

# ANAPHYLAXIS

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**GIRL WITH ALLERGY DIES AFTER HEATHROW  
PRET BAGUETTE  
17 JULY 2016**



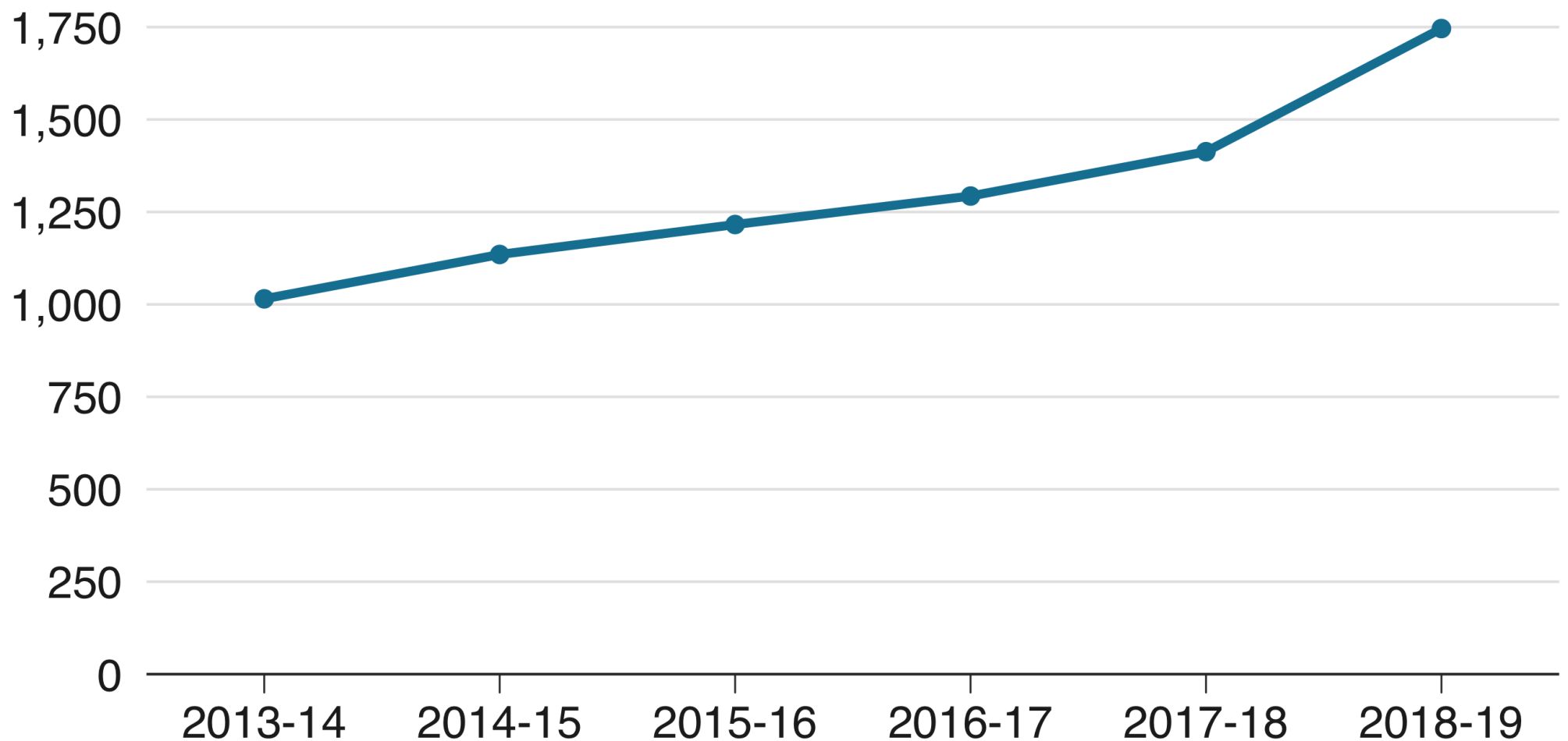
# LEARNING OUTCOMES

- Understand the approach to the patient with anaphylaxis
- Recognise the signs and symptoms of anaphylaxis
- Pathophysiology, DDx
- Know how to manage a patient with anaphylaxis
- Review the anaphylaxis algorithm ( Resus Council UK)
- Case Based Discussion



# Number of children admitted to hospital with severe allergic reactions

All under-18 admissions in England, 2013-14 to 2018-19



Source: Hospital Episode Statistics, NHS Digital

# SCENARIO 1

X is 18 years old and goes out at the weekend with a group of friends. After going clubbing, he has a curry at a local restaurant.

During the meal he complains of having stomach cramps. He then starts to feel unwell and feels a bit breathless.



# INITIAL ASSESSMENT

- A Clear
- B RR 18 min<sup>-1</sup>
- C P 90 min<sup>-1</sup>, BP 110/60
- D Alert, anxious
- E Normal

What action will you take?



# SCENARIO (CONTINUED)

Over the next 10 min, he becomes very short of breath, has widespread wheeze, develops an urticarial rash, and feels light headed.

