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The Effects of Allergies and Anaphylaxis on the Body and Mind:

A Survey of Opinions and Knowledge on these Disorders

Kathryn O'Brien

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Introduction

I can't remember when I was told I had anaphylaxis because I was only 18 months old. However, I can remember sitting alone during lunchtime in 1st grade because my friend who didn't mind sitting in desks apart from everyone else, was sick. I remember giving away half of my Halloween candy every year because it was milk chocolate. I remember riding in the ambulance when I was 11 because the pancakes with and without eggs weren't labeled in the fridge. To anyone with food allergies/anaphylaxis, it is not just a diagnosis, but a change in their daily lives. It is so common to hear people say "I'm sorry you can't eat ice cream" but I rarely hear people say "I'm sorry you dread going out to eat." The social ramifications are seldom acknowledged, and the extent of the allergic response has often been underestimated, at least in my experience.

Not only is having a true allergy an onslaught to your immune system (and in the case of anaphylaxis, your entire body), but also an onslaught on your self-esteem and social life. At age 8, I told my principal that I needed a separate table for lunch and when he wouldn't listen I demanded he call my mom. I have had to refuse countless meals from my friends' parents. There are many stressful situations that are experienced by someone with allergies/anaphylaxis that the average person who doesn't have to think about cross-contamination. At social gatherings, you find yourself paying closer attention to the how the food is being prepared, rather than to what someone is saying to you.

There are many variations and severities to food allergies and different ways to handle each situation. In the case of an allergy, one should have Benadryl at the ready, while with anaphylaxis, one needs to be prepared to administer epinephrine. Furthermore, the pressure of constant vigilance that having this disorder entails has life-long impacts on

both children and adults when they are told they have food allergies, particularly anaphylaxis.

In this paper, I intend to discuss all of these nuances and report the findings from two surveys; an assessment of how well educated and prepared teachers are for students with allergies and whether other students with food allergies have had the same experiences as me. I will report the etiology and scientific aspects of allergies, anaphylaxis, and hypersensitivity. I will then summarize studies concerning the social and psychological implications of having a food allergy. Finally, I will draw conclusions I have surmised from this project in relation to past and future research.

Hypersensitivity Defined

Hypersensitivity is a broad term to describe extensive or “inappropriate immune reactions” (Delves). As outlined in the Merck Manual, there are four classifications of hypersensitivity. Type 1 reactions involve IgE (Immunoglobulin E), a protein made to recognize an invader in the body. IgE is involved in signaling mediators to release cytokines or a similar immune response that leads to such symptoms as vasodilation and mucus hypersecretion (Delves). Type 1 reactions are, therefore, recognized as “IgE-mediated” and include “true” allergies and anaphylaxis (Delves).

Type 2 hypersensitivity reactions cause tissue damage as a result of non-IgE antibodies “binding to the cell surface of antigens,” the scientific name for a foreign substance in the body (Delves). This causes the recruitment of leukocytes such as macrophages and natural killer cells that are cytotoxic, dangerous to the cells, and destroy the recognized foreign substance (Delves). Organ transplant rejection is classified as Type 2

hypersensitivity because some else's cells are being introduced into the body. Because these cells are not recognized as one's own, leukocytes attack them as any other antigen.

Type 3 hypersensitivity reactions are caused by the deposition of non-IgE mediated immune complexes (antigen-antibody structures) on the tissues of the body (Delves). This causes extensive inflammation in the tissues. Serum sickness is a common Type 3 reaction as it involves the injection of "foreign serum or serum proteins" (Murphy, Travers, and Walport, 584).

The final classification, Type 4, involves the recognition of the antigen by memory T-cells, instead of antibodies. This class describes contact dermatitis, or common skin reactions such as that to poison ivy (Delves). Although people call any adverse reaction an allergy in colloquial terms, many common foods are not allergens at all. Most gluten reactions are not a result of true allergies, but are a Type 4 hypersensitivity. There are no IgE antibodies involved in creating the presenting symptoms.

Allergy Etiology

True allergy, a form of Type 1 hypersensitivity, is an overreaction of the immune system to a foreign substance such as dander or pollen. These foreign substances have proteins on them known as antigens, which the immune system recognizes as dangerous. Since these antigenic proteins are actually not dangerous to the human body, they are labeled uniquely as allergens (Dhanapala et al., 375). Allergy is designated by the increased production and circulation of Immunoglobulin E (IgE) antibodies (Bauer et al., 313).

