

DATA HEALTH BRIEF: EPINEPHRINE ADMINISTRATION IN SCHOOLS
Massachusetts Department of Public Health
Bureau of Community Health Access and Promotion
School Health Unit
August 1, 2011 – July 31, 2012 (School Year 2011 – 2012)

This annual data health brief documents the epidemiology of epinephrine administration for the treatment of life threatening allergic reactions or anaphylaxis in Massachusetts schools. The American Academy of Allergy, Asthma and Immunology defines anaphylaxis as a collection of symptoms affecting multiple systems in the body. Common signs and symptoms may be a combination of hives, swelling (of any body parts), stomach cramps, throat tightness or closing, difficulty breathing, faintness or loss of consciousness and others. The most dangerous symptoms include breathing difficulties and a drop in blood pressure or shock, which are potentially fatal. Common examples of potentially life-threatening allergies are those to food, stinging insects, medications, latex, environmental, and others. Reactions to those allergens may be mild, moderate, or severe. Epinephrine (adrenalin) is the first drug that should be used in the emergency management of an individual having a potentially life-threatening allergic reaction. It is recommended that epinephrine be given at the start of any reaction occurring in conjunction with exposure to a known or suspected allergen.¹

After administering epinephrine, all Massachusetts schools are required to complete a standard form, *Report of EpiPen[®] Administration*, and submit it to the Massachusetts Department of Public Health (MDPH), School Health Unit. Reporting of epinephrine administration in all public and nonpublic schools became mandatory in November 2003 under 105 CMR 210.000, the Regulations Governing the Administration of Prescription Medications in Public and Private Schools.

¹ Position Statement: Anaphylaxis in schools and other child-care settings, American Academy of Allergy, Asthma and Immunology, J Allergy Clinical Immunology 1998; Vol.102, No. 2, 173-175.

This annual data report demonstrates findings consistent with previous reports:

- **The majority of the epinephrine administrations were administered by school nurses (81%) which is similar to prior school year reports (2010-2011: 86%, 2009-2010: 92%, 2008-2009: 89%).**
- **The numbers of individuals who had a life threatening anaphylactic event without a previous allergy history remains high (18%). Again this is similar to prior years. Since 2009, the number of individuals who had a life threatening anaphylactic event without a previous allergy history has been between 15% and 25%.**

During the 2011-2012 school year, schools in 106 school districts reported 214 administrations of epinephrine for the treatment of allergic reactions in schools.

- All six regions of the state reported epinephrine administration (Table 1). The epinephrine administration rate ranged from 16 per 100,000 (Boston) to 26 per 100,000 students (MetroWest).

Table 1. Epinephrine Administration Rates by Region

Massachusetts Region	Administrations Per 100,000 School Children
Western Mass.	26
Central Mass.	21
Northeast	23
MetroWest	25
Southeast	17
Boston	16
STATE TOTAL	22

- While most school districts reported only one administration of epinephrine, 42 school districts reported more than one. Six school districts reported five or more epinephrine administrations during the school year.
- Over the past 4 years, the percentage of individuals with no known allergies who were administered epinephrine ranged from 15% to 25% (Table 2).

Table 2. Percentage of Individuals With No Known Allergies That Were Administered Epinephrine in School (2009-2012)

School Year	Number of Epinephrine Administrations (All Individuals)	% of Individuals With No Known Allergies
SY 2009	175	22
SY 2010	225	25
SY 2011	208	15
SY 2012	214	18

Characteristics of Individuals Receiving Epinephrine

- Of the individuals receiving epinephrine, 194 (or 91%) were students; 20 (9%) were staff members. Figure 1.1 shows the age distribution of all individuals who received epinephrine.

