

Lunch Seminar 7 Oct 2016

# Diagnosing and Management of Childhood Food Allergy and Intolerance

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# Disclosures

- Pharmaceuticals: **none**
- Industry: **none**
- Gifts: **none**
- Pharmaceutical stocks: **none**

# Outline

- Introduction
- Epidemiology
- Diagnosis and management
- Co-morbidity
- Prevention
- Conclusion

# Allergy can be serious



Atopic Dermatitis



Allergic Nettle-Rash



Asthma



Allergic Rhinitis



Food Allergy



Conjunctivitis

# Global Allergy Trend

- **40-50%** school-aged children are affected by one or more than one form of allergy<sup>1</sup>
- In 2012, **4.1 million** children had food allergies ; **8.8 million** children had skin allergies<sup>2</sup>
- **400 million** people are affected by allergic rhinitis and **300 million** people are affected by asthma globally<sup>3</sup>
- The WHO estimated that **400 million** people in the world will suffer from asthma by 2025<sup>3</sup>



# Globally...

1 in 3 children under 18 years old has allergy



**Alarming!!!**

# Common allergies in infants and young children

- Allergy is an **excessive or inappropriate reaction** of the immune system in response to **harmless substances**.



**Eczema, Itchiness, Rash,  
Oedema, Dry skin**



**Wheeze, Asthma,  
Cough,  
Allergic Rhinitis**

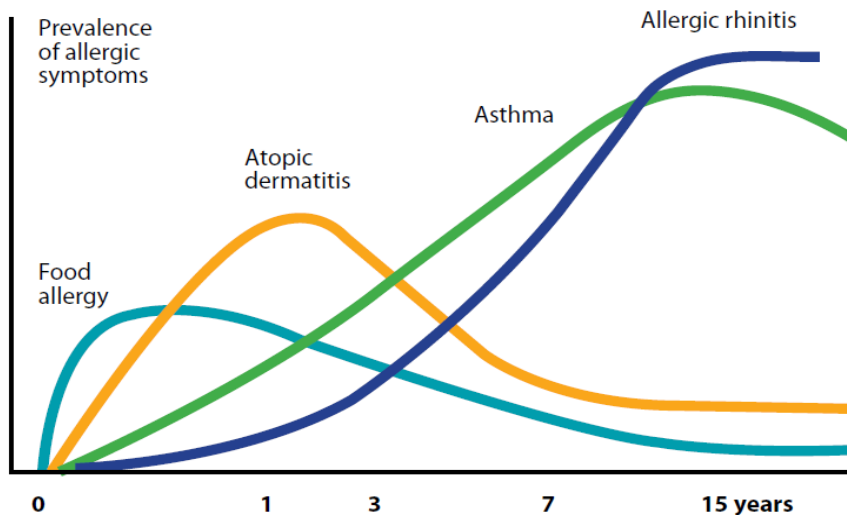


**Food Allergy  
Vomiting, Diarrhea,  
Constipation,  
Abdominal pain**

# Infant-onset allergy will trigger other allergic diseases later in life<sup>1</sup>

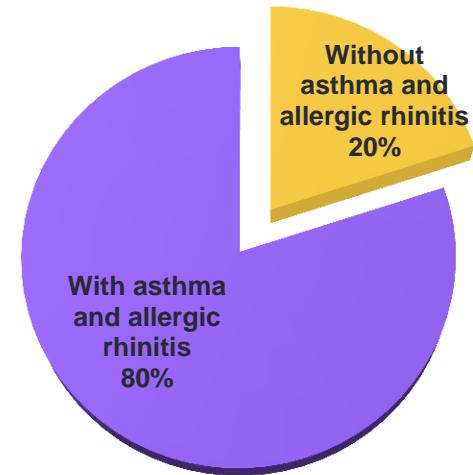
**Infant-onset allergy would increase the risk of having other allergies diseases in later life**

**Typical evolution of allergic disease**



Adapted from Holgate S, Church MK. eds. Allergy, London: Gower Medical Publishing, 1993

**80% children with infant-eczema may develop asthma and allergic rhinitis when grow up<sup>2</sup>**

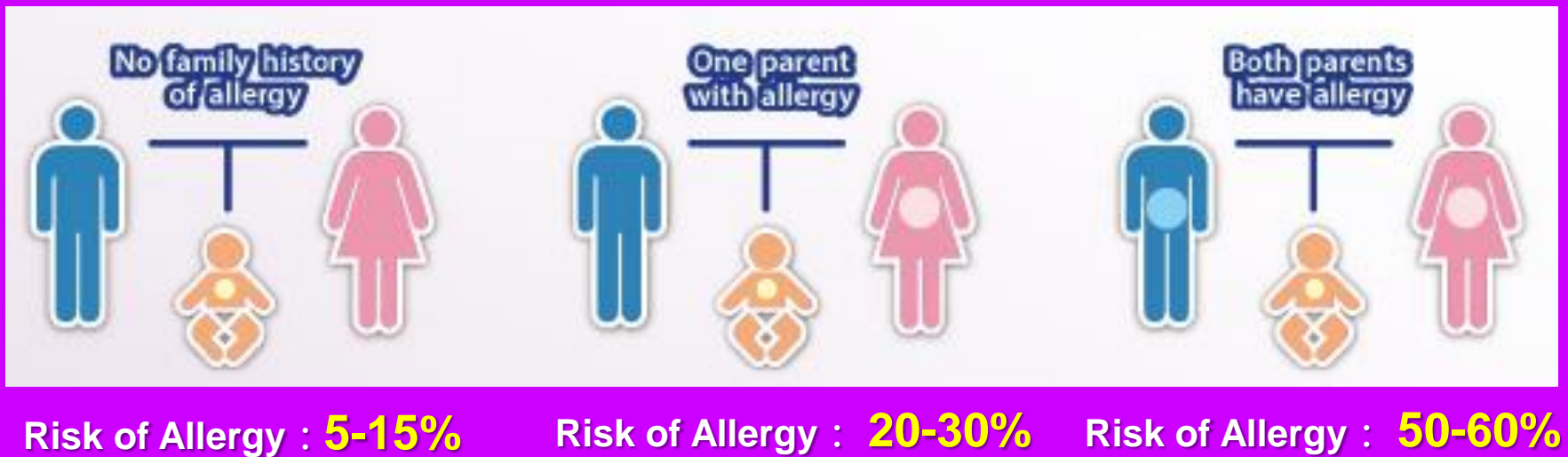


**The Risk of having asthma and allergic rhinitis of the infants with eczema**



# Risk factors of allergy

- Family History<sup>1,2</sup>



- Immature immune system<sup>3</sup>
- The risk of allergy is **4 times** higher in infants fed with **intact cow's milk protein** than breast-fed infants in the first week of life.<sup>4,5</sup>