The first phase of developing an allergy is the cellular process of recognizing the antigens as dangerous and becoming sensitized to it. Normally, upon entrance into the body, regulatory T cells (Treg) are maintaining tolerance by adjusting the production of

cytokines (small proteins that induce a response on another cell) that inhibit such overreactions (Murphy, Travers, and Walport, 83). This includes inhibiting the proliferation of naïve Helper T cells (T_H), specific T cells that can activate B cells and macrophages (Murphy, Travers, and Walport, 9; Bauer et al., 314). Upon entrance into the body, the protein is consumed by antigen presenting cells (APCs) and exposed to naïve T_H cells (Dhanapala et al., 375). In the case of an individual with allergies, the proliferation of naïve T_H cells is not regulated and the cells are forced to develop into Type 2 Helper T cells (T_{H2}) (Dhanapala et al., 375). The maturation of these cells creates a signal cascade causing cytokines to be sent to B cells, which in turn causes them to differentiate into plasma cells and excrete IgE antibodies (Dhanapala et al., 375). These IgE antibodies bind to Fc ϵ RI, a high affinity IgE receptor on mast cells and basophils, leading to sensitization of the allergen, the second phase of true allergy development (Bauer et al., 315).

Now that there are specific receptors on basophils and mast cells that will recognize the allergen upon secondary exposure. The allergen's antigens bind to these cells and cause degranulation, or dissociation of the cell and its cytokines (Bauer et al., 315). The third phase of allergy acquisition has then begun as the basophils and mast cells react by degranulation. Mediators of inflammation and chemical messengers are excreted to inform the immune system how to further react. Common mediators are histamines and platelet-activating factor (Bauer et al., 315). These particular mediators are vasoactive chemicals that lead to constriction of smooth muscles in the body causing vasodilation, bronchoconstriction, and increased heart rate, (Dhanapala et al., 376; Bauer et al., 315).

Anaphylaxis: An Extreme Response to Allergies

Anaphylaxis is derived from Greek origins where 'ana' means backwards and 'phylaxis' means reaction (Girotra and Lalkhen, 15). Recently, the definition of anaphylaxis has been broadened by the World Allergy Organization to include IgE-mediated reactions, IgG (immunoglobulin G) mediated reactions, immune complex reactions, and any sudden release of mast cells or basophils causing a systemic reaction (WAO). In short, Hypersensitivities type I, II, and III are recognized as 'allergies' for the sake of research and awareness. However, for the purpose of this discussion, common anaphylactic reactions will involve only IgE-mediated reactions. This is a reaction that occurs similarly to that of allergies, however, it is systemic. A full-body potentially fatal reaction will occur affecting blood pressure and heart rate, which lead to shock and organ failure, rather than itchy skin or runny nose.

The time in which it takes someone to have an anaphylactic crisis is also a means to classify anaphylaxis. A uniphasic reaction describes one that "occurs within 30 to 60 minutes after exposure", while a biphasic reaction includes an initial uniphasic response, followed by the patient being asymptomatic for an hour, and then the primary reaction repeats "without further exposure to the antigen" (Girotra and Lalkhen, 15). There is also a very rare type of anaphylaxis, known as protracted anaphylaxis, which can last hours or even days. Uniphasic reactions comprise 80-90% of anaphylactic crises (Girotra and Lalkhen, 15). According to the World Allergy Organization, WAO, there are approximately 29000 cases of food-induced anaphylaxis per year in the United States (WAO). Further statistics infer that there are 2000 hospitalizations and 150 deaths, as a result.

Symptoms and Treatment for Anaphylaxis

According to the World Allergy Organization, the symptoms of anaphylaxis are as follows:

Gastro-intestinal: Abdominal pain, hyperperistalsis with fecal urgency or incontinence, nausea, vomiting, diarrhea.

Oral: Pruritus of lips, tongue and palate, edema of lips and tongue.

Respiratory: Upper airway obstruction from angioedema of the tongue, oropharynx or larynx; bronchospasm, chest tightness, cough, wheezing; rhinitis, sneezing, congestion, rhinorrhea.

