

**The Development of a Half-Day Workshop Regarding Food Allergy Management  
for Elementary School Staff**

by © Shannon E. Quennell

A practicum report submitted to the School of Graduate Studies in partial fulfillment of  
the requirements for the degree of

**Master of Nursing Graduate Studies/School of Nursing**

Memorial University of Newfoundland

**October 2017**

St. John's Newfoundland and Labrador

## **Abstract**

**Background:** Globally there is a growing incidence of food allergy that is predicted to continue to rise over the next 10 years, and the cause of this rise is unknown. Food allergy is life-threatening due to a significant risk of anaphylaxis, and it is a public health concern, especially for children.

**Purpose:** The food allergy knowledge of school staff influences the prevention and management of school-based reactions. Ongoing education to recognize the signs and symptoms of anaphylaxis and to properly administer an EpiPen®, as well as consistent food allergy management education, ensure that school staff will be prepared.

**Methods:** A systematic process was used for an integrated literature review and consultations with key stakeholders to develop the content and delivery of a half-day food allergy management workshop.

**Results:** Concepts that emerged from the literature review and consultations were used to develop the workshop for elementary school staff. Morrison, Ross, Kalman, and Kemp's (2013) Instructional Design Model and Knowles's (1984) Adult Learning Theory were used as the theoretical foundation. The advanced nursing competencies: research, leadership, and consultation and collaboration were achieved.

**Conclusion:** This practicum report provides an overview, the background and rationale, the review of literature, and key stakeholder consultations that guided the development of the workshop. This workshop will enhance the knowledge of school staff about food allergy management, as well as increase their confidence to recognize an anaphylactic reaction in one of their students and to properly administer an EpiPen®.

## **Acknowledgements**

There are several persons whom I wish to acknowledge, for without their valuable contributions, the completion of my Master of Nursing degree would not have been possible. I wish to thank my advisor, Professor Donna Best, for offering her expertise and guidance throughout this practicum project.

Thank you to the school staff at St. Joseph's Catholic School for letting me into their world to share my passion for education about food allergy management. To Laura Bantock from Food Allergy Canada for sharing her wealth of knowledge and experience with me during this practicum project. A special thank you to Stephanie Zettel, a brilliant nurse and educator who provided countless hours of feedback, and who authentically demonstrates what it means to be a nurse educator. To the mentors—Sheila Rigby, Jennette Coates, and Kathleen Kincaid—in my nursing career that believed in me and supported, influenced, and encouraged me to be uncomfortable in various stages of my career in order to grow. These women are true leaders and advocates in nursing.

Special appreciation is extended to my parents for their encouragement, love, and unconditional support, while always being there for Ava and me when needed.

To Ava, for being a constant reminder of the most important role in my life, that of being a mother; and the numerous acts of affection that sustained me while achieving this graduate degree. Thank you for your mature approach to life's obstacles and for teaching me more than anyone how to live a happy, fulfilling life with food allergies. Ava, you are the impetus for this practicum project and you are an inspiration to me always.

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## **Introduction**

Globally there is a growing incidence of food allergy that is predicted to continue to rise over the next 10 years, and the cause of this rise is unknown. Food allergy is a life-threatening condition due to a significant risk of anaphylaxis, and it is a public health concern for children. Approximately 300,000 Canadians under the age of 18 years have food allergies. Peanut allergy is the most common in Canada, affecting 2% of children.

The amount of time children spend at school is significant, and 85% of children diagnosed with a food allergy will experience an allergic reaction while at school. More importantly, 25% of these children will experience their first reaction to food in the school environment. The food allergy knowledge of school staff influences the prevention and management of school-based reactions. Evidence shows that many schools are poorly prepared to identify and treat anaphylaxis. Many policies that have been developed for the prevention of food allergen exposure are missing essential components, such as ongoing education to recognize the signs and symptoms of anaphylaxis and to properly administer an EpiPen®. Consistent food allergy management education will ensure that school staff will be prepared should an anaphylactic reaction happen.

In my practicum project, I developed and instructed a half-day workshop to teach school staff proper food allergy management for the school setting. Knowles's Theory of Adult Learning (1984), along with Morrison, Ross, Kalman, and Kemp's Instructional Design Model (2013) were utilized throughout the development of the workshop. Throughout the entirety of this project I developed and utilized the Advanced Nursing Practice competencies of research, leadership, and consultation and collaboration.

## **Background and Rationale for Practicum**

A food allergy is a chronic disease where the immune system is hypersensitive or hyper-responsive to substances in the environment and/or to food proteins. Certain allergic individuals may be at risk of death from severe allergic reactions (anaphylaxis) that affect the respiratory and cardiovascular systems (DeSantiago-Cardenas et al., 2015).

There is no known cure for food allergies (Sicherer, 2001; Sampson, 2001; Muraro et al, 2010), which necessitates individuals diagnosed with a food allergy to manage this life-threatening condition in their daily lives. Approximately 2.5 million Canadians have at least one food allergy (Food Allergy Canada, 2017). The incidence is highest among school-aged children (Food Allergy Canada, 2017; Sicherer, 2001). Approximately 300,000 Canadians under the age of 18 years have food allergies (Food Allergy Canada, 2017). Eighty-five percent of children diagnosed with a food allergy will experience an allergic reaction while at school (Powers, Bergren, & Finnegan, 2007; Food Allergy Canada, 2017); 25% of these children will experience their first reaction to food in the school environment (Sicherer, Furlong, DeSimone, & Sampson, 2001). That statistic has prompted schools to develop emergency preparedness policies for food allergy management, anaphylaxis, and methods to prevent unintentional consumption of food allergens. School policies that have been developed for the prevention of food allergen exposure are missing essential components such as recognizing the signs and symptoms of anaphylaxis and the proper administration of an EpiPen® (Muraro et al., 2010).

I have spent time educating individuals about food allergy management who have been caring for my daughter since she was diagnosed at 18 months with a peanut and raw egg white allergy. As a result, the school staff at St. Joseph's Catholic School has used me as a resource regarding food allergies over the last four years. This personal experience supports my practicum; a half-day workshop that educates school staff on how to recognize anaphylaxis and properly administer an EpiPen® in the event that a food-allergic reaction occurs in a student while at school.

### **Goal, Methods, and Objectives**

The overall goal of this practicum was to develop a half-day educational workshop for elementary school staff to engage them as “food allergy champions” so they can recognize an anaphylactic reaction in a student and confidently administer an EpiPen® should an allergic reaction occur while at school. A comprehensive literature review, consultations with key stakeholders, a theoretical framework, and a conceptual model of instructional design were used to meet the following objectives:

1. To demonstrate an application of the following Advanced Nursing Practice competencies by the end of my practicum process: research, leadership, and consultation and collaboration.
2. To complete a comprehensive literature review to inform the development of the practicum project.
3. To complete the consultations with key stakeholders in order to develop the practicum project.

4. To develop a half-day workshop related to food allergy management for school staff in elementary school.

## **Literature Review**

Food allergy is a substantial and evolving public health issue that has continued to emerge over the last 10–15 years (Prescott & Allen, 2011) and continues to rise. There is no cure for a food allergy (Muraro et al., 2010). Although the exact cause of food allergy is unknown, there are many theories as to what causes or contributes to the development of IgE-mediated food allergy, such as the hygiene hypothesis, environmental factors, and genetics.

In Canada, Lu, Elliot, and Clarke (2010) found that a significant gap exists between health care providers' and patients' perceptions about proper diagnosis and management of food allergy. The Government of Canada (2010) states that food allergies affect approximately 7.5% of the Canadian population, representing over 1.5 million people. The Center for Disease Control (2007) in the United States estimates that food allergy prevalence of IgE-mediated food allergies is currently at 3.9% in children (under 18 years). From 1997 to 2007, the prevalence of reported food allergy in children increased 18%. These numbers translate into four out of every 100 children having a food allergy. Research has demonstrated that a knowledge gap exists in food allergy management protocols amongst health care professionals, the parents of food-allergic children, and school staff (Muraro et al., 2010; Sicherer, 2001). Recognition of the signs and symptoms of anaphylaxis and the proper administration of epinephrine remain a challenge. Food allergy prevalence and incidence rates are mainly self-reported, leading to an overestimation of food allergy that occurs from non-allergic adverse reactions to foods. This highlights Clarke and Elliot's (2008) research about the importance of a



proper diagnosis by a physician. This confusion surrounding the inconsistency in recognizing true food-allergic reactions poses a significant challenge to the parents, educators, and health care professionals that oversee the child's well-being (Sicherer, 2001). What will dispel this confusion amongst those who are in care of children is recognizing the signs and symptoms of anaphylaxis and confidently administering epinephrine should anaphylaxis arise.

In order to gain a deeper understanding of the factors that impact food allergy management amongst school staff, a literature review was completed (see Appendix A). This literature review informed the development of a half-day workshop for school staff regarding food allergy management in elementary school. A search was completed using the databases CINAHL, PUBMED, ERIC, and the Cochrane Library with the key words: "food allergy in school children", "food hypersensitivity", "food hypersensitivity in school children", "food allergy bullying", and "teaching strategies and food allergies". The Public Health Agency of Canada's critical appraisal tool kit was used to appraise a total of 33 articles, from which literature summary tables were created (see Appendix A).

There were five main bodies of literature identified that provided insights into the challenges of food allergy management in elementary school: 1) sources of stress with life-threatening allergies, 2) anaphylactic reactions in children at school, 3) allergy management behaviours at school, 4) Sabrina's Law (2005) (in Ontario), and 5) food allergy bullying.

## **The Sources of Stress Associated with Life-Threatening Food Allergies**

Hyper-vigilance, awareness and stigmatization, and social vulnerability are considered sources of stress for individuals and families with food allergies (Avery, King, Knight, & Hourihane, 2003; Behrmann, 2010; Liberman et al., 2010). The hyper-vigilance required when reading food labels, preparing food, eating outside the home, and attending social gatherings with food can be arduous. Avery et al. (2003) found that 60% of families with peanut allergies continually went to the same restaurant because it was vigilant in health and safety practices regarding food allergies.

Similarly, awareness and stigmatization are also a source of stress for the food-allergic individual and family. Awareness about food allergies has at times created a misconception that food allergies are nuisance and inconvenient rather than a life-threatening condition (Avery et al., 2003).

Executing food allergy management strategies is not as straightforward as one may think. Schools have attempted to provide a safe environment for children with food allergies by designating certain lunch tables as “nut-free” or “allergen-free”. This strategy has contributed to undue psychosocial stress by introducing exclusion and discrimination that encourages food allergy stigmatization (Behrmann, 2010). Similarly, another strategy that has been tried without much success is the banning of a food allergen from school. This strategy contributes to a false sense of security that the environment is free from the banned food allergen. It would be impossible for school staff to monitor every individual that brings food into a school (Behrmann, 2010).

## **Anaphylactic Reactions in Children at School**

Anaphylaxis is incredibly unpredictable and no two reactions are the same. A lack of education amongst school staff with regard to food allergy management policy, guidelines, recognizing the signs and symptoms of anaphylaxis, and the inconsistent use of epinephrine puts those with food allergies at risk while at school. Eighty-four percent of children diagnosed with a food allergy will experience an allergic reaction while at school (Powers, Bergren, & Finnegan, 2007; Food Allergy Canada, 2017); 25 % of these children will experience their first reaction to food in the school environment (Sicherer, Furlong, DeSimone, & Sampson, 2001). That statistic has prompted schools to develop emergency preparedness policies for food allergy management, anaphylaxis, and methods to prevent unintentional consumption of food allergens. Unfortunately, research indicates that many schools are poorly prepared to handle anaphylaxis. Policies that have been developed for the prevention of food allergen exposure are missing essential components such as recognizing the signs and symptoms of anaphylaxis and the proper administration of an EpiPen (Muraro et al, 2010).

## **Food Allergy Management in Schools**

Historically, food-induced allergic reactions in school and preschool are not well documented. Fatalities that occurred in the early 1990s from food-induced anaphylaxis in children while at school prompted Canadian allergy organizations and those in the medical community to develop a position for the management of anaphylaxis in schools and other settings involved in the care of children (Gold, Sussman, Loubser, & Binkley, 1996). That paper became foundational in the development of policy and a handbook

guide that led Canadian school boards to develop policies on the safe management of students with anaphylaxis. It also contributed to an increase in research about allergy management behaviour. Despite Gold et al.'s (1996) paper and policy, evidence shows that there are inconsistent allergy management behaviours in schools, such as a lack of a written anaphylactic plan, or the inconsistent storage of epinephrine throughout schools, which results in communication issues and increased medication retrieval time during an anaphylactic reaction. In an effort to prevent anaphylactic reactions, schools tried isolating students at allergy-designated tables and tried enforcing food-allergen bans, such as “no peanuts”. These well-meaning strategies provided a false sense of security and were deemed unethical, discriminatory, and exclusionary to those diagnosed with food allergies (Behrmann, 2010).

Evidence shows that how and when to use an EpiPen® continues to be challenging for most individuals (Muraro et al., 2010; Sampson, 2001; Sicherer, 2001). As a result, food allergy fatalities in children while at school have received attention from governments, lay organizations, parents, and experts in the field of food allergy, who have responded by developing school management policies and guidelines for individuals with food allergies, such as Sabrina's Law (also known as Bill 3) in Ontario. Muraro et al. (2010) discussed the efforts of a task force that evolved from a lack of consensus in Europe about how to manage food allergies of children in school. That paper addresses managing food allergies, including: 1) the rights of the allergic child, 2) action points for all children with allergic disease at school, 3) the roles of stakeholders, and 4) individualized anaphylaxis management plans. Muraro et al. (2010) state:

Every child has the right to be educated in a safe and healthy environment, not to be stigmatized as a result of their condition, be able to participate in all educational and recreational activities to the same extent as their peers, to have access to medication and other measures to relieve symptoms, to have trained personnel who are able to treat acute reactions, and to have their education adapted to their condition if necessary.” (p. 682).

### **Sabrina’s Law (2005)**

The motivation for this bill began in 2003, when a high school student in Ontario died from anaphylaxis. It is believed that the food she ate at her school cafeteria encountered cross-contamination with one of her known multiple food allergens. Even though she had been taught to self-administer an EpiPen®, she did not have it with her on that day in the cafeteria. Food Allergy Canada (2017) supports the literature that food allergy safety is a shared responsibility between the child, family, and the school. Whether or not a school has a good allergy management policy in place often depends on the principal’s commitment and whether the parents are effective communicators. In a reaction to the inconsistent, and at times substandard, protection for children with allergies attending schools Food Allergy Canada called upon the government to introduce Bill 3, also named Sabrina’s Law, in memory of the student who died. Bill 3 came into effect January 1, 2006. The Bill requires that every school board:

establish and maintain an anaphylactic policy, which must include, among other things, strategies to reduce risk of exposure to anaphylactic causative agents, a communication plan for the dissemination of information on life-threatening

allergies, regular training on dealing with life-threatening allergies, a requirement that every school principal develop an individual plan for each pupil who has an anaphylactic allergy and a requirement that every school principal maintain a file for each anaphylactic pupil. (Government of Ontario, 2005)

### **Food Allergy Bullying**

Evidence shows there is a social vulnerability associated with food allergies and children are susceptible to bullying specifically due to food allergy. Shemesh, Annuziato, and Ambrose (2013) found 31.5% of children with food allergies reported bullying in relation to their allergy, and 80% of the threats were from classmates. In a later study, Muraro et al. (2014), found that food-allergic children had twice the probability of being bullied than healthy children. Sixty percent of the allergic children were victims of some form of bullying a minimum of once in the last two months, compared with the control group that reported a frequency of 31.7%. Even though the sample size is small, this study aligns with the literature and suggests that bullying of food-allergic children is a universal issue.

Torabi, Cardwell, Elliot, and Chan (2016) and Egan and Sicherer (2016) identify bullying as one of several types of emotional concern for children with food allergies. Often these children suffer from increased levels of anxiety and may have limited social activities, especially where food is involved, that can result in poorer health-related quality of life. Children with food allergies are vulnerable for experiencing life-threatening allergic reactions as a result of the social consequences of bullying. For example, there are cases of bullying where food-allergic children have been taunted with

their known food allergen, the known food allergen has been waved in front of them, or the food has touched the allergic child in an effort to bully them and to see what will happen should a food allergy reaction occur. There is a psychological consequence when a person is intentionally trying to harm another person that has the potential to make the individual who is being bullied feel victimized (Torabi et al., 2016). Evidence shows that medical identification, carrying an EpiPen®, and disclosure of health information has the potential to label an individual with a known food allergy. In an effort to address disclosure of an allergy, Dean et al. (2015) wrote a paper about the experiences of health-related stigma among food-allergic children at risk of anaphylaxis as a result of Bill 3, which requires those at risk to disclose their health status. Questions were raised at the time this legislation was being put in place (January 1, 2006) regarding the potential of doing more harm than good. This is the first study in the realm of food allergy that addresses disclosure. The results indicated that participants were stigmatized as a result of protective school policies under the law, and that created tension between their physical safety and social well-being. Sabrina's Law (Bill 3) also led to a culture shift in awareness of food allergies that resulted in some participants normalizing their health status and offered a promising direction for the future. Although the introduction of Sabrina's Law (2005) in Ontario is to physically safeguard those with food allergies, how the law was operationalized in the school setting has been, at times, less than positive. Bullying, teasing, and harassment of children with food allergy appear to be common, frequent, and repetitive. Liberman, Weiss, Furlong, Sicherer, and Sicherer (2010) found that 32.5% of children reported being bullied and 79% of those stated the bullying was

specifically related to their food allergy. Sadly, 21% reported bullying by a teacher or school staff member. Sixty-seven percent reported verbal teasing and, shockingly, 43% reported having the known food allergen waved in their face.

### **Gaps in the Research**

The review of literature has highlighted some key gaps that informed the development of this practicum project. Evidence shows that there is a gap in knowledge in recognizing the signs and symptoms of anaphylaxis and properly administering an EpiPen®. The literature also suggests that there is a lack of research about the knowledge and attitudes of school staff toward the food-allergic individual. Little is known about the effective intervention and management strategies targeted at the bullying of children with food allergies.

Drawing on existing evidence in the literature, the development of an educational workshop regarding food allergy management will bring school staff one step closer to feeling confident in the recognition of anaphylaxis and administration of an EpiPen® should a food-allergic reaction occur in a student at school.



## **Consultations**

### **Consultation with School Staff**

Consultations took place with key stakeholders in which the questions and content were guided by the literature review. A consultation report (see Appendix B) was completed.

### **Data Collection**

Prior to the start of the discussion, participants were verbally informed of the rationale and objectives of the focus group. Confidentiality of the data that emerged was discussed. The school staff's willingness to participate in the discussion inferred informed consent. A series of semi-structured interview questions (see Appendix C) were asked. The interview was approximately 60 minutes. This practicum project is not a research project and did not require the ethics approval as per the Health Research Ethics Authority assessment tool.

### **Data Analysis**

Responses to the interview questions were transcribed and coded from the main ideas that emerged. Coding consisted of systematically reading the transcripts, grouping similar responses, and extracting themes. Common themes were grouped together and compared to the findings in the literature. Important quotes that best captured the meaning of the discussion were noted. I re-examined the field notes and identified keywords and phrases for accuracy.

## **Discussion**

This school staff was aware of their lack of knowledge and requested more education related to food allergy management in their school. They are motivated and although there is an online module available to them, the staff have indicated that they do not feel comfortable in treating a child having an anaphylactic reaction. There is an overarching theme of helplessness and what contributes to this helplessness can be broken into three themes: 1) awareness of a desire for information, 2) a lack of confidence, and 3) uncertainty about putting their current training module into practice. Education that meets the needs of the learner can be empowering, diminishes the feeling of helplessness, and allows a person to have confidence in their decisions and actions.

### ***Theme One: Awareness of a Desire for Information***

The staff revealed concern about their lack of knowledge about food allergy management and suggested that the online module was not enough information for them to competently manage an allergic reaction.

### ***Theme Two: A Lack of Confidence***

The second theme that emerged was a lack of confidence in the staff's ability to manage an allergic reaction. Although the school staff has access to information about food allergies, such as the online module, anaphylaxis plans, and parents' communications about their child's food allergy, they do not feel confident in their ability to put this information into practice.

### ***Theme Three: Uncertainty with Food Allergy Management***

Uncertainty was the third theme in the analysis of the data. Various interview questions were answered in the form of a question. It was my observation that the staff were looking at me to validate their answers. Uncertainty leads to a lack of confidence that contributes to the overarching theme of helplessness.

### **Consultation with a Food Allergy Educator**

This educator is a Registered Nurse who works for Food Allergy Canada. She has participated in research, education, and program development for those living with food allergies for over a decade. Her passion to advocate for food-allergic individuals arose when her daughter was diagnosed with food allergies as a young girl in the mid 1990s. Information, support, and resources about food allergies were not as readily available then as they are now. This interview was approximately 60 minutes.

### **Data Collection**

The key points revealed in the literature focused on what education delivery methods were most effective when educating school staff about food allergy management. Prior to the start of the discussion, the participant was verbally informed of the rationale and objective of the consultation.

### **Data Analysis**

The educator stated that in her experience, effective allergy management education is most effective with face-to-face education and hands-on return demonstration with an EpiPen® trainer.

### **Gaps Noted in the Interview Findings**

An issue noted in the interview findings is that there is not a consistent process regarding food allergy management for field trips, or for when supply staff replaces regular school staff. It was important to incorporate this information into the education session to ensure that consistent food allergy management strategies are used off school property or when supply staff is present at the school.

During the interview, one participant suggested that it would be helpful to understand strategies to decrease the risk of a student coming into contact with a food allergen. It is beneficial to discuss risk reduction strategies and information about cross-contamination, to help prevent a reaction from occurring in the first place, and not just the signs and symptoms of an allergic reaction and how to treat it.

### **Conclusion**

The results of these consultations, along with the knowledge gained from my literature review, informed the content and delivery of the half-day workshop. Education that highlights the signs and symptoms of a food-induced anaphylactic reaction and how and when to administer an EpiPen® are key points.

During the school staff consultation, two participants stated that it would be valuable to organize a food-allergic reaction practice scenario. This type of practice would provide an opportunity to demonstrate knowledge, instill confidence, and decrease uncertainty in the participants' actions and ability to respond. It also allows for reflection and evaluation of the practice scenario and this may be helpful in building capacity.

### **Knowles's Adult Learning Theory**

Knowles (1984) developed six principles that reflect how adults learn and this theory intentionally recognizes the equality between the teacher and the learner. This two-way process is a less traditional approach than a historical and paternalistic model. The assumptions that are fundamental in Knowles's Adult Learning Theory are that active adult learning uses approaches to learning that are problem-based and collaborative. Adults learn best when they see the relevance of the information taught to their experience.

### **Model of Instructional Design**

This instructional design approach considers “instruction from the perspective of the learner, rather than from the perspective of the content” (Morrison, Ross, Kalman, & Kemp, 2013, p. 7). The overall goal of instructional design is to make learning more effective and efficient in order to meet the needs of the learner (Morrison et al., 2013). Tailoring instructional strategies to coincide with the learners' needs facilitate the learning process for participants. The more relevant, practical, and efficient, the learning process is, the more the information and the workshop will be accepted and received. It is clear that the principles of Morrison et al.'s Model of Instructional Design are in alignment with Knowles's adult learning principles.

### **Half-Day Workshop**

The half-day workshop entitled “A Half-Day Workshop Regarding Food Allergy Management for Elementary School Staff” was created for St. Joseph's Catholic School with the purpose of teaching the school staff how to recognize anaphylaxis in a student

that may be experiencing a food-allergic reaction and to confidently administer an EpiPen® should a student require it. This workshop provides school staff with the elements needed to apply new knowledge about food allergy management, to effectively administer an EpiPen®, to become motivated food allergy champions, and to identify challenges related to food allergy management in school. The workshop is comprised of 12 sessions:

- 1) Welcome and Introductions
- 2) Icebreaker Activity (electronic polling)
- 3) Background, Theories, and Myths, and Sabrina's Law (PowerPoint)
- 4) Anaphylaxis and Epinephrine (PowerPoint)
- 5) Coffee Break (provided)
- 6) EpiPen® Trainer Demonstration Station (hands-on)
- 7) Cross-Contamination and Risk Reduction (PowerPoint)
- 8) Question and Answer Time
- 9) Creating Food Allergy Champions (concept mapping)
- 10) The Challenges of Being a Food Allergy Champion (brainstorming)
- 11) Reflection: Where do we go from here? (group discussion)
- 12) Evaluation

The introduction is brief and consists of housekeeping items such as location of restrooms, orientation of the display table, and introductions of the instructor and the participants. The second session is an interactive icebreaker activity where participants will see questions about food allergies and answer these questions using a “clicker” to

answer (electronic polling). The answers will then be polled and bar graphs will show the percentages of indicated answers. The third and fourth sessions are PowerPoint presentations that provide information on the background, theories, and myths related to food allergy, Sabrina's Law (Ontario legislation), and information about anaphylaxis and epinephrine. A video clip at the end of this session summarizes key points about anaphylaxis and epinephrine. The fifth session will be a much-needed coffee break provided by me. I will also have a table set up with sample allergy-friendly food that will introduce the school staff to allergy-safe snacks that are available in local grocery stores. I have contacted SunButter, Enjoy Life, and SunRype, who have donated samples of their products. The sixth session is a psychomotor session in which the participants will be able to demonstrate the administration of an EpiPen® trainer. Session seven is a short PowerPoint presentation about cross-contamination and risk reduction, which were identified gaps during the consultation. In session eight, I built in a question and answer period to allow the group to ask any burning questions about the information they just learned. Session nine is a brainstorming session in small groups that lets the group together define what a food allergy champion is to them. The tenth session is a concept-mapping session in which the participants discuss and identify challenges related to food allergies in school and then together map solutions that they could implement. The eleventh session is a reflective session in which the participants can reflect upon what was learned and how they will use this new knowledge after the workshop. The last session is an evaluation. A questionnaire will be handed out to assess the effectiveness of the workshop and any ideas or suggestions for improvement. Approval from the principal is

in place and a meeting has been arranged for the first week of September 2017 to discuss the details to execute the workshop. A date, staff replacement, and payment for the time of the participants will be discussed at that meeting.