1. Hong Kong Institute of Allergy. What is Allergy? 2015. <http://allergy.org.hk/allergy.html>

2. FOOD ALLERGY BOOKLET – What Every Parents Needs to Know About. The Malaysian Society of Allergy and Immunology.

3. Kebesch M. Toxicol Lett 2006; 162:43-8.

4. Roduit C, et al. Asthma at 8 years of age in children born by caesarean section. Thorax 2009; 64: 107-113

5. Marini et al Acta Paediatrica 1996, 414:1-22.

# Outline

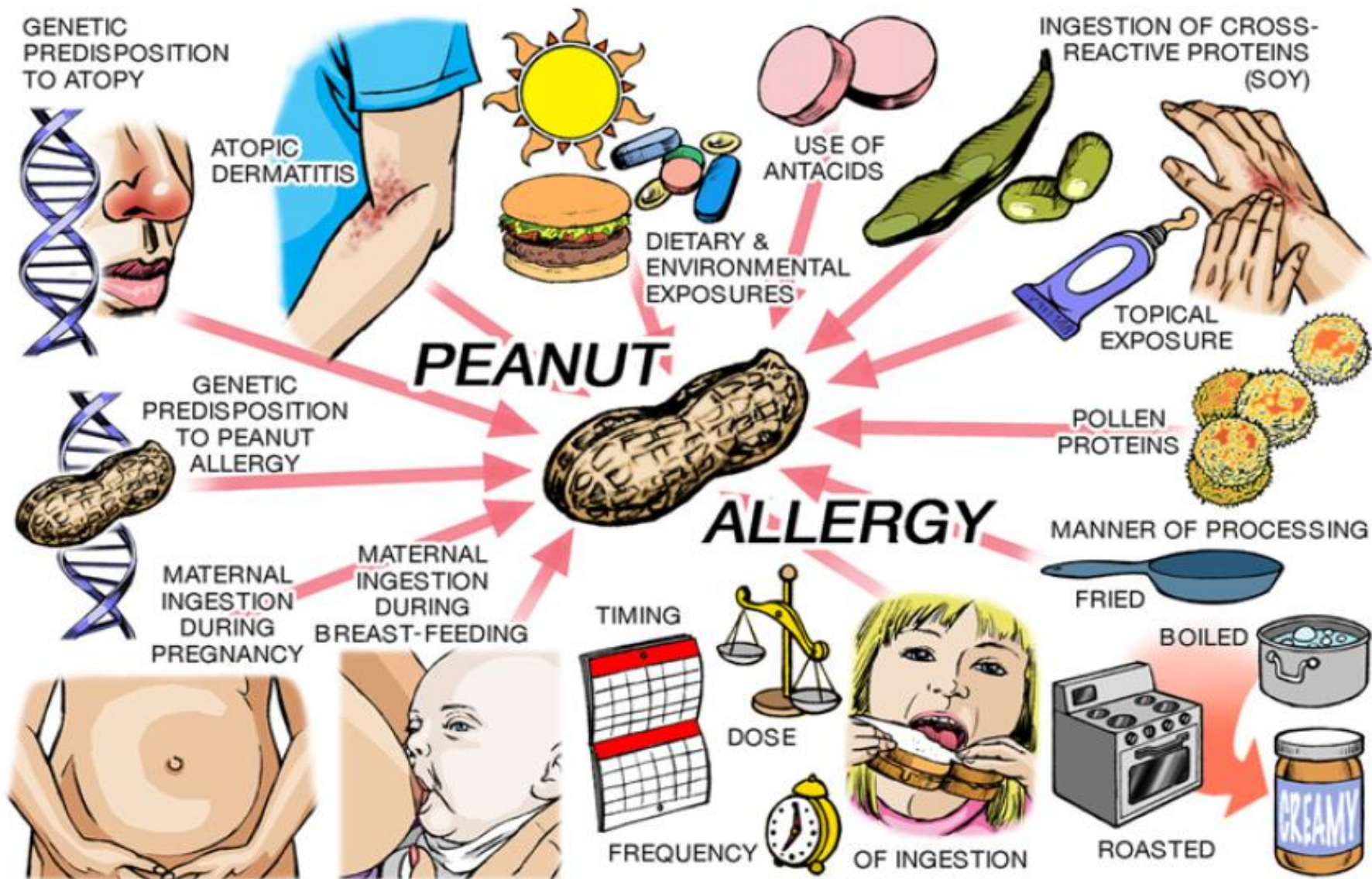
- Introduction
- **Epidemiology**
- Diagnosis and management
- Co-morbidity
- Prevention
- Conclusion

# Epidemiology of FA -world wide

- adults 5%, children 8%,
- increasing in prevalence.

Scott H. Sicherer and Hugh A. Sampson ***JACI* 2014**

Food allergy occurs when the intestinal immune system fails to develop tolerance to food antigens.



**FIG 1.** Possible genetic, immunologic, and environmental risk factors for food allergy.

Scott H Sicherer, Hugh A Sampson JACI 2008

# Epidemiology of FA in HK

	CUHK	HKU
Year	2008	2012
Age (Yr)	2-7	0-14
Setting	21 Nurseries	Population-based
Subject number	3827	7393
Method	Questionnaire	Questionnaire (Cantonese) Face to face interview Parent and child
Prevalence of FA	4.6%	4.8%
Authors/Journal	Leung et al /PAI	Ho et al/APJACI

# **CUHK's study**

## **Additional findings**

- 5% with doctor-diagnosed asthma
- parent-reported AFR was associated with
  - younger age
  - born in mainland China
  - AFR history in parents and siblings
  - paternal history of rhinitis

