CLINICAL GUIDELINE

Anaphylaxis

Patients ≥1 month of age

Aim: Standardize the approach to anaphylaxis and define the roles of pharmacologic treatments in the management of anaphylaxis

Children's MINNESOTA

Phase	Timing	Decision making and medication*	Tasks and Notes	Terminology

Stabilization*

0 min — Patient presents with signs and symptoms of anaphylaxis (Note 1)

Assess ABCs (Airway, Breathing, and Circulation)
Initiate oxygen if SPO2 <92%
Initiate continuous cardiorespiratory monitoring with blood pressure cycle every 5 minutes (3-lead ECG to monitor BP/HR/RR; pulse ox for O2 sats)

Give Epinephrine **IM** (Note 5 for Medication Dosing)
Do NOT give epinephrine IV, even if patient has IV access.

Monitoring/Escalation*

5min

If HYPOTENSION (Note 3)	If WHEEZING	If STRIDOR
Give fluid bolus	Give albuterol	Give racemic epinephrine

10min

Continued respiratory symptoms or hypotension	If gastrointestinal symptoms	If dermatologic symptoms
Repeat epinephrine **IM**; Consider giving a glucocorticoid steroid (Note 2)	Give famotidine	Give cetirizine or diphenhydramine; Consider famotidine

Escalation*

15min

Continued respiratory symptoms or hypotension	If on beta-blocker
Repeat epinephrine **IM**	Administer glucagon

20min — **Continued respiratory symptoms or hypotension**
Repeat epinephrine **IM**
Determine disposition and notify appropriate admitting team and hospital unit

Disposition*

25min — Start Epinephrine Drip
Admit to ICU

Phase 1: Stabilization*
-Call for assistance.
-Support ABC's
-Epinephrine should be administered first before any other medications are considered or attempted
-Assess patient for red flags for severe, prolonged, or biphasic reaction, or death (Note 2)

Phase 2a: Monitoring/Escalation*
-Patient should be placed in supine position after initial epinephrine administration
-Establish IV access if NS bolus indicated
-Steroids do not have proven benefit unless patient has severe anaphylaxis, history of asthma, or other airway concerns
-If hypotensive, place in recumbent position

Phase 2b: Escalation*
-Epinephrine **IM** should be repeated every 5 minutes and continued until anaphylaxis resolves or continuous infusion epinephrine is initiated

Phase 3: Disposition*
-Observation / Discharge vs. Admit (Note 4)
-Prep for IV drip prior to admit
-Early intubation recommended. Anticipate a difficult airway

Anaphylaxis: An allergic reaction that is rapid in onset and may cause death. Causes may be immunologic or idiopathic in origin.

Biphasic: Late phase reaction that can occur 1-72 hours after remission of initial attack

INCLUSION CRITERIA
- Signs and symptoms of anaphylaxis
- Exposure to potential allergen
- Age greater than 1 month
- May have received epinephrine prior to arrival

EXCLUSION CRITERIA
- Symptoms clearly attributed to other cause
- HemOnc anticipated reaction with specific medication-reaction guideline as outlined by the manufacturer (e.g. dinutuximab)
- Non-Anaphylaxis Iron infusion-related reaction (see separate guideline)

If at any point, the patient is no longer demonstrating symptoms of anaphylaxis, discontinue moving down the pathway and continue to monitor patient (Note 4)

Anaphylaxis: Notes

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Note 1: Signs and Symptoms of an Allergic/Anaphylactic Reaction

Must meet at least **one** of the following criteria:

1. Hypotension after exposure to known allergen;
2. Acute involvement of 2 or more of the following organ systems:
    - **Skin** changes (i.e., rash, hives, itching)
    - **Mucosal** changes (swollen lips, tongue or uvula) or difficulty swallowing or talking
    - **Respiratory** compromise (dyspnea, wheezing-bronchospasm, stridor, hypoxemia, persistent coughing)
    - **Cardiovascular** compromise (dizziness, hypotension, syncope, or signs of end-organ dysfunction)
    - **Gastrointestinal** symptoms, persistent (crampy abdominal pain, vomiting, diarrhea)

Note 2: Red Flags Indicating Higher Risk for Severe, Prolonged, and/or Biphasic Anaphylaxis or Death

