Better data for a Safe System

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High-speed train derailment in the north of Spain, 24 July 2013

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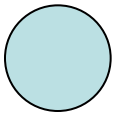
What happened?

- High-speed train derailed on a sharp curve: 80 passengers were killed, 144 were injured
- The train was travelling at twice the permitted speed limit of 80 km/h
- The driver was reported to have been on the phone talking to colleagues just prior to the crash
- An official investigative report determined that this crash was *completely preventable*
- Official findings: driver was **'exclusively'** responsible



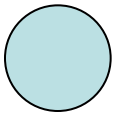
The cause(s)?

- The facts primes us to believe the driver was to blame:

train driver inattention
excess speed
⇒
excess speed on curve
derailment and crash

- If you dig a little bit deeper, another picture emerges:

'Upstream' risk landscape: no driver alerts, no last line of defence (e.g. European Train Control System ETCS had consciously been switched off)



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Safe System thinking: 'upstream' risk landscape to identify possible causal factors and points for interventions

- A crash like the high-speed derailment could be prevented by installing multiple layers of prevention, by redundant safety systems and a pro-active safety culture

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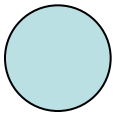
System approach: humans are fallible and errors are to be expected

- Errors are seen as consequences rather than causes, having their origins not so much in the perversity of human nature, but in "upstream" systemic factors

- Countermeasures are based on the assumption that, though we cannot change the human condition, we can change the conditions under which humans work

("not fitting the person to the job, but the job to the person")



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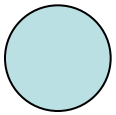
Our fundamental road safety problem are *basic risk factors (not just risk increasing factors)*

- Today's road traffic is *inherently* unsafe
- The road system of today has not been designed with safety in mind, as is the case with air transport or rail transport (sic)
- Which means we are almost fully dependent on whether a road user performs their tasks well, but they make mistakes or errors or violate laws
- And 2: we face too high levels of kinetic energy in crashes (above tolerable human levels)
- Another approach is needed: *Safe System Approach*



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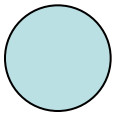
Safe System: the prevailing approach in the world these days

- Similar names are around, that accept the same principles (human beings make mistakes, the human body has a limited physical ability, there is a shared responsibility amongst stakeholders and road users, all parts of the system should be strengthened in combination)
  - Vision Zero
  - Towards Zero
  - Sustainable Safety
  - Safe System
- Safe System is not cast in concrete, but a living concept



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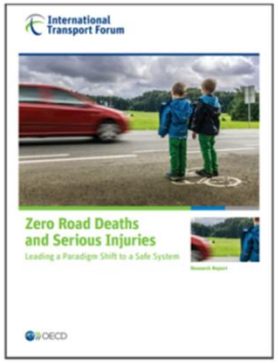
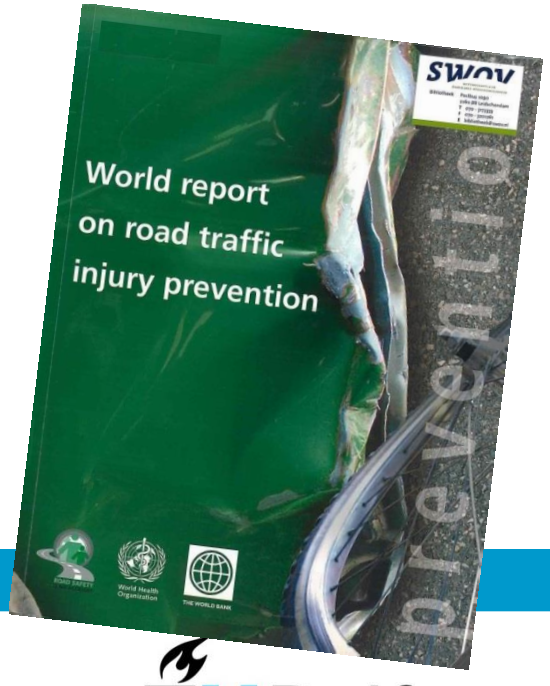
Safe System approach: support and endorsement from many



