Speed Management: From Vision to Practice

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Objectives

- Learning Objectives: understand the importance of speed as a major RTI risk factor, and the key characteristics of successful speed management programs.

- Outcomes: attendees will be able to formulate specific interventions and campaigns to effectively address excessive speeding.

Terminology

- Road traffic crash: “a collision or incident occurring on a public road involving at least one moving vehicle”
- Road traffic injury (RTI): “a fatal or nonfatal injury that results from a road traffic crash”
- Road traffic fatality: a fatality that results from a road traffic crash

“RTIs are largely preventable and predictable; they are a human-made problem amenable to rational analysis and countermeasure”

WHO World Report on Road Traffic Injury Preventions, 2004

A typical road in Denmark….

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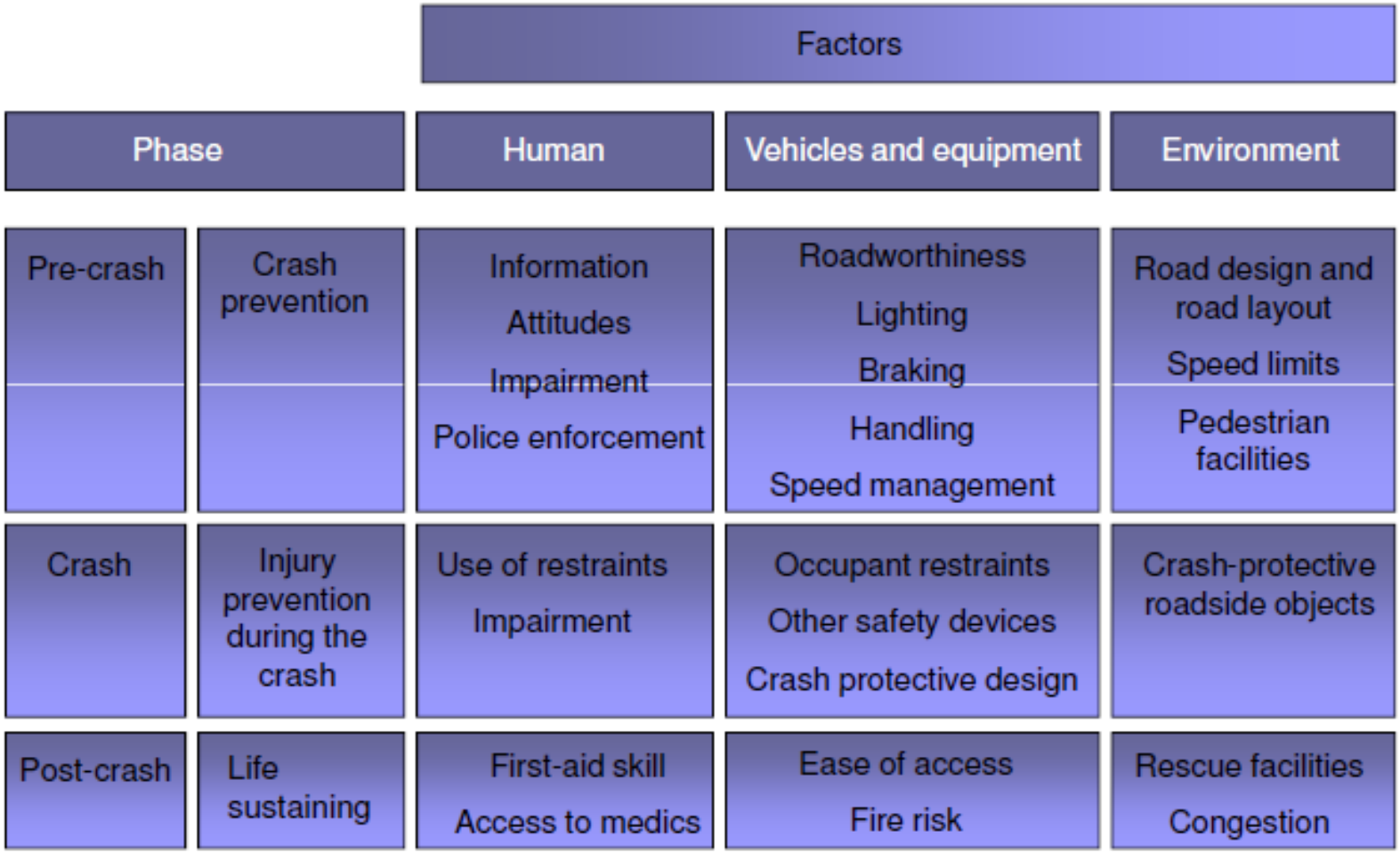
1. **Introduction to Risk Factors**
2. Speed Management Fundamentals
3. Intervention areas:
    a. Legislation
    b. Campaigns
    c. Traffic calming
    d. Automated Speed Enforcement

Risk factors

"A risk factor is any attribute, characteristic or exposure of an individual that increases the likelihood of developing an injury"

