Clinical Pathway: Anaphylaxis

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What is a Clinical Pathway?

An evidence-based guideline that decreases unnecessary variation and helps promote safe, effective, and consistent patient care.

Objectives of Pathway

- To standardize the approach for patients with anaphylaxis
- To improve the recognition of anaphylaxis and early administration of intramuscular epinephrine
- To improve the safety of patients who develop anaphylaxis
- To improve documentation in patient chart of allergic reactions, including details of the specific reaction and severity of reaction

Why is Pathway Necessary?

- Anaphylaxis is a life threatening condition that requires rapid assessment and treatment
- A clinical pathway can empower early administration of epinephrine when anaphylaxis is suspected
- It can also ensure adherence to the American Academy of Allergy, Asthma and Immunology guideline for management of anaphylaxis

Background

- Anaphylaxis is a multisystem emergency and can progress to a life threatening condition
- Anaphylaxis requires prompt recognition and treatment
- Delayed treatment with epinephrine is associated with increased risk for fatality
- Leading causes of anaphylaxis are medications, foods, Hymenoptera (i.e. bees, wasps, hornets) stings

Background: Signs and Symptoms Anaphylaxis [1]

Table II-1
Signs and symptoms of anaphylaxis

System	Symptoms	System	Symptoms
Skin	Flushing, local or generalized	Cardiovascular	Chest pain, eg, substernal, tachycardia, bradycardia, palpitations, arrhythmias, hypotension, feeling faint, urinary or fecal incontinence, shock, cardiac arrest
	Localized itching of skin or mucosa (local areas, eg, palms, genitalia, and/or palate) or generalized itching		
	Urticaria		
	Angioedema of skin or mucosa (eg, lips or tongue)		
	morbilliform rash		
	pilar erection		
	Conjunctival itching, redness, tearing, and/or swelling		
Respiratory	Nasal itching, congestion, rhinorrhea, sneezing	Central nervous system	Aura of impending doom
			Uneasiness
	Throat itching and tightness		Sudden behavioral change (eg, irritability)
	Dysphonia, hoarseness, stridor		Dizziness
	Coughing		Headache (eg, throbbing)
	Increased respiratory rate		Altered mental state
	Shortness of breath		Tunnel vision
	Wheezing		Confusion
	Chest tightness		Seizure
	Cyanosis	Other	Metallic taste in mouth
	Respiratory arrest		Uterine cramping and/or bleeding
Gastrointestinal	Abdominal pain (eg, cramping)		
	Nausea		
	Vomiting		
	Diarrhea		
	Dysphagia		

Table I-1
Signs and symptoms of anaphylaxis[a]

Signs and symptoms	Percentage[b]
Cutaneous	
Urticaria and angioedema	62–90
Flushing	45–55
Pruritus without rash	2–5
Respiratory	
Dyspnea, wheeze	45–50
Upper airway angioedema	50–60
Rhinitis	15–20
Hypotension, dizziness, syncope, diaphoresis	30–35
Abdominal	
Nausea, vomiting, diarrhea, abdominal pain	25–30
Miscellaneous	
Headache	5–8
Substernal pain	4–5
Seizure	1–2

[a]Data were derived from the following references: Lieberman P, Nicklas R, Oppenheimer J, et al. The diagnosis and management of anaphylaxis practice parameter: 2010 update. *J Allergy Clin Immunol.* 2010;126:477–480; Wood R, Camargo CA, Lieberman P, et al. Anaphylaxis in America: results from a national physician survey. *Ann Allergy Asthma Immunol.* 2012;109 (suppl):A20; and Boyle J, Camargo CA, Lieberman P, et al. Anaphylaxis in America: results from a national telephone survey. *J Allergy Clin Immunol.* 2012;129 (suppl):AB132.
[b]Percentages are approximations.

Background: Signs and Symptoms Anaphylaxis[3]

New Literature

ORIGINAL ARTICLE | ANAPHYLAXIS · Volume 12, Issue 8, P2026-2034.E2, August 2024

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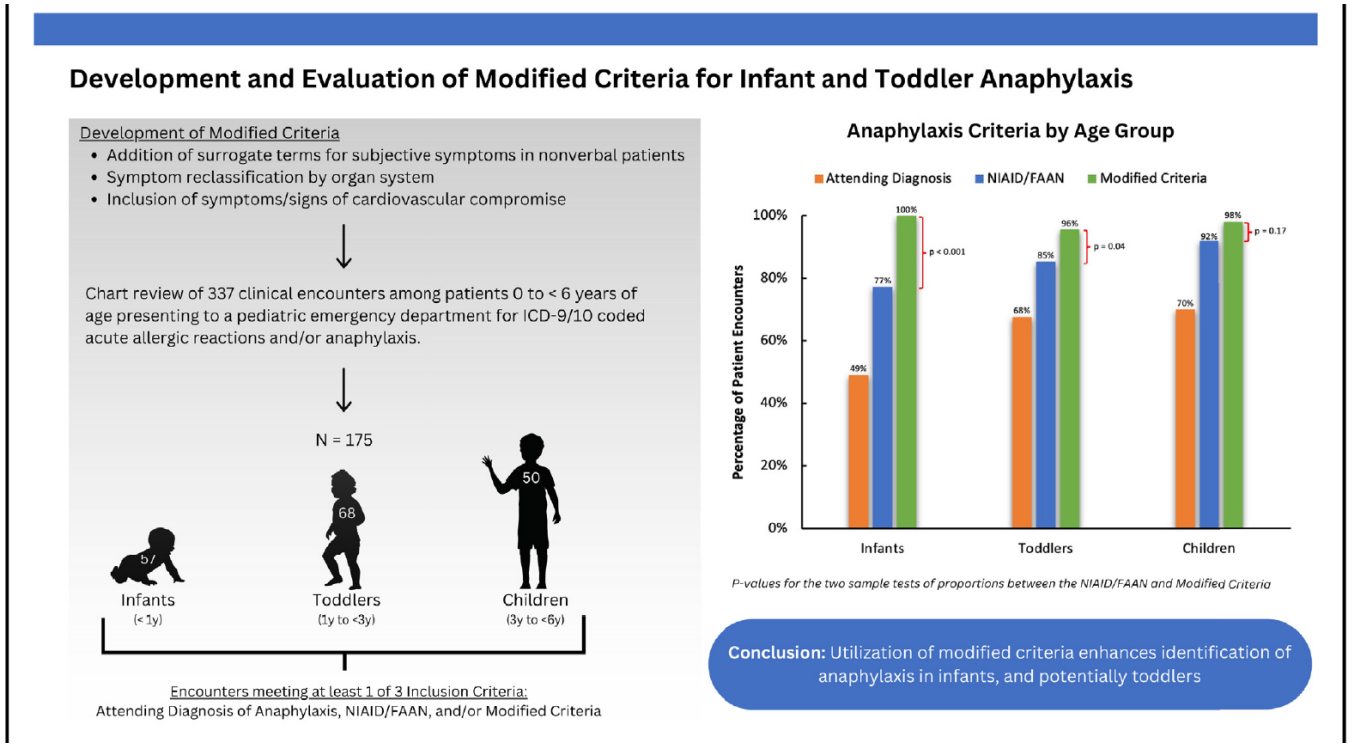
Development and Evaluation of Modified Criteria for Infant and Toddler Anaphylaxis

