

EFFECTS OF FOOD ALLERGEN LABELS ON HEALTH OF CANADIANS

'EVERYBODY ELSE GOT TO HAVE THIS COOKIE':
THE EFFECTS OF FOOD ALLERGEN LABELS
ON
THE WELL-BEING OF CANADIANS

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A Thesis
Submitted to the School of Graduate Studies
in Partial Fulfillment of the Requirements
for the Degree
Master of Arts
McMaster University
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MASTER OF ARTS (2011)
(Geography)

McMaster University
Hamilton, Ontario

TITLE: 'Everybody Else Got To Have This Cookie': The Effects of Food Allergen Labels
On the Well-Being of Canadians

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NUMBER OF PAGES: viii, 124

ABSTRACT

The Canadian prevalence for all food allergies is estimated to be 7.5%. The only management strategy for an allergic individual is a strict avoidance diet, which is heavily reliant on the effectiveness of food labels used on commercial food products. This thesis explores the effects of food allergen labels on the well-being of affected Canadians, using a social constructionist framework and a mixed methods approach.

The quantitative portion of this study drew upon primary survey data. Respondents were asked to self-report household allergic status, as well as purchasing behavior and attitudes towards precautionary statements (n=1380). Results from the quantitative analysis were used to inform and develop the qualitative interview schedule for the second phase of this thesis. Qualitative interviews in a grocery store setting were conducted with 12 anaphylactic individuals, or parents of anaphylactic children. Respondents were observed during the course of product selection and questioned about their shopping habits, perceptions of and preferences for allergen labels.

Results indicate that current Canadian allergen labels are not as effective as expected, since affected consumers reported not heeding precautionary statements. Allergic families were found to be less diligent than indirectly affected families, and also less likely to find precautionary statements helpful. Through qualitative interviews, it was found that prior experience, not allergen information, is the primary factor guiding purchasing decisions. Even though precautionary statements were found to be easy to understand, terminology, font sizes, and contrast issues on labels were reported to be key areas of improvement. Results from the two phases reflect differences in individuals' social constructions of risk, which ultimately shape purchasing and consumption behaviors.

This research is the first to explore the effects of allergen labels on affected Canadians, using a social constructionist approach. Ultimately, results will help effective policy change in Canada and help affected consumers make safe consumption choices. This research contributes to the number of health studies that utilized a mixed methods approach, which is an emerging paradigm. The use of mixed methods allowed for extension and refinement of results. Future research directions identified in this research include the need for pharmaceutical labeling in Canada, as well as the need to explore purchasing behaviors of indirectly affected families, as they also utilize allergen labels to guide consumption choices when shopping for allergy-controlled environments.

ACKNOWLEDGEMENTS

First and foremost, I would like to thank my supervisor, Dr. Susan Elliott for her guidance, encouragement and incredible patience since Day 1, and for opening doors to countless opportunities. Your generous support has helped me overcome tough times, both academically and personally.

My family and friends have also been an important source of support, especially my parents, Carol & Anthony. Thank you for being an unwavering source of love and encouragement. I would also like to thank the BSB/ 339 crew: Dan, Francesca, Huyen, Jen, Kate, Kim, Michelle, Morgan, Sarah A., & Sara E. I am grateful to have met every single one of you, and would like to thank you all for an excellent blend of friendship, advice and gossip.

I would like to thank my committee: Nancy, Bruce, and Walt, for the wonderful and stimulating discussions we had about the project; Anaphylaxis Canada and the Niagara regional anaphylaxis support group, for their help with recruitment; my funding agencies: the Social Sciences & Humanities Research Council (SSHRC) and AllerGen NCE; and my participants, for opening up and sharing their stories with me.

Lastly, I would like to thank James, without whom, I wouldn't be here today.

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CHAPTER ONE

Introduction

1.1 Research Context

Food allergy represents an abnormal adverse response to foods mediated by the immunological system (Sicherer et al., 2000). Reactions may affect multiple body systems, and in its most severe form (i.e. anaphylaxis), they induce respiratory distress, which can be life-threatening (Sicherer, 2002; Papageorgiou, 2002).

International studies estimate food allergy prevalence to be 2.5% among adults and 6 – 8% among children (Papageorgiou, 2002). The numbers range from 6 – 8% in American studies (Sicherer et al., 2006) to 0.3% in Mediterranean studies (Gelincik et al., 2008). A Canadian study conducted in 2008 estimated the Canadian prevalence rate to be around 1% for peanut allergies but 6 – 8% for all food allergies, i.e.: peanut, tree nut, sesame, fish, and shellfish allergies (Ben-Shoshan et al., 2010). From the study, it was found that prevalence was higher in children than adults for peanut, tree nut, and sesame allergy; and vice versa for fish and shellfish.

Several studies from Western countries suggest that the prevalence of food allergy is increasing. For example, recent research in the United States reported an 18% increase in allergies among school-aged children in the past decade (Young et al., 2009), while one from the United Kingdom reported a 2-fold increase in peanut allergies in two cohorts of children born 3 years apart, from 0.5% to 1.0% (Grundy et al., 2002). Although there is currently no study that documents temporal trends in Canada, there is no reason to suspect that trends would be dissimilar here.

There is no cure for food allergies, and medications are only available for acute treatment of reactions following accidental ingestion. If given immediately at the first sign of an anaphylactic reaction, medications can delay the onset of symptoms and provide temporary supportive treatment until emergency care arrives (Anaphylaxis Canada, 2009). Since there is no cure for food allergies, the only management strategy for allergic individuals is to follow strict avoidance diets in order to prevent accidental ingestion. The success of this difficult task is heavily dependent on the effectiveness of food labels used on commercial food products.

Risk of consumption is communicated through two different types of labels on prepackaged products: ingredient lists and allergen precautionary statements. An ingredient list declares all ingredients used during the manufacturing process. An allergen precautionary statement is a declaration of the possible inadvertent presence of an allergen in the food, not used as an ingredient. When used, they alert consumers to the possible risk of allergen exposure, and prevent consumption by affected individuals (Health Canada, 2007).

Food allergen precautionary statements are not only used by food allergic individuals and/ or their caregivers. They are also used by consumers that are indirectly affected by food allergies. These are consumers that do not have an allergic member in the family, but have responsibilities preparing food for an allergic individual, or an allergy-controlled environment, such as a school setting or a social gathering.

1.2 Research Rationale

In Canada, the need for revising allergen labeling regulations was recognized in 2008. Since then, Health Canada has taken steps to address stakeholders' concerns and

identify possible measures to increase labeling accuracy. In February 2011, Health Canada officially published amendments to the *Food and Drugs Regulations*, to be enforced by August 14th 2012. Prior to enforcement, prepackaged foods will continue to be required to carry a label listing ingredients in decreasing order of proportion, with some exempted ingredients. After the enforcement of the new amendments in August 2012, prepackaged products will be required to declare the presence of priority allergens (as defined by Health Canada) or gluten, if present, in the ingredients list, as an allergen list, or both (Health Canada, 2011). There will be no more exempted ingredients to the declaration. However, the use of precautionary statements suggesting possible cross-contamination remains unchanged, and will continue to be a *voluntary* risk management tool in addition to the basic labeling requirements (Health Canada, 2007).

Precautionary statements were welcomed by allergic consumers when they were first introduced. Since then, there has been an increase in the variety of statements issued. These include ‘may contain [allergen]’, ‘may contain traces of [allergen]’, ‘manufactured in a facility that processes [allergen]’, and other variations (Health Canada, 2009 [A]). The large variety of precautionary statements leaves consumers confused about the potential risks associated with consumption. A study undertaken by Health Canada suggests that manufacturers overuse precautionary labeling, leading to unnecessary restrictions in food choices for those affected (Health Canada, 2009 [B]).

Although amending the Canadian food allergen labeling system is a good step forward, it does not address the use of precautionary statements. In addition, there is currently no study that addresses the perceptions of and preferences for allergen labels on packaged foods in Canada, from the consumer’s point of view. This gap in literature must

be addressed in order to guide effective policy change and improve the quality of life for those affected. By exploring preferences of affected consumers and understanding difficulties encountered when they utilize allergen labels, policies can be designed to improve risk communication, minimize accidental ingestion, and guide safe consumption.

This thesis will attempt to fill this gap, using a mixed methods approach. Specifically, this thesis will address three research objectives:

- (1) To investigate factors affecting Canadians' perceptions of precautionary statements, and their purchasing behaviors of products carrying these statements;
- (2) To explore the lived experiences of individuals directly affected by food allergies; and
- (3) To identify areas of improvement for allergen labeling to maximize effective risk communication and potentially reduce adverse events.

1.3 Research Contributions

This research will make substantial, theoretical, and methodological contributions. Substantively, this research contributes to the current gap in the literature pertaining to perceptions of allergen labels by Canadian consumers, as well as purchasing behavior of products labeled with various precautionary statements. This is useful in guiding effective policy change, and ultimately helps allergic families and parents of school-aged children make safe consumption choices.

Theoretically, this research will adopt the social constructionist theory in the context of food allergies. This theory explores personal meanings in space that make individual behavior rational, as personal perception of risks guide health related behaviors. In this context, individuals' experiences interacting with food allergen labels

will shape consumption and purchasing behavior, which has a direct influence on the well-being of allergic consumers. This study is the first to adopt the social constructionist approach in the area of food allergen labeling in Canada.

Methodologically, this research adopts a mixed methods approach by drawing upon both quantitative and qualitative data. The emerging mixed methods paradigm in health research is still widely debated, and this research contributes to the number of health studies that utilizes mixed methods.

1.4 Chapter Outline

This thesis comprises five chapters: Chapter 2 presents a review of the literature related to food allergies, allergen labeling, and consumers' purchasing behavior and preferences for allergen labels. This review highlights the theoretical and substantive components of previous work, and looks to examine the gaps in the literature that this research will fill.

Chapter 3 reviews the research design and methodology adopted for data collection and analysis. The development of a qualitative data collection tool informed by quantitative data is discussed, and sample characteristics are also presented.

Chapter 4 presents the findings from this research, examining results from a large scale survey and from the analysis of interview transcripts. This section will highlight similarities and differences from the two different samples. Chapter 5 concludes the thesis by reviewing the major findings and discussing how they relate to the overall research objectives. The thesis concludes with an examination of policy implications of this research, as well as future directions for research.

CHAPTER TWO

Literature Review

2.1 Introduction

A food allergy is an abnormal adverse reaction to foods mediated by the immunological system, and can be life-threatening (Sicherer et. al., 2000, Papageorgiou, 2002). The international prevalence rate is estimated to be 2.5% among adults and 6 -8% among children (Papageorgiou, 2002). The Canadian prevalence rate, as estimated by a 2008 national study, is 6 – 8% for all food allergies, with peanut, tree nut, and sesame allergy being more prevalent among children than adults (Ben-Shoshan et al., 2010). Since there is currently no cure for food allergies, the only management strategy for allergic individuals is to follow strict avoidance diets in order to prevent accidental ingestion (Anaphylaxis Canada, 2009). As purchasing and consumption behavior are very much guided by the individual's perception of risk, it is of paramount importance that food allergen labels on commercial food products are accurate representations of risk.

This chapter examines literature relevant to food allergies, food allergen labeling, consumers' perceptions of allergen labels, as well as the current Canadian and international labeling environments. This will be followed by a review of the theoretical framework underlying the research.

2.2 Food Allergy & Prevalence

2.2.1 *Definition of Food Allergies*

The term 'food allergy' is used uncritically in everyday language to describe abnormal discomfort following exposure to foods that 'do not harm most people' (Roehr et al., 2004). However, this term is widely misunderstood and differences in classification

across countries resulted in the European Academy of Allergology and Clinical Immunology and the World Allergy Organization production of clarification documents in 2001 and 2003, respectively. In both documents, the term *food allergy* is used to define adverse reactions mediated by the immune system to the protein, not fat or carbohydrate, in food (Gelincik et al., 2008). These reactions are mediated by food specific Ig-E antibodies, which interact with the food protein, resulting in a release of powerful mediators, such as histamine (Sicherer et al, 2000). The term *non-allergic food hypersensitivity* describes reactions that are not mediated by the immune system (Gelincik et al., 2008). They are commonly known as *food intolerances* (Venter et al., 2006). The term *food hypersensitivity* is the umbrella term for both types of reactions (Gelincik et al., 2008).

Allergic reactions mediated by the immune system are immediate and can be severe (Boden et al., 2005). Reactions may affect multiple body systems, including the gastrointestinal system (vomiting or diarrhea), the cutaneous system (hives or swelling of the face), or the respiratory system (wheezing, chest tightness, or shortness of breath) (Bernhisel-Broadbent, 1999). In its most severe form, namely *anaphylaxis*, reactions can be life-threatening, with the most common presenting symptom being severe respiratory distress that may progress to shock and/ or cardiac arrest (Papageorgiou, 2002).

2.2.2 *Diagnosis, Management & Treatment*

Diagnosing a food allergy starts with a thorough review of the individual's history of symptoms following ingestion of the allergen in question (Kagan, 2003). This provides a platform for distinguishing between food allergy and food hypersensitivity and to determine reaction consistency (Sicherer et al., 2006). After food allergy has been

identified as a likely cause of symptoms, three different *in-vitro* confirmation tests can be conducted to confirm a diagnosis.

The most frequently used test to screen for an Ig-E mediated food allergy is a skin prick test (SPT). A sharp device, such as a probe, is pressed through an extract of the food in question into the epidermis of the individual. If a localized wheal and flare of more than 3mm is present on the skin within 15 minutes, it is considered a positive response (Sicherer, 2002). A negative SPT result will confirm a hypersensitivity, while a positive result suggests the possibility of an Ig-E mediated food allergy (Asero et al., 2007).

When the possibility of a food allergy exists, blood serum tests can determine the level of food-specific Ig-E antibodies released. Higher concentrations of Ig-E correlate with an increasing likelihood of a clinical reaction. When an individual's Ig-E level exceeds predicted values, s/he is more than 95% likely to experience an allergic reaction (Sicherer et al., 2006). However, there are limitations to both SPTs and blood tests, and the diagnosis of an allergy cannot be made solely on the results of these two tests. The gold standard for diagnosing a food allergy is a double-blind, placebo-controlled oral food challenge (DBPCFC) (Sicherer et al., 2006).

In a DBPCFC, the individual is presented with the suspected food and a placebo food. To eliminate bias during the test, both the individual and the clinician do not know whether each trial is the suspected allergen or a placebo, hence 'double-blind' (Bock et al., 1988). The symptoms produced in each trial are noted, and results can dismiss or confirm the food as a cause of reaction.

There is currently no cure for food allergies, and treatment is only limited to acute medications for reactions following accidental ingestion. These include epinephrine, antihistamines, and corticosteroids. The most commonly used medication is self-administered epinephrine (Sicherer, 2002). Epinephrine is a hormone that increases heart rate, diverts blood to muscles, and most importantly, opens up the airways (Anaphylaxis Canada, 2009). If given immediately at the first sign of an anaphylactic reaction, it can delay the onset of symptoms until emergency care arrives (Anaphylaxis Canada, 2009). Since there is no cure for food allergies, the only management strategy for allergic individuals is to follow strict avoidance diets in order to prevent accidental ingestion (Kagan et al., 2003).

Novel techniques for treating food allergies are being explored, but further research is needed to confirm their effectiveness. Injection of anti-Ig-E antibodies for individuals with a peanut allergy has been shown to increase peanut tolerance in some, while traditional Chinese herbs have been somewhat effective in blocking symptoms of peanut-induced anaphylaxis (Sicherer et al., 2006; Sicherer et al., 2007). Other therapeutic options being explored include oral immunotherapy, engineered protein, peptide immunotherapy and DNA-based immunotherapy (Sicherer et al., 2007). However, these advances are all in the preclinical stage, and their effectiveness is yet to be determined.

2.2.3 Prevalence of Food Allergies

Any food can cause allergic reactions, but in Western societies, only six foods are responsible for over 90% of allergies in children: egg, milk, peanut, soybean, fish, and wheat. Tree nut and shellfish allergies are also common in adults (Bernhisel-Broadbent,

1999). In terms of anaphylaxis, peanut, tree nuts, fish, and shellfish are most commonly associated with severe life-threatening reactions (Bernhisel-Broadbent, 1999). In recent decades, sesame allergy has been an increasing allergy of concern. A meta-analysis conducted by Gangur et al. in 2005 found evidence for increased reports of sesame allergy during the past 5 decades from developed countries, such as the United States, Australia, Europe, and Japan.

While the international prevalence of food allergy is estimated to be 2.5% among adults and 6 -8% among children (Papageorgiou, 2002), estimates vary significantly geographically. Numerous studies have been conducted to estimate the prevalence rate of food allergies in various countries (Appendix A). However, most do not consider ‘special populations’, i.e. populations lower in socio-economic status, immigrants, populations with language barriers, Aboriginal populations, etc., thus decreasing the generalizability of the estimates. This point is important to note when considering prevalence estimates.

From the studies, it is evident that self-reported allergies almost always exceed true diagnosed allergies. In studies where DBPCFCs were conducted, results confirm a small number of reported sensitivities as Ig-E mediated food allergies (e.g. Kristjansson et al., 1999; Nicolaou et al., 2010, Roehr et al., 2004). This is especially evident in the study conducted by Gelincik et al in 2008 in Istanbul, where households self-reported food allergies via a telephone interview. Follow-up clinical visits attempted to confirm self-reports using SPTs, Ig-E tests and DBPCFCs. The prevalence rate of food allergies based on self-reports was 9.5%. However, SPTs and Ig-E tests were only able to confirm 0.3%, and DBPCFCs were able to confirm only 0.1%.

There are two Canadian studies that should be highlighted, namely studies by Kagan et al. in 2003 and Ben-Shoshan et al. in 2010. Kagan et al. measured the prevalence rate of peanut allergies among Montreal school children in kindergarten through Grade 3 by means of a questionnaire to parents. Three confirmatory tests were conducted: SPTs, Ig-E tests and food challenges. The prevalence rate of peanut allergy among Montreal children after confirmatory testing was found to be 1.34%.

Ben-Shoshan et al.'s (2010) study was the first to estimate the national prevalence of food allergies in Canada. Participants were asked to self-report their allergic status via a telephone interview. Attempts were made to confirm these reports by accessing results of confirmatory testing, if they were conducted. However, due to low response rates and difficulties in locating physicians, this attempt was unsuccessful. Therefore, self-reported physician diagnosis and/or convincing self-reported history were used as confirmation to reported allergies. A 6 – 8% prevalence rate was found for all food allergies. Probable peanut allergy prevalence was estimated to be 0.93%, tree nut allergy 1.14%, fish allergy 0.48%, shellfish allergy 1.42%, and sesame allergy 0.09%. Peanut, tree nut and sesame allergies were found to be more prevalent in children than adults, at 1.68%, 1.59% and 0.23% respectively. Shellfish and fish allergy were found to be more prevalent among adults than children. Although special populations were under-represented in this study and confirmatory follow-up tests were not conducted, these results provide a good baseline preliminary estimate of the national food allergy prevalence in Canada.

2.2.4 Temporal Trends

Studies have also explored temporal trends in prevalence. Branum et al. (2009) investigated self-reported food allergy prevalence among US children aged 18 or younger

in the 1997 – 2007 periods, as documented in the US National Health Interview Survey. It was found that the prevalence of self-reported food allergies increased from 3.3% to 3.9% in the timeframe, and annual ambulatory care visits for food allergy reactions tripled, from 116,000 to 317,000 (Branum et al., 2009).

In a national study that examined only self-reported peanut and tree nut allergies in the US, a rising trend was also found. By conducting a 5 year follow-up national random digit dial telephone survey, Sicherer et al. (2003) found that self-reported peanut and/ or tree nut allergy doubled among children from 1997 to 2002, from 0.4% to 0.8%. Peanut, tree nut allergies, or both continue to be reported by more than 3 million American adults (Sicherer et al., 2003).

A study conducted by Venter et al. (2010) looked at the prevalence of peanut allergy across three cohorts of children born in the same geographical location in the UK. It was found that peanut sensitization and reported allergy in children increased between 1989 and 1994, from 0.5% to 1.4%. Trends found in the late 1990s were not statistically significant (Venter et al., 2010).

A recent study conducted in China by Hu et al. (2010) compared the prevalence rate of food allergies in infants aged 0 – 24 months born 10 years apart, i.e. 1999 and 2009. SPTs and food challenge tests were conducted on both samples, and the prevalence rate was found to have increased from 3.5% to 7.7% in the time frame (Hu et al., 2010).

Hospitalization rates for anaphylaxis have also shown increases in recent decades. A UK study found a 19% increase in age-standardized anaphylaxis incidence, from 6.7 per 100,000 in 2001 to 7.9 in 2005 (Sheikh et al., 2008). Lifetime prevalence increased by 51%, from 50.0 per 100,000 to 75.5 in the same timeframe (Sheikh et al., 2008). A

similar increasing trend was found in New York and Australia. The hospitalization rate for anaphylaxis in New York among patients younger than 20 increased by more than four-fold: from 1.0 per 100,000 in 1990 to 4.7 in 2006 (Lin et al., 2008). The hospitalization rate in Australia increased from 4.1 per 100,000 in 1993 – 1994 to 19.7 in 2004 – 2005 (Poulos et al., 2007). Although these studies investigated all causes of anaphylaxis, including food related anaphylaxis and insect stings, the increase in these countries are nevertheless alarming.

Currently, there are no studies that investigate national temporal trends of food allergies in Canada. Ben-Shoshan et al. attempted in 2009 to document changes in prevalence of peanut allergies in Montreal children over 5 years. Results after confirmatory tests suggest a stable prevalence, but wide confidence intervals preclude definitive conclusions (Ben-Shoshan et al., 2009). Although there are no studies that look at Canadian food allergy prevalence rates over time, there is no reason to believe that an increasing trend, similar to that found in the US and UK, is not present in Canada. Since avoidance diets are the only management strategy, it is crucial that allergen labels in Canada are accurate representations of risk.

2.3 Canadian & International Allergen Labeling

2.3.1 Current Canadian Labeling Environment

Canada's regulations regarding ingredients and allergen labeling on prepackaged products have recently undergone amendments. Currently, the labeling environment is in a transition phase before the new regulations will come into force in August, 2012.

The regulations prior to amendment were set in 1994 by Health Canada's Food Directorate. They require that most prepackaged foods carry a label that lists ingredients

in decreasing order of proportion. However, some ingredients are exempted from this requirement, such as components of margarine, seasoning, and flour (Health Canada, 2009 [B]). This makes it difficult for consumers to follow strict avoidance diets.

In light of this, the regulations support the appropriate use of food allergen precautionary statements, in addition to the basic labeling requirements, as a voluntary risk management tool. A precautionary statement is a declaration on a packaged food of the possible inadvertent presence of an allergen in the food, not used as an ingredient (Health Canada, 2007). When used, they alert the consumer to the possible risk of allergen exposure, and potentially prevent consumption by affected individuals. Health Canada is non-prescriptive with respect to the wording of the statements, requiring only that they be ‘truthful, clear and non-ambiguous, and not be a substitute for Good Manufacturing Practices’ (Health Canada, 2007). This means that manufacturers cannot choose to issue an allergen precautionary statement as a substitute for engaging in appropriate risk mitigation precautions during the manufacturing process.

Allergen precautionary labeling was welcomed by allergic consumers in 1994 when first introduced. Since then, there has been a substantial increase in the variety of statements issued on packaged foods. These include ‘may contain [allergen]’, ‘may contain traces of [allergen]’, ‘manufactured in a facility that processes [allergen]’, ‘manufactured on the same equipment as products containing [allergen]’, ‘packaged in a facility that also packages products containing [allergen]’, ‘not suitable for people with a [particular allergy]’, ‘[allergen]-free’, and ‘manufactured in a facility that is [allergen]-free’ (Health Canada, 2009 [A]).

The large variety of precautionary statements in use leaves many consumers confused about the actual risks involved in consuming the product (Health Canada, 2009 [A]). This may lead to labels being ignored or misunderstood, which ultimately puts consumers at risk. In 2007, Health Canada and the Canadian Food Inspection Agency (CFIA) issued updated advice to food industries, recommending they limit labels to only ‘may contain [allergen]’ and ‘not suitable for consumption by persons with an allergy to [allergen]’. A follow-up study done by Health Canada has found that there is overuse of precautionary labeling by manufacturers when there is no real risk present, leading to unnecessary restrictions in food choices for those affected by food allergies (Health Canada, 2009 [B]). As a result, in February 2011, Health Canada published amendments to the Canadian food labeling system, which will come into force on August 4th, 2012.