Risk factors



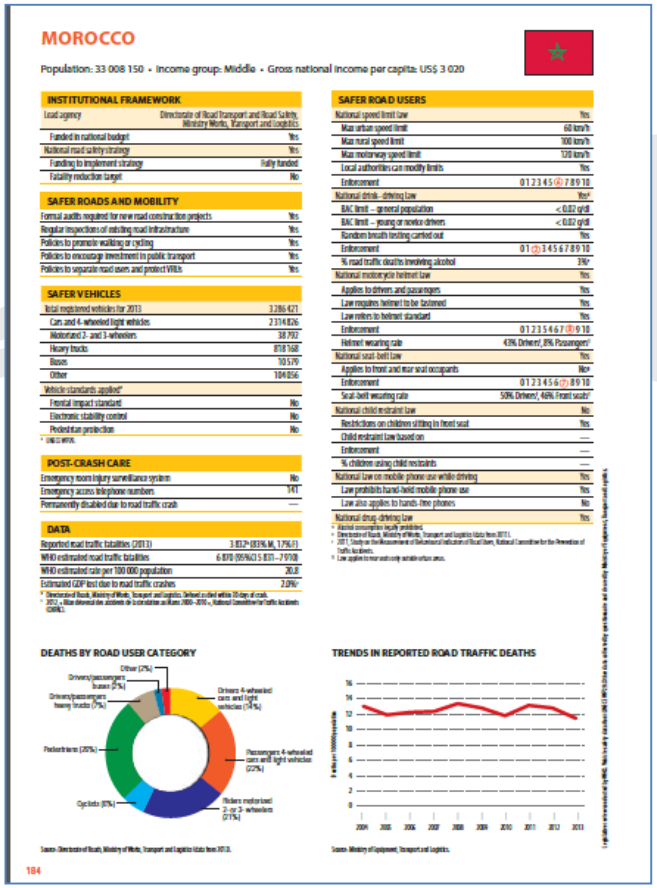
		Factors		
Phase		Human	Vehicles and equipment	Environment
Pre-crash	Crash prevention	Information Attitudes Impairment Police enforcement	Roadworthiness Lighting Braking Handling Speed management	Road design and road layout Speed limits Pedestrian facilities
Crash	Injury prevention during the crash	Use of restraints Impairment	Occupant restraints Other safety devices Crash protective design	Crash-protective roadside objects
Post-crash	Life sustaining	First-aid skill Access to medics	Ease of access Fire risk	Rescue facilities Congestion

Risk Factors

Risk factors influencing crash involvement	Risk factors influencing post-crash outcome of injuries
• speed • alcohol • distracted driving • drugs • fatigue • male • vehicle defects • youth driving together • vulnerable road users	• speed • seat-belts, child restraints • helmets • non-crash protective roadside objects • insufficient vehicle crash protection • alcohol and other drugs

"Key behavioral risk factor"

Risk Factors



MOROCCO

Population: 33 008 150 • Income group: Middle • Gross national income per capita: US$ 3 020

INSTITUTIONAL FRAMEWORK

Lead agency	Directorate of Road Transport and Road Safety, Ministry Works, Transport and Logistics
Funded in national budget	Yes
National road safety strategy	Yes
Funding to implement strategy	Fully funded
Fatality reduction target	No

SAFER ROADS AND MOBILITY

Formal audits required for new road construction projects	Yes
Regular inspections of existing road infrastructure	Yes
Policies to promote walking or cycling	Yes
Policies to encourage investment in public transport	Yes
Policies to separate road users and protect VRUs	Yes

SAFER VEHICLES

Total registered vehicles for 2013	3 286 421
Cars and 4-wheeled light vehicles	2 314 826
Motorized 2- and 3-wheelers	38 707
Heavy trucks	878 568
Buses	103 179
Other	184 056
Vehicle standards applied*	
Frontal impact standard	No
Electronic stability control	No
Pedestrian protection	No

* UNECE WP.29.

POST-CRASH CARE

Emergency room injury surveillance system	No
Emergency access telephone numbers	141
Permanently disabled due to road traffic crash	—

DATA

Reported road traffic fatalities (2013)	3 832* (83% M, 17% F)
WHO estimated road traffic fatalities	6 870 (95% CI: 5 831 – 7 970)
WHO estimated rate per 100 000 population	20.8
Estimated GDP lost due to road traffic crashes	2.0%*

* Directorate of Roads, Ministry of Works, Transport and Logistics. Defined as killed within 30 days of crash.
* 2012, « Bilan détaillé des accidents de la circulation au Maroc 2000 – 2010 », National Committee for Traffic Accidents (CNAC).

SAFER ROAD USERS

National speed limit law	Yes
Max urban speed limit	60 km/h
Max rural speed limit	100 km/h
Max motorway speed limit	120 km/h
Local authorities can modify limits	Yes
Enforcement	0 1 2 3 4 5 ⓪ 7 8 9 10
National drink–driving law	Yes*
BAC limit – general population	< 0.02 g/dl
BAC limit – young or novice drivers	< 0.02 g/dl
Random breath testing carried out	Yes
Enforcement	0 1 ⓪ 3 4 5 6 7 8 9 10
% road traffic deaths involving alcohol	3%*
National motorcycle helmet law	Yes
Applies to drivers and passengers	Yes
Law requires helmet to be fastened	Yes
Law refers to helmet standard	Yes
Enforcement	0 1 2 3 5 4 6 7 ⓪ 9 10
Helmet wearing rate	43% Drivers*, 8% Passengers*
National seat-belt law	Yes
Applies to front and rear seat occupants	No*
Enforcement	0 1 2 3 4 5 6 ⓪ 8 9 10
Seat-belt wearing rate	50% Drivers*, 46% Front seats*
National child restraint law	No
Restrictions on children sitting in front seat	Yes
Child restraint law based on	—
Enforcement	—
% children using child restraints	—
National law on mobile phone use while driving	Yes
Law prohibits hand-held mobile phone use	Yes
Law also applies to hands-free phones	No
National drug–driving law	Yes

* Alcohol consumption legally prohibited.
* Directorate of Roads, Ministry of Works, Transport and Logistics Visits from 2011.
* 2011, Study on the Measurement of Behavioural Indicators of Road Users, National Committee for the Prevention of Traffic Accidents.
* Law applies to rear seats only outside urban areas.

DEATHS BY ROAD USER CATEGORY

Source: Directorate of Roads, Ministry of Works, Transport and Logistics Visits from 2013.

TRENDS IN REPORTED ROAD TRAFFIC DEATHS

Source: Ministry of Equipment, Transport and Logistics.