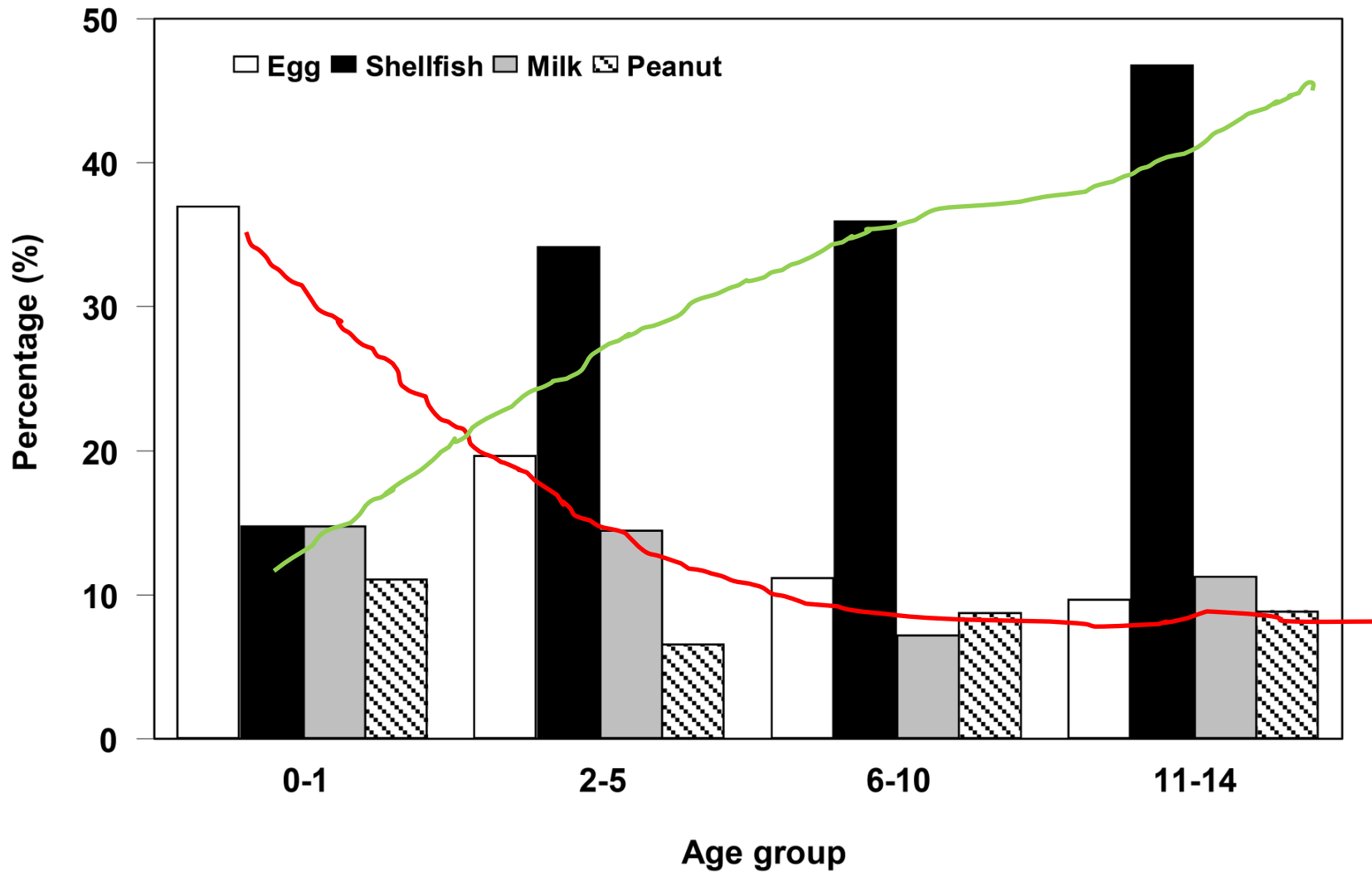
# HKU's additional findings

- Slightly more among boys
- Similar among different Age bands (infant, toddler, preschooler, primary school children, early secondary school)
- Majority (85%) single item



**Table 3.** Signs and symptoms of adverse food reactions

Type of reactions	Total (n=352)	95% C.I.
Urticaria ± Angioedema	127 (36.1%)	31.2% - 41.2%
Exacerbated eczema	79 (22.4%)	18.4% - 27.1%
Anaphylaxis	55 (15.6%)	12.2% - 19.8%
Diarrhoea	45 (12.8%)	9.7% - 16.7%
Vomiting	19 (5.4%)	3.5% - 8.3%
Abdominal Pain	9 (2.6%)	1.4% - 4.8%
Respiratory difficulties	7 (2.0%)	1.0% - 4.1%
Restless/irritability	1 (0.3%)	0.1% - 1.6%
Others	10 (2.8%)	1.5% - 5.2%



**Figure 1.** Comparison of relative frequencies of common food allergies in different age groups

# Additional findings

- FA children-
  - Poor QoL
  - Poor sleep
  - Higher asthma/rhinitis ( 2-3 fold increase)
  - Higher eczema ( 5-8 fold increase)

# Leading Food Allergen

CUHK	HKU
shellfish	Shellfish
Egg	Egg
Peanut	Cow milk
Meat	Peanut
Cow milk	Fruit
Tree nuts	Bean
	Meat
	Fish
	Tree nuts

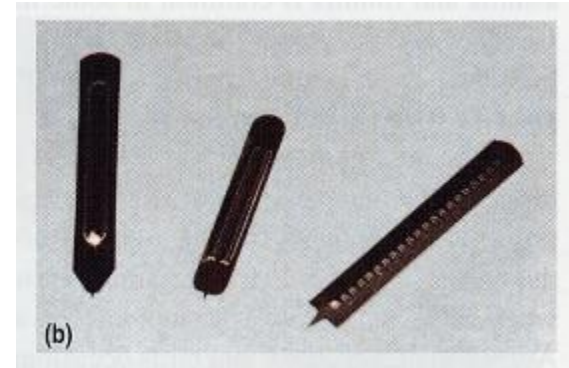
# Outline

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- Epidemiology
- **Diagnosis and management**
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# Diagnosis of FA

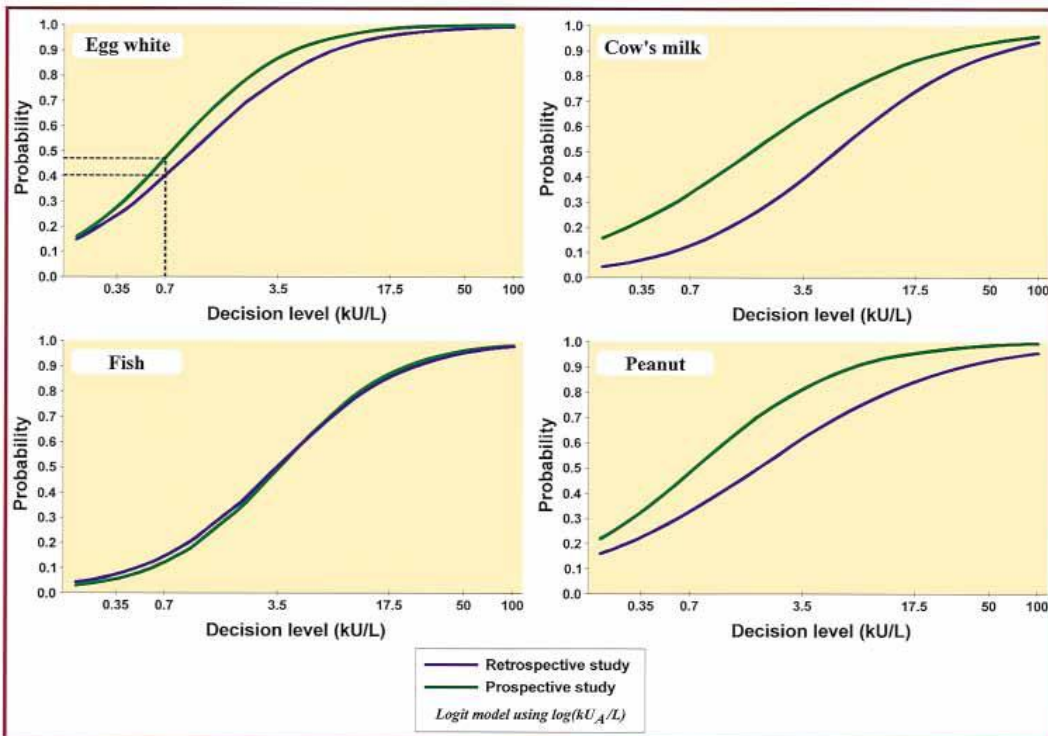
- History
- RAST test or Skin prick test
- +/- Oral food challenge
- Elimination and re-challenge
- Endoscopy + biopsy

# IgE Skin testing



# In vitro test (RAST)

- Quantification of level of food specific IgE



## Diagnostic decision points of 95% PPV

- cow's milk 15 kU/L
- egg 7 kU/L
- peanut 14 kU/L
- fish 20 kU/L



# Food Challenge

- “gold standard”
- Potentially dangerous test
- Safeguards: individual protocol, appropriate setting



