

The burden and cost of chronic diseases in LMICs

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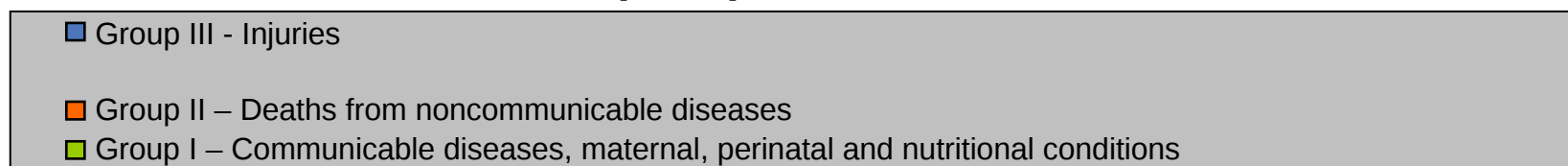
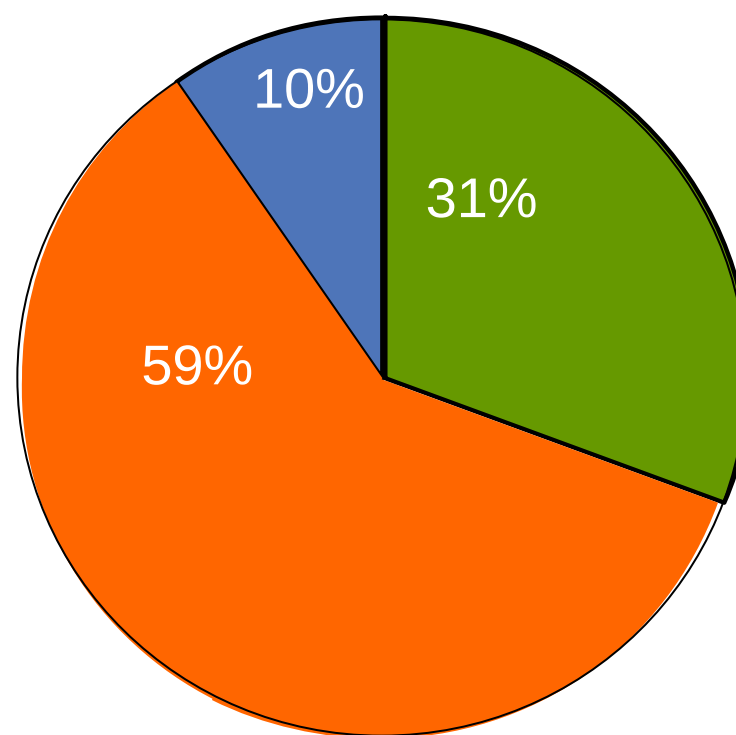
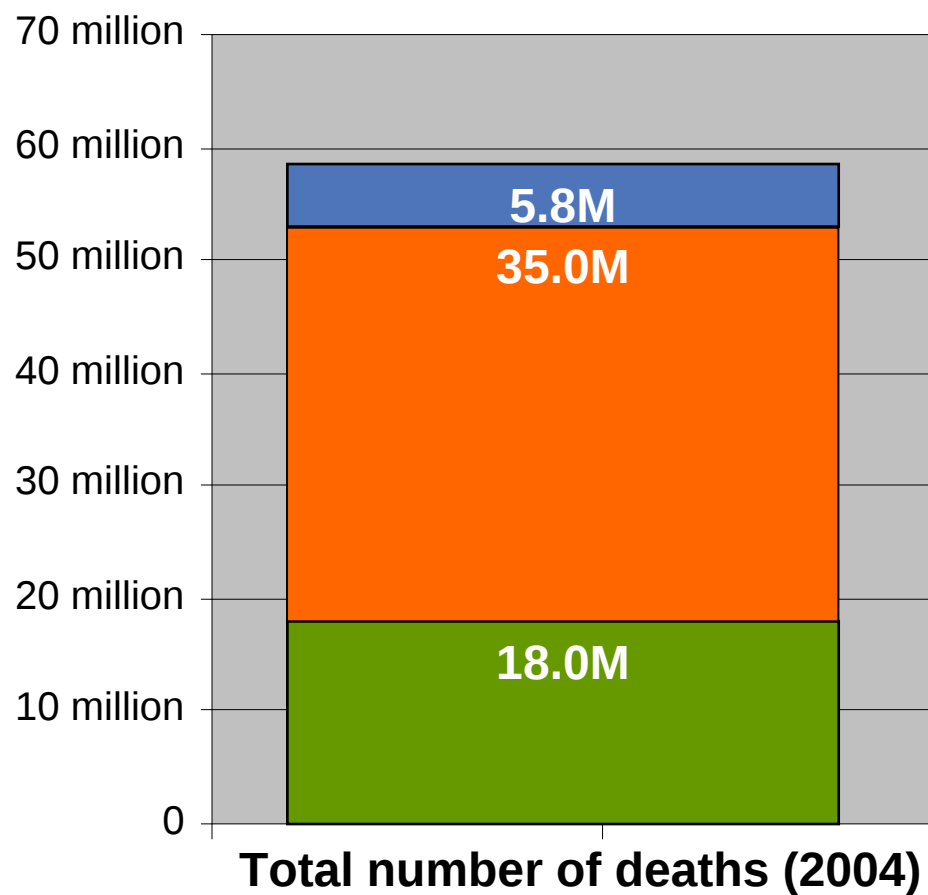
Chronic NCDs in LMIC

Who is affected ?

What are the economic consequences?