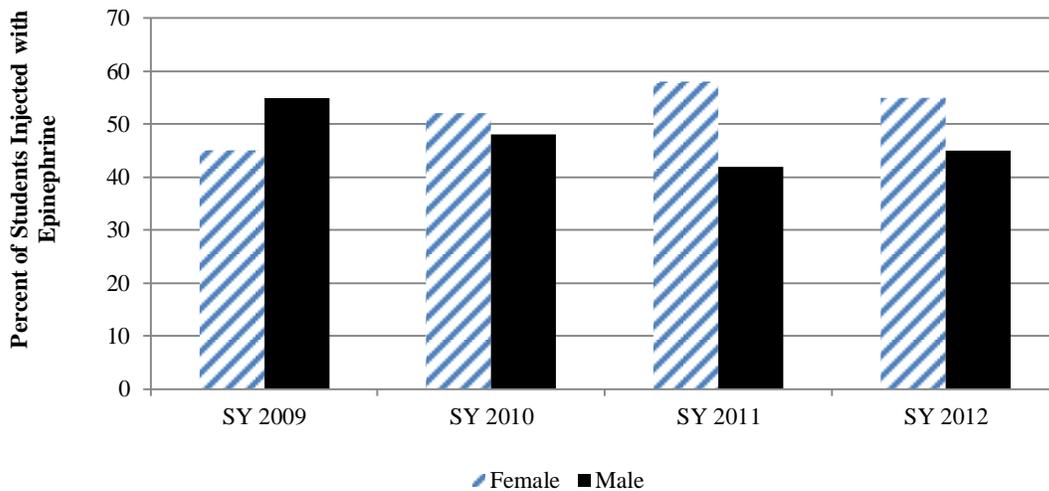
Figure 1.1 Number of Epinephrine Administrations by Age: Massachusetts, August 2011 - July 2012 (N = 210)



Data Source: Report of EpiPen® Administration forms. Age was not reported for 4 individuals

Of the 189 students who received epinephrine in the 2011-2012 school year, 55% were female and 45% male (Figure 1.2).²

Figure 1.2 Sex of Students Injected With Epinephrine: Massachusetts Schools (2009-2012)

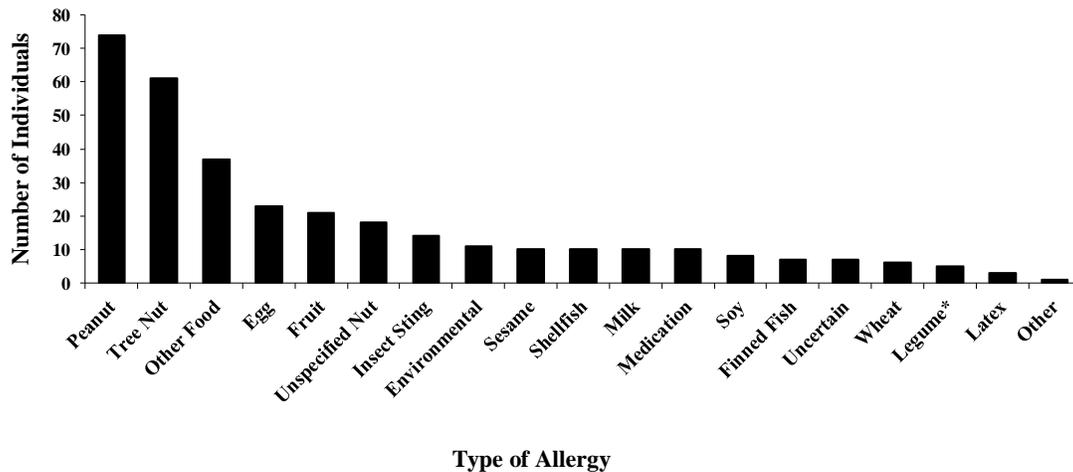


Data Source: Report of EpiPen® Administration forms. Sex was not reported for 5 individuals.

² The sex of 5 students was not reported.

- The most frequently reported allergies were peanut and nut allergies (Figure 2).

Figure 2. Types of Allergies Reported by Individuals Receiving Epinephrine in Schools: Massachusetts, August 2011 - July 2012 (N = 336)



Since those with multiple allergies reported more than one allergen, the total number of allergies reported is greater than the number of cases. * Not Soy or Peanut. Data Source: Report of EpiPen Administration forms.