Cutaneous: Diffuse erythema, flushing, urticaria, pruritus, angioedema.

Cardiovascular: Faintness, hypotension, arrhythmias, hypovolemic shock, syncope, chest pain.

Ocular: Periorbital edema, erythema, conjunctival erythema, tearing.

Genito-urinary: Uterine cramps, urinary urgency or incontinence. (WAO)

For the management of anaphylaxis, the WAO prescribes the mnemonic ABC to physically and pharmacologically, respectively, treat an anaphylaxis crisis. The ABC represents by first letter the physical aspects of airway, breathing, and circulation. The state of all three of these aspects depends on the position of the patient. Because of angioedema, or swelling of the tissues, and bronchospasms, constriction of the bronchi, it may be necessary to help the patient sit up straighter or to position the head so that it is tilted back with the chin up. Circulation is only a concern if the antigen is an injection. In such an instance, one would need to tie off the area to prohibit spread of the injection, sting or bite.

ABC also represents the pharmaceutical treatments for anaphylaxis: Adrenaline, Benadryl, and Corticosteroids. Adrenaline is synonymous with epinephrine, which may come in Epi-pens® or Auvi-Q® injections. This is the primary and immediate treatment for

anaphylactic reactions. Benadryl or diphenhydramine is a strong antihistamine that can be used when a patient becomes more stable. Corticosteroids are for use after the anaphylaxis crisis has been treated. They may help to prevent protracted or biphasic anaphylaxis reactions.

Epidemiology of Anaphylaxis

The exact epidemiology of anaphylaxis is hard to express as many cases either go undiagnosed or are coded differently in hospital records. It is believed that “only 1% of emergency department visits for acute systemic allergic reactions” is properly identified (Simons, S161). Many patient files are labeled as allergies or hypersensitivity reactions instead of anaphylaxis. However, the number of prescriptions of “just in case” epinephrine can be documented. Researchers found that about 1% of the population in Manitoba, Canada were prescribed the medication (Simons, Peterson, and Black, 647). In more general terms, it has been estimated that about 1-3 people in every 10,000 people have anaphylaxis (Moneret-Vautrin et al., 443).

In respect to food allergies, about 13% of households self proclaim having a member with a food allergy or food intolerance (Altman and Chiaramonte, 1249). Because oral food challenges and skin tests are required for confirmed cases, it is difficult to have accurate statistics. However, the Center for Disease Control (CDC) “indicated that among children aged 0-17 years, the prevalence of food allergies increased from 3.4% in 1997-1999 to 5.1% in 2009-2011, a 50% rise” (Jackson, Howie and Akinbami, 1). Currently, the CDC states that 1 in every 13 children under 18 has a food allergy (FARE).

Social and Psychological Implications for Those with Anaphylaxis

For young children, the concept of having a life-threatening allergy can make them feel “overwhelmed with the responsibility of managing” said allergy (Monga and Manassis, 1009). For all ages, there is a possibility of anxious behavior that manifests as avoidance of situations that are actually relatively safe (Manassis, 1). As a result, individuals may not dine out or place themselves in situations where their allergies may be a factor.

Furthermore, physiological symptoms of anxiety disorders and allergies, such as hyperventilation and increased heart rate may often overlap, leading to uncomfortable situations and potential misuse of maintenance medication.

Research has shown that “anxiety and anaphylactic conditions are often comorbid” (Monga and Manassis, 1009). When a young adult, for example, has a severe food allergy, they do not always develop the appropriate level of autonomy for their age (Herbet and Dahlquist, 262). This perceived lack of independence can lead to anxiety and depression, including separation anxiety disorders (Stewart et al., 484).

Furthermore, adolescents with food allergies have reported feeling “isolated, different, and excluded” due to their allergies (Stewart et al., 481). Because adolescents strive to be accepted, it is important to them that they appear ‘normal.’ As a result, peer pressure and self-image can be even more difficult for these youth than for someone without a disability. In fact, one 16 year old girl from a study by Stewart et al. said, “The hardest thing about having a food allergy is coping with the sense of alienation; being left out of activities because foods involved, sleepovers, explaining to friends, my emergency poster being hung up in elementary, being worried about eating friends houses, people

asking about them such as “oh, are you gonna DIE? [and] how people treat me (friends parents, my parents)” (484).