2.3.2 *Amending the Canadian System*

Recognizing the difficulty of making safe consumption choices for those with a food allergy, Health Canada has been taking steps to amend the allergen labeling system since 2008. Amendments to the Canadian labeling system were published online in July 2008 to allow for public comment until November 2008. Following this period, consultation workshops were held across the country with various stakeholders, including allergy associations, the food industry, academia, and youth organizations, to discuss policy options around regulating allergen labeling and precautionary statement use. The finalized amendments were published on February 16th, 2011.

The amended regulations would require manufacturers to declare the source of a priority food allergen or gluten on a label, either in the ingredients list, or as a list immediately following it titled ‘Contains:’, if they were added as an ingredient, or as

components of ingredients. If such a Contains list is present, it must be comprehensive.

This means that all required allergens, gluten sources, and sulphites must be declared, even if they have already been listed in the ingredients list (Health Canada, 2008).

Priority allergens as defined by Health Canada are:

- i. almonds, Brazil nuts, cashews, hazelnuts, macadamia nuts, pecans, pine nuts, pistachios or walnuts;
- ii. peanuts;
- iii. sesame seeds;
- iv. wheat, or triticale;
- v. eggs;
- vi. milk;
- vii. soybeans;
- viii. crustaceans;
- ix. shellfish;
- x. fish;
- xi. mustard seeds; and
- xii. gluten from the grains of barley; oats; triticale; and wheat.

In addition to the above list of priority allergens, sulphites, when directly added or existing in 10 parts per million or more in the food, must also be declared. The specific source of hydrolyzed proteins, starches, and modified starches must also be identified (Health Canada, 2011).

The criteria for inclusion in the list of priority allergens are in line with recommendations from the Codex Alimentarius Commissions, an international food standard setting body created by the Food and Agriculture Organization of the United Nations and the World Health Organization (Health Canada, 2011). Some of the inclusion criteria include: scientific proven causal relationship between exposure and the symptoms of allergic reactions; and scientific assessment of all available information on reactions from the food (Health Canada, 2009 [C]).

These amendments were officially published on February 16th, 2011. After acknowledging stakeholders' concerns for product shelf life, Health Canada has decided to introduce a transition period, and announced that the new regulations will come into force 18 months after the date they were registered, i.e. August 4th, 2012.

Although a good step forward, the amendments are not applicable to food allergens or gluten present in the product as a result of cross-contamination (Health Canada, 2008). Often occurring in multi-product facilities, cross-contamination refers to an allergen being unintentionally present in a product due to its contact with other allergen-containing products during the manufacturing process. Health Canada recognizes the need for clearer guidelines on precautionary statements. Thus, regional consultation workshops were held in November 2009 across the country to discuss policy options around precautionary statement use. A wide variety of stakeholder groups were invited to participate, including the food industry, academia, and youth organizations (Health Canada, 2011). A consultation document outlining the policy options was available online for those that did not attend these workshops. The policy options were opened for public comment on Health Canada's website until February 10th, 2010. Currently, the regulations around precautionary labeling are still being reviewed, and precautionary statements remain voluntary.

2.3.3 International Labeling

Health Canada's amendments to implement mandatory declaration of priority food allergens, gluten sources and added sulphites in an amount of 10 ppm or more in packaged foods is in line with guidelines established by the Codex Alimentarius

Commission. Similar guidelines have also been adapted in other countries, such as the United States, the European Union, and Australia/ New Zealand (Health Canada, 2011).

In the United States, the *Food Allergen Labeling and Consumer Protection Act of 2004* identifies priority allergens to be milk, eggs, fish, crustacean shellfish, tree nuts, wheat, peanuts and soybeans. These allergens must be declared in either one of the following two ways: in the ingredients list by its common or usual name followed by the name of the source from which the allergen was derived; or listed in a separate list titled ‘Contains’ (Food & Drugs Administration of the US [FDA], 2010).

Similar regulations have been enforced in the European Union since 2003 with a longer list of priority allergens. They include gluten, crustaceans, eggs, fish, peanuts, soybeans, milk (including lactose), tree nuts, celery, mustard, sesame seeds, sulphur dioxide, and sulphites at concentrations of more than 10 mg/kg or 10 mg/litre. The *Directive 2003/89/EC* requires that any of the above ingredients used in the production and still present in the finished food product be indicated on the food label (Health Canada, 2008; European Commission, 2010).

In Australia and New Zealand, the *Australia and New Zealand Food Standards Code* requires priority food allergens used as an ingredient, an ingredient of a compound ingredient, a food additive, or a processing aid to be declared in the ingredients list, or if this is not required, to be provided to the purchaser upon request. This regulation has been in place since 2002. Priority allergens identified in Australia and New Zealand include gluten, crustaceans, fish, egg, milk, peanuts, soybeans, tree nuts, sesame seeds, and added sulphites in concentration of 10 mg/kg or more. Names to be used on

ingredients labels for priority allergens are specifically regulated (Health Canada, 2009 [A], Food Standards Australia & New Zealand, 2010).

Regulations currently in the above noted countries are specific to ingredients labeling, and similar to the amendments posted by Health Canada, do not address precautionary labeling for the possibility of cross-contamination. The Food and Drugs Administration of the United States is ‘considering ways to best manage the use of these types of statements by manufacturers to better inform consumers’ (FDA, 2010). The European Commission guidelines acknowledge that ‘labeling... is not to be regarded as the only medium of information... It is advisable to assist consumers who have allergies or intolerances as much as possible by providing them with more comprehensive information on the composition of foodstuffs’ (European Commission, 2010). In Australia and New Zealand, the regulations only address mandatory advisory statement for foods with a laxative effect. Advisory statements for other foods do not fall under the food standards requirements (Food Standards Australia New Zealand, 2010).

The amendments posted by Health Canada are in line with international allergen labeling regulations. The enforcement of these amendments in 2012 will align Canada’s allergen labeling environment to the general requirements of its major trading partners.

2.4 Consumer Preferences

Since food labels are primary risk communication tools for allergic consumers, it is important to understand the effects of these labels on the consumption decisions of consumers, as well as consumer preferences for these labels. Studies have explored consumers’ preferences and attitudes for food allergen labeling (Appendix B).

An important study to highlight is a Canadian study conducted by Sheth et al. in 2010. Sheth et al. recruited allergic individuals and/ or their care-givers from the Canadian peanut allergy registry, as well as from allergy awareness organizations to complete a questionnaire. The questionnaire asked about accidental exposures and whether the incident was attributable to food labels. Results indicate that 47.8% of the 1454 respondents reported having at least 1 accidental exposure after being diagnosed. Almost half (47.0%) of them attributed the incident to a labeling-related issue, such as ‘Allergen was not identified in plain language’ or ‘Label was read but listed allergen was not noticed’. 28.6% attributed the incident to failure to read a label, while 8.3% ignored a precautionary statement altogether (Sheth et al., 2010). This study is the only Canadian study to explore Canadian allergen labeling, and indicates that allergen labels in Canada are ineffective, and that some consumers consciously decide to ignore precautionary statements, leading to accidental exposure.

A second study to note is the one by Cornelisse-Vermaat et al., 2007 in the Netherlands and Greece. The qualitative component of this thesis is a replication of this study. Cornelisse-Vermaat et al. randomly recruited 20 consumers with a household allergy to milk, egg, peanuts and/ or tree nuts from each country. These participants were given a list of 15 products to buy as if for their own household. They were observed during the course of product selection and questioned about their experience of utilizing food labels and their preferences for these labels.

All participants reported problems regarding both the readability and the visibility of information on labels. Problems regarding terminology, lack of specificity, information overload, small font sizes, and color contrasts were reported. Respondents

reported that not all packages contained relevant allergy information and that the ingredients list was insufficient for their needs (Cornelisse-Vermaat et al, 2007). Many indicated that precautionary statements limit their food choices. Lastly, it was found that past experience with a particular product was an important factor in the selection process. Feelings of insecurity were associated with purchasing new products, as well as with products that have caused prior reactions (Cornelisse-Vermaat et al., 2007). In general, results from the study suggest that Dutch and Greek consumers were not satisfied with allergen labels and find them inadequate and difficult to use.

Similar problems were reported by consumers in different countries. A consistent problem reported by consumers are terminologies being too hard and technical to understand (Joshi et al., 2002, Simons et al., 2005, Vierk et al., 2007, Voordouw et al., 2009). This led to the inability of parents of allergic children to identify foods that may be harmful for their child to consume (Joshi et al., 2002, Noimark et al., 2009). Limited food choices were also reported by participants across studies (Gupta et al., 2010, Cornelisse-Vermaat et al., 2007, Noimark et al., 2009, Voordouw et al., 2009).

Another finding consistent across studies is the willing consumption of foods labeled with precautionary statements by a notable proportion of allergic consumers, particularly adolescents (Hefle et al., 2007, Noimark et al., 2009, Sampson et al., 2006). Results from these studies suggest that food allergen precautionary statements are not heeded by allergic consumers in the countries from which these studies were conducted in and that they are ineffective in communicating risk.

A study by Vierrill et al. in the United States attempted to compare consumers' preferences for different variations of precautionary statements. Online surveys and

experiments were conducted with a random sample of households. Respondents were asked to rank 4 different versions of precautionary statements by order of preference. These statements include ‘May Contain’ statements as well as statements suggesting shared equipment. It was found that respondents greatly favored ‘Allergy Information: May Contain Peanuts’ over all other variations of the statements (Vierrill et al., 2009).

A follow-up round presented the same sample with products that carried the above 4 variations of precautionary statements, and control products that carried no precautionary statement. Respondents were asked to rank them by order of risk. It was found that compared with products carrying no precautionary statement, all 4 versions of statements improved consumers’ ability to correctly identify the presence of an allergen. This indicates that precautionary statements are helpful. However, results also suggest that consumers’ perceptions of risks are product dependent, as respondents identified a candy bar to be safer than a casserole, even though both products carried the same precautionary statement.

Studies have also analyzed commercial food products for the presence of allergens, in an attempt to explore the risks involved for allergic consumers when faced with inaccurate labeling. In 2007, the Dutch Food and Consumer Product Safety Authority performed a survey to investigate the concentration of undeclared allergens in commercial food products. It was found that peanut was detectable at various concentrations in 32% of products not labeled for peanut. Casein was also detected in 45% of products not labeled for milk proteins (Spanjersberg et al., 2010).

A similar analysis for peanut and hazelnut was conducted by Pele et al. in 2007 in Europe, where 315 different types of cookies and 254 types of chocolates were purchased

from 10 European countries. The majority of chocolates and almost half of the cookies did not declare either peanut or hazelnut as an ingredient. However, most contained a precautionary statement suggesting that traces of them may be present. Results show that compared to cookies, chocolates were more likely to contain undeclared allergens. The majority of chocolates carrying a precautionary statement tested positive for hazelnut, while peanut was not detected in 75% of cookies carrying a precautionary statement (Pele et al., 2007).

These studies indicate that allergen labels are not always accurate representations of risk. To mitigate reactions caused by accidental exposure and avoid unnecessary limitations to food choices, a review of the appropriate use of precautionary statements is needed. Although there is no study that investigates the accuracy of Canadian allergen labels, it is believed that they are similarly ineffective at communicating risk. Although Health Canada has amended the Canadian allergen labeling regulations for stricter requirements, they, like those in similar Western countries, do not address the use of precautionary statements and their effects on the health and well-being of allergic individuals. There is also no Canadian study as of yet that explores the lived experiences of food allergy and allergic consumers' perceptions of allergen labels in Canada. This research will aim to fill this gap by adopting a social constructionist theory.

2.5 Theoretical Framework

2.5.1 Geographies of Health

The definition of health has evolved over time. In early biomedical research, health was defined as the biological absence of disease (Kearns, 1993, Gatrell & Elliott, 2009). However, in the mid-1990s, as health research began to challenge the traditional

biomedical paradigm and argue the existence of social determinants of health, the definition of health shifted. In 1957, the World Health Organization [WHO] redefined health as ‘a state of complete physical, mental and social well-being not merely the absence of disease or infirmity’ (WHO, 2010). This new definition of health suggests the importance of social and emotional components, in addition to the physical properties of health. However, critics suggest that this definition describes a utopia where ‘most if not all of us are unhealthy at all times’ (Gatrell & Elliott, 2009, p.4). Thus, in the late 1980s, health was redefined to be ‘a resource for everyday living which allows [an] individual to manage, cope with, and even change their environments’ (Epp, 1986, Gatrell & Elliott, 2009).

The new definition of health led to an expansion of the medical geography field. Previously, medical geography focused on epidemiology, as well as spatial patterns of disease, mostly utilizing quantitative data collection methods (Andrews and Moon, 2005). Following the new definition of health, research focused on the concept of *space* as a determinant of health and well-being, i.e. social, cultural, economic and political characteristics of it (Andrews et al., 2004). The emphasis on place, society, location, and individual experiences of the above led to a shift from the label of Medical Geography to *Geographies of Health and Health Care*. This new paradigm recognizes how individual level biological and behavioral variables work with social and environmental factors to influence health (Elliott, 1999). As researchers aimed to uncover the meaning of individual experiences of place, there has been an increase in the use of qualitative and mixed-methods approaches to allow for deeper understanding of participants’ experiences and interactions within place (Dyck, 1999). In contrast to the traditional

positivist approach, health geographers began to turn to humanistic approaches to uncover the importance of personal experiences.

2.5.2 *Social Constructionist Approach to Health*

Humanistic approaches address human beliefs, values and meanings (Gatrell & Elliott, 2009). *Social constructionist* (also known as *social interactionist*) approaches are recognized by health geographers as humanistic because they focus on uncovering the meaning of an illness to an individual (Gatrell & Elliott, 2009). Social constructionists interpret personal meanings that make individual behavior rational, as shaped by social relations in space. The ultimate goal is empathetic understanding of an individual's lived experience derived from their own stories and words (Cutis & Taket, 1996). Since this approach focuses on personal meanings, the study sample is usually small, and the methods used are usually qualitative, including in-depth interviews and focus groups (Crabtree & Miller, 1999). Contrary to positivist research, social constructionist results inform *why* instead of *what* (Curtis & Taket, 1996).

The social constructionist approach has been adopted by health geographers in various research areas. Berman et al. adopted the social constructionist approach in 2009 to investigate the effects of violence in the context of war on the lives of refugee women arriving in Canada. Semi-structured in-depth interviews were conducted with nine women. They revealed that after experiencing traumatic violence, women felt that their lives were forever changed, both physically and emotionally, and had new notions of normality. After arriving in Canada, despite being physically removed from war, many women experienced a pervasive sense of fear, and a distrust of people. They also experienced a loss of identity and suffered from great stress (Berman et al., 2009). The

findings from the study suggest that personal experiences of violence deeply affect refugee women's physical and emotional health. These personal experiences subsequently have significant impacts on the women's resettlement process in Canada.

Similar to Berman et al., this research will aim to uncover personal experiences and meanings of living with an anaphylactic food allergy, in the context of consumers' perceptions of food allergen labels in Canada. An individual's social construction of the illness and consumption risks, as shaped by personal experiences of the allergy, guides their decision to consume or avoid products labeled with allergen warnings. Ultimately, this decision has a direct effect on the individual's well-being. Thus, to understand purchasing and consumption behaviors, it is important to explore individuals' lived experiences. This study will also explore consumers' preferences for Canadian food allergen labels. It will be the first to adopt the social constructionist approach in the area of food allergen labeling in Canada.

2.6 Chapter Summary

This chapter began with a discussion on literature relevant to food allergies, as well as a review of prevalence studies and consumer perception studies. The current Canadian allergen labeling environment was also examined, and contrasted with that of other international countries. Finally, the shift from medical geography to geography of health was discussed. The shift to Geography of Health emphasizes the importance of individual experiences of place, which was not addressed in the traditional Medical Geography approaches to health. The application of humanistic approaches led to the increased use of qualitative methods in health research. This research will be the first to adopt a social constructionist approach in the area of food allergen labeling in Canada.

CHAPTER THREE

Study Design and Methods

3.1 Introduction

Within health research, a mixed methods approach has been emerging as a dominant paradigm, especially since the field of Medical Geography has evolved to be a branch in the social sciences (Doyle et al., 2009). Mixed methods designs include the use of both qualitative and quantitative data collection methods, to complement and obtain a more comprehensive perspective of participants' experiences (Stewart et al., 2008). This research project adopts a mixed methods approach by drawing upon both quantitative survey data and qualitative interview data. This chapter outlines the study design and methods employed to address the following objectives:

- (1) To investigate factors affecting Canadians' perceptions of precautionary statements, and their purchasing behaviors of products carrying these statements;
- (2) To explore the lived experiences of individuals directly affected by food allergies;
and
- (3) To identify areas of improvement for allergen labeling to maximize effective risk communication and potentially reduce adverse events.

This chapter is divided into two sections. The first describes the quantitative portion of the study, which includes a discussion of study design, participant selection, data collection and analysis of quantitative data. The second section describes the qualitative portion of the study, which is facilitated by quantitative findings.

3.2 Quantitative Data Collection

3.2.1 Recruitment

The quantitative portion of the study draws upon primary survey data from a nation wide, cross-sectional, computer-assisted telephone interview survey conducted in 2008 across Canada, namely the Surveying Canadians to Assess the Prevalence of Common Food Allergies and Attitudes towards Food Labeling and Risk (SCAAALAR) project, which was supported by Health Canada and AllerGen NCE Inc (www.allergen-nce.ca). AllerGen NCE Inc. is a national research network funded by Industry Canada. Its mandate is to support research, networking and knowledge mobilization between allergy and asthma researchers. The SCAAALAR project is the first in Canada to estimate national food allergy prevalence.

A computer assisted telephone survey was conducted across Canada from May 2008 to March 2009, surveying households from the ten Canadian provinces. The three territories were excluded due to population density issues, as well as cultural differences. Households with cellular phone service only (8% of the Canadian population) and households without any telephone service (0.9% of the Canadian population) were excluded from recruitment (Statistics Canada, 2008). Indian Reserves, Canadian Forces Bases, and institutionalized populations were also excluded.

The interviews were conducted in French or English by researchers from McMaster and McGill University. Households were selected via a random selection of telephone numbers from the electronic White Pages. In order to increase response rates, each household was sent a letter of information regarding the study approximately one week before they were first contacted on the telephone. Up to 10 attempts were made to

contact a resident of the household. If at the time of contact, there was no adult aged 18 or older available, a callback was scheduled for a more appropriate time. To minimize selection bias, an effort was made to call each household at different times of the day on different days of the week, including weekends. The questionnaire was pilot-tested to ensure that computer algorithms were working properly and questions correctly interpreted by participants before data collection.

3.2.2 Survey Content

The interview began with screener questions to ensure that the respondent was over 18, belonged to the household, obtained verbal informed consent, and asked for a self-report of food allergies in the household. If an adult other than the respondent had a food allergy, an attempt was made to contact the allergic adult. If this was not possible, the respondent answered on the allergic individual's behalf, provided that s/he felt comfortable. Child (ren)'s allergies were reported by the adult available to speak best on their behalf, typically the child's mother.

If a respondent reported a household allergy consistent with one of the five priority allergies identified by Health Canada, namely peanut, tree nut, fish, shellfish, or sesame allergy, the respondent underwent further questions regarding allergy severity, as well as diagnostic history for each reported allergy. If consent was given, a nurse from the research group followed up to confirm the reported allergy.

After self-reporting allergies, the interview moved on to a brief section about food allergen labeling and purchasing behavior. If the respondent had previously identified a peanut, tree nut, sesame, milk, egg, wheat, soy or more than one of the above allergies in the household, s/he was automatically included in this part of the survey. If the

respondent identified any other allergies in the household, s/he skipped the labeling section of the survey entirely. This is due to the fact that precautionary statements often do not address the presence of fish and shellfish. Households with no allergies were asked screener questions, to include only respondents indirectly affected by food allergies, i.e. those that have had experience preparing food for an allergic individual, a school, daycare or a social gathering with food restrictions, **and** have noticed precautionary statements on packaged foods.

In this food labeling section of the survey, respondents were asked how often they would purchase a packaged food labeled with eight different kinds of precautionary statements (see below), responses varying from Never, Sometimes, to Always:

1. May Contain [Allergen]
2. May Contain Traces of [Allergen]
3. Manufactured in a facility that processes [Allergen]
4. Manufactured on the same equipment as products containing [Allergen]
5. Packaged in a facility that also packages products containing [Allergen]
6. Not suitable for people with a [Particular Allergy]
7. [Allergen]-Free
8. Manufactured in a facility that is [Allergen]-Free

Respondents were also asked how much they agreed with statements describing attitudes towards precautionary statements (see below), with responses varying from Agree, Somewhat Agree, to Disagree:

1. Precautionary statements are helpful.
2. Companies should only use precautionary statements when there is a real risk to food allergic individuals.
3. The current precautionary statements are easy to understand.
4. Precautionary statements are used when companies are concerned about protecting themselves.
5. Precautionary statements are limiting the food choices for people with food allergies.

A section on perceptions of environmental risk perception followed, which asked about factors that may influence global and personal environmental risk perceptions. Finally the survey concluded with demographic questions about the household. The analysis in this thesis focuses solely on reported purchasing behavior and perceptions of precautionary statements.

3.3 Qualitative Data Collection

3.3.1 Recruitment

To obtain individual lived experiences of utilizing food allergen labels, qualitative in-depth interviews were conducted with 13 allergic families in a grocery store setting. This is a replication of a study conducted in Greece and the Netherlands by Cornelisse-Vermaat et al., in 2007. Conducting qualitative interviews in the individual's contextual space is a variation of in-depth interviewing that allows for observation within the space (Carpiano, 2009). In the context of this research, interviewing consumers in a grocery store, where they interact with allergen labels and make health related consumption choices allows for observation beyond their narrative of experiences.

Data collection occurred in the fall of 2010. After obtaining approval from the McMaster University Research Ethics Board (Appendix C), recruitment posters were posted at community centers in Hamilton and Burlington, and were also circulated on Anaphylaxis Canada's website, Ontario's largest anaphylaxis support group. Individuals and caregivers of children with allergies to peanut, tree nut and/ or sesame seeds living within the Greater Hamilton area were invited to participate. As a token of appreciation, participants received a \$50 gift card to a grocery store of their choice.

3.3.2 Interview Content

The interview began with questions about the allergy in the family and covered a variety of topics, including feelings towards grocery shopping, use of allergen labels, perceptions of and preferences for allergen labels (Appendix D). Participants were interviewed during the course of a regular grocery shopping trip, where their shopping habits were observed.

Interviews were conducted with thirteen participants and lasted 30 to 90 minutes. They were digitally recorded with permission of the participant, and transcribed verbatim for subsequent thematic analysis. However, due to equipment failure, only twelve interviews were included in the analysis. An effort was made to ensure maximum variation of participant characteristics and geographical location. However, recruitment was limited to families directly affected by the three noted allergens within the Greater Hamilton Area, and participants mostly consisted of female caregivers of allergic children (Table 3.1).

3.4 Data Analysis

Quantitative data were analyzed using SPSS. Descriptive statistics were generated to estimate the percentage of affected households in Canada. Households were categorized into three different types: directly affected, indirectly affected, and unaffected. A *directly affected* household is defined as a food allergic household, an *indirectly affected* household is defined as a household that is non-allergic, but prepares food for those who are allergic or for an allergy controlled environment and/or social gathering, and an *unaffected* household is defined as a household that is non-allergic, and does not prepare foods for the above populations.

