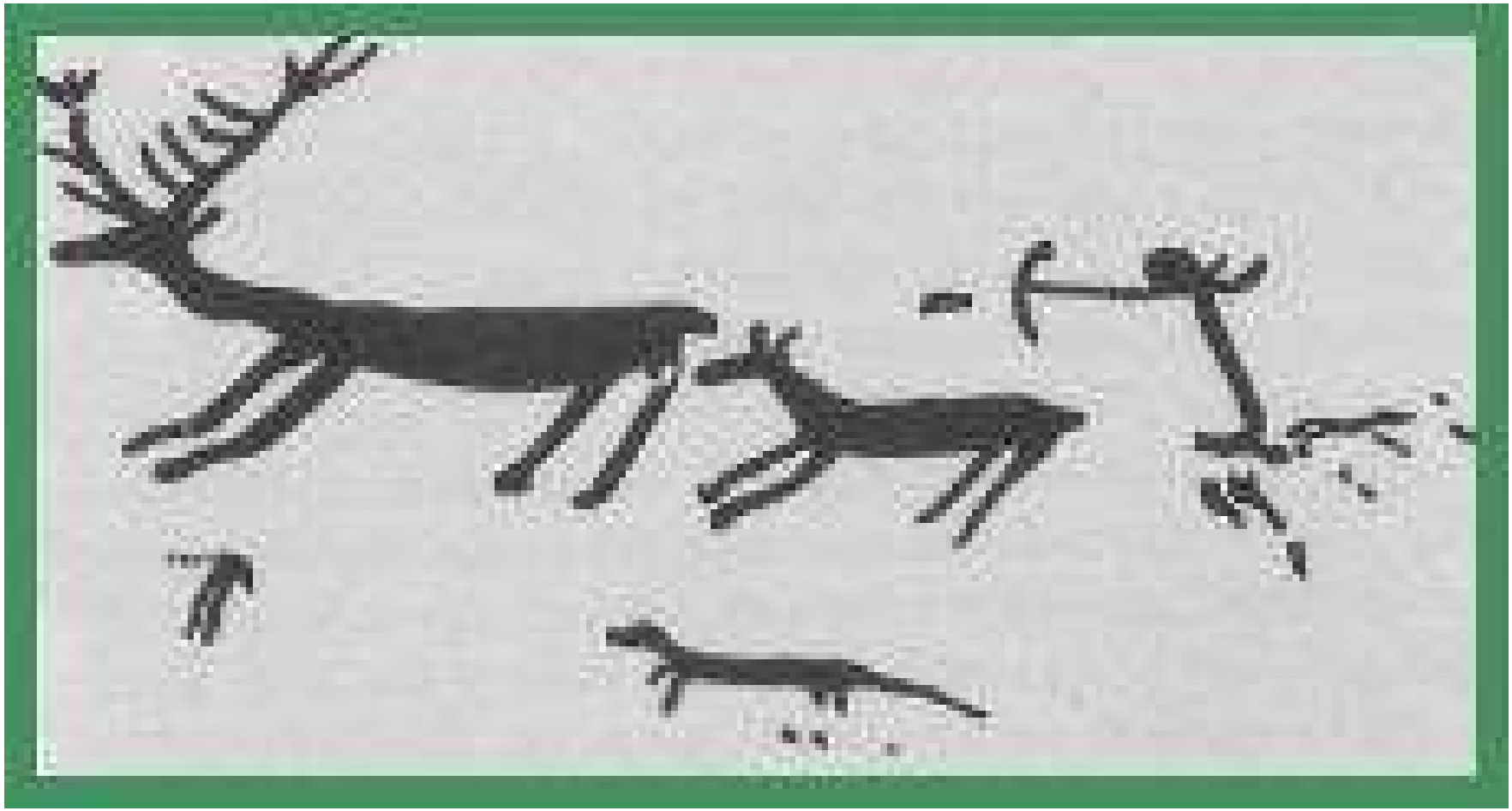
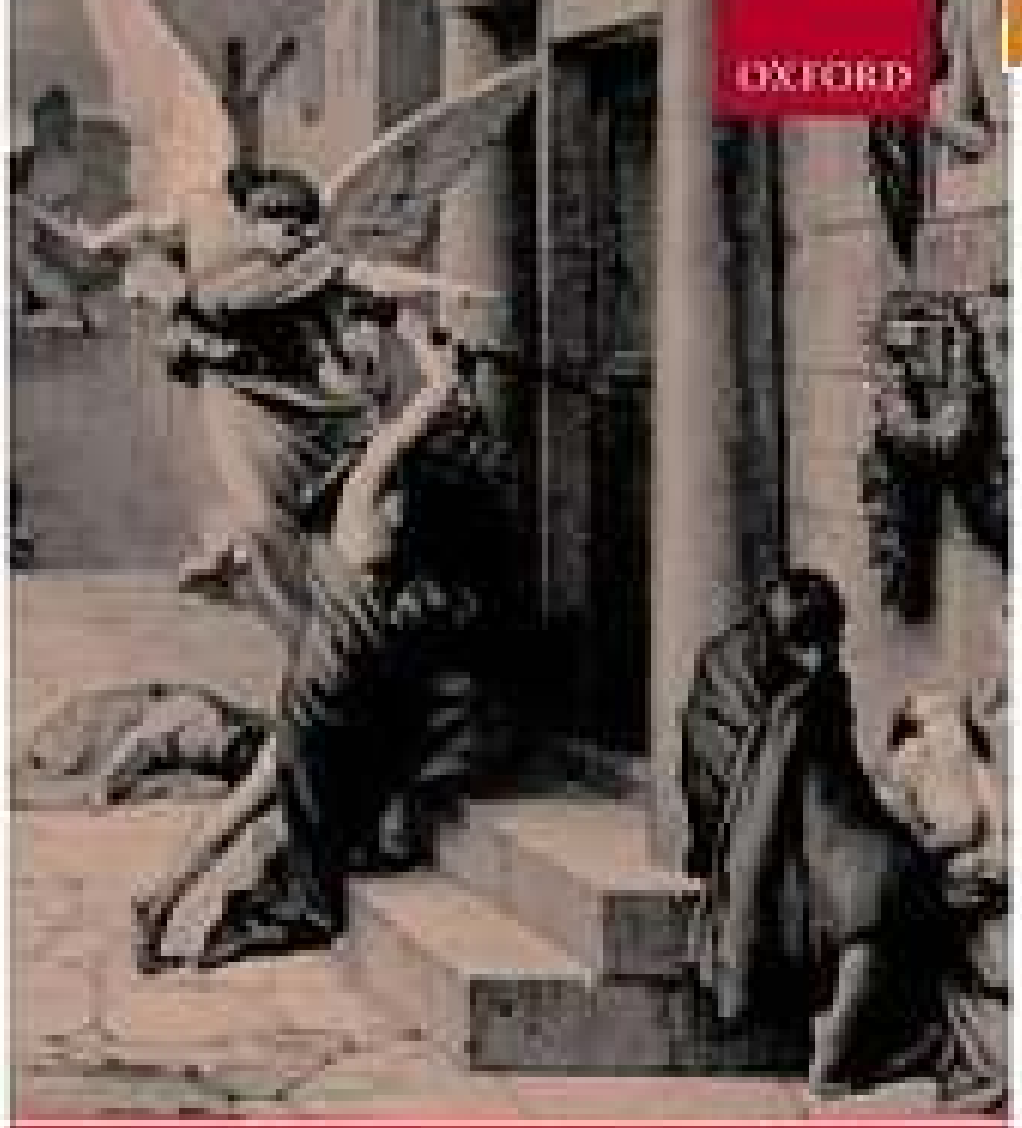



VIA SALARIA
VIA NUMENTANA
VATICANUS


COMITIVM
ARGILETVM
SITE OF BASILICA AEMILIA
Cloaca Maxima
AD IANVM
ARCH OF SEVERVS
VRBICVS
SITE OF SCHOLA XANTHA
COL. PHOCAE
CABALLVS CONSTANTINI
SACRA VIA
BASILICA IVLIA



