Maladies chroniques et traumatismes

Transport-related deaths in an enlarged European Union

Objective

The objective of this monograph is to provide producers and users of death statistics with a practical tool to help study deaths related to **transport**.

Methods

Mortality data produced by health authorities of 33 European countries[1] and compiled yearly by Eurostat[2] were used. Depending on their availability, data were used to describe time trends, geographical distributions and demographical risks.

By reviewing the literature, the international forum for mortality specialists[3], the revision and update process of the International Classification of Diseases (ICD) and the answers of a questionnaire filled in by death statistics producers of 36 European countries[4] in the framework of the **Anamort** project[5], it has been possible to:

- describe the limits of the observed differences
- elaborate recommendations for a better use of available data
- elaborate recommendations for a better production of future data

Definition of deaths related to transport

Death from transport accident was considered as any death reported to Eurostat with an underlying cause of death coded V01 to V99 (table 1) in the 10th revision of ICD (ICD-10).

Deaths due to "all transport" incident whatever the intent were processed including in addition of deaths from transport accident, suicide by crashing of motor vehicle, homicide by crashing of motor vehicle, crashing of motor vehicle from undetermined intent and sequelae of transport accidents.

Definition of indicators used

The number of deaths for each group of underlying causes of death (UCoD) was the one transmitted by the countries' national authorities to Eurostat for a given year. Aggregation of the number of deaths for the European Union (EU) was made by Eurostat, using the last available data for a given year. Crude death rate (CDR) was obtained by dividing the number of deaths by the last estimate of the population available in Eurostat (for a given age group if age specific crude death rate was computed). Age-standardised death rate (SDR) was computed by direct standardisation, using the 1976 European population. The potential years of life lost before 75 years-old (PYLL75) due to a given cause were calculated for each age group by multiplying the number of deaths related to this cause by the difference between age 75 and the mean age at death in each age group. Potential years of life lost were the sum of the products obtained for each age group. Proportions of PYLL75 were calculated by dividing the PYLL75 due to a given cause by the total amount of PYLL75 due to all causes of death. Indicators were produced at country level, for all countries of EU15[6] or EU25[7]. For other groups of countries, estimation of a given indicator was calculated as an average of this indicator at country level weighed by the proportion of its population among the group.

Situation regarding deaths related to transport in Europe

The number of deaths from transport accident in EU25 was 46,676 in 2005, which represents 20.3% of deaths due to external causes. SDR for transport accident was 9.5 for 100,000 inhabitants in 2005, among the 25 countries of the European Union. Variations between 1.6 and 29.1/100 000/year according to the countries were observed in Europe (Figure 1).

A west-east gradient was observed, with the highest SDR by transport accident observed in Cyprus, Lithuania, Latvia, Romania, Greece, and Poland.

Regardless of age, the CDRs by transport accident for men were higher than for women (Figure 2). The risk of death by transport accident was 3.4 times higher among men (average for EU25 in 2005). In 2005 among EU25 countries, victims were observed among the elderly (65 years-old and more) in 25% of the cases. The highest CDR was observed among people of 15 years-old and more (maximum for the 20-24 years-old age group with 19.2/100 000 in 2005). There was no clear association of risk of death and age after the age of 15 years.

The SDR has decreased by 19% between 2000 and 2005 (from 11.7 to 9.5/100,000/year) in the European Union of 25 countries (Figure 3). This trend was also observed over a longer period in the European Union of 15 countries. The 10 new Member States, mostly in

