Anaphylaxis
Definition & Diagnosis

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You visit 6 y boy in ER that is transferred by ambulance from his school:

He was good till resting time that developed with dizziness, vomiting, cough and LOC reduction

RR:20 PR:150 T:37 BP:80/50

Pupil NL size reactive, wheeze in lung

What is your DX?

Definition and Epidemiology of ANAPHYLAXIS :

- ✓ Anaphylaxis is a severe life-threatening generalized or systemic hypersensitivity reaction.
- ✓ incidence of anaphylaxis between 50 and 112 episodes per 100 000 person-years while the estimated lifetime prevalence is 0.3–5.1%
- ✓ recurrence of reactions occurs in 26.5–54.0%

hospitalizations due to anaphylaxis, mortality remains low, estimated at

0.05–0.51 per million people/year for drugs, at 0.03–0.32 for food and at 0.09–0.13 for venom

- Different definitions for anaphylaxis are currently used in the literature.
- Some definitions imply the need of multiple organ involvement,
- however severe symptoms can present in only one organ system

WAO 2011 (1)	EAACI 2013 (2)	AAAAI/ACAAI 2010 (11)	ASCIA 2016 (16)	NIAID 2006 (13)	WHO ICD-11 2019 (14)
A serious life-threatening generalized or systemic hypersensitivity reaction.	A severe life-threatening generalized or systemic hypersensitivity reaction.	An acute life-threatening systemic reaction with varied mechanisms, clinical presentations, and severity that results from the sudden release of mediators from mast cells and basophils.	Any acute onset illness with typical skin features (urticarial rash or erythema/flushing, and/or angioedema), PLUS involvement of respiratory and/or cardiovascular and/or persistent severe gastrointestinal symptoms; or Any acute onset of hypotension or bronchospasm or upper airway obstruction where anaphylaxis is considered possible, even if typical skin features are not present.	Anaphylaxis is a serious allergic reaction that involves more than one organ system (for example, skin, respiratory tract, and/or gastrointestinal tract). It can begin very rapidly, and symptoms may be severe or life-threatening.	Anaphylaxis is a severe, life-threatening systemic hypersensitivity reaction characterized by being rapid in onset with potentially life-threatening airway, breathing, or circulatory problems and is usually, although not always, associated with skin and mucosal changes.
A serious allergic reaction that is rapid in onset and might cause death	An acute, potentially fatal, multi-organ system, allergic reaction.				

WHO ICD-11 2019 (14)