# Anaphylaxis Checklist

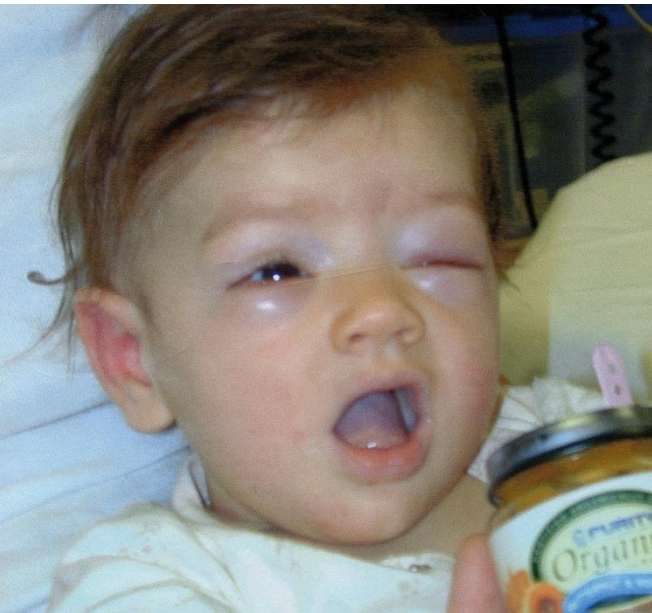
Clinical features

Avoidance of allergens

Revue and Reassessment

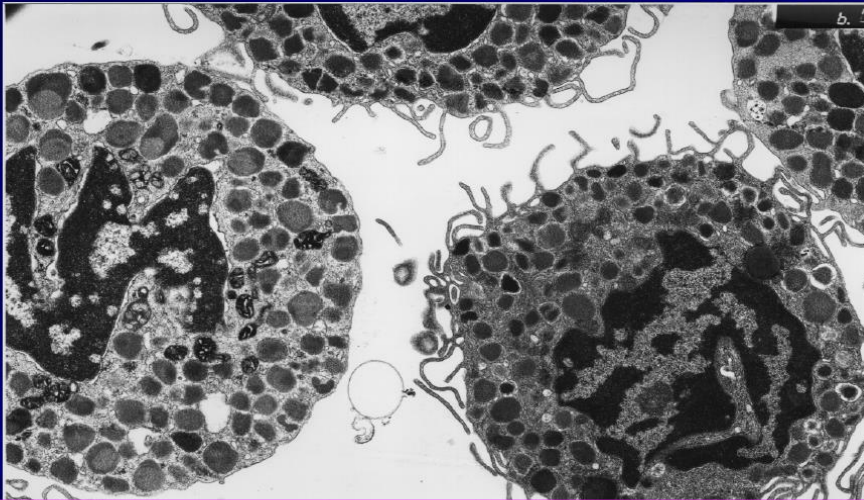
Emergency plan and Epinephrine auto-injector

A reaction 5 minutes after eating a  
peanut

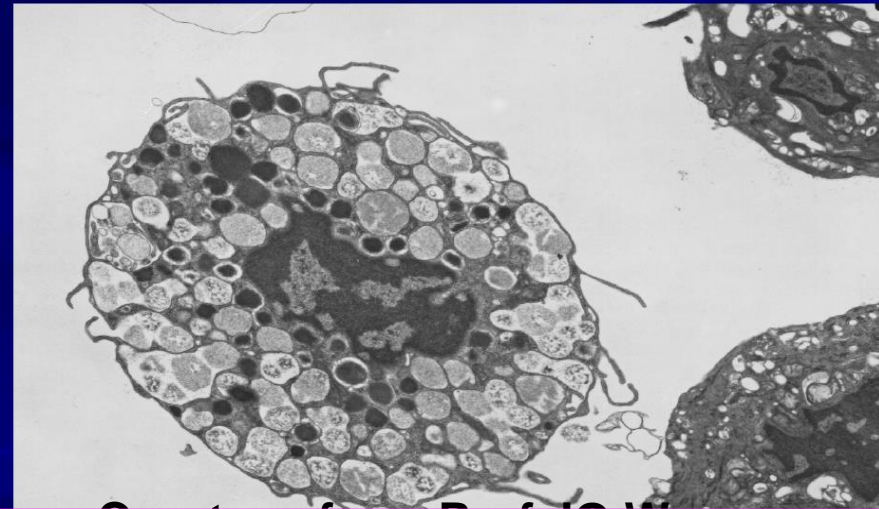




## Resting Mast cells



## De-granulated Mast cells

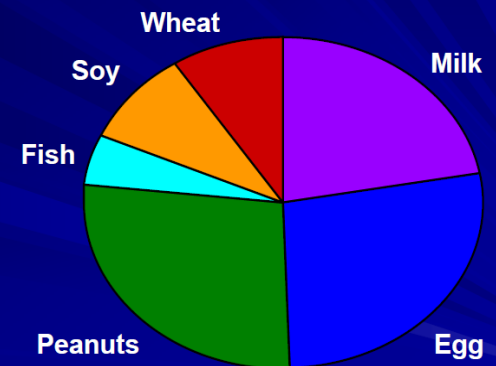


## Mast cell/Basophil mediators

- Cytokines – Il-4,5,6,13. TNF- $\alpha$
- Granule mediators – histamine  
tryptase  
heparin etc.
- Lipid mediators - leukotrienes B<sub>4</sub>, C<sub>4</sub>, D<sub>4</sub>,  
E<sub>4</sub>, prostaglandins D<sub>2</sub>, F<sub>2</sub> $\alpha$  etc.
- Chemokines

## 90% of Immediate Food Allergy is Caused by 8 Foods

1. **Milk**
2. **Egg**
3. **Peanuts**
4. **Treenuts**
5. **Fish**
6. **Soya**
7. **Wheat**
8. **Shellfish**



# Risk factors for **fatal** anaphylaxis

- Delayed epinephrine
- Adolescents and young adult
- Previous severe reaction
- Underlying asthma
- Symptom denial

# Anaphylaxis Checklist

Clinical features

Avoidance of allergens

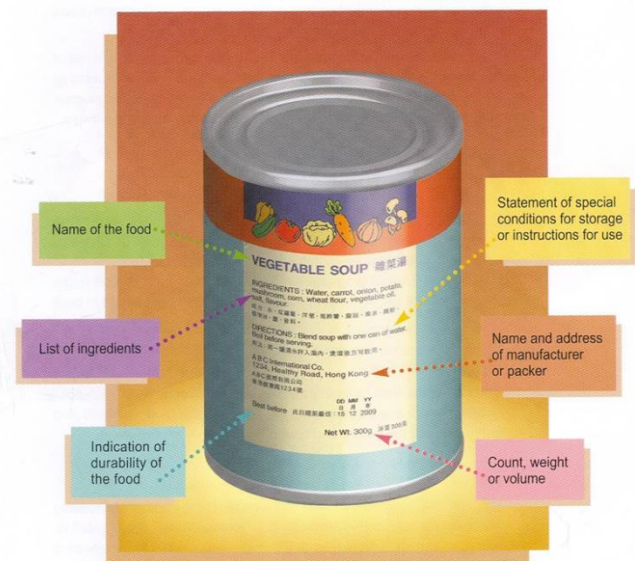
Revue and Reassessment

Emergency plan and Epinephrine auto-injector



中華人民共和國香港特別行政區政府  
The Government of the Hong Kong Special Administrative Region  
of the People's Republic of China

