



Safety of VRUs :(Pedestrians, Bicyclists, MTW users)

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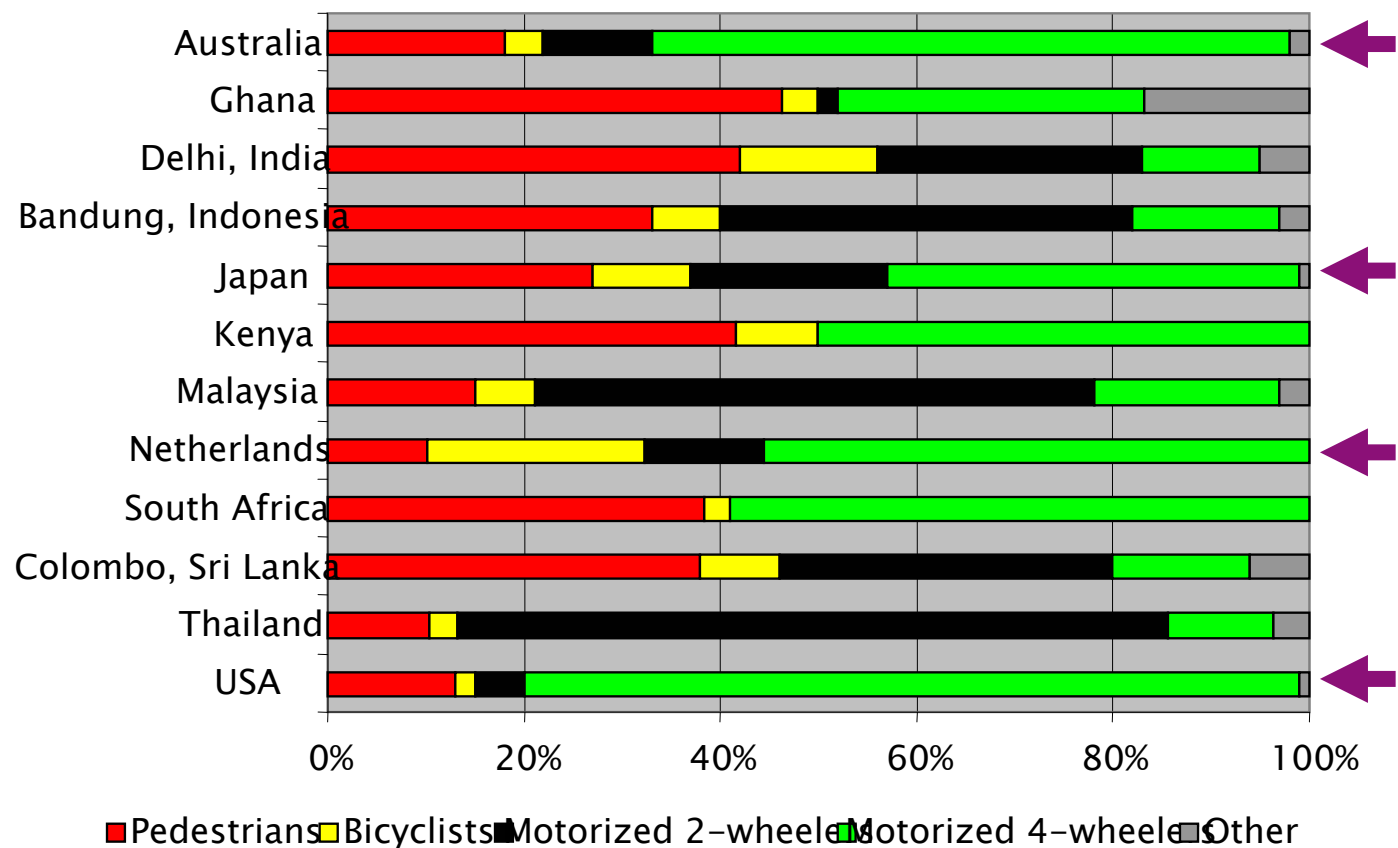
**4th IRF Regional Conference on "Accident Prevention:
Road Safety Measures"**

23-24 October 2009, New Delhi

**IIT Delhi
2009**

VRUs are RTC victims in all countries, higher proportion in low income countries; NMVs, PT dominant modes

- “success” ~ more people travel by car
- Netherlands: high bicycle use and RTC victims
- Thailand & Malaysia: High MTW and RTC victims



