THE GEORGE INSTITUTE
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Affiliated with the University of Sydney

Road Traffic Injuries in Asia

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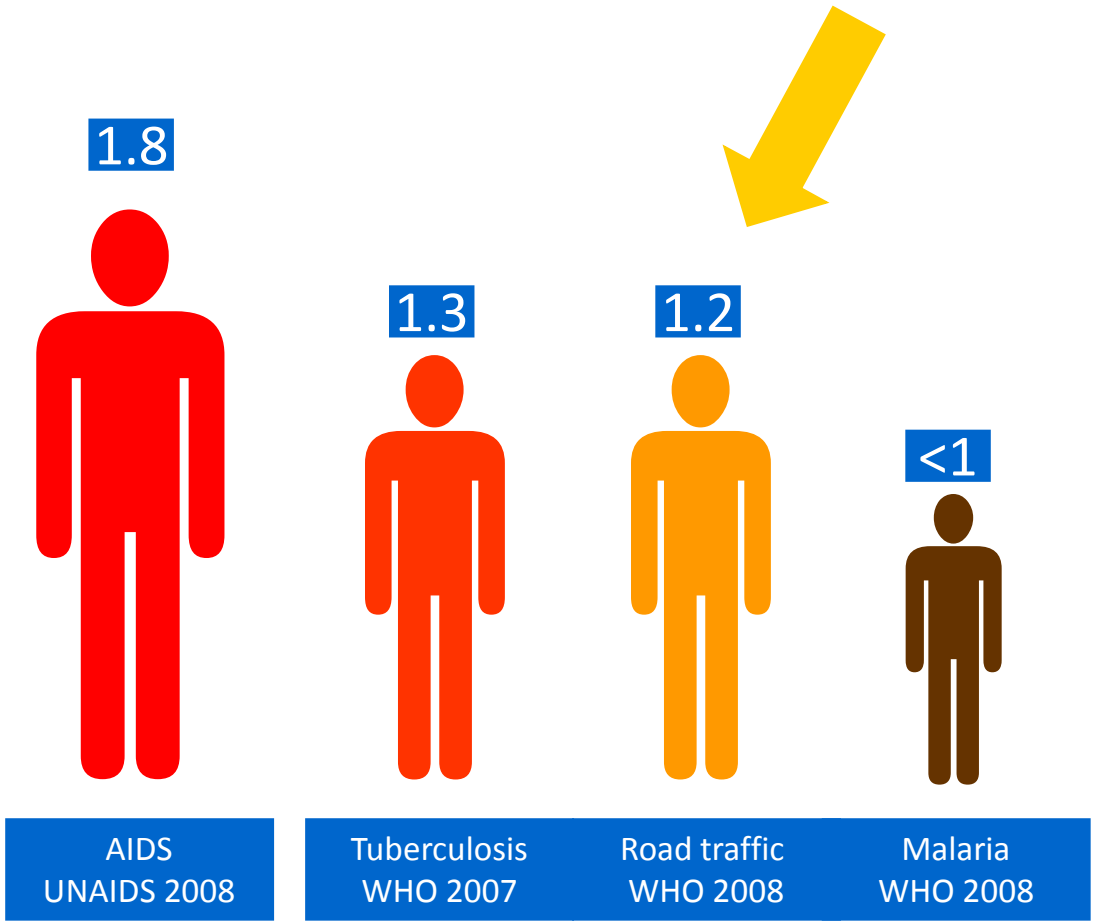
Major causes of death

