



Deaths by Cause and the Global Burden of Disease

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- **Where we were with *DCP1***
 - **What's in *DCP2***
- **Global Burden of Disease**
- **Changes in mortality and burden of disease –**
global population health today

DCP1

- Covered 25 conditions quite comprehensively; stated life expectancy increased from 40 to 63 years from 1950 to 1990
- NCDs were growing in adults; under-nutrition and childhood diseases continuing problem; and AIDS was emerging

DCP2

- 37 chapters covering conditions, risk factors and consequences (inclusion of ignored themes - hemoglobinopathies and neonatal conditions);
- Continued effects of NCDs and Injuries; and
- Greater focus on HIV/AIDS

Global Burden of Disease 2001

- WHO generated estimates of deaths and DALYs for DCPP by age, sex and cause for 125 conditions and injuries by World Bank regional groupings (3% discounting and without age-weights)

Burden of Disease Volume (GBD)

- 1st ever compilation of the entire global & regional descriptive epidemiology of deaths, disease/injury burden & attributable disease burden for major risk factors; with detailed demographic characteristics.
- Key resource for indicating priorities for health development and policy globally.



Some slides on concepts, methods, data, history



GBD Goals

- **Measure loss of health due to comprehensive set of disease injury and risk factor causes in a comparable way**
- **Decouple epidemiological assessment and advocacy**
- **Inject non-fatal health outcomes into health policy debate**
- **Use a common metric for burden of disease assessment using summary measure of population health and cost-effectiveness analysis**

Burden of Disease (BOD)

- BOD analysis provides a standardized framework for integrating all available information on mortality, causes of death, individual health status, and condition-specific epidemiology to provide an overview of the levels of population health and the causes of loss of health
 - Consistent, comprehensive descriptive epidemiology
 - Common metric or summary measure

HISTORY

- 1992-96** **Global Burden of Disease 1990 Study**
World Bank 1993, Murray & Lopez 1996
- 1998-2004** **WHO assessments of GBD for 1999-2002**
World Health Reports 2000 – 2004
- 2003-06** **Disease Control Priorities Project**
(GBD for 2001, World Bank regions)
GBD volume

Disability Adjusted Life Years

$$DALY = YLL + YLD$$

*Time is used as the common metric
for mortality and health states*

YLL Years of life lost due to mortality

YLD Equivalent years of healthy life lost due to
disability

DCPP Value Choices for the DALY

Years lost due to death: GBD standard life expectancies

Time discounting: 3%

Age weighting: Not applied

Disability weights: Largely based on GBD 1990 study with some revisions

GBD Data sources

Mortality

⇒ Death registration, sample registration systems, household surveys, surveillance systems, epidemiological studies, population laboratories

Morbidity/disability

⇒ Disease registers, population based studies, longitudinal studies, health facility data (injuries)

Approximate number of data sources, GBD 2001

Mortality – causes of death	
Death registration data for 2001 or 2002	59
Death registration data for earlier years	711
Child & adult mortality – other sources	535
Epidemiological studies/register/HS data etc	
Group I. Communicable, mat, perinatal, nutrition	6,539
Group II. Non-communicable	2,127
Group III. Injuries	18
Approximate total datasets used	10,052

