

PROTOCOL AND PROCEDURES FOR ALLERGIC REACTIONS, INCLUDING ACUTE ANAPHYLAXIS IN ADULTS, INFANTS AND CHILDREN

DEFINITIONS

Allergic reactions **that are potentially** life-threatening (anaphylactic) reactions, after exposure to an antigen which has been injected, ingested or inhaled.

Reactions range from mild, self-limited symptoms to rapid death:

1. Mild to moderate allergic reactions involve signs and symptoms of the gastrointestinal tract and skin. Observing the client for rapid increase in severity of signs and symptoms is important, as the sequence of itching, cough, dyspnea and cardiopulmonary arrest can lead quickly to death.
2. Severe/anaphylactic reactions involve signs and symptoms of the respiratory and/or cardiovascular systems. These may initially appear minor (i.e., coughing, **hoarseness, dizziness, mild wheeze**) but any involvement of the respiratory tract or circulatory system has the potential to rapidly become severe. Death can occur within minutes. Therefore, prompt and effective treatment is mandatory if the client's life is to be saved.

ETIOLOGY

Agents commonly associated with allergic reactions/anaphylaxis, include:

1. Antibiotics (especially penicillin).
2. Biologicals (non-human sera, gamma globulin, vaccines, blood and blood products).
3. Local anesthetics.
4. Hymenoptera stings (bee, yellow jacket, wasp, hornet, fire ants).
5. Allergy extracts (skin-testing and treatment solutions).
6. Foods (especially eggs, nuts and shellfish).
7. Intravenous narcotics (heroin).
8. Alternative medicines (e.g., herbal or home remedies).
9. Environmental agents (e.g., pollens, grasses, molds, smoke, animal dander).

**SUBJECTIVE &
OBJECTIVE**

1. In 1-15 minutes clients may develop:
 - a. Apprehension.
 - b. Flushing and/or skin edema.
 - c. Palpitations.
 - d. Numbness and tingling.
 - e. Itching.
 - f. Localized or generalized urticaria (rash, welts).
 - g. Choking sensation. (Indicates laryngeal edema which may precipitate closure of the airway.)
 - h. Coughing and wheezing.
 - i. Difficulty breathing.
 - j. Nausea and vomiting.
 - k. Dizziness and fainting.

2. **Severe respiratory compromise or shock** may develop **rapidly** with severe hypotension and vasomotor collapse.

ASSESSMENT

Allergic reaction, severe (any respiratory or circulatory signs/symptoms; anaphylaxis) to mild or moderate

PLAN

THERAPEUTIC

1. **Mild (minor) or Moderate Reactions (absolutely no respiratory or circulatory signs)**
Step 1 Diphenhydramine PO or IM
NOTE: Children younger than 2 years of age should receive diphenhydramine only under the direction of a physician.

For itching, redness, welts/hives without respiratory or circulatory signs **or gastrointestinal symptoms of cramplike pain with nausea, vomiting or diarrhea.**

Diphenhydramine Oral Dosing

12.5 mg/5 mL elixir/solution,

OR

25 mg or 50 mg capsules

Child **older than 2 years of age:** 1.25 mg/kg/dose (max 50mg) PO STAT

Adult: 50 mg to 100 mg PO STAT

Diphenhydramine IM Dosing

1 mg/kg body weight, up to 100 mg

Diphenhydramine Oral Dosing Chart, Elixir/Solution (12.5 mg/5 mL)			
Weight (kg)	Diphenhydramine Oral Elixir/Solution Dose (mL)	Weight (kg)	Diphenhydramine Oral Elixir/Solution Dose (mL)
9	4.5 mL	25	12.5 mL
10	5 mL	26	13 mL
11	5.5 mL	27	13.5 mL
12	6 mL	28	14 mL
13	6.5 mL	29	14.5 mL
14	7 mL	30	15 mL
15	7.5 mL	31	15.5 mL
16	8 mL	32	16 mL
17	8.5 mL	33	16.5 mL
18	9 mL	34	17 mL
19	9.5 mL	35	17.5 mL
20	10 mL	36	18 mL
21	10.5 mL	37	18.5 mL
22	11 mL	38	19 mL
23	11.5 mL	39	19.5 mL
24	12 mL	40	20 mL