Anna Handorf, MD [a,b,*] · Ian R. Roy, MPH [a,b,*] · Ari Cohen, MD [a,c] · Carlos A. Camargo, Jr., MD, DrPH [c] · Timothy E. Dribin, MD [d,e] · Michael Pistiner, MD, MMS [a]



Background: Signs and Symptoms Anaphylaxis[2]

NIAID/FAAN[6]	1. Acute onset of an illness (minutes to several hours) with involvement of the skin, mucosal tissue, or both (eg, generalized hives, pruritus or flushing, swollen lips-tongue-uvula) *and at least one of the following:* a. Respiratory compromise (eg, dyspnea, wheeze-bronchospasm, stridor, reduced PEF, hypoxemia) b. Reduced BP or associated symptoms of end-organ dysfunction (eg, hypotonia [collapse], syncope, incontinence)
	2. Two or more of the following that occur rapidly after exposure to a likely allergen for that patient (minutes to several hours) a. Involvement of the skin-mucosal tissue (eg, generalized hives,itch-flush, swollen lips-tongue-uvula) b. Respiratory compromise (eg, dyspnea, wheeze-bronchospasm, stridor, reduced PEF, hypoxemia) c. Reduced BP or associated symptoms (eg, hypotonia [collapse], syncope, incontinence) d. Persistent gastrointestinal symptoms (eg, crampy abdominal pain, vomiting)
	3. Reduced BP after exposure to known allergen for that patient (minutes to several hours) a. Infants and children: low systolic BP (age-specific) or > 30% decrease in systolic BP b. Adults: systolic BP <90 mmHg or > 30% decrease from that person's baseline
WAO[7]	1. Acute onset of an illness (minutes to several hours) with involvement of the skin, mucosal tissue, or both (eg, generalized hives, pruritus or flushing, swollen lips-tongue-uvula) *and at least one of the following:* a. Respiratory compromise (eg, dyspnea, wheeze-bronchospasm, stridor, reduced PEF, hypoxemia) b. Reduced BP or associated symptoms of end-organ dysfunction (eg, hypotonia [collapse], syncope, incontinence) **c.** Severe gastrointestinal symptoms (eg, severe crampy abdominal pain, repetitive vomiting), especially after exposure to non-food allergens
	2. Acute onset of hypotension or bronchospasm or laryngeal involvement after exposure to a known or highly probably allergen for that patient (minutes to several hours), even in the absence of typical skin involvement

FIGURE 1. NIAID/FAAN and WAO criteria for likely anaphylaxis.

	Symptoms included in NIAID/FAAN criteria	**Symptoms included in modified criteria**
Mucocutaneous	Hives/urticaria, pruritus, flushing, swollen lips, *swollen tongue, swollen uvula/soft palate*	Hives/urticaria, pruritus, flushing, swollen lips, **swollen ears/eyes/face, swollen extremities, itching/tingling mouth, itchy tongue, throat symptoms, tongue thrusting/licking***
Respiratory	Dyspnea, wheeze-bronchospasm, stridor, reduced PEF†, hypoxemia	Dyspnea, wheeze-bronchospasm, stridor, hypoxemia, ***swollen tongue, swollen uvula/soft palate,*** **respiratory cyanosis‡, cough, drooling, tachypnea, increased work of breathing, hoarse voice/cry§**
Gastrointestinal	Crampy abdominal pain, vomiting	Abdominal pain‖, vomiting, **gagging, spiting up, diarrhea, back arching**
Cardiovascular/end organ dysfunction	Hypotension, hypotonia, syncope, incontinence	Hypotension, hypotonia, syncope, incontinence, **tachycardia, cardiovascular cyanosis¶, pallor, mottling, obtunded/lethargy, altered mental status#**

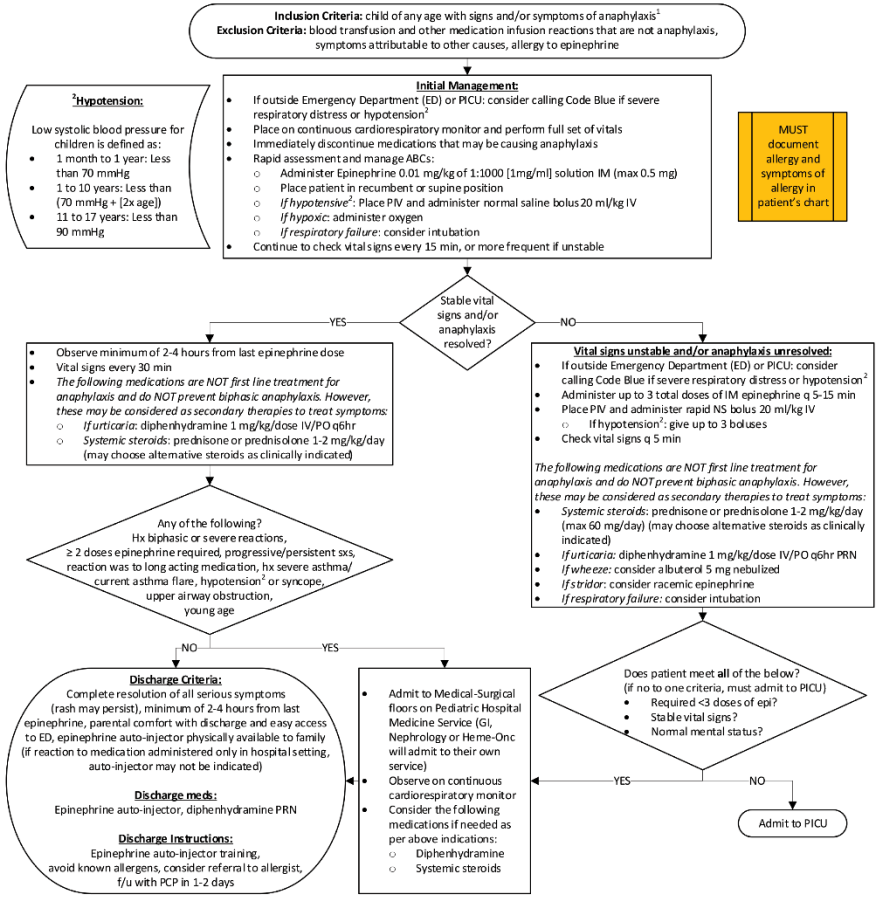
This is the Anaphylaxis Clinical Pathway.

We will be reviewing each component in the following slides.

CLINICAL PATHWAY:

Anaphylaxis

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.



