Measuring serious injuries on European roads

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Minister will bei Verkehrsunfällen Schwerverletzte zählen

Agenda

• About KFV (Austrian Road Safety Board)
• EU focus on serious injuries
• What are serious injuries?
• Current practice in the EU
• SafetyCube recommendations
• Acknowledgements
The KFV has been at the heart of accident prevention since 1959 and is Austria’s leading independent non-profit association regarding the promotion of safety and prevention of accidents. We facilitate research and offer advice and information in the following areas of accident prevention:

- **Road Safety**
- **Home Safety**
- **Leisure Safety**
- **International Project Collaborations**
- **Publikationen**
- **Fachartikel**

The KFV provides professional expertise of the highest scientific level and advises government agencies and private bodies. It plays a key role in various regional and national networks and has established itself as a renowned and innovative project partner.

The KFV takes account of the latest technological developments and social changes. Based on the findings derived from our research, new strategies and measures are adopted. The KFV works tirelessly at reducing accidents and improving the lives of people living in Austria.
Measures & Achievements in Austria, EU

Accidents
Fatalities
Injured
Serious injuries?

Source: http://unfallstatistik.kfv.at/index.php?id=57
Annual number of road traffic crashes, non-fatal and fatal injuries in the EU

Source: CARE (EU road accidents database) or national publications. Last update: May 2016
How to assess injury severity?

• by the **police** at the scene (serious & slight, correct in ≈ 60% of cases)

• by **direct assessment** in the hospital, e.g. through the Abbreviated Injury Scale **AIS** ©

• by **indirect assessment** through the injury diagnoses, e.g. through **ICD to AIS** mapping
DG Move focus on serious injuries

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
What is MAIS3+?

AIS: Abbreviated Injury Scale 123456.7

- 1 Body Region
- 2 Type of Anatomical Structure
- 3/4 Specific Anatomical Structure
- 5/6 Level
- 7 Severity Score

“7” Severity Score (AIS ©)

- 1 Minor
- 2 Moderate
- 3 Serious
- 4 Severe
- 5 Critical
- 6 Maximum

MAIS

- Maximum AIS for an occupant or body region; MAIS>2 = MAIS3+

© AAAM Association for the Advancement of Automotive Medicine
DG Move focus on serious injuries
Options for reporting

- The High Level Group identified **three main ways** Member States can collect data on serious traffic injuries (MAIS ≥ 3):
  1. by applying a correction on police data,
  2. by using hospital data and
  3. 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.
What do we know?

→ 135,000 people seriously injured on Europe’s roads in 2014

→ the majority of those were vulnerable road users, pedestrians, cyclists and drivers of powered two-wheelers

→ while the number of deaths on European roads has fallen dramatically over the last decade, serious injuries seem to have declined at a much slower rate

→ Official targets to reduce road deaths have been in place since 2001, but there is no equivalent for serious injuries

Source: www.tispol.org  Published Sat, 30/04/2016 - 09:59
Annual number of road traffic crashes, non-fatal and fatal injuries in the EU

Source: CARE (EU road accidents database) or national publications. Last update: May 2016
What do we expect?

→ The MAIS3+ new methodology should yield more reliable and comparable data than the old reporting system.

→ In the longer term, the Commission will be able to monitor and benchmark Member State performance.

→ Also, the new data (*) shows that fatal crashes and crashes resulting in serious injury have slightly different characteristics. This will help to see where more work is needed, such as on safety for vulnerable road users or safety in urban areas.

What still needs to be done?

→ 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

→ Complete ongoing research on MASI3+ Guidelines by the EU Horizon 2020 project SafetyCube: www.safetycube-project.eu

Safety CaUsation, Benefits and Efficiency

Funding  EU Kommission / INEA (Innovation and Networks Executive Agency)
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Coordinator  Transport Safety Research, Loughborough University (LOUGH)
Partners  NTUA, BRSI, SWOV, KFV, IFSTTAR, CHALMERS, Institute of Transport Economics, ERF, CTL, ASPB, Medical University of Hannover, AVP, LAB, CEESAR, CIAUT, DEKRA Automobil GmbH
SafetyCube survey results
Current practice in the EU

- 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

Source: State of data collection on serious traffic injuries across Europe (June 2016). [http://www.safetycube-project.eu](http://www.safetycube-project.eu)
SafetyCube Recommendations - Correcting police data

**WHEN**
- In case there is no hospital data for the entire country and/or every year
- In case hospital data becomes available at too late a 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.
**SafetyCube Recommendations**

- **Hospital data**

**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: Soo-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)
SafetyCube Recommendations - Hospital data

Other issues 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
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.
SafetyCube Conclusions

• A common definition is a very good first step
• Hospital data of good quality is essential
• 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
• 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

Practical guidelines for the registration and monitoring of serious traffic injuries
Deliverable 7.1
Thank you! The SafetyCube WP7 Team

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