

Blood pressure and hypertension

A global health perspective

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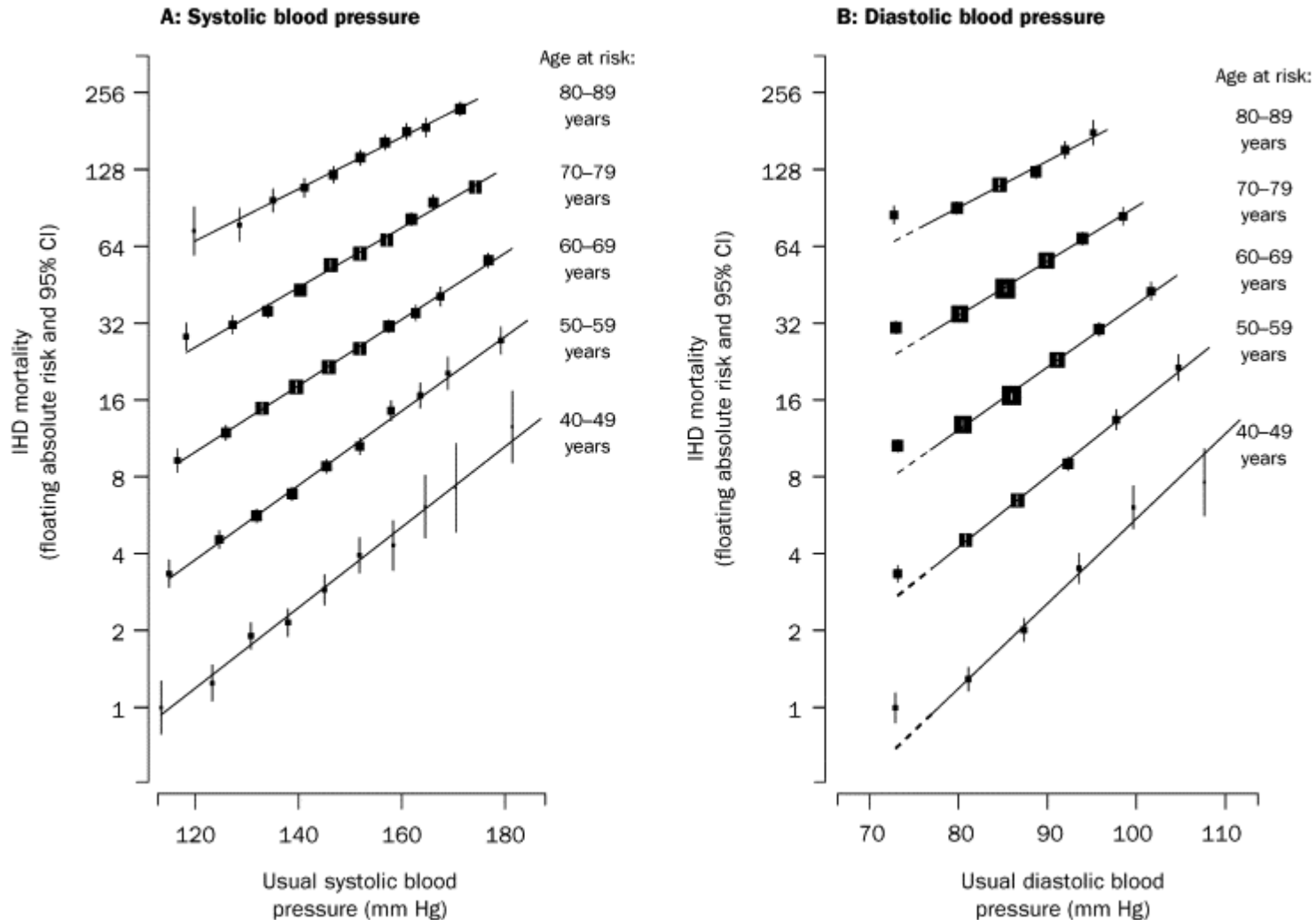


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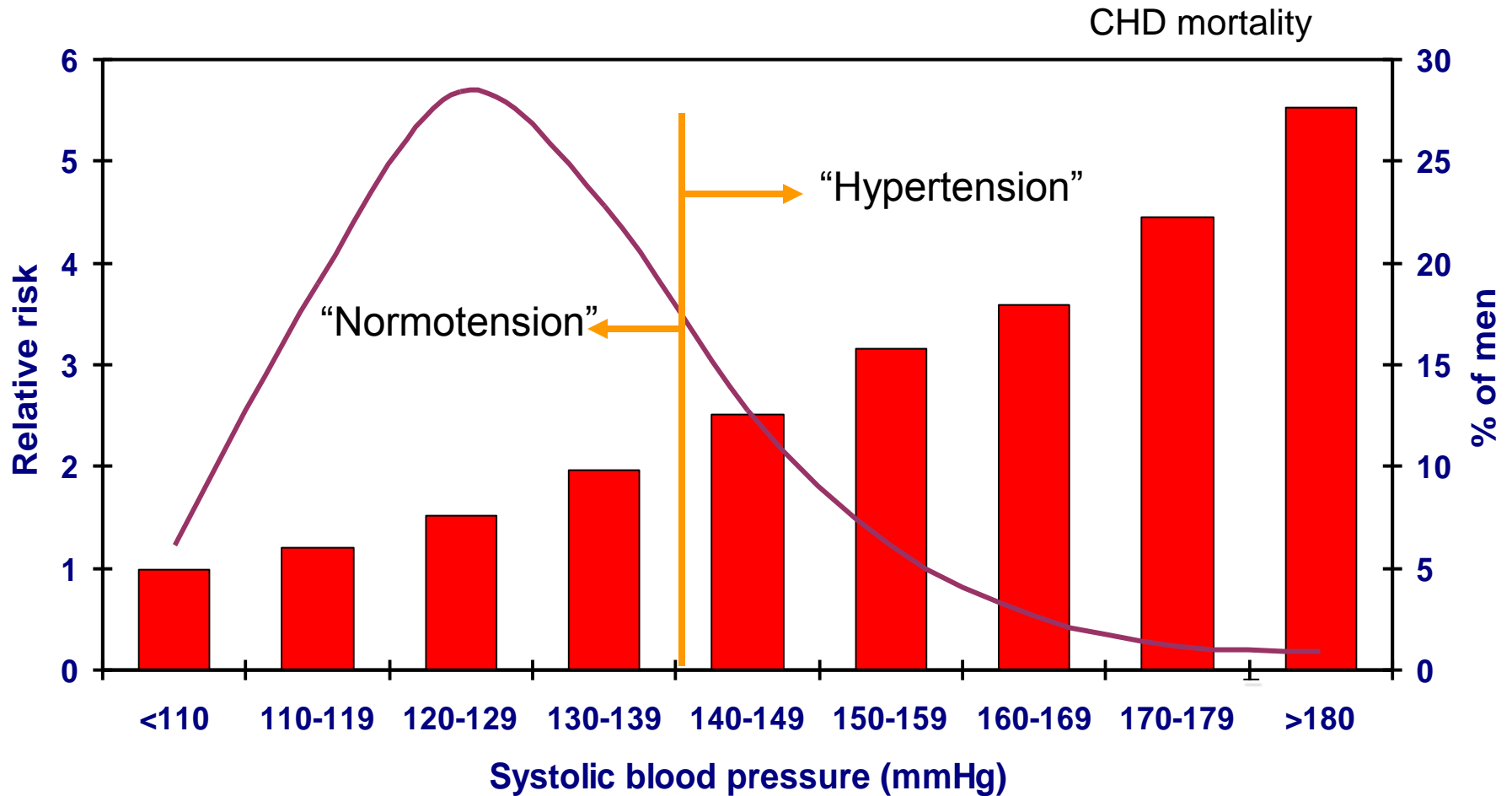


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Blood pressure or hypertension: association of SBP and DPB with IHD



MRFIT blood pressure distribution and risk of death at 25 years follow-up



347,978 men ages 35-57 at baseline

Adapted from Elliott & Stamler 2005

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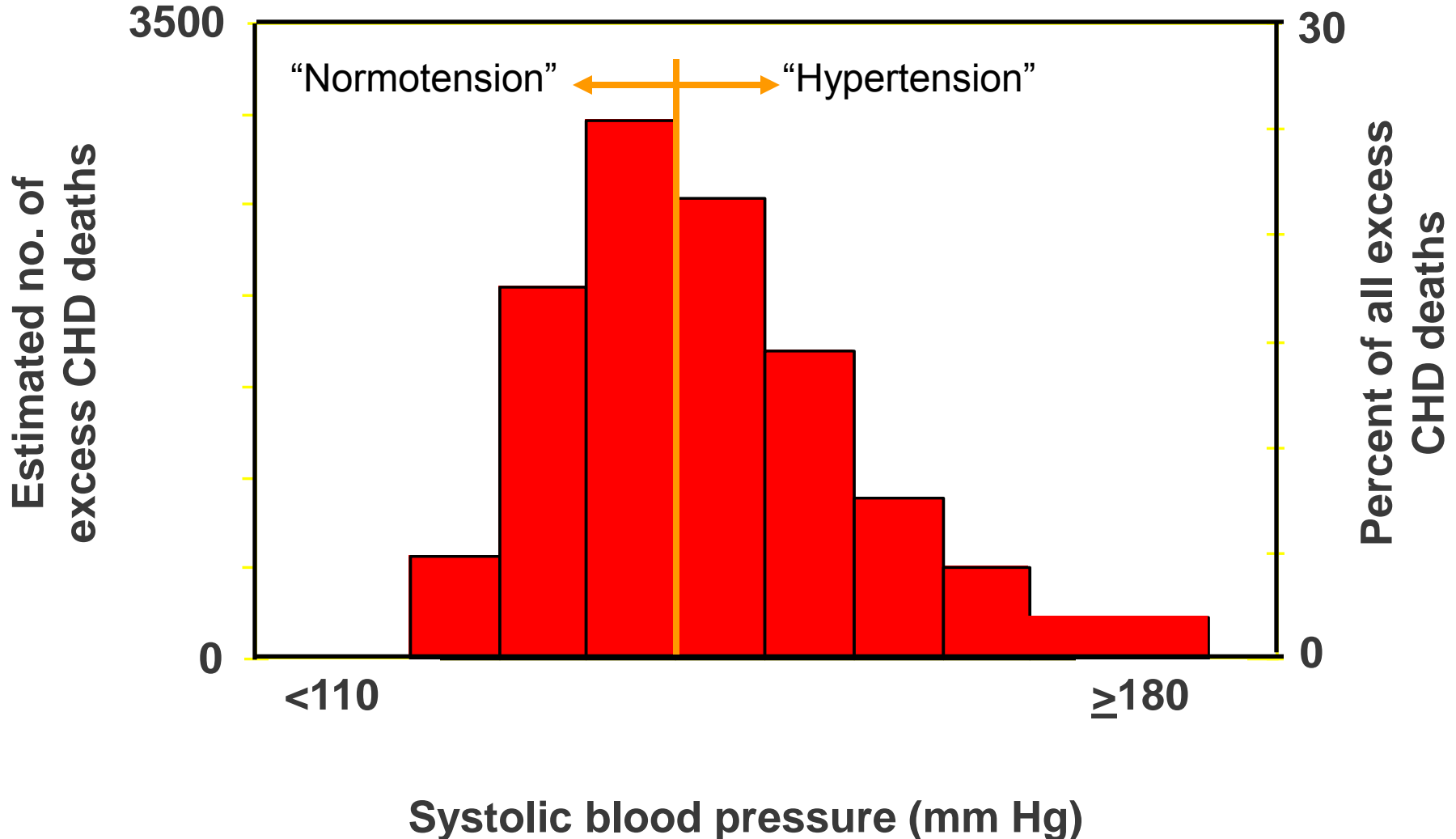
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MRFIT 25-year follow-up: Numbers and proportions of excess CHD deaths by SBP



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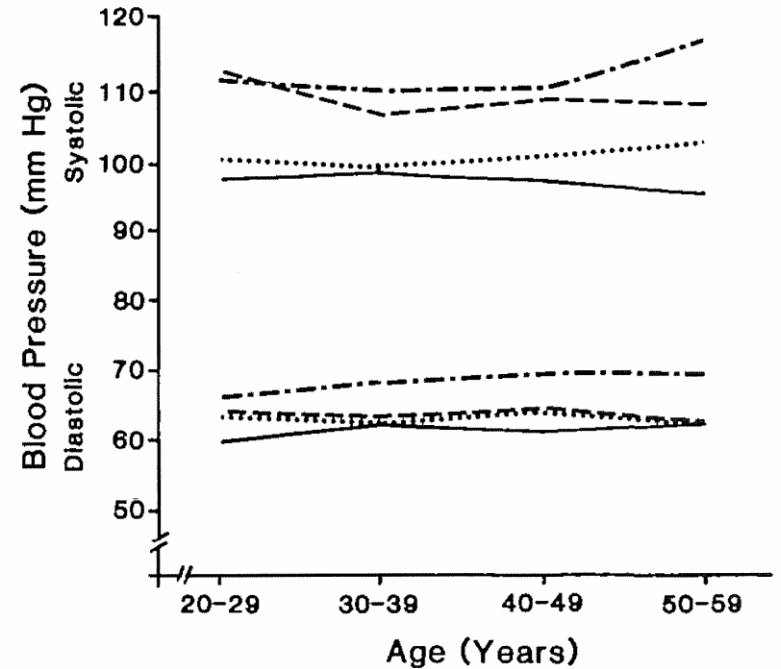
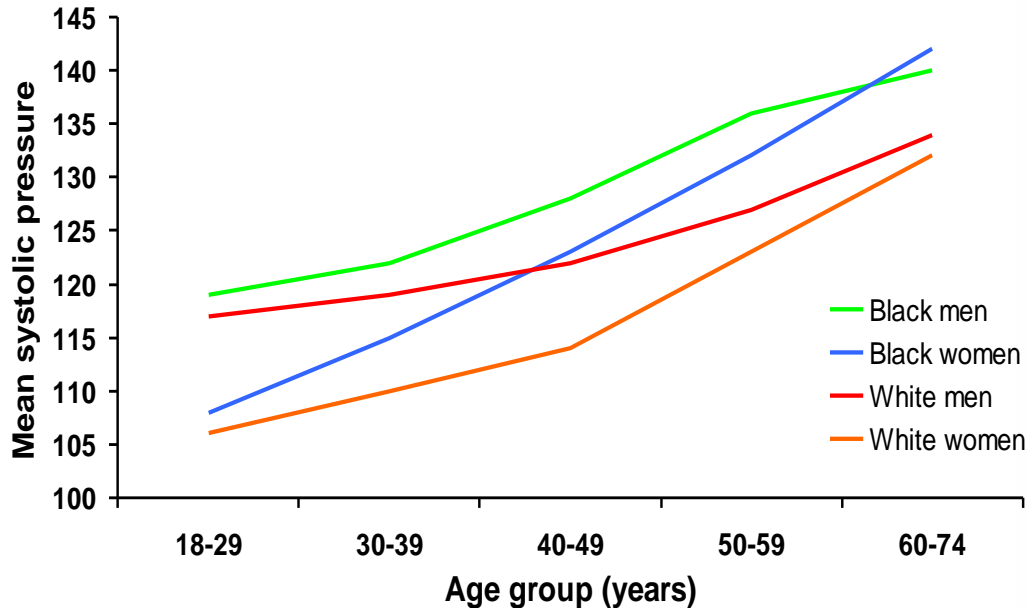
Adapted from Elliott & Stamler 2005

What is hypertension?

