SafetyCube

Developing the European Road Safety Decision Support System

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SafetyCube concept

- Problem
  - *Evidence based road safety policies are becoming more usual and there is much better availability of national data to describe the problem areas*
  - *Effective road safety policies need good information about accident risk factors and about measures*
  - *Impact studies are typically used to assess viability of road safety measures*

Accessing the evidence base

- Much of the evidence on risks and measures is in the research literature – how can it be brought together?

- How can we assess transferability of measures from one country to another?

- How can the available information and data be synthesised?

Challenges of the evidence based approach

- Do we have a comprehensive method to identify risks and measures?
  - *Road, road users and vehicles*
- How do we estimate the likely casualty reduction of a measure that has not been introduced to the real-world?
- Do we have a comprehensive method to evaluate cost-effectiveness?
- How do we handle the situation where there are many measures of effectiveness but they disagree?

What is a risk?

- "Risk factor" denotes any factor that contributes to accidents or injuries.

- There are risk factors related to all elements of the road system and the interactions between these elements.

- The importance of a risk factor can be defined as the size of the contribution it makes to accidents or injuries.

What is a measure?

- A measure is any action intended to reduce the numbers of accidents or injuries.
  - *May reduce the risk of a crash*
  - *May reduce the risk of injury*
  - *May reduce exposure to risk*
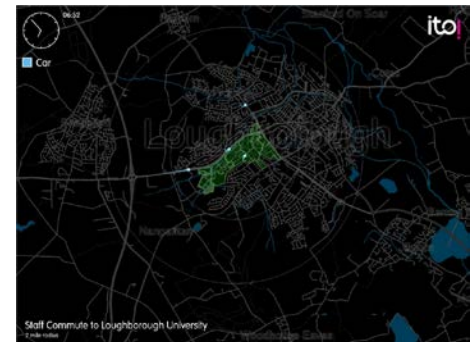
Example: taxonomy of infrastructure risk factors and measures

More than 90 risk factors and 95 measures in 15 infrastructure areas

Exposure
Traffic flow
Traffic composition

Road safety management
Road safety audits, inspections etc.
Blackspots treatment
Speed management

Horizontal alignment
Road curvature (curve radius, curve frequency, transition curves etc.)

Vertical alignment
Gradient
Vertical curvature (sight distance)

Cross-section
Superelevation, cross-slopes
Lanes (number, type, width)
Shoulder (type, width)
Median / barrier

Roadside
guardrails, obstacles, visibility
Sidewalks, cycle lanes

Road surface
Friction
Uneven surface
Oil, leaves, ice, snow etc.

Junctions alignment
Roundabouts
Interchanges & ramps
At-grade junctions
Channelization (left turn lanes, traffic islands)
Rail/road crossings