## READ THE FOOD LABELS



## Food and Drugs (Composition and Labelling) (Amendment) Regulation 2004 ( grace period until 2007)

## Labelling Guidelines On Food Allergens, Food Additives

# Peanut Avoidance

## Foods Containing Peanut



Nuts and oils  
堅果和油



Cakes and Pastries  
蛋糕和各類糕點



Spreads, Dips, sauces  
and soup  
酌料、醬汁和湯



Breakfast Cereals  
早餐穀類食品



Candies and snacks  
糖果和零食



Eating Out  
外出用膳

Courtesy: June Chan (Senior Dietitian @ HKSH)



# Peanut Avoidance

## Common Restaurant Food that May Contain Peanut



Satay Sauce  
沙爹醬



Pad Thai Noodle  
泰式金邊粉



Seafood Congee  
艇仔粥



Kung Po Chicken  
宮保雞丁



HK Style French Toast  
西多士



Ice cream sundae  
雪糕新地



Pasta with Pesto  
Sauce 香蒜醬意粉



Rice rolls in sesame  
sauce 麻醬腸粉

Courtesy: June Chan (Senior Dietitian @ HKSH)

# Anaphylaxis Checklist

Clinical features

Avoidance of allergens

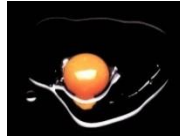
Revision and Reassessment

Emergency plan and Epinephrine auto-injector

# Every food has its own story...



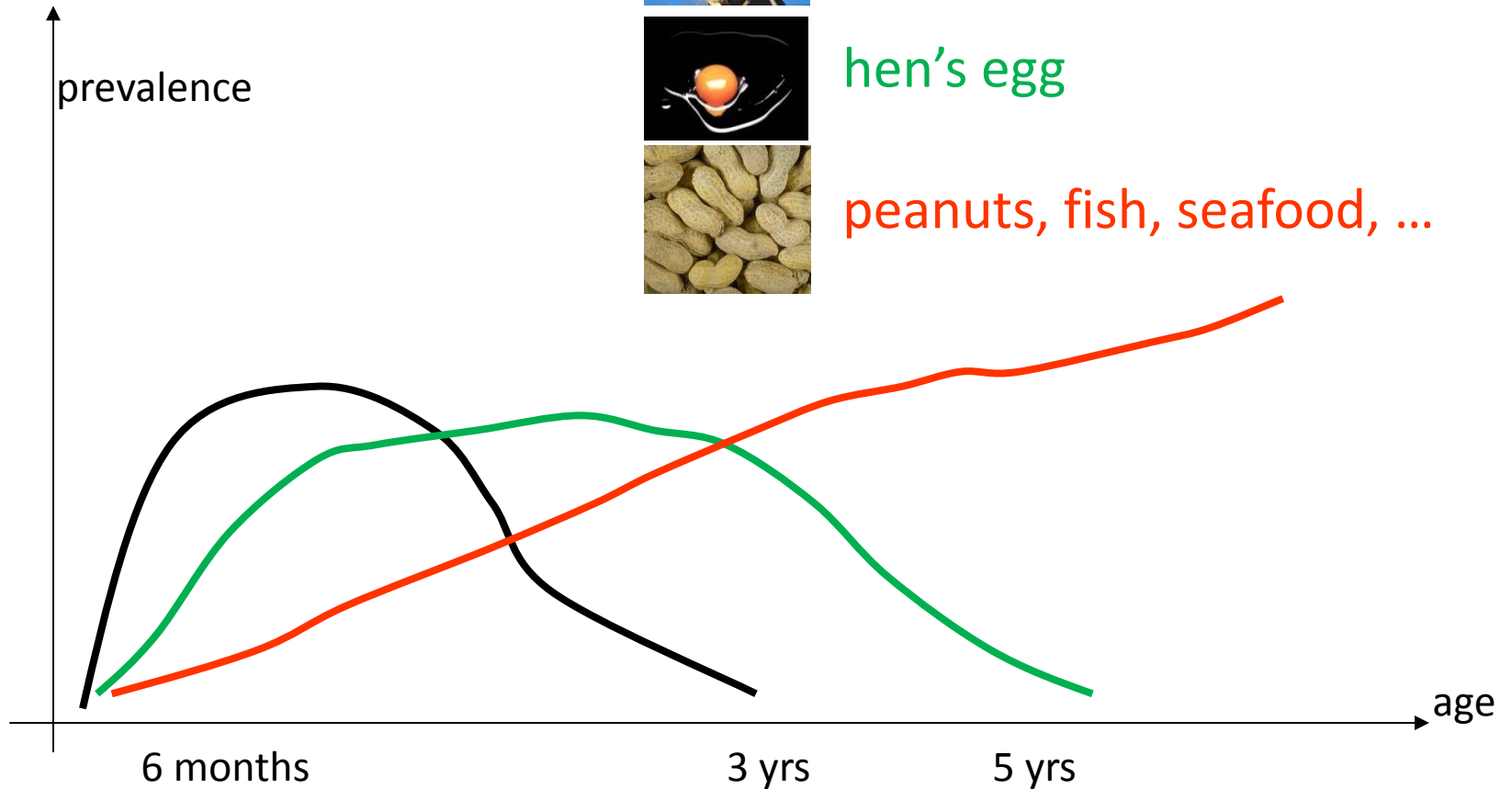
cow's milk




























hen's egg



peanuts, fish, seafood, ...



If Allergic to:	Risk of Reaction to at Least One:	Risk:
<b>A legume*</b> peanut 	<b>Other legumes</b> peas  lentils  beans 	<b>5%</b> 
<b>A tree nut</b> walnut 	<b>Other tree nuts</b> brazil  cashew  hazelnut 	<b>37%</b> 
<b>A fish*</b> salmon 	<b>Other fish</b> swordfish  sole 	<b>50%</b> 
<b>A shellfish</b> shrimp 	<b>Other shellfish</b> crab  lobster 	<b>75%</b> 
<b>A grain*</b> wheat 	<b>Other grains</b> barley  rye 	<b>20%</b> 
<b>Cow's milk*</b> 	<b>Beef</b> hamburger 	<b>10%</b> 

# Anaphylaxis Checklist

Clinical features

Avoidance of allergens

Revue and Reassessment

Emergency plan and Epinephrine auto-injector





# Action plan for Anaphylaxis



# 過敏休克症的緊急應變措施



Label here

Name: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Known severe allergies: \_\_\_\_\_

Parent /carer name(s): \_\_\_\_\_

Work Phone: \_\_\_\_\_

Home Phone: \_\_\_\_\_

Mobile Phone: \_\_\_\_\_

Plan Doctor: \_\_\_\_\_

Doctor In-Charge: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## MILD TO MODERATE ALLERGIC REACTION

- swelling of lips, face, eyes
- hives (urticaria)
- abdominal pain, vomiting

## ACTION

- stay with child and call for help
- give medications (if prescribed)

- locate EpiPen® or EpiPen® Jr
- contact parent/carers

Watch for signs of Anaphylaxis

## ANAPHYLAXIS (SEVERE ALLERGIC REACTION)

- difficulty/noisy breathing
- swelling of tongue
- swelling/tightness in throat
- difficulty talking and/or hoarse voice
- wheeze or persistent cough
- loss of consciousness and/or collapse
- pale and floppy (young children)

