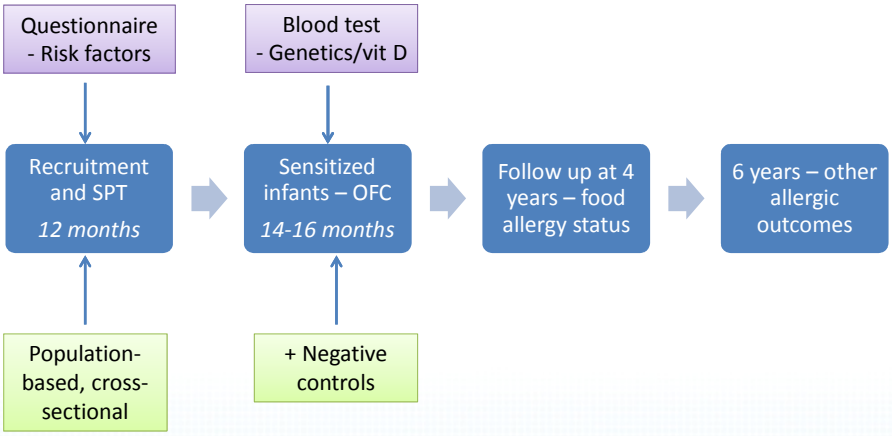
Demographic and lifestyle factors associated with differences in allergic disease prevalence between two population-based allergy studies in different regions of Victoria (Comparison of the BIS/HealthNuts cohorts)

Aims

1. To compare and contrast baseline characteristics potentially contributing to allergic disease risk between the Melbourne-based HealthNuts cohort and the Barwon Infant Study cohort.
2. To assess how these differences, if evident, explain any study-specific differences in atopic outcomes

Methods: HealthNuts



Methods: HealthNuts

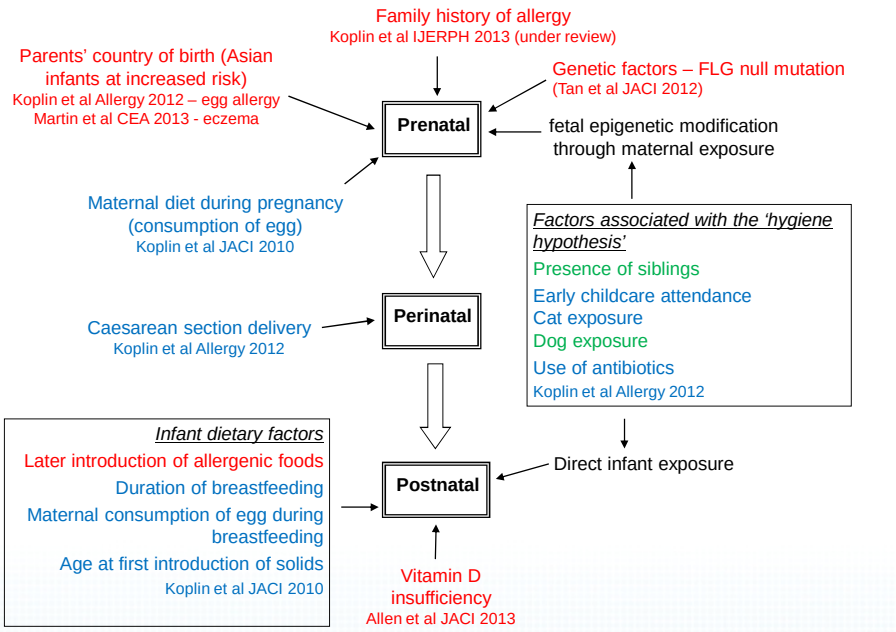
Table 1. Demographics of HealthNuts study population and comparison with VPDC data (from 2006) published in Births in Victoria 2005 & 2006 [17]

