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Road accident data analysis: from correlation to causation and policy support

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Road safety is ideal for spending money for nothing

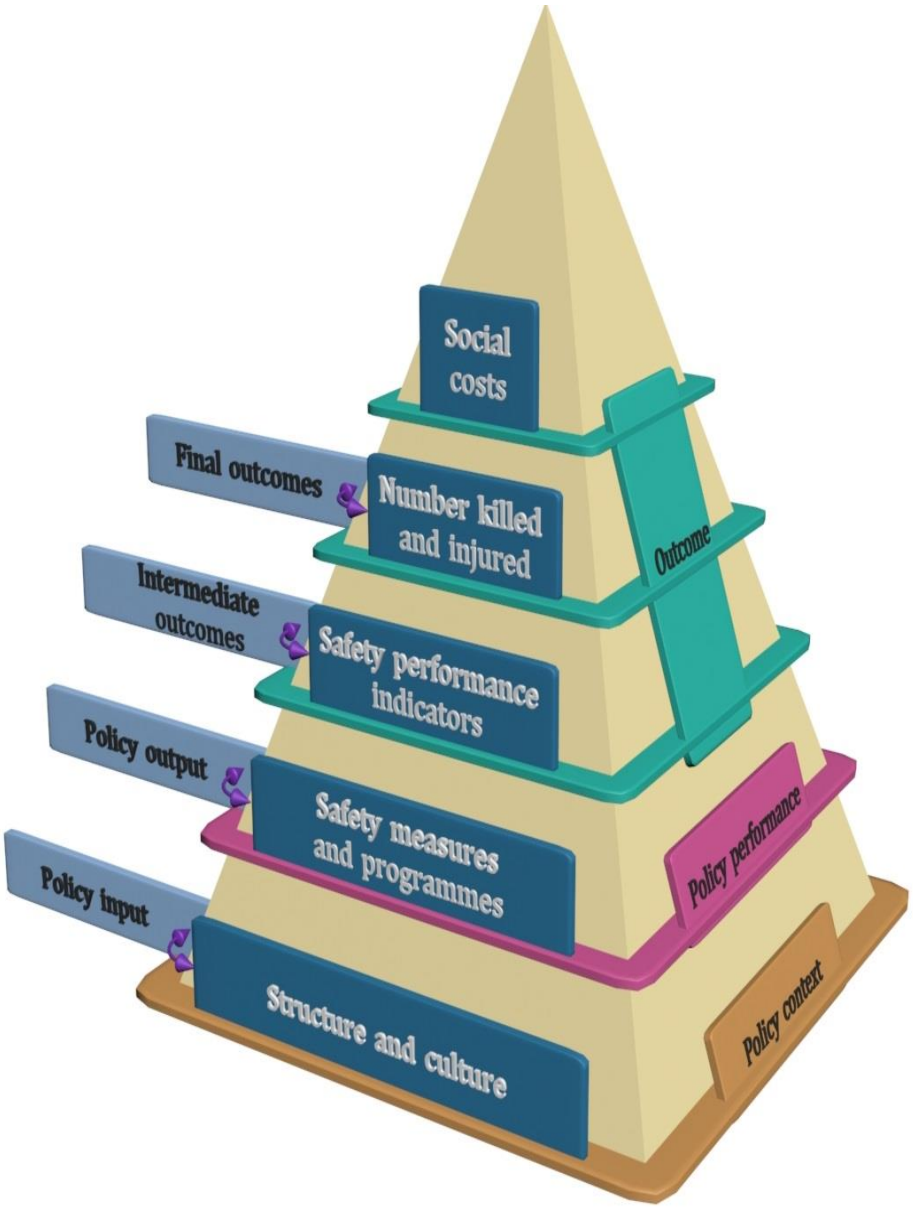
If you cannot measure it, you cannot improve it
(Lord Kelvin)

Road Safety is a typical field
with high risk of important investments
not bringing results

The ‘pyramid’ of road safety management systems

- The road safety management ‘footprint’ of a country at specific point in time

- Level 1: Structural and cultural characteristics (i.e. policy input).
- Level 2: Safety measures and programs (i.e. policy output).
- Level 3: The operational level of road safety in the country (road safety performance indicators)
- Level 4: Final outcomes (i.e. road casualties).
- Level 5: The total social costs of road crashes.



