

Non-allergic asthma

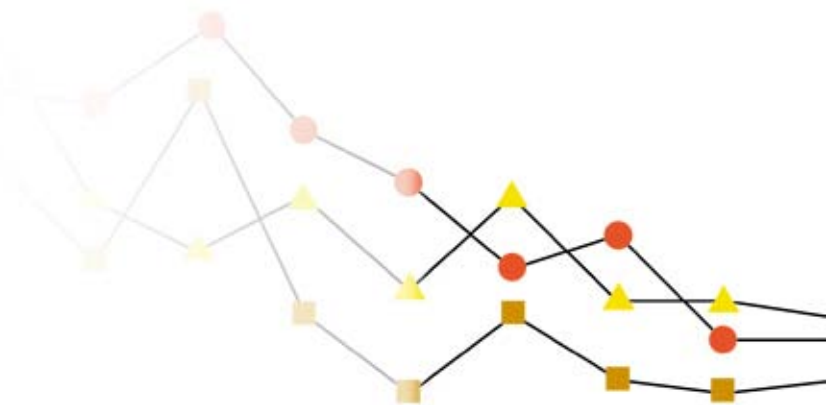
Neil Pearce

Centre for Public Health Research
Massey University Wellington Campus
Wellington, New Zealand

Faculty of Epidemiology and Population Health
London School of Hygiene and Tropical Medicine
London, United Kingdom

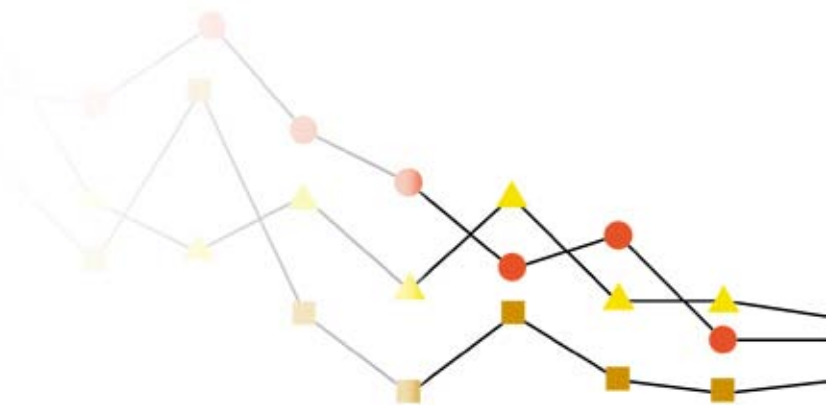
“Established” asthma risk factors

- House dust mite allergen
- Other indoor allergens
- “Colds”
- Parental smoking
- Diet
- Air pollution
- Stress
- Occupational exposures
- Genetic factors

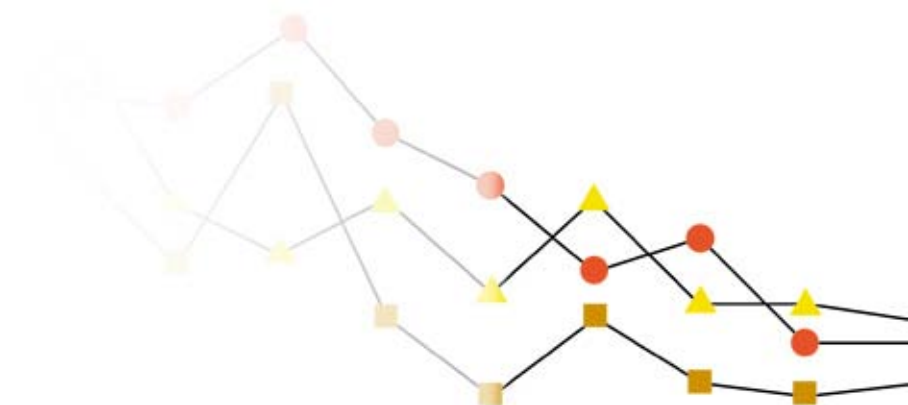
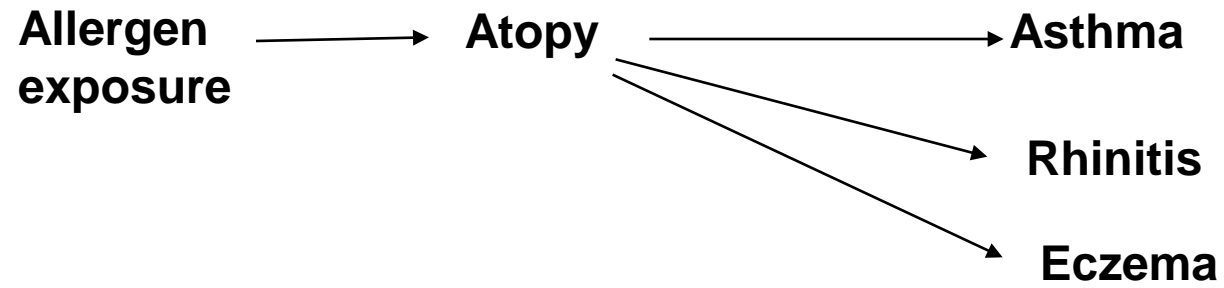


“Asthma Is an Allergic Disease”

- Allergen exposure, particularly in infancy produces atopic sensitization
- Continued exposure results in asthma through the development of bronchial hyperresponsiveness, airway inflammation and reversible airways obstruction