OXFORD

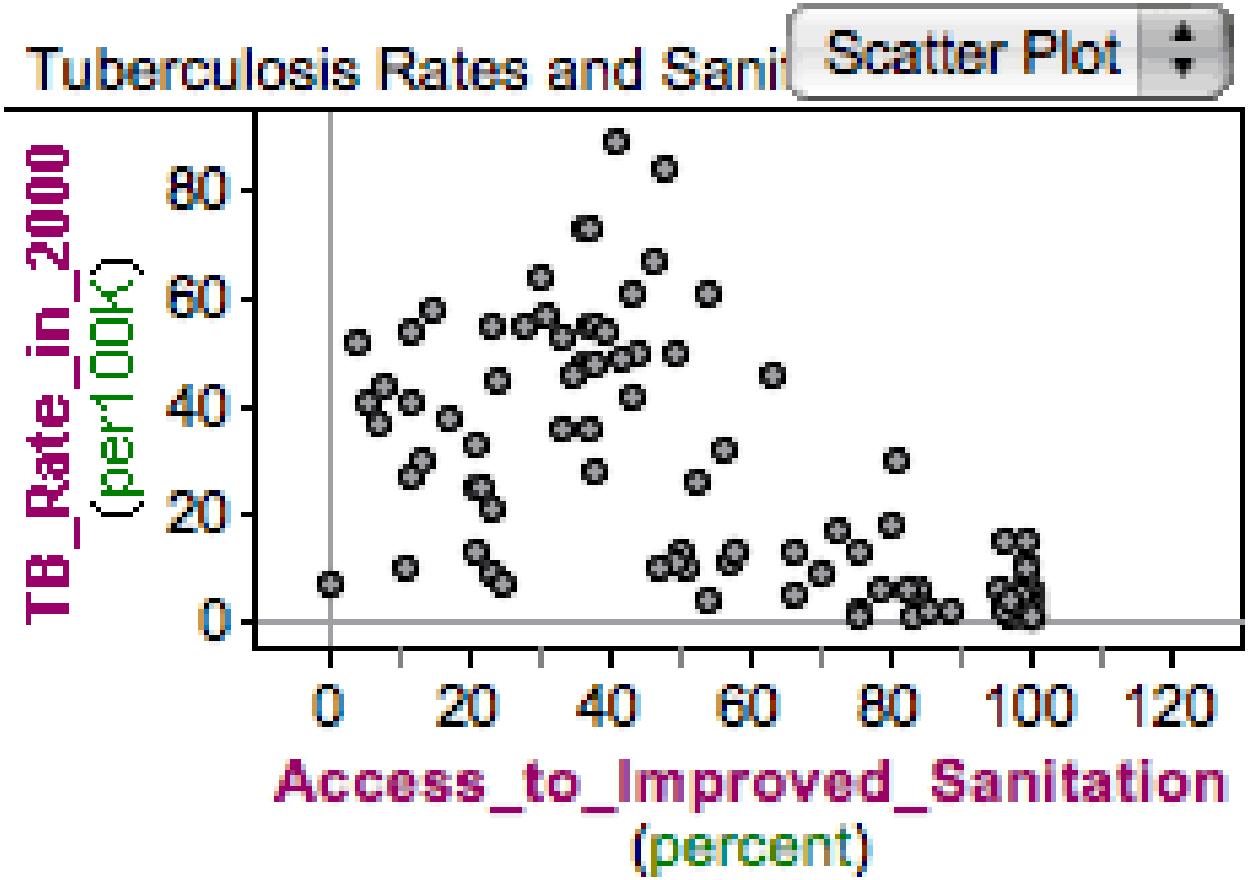
MALARIA AND ROME

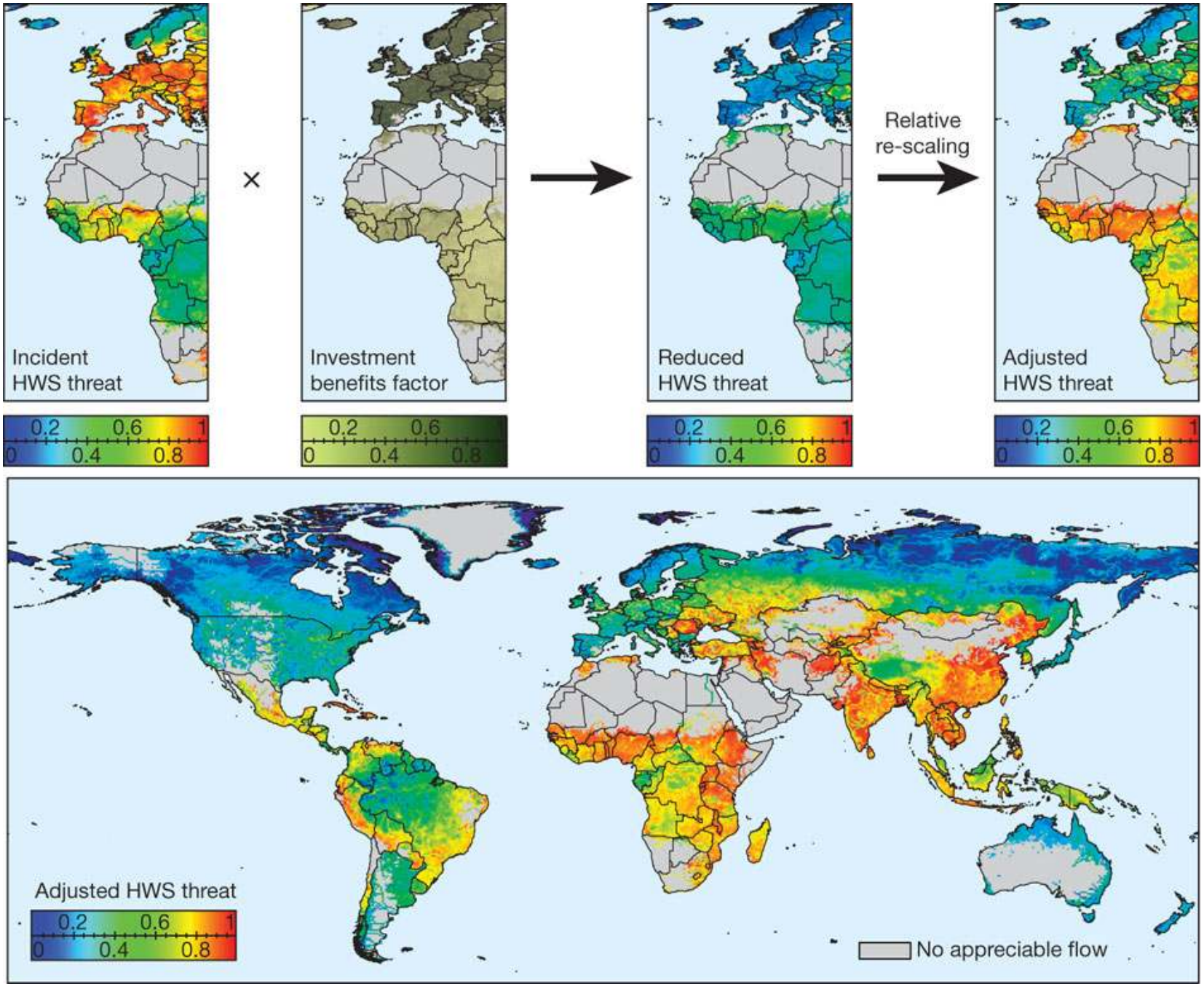
A History of Malaria in Ancient Italy

ROBERT SALLARES

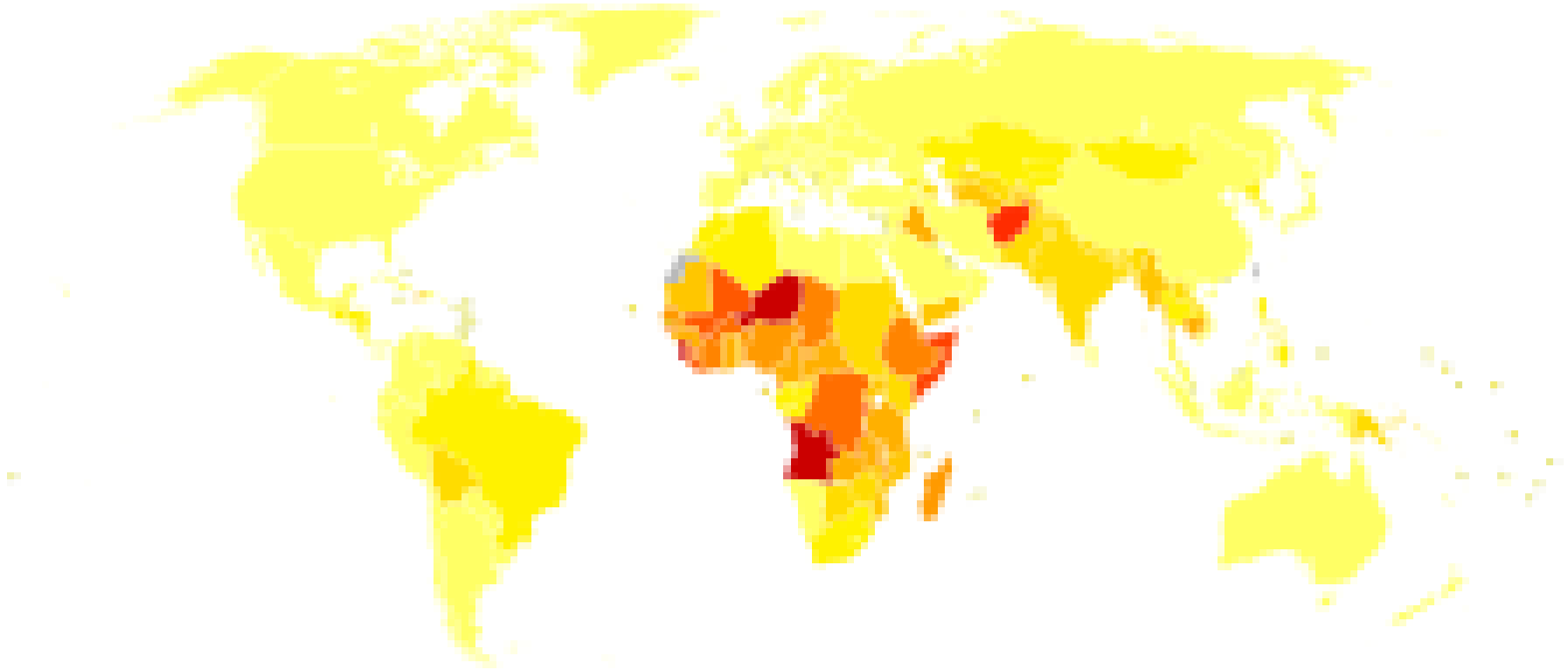

50 0 50 100 150 200 Yards
X Pump
• Deaths from cholera
OXFORD STREET
REGENT STREET
GT. MARLBOROUGH ST.
KARROUA STREET
DEAN STREET
BROAD STREET
KING STREET
CONDUIT STREET
GOLDEN SQUARE
BREWER STREET
SAVILLE ROW
NEW BOND STREET
REGENTS QUADRANT
PICCADILLY

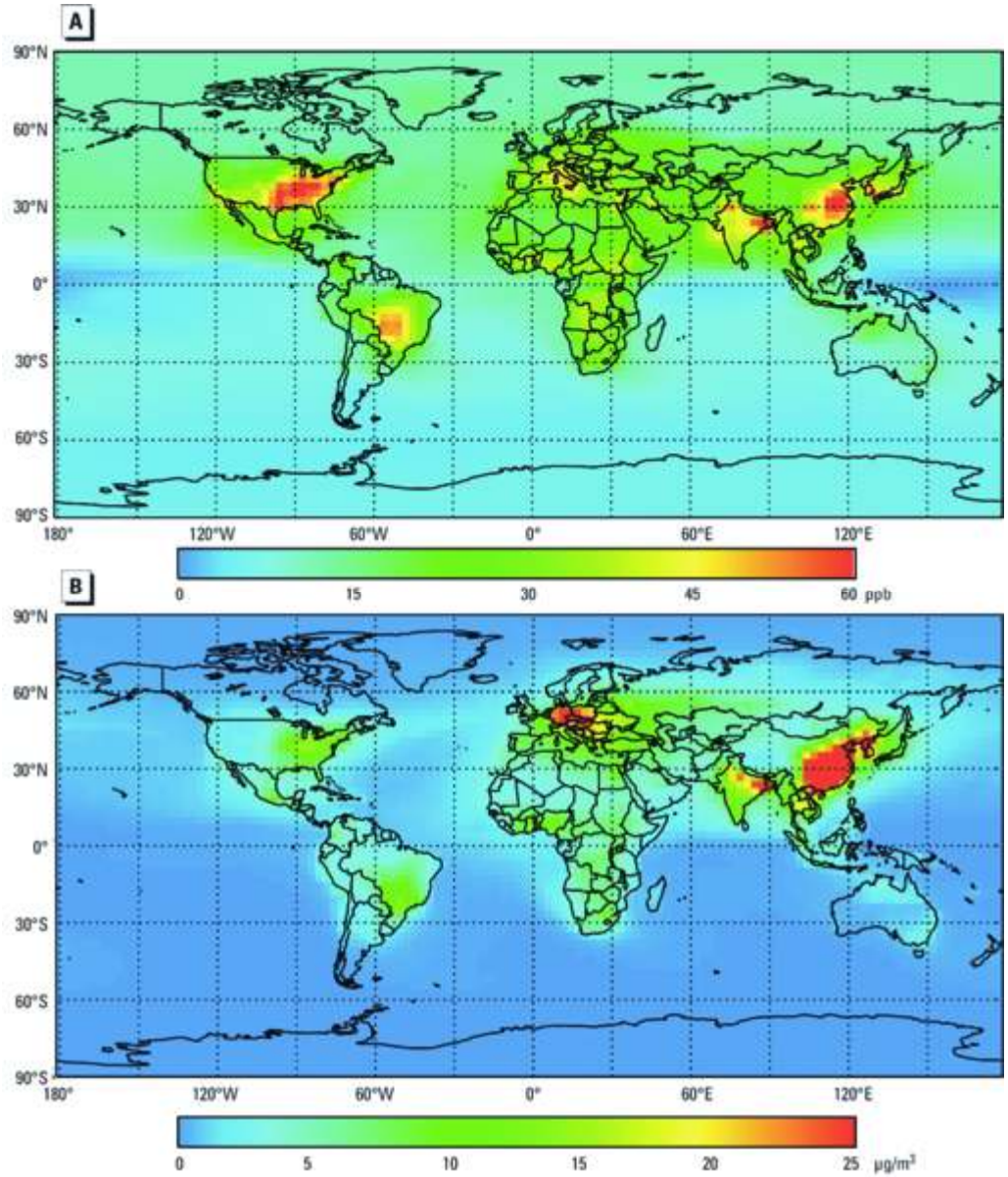

UMA LIMPEZA INDISPENSAVEL
AUGUSTA


Tuberculosis Rates and Sani
Scatter Plot
TB_Rate_in_2000
(per100K)
80
60
40
20
0
0
20
40
60
80
100
120
Access_to_Improved_Sanitation
(percent)

