Jornadas Nacionales Conjuntas
de Alergia e Inmunologia em Pediatria

Epidemiologia de Enfermedades alérgicas en Latinoamérica

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International Study of Asthma and Allergies in Childhood
ISAAC Phases I and III

Asher et al – Lancet 2006;368:733-43

Latin America

20 Countries & 11 Territories

Total population = 569 million

Urban areas = 389 million
(10% without potable water)

Colonization
Portuguese = Brazil
Spanish = All the others

International Study of Asthma and Allergies in Childhood

ISAAC in Latin America

Phase I

17 Centers

9 Countries

6-7 yrs: 36,264

13-14 yrs: 52,549

Phase III

56 Centers

17 Countries

6-7 yrs: 93,851

13-14 yrs: 165,917

Mallol & Solé, 2009

Prevalence of asthma symptoms in children
ISAAC Phase III

6-7yr-old	N	Wheezing 12 mo	Asthma ever	Severe wheeze	Severe wheeze*	Severe wheeze**
Latin America	93,851	17.3	11.2	7.8	41.1	18.9
Global total	388,811	11.5	9.4	4.9	38.5	16.5

13-14yr-old	N	Wheezing 12 mo	Asthma ever	Severe wheeze	Severe wheeze*	Severe wheeze**
Latin America	165,917	15.9	13.6	7.2	38.3	18.9
Global total	798,685	14.1	12.6	6.9	43.3	20.0

*among current wheezers
** without asthma among current wheezers

Mallol, Solé and ISAAC Phase 3 colaborators – J Asthma, in press

Mean prevalence of current wheezing among children Centers participating in ISAAC phases I and III

6-7 yr-old

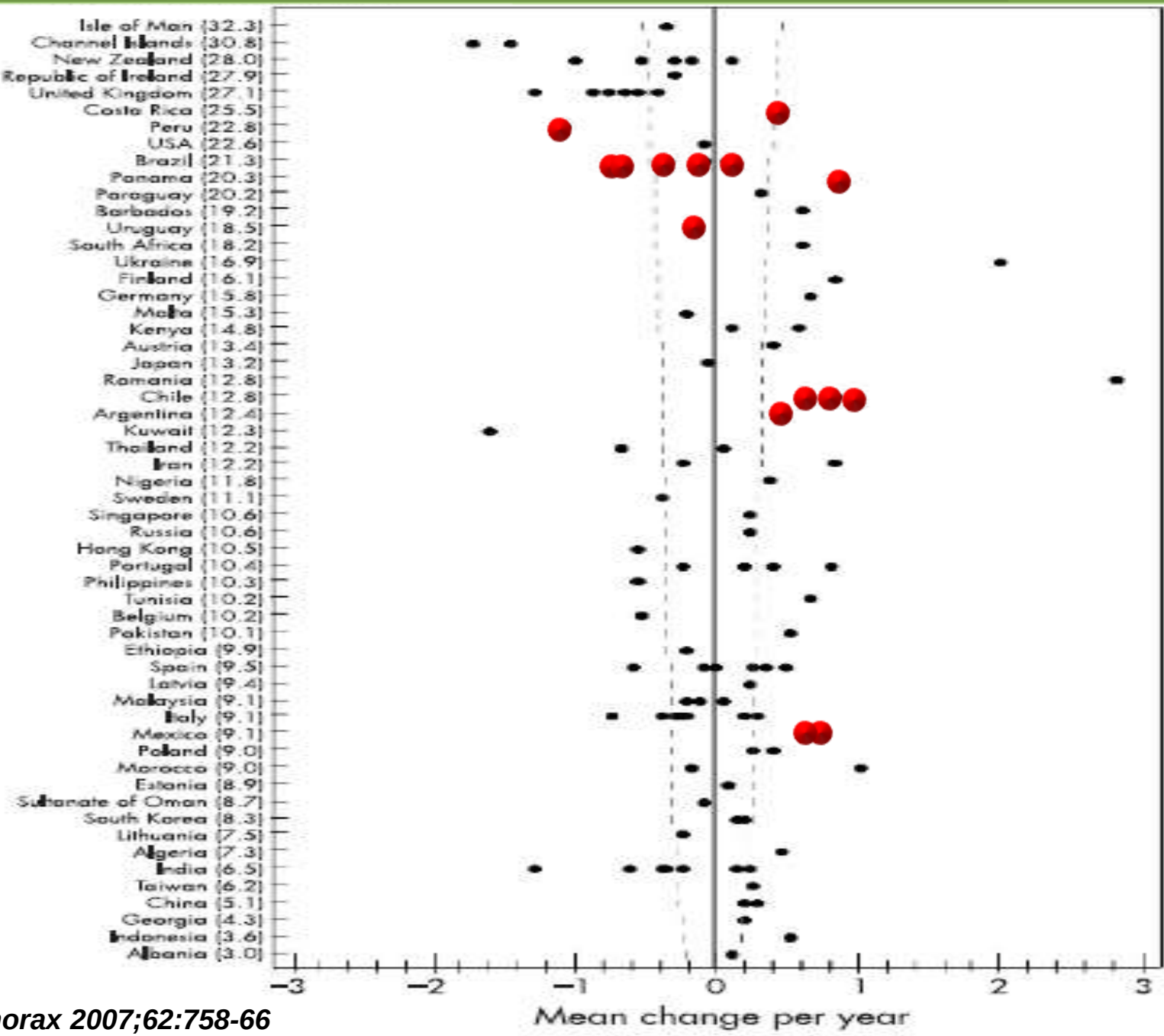
Centre	N	Year between phases	P1	P3	Change/ year	Response rate (%)
Latin-America	21,112	7.1	20.9	21.4	**0.07**	83.8
Total	193,436	7.1	10.6	11.6	**0.13**	84.8

13-14 yr-old

Centre	N	Year between phases	P1	P3	Change/ year	Response rate (%)
Latin-America	44,550	6.9	17.8	18.8	**0.32**	90.9
Total	304,811	7.0	13.2	13.7	**0.06**	90.9

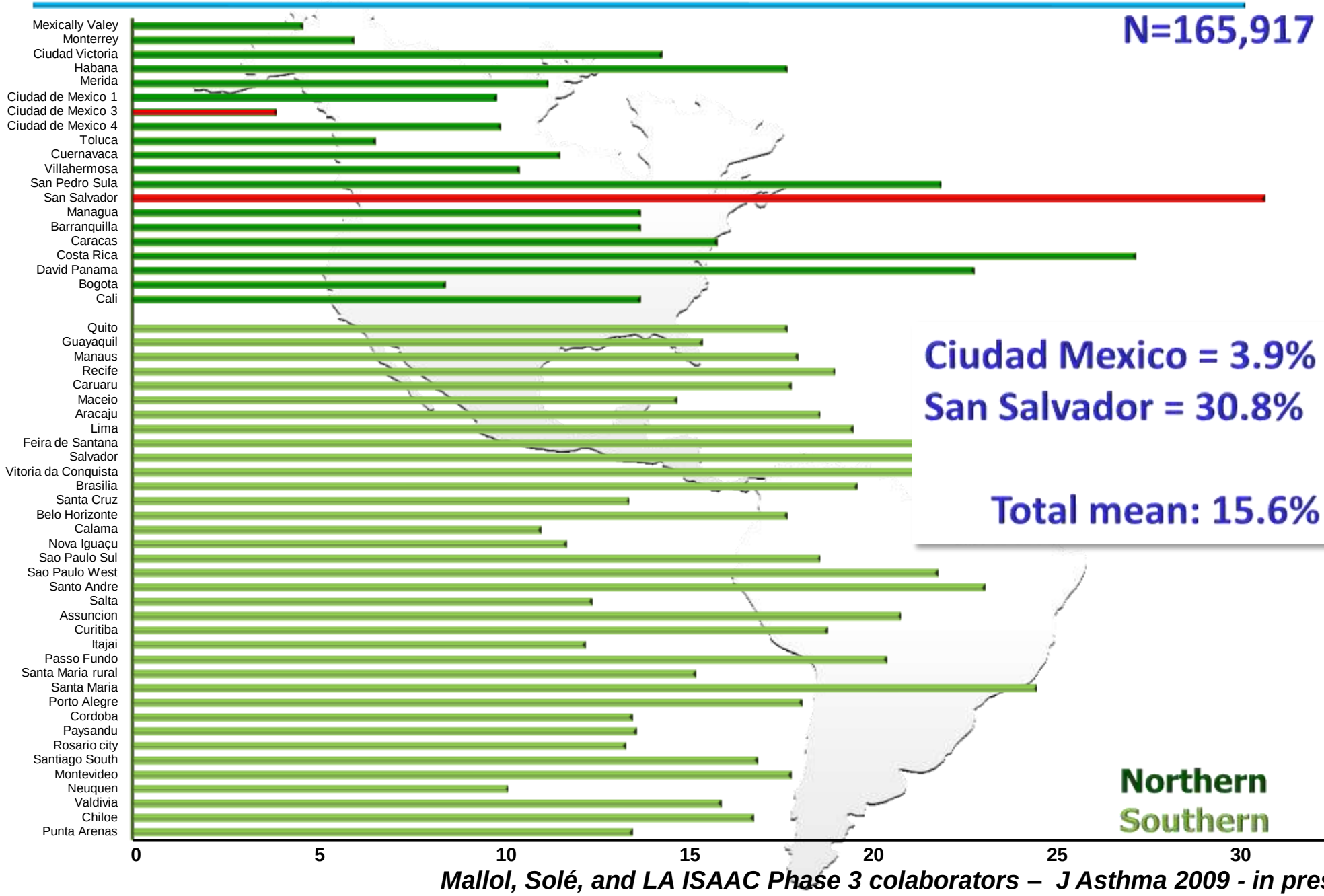
Asher et al – Lancet 2006;368:733-43
Pearce et al – Thorax 2007;62:757-65
Mallol et al – J Asthma 2009, in press

