Progress in MAIS3+ Serious Injuries Data Collection

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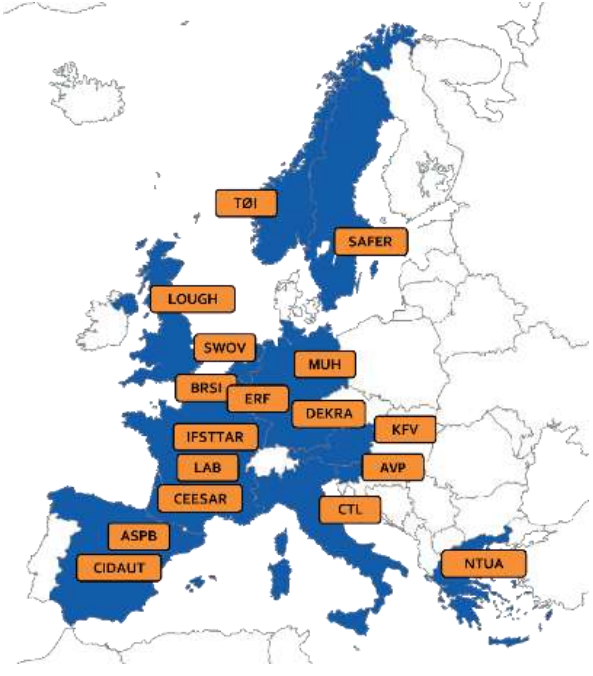
International Road Safety Conference
Bucharest, 20 March 2019

The SafetyCube Project

Funded by the European Commission under the Horizon 2020 research framework programme.

- Coordinator: Pete Thomas, Loughborough University
- Start: May 2015
- Finish: April 2018
- 17 partners from 12 EU countries

- The SafetyCube DSS objective is to provide the European and Global road safety community a **user friendly, web-based, interactive Decision Support Tool** to properly substantiate their road safety decisions for the actions, measures, programmes, policies and strategies to be implemented at local, regional, national, European and international level.

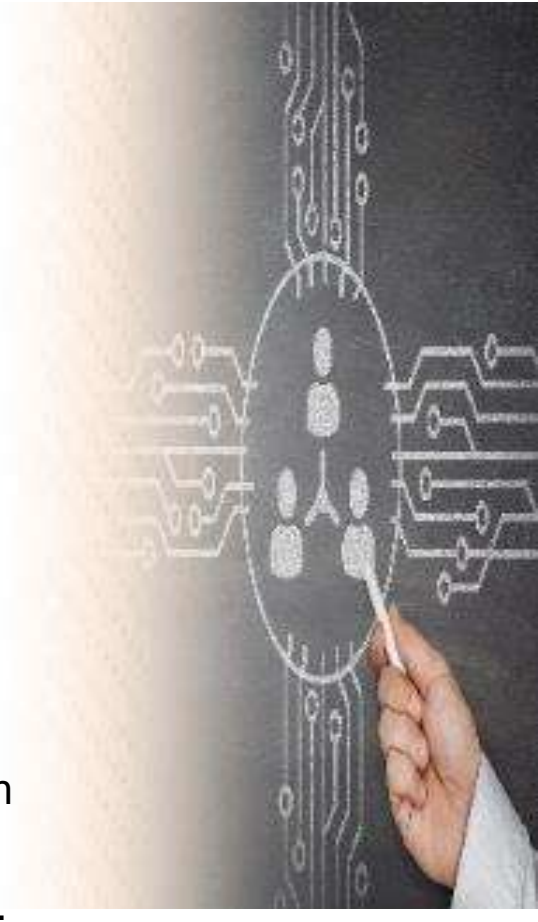


Serious Traffic Injuries in the EU

- According to the European Commission's estimates, about **135.000 people sustain serious road traffic injuries** on EU roads per year.
- On average there are **5 serious injuries for each road fatality** in the EU.
- In EU countries, more than half of all serious injuries occur **inside built-up areas**.
- 45% of all seriously injured persons are **vulnerable road users** (pedestrians, cyclists, powered two-wheeler drivers).
- The **young and the elderly** are over-represented among the seriously injured in road crashes and especially the elderly pedestrians.
- Serious injuries are **more costly to society** because of long-time rehabilitation and healthcare needs.

Data Collection Background

- Reducing the number of serious traffic injuries is one of the **key priorities** in the road safety programme 2011-2020 of the European Commission (EC, 2010).
- In January 2013, the High Level Group on Road Safety, representing all EU Member States, established the **definition of serious traffic injuries** as road casualties with an injury level of MAIS ≥ 3.
- The High Level Group identified **three main ways** Member States can collect data on serious traffic injuries (MAIS ≥ 3):
  - *by applying a correction factor on police data,*
  - *by using hospital data alone and*
  - *by using linked police and hospital data.*
- Currently, EU member states use **different procedures to determine the number of MAIS ≥ 3 traffic injuries**, dependent on the available data.
- The **impact** of this heterogeneity on final estimations is unknown.



Objectives

- Describe the **current state of collection** of data on serious traffic injuries across Europe.
- Provide **practical guidelines** for the estimation of the number of serious traffic injuries for each of the three ways identified by the High Level Group.
- Examine how the estimated number of serious traffic injuries is affected by **differences in methodology**.