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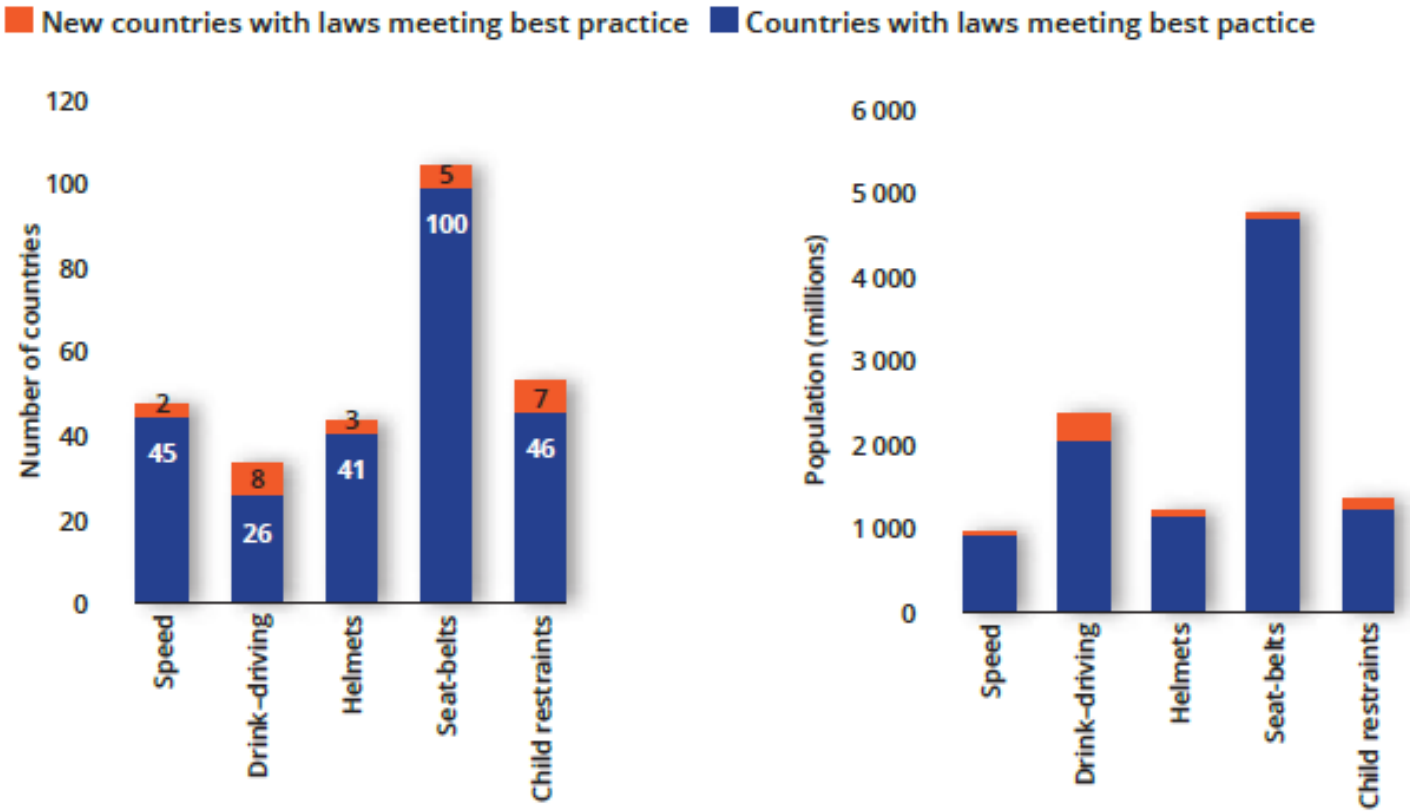
- Speed Limit Law
- Drink Driving Law
- Motorcyclist Helmet Law
- Seatbelt Law
- Child Restraint Law
- Cell Phone Law
- Drug Driving Law

Risk Factors



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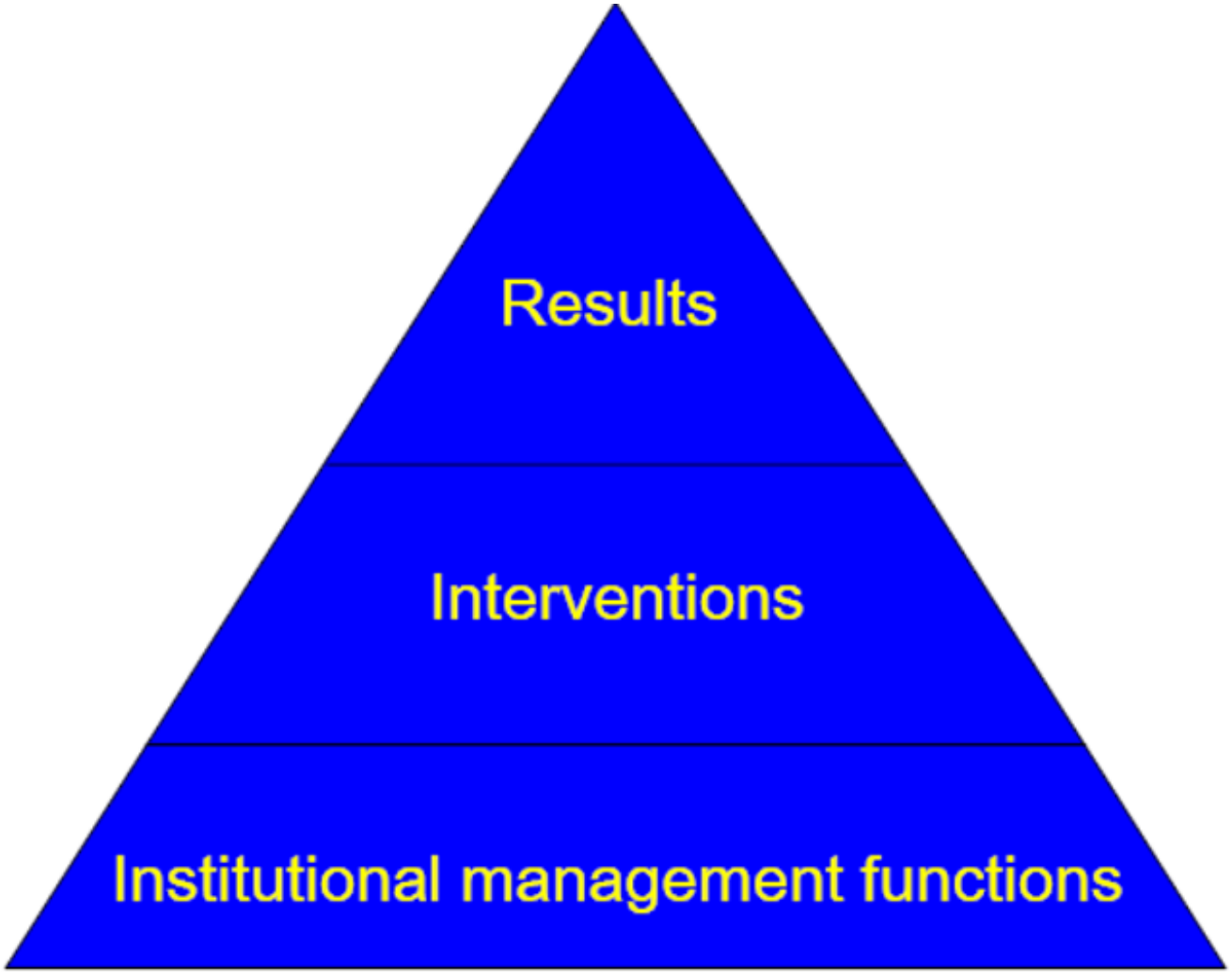