Zero Road Deaths and Serious Injuries

Leading a Paradigm Shift to a Safe System

WORLD ROAD ASSOCIATION
MONDIALE DE LA ROUTE
AIPCR PIARC



Europe on the Move

Safe, connected and clean mobility #MobilityEU

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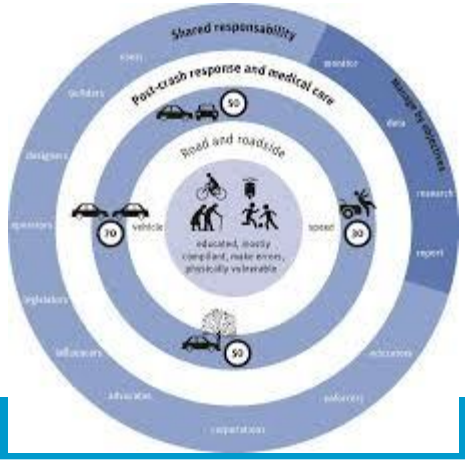
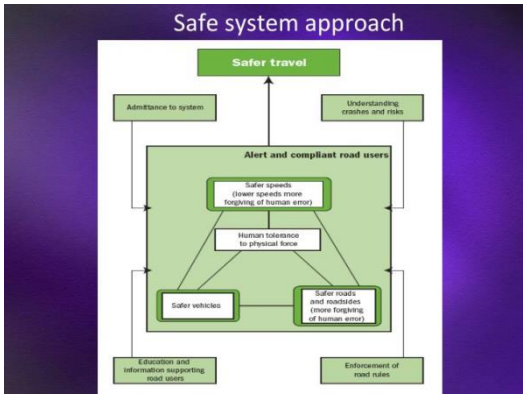
Safe System approach: three layers

- A vision
- A set of principles
- A set of tools

Road safety *vision* = a product of underlying community values

- No one should be killed or seriously injured in road crashes
- Protecting vulnerable road users, such as children
- Limit disadvantage due to actions by other road users
- Mobility should be maximised within the limits of safe operations





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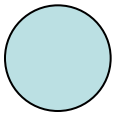
Safe System ('Sustainable Safety') *principles* in the Netherlands, 2005 (I)

- Ethical
  - We don't want to hand over a traffic system to the next generation with current casualty levels, but considerably less: *Towards zero*
- A proactive approach
  - There is no need to wait for crashes before to act; 'we' have enough knowledge/evidence to be applied; adapt that to local conditions
- People are the measure of all things
  - Human capacities and limitations are the guiding factors (physically and psychologically)



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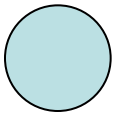
Safe System ('Sustainable Safety) *principles* in the Netherlands, 2005 (II)

- An integrated/holistic approach
  - Integrate man, vehicle and road into a safe system
  - Covers the whole network, all vehicles, all road users
  - Align with other policy areas: infrastructure, planning, health, etc.
  - Shared responsibility between 'system' and users
- Reducing latent errors (system gaps) of the system
  - Which means we will not be fully dependent on whether a road user makes a mistake or an error in preventing a crash
- Use criterion of preventable injuries
  - If we know the causes, if we know how to cure, if interventions are cost-beneficial for society



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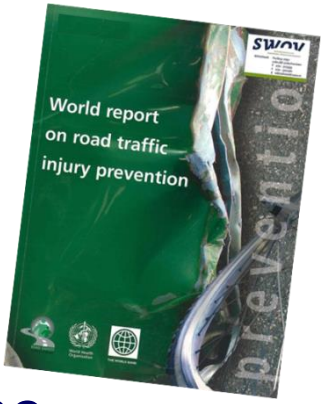
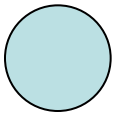
Is a Safe System approach also applicable in South East Asia?



- My view: Yes, vision and principles are the same (independently of countries' income levels), however I expect that tools will be different
- It is the dominant paradigm today in road safety, so…
- How to create support for a Safe System approach?
- How to define your version of Safe System (vision + principles + tools)?
- How to bring Safe System approach to implementation in your country?