Table 3.1: Participant Characteristics: In-depth interviews

Participant #	Gender	Number of children in household	Number of allergic members	Child Allergic (Y/N)	Allergy	City	Work Status of Respondent
21	Female	1	1	Y	Peanuts, tree nuts, other	St. Catherines	Full-Time
23	Female	2	2	Y	Peanuts, tree nuts	Welland	Unemployed
25	Female	3	1	Y	Peanuts, tree nuts	St. Catherines	Part-Time
26	Female	2	1	Y	Peanuts, tree nuts	Hamilton	Full-Time
32	Female	2	2	Y	Peanuts, tree nuts, other	Ancaster	Full-Time
35	Female	2	2	Y	Peanuts, tree nuts, sesame, other	Mississauga	Full-Time
36	Female	2	1	Y	Peanuts, tree nuts	Stoney Creek	Full-Time
37	Female	2	1	N	Peanuts, tree nuts	St. Catherines	Unknown
39	Female	2	1	Y	Peanuts, tree nuts	Mississauga	Full-Time
40	Male	N/A	1	N/A	Peanuts, tree nut	Waterloo	Full-Time
41	Male	2	1	Y	Peanuts, sesame, other	Schomberg	Unknown
42	Female	1	1	Y	Peanuts	Whitby	Full-Time

10,596 households were surveyed between May 2008 and March 2009. 3442 households participated, representing 9667 individuals and a 35% household participation rate. Respondents displayed a wide range of demographic characteristics (Table 3.2). When comparing the sample population to the 2006 national census population from Statistics Canada, it was found that the sample over-represented females, as well as those in the 40 – 59 age group, those with high school diplomas, and families with higher income. In terms of region, families in the Central region, i.e. Ontario and Quebec, were slightly over-represented. This suggests that the sample is not necessarily representative of the Canadian population. This must be kept in mind when interpreting results.

Cross-tab Chi square (χ^2) tests were conducted to examine differences in purchasing behavior and attitudes towards precautionary statements across a range of demographic variables, including gender, region, allergic status (i.e. directly affected or indirectly affected), age and education level. Differences in age were also stratified using ANOVA (analysis of variance) tests. By taking the average age of respondents for each response, differences in mean respondent age for each response were compared. A statistically significant difference in purchasing behavior or attitudes towards precautionary statements were indicated when a significant value less than 0.05 ($p < 0.05$) was obtained. During the analyses, Agree responses were collapsed with Somewhat Agree responses to form one single group, and Always responses were collapsed with Sometimes responses in the same way. This was to enable easier presentation and analysis of data.

Table 3.2: Participant Characteristics (n = 3442) compared to 2006 Census

Characteristic		Percentage	
		Respondents	Canadian Population (2006)
Age	18 – 39	23.1	35.7
	40 – 59	45.8	38.9
	60 – 79	28.4	20.4
	≥ 80	2.7	5.0
Gender	Male	34.9	49.6
	Female	65.1	50.4
Education	< High School Diploma	9.3	23.8
	≥ High School Diploma	90.7	76.2
Household Annual Income	< 10k	0.6	8.08
	10k – 39k	19.7	37.0
	40k – 69k	27.7	24.2
	70k – 99k	23.9	15.1
	≥ 100k	28.2	17.1
Region	Western Canada	22.4	29.7
	Central Canada	72.2	62.3
	Atlantic Canada	5.4	5.89

Qualitative analysis of interview data was facilitated by a computer assisted qualitative data analysis software, NVivo 9. Organization and coding of data was completed using the template coding style, guided by the research objectives and interview schedule (see Appendix E for the thematic codes). A template organizing style uses a detailed coding manual to identify relevant data, which is useful when using qualitative software (Crabtree and Miller, 1999). The thematic codes used for analysis in this research were developed inductively and deductively. Inter-rater reliability was assessed as part of the coding process. Inter-rater agreement between the two coders was high, ranging around 90%.

Rigor in qualitative analysis was established through the four criteria for qualitative research as outlined by Lincoln and Guba (1985), and extended by Baxter and Eyles (1997):

Credibility refers to the degree to which the research presents an authentic representation of the experience. In this research, credibility was established through multiple methods. First of all, purposeful sampling of participants across a wide variety of characteristics ensured a wide range of perceptions. Secondly, recruitment occurred until saturation, i.e. no new themes emerged, ensuring that credibility was not compromised by the small sample size. Thirdly, credibility was increased by utilizing both quantitative and qualitative data, and by assessing inter-rater reliability.

The second criterion, transferability, is the degree to which findings apply to contexts beyond the study. Although it is not the purpose of qualitative research to generalize, the experiences expressed by participants of this research are common to the larger group of allergic families in Canada, as allergen labeling falls under federal jurisdiction. This increases the transferability of the results (Baxter and Eyles, 1997).

Dependability refers to the degree of consistency of the results. In this research, consistency was ensured through multiple means. Firstly, all interviews were digitally recorded for verbatim transcription. Secondly, all interviews were conducted and coded by one researcher, and peer examination of codes was used. The above all contribute to the dependability of the results (Baxter and Eyles, 1997).

Lastly, confirmability refers to the extent of biases affecting interpretation of results. It can be defined as ‘the degree to which findings are determined by the respondents and conditions of the inquiry, and not by biases, motivations, interests or perspectives of the inquirer’ (Lincoln and Guba, 1985, p.290). Being a non-allergic consumer, and having no experience preparing foods for an allergic environment, I have never had to deal with the challenges and implications of purchasing decisions. I have

also never had to experience the constant stress of living with or being a caregiver for a loved one with a fatal anaphylactic allergy. Therefore, I may be perceived to be an outsider to participants, and may have affected their willingness to be honest about the challenges they face. However, by empathetic understanding and listening to participants' stories, as well as genuine curiosity, participants felt comfortable expressing their emotions of living with a food allergy. In some cases, interviews lasted over an hour, and mothers of allergic children demonstrated their anxiousness and alleviated their stress by sharing stories about their lives with me. Several participants expressed relief after the interview of having been given a chance to express their frustration, and having an interested party listen to their stories. The willingness of participants to share their stories ensures confirmability and increases the degree to which findings are determined by their experiences.

3.5 Chapter Summary

This chapter outlines the research design and methodology used in the research. This includes both quantitative and qualitative data collection and analysis. In addition, sample characteristics were discussed, along with steps undertaken to establish rigour within qualitative research. Results from quantitative and qualitative analysis will be presented in the following chapter.

CHAPTER FOUR

Results

4.1 Introduction

This chapter first reports results from quantitative analysis of survey data from SCAAALAR, and then qualitative analysis of twelve interviews with allergic households.

These data were collected to address the following research objectives:

- (1) To investigate factors affecting Canadians' perceptions of precautionary statements, and their purchasing behaviors of products carrying these statements;
- (2) To explore the lived experiences of individuals directly affected by food allergies; and
- (3) To identify areas of improvement for allergen labeling to maximize effective risk communication and potentially reduce adverse events.

With respect to the interview data, tables are used where appropriate to illustrate frequency of reporting. Direct quotations from interview participants are used to punctuate these findings.

4.2 Quantitative Analysis

4.2.1 *Proportion of Affected Canadians*

In order to understand the effectiveness of food allergen labels in Canada, it is first necessary to identify the proportion of Canadians affected (Table 4.1). Of the 3442 Canadian households surveyed in SCAAALAR, 20% (n = 688) reported a food allergy and thus are 'directly affected' households. 18.8% (n = 180) of allergic households reported an allergic child. 23% (n = 159) of allergic households reported allergies to peanut, tree nut, and/or sesame seeds. Other allergies reported include fish, shellfish, milk,

eggs, wheat, and soy. However, the three noted above are identified by Health Canada as most commonly associated with the use of precautionary statements.

Table 4.1: Frequency of Affected Households

		Frequency	Percentage	
Allergic Status of Household (n = 3442)	Non-Allergic Household	2754	80.0	
	Allergic Household	688	20.0	
	Allergic Family Members (n = 688)	Adult Allergic Only	556	81.2
		Children Allergic Only	79	11.5
		Adult + Children Allergic	50	7.3
		Don't Know, Refused	3	N/A
	Prevalence (Peanut, Tree Nut, Sesame only) (n = 159)	Peanut	49	31.0
		Tree Nut	71	44.9
Sesame Seed		2	1.3	
More than 1 of the above		37	23.3	
Household Affected Type (n = 3442)	Totally Unaffected	1674	48.6	
	Indirectly Affected	1080	31.4	
	Directly Affected	688	20.0	

31% (n = 1080) of surveyed households did not report a food allergy of any type, but reported experience preparing food for an allergic individual, an allergy controlled environment and/or social gathering. These are referred to as 'indirectly affected' households. 51.4% of surveyed households reported being affected by food allergies either directly or indirectly (Table 4.1), and thus rely on food allergen labels to guide consumption choices.

The demographic characteristics of directly and indirectly affected households are presented in Table 4.2. No significant differences were found between the two types of households.

Table 4.2: Demographic Characteristics by Affected Households

Characteristic		Directly Affected Household (%) (n = 688)	Indirectly Affected Household (%) (n = 1080)
Age of respondent	18 – 39	24.2	29.0
	40 – 59	46.6	51.3
	60 – 79	26.0	18.8
	≥ 80	3.1	0.9
Gender of respondent	Male	29.1	28.5
	Female	70.9	71.5
Education of respondent	< High School Diploma	7.5	4.6
	≥ High School Diploma	92.6	95.3
Household Annual Income	< 10k	0.4	0.2
	10k – 39k	18.3	15.4
	40k – 69k	25.0	25.7
	70k – 99k	24.6	25.3
	≥ 100k	31.6	33.4
Region of household	Western Canada	28.8	20.7
	Central Canada	66.1	72.7
	Atlantic Canada	5.1	6.6

4.2.2 Factors affecting Purchasing Behavior

When reporting purchasing behavior, over 20% of respondents reported always or sometimes purchasing products with a precautionary statement suggestive of the possibility of cross-contamination (Table 4.3). In addition, 5% of respondents reported avoiding products labeled with an [Allergen] - safe statement. This suggests that precautionary statements are not always effective at communicating risks to affected consumers. Tables 4.4 to 4.10 illustrate the differences in purchasing behaviors as stratified by demographic characteristics¹.

There were no significant differences in purchasing behavior by gender (Table 4.4) or education (Table 4.7), likely given the lack of variation in the sample with respect to these variables. However, significant differences were uncovered for age. An increasing

¹After accounting for missing and incomplete data, n decreased from 3666 to 3442. Analyses included only:

proportion of older respondents reported avoiding products labeled with ‘Manufactured in a facility that processes [Allergen]’ statements (Table 4.5). Significant differences were also found for other variations of precautionary statements. However, no trends were apparent. Strong significant differences were also found across the two allergen-free statements. Increasing proportions of older respondents reported avoiding these products, even though they are safe for consumption.

Table 4.3: Reported Purchasing Behavior, Directly & Indirectly Affected Households

		Percentage of Reports (n = 1380)
May Contain [Allergen]	Always/ Sometimes	20.7
	Never	79.3
May Contain Traces of [Allergen]	Always/ Sometimes	25.9
	Never	74.1
Manufactured in a Facility that processes [Allergen]	Always/ Sometimes	30.0
	Never	70.0
Manufactured on the same equipment as products containing [Allergen]	Always/ Sometimes	21.4
	Never	78.6
Packaged in a facility that also packages products containing [Allergen]	Always/ Sometimes	30.3
	Never	69.7
Not suitable for people with a [particular allergy]	Always/ Sometimes	12.1
	Never	87.9
[Allergen]-free	Always/ Sometimes	94.4
	Never	5.6
Manufactured in a facility that is [Allergen]-free	Always/ Sometimes	94.2
	Never	5.8

Differences by age were further stratified by comparing mean ages of responses (Table 4.6). When faced with products carrying precautionary warnings, those who reported avoiding them were slightly older. The mean age of consumers avoiding products labeled with allergen-free statements was considerably older as well. This strong significant finding was observed in both types of allergen-free claims. This suggests that older consumers are avoiding products labeled with any type of precautionary statements, regardless of what the statement suggests.

Consumers from Atlantic Canada were most likely to heed precautionary warnings (Table 4.8), while consumers from Western Canada were most likely to ignore these warnings. When compared to the directly affected households, a larger proportion of respondents from indirectly affected households reported heeding all precautionary statements, i.e. avoiding foods with allergen warnings (Table 4.9).

In summary, it was found that a notable proportion of consumers do purchase products labeled with precautionary warnings, and do avoid products labeled with allergen safe statements. This suggests that allergen labels may not be as effective as expected at communicating risk.

Table 4.4: Differences in Purchasing Behavior by Respondent Gender (%) (n = 1386)

		Gender		Level of Significance ²
		Male (n = 380)	Female (n = 1006)	
May Contain [Allergen]	Always/ Sometimes	21.8	20.4	N/S
	Never	78.2	79.6	
May Contain Traces of [Allergen]	Always/ Sometimes	24.7	26.4	N/S
	Never	75.3	73.6	
Manufactured in a Facility that processes [Allergen]	Always/ Sometimes	32.6	29.1	N/S
	Never	67.4	70.9	
Manufactured on the same equipment as products containing [Allergen]	Always/ Sometimes	23.9	20.6	N/S
	Never	76.1	79.4	
Packaged in a facility that also packages products containing [Allergen]	Always/ Sometimes	33.2	29.2	N/S
	Never	66.8	70.8	
Not suitable for people with a [particular allergy]	Always/ Sometimes	13.9	11.5	N/S
	Never	86.1	88.5	
[Allergen]-free	Always/ Sometimes	95.3	94.1	N/S
	Never	4.7	5.9	
Manufactured in a facility that is [Allergen]-free	Always/ Sometimes	95.3	93.8	N/S
	Never	4.7	6.2	

² In significance reports, N/S denotes statistically non-significant results; * denotes p value < 0.05; ** denotes p value < 0.01; and *** denotes p value < 0.001

Table 4.5: Differences in Purchasing Behavior by Respondent Age Category (%) (n =1351)

		Age Category					Level of Significance
		18 – 19 (n = 11)	20 – 34 (n = 229)	35 – 44 (n = 312)	45 – 64 (n = 626)	≥65 (n = 173)	
May Contain [Allergen]	Always/ Sometimes	45.5	24.5	22.1	19.3	19.1	N/S
	Never	54.5	75.5	77.9	80.7	80.9	
May Contain Traces of [Allergen]	Always/ Sometimes	54.5	32.3	23.7	24.4	27.2	*
	Never	45.5	67.7	76.3	75.6	72.8	
Manufactured in a Facility that processes [Allergen]	Always/ Sometimes	54.5	34.9	31.4	29.6	24.3	*
	Never	45.5	65.1	68.6	70.4	75.7	
Manufactured on the same equipment as products containing [Allergen]	Always/ Sometimes	27.3	23.6	23.7	20.4	20.2	N/S
	Never	72.7	76.4	76.3	79.6	79.8	
Packaged in a facility that also packages products containing [Allergen]	Always/ Sometimes	45.5	36.2	32.1	29.1	23.7	*
	Never	54.5	63.8	67.9	70.9	76.3	
Not suitable for people with a [particular allergy]	Always/ Sometimes	27.3	15.7	12.2	11.5	9.2	N/S
	Never	72.7	84.3	87.8	88.5	90.8	
[Allergen]-free	Always/ Sometimes	72.7	97.8	96.2	94.4	87.9	***
	Never	27.3	2.2	3.8	5.6	12.1	
Manufactured in a facility that is [Allergen]-free	Always/ Sometimes	100.0	96.9	97.1	93.6	86.7	***
	Never	0.0	3.1	2.9	6.4	13.3	

Table 4.6: Differences in Purchasing Behavior by Respondent Mean Age

Precautionary Statement	Response	n	Mean Age	Level of Significance
May Contain [Allergen]	Always/ Sometimes	284	46.45	*
	Never	1067	48.38	
May Contain Traces of [Allergen]	Always/ Sometimes	354	46.73	*
	Never	997	48.42	
Manufactured in a Facility that processes [Allergen]	Always/ Sometimes	411	46.42	**
	Never	940	48.65	
Manufactured on the same equipment as products containing [Allergen]	Always/ Sometimes	294	47.10	N/S
	Never	1057	48.22	
Packaged in a facility that also packages products containing [Allergen]	Always/ Sometimes	411	46.31	**
	Never	940	48.70	
Not suitable for people with a [particular allergy]	Always/ Sometimes	165	46.30	N/S
	Never	1186	48.21	
[Allergen]-free	Always/ Sometimes	1275	47.57	***
	Never	76	54.78	
Manufactured in a facility that is [Allergen]-free	Always/ Sometimes	1272	47.48	***
	Never	79	55.92	

Table 4.7: Differences in Purchasing Behavior by Respondent Education (%) (n = 1361)

		Education (n)		Level of Significance
		< High School Diploma (63)	≥ High School (1298)	
May Contain [Allergen]	Always/Sometimes	25.4	20.8	N/S
	Never	74.6	79.2	
May Contain Traces of [Allergen]	Always/Sometimes	23.8	26.4	N/S
	Never	76.2	73.6	
Manufactured in a Facility that processes [Allergen]	Always/Sometimes	25.4	30.6	N/S
	Never	74.6	69.4	
Manufactured on the same equipment as products containing [Allergen]	Always/Sometimes	19.0	21.9	N/S
	Never	81.0	78.1	
Packaged in a facility that also packages products containing [Allergen]	Always/Sometimes	25.4	30.8	N/S
	Never	74.6	69.2	
Not suitable for people with a [particular allergy]	Always/Sometimes	6.3	12.6	N/S
	Never	93.7	87.4	
[Allergen]-free	Always/Sometimes	90.5	94.6	N/S
	Never	9.5	5.4	
Manufactured in a facility that is [Allergen]-free	Always/Sometimes	90.5	94.4	N/S
	Never	9.5	5.6	

Table 4.8: Differences in Purchasing Behavior by Region of Household (%) (n = 1385)

		Region (n)			Level of Significance
		Western Canada (316)	Central Canada (983)	Atlantic Canada (86)	
May Contain [Allergen]	Always/Sometimes	24.7	20.1	12.8	*
	Never	75.3	79.9	87.2	
May Contain Traces of [Allergen]	Always/Sometimes	31.3	24.8	18.6	*
	Never	68.7	75.2	81.4	
Manufactured in a Facility that processes [Allergen]	Always/Sometimes	32.3	29.6	26.7	N/S
	Never	67.7	70.4	73.3	
Manufactured on the same equipment as products containing [Allergen]	Always/Sometimes	25.3	20.9	14.0	*
	Never	74.7	79.1	86.0	
Packaged in a facility that also packages products containing [Allergen]	Always/Sometimes	32.0	29.6	31.4	N/S
	Never	68.0	70.4	68.6	
Not suitable for people with a [particular allergy]	Always/Sometimes	18.7	10.6	5.8	***
	Never	81.3	89.4	94.2	
[Allergen]-free	Always/Sometimes	93.4	94.6	96.5	N/S
	Never	6.6	5.4	3.5	
Manufactured in a facility that is [Allergen]-free	Always/Sometimes	93.7	94.2	96.5	N/S
	Never	6.3	5.8	3.5	

Table 4.9: Differences in Purchasing Behavior by Household Allergic Status (%) (n = 1380)

		Households		Level of Significance
		Directly Affected (n = 325)	Indirectly Affected (n = 1055)	
May Contain [Allergen]	Always/Sometimes	41.8	14.3	***
	Never	58.2	85.7	
May Contain Traces of [Allergen]	Always/Sometimes	56.3	16.6	***
	Never	43.7	83.4	
Manufactured in a Facility that processes [Allergen]	Always/Sometimes	56.6	22.0	***
	Never	43.4	78.0	
Manufactured on the same equipment as products containing [Allergen]	Always/Sometimes	44.6	14.5	***
	Never	55.4	85.5	
Packaged in a facility that also packages products containing [Allergen]	Always/Sometimes	57.2	22.2	***
	Never	42.8	77.8	
Not suitable for people with a [particular allergy]	Always/Sometimes	21.8	9.3	***
	Never	78.2	90.7	
[Allergen]-free	Always/Sometimes	92.9	95.0	N/S
	Never	7.1	5.0	
Manufactured in a facility that is [Allergen]-free	Always/Sometimes	92.9	94.7	N/S
	Never	7.1	5.3	

Table 4.10: Differences in Purchasing Behavior by Household Annual Income (%) (n = 1379)

		Income Range					Level of Significance
		< 10 k (n =2)	10k – 39k (n = 215)	40k – 69k (n = 348)	70k – 99k (n = 350)	≥100 k (n = 464)	
May Contain [Allergen]	Always/ Sometimes	0.0	20.5	23.0	22.0	18.5	N/S
	Never	100.0	79.5	77.0	78.0	81.5	
May Contain Traces of [Allergen]	Always/ Sometimes	100.0	25.1	26.1	26.6	25.6	N/S
	Never	0.0	74.9	73.9	73.4	74.4	
Manufactured in a Facility that processes [Allergen]	Always/ Sometimes	50.0	28.4	29.0	29.4	32.3	N/S
	Never	50.0	71.6	71.0	70.6	67.7	
Manufactured on the same equipment as products containing [Allergen]	Always/ Sometimes	0.0	20.5	20.7	23.4	21.3	N/S
	Never	100.0	79.5	79.3	76.6	78.7	
Packaged in a facility that also packages products containing [Allergen]	Always/ Sometimes	50.0	26.5	26.7	34.0	32.1	N/S
	Never	50.0	73.5	73.3	66.0	67.9	
Not suitable for people with a [particular allergy]	Always/ Sometimes	0.0	10.2	14.7	13.4	10.3	N/S
	Never	100.0	89.8	85.3	86.6	89.7	
[Allergen]-free	Always/ Sometimes	100.0	91.2	96.8	93.4	95.0	*
	Never	0.0	8.8	3.2	6.6	5.0	
Manufactured in a facility that is [Allergen]-free	Always/ Sometimes	100.0	25.1	26.1	26.6	25.6	N/S
	Never	0.0	74.9	73.9	73.4	74.4	

4.2.3 Factors affecting Attitudes towards Precautionary Statements

Respondents from directly and indirectly affected households were asked about their attitudes towards precautionary statements.

Table 4.11: Reported Attitudes towards Precautionary Statements, Directly & Indirectly Affected Households

		Percentage of Reports (n = 1381)
Precautionary statements are helpful	Agree	98.1
	Disagree	1.9
Companies should only use precautionary statements when there is a real risk to food allergic individuals	Agree	64.3
	Disagree	35.7
The current precautionary statements are easy to understand	Agree	85.2
	Disagree	14.8
Precautionary statements are used when companies are concerned about protecting themselves	Agree	92.3
	Disagree	7.7
Precautionary statements are limiting the food choices for people with food allergies	Agree	70.2
	Disagree	29.8

Over 85% of respondents found precautionary statements helpful and easy to understand (Table 4.11). However, manufacturer misuse was reported by over 92% of respondents, as they believe that precautionary statements are used because companies want to protect themselves. Over 64% found them to limit food choices (Table 4.11).

Significant differences were observed across all variables except respondent education (Table 4.15). Results by gender (Table 4.12) suggest that males are more likely to find precautionary statements to be limiting food choices, and thus are more likely to agree that companies should only use them when there is a real risk.

Interestingly, as age increased, the proportion of respondents finding precautionary statements easy to understand decreased (Table 4.13). Further, the mean age of respondents disagreeing that precautionary statements are easy to understand is

considerably higher than those that agree (Table 4.14). It appears that older consumers find precautionary statements difficult to understand, which is reflected in their purchasing behavior, as they reported staying away from products carrying all kinds of allergen labels, including '[Allergen]-Free' labels.

Only 2 significant results were obtained when stratifying differences in attitudes by region of household (Table 4.16). It was found that consumers in Atlantic Canada were least skeptical about precautionary statements, and least likely to find them to be limiting their food choices. This is consistent with previously reported findings (Table 4.8), where respondents from Atlantic Canada were most likely to heed precautionary statements.

Two significant differences in attitudes between directly and indirectly affected families were found (Table 4.17). Allergic families were more likely to disagree that precautionary statements are helpful and are also more skeptical about the statements. This is consistent with reported purchasing behavior, where allergic families were less likely to heed precautionary statements. When looking at differences by income, no apparent trend was observed, likely due to the lack in income variation of the sample (Table 4.18).

Overall, it was found that precautionary statements are perceived to be helpful tools to guide consumption choices. However, consumers also perceive a degree of misuse and/or overuse by manufacturers. Gender, age, region, allergic status and income of household do have an effect on attitudes towards precautionary statements.