	HealthNuts	95% CI	VPDC
n	2172		69 186
Sex (% male)*	52.2%	50.1, 54.4	51.60%
Birth weight (g)			
<500	0.0		0.2
500–999	0.1	0.1, 0.3	0.4
1000–1499	0.5	0.2, 0.9	0.7
1500–1999	0.9	0.5, 1.4	1.3
2000–2499	4.0	3.1, 4.9	4.0
2500–2999	15.6	14.1, 17.3	15.1
3000–3499	36.8	34.7, 38.9	35.6
3500–3999	30.7	28.7, 32.8	30.4
4000–4499	9.4	8.2, 10.8	10.2
>4500	1.7	1.2, 2.4	1.9
Low birth weight†	5.3%	4.4, 6.4	6.6%
Mode of delivery (% vaginal)	66%	63.9, 67.9	69%
Average gestation (weeks)	39.4‡	39.4, 39.5	38.9
Median age of mother (years)	34	33.9, 34.3	31
Median age–primiparae (years)	31.7		29
Birth of twins			3.6
% mothers >34 years	53.0%	50.7, 55.1	24.4%
% Parity before the index birth	51.4%		43.2%
% Pre-term birth§	6.8%	5.1, 7.2	6.9%
Maternal place of birth¶			
Australia	72.6%	70.6, 74.5	75.2%
Asia	13.1%	11.7, 14.7	10.5%
UK including Ireland	3.7%	2.9, 4.6	2.6%
Continental Europe	2.7%	2.0, 3.5	2.9%
Mid East	1.6%	1.1, 2.3	2.2%
Africa	1.6%	1.1, 2.3	2.4%

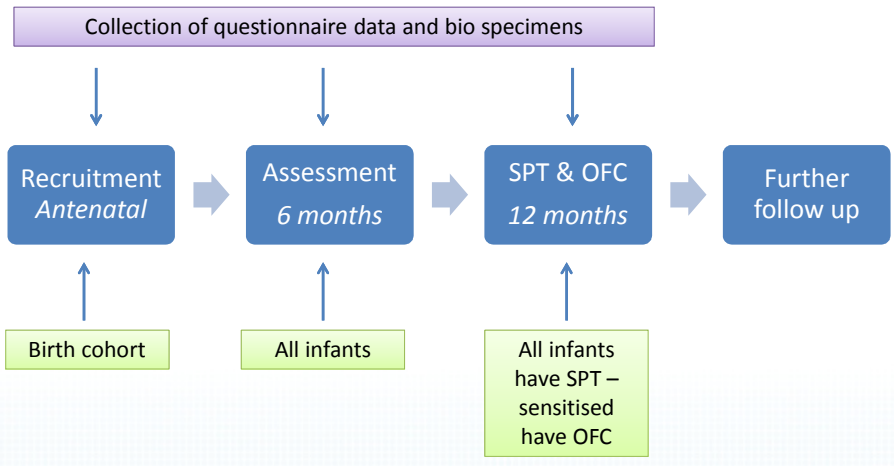
*Percentage of participants in each birth weight range.
†Percent with low birth defined as live births <2500 g.
‡HealthNuts average not inclusive of those <36 or >42 weeks.
§Pre-term defined as <37 weeks gestational age.
¶Asia includes South Asia and Far East.