VRUs on highways



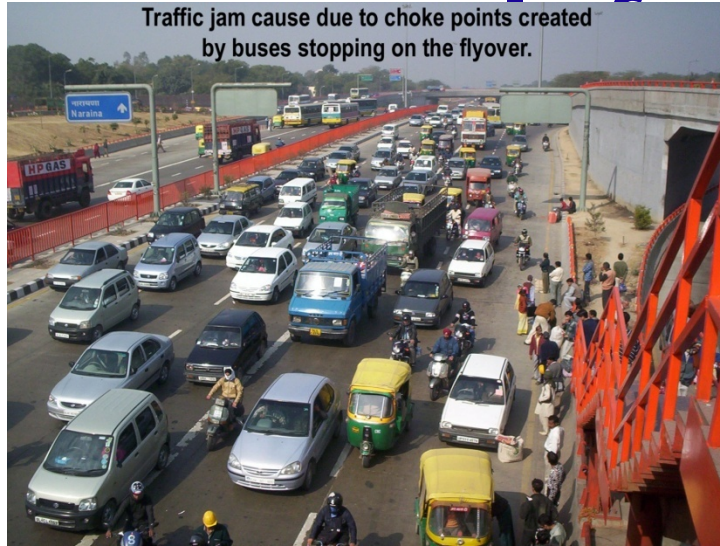
Bicycles and pedestrians near construction zone



Highway passing through small town



VRUs & Urban Transport



Bus commuters on signal free junction and bus stop



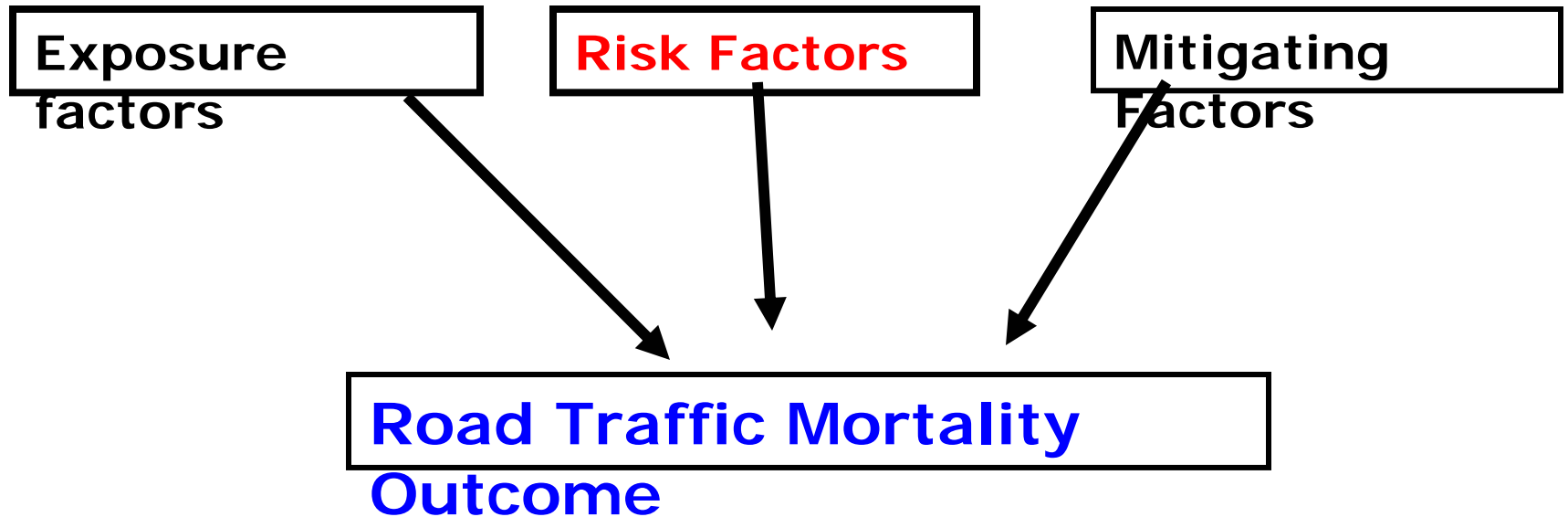
Pedestrians at intersection and midblock

Pedestrians on grade separated junctions



Bus commuters running across the foot of the flyover.

Road Safety Policy aims at reducing morbidity and mortality of RTC victims



RSP in Global Status Report on Road Safety(WHO,2009)

- National Drinking and driving laws (80%)

Level of Enforcement Low(3 / 10)

- Speed laws and enforcement (80%)

Level of Enforcement Low(4 / 10)

RSP in Global Status Report on Road Safety(WHO,2009)

- Road Safety management, strategies and policies
 - Presence of lead agency (90%) **Yes**
 - Funding of lead agency(60%) **Yes**
 - National road safety strategy(50%)**NO**
 - Measurable national targets(30%) **NO**
 - National policy to promote walking and cycling(40%)**Yes**
 - National policy to promote public transport(40%)**Yes**
 - Safety audit required for existing roads(70%)**NO**
 - Safety audit required for new construction(70%)**NO**
 - Driving test(100%)**Yes**
 - Vehicle insurance(70%)**Yes**



What are the driving forces for RSP?

1. Safety concerns of stakeholders (intuition based)
2. Traffic safety science (Evidence based)

The logo for TRIPP (Transportation Research Institute for Policy and Planning) is located on the left side of the slide. It consists of the word "TRIPP" in a bold, white, sans-serif font, stacked vertically on a dark blue background. Above the letters, there is a stylized graphic of a road or path leading upwards, with a white circle at the top. The background of the slide is white, with a blue vertical bar on the left side.

