

Medical Management of Vaccine Reactions in Children and Teens in a Community Setting

The table below describes steps to take if an adverse reaction occurs following vaccination.

Administering any medication, including vaccines, has the potential to cause an adverse reaction. To minimize the likelihood of an adverse event, screen patients for vaccine contraindications and precautions prior to vaccination (see “Screening Checklist for Contraindications to Vaccines for Children and Teens” at www.immunize.org/catg.d/p4060.pdf). When adverse reactions do

occur, they can vary from minor (e.g., soreness, itching) to the rare and serious (e.g., anaphylaxis). Be prepared.

Vaccine providers should know how to recognize allergic reactions, including anaphylaxis. Have a plan in place and supplies available to provide appropriate medical care should such an event occur.

REACTION	SIGNS AND SYMPTOMS	MANAGEMENT
Localized	Soreness, redness, itching, or swelling at the injection site	Apply a cold compress to the injection site. Consider giving an analgesic (pain reliever) or antipruritic (anti-itch) medication.
	Slight bleeding	Apply pressure and an adhesive compress over the injection site.
	Continuous bleeding	Place thick layer of gauze pads over site and maintain direct and firm pressure; raise the bleeding injection site (e.g., arm) above the level of the patient’s heart.
Psychological fright and syncope (fainting)	Fright before injection is given	Have patient sit or lie down for the vaccination.
	Paleness, sweating, coldness of the hands and feet, nausea, light-headedness, dizziness, weakness, or visual disturbances	Have patient lie flat. Loosen any tight clothing and maintain open airway. Apply cool, damp cloth to patient’s face and neck. Keep them under close observation until full recovery.
	Fall, without loss of consciousness	Examine the patient to determine if injury is present before attempting to move the patient. Place patient flat on back with feet elevated.
	Loss of consciousness	Check to determine if injury is present before attempting to move the patient. Place patient flat on back with feet elevated. Call 911 if patient does not recover immediately.
Anaphylaxis	Skin and mucosal symptoms such as generalized hives, itching, or flushing; swelling of lips, face, throat, or eyes. Respiratory symptoms such as nasal congestion, change in voice, sensation of throat closing, stridor, shortness of breath, wheeze, or cough. Gastrointestinal symptoms such as nausea, vomiting, diarrhea, cramping abdominal pain. Cardiovascular symptoms such as collapse, dizziness, tachycardia, hypotension.	See the emergency medical protocol on the next page for detailed steps to follow in treating anaphylaxis.

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Technical content reviewed by the Centers for Disease Control and Prevention

Suggested Medications for Managing Anaphylaxis in a Community Immunization Clinic Setting

FIRST-LINE medication

- Epinephrine** 1.0 mg/mL aqueous solution (1:1000 dilution) in prefilled autoinjector or prefilled syringe (various doses), prepackaged syringes, vials, or ampules. At least three epinephrine doses should be available on site, dosages as appropriate for patient population.

OPTIONAL medications: H₁ antihistamines

These relieve itching and hives only; they DO NOT relieve upper or lower airway obstruction, hypotension, or shock.

- Diphenhydramine** (e.g., Benadryl) oral, 12.5 mg/5 mL liquid; 25 or 50 mg tablets
- Hydroxyzine** (e.g., Atarax, Vistaril) oral, 10 mg/5 mL liquid, 10 mg or 25 mg tablets

Additional emergency supplies you may need

- Syringes (1 and 3 cc) and needles (22 and 25 g, 1", 1½", and 2") if needed for epinephrine
- Alcohol wipes
- Tourniquet
Applied on the extremity above the injection site to slow systemic absorption of antigen and anaphylactic mediators
- Stethoscope
- Blood pressure measuring device with multiple-sized cuffs depending on patient population
- Tongue depressors
- Light with extra batteries (for examination of the mouth and throat)
- A timing device, such as wristwatch, for checking pulse
- Cell phone or access to onsite phone

For remote areas without EMS support

- Pediatric- and adult-sized airways (various sizes)
- Various-sized pocket masks with one-way valve
- Oxygen (if available)

REFERENCES

*American Academy of Pediatrics. *Red Book: 2018–2021 Report of the Committee on Infectious Diseases*. 31st edition, p. 64–67.