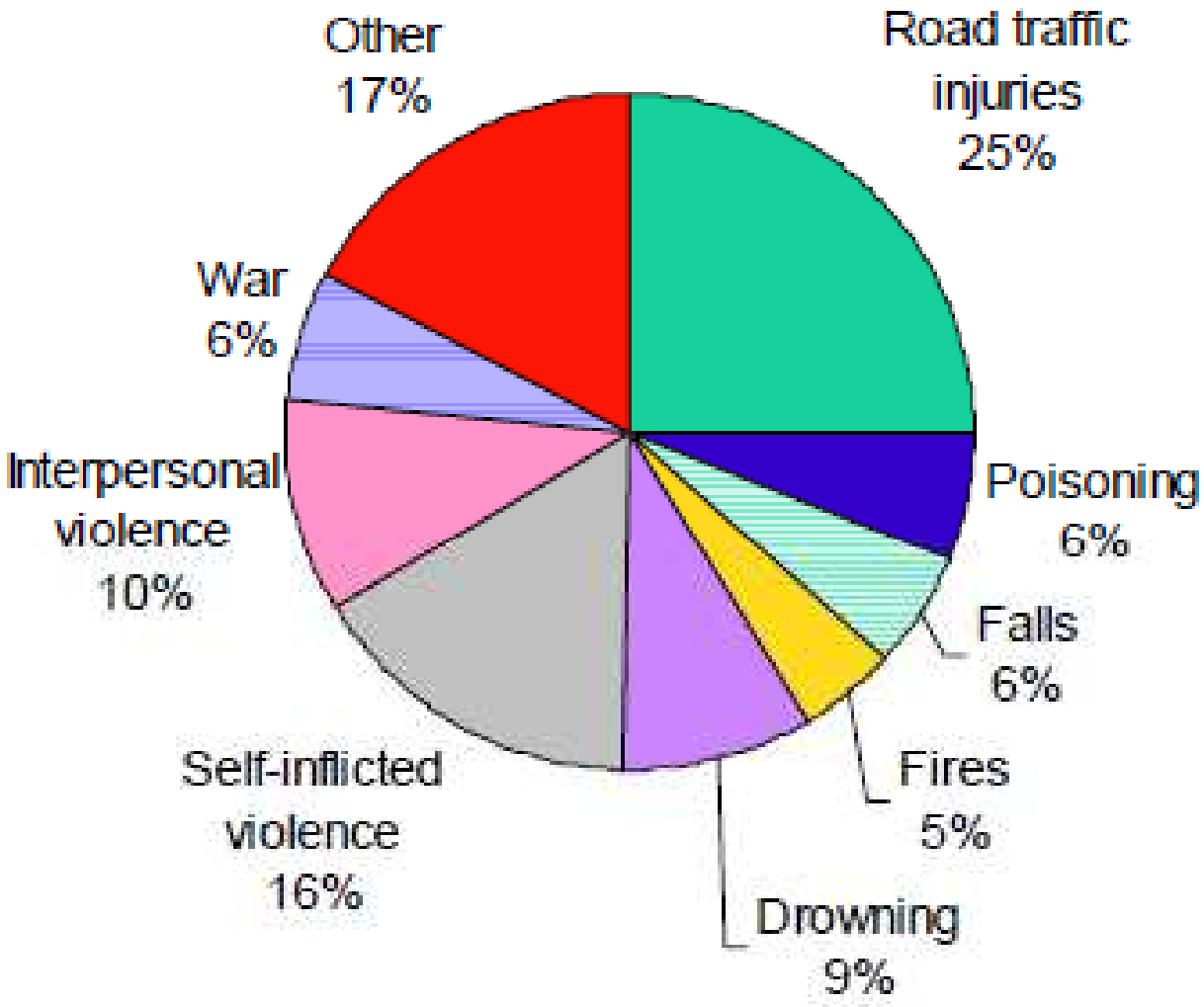


Young adults and males are at greatest risk

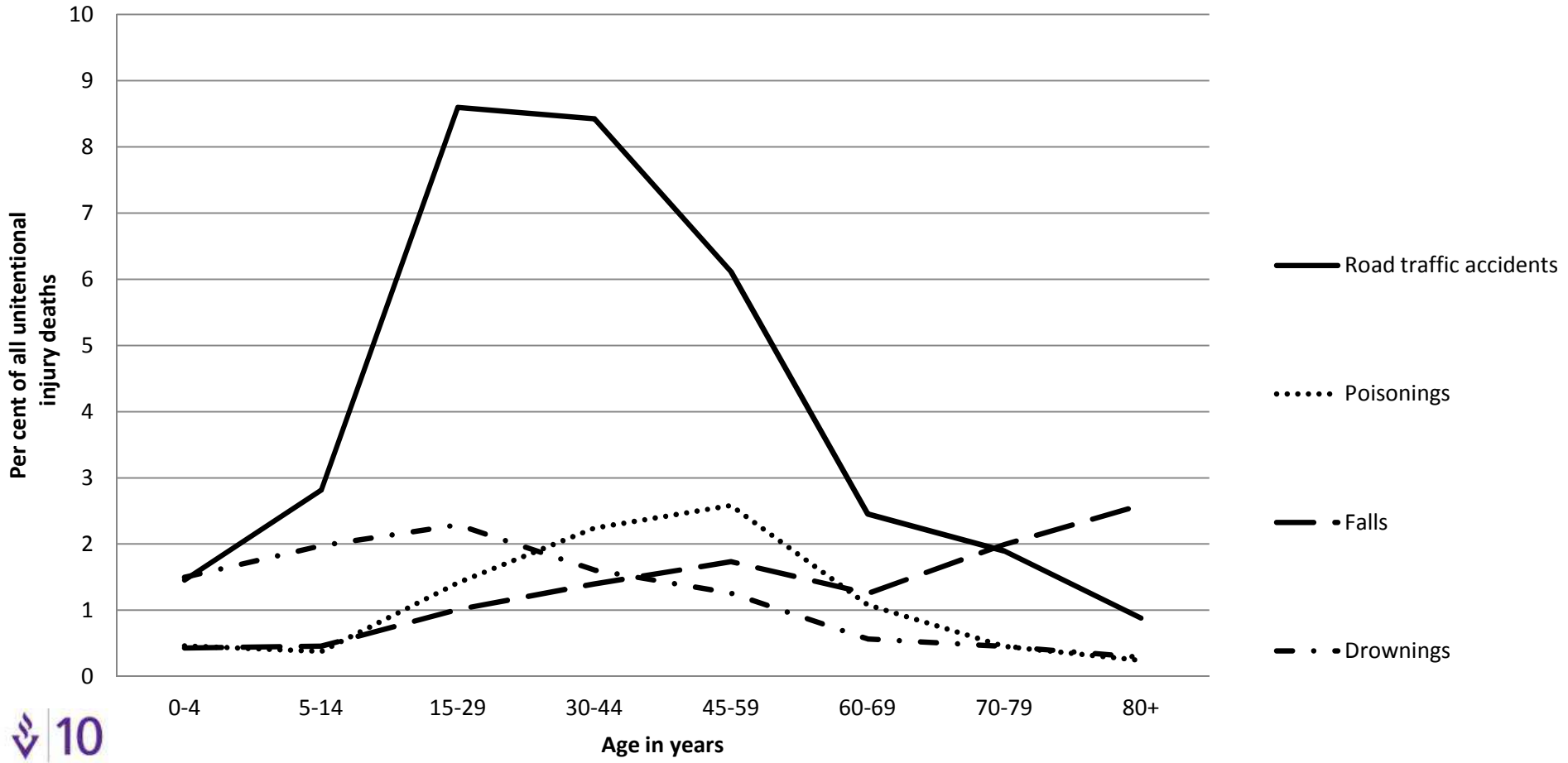
- Half of all global road traffic deaths occur among young adults between 15 and 44 years of age.
- 73% of all global road traffic fatalities are males.
- In Africa, a third of all road traffic deaths occur among those aged 5-14 years.
- Males takes more risks as drivers or pedestrians.
- In high-income countries young drivers are disproportionately represented.
- In low- and middle-income countries, most young victims are vulnerable road users

