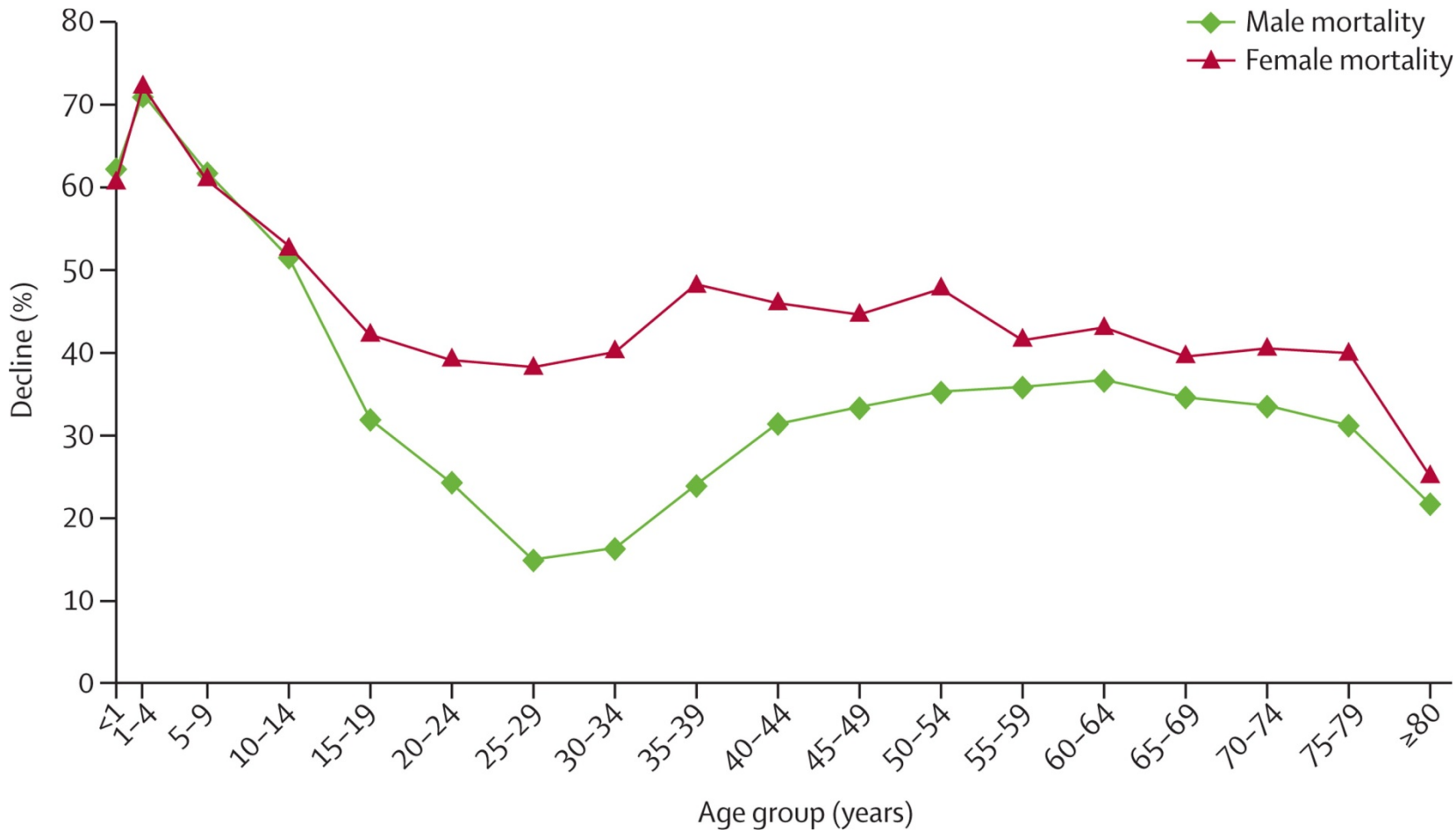


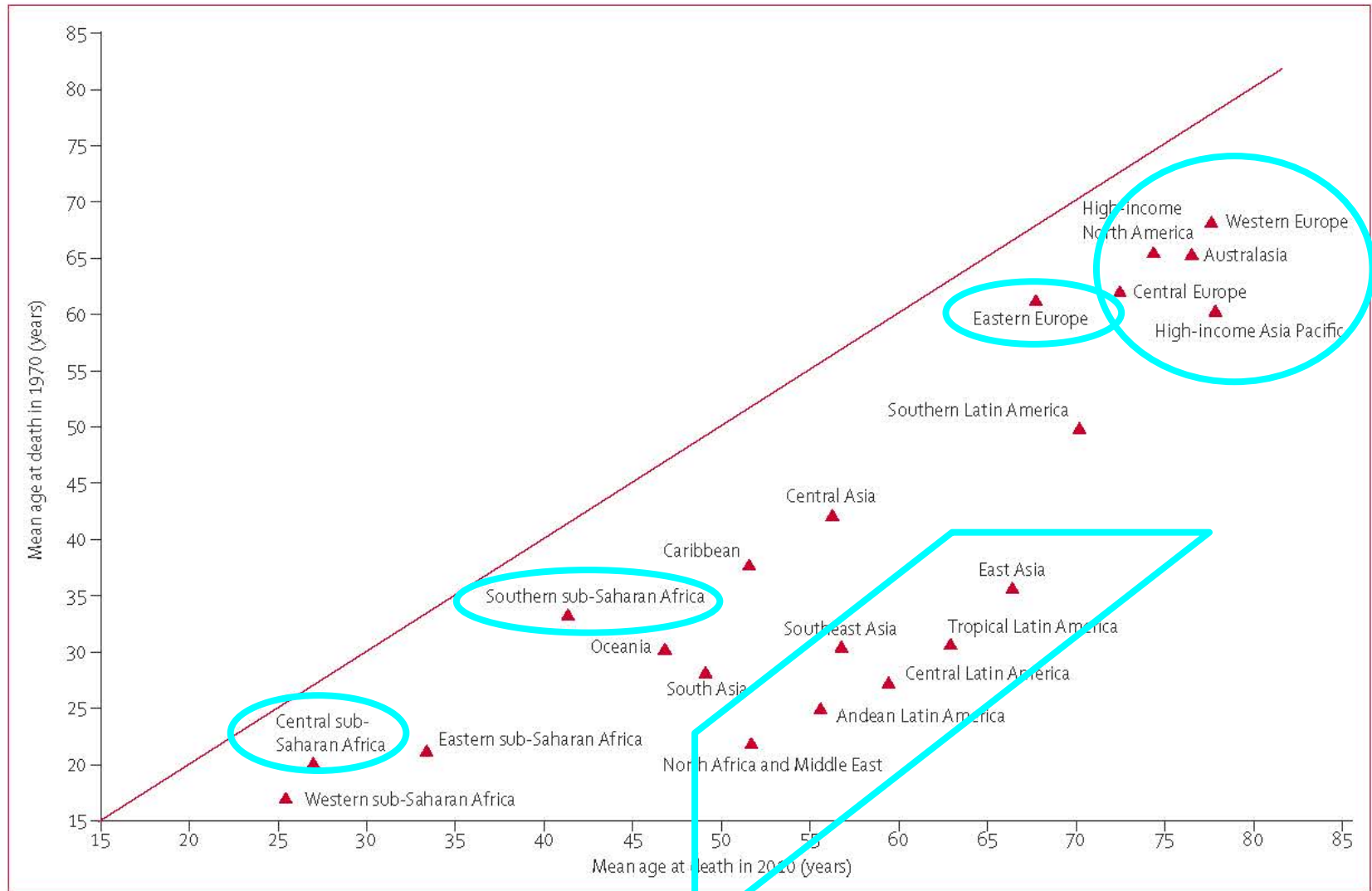
# The global health impacts of poor nutrition

Majid Ezzati FMedSci  
MRC-PHE Centre for Environment and Health  
School of Public Health  
Imperial College London

