Food Allergies in Childhood

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Healthier Kids. Healthier Future.

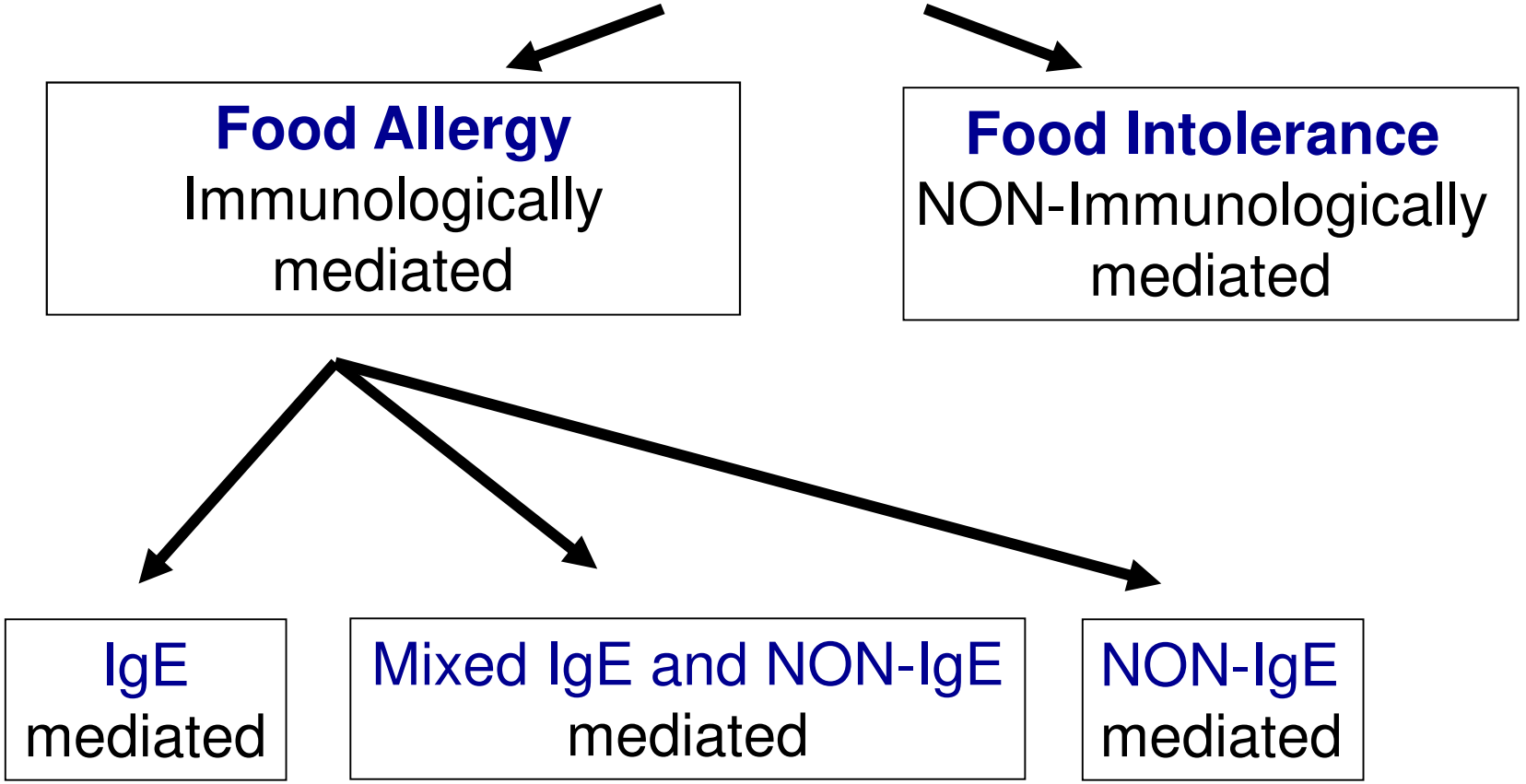
Food Allergies in Childhood

- Approach to diagnosis and management
- Current advice on prevention of allergic disease including food allergy
  - Infant feeding advice

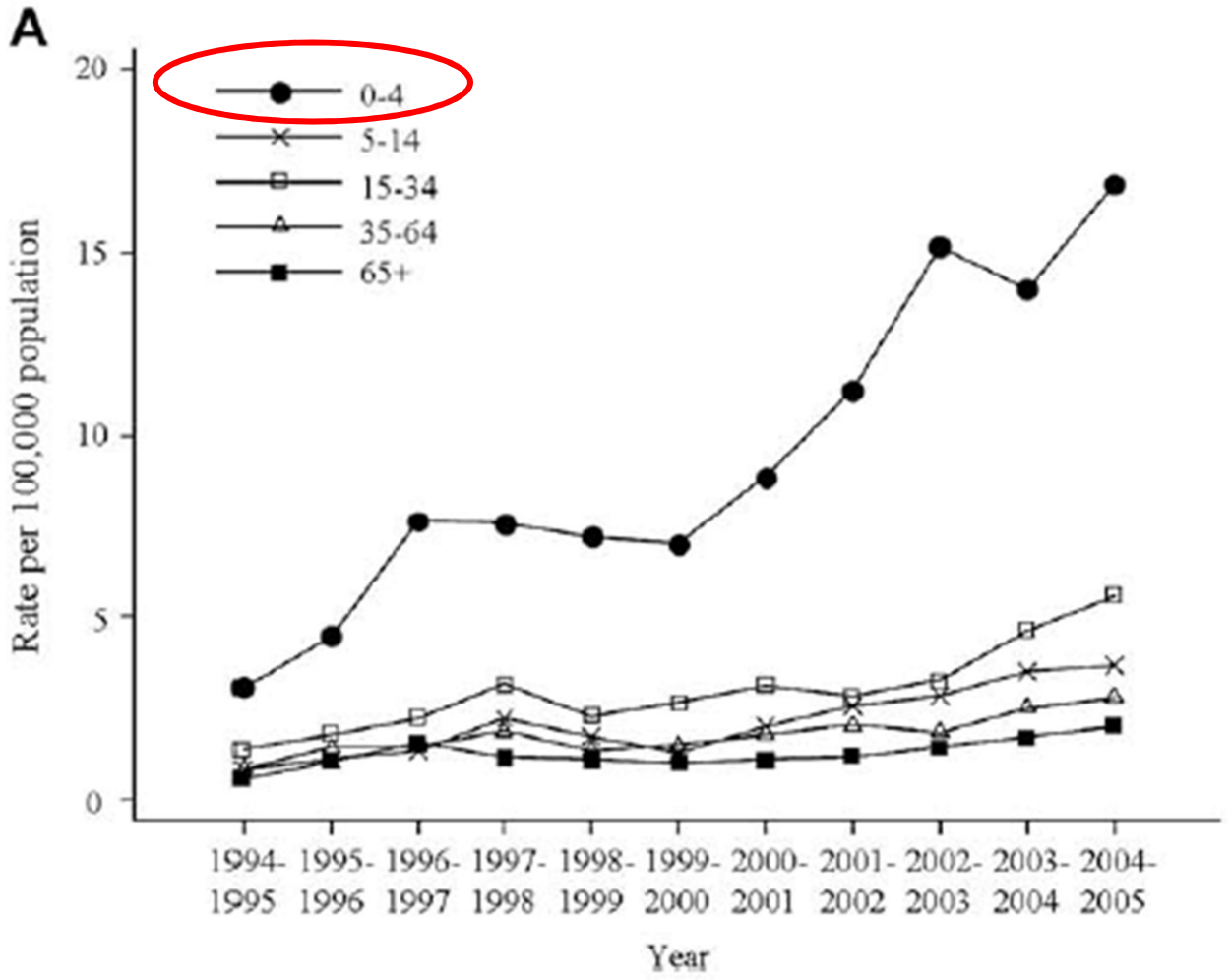
WAO Nomenclature 2003

- Allergy
  - Reaction initiated by specific immunological mechanisms
- Intolerance
  - Reaction initiated by NON-immunological mechanisms

Food Hypersensitivity (All reproducible reactions)