Vital signs:

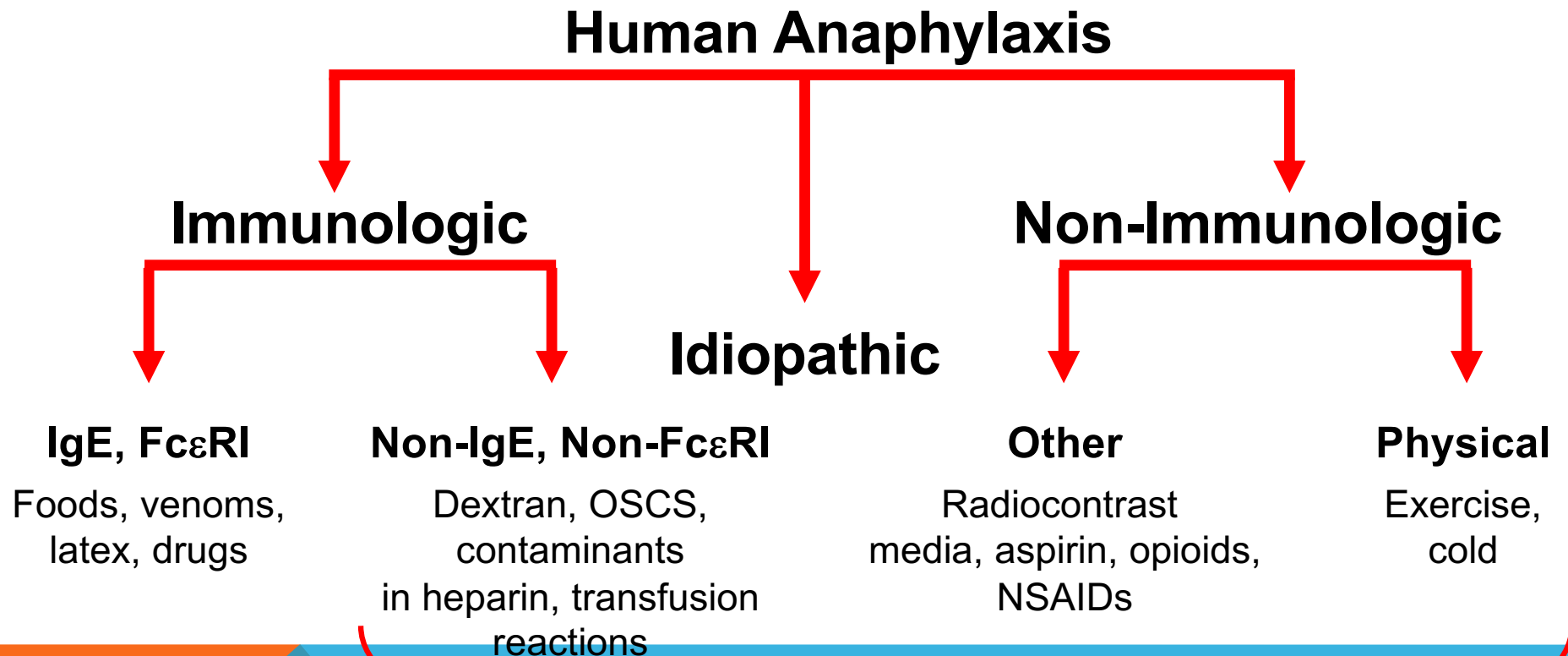
- A Complains of tightness in throat
- B RR 28 min<sup>-1</sup>, widespread wheeze
- C P 120 min<sup>-1</sup>, BP 80/60
- D Very anxious
- E Widespread urticaria



What will you do now?