Osborne et al. CEA 2010

Factors examined for possible association with food allergy in HealthNuts



Methods: BIS

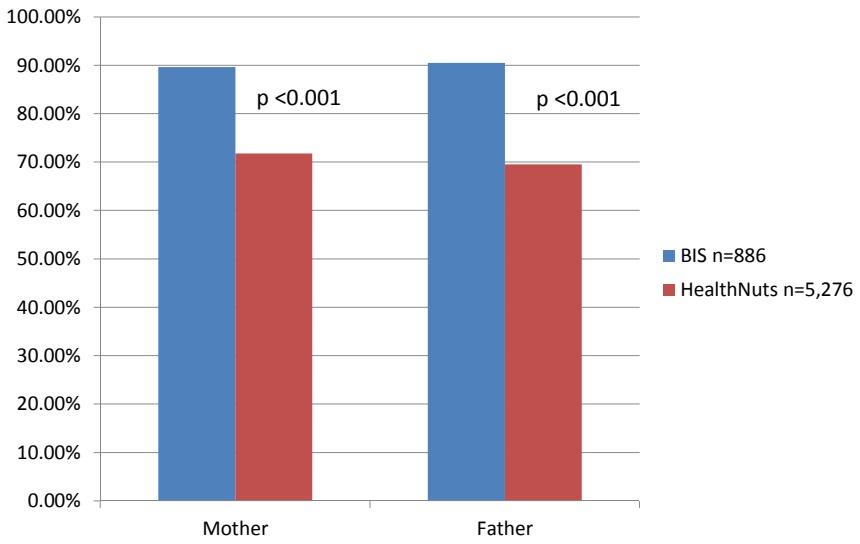


Results:
1. Comparison of HealthNuts and BIS cohorts

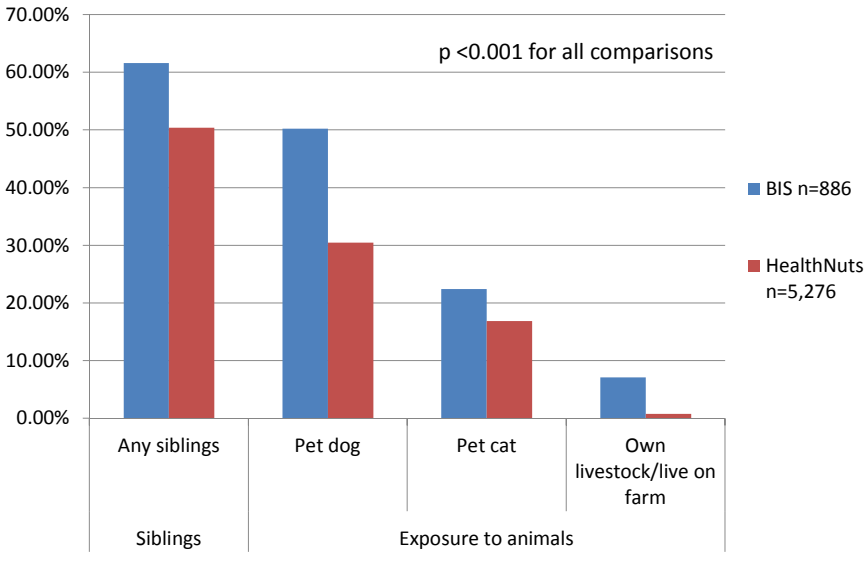
Results – cohort comparison

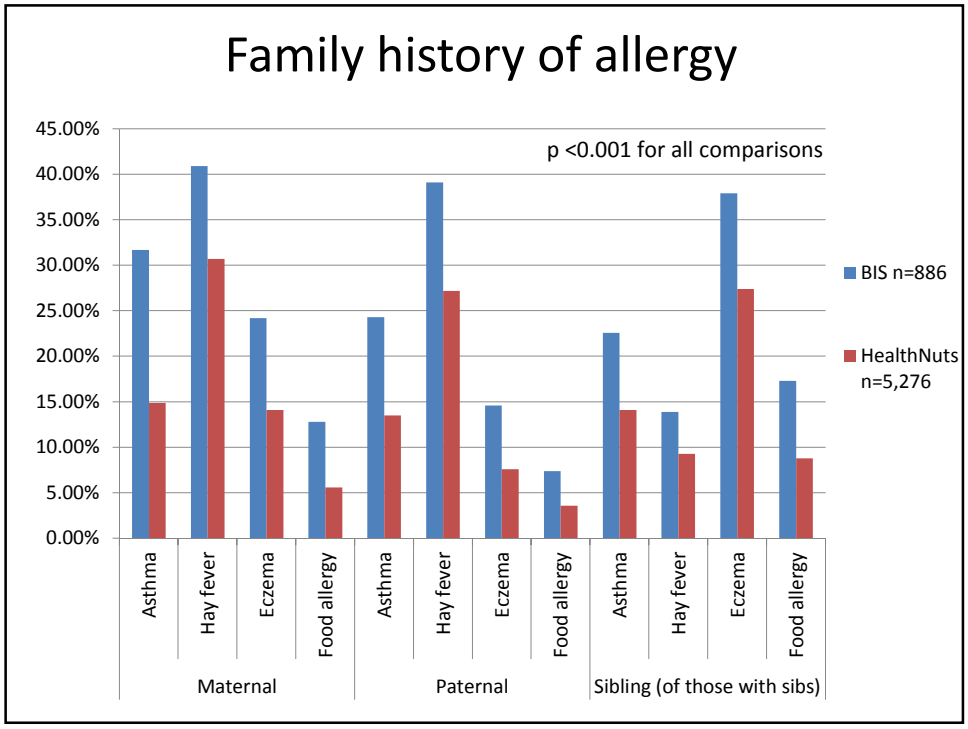
	BIS n=886	HealthNuts n=5,276	P value for comparison*
Year of birth	Nov 2010 - Apr 2013	Jun 2007 - Aug 2010	
Maternal age			
Mean (SD)	31.9 (4.8)	33.0 (4.8)	<0.001
Paternal age			
Mean (SD)	34.4 (6.1)	35.1 (5.6)	0.0016
Maternal smoking during pregnancy	14.80%	4.70%	<0.001
Any breastfeeding	85.50%	94.40%	<0.001
Pre-term birth	4.06%	6.17%	0.018

