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Abstract

The objective of this work is to present a comprehensive set of road safety basic statistics in Europe, as well as the methodology used for their development. These statistical outputs are based on data derived from CARE, the EU database with disaggregate data on road accidents, and from other international data files (OECD/IRTAD, Eurostat, etc.). More precisely, the various needs for road accident statistics as well as accident and exposure data availability were identified and analysed allowing for the design of the selected statistical outputs; namely: the Annual Statistical Report, the Basic Fact Sheets and the Aggregate Data Files. These statistical outputs are designed to satisfy the needs of the large majority of those dealing with road safety, but not necessarily of those seeking for in-depth accident data research and analysis. These statistical outputs constitute an attempt to optimise the exploitation of existing road accident data by covering as many of the available road safety parameters as possible. It is concluded that the appropriate exploitation of existing data can certainly cover a wide range of current needs for road safety analysis at European, national and local level.

A comprehensive set of road safety basic statistics in Europe

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1. Introduction

In 2001, the European Union adopted the target of reducing road accident fatalities by 50% until 2010 in comparison to the 2000 figures. Monitoring road accident trends across Europe is an important tool for the achievement of this goal. The definition of target road user groups or modes of transport will allow the identification of the most efficient countermeasures aiming to reduce the numbers of road fatalities and injuries, in the EU countries.

In its 2001 White Paper (*European Commission, 2001*) and in the Road Safety Action Plan 2003 (*European Commission, 2003*) the EC pointed out an urgent need for a “European Road Safety Observatory”. On the basis of this decision, the EC co-funded project SafetyNet started to develop this observatory since May 2004. SafetyNet aims at addressing the specific needs for co-ordinated accident and injury data analysis and will provide all relevant information which is needed to support policy decision making at EU and national level.

The SafetyNet project consists of seven workpackages (*Thomas et al., 2005*). Workpackages 1 to 3 are dealing with macroscopic data. With macroscopic data all relevant trends and major developments in the road accident statistics can be examined. In the very first workpackage the exploitation and enhancement of accident data from the EC CARE database, takes place. One of the Work Package tasks concerns the development of a comprehensive set of road safety statistics in Europe. The outputs foreseen are publications but also electronic data files to support road safety analysis.

To determine what kind of road accident statistics are required by the Road Safety Community, various international databases such as the FARS (www-fars.nhtsa.dot.gov/) database and their outputs were examined (*Yannis et al., 1998*). All this information was combined with the results of a questionnaire where stakeholders were asked about their data needs. This work resulted in the determination and definition of three major outputs which were developed within this task of SafetyNet (*Kuratorium für Schutz und Sicherheit, 2005a*). These are:

- Various Traffic Safety Basic Fact Sheets
- Annual Statistical Reports
- Aggregated Data Files

Different versions of these outputs are now available and they can be downloaded either from the SafetyNet website (www.erso.eu/) or the public CARE website of the European Commission (ec.europa.eu/transport/roadsafety/road_safety_observatory/care_reports_en.htm).

Each output was designed to address specific needs of different target groups. Basic Fact Sheets are dealing with several specific road safety topics, which are of high interest for the wide public. On that purpose, basic Tables and Figures are combined with explanatory text. The most important and worth-mentioning points of each Basic Fact Sheet are highlighted to attract the audience’s attention. The Annual Statistical Report consists of selected Tables and Figures concerning basic road safety statistics. These Tables and Figures should serve as a basic information source, where all relevant information has been assembled. Moreover, Aggregated Data Files consist of subsets of the CARE database, which can be used by road safety experts as a basis for further analysis.

The goal of this work is to compile a comprehensive set of road safety basic statistics, which can be easily accessed by the public. Furthermore, these statistical outputs will allow not only for the further improvement of the EC CARE database, but also for the better exploitation of the important potential of this database.

2. Traffic Safety Basic Fact Sheets

Overview on Traffic Safety Basic Fact Sheets

In road accident statistics, there are some very important issues which are of high interest also for the broader public. Traffic Safety Basic Fact Sheets aim to open up the interpretation of the road accident data to a much wider audience within the road and vehicle safety community and on this purpose, their size should not exceed 10-15 pages and should describe basic characteristics concerning the selected road safety topic. These publications are not advanced scientific papers including extensive in-depth accident data analyses but present basic, important information in a direct and compact way to the wide public. Therefore no introduction or table of content sections are used.