Methods I

The practical **guidelines** for the determination of the number of serious traffic injuries were developed using:

- A **survey** carried out to experts in the 28 EU Member States and 3 EFTA countries
- **Current practices and experiences** from a number of countries
- Specific **analysis** to the same data for different procedures were applied

Methods II

Current practices and experiences from a number of countries

Methods to apply **correction factors** using data from Belgium, France and Austria

Inclusion and exclusion criteria using Hospital data & sensitivity analysis

Methods **to derive MAIS**, using data from Spain, Belgium, the Netherlands and Germany

Record linkage with data from France, the Netherlands and Slovenia

Results

State of data collection on serious traffic injuries across Europe (June 2016)

- Only **17 of the 26**: MAIS ≥ 3 estimates to DG-MOVE.
- **Difficulties to get access** to hospital discharge data.
- **9** hospital data, **2** corrections to police data, and **4** record linkage of police and hospital data. **France** and **Germany** apply a combination.
- The ratio of MAIS ≥ 3 casualties / fatalities **differs considerably between these countries**, from 0.6 MAIS ≥ 3 in Poland to 13.2 MAIS ≥ 3 in the Netherlands.

	MAIS ≥ 3 estimations already delivered or soon available?	For which years are MAIS ≥ 3 data available?
Austria	yes (2016)	2014
Belgium	yes (2015)	2011-2014
Bulgaria	no	-
Croatia	no	-
Cyprus	yes	-
Czech Republic	yes	2014
Denmark	no	-
Estonia	No (possibly from 2017)	-
Finland	yes (2015)	2010 & 2011, 2014
France	yes (preliminary figures)	2006-2012
Germany	yes (2015)	2014
Greece	no	-
Hungary	no	-
Ireland	yes (2015)	2005-2014
Italy	yes (2015)	2012-2014
Latvia	no	-
Lithuania*	no	-
Luxembourg	no	-
Malta*	no	-
Netherlands	yes (2015)	1993-2014
Poland	yes (2015)	2013
Portugal	yes (2015)	2010-2014
Romania*	no	-
Slovakia	no	-
Slovenia	yes (2015)	2012-2014
Spain	yes (2016)	2000-2014
Sweden*	yes	2014-2015
United Kingdom	yes (2016)	1999-2011 (soon up to 2015)
Iceland	no	-
Norway	no	-
Switzerland	yes (2016)	2011-2014

* no detailed information on methodology yet available

Source: SafetyCube questionnaire, information by DG-MOVE (CARE Expert Group).

Results

Applying correction on police data

WHEN:

- In case you there is no hospital data for the entire country and/or every year
- In case hospital data becomes available at a too late stage

HOW

- Use a sample of hospital data (previous years and/or part of the country)
- Derive and apply multiple correction factors
- Update correction factors on a regular basis.

Results

Using of hospital data (I)

WHEN:

- In case hospital data of good enough quality is available and record linkage with police data is not available

HOW

- Select patients with **external causes for road traffic injuries** (public road): ICD9CM: E810-E819, E826, E827, E829, E988.5; ICD10: V01-89 for those codes for traffic injuries and/or weighting -correcting for non-public road- for non-traffic injury codes
- **Exclude hospitalized fatalities within 30 days**
- **Exclude readmissions** (as well as scheduled admissions when they are a second episode of a previous emergency injury)
- Select all cases with any **injury diagnosis** (ICD9CM: 800-999; ICD10: S00-T88; AIS injury)
- In case of ICD coded injuries, **assess the severity (AIS)** of each injury using a ICD to AIS recoding tool (e.g. ICDpic, AAAM, ECIP/Navarra)

Results

Using of hospital data (II)

Other issues to consider with hospital data

- **External causes** (E/V-codes) may be **missing or misspecified** for many casualties. Compensate for these missing E-codes by using information from additional sources.
- Traffic Crashes happening on **public roads** should be selected (country specific weighting factor).
- **Different versions of AIS:** multiplied by a factor 0.89 when injuries are coded in AIS1990 or AIS1998 instead of AIS2005 or AIS2008
- **ICD to AIS recoding tool** applied. Current version of the AAAM10 (2016) tool results in a clear underestimation of the number of MAIS3+ casualties and the tool is not able to deal with truncated codes
- **Limited number of injuries:** can result in an underestimation. Weighting factors: 1.28 in case of 1 injury, 1.11 in case of 2 injuries, 1.05 in case of 3 injuries
- **ICD codes** are **truncated** leads to a less reliable selection of MAIS3+ casualties. Not use ICDpic and AAAM10 tools. Weighting: 1.06 in case of ICDmap90 or DGT, 1.03 in case of ECIP,1.11 in case of AAAM9

Results

Applying record linkage

WHEN:

- In case the selection of MAIS3+ road traffic casualties is problematic (missing Ecodes)

HOW

Link hospital and police (and possibly other sources) on the basis of variables that are common to in both data sources

Ideally, linkage is based on a unique personal identification number (**deterministic linkage**), but this is rarely available for privacy reasons

When deterministic linkage is not possible, **probabilistic or distance based** linkage is recommend.

Once the linkage is completed, the number of serious traffic casualties recorded in hospital data but not identified as such can be estimated using the **capture-recapture method**.

Methods Comparison

- The **method applied influences** the estimated number of MAIS ≥ 3 casualties.
- **Linked data** is the most reliable method to estimate the number of MAIS ≥ 3 casualties, followed by hospital data alone.
- Each method is subject to **limitations**. The number of serious injury casualties identified should be considered an estimate.
- The biggest limitation for all methods is the **quality of the data** being used.

Conclusions

- All three methods for estimating the number of serious traffic injuries have both **advantages and limitations**. Which method(s) to choose will depend on the context and constraints of each individual country.
- Attempts should be made to access **data of the highest quality possible**.
- Further **harmonisation of methods** over the next years is desirable in order to ensure that the estimated numbers of MAIS ≥ 3 road traffic injuries are comparable across Europe.
- At a European level **institutional collaboration** with Eurostat, WHO and DG-MOVE would improve reporting serious road traffic injuries in Europe.

The team:

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http://www.safetycube-project.eu/

Thank you

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