SafetyCube

Survey on MAIS3+ assessment (EU & EFTA)

Practical guidelines for the registration and monitoring of serious road injuries

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IRTAD meeting 13 October 2016, Rome

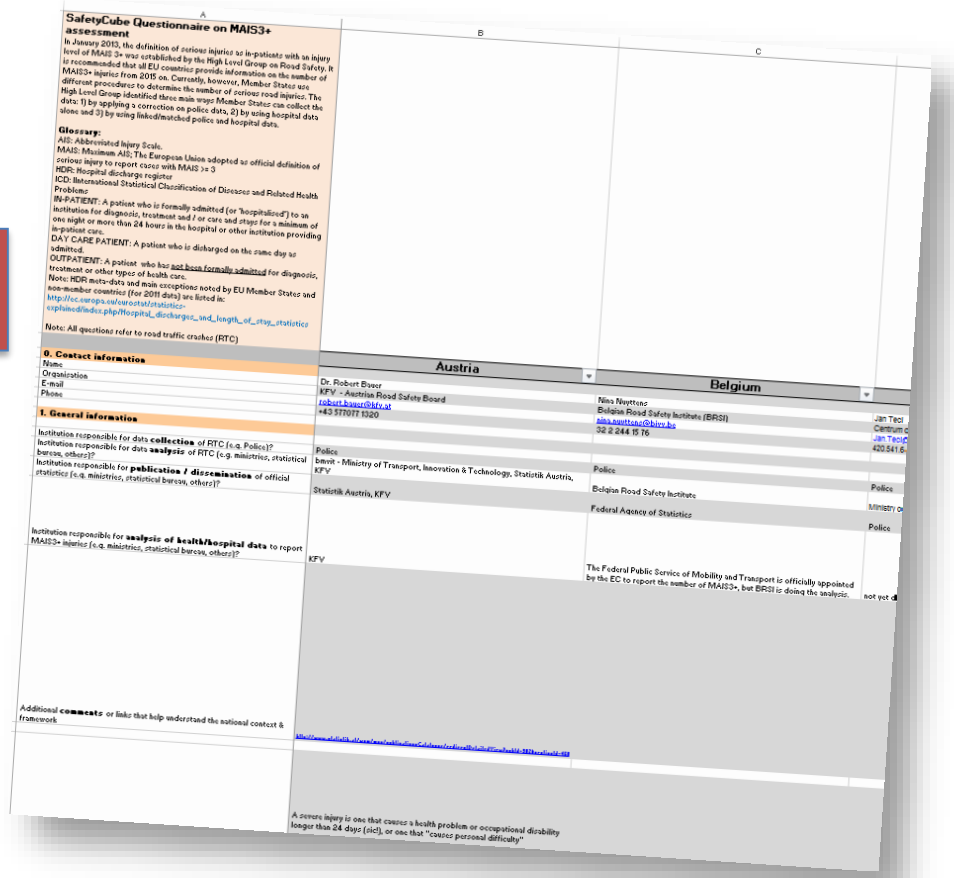
Co-funded by the Horizon 2020
Framework Programme of the European Union

Data collection (EU & EFTA)