Although these studies present data that anxiety and mental health disorders are increased in individuals with food allergies, they are extremely small and isolated studies. In addition, parents generally answer on behalf of their children and they may be projecting their own anxieties into the survey. The symptoms that define General Anxiety Disorder also seem to be most questioned about, rather than including other disorders such as Obsessive Compulsive Disorder or Separation Anxiety Disorder. By not addressing other symptoms, data could be missing on disorders these children might be developing. Further, consulting individuals about whether they have occurrence-specific anxieties should also be analyzed, i.e. a child having fear of an anaphylactic response.

Allergy and Anaphylaxis as a Disability

Contrary to common knowledge, food allergies and anaphylaxis are considered a disability under the Americans with Disabilities Act of 1990. “The term ‘disability’ means, with respect to an individual, a physical or mental impairment that substantially limits one or more major life activities of such individual.” The document goes on to state that major life activities include major bodily functions, “including...functions of the immune system.” As previously described, legitimate food allergies and anaphylaxis are a result of the unnecessary expression of the IgE immunoglobulin and acquired immunoglobulins are a cornerstone of the immune system’s functions. Furthermore, the document states “it shall be discriminatory to subject an individual or class of individuals on the basis of a disability...to a denial of the opportunity of the individual or class to participate in or benefit from the goods, services, [or] facilities...” In other words, this act legally states that

public services such as restaurants and schools are required to provide food to those with food allergies. Furthermore, restaurant managers and staff are required to allow separate food be brought into an establishment if it allows the individual to be more comfortable.

As of 2006, any manufacturing facility is required to label if there are any potential allergens in their product. They must be bolded in the ingredients list or separately marked. The Food Allergen Labeling and Consumer Protection Act of 2006 has reduced stress in the lives of many living with food allergies, including myself. Prior to this act, one had to read every ingredient on every label of a bread package, for example, to be sure it did or did not contain milk or eggs. Now, with one glance this information is known.

Furthermore, allergens are obvious if they are present in manufactured foods. By bolding them or listing them separately, one cannot skim over seeing that the loaf of bread “CONTAINS: MILK, EGGS.” However, they are not required to include a “may contain” statement (FARE). These statements alert consumers to possible cross contamination, but adding this addition to food labeling is only optional. However, this optional addition may be even more useful than the required labeling for people with severe food allergies such as anaphylaxis. It is surprising what some manufactured items may contain. SweeTarts, for example, are fruit flavored candies that are “manufactured in a facility that also processes egg and wheat,” according to the package label. Prior to this labeling, an individual may have been exposed to just enough of an allergen to get a stomachache and possibly an increase in IgE towards that allergen, but not seriously affect them. There would be no way of knowing that this candy was the culprit.

School Policy

In 2013, President Obama signed the School Access to Emergency Epinephrine Act saying that schools are allowed to have undesignated stock epinephrine (FARE). Currently, a student needs to have a 504 plan (an emergency plan for any public school student with a disability) stating that they require an Epi-Pen® in case of emergency. If a 504 plan is on file for a student, epinephrine cannot be injected until an ambulance is called. Food Allergy Research and Education has found that 20-25% of situations that required epinephrine in schools were because of students or staff reacting to an unknown allergy (FARE). Illinois, for example, has acknowledged this federal law, but state legislation requiring the stocking of epinephrine in all public schools has not passed. Furthermore, there was state legislation passed in Illinois in 2006 to allow students to carry epinephrine on them in school with “appropriate consent,” although the consent is not defined (FARE).

Illinois is 1 of 15 states to have published state guidelines for severe food allergies, which can be found on the Food Allergy Research and Education website. This document outlines effective cleaning techniques, classroom teacher guidelines, vocabulary definitions and 4 sample forms for an emergency plan. The creation of this document is an attempt at standardizing procedures towards food allergies in all Illinois schools. With schools utilizing this educational resource, there could be less variability in the knowledge and practices the staff members have. Ergo, there would be even less of a chance of exposing an allergen to a student.

