Anaphylaxis is suspected when ONE of the following 3 criteria are fulfilled following possible allergen exposure:

Criteria 1
- Acute onset of symptoms with involvement of the skin, mucosal tissue, or both
- AND AT LEAST ONE OF THE FOLLOWING:
  - Respiratory compromise
  - Reduced BP or associated symptoms of end-organ dysfunction
  - Persistent GI symptoms, significant abdominal pain and/or significant vomiting

Criteria 2
- Two or more of the following that occur rapidly after exposure to a POSSIBLE ALLERGEN for that patient:
  - Involvement of the skin-mucosal tissue
  - Respiratory compromise
  - Reduced BP or associated symptoms
  - Persistent gastrointestinal symptoms

Criteria 3
- Reduced BP after exposure to KNOWN ALLERGEN for that patient

Inclusion Criteria
- Suspected anaphylaxis

Exclusion Criteria
- Blood transfusion reactions that are not anaphylactic
- Symptoms clearly attributable to other causes

Do clinical judgement support anaphylaxis?

STOP ALL INFUSING FEEDS, IV FLUIDS, and/or MEDICATIONS

Administer EPINEPHRINE 0.01 mg/kg IM (1 mg/mL) (max 0.5 mg) in anterolateral thigh

- Place on full cardiac monitor
- Monitor vital signs every 5 minutes
- Place patient supine if tolerated
- Avoid sudden changes in position
- Monitor vital signs every 5 minutes
- Place patient on full cardiac monitor
- If MAP < 5th percentile, place IV and administer 20mL/kg NS bolus and consider vasoactive infusion
  - MAP=40 + 1.5 (age in years); 5th percentile > 13yo: use MAP > 60
  - If bronchospasm administer albuterol per medication table

Reassess/Evaluate for risk factors:
- History of biphasic or severe reaction
- History of asthma or wheezing/current asthma exacerbation
- Progression of/or persistent symptoms
- Time from exposure to symptom onset delayed > 1 hour or unknown
- Hypotension during ED stay
- Upper airway obstruction/stridor

If the patient is positive for one of the above risk factors, consider admission or longer observation

Approved:
P&T Committee 6/15/21
Approved by PCOC 7/6/21
Anaphylaxis – Emergency Department Disposition

**Reassess/Evaluate for risk factors:**
- History of biphasic or severe reaction
- History of asthma or wheezing/current asthma exacerbation
- Progression of/or persistent symptoms
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- Hypotension during ED stay
- Upper airway obstruction/stridor

If the patient is positive for one of the above risk factors, consider admission or longer observation

**PICU Admit Criteria**
- Need for epinephrine infusion
- Persistent MAP <5%ile
  - MAP = 40 + 1.5 (age in years); 5th %ile > 13yo: use MAP > 60
- Altered mental status after 1 epinephrine dose
- > 2 doses of epinephrine administered
- Persistent cardiovascular compromise

**Inpatient Admit Criteria**
- 2 total doses of epinephrine (home ± ED)
- Biphasic reaction during ED stay
- Physician concern

**Discharge Criteria**
- Complete clinical resolution of acute symptoms
- Teaching completed:
  - Allergic avoidance/discharge video
- Parental comfort with discharge with good access to ED if symptoms recur
- Tolerating PO

**Discharge Instructions**
- Provide anaphylaxis discharge materials
- Anaphylaxis Action Plan
- Discharge with prescription for:
  - Epinephrine auto injector – Provide training
  - Other medications as needed
- Consider Allergy referral within 1 month
- Follow up with PCP within 3 days

**Enter allergy into patient profile in EPIC**
Anaphylaxis – Inpatient Pathway

**Inclusion Criteria**
Suspected anaphylaxis

**Exclusion Criteria**
- Blood transfusion reactions that are not anaphylaxis
- Symptoms clearly attributable to other causes

**Does clinical judgement by care team support anaphylaxis?**

**STOP ALL INFUSING FEEDS, IV FLUIDS, and/or MEDICATIONS**

**Anaphylaxis is suspected when ONE of the following 3 criteria are fulfilled within 2-3 hours following possible allergen exposure**

**Criteria 1**
- Acute onset of symptoms with involvement of the skin, mucosal tissue, or both
- AND AT LEAST ONE OF THE FOLLOWING:
  - Respiratory compromise
  - Reduced BP or associated symptoms of end-organ dysfunction
  - Persistent GI symptoms, significant abdominal pain and/or significant vomiting

**Criteria 2**
- Two or more of the following that occur rapidly after exposure to a POSSIBLE ALLERGEN for that patient:
  - Involvement of the skin/mucosal tissue
  - Respiratory compromise
  - Reduced BP or associated symptoms
  - Persistent gastrointestinal symptoms

**Criteria 3**
- Reduced BP after exposure to KNOWN ALLERGEN for that patient

**Does pt. meet one of the above criteria?**

**Call CODE Team**
**Administer Epinephrine IM**

- Epinephrine 0.01 mg/kg (1 mg/mL) IM (max 0.5 mg) in anterolateral thigh
- May repeat every 5-15 minutes as indicated or more frequently if severe symptoms continue
- Consider transfer to IMU/PICU after 2 doses of epinephrine
**Anaphylaxis – Inpatient Ongoing Management Pathway**

**Reassess/Evaluate for risk factors:**
- History of biphasic or severe reaction
- History of asthma or wheezing/current asthma exacerbation
- Progression of/or persistent symptoms
- Time from exposure to symptom onset delayed > 1 hour or unknown
- Hypotension during ED stay
- Upper airway obstruction/stridor

