

Some Considerations on Serious Road Traffic Injuries

P. Holló, D. Kiss

**Széchenyi István University, H-9026 Győr, Egyetem tér 1.
Phone: +36 96 503 400, fax: +36 96 503 400
e-mail: hollo@sze.hu; kdiana@sze.hu**

Abstract: In the EU in 2011 the number of serious road injuries was more than 250,000 and the death tolls were 28,000. In the last period (between 2001 and 2011) the number of those who lost their lives as a result of road accident decreased ordinarily by 43 percent in the EU countries on average, whereas that of the seriously injured by 36 percent – in the light of these countries' own definitions differing from one another. The MAIS3+ is the adopted common EU definition, that is all 3-grade or above values according to the Maximum Abbreviated Injury Scale (MAIS). Although the definition seems professionally justified, in our view further clarification is necessary. For the years 2014 and 2015 the EU has already drawn up specific tasks for the member states. Since the Baltic States were particularly successful in the field of road safety in the last 10 years, it is certain that in the future they can do a lot in order to have the number of serious road accident victims significantly reduced and also internationally compared and assessed.

Keywords: road safety, serious injuries, MAIS3+

1. Introduction

As a consequence of road accidents the number of people killed was 28.126 and that of people injured was 1.432.235 in the 28 member states of the EU in 2012. For every death on Europe's roads there are an estimated 4 permanently disabling injuries such as damage to the brain or spinal cord, 8 serious and 50 minor injuries. [5].

In the EU the road accident is considered as number one mortality cause in the age group of 45 years and younger ones. Road accident is similarly the cause of most hospitalizations.

Beyond human sufferings injuries cause tremendous loss for the national economy, too. In the EU this is estimated to 2% of the GDP. In 2012 this amount was 250 billion Euro. In worldwide dimension, according to WHO data, this is approximately equal to 580 million dollars/year. [9].

On the priority list the most frequent serious injuries are the head and brain impairments then follow the traumas of the lower limbs and the vertebral column. Mainly vulnerable road users (pedestrians, cyclists, motorcyclists) or the most vulnerable age groups (elderly people, children) are the victims of such injuries.

Such kind of injuries can be experienced on every road types, however most of them occur in built-up areas and their victims are the vulnerable road users. Mainly because of higher speed, injuries are even more serious outside built-up areas.

In the last period (between 2001 and 2011) the number of those who lost their lives as a consequence of road accident decreased by 43 percent in the EU countries on average, whereas that of the seriously injured by 36 percent [4].

The Figure below illustrates the change in EU fatalities between 2001 and 2013 [5].



Figure 1: The number of road accident fatalities in the EU between 2001 and 2013[5]

Comparing the two data there are many who note that while in the period in question in the EU on average the number of fatalities decreased by 43%, that of the seriously injured by 36% “only”.

“Only”, in our opinion is unjustifiable because one must not forget that several passive safety devices (e.g. the safety belt, the airbag, etc) are the cause different kinds of injuries while saving the life of those involved in accidents.

To put it in another way: the “price” of survival mostly involves the endurance of the consequences of some injury.

To set a more moderate, numerical target in order to change the number of seriously injured seems to be more realistic.

In most highly motorized countries a dramatic decrease in the number of accident fatalities can be observed, i.e. primarily it was not the probability of the occurrence of road accidents with personal injury that decreased but the probability of survival increased. In other words: it seems that the development of passive safety is more successful than that of the active safety. (So-called “risk compensation” is likely to have

a role in this which means that the devices meant to enhance active safety – while generating a false sense of safety in the driver – unfavourably affect the driver’s behaviour and lead to higher levels of risk-taking.)

Such trends can be observed in Hungary, too. (See Fig. 2) One can recognize the dramatic decrease in the number of road fatalities (passive safety) but only a small decrease in the number of personal injury accidents (active safety).

No doubt those active safety devices are very important, too, which – even without the driver’s knowledge – support accident prevention and, as a consequence, the avoiding of serious injuries as well. Such an active safety device is for example the electronic stability programme (ESP) which by separate braking of different wheels is responsible for correcting the stability loss of the vehicle (under- or over-steering) in critical situations.