Table 4.12: Differences in Attitudes towards Precautionary Statements by Respondent Gender (%) (n = 1381)

		Gender		Level of Significance
		Male (n = 372)	Female (n = 1009)	
Precautionary Statements are helpful	Agree/ Somewhat Agree	97.4	98.4	N/S
	Disagree	2.6	1.6	
Companies should only use precautionary statements when there is a real risk to food allergic individuals	Agree/ Somewhat Agree	69.4	62.4	**
	Disagree	30.6	37.6	
The current precautionary statements are easy to understand	Agree/ Somewhat Agree	86.1	84.9	N/S
	Disagree	13.9	15.1	
Precautionary Statements are used when companies are concerned about protecting themselves	Agree/ Somewhat Agree	91.8	92.5	N/S
	Disagree	8.2	7.5	
Precautionary Statements are limiting the food choices for people with food allergies	Agree/ Somewhat Agree	69.4	62.4	**
	Disagree	30.6	37.6	

Table 4.13: Differences in Attitudes towards Precautionary Statements by Respondent Age Category (%) (n =1346)

		Age Category					Level of Significance
		18 – 19 (n = 11)	20 – 34 (n = 229)	35 – 44 (n = 312)	45 – 64 (n = 622)	≥65 (n = 172)	
Precautionary Statements are helpful	Agree/ Somewhat Agree	100.0	97.8	96.8	98.7	98.3	N/S
	Disagree	0.0	2.2	3.2	1.3	1.7	
Companies should only use precautionary statements when there is a real risk to food allergic individuals	Agree/ Somewhat Agree	36.4	73.1	71.1	60.7	54.2	***
	Disagree	63.6	26.9	28.9	39.3	45.8	
The current precautionary statements are easy to understand	Agree/ Somewhat Agree	90.9	93.0	87.8	82.4	81.2	***
	Disagree	9.1	7.0	12.2	17.6	18.8	
Precautionary Statements are used when companies are concerned about protecting themselves	Agree/ Somewhat Agree	100.0	94.7	91.8	91.6	92.9	N/S
	Disagree	0.0	5.3	8.2	8.4	7.1	
Precautionary Statements are limiting the food choices for people with food allergies	Agree/ Somewhat Agree	63.6	73.8	72.0	67.0	74.3	N/S
	Disagree	36.4	26.2	28.0	33.0	25.7	

Table 4.14: Differences in Attitudes towards Precautionary Statements by Respondent Mean Age (%)

		n	Mean Age	Level of Significance
Precautionary Statements are helpful	Agree/ Somewhat Agree	1230	47.96	N/S
	Disagree	26	45.54	
Companies should only use precautionary statements when there is a real risk to food allergic individuals	Agree/ Somewhat Agree	854	46.57	***
	Disagree	475	50.01	
The current precautionary statements are easy to understand	Agree/ Somewhat Agree	1139	47.24	***
	Disagree	195	51.57	
Precautionary Statements are used when companies are concerned about protecting themselves	Agree/ Somewhat Agree	1214	47.72	N/S
	Disagree	100	49.51	
Precautionary Statements are limiting the food choices for people with food allergies	Agree/ Somewhat Agree	927	47.64	N/S
	Disagree	393	48.46	

Table 4.15: Differences in Attitudes towards Precautionary Statements by Education (%) (n = 1356)

		Education Level		Level of Significance
		< High School Diploma (n = 62)	≥ High School (n = 1294)	
Precautionary Statements are helpful	Agree/ Somewhat Agree	100.0	98.0	N/S
	Disagree	0.0	2.0	
Companies should only use precautionary statements when there is a real risk to food allergic individuals	Agree/ Somewhat Agree	53.2	64.5	N/S
	Disagree	46.8	35.5	
The current precautionary statements are easy to understand	Agree/ Somewhat Agree	79.0	85.5	N/S
	Disagree	21.0	14.5	
Precautionary Statements are used when companies are concerned about protecting themselves	Agree/ Somewhat Agree	88.1	92.5	N/S
	Disagree	11.9	7.5	
Precautionary Statements are limiting the food choices for people with food allergies	Agree/ Somewhat Agree	81.0	70.0	N/S
	Disagree	54 19.0	30.0	

Table 4.16: Differences in Attitudes towards Precautionary Statements by Region of Household (%) (n = 1380)

		Region			Level of Significance
		Western Canada (n = 314)	Central Canada (n = 980)	Atlantic Canada (n = 86)	
Precautionary Statements are helpful	Agree/ Somewhat Agree	98.7	97.9	98.8	N/S
	Disagree	1.3	2.1	1.2	
Companies should only use precautionary statements when there is a real risk to food allergic individuals	Agree/ Somewhat Agree	66.7	64.3	57.0	N/S
	Disagree	33.3	35.7	43.0	
The current precautionary statements are easy to understand	Agree/ Somewhat Agree	86.1	85.2	82.6	N/S
	Disagree	13.9	14.8	17.4	
Precautionary Statements are used when companies are concerned about protecting themselves	Agree/ Somewhat Agree	96.5	91.7	83.3	***
	Disagree	3.5	8.3	16.7	
Precautionary Statements are limiting the food choices for people with food allergies	Agree/ Somewhat Agree	66.8	72.7	55.4	***
	Disagree	33.2	27.3	44.6	

Table 4.17: Differences in Attitudes towards Precautionary Statements by Household Allergic Status (%) (n = 1376)

		Households		Level of Significance
		Directly Affected (n = 321)	Indirectly Affected (n = 1055)	
Precautionary Statements are helpful	Agree/ Somewhat Agree	95.0	99.1	***
	Disagree	5.0	0.9	
Companies should only use precautionary statements when there is a real risk to food allergic individuals	Agree/ Somewhat Agree	67.2	63.2	N/S
	Disagree	32.8	36.8	
The current precautionary statements are easy to understand	Agree/ Somewhat Agree	83.0	86.1	N/S
	Disagree	17.0	13.9	
Precautionary Statements are used when companies are concerned about protecting themselves	Agree/ Somewhat Agree	95.0	91.5	*
	Disagree	5.0	8.5	
Precautionary Statements are limiting the food choices for people with food allergies	Agree/ Somewhat Agree	69.8	70.2	N/S
	Disagree	30.2	29.8	

Table 4.18: Differences in Attitudes towards Precautionary Statements by Household Income (%) (n = 1374)

		Income Range					Level of Significance
		<10k (n = 2)	10k – 39k (n = 214)	40k – 69k (n = 347)	70k – 99k (n = 347)	≥ 100k (n = 464)	
Precautionary Statements are helpful	Agree/ Somewhat Agree	100.0	98.1	99.1	98.6	97.0	N/S
	Disagree	0.0	1.9	0.9	1.4	3.0	
Companies should only use precautionary statements when there is a real risk to food allergic individuals	Agree/ Somewhat Agree	100.0	57.7	61.3	68.3	66.7	*
	Disagree	0.0	42.3	38.7	31.7	33.3	
The current precautionary statements are easy to understand	Agree/ Somewhat Agree	50.0	84.4	84.8	85.3	85.8	N/S
	Disagree	50.0	15.6	15.2	14.7	14.2	
Precautionary Statements are used when companies are concerned about protecting themselves	Agree/ Somewhat Agree	50.0	90.9	93.9	93.8	90.8	*
	Disagree	50.0	9.1	6.1	6.2	9.2	
Precautionary Statements are limiting the food choices for people with food allergies	Agree/ Somewhat Agree	100.0	75.0	71.9	67.8	68.7	N/S
	Disagree	0.0	25.0	28.1	32.2	31.3	

4.2.4 Summary

After surveying approximately 1300 households that are affected by food allergies, a considerable proportion of consumers reported not heeding precautionary statements. Generally, affected consumers view precautionary statements to be helpful and easy to understand, however, they also perceive them to be misused by manufacturers. Age,

region and allergic status of household were found to affect both purchasing behavior and perceptions of precautionary statements.

The most notable trend observed was differences by allergic status. Allergic families were less likely than indirectly affected families to find precautionary statements helpful. This is reflected in their purchasing behavior, as they were more likely to purchase products labeled with precautionary statements.

Another interesting trend is differences by age. Older consumers reported finding precautionary statements difficult to understand, and therefore choose to avoid products carrying any type of precautionary statements, including '[Allergen]-Free' statements, possibly creating unnecessary limitations to their food choices.

To address purchasing behavior, perceptions and effectiveness of precautionary statements on an individual scale, twelve qualitative in-depth interviews were conducted with directly affected consumers.

4.3 Qualitative Analysis

Interviews with directly affected consumers explored the experience of food shopping for an anaphylactic food allergy in the family. Results are organized around four major themes: grocery shopping experience, purchasing behavior, perceptions of allergen labels, and living with a food allergy.

4.3.1 Grocery Shopping Experience

The sole management strategy for a food allergy is a strict avoidance diet that relies heavily on allergen labels on prepackaged foods. To understand the lived experiences of an allergic family, it is important to understand the family's purchasing behavior, as well as their attitudes towards grocery shopping.

Attitudes toward Grocery Shopping

Respondents reported perceptions related to costs and time of a grocery shopping trip (Table 4.19). All 12 respondents indicated they felt it takes them longer to shop than an average consumer with no allergies in the family:

Definitely takes us longer, because we have to stop and read all the labels. Somebody once ran into me at the grocery store, and she saw me with my glasses, reading a label, and she said, “Oh my goodness, it does take you longer, doesn’t it? I never really thought about all the stopping and reading you have to do, but you have to do it with everything.”

(Participant #21 – *Mother of child with peanut, tree nut and other allergies*)

Respondents also perceived themselves to be paying more than an average family for groceries:

R³: Do you think you pay more for your groceries?

P: Definitely.

R: Are you willing to pay more?

P: Absolutely. How do you not? I am a huge advocate... These kids have a right to be in the world.

(Participant #32 – *Mother of 2 allergic children with peanut, tree nut and other allergies*)

To explore the cost burden associated with shopping for food allergies, a shopping list was adopted from Cornelisse-Vermaat et al., 2007 (Appendix F). It was developed by a dietician, and consists of foods required for breakfast, lunch, dinner and dessert. Costs for two baskets of products were compared: one with no dietary restrictions, and one for a peanut and nut free environment. An effort was made to keep serving sizes similar.

Products with no allergen warning, and the absence of peanut and tree nut in the ingredients list were assumed to be safe. Prices for allergen-free products were found to be only slightly higher for processed foods than other products. However, due to limited food choices for consumers with a peanut and tree nut allergy, there were fewer

³ In participant quotes, R refers to questions asked by the researcher, P refers to the participant’s answer, and texts in brackets are the interviewer’s explanations.

opportunities to take advantage of sales and in-store promotions, possibly increasing the cost burden for allergic families.

Table 4.19: Individual perceptions towards grocery shopping

Perception towards Grocery Shopping		Number of Participants (% of total)
General experience	Positive	6 (50%)
	Negative	4 (33%)
	Mixed	1 (8%)
Length of time compared with an average consumer	Longer	12 (100%)
	Same	-
	Shorter	-
Cost of groceries compared with an average consumer	Higher	9 (75%)
	Same	3 (25%)
	Lower	-
Willing to pay more than an average consumer for groceries	Yes	3 (25%)
	No	1 (8%)
	Mixed & Unsure	1 (8%)
	No Choice	4 (33%)
Satisfied with food choices	Yes	4 (33%)
	No	5 (42%)
	Mixed & Unsure	3 (33%)

Grocery Shopping Related Practices

Respondents' regular grocery shopping practices were explored (Table 4.20). While all participants perceived themselves to be heavily reliant on allergen labels to guide consumption choices, only 50% reported always reading allergen labels prior to purchase, and 58% re-reading prior to consumption, despite the fact that this is standard advice given by Anaphylaxis Canada (www.anaphylaxis.ca).

In addition, although 50% of respondents reported reading labels prior to purchase, it was observed that this was not the case. This was especially true for consumers shopping for peanut and/or tree nut allergies, which arguably are easiest to avoid due to increased awareness of these allergens. When asked, it was often explained that not all

products are bought for the allergic member, or that the family is familiar with the product and feels safe consuming it.

Table 4.20: Individual practices related to grocery shopping

Reported Practices		Number of Participants (% of total)	Number of mentions (% of total)
Frequency of reading allergen labels at grocery stores prior to purchase	Every time	6 (50%)	13 (68%)
	Sometimes	4 (33%)	6 (32%)
	Never	-	-
Re-read labels at home prior to consumption	Always	7 (58%)	8 (62%)
	Sometimes	4 (33%)	4 (31%)
	Never	1 (8%)	1 (8%)
Perceived reliance on allergen labels to guide consumption choices	Heavy	10 (83%)	10 (100%)
	Somewhat	-	-
	Little	-	-
Other Shopping Habits		8 ⁴ (67%)	15 (50%)
Avoiding bulk and/ or open foods in stores		5 (63%)	7 (23%)
Developing comfort zones around familiar 'may contain [allergen]' products		2 (25%)	2 (7%)
Other		3 (38%)	6 (20%)

Respondents also mentioned concerns related to open and bulk foods in grocery stores. They were generally perceived to be a source of cross-contamination.

Never ever would I buy any of that bulk food, ever. This time of year, and Christmas I really don't even bring him [allergic son]... They had chestnuts, and walnuts and stuff, and people touch it and then they touch everything. You see like these nuts here [bulk food], that to me is wrong, but not to everybody, right?
(Participant #32 – *Mother of 2 children with peanut, tree nut and other allergies*)

It is frustrating actually [at] this particular store, you can't even buy a carton of milk here, because everything is dripping, literally dripping, and it is really quite frustrating.
(Participant #35 – *Mother of 2 children with peanut, tree nut, sesame, milk and other allergies*)

This suggests that an individual's social construction of the illness, based on perceived reliance on labels, satisfaction with food choices, and interaction with grocery

⁴ The total is not equal to the sum of the participants in the following breakdown due to overlap in responses.

store environment guides their shopping habits, e.g. how often labels are read. This in turn has direct effects on the health and well-being of those allergic.

Trust

Trust also influenced consumers' grocery shopping experience and practices (Table 4.21). Although 67% of respondents do not trust a brand enough to make purchases without reading labels, 92% did identify 'good' brands. There were 20 mentions from 12 participants of these preferred brands that they perceive to be 'allergy aware and diligent'.

I like [Product]⁵. They have a peanut free symbol, and under their ingredients list they have 'Made in a dedicated nut free' [statement], just that extra step. As a consumer and buyer, it just makes my life so much easier.

(Participant #32 - Mother of 2 children with peanut, tree nut and other allergies)

One that I give great credit is [Company]. They have phenomenal allergy control on absolutely everything. A couple times a year I download their menu page pdf file. Do a search and highlight for everything we can't have... My wife will go in and ask to speak to the manager, and say, 'According to this we can eat [product]. Can you put on clean gloves and use a fresh scoop, and do the [product] for the kids'. They do a great job of that.

(Participant #41 – Father of child with peanut, sesame and other allergies)

Interestingly, no participants reported trust for grocery store staff and would not ask for their help if they required additional information. It was perceived that store staff would not understand, and would not know enough about products. Five respondents described prior negative experiences with store staff.

R: If you want more information, would you ask store staff?

P: No. I have done that before, and they really don't know, so I have ended up calling the company itself. It is almost worse if you get an answer from them. You think you can rely on it, but it is not the right answer.

(Participant #39 – Mother of child with peanut and tree nut allergies)

⁵Product and company names have been removed from interview transcripts.

Table 4.21: Individual reports of trust towards manufacturers and store staff

			Number of Participants (% of total)	Number of mentions (% of total)
Manufacturers	Trusted brand without having to read labels	None	8 (67%)	8 (53%)
		1 -3	4 (33%)	7 (47%)
	Frequency of visiting manufacturers' websites	Often	1 (8%)	1 (11%)
		Never	8 (67%)	8 (89%)
	Prior contact experience with brands	Positive	5 (42%)	6 (50%)
		Negative	4 (33%)	6 (50%)
	Prior consumption experience of product	Positive	3 (25%)	5 (72%)
Negative		2 (17%)	2 (28%)	
'Good' Brands Identified			11 (92%)	20 (N/A)
Store Staff	Trust store staff	Yes	-	-
		No	12 (100%)	14 (100%)
	Prior experience with grocery store staff	Positive	1 (8%)	1 (14%)
		Negative	5 (42%)	6 (86%)

Respondents also reported prior negative experiences about foods baked in the store by staff, such as store bakery. Most reported inconsistent answers, such as allergy warnings in stores contradicting those on boxes.

P: That sign is on everything, because really [we] should be able to buy pineapple and [they] cut a watermelon without having it touch peanuts.

R: Would you ask them whether or not ...

P: I have but you get a different answer depending on who you get. 'Well we don't do it at the same time as anything else. It should be fine. Well we can't guarantee it.' So if I was to be really, really, really safe I shouldn't buy this. But it would eliminate fruit for us.

(Participant #39 – *Mother of child with peanut and tree nut allergies*)

In summary, all participants perceive themselves to be heavily reliant on allergen labels to guide their choices, because many do not have a trusted brand. However, participants do prefer some brands over others. All agree it takes them longer than an average consumer to shop, since they need to read labels prior to purchase. There is a high level of mistrust in store staff, suggesting the need for policies to increase allergen and product knowledge among grocery store staff.

Interactions with food products, store staff, and in-store allergen warnings all contribute to shape social constructions of the allergy. Differences in individual shopping habits reflect differences in these social constructs. Based on these social constructs, families act in ways that are perceived as rational, which directly affects the well-being of allergic individuals.

4.3.2 Purchasing Behavior

Information Source

A food label consists of several components indicating consumption risk. These include the ingredients list, allergen alerts, as well as the origin of the product. Most participants look for allergen warnings as the primary source of information, followed by the ingredients list (Table 4.22).

First thing, I always look at the bottom to see if there is a ‘May Contain’, and if it doesn’t say nuts, then I will read the rest of the label, so I don’t waste time.

(Participant #40 – *Male with peanut and tree nut allergies*)

Table 4.22: Mentions of information sources, qualitative interviews

Information Source		Number of Participants (% of total)	Number of mentions (% of total)
Primary	Allergen Warning	7 (58%)	8 (73%)
	Ingredients List	2 (17%)	2 (18%)
	Highlighted Text	1 (8%)	1 (9%)
Secondary	Allergen Warning	1 (8%)	1 (10%)
	Ingredients List	6 (50%)	8 (80%)
	Origin of product	1 (8%)	1 (10%)
Unresolved Issues	Manufacturer	12 (100%)	16 (89%)
	By phone	9 (75%)	11 (69%)
	By email	1 (8%)	1 (6%)
	By website	2 (17%)	4 (25%)
	Store Staff	1 (8%)	1 (6%)
	Self test	1 (8%)	1 (6%)

When faced with unresolved issues, i.e. further questions about the product that were not answered in stores, all participants stated that they would contact the manufacturer, primarily by phone:

To be honest, I really don't depend on anybody. If there is something here that I want to know, I will not buy it this time. I will go home and research it, call the manufacturer, and deal with it that way. I don't depend on people here that are not educated in it.

(Participant #32 – *Mother of 2 children with peanut, tree nut and other allergies*)

Factors Influencing Purchases

Over 90% of participants reported that a precautionary statement leads to the decision not to purchase and/ or consume the product (Table 4.23). This complements previous findings, where precautionary statements were reported to be the primary source of information by most participants (Table 4.22). However, when comparing this to quantitative data, results seem to be contradictory. Over 20% of surveyed participants reported purchasing products labeled with precautionary statements (Table 4.3). Over 40% of allergic families reported purchasing products labeled with precautionary statements (Table 4.9). This suggests that there may be individual factors affecting purchasing decisions, which may not be explored using large scale survey methods.

R: When you pick up a label, do you see 'May Contain'?

M: Oh yes, because we won't purchase it. We do not eat it, because I am not comfortable. What happens if my kids were the one to eat that first piece that actually went through the processing? How much contamination is on it? Some people are okay with it. But I myself am not.

(Participant #23 – *Mother of 2 children with peanut and tree nut allergies*)

This quote demonstrates how an individual's social construction of the allergy affects their behavior. Prior experience and acquired knowledge of precautionary statements shape these constructs, which in turn guides purchasing and consumption.

The absence of a label on a product was also mentioned as an important factor leading to the decision not to purchase and/ consume a product:

We don't buy those, because there is no allergen listing, and it doesn't say 'May Contain'. So to me, they are not making people aware.

(Participant #32 – *Mother of 2 children with peanut, tree nut and other allergies*)

It was also perceived by participants that overseas laws are different from Canadian laws, and therefore less trustworthy.

P: We stay away from things not made in Canada, or the United States. Candy and things, I always tell Eric, look to see where it is made. If it is made in China, Brazil, or Mexico, we don't care what it says, just don't eat it. I don't trust those.

R: And what is the reason behind staying with Canadian and United States?

P: Well I think their manufacturing process and labeling standards are more reliable.

(Participant #37 – *Mother of child with peanut and tree nut allergy*)

Table 4.23: Individual Factors leading to decision to purchase/ consume and not purchase/ consume

		Number of Participants (% of total)	Number of mentions (% of total)
Factors leading to purchase/ consumption	Absence of allergen in ingredients	1 (8%)	1 (2%)
	Allergen-free claim	4 (33%)	7 (15%)
	Brand of product	5 (42%)	7 (15%)
	No warning on package	4 (33%)	5 (11%)
	Origin of product	1 (8%)	2 (4%)
	Prior experience with product	11 (92%)	26 (54%)
Factors leading to not purchase/ consumption	Brand new product	1 (8%)	2 (5%)
	No label on product	5 (42%)	6 (15%)
	Origin of product	5 (42%)	7 (18%)
	Precautionary statement	11 (92%)	22 (56%)

When exploring factors leading to the decision to purchase a product, prior experience was most frequently mentioned. It was reported to be more important than allergen claims on labels, since many reported not reading labels if they are familiar with the product:

P: I guess the icings are ‘May Contain’. This one is ‘Manufactured on equipments that also process tree nuts’. But I do purchase this one.

R: This one as in this product or products labeled with this version?

P: This product. It is a ‘Manufactured on’ and we are not 100% sure, but I have had this product quite a bit, and he has been okay with it, so ...

(Participant #36 – Mother of child with peanut and tree nut allergy)

Brand of product was also mentioned to be an important factor influencing purchasing decisions. The brand’s image as an allergy aware company is an important part of the decision making process.

The only exception is through [Company]; on the granola bars it says ‘Manufactured on the same line that uses Sesame’. But they are an allergy aware company. When I phoned and talked to the founder, he explained that the product that is made on the line before them is another company’s product. They clean the machine. They do their granola bars, and they test samples. If the tests ever showed any amount of sesame, the website would be updated, and on the box of bars you purchased, it would be notified. So they are an allergy “safe” company.

(Participant #35 – Mother of 2 children with allergies to peanut, tree nut, sesame and other allergies)

Allergen free claims were also reported to influence purchasing decisions. Trust in these statements over precautionary warnings was reported by participants:

What I know is I have never heard of a ‘Peanut free’ product with a symbol being recalled. I have heard of people forgetting to put ‘May Contain Peanuts’ or ‘Contains Peanuts’, or saying whatever the allergen is.

(Participant #32 – Mother of 2 allergic children with allergies to peanut, tree nut and other allergies)

Participants also described using allergen warnings as an indication of the company’s awareness of food allergies, and their commitment to adopting Good Manufacturing Practices.

It just says, ‘May Contain Sesame’, and doesn’t say ‘May Contain Trees nuts’. I look at this, and I say tree nuts and peanuts are priority allergens. If they [Company] are going to say that it may contain sesame, they are going to say it may contain peanuts or tree nuts too, if there is a chance of it, I know this manufacturer is careful.

(Participant #25 – Mother of child with peanut and tree nut allergy)

In summary, the presence of precautionary statements was most frequently reported to be a deterrent to purchase and consume a product. On the other hand, prior experience with the product was most frequently reported to be a factor leading to purchase and consumption. Individuals' social constructions of risks involved with consumption are shaped by prior experience and familiarity with the product. Differences in these constructs lead to differences in purchasing behavior, i.e. some consumers are comfortable with purchasing products labeled with precautionary statements. Ultimately, this has a direct health effect on allergic individuals.

4.3.3 Perception of Allergen Labels

Perceptions of allergen labels were also explored in the interviews. This includes perceived usefulness, concerns and suggested improvements for the labeling environment.

Perceived Usefulness

Over 65% of respondents reported finding allergen labels useful (Table 4.24):

R: Overall do you think the labels are helpful?

P: Absolutely. I mean it gives us a starting point. It gives us some place to work from. At store level for certain companies like [Company], I can determine right in the store whether or not it is safe.

(Participant #35 – Mother of 2 children with peanut, tree nut, sesame, and other allergies)

However, when focusing perceived usefulness on the allergen free logo and precautionary statements, perceptions differed. The logo was found to be an eye catching cue that draws immediate attention.

R: I noticed when you picked up [Product], you didn't need to read the label.