# CLASSIFICATION OF HUMAN ANAPHYLAXIS



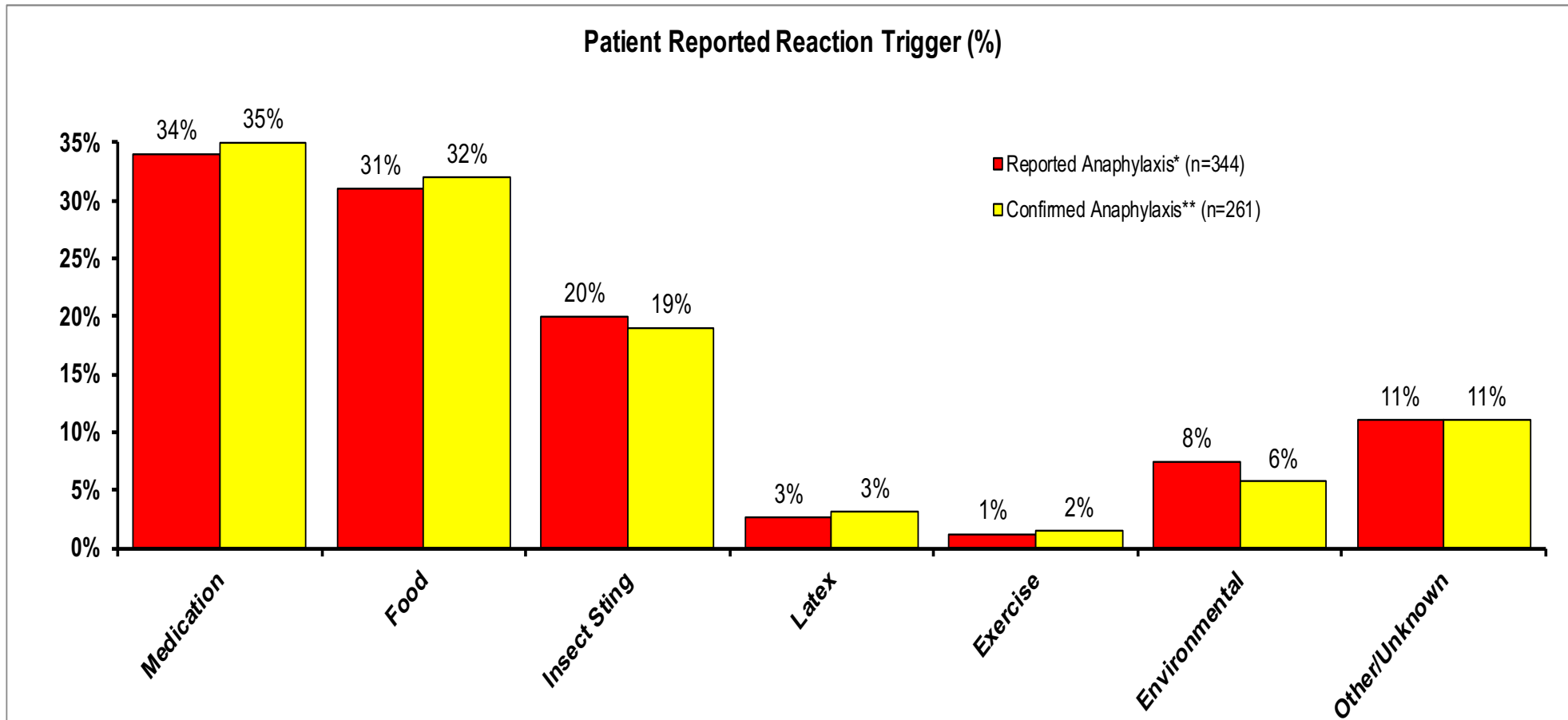
**ANAPHYLACTOID**

IgE, immunoglobulin E;  
FcεRI, high-affinity IgE receptor;  
OSCS, oversulfated chondroitin sulfate;  
NSAIDs, nonsteroidal anti-inflammatory drug.

Simons FER, et al. *J Allergy Clin Immunol.* 2010;125:S161-S181.



# PATIENT REPORTED CAUSES OF ANAPHYLAXIS



\*Reported reactions were categorized as those involving  $\geq 1$  system.

\*\*Confirmed reactions were categorized as those involving  $\geq 2$  systems with respiratory and/or cardiovascular symptoms or those leading to loss of consciousness, even if only that single system was involved.

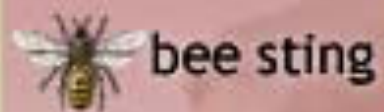
Wood RA, et al. *JACI*. 2014;133:461-7

# ALLERGIC REACTIONS

## Skin Contact



## Injection



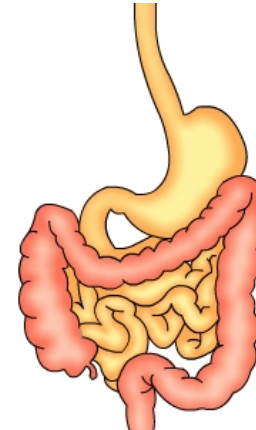
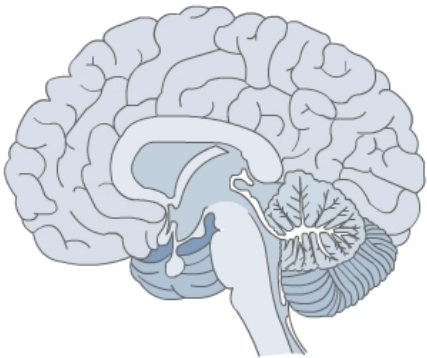
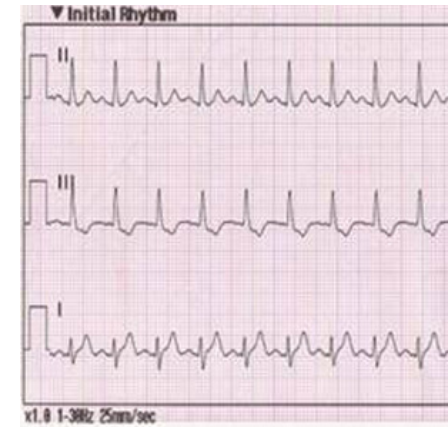
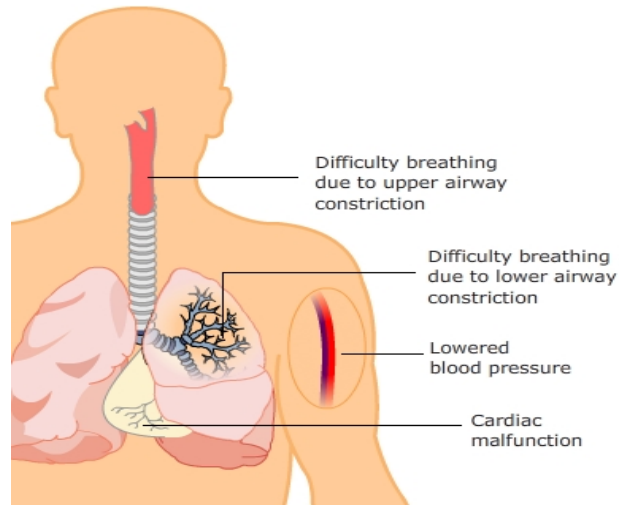
## Ingestion