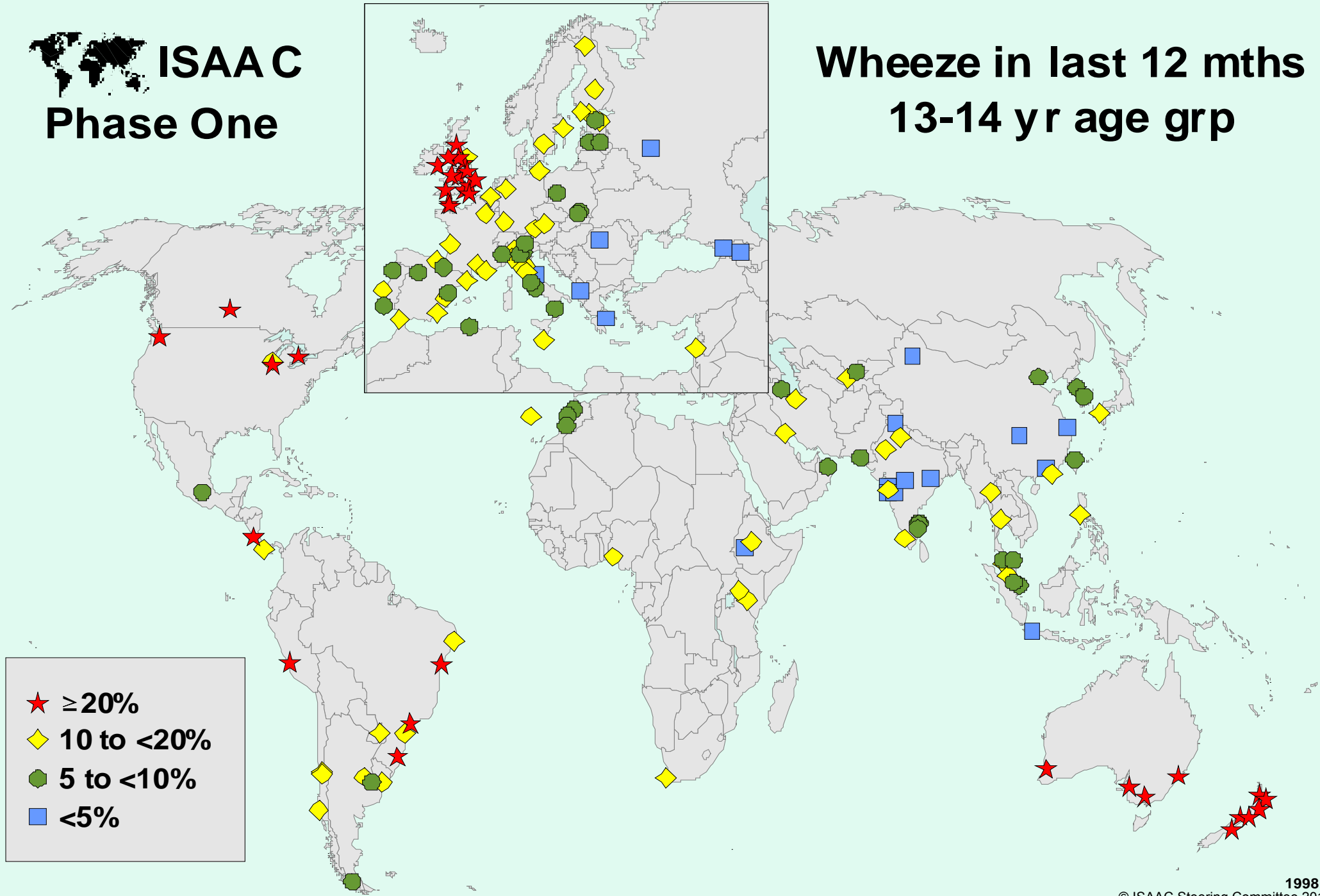


Models of asthma causation



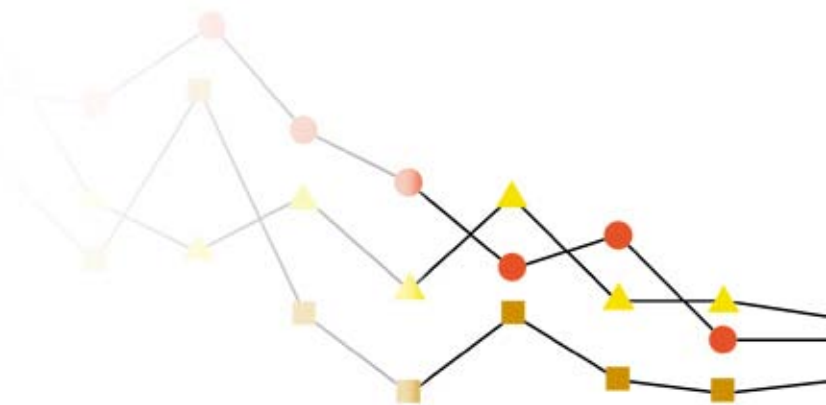
ISAA C
Phase One

Wheeze in last 12 mths
13-14 yr age grp



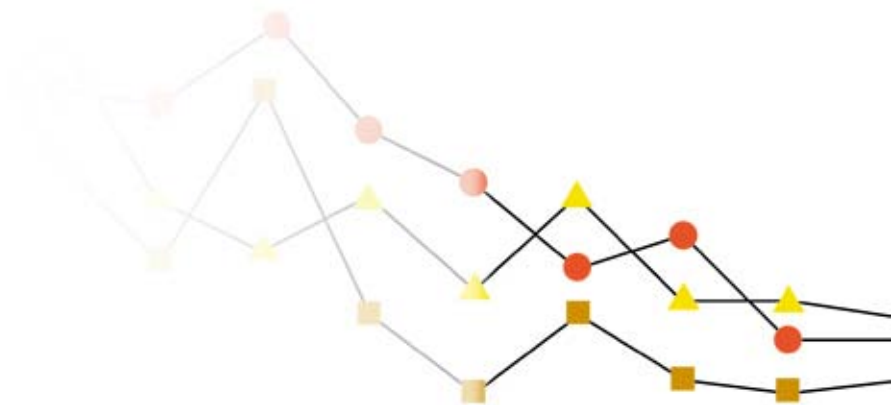
“Asthma Is an Allergic Disease”

1. Is BHR a valid measure of asthma prevalence?
2. How much asthma is really attributable to atopy?
3. Is allergen exposure a primary cause of asthma?



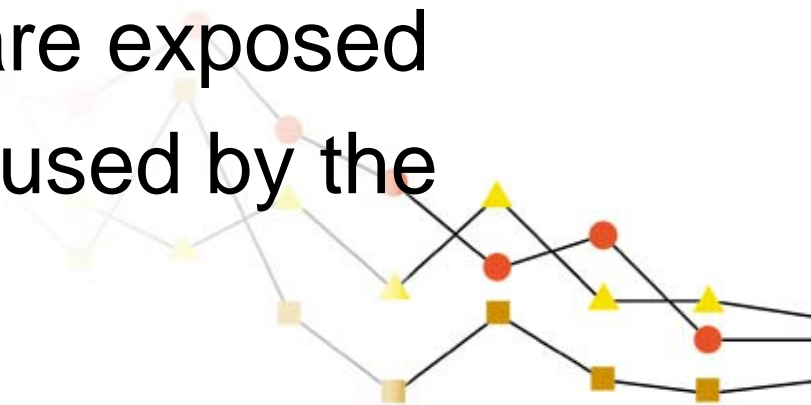
How Much Asthma Is Really Attributable to Atopy?

Neil Pearce, Juha Pekkanen, Richard Beasley
Thorax 1999



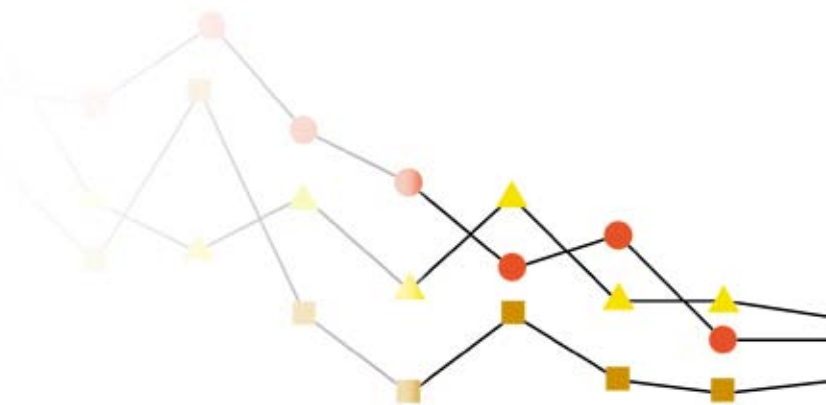
Population Attributable Risk

- Suppose an exposure doubles the risk of developing asthma
- For every two cases that occur in exposed people, one would have occurred anyway, and one is an “extra” cases caused by exposure
- Suppose that 40% of cases are exposed
- Then 20% of all cases are caused by the exposure