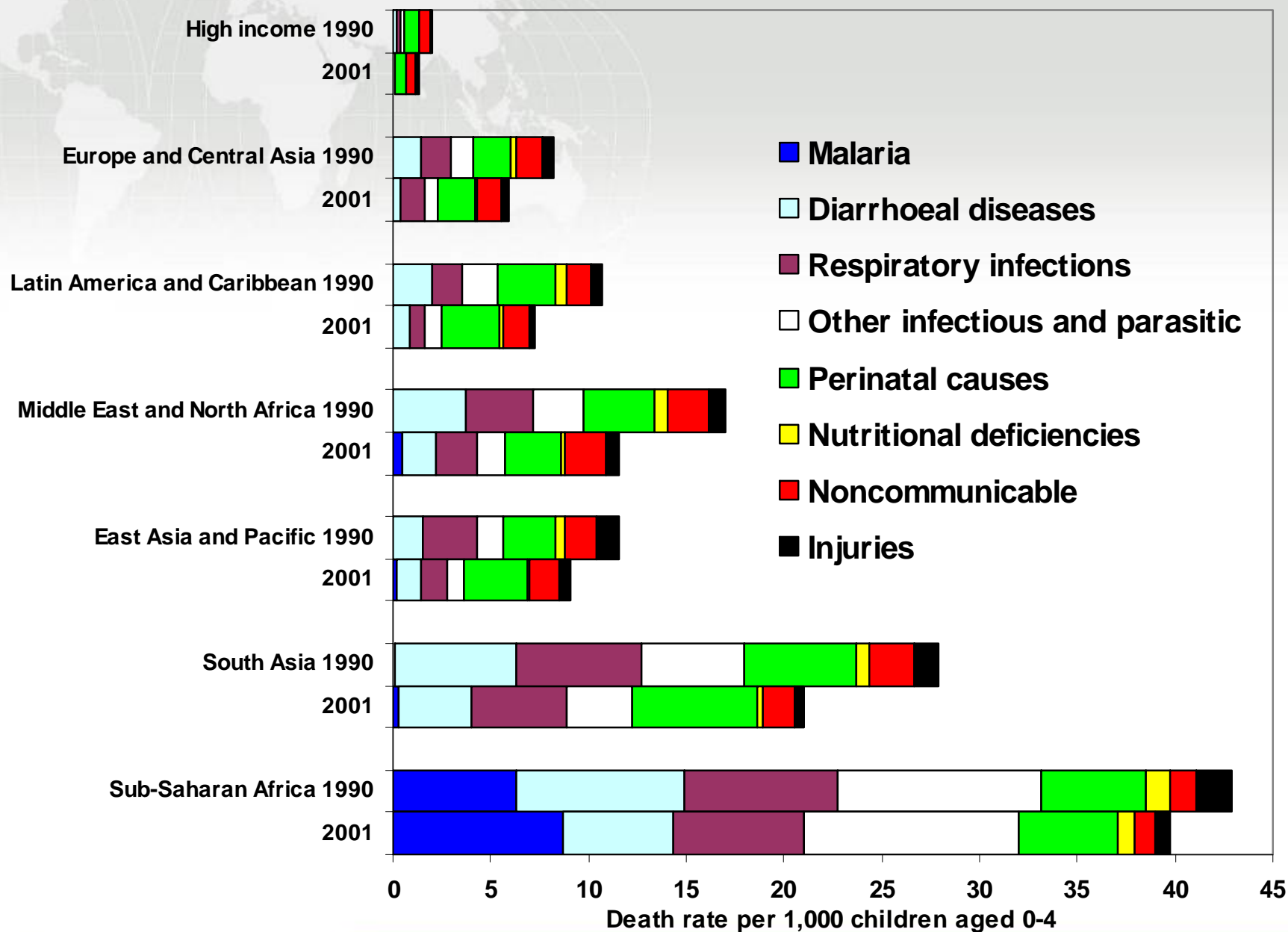
Numbers of datasets – regional distribution

	Death registration data	Child/adult mortality data	Epidemiologic data sources	Total data sources
Asia/Pacific	117	118	1,820	2,055
Europe	149	22	971	1,142
High income	142	16	1,830	1,988
Latin America & Caribbean	286	122	1,311	1,719
Middle East & North Africa	46	67	645	758
Sub-Saharan Africa	30	190	2,185	2,405
World	770	535	8,747	10,052



