

Innes Asher

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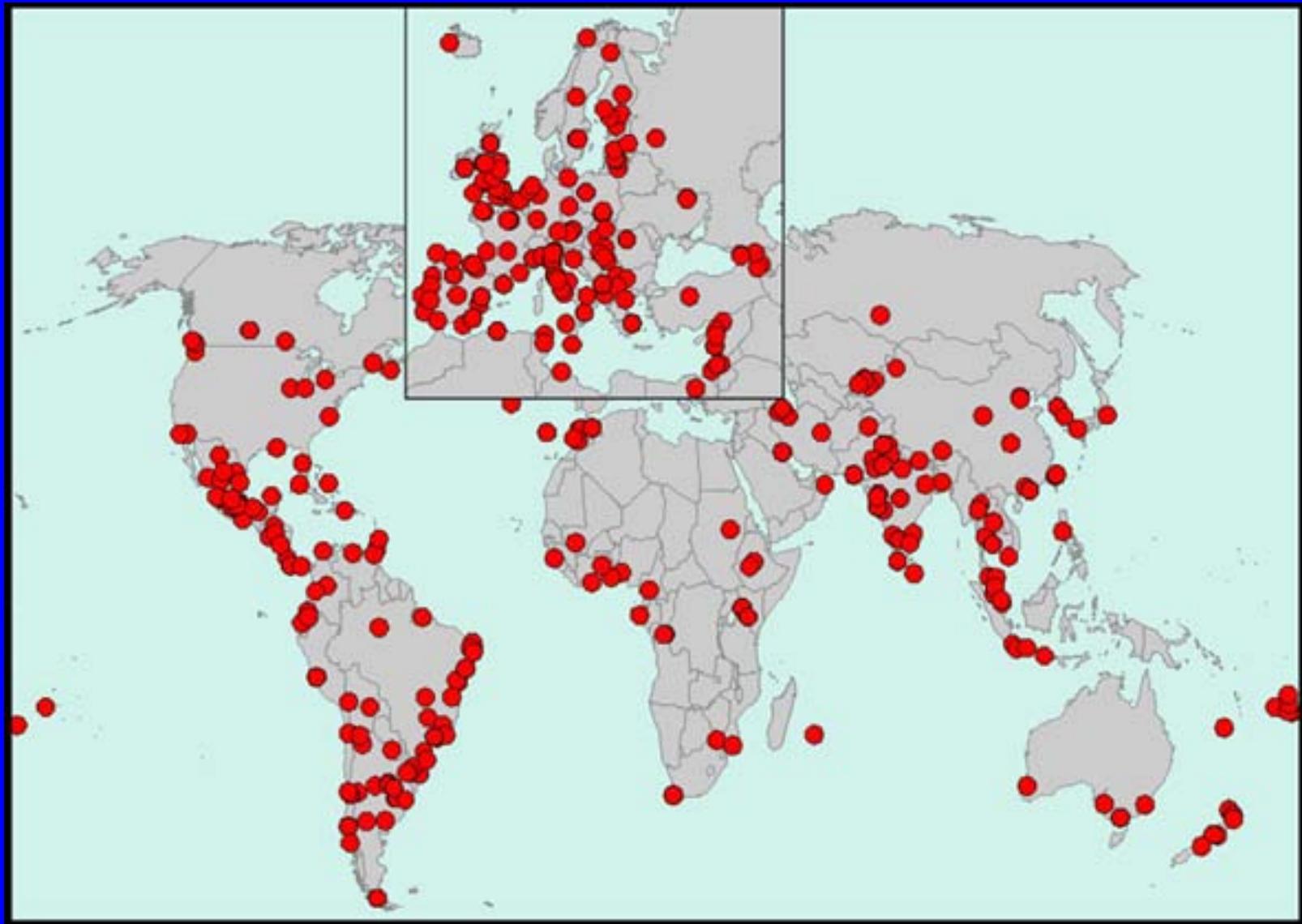
The University of Auckland

Chair of the International Study of Asthma and Allergies in Childhood (ISAAC)



<http://isaac.auckland.ac.nz>

ISAAC Centres



ISAAC – how did it start?

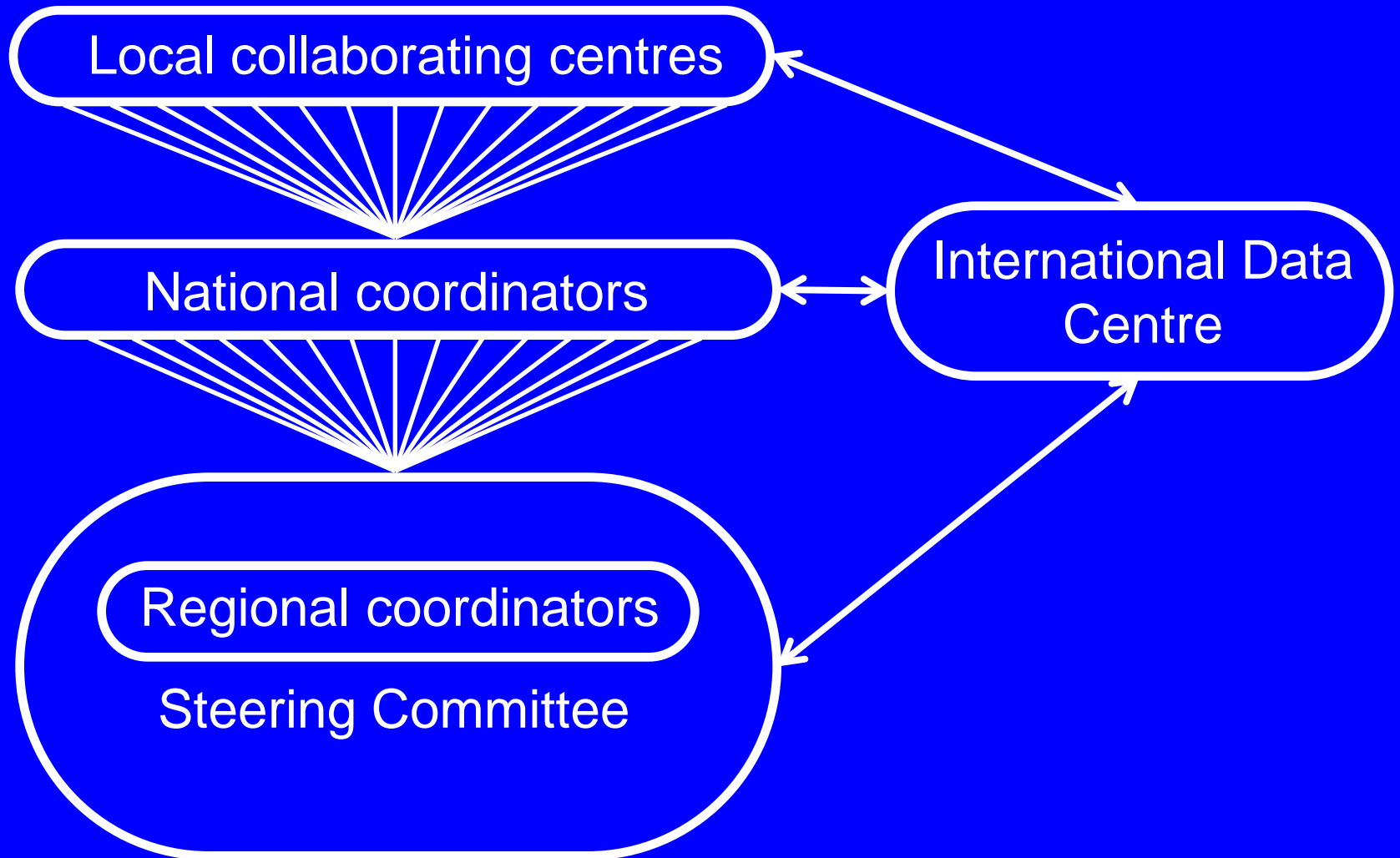
ISAAC Formed in 1991 From Two Initiatives

1. Does New Zealand have more severe asthma than other English speaking countries?
(NZ asthma deaths and admissions were high)
2. Monitoring trends and determinants of asthma and allergies in childhood – following the fall of the Berlin wall.
(genetically similar populations, different environments)

Rationale of ISAAC

- Increasing concern about asthma and allergies.
- A fresh look was needed with a world population view – between populations rather than within populations.
- Most of world not yet studied – may add something.
- A standardised and coordinated approach was needed to obtain comparable worldwide data.