The workshop is for elementary school staff that work with students from junior kindergarten to grade eight. This workshop was designed to accommodate 20–25 participants. The content of this workshop was developed from the literature review and the consultations. The sessions and instruction of the workshop was completed using Knowles's Adult Learning Theory (1984) and Morrison, Ross, Kalman, and Kemp's (2013) Instructional Design Model.



## **Advanced Nursing Practice Competencies**

Advanced Nursing Practice (ANP) competencies were created to ensure Registered Nurses (RNs) meet the specific knowledge, theory, personal attributes, and clinical skills to work in their roles safely, ethically, and competently (Canadian Nurses Association, 2008). The core competencies are as follows: 1) Clinical, 2) Research, 3) Leadership, and 4) Consultation and Collaboration. This project focusses on the following ANP competencies: 2) Research, 3) Leadership, and 4) Consultation and Collaboration.

### **Research**

Advanced practice nurses read, use, apply, and develop knowledge, evidence, and information that are critical to advancing the nursing profession (Canadian Nurses Association, 2008). I achieved this competency through my literature search and my critical appraisal and synthesis of the literature. The literature informs the content of the half-day workshop, and Knowles's Adult Learning Theory and the Morrison et al. (2013) Instructional Design Model will guide the instruction.

### **Leadership**

Advanced practice nurses are leaders within their workplace, community, and organization. They are consistently seeking to improve the delivery of care in innovative ways. They work to shape their organization in a positive manner as change agents (Canadian Nurses Association, 2008).

These skills involve identifying the learning needs of individuals, families, and populations, and finding or developing programs and resources to meet those needs. As a

leader, one must advocate for the continuous learning of others. Leadership is an advanced nursing competency that I believe to be instrumental in elevating my practice by displaying a level of professionalism and forward thinking beyond that of a novice nurse. I demonstrate this competency by developing partnerships with school staff at St. Joseph's Catholic School, as well as by facilitating a program about food allergy management in schools that can help create change that will not only benefit the school staff, but also the students and their families.

### **Consultation and Collaboration**

Advanced practice nurses should effectively communicate and collaborate with individuals and multidisciplinary team members representing the nursing profession (Canadian Nurses Association, 2008). The first part of this ANP competency is reflected by consulting with my supervisor, members of the school staff, and an RN educator from Food Allergy Canada to develop my half-day workshop that represents an improvement in knowledge, education, and health outcomes for individuals with food allergies attending school.

I consulted with school staff of St. Joseph's Catholic School to identify gaps in existing knowledge and practice, as well as the needs of school staff that are in the care of food-allergic children. In addition, I consulted with Laura Bantock, an expert in developing and delivering food allergy education to a variety of populations in Canada and internationally. This information informs the content and delivery of the half-day workshop. I hope to improve the knowledge of school staff so they can recognize the

signs and symptoms of anaphylaxis and confidently administer an EpiPen® in the event of an unexpected anaphylactic reaction in a student.

To meet this competency, one also needs to practice collaboratively and effectively to work for changes in healthy public policies, as well as participate in collaborative group projects with academic institutions (Canadian Nurses Association, 2008). The second part of this competency is achieved through collaborating with key stakeholders (school staff and Food Allergy Canada) to develop the content for the workshop, and through my collaboration with my professor throughout this project.

### **Limitations and Next Steps**

This practicum project is not without its limitations. This project did not go through the process of implementation and therefore after the completion of this report I will begin the implementation planning in preparation for a meeting that is scheduled for September 2017.

Support from the administration of St. Joseph's Catholic School has been expressed and the details to best execute the half-day workshop will be decided during the September 2017 meeting. Possibilities include: delivering the workshop during the first professional development day in September, in which case, replacement staff will not be necessary. Another suggestion is to deliver the workshop outside school time and the limitation of this option will be education-leave pay for school staff. After the details are confirmed for implementation, an evaluation plan for the workshop must be created. One solution may be working with school staff to create scenarios, case studies, and food allergy drills, and then implementing them throughout the school year.

## **Conclusion**

This practicum project has highlighted some key elements that need to be explored going forward. Schools, families, and allergic individuals must learn to collaborate in the prevention and management of food-allergic reactions, which will improve the school's environment, and the confidence of school staff in recognizing the signs and symptoms of anaphylaxis, and properly administering an EpiPen®. The implementation of this half-day workshop will greatly improve the overall quality of life and the well-being of students with food allergies.

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## **Appendix A: Literature Review**

A Review of Relevant Literature: Food Allergy Management Behaviours

Shannon E. Quennell

Memorial University of Newfoundland

## **Abstract**

Food allergy is a substantial and evolving public health issue that has continued to emerge over the last 10–15 years (Prescott & Allen, 2011) and continues to rise. There is no cure for a food allergy (Muraro et al., 2010). Although the exact cause of food allergy is unknown, there are many theories such as the hygiene hypothesis, environmental factors, and genetics that contribute to IgE-mediated food allergy development. Research has demonstrated that food allergy management protocols historically show that a knowledge gap exists amongst health care professionals, the parents of food-allergic children, and school staff (Muraro et al., 2010; Sicherer, 2001). Recognizing the signs and symptoms of anaphylaxis and the proper administration of epinephrine remain a challenge. This literature review provides an overview, background and rationale, review of literature, gaps in the literature, and ideas for a half-day workshop for engaging allergy champions. Morrison, Ross, Kalman, and Kemp's (2013) Instructional Design Model along with Knowles's Adult Learning Theory (1984) are incorporated throughout the development of the workshop. The advanced nursing competencies: research, leadership, and consultation and collaboration are achieved throughout the process.

## Overview

There is no known cure for food allergies (Sicherer, 2001; Sampson, 2001; Muraro, 2010), which requires individuals diagnosed with a food allergy to manage this life-threatening condition in their daily lives. Approximately 2.5 million Canadians have at least one food allergy (Food Allergy Canada, 2017). The incidence is highest among school-aged children (Food Allergy Canada, 2017; Sicherer, 2001). Approximately 300,000 Canadian children (under the age of 18 years) have food allergies (Food Allergy Canada, 2017). Peanut allergy is the most common in Canada and affects two children in every 100. One in two Canadians knows someone with a food allergy.

Food allergy in children is a growing public health concern and a life-threatening condition that carries a significant risk of anaphylaxis (Behrmann, 2010; Dean, Fenton, Shannon, Elliott, & Clarke, 2015; Nowak-Wgrzyn, Conover-Walker, & Wood, 2001; Pumphrey, 2000). Eighty-five percent of children diagnosed with a food allergy will experience an allergic reaction while at school (Powers, Bergren, & Finnegan, 2007; Food Allergy Canada, 2017); 25% of these children will experience their first reaction to food in the school environment (Sicherer, Furlong, DeSimone, & Sampson, 2001). That statistic has prompted schools to develop emergency preparedness policies for food allergy management, anaphylaxis, and methods to prevent unintentional consumption of food allergens. Unfortunately, research indicates that many schools are poorly prepared to handle anaphylaxis. Policies that have been developed for the prevention of food allergen exposure are missing essential components, such as recognizing the signs and symptoms of anaphylaxis and the proper administration of an EpiPen® (Muraro et al., 2010).

The purpose of this paper is to review the literature that is relevant to food allergy management in schools. It begins with the background information necessary to understand the complexities of this potential life-threatening condition, the literature search strategy, and evidence that food allergy prevalence continues to rise. Food allergy reaction and anaphylaxis will be defined, as well as the challenges associated with the proper use of an EpiPen®. The highlights and gaps in the relevant literature search, along with consultations with key stakeholders, informs the half-day workshop for the school staff at St. Joseph's Catholic School in Port Elgin, Ontario. Knowles's Adult Learning Theory and Morrison, Ross, Kalman, & Kemp's (2013) Instructional Model of Design will be used to guide the instruction of the workshop.

### **Background and Rationale**

Globally there is a growing incidence of food allergy that is predicted to continue to rise over the next 10 years (Caffarelli et al., 2011; DeSantiago et al., 2015; Grabenhenrich et al., 2012; Javenpaa et al., 2014; Kilger et al., 2015; Kljakovic et al., 2008; Kim et al., 2012; Ozen et al., 2015; Prescott & Allen, 2011). The cause of such rise is unknown. There are many theories about the causes of allergic disease, most notably, it is thought to be linked to the modern lifestyle, including dietary habits. Genetics and progressive environmental changes are also considered factors (Prescott & Allen, 2011). Historically, there was a possibility that an individual had the potential to outgrow his or her food allergy. The difference between the "first wave" of allergic disease from over 50 years ago is that there is less likelihood of an individual outgrowing an allergy now than in the previous generations (Prescott & Allen, 2011). Food allergy has come into view

over the last 10–15 years as a “second wave” of the allergy epidemic. It remains ambiguous as to why this second wave is decades behind the first wave (Prescott & Allen, 2011).

A food allergy is a chronic disease where the immune system is hypersensitive or hyper-responsive to substances in the environment and/or to food. A classic allergic reaction produces symptoms such as itchy, watery eyes, nasal congestion, and skin irritations, typically in the form of hives. However, certain allergic individuals may be at risk of death from severe allergic reactions that affect the respiratory and cardiovascular systems (DeSantiago-Cardenas et al., 2015).

The medical community has struggled to agree upon a definition of anaphylaxis. However, they have agreed that anaphylaxis is a severe and potentially life-threatening form of allergic reaction that involves two body systems and is precipitated by a variety of agents, such as foods, vaccines, medication, latex, and insect venom (Muraro, et al., 2007; Sampson, et al., 2005; Tiyyagura et al., 2013). For the purposes of this paper, anaphylaxis is defined as: a systemic reaction involving two body systems (cardiac, respiratory, gastrointestinal, or neurological) that can result in extreme cardiac and respiratory impairment and is typically fatal if medical attention is not sought out immediately (Behrmann, 2010; Food Allergy Canada, 2017).

## **Review of Literature**

### **Literature Search Strategy**

A literature review was conducted covering the time period of January 2000 to January 2016 and using the following key terms: *food allergy in school children, food*

*hypersensitivity, food hypersensitivity in school children, food allergy bullying, teaching strategies and food allergies, Knowles's Adult Learning Theory, and Morrison, Ross, Kalman, & Kemp's Instructional Model of Design.*

The databases used were CINAHL, PUBMED, ERIC, and the Cochrane Library. From this search, I was able to identify 83 relevant articles. The final total for this summary of relevant literature is 35 articles. The remaining 48 articles were rejected because they were either research studies in adult populations or were not research-based articles.

### **Prevalence of Food Allergy in Canada and Globally**

Food allergy continues to rise, particularly in children. In Canada, Clarke and Elliot (2008) found a significant gap exists between health care providers' and patients' perceptions about proper diagnosis and management of food allergy. The Government of Canada (2010) states that food allergies affect approximately 7.5% of the Canadian population, representing over 2.5 million people. These numbers were published in 2010 from AllerGen, a Canadian government-funded allergy research organization. A third national survey will provide an updated prevalence rate and is set to be published in 2018.

According to the Center for Disease Control (2007) in the United States, estimated food allergy prevalence of IgE-mediated food allergies is currently at 3.9% in children (under 18 years). From 1997 to 2007, the prevalence of reported food allergy increased 18% in children. These numbers translate into four out of every 100 children having a food allergy. More recently, DeSantiago-Cardenas, Rivkina, Whyte, Harvey-Gintoft,

Bunning, & Gupta (2015) stated, “pediatric food allergy is a public health concern in the United States affecting 8% of children nationally” (p. 170).

A true food allergy involves an adverse immunologic response (Sicherer, 2001). Food intolerance is host-specific and does not involve an immune response. However, there can be an overlap in symptoms, thus creating some confusion. Sicherer (2001) reports that 28% of parents believe that their young child has a food allergy, but when physician-supervised oral food challenges are performed to confirm a diagnosis, only 8% have a true allergy to a food allergen. This highlights Elliot and Clarke’s (2008) research about the importance of a proper diagnosis by a physician. The overestimation of food allergy can occur from non-allergic adverse reactions to foods. This confusion surrounding the inconsistency in recognizing true food-allergic reactions poses a significant challenge to parents, educators, and health care professionals that oversee a child’s well-being (Sicherer, 2001). What will dispel this confusion amongst those who are in care of children is recognizing the signs and symptoms of anaphylaxis and confidently administering epinephrine should anaphylaxis arise.

A growing prevalence of food allergies is also being seen across the globe. Australia estimates food allergy at 3.8% in children, and 3.3% is peanut allergy alone. Similar to other countries, this data is estimated because it is patient-reported. However, 2.4% of children entering kindergarten did have a diagnostic test-confirmed food allergy (Kljakovic, Gatenby, Hawkins, Attewell, Ciszek, Kratochvil, Moreira, & Ponsonby, 2008).



Caffarelli et al., (2011) implemented a cross-sectional study in Parma, Italy, that investigated the frequency and characteristics of perceived food reactions in school-aged children. They found that 10.9% of parents (of the 69% that responded to a questionnaire) perceived their child had allergic reactions to food. Evidence shows that acquiring a proper diagnosis from a pediatrician or allergist can decrease the overestimation of the true prevalence of food allergy.

Consistent food allergy management education provides those who are in care of children the opportunity to increase their knowledge and feel confident about how to prevent exposure to food allergens, how to recognize an anaphylactic reaction, and treat a child with an EpiPen® should an anaphylactic reaction happen. Muraro et al. (2010) reported that food allergies affect one quarter of European school children and 20% of their food reactions occur at school. Muraro et al., (2010) call for a task force to describe an ideal model of care centered on allergic children in school. That document highlights the lack of education of school staff about how to effectively manage food allergies and provides information from allergy experts in Europe that stresses the importance of consistent food allergy management for those who care for children in schools and child care centres.

Food allergies have continued to be a growing public health concern in Asia since the mid 1990s. In Korea, Kim et al. (2012) examined the current status of managing food allergies in children at 154 schools and recognized that school staff were ill-equipped to manage food allergy. Food allergy status was determined through self-reported parental surveys. These researchers acknowledge that studies that have taken place in Western

populations show greater prevalence of food allergy. However, they are seeing a significant increase ( $p<0.05$ ) in food allergy in children and adolescence, with an increase from 4.2% to 4.7% for children aged six to 12, and additionally, 3.8% to 5.2% for those aged 12 to 15 years.

In summary, the evidence demonstrates that food allergy is a growing global public health concern, particularly in school-aged children. School staff needs to be equipped with the education and knowledge to recognize a food-induced anaphylactic reaction, as well as the confidence to administer an EpiPen®, in order to manage a variety of food allergies while children are in their care.

They also need the ability to differentiate a true food allergy, which is triggered by an immune response, from a food intolerance, which may have overlapping symptoms. It is imperative for school staff to know how to treat anaphylaxis. Additionally, proper diagnostic testing of a food allergy is paramount in understanding that food allergy is a life-threatening condition that requires a person to recognize the signs and symptoms of anaphylaxis, and to properly administer an EpiPen®.

### **What is a Food Allergy Reaction?**

A food allergy is characterized by the failure of the immune system to develop tolerance, or by the breakdown of tolerance, to food proteins (Abrams & Sicherer, 2016). The absence of tolerance to food proteins can become evident as classical immediate hypersensitivity responses that are mediated by specific immunoglobulin E (IgE) antibodies to food proteins. These can be subdivided into IgE-mediated reactions or non-mediated reactions, such as celiac disease. Additionally, exposure to allergens, such as

peanut, tree nuts, wheat, mustard, fish, shellfish, sulphites, milk, egg, sesame, and soy, will stimulate mast cells and basophiles to release mediators that result in the signs and symptoms of an allergic reaction (Abrams & Sicherer, 2016). These signs and symptoms include hives, itchy, watery eyes, and potentially more severe signs and symptoms that affect the respiratory and cardiovascular system.

The causes of food allergy are not well understood. Genetic and environmental reasons are thought to contribute to the increase in food allergy in children. Abrams and Sicherer (2016) identified a study that examined 58 pairs of twins that showed that peanut allergies have a significant genetic link among monozygotic twins, with an 81% chance of inheritance. Other such hypotheses include: a lack of vitamin D in a mother's diet while pregnant, the hygiene hypothesis that suggests that changes in the microbiome that protects people against germs have altered the immune response, and lastly, the change in how food is produced and manufactured has been implicated in the increased incidence of food allergy (Sampson, 2001; Sicherer, 2001; Muraro et al., 2010).

### **Food Allergy-Induced Anaphylaxis**

Food-induced anaphylactic reactions are the most common reactions seen in emergency departments (Sampson et al., 2005). Anaphylaxis may be classified as a uniphasic or a biphasic reaction. A uniphasic reaction may resolve within hours of medical treatment. Once the symptoms of anaphylaxis have completely subsided there is the potential that the individual may experience another reaction, called a biphasic reaction. A second surge of anaphylactic symptoms can occur up to 72 hours after the initial reaction. Biphasic symptoms affect 30% of the population and are dangerous

because people believe they have fully recovered and may not recognize they need to treat a second anaphylactic reaction (Sampson et al., 2005). Early recognition of anaphylaxis and administration of epinephrine can decrease the potential of a biphasic reaction or death.

### **Epinephrine as Treatment**

Food allergy is a life-threatening condition and can lead to systemic symptoms and anaphylaxis. There is no cure for food allergy. Food allergy management guidelines recommend avoiding the known food allergen and the immediate administration of epinephrine should anaphylaxis occur (Muraro et al., 2010). Epinephrine works to maintain an open airway for breathing and support the circulatory system. Individuals who are at risk for food-induced anaphylaxis should be prescribed epinephrine, which can be self-administered or administered by someone else. It is also recommended that it be carried physically on them in the form of an auto-injector (EpiPen®). Despite epinephrine being the recommended first line of defense, several studies revealed that epinephrine is underutilized in anaphylactic reactions.

A retrospective chart review was completed for patients with a diagnosis of anaphylaxis that were seen in a pediatric emergency department in Connecticut from May 2008 to January 2010. Tiyyagura, Arnold, Cone, and Langan (2014) were looking to understand the pre-hospital management of anaphylaxis patients. A total of 218 cases of anaphylaxis in 202 children were included in the analysis. The evaluation revealed low rates of epinephrine administration by emergency medical services, parents, and patients

themselves, despite the recommended guidelines to administer epinephrine as a first line of defense against anaphylaxis.

In a cross-sectional survey given to 12,275 school administrators, 12,196 responded about policies regarding the first line of treatment for anaphylaxis. Surprisingly, 18% of the school administrators did not list a policy to administer epinephrine as the first line of therapy (White, Hogue, Silvia, Muniz, & Herrem, 2016). Other lines of therapy reported by school administrators included antihistamines, albuterol, and corticosteroids. Of the school administrators that provided information, 89.9% had a policy that included having the school nurse administer the epinephrine, 73.2% permitted some teachers, and 32.8% permitted all teachers. That study revealed that greater than 20% of the schools listed other medication as their standard first line of therapy for anaphylaxis. These policies place students with food allergies especially at risk for delay of treatment with epinephrine and an increased risk of mortality and morbidity. Anaphylaxis is incredibly unpredictable and no two reactions are the same. A lack of education amongst school staff with regard to food allergy management policies and guidelines, recognizing the signs and symptoms of anaphylaxis, and the inconsistent use of epinephrine puts those with food allergies at risk while at school. A study performed in the Milwaukee School System examined the current status of food allergy guidelines, policy development, and anaphylaxis plans for food-allergic students. The researchers learned that one in four of the 125 responding schools reported no guidelines or policies in place for those with food allergies. Fifty-three schools had some type of policy and 56 schools reported making special arrangements for those with food allergies.

That study highlighted that there is inconsistent epinephrine use in the schools. As a result of that study, the researchers had requests from school administrators for more education and training on food allergy management in order to support their school staff that are responsible for students with food allergies.

Alternatively, the existence of food allergy policies and guidelines does not mean that they are being put into practice or implemented properly. Putting knowledge into practice requires education in order for people to feel confident in recognizing the signs and symptoms of anaphylaxis and properly administering an EpiPen® (Abdurrahman et al., 2013).

Abdurrahman et al. (2013) performed a mixed-method study that revealed three major themes that emerged from the 184 participants. A systematic review and an online survey of anaphylaxis management revealed that physicians in Canadian emergency departments lacked knowledge on how to use an EpiPen®, thus failing to provide training to patients and families on how to use an EpiPen®. Three themes emerged in this study 1) a lack of provision of information following the episode on the recognition and management of food allergy and anaphylactic reactions, 2) prolonged wait times for an allergist, and 3) significant family anxiety. That study identified that health care professionals had insufficient knowledge about food allergy management and treating anaphylaxis. In this instance, it is easy to see how a lack of education might be confusing to school staff if parents are translating the information from uninformed health care professionals. Especially if school staff is also hearing different food allergy protocols from different parents, there is the potential to create real confusion about how to

emergently respond should a child come in contact with a known food allergen (Abdurrahman et al., 2013).

The Chicago public school system responded to the death of a grade seven student due to an anaphylactic reaction by stocking every public school with EpiPens®. Epinephrine was not readily available in the school at the time of this fatal reaction (DeSantiago-Cardenas et al., 2014). After this, a review was conducted during the 2012–2013 school year. The researchers learned that 38 food-allergic individuals avoided a potential life-threatening outcome. The epinephrine auto-injector was administered to students (in 92.1% of the cases) and school staff (7.9%). Fifty-five percent of the individuals were administered epinephrine at school for a first-time food allergen-induced anaphylactic reaction. Given that this 55% did not have a diagnosis or a prescription for epinephrine, they were in a vulnerable position because they did not carry their own EpiPens®. Had the schools in Chicago not been equipped with EpiPens® the reactions could have resulted in death.

### **The Proper Use of an EpiPen®**

Effective management of anaphylaxis assumes that the responding individual knows how to proficiently administer an EpiPen®. Evidence revealed that many parents, school staff, pediatricians, and individuals themselves who were prescribed an EpiPen® could not properly use them (Sicherer, 2001). Two factors that contributed to this knowledge deficit is that those in care of children are challenged in recognizing the signs and symptoms of anaphylaxis and are uncertain about when to administer the EpiPen®

(Blyth & Sundrum, 2002). Secondly, when patients, school staff, and physicians were asked to demonstrate the use of an EpiPen® using a trainer device, many errors were made that increased the risk of grave consequences in the event of an anaphylactic reaction (Sircherer, Forman, & Noone, 2000).

As previously mentioned, a lack of consistency in managing food allergies and treating anaphylaxis contributes to the improper use of an EpiPen® auto-injector. Gold and Sainsbury's (2000) research revealed that of 29 attending physicians interviewed, only 21% were familiar with and able to correctly demonstrate the use of an EpiPen®. Results of the study show that physicians are diagnosing and writing prescriptions for an EpiPen®, but there is a lack of health teaching and follow-up. Patients and families should consistently review food allergy education and the steps of administering an EpiPen® in order to remain competent to manage food allergies and the potential of a life-threatening anaphylactic reaction. Physicians should be proactive in educating themselves regarding food allergy management and how to properly use an EpiPen® in order to provide prudent education to patients and families diagnosed with food allergies that require them to carry an EpiPen® (Gold & Sainsbury, 2000).

### **EpiPen® Use in Schools**

Since 2005, school boards in Ontario have been mandated to provide an anaphylaxis policy. The policy states that it is the school principal's responsibility to assist parents in developing individual anaphylaxis plans for their children while they are in school. Although the policy does state that there is required training for school staff, it



neglects to address the content of that training for those that are in care of children with food allergies and may be required to use an EpiPen® (Food Allergy Canada, 2017).

A brief report by Wahl et al. (2014) suggests practicing food allergy management drills in schools, including using an EpiPen®, similar to the established fire drills and lockdown drills in most North American schools. Food allergy management has a similar unpredictable emergency nature because an anaphylactic reaction requires the immediate and proficient action of an individual to prevent a grave outcome. More locally in Ontario, a report showed that in 2005 only 12 of 100 elementary school teachers correctly demonstrated the use of an EpiPen® (Watson, Woodrow, & Power, 2010). Further to that, nationally, 82% of school teachers reported that they received EpiPen® training from either a health professional or a parent, and 80% of the school teachers claimed they were confident in using an EpiPen®. In contrast to the Ontario experience, these teachers were not actually evaluated on their ability to use the auto-injector; the data was self-reported via electronic survey (Watson, Woodrow, & Power, 2010).

Another Canadian study by Nguyen Luu et al. (2012) assessed the ability of school staff in Quebec to demonstrate the EpiPen® technique and identify symptoms of anaphylaxis. There were two groups in this study: a full-disclosure group, who knew in advance that they would have to demonstrate the use of an EpiPen®, and a partial-disclosure group, who did not know in advance. Twenty-six percent of the full-disclosure group, and 15% of the partial-disclosure group were able to accurately demonstrate the use of the EpiPen®. These results were alarming as they demonstrated that a large portion of school staff was unable to properly use an EpiPen®. The result of improper use of an

EpiPen® contributes to a delay in an individual receiving treatment for anaphylaxis, which may have the potential to lead to a grave consequence. Despite this poor performance of proper administration of an EpiPen®, 89% of the school staff reported that they had previous food allergy management training, but the quality and the frequency of this education needed to be reviewed. The school staff in that study also welcomed and requested more education regarding food allergy.