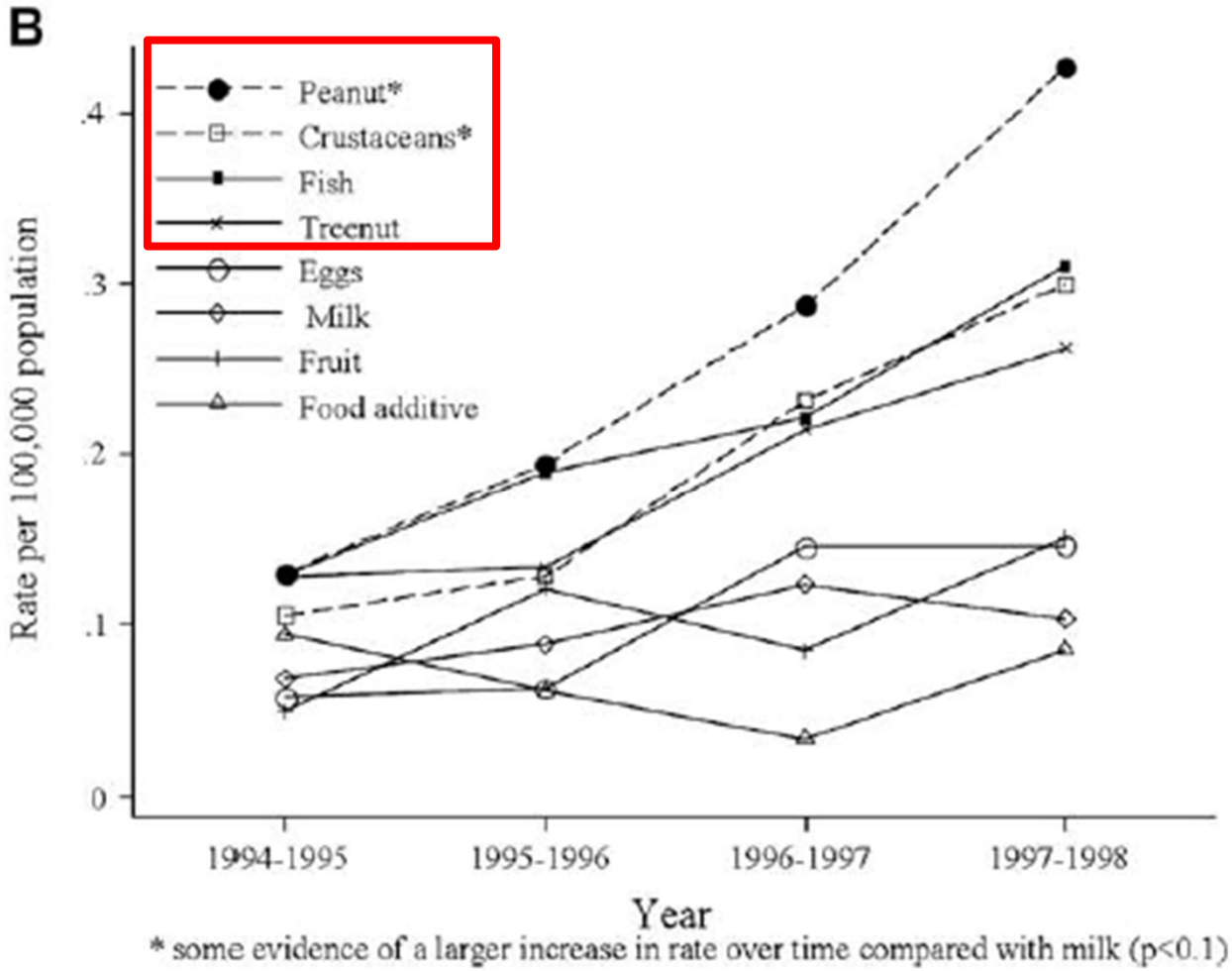


Exponential Rise in Food Anaphylaxis



Liew WK, Williamson E, Tang MLK. J Allergy Clin Immunol 2009;123:434-42

Exponential Rise in Food Anaphylaxis



Liew WK, Williamson E, Tang MLK. J Allergy Clin Immunol 2009;123:434-42

Incidence of Food Allergy

- Overall ~ 2 - 5% of population experience food allergy reactions
- 6% - 8% children experience food allergic reactions [2]
- Recent HealthNuts study found more than 10% of 12 month old Melbourne infants have food allergy [1]
- 2% adults experience food allergic reactions [3]

1. Osborne N et al. J Allergy Clin Immunology 2011
2. Bock et al. Pediatr 1987;79:683-88
3. Young et al. Lancet 1994;343:1127-30

IgE mediated	
Onset of symptoms	< 30 mins - 1hr
Skin	Erythema Urticaria Angioedema
Gastrointestinal	Vomiting Diarrhoea Cramps
Respiratory	Persistent cough, Stridor, Wheeze Hoarse voice
Cardiovascular	Hypotension Pale, Floppy Infant

← Anaphylaxis

	IgE mediated	Mixed	Non IgE mediated
Onset	< 30 mins - 1hr	1hr → 24hr / 48hr	1hr → 24hr / 48hr
Skin	Erythema, Urticaria Angioedema Eczema	eczema	-
Gut	Vomiting Diarrhoea Cramps	Vomit, Diarrhoea FTT/LOW Abdominal pain GOR	Vomit, Diarrhoea FTT/LOW Abdominal pain
Resp	Persistent Cough, Stridor Wheeze Hoarse voice	-	-
CVS	Hypotension Pale and floppy infant	-	Hypotension Pale and floppy infant

