

## The Effect Of Diet On Symptom Prevalence Of Asthma, Rhinitis And Eczema In Children: Global Findings From The International Study Of Asthma And Allergies In Childhood (ISAAC) Phase Three

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### Rationale:

Ecological analyses of ISAAC Phase One (1997) with Food and Agricultural Organization of the United Nations (FAOSTAT) 1995 data, found inverse associations between consumption of calories from cereals and rice, protein from cereal and nuts, starch, vegetables and symptoms of asthma, rhinitis and eczema in children 6-7 years and adolescents 13-14 years. ISAAC Phase Three (2001 to 2005) used the same core questions and age groups and added an environmental questionnaire which included a range of other risk factors including diet, enabling individual-level analyses.

### Methods:

Questions about symptoms of asthma, rhinitis and eczema were completed by parents/guardians for children and self completed by adolescents. Additional questions included consumption of butter, cereal, eggs, fast food, fruit, margarine, meat, milk, nuts, pasta, potato, pulses, rice, seafood and vegetables in the past 12 months. Categories were “never or only occasionally”, “once or twice per week”, and “most or all days”. Prevalence odds ratios were estimated using logistic regression, adjusted for gender, region of the world, language, and per capita gross national income. Additional analyses included potential confounders (physical activity, television viewing, maternal education, current maternal smoking and for children only, maternal smoking in the first year of life). Associations are reported if statistically significant at the 5% level.

### Results:

There were 166345 children from 62 centers in 30 countries and 301243 adolescents from 104 centers in 49 countries. For children, an inverse association was observed between eggs, fruit, meat, milk, vegetables and all three conditions, for nuts, pulses, seafood with wheeze and eczema and for potato with rhinitis (Table 1). A positive association was observed for fast food with wheeze and rhinitis and for margarine with rhinitis. For adolescents, an inverse association was observed for fruit with wheeze and rhinitis, milk with eczema, and vegetables with wheeze alone. A positive association was observed between butter, fast foods, margarine, nuts, pasta and all three conditions, for eggs with eczema, for meat with wheeze and rhinitis and for potato, pulses, rice, seafood with rhinitis and eczema.

### Conclusion:

In both age groups, the inverse and positive associations observed between food groups and symptoms of asthma, rhinitis and eczema, warrant further investigation at the region and country level. Prospective studies are needed to adjust for avoidance behaviour. If foods considered protective and aggravating to the reported prevalence of asthma, rhinitis and eczema are globally advocated, worldwide population health benefits may be observed.

Table 1. Diet variables and odds ratios adjusted for region, gender, language and GNI, and other confounders for multivariate analyses for the 6-7 year age group for the global symptom prevalence of wheeze, rhinitis and eczema in the past 12 months

	Current wheeze	Current Rhinitis	Current eczema
Exposure	Multivariate analyses OR (95%CI)	Multivariate analyses OR (95%CI)	Multivariate analyses OR (95%CI)
Butter	0.99 (0.94, 1.05)	0.98 (0.92, 1.04)	0.97 (0.91, 1.02)
Cereals	0.93 (0.84, 1.02)	0.97 (0.88, 1.08)	1.00 (0.91, 1.10)
Eggs	0.76 (0.70, 0.81)*	0.82 (0.76, 0.89)*	0.76 (0.71, 0.82)*
Fast food	1.17 (1.08, 1.27)*	1.20 (1.11, 1.31)*	1.04 (0.95, 1.14)
Fruit	0.87 (0.80, 0.95)*	0.83 (0.76, 0.91)*	0.90 (0.82, 0.98)*
Margarine	1.00 (0.95, 1.06)	1.11 (1.04, 1.18)*	1.01 (0.95, 1.07)
Meat	0.86 (0.78, 0.94)*	0.87 (0.79, 0.96)*	0.85 (0.78, 0.93)*
Milk	0.83 (0.76, 0.90)*	0.77 (0.71, 0.85)*	0.73 (0.67, 0.79)*
Nuts	0.86 (0.79, 0.94)*	0.96 (0.88, 1.05)	0.90 (0.82, 0.99)*
Pasta	0.96 (0.89, 1.03)	1.02 (0.94, 1.11)	1.00 (0.93, 1.08)
Potato	0.97 (0.90, 1.05)	0.90 (0.84, 0.97)*	0.92 (0.85, 0.99)*

Pulses	0.94 (0.88, 0.99)*	0.95 (0.89, 1.02)	0.90 (0.84, 0.96)*
Rice	0.96 (0.89, 1.04)	1.05 (0.96, 1.14)	1.02 (0.93, 1.11)
Sea food	0.88 (0.82, 0.94)*	0.95 (0.88, 1.02)	0.92 (0.85, 0.99)*
Vegetables	0.88 (0.82, 0.94)*	0.92 (0.86, 0.99)*	0.93 (0.87, 0.99)*

\* Significant associations

This abstract is funded by: The BUPA Foundation

**Am J Respir Crit Care Med 181;2010:A1898**

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