Surveys to Assess Teacher and Student Perspectives

A survey was sent out to teachers at six Chicago-area public schools asking the staff's views on the definitions of allergies and anaphylaxis and their experiences with

these disorders (see Appendix A). There was a \$25 Visa gift card raffled as an incentive to those who took the survey. There were 64 responses from grade school teachers from all six schools polled.

A second survey was sent out to the student body at Augustana College in Rock Island, IL asking if students who had anaphylaxis or food allergies to detail their allergens and what their experiences had been with their disorder in school (See Appendix B). There was a \$10 Hyvee gift card raffled as an incentive to those who took the survey. There were 64 responses but due to evident repeats as a result of confusion with applying for a gift card and some students responding who didn't have allergies, 10 responses were excluded, and 54 responses were analyzed.

Teacher Results & Discussion

Of the responses 64 responses received, 97% of respondents claimed to have had at least one student with a food allergy. Of this 97%, 79% said that they had had more than five students with food allergies in their teaching career. Those who had not had a student with a food allergy were teachers aged 51-60. Although this is a small sample size, the fact that younger teachers are seeing more food allergies than teachers who taught years ago could be indicative of the growing food allergic population. The most common three food allergies the teachers reported of their students were peanuts, dairy, and eggs. In fact, every teacher who had a student with food allergies had at least one with a peanut allergy.

Of the respondents, 44 defined food allergy in terms of only physiological changes that occur. Some responses were more vague: "if eaten, certain foods will cause an adverse reaction." Other responses included specific symptoms: "when a child cannot breathe, breaks out in a rash, or becomes irritable after eating a particular food, he/she most likely

has a food allergy.” Interestingly, eight teachers defined food allergy in terms of how it would affect the lifestyle of the student such as “being aware of all ingredients in food... and how to manage the allergy.” Although the question “what does having a food allergy mean to you” was open-ended, I did not anticipate having them detail how it could affect the students in any way but physiologically. As discussed, the social and psychological implications are beginning to gain more attention from scholars. The importance of further study on this topic is emphasized by the teachers that are thinking about not only physical, but mental and social health of their students, as well. In the future, I would like to ask if teachers had witnessed any bullying among students they knew had food allergies.

Eleven teachers identified the disorder in terms of how it would affect them and the responsibilities required of them, professionally. One teacher said “to me [having an allergy] means that you should have training and knowledge on the students or persons allergy.” This may have been due to my error in wording the question, but it led to data I wasn’t expecting. All of the teachers who defined food allergy in this manner believed that it required them to have more education and be more “vigilant” toward students with the allergy.

Sixty-two and a half percent of respondents claimed to have had at least one student with anaphylaxis in their teaching career. Twenty five percent of these teachers had taught more than five students with anaphylaxis. The populations of the towns involved in this study total to roughly 62,000 individuals. If the predicted average is one to three in every 10,000 individuals, the results do not align with this prediction. This would mean that at one point, there would be only 6-20 individuals with anaphylaxis at one time in the three towns sampled. In fact, of the eight teachers who reported only teaching for four years or

less, two reported having had more than five students in class with anaphylaxis. Therefore, in the last four years alone, there have been at least 12 students with anaphylaxis out of a population of 62,000. Although there is no way to know if all of the students these teachers taught were in school simultaneously, and for some teachers who are there is still inconsistency between my data and general data. Finally, the most common anaphylaxis-inducing allergens reported by teachers were peanuts, bee or wasp stings, dairy, and eggs.

Forty-one respondents described anaphylaxis as a “severe reaction” or described symptoms that can be life-threatening such as “constriction of [the] airway.” Other responses varied from “not sure” to “you must react immediately to the symptoms that a student/person has in order to open up his/her airway (ex. use epipen, call 911, etc.)” It is slightly unsettling that even one teacher did not know how to define anaphylaxis. Although this may never be relevant to one of their specific students, it is a growing problem that all school faculty should have knowledge about. Furthermore, this individual had claimed to have never heard of anaphylaxis.

Fifteen respondents had encountered an allergic reaction during school hours, but 22 teachers answered the ranking scenario provided about how well the reaction was handled. Therefore, between 15 and 22 teachers had dealt with an allergic reaction. Of these 22, 15 said that the student could have handled it on their own. Interestingly, these teachers ranged from teaching Kindergarten to 8th grade. All of the individuals who answered this specific set of questions said the medicine was readily accessible. In 16 of the 22 cases, the respondents said that a school nurse predominantly handled the situation.

