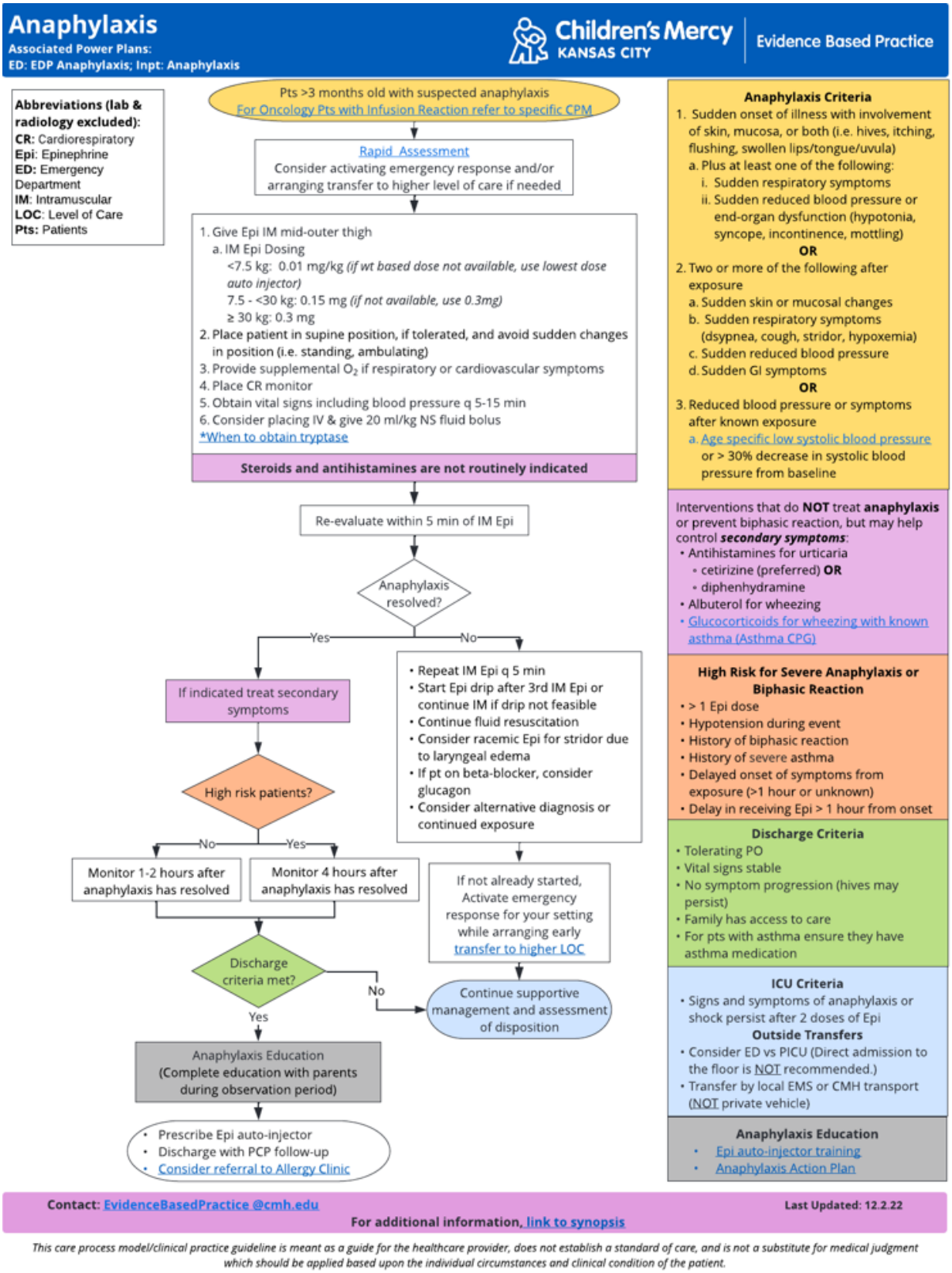
Anaphylaxis
Clinical Practice Guideline Synopsis



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Objective of Guideline

To provide care standards for patient prevention, diagnosis, and management of anaphylaxis throughout the care continuum.