Organisation of ISAAC



Asthma



Rhinitis



Eczema



Asthma



Rhinitis

Luis García-Marcos



Eczema



Asthma



Rhinitis

Luis García-Marcos



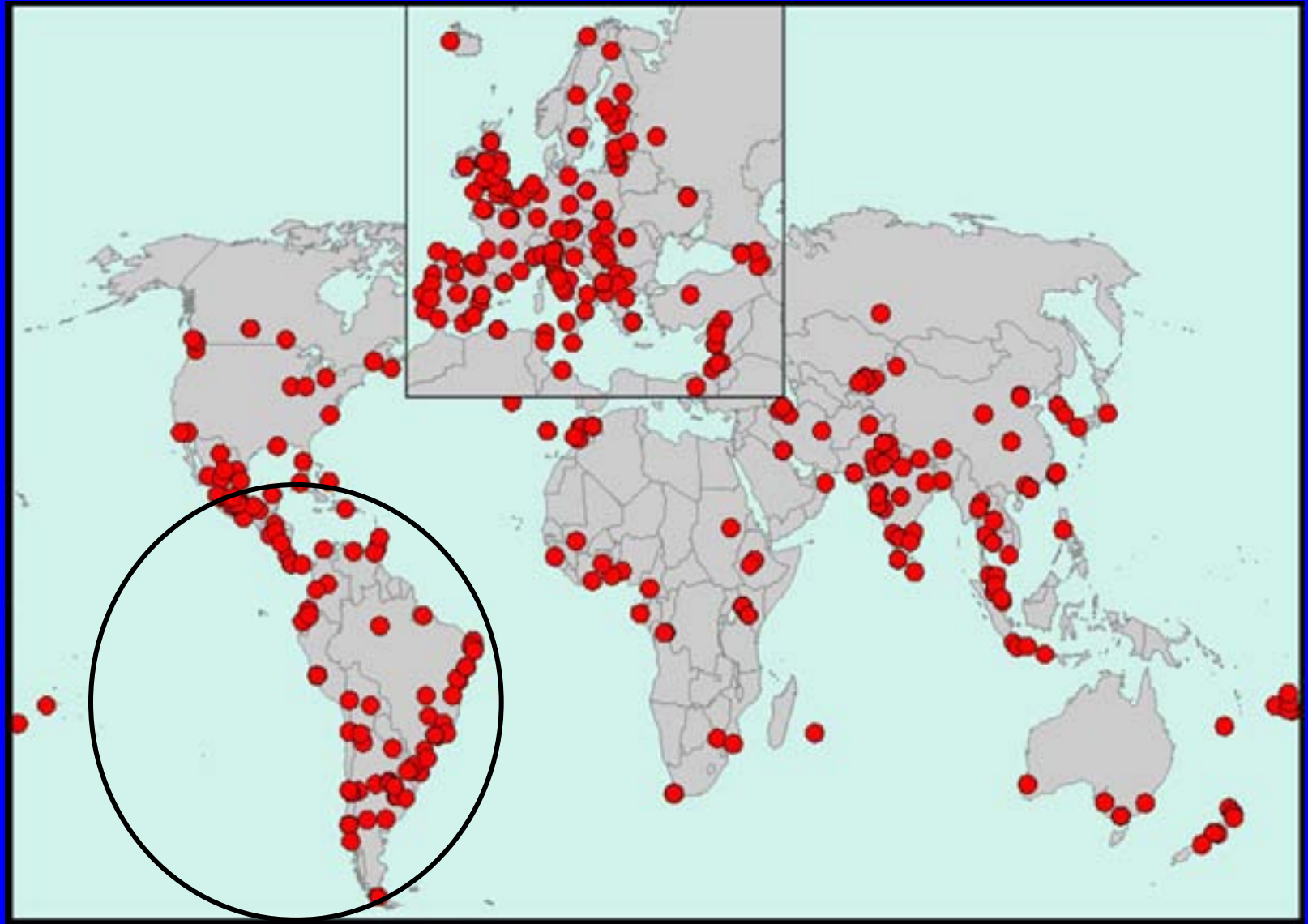
Eczema

Hywel Williams



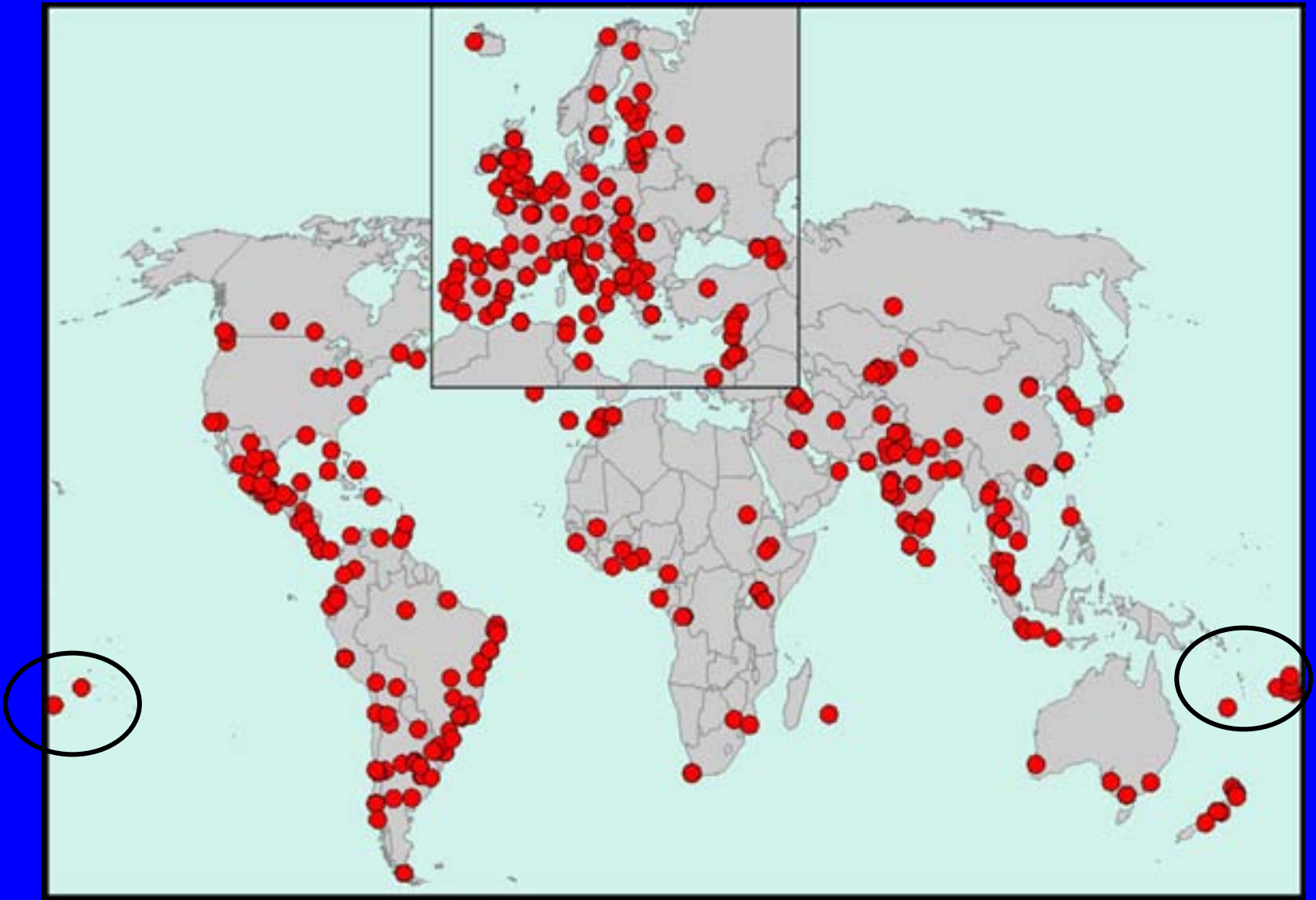
ISAAC Centres – Latin America

Javier Mallol



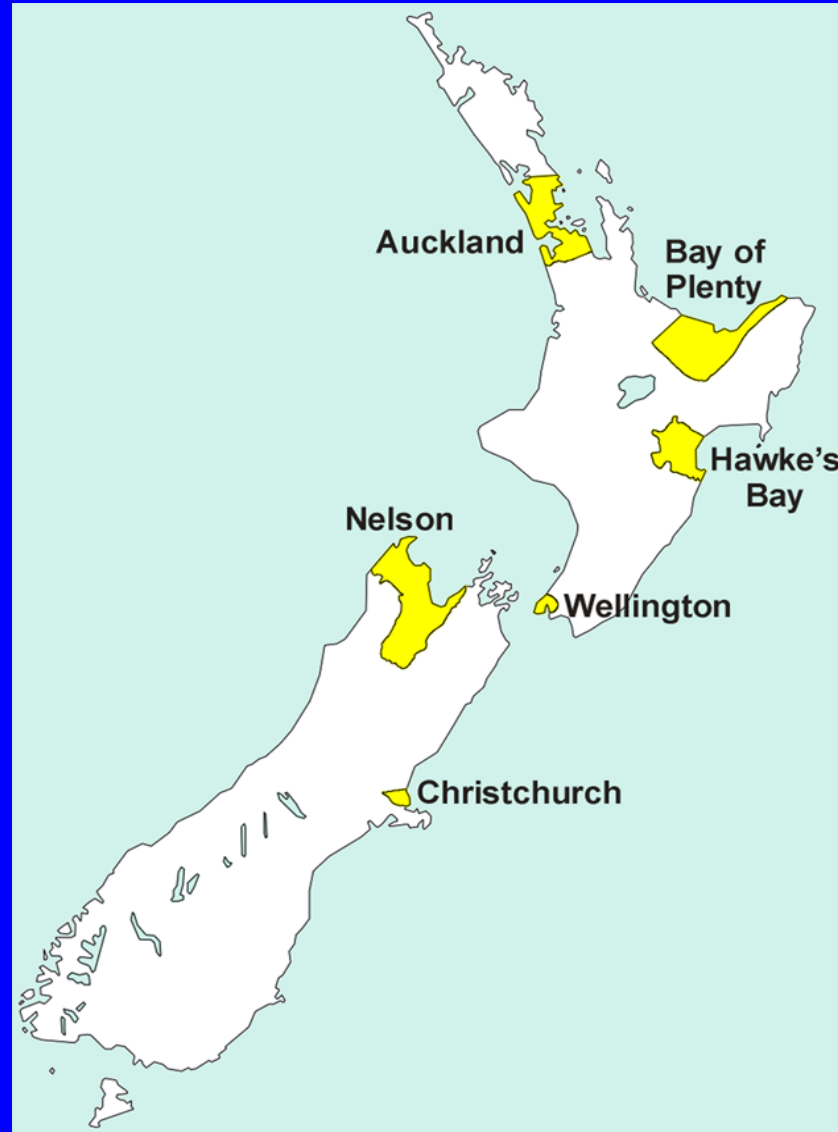
ISAAC Centres – Pacific

Sunia Foliaki



ISAAC – New Zealand?

ISAAC New Zealand Centres



ISAAC New Zealand

He mate huango = asthma

Lis Ellison Loschman

Funders of The ISAAC Programme in New Zealand

- The Health Research Council of NZ
- The Asthma and Respiratory Foundation of NZ
- The National Child Health Research Foundation
- The Hawke's Bay Medical Research Foundation
- The Waikato Medical Research Foundation
- Glaxo Wellcome NZ, and International Medical Affairs
- Astra NZ
- Maurice & Phyllis Paykel Trust
- BUPA Foundation
- Auckland Medical Research Foundation
- NZ Lotteries Commission
- The University of Auckland

Funders of this Symposium

- The Butland Foundation
- Ministry of Social Development
- Lufthansa
- Image Centre Group and Boston Digital
- The University of Auckland
- The Dean, Iain Martin and his team at
The Faculty of Medical and Health
Sciences
- Registrants

ISAAC – what did we do?

The ISAAC Programme

ISAAC Phase One

1991 – 1998