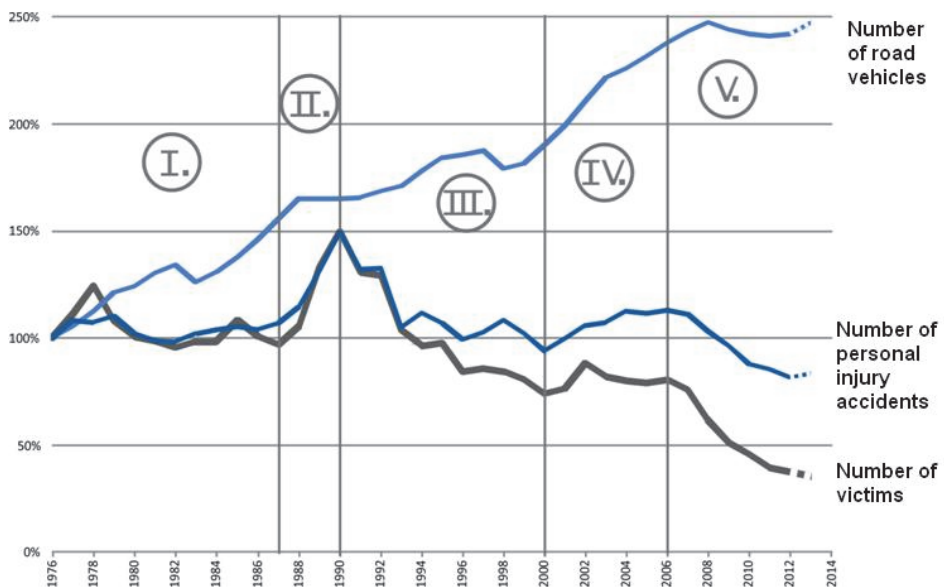


Figure 2: Number of road motor vehicles, of personal injury accidents and the victims killed as a consequence between 1976 and 2012 (The main road safety phases)

2. Definitions in Hungary

The EU has recognized the importance of serious injuries however, the absence of a uniform EU definition made impossible the setting of a common numerical target.

Before describing the development accomplished in this area a brief overview of the domestic situation is given below.

Until 2011 according to national accident statistics those injured were considered as serious cases whose recovery was beyond 8 days.

The experts of accident analysis have already previously found that this 3-degree scale (fatal, serious and slight injuries) is completely improper for the appropriate classification of traumatic injuries, because, for example a person already entirely healthy on the ninth day was considered as seriously injured as the one who was forced to end his life in a wheelchair.

The AIS scale (Abbreviated Injury Scale) [1] which makes a more suitable and a more relevant comparison possible has been used long ago in the domain of public health nonetheless that its application requires high level medical knowledge.

Before dealing with this, one has to see how the definitions of the accident statistics changed.

As of 2011 the Hungarian Central Statistical Office (KSH) adopted the following definitions [7]:

Serious injury: means an injury suffered in the course of an accident, and which

- requires hospitalization for more than 48 hours within seven days as of the date of the injury, or
- causes some fracture, with the exception of the fractures of fingers, toes and nose, or which
- involves lacerations causing severe haemorrhage or nerve, muscle or tendon damages, or
- causes damage to the internal organs, or
- involves second or third degree burns or harms as a result of which more than 5% of the body surface area burns.

This definition – which has been introduced in the spirit of the harmonization of the different transport modes – raises doubts on the one hand, in connection with the homogeneity of time series, and on the other hand, with respect to data's verification.

Not to mention the fact that one cannot expect the police officer visiting the scene of the accident to judge the outcome in a professional way, since no such training has been obtained.

Despite the change in definition no significant change appears in the decreasing tendency, so in addition to various definitions of terms the number of injuries seems to be comparable without correction factors. (Figure 4)

Causing a road traffic accident with serious injury is considered as a criminal offence, consequently it is the subject of a more severe judgement and the administrative proceedings related to the case differ also from the milder cases.