The reader of a Basic Fact Sheet is guided with text which explains Tables and Figures. The most important, worth-noticing conclusions and comments concerning the road safety topic treated are highlighted in boxes beside the text. These "eye catchers" should provide main messages which could also be used in press releases.

Methodological aspects

To determine the road safety topics of these Basic Fact Sheets a questionnaire was sent to several institutes. The results showed that there are some issues which could be examined with data derived from the CARE database but also topics which could not be treated at this present stage due to lack of relevant data or unreliable data. Alcohol related accidents for example, even though they are of high interest for the safety community, cannot be examined, as until now relevant reliable and comparable data among EU countries is not available within CARE. This is mostly due to different definitions and a high number of "unknown" in several Member States.

The CARE database also includes data on road accident injuries and road accidents. Due to the high variance of underreporting (*Aptel et al., 1999, Elvik, 1999, James, 1991, IRTAD, 1994*), the Task 3 SafetyNet partners decided to use just fatality data in the Basic Fact Sheets. Additionally, in order to allow comparisons between different EU Member States exposure data derived from Eurostat but also from the IRTAD database has been used for the development of the Basic Fact Sheets.

The content

The following road safety topics were chosen to be treated in the last version of the Basic Fact Sheets - 2005 (*Kuratorium für Schutz und Sicherheit, 2005c*):

- Children (aged < 16 years)
- Young People (aged 16-24 years)
- The Elderly (aged > 64 years)
- Pedestrians
- Motorcycles and Mopeds
- Car Occupants
- Motorways

Each Basic Fact Sheet starts with an overview showing a time series of fatalities within the last 10 years. The size of the problem compared to the total of road accident fatalities shows the importance of the examined topic. The proceeding pages present interesting details related to the topic. The partners agreed

to put emphasis on the comparison between countries but also between a single country and the EU average. Additionally, the text, Tables and Figures should explain the basic characteristics which are the same all over Europe.

It is important that each Basic Fact Sheet follows the same common format and uses a uniform way to examine the treated topic. Furthermore, the common graphical design of the Basic Fact Sheets shows the connection not only between the Basic Fact Sheets but also to the ERSO website (www.erso.eu) which is a pilot website of the European Road Safety Observatory (ERSO). Additionally, at the last page of each Basic Fact Sheet a note indicates the link to the other Basic Fact Sheets and to the Annual Statistical Report.

Four versions of the Basic Fact Sheets will be prepared during the SafetyNet project on an annual basis allowing partners to improve and enhance the Basic Fact Sheets in terms of quality but also in terms of numbers of Basic Fact Sheets each year. The improvement in terms of quality is ensured by the rotation principle where partners change the preparation of the issues each year.

The third version of these documents will consist of eleven Fact Sheets, the updated versions of the existing seven, which are mentioned above and additionally four new ones on Pedal cycles, Junctions, Heavy goods vehicles and one on overall road accident figures.

Constraints / Solution

The base year of the Basic Fact Sheets is the most recent year for which data is available for the majority of Member States in the CARE database. In the Basic Fact Sheets 2006 mostly data from the year 2004 is used. This delay is due to late delivery of national files to the EC DG-TREN and additionally some countries did not manage to send their national data for 2004 in time. Consequently, in order to calculate total figures for all Member States in the CARE database, data for the last available years are used for each country.

At the moment, the CARE database comprises of only 14 Member States of the EU15 countries, as accident data from Germany cannot be included into CARE due to privacy protection issues. The CARE database would strongly benefit if this problem could be solved in collaboration with the German authorities and the European Commission. Furthermore, each year accident data for more countries will be available, as national data from the 10 new member states will also be progressively incorporated in CARE, after being appropriately transformed to ensure compatibility with the existing system.

Furthermore, more advanced time series or multilevel analyses of specific accident variables are considered for the next versions of the Basic Fact Sheets, allowing detailed examination of specific issues concerning the selected road safety topics.