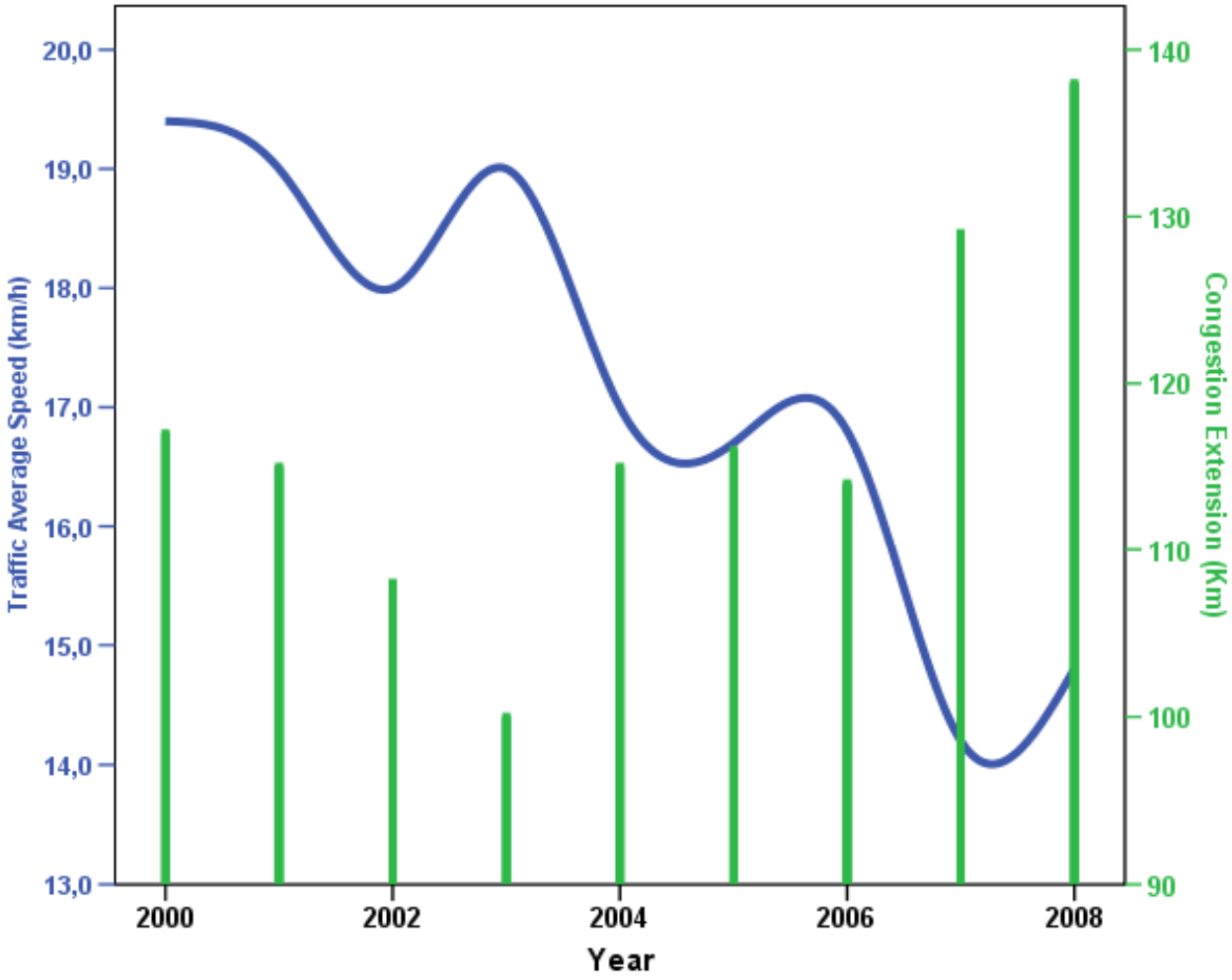


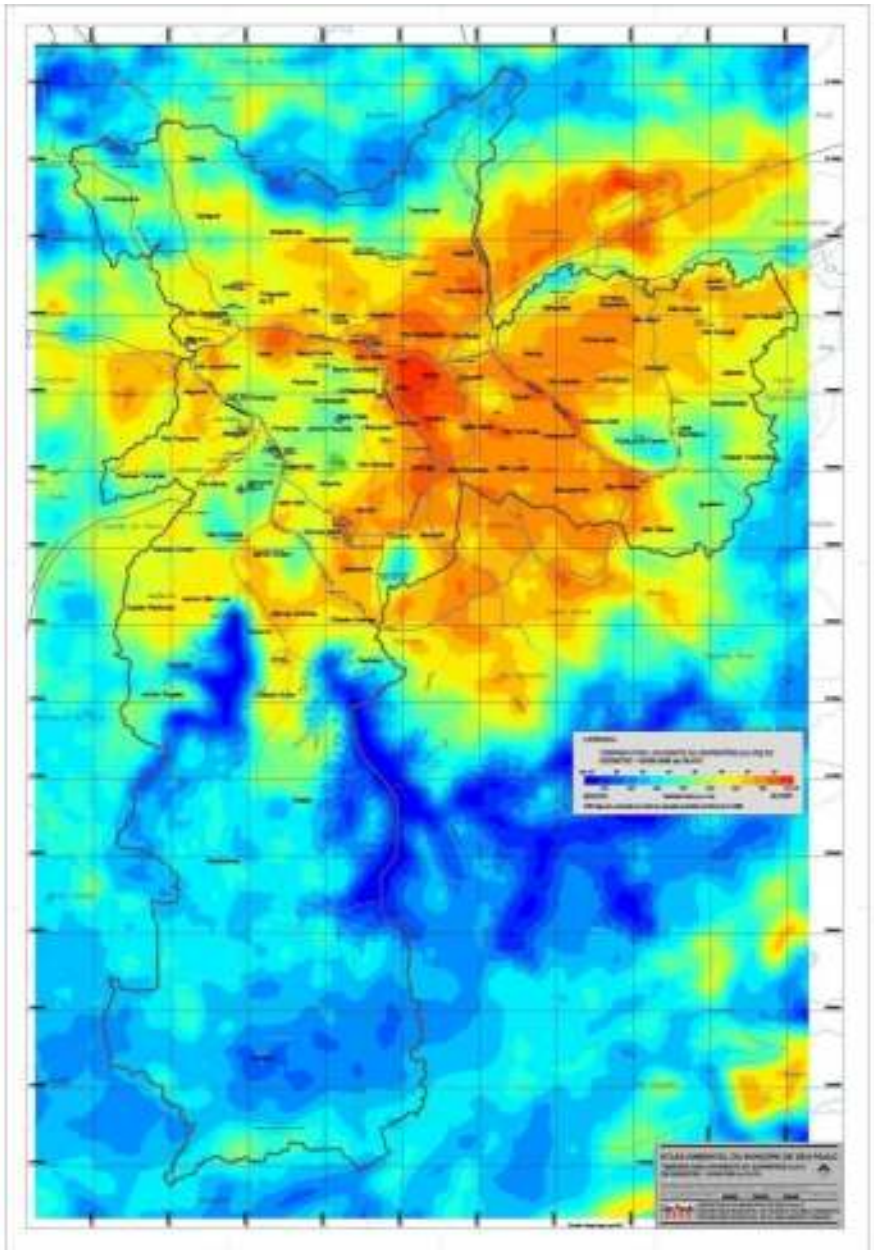
Vörösmarty et al. ***Nature* 467**, 555-561 (29 September 2010)

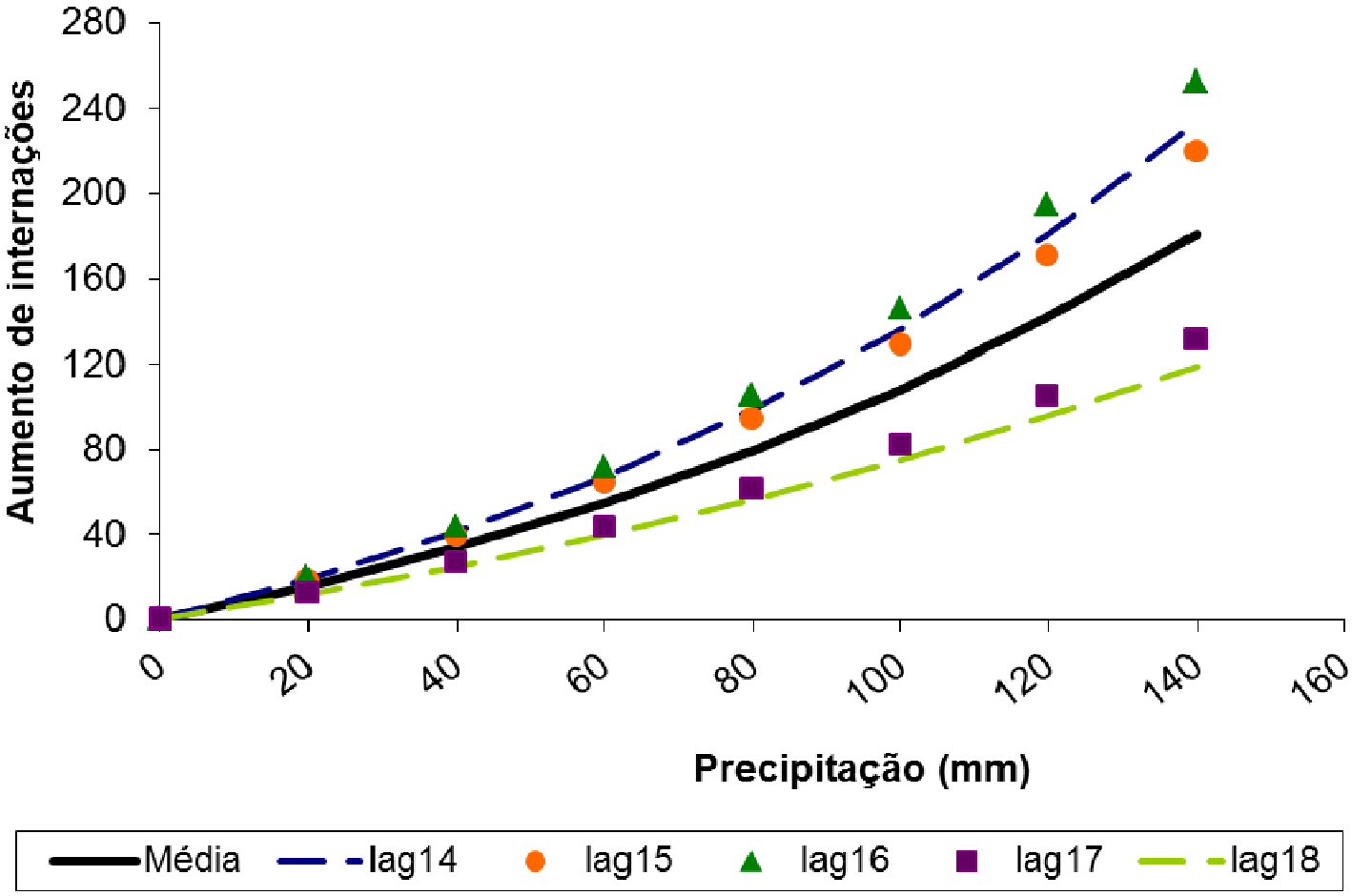




Anenberg et al Environ Health Perspect 118:1189-1195.

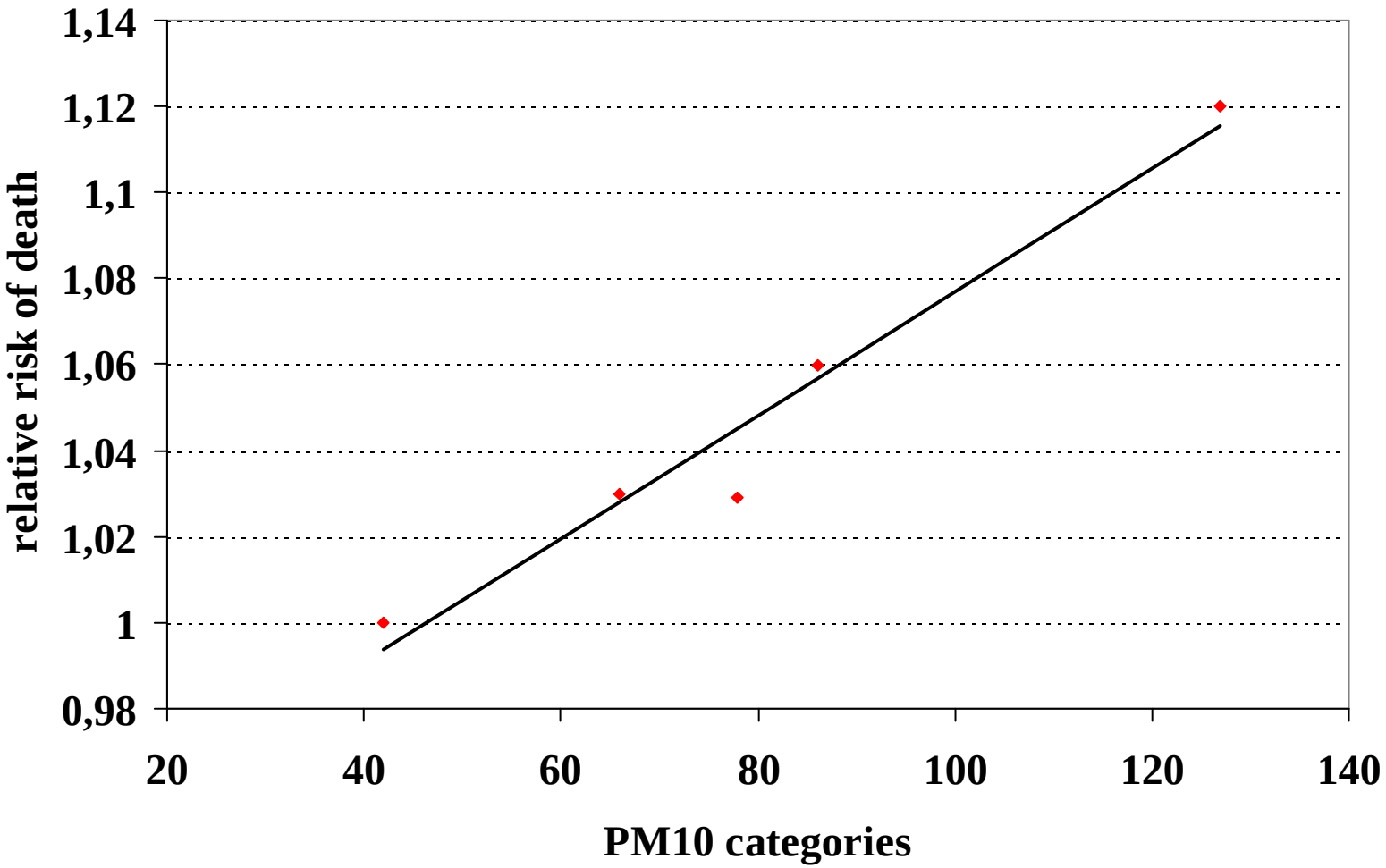

20,0
19,0
18,0
17,0
16,0
15,0
14,0
13,0
Traffic Average Speed (km/h)
140
130
120
110
100
90
Congestion Extension (Km)
2000
2002
2004
2006
2008
Year



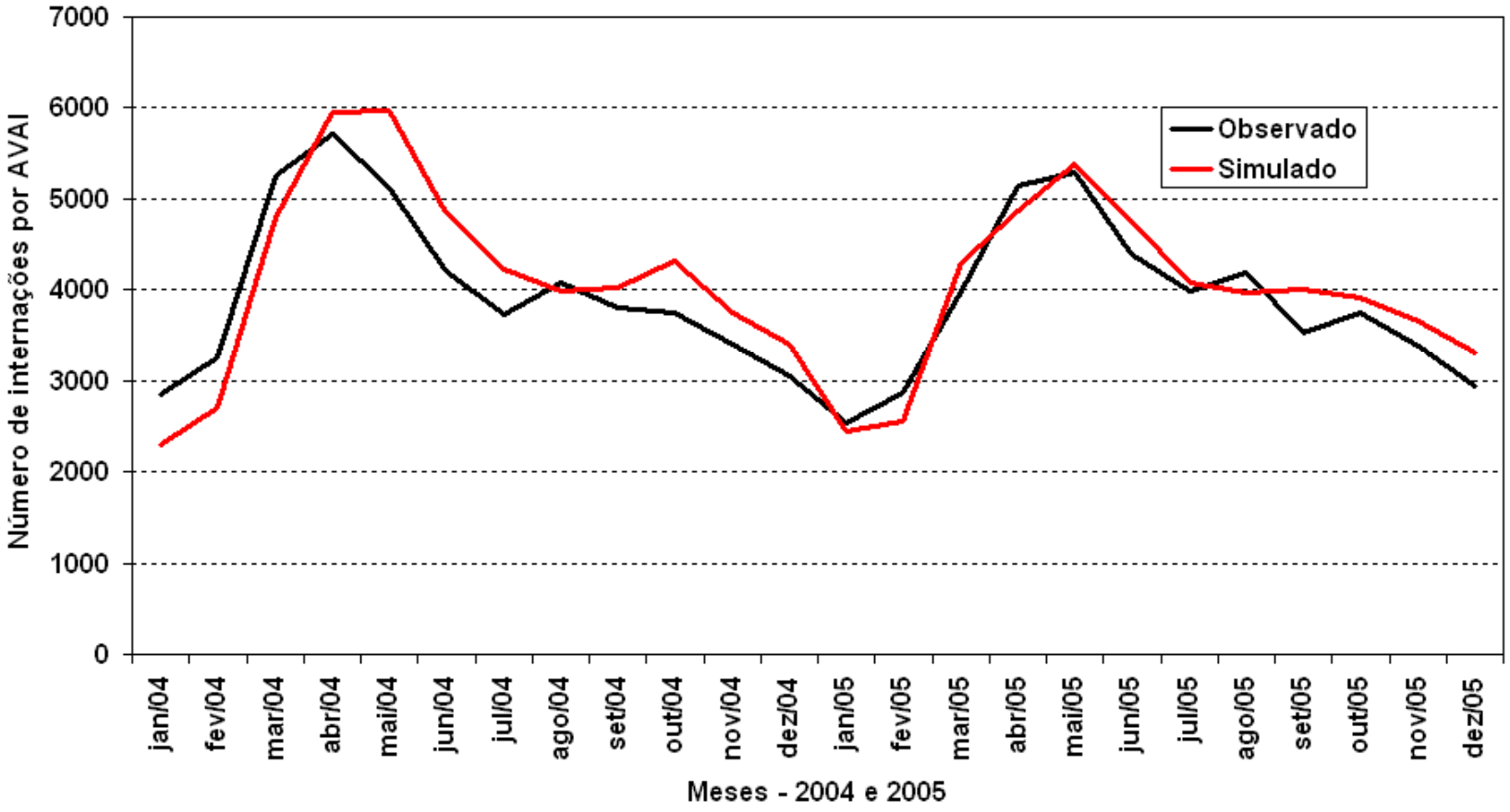

Aumento de internações
280
240
200
160
120
80
40
0
0
20
40
60
80
100
120
140
160
Precipitação (mm)
Média
lag14
lag15
lag16
lag17
lag18

