Mudanças climáticas e saúde humana

Paulo Saldiva
Faculdade de Medicina da USP
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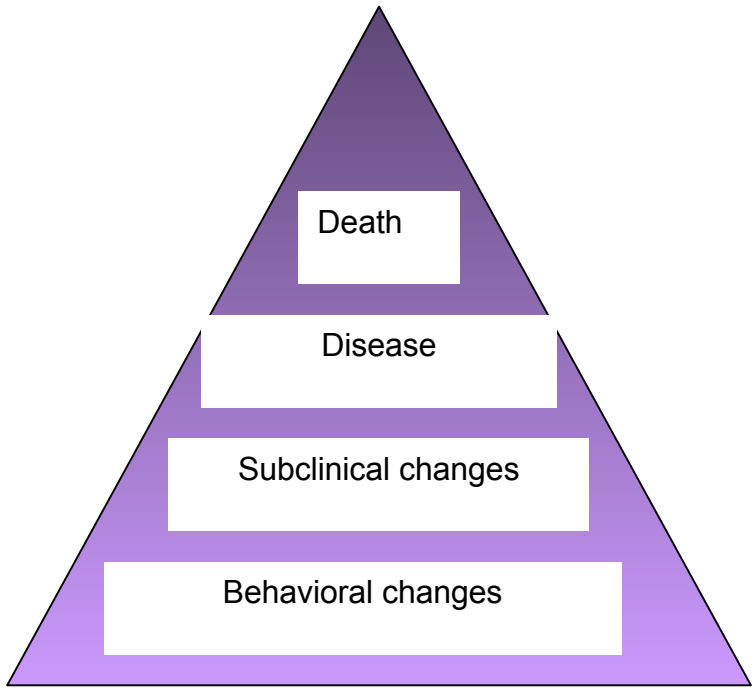
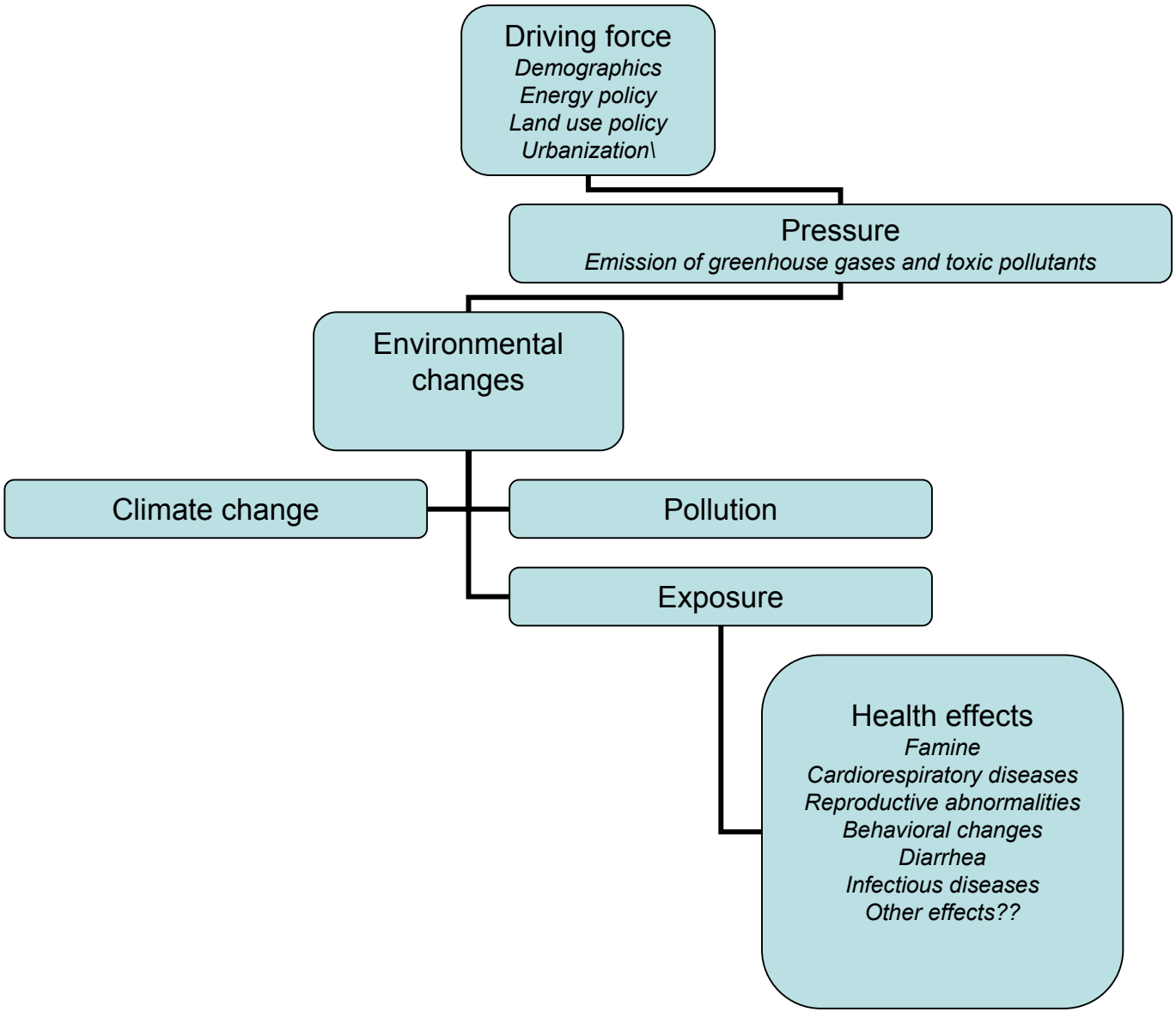
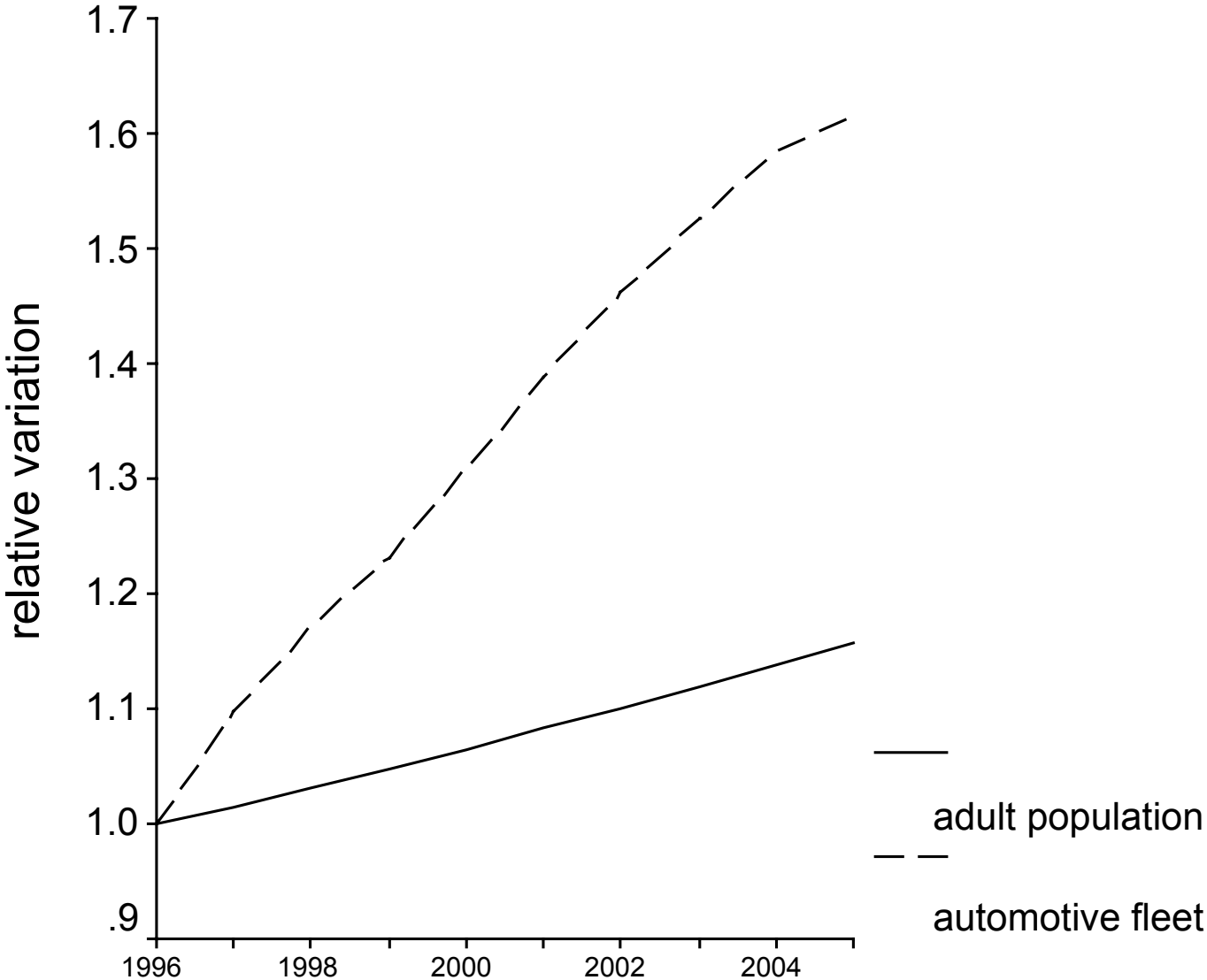
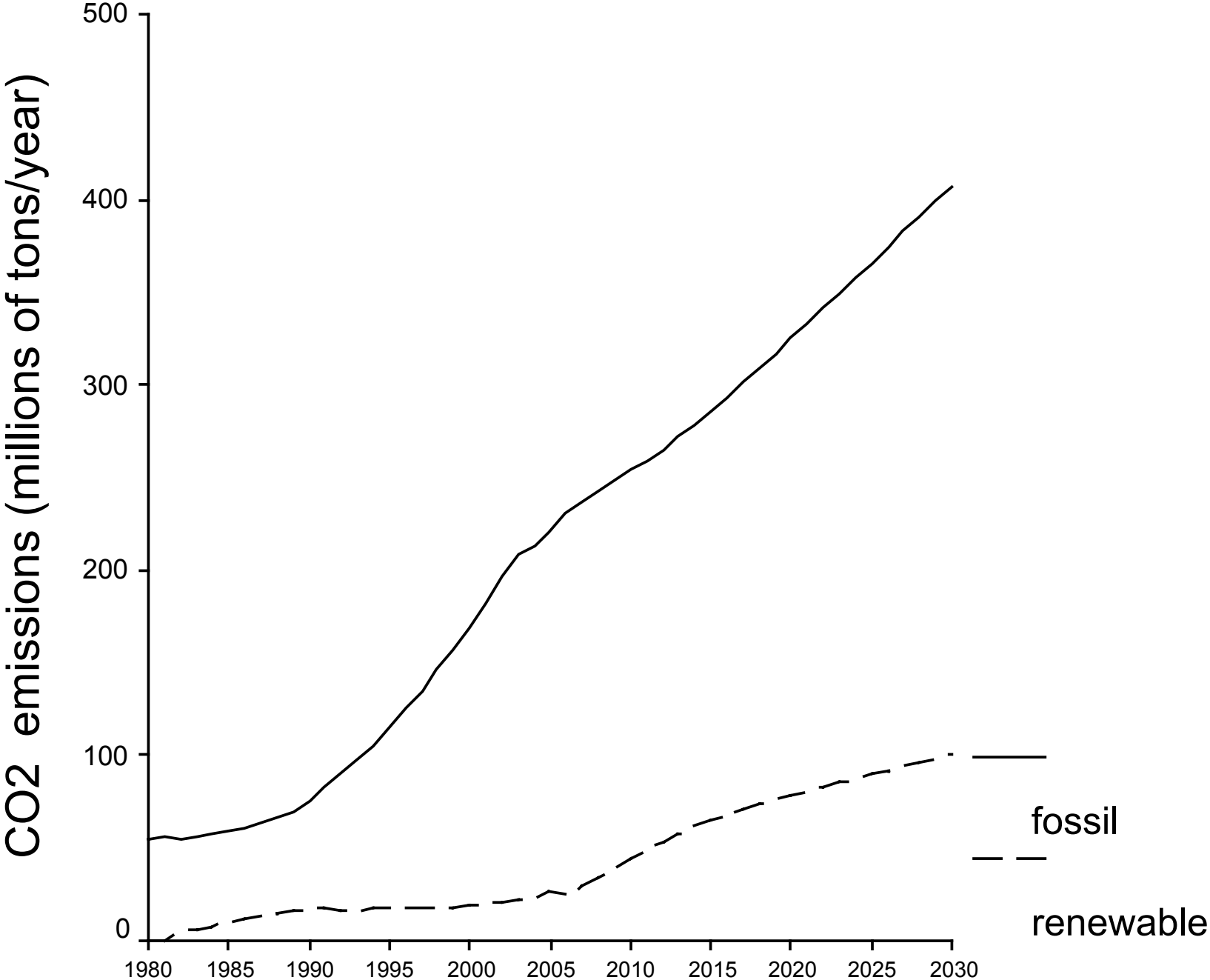