8 major food groups cause >90% food allergy

Cow's milk

Hen's egg

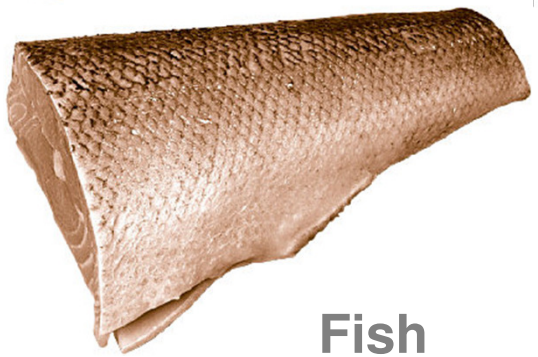
Peanut

Tree nuts

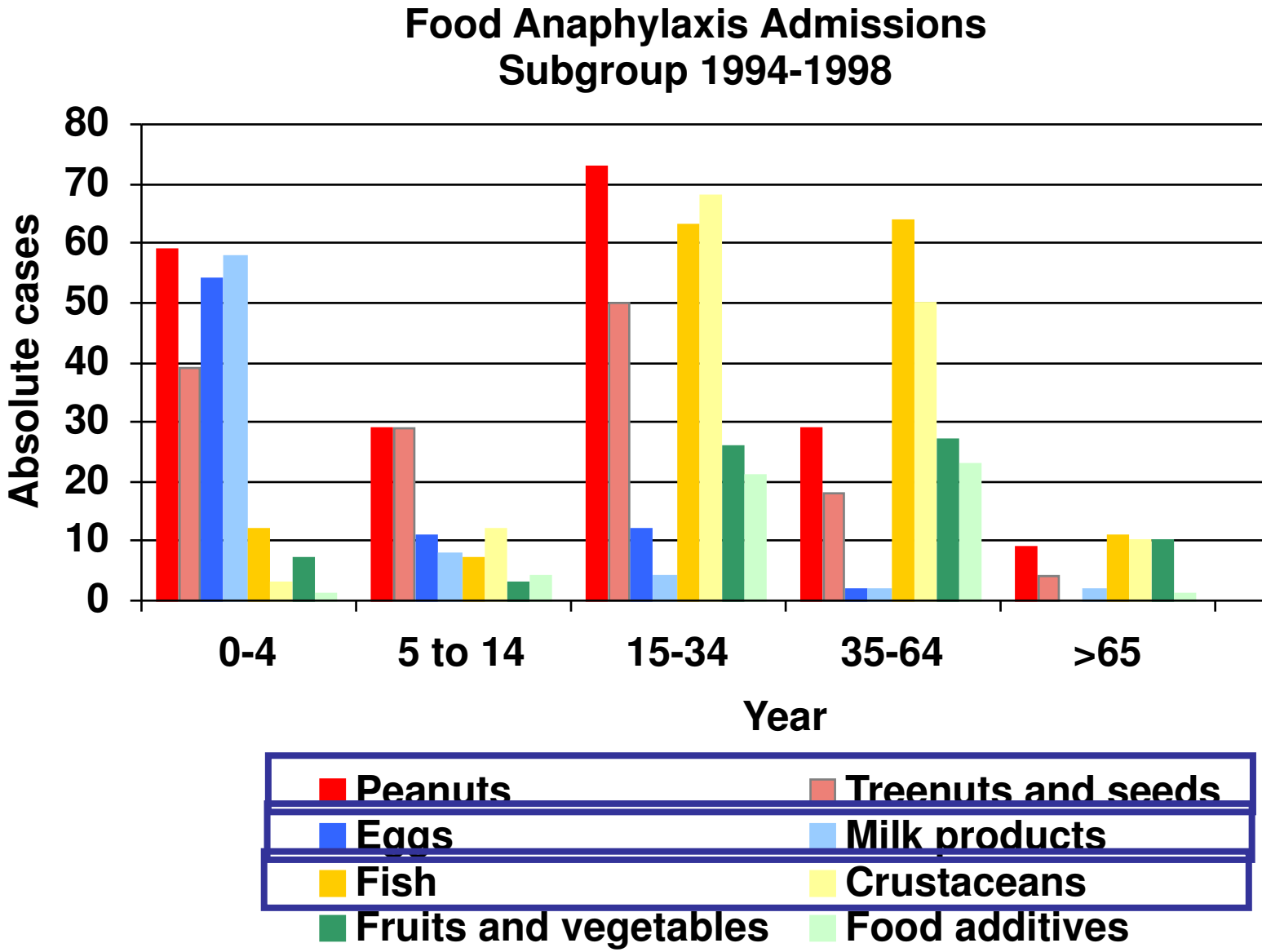
Wheat

Soya bean

Shellfish



Fish



Liew WK, Williamson E, Tang MLK. J Allergy Clin Immunol 2009;123:434-42

Diagnostic Tests for IgE Mediated Food Allergy

- Skin Prick Test
  - Sensitive, inexpensive, simple, rapid
  - Negative predictive value - >95%
  - Positive predictive value - 50%
- Serum allergen-specific IgE (sIgE)
  - Similar to SPT in sensitivity, specificity, NPV, PPV
  - More expensive, delayed result
- Food challenge
  - Must be supervised
  - Should NOT be performed at home if positive SPT or sIgE

Diagnostic Approach to IgE Mediated Food Allergy

- Most important information is the history
- If history suggests food allergy then perform sIgE test to that specific food
- Avoid 'screening' sIgE testing as a +ve result when the patient has not eaten the food can be difficult to interpret
  - Exception is in a child with food anaphylaxis → sIgE testing for common food allergens that have not yet been introduced

How to interpret sIgE test if food not introduced

- +ve test without history of exposure to the food is a poor predictor of allergy
  - Cow's milk, egg → 50% not allergic
  - Peanut → 60-70% not allergic
- The larger the SPT and the higher the serum sIgE level, the more likely there is clinical allergy
- 95% thresholds (PPV or specificity) can help make a diagnosis of food allergy if no previous exposure

** BUT... Size SPT does NOT predict severity of reaction

Pucar et al Clin Exp Allergy 2001;31:40)
Spergel et al Ann Allergy Asthma Immunol 2000;85:473)

Diagnostic Approach for Delayed Food Allergies

- There are no specific tests for non-IgE mediated or mixed IgE/non-IgE mediated food allergy syndromes
- History is the primary tool for diagnosis
- GI endoscopy and biopsy can support diagnosis

Management of Food Allergy

- Allergen avoidance is the first line approach
  - Read ingredient labels, 'may contain traces' labelling
  - Alternative foods…. Involve dietician
  - Educate about situations that carry increased risk of accidental exposure…. eg: eating out, parties, friend's home

- Risk minimisation
  - Educate on recognition and treatment of allergic reactions
  - Action plan #
  - Consider provision of adrenaline auto-injector *
  - Ensure that asthma is well controlled #
  - Annual review with GP or Paediatrician

* Not relevant for non-IgE or mixed IgE/non-IgE mediated food allergy
# May not be relevant for non-IgE or mixed IgE/non-IgE mediated food allergy

ASCIA www.allergy.org.au

ascia
www.allergy.org.au

ACTION PLAN FOR Allergic Reactions

Name:
Date of birth:

Photo

Confirmed allergens:

Asthma Yes ☐ No ☐

Family/emergency contact name(s):

Work Ph:
Home Ph:
Mobile Ph:

Plan prepared by:
Dr:
Signed:
Date:

Note: The ASCIA Action Plan for Allergic Reactions is for people with mild to moderate allergies, who need to avoid certain allergens.
For people with severe allergies (and at risk of anaphylaxis) there are ASCIA Action Plans for Anaphylaxis, which include adrenaline autoinjector instructions.
Instructions are also on the device label and at:
www.allergy.org.au/anaphylaxis

Note: This is a medical document that can only be completed and signed by the patient's treating medical doctor and cannot be altered without their permission.

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MILD TO MODERAT

- Swelling of lips, face, e
- Hives or welts
- Tingling mouth
- Abdominal pain, vomiti
  allergic reaction to inse

ACTION

- For insect allergy, flic
  remove ticks.
- Stay with person and c
- Give medications (if pr
  Dose: .....
- Phone family/emergen

Mild to moder
or may no

Watch for any one of t

ANAPHYLAXIS (SE

- Difficult/noisy breathin
- Swelling of tongue
- Swelling/tightness in th
- Difficulty talking and/o
- Wheeze or persistent c
- Persistent dizziness or
- Pale and floppy (young

ACTION

1 Lay person flat. Do no
If breathing is difficult
2 Give adrenaline autoin
3 Phone ambulance* 0
4 Phone family/emerge

Commence CPR at any time if pers
If uncertain whether it is asthma or
then asthma reliever.

* Medical observation in hospital for a

Additional information

ascia
www.allergy.org.au

ACTION PLAN FOR Anaphylaxis

For use with EpiPen® Adrenaline Autoinjectors

Name:
Date of birth:

Photo

Confirmed allergens:

Asthma Yes ☐ No ☐

Family/emergency contact name(s):

Work Ph:
Home Ph:
Mobile Ph:

Plan prepared by:
Dr:
Signed:
Date:

How to give EpiPen®

1 Form fist around EpiPen® and PULL OFF BLUE SAFETY RELEASE.

2 PLACE ORANGE END against outer mid-thigh (with or without clothing).

3 PUSH DOWN HARD until a click is heard or felt and hold in place for 10 seconds. REMOVE EpiPen®. Massage injection site for 10 seconds.

Instructions are also on the device label and at:
www.allergy.org.au/anaphylaxis

© ASCIA 2014. This plan was developed by ASCIA

MILD TO MODERATE ALLERGIC REACTION

- Swelling of lips, face, eyes
- Hives or welts
- Tingling mouth
- Abdominal pain, vomiting (thes
  reaction to insects)

ACTION

- For insect allergy, flick out stin
- Stay with person and call for h
- Locate EpiPen® or EpiPen® Jr
- Give other medications (if pre
  Dose: .....
- Phone family/emergency cont

Mild to moderate all
or may not prec

Watch for any one of the foll

ANAPHYLAXIS (SEVERE

- Difficult/noisy breathing
- Swelling of tongue
- Swelling/tightness in throat
- Difficulty talking and/or hoars
- Wheeze or persistent cough
- Persistent dizziness or collaps
- Pale and floppy (young childre

ACTION

1 Lay person flat. Do not allow
If breathing is difficult allow t
2 Give EpiPen® or EpiPen® Jr
3 Phone ambulance* 000 (AU)
4 Phone family/emergency cor
5 Further adrenaline doses ma
5 minutes (if another adrenal

If in doubt, give adrenaline au

Commence CPR at any time if person is unres
If uncertain whether it is asthma or anaphylax
then asthma reliever.