- Worldwide prevalence (questionnaires)
- ISAAC Phase One ecological analyses

ISAAC Phase Two

2000 – 2004

- Questionnaires & additional markers

ISAAC Phase Three

2001 – 2005

- Repetition of Phase One
- Addition of more centres
- Environmental questionnaire

ISAAC Methods: Phases One & Three

- Multicentre cross-sectional studies of children in randomly sampled schools.
- 13-14 year olds and optional 6-7 year olds.
- 3000 per age group per centre.
- Standardised validated simple written questionnaires (optional video asthma questionnaire in 13-14 year olds).

ISAAC Methods: Phase Two

- Multicentre cross-sectional study of school children in randomly sampled schools.
- 30 centres in 22 countries.
- 9-11 year old participants.
- 1000 per age group per centre.
- Simple core written questionnaires.
- Child contact modules including skin prick tests.

How many took part?

ISAAC Phase Three

	Countries	Centres	Participants	Response Rate (%)
13-14 year	97	233	798,685	88
6-7 year	61	144	388,811	85

The Prevalence of Asthma Symptoms Between Populations

Current wheeze definition

Yes to:

“Have you (Has your child) had wheezing or whistling in the chest in the past 12 months?”

Definition of Symptoms of Severe Asthma

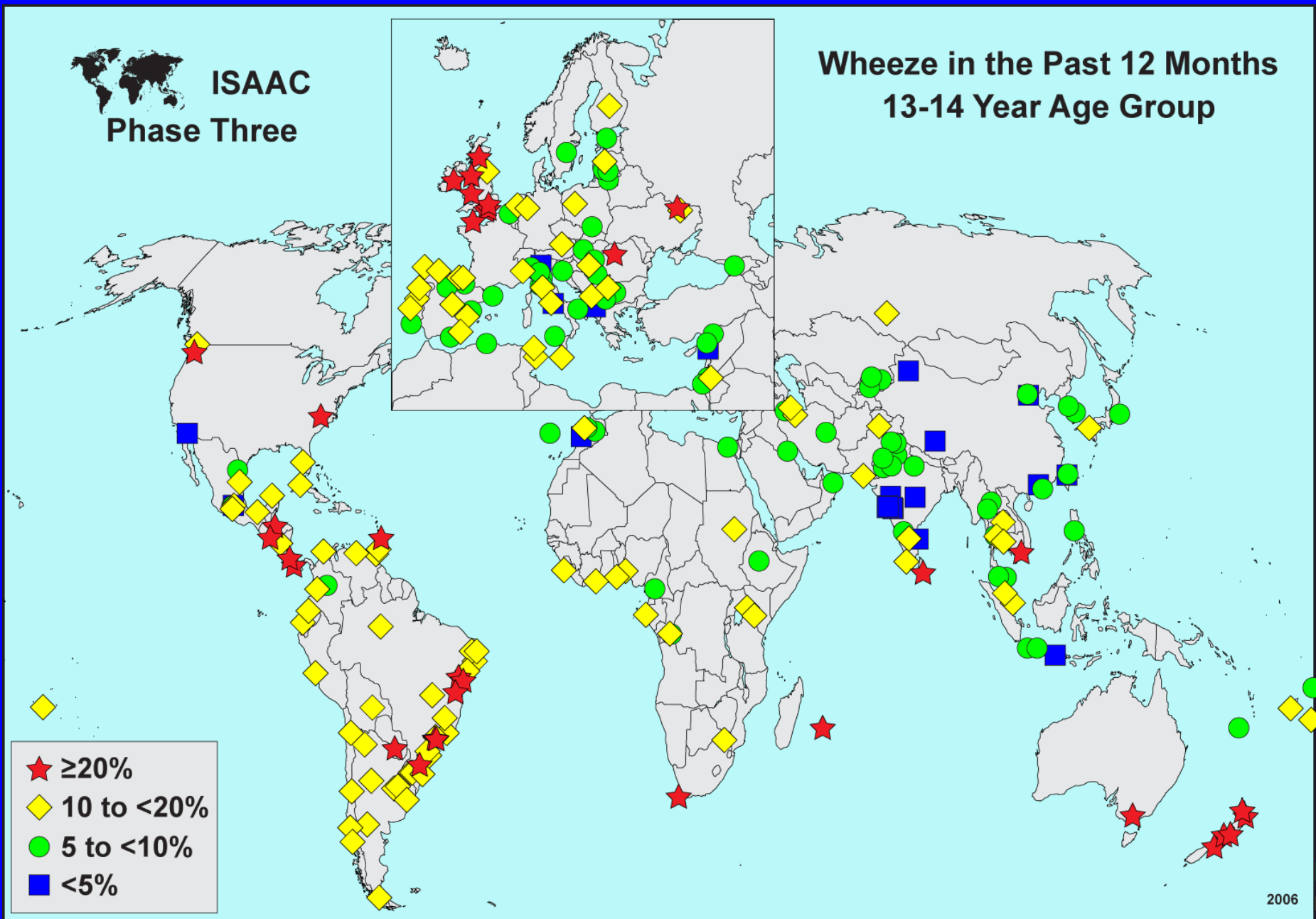
Current wheeze and at least one of:

- ≥ 4 attacks of wheeze
- ≥ 1 night per week sleep disturbance from wheeze
- wheeze limiting speech

ISAAC – what did we find?

**ISAAC
Phase Three**

**Wheeze in the Past 12 Months
13-14 Year Age Group**

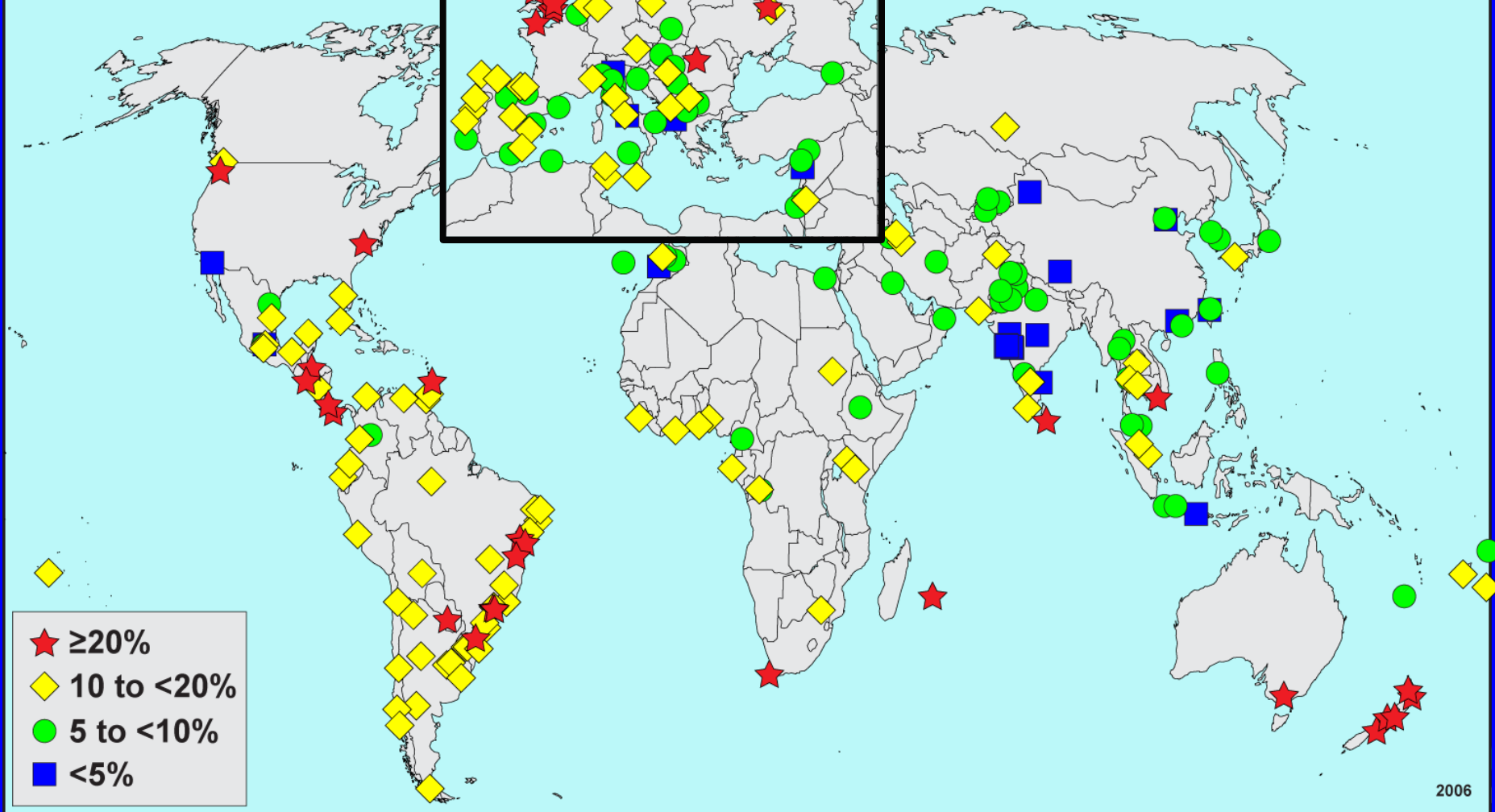


2006



ISAAC Phase Three

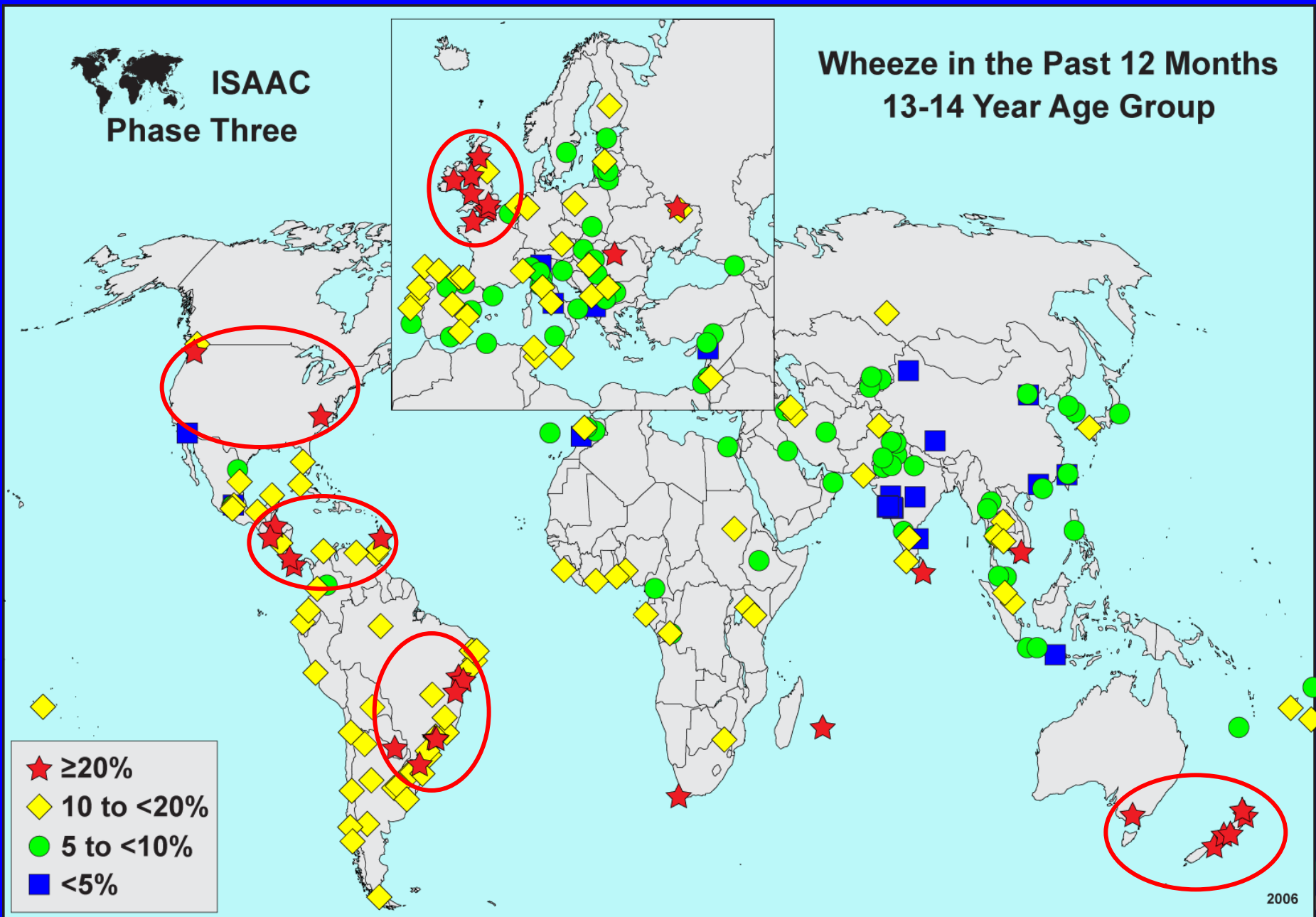
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2006

