

# Anaphylaxis

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# Classification of Adverse Events Following Immunisation (AEFI)

- Vaccine-induced AEFI
  - Induced direct effects of vaccine or vaccine component and/or due to underlying medical condition or idiosyncratic response in recipient
- Programmatic errors
  - Incorrect doses or routes, wrong diluent
- Coincidental events
  - Chance happening
- Injection reaction
  - Result of injection itself, not the vaccine e.g. pain, anxiety
- Unknown
  - Cause cannot be determined

# Vaccine composition

- In addition to the antigen, vaccines may contain some or all of
- the following components:

Component	Purpose	Example
Adjuvants	enhance the immune response to a vaccine	
Additives	stabilise vaccines from adverse conditions such as freeze-drying or heat, thereby maintaining a vaccine's potency	
Residuals from manufacturing process	Inactivating agents  Antibiotics - prevent bacterial contamination during manufacturing process  Egg proteins- some vaccine viruses are grown in chick embryo cells  Yeast proteins	

# Vaccine composition

- In addition to the antigen, vaccines may contain some or all of
- the following components:

Component	Purpose	Example
Adjuvants	enhance the immune response to a vaccine	aluminium salts
Additives	stabilise vaccines from adverse conditions such as freeze-drying or heat, thereby maintaining a vaccine's potency	gelatine
Residuals from manufacturing process	Inactivating agents  Antibiotics - prevent bacterial contamination during manufacturing process  Egg proteins- some vaccine viruses are grown in chick embryo cells  Yeast proteins	formaldehyde  neomycin, streptomycin, polymyxin B  influenza, yellow fever  HepB vaccine

## Types of adverse event

- Local Reactions
  - *More common with non-live vaccines containing adjuvants* (Pain, redness, swelling at injection site)
- Systemic Reactions
  - *Generally more common following live vaccine, but less severe with subsequent doses* (Fever, headache, loss of appetite)
- Allergic Reaction
  - *Anaphylaxis/Severe systemic allergic reaction*

## **Systems for monitoring/reporting AEFI**

- Yellow card System
- Passive reporting by doctor, pharmacist, nurse, patient or parent to the Medicine and Healthcare Products Regulatory Agency (MHRA)

# What is anaphylaxis?

- Definition of anaphylaxis
  - 
  - *Typically rapid and unpredictable with variable severity and clinical features including cardiovascular collapse, bronchospasm, angioedema, pulmonary oedema, loss of consciousness and urticaria*
- Potentially life threatening AEFI
- Very rare - approx. 1 in 900,000
  - *Reference: Oxford vaccine group 2019*

# What happens during anaphylaxis

- Essentially an inappropriate immune response
- Occurs as a result of exposure to an allergen to which a person has been sensitised and previously made specific immunoglobulin E (IgE)
- Anaphylaxis can occur on re-exposure to the antigen when explosive amounts of histamine and other chemical mediators are released following the binding of the antigen to IgE coated mast cells



# Potential triggers

- Various common food and non food triggers

(Nuts, shellfish, dairy products, wasp or bee stings, latex, antibiotics, anti-inflammatories)

- Vaccine specific

*Egg proteins* (yellow fever and influenza vaccines)

*Antibiotics* (Neomycin streptomycin and polymixin B)

*Toxoid* (DTaP, Td)

*Stabilisers and other vaccine components* (Yeast, gelatin)

# Distinguishing signs and symptoms of anaphylaxis and a faint:

- In groups list the signs and symptoms of anaphylaxis and a faint
- Cardiovascular system
- Respiratory system
- Gastrointestinal tract
- Skin
- Central nervous system

# ABCDE

- Airway – swelling of tongue , throat
- Difficulty breathing
- Hoarse voice , stridor
- Breathing – shortness of breath
- Increased respiratory rate
- Wheeze
- Hypoxia – confusion
- Respiratory arrest

- Circulation – Signs of shock
- Pale , clammy , tachycardia , hypotension
- Decreased conscious level
- Cardiac arrest
- Do not stand patient up

- Disability – sense of impending doom
- Anxiety , panic
- Decreased conscious level
- Exposure – skin changes in over 80%
- Erythema / Urticaria
- Includes mucosal changes - Angioedema

## Signs & Symptoms

- Mild
  - Flushed Appearance
  - Urticaria
  - Anxiety
  - Headache
  - Nausea



## Signs & Symptoms

- Moderate
  - Feeling of Impending Doom!
  - Swelling
  - Dyspnoea
  - Wheeze
  - Stridor
  - Tachycardia
  - Swelling of lips
  - Urticaria



## Signs & Symptoms

### Severe

- Angioedema (Including Pharyngeal/Laryngeal)
- Hypotension
- Cyanosis
- Collapse
- Respiratory or cardiac arrest
- DEATH!!!





# Management of anaphylaxis

- Call for assistance
- Lie patient down with legs raised (unless breathing difficulties)
- Where available administer oxygen (10-15 Litre/min)
- If showing clinical signs of shock, difficulty breathing or deteriorating consciousness administer intramuscular adrenaline into anterolateral aspect of thigh
- Repeat dose if no clinical improvement

Age	Dose of adrenaline 1:1000 (1mg/ml)
Less than 6 mths	0.15ml
6 months- 6 yrs	0.15ml
6-12 years	0.3ml
Over 12 years	0.5ml or 0.3ml (if small or prepubertal)

# Adrenaline Auto-Injectors

- Licensed of adrenaline auto-injectors in the UK:
- Emerade
- Epipen
- Jext

# Anaphylaxis

Suppresses release of  
inflammatory mediators  
decreasing angio-oedema

Rapid systemic  
release of large  
quantities of  
histamine

Reverses peripheral  
vasodilation

## Action of adrenaline in anaphylaxis

Causing angio-  
oedema and capillary  
leakage

Causes  
bronchodilation,  
improving  
respiration

Mucosal oedema,  
Bronchospasm, asphyxia

Increases cardiac  
contraction, improving  
BP and cardiac  
perfusion

Shock, BP drops,  
reduced cardiac  
output

**Adrenaline**

