domain of *Definition and Diagnosis*, which describes the defining terms for diagnosis varied. More Dutch participants correctly defined an allergic reaction as occurring when the body considers food harmful, than participants from the United States and Australia. On the other hand more Australian participants correctly differentiated lactose intolerance from milk allergy. For the *Symptoms and Severity* domain (assessing signs of allergy), most participants from all three countries correctly identified that food allergic reaction can be fatal, yet Dutch failed to identify tongue swelling and trouble breathing as a sign of a milk allergy. Of the *Triggers and Environmental Risk* domain (assessing factors causing reactions) Dutch participants incorrectly answered half the items, however performed well in identifying that

mothers can pass food to their child through breast milk. The US participants performed well overall in this domain, however largely failed to identify egg as one of the three most common allergens. Of the Australian participants the majority correctly responded that an allergic reaction can eventuate from touching food allergen and food eaten by mother can pass to child through breast milk. Within the *Perceptions of Susceptibility and Prevalence* (factors contributing to prevalence) domain Dutch indicated they mostly realised that food allergy is increasing in the Netherlands. In the US most participants realised food allergy is rising in their country. The majority of Australian participants realised food allergy is rising within Australia, performing better overall throughout the whole domain. The domain *Treatment and Utilisation of Health Care* (assessing methods of prevention) had no Dutch participant correctly respond to avoidance of allergen prevents reaction and most believe a cure for food allergy exists. Fewer, though more than half of US participants believed this, a small percentage knew that daily antihistamine cannot prevent food allergy reactions. Just over half of Australian participants' realised avoidance of allergen prevents reaction. For the domain *Policy Issues* (addressing food labelling law) more Australian participants were aware of legislation requiring food to be labelled than their US and Dutch counterparts. These findings would seem to suggest differences are evident in food allergy knowledge among these three countries, though comparison of Australian data with other countries, particularly in older children, is lacking.

**Attitudes and beliefs of the general public.** Dutch participants were generally unaware of difficulties experienced by food allergic patients. The *Stigma and Acceptability* domain (assessing stigma of food allergy) suggested participants disagreed with the way food allergic individuals are accepted, believing overall that others are tolerant and understanding. Participants from the US felt food allergic people are treated differently. In Australia similar findings were evident. The *Perceptions of Quality of Life* domain (assessing personal

satisfaction factors) indicated overall the three countries were in agreement with the difficulties of having food allergies. For the *Treatment and Utilisation of Health Care* domain less than half of Dutch participants agreed with importance of EpiPen for severely food allergic children. Most of the US and majority of Australian participants agreed with this item. The *Policy Issues* domain had Dutch aware of the need for schools to keep food allergic children safe yet believed it unfair if their child could not have a peanut butter sandwich and disagreed with schools banning all nut products. In the US most participants agreed schools should have plans to keep food allergic children safe. Australian participants were of the same opinion. Dutch, US and Australian participants viewed determining the cause(s) of food allergy as most important in helping food allergic patients, and that television was the best medium to learn about food allergy.

**Food allergy knowledge in parents of children with food allergy.** Limited food allergy knowledge, attitudes and beliefs research has been conducted on parents of food allergic children. Gupta and colleagues (2010) found US parents of food allergic children with an average overall knowledge score of 75% correct ranging from 19% to 100%. In the Netherlands, Goossens and colleagues (2013) found food allergy knowledge among parents with food allergic children to be suboptimal in comparison with the US (Gupta et al., 2010). The Dutch exhibited a mean overall knowledge score of 9.9 (mean number of correctly answered items ranging 0-21) compared with 12.7 from the US (Goossens et al., 2013). In an Australian first, Staff (2015) investigated food allergy knowledge in parents of food allergic children aged 0-2 years with overall knowledge scores of median 76% ranging from 33% to 95% correct.

Individual knowledge items varied across each of the three countries and are presented by domain. Scores from Dutch parents of food allergic children were highest within the domains of *Definition and Diagnosis* and *Symptoms and Severity*, most

participants acknowledged food allergy involves the immune system and eczema may be the first sign of such. Additionally, the majority of US participants were aware that hives, tongue swelling and breathing difficulties were signs of milk allergy reaction, whilst Australians scored highly overall for each individual item of the above-mentioned domains. The *Triggers and Environmental Risk* and *Perceptions of Susceptibility and Prevalence* domains indicated poor performance by the Dutch on items such as asthma is a risk factor for anaphylaxis and all participants were unaware teenagers are at higher risk for fatal food allergy reactions than children. Less than half Dutch participants recognised egg and peanut as two of the three most common childhood food allergens. Participants from the US performed poorly, also unaware teenagers are at higher risk for fatal food allergy; however most participants knew food can pass from mother to child by breastfeeding. Interestingly, US participants were well aware peanut is one of three most common childhood food allergens yet less than half recognised egg as a common allergen. In Australia, similar results were evident, with poorly performed items such as asthma being a risk factor for anaphylaxis and teenagers at higher risk for fatal food allergy reactions than children. The majority of Australians correctly recognised foods eaten by the mother can be passed to the child through breast milk and that egg is one of the three most common allergens in children. Within the domain of *Treatment and Utilisation of Health Care* Dutch participants were unaware of the best place to use an EpiPen, however in the US this was more widely known and in Australia most participants answered this correctly.

**Attitudes and beliefs in parents of children with food allergies.** Dutch participants were generally optimistic regarding attitudes and beliefs of food allergy. The *Treatment and Utilisation of Health Care* domain indicated overall frustration with doctors saying different things about child's food allergy as was the viewpoint of the US and Australian participants. Of the *Stigma and Acceptability* domain Dutch, US, and Australian participants felt most

people do not take food allergy seriously and have limited knowledge of food allergy symptoms. For the *Perceptions of Quality of Life* domain Dutch participants generally disagreed with items such as marital strain due to child's food allergy and financial problems caused due to food allergy. Participants from the US followed suit, however the general consensus was participants felt they paid more attention than partner to keep child from allergenic food and worried more about child's food allergy. Australian participants agreed with the latter two items of the US. Australians generally did not feel child's food allergy caused marital strain. For the *Policy Issues* domain Dutch participants felt uncomfortable that school/day care staff could manage food allergy emergencies and disagreed that schools should ban all nut products. On the contrary US and Australian participants felt comfortable that school/day care staff could manage food allergy emergencies and schools should ban all nut products. Most Dutch and US participants felt that developing a cure was most important to help food allergic patients and promoting school education programs least important. Australian participants indicated promoting public awareness was most important and improving treatments was least important. As the Australian sample was aimed at the 0 to 2 year age bracket the item promoting school education programs was not presented to participants hence no data captured.

Overall, for parents of children with food allergy and the general public, the US shows evidence of having greater food allergy knowledge than their Dutch counterparts whilst the Dutch indicate more optimistic attitudes and beliefs than the US. As presented above a substantial amount of evidence exists suggesting food allergy knowledge, attitudes and beliefs are varied. Unfortunately, there is a paucity of data overall regarding food allergy knowledge, including within Australia. There does not appear to be any further cross-cultural comparisons regarding food allergy knowledge between other countries apart from the Netherlands and US. Some of the Australian (Staff, 2015) results appear to be on par with the

US, however since only the 0- 2 years age group was studied, it is necessary to research Australian parents of the broader age 0 to 18 years in order to further compare. With Australia having among the highest prevalence of allergic disorders in the developed world, it is speculated that Australian food allergy knowledge may be different to other countries. As a nation, numerous policies exist as previously mentioned, EpiPens may be obtained with or without physician's prescription and are frequently prescribed (Salter, Loh, Sanfilippo & Clifford, 2014), this is contrary to evidence from the Netherlands (Saleh-Langenberg et al., 2016). As such, variations in knowledge between countries would be expected.

### **Measurement of Food Allergy Knowledge, Attitudes and Beliefs**

Currently the only tool available utilised to measure food allergy knowledge, attitudes and beliefs is the Chicago Food Allergy Research Surveys (CFARS; Gupta, Kim, Springston, Pongracic et al., 2009). The CFARS was devised to provide a population-specific survey instrument assessing perceptions and understanding of food allergy where a lack of such tools existed (Gupta, Kim, Springston, Pongracic et al., 2009). Currently three versions of this self-report instrument are in use for parents (CFARS-PRNT), physicians (CFARS-PHYS) and the general public (CFARS-GP). The surveys were constructed using a three stage process: (a) creation of content domains, expert panel review, and focus groups; (b) survey validation including creation of initial items, importance and validity rating, cognitive interviews, reliability testing, item reduction, and final validation; and (c) national launch (Gupta, Kim, Springston, Pongracic et al., 2009). Significant changes were made at each stage to ensure the inclusion and retention of items with face validity and good performance characteristics (Gupta Kim, Springston, Pongracic et al., 2009). The final set contained eight content domains: (1) definition and diagnosis, (2) symptoms and severity, (3) triggers and environmental risk, (4) perceptions of susceptibility and prevalence, (5) stigma and acceptability, (6) perceptions of quality of life, (7) treatment and utilization of healthcare, and

(8) policy issues. Psychometric properties have not been released by the researchers however, Staff (2015) found adequate internal consistency for the knowledge items (CFARS-PRNT  $\alpha=.69$ , CFARS-GP  $\alpha=.73$ ).

### **The Present Study**

Overall there is a paucity of data regarding food allergy knowledge, attitudes, and beliefs, particularly in Australia and among parents of children of all ages. As a nation Australia has one of the highest recordings of food allergy. It is essential to establish a baseline measure of food allergy knowledge, attitudes and beliefs within an Australian context in order to develop food allergy knowledge-enhancing programs, including keeping our children safe. The present study aimed to investigate Australian parents' food allergy knowledge, attitudes and beliefs in parents of children both with and without food allergies aged 0-18 years. It also aimed to conduct a cross-cultural comparison with data from the US (Gupta, Kim, Springston, Smith et al., 2009; Gupta et al., 2010) and the Netherlands (Goossens et al., 2013, 2014). In addition, this study conducted exploratory research on the predictors of food allergy knowledge for Australian parents.

The present study administered an online survey containing the appropriate version of the CFARS to Australian parents of children with food allergy (CFARS-PRNT) and Australian parents of children without food allergy (CFARS-GP) in addition to a short demographics questionnaire. It was hypothesised that:

- Australian parents of children with food allergy would have greater knowledge overall than Australian parents in the general public, consistent with findings by Staff (2015). Differences in the attitudes and beliefs of Australian parents of children with and without food allergy were also predicted.
- In regard to cross-cultural differences, Australian parents were expected to exhibit similar baseline knowledge to their US counterparts (Gupta, Kim, Springston, Smith

et al., 2009; Gupta et al., 2010) and greater baseline knowledge than the Netherlands (Goossens et al., 2013, 2014).

- As there is no evidence of research having been conducted regarding the predictors of food allergy knowledge in Australian parents of children with and without food allergies, this hypothesis is purely exploratory. Individual predictors are as follows: child allergy status; parent, spouse or partner history of food allergy; parent's exposure to food allergy information through work; and level of parent education.



## Chapter 2: Method

### Participants

Participants were recruited utilising a variety of avenues to obtain a diverse sample of the Australian population. A number of private and public schools across Australia were approached via email to advertise the study. Further recruiting was conducted using online parenting forums/discussion groups, Facebook sites for food allergy support groups such as Allergy and Anaphylaxis Australia, Anaphylaxis Network Australia and the Food Intolerance Network, and other social media and networks available to the researcher. Furthermore, undergraduate Psychology students were recruited from the University of Southern Queensland (USQ) Faculty of Health, Engineering and Sciences. Recruitment occurred between May and August 2016.

Participants were required to be residing in Australia, at least 18 years of age and the parent or carer of at least one child aged 0 to 18 years, either with or without a food allergy. Participation was voluntary with parents offered an incentive of entry into the School of Psychology and Counselling's survey prize draw of a prepaid Visa; USQ students had the option to receive 1% course credit upon survey completion.

Participants were aged between 19 and 55 years of age ( $M=38.40$  years;  $SD=6.66$ ). Of the 463 participants, 274 had a child with a clinically diagnosed food allergy; the remaining 189 had no food allergic children. Demographic data is presented in Table 1. The majority of families had two children, these were fairly evenly distributed between food allergic and non-food allergic groups (48.5% and 48.1% respectively). The target child reported on ranged from 0.25 years to 17.92 years ( $M=8.06$  years;  $SD=4.52$ ). Boys represented a greater percentage (51.6%) of the target sample than females (37.1%). A small number of parents of single children did not report child age or gender due to a technical error with the survey; (11.2% of the total sample).

Table 1.

*Demographic Characteristics for Australian Parents of Food Allergic and Non-Food Allergic Children (N = 463)*

Variable	Parents of food allergic child (n=274)		Parents of non-food allergic child (n=189)		t(df)	p		
	n	M(SD)	n	M(SD)				
Target child's age (years)	250	7.74(4.57)	161	8.55(4.41)	1.76(409)	.079		
Parent age (years)	274	38.45(6.31)	188	38.32(7.17)	-0.21(460)	.833		
	n	%	n	%	$\chi^2(df)$	p		
Number of children in family <18 years	251		161					
1	44	17.53	24	14.91	2.65(5)	.754		
2	133	52.99	91	56.52				
3	56	22.31	34	21.11				
4	11	4.38	10	6.21				
5	6	2.39	2	1.24				
6	1	0.40	0	0				
Geographic location	274		189					
Queensland	92	33.58	117	61.90	51.33(7)	.000		
New South Wales	67	24.45	14	7.41				
Australian Capital Territory	8	2.92	4	2.12				
Victoria	43	15.69	13	6.88				
South Australia	29	10.58	25	13.23				
Northern Territory	0	0	1	0.53				
Western Australia	17	6.20	5	2.65				
Tasmania	18	6.57	10	5.29				
Ethnicity	270		185					
Australian/New Zealand	237	87.78	167	90.27			5.13(4)	.274
Aboriginal/Torres Strait Islander	5	1.85	2	1.08				
African	3	1.11	1	0.54				
Asian	10	3.70	11	5.95				
European	15	5.56	4	2.16				
Marital status	274		189					
Married	219	79.93	140	74.07	6.83(4)	.145		
Separated/Divorced	20	7.30	21	11.11				
Single	11	4.01	9	4.76				
Defacto	24	8.76	16	8.47				
Widow/er	0	0	3	1.59				
Education level	274		188					
Did not complete High School	11	4.01	6	3.19	0.30(4)	.990		
Completed High School	34	12.41	25	13.30				

School						
Trade/Technical	72	26.28	50	26.60		
College Qualification						
University Degree	91	33.21	63	33.51		
Post-graduate Degree	66	24.09	44	23.40		
Household income	274		189			
Less than \$24,999	11	4.01	14	7.41	10.79(6)	.095
\$25,000 to \$39,999	15	5.47	11	5.82		
\$40,000 to \$59,999	22	8.03	25	13.23		
\$60,000 to \$99,999	65	23.72	49	25.93		
\$100,000 to \$149,999	88	32.12	51	26.98		
\$150,000 to \$199,999	49	17.88	20	10.58		
Over \$200,000	24	8.76	19	10.05		

*Note.*  $t$ =Independent samples t-test;  $\chi^2$ =Pearson's chi-square.

