Estimating Burden of Injuries in Bangladesh: Some Methodological Concerns

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Presentation

- Magnitude of Injury Problem
  - Global
- Estimation of Injury Burden in Bangladesh
- Methodological Concerns in Bangladesh

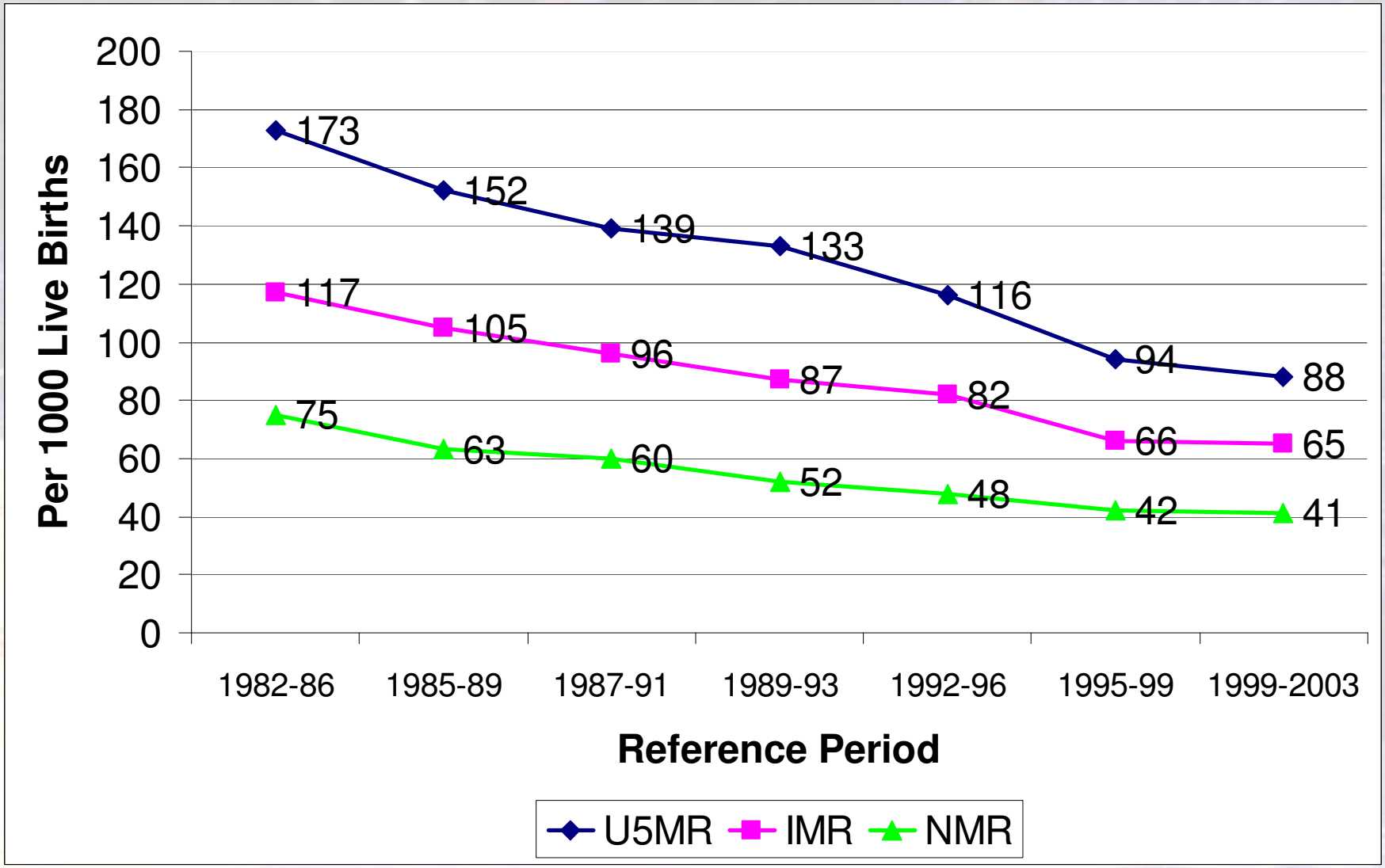
Context….

Epidemiological Transition

Pattern of morbidity and mortality is changing

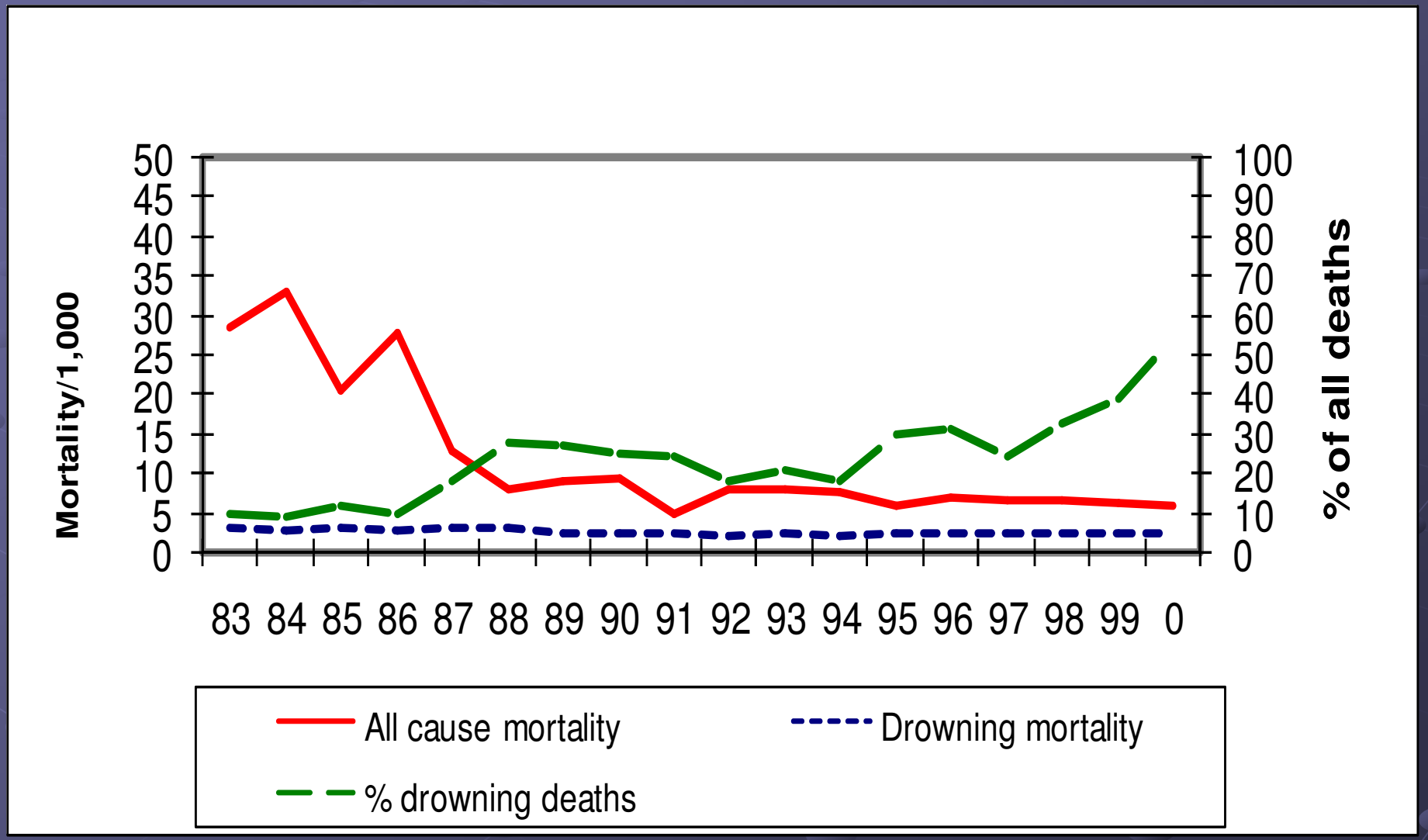
Infectious diseases → Non-Communicable disease and Injuries

Trends in Childhood Mortality in Bangladesh



Source: Bangladesh Demographic and Health Surveys (BDHS)

Matlab Data


Mortality/1,000
50
45
40
35
30
25
20
15
10
5
0
100
90
80
70
60
50
40
30
20
10
0
% of all deaths
83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 0
All cause mortality
Drowning mortality
% drowning deaths

