National, regional, and global trends in metabolic risk factors

Global Burden of Metabolic Risk Factors of Chronic Diseases Collaborating Group
Citations


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Study objective

• To estimate trends for three major metabolic risk factors for chronic diseases by age, sex, and country/region between 1980 and 2008
  – Body mass index (BMI)
  – Systolic blood pressure (SBP)
  – Serum total cholesterol (TC)

• To quantify the uncertainty of the estimates
324 health surveys and epidemiologic studies analyzed by Collaborating Group members representing 380 country-years

3 multi-center epidemiologic studies representing 169 country-years

14,763 articles identified in Medline and Embase

10,682 articles excluded based on title and abstract review

4,081 articles remaining after exclusion based on title and abstract review

2,113 articles excluded based on full text review and 285 articles excluded because we could not retrieve the full text or because we could not translate the article

1,683 articles remaining after exclusion based on full text review

1,543 articles excluded because data were not accessible by age and sex, because they were based on the same study as another article, or because the same data were available from Collaborating Group members

3 articles received through personal communication

Data extracted from 143 published studies representing 198 country-years

39 additional country-years of data retrieved from WHO Global Infobase

Data extracted for 786 country-years with 5.4 million participants

Danaei et al. *Lancet* 2011
8,246 articles identified in Medline and Embase

2,604 articles remaining after exclusion based on title and abstract review

631 articles remaining after exclusion based on full text review

1 multi-center epidemiologic study representing 59 country-years

149 health surveys and epidemiologic studies analyzed by Collaborating Group members representing 204 country-years

149 health surveys and epidemiologic studies analyzed by Collaborating Group members representing 204 country-years

Data extracted from 41 published studies representing 52 country-years

1948 articles excluded based on full text review and 25 articles excluded because we could not retrieve the full-text or because we could not translate the article

590 articles excluded because data were not accessible by age and sex, because they were based on the same study as another article, or because the same data were available from Collaborating Group members

Data extracted for 321 country-years with 3.0 million participants

6 additional country-years of data retrieved from WHO Global Infobase

5642 articles excluded based on title and abstract review

7,219 articles identified in Medline and Embase

3,207 articles excluded based on title and abstract review

4,012 articles remaining after exclusion based on title and abstract review

2,088 articles excluded based on full text review and 279 articles excluded because we could not retrieve the full-text or because we could not translate the article

1,645 articles remaining after exclusion based on full text review

1,502 articles excluded because data were not accessible by age and sex, because they were based on the same study as another article, or because the same data were available from Collaborating Group members

3 reports with 4 country-years received through personal communication

75 additional country-years of data retrieved from WHO Global Infobase

425 health surveys and epidemiologic studies analyzed by Collaborating Group members representing 529 country-years

3 multi-center epidemiologic studies representing 175 country-years

Data extracted for 960 country-years with 9.1 million participants

Data extracted from 146 published studies representing 181 country-years

Finucane et al. Lancet 2011
SBP data availability (all data)

Number of data sources (all data)

Danaei et al. Lancet 2011
SBP data availability (national data)

Number of data sources (national)

Danaei et al. Lancet 2011
BMI data availability (all data)

Number of data sources (all data)

Finucane et al. Lancet 2011
BMI data availability (national data, male)

Number of data sources (national): male

Finucane et al. Lancet 2011
BMI data availability (national data, female)

Number of data sources (national): female

Finucane et al. Lancet 2011
TC data availability (all data)

Number of data sources (all data)

Farzadfar et al. Lancet 2011
TC data availability (national data)

Number of data sources (national)

Farzadfars et al. Lancet 2011
TC data availability by year and region

Farzadfar et al. Lancet 2011
BMI data availability by year and region (male)

Finucane et al. Lancet 2011
Age-standardized mean SBP in 2008
World trends in age-standardized mean SBP

Danaei et al. *Lancet* 2011
SBP trends in high-income regions (men)

Change = $-2.8$ ($-4.5$, $-1.3$) mmHg/decade

North America

Change = $-1.7$ ($-2.9$, $-0.6$) mmHg/decade

Asia-Pacific

Change = $-2.3$ ($-4.5$, $-0.3$) mmHg/decade

Australasia

Change = $-2.1$ ($-3.4$, $-0.8$) mmHg/decade

Western Europe

Danaei et al. Lancet 2011
SBP trends in high-income regions (women)

**North America**
Change = $-2.3 (-4.0, -0.5)$ mmHg/decade

**Australasia**
Change = $-3.9 (-6.4, -1.6)$ mmHg/decade

**Asia-Pacific**
Change = $-2.9 (-4.1, -1.6)$ mmHg/decade

**Western Europe**
Change = $-3.5 (-5.0, -2.2)$ mmHg/decade
SBP trends in selected regions (men)

- **East Asia**: Change = $-0.2 (-2.4, 1.8)$ mmHg/decade
- **South Asia**: Change = $0.8 (-2.2, 3.4)$ mmHg/decade
- **Central Latin America**: Change = $-1.2 (-3.9, 1.5)$ mmHg/decade
- **East Africa**: Change = $1.6 (-0.7, 4.0)$ mmHg/decade

