ANAPHYLAXIS IN PRESCHOOL CHILDREN

INTRODUCTION

As a parent of a child who experiences anaphylaxis to foods or insect stings you have important decisions to make about safety. Among them is the selection of a dependable day care facility, nursery or preschool as committed as you are to protecting children from exposure to potentially dangerous substances. Such a place must have trained concerned staff able to quickly recognize a developing allergy emergency and who are both capable and willing to immediately take appropriate lifesaving steps.

This pamphlet is about how to find and recognize such facilities. It contains information from over seventy San Mateo County day care, nursery schools and preschools that completed a questionnaire about their policies and their experience with serious allergic reactions to foods and insect stings in children. If your child's current facility is not included in this list information and resources to assist you in working with your school's director and personnel to improve anaphylaxis readiness is provided.

Sincerely,

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25 December 2008

WHAT IS ANAPHYLAXIS?

Anaphylaxis is a serious allergic reaction involving at least two of these organ systems: the skin, the heart and blood vessels, the lungs (windpipe and breathing tubes), and the digestive tract from mouth to intestines. Anaphylaxis occurs when a foreign substance to which the person already has an allergy (allergists say to which the patient is sensitized) enters the body and combines with an allergy antibody (IgE antibody) that specifically recognizes the substance. The interaction of foreign substance (allergen) with IgE antibody triggers two immune system cells, mast cells and basophils, to release a variety of biochemical messengers including histamine. These messengers activate nerves triggering itching, make blood vessels more porous resulting in swelling, and induce smooth muscle in the digestive tract and breathing tubes to contract causing abdominal cramping and difficulty breathing.

After an exposure anaphylaxis often begins in seconds or minutes but almost always within two hours. Initial symptoms may be mild like mouth itchiness or severe like difficulty breathing if the vocal cords become swollen (called laryngospasm) or even a sense of dread or doom if blood pressure drops. Table 1 lists the major symptoms of anaphylaxis. **Without warning mild symptoms may be followed by severe symptoms. Bold-faced symptoms are particularly serious and may be rapidly life-endangering.**

Skin	Respiratory	Heart & Circulation	Gastrointestinal
Hives Flushing Angioedema (swelling of lips, eyelids, face, hands, feet, genitals)	Sneezing **Laryngospasm** (throat closure) Coughing Wheezing Asthma Difficulty breathing	Pallor (pale skin) Dizziness **Fainting** **Sense of dread** Rapid heart rate **Slow heart rate**	Tongue swelling Mouth itching Nausea Vomiting Cramping Diarrhea

When an allergen is swallowed initial symptoms usually involve the mouth and stomach. Once the allergen enters the bloodstream it is carried to all parts of the body triggering multiple symptoms in the skin, lungs, throat, heart and blood vessels. Leakage of plasma out of the bloodstream, when severe, results in dizziness, loss of consciousness and shock. ***In young children pale skin accompanied by sleepiness suggests shock.*** **Shock means that oxygen is not reaching the heart, the brain and other vital organs.**

Honeybees, yellow jackets, wasps and hornets can trigger anaphylaxis through stings. Typical symptoms are hives, difficulty breathing, and shock.

Not all symptoms will be present in each episode of anaphylaxis and symptoms may not appear all at once. **Skin symptoms are almost always present but in severe episodes may appear last in the sequence of events.** Because of the life-threatening effects, the sudden onset, and the rapidity by which symptoms develop **anaphylaxis is a medical emergency**. Time is critical in recognizing and initiating treatment in anaphylaxis. **The risk of prolonged symptoms and death increases when treatment is delayed.**

TIME COURSE AND OUTCOME OF ANAPHYLAXIS

Most episodes of anaphylaxis resolve in a few hours. Some last much longer, especially when treatment is delayed by 30 minutes or more. After initially responding to treatment symptoms may return 4 to 6 hours later. **Parents must be alert for symptoms occurring up to 24 hours after an episode.**