Change /yr prevalence of current wheeze in 13-14-yr-old adolescents



Pearce et al – Thorax 2007;62:758-66

Prevalence of wheezing in the last year in LA adolescents: ISAAC phase 3



Mallol, Solé, and LA ISAAC Phase 3 colaborators – J Asthma 2009 - in press

Rhinitis

Prevalence of symptoms of rhinitis in children ISAAC Phase I and III

	Latin America			Global		
6-7 yr	N	Rhinitis last yr	Rhino conjunctivitis	N	Rhinitis last yr	Rhino conjunctivitis
P1	36,264	27.9	9.1	257,800	11.8	2.4
P3	93,851	28.7	13.5	388,811	21.4	9.1
13-14 yr						
P1	52,549	16.9	15.5	463,801	13.8	13.6
P3	165,917	34.3	18.9	798,685	31.7	16.0

Strachan et al – Pediatr Allergy Immunol 1997;
Aït-Khaled et al – Allergy 2009;64:123-48
Solé et al –Pediatr Allergy Immunol 2009 Sep 24. [Epub ahead of print]

Mean prevalence of current rhinoconjunctivitis among children
Centers participating in ISAAC phases I and III

6-7 yr-old

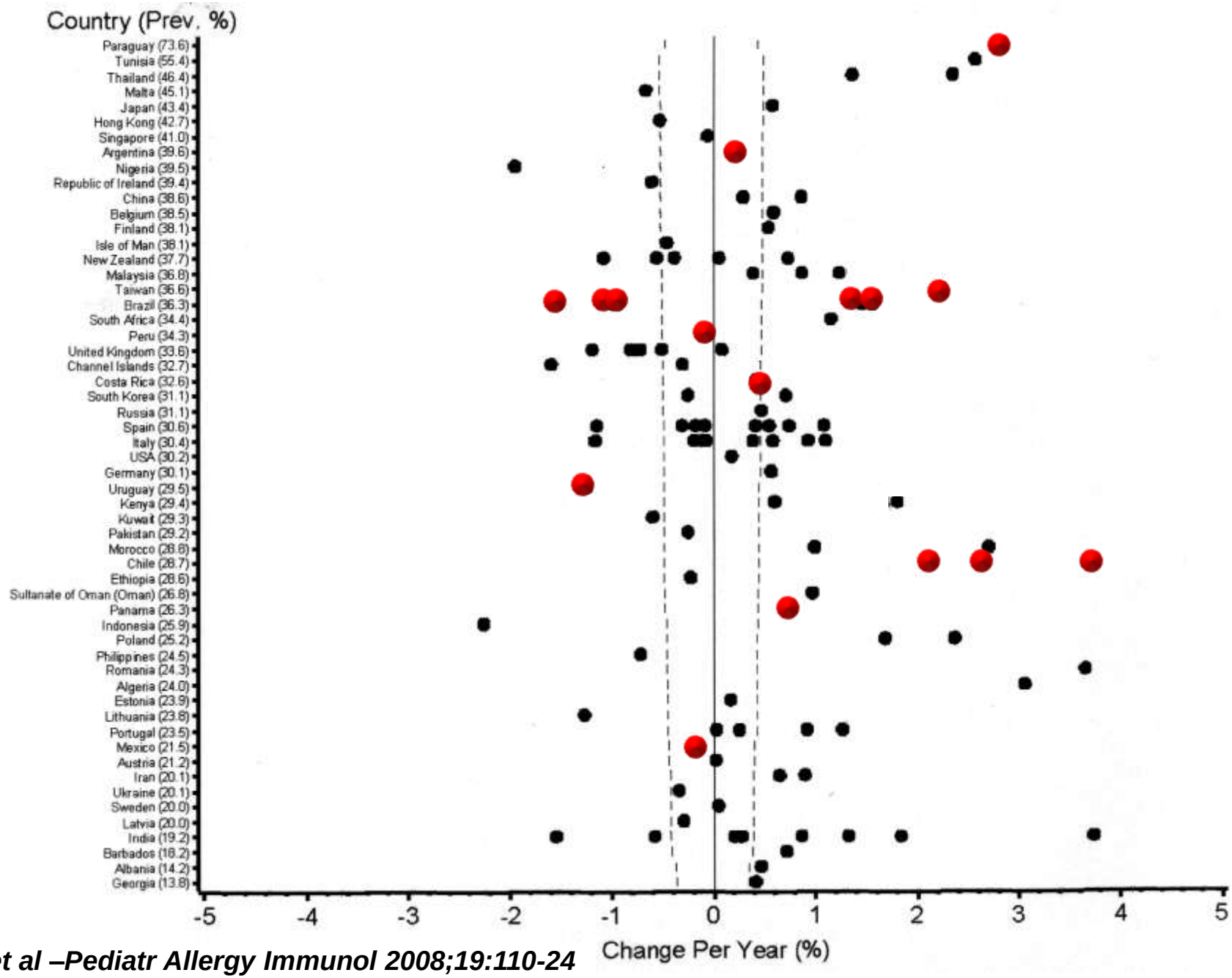
Centre	N	Year between phases	P1	P3	Change/ year	Response rate (%)
Latin-America	21,112	7.1	9.1	12.1	**0.32**	83.8
Total	193,436	7.1	7.0	8.3	**0.17**	84.8

13-14 yr-old

Centre	N	Year between phases	P1	P3	Change/ year	Response rate (%)
Latin-America	44,550	6.9	15.5	18.5	**0.17**	90.9
Total	304,811	7.0	13.6	15.1	**0.18**	90.9

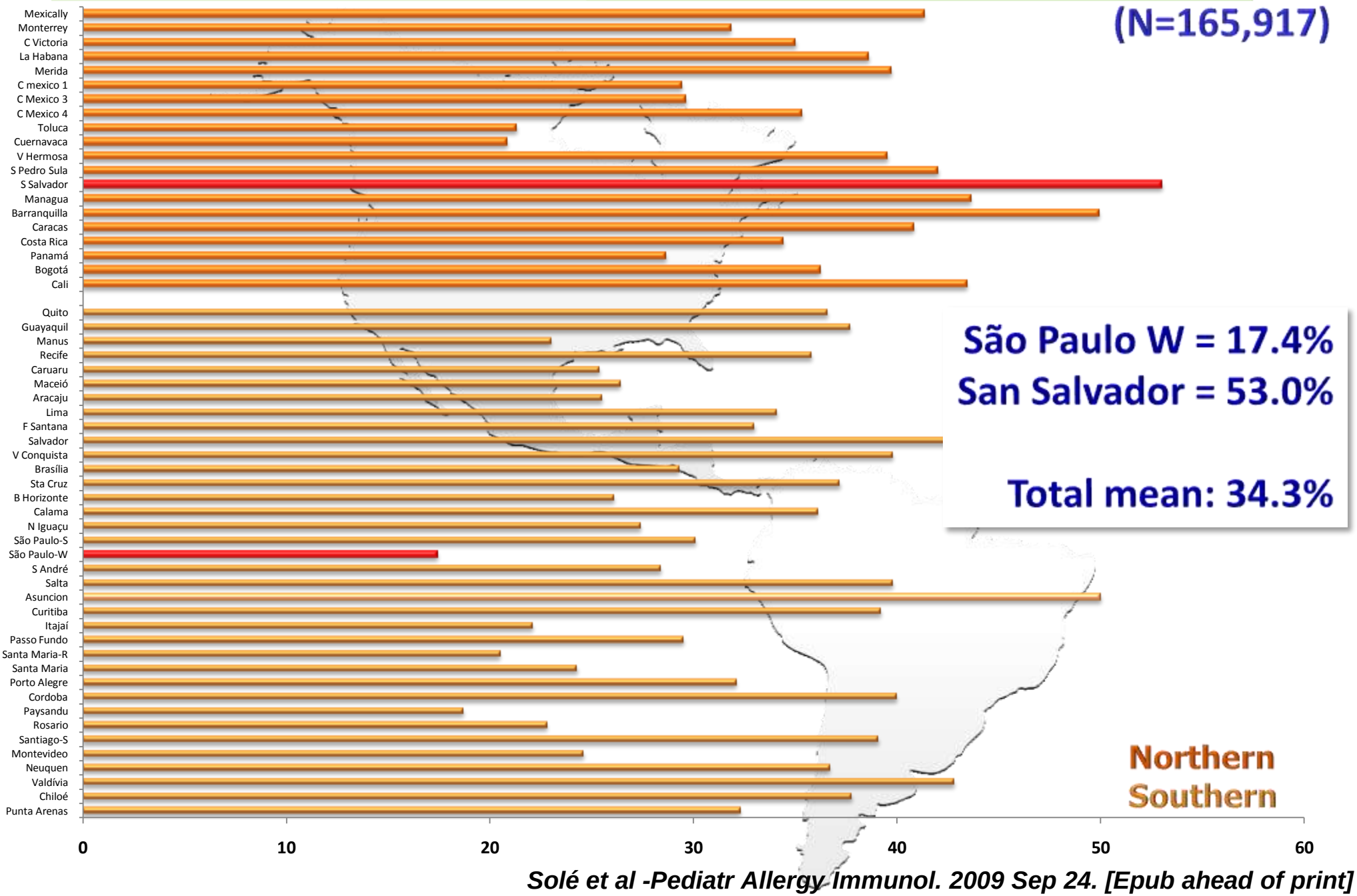
Bjorksten et al –Pediatr Allergy Immunol 2008;19:110-24
Solé et al - Pediatr Allergy Immunol 2009 Sep 24. [Epub ahead of print]