## ACTION

- Give EpiPen® or EpiPen® Jr
- Call ambulance. Telephone: 999
- Contact parent/carers

If in doubt, give EpiPen® or EpiPen® Jr

Additional Instructions

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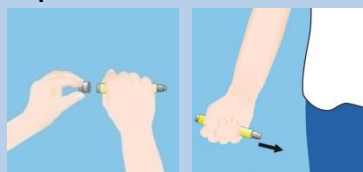


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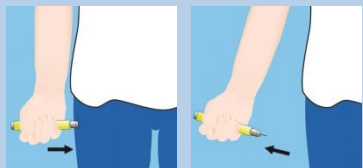
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## How to give EpiPen® or EpiPen® Jr



1. Form fist around EpiPen® and pull off grey cap.

2. Place black end against outer mid-thigh.



3. Push down **HARD** until a click is heard or felt and hold in place for 10 seconds

4. Remove EpiPen® and be careful not to touch the needle. Massage the Injection site for 10 seconds

Label here

病人姓名: \_\_\_\_\_

出生日期: \_\_\_\_\_

已知敏感原: \_\_\_\_\_

家長/監護人名稱: \_\_\_\_\_

公司電話: \_\_\_\_\_

住宅電話: \_\_\_\_\_

手提電話: \_\_\_\_\_

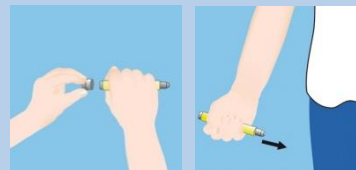
計劃醫生: \_\_\_\_\_

主診醫生: \_\_\_\_\_

簽署: \_\_\_\_\_

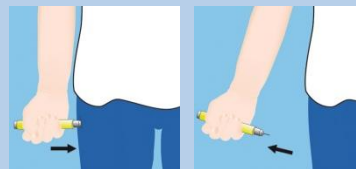
日期: \_\_\_\_\_

## 如何施用EpiPen® 或EpiPen® Jr



1. 掌握EpiPen® 然後拉開灰蓋

2. 置黑色尾端對準大腿外側



3. 大力按下直至聽到或感到“卡”聲，維持動作十秒鐘

4. 移除EpiPen®, 避免接觸針頭。按摩注射部位十秒鐘

## 輕至中度敏感反應

- 嘴唇, 臉頰, 眼睛腫脹
- 風疹 (蕁麻疹)
- 腹痛, 嘔吐

## 採取行動

- 留在小童身邊及致電求救
- 給予藥物(如已處方)
- 找出EpiPen®或EpiPen® Jr
- 聯絡家長或監護人

觀察過敏症病徵

## 過敏休克症 (各樣敏感反應)

- 呼吸困難/ 嘈雜
- 舌頭腫脹
- 咽喉腫脹/ 收窄
- 發音困難和/ 或聲音沙啞
- 喘息或持續咳嗽
- 神智不清或虛脫
- 臉色蒼白及肌張力減退 (幼童)

## 採取行動

- 施用EpiPen®或EpiPen® Jr
- 致電救護車。電話: 999
- 聯絡家長或監護人

如有懷疑是嚴重過敏，請即施用EpiPen®或EpiPen® Jr

附加指引

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# Anaphylaxis

- Intramuscular adrenaline  
1:1,000 - 1mg/ml - 0.01ml/kg/dose
- 



Children 10-20kg- (0.15mg)

Children > 20kg and adults – (0.3mg)



# Casualty Position

- Casualty suffering from breathing difficulties



- Casualty suffering from anaphylactic shock





AVAILABLE  
SPRING  
2010



Hold firmly with orange tip  
pointing downward  
Remove blue safety release



Swing and push orange tip  
firmly into mid-outer thigh until  
you hear a 'click'  
Hold on thigh for several  
seconds

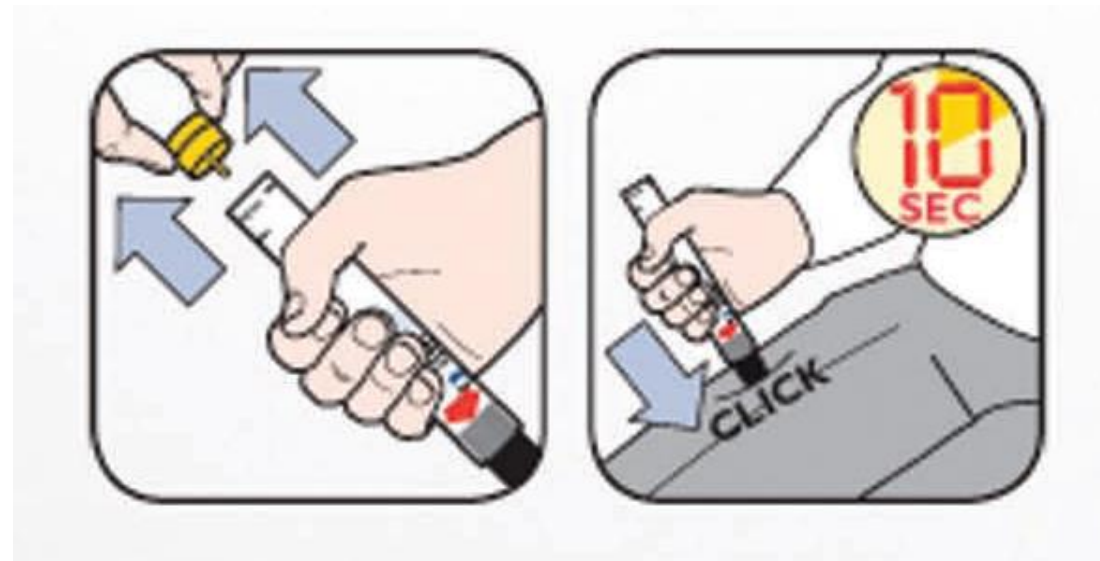


### **Built-in needle protection**

When the EpiPen® Auto-injector  
is removed, the orange needle  
cover automatically extends to  
cover the injection needle

**After administration, you should seek medical attention immediately or go to the emergency room. For the next 48 hours, you must stay within close proximity to a healthcare facility or where you can call 999.**

# Jext



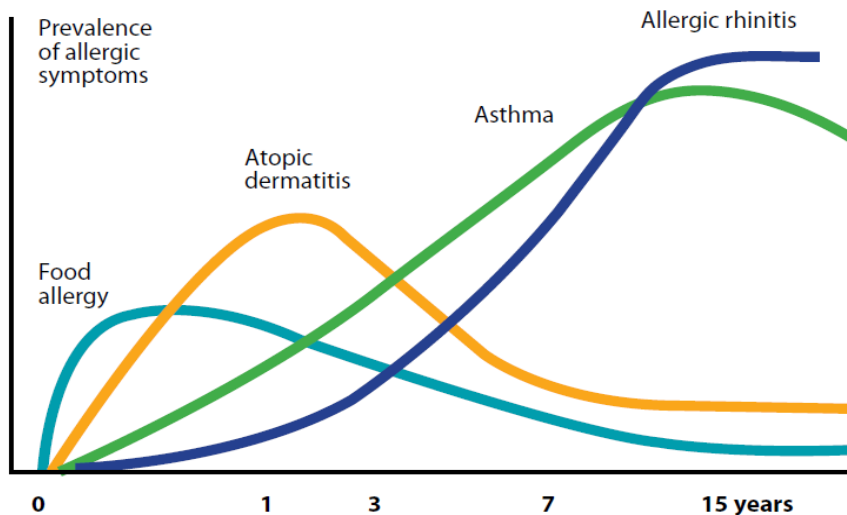
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- **Co-morbidity**
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# Infant-onset allergy will trigger other allergic diseases later in life<sup>1</sup>