Some discrepancies in  $n$  values due to missing demographic data.

The majority of respondents were mothers (92.0%) who identified their ethnicity as Australian or New Zealand, residing in Queensland. A substantial number of respondents were university educated or with a trade/technical college qualification. About a third of respondents reported a household income of \$100,000-\$149,999.

Demographic characteristics of food allergic parents and non-food allergic parents were compared using chi-square tests and independent samples t-tests. No significant differences were found between groups except for geographic location, with 61.9% of respondents of non-food allergic children located in Queensland, whilst the food allergic group was more evenly distributed throughout Australia.

**Cross-cultural samples.** As the paper compares Australian data to that published on the United States and the Netherlands, it is necessary to briefly describe these samples.

**The Netherlands.** The Netherlands sample was taken from two studies conducted by Goossens and colleagues (2013, 2014). Parents with food allergic children who completed the CFARS-PRNT were recruited from the website of the Dutch Food Allergy Foundation and the food allergy challenge units of two medical centres in the Netherlands (Goossens et al., 2013). Of the 299 participants, the majority were female (96.3%), married (93.0%), with

a college degree or higher (92.6%) and most families (73.9%) had two or more children (Goossens et al., 2013).

Non-food allergic participants from the Netherlands were randomly selected from among the general public via the municipal population registers and from three municipalities within the Netherlands. Participants were aged 18 years plus with most of the sample aged 45-65 years (43.4%). Of the 461 participants, 57.0% were female and held a university degree (79.4%) with most participants (54.6%) knowing at least one food allergic person (Goossens et al., 2014). Participants from this sample working daily with children represented 12.1%.

**United States.** The US sample was taken from two large studies (Gupta, Kim, Springston, Smith et al., 2009; Gupta et al., 2010). Data from these studies was presented by Goossens and colleagues (2013, 2014) in more detailed form and so is reported in this paper. Parents with food allergic children from the US who completed the CFARS-PRNT were well distributed across the US (Gupta et al., 2010). Of the 2945 participants, the majority were female (93.5%) and predominantly (89.3%) of white ethnicity (Gupta et al., 2010). Participants were highly educated with the majority holding an associate degree or higher (90.3%), and 32.4% reported a gross annual income of \$100,000-\$199,999 (Gupta et al., 2010). The majority of participants were married (91.4%) and most families (71.5%) had two or more children (Gupta et al., 2010).

Parents with non-food allergic children from the US who completed the CFARS-GP were well distributed across the US (Gupta, Kim, Springston, Smith et al., 2009). Of the 2148 participants, the majority were female (61.6%) and almost evenly (57.2%) of white ethnicity (Gupta, Kim, Springston, Smith et al., 2009). Participants were highly educated with the majority holding an associate degree or higher (80.2%), and 21.3% reported a gross annual income of \$100,000 and above (Gupta, Kim, Springston, Smith et al., 2009). Almost

half of the sample had a child, 35.9% of whom were school-aged (Gupta, Kim, Springston, Smith et al., 2009).

## **Materials**

This study was part of broader research investigating food allergy knowledge, attitudes and beliefs, including the influence of these constructs on how parents introduced high allergen solids, and their associated levels of concern (Staff, 2015). The internet-based survey (Appendix A) collected data on demographics, feeding practices, food allergy knowledge, attitudes, and beliefs. In the current study, of primary interest was Australian parents' food allergy knowledge, attitudes and beliefs.

**Demographic questionnaire.** Information collected included parent's geographic location, ethnicity, education level, marital status and household income. In addition, information regarding parent food allergy history and exposure to food allergy information through the workplace was obtained. Furthermore, information was collected on the child of interest, specifically age, gender and nature of any diagnosed food allergy.

**Chicago Food Allergy Research Surveys (CFARS).** Food allergy knowledge, attitudes and beliefs among parents of children with food allergy and the general public were measured using the CFARS (Gupta, Kim, Springston, Pongracic et al., 2009). The CFARS is currently the only validated tool used to investigate food allergy knowledge, attitudes and beliefs. Of the three available versions of the survey, this study utilised the CFARS for parents of children with food allergy (CFARS-PRNT), and CFARS for the general public (CFARS-GP).

The Chicago Food Allergy Research Survey for Parents of Children with Food Allergy (CFARS-PRNT) is a 42-item survey instrument. In this instrument 15 items test food allergy knowledge: eight items requiring *True*, *False* or *I don't know* responses (e.g., *Eczema may be the first sign of having a food allergy*), and seven multiple choice items (e.g.,

*Which of the following contain food ingredients that could cause an allergic reaction? Play-doh; Medicines; Toothpaste; Lotions & creams*). The remaining 27 items assess parental attitudes and beliefs of food allergy: 23 items using a 5-point Likert scale (e.g., *More government money should go toward research about food allergy*) with responses ranging from *strongly disagree* to *strongly agree*, including a *not applicable* option for most items, and four multiple choice questions (e.g., *Have you or your significant other made career changes because of your child's food allergy? Yes, I have; No; Yes, my significant other has*). An additional 30 questions from the CFARS-GP not in the survey instrument for parents of children with food allergy were administered to allow for later comparison across groups and to provide further detail on items not usually administered to other groups. Therefore, parents of children with food allergy were presented with 31 food allergy knowledge items and 41 items assessing food allergy attitudes and beliefs.

The Chicago Food Allergy Research Survey for the General Public (CFARS-GP) is a 35-item survey instrument. In this instrument 19 items test food allergy knowledge: 16 items requiring *True, False* or *I don't know* responses (e.g., *Allergic diseases run in families*), and 3 multiple choice items (e.g., *Which of the following is the most common food allergy in adults? Milk; Peanut; Shellfish; I don't know*). The remaining 16 items assess parental attitudes and belief of food allergy: 13 items using a 5-point Likert scale (e.g., *Food allergy is a serious health problem in Australia*) with responses ranging from *strongly disagree* to *strongly agree*, and three multiple choice questions (e.g., *Which of the following would be the best way to learn about food allergy? Radio; Television; Handout/Brochure; Internet/Email; Newspapers/Magazines; Other*). An additional 16 questions from the CFARS-PRNT not in the survey instrument for the general public were administered to allow for comparison across groups and to provide further detail on items not usually administered to other groups.

Therefore, participants from the general public were presented with 31 food allergy knowledge items and 20 items assessing food allergy attitudes and beliefs.

An overall knowledge score was calculated by summing all correct knowledge items; this was converted to a percentage to enable comparison between the two CFARS versions which were of differing lengths (food allergic score range of 0-21 and non-food allergic score range of 0-24). To describe the CFARS attitudes and beliefs components, response categories were collapsed into *strongly disagree/disagree*, *neither agree/disagree*, and *strongly agree/agree*. This method was adopted to compare the Australian data with that presented by Goossens (2014). Data for the response category of *neither agree/disagree* was not made available for the Netherlands and US data nor could this be calculated as the proportions of use of this response versus missing data was unknown. As a result the category of *neither agree/disagree* was not reported in the comparison between Australia, the Netherlands and the US for the general public including parents of children without food allergy.

Well established survey methodology such as focus groups, cognitive interviews, reliability testing and item reduction were used to develop and validate these instruments (Gupta et. al., 2010). The process was overseen by an expert panel of paediatricians, paediatric allergists, survey researchers, and food allergy awareness advocates (Gupta, 2010). Whilst psychometric properties have yet to be made available for the CFARS, Staff (2015) found adequate internal consistency scores for the knowledge items (CFARS-PRNT  $\alpha=.69$ , CFARS-GP  $\alpha=.73$ ). In the current study internal consistency was adequate (Field, 2013) for the knowledge items (CFARS-PRNT  $\alpha=.66$ , CFARS-GP  $\alpha=.62$ ). Test-retest correlations for the initial and follow-up administrations of the CFARS in the current study indicated a significant relationship between the knowledge scores of the CFARS two weeks apart, (CFARS-PRNT  $r=.74$ ,  $p=.000$ , CFARS-GP  $r=.73$ ,  $p=.000$ ).

## **Procedure**

Ethical clearance (approval number H14REA217) was obtained from the University of Southern Queensland (USQ) Human Research Ethics Committee prior to data collection. Participants accessed the survey website using a hyperlink provided in the online advertisements. Detailed information explaining the purpose of the study and participation required was outlined prior to participants clicking 'agree' and giving informed consent (refer to Appendix A). Participants were informed that their responses were confidential, their participation voluntary, and they could withdraw from the survey at any time without penalty. Participants were informed that data could be withdrawn once submitted by providing the survey ID and unique reference number that appeared at completion. The survey was anonymous, however at completion participants were asked if they would like to participate in a retest survey (refer to Appendix B); those who agreed were required to leave a contact email address for the researcher to forward a follow-up link to two weeks later. The email address was used to match the retest response to the original survey, and then deleted. Debriefing and feedback was offered if required with participants given the name and contact details of the researcher and links to a selection of websites for additional information.

Within the survey, participants were asked a variety of questions to confirm their eligibility and lead them towards the appropriate version of the CFARS. If the parent had a child with food allergy they were asked to report on that child, if the parent had more than one child with food allergy they were asked to randomly select a child to report on and were guided towards the CFARS-PRNT. If parents had no food allergic children they were to either report on their only child or randomly select a child to report on and were administered the CFARS-GP. The survey took approximately 15-20 minutes to complete. For the retest survey parents were asked to answer the questions with the same child in mind as when they completed the first survey.



### **Statistical Analyses**

Analyses were conducted using the IBM Statistical Package for the Social Sciences (SPSS version 23.0). A priori power analysis using G\*Power version 3.1.9.2 (Faul, Erdfelder, Lang, & Buchner, 2009) indicated that in order to detect a medium effect size ( $d=.5$ ; Cohen, 1992), with  $\alpha=.01$ , and achieve a power of .80 a total sample size of 192 was required. The obtained sample of 463 was deemed sufficient for all analyses within this research. Following demographic analyses by group (as detailed above) an independent samples *t*-test was utilised to compare the overall CFARS knowledge score for Australian food allergic and non-food allergic groups. Pearson's chi-square tests were then utilised to compare the percentage of parents answering correctly on each of the CFARS knowledge items by group. In this instance a more conservative alpha of .01 was used to decrease the risk of Type II error given the number of comparisons. A range of descriptive analyses were then presented to compare the Australian, US and Netherlands (Goossens et al., 2013, 2014) samples on the CFARS based on published data (attempts were made to obtain raw data for further analysis though these were unsuccessful). Multiple hierarchical regression method was then used to examine predictors of food allergy knowledge among Australian parents.

## Chapter 3: Results

### Data Screening

Accuracy of data entry and missing values were initially screened for prior to conducting analysis. There was no missing data for the CFARS measures and all scores from the measures were within minimum and maximum values. Of the initial sample of 470 participants seven cases were deleted. Four participants (P146422268524, P146547300485, P146674827264, and P146916229569) did not meet eligibility requirements of the survey (e.g., were not parents, or child was not under 18 years). Two participants (P146433107417, P146883556582) completed the survey twice hence one complete response of each was randomly removed from the analysis. One participant (P146536670094) completed the incorrect survey version (i.e., CFARS-GP) despite having a food allergic child. In addition one parent recorded their age as 10 years; whilst this age was deleted due to its apparent error, the remaining data was complete and thereby retained. Due to a technical error with the online survey, a proportion of the sample with only one child were not asked their target child's age, resulting in missing age for 24 food allergic families (8.8% of the total group) and 28 non-food allergic families (14.8%). The data of these respondents was utilised as no further discrepancies were noted with their data. The final sample (N=463) utilised for descriptives comprised of 274 parents of food allergic children (59.2%) and 189 parents of non-food allergic children (40.8%).

**Assumption testing.** All relevant assumptions were tested for independent samples t-test and hierarchical regression. All assumptions were met for each of the relevant variables. Skewness and kurtosis were well within limits, frequency histograms showed normality, scatterplots showed linearity and no violations were noted. An assessment of homogeneity of variance was conducted using Levene's test with no violations found. No univariate outliers were present. Multivariate outliers were tested for combined predictors using Mahalanobis

distances, two cases (P146499489860, P146589423885) were deleted due to having values exceeding the cut-off point of 18.47 ( $p=.001$ ) using  $df=4$ . Residual outliers were assessed using residual plots, no casewise diagnostics were evident hence no further deletions were made. Multicollinearity was assessed; VIF values were well below 10 and tolerance statistics were above 0.2, hence no collinearity appears within this data. The total sample size used for the hierarchical multiple regression after removal of outliers was 461.

### Data Analysis

**Food allergy knowledge of Australian parents.** The overall CFARS knowledge score for parents of children with food allergies ranged from 7–21 out of a possible 21 ( $M=15.26$ ,  $SD=2.81$ ), and 9–23 out of a possible 24 ( $M=17.61$ ,  $SD=2.90$ ) for parents of children without food allergies. These summary scores were converted to percentages to enable comparison between groups. Table 2 summarises descriptive and inferential statistics by group for the CFARS overall knowledge score and each of the items. An independent samples  $t$ -test was conducted to determine whether parents of food allergic and non-food allergic children differed in their overall knowledge of food allergy. No significant difference was found by group,  $t(461)=0.61$ ,  $p=.540$ . The percentage of parents correctly answering each knowledge item was then compared by group using Pearson's chi-square. Significant differences were found between parents of food allergic children and parents of children without food allergies on various items from each of the six domains. The *Definition and Diagnosis* domain with items such as *Medical test is only way to know child has food allergy*, and *Allergic reaction when body considers food harmful*, The *Triggers and Environmental Risk* domain with items such as *Food additives are common food allergens* and *Three most common childhood food allergens – egg and milk* indicated significant differences between groups. Various items within the domains were more correctly answered by parents of children with food allergies.