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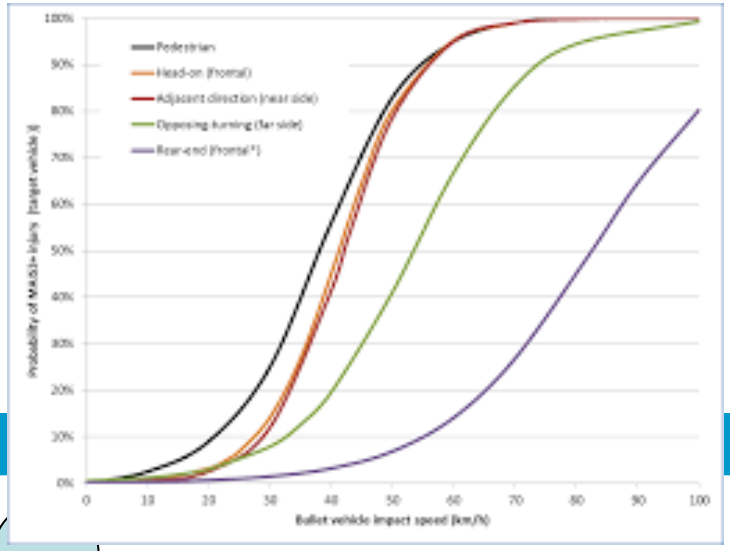
Safe System approach starts with available evidence/knowledge

- For example, vulnerability of the human body: crash type - impact speeds - protection - injuries
- For example effectiveness of seat belts, child restraints, or crash helmets



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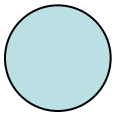
Designing a (Safe System) strategy, action plans incl. setting targets

- Define strategies and action plans based on Safe System principles
- For example: zero violations of safe speed limits; 30 km/h unless a higher driving speed is safe
- For example: 100% penetration of seat belts in cars and 100% wearing rates
- For example: 100% functional road hierarchy and zero people killed/injured in head-on collisions

Pillar 1	Pillar 2	Pillar 3	Pillar 4	Pillar 5
Road safety management	Safer roads and mobility	Safer vehicles	Safer road users	Post-crash response



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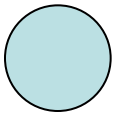
Collect and analyse road safety data, also in Safe System approach

- Is it relevant for policy making?
- Have the knowledge which data to collect/analyse
- Carry out high quality data collection (valid and reliable data)
- Have enough expertise to analyse data properly
- Publish results
- Four ingredients are crucial to develop and maintain effective road safety data systems (‘**people, knowledge, processes, hardware and software**’)



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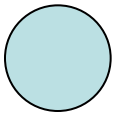
Results (*less people killed and injured*) are measured by indicators; indicators are based on data

- We need good data for designing good indicators, e.g.
  - Measuring relative performance/benchmarking
  - Understanding causes of crashes and drawing attention to particular issues
  - Identifying trends and predicting problems
  - Assessing the impact of interventions
  - Setting targets and priorities
  - Evaluating progress towards targets