Death
Disease
Subclinical changes
Behavioral changes

Kovats RS, Campbell-Lendrum D, Matthies F. 2005. Climate change and human health: estimating avoidable deaths and disease. Risk Analysis 25:1409-1418




1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
.9
relative variation
1996
1998
2000
2002
2004
adult population
automotive fleet


CO2 emissions (millions of tons/year)
500
400
300
200
100
0
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
fossil
renewable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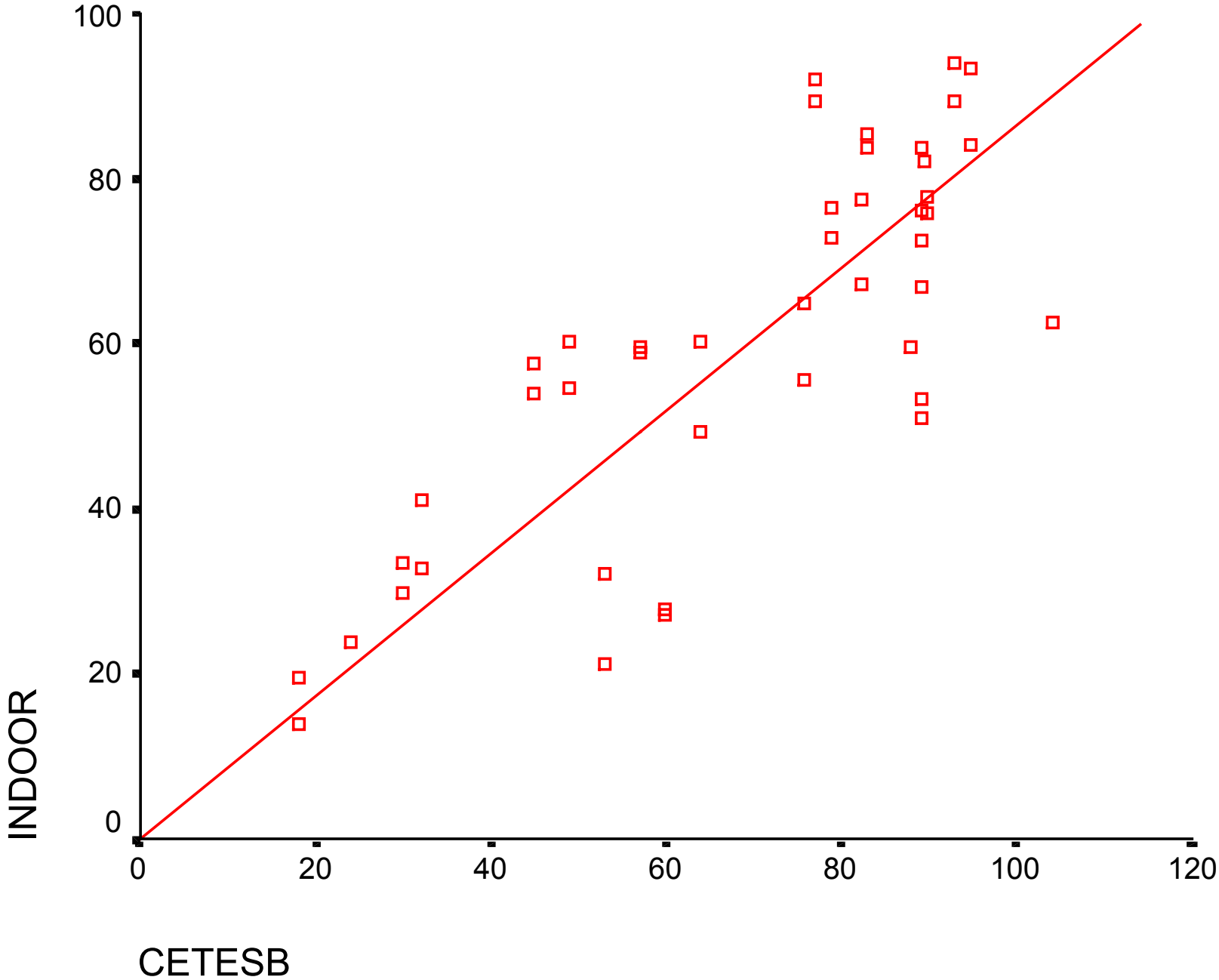
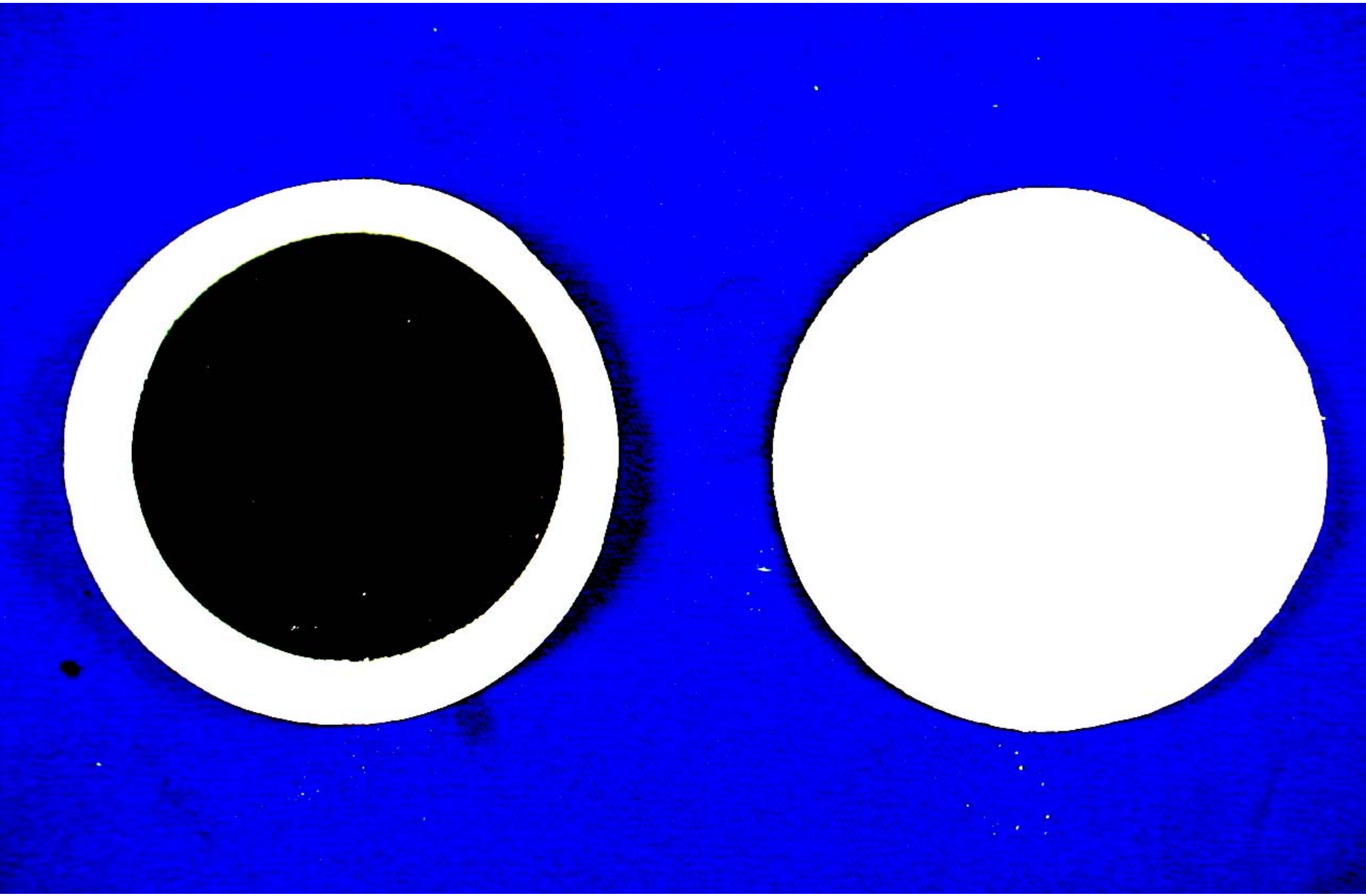
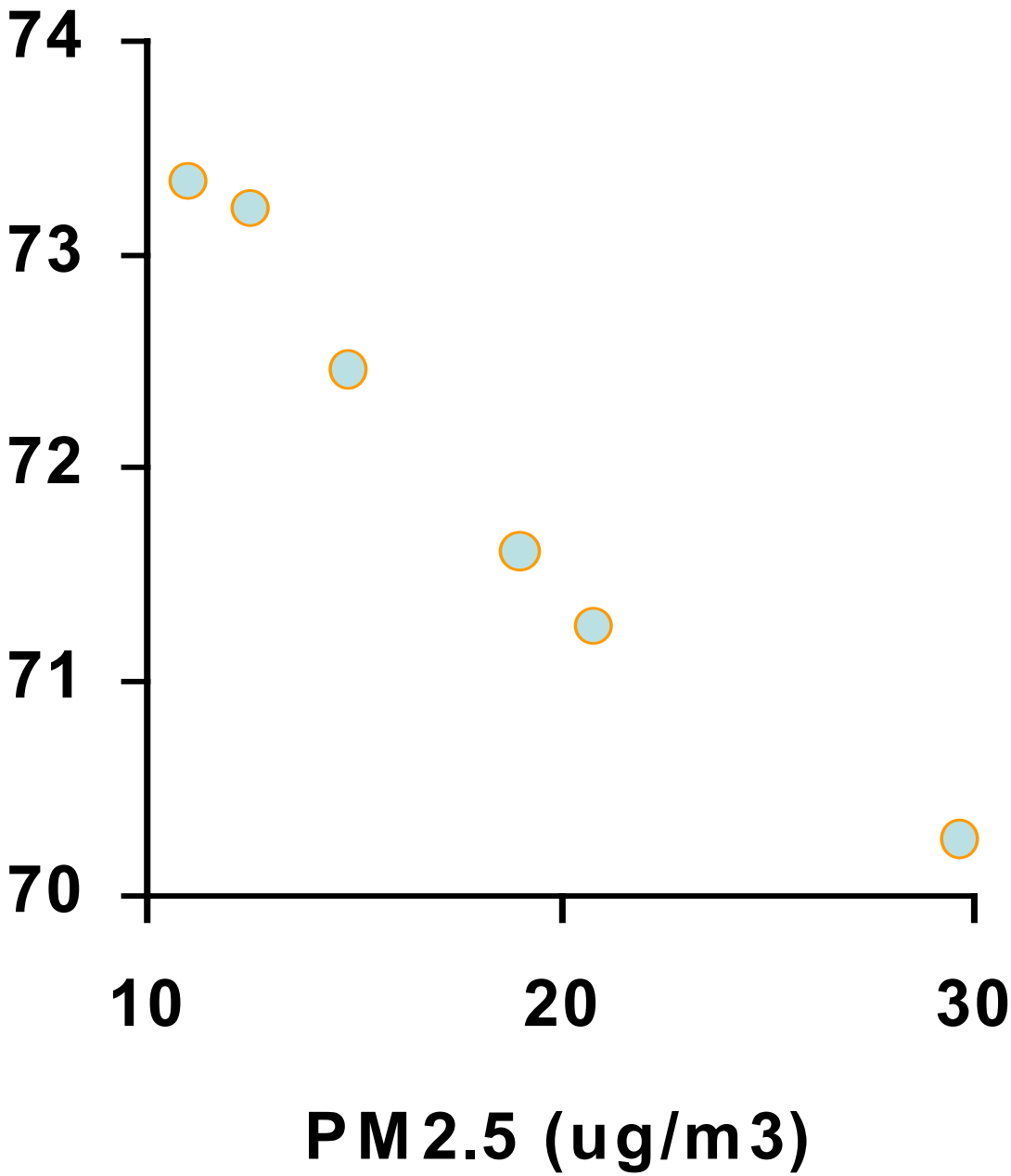
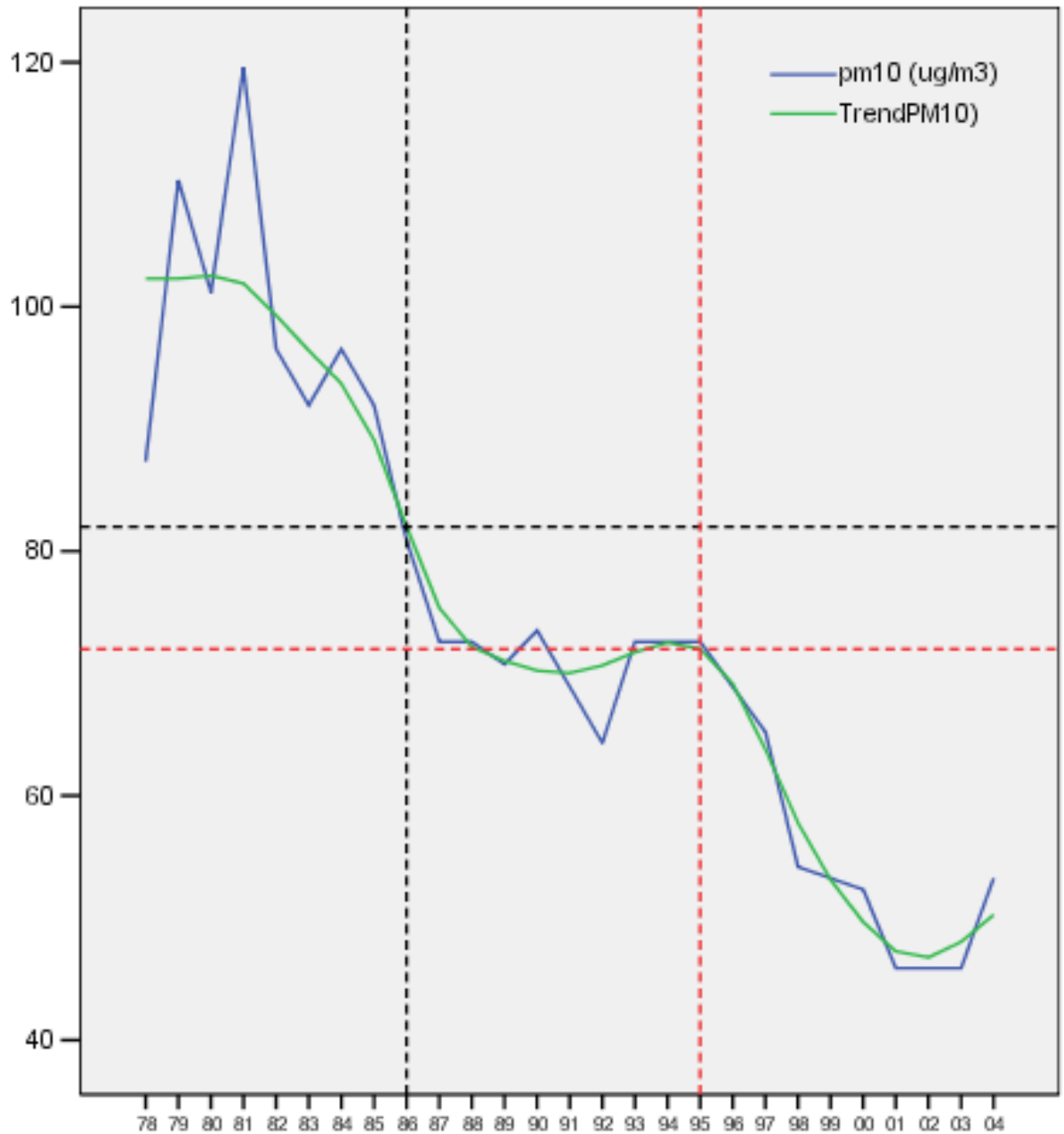
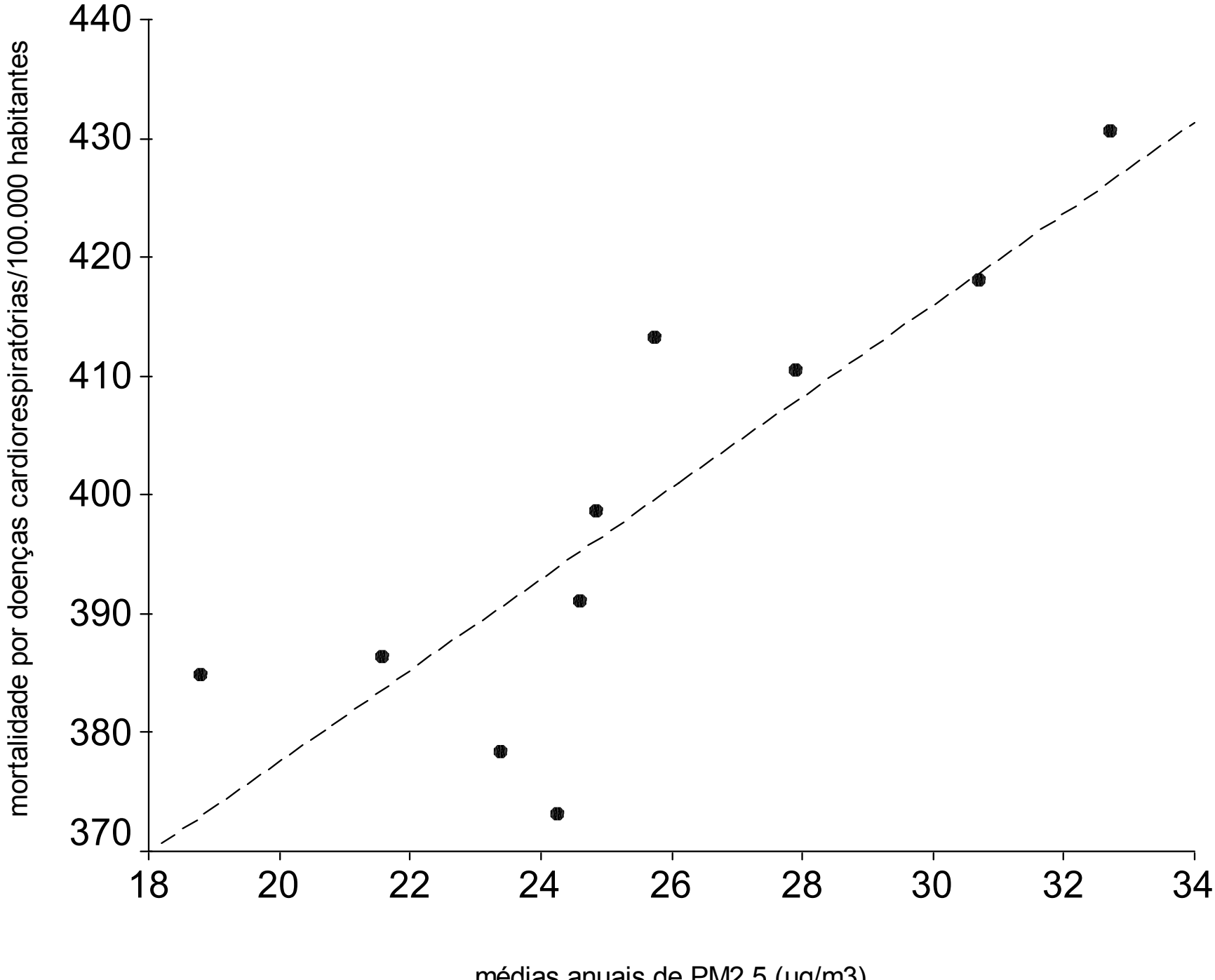
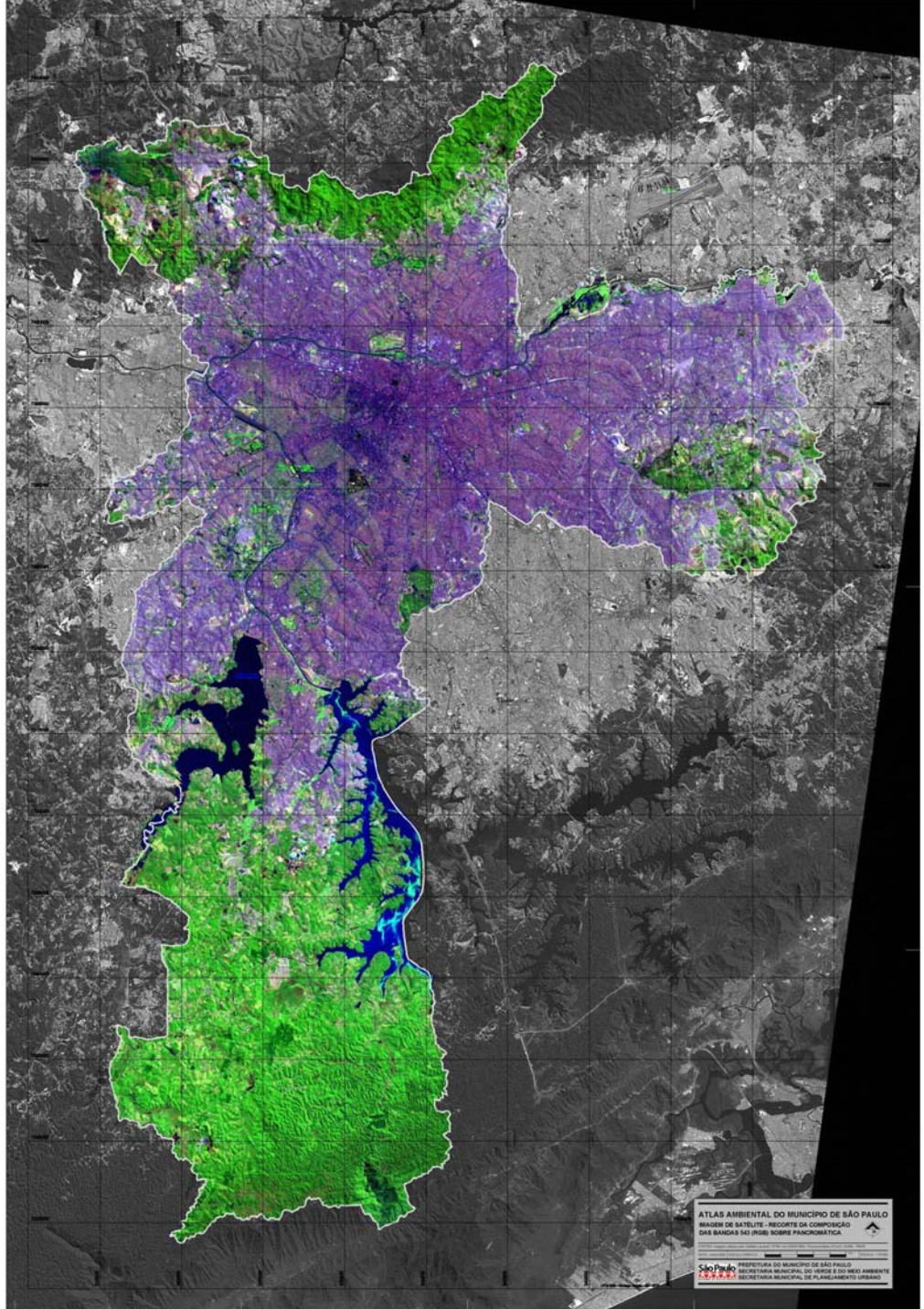