→ Major implications for productivity, PYPLL

Distribution of global injury mortality, 2000



Leading causes of unintentional injury deaths by age, GBD 2004



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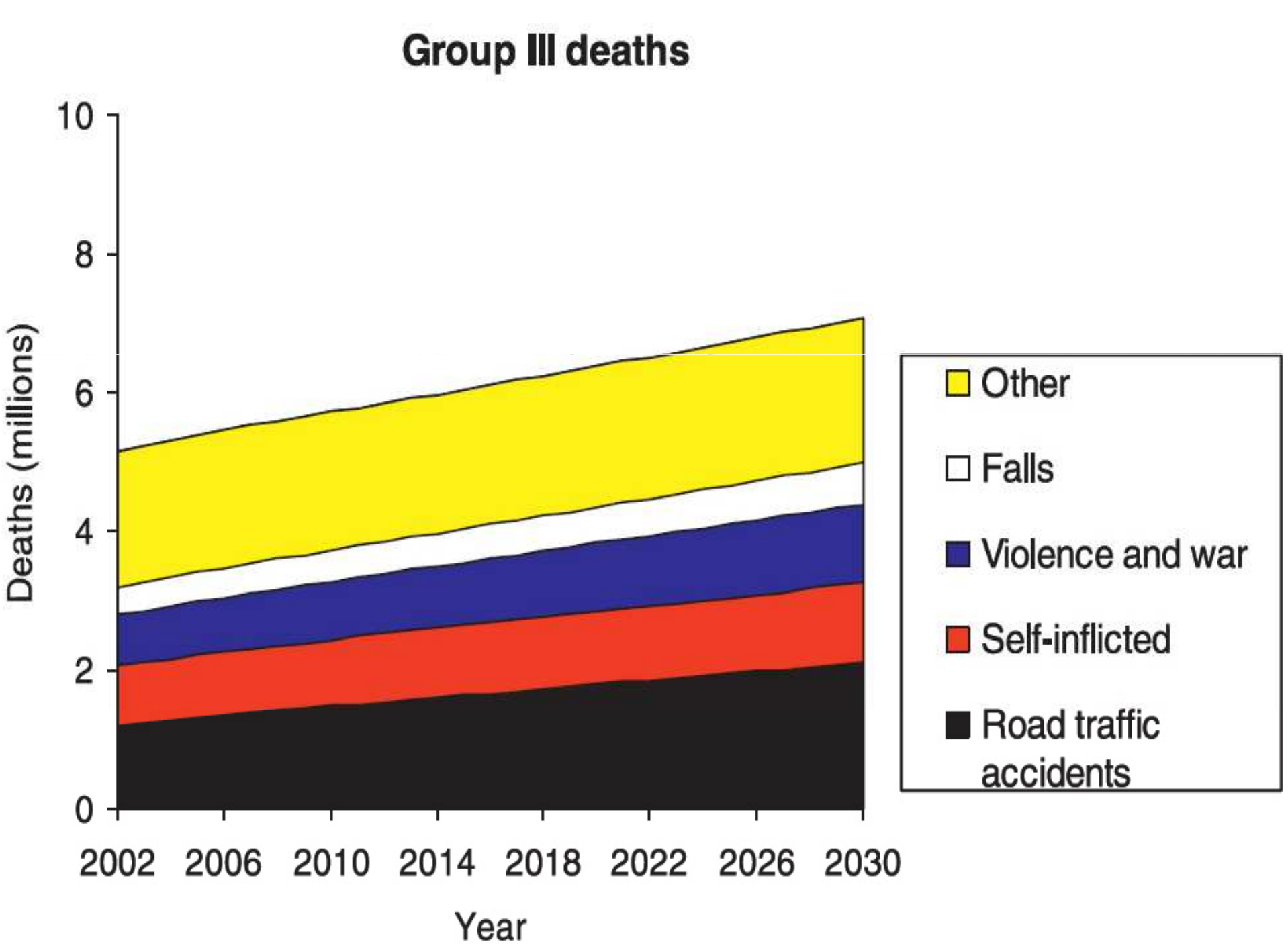
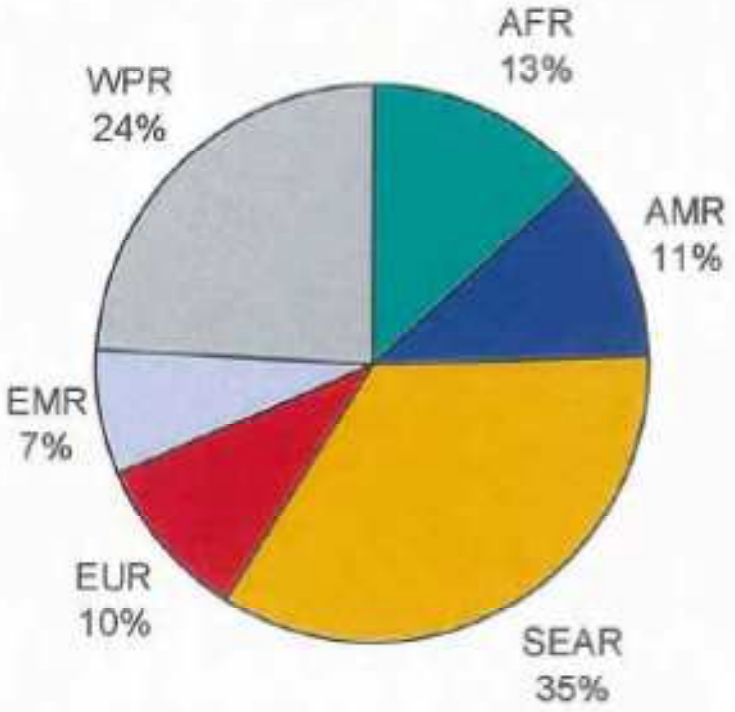