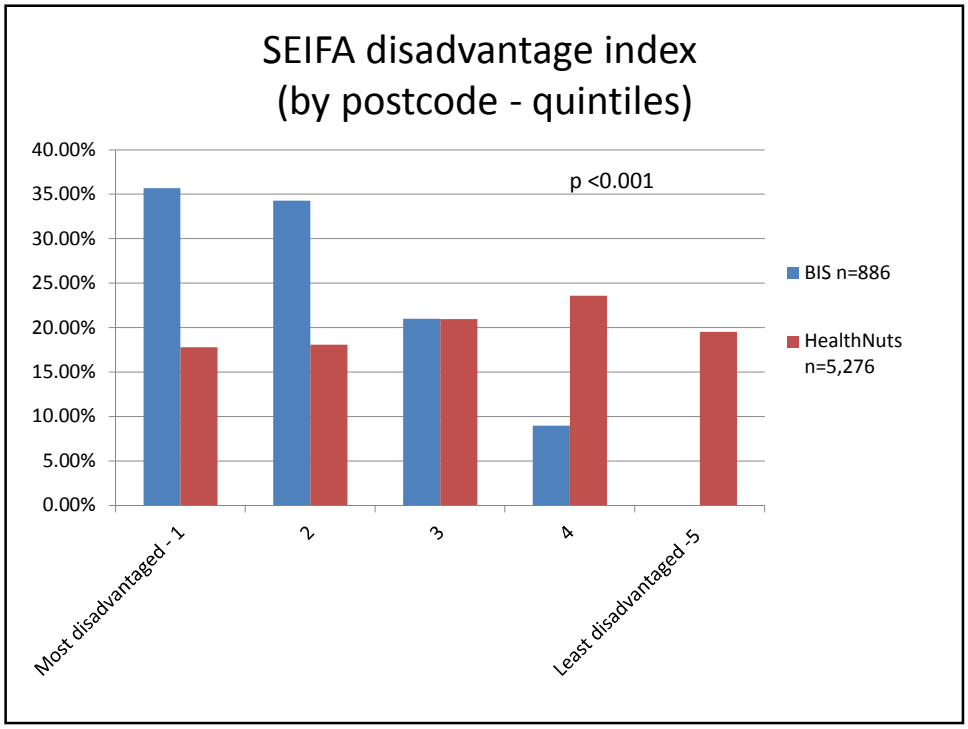
Proportion of parents born in Australia



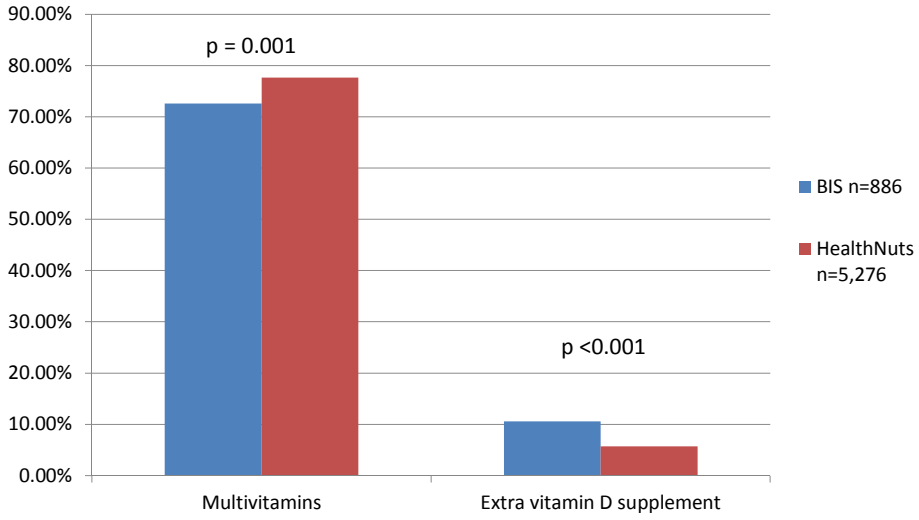
Siblings/exposure to animals




Family history of allergy
45.00%
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
p <0.001 for all comparisons
BIS n=886
HealthNuts n=5,276
Asthma
Hay fever
Eczema
Food allergy
Asthma
Hay fever
Eczema
Food allergy
Asthma
Hay fever
Eczema
Food allergy
Maternal
Paternal
Sibling (of those with sibs)


SEIFA disadvantage index
(by postcode - quintiles)
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
p <0.001
BIS n=886
HealthNuts n=5,276
Most disadvantaged - 1
2
3
4
Least disadvantaged -5