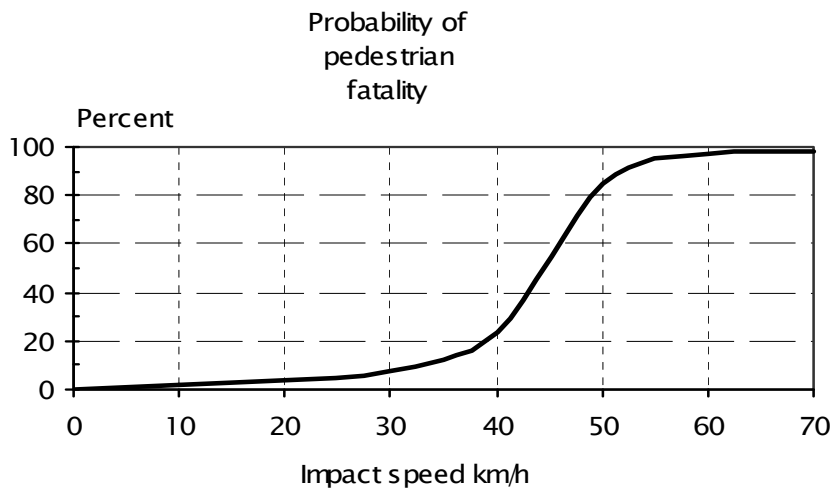
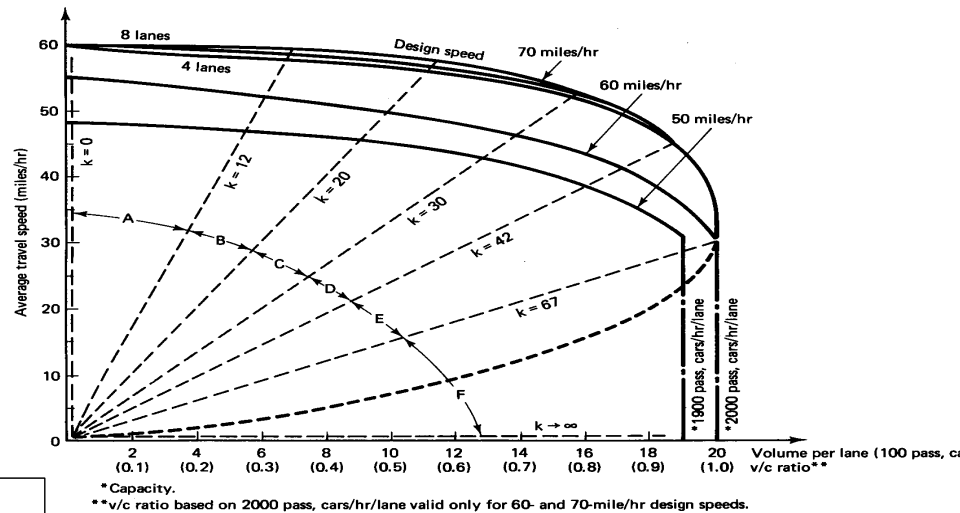
What are the driving forces for RSP?

1. Safety concerns of stakeholders

- Conflict between mobility concerns vs safety
- Mobility benefits to vehicle users and costs to vulnerable road users
- Myopic, based on “common sense”/ intuition