Although only one in a hundred episodes of anaphylaxis ends in death **the severity of previous episodes does not predict the severity of the next one. Consequently early recognition and treatment of symptoms of anaphylaxis, and safe, rapid transportation to a medical facility that can administer additional care is of the greatest importance in the treatment of <u>every</u> episode of anaphylaxis.**

TREATMENT OF ANAPHYLAXIS

The most important step to take when anaphylaxis is suspected is the injection of epinephrine into the thigh muscle. Epinephrine (adrenalin) is the only medication that stops mast cells and basophils. All other medications work by blocking some but not all of the effects of these cells. Because epinephrine is injected it also works much faster than other medications. Prompt administration of epinephrine prevents death, shortens the course and decreases the severity of episodes, and reduces the need for hospitalization.

Epinephrine is administered into the muscle on the outside of the thigh using an autoinjector. Autoinjectors are always ready to use, require no measurement of dose, and are easy to store and carry. Two brands of epinephrine autoinjector are available, EpiPen® and Twinject®. Each comes in two dosages. The lower dose is used for children under 54 pounds. The higher dose is for larger children, teenagers and adults.

Epinephrine works within five minutes. Beneficial effects may wear off in 15 to 20 minutes. **Because a second dose of epinephrine is sometimes needed, two doses should always be available.**

Every adult responsible for the care of a child with anaphylaxis should be familiar with the use of the child's autoinjector. Pharmaceutical companies provide free written and audiovisual instruction materials in their use. Check the Resource Section for additional information.

Epinephrine is safe to use. For many years it was the primary drug for the treatment of asthma emergencies. In children epinephrine does not injure the heart or other organs. Brief muscle shaking, upset stomach, dizziness, rapid heart rate and nervousness may occur. These are symptoms we all experience when in a frightening situation as epinephrine is a chemical released at these times from the adrenal glands.

For fear of causing their child pain parents sometimes fail to administer epinephrine during an anaphylaxis emergency. Epinephrine hurts much less than a blood draw or the insertion of a needle for intravenous fluids. Pain lasts only for a few seconds and can be treated by rubbing the injection site.

STEPS TO TAKE WHEN TREATING ANAPHYLAXIS

1. First decide if anaphylaxis is occurring. Are two or more organ systems involved (skin, breathing, gut, heart)?
2. When severe reactions have occurred in the past one symptom alone may be enough for you to take action.
3. Administer epinephrine autoinjector in the outside of the thigh.
4. Call 911. Don't drive to the Emergency Room; let the ER come to you.
5. Lay patient down on back with feet elevated about twelve inches. This is the best position for falling blood pressure.
6. If patient is not nauseous give an antihistamine like cetirizine (Zyrtec®) or fexofenadine (Allegra®). Avoid antihistamines that cause drowsiness like diphenhydramine (Benadryl®) as drowsiness is a symptom of anaphylaxis.
7. Give 2nd dose of epinephrine if patient does not respond in 10 minutes or if symptoms return after 20 minutes
8. If patient has a history of asthma and has difficulty breathing give bronchodilators such as albuterol, Xopenex®, or Maxair®.
9. Do not induce vomiting.

PREVENTING AND AVOIDING ANAPHYLAXIS

Avoiding highly allergenic foods like cow's milk, eggs, and wheat during pregnancy and breast-feeding has no effect on anaphylaxis to foods, food allergy, or allergic diseases. Exclusive breast-feeding for the first six months of life may be beneficial.

More than 95% of all allergic reactions to foods occur to the following foods:	
Cow's milk & dairy products	Shellfish – usually shrimp, crab & lobster
Egg	Fish
Peanut	Wheat
Tree nuts	Soy
Sesame	Corn

1. Among children with food allergies half are allergic to one food or food group. Less than 1% of all children with food allergies are sensitized to more than three foods.