Table 2.

*Australian Parents Knowledge of Food Allergies by Group (Food Allergic and Non-Food Allergic) using the CFARS*

	Food Allergic (n=274)		Non-Food Allergic (n=189)		<i>t(df)</i>	<i>p</i>
	Mean	SD	Mean	SD		
Overall knowledge score <sup>†</sup>	15.26	2.81	17.61	2.90	0.61(461)	.540
Domain/Item	Knowledge score					
	<i>n</i>	% correct <sup>a</sup>	<i>n</i>	% correct <sup>a</sup>	$\chi^2(df)$	<i>p</i>
Definition and diagnosis						
FA involves the immune system (T)	231	84.3	152	80.4	1.18(1)	.277
Medical test is only way to know child has FA (F)	199	72.6	94	49.7	25.23(1)	.000
Allergic reaction when body considers food harmful (T)	255	93.1	143	75.7	28.07(1)	.000
Lactose intolerance same as milk allergy (F)	244	89.1	144	76.2	13.63(1)	.000
Symptoms and severity						
Eczema may be first sign of FA (T)	206	75.2	114	60.3	11.58(1)	.001
Food allergy reaction can be fatal (T)	271	98.9	186	98.4	0.21(1)	.650
Hives a common symptom of FA (T)	267	97.4	174	92.1	7.16(1)	.008
Sign of milk allergy reaction						
Hyperactivity (F)	230	83.9	161	85.2	0.13(1)	.717
Hives on face/chest (T)	247	90.1	147	77.8	13.49(1)	.000
Tongue swells/trouble breathing (T)	264	96.4	153	81.0	29.64(1)	.000
Stuffy nose (F)	207	75.5	137	72.5	0.55(1)	.459
Triggers and environmental risk						
Asthma is risk factor for anaphylaxis (T)	168	61.3	97	51.3	4.56(1)	.033
Foods can pass from mother to child by breast milk (T)	242	88.3	168	88.9	0.04(1)	.850
Food additives are common food allergens (F)	96	35.0	29	15.3	22.01(1)	.000
Allergic reaction from touching allergenic food (T)	262	95.6	174	92.1	2.58(1)	.108
Milk-allergic child can safely drink low-fat milk (F)	236	86.1	138	73.0	12.39(1)	.000
Acidic food is a common cause of FA (F)	108	39.4	96	50.8	5.87(1)	.015

Food ingredients that could cause allergic reaction						
Play-doh (T)	207	75.5	126	66.7	4.37(1)	.037
Medicines (T)	245	89.4	163	86.2	1.08(1)	.300
Toothpaste (T)	149	54.4	81	42.9	5.94(1)	.015
Lotions/creams (T)	239	87.2	152	80.4	3.94(1)	.047
Three most common childhood food allergens						
Egg (T)	249	90.9	131	69.3	35.35(1)	.000
Milk (T)	190	69.3	100	52.9	12.91(1)	.000
Peanut (T)	255	93.1	175	92.6	0.04(1)	.846
Most common adult FA (shellfish) (T)	95	34.7	91	48.1	8.45(1)	.004
Perceptions of susceptibility and prevalence						
Teenagers at higher risk for fatal FA than children (T)	130	47.4	20	10.6	69.40(1)	.000
Age group most likely to have FA (0-5 yr)	226	82.5	110	58.2	33.13(1)	.000
Percentage of children with milk allergy who develop tolerance (>75%)	74	27.0	19	10.1	20.03(1)	.000
Percentage of children with peanut allergy who develop tolerance (1-25%)	112	40.9	35	18.5	25.80(1)	.000
Allergic diseases run in families (T)	143	52.2	99	52.4	0.02(1)	.968
FA can go away with age (T)	237	86.5	144	76.2	8.15(1)	.004
FA more common in children (T)	219	79.9	121	64.0	14.51(1)	.000
FA increasing in Australian children (T)	263	96.0	168	88.9	8.76(1)	.003
Treatment and utilisation of healthcare						
Daily antihistamine can prevent FA reaction (F)	186	67.9	98	51.9	12.12(1)	.000
Best place to use EpiPen/Twinject (outer thigh)	265	96.7	146	77.2	42.51(1)	.000
There is a cure for FA (F)	246	89.8	101	53.4	78.67(1)	.000
Avoidance is the only way to prevent FA reaction (T)	233	85.0	117	61.9	32.44(1)	.000
Daily medicine can prevent FA reaction (F)	207	75.5	102	54.0	23.46(1)	.000
Policy issues						
Law in Australia requires foods to be labelled (T)	228	83.2	157	83.1	0.02(1)	.968

*Note.* Food Allergic=parents of children with food allergies; Non-Food Allergic=parents of children without food allergies; FA=food allergy; correct answers are provided in parenthesis after items - T=true; F=false.

<sup>†</sup> Overall knowledge score: mean number of correctly answered items (ranging 0-21 for parents of children with food allergies; ranging 0-24 for parents of children without food allergies).

<sup>a</sup>Percentage of items answered correctly (excluding incorrect or “*I don’t know*” responses).

Domains such as *Perceptions of Susceptibility and Prevalence* including items such as *Age group most likely to have food allergy*, answer being *0-5years*, *Food allergy can go away with age*, and *Food allergy increasing in Australian children*. Furthermore, *Teenagers at higher risk for fatal food allergy than children* was more correctly answered by parents with food allergic children than parents of children without food allergies. Additionally, the *Treatment and utilisation of healthcare* domain was most correctly answered by parents of children with food allergies. Items such as *Daily antihistamine can prevent food allergic reaction* and *Daily medicine can prevent food allergic reaction* were correctly answered as false in comparison to parents of children without food allergies. Furthermore, within the *Symptoms and Severity* domain *Food allergy reaction can be fatal* was correctly answered as true by both parents of children with food allergy and parents of children without food allergies. Various items throughout each of the domains were more correctly answered by parents of children without food allergies in comparison to parents of children with food allergies. Items such as *Foods can be passed from mother to child through breast milk*, correctly answering false to the question of *Acidic food is a common cause of food allergy*, and *Most common adult food allergy* correctly identified as shellfish.

**Food allergy attitudes and beliefs of Australian parents.** Attitudes and beliefs of Australian parents with and without food allergic children are outlined in Tables 3 and 4 respectively. Approximately half of Australian parents with food allergic children indicated they felt some relatives did not accommodate their child's food allergy, and half disagreed that their child's friends treated them differently. Many parents disagreed that most people take food allergy seriously, and that most people know the symptoms of food allergy. Furthermore, a small proportion indicated that having a child with food allergy causes marital strain and half of parents disagreed that having a food allergic child causes family financial. The consensus amongst parents of children with food allergies was split with regards to day

Table 3.

*Food Allergy Attitudes and Beliefs of Australian Parents with Food Allergic Children Using the CFARS-PRNT (n=274)*

Domain/Item	N/A		Disagree		Neutral		Agree	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Treatment and utilisation of healthcare								
Frustrated doctors say different things about child's FA	4	1.5	118	42.9	23	8.4	129	46.9
Stigma and acceptability								
Some relatives don't accommodate child's FA	4	1.5	103	37.5	24	8.8	143	52.2
Child's friends treat him/her differently because of FA	16	5.8	138	50.3	46	16.8	74	27.0
Experienced hostility from other parents in accommodating child's FA	16	5.8	123	44.9	37	13.5	98	35.7
How I deal with FA affects how child deals	14	5.1	44	16.1	37	13.5	179	65.4
Most people know symptoms of FA	-	-	215	78.5	25	9.1	34	12.4
Most people take FA seriously	-	-	172	62.8	30	10.9	72	26.3
Food allergy serious problem in Australia <sup>†</sup>	-	-	3	1.1	18	6.6	253	92.3
People with FA treated differently <sup>†</sup>	-	-	33	12.0	54	19.7	187	68.3
Parents of food allergic child overprotective <sup>†</sup>	-	-	136	49.6	63	23.0	75	27.3
Food allergic children teased at school <sup>†</sup>	-	-	90	32.8	105	38.3	79	28.8
Would worry about having over child with FA <sup>†</sup>	-	-	182	66.5	32	11.7	60	21.9
Perceptions of quality of life								
Child's FA causes strain on marriage/relationship*	9	3.3	168	61.3	22	8.0	49	17.9
Partner and I don't agree on how to care for child's FA*	9	3.3	199	72.7	19	6.9	21	7.7
Pay more attention than partner to keep child from allergenic food(s)*	4	1.5	124	45.3	14	5.1	106	38.7
Worry more than my partner about child's FA*	6	2.2	98	35.8	22	8.0	122	44.5
Partner thinks I exaggerate seriousness of child's FA*	8	2.9	187	68.3	23	8.4	30	10.9
Partner's career has suffered because of child's FA*	10	3.6	216	78.9	9	3.3	13	4.7
Child with FA affects other children's daily lives	54	19.7	83	30.3	30	10.9	107	39.1
My career has suffered because of child's FA	16	5.8	168	61.3	26	9.5	64	23.3
Food allergy of child causes financial problems for my family	8	2.9	142	51.9	43	15.7	81	29.6

Avoiding allergenic food is difficult <sup>†</sup>	-	-	55	20.1	53	19.3	166	60.6
People worry a lot about their FA <sup>†</sup>	-	-	27	9.8	73	26.6	174	63.5
Difficult to eat out safely with FA <sup>†</sup>	-	-	27	9.9	23	8.4	224	81.7
Policy issues								
Confident that school/day care staff can manage FA emergencies	14	5.1	41	14.9	34	12.4	185	67.5
Children with FA should have EpiPen/Twinject with them at school	2	0.7	23	8.4	37	13.5	212	77.3
EpiPen/Twinject should be kept only in nurse's office at school	1	0.4	192	70.0	29	10.6	52	19.0
Day care centres/schools should ban all products with nuts	1	0.4	73	26.6	47	17.2	153	55.8
Trained adult should be at day care centres/school lunch, parties, and field trips	1	0.4	15	5.5	13	4.7	245	89.4
Food labelling laws decreased choice of foods my child can eat	8	2.9	94	34.3	69	25.2	103	37.5
More government money should go towards FA research	1	0.4	14	5.1	34	12.4	225	82.1
Having EpiPen/Twinject (injectable epinephrine) important for child with severe FA <sup>†</sup>	-	-	5	1.8	5	1.8	264	96.4
Day care centres/schools should have plans to keep FA children safe <sup>†</sup>	-	-	4	1.5	3	1.1	267	97.5
Day care centres/schools should have special table for FA child <sup>†</sup>	-	-	126	46.0	82	29.9	66	24.1
Unfair if my child cannot have peanut butter sandwich due to another child's peanut allergy <sup>†</sup>	-	-	229	83.6	30	10.9	15	5.5

Note. Items abbreviated for brevity in table. FA=food allergy; N/A=not applicable; ‘-‘ indicates no participants responded with this option.

<sup>†</sup>This item included from CFARS-GP for comparison of groups

\*This item only answered by participants with significant other (n=248)



Table 4.

*Food Allergy Attitudes and Beliefs of Australian Parents of Children without Food Allergies Using the CFARS-GP (n=189)*

Domain/Item	Disagree		Neutral		Agree	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<b>Stigma and acceptability</b>						
Food allergy serious problem in Australia	17	9.0	22	11.6	150	79.4
People with FA treated differently	45	23.8	58	30.2	87	46.0
Parents of food allergic child overprotective	91	48.1	48	25.4	50	26.4
Food allergic children teased at school	104	55.0	65	34.4	20	10.6
Would worry about having over child with FA	105	55.5	37	19.6	47	24.9
<b>Perceptions of quality of life</b>						
Avoiding allergenic food is difficult	40	21.1	49	25.9	100	52.9
People worry a lot about their FA	13	6.9	72	38.1	104	55.0
Difficult to eat out safely with FA	30	15.9	29	15.3	130	68.8
<b>Treatment and use of healthcare</b>						
Having injectable epinephrine (EpiPen) important for child with severe FA	7	3.7	5	2.6	177	93.6
<b>Policy issues</b>						
Day care centres/schools should have plans to keep FA children safe	3	1.6	4	2.1	182	96.3
Children with FA should have EpiPen/Twinject with them at school <sup>†</sup>	25	13.2	27	14.3	137	72.5
EpiPen/Twinject should be kept only in nurse's office at school <sup>†</sup>	104	55.0	37	19.6	48	25.4
Trained adult should be at day care centres/school lunch, parties, and field trips <sup>†</sup>	12	6.4	22	11.6	155	82.0
More government money should go towards FA research <sup>†</sup>	12	6.3	62	32.8	115	60.9
Day care centres/schools should ban all products with nuts	76	40.3	55	29.1	58	30.7
Day care centres/schools should have special table for FA child	82	43.4	40	21.2	67	35.4
Unfair if my child cannot have peanut butter sandwich due to another child's peanut allergy	98	51.8	36	19.0	55	29.1

Note. Items abbreviated for brevity in table. FA=food allergy; ‘-’ indicates no participants responded with this option.

N/A=not applicable was not an option for CFARS-GP

<sup>†</sup>This item included from CFARS-PRNT for comparison of groups

care centres/schools needing to ban all products with nuts. The majority of parents with food allergic children and a large proportion of parents without food allergic children felt that more government money should go towards food allergy research. Overall, the majority of parents of children with food allergies and without food allergies view food allergy as a serious problem in Australia

The majority of parents of children without food allergies agreed that having injectable epinephrine (EpiPen) is important for child with severe food allergy and day care centres/schools should have plans to keep food allergic children safe. Almost half agreed that people with food allergy are treated differently yet disagreed that food allergic children are teased at school. Approximately one third agreed that day care centres/schools should ban all products with nuts, have a special table for food allergic children and felt it unfair if their child could not have peanut butter sandwich due to another child's peanut allergy.

With respect to policy considerations (see Table 5), Australian parents with food allergic children endorsed developing a cure as the most important step to improve the lives of those with food allergy whilst parents of children without food allergies reported determining the cause as priority. Parents of children with food allergies view television to be the best way to learn about food allergy whilst parents of children without food allergies would prefer the internet/email and television. In considering the best way for schools to educate parents about food allergy, parents of children with food allergies would like to see a Doctor or nurse talking about food allergies. Presentation at parent-teacher meetings was the second most preferred method for parents of children with food allergies and the most preferred method for parents of children without food allergies.