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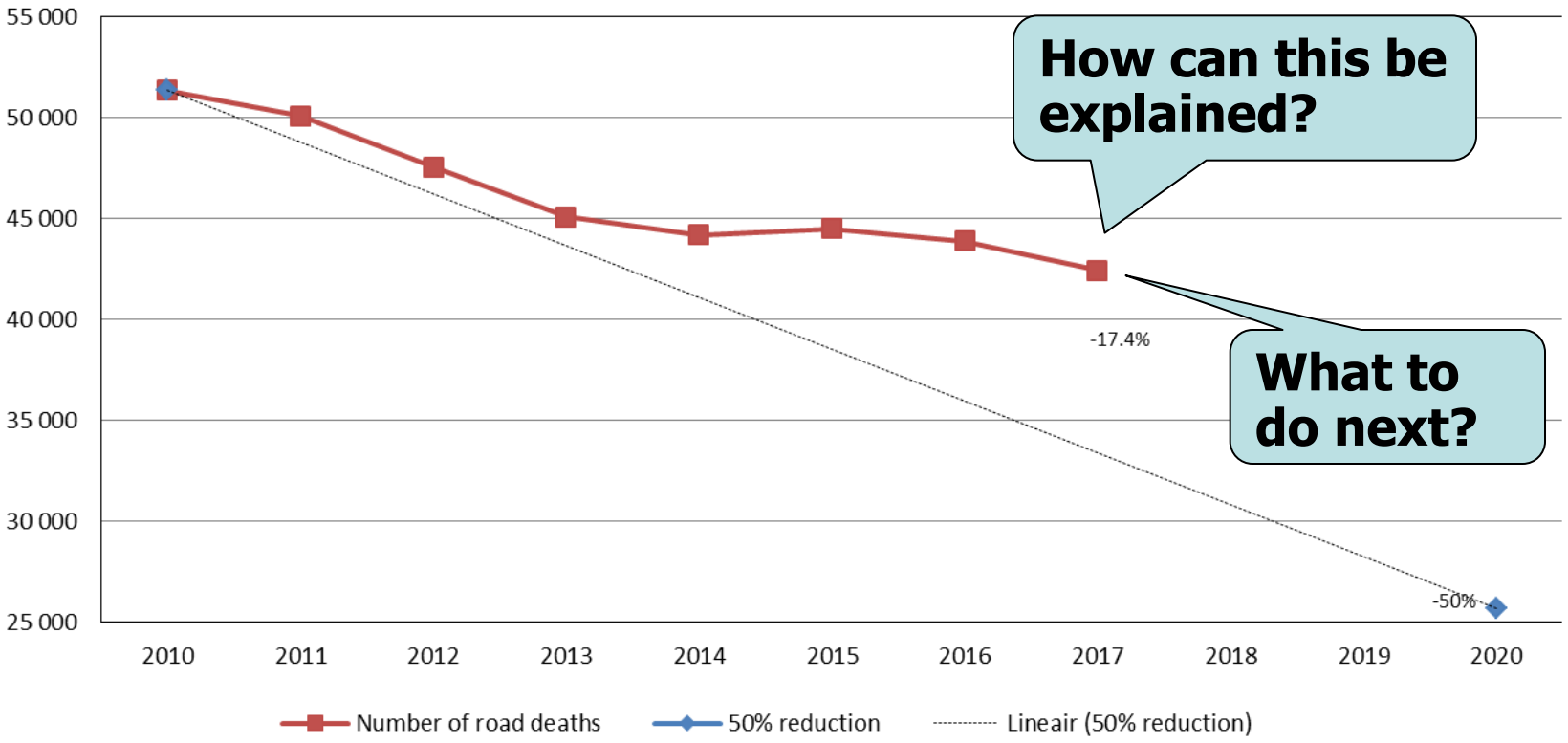
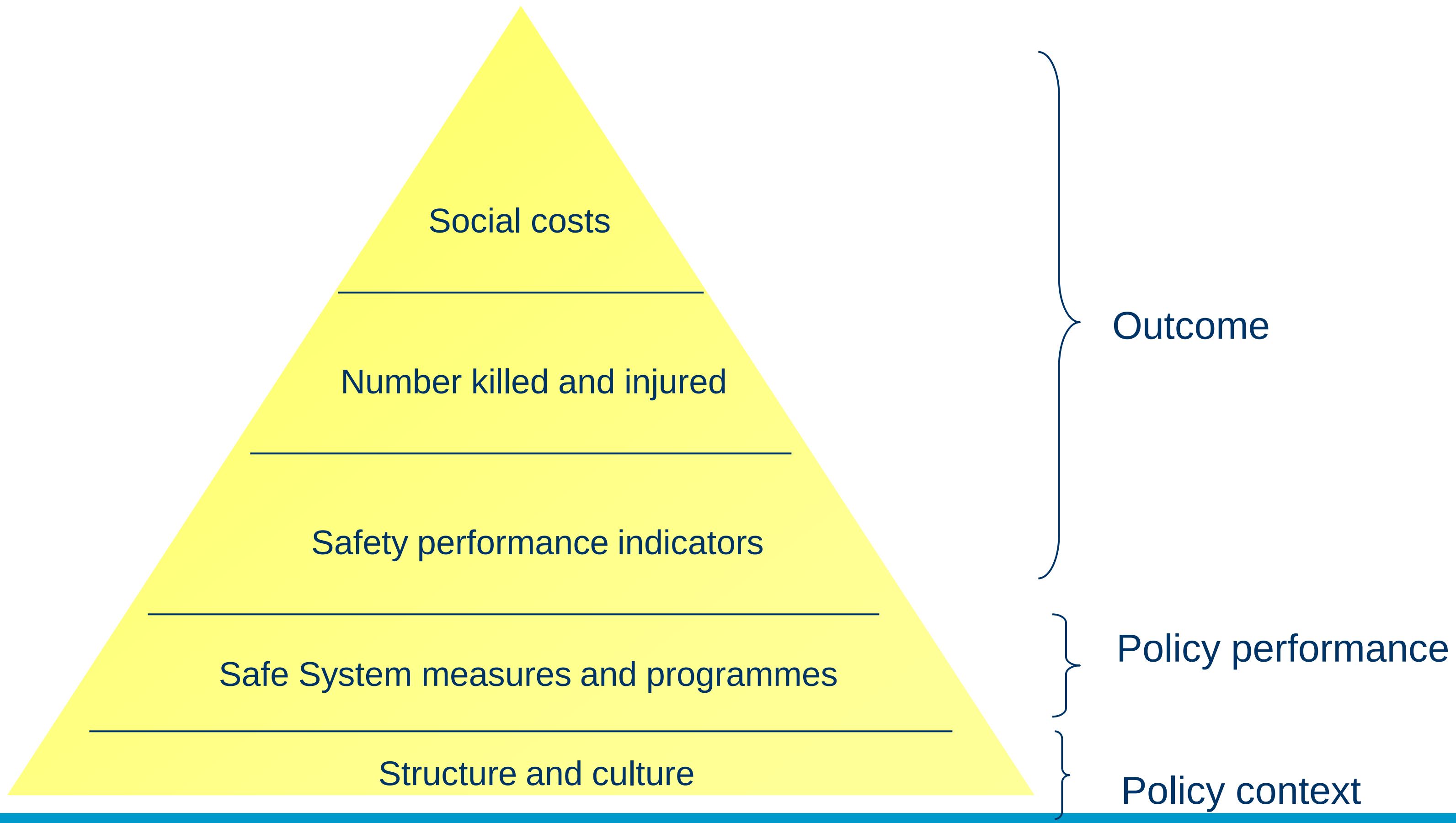