Change per year of symptoms of rhinitis in 13-14yrs-old children: ISAAC Phases I & III



Bjorksten et al –Pediatr Allergy Immunol 2008;19:110-24

Prevalence of current rhinitis in LA adolescents: ISAAC phase 3



Solé et al -Pediatr Allergy Immunol. 2009 Sep 24. [Epub ahead of print]

Atopic Eczema

Prevalence of eczema symptoms in children
ISAAC Phase I and III

	Latin America			Global		
6-7 yr	N	Flexural eczema	Severe eczema	N	Flexural eczema	Severe eczema
P1	36,264	8.7	1.2	257,800	6.9	0.7
P3	93,851	10.5	1.3	388,811	8.6	0.9
13-14 yr						
P1	52,549	7.2	1.0	463,801	7.0	1.0
P3	165,917	9.0	1.2	798,685	7.6	1.2

Williams et al – J Allergy Clin Immunol 1999;103:125-38
Williams et al – J Allergy Clin Immunol 2008;121:947-54
Solé et al – Pediatr Allergy Immunol 2009, in press

Mean prevalence of flexural eczema among children
Centers participating in ISAAC phases I and III

6-7 yr-old

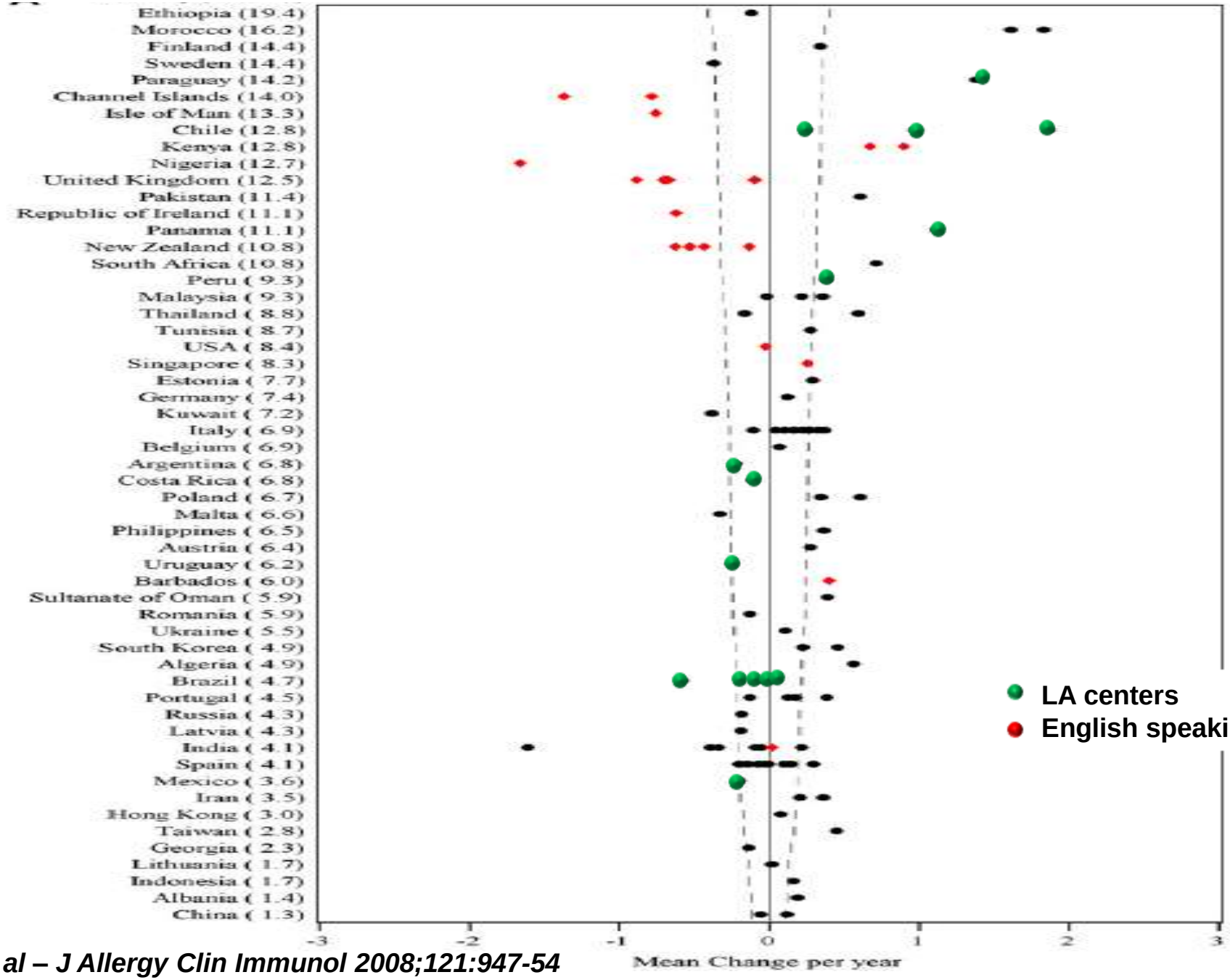
Centre	N	Year between phases	P1	P3	Change/ year	Response rate (%)
Latin-America	21,112	7.1	8.7	10.5	**0.25**	83.8
Total	193,436	7.1	6.9	8.6	**0.21**	84.8

13-14 yr-old

Centre	N	Year between phases	P1	P3	Change/ year	Response rate (%)
Latin-America	44,550	6.9	7.2	9.0	**0.25**	90.9
Total	304,811	7.0	7.0	7.6	**0.08**	90.9

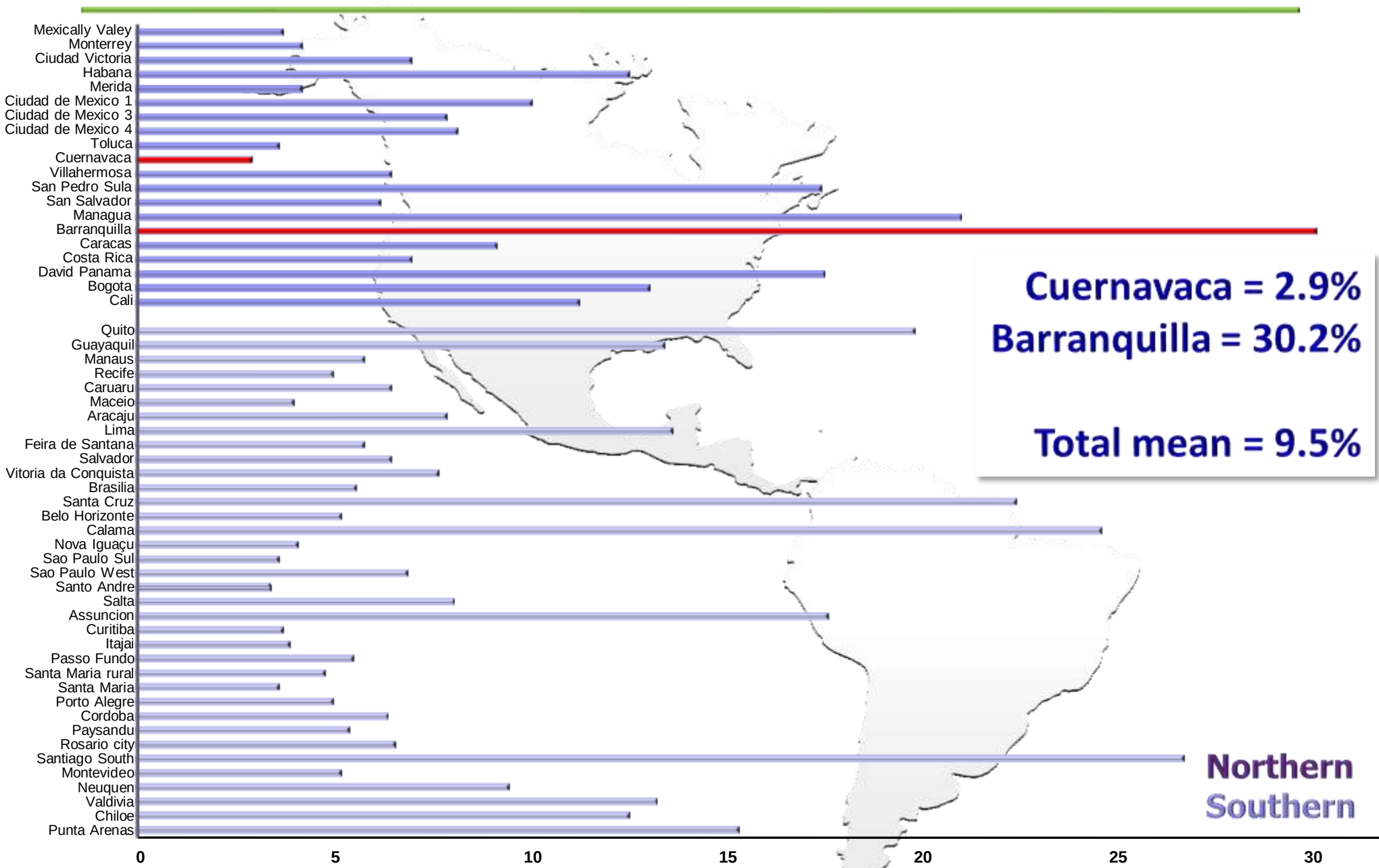
Asher et al – Lancet 2006;368:733-43
Bjorksten et al –Pediatr Allergy Immunol 2008;19:110-24
Solé et al – Pediatr Allergy Immunol 2009, in press

Prevalence and annual change of flexural eczema prevalence (Ph1 x 3) - Adolescents



Williams et al – J Allergy Clin Immunol 2008;121:947-54

Prevalence of flexural eczema last year in LA adolescents: ISAAC F3 (N=165,917)



Solé et al – J Investig Allergol Immunol 2009, in press

Variation in the prevalence of current asthma and allergic diseases in Latin America – ISAAC Phase 3

	Min (%)	Max (%)	Mean (%)	Variation
Asthma				
6-7yr	**3.6**	**37.6**	**17.3**	**10.0**
				0
				0
				0
				0
				0
				10.0
Severe eczema				
6-7	**0.3**	**2.7**	**1.5**	**9.0**
13-14 yr	**0.1**	**4.2**	**1.3**	**42.0**

How to explain these differences?