- Overview of data and procedures that are applied across EU Member States

- Building on a survey by

FERSI Road Safety Research



The SafetyCube data collection sheet

Questions in detail 1

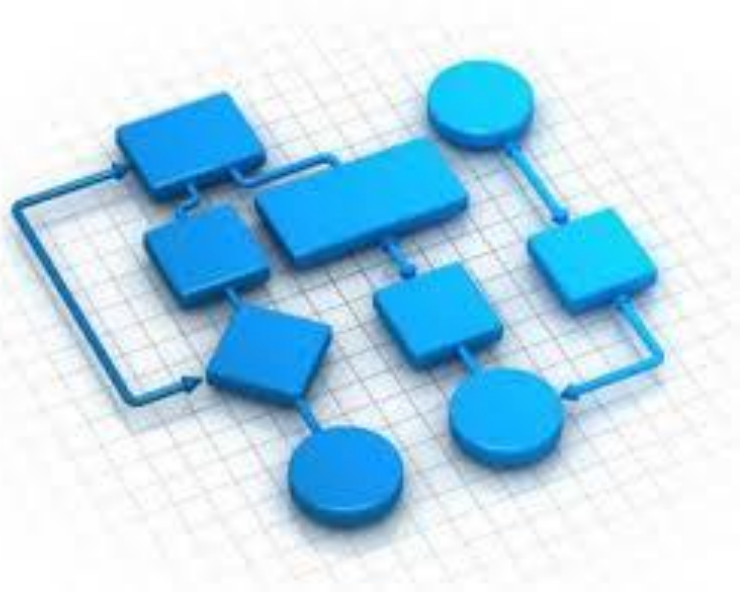
Responsibilities in the police & health data sector

- Collection
- Analysis
- Publication

Questions in detail 2

MAIS3+ methodology

- Which of the method proposed by EC is in use?
- Changes in methodology planned?



Questions in detail 3

Information of health/hospital data

- Data sources
- Inclusion criteria (e.g. outpatients, day care patients, re-admissions, scheduled admissions, fatalities within 30 days)
- ICD version
- Nr. of diagnoses & nr. of digits
- Conversion algorithm
- Proportion of failed transformations (ICD > MAIS)
- ICD injury codes
- Codes on external causes
- …

Questions in detail 4

Details on EC methods 1, 2, 3

1. Correction coefficient on police data
   - *Estimation & application of coefficient*
   - *Available by age, gender, road user type, …*
2. Use of hospital data alone
   - *Description of method*
   - *Representative?*
3. Link police / hospital data
   - *Which databases?*
   - *Method?*
   - *Assessment of underreporting?*

Questions in detail 5

Crash & Serious injury figures

- Nr. of fatalities
- (serious) injuries
  - *Police*
  - *MAIS3+*
- Gender?
- Age groups?
- Different MAIS levels available?

Responses

- From ~~23~~ **27** countries
- Missing: ~~*IE*~~, ~~*LV*~~, *LT*, *MT*, ~~*RO*~~, *SK*, ~~*SE*~~, *IS*

FERSI Road Safety Research

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irtad International Traffic Safety Data and Analysis Group

Care Experts

MAIS3+ data availability: 17!

	MAIS3+ estimationscurrently or soon available?	For which years are MAIS3+ data available?
Austria	**yes** (2016)	2014
Belgium	**yes** (2015)	2011-2014
Bulgaria	No	-
Croatia	No	-
Cyprus	**yes** (soon)	-
Czech Republic*	**Yes**	2014
Denmark	No	-
Estonia	No	-
Finland	**yes** (2015)	2010 & 2011, 2014
France	**yes** (preliminary figures)	2006-2014
Germany	**yes** (2015)	2014
Greece	No	-
Hungary	No	-
Ireland*	**Yes**	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
United Kingdom	**yes** (2016)	1999-2011 (soon up to 2015)
Iceland	No	-
Norway	No	-
Switzerland	**yes** (2016)	2011-2014