Table 5.

*Australian Parents' Policy Considerations by Group (Food Allergic and Non-Food Allergic)*

Item	Food Allergic (n = 274)		Non-Food Allergic (n = 189)	
	<i>n</i>	%	<i>n</i>	%
Most important step to improve the lives of those with food allergy?				
Develop a cure	97	35.4	24	12.7
Improve treatments	10	3.6	15	7.9
Determine the cause(s)	75	27.4	99	52.4
Promote school education programs	17	6.2	7	3.7
Promote public awareness	75	27.4	44	23.3
Best way to learn about food allergy?				
Radio	3	1.1	4	2.1
Television	117	42.7	69	36.5
Handout/brochure	23	8.4	17	9.0
Internet/e-mail	95	34.7	74	39.2
Newspapers/magazines	8	2.9	3	1.6
Other	28	10.2	22	11.6
Best way for schools to educate parents about food allergy?				
Handouts/brochures in the mail	44	16.1	48	25.4
Presentation at parent-teacher meetings	79	28.8	50	26.5
Parents of food-allergic children talking to other parents	56	20.4	38	20.1
Doctor or nurse talking about food allergies	84	30.7	46	24.3
Other	11	4.0	7	3.7

Note. Note. Items abbreviated for brevity in table.  
N=463

**Cross-cultural comparison of food allergy knowledge, attitudes and beliefs.** Data from parents with food allergic children and the general public including parents of children without food allergy in Australia, the Netherlands and the US are presented in Table 6 and Table 7 respectively. This comprises descriptive statistics on the overall CFARS knowledge score and individual attitude and belief items in accordance with the data available from research conducted previously for parents of children with food allergies (Goossens et al., 2013, 2014)

Australian parents of children with food allergies exhibited a greater overall knowledge score ( $M=15.3, SD=2.8$ ) than their Dutch ( $M=9.9, SD=4.3$ ) and US counterparts ( $M=12.7, SD=4.8$ ). A number of attitude/belief items warrant comment.

Table 6.

*Cross-Cultural Comparison of Food Allergy Knowledge, Attitudes and Beliefs for Parents of Food Allergic Children*

Item	Australia (n = 274)		Netherlands <sup>‡</sup> (n = 299)		United States <sup>‡</sup> (n = 2945)	
	Mean <sup>*</sup>	SD	Mean <sup>*</sup>	SD	Mean <sup>*</sup>	SD
Food allergy knowledge						
Overall knowledge score <sup>†</sup>	15.3	2.8	9.9	4.3	12.7	4.8
Food allergy attitudes and beliefs						
Treatment and utilisation of health care						
Frustrated because doctors say different things about child's food allergy	3.2	1.5	3.2	1.4	3.3	1.4
Stigma and acceptability						
Some relatives do not accommodate child's food allergy	3.2	1.5	2.9	1.3	3.1	1.4
Child's friends treat him/her differently because of food allergy	2.8	1.4	2.3	0.9	2.6	1.1
Experienced hostility from other parents in accommodating child's food allergy	3.1	1.5	2.7	1.1	3.0	1.3
How I deal with FA affects how child deals with food allergy	3.9	1.3	4.0	1.0	4.1	1.0
Most people know symptoms of food allergy	2.1	1.0	2.0	0.9	1.8	1.0
Most people take food allergy seriously	2.5	1.2	2.8	1.1	2.2	1.2
Perceptions of quality of life						
Child's food allergy causes strain on marriage/relationship	2.2	1.4	2.5	1.3	2.5	1.3
Partner and I do not agree on how to care for child's food allergy	1.9	1.3	1.9	1.0	2.0	1.1
Pay more attention than partner to keep child from allergenic food(s)	2.8	1.6	2.7	1.3	3.0	1.5
Worry more than my partner about child's food allergy	3.2	1.6	2.8	1.3	3.3	1.5
Partner thinks I exaggerate seriousness of child's food allergy	2.0	1.4	1.9	0.9	2.2	1.3
Partners' career has suffered because of child's food allergy	1.7	1.2	1.8	1.0	1.7	1.0
Child with FA affects other children's daily lives	3.7	1.7	3.5	1.2	3.7	1.2
My career has suffered because of child's food allergy	2.6	1.6	2.3	1.1	2.4	1.3
Food allergy of child causes financial problems for my family	2.7	1.5	2.4	1.0	2.7	1.3
Policy issues						
Comfortable that school/day care staff can manage food allergy emergency	3.9	1.1	2.9	1.0	3.3	1.0

Children with FA should have EpiPen/Twinject with them at school	4.2	1.0	3.8	0.9	4.4	0.9
EpiPen/Twinject should be kept only in nurses office at school	2.2	1.3	3.0	1.2	2.1	1.2
Schools should ban all products with nuts	3.5	1.3	2.7	1.0	3.4	1.3
Trained adults should be at school lunch, parties, and field trips	4.5	0.9	3.7	1.0	4.5	0.8
Food labelling laws have decreased choice of foods my child can eat	3.2	1.4	3.0	1.1	3.0	1.3
More government money should go toward food allergy research	4.2	1.0	4.0	0.8	4.4	0.9
Which of the following is most important to help food allergic patients, (%)						
Developing a cure	35.4		32.1		42.4	
Improving treatment	3.6		13.0		20.6	
Identifying the cause	27.4		28.4		20.4	
Promoting public awareness	27.4		19.7		8.9	
Promoting school education programs	6.2		6.7		7.7	

*Note.* Items abbreviated for brevity in table. FA=food allergy.

<sup>†</sup>Overall knowledge score: mean number of correctly answered items (ranging 0-21); <sup>‡</sup>Netherlands and United States data taken from Goossens (2014).

<sup>\*</sup>Mean response score (range 1-5, with scores above 3 indicating general agreement and scores below 3 indicating general disagreement).

Whilst Dutch participants did not feel hostility from other parents in accommodating child's food allergy, participants from Australia and the US generally agreed with this statement. All participants from the three countries generally disagreed that most people know the symptoms of food allergy. Furthermore, it was generally disagreed amongst the three countries that most people take food allergy seriously. Australian and US participants were more in agreement with the ability of school/day care staff manage food allergy emergencies, yet the general consensus was one of disagreement in the Netherlands. All three countries generally agreed that more government money should go toward food allergy research and that developing a cure is most important to help food allergic patients.

With regard to Table 7, overall knowledge score and attitudes and beliefs medians and range for the Netherlands and US participants were taken from research conducted previously from the general public (Goossens et al., 2014). Australians exhibited a greater overall knowledge score (*Mdn*=18.0, *Range*=9.0-23.0) for parents of children with food allergies than the Netherlands (*Mdn*=8.0, *Range*=5.0-10.5) and US (*Mdn*=11.0, *Range*=8.0-14.0). Australians agreed that people with food allergies are treated differently; the US was almost equally divided whilst the Dutch disagreed. Almost the majority of Australian, most of US and less than half Dutch participants acknowledged the importance of an EpiPen for children with severe food allergies. Australian and Dutch parents without food allergic children and general public disagreed that schools should ban all products with nuts. Australian participants generally disagreed that it would not be fair if their child could not have a peanut butter sandwich because of another student's peanut allergy, whilst Dutch participants were in agreement.

All three countries recognised that identifying the cause of food allergy was most important in helping food allergic patients, whilst both Australian and Dutch participants viewed parent-teacher presentations as the best way for schools to educate parents on food

Table 7.

*Cross-Cultural Comparison of Food Allergy Knowledge, Attitudes and Beliefs for Parents of Non-Food Allergic Children*

Item	Australia (n = 189)		Netherlands <sup>‡</sup> (n = 461)		United States <sup>‡</sup> (n = 2148)	
	Median	Range	Median	Range	Median	Range
Food allergy knowledge						
Overall knowledge score <sup>†</sup>	18.0	9.0-23.0	8.0	5.0-10.5	11.0	8.0-14.0
Food allergy attitudes and beliefs	% agree	% disagree	% agree	% disagree	% agree	% disagree
Stigma and acceptability						
People with food allergies are treated differently because of their food allergy	46.0*	23.8	18.5	41.5*	35.0*	33.1
Children with food allergies have overprotective parents	26.4	48.1*	30.2	38.4*	32.2	37.2*
Children with food allergies are teased at school	10.6	55.0*	9.3	53.1*	19.2	41.9*
Would worry about having over child with food allergy	24.9	55.5*	14.8	56.6*	-	-
Perceptions of quality of life,						
For someone who has a food allergy, staying away from the food that he or she is allergic to is difficult	52.9*	21.1	39.4*	24.7	46.4*	27.2
People with food allergies worry a lot about their allergy	55.0*	45.0	36.1*	16.9	51.9*	13.2
It is difficult for people with food allergies to safely eat at restaurants	68.8*	15.9	61.8*	12.3	56.5*	23.7
Treatment and use of health care,						
Having an EpiPen or Twinject (injectable epinephrine) is important for most children with severe food allergies	93.6*	3.7	42.7*	5.4	67.7*	4.2
Policy issues,						
Day care centres and schools should have plans for keeping children with food allergies safe at school	96.3*	3.7	59.7*	9.5	84.7*	5.4
Day care centres and schools should ban all products with nuts	30.7	40.3*	12.2	47.9*	-	-
Schools should have special tables where child with food allergies can safely eat lunch	35.4	43.4*	24.5	44.9*	-	-
It would not be fair if my child could not have a peanut butter	29.1	51.8*	54.4*	20.1	-	-

sandwich because of another student’s peanut allergy  
 Which of the following is most important to help food allergic patients, %

Develop a cure	12.7	25.2	20.2
Improve treatments	7.9	11.1	16.9
Identify the cause(s)	52.4	50.8	38.6
Promote school education	3.7	3.3	4.7
Promote public awareness	23.3	9.8	19.8

Which of the following is the best way for schools to educate parents about food allergy, %

Handouts/brochures	25.4	15.0	-
Presentations at parent-teacher meetings	26.5	28.4	-
Parents of food allergic children talking to other parents	20.1	27.8	-
Physician or nurse talking to parents about food allergy	24.3	27.3	-
Other	3.7	1.5	-

Best way to learn about food allergy, %

Radio	2.1	0.9	1.5
Television	36.5	44.5	46.9
Handouts/brochures	9.0	11.9	15.5
Internet/e-mail	39.2	28.2	21.6
Newspapers/magazines	1.6	10.0	9.7
Other	11.6	4.6	4.8

Note. Items abbreviated for brevity in table. FA=food allergy; N/A=not applicable was not an option for CFARS-GP; ‘-’ indicates no participants responded with this option. <sup>†</sup>Overall knowledge score: median of correctly answered items (ranging 0-24); <sup>‡</sup>Netherlands and United States data taken from Goossens (2014).

\*Most frequently chosen answer option

\*\* Percentage of participants who answered with ‘agree’ or ‘disagree’ within the sample. Percent (%) agree and disagree determined by collapsing response categories strongly agree/agree and strongly disagree/disagree respectively. Data was presented this way to enable comparison of non-food allergic children between Australia, the Netherlands and the United States as per Goossens (2014).



allergy. More Australian participants viewed the internet/email then television as the best way to learn about food allergy in comparison to Dutch and US participants viewing television as the best.

**Factors predicting food allergy knowledge for Australian parents.** A four stage hierarchical multiple regression was conducted to analyse what predicts food allergy knowledge for the total sample of Australian parents. The CFARS knowledge score was entered as the dependent variable. Child allergy status (food allergic, non-food allergic) was entered as the first step and parent or spouse/partner history of food allergy entered at step 2 to control for the effects of close experience of food allergy on knowledge. Parents' food allergy experience/training at work was entered at step 3 and parents' education level entered at the final step. Table 8 shows the regression coefficients ( $B$ ,  $\beta$ ), standard error of the regression coefficient, ( $B$ ), 95% confidence intervals, tests of significance, zero-order and squared semi-partial correlations for the four steps of the analysis.

The analysis revealed that child allergy status did not contribute significantly to the regression model, nor did it account for any variance in Australian parents' food allergy knowledge,  $F(1, 459)=.355, p=.551$ . The addition of parent/spouse/partner history of food allergy into the regression model at step 2 did not contribute significantly to the regression model, nor did it account for any variance in Australian parents' food allergy knowledge,  $F_{\text{change}}(1, 458)=.757, p=.385$ . The parent's food allergy experience/training at work added at step 3 accounted for 2.40% of the variance ( $R_{\text{adj}}^2=.020$ ) in food allergy knowledge. The change in  $R^2$  from the addition of food allergy experience/training was significant,  $F_{\text{change}}(1, 457)=11.198, p=.001$ . At step 4 parents' education level made no significant contribution, nor did it account for any variance in food allergy knowledge,  $F_{\text{change}}(1, 456)=.806, p=.370$ . Taken together all of the variables accounted for 0.2% of the variance in predicting

Table 8.

*Hierarchical Multiple Regression Predicting Food Allergy Knowledge for Australian Parents*

Variable	B	SE	$\beta$	<i>t</i>	<i>p</i>	<i>r</i>	<i>Sr</i> <sup>2</sup>	95% CI
Step 1								
Child Allergy Status	-.73	1.22	-.03	-.60	.551	-.03	-.03	[-3.129, 1.673]
Step 2								
Child Allergy Status	-.38	1.29	-.01	-.29	.770	-.03	-.01	[-2.906, 2.152]
Parent, Spouse/Partner History of Food Allergy	2.27	2.60	.04	.87	.385	.05	.04	[-2.850, 7.380]
Step 3								
Child Allergy Status	-.31	1.27	-.01	-.01	.811	-.03	-.01	[-2.807, 2.197]
Parent, Spouse/Partner History of Food Allergy	2.06	2.58	.04	.04	.425	.05	.04	[-3.002, 7.118]
Parents' Food Allergy Experience/Training	-4.38	1.31	-.16	-.16	.001	-.16	-.15	[-6.946, -1.806]
Step 4								
Child Allergy Status	-.31	1.27	-.01	-.01	.810	-.03	-.01	[-2.809, 2.196]
Parent, Spouse/Partner History of Food Allergy	2.08	2.58	.04	.04	.419	.05	.04	[-2.979, 7.144]
Parents' Food Allergy Experience/Training	-4.15	1.33	-.15	-.15	.002	-.16	-.14	[-6.768, -1.532]
Parent Education Level	.50	.55	.04	.04	.370	.07	.04	[-.589, 1.579]

Note. B=unstandardized regression coefficient, SE=standard error of the coefficient,  $\beta$ =standardized coefficient, *Sr*<sup>2</sup>=semi-partial/part correlation, CI=Confidence Interval.