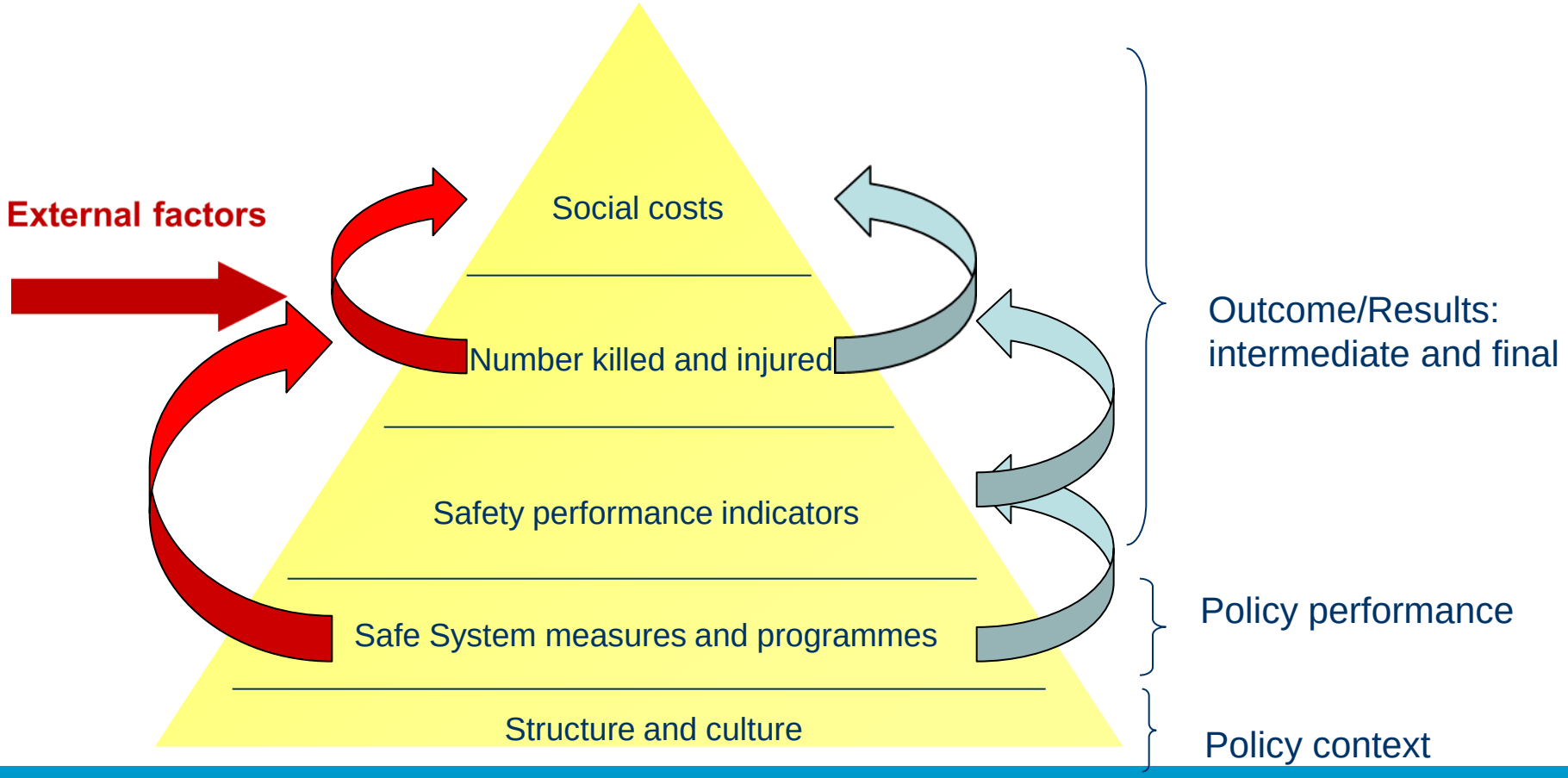
Monitoring: evolution in number of road deaths 2010-2017