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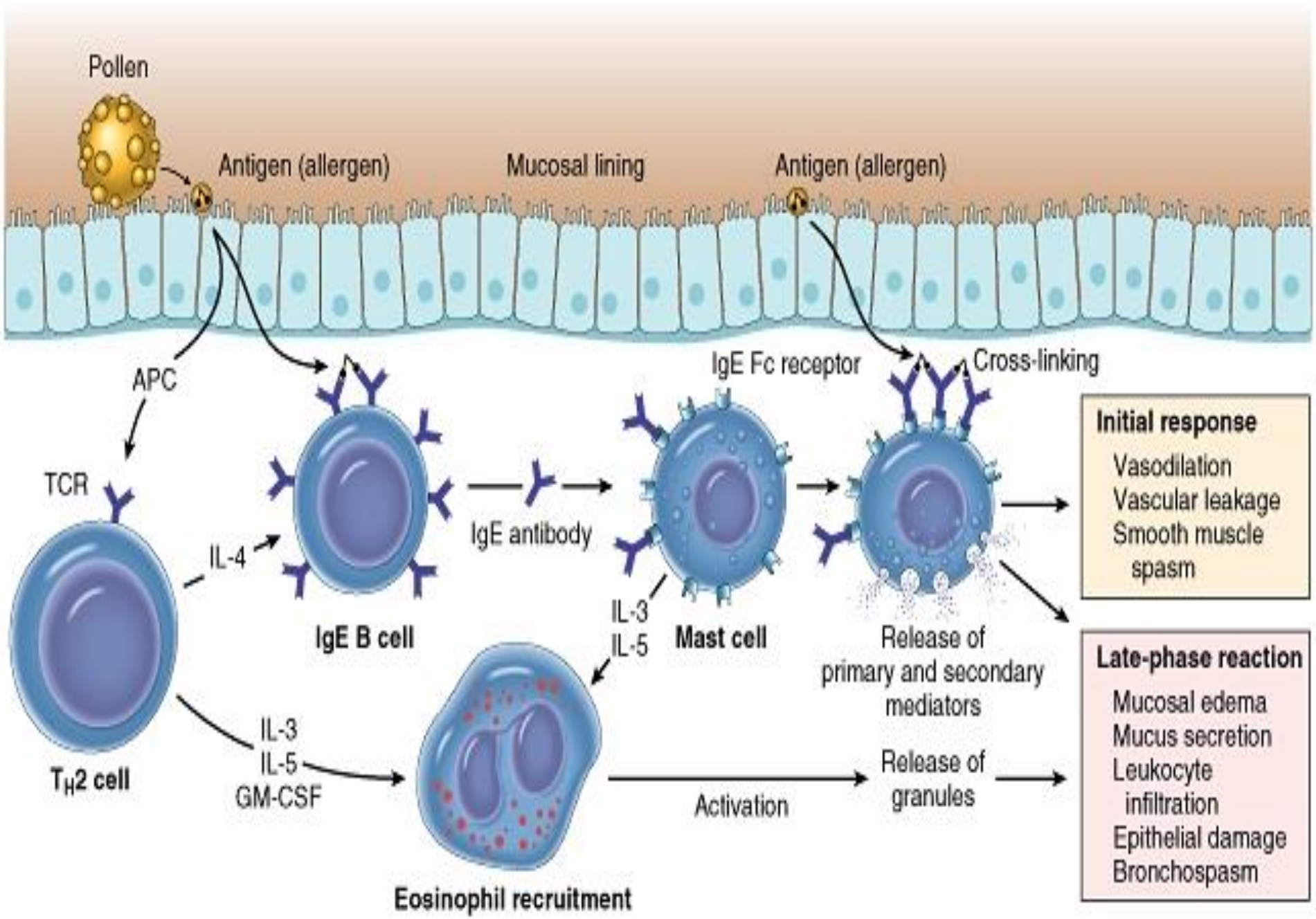
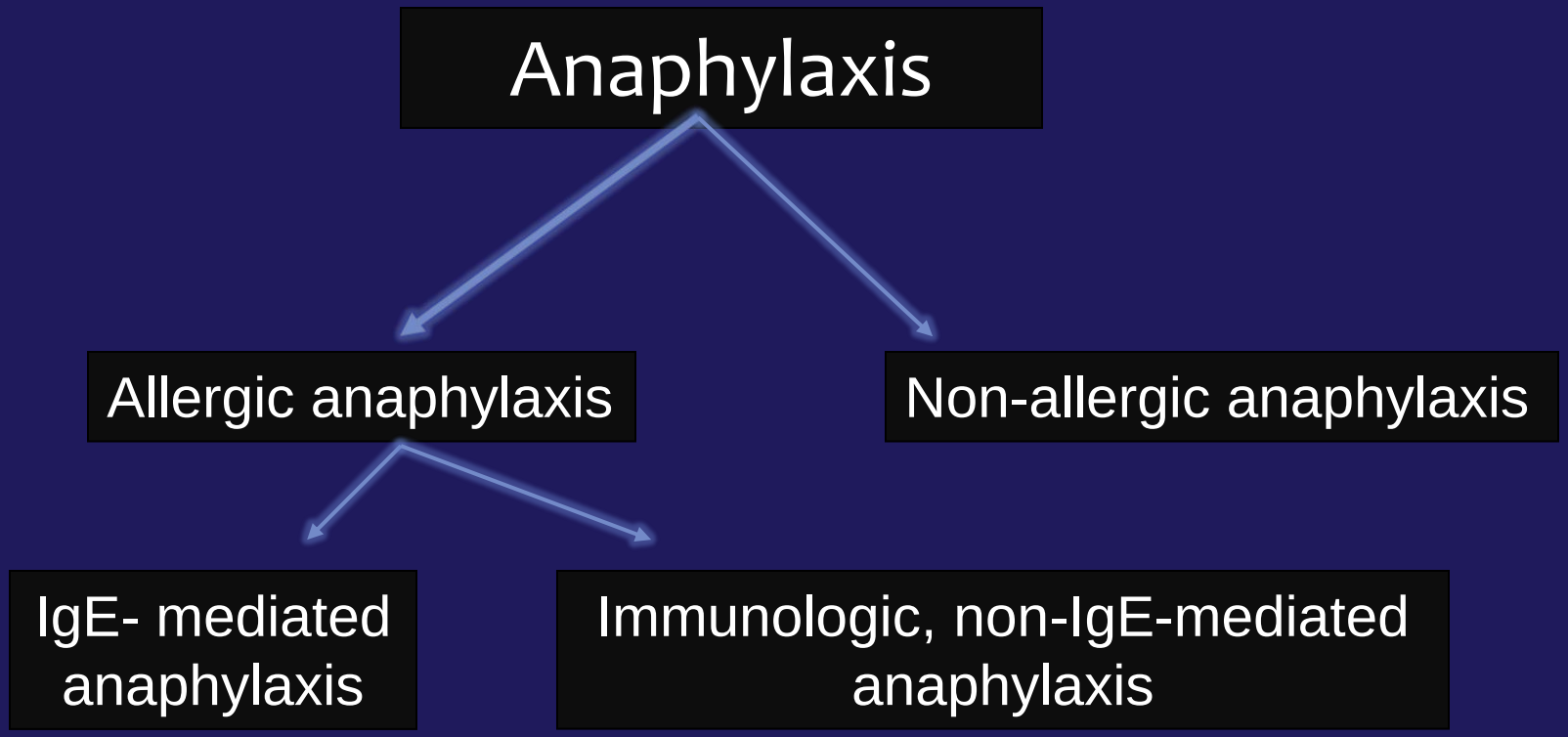