Student Results & Discussion

Ten of the respondents' results were deleted as they claimed to have neither food allergies nor anaphylaxis. I did not include myself in this data. Therefore, 54 sets of data were saved for analysis. 51 of these students, or 94%, had food allergies, 12 of which also had anaphylaxis. The most common reported food allergies were dairy, egg, and tree nuts. However, students reported gluten and dairy as food allergies, when these may range from a true allergy to another type of hypersensitivity, which are not IgE-mediated (Vojdani and Perlmutter, 1). In the future, there should be a separate question for Celiac's disease and lactose intolerance, as neither of these classify as a true allergy and may have skewed the data. Seventy-two percent of respondents claimed having seasonal allergies, as well as food allergies. Seven of the nine students who reported having a food allergy to fruit also reported having seasonal allergies. Some of these allergies may be due to oral allergy syndrome in which there is an allergen, such as pollen, on the fruit that may have been what initiated an immune response (Oral Allergy Syndrome).

In total, 25 students, or 46%, had anaphylaxis. Thirteen of these students currently carry an Epi-Pen® on their person. The most common anaphylactic triggers were peanuts and tree nuts. This number may be irrationally high for Augustana College because people may have chosen a smaller school so they can control their environment. In smaller schools, there is generally fewer kitchen staff members to interact with. As a result, one might only have to explain their allergies once or twice and there is less chance of miscommunication about one's needs from chef to chef. Therefore, the ratio of anaphylactic individuals at this two thousand student, Liberal Arts College may be higher than the

average. Personally, my allergies were a significant reason I chose a smaller school like Augustana.

Fifty four percent of students believe the general public does not have adequate knowledge of their disorder. Twenty four percent were unsure if the public is well educated on the matter and 22% said the public is. Seventy-four percent of students who responded to the question "What was your experience with your allergies/anaphylaxis in middle school?" said that it was not up to par. Only 16% of students who kept medication in school were allowed to carry it on their person.

Sixty-two percent of students dined out once a month or less. Although this may not be related to them having food allergies. When given a hypothetical situation in which an allergic individual cannot control how the food is prepared or what is on the menu, 77% of students said they would feel uncomfortable. Specifically they felt alienated, self-conscious, unique, and/or frustrated. The data obtained from this survey aligns with the data that other researchers have analyzed. Alienation and frustration are a common byproduct of growing up with food allergies (Stewart et al., 481).

Conclusion

I engaged in this research to analyze if my experiences with anaphylaxis/food allergies were unique or commonplace. Through my research, I see that the answer is both. Throughout middle school, I had conflict with school nurses and teachers understanding the extent of my allergies. I entered into this project expecting to get ignorant responses in regards to allergies/anaphylaxis, but I am surprised and pleased that this was not the case. Based on the schools surveyed, though, this may no longer be the case. Only one teacher did not know what anaphylaxis was and many of the teachers not only stated the definition

but relayed what food allergies or anaphylaxis means in regards to the student and themselves. Teachers also stated that they believed the students could have handled an allergy incidence independently. It seems the sense of respect for allergies/anaphylaxis and the individuals who are coping with the disorder has heightened. I am more confident that the public is starting to become more aware of just how life-threatening and life-altering food allergies/anaphylaxis can be.

If research on this project were to be continued, it would be interesting to explore how many individuals, both teachers and students, are aware that food allergies fall under the category of a disorder. I would also like to know where teachers have gained their knowledge on these disorders. Are allergies becoming so common they are familiar with it from their own experiences or are there seminars being held for the faculty in schools?

I also did not expect there to be as many students with food allergies at Augustana College. I was told I was only 1 of 5 allergy students that went into the kitchens to discuss food preparations with the chefs and there are actually fifty-four students that have dietary restrictions. However, this could be a cause for concern that individuals either do not want to be alienated by having to walk to the kitchen and wait for their food or there is something unwelcoming about the cafeteria setting. I believe that independence and assertiveness are both imperative in order to live a normal life with food allergies so I would like to see more people taking the step to communicate their needs. If this survey were repeated, I would also like to ask questions about student' interactions with adults while growing up. Did they also have to stand up for themselves and did they feel comfortable telling adults 'no?'