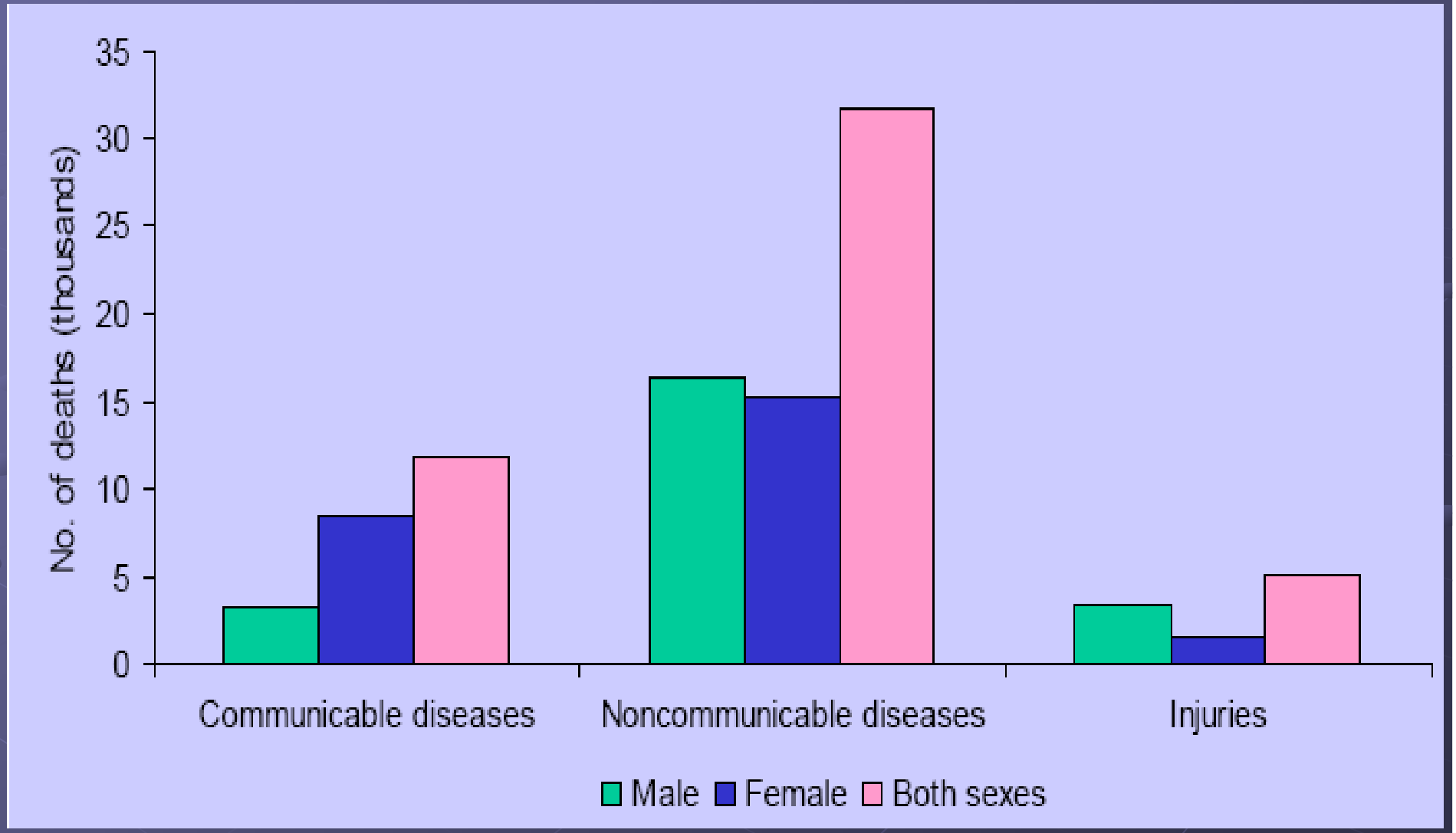
Global Burden of Injuries

- An estimated 5 million people worldwide died from injuries in 2000 — a mortality rate of 83.7 per 100 000 population
- Injuries accounted for 9% of the world's deaths in 2000 and 12% of the world’s burden of disease
- The burden of disease related to injuries, particularly road traffic injuries, interpersonal violence, war and self-inflicted injuries is expected to rise dramatically by the year 2020
- Road traffic injuries are the leading cause of injury-related deaths worldwide

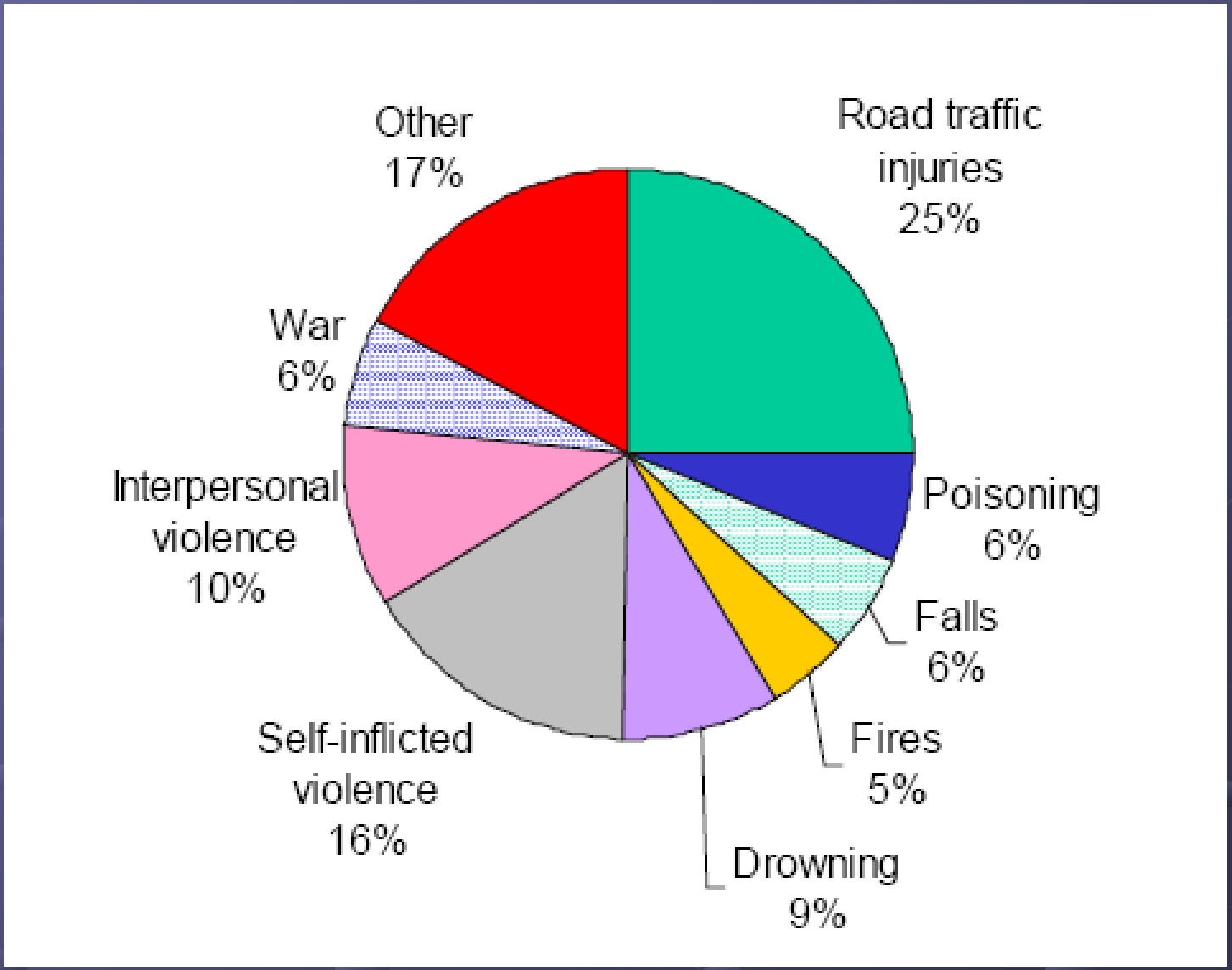
World rankings of injury-related mortality and burden of disease (DALYs lost), 1990 and 2020