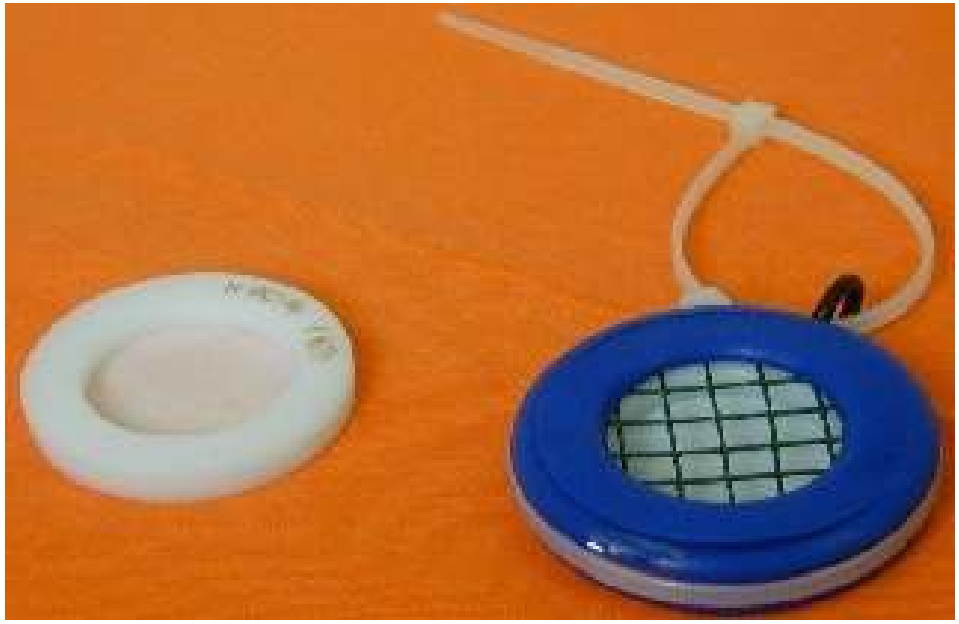
São Paulo – 28 µg/m³

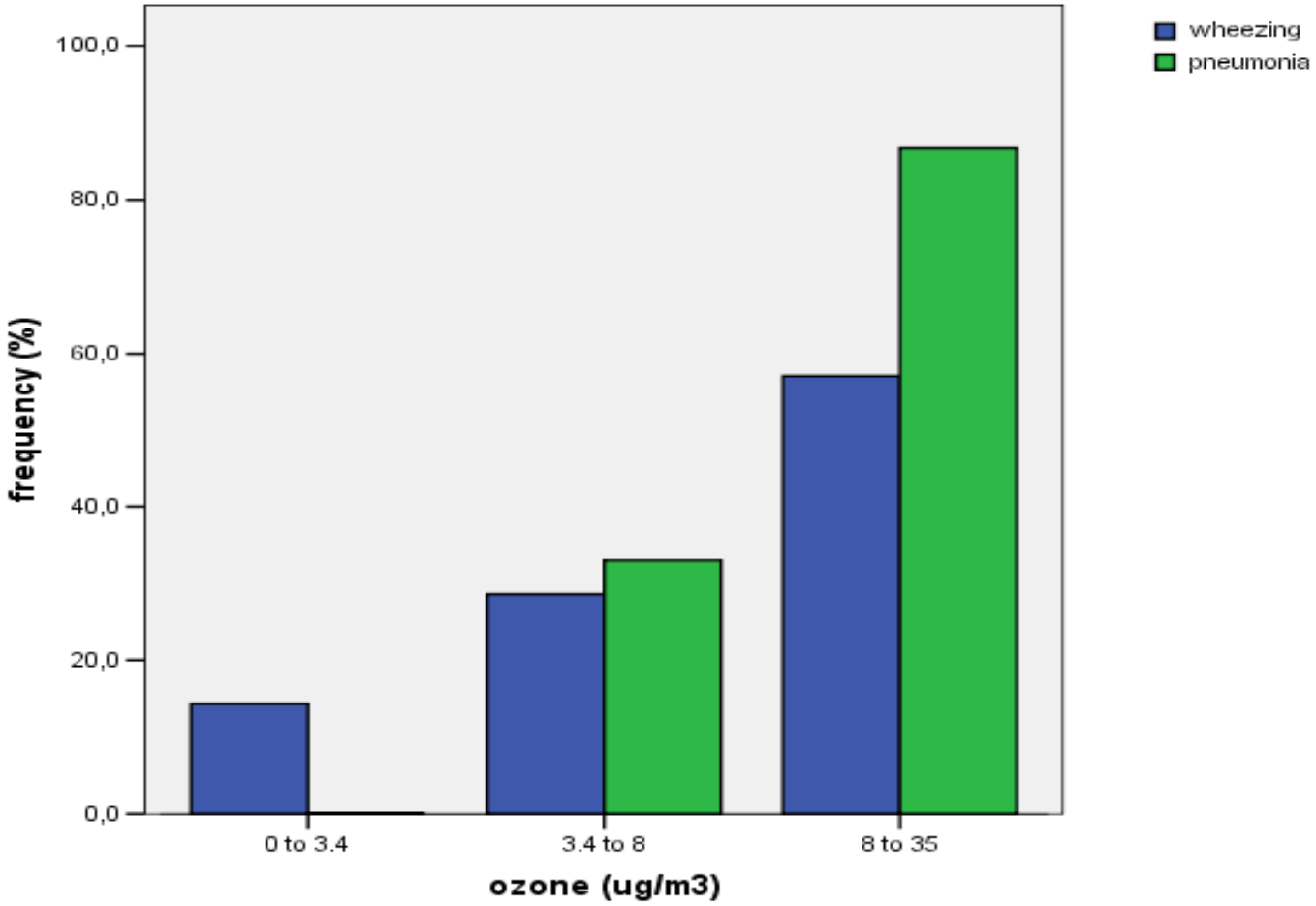
	ug/m3	%	
Fator 1	2.43	8.58	Solo
Fator 2	7.01	24.72	Óleo
Fator 3	3.87	13.66	Leve
Fator 4	10.90	38.45	Pesado

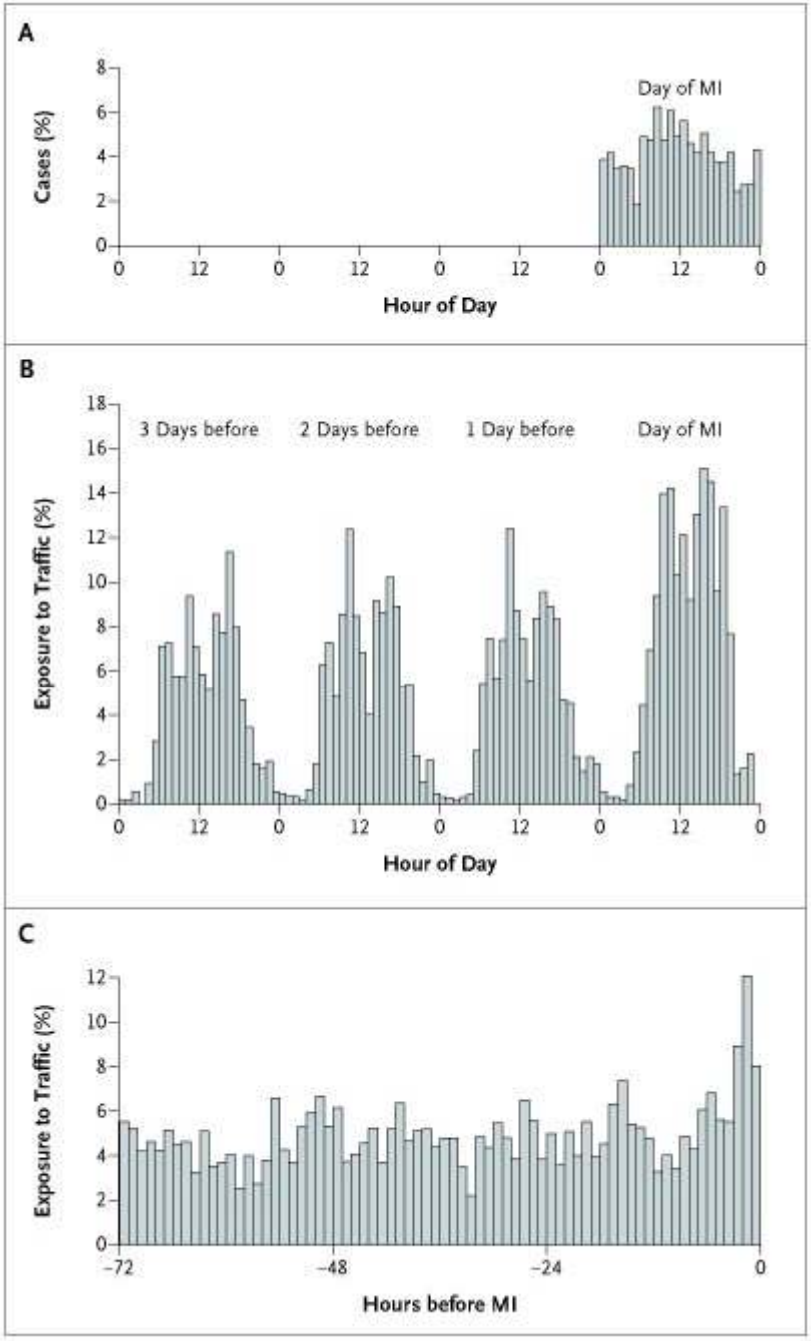

1,14
1,12
1,1
1,08
1,06
1,04
1,02
1
0,98
relative risk of death
20
40
60
80
100
120
140
PM10 categories

Comparação entre dados observados e simulados de Casos de AVAI na cidade de São Paulo