✓It is commonly, but not always, mediated by an allergic mechanism, usually by IgE.

✓Allergic (immunologic) non-IgE-mediated anaphylaxis also occurs.

✓Non-allergic anaphylactic reactions, formerly called anaphylactoid or pseudo-allergic reactions, may also occur.

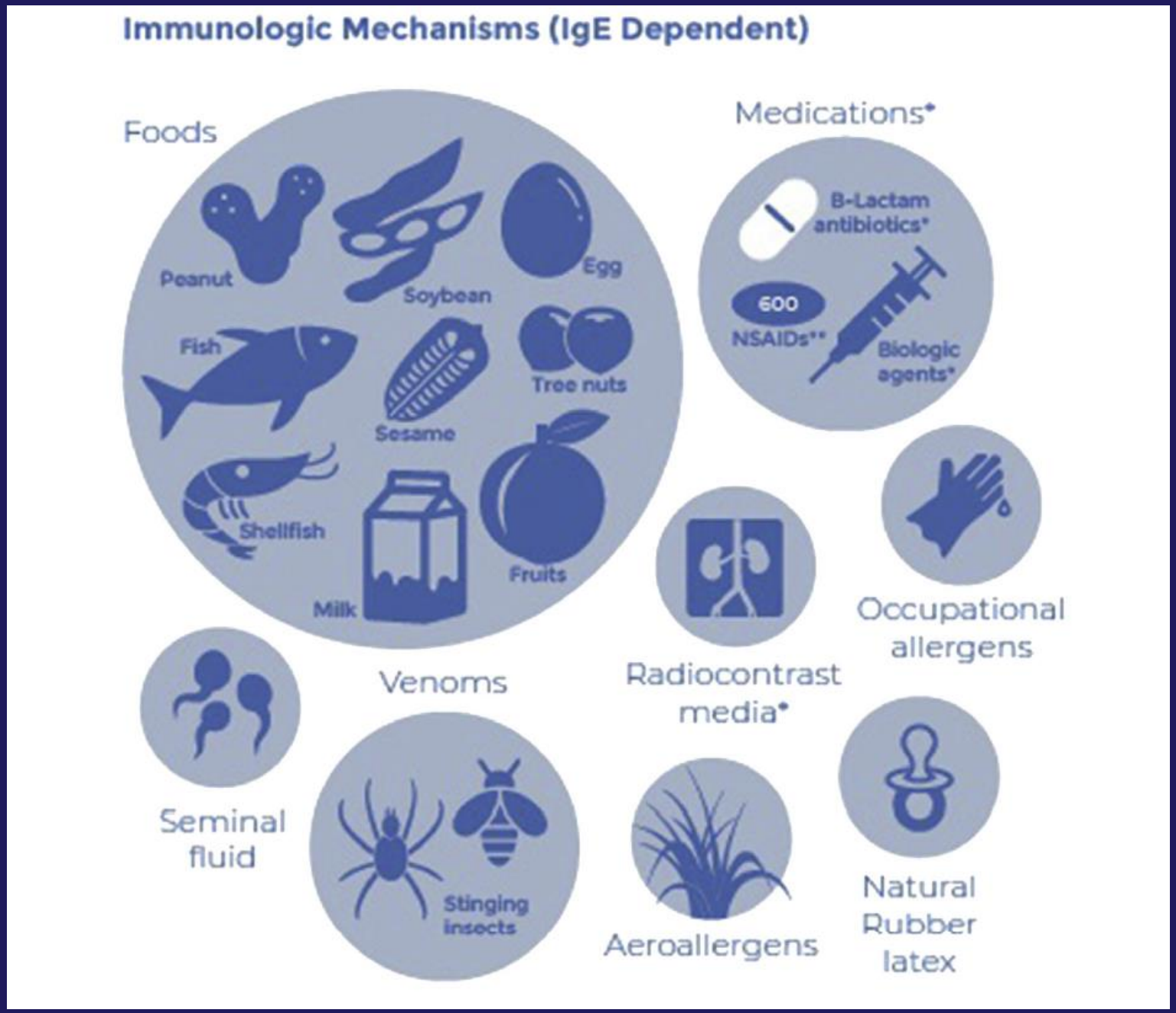
REVISED NOMENCLATURE FOR ANAPHYLAXIS



GELL AND COOMBS CLASSIFICATION OF HYPERSENSITIVITY REACTIONS

Type I	Immediate hypersensitivity
Type II	Cytotoxic reactions
Type III	Immune complex reactions
Type IV	Delayed hypersensitivity

Anaphylaxis can occur through Types I, II and III immunopathologic mechanisms


Immunologic Mechanisms (IgE Dependent)
Foods
Peanut
Soybean
Egg
Fish
Tree nuts
Sesame
Shellfish
Milk
Fruits
Medications*
B-Lactam antibiotics*
600
NSAIDs**
Biologic agents*
Occupational allergens
Radiocontrast media*
Venoms
Stinging insects
Seminal fluid
Aeroallergens
Natural Rubber latex

Immunologic Mechanisms (IgE independent)

Radiocontrast media*

NSAIDs* **

Dextrans

(e.g. HMW*** iron or other source)

Biologic agents*

(e.g. some monoclonal antibodies)

Nonimmunologic Mechanisms (Direct mast cell activation)

Physical factors

(e.g. exercise, cold, heat, sunlight)

Ethanol

Medications*

(e.g. opioids)

Idiopathic Anaphylaxis (No apparent trigger)

Previously unrecognized allergen?