	No. of deaths		DALYs lost	
	1990	2020	1990	2020
Road traffic injuries	9 →	6	9 →	3
Self-inflicted injuries	12 →	10	17 →	14
Interpersonal violence	16 →	14	19 →	12
War	20 →	15	16 →	8

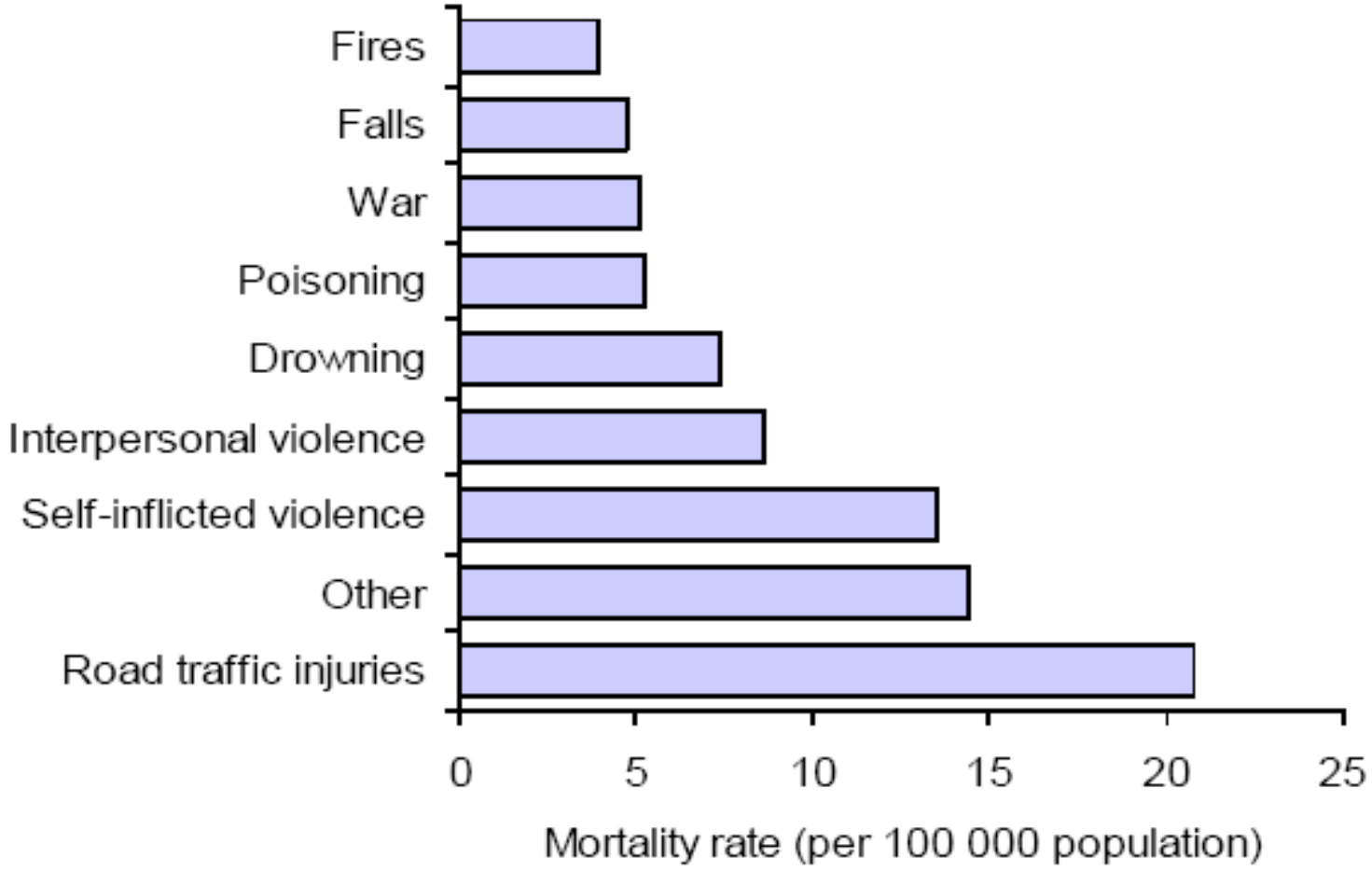
Global Mortality by Cause and Sex, 2000



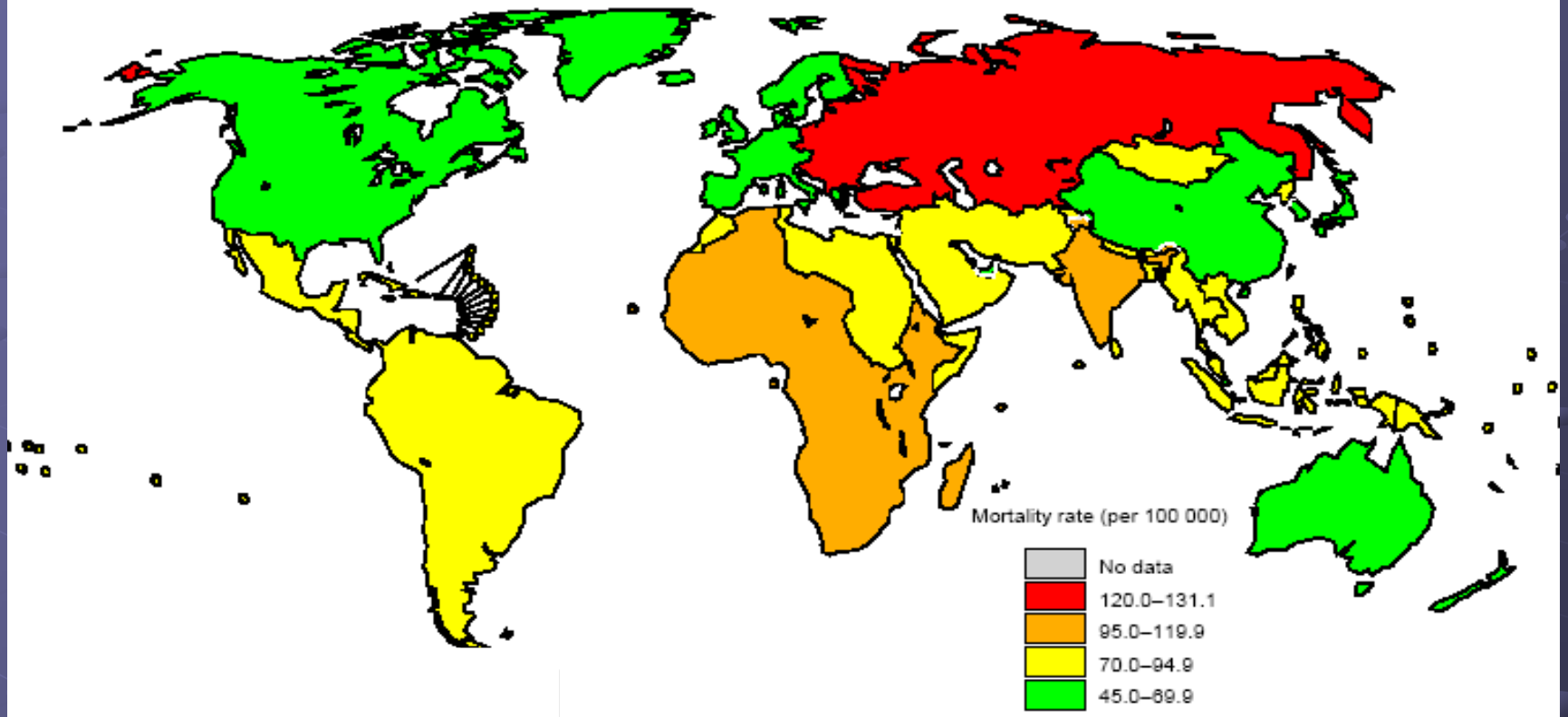
Distribution of Global Injury Mortality by Cause, 2000