Risk factors associated with prevalence of asthma, rhinoconjunctivitis and atopic eczema: No significant association

- ✓ Gross National Product
- ✓ Infant mortality rate
- ✓ % population with potable water service
- ✓ % population with sewage disposal services
- ✓ Annual deaths – kids under 5 yrs of age due to intestinal infectious diseases
- ✓ Annual incidence of tuberculosis

http://www.studentsoftheworld.info/infopays/rank/PNB2.html; http://hdr.undp.org/en/reports/global/hdr2007-2008 http://en.wikipedia.org/wiki/Water_and_sanitation_in_Latin_America; http://www.paho.org/English/SHA/coredata/tabulator/newTabulator.htm; http://en.wikipedia.org/wiki/List_of_countries_by_infant_mortality_rate_(2005)

Air pollution?

Ambient particulate pollution and the world-wide prevalence of asthma, rhinoconjunctivitis and eczema in children: Phase One of the International Study of Asthma and Allergies in Childhood (ISAAC)

Prevalence of symptoms (ISAAC Ph 1):
asthma, rhinoconjunctivitis, eczema

Particulate matter <10mm (PM_{10}) – city-level

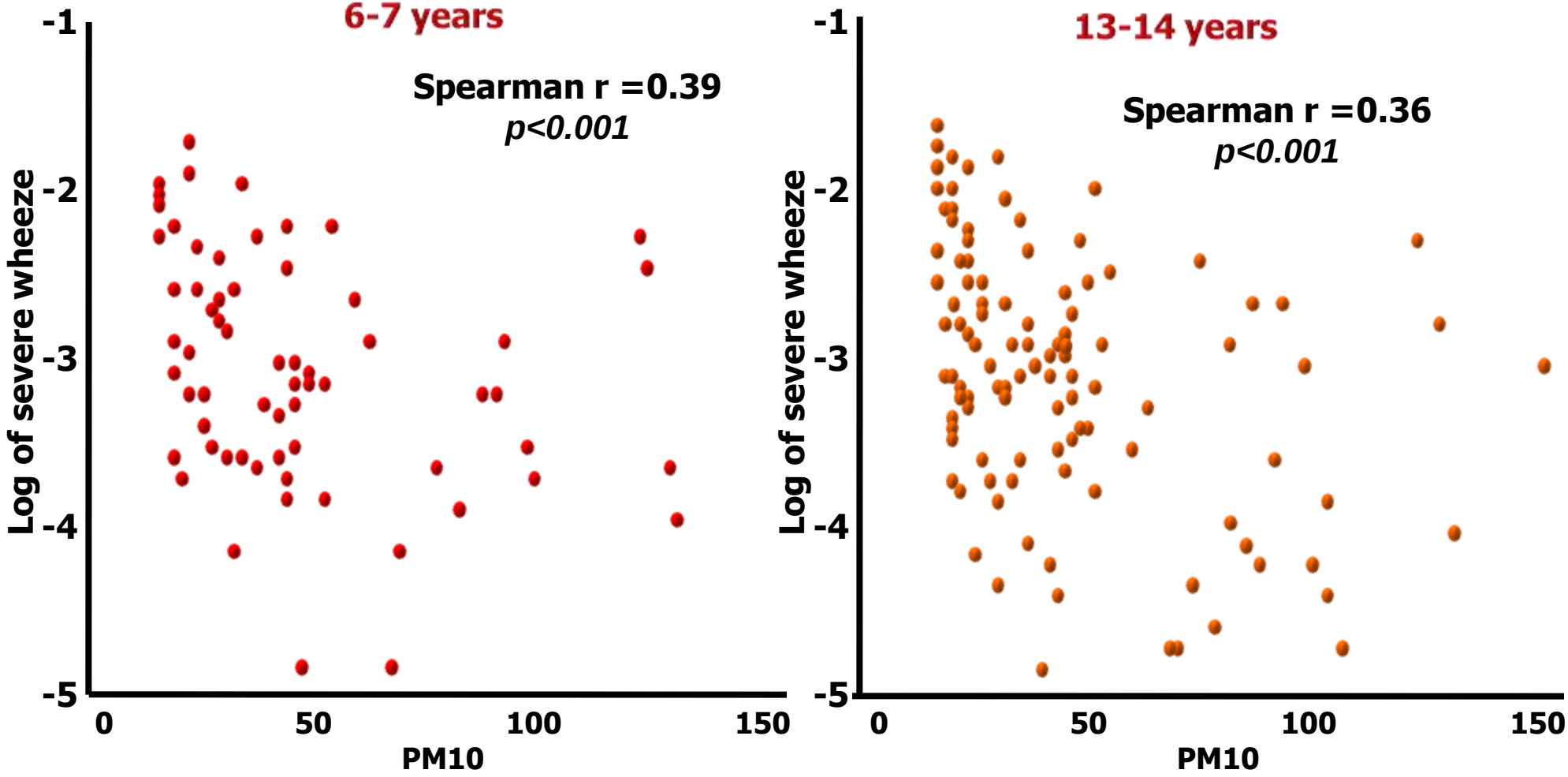
Associations evaluated by binomial regression

Adjusted for Gross National Product per capita

Results compared with a meta-analysis of
published multi-centre studies

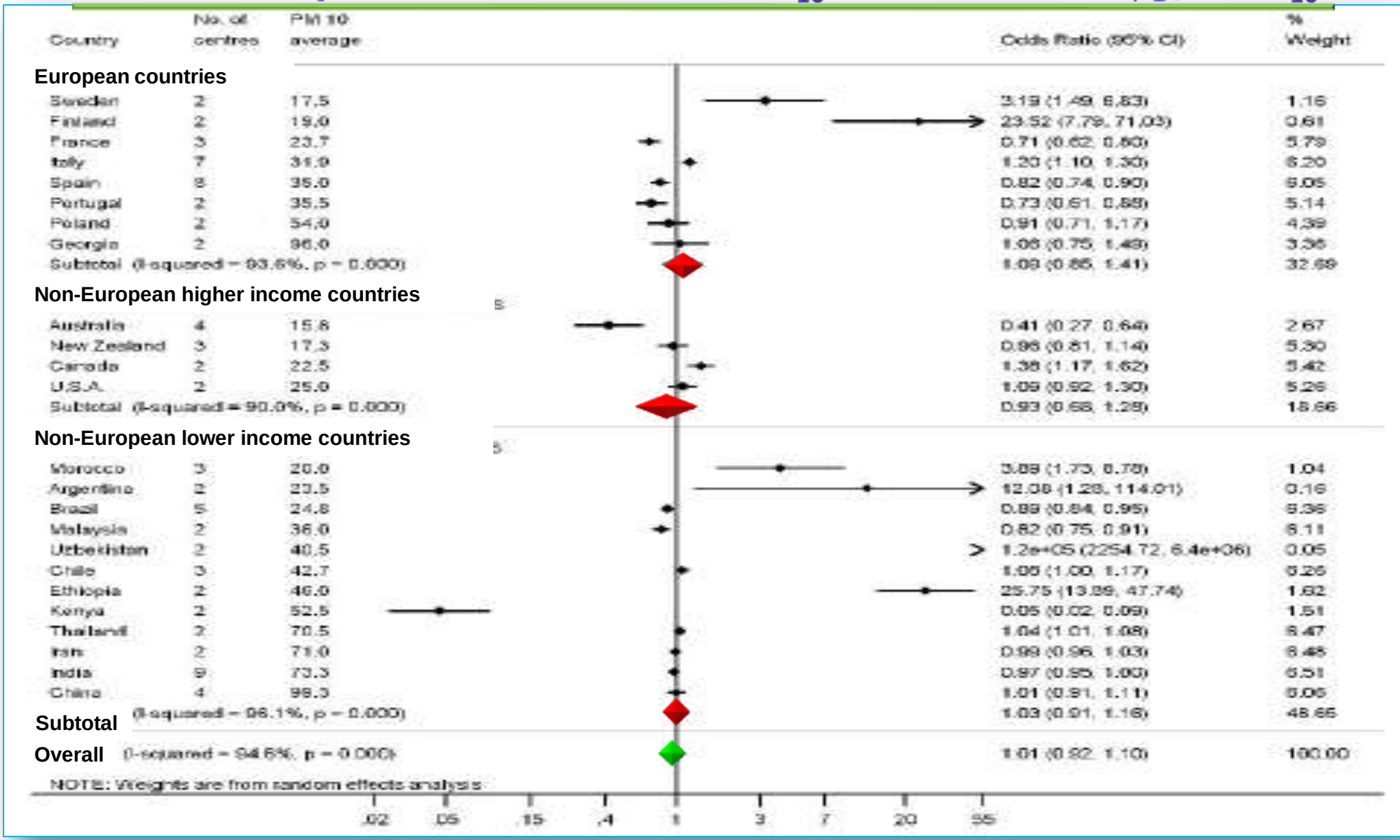
Anderson et al – Occup Environ Med published online 5 Nov 2009

Spearman correlation index between severe asthma and ambient particulate pollution - Phase One of the International Study of Asthma and Allergies in Childhood (ISAAC)



Anderson et al – Occup Environ Med published online 5 Nov 2009

Meta-analysis of the association between PM_{10} and the prevalence fo severe wheeze in the 13-14 year age group for countries with more than one center. Stratified by region and ranked by mean concentration of PM_{10}. Odds ratio for 10μg/m³PM_{10}



Anderson et al – Occup Environ Med published online 5 Nov 2009

Ambient particulate pollution and the world-wide prevalence of asthma, rhinoconjunctivitis and eczema in children: Phase One of the International Study of Asthma and Allergies in Childhood (ISAAC)

- ✓ The reasons for the wide international variations in the prevalence of childhood asthma, rhinoconjunctivitis and eczema are not understood.