Methods and changes …

	1 Correction coefficient on police data	2 Use of hospital data alone	3 Using linked / matched police and hospital data	Other Methods	Changes planned?
Austria	(2015)	(from 2016)			Austria seeks to implement direct linking (mid-term)
Belgium	(from 2012)	(2008-2011)			Short term: refine method 1; long term: direct linking
Bulgaria	-	-	-	-	-
Croatia	-	-	-	-	-
Cyprus	-	-	-	-	-
Czech Republic				Direct AIS coding (source: FERSI Report)?	
Denmark	-	-	-	-	-
Estonia	-	-	-	-	-
Finland			x		no
France				A model is constructed on linked casualties between the Rhône police data and the Rhône road trauma registry >> generalisation to France	Mid-term: extend the Rhône road trauma registry to a wider geographical coverage
Germany				In-depth accident data (GIDAS) and hospital data of very seriously injured RTC victims (TraumaRegister DGU®) used to estimate the number of serious injuries >> generalisation to Germany	Ongoing optimisation
Greece	-	-	-	-	-
Hungary	-	-	-	-	-
Ireland		x			Mid-term: statistically match police and hospital data to estimate the level of underreporting (Source: FERSI Report).
Italy		x			no
Latvia	-	-	-	-	-
Lithuania	-	-	-	-	-
Luxembourg	-	-	-	-	-
Malta	-	-	-	-	-
Netherlands			x		change from ICD9/AIS1990 to ICD10/AIS2008
Poland		x			improvement of reliability of methodology sought
Portugal		x			mid/long term: linking police and hospital data
Romania	-	-	-	-	-
Slovakia	-	-	-	-	-
Slovenia			x		no
Spain		x			no
Sweden		x			
United Kingdom	UK (derived from hospital data from England)	England (Hospital data not available for rest of UK)			Work in progress. methodology isn't finalised
Iceland	-	-	-	-	-
pNorway	-	-	-	-	-
Switzerland			x		no

Details in hospital data …

- *Outpatients*
- *Day care patients*
- *Re-admissions*
- *Scheduled admissions*
- *ICD version*
- *ICD nr. of digits*
- *Nr. of diagnoses*
- *Conv. algorithm*
- *Failed transform.*

	Hospital data include …									
	Outpatients (non-hospitalised patients)	Day care patients (no overnight stay)	Re-admissions	Scheduled (non-urgent) admissions	Fatalities within 30 days	ICD version used	How many ICD digits are used to derive AIS?	Number of diag-noses available	Conversion algo-rithm	Share of failed transformations ICD > MAIS
Austria	no	yes	no	yes	no	ICD10	4	1	AAAM	19%
Belgium	no	no	no	yes	yes	ICD9-CM	5	1	ICDPIC	0.4%
Bulgaria	-	-	-	-	-	-	-	-	-	-
Croatia	-	-	-	-	-	-	-	-	-	-
Cyprus	-	-	-	-	-	-	-	-	-	-
Czech Republic	-	-	-	-	-	-	-	-	-	-
Denmark	yes	yes	y/n	yes	yes	ICD10	-	-	AAAM	-
Estonia	-	-	-	-	-	-	-	-	-	-
Finland	yes	yes	yes.	yes	no	ICD-10	5	All	AAAM	unknown
France	yes	yes	Yes	?	no	Direct coding to AIS	n/a	n/a	n/a	n/a
Germany	no	no	No	no	no	Direct coding to AIS	n/a	n/a	n/a	n/a
Greece	-	-	-	-	-	ICD9	-		-	-
Hungary	no	no	Yes	yes	yes	ICD10	5	?	-	-
Ireland	-	-	-	-	-	-	-	-	-	-
Italy	no	no	No	no	no	ICD-9-CM (2002)	5	1	AAAM	8%
Latvia	-	-	-	-	-	-	-	-	-	-
Lithuania	-	-	-	-	-	-	-	-	-	-
Luxembourg	-	-	-	-	-	-	-	-	-	-
Malta	-	-	-	-	-	-	-	-	-	-
Netherlands	no	yes	no	yes	no	ICD10	5	10	ICDmap90	~0%
Poland	no	yes	yes	Yes	no	ICD10	4	1	AAAM	21%
Portugal	no	no	yes	no	no	ICD9-CM	4	All	AAAM	0%?
Romania	-	-	-	-	-	-	-	-	-	-
Slovakia	-	-	-	-	-	-	-	-	-	-
Slovenia	no	yes	no	yes	yes.	ICD10	4	20	AAAM	unknown
Spain	no	no	no	no	no.	ICD9-CM	5	14	AAAM	1.6%
Sweden	-	-	-	-	-	-	-	-	-	-
UK	no	yes	no	no	no	ICD10	5	All	AAAM	6%
Iceland	-	-	-	-	-	-	-	-	-	-
Norway	-	-	-	-	-	-	-	-	-	-
Switzerland	no	no	no	no	no	ICD-10-GM	5	9	AGU	6%