Global Injury Mortality Rate by Cause, 2000



Global Injury-related Mortality



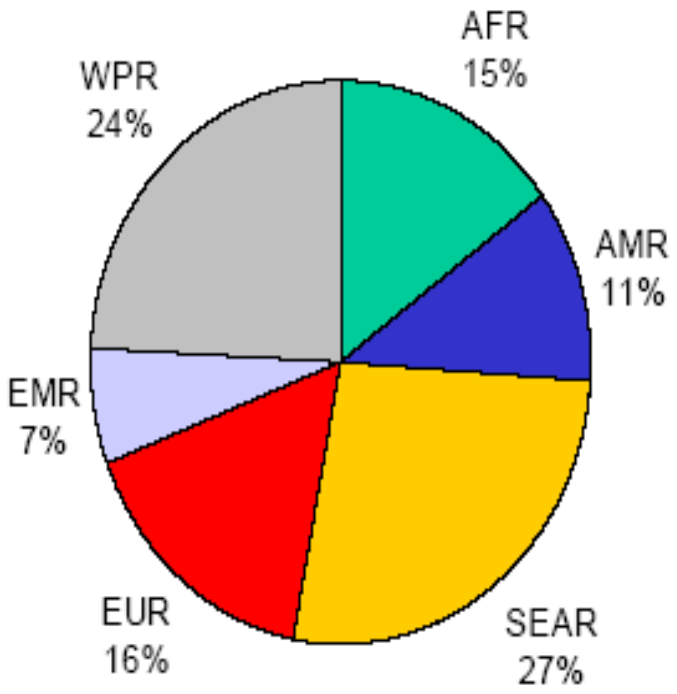
Injury-related mortality rates (per 100 000 population) in WHO regions, 2000

Africa	Americas		South-East Asia		Europe		Eastern Mediterranean		Western Pacific		
LMIC	HIC	LMIC	India	Other LMIC	HIC	LMIC	HIC	LMIC	HIC	China	Other LMIC
118.8	53.8	76.2	96.9	75.0	47.6	131.5	51.1	70.4	56.2	51.5	78.4

HIC, High-income countries; LMIC, Low- and middle-income countries.

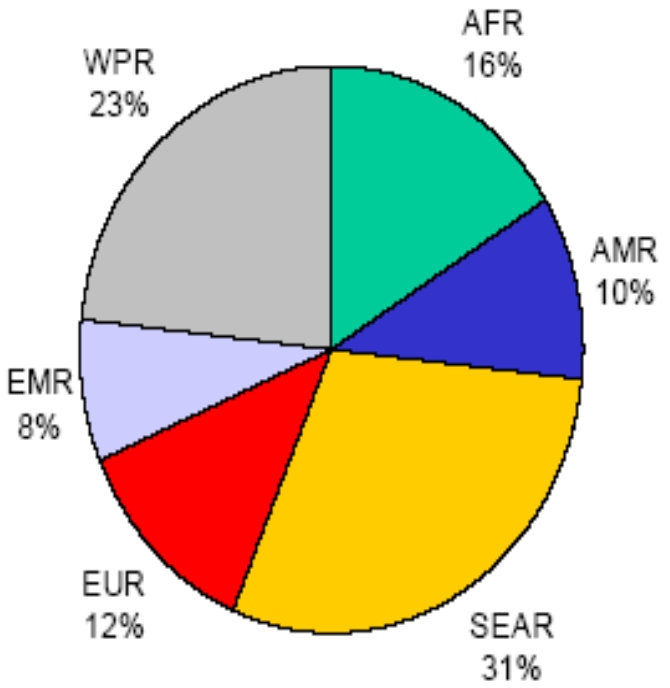
Regional distribution of global injury-related *mortality*, 2000

Total no. of deaths = 5 062 000

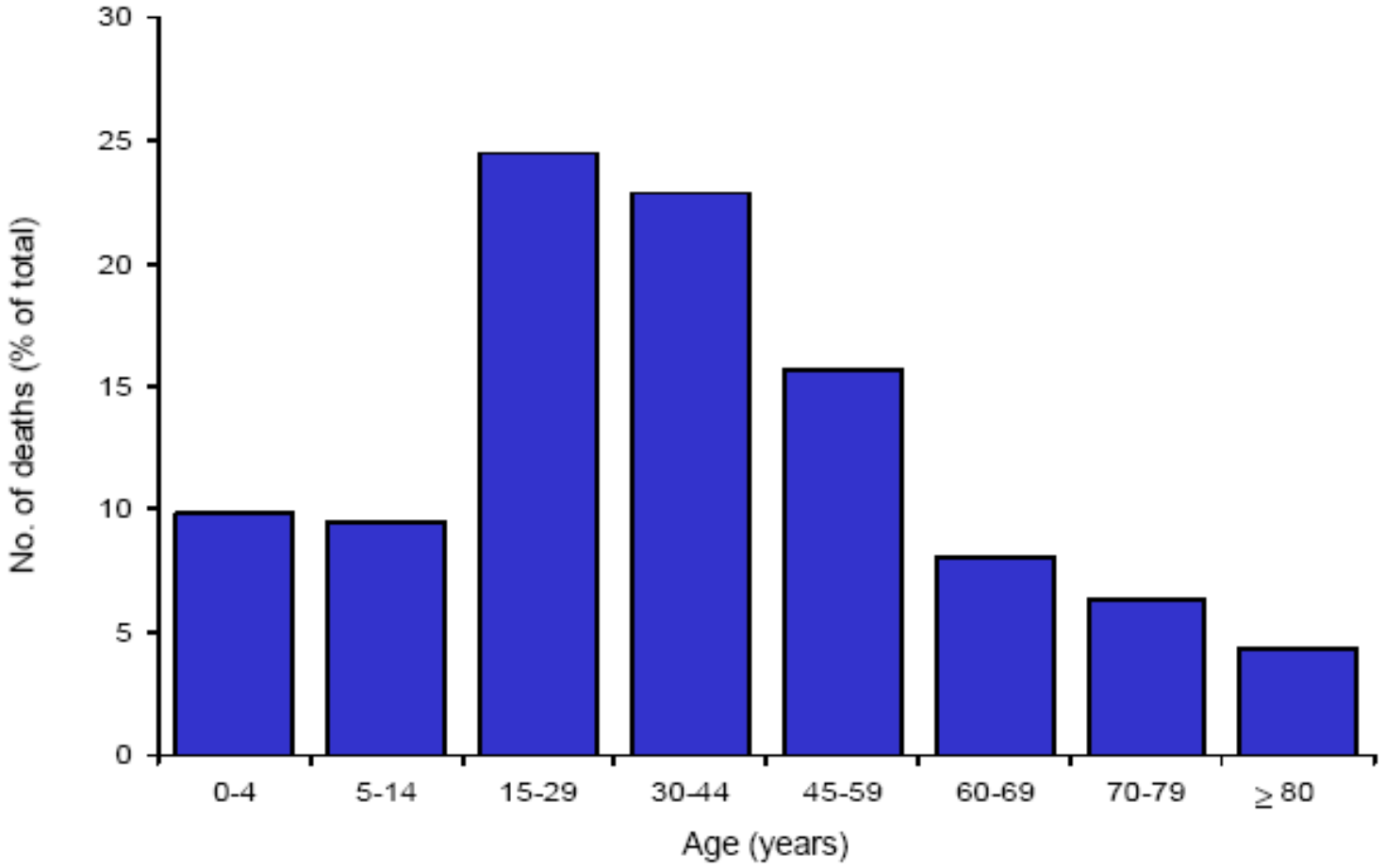


Regional distribution of the global injury *burden* (DALYs lost), 2000

Total no. of DALYs lost = 182 555 000



Age distribution of global injury-related mortality, 2000



Injury is still a neglected Health and Social Problem in Bangladesh as well as other countries of SEAR

Why unrecognized and neglected?

Burden of Injury has not been estimated to

- Convince Policy Makers for Resource allocation
- Professionals for their involvement in research
- Community people to raise demand for action

Why?