Traffic control
Speed (speed limits, section control, speed humps)
Traffic signs
Delineation and Road markings
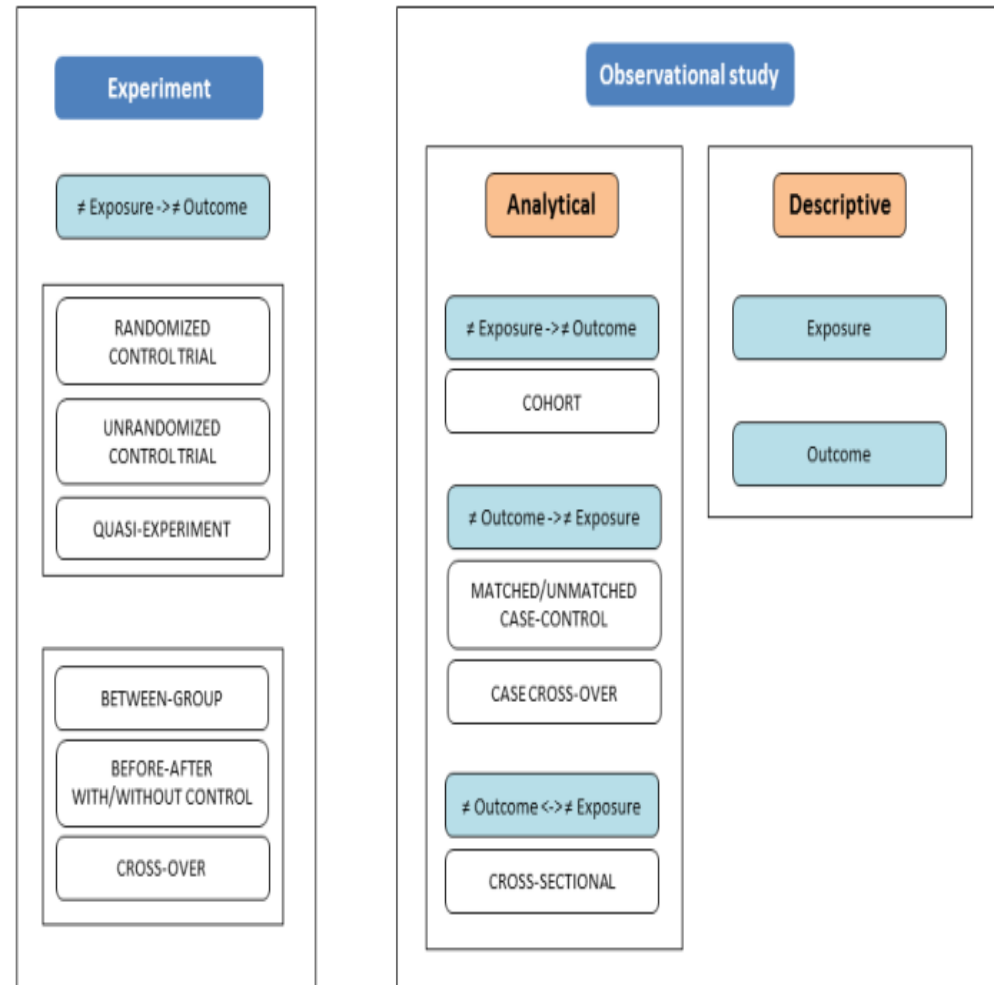*Traffic signals (installation, timing)*
ITS (VMS, V2I)

Lighting

Weather

Workzones

**Road type**

Methodology-Guidelines and tools

- A **taxonomy of study designs**

- Different estimators of **effects**
  - *Crash Modification Factor (CMF)*
  - *Absolute difference*
  - *Regression coefficient / slope*
  - *Odds ratios*
  - *Accident rates ratios*

Experiment

≠ Exposure -> ≠ Outcome

RANDOMIZED CONTROL TRIAL

UNRANDOMIZED CONTROL TRIAL

QUASI-EXPERIMENT

BETWEEN-GROUP

BEFORE-AFTER WITH/WITHOUT CONTROL

CROSS-OVER

Observational study

Analytical

≠ Exposure -> ≠ Outcome

COHORT

≠ Outcome -> ≠ Exposure

MATCHED/UNMATCHED CASE-CONTROL

CASE CROSS-OVER

≠ Outcome <-> ≠ Exposure

CROSS-SECTIONAL

Descriptive

Exposure

Outcome

Coding template and database

- A **template for coding research studies** and existing results (excel)