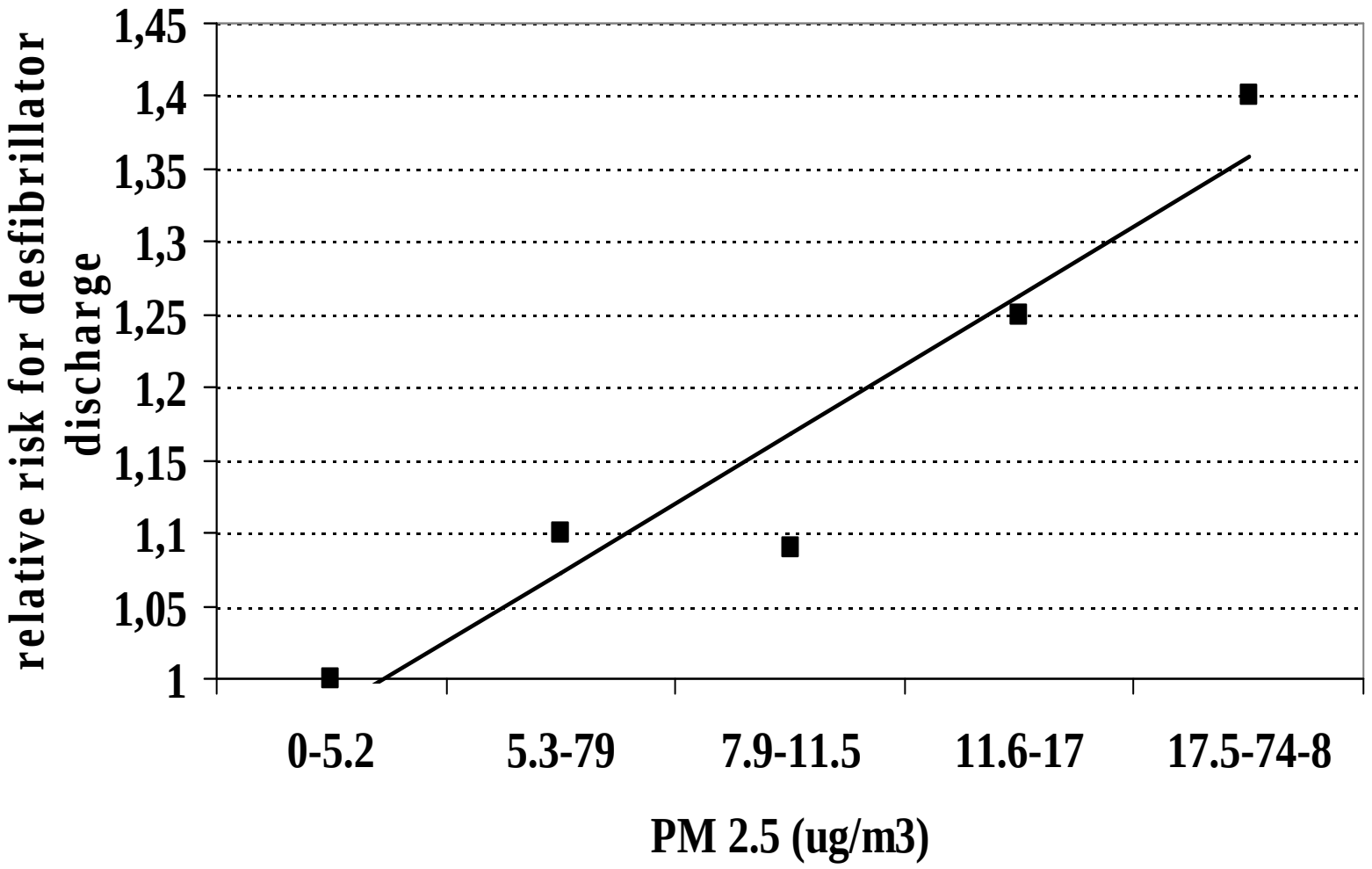


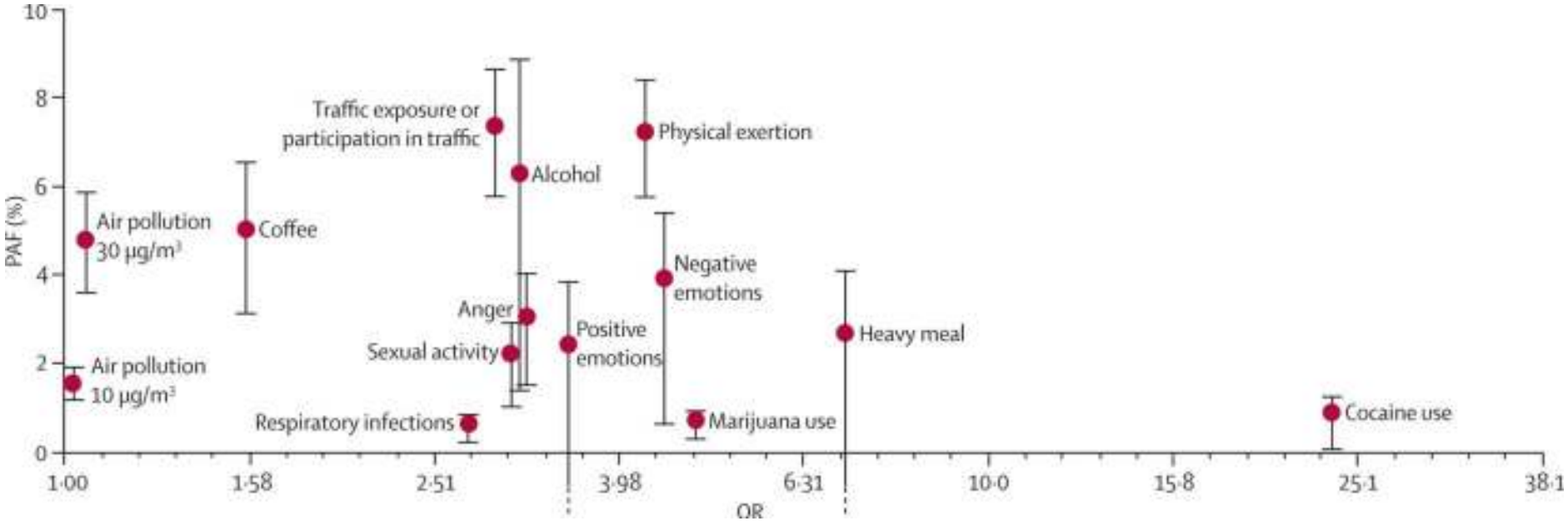



wheezing
pneumonia
100,0
80,0
60,0
40,0
20,0
0,0
frequency (%)
0 to 3.4
3.4 to 8
8 to 35
ozone (ug/m3)



N Engl J Med 2004;351:1721-30.

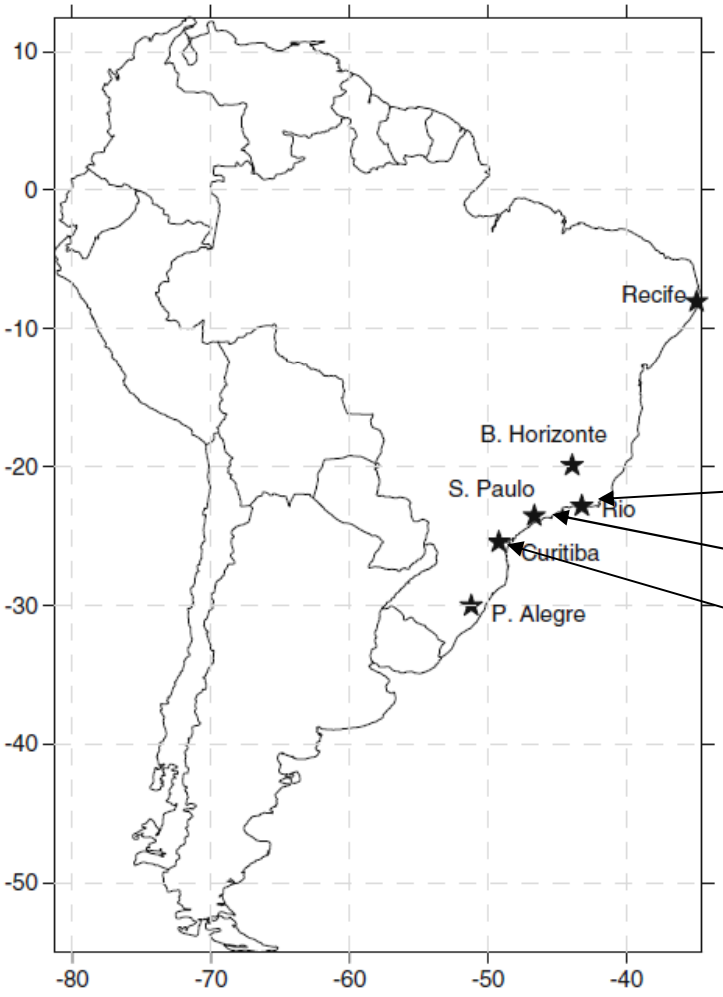

relative risk for desfibrillator discharge
1,45
1,4
1,35
1,3
1,25
1,2
1,15
1,1
1,05
1
0-5.2
5.3-79
7.9-11.5
11.6-17
17.5-74-8
PM 2.5 (ug/m3)



Lancet. 2011 Feb 26;377(9767):732-40

Fine Particulate ($PM_{2.5}$)Air Pollution

de Miranda et al, Air Qual Atmos Health 2011

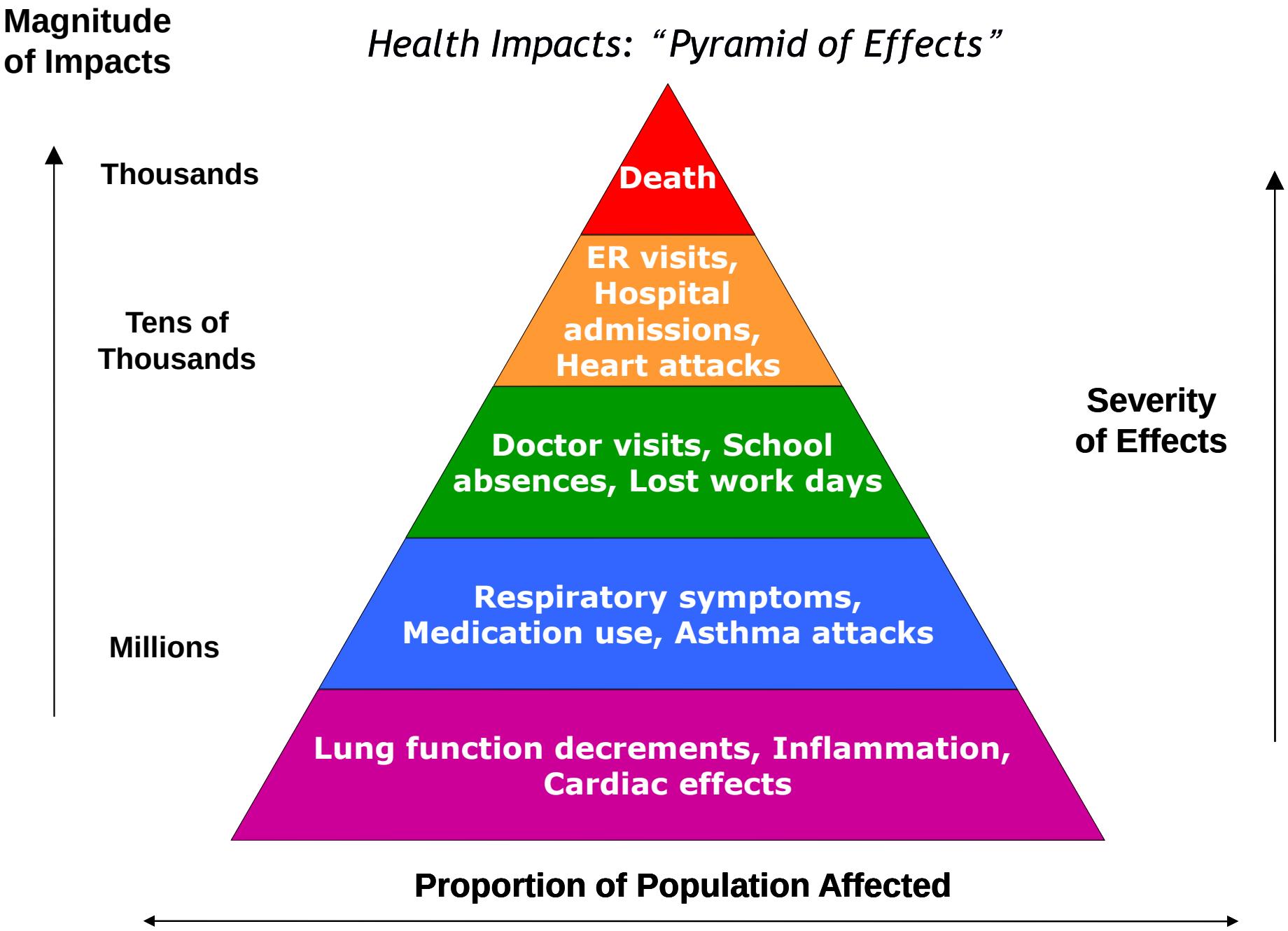


WHO Air Quality Guideline 10 µg/m³

20 µg/m³

28 µg/m³

16 µg/m³

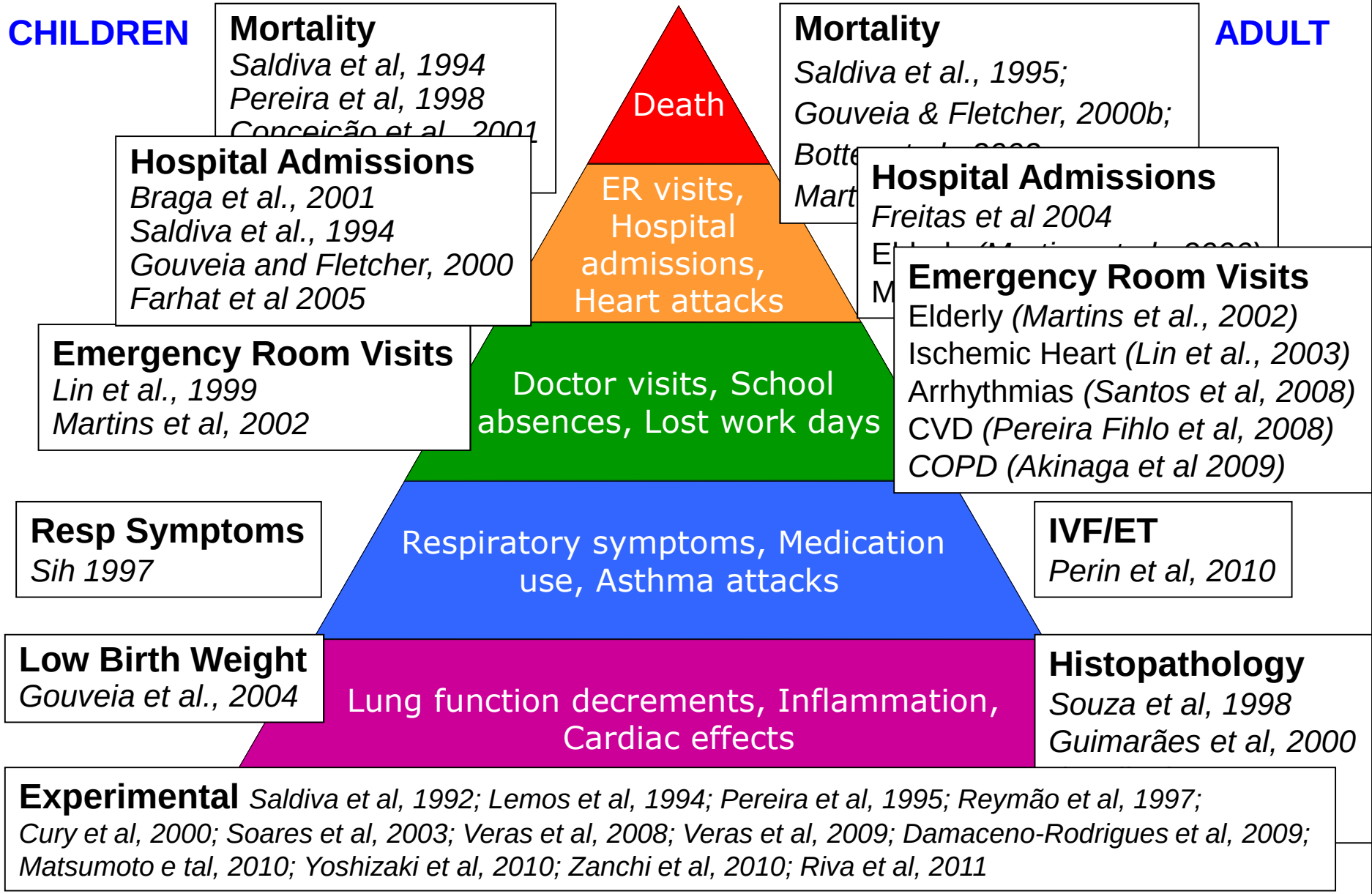

Magnitude of Impacts
Health Impacts: "Pyramid of Effects"
Thousands
Tens of Thousands
Millions
Death
ER visits, Hospital admissions, Heart attacks
Doctor visits, School absences, Lost work days
Respiratory symptoms, Medication use, Asthma attacks
Lung function decrements, Inflammation, Cardiac effects
Severity of Effects
Proportion of Population Affected

Estimated benefits of 10% reduction in São Paulo air pollutants between 2000 and 2020

Bell, Davis, Gouveia, Borja-Aburto, Cifuentes, Envir Res 2006; 100:431

Health endpoint		Events avoided
Mortality		
	Adult	113,165
	Infant (<1 year)	735
Medical visits		
	Children's medical visits (3 to 15 years)	138,572
	Hospital admissions (cardiovascular)	1,449
	Hospital admissions (respiratory)	10,945
	Children's hospital admissions	5,563
	Emergency room visits (respiratory)	102,331
Bronchitis and asthma		
	Asthma attacks	817,064
	Acute bronchitis	38,384
	Chronic bronchitis	11,603
Activity effects		
	Restricted activity days (18 to 65 years)	6,852,601
	Work loss days	2,376,710