- “Essential hypertension is a type of disease not hitherto recognised in medicine in which the defect is quantitative not qualitative. It is difficult for doctors to understand because it is a departure from the ordinary process of binary thought to which they are brought up. Medicine in its present state can count up to two but not beyond”
Pickering 1968

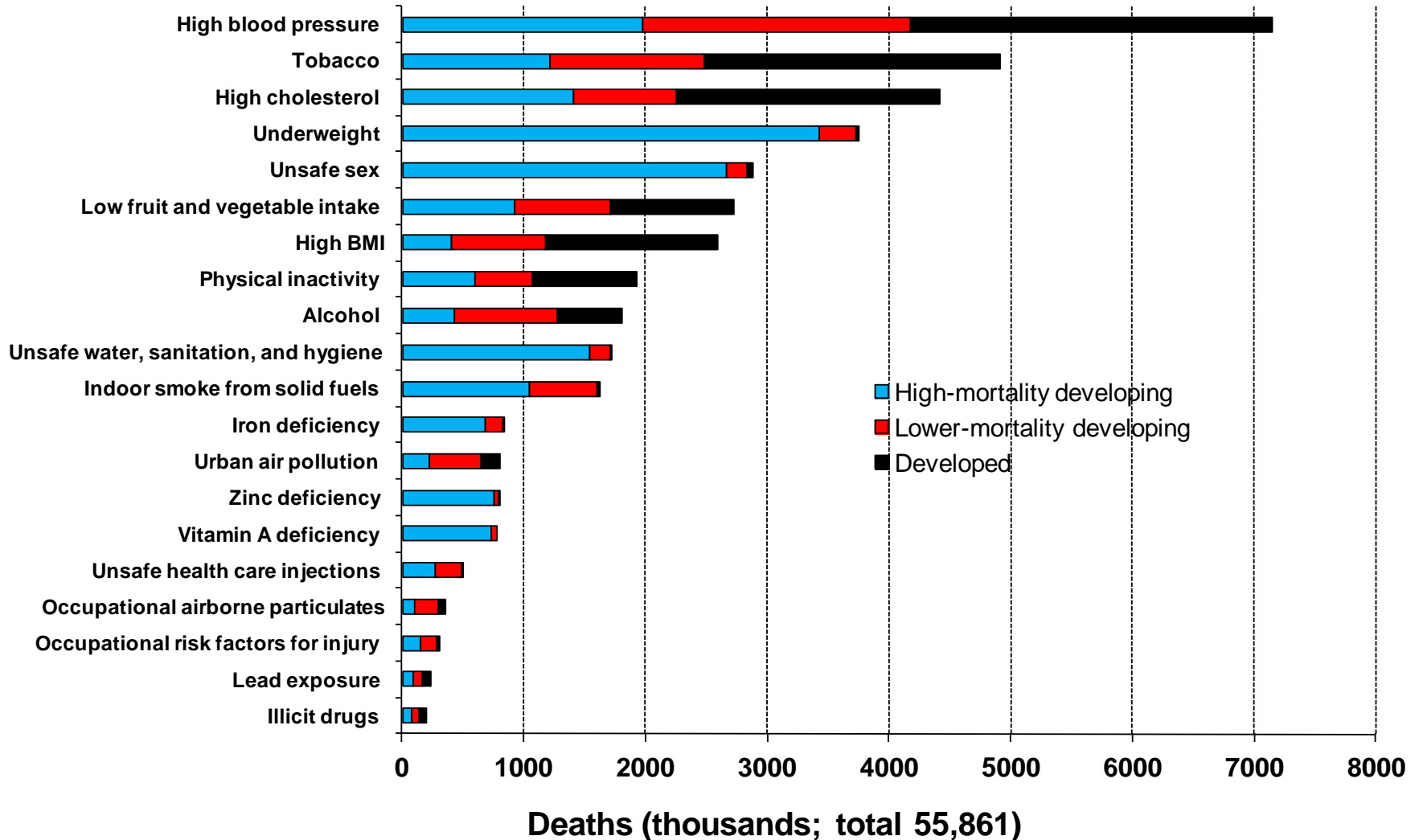
Does blood pressure rise with age?

Mean systolic blood pressure (mmHg), US population, NHANES III Phase I (1988-1991) by age, ethnic group and gender

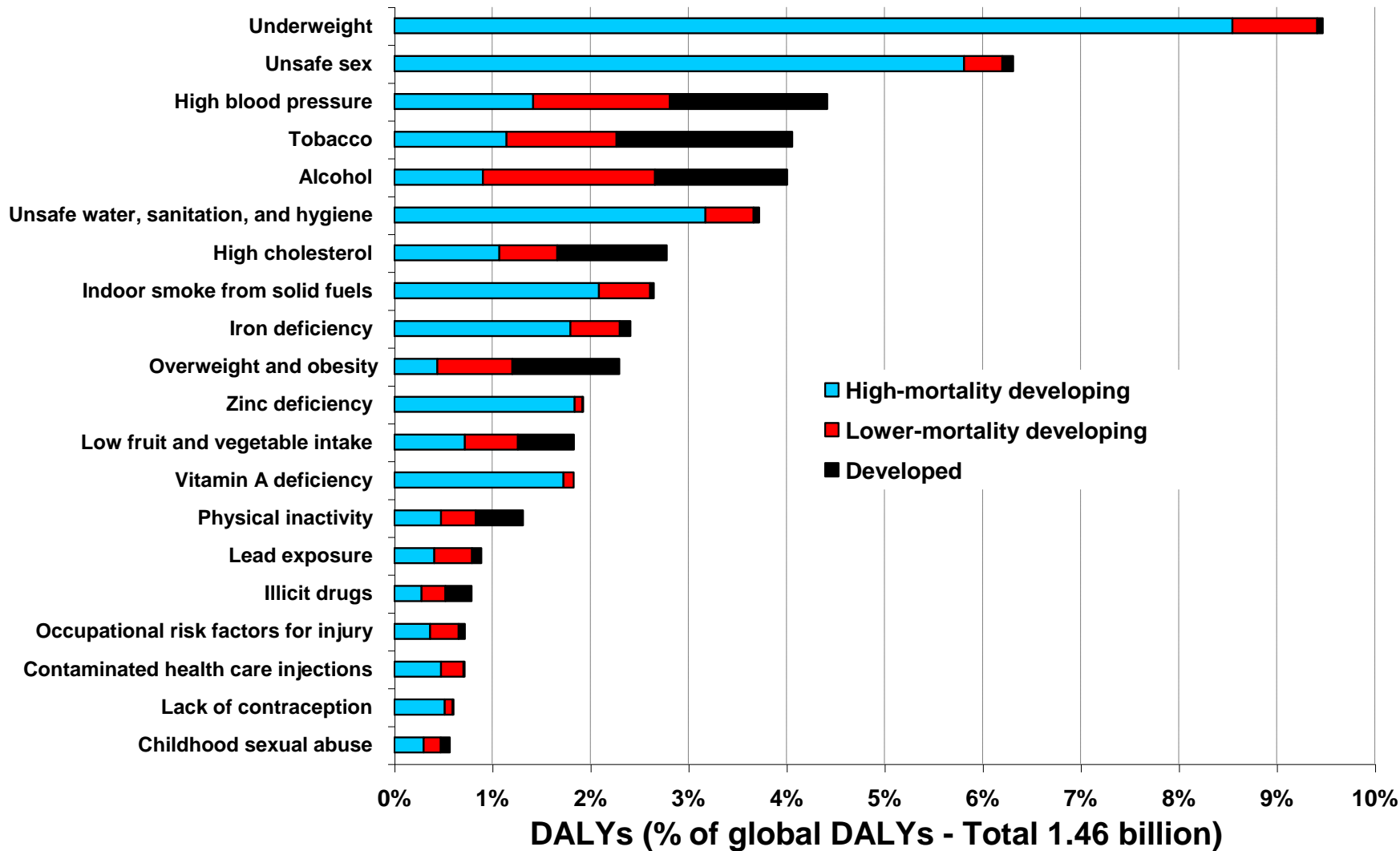


— Yanomamo
..... Xingu
- - - Papua New Guinea
- . . . Kenya

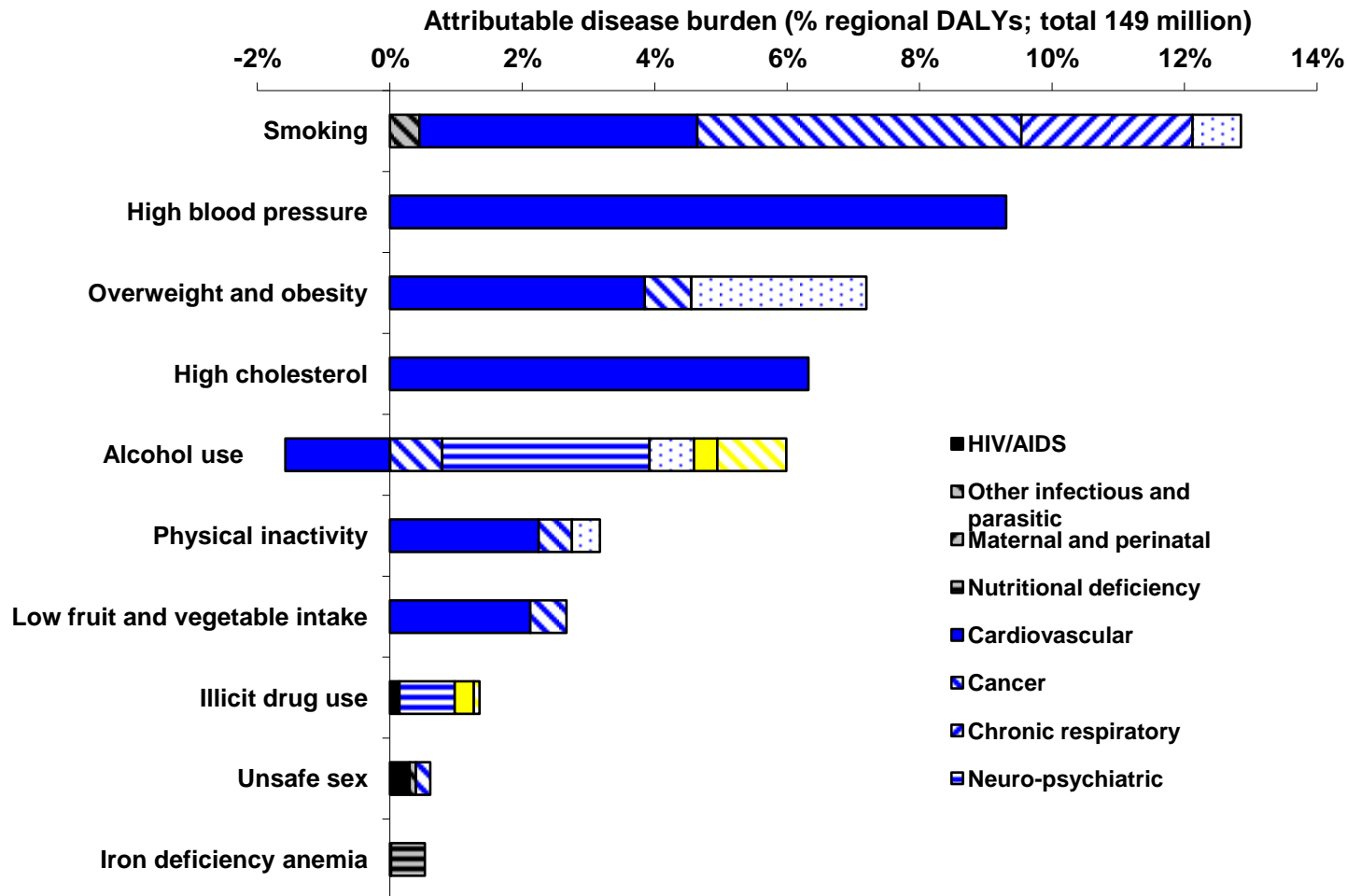
Deaths attributable to leading risk factors in 2000



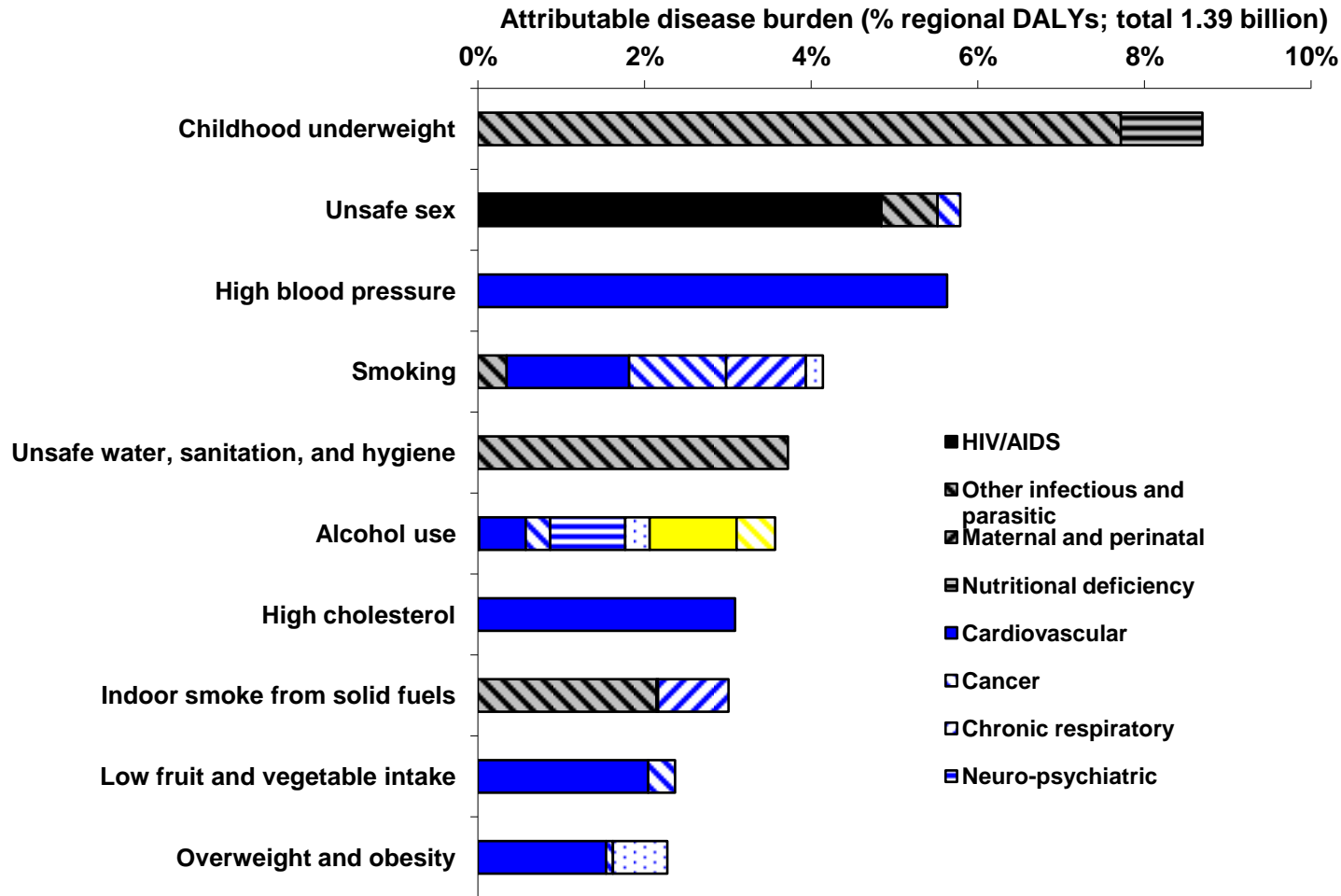
Burden of disease attributable to leading risk factors in 2000



Burden of disease attributable to risk factors in 2001, high-income countries

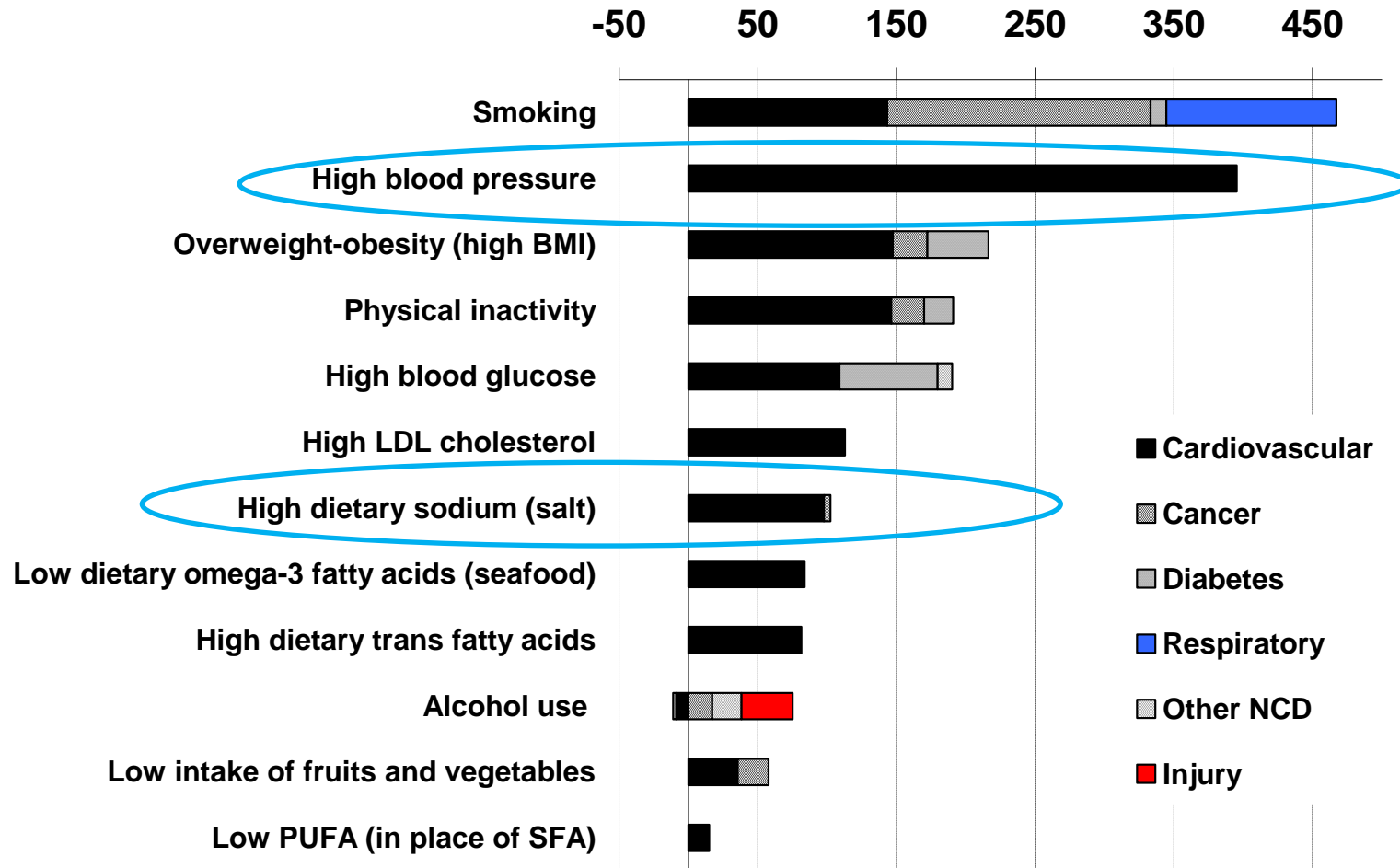


Burden of disease attributable to risk factors in 2001, low-and-middle income countries