- ✓ **In a study of over a million children from 105 cities in 51 countries, we found little or no evidence of associations with modelled urban background PM_{10}.**

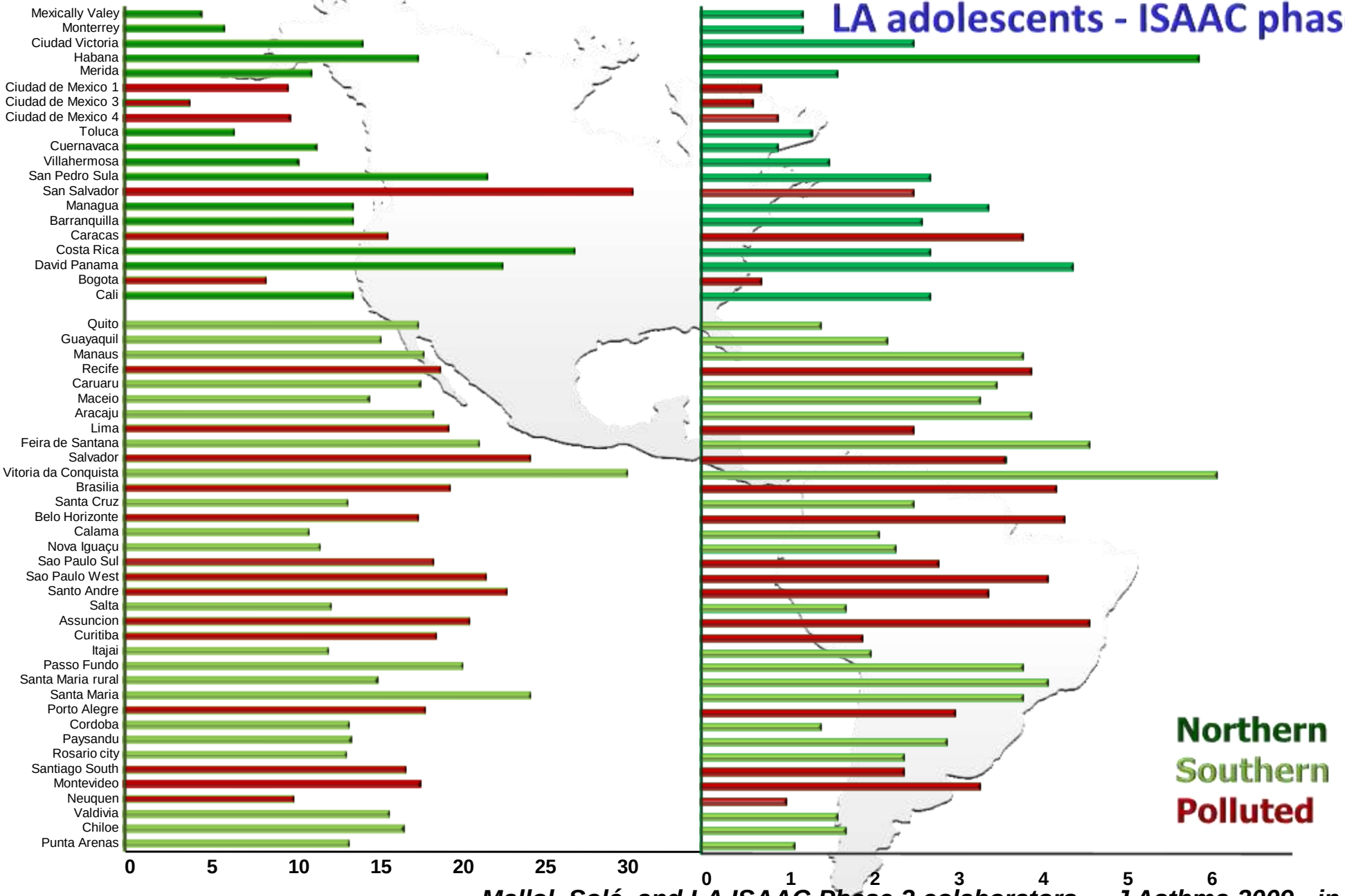
- ✓ **The results suggest that community levels of ambient PM are unlikely to explain international variations in prevalence.**

- ✓ Fututre studies of differences in prevalence between communities will benefit from improved exposure assessment and control for confounding factors at individual level.

Anderson et al – Occup Environ Med published online 5 Nov 2009

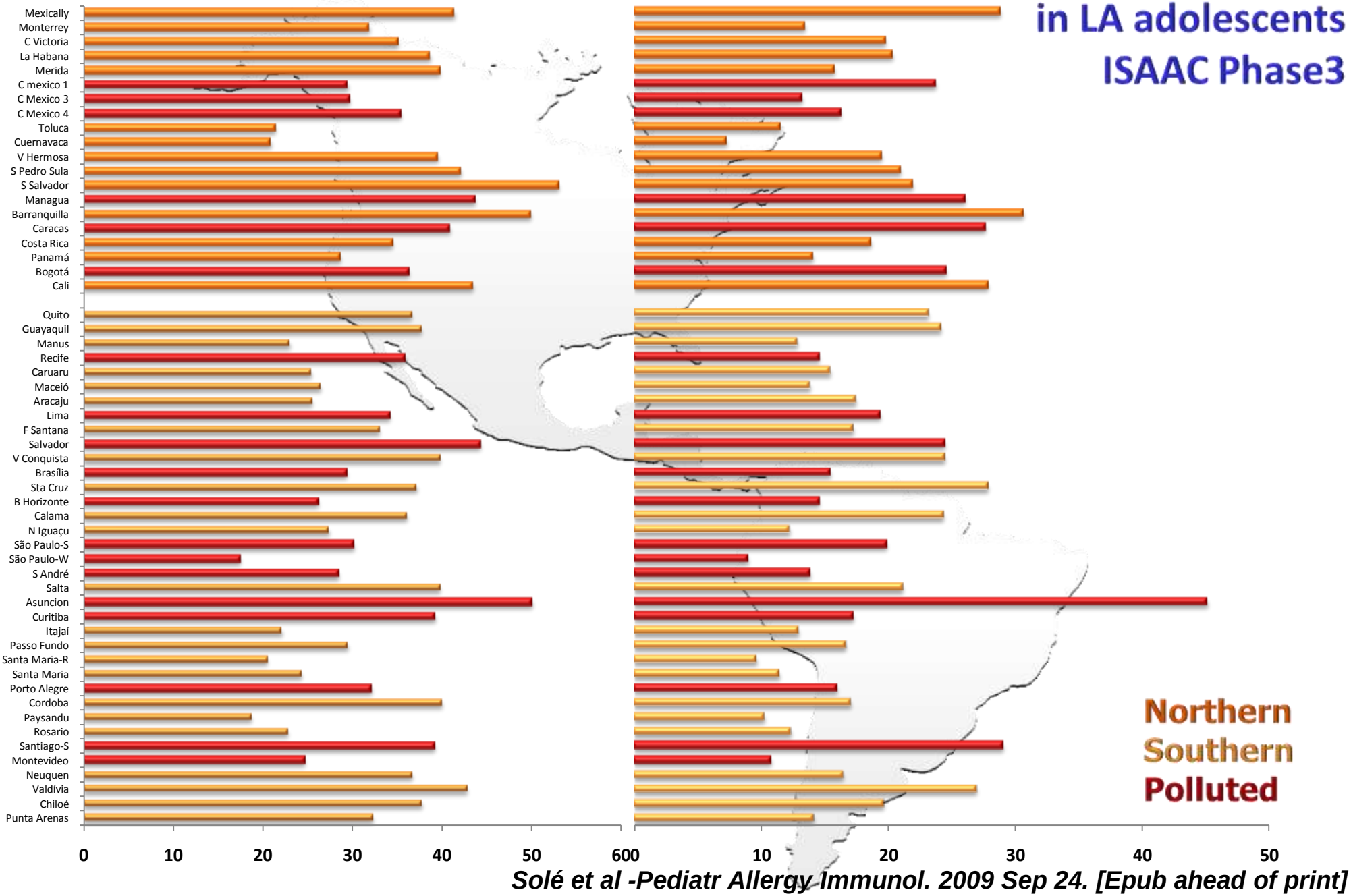
Prevalence of wheezing and severe wheezing in the last year and air pollution