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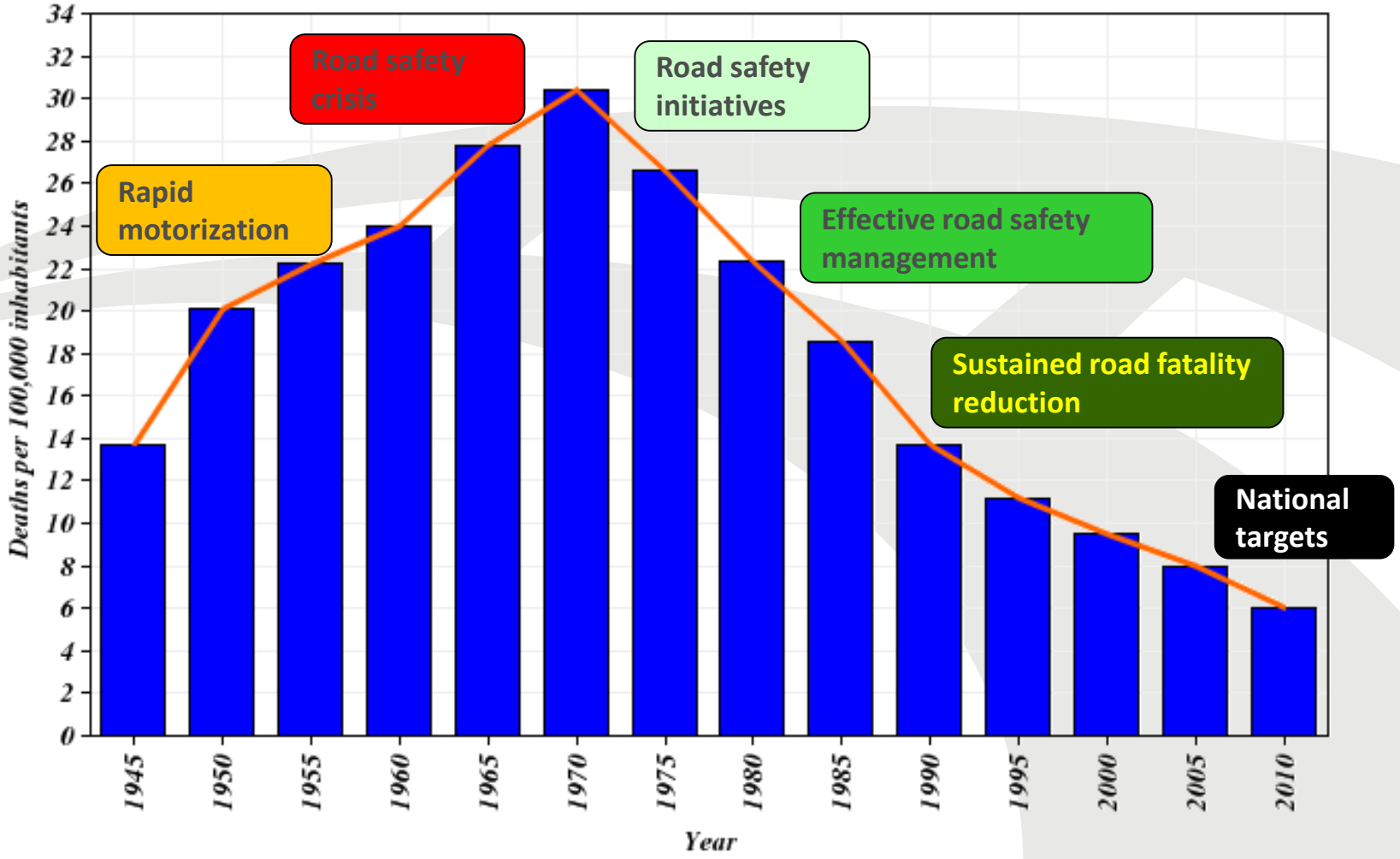