CONTACTS: KATIE LORD, BSN | NATALIE BEZLER, MD | ERIC HOPPA, MD | ILANA WAYNIK, MD

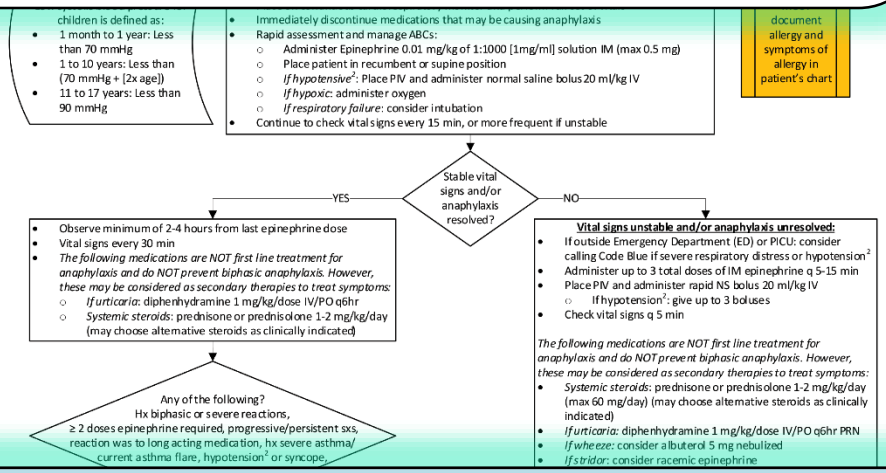
LAST UPDATED: 01.16.25

- Inclusion criteria: anyone with anaphylaxis should be treated per pathway
- The diagnostic criteria for anaphylaxis are from National Institute of Allergy, Immunology, and Infectious Diseases/Food Allergy and Anaphylaxis Network

CLINICAL PATHWAY:
Anaphylaxis

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.

Inclusion Criteria: child of any age with signs and/or symptoms of anaphylaxis[1]
Exclusion Criteria: blood transfusion and other medication infusion reactions that are not anaphylaxis, symptoms attributable to other causes, allergy to epinephrine



[1]Diagnostic Criteria for Anaphylaxis:

(must meet ONE of the following three criteria)

1. Acute onset (seconds to minutes) of skin and/or mucosal involvement (e.g. generalized hives, pruritus or flushing, swollen lips/tongue/uvula), AND respiratory compromise (e.g. dyspnea, wheeze/bronchospasm, stridor, hypoxemia) OR reduced blood pressure or associated symptoms of end-organ dysfunction (e.g. hypotonia, syncope, incontinence)

2. TWO OR MORE OF THE FOLLOWING that occur rapidly after exposure to a LIKELY allergen for that patient (seconds to minutes):

A. Skin-mucosal involvement (e.g. generalized hives, pruritus or flushing, swollen lips/tongue/uvula)
B. Respiratory compromise (e.g. dyspnea, wheeze/bronchospasm, stridor, hypoxemia)
C. Reduced blood pressure or associated symptoms (e.g. hypotonia, syncope, incontinence)
D. Persistent gastrointestinal symptoms (e.g. crampy abdominal pain, vomiting, diarrhea)
E. Additional signs of anaphylaxis that may be seen in infants: gagging, tongue thrusting, regurgitation or spitting up, flushing, hoarseness or dysphonia, loose stools, sudden onset of lethargy, irritability, crying, extreme fussiness

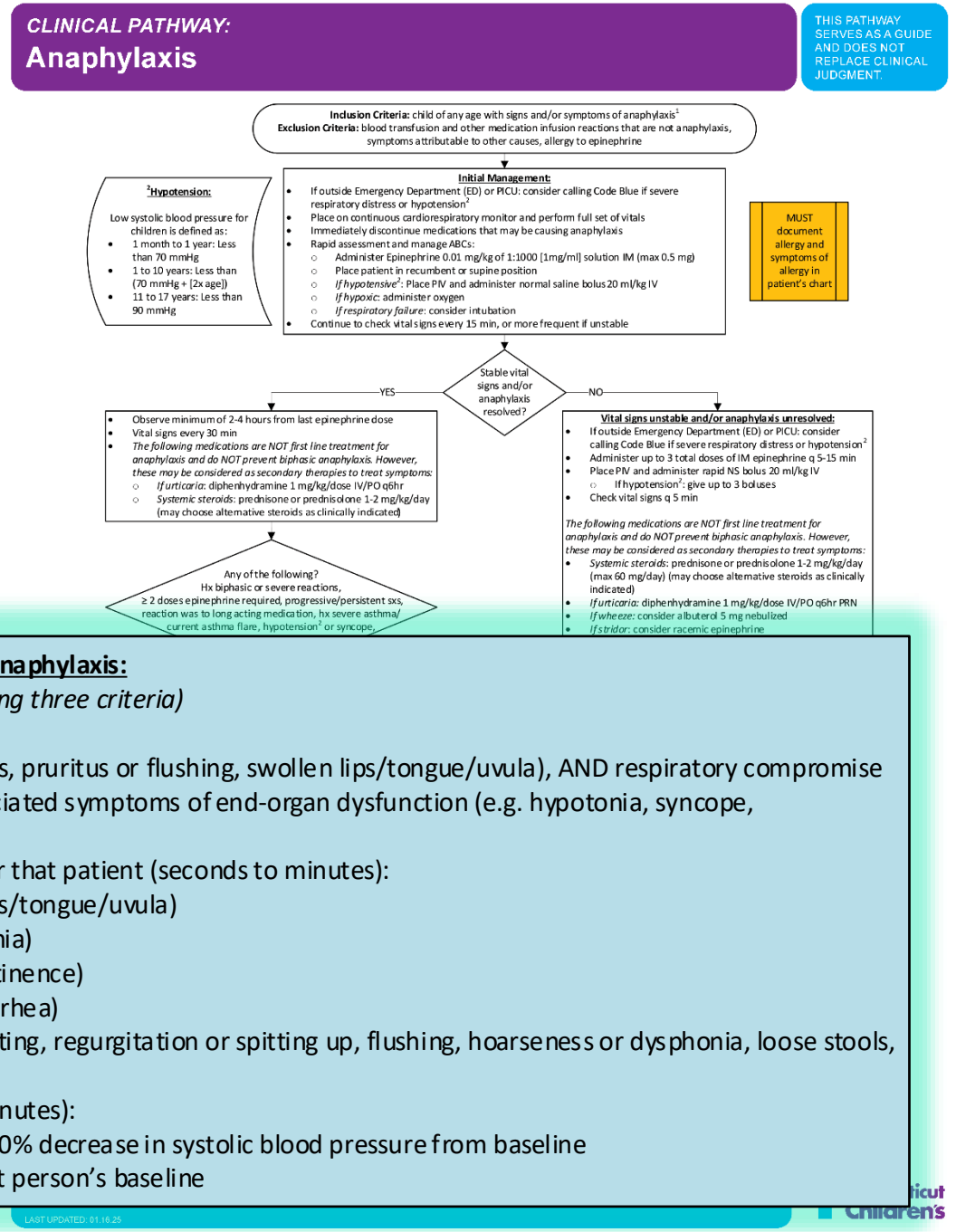
3. Reduced blood pressure after exposure to a KNOWN allergen for that patient (seconds to minutes):

A. Infants and children – Low systolic blood pressure (age-specific) or greater than 30% decrease in systolic blood pressure from baseline
B. Adults – Systolic BP of less than 90 mmHg or greater than 30% decrease from that person's baseline

LAST UPDATED: 01.16.25

Update in 2025:

- Additional signs of anaphylaxis that may be seen in infants has been added[2]



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MUST document allergy and symptoms of allergy in patient's chart

[2]Hypotension:

Low systolic blood pressure for children is defined as:

- 1 month to 1 year: Less than 70 mmHg
- 1 to 10 years: Less than (70 mmHg + [2x age])
- 11 to 17 years: Less than 90 mmHg

Initial Management:

- If outside Emergency Department (ED) or PICU: consider calling Code Blue if severe respiratory distress or hypotension[2]
- Place on continuous cardiorespiratory monitor and perform full set of vitals
- Immediately discontinue medications that may be causing anaphylaxis
- Rapid assessment and manage ABCs:
  - Administer Epinephrine 0.01 mg/kg of 1:1000 [1mg/ml] solution IM (max 0.5 mg)
  - Place patient in recumbent or supine position
  - *If hypotensive*[2]: Place PIV and administer normal saline bolus 20 ml/kg IV
  - *If hypoxic*: administer oxygen
  - *If respiratory failure*: consider intubation
- Continue to check vital signs every 15 min, or more frequent if unstable

…s unresolved:
…PICU: consider …stress or hypotension[2] …ephrine q 5-15 min …20 ml/kg IV …s

…atment for …hylaxis. However, these may be considered as secondary therapies to treat symptoms:

- *Systemic steroids*: prednisone or prednisolone 1-2 mg/kg/day (max 60 mg/day) (may choose alternative steroids as clinically indicated)
- *If urticaria:* diphenhydramine 1 mg/kg/dose IV/PO q6hr PRN
- *If wheeze:* consider albuterol 5 mg nebulized
- *If stridor:* consider racemic epinephrine
- *If respiratory failure:* consider intubation

Any of the following?
Hx biphasic or severe reactions,
≥ 2 doses epinephrine required, progressive/persistent sxs,
reaction was to long acting medication, hx severe asthma/
current asthma flare, hypotension[2] or syncope,
upper airway obstruction,
young age

NO → **Discharge Criteria:**
Complete resolution of all serious symptoms (rash may persist), minimum of 2-4 hours from last epinephrine, parental comfort with discharge and easy access to ED, epinephrine auto-injector physically available to family (if reaction to medication administered only in hospital setting, auto-injector may not be indicated)

Discharge meds:
Epinephrine auto-injector, diphenhydramine PRN

Discharge Instructions:
Epinephrine auto-injector training, avoid known allergens, consider referral to allergist, f/u with PCP in 1-2 days

YES → Admit to Medical-Surgical floors on Pediatric Hospital Medicine Service (GI, Nephrology or Heme-Onc will admit to their own service)
- Observe on continuous cardiorespiratory monitor
- Consider the following medications if needed as per above indications:
  - Diphenhydramine
  - Systemic steroids

Does patient meet **all** of the below?
(if no to one criteria, must admit to PICU)
- Required <3 doses of epi?
- Stable vital signs?
- Normal mental status?

YES → Admit to Medical-Surgical floors on Pediatric Hospital Medicine Service (GI, Nephrology or Heme-Onc will admit to their own service)
NO → Admit to PICU

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Initial Management:

- Rapid assessment and management of ABCs are key
- Do NOT delay administration of IM epinephrine, as this is the definitive first line treatment for anaphylaxis

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LAST UPDATED: 01.16.25

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It is VERY important to document any allergic reaction in the patient chart.

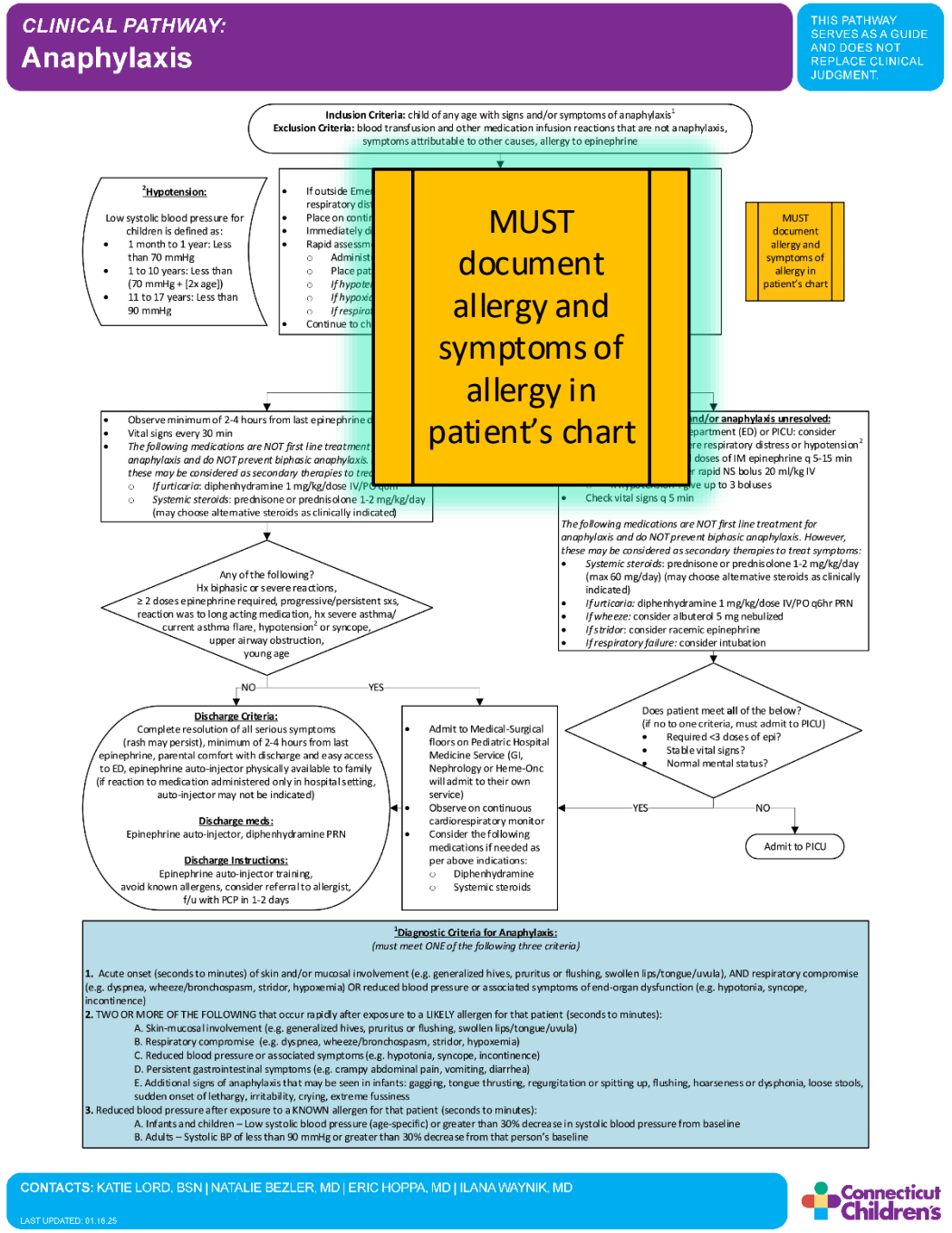
Document allergen AND allergic reaction associated with the exposure