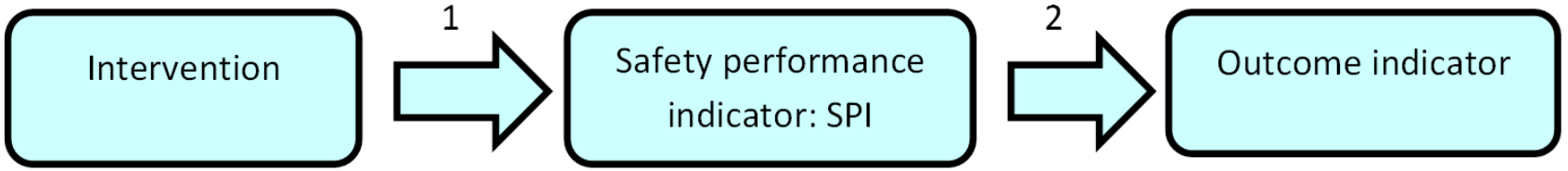
A framework for data (collection) and knowledge: road safety target hierarchy

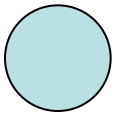


A framework for road safety management (from bottom to top or vice versa)



Relationship between intervention, intermediate (SPI's) and final outcome indicators (fatalities, serious injuries and related social costs)





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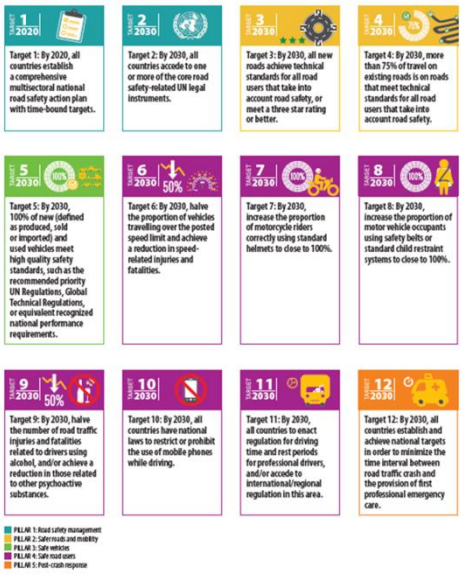
Safety Performance Indicators (SPIs)

- European Union is working on a set of indicators (results are expected soon)
- WHO produced Global Road Safety Performance Targets by 2030 (2018); these performance targets are not all performance indicators (SPIs) and they set 'interim targets'



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Road safety data …

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Better data for a Safe System

- This starts with accepting a Safe System approach
- Then, use available evidence/knowledge
- Safe System works with very ambitious goals!!
- Set (interim) targets and monitor progress
- Collecting good quality data and analysing them is an essential task in every country (under the leadership of a Lead Road Safety Agency)

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