Deliverable 5.7
Fatal Accident Database Development and Analysis - Final Report

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Dissemination Level		
PU	Public	x
PP	Restricted to other programme participants (inc. Commission Services)	
RE	Restricted to group specified by consortium (inc. Commission Services)	
CO	Confidential only for members of the consortium (inc. Commission Services)	

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Transport
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1 Introduction

Task 5.1 of SafetyNet Work Package 5 is concerned with the development of a broad ranging, intermediate level Fatal Accident database. The information provided in the database represents a major advance in the knowledge of the nature and circumstances of fatal accidents within the EU. The information could be used as the basis for the development of countermeasures for fatal accidents within the EU - the data have been systematically collected according to defined sampling plans in participating Member States and hence the data are broadly representative of these Member States.

In the main, the data were derived from strictly factual police reports of fatal accident investigations although in certain cases, alternative sources of information were used including insurance investigation reports. The data recorded described the highway, vehicle and road-user factors to provide a description of the whole crash. The level of detail recorded was considerably greater than is currently obtainable in the CARE or CAREPLUS 2 specification. Approximately 100 – 150 variables with 500+ items of data were typically gathered for each accident investigated. Specific areas of data described the overall accident circumstances, driver and vehicle characteristics, specific road infrastructure features and descriptions of other crash participants.

A pilot and review activity took place before the main data collection phase commenced. During the main phase, the data were gathered and recorded onto a database which was specifically developed for WP5. The main data collection period involved collection of a representative sample of between 2% and 10% of the fatal crashes in each country (depending on the magnitude of the fatal accident population). In the end, 1298 fatal accident cases, involving at least 1 fatality per accident case were entered onto the database and subsequently analysed.

2 Project Objectives

Work Package 5 (WP5) officially commenced with the start of the SafetyNet IP on 1st May 2004. The aim (for the first 12 months) of the WP 5 Task 1 project was to develop the methodologies and protocols for an intermediate level fatal accident study, primarily directed to support road and vehicle safety policy.

The project was developed with close attention to the following objectives:

(a) To set up the building blocks for a continuous European process of fatal accident data collection, coding and analysis

The main purpose of Task 5.1 was to build an effective data gathering structure, (involving all participating partners), to ensure that specific data on fatal crashes could be gathered in a systematic and routine manner. It was specified that the data should be collected in a number of EU member states using completely compatible methods although it was acknowledged that there would be slight variations between teams according to differences in local infrastructure. The data were recognised as being at an 'intermediate' level of detail (compared to CARE on the one hand and national in-depth studies on the other).

(b) To create a broad ranging, intermediate level, fatal accident database

The data recorded described the environmental (including road infrastructure, e.g. crash barriers, road signs etc.), vehicle and road-user factors to provide a description of the whole crash (for example, similar to FARS and Stats19 databases). Approximately 100 – 150 variables in total for each case (accident/vehicle/ occupant/other records) were agreed by the partners as being 'core data elements' that could be collected by all. This included around 500 pieces of information per case. It should be stressed that the data were not selected according to a "lowest common denominator" approach; instead partners were challenged to gather a variety of information types. Additional interpretative information was also specified including a basic list of 'events' (essentially causation and contributory factors). Further information on the approach taken by the WP5 partnership is available through Deliverable D5.3: Fatal Data Methodology Development Report, SafetyNet, 2006. To support the concept of integrated datasets, variables that were common to both task 5.1 and 5.2 (of WP5) were identified and these are specified in the WP5 data glossary (Deliverable D5.5).

(c) To create an