Baseline Projections of Deaths from Group III Causes, World, 2002–2030

Regional distribution of global RTI *mortality*, 2000

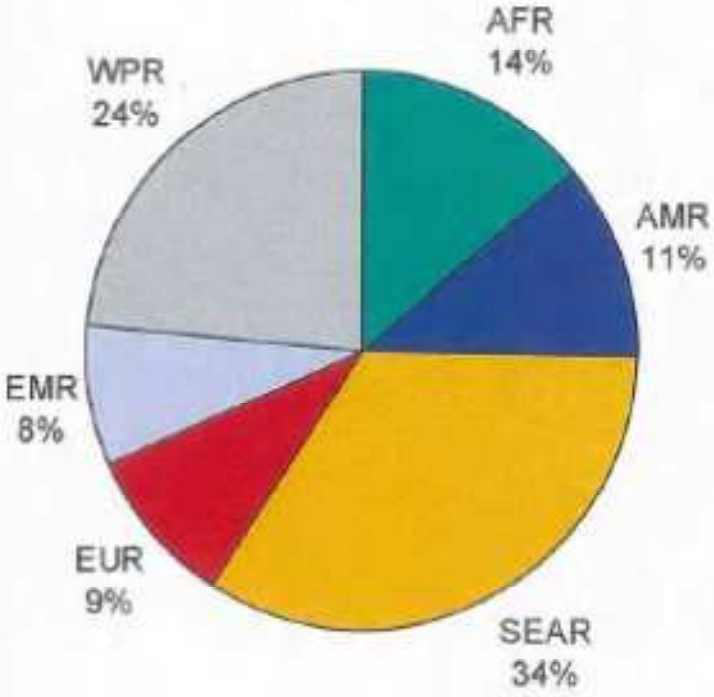
Total no. of deaths = 1 260 000



Of the WHO regions, South-East Asia (SEAR) accounts for the highest proportion of road traffic injury deaths.

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

Total no. of DALYs lost = 41 234 000



The South-East Asia Region (SEAR) accounts for more than one-third of the total number of DALYs lost globally to road traffic injuries.

RTI deaths

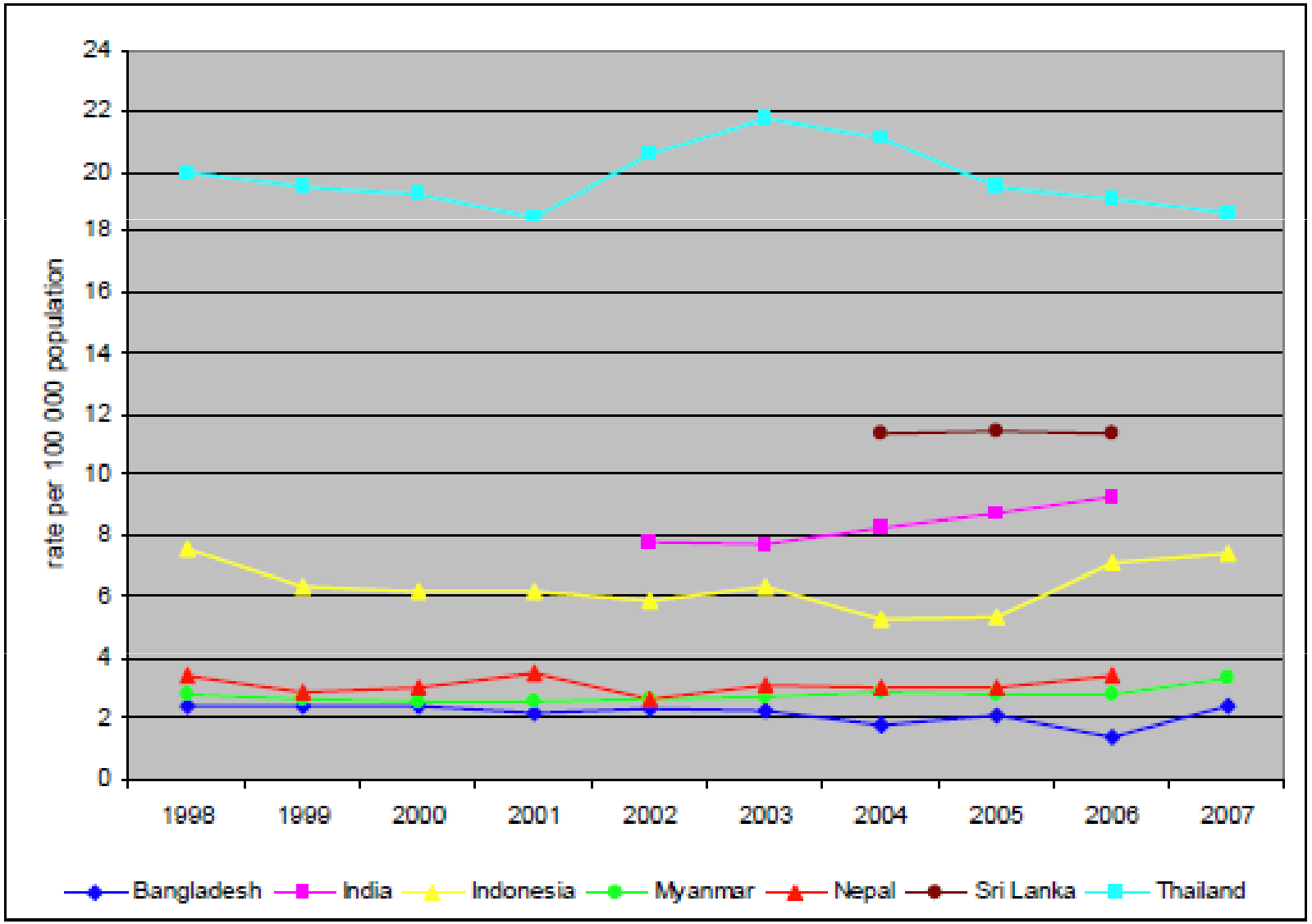
Road traffic injury fatality rates* per 100 000 population, by WHO region

WHO region	High-income	Middle-income	Low-income	Total
African	—	32.2	32.3	32.2
The Americas	13.4	17.3	—	15.8
South-East Asia	—	16.7	16.5	16.6
European	7.9	19.3	12.2	13.4
Eastern Mediterranean	28.5	35.8	27.5	32.2
Western Pacific	7.2	16.9	15.6	15.7
Global	**10.3**	**19.5**	**21.5**	**18.8**

* 30-day definition of a road traffic death
Source: Global Status Report on Road Safety, 2009

Africa and the Eastern Mediterranean have the highest rates of RTI deaths.