N=461. *R*<sup>2</sup>=.00 for Step 1;  $\Delta R^2$ =.00 for Step 2;  $\Delta R^2$ =.02 for Step 3;  $\Delta R^2$ =.00 for Step 4

Australian parents' food allergy knowledge. The overall model including all predictors was significant,  $F(4, 456)=3.284, p=.011$ . The final model showed statistical significance of one out of the four predictor variables, food allergy experience/training, reporting a Beta value ( $\beta=-.15, p < .01$ ).

## Chapter 4: Discussion

This is the first Australian study investigating food allergy knowledge, attitudes and beliefs in parents of children 0 to 18 years with and without food allergy and conduct a cross-cultural comparison with the US and the Netherlands. Knowledge, attitudes and beliefs regarding food allergy are little studied in the literature, yet represent an important means of identifying strengths and limitations in knowledge and understanding this advancing childhood health problem. Knowledge is vital in food allergy awareness and understanding with its contribution towards the prediction of individual behaviour and informing management of food allergy. Of the few studies conducted on the topic, findings have indicated overall knowledge is varied among parents of children with food allergy and the general public (Goossens et al., 2013, 2014; Gupta Kim, Springston, Smith et al. 2009; Gupta et al., 2010; Staff, 2015). The present study aimed to describe food allergy knowledge, attitudes and beliefs in Australian parents of children with and without food allergy and establish a baseline. The study also aimed to compare data with the US and the Netherlands. Finally, exploratory research was conducted on the predictors of food allergy knowledge. The hypotheses proposed to investigate these research questions are presented below.

The first hypothesis proposed that Australian parents of children aged 0-18 years with food allergy will have greater knowledge overall when compared to Australian parents of children without food allergy, consistent with findings from Staff (2015). No significant difference was found between groups in the overall knowledge score contrary to findings from Staff (2015) though the latter researched parents of children aged 0-2 years only. Most participants acknowledged the role of the immune system in food allergy and the implications of food allergic reaction. The majority knew how allergic reactions can eventuate and of common allergens. Interestingly the majority were aware of Australian policies. Despite both groups differing on knowledge of outer thigh being the best place to use EpiPen, overall

correct response was high. Weaknesses were evident across domains. Surprisingly, non-food allergic participants were more knowledgeable with shellfish being the most common adult food allergen. Similar to findings from Staff (2015) both groups had limited knowledge of teenagers at higher risk for fatal food allergy than children. Furthermore, as per findings from Staff (2015) only half of the non-food allergy group recognised there is no cure for food allergy and that daily antihistamine or medicine does not prevent a food allergic reaction.

Attitudes and beliefs of Australian parents were varied across all domains. Contrary to previous findings (Goossens et al., 2013; Gupta et al., 2010; Staff, 2015) participants from this study almost equally expressed agreement and disagreement with frustrations felt towards doctors differing allergy information. A large proportion of food allergic participants disagreed that most people know the symptoms of food allergy similar to attitudes in the US (Gupta et al., 2010), the Netherlands (Goossens et al., 2013) and Australia previously (Staff, 2015). This is contrary to current findings regarding food allergy knowledge scores from the above-mentioned general public. Overall, most food allergic parents disagreed that food allergy is taken seriously, feeling that food allergic people are treated differently, as per findings from the US (Gupta et al., 2010) and Australia (Staff, 2015). Perceptions of quality of life for food allergic parents indicated there was little feeling of marital strain, and overall partners were supportive towards the child's food allergy and the resulting lifestyle to accommodate. Both groups were in agreement with various perceptions of quality of life, evidence supporting the awareness of challenges presented to food allergic families. The importance of having an EpiPen available for a child with severe food allergy was further acknowledged. This is interesting to note considering the food allergic group felt most people do not understand or know the severity of the food allergy problem, evidence presented suggests otherwise. Overall, both groups believe the most important step to improve the lives of those with food allergy is to determine the cause and

develop a cure. Both groups suggest the best ways to learn about food allergy is via television and internet/email.

We aimed to investigate whether Australian parents of children 0-18 years with and without food allergy would exhibit similar baseline knowledge to the US (Gupta, Kim, Springston, Smith et al. 2009; Gupta et al., 2010) and Netherlands (Goossens et al., 2013, 2014). Evidence suggests Australians exhibit similar if not greater baseline knowledge to the US and greater knowledge to the Netherlands for both groups. Not with-standing limitations with comparisons through scoring as presented below. Differences existed with common childhood food allergens with Australia having greater knowledge of these items than US and Dutch participants. Australians recognised that teens are at higher risk for fatal reaction whilst US and Dutch participants performed poorly (Goossens et al., 2013)

We aimed to investigate whether Australian parents of children 0-18 years with and without food allergy would exhibit more optimistic attitudes and beliefs compared to studies conducted in the US (Gupta, Kim, Springston, Smith et al. 2009; Gupta et al., 2010) and the Netherlands (Goossens et al., 2013, 2014). Australian parents of food allergic children hold similar attitudes and beliefs to those found in the US (Gupta, Kim, Springston, Smith et al., 2009, Gupta et al., 2010) and to some degree the Netherlands (Goossens et al., 2013, 2014). Similarities and differences of attitudes are evident across most domains. Australian and US general public agree that people with food allergies are treated differently whilst Dutch participants disagree. The difference could be due to the Netherlands lack of awareness regarding the issues surrounding a food allergic person (Goossens et al., 2014). Additionally, Dutch participants felt it unfair if their child could not have a peanut butter sandwich because of another student's allergy whereas Australian participants mostly did not feel this way. Dutch participants appeared more sympathetic towards food allergy patients, yet still underestimated the impact of food allergy on the daily lives of these patients (Gossens et al.,

2014), evidenced by their lack of knowledge regarding food allergens such as peanut appears to hinder their perception.

We aimed to investigate the factors predicting food allergy knowledge in Australian parents. Child allergy status (food allergic, non-food allergic) was initially entered to control for group differences though this variable did not predict food allergy knowledge. This was surprising given that knowing someone with food allergy predicts food allergy knowledge (Goossens et al., 2014; Gupta, Kim, Springston, Smith et al., 2009) but appears consistent with the lack of differences between the groups on overall knowledge score. Parent/spouse history was entered to control for the effects of underlying parental food allergy knowledge and did not predict food allergy knowledge, once again this is contrary to the same above-mentioned findings (Goossens et al., 2014; Gupta Kim, Springston, Smith et al., 2009). Parents' food allergy experience/training accounted for a small amount of variance in food allergy knowledge of Australian parents. This was consistent with the findings of Gupta, Kim, Springston, Smith and colleagues (2009) supporting prior training in food allergy with better allergy knowledge. The education level of parents did not predict food allergy knowledge and no significant contributions were found, contrary to previous findings (Goossens et al., 2013).

### **Implications**

Overall, Australian participants of this study have identified to the researchers strengths and weaknesses in food allergy knowledge with some misconceptions as mentioned previously. As food allergy is becoming increasingly prevalent in Australia, an excellent knowledge base of the problem at hand is vital, this increased knowledge will prove beneficial to all Australians. Many of the vital components of food allergy knowledge are known by most of the participants in this study, with examples as per the above-mentioned hypotheses conducted. Whilst attitudes and beliefs are varied between the groups studied, it

appears overall the non-food allergic group understands more than given credit for. Whilst evidence exists suggesting Australian knowledge is greater than that of US and Dutch participants, caution must be taken when interpreting the above-mentioned results as the CFARS currently lacks psychometric validation. Despite Australians exhibiting strengths in food allergy knowledge and increased overall knowledge scores comparative to the US and the Netherlands, further education could be provided by taking a worldwide collaborative approach to this increasingly prevalent childhood problem. This could further enhance our learning and knowledge base. It is important to embrace food allergy knowledge globally thus enhancing our learning and providing the best resources to educate on a global basis. Australian parent's exhibit increased knowledge due to work related food allergy exposure, this could be used advantageously to provide authorities with the opportunity to intervene and increase knowledge to all Australians through workplace training. Further studies would be necessary to ensure that there is no mediating or moderating variables implicated in this increased knowledge through training. Perhaps analyses conducted using child age group may have resulted in differences between food allergic and non-food allergic groups. There is the possibility that early childhood families with food allergy knowledge may have that understanding due to food allergic diagnosis, however non-food allergic early childhood families have yet to attain this knowledge. Despite the equivalence in overall knowledge score between the groups, similarities and variations in individual knowledge items were found.

### **Limitations**

A number of limitations exist within this study. The recruitment process aimed to target a diverse sample from the Australian population. Despite stratified sampling methods not being practicable, we managed to obtain a broad demographic sample by number of children in family, marital status, household income and to a lesser degree geographic



location managing to recruit participants from most states of Australia. More participants came from Queensland which most likely resulted from the location of the researcher and university. Sampling was mostly conducted online via the use of an internet-based survey, approaching many Australian schools, online forums and allergy websites. Whilst this enabled participation from afar, it may also have excluded participants without internet or computer access thus increasing response bias.

Upper income, highly educated mothers were over-represented in this research, as is often the case for parenting research (Coley & Morris, 2002) which challenges the generalisability of findings. The sample also encompassed a number of occupations (e.g., nutritionists, doctors, and teachers) who may have had increased food allergy knowledge and/or made the sample particularly sophisticated. Workplace exposure to training on food allergy was explored in the regression and indeed found to contribute significantly to knowledge of food allergy. This and education level may thus have increased overall knowledge estimates of the Australian sample, as previously found in the Netherlands (Goossens, 2013), though this study did not find education to predict food allergy knowledge, contrary to previous findings (Goossens et al., 2013). Furthermore, this sample included only parents and did not recruit adults without children for the general public component. It is possible that the sample is biased towards a more favourable food allergy knowledge score however Gupta Kim, Springston, Smith and colleagues (2009) found that being a parent was not a predictor of food allergy knowledge. Most parents would know of someone through school, day care and friend channels that may have a food allergic child and this could contribute to the inflated knowledge for this group. Future research may use a broader sample of Australians from the general public, representing more diverse educational and geographical groups.

Further limitations exist with respect to the CFARS measures utilised. Firstly, limited psychometric data was available on this measure. Staff (2015) found internal consistency scores for the knowledge items to be adequate, yet these were slightly lower in the current study (CFARS-PRNT  $\alpha=.66$ , CFARS-GP  $\alpha=.62$ ). It is possible that this difference in Cronbach's alpha is due to differences in calculations between this study and Staff (2015). As there was a crossover between items included for the food allergic and non-food allergic groups to conduct group comparisons on the CFARS, whilst these were not used for Cronbach calculations for the present study, they may have been utilised in Staff (2015). Additionally, this could temper conclusions for this study. It would be advantageous to conduct further analysis on the CFARS measures, including factor analysis of the items on the attitudes/beliefs scale to explore constructs represented therein and enable calculation of a composite score.

Comparison of the Australian data obtained in this study with that of US and Dutch participants was made difficult in a few ways. First, despite many attempts to do so, it was not possible to obtain raw data from the US and Netherlands research to conduct cross-cultural comparisons. This resulted in the reporting of descriptive data between the three nations which did not allow for inferential testing to determine if there were significant differences by nation. Second, the reporting of results varies for each sample, overall knowledge scores were represented as means and % correct, whilst attitudes and beliefs were reported as % agreement/disagreement/neutral and not applicable for Gupta, Kim, Springston, Smith and colleagues (2009) and Gupta and colleagues (2010). Goossens and colleagues (2013, 2014) reported cross-cultural comparisons using means and standard deviations for overall knowledge score and individual items of attitudes and beliefs for food allergic group, then median and range for overall knowledge score of non-food allergic (general public) group. Additionally Goossens and colleagues (2014) reported %

agree/disagree for individual attitudes and beliefs items. Third, Goossens and colleagues (2013, 2014) adopted an adjusted for guessing method for the overall knowledge scores and individual knowledge item scores. This was not clearly noted within the data and without having access to raw scores it was impossible to utilise the same practice for the Australian data so as to conduct cross-cultural comparisons. As a result it appears that Australians have greater knowledge scores overall and by item than do the US and the Netherlands. Australian scores may appear inflated due to this. A final point relates to the equivalency of the samples from each country. While parents of children with food allergy groups were similar, as noted above, US and Dutch general public participants could include adults with no children. The sample utilised for the present study were all parents of children aged 0 to 18 years, therefore some differences in attitudes are possible.

### **Conclusions**

This is the first study to investigate food allergy knowledge, attitudes and beliefs in Australian parents of children aged 0-18 years with and without food allergy. Furthermore, this is the first cross-cultural comparison of knowledge, attitudes and beliefs between three differing countries. Additionally exploratory research was conducted on predictors of food allergy knowledge with consideration to child allergy status (food allergic, non-food allergic) parent/spouse history, parents' food allergy experience/training, and parent's education level. In conclusion, the CFARS measures produced very interesting findings within Australian parents of children with and without food allergy. These findings suggest despite the strong knowledge base of Australians, misconceptions are still evident. Targeted training and education is vital to increase this knowledge thus enhancing the likelihood of increased safety for the food allergic child and an increased awareness of the underlying feelings and perceptions held by the food allergic child and their family. Additionally, examination of knowledge by context in the CFARS would give an overview of where the strengths and

weaknesses lie so as to improve training methods. Overall, we should adopt a global collaborative approach so as to learn from each other's strengths and weaknesses and contribute to the learning of those less educated.

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## Appendix A

### Participant Information Sheet

#### Food Allergy Knowledge: A Comparison of Nations.

#### **Investigators**

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#### **About The Study**

This study is being conducted as part of a Bachelor of Science (Honours) Psychology degree being completed by Mrs Louise Allan at the University of Southern Queensland (USQ) and is being supervised by Dr Michelle Adamson. The study aims to investigate food allergy knowledge of parents with a comparison between the nations of Australia, United States and the Netherlands.

#### **What You Will Be Required To Do**

To be eligible to participate in this study you must be at least 18 years of age and be the parent or carer of at least one child aged from 0 up to 18yrs. By agreeing to participate in this survey, you will be asked to respond to several questions regarding your family, the ways in which you have or plan to introduce solid foods to your child and general information regarding food allergies. The survey should take approximately 15-20 minutes to complete. Upon completion of the survey, you will be asked if you would like to participate in completing a follow-up shortened version of the questionnaire. This questionnaire should take 5 minutes to complete. If you would like to participate in the follow-up questionnaire you will be required to leave a contact email address so that the link may be forwarded to you at the required time. Following this you will be redirected to an independent screen where you will have the opportunity to enter into the School of Psychology and Counselling Survey Prize Draw. Alternatively, those eligible USQ psychology students may receive a 1% course credit for their participation.