P: Because I know the peanut free symbol.

R: And is that helpful for you?

P: Very helpful. I love it. My son is only three, and he can pick that out. So it is really, really nice to have.

(Participant #25 – Mother of child with peanut and tree nut allergy)

Table 4.24: Perception of usefulness of allergen labels

Perception		Number of Participants (% of total)	Number of Mentions (% of total)
General label is useful	Yes	8 (67%)	11 (92%)
	Sometimes	1 (8%)	1 (8%)
	No	-	-
Allergen free logo is useful	Yes	5 (42%)	6 (32%)
	Sometimes	10 (83%)	13 (68%)
	No	-	-
Precautionary statements are useful	Yes	1 (8%)	1 (9%)
	Sometimes	3 (25%)	4 (36%)
	No	3 (25%)	6 (55%)
Precautionary statements limit food choices	A lot	11 (92%)	15 (94%)
	Moderate	-	-
	Low	-	-
	None	1 (8%)	1 (6%)

For families with multiple allergies, the logo is a good first step, but can be misleading, since peanuts are often confused with tree nuts. Some suggested that the logo may mislead friends and relatives into thinking it is a safe product.

R: Do these work for you, the logos?

P: They do...but sometimes they use the peanut free logo, when there are tree nut ingredients in there, because peanut and tree nut are two very different things, and not everybody is allergic to both. However, my concern is when people pick them up in a hurry, for example, people who are throwing birthday parties or supplying foods for the church group, or grandparents. They just see the logo, and they quickly grab it not realizing that there might be tree nuts in there.

(Participant #21 – *Mother of child with peanut, tree nut and other allergy*)

When asked about precautionary statements, respondents expressed viewing them being used by companies as a legal precaution:

I kind of think all of them is a cop out. It is a little bit like legal ease language. From my point of view, 'May Contain', 'Manufactured in a facility that does', I have to assume that it does. I can't take that home. But even then, if [I] got away with it once, do I now trust it and buy that regularly? I am not signing up for that stress every time I feed my son that thing. When I know that [warning] half the time is just a lawyer or insurance company telling [Companies] to do that, I actually get quite angry about it, because I am 95% sure I could take this product

home. But because some risk assessment guy said maybe there is a chance, I can't take that risk.

(Participant #41 – *Father of child with peanut, sesame and other allergies*)

Some respondents found some versions of precautionary statements more useful than others. But these perceptions varied greatly among participants.

The 'Manufactured in the same facility as', that one I don't like because if it is on a totally different floor or a totally separate area, then you know it doesn't bother me as much as 'Made on the same equipment as'.

(Participant #25 – *Mother of child with peanut and tree nut allergy*)

I hate the 'May Contain', because I find that it is like a catch all statement that doesn't really mean anything. Does that 'May Contain' mean somewhere in the building we have nuts, so just keep it safe, we are going to put this label on? Versus you know 'Processed on the same'. I take that very seriously. So I like that label a lot better, because it means something to me. It means that nuts went on the same line as your child's food is about to, so I won't buy that.

(Participant #39 – *Mother of child with peanut and tree nut allergy*)

When asked about precautionary statements limiting food choices, all but one respondent found precautionary statements to be substantially limiting food choices. This is consistent with quantitative data presented previously, where 70% of respondents agreed that they limit food choices for allergic people (Table 4.17), as well as qualitative data, where only 4 respondents reported satisfaction with food choices (Table 4.19)

R: Do you think advisory labeling limit your food choices?

P: Oh yes, because we won't purchase it.

R: And how much do you think they limit?

R: I would say a lot, because it narrows your choices down. A section has like ten things. 'May contain' I would say would be on about six of them. So now you are narrowed down to four automatically, because I will not purchase any of those other six, so that is you know right then and there.

(Participant #23 – *Mother of 2 children with peanut and tree nut allergies*)

Respondents also compared Canadian to international regulations. Six out of seven respondents expressed that they feel more secure with Canadian labeling and would consciously choose to purchase Canadian products over imported products.

In the US it just says nothing... I have actually picked up things and put them in my cart [which] has no allergy warnings. But then when you read, it has peanut right in it as part of the food product. So if you didn't actually read through every ingredient, you would have bought that product. I don't know why the US is so, so behind, because it is not like they have less children with allergies.

(Participant #39 – *Mother of child with peanut and tree nut allergies*)

Some respondents relate Canadian labeling to anaphylaxis policies and peanut bans in schools. They express appreciation of the regulations in Canada:

I feel like there is more regulation in Canada, maybe than there would be outside of North America. There are just so many more products here that highlight [Peanut-free]. I think it is the laws, or Sabrina's Law in the schools that has really helped with that.

I think we are really lucky in Canada with the way the rules are in most schools, being peanut and nut free. Because of that, the labels are reflecting that I think.

(Participant #25 – *Mother of child with peanut and tree nut allergies*)

Overall, results suggest that generally, participants do find allergen labels to be helpful, because they are good starting points. When comparing Canadian to international labeling, almost all respondents prefer and appreciate Canadian labels. However, when focusing specifically on the usefulness of various aspects of the allergen label, such as allergen free logos, and different versions of precautionary statements, respondents suggest that they are useful only in some instances.

Individuals' perceptions of allergen labels shape their social constructions of risk involved with consuming a product. Some versions of precautionary statements are perceived to be more useful than others, leading to differences in purchasing behavior. This ultimately has a direct effect on the well-being of allergic consumers.

Concerns with the current labels and the labeling environment

The most frequently voiced concerns by participants were terminology related (Table 4.25). Respondents expressed two problems: hidden ingredients and words not being in lay terms:

The word ‘spices’ can include sesame, so in the back of our mind... [we’ve] never had a problem with it, but spices [shouldn’t be] an ingredient.

(Participant #41 – *Father of child with peanut, sesame and other allergies*)

P: Sometimes, like for this, is processed junk, right? It is a lot of words that aren’t English. I shouldn’t say English, understandable to a consumer.

R: Not in lay terms?

P: Exactly. Now I have learned a lot more by researching.

(Participant #23 – *Mother of 2 children with peanut and tree nut allergies*)

Table 4.25: Concerns towards allergen label and current labeling environment

Concerns		Number of Participants (% of total)	Number of mentions (% of total)
Allergen Labels	Contrast	3 (25%)	3 (12%)
	Small font sizes	3 (25%)	4 (16%)
	Inconsistent labels	1 (8%)	4 (16%)
	Location of allergen information	5 (42%)	7 (28%)
	Terminology	7 (58%)	7 (28%)
Allergen Labeling Environment	Manufacturers not adopting Good Manufacturing Practices	5 (42%)	6 (23%)
	Inconsistency across different companies	6 (50%)	10 (38%)
	Voluntary nature of precautionary statements	4 (33%)	6 (23%)
	Mislabeling – Inaccurate labels	3 (25%)	4 (15%)

The second most frequently reported concern is the location of allergen related information on the label. Respondents reported problems locating allergen related information, and expressed frustration looking for allergen information.

Even if it had a ‘May Contain’ warning, you wouldn’t know where to look for it, and identify it. So you really have to look completely over a package to look for the ‘May Contain’ warnings.

(Participant #37 – *Mother of child with peanut and tree nut allergy*)

We have just learned to hunt for it. It is most frustrating on smaller packages, things like lollipops where the label is actually on the wrapper and the wrapper is twisted all around... We have just learned to deal with it. We look for it, hunt for it, because we are specifically looking to see if it is safe. On cracker boxes too it is hard because sometimes they are underneath the flap... Once you have opened

a package, you have destroyed the seal, or the whole list itself, so you can't go back and recheck it.

(Participant #35 – *Mother of 2 children with peanut, tree nut, sesame and other allergies*)

When mentioning concerns about the Canadian labeling environment, the most frequently mentioned problem is inconsistency across different companies.

R: When you pick up a product, do you sometimes see precautionary statements?

P: Some have them and some don't, and so that is the problem. There are a lot of inconsistencies, where some do say it, and some don't.

(Participant #21 – *Mother of child with peanut, tree nut and other allergies*)

I find it difficult when a company doesn't have a label and there is no peanut product in it, because then people won't know if it is peanut free, or nut free, or what it is... I was calling companies and saying, 'You don't have a peanut or tree nut listed, but you don't have a warning, saying it is peanut free. What is happening?' And then they would say, 'Oh no there is no peanut product in there, it is safe. We just don't have the allergy warning on it.' That is frustrating, and I find it more frustrating for people trying to buy for my daughter...

(Participant #26 – *Mother of child with peanut and tree nut allergies*)

Another concern mentioned by participants is manufacturers not adopting Good Manufacturing Practices and issuing precautionary statements instead.

The company just says that [precautionary statements] to cover themselves for liability, because they don't want to be sued if someone does have a reaction. And I can respect that for a company, but that becomes frustrating if it is a product that really doesn't contain nuts, and they won't just take the time to go through the process properly, and take the label off.

(Participant #26 – *Mother of child with peanut and tree nut allergies*)

'May contain traces of' and 'May Contain' is as good as certainly does contain. I can't buy it. It's not an excuse for bad manufacturing. Either it does or it doesn't.

(Participant #41 – *Father of child with peanut, sesame and other allergies*)

Respondents also expressed confusion about the risks involved with consuming the product, due to the lack of regulations.

There is nothing on these ingredients that tells me there is any allergy warning. So should I assume that there is nothing I need to worry about? Or do they just not bother doing that? [Company] is a reputable company, and I know it is packaged in Ontario, so I'm reasonably sure, but still in the back of my mind, I know it is not actually the law. It is a practice that they don't subscribe to.

(Participant #41 – *Father of child with peanuts, sesame and other allergies*)

Overall, terminology and location of allergen labels were most frequently mentioned by participants as concerns. Regarding the labeling environments, most frequently mentioned concerns were inconsistencies in labels, and manufacturers issuing precautionary statements instead of adopting Good Manufacturing Practices.

The experience of utilizing allergen labels shape consumers' social constructions of risks involved with purchasing and consuming a food product. These constructs guide consumers to develop ways obtain allergen information on labels and make safe choices.

Suggested Improvements

In addition to voicing concerns, participants also suggested improvements to allergen labels and the labeling environment (Table 4.26).

Table 4.26: Suggested Improvements by respondents towards allergen labels and the environment

	Number of Participants (% of total)	Number of mentions (% of total)
Consistent labels	4 (33%)	4 (9%)
Contrast	3 (25%)	3 (7%)
Font size and bolded text	7 (58%)	9 (20%)
Companies adopting Good Manufacturing Practices	4 (33%)	6 (13%)
Location of allergen information	4 (33%)	5 (11%)
Pharmaceutical labeling	4 (33%)	6 (13%)
Implementation of stricter regulations	4 (33%)	6 (13%)
Identifying tree nut type in labels	1 (8%)	2 (4%)
Other	3 (25%)	4 (9%)

Although terminology was the most frequently reported concern by participants, there was no suggestion to improve this area. The most frequently suggested improvement was related to font sizes and bolding relevant text to make identifying information easier:

Personally I would like allergens to be bolded, some companies do it, some don't. But if I am reading and there is wheat, I would like to see wheat bolded, perhaps even a little bit bigger as a font... That would make things easier.

(Participant #32 – *Mother of 2 children with peanut, tree nut and other allergy*)

Respondents also suggested improvements for companies to adopt Good

Manufacturing Practices.

I would love to see companies actually make sure [and] to be legitimate, there are no peanuts or nuts in it, to take the time to go through the process, and take that warning off if it is not necessary... At this point, I don't really know how true it is that they are just covering themselves.

(Participant #26 – *Mother of child with peanut and tree nut allergy*)

Respondents suggested implementation of stricter regulations, mostly in two areas: requirements for honest and proper manufacturing, and removing the voluntary nature of precautionary statements:

I would really like the government to have more set guidelines. If they had more set guidelines, and more things a business person would have to go through, I think in the long run make people's jobs easier.

(Participant #23 – *Mother of 2 children with peanut and tree nut allergies*)

Well I think the biggest thing would be if they made precautionary statements not voluntary. They made it a mandatory thing to label the 'May Contain' items. That would make my life a lot easier. If I knew that was mandatory, I wouldn't feel the need to call the company. It would save me a lot of time.

(Participant #25 – *Mother of child with peanut and tree nut allergy*)

Interestingly, there were considerable mentions from several participants about the need for pharmaceutical labeling beyond food labeling. Areas mentioned include makeup, lotions, soaps and shampoo. These areas were reported to be harder to manage, since there is dermal contact, and regulation is lacking.

Soaps and shampoos, and all this stuff that I buy with my groceries, it doesn't have any warnings on it at all. A lot of them have almond oil and walnut oil in them, and in the makeup and cream, too. That is what I find even harder than food. It isn't regulated at all.

(Participant #36 – *Mother of child with peanut and tree nut allergies*)

Any of the lotions, I have to actually read through because hazelnuts are shea butter. There is a lot of lotions and things that you don't know if they have nut products in them or almond oil. Right now my kids are young, so we just use [Product], but once they get older, they are going to want to wear makeup, so that is going to become difficult because so many of these things have oils in them.

(Participant #39 – *Mother of child with peanut and tree nut allergies*)

In summary, participants suggested various improvements to make following strict avoidance diets easier for them. Although terminology issues were most frequently mentioned as a concern, no suggestion of improving this was raised. The most frequently voiced improvements are bolding allergens and making them larger, as well as adopting stricter regulations and guidelines. Interestingly, there were multiple mentions of improving pharmaceutical labeling, such as labeling for lotions and makeup products.

4.3.4 *Living with a Food Allergy*

Throughout the interviews, there were discussions about the family's daily experiences of living with an allergy.

Living with an allergy

When describing daily experiences living with an allergy, respondents reported emotions felt by the caregiver, as well as by the allergic child (Table 4.27). The most frequently reported emotion is isolation, especially in social settings:

It has isolated us from a lot of families. They don't get it. They don't understand it. They think it is just attention seeking, but he can't eat at your house if you are going to put peanut butter in your gravy as a thickener. He just can't, and we won't. We are not going to leave him behind to come to something. We are just not going to isolate him any more than he is already isolated.

(Participant #32 – *Mother of 2 children with peanut, tree nut and other allergies*)

There is one incident that will always be seared in my brain from when my daughter was four. One Valentine's Day, a parent brought in a large heart cookie that just came from a bakery, no label... The teacher took it, everybody was allowed to break a piece. But because there was no label, she said to my daughter, 'You can't have any, because we don't know if it is safe for you.' While I am

thankful that she did that, because it kept her safe, it was heartbreaking, because she came in the car at the end of the day, and just floods of tears, ‘Mommy I wish I didn’t have this allergy. Everybody else got to have this cookie.’ And the thing is, it was a crappy cookie. It didn’t really [matter], but it is that whole feeling of everyone else got to do something that I was left out of. And from time to time, she really feels ‘I am left out of something’.

(Participant #39 – *Mother of child with peanut and tree nut allergy*)

Table 4.27: Emotions expressed by respondents towards living with allergy

	Number of Participants (% of total)	Number of mentions (% of total)
Difficulty eating out	6 (50%)	11 (22%)
Frustration	2 (17%)	2 (4%)
Isolation	7 (58%)	14 (27%)
Importance of support groups	3 (25%)	3 (6%)
Difficulty travelling	4 (33%)	6 (12%)
Uncertainty	2 (17%)	3 (6%)
Constant worry and nervousness	6 (50%)	12 (24%)

Parents also reported constant worry when the allergic child is out of their control, such as in school; or for older children, when they are out at social events with friends:

I had a lot of discussions with the school and the food services people, and they have been very responsive. So I am not concerned about the food he eats while he is at school. I am a little bit concerned about him going out, and hanging out with friends. He has gone an entire day when he has been out with his friends, and not had anything to eat, because he has not been certain. So it is good that he is careful, but it is not a very pleasant way to live. It is 24/7, it is a huge burden for people who have food allergies.

(Participant #37 – *Mother of child with peanut and tree nut allergies*)

Participants also described experiences when the allergic child was so worried that she believed she was having an allergic attack out of sheer worry:

Taco shells! I never thought about it. So I bought them, and they were safe, and Brady loved them. But the first night we made them, Delaney tried them and got herself in an anxiety stage that she had two bites, and she was sure she was having an allergic reaction. But it was out of sheer worry.

(Participant #35 – *Mother of 2 children with peanut, tree nut, sesame, and other allergies*)

Difficulty eating out was also mentioned by 50% of participants. Eating out was reported to not be an option for the family, because ‘it is not worth the risk’. Participants reported going to the same restaurant every time, because they know it is safe.

If we go out for dinner, which is very, very, very rare, I have to research that restaurant before we go, and then you do silly things like risk assessment, if you eat this, you are at 10% risk. We don’t go anywhere unless they have an allergen listing. Friday we went out for dinner, but we fed him before we went. Even though they have an allergen listing, [I say] ‘Thank you, but I know you have the stuff back there, and as long as you have it, then that is a risk’.

(Participant #32 – *Mother of 2 children with peanut, tree nut, and other allergies*)

Some participants described their child’s unfamiliarity with popular restaurants:

A few years back, Brady used to think that MacDonald’s is ‘old MacDonald’s had a farm.’ And he is the only kid in the world that doesn’t know what a Happy Meal is. He is like, ‘What is a happy meal? A meal that is happy? It has smiley faces on it?’

(Participant #35 – *Mother of 2 children with peanut, tree nut, sesame and other allergies*)

In summary, families living with a food allergy expressed various emotions of living with an allergy. The most frequently reported emotions are isolation, worry, and difficulty eating out. Individuals’ daily experiences living with a food allergy shape their social constructions of the allergy. These social constructions of the allergy then lead to risk managing strategies, such as researching restaurants before eating out.

Managing the Allergy on a Daily Basis

Strategies on managing the food allergy as a family were also mentioned by several participants. When speaking about teaching their children to manage their allergies, respondents described strict rules about food consumption, as well as teaching their child to read labels on their own.

My kids have been told that not every chocolate chip cookie is the same. It looks the same, but it is not. My kids know the rules. No labeling, no nothing.

(Participant #23 – *Mother of 2 children with peanut and tree nut allergies*)

I would always get him to read the labels himself, just so he could get used to reading labels... We don't talk about his allergies a lot, but I do talk about reading ingredients lists. We always talk about that because I am always giving him examples of things that he needs to be aware of and careful about.

(Participant #37 – *Mother of child with peanut and tree nut allergy*)

A want to keep the home a safe haven where the allergic family member can just pick up any food without having to worry, was expressed by 8 (67%) respondents:

Our home was like a safe haven. We always wanted it to be. My kids can eat anything in my house. We don't buy anything with nuts in it. I always tell my husband, you have to eat it at work, triple wash your hands. Brush your teeth. We don't allow the tooth brush to even stay in the house. I throw it away, because it could have residue.

(Participant #23 – *Mother of 2 children with peanut and tree nut allergies*)

Precautions to clean up spills and eliminate residue were also described:

I spilled milk at home, I took a paper towel, I wiped it up. I took another paper towel. I put soap and water on it. I took a wet dish clothe, and then I wiped it up, and then I took two more paper towels, and dried it off, and then I put a dish clothe over top of it, so no one would step there until Mom got home. We don't want to be the ones that have caused something to may contain.

We are very careful that there is no obvious drip, and then in our fridge, we have a section that is dairy, and things that aren't.

And that is why even when we have friends over, if I offer coffee that had dairy in, I just remind them, that any spills or drips we have to treat as toxic. Those are the words we use.

(Allergic Daughter of Participant #35 – *Mother of 2 children with peanut, tree nut, sesame and other allergies*)

The precautions adopted by affected families against accidental ingestion suggest the difficulty and constant stress of living with an anaphylactic food allergy.

Increasing Awareness

The burden of having to educate and increase awareness among those around them was expressed by 8 (67%) respondents. Negative prior experience educating other parents, teachers, family members and friends were recalled:

You need to educate everybody you come in contact with, everybody. And people see it as, ‘Oh my god, don’t they have anything better to do?’ It is so frustrating, because it is my own family.

(Participant #32 – *Mother of 2 children with peanut, tree nut and other allergies*)

There is such a misunderstanding about what is peanut free and what is not. Even with people who you would think would know, because they are teachers or there is a teacher in the family or whatever...

(Participant #42 – *Mother of child with peanut allergy*)

Respondents also described taking the reasonable approach, hoping to get others to realize that anaphylaxis is a real problem:

I think we always try to take the approach when talking to friends and other parents, to be the reasonable people. I think by trying to be reasonable they also get a sense that you are not hysterical, freaking out about everything. That seems to get a little more support too.

(Participant #41 – *Father of child with peanut, sesame and other allergies*)

In summary, living with an allergy on a daily basis has been expressed by families to be an emotional experience. The allergy has isolated the families from others, especially in social events, and has put those affected in constant worry and nervousness. These experiences shape individuals’ social construction of the allergy. These constructs in turn guides behaviors that are perceived to be rational, such as adopting precautionary measures to manage the allergy. Many have also tried to educate those around them about their allergies. These strategies ultimately have a direct effect on the health and well-being of those allergic.

4.4 Chapter Summary

This chapter presented the results of both quantitative and qualitative investigations of the effects of allergen labels on the well-being of affected Canadians. Over 50% of Canadians are affected, directly or indirectly, by food allergies, and utilize allergen labels to guide purchasing behavior. Results suggest that precautionary

statements are not as effective as anticipated at communicating risk to affected consumers, as over 20% of affected respondents reported purchasing products labeled with precautionary statements. The majority of respondents find precautionary statements helpful and easy to understand. However, there is also a perception of manufacturer misuse. When stratifying differences by demographic variables, the most observable trend was by allergic status of households. It was found that indirectly affected families were more likely to heed precautionary statements than allergic families. They are also more likely to find precautionary statements to be helpful. These purchasing behaviors and perceptions are guided by families' social constructions of food allergy. These constructions are shaped by families' food allergy related interactions with media, school policies, other parents etc.

When exploring the lived experiences of those directly affected by food allergies, it was found that prior experience with the product was the most frequently reported factor influencing purchasing decisions. The presence of a precautionary statement was the most frequently reported factor leading to the decision not to purchase a product. Generally, allergen labels were perceived to be helpful tools; however, precautionary statements were viewed to be less helpful, as they substantially limit food choices. When describing the daily lives of living with an anaphylactic allergy, respondents reported feeling isolated, and described a burden of having to educate those around them about food allergies.

Finally, participants mentioned concerns about the current labels. The main concerns voiced by interview participants were terminology issues and location of allergen information on the label. Participants also expressed concerns about the

inconsistent use of precautionary statements across companies, as well as companies choosing to issue precautionary statements over adopting Good Manufacturing Practices. To improve the Canadian labeling environment, respondents suggested bolding allergen information and increasing font sizes to make them easier to locate. There were also mentions of implementing stricter regulations around precautionary labeling, and regulating pharmaceutical labeling.

When comparing quantitative and qualitative findings, results appear to be contradictory. Quantitative data suggests that affected consumers are consciously purchasing products labeled with precautionary statements. However, interviews with allergic families suggest that the presence of a precautionary statement is the main factor leading to the decision not to purchase a product. These findings are reflections of differences in the social constructions of the allergy among affected consumers. These constructions are shaped by everyday experiences of making purchasing decisions and utilizing allergen labels. Based on these personal constructs, individuals then make purchasing and consumption decisions they perceive as rational. Differences in the social construction of the allergy lead to differences in purchasing behaviors, which ultimately has a direct effect on the health and well-being of allergic consumers.

This summarizes the key findings of this research. A discussion of these findings, as well as conclusions and future directions of the research, will be discussed in the following chapter.

CHAPTER FIVE

Discussion and Conclusions

5.1 Introduction

This final chapter begins with a summary of the key findings of the research and a discussion of the research within the broader context of the literature. Contributions and limitations of the research will follow. Finally, the chapter concludes with suggested future research directions.

5.2 Key Findings

Results from this research suggests that food allergen labeling in Canada are not as effective at communicating risk as expected, since affected consumers reported not heeding precautionary statements. Allergic families were found to be less diligent than indirectly affected families, and also less likely to find precautionary statements helpful.