3. Annual Statistical Report

Overview on Annual Statistical Report

The Annual Statistical Report gives a detailed insight into road accident data in the 14 EU Member States and serves as a reference document from which the broader public but also road safety experts are able to retrieve data. The length of this publication is around 60-70 pages and the last version of 2005 includes approximately 55 Tables and 20 Figures with the most interesting combination of CARE accident data.

This statistical document provides the reader with additional side information such as definitions of variables, an introduction and a table of contents. No comments are included in the form of text and only data/information comparable among EU countries in the form of Tables and Figures is used. The aim of this specific statistical document is just to present road accident data and not to explain or further analyse it.



Methodological aspects

The partners of workpackage 1 have sent out a questionnaire to several institutes, asking which data is important for different institutes and ministries in the Member States. This information was used to decide on the content of the Tables and Figures used in this publication.

The table of contents reflects the multilevel structure of road accident data. These levels consist of accident related data, vehicle related data and person related data.

With the exception of some Tables, only data about fatalities and fatal road accidents are used to ensure comparability among different EU countries, which is not feasible for the other casualty types (serious or slight injuries and accidents) due to the increased level of underreporting (*Aptel et al., 1999, Elvik, 1999, James, 1991, IRTAD, 1994*) among Member States on injured persons and injury road accidents.

The content

The Annual Statistical Report consists of the following major parts (*Kuratorium für Schutz und Sicherheit, 2005c*):

- Introduction
- Overview – major issues (figures)
 - o EU25 – Developments (includes other database than CARE)
 - o Interesting details
- Time Series – last 10 years
 - o General time series
 - o Mode of transport related time series
 - o Person age, and gender related time series
- Fatalities 2004
 - o People involved
 - Age and gender of persons
 - Age of persons by mode of transport
 - o Modes of transport

- Mode of transport by age of persons
 - Mode of transport by type of area
- Accident characteristics
 - Various periods of time (month, day of week, hour of day)
 - Type of area/road
 - Type of junction
 - Weather conditions
- Fatal accidents 2004
 - Various periods of time (month, day of week, hour of day)
 - Type of area/road
 - Type of junction
 - Weather conditions
- Glossary

After the introduction, an overview on the road accident fatality situation in EU25 follows. This is an exception as it needs to include additional information to the CARE database data. Time series over the last 10 years show the general trend of major numbers. Furthermore, only fatalities and fatal accident data of the base year or the last available year of those Member States that have road accident data in the CARE database are presented. The definitions of the various variables and values used in this report are presented in the Glossary and moreover, in the last page of the Annual Statistical Report, a note indicates its link to the Basic Fact Sheets.

Production of the Annual Statistical Report

Although the CARE database has an enormous potential for road safety statistics, the handling of the database is not easy and the person in charge for working with it has to be well trained. The connection to the database is very slow and often timeouts occur. The partners shared the work of the production of the Tables and Figures also to learn more about mistakes and errors which can occur when working with the CARE database. This fruitful work contributed to the enhancement and improvement of the CARE database and also to the better understanding of the different data structure in the Member States.

The graphical design of the cover of the Annual Statistical Report shows the relationship between the ERSO website and other products of the comprehensive set of road accident statistics. All Tables and Figures used in the Annual Statistical Report are prepared in Excel and are linked to a Word document, allowing easier extraction of each table or figure.

Constraints / Solution

Some of the used variables have different definitions in respective Member States, which is indicated by footnotes. As mentioned in the chapter about Basic Fact Sheets, some Member States have a delay in delivering their national accident data files to the EC CARE database. If totals for the Member States are needed, the last available year of such Member States is chosen.

With the introduction of CARE +2 (*Cete Sud-Ouest, 2000*) variables numerous additional variables are now available in the CARE system. Due to a high number of “unknown” or not reported information, these variables could not be used in the Annual Statistical Report so far.

4. Aggregate Data File

Overview on Annual Statistical Report

The creation of Aggregated Data Files is still under consideration. The idea of these Aggregated Data Files is to provide road safety experts with an “easy-to-access” subset of CARE data. These data files will consist of multi-dimensional data Tables based on accident data derived from the CARE database, which will allow users outside of the CARE structure to have access to aggregate accident data at European level. Thus, road accident data stakeholders will be able to access selected data variables and values of CARE in order to perform appropriate analyses and compare accident data among different EU countries. The size and exact content of these files and the number of variables will be considered within the remaining period of the SafetyNet project in close cooperation with the EC.