#### **Confidentiality and Other Matters**

The main survey will be completed anonymously and confidentiality is assured; if you choose to participate in the follow-up survey your email address will be required to match this to the original survey; this will then be separated from your responses. Any publication of this study will contain group statistics only. Upon completion of the study, general feedback via an e-mail summary of results will be available upon request. Please contact Louise Allan ([q9420727@uemail.usq.edu.au](mailto:q9420727@uemail.usq.edu.au)) to request a copy.

The risks of participation in this study are minimal; however, you are welcome to contact the researchers if you find participation in the study distressing. A range of websites available with information on food allergies will be presented upon completion of the survey.

If you have any ethical concerns with how the research is being conducted, or any queries about your rights as a participant, please contact the USQ ethics officer, Office of Research & Higher Degrees, University of Southern Queensland, West Street, Toowoomba QLD 4350, Telephone +61 7 46312690, email [ethics@usq.edu.au](mailto:ethics@usq.edu.au)

The ethics approval number for this project is H14REA217.

### **Withdrawal from the Study**

Your participation in this study is voluntary. You may withdraw your participation by exiting the survey at any time without penalty. Prior to submitting the survey, the survey id and a unique reference number will appear on the screen. These details can be quoted should you wish to withdraw your data/participation after completing and submitting the survey. All data collected will be stored electronically and will be password protected and secure. The de-identified data set may be re-analysed for future research.

### **Additional Information and Assistance**

If you have any questions about the study, please e-mail Louise Allan at [q94207272@umail.usq.edu.au](mailto:q94207272@umail.usq.edu.au). For technical concerns or difficulties accessing the survey, please contact Ken Askin, University of Southern Queensland, at [askin@usq.edu.au](mailto:askin@usq.edu.au)

### **I declare:**

- I have read the Participant Information Sheet and the nature and purpose of the research project and the extent of my involvement. I have had the opportunity to ask further questions and am satisfied that I understand.
- I understand that if I choose to participate in the follow-up survey, I will be required to give an email address so that I may be sent the link to the survey.
- I understand that my email address will be used to match my initial and follow-up survey but will then be removed from my data and my data will remain confidential.
- I have been informed as to the nature and extent of any risk to my health or well-being.
- I understand that I may withdraw my participation from the study by exiting the survey at any time without penalty.
- I understand that should I wish to withdraw my data after completing the survey, I can do so by contacting the researcher and quoting the survey identification and reference numbers that will be automatically generated before I submit the survey.
- I understand and give permission for my non-identifiable data to be electronically stored in a secure and password protected computer file located within the School of Psychology and Counselling and for the data to be made available for future research.
- I understand that the data from my survey will contribute to the results of this study, which will be reported in the thesis project being conducted by Louise Allan.
- I understand that while information gained during the study may be published, I will not be able to be identified and my personal results will remain confidential.

**[Click here to agree](#)**

**THANK YOU FOR YOUR PARTICIPATION**

To start the survey please click on the 'Next' button below

Survey

	Child #1	Child #2	Child #3	Child #4
How old is your child	-----years -----months	-----years -----months	-----years -----months	-----years -----months
What is his/her gender	<ul style="list-style-type: none"> <li>• Male</li> <li>• Female</li> </ul>	<ul style="list-style-type: none"> <li>• Male</li> <li>• Female</li> </ul>	<ul style="list-style-type: none"> <li>• Male</li> <li>• Female</li> </ul>	<ul style="list-style-type: none"> <li>• Male</li> <li>• Female</li> </ul>
What is his/her ethnicity?	Anglo-Australian, Aboriginal, Torres Strait Islander, Asian, Other	Anglo-Australian, Aboriginal, Torres Strait Islander, Asian, Other	Anglo-Australian, Aboriginal, Torres Strait Islander, Asian, Other	Anglo-Australian, Aboriginal, Torres Strait Islander, Asian, Other
Has he/she <b>ever</b> been diagnosed with food allergy?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No**</li> </ul> <p>**Please skip the remaining questions in the column “Child #1”</p>	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No**</li> </ul> <p>**Please skip the remaining questions in the column “Child #2”</p>	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No**</li> </ul> <p>**Please skip the remaining questions in the column “Child #3”</p>	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No**</li> </ul> <p>**Please skip the remaining questions in the column “Child #4”</p>
Does your child have a <b>current</b> physician-diagnosed food allergy?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No**</li> </ul> <p>**Please skip the remaining questions in the column “Child #1”</p>	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No**</li> </ul> <p>**Please skip the remaining questions in the column “Child #2”</p>	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No**</li> </ul> <p>**Please skip the remaining questions in the column “Child #3”</p>	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No**</li> </ul> <p>**Please skip the remaining questions in the column “Child #4”</p>

**Demographics: Child with a diagnosed food allergy**

1. Does your child have any of the following? Mark <b>all</b> that apply.	Radio button with an option to select more than one option: Eczema, Asthma, Environmental Allergies, None of the above
2. Has your child ever experienced anaphylaxis?	Radio button, select yes, no
3. How old was your child when the food allergy diagnosis was made?	Select age from drop down menu: less than 1 month, 1 month, 2 months, 3 months, 4 months, 5 months ....24months
4. Has your child outgrown any food allergies?	Drop down menu: No Yes → <Text>
5. To which foods is your child <b>CURRENTLY</b> allergic?	<Text>

**Demographic Questionnaire**

**Please tell us about your family.**

1. What is your gender?	Drop down menu: Male, Female
2. Which ethnic or cultural group do you most strongly identify with?	Please type your response: _____



(e.g. Anglo Australian, Aboriginal, Torres Strait Islander, Asian)	
3. What is your current marital status?	Drop down menu: married, separated/divorced, single, defacto, widow/er
4. What is your highest level of education?	Drop down menu: primary school or less; some high school; completed high school; trade/technical college qualification; university degree; post-graduate degree
5. What is your current household income?	<ul style="list-style-type: none"> <li>• Less than \$15 000</li> <li>• \$15 000 - \$24 999</li> <li>• \$25 000 - \$39 999</li> <li>• \$40 000 - \$59 999</li> <li>• \$60 000 - \$99 999</li> <li>• \$100 000 - \$149 999</li> <li>• \$150 000 - \$199 999</li> <li>• Over \$200 000</li> </ul>
6. What is your current occupation?	Please type your response: _____
7. Is your child's immunisation record up to date?	<p>Drop down menu:</p> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul> <p><b>If no, please indicate your reason(s) why</b> (allow multiple selections):</p> <ul style="list-style-type: none"> <li>• Availability of appointments</li> <li>• Medical reasons</li> <li>• Cultural or religious reasons</li> <li>• Concerns about allergic reactions</li> <li>• Links to certain disorders, such as autism and diabetes</li> <li>• Personal choice</li> <li>• Other: _____</li> </ul>
8. Have you had any experience or training with food allergy through your job or work?	<p>Drop down menu:</p> <ul style="list-style-type: none"> <li>• No</li> <li>• Yes → Please describe</li> </ul> <p>_____</p>
9. Do you know anyone with a food allergy? <b>(Q9: Only for parents of children without food allergies)</b>	<p>Drop down menu:</p> <p>No,</p> <p>Yes → <i>allow multiple selections</i></p> <ul style="list-style-type: none"> <li>• Me;</li> <li>• Another child in my family (aged 0-18yrs);</li> <li>• Spouse/Partner;</li> <li>• Friend or Relative,</li> <li>• Child's classmate or friend,</li> <li>• Child in my parent's group/ playgroup</li> </ul>

	<ul style="list-style-type: none"> <li>• Child in my day care group</li> </ul>
10. In the past 12months, how many times have you spoken with your <b>GP or paediatrician</b> during an office visit or by telephone about your child's food allergy? <b>(Q10-Q13: Only for Parents of children with food allergies)</b>	Drop down menu: 0 times; 1-2times; 3-5times; 6-9times, More than 10 times
11. In the past 12months, how many times have you spoken to an <b>allergist</b> during an office visit or by telephone about your child's food allergy?	Drop down menu: 0 times; 1-2times; 3-5times; 6-9times, More than 10 times
12. In the past 12months, have you had to access a hospital emergency department (A&E) for your child's food allergy?	Drop down menu: No Yes →Number of times (drop down: 1, 2, 3, 4, 5, 5+)
13. Are you a member of a food allergy support group?	Drop down menu: Yes, No
<b>Feeding Practices (Q6-Q9 to be answered retrospectively or prospectively)</b>	
1. Has your child ever had breast milk?	Yes No – go to question 4
2. Is your child currently receiving breast milk?	Yes No
3. Has your child ever drunk any infant formula products? Note: <ul style="list-style-type: none"> <li>• Include pre-term formula, infant formula, follow on formula, soy formula and lactose-free formula.</li> <li>• Exclude milks suitable for children aged 12months or more, such as toddler milk drinks.</li> <li>• Exclude any infant formula products combined with solid food, such as cereal</li> </ul>	Yes No → Go to Q5
4. How old was your child when he/she first drank an infant formula product? <ul style="list-style-type: none"> <li>• Include pre-term formula, infant formula, follow-on formula, soy formula and lactose free formula.</li> <li>• Exclude milks suitable for children aged 12months or more, such as toddler milk drinks</li> </ul>	Birth <1m 1m 2m 3m 4m 5m 6m 7m 8m 9m 10m 11m 12m >1yrs
5. Has your child ever eaten any soft or semi-solid or solid food? <ul style="list-style-type: none"> <li>• Include solid food, soft food such as custard and mashed food diluted with water, milk or other fluids</li> </ul>	Yes – continue below with Retrospective Questionnaire No – Go to Prospective Questionnaire -







	17m 18m 19m 20m 21m 22m 23m 24m or Not yet introduced <text> Not at all concerned • • • • • Very concerned
• Tree nuts (e.g. almonds, walnuts, pecans etc)	<3m 4m 5m 6m 7m 8m 9m 10m 11m 12m 13m 14m 15m 16m 17m 18m 19m 20m 21m 22m 23m 24m or Not yet introduced <text> Not at all concerned • • • • • Very concerned
• Shellfish(e.g. shrimp, lobster, crab)	<3m 4m 5m 6m 7m 8m 9m 10m 11m 12m 13m 14m 15m 16m 17m 18m 19m 20m 21m 22m 23m 24m or Not yet introduced <text> Not at all concerned • • • • • Very concerned
• Wheat	<3m 4m 5m 6m 7m 8m 9m 10m 11m 12m 13m 14m 15m 16m 17m 18m 19m 20m 21m 22m 23m 24m or Not yet introduced <text> Not at all concerned • • • • • Very concerned
• Egg	<3m 4m 5m 6m 7m 8m 9m 10m 11m 12m 13m 14m 15m 16m 17m 18m 19m 20m 21m 22m 23m 24m or Not yet introduced <text> Not at all concerned • • • • • Very concerned

9. In regards to introducing soft, semi-solid, and solid foods, please indicate how strongly the following may influence the way in which you introduce high allergen foods to your child.

My decision was influenced because ...	Very Strong Influence	Strong Influence	Some Influence	Little Influence	Very little Influence	Not at all
... I avoid certain food groups due to my own food allergies.	•	•	•	•	•	•
... I have another child with a food allergy.	•	•	•	•	•	•
... a member of my family has a food allergy (e.g. sibling, parent, grandparent)	•	•	•	•	•	•
... certain foods affect my child/ children's	•	•	•	•	•	•

behaviours.						
... of advice from a health practitioner (e.g. G.P., child health nurse etc).	•	•	•	•	•	•
... of information I have read in brochures, magazines and/or on the internet.	•	•	•	•	•	•
... of information presented in programs or documentaries I have watched on TV.	•	•	•	•	•	•
... of advice from my parents or grandparents.	•	•	•	•	•	•
... of advice from my friends with children of similar ages	•	•	•	•	•	•
... of discussions I have had with other parents who attend my child's day care centre.	•	•	•	•	•	•
... of discussions I have had with other parents when I attend playgroup/mother's group type activities	•	•	•	•	•	•
... of accessibility to a G.P., medical centre or hospital.	•	•	•	•	•	•
.... of cultural/religious or ethnic reasons	•	•	•	•	•	•
Other	Please Specify:					

**Chicago Food Allergy Research Survey for Parents of Children with Food Allergies**

1. Food allergy involves the immune system.	Radio button: <b>True</b> , False, I don't know
2. The only way to know that your child is allergic to a food is with a medical test.	Radio button: True, <b>False</b> , I don't know
3. Eczema may be the	Radio button:

first sign of having a food allergy.	<b>True</b> , False, I don't know
4. Asthma is an important risk factor for severe anaphylaxis.	Radio button: <b>True</b> , False, I don't know
5. Foods eaten by a mother can be passed to her child through her breast milk.	Radio button: <b>True</b> , False, I don't know
6. Food additives (like citric acid, colourings, starch) are common food allergens.	Radio button: True, <b>False</b> , I don't know
7. Teenagers are at higher risk for fatal food allergy compared to younger children.	Radio button: <b>True</b> , False, I don't know
8. Taking a daily antihistamine (like Telfast or Claratyne) can prevent food allergy reactions.	Radio button: True, <b>False</b> , I don't know
9. Which of the following contain food ingredients that could cause an allergic reaction?	Radio button: ( <i>allow multiple selections</i> ) <b>Play-doh, medicines, toothpaste, lotions &amp; creams</b>
10. A boy with a milk allergy accidentally drank some milk. Please mark which of the following could be a sign of a food allergy reaction.	Radio button: ( <i>allow multiple selections</i> ) <ul style="list-style-type: none"> <li>• After 2 days he gets hyperactive, cranky and complains of headaches</li> <li>• <b>After 1 hour he has hives on his face and chest</b></li> <li>• <b>Immediately his tongue swells and he has trouble breathing</b></li> <li>• He has a stuffy nose that won't go away for weeks</li> </ul>
11. Which of the following are the three most common allergies in children?	Radio button: ( <i>allow up to 3 selections</i> ) <b>Egg</b> , Wheat, <b>Milk</b> , <b>Peanut</b> , Tree nuts (almonds, walnuts, pecans, cashews), Shellfish (shrimp, lobster, crab).
12. Which age group is the most likely to have food allergies?	Radio button: <b>0-5years</b> ; 6-10years, 11years or older, I don't know