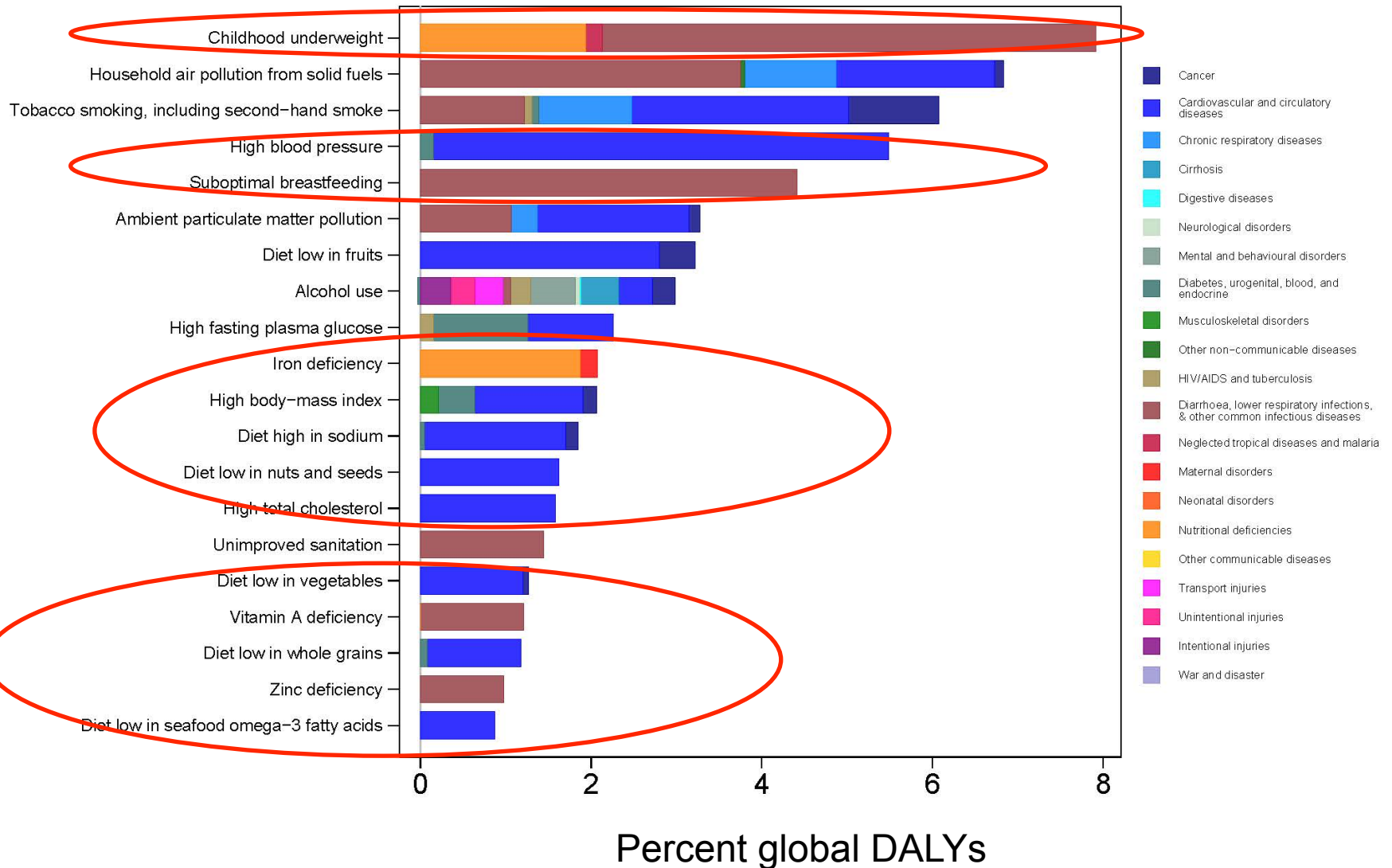
# Percent decline in age-specific mortality between 1970 and 2010 in the world



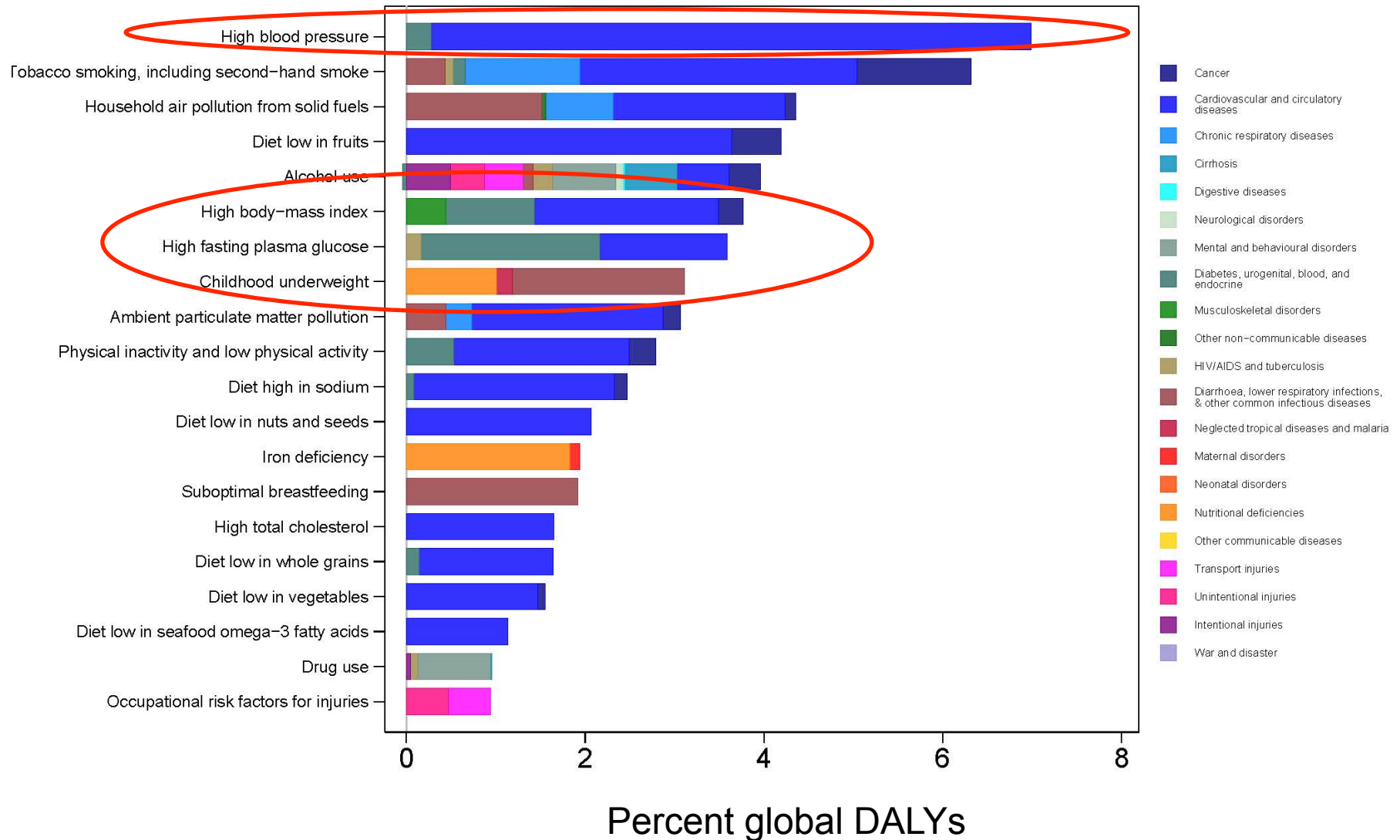
# Shift in mean age at death between 1970 and 2010



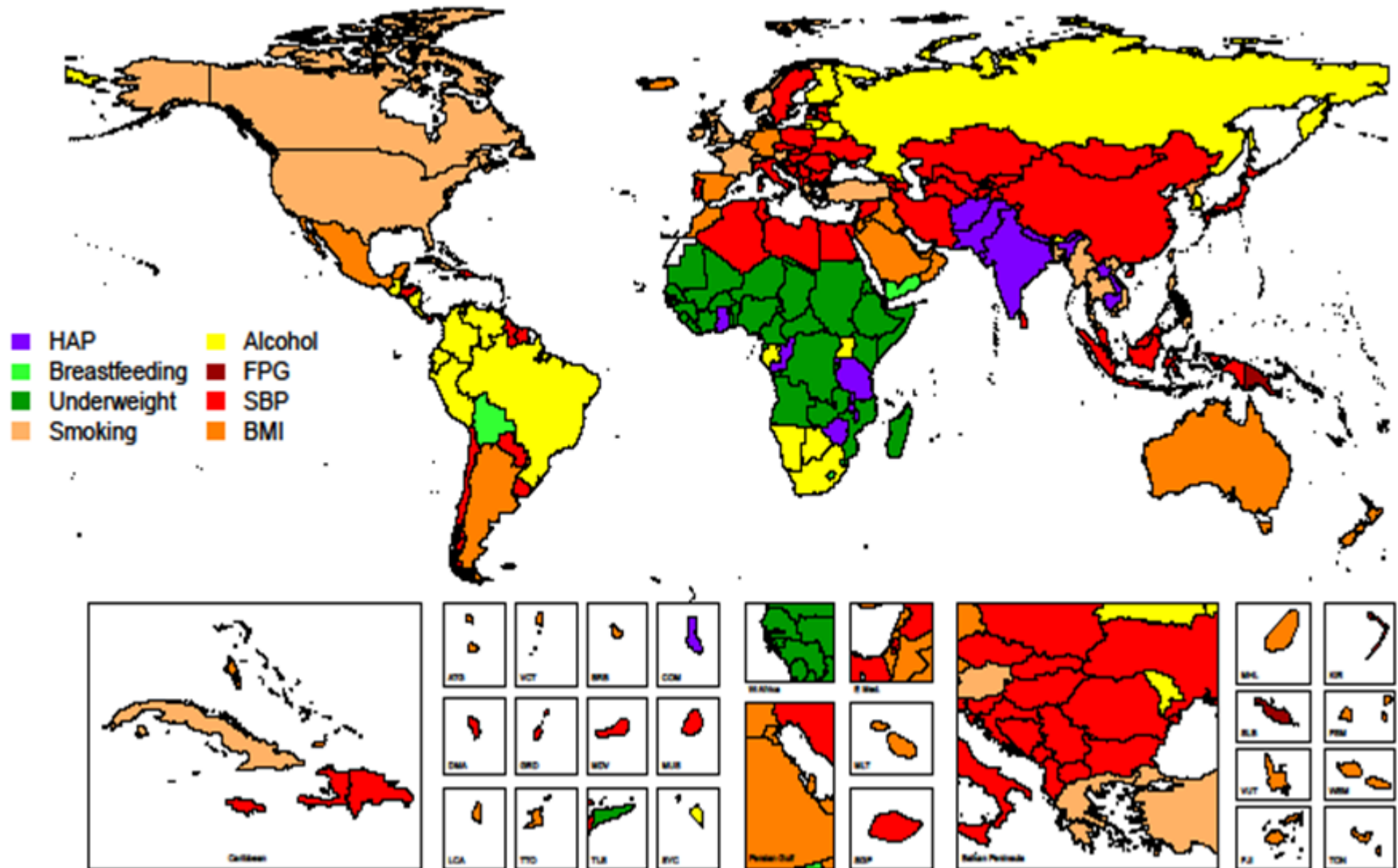
# Burden of disease attributable to risk factors in the world in 1990