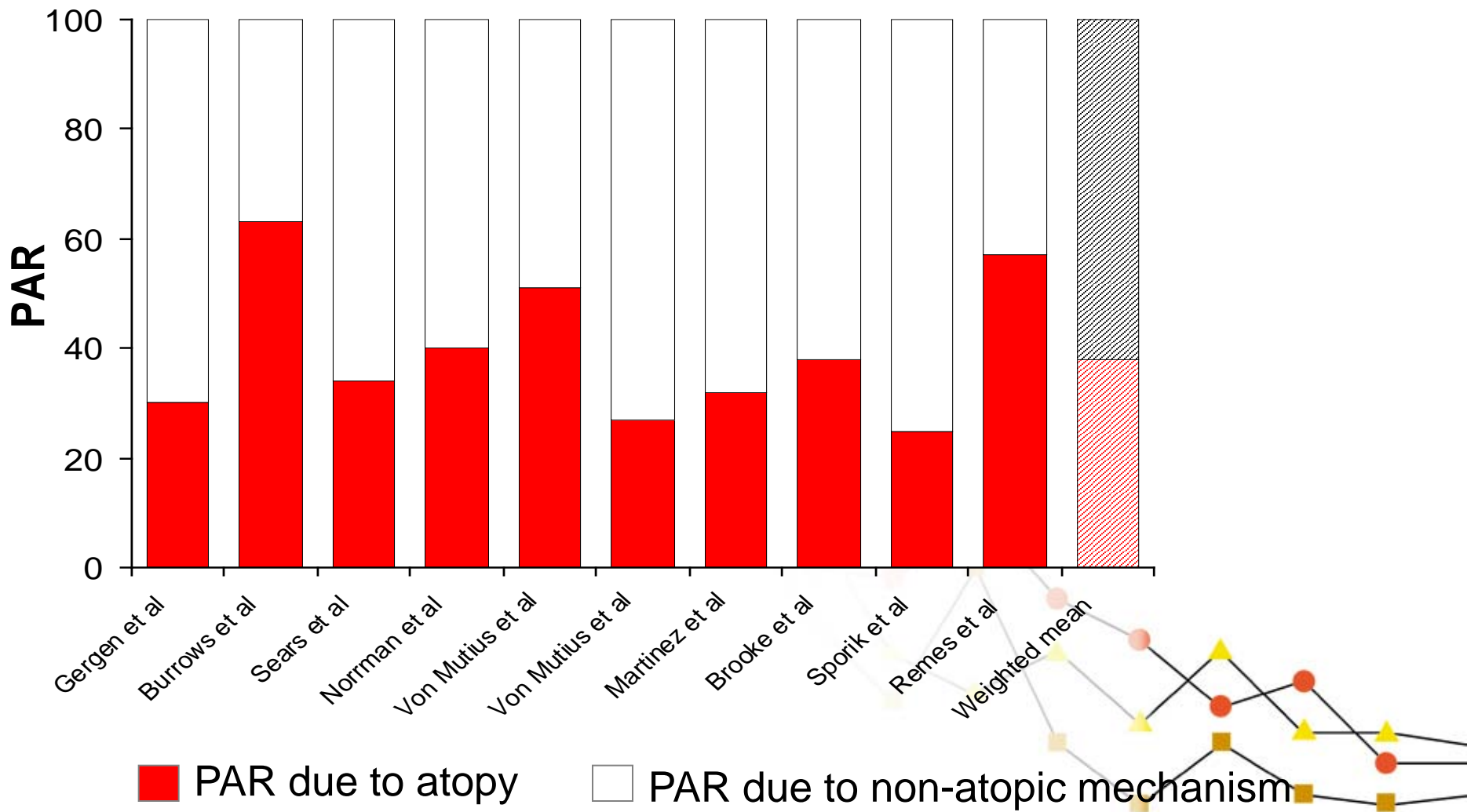


Example: Sears et al (1989)

- Age = 13
- Asthmatics: N = 315, % atopic = 57%
- Non-cases: N = 399, % atopic = 35%
- Odds ratio = 2.5
- Proportion of atopic cases due to atopy
= $1.5/2.5 = 0.6$
- PAR = $57 * 0.6 = 34\%$

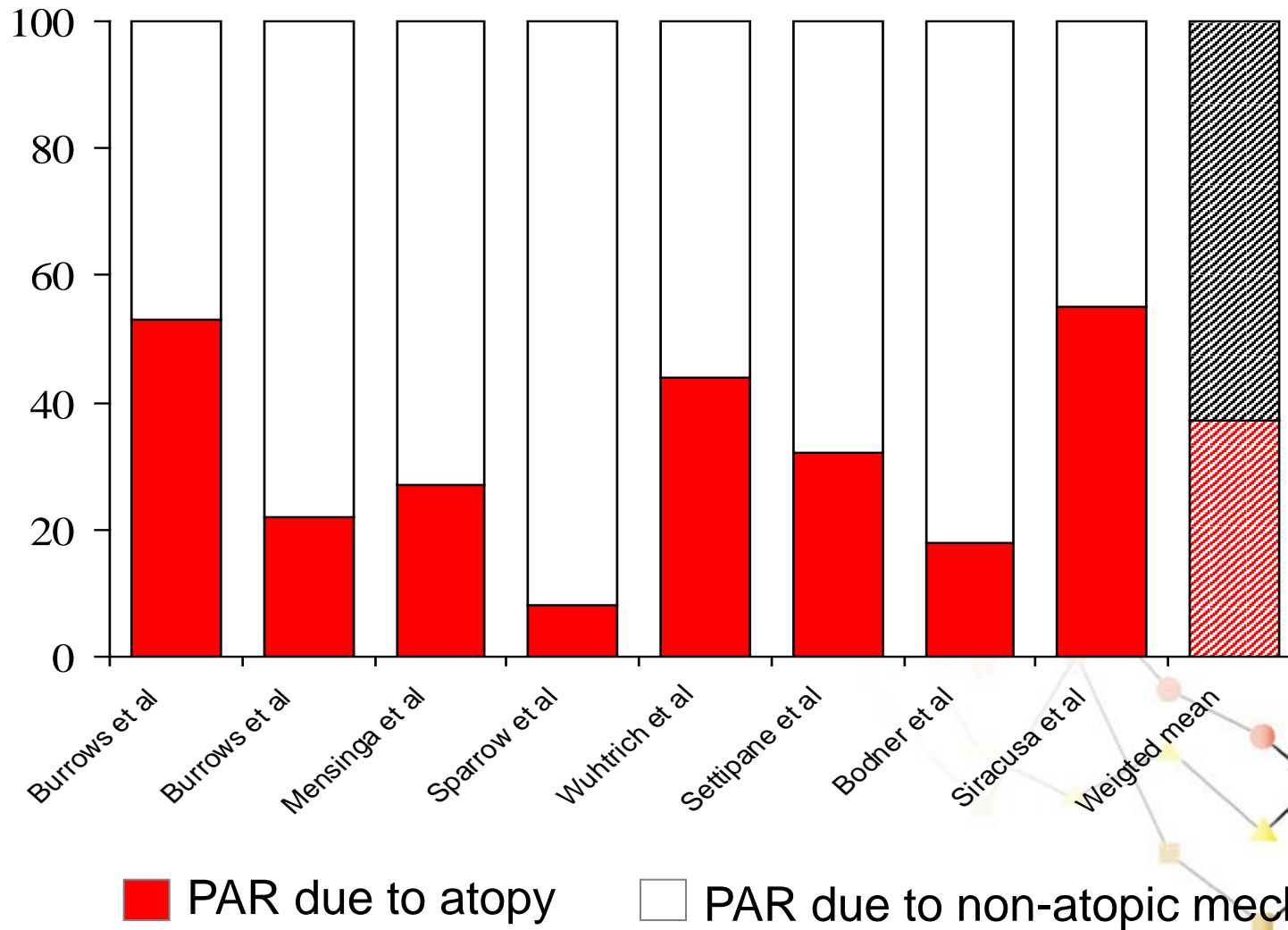


How much asthma is attributable to atopy in children of the general population? (Pearce et al., Thorax 1999)