100
80
60
40
20
0
INDOOR
0
20
40
60
80
100
120
CETESB




74
73
72
71
70
10
20
30
PM2.5 (ug/m3)


120
100
80
60
40
pm10 (ug/m3)
TrendPM10)
78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00 01 02 03 04


440
430
420
410
400
390
380
370
mortalidade por doenças cardiorespiratórias/100.000 habitantes
18
20
22
24
26
28
30
32
34
médias anuais de PM2.5 (ug/m3)


ATLAS AMBIENTAL DO MUNICÍPIO DE SÃO PAULO
IMAGEM DE SATÉLITE – RECORTE DA COMPOSIÇÃO
DAS BANDAS 543 (RGB) SOBRE PANCROMÁTICA
São Paulo
PREFEITURA DO MUNICÍPIO DE SÃO PAULO
SECRETARIA MUNICIPAL DO VERDE E DO MEIO AMBIENTE
SECRETARIA MUNICIPAL DE PLANEJAMENTO URBANO

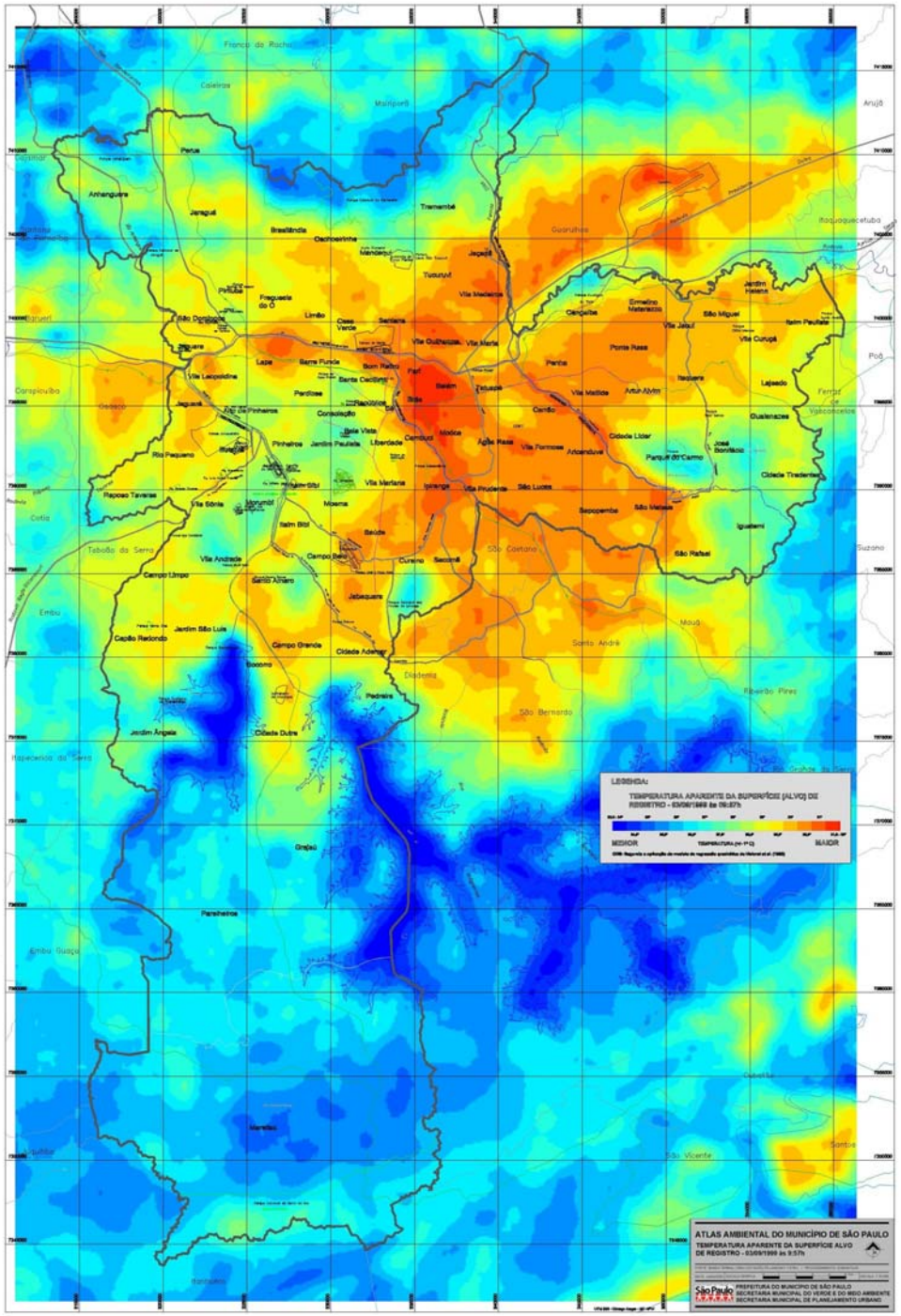
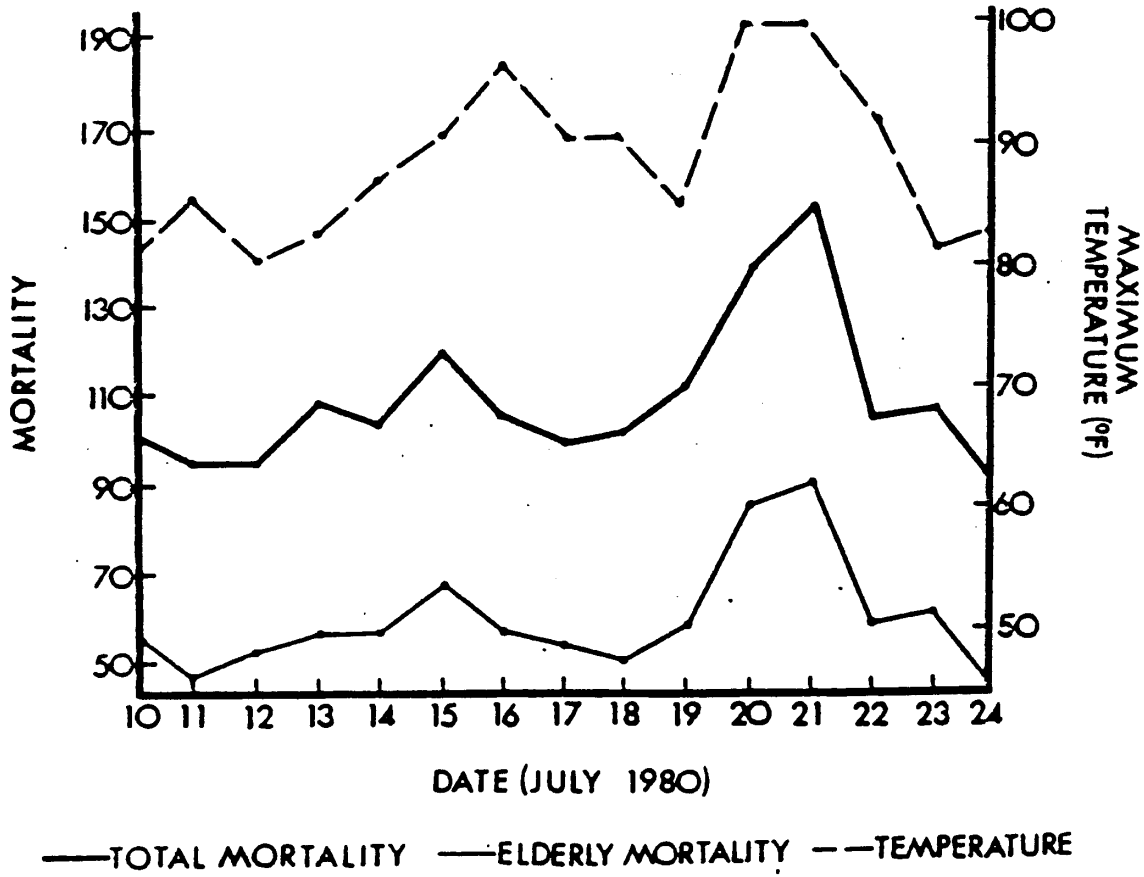

LEGENDA:
TEMPERATURA APARENTE DA SUPERFÍCIE (ALVO) DE REGISTRO - 03/09/1999 às 09:57h
MENOR
TEMPERATURA (ºC)
MAIOR
ATLAS AMBIENTAL DO MUNICÍPIO DE SÃO PAULO
TEMPERATURA APARENTE DA SUPERFÍCIE ALVO DE REGISTRO - 03/09/1999 às 9:57h
São Paulo
PREFEITURA DO MUNICÍPIO DE SÃO PAULO
SECRETARIA MUNICIPAL DO VERDE E DO MEIO AMBIENTE
SECRETARIA MUNICIPAL DE PLANEJAMENTO URBANO