Some slides on trends 1990 to 2001

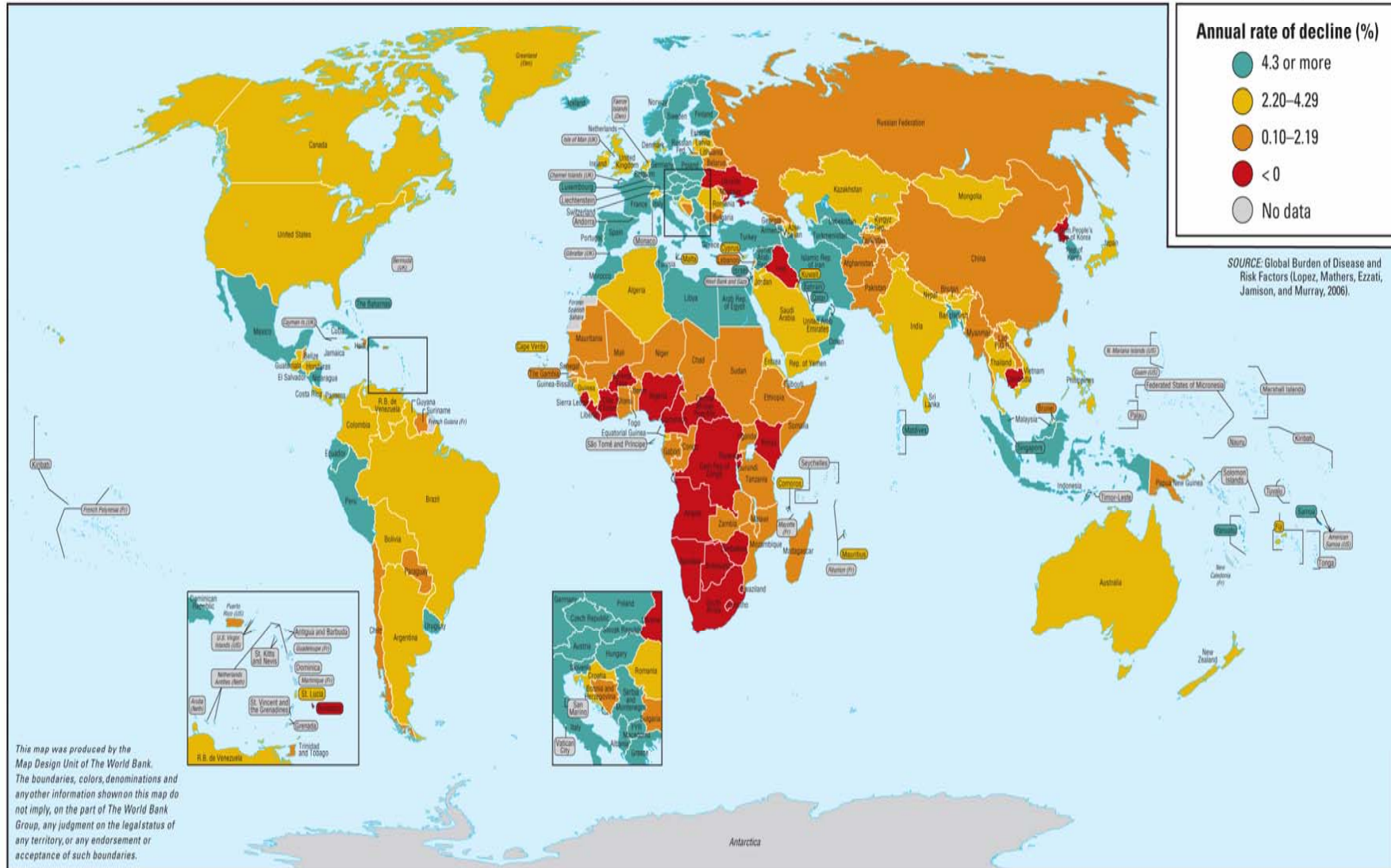
Trends in causes of under 5 mortality, 1990 to 2001