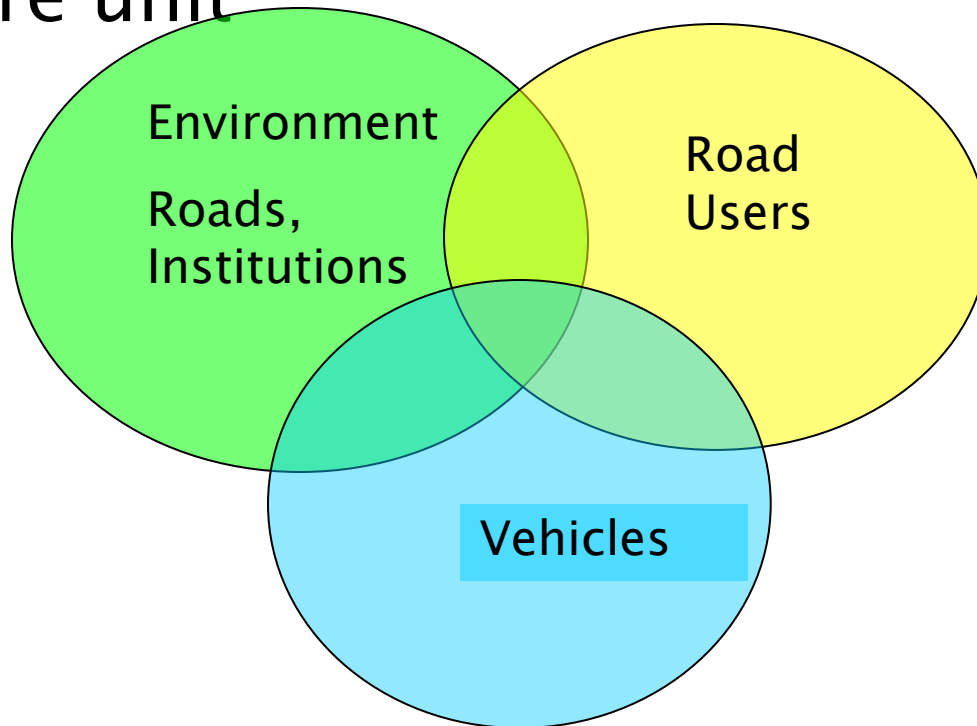
Conflict between safety and mobility

- Higher level of service implies higher speeds—i.e. higher probability of fatality

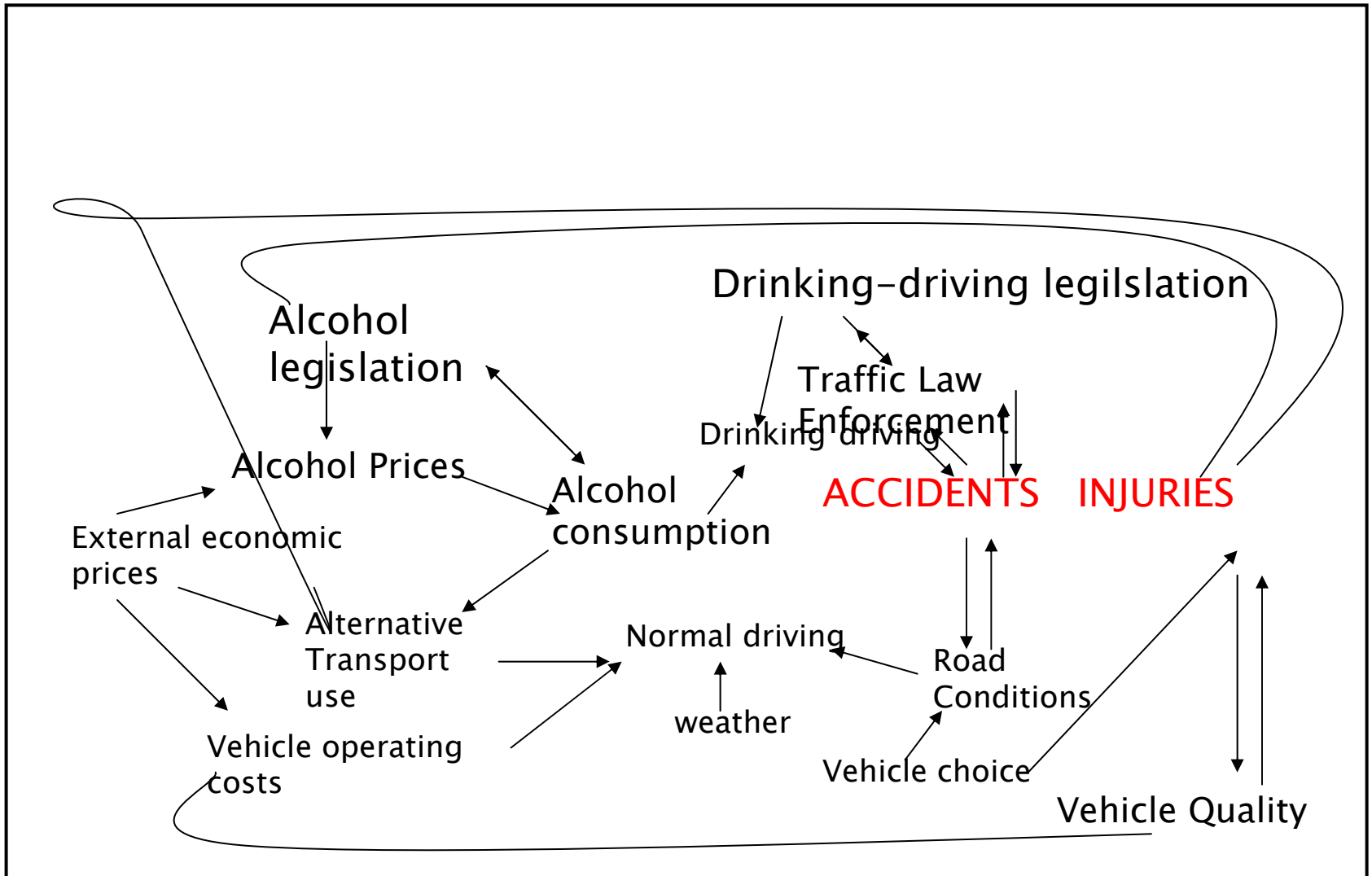


Traffic Safety Science (Public health/systems approach)

- Accident is a failure in a subsystem, or the system as a whole that damages one or more unit