FIGURE V-1

Mortality During 1980 Heat Wave in New York City

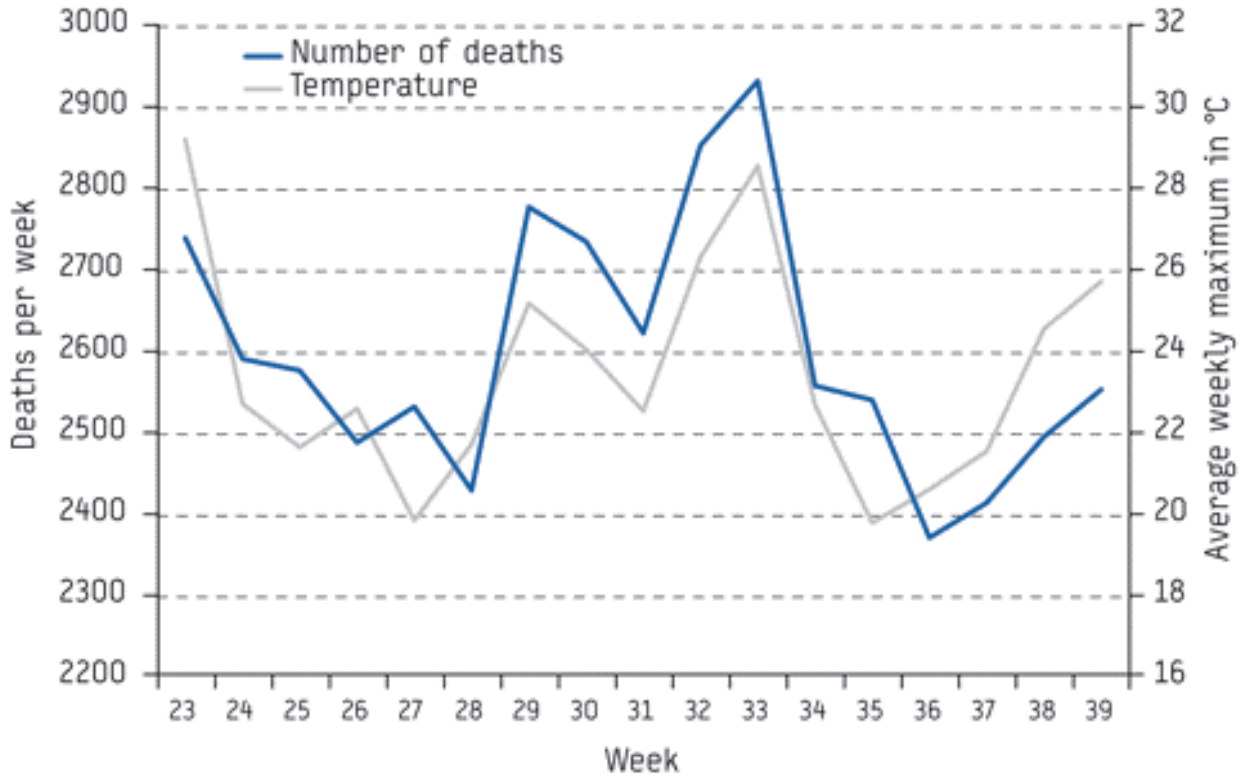


Source: Kalksten, Davis and Skindlow (September 1986).

Euro Surveill 2005;10(7):165-8

FIGURE 2

Mortality and average maximum temperature per week, The Netherlands, June-September 2003