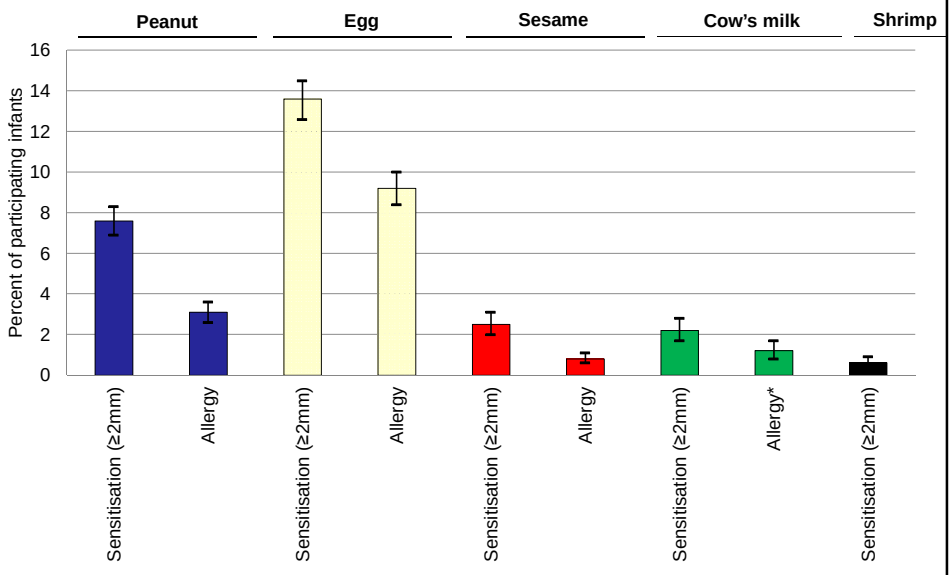
Maternal use of vitamin supplements during pregnancy



Results:
2. Outcome data

Prevalence of challenge-proven food allergy in the HealthNuts study

(Osborne et al JACI 2011)



* Allergy to milk was based on parent-reported reaction consistent with IgE-mediated allergy, in the context of a positive SPT

Eczema prevalence

- HealthNuts population prevalence:
  - Observed eczema at 12 months:

    20.3% (95% CI 19.0, 21.5)
  - Cumulative prevalence for parent-reported eczema:

    28.0% (95% CI 26.7, 29.4)

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Table 1: Population prevalence of infantile eczema, by various measures

Measure of eczema	Number affirmative for the eczema measure†	Proportion in participant fraction		Population prevalence*	
		%	95% CI	%	95% CI
During the first year of life					
Diagnosis of eczema	1223/4719	25.9%	24.7, 27.2	23.7%	22.5, 25.0
History of itchy rash (any)	1849/4955	37.3%	36.0, 38.7	35.3%	33.9, 36.8
History of itchy rash, treated with topical steroids	931/4889	19.0%	17.9, 20.1	17.5%	16.3, 18.6
Current eczema at 12 months of age					
Any current eczema (face, back *or* elbow flexures)	1000/4730	21.1%	20.0, 22.3	20.3%	19.0, 21.5
Eczema on the face	582/4771	12.2%	11.3, 13.1	11.8%	10.9, 12.9
Eczema on the back	594/4719	12.6%	11.6, 13.5	11.9%	10.9, 12.9
Eczema in the elbow flexures	190/3656	5.2%	4.5, 5.9	5.0%	4.3, 5.8
Eczema on back, face *and* in elbow flexures	68/3638	1.9%	1.4 2.3	1.9%	1.5, 2.4
Combined estimates					
Diagnosis &/or Itchy rash, treated with steroids	1466/4735	31.0%	29.6, 32.3	28.0%	26.7, 29.4
Current, Diagnosis, &/or Itchy rash, treated with steroids	1690/4486	37.7%	36.3, 39.1	35.9%	34.5, 37.4

†The denominator for each measure represents that number of participants who responded to the corresponding question, or the number of infants examined for eczema at each site at 12 months of age. *Prevalence estimates were calculated by weighting the proportion of the participants with each eczema measure using sampling weights, calculated using the probability that a family participated in the study based on family history of food allergy and other allergy, infantile eczema, family size, socioeconomic status, and whether the infant was tolerating peanut in their diet.

Martin et al. CEA 2013

Future work:

Future work

- Additional variables to add:
  - Rural location (assessed by postcode linked to ABS)
  - Infant feeding:
    - Vitamin D supplementation
    - Timing of introduction of solids
    - Timing of introduction of egg/peanut
  - Child care in first year of life
  - Antibiotics in first year of life
  - Household income? (in addition to SEIFA)

Future work

- Additional analysis:
  - Formal comparison of SPT/OFC positive rates in BIS/HealthNuts
  - Can any of these differences explain study-specific differences in atopic outcomes?

Acknowledgements

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