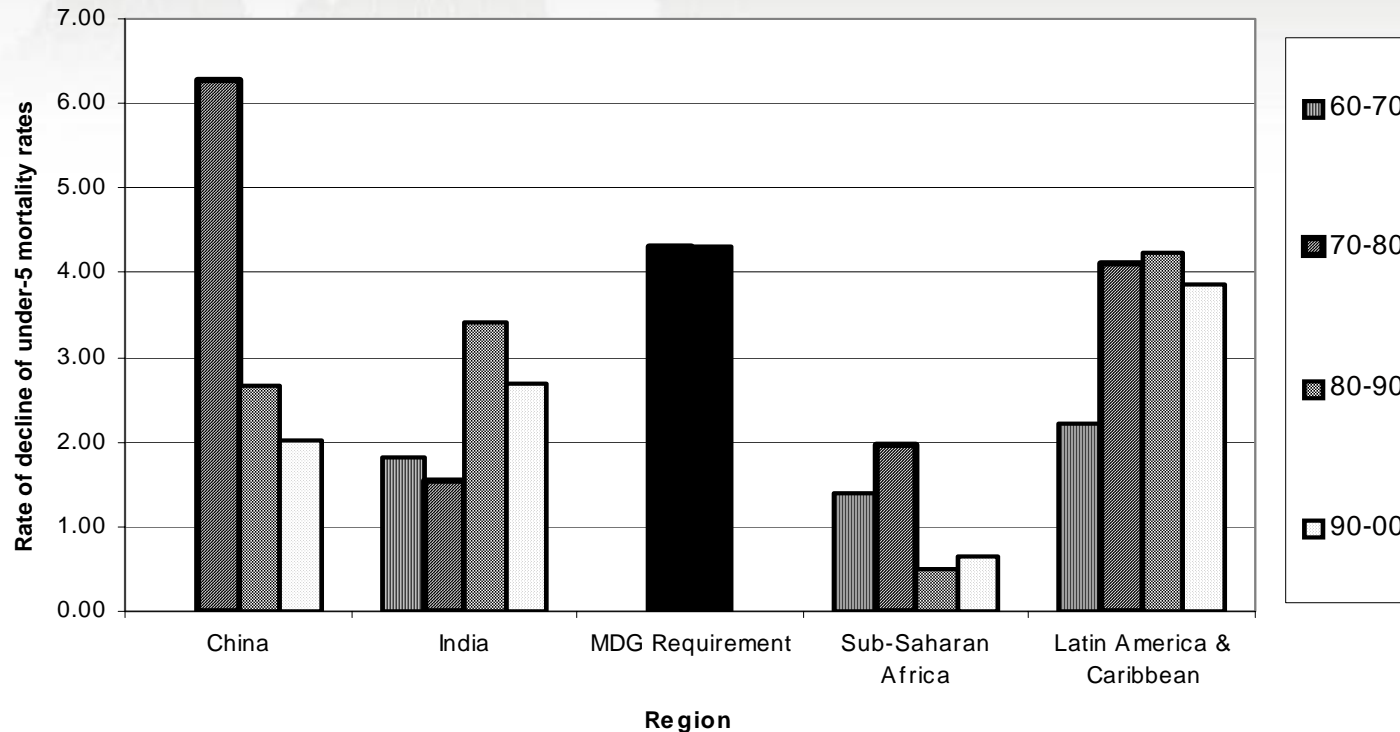
Rate of Decline in Under-Five Mortality, 1990-2001

Note: Meeting the Millenium Development Goal No.4, to reduce under-5 mortality by 2/3 between 1990 and 2015, requires an average annual rate of decline of 4.3%.

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The Rate of Progress in Reducing Under-5 Mortality, 1960-2000: China, India, Latin America and Sub-Saharan Africa



Source: Calculations based on data in the *World Development Indicators* CD-ROM version (World Bank, 2004).