Environmental Health Perspectives Volume 114, Number 9, September 2006

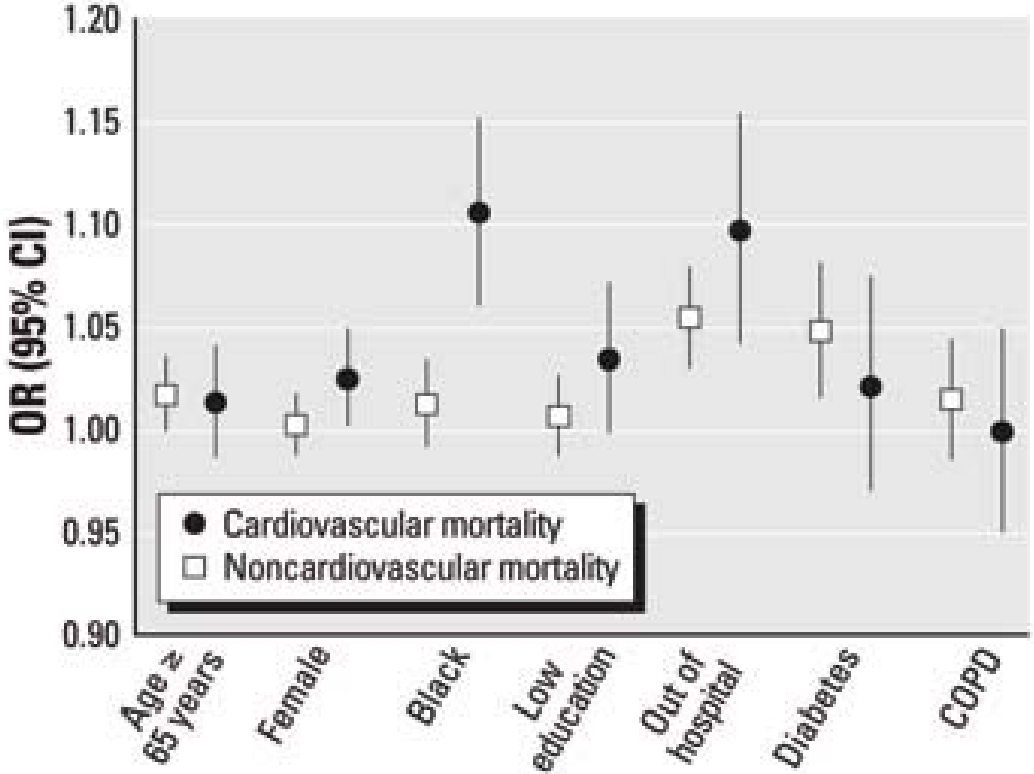
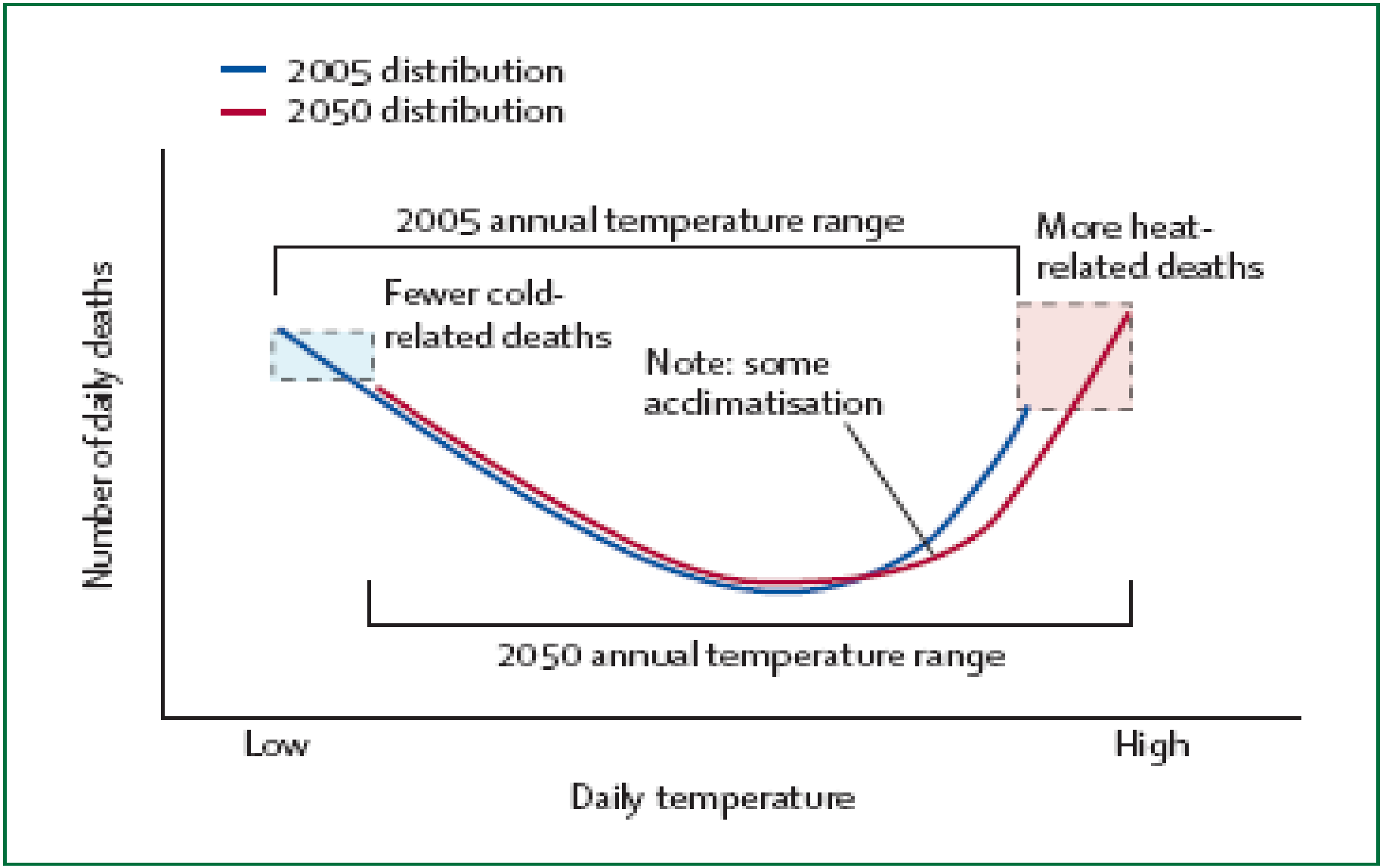
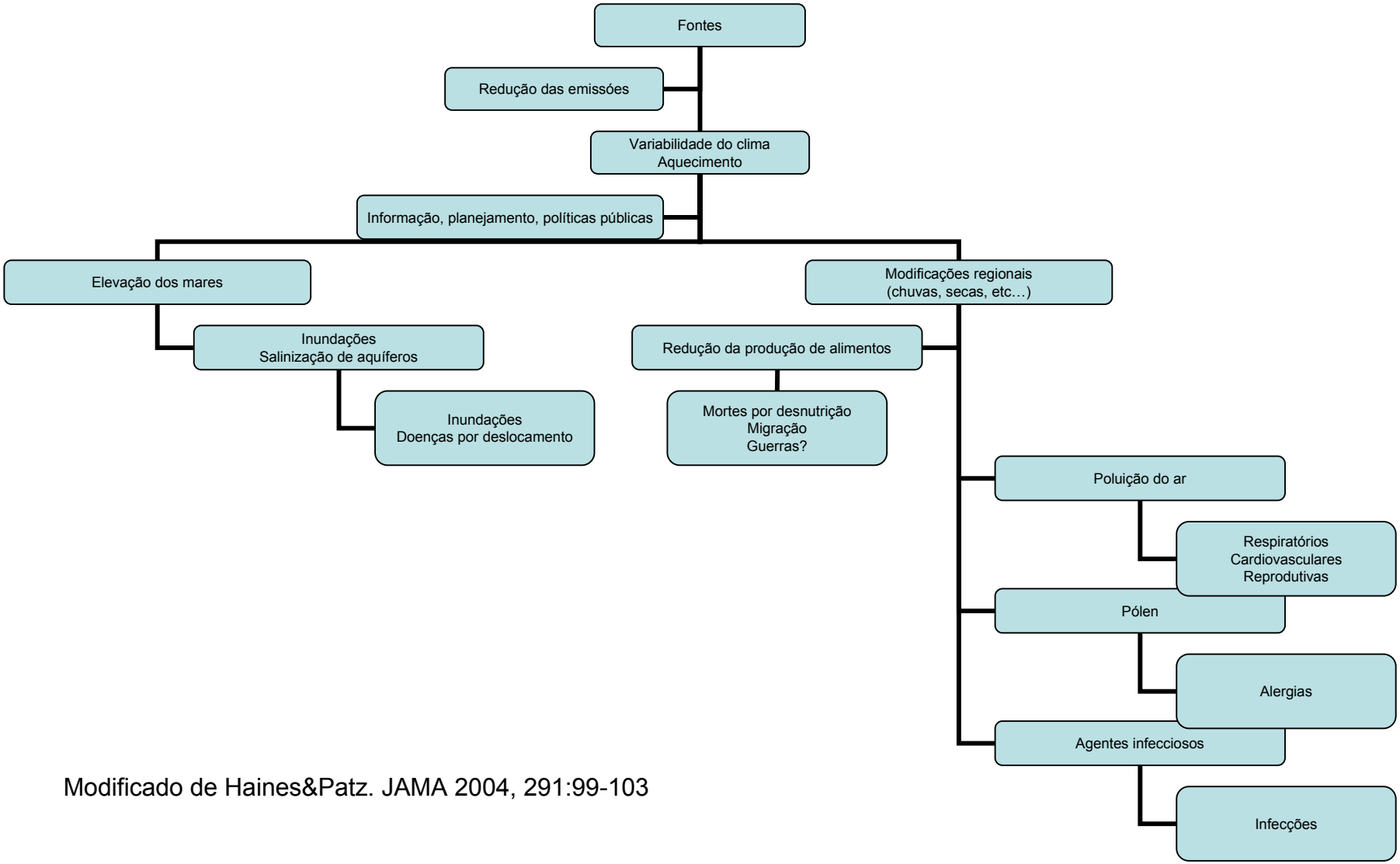


Figure 2. Modification by subject characteristics of the effect of extreme hot temperature on cardiovascular mortality and noncardiovascular mortality: results from the meta-analysis of 42 U.S. cities during the period 1989–2000. Estimates represent the relative odds of dying on an extreme temperature day for persons who had the condition (e.g., being female) compared with persons who did not have the condition.



McMichael AJ, Woodruff RE, Hales S. 2006. Climate change and human health: present and future risks. Lancet 367:859-869



Modificado de Haines&Patz. JAMA 2004, 291:99-103

Global Genetic Change Tracks Global Climate Warming in *Drosophila subobscura*

Joan Balanyá,[1*] Josep M. Oller,[2] Raymond B. Huey,[3] George W. Gilchrist,[4] Luis Serra[1]

Sciencexpress / www.sciencexpress.org / 31 August 2006 / Page 1 / 10.1126/science.1131002

Comparisons of recent with historical samples of chromosome inversion frequencies provide opportunities to determine whether genetic change is tracking climate change in natural populations. We determined the magnitude and direction of shifts over time (24 years between samples on average) in chromosome inversion frequencies and in ambient temperature for populations of the fly *Drosophila subobscura* on three continents. In 22 of 26 populations, climates warmed over the intervals, and genotypes characteristic of low latitudes (warm climates) increased in frequency in 21 of those 22 populations. Thus, genetic change in this fly is tracking climate warming, and is doing so globally.