Background/Epidemiology

Anaphylaxis is defined as a serious, generalized, or systemic allergic reaction that is rapid in onset. It can be the result of various allergic triggers including food, insect venom and medication (Anagnostou, 2018). Anaphylaxis has a reported prevalence of 0.02%-15%, an incidence of 8.4-111.2 per 100,000 persons per year, and a mortality rate of 0.33-1.06 per 1,000,000 persons per year or 0.25%-0.33% (Ramsey et al., 2019).

Target Users

- Primary Care Clinicians and/or Children's Mercy Affiliated Partners
- Urgent Care
- Emergency Medicine
- Hospital Medicine
- Pediatric residents
- Pediatric subspecialty fellows
- Advance Practice Providers

Target Population

- 3 months to 18 years with signs and symptoms of anaphylaxis

Guideline Inclusion Criteria

- Diagnosed and/or suspected anaphylaxis

Guideline Exclusion Criteria

- Local allergic reaction
- Mild allergic reaction
- For patients with oncologic conditions managed oncology, please refer to the Allergic Reaction in Hem/Onc Patient CPM (Link)

AGREE

The American Academy of Allergy, Asthma, & Immunology (AAAAI) national guideline on anaphylaxis provided guidance to the Anaphylaxis Clinical Practice Guideline (CPG) Committee (Shaker et al., 2020). See Table 1 for AGREE II.

Table 1

AGREE II[a] Summary for the Guideline Shaker et al. (2020)

Domain	Percent Agreement	Percent Justification
Scope and purpose	92%	The aim of the guideline, the clinical questions posed and target populations **were** identified.
Stakeholder involvement	93%	The guideline **was developed** by the appropriate stakeholders and represents the views of its intended users.
Rigor of development	90%	The process used to gather and synthesize the evidence, the methods to formulate the recommendations and to update the guidelines **were** explicitly stated.
Clarity and presentation	97%	The guideline recommendations **are** clear, unambiguous, and easily identified; in addition, different management options are presented.
Applicability	79%	Barriers and facilitators to implementation, strategies to improve utilization and resource implications **were addressed** in the guideline.

Editorial independence	96%	The recommendations **were not** biased with competing interests.
Committee's recommendation for guideline use	Yes	

Note: Four EBP Scholars completed the AGREE II on this guideline.

Care Question(s) Answered

No clinical questions were posed for this review as all clinical questions by the CPG committee were addressed in the AAAAI guideline.

Practice Recommendations

The American Academy of Allergy, Asthma, & Immunology (AAAAI), Anaphylaxis CPG served as the parent guideline (Shaker et al., 2020) for this clinical practice guideline (CPG). Please refer to the AAAAI national guideline, Anaphylaxis Clinical Practice Guideline (Shaker et al., 2020), for full evaluation and treatment recommendations.

A. Anaphylaxis Criteria

a. Sudden onset of illness with involvement of skin, mucosa, or both (i.e. hives, itching, flushing, swollen lips/tongue/uvula)
   i. Plus at least one of the following:
      1. Sudden respiratory symptoms
      2. Sudden reduced blood pressure or end-organ dysfunction (hypotonia, syncope, incontinence, mottling)

b. **OR** Two or more of the following after exposure
   i. Sudden skin or mucosal changes
   ii. Sudden reduced blood pressure
   iii. Sudden gastrointestinal symptoms

c. **OR** Reduced blood pressure or symptoms after known exposure
(Age-specific low systolic blood pressure or > 30% decrease in systolic blood pressure from baseline)