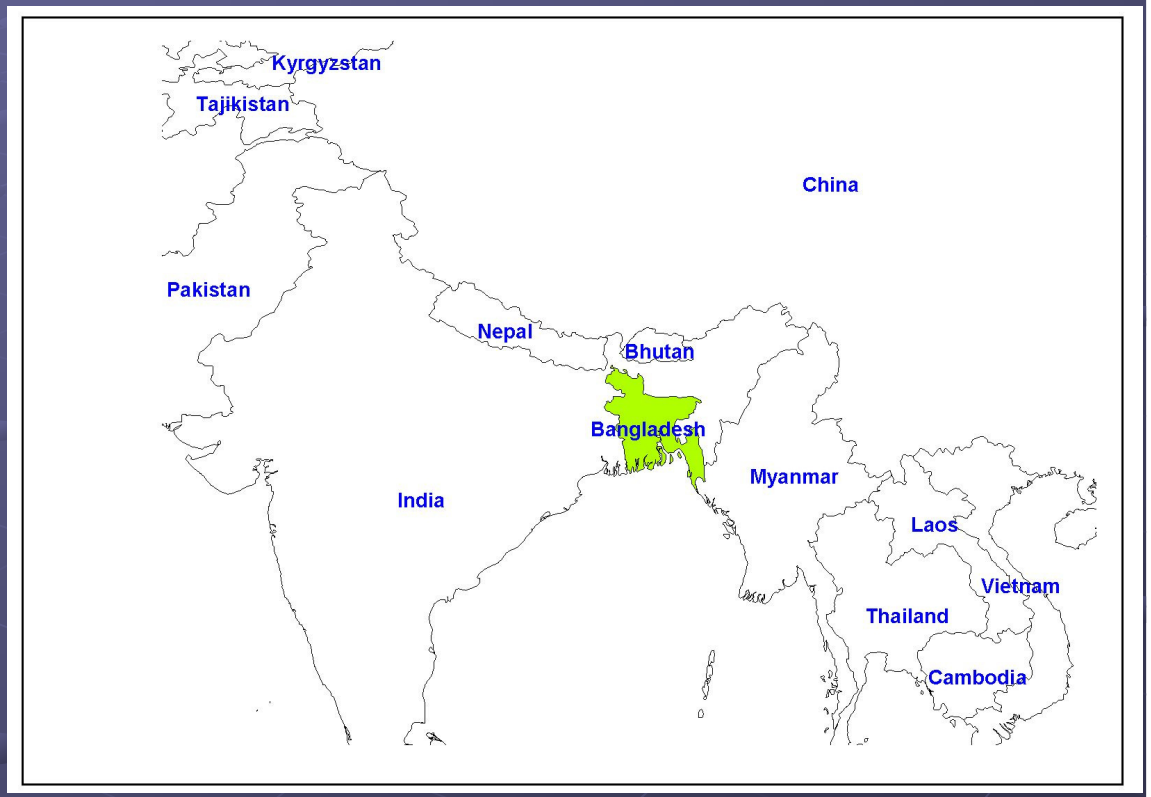
- Mainly Lack of Data
- Lack of skilled man power

Lack of Data

- No vital Registry System
- Poor Hospital Information
- Other Data sources
  - Under-representative
  - Incomplete

Bangladesh

Largest delta
Area: 144,000 Sq km
Population: 140 million
Population density: 855/sq km
Literacy rate: 55%
Per capita income: US$ 490
Economic mainstay:
Agriculture, Industry
CBR: 19.9/1000 pop
CDR: 4.8/1000 pop
IMR: 56/1000 live birth
U5 : 82/1000 live birth
Life expectancy at birth: 63 yrs



Bangladesh Health and Injury Survey (BHIS)

Duration January – December 2003

Quantitative Study

170,000 HH (820,000 persons) of 12 districts randomly selected;

Environmental and behavioral risk survey among a subset of national sample.

Qualitative Study

52 Focus Group Discussions in rural and urban areas.

DDirectorate General of Health Services (DGHS), MOH&FW
IInstitute of Child and Mother Health (ICMH)

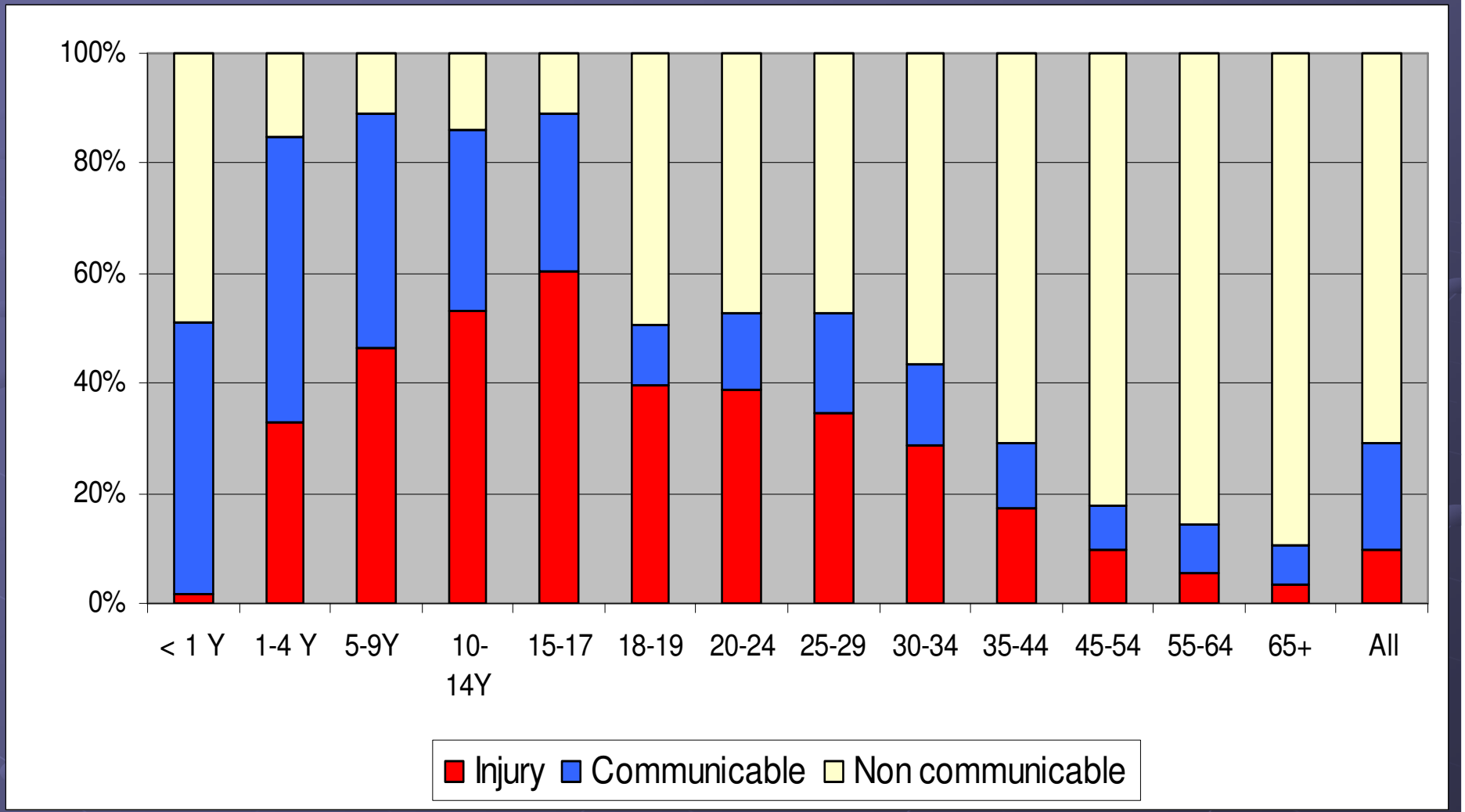
TThe Alliance for Safe Children (TASC)
UUNICEF Bangladesh