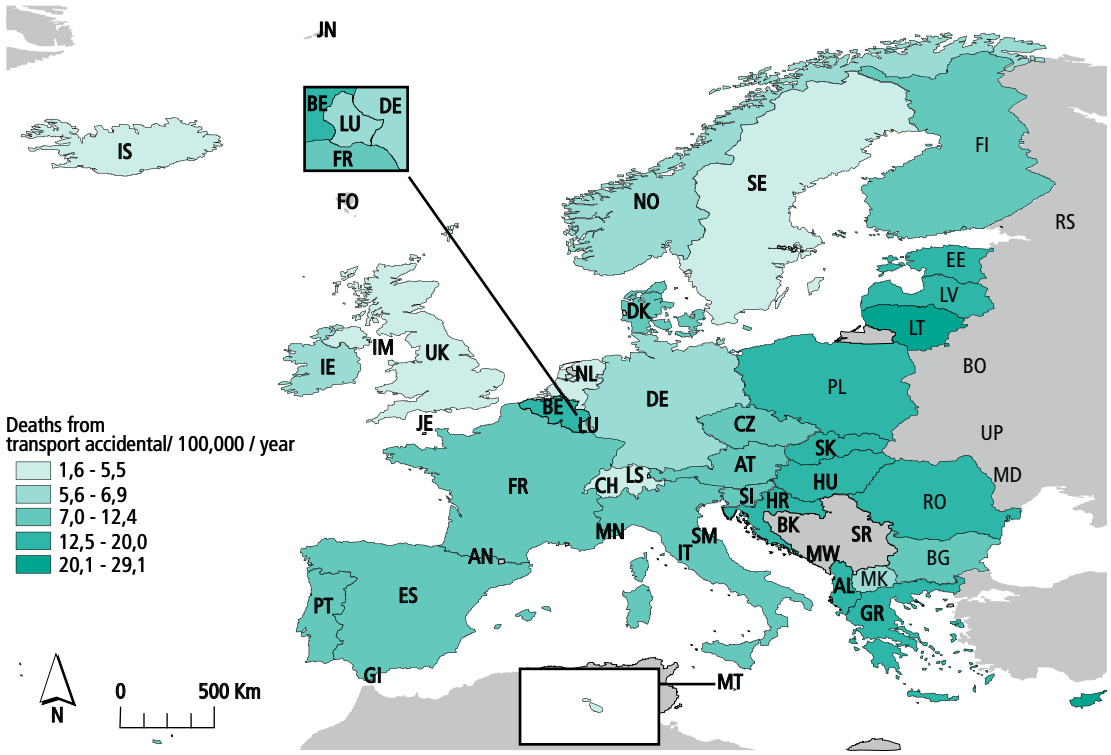
1. *Included the 25 Member States of the European Union before 2007, Albania, Bulgaria, Croatia, Iceland, Macedonia, Norway, Romania and Switzerland.*
2. *http://epp.eurostat.ec.europa.eu.*
3. *www.nordclass.uu.se/index_e.htm.*
4. *33 above mentioned countries, Bosnia Herzegovina, Serbia and Turkey.*
5. *www.invs.sante.fr/surveillance/anamort.*
6. *EU15 comprised the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.*
7. *EU25 comprised EU15 and the following 10 countries: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovak Republic, and Slovenia.*

Eastern Europe, explained that the increase in death rates by transport accident in the European Union (EU25 versus EU15) was due to higher incidence rates in these countries (Figure 3).

In 22 countries[8], it was possible to obtain statistics on "all transport" (whatever the intent was, see table 1) in 2005. Non accidental transport accidents represented 0 to 5% of all transport accidents (1% on average for all these countries).

In EU25, deaths from transport accident were responsible for 33% of the PYLL by external causes of death. The highest impact was among people between 15 and 29 years-old (Figure 4).

Figure 1 Age-standardised mortality rate by transport accident in Europe in 2005*



** Owing to missing data for 2005, the map included data for 2004 for Albania, 1998 for Belgium, 2001 for Denmark and 2003 for Italy.*

Figure 2 Crude rates of mortality by transport accident by gender and age group in the European Union (25 countries) in 2005 – logarithmic scale

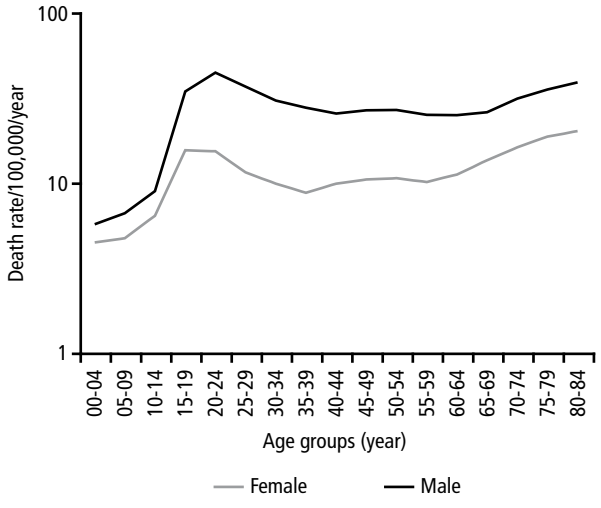
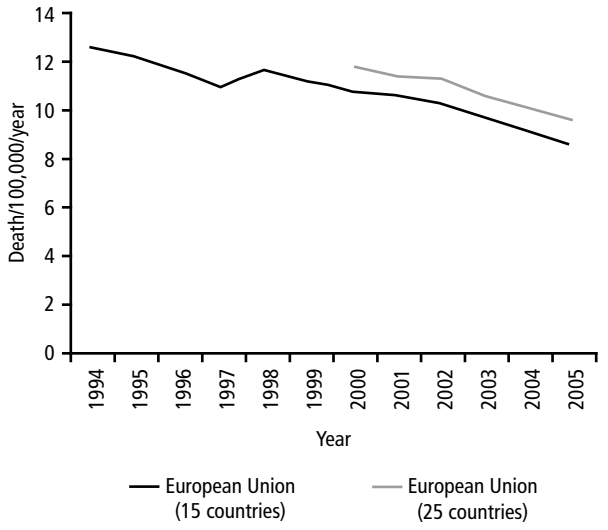
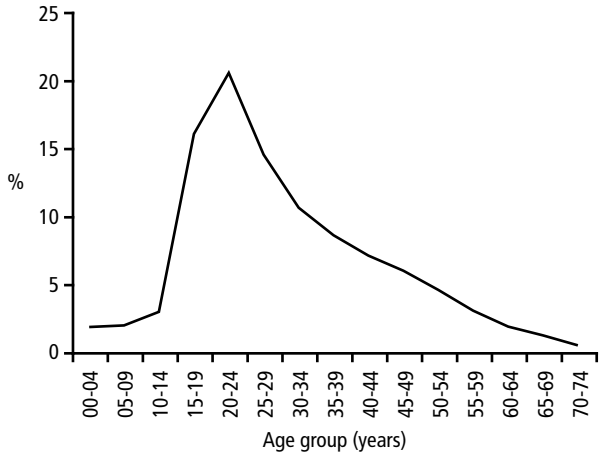