# Burden of disease attributable to risk factors in the world in 2010



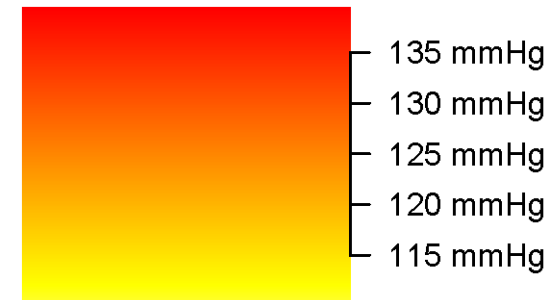
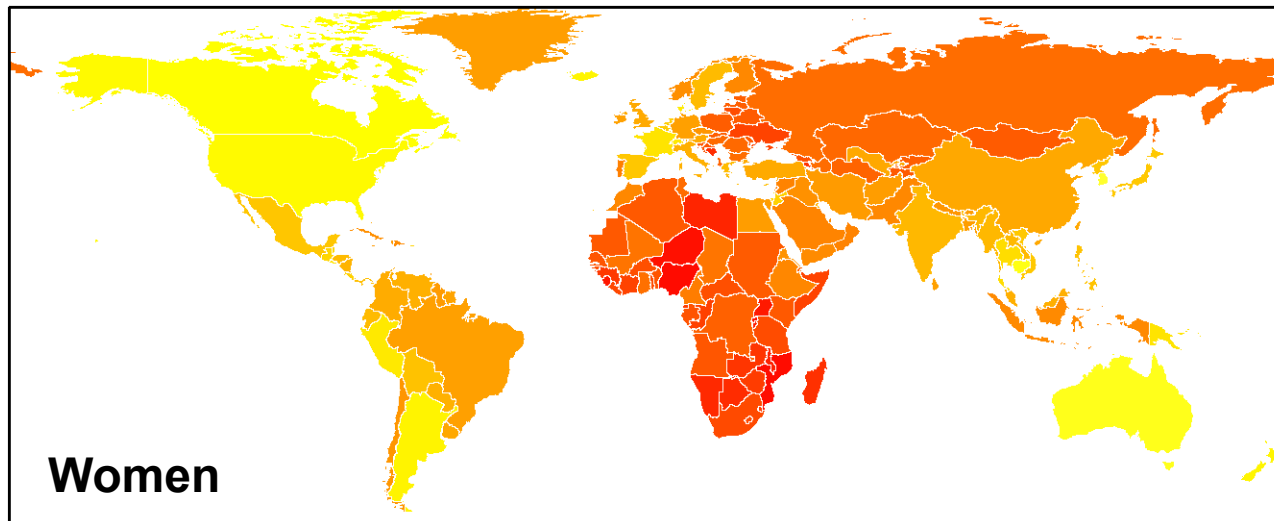
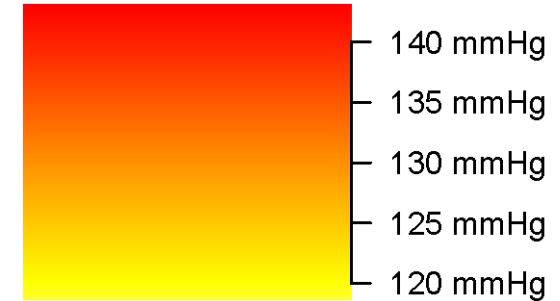
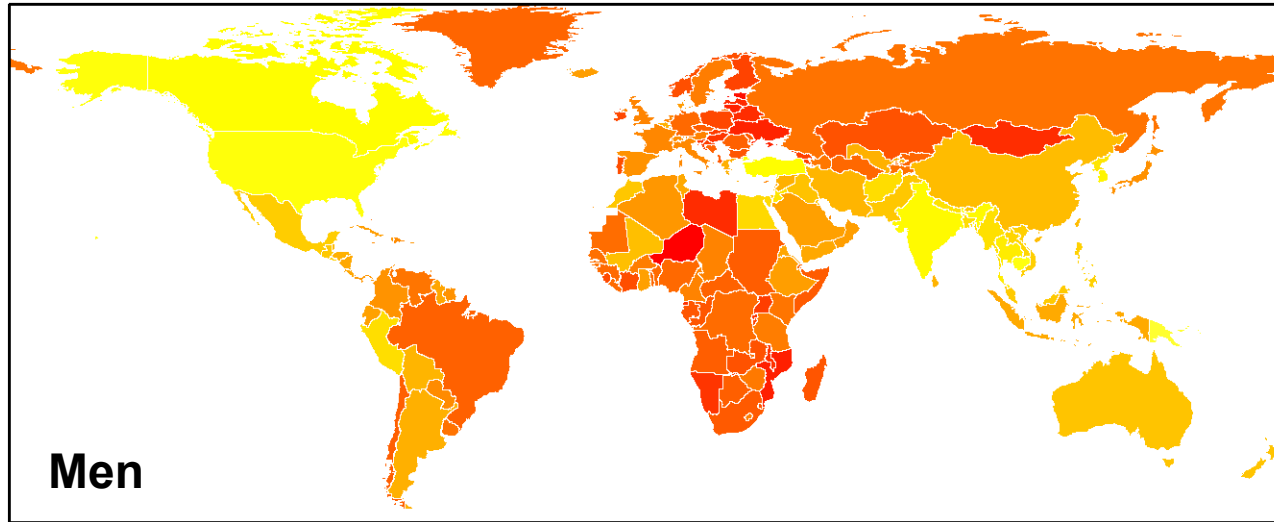
# Leading risk factor by country in 2010