- A **template for summarising results** / meta-analysing

- The templates of **coded studies** will undergo a thorough checking and debugging process, in order to be eventually stored in a **relational database**, which will serve as the back-end of the DSS
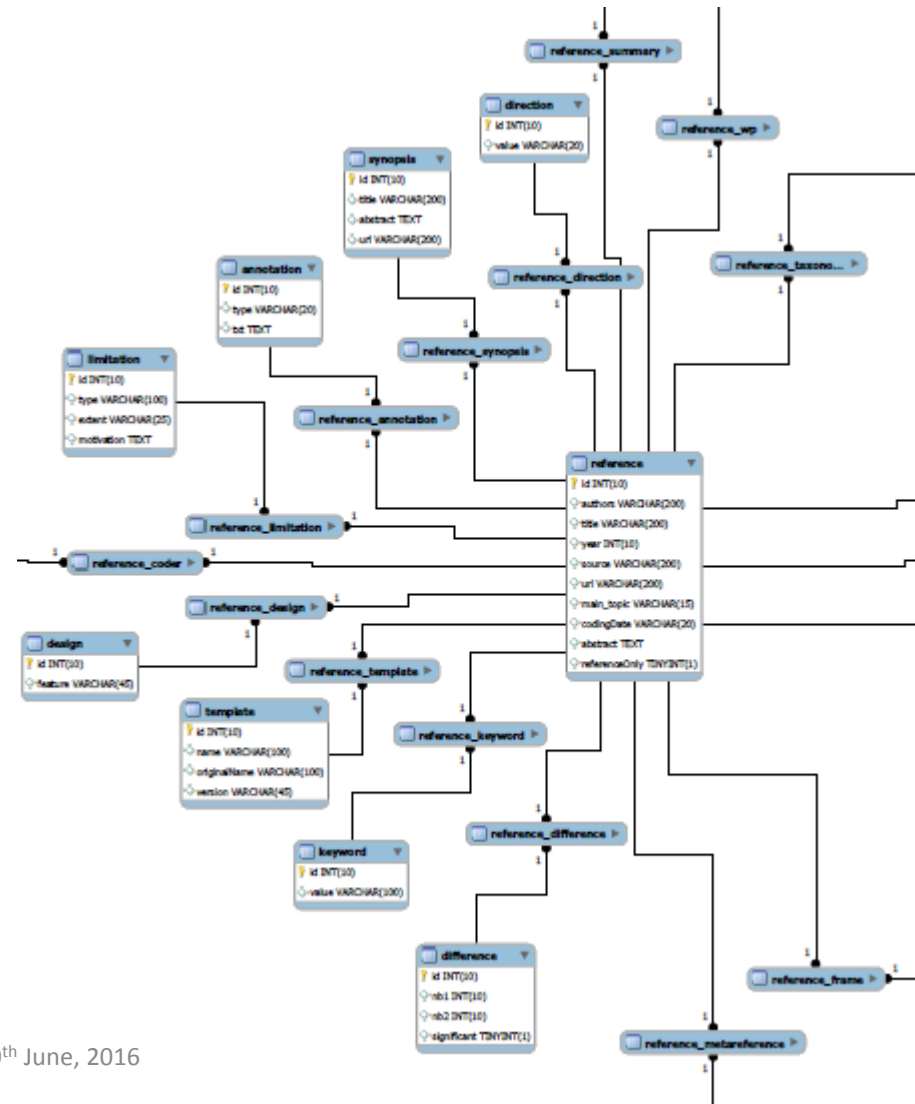
DSS-Analysis of user needs

- Stakeholders from government, industry, research, and user associations.

- The DSS should be suitable for use by a wide range of end users, not be limited to EU policy makers, but also local authorities.

- The DSS should have the following characteristics:
  - *include robust data which allow for critical analysis and transparency*
  - *access to the studies used and to all results as well*
  - *information of the best quality studies and recommendations*

Progress to date

- **Wealth of risks, countermeasures and studies** related to behaviour, road infrastructure and vehicle (CMF approach).

- Already analysed approx. **500 studies,** and many more in progress.

- Updated more than **20 existing meta-analyses,** about 65 more in progress.

- The **design of the DSS** is finalized and the first static prototype of the DSS will be available by the end of June 2016.

- The **DSS testing phase** (with test tables) will be ready in August 2016.

- The **DSS Pilot Operation** will start on September 2016.

- The **final opening of the DSS** will start on September 2017 and will be constantly updating from April 2018 and onwards.

Contact

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