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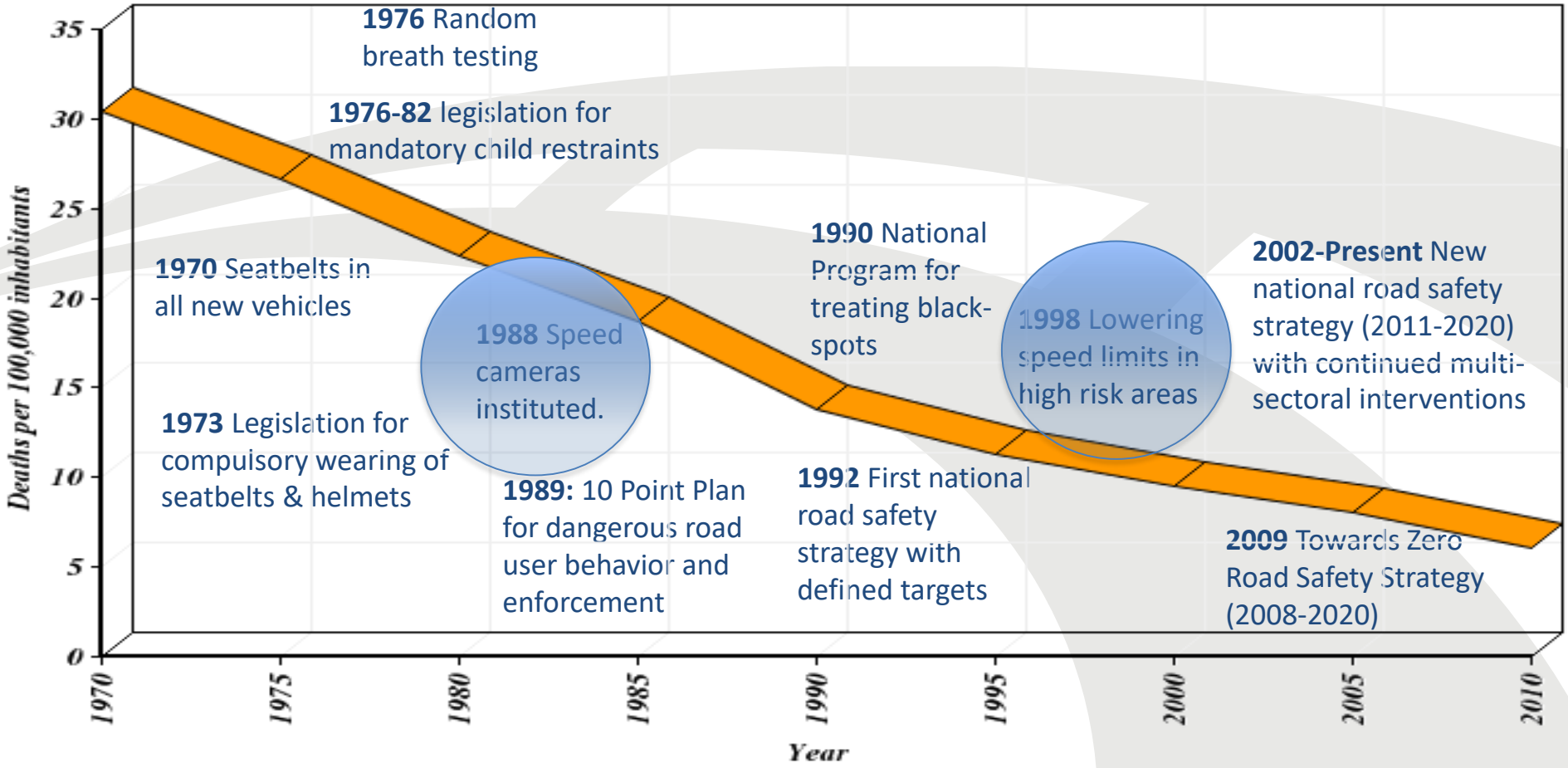

Summary

A risk factor is any attribute, characteristic or exposure of an individual that increases the likelihood of developing an injury.

Using the Haddon matrix, it is possible to identify factors that contribute to the likelihood and severity of road crashes.

Effective risk factor management flows from the adoption of sound road safety management principles at all levels of government.

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1. Overview of Risk Factors
2. **Speed Management Fundamentals**
3. Intervention areas:
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Speed Management Fundamentals

"Speed remains a very important risk factor. It has a greater effect on the number of accidents and injury severity than almost all other known risk factors."

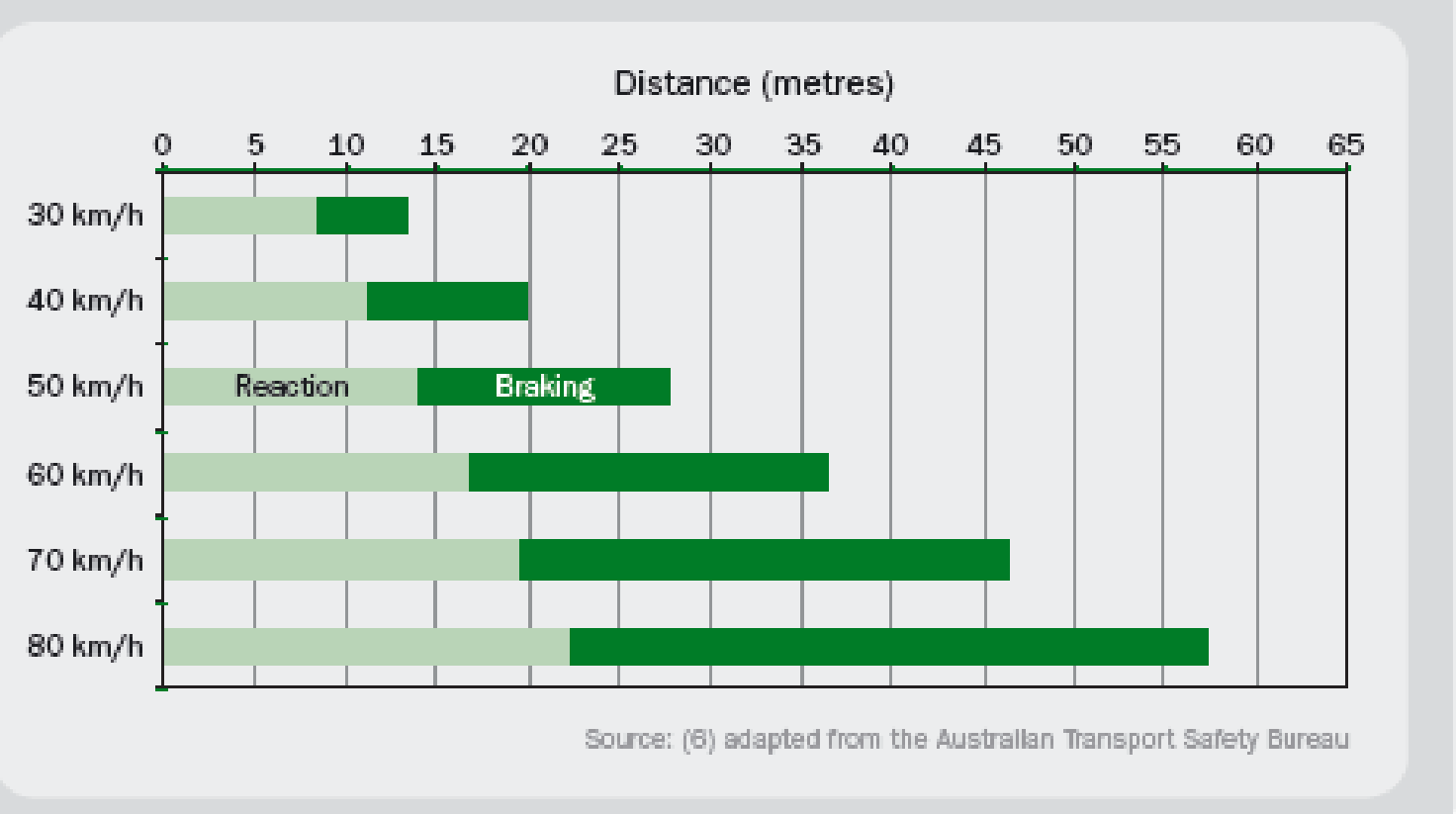
Rune Elvik, *The Power Model of the relationship between speed and road safety: Update and new analyses (2009)*