Table I-2

Essential features of history in the evaluation of a patient who has experienced an episode of anaphylaxis

A	Detailed history of ingestants (foods/drugs) taken within 6 h before the event
B	Activity in which the patient was engaged at the time of the event
C	Location of the event (home, school, work, indoors/outdoors)
D	Exposure to heat or cold
E	Any related sting or bite
F	Time of day or night
G	Duration of event
H	Recurrence of symptoms after initial resolution
I	Exact nature of symptoms (eg, if cutaneous, determine whether flush, pruritus, urticaria, or angioedema)
J	In a woman, the relation between the event and her menstrual cycle
K	Was medical care given and what treatments were administered
L	How long before recovery occurred and was there a recurrence of symptoms after a symptom-free period

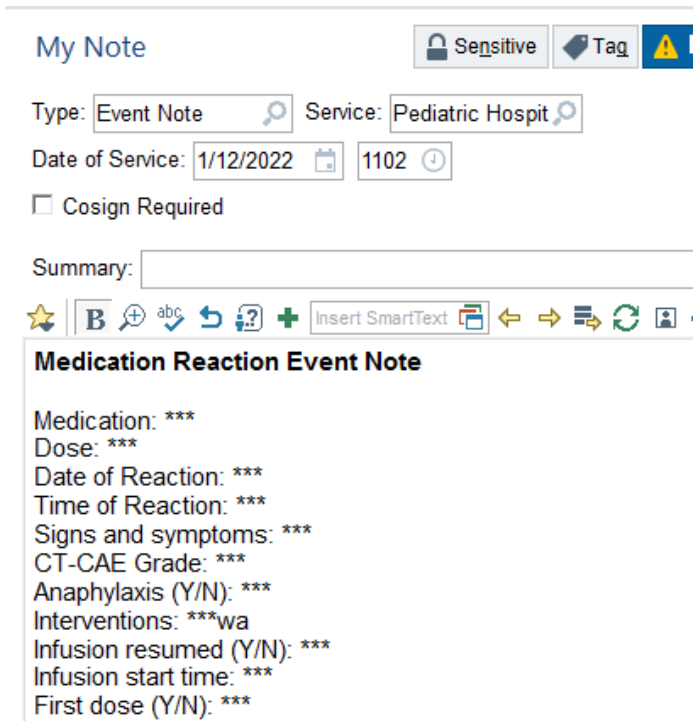
From Liberman P, Nicklas RA, Randolph C, et al. Anaphylaxis - a practice parameter update 2015. *Ann Allergy Asthma Immunol.* 2015 Nov;115(5):341-84.

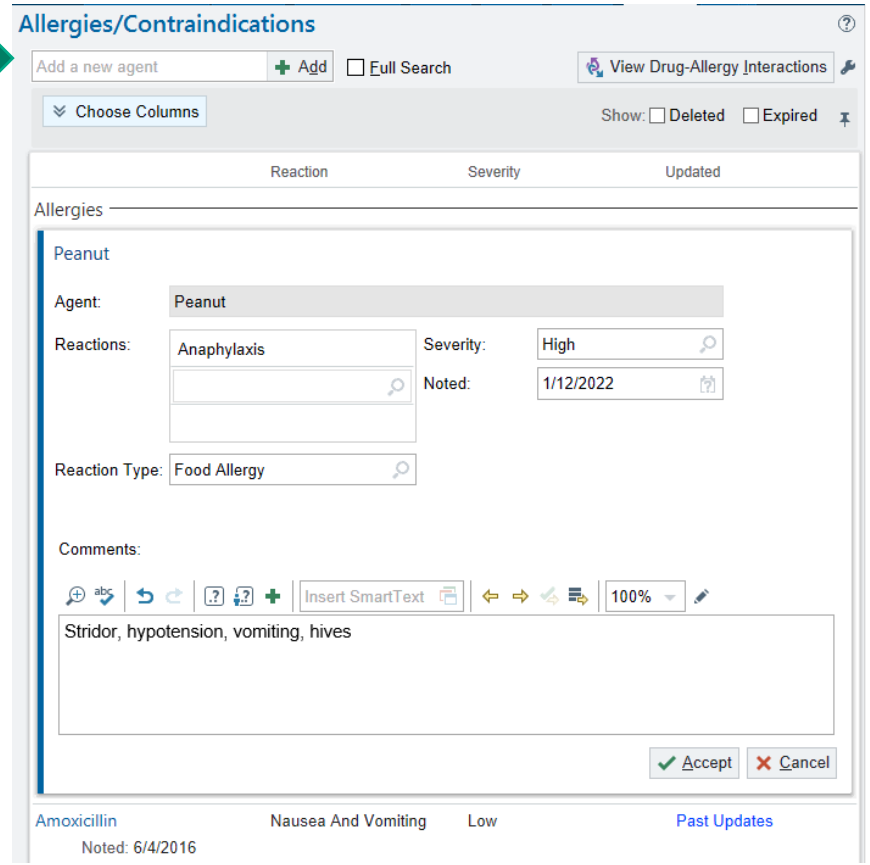


Document detailed history of allergic reaction

- MUST add allergy and specific allergic reaction to the patient chart in EPIC using the “Allergies/Contraindications” tab