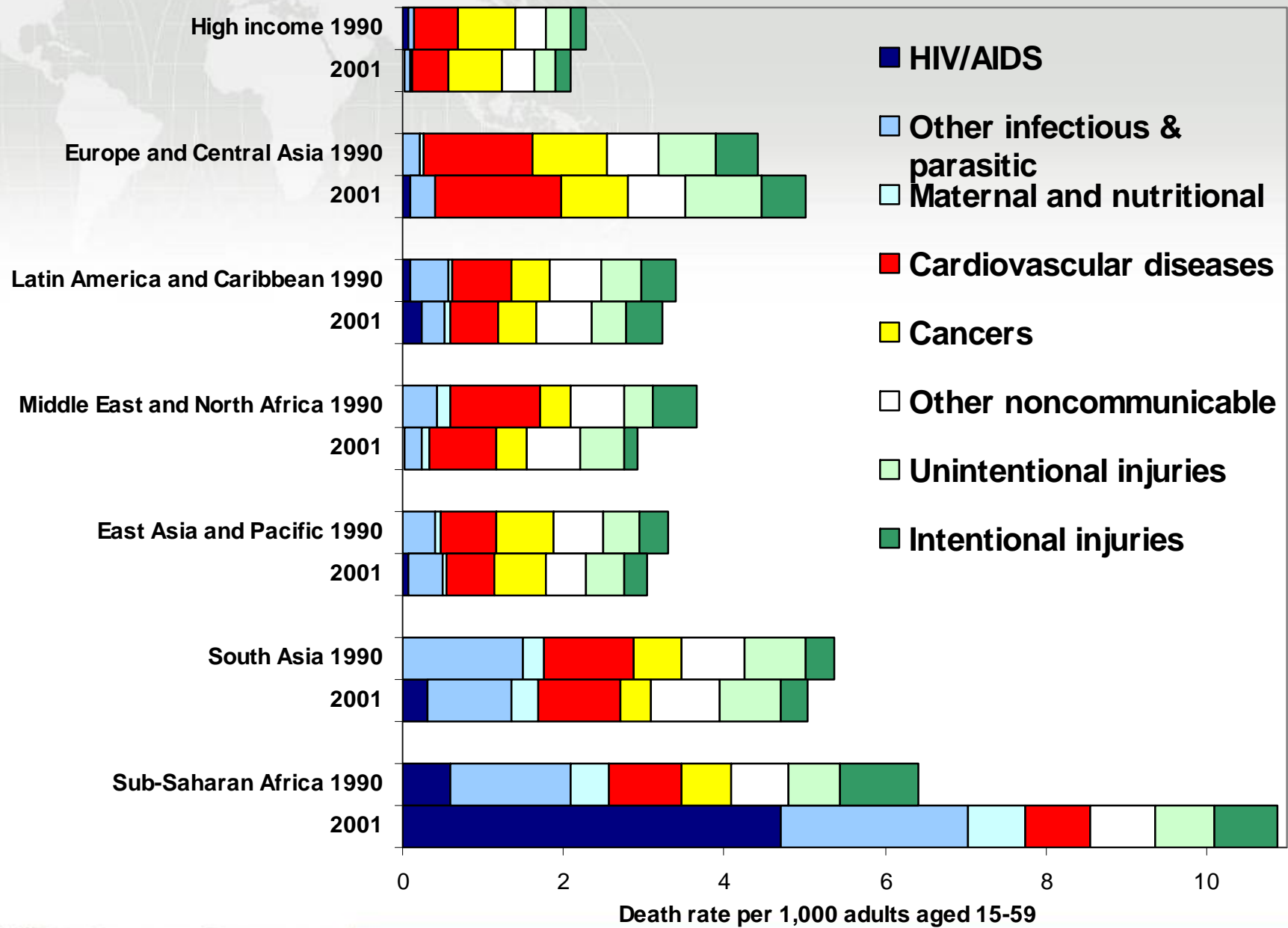
Note: 4.3% per year equals the rate of decline required for the period 1990–2015 to meet MDG4 of reducing under-5 mortality by 2/3.



Child mortality under 5

- Child mortality (ages 0-4 years) declined between 1990 and 2001 in all regions of the world except SSA
- 5 causes responsible for more than 50% of child deaths: respiratory infections, measles, diarrhea, malaria, and HIV/AIDS
- Death rates have risen for HIV/AIDS, malaria
- Death rates have fallen for respiratory infections, measles and diarrhea