Burden Estimates

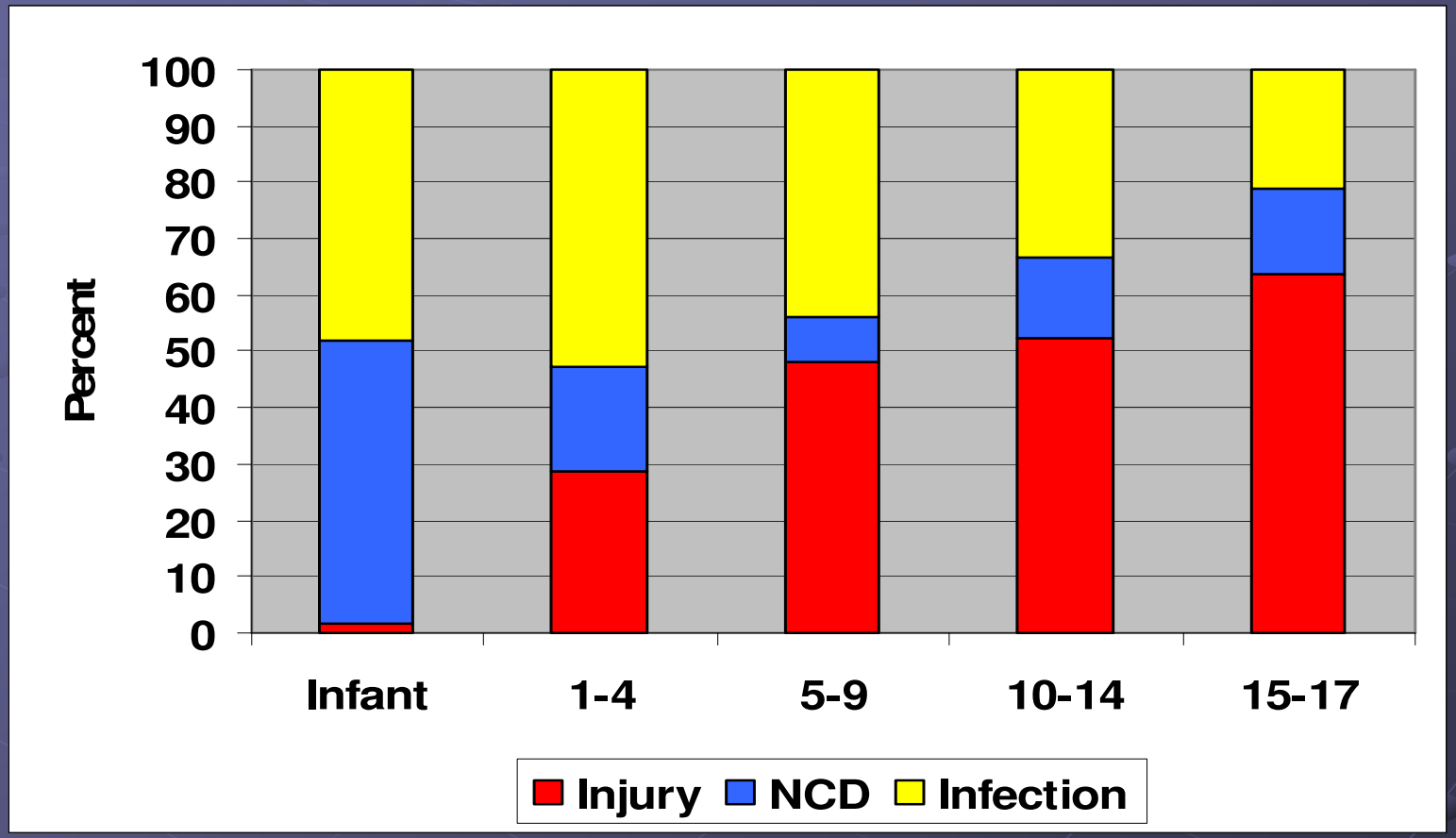
- Mortality : Number and Rate
  - By Age, Sex and Cause
- Morbidity: Number and Rate
  - By Age, Sex and cause
  - Disability
    - By Age, Sex and Cause
- Social Implication
  - Injury Orphanhood
- Cost of Injuries
- Summary Measures

  Aggregate mortality and morbidity into a single measure # years healthy life lost (DALYs, QALYs)