"Speed is at the core of the road traffic injury problem. 1 in 3 road traffic deaths occur because someone has been driving too fast".

Dr Margaret Chan, Director-General of the World Health Organization (2017)

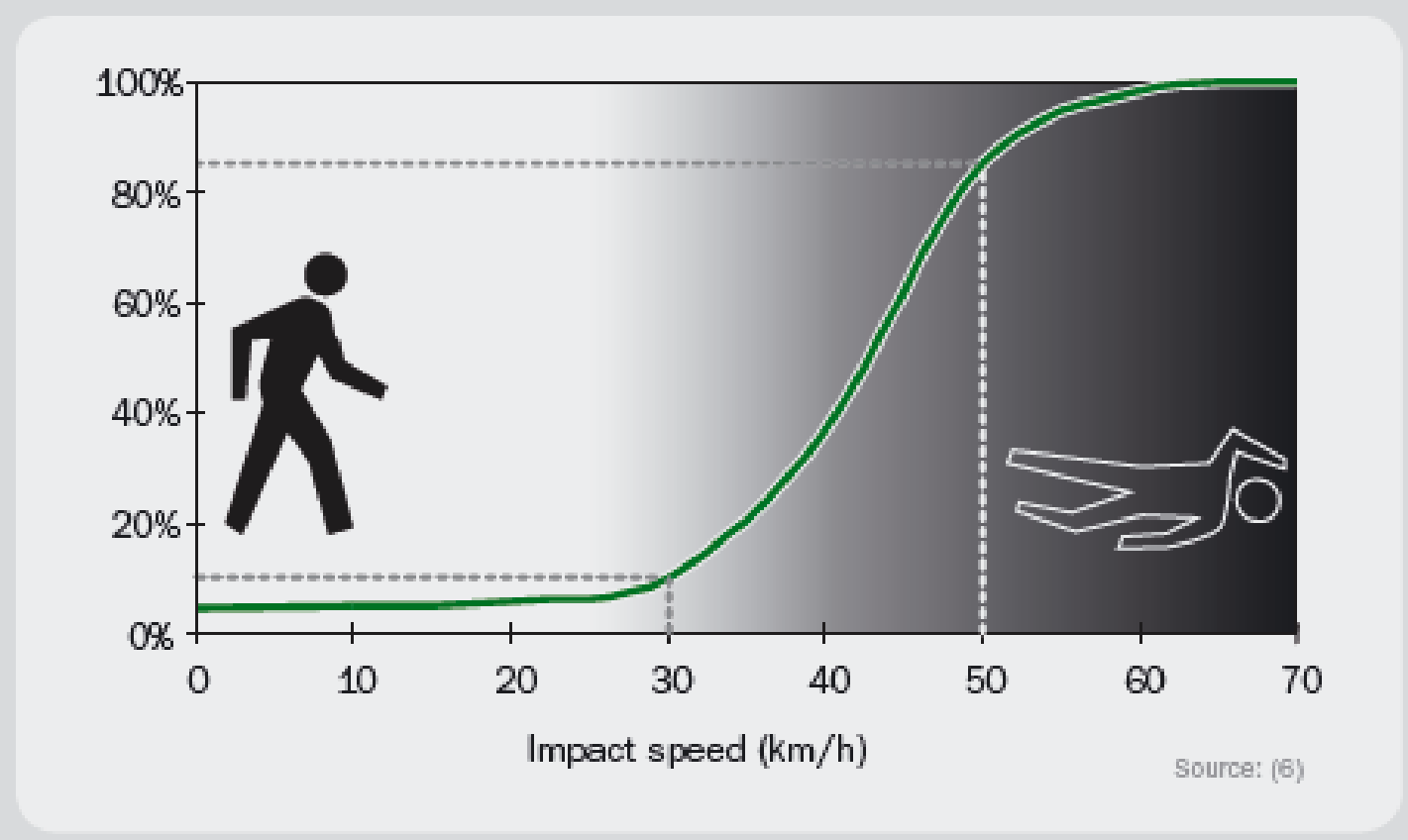
Speed Management Fundamentals

Higher speeds increase the risk of a crash…



Speed Management Fundamentals

…and the severity of injuries



Speed Management Fundamentals

Factors that contribute to speeding:

- shorter journey time vs. perception of injury risk
- perception of driving skills
- circumstances of individual trip
- productivity / fleet management
- road environment: design speed vs. posted speed limit

Speed Management Fundamentals

Apply the laws of physics…

- if there are large numbers of vulnerable road users on a section of road they should not be exposed to motorized vehicles travelling at speeds exceeding **30 km/h**
- car occupants should not be exposed to other motorized vehicles at intersections where right-angle, side-impact crashes are possible at speeds exceeding **50 km/h**
- car occupants should not be exposed to oncoming traffic where their speed and that of the traffic travelling towards them, in each instance, exceeds **70 km/h**, and there are no separating barriers between opposing flows
- if there are unshielded poles or other roadside hazards, the speed limits need to be reduced to **50 km/h** or less.