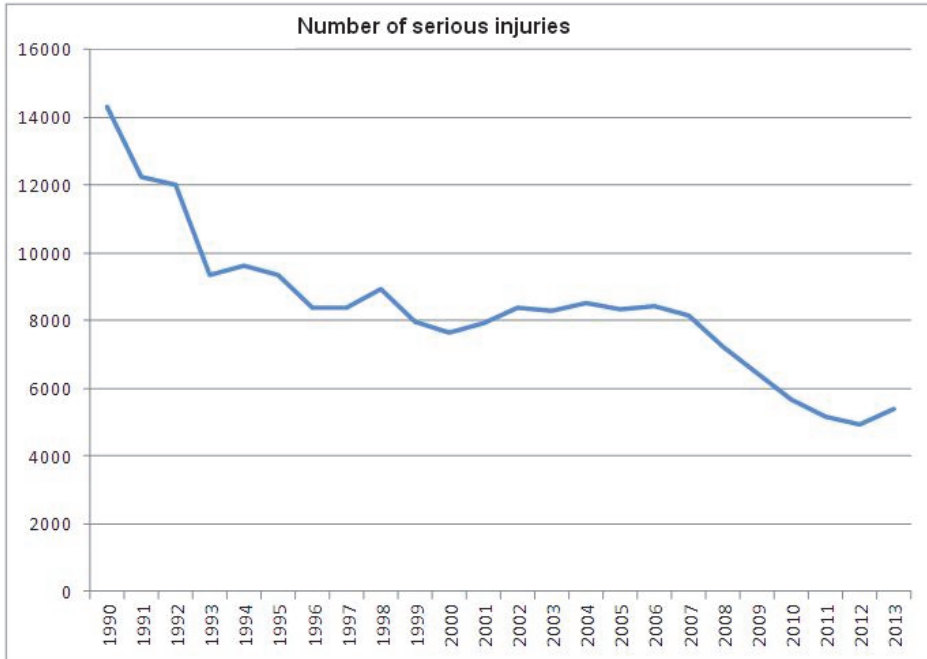


Figure 4: Number of serious injuries resulting from road accidents between 1990 and 2013 [5]

3. Definitions used in other countries

It is just the absence of a uniform definition that makes difficult the international comparison of the data related to serious injuries and the definition of the numerical EU target.

This is one reason why the international comparison of road safety is still limited to comparing the data of road accident fatalities, because the definition of the fatally injured (the so-called 30-day definition) is widely uniform. In case of some countries where this is not used, its lack can be solved by the application of the so-called correction factor.

Some examples to illustrate different definitions of the seriously injured:

The period of hospitalization:

In most countries 24 hours

In Poland: 7 days

Type of injury:

Sweden: a person who has suffered some fracture, contusion, rupture, severe cut, shock, or internal injury.

Incapacity:

Austria, Switzerland.

Time of recovery:

Japan: more than 30 days.

To compare the data of different countries is further complicated by the circumstance that there is a significant discrepancy between the statistical data which are based on police investigation on the spot and the data recorded in the medical databases. This is the so-called underreporting, which is due to the fact that in the event of serious or light injuries in some cases the participants do not call police. According to some studies only about 70% of the data relating to serious injuries are recorded in the databases of the police. [6]. From the point of view of data deficiency, too, the figures relating to fatal injuries can be considered as the most complete and reliable ones. Not to mention the fact that these are the most tragic consequences of road accidents.

The uniform definition could eliminate the differences manifested in data deficiency [2].

The first step taken in this direction has been made by IRTAD (International Road Traffic and Accident Database, the accident and road traffic database of the OECD countries) with the introduction of the definition of the “hospitalized person”. This referred to injured who spent minimum 24 hours in hospital. [3]. (Today you may already know that besides its benefits it wasn’t precise enough and did not really spread).

It seems increasingly that only a reliable, professional national public health database can provide a complete picture on the data relating to the injured of the road accidents.

4. Brief information about the AIS scale

To encode the severity of injuries the following codes are used in the AIS 2005 [1] updated in 2008 (Table 1.):

Table 1: AIS code and description

AIS code	description
1	Minor (slight, insignificant)
2	Moderate (moderate)
3	Serious (serious)
4	Severe (very serious)
5	Critical (dangerous, life-threatening)
6	Maximal (fatal, life-incompatible)

The common EU-wide definition that until now has been adopted by all organizations (the EU High Level Group, IRTAD, ETSC, etc.) is the

MAIS3+,

i.e. all number 3 values or those beyond this according to the Maximum Abbreviated Injury Scale (MAIS).