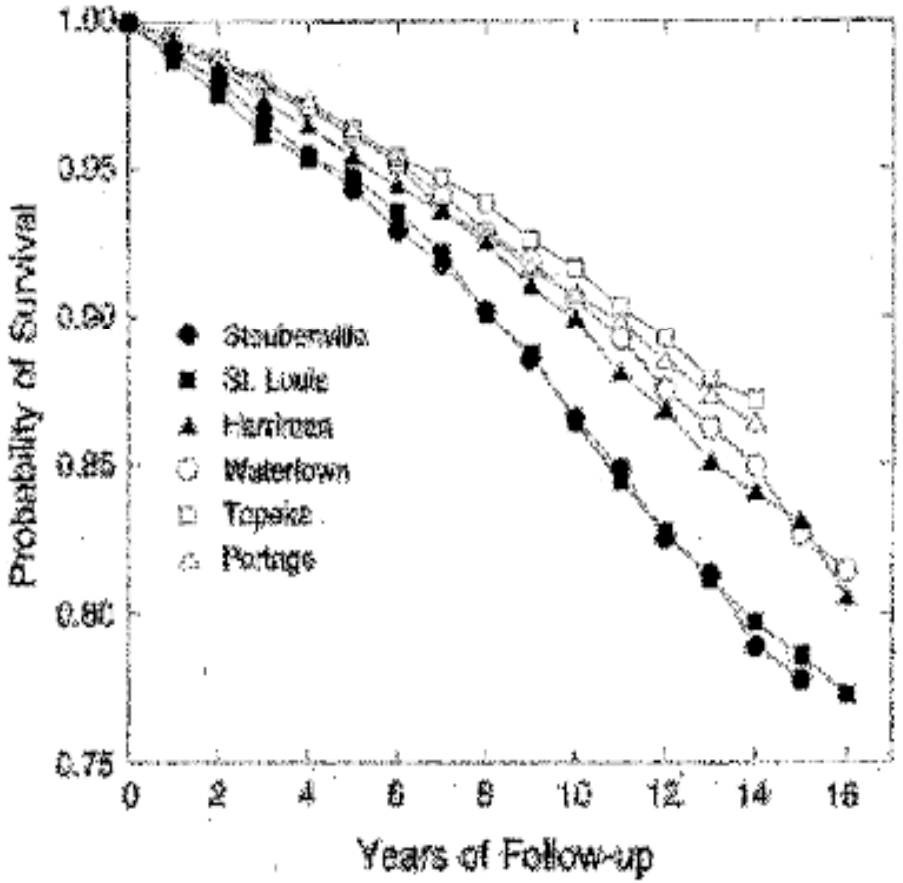
Air Pollution Health Effects Studies: São Paulo



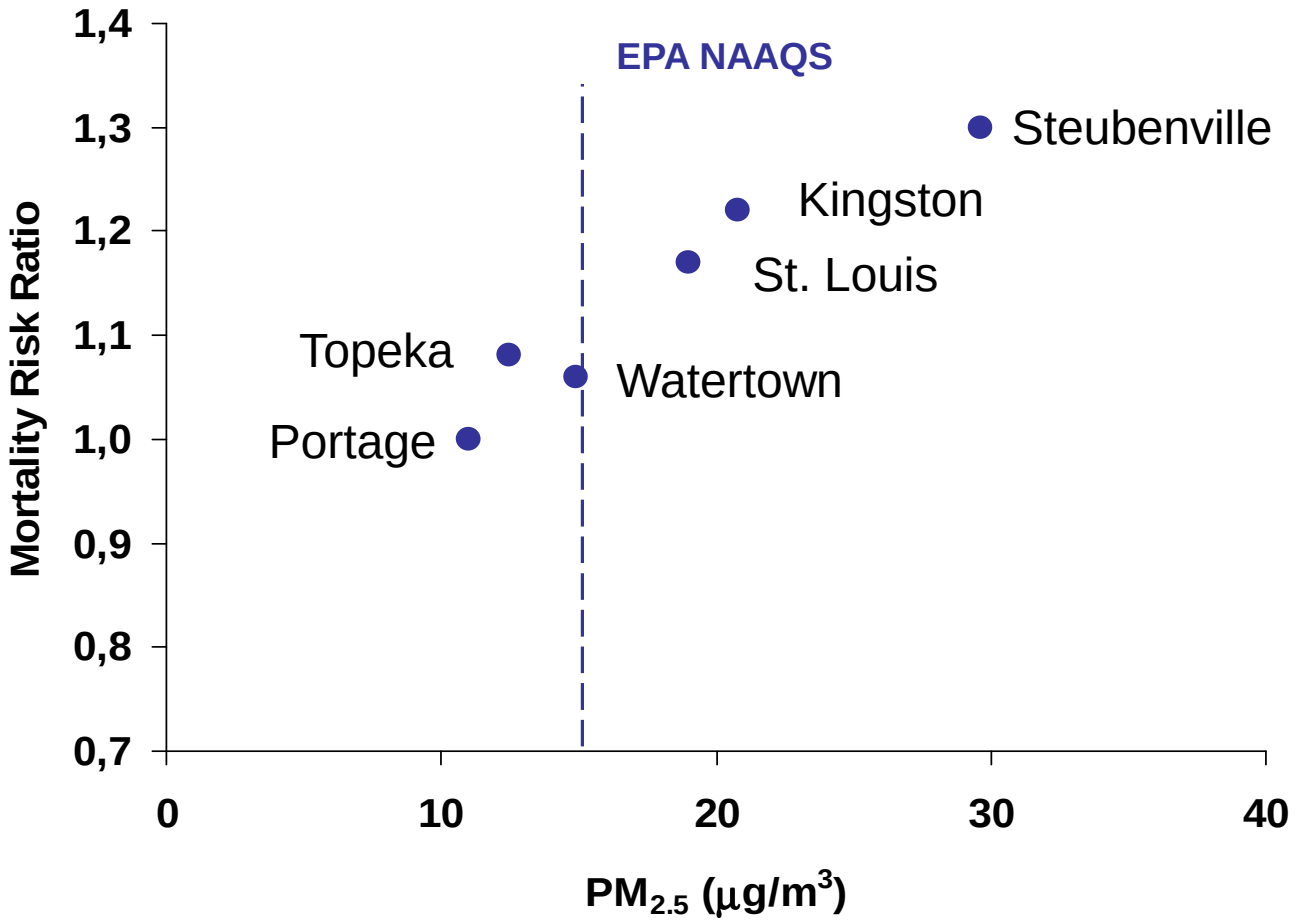
Six Cities Adult Mortality Study

Dockery et al, NEJM 1993:329:1753

- 8411 adults in 6 cities
  - Dirty: *Steubenville & St. Louis*
  - Moderate: *Watertown & Kinston/Harriman*
  - Clean: *Topeka & Portage*
- Enrolled starting in 1974
- 14-16 years of mortality follow-up



Six Cities Adult Mortality

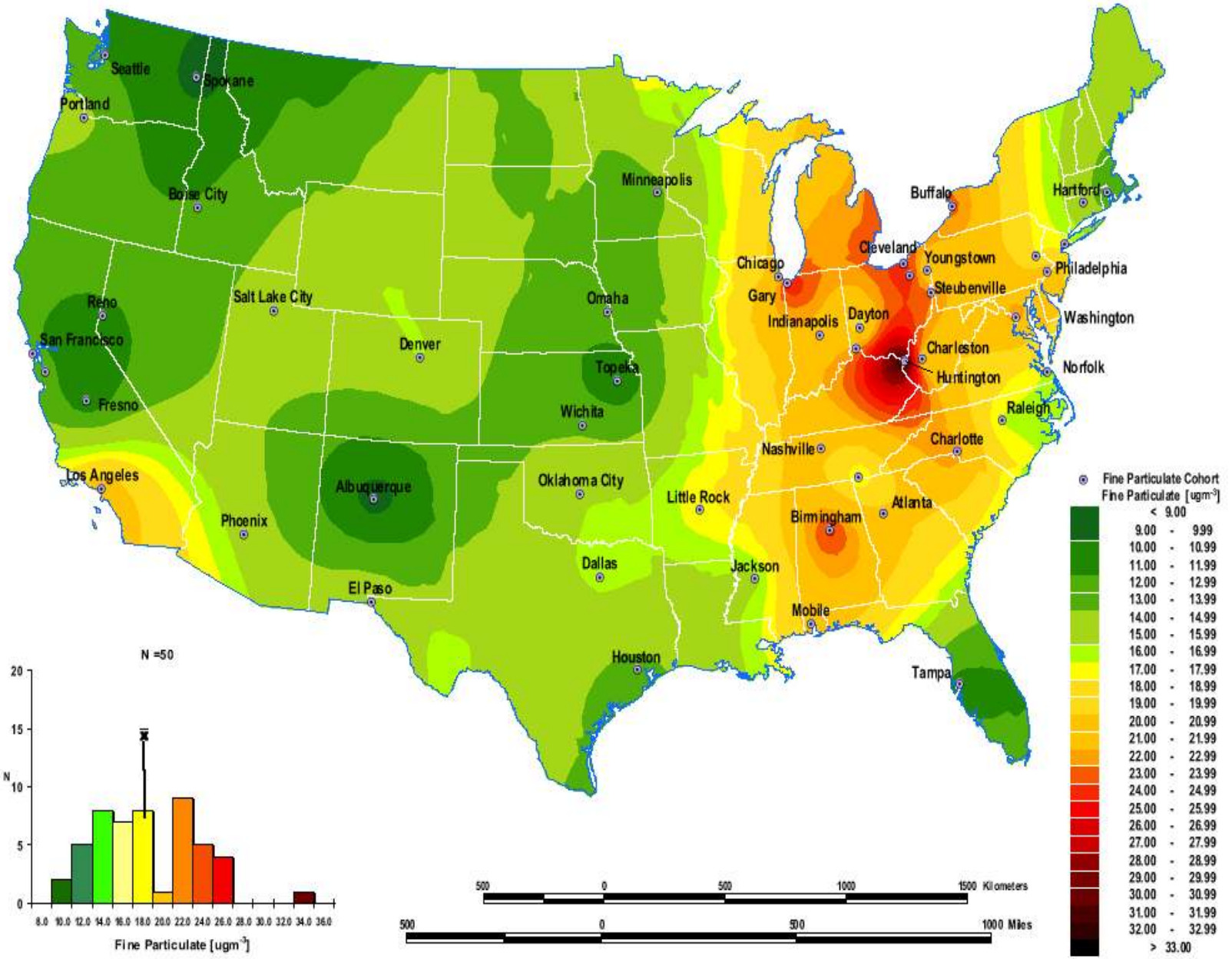


American Cancer Society Study

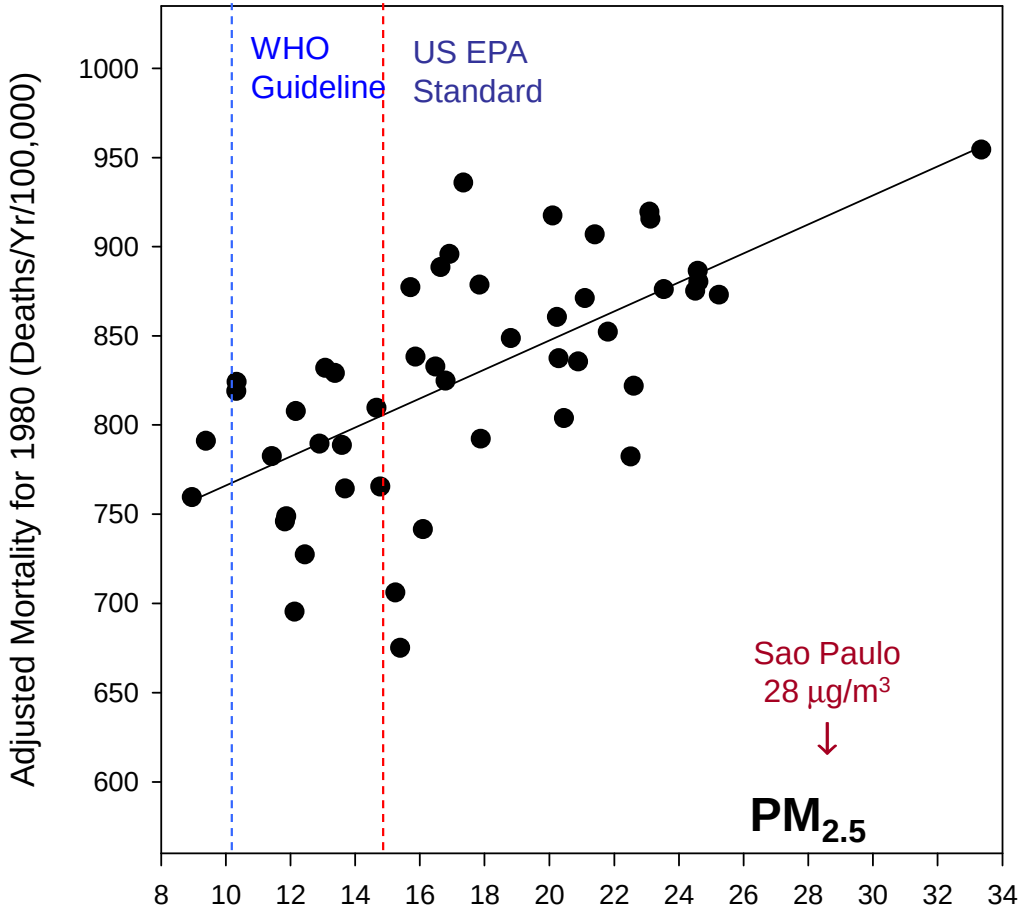
- Existing prospective cohort
  - sample of entire US population
  - 1,200,000 adults
- Detailed personal characteristics
- Matched by metropolitan area to 1980 $PM_{2.5}$ data (50 monitors; 295,223 subjects)
- Effect of 10 $\mu g/m^3$ $PM_{2.5}$
  - +7% (95% CI 4% to 10%) increase in mortality

Pope et al, Am J Respir Crit Care Med. 1995;151:669

1980 Modeled Fine Particle Surface



Age-, sex-, and race- adjusted mortality rates in U.S. cities for 1980 fine particulate ($PM_{2.5}$) air pollution