EpiPen® is generally prescribed for adults and chi
EpiPen® Jr is generally prescribed for children ag
*Medical observation in hospital for at least 4 ho

Additional information

Note: This is a medical document that can only b
treating medical doctor and cannot be altered wi

ascia
www.allergy.org.au

ACTION PLAN FOR Anaphylaxis

For use with Anapen® Adrenaline Autoinjectors

Name:
Date of birth:

Photo

Confirmed allergens:

Asthma Yes ☐ No ☐

Family/emergency contact name(s):

Work Ph:
Home Ph:
Mobile Ph:

Plan prepared by:
Dr:
Signed:
Date:

How to give Anapen®

1 PULL OFF BLACK NEEDLE SHIELD.

2 PULL OFF GREY SAFETY CAP from red button.

3 PLACE NEEDLE END FIRMLY against outer mid-thigh at 90° angle (with or without clothing).

4 PRESS RED BUTTON as it clicks and hold for 10 seconds. REMOVE Anapen® and DO NOT touch needle. Massage injection site for 10 seconds.

Instructions are also on the device label and at:
www.allergy.org.au/anaphylaxis

MILD TO MODERATE ALLERGIC REACTION

- Swelling of lips, face, eyes
- Hives or welts
- Tingling mouth
- Abdominal pain, vomiting (these are signs of a severe allergic reaction to insects)

ACTION

- For insect allergy, flick out sting if visible. Do not remove ticks.
- Stay with person and call for help
- Locate Anapen® 300 or Anapen® 150
- Give other medications (if prescribed) .....
  Dose: .....
- Phone family/emergency contact

Mild to moderate allergic reactions may or may not precede anaphylaxis

Watch for any one of the following signs of anaphylaxis

ANAPHYLAXIS (SEVERE ALLERGIC REACTION)

- Difficult/noisy breathing
- Swelling of tongue
- Swelling/tightness in throat
- Difficulty talking and/or hoarse voice
- Wheeze or persistent cough
- Persistent dizziness or collapse
- Pale and floppy (young children)

ACTION

1 Lay person flat. Do not allow them to stand or walk.
If breathing is difficult allow them to sit.
2 Give Anapen® 300 or Anapen® 150
3 Phone ambulance* 000 (AU), 111 (NZ), 112 (mobile)
4 Phone family/emergency contact
5 Further adrenaline doses may be given if no response after 5 minutes (if another adrenaline autoinjector is available)

If in doubt, give adrenaline autoinjector

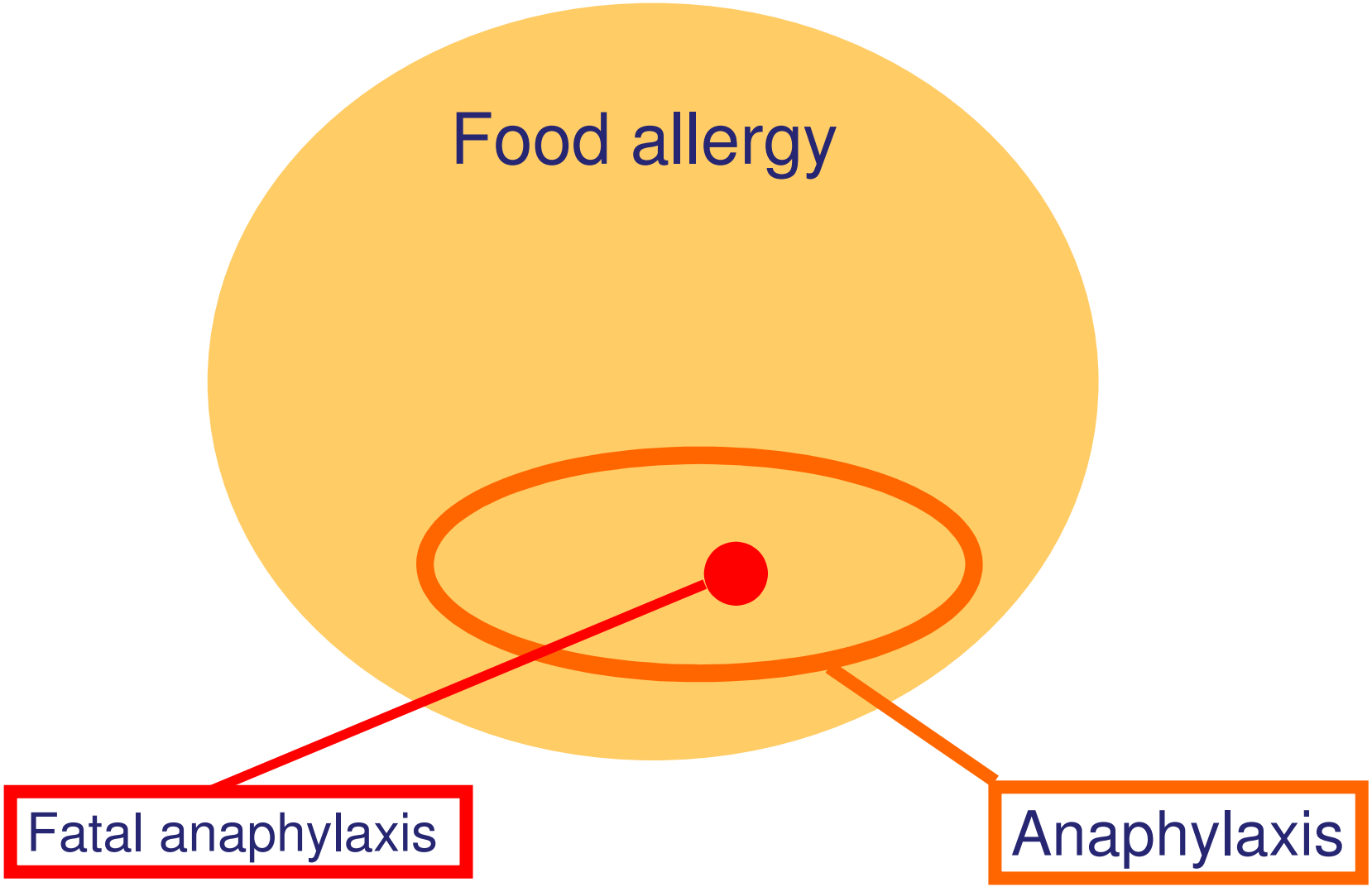
Commence CPR at any time if person is unresponsive and not breathing normally.
If uncertain whether it is asthma or anaphylaxis, give adrenaline autoinjector FIRST, then asthma reliever.

Anapen® 300 is generally prescribed for adults and children over 5 years.
Anapen® 150 is generally prescribed for children aged 1-5 years.
*Medical observation in hospital for at least 4 hours is recommended after anaphylaxis.

Additional information

Note: This is a medical document that can only be completed and signed by the patient's

Who should have an Adrenaline Autoinjector?



Can we predict who will have Anaphylaxis?