Road safety data to support evidence-based policies

- Fatalities and their evolution
- Exposure
- Safety Performance Indicators
- Causation (in-depth accident investigations)
- Health indicators
- Economic indicators
- Driver behavior, attitudes etc.
- Road safety rules and regulations
- Road safety measures assessment

Do we have the data we need?

Do we need the data we have?

Necessary Exposure Data and Performance Indicators

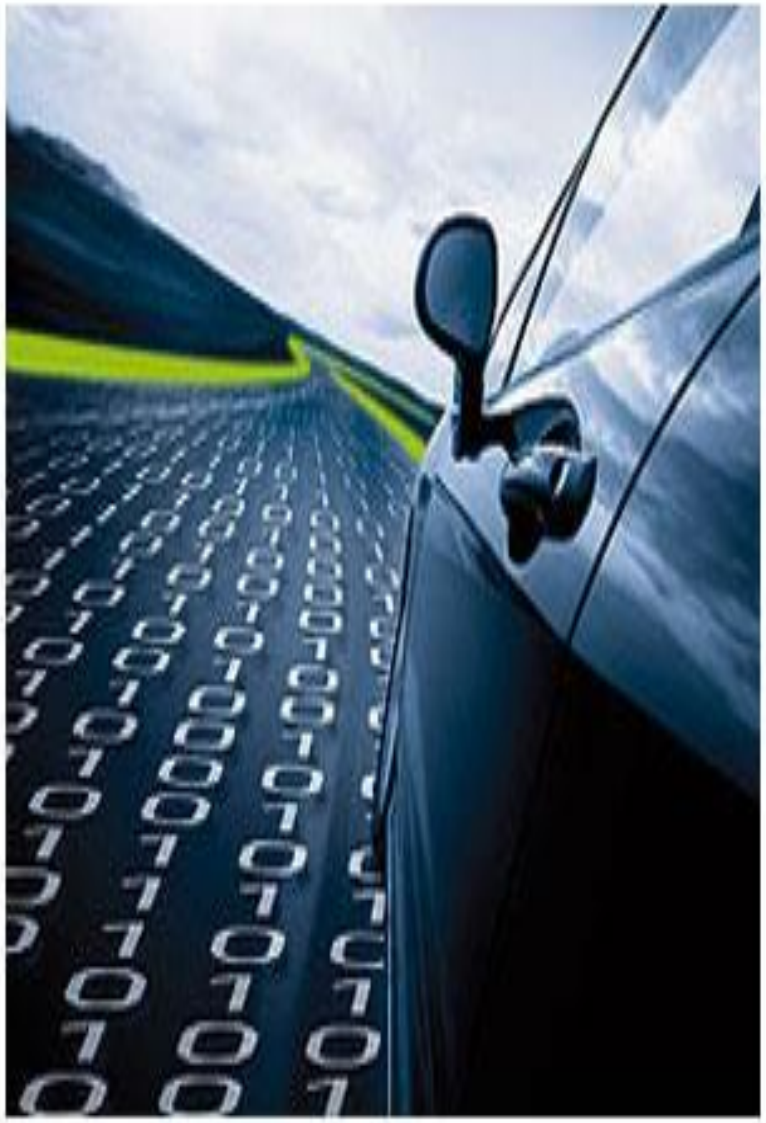
Exposure indicators

- Vehicle- and person-kilometres of travel
- Time spent in traffic
- Number of trips
- Vehicle fleet
- Population

Safety Performance Indicators

- Road user behavior (e.g. speeding, alcohol)
- Vehicles (e.g. crashworthiness, fleet age etc.)
- Infrastructure (e.g. meeting design and safety standards)

The most useful data are often the least available



Road accident analysis techniques

- Descriptive and qualitative analysis
- Linear regression
- Generalised Linear Models / Non-Linear Models
- Multilevel analysis
- Time series analysis
- Cost-Benefit Analysis

Conventional analysis techniques may not be appropriate for the complex and hierarchical nature of road safety outcomes.