Effective allergy management education suggests that face-to-face education and hands-on training with an EpiPen® are effective in managing food allergy (Bantock, 2017; Kapoor et al., 2004). The researchers examined the impact of food allergy education on parents' knowledge about the management of allergic reactions and EpiPen® use. Sixty-two participants were enrolled to answer a questionnaire and demonstrate the EpiPen® trainer. The questionnaire and the EpiPen® demonstration were used to assess parental knowledge. With only one visit to a multidisciplinary allergy clinic that involved a pediatric allergy specialist, a clinical nurse specialist, and a dietitian, the parents demonstrated considerable improvements in their family's ability to manage allergic reactions (Kapoor et al., 2004).

In summary, to prevent and manage anaphylaxis, food-allergic individuals must make every effort to avoid food allergens, while remaining prepared and carrying an EpiPen® in the event of an accidental ingestion. The treatment for anaphylaxis is the intramuscular injection of epinephrine, and epinephrine must be carried at all times and must be replaced upon the expiratory date. Patients, families, and health care professionals require further education and support in order to ensure the correct

dissemination of food allergy education material and resources and the timely use of the EpiPen®.

### **The EpiPen® in Ontario**

Epinephrine (EpiPen®) is available in an auto-injector that consists of a spring-activated needle that is hidden until activated by the user and contains enough epinephrine for a single intramuscular injection (Abdurrahman et al., 2013; Food Allergy Canada, 2017; Nguyen Luu et al., 2011). The cost of an EpiPen® in Ontario is \$118.00 and has a marked expiratory date that is typically within 12 to 18 months of purchase. A prescription is not required to purchase an EpiPen®. Physicians recommend carrying more than one EpiPen®, especially if the allergic individual lives more than 15 minutes from the nearest hospital.

### **The Sources of Stress Associated with Life-Threatening Food Allergies**

Hyper-vigilance, awareness and stigmatization, and social vulnerability are considered sources of stress for individuals and families with food allergies (Avery, King, Knight, & Hourihane, 2003; Behrmann, 2010; Liberman et al., 2010). The hyper-vigilance of reading food labels, preparing food, eating outside the home, and attending social gatherings with food can be arduous. Avery et al. (2003) found that 60% of families with peanut allergies continually went to the same restaurant because it was vigilant in health and safety practices regarding food allergies.

Similarly, awareness and stigmatization are also sources of stress for the food-allergic individual and family. Awareness about food allergies has at times created a

misconception that food allergies are a nuisance and inconvenient rather than a life-threatening condition (Avery et al., 2003).

Executing food allergy management strategies is not as straightforward as one may think. Schools have attempted to provide a safe environment for children with food allergies by designating certain lunch tables as nut-free or allergen-free. This strategy has contributed to undue psychosocial stress by introducing exclusion and discrimination that encourages food allergy stigmatization (Behrmann, 2010). Similarly, another strategy that has been tried without much success is the banning of a food allergen from school. This strategy contributes to a false sense of security that the environment is free from the banned food allergen, yet it would be impossible for school staff to monitor every individual that brings food into a school (Behrmann, 2010).

Evidence shows there is a social vulnerability associated with food allergies and children are susceptible to bullying specifically due to food allergy. Shemesh, Annuziato, and Ambrose (2013) found that 31.5% of children with food allergies reported bullying in relation to their allergy and 80% of the threats were from classmates. The researchers learned that bullying significantly decreased the students' quality of life, increased their anxiety, and was a source of stress for them and their families. In contrast, when parents were aware that their child was being bullied due to the stigma of their food allergy the child's quality of life improved and the distress decreased.

Bullying, teasing, and harassment of children with food allergies appears to be common, frequent, and repetitive. Liberman, Weiss, Furlong, Sicherer, and Sicherer (2010) found that 32.5% of children reported being bullied and 79% of those stated the

bullying was specifically related to their food allergy. Sadly, 21% reported bullying by a teacher or school staff member. Sixty-seven percent reported verbal teasing and, shockingly, 43% reported having the known food allergen waved in their face.

### **Parental Perceptions of the Impact on the Child**

Parents and children differed in their perception of the impact of food allergy on the quality of life of the food-allergic child. Ostblom, Egmar, Gardulf, Lilja, and Wickman (2007), investigated the quality of life (QOL) in nine-year-old food-allergic and food-hypersensitive children in a case-controlled study. The researchers used the Children's Health Questionnaire (CHQ), a tool that has demonstrated strong validity and consistency in other research. Parents of 1378 children filled out the CHQ. There were 212 children with food hypersensitivity (FHS) and 221 children with allergic disease. The children with FHS scored lower on physical functioning, role and social limitations, and physical and general health. Children with food-related symptoms that affect the respiratory system scored lower on self-esteem, parental impact, time, and family cohesion categories. A food allergy diagnosis in individuals that demonstrated high levels of food specific IgE-antibodies negatively affected the mental health and general health, more so than the individuals in the FHS group.

Van der Velde, de Blok, DunnGalvin, Hourihane, Duiverman, and Dubois (2011) compared the child's and the parents' reported health-related quality of life (HRQL) in food-allergic children between 8 and 12 years of age. The researchers used the Food Allergy Quality of Life Questionnaire Child Form (FAQLQ-CF) and the FAQLQ-Parent Form (PF). The results of the study indicate that parents reported significantly less impact

of food allergy on the child's HRQL than the children did themselves. Reports of perceptions of disease severity were almost identical. These results may reflect real differences in perspectives between children and parents and may indicate that parents tend to underestimate their child's HRQL issues. There is a need for support through effective coping strategies and defusing techniques when children are in distress.

### **Parental Perceptions of Family Stress**

Parents of children with food allergies report that the life-threatening nature of food allergy evokes strong emotions of fear, guilt, and paranoia (Sicherer, 2001). Parents experienced anxiety about the challenges of keeping their children safe from allergenic foods in daily living, such as going to school or restaurants, and attending social gatherings (Behrmann, 2010).

Sicherer, Furlong, DeSimone, and Sampson (2001) measured parents' perceptions of the impact of a food allergy on overall family functioning. The investigators found that parents reported significantly more restrictions on their family activities, and more family tension than parents of non-allergic children. A qualitative study examined the psychosocial needs of 17 families coping with anaphylaxis in a child. The results showed that while mothers assumed the primary responsibility for the management of the child's allergy, fathers were less informed and less vigilant about protecting the child from an anaphylactic reaction (Mandell, Curtis, Gold, & Hardie, 2005). Several mothers also stated that they had remained in the homemaker role, at least in part to be available to meet the needs of the child with the food allergy, which could contribute to financial stress due to a reduction in family income (Mandell, Curtis, Gold, & Hardie, 2005).

Fathers viewed restrictions that were placed on children with food allergies as having a negative impact on the child's social development (Mandell et al., 2005). These findings were congruent with those from another qualitative study (Primeau et al., 2000) that looked at 153 parents' perceptions of the psychological burden of living with a child with a peanut allergy, as compared to 69 parents of children with chronic rheumatological disease (RD). When comparing the two parent groups, parents of children with peanut allergy reported that their children experienced more disruption in their daily activities (a difference of 14 points), and impairment of their family and social interactions (3.4 points) than the RD group. Part of the stress associated with peanut allergy stemmed from the parents' need to exercise extreme dietary vigilance in order to avoid foods that contain peanuts (and risk of a life-threatening allergic reaction).

In summary, food allergies remain a source of stress for both children and their families. The stress of the ongoing management of food allergies in daily living, as well as the psychosocial impact that food allergies have over children and families, cannot be overlooked. Major obstacles to coping include a lack of public understanding and a lack of adequate information on the safe management of life-threatening food allergies (Mandell et al., 2005).

## **Food Allergy Management in Schools**

### **Anaphylactic Reactions**

Anaphylactic reactions to foods are medical emergencies that must be appropriately managed in the school with an individual anaphylaxis plan that requires using epinephrine. Although epinephrine is the treatment of choice for anaphylaxis,

evidence shows it remains underused (Sicherer, 2001). The following evidence examines the characteristics of food-induced anaphylactic reactions in school.

Two studies offered some insight into the nature and extent of the allergic reactions in schools. Of 4,586 participants that were recruited from a peanut- and tree nut-allergy registry (PAR) in the United States, 750 reported they had an anaphylactic reaction in a school or daycare (Sicherer, Furlong, DeSimone, & Sampson, 2001). In 90% of reactions, medications were given (86% received antihistamines and 28% received epinephrine). Delay in treatment was attributed to a lack of recognizing anaphylaxis signs and symptoms, calling parents, not following emergency plans, and an unsuccessful attempt to administer epinephrine. The researchers re-emphasized the importance that school staff needs to be educated to recognize the signs and symptoms of anaphylaxis and properly administer the EpiPen®.

Nowak-Wegrzyn, Conover-Walker, and Wood (2001) examined 132 children, aged three to 19 years, whose parents reported in an interview that 58% had had an allergic reaction in the past two years. Of the 132 children, 18% had one or more food-induced allergic reactions in school. In 34 out of 41 reactions, the food allergen was responsible for the reaction. Thirty-six percent of the reactions involved two or more organ systems and 32% involved wheezing. The researchers stated that school staff must be educated in the management of food allergies while children are in their care.

Parental vigilance has led to strategies such as a “no peanut” policy at school, which proves to be ineffective because it creates a false sense of security and it is challenging to monitor and manage food coming in and out of a school. What has been



instrumental is face-to-face education and practice using an EpiPen® training device for school staff. Nowak-Wegrzyn (2001) states that consistent education has the potential to increase knowledge about the signs and symptoms of anaphylaxis and the proper administration of an EpiPen® for school staff that are responsible for children (Food Allergy Canada, 2017; Nowak-Wegrzyn, 2001).

### **Allergy Management Behaviours in School**

Historically, characteristics of food-induced allergic reactions in school and preschool are not well documented. In the mid-1990s two children died due to severe peanut allergy while in supervised settings. These unfortunate events prompted Canadian allergy organizations and those in the medical community to develop a position for the management of anaphylaxis in schools and other settings involved in the care of children (Gold, Sussman, Loubser, & Binkley, 1996). That paper became foundational in the development of policy and a handbook that led Canadian school boards to develop policies on the safe management of students with anaphylaxis. It also contributed to an increase in research about allergy management behaviour. Despite Gold et al.'s (1996) paper and policy, evidence shows that there are inconsistent allergy management behaviours in schools, such as a lack of a written anaphylactic plan, or the inconsistent storage of epinephrine throughout schools, which results in communication issues and increased medication retrieval time during an anaphylactic reaction. In an effort to prevent anaphylactic reactions, schools tried isolating students at allergy-designated tables and tried enforcing food-allergen bans, such as “no peanuts”. These well-meaning

strategies provided a false sense of security and were deemed unethical, discriminatory, and exclusionary to those diagnosed with food allergies (Behrmann, 2010).

Evidence shows that how and when to use an EpiPen® continues to be challenging for most individuals (Muraro, 2010; Sampson, 2001; Sicherer, 2001). As a result, food allergy fatalities in children while at school have received attention from governments, lay organizations, parents, and experts in the field of food allergy, who have responded by developing school management policies and guidelines for individuals with food allergies, such as Sabrina's Law (also known as Bill 3) in Ontario. Muraro et al. (2010) discussed the efforts of a task force that evolved from a lack of consensus in Europe about how to manage food allergies of children in school. That paper addresses managing food allergies, including: 1) the rights of the allergic child, 2) action points for all children with allergic disease at school, 3) the roles of stakeholders, and 4) individualized anaphylaxis management plans. Muraro et al. (2010) state:

Every child has the right to be educated in a safe and healthy environment, not to be stigmatized as a result of their condition, be able to participate in all educational and recreational activities to the same extent as their peers, to have access to medication and other measures to relieve symptoms, to have trained personnel who able to treat acute reactions, and to have their education adapted to their condition if necessary. (p. 682)

In Ontario, the Ministry of Education states that 1) every student is entitled to learn to the best of their ability, 2) every student is entitled to a safe and caring learning environment, 3) safety is a precondition for learning, and 4) safe schools are the

responsibility of a community partnership among government, administrators, staff, students, parents, police, and community partners. Education is imperative to developing such community partnerships. Locally, the Bruce Grey District Catholic School Board has a “*Keeping Our Kids Safe at School Bill 157*” that is an amendment to the Education Act. It affects how all school board employees are required to handle incidents at school in order to provide safe and effective learning environments for children. More specifically, the Province of Ontario adopted Bill 3, or Sabrina’s Law, in 2006, which is particular to individuals with food allergies.

### **Sabrina’s Law (2005)**

The Ontario government introduced legislation to protect anaphylactic children in 2006. Bill 3 is a private member’s bill initiated by Liberal MPP Dave Levac, who is a former high school principal (Food Allergy Canada, 2017). The motivation for this bill began in 2003, when a high school student in Ontario died from anaphylaxis. It is the food she ate at her school cafeteria encountered cross-contamination with one of her known multiple food allergens. Even though she had been taught to self-administer an EpiPen®, she did not have it with her on that day in the cafeteria. Food Allergy Canada (2017) supports the literature that food allergy safety is a shared responsibility between the child, family, and the school. Whether or not a school has a good allergy management policy in place often depends on the principal’s commitment and whether the parents are effective communicators. In a reaction to the inconsistent, and at times substandard, protection for children with allergies attending schools, Food Allergy Canada called upon the government to introduce Bill 3, also named Sabrina’s Law, in memory of the student

who died. Bill 3 came into effect January 1, 2006. The Bill requires that every school board:

establish and maintain an anaphylactic policy, which must include, among other things, strategies to reduce risk of exposure to anaphylactic causative agents, a communication plan for the dissemination of information on life-threatening allergies, regular training on dealing with life-threatening allergies, a requirement that every school principal develop an individual plan for each pupil who has an anaphylactic allergy and a requirement that every school principal maintain a file for each anaphylactic pupil. (Government of Ontario, 2005)

### **Food Allergy Bullying**

Bullying is a well-known problem among children, adolescents, and young adults with food allergies (Lieberman et al., 2010). This literature search would not be complete without addressing the second right of the allergic child—not to be stigmatized as a result of their condition—from Muraro et al.'s (2010) recommendations.

In a later study, Muraro et al. (2014) found that food-allergic children had twice the probability of being bullied than healthy children. Sixty percent of the allergic children were victims of some form of bullying a minimum of once in the last two months, compared to the control group that reported a frequency of 31.7%. Even though the sample size is small, this study aligns with the literature and suggests that the bullying of food-allergic children is a universal issue.

Torabi, Cardwell, Elliot, and Chan (2016) and Egan and Sicherer (2016) identify bullying as one of several types of emotional concern for children with food allergies.

Often these children suffer from increased levels of anxiety, and may have limited social activities, especially where food is involved, that can result in poorer health-related quality of life. Children with food allergies are vulnerable to experiencing life-threatening allergic reactions as a result of the social consequences of bullying. For example, there are cases of bullying where food-allergic children have been taunted with their known food allergen, the known food allergen has been waved in front of them, or the food has touched the allergic child in an effort to bully them and to see what will happen should a food allergy reaction occur. There is a psychological consequence when a person is intentionally trying to harm another person that has the potential to make the individual who is being bullied feel victimized (Torabi et al., 2016).

Torabi et al. (2016) examined 110 participants, aged five to 17 years, many of whom preferred not to wear medical identification or carry their prescribed EpiPen®, in order to avoid attracting attention to themselves and risk being bullied. Twenty percent reported being bullied because of their food allergy and 77.3% experienced it repeatedly. Medical identification was worn by 24.5%, and 16.3% reported not wearing medical identification for fear of being “labelled” for bullying.

Evidence shows that medical identification, carrying an EpiPen®, and disclosure of health information has the potential to label an individual with a known food allergy. In an effort to address disclosure of an allergy, Dean et al. (2016) wrote a paper about the experiences of health-related stigma among food-allergic children at risk of anaphylaxis as a result of Bill 3, which requires that those at risk must disclose their health status. Questions were raised at the time this legislation was being put in place (January 1, 2006)

regarding the potential of doing more harm than good. This is the first study in the realm of food allergy that addresses disclosure. The results indicated that participants were stigmatized as a result of protective school policies under the law, and that created tension between their physical safety and social well-being. Sabrina's Law (Bill 3) also led to a culture shift in awareness of food allergies that resulted in some participants normalizing their health status and offered a promising direction for the future. Although the introduction of Sabrina's Law is to physically safeguard those with food allergies, how the law was operationalized in the school setting has been, at times, less than positive.

### **Gaps in the Literature**

The review of the literature has highlighted some key gaps that informed the development of this practicum project. Evidence shows that there is a gap in knowledge in recognizing the signs and symptoms of anaphylaxis and the proper administration of an EpiPen®. The literature also suggests that there is a lack of research about the knowledge and attitudes of school staff toward the food-allergic individual. Little is known about the effective intervention and management strategies targeted at the bullying of children with food allergies.

### **A Half-Day Workshop**

Drawing on existing evidence in the literature, I developed an educational workshop to engage the school staff at St. Joseph's Catholic School with a face-to-face interactive presentation and a practical EpiPen® component. My goal is for the school staff to become "allergy champions". I reviewed the literature on how to effectively

deliver food allergy management education to school staff. Most literature is directed to the content and intended learning outcomes, with no mention as to how the education was delivered.

My audience is adult school staff. Most of the school staff will be elementary school teachers. The application of Malcolm Knowles's Adult Learning Theory will address the needs of the learner. Morrison, Ross, Kalman, and Kemp's (2013) Model of Instructional Design is both a flexible and adaptable model that guides the workshop delivery and content to produce efficient and effective information about food allergy management in schools.

### **Consultations**

On March 8, 2017, I attended a prearranged meeting with the principal to discuss conducting a semi-structured interview with a focus group of the school staff and principal. I wanted to learn what preparation the school staff do before the school year starts, what information is available to them, what allergy management behaviours are currently in place, what gaps do the teachers perceive, and any suggestions they had. I also wanted to explore what methods are most effective to deliver this material.

I also consulted with a food allergy educator that is a Registered Nurse (RN) from Food Allergy Canada and an expert in the area of food allergy behaviour management. Additionally, she is an educator and researcher for Food Allergy Canada, and it was important for me to learn from her an effective method and approach to delivering food allergy management education to the school staff at St. Joseph's Catholic School.

### **Knowles's Adult Learning Theory**

Malcolm Knowles (1913–1997) was an educator from the United States and was well known for the use of the term “andragogy” that means the “art and science of adult learning”. Knowles (1984) developed six principles that reflect how adults learn, and this theory intentionally recognizes the equality between the teacher and the learner. This two-way process is a less traditional approach than historical paternalistic models. Knowles’s six principles of adult learning are:

1. The need for information.
2. Adults have a self-concept of being responsible for their own decisions.
3. The importance of past experiences.
4. The readiness to learn.
5. Orientation to learning.
6. Motivation to learn.

The assumptions that are fundamental in Knowles’s Adult Learning Theory are that active adult learning uses approaches to learning that are problem-based and collaborative. The adult learns best when they see the relevance of the information taught to their experience.

### **Model of Instructional Design**

Morrison, Ross, Kalman, and Kemp’s (2013) Model of Instructional Design was used to develop the half-day allergy management workshop for the school staff to become “allergy champions”. This instructional design approach considers “instruction from the perspective of the learner, rather than from the perspective of the content”



(Morrison, Ross, Kalman, & Kemp, 2013, p. 7). The overall goal of instructional design is to make learning more effective and efficient, in order to meet the needs of the learner (Morrison et al., 2013). Tailoring instructional strategies to coincide with the learners' needs facilitates the learning process for participants. This is applicable for the school staff. Their time is very valuable and their workloads are significant; therefore, the more relevant, practical, and efficient the learning process is, the more likely it is that the information and workshop will be accepted. The principles of Morrison et al.'s (2013) Model of Instructional Design are in alignment with Knowles's Adult Learning Theory principles.

### **Conclusion**

In summary, there is no known cure for food allergies and avoidance of the known food allergens is the best prevention. Avoidance does not protect against accidental ingestion of a food allergen, which can potentially cause a life-threatening reaction known as anaphylaxis. Empirical research suggests a long history that provides valuable information to guide both acute and long-term management of food allergies and anaphylaxis.

Children spend the majority of their childhood in school, and research has demonstrated that there is considerable variation amongst school staff regarding the safe management of students with food allergies. The sources of stress for food-allergic individuals, families, and school staff are real and significant. They warrant further education, ongoing communication, and ongoing collaboration with each other, which will ultimately ensure that food-allergic individuals are provided a healthy, safe

environment to learn in, while feeling supported by competent school staff should an anaphylactic reaction occur at school.

Legislation and policies give the allergic child, family, and school staff the ability to manage the bullying, despite the fact that evidence is limited with regard to the best intervention and prevention methods for bullying.

A description of the current allergy management behaviours and sources of stress for school staff at St. Joseph's Catholic School helped inform the development of my half-day workshop about food allergy management. This workshop will improve the confidence of school staff in recognizing the signs and symptoms of anaphylaxis and in properly administering an EpiPen®. This half-day workshop can greatly improve the school environment, as well as the overall quality of life and the well-being of children with food allergies.

### Literature Summary Tables

<b>Title # 1</b>	Abdurrahman, Z. B., Kastner, M., Wurman, C., Harada, L., Bantock, L., Cruickshank, H., & Wasserman, S. (2013). Experiencing a food allergic reaction: a survey of parent and caregiver perspectives.
<b>Setting &amp; Objective</b>	Objective: <ul style="list-style-type: none"> <li>The purpose of this study was to better understand the experiences of caregivers of children with a first allergic reaction to food, and to identify any deficiencies in the information received at diagnosis.</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Mixed method study with an online survey administered to the Food Allergy Canada patient support database of approximately 10,000 members. As well as a follow-up qualitative interview with a subset of survey participants. Frequency analysis consisting of both quantitative analysis of descriptive statistics to calculate proportions and means with standard deviations. Qualitative analysis was guided by a constant comparative method of grounded theory methodology.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>There were 208 (71%) eligible participants and 184 (61%) participants consented and completed the survey. Seventy-one percent of the respondents were residents of Ontario; 29% from other provinces across Canada. The mean age of the participants' children was 3.5 years (range: 1 month to 17 years).</li> <li>Fifty-one percent took their child to the emergency department (ED) and 21% went to the pediatrician at the time of a first food reaction. Five percent went to see an allergist, 1% went to a nurse practitioner, 7% to a walk-in clinic, and 11% did not take their child to a health care professional.</li> </ul>
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li>Population.</li> <li>Canada's single-payer health system.</li> <li>A possible selection bias because all the participants were from Ontario. Approximately 40% of the population of Canada lives in Ontario.</li> <li>The mailing list held by Food Allergy Canada is compiled on a volunteer basis and these families can be viewed as specifically motivated.</li> <li>The diagnosis is based on self-reporting and not medically confirmed.</li> <li>One survey did not require an answer for each question therefore there is a high potential for missing data.</li> <li>The survey was internet-based and therefore only accessible to those with the internet.</li> <li>There may be an underestimation in knowledge gaps in the</li> </ul>

	<p>participants because there may have been prior knowledge with regard to allergies in this population group.</p> <ul style="list-style-type: none"> <li>It would be difficult to generalize the results when compared with other countries.</li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li>Approved by McMaster University Health Science Ethics Board.</li> <li>Written informed consent was obtained except for those participating via telephone which verbal consent was obtained.</li> <li>Statistical analyses of the data were done using SPSS software.</li> <li>Data was coded for the interview portion using NVIVO 9 software.</li> <li>Interview guide was pilot tested for clarity with local patients at a Hamilton, ON, allergy clinic.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>This study highlighted the multiple deficiencies that exist at different levels of the health system for caregivers of children with a first food-allergic reaction. The qualitative portion of the survey reinforced a lack of food allergy management, primarily at ED and family doctor visits.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 2</b>	Behrmann, J. (2010). Ethical principles as a guide in implanting policies for the management of food allergies in schools.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>The goal is to provide guidance for school health officials involved in creating food allergy policies. By structuring policies around ethical principles of confidentiality and anonymity, fairness, avoiding stigmatization, and empowerment, policy makers gain another method to support better policy making.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Article.</li> </ul>
<b>Results</b>	
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <p>Strengths:</p>
<b>Comments</b>	<ul style="list-style-type: none"> <li>Provides a very comprehensive review of public health ethics in relation to food allergies.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 3</b>	Blyth, T. P., & Sundrum, R. (2002). Adrenaline autoinjectors and school
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	children: a community-based study.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>The researchers aim was to obtain information about all school children using adrenaline auto-injectors in Hounslow, London, UK.</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Sixty school children in Hounslow's schools were prescribed adrenaline auto-injectors.</li> <li>Twenty-five families consented and interviewed by telephone.</li> <li>Questionnaires were sent to all schools in the London Borough of Hounslow. A representative from each school was asked to indicate the number of children with an adrenaline auto-injector.</li> <li>These children were given an information sheet requesting consent for an interview.</li> <li>Parents were interviewed regarding reasons for adrenaline prescription, indications for use, number and location of adrenaline auto-injectors, follow-up arrangements, and the effect the prescription had had on the family.</li> <li>An auto-injector demonstration was also observed.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>Fifty six of the 86 schools returned the questionnaire. The other thirty were contacted by telephone. The researchers identified 60 pupils with adrenaline auto-injectors in the school population of 36,000. Individual schools report between zero and four pupils.</li> <li>Consent obtained for 25 families. Of the 25 children interviewed, 13 were boys with a median age of 9 years (4–17 range). The median age when the adrenaline auto-injector was prescribed was six years (1–12 range). The median duration of prescription was three years (1 month to 5 years range).</li> <li>Half the children were in the care of a pediatrician at a district general hospital, a quarter were under the care of their general practitioner, and a quarter attended a tertiary allergy clinic.</li> <li>Sixteen children had been prescribed adrenaline for allergy to peanut (64%) and five children (20%) for allergy to tree nut. Ten children reported that their most severe reaction caused symptoms of facial swelling, eight reported respiratory difficulty, two reported vomiting, and one had no symptoms, but a positive radioallergosorbent test (RAST). Eleven of these children had coexisting asthma.</li> <li>Three children had been prescribed an incorrect dose of adrenaline, as all three remained on a low dose auto-injector rather than full strength when their weight reached 30 kg.</li> <li>Six children and caregivers of the 25 could demonstrate the correct use of the auto-injector.</li> <li>Only two schools requested further training for teachers. This may be due to the presence of a program for schoolteachers developed</li> </ul>

	by the school nurse team in Hounslow.
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li>• Small sample size, although the researchers revealed similar difficulties in their study with regard to other literature.</li> </ul>
<b>Comments</b>	
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• Moderate.</li> </ul>