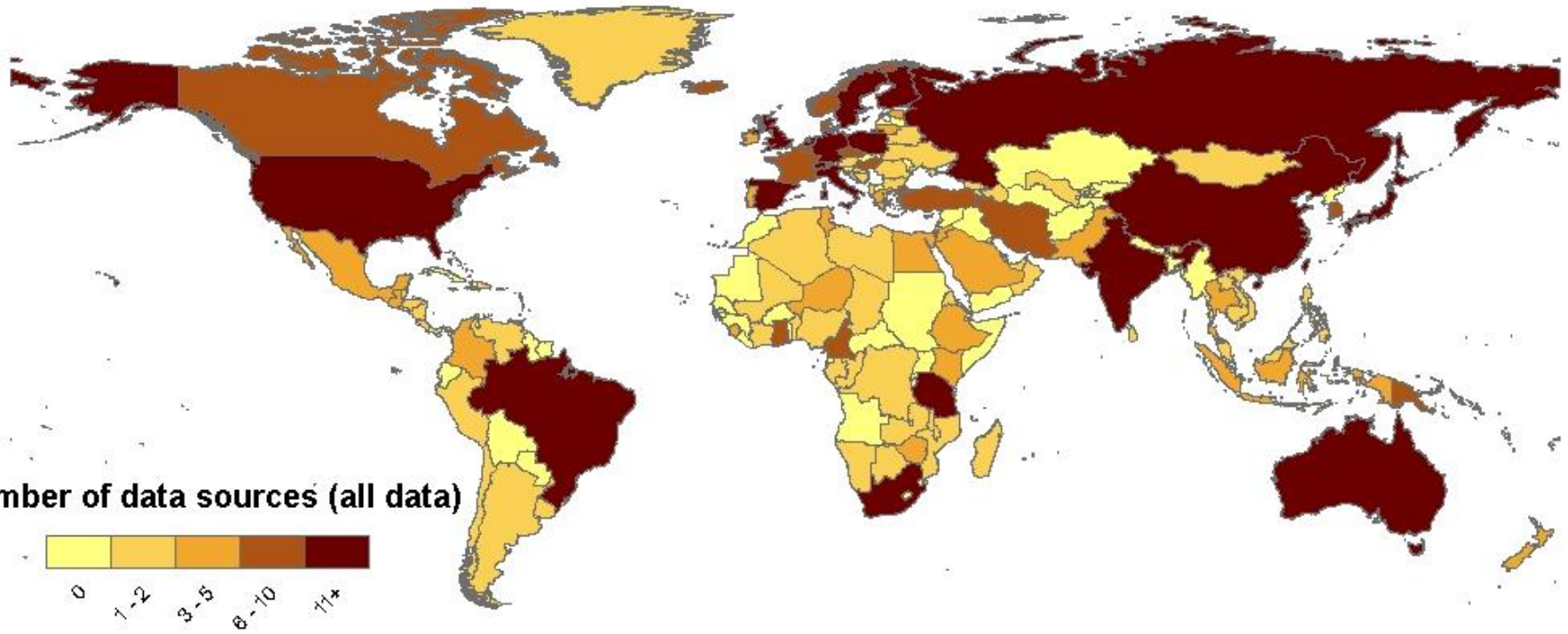


Deaths attributable to individual risk factors in the USA in 2005

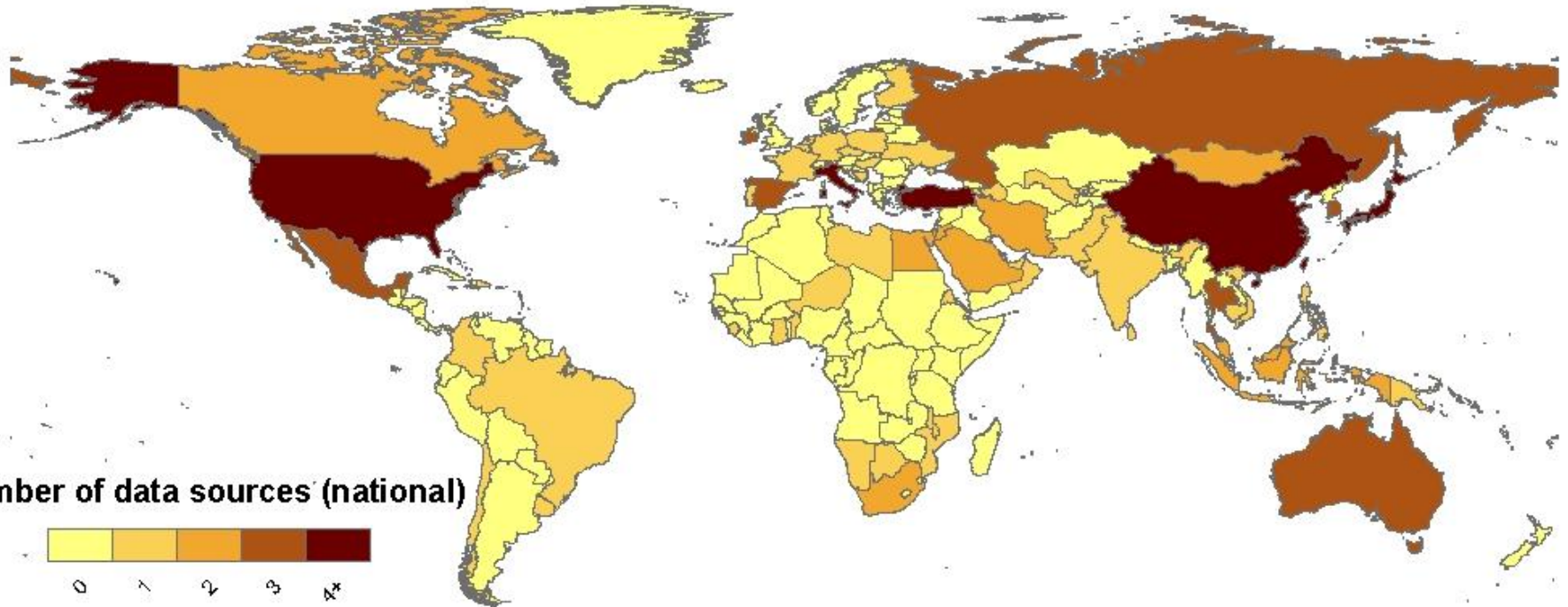
Deaths attributable to individual risks (thousands) in both sexes



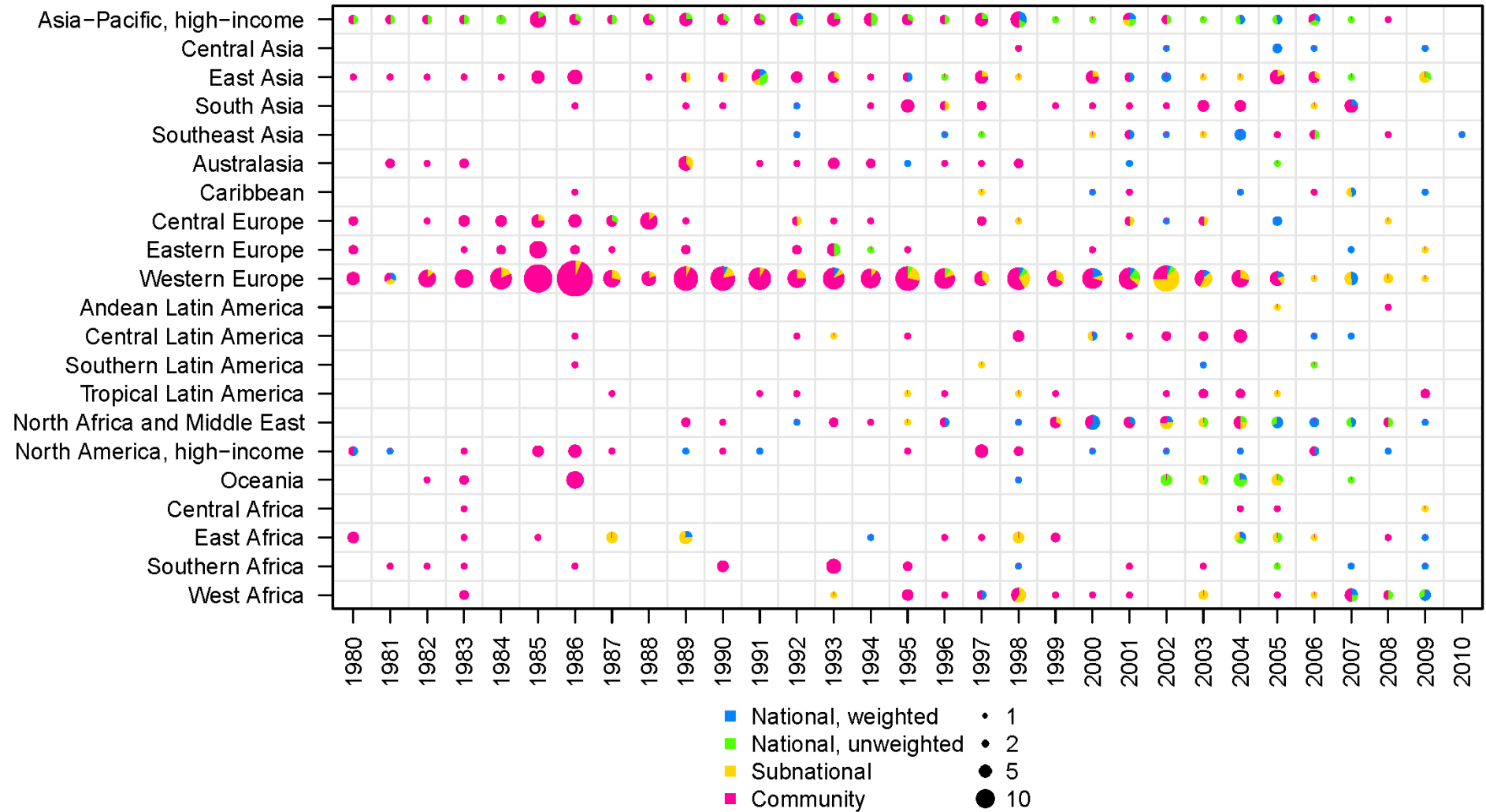
SBP data availability between 1980 and 2008 (all data)



SBP data availability between 1980 and 2008 (national data)



SBP data availability by year and region

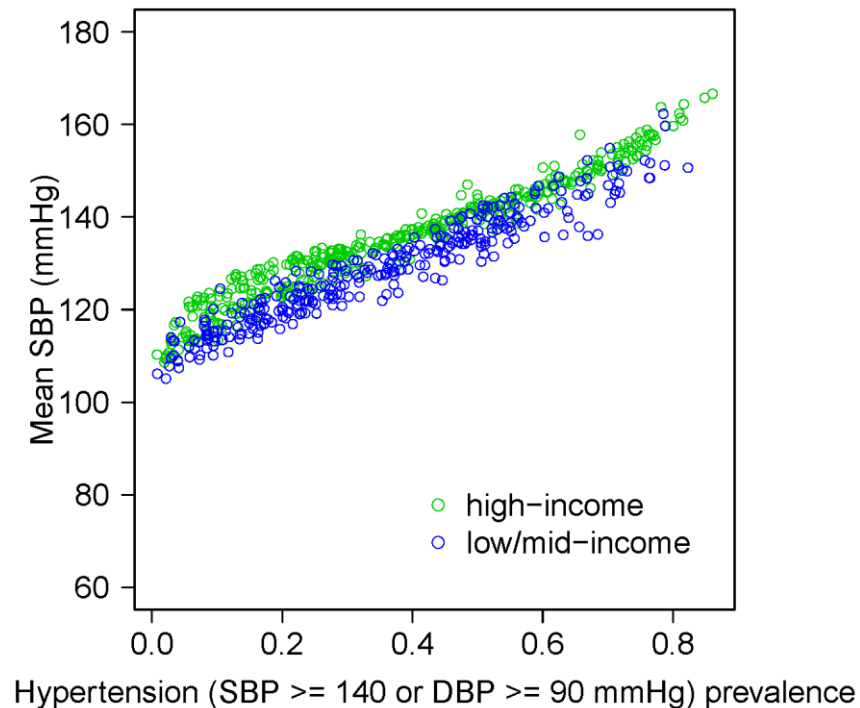


Challenges in making estimates of BP trends for countries

- Data only on prevalence (vs. mean)

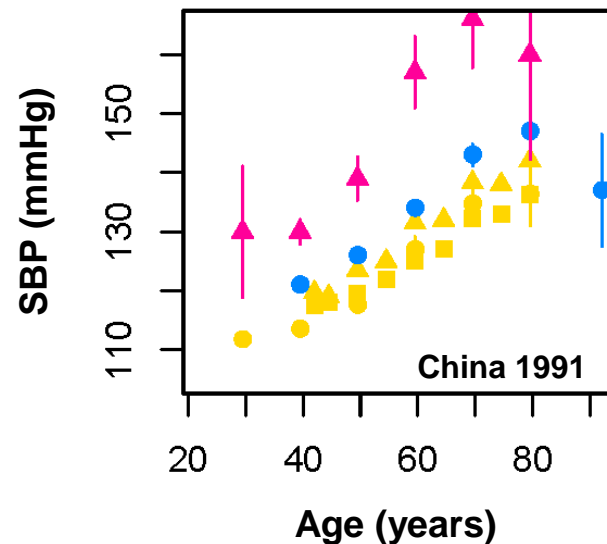
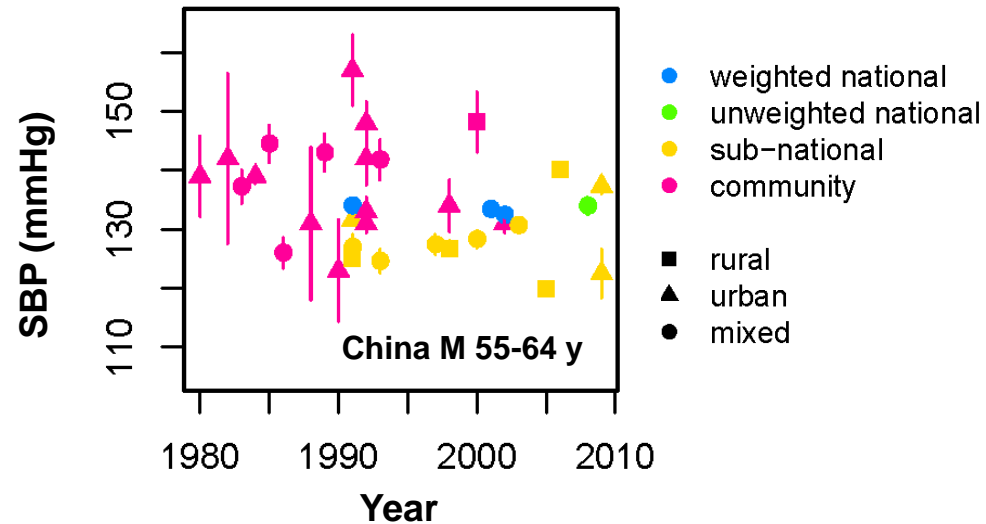
Converting prevalence to mean

- Some studies report hypertension prevalence, but not population mean
- Develop regression models using sources with both mean and prevalence to estimate mean from prevalence (“cross-walking”)