LA adolescents - ISAAC phase 3



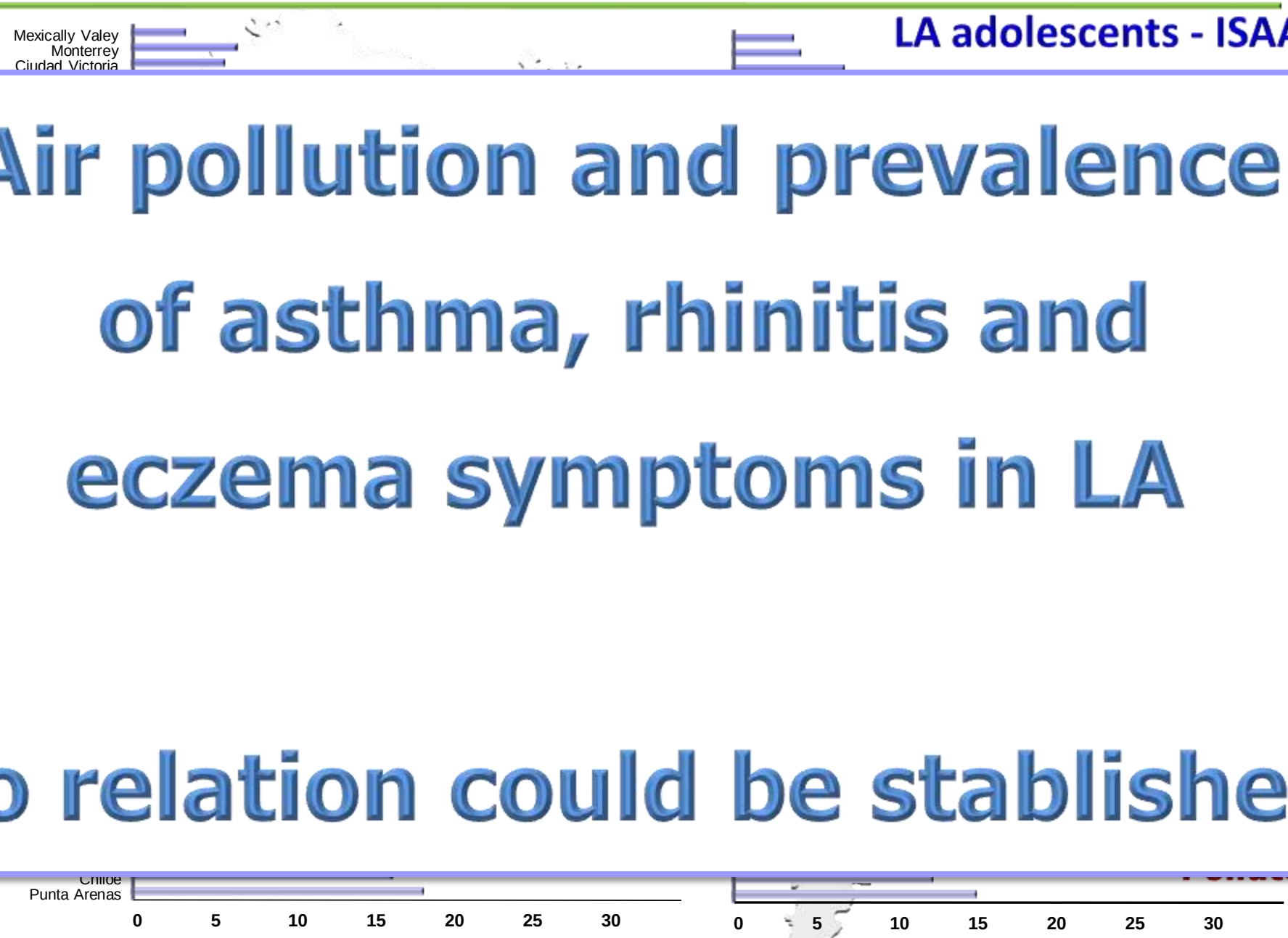
Mallol, Solé, and LA ISAAC Phase 3 colaborators – J Asthma 2009 - in press

Prevalence of current rhinitis and current rhinoconjunctivitis and air pollution in LA adolescents ISAAC Phase3



Solé et al -Pediatr Allergy Immunol. 2009 Sep 24. [Epub ahead of print]

Prevalence of current eczema and flexural eczema last year and air pollution in LA adolescents - ISAAC F3



Air pollution and prevalence of asthma, rhinitis and eczema symptoms in LA

No relation could be stablished

Solé et al – J Investig Allergol Immunol 2009, in press

No significant correlation between prevalence of current asthma, rhinitis and eczema symptoms and national pattern of food intake

Total
Calories/capita/day
Protein/capita/day (g)
Fat/capita/day (g)

Vegetal
Calories/capita/day
Protein/capita/day (g)
Fat/capita/day (g)

Animal
Calories/capita/day
Protein/capita/day (g)
Fat/capita/day (g)

http://faostat.fao.org/site/502/DesktopDefault.aspx?PageID=502

Antibiotic use in infancy and symptoms of asthma, rhinoconjunctivitis, and eczema in children 6 and 7 years old: International Study of Asthma and Allergies in Childhood Phase III

Antibiotic use early in life may increase risk of asthma

and allergic diseases?

Ecologic analysis: antibiotics sales vs prevalence of symptoms

(asthma, allergic rhinoconjunctivitis, and atopic eczema - ISAAC Ph3)

99 centres from 28 countries

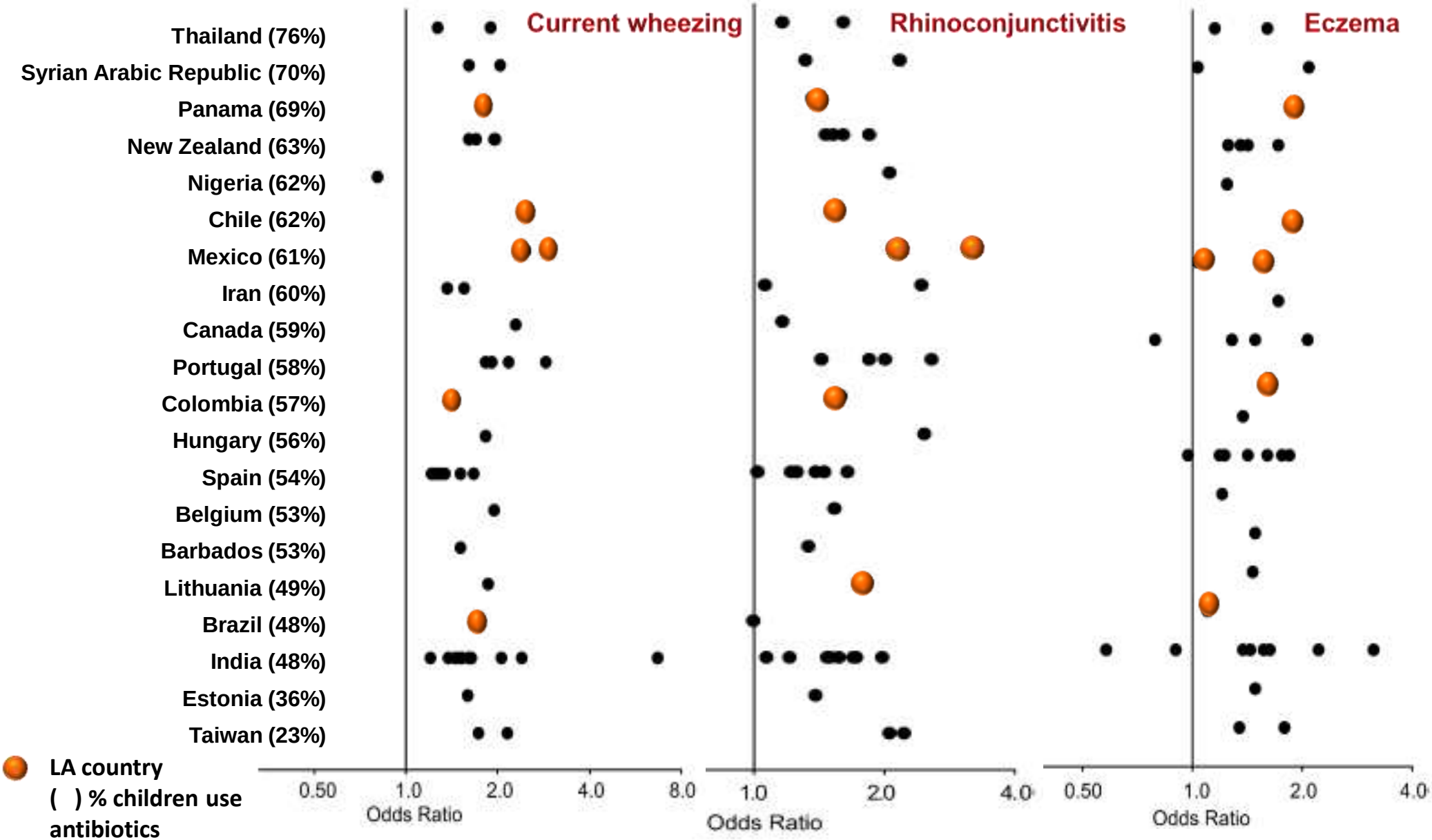
Data obtained from: Institute for Medical Statistics (IMS),

Health Global Services, UK

Analysis adjusted for gross national product (GNP)