OR

Diphenhydramine IM Dosing (Dosing by body weight is preferred.) (The standard dose is 1 mg/kg body weight, up to 100 mg)	
Weight* lbs (kg)	Diphenhydramine Dose (Injection: 50 mg/mL)
24-37 (11-17)	15 mg / 0.3 mL
37-51 (17-23)	20 mg / 0.4 mL
51-77 (23-35)	30 mg / 0.6 mL
77-99 (35-45)	40 mg / 0.8 mL
>99 (>45)	50 to 100 mg / 1 – 2 mL

- Step 2** **Complete Allergic Reaction Record**
- Step 3** **Observe for 60 minutes**
- Step 4** **If any respiratory or circulatory signs develop, proceed to 2. below (Severe Reactions)**
- Step 5** **If, after 60 minutes, the client's symptoms are still limited to the skin and the client is comfortable, then:**
 - a. **Tell client to take diphenhydramine every 6 hours as long as any signs/symptoms are present.**
 - b. **Inform the client that he/she has an apparent allergy to the causative agent and advise that this information should be provided to all healthcare givers in the future.**

- c. **If the causative agent was a medication being dispensed for additional use at home, then this plan should be reconsidered and an alternative medication should be used that is in a different chemical family which is not regarded as having “cross-reactivity” with the causative agent.**

NOTE: Skin reactions that are “extensive,” but absolutely confined to the skin, do not qualify as “severe” allergic reactions; however, if tongue swelling is involved, this does represent an anaphylactic reaction – if present, proceed to 2. below. Severe lip swelling (huge, bordering on grotesque) may indicate additional swelling in the oropharynx – if present, proceed to 2. below.

2. **Severe Reactions (remember, severity is defined by the presence of any respiratory or circulatory signs/symptoms, e.g., wheezing, laryngeal edema [stridor], hypotension, whether these be mild, moderate or severe in themselves, OR tongue swelling or severe lip swelling).**

- Step 1 Call for HELP
- a. Have someone call EMS/911 and/or the physician.
 - b. Assign one person to keep the anaphylaxis record and be the timekeeper.
 - c. Do not leave the client unattended!
- Step 2 If the client received an immunization, apply a tourniquet above the injection site, if possible, to reduce systemic absorption of the antigen.
- Step 3 Procedures
- a. Place patient in supine POSITION, legs elevated.
 - b. Assure OPEN AIRWAY and begin CPR if indicated.
 - c. Begin monitoring VITAL SIGNS with BP every 5 minutes.
 - d. Help to maintain position of comfort (sitting if wheezing; supine with legs elevated if light-headed or in shock).
 - e. Oxygen at 4-6L/minute by nasal cannula, face mask
OR
blow-by, if indicated and available.
 - f. Monitor with pulse-oximeter, if available.

Step 4**Administer epinephrine**

NOTE: Administer into thigh (more effective at achieving peak blood levels than into deltoid area).

Epinephrine IM Dosing	
(Dosing by body weight is preferred; the standard dose is 0.01 mg/kg body weight [including for low birth weight babies], up to 0.5 mg.)	
Weight* lbs (kg)	Epinephrine IM Dose (1mg/ml=1:1,000 wt/volume)
<9 (<4)	Weigh baby and calculate appropriate dose
9-15 (4-7)	0.05 mg/0.05 mL
15-24 (7-11)	0.10 mg/0.10 mL
24-31 (11-14)	0.13 mg/0.13 mL
31-37 (14-17)	0.16 mg/0.16 mL
37-42 (17-19)	0.18 mg/0.18 mL
42-51 (19-23)	0.20 mg/0.20 mL
51-77 (23-35)	0.30 mg/0.30 mL
77-99 (35-45)	0.40 mg/0.40 mL
>99 (>45)	0.50 mg/0.50 mL
May repeat every 15-20 minutes PRN for a total of 3 doses (≤1.5 mL [1.5 mg] total)	

Step 5

Give corticosteroid (methylprednisolone) to decrease the incidence and severity of delayed reactions. Corticosteroids may not influence the acute course of the reaction; therefore, they have a lower priority than epinephrine.