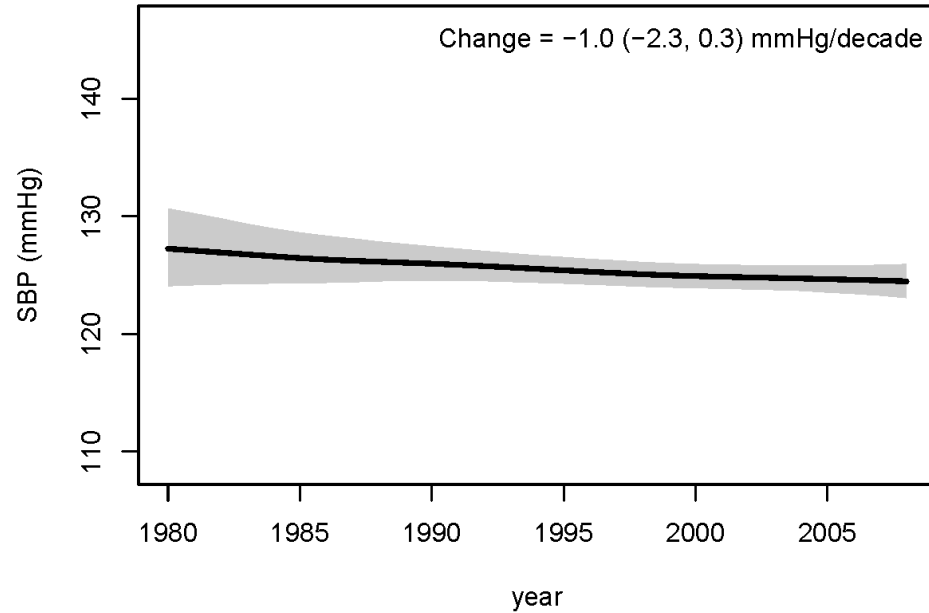
Challenges in making estimates of BP trends for countries

- Data only on prevalence (vs. mean)
- Missing data for whole countries or across time
- Missing data in older ages in some countries
- Non-linear time trends
- Some data were not national

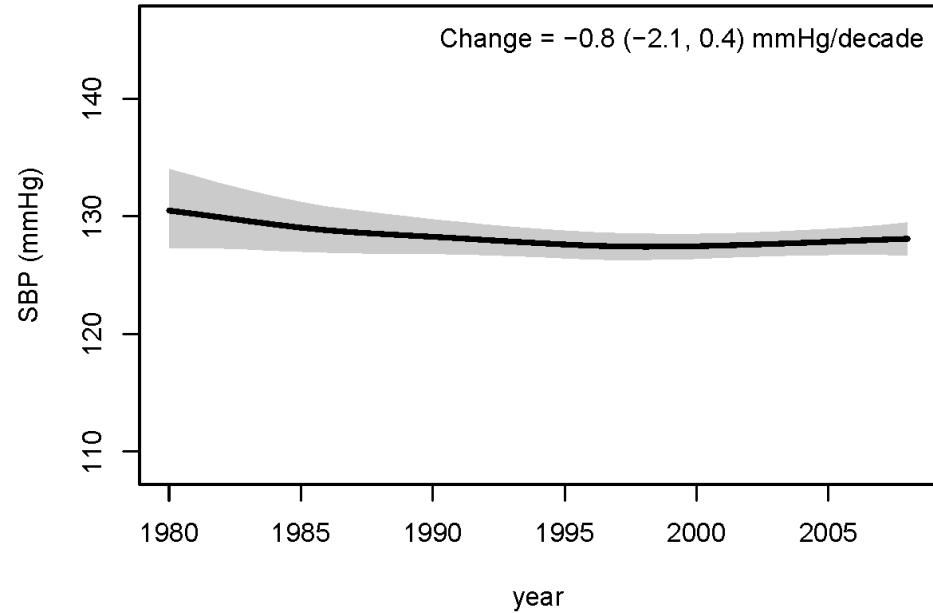


World trends in age-standardized mean SBP

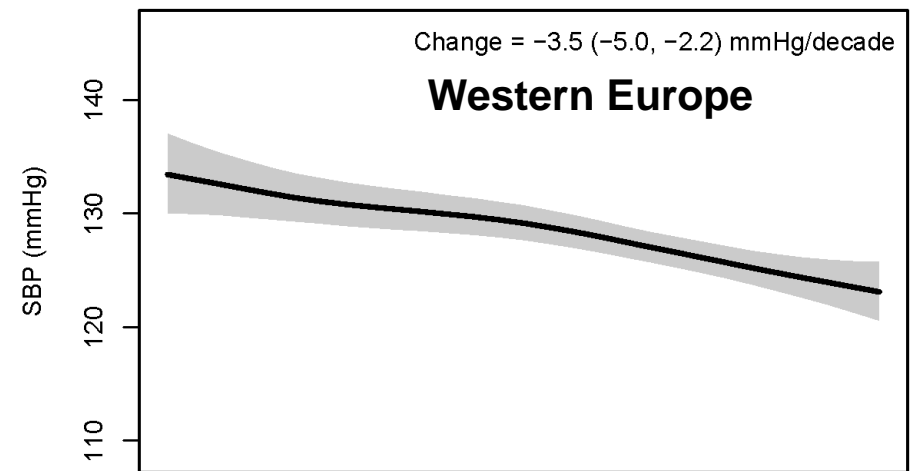
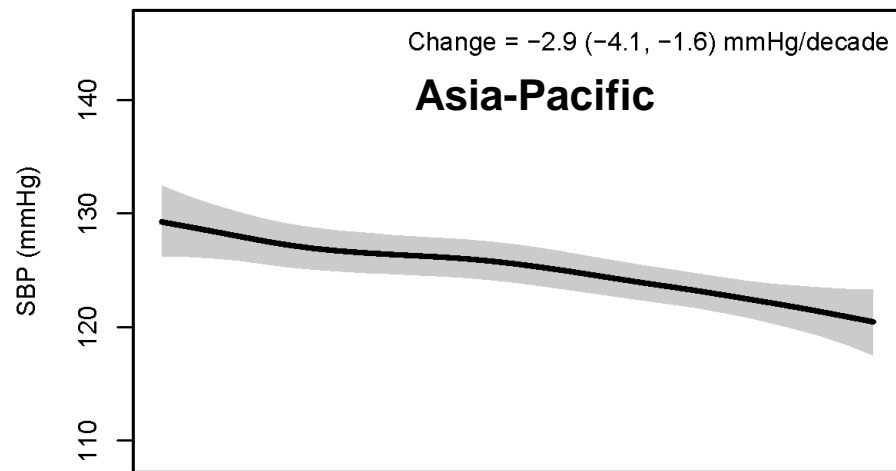
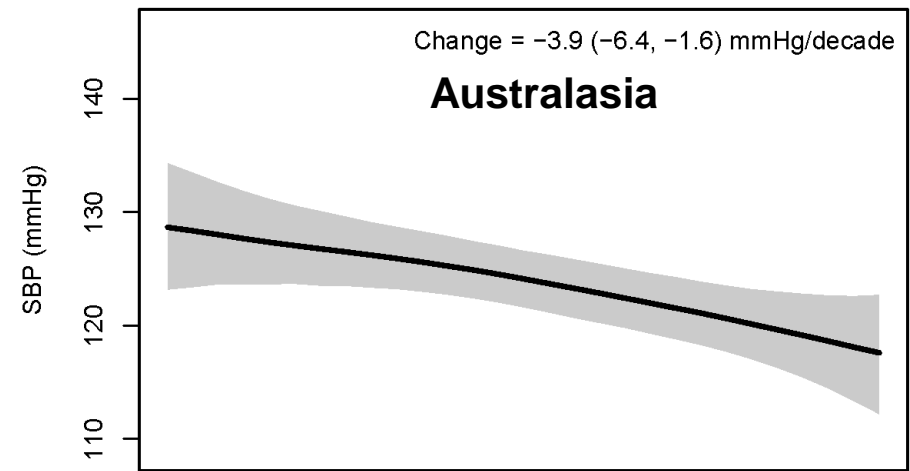
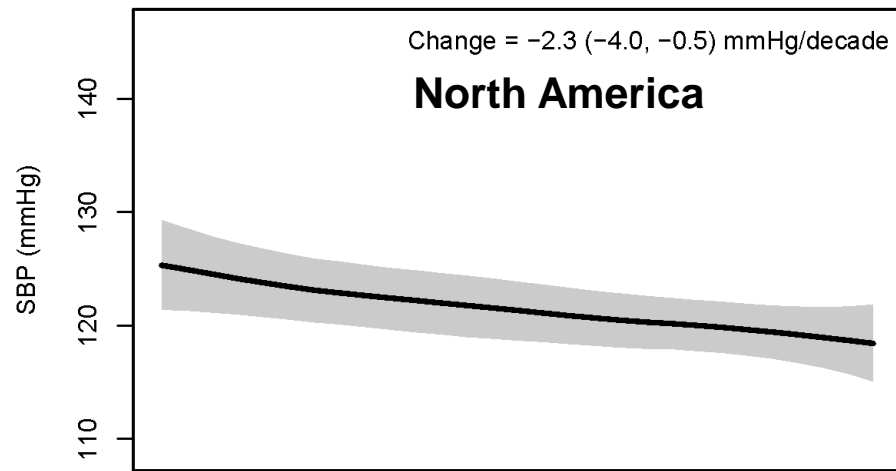
Women



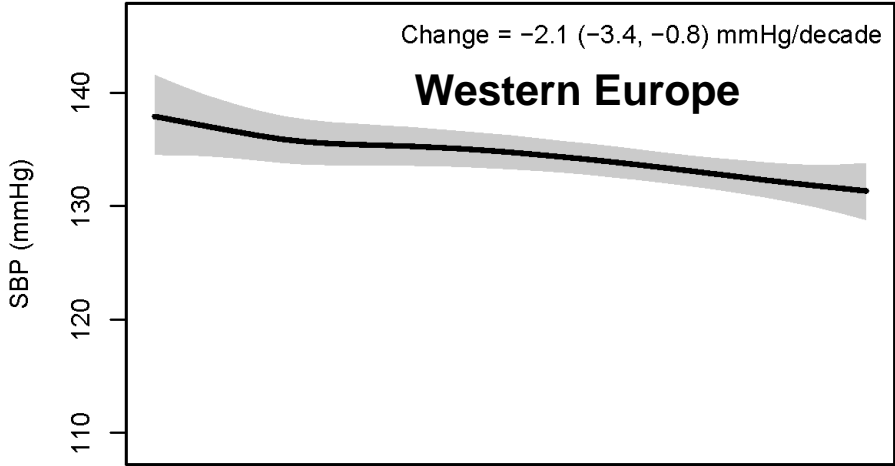
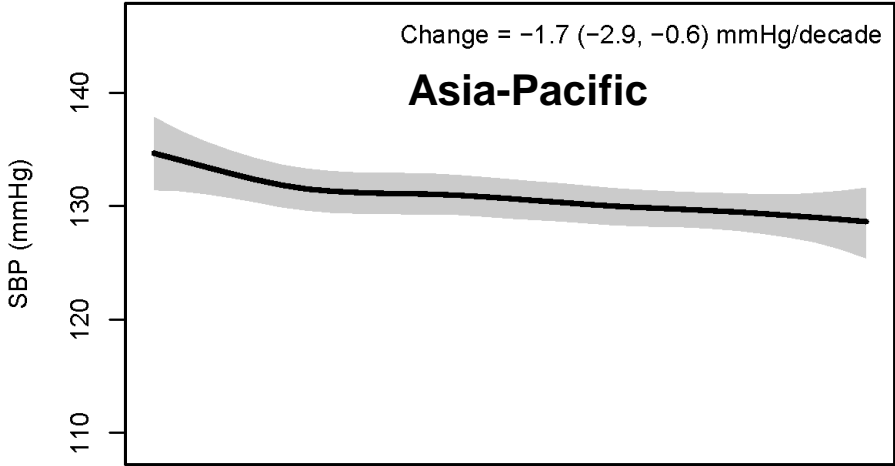
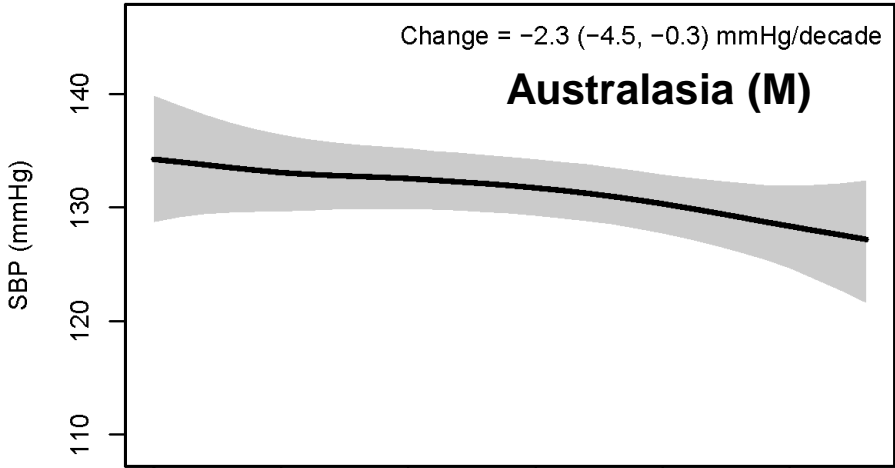
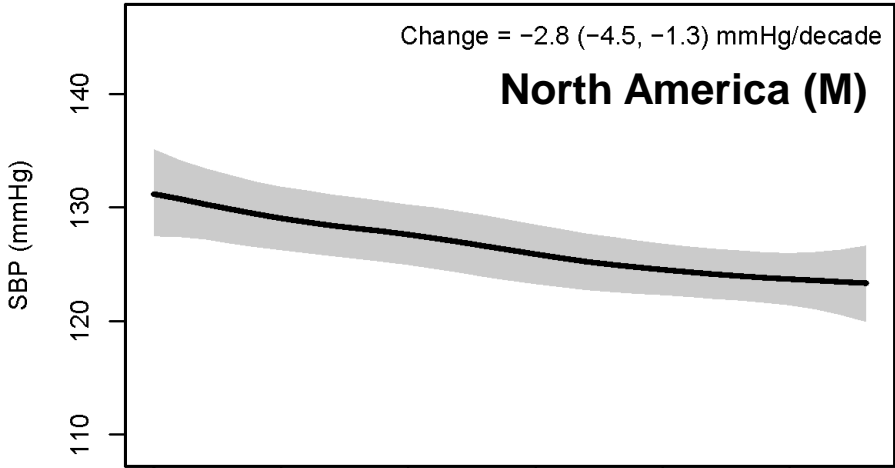
Men