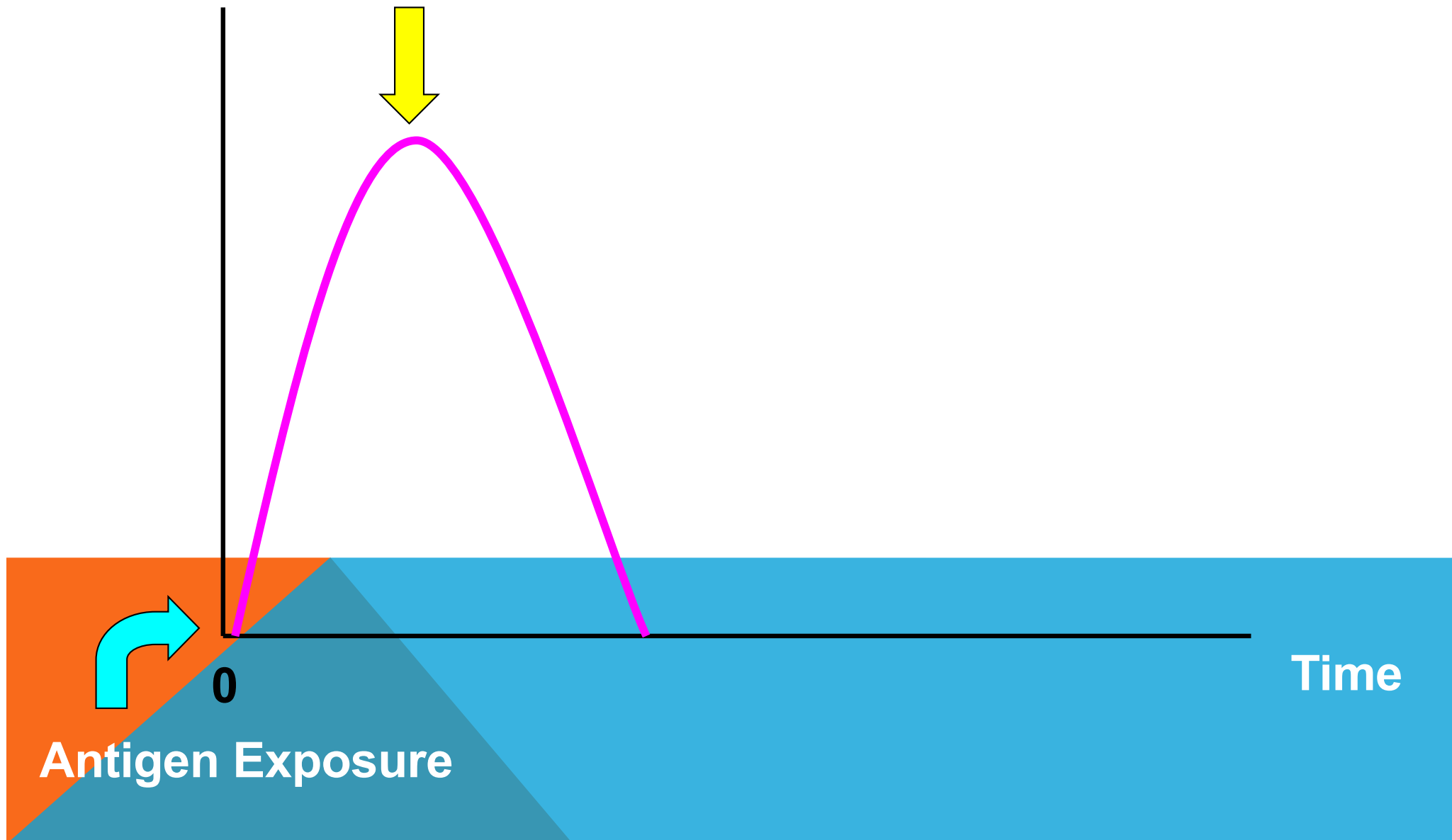
## Inhalation



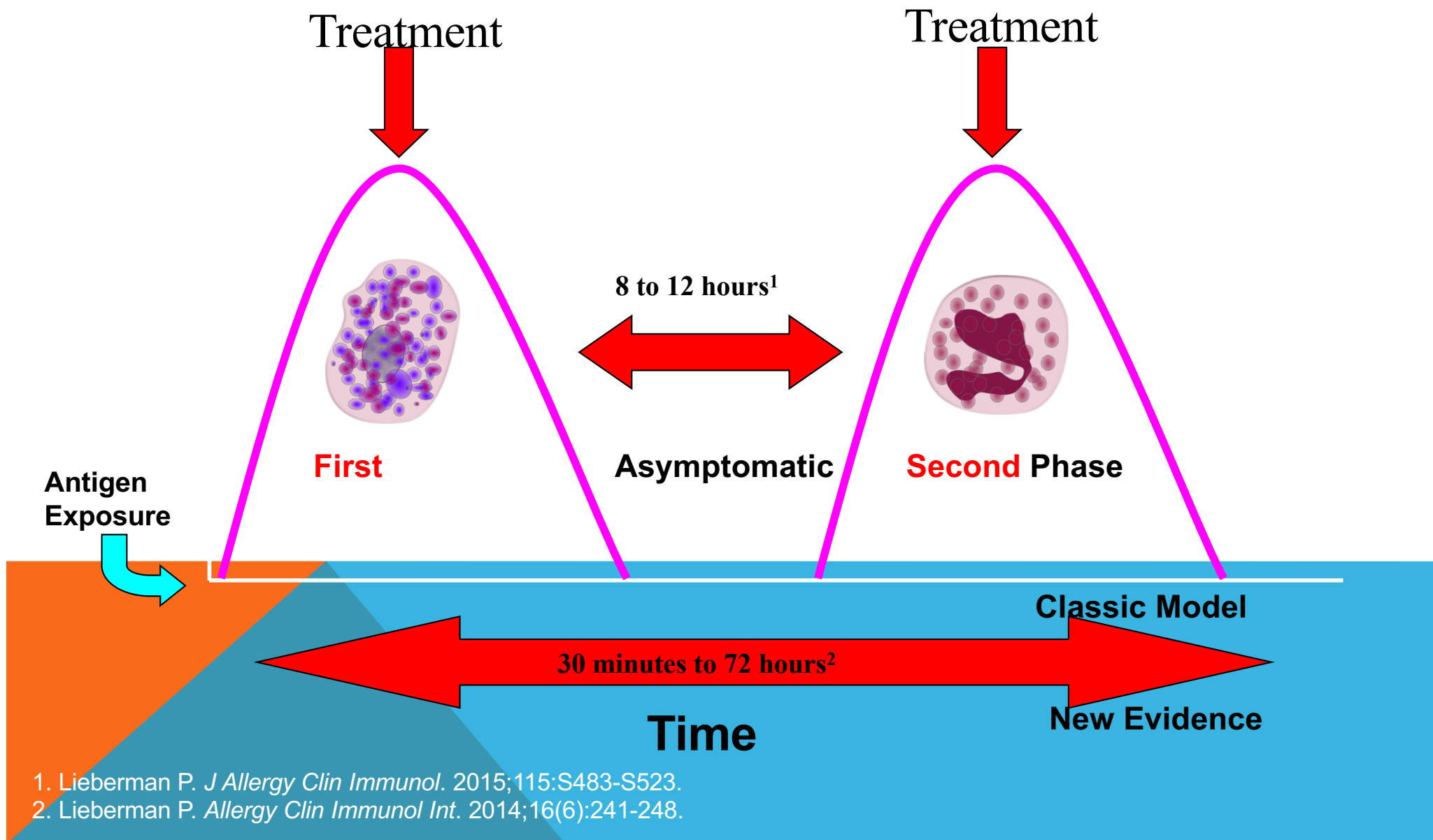
# SIGNS & SYMPTOMS OF ANAPHYLAXIS



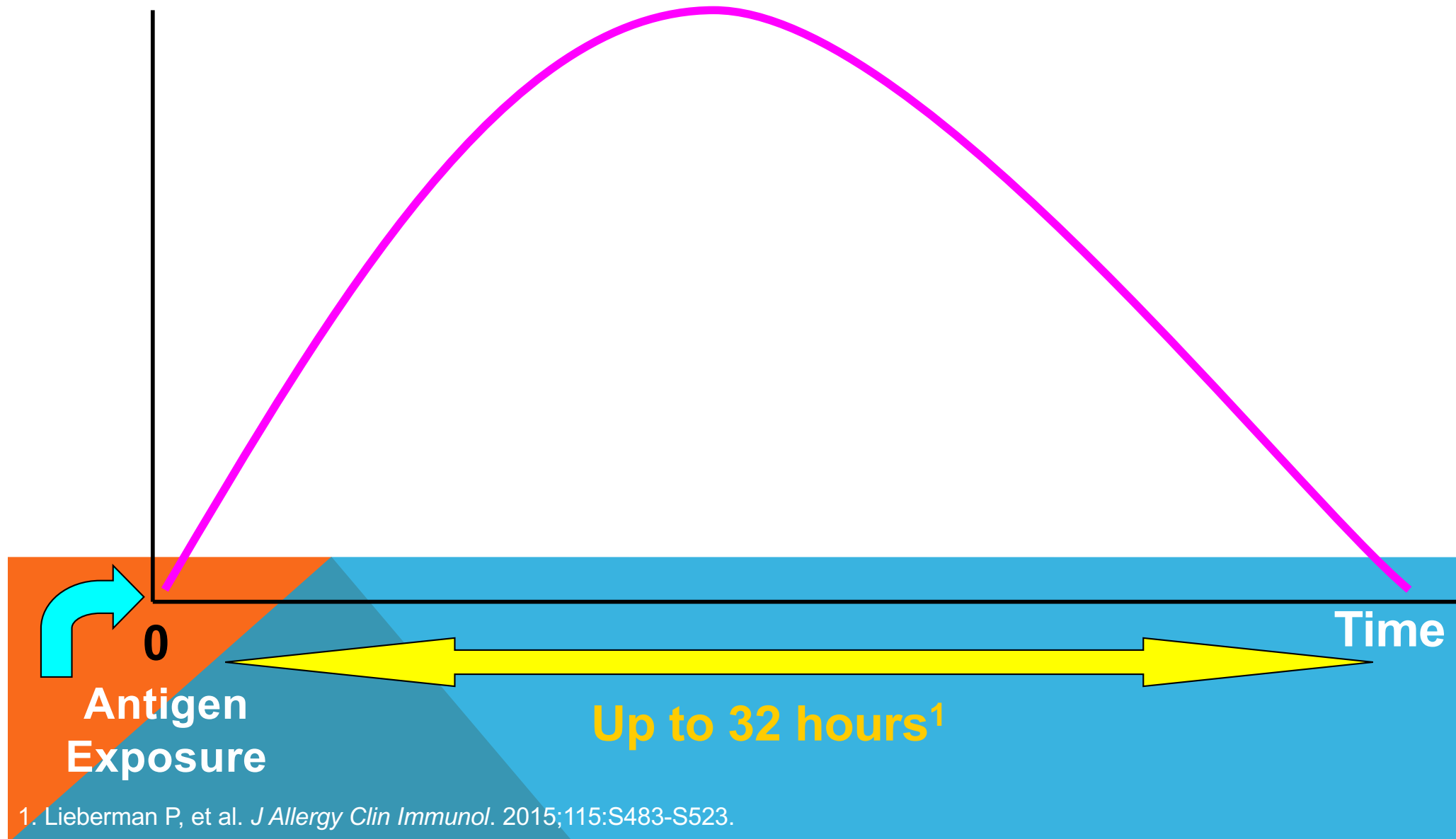
# UNIPHASIC ANAPHYLAXIS



# Biphasic Anaphylaxis



# PROTRACTED ANAPHYLAXIS



# PATIENT FACTORS THAT INCREASE RISK OR SEVERITY OF EVENT

- \* History of previous anaphylactic reaction
- \* Atopy
- \* Asthma
- \* Age
  - Adolescents and young adults: risk-taking behaviors
  - Elderly: comorbidities and medications
- \* Cardiovascular disease
- \* Medications ( $\beta$ -blockers, ACE inhibitors, ARBs, tricyclics, MAO inhibitors)
- \* Mast cell activating disorders

# Anaphylaxis - management

## \*ABCDE

- \* Call for help