Through in-depth interviews with allergic families, allergen labels were generally viewed to be helpful tools that are easy to understand. Participants reported more trust in allergen-free labels than precautionary warnings. Almost all interviewed participants found precautionary statements to be substantially limiting their food choices. Hence, they consciously make purchases that may involve allergen exposure, as prior experience with the product, not allergen information, becomes the main factor influencing these decisions. Findings from this study are consistent with existing literature, as consumers from similar Western countries reported limited food choices due to precautionary statements (Gupta et al., 2010; Cornelisse-Vermaat et al. 2007; Noimark et al., 2009), and therefore rely on prior experience to guide consumption choices (Cornelisse-Vermaat et al., 2007; Hefle et al., 2007; Noimark et al., 2009). Individuals' social constructions of the allergy are shaped by prior experiences of making purchasing decisions and utilizing

allergen labels. These personal constructs guide purchasing behaviors in ways that are perceived to be rational, such as developing comfort zones, and purchasing products based on familiarity, not allergen information.

There was also much discussion about problems related to location of allergen information on labels and inconsistent labels across manufacturers. Even though precautionary statements were found to be easy to understand, terminology, font sizes and the need to highlight key allergens were reported to be key areas of improvement. These findings are consistent with existing literature, as consumers from similar Western countries reported problems related to terminology, inappropriate use of fonts and colors, as well as inconsistent use across manufacturers (Joshi et al., 2002; Simons et al., 2005; Vierk et al., 2007; Voordouw et al., 2009; Cornelisse-Vermaat et al. 2007). It was reported in this study that manufacturers occasionally use peanut-free logos as an alternative risk communication tool. However, it is actually misleading, as indirectly affected families often assume peanut-free logos to mean nut-free as well. An interesting area noted by allergic families in need of regulations is pharmaceutical labeling, since many products contain peanut and nut oils.

In addition, many families reported isolation and constant stress when reporting emotions of living with a food allergy. Some also reported difficulty eating out. This suggests the need for increased emotional and social support for affected families, possibly through existing small scale regional support groups. Affected families' daily experience of living with an anaphylactic food allergy shape social constructions of the allergy, as well as risks associated with food consumption. In turn, these social constructs

shape behaviors, as families reported preferring to make their own meals. These behaviors have direct influences on the health and well-being of affected individuals.

Lastly, drawing upon both quantitative and qualitative data, it was found that findings converged on some themes, but also produced divergent conclusions. Quantitative data suggested that allergic families are less likely than indirectly affected families to heed allergen warnings, as they consciously purchase products labeled with precautionary statements. However, qualitative interviews with allergic families indicated that allergen labels lead to the immediate decision not to purchase a product. The two contradictory conclusions suggest that behaviors of affected individuals are guided by their social constructions of the allergy. These social constructs are shaped by the individuals' prior interactions with allergen labels, as well as acquired knowledge about the allergy. Therefore, to understand reasons behind affected families' health related behaviors, it is necessary to interpret personal meanings of the allergy to the individual, using a social constructionist approach.

In conclusion, drawing upon quantitative and qualitative data, this thesis indicates that food allergen warnings are not as effective in Canada than expected. Consumers do not trust Canadian allergen labels, and therefore draw upon personal constructions of risk to guide consumption and purchasing choices. However, these constructions are based on prior experience with products, and may not always be accurate interpretations of risk, due to constant changes in manufacturing processes. Consumption behavior based on personal social constructs may lead to allergen exposure and possibly fatal reactions.

5.3 Policy Implications

The recent amendments published by Health Canada address some of the concerns raised by the affected consumers interviewed. By August 2012, priority allergens identified by Health Canada will have to be declared immediately following the ingredients list. This standardizes the location of allergen information across different manufacturers. However, the amendments do not address precautionary statements as a result of cross-contamination, and they remain a voluntary risk management tool. Therefore, the amended policy does not reduce the degree of limitation of food choices for those affected. To alleviate unnecessary food limitations, it is necessary to standardize how manufacturers issue precautionary statements. This is a possible area for Health Canada to improve allergen labeling policies. The new amendments also do not address technical details such as font sizes and contrast of labels, which are also further areas that Health Canada could consider, as this is a primary area of concern raised by respondents.

It was reported by interviewed respondents that they would not go to store staff for additional allergen information, nor would they trust information given to them by store staff. This suggests the evident need to increase allergen knowledge among grocery store staff, since they are a potentially important information source for consumers. Training workshops and/ or resources for allergen information could be provided to store staff to increase allergy awareness.

5.4 Contributions

This thesis makes substantive, theoretical and methodological contributions. Substantively, this research is the first to adopt a social constructionist approach in exploring consumers' purchasing behavior and perceptions of allergen labels in Canada.

Results suggest that Canadian food allergen labels are not as effective as expected, as consumers reported past experience, not allergen information, as the most important factor influencing purchasing decisions. Problems regarding terminology and font sizes used on allergen labels were reported. These findings are consistent with similar studies conducted in other countries, e.g. Cornelisse-Vermaat et al., 2007 in the Netherlands and Greece, Joshi et al., 2002, Simons et al., 2005, and Vierk et al., 2007 in the United States. Results from this thesis will be useful for guiding effective policy change in Canada. Ultimately, it will help allergic families and parents of school-aged children make safe consumption choices, and minimize limitations in food choices.

Theoretically, this thesis adopted a social constructionist framework in the context of food allergies. By conducting in-depth interviews with allergic consumers, personal meanings of living with the food allergy were explored. These individual experiences shape individuals' social constructions of consumption risks. Based on these constructs, individuals then make purchasing and consumption decisions that they perceive as rational.

The social constructionist approach has been adopted by health geographers in various research areas. A recent example is the study by Berman et al., (2009), which adopted the social constructionist approach to explore the effects of war-related violence on the lives of refugee women arriving in Canada. It was found that the women's health related behaviors during their resettlement process were shaped by their social constructions of violence. Similar to Berman et al., by adopting a social constructionist approach, this thesis concludes that the purchasing behaviors of families with an anaphylactic food allergy are shaped by social constructions of the disease.

Methodologically, this thesis drew upon both quantitative and qualitative data. The emerging mixed methods paradigm in health research is still widely debated, and this research contributes to the number of health studies that utilizes mixed methods. An example of health research that utilized mixed methods is Stewart et al., 2008. By conducting telephone interviews, in-depth interviews, and focus group interviews with vulnerable populations in Canada, the populations' health related support needs, support seeking strategies, and preferences for health related support were explored. It was found that quantitative and qualitative findings converged on some themes, but also produced divergent findings. Stewart et al. concluded that the use of mixed methods allowed for extension and refinement of results.

In the context of this research, it was found that many themes not reflected through quantitative data were captured through qualitative interviews, especially affective emotions such as frustration and isolation. This complements and explains quantitative results, as in-depth interviews illustrate how differences in social constructions of the illness lead to differences in health related purchasing behaviors of allergic families. This thesis is a reflection of the advantages of utilizing a mixed methods approach in health research.

5.5 Limitations

This research is not without limitations. First, the quantitative sample is not representative of the Canadian population (Table 3.2). When compared to the 2006 census population, the sample over-represented females, as well as those in the 40 – 59 age group, those with high school diplomas, and families with higher income. In terms of region of respondents, families in the Central Canadian region, i.e. Ontario and Quebec,

were slightly over-represented. In addition, the survey excluded the three Canadian Territories, as well as households with only cellular phone services and those without any telephone services. This decreases the generalizability of results. To address this weakness, a follow-up study aimed at interviewing vulnerable populations, i.e. populations with lower socio-economic status and new immigrants, is currently being undertaken.

Second, due to ethical issues, the dataset did not identify which child in the family (if multiple) is the allergic child. As a result, families with allergic teens and families with allergic toddlers and/ or infants, were coded as families with an allergic child. However, the age of the allergic child may be an important factor in determining purchasing behavior.

Third, the survey asked for self-reports of food allergies. Throughout the literature, self-reported allergies almost always exceed diagnosed allergies. In studies where diagnostic tests were conducted, only a small number of reported allergies were confirmed as immune system mediated food allergies (e.g. Gelincik et al., 2008; Nicolaou et al., 2010, Roehr et al., 2004). Perceived and doctor diagnosed allergies were not distinguished during analyses, possibly inflating the estimate of directly affected population. Although consumers with food hypersensitivities make purchasing decisions similar to those with an Ig-E mediated food allergy, the estimation of affected populations might not have been an accurate representation of true food allergic families. Ben-Shoshan et al. attempted to distinguish probable allergies from perceived allergies in the quantitative sample by identifying reports with convincing histories of reactions and/ or physician confirmed diagnosis. It was found that disparities between perceived and

probable allergies were lowest for peanut, tree nut, and sesame seed allergies (Ben-Shoshan et al., 2009). Since only families with peanut, tree nut, and/or sesame seed allergies were included in the allergen labeling section of the quantitative survey, it is not anticipated that differences between perceived and true allergies are a major limitation.

In terms of the qualitative portion of the research, participants were recruited through Anaphylaxis Canada, Ontario's largest support group. This may have led to selection bias, and a skew in the sample because being a member of a food allergy awareness association is associated with higher income and higher education. To overcome this limitation, an effort was made to minimize this bias by recruiting until saturation, i.e. no new themes emerge.

Lastly, since the interviewer may be perceived by participants to judge their purchasing behavior, there is a possibility that they report what they believe their purchasing behavior *should* be, instead of what it *really* is. In several interviews, participants reported always reading precautionary statements prior to every purchase, but subsequent observation proved that this was not the case. To address this possibility of biased responses, an effort was made to discreetly observe participants' purchasing behaviors, and compare them with what was reported.

5.6 Research Directions

This research is the first to explore the daily experience of utilizing food allergen labels by allergic families in Canada using a social constructionist approach. However, this research focused on allergic families. Since indirectly affected families also use allergen labels to guide their choices for allergen controlled environments, further

research is needed to better understand how allergen labels are utilized by this group of affected consumers.

Lastly, as the need for regulating pharmaceutical labeling was reported by many consumers, future research directions could be targeted towards this area, to explore the effects of current pharmaceutical labels on the health and well-being of allergic consumers, and to identify the labeling needs of affected consumers regarding this area. This knowledge is critical in guiding effective policy development around pharmaceutical labeling in Canada.

References

- Anaphylaxis Canada. (2009). Anaphylaxis Canada Home. Retrieved February 12th, 2010 from <http://www.anaphylaxis.org/index.asp>
- Andrews, G.J., Wiles, J., & Miller, K.L. (2004). The geography of complementary medicine: perspectives and prospects. *Complementary Therpaies in Nursing and Midwifery*, 10, 175 – 185.
- Andrews, G.J., & Moon, G. (2005). Space, place and the evidence base: Part I – An introduction to health geography. *Worldviews on Evidence-Based Nursing, second quarter*, 55 – 62.
- Asero, R., Ballmer-Weber, B., Beyer, K., Conti, A., Dubakiene, R., & Fernandez-Rivas, M. (2007). IgE-mediated food allergy diagnosis: Current status and new perspectives. *Molecular Nutrition Food Research*, 51(1), 135 – 147.
- Baxter, J. & Eyles, J. (1997). Evaluating qualitative research in social geography: establishing ‘rigour’ in interview analysis. *Transitions Institute British Geography*, NS22, 505 – 525.
- Ben-Shoshan, M., Kagan, R.S., Alizadehfar, R., Joseph, L., Turnbull, E., St. Pierre, Y., & Clarke, A.E. (2009). Is the prevalence of peanut allergy increasing? A 5-year follow-up study in children in Montreal. *Journal of Allergy and Clinical Immunology*, 123 (4), 783 – 788.
- Ben-Shoshan, M., Harrington, D.W., Soller, L., Fragapane, J., Joseph, L., St. Pierre, Y., Godefroy, S., Elliott, S.J., & Clarke, A.E. (2010). A population-based study on peanut, tree nut, fish, shellfish, and sesame allergy prevalence in Canada. *The Journal of Allergy and Clinical Immunology*, 125 (6), 1327 – 1335.
- Berman, H., Giron, E.R.I., & Marroquin, A.P. (2009). A Narrative Study of Refugee Women Who Have Experienced Violence in the Context of War. *The Canadian Journal of Nursing Research*, 41, 1: 144 – 165.
- Bernhisel-Broadbent, J. (1999). Diagnosis and management of food hypersensitivity. *Immunology and Allergy Clinics of North America*, 19(3), 463 – 477.
- Bock, S., Sampson, H., Atkins, F., Zeiger, R., Lehrer, S., & Sachs, M. (1988). Double-blind, placebo-controlled food challenge (DBPCFC) as an office procedure – A manual. *The Journal of Allergy and Clinical Immunology*, 82(6), 986 – 997.
- Boden, M., Dadswell, R., & Hattersley, S. (2005). Review of statutory and voluntary labelling of food allergens. *The Proceedings of the Nutrition Society*, 64(4), 475 – 480.

- Branum, A., & Lukacs, S. (2009). Food Allergy Among Children in the United States. *Pediatrics*, 124, 1549 – 1555.
- Brugman, E., Meulmeester, J., Spee-van der Wekke, A., Beuker, R., Radder, J., & Verloove-Vanhorick, S. Prevalence of self-reported food hypersensitivity among school children in The Netherlands. *European Journal of Clinical Nutrition*, 52, 577 – 581.
- Carpiano, R. (2009). Come take a walk with me: The "go-along" interview as a novel method for studying the implications of place for health and well-being. *Health & Place*, 15(1), 263 – 272.
- Chiang, W., Kidon, M., Liew, W., Gohw, A., Tang, J., & Chay, O. (2007). The changing face of food hypersensitivity in an Asian community. *Clinical and Experimental Allergy*, 37(7), 1055 – 1061.
- Cornelisse-Vermaat, J. R., Voordouw, J., Yiakoumaki, V., Theodoridis, G., & Frewer, L. J. (2007). Food-allergic consumers' labelling preferences: A cross-cultural comparison. *European Journal of Public Health*, 18(2), 115 – 120.
- Crabtree, B.F., & Miller, W.L. (1999). *Doing Qualitative Research* (2nd Ed.). California: Sage Publishing.
- Curtis, S., & Taket A. (1996). *Health and Societies, Changing Perspectives*. London: Arnold.
- Dalal, I., Binson, I., Reifen, R., Amitai, Z., Shohat, T., Rahmani, S., Levine, A., Ballin, A., & Somekh, E. (2002). Food Allergy is a matter of geography after all: sesame as a major cause of severe Ig-E mediated food allergic reactions among infants and young children in Israel. *Allergy*, 57: 362 – 365.
- Doyle, L., Brady, A.M., Bryne, G. (2009). An Overview of Mixed Methods Research. *Journal of Research in Nursing* 14 (2): 175 – 185.
- Dyck, I. (1999). Using qualitative methods in medical geography Deconstructive moments in a subdiscipline? *Professional Geographer*, 51 (2), 243 – 243..
- Eggesbo, M., Halvorsen, R., Tambs, K., & Botten, G. (1999). Prevalence of parentally perceived adverse reactions to food in young children. *Pediatric Allergy & Immunology*, 10: 122 – 132.
- Eggesbo, M., Halvorsen, R., Tambs, K., & Botten, G. (2001). The prevalence of allergy to egg: a population-based study in young children. *Allergy*, 56: 403 – 411.

- Eller, E., Kjaer, H.F., Host, A., Andersen, K.E., & Bindslev-Jensen, C. (2008). Food allergy and food sensitization in early childhood: results from the DARC cohort. *Allergy*, 64, 1023 – 1029.
- Elliott, S.J. (1999). And the Question Shall Determine the Method. *Professional Geographer*, 51 (2): 240 – 243.
- Emmett, S., Angus, F., Fry, J., & Lee, P.N. (1999). Perceived prevalence of peanut allergy in Great Britain and its association with other atopic conditions and with peanut allergy in other household members. *Allergy*, 54, 380 – 385.
- Epp, J. (1986). AddressL the honourable Jack Epp, *Health Promotion International*, 1, 413 – 417.
- Food & Drugs Administration of the United States [FDA]. *Food Allergen Labeling*. Retrieved September 20th, 2010 from <http://www.fda.gov/Food/LabelingNutrition/FoodAllergensLabeling/default.htm>
- Food Standards Australia New Zealand. (2004). Quantitative Consumer Survey on Allergen Labelling: Benchmark 2003. Retrieved September 20th, 2010 from http://www.foodstandards.gov.au/_srcfiles/combined_Allergy_Final%20Report_16Feb%20.pdf
- Food Standards Australia New Zealand. (2010). *Food Standards Code* [Chapter 1]. Retrieved May 21st 2010 from <http://www.foodstandards.gov.au/foodstandards/foodstandardscode/>
- Gatrell, A., & Elliott, S. (2009). *Geography of Health* (2nd Ed.) United Kingdom: Wiley-Blackwell Ltd.
- Gangur, V., Kelly, C., & Navuluri, L. (2005). Sesame allergy: a growing food allergy of global proportions? *Annals of Allergy, Asthma & Immunology*, 95, 4 – 11.
- Gelincik, A., Uy, S., Gul, H., Isik, E., Issever, H., & Ozseker, F. (2008). Confirmed prevalence of food allergy and non-allergic food hypersensitivity in a mediterranean population. *Clinical and Experimental Allergy*, 38(8), 1333 – 1341.
- Greenhawt, M., Singer, A., & Baptist, A. (2009). Food allergy and food allergy attitudes among college students. *The Journal of Allergy and Clinical Immunology*, 124 (2), 323 – 327.
- Grundy, J., Matthews, S., Bateman, B., Dean, T., & Arshad, S. (2002). Rising prevalence of allergy to peanut in children: Data from 2 sequential cohorts. *The Journal of Allergy and Clinical Immunology* 110(5), 784 – 789.

- Gupta, R.S., Springston, E.E., Smith, B., Kim, J.S., Pongracic, J.A., Wang, X., & Holl, J. (2010). Food allergy knowledge, attitudes, and beliefs of parents with food-allergic children in the United States. *Pediatric Allergy and Immunology*, 21, 927 – 934.
- Health Canada. (2007). *The Use of Food Allergen Precautionary Statements on Prepackaged Foods*. Retrieved February 22nd, 2010 from http://www.hc-sc.gc.ca/fn-an/label-etiquet/allergen/precaution_label-etiquette-eng.php
- Health Canada. (2008). *Regulations Amending the Food and Drug Regulations (1220 – Enhanced Labeling)*. Retrieved November 24th, 2010 from <http://www.gazette.gc.ca/rp-pr/p1/2008/2008-07-26/html/reg1-eng.html>
- Health Canada. (2009) [A]. *Food allergies and intolerances*. Retrieved February 10th, 2010 from <http://www.hc-sc.gc.ca/fn-an/securit/allerg/index-eng.php>
- Health Canada. (2009) [B]. Consultation Document on Precautionary Labelling of Priority Allergens in Prepackaged Foods. *Bureau of Chemical Safety*.
- Health Canada. (2009) [C]. *Proposal to Update the Canadian List of Food Allergens Requiring Enhanced Labeling*. Retrieved February 24th, 2010 from <http://www.hc-sc.gc.ca/fn-an/label-etiquet/allergen/allergen-prop-eng.php>
- Health Canada. (2011). *Regulatory Impact Analysis Statement*. Retrieved April 21st, 2011 from http://www.hc-sc.gc.ca/fn-an/label-etiquet/allergen/project_1220_rias_eeir-eng.php
- Hefle, S., Furlong, T.J., Niemann, L., Lemon-Mule, H., Sicherer, S., & Taylor, S.L. (2007). Consumer attitudes and risk associated with packaged foods having advisory labeling regarding the presence of peanuts. *Journal of Allergy and Clinical Immunology*, 120 (1), 171 – 176.
- Hu, Y., Chen, J., & Li, H. (2010). Comparison of food allergy prevalence among Chinese infants in Chongqing, 2009 versus 1999. *Pediatrics International*, 52, 820 – 824.
- Imamura, T., Kanagawa, Y., & Ebisawa, M. (2008). A survey of patients with self-reported severe food allergies in Japan. *Pediatric Allergy and Immunology*, 19, 270 – 274.
- Joshi, P., Mofidi, S., & Sicherer, S. (2002). Interpretation of commercial food ingredient labels by parents of food-allergic children. *The Journal of Allergy and Clinical Immunology*, 109(6), 1019 – 1021.
- Kagan, R., Joseph, L., Dufresne, C., Gray-Donald, K., Turnbu, E., & St Pierre, Y. (2003). Prevalence of peanut allergy in primary-school children in Montreal, Canada. *The Journal of Allergy and Clinical Immunology*, 112(6), 1223 – 1228.

- Kanny, G., Moneret-Vautrin, D., Fllabbee, J., Beaudouin, E., Morisset, M., & Thevenin, F. (2001). Population Study of food allergy in France. *The Journal of Allergy and Clinical Immunology*, 108 (1), 133 – 140.
- Kearns, R.A. (1993). Place and Health: Towards a Reformed Medical Geography. *Professional Geographer*, 45 (2): 139 – 147.
- Kljakovic M., Gatenby, P., Hawkins, C., Attewell, R.G., Ciszek, K., Kratochivil, G., Moreira, A., & Ponsonby, A. (2008). The parent-reported prevalence and management of peanut and nut allergy in school children in the Australian Capital Territory. *Journal of Pediatrics and Child Health*, 45, 98 – 103.
- Kristjansson, I., Ardal, B., Jonsson, J.S., Sigurdsson, J.S., Foldevi, M., & Bjorksten, B. (1999). Adverse reactions to food and food allergy in young children in Iceland and Sweden. *Scandinavian Journal of Primary Health Care*, 17, 30 – 34.
- Le, T., Lindner, T., Pasmans, S., Guikers, C., van Hoffen, E., Bruijnzeel-Koomen, C., & Knulst, A. (2008). Reported food allergy to peanut, tree nuts, and fruit: comparison of clinical manifestations, prescription of medication and impact on daily life. *Allergy*, 63, 910 – 916.
- Leung, T.F., Yung, E., Wong, Y.S., Lam, C.W.K., Wong, G.W.K. (2009). Parent-reported adverse food reactions in Hong Kong Chinese pre-schoolers: epidemiology, clinical spectrum and risk factors. *Pediatric Allergy and Immunology*, 20: 339 – 346.
- Lin, R.Y., Sanderson, A.S., Shah, S.N., & Nurruzzaman, F. (2008). Increasing anaphylaxis hospitalizations in the first 2 decades of life: New York State, 1990 – 2006. *Annals of Allergy, Asthma & Immunology*, 101, 387 – 393.
- Lincoln, Y., & Guba, E. (1985). *Naturalistic Inquiry*. Beverly Hills: Sage Publications.
- Lunet, N., Falcao, H., Sousa, M., Bay, N., & Barros, H. (2005). Self-reported food and drug allergy in Maputo, Mozambique. *Public Health*, 119, 587 – 589.
- Marrugo, J., Hernandez, L., & Villalba, V. (2008). Prevalence of self-reported food allergy in Cartagena (Columbia) population. *Allergologia et Immunopathologia*, 36, 6, 320 – 324.
- Nicolaou, N., Poorafshar, M., Murray, C., Simpson, A., Winell, H., Kerry, G., Harlin, A., Woodcock, A., Ahlstedt, S., & Custovic, A (2010). Allergy or Tolerance in children sensitized to peanuts: Prevalence and differentiation using component-resolved diagnostics. *The Journal of Allergy and Clinical Immunology*, 125 (1), 191 – 197.
- Noimark, L., Gardner, J., & Warner, J. (2009). Parents' attitudes when purchasing products for children with nut allergy: A UK perspective. *Pediatric Allergy and Immunology*, 20(5), 500 – 504.