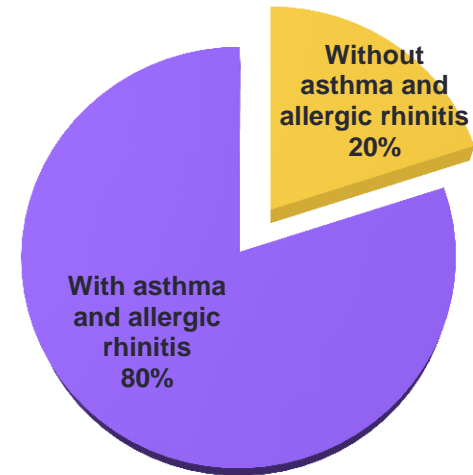
**Infant-onset allergy would increase the risk of having other allergies diseases in later life**

**Typical evolution of allergic disease**



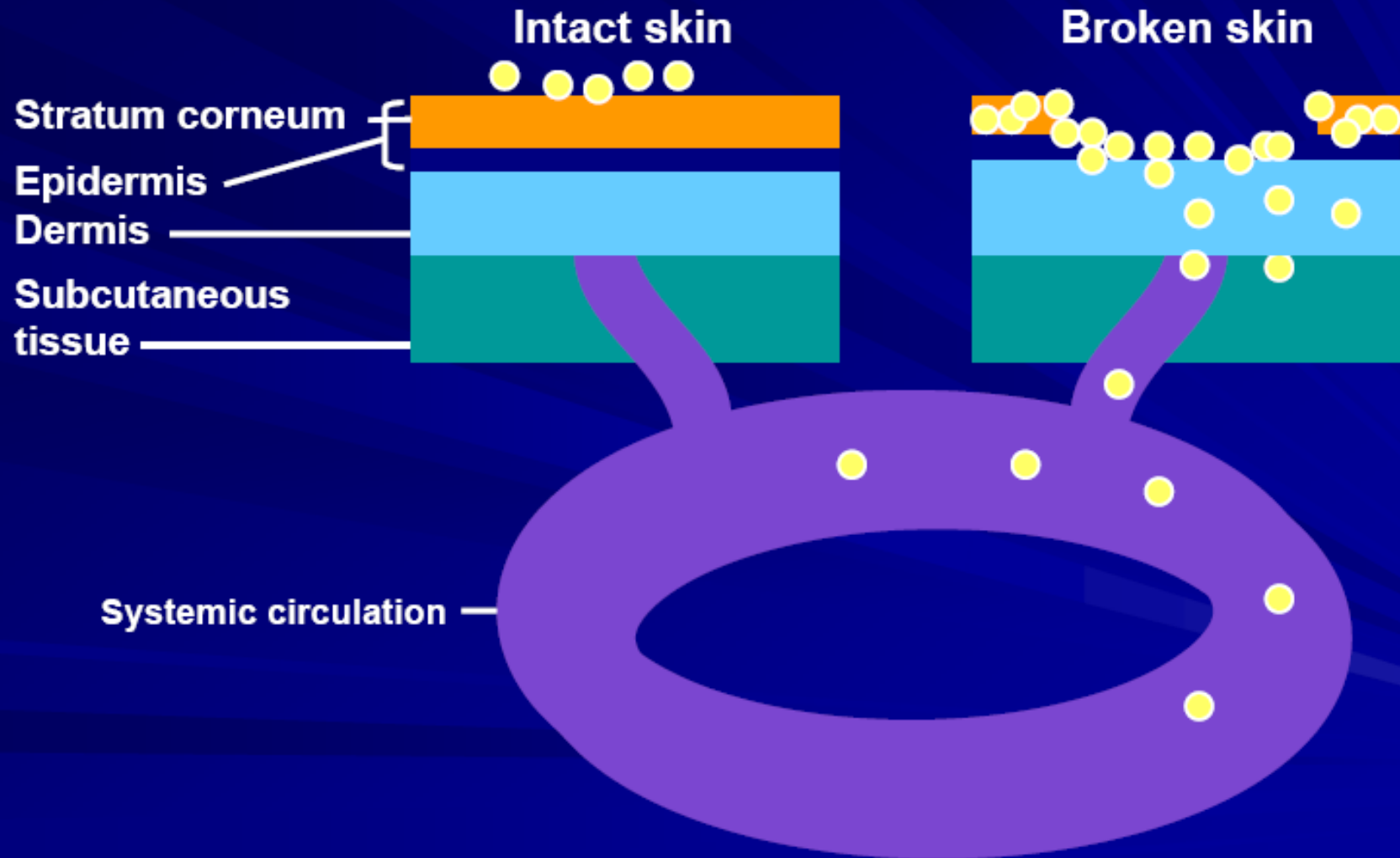
Adapted from Holgate S, Church MK. eds. Allergy, London: Gower Medical Publishing, 1993