**Can interventions prevent at
reasonable cost?**

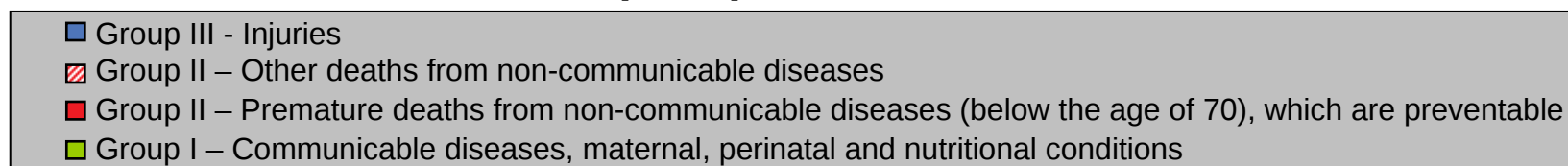
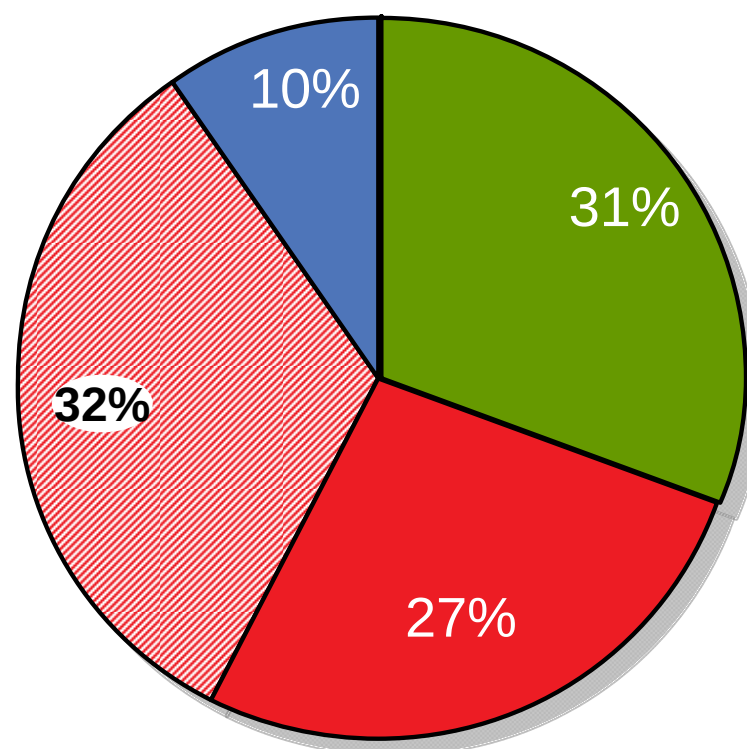
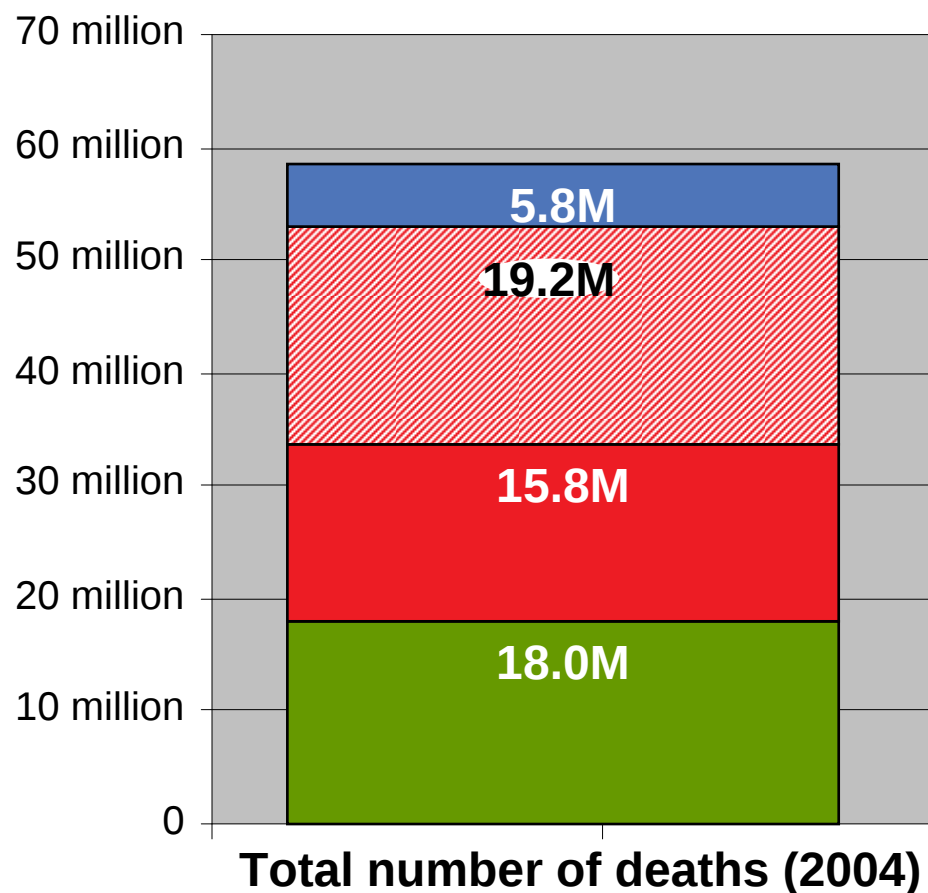
Global magnitude of deaths from noncommunicable diseases



Source: THE GLOBAL BURDEN OF DISEASE
2004 UPDATE

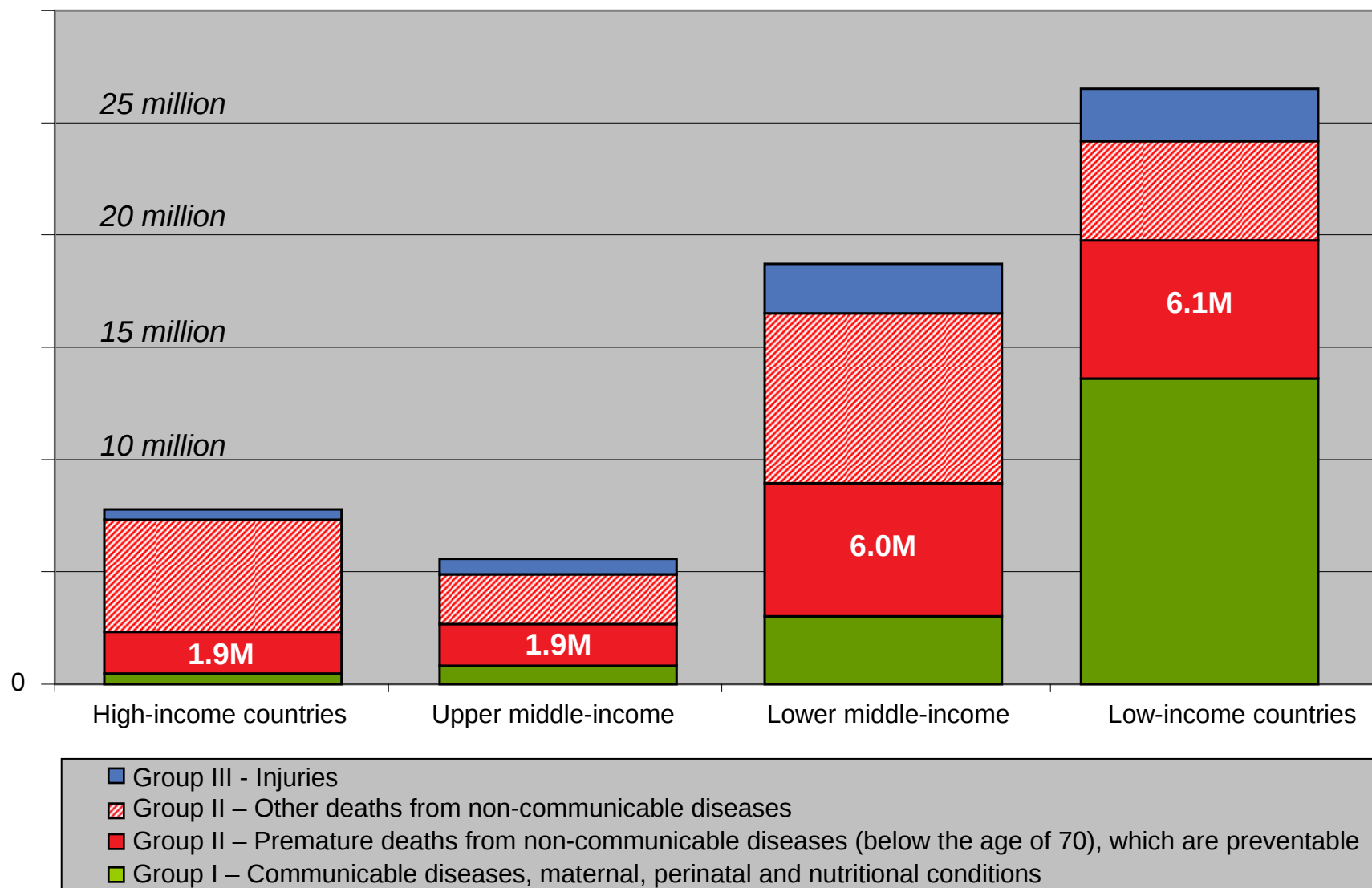
Global magnitude of deaths from noncommunicable diseases