<b>Title # 4</b>	Caffarelli, C., Coscia, A., Dascola, C.P., Gelmetti, C., Raggi, V., Volta, E., Vanelli, M., & Aglio P. D. P. (2011). Parents' estimate of food allergy prevalence and management in Italian school-aged children.
<b>Setting &amp; Objective</b>	Objective: <ul style="list-style-type: none"> <li>• The purpose of the study was to determine the frequency and characteristics of food reactions caused by allergy in school-aged children.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>• Cross-sectional study was conducted in Italy. The participants were parents of a random sample of children aged 5–14 years. The population was enrolled in a summer day camp.</li> <li>• The parents in a self-administered questionnaire provided data handed out by teachers to 900 parents. Six hundred and twenty-five out of 900 parents provided a response, which was 69%. There were 388 boys and 237 girls with a mean age of 9.36 years. The age range was 5–14 years old.</li> <li>• A final sample size of 886 children was calculated after adjusting for an anticipated non-response rate of 35% for parents.</li> <li>• Fisher's exact test to compare proportions on the analysis of the data to study associations. Results were considered significant if <math>P</math>, 0.05. The OR and 95% CI were also calculated.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• The researchers observed a frequency of perceived food reactions in school-aged children. Appropriate assessment to confirm clinical food hypersensitivity. Children underwent diagnostic tests after a suspected food reaction. Efforts should be made for training in food allergy management for physicians. An increased educational campaign directed at the community to make known information about food allergy was initiated as a result of this study with the hope to change both the patients' expectations and the practice of clinicians.</li> </ul>
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li>• There was subjectivity to answers on the questionnaire leading to misclassification error.</li> <li>• The questions covered a large part of the child's life span leading to questions in the accuracy of the parent's recall. The questionnaire was filled out by the parents, therefore data bias is unlikely.</li> </ul>

	<ul style="list-style-type: none"> <li>It was not practical or economical to confirm a food allergy by performing an oral food challenge with all foods. This is also not ethical.</li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li>The questionnaire was pre-tested on a pilot group of 16 parents with children with or without a food allergy.</li> <li>The study was approved by the Medical School of Pediatrics and the University of Parma, Italy.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li></li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 5</b>	Carlisle, S., Vargas, P., Noone, S., Steele, P., Sicherer, S., Burks, A. W., & Jones, S. M. (2010). Food allergy education for school nurses: A needs assessment survey by the Consortium of Food Allergy Research.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>To assess self-reported proficiency and educational needs of school nurses in regard to providing instruction and treatment for children with food allergies.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Convenience sampling</li> <li>An anonymous survey administered to school nurses at a professional association meeting.</li> <li>With 199 school nurses (81 % response rate) responding a self-assessing survey was done using a 4-point Likert scale inquiring about food allergy-related knowledge-based areas and skills. Additionally, nurses were asked to identify the availability of an easy-to-use “tool kit” to help manage food allergies in their school also using a 4-point Likert scale.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>Several areas of educational deficiencies that hinder the school nurses’ ability to provide adequate management of food allergies (food allergy knowledge, management, and emergency plan development).</li> <li>School environment can provide an opportunity to increase awareness, prevention, and treatment to children with food allergies.</li> <li>Nurses express a high interest in educational material preferred by Internet and video that are promoted by professional organizations.</li> <li>A <i>P</i> value of less than .05 was statistically significant.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>This study is based on the nurses’ perceptions of their proficiency in the area of food allergy rather than direct measurement of their proficiency.</li> </ul>

	<ul style="list-style-type: none"> <li>• The survey did not test the accuracy of their knowledge or skills related to food allergies. A more in-depth study would need to be conducted to assess the true proficiency levels of these school nurses.</li> <li>• Convenience sampling limits the ability to generalize these findings. The surveys may not represent all school nurses.</li> <li>• Participation from a more diverse demographic population may also impact the results of the survey.</li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li>• Consent was implied by voluntary participation and no personal identifiers were collected.</li> <li>• Ethics board at Duke University Medical Center and Mount Sinai School of Medicine approved the study.</li> <li>• SPSS data collection software was used.</li> <li>• Consortium of Food Allergy Research (CoFAR).</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>• There was a need noted that school nurses need to be prepared to care and supervise children with allergies.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• High</li> </ul>

<b>Title # 6</b>	Dean, J., Fenton, N., Shannon, S., Elliot, S., & Clarke, A. (2016). Disclosing food allergy status in schools: health-related stigma among school children in Ontario.
<b>Settings &amp; Objectives</b>	<ul style="list-style-type: none"> <li>• Sample size included 10 children (aged 8–12), and 10 youth (aged 13–17) who attended school in Ontario.</li> <li>• Parents and children were interviewed alone (n=18), except in two cases where both parent and child (n=1) and youth (n=1) were interviewed together at their request.</li> <li>• This research reports the experience of health-related stigma among food-allergic children at risk of anaphylaxis who were required to disclose their health status following the legislation of Bill 3.</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>• In 2008, in-depth interviews were conducted with 20 children and youth and their parents in order to explore the experiences living with a severe food allergy. The study explored how the participants felt and enacted stigma in the school setting as a result of the disclosure process. Interviews were tape recorded with permission and transcribed for thematic analysis using NVIVO, a qualitative analysis software package.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• Results indicated that participants were stigmatized as a result of protective school policies under the law, and that created tension between their physical safety and social well-being.</li> </ul>
<b>Limitations &amp;</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>• Small population size.</li> </ul>



<b>Strengths</b>	
<b>Comments</b>	
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>Moderate, due to small population size</li> </ul>

<b>Title # 7</b>	DeSantiago-Cardenas, L., Rivkina, V., Whyte, S. A., Harvey-Gintoft, B. C., Bunning, B.J., & Gupta, R.S. (2015). Emergency epinephrine use for food allergy reactions in Chicago public schools.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>To describe the use of epinephrine auto-injectors in Chicago public schools during the 2012–2013 school year, specifically for food-induced allergic reactions.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>38 Chicago public school students and staff avoided potential morbidity and mortality associated with anaphylaxis due to the administration of district-issued epinephrine auto-injectors.</li> <li>District issued EAI were distributed to all public and charter schools in Chicago prior to the start of the 2012–2013 school year. Data on their use were collected and frequencies were computed in the autumn of 2013.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>38 district-issued EAI were administered during the inaugural year of the Chicago public schools initiative. They were administered 92.1% to students and 7.9% to staff. Most district issued EAI were administered in elementary schools (63.2%) and on Chicago's North west side (36.8%) More than half (55.0%) DIEAI were administered for first time anaphylactic events.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>Inconsistent reporting practices made it nearly impossible to obtain complete and accurate data for the 38 cases of district issued epinephrine administration.</li> <li>Fee-form electronic text entry, which led to certain variables missing.</li> <li>Small sample size makes it difficult to estimate district-issued epinephrine auto-injector usage in Chicago school district.</li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li></li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li></li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>Moderate</li> </ul>

<b>Title # 8</b>	Egan, M., & Sicherer, S. (2016). Doctor, my child is bullied: Food allergy management in schools.
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<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>Studies suggest that food allergies have increased in prevalence, resulting in most school classrooms having more than one child affected. Children with food allergies are vulnerable to experiencing potentially life-threatening allergic reactions, as well as social consequences, such as bullying. Management recommendations for food allergies in schools should incorporate knowledge of both issues.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>This article set out to describe that food allergies commonly occur in school, bullying is an established problem among school-aged children, with evidence demonstrating an increased prevalence amongst children with food allergies.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>Management recommendations for food allergies in schools should ensure the safety of the child, address bullying, and avoid unnecessary isolation.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations</p> <ul style="list-style-type: none"> <li>Review of studies regarding food allergy bullying at school.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>Managing food allergies is a collaborative effort between physicians, parents, school staff, and the students.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>Moderate</li> </ul>

<b>Title # 9</b>	Gold, S., Sainsbury, R. (2000). First aid anaphylaxis management in children who were prescribed an epinephrine auto injector device (EpiPen®).
<b>Setting &amp; Objective</b>	<ul style="list-style-type: none"> <li>The purpose of this study was to determine parental knowledge and practice concerning first aid anaphylaxis management, the frequency of recurrent generalized allergic reactions, the first aid measures taken, and the subsequent outcome of these reactions.</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>All children with anaphylaxis who were prescribed an EpiPen® between January 1996 and June 1998 and who were attending the pediatric allergy clinic in Adelaide, South Australia.</li> <li>A retrospective survey was performed with a telephone questionnaire.</li> <li>Ninety-four children attended the clinic. Eighty-six had anaphylaxis and eight children had acute severe asthma as the primary reason for an EpiPen® prescription.</li> <li>Sixty-eight (80 %) parents were interviewed. Seventeen could not be contacted and one parent refused.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>Recurrent generalized allergic reactions occurred with a frequency of 0.98 episodes per patient per year and were more common in</li> </ul>

	<p>those with food compared with insect venom anaphylaxis.</p> <ul style="list-style-type: none"> <li>• EpiPen® device was only used 29 % of recurrent anaphylaxis reactions.</li> <li>• Parental knowledge was deficient in recognition of symptoms and use of the EpiPen®.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>• Self-reported data.</li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li>• Large sample size.</li> </ul>
<b>Comments</b>	
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• Moderate</li> </ul>

<b>Title # 10</b>	Grabenhenrick, L., Hompes, S., Gough, H., Rueff, F., Scherer, K., Pfohler, C., Treudler, R., Mahler, V., Hawranek, T., Nemat, K., Koehli, A., Keil, T., & Worm, M. (2012). Implementation of anaphylaxis management guidelines: a register-based study.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>• This paper addresses the gaps between anaphylactic management guidelines, management recommendations, and their implementation that have been reported, but only in confined settings. The researchers analyzed nation-wide data on the management of anaphylaxis, evaluating the implementation of guidelines.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>• Within the anaphylaxis registry, allergy referral centres across Germany, Austria, and Switzerland provided data on severe anaphylaxis cases. Online surveys collected data based on patient records with detailed circumstances on diagnostic work-up and treatment from emergency physicians.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• There was a distinct discrepancy between current anaphylaxis management guidelines and their implementation. To improve patient care, a revised approach for medical education and training on the management of severe anaphylaxis is warranted.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>• The registry is not exhaustive as not all patients are referred to or follow the recommendations to present at a specialized allergy centre. Selection may be influenced by socioeconomic background, perceived severity of anaphylaxis, or other health-related attitudes.</li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li>• Written informed consent was provided by parents for children from the 83 centres participating in the anaphylaxis registry.</li> </ul>

	<ul style="list-style-type: none"> <li>Charite University Medical Centre in Berlin, Germany, ethics committee approved the study.</li> <li>Anaphylaxis registry is derived from medical records in specialized referral centres, supplemented by emergency physicians' on-site documentation, if available.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>To improve treatment of anaphylaxis, the researchers strongly recommend revision of medical education and practice training, targeting a broad range of professionals. This approach could foster a high coverage of guideline-conforming management.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 11</b>	Jarvenpaa, J., Paassilta, M., Salmivesi, S., Sannisto, T., Niitty, S., & Korppi, M. (2014). Stability of parent-reported food allergy in six- and 7-year-old children: the first 5 years of the Finnish allergy program.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>The Finnish national allergy program was introduced in 2008 to decrease the burden of allergy in the population. This study carried out in 2013 evaluated the prevalence of parent-reported food allergies, treated with an avoidance diet until early school age, and discussed the data in relation to those found in identical studies in 2009.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>School health nurses used a structured questionnaire to interview parents of 1,653 children aged six or seven in the first year of elementary school. The criterion for a parent-reported food allergy was that the parents considered it necessary for their child to follow an avoidance diet at school.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>In 2013, 6.1% of the children were allergic to at least one food and 2.5% of the children were allergic to basic foods such as cow's milk, eggs, and wheat, compared with 2.7% in 2009. A significant decrease was seen in allergies to nuts, fruits, and vegetables.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li></li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li>The data were analyzed using SPSS statistic software. The results expressed as percentages with 95% confidence intervals and Pearson's chi-square test and Fisher's exact test were used in the statistical analysis of the data.</li> <li>Oral consent was obtained from the parents before the school health nurse interviewed them. The children's personal data was not registered therefore the study was carried out without the permission of the Director of Social and Primary Health Care Services of the city of Tampere.</li> </ul>

<b>Comments</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• High</li> </ul>

<b>Title # 12</b>	Kapoor, S., Roberts, G., Bynoe, Y., Gaughan, M., Habibi, P., & Lack, G. (2004). Influence of a multidisciplinary pediatric allergy clinic on parental knowledge and rate of subsequent allergic reactions.
<b>Setting &amp; Objective</b>	<ul style="list-style-type: none"> <li>• Sixty-two participants aged 17 years and younger referred with food allergy were prospectively enrolled.</li> <li>• This study aims to assess the impact of a multidisciplinary pediatric allergy clinic consultation on parental knowledge of food allergy and to determine the rate of subsequent allergic reactions.</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>• Parental knowledge was assessed by questionnaire and EpiPen® trainer.</li> <li>• Families saw a pediatric allergist, clinical nurse specialist, and dietician.</li> <li>• Knowledge was reassessed after three months and rate of allergic reactions after 1 year.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• After one visit to the pediatric allergy clinic there was a significant improvement in parental knowledge of allergen avoidance (26.9% <math>P &lt; 0.001</math>), managing allergic reactions 185.4% <math>P &lt; 0.001</math>), and EpiPen® usage (83.3% <math>P &lt; 0.001</math>).</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>• A control group was not included as it was felt to be unethical.</li> <li>• The multidisciplinary clinic team was aware of study although the education was not changed because of the study questionnaire.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>• A single visit to this multidisciplinary allergy clinic considerably improves a family's ability to manage allergic reactions to foods with an accompanying reduction in allergic reactions.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• Moderate</li> </ul>

<b>Title # 13</b>	Kilger, M., Range, U., & Vogelberg, C. (2015). Acute and preventive anaphylaxis in German primary school and kindergarten children.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>• Cross-sectional, questionnaire-based survey collected over four months.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>• 6,352 surveys were returned from 86 primary schools and kindergartens in Dresden, Germany. Parents, schoolteachers, and childcare providers filled out the surveys.</li> <li>• Anaphylaxis was identified in 87 cases. Average age of 5,981 was</li> </ul>

	seven years old. Age range was 12 months to 12 years old and gender was almost equal with 2,965 (49.6 %) boys and 3,004 (50.2%) girls.
<b>Results</b>	<ul style="list-style-type: none"> <li>• Eighty-six out of 100 schools and kindergartens participated in the study. The parent group had the highest survey return rate. Therefore most of the data in the results section were drawn from the questionnaires filled out by parents. The childcare provider group had a higher rate of reported anaphylactic reactions while children were in their care and a higher rate of using the emergency set than the teacher group.</li> <li>• Communication from parents to childcare providers about the content was higher than to the teachers. The results of this study conclude that an increase in education to teachers and childcare providers is needed due to the under-treatment of anaphylaxis and the use of epinephrine.</li> <li>• Additionally, the emergency sets are not correctly or consistently equipped with epinephrine. An important conclusion was noted that an agreed upon definition of anaphylaxis has potential to improve the correct treatment.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>• Despite the attempt to increase the response rate, only 39% of the contacted persons at schools and kindergartens filled out the questionnaire, therefore selection bias cannot be totally excluded.</li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li>• Consent obtained from parents and school staff by completing the questionnaires. University of Dresden ethics committee approved the study. The survey was anonymous and participation was voluntary.</li> <li>• To prevent bias, both public and private schools were selected, including different social backgrounds throughout all city districts. Kindergarten was defined as aged 1–5 years old.</li> <li>• Three versions of the questionnaire were designed (teachers, parents, and childcare providers). The surveys were pre-tested and validated.</li> <li>• The data was analyzed and processed using SPSS software. The tests were represented using Pearson's chi-squared test and Fisher's exact test and the significance level was 0.05 with a 95% confidence interval.</li> <li>• Data obtained from teachers and childcare providers are presented separately.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>• An agreed upon and clear understanding of anaphylaxis among the teachers, parents, and childcare providers will improve the outcome</li> </ul>

	(receiving epinephrine immediately) for the primary and kindergarten children experiencing an anaphylactic reaction.
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>Moderate design/High quality</li> </ul>
<b>Title # 14</b>	Kljakovic, M., Gatenby, P., Hawkins, C., Attewell, R., Ciszek, K., Kratochvil, G., Moreira, A., & Ponsonby, AL. (2009). The parent-reported prevalence and management of peanut and nut allergy in school children in the Australian Capital Territory (ACT).
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>To describe parent-reported prevalence and management of peanut and nut allergy in school children in the ACT. Reported nut allergy and the association between reported nut allergy and other atopic disease at primary school. Secondly the follow-up study aimed to assess how parent-reported nut allergy is managed in the community.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Using the Health Screen Questionnaire (HSQ) parents were to report on a variety of health issues in their child, and the response rates range from 85–89%. Data were collected of the child's demographics and four possible atopic outcomes, such as “has your child ever had a strong allergic reaction to peanuts/peanut products and/or other nut products?” A positive response was termed parent-reported.</li> <li>Analysis was done using SPSS Software.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>The HSQ was delivered to all 110 primary schools in the ACT. Parents of 3,851 children (85%) completed the HSQ. Parents reported that 127 children had allergy to peanuts ever and 19 to other nuts ever. Fifty children were reported with allergy to both. The overall prevalence of reported nut allergy was estimated as 146/3851 or 3.8% (95% CI 3.2–4.4%) and the prevalence of reported peanut allergy was 3.3%. The 112 children whose parents left the nut allergy questions blank were assumed to have no reported nut allergy.</li> <li>This study found that breastfeeding history and duration were associated with parents reporting a strong allergic reaction to peanuts and nuts. This is consistent with two cohorts with odds ratio for breastfeeding and peanut allergy of over three.</li> <li>This study found that adrenaline auto-injectors were used rarely in the community. Many people took various actions such as induced vomiting or waiting for symptoms to subside.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>Self-report.</li> </ul> <p>Strengths:</p>

	<ul style="list-style-type: none"> <li>The ACT department of Health Research Ethics Committee approved this study.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li></li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 15</b>	Kim, S., Yoon, J., Kwon, S., Kim, J., & Han, Y. (2012). Current status of managing food allergies in Seoul, Korea.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>The aim of this study was to examine the current status of managing food allergy in schools in Seoul, Korea. Lunch is provided at elementary, middle, and high schools.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>In April 2009, 154 participating schools returned their questionnaires. Seventy-three from elementary school, 38 from middle school, and 43 from high schools.</li> <li>Out of the 154 schools it was determined through parent reporting that 109 schools had students with a food allergy. Fifty-seven out of the 109 were elementary schools, 29 middle schools, and 23 high schools.</li> <li>One year prior to this survey 72 out of the 154 schools were found to have experienced student visits to a school health room due to food allergies. Twenty-nine from elementary schools, 19 middle schools, and 24 from high schools. The most common symptom was urticaria (70 cases), atopic dermatitis (15 cases), and diarrhea (two cases).</li> <li>The results revealed that 130 schools out of 154 participating in the survey relied solely on self-care provided by the students experiencing the food allergies without any school-wide measures for food allergies in place.</li> <li>Seventeen schools gave notification for the inclusion of food allergens in school lunches, 10 schools provided an alternative food option, and three schools eliminated food allergens from their menus.</li> </ul>
<b>Results</b>	
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>Caution should be taken when interpreting and generalizing the study results due to the low response rate of the survey. The low response rate could also signify the potential problem of non-response error, indicating that the schools that participated in the survey vary from those that did not.</li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li></li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>The most common food allergies were eggs, fruits, shellfish, milk,</li> </ul>



	fish, chocolate, and instant food not specifically specified.
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>Moderate</li> </ul>

<b>Title # 16</b>	Lieberman, J.A., Weiss, C., Furlong, T.J., Sicherer, M., & Sicherer, S. (2010). Bullying among pediatric patients with food allergy.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>To determine the presence and characteristics of bullying, teasing, or harassment of food-allergic patients owing to their food allergies.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Questionnaires were compiled by food-allergic children and adults, and by parents of food-allergic children.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>A total of 353 surveys were completed. Because most food-allergic individuals were children, most surveys were completed by parents of food-allergic individuals. The ages of the food-allergic individuals were younger than four years (25.9%), 4–11 years (55.0%), 12–18 years (12.5%), 19–25 (2.6%), and older than 25 years (4.0%). Including all age groups, 24% of respondents reported that the food-allergic individual had been bullied, teased, or harassed because of food allergy. Of those who were bullied, teased, or harassed, 86% reported multiple episodes. Eighty-two percent of episodes occurred at school, and 80% were perpetuated by classmates. Twenty-one percent of those who were bullied, teased, or harassed reported the perpetrators to be teachers or school staff. Overall, 79% of those bullied, teased, or harassed attributed this solely to food allergy. Of those bullied, 57% described physical events, such as being touched by an allergen and having an allergen thrown or waved at them, and several reported intentional contamination of their food with an allergen.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>Parents were the respondents for children. This surrogacy bias could over-report or under-report bullying because often children do not report episodes to parents. The sample may be biased toward selected families with children who have more severe or troubling food allergies or who are having concerns about management.</li> <li>The respondents were attendees of regional meetings of the FAAN, a lay organization intended for support and education for families with food allergy.</li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li>This is one of the first studies to characterize bullying, teasing, or</li> </ul>

	harassment of food-allergic individuals. These actions pose a risk of psychological harm in all people, but unique to this population is that bullying, teasing, or harassment can also pose a direct physical threat when an allergen is involved. This study demonstrates the need for future research in this area.
<b>Comments</b>	<ul style="list-style-type: none"> <li>• Bullying, teasing, or harassment of children with food allergy seems to be common, frequent, and repetitive. Those actions pose emotional and physical risks that should be addressed in food allergy management.</li> <li>• Overall, nonphysical acts of bullying, teasing, or harassment were more common than were physical acts.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• High</li> </ul>

<b>Title # 17</b>	Mandell, D., Curtis, R., Gold, M., & Hardie, S. (2005). Anaphylaxis: how do you live with it?
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>• This article reports on a study about the needs of families coping with life-threatening allergies in a child. Due to the scarcity of publications on the psychosocial dimensions of anaphylaxis, the authors draw on selected literature on family coping with chronic illness, asthma, and allergy to provide a conceptual context for the research and discussion of findings.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>• Using qualitative methodology, parents from 17 families were interviewed about their experiences adjusting to a diagnosis of anaphylaxis in a child.</li> <li>• Purposive sampling was designed to select participants. In an effort to recruit parents who might be associated with a support group as well as those who were not, respondents were drawn from three sources. Attendees at an anaphylaxis educational seminar, visitors to the asthma clinic at a major urban children's hospital, and parents known to the community support. Eighteen families were selected and one withdrew confirming 17 families who are parents of the allergic children that have been diagnosed by a physician by having an anaphylactic reaction.</li> <li>• Grounded Theory analysis of data using open and axial coding at first and second levels by a social work PhD student and reviewed by a second author. Trustworthiness was established through independent coding and triangulation of data and analyses. The results were checked by 11 of the participants to ensure that the data reflected the participants' experiences.</li> <li>• Themes such as management of safety, patterns of coping, children's responses, developmental issues, strategies for coping,</li> </ul>

	and what helps and what hinders coping were revealed.
<b>Results</b>	<ul style="list-style-type: none"> <li>• Rather than physicians assisting in all the details of a family's adjustment, a realistic approach is the use of interdisciplinary team to assist families in helping themselves.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>• Parent-reported data on behalf of the child has potential to create bias.</li> <li>• Families with language difficulties or class, cultural, and other barriers may be less likely to find their way to the types of settings the researchers sampled from.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>• Social workers offer direct service to families. Exploring parent dynamics that may be complicating coping patterns may also assist coping. This includes the different responses from mothers and fathers.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• High</li> </ul>

<b>Title # 18</b>	Muraro,A., Clark, A., Beyer, K., Borrego, L.M., Borres, M., Lodrup Carlsen, K.C., Carrer, P., Mazon, A., Rance, F., Valovirta. E., Wickman, M., Zanchetti, M. (2010). The management of the allergic child at school: EAACI/GA 2 LEN task force on the allergic child at school.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>• The aim of this task force document is to describe an ideal model of care centered on the allergic children at school in Europe, which is appropriate for use by all stakeholders (doctors, community, school nurses, school staff, parents, and child). Muraro et al. have presented their information so that individuals will be able to adopt the advice within the context of their local or national facilities to improve care for all children with allergy at school.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>• A report from a European task force compiled a list of recommendations for the rights of the child, action points for all children with allergic disease at school, roles of stakeholders, and individualized anaphylaxis management plans for specific issues.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• One in four school-aged children in Europe lives with allergic disease. There is a broad spectrum of severity with some children at risk of severe asthma or anaphylaxis, which on rare occasions may cause death, whilst others present with chronic allergic diseases, and experience reduced quality of life and impaired school performance. All children with allergic disease may experience acute exacerbations at school; recognition of the allergic child is the first step in management.</li> <li>• Appropriate legislation should be introduced to make a safe school environment for the allergic child as well as safeguarding</li> </ul>

	educational workers. An education network involving families, health care providers, and educators is crucial in ensuring that children are identified, the school staff alerted and trained, and specific allergy management plans initiated.
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li>•</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• High</li> </ul>