Figure 4: Fatal road traffic injuries rate (per 100 000 population[a]) trends in the South-East Asia Region (using actual data updated from countries), 1995-2007



WHO SEARO, 2011

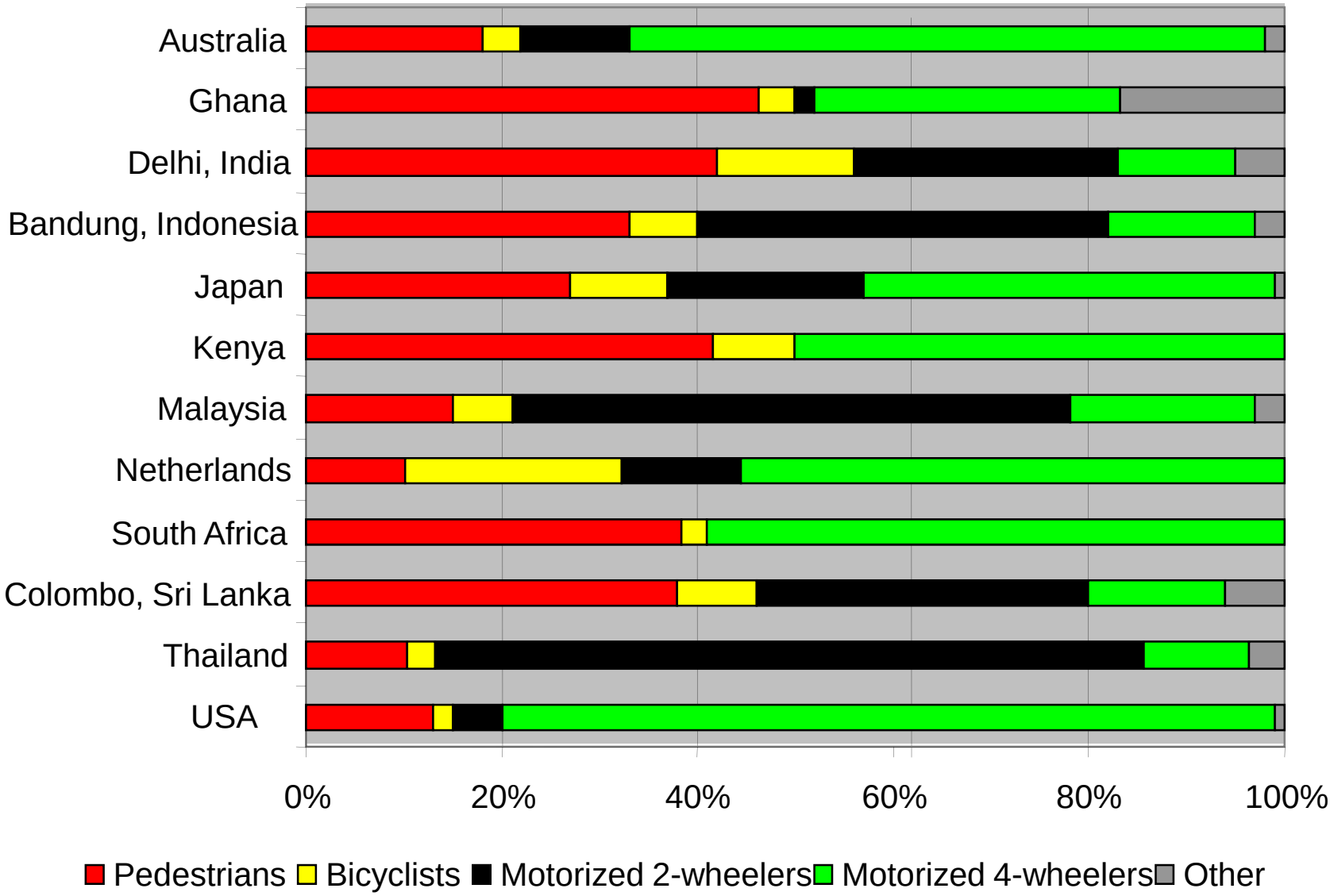
(Source: Government approved data from the participating countries.)

Table 2: Road traffic deaths (per 100 000 population) in 10 countries of the South-East Asia Region (using modelled data), 2007*