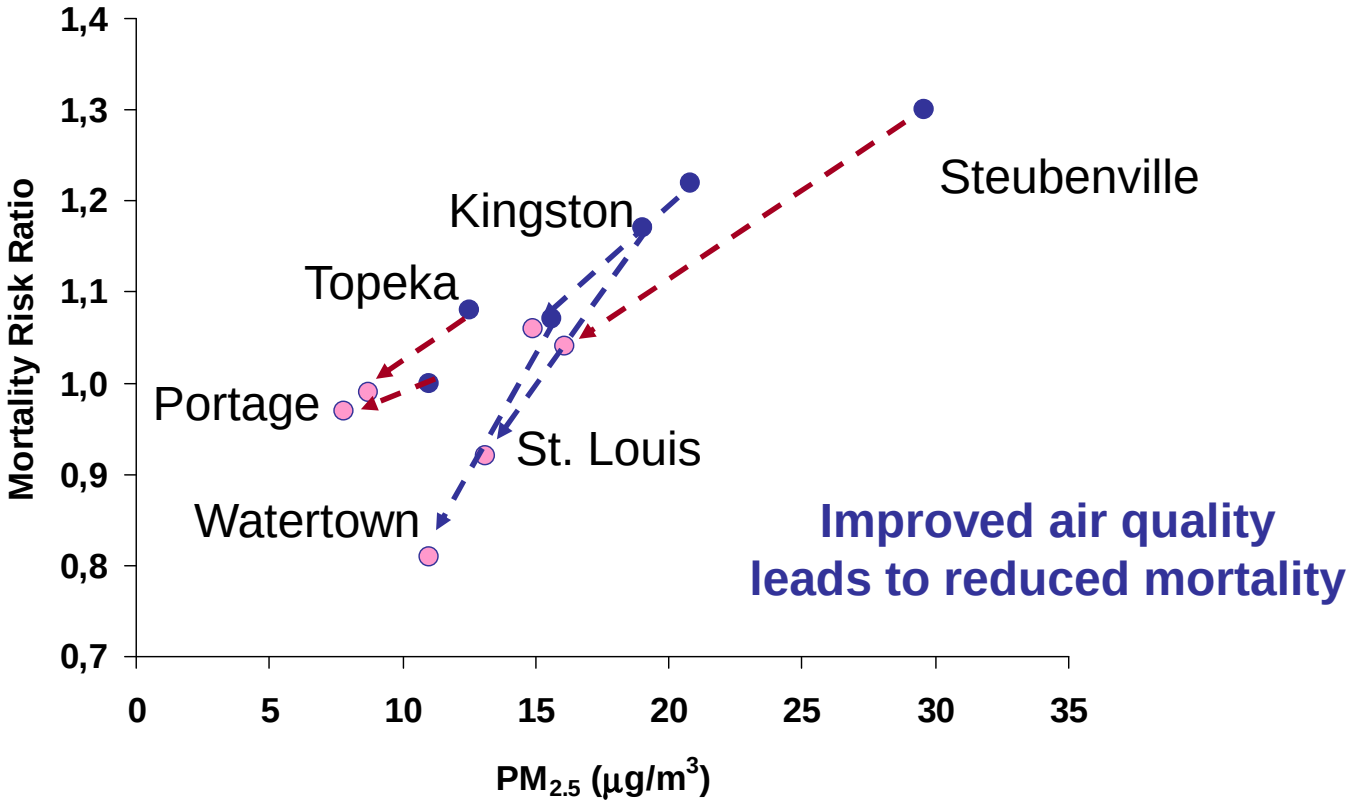
Pope et al, 2000

Six Cities Mortality Follow-up

- 1974 to 1989 follow-up
  - Annual returned postcards and National Death Index
  - 1,364 deaths
    - 104,243 person years
  - $PM_{2.5}$ measurements 1979-1986
- 1990 to 1998 follow-up
  - National Death Index search
  - 1,368 deaths
    - 54,735 person years
  - $PM_{2.5}$ estimated from PM_{10} 1990-1998

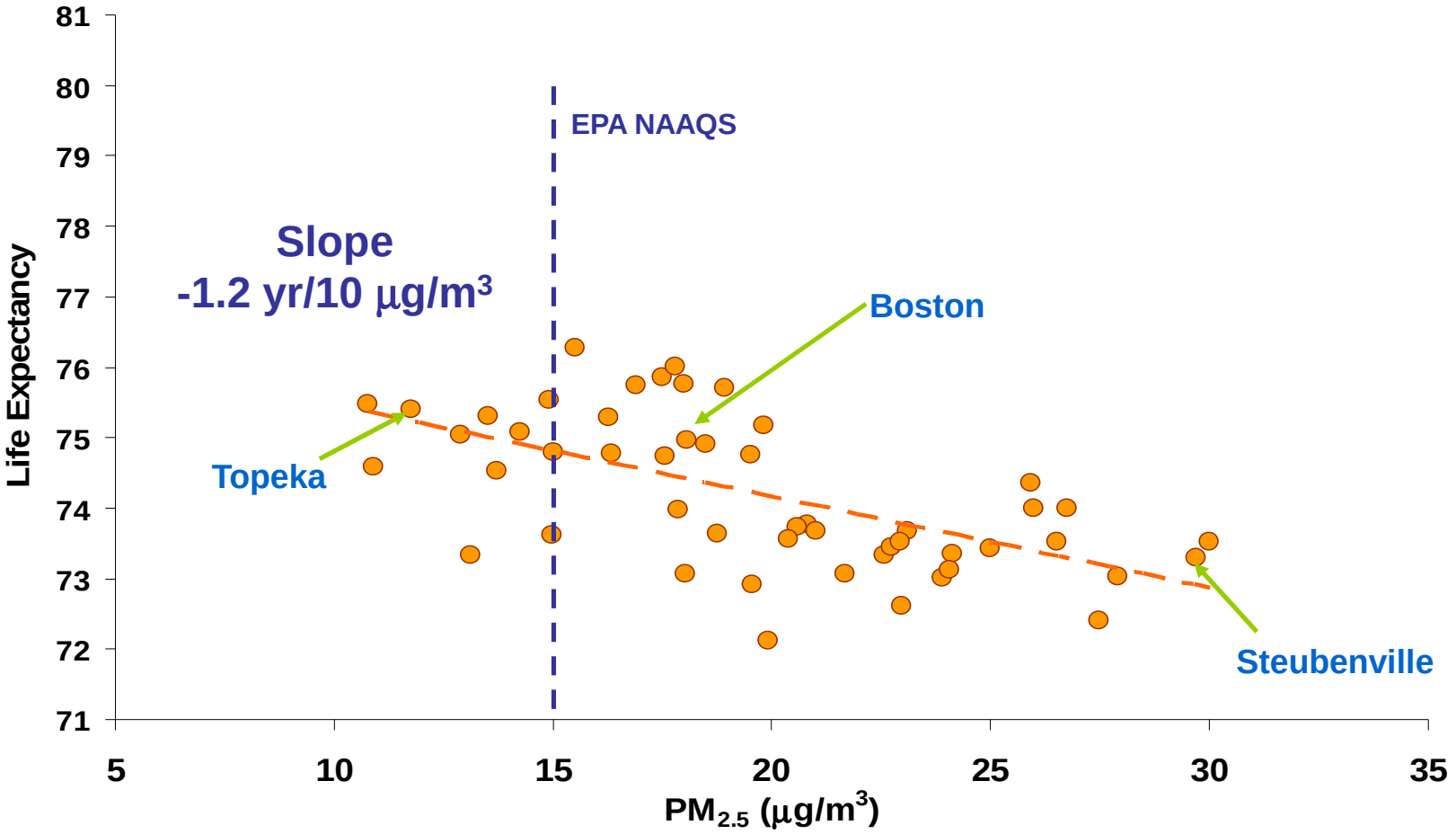
Laden et al, AJRCCM 2006;54:709

Six Cities Cohort Follow-up



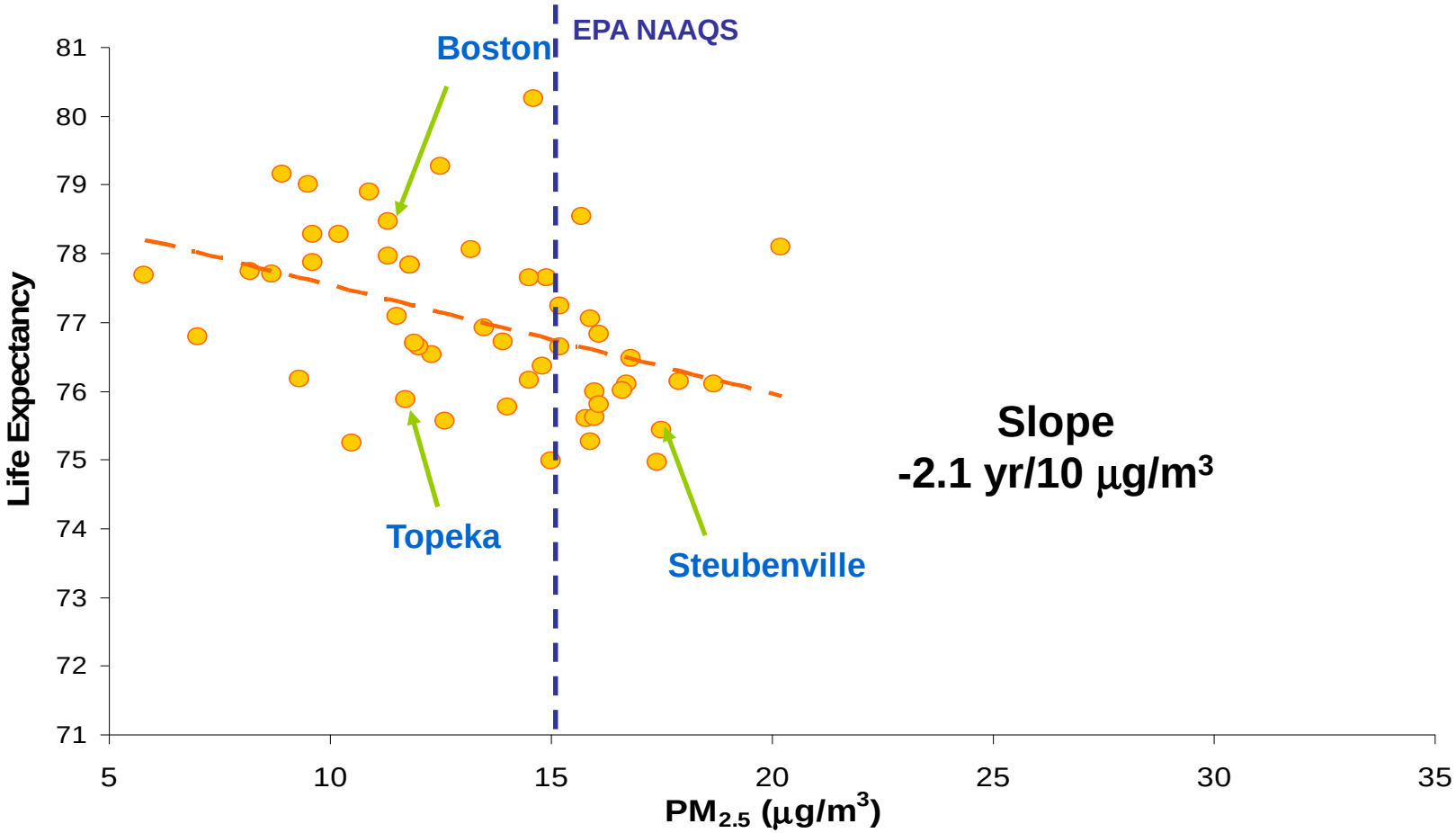
Laden et al, AJRCCM 2006;54:709

Life Expectancy vs $PM_{2.5}$ 1978-82



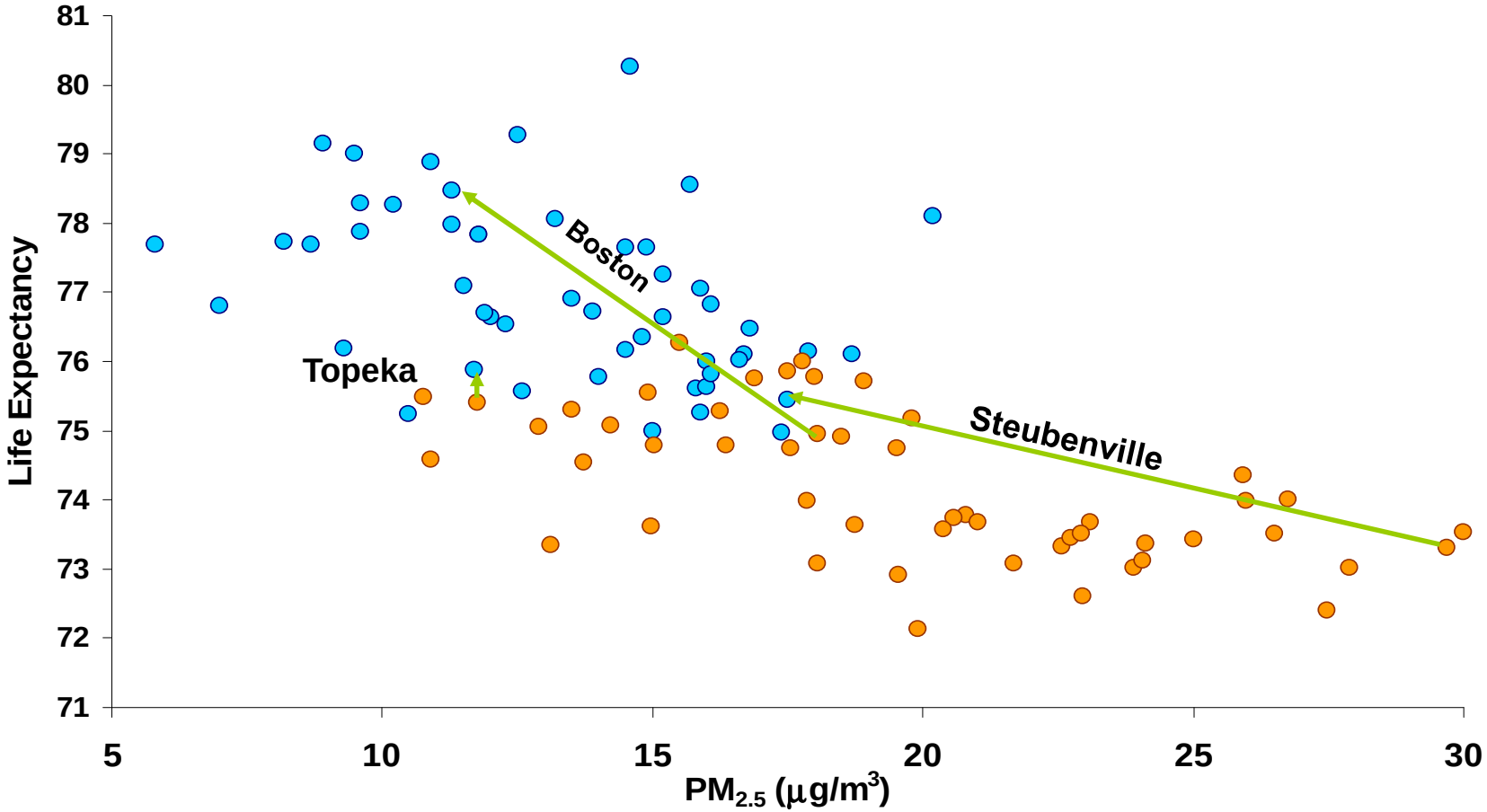
Pope, Ezzati, Dockery (NEJM 2009)