- Level of specific IgE and SPT size are *NOT* predictive of severity of reaction

  ➔ Not prescribed for a large SPT or high sIgE

- Risk factors:
  - History of anaphylaxis indicates high risk of subsequent anaphylaxis… but 40% first event
  - Age – adolescents and young adults
  - Delayed adrenaline – remote geographic location
  - Poorly controlled asthma
  - Allergy to peanut or tree nuts

PBS Indications for Adrenaline Auto-injectors

Recommended if…

History of anaphylaxis (and continued risk)

May be recommended if…

Generalised allergic reaction PLUS risk factors

- Geographically isolated
- Age – adolescence or adult
- Asthma
- Nuts or Stinging insects

PBS Indications for Epipen/Epipen Jr

Not normally recommended for…

- Positive skin prick tests or blood sIgE tests in the absence of previous clinical reaction
- Local reactions to insect stings (children & adults)
- Generalised skin rash only to insect stings (children)
- Asthma without history of anaphylaxis or systemic reaction
- Family history of anaphylaxis or allergy

Ongoing Management of Food Allergy

- Annual review by GP or Paediatrician
  - Review diet – nutritionally adequate, dietician
  - Accidental ingestion and allergic reactions
  - Education on recognition and emergency treatment of allergic reactions
  - Update Action Plan
  - Review need for adrenaline auto-injector *
  - Review asthma control
  - Monitor SPT or RAST → consider as test approaches negative to determine if appropriate to challenge *

* Not relevant for non-IgE or mixed IgE/non-IgE mediated food allergy

When to Refer to an Allergist

- Anaphylaxis
- If history does not match SPT / sIgE test result
  - Positive history and negative test
  - Positive test (but <95% threshold) and NO history of ingestion
- Non-IgE mediated syndromes
  - FPIES (food protein induced enterocolitis syndrome)
  - Failure to thrive
  - Low protein (protein losing enteropathy)
  - If no response to elimination diet

Prevention of Allergic Disease

- For babies at INCREASED RISK of allergic disease (family history of allergic disease)
  - Breastfeed for at least 6 months
  - Introduce complementary foods from 4-6 months
  - If unable to breastfeed in first 4-6 months, use a hydrolysed formula in place of standard formulas
  - Avoid exposure to cigarette smoke
  - **Not recommended**: elimination diets during pregnancy or lactation

1. AAAAI advice: Fleischer D et al. JACI In Practice 2012
2. AAP advice: Greer FR et al. Pediatrics 2008;121:183-91.
3. ASCIA advice: Prescott SL, Tang MLK. Med J Aust 2005;181:464-7.
4. ESPGHAN advice: Agostoni C et al. JPGN 2008;46:99-110.

Benefits of breastfeeding and breast milk

- Breast feeding helps the **emotional bond** between mother and child and contributes to the emotional development of the infant
- Breast milk is **nutritionally complete** for infants from 0 to 6 months
  - contains all the nutrients a baby needs for growth and development & is easily digested
- Breast milk contains a large number of **immune factors** such as immunoglobulins, cytokines, prebiotics etc that assist in gut maturation, physiological development and immunity
  - Breast fed babies have fewer and less severe infections
- Breast feeding may lower risk of developing chronic diseases such as childhood obesity, diabetes, CVD in later life
- Breast milk promotes a healthy gut microbiota
  - Higher numbers of ‘good’ bacteria, fewer pathogenic bacteria

Breast feeding and Prevention of Allergic Disease

- Systematic Reviews fail to show a protective effect for breastfeeding in prevention of allergic disease [1]
- Studies with longer term follow up show increased risk for food allergy, asthma, rhinitis [2-5]
- Methodological issues with breastfeeding studies
  - Not possible to randomise breastfeeding → reverse causation
  - Recall bias in retrospective studies
  - Variable definitions of breastfeeding and allergic outcomes
  - Failure to adjust for confounding factors
    - Risk factors for allergic disease
    - Study population – allergic disease risk, breast milk composition

1. Yang YW et al. Br J Dermatol 2009;161: 373
2. Matheson MC et al. J Allergy Clin Immunol 2007;120: 1051-1057
3. Rusconi F et al. Am J Respir Crit Care Med 1999;160: 1617-1622
4. Wright AL et al. Thorax 2001;56: 192-197
5. Sears MR et al. Lancet 2002;360: 901-907

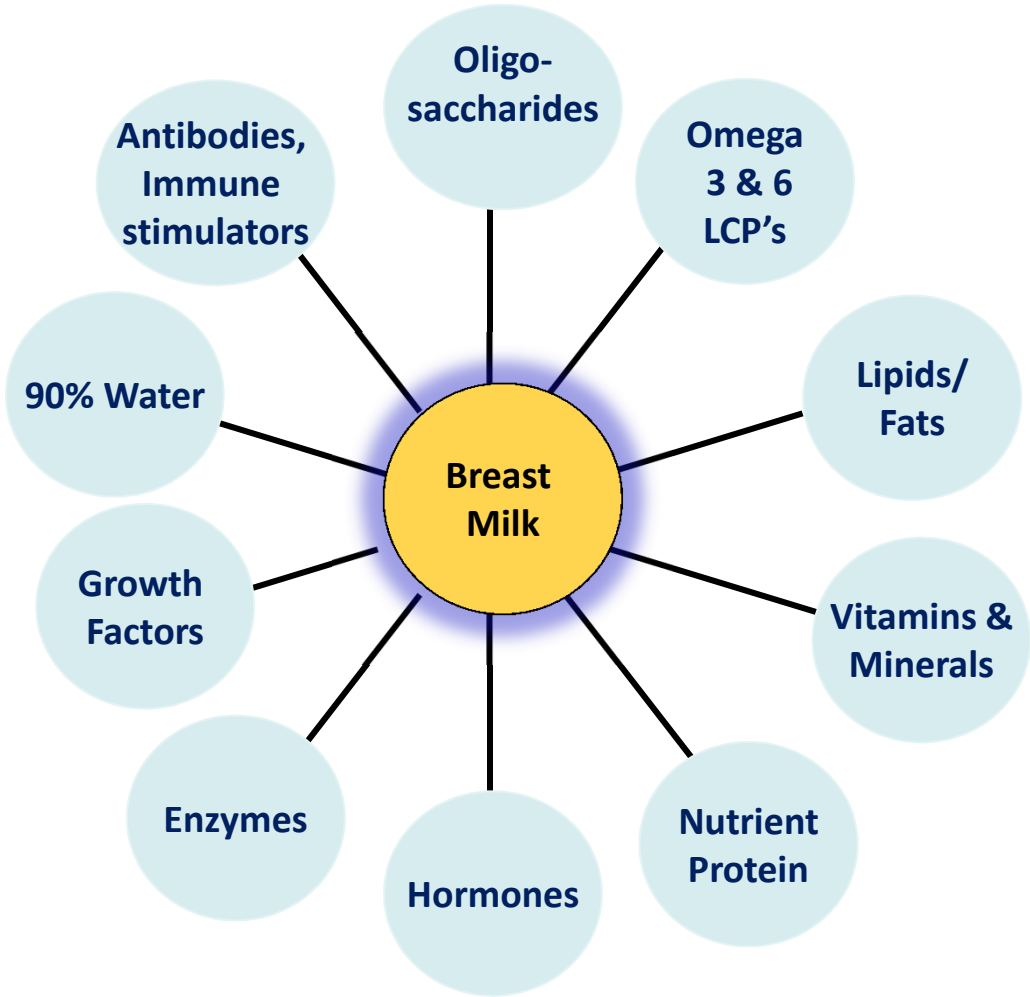
Breast Milk Immune Factors

Anti-microbial compounds
Immunoglobiuines: sIgA, SIgG, SIgM
Lactoferrin, lactoferrin B and H
Lysozyme
Lactoperoxidase
Nucleotide-hydrolizing Antibodies
κ-casein and α-lactalbumin
Haptocorrin
Mucins
Lactadherin
Free secretory component
Oligosaccharides and pre-biotics
Fatty acids
Maternal leukocytes and Cytokines
sCD14
Complement and complement receptors
β-defensin-1
Toll-like receptors
Bifidus factor

Tolerance/priming compounds
Cytokines: Il10 and TGFβ
Anti-idiotypic antibodies

Immune development compounds
Macrophages
Neutrophils
Lymphocytes
Cytokines
Growth factors
Hormones
Milk peptides
Long-chain polyunsaturated fatty acids
Nucleotides
Adhesion molecules

Anti-inflammatory compounds
Cytokines: Il-10 and TGFβ
Il-1 receptor anatagonist
TNFα and Il-6 receptors
sCD14
Adhesion molecules
Long-chain polyunsaturated fatty acids
Hormones and growth factors
Osteoprotegerin
Long-chain polyunsaturated fatty acids
Hormones and growth factors



1. Field 2005 . *J Nutr. January 1, 2005 vol. 135 no. 1 1-4*

TABLE III. Adjusted association between breast-feeding and age at introduction of complementary foods and the risk of asthma, allergic rhinitis, and specific atopic sensitization in 5-year-old children