<b>Title # 19</b>	Muraro, A., Polloni, L., Lazzarotto, F., Toniolo, A., Baldi, L., Bonaguro, R., Gini, G., & Masiello, M. (2014). Comparison of bullying of food-allergic versus healthy school children in Italy.
<b>Setting &amp; Objective</b>	Objective: <ul style="list-style-type: none"> <li>• The current study investigated both types of bullying (food allergy-related versus general) in a sample of food-allergic Italian students matched to healthy controls.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>• Two hundred and forty participants were recruited consecutively during 12 months; 121 patients were asked to participate in the study, during clinical evaluations at the referral centre for Food Allergy Diagnosis and Treatment in Veneto, Italy.</li> <li>• One patient withdrew from the study.</li> <li>• All the participants developed food allergies before the age of three and they did not suffer from concomitant non-allergic diseases.</li> <li>• The questionnaires were completed by the participants in writing. The Mantel-Haenszel test was used to compare the risk of bullying victimizations (at least once versus never, across the four bullying types) and between matching pairs of allergic and healthy children.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• Among allergic patients, 60% reported that they were victim of some form of bullying at least once in the last two months. The control group reported a frequency of 31.7%. The victimization rate found among healthy participants corresponds to regional data.</li> </ul>
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li>• Small sample size.</li> <li>• The children that are younger may not be able to differentiate between general bullying and bullying related to their food allergy.</li> <li>• Bullying assessment was not corroborated by other sources, such as teachers or parents.</li> </ul> Strengths: <ul style="list-style-type: none"> <li>• Informed consent was signed by parents and the study was performed in accordance to Italian regulations regarding potentially sensitive data and to the World Medical Association Declaration of</li> </ul>

	Helsinki Ethical Principles for Medical Research Involving Human Subjects.
<b>Comments</b>	<ul style="list-style-type: none"> <li>This appears to be the first work in Italy that compares students with food allergy to a healthy control group. Students with a food allergy should be included in a category of students at high risk of bullying given that food-allergic students are approximately two times higher to be bullied than healthy children.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 20</b>	Muraro, A., Roberts, G., Clark, A., Eigenmann, P. A., Halken, S., & Lack, G. (2007). The management of anaphylaxis in childhood: position paper of the European academy of allergology and clinical immunology.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>Munro et al. provide a systematic review of the highest evidence about managing anaphylaxis that supports the recommendations such as epinephrine as a first-line therapy for an anaphylactic reaction.</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Systematic review</li> </ul>
<b>Results</b>	As a result of this position paper, Muraro et al. (2010) prepared an ideal model of care in the management of the allergic child at school (see Title # 18).
<b>Limitations &amp; Strengths</b>	
<b>Comments</b>	
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 21</b>	Nguyen Luu, N., Cicutto, L., Soller, L., Joseph, L., Wasserman, S., St-Pierre, Y., & Clarke, A. (2012). Management of anaphylaxis in schools: Evaluation of epinephrine auto-injector (EpiPen®) use by school personnel and comparison of two approaches of soliciting participation.
<b>Setting &amp; Objective</b>	<ul style="list-style-type: none"> <li>Two school boards out of 10 were randomly selected in Montreal, Quebec.</li> <li>All school personnel were invited to participate. This included teachers, lunch monitors, administrative staff, school nurses, and janitors.</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Participants were asked to provide three symptoms of anaphylaxis and do a demonstration of EpiPen® technique.</li> <li>There were two groups: a full-disclosure group and a partial-</li> </ul>

	<p>disclosure group.</p> <ul style="list-style-type: none"> <li>• In the partial-disclosure group, 9 out of 33 schools participated, which equaled 187 participants out of 460.</li> <li>• In the full-disclosure group, 11 schools participated out of 34, which equaled 156 participants out of 711.</li> <li>• The majority of participants were teachers: 64.2% in the partial-disclosure group and 66.7% in the full-disclosure group.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• Twenty six percent of the full disclosure group and 15.8% of the partial disclosure group were able to demonstrate the use of the EpiPen®.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>• The researchers explored consent bias with two different groups and learned that the participation rate was higher in the partial-disclosure group, and those in the full-disclosure group were more likely to earn a perfect score.</li> <li>• The Research Ethics Board asked the investigators to fully disclose the intended purpose of their research to potential participants.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>• This study highlights the need for education about anaphylaxis and proper EpiPen® use.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• High</li> </ul>

<b>Title # 22</b>	Nowak-Wegrzyn A., Conover-Walker, M. K., & Wood, R. A. (2001). Food-allergic reactions in schools and preschools.
<b>Setting &amp; Objective</b>	<ul style="list-style-type: none"> <li>• The researchers conducted telephone surveys to characterize food-allergic reactions in children from age 3 to 19 years with known food allergies in schools and preschools, and to determine mechanisms that are in place to prevent and treat anaphylactic reactions.</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>• 132 children aged 3–19 years in the study. Parental surveys were done.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• One hundred and sixty food-allergic children were recruited from the John's Hopkins Hospital Allergy Clinic from April 1, 1999, to April 30, 2000.</li> <li>• Children not in school were excluded from the study.</li> <li>• Of 132 children in the study, 58% reported food-allergic reactions in the past two years. Eighteen percent experienced one or more reactions in school. The offending food was identified in 34 of 41 reactions, milk being the causative food in 11 (32%), peanut in 10 (29%), egg in 6 (18%), tree nuts in 2 (6%), and soy, wheat, celery, mango, or garlic in 1 each (3% each).</li> </ul>

	<ul style="list-style-type: none"> <li>• In 24 (59%) reactions, symptoms were limited to the skin, wheezing occurred in 13 (32%), vomiting and/or diarrhea in 4 (10%), and hypotension in 1 (2%). Also, 15 (36%) of the 41 reactions involved two or more organ systems, and 6 (15%) were treated with epinephrine.</li> <li>• Fourteen percent of the children did not have a physician's order for treatment, and 16% did not have any medications available.</li> <li>• Of the 80 participating schools, 31 (39%) reported at least 1 food-allergic reaction within the past two years, and 54 (67%) made at least one accommodation for children with a food allergy that included "peanut-free" tables, a peanut ban from the classroom, or alternative meals.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Strengths:</p> <ul style="list-style-type: none"> <li>• A large sample size.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>• This study demonstrates that the complete elimination of food-allergic reactions in schools is extremely challenging. Therefore, it is critical that schools are prepared to recognize and treat food-allergic reactions and make every effort to minimize the risk of reactions.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• High</li> </ul>

<b>Title # 23</b>	Ozen, A., Boran, P., Torlak., F., Karakoc-Aydiner, E., Baris, S., Karavus., & M., Barlan, I. (2013). School board policies on prevention and management of anaphylaxis in Istanbul: Where do we stand?
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>• This study was carried out to identify the current status of prevention and management of anaphylaxis in school children with the main goal of establishing an action plan.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>• Cross-sectional study.</li> <li>• Schools were randomly selected from 11 different regions of Istanbul. A questionnaire was filled out by 2,596 teachers/school principals from 232 public schools.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• A school safety committee was absent in 80% of elementary schools (ESs) and 60.8% of preschools (PSs). Although some form of health recording system was available in many schools, no such system was available in 24.5% of ESs and 10% of PSs. A specific inquiry for detecting children with food allergies was a routine practice in only 4% of ESs and 10% of PSs. Twenty-seven percent of teachers stated that monitoring children in school places was not possible at all times. Eighty-four percent had no written anaphylaxis treatment protocol available in their school and</li> </ul>

	approximately 2.3% in ESs and 3.1% in PSs stated that they would perform an epinephrine injection in the event of anaphylaxis.
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li>Difficult to generalize results given the random sample size from Istanbul even though it is the largest city in the country.</li> </ul> Strengths:
<b>Comments</b>	<ul style="list-style-type: none"> <li>This survey identified critical gaps in the organization of schools for the management of children at risk of anaphylaxis. Data derived from this study would provide the initiative for legislators to review the current situation of school health policies.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 24</b>	Primeau, M.N., Kagan, R., Joseph, L., Lim, H., Dufresne, C., Duffy, C., Prhcal, D., & Clarke. (2000). The psychological burden of peanut allergy as perceived by adults with peanut allergy and the parents of peanut-allergic children.
<b>Setting &amp; Objective</b>	<ul style="list-style-type: none"> <li>To compare the quality of life and family relations of children and adults with a peanut allergy to that of children and adults with rheumatological disease (RD).</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Retrospective chart review, peanut-allergy presenting to the allergy clinic in Montreal, Quebec, and advertising through lay/educational support organizations gathered 53 peanut allergic participants to compare to 69 children with RD.</li> <li>Thirty-seven peanut-allergic adults were compared with 42 adults with RD.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>The parents of peanut-allergic children experienced significantly more disruption in their daily activities compared to the parents of children diagnosed with RD.</li> <li>The parents of peanut-allergic children reported more impairment in the familial-social dimension of the Impact on Family Questionnaire (IFQ).</li> <li>Adults with RD reported more disruption in their family relations than peanut-allergic adults.</li> </ul>
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li>Potential sample bias from volunteer completion of the questionnaires.</li> <li>Response rate was 53%, and it is possible that those who were more likely to participate felt their condition had a considerable negative impact on their life.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>Although this study is 16 years old, it is in line with more current studies that support and education are needed by those managing food allergies in their daily lives.</li> </ul>



	<ul style="list-style-type: none"> <li>It also highlights that labelling a child as peanut-allergic can have consequences on the individual's family life and activities of daily living.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>Moderate, due to the low sample size and the route the researcher acquired participants.</li> </ul>

<b>Title # 25</b>	Pumphrey. (2000). Lessons for management of anaphylaxis from a study of fatal reactions.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>The aim of this study was to investigate the circumstances leading to fatal anaphylaxis.</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>The Office of National Statistics (ONS) established a registry that included fatal anaphylactic reactions in the UK since 1992 that could be traced from the certified cause of death. Data from other sources indicated that deaths certified as due to anaphylaxis underestimate the true incidence.</li> <li>Details of the previous medical history, the reaction, and necropsy were sought for all cases.</li> <li>This is a retrospective study.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>Out of 164 fatalities from 1992 to 1998, an arithmetic mean of 20.4 were probable anaphylactic deaths each year that was recorded.</li> <li>Approximately 10 fatal reactions recorded each year in the UK were iatrogenic, and <math>\frac{1}{4}</math> each due to food or insect venom. All fatal reactions thought to have been due to food caused difficulty breathing that in 86% led to respiratory arrest; shock was more common in iatrogenic and venom reactions.</li> <li>The median time to respiratory or cardiac arrest was 30 minutes for foods, 15 minutes for venom, and 5 minutes for iatrogenic reactions.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>The researchers were dependant on the interpretation of medical chart documentation.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>This study revealed how avoidance, self-treatment, and medical management failed to prevent anaphylactic death. The authors suggest that this insight should lead to better management of severe allergies by more effective advice on allergen avoidance; more appropriate prescribing of self-treatment kits, and improved training in its use.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li></li> </ul>

<b>Title # 26</b>	Sicherer, S. H., Forman, J. A., & Noone, S. A. (2000). Use Assessment of
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	Self-Administered Epinephrine Among Food-Allergic Children and Pediatricians.
<b>Setting &amp; Objective</b>	Objective: <ul style="list-style-type: none"> <li>The researcher sought to determine the ability of families with food-allergic children and pediatricians to properly use self-injectable epinephrine.</li> </ul>
<b>Sample, Method, &amp; Analysis</b>	<ul style="list-style-type: none"> <li>One hundred one families of food-allergic children were enrolled.</li> <li>A sampling of pediatricians (attending and resident physicians) were enrolled in the study.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>Self-injectable epinephrine had been prescribed a mean of 2.7 years previously by a pediatrician, an allergist, an emergency physician, or a pulmonologist. Ninety-three patients were prescribed EpiPen Jr.®, 11 were prescribed EpiE-Z Pen Junior, three were prescribed an Ana-Kit, and six families had more than one type.</li> <li>Seventy-seven had been prescribed epinephrine for previous severe reactions and the remainder for a potential severe anaphylactic reaction.</li> <li>More education is needed to properly ensure the use of epinephrine.</li> </ul>
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li>Demonstrations were scored in a standard manner (not described in the article).</li> </ul> Strengths: <ul style="list-style-type: none"> <li>Large sample size.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>A surprising proportion of attending physicians was not familiar with the epinephrine devices or could not demonstrate them properly.</li> <li>Two commented that they thought the pharmacist reviewed the medication with patients.</li> <li>Few physicians provided written material to their patients to reinforce instructions on indications for use.</li> <li>The recommendation made from this study is that patients should be shown how to use trainer devices and the expiration date.</li> <li>Verbal and written instructions should be reviewed.</li> <li>Anaphylaxis training should be a part of residents' training.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 27</b>	Sicherer, S.H., Furlong, T.J., DeSimone, J., & Sampson, H.A., (2001). The US peanut and tree nut allergy registry: characteristics of reactions in schools and day care.
<b>Setting &amp; Objective</b>	Objective: <ul style="list-style-type: none"> <li>This study was done to better understand food-allergic reactions in the school setting. There is a self-reported registry of individuals</li> </ul>

	who are allergic to peanut and tree nuts called the US Peanut Tree Nut Allergy Registry (PAR).
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>4,586 participants from the Registry were randomly selected for a telephone interview to answer a structured questionnaire.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>Seven hundred and fifty (16%) indicated a reaction in school or day care, and 100 individuals described 124 reactions to peanut (115) or tree nut (9); 64% of the reactions occurred in day care or preschool, and the remainder in elementary school or higher grades. Reactions were reported from ingestion (60%), skin contact (24%), and inhalation (16%).</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>The PAR database is potentially enriched for patients with significant allergy.</li> <li>Recollection of more severe reactions may have occurred and may not be able to make generalizations about the “average” child with peanut/tree nut allergy.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>School personnel must be educated to recognize and treat food-allergic reactions. Awareness must be increased to avoid accidental exposures, including exposure from peanut butter craft projects.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 28</b>	Tiyyagura, G.K., Arnold, L., Cone, D.C., & Langan, M. (2014). Pediatric anaphylaxis management in the prehospital setting.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>The purpose of this study was to investigate the prehospital management of anaphylaxis among patients receiving care in an urban tertiary care pediatric emergency department (PED).</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>The researchers performed a retrospective chart review from May 2008 to January 2010 of patients 18 years or younger who received care in the PED for anaphylaxis.</li> <li>Two hundred eighteen cases of anaphylaxis were reviewed in 202 children.</li> <li>A total of 214 (98%) manifested symptoms in the skin/mucosal system, 68% had respiratory symptoms, 44% had gastrointestinal symptoms, and 2% had hypotension.</li> <li>Sixty-seven percent had had a previous allergic reaction and 38% had a history of asthma.</li> <li>Reactions occurred at home or with family members 87% of the time, and at school 12% of the time. Only 36% of the patients who</li> </ul>

	met criteria for anaphylaxis had epinephrine administered by emergency medical services (EMS). Among 26 patients with anaphylactic reactions at school, 69% received epinephrine by the school nurse. Of 117 patients with known allergies who were with their parents at the time of anaphylactic reaction, 41% received epinephrine.
<b>Results</b>	<ul style="list-style-type: none"> <li>The evaluation revealed low rates of epinephrine administration by EMS providers and parents/patients. Education is imperative to encourage earlier administration of epinephrine.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>The retrospective nature of this study precluded the use of standardized ED or EMS documentation of symptoms of anaphylaxis.</li> <li>Reliance on ED medical records limited the researchers' ability to discern the true severity of the anaphylactic reaction and the decision-making process by the individual or provider.</li> <li>It was not always clear if children with previous allergies carried an auto-injector.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li></li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 29</b>	Torabi, B., Cadrwell, F.S., Elliot, S.J., & Chan, E.S. (2016). The impact of bullying in Canadian children with confirmed food allergy and its influence on wearing medical identification.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>This study examined the presence and characteristics of bullying in children and adolescents with confirmed food allergy in British Columbia (BC), and to investigate the role of bullying on the decision to wear a medical identification bracelet or necklace.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Surveys were completed by parents of children aged five to 12 years of age who attended the BC Children's Hospital Allergy Clinic. The study included 110 children.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>Twenty percent reported being bullied and 77.3% of those experienced it repeatedly.</li> <li>Medical identification was worn by 24.5%, and 16.3% reported not wearing medical identification due to the fear of being labelled for bullying.</li> <li>School grounds were the most frequent location for bullying (86.3%) and classmates were the highest reported offenders (86.3%). Nonphysical acts occurred more often than physical acts. Potential confounders of sex and body mass index were not</li> </ul>

	associated with increased bullying.
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li></li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>The rate of bullying in the present study was comparable with that reported in previous American studies. It was found that few children with food allergy wear medical identification, and some avoid wearing it due to the fear of being bullied. Many children and adolescents who are bullied due to food allergy are additionally bullied for other reasons, making this population even more vulnerable.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 30</b>	Van der Velde, J. L., Flokstra-de Blok - B. M. J., DunnGalvin. A., Hourihane, J. O'BDuiverman, E. J., & Dubois, A. J. (2011). Parents report better health-related quality of life for their food-allergic children than children themselves.
<b>Setting &amp; Objective</b>	Objective: <ul style="list-style-type: none"> <li>The aim of this study was to compare child and parent-proxy reports on Health-Related Quality of Life (HRQL) in food-allergic children.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Dutch food-allergic children aged eight to 12 years old and their parents were recruited from a pediatric allergy clinic between May 2007 and March 2009.</li> <li>Dutch versions of the Food Allergy Quality of Life Questionnaire (FAQLQ) and the Food Allergy Independent Measure questionnaire (FAIM) were sent by mail to be completed at home.</li> <li>Participation was voluntary and child-parent pairs were requested not to discuss questions and responses with each other.</li> <li>Child-parent pairs were excluded when &lt;85% of the questions were completed.</li> <li>Child and parent-proxy reports were correlated and tested for significant differences. Construct validity (Spearman's correlation coefficient between the FAQLQs and FAIMs) and internal validity (Cronbach's <math>\alpha</math>) were assessed and compared.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>Seventy-four child-parent pairs were included. The FAQLQ-CF score was significantly higher than the FAQLQ-PF score (3.74 vs. 2.68, <math>P &lt; 0.001</math>, where 1 indicates no impairment and 7 indicates extreme impairment).</li> <li>FAIM-CF and -PF scores were almost identical (3.29 vs. 3.33, <math>P = 0.594</math>). There was moderate agreement between the FAQLQ-CF</li> </ul>

	<p>and –PF scores (ICC=0.57 [<math>P &lt; 0.001</math>]) and good agreement between FAIM_CF and –PF scores (ICC = 0.80 [<math>P &lt; 0.001</math>]).</p> <ul style="list-style-type: none"> <li>Construct validity was confirmed for the FAQLQ-CF (<math>p = 0.60</math>, <math>P &lt; 0.001</math>) and –PF (<math>p = 0.58</math>, <math>P &lt; 0.001</math>). Internal consistency was excellent for the FAQLQ-CF (<math>\alpha = 0.95</math>) and –PF (<math>\alpha = 0.95</math>).</li> <li>It is important for clinicians to include both the child's and their parent's perceptions in order to perform a complete assessment of the impact of food allergy on the child's HRQL and to identify areas of disagreement that need special attention in clinical practice.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>Self-reported data.</li> </ul> <p>Strengths:</p> <ul style="list-style-type: none"> <li>Valid disease-specific instruments were used in this study.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>Parents reported significantly less impact of food allergy on the child's HRQL than children themselves, while reported perceptions of disease severity were nearly identical.</li> <li>This may reflect real differences in perspectives between children and parents and may indicate that parents tend to underestimate their child's HRQL impairment.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 31</b>	Wahl, A., Stephens, H., Ruffo, M., & Jones, A.L. (2015). The evaluation of a good allergy and epinephrine auto-injector training program for personnel who care for children in schools and community settings.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>The objectives of this study were to assess the effectiveness of in-person training on enhancing knowledge about food allergies and improving self-confidence in preventing, recognizing, and treating food allergy reactions, and to collect information about prior training and participation in response to food allergy incidents.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>A descriptive observational study and had no control group.</li> <li>A total of 4,818 individuals at 247 schools and community sites participated in the training program, which was delivered by a registered nurse (RN). Written evaluations, online surveys, and phone interviews were used to measure the impact including content retention, confidence, and behaviour changes.</li> <li>Three evaluation tools were developed; a primary survey to be completed immediately following the presentation, a secondary online survey, and a telephone interview survey.</li> <li>Presentations were delivered between March 2009 and April 2012.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>A total of 4,088 (84%) individuals completed some or all of the survey following the presentation.</li> </ul>

	<ul style="list-style-type: none"> <li>Teachers (48%) were the largest group receiving the presentation, camp counsellors were 10% of attendees, childcare providers were the third largest group representing 6%, followed by program administrators at 5%, school aides 5%, and people reporting that they had more than one role or position (5%).</li> <li>Attendees whose position was not listed as an option represented 15% of the respondents.</li> <li>The results of this study showed that in-person training can increase participants' knowledge about food allergies and improve self-confidence in preventing, recognizing, and treating allergic reactions and that these gains were sustained over time.</li> </ul>
<b>Limitations &amp; Strengths</b>	<p>Limitations:</p> <ul style="list-style-type: none"> <li>All data were self-reported and responses rely heavily on respondents' recall of past occurrences and willingness to provide information about incidents.</li> <li>It is possible the researchers collected multiple responses because 23 out of 247 presentation sites received more than one visit from the same person.</li> <li>It was not possible to remove duplicate survey responses since the data were collected anonymously.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li></li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 32</b>	White, M., Hogue, S., Silvia, S., Muniz, R., & Herrem, C. (2016). Anaphylaxis management and treatment policies in schools as observed in the 2014–2015 EpiPen4Schools® survey.
<b>Setting &amp; Objective</b>	<p>Objective:</p> <ul style="list-style-type: none"> <li>An exploratory survey conducted during the 2013–2014 school year exposed potential gaps in some schools' anaphylaxis treatment policies. To increase understanding of these policies, an updated survey was developed for the 2014–2015 school year.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>Of 12,275 responding schools, 12,196 provided information on policies regarding first-line treatment of anaphylaxis.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>Of the 12,196 schools 2,261 (18%) did not list a standard first-line therapy. Only 7,243 (59%) listed epinephrine as their standard first-line therapy for anaphylaxis; other standard therapies included antihistamines (21.4%), albuterol (0.7%), and corticosteroids (&lt;0.1%). Of the 12,213 schools that provided information on epinephrine administration, most permitted the school nurse to administer epinephrine (89.8%), while 73.2% permitted some teachers and 32.8% permitted all teachers.</li> </ul>

	<ul style="list-style-type: none"> <li>The most commonly reported method for training staff in administration was in-service provided at the school (87.5%).</li> </ul>
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li>Self reported data.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>Anaphylaxis can be unpredictable and these policies place many students, especially those without individual allergy protocols, at risk of delayed treatment with epinephrine.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>High</li> </ul>

<b>Title # 33</b>	White, M.V., Hogue, S.L., Bennett, M.E., Goss, D., Millar, K., Hollis, K., Siegel, P.H., Wolf, R.A., Wooddell, M.J., & Silva, S. (2015) EpiPens4Schools® pilot survey: occurrence of anaphylaxis triggers, and epinephrine administration in a US school setting.
<b>Setting &amp; Objective</b>	Objective: <ul style="list-style-type: none"> <li>This study was designed to describe anaphylactic events and epinephrine auto-injector (EAI) use in US schools enrolled in the EpiPen4Schools® program.</li> </ul>
<b>Sample, Method &amp; Analysis</b>	<ul style="list-style-type: none"> <li>This exploratory, cross-sectional, web-based survey of 6,019 schools that participated in the EpiPen4Schools® program assessed anaphylactic events and EAI use at responding schools during the 2013–2014 school year.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>A total of 919 anaphylactic events were reported in 607 schools. Of the 852 anaphylactic events with data on those who experienced an event, most (88.8%, n = 757) occurred in students, and 21.9% of events (n = 187) occurred in individuals with no known allergies. Of the 851 events with data on EAI use, 74.7% (n=636) were treated with EAIs and 8.5% (n = 54) received a second injection.</li> <li>Of the 204 individuals not treated with an EAI use, 77% (n = 157) received antihistamines, 12.7% (n = 26) received another treatment, and 8.3% (n = 17) received no treatment.</li> <li>Given that 20.4% of patients were not taken to hospital after an anaphylactic reaction, thus putting the patient at risk for a biphasic reaction to occur, the analysis of this data indicates the value of stocking EAIs and providing continuing education for school personnel about the recognition and management of anaphylaxis.</li> </ul>
<b>Limitations &amp; Strengths</b>	Limitations: <ul style="list-style-type: none"> <li>Surveys are subject to a number measurement errors, such as how the questions are interpreted.</li> <li>Response bias may arise from oversampling schools from a</li> </ul>



	<p>particular region or from low overall response rates.</p> <ul style="list-style-type: none"> <li>• A survey does not allow for determination of the number of reported cases of anaphylaxis in which the respondent had a confirmed diagnosis.</li> <li>• This exploratory survey had a response rate of 19%. Factors that contributed to this response rate included collecting of the data during the final weeks of the school year. This limited the possibility of pursuing responses through repeat contacts via email and telephone.</li> <li>• Also, some schools could not participate without school district approval and there was no time to complete that process.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>• Approximately 25% of individuals with anaphylactic events were not treated with EAI's, and 20.4% of patients were not taken to the hospital after an anaphylactic event.</li> <li>• Analysis of this data supports the value of stocking EAI's and of providing continuing education regarding the recognition and proper treatment of anaphylaxis for school personnel.</li> </ul>
<b>PHAC Rating</b>	<ul style="list-style-type: none"> <li>• Moderate</li> </ul>

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## **Appendix B: A Report for Consultations with Key Stakeholders**

The World Health Organization recognizes food allergy as a significant public health concern due to the high prevalence and potential severity of the condition and the impact it has on the quality of life. Approximately 2.5 million Canadians have at least one food allergy (Food Allergy Canada, 2017). The incidence is highest among school-aged children (Food Allergy Canada, 2017; Sicherer, 2001). Approximately 300,000 Canadian children (under the age of 18 years) have food allergies. One in two Canadians knows someone with a food allergy. Peanut allergy is the most common in Canada and affects two children in every 100 (Food Allergy Canada, 2017). Eighty-five percent of children diagnosed with a food allergy will experience an allergic reaction while at school (Powers, Bergren, & Finnegan, 2007; Food Allergy Canada, 2017); 25% of these children will experience their first reaction to food in the school environment (Sicherer, Furlong, DeSimone, & Sampson, 2001). That statistic has prompted schools to develop policies for food allergy management.