- \* Adrenaline
- \* Oxygen, IV fluids, Chlorphenamine, hydrocortisone
- \* Observation and Monitoring
- \* Discharge advice, follow up, education







## Anaphylaxis algorithm

**Anaphylactic reaction?**

**Airway, Breathing, Circulation, Disability, Exposure**

**Diagnosis** - look for:

- Acute onset of illness
- Life-threatening Airway and/or Breathing and/or Circulation problems <sup>1</sup>
- And usually skin changes

- **Call for help**
- Lie patient flat
- Raise patient's legs

**Adrenaline** <sup>2</sup>

**When skills and equipment available:**

- Establish airway
- High flow oxygen <sup>3</sup>
- IV fluid challenge <sup>4</sup>
- Chlorphenamine <sup>5</sup>
- Hydrocortisone <sup>5</sup>

**Monitor:**

- Pulse oximetry
- ECG
- Blood pressure

### 1 Life-threatening problems:

**Airway:** swelling, hoarseness, stridor  
**Breathing:** rapid breathing, wheeze, fatigue, cyanosis, SpO<sub>2</sub> < 92%, confusion  
**Circulation:** pale, clammy, low blood pressure, faintness, drowsy/coma

### 2 Adrenaline (give IM unless experienced with IV adrenaline)

IM doses of 1:1000 adrenaline (repeat after 5 min if no better)

- Adult 500 micrograms IM (0.5 mL)
- Child more than 12 years: 500 micrograms IM (0.5 mL)
- Child 6 - 12 years: 300 micrograms IM (0.3 mL)
- Child less than 6 years: 150 micrograms IM (0.15 mL)