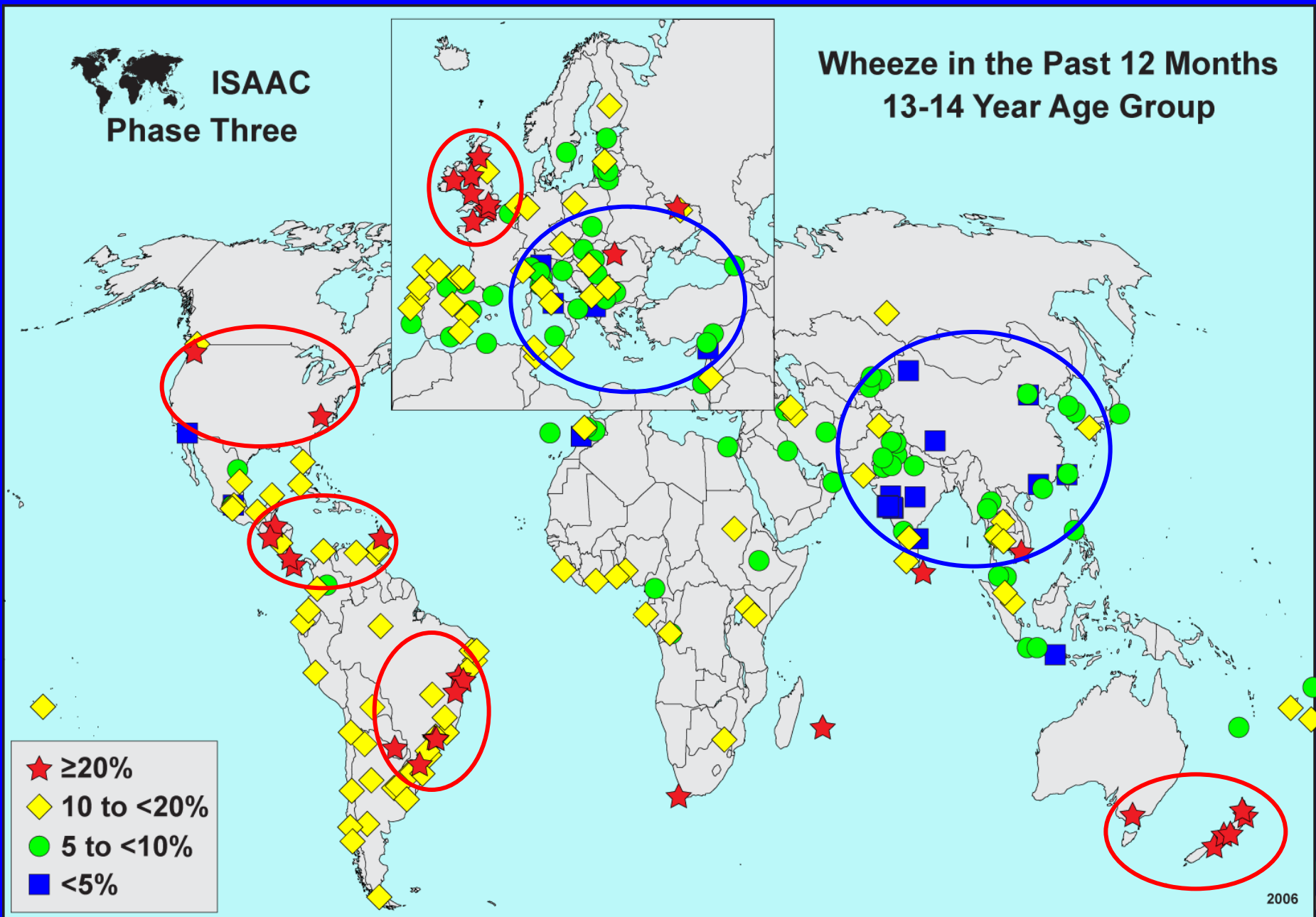
**ISAAC
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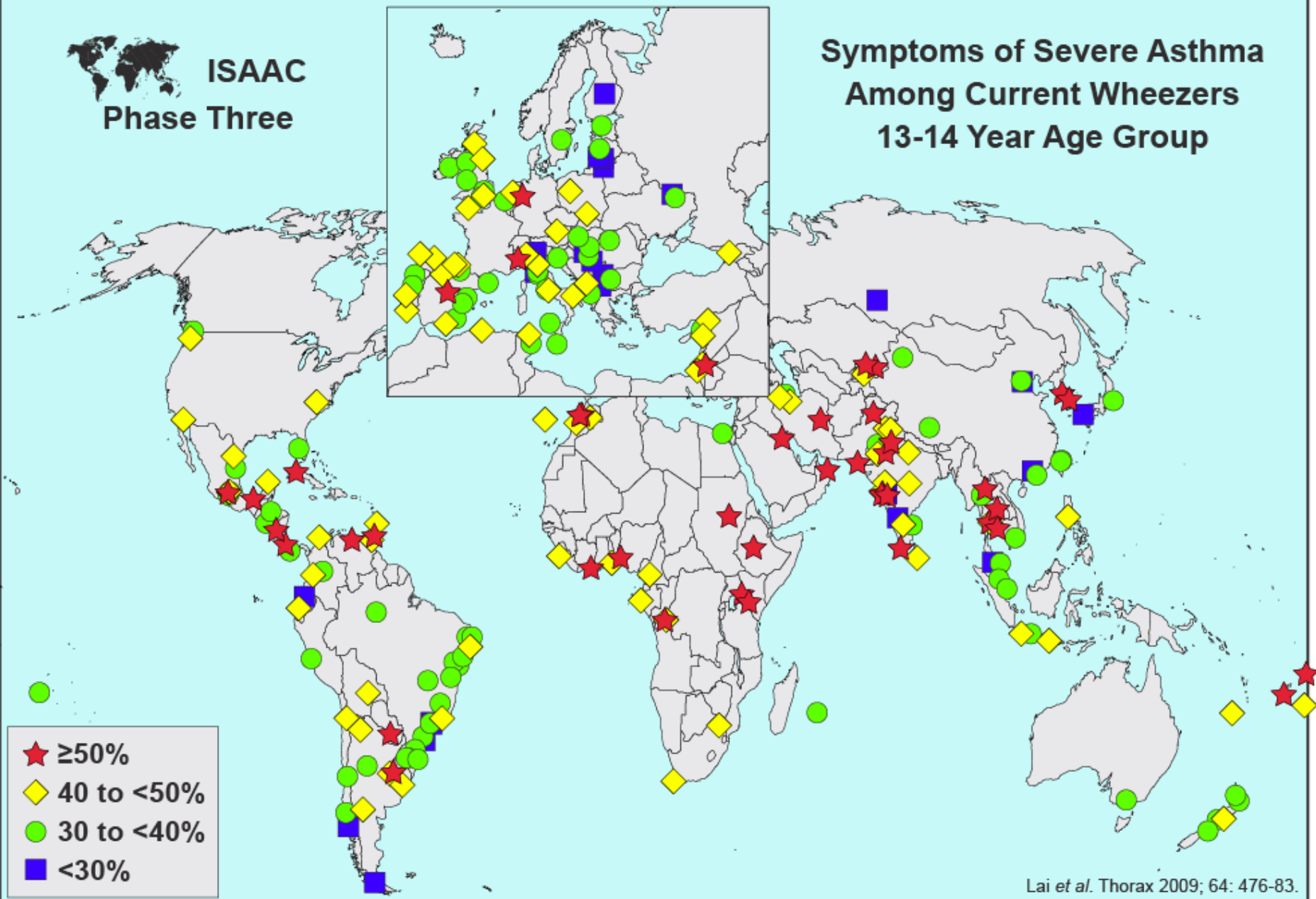