I intend to share this data with Augustana College and of the schools that participated in the survey for the teachers. The goal of my surveys was to not only gain a clearer idea of the awareness of food allergies/anaphylaxis amongst the public, but to spark interest in the concept. I hope that people really considered how food allergies may affect those around them, or how it has affected them in the case of students, and potentially drew some conclusions themselves. Allergies and anaphylaxis are becoming increasingly more prevalent and need to be recognized as disorders that affect more than just one's diet.

APPENDIX A: Teacher Survey **Gender*** _

- Male
- Female
- Other

Age?* _

- 20-30
- 31-40
- 41-50
- 51-60
- Over 60

Grade(s) Taught* _

- K-2
- 3-5
- 6-8
- 9-12

Years Spent Teaching* _

- 4 or less
- 5-10
- 11-20
- More than 20

In your career, have you ever had a student with a food allergy?* _This does not mean they had a reaction, but that they had this health concern.

- Yes, just 1
- Yes, between 2 and 5
- Yes, more than 5
- No

If you have had students with a food allergy, to what were they allergic? Only applicable if yes to previous question

- Dairy
- Eggs
- Peanuts
- Treenuts
- Soy

- Fish
- Shellfish
- Other:

In a sentence, what does having a food allergy mean to you?* _

Have you ever heard of Anaphylaxis?* _

- Yes
- No

In your career, have you ever had a student with anaphylaxis?* _ This does not mean they had a reaction, but that they had this health concern.

- Yes, just 1
- Yes, between 2 and 5
- Yes, more than 5
- No

If you had students with anaphylaxis, to what could they potentially react to? Only applicable if yes to previous question

- Dairy
- Eggs
- Peanuts
- Tree Nuts
- Latex
- Soy
- Fish
- Shellfish
- Bee/Wasp Stings
- Other:

In a sentence, what does having the disorder anaphylaxis mean to you?* _

Have you ever worked lunch duty?* _

- Yes
- No

Have you ever dealt with an allergic reaction in school (including field trips)?* _

- Yes
- No

On a scale of 1-4, how true are the following statements? Only applicable if yes to previous question

	1-Entirely False	2- Mostly False	3- Mostly true	4-Entirely True
The required medicine was easily accessible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt well prepared for the situation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The school nurse predominantly handled the situation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The situation was handled quickly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The student was able to take care of the situation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, I would say the situation went smoothly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX B: Student Survey

What year are you?* _

- 1st

- Sophomore
- Junior
- Senior

How often do you dine out?* _

- 3 or more times a week
- 1-2 times a week
- Once every two weeks
- Once a month
- Barely ever

Do you have food allergies?* _

- Yes
- No

If yes to previous question, what are you allergic to?

- Dairy
- Eggs
- Tree Nuts
- Peanuts
- Latex
- Soy
- Fish
- Shellfish
- Other:

Do you have other allergies? (cats, seasonal)* _

- Yes
- No

Do you have anaphylaxis?* _

- Yes
- No

If yes to previous question, what do you react to?

- Dairy
- Eggs
- Tree Nuts

- Peanuts
- Latex
- Soy
- Fish
- Shellfish
- Bee/Wasp Stings
- Other:

Do you think the general public has adequate knowledge of your disorder?* _

- Yes
- Unsure
- No

What emergency drugs do you carry on your person?* _

- Epi-pen (or similar)
- Benadryl (or similar)
- None

Where were these drugs allowed to be in middle school?* _

- In the classroom
- My locker
- On me
- Nurses Office
- N/A

In your experience, did/do middle school staff have adequate knowledge on your disorder?* _

- Yes
- Unsure
- No

What was your experience with your allergies/anaphylaxis in middle school?

1 2 3 4

Normal (no trouble communicating my disorder
or having no reactions)

Difficult (trouble conveying my allergies to
others or some reactions)

Is there anything that you think should be changed in regards to how middle schools handle allergies/anaphylaxis? If no, please leave blank

Hypothetical Situation: There is a social dining event and you have no control over what food(s) are served and no way to ask about ingredients. How does this make you feel?

- Normal
- Relaxed
- Self-conscious
- Unique
- Frustrated
- Alienated

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