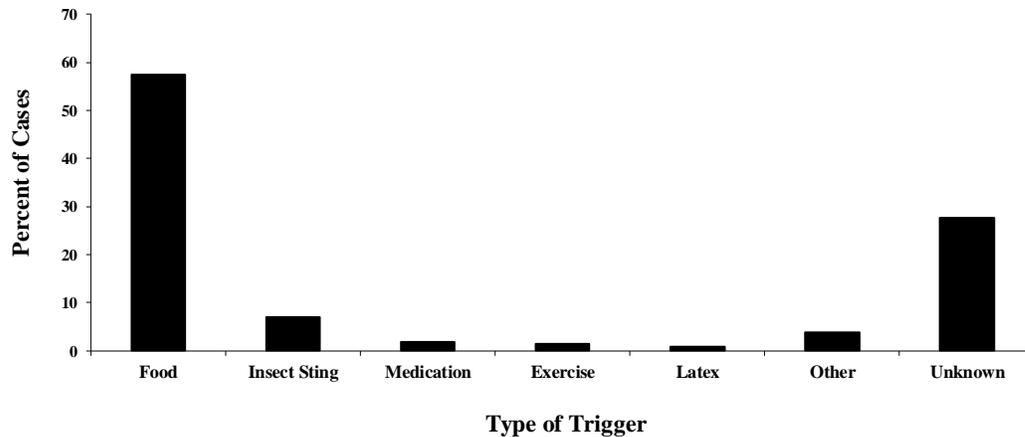
- 78 individuals receiving epinephrine (36%) reported having a history of multiple allergies.
- In 39 cases (18%), the individual receiving epinephrine was not known to have an allergic condition at the time of the anaphylactic event. For these individuals, it was a first time event.

Characteristics of Allergic Reactions

- Food was believed to be the cause of 57% of the reactions (Figure 3).
- In 28% of the events, the allergen that triggered the reaction was not identified (Figure 3).
- Reported symptoms involved multiple organ systems such as the respiratory, skin, gastrointestinal, and cardiovascular systems. In 83% of the cases, the symptoms reported involved the respiratory tract, such as tightness of the chest or throat, wheezing, shortness of breath, or swollen throat or tongue. Over one-half of the cases (71%) involved symptoms related to the skin such as hives, lip swelling, or rash. Gastrointestinal symptoms such as nausea or vomiting were reported in 43% of the cases. Cardiovascular symptoms such as tachycardia, dizziness, and chest discomfort were reported in 29% of the cases. Other symptoms, such as loss of consciousness and red eyes were reported in 26% of cases.

- Symptoms most frequently developed in the classroom (43%). Other locations included the cafeteria (21%), health office (7%), playground (8%), bus (2%), and various additional locations both inside (3%) and outside (6%) the school building. In 89% of the cases, epinephrine was administered in the health office.

Figure 3. Triggers of Allergic Reactions Reported by Individuals Receiving Epinephrine in Schools, Massachusetts, August 2011 - July 2012 (N=214)



Data Source: Report of EpiPen® Administration forms.