External causes

- *E/V-Codes to determine road accident*
- *Proportion of missing external causes*

	ICD external causes	Proportion of unknowns with respect to external causes among all injuries
Austria	Austria-specific codes for external causes: only two codes for all traffic accidents (work or non work-related: U11, U12)	35%
Belgium	E810-E819, E826, E827, E829	16%
Bulgaria	-	-
Croatia	-	-
Cyprus	-	-
Czech Republic	-	-
Denmark	-	-
Estonia	-	-
Finland	external causes in the hospital data are not used to determine involved in road traffic accidents	undetermined
France	n/a	n/a (would be 80% if hospital database were used)
Germany	n/a	n/a
Greece	-	-
Hungary	V00-V89	5%
Ireland	-	-
Italy	E800-E819, E826	unknown
Latvia	-	-
Lithuania	-	-
Luxembourg	-	-
Malta	-	-
Netherlands	Conversion V00-V89 back to ICD9 and selection E810-E816, E818-E819 + E826, E827, E829	5%
Poland	V02-V04, V09, V12-V14, V20-V79, V82-V87, V89	38%
Portugal	E810-E819, E826	unknown
Romania	-	-
Slovakia	-	-
Slovenia	V00 - V89	0% (coding external causes is mandatory)
Spain	E810-E819, E826	17.5%
Sweden	-	-
United Kingdom	V01 to V89, excluding V81	unknown
Iceland	-	-
Norway	-	-
Switzerland	n/a	n/a

Fatalities vs. serious injuries

- *Substantial variation*

	Fatalities 2014	Serious Injuries MAIS ≥ 3 2014	Proportion between MAIS ≥ 3 injuries and fatalities
Austria	430	1410	3.3
Belgium	727	2979	4.1
Bulgaria	901		
Croatia	308		
Cyprus	45	83	1.8
Czech Republic	688		
Denmark	182		
Estonia	78		
Finland	229	519	2.3
France	3650	25500	7.0
Germany	3377	14645	4.3
Greece	879		
Hungary	626		
Iceland	4		
Ireland	193	343	2.0
Italy	3381	14943	4.4
Latvia	212		
Lithuania	267		
Luxembourg	35		
Malta	13		
Netherlands	570	7500	13.2
Norway	147		
Poland	3357	1859	0.6
Portugal	638	2046	3.2
Romania	1818		
Slovakia	321		
Slovenia	108	213	2.0
Spain	1680	6613	3.9
Sweden	270	1192	4.4
Switzerland	243	2899	11.9
United Kingdom	1854	5070	2.7

In summary: big spread!

- **Varied methods to determine MAIS3+** across the countries
  - *1: AT (formerly), BE (based on method 2 for years 08-11), UK*
  - *2: AT (now), NL, PT, ES, England,*
  - *3: FIN, SLO, CH,*
  - *Other: FR (combination of 1 and 3 and 4), DE (GIDAS)*
- **Number of diagnoses**: 1 (AT, BE, IT) .. 9/10/14/20.
- **Number of digits**: 4 (AT, PL, PT, SLO) .. 5
- **Conversion algorithm**: AAAM!, ICDPIC (BE), ICDmap90 (NL), AGU (CH), Trauma 1 (CY)
- **MAIS3+ per fatalities**: 0.6 (PL) to 13.2 (NL)
- Several countries are only in early phases of the process

SafetyCube Serious Injuries Workshop The Hague

Towards 28 + 4 countries: SafetyCube Guidelines!