Trends in causes of mortality for adults aged 15-59 years, 1990 to 2001



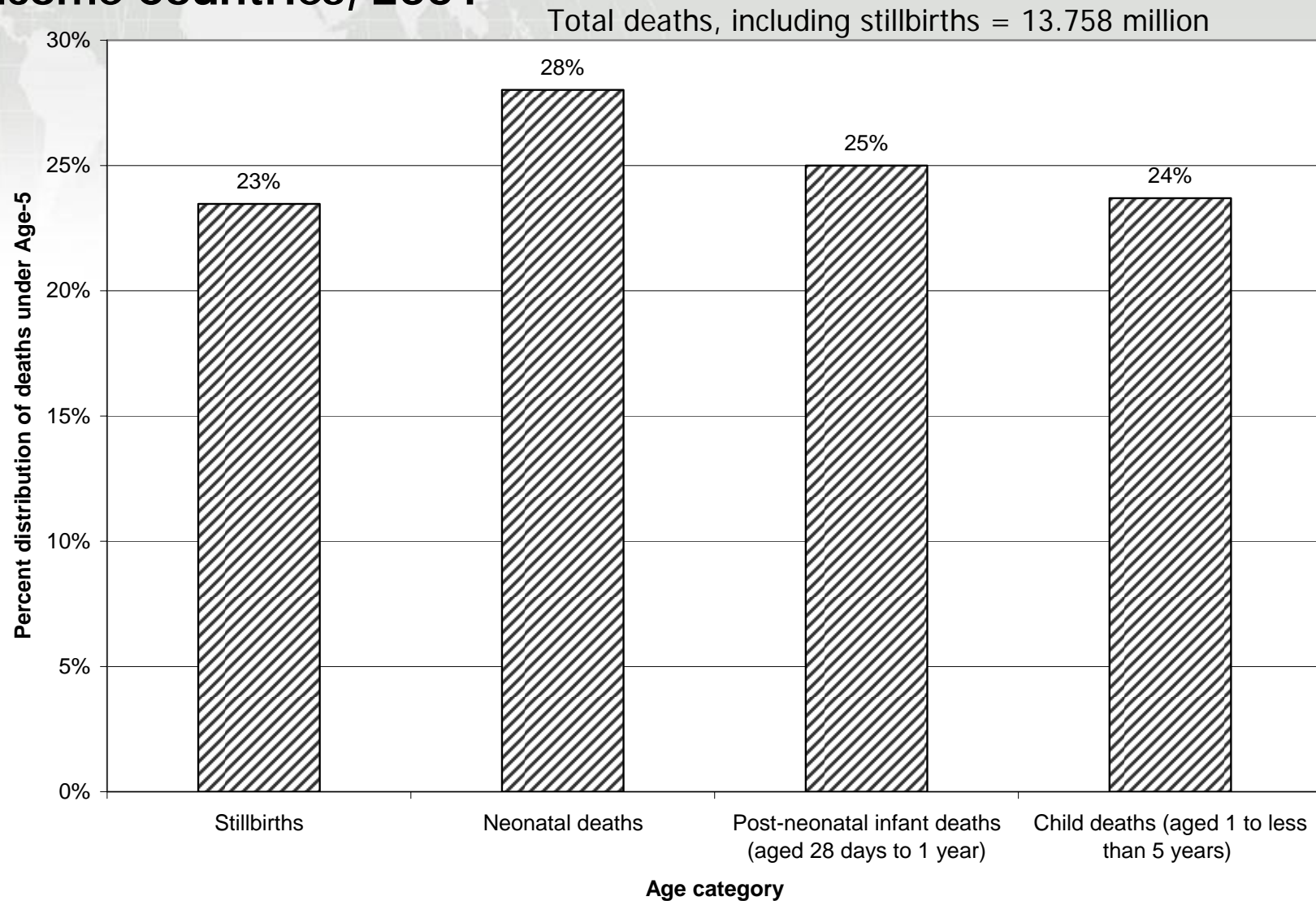
Adult mortality 15-59 years

- Death rates have increased in sub-Saharan Africa mainly due to HIV/AIDS
- Death rates have increased in the low and middle income countries of Europe mainly due to cardiovascular diseases and injuries
- Death rates have decreased in all other regions
- Non-communicable diseases cause more than 50% of deaths in all regions except Africa and South Asia
- Non-communicable disease death rates 30% higher in low and middle income countries than high income countries
- Injuries cause one-quarter of deaths in this age group