2. **Once anaphylaxis is established, complete avoidance of the responsible food and sometimes closely related foods is the rule.**

3. **Half of peanut and tree allergy patients experience their first allergic reaction with the first feeding of the food**. Your child should have eaten and tolerated peanuts, tree nuts, sesame, milk, egg, and wheat before entering preschool because it's better to have the first reaction at home than at school.

4. Most persons with peanut allergy can tolerate other legumes like beans and soy.

5. 25-50% of children with peanut allergy also have tree nut allergy. Children with peanut allergy should be tested for tree nut before eating tree nuts.

6. Children with peanut allergy may have allergic reactions or anaphylaxis after eating lupine. Lupine is a wild flower often used in baking flour. Read the label.

7. One out of every four siblings of a child with peanut allergy will also have peanut allergy. Ask your doctor to perform allergy testing before introducing peanut into their diet.

8. **Learn to read package labels.** Package labels may refer to cow's milk as **casein, caseinate, or whey. Even "non-dairy" products may contain these milk products.**

9. Nine out of ten children allergic to cow's milk are also allergic to goat milk. On the other hand lactose, the sugar found in milk, does not contain any significant amounts of cow's milk protein and is safe to use by milk-allergic patients.

10. Package labels may refer to egg protein, the allergen in egg white, as ovalbumin or ovomucin.

11. Products labeled with warnings like "contain traces of peanut", "may contain traces of peanut", "made on equipment that processes peanut", and "made in plant where peanuts are processed" sometimes contain enough peanut material to trigger reactions. No one warning is safer than any other. **If a label says it may contain a trace of the food to which your child is allergic don't use the product.**

12. Skin contact to peanut or inhalation of peanut fragrance is not likely to trigger anaphylaxis. Remove peanut residue on hands with soap & water rather than hand sanitizers and from surfaces with household cleansers rather than dish detergent.

13. Children with asthma are more likely to have severe reactions to foods to which they are sensitized.

FOOD ALLERGY, FOOD INTOLERANCE AND ANAPHYLAXIS

Anaphylaxis does not occur in all patients with food allergy. Food allergy can cause atopic dermatitis (eczema), hives, allergic rhinitis, asthma, vomiting or diarrhea. **Epinephrine is not required in the absence of anaphylaxis.** Complete avoidance is still stressed in situations where food allergy triggers asthma or hives. Patients with eczema may tolerate small amounts of the foods to which they are sensitized.

Reactions to foods not caused by allergy are called **food intolerance**. A common form is lactose intolerance. In this condition an inability to digest the sugar present in milk results in bloating, gas, cramps and diarrhea. **Epinephrine is not required for patients with food intolerance.**

SAN MATEO SCHOOLS & ANAPHYLAXIS IN YOUNG CHILDREN

This section summarizes the 2007 and 2008 surveys of nearly 200 San Mateo county preschools, nursery schools, daycare facilities, pre-kindergartens, and private kindergartens. The survey questioned school personnel's readiness to recognize and treat food allergy and anaphylaxis. Eighty-five schools responded to the survey of which 72 are included in this report. If your child's school is not listed it may be because they failed to reply, couldn't be found with a Google search or in the telephone book, or weren't prepared to recognize or treat anaphylaxis. Use the blank questionnaire in this pamphlet to survey your child's school.

Five survey questions are used to assess school readiness for anaphylaxis:
1. Does your school have a written policy concerning students with food allergies?
2. Are all parents, including those whose children who do not have food allergies, informed about the presence in the classroom of children with food allergies?
3. Are all parents requested to not bring snacks to be shared at school (such as birthday cake or cupcakes) containing ingredients to which other children are allergic?
4. Are school staff members trained in the recognition of students experiencing life-endangering reactions due to food allergies or bee stings?
5. Are any staff members trained in administering epinephrine auto-injector (EpiPen Junior, EpiPen, Twinject) to students experiencing a life-threatening allergic reaction?