Foliaki et al – J Allergy Clin Immunol 2009;124:982-9

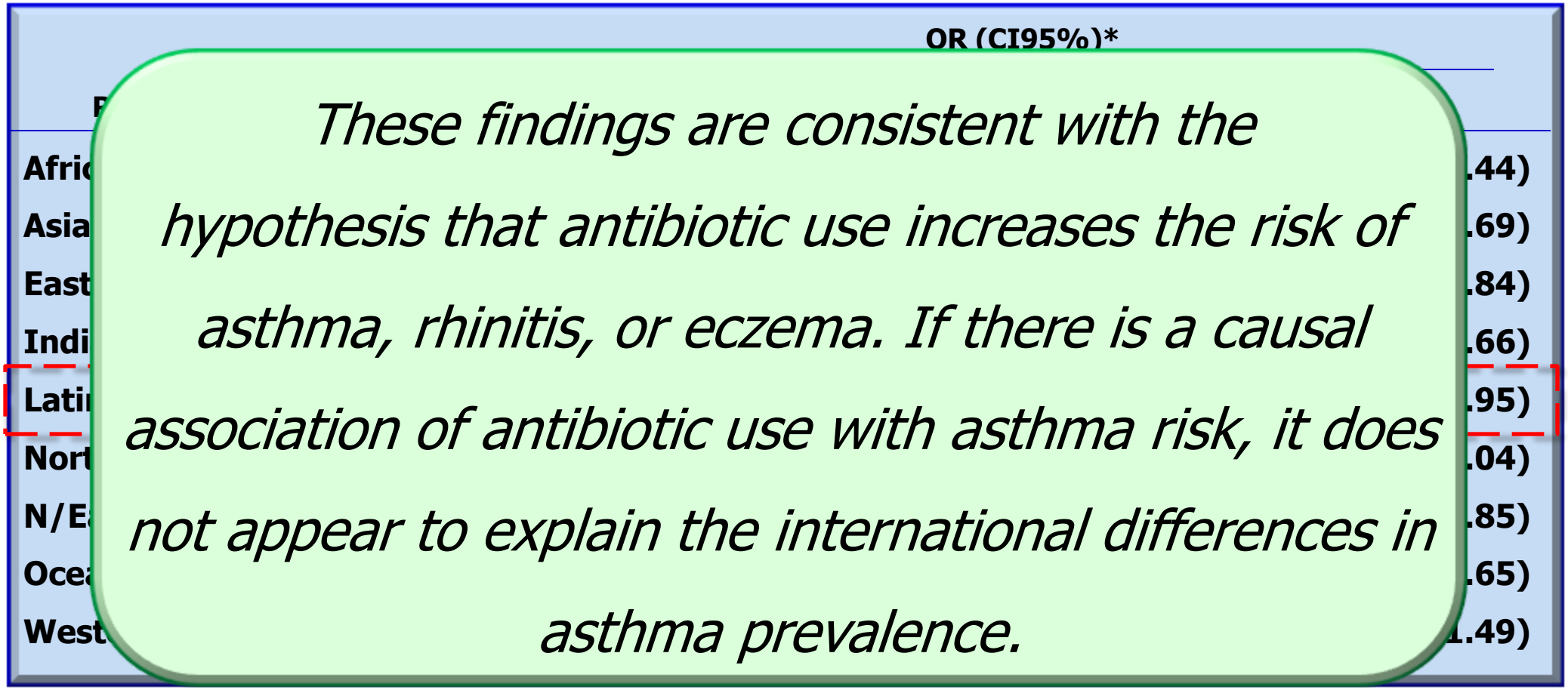
Reported use of antibiotics in the first year of life and Current Symptoms in children 6-7-yr-old – Forest-plot showing adjusted ORs; 47 centers in 20 countries



LA country
( ) % children use antibiotics

Foliaki et al – J Allergy Clin Immunol 2009;124:982-9

Association between antibiotic use in the first year of life and current symptoms of asthma, rhinoconjunctivitis, and eczema in children 6 to 7 years old in different regions of the world: multiple regression analysis in children with complete covariate data



* Multiple regression analysis including centers with at least 70% data available for all covariates. All children who had a missing value of any of the covariates have been removed. Adjusted for sex, region of the world, language, GNI, maternal education, breast-feeding, current paternal smoking, consumption of vegetables, consumption of pulses, consumpption of fruits, paracetamol use in the first year of life, current paracetamol use, older siblings, and younger siblings

Foliaki et al – J Allergy Clin Immunol 2009;124:982-9

Association between paracetamol use in infancy and childhood, and risk of asthma, rhinoconjunctivitis, and eczema in children aged 6-7 years: analysis from Phase Three of the ISAAC programme

205,487 children (6-7 yrs old)

73 centers in 31 countries

Association of:

Paracetamol for fever (first year of life and nowadays)

with increased risk of asthma and allergic diseases

Beasley et al – Lancet 2008;372:1039-48

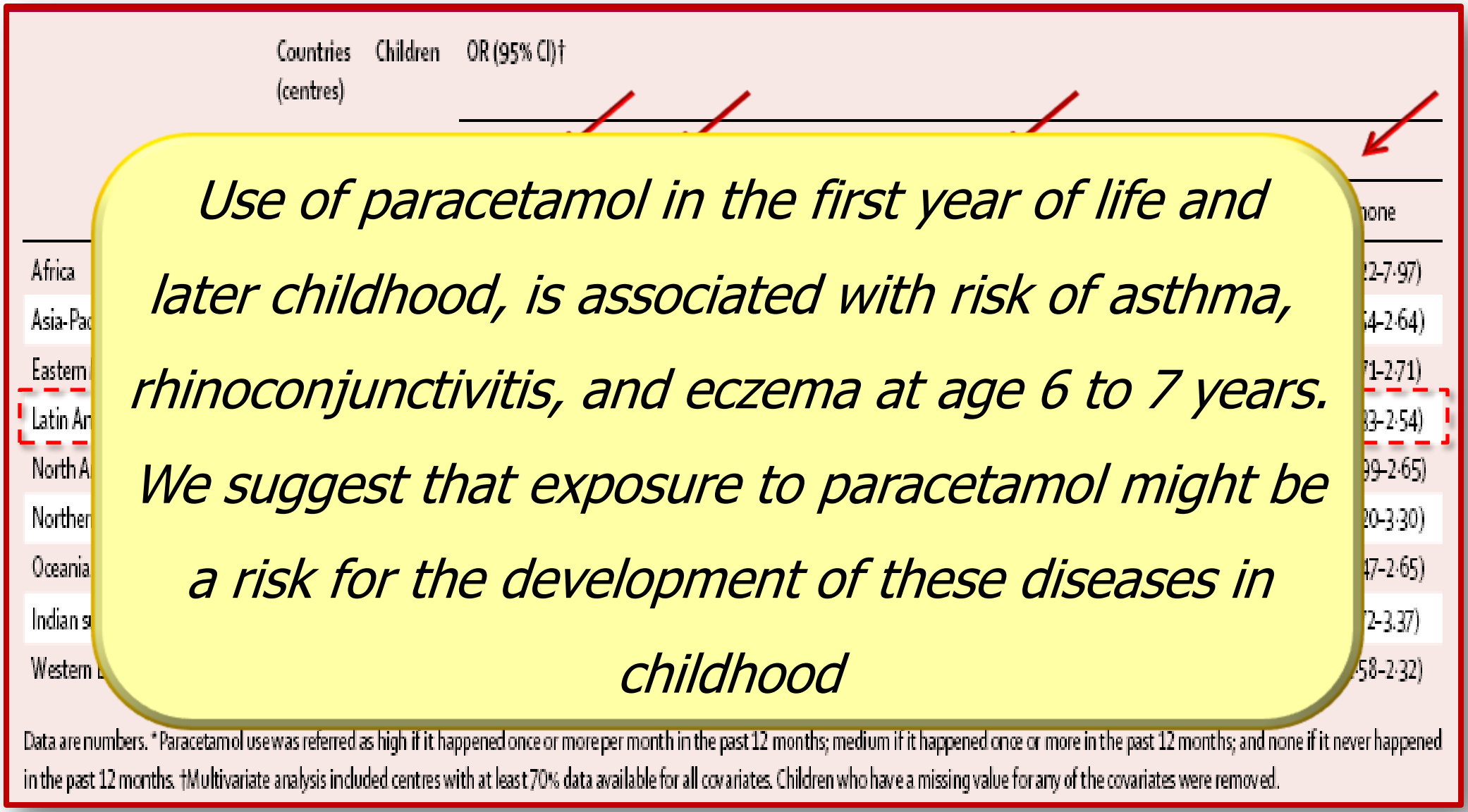
Association between paracetamol use for fever in the first yr of life and symptoms of asthma, rhinoconjunctivitis, and eczema at 6-7 years of age worldwide

	Countries (centres)	Children	OR (95% CI)*		
			Asthma	Rhinoconjunctivitis	Eczema
Africa	1 (1)	917	1·60 (0·20–12·57)	0·70 (0·06–8·74)	0·89 (0·23–3·42)
Asia-Pacific	2 (4)	10217	1·82 (1·39–2·37)	1·37 (1·09–1·74)	1·45 (1·19–1·76)
Eastern Mediterranean	2 (4)	8489	1·66 (1·13–2·44)	1·47 (0·86–2·54)	1·11 (0·62–2·00)
Latin America	5 (6)	12869	1·46 (1·25–1·72)	1·44 (1·22–1·71)	1·49 (1·26–1·76)
North America	2 (2)	2719	1·25 (0·95–1·64)	1·97 (1·25–3·08)	1·07 (0·75–1·53)
Northern and eastern Europe	3 (3)	6565	1·29 (1·03–1·61)	1·20 (0·89–1·60)	1·19 (0·94–1·51)
Oceania	1 (4)	9334	1·79 (1·45–2·21)	2·00 (1·52–2·65)	1·45 (1·17–1·80)
Indian subcontinent	1 (11)	27411	1·22 (0·96–1·54)	1·71 (1·37–2·15)	1·54 (1·18–2·01)
Western Europe	3 (12)	26520	1·44 (1·29–1·61)	1·41 (1·25–1·60)	1·30 (1·15–1·46)

Data are numbers. * Multivariate analysis included centres with at least 70% data available for all covariates. Children who had a missing value for any of the covariates were removed. 105 041 children were included from 47 centres in 20 countries.