Member State Name	Year	Vehicle Group	Age	Killed at 30 days
Belgique/Belgie	2002	lorry, under 3.5 tonnes	023	1
Belgique/Belgie	2002	lorry, under 3.5 tonnes	024	1
Belgique/Belgie	2002	lorry, under 3.5 tonnes	025	2
Belgique/Belgie	2002	lorry, under 3.5 tonnes	027	2
Belgique/Belgie	2002	lorry, under 3.5 tonnes	028	2
Osterreich	2001	agricultural tractor	055	1
Osterreich	2001	agricultural tractor	061	1
Osterreich	2001	agricultural tractor	066	1
Osterreich	2001	agricultural tractor	068	1
Osterreich	2001	agricultural tractor	070	2

Methodological aspects

The multilevel structure of the road accident data (three levels: accident related data, vehicle related data and person related data) has to be taken into account when choosing variables for an Aggregated Data File. Only variables of the same level can be used within an Aggregated Data File.

Constraints / Solution

The size of the file depends on the type and number of variables that are used. If the number of rows exceeds 65.000, analysis by end-users becomes more complicated as this is the file limit in some spreadsheet programmes like Excel. A solution to handle this problem could be the use of appropriate softwares. Moreover, due to the application of correction factors for fatalities in some Member States, the variable “Killed at 30 days” is not only an integer value. This has also to be taken into account when defining the type of this variable.

5. Future development of statistical outputs

It is evident that a better, more complete description of the road accident phenomenon can be accomplished when combining accident data from the various international databases with exposure and other kind of data in road accident analysis. Consequently, with reference to the future development of all above described statistical outputs, it should be noted that the linkage of the CARE accident data with in-depth and exposure data, as well as with safety performance indicators could be attempted, aiming at the enhancement of the potential of the CARE system through the development of appropriate, reliable and comparable across the EU countries accident indicators, allowing thus for more useful road accident analyses at both national and European level.

Certainly, a prerequisite for the establishment of the necessary indicators is the collection of available exposure data, in-depth accident data and also data on safety performance indicators, which will provide the necessary information on the characteristics of the data to be combined with CARE data for the

execution of the appropriate analyses. Exposure data can indicatively include vehicle-kilometres, passenger-kilometres, vehicle fleet, drivers' population by categories etc.

Additionally, data on specific safety performance indicators can be used complementary to existing road accident data to measure changes in the operational conditions of traffic system, allowing better understanding of road accidents and underlying processes, enabling policy interventions monitoring and facilitating decision making. Indicative performance indicators are the alcohol and drug use, speeds, protection systems, daytime running lights, vehicle's passive safety etc. Combination of performance indicators and accident data could result to the development of a concrete picture of road safety at EU level and additionally the detection of the emergence of road safety problems at an early stage.

6. Conclusions

At the current stage, road accident statistics are available in several databases of various international organisations (CARE, UN-ECE, OECD/IRTAD, and Eurostat, WHO). These data are used to monitor and analyse the road safety trends and developments in Europe. However, these analyses should be opened to the European road safety Community and the wide public allowing for their full exploitation in the various road safety initiatives across Europe. Therefore the development and provision of a comprehensive set of annually updated road safety statistics could be proved essential for the support of various decisions at local, national and European level.

On that purpose, three possibilities to assemble such a set of road safety statistics were exploited: Road Safety Basic Fact Sheets are prepared for the wider public, whereas the Annual Statistical Report serves as a reference document also for road safety experts. Finally, Aggregated Data Files are very flexible tools, allowing for more detailed analysis of the road accident phenomenon by the creation of multi-dimension Tables.

Annual updates are expected to improve these statistical outputs and contribute hence to the further exploitation of the existing important road safety data potential in Europe. Subsequently, these outputs could also be translated into several other languages allowing for their broader usage and incorporation at the national and local road safety practices.

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