Complex interactions



Road Traffic Crash is a complex phenomenon

- **Counterintuitive results:** Traffic education for children(Sandels 1974) may increase injury rates
- Stricter penalties may reduce enforcement and crash reporting
- LIC peds vs HIC peds: findings about red light observance, gap acceptance, crossing behaviour
- Education and culture vs ease of implementation and effectiveness

Traffic Safety Science in its infancy

- **Counterintuitive results:** marked pedestrian crossings increased fatalities by 20% compared to unmarked, raised crossings decreased fatalities by 40% (Hyden et al)
- Drivers speed increase near a zebra crossing (varhelyi, A, 1999)
- Poor understanding of city structures and pedestrian behaviour: pedestrian exposure
- **Pedestrian safety requires safe cities,** *safe traffic system is a subset*

Pedestrian safety

- The most influential factor ..in making a decision to cross at a designated crossing location is the distance of the crosswalk to desired destinations of pedestrians.
(Handy, 1996; Shriver, 1997)
- Also it is evident that pedestrian safety can be affected by changes in the signal settings at signalized crosswalks(peds delay < 40 sec) (Garter, 1989).



Road Safety Policy Models

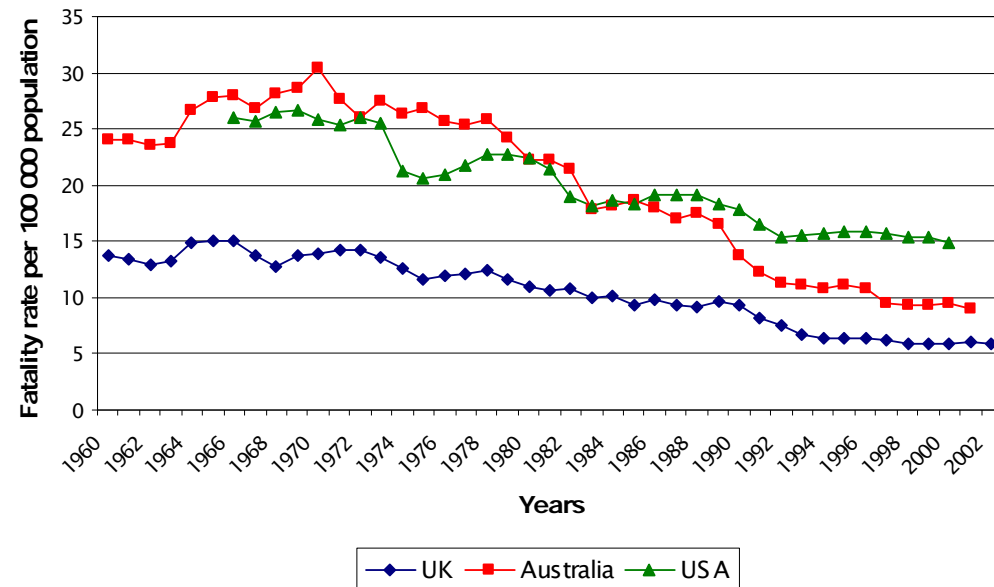
Intuitive model

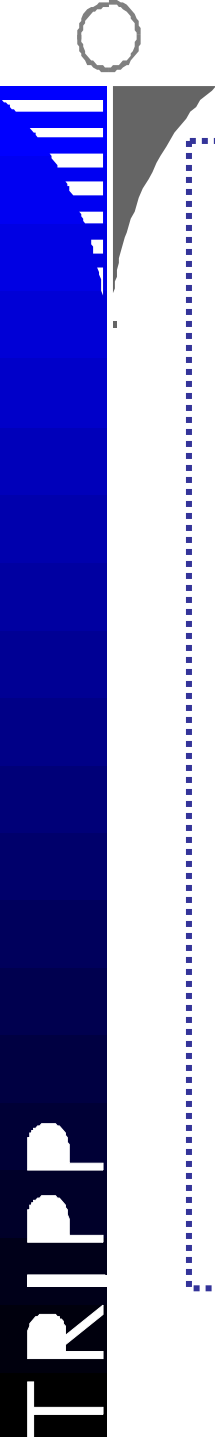
Vehicle centric model

Human Centric model

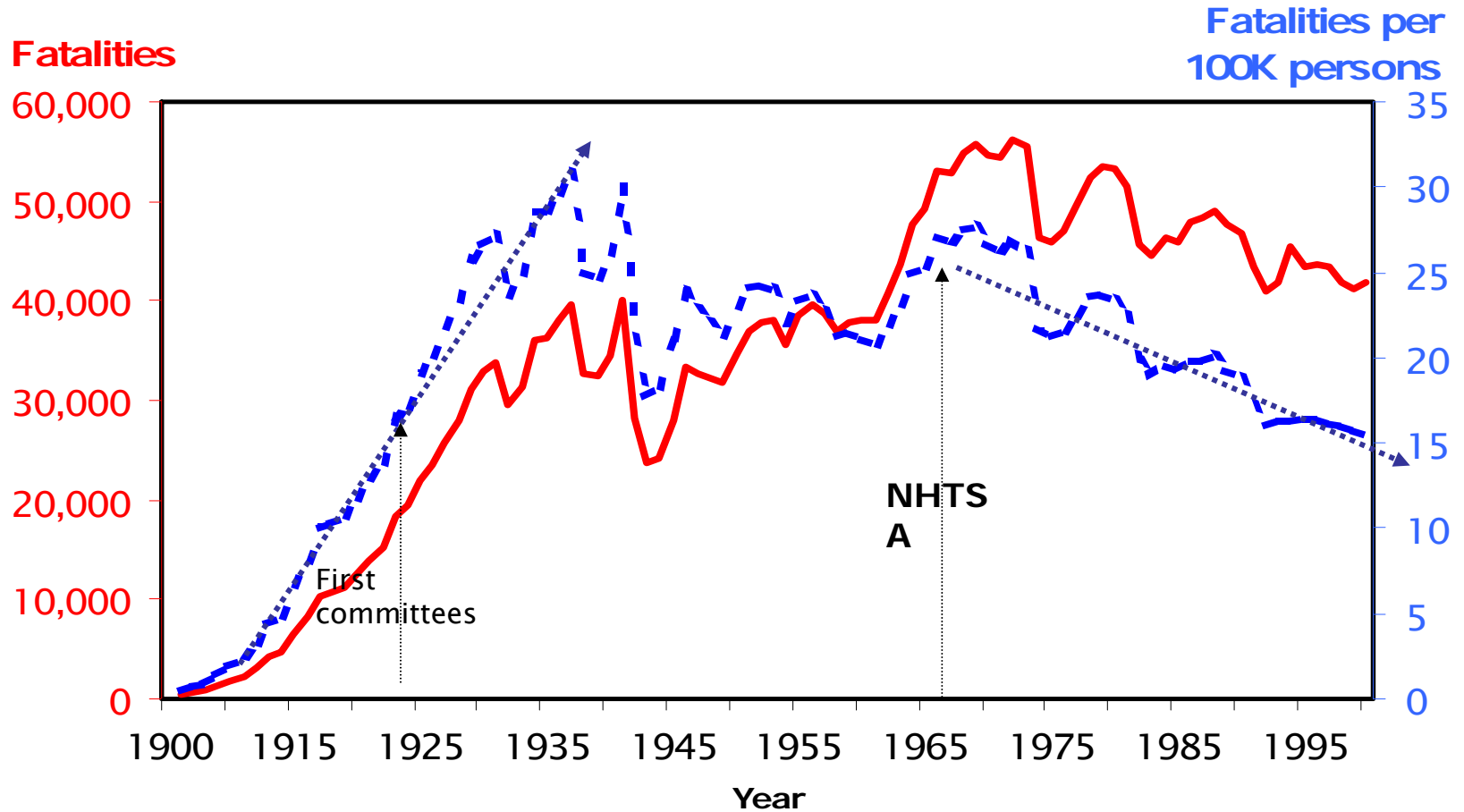
How should we understand quality of RSP?