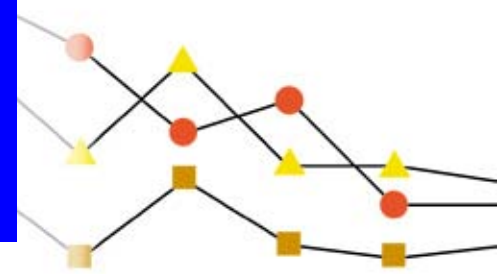
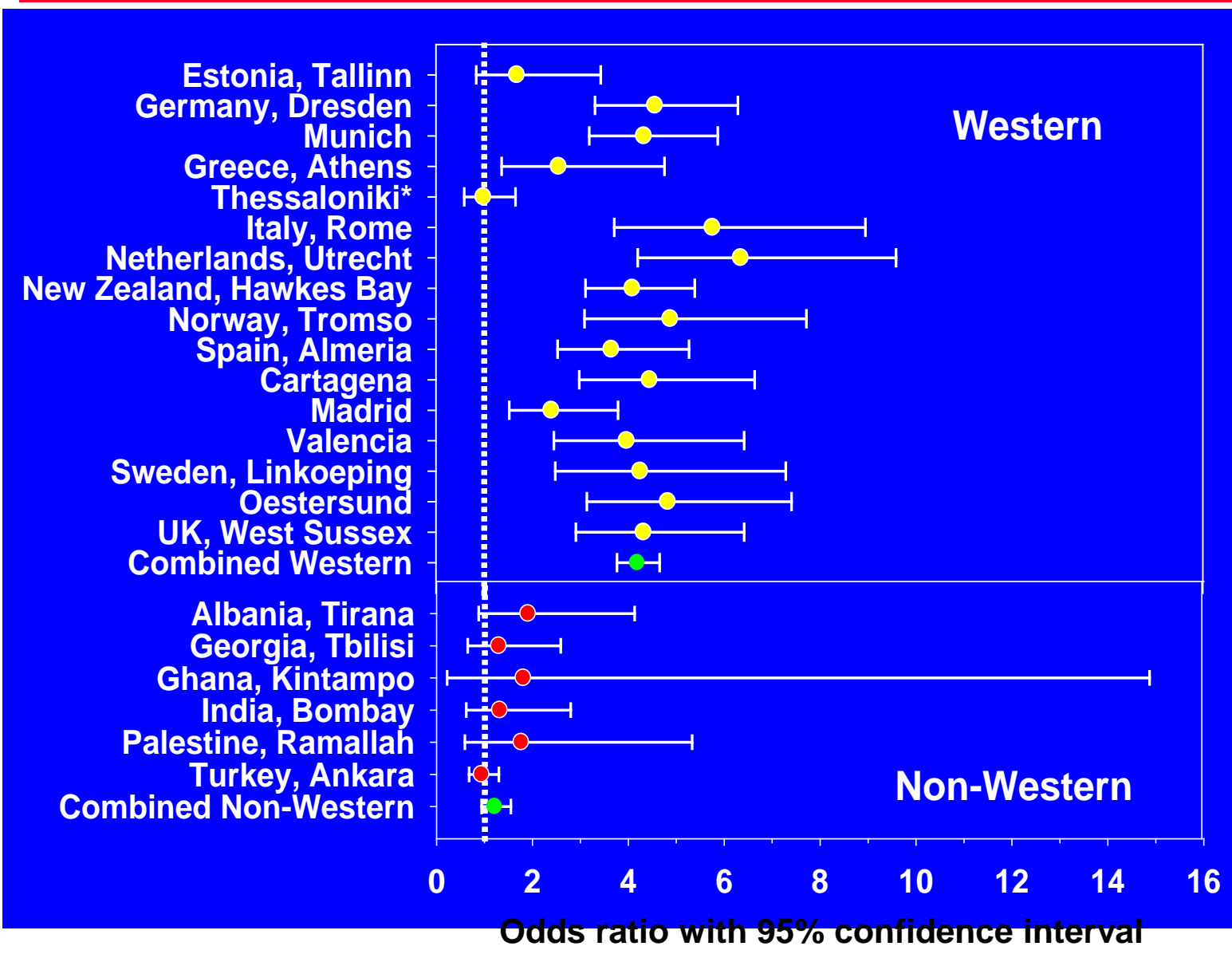


How much asthma is attributable to atopy in adults of the general population? (Pearce et al., Thorax 1999)