B. Evaluation and Management of Anaphylaxis

a. For patients with confirmed or high suspicion of anaphylaxis, do not delay giving intramuscular (IM) epinephrine in the mid-outer thigh
   i. IM epinephrine dosing
      1. < 7.5 kg: 0.01 mg/kg (if weight based dose not available, use lowest dose auto injector)
      2. 7.5 - 25 kg: 0.15 mg (if not available, use 0.3 mg)
      3. ≥ 30 kg: 0.3 mg
   ii. Place patient in supine position, if tolerated, and avoid sudden changes in position (i.e. standing, ambulating)
   iii. Provide supplemental O_2 if respiratory or cardiovascular signs/symptoms are present
   iv. Place cardiorespiratory monitor
   v. Obtain vitals including blood pressure every 5-15 min
   vi. Consider placing IV & give 20 ml/kg normal saline fluid bolus
   vii. Tryptase
      1. Tryptase levels may be elevated in the setting of anaphylaxis. However, this lab is not rapidly available and is not useful in the immediate management of the patient
      2. Obtaining tryptase levels may be useful for patient with recurrent anaphylaxis, especially if the trigger is unknown or when the diagnosis of anaphylaxis is uncertain
      3. Of note, a normal tryptase level does not rule out anaphylaxis. It is often normal in patients who develop anaphylaxis from foods
      4. If a tryptase level is obtained, it should occur within the timeframe of 30 minutes following event onset and prior to 3 hours since onset of event (30 minutes > 3 hours)

b. If anaphylaxis resolves after treatment, assess the risk of biphasic reaction
   i. Patients at high risk for biphasic reaction, monitor for 4 hours after anaphylaxis has resolved
      1. High biphasic risk patients
      2. > 1 epinephrine dose
      3. Hypotension during event
      4. History of biphasic reaction

5. History of severe asthma
6. Delayed onset of symptoms from exposure (>1 hour or unknown)
7. Delay in receiving epinephrine (> 1 hour from onset of symptoms)

ii. Patients at low risk for biphasic reaction, monitor for 1-2 hours after anaphylaxis has resolved

c. Interventions that do NOT treat anaphylaxis or prevent biphasic reaction, but may help control *secondary symptoms*:
   i. Antihistamines for urticaria (cetirizine, when readily available, is preferred over diphenhydramine to minimize sedation)
   ii. Albuterol for wheezing
   iii. Glucocorticoids for wheezing with known asthma (Asthma CPG)

d. Educate patients and their caregivers on identification of anaphylaxis and use of epinephrine autoinjector
   i. Epinephrine autoinjector family education can be found in Cerner depart. Please enter the patient's name, allergen (if known), epinephrine dose, and emergency contact information. This can assist families with instructions for daycare, school, camp, etc.
   ii. Epinephrine autoinjector infographic.

Measures
- Time to epinephrine injection and number of epinephrine injections during initial phase
- Length of stay
- Reevaluations within 24 hours
- Transfers to higher level of care
- Patient education (handouts and in-person education)
- Decreased steroid use

Potential Cost Implications
- Reducing direct and indirect costs by:
  - Decreasing length of stay in Emergency Department and Urgent Care settings
  - Decreasing admissions in cases when prolonged observation is not indicated
  - Decreasing adverse reactions to medications (diphenhydramine; systemic steroids)
  - Decreasing future episodes of anaphylaxis through improved patient/family education

Potential Organizational Barriers and Facilitators

Potential Barriers
- Variability of acceptable level of risk among providers
- Different clinical perspectives among providers of various care settings (acute care, subspecialty care)
- Challenges with follow-up faced by some families

Potential Facilitators
- Collaborative engagement across settings in the care continuum during CPG development
- High rate of use of CPG and order sets
- Standardized order set for Urgent Care, Emergency Department, and Hospital Medicine

Power Plans
- Emergency Department and Urgent Care: EDP Anaphylaxis *EBP
- Inpatient: Inpt: Anaphylaxis *EBP

Policies
- Emergency Meds Standing Orders (in development)
- COVID Reaction Medications Standing Order

Educational Materials
- Anaphylaxis Action Plan (Appendix A)
  - Intended to be customized to the individual patient
  - Found in Cerner depart process
  - Available in English and Spanish
- Epinephrine autoinjector instructions (Appendix A)
  - Intended for all patients

- Provided instructions for all currently available brands of autoinjectors

How guideline was placed into practice
Once approved, the guideline was presented to appropriate care teams and implemented. Care measurements will be assessed and shared with appropriate care teams to determine if changes need to occur. Education tools reviewed by health literacy, family advisor board, and human factors. Education material underwent usability testing.