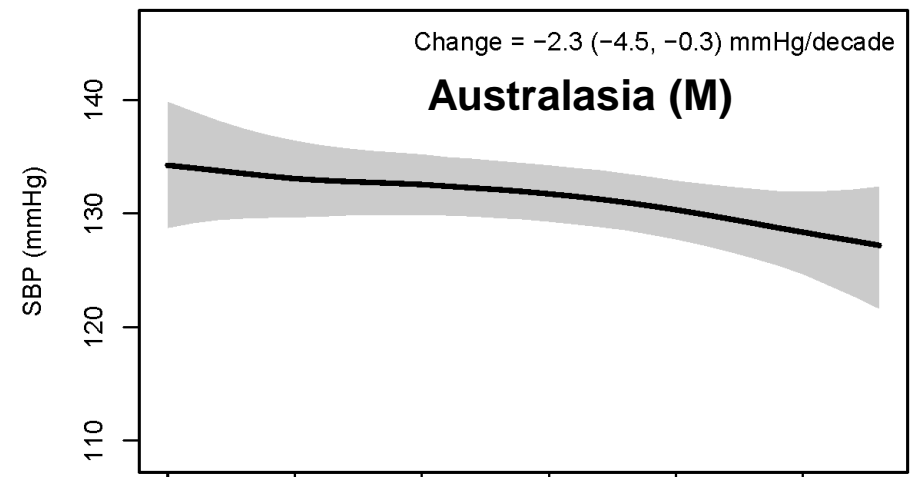
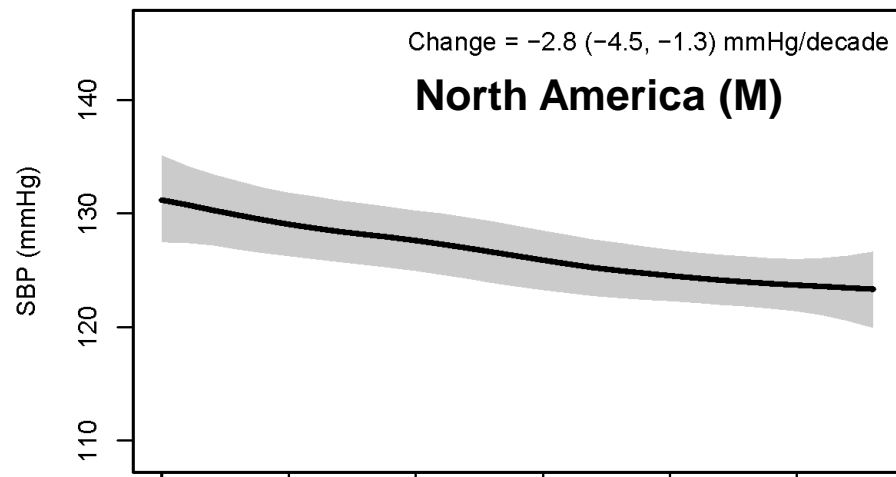
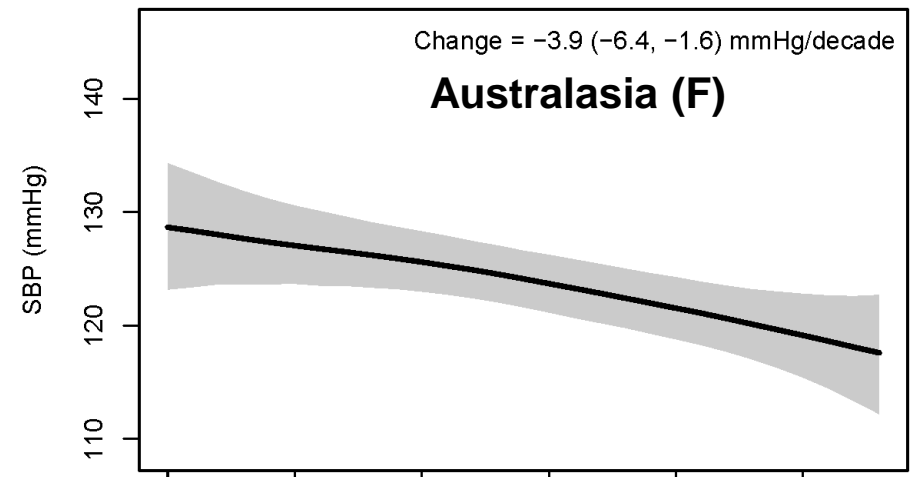
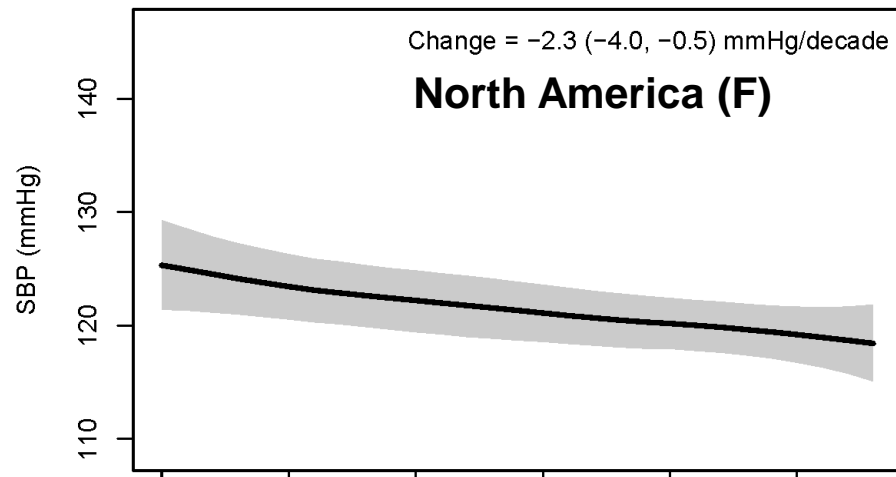
SBP trends in high-income regions (women)



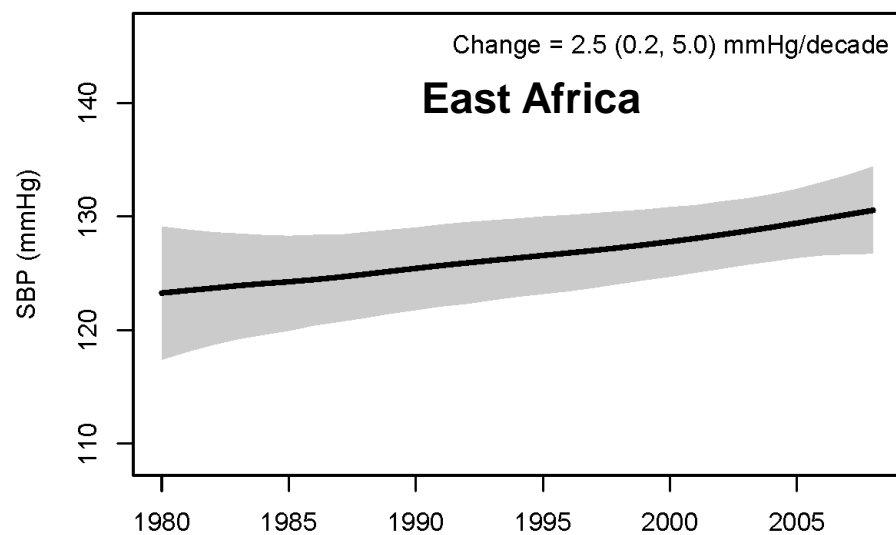
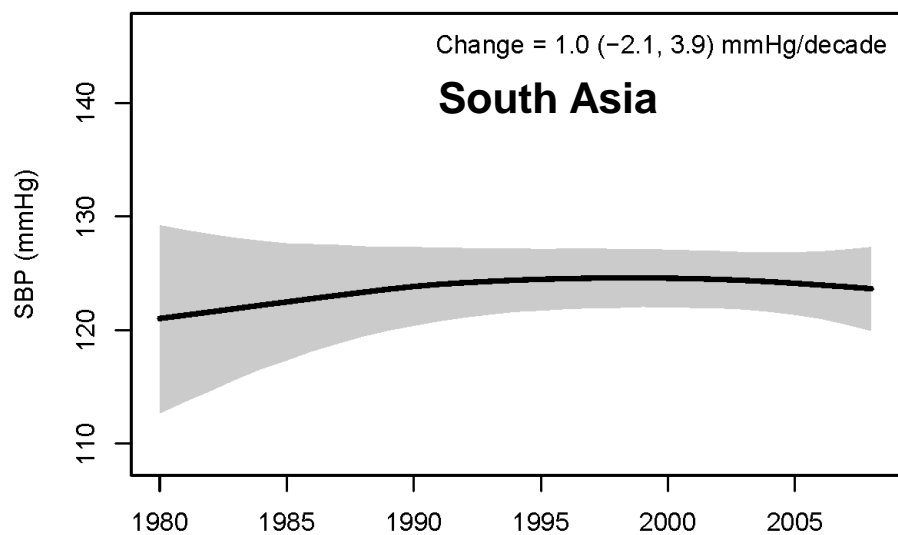
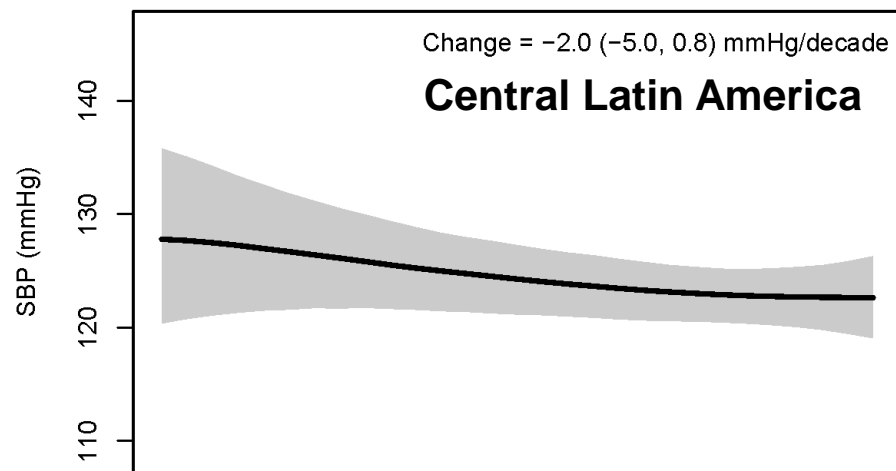
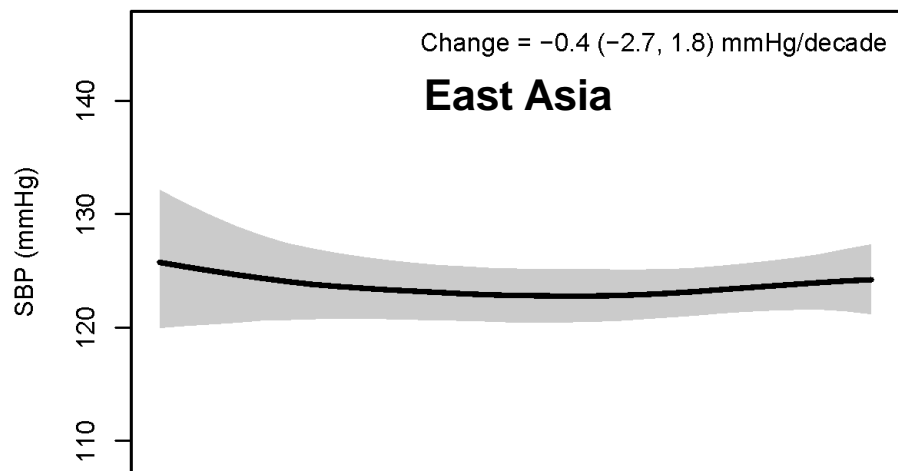
SBP trends in high-income regions (men)



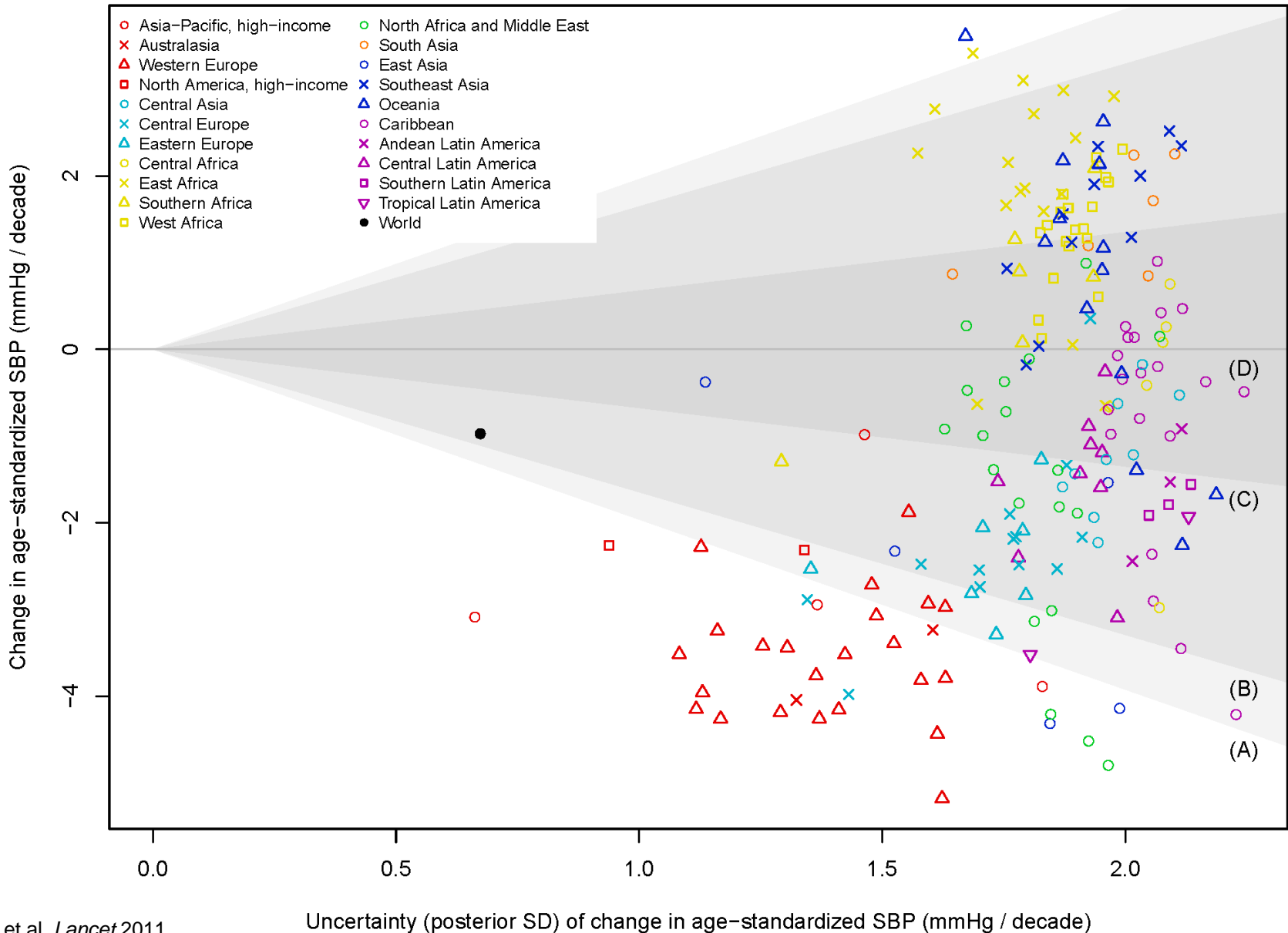
SBP trends in selected high-income regions



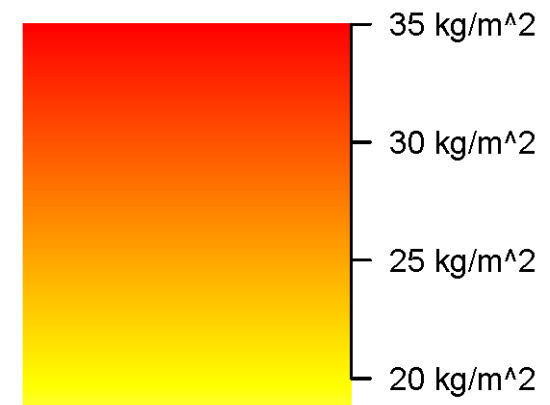
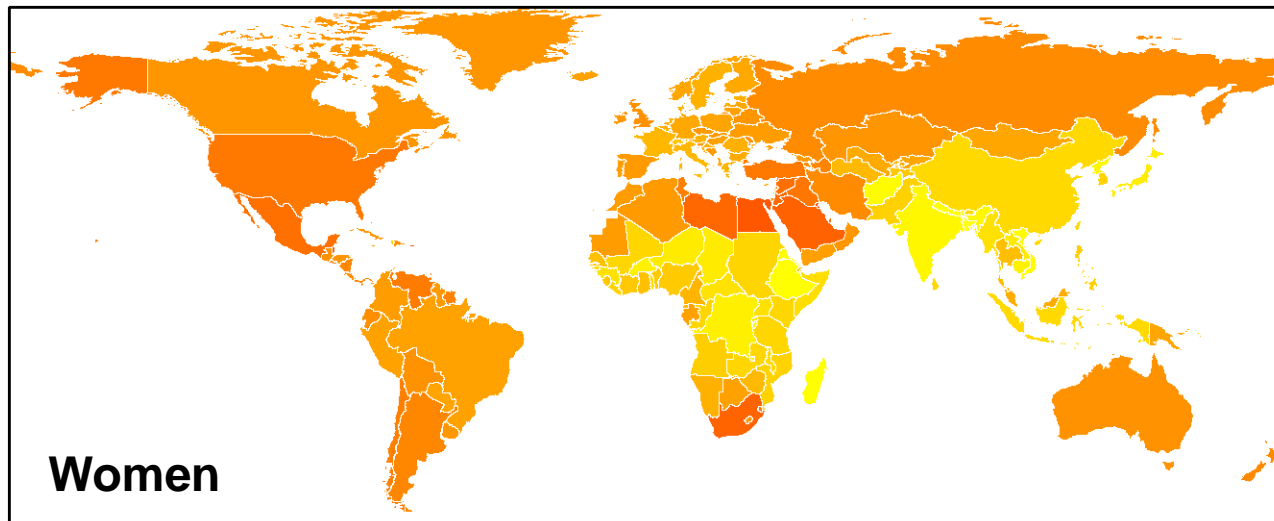
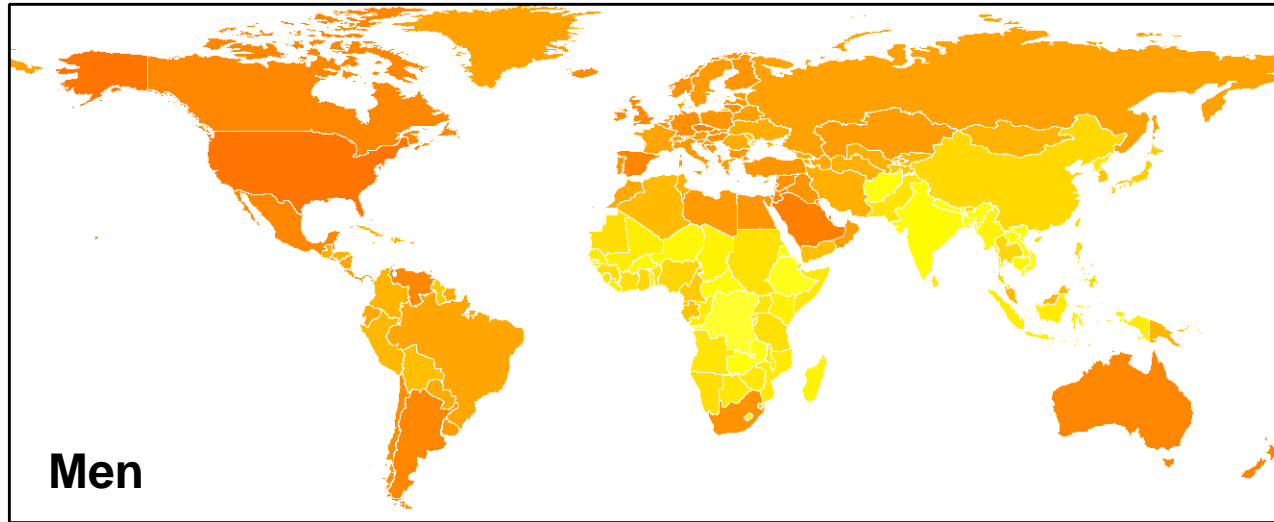
SBP trends in selected regions (women)