Methylprednisolone Sodium Succinate IM Dosing	
(Dosing by body weight is preferred.)	
(The loading dose is 2 mg/kg/dose, then 1mg/kg body weight every 6 hours for up to 5 days)	
Weight* lbs (kg)	Methylprednisolone Sodium Succinate Loading Dose (Injection: 125mg/2mL)
<9 (<4)	Weigh baby and calculate appropriate dose
9-15 (4-7)	14 mg / 0.22 mL*
15-24 (7-11)	22 mg / 0.35mL*
24-37 (11-17)	34 mg / 0.54 mL*
37-51 (17-23)	46mg / 0.74 mL*
51-77 (23-35)	70 mg / 1.12 mL*
77-99 (35-45)	90 mg / 1.44 mL*
>99 (>45)	Weigh and calculate appropriate dose
* based on maximum weight in category	

Step 6

Assure that the Allergic Reaction/Anaphylaxis Record (see pp. 14.11-14.12) has been completed and a copy given to EMS personnel before they transport the client.

CLIENT EDUCATION/COUNSELING

When a client is given an agent (e.g., antibiotic or vaccine) capable of inducing anaphylaxis, he/she should be advised or encouraged to remain in the clinic for at least 30 minutes.

REFERRAL

1. Immediately refer clients with wheezing, laryngeal edema, hypotension, shock or cardiovascular collapse.
2. Refer to primary care provider for further evaluation those clients with itching, redness welts/hives.

FOLLOW-UP

1. Place an allergy label on the front cover of the client's medical record.
2. Educate the client/caretaker about medical alert bracelets **for anaphylactic reactions**.
3. If the allergic reaction is immunization-induced, complete a vaccine adverse event record (VAERS).

ALLERGIC REACTION / ANAPHYLAXIS RECORD – page 1

District/Clinic Site _____ Date _____

Client Demographic Information:

Name: _____

DOB ____/____/____ AGE _____ months / years

Estimated/Actual Weight (please circle one) Infant / Child / Adult ____ lbs/kg

Event which preceded reaction:

- Immunization
- Medication administered
- Biologicals administered
- Other: (please explain) _____

TIME OF REACTION: _____ AM / PM

TIME EMS CALLED: _____ AM / PM

Signs and Symptoms: (please check)

- | | |
|--|--|
| <input type="checkbox"/> Apprehension | <input type="checkbox"/> Choking sensation |
| <input type="checkbox"/> Flushing and/or skin edema | <input type="checkbox"/> Coughing/ hoarseness /wheezing |
| <input type="checkbox"/> Palpitations | <input type="checkbox"/> Difficulty breathing |
| <input type="checkbox"/> Numbness and tingling | <input type="checkbox"/> Nausea and vomiting |
| <input type="checkbox"/> Itching | <input type="checkbox"/> Severe hypotension |
| <input type="checkbox"/> Localized or generalized urticaria
(rash, welts) | <input type="checkbox"/> Vasomotor collapse |
| | <input type="checkbox"/> Loss of consciousness |

Other (e.g., dizziness): _____

OTHER OBSERVATIONS / COMMENTS: _____

SIGNATURE OF RN/APRN: _____

DISPOSITION: _____

REVIEWER: _____

NOTE: Send copies of both pages of this record with client referred to a physician's office or hospital

ALLERGIC REACTION / ANAPHYLAXIS RECORD – page 2

1. Call for HELP.
Have EMS called.
Assign timekeeper/recorder.

2. Assure AIRWAY.
Check VITAL SIGNS q 5 minutes.
CPR if necessary.

3. **FOR ITCHING, REDNESS, WELTS/HIVES OR GI SYMPTOMS:**

Diphenhydramine 12.5 mg/5 mL Elixir **OR**
Diphenhydramine 25 mg or 50 mg Capsules

CHILD at least 2 years of age
1.25 mg/kg/dose (up to 50 mg) PO, once
ADULT 50-100 mg PO, STAT

OR
Diphenhydramine 50 mg/mL (vial) IM

<u>WEIGHT</u>	<u>IM DOSE</u>
24-37 lbs (11-17 kg)	15 mg / 0.3 mL
37-51 lbs (17-23 kg)	20 mg / 0.4 mL
51-77 lbs (23-35 kg)	30 mg / 0.6 mL
77-99 lbs (35-45 kg)	40 mg / 0.8 mL
>99 lbs (>45 kg)	50 mg to 100 mg/1 -2 mL

4. **FOR RESPIRATORY/CIRCULATORY SIGNS/SYMPTOMS**

Epinephrine 1 mg/mL = 1:1,000 wt/volume (w/v)