Proportion of premature mortality...

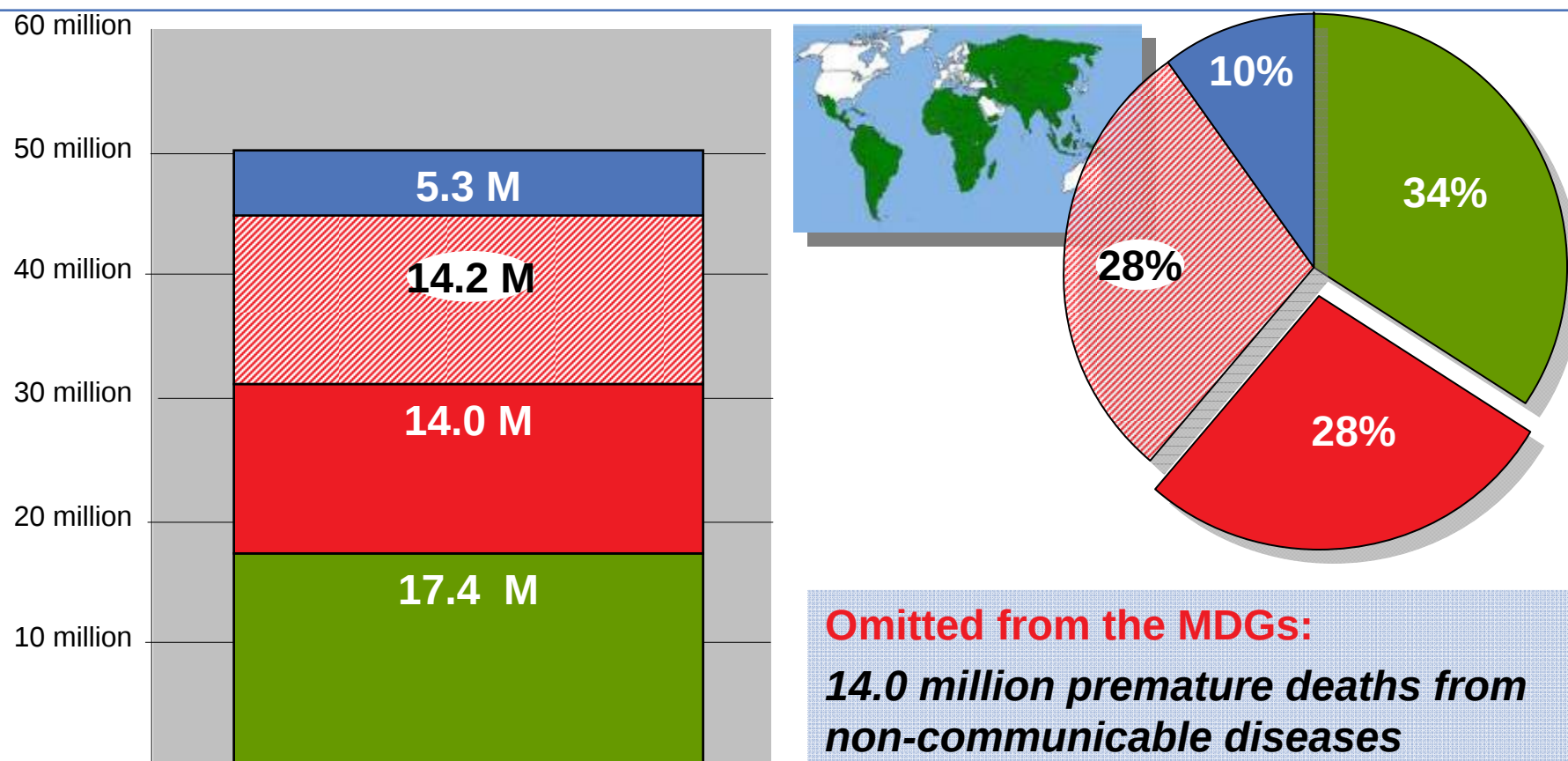


Source: THE GLOBAL BURDEN OF DISEASE
2004 UPDATE

Global magnitude of deaths from noncommunicable diseases In LMICs



What is the magnitude in low- and middle-income countries?



Total number of deaths in low- and middle-income countries (2004)

- Group III - Injuries
- ▨ Group II – Other deaths from non-communicable diseases
- Group II – Premature deaths from non-communicable diseases (below the age of 70), which are preventable
- Group I – Communicable diseases, maternal, perinatal and nutritional conditions

Source: **THE GLOBAL BURDEN OF DISEASE**
2004 UPDATE

Global Disease Burden in High/LMIC countries (DALYs thousands, 2004)

	High	Middle	Low
CVD	17 853	76 204	57 258
Cancer	17 826	40 975	18 982
CRD	7 266	29 044	22 706
Diabetes	3 623	10 081	5 991
Total DALYs	122 092	572 859	827 669

Noncommunicable Diseases

Death trends (2006-2015)

	2005		2006-2015 (cumulative)		
Geographical regions (WHO classification)	Total deaths (millions)	NCD deaths (millions)	NCD deaths (millions)	Trend: Death from infectious disease	Trend: Death from NCD
Africa	10.8	2.5	28	+6%	+27%
Americas	6.2	4.8	53	-8%	+17%
Eastern Mediterranean	4.3	2.2	25	-10%	+25%
Europe	9.8	8.5	88	+7%	+4%
South-East Asia	14.7	8.0	89	-16%	+21%
Western Pacific	12.4	9.7	105	+1	+20%
	58.2	35.7	388	-3%	+17%

(WHO Chronic Disease Report, 2005)

WHO projects that over the next 10 years, the largest increase in deaths from cardiovascular disease, cancer, respiratory disease and diabetes will occur in LMIC.

Chronic NCDs

Who is affected ?

What are the economic consequences?

Can interventions prevent at reasonable cost?

Why do we need to focus on costs?