# Risk factor ranks in the world and by region

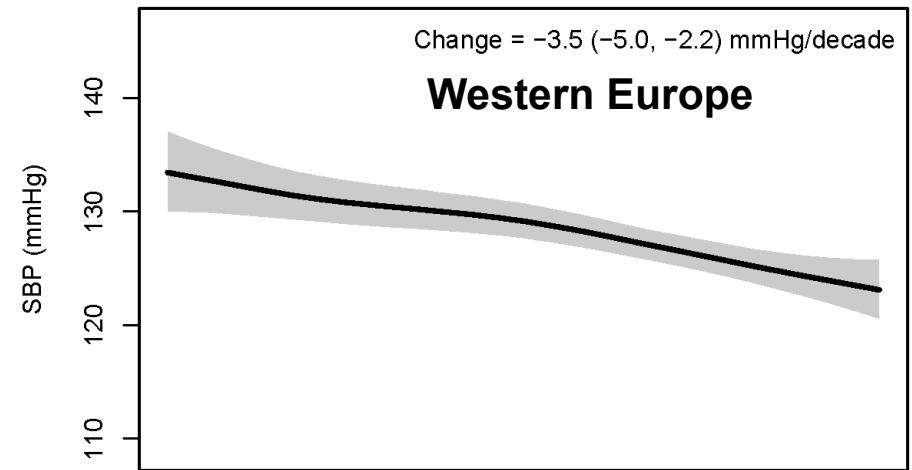
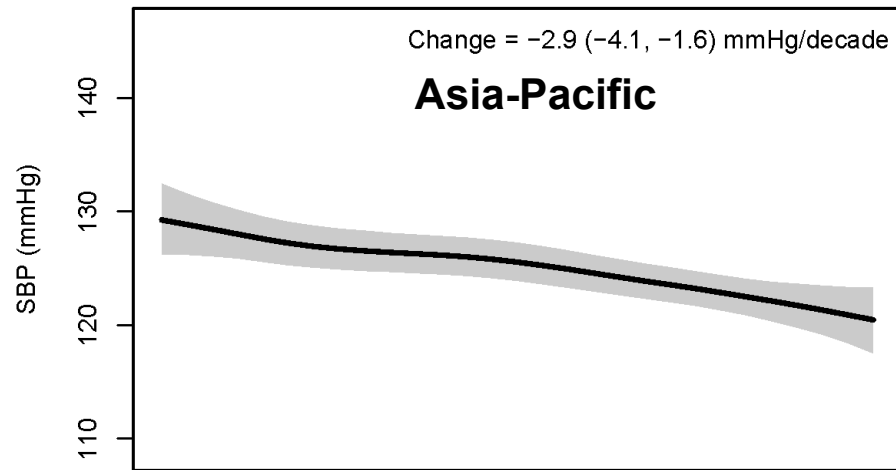
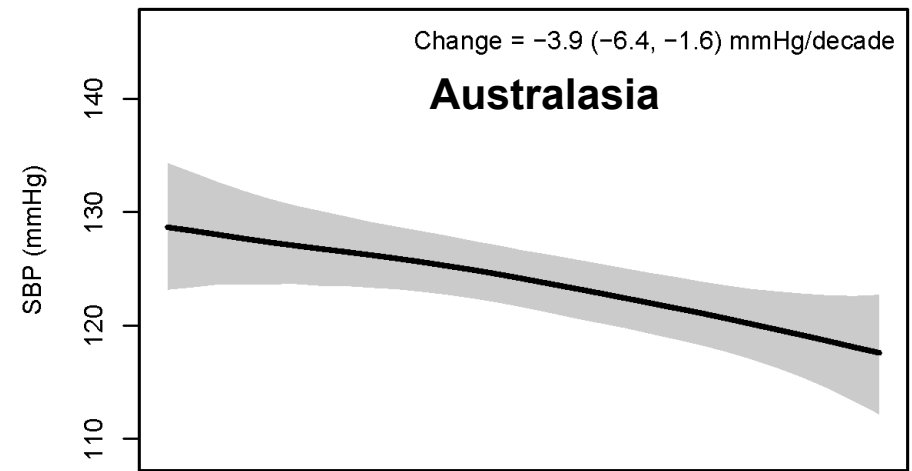
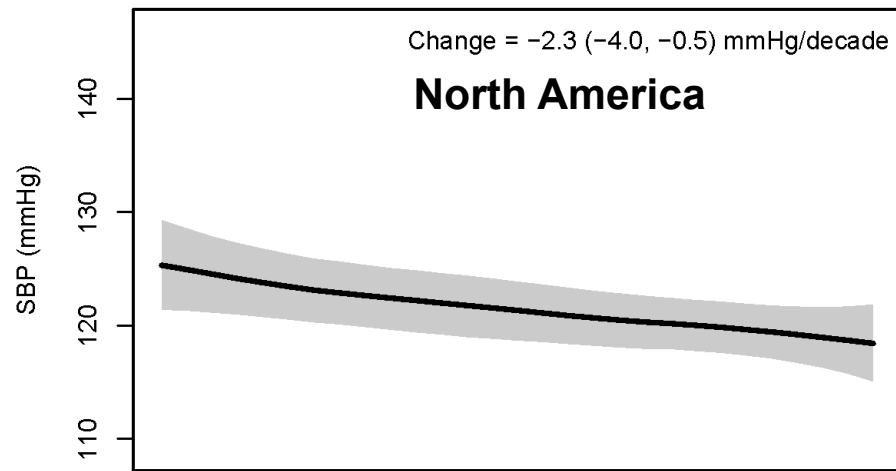
	Global	High-income Asia Pacific	Western Europe	Australasia	High-income North America	Central Europe Southern Latin America	Eastern Europe	East Asia	Tropical Latin America	Central Latin America	Southeast Asia	Central Asia	Andean Latin America	North Africa and Middle East	Caribbean	South Asia	Oceania	Southern sub-Saharan Africa	Eastern sub-Saharan Africa	Central sub-Saharan Africa	Western sub-Saharan Africa	
High blood pressure	1	1	2	3	3	1	2	2	1	1	4	1	1	2	1	1	3	5	2	5	5	6
Tobacco smoking, including second-hand smoke	2	2	1	2	1	2	3	3	2	4	5	2	2	5	3	3	2	3	5	7	12	10
Household air pollution from solid fuels	3	42				14	23	20	5	18	11	3	12	7	25	8	1	4	7	2	2	2
Diet low in fruits	4	4	7	6	6	5	6	5	3	6	7	4	4	10	6	7	5	9	8	8	11	13
Alcohol use	5	5	6	9	7	4	4	1	8	2	2	6	5	1	18	9	10	7	1	6	10	5
High body-mass index	6	8	3	1	2	3	1	4	9	3	1	9	3	3	2	2	17	2	3	14	18	15
High fasting plasma glucose	7	7	5	5	4	7	5	10	7	5	3	5	7	6	4	4	7	1	6	10	13	11
Childhood underweight	8	39	38	37	39	38	38	38	38	32	23	13	25	18	20	14	4	8	9	1	1	1
Ambient particulate matter pollution	9	9	11	26	14	12	24	14	4	27	19	11	10	24	7	19	6	32	25	16	14	7
Physical inactivity and low physical activity	10	3	4	4	5	6	7	7	10	8	6	8	9	8	5	6	11	6	11	15	15	16
Diet high in sodium	11	6	10	11	11	9	11	9	6	9	13	7	6	13	8	15	14	16	13	21	17	18
Diet low in nuts and seeds	12	11	9	7	8	8	8	8	12	10	8	15	8	12	9	10	13	13	16	22	16	21
Iron deficiency	13	20	32	21	35	22	17	21	19	14	12	12	17	4	11	5	8	11	10	4	4	4
Suboptimal breastfeeding	14					27		24	22	15	14	16	9	13	13	9	10	4	3	3	3	
High total cholesterol	15	12	8	8	9	10	9	6	13	11	10	16	14	16	10	16	20	14	19	28	27	30
Diet low in whole grains	16	10	16	16	17	11	12	11	11	12	14	26	13	17	12	12	15	15	32	24	19	24
Diet low in vegetables	17	14	13	12	13	13	10	12	15	16	20	10	11	14	16	11	16	12	15	23	23	20

# Age-standardized mean SBP in 2008

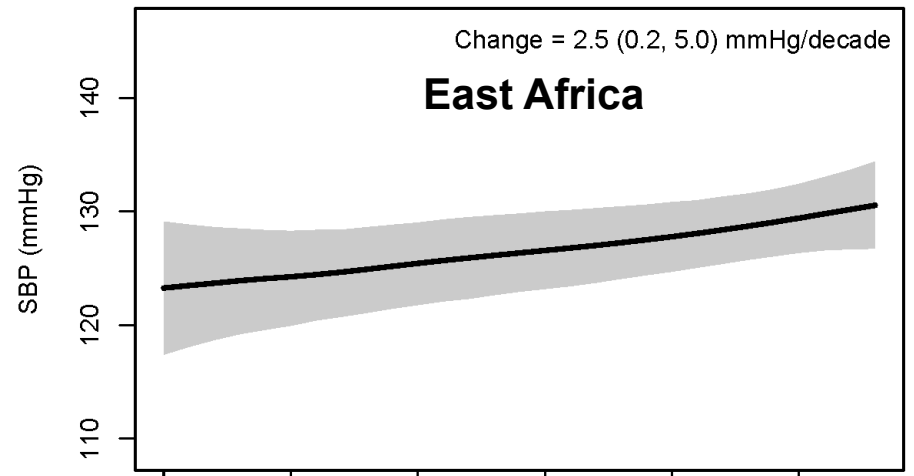
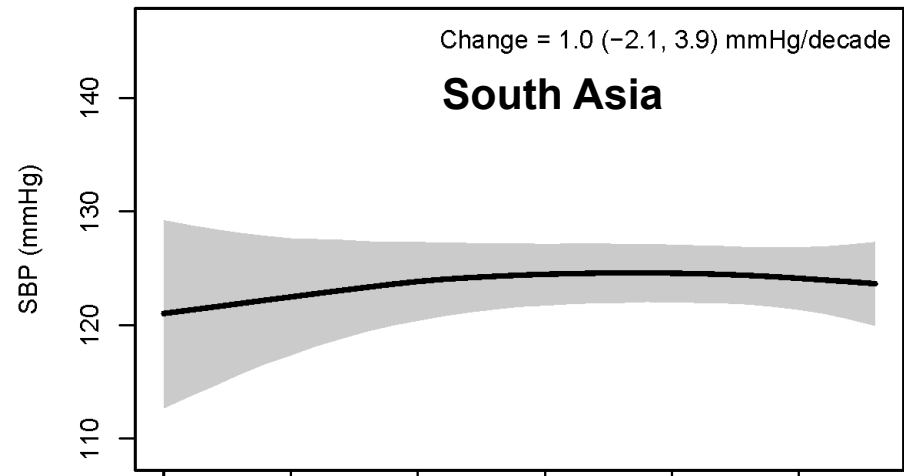
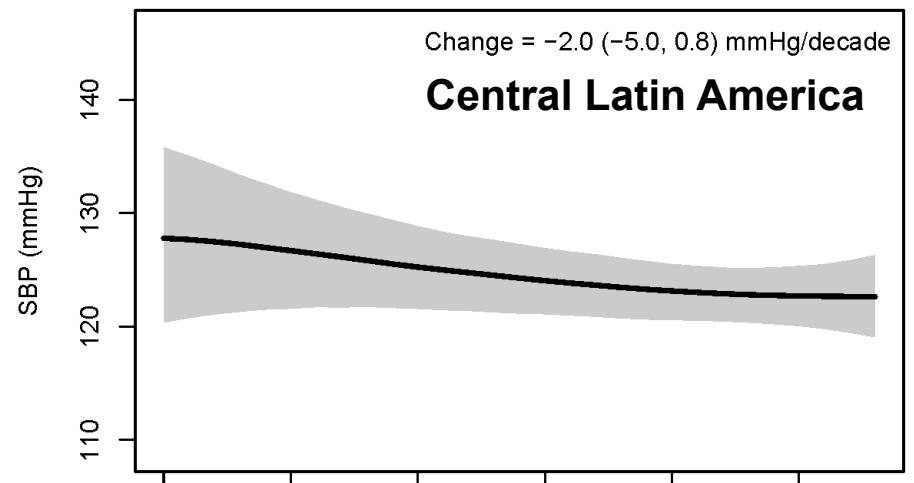
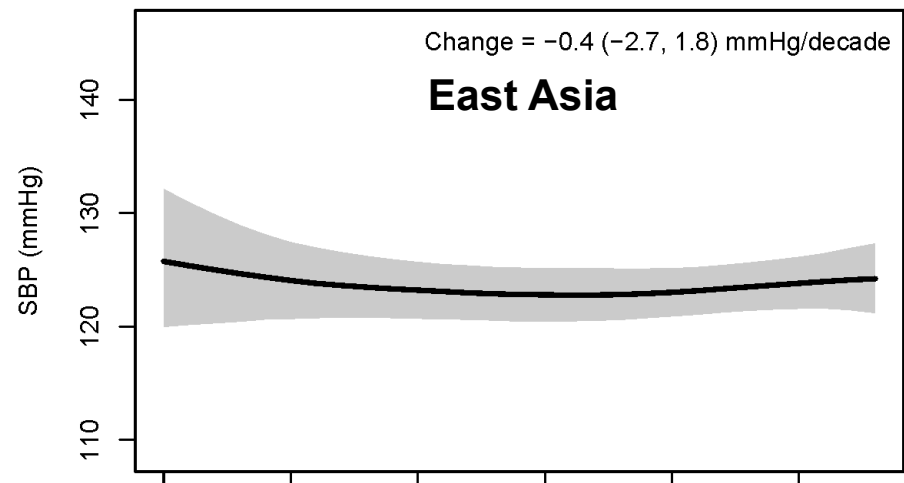