Life Expectancy vs $PM_{2.5}$ 1997-2001



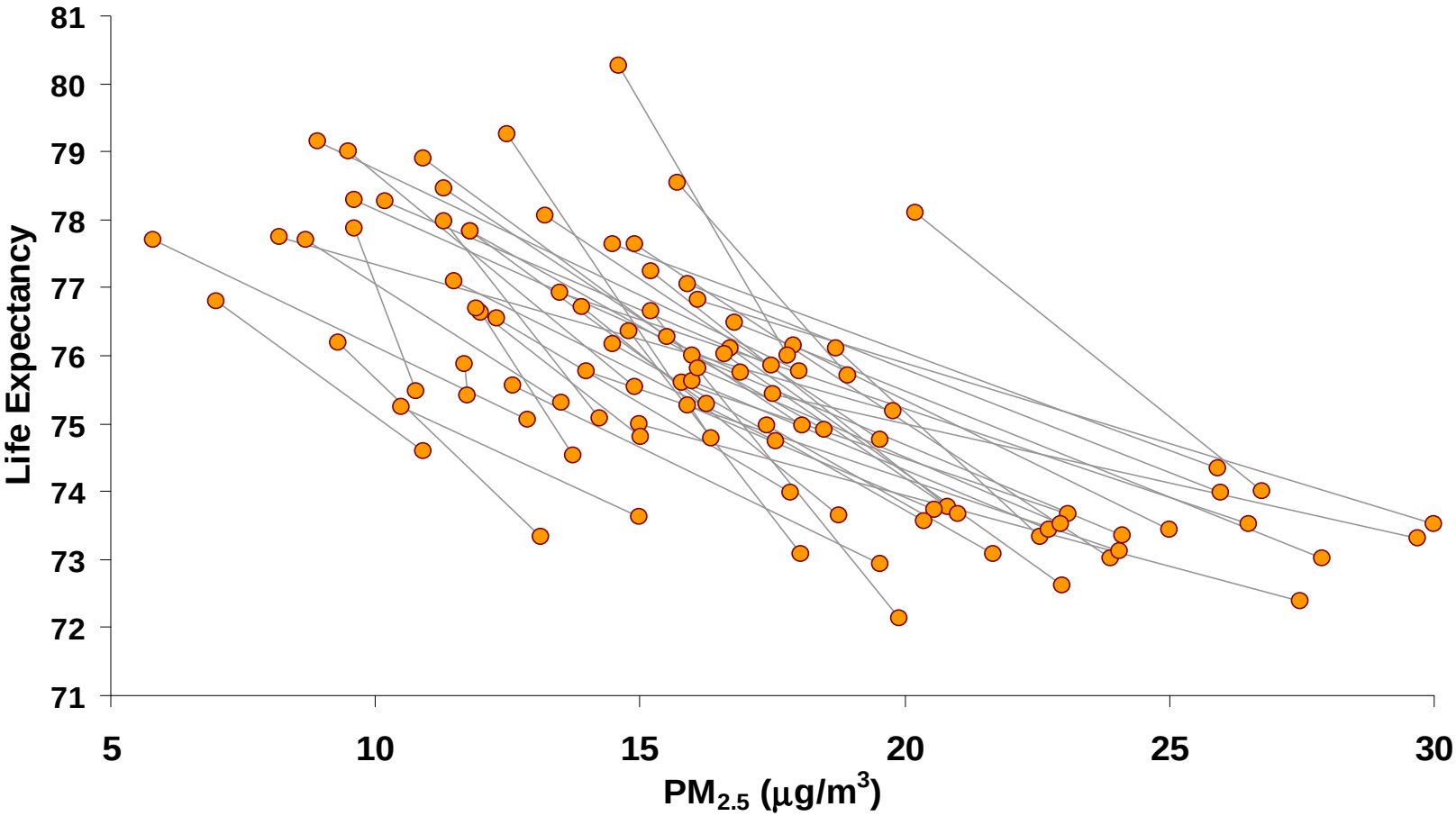
Pope, Ezzati, Dockery (NEJM 2009)

Life Expectancy vs $PM_{2.5}$ 1980-2000



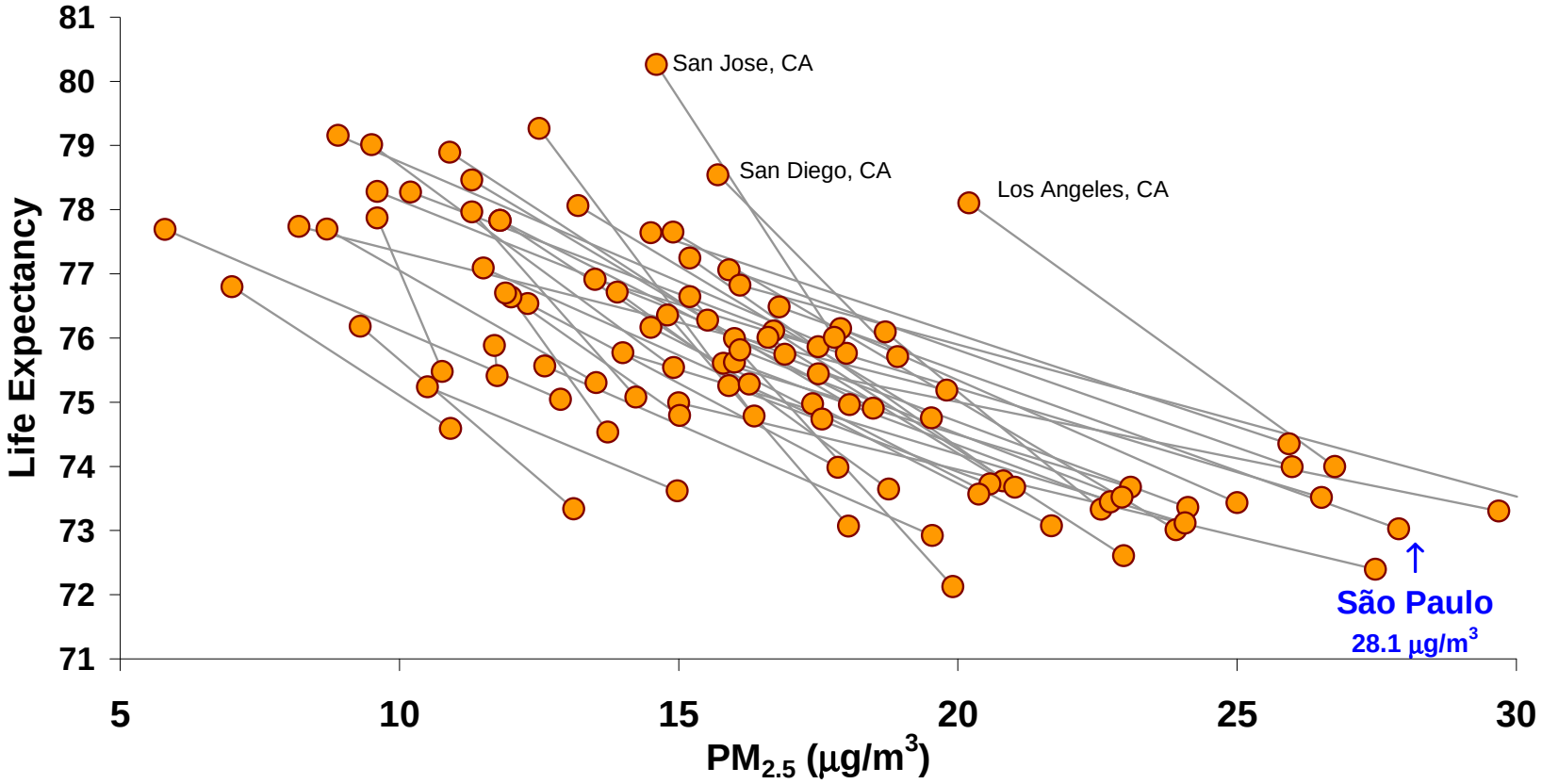
Pope, Ezzati, Dockery (NEJM 2009)

Life Expectancy vs $PM_{2.5}$ 1980-2000

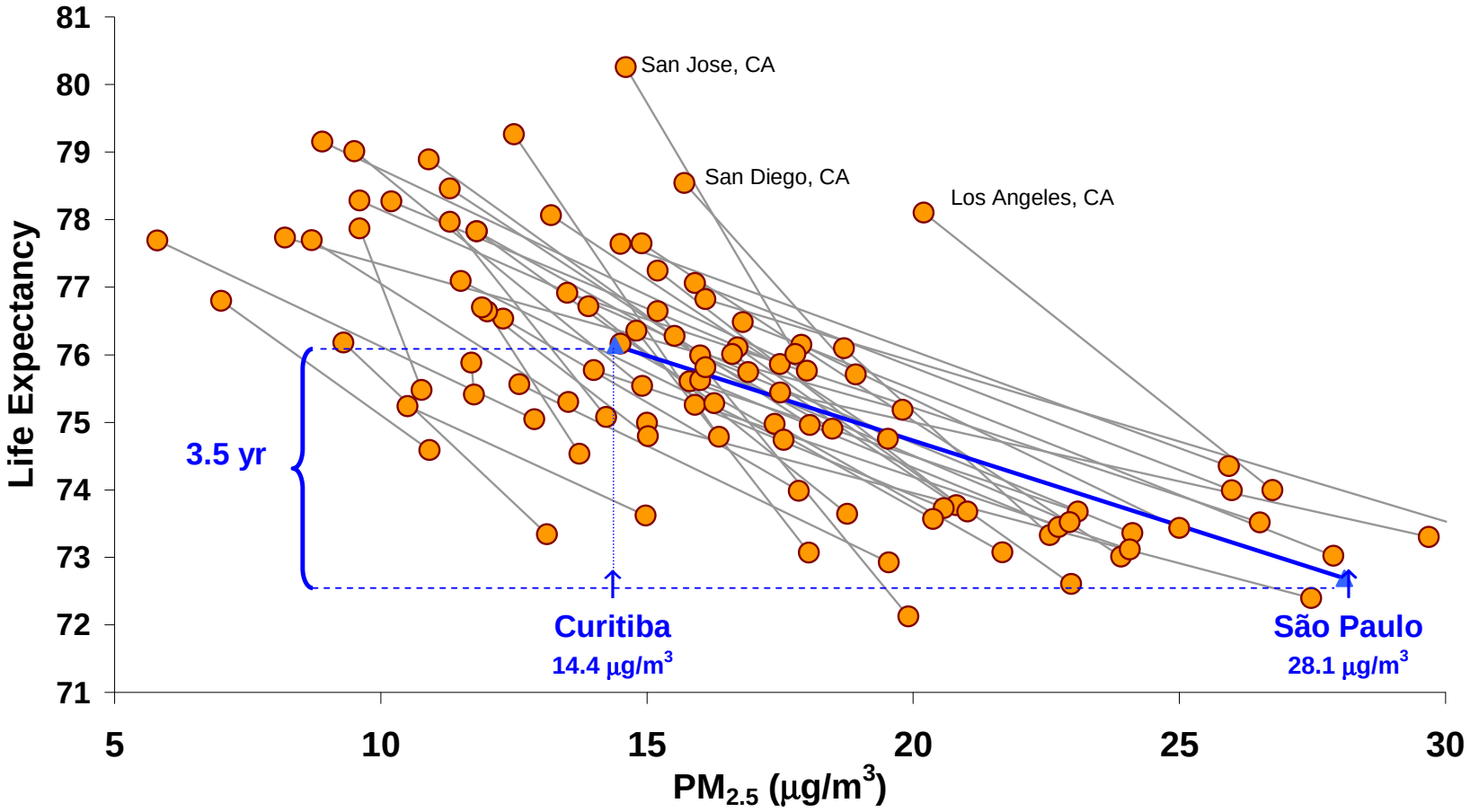


Pope, Ezzati, Dockery (NEJM 2009)

Life Expectancy vs $PM_{2.5}$ 1980-2000



Life Expectancy vs $PM_{2.5}$ 1980-2000



IAMP

INTERACADEMYMEDICALPANEL

Statement on the health co-benefits of policies to tackle climate change

•The improvement of health both locally and globally shouldbe one of the main criteria motivating climate changemitigation measures. The potential health co-benefits andharms should be considered when making choices about mitigation policies.
•The health co-benefits of climate change mitigation should be given greater prominence in international negotiations, for example through dedicated sessions on this topic.
•Health Ministers and ministries should actively engage in promoting mitigation strategies that result in health cobenefits in their own country and should make the case for such strategies to their national climate change negotiators in advance of international meetings.
•Health policymakers, scientists, health professionals and industry should reach beyond national and disciplinary boundaries to collaborate with each other to study, develop and implement climate change mitigation measures that also benefit health.
•The health community must provide leadership by reducing the emissions from health systems.