- History of biphasic or delayed reaction
- Received more than one dose of epinephrine with current episode
- Non-verbal
- Difficult airway
- History of asthma or current asthma exacerbation
- Significant co-morbidities
- Delayed epinephrine administration (≥30 minutes from onset of symptoms)
- Facial or airway swelling with current episode

Note 3: Defining Hypotension

- Systolic blood pressure reading:
    - < 70 mmHg in infants (1-12 months old)
    - < 70 mmHg (+2 x age in years) in children 1-10 years old
    - < 90 mmHg in adults and children ≥10 years old
- Results in organs receiving reduced oxygen
- Symptoms include lightheadedness, dizziness, syncope

Note 4: Disposition

- Observation in ER, then discharge home
    - Observation for 2-4 hours
    - Strongly recommend education with anaphylaxis action plan (see Note 6)
    - Strongly recommend confirmed receipt of epinephrine autoinjector on hand prior to leaving ER
- Admit for observation
    - Observation for 4-24 hours
    - If history of severe, delayed, or biphasic reaction
    - Discharge with epinephrine autoinjector and education with anaphylaxis action plan (see Note 6)
- Admit to ICU
    - If severe anaphylaxis (Phase 2b + Phase 3)
    - Maintain in ICU until clinically stable, then observation for 12-24 hours
    - Discharge with epinephrine autoinjector and education with anaphylaxis action plan (see Note 6)

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Note 5: Anaphylaxis Medications and Dosing

Medication	Route Options	Dosing	Indication
EPINEPHrine* **or**	**IM**	0.01 mg/kg (max 0.5 mg)	All patients
EPINEPHrine auto-injector*	**IM**	< 7.5 kg: Contact Provider	All patients in areas that epinephrine auto-injector is utilized (i.e., Clinics)
		7.5 - 25 kg: 0.15 mg	
		≥25 kg: 0.3 mg	
EPINEPHrine Continuous Infusion	IV	0.05-0.1 mcg/kg/min, titrate to effect	Refractory anaphylaxis Consider initiating after 2-3 doses of epinephrine IM
Inhaled Medications			
Albuterol	Inhaled (Nebs or MDI)	<2 years old: 2.5 mg ≥2 years old: 5 mg	Wheezing
Racemic EPINEPHrine	Inhaled (Nebs)	0.05 mL/kg (max 0.5 mL)	Stridor

*Intranasal EPINEPHrine is not formulary/available in the inpatient or clinic setting at Children's Minnesota

Note 5, continued: Anaphylaxis Medications and Dosing

Medication	Route Options	Dosing	Indication
Corticosteroids			
DexAMETHasone	Enteral IM IV	0.6 mg/kg (max 12 mg)	Severe anaphylaxis
MethylPREDNISolone	IM IV	2 mg/kg (max 80 mg)	Severe anaphylaxis
PredniSONE/ PrednisoLONE	Enteral	2 mg/kg (max 60 mg)	Severe anaphylaxis
Miscellaneous			
Cetirizine¥	Enteral	<6 months: 1.25 mg 6-24 months: 2.5 mg 2-5 years: 5 mg >5 years: 10 mg	Itching
DiphenhydrAMINE¥	Enteral IM IV	1 mg/kg (max 50 mg)	Itching
Famotidine	Enteral IV	0.5 mg/kg (max 20 mg)	GI Symptoms (diarrhea, vomiting)
Glucagon	IV	20-30 mcg/kg (max 1 mg)	Patient on beta-blocker and refractory to epinephrine

¥Cetirizine preferred over PO diphenhydrAMINE due to longer duration of action, equivalent efficacy, and better side effect profile

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Note 6: Anaphylaxis Action Plan options based on patient's primary language

Children's Minnesota Hospital-based clinic and inpatient clinicians, please use Cerner PowerForms to create Anaphylaxis Action Plans.
For all other Children's Minnesota clinicians, follow the Star Net hyperlinks on internal guideline version on Star Net.
For all other Children's Health Network (CHN) clinics or those without access to StarNet, please contact CHN for printable Anaphylaxis Action Plans or use your clinic's EMR-based form.

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