- Advocacy for action
- Cost data may justify public policy interventions
- Health care should be distributed fairly according to need and not ability to pay
- Resources for health care are finite
- Getting value for money is important in health care
- Opportunity costs – spending in one area is lost to other (more) important areas
- Rationality – choices should maximize health gain at lowest cost
- Service planning

Costs

(partly overlapping evidence that illustrate the economic impact)

- Cost of illness**
- Microeconomic consequences**
- Macroeconomic consequences**

Cost of illness

**Additional per person annual health care costs
associated with risk factors**

Obesity \$395 (36% increase)

Smoking \$230 (21% increase)

Alcohol \$150 (10% increase)

Sturm 2002

Cost of illness

Chronic diseases and RF 02 -6.77 of GDP

CVD in developed countries 1-3%

Diabetes 1.8% GDP Venezuela, 5.9% GDP - Barbados

Tobacco 1.5% of GDP - China

Obesity 2.1% of GDP –China

Indirect costs account for more than half the costs

Summary of Total Costs During First Year After First-Ever-in-a-Lifetime Strokes That Occurred in Australia in 1997 (Dewey et al 1997)

Resource Category	Cost, Australian Dollars(000,000)	% of Total First-Year Cost
Acute hospitalization	154	28
Inpatient rehabilitation	150	27
Nursing home care	63	11
Rehospitalization for stroke complications	34	6
Carer time costs (opportunity cost approach)	28	5
Out-of-pocket costs	22	3.9

Resource Category	Cost, Australian Dollars(000,000)	% of Total First-Year Cost
Hospitalization for recurrent stroke event	18	3.2
Community rehabilitation centers	17	3
Ambulance transfers for acute care	10	1.8
Outpatient rehabilitation	8	1.5
Investigations (eg, pathology, radiology)	6	1
Respite care	6	1
Outpatient rehabilitation	5.7	1

Microeconomic costs

Diabetes 15-25% of household income (India)

Diabetes 25% of the minimum wage (Tanzania)

Cancer hospital stay > annual per person income (China)

Shobhana et al 2001, Neuhann 2001.

The poorest people in LMIC countries affected the most

The cost of caring for a family member with diabetes can be more than 20 per cent of low-income household incomes

The cost per year of diabetes care at household level

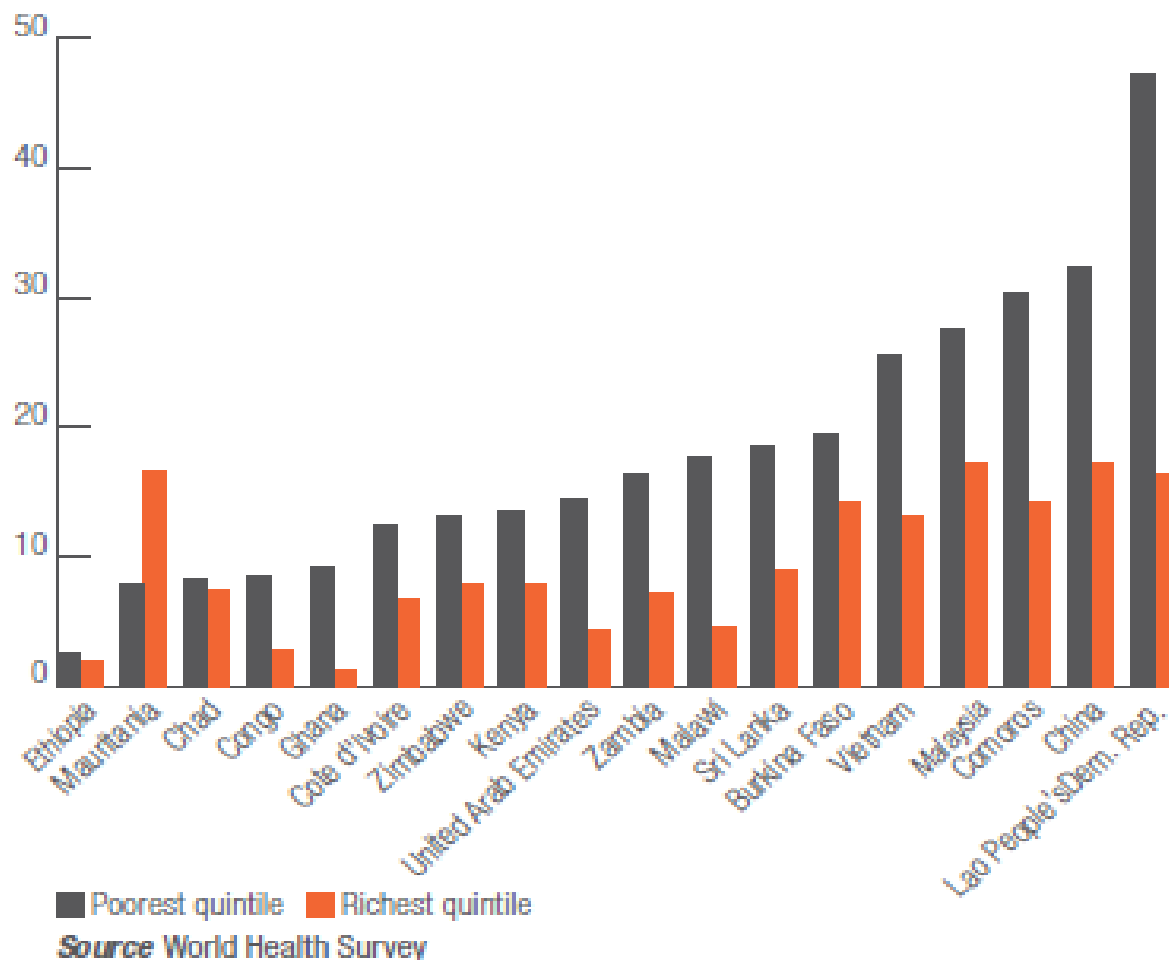
	Insulin	Syringes	Testing	Consultation	Travel	Total cost	% of per capita Income
Mali (2004)	38%	34%	8%	7%	12%	\$339.4	61%
Mozambique (2003)	5%	24%	1%	9%	61%	\$273.6	75%
Nicaragua (2007)	0%	73%	0%	0%	27%	\$74.4	7%
Zambia (2003)	12%	63%	6%	6%	12%	\$199.1	21%
Vietnam (2008)	39%	8%	5%	3%	46%	\$427.0	51%