Guideline Preparation
This guideline was prepared by the Evidence Based Practice (EBP) Department in collaboration with content experts at Children's Mercy Kansas City. The development of this guideline supports the Quality Excellence and Safety Section initiative to promote care standardization that builds a culture of quality and safety that is evidenced by measured outcomes. If a conflict of interest is identified, the conflict will be disclosed next to the committee member's name.

Anaphylaxis CPG Committee Members and Representation
- Amanda Nedved, MD | Urgent Care | Committee Chair
- Nicholas Clark, MD, FAAP, CPHQ | Hospital Medicine | Committee Member
- Katelyn Shaw, PharmD | Pharmacy | Committee Member
- Jennifer McKinsey, MD | Urgent Care | Committee Member
- Emily Bonanni, MD | Hospital Medicine | Committee Member
- Cara Holton, MD | Critical Care Medicine | Committee Member
- Ashly Daniel, MD | Critical Care Medicine | Committee Member
- Jay Portnoy, MD | Allergy, Asthma, and Immunology | Committee Member
- Allison Hadley, MD, FAAP | Emergency Department | Committee Member

Patient/Family Committee Member
- Mandi Kearns | Committee Member

EBP Committee Members
- Kathleen Berg, MD, FAAP | Hospital Medicine and Evidence Based Practice | Committee Member
- Jarrod Dusin, MS, RD, LD, CQHP | Evidence Based Practice | Committee Member

Guideline Development Funding
The development of this guideline was underwritten by the EBP and Urgent Care; Hospital Medicine; Critical Care; Allergy, Asthma, and Immunology; and Emergency Departments.

Conflict of Interest
All members of the committee complete a standard potential COI disclosure form prior to work on the committee. Dr. Portnoy was a content expert within the CPG committee and served as an author on the AAAAI guideline.

Approval Process
This guideline was reviewed and approved by the Anaphylaxis CPG Committee, content expert departments/divisions, and the EBP Department; after which they are approved by the Medical Executive Committee. Guidelines are reviewed and updated as necessary at a minimum of every 3 years within the EBP Department at CMKC. Content expert committees will be involved with every review and update.

Approval Obtained

Department/Unit	Date Approved
Urgent Care	October, 2022
Emergency Department	December, 2022
Critical Care	January, 2023
Pharmacy	October, 2022
Allergy, Asthma, and Immunology	November, 2022
Hospital Medicine	September, 2022

Version History

Date	Comments
March 2023	Version one

Date for Next Review:

- March 2026

Disclaimer

The content experts and the Department of EBP are aware of the controversies surrounding the Anaphylaxis CPG. When evidence is lacking or inconclusive, options in care are provided in the guideline and the power plans that accompany the guideline.

These guidelines do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time.

It is impossible to anticipate all possible situations that may exist and to prepare guidelines for each. Accordingly, these guidelines should guide care with the understanding that departures from them may be required at times.

References

Anagnostou, K. (2018). Anaphylaxis in children: epidemiology, risk factors and management. *Current pediatric reviews*, *14*(3), 180-186.

Ramsey, N. B., Guffey, D., Anagnostou, K., Coleman, N. E., & Davis, C. M. (2019). Epidemiology of anaphylaxis in critically ill children in the United States and Canada. *The Journal of Allergy and Clinical Immunology: In Practice*, *7*(7), 2241-2249.

Shaker, M. S., Wallace, D. V., Golden, D. B., Oppenheimer, J., Bernstein, J. A., Campbell, R. L., ... & Contributors, W. (2020). Anaphylaxis—a 2020 practice parameter update, systematic review, and Grading of Recommendations, Assessment, Development and Evaluation (GRADE) analysis. *Journal of Allergy and Clinical Immunology*, *145*(4), 1082-1123.

Appendix A Education Handouts

Anaphylaxis Action Plan

Epinephrine Auto-Injector