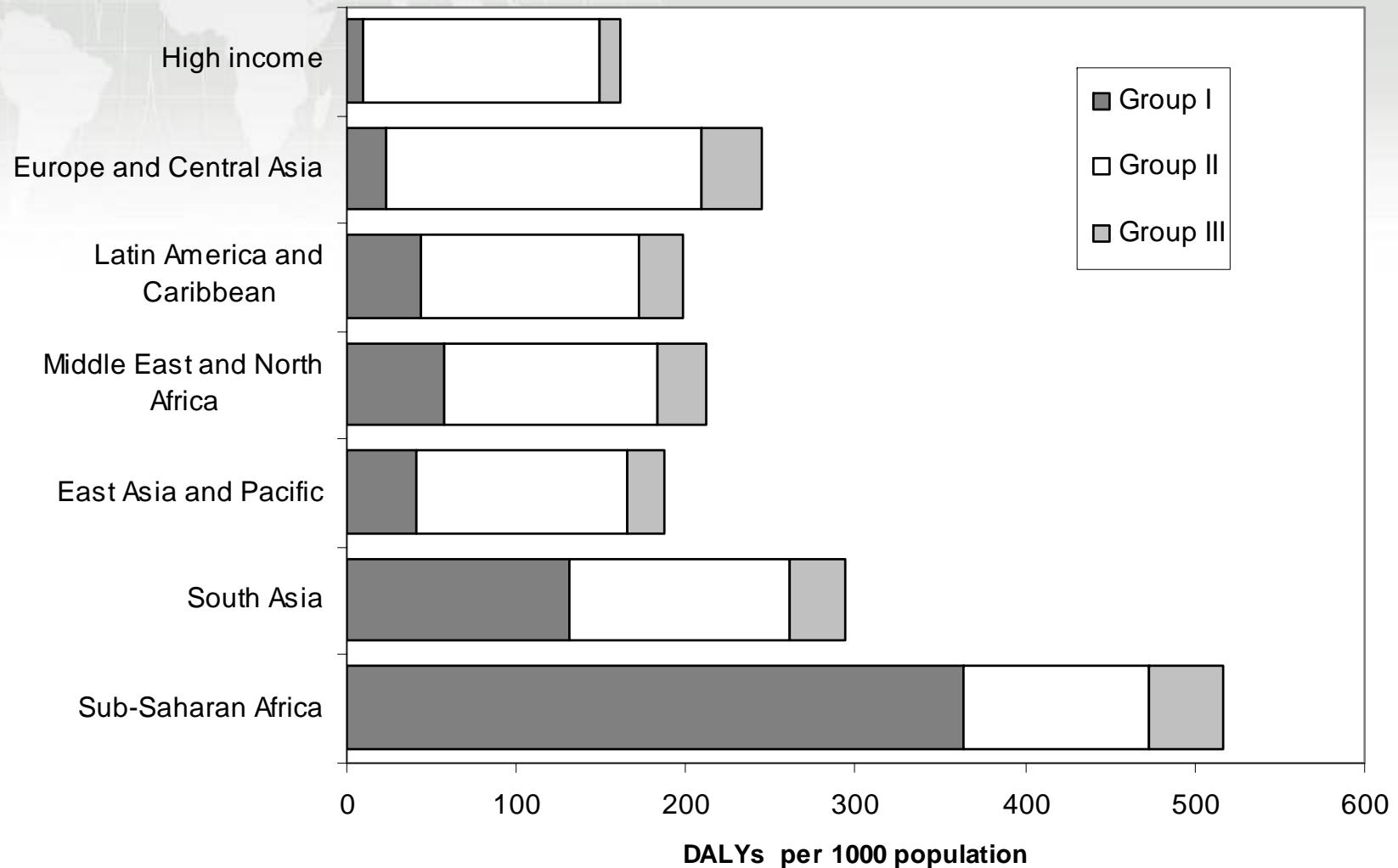
Some slides on burden 2001

The Age Distribution of Deaths Under Age-5, Low- and Middle-Income Countries, 2001



Source: Jamison, Shahid-Salles, Jamison, Lawn and Zupan, Burden of Disease Volume, 2006.