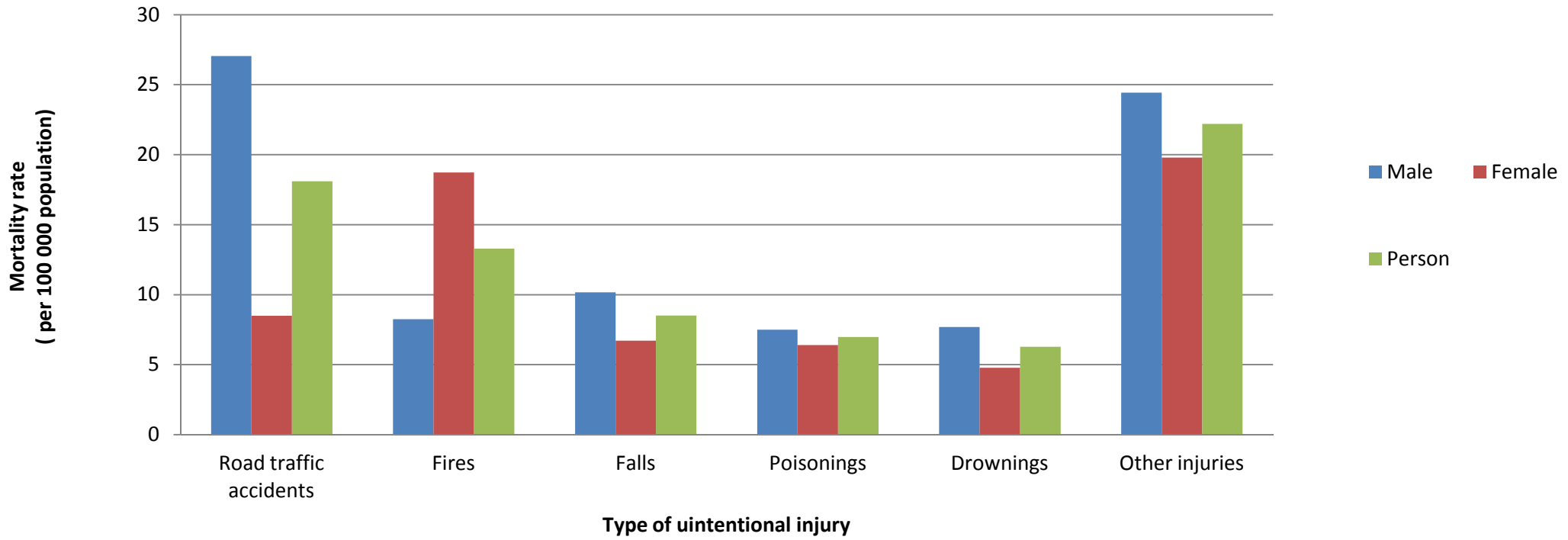
Country	Population[a]	Reported number of deaths[b]	Modelled number of deaths[c]		Estimated road traffic death rate per 100 000 population[c]
			Point estimate	90% confidence interval	
Bangladesh	158 664 959	4 108	20 038	14 882–29 155	12.6
Bhutan	658 479	111	95	72–115	14.4
India	1 169 015 509	105 725	196 445	155 727–266 999	16.8
Indonesia	231 626 978	16 548	37 438	29 785–65 158	16.2
Maldives	305 556	10	56	37–105	18.3
Myanmar	48 798 212	1 638	11 422	6 905–16 883	23.4
Nepal	28 195 994	962	4 245	3 453–5 288	15.1
Sri Lanka	19 299 190	2 334	2 603	2 185–3 097	13.5
Thailand	63 883 662	16 240	16 240	-	25.4
Timor-Leste	1 154 775	49	186	143–255	16.1

(Source: Government approved data from the participating countries)

Road users killed in various modes of transport as a proportion of all RTI deaths (WHO, 2009)



Distribution of mortality rates by type of injury in India, GBD, 2004



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Upward trend in India (WHO, 2007)