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ISAAC
Phase Three

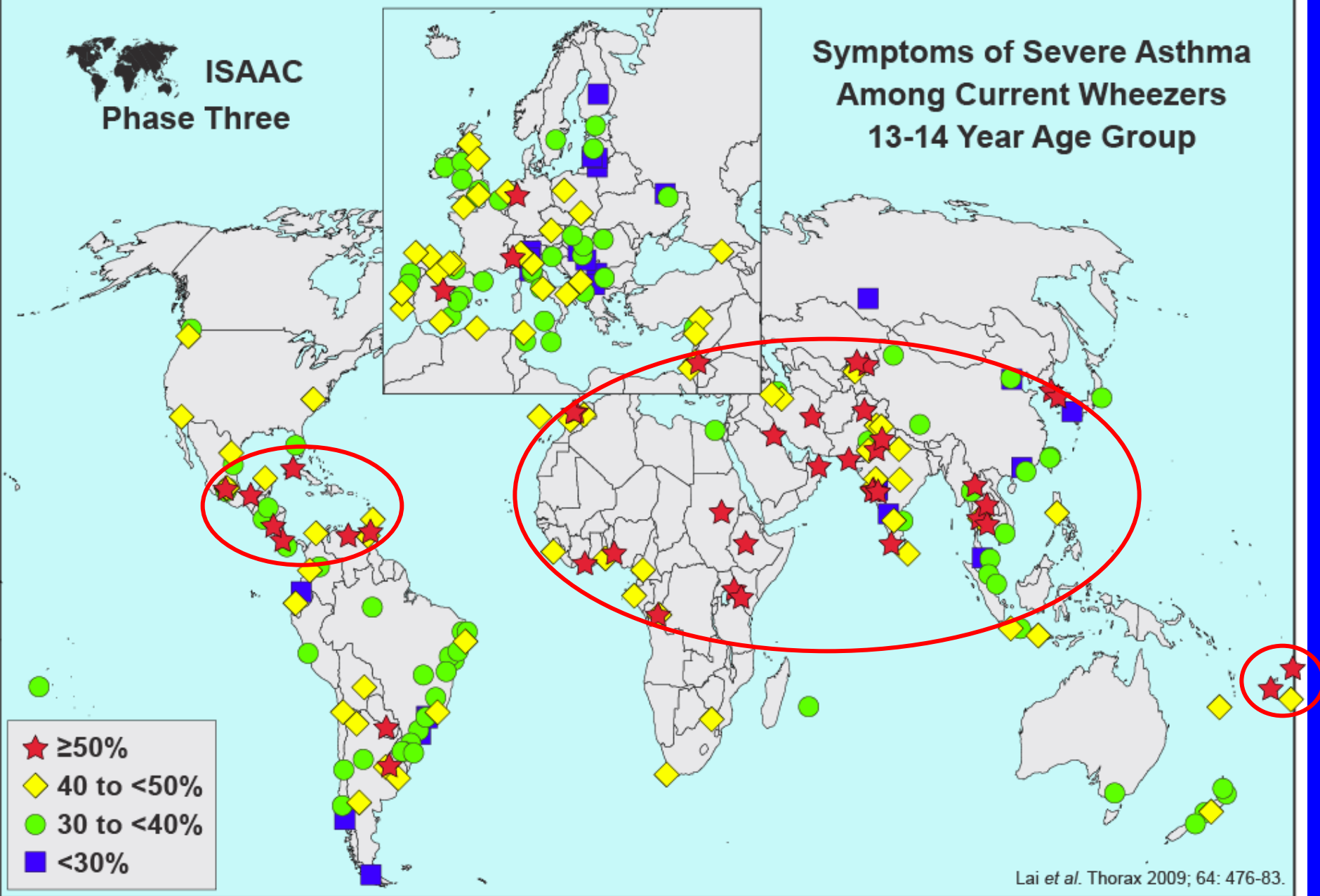
Symptoms of Severe Asthma Among Current Wheezers 13-14 Year Age Group



Lai *et al.* Thorax 2009; 64: 476-83.

**ISAAC
Phase Three**

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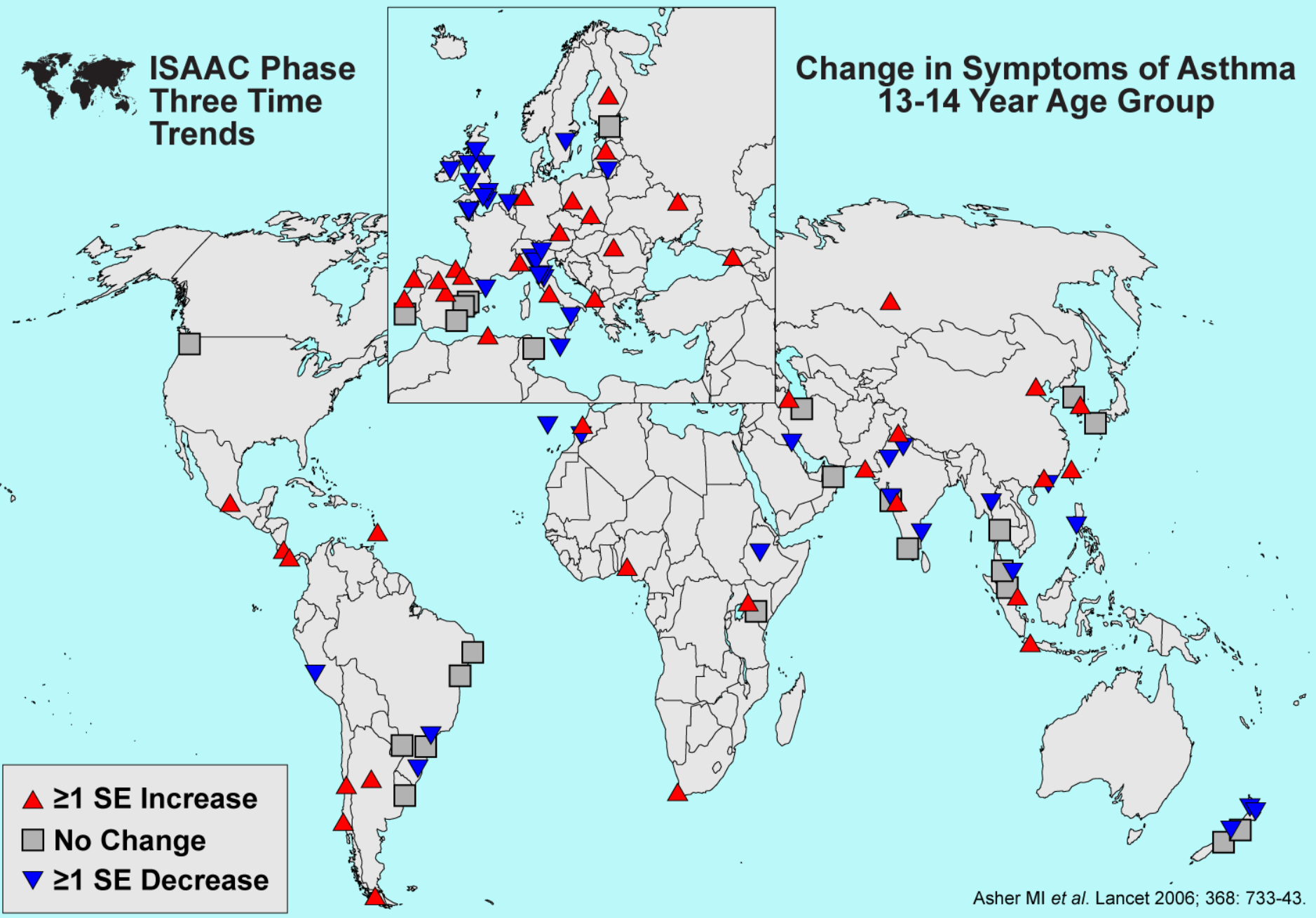
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Have asthma symptoms become more or less common over time?