- Decreasing trend
- Increasing trend
- Flattening trend



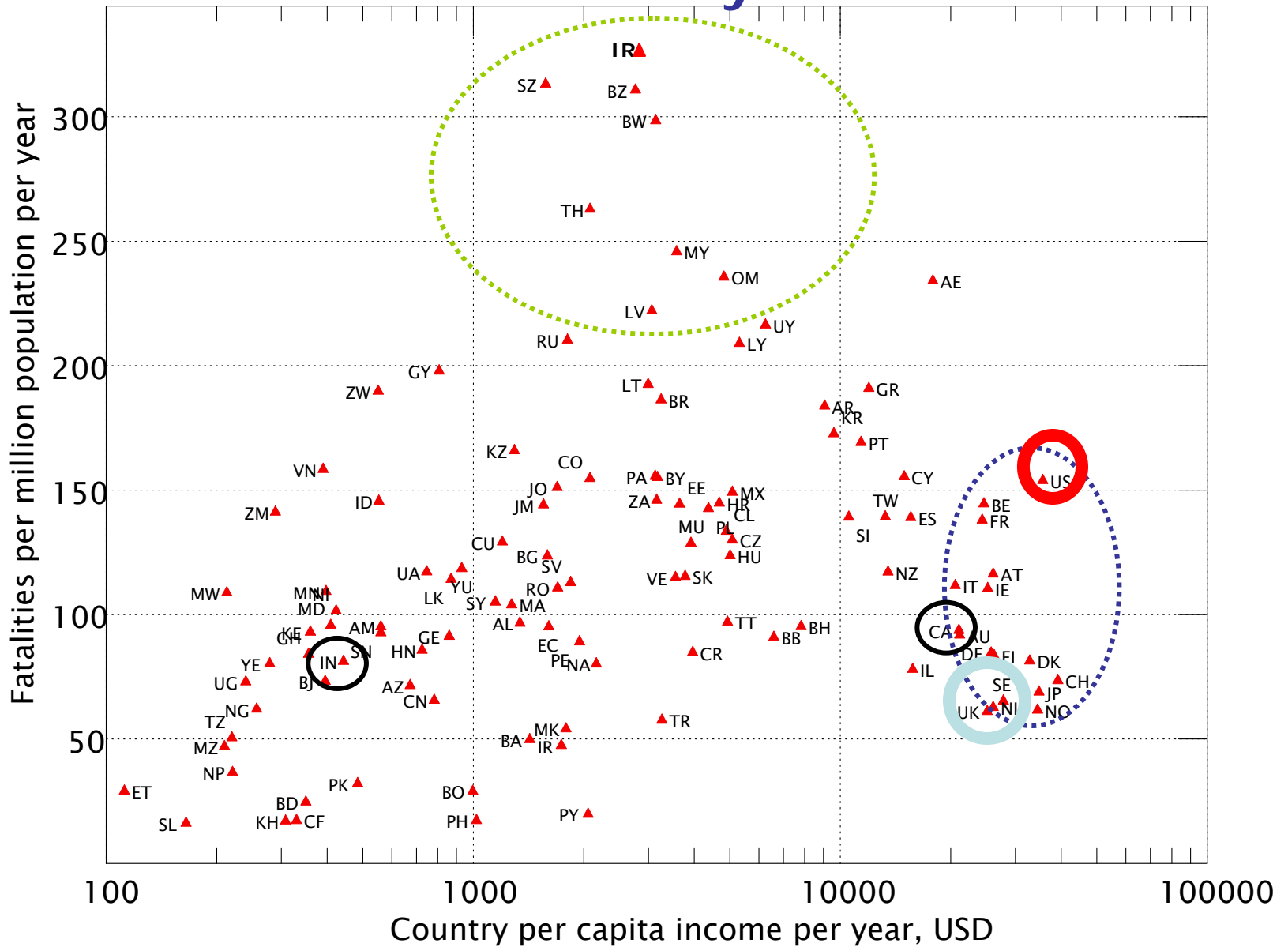


Road traffic fatality trends USA



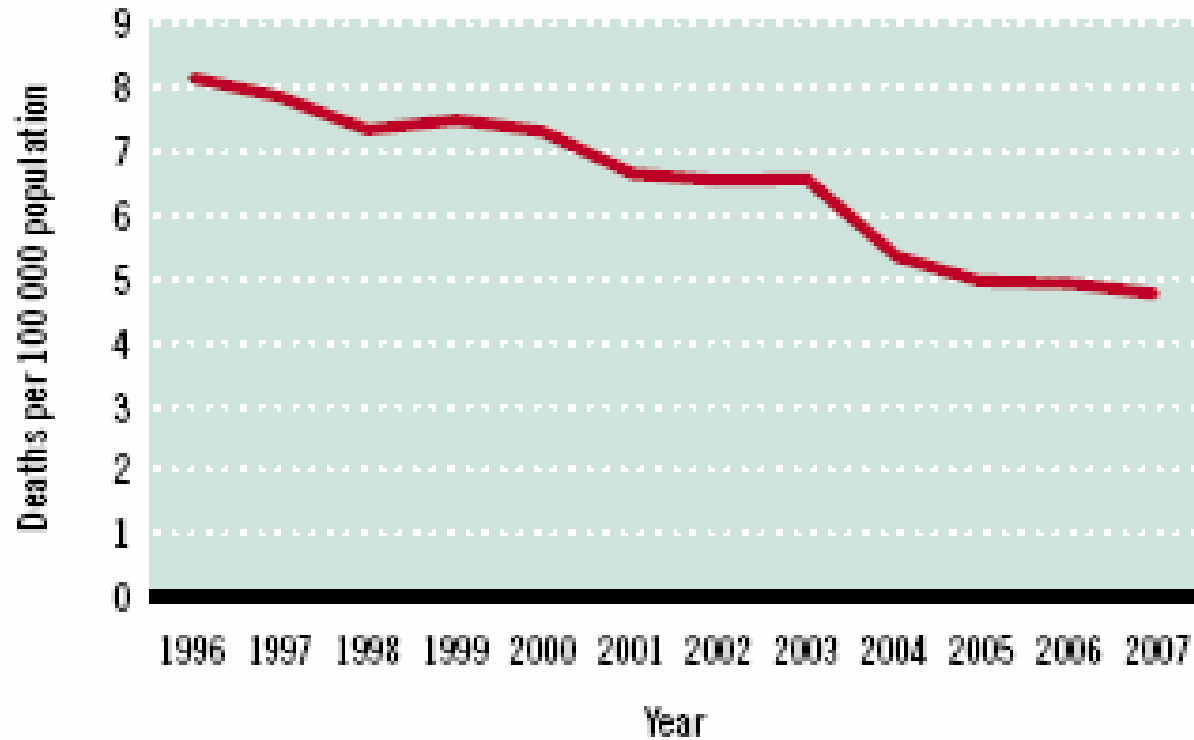
Change in vehicle design and hiway standards