# SBP trends in high-income regions (women)



# SBP trends in selected regions (women)



# Population mean systolic blood pressure in relation to national income

Women

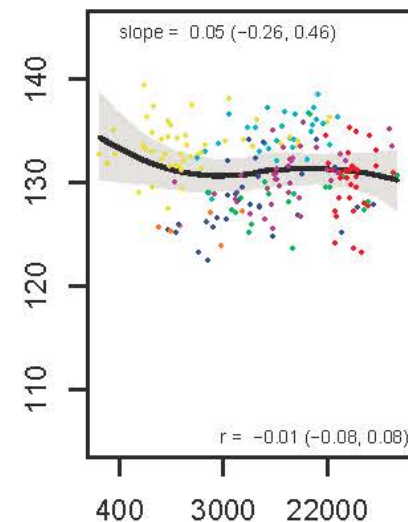
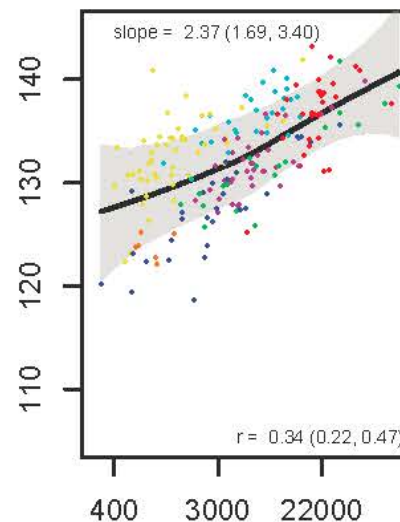
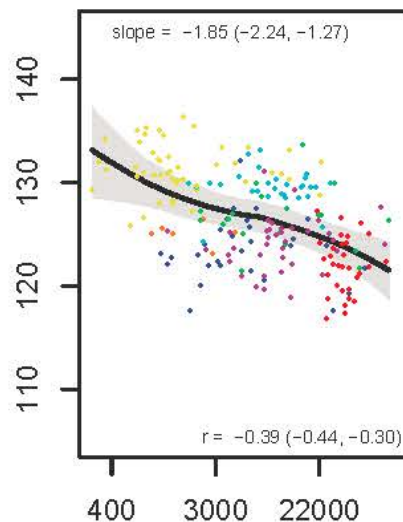
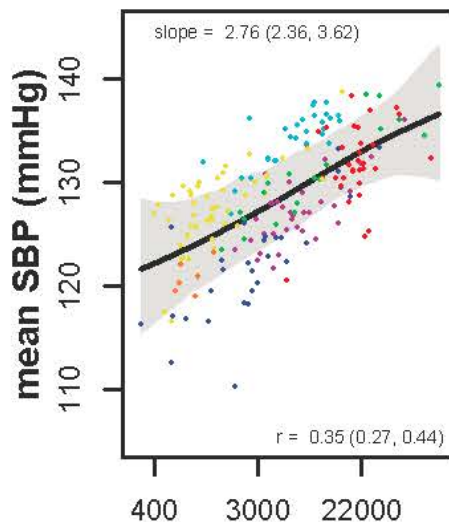
Men

1980

2008

1980

2008



GDP (2005 Int \$)

GDP (2005 Int \$)

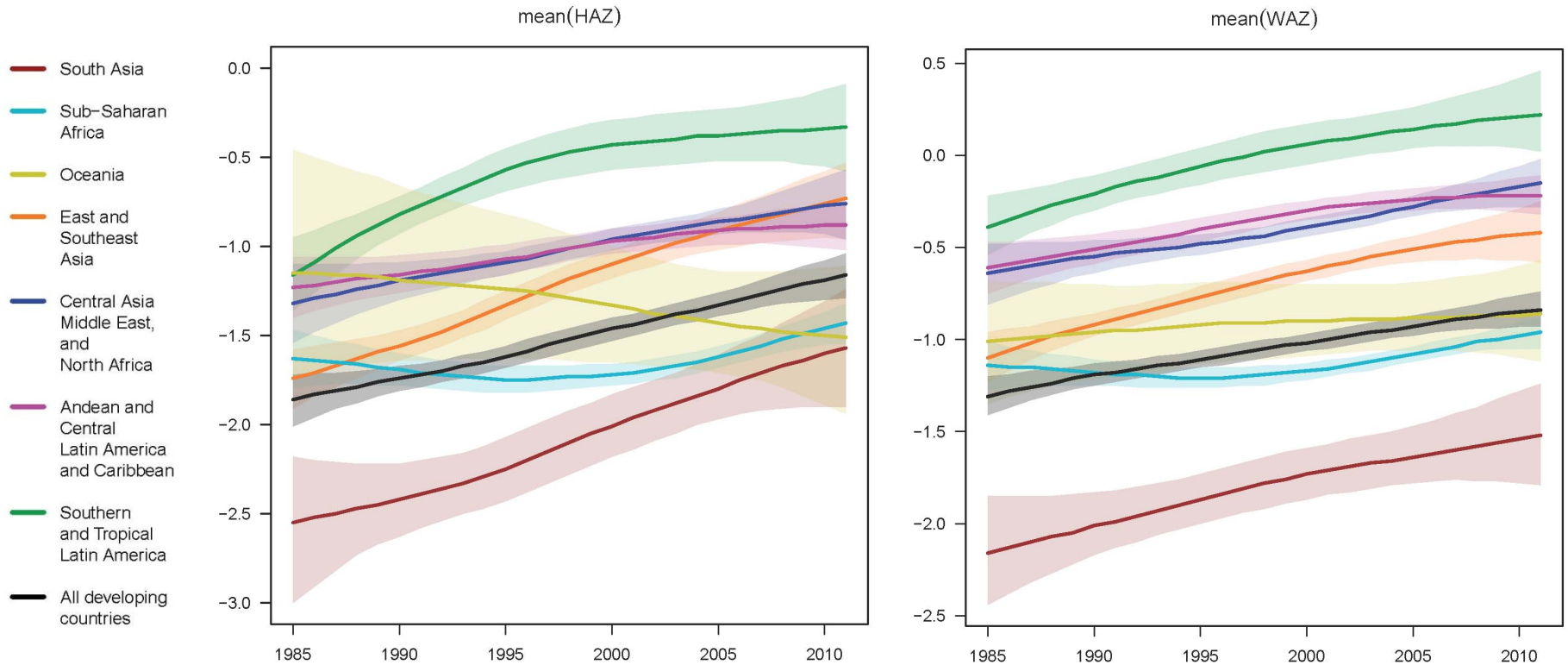
GDP (2005 Int \$)

GDP (2005 Int \$)