ISAAC Phase Three Time Trends

Change in Symptoms of Asthma 13-14 Year Age Group

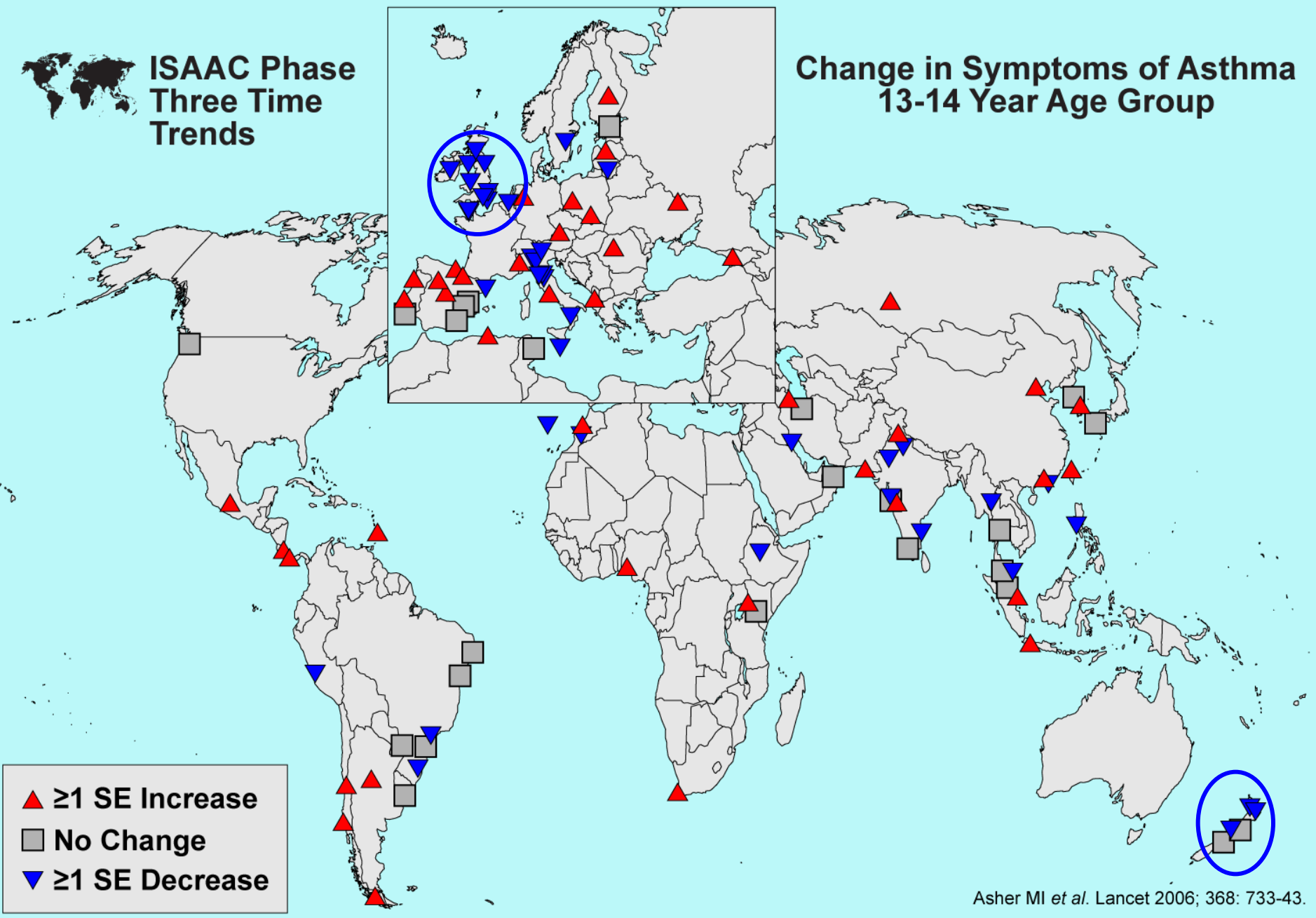


Asher MI *et al.* Lancet 2006; 368: 733-43.



ISAAC Phase Three Time Trends

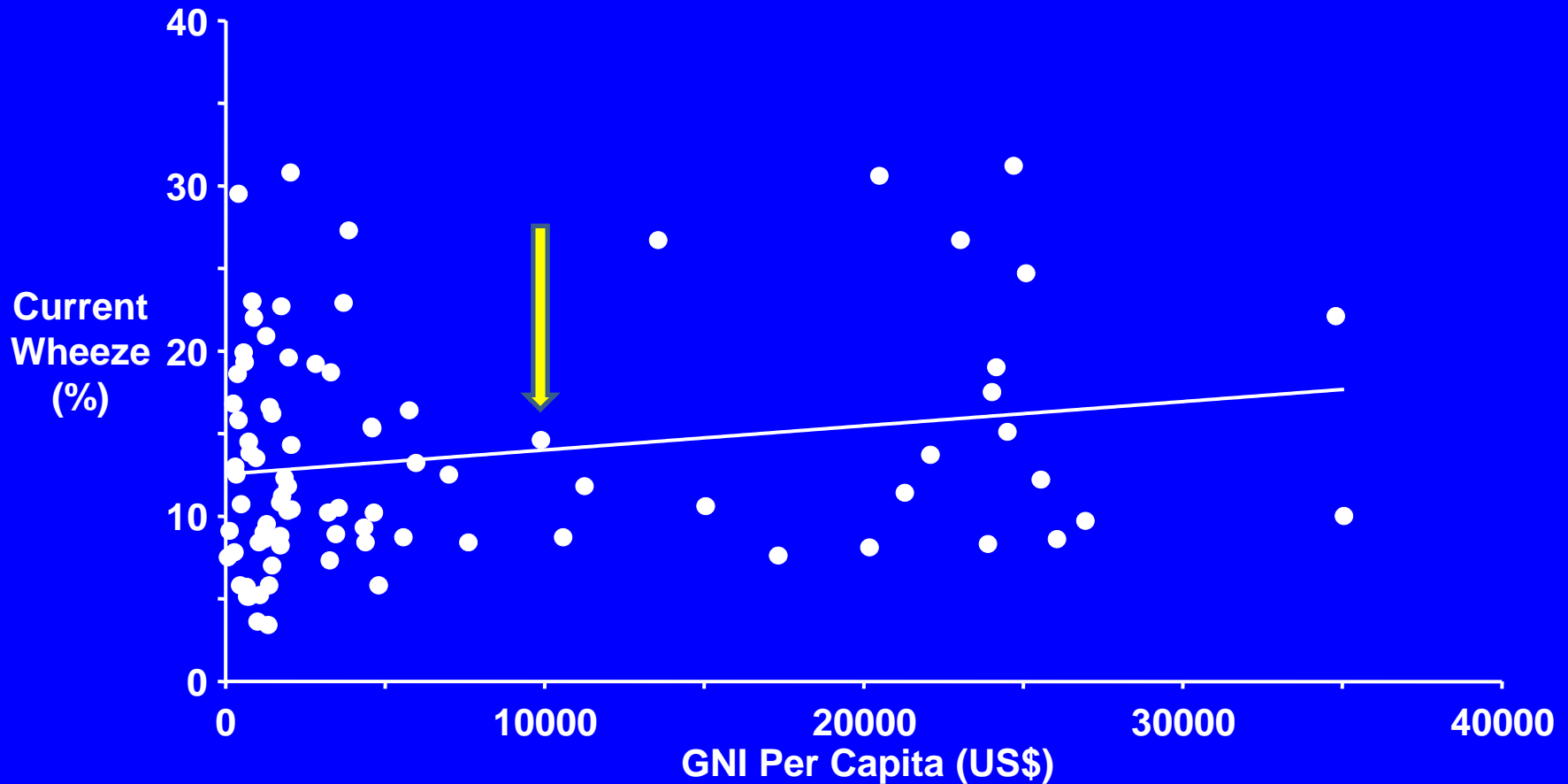
Change in Symptoms of Asthma 13-14 Year Age Group