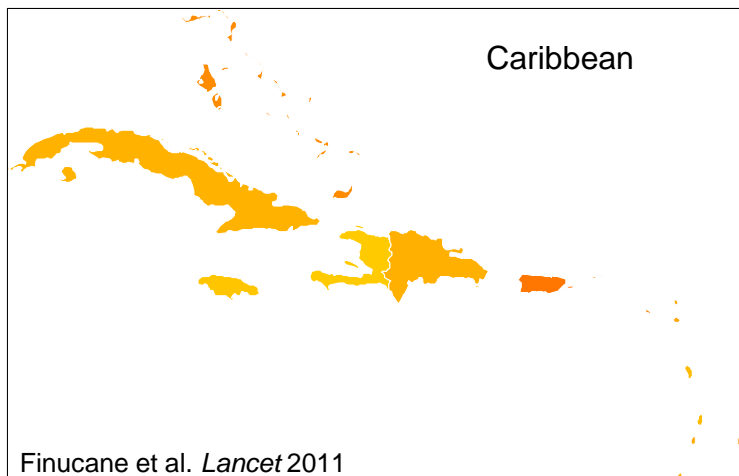
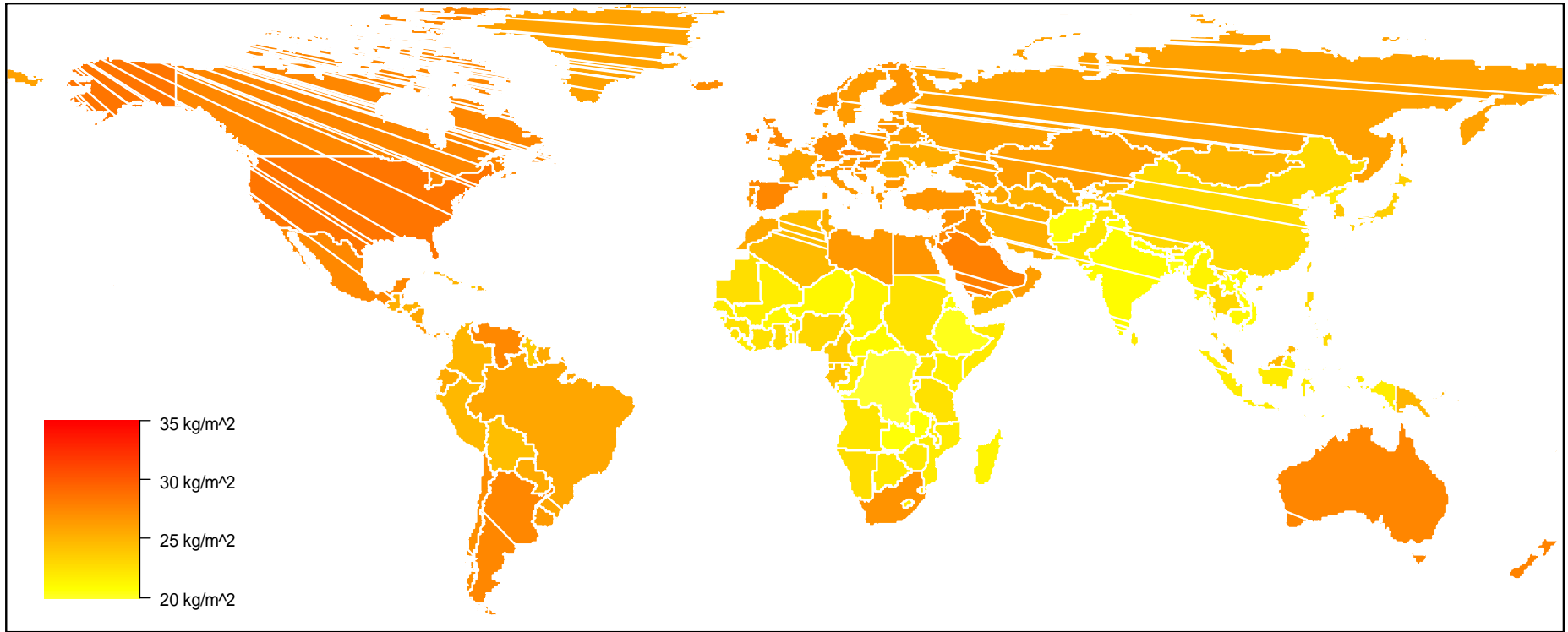
Change in SBP in 199 countries (women)



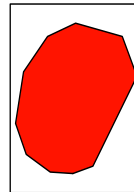
Age-standardized mean BMI in 2008



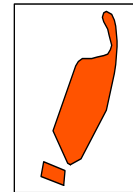
Age-standardized mean BMI in 2008 (men)



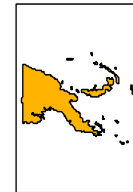
Nauru



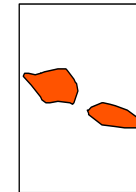
Palau



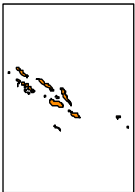
Papua New Guinea



Samoa



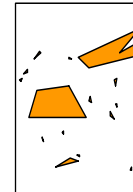
Solomon Islands



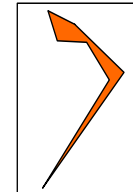
Vanuatu



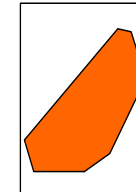
Fiji



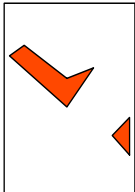
Kiribati



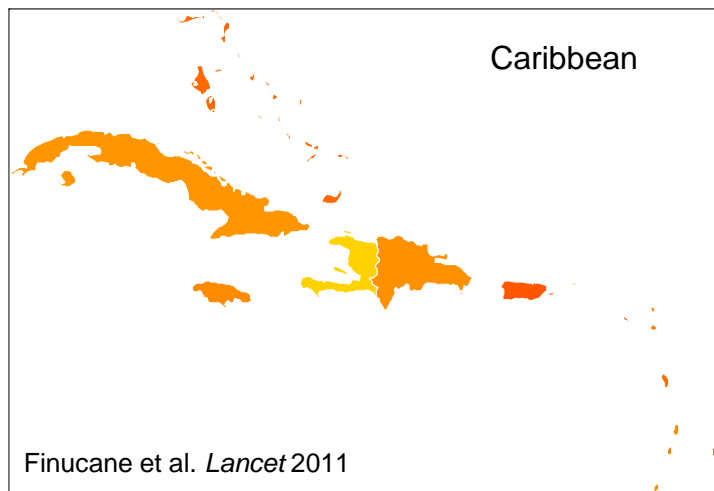
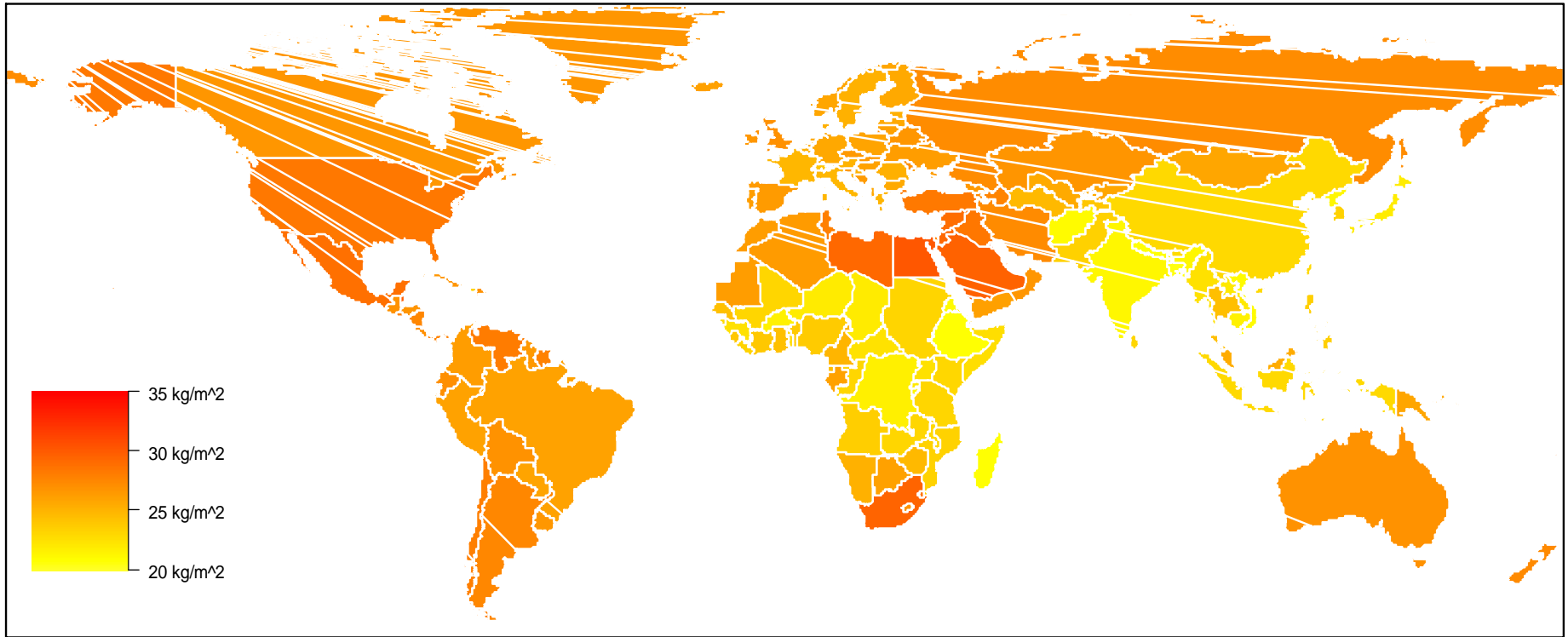
Marshall Islands



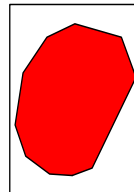
Tonga



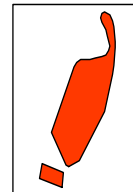
Age-standardized mean BMI in 2008 (women)