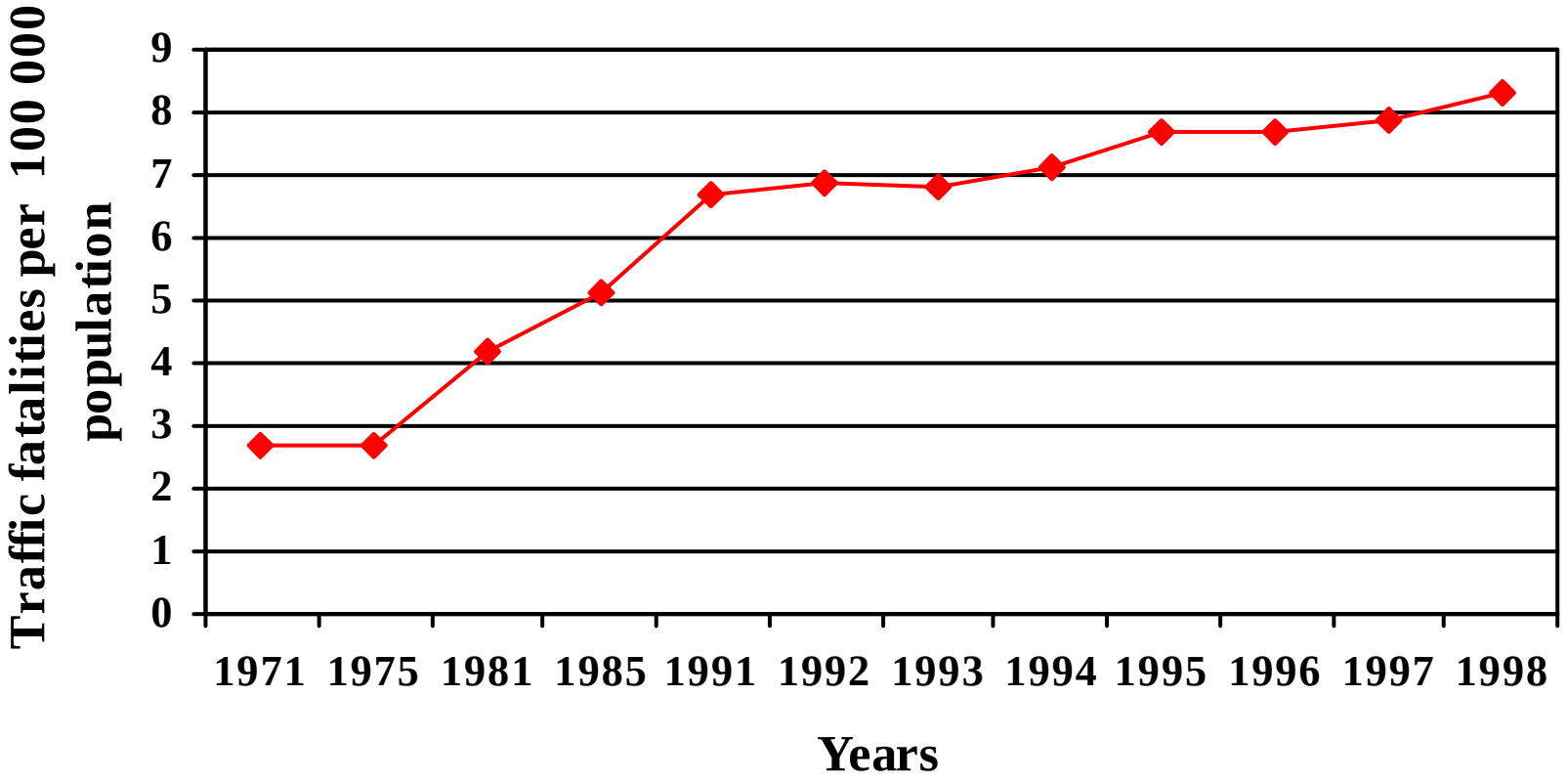
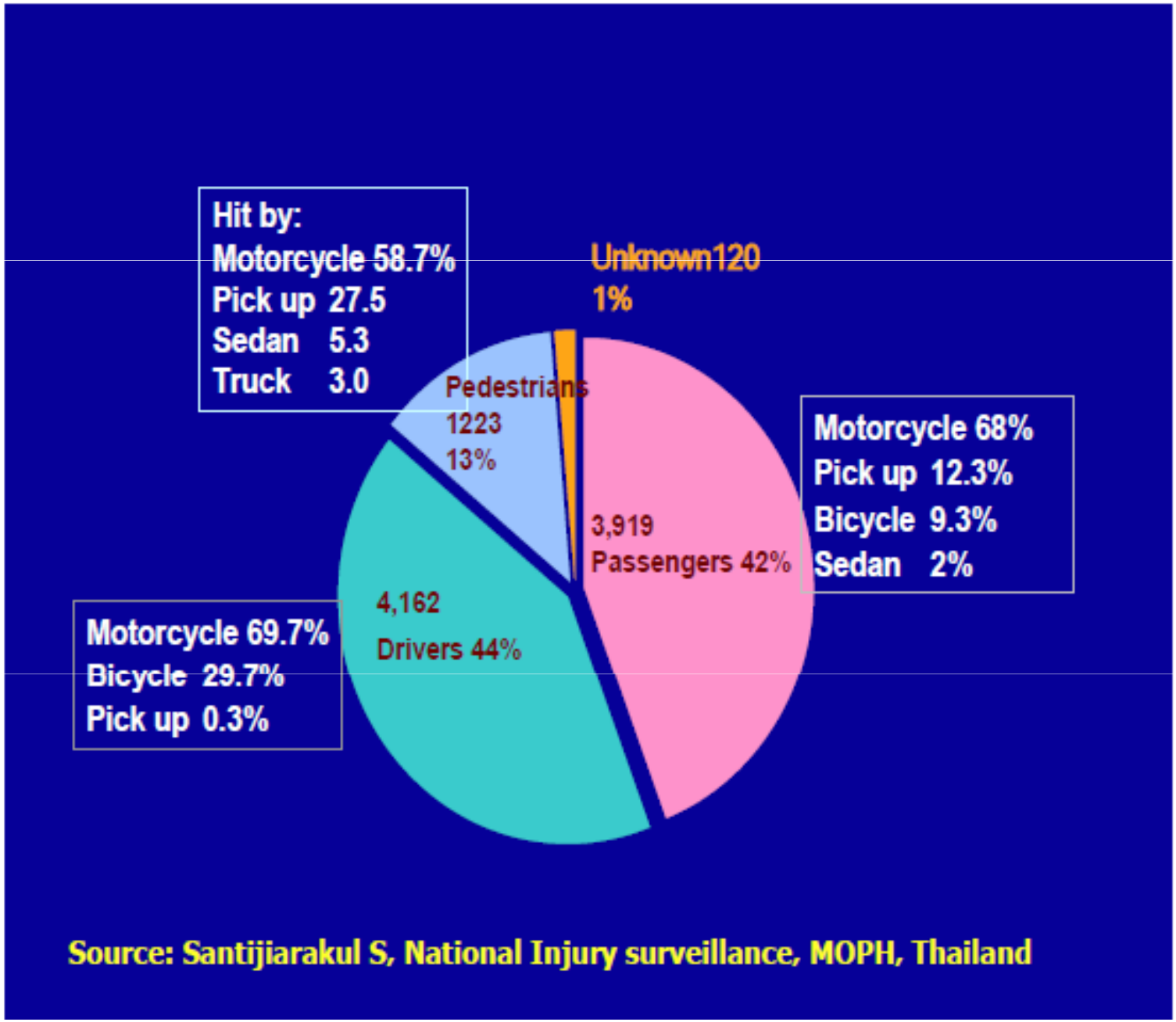


Figure 6: Involvement of motorcycles in transport injuries among Thai children (less than 15 years), Thailand 2005.



The burden of motorcycle injuries

- Motorcycle riders account for between 50-70% of road users in SEARO region
- Over 313 million motorcycles world wide, 77% in Asia
- Fleet growing – from 1995 to 2006 from 20 to 100M in China, doubled in India, tripled in Indonesia
- Motorcyclists and scooter riders are at increased risk of crash, and more likely to die or be seriously injured than car occupants
- Increased risk for death and serious injury can be as high as 30-35X
- Range of different risk factors compared to high income settings

Motorcycles and motorcyclists as proportions of all registered vehicles and road casualties

Country	All vehicles	Motorcycles	All vehicles	All road casualties
	n	% motorcycles	% motorcyclists	
Singapore[a]	711,043	134,767	19.0	45.9
Philippines [b]	4,292,000	1,617,000	37.7	10.1
Malaysia[c]	12,868,930	5,859,195	48.2	59.5
Thailand[d]	25,100,000	17,800,000	70.9	73.6
Indonesia[e]	24,994,890	18,800,000	75.2	73.1
Cambodia[f]	447,428	336,502	75.2	86.2
Vietnam[g]	12,054,000	11,379,000	94.4	62.9
China (2005) [h]	NA	75,565,000	58.1	22.2
India (2008)[gi]	105,352,854	75,336,026	71.5	18.7

a.(ADB 2005f); b.(ADB 2005e); c.(ADB 2005d); d(ADB 2005g); e.(ADB 2005c); f.(ADB 2005b); g.(ADB 2005h); h.(Traffic Administration Bureau),i. (Government of India 2010)

De Rome, 2011

Motorcycle injuries

- Many injuries low severity but can be disabling
- Significant head injuries

- Patterns of transport, road systems, number of passengers and loads carried vary from those in HIC
- Higher proportion of children carried, including unrestrained children and infants
- Most research on effective interventions carried out in HIC settings – questionable relevance?