PAR

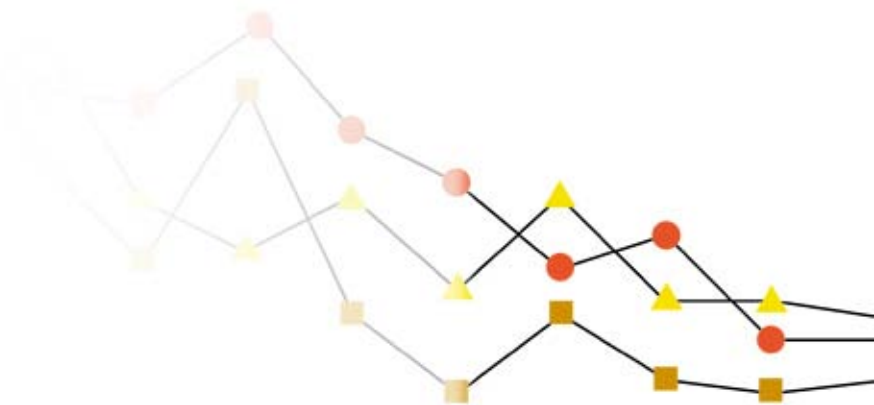


Current wheeze v skin prick test for atopy

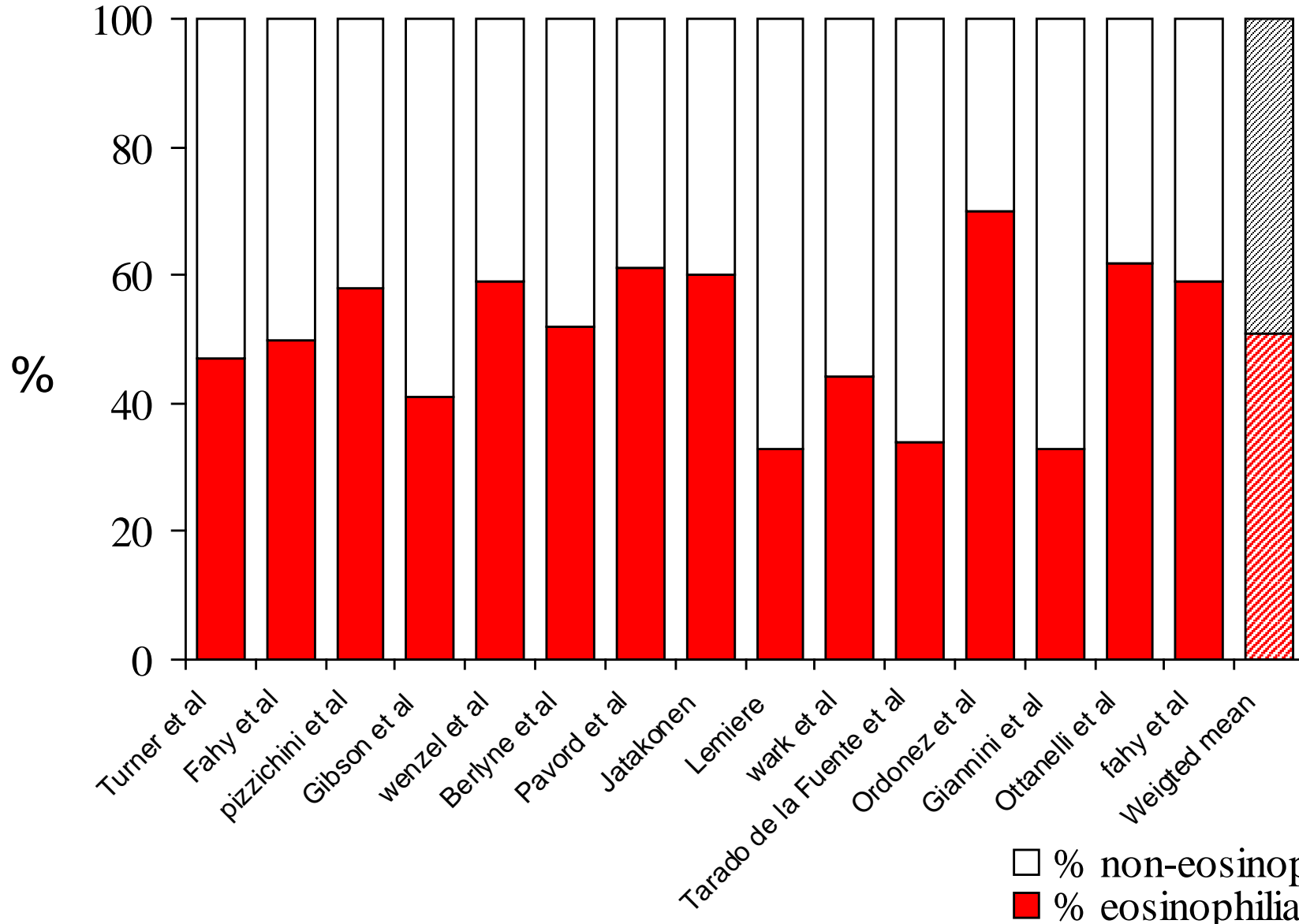


Non-eosinophilic asthma: importance and possible mechanisms.

Douwes J, Gibson P, Pekkanen J, Pearce N.
Thorax 2002; 57: 643-8.

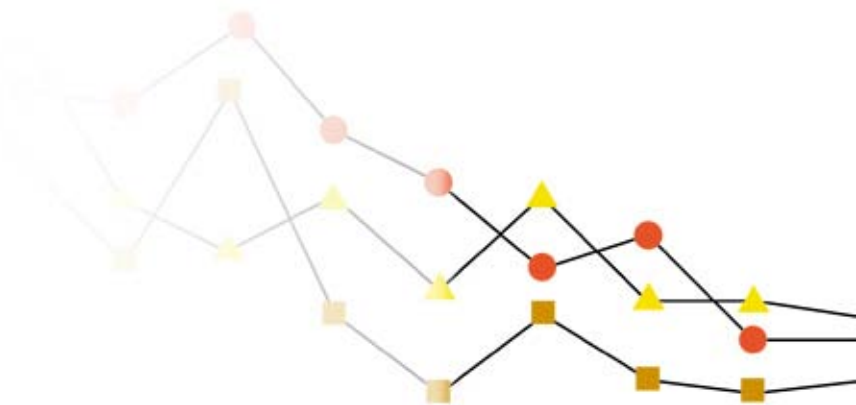


How much asthma is “attributable” to eosinophilia in adults of the general population (Douwes et al., Thorax 2002)

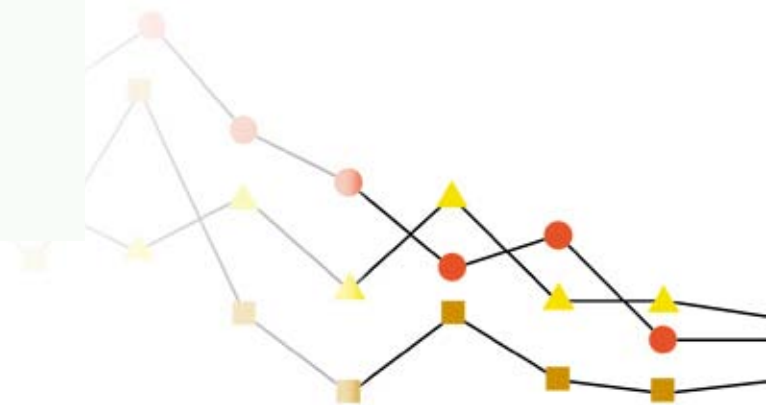
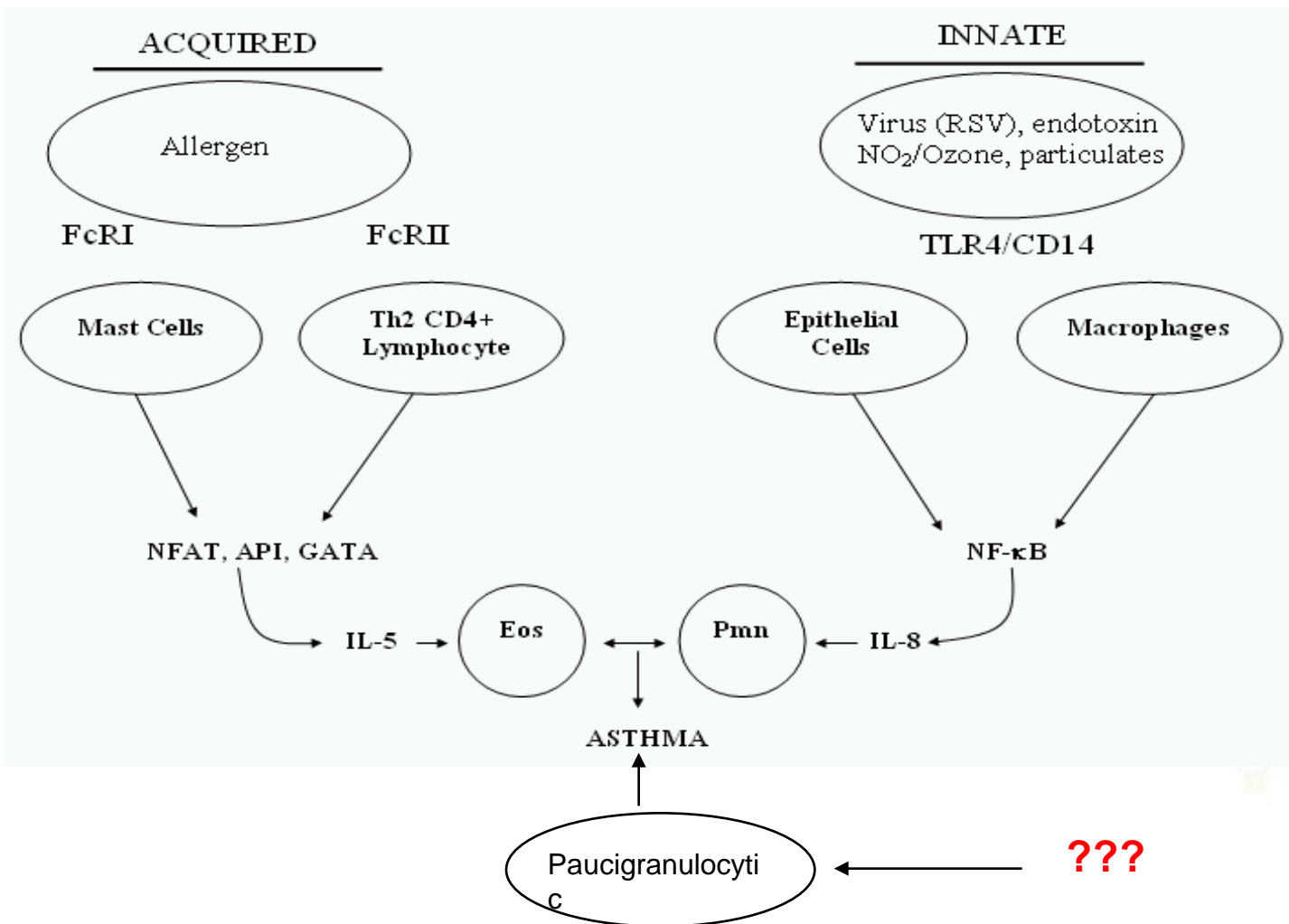