Adrenaline IV to be given **only by experienced specialists**

Titrate: Adults 50 micrograms; Children 1 microgram/kg

### 3 IV fluid challenge:

Adult - 500 – 1000 mL  
 Child - crystalloid 20 mL/kg

Stop IV colloid if this might be the cause of anaphylaxis

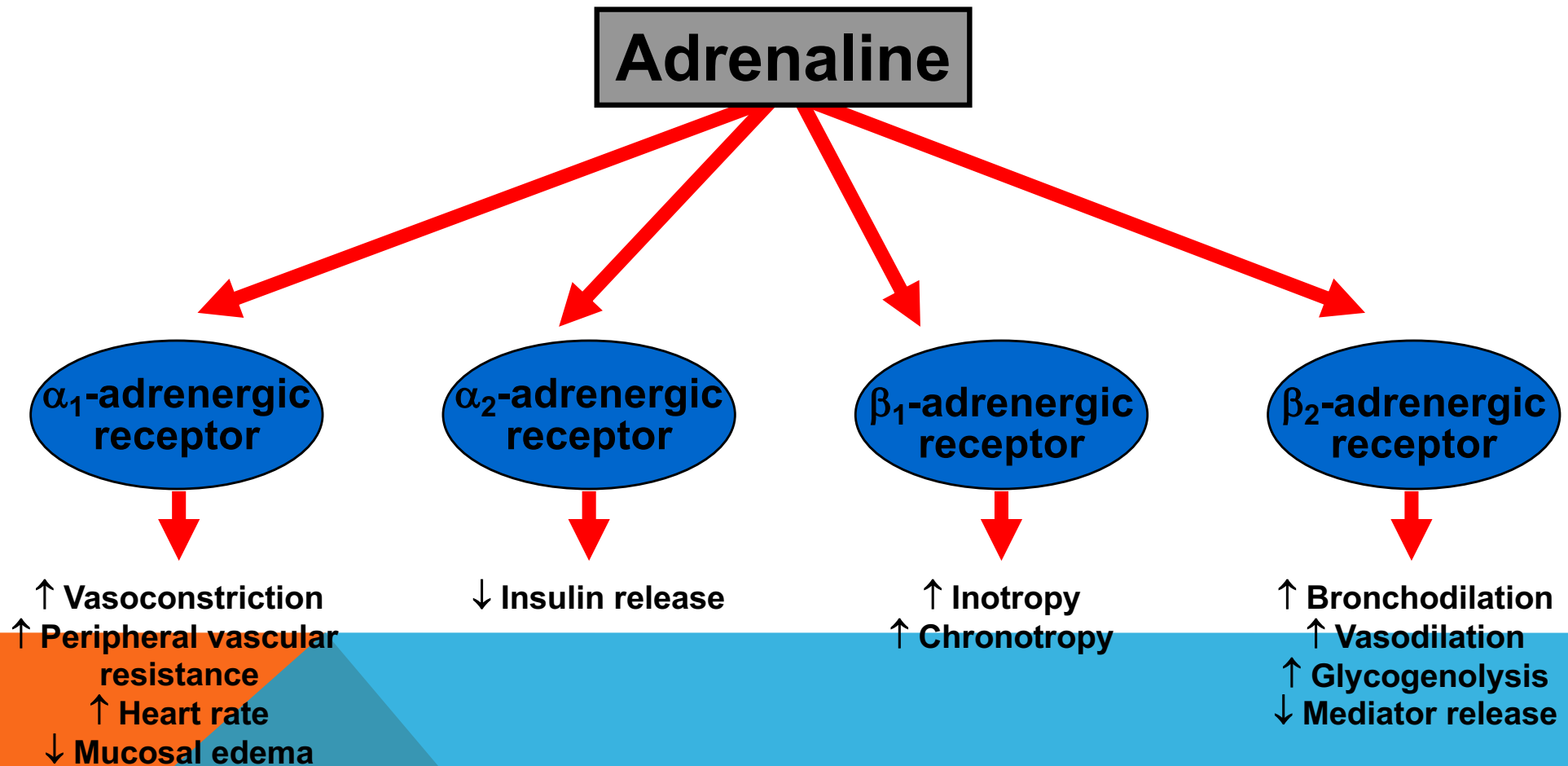
### 4 Chlorphenamine (IM or slow IV)

Adult or child more than 12 years 10 mg  
 Child 6 - 12 years 5 mg  
 Child 6 months to 6 years 2.5 mg  
 Child less than 6 months 250 micrograms/kg

### 5 Hydrocortisone (IM or slow IV)

200 mg  
 100 mg  
 50 mg  
 25 mg

# ACTION OF ADRENALINE



# MAST CELL TRYPTASE

Mast cell tryptase is released during the anaphylactic reaction and may be measured in the blood.

It reaches its peak blood concentration approximately 1-2 hours after the reaction.

The half-life of tryptase is short (approximately 2 hours) and concentrations may be back to normal within 6-8 hours.