Mastocytosis / clonal mast cell disorder?

Anaphylaxis is classified as idiopathic when no trigger can be identified and currently represents between 6.5 and 35.0% of cases

Diagnose is clinically

Anaphylaxis is highly likely when any one of the following 2 criteria are fulfilled:

1. Acute onset of an illness (minutes to several hours) with simultaneous 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[a] or bronchospasm[b] or laryngeal involvement[c] after exposure to a known or highly probable allergen[d] for that patient (minutes to several hours), even in the absence of typical skin involvement.

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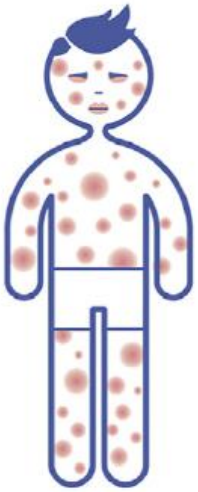


and at least one of the following

A. Airway/Breathing: Respiratory compromise.

(e.g. dyspnea, wheeze-bronchospasm, stridor, reduced PEF, hypoxemia)

B. Circulation: Reduced BP or associated symptoms of end-organ dysfunction.

(e.g. hypotonia [collapse], syncope, incontinence)

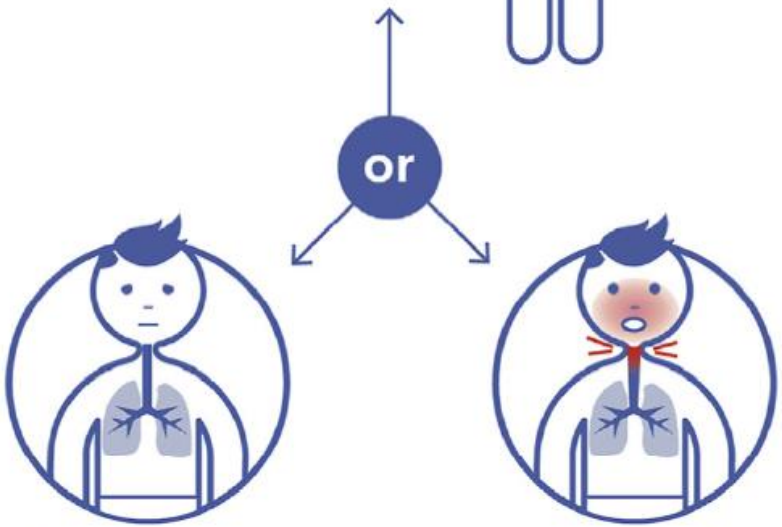
C. Other: Severe gastrointestinal symptoms.

(e.g. 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 probable allergen for that patient (minutes to several hours), **even in the absence of typical skin involvement.**

Infants and children:
low systolic BP (age-specific)
or greater then 30% decrease
in systolic BP*

Adults:
systolic BP of less than 90
mm Hg or greater than 30%
drecrease from that person's
baseline



Bronchospasm

Laryngeal
involvement

1. Typical skin symptoms AND significant symptoms from at least 1 other organ system;

2. Exposure to a known or probable allergen for that patient, with respiratory and/or cardiovascular compromise.

- Severe gastrointestinal symptoms (severe crampy, abdominal pain, repetitive vomiting), especially after exposure to non-food allergens".
- gastrointestinal symptoms, particularly after exposure to non-food allergens, are indicative of anaphylaxis, without requiring such symptoms to become persistent
- Hypotention: Infants and children: <70 mmHg; 1-10 years old : <70 mmHg+[2 * age]

- Some reactions present initially with isolated respiratory or cardiovascular symptoms; such presentations are not uncommon in fatal anaphylaxis triggered by exposure to food and other allergens, and are increasingly seen with oral immunotherapy/desensitization protocols