Campbell RL, Kelso JM. Anaphylaxis: Emergency treatment. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA. November 2018.

Kroger AT, Duchin J, Vazquez M. General Best Practice Guidelines for Immunization. Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP) at www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html

Emergency medical protocol for management of anaphylactic reactions in children and teens in a community setting

1 If itching and swelling are confined to the injection site where the vaccination was given, observe patient closely for the development of generalized symptoms.

2 If symptoms are generalized, activate the emergency medical system (EMS; e.g., call 911) and notify the patient's physician. This should be done by a second person, while the primary healthcare professional assesses the airway, breathing, circulation, and level of consciousness of the patient. Vital signs should be monitored continuously.

3 DRUG DOSING INFORMATION: The first-line and most important therapy in anaphylaxis is epinephrine. There are NO absolute contraindications to epinephrine in the setting of anaphylaxis.

a First-line treatment: EPINEPHRINE is the first-line treatment for anaphylaxis, and there is no known equivalent substitute. Use epinephrine in a 1.0 mg/mL aqueous solution (1:1000 dilution). See page 3 to determine correct dose to be used based on child's weight. If using an autoinjector or pre-filled syringe, administer a dose of 0.1 mg, 0.15 mg, or 0.3 mg IM (as appropriate for the patient's weight) into the anterolateral thigh. If using another epinephrine format, the recommended dose is 0.01 mg/kg per dose, up to a maximum single dose of 0.5 mg. Administer IM, preferably in the anterolateral thigh. Epinephrine dose may be repeated every 5–15 minutes (or sooner as needed) while waiting for EMS to arrive.

b Optional treatment: H₁ ANTIHISTAMINES relieve itching and urticaria (hives). These medications DO NOT relieve upper or lower airway obstruction, hypotension, or shock. Consider giving **diphenhydramine** (e.g., Benadryl) or **hydroxyzine** (e.g., Atarax, Vistaril) for relief of itching or hives.

- Administer **diphenhydramine** orally, standard dose of 1–2 mg/kg every 4–6 hours. Maximum single dose is 40 mg for children age <12 years; for children age ≥12 years, 100 mg. See dosing chart on page 3.*
- Administer **hydroxyzine** orally; the standard dose is 0.5–1 mg/kg/dose, up to 50–100 mg maximum per day in children and adolescents. See dosing chart on page 3.

4 Monitor the patient closely until EMS arrives. Perform cardiopulmonary resuscitation (CPR), if necessary, and maintain airway. Keep patient in recumbent position (flat on back) unless he or she is having breathing difficulty. If breathing is difficult, patient's head may be elevated, provided blood pressure is adequate to prevent loss of consciousness. If blood pressure is low, elevate legs. Monitor blood pressure and pulse every 5 minutes.

5 Record the patient's reaction (e.g., hives, anaphylaxis) to the vaccine, all vital signs, medications administered to the patient, including the time, dosage, response, and the name of the medical personnel who administered the medication, and other relevant clinical information.

6 Notify the patient's primary care physician.

7 Report the incident to the Vaccine Adverse Event Reporting System (VAERS) at www.vaers.hhs.gov.

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For your convenience, approximate dosages based on weight and age are provided in the following charts. Please confirm that you are administering the correct dose for your patient.