Beasley et al – Lancet 2008;372:1039-48

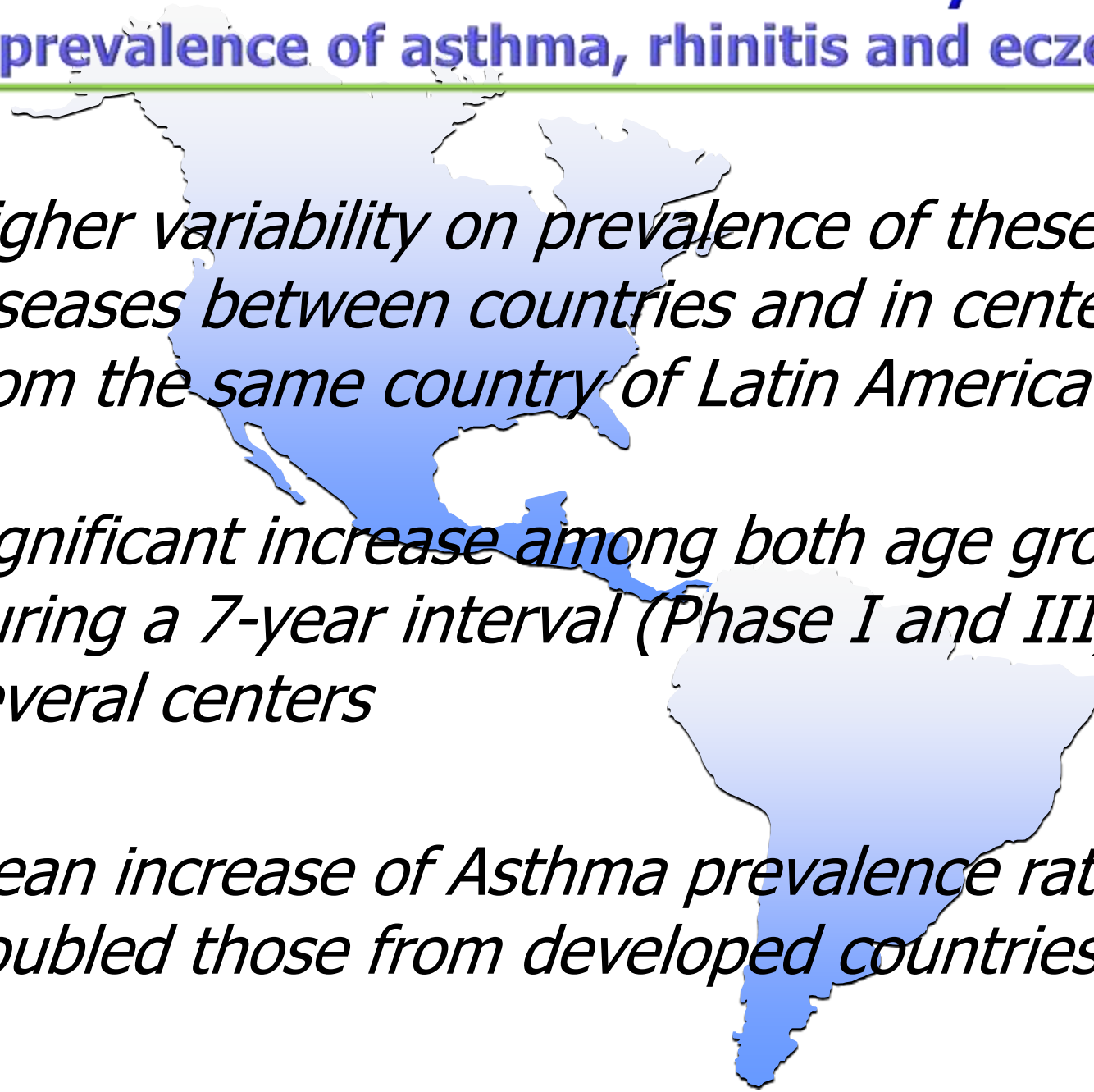
Association between paracetamol use in the past 12 months and symptoms of asthma, rhinoconjunctivitis, and eczema in children aged 6-7 years worldwide



Beasley et al – Lancet 2008;372:1039-48

Latin America ISAAC Phase 3: Preliminary conclusions

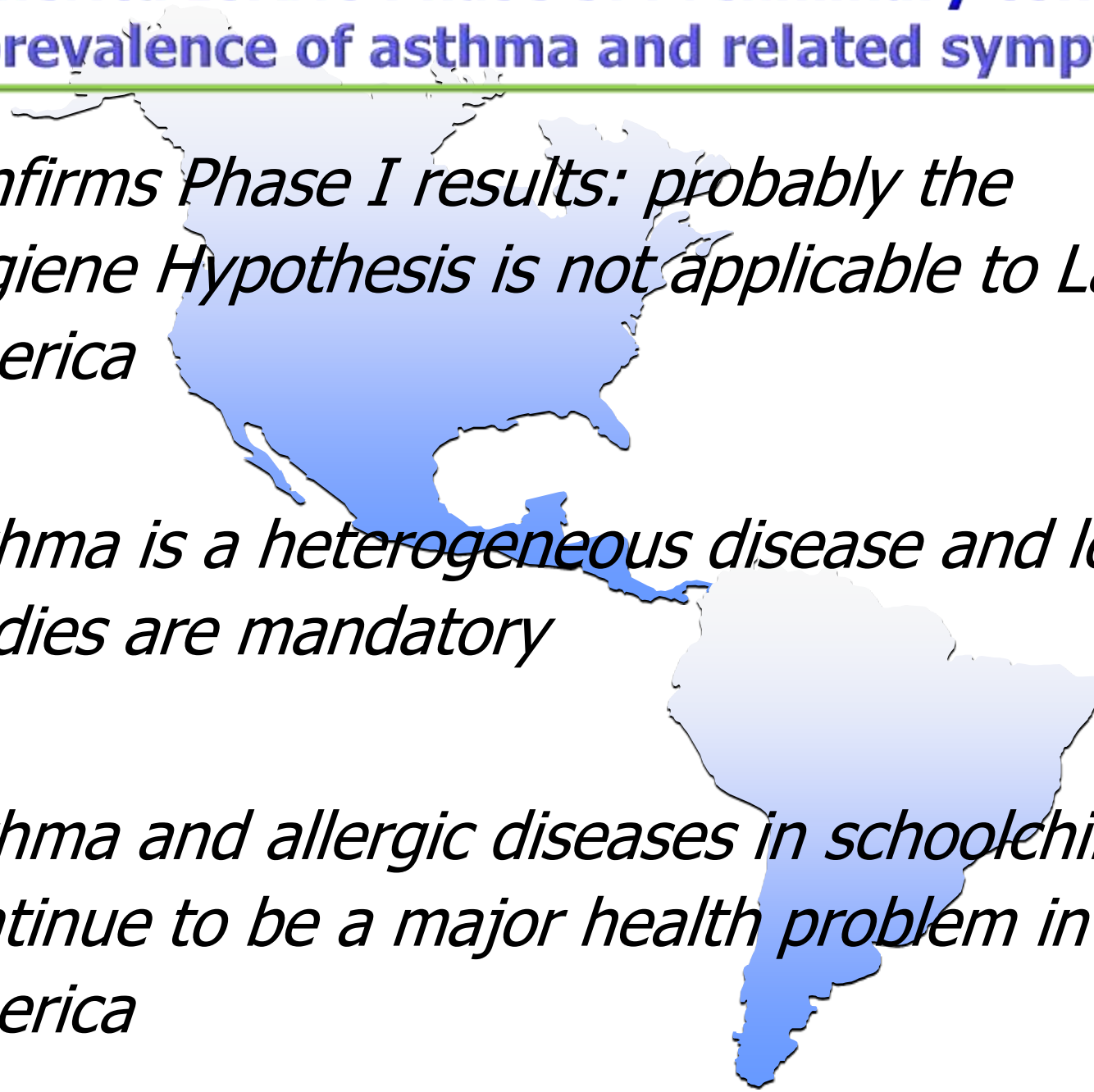
The prevalence of asthma, rhinitis and eczema:



- ✓ *Higher variability on prevalence of these diseases between countries and in centers from the same country of Latin America*
- ✓ *Significant increase among both age groups during a 7-year interval (Phase I and III) in several centers*
- ✓ *Mean increase of Asthma prevalence rates doubled those from developed countries*

Latin America ISAAC Phase 3: Preliminary conclusions

The prevalence of asthma and related symptoms:



- ✓ *Confirms Phase I results: probably the Hygiene Hypothesis is not applicable to Latin America*
- ✓ *Asthma is a heterogeneous disease and local studies are mandatory*
- ✓ *Asthma and allergic diseases in schoolchildren continue to be a major health problem in Latin America*

See you in Rio 2010!

VI Latin American Congress of Allergy, Asthma and Immunolo
XXXVII Brazilian Congress of Allergy and Immunopathology
National Congress of Asthma – CONASMA 2010

November ,13 to 16, 2010, Rio de Janeiro – Bra

www.congressosalergia2010.com.br

Associação Brasileira de Alergia e Imunopatologia – ASBAI

SLaai – Sociedad Latinoamericana de alergia, asma e inmunología