**80% children with infant-eczema may develop asthma and allergic rhinitis when grow up<sup>2</sup>**



**The Risk of having asthma and allergic rhinitis of the infants with eczema**

# Food allergy as a consequence of eczema



**Genetic factors**



**Skin barrier defect**

**Immunodysregulation**



+

+

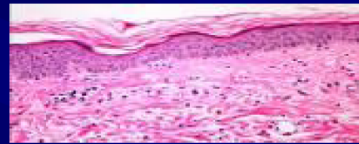
**Infection**

**Contact  
irritants**

**Chemicals**

**Temperature  
change**

**Skin inflammation,  
Pruritis**



**Atopic Eczema**



**Infection**

**Food allergens**

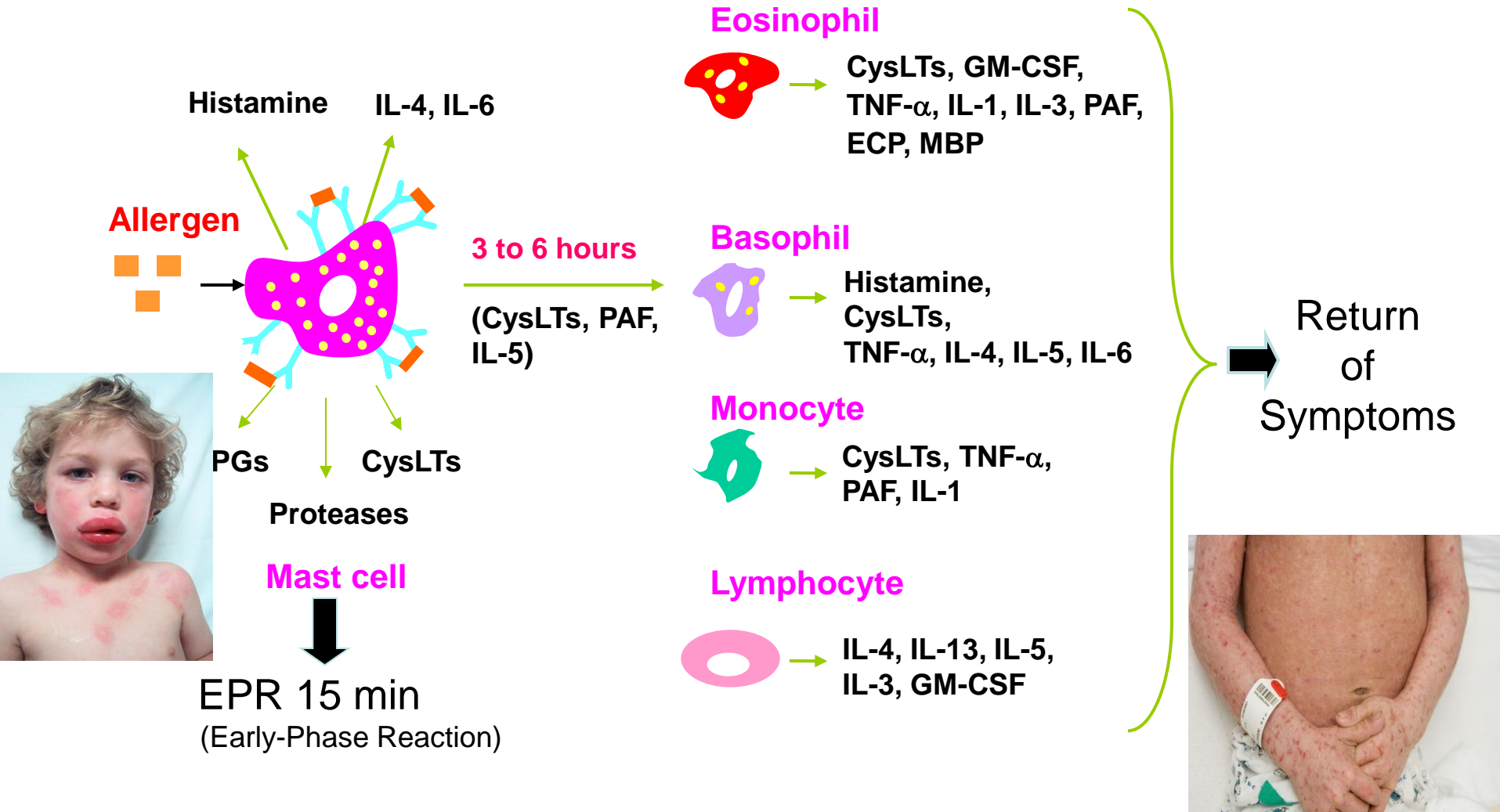
**Aeroallergens**

**Vaccination**

**Stress**

# BIPHASIC/**LATE-PHASE** REACTION

Cellular infiltrates: **3 to 6 hours (LPR)**





























## UK and USA national guidelines on atopic eczema

- A diagnosis of food allergy should be considered for young child :
  - History of **immediate** symptoms
  - Moderate to severe **eczema** not controlled by optimum management
  - Particularly associated with **GI dysmotility and failure to thrive**



## Clinical comparison of different presentation of FPIES

### **Non-IgE medicated: FPIES (Non-IgE medicated) Protein induced syndromes**

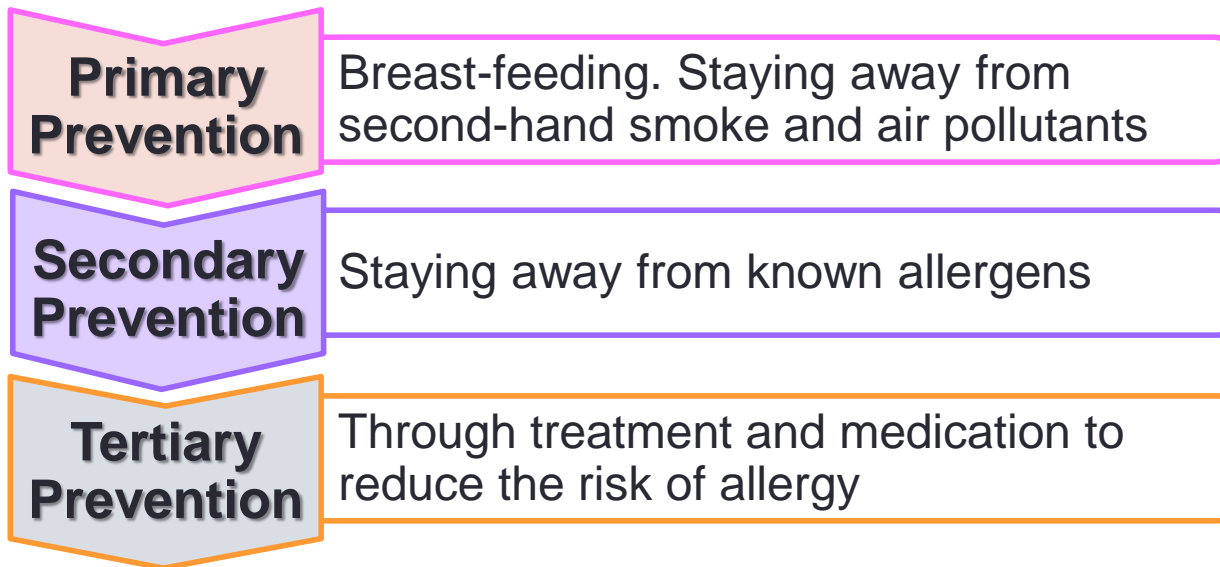
	<u>Enterocolitis</u>	<u>Enteropathy</u>	<u>Proctocolitis</u>
Age of onset	Infant	Infant/Toddler	Newborn
Times from onset to remission	12-24 month	? 12-24 month	< 12 month
Clinical features	Failure to thrive Shock, Lethargy Chronic Diarrhes	Malabsorption Syndrome Villous atrophy on biopsy Chronic Diarrhes	Bloody stools Usually well baby Eosinophil in peripheral blood

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- Co-morbidity
- **Prevention**
- Conclusion

# International Guidelines of Allergy Prevention

World Allergy Organization(WAO) divide allergy prevention into 3 levels:



**Education is crucial!**

**- Teach the general public on the knowledge of allergy, show them ways to prevent**

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- **Conclusion**

# Key messages

- Prevalence of FA in HK children is comparable to developed nations
- The morbidities and potential life threatening reactions, restricted life styles were of significant health concerns
- Demands a systematic public health approach.
  - Allergy in HK-an unmet need in service provision and training by **The Allergy Alliance**  
[http://www.allergy.org.hk/new/final\\_review.pdf](http://www.allergy.org.hk/new/final_review.pdf)

# Hong Kong Institute of Allergy

- Founded in 1996
- Organized by a group of Allergists, Respiriologists, Paediatricians and Dermatologists
- Share the most up-to-date **knowledge on the management of allergic diseases** to the medical community in Hong Kong
- <http://www.allergy.org.hk/>



# Hong Kong Allergy Association

- Founded in 2008
- Organized by patients with allergy, their care givers and medical professionals
- Raise the public **awareness of allergy** through education and provide support to those with allergy
- <http://www.allergyhk.org/>





Thank you