Risk of catastrophic expenditure

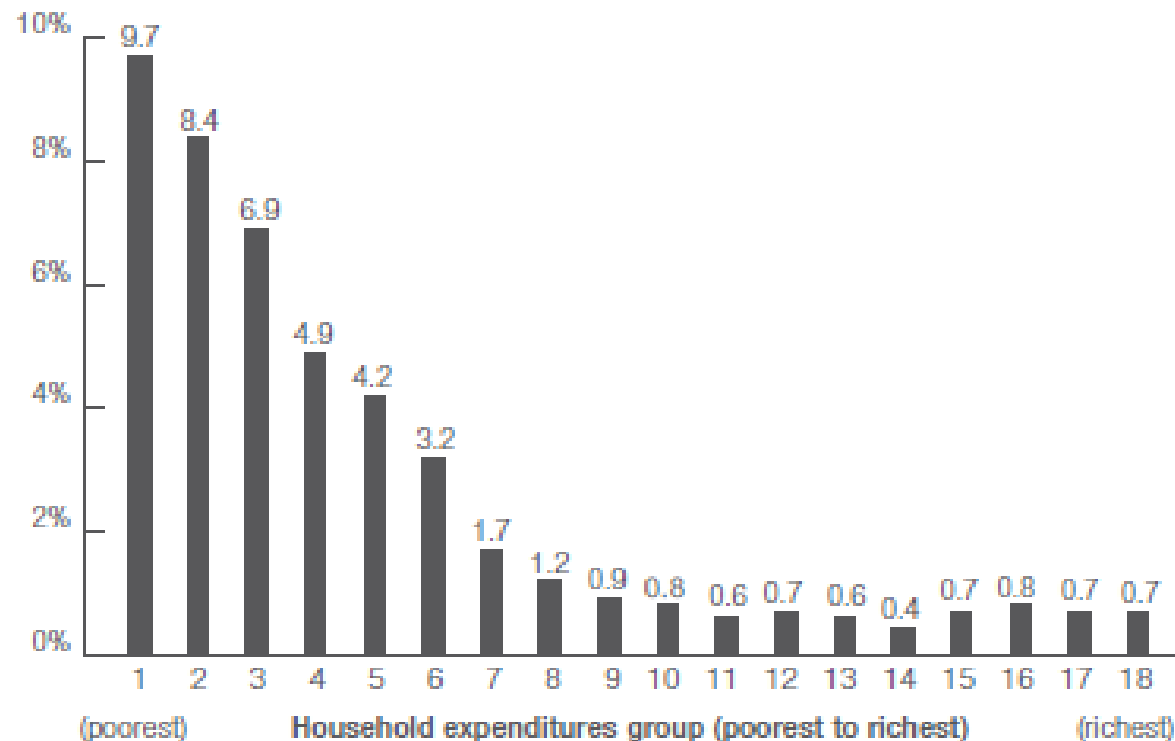
Burkina Faso –When a family member has a chronic illness the probability of catastrophic exp 3.3-7.8 times (Tin Su 2006)

Share of households with catastrophic expenditure vary from 0.01% in France to 10.45 % in Vietnam (Xu et al 2003).

Prevalence of daily smokers in the poorest and richest income quintiles in selected low- and middle-income countries



Ratio of expenditures on tobacco versus education in Bangladesh, 1995–1996

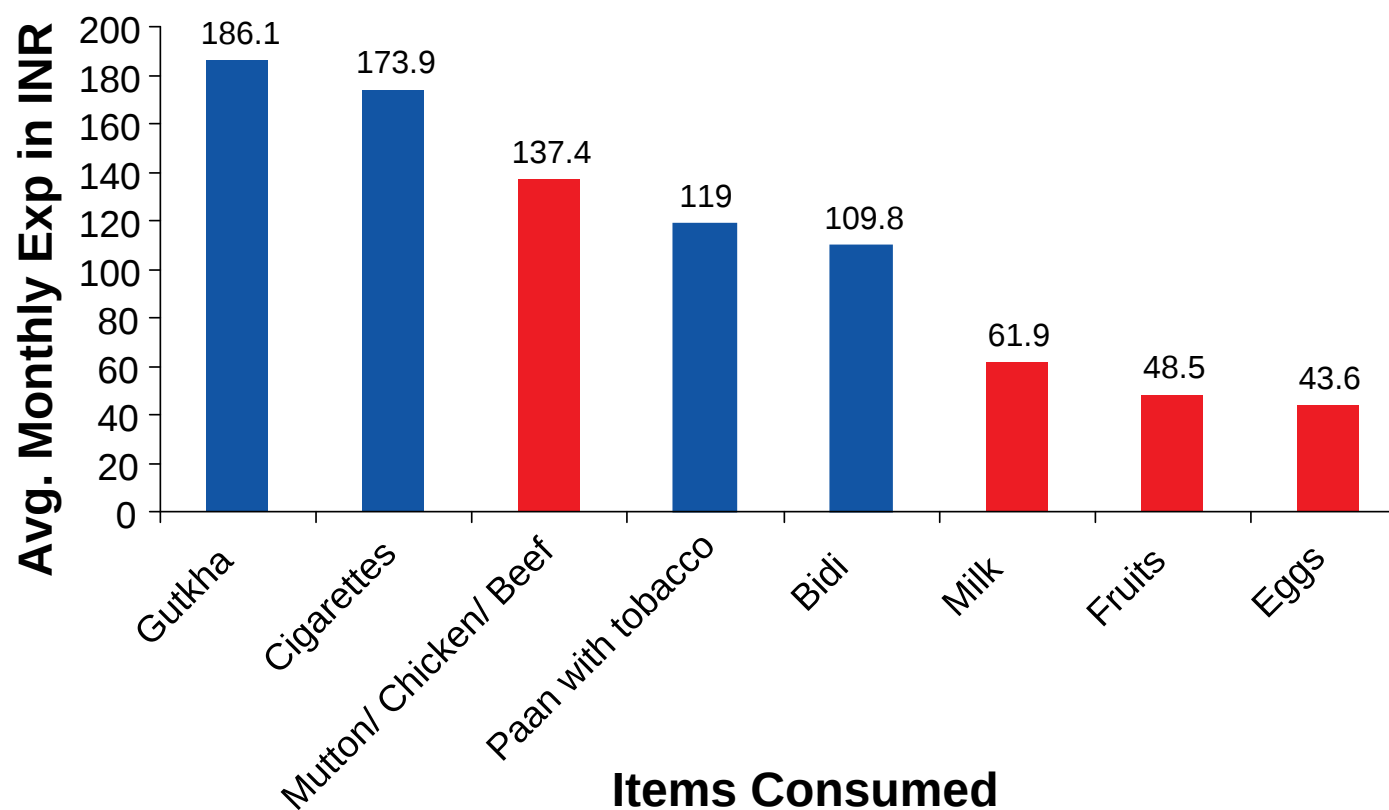


Source Efroymson et al. (2001)

Poorest households spend close to 10 times as much on tobacco as on education

*Monthly household expenditure of tobacco vs. nutritious food
among street children in Mumbai (India)*