SafetyCube

Practical guidelines for the registration and monitoring of serious road injuries

Co-funded by the Horizon 2020
Framework Programme of the European Union

10/25/2016

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:

I

A survey asking for current practices in all EU member states

II

Current practices and experiences from a number of countries

III

Sensitivity analyses to analyse consequences of methodological differences

Methods II

II

Current practices and experiences from a number of countries

Application of **correction factors** in Belgium, France and Austria

Inclusion and exclusion criteria using Hospital data from Spain and the Netherlands

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

Record linkage in France, the Netherlands and Slovenia

Methods III

III

Sensitivity analyses to analyse consequences of methodological differences

Application of all three methods to data from the Netherlands

Application of methods 1 and 2 to data from Austria

Sensitivity analyses concerning in/exclusion criteria and selection of MAIS3+ casualties

Guidelines: access to hospital data

- Anonymized hospital data should be available for research or statistical purposes
- EUROSTAT(?)
- Stronger inter-sectorial collaboration between health and transport sectors, both national and international

Guidelines: correction factor 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.

Guidelines: use 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)

Guidelines: use 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.
- **Different versions of AIS:** correction factor when injuries are coded in AIS1990 or AIS1998 instead of AIS2005 or AIS2008: 0.89
- **ICD to AIS recoding tool** applied. No weighting factors could be determined. 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 diagnoses:** 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
- **Truncated ICD codes** result in a less reliable selection of MAIS3+ casualties. Don't use ICDpic and AAAM10 tools in case of truncated codes. Weighting: 1.06 in case of ICDmap90 or DGT, 1.03 in case of ECIP,1.11 in case of AAAM9

Guidelines: 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 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**.

Comparison of different methods

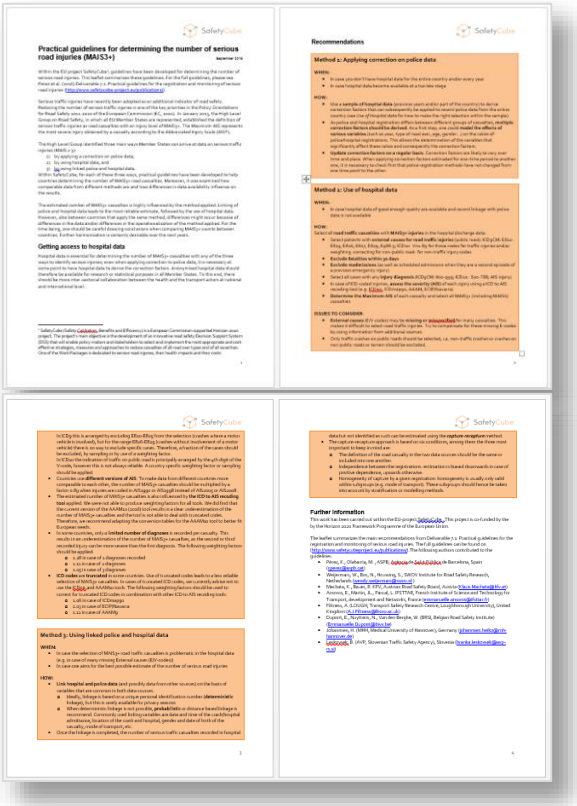
- Linking of police and hospital data results in most reliable estimate, followed by use of hospital data
  - *In case you apply correction factors to police data, you should be alert to changes in police registration*
- Also differences due to different in/exclusion criteria and differences in the selection of MAIS3+ casualties
  - *Missing E-codes*
  - *AIS version*
  - *ICD to AIS recoding tool applied*
  - *Number of diagnoses taken into account*

Conclusions

- A common definition very good, but only first step
- Hospital data of good quality is essential
- As methodologies differ between countries and methodology affects MAIS3+ estimate one should be careful when comparing estimates between countries
- Further harmonization of methods is desirable

The report

The leaflet



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Thank you!