The Government of Ontario introduced Bill 3, which is also named Sabrina's Law, in memory of a student who died at school from anaphylaxis due to the cross-contamination of her food with an allergen. Bill 3 came into effect January 1, 2006. The Bill requires that every school board:

establish and maintain an anaphylactic policy, which must include, among other things, strategies to reduce risk of exposure to anaphylactic causative agents, a communication plan for the dissemination of information on life-threatening allergies, regular training on dealing with life-threatening allergies, a requirement

that every school principal develop an individual plan for each pupil who has an anaphylactic allergy and a requirement that every school principal maintain a file for each anaphylactic pupil. (Government of Ontario, 2005)

Unfortunately, research indicates that school staff is poorly prepared to handle anaphylaxis. Updating the essential education that is lacking would assist school staff to recognize the signs and symptoms of anaphylaxis, and give them the confidence to properly administer an EpiPen® should an allergic reaction occur while students are in their care (Muraro et al., 2010).

I conducted two consultations about food allergy management in schools. First, I met with the school staff that was requesting more education about managing food allergies in their school. Second, I met with a food allergy educator who is an expert in Canada in educating health care professionals, newly diagnosed parents of children with food allergies, and the public. This consultation report highlights and explains the key findings for my practicum project and also identifies any gaps in the information.

### **Consultation with School Staff**

#### **Objectives**

1. To identify the information the school staff needs in order to deal with a child that is having an allergic reaction.
2. To examine existing food allergy management policy and practice that is used at the school.
3. To gather information from key stakeholders that will inform the content and delivery of the half-day food allergy workshop.

## **Methods**

### **Setting and Sample**

The literature review and the participants guided the consultation for a semi-structured focus group. The key points revealed in the literature were the gaps in knowledge in school staff about anaphylaxis and epinephrine, as well as decreasing self-efficacy or the inability to act effectively in the event of an allergic reaction, a lack of confidence, uncertainty about food allergy management, and organizational structures and communication.

I met with 18 school staff that included the principal, secretary, 12 teachers, two early childhood educators, and two resource support staff. The principal, prior to the staff meeting, informed the participants that I am a graduate student nurse and that I am meeting with them regarding food allergy management in school for the purpose of completing a project for the Master's in Nursing program at Memorial University of Newfoundland. The principal dedicated the first hour of the meeting to me so I could determine the information that I required or wanted from the school staff about food allergies for the future half-day workshop. The participants consisted of fourteen women and four men. Their work experience ranged from less than five years to greater than 20 years in a variety of areas of teaching in the elementary school system in Ontario. All staff agreed to participate in the semi-structured focus group.

### **Data Collection**

As a part of the qualitative research process I recognized that I needed to explain my own thoughts and feelings about food allergy management. I am intrinsically

motivated to educate others about food allergies because my daughter has an allergy to all nuts and raw egg white. This cognitive process of putting my own beliefs aside, allowed me to be open to the data as it was revealed during the interview. This process is called “bracketing” (Streubert & Carpenter, 2011). I recognize that during the qualitative research process that the participants decide what information is shared, and that good interpersonal skills and a trusting relationship will enhance the discovery process of the data. I believe that the school staff was open and motivated to learn about food allergies. They had previously requested more education that includes how to recognize when a student is having an allergic reaction and practice with an EpiPen® trainer. I asked them to participate in the focus group because they expressed wanting to learn more about food allergies and they are exposed to students with food allergy.

Prior to the start of the discussion participants were verbally informed of the rationale and objectives of the focus group. Confidentiality of the data that emerged was discussed. The school staff’s willingness to participate in the discussion inferred informed consent. A series of semi-structured interview questions (see Appendix C) were asked to the participants in the focus group. I offered my contact information by writing it on the blackboard (phone number and email address) for a variety of reasons. First, in the event the school staff wanted to provide additional information after the interview as the focus group allowed the participants to reflect on the experience. Secondly, I wanted to encourage communication about food allergies should anyone feel uncomfortable providing information in a focus group setting or in front of the principal. I wanted to create an opportunity for those in the focus group to be authentic and truthful when

answering the questions. It may be a challenge for the school staff to feel they can speak openly in front of their peers or a leader, such as the principal.

This practicum project did not require the ethics approval as per the Health Research Ethics Authority Screening Tool (see Appendix K). Field notes were taken during the interview, and it was audiotaped for completeness and transcribed into a password-protected computer that is only accessible to me. The computer is located in a locked office attached to my house, which is also locked when I am not at home. I ensured that I have adhered to the ethical standards outlined in the consultation proposal. All identifying information was removed.

### **Data Analysis**

Field notes were taken when the interview questions were asked. I documented personal narratives, and observations in body language. The data was transcribed and coded from the main ideas that emerged. Coding consisted of systematically reading the transcripts, grouping similar responses, and extracting themes. Common themes were grouped together and compared to the findings in the literature. Important quotes that best captured the meaning of the discussion were noted. The focus group consultation lasted one hour. I re-examined the field notes and identified keywords and phrases for accuracy.

In analyzing the responses from the school staff that answered the semi-structured interview questions there was an overarching theme of helplessness. These answers reveal that the school staff did not feel they were able to act effectively should an allergic reaction occur in a student. Three themes contributed to the overarching theme of

helplessness and the inability to act effectively in the event of an allergic reaction: 1) awareness about a desire for information, 2) a lack of confidence, and 3) uncertainty.

***Theme One: Awareness about a Desire for Information***

The school staff was required to complete an online module about Sabrina's Law prior to the start of the school year. The staff revealed concerns about their lack of knowledge about food allergy management and suggested that the online module was not enough information for them to competently manage an allergic reaction. The principal mentioned that, as a group, they need more education with regard to food allergies. He went on to acknowledge one of the school staff who is also a volunteer firefighter and that her training helped her to recognize that the school staff needs more education to effectively manage food allergies in the school. This awareness about a desire for more information is what has prompted this group to seek more knowledge. When they were asked for the definition of food allergy, staff answered with words that described some symptoms associated with food allergy, such as "hives", "a reaction to food", "when a food doesn't agree with them". I observed that several of them shrugged their shoulders and were looking at each other, as well as saying, "I don't know".

The principal and two of the other school staff specifically noted this awareness and a desire for more information. One answered a question by whispering to me, "I should know, but I don't. I have allergies myself and don't carry my epi." The other one stated, "Personally, I would like you to spend some time with my son, Shannon. I know I should know, but I am too uncertain. He reacts badly to bee stings and we have an EpiPen®, but we need to practice with it." The part of the statement, "I know I should



know”, brings forth the *awareness* about the lack of knowledge amongst the school staff. Although I recognize that spending time with a school staff member addressing her personal situation is not my role as a student completing this project, this data contributes to the school staff’s desire to learn.

### ***Theme Two: A Lack of Confidence***

The second theme that emerged was a lack of confidence in the staff’s ability to manage an allergic reaction. Although the school staff has access to information about food allergies such as the online module, anaphylaxis plans, and when parents communicate with them about their child’s food allergy, they do not feel confident in their ability to put this information into practice. Many of the school staff indicated that the current online module did not provide them with what they needed to manage an allergic reaction. In response to a question regarding what education would help them manage a student with an allergic reaction, one staff member stated, “Hands-on with an EpiPen®—I’ve never touched one. I’m not confident doing that.” When asked if they could recognize anaphylaxis in a student, answers such as, “I think so” and “I hope so,” also indicated a lack of confidence.

### ***Theme Three: Uncertainty with Food Allergy Management***

Uncertainty was the third theme in the analysis of the data. Various answers to the interview questions were answered in the form of a question. It was my observation that the staff were looking at me to validate their answers. When asked about the steps involved in administering an EpiPen®, a staff member responded, “Remove the blue cap,

and swing the pen into the leg?” and then further indicated, “I hope I’m right there?”

Another staff member stated, “I have seen the commercial about swinging it into the leg. Blue to the sky, orange to the thigh. But I don’t know if I could actually do it.”

Additionally, the data that emerged from the questions that asked staff to demonstrate their knowledge such as, “What is anaphylaxis?” and “What is a food allergy?” demonstrated uncertainty, incorrect information, and an element of guessing. The dialogue between the staff members that generated from these questions provided data such as, “Hives?”, “A reaction to a food?”, and “I didn’t realize it’s more than their throat closing off”. It was my observation that the staff was trying to recall information, knowledge, or education that they had previously encountered. The staff answered, “Not really” to the question about whether or not the current available information about allergy management provides them with the confidence to recognize anaphylaxis and administer an EpiPen®. This uncertainty leads to a lack of confidence that contributes to the overarching theme of helplessness.

### **Discussion**

This school staff was aware of their lack of knowledge and requested more education related to food allergy management in their school. They are motivated and, although there is an online module available to them, the staff indicated that they do not feel comfortable in treating a child having an anaphylactic reaction. There is an overarching theme of helplessness and what contributes to this helplessness is awareness for a desire of information, a lack of confidence, and uncertainty to put their current training module into practice. Education that meets the needs of the learner can be

empowering and diminish the feeling of helplessness, allowing a person to have confidence in their decisions and actions.

Research indicates that many schools are poorly prepared to handle anaphylaxis. Policies that have been developed for the prevention of food allergy reactions are missing essential components, such as education to recognize the signs and symptoms of anaphylaxis, and to properly administer an EpiPen® (Muraro et al., 2010). Consistent food allergy management education provides those who are in care of children the opportunity to increase their knowledge and feel confident about how to prevent exposure to food allergens, how to recognize an anaphylactic reaction, and how to treat a child with an EpiPen® should an anaphylactic reaction occur at school (Muraro et al., 2010).

Although the study by Xu et al. (2010) involves participants that are patients, there is some value for my practicum project that is relevant in the results. Evidence shows that there is a lack of confidence and a high degree of uncertainty in using an EpiPen®. Xu et al.'s (2010) study revealed that 33% of patients were not shown how to use an EpiPen® trainer device, and 43% were not asked to demonstrate the use of an EpiPen®, even after visiting an allergist four and five times. Additionally, only 30% of patients felt confident using an EpiPen®. A result of this study suggested that every physician visit should include a return demonstration of an EpiPen® trainer and the signs and symptoms of anaphylaxis. This study demonstrates that consistent regular education about the key points of food allergy management can instill confidence and diminish uncertainty for those who may be required to treat an individual having an anaphylactic reaction.

## **Consultation with a Food Allergy Educator**

### **Objective**

1. To identify effective education delivery methods about food allergy education to school staff.

### **Methods**

#### **Setting and Sample**

This educator is a Registered Nurse who works for Food Allergy Canada. She has participated in research, education, and program development for those living with food allergies for over a decade. Her passion to advocate for food-allergic individuals arose when her daughter was diagnosed with food allergies as a young girl in the mid 1990s. Information, support, and resources about food allergies were not as readily available then as they are now. This phone interview was approximately 60 minutes.

#### **Data Collection**

The key points revealed in the literature focused on what education delivery methods were most effective when educating school staff about food allergy management. Prior to the start of the discussion, the participant was verbally informed of the rationale and objective of the consultation. Confidentiality of the data was discussed with the educator and a verbal consent was provided. This consultation was a telephone conversation and field notes were taken. I was unable to audiotape this discussion for completeness due to technical difficulties. I kept this written data in a file folder in a

locked file cabinet only accessible by me in my personal office that is also locked when I am not present.

### **Data Analysis**

The educator stated that in her experience, effective allergy management education is most effective with face-to-face education and a hands-on return demonstration with an EpiPen® trainer. She assesses her audience's baseline knowledge by asking a few simple questions. Her experience as an educator has taught her not to make any assumptions in her participants' knowledge level when she is teaching people about food allergies. She stated, "People don't know what they don't know." Therefore, her preference is to start with basic information that often generates questions from her participants that additionally allows her to address food allergy myths. This experiential information reinforced to me how valuable it is to assess the baseline knowledge and needs of the learner before creating my half-day workshop. Assessment of a learner is an integral part of instruction. Demonstrating an understanding of information is a critical part of the learning process and can determine whether or not the goals of the education are being met (Weinberger, Stegmann, & Fischer, 2007).

The educator discussed that it would be her wish to have food allergy drills in schools, similar to fire and lockdown drills. "I believe that anaphylaxis ranks up there in how unpredictable it is in nature, like a fire. A food allergy drill a couple of times a semester would allow staff to demonstrate how they might respond to a child having an anaphylactic reaction. Also, debriefing about the drill allows the staff to learn from each other and critique and analyze the scenario."

## **Discussion**

The information about how to deliver food allergy management education informed me as to what is most effective in delivering food allergy education to the school staff. Furthermore, the consultation with school staff and assessing what the staff was requesting for further education is also relevant. Similar to the educator's recommendations, the school staff has requested in-person education with a practical component that allows them to demonstrate how to use an EpiPen® trainer.

In the first study of its kind, Shah, Parker, and Davis (2013) examined the improvement of teacher food allergy knowledge after a one-hour education session. A physician delivered a one-hour teaching session about food allergy development, and essential topics related to the understanding of food-allergic reactions. It was delivered by PowerPoint presentation and pre- and post-questionnaires were used to understand the teachers pre- and post-presentation knowledge. This one-hour, didactic session about food allergies had significantly increased their knowledge. The data was analyzed based on overall percentage of questions answered correctly, and confidence intervals of 95% were used to establish significance of results. Knowledge improvement was specifically noted in the appropriate treatment of anaphylaxis and the immediate use of epinephrine from less than 50% to greater than 94% of the teachers understanding. This study offers validation of an educational method for school staff and recognizes that physicians and nurse educators can play an important role in educating school staff about the treatment of food allergies.

Both Xu, et al., (2010), and Kumar et al. (2008) examined the educational methods for food allergy support to patients and health care professionals. Although the participants in both of these studies were not teachers, the results about educational methods could be used in a variety of participant groups. These studies suggest that standardized accessible educational programs that catered to small-group sessions and were taught by trained personnel that could guide them through scenarios of anaphylactic reactions “help participants gain practical knowledge and improve their self-confidence” (Xu et al., 2010, p. 7).

Analysis of the data from both consultations informed me in the development of my educational workshop. Education that highlights the signs and symptoms of a food-induced anaphylactic reaction and how and when to administer an EpiPen® are key points. During the school staff consultation, several participants stated that it would be valuable to them if food allergy education could be delivered in-person rather than, or in addition to, the current online education available to them, as well as being delivered more than once a year. The educator’s suggestion regarding food allergy drills is consistent with a brief report by Wahl et al., (2014), which suggests practicing food allergy management drills in schools, including the use of an EpiPen® trainer. A practice scenario that provides an opportunity to demonstrate knowledge and instill confidence in a person’s actions can effectively diminish uncertainty. It also allows for reflection and evaluation of the practice scenario, and this repetition is helpful in building capacity.

### **Gaps Noted in the Interview Findings**

I did not ask a direct question about Bill 3 and how the current individualized anaphylaxis plans are utilized in the school. The staff did not discuss if they read, re-familiarize themselves, or periodically checked these plans as a source of current information. The responsibility of individual anaphylaxis plans is that of the principal. The purpose of a plan is as a communication tool, from parents to school staff that outlines the allergy information of the child and the actions that a parent expects the staff to take in the event that their child is exposed to a food allergen. This policy of individual anaphylaxis plans is a part of every school board in Ontario and is legislated from Bill 3, which is also known as Sabrina's Law.

### **Limitations**

The time constraints and the limited opportunity for the school staff to come together for a focus group did not provide me with the desired preparation for the interview questions. I recognize that my interview questions could have been worded in a more open-ended way and with a less directive tone. However, my intention was to learn what current and accurate information is available to school staff about food allergies, as well as to learn the extent of the current gaps in their understanding. I feel the first few questions address this. Upon reflection, I wonder what would be the effect if the questions were delivered in a different order. I will address these limitations with the information gained from my literature search, using my own knowledge, and the evaluation from school staff about the half-day workshop.



I was previously approached by a variety of school staff to educate them on food allergies. I also have a personal stake in the outcome because my child attends this school. I recognize that I was informed going into this interview that this particular group of school staff want education to safely and competently manage an allergic reaction in a child at school. I recognize my bias, and tried to mitigate it in my analysis of the data.

I recognize that focus groups have limitations. It can be challenging to quantify or draw conclusions from information collected in a group setting. I am aware that focus-group data may not be generalizable to other populations because participant selection is both non-random and potentially non-representative. Despite these limitations, the range of specific comments from the school staff was comprehensive about the education they feel they need to be able to deal with a child that is having an allergic reaction while at school.

### **Conclusion**

The results of these consultations, along with the knowledge gained from my literature review, guided the development of the educational half-day workshop. This workshop includes the signs and symptoms of anaphylaxis, the common causes of anaphylaxis, priority food allergens, managing the risks of food allergy, risk-reduction tips, hands-on training in the five emergency steps of EpiPen® administration, the steps to take after an EpiPen® has been administered, and available food allergy resources.

After developing the half-day workshop, some of the key stakeholders reviewed the content and offered any further suggestions. Recommendations from the key

stakeholders helped me revise the workshop in order to produce the most effective education possible.

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## Appendix C: Interview Questions

### Consultation with School Staff

<p>Can you tell me how you prepare when you learn you have a child with food allergy in your classroom?</p> <ul style="list-style-type: none"> <li>• Does this online training provide you with what you need to manage an allergic reaction in a student?</li> <li>• Can you tell me what education or training would help you to manage an allergic reaction should a student have one?</li> <li>• Would this staff member be available to talk?</li> </ul>	<ul style="list-style-type: none"> <li>• At the beginning of the year there is an online module about Sabrina's Law and 10 questions to answer.</li> <li>• No, no, no. (Also, staff shaking heads "no".)</li> <li>• Hands-on with an EpiPen®—I've never touched one. I'm not confident doing that.</li> <li>• Personally, I would like you to spend some time with my son, Shannon. I know I should know, but I am too uncertain. He reacts badly to bee stings and we have an EpiPen®, but we need to practice with it.</li> <li>• Principal: Shannon, we are aware we need to be doing a better job here with our allergic students. You have brought awareness to us, and one of our staff that is currently on a leave is also a volunteer firefighter. During her training in the late fall allergies were a part of her training and she talked to me about needing to do a better job in our school with allergies.</li> <li>• Unfortunately, no.</li> </ul>
<p>What is a food allergy?</p>	<ul style="list-style-type: none"> <li>• When a child develops a rash after eating.</li> <li>• A reaction to a food.</li> <li>• Hives show up when a child has eaten a food they are allergic to.</li> <li>• When a food doesn't agree with them.</li> </ul>

<p>What is anaphylaxis or a food allergy reaction?</p> <ul style="list-style-type: none"> <li>• Could you recognize anaphylaxis in one of your students?</li> </ul>	<ul style="list-style-type: none"> <li>• When someone can't breathe.</li> <li>• Their throat closes up.</li> <li>• Hives.</li> <li>• I think so</li> <li>• I hope so</li> <li>• I didn't realize it's more than their throat closing off.</li> </ul>
<p>Have you ever had the opportunity to administer an EpiPen® or an EpiPen® trainer?</p> <ul style="list-style-type: none"> <li>• When were you a student counsellor?</li> </ul>	<ul style="list-style-type: none"> <li>• Once, as a student counsellor at camp I touched a trainer.</li> <li>• Seven years ago</li> </ul>
<p>What food allergy information is available to you as school staff?</p>	<ul style="list-style-type: none"> <li>• The online module.</li> <li>• When parent of a child with allergies talks to me directly.</li> </ul>
<p>What does the school board inform the school staff about food allergy management in school?</p>	<ul style="list-style-type: none"> <li>• Isn't there something called Shannon's Law?</li> <li>• Principal: Anaphylaxis plans are sent home with students that have allergies at the beginning of the year and they are signed off by me, and put on the board with an EpiPen® brought in by the parents.</li> </ul>
<p>Does the available information about food allergy management provide you with the confidence to recognize the signs and symptoms of anaphylaxis, and properly administer an EpiPen®?</p>	<ul style="list-style-type: none"> <li>• Not really.</li> <li>• Once a year is not enough.</li> <li>• Making it easy to put my hands on this information would help.</li> <li>• I'm uncertain if I could help a student in this kind of trouble.</li> </ul>
<p>What are the five steps involved in delivering an EpiPen® to a student?</p>	<ul style="list-style-type: none"> <li>• Remove the blue cap, and swing the pen into the leg? I hope I'm right there?</li> <li>• I have seen the commercial about swinging it into the leg—blue to the sky, orange to the thigh—but I don't know if I could actually do it.</li> <li>• I should know, but I don't. (Then whispering: I have allergies myself and don't carry my epi).</li> </ul>
<p>What are the actions after the EpiPen® has</p>	<ul style="list-style-type: none"> <li>• I don't know. (All participants</li> </ul>

been given?	<ul style="list-style-type: none"> <li>shaking heads “no”.)</li> <li>Call 911?</li> </ul>
Is there any information that you feel would be important for school staff to have in order to safely manage food allergy in school?	<ul style="list-style-type: none"> <li>What we should be watching for in our students who have allergies.</li> <li>Hands-on practice with an EpiPen®.</li> <li>Quick, easy-to-read information.</li> <li>What signs are most important to help us decide when to use an EpiPen®.</li> </ul>
If you had an opportunity, would you attend a half-day workshop about food allergy management in school?	<ul style="list-style-type: none"> <li>Yes, it would be helpful to practice with an actual EpiPen®.</li> <li>Yes. (Noted most school staff nodding yes.)</li> </ul>
<p>What kind of information do you envision as being important in a half-day workshop that trains food allergy “champions”?</p> <ul style="list-style-type: none"> <li>Do you mean the signs and symptoms of anaphylaxis that is attributed to a food allergy exposure?</li> </ul>	<ul style="list-style-type: none"> <li>Practice with an EpiPen®. (Most nodding “yes”.)</li> <li>Crucial signs of allergies. (Most nodding “yes”.)</li> <li>Yes, this will help me decide when to use the EpiPen®.</li> </ul>

### Consultation with a Food Allergy Educator

- 1) In your experience as a food allergy educator, what method of food allergy education is most effective when the audience is elementary school staff?
- 2) Can you tell me about the development of the online allergy parent mentor program you created?
- 3) Do you have a preference of delivering food allergy education in person versus online?

## **Appendix D: Theoretical Framework: Malcolm Knowles's Adult Learning Theory**

The theoretical framework that informed the half-day educational workshop is Malcolm Knowles's Adult Learning Theory (1984). This framework is appropriate for this project because the learners are adults and the focus is related to educating school staff about food allergy management.

Knowles (1984) developed six principles that reflect how adults learn and this theory intentionally recognizes the equality between the teacher and the learner. This two-way process is a less traditional approach than a historical and paternalistic model. Based on humanistic psychology, Knowles's concept of andragogy recognizes the adult learner that is autonomous, free, and growth-oriented (Knowles, 1984). Knowles's six principles of adult learning are:

1. The need for information.
2. Adults have a self-concept of being responsible for their own decisions.
3. The importance of past experiences.
4. The readiness to learn.
5. Orientation to learning.
6. Motivation to learn.

The assumptions that are fundamental in Knowles's Adult Learning Theory are that active adult learning uses approaches that are problem-based and collaborative. The adult learns best when they see the relevance of the information taught to their experience.



The first principle, the need for information, takes into consideration the benefits and significance of the information. It was evident in the literature review and through the formal consultations that knowledge about food allergy management is important to school staff that are taking care of children. The school staff asked for information about how to recognize an allergic reaction in a student and how to properly administer an EpiPen®. This population is internally motivated to learn information about food allergy management and treating an allergic reaction (Knowles, 1984).

The second principle, self-concept, acknowledges that adult learners are self-directed and able to critically appraise evidence and make the decision as to whether the findings are relevant and useful to their current work-related practice. Adult learners can develop skills that allow them to independently investigate and assimilate each experience, both in formal classroom settings and in their everyday lives.

The third principle of adult learning recognizes the importance of one's past experiences on one's future learning (Knowles, 1984). In this project, the teachers can draw on their past experiences with children with food allergies when engaging with workshop activities, and build on that experience using their past as a catalyst.

The fourth principle captures an adult's readiness to learn. Their readiness to learn is enhanced when they can apply the information to help them cope and function in their daily lives (Knowles, 1984). Adult learners are practical and want to learn what they can use in the present, while using their past as a vehicle for change. Therefore, basing information on future initiatives will be less effective than making the information more relevant to their current situation (Knowles, 1984). The school staff requested more

education about food allergy management. They are aware that food allergies in schools are an important topic, because as the prevalence continues to rise, so does the chance of having more children with food allergies in their classrooms.