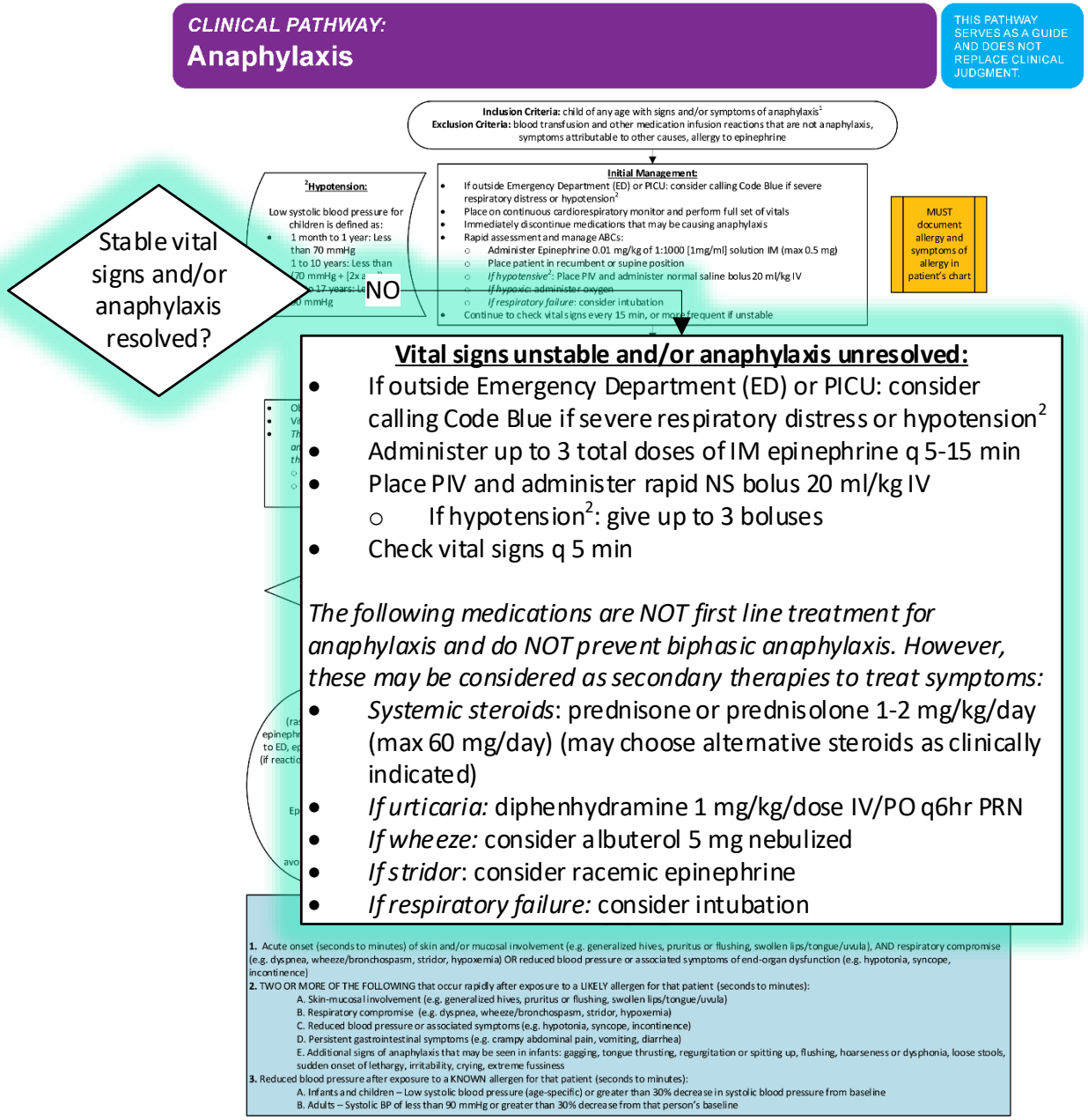
- For an allergic reaction that occurs to a medication given while at Connecticut Children’s:
  - Document under allergies as above
  - Consider documenting by using SmartPhrase “.MEDREACTION” in event note to document details of reaction





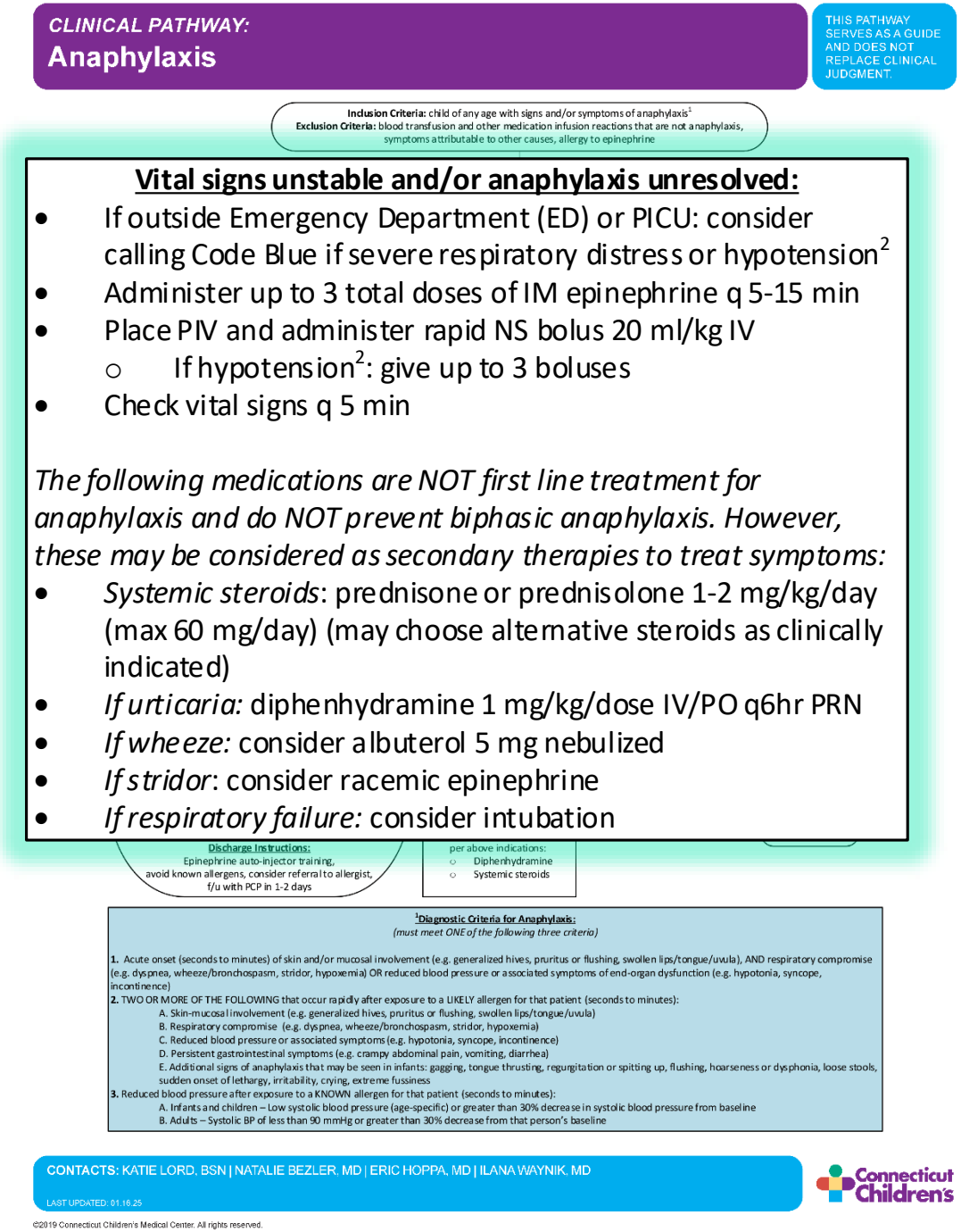
Management Continued (UNSTABLE PATIENT OR ANAPHYLAXIS UNRESOLVED):

- Must determine if symptoms/signs of anaphylaxis resolve and patient is stable or if patient requires repeated doses of IM
- If *unstable* at any point AND outside the Emergency Department, consider calling Code Blue if there is severe respiratory distress or hypotension while addressing these issues
- See next slide to learn about secondary therapies



Adjunctive or Second Line Therapies [1-7]:

- They do NOT prevent or treat upper airway obstruction or hypotension! IM epinephrine is the first line treatment.
- Antihistamines, H1 and H2 blockers, are second line, because there is no evidence to support their use in first line management of anaphylaxis – may be used symptomatically to treat pruritus/hives. These do NOT prevent biphasic or prolonged reactions.
- Literature review demonstrates that systemic corticosteroids do NOT prevent biphasic or prolonged reactions. May be used for symptom control/comfort in dose of 1-2 mg/kg/day.
- Patients with complete resolution of symptoms after treatment with epinephrine do NOT require prescription for antihistamines or corticosteroids.