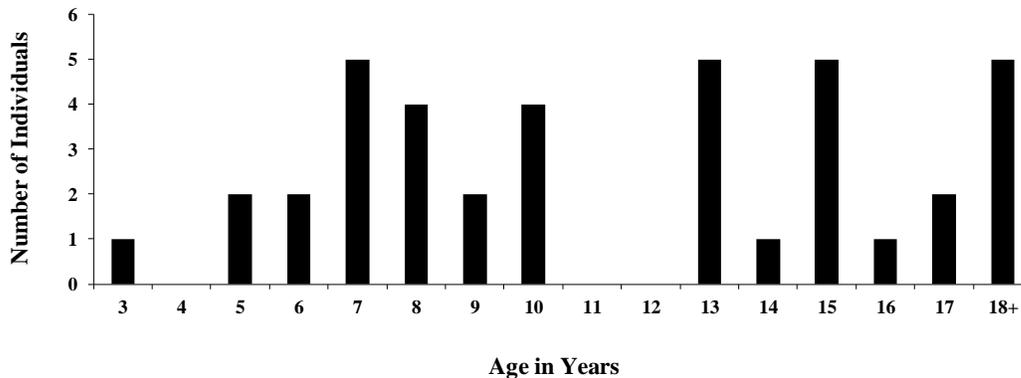
- The majority of epinephrine administrations (81%) were performed by the school registered nurse. 11 individuals (5%) received epinephrine from unlicensed personnel such as teachers, coaches, administrators and parents. Five of the 11 unlicensed personnel had been trained in the administration of epinephrine. Six of the 11 unlicensed personnel (3%) were school staff such as teachers or school administrators.
- In 9% of the cases, individuals self-administered the epinephrine (n = 20). The students who self-administered were between 9 and 17 years of age.
- After the development of symptoms, epinephrine was administered in 10 minutes or less 56% of the time (Range: 1 - 250 minutes).³ The time between development of symptoms and administration of epinephrine was unreported for 67 individuals.
- Of those students with known allergies, 57% had an individualized health care plan (IHCP) in place.
- Of those students with known allergies, 40% had also been diagnosed with asthma.
- 99.5% of administrations resulted in the individual being transported to a medical facility.

³ This includes individuals with known and unknown allergic conditions.

Characteristics of Cases Involving Individuals without a Known Allergic Condition

- In 39 cases (18%) the individual who received epinephrine did not have a known allergic condition, and in 34 of these cases the individual was a student.
- In cases involving individuals without a known allergic condition:
 - The average age of the individual was 13.5 years, with a range of 3-45 years (Figure 4).
 - After the development of symptoms, epinephrine was administered in 10 minutes or less 10% of the time (compared to 46% of the time in cases involving a known allergic condition).
 - In 67 cases, it is unknown how much time elapsed between development of symptoms and administration of epinephrine.

Figure 4. Number of Individuals with No Known Allergies Who Received Epinephrine in School, by Age, Massachusetts, August 2011 - July 2012 (N=39)



Data Source: Report of EpiPen® Administration forms

ONGOING RECOMMENDATIONS TO SCHOOLS

This report has been prepared as a performance improvement strategy to ensure high quality management of individuals with life threatening allergies in the school setting. Based on some of the findings, the following are ongoing recommendations and will be shared with all school nurses:

- Educate parents stressing the importance of sharing their children's information on known allergies with the school nurse and ensure that EpiPens[®] are available at the school.
- Ensure that all students with life threatening allergies have an individualized health care plan and a 504 plan to ensure appropriate accommodations to prevent exposure to known allergens.
- Recommend that school staff share any information on their own life threatening allergies with the school nurse to ensure a prompt emergency response should an unintended exposure occur.
- Ensure that all individuals who have experienced a life threatening allergic event are transported via an emergency medical vehicle to an emergency care facility. This requires education of the parents/guardians, all school staff and emergency medical personnel about the potential for a repeat of the symptoms or a biphasic reaction.⁴
- Ensure that school policy and individual health care plans follow the American Academy of Allergy, Asthma and Immunology position statement that epinephrine is the first drug that should be used in the emergency management of a child having a potentially life threatening allergic reaction.⁵
- Continue to ensure "stock" EpiPens[®] are available in the school to administer to those individuals who have no previous history of allergies.
- Be aware that individuals that have a history of asthma are at greater risk of having a life-threatening allergic reaction.
- Implement the Massachusetts guidelines, *Managing Life Threatening Food Allergies in Schools*. www.doe.mass.edu/cnp/allergy.pdf

⁴ Biphasic reaction or secondary response is a recurrence of symptoms within 72 hours with no further exposure however a continued presence of antigens in the body.

⁵ Position Statement: Anaphylaxis in schools and other child-care settings, American Academy of Allergy, Asthma and Immunology, J Allergy Clinical Immunology 1998; Vol.102, No. 2, 173-175.