# Risk factor ranks in the world and by region

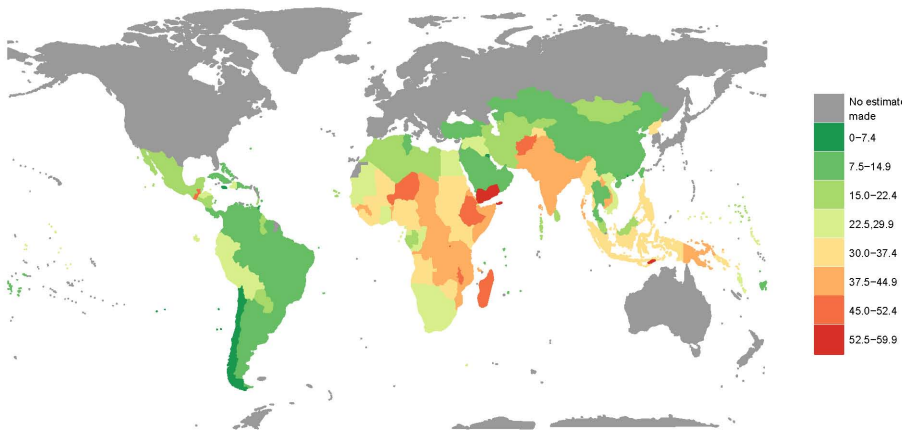
	Global	High-income Asia Pacific	Western Europe	Australasia	High-income North America	Central Europe Southern Latin America	Eastern Europe	East Asia	Tropical Latin America	Central Latin America	Southeast Asia	Central Asia	Andean Latin America	North Africa and Middle East	Caribbean	South Asia	Oceania	Southern sub-Saharan Africa	Eastern sub-Saharan Africa	Central sub-Saharan Africa	Western sub-Saharan Africa	
High blood pressure	1	1	2	3	3	1	2	2	1	1	4	1	1	2	1	1	3	5	2	5	5	6
Tobacco smoking, including second-hand smoke	2	2	1	2	1	2	3	3	2	4	5	2	2	5	3	3	2	3	5	7	12	10
Household air pollution from solid fuels	3	42				14	23	20	5	18	11	3	12	7	25	8	1	4	7	2	2	2
Diet low in fruits	4	4	7	6	6	5	6	5	3	6	7	4	4	10	6	7	5	9	8	8	11	13
Alcohol use	5	5	6	9	7	4	4	1	8	2	2	6	5	1	18	9	10	7	1	6	10	5
High body-mass index	6	8	3	1	2	3	1	4	9	3	1	9	3	3	2	2	17	2	3	14	18	15
High fasting plasma glucose	7	7	5	5	4	7	5	10	7	5	3	5	7	6	4	4	7	1	6	10	13	11
Childhood underweight	8	39	38	37	39	38	38	38	38	32	23	13	25	18	20	14	4	8	9	1	1	1
Ambient particulate matter pollution	9	9	11	26	14	12	24	14	4	27	19	11	10	24	7	19	6	32	25	16	14	7
Physical inactivity and low physical activity	10	3	4	4	5	6	7	7	10	8	6	8	9	8	5	6	11	6	11	15	15	16
Diet high in sodium	11	6	10	11	11	9	11	9	6	9	13	7	6	13	8	15	14	16	13	21	17	18
Diet low in nuts and seeds	12	11	9	7	8	8	8	8	12	10	8	15	8	12	9	10	13	13	16	22	16	21
Iron deficiency	13	20	32	21	35	22	17	21	19	14	12	12	17	4	11	5	8	11	10	4	4	4
Suboptimal breastfeeding	14					27		24	22	15	14	16	9	13	13	9	10	4	3	3	3	3
High total cholesterol	15	12	8	8	9	10	9	6	13	11	10	16	14	16	10	16	20	14	19	28	27	30
Diet low in whole grains	16	10	16	16	17	11	12	11	11	12	14	26	13	17	12	12	15	15	32	24	19	24
Diet low in vegetables	17	14	13	12	13	13	10	12	15	16	20	10	11	14	16	11	16	12	15	23	23	20