A school may still be prepared to handle food anaphylaxis even if they didn't answer "Yes" to every question. Preparation doesn't guarantee that everything will go as planned when a real emergency occurs. Still this information may be helpful in selecting a school that best fits the requirements of your food allergic child. Inclusion on any of the following lists required that the school answer "Yes" to questions 4 and 5 regarding training in recognizing anaphylaxis and in administering epinephrine autoinjector. Ten schools answered "No" to either or both of these essential readiness questions.

The following schools answered "Yes" to all five questions:

School	Updated	City
Belmont Oaks Academy	2008	Belmont
First Presbyterian Church Nursery School	2008	Burlingame
Papillon Preschool	2007	Burlingame
Peninsula Temple Sholom Preschool	2008	Burlingame
St. Paul's Co-op Nursery School	2007	Burlingame
Hope Lutheran School	2008	Daly City
Wilkinson School: Alhambra-El Granada	2008	El Granada
Peninsula Jewish Community Center	2008	Foster City
Los Niños Nursery School	2008	Half Moon Bay
Nueva School	2008	Hillsborough
South Hillsborough Preschool	2008	Hillsborough
Geokids	2008	Menlo Park
Kirkhouse Preschool	2008	Menlo Park
New Beginnings Preschool	2008	Menlo Park
Trinity School Early Childhood Program	2007	Menlo Park
Millbrae Montessori	2007	Millbrae
Millbrae Nursery School	2008	Millbrae
Pacifica Playschool	2008	Pacifica
Ladera Community Church Preschool	2007	Portola Valley
Windmill Preschool (new written policy)	2008	Portola Valley
Beresford Montessori	2008	Redwood City
Children's Creative Learning Centers	2008	Redwood City
Kiddie Garden Pre-School	2008	Redwood City
Marin Day Schools	2008	Redwood City
Open Gate Parent Coop Nursery School	2007	Redwood City
Sequoia Children's Center	2008	Redwood City
Happy Hall Schools	2008	San Bruno
Kindercourt School System	2007	San Carlos
Trinity Presbyterian Nursery School	2008	San Carlos
Beresford Montessori	2008	San Mateo
Bright Beginnings Toddler & Preschool	2007	San Mateo
Bridge Point Academy	2008	San Mateo
The Carey School	2008	San Mateo
Childrens School Hillsdale United Methodist Church	2008	San Mateo
Pacific Rim International School	2008	San Mateo
City of South San Francisco Preschool Program	2008	South San Francisco
Urban Sprouts Pre-School	2008	South San Francisco
Woodside Preschool	2008	Woodside

These schools have no written policy but answered the remaining questions "Yes":

Montessori Morning Glory Preschool	2007	Burlingame
Palcare	2008	Burlingame
Picasso Preschool	2008	El Granada
Sea Breeze Episcopal School	2007	Foster City
Coastside Children's Programs	2007	Half Moon Bay
West Hillsborough Preschool	2007	Hillsborough
Carillon Preschool at Christ Church	2008	Portola Valley
Playschool	2007	Redwood City
Happy Hearts Family Child Care & Preschool	2008	San Mateo
Hope Lutheran Preschool	2007	San Mateo
Kinder Academy Montessori	2007	San Mateo
Transfiguration Nursery School (change)	2008	San Mateo
Woodside Parents Nursery School	2007	Woodside

The following schools state that their teachers and/or directors are trained in both recognition and treatment of anaphylaxis. Not all of these schools have a written food allergy policy. They answered "No" to questions about either informing all parents of the presence of food-allergic children at school, restricting shared snacks containing food allergens or both:

School	City	Q1	Q2	Q3	Q4	Q5
Playschool	Atherton	No	No	Yes	Yes	Yes
Montessori Morning Glory Preschool	Burlingame	No	NA	NA	Yes	Yes
United Methodist Church Co-op Nursery School	Burlingame	No	Yes	No	Yes	Yes
All Are Friends Montessori	Foster City	No	No	Yes	Yes	Yes
Holy Family Children's Center	Half Moon Bay	No	Yes	No	Yes	Yes
Circle of Friends	Menlo Park	No	Yes	No	Yes	Yes
Footsteps Preschool	Menlo Park	No	Yes	No	Yes	Yes
University Heights Montessori	Menlo Park	No	Yes	No	Yes	Yes
Happy Harte Preschool & Child Care	Montara	No	No	Yes	Yes	Yes
Montessori Community School	Redwood City	No	No	Yes	Yes	Yes
Sequoia Preschool	Redwood City	Yes	Yes	No	Yes	Yes
St. Matthias Pre-School	Redwood City	Yes	Yes	No	Yes	Yes
St. Andrew's Pre-School & Daycare	San Bruno	Yes	No	Yes	Yes	Yes
The Children's Place	San Carlos	Yes	No	Yes	Yes	Yes
The Wonder Years	San Carlos	No	Yes	No	Yes	Yes
Hope Lutheran Preschool	San Mateo	No	Yes	No	Yes	Yes
Peninsual Temple Beth-El Preschool	San Mateo	Yes	Yes	No	Yes	Yes
San Mateo Montessori	San Mateo	No	Yes	No	Yes	Yes
Serendipity School	San Mateo	No	No	No	Yes	Yes
Tulane Montessori	San Mateo	Yes	Yes	No	Yes	Yes
Building Kidz	South San Fran	No	No	Yes	Yes	Yes
Hillside Nursery School	South San Fran	Yes	No	Yes	Yes	Yes

These schools are peanut and nut-free by policy. Their approach to food allergies to other foods may be assessed by how they answered other questions in the survey:

School	**City**	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**
Kirkhouse Preschool	Menlo Park	Yes	Yes	Yes	Yes	Yes
Happy Harte Preschool	Montara	No	No	Yes	Yes	Yes
Bridge Point Academy	San Mateo	Yes	Yes	Yes	Yes	Yes
Little Wonders	San Mateo	Yes	Yes	Yes	Yes	No
West Hillsborough Preschool	San Mateo	No	Yes	Yes	Yes	Yes

The questionnaire asked about episodes of anaphylaxis occurring at school in the past three years. Of fifty-eight schools that returned questionnaires 2/3 reported having children with anaphylaxis to a food in the classroom. This rate was the same for schools with or without a written policy for anaphylaxis to food at school. There were about forty-two events during this period. Two were considered near fatal by the person completing the survey. Epinephrine was used in one of these two instances. Half of these episodes occurred at schools without a written policy regarding food anaphylaxis but all occurred at schools that now have trained personnel.

PREPARING THE FOOD ALLERGIC CHILD FOR SCHOOL & THE SCHOOL FOR YOUR CHILD

1. Know your school's policies and experience with food allergy and anaphylaxis.
2. If your child's school is not listed in the survey use the survey questions in this pamphlet to perform your own assessment.
3. With the assistance of your allergist or pediatrician prepare a Food Allergy Treatment Plan for your child. Make copies of the plan for all concerned and review it with school personnel.
4. Periodically review with your child the details of their food allergy including precautions about sharing food with other children and telling school personnel about symptoms of anaphylaxis when they occur.
5. Have your child wear a medical alert bracelet or necklace.
6. Make certain that all school personnel are trained in the use of your child's epinephrine autoinjector. Training devices and video are readily available.
7. Make certain that the school always has two unexpired epinephrine autoinjectors labeled for your child.
8. Make certain that the school has an oral antihistamine for your child.
9. Be an advocate for children with food allergy or anaphylaxis. Be available to answer questions and provide information to school personnel and other parents.
10. When anaphylaxis occurs at school, gather the facts then review the episode in its entirety with school personnel. Such an event can be a great learning experience for all those involved decreasing the likelihood of a repeat episode.