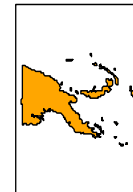
Nauru



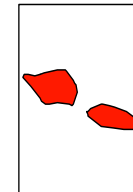
Palau



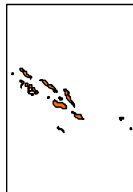
Papua New Guinea



Samoa



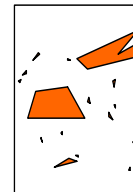
Solomon Islands



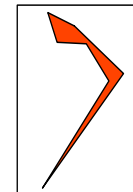
Vanuatu



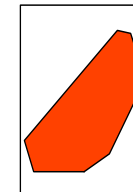
Fiji



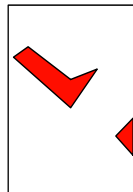
Kiribati



Marshall Islands

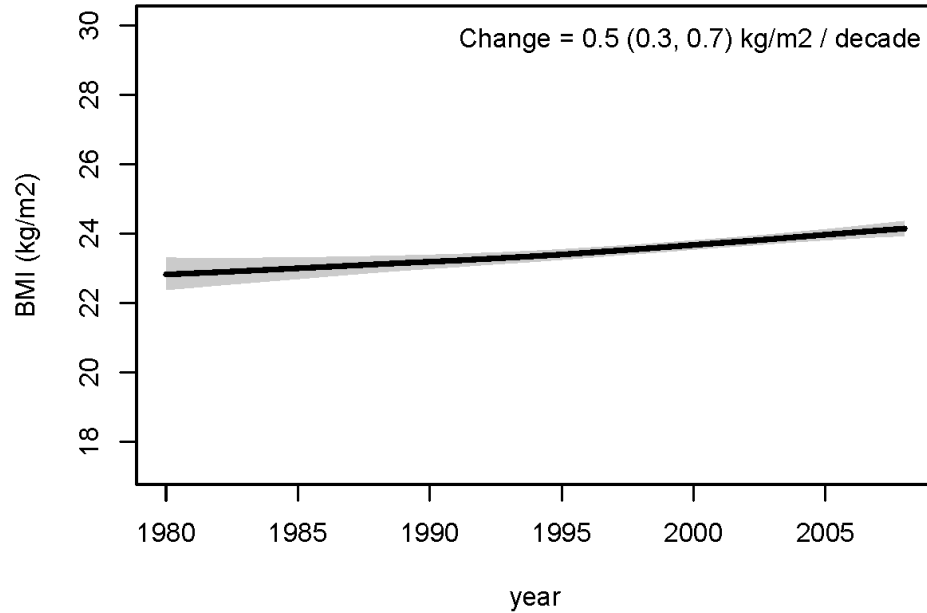


Tonga

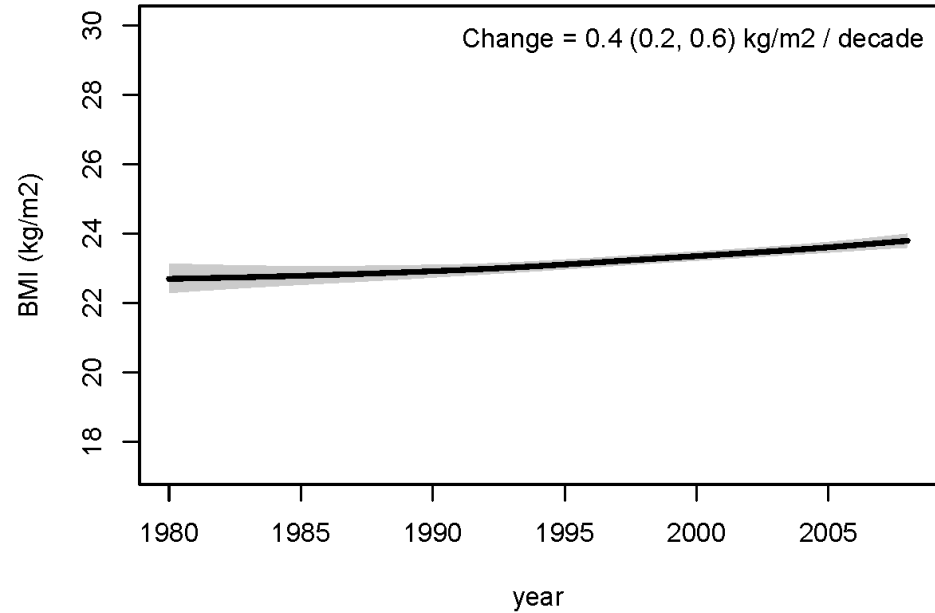


World trends in age-standardized mean BMI

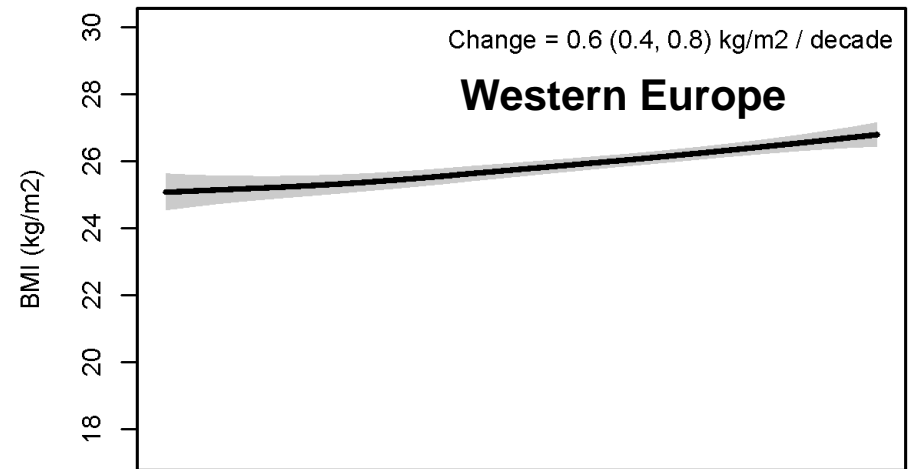
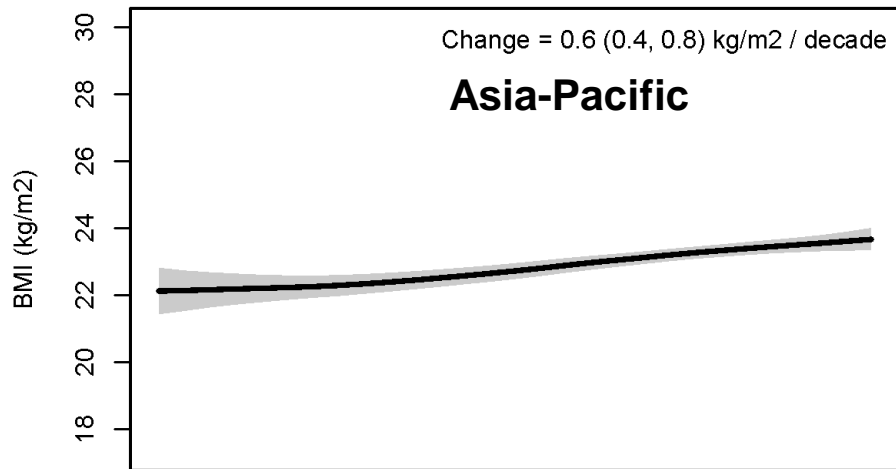
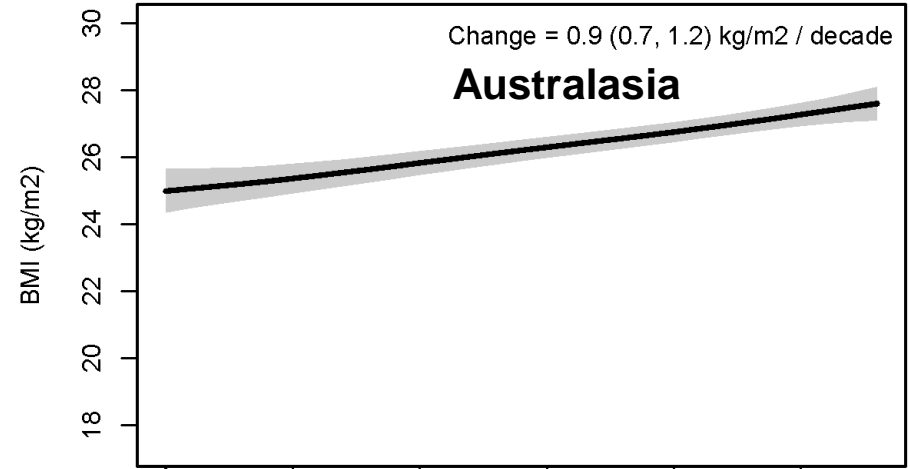
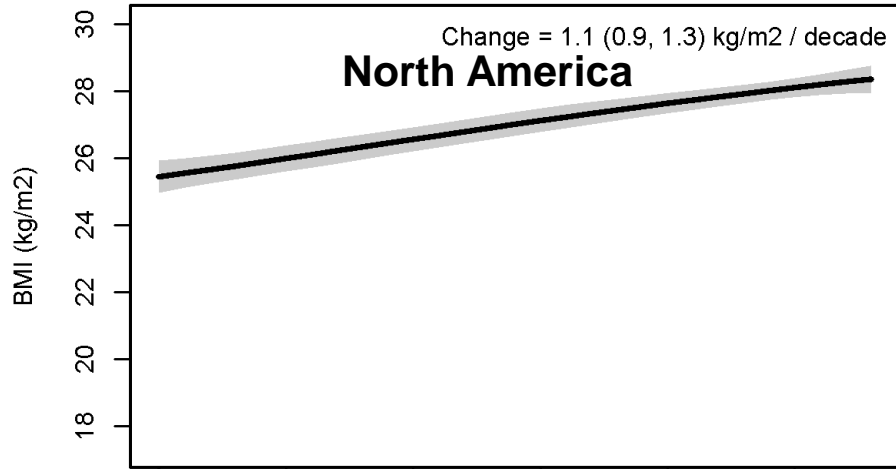
Women



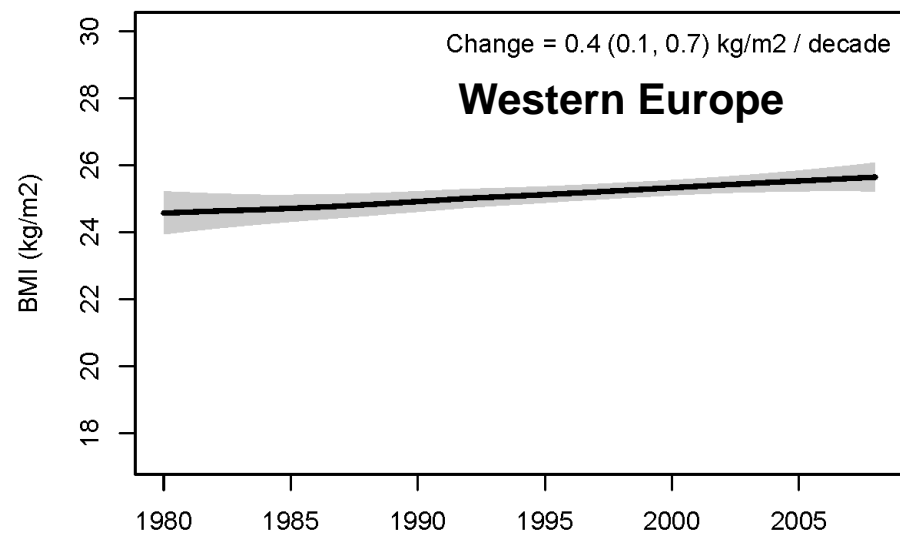
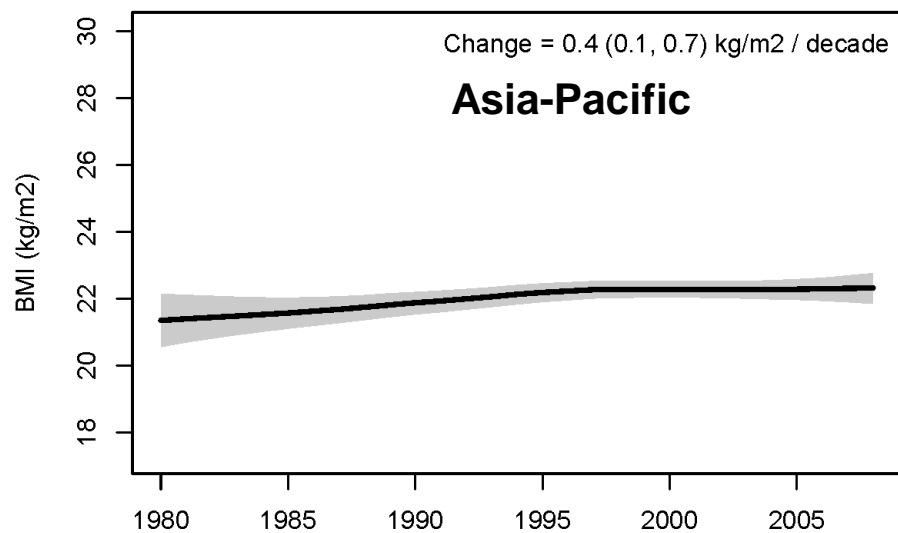
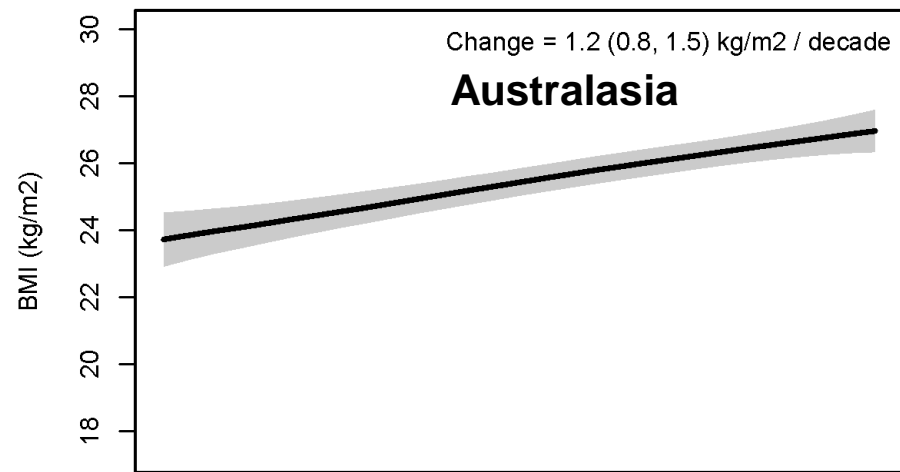
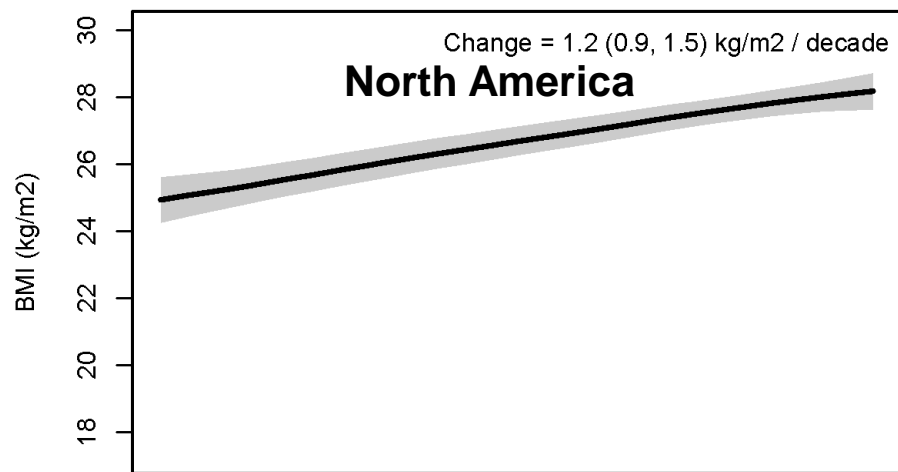
Men



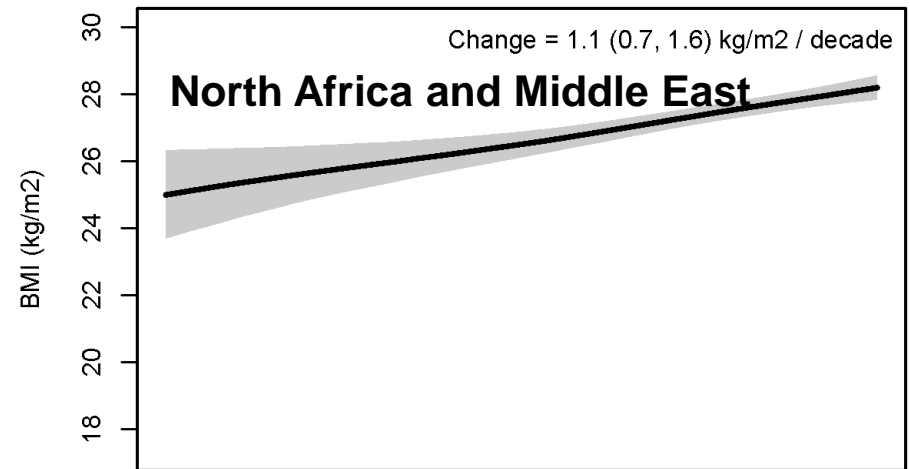
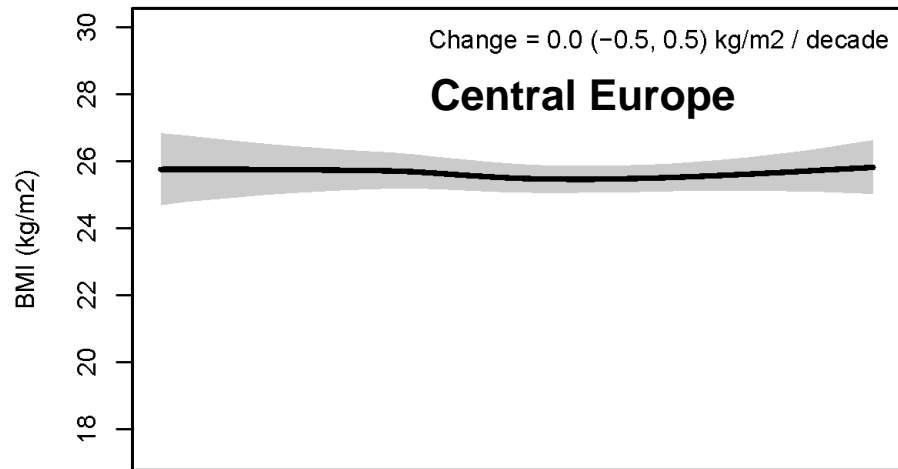
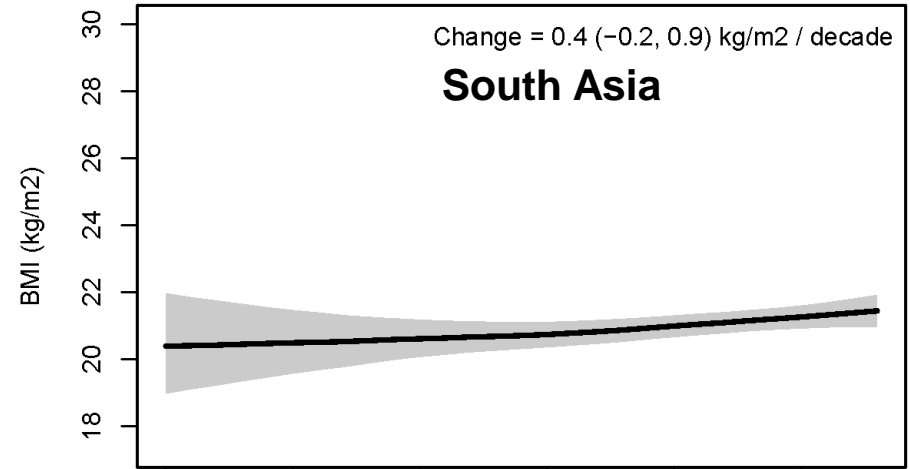
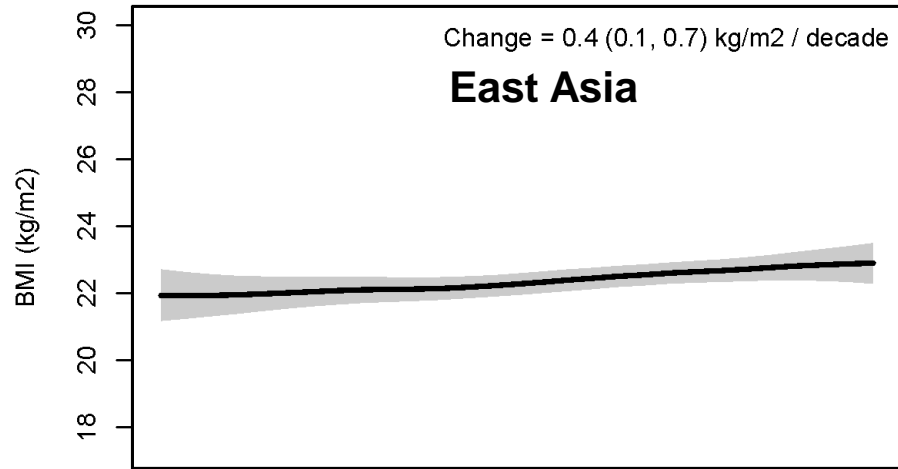
BMI trends in high-income regions (men)