Tobacco costs



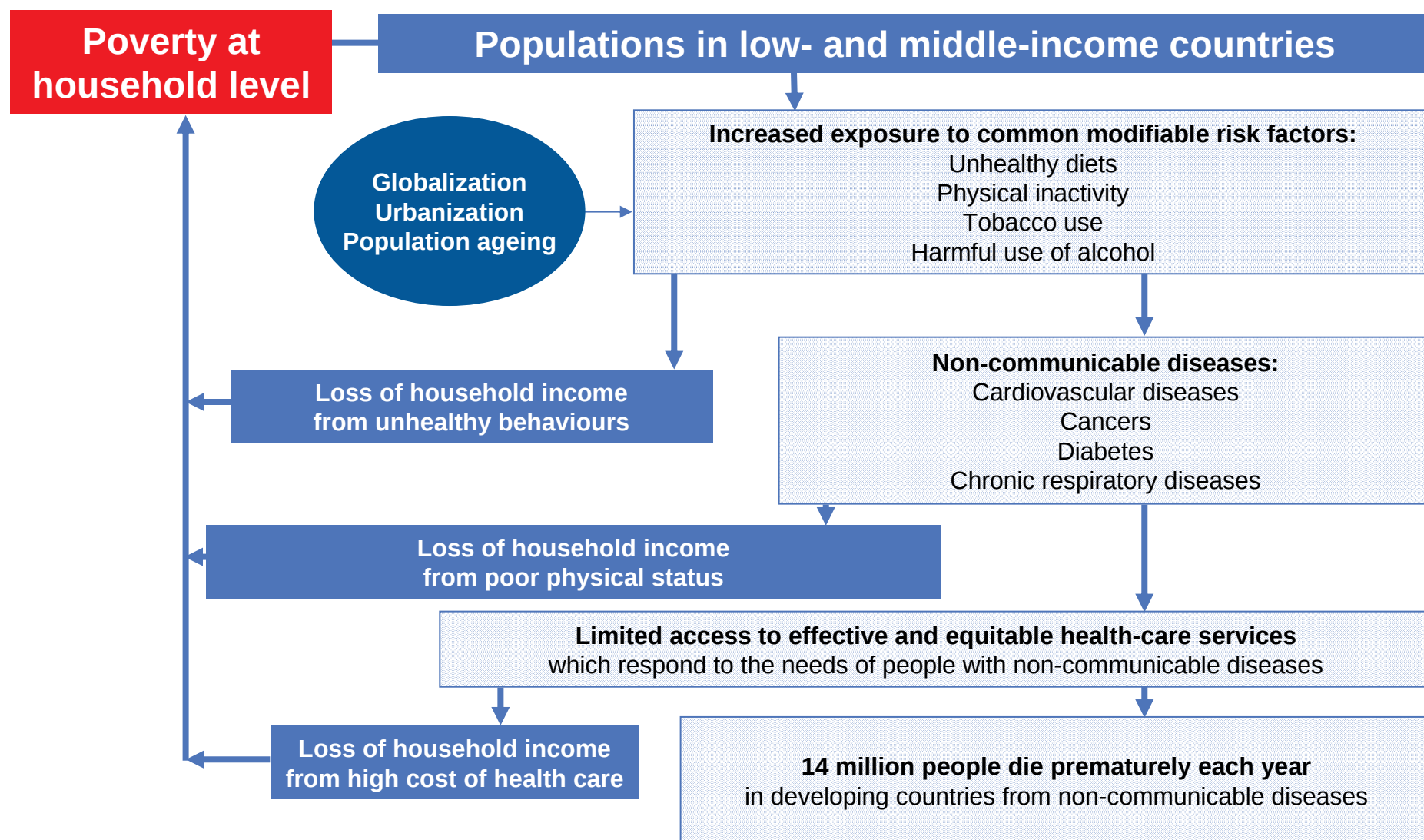
Macro-economic Impact: Lost National Income

Lost national income from premature deaths due to heart disease, stroke and diabetes	2005	2006-2015 (cumulative)
Countries	Lost national income (billions)	Lost national income (billions)
Brazil	3	49
China	18	558
India	9	237
Nigeria	0.4	8
Pakistan	1	31
Russian Federation	11	303
Tanzania	0.1	3

(WHO Chronic Disease Report, 2005)

WHO: "Heart disease, stroke and diabetes alone are estimated to reduce GDP between 1 to 5% per year in developing countries experiencing rapid economic growth"

Impact on socioeconomic development: Why are the poorest people in LMIC the most affected?



Chronic NCDs

Internal and external costs

Consumption and saving

Labour productivity and supply

Education and human capital accumulation

Health costs (morbidity and mortality)

Suhrcke M, Nugent RA, Stuckler, Rocco L 2006

Change in wages associated with sickness due to chronic disease

Country	Chronic disease indicator	Wage elasticities (%) (Females)	For males	Source
Colombia	Days unable to work	0.04	0.07	Ribeiro and Nunez (1999)
Colombia	Unable to work	0.10	0.017	Ribeiro and Nunez (1999)
Peru	Days sick	0.04	0.07	Murrugarra and Valdivia
Peru (Urban only)	Days sick	0.10	0.20	Cortez (1999)
Mexico (elderly)	Days sick or injured in last 180 days	NS	0.08	Parker (1999)
Nicaragua	Days sick	0.16	NS	Espinosa and Hernandez(1999)
Ghana	Days unable to work	-	0.11 – 0.24	Schultz and Tansel(1997)
Cote d'Ivoire	Days unable to work	-	0.09 – 0.28	Schultz and Tansel(1997)
Mexico (Elderly)	NO of ADL for workers	NS	0.38	Parker (1999)

When No of missed days increased by 1% wages decreased in men by 0.7%
Savedoff et al 2000.

Change in the probability of labour-market participation in response to limited ADL among countries in the commonwealth of independent states

Country	Change(%)in the probability of labour-market participation
Armenia	-16.3
Belarus	-25.1
Georgia	-6.9
Kazakhstan	-30.4
Kyrgyzstan	-18.8
Moldova	-22.3
Russia	-23.0
Ukraine	-16.7

Eastern Europe and Central Asia probability that sick people will participate in the labour market 6.9%-30% lower

Costs - internal, quasi-external and external costs (and benefits) of chronic disease and unhealthy lifestyles (Manning 1991)

INTERNAL	QUASI-EXTERNAL (costs to other household members)	EXTERNAL
	Consumption and saving	
Medical expenditures: treatment for illness (user-paid insurance, out-of-pocket payments, co-payments) or Expenditure on addictive goods Lost future income or other forgone long-term benefits from selling assets or from dissaving Criminal justice response; unreimbursed property damage (e.g. due to fires caused by smoking) Uncovered sick loss Foregone income not replaced by disability insurance Defined pension contribution plans	Lost future income or other foregone long-term benefits from selling assets partly owned by other household members, or from dissaving (from common household resources) Property damage (e.g. fire due to smoking) Reduced household investment in productive assets	Research, training, prevention, welfare Increased insurance premiums for those with healthy lifestyles Health insurance reimbursements Property damage (if other property affected) Covered sick loss Disability insurance Retirement pension and defined-benefit plans Taxes on earnings Group life insurance (death benefit)
	Labour productivity and supply	
violence Diminished productivity and decreased wages Work absenteeism Early retirement Foregone income net of taxes Reduced labour supply (work absenteeism, early retirement, unemployment	Intra-household reallocation of labour (e.g., reduction in spouse's labour supply in order to care for sick partner)	Productivity losses of the worker's company due to absenteeism caused by premature deaths or illness