- Osterballe, M., Mortz, C., Hansen, T., Andersen, K., & Bindslev-Jensen, C. (2009). The Prevalence of food hypersensitivity in young adults. *Pediatric Allergy and Immunology*, 20, 686 – 692.
- Papageorgiou, P. (2002). Clinical aspects of food allergy. *Biochemical Society Transactions*, 30, 901 – 906.
- Pereira, B., Venter, C., Grundy, J., Clayton, B., Arshad, S., & Dean, T. (2005). Prevalence of sensitization to food allergens, reported adverse reaction to foods, food avoidance, and food hypersensitivity among teenagers. *The Journal of Allergy and Clinical Immunology*, 116(4), 884 – 892.
- Poulos, L.M., Waters, A., Correll, P.K., Loblay, R.H., & Marks, G.B. (2007). Trends in hospitalizations for anaphylaxis, angioedema, and urticaria in Australia, 1993 – 1994 to 2004 – 2005. *Journal of Allergy and Clinical Immunology*, 120, 878 – 884.
- Pyrhonen, K., Nayha, S., Kaila, M., Hiltunen, L., & Laara, E. (2009). Occurrence of parent-reported food hypersensitivities and food allergies among children aged 1 – 4 year. *Pediatric Allergy and Immunology*, 20, 328 – 338.
- Rance, F., Grandmottet, X., & Grandjean, H. (2005). Prevalence and main characteristics of schoolchildren diagnosed with food allergies in France. *Clinical and Experimental Allergy*, 35, 167 – 172.
- Rivas, M. Fernandez. (2005). Food Allergy in Alergologica – 2005. *Journal of Investigative Clinical Immunology*, 19 (S2): 37 – 44.
- Roehr, C., Edenharter, G., Reimann, S., Ehlers, I., Worm, M., Zuberbier, T., & Niggemann, B. (2004). Food allergy and non-allergic food hypersensitivity in children and adolescents. *Clinical and Experimental Allergy*, 34, 1534 – 1541.
- Sampson, M., Munoz-Furlong, A., & Sicherer, S. (2006). Risk-taking and coping strategies of adolescents and young adults with food allergy. *The Journal of Allergy and Clinical Immunology*, 117 (6), 1440 – 1445.
- Sandin, A., Annus, T., Bjorksten, B., Nilsson, L., Riikjarv, M., van Hage-Hamsten, M., & Braback, L. (2005). Prevalence of self-reported food allergy and IgE antibodies to food allergens in Swedish and Estonian schoolchildren. *European Journal of Clinical Nutrition*, 59, 399 – 403.
- Sheikh, A., Hippisley-Cox, J., Newton, J., & Fenty, J. (2008). Trends in national incidence, lifetime prevalence and adrenaline prescribing for anaphylaxis in England. *Journal of the Royal Society of Medicine*, 101, 193 – 143.
- Shek, L., & Chee, B.W. (2006). Food allergy in Asia. *Current Opinion in Allergy and Clinical Immunology*, 6, 297 – 201.

- Sheth, S.S., Wasserman, S., Kagan, R., Alizadehfar, R., Primeau, M., Elliott, S., St.Pierre, Y., Wickett, R., Joseph, L., Harada, L., Dufresne, C., Allen, M., Allen, M., Godefroy, S. B., & Clarke, A.E. (2010). Role of food labels in accidental exposures in food-allergic individuals in Canada. *Annals of Allergy, Asthma and Immunology*, 104, 60 – 65.
- Sicherer, S., Munoz-Furlong, A., Burks, A., & Sampson, H. (1999). Prevalence of peanut and tree nut allergy in the US determined by a random digit dial telephone survey. *The Journal of Allergy and Clinical Immunology*, 103(4), 559 – 562.
- Sicherer, S., & Sampson, H. (2000). Peanut and tree nut allergy. *Current Opinion in Pediatrics*, 12(6), 567 – 572.
- Sicherer, S. (2002). Food allergy. *The Lancet*, 360(9334), 701 – 710.
- Sicherer, S., Munoz-Furlong, A., & Sampson, H. (2003). Prevalence of peanut and tree nut allergy in the united states determined by means of a random digit dial telephone survey: A 5-year follow-up study. *The Journal of Allergy and Clinical Immunology*, 112(6), 1203 – 1207.
- Sicherer, S., Munoz-Furlong, A., & Sampson, H. (2004). Prevalence of seafood allergy in the united states determined by a random telephone survey. *The Journal of Allergy and Clinical Immunology*, 114(1), 159 – 165.
- Sicherer, S., & Sampson, H. (2006). Food allergy. *The Journal of Allergy and Clinical Immunology*, 117(2), S470 – S475.
- Sicherer, S., & Sampson, H. (2007). Peanut allergy: Emerging concepts and approaches for an apparent epidemic. *The Journal of Allergy and Clinical Immunology*, 120, 491 – 503.
- Simons, E., Weiss, C.C., Furlong, T.J., & Sicherer, S.H. (2005). Impact of ingredient labeling practices on food allergic consumers. *Annals of Allergy, Asthma, & Immunology*, 95, 426 – 428.
- Soost, S., Leynaert, B., Almqvist, C., Edenharter, G., Zuberbier, T., & Worm, M. (2009). Risk factors of adverse reactions to food in German adults. *Clinical and Experimental Allergy*, 39(7), 1036 – 1044.
- Statistics Canada. (2008). *Residential Telephone Service Survey*. Retrieved March 7th 2010 from <http://www.statcan.gc.ca/daily-quotidien/090615/dq090615c-eng.htm>
- Steinke, M., Fiocchi, A., Kirchlechner, V., Ballmer-Weber, B., Brockow, K., & Hishchenhuber, C. (2007). Perceived food allergy in children in 10 European nations - A randomised telephone survey. *International Archives of Allergy and Immunology*, 143(4), 290 – 295.

- Stewart, M., Makwarimba, E., Barnfather, A., Letourneau, N., & Neufeld, A. (2008). Researching reducing health disparities: Mixed-methods approaches. *Social Science and Medicine*, 66, 1406 – 1417.
- Venter, C., Pereira, B., Grundy, J., Clayton, C.B., Roberts, G., Higgins, B., & Dean, T. (2006). Incidence of parentally reported and clinically diagnosed food hypersensitivity in the first year of life. *The Journal of Allergy and Clinical Immunology*, 117 (5), 1118 – 1124.
- Venter, C., Arshad, S., Grundy, J., Pererira, B., Clayton, C., Voigt, K., Higgins, B., & Dean, T. (2010). Time trends in the prevalence of peanut allergy: three cohorts of children from the same geographical location in the UK. *Allergy*, 65, 103 – 108.
- Verrill, L. & Choiniere, C.J. (2009). Are Food Allergen Advisory Statements Really Warnings? Variation in Consumer Preferences and Consumption Decisions. *Journal of Food Products Marketing*, 15, 139 – 151.
- Vierk, K., Koehler, K., Fein, S., & Street, D. (2007). Prevalence of self-reported food allergy in american adults and use of food labels. *The Journal of Allergy and Clinical Immunology*, 119(6), 1504 – 1510.
- Voordouw, J., Cornelisse-Vermaat, J.R., Yiakoumaki, V., Theodoridis, G., Chryssochoidis, G., & Frewer, L.J. (2009). Food allergic consumers' preferences for labeling practices: A qualitative study in a real shopping environment. *International Journal of Consumer Studies*, 33, 94 – 102.
- Woods, R., Stoney, R., Raven, J., Walters, E., Abramson, M., & Thien, F. (2002). Reported adverse food reactions overestimate true food allergy in the community. *European Journal of Clinical Nutrition*, 56, 31 – 36.
- World Health Organization [WHO]. (2010). *WHO – Frequently Asked Questions*. Retrieved July 12th, 2010 from <http://www.who.int/suggestions/faq/en/index.html>.
- Yoneyama K., & Ono, A. (2002). Study of food allergy among university students in Japan. *Allergology International*, 51, 205 – 208.
- Young, M., Munoz-Furlong, A., & Sicherer, S. (2009). Management of food allergies in schools: A perspective for allergists. *The Journal of Allergy and Clinical Immunology*, 124(2), 175 – 182.
- Zuberbier, T., Edharter, G., Worm, M., Ehlers, I., Reimann, S., Hantke, T., Roehr, C., Bergmann, K., & Niggemann, B. (2004). Prevalence of adverse reactions to food in Germany – a population study. *Allergy*, 59, 338 – 345.

Appendix A

Study	Subject Profile	Methods	Special Populations Consideration	Key Findings
Ben-Shoshan et al., 2010	Canada - Random sample households (n = 3666)	- Interviewer administered questionnaire	- Populations in the 3 territories, without telephone service, or only cell phone service <i>excluded</i> - Indian Reserves, Canadian Forces Bases, populations with language barrier, and institutionalized populations <i>excluded</i>	- 6 – 8% prevalence for all food allergies - Probable prevalence based on convincing history and/ or self-report physician diagnosis: peanut: 0.93%; tree nut: 1.14%; fish: 0.48%; shellfish: 1.42%; sesame: 0.09% - Peanut, tree nut and sesame allergy more prevalent in children; vice versa for shellfish and fish
Brugman et al., 1998	Netherlands - Children aged 4 to15 (n = 4450)	- Self administered questionnaire completed by parents	- 2 Ethnic minorities slightly under-represented (3% vs 4 % of population) - 8% of fathers had no education	- prevalence of self-reported hypersensitivity: 7.2% - non-significant tendency for a higher prevalence in Moroccan children & in children whose father had a low level of education - food additives and chocolate most frequently avoided, followed by milk, pork, sugar, nuts
Chiang et al., 2007	Singapore - Children aged 0.3 to 15.4 (n = 227)	- SPTs & self-administered questionnaire	- Sample representative of Singapore's racial diversity	- Positive SPTs: 40% to egg, 39% to shellfish, 27.3% to peanuts, 13.2% to fish, 11.8% to cow's milk, 9.3% to sesame, 3.7% to wheat, and 3.2% to soy
Dalal et al., 2002	Israel - Children aged 0 to 2 (n = 9070)	- If suspected allergy, questionnaire completed by parents - Physician interview & SPT		- 1.7% of children at clinic with suspected Ig-E mediated allergy and underwent SPT - 1.2% of children had clinically relevant Ig-E mediated food allergic reactions after SPT - Common allergens: egg, cow's milk, sesame

<p>Eggesbo et al., 1999</p>	<p>Norway</p> <ul style="list-style-type: none"> - Cohort of children born 1992-93 followed until 2 years old (n = 3623) 	<ul style="list-style-type: none"> - Self-administered questionnaire every 6 months completed by parents 	<ul style="list-style-type: none"> - Immigrants with language barrier and families from 3rd world countries <i>excluded</i> 	<ul style="list-style-type: none"> - Adverse reactions reported by 1/3 of parents before age 2; - 2/3 of reactions not reported again 6 months later - Milk is single food item most commonly incriminated, cumulative incidence 11.6%
<p>Eggesbo et al., 2001</p>	<p>Norway</p> <ul style="list-style-type: none"> - Cohort of children born 1992-93 followed until 2 years old (n = 2721) 	<ul style="list-style-type: none"> - Self-administered questionnaire at 12th, 18th & 24th months - Interview & diet trials, Ig-E tests, open food challenge, DBPCFC 	<ul style="list-style-type: none"> - Immigrants with language barrier and families from 3rd world countries <i>excluded</i> 	<ul style="list-style-type: none"> - Point prevalence of allergy to egg in children aged 2.5: 1.6% - 2/3 of reported allergies verified
<p>Eller et al., 2008</p>	<p>Denmark</p> <ul style="list-style-type: none"> - Random sample of children born within the first 14 days of each month from Nov 1998 – 1999 - Followed from birth until 6 years of age (n = 562) 	<ul style="list-style-type: none"> - SPT, Ig-E tests, parental interview about atopic predisposition, environmental & social factors 	<ul style="list-style-type: none"> - Parental with insufficient knowledge of Danish <i>excluded</i> 	<ul style="list-style-type: none"> - 20 children confirmed with food hypersensitivity to milk, egg, and peanut – peaked at 3.6% at 18 months, then decreased to 1.2% at age 6 - No new cases after 3 years of age - Tests confirmed 31% of self-reports
<p>Emmett et al., 1999</p>	<p>Britain</p> <ul style="list-style-type: none"> - Sample of 2000 households (16434 individuals) 	<ul style="list-style-type: none"> - At home interviews & in-depth interviews with reported sufferers from peanut allergies 	<ul style="list-style-type: none"> - Nationally representative of age, sex, social class, and household size 	<ul style="list-style-type: none"> - Peanut allergy estimated as 0.48%; prevalence in children: 0.61% - Prevalence strongly associated with other atopic diseases - Significantly clustered in households

Falcao et al., 2004	Portugal - Aged 39 or older, random digit dialling (n = 659)	- Interviewer administered questionnaire		- Self-reported hypersensitivity: 4.8% - Fresh fruit most frequently incriminated (25%)
Gelincik et al., 2008	Istanbul - Households recruited over telephone (n = 11816)	- Interviewer administered questionnaire - SPTs, Ig-E tests, DBPCFC	- Age representative of Istanbul population - Majority of respondents were women, mostly housewives	- Lifetime prevalence of self-reported food allergy: 9.5%; after confirmation tests: 0.3%; DBPCFC tests: 0.1%
Greenhawt et al., 2009	United States - Undergraduate students enrolled in a US university (n = 513)	- Online survey		- 57% reported allergic reaction to food; 36.2% consistent with anaphylaxis - Allergy to milk, tree nut, shellfish, peanut significantly associated with anaphylaxis
Imamura et al., 2008	Japan - Families affiliated with the allergy nation-wide network (n = 1383)	- Self-administered questionnaire		- 32% of participants previously suffered from anaphylaxis; 23% self-reported physician diagnosis - Average age of first anaphylactic attack: 3.20 years; common allergens by order: milk, egg, wheat, peanuts, soybeans, sesame, buckwheat
Kagan et al., 2003	Montreal, Canada - Random selection of children in kindergarten through Gr.3 (n = 4339)	- Self-administered questionnaire - SPT, Ig-E test, DBPCFC	- Ethnicity representative of Montreal	- Prevalence of peanut allergy: 1.34%

Kanny et al., 2001	France - Age less than 60 years (n = 33,110)	- Self-administered questionnaire	- Representative of French population in terms of region, size of city, profession & social category & age of head of household, number of people in household	- Reported prevalence: 3.52%, - Estimated prevalence: 3.24% - Food allergy persistent, lasting >7 years in 91% of adults
Kljakovic et al., 2008	Australia - New entrants with parent-reported peanut/ nut allergy - Follow-up survey administered 1 year later (n = 3851)	- Self-administered questionnaire		- Peanut allergy reported by 3.3%; tree nut by 3.8% - Follow-up study (n = 109): 70% parents self-reported physician diagnostic confirmation; 46% prescribed autoinjector
Kristjansson et al., 1999	Iceland & Sweden - 18 month old children (n = 324 in Iceland; n = 328 in Sweden)	- Self-administered questionnaire - SPTs, DBPCFC		- Adverse reaction reported in 27% of Iceland children & 28% of Sweden children - Confirmed food allergy: 2.0%
Le et al., 2008	Netherlands - adult patients from allergy clinic that were allergic to peanuts, tree nuts or fruits (n = 218)	- Self-administered questionnaire - SPTs, Ig-E test		- Fruit allergy causes less severe symptoms than tree nut and especially peanut allergies - Percentage of severe respiratory symptoms to: peanut – 47%, tree nut – 39%, and fruits – 31% - Percentage of severe cardiovascular symptoms to: peanut – 11.0%, tree nut – 5.0%, fruits – 3.4%

Leung et al., 2009	Hong Kong, China - Children aged 2 – 7 (n = 3677)	- Self-administered questionnaire		- Parent-reported adverse food reaction: 8.1%; parent-reported diagnosed food allergy: 4.6% - 6 most common allergens: shellfish (15.8%), egg (9.1%), peanut (8.1%), beef (6.4%), cow's milk (5.7%), and nuts (5.0%)
Lunet et al., 2005	Mozambique - Students and non-teaching staff at private university (n = 3677)	- Self-administered questionnaire	- Sample population highly educated, <i>not</i> representative of Mozambican population	- 19.1% self-reported food allergy - Common allergens: seafood, meat and fruit/vegetable - Self-reported allergy decreased with age
Marrugo et al., 2008	Columbia - Random sample of individuals aged 1 - 83 (n = 3099)	- Interviewer administered questionnaire		- Self-reported prevalence: 14.9% - Fruits/ vegetables, seafood, and meats were most commonly reported allergens, in order
Nicolaou et al., 2010	England - children aged 8 from the same birth cohort (n = 933)	- Interviewer administered questionnaire - SPT, Ig-E test - Open food challenge, DBPCFC - Examined peanut sensitization only		- Majority of children with positive SPT & measurable IgE to peanut do not have clinical peanut allergy - 10% are sensitized to peanuts, but only 2% have peanut allergy
Osterballe et al., 2009	Denmark - young adults – Gr 8 students (n = 1094)	- Questionnaire - SPT, histamine released test, oral food challenge test (including open food challenge & DBPCFC)		- Primary FHS was defined as being independent of pollen sensitization - Prevalence of primary food hypersensitivity: 1.7% - Most common allergens (in order): peanuts, additives, shrimp, codfish, cow's milk, octopus, soy

Pereira et al., 2005	United Kingdom - 11 (n = 388) and 15 (n = 379) year olds	- Self-administered questionnaire - SPT, open food challenge, DBPCFC		- Prevalence of food hypersensitivity, as confirmed by DBPCFC, is 0.1% of 11 year olds, 0.5% of 15 year olds
Pyrhonen et al., 2009	Finland - Children born between April 1 st 2001 and March 31 st 2005 (n = 3308)	- Self-administered questionnaire	- Questionnaire administered to Finnish citizen & immigrants staying in Finland for over 1 year	- Physician diagnosis reported by 9% of parents - 21% of parents reported hypersensitivity with no physician diagnosis - 19% eliminated at least 1 food item with no perception of symptoms - Cow's milk most commonly reported allergen
Rance et al., 2005	France - children under 14 (n = 192)	- Self-administered questionnaire		- Point prevalence 4.0% for children aged 2 – 5 years , 6.8% aged 6 – 10 years, 3.4% aged 11 – 14 years - Common allergens (in order): cow's milk, eggs, kiwis, peanuts, fish, tree nuts, shrimps - Cumulative prevalence: 6.7%; Point prevalence: 4.7%
Rivas, 2005	Spain - National allergists recruitment new patients (n = 4991)	- SPT, Ig-E tests	- 66.4% from urban areas, 92% had middle socioeconomic status	- Food allergy diagnosed 7.4% - Common allergens in order: fruits, nuts, shellfish, egg, milk, fish
Roehr et al., 2004	Germany - children aged 0 – 17 years (n = 739)	- Self-administered questionnaire - Telephone interview - SPT, DBPCFC		- 61.5% self-reported food allergy, 38.4% affirmed symptoms in telephone interview - 3.5% had food allergies, 0.7% had non-allergic food hypersensitivity

Sandin et al., 2005	Sweden & Estonia - Children aged 10 – 11 years	- Self-administered questionnaire - SPT, Ig-E tests		- Prevalence of self-reported food allergy similar in Estonia & Sweden, and twice as high in wheezing than in non-wheezing children - prevalence of circulating Ig-E to allergens similar in wheezing and non-wheezing children in Estonia, but more likely among wheezing children in Sweden
Shek et al., 2006	Review paper on allergy in Asia	N/A		- Singapore: Parent-reported questionnaire of 6404 children aged 5 – 12: 4 – 5% - Korea: Self-reported questionnaire of >25 000 children aged 6 – 12: 10.9% - North-East China: self-reported 4.98% - Japan: parent-reported children under 6: 12.6%
Sicherer et al., 1999	United States - Random sample of 4374 households	- Nation-wide, random digit dial telephone survey	- Respondents with language barriers <i>excluded</i>	- Peanut or tree nut allergy reported by 1.4% - Prevalence of reported allergy higher in adults than children - Final corrected prevalence of self-reported peanut/ tree nut allergy: 1.1%
Sicherer et al., 2004	United States - Random sample of 5529 households	- Nation-wide, random digit dial telephone survey	- Respondents with language barriers <i>excluded</i>	- Fish or shellfish allergy reported by 5.9%: 2.3% for any seafood allergy, 2% for shellfish, 0.4% for fish, 0.2% for both - Prevalence of reported allergy higher in adults than children, and in women than men - Final corrected prevalence of self-reported seafood allergy: 2.3%
Soost et al., 2009	Germany - Random sample of adults (aged 18 – 79) (n = 3227)	- Self-administered questionnaires - Telephone interview, Ig-E test, SPT, DBPCFC	- Weighted by age, sex and education to national German health survey	- Females showed higher risk of non-Ig-E and Ig-E mediated food hypersensitivities - Point prevalence after DBPCFC: 3.3% for women and 1.8% for men

Steinke et al., 2007	<p>10 European Nations: Austria, Belgium, Denmark, Finland, Germany, Greece, Italy, Poland, Slovenia, Switzerland</p> <ul style="list-style-type: none"> - Random sample of 5529 parents, representing youngest live-in child 	<ul style="list-style-type: none"> - Random digit dial telephone survey 		<ul style="list-style-type: none"> - Parent reported food allergy prevalence: 4.7% - Single country incidence ranged from 1.7% (Austria) to 11.7% (Finland) - Most affected age group: 2 – 3 year olds - Most common allergen (in order): Milk, fruits, eggs, and vegetables
Venter et al., 2006	<p>United Kingdom</p> <ul style="list-style-type: none"> - Cohort of babies aged 1 (n = 969) 	<ul style="list-style-type: none"> - Interviewer administered questionnaire at 3, 6, 9 and 12 months - SPT, open food challenge, DBPCFC at 12 months 	<ul style="list-style-type: none"> - Respondents with language barriers <i>excluded</i> - 60.8% were of high/medium socioeconomic status 	<ul style="list-style-type: none"> - Between 2.2% and 5.5% of infants have food hypersensitivity in 1st year of life - Between 6 and 9 months and 9 and 12 months, 1.4% and 2.8% diagnosed with food hypersensitivity based on open food challenges and 0.9% (9/969) and 2.5% (24/969) based on DBPCFC - Cumulative incidence of food hypersensitivity by 12 months was 4% based on open food challenges and 3.2% based on DBPCFC
Vierk et al., 2007	<p>United States</p> <ul style="list-style-type: none"> - random sample of 4482 people 	<ul style="list-style-type: none"> - list-assisted random-digit-dial survey 		<ul style="list-style-type: none"> - Prevalence of self-reported food allergy is 9.1%, with 5.3% reporting doctor diagnosed - Prevalence of food allergy to the 8 most common allergens (peanut, tree nuts, egg, milk, wheat, soybeans, fish, and crustacean shellfish) self-reported as 2.7% among respondents with doctors' diagnoses

Woods et al., 2002	Australia - young adults aged 20 – 44 years (n = 457)	- Postal questionnaire - SPT		- Prevalence of adverse reactions associated with Ig-E mediated allergy in the adult general population is less than 1.5% - Agreement between SPT and self-report was poor for cow's milk and wheat, slight for shrimp & egg white, and fair for peanut mix
Yoneyama et al., 2002	Japan - university students in Faculties of Medicine, Dentistry, & Pharmaceutical Sciences (n = 2053)	- Self-administered questionnaire - Radioallergosorbent or food challenge tests		- Food allergy confirmed in 5.2% of students
Zuberbier et al., 2004	Germany - random sample of 4093 people	- Self-administered questionnaire - Telephone interview, Ig-E test, SPT, DBPCFC	- Data projected to population (aged 18-79 years) from national German Health Survey - Data weighted by age, sex, education	- Adverse reactions to food in the adult population of Germany (age 18–79): 2.6% - Self-reported lifetime prevalence of any adverse reaction to food: 34.9%

Appendix B

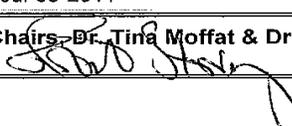
Study	Place & Subject Profile	Methods	Key Findings
Food Standards Australia, New Zealand, 2004	Australia, New Zealand - n = 510: 413 from Australia, 97 from New Zealand - individuals from allergy clinics and support groups	- self-administered questionnaires to be answered by main grocery buyer in household	- 90% ‘always’ read labels carefully, 62% ‘always’ buy a particular brand, 43% never buy loose or bulk foods, 44% ‘often’ buy foods in sealed packages, 24% ‘often’ check food lists provided by support groups - Respondents preferred ‘same equipment’ statements over other variations - Respondents reported lack of clarity of terms used on labels, over-use and unclear use of ‘may contain’ statements
Cornelisse-Vermaat et al., 2007	Netherlands & Greece - n = 40, 20 from each country - random selected consumers suffering from milk, egg, peanut and/or tree nut allergies	- Interviewed & observed in supermarket during course of shopping - participants asked to purchase all items mentioned on a pre-designed shopping list	- All reported problems regarding both readability & visibility/accessibility of information on label (e.g. font size, contrast) - Precautionary statements limit food choices for many - Personal experience of particular products an important factor in selection process - Reported personal stress & feelings of insecurity
Gupta et al., 2010	United States - n = 2945	- parents of physician diagnosed food allergic child(ren) completed an online survey assessing food allergy knowledge, attitudes, beliefs	- 39% agreed that food labeling laws decreased choice of foods their child can eat, 36% disagreed - Parents had solid baseline knowledge of food allergy; - 52% incorrectly believed young children at higher risk for fatal anaphylaxis than adolescents - While other beliefs were diverse, large proportion reported child’s allergy having adverse impact on personal relationships, and agreed on policies to address allergies in schools