Speed Management Fundamentals

…and combine with local factors:

- Traffic mix
- Road shoulder width and pavement quality
- Lane width
- Quality of delineation
- Presence and type of intersections
- Intensity of land development abutting the road
- Traffic volume and flow
- Ability to overtake safely
- Time-based concerns (e.g. school start/finish times)

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Intervention areas

Effective speed management:

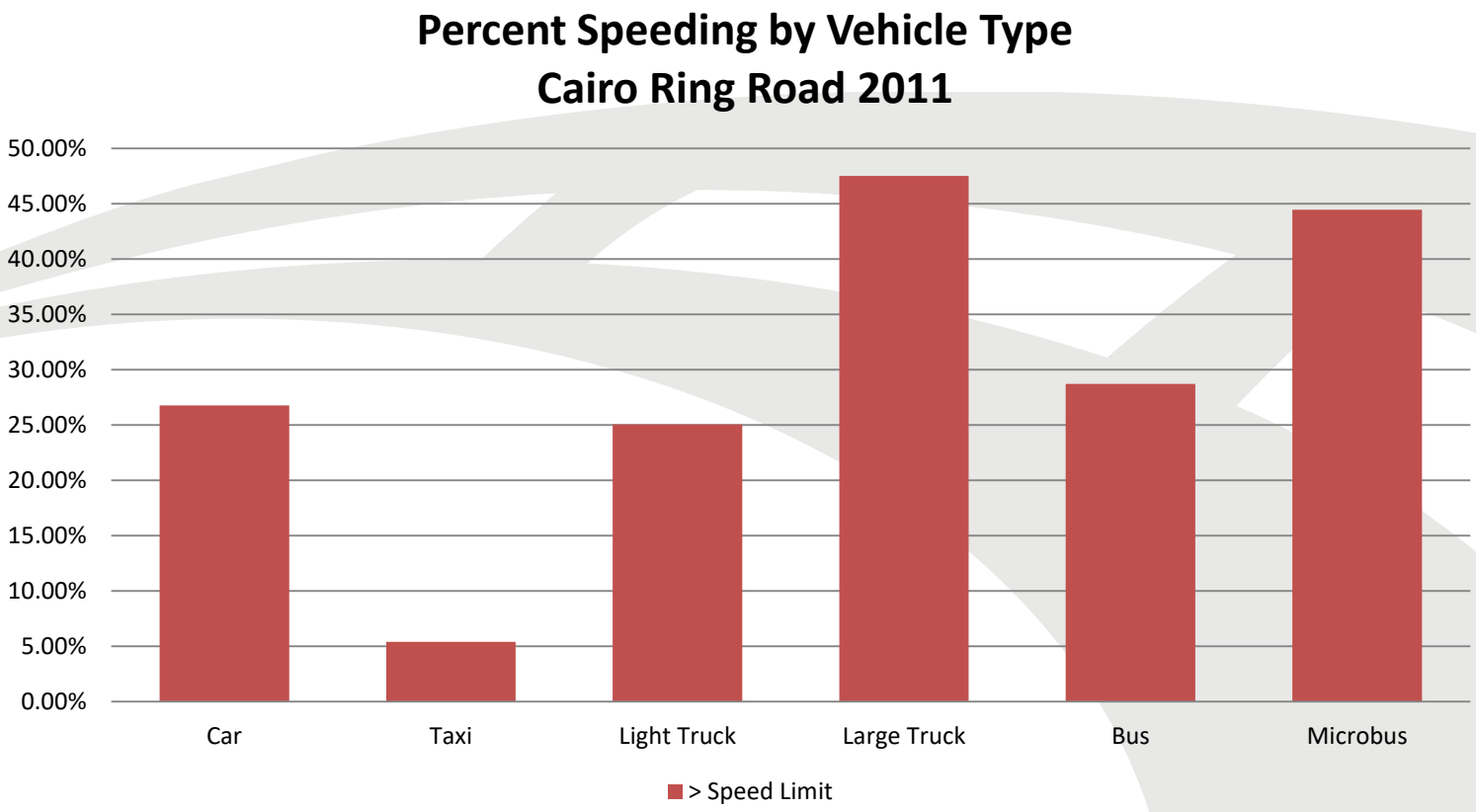
- employs a range of measures that will include enforcement, engineering and education
- is grounded in the hierarchy of roads (arterial, sub-arterial, local)
- is accepted by the motoring public
- factors multiple criteria (current speed measurements, traffic flow & mix, crash rates, presence of VRUs, physical characteristics of the roads, etc.) in setting legal limits

Intervention Areas

Start with data:

- What is the scale of the problem of speed related crashes?
- What proportion of overall road traffic crashes does this comprise?
- What does the crash data indicate about current speed limits?
- Who are those most likely to be involved as drivers or riders in speed related crashes?
- Where are the locations where pedestrian and other VRUs form a high proportion of total crash numbers?
- What are the characteristics of drivers involved in serious or fatal pedestrian crashes?