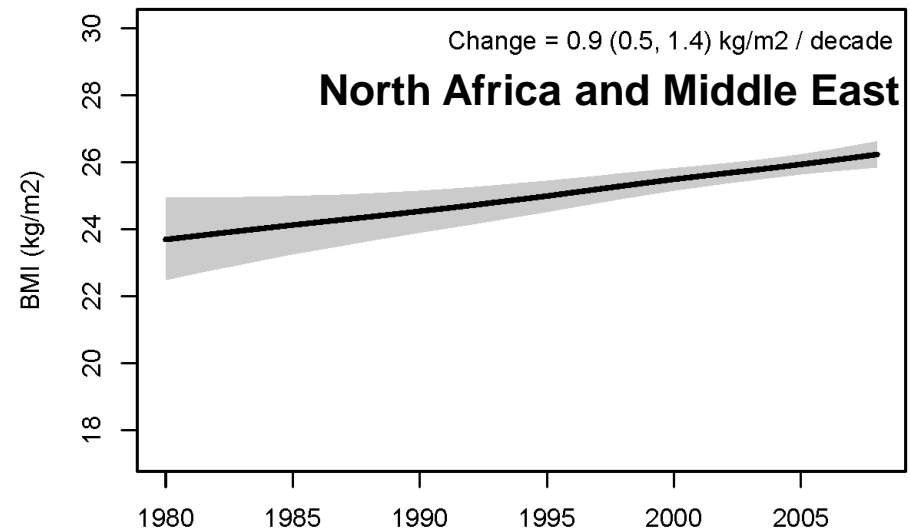
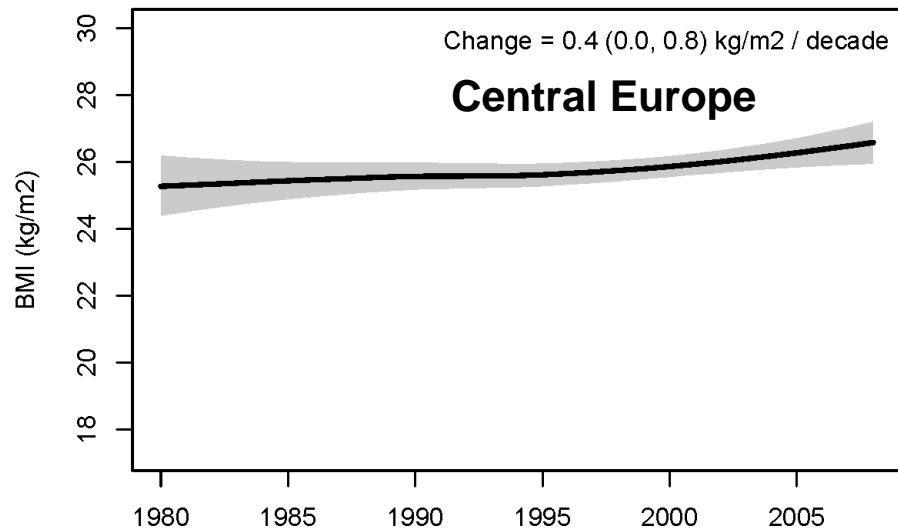
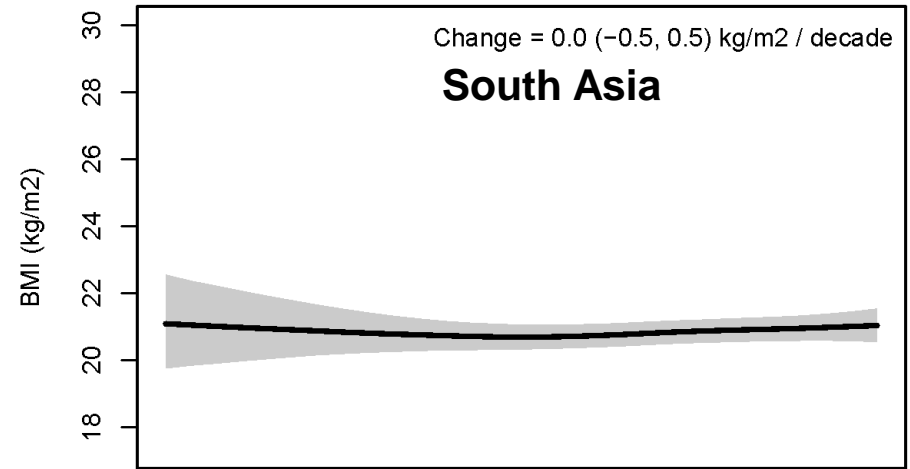
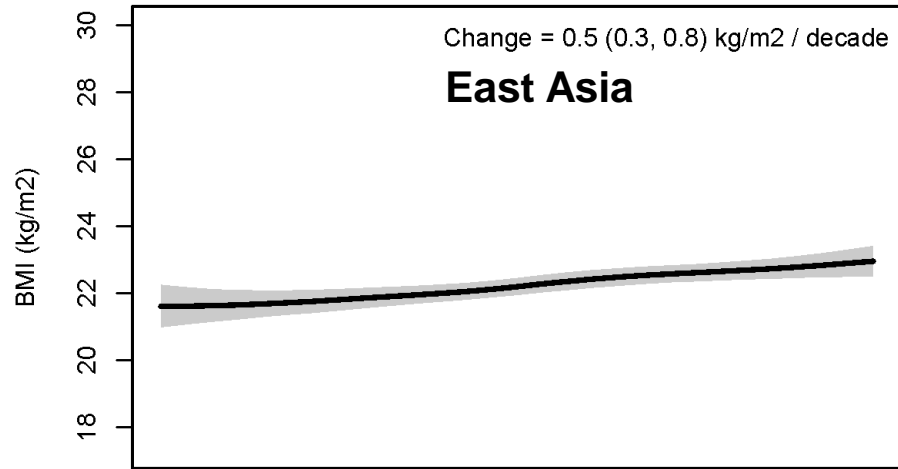
BMI trends in high-income regions (women)



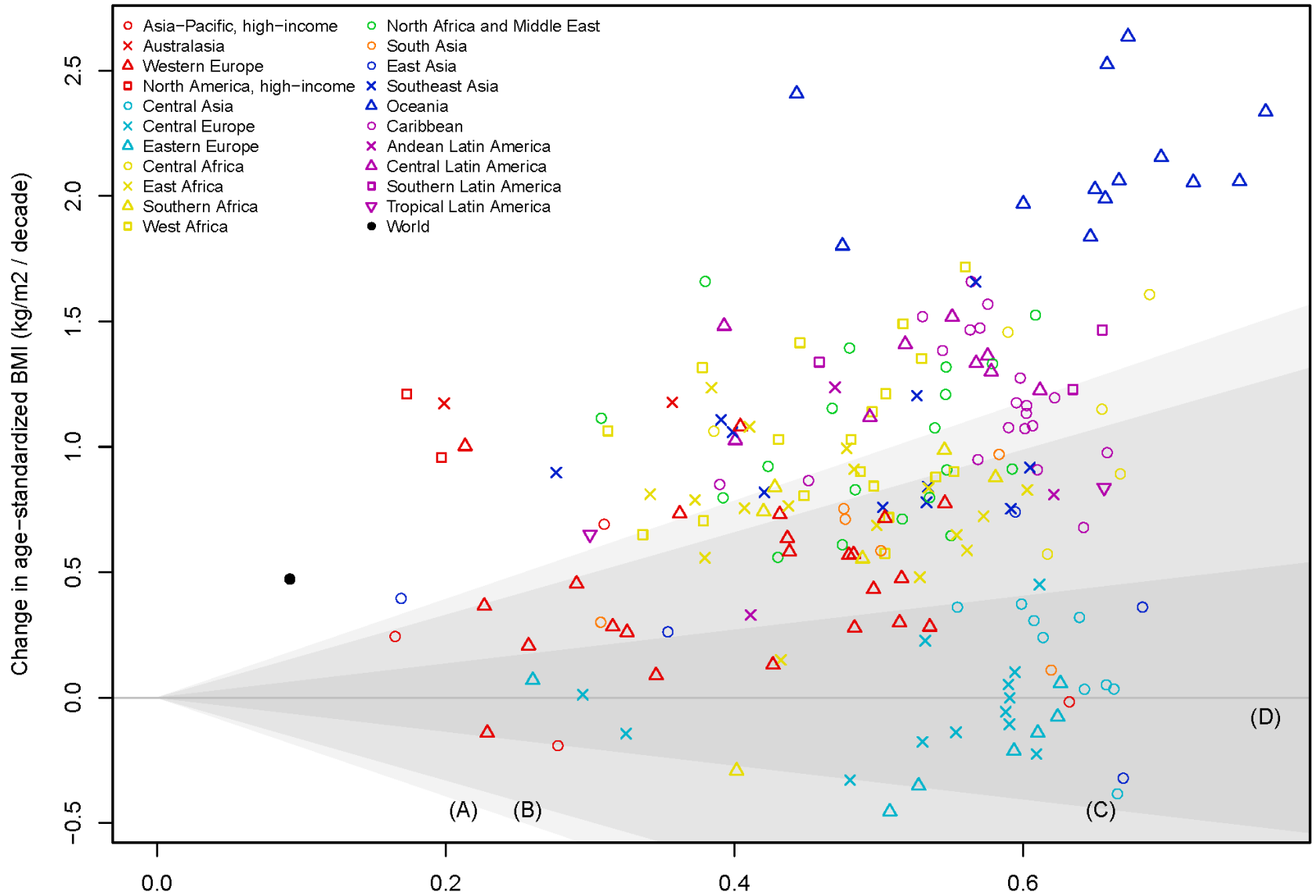
BMI trends in selected regions (women)



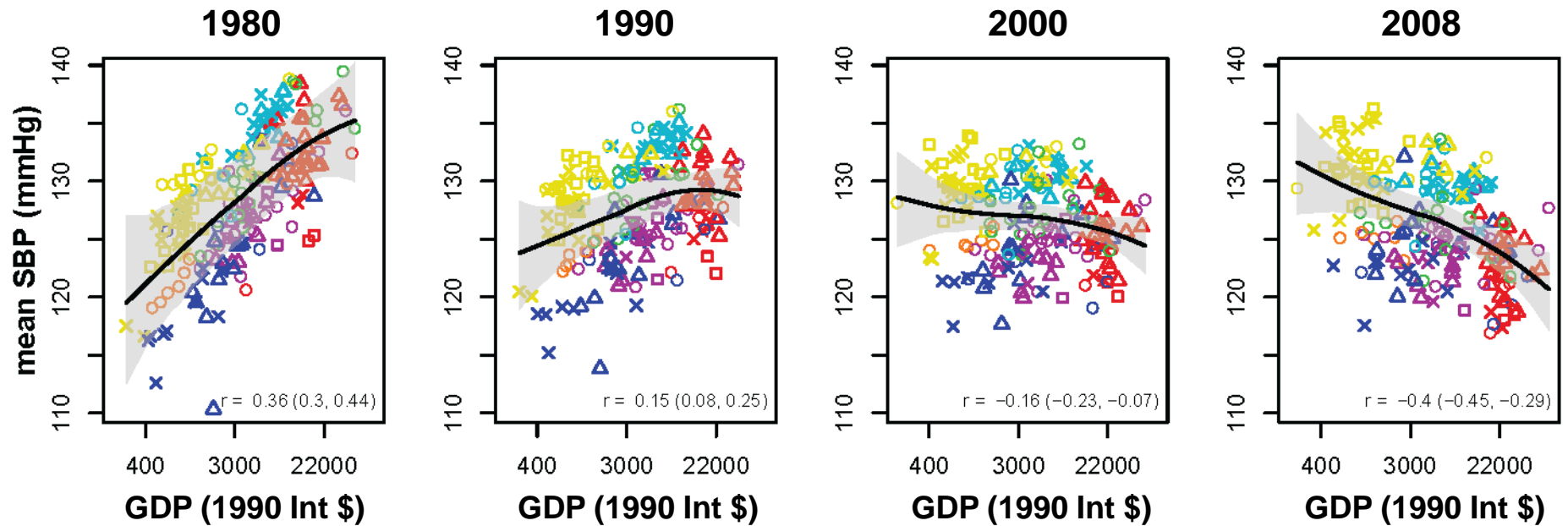
BMI trends in selected regions (men)



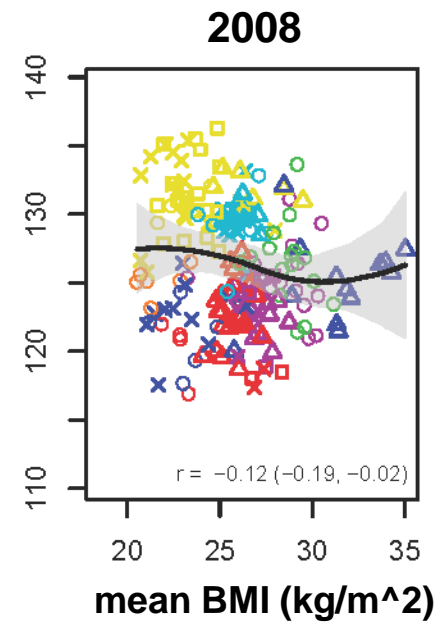
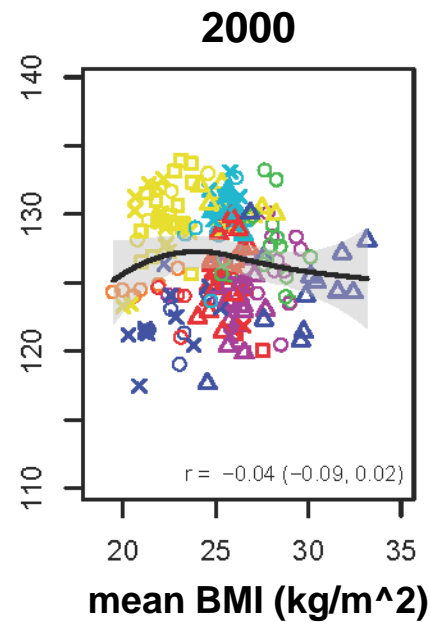
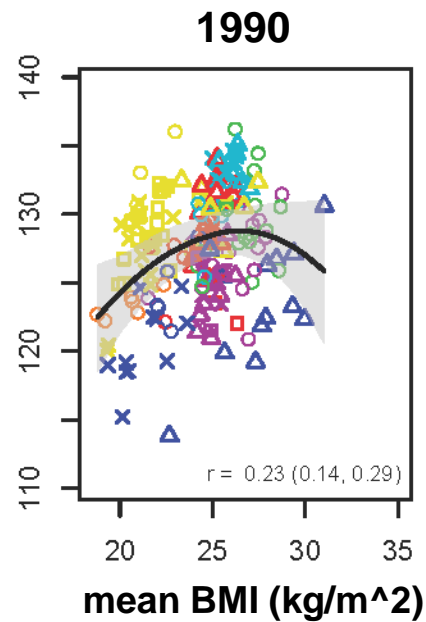
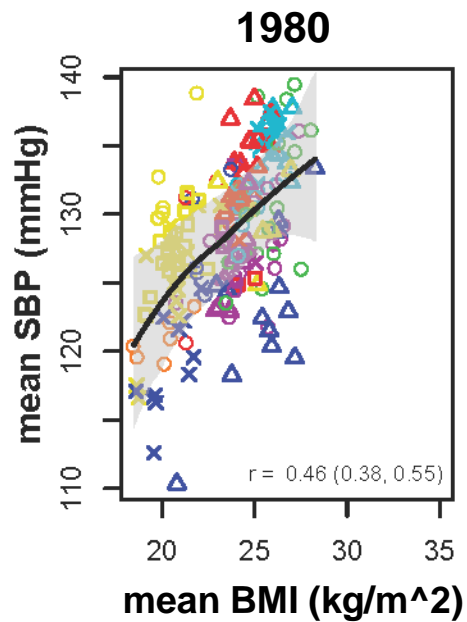
Change in BMI in 199 countries (women)



SBP in relation to national income 1980-2008 (women)



SBP in relation to BMI 1980-2008 (women)



Risk factors in the eight subgroups of US population: men \geq 60 years

America	SBP (mmHg)	BMI (kg/m ²)	FPG (mg/dL)	Current smoking (%)	Former smoking (%)
Asians	135 (4.4)	27 (0.81)	106 (1.9)	5 (3.5)	35 (11.7)
Northland rural whites	133 (1.2)	28.6 (0.34)	110 (1.0)	11 (2.3)	59 (3.7)
Middle America	133 (0.3)	27.9 (0.09)	109 (0.3)	11 (0.6)	56 (1.0)
Whites in Appalachia and Mississippi Valley	133 (0.8)	27.9 (0.21)	110 (0.6)	14 (1.4)	56 (2.2)
Western Native Americans	138 (4.0)	29.4 (1.14)	116 (3.6)	21 (9.2)	40 (9.8)
Black middle America	138 (2.0)	28.3 (0.52)	112 (1.4)	19 (4.3)	45 (6.1)
Southern rural blacks	140 (2.0)	28.7 (0.57)	113 (1.8)	17 (3.7)	44 (5.6)
High-risk urban blacks	138 (2.9)	28.0 (0.78)	110 (2.1)	21 (5.9)	39 (7.5)

Risk factors in the eight subgroups of US population: women \geq 60 years

America	SBP (mmHg)	BMI (kg/m ²)	FPG (mg/dL)	Current smoking (%)	Former smoking (%)
Asians	143 (4.8)	27.6 (1.37)	103 (2.4)	3 (2.0)	21 (7.2)
Northland rural whites	139 (1.2)	29.7 (0.39)	104 (0.6)	8 (1.5)	27 (2.7)
Middle America	139 (0.3)	28.9 (0.12)	104 (0.2)	11 (0.5)	34 (0.7)
Whites in Appalachia and Mississippi Valley	139 (0.6)	29.2 (0.25)	105 (0.4)	14 (1.1)	26 (1.4)
Western Native Americans	140 (3.6)	30.1 (1.79)	108 (2.9)	15 (5.7)	36 (10.1)
Black middle America	143 (1.6)	31.9 (0.67)	108 (1.1)	14 (2.7)	27 (3.4)
Southern rural blacks	144 (1.5)	32.7 (0.7)	110 (1.3)	10 (2.4)	20 (3.0)
High-risk urban blacks	144 (2.3)	31.0 (0.87)	106 (1.6)	12 (3.2)	32 (5.5)

Blood pressure and hypertension

A global health perspective

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