**The Resuscitation Council recommend that three tryptase levels are taken:**

As soon as resuscitation has started; 1-2 hrs after start of symptoms, at 24hrs



# STINGING INSECTS

- ants, bees, hornets, wasps, and yellow jackets.

Fatal anaphylaxis can develop when a person with IgE antibodies induced by a previous sting is stung again.

*Removal of venom sac.* Insect envenomation by bees (but not wasps) may leave a venom sac attached to the victim's skin.

Avoid compressing or squeezing any insect parts near the skin because squeezing may increase envenomation

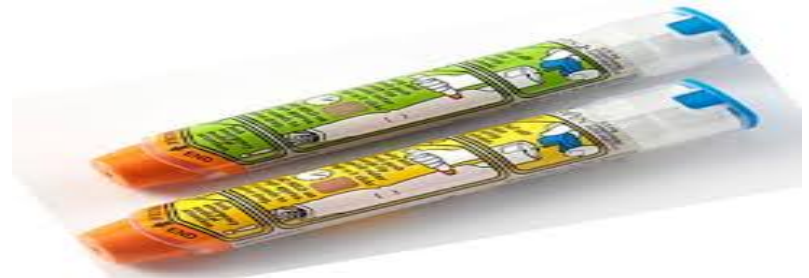


# OBSERVATION

- \* Most patients who have suffered an anaphylactic reaction will need admission and observation for 6-12 hours depending on response to treatment.
- \* **Patients with particular conditions and circumstances such as those listed below, may need observation for up to 24 hours:**
- \* All children and young people under 16 years (NICE guidelines)
- \* A previous history of biphasic reactions or known asthmatics
- \* Possibility of continuing absorption of allergen (like a fully eaten peanut butter sandwich)
- \* Poor access to emergency care
- \* Presentation in the evening or at night
- \* Severe reactions with slow onset caused by idiopathic anaphylaxis
- \* Biphasic reactions are not easy to predict. Patients who have suffered an anaphylactic reaction are likely to suffer future episodes, and should all be offered a referral to a specialist allergy service.
- \* Outpatient follow up is essential for investigation, identification of the allergen and provision of ongoing management.



# ADRENALINE AUTO-INJECTOR



- A prescription for two should be given.
- Patients should be advised to have the auto-injector easily available at all times.
- Three types are commercially available (EpiPen , Jext and Emerade).
- They come in 0.3ml and 0.15ml strengths (EpiPen and Jext) and 0.5ml, 0.3ml and 0.15ml strengths (Emerade).

- \* **Medic Alert** bracelet
- \* Referral to immunologist
- \* Drug induced anaphylaxis – report incident to MHRA





# How to use an adrenalin autoinjector (Epipen, Jext or Emerade)

1.



Hold in your  
dominant hand

2.



Remove the cap  
with your other  
hand

3.



Swing and jab the tip of  
the autoinjector into your  
upper, outer thigh (with  
or without clothes, but  
avoiding seams)

4.



Hold the injection  
in place for **10  
seconds**

5.



Massage the  
injection site for  
10 seconds

6.



Phone for an  
ambulance

# DDX

1. Asthma
2. Septic Shock
3. Vasovagal syncope
4. Panic attack / Hyperventilation
5. Systemic mast cell disorders
6. Idiopathic urticaria or angioedema
7. Scromboid poisoning





## SCENARIO 2

A 6yr old child with bee sting came to ED





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**Adrenaline** <sup>2</sup>

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**5 Hydrocortisone**  
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 50 mg  
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## SCENARIO 3

AB is a keen wild life photographer and is known to be allergic to bee stings. He uses his epipen after being stung by a bee but stills feels breathless and is rushed to the emergency department...

...On arrival at hospital AB's vital signs are:

- Grossly swollen lips and tongue, slurred speech
- Wheezing
- SaO<sub>2</sub> 90% room air
- Pulse: 160 bpm, BP 60/40







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# **ALLERGY GIRL, 4, STOPS BREATHING ON FLIGHT AFTER 'SELFISH' PASSENGER OPENS PACKET OF NUTS DESPITE THREE WARNINGS**

“For a few moments she stopped breathing. Her airway was compromised and she went unconscious.” This 4 yr old child, went into anaphylactic shock and was only revived with an emergency injection. A call by the cabin crew for medically trained passengers produced a nurse and an ambulance driver, who offered to inject her with a Jext “epi” pen.

She regained consciousness and was taken by ambulance to Broomfield Hospital in Chelmsford, Essex, when the plane landed.



# QUESTIONS ?





# NATASHA'S LAW



# SUMMARY

- \* Anaphylaxis is a life-threatening systemic reaction with rapid onset
- \* Early recognition is essential to optimal anaphylaxis management
- \* IM Adrenaline is the treatment of choice for anaphylaxis
- \* Adrenaline should be administered immediately at the onset of likely anaphylaxis
- \* Some reactions may be protracted or biphasic and warrant additional consideration and monitoring
- \* Emergency action plans should be developed for all patients at risk for anaphylaxis
- \* Education on anaphylaxis and allergen avoidance is critical