Intervention Areas



#1 Legislation

Legislation:

- Usually includes limits, sanctions for people who break them (fines, suspension) and specifications of equipment used for enforcement by the police
- Set by the government road authority for arterial routes, and municipalities for local roads and streets
- Communicated through signs to the road user

#1 Legislation

#1 Legislation

75% road signs, traffic signals in Delhi are faulty: study

Nearly 75% of road signs, traffic signals and road markings in Delhi are not up to the mark and lead to millions of traffic violations without road users being at fault, says a study

Mayank Aggarwal

Most traffic signals at intersections in Delhi were not functioning as per the prescribed standards or are wrongly installed, said the study. Photo: Mint

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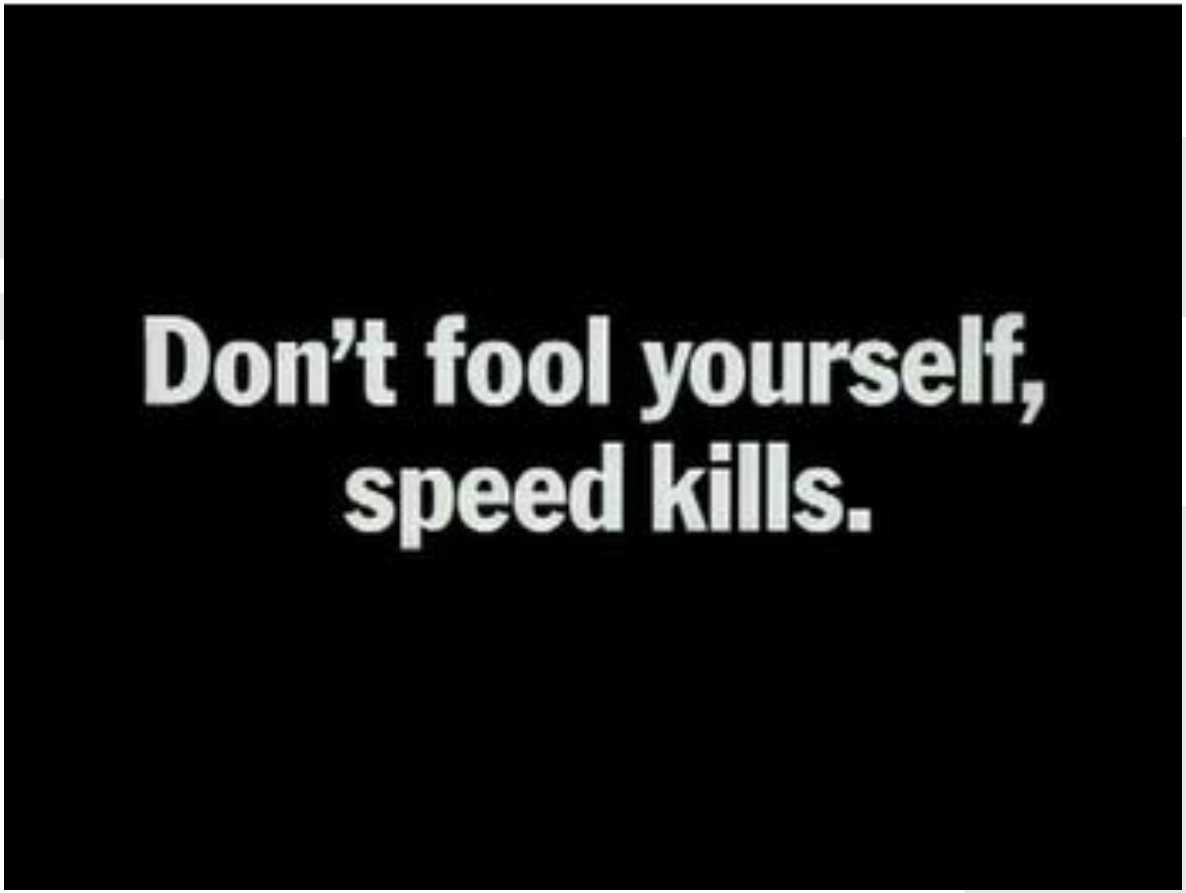
#1 Legislation

#2 Campaigns



#2 Campaigns

Scoring campaigns:

- Comprehensibility: What messages are viewers taking from the ads? Do they understand what the ad is saying?
- Acceptability: Do they accept what the ad is saying as credible, as relevant to them?
- Do viewers respond to the ads in a way that generates the relevant concern and motivation for adopting safer road safety behaviors (e.g. not speeding)?

#2 Campaigns

Underlying theories:

Theory of Planned Behavior (TPB): personal decisions to carry out certain behaviors are based on 1) attitudes toward the behavior; 2) subjective norms; and, 3) perceived behavioral control

Health Belief Model (HBM): the main motivator for people to preserve or protect their health is to avoid negative health outcomes.

Social Norms Theory: behavior influenced by perceptions of how other members of their social group think and behave

#2 Campaigns

Fear-based approaches:

Confronts viewers with depictions or associations of negative consequences of risky behaviors by capitalizing on their fears through graphic imagery to scare and shock individuals, or invoke shame or guilt.

These campaigns are not equally effective with all audiences, younger and male audiences are more difficult to influence using this approach, and the effects of fear-based appeals are often short-lived

#2 Campaigns

#2 Campaigns

Limitations to assessing campaigns:

- Campaigns are rarely systematically and empirically evaluated.
- Difficult to determine how to accurately and objectively measure the impact of a campaign
- Variety of methodological research design challenges
- Many campaigns consist of multiple strategies (e.g., enforcement, TV advertisements, billboards). What is the effectiveness of each component?

#2 Campaigns

Campaigns that are based on a solid theoretical foundation are more likely to successfully influence behavior. Social norms should not be overlooked in the development of campaign

Well-executed campaigns carefully consider the use of various campaign tools and select those that are most accessible, practical, and likely to reach the target audience, at a given budget

The combination of public relations and enforcement as supporting activities shows particularly large effects

#3 Engineering Treatments

#3 Engineering Treatments

Engineering Treatments:

- Conspicuous street signs
- Speed humps and raised platforms at pedestrian crossing locations and at intersections
- Gateway treatment at entrances to towns and villages
- Roundabouts
- Separation of vulnerable road users
- Variable speed limits

#3 Engineering Treatments

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#3 Engineering Treatments

Summary

- The laws of physics apply everywhere
- Substantial reductions in speed are possible within extremely limited budgets
- Substantial reductions in speed and the capture of the benefits of these reductions are feasible within the timeframe of the 2020 target

Sources

Speed:

Speed management, a road safety manual for decision makers & practitioners, WHO, 2009

Automated speed enforcement systems to reduce traffic-related injuries: closing the policy implementation gap, Stephanie R Morain et al., 2015

Thank you for your attention

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