	Education and human-capital accumulation	
Reduced educational performance and attainment	Reduced educational and health attainment of those caring for the sick or substituting labour to compensate Crowding out of financial resources that could be invested in education and health of children Low birth weight of newborns with potential impact on cognitive development (e.g. through tobacco consumption in pregnancy) Reduced schooling through alcohol abuse in youth, impact of death of the bread winner	
	Health costs / morbidity and mortality	
Healthy life years lost Pain and suffering	Health of household members Pain and suffering of household members Domestic violence (alcohol) Health effect on the newborn child through maternal health behaviour and nutritional status, impact of death of the bread winner	Co-workers and others (e.g. environmental tobacco smoke in public places) Victims of alcohol-related traffic incidents Alcohol-related violence Diminished

Chronic NCDs

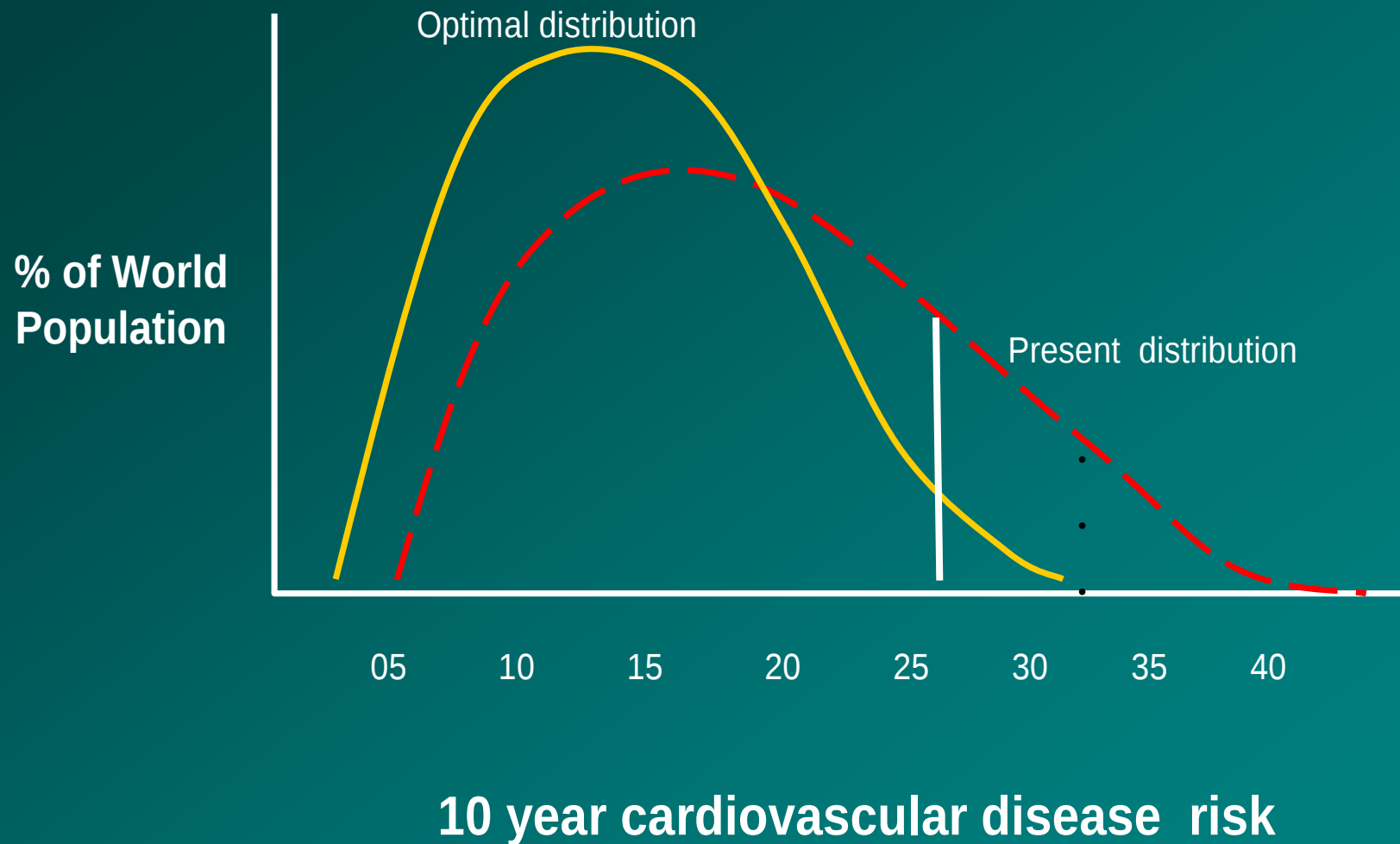
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Population Strategy