Proportional Mortality by Age

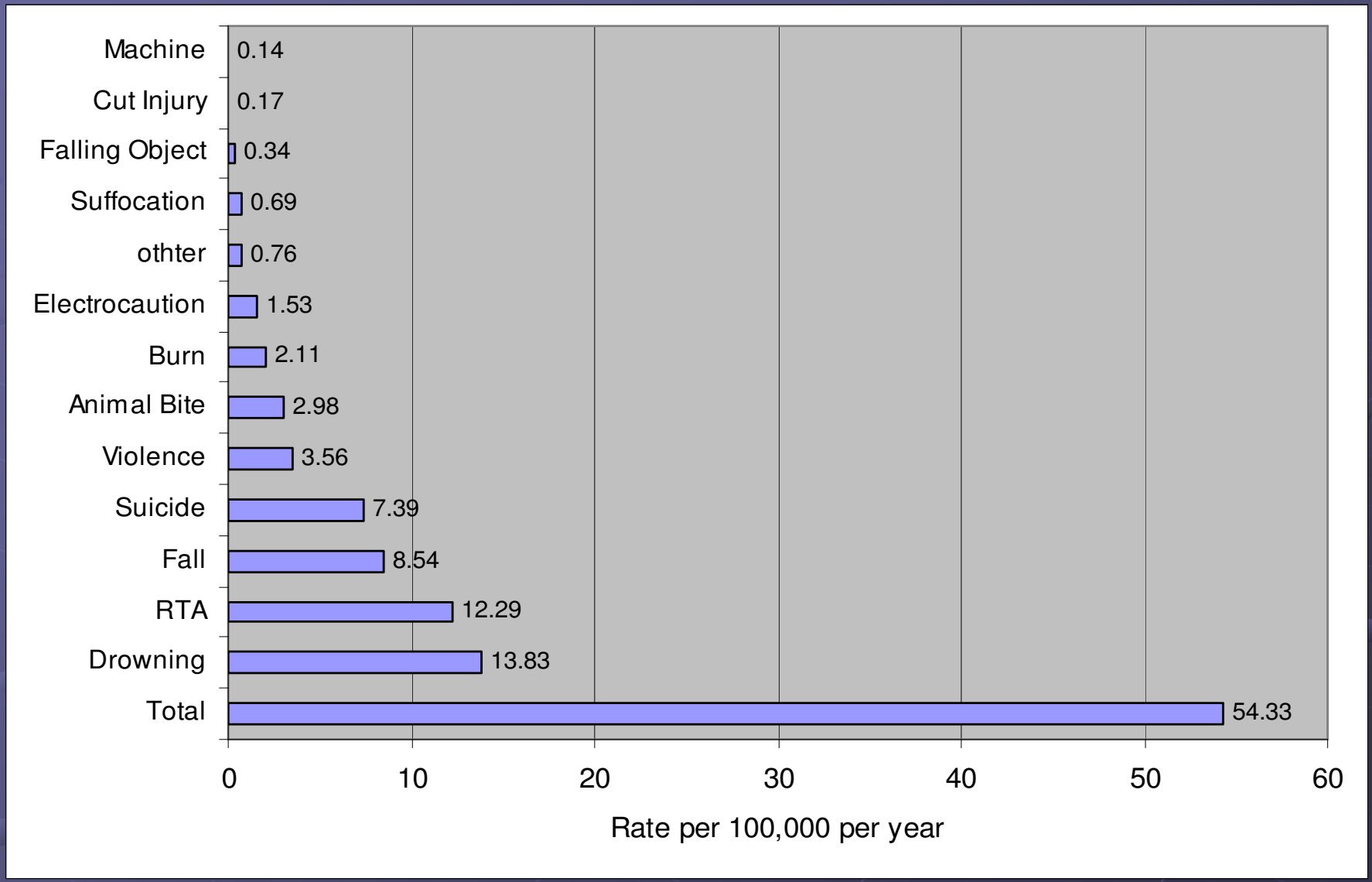


Proportional Mortality of Children by Age

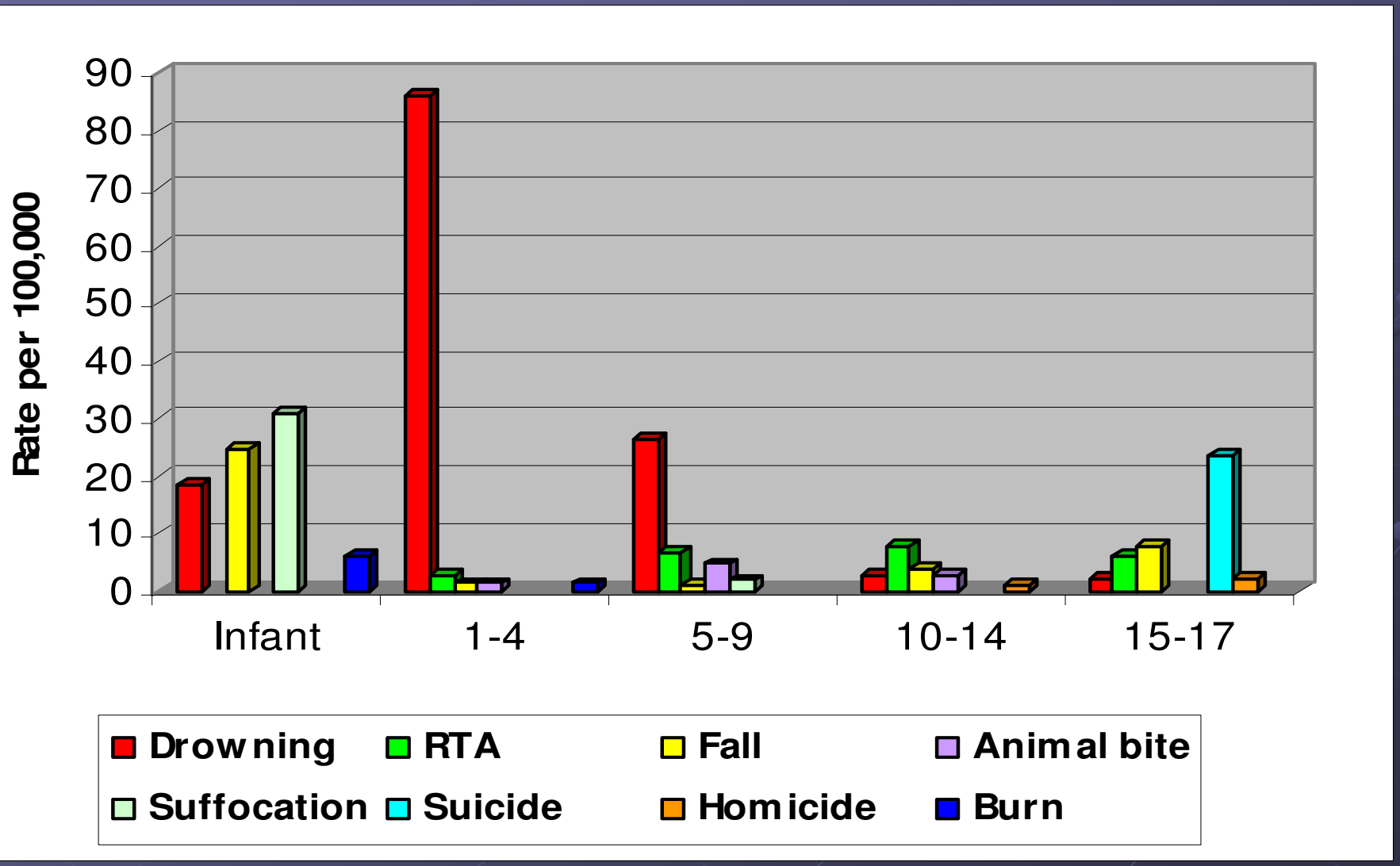


Injury kills 83 children under 18 everyday.

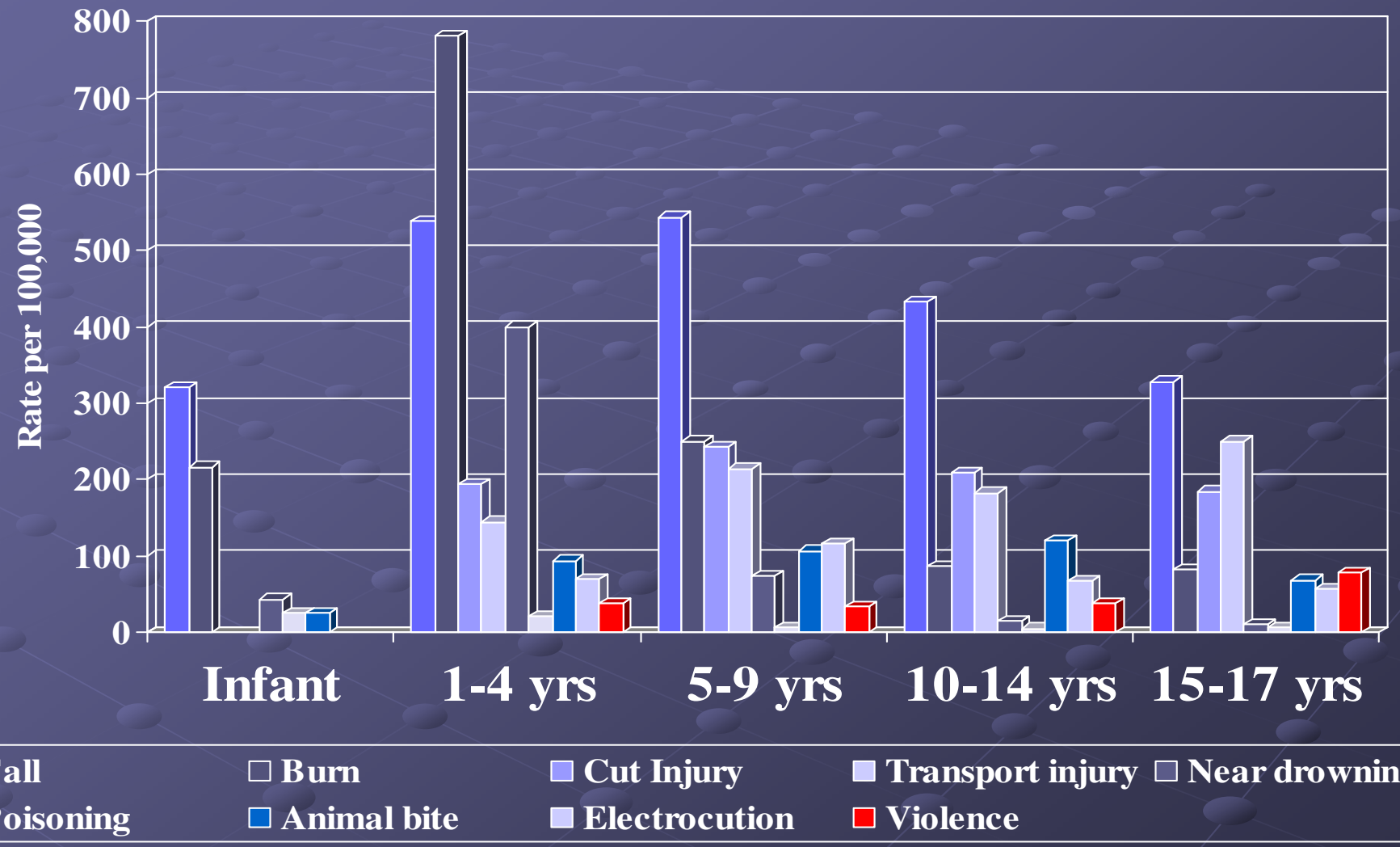
Injury Mortality Rate by cause, Bangladesh 2003