Challenges of road accident analysis

Lack of data
(accidents, injuries, exposure, performance indicators,…)

Data not comparable

Correlations but not Causations

Data incompatible

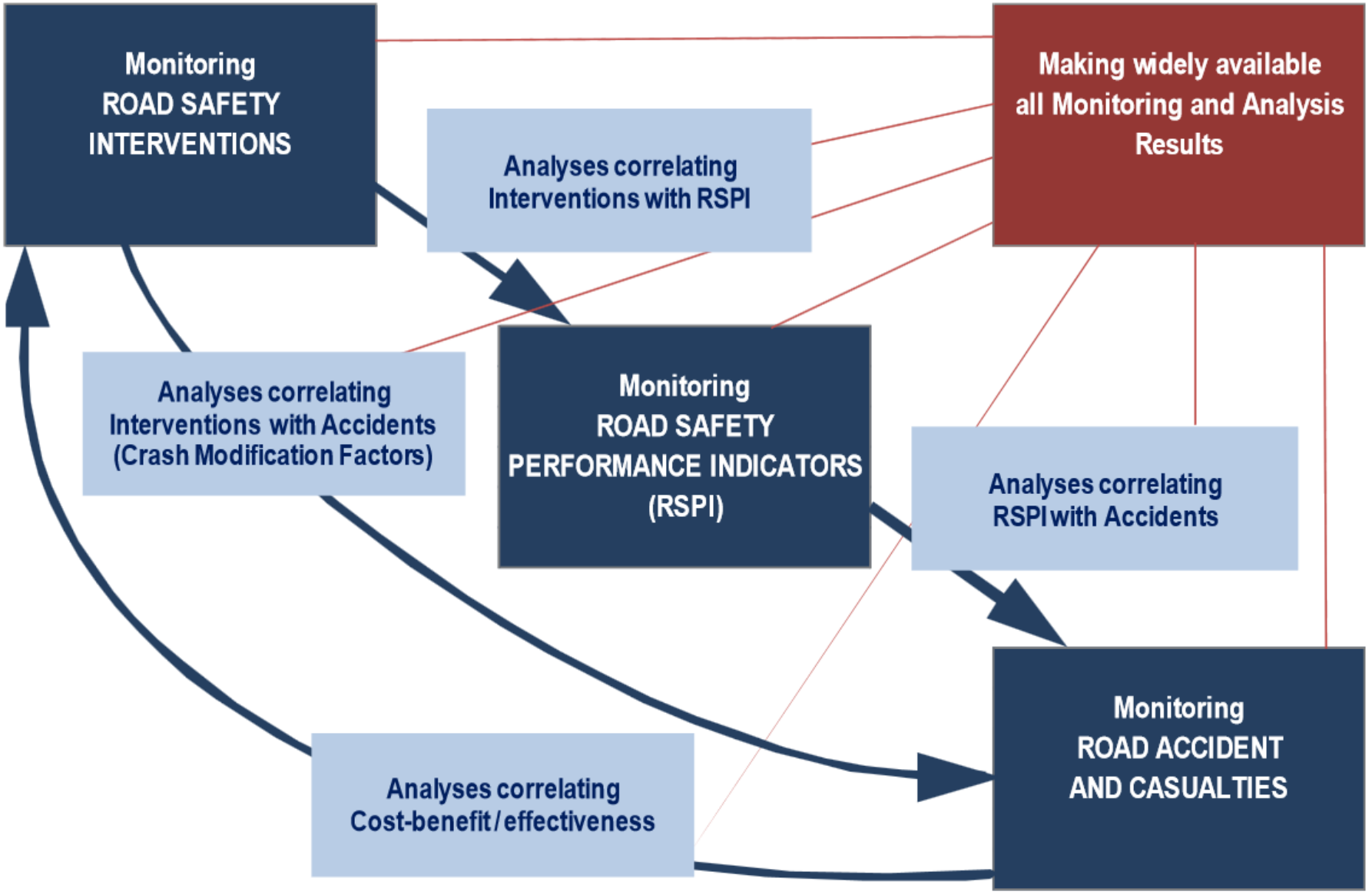
Lack of standard methodologies

Insufficient data details

Analyses not solution oriented

Low reliability of data

Data monitoring and analysis for policy support



Fundamental directions for road accident analysis

- Streamline road safety monitoring by exploiting also new technological advances (big data)
- Establish the links between accident causation and injury causation
- Establish the links:
  - between measures and behaviour
  - between behaviour and risk
- Focus on the most cost-effective measures
- Improve the transferability of methods and experiences
- Bridge the gaps between research and policy

The future of road accident data analysis