Non-eosinophilic asthma

- At most 50% of asthma cases are attributable to eosinophilic airway inflammation
- The remainder may be due to neutrophilic airway inflammation triggered by environmental exposure to bacterial endotoxin, air pollution, ozone, viral infections, etc

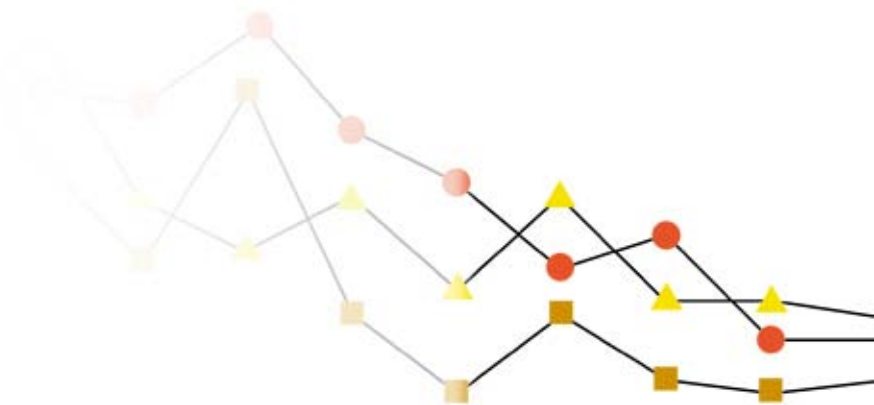


Acquired and innate immune pathways leading to asthma (Douwes et al., Thorax 2002)



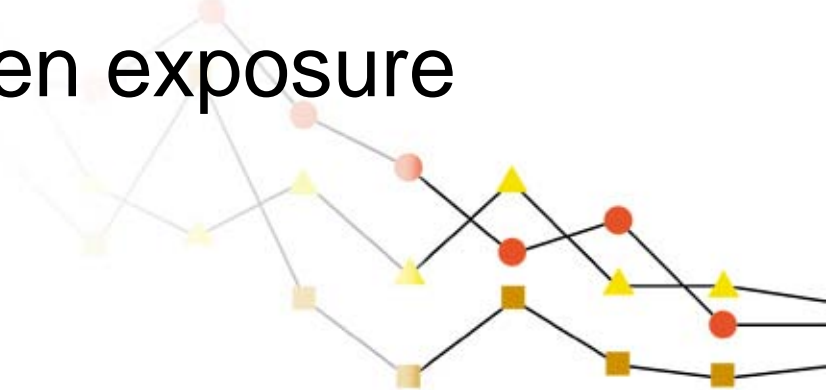
Is Allergen Exposure a Major Primary Risk Factor for Asthma?

Neil Pearce, Jeroen Douwes, Richard Beasley
Thorax 2000

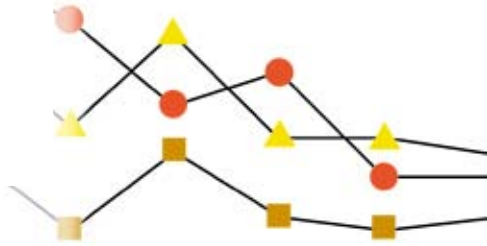
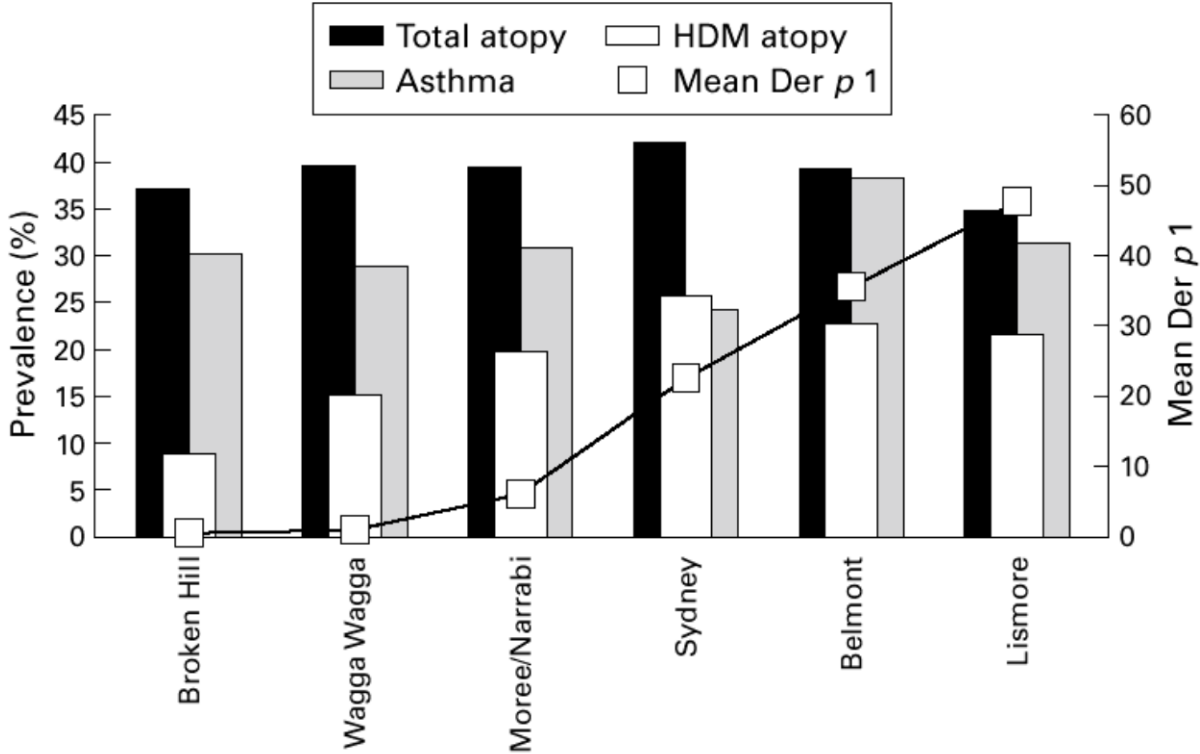


Is Allergen Exposure a Major Primary Risk Factor for Asthma?