The requested education about food allergies will assist school staff to recognize the signs and symptoms of an allergic reaction and give them the confidence to administer an EpiPen® should an anaphylactic reaction happen in one of their students.

Knowles's fifth principle involves the adult's orientation to learning. An adult views education as a process that they go through to improve their current situation in life or work (Knowles, 1984). Hence, in this workshop there are activities that actively engage the participants. The workshop has a session on concept mapping, which allows the participants to facilitate and build their own learning through discussing their own personal challenges with each other and then working together to create potential solutions to these challenges.

The final principle is the motivation to learn. The adult learner needs to be motivated internally and externally. Motivation to learn will likely be activated for the adult learner once the first five principles have been met (Knowles, 1984). School staff is more apt to learn and absorb information when they feel internally motivated to do so. It was evident during the consultation with the school staff that they truly care about the well-being of the children they are responsible for. If motivation to learn is not present, due to negative past experiences or the perceived lack of importance of the information, then effective learning will not occur (Knowles, 1984). The participants have

demonstrated this motivation to learn by requesting further education about food allergy management.

## **Appendix E: Model of Instructional Design**

The instructional design model selected to guide the development of the half-day workshop on food allergy management in schools was Morrison, Ross, Kalman, and Kemp's (2013) Model of Instructional Design. This instructional design approach considers "instruction from the perspective of the learner rather than from the perspective of the content" (Morrison, Ross, Kalman, & Kemp, 2013, p. 7). The overall goal of instructional design is to make learning more effective and efficient, in order to meet the needs of the learner (Morrison et al., 2013). Tailoring instructional strategies to coincide with the learner's needs can facilitate the learning process for participants. The participants of this workshop are school staff and mainly teachers whose time is very valuable, therefore, the more efficient and less difficult a learning process is, and the more the material will be accepted and embraced.

Morrison et al.'s (2013) Model of Instructional Design contains five elements that ensure the instructional tool is tailored for the target audience: analysis, design, development, implementation, and evaluation elements that are represented in a circular model (see Figure 1). The inner circle contains nine elements these are: instructional problems, learner characteristics, task analysis, instructional objectives, content sequencing, instructional strategies, designing the message, development of instruction, and evaluation instruments. The middle circle highlights the evaluation and revision elements, which are used to continually reassess the inner nine elements so that improvements are made as needed.

The outer circle addresses the concerns of planning, implementation, project management, and support services that successfully link the target learners with the developed education tool. While each section is addressed below, the circular model is unique to this specific instructional design. The nine elements within this model do not need to be followed in a stepwise linear approach, instead, the elements of this model overlap and interact with each other, which allows for flexibility in the design and evaluation process (Morrison et al., 2013).

### **Instructional Problem**

The first step in effective instructional design is the identification of the problem by carrying out a needs assessment from an identified gap between existing knowledge and the desired outcome. The school staff is concerned that there is a lack of knowledge about how to recognize the signs and symptoms of an allergic reaction and how to properly treat the child during the reaction. Education about food allergy management has been requested from school staff. Once the problem is identified, the need must be examined in order to find the most effective solution. “A need is the gap between what is expected and the existing situation” (Morrison et al., 2013, p. 31). The need that was identified by the school staff is a felt need. A felt need gap is defined as the difference between the current performance and the desired level of performance (Morrison et al., 2013). This felt need was identified through a review of the literature and consultation with the school staff. During the focus group consultation, the school staff expressed that they would embrace learning more about how to recognize an allergic reaction and how to treat a child should an allergic reaction takes place. Additionally, they expressed

interest in learning how to properly give an EpiPen® in the event of an allergic reaction. It became very clear that this issue with food allergy management was two-fold. First, the degree of knowledge about food allergy management was almost non-existent within this focus group. Second, the school staff requested more education about food allergies and they are aware that they need more education to safely manage an anaphylactic reaction and properly use an EpiPen®. The literature review and the semi-structured focus group consultation allowed me to have a comprehensive understanding of the particular learning needs around this topic. Therefore, the information involved in the design of the workshop will meet the needs of the school staff, starting with building a knowledge base about food allergy management and anaphylaxis.

### **Learner Characteristics**

An examination of the learners' characteristics is very important when using this instructional design. The target audience for my workshop is 25 school staff at a local elementary school (grades junior kindergarten through grade eight). When developing my instruction, it was important to examine the unique characteristics of each participant, including profession type, age, past experience, educational level, and working environment. This was important so that the workshop would appeal to each learner in some way. The educational background and preparation of the participants varies, although foundationally they have similar backgrounds. Most of the school staff possesses an undergraduate degree in teaching at the primary level. One teacher possesses a graduate degree in education, and three of the teachers have their principal certification. Two early childhood educators and one resource teacher possess post-secondary

education at the college level. What is common amongst this focus group is that they all have education in the teaching and learning of elementary school children. They all appear to possess leadership qualities and motivation, and to respect one another. I suspect that, given their backgrounds in teaching and learning, they are also comfortable engaging in group work and psychomotor skills. I anticipate an easily motivated group of school staff, given their request of more education regarding food allergies.

### **Task Analysis**

Task analysis is considered one of the most important components in the instructional design process. Task analysis helps determine the knowledge, concepts, content, procedures, and interpersonal skills that are needed for the learner to complete the desired task (Morrison et al., 2013). Topic analysis and procedural analysis were used to develop the food allergy management workshop.

Topic analysis was used to analyze cognitive knowledge and to develop content facts, concepts, and principles associated with food allergy management throughout the workshop. The topic analysis revealed the content focus and the structure of how the components would be presented (Morrison et al., 2013). The content of the half-day workshop was guided by a comprehensive literature review and information from my consultations with key stakeholders. The stakeholders (the food allergy educator and the school staff) suggested that the workshop be face-to-face, and that it include a good knowledge base about food allergy management, recognition of the signs and symptoms of anaphylaxis, and EpiPen® administration. The workshop begins with basic knowledge

and necessary information about food allergy management in school, so that the learner can have a solid foundation and understanding of the topic.

### **Procedural Analysis**

Procedural analysis is used to identify the steps or essential tasks needed to master a psychomotor task. Similar to topic analysis, it is used to consider content structure (Morrison et al., 2013). The sequencing of how to efficiently and effectively administer an EpiPen® is demonstrated during the half-day workshop. This is a skill the school staff should be familiar with in the event a child is having an allergic reaction. The literature and consultation revealed that EpiPen® administration remains a challenge. There is a lack of confidence in how to administer an EpiPen® and uncertainty of when to administer it should a child be experiencing an allergic reaction. It is important to note that a school staff member may go months or years without having the opportunity to administer an EpiPen® to a child having an allergic reaction. Consistent education about the five simple steps to administer an EpiPen® and the opportunity to practice the action of administering it can greatly increase confidence in a person should an allergic reaction occur in a child at school. The school staff expressed a strong desire to learn and practice how to administer an EpiPen® to a child during an allergic reaction.

### **Instructional Objectives**

Instructional objectives stress the importance of developing instructional objectives that indicate what the learner is to accomplish in the cognitive, psychomotor, and affective domains. Objectives provide the learner with what they are expected to know and be able to perform once the workshop is completed (Morrison et al., 2013). The objectives are a guiding tool to help the instructor correctly design strategies and



assessments. The objectives should all be measurable, realistic, and achievable. The design of the workshop could include one or all of the domains to formulate objectives. This half-day workshop includes objectives from all three domains.

### **Cognitive Domain**

The cognitive domain includes an assortment of objectives including knowledge, comprehension, application, analysis, synthesis, and evaluation (Morrison et al., 2013). The half-day workshop highlights this domain by teaching foundational knowledge about the background of food allergies, including prevalence, theories, and myths. The workshop allows time for application, analysis, and synthesis through a concept-mapping session in which any challenges, and methods of how to address these in the school, will be discussed. Evaluations of the participants' learning are continuous throughout the workshop through the electronic polling pre-and post-test questions and reflective questions.

### **Psychomotor Domain**

The psychomotor domain includes the proficiency to complete physical activities (Morrison et al., 2013). The session about the proper administration of an EpiPen® trainer allows the participants to feel what it is like to give an EpiPen® injection.

### **Affective Domain**

The affective domain includes objectives regarding attitudes, beliefs, and values (Morrison et al., 2013). This domain consists of five levels:

1. Receiving
2. Responding
3. Valuing

4. Organizing
5. Characterizing by a value complex

This workshop applies all five levels of this domain. The first level, receiving, includes the motivation to be attentive to an activity (Morrison et al., 2013). This is accomplished by enticing the participants with the interactive electronic polling, and then followed with the informative PowerPoint session on food allergy management in schools. The second level, responding, is continuous throughout the workshop. Responding requires the participants to answer questions or following along during different sections of the workshop. The last three levels are accomplished in the second part of the half-day workshop. The third level, valuing, is attained by the participants through the process of creating their own definition of an allergy champion. This exercise allows them to each to apply new knowledge and support each other in becoming their own definition of a food allergy champion. The remaining fourth and fifth levels are accomplished through the final session of concept mapping related to reflection. The participants have an opportunity to discuss specific challenges they may be faced in their classrooms and create their own solutions together. It is my hope that through this workshop the participants will come to believe and practice what they have learned by applying this new knowledge in their practice. The newly learned role of food allergy champion should become a part of their day-to-day work lives (Morrison et al., 2013).

### **Content Sequencing**

Content sequencing refers to the way information is presented, such that each fact or concept builds on the other in a logical manner, helps the learner meet established objectives, and involves a sequencing strategy (Morrison et al. (2013). The learner-related

sequencing allows the instructor to start with the foundational information of the content, which is necessary before building toward more challenging concepts (Morrison et al., 2013). This workshop is designed based on the learner characteristics discovered through consultation. The workshop flows in an orderly sequence, starting with the facts, background, and theories related to food allergies, building on those throughout the day, and ending with the most difficult content, which is creating solutions to overcome challenges related to food allergies brought forth by school staff.

### **Instructional Strategies**

An instructional strategy takes into consideration the best methods to teach new information to the learner in a meaningful way so that the desired objectives can be achieved (Morrison et al, 2013). The strategies I have used throughout my workshop are intriguing, exceptional, and diverse to ensure all learners successfully take in the content. Some examples of the day include PowerPoint sessions, small-group discussions, an EpiPen® trainer demonstration station, and brainstorming sessions. The workshop begins with an electronic polling session to stimulate the interest of the participants through interactive technology. This is followed by a PowerPoint session developed with fitting slide orientation, so as not to overwhelm the participants. The EpiPen® demonstration is another interactive session to keep the interest of the participants and to allow them to actively be involved with their own learning. The workshop ends with a concept-mapping session, which gives the participants a means to develop their own solutions to their own challenges. Overall the workshop is engaging and promotes a good learning environment.

**Designing the Instructional Message**

When designing the instructional message, the aim must be on translating the plan into an effective information session that will unite the learner and motivate them by highlighting the key messages (Morrison et al., 2013). I used the strategy of pre-instruction. This includes open-ended questions to enhance the learners' awareness of the content and key messages to be discussed. It is not necessary for the learner to answer the questions during the pre-instruction; rather the questions should direct the learner to the key areas of instruction. Headings are also used to indicate the change in topic and provide the learner with an image of how the content is organized. I have selected the appropriate graphics, text, to further enhance the readability and the learners understanding of the instruction (Morrison et al., 2013).

**Development of the Instruction**

The development of the instruction involves implementing the designed instructional message. The instructional designer has to decide how to communicate the information and materials created to the learner in an effective way (Morrison et al., 2013). The instruction for this workshop was developed with the specific participants and learners of elementary school staff in mind. Each component uses language and information at a level that a teacher, ECE, and resource teacher could grasp and understand, omitting any medical terms and abbreviations. Key stakeholders—the school principal, a food allergy educator, and my supervisor—reviewed the workshop content.

The basis of an instructional design is to ensure the instruction is developed to best meet the specific learning needs of the participants. Morrison et al., (2013) discuss several instructional methods. The method most applicable to my educational workshop is

the use of group presentations and small-group learning formats. The workshop incorporates technology and interactive ways of involving the learner to assess the effectiveness of the workshop. The workshop has electronic polling to create two-way dialogue between teacher and learner, and to create an open, active learning environment. The content is visually appealing and designed to ensure the full attention of the participants. The small groups include a hands-on session with tactile and visual stimulation to make the participants aware of how to treat a student having an allergic reaction and the proper use of an EpiPen®. Also, the workshop consists of a concept-mapping and brainstorming session, which allows the participants to discuss their own challenges related to food allergy management at work, along with the development of their own solutions. The small-group reflective and interactive sessions will help learners integrate the new knowledge by allowing participants to discuss the content, share ideas, and problem solve with others (Morrison et al., 2013).

### **Development of Evaluation Tools**

The final step when creating an instructional design is developing the evaluation tools that will be used to assess the outcome of the program. The goal of any educational program is to have successful learning by the learner (Morrison et al., 2013). Evaluating the effect of the designed instruction allows the instructor to improve the workshop. This is why evaluation and revision is an ongoing process that is not linear, but can occur during at any point during the instruction.

There are different types of evaluation in the Morrison et al. (2013) model for instructional design. The most useful form of evaluation depends on the stage of the

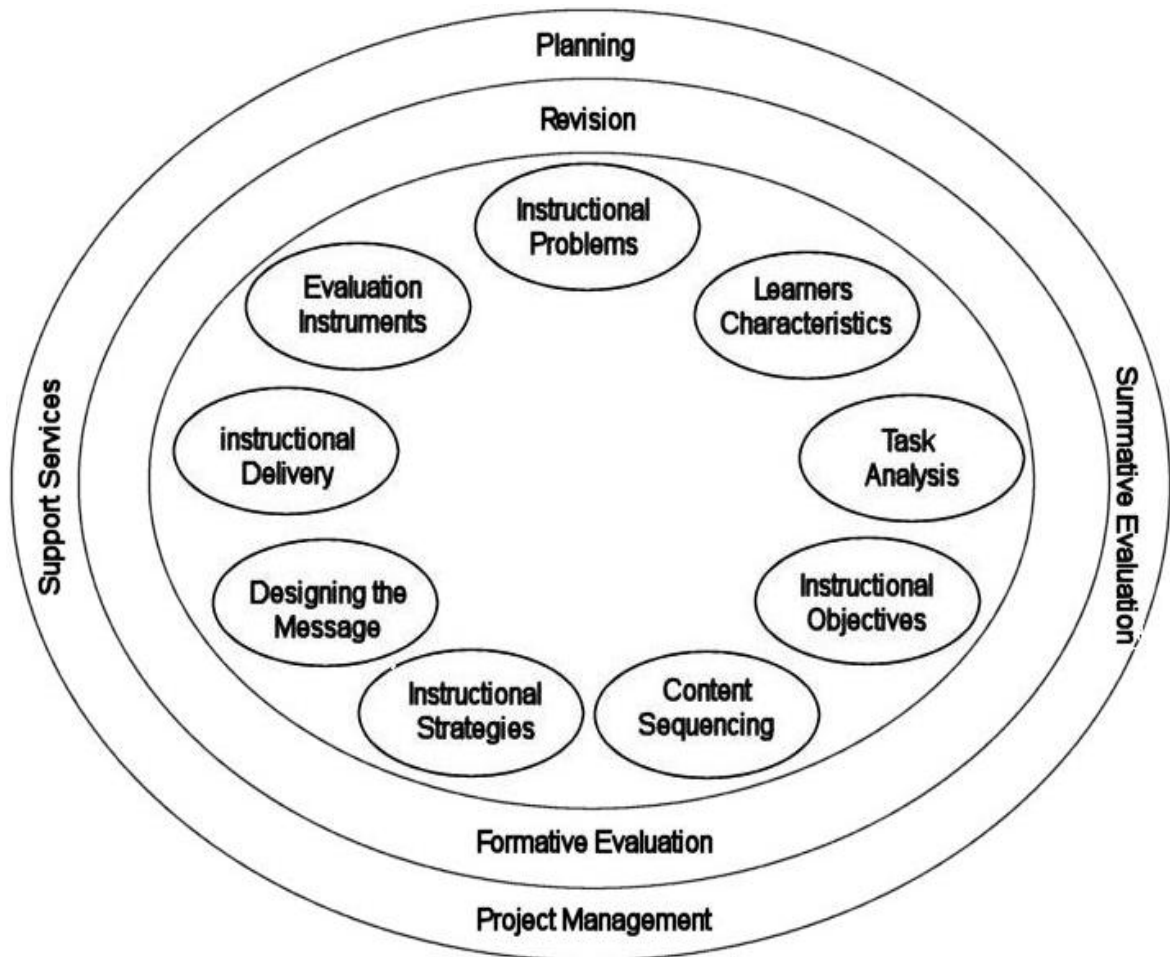
instruction (Morrison et al., 2013). Formative evaluation should be used early in the instruction process to help revise any issues or problems before the workshop is completed. For example, woven throughout the workshop are reflective questions stimulating the learner to reflect and discuss personal thoughts and ideas in relation to the topic learned. Prior to finalizing the workshop, I consulted with key stakeholders and obtained feedback from them on the content chosen and how it would be delivered.

Summative evaluation measures how well the instructional material was mastered and perceived by the learners. Confirmative evaluation focuses on the learners retention of skill or change in knowledge are assessed (Morrison et al., 2013) after this educational workshop through comparing a pre-test given at the start of the workshop to a post-test given at the end. Lastly, a survey is administered to compile feedback from participants on what aspects of the workshop were positive and what aspects needed improvements. The survey is confidential and delivered anonymously. All the information obtained from the final survey is for the facilitator's information only, to improve the workshop for future participants.

### **An Ongoing Process**

The instructional design model chosen has two outer circles that contain components that are part of an ongoing process (Morrison et al., 2013). The nine components are meant to be continuous, and as the instruction changes and evolves, I (the educator) will work through them. My educational workshop is not meant for a large group of people, and it has some costs, such as paid time for staff and possibly for replacement staff, depending on when the workshop is provided during the school year. To date, the goal is to provide this half-day workshop to the school staff in September

2017. The feedback from key stakeholders and the information from my literature review have allowed me to consider potential revisions.



**Figure 1. Model of Instructional Design**  
(Morrison, Ross, Kalman, & Kemp, 2013, p. 12)

## **Appendix F: Workshop Goals and Objectives**

### **Goal**

To increase school staff's knowledge about food allergy management, in order to recognize an anaphylactic reaction in a student and confidently administer an EpiPen® should an allergic reaction occur.

### **Objectives**

Following the completion of this half-day workshop, participants will be able:

- 1) To apply new knowledge about food allergy management in school.
- 2) To effectively administer an EpiPen® trainer.
- 3) To become motivated to undertake the role of “food allergy champion”.
- 4) To be able to identify challenges related to food allergy management in school.

Prior to beginning this half-day workshop, I must:

- Create an agenda for the half-day workshop.
- Book a room and equipment, such as a laptop, projector, speakers, Wi-Fi connectivity, and clickers for interactive polling.
- Communicate with the principal about staff replacement or educational leave for the staff to attend.
- Organize and provide a coffee break halfway through the workshop.
- Set up the room before the workshop starts. Tables are to be placed in a “U” shape or square so that everyone can see each other with me in front of the white/smart board.

## **Food Allergy Management Workshop Agenda**



08:30 – 08:45 Welcome and introduction

08:45 – 09:15 Ice-breaker activity: electronic polling (clickers)

09:15 – 09:30 Background, Sabrina’s Law, theories, and myths (PowerPoint)

09:30 – 09:45 Recognizing anaphylaxis and using epinephrine (PowerPoint)

09:45 – 10:00 Coffee break (allergy-friendly food from SunButter, Made Good, and Enjoy Life)

10:00 – 10:30 EpiPen® trainer demonstration station

10:30 – 10:40 Cross-contamination and risk reduction (PowerPoint)

10:40 – 10:55 Q & A

10:55 – 11:15 Creating food allergy champions (white/smart board)

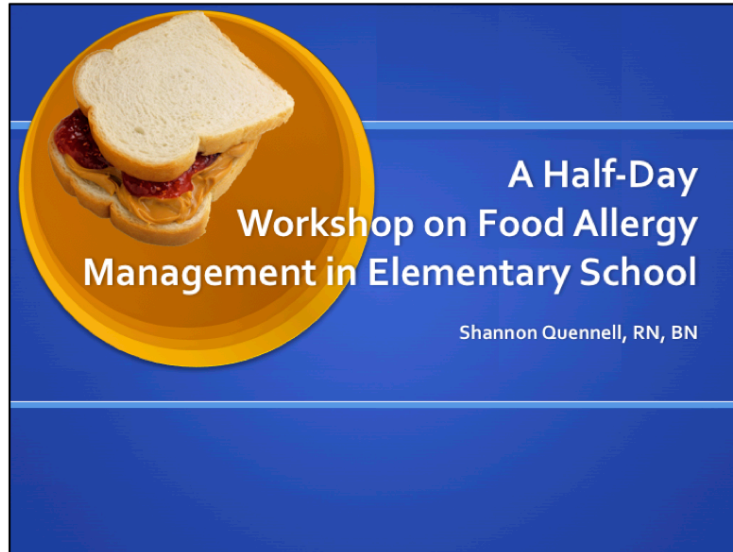
11:15 – 11:45 The challenges of being a food allergy champion (white/smart board)

11:45 – 12:15 Reflection: Where do we go from here? (group discussion)

12:15 – 12:30 Evaluation

## Appendix G: Workshop Presentation

Presentation slides with presenter's notes.



Each attendee will be offered an opportunity to introduce themselves and their background and past experience with food allergies.

## Workshop Agenda

- 8:30 – 8:45 Welcome and introductions
- 8:45 – 9:15 Ice-breaker activity: electronic polling
- 9:15 – 9:30 Sabrina's Law, background, theories, and myths about food allergies
- 9:30 – 9:45 Recognizing anaphylaxis and using epinephrine
- 9:45 – 10:00 Coffee break
- 10:00 – 10:30 EpiPen® trainer station
- 10:30 – 10:40 Prevention and risk reduction

I will have a printed copy of the slides for the school staff, with room to take notes.

## Workshop Agenda

- 10:40 – 10:50 Remaining 5 ice-breaker activity questions
- 10:50 – 11:00 Q & A
- 11:00 – 11:15 Creating food allergy champions
- 11:15 – 11:45 The challenges of being a food allergy champion
- 11:45 – 12:15 Reflection: Where do we go from here?
- 12:25 – 12:30 Evaluation

## Ice-Breaker Activity



The first 5 electronic polling questions

## Reflective Question

- What are you most concerned about when you have a student with food allergies in your class?

End electronic polling session with this reflective question. Brainstorm the answers to this question, write them down, and park them. These answers will contribute to the later morning session "Creating Food Allergy Champions".

## What is a Food Allergy?

- A food allergy is when the body's immune system reacts unusually to specific food proteins.
- The top ten priority food allergens from Health Canada are: egg, milk, soy, wheat, peanut, seafood, sulphites, tree nuts, mustard, and fish.
- Kiwi allergy is on the rise in Canada.
- Lupin allergy is also being recognized. It is a legume that belongs to the peanut family. Lupin is a bean and is often made into a flour and baked in gluten-free foods.

A food allergy is when the body's immune system sees a certain food as harmful and reacts by causing symptoms such as itchy, water eyes, hives, a hoarse throat, feeling like something is not right, dizziness, or passing out.

Health Canada recognizes these 10 food allergens as a priority. Kiwi allergy is documented as being on the rise, and Lupin is soon to be recognized as a priority food allergen. It is a legume that belongs to the peanut family that is made into a flour and baked in gluten-free foods.

These are Canada's priority food allergens. Priority food allergens are different in different countries.

It is important to note that wheat allergy and celiac disease are not the same thing. Lactose intolerance and milk allergy are also different. Wheat and milk allergies are the same as any other food allergy that is an overreaction of the immune system to a food protein and, if accidentally consumed, there is risk of anaphylaxis.

## Sources of Stress with Life-Threatening Food Allergies

- Hyper-vigilance, stigmatization, and social vulnerability are reported sources of stress for individuals and families living with food allergies.
- Awareness about food allergies has at times resulted in a misconception that food allergies are nuisance and inconvenient, rather than a life-threatening condition.
- Evidence shows that children are susceptible to bullying specifically due to food allergy.

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There are many sources of stress for individuals and families with regard to food allergies.

1. The hyper-vigilance of reading food labels, food preparation, eating outside the home, and attending social gatherings with food can be arduous.
2. The literature shows that the misconception that food allergies are a nuisance rather than life-threatening provides another platform for children to bully each other specific to a child's food allergy.

Bullying, teasing, and harassment of children with food allergy appear to be common, frequent, and repetitive. A study published in 2010 by Liberman et al. found that 32.5% of children reported being bullied, and 79% of those stated the bullying was specifically related to their food allergy. As one would expect, evidence shows that bullying significantly decreased the child's quality of life, increased their anxiety, and was a source of stress for them and their families.

3. With the intent to keep students safe, strategies such as allergen-free tables where students can eat their lunch have contributed to undue psychosocial stress by introducing exclusion and discrimination that encourages food-allergy stigmatization. Also, the banning of a food allergen from entering school provides a false sense of security that the environment is free from the banned food allergen. Teaching risk reduction strategies to people in public environments such as school have proven to more effective.

## Sabrina's Law (2005)

- The Ontario government introduced legislation to protect anaphylactic children in 2006.
- "establish and maintain an anaphylactic policy, which must include, among other things, strategies to reduce risk of exposure to anaphylactic causative agents, a communication plan for the dissemination of information on life-threatening allergies, regular training on dealing with life-threatening allergies, a requirement that every school principal develop an individual plan for each pupil who has an anaphylactic allergy and a requirement that every school principal maintain a file for each anaphylactic pupil." (Government of Ontario, 2005).