Duration of breast-feeding and age at introduction of complementary foods*	End point (n end points/total N)					
	All asthma† (157/2617),§ HR (95% CI)	Atopic asthma‡ (86/960),§ HR (95% CI)	Nonatopic asthma‡ (66/1573),§ HR (95% CI)	Allergic rhinitis (371/2593),§ OR (95% CI)	Atopic sensitization (961/2530),§ OR (95% CI)	Atopic eczema (776/2293),§ OR (95% CI)
Total breast-feeding						
First third: <5.0 mo	1.91 (1.21-3.02)		2.95 (1.31-6.66)			
Second third: 5.0-9.5 mo	1.97 (1.28-3.02)		3.60 (1.67-7.76)			
Third third: >9.5 mo	1		1			
P value	.003		.001			
Wheat, rye, oats, and barley						
First third: <5.0 mo	0.72 (0.44-1.19)		1.10 (0.54-2.25)	0.79 (0.55-1.16)		
Second third: 5.0-5.5 mo	0.59 (0.41-0.86)		0.57 (0.31-1.06)	0.66 (0.50-0.87)		
Third third: >5.5 mo	1		1	1		
P value	.02		.06	.02		
Other cereals‖						
First third: <4.5 mo						1.47 (1.10-1.97)
Second third: 4.5-5.5 mo						1.17 (0.88-1.56)
Third third: >5.5 mo						1
P value						.029
Fish						
First third: <6.0 mo				0.68 (0.47-0.98)	0.71 (0.55-0.92)	
Second third: 6.0-9.0 mo				0.63 (0.48-0.84)	0.64 (0.52-0.79)	
Third third: >9.0 mo				1	1	
P value				.01	<.001	
Egg						
First third: <8.0 mo	0.61 (0.39-0.94)	0.46 (0.25-0.84)		0.73 (0.52-1.02)	0.82 (0.65-1.03)	
Second third: 8.0-11.0 mo	0.55 (0.38-0.81)	0.55 (0.34-0.91)		0.72 (0.55-0.94)	0.71 (0.59-0.87)	
Third third: >11.0 mo	1	1		1	1	
P value	.005	<.001		.04	.004	

HR, Hazard ratio; *OR*, odds ratio.

*The foods remaining in the last stage of the stepwise model were simultaneously adjusted for the confounding covariates sex of child, siblings, parental asthma, parental rhinitis, hospital of birth, maternal smoking during pregnancy, season of birth, duration of gestation, maternal age, maternal basic education, pets at home by 1 year of age, mode of delivery, and birth weight.

†Asthma, regardless of atopic status.

‡Asthma stratified by atopic sensitization.

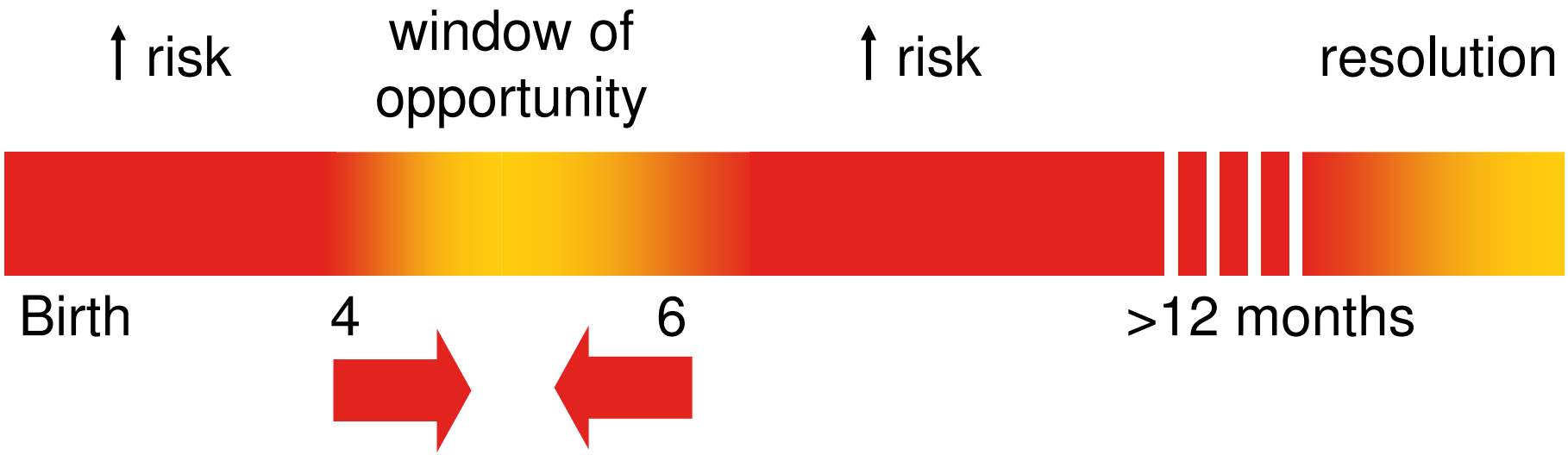
§Number included in the analysis, constituting those with complete information on the exposure and the respective end point.

‖Maize, rice, millet, and buckwheat.

Nwaru et al JACI 2013

Timing of Introduction of Foods and Allergy Risk

- Is there an optimal time for oral tolerance induction?



Prescott et al. Pediatr Allergy Immunol 2008;19:375-80

Timing of Introduction of Foods and Allergy Risk

- Delayed introduction of foods after 6-9 months is associated with an increased risk of allergic disease (eczema, asthma, allergic rhinitis) [3-9]
    - Food allergy was not assessed in these studies

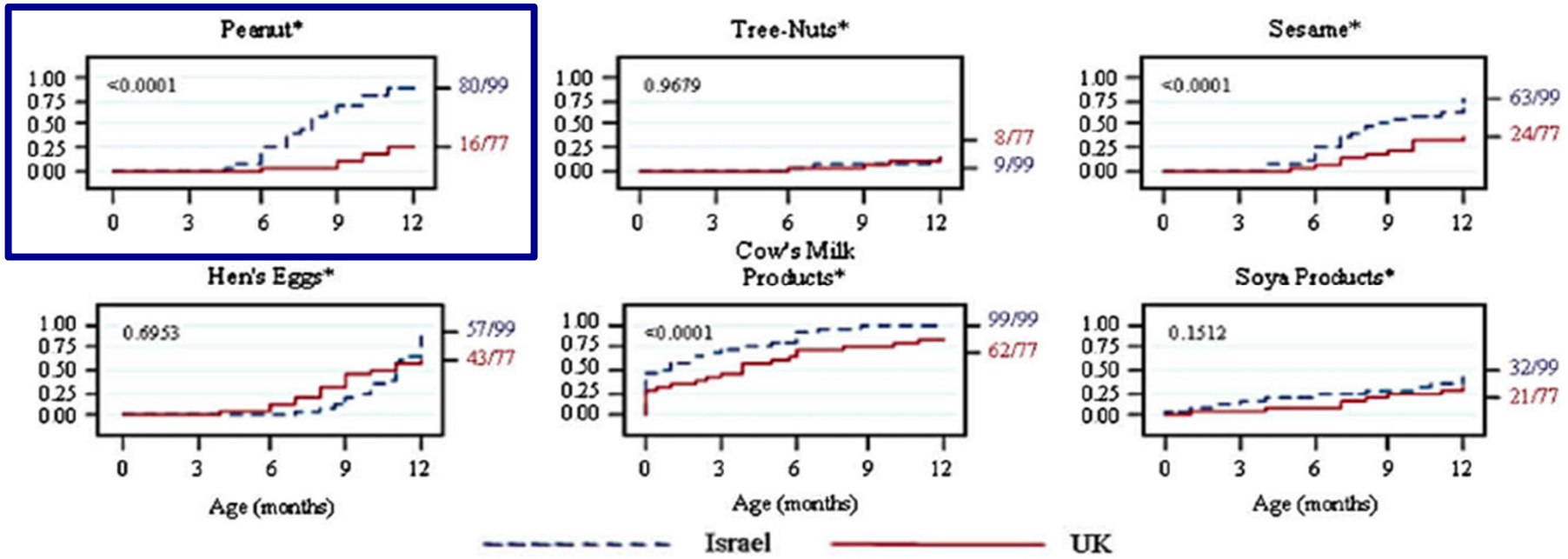
1. Norris JM et al. JAMA 2003; 290:1713-20; 2. Norris JM et al. JAMA 2005; 293:2343-51
3. Alm B et al. Arch Dis Child 2009;94:11-5; 4. Filipiak B et al. J Pediatr 2007;151:352-8;
5. Hesselmar B et al. Acta Paediatr 2010;99:1861-7; 6. Kull I et al. Allergy 2006;61:1009-15;
7. Snijders BE et al. Pediatrics 2008;122:e115-22; 8. Virtanen SM et al. Br J Nutr 2010;103:266-73;
9. Zutavern A et al. Arch Dis Child 2004;89:303-8