# Trends in mean HAZ and WAZ by region

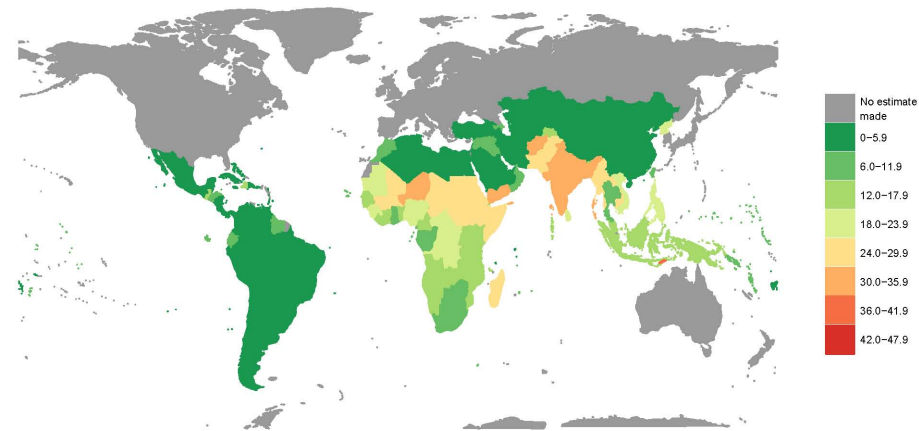


# Prevalence of stunting and underweight in 2011

## Stunting

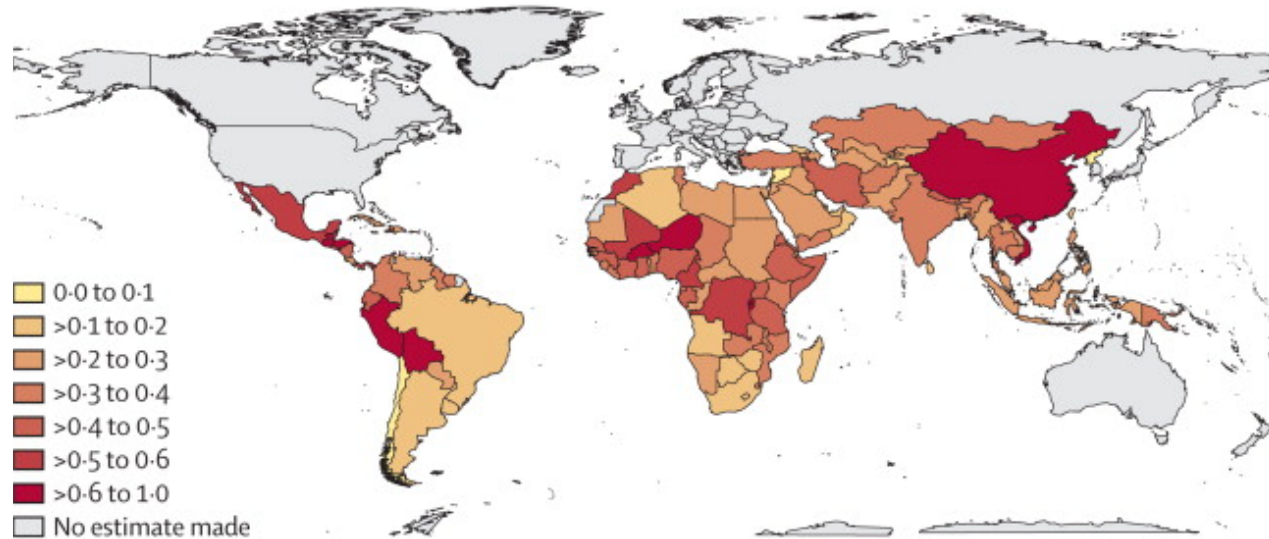


## Underweight

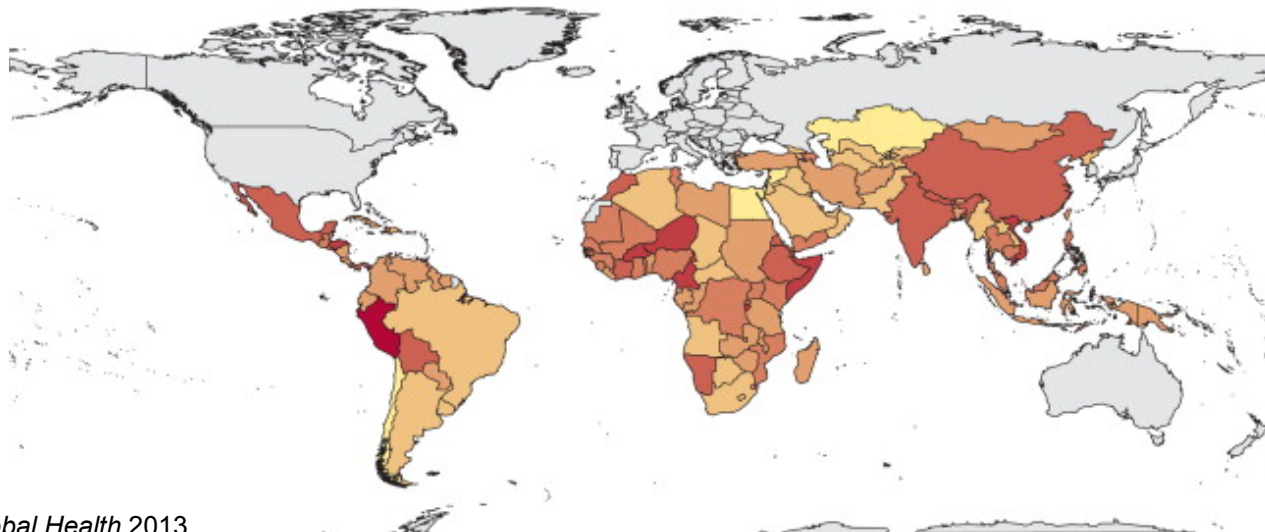


# Urban advantage in child anthropometry

Urban-rural difference in mean height-for-age Z score



Urban-rural difference in mean weight-for-age Z score



# Mean haemoglobin and anaemia by region (pregnant women)

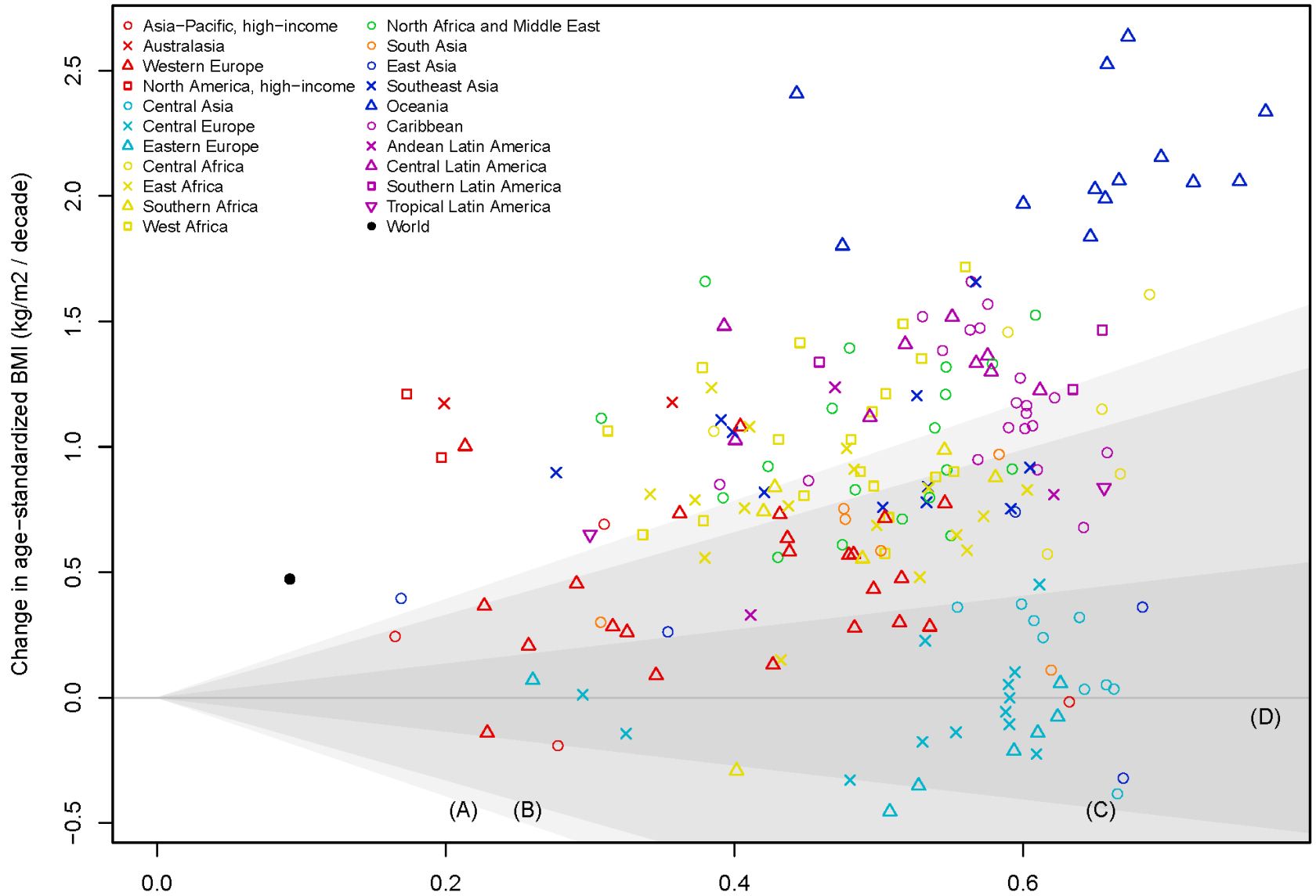
	1995			2011		
	Mean haemoglobin (g/L)	Anaemia (%)	Severe anaemia (%)	Mean haemoglobin (g/L)	Anaemia (%)	Severe anaemia (%)
<b>Pregnant women aged 15–49 years</b>						
High-income regions	119 (116–121)	23% (18–30)	0.5% (0.1–1.1)	119 (117–122)	22% (16–29)	0.2% (0.0–0.4)
Central and eastern Europe	117 (111–124)	30% (17–47)	0.9% (0.2–2.2)	119 (113–125)	24% (14–40)	0.3% (0.1–0.9)
East and southeast Asia	115 (112–117)	34% (28–43)	1.3% (0.7–2.0)	119 (114–123)	25% (17–38)	0.4% (0.1–1.0)
Oceania	110 (104–117)	48% (31–63)	2.8% (0.8–5.9)	115 (107–124)	36% (18–59)	1.1% (0.2–3.2)
South Asia	108 (104–111)	53% (43–63)	2.9% (1.8–4.4)	108 (105–113)	52% (40–63)	1.3% (0.7–2.4)
Central Asia, Middle East, and north Africa	114 (111–117)	37% (30–46)	1.1% (0.5–2.0)	117 (113–120)	31% (22–42)	0.4% (0.1–0.8)
Central and west Africa	105 (103–109)	61% (53–66)	3.3% (2.2–4.7)	108 (105–111)	56% (46–62)	1.8% (1.1–3.2)
East Africa	111 (109–114)	46% (41–52)	2.9% (1.9–4.1)	116 (113–118)	36% (30–41)	1.2% (0.8–1.7)
Southern Africa	117 (110–124)	34% (21–51)	1.2% (0.4–2.7)	118 (111–124)	31% (20–48)	0.4% (0.2–0.9)
Andean and central Latin America and Caribbean	115 (112–118)	37% (30–44)	1.4% (0.8–2.3)	119 (116–122)	27% (21–34)	0.3% (0.2–0.6)
Southern and tropical Latin America	115 (106–125)	37% (18–60)	1.3% (0.2–3.8)	117 (108–127)	31% (13–56)	0.5% (0.1–1.7)
Globe	112 (111–113)	43% (39–47)	2.0% (1.5–2.6)	114 (112–116)	38% (34–43)	0.9% (0.6–1.3)



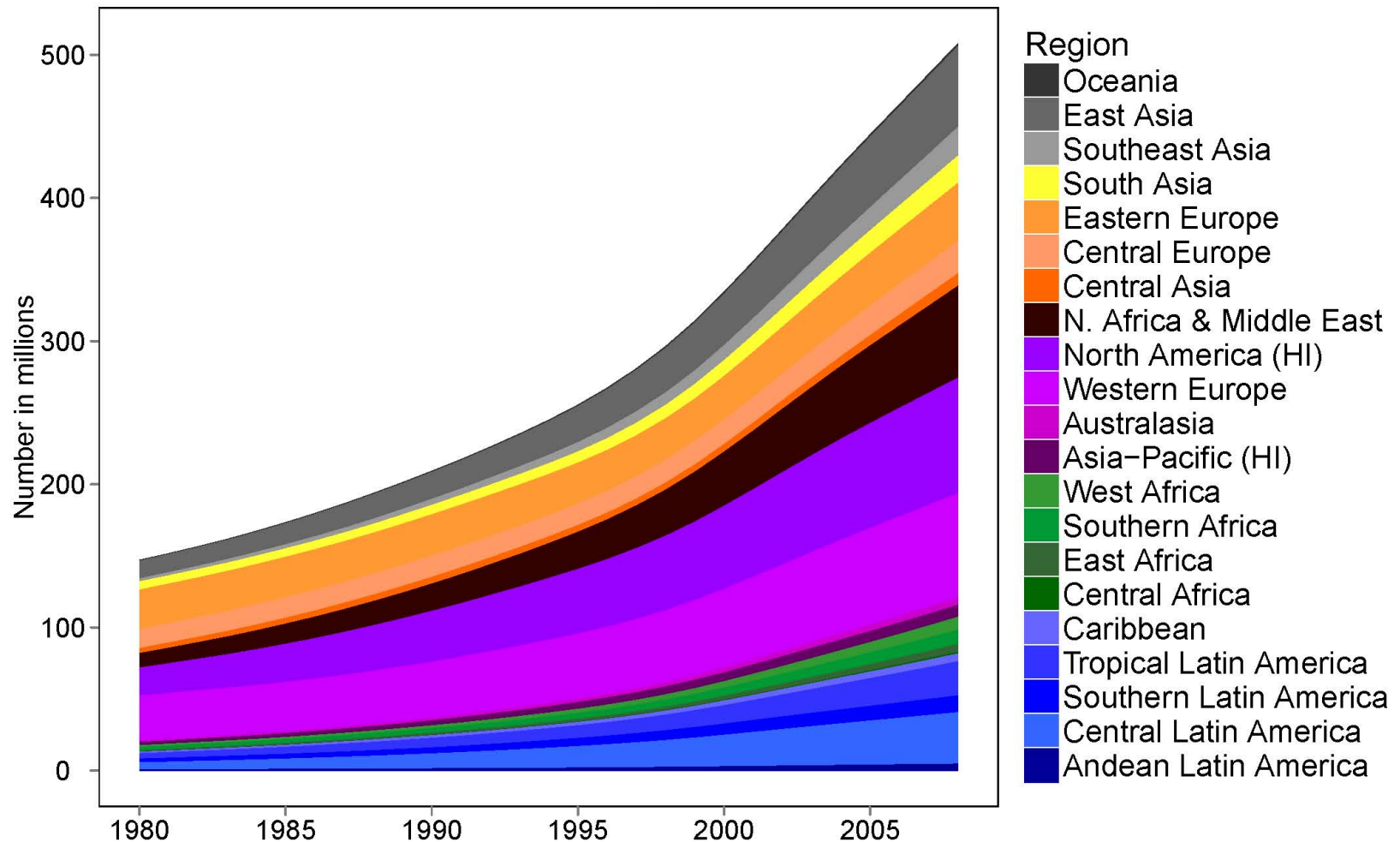
# Risk factor ranks in the world and by region