Figure 3 Trends in age standardised deaths by transport accident in the European Union



8. *Austria, Croatia, Cyprus, Czech Republic, Estonia, Metropolitan France, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Macedonia (the former Republic of Yugoslavia) Malta, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, and Switzerland.*

Figure 4 Distribution of potential years of life lost by transport accident in the European Union (25 countries) by age group



Interpretation and limitations of observed differences in deaths by transport accident in Europe

Misclassifications of deaths from transport accidents due to inappropriate selection of underlying causes of death were described by half of the 36 countries questioned during the Anamort project. A combined effect of these misclassifications was considered as leading to underestimation of the magnitude of the deaths due to transport accidents in most of these countries.

Inclusion or not of non-residents dying in a given country and inversely, residents dying abroad were considered as a source of bias for assessing deaths from transport accident. This might have a major impact in small countries due to large migratory flux as transport accidents were the main cause of external death when travelling or living abroad.

Less frequently, overestimations of deaths by transport accident have been described in case of non-identified suicide by car crash.

Indicators used covered all type of transport accidents (road, traffic or not, sea, air, train). Complexity and differential use of the 4th digit of ICD codes according to countries may bias estimation of road traffic accidents, which may be a usefull indicator for public health strategies.

Analytical recommendation to improve comparability of time trends (for statistics users)

In order to improve the data coverage, administrative databases on road accidents (e.g. police, ministry of transport, insurance companies) should be compared/linked with mortality databases (after considering confidentiality issues for linkage).

When comparing data sources, differences in definitions should be considered (e.g. in general, police do not consider deaths due to traffic accidents if the death occurred more than 30 days after the accident).

Certifiers should be aware of situations in which suicide should be suspected while facing some specific deaths from transport accidents (e.g. only one victim, car against truck or train, single car driver or pedestrians involved).

Queries regarding external causes should not only include the certifier but also other sources. It could be done by linkage with data from transport or forensic authorities for traffic accidents.

The 4th digit should not be used to produce specific indicators before validating the appropriate use of this digit in a country.

Recommendations to improve comparability of future data collected (for data producers)

In order to apply adequately ICD-10 rules, detailed information should be included in the death certificate:

- the type of vehicle(s) involved (bicycle, car, heavy transport vehicle, ultra-light aircraft, horse, etc.)
- the number of vehicles involved
- the type of vehicle in which the deceased was occupant
- the role of the deceased (driver, passenger, pedestrian)
- in case of a collision , specify the object(s) involved
- the location (or place) at the time of the accident (on highway, off highway, railroad track, ski slopes, sea harbour, etc.).

Specific studies should be developed to quantify residents dying abroad from traffic accidents as well as non-residents. (e.g. using insurance company databases). These could help to define priorities for prevention or care organisation.

WHO guidelines on "highly improbable" sequences should be reinforced by including more examples (e.g. how to deal with traffic accidents associated with heart attack).

Certifiers should be encouraged to write information on conditions contributing/initiating death if a traffic accident occurred in the past, and mention the time lag between the elements of the causal chain.

Additional and more detailed recommendations may be found on www.invs.sante.fr/surveillance/anamort.

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Table 1 Correspondence table defining the group of transport accidents according to revision number of International Classification of Diseases (ICD)

		ICD-10	Label	ICD-9	ICD-8
All transport	Transport accidents	V01-V09	Pedestrian injured in transport accident	E800- E829	E800- E827
		V10-V19	Pedal cyclist injured in transport accident		
		V20-V29	Motorcycle rider injured in transport accident		
		V30-V39	Occupant of three-wheeled motor vehicle injured in transport accident		
		V40-V49	Car occupant injured in transport accident		
		V50-V59	Occupant of pick-up truck or van injured in transport accident		
		V60-V69	Occupant of heavy transport vehicle injured in transport accident		
		V70-V79	Bus occupant injured in transport accident		
		V80-V89	Other land transport accidents		
		V90-V94	Water transport accidents	E830-E838	E830-E838
		V95-V97	Air and space transport accidents	E840-E845	E840-E845
		V98-V99	Other and unspecified transport accidents	E846-E848	////////
		X82	Intentional self-harm by crashing of motor vehicle	E958.5	////////
		Y03	Assault by crashing of motor vehicle		
		Y32	Crashing of motor vehicle, undetermined intent	E988.5	////////
		Y85	Sequelae of transport accidents	E929.0-E929.1	E940-E941

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