Early consumption of peanuts in infancy is associated with a low prevalence of peanut allergy

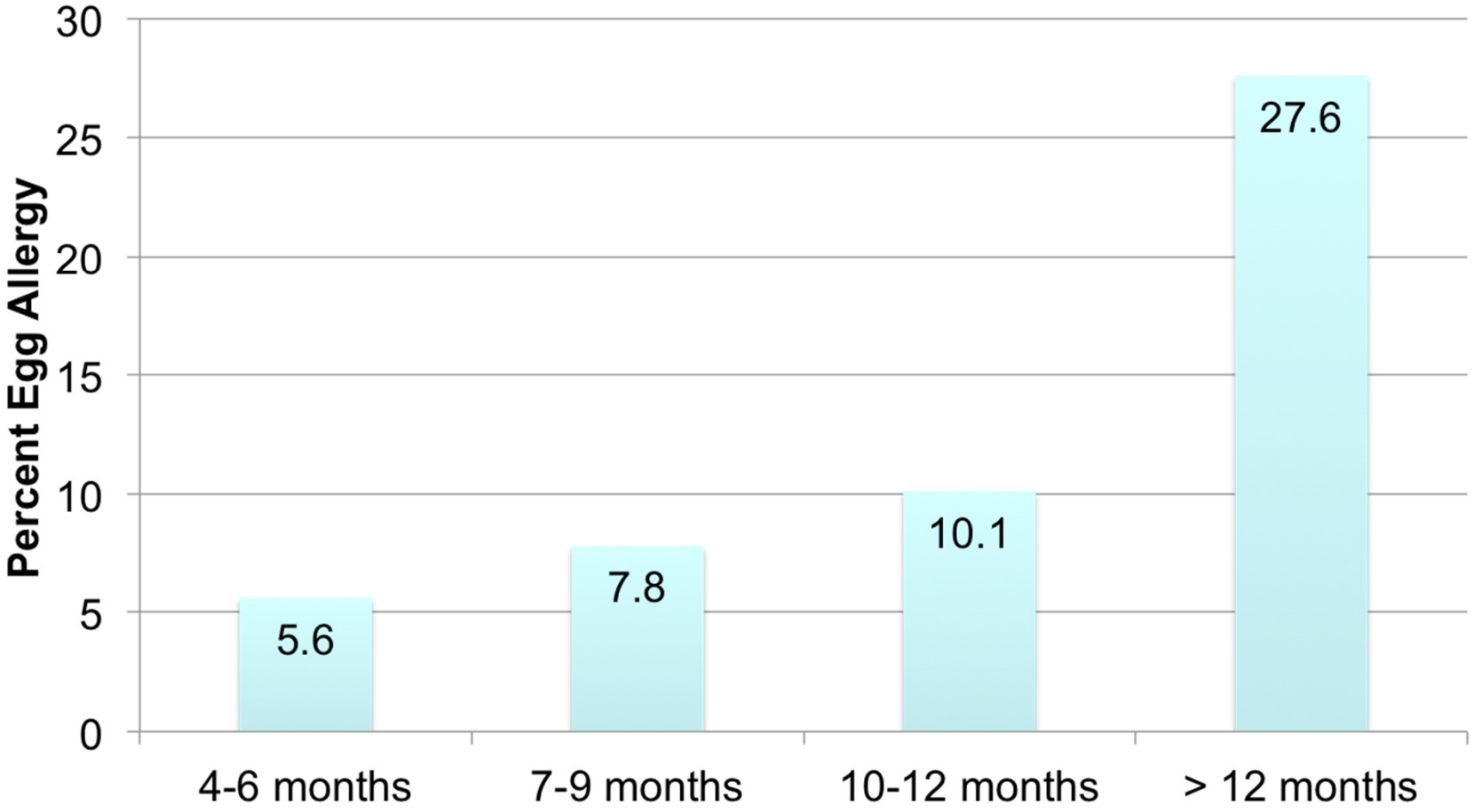
Du Toit et al. JACI 2008

TABLE II. The ratio of the risk of food allergies in the UK compared with Israel

	Peanut		Sesame		Tree nuts		Egg		Milk	
	RR (95% CI)	*P* value	RR (95% CI)	*P* value	RR (95% CI)	*P* value	RR (95% CI)	*P* value	RR (95% CI)	*P* value
All individuals										
Unadjusted	10.8 (5.2-22.3)	<.001	6.1 (2.5-14.6)	<.001	15.2 (6.6-34.7)	<.001	3.4 (2.1-5.7)	<.001	1.9 (1.4-2.7)	<.001
Adjusted for age group* and sex§	10.4 (4.8-22.2)	<.001	5.3 (2.2-13.0)	<.001	14.0 (6.0-32.5)	<.001	3.1 (1.8-5.2)	<.001	1.7 (1.2-2.4)	.008
Adjusted for age group,* sex,§ food allergy,‡ and atopy†	5.8 (2.8-11.8)	<.001	2.7 (1.1-7.0)	.057	8.4 (3.6-19.5)	<.001	1.8 (1.0-3.1)	.054	1.3 (0.9-1.9)	.33
Primary school										
Unadjusted	17.4 (5.5-55.6)	<.001	6.3 (2.2-18.0)	<.001	17.4 (5.5-55.6)	<.001	4.8 (2.4-9.4)	<.001	1.7 (1.1-2.5)	.012
Adjusted for sex§	16.9 (5.3-53.5)	<.001	6.1 (2.2-17.6)	<.001	16.5 (5.3-51.8)	<.001	4.6 (2.3-9.0)	<.001	1.6 (1.1-2.4)	.046
Adjusted for sex,§ food allergy,‡ and atopy†	9.8 (3.1-30.5)	<.001	3.6 (1.1-12.1)	.045	9.5 (3.0-29.5)	<.001	2.5 (1.3-4.9)	.011	1.2 (0.8-1.9)	.47



Introducing egg between 4 and 6 months is associated with a reduced risk of egg allergy



Koplin et al JACI 2010

Introducing egg between 4 and 6 months is associated with a reduced risk of egg allergy

TABLE II. Association between infant dietary factors and egg allergy at 1 year of age

Variable	No.*	Egg allergy (%)	Unadjusted		Adjusted	
			OR (95% CI)	*P* value, trend	OR (95% CI)	*P* value, trend
Age at introduction of egg (mo)†						
4-6	485	5.6	1.0	<.001	1.0	<.001
7-9	933	7.8	1.4 (0.9-2.3)		1.3 (0.8-2.1)	
10-12	730	10.1	1.9 (1.2-3.0)		1.6 (1.0-2.6)	
>12	98	27.6	6.5 (3.6-11.6)		3.4 (1.8-6.5)	
Age at introduction of solids (mo)‡						
<4	69	4.4	1.0	.70	1.0	.16
4	354	9.0	2.2 (0.7-7.4)		1.7 (0.5-6.0)	
5	636	8.8	2.1 (0.6-7.0)		1.2 (0.4-4.3)	
6	996	9.4	2.3 (0.7-7.4)		1.2 (0.4-4.2)	
>6	106	5.7	1.3 (0.3-5.5)		0.7 (0.2-3.0)	
Duration of breast-feeding (mo)§						
<1	293	5.5	1.0	.005	1.0	.088
1-3	311	7.7	1.4 (0.8-2.8)		1.1 (0.5-2.2)	
4-6	328	10.4	2.0 (1.1-3.7)		1.1 (0.6-2.3)	
7-9	285	10.9	2.1 (1.1-4.0)		0.9 (0.5-1.9)	
10-12	312	11.5	2.3 (1.2-4.2)		0.9 (0.4-1.8)	
>12	655	11.0	2.1 (1.2-3.7)		0.7 (0.4-1.4)	

*Numbers in each analysis differ because of missing data.