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**Which environmental factors
influence how common asthma
symptoms are in populations?**

Current Wheeze and Gross National Income (GNI), 13-14 Year Age Group



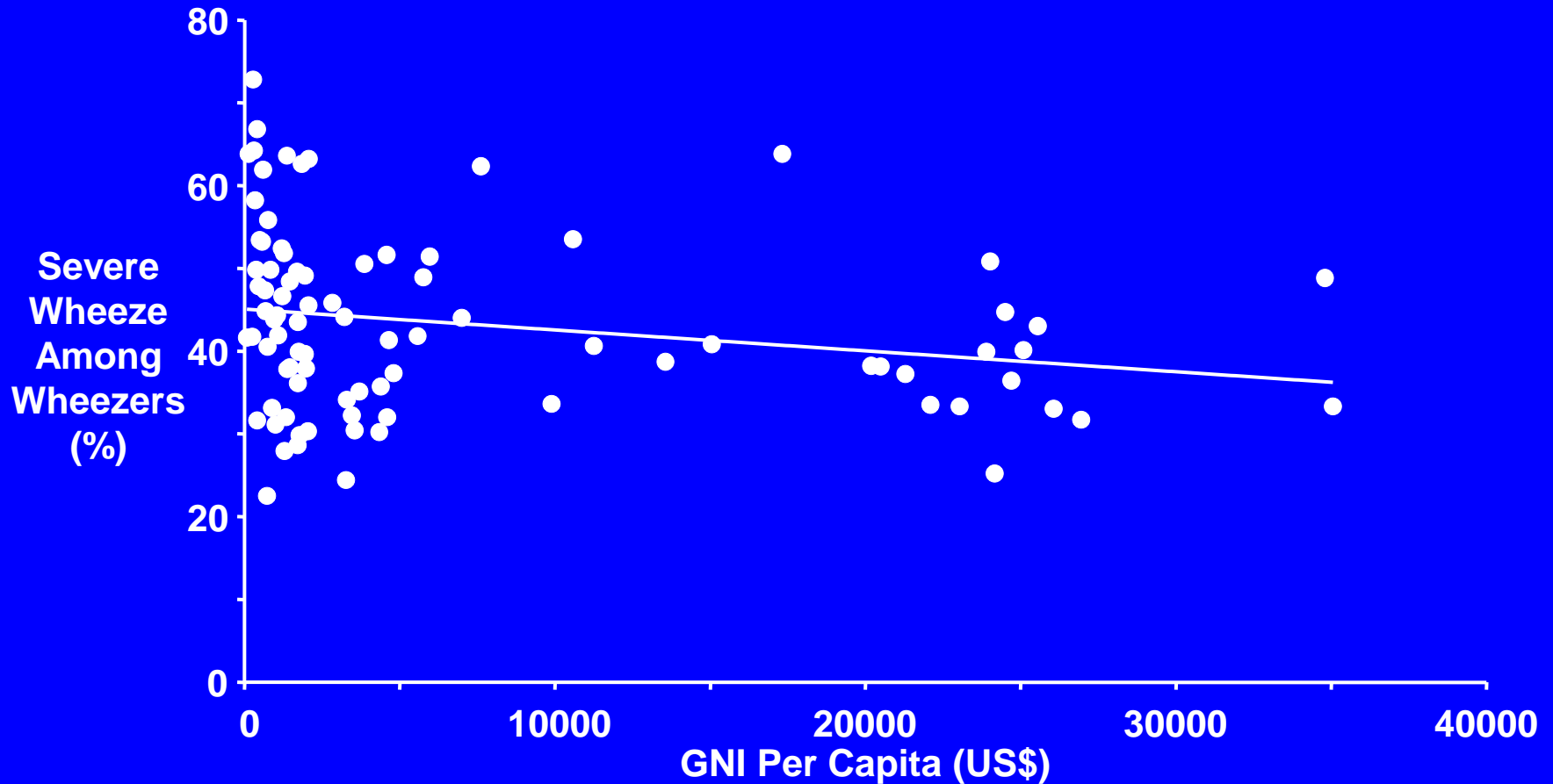
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World Bank. Data for 2001; <http://go.worldbank.org/U9BK7IA1J0> (accessed 8 October 2007).

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Associations Between Current Wheeze and Environmental Factors

ISAAC Phase One ecological analyses:

Exposure	Direction of Association
GNP (GNI)	
Tobacco (females)	
Paracetamol sales	↑
<i>Trans</i> fatty acids	
Plant-based foods	
Immunisations	
TB rates	↓
Tobacco (males)	
Pollens	
Antibiotics	
Climate	—
Air pollution	

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Bert Brunekreef

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Ross Anderson

Current Wheeze and Environmental Factors (Phase Three 6-7 year olds)

Multivariate analysis Odds Ratio (95%CI)

Antibiotic use in the 1st year
of life

1.70 (1.60-1.80)

Paracetamol use in the 1st
year of life

1.46 (1.36-1.56)

Truck traffic in street of
residence

1.35 (1.22-1.48)

Foliaki S *et al.* J Allergy Clin Immunol 2009; 124: 982-9.

Beasley R *et al.* Lancet 2008; 372: 1039-48.

Bruneekreef B *et al.* Environ Health Perspect 2009; 117: 1791-98.

ISAAC Phase Two

Current Wheeze and Diet

Exposure	Direction of Association
Burger consumption	↑
<hr/>	
Fresh fruit	↓
Fresh vegetables	
Fish	
Mediterranean diet	
<hr/>	

ISAAC Phase Two

Bronchial Hyper-responsiveness (BHR)

- High rates of BHR found in centres with high and low prevalence of wheeze.
- BHR modulated by atopy.
- BHR is related to wheeze, but does not explain its worldwide variation.

ISAAC Phase Two

Genetic risk factors

David Strachan

ISAAC – what have we learned?

Global Summary – Asthma

- Asthma symptoms are a big global problem, and the global burden is increasing.
- Environmental factors are key, and we need to find out which matter most.

Root Causes of the Variations in Asthma?

Country Economic Influences

- Positive associations with GNI and income inequality.
- In less affluent countries, asthma symptoms are more commonly severe.

Environmental Factors

- Several associations – inverse (protective) and positive (risk) – further exploration needed.

Influence of Atopy

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Influence of Atopy

Neil Pearce

Global Solutions?

We need to:

- Understand the influences of income and income inequality.
- Seek the key environmental factors in low and middle income countries.
- Understand the mechanisms of and influences on non-atopic asthma.
- Deliver good asthma management to all children with asthma in the world.

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Colin Robertson

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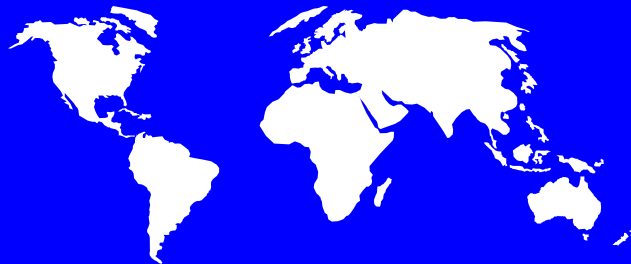
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Nadia Aït-Khaled

**Thanks to children, parents, school staff,
ISAAC staff and collaborators, funders**



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