- it is not uncommon for allergic reactions to involve only the skin, remote to the site of allergen exposure: this is clearly a systemic manifestation, but should not be classified as anaphylaxis in the absence of potentially life-threatening compromise affecting the respiratory and/or cardiovascular systems

- Some triggers of anaphylaxis cause rapidly progressing symptoms, but are of delayed onset after allergen exposure eg, galactose-alpha-1,3 galactose (alpha-gal allergy)

ELICITORS AND COFACTORS OF ANAPHYLAXIS

Age-Related Factors*

Infants

Cannot describe their symptoms

Adolescents and young adults

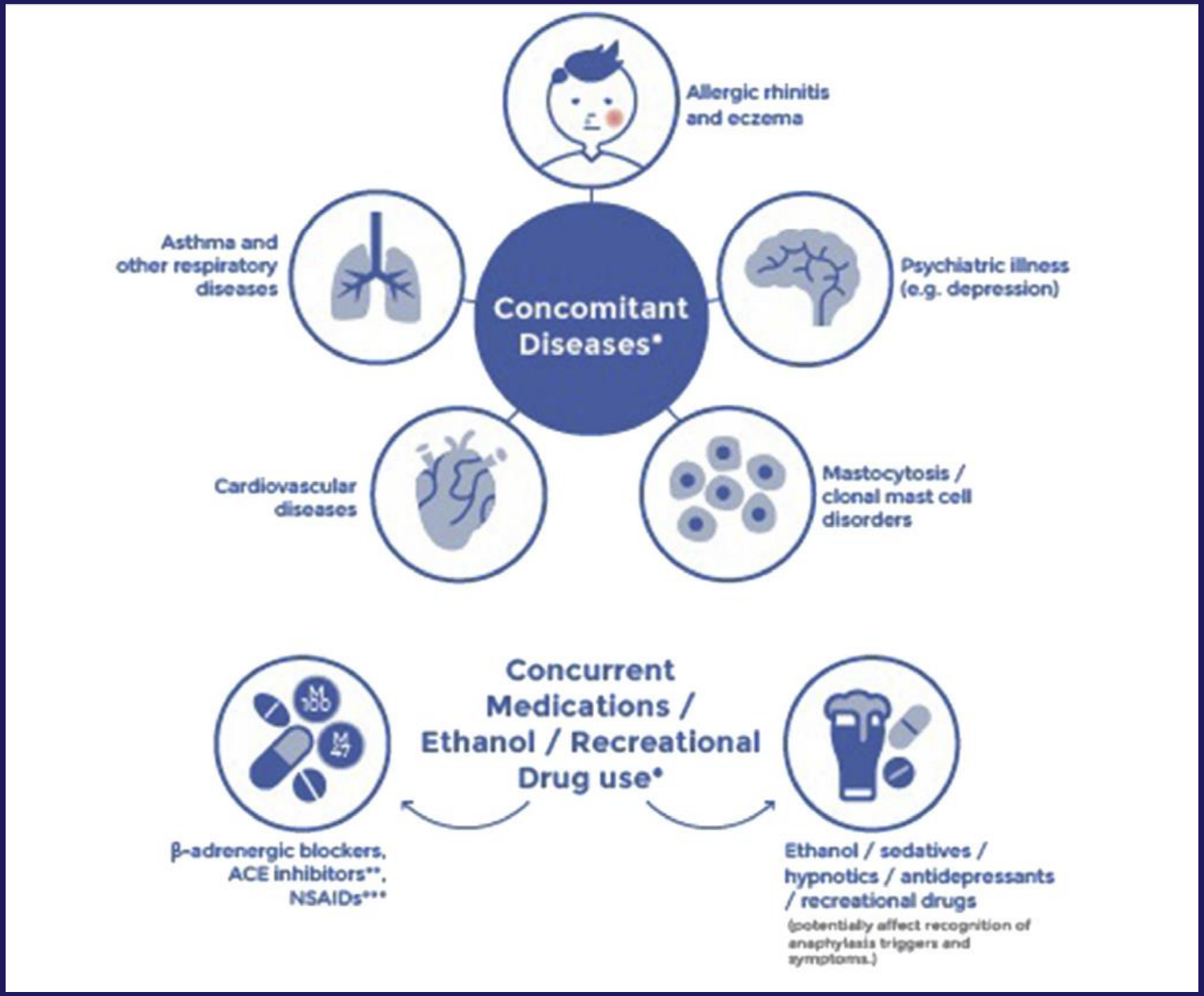
Increased risk-taking behaviors

Labor and delivery

Risk from medications (e.g. antibiotic to prevent neonatal group B strep infection)

Elderly

Increased risk of fatality from medication and venom-triggered anaphylaxis


Allergic rhinitis and eczema
Asthma and other respiratory diseases
Concomitant Diseases*
Psychiatric illness (e.g. depression)
Cardiovascular diseases
Mastocytosis / clonal mast cell disorders
Concurrent Medications / Ethanol / Recreational Drug use*
β-adrenergic blockers, ACE inhibitors**, NSAIDs***
Ethanol / sedatives / hypnotics / antidepressants / recreational drugs
(potentially affect recognition of anaphylaxis triggers and symptoms.)

Co-Factors that Amplify Anaphylaxis*

Endogenous	Exogenous
sex, age	medication
cardiovascular disease	physical activity
mastocytosis	psychological burden
atopic disease	certain elicitors
elevated tryptase	sleep deprivation
ongoing infection	

Table 5. Factors, which can increase severity of anaphylaxis

PRIMARY SYMPTOMS OF ANAPHYLAXIS

- **Skin:**
  flushing, itching, urticaria, angioedema
- **Gastrointestinal:**
  nausea, vomiting, bloating, cramping, diarrhea