†Adjusted OR based on logistic regression model adjusted for family history of allergy, eczema diagnosis before the introduction of egg, and parent-reported reactions to 1 or more foods in the infant.

‡Adjusted OR based on logistic regression model adjusted for family history of allergy, age at introduction of egg, duration of breast-feeding, maternal smoking during pregnancy, parents' country of birth, and eczema diagnosis before the introduction of solids.

§Adjusted OR based on logistic regression model adjusted for family history of allergy, maternal consumption of egg during breast-feeding, maternal smoking during pregnancy, and eczema diagnosis before ceasing breast-feeding.

Koplin et al JACI 2010

RCT: Effect of egg introduction at 4m vs 8m in infants with eczema on Egg Allergy

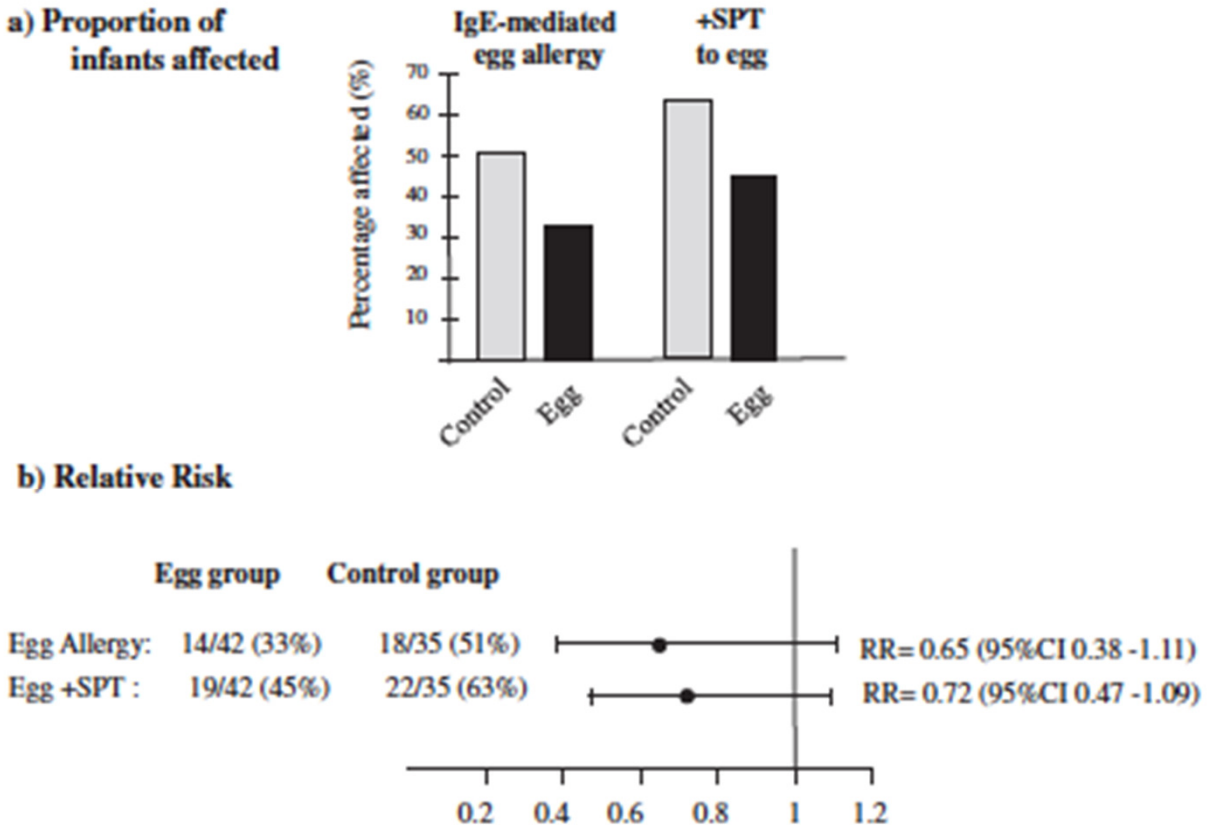


FIG 1. IgE-mediated egg allergy and positive SPT response *(+ SPT)* to egg at 12 months of age. **A,** Proportion of infants. **B,** RR between the egg and control groups.

Palmer et al JACI 2013

INFANT FEEDING
ADVICE

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www.allergy.org.au

BREASTFEED FOR AT LEAST 6 MONTHS:

- There are many nutritional and non-nutritional benefits of breastfeeding for both the mother and infant.
- Breastfeeding is recommended for at least 6 months.
- Breastfeeding can continue beyond 12 months, or for as long as mother and infant wish to continue.

BEFORE 4 MONTHS:

- If complementary infant formula is required before solid foods are started, a standard cow's milk infant formula may be used (where there is no history of allergic disease in the infant's parents or siblings).
- Infants with a history of allergic disease in the infant's parents or siblings may be placed on a partially hydrolysed formula (usually labeled "HA" or hypo-allergenic). These formulas are not suitable for children who have already developed cow's milk allergy.
- Soy milk and other mammalian milks such as goat milk are not recommended for allergy prevention.

FROM 4-6 MONTHS:

- When your child is ready, consider introducing a new food every 2-3 days according to what the family usually eats (regardless of whether the food is thought to be highly allergenic).
- Give one new food at a time so that reactions can be more clearly identified. If a food is tolerated, continue to give this as a part of a varied diet (see Table for examples).
- Breast milk or an appropriate infant formula should remain the main source of milk until 12 months of age, although cow's milk can be used in cooking or with other foods.

NOTE:

- **There are no particular allergenic foods that need to be avoided**
- Some children will develop allergies. If there is any reaction to any food, you should seek medical advice and that food should be avoided until your child is reviewed by a medical practitioner with experience in food allergy.
- Infants who already have eczema are at higher risk of allergies. In general this advice applies to these children, however if your child develops a reaction to a food this should be discussed with your doctor (as above).
- If you are uncertain about this advice you should discuss this with your doctor.

Australian Government
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Department of Health and Ageing

EAT FOR HEALTH

Infant Feeding Guidelines

SUMMARY

Breastfeeding

Recommendations

- Encourage, support and promote exclusive breastfeeding to around 6 months of age.
- Continue breastfeeding while introducing appropriate solid foods until 12 months of age and beyond, for as long as the mother and child desire.
- While breastfeeding is recommended for the first 6 to 12 months and beyond, any breastfeeding is beneficial to the infant and mother.

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EAT FOR HEALTH

Infant Feeding Guidelines

SUMMARY

The transition to solid foods

At around the age of 6 months, infants are physiologically and developmentally ready for new foods, textures and modes of feeding, and they need more nutrients than can be provided by breastmilk or formula alone. By 12 months of age, a variety of nutritious foods from the Five Food Groups, as described in the *Australian Guide to Healthy Eating,* is recommended.

Recommendations

- Introduce solid foods at around 6 months, to meet the infant's increasing nutritional and developmental needs.
- Foods can be introduced in any order provided iron-rich nutritious foods are included and the texture is suitable for the infant's stage of development. Cow's milk products including full-fat yoghurt, cheese and custard may be given, but not cow's milk as a main drink before 12 months.

Summary

- Food allergies are increasing particularly in young children
- Diagnosis mainly relies upon history of reaction
  - Allergen-specific IgE test supports diagnosis of IgE mediated food allergy
  - No specific test for non-IgE mediated or mixed forms of food allergy
- Management involves education and provision of action plan
  - Adrenaline autoinjectors may be of benefit in some but not all children
- Limited prevention strategies available at present
  - Primarily aimed at high risk infants
- Current guidelines
  - Breastfeeding for at least 6 months
  - Introduce foods (including allergenic foods) from 4-6 months
  - For high risk infants - hydrolysed formula if unable to breastfeed in first 4-6 months of life