High Risk Strategy

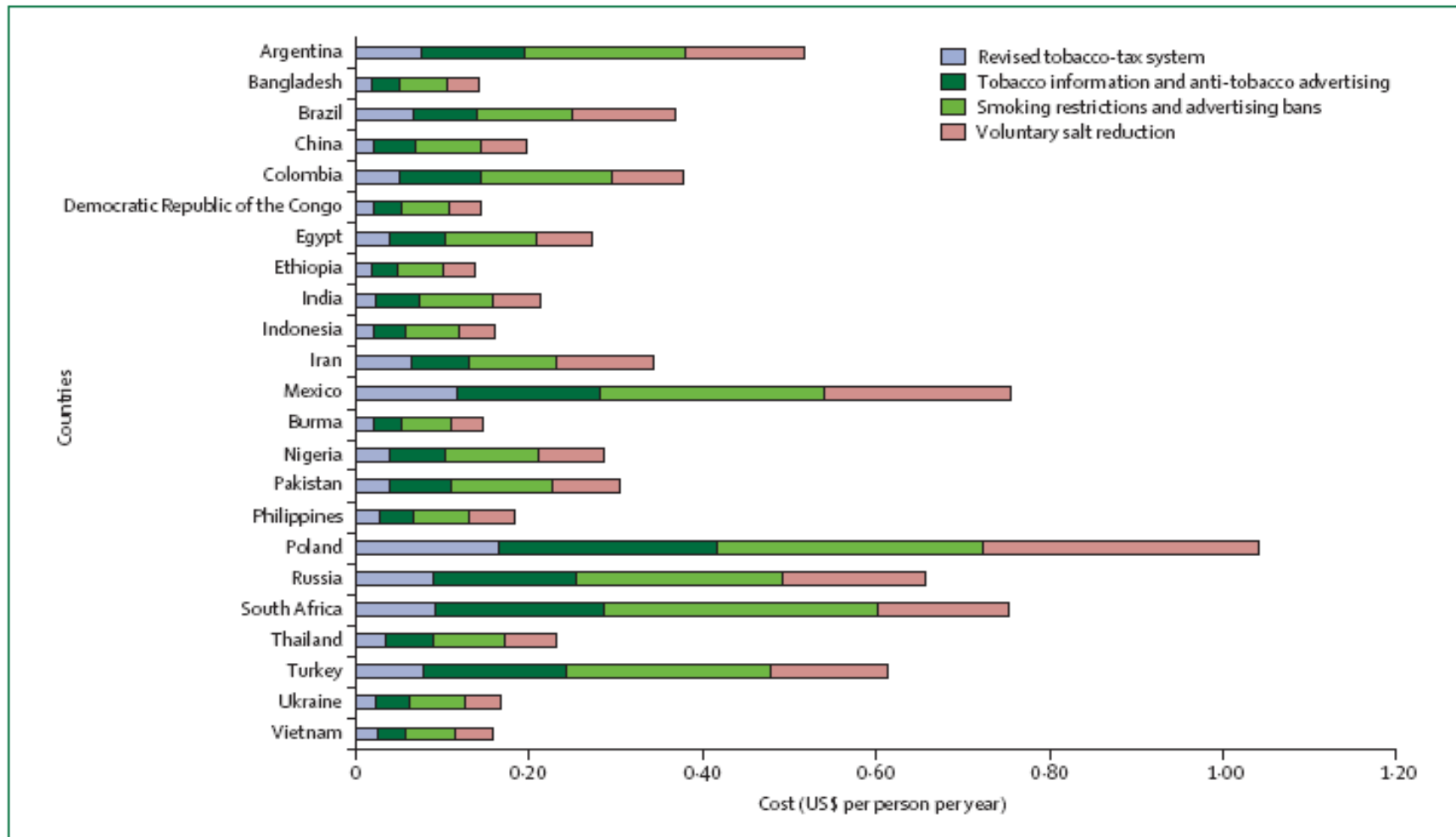


Cost per DALY saved for interventions to reduce BP and serum cholesterol by country income group

Intervention	Very low income	Low income	Medium income
Education and mass media	50-57	19-92	12-54
Voluntary salt reduction	26-30	10-92	6-27
Legislated salt reduction	34-78	14-114	9-14
Education and legislated salt reduction combined	31-48	31-48	7-23

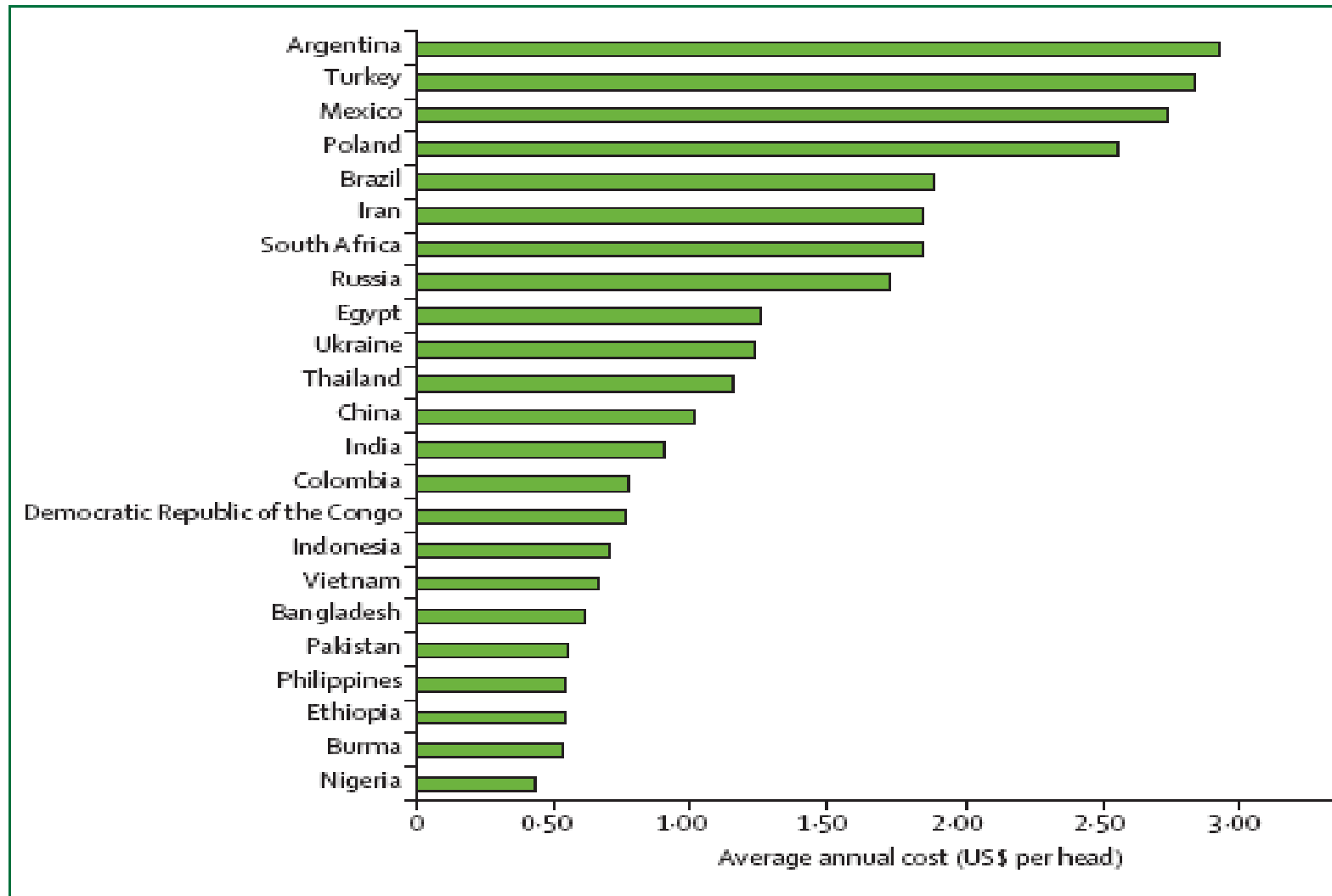
Murray et al 2003

Cost to implement the package of interventions (US\$ per person per year, 2005)



Asaria et al, Lancet 2007;370:2044-2053

Average yearly cost (US\$ per head) of scaling up a multidrug regimen for CVD prevention



Lim et al. Lancet 2007; 370: 2054–62

Per capita expenditure on health (International dollars)

Expenditure		Number of countries
Less than 50 \$		33
50 – 99		25
100-499		72
500-999		24
1000-1999		19
>2000		18

NCDs

- Cardiovascular disease
- Chronic respiratory disease
- Diabetes
- Prevention of renal disease
- Cancer
- epilepsy etc



**Package of Essential
Noncommunicable (PEN) Disease
Interventions for
Primary Health Care
in Low-Resource Settings**



Chronic NCDs

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Summary

- **NCD are a major Public Health Problem in LMIC**
- **Significant premature mortality**
- **Cost of illness, micro and macroeconomic data illustrate the economic impact of NCD**
- **Impact on the individual**
- **Loss of household income**
- **Pain/suffering due to loss of bread winner**
- **Consumption and saving decisions**
- **Labour market performance**
- **Human capital accumulation**
- **Detract economic growth**
- **Cost effective population wide/ individual interventions available**
- **Gaps in data in LMIC**

Thank You