<u>WEIGHT</u>	<u>IM DOSE</u>
< 9 lbs (< 4 kg)	Weigh/calculate dose
9-15 lbs (4-7 kg)	0.05 mg / 0.05 mL
15-24 lbs (7-11 kg)	0.10 mg / 0.10 mL
24-31 lbs (11-14 kg)	0.13 mg / 0.13 mL
31-37 lbs (14-17 kg)	0.16 mg / 0.16 mL
37-42 lbs (17-19 kg)	0.18 mg / 0.18 mL
42-51 lbs (19-23 kg)	0.20 mg / 0.20 mL
51-77 lbs (23-35 kg)	0.30 mg / 0.30 mL
77-99 lbs (35-45 kg)	0.40 mg / 0.40 mL
>99 lbs (>45 kg)	0.50 mg / 0.50 mL

May repeat every 15-20 minutes as needed, for a total of 3 doses (no more than 1.5 mL [1.5 mg] total).

AND, to decrease intensity/severity of delayed reactions

Methylprednisolone Sodium Succinate **2 mg/kg IM**
(according to dosing table on p. 14.10).

Client Name: _____

DOB: _____

VITAL SIGNS

<u>Time</u>	<u>B/P</u>	<u>Pulse</u>	<u>Resp</u>
_____	____/____	_____	____
_____	____/____	_____	____
_____	____/____	_____	____
_____	____/____	_____	____
_____	____/____	_____	____
_____	____/____	_____	____

CPR Indicated: _____ YES _____ NO

TIME CPR started: _____ AM / PM

TIME CPR ended: _____ AM / PM

Diphenhydramine
12.5 mg/5 mL (Elixir/Solution)
OR 25 mg, 50 mg (Capsules)

<u>TIME</u>	<u>ORAL DOSE</u>
_____	_____
_____	_____

Diphenhydramine 50 mg/mL vial

<u>TIME</u>	<u>IM DOSE</u>
_____	_____

Epinephrine 1:1000 w/v ampule

<u>TIME</u>	<u>DOSE</u>	<u>ROUTE</u>
_____	_____	IM
_____	_____	IM
_____	_____	IM

Methylprednisolone Sodium Succinate **IM**

<u>TIME</u>	<u>DOSE</u>	<u>ROUTE</u>
_____	_____	IM

TIME EMS ARRIVED: _____ AM/PM

REFERENCES

1. K. F. Austen, *Harrison's Principles of Internal Medicine*, 17th ed., 2008, Chapter 311, "Allergies, Anaphylaxis, and Systemic Mastocytosis," <<http://www.accessmedicine.com/content.aspx?aID=2858746>> (April 23, 2009).
2. *Lexi-Comp Online*, Lexi-Comp, Inc., 2009 <<http://online.lexi.com>> (April 22, 2009).
3. American Pharmaceutical Association, *American Hospital Formulary Service*, 2009, pp.17-20, 1389-1395.
4. Karen M. Burke, Priscilla LeMone, Elaine L. Mohn-Brown and Linda Eby, *Trauma or Critical Illness, Medical-Surgical Nursing Care*, 2nd ed., 2007, Chapter 13, "Caring for Clients Experiencing Shock," <<http://online.statref.com/document.aspx?fxid=187&docid=149>> (April 28, 2009).
5. Mark Boguniewicz, Ronina A. Covar and David M. Fleischer, *Diagnosis & Treatment: Pediatrics*, 19th ed., 2008, Chapter 36, "Allergic Disorders," <<http://www.accessmedicine.com/content.aspx?aID=3409411>> (April 23, 2009).
6. Richard S. Krause, M.D., "Anaphylaxis," *Department of Emergency Medicine, State University of New York at Buffalo School of Medicine*, <<http://www.emedicine.com/emerg/topic25.htm#target1>> (April 28, 2009).
7. Brian H. Rowe and Stuart Carr, J.E. Tintinalli, G.D. Kelen, J.S. Stapczynski, O.J. Ma and D.M. Cline, *Tintinalli's Emergency Medicine: A Comprehensive Study Guide*, 6th Edition, 2004, Chapter 34, "Anaphylaxis and Acute Allergic Reactions," <<http://www.accessmedicine.com/content.aspx?aID=588677>> (April 23, 2009). (Current)