Major risk factors for motorcycle injury Environment

Factors influencing exposure to risk:

- Economic factors
- Demographic factors
- Land use
- Travel modes
- Road design

Interventions – Environment

- **Road design – separated traffic**
- Malaysia – exclusive motorcycle lane
- USD 12850/death averted
- High costs because of engineering – future lanes cheaper?

Interventions - environment

- **Traffic mix (MC vs heavy vehicle)**
- **Unforgiving roadside objects**
- **Road condition** (potholes, slippery surfaces etc)

- **Traffic calming – slow speeds**
  - Traffic calming/appropriate road design effective in reducing speed
  - Requires investment in infrastructure
  - Cost effective
- **Alternatives**
  - Effective public transport
  - Avoid shift to private car use

Major risk factors for motorcycle injury People

- Driver inexperience (training and licensing)
- Speed
- Alcohol & other drugs
- Distractions

Interventions – people (1)

- **Effective driver licensing and training systems**
  - Unknown effectiveness but aids enforcement
- **Management of passenger/goods carriage**
  - Enforcement and education
  - Availability of alternatives
  - Unknown effectiveness
- **Alcohol/distraction**
  - Known risk factors
  - Enforcement and education effective
- **Speed**
  - Enforcement based approaches (effective)

Interventions – people (2)

- **Enforcement of road rules, traffic signals**
  - Effective, requires enforcement and education

- **Safe vehicles**
  - Well maintained, no defects
  - Registration and maintenance system (? Cost effectiveness?)
- **Overloading of vehicles**
  - Passengers
  - Goods
  - Need alternatives
  - Enforcement effective

Interventions – people (3)

- **Helmets**
  - Very effective for reducing head injury and death
  - Design issues for children – mechanics of injury poorly understood; need for light-weight design
  - Motorsport helmet standard for children 6 yrs + may be appropriate
  - Unknown effectiveness of black-market helmets/locally manufactured
- **Protective clothing**
  - Effective at reducing injury, esp impact protectors
  - Expensive and impractical in hot weather
  - Need for management of heat stress issues (R&D)

Major risk factors for motorcycle injury
Vehicle

- **Vehicle condition**
- **Vehicle design**
- **Visibility**

Interventions - vehicle

- **Regulation of vehicles**
  - Bike type (size of engine, wheels, design)
  - Safety features
  - Maintenance
- **Visibility**

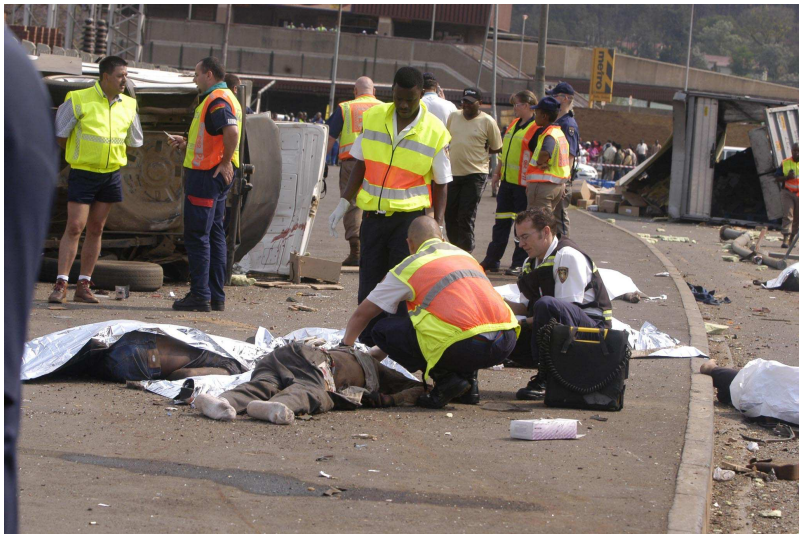
  Visibility enhancement materials

  Modest (?) effectiveness

Major risk factors for motorcycle injury
Injury severity

Risk factors influencing severity of post-crash injuries

- Human tolerance, health
- First response, emergency medical care
- Chain of medical care from pre-hospital to rehabilitation



Interventions – medical care

- Development of cost effective first response/emergency care
- Benefits all traumatic injury/RTI
- Improvements in medical care/trauma management

Most urgent needs - people

- **Legislative, enforcement, social marketing initiatives around:**
  - Helmet use
  - Drink driving
  - Distraction
  - Passenger carriage/overloading
- **Need for research on these?**
  - Potentially research needed to identify most effective communication campaigns
  - On how to encourage Government investment/police support
  - Police attitudes to enforcement and interventions to improve?

Most urgent needs - people

- **Helmets**
  - Development of appropriate helmet standard for children > 2 years
  - No consensus on experts regarding children < 2 so discourage MC use
  - Work to develop light weight helmet for tropical conditions; with appropriate safety rating
  - Work to regulate manufacture and sale of helmets
  - Licensing, training and registration
    - Some road safety benefits
    - Aid understanding of road rules
    - Aids enforcement

Most urgent needs - environment

- **Separation of traffic**
- **Speed management via engineering and use of speed detection devices (cameras)**