Leading Causes of Injury Mortality by Age

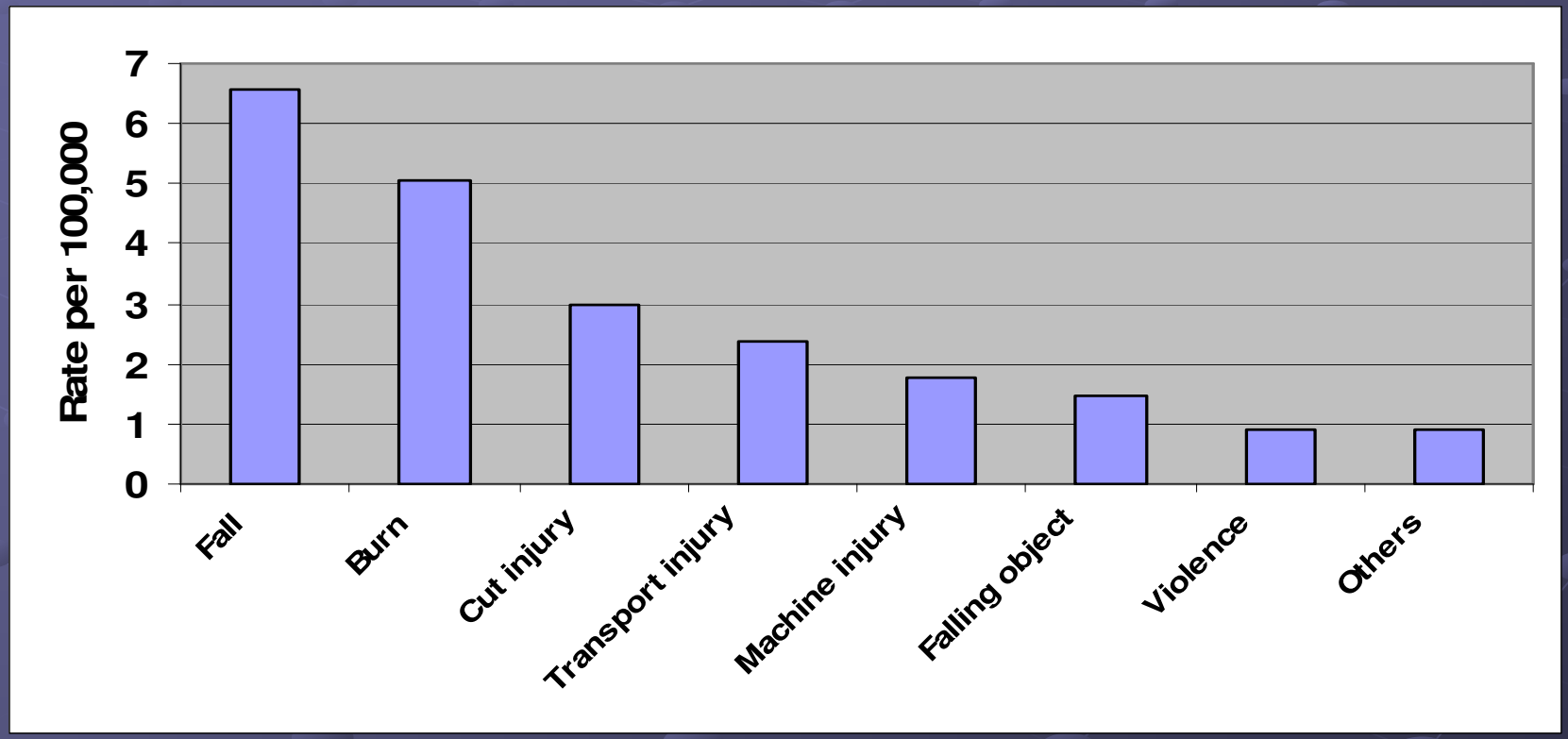


Leading Causes of Injury Morbidity by Age



Injury Disability

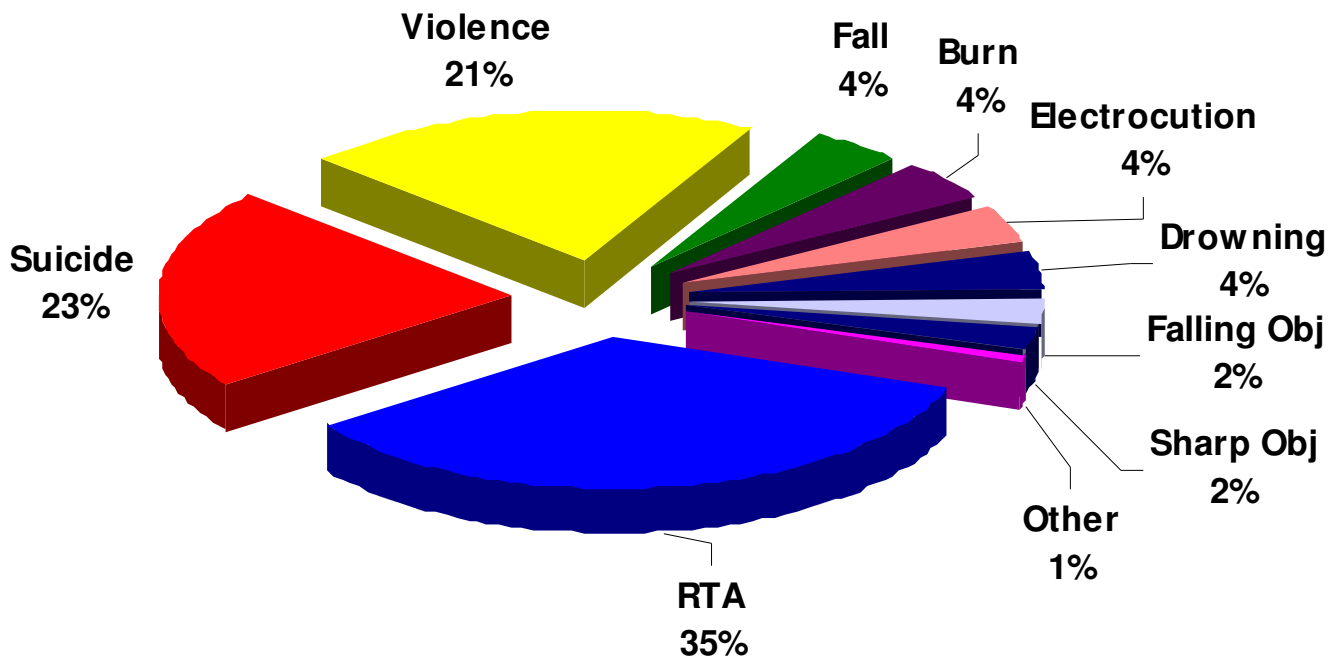
More than 13,000 children becoming disabled every year from injury



Causes of permanent disability due to injury among children 1-17 yrs

Injury Orphanhood

At least 38,000 infants and children (0-17) lost either their primary caregiver (mother) or primary economic provider (father) due to injury



BHIS Key findings on Child Injuries

- **38% of all deaths in children 1-17 yrs are due to injuries**
- **30,000 children die due to injury every year**
- **13,000 children become permanently disabled each year**
- **1,000,000 children suffer from moderate to severe injury morbidities**

Specific burden metrics

DALYs Estimation

DALYs count the years of healthy life that are lost because of injuries, incorporating in a single measure the loss of healthy life due to premature death and that due to disability. The DALY measure adds value in that it begins to try and quantify the impact of injury related disability on the family and society as a whole. This is important as the leading external causes of injury death differ from the leading external causes of non-fatal injury and the more complete picture allows better decisions in terms of addressing those injury issues with the highest burden.

DALY Calculation (the easiest way)

Years of lost life (YLLs)	+	Years lost to disability (YLDs)

Input
- Life expectancy at age of death
- Age at death

Input
- Duration of disease/injury
- Disability weight of disease/injury
- % long-term cases

DALY Calculation: an example

A Two-Car Collision

1 family dies
- **10 year old girl**
- **8 year old boy**
- **38 year old mother**
- **42 year old father**

2 people injured
- **45 y/o woman – SCI**
- **55 y/o man – fractured rib**

YLLs from deaths
- **70 year life expectancy**
- **73 year life expectancy**
- **46 year life expectancy**
- **33 year life expectancy**

YLDs from injuries
- **Duration (36 year LE) * Disability Wt (.725) = 26 YLDs**
- Duration (.115 years) * Disability Wt (.199) = 0.02 YLDs

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222 YLLs + 26.02 YLDs = 248.02 YLDs

National DALY lost due to injury in 2003

Male:	**2,351,931**	**YLDs**	**61.1%**
Female:	**1,444,998**	**YLDs**	**38.9%**
Total :	**3,796,929**	**YLDs**	

National DALY lost due to injury in 2003

	Male	Female
YLL	2,039,182	1,318,692
YLD	312,749	126,306

Methodological Concerns in Estimating Burden of Injuries

- Data Limitation
  - Survey Data
    - Costly- Large sample size
    - Recall Bias
    - Incomplete
- Hospital Registry Data
  - Death: Grossly under representative
  - Morbidity: Incomplete, Under representative
  - Disability: Limited
- Other Data Sources
  - Police Data
  - Post-mortem data

Methodological Concern

- Morbidity estimate: Severity
- In DALYs estimation
  - Disability weight
  - Duration of Disability
  - Age weighting
  - Discounting factor

Conclusions

- The Epidemiological Data for estimation of Burden of Injuries in limited in Bangladesh.
  - Need to establish injury surveillance system including police data, hospital registry and periodical survey.
- Very Simple and clear methods for estimation of DALYs need to be worked out for country like Bangladesh.