Hefle et al., 2007	United States - n = 645 - Food Allergy & Anaphylaxis Network patient conferences attendees	- market analysis survey in 2003 & 2006 - presented participants with 8 common forms of advisory labels and requested to indicate how often they would purchase food labelled with each form - tested for residual peanut proteins in 200 packaged foods listing peanuts as ingredients/ advisory labels	- Consumers less likely to heed advisory labels in 2006 than in 2003, varying significantly based on form of label - peanut protein detected in 10% of packaged foods with advisory labels
Imamura et al., 2008	Japan - Families affiliated with the allergy nation-wide network (n = 1383)	- Self-administered questionnaire	- 80% of allergic individuals/ caregivers would not buy products when allergens are listed as ingredients, suggested the use of allergen or indicated the use of minute amount of allergen - 66.4% would avoid products manufactured on the same production line as allergen; 34.5% avoided products made in same factory; 22.4% avoid product indicated use of allergen on different product line - More detailed labels would affect consumption: 37.5% indicated 'would purchase' if label more substantial
Joshi et al., 2002	United States - n = 91 - parents of children on restricted diets attending pediatric clinic	- participants asked to review group of 23 labels and indicate whether product is safe for child to consume	- Most parents unable to identify common allergenic food ingredients - identification of milk & soy most problematic - Correct label identification associated with prior instruction by dietitian

Noimark et al., 2009	United Kingdom - n = 184 - parents of children with nut allergy attending tertiary pediatric allergy clinic, diagnosed with a positive SPT	- Questionnaire asking parents whether or not they would purchase a product bearing five different allergen labels - Parents asked whether they avoided 3 foods not considered nuts in the UK (coconut, nutmeg, coconut)	- 80% of parents would not purchase a product labeled 'not suitable' or 'may contain' - other labels were avoided by 50% of parents - previous allergic reaction to nuts associated with behavior - large number of patients with nut allergy ignore warning labels or assume there is a gradation of risk depending on wording
Sampson et al., 2006	United States - n = 174 - persons aged 13 – 21 with food allergy	- Internet-based questionnaire	- 54% indicated purposefully ingesting a potentially unsafe food - 42% willing to eat a food labeled 'may contain'
Sheth et al., 2010	Canada - n = 1454 - persons from the Canadian peanut allergy registry & allergy awareness organizations	- self-administered questionnaire	- 47.8% reported at least 1 reaction after diagnosis - Among the 47.8%, 47% attributed reaction to food labeling related issue, 28.6% to failure to read a label, and 8.3% to ignoring precautionary statement - Unintentional cross-contamination with no precautionary statement most commonly reported reason for inadvertent exposure
Simons et al., 2005	United States - n = 489 - adults that attended Food Allergy & Anaphylaxis Network conferences	- self-administered survey	- 16% attributed adverse reactions to misunderstanding a label term - 22% to ingredients not declared in a spice or natural flavor - Ingredient labels were 'always'/'frequently' read before purchase by 99% and while cooking by 94% - 86%'s product brand choice was 'very much influenced' by the manner of labeling

Vierk et al., 2007	United States - n = 471 - self-reported food allergy	- list-assisted random digit dial survey conducted to America consumers - questions asked participants' experience with food allergy & opinion about role of food labels in managing food allergy	- Reported serious/ very serious obstacles for managing food allergy: words in ingredients lists too technical or hard to understand & food labels not always alerting persons to new ingredients
Vierrill et al., 2009	United States - random drawn sample from a panel of 11,000 households that agreed to participate	1. Online survey (n = 1243) - Respondents viewed front and back of 4 product labels. Each label had one version of 4 precautionary statements. Respondents were asked to rank by preference 2. Online Experiment (n = 4049) - A different sample of respondents viewed front and back of 5candy bars and 5 seafood casseroles. Each had one version of 4 precautionary statements, same as those from the online survey, plus a no statement control - Respondents were asked to rank by credibility and helpfulness and the likelihood of allergen exposure	- Respondents preferred 'Allergy Information: May Contain Peanuts' over all other versions of statements - When compared with no statement control, all 4 versions of statements improved consumer's ability to correctly identify presence of allergen - Participants viewing 'Allergy Information: May Contain Peanuts' more likely to serve candy bar to allergic individual than casserole - Participants viewing any statement rated casserole more likely to contain allergen than candy bar
Voordouw et al., 2009	Netherlands & Greece - n = 40, 20 from each country - random selected consumers suffering from milk, egg, peanut and/or tree nut allergies	- Interviewed & observed in supermarket during course of shopping - participants asked to purchase all items mentioned on a pre-designed shopping list - information search behavior was observed, and participants questioned about preferences for allergen information provision	- inappropriate use of fonts, colors and languages, application of precautionary labeling and lack of harmonization in labeling practices across countries cause unnecessary dietary restrictions

Appendix C

 <p style="font-size: small;">Inspiring Innovation and Discovery</p>	<p>McMaster University Research Ethics Board (MREB)</p> <p style="font-size: x-small;">c/o Office of Research Services, MREB Secretariat, GH-305/H, e-mail: ethicsoffice@mcmaster.ca</p> <p>CERTIFICATE OF ETHICS CLEARANCE TO INVOLVE HUMAN PARTICIPANTS IN RESEARCH</p>		
<p>Application Status: New <input checked="" type="checkbox"/> Addendum <input type="checkbox"/> Project Number: 2010 093</p>			
<p>TITLE OF RESEARCH PROJECT:</p> <p style="text-align: center;">Canadians Perceptions of Food Allergen labels on Packaged Foods in Canada</p>			
Faculty Investigator (s)/ Supervisor(s)	Dept./Address	Phone	E-Mail
S. Elliott	Geography	23139	elliotts@mcmaster.ca
Student Investigator(s)	Dept./Address	Phone	E-Mail
B. Chow	Geography	20440	chowb2@mcmaster.ca
<p>The application in support of the above research project has been reviewed by the MREB to ensure compliance with the Tri-Council Policy Statement and the McMaster University Policies and Guidelines for Research Involving Human Participants. The following ethics certification is provided by the MREB:</p> <p><input type="checkbox"/> The application protocol is approved as presented without questions or requests for modification.</p> <p><input type="checkbox"/> The application protocol is approved as revised without questions or requests for modification.</p> <p><input type="checkbox"/> The application protocol is approved subject to clarification and/or modification as appended or identified below:</p>			
<p>COMMENTS AND CONDITIONS: Ongoing approval is contingent on completing the annual completed/status report. A "Change Request" or amendment must be made and approved before any alterations are made to the research.</p>			
Reporting Frequency:		Annual: Jul-08-2011	Other:
Date: Jul-08-2010		Chair, Dr. R. Storey/ Vice-Chairs, Dr. Tina Moffat & Dr. Bruce Milliken: 	

Appendix D

In-depth Interview Schedule

Canadians' Perceptions of Allergen Labels on Packaged Foods		
<u>Purpose of Checklist:</u> To understand how Canadians perceive food allergen labels on packaged foods in Canada, with a focus on precautionary statements. To understand consumers' preferences for food allergen labels. This checklist will guide the collection of perceptual data on how allergen labels affect the everyday lives of affected families		
Construct	Question	Probe
<u>Context of Family</u>	Before we begin the interview, I'd like to ask you some questions about your family, to get a sense of context. If you do not feel comfortable answering any of these, just let me know and we can skip the question.	
	<ul style="list-style-type: none"> - How many children do you have in your family? - Who in the household is primarily responsible for grocery shopping? - Do you work? - How do you feel about grocery shopping? 	<ul style="list-style-type: none"> - Do you work full or part-time? - Do you like or dislike it?
<u>Allergic Status of Family, i.e. severity, prior reactions</u>	Thank you for answering those. Now I'd just like to ask about the allergy in the family.	
	<ul style="list-style-type: none"> - Who is the allergic person in the household? - What is/ are he/she allergic to? - Are there multiple allergies in the household? 	<ul style="list-style-type: none"> - Is it you or your child? - Can you please list all allergies?

	<ul style="list-style-type: none"> - How old is/ are the allergic individual(s) now? - How old was/ are his/ her first reaction(s)? - Could you briefly describe the severity of his/ her most serious reaction(s)? 	<ul style="list-style-type: none"> - Symptoms? Anaphylactic?
<p><u>Use of allergen labels in consumption choices</u></p>	<p>Thanks for telling me that. Some final questions about your use of food allergen labels before we actually begin grocery shopping...</p>	
	<ul style="list-style-type: none"> - How often do you read labels when making purchasing decisions? - Do you read the labels (at home) before giving the food to the child? - Would you identify yourself as heavily reliant on allergen labels to guide your choices? - What information do you look for first on a package? 	<ul style="list-style-type: none"> - Often? Sometimes? Never? - Why? Why not? - Why? Why not? - Why? Easiest to locate? Most helpful?
<p><u>Use of allergen labels in individual consumption choices</u></p>	<p>Thanks very much for answering those questions. We are ready to start grocery shopping. I'd like to observe your consumption choices & ask you some questions when you are doing your shopping. You are welcome to skip any of them or stop the interview at any time...</p>	
	<p>During walk...</p> <ul style="list-style-type: none"> - So you are considering to purchase this product, what are you looking for? - What made you decide to purchase/ not purchase this product? 	<ul style="list-style-type: none"> - Particular wording you are looking for? - Why?
	<p>[Repeat above questions for items]</p>	

	<ul style="list-style-type: none"> - Is there a brand that you particularly trust without needing to read labels? - If you have further questions about the product, who do you ask for help? - Do you think it takes you longer to shop, than an average consumer? - Do you think you pay more for your groceries? - As an allergic consumer, are you satisfied with the variety of choices that are available to you? 	<ul style="list-style-type: none"> - Why? Do you constantly check the brand’s website for changes in manufacturing process? - Store staff? Manufacturer? - Do you trust their information? - Would you be willing to pay more for allergen-free products? - Why? Why not?
<p><u>Concerns about allergen labels</u></p>	<ul style="list-style-type: none"> - What do you think about the way information is communicated? Does it work for you? - Do you trust information given by the labels? 	<ul style="list-style-type: none"> - Readability, e.g. font size? Terminology? Too much/ little Information? - Accurate representation of risks? Why? Why not?
	<p>Great! Thanks for answering those questions. Now I’m going to focus on precautionary labeling, and not ingredients labeling. Are you aware of the differences between the two?</p>	
	<ul style="list-style-type: none"> - Are there any specific types of precautionary statements that you find more/ less useful? - How much do you think precautionary statements limit your food choices? 	<ul style="list-style-type: none"> - Why these specific types? - Why? - Do you think they are necessary or unnecessary limitations?

	- Overall, would you agree that precautionary statements are helpful?	- Why?
<u>Preferences for allergen labels</u>	Thank you for answering questions about precautionary statements. Now we will just be talking about allergen labeling in general, so both ingredients labeling & precautionary labeling.	
	- Are there ways to improve allergen labeling so as to make them more helpful for you?	- How? Why?
<u>Awareness about current labeling situation</u>	Thanks so much for your suggestions. Now just before we are done, I have some final questions about the Canadian labeling environment to ask you.	
	- What do you know about the current labeling environment in Canada? - What do you know about the amendments towards regulating allergen labeling?	- Voluntary use? Policy change underway? - Do these amendments work for you?
<u>Concluding</u>	Thank you very much for your time today. You have given me a better understanding of how allergen labels affect your everyday life. Before we end the interview, is there anything that you would like to add?	

Appendix E

Coding Manual: In-depth Interview

(1) Family Background

- i. Background/ Number of Children
- ii. Background/ Number of Children/ 0 -3
- iii. Background/ Number of Children/ More than 3
- iv. Background/ Work Status of Respondent
- v. Background/ Work Status of Respondent/ Part-Time
- vi. Background/ Work Status of Respondent/ Full-Time
- vii. Background/ Work Status of Respondent/ Unemployed
- viii. Background/ Allergic Members
- ix. Background/ Allergic Members/Self
- x. Background/ Allergic Members/Other Adult
- xi. Background/ Allergic Members/Child
- xii. Background/ Allergic Members/Child/ 1
- xiii. Background/ Allergic Members/Child/ 2
- xiv. Background/ Allergic Members/Child/ 3 or more
- xv. Background/ Allergic Members/ Current Age
- xvi. Background/ Allergic Members/ Current Age/ Less than 5
- xvii. Background/ Allergic Members/ Current Age/ 5 – 10
- xviii. Background/ Allergic Members/ Current Age/ 11 – 18
- xix. Background/ Allergic Members/ Current Age/ Older than 18
- xx. Background/ Allergic Members/ Age of 1st reaction
- xxi. Background/ Allergic Members/ Age of 1st reaction/ No prior reaction
- xxii. Background/ Allergic Members/ Age of 1st reaction/ Less than 5
- xxiii. Background/ Allergic Members/ Age of 1st reaction/ 5 – 10
- xxiv. Background/ Allergic Members/ Age of 1st reaction/ 11 – 18
- xxv. Background/ Allergic Members/ Age of 1st reaction/ Older than 18
- xxvi. Background/ Allergic Members/ Severity
- xxvii. Background/ Allergic Members/ Severity/ No medication or reaction
- xxviii. Background/ Allergic Members/ Severity/ Self-administered medication
- xxix. Background/ Allergic Members/ Severity/ Hospitalization
- xxx. Background/ Allergic Members/ Severity/ Anaphylactic
- xxxi. Background/ Allergens in Family
- xxxii. Background/ Allergens in Family/ Peanut
- xxxiii. Background/ Allergens in Family/ Tree nut
- xxxiv. Background/ Allergens in Family/ Sesame

(2) Grocery Shopping

- i. Grocery Shopping/ Responsibility
- ii. Grocery Shopping/ Responsibility/ Respondent
- iii. Grocery Shopping/ Responsibility/ Other Adult
- iv. Grocery Shopping/ Responsibility/ Shared
- v. Grocery Shopping/ Feelings
- vi. Grocery Shopping/ Feelings/ Positive

- vii. Grocery Shopping/ Feelings/ Negative
- viii. Grocery Shopping/ Feelings/ Mixed
- ix. Grocery Shopping/ Length
- x. Grocery Shopping/ Length/ Longer
- xi. Grocery Shopping/ Length/ Same
- xii. Grocery Shopping/ Length/ Faster
- xiii. Grocery Shopping/ Cost
- xiv. Grocery Shopping/ Cost/ Higher
- xv. Grocery Shopping/ Cost/ Same
- xvi. Grocery Shopping/ Cost/ Lower
- xvii. Grocery Shopping/ Willingness to pay more
- xviii. Grocery Shopping/ Willingness to pay more/ Yes
- xix. Grocery Shopping/ Willingness to pay more/ No
- xx. Grocery Shopping/ Willingness to pay more/ Mixed & Unsure
- xxi. Grocery Shopping/ Willingness to pay more/ No Choice
- xxii. Grocery Shopping/ Satisfied with food choices
- xxiii. Grocery Shopping/ Satisfied with food choices/ Yes
- xxiv. Grocery Shopping/ Satisfied with food choices/ No
- xxv. Grocery Shopping/ Satisfied with food choices/ Mixed & Unsure
- xxvi. Grocery Shopping/ Other Shopping Habits

(3) Use of allergen label

- i. Use/ Frequency
- ii. Use/ Frequency/ Every time
- iii. Use/ Frequency/ Sometimes
- iv. Use/ Frequency/ Never
- v. Use/ Re-read at home
- vi. Use/ Re-read at home/ Always
- vii. Use/ Re-read at home/ Sometimes
- viii. Use/ Re-read at home/ Never
- ix. Use/ Self-perceived reliance
- x. Use/ Self-perceived reliance/ Heavy
- xi. Use/ Self-perceived reliance/ Somewhat
- xii. Use/ Self-perceived reliance/ Little Reliance

(4) Information Source

- i. Information/ Primary
- ii. Information/ Primary/ Allergen warning
- iii. Information/ Primary/ Ingredients List
- iv. Information/ Primary/ Brand
- v. Information/ Primary/ Symbol
- vi. Information/ Primary/ Other
- vii. Information/ Secondary
- viii. Information/ Secondary/ Precautionary Statement
- ix. Information/ Secondary/ Ingredients List
- x. Information/ Secondary/ Brand

- xi. Information/ Secondary/ Symbol
- xii. Information/ Secondary/ Other
- xiii. Information/ Further Sources
- xiv. Information/ Unresolved Issues Source
- xv. Information/ Unresolved Issues Source/ Store Staff
- xvi. Information/ Unresolved Issues Source/ Manufacturer
- xvii. Information/ Unresolved Issues Source/ Manufacturer/ Website
- xviii. Information/ Unresolved Issues Source/ Manufacturer/ Phone
- xix. Information/ Unresolved Issues Source/ Manufacturer/ Email
- xx. Information/ Unresolved Issues Source/ Manufacturer/ Trust their information
- xxi. Information/ Unresolved Issues Source/ Manufacturer/ Trust their information/ Yes
- xxii. Information/ Unresolved Issues Source/ Manufacturer/ Trust their information/ No
- xxiii. Information/ Unresolved Issues Source/ Manufacturer/ Trust their information/ No Choice
- xxiv. Information/ Unresolved Issues Source/ Other

(5) Management

- i. Management/ Factors for purchase
- ii. Management/ Factors for purchase/ Prior experience
- iii. Management/ Factors for purchase/ Absence of allergen in ingredient
- iv. Management/ Factors for purchase/ No Warning
- v. Management/ Factors for purchase/ Origin of product
- vi. Management/ Factors for purchase/ Brand
- vii. Management/ Factors for purchase/ Allergen-Free
- viii. Management/ Factors for non purchase
- ix. Management/ Factors for non purchase/ Precautionary statement
- x. Management/ Factors for non purchase/ Prior experience
- xi. Management/ To Factors for non purchase/ Presence of allergen in ingredient
- xii. Management/ Factors for non purchase/ Origin of product
- xiii. Management/ Factors for non purchase/ Brand
- xiv. Management/ Factors for non purchase/ No order
- xv. Management/ Factors for non purchase/ Other
- xvi. Management/ Teaching child
- xvii. Management/ Teaching child/ Read labels
- xviii. Management/ Teaching child/ Consumption behaviors
- xix. Management/ Alternative foods
- xx. Management/ Alternative foods/ Bake own food
- xxi. Management/ Alternative foods/ Bring own food on trips
- xxii. Management/ Keeping home safe
- xxiii. Management/ Emotions of living of living with allergy
- xxiv. Management/ Emotions of living of living with allergy/ Worried, nervous

- xxv. Management/ Emotions of living of living with allergy/ Developing comfort zone
- xxvi. Management/ Emotions of living of living with allergy/ Travelling
- xxvii. Management/ Emotions of living of living with allergy/ Eating out
- xxviii. Management/ Emotions of living of living with allergy/ Support Groups
- xxix. Management/ Emotions of living of living with allergy/ Isolation
- xxx. Management/ Emotions of living of living with allergy/ Frustration
- xxxi. Management/ Emotions of living of living with allergy/ Uncertainty

(6) Trust

- i. Trust/ Trusted brand
- ii. Trust/ Trusted brand/ No
- iii. Trust/ Trusted brand/ Yes
- iv. Trust/ Trusted brand/ Website Browse
- v. Trust/ Trusted brand/ Website Browse/ Often
- vi. Trust/ Trusted brand/ Website Browse/ Rarely
- vii. Trust/ Trusted brand/ Prior Contact Experience
- viii. Trust/ Trusted brand/ Prior Contact Experience/ Positive
- ix. Trust/ Trusted brand/ Prior Contact Experience/ Negative
- x. Trust/ Trusted brand/ Prior Consumption Experience
- xi. Trust/ Trusted brand/ Prior Consumption Experience/ Positive
- xii. Trust/ Trusted brand/ Prior Consumption Experience/ Negative
- xiii. Trust/ Trusted brand/ Good brands
- xiv. Trust/ Store Staff/ Yes
- xv. Trust/ Store Staff/ No
- xvi. Trust/ Store Staff/ Prior Experience
- xvii. Trust/ Store Staff/ Prior Experience/ Positive
- xviii. Trust/ Store Staff/ Prior Experience/ Negative
- xix. Trust/ Trust Label
- xx. Trust/ Trust Label/ Yes
- xxi. Trust/ Trust Label/ Sometimes
- xxii. Trust/ Trust Label/ No
- xxiii. Trust/ Trust Label/ No choice
- xxiv. Trust/ Trust Label/ Prior Experience/ Positive
- xxv. Trust/ Trust Label/ Prior Experience/ Negative

(7) Perceptions of Current Labels

- i. Perception/ Concerns/
- ii. Perception/ Concerns/ Label
- iii. Perception/ Concerns/ Label/ Font Sizes
- iv. Perception/ Concerns/ Label/ Terminology
- v. Perception/ Concerns/ Label/ Contrast
- vi. Perception/ Concerns/ Label/ Location
- vii. Perception/ Concerns/ Label/ Inconsistency
- viii. Perception/ Concerns/ Labeling Environment
- ix. Perception/ Concerns/ Labeling Environment/ Inconsistency

- x. Perception/ Concerns/ Labeling Environment/ Voluntary
- xi. Perception/ Concerns/ Labeling Environment/ Good Manufacturing Practices
- xii. Perception/ Usefulness
- xiii. Perception/ Usefulness/ General Label
- xiv. Perception/ Usefulness/ General Label/ Yes
- xv. Perception/ Usefulness/ General Label/ No
- xvi. Perception/ Usefulness/ General Label/ Sometimes
- xvii. Perception/ Usefulness/ Logo
- xviii. Perception/ Usefulness/ Logo/ Yes
- xix. Perception/ Usefulness/ Logo/ No
- xx. Perception/ Usefulness/ Logo/ Sometimes
- xxi. Perception/ Usefulness/ Precautionary Statements/
- xxii. Perception/ Usefulness/ Precautionary Statements/ Yes
- xxiii. Perception/ Usefulness/ Precautionary Statements/ No
- xxiv. Perception/ Usefulness/ Precautionary Statements/ Sometimes
- xxv. Perception/ Usefulness/ Precautionary Statements/ Limit choices
- xxvi. Perception/ Usefulness/ Precautionary Statements/ A lot
- xxvii. Perception/ Usefulness/ Precautionary Statements/ Moderate
- xxviii. Perception/ Usefulness/ Precautionary Statements/ Low
- xxix. Perception/ Usefulness/ Precautionary Statements/ None
- xxx. Perception/ Improvements
- xxxi. Perception/ Improvements/ Consistency
- xxxii. Perception/ Improvements/ Terminology
- xxxiii. Perception/ Improvements/ Location
- xxxiv. Perception/ Improvements/ Regulations
- xxxv. Perception/ Improvements/ Font size & highlight
- xxxvi. Perception/ Improvements/ Contrast
- xxxvii. Perception/ Improvements/ Good Manufacturing Practices
- xxxviii. Perception/ Improvements/ Specific about nut type
- xxxix. Perception/ Improvements/ Pharmaceutical Labeling
- xl. Perception/ Improvements/ Other

(8) Awareness

- i. Awareness/ Educating
- ii. Awareness/ Educating/ Teachers
- iii. Awareness/ Educating/ Parents
- iv. Awareness/ Educating/ Children
- v. Awareness/ Educating/ Others
- vi. Awareness/ Policy
- vii. Awareness/ Policy/ Precautionary Statements
- viii. Awareness/ Policy/ Precautionary Statements/ Aware voluntary
- ix. Awareness/ Policy/ Precautionary Statements/ Unaware voluntary
- x. Awareness/ Policy/ Proposed Changes
- xi. Awareness/ Policy/ Proposed Changes/ Generally Aware
- xii. Awareness/ Policy/ Proposed Changes/ Very informed

- xiii. Awareness/ Policy/ Proposed Changes/ Unaware
- xiv. Awareness/ Policy/ Changing Over Time
- xv. Awareness/ Policy/ Canada vs. International

Appendix F

Shopping list for food basket

1. A loaf of white bread
2. Chocolate chip cookies
3. Cornflakes
4. Cereal bar
5. Chocolate bar
6. Margarine
7. Mayonnaise
8. Pre-made lasagna
9. Pre-made pizza
10. Ready meal Asian food
11. Spaghetti sauce
12. Vanilla ice cream