Fatality risk in traffic crashes by country



NETHERLANDS

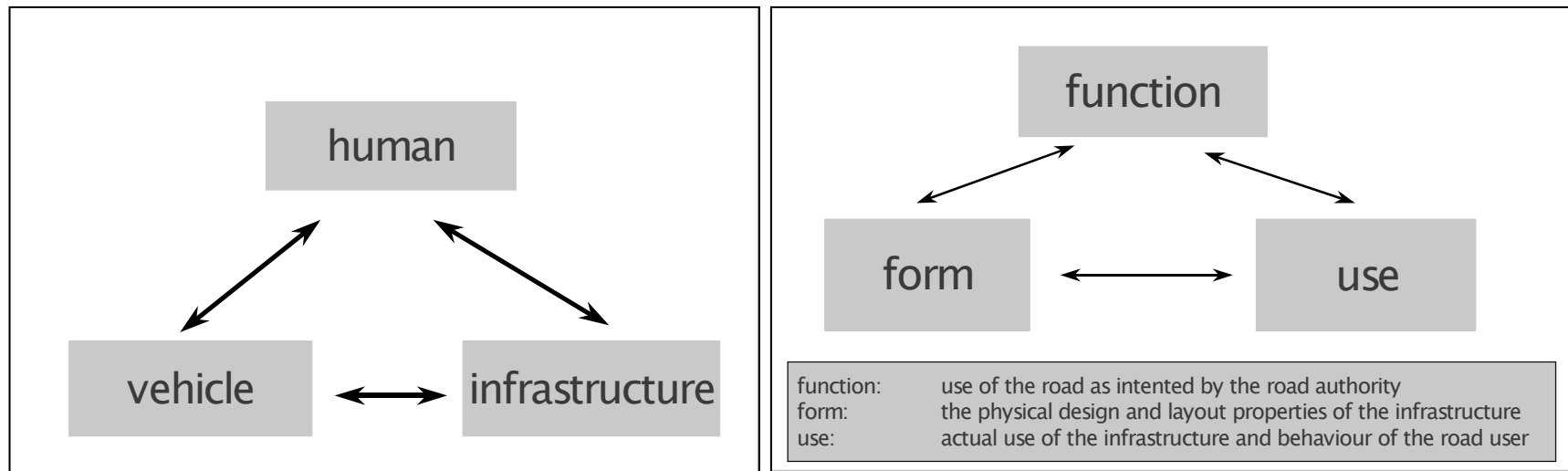
TRENDS IN ROAD TRAFFIC DEATHS



Source: Statistics Netherlands/Ministry of Transport, 2007

sustainable safe traffic system

- a road environment with an infrastructure adapted to the limitations of the road user;
- vehicles equipped with technology to simplify the driving task and provided with features that protect vulnerable and other road users; and
- road users that are well informed and adequately educated.



**Retrofitting cities: Traffic Calming,
roundabouts**

The Zero Vision

October 1997, Road Traffic Safety Bill, Swedish Parliament

- **“The scientific basis of the vision zero differs from the usual approach to safety in human-machine systems: designing a system to minimize the number of events that cause injury. Instead, the vision zero is based on the notion of “allowing” these incidents to occur, but at a level of violence that does not threaten life or long-term health”**
- **“In the vision zero, the entire transport system must be designed to accommodate the individual who has the worst protection and the lowest tolerance of violence. No event must be allowed to generate a level of violence that is so high that it represents an unacceptable loss of health for that vulnerable individual.”**
- **“The responsibility for every death or loss of health in the road transport system rests with the person responsible for the design of that system. This is the ethical basis for realizing the vision zero.”**

CLAES TINGVALL

Road Safety Policy

- Road safety policy is about political choices, vision of the kind of city/region we want to live in;
- Policies based on intuition do not improve safety, design based on evidence does!

Safe urban road

Bicycle lane and Midblock bus shelter (single platform)



~1500 bicycles/h



At grade pedestrian crossing

Safe urban road



Rumble strip before the bus platform and midblock



Accidents on the corridor

Year

Fatalities

2002 9

2003 17

2004 9

2005 6

2006 8

2007 2

2008 7

2009 0

Average fatalities/month

Before BRT (five yrs)

0.85

During BRT construction (16 m)

0.25

BRT in Operation (7 m)

0.71

RAISED CROSSINGS :PRIORITY TO PEDESTRIANS AT JUNCTIONS

Safe construction zone

Rumble strips for speed control near pedestrian crossing



Future Directions

- Adopting Human(VRU) Centric safety model
 - Policies and strategies with specific targets(long term and short term).
 - Institutions at national and state level for improved data, standards, mandatory audits, research.
 - Safety agency independent of road building agency