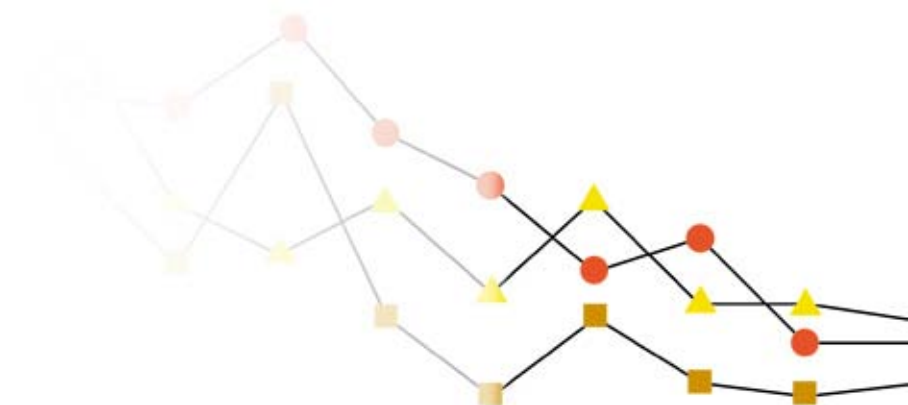
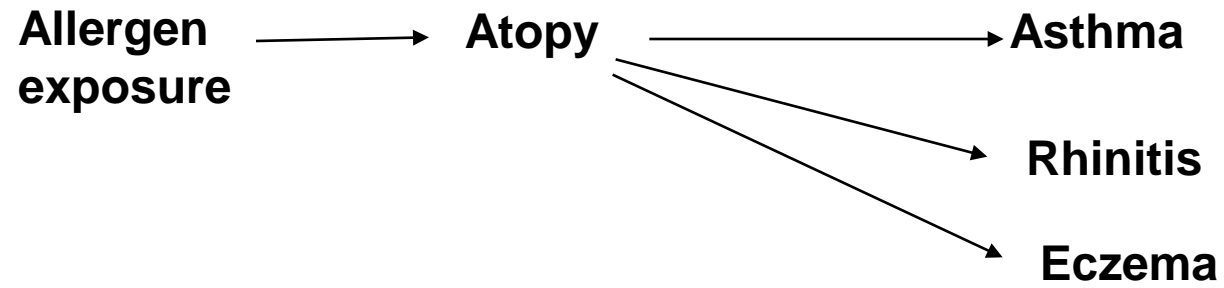
- Only five cohort studies have been conducted (all in selected populations) of allergen exposure in infancy and asthma risk after age six years
- One study (Sporik et al) was positive, but not statistically significantly; the others found no association between allergen exposure and subsequent asthma risk



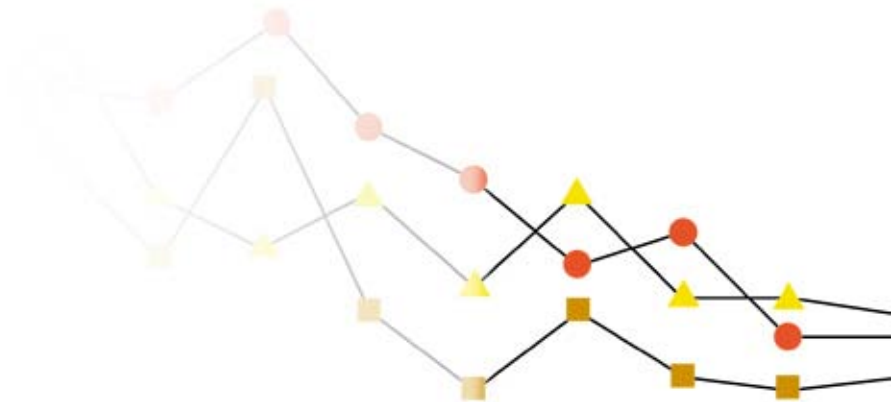
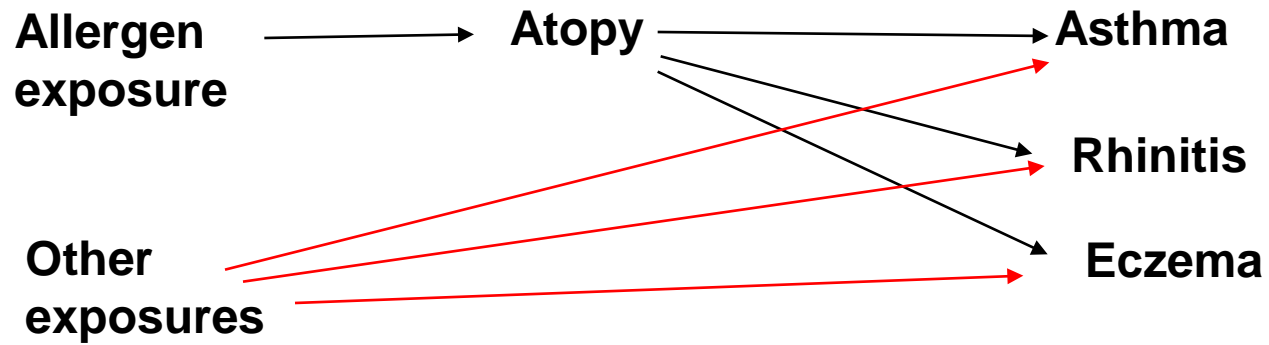
Mean Der P 1 Levels, and Prevalence of HDM Atopy and Total Atopy in Six Australian Centres



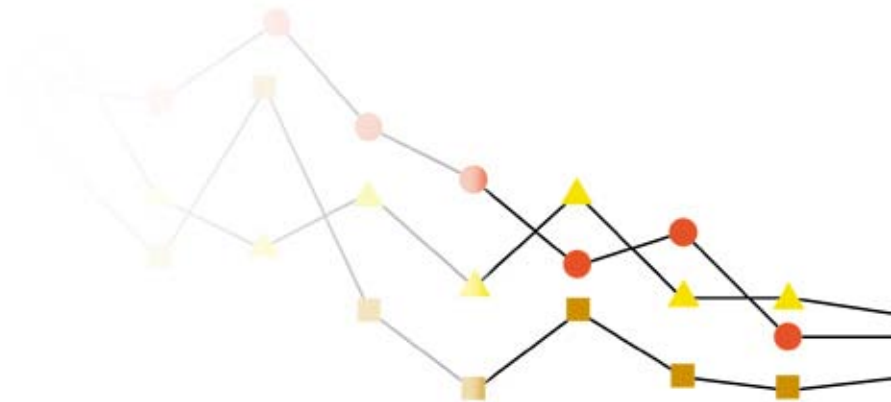
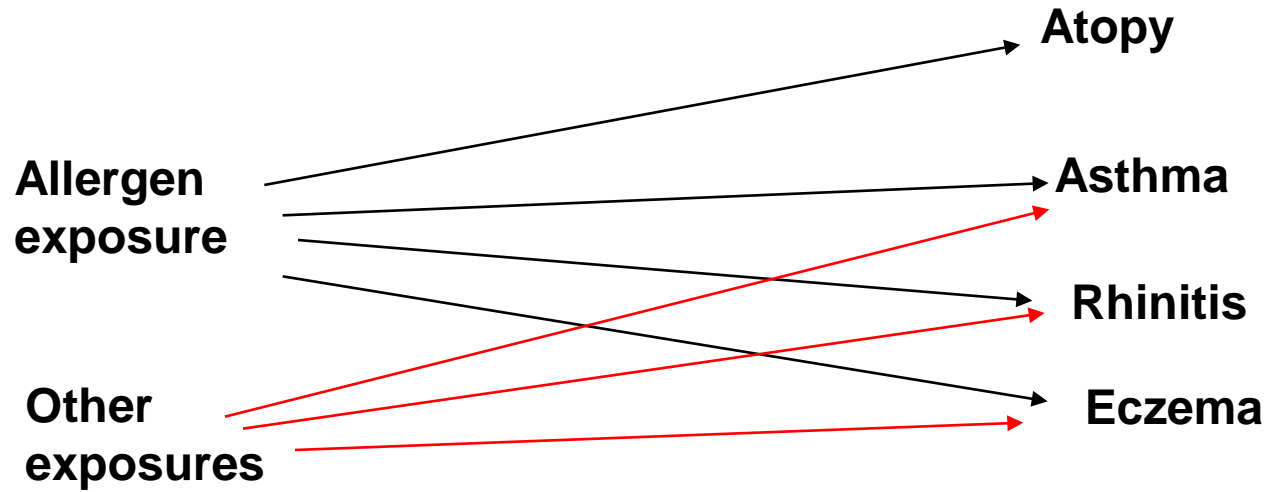
Models of asthma causation