In our view this definition is not precise enough

On the one hand, it includes the AIS6 value, too, which practically means those who died on the spot. Thus, there is an inconsistency (overlapping) in the definition and at least a theoretical risk that the fatal victims are taken into account twice.

On the other hand, the interval is open from one side and closed from the other side which is inconsistent in our opinion.

We consider that the precise definition of serious injuries can range from MAIS3 to MAIS5.

Based on the above the EU has defined the following tasks:

- In 2014 the member states have to make arrangements for being prepared for the use of the new definition
- In 2015 the member states have to provide information concerning the first, serious injury data

Subsequently the EU sets a numerical target and determines a strategy for reducing the number of serious injuries between the years 2015 and 2020. The Forum of European Road Safety Research Institutes (FERSI) established a working group called the “Severely injured road users in crash statistics” when recognized the challenges of the tasks and the existing gaps of the research. Dr. Péter HOLLÓ is member of this group.

According to our information the EU received the so-called “position paper” well and is ready to cooperate with FERSI in solving the existing problems in the field.

It’s definitely worth mentioning that an ongoing EU project is just aimed at creating a uniform European system in order to record the injured persons’ data in a professional and reliable way [10].

This is the JAMIE (Joint action on monitoring injuries in Europe) project, which will be completed by mid 2014. As we are informed not even the suggested whole data content (FDS) will include the data describing the injury’s severity. The National Health Development Institute is representing Hungary in the consortium.

The EU High Level Group deems that the following solutions are feasible to resolve the outlined tasks:

- Further collection of police data, application of correction factors to estimate the real number of the injured,
- Collection of the data at hospitals using the MAIS codes.
- Linking the two data sources (police and hospitals).

In our opinion the first solution may only be a temporary one and determining the correction factors must be based on a representative sample. It goes without saying that data recorded by the police forming the bases of numerous activities are still very much needed. (Limitations: underreporting, not always precisely defined accident causes, etc.) This may be the reality in the near future.

The second solution requires the establishment of the collection system of the national health data and professional application of the AIS codes. To our knowledge this cannot

be expected in the near future in Hungary. Without the collection of former police data this is not sufficient either.

The third option gives the optimal long-term solution providing the most complete picture about the seriously injured. In most countries linking of the two datasets cannot be done by using the name of the injured person (protection of personality rights) which complicates this process.

Close co-operation and common work of the police and hospitals (moreover, of the polyclinics and family physicians) are indispensable for preparing precise statistics.

No “medical” accomplishment can be expected from the police officer arriving at the scene of an accident to determine on the basis of what has been witnessed the severity of an injury. While having an almost permanent contact with the police, neither a doctor’s working time nor the intensive stress of work allow to harmonize the number and severity of the injuries. Co-operation between these two work-fields needs necessarily the development of such an information background that would allow the simple, fast but the more accurate recording.

Currently there are only a few EU member states that have the data meeting all the requirements (Sweden, the Netherlands, Austria, etc.)

In some countries helped by the appropriate algorithms the ICD codes are transformed into AIS, or MAIS codes, which is also a possible solution [8].

5. Challenges

The EU expectations for 2014, such as the new uniform definition, too, seem somewhat premature. See some challenges which can be outlined already now:

- The definition should be clarified.
- Development of a national public health database containing also the severity data needs much time and expenditure. It requires the increased co-operation of the ministry of health and home affairs.
- It is not decided yet whether the overburdened health workers should be involved in the encoding process, or is there any other idea to solve the problem. (The application requires a high level expertise.) Universities, research institutes could come into question.
- The quantified target for reducing the number of seriously injured can be developed only if it is known already the real number of the occurrence of serious injuries.

Overall it may be concluded that co-ordinated measures are needed which have to cover the division of responsibilities, collaboration, legislation, enforcement and even many other areas.

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