If the patient is positive for one of the above risk factors, consider admission or longer observation

- Did the patient receive epinephrine on the floor?
  - YES
    - If patient received 1 dose of epinephrine, observe on floor for 4 hours from the latest of:
      - Epinephrine administration
      - Any worsening symptoms
      - Consider calling Allergy for patients followed by Allergy or if patient has identifiable risk factors (see yellow box)

**PICU Transfer Criteria**
- Need for epinephrine infusion
- Persistent MAP <5th %ile
  - MAP = 40 + 1.5 (age in years); 5th %ile >13 yo: use MAP > 60
- Altered mental status after 1 epinephrine dose
- > 2 doses of epinephrine administered
- Persistent cardiovascular compromise

**Inpatient Criteria**
- Continue to monitor
- Continue prior medical care

**Discharge Criteria**
- Complete clinical resolution of acute symptoms
- Teaching completed:
  - Allergic avoidance/Discharge video
- Parental comfort with discharge with good access to ED if symptoms recur
- Tolerating PO

**Discharge Instructions**
- Provide anaphylaxis discharge materials
  - Anaphylaxis Action Plan
- Discharge with prescription for:
  - Epinephrine auto injector – Provide training
  - Other medications as needed
- Consider Allergy referral within 1 month
- Follow up with PCP within 3 days

**Enter allergy into patient profile in EPIC**
## MAP Table

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>MAP 5th %tile</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>1</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td>43</td>
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<tr>
<td>12</td>
<td>58</td>
</tr>
<tr>
<td>13</td>
<td>60</td>
</tr>
<tr>
<td>≥ 14</td>
<td>≥ 60</td>
</tr>
</tbody>
</table>
### Medications

**Epinephrine Dosing – Intramuscular (IM in anterolateral thigh)**

<table>
<thead>
<tr>
<th>Administration</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epinephrine IM (1 mg/mL)</td>
<td>0.01 mg/kg (max dose 0.5 mg)</td>
</tr>
</tbody>
</table>

**Epinephrine is the PRIMARY treatment for Anaphylaxis!**
All other medications are supportive. In the event of emergency, Epinephrine IM is available in the Emergency Drug Box.

<table>
<thead>
<tr>
<th>Albuterol Weight-Based Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kg</td>
</tr>
<tr>
<td>&lt; 5 kg</td>
</tr>
<tr>
<td>5-10 kg</td>
</tr>
<tr>
<td>10-20 kg</td>
</tr>
<tr>
<td>&gt;20 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vasopressor</th>
<th>Starting Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epinephrine</td>
<td>0.05 – 0.1 mcg/kg/min</td>
</tr>
<tr>
<td>Norepinephrine</td>
<td>0.05 – 0.1 mcg/kg/min</td>
</tr>
</tbody>
</table>

### Glucose Elevating Agents

<table>
<thead>
<tr>
<th>Glucagon &lt; 20 kg</th>
<th>Dose</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.5 mg</td>
<td>May repeat in 15 minutes if no response</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Glucagon ≥ 20 kg</th>
<th>Dose</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 mg</td>
<td>May repeat in 15 minutes if no response</td>
</tr>
</tbody>
</table>

### Corticosteroids

<table>
<thead>
<tr>
<th>Corticosteroids</th>
<th>Route</th>
<th>Mg/kg</th>
<th>Max Dose</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylprednisolone</td>
<td>IV</td>
<td>2 mg/kg</td>
<td>60 mg</td>
<td></td>
</tr>
<tr>
<td>Prednisolone</td>
<td>PO</td>
<td>2 mg/kg</td>
<td>60 mg</td>
<td></td>
</tr>
<tr>
<td>Prednisone</td>
<td>PO</td>
<td>2 mg/kg</td>
<td>60 mg</td>
<td></td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>PO</td>
<td>0.3 mg/kg</td>
<td>8 mg</td>
<td>Prednisone/prednisolone alternative No second dose required</td>
</tr>
</tbody>
</table>

### Antihistamines

<table>
<thead>
<tr>
<th>Antihistamines</th>
<th>Route</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphenhydramine</td>
<td>IV/PO</td>
<td>1 mg/kg (max 50 mg)</td>
</tr>
<tr>
<td>Cetirizine</td>
<td>PO</td>
<td>6-23 months 2.5 mg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-5 years 5 mg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;6 years 10 mg/day</td>
</tr>
<tr>
<td>Famotidine</td>
<td>IV</td>
<td>0.25 mg/kg Q12 hours (max 40 mg)</td>
</tr>
<tr>
<td>Famotidine</td>
<td>PO</td>
<td>0.5 mg/kg/day up to 40 kg then 20-40 mg daily (max 40 mg)</td>
</tr>
</tbody>
</table>
Metrics

1. Increase the percent of patients receiving epinephrine PRN who present with anaphylaxis (if not administered at home) from __X__ to __Y__ by December 31, 2021.

2. Increase the percentage of patients discharged within 24 hours for the diagnosis of anaphylaxis from __X__ to __Y__ by December 31, 2021.

3. Decrease the amount of time from recognition of anaphylaxis to administration of epinephrine from __X__ to __Y__ by December 31, 2021.
Contributing Members

Christopher Edwards, MD, Hospital Medicine
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Michael Stroud, MD Critical Care Medicine
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References


Children’s Hospital of Philadelphia T. Brown-Whitehorn, MD; J. Spergel, MD, PhD; J. Lavelle, MD; S. O’Neill, PharmD; J. Lamaina, RN, MSN; R. Sutton, MD; D. Davis, MD February 2019. Anaphylaxis Pathway