	Global	High-income Asia Pacific	Western Europe	Australasia	High-income North America	Central Europe Southern Latin America	Eastern Europe	East Asia	Tropical Latin America	Central Latin America	Southeast Asia	Central Asia	Andean Latin America	North Africa and Middle East	Caribbean	South Asia	Oceania	Southern sub-Saharan Africa	Eastern sub-Saharan Africa	Central sub-Saharan Africa	Western sub-Saharan Africa	
High blood pressure	1	1	2	3	3	1	2	2	1	1	4	1	1	2	1	1	3	5	2	5	5	6
Tobacco smoking, including second-hand smoke	2	2	1	2	1	2	3	3	2	4	5	2	2	5	3	3	2	3	5	7	12	10
Household air pollution from solid fuels	3	42				14	23	20	5	18	11	3	12	7	25	8	1	4	7	2	2	2
Diet low in fruits	4	4	7	6	6	5	6	5	3	6	7	4	4	10	6	7	5	9	8	8	11	13
Alcohol use	5	5	6	9	7	4	4	1	8	2	2	6	5	1	18	9	10	7	1	6	10	5
High body-mass index	6	8	3	1	2	3	1	4	9	3	1	9	3	3	2	2	17	2	3	14	18	15
High fasting plasma glucose	7	7	5	5	4	7	5	10	7	5	3	5	7	6	4	4	7	1	6	10	13	11
Childhood underweight	8	39	38	37	39	38	38	38	38	32	23	13	25	18	20	14	4	8	9	1	1	1
Ambient particulate matter pollution	9	9	11	26	14	12	24	14	4	27	19	11	10	24	7	19	6	32	25	16	14	7
Physical inactivity and low physical activity	10	3	4	4	5	6	7	7	10	8	6	8	9	8	5	6	11	6	11	15	15	16
Diet high in sodium	11	6	10	11	11	9	11	9	6	9	13	7	6	13	8	15	14	16	13	21	17	18
Diet low in nuts and seeds	12	11	9	7	8	8	8	8	12	10	8	15	8	12	9	10	13	13	16	22	16	21
Iron deficiency	13	20	32	21	35	22	17	21	19	14	12	12	17	4	11	5	8	11	10	4	4	4
Suboptimal breastfeeding	14					27		24	22	15	14	16	9	13	13	9	10	4	3	3	3	
High total cholesterol	15	12	8	8	9	10	9	6	13	11	10	16	14	16	10	16	20	14	19	28	27	30
Diet low in whole grains	16	10	16	16	17	11	12	11	11	12	14	26	13	17	12	12	15	15	32	24	19	24
Diet low in vegetables	17	14	13	12	13	13	10	12	15	16	20	10	11	14	16	11	16	12	15	23	23	20

# Change in BMI in 199 countries (women)



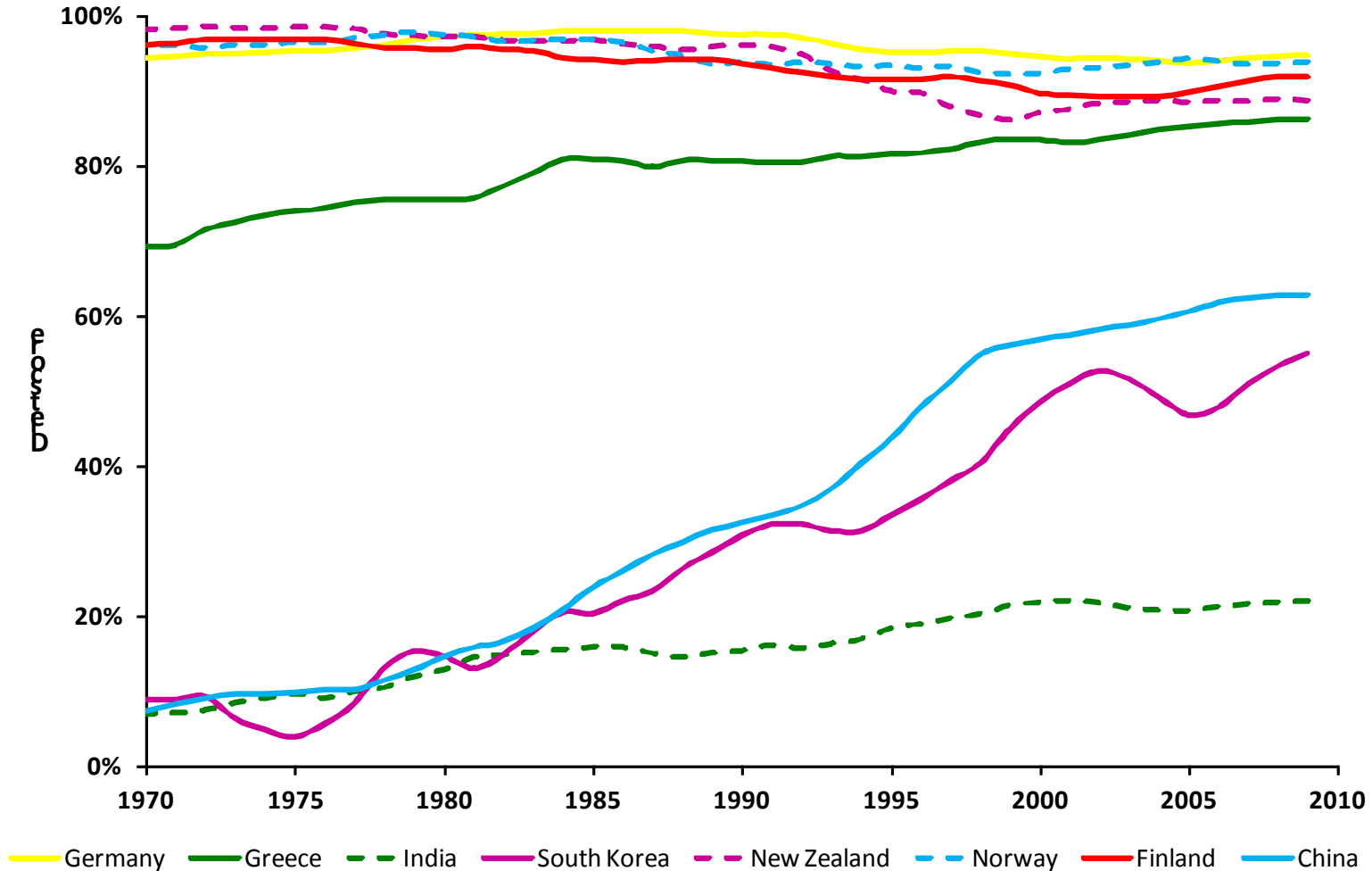
# Trends in the number of obese people, by region



# Risk factor ranks in the world and by region

	Global	High-income Asia Pacific	Western Europe	Australasia	High-income North America	Central Europe Southern Latin America	Eastern Europe	East Asia	Tropical Latin America	Central Latin America	Southeast Asia	Central Asia	Andean Latin America	North Africa and Middle East	Caribbean	South Asia	Oceania	Southern sub-Saharan Africa	Eastern sub-Saharan Africa	Central sub-Saharan Africa	Western sub-Saharan Africa	
High blood pressure	1	1	2	3	3	1	2	2	1	1	4	1	1	2	1	1	3	5	2	5	5	6
Tobacco smoking, including second-hand smoke	2	2	1	2	1	2	3	3	2	4	5	2	2	5	3	3	2	3	5	7	12	10
Household air pollution from solid fuels	3	42				14	23	20	5	18	11	3	12	7	25	8	1	4	7	2	2	2
Diet low in fruits	4	4	7	6	6	5	6	5	3	6	7	4	4	10	6	7	5	9	8	8	11	13
Alcohol use	5	5	6	9	7	4	4	1	8	2	2	6	5	1	18	9	10	7	1	6	10	5
High body-mass index	6	8	3	1	2	3	1	4	9	3	1	9	3	3	2	2	17	2	3	14	18	15
High fasting plasma glucose	7	7	5	5	4	7	5	10	7	5	3	5	7	6	4	4	7	1	6	10	13	11
Childhood underweight	8	39	38	37	39	38	38	38	38	32	23	13	25	18	20	14	4	8	9	1	1	1
Ambient particulate matter pollution	9	9	11	26	14	12	24	14	4	27	19	11	10	24	7	19	6	32	25	16	14	7
Physical inactivity and low physical activity	10	3	4	4	5	6	7	7	10	8	6	8	9	8	5	6	11	6	11	15	15	16
Diet high in sodium	11	6	10	11	11	9	11	9	6	9	13	7	6	13	8	15	14	16	13	21	17	18
Diet low in nuts and seeds	12	11	9	7	8	8	8	8	12	10	8	15	8	12	9	10	13	13	16	22	16	21
Iron deficiency	13	20	32	21	35	22	17	21	19	14	12	12	17	4	11	5	8	11	10	4	4	4
Suboptimal breastfeeding	14					27			24	22	15	14	16	9	13	13	9	10	4	3	3	3
High total cholesterol	15	12	8	8	9	10	9	6	13	11	10	16	14	16	10	16	20	14	19	28	27	30
Diet low in whole grains	16	10	16	16	17	11	12	11	11	12	14	26	13	17	12	12	15	15	32	24	19	24
Diet low in vegetables	17	14	13	12	13	13	10	12	15	16	20	10	11	14	16	11	16	12	15	23	23	20

# Trends in a Western diet score in selected countries



high availability of sugars; meat, animal products, animal fats, milk, and eggs; and total calories, as well as a low availability of pulses (legumes) and cereals

# The worldwide epidemiological transition

- Overall improvement in mortality across the world, with near stagnation in Eastern Europe and parts of sub-Saharan Africa
- Large declines in child infectious diseases and in the burden of its key risk factors, leading to more people dying at older ages and **larger share** of disease burden from NCDs and their nutritional risk factors
  - More to be done in sub-Saharan Africa and South Asia for undernutrition
- Also important transitions within NCDs (e.g. various cancers/CVDs) with implications for impacts of nutrition