First-Line Treatment: Epinephrine				Epinephrine Dose		
	Age group	Range of weight (lb)	Range of weight (kg)*	1.0 mg/mL aqueous solution (1:1000 dilution); intramuscular. Minimum dose: 0.05 mL	Epinephrine autoinjector or prefilled syringe (0.1 mg, 0.15 mg, 0.3 mg)	
Recommended dose is 0.01 mg/kg body weight up to 0.5 mg maximum dose. May be repeated every 5–15 minutes (or sooner) up to 3 times while waiting for EMS to arrive.	Infants and children	1–6 months	9–19 lb	4–8.5 kg	0.05 mL (or mg)	off label
		7–36 months	20–32 lb†	9–14.5 kg†	0.1 mL (or mg)	0.1 mg†
		37–59 months	33–39 lb	15–17.5 kg	0.15 mL (or mg)	0.15 mg/dose
		5–7 years	40–56 lb	18–25.5 kg	0.2–0.25 mL (or mg)	0.15 mg/dose
		8–10 years	57–76 lb	26–34.5 kg	0.25–0.3 mL (or mg)	0.15 mg or 0.3 mg/dose
Teens	11–12 years	77–99 lb	35–45 kg	0.35–0.4 mL (or mg)	0.3 mg/dose	
	13 years & older	100+ lb	46+ kg	0.5 mL (or mg) – max. dose	0.3 mg/dose	

NOTE: If body weight is known, then dosing by weight is preferred. If weight is not known or not readily available, dosing by age is appropriate.

* Rounded weight at the 50th percentile for each age range

† 0.1 mg autoinjector is licensed for use in 7.5 to 14 kg infants and children

Optional Treatment: Diphenhydramine				Diphenhydramine dose calculations based on 1 mg/kg†	
	Age group	Range of weight (lb)	Range of weight (kg)*	Liquid: 12.5 mg/5 mL	Tablets: 25 mg or 50 mg
commonly known as Benadryl Recommended dose is 1–2 mg/kg body weight every 4–6 hrs†	Infants and children	7–36 months	20–32 lb	9–14.5 kg	10–15 mg/dose †
		37–59 months	33–39 lb	15–17.5 kg	15–20 mg/dose †
		5–7 years	40–56 lb	18–25.5 kg	20–25 mg/dose †
		8–12 years	57–99 lb	26–45 kg	25–50 mg/dose †
	Teens	13 years & older	100+ lb	46+ kg	50 mg/dose (up to 50 mg or 100 mg single dose) †

NOTE: If body weight is known, then dosing by weight is preferred. If weight is not known or not readily available, dosing by age is appropriate.

* Rounded weight at the 50th percentile for each age range

† AAP. Red Book: 2018–2021, 31st ed. (p. 66). Diphenhydramine maximum single dose for children younger than age 12 years is 40 mg, for children age 12 years and older, 100 mg.

Optional Treatment: Hydroxyzine				Hydroxyzine dose calculations based on 0.5 mg/kg	
	Age group	Range of weight (lb)	Range of weight (kg)*	Liquid: 10 mg/5 mL	Tablets: 10 mg or 25 mg
commonly known as Atarax, Vistaril Recommended oral dose is 0.5–1 mg/kg body weight every 4–6 hrs†	Infants and children	7–36 months	20–32 lb	9–14.5 kg	5–7.5 mg/dose
		37–59 months	33–39 lb	15–17.5 kg	7.5–10 mg/dose
		5–7 years	40–56 lb	18–25.5 kg	10–12.5 mg/dose
		8–10 years	57–76 lb	26–34.5 kg	12.5–15 mg/dose
	Teens	11–12 years	77–99 lb	35–45 kg	15–25 mg/dose
13 years & older		100+ lb	46+ kg	25 mg/dose (50–100 mg, maximum per day)	

NOTE: If body weight is known, then dosing by weight is preferred. If weight is not known or not readily available, dosing by age is appropriate.

* Rounded weight at the 50th percentile for each age range

This policy and procedure shall remain in effect for all patients of the name of practice _____ effective _____ until rescinded or until _____	Medical Director _____ PRINT NAME _____ SIGNATURE _____ DATE
NAME OF PRACTICE OR CLINIC DATE	DATE