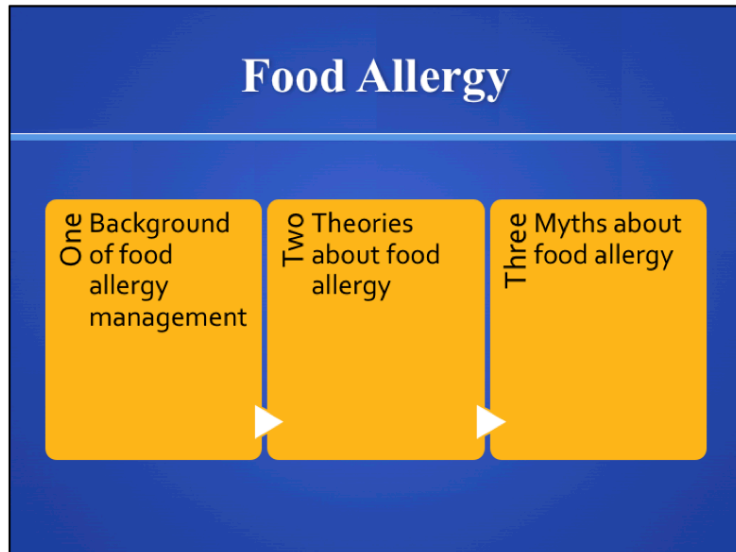
Sabrina Shannon passed away from anaphylaxis as a result of eating at her school cafeteria. Even though she had been taught to self-administer an EpiPen®, she did not have it with her on that day in the cafeteria.

Here at St. Joseph's, anaphylaxis plans are in place for students with known food, insect, and medication allergies. These plans are kept in the office with an EpiPen® attached to the plan.

## Reflective Questions

- What are your thoughts about the location of the anaphylaxis plans and EpiPen® storage?
- What does food allergy management look like on school field trips?
- What about communication hand-offs for supply teachers and other staff that may be stepping in during your absence?

Take a minute and write down your thoughts or concerns that we can discuss in the upcoming segment called "Where do we go from here?".



Now that we have defined what a food allergy is, let's talk about the background, the theories, and any myths about food allergies.

## Background

Context

- Food allergies in children continue to rise, which makes anaphylaxis a growing public health issue.
- While anaphylaxis has the potential to cause death, fatalities are rare and usually avoidable.
- School staff are often first responders to food-allergic reactions in children at school.

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Life-threatening food allergies in children continue to rise, and although there is no one cause as to how an individual develops a food allergy, education, and anaphylactic management strategies can prevent fatalities. Eighty-five percent children with food allergies will have a reaction while in school and for 25% of these children their first reaction will be at school. It's important to recognize that school staff are first responders to medical emergencies when children are at school.



## Global Statistics

- Food allergies are among the most common chronic non-communicable diseases worldwide. Quality data on the prevalence is lacking.
- Prescott et al. (2013) surveyed 89 countries about the health care burden of food allergy and learned that 52/89 did not have any data on food allergy prevalence. Only 10% (9/89) of countries had accurate food allergy prevalence data based on oral food challenges.
- In developed countries, food allergy prevalence is as high as 10% in preschool children.
- Countries such as China, Russia, South Korea, Australia, India, and European regions are also documenting an increase in food allergy.

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A food allergy is when the body's immune system reacts unusually to specific food proteins. It is the most common chronic non-communicable disease globally.

While there have been systemic reviews on food allergy prevalence, these largely capture data from Western Europe and North America, where the majority of these studies were performed a decade ago. Most of these reports are based on self-reported food reactions, rather than objective measures of true IgE-mediated blood test, or the now gold standard of oral food challenges.

## Currently in Food Allergy

- Globally there is a growing incidence of food allergy that is predicted to rise over the next 10 years.
- Food allergy has come into view over the last 10-15 years as a 'second wave' of allergic epidemic.
- Approximately 2.5 million Canadians are diagnosed with a food allergy.
- 300,000 are children under 18 years of age.
- There is no cure. Avoidance of known food allergens decreases the risk of anaphylaxis.
- Oral immune therapy (OIT) is challenging established thinking about desensitization

Food allergy has been identified in the literature as an unanticipated “second wave” of a food allergic epidemic. There was a time in the late 1980s and early 1990s that children “outgrew” their food allergy. Studies have shown that this is now less likely.

The statistics on this slide are mostly self-reports. However, oral food challenge is becoming more popular to achieve a proper diagnosis. These statistics are published from 2010 and Health Canada is set to publish new statistics in 2018 and are expected to be more accurate due to a wider clinical picture of IgE blood testing and oral food challenge.

### Reference

Prescott, S., & Allen, K. J. (2011). Food allergy: riding the second wave of the allergy epidemic. *Pediatric Allergy And Immunology*, 22(2), 155-160. doi:10.1111/j.1399-3038.2011.01145.x

## Food Allergy Theories

- Genetically modified foods.
- Hygiene Hypothesis.
- Genetics.
- Pregnancy and food avoidance.
- Currently no one knows exactly what is causing people to develop food allergies. It is likely a combination of many factors.

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There are many theories about why food allergies exist and continue to rise.

**GMO:** During the late 1980s and early 1990s genetically modified crops were engineered to grow faster and bigger. Food allergies, such as peanut allergy, doubled between 1997 and 2002.

**HYGIENE:** The hygiene hypothesis is the idea that we keep our houses and environment too clean and therefore the immune system is underdeveloped and turns on itself by reacting to food proteins that would normally be safe.

**GENETICS:** Evidence suggests that if one parent has allergies of any type there is a 1 in 3 chance that each child will have an allergy. The specific allergy is not inherited from the parent(s). This only indicates a predisposition and is not an entire explanation to cause of allergies. There are many parents with no food allergies and none in the family, yet their child does have food allergies.

**PREGNANCY:** Controversy remains when it comes to avoiding the top priority allergens during pregnancy and during breastfeeding. Two studies exist, one from the UK and one from Quebec, that contradict one another as to avoid peanuts or not during pregnancy. The results of the research are ambiguous and more studies are currently taking a closer look at this question.

## Food Allergy Myths

- Lactose intolerance and milk allergy are the same thing.
- Food allergies are not real.
- Benadryl® is a good first response for anaphylaxis.
- Food allergies are not life-threatening.

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1. Milk allergy is a reaction by the body's immune system to one or more milk proteins and can be life-threatening when just a small amount of milk or milk product is consumed. People with lactose intolerance may feel uncomfortable after consuming milk and milk products, but it is usually not life-threatening and does not need to be treated with epinephrine.

2. Food allergies are very real, and involve the body's immune system. The immune system misinterprets a food as a harmful invader and releases histamine (and other chemicals) to protect itself.

3. Epinephrine (adrenaline), a self-injectable medication, should always be the first-line treatment for severe or life-threatening allergic reactions (anaphylaxis). All other drugs have a delayed onset of action.

4. Until 2014, there was no Canadian data collected about deaths from anaphylaxis. A retrospective study revealed 92 deaths in the last 26 years. Of these cases, 40 were reactions from food allergies. It is important to note that information on fatal anaphylaxis is limited. Prior to 2003, the term anaphylaxis had not been recognized by the coroner's electronic database and cause of death may have been described as insect bite, allergic reaction, or allergy-related death.

### Reference

Xu, Y. s., Wasserman, S., Harada, L., & Kastner, M. (2012). Anaphylaxis-related deaths in Ontario: a retrospective review of cases from 1986 to 2011. *Allergy Asthma and Clinical Immunology*, 8(1), doi: 10.1186/1710-1492-8-s1-a8

# Anaphylaxis

- Anaphylaxis is the most severe type of reaction.
  - It affects different body systems
  - It is unpredictable in nature
  - It can be life-threatening
- ✓ Immediate treatment is necessary.

Anaphylaxis is the body's way of reacting to something it does not recognize. It involves more than one body system such as respiratory (breathing), gastrointestinal (stomach), cardiovascular (heart), and or neurological.

Anaphylaxis is unpredictable in nature. Reactions can occur immediately after an exposure with an allergen or be delayed. If not treated immediately anaphylaxis has potential to lead to death. It is important to note that regardless of a previous history no two reactions are the same from person to person or in the same individual.

# Anaphylaxis

SKIN	RESPIRATORY	GASTROINTESTINAL	CARDIOVASCULAR	NEUROLOGICAL
hives, swelling, itching, warmth, redness	coughing, wheezing, shortness of breath, chest pain or tightness, throat tightness, trouble swallowing, hoarse voice, nasal congestion or hay fever-like symptoms, (sneezing or runny or itchy nose; red, itchy or watery eyes)	nausea, stomach pain or cramps, vomiting, diarrhea	dizziness/ lightheadedness, pale/blue colour, weak pulse, fainting, shock, loss of consciousness	anxiety, feeling of "impending doom" (feeling that something really bad is about to happen), headache
				OTHER
				uterine cramps

This is a great graphic that breaks down all the different body systems involved during an anaphylactic reaction. What is key here is that an individual may experience different symptoms for each reaction they have.

Permission for this graphic was obtained June 5, 2017 from Food Allergy Canada. (Bantock, 2017)

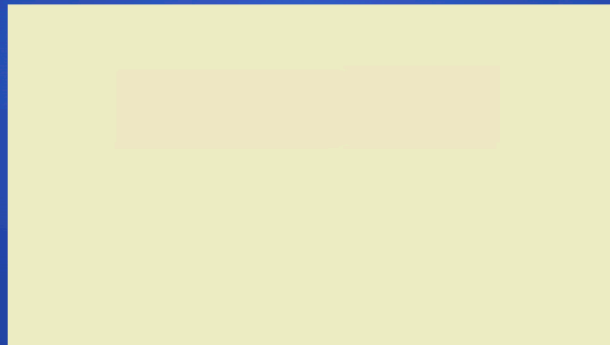
## Describing Symptoms

- Children may describe their symptoms differently than adults.
  - My mouth is itchy or it feels funny
  - My mouth is burning or hot
- Excessive drooling and sudden fatigue are symptoms of anaphylaxis.
  - Squeaky hoarse voice.
  - Slurred speech
- They may not be sure what they are feeling therefore, it is important to think "allergic child" first.

Elementary school-aged children may use unexpected language to describe an allergic reaction. Some examples include: (read a couple examples from above).

What is really important when a child comes to you feeling unwell is to think allergy first.

## Key Points: Anaphylaxis



This is a YouTube video developed by Food Allergy Canada in 2014 that offers the key messages about anaphylaxis.

Permission for this video was obtained June 5, 2017 from Food Allergy Canada. (Bantock, 2017)

# Epinephrine

- The first-line of treatment of anaphylaxis.
- An EpiPen® immediately starts reversing the symptoms of an allergic reaction.
  - It opens the airway and increases the blood pressure.
  - Giving an EpiPen® earlier decreases the risk of a negative outcome. Hesitation and waiting to see if the anaphylactic symptoms progress further puts the individual at serious risk.
- Call 9-1-1 and, if symptoms do not improve, give another EpiPen® as soon as 5 minutes after the first injection.
- ✓ There is no role for antihistamines like Benadryl® during an anaphylactic reaction.

An EpiPen® is a life-saving medication that reverses the symptoms of anaphylaxis. It opens up the airway, improves blood pressure, and accelerates the heart rate. Epinephrine is the drug form of a hormone that is naturally produced in the body. Possible side effects of epinephrine include increased heart rate, dizzy, weakness, tremors, and headache. The effect of epinephrine wears off within a few minutes to half an hour.

There is one brand currently available in Canada and that is the EpiPen® auto-injector. It is highly recommended to carry two EpiPens® in the event a second one is required during an anaphylactic reaction.



## Five Emergency Steps

1. Give an EpiPen® at the first sign of an allergic reaction.
2. Call 9-1-1.
3. If the symptoms do not improve, give a second EpiPen® as early as 5 minutes after the first injection.
4. Go to the nearest hospital, preferably by ambulance.
5. Call the emergency contact person.

Food Allergy Canada recommends using these five emergency steps to treat an anaphylactic reaction. This is the type of information that should be written on an anaphylaxis plan.

\*\*If the symptoms of anaphylaxis subside, is follow up at the nearest medical center necessary?

## If Anaphylaxis Occurs...

- You are in charge!
  - This is not a time for negotiation:
    - "I think you need your EpiPen®, what do you think?"
    - Your students can interpret facial expressions and body language. Talk calmly with reassurance.
- Put the emergency plan into action.
- Practice often.

What is important to understand when someone is having an anaphylactic reaction is that you are in charge. Remain as calm as possible and give clear direction, such as 1) let's sit or lie down, 2) you are going to be okay, 3) I am going to give you your EpiPen® now.



## The EpiPen®

The 0.3 mg dosage is for adults and children weighing 30 kg (66 lbs) or greater.



The 0.15 mg dosage is for children weighing between 15 and 30 kg (33 and 66 lbs).



[www.epipen.ca](http://www.epipen.ca)

(Food Allergy Canada, 2017) 26

This slide demonstrates the two different EpiPen® dosages. EpiPen® contains a single pre-measured dose of epinephrine.

EpiPen® with a yellow label has a dosage of 0.3 mg for adults and children weighing 30 kg (66 lbs) or greater.

EpiPen® Jr. with a green label has a dosage of 0.15 mg for children weighing between 15 and 30 kg (33 and 66 lbs.)

Note: Sometimes people are prescribed the adult dose at a smaller weight than shown here. Use what was prescribed.

Permission for this graphic was obtained June 5, 2017 from Food Allergy Canada (Bantock, 2017).

## Blue to the Sky...Orange to the Thigh



(Food Allergy Canada, 2017) 27

Here, this graphic shows a visual as to how to operate an EpiPen®. Hold firmly with orange tip pointing downward.

- 1) Remove blue safety cap by pulling straight up. Do not bend or twist. To reduce the chance of an accidental injection, do not touch the orange end of the auto-injector, which is where the needle comes out.
- 2) It is recommended to carry two EpiPens® in the event that the first one is dropped or malfunctions, or in the event the symptoms do not subside before EMS arrives.

Permission for this graphic was obtained June 5, 2017 from Food Allergy Canada (Bantock, 2017).

## Place and Push



Place and push **orange** tip firmly into mid-outer thigh until you hear a "click". Hold on thigh for several seconds.

Remember, "**blue** to the sky, **orange** to the thigh".

(Food Allergy Canada, 2017) 28

What is important in this slide is to show the person sitting down or better yet lying down. Lying down is preferred in case the anaphylactic individual vomits or to accommodate a sudden drop in blood pressure.

- 1) Place and push orange tip firmly into mid-outer thigh until you hear a "click".
- 2) Hold on thigh for several seconds.
- 3) When the EpiPen® is removed, the orange needle cover automatically extends to cover the needle. This means that the needle is never exposed or seen.

Permission for this graphic was obtained June 5, 2017 from Food Allergy Canada (Bantock, 2017).

## Coffee Break



Please explore and enjoy some of the top allergen-free snacks and beverages on the back table.

These snacks are provided by SunButter (sunflower seed), Enjoy Life, and Made Good.

## EpiPen® Trainer Demonstration

- Let's practice!!

# Classroom Management

- Cross-Contamination
- Risk Reduction Habits
- Ideas?

The next few slides will look at classroom management strategies.

## Cross-Contamination

- Food to Food
  - Do not pick food allergens out of food (e.g., eggs out of salad).
  - Dipping one food into another.
- Objects and Surfaces
  - Cutlery, cookware, and surfaces.
- Saliva
  - Oral hygiene is important.
- Unusual Sources
  - Ant traps, pet food, ground covers, skin cream, and craft supplies.

Some of these practices already occur here at the school. When I started educating myself about food allergies some of the information that surprised me was the unusual places that nut butters are used such as ant traps, and Jules's (the class tortoise) ground cover was made of walnut shells. Can you think of any that you know of that I have missed?

## Good Risk Reduction Habits

- Good risk reduction habits can prevent accidental exposure.
  - Wash hands before and after eating.
  - No food or drink sharing.
  - Only eat approved foods.
  - Wear a MedicAlert® and carry an EpiPen®.
  - Encourage children to tell others about their allergies and to report instances when they feel they are at risk.

Children with food allergies should be taught these risk reduction strategies:

-Wash hands with soap thoroughly before and after eating to reduce the risk of cross-contamination (hand sanitizer is not effective at removing allergens).

-Avoid food and drink sharing. This is already an established school rule. Taking this one step further, children should not be offering any food and drink to each other.

-Children should be taught to politely say “no, thank you” and check with a trusted grown-up that knows about their allergy.

-No EpiPen® = no eating!!!

## Ice-Breaker Activity



The last 5 electronic polling questions

## Q & A

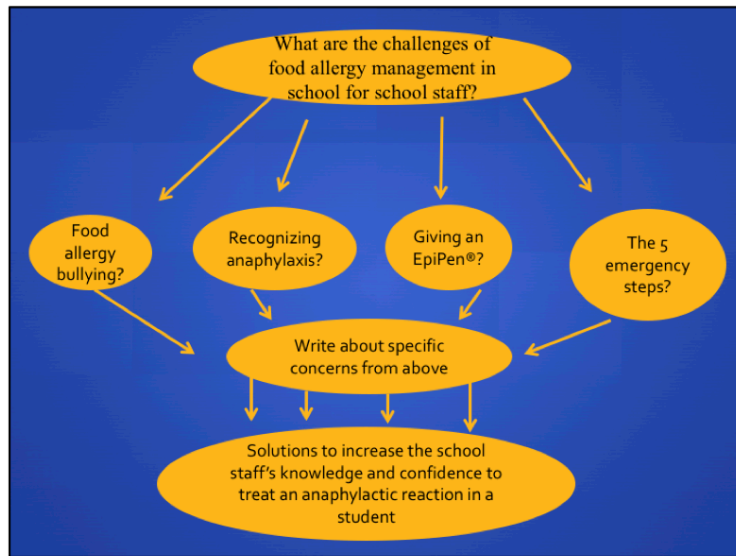


An opportunity to ask any questions before the next segment.

## Food Allergy Champions

- Review the brainstorming ideas from the reflection question provided earlier in the session.

Let's look at the reflection question asked earlier by concept mapping. What are you most concerned about when you have a student in your class with food allergies?



## Where Do We Go from Here?

- Let's look at the following reflective questions from earlier:
  - 1) What are your thoughts about the location of the anaphylaxis plans and EpiPen® storage?
  - 2) What does food allergy management look like on school field trips?
  - 3) What about communication hand-offs for supply teachers and other staff that may be stepping in during your absence?

Let's review some of the answers or concerns from the reflective questions and discuss "Where do we go from here?"



## Evaluation

- Please take a few minutes and provide feedback about today's workshop.

Fill out the provided paper evaluation form

## Thank you

- Thank you for sharing your time with me to learn more about food allergy management.
- I would like to acknowledge Food Allergy Canada, specifically Laura Bantock.
- Please do not hesitate to contact me if you have any questions or concerns regarding food allergies in the future.
- [shannonquennell@icloud.com](mailto:shannonquennell@icloud.com)

## **Appendix H: Electronic Polling Questions**

### **Ice-Breaker Activity Pre-Test: Electronic Polling Questions**

#### **Learning Objective**

- To pique the participants' interest in the topics to be discussed in the workshop. It is not important that school staff know the answers to the questions, but that the questions get them thinking about food allergies.

1. Do you know someone with a food allergy?

- a) Yes
- b) No

2. What are the most common food allergies in Canada? Choose the correct combination.

**Answer:** Sulphites, Mustard, Wheat, Peanut, Egg, Milk, Tree Nuts, Soy, Sesame, and Seafood.

- a) The answer.
- b) Peanut, Coconut, nutmeg, sulphites.
- c) Soy, gluten, peanut, nitrates.
- d) Kiwi, lupin, nutmeg, tree nuts.

3. Is lactose intolerance the same as a milk allergy?

**Answer:** No. Allergies affect different systems in the body. Intolerances are generally associated with the digestive system such as an upset stomach and do not require epinephrine.

- a) Yes, the symptoms are the same.
- b) The answer.
- c) Food intolerances are indicated by a rash and itchy, watery eyes.
- d) Lactose intolerance symptoms usually start with difficulty breathing.

4. Are peanuts the most serious allergy of all?

**Answer:** No, all allergens can be serious and cause anaphylaxis.

- a) Yes.
- b) No, wheat allergy is more serious.
- c) The answer.
- d) No, milk allergy is more serious.

5. Are tree nuts, peanuts, and coconut the same thing?

**Answer:** No, they are all different. Someone can be allergic to one, but not the other. Peanuts are a legume, while tree nuts are nuts. Coconut is a fruit.

- a) Yes.
- b) The answer.
- c) Tree nuts and coconut are the same, but peanut is different.
- d) Tree nuts and peanut are the same, but coconut is different.

### **Post-Test: Electronic Polling Questions**

6. What are three things people can do to decrease cross-contamination with food allergens?

**Answer:** Wash hands, do not share food or drinks, and wipe down surfaces.

- a) The answer.

- b) Nothing, food allergens are present everywhere and unable to be controlled.
- c) Wash hands, share food, and wipe down surfaces.
- d) None of the above.

7. What are some symptoms of anaphylaxis?

**Answer:** Hot mouth, itchy mouth, coughing, wheezing, increased weakness, feeling of doom, blue lips, and hives or rash.

- a) The answer.
- b) Digestive symptoms such as cramps, diarrhea, nausea.
- c) All of the above.
- d) None of the above.

8. Why is an EpiPen® so important?

**Answer:** It is the first-line medication to treat anaphylaxis. It works immediately to increase the blood pressure, and open up the airway.

- a) It stops vomiting and diarrhea.
- b) The answer.
- c) It's not. Antihistamines like Benedryl® are preferred
- d) All of the above

9. What are the basic steps to administer an EpiPen®?

**Answer:** Child lying down, firm grip on the EpiPen®, press (blue to the sky, orange to the thigh), hold for several seconds. Give a second EpiPen® if the symptoms are not subsiding within 5 minutes.

- a) Child standing up, orange to the sky, blue to the thigh, call 9-1-1.
- b) Child sitting, call 9-1-1, give Benedryl®.
- c) The answer.
- d) None of the above.

10. What is the follow-up after an EpiPen® administration?

**Answer:** Remain in a lying-down position, travel to the hospital, preferably by ambulance. Phone the emergency contact.

- a) The answer.
- b) Call the emergency contact first on the anaphylaxis plan.
- c) When the ambulance arrives, help walk the child to the stretcher.
- d) None of the above.

## Appendix I: Workshop Evaluation Questionnaire

### Evaluation Form

1	Strongly Agree
2	Agree
3	Unknown
4	Disagree
5	Strongly Disagree

Please insert the appropriate number in the box for each statement

1. The workshop met your expectations.	
2. The material was presented in a logical manner.	
3. I was satisfied with the content of each session.	
4. I feel I have increased my knowledge base regarding food allergy management.	
5. The interactive sessions (electronic polling, EpiPen® trainer station, concept-mapping) facilitated my understanding of food allergy management.	
6. I feel equipped to educate other school staff, peers, or students about the signs and symptoms of anaphylaxis and proper EpiPen® administration.	
7. I feel motivated and prepared to promote food allergy management in school as a food allergy champion.	

**What part of the workshop was most interesting to you?**

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**What part of the workshop was least interesting to you?**

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**What would you change or suggest about the workshop?**

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### **Appendix J: Permission to Use Copyrighted Material**

Permission was obtained from Laura Bantock to use various graphics from Food Allergy Canada in the workshop and practicum presentations.

### Appendix K: Health Research Ethics Authority Screening Tool

	Question	Yes	No
1.	Is the project funded by, or being submitted to, a research funding agency for a research grant or award that requires research ethics review?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2.	Are there any local policies which require this project to undergo review by a Research Ethics Board?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<b>IF YES</b> to either of the above, the project should be submitted to a Research Ethics Board. <b>IF NO</b> to both questions, continue to complete the checklist.	<input type="checkbox"/>	<input type="checkbox"/>
3.	Is the primary purpose of the project to contribute to the growing body of knowledge regarding health and/or health systems that are generally accessible through academic literature?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.	Is the project designed to answer a specific research question or to test an explicit hypothesis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5.	Does the project involve a comparison of multiple sites, control sites, and/or control groups?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6.	Is the project design and methodology adequate to support generalizations that go beyond the particular population the sample is being drawn from?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7.	Does the project impose any additional burdens on participants beyond what would be expected through a typically expected course of care or role expectations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>LINE A: SUBTOTAL Questions 3 through 7 = (Count the # of Yes responses)</b>		<b>1</b>	
8.	Are many of the participants in the project also likely to be among those who might potentially benefit from the result of the project as it proceeds?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9.	Is the project intended to define a best practice within your organization or practice?	<input checked="" type="checkbox"/>	
10.	Would the project still be done at your site, even if there were no opportunity to publish the results or if the results might not be applicable anywhere else?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.	Does the statement of purpose of the project refer explicitly to the features of a particular program, organization, or region, rather than using more general terminology such as rural vs. urban populations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12.	Is the current project part of a continuous process of gathering or monitoring data within an organization?		<input checked="" type="checkbox"/>
<b>LINE B: SUBTOTAL Questions 8 through 12 = (Count the # of Yes responses)</b>		<b>4</b>	
	<b>SUMMARY</b> <b>See Interpretation Below</b>		

#### Interpretation:

- If the sum of Line A is greater than Line B, the most probable purpose is **research**. The project should be submitted to an REB.



- If the sum of Line B is greater than Line A, the most probable purpose is **quality/evaluation**. Proceed with locally relevant process for ethics review (may not necessarily involve an REB).
- If the sums are equal, seek a second opinion to further explore whether the project should be classified as Research or as Quality and Evaluation.

**These guidelines are used at Memorial University of Newfoundland and were adapted from ALBERTA RESEARCH ETHICS COMMUNITY CONSENSUS INITIATIVE (ARECCI). Further information can be found at:**  
<http://www.hrea.ca/Ethics-Review-Required.aspx>.

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