Danaei et al. *Lancet* 2011
SBP trends in selected regions (women)

**East Asia**
Change = $-0.4 (-2.7, 1.8)$ mmHg/decade

**Central Latin America**
Change = $-2.0 (-5.0, 0.8)$ mmHg/decade

**South Asia**
Change = $1.0 (-2.1, 3.9)$ mmHg/decade

**East Africa**
Change = $2.5 (0.2, 5.0)$ mmHg/decade

Danaei et al. *Lancet* 2011
Change in SBP in 199 countries (women)

Danaei et al. Lancet 2011
Age-standardized mean BMI in 2008

Finucane et al. *Lancet* 2011
World trends in age-standardized mean BMI

Women

Men

Change = 0.5 (0.3, 0.7) kg/m² / decade

Change = 0.4 (0.2, 0.6) kg/m² / decade

Finucane et al. Lancet 2011
BMI trends in high-income regions (men)

North America
Change = 1.1 (0.9, 1.3) kg/m² / decade

Australasia
Change = 0.9 (0.7, 1.2) kg/m² / decade

Asia-Pacific
Change = 0.6 (0.4, 0.8) kg/m² / decade

Western Europe
Change = 0.6 (0.4, 0.8) kg/m² / decade

Finucane et al. Lancet 2011
BMI trends in high-income regions (women)

North America

Change = 1.2 (0.9, 1.5) kg/m² / decade

Australasia

Change = 1.2 (0.8, 1.5) kg/m² / decade

Asia-Pacific

Change = 0.4 (0.1, 0.7) kg/m² / decade

Western Europe

Change = 0.4 (0.1, 0.7) kg/m² / decade

Finucane et al. Lancet 2011 year
BMI trends in selected regions (men)

East Asia
Change = 0.5 (0.3, 0.8) kg/m² / decade

South Asia
Change = 0.0 (-0.5, 0.5) kg/m² / decade

Central Europe
Change = 0.4 (0.0, 0.8) kg/m² / decade

North Africa and Middle East
Change = 0.9 (0.5, 1.4) kg/m² / decade

Finucane et al. Lancet 2011
BMI trends in selected regions (women)

East Asia
Change = 0.4 (0.1, 0.7) kg/m² / decade

South Asia
Change = 0.4 (-0.2, 0.9) kg/m² / decade

Central Europe
Change = 0.0 (-0.5, 0.5) kg/m² / decade

North Africa and Middle East
Change = 1.1 (0.7, 1.6) kg/m² / decade

Finucane et al. Lancet 2011
Change in BMI in 199 countries (men)

Finucane et al. Lancet 2011
Change in BMI in 199 countries (women)

Finucane et al. Lancet 2011
Age-standardized mean TC in 2008

Farzadfar et al. Lancet 2011
World trends in age-standardized mean TC

Women

Change = $-0.07 (-0.17, 0.03)$ mmol/L / decade

Men

Change = $-0.08 (-0.16, 0.00)$ mmol/L / decade

Farzadfar et al. Lancet 2011
TC trends in high-income regions (men)

North America
Change = -0.19 (-0.32, -0.06) mmol/L / decade

Australasia
Change = -0.24 (-0.40, -0.08) mmol/L / decade

Asia-Pacific
Change = 0.10 (0.00, 0.20) mmol/L / decade

Western Europe
Change = -0.19 (-0.29, -0.08) mmol/L / decade

Farzadfar et al. Lancet 2011
TC trends in high-income regions (women)

North America: Change = -0.20 (-0.36, -0.04) mmol/L / decade

Australasia: Change = -0.23 (-0.42, -0.05) mmol/L / decade

Asia-Pacific: Change = 0.08 (-0.03, 0.19) mmol/L / decade

Western Europe: Change = -0.21 (-0.33, -0.09) mmol/L / decade

Farzadfar et al. Lancet 2011
TC trends in selected regions (men)

**East Asia**
Change = 0.11 (-0.09, 0.30) mmol/L / decade

**Southern Latin America**
Change = -0.10 (-0.41, 0.21) mmol/L / decade

**Central Latin America**
Change = -0.04 (-0.27, 0.19) mmol/L / decade

**Central Africa**
Change = -0.12 (-0.46, 0.22) mmol/L / decade

Farzadfar et al. Lancet 2011
TC trends in selected regions (women)

- **East Asia**: Change = 0.11 (-0.10, 0.33) mmol/L / decade
- **Southern Latin America**: Change = -0.10 (-0.46, 0.26) mmol/L / decade
- **Central Latin America**: Change = 0.00 (-0.27, 0.28) mmol/L / decade
- **Central Africa**: Change = -0.18 (-0.57, 0.19) mmol/L / decade