Note. Correct options are bolded

13. What percent of children with <b>milk</b> allergies develop tolerance (or outgrow the allergy)?	Radio button: Less than 1%; Between 1%-25%; Between 26%-50%, Between 51%-75%, <b>Greater than 75%</b> , I don't know.
14. What percent of	Radio button:



children with <b>peanut</b> allergies develop tolerance (or outgrow the allergy)?	Less than 1%; <b>Between 1%-25%</b> ; Between 26%-50%, Between 51%-75%, Greater than 75%, I don't know.					
15. Where is the best place to use an EpiPen or Twinject (injectable epinephrine)	Radio button: Upper arm, <b>Outer thigh</b> , Buttock, I don't know.					
Do you have a significant other, such as a spouse or partner?						
<input type="radio"/> No – survey program skips to Q22 <input type="radio"/> Yes – survey continues below						
	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Does Not Apply</b>
16. My child's food allergy causes a strain on my marriage/relationship.	•	•	•	•	•	•
17. He/She and I do not agree on how to take care of our child's food allergy.	•	•	•	•	•	•
18. I pay more attention than him/her in keeping out child away from the allergenic food(s).	•	•	•	•	•	•
19. I worry more than him/her about our child's food allergy.	•	•	•	•	•	•
20. He/she thinks that I exaggerate the seriousness of our child's food allergy.	•	•	•	•	•	•
21. His/her career has suffered because of our child's food allergy.	•	•	•	•	•	•
22. I have relatives who do not accommodate my child's food allergy.	•	•	•	•	•	•
23. My child's friends treat my child differently because of his or her food allergy.	•	•	•	•	•	•
24. I have experience						



school or day care is knowledgeable in the management of food allergy emergencies.						
35. Children with food allergies should be allowed to carry an EpiPen or Twinject with them at school	•	•	•	•	•	•
36. In Schools, an EpiPen or Twinject should be kept only in the nurse's office	•	•	•	•	•	•
37. Schools should ban all products with nuts.	•	•	•	•	•	•
38. Schools should have an adult with experience or training in food allergy always present during meal times.	•	•	•	•	•	•
39. Food labelling laws have decreased the choice of foods that my child can eat.	•	•	•	•	•	•
40. More government money should go towards research about food allergy.	•	•	•	•	•	•
41. Which of the following do you think is the <b>most</b> important to help people with food allergies?	Radio button: <ul style="list-style-type: none"> <li>• Develop a cure for food allergy</li> <li>• Improve the treatments of food allergy</li> <li>• Identify the cause of food allergy</li> <li>• Promote school education programs about food allergy</li> <li>• Promote public awareness campaigns about food allergy.</li> </ul>					
42. Which of the following resources have you used for food allergy education or support?	Radio button: ( <i>allow multiple selections</i> ) <ul style="list-style-type: none"> <li>• Australasian Society of Clinical Immunology and Allergy</li> <li>• Anaphylaxis Australia</li> <li>• MedlinePlus</li> <li>• Allergy Medical Group</li> <li>• Local support groups</li> <li>• None of the above</li> <li>• Other:</li> </ul>					
<b>Chicago Food Allergy Research Survey for Parents from the General Public</b>						

1. An allergic reaction can happen when the body considers a food to be harmful.	Radio button: <b>True</b> , False, I don't know ( <b>Bold</b> statement is the correct answer)
2. Lactose intolerance (trouble digesting dairy products) is the same as having a milk allergy.	Radio button: True, <b>False</b> , I don't know
3. A person can die from having a food allergy reaction.	Radio button: <b>True</b> , False, I don't know
4. Hives (red bumps or blotches on the skin that can be itchy) are a <b>common</b> symptom of a food allergy reaction.	Radio button: <b>True</b> , False, I don't know
5. People with food allergies can have an allergic reaction after touching a food.	Radio button: <b>True</b> , False, I don't know
6. A person with a milk allergy can still drink low-fat milk without having an allergic reaction.	Radio button: True, <b>False</b> , I don't know
7. Foods eaten by a mother can be passed to her child through her breast milk.	Radio button: <b>True</b> , False, I don't know
8. Acidic foods (like lemons, oranges and tomatoes) commonly cause food allergy.	Radio button: True, <b>False</b> , I don't know
9. Allergic diseases run in families.	Radio button: <b>True</b> , False, I don't know
10. Food allergies can go away as a person gets older.	Radio button: <b>True</b> , False, I don't know
11. Food allergy is more common in children than adults.	Radio button: <b>True</b> , False, I don't know
12. The number of children in <b>Australia</b> who have a food allergy has been increasing over the past ten years.	Radio button: <b>True</b> , False, I don't know
13. There is a cure for food allergy.	Radio button: True, <b>False</b> , I don't know
14. The <b>only</b> way to prevent an allergic reaction is to stay away from the food that causes the allergy.	Radio button: <b>True</b> , False, I don't know
15. A person can take a medicine everyday to prevent having food allergy reactions.	Radio button: True, <b>False</b> , I don't know
16. There is a law in Australia that requires all foods to be labelled with allergy information.	Radio button: <b>True</b> , False, I don't know

Note. Correct options are bolded

17. Which of the following are the	Radio button: ( <i>allow up to 3 selections</i> )
------------------------------------	---

<p>three most common allergies in children?</p>	<ul style="list-style-type: none"> <li>• <b>Egg</b>,</li> <li>• Wheat</li> <li>• <b>Milk</b></li> <li>• <b>Peanut</b></li> <li>• Tree nuts (almonds, walnuts, pecans, cashews)</li> <li>• Shellfish (shrimp, lobster, crab).</li> </ul>				
<p>18. Which of the following is the most common food allergy in adults?</p>	<p>Radio button: Milk, Peanut, <b>Shellfish</b> (shrimp, lobster, crab), I don't know</p>				
<p>19. A boy with a milk allergy accidentally drank some milk. Please mark which of the following could be a sign of a food allergy reaction.</p>	<p>Radio button: <i>(allow multiple selections)</i></p> <ul style="list-style-type: none"> <li>• After 2 days he gets hyperactive, cranky and has headaches</li> <li>• <b>After 15minutes he gets hives on his face and chest</b></li> <li>• <b>Immediately his tongue swells and he has trouble breathing</b></li> <li>• He has a stuffy nose that won't go away for weeks</li> </ul>				
<p>20. Food allergy involves the immune system.</p>	<p>Radio button: <b>True</b>, False, I don't know</p>				
<p>21. The only way to know that a child is allergic to a food is with a medical test.</p>	<p>Radio button: True, <b>False</b>, I don't know</p>				
<p>22. Eczema may be the first sign of having a food allergy.</p>	<p>Radio button: <b>True</b>, False, I don't know</p>				
<p>23. Asthma is an important risk factor for severe anaphylaxis.</p>	<p>Radio button: <b>True</b>, False, I don't know</p>				
<p>24. Teenagers are at higher risk for fatal food allergy compared to younger children.</p>	<p>Radio button: <b>True</b>, False, I don't know</p>				
<p>25. Which of the following contain food ingredients that could cause an allergic reaction?</p>	<p>Radio button: <i>(allow multiple selections)</i> <b>Play-doh, medicines, toothpaste, lotions &amp; creams</b></p>				
<p>26. Which age group is the most likely to have food allergies?</p>	<p>Radio button: <b>0-5years</b>; 6-10years, 11years or older, I don't know</p>				
<p>27. What percent of children with <b>milk</b> allergies develop tolerance (or outgrow) the allergy)?</p>	<p>Radio button: Less than 1%; Between 1%-25%; Between 26%-50%, Between 51%-75%, <b>Greater than 75%</b>, I don't know.</p>				
<p>28. What percent of children with <b>peanut</b> allergies develop tolerance (or outgrow) the allergy)?</p>	<p>Radio button: Less than 1%; <b>Between 1%-25%</b>; Between 26%-50%, Between 51%-75%, Greater than 75%, I don't know.</p>				
<p>29. Where is the best place to use an EpiPen or Twinject (injectable epinephrine)</p>	<p>Radio button: Upper arm, <b>Outer thigh</b>, Buttock, I don't know.</p>				
	<p><b>Strongly Disagree</b></p>	<p><b>Disagree</b></p>	<p><b>Neither Agree</b></p>	<p><b>Agree</b></p>	<p><b>Strongly Agree</b></p>

			<b>nor Disagree</b>		
30. Food allergy is a serious health problem in <b>Australia</b> .	•	•	•	•	•
31. People with food allergies are treated differently because of their food allergy.	•	•	•	•	•
32. Children with food allergies have overprotective parents.	•	•	•	•	•
33. Children with food allergies are teased at school.	•	•	•	•	•
34. For someone who has a food allergy, staying away from the food that he or she is allergic to is difficult.	•	•	•	•	•
35. People with food allergies worry a lot about their allergy.	•	•	•	•	•
36. It is difficult for people with food allergies to safely eat at restaurants.	•	•	•	•	•
37. Having an EpiPen or Twinject (injectable epinephrine) is important for most children with severe food allergies.	•	•	•	•	•
38. Schools should have plans for keeping children with food allergies safe at school	•	•	•	•	•
39. Which of the following do you think is the <b>most</b> important to help people with food allergies.	Radio buttons: ( <i>allow only one selection</i> ) <ul style="list-style-type: none"> <li>• Develop a cure for food allergy</li> <li>• Improve the treatments of food allergy</li> <li>• Identify the cause of food allergy</li> <li>• Promote school education programs for food allergy</li> <li>• Promote public awareness campaigns about food allergy.</li> </ul>				
40. Which of the following would be the best way to learn about food allergy?	Radio buttons: ( <i>allow only one selection</i> ) <ul style="list-style-type: none"> <li>• Radio</li> <li>• Television</li> <li>• Handout/ Brochure</li> <li>• Internet/E-mail</li> <li>• Newspapers/ Magazines</li> <li>• Other: _____</li> </ul>				
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
41. Schools should ban	•	•	•	•	•

all products with nuts					
42. Schools should have special tables where children with food allergies can safely eat lunch	•	•	•	•	•
43. It would be unfair if my child could not have a peanut butter sandwich because of another student's peanut allergy	•	•	•	•	•
44. I would worry about having a child with food allergy play at my house	•	•	•	•	•
45. What would be the best way for schools to teach parents about how to protect children with food allergies? Mark <u>one</u> answer.	<ul style="list-style-type: none"> <li>• Handouts/brochures in the mail</li> <li>• Presentation at parent-teacher meetings</li> <li>• Parents of food-allergic children talking to other parents</li> <li>• Doctor or nurse talking about food allergies</li> </ul> Other: _____				

## Appendix B

### For Retest Reliability Data

### Participant Information Sheet

#### Food Allergy Knowledge: A Comparison of Nations.

#### **Investigators**

Principal Researcher

Louise Allan

University of Southern Queensland, Toowoomba Campus

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#### **About The Study**

This study is being conducted as part of a Bachelor of Science (Honours) Psychology degree being completed by Mrs Louise Allan at the University of Southern Queensland (USQ) and is being supervised by Dr Michelle Adamson. The study aims to investigate food allergy knowledge of parents with a comparison between the nations of Australia, United States and the Netherlands.

This Participant Information Sheet describes a second part of the study wherein after completing a survey, parents will be asked whether they would like to participate in a follow-up shortened version of the questionnaire. Participants who agree to participate will receive an email with the follow-up link sent to the email address supplied upon completion of the initial survey.

#### **What You Will Be Required To Do**

To be eligible to participate in this study you must be a parent or carer who completed the initial survey of food allergy knowledge. By agreeing to participate in this survey, you will be asked to respond to several questions regarding general information about food allergies. Upon commencement of the survey you will be required to enter the email address you supplied upon completion of the initial survey. The survey should take approximately 5 minutes to complete. Upon completion of this survey, you will be redirected to an independent screen where you will have the opportunity to enter into the School of Psychology and Counselling Survey Prize Draw. Alternatively, those eligible USQ psychology students may receive a 1% course credit for their participation.

#### **Confidentiality and Other Matters**

If you choose to participate in this follow-up survey your email address will be required to match your responses to the original survey; once this is done we will separate your email address from your responses. Confidentiality is assured. Any publication of this study will



contain group statistics only. Upon completion of the study, general feedback via an e-mail summary of results will be available upon request. Please contact Louise Allan (q9420727@uemail.usq.edu.au) to request a copy.

The risks of participation in this study are minimal; however, you are welcome to contact the researchers if you find participation in the study distressing. A range of websites available with information on food allergies will be presented upon completion of the survey.

If you have any ethical concerns with how the research is being conducted, or any queries about your rights as a participant, please contact the USQ ethics officer, Office of Research & Higher Degrees, University of Southern Queensland, West Street, Toowoomba QLD 4350, Telephone +61 7 46312690, email [ethics@usq.edu.au](mailto:ethics@usq.edu.au)

The ethics approval number for this project is H14REA217.

### **Withdrawal from the Study**

Your participation in this study is voluntary. You may withdraw your participation by exiting the survey at any time without penalty. Prior to submitting the survey, the survey id and a unique reference number will appear on the screen. These details can be quoted should you wish to withdraw your data/participation after completing and submitting the survey. All data collected will be stored electronically and will be password protected and secure. The de-identified data set may be re-analysed for future research.

### **Additional Information and Assistance**

If you have any questions about the study, please e-mail Louise Allan at q94207272@uemail.usq.edu.au. For technical concerns or difficulties accessing the survey, please contact Ken Askin, University of Southern Queensland, at [askin@usq.edu.au](mailto:askin@usq.edu.au)

### **I declare:**

- I have read the Participant Information Sheet and the nature and purpose of the research project and the extent of my involvement. I have had the opportunity to ask further questions and am satisfied that I understand.
- I understand that my email address will be used to match my initial and follow-up survey but will then be removed from my data and my data will remain confidential.
- I have been informed as to the nature and extent of any risk to my health or well-being.
- I understand that I may withdraw my participation from the study by exiting the survey at any time without penalty.
- I understand that should I wish to withdraw my data after completing the survey, I can do so by contacting the researcher and quoting the survey identification and reference numbers that will be automatically generated before I submit the survey.
- I understand and give permission for my non-identifiable data to be electronically stored in a secure and password protected computer file located within the School of Psychology and Counselling and for the data to be made available for future research.
- I understand that the data from my survey will contribute to the results of this study, which will be reported in the thesis project being conducted by Louise Allan.