SUMMARY

Food allergy and anaphylaxis to foods affects about one in thirty young children. For reasons not yet clear the rate of food allergy is increasing. So the presence of children at daycare, preschool and nursery school with food allergies, even life-threatening food allergies is becoming more commonplace. Parents should expect school personnel at every grade level to be prepared for emergencies and to recognize and treat them competently when they occur. Although anaphylaxis to foods and insect stings will occur at school, such accidents need not end tragically. The best approach to minimize the risk begins with an avoidance policy that all parents and educators understand and follow. When an episode of anaphylaxis occurs adults in charge must quickly assess the situation, begin life-saving treatment by administering epinephrine, and promptly summon emergency medical assistance through the 911 system.

RESOURCES

The Food Allergy & Anaphylaxis Network (www.foodallergy.org) is a nonprofit organization founded by concerned parents of children with anaphylaxis to foods and dedicated to increasing understanding of food allergies. This is a great resource for **Food Allergy Treatment Plans** (http://www.foodallergy.org/actionplan.pdf), information about trace contamination of food products by food allergens, recipes, teaching ideas, support, and lots of good advice.

Kid with Food Allergies (www.kidswithfoodallergies.org) is another nonprofit website with lots of information for children with food allergies and their parents.

The American Academy of Allergy, Asthma & Immunology (www.aaaai.org) has excellent information for patients. Choose the "Patients & Consumers" tab at the top left of the lower blue bar. Then choose "Diseases 101" and AAAAI Tips Brochures

The American College of Allergy, Asthma & Immunology (www.acaai.org) has online information about food allergies. From the homepage choose "Patient Education".

EpiPen and EpiPen Jr autoinjector information can be found at www.epipen.com. The website includes a video in both English and Spanish versions on how to use the EpiPen autoinjector. Their "Center for Anaphylactic Support" provides a free reminder program that informs you when to refill your expired EpiPen or EpiPen Jr.

Twinject autoinjector information can be obtained at www.twinject.com. This website also includes video about how to use the Twinject autoinjector.

Medical Alert bracelets with panache can be found at Lauren's Hope (www.laurenshope.com/allergy-bracelets-for-children.asp) and at Creative Medical ID (www.creativemedicalid.com).

www.beyondapeanut.com

ANAPHYLAXIS READINESS SURVEY

Name of School	
Address	
City	
Telephone Number	
FAX Number	
Grades Attending (circle)	Infants Toddlers pre-K K-3 4-6 7-8 9-12
Person completing survey	
Position	
Email	
Website	

1. Do any children attending your school have life-threatening food allergies (known as anaphylaxis)?	Yes	No
2. **(Q1)** Does your school have a written policy concerning students with food allergies?	Yes	No
3. **(Q2)** Are all parents, including those whose children who do not have food allergies, informed about the presence in the classroom of children with food allergies?	Yes	No
4. **(Q3)** Are all parents requested to not bring snacks to be shared at school (such as birthday cake or cupcakes) containing ingredients to which other children are allergic?	Yes	No
5. **(Q4)** Are school staff members trained in the recognition of students experiencing life-endangering reactions due to food allergies or bee stings?	Yes	No
6. **(Q5)** Are any staff members trained in administering epinephrine auto-injector (EpiPen Junior, EpiPen, Twinject) to students experiencing a life-threatening allergic reaction?	Yes	No
7. Which staff members are trained in administering epinephrine auto-injector? (*circle all that apply*)	Teachers Classroom aides Nurse Office personnel Principal or Director	
8. How many allergic reactions to foods have occurred at your school in the past 3 years? (*Include hives, wheezing, and vomiting due to allergy as well as life-threatening anaphylaxis*)		
9. How many life-threatening reactions to food or insect stings have occurred at your school in the past 3 years?		
10. In how many of these episodes was an epinephrine auto-injector administered?		