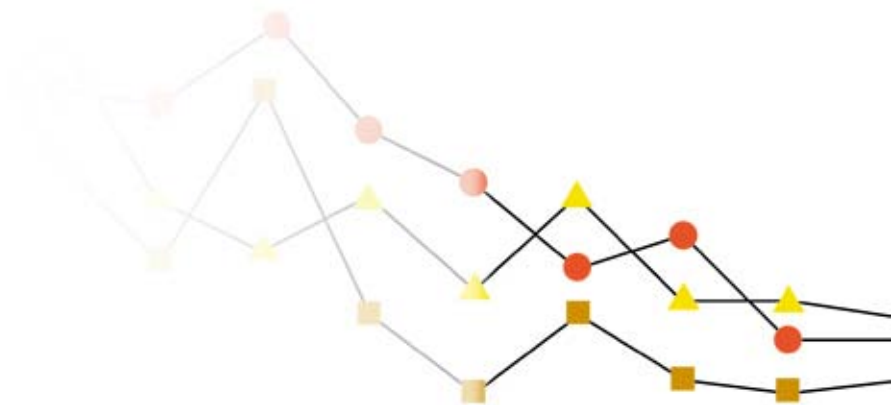
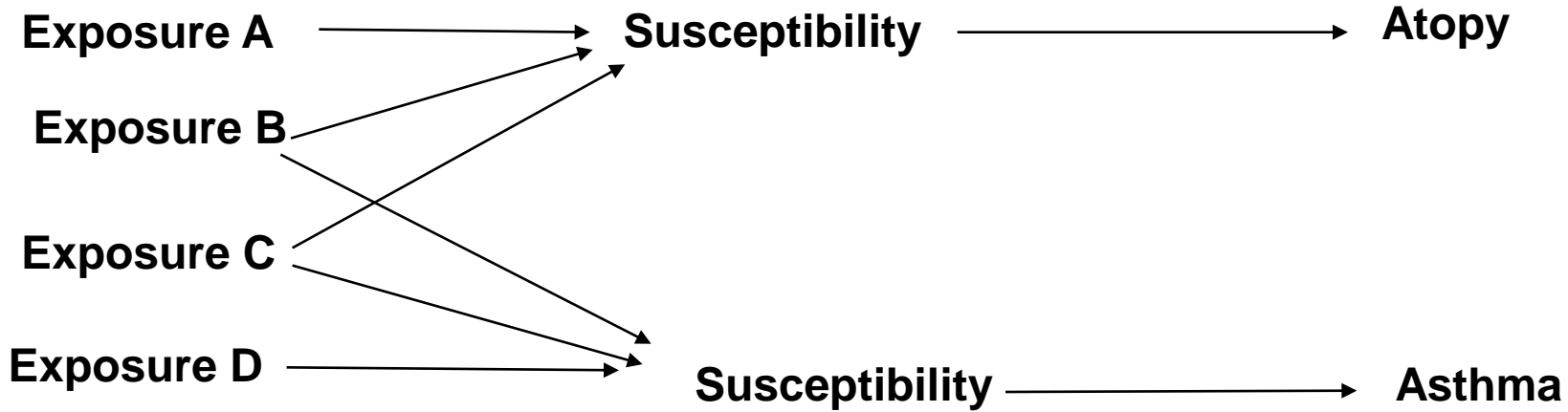
Models of asthma causation



Models of asthma causation

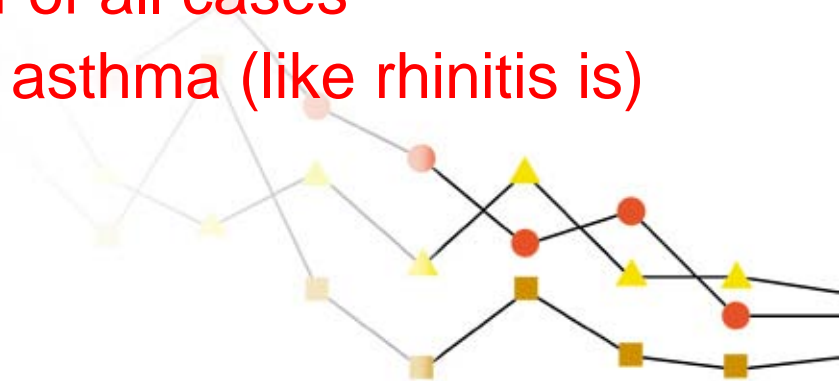


Models of asthma causation



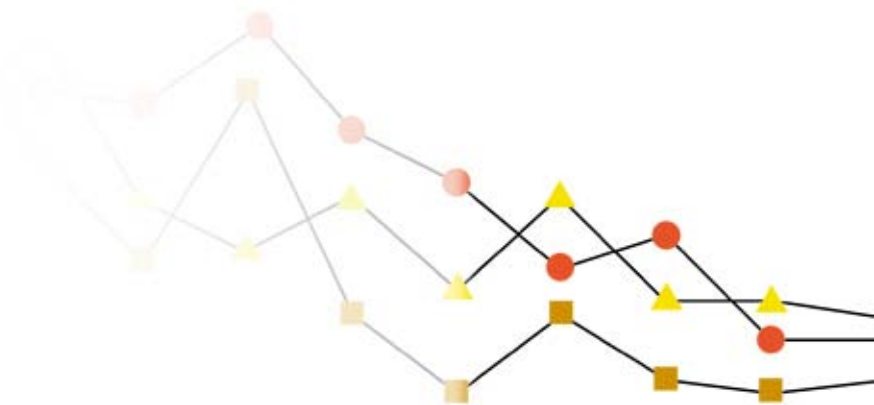
Is “asthma” a collection of different diseases?

- It depends on your definition
 - “Allergic inflammation of the airways”
 - Variable airways obstruction (bronchospasm)
- Is there evidence of different phenotypes?
 - Unclear currently
- Is atopy a risk factor for asthma?
 - If it is, it accounts for less than half of all cases
 - It may simply be “associated” with asthma (like rhinitis is) rather than a causal factor



Why is it important to differentiate between asthma phenotypes?

- Treatment
 - Corticosteroids
- Disease progress
 - Fixed airflow obstruction
- Aetiology
 - Hygiene hypothesis only applies to atopic asthma
- Causes
 - Causal exposures



Non-allergic asthma

Neil Pearce

Centre for Public Health Research
Massey University Wellington Campus
Wellington, New Zealand

Faculty of Epidemiology and Population Health
London School of Hygiene and Tropical Medicine
London, United Kingdom