- I understand that while information gained during the study may be published, I will not be able to be identified and my personal results will remain confidential.

**[Click here to agree](#)**

**THANK YOU FOR YOUR PARTICIPATION**

To start the survey please click on the 'Next' button below

Appendix B

Please enter your survey id and unique reference number

<b>Chicago Food Allergy Research Survey for Parents of Children with Food Allergies</b>	
1. Food allergy involves the immune system.	Radio button: <b>True</b> , False, I don't know
2. The only way to know that your child is allergic to a food is with a medical test.	Radio button: True, <b>False</b> , I don't know
3. Eczema may be the first sign of having a food allergy.	Radio button: <b>True</b> , False, I don't know
4. Asthma is an important risk factor for severe anaphylaxis.	Radio button: <b>True</b> , False, I don't know
5. Foods eaten by a mother can be passed to her child through her breast milk.	Radio button: <b>True</b> , False, I don't know
6. Food additives (like citric acid, colourings, starch) are common food allergens.	Radio button: True, <b>False</b> , I don't know
7. Teenagers are at higher risk for fatal food allergy compared to younger children.	Radio button: <b>True</b> , False, I don't know
8. Taking a daily antihistamine (like Telfast or Claratyne) can prevent food allergy reactions.	Radio button: True, <b>False</b> , I don't know
9. Which of the following contain food ingredients that could cause an allergic reaction?	Radio button: <i>(allow multiple selections)</i> <b>Play-doh, medicines, toothpaste, lotions &amp; creams</b>
10. A boy with a milk allergy accidentally drank some milk. Please mark which of the following could be a sign of a food allergy reaction.	Radio button: <i>(allow multiple selections)</i> <ul style="list-style-type: none"> <li>• After 2 days he gets hyperactive, cranky and complains of headaches</li> <li>• <b>After 1 hour he has hives on his face and chest</b></li> <li>• <b>Immediately his tongue swells and he has trouble breathing</b></li> <li>• He has a stuffy nose that won't go away for weeks</li> </ul>
11. Which of the following are the three most common allergies in children?	Radio button: <i>(allow up to 3 selections)</i> <b>Egg, Wheat, Milk, Peanut</b> , Tree nuts (almonds, walnuts, pecans, cashews), Shellfish (shrimp, lobster, crab).

12. Which age group is the most likely to have food allergies?	Radio button: <b>0-5years</b> ; 6-10years, 11years or older, I don't know					
<i>Note.</i> Correct options are bolded						
13. What percent of children with <b>milk</b> allergies develop tolerance (or outgrow the allergy)?	Radio button: Less than 1%; <b>Between 1%-25%</b> ; Between 26%-50%, Between 51%-75%, <b>Greater than 75%</b> , I don't know.					
14. What percent of children with <b>peanut</b> allergies develop tolerance (or outgrow the allergy)?	Radio button: Less than 1%; <b>Between 1%-25%</b> ; Between 26%-50%, Between 51%-75%, Greater than 75%, I don't know.					
15. Where is the best place to use an EpiPen or Twinject (injectable epinephrine)	Radio button: Upper arm, <b>Outer thigh</b> , Buttock, I don't know.					
Do you have a significant other, such as a spouse or partner? ○ No – survey program skips to Q22 ○ Yes – survey continues below						
	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Does Not Apply</b>
16. My child's food allergy causes a strain on my marriage/relationship.	●	●	●	●	●	●
17. He/She and I do not agree on how to take care of our child's food allergy.	●	●	●	●	●	●
18. I pay more attention than him/her in keeping out child away from the allergenic food(s).	●	●	●	●	●	●
19. I worry more than him/her about our child's food allergy.	●	●	●	●	●	●
20. He/she thinks that I exaggerate the seriousness of our child's food allergy.	●	●	●	●	●	●
21. His/her career has suffered because of our child's food allergy.	●	●	●	●	●	●
22. I have relatives who do not accommodate my child's food allergy.	●	●	●	●	●	●

23. My child's friends treat my child differently because of his or her food allergy.	•	•	•	•	•	•
24. I have experienced hostility from parents of children without food allergies when I have asked them to make accommodations for my child's food allergy.	•	•	•	•	•	•
25. The way I deal with my child's food allergy affects the way my child deals with his or her own food allergy.	•	•	•	•	•	•
26. Having a child with a food allergy affects my other children's daily lives.	•	•	•	•	•	•
27. Having a child with a food allergy causes money problems for my family.	•	•	•	•	•	•
28. My career has suffered because of my child's food allergy.	•	•	•	•	•	•
29. I have been frustrated because different doctors have told me different things about my child's food allergy.	•	•	•	•	•	•
30. Most people know the symptoms of food allergy.	•	•	•	•	•	•
31. Most people take food allergy seriously.	•	•	•	•	•	•
32. Have you or your significant other made career changes because of your child's food allergy?	Radio button: <i>(allow multiple selections)</i> Yes, I have; Yes, my significant other has; No					
33. Have you or your significant other chosen not to work outside the home because of your child's food allergy.	Radio button: <i>(allow multiple selections)</i> Yes, I have; Yes, my significant other has; No; Not applicable					
34. I feel confident that the staff in my child's	•	•	•	•	•	•

school or day care is knowledgeable in the management of food allergy emergencies.						
35. Children with food allergies should be allowed to carry an EpiPen or Twinject with them at school	•	•	•	•	•	•
36. In Schools, an EpiPen or Twinject should be kept only in the nurse's office	•	•	•	•	•	•
37. Schools should ban all products with nuts.	•	•	•	•	•	•
38. Schools should have an adult with experience or training in food allergy always present during meal times.	•	•	•	•	•	•
39. Food labelling laws have decreased the choice of foods that my child can eat.	•	•	•	•	•	•
40. More government money should go towards research about food allergy.	•	•	•	•	•	•
41. Which of the following do you think is the <b>most</b> important to help people with food allergies?	Radio button: <ul style="list-style-type: none"> <li>• Develop a cure for food allergy</li> <li>• Improve the treatments of food allergy</li> <li>• Identify the cause of food allergy</li> <li>• Promote school education programs about food allergy</li> <li>• Promote public awareness campaigns about food allergy.</li> </ul>					
42. Which of the following resources have you used for food allergy education or support?	Radio button: ( <i>allow multiple selections</i> ) <ul style="list-style-type: none"> <li>• Australasian Society of Clinical Immunology and Allergy</li> <li>• Anaphylaxis Australia</li> <li>• MedlinePlus</li> <li>• Allergy Medical Group</li> <li>• Local support groups</li> <li>• None of the above</li> <li>• Other:</li> </ul>					

<b>Chicago Food Allergy Research Survey for Parents from the General Public</b>	
1. An allergic reaction can happen when the body considers a food to be harmful.	Radio button: <b>True</b> , False, I don't know (Bold statement is the correct answer)
2. Lactose intolerance (trouble digesting dairy products) is the same as having a milk allergy.	Radio button: True, <b>False</b> , I don't know
3. A person can die from having a food allergy reaction.	Radio button: <b>True</b> , False, I don't know
4. Hives (red bumps or blotches on the skin that can be itchy) are a <b>common</b> symptom of a food allergy reaction.	Radio button: <b>True</b> , False, I don't know
5. People with food allergies can have an allergic reaction after touching a food.	Radio button: <b>True</b> , False, I don't know
6. A person with a milk allergy can still drink low-fat milk without having an allergic reaction.	Radio button: True, <b>False</b> , I don't know
7. Foods eaten by a mother can be passed to her child through her breast milk.	Radio button: <b>True</b> , False, I don't know
8. Acidic foods (like lemons, oranges and tomatoes) commonly cause food allergy.	Radio button: True, <b>False</b> , I don't know
9. Allergic diseases run in families.	Radio button: <b>True</b> , False, I don't know
10. Food allergies can go away as a person gets older.	Radio button: <b>True</b> , False, I don't know
11. Food allergy is more common in children than adults.	Radio button: <b>True</b> , False, I don't know
12. The number of children in <b>Australia</b> who have a food allergy has been increasing over the past ten years.	Radio button: <b>True</b> , False, I don't know
13. There is a cure for food allergy.	Radio button: True, <b>False</b> , I don't know
14. The <b>only</b> way to prevent an allergic reaction is to stay away from the food that causes the allergy.	Radio button: <b>True</b> , False, I don't know
15. A person can take a medicine everyday to prevent having food allergy reactions.	Radio button: True, <b>False</b> , I don't know
16. There is a law in Australia that requires all foods to be labelled with allergy information.	Radio button: <b>True</b> , False, I don't know
17. Which of the following are the	Radio button: ( <i>allow up to 3 selections</i> )

Note. Correct options are bolded

<p>three most common allergies in children?</p>	<ul style="list-style-type: none"> <li>• <b>Egg,</b></li> <li>• <b>Wheat</b></li> <li>• <b>Milk</b></li> <li>• <b>Peanut</b></li> <li>• Tree nuts (almonds, walnuts, pecans, cashews)</li> <li>• Shellfish (shrimp, lobster, crab).</li> </ul>					
<p>18. Which of the following is the most common food allergy in adults?</p>	<p>Radio button: Milk, Peanut, <b>Shellfish</b> (shrimp, lobster, crab), I don't know</p>					
<p>19. A boy with a milk allergy accidentally drank some milk. Please mark which of the following could be a sign of a food allergy reaction.</p>	<p>Radio button: <i>(allow multiple selections)</i></p> <ul style="list-style-type: none"> <li>• After 2 days he gets hyperactive, cranky and has headaches</li> <li>• <b>After 15minutes he gets hives on his face and chest</b></li> <li>• <b>Immediately his tongue swells and he has trouble breathing</b></li> <li>• He has a stuffy nose that won't go away for weeks</li> </ul>					
<p>20. Food allergy involves the immune system.</p>	<p>Radio button: <b>True</b>, False, I don't know</p>					
<p>21. The only way to know that a child is allergic to a food is with a medical test.</p>	<p>Radio button: True, <b>False</b>, I don't know</p>					
<p>22. Eczema may be the first sign of having a food allergy.</p>	<p>Radio button: <b>True</b>, False, I don't know</p>					
<p>23. Asthma is an important risk factor for severe anaphylaxis.</p>	<p>Radio button: <b>True</b>, False, I don't know</p>					
<p>24. Teenagers are at higher risk for fatal food allergy compared to younger children.</p>	<p>Radio button: <b>True</b>, False, I don't know</p>					
<p>25. Which of the following contain food ingredients that could cause an allergic reaction?</p>	<p>Radio button: <i>(allow multiple selections)</i> <b>Play-doh, medicines, toothpaste, lotions &amp; creams</b></p>					
<p>26. Which age group is the most likely to have food allergies?</p>	<p>Radio button: <b>0-5years</b>; 6-10years, 11years or older, I don't know</p>					
<p>27. What percent of children with <b>milk</b> allergies develop tolerance (or outgrow) the allergy)?</p>	<p>Radio button: Less than 1%; Between 1%-25%; Between 26%-50%, Between 51%-75%, <b>Greater than 75%</b>, I don't know.</p>					
<p>28. What percent of children with <b>peanut</b> allergies develop tolerance (or outgrow) the allergy)?</p>	<p>Radio button: Less than 1%; <b>Between 1%-25%</b>; Between 26%-50%, Between 51%-75%, Greater than 75%, I don't know.</p>					
<p>29. Where is the best place to use an EpiPen or Twinject (injectable epinephrine)</p>	<p>Radio button: Upper arm, <b>Outer thigh</b>, Buttock, I don't know.</p>					
	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20%;"><b>Strongly Disagree</b></td> <td style="width: 20%;"><b>Disagree</b></td> <td style="width: 20%;"><b>Neither Agree</b></td> <td style="width: 20%;"><b>Agree</b></td> <td style="width: 20%;"><b>Strongly Agree</b></td> </tr> </table>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>		



			<b>nor Disagree</b>		
30. Food allergy is a serious health problem in <b>Australia</b> .	•	•	•	•	•
31. People with food allergies are treated differently because of their food allergy.	•	•	•	•	•
32. Children with food allergies have overprotective parents.	•	•	•	•	•
33. Children with food allergies are teased at school.	•	•	•	•	•
34. For someone who has a food allergy, staying away from the food that he or she is allergic to is difficult.	•	•	•	•	•
35. People with food allergies worry a lot about their allergy.	•	•	•	•	•
36. It is difficult for people with food allergies to safely eat at restaurants.	•	•	•	•	•
37. Having an EpiPen or Twinject (injectable epinephrine) is important for most children with severe food allergies.	•	•	•	•	•
38. Schools should have plans for keeping children with food allergies safe at school	•	•	•	•	•
39. Which of the following do you think is the <b>most</b> important to help people with food allergies.	Radio buttons: ( <i>allow only one selection</i> ) <ul style="list-style-type: none"> <li>• Develop a cure for food allergy</li> <li>• Improve the treatments of food allergy</li> <li>• Identify the cause of food allergy</li> <li>• Promote school education programs for food allergy</li> <li>• Promote public awareness campaigns about food allergy.</li> </ul>				
40. Which of the following would be the best way to learn about food allergy?	Radio buttons: ( <i>allow only one selection</i> ) <ul style="list-style-type: none"> <li>• Radio</li> <li>• Television</li> <li>• Handout/ Brochure</li> <li>• Internet/E-mail</li> <li>• Newspapers/ Magazines</li> <li>• Other: _____</li> </ul>				
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

41. Schools should ban all products with nuts	•	•	•	•	•
42. Schools should have special tables where children with food allergies can safely eat lunch	•	•	•	•	•
43. It would be unfair if my child could not have a peanut butter sandwich because of another student's peanut allergy	•	•	•	•	•
44. I would worry about having a child with food allergy play at my house	•	•	•	•	•
45. What would be the best way for schools to teach parents about how to protect children with food allergies? Mark <u>one</u> answer.	<ul style="list-style-type: none"> <li>• Handouts/brochures in the mail</li> <li>• Presentation at parent-teacher meetings</li> <li>• Parents of food-allergic children talking to other parents</li> <li>• Doctor or nurse talking about food allergies</li> </ul> Other: _____				

You would insert your appendix here. Do not forget that the Appendix has the same margins as the rest of your thesis! Include any permissions for published materials in this section.