The broad cause distribution of burden of disease, by region, 2001



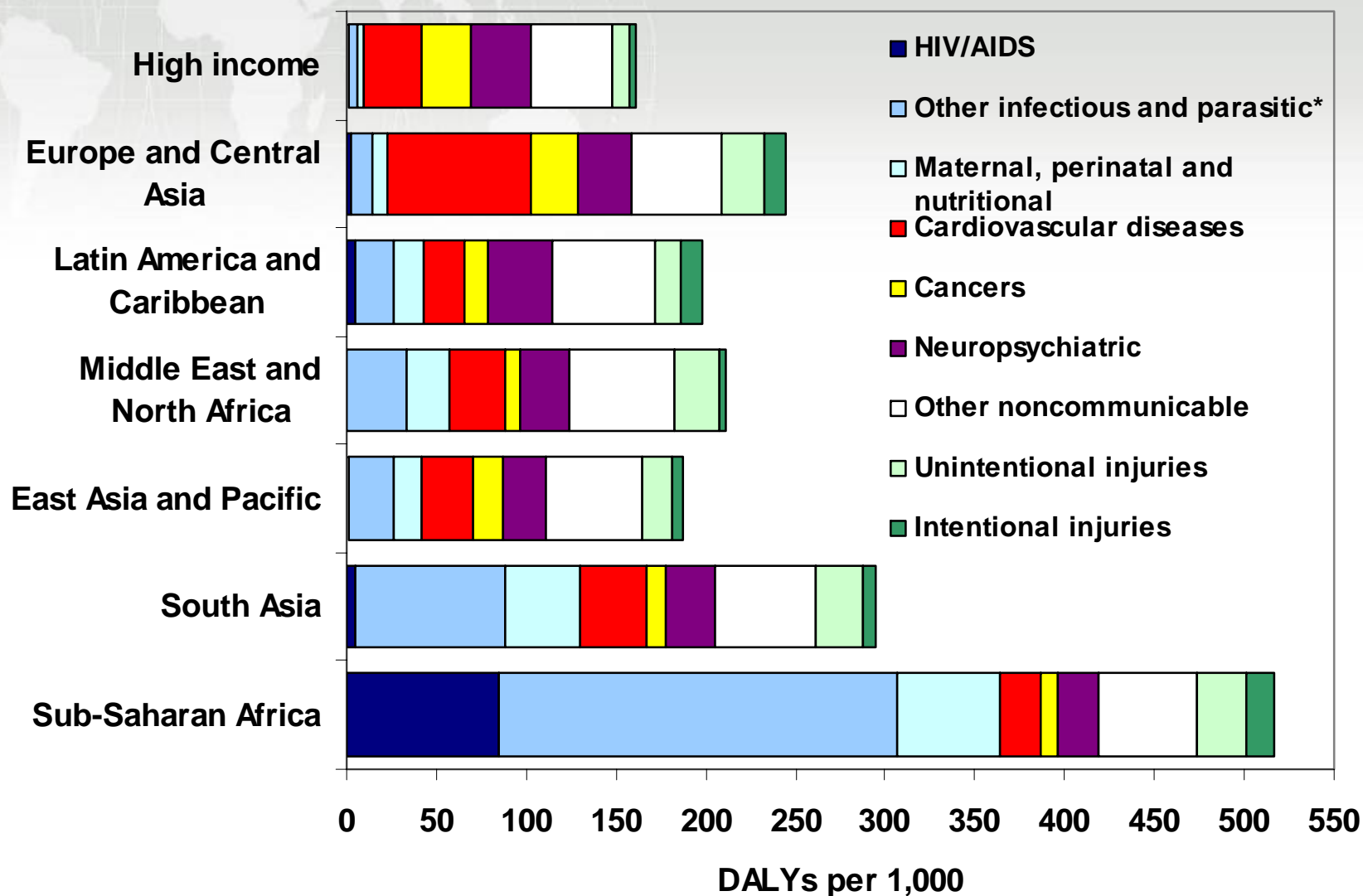
Source: Mathers, Lopez & Murray, Burden of Disease Volume, 2006.

Disease Burden from Selected Causes – Low- and Middle-Income Countries, 2001

Cause	% of Deaths (total deaths = 48.4 million)	% of DALYs (total DALYs = 1.39 billion)
I. Selected Infections		
Tuberculosis	3.3 %	2.6 %
HIV/AIDS	5.3	5.1
Malaria	2.5	2.9
II. Selected NCDs		
Malignant Neoplasms	10.2	5.4
Ischaemic Heart Disease	11.8	5.2
Cerebrovascular Disease	9.5	4.5
III. Selected Injuries		
Road traffic accidents	2.2	2.3
Suicide	1.5	1.3

Source: Mathers, et. al., DCPD Burden of Disease volume, 2006.

The cause distribution of burden of disease, by region, 2001



Source: Mathers, Lopez & Murray, Burden of Disease Volume, 2006.

Leading Causes of Mortality and Burden of Disease Low and middle income countries 2001

Mortality

	%
• Ischaemic heart disease	11.8
• Cerebrovascular disease	9.5
• Lower respiratory infections	7.0
• HIV/AIDS	5.3
• Perinatal conditions	5.1
• Chronic obstructive lung disease	4.9
• Diarrhoeal diseases	3.7
• Tuberculosis	3.3
• Malaria	2.5
• Road traffic accidents	2.2

DALYs

	%
• Perinatal conditions	6.4
• Lower respiratory infections	6.0
• Ischaemic heart disease	5.2
• HIV/AIDS	5.1
• Cerebrovascular disease	4.5
• Diarrhoeal diseases	4.2
• Unipolar depressive disorders	3.1
• Malaria	2.9
• Tuberculosis	2.6
• Chronic obstructive lung disease	2.4

Source: Mathers, Lopez & Murray, Burden of Disease Volume, 2006.



Sensitivity and uncertainty

In Summary

- 56 million people died in 2001
- Stillbirths and neonatal deaths contribute to nearly ½ of all under-5 deaths (13+ million) in low- and middle-income countries
- Over 30% of all deaths in developing countries occur from ages 15-59 compared to 20% in high income countries
- Premature adult mortality in low- and middle-income countries is a major public health concern



For more information,
visit us at www.dcp2.org