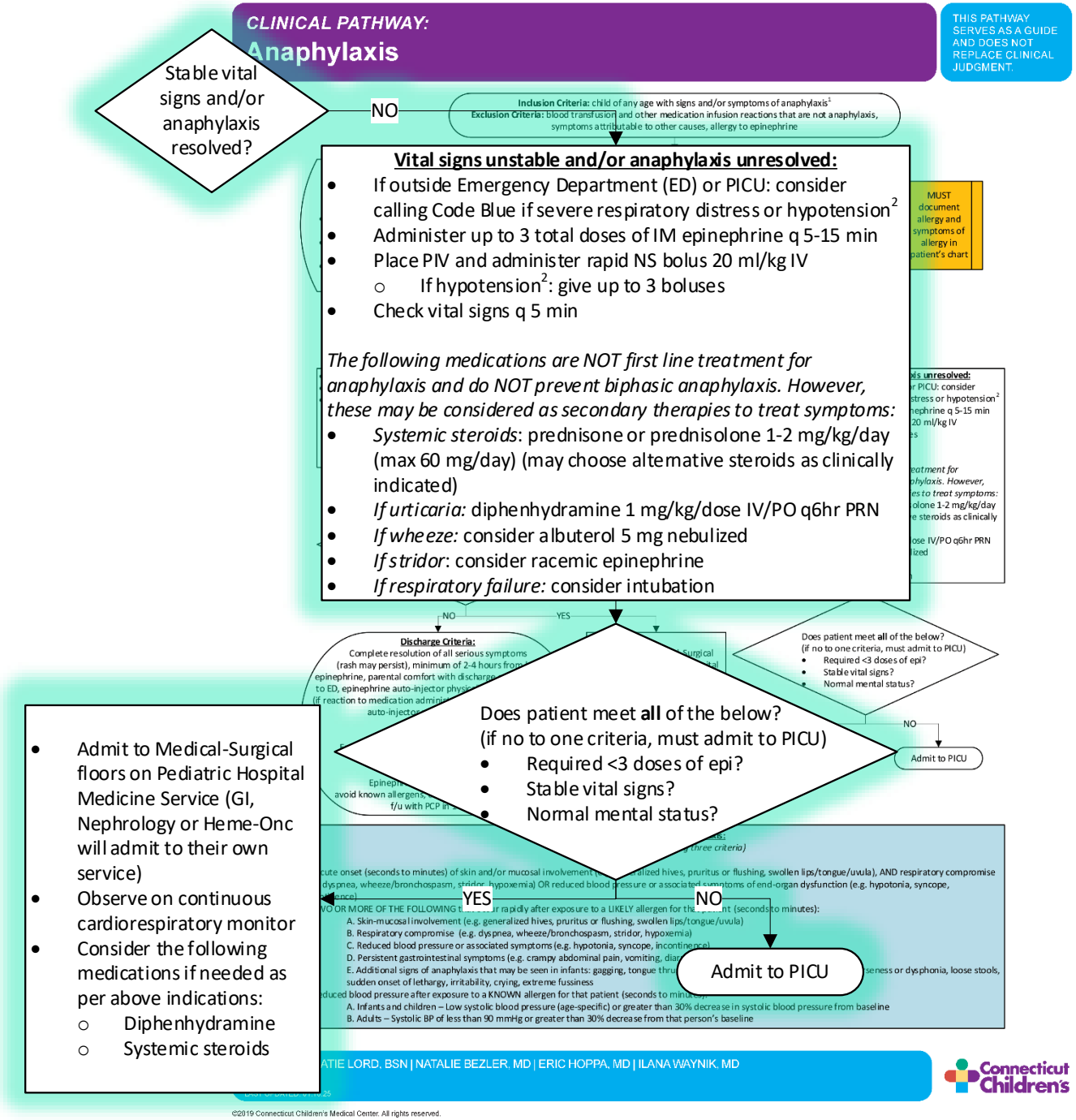


Select Appropriate Disposition:

- If patient meets ALL of the following criteria, admit to the Medical-Surgical floors:
  - Required <3 doses of epi?
  - Stable vital signs?
  - Normal mental status?

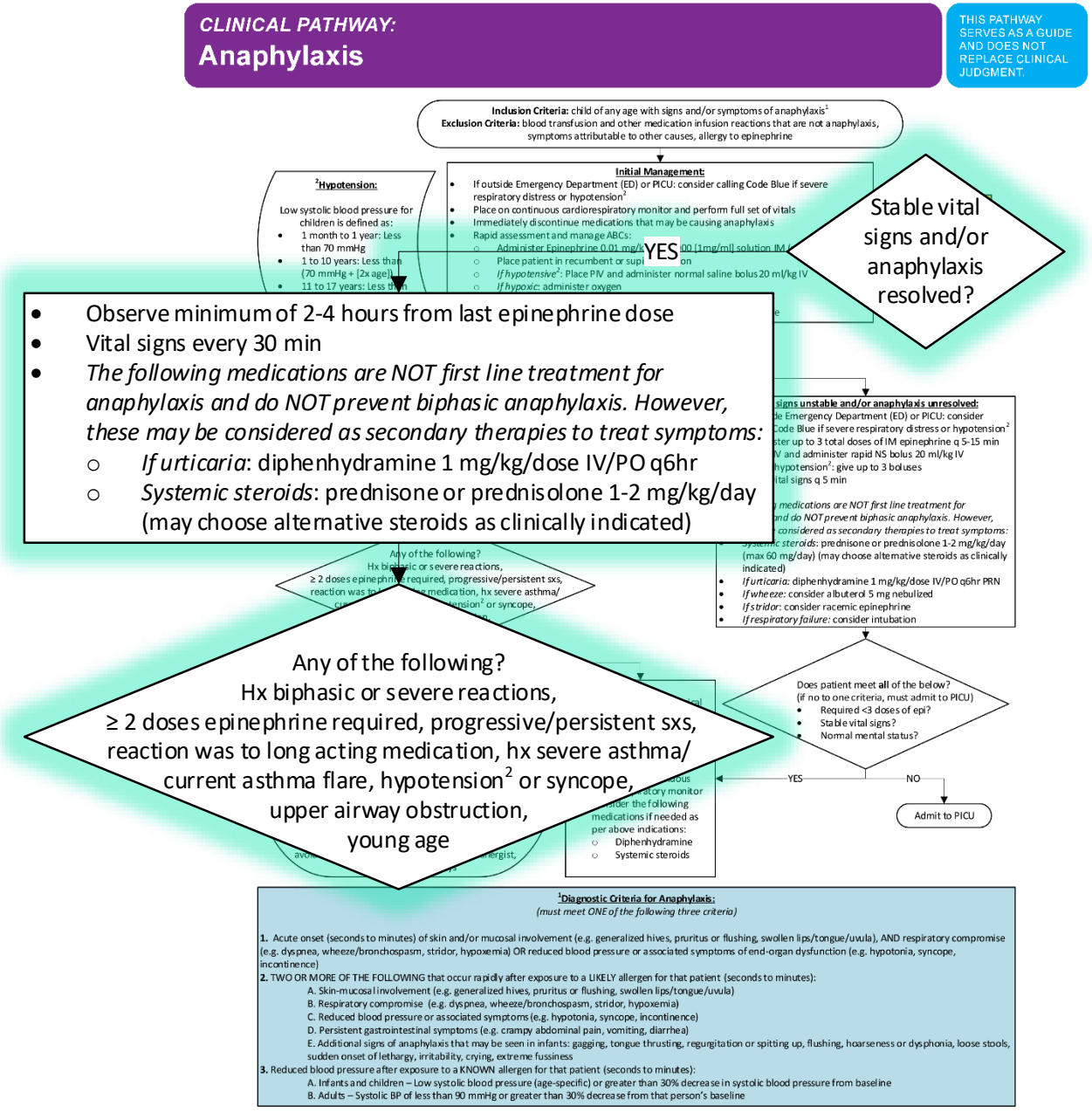
- If patient does NOT meet ALL criteria, admit to the Pediatric Intensive Care Unit (PICU)