- **Other:**
  feeling of impending doom, metallic taste
- **Respiratory:**
  dysphonia, cough, stridor, wheezing, dyspnea, chest tightness, asphyxiation, death
- **Cardiovascular:**
  tachycardia, hypotension, dizziness, collapse, death

COMMENTS ABOUT ANAPHYLAXIS SIGNS AND SYMPTOMS

- skin symptoms occur most commonly (> 90% of patients)
- skin, oral, and throat symptoms are often the first ones noted
- respiratory symptoms occur in 40% to 70% of patients
- gastrointestinal symptoms occur in about 30% of patients
- shock occurs in about 10% of patients
- signs and symptoms are usually seen within 5 to 30 minutes
- The more rapid onset, the more serious reaction

BIPHASIC AND PROTRACTED ANAPHYLAXIS

- biphasic anaphylaxis is defined as return of symptoms after resolution of initial symptoms, without subsequent allergen exposure
- usually, symptoms return within 1 to 8 hours (sometimes longer)
- up to 20% of anaphylactic reactions are biphasic
- patients with biphasic anaphylaxis may require more epinephrine to control initial symptoms
- in protracted anaphylaxis, symptoms may be continuous for 5-32 hrs

IATROGENIC ANAPHYLAXIS

- estimated 550,000 serious allergic reactions to drugs/year in US hospitals
- most common drug triggers
  - penicillin (highest number of documented deaths from anaphylaxis)
  - sulfa drugs
  - non-steroidal anti-inflammatory drugs
  - muscle relaxants
- most common biologic triggers
  - anti-sera for snakebite
  - anti-lymphocyte globulin
  - vaccines
  - allergens

FACTORS AFFECTING PROGNOSIS

Factor	Poor Prognosis	Good Prognosis
Onset of symptoms	Early	Late
Initiation of treatment	Late	Early
Route of exposure	Injection	Oral*
β-adrenergic blocker use	Yes	No
Presence of underlying disease	Yes	No

* true for drugs, not foods

THE END