** Of note, the following subspecialty services will admit patients to their own service: Gastroenterology, Nephrology, Hematology Oncology. Otherwise, admit to Pediatric Hospital Medicine.*



Management Continued (STABLE PATIENT):

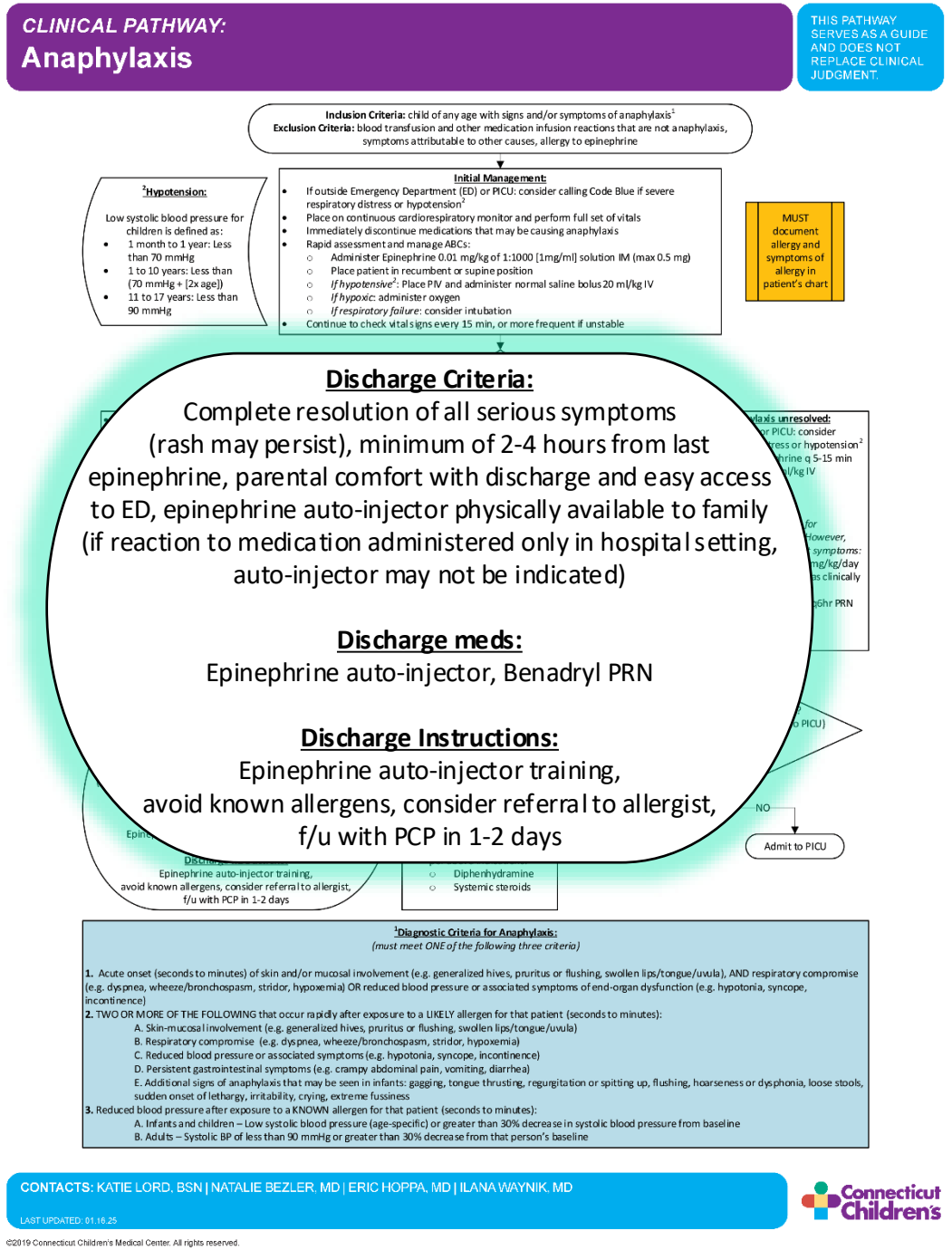
- If patient has *stable vital signs and/or anaphylaxis resolved*, observe for 2-4 hours from last epinephrine dose
- If NO risk factors, may discharge home
- Risk factors:
  - History biphasic or severe reactions
  - ≥ 2 doses epinephrine required
  - Progressive/persistent symptoms
  - Reaction was to long acting medication
  - History of severe asthma/current asthma flare
  - Hypotension or syncope
  - Upper airway obstruction
  - Young age



- Discharge Criteria and Instructions are listed here

Discharge meds:

- Epinephrine auto-injector (consider dispensing at least 2)
- Diphenhydramine PRN pruritic rash



Review of Key Points

- This clinical pathway serves to standardize management of anaphylaxis across the institution (ED, inpatient, clinics, etc.) and across different triggers (medications, food, environmental, etc.)
- Anaphylaxis requires rapid assessment and treatment
- The primary treatment for anaphylaxis is rapid administration of IM epinephrine
- Secondary therapies may be used for symptomatic management, but they do NOT prevent or treat upper airway obstruction or hypotension and they do NOT prevent biphasic or prolonged reactions
- Documentation of allergic reactions, including details of the specific reaction and severity should occur in a standardized manner

Quality Metrics

- % of patients with utilization of pathway order set
- Time from ED arrival to epinephrine administration
- Time from epinephrine administration to ED discharge
- Percentage of patients on pathway with documentation of allergy AND reaction in chart
- Number of patients discharged from the ED who return within 72 hours and 7 days
- Average length of stay (ED and inpatient)

Pathway Contacts

- Hematology/Oncology
  - Katie Lord, BSN, Natalie Bezler, MD
- Hospital Medicine
  - Ilana Waynik, MD
- Emergency Medicine
  - Eric Hoppa, MD

References

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Thank You!

About Connecticut Children's Pathways Program

Clinical pathways guide the management of patients to optimize consistent use of evidence-based practice. Clinical pathways have been shown to improve guideline adherence and quality outcomes, while decreasing length of stay and cost. Here at Connecticut Children's, our Clinical Pathways Program aims to deliver evidence-based, high value care to the greatest number of children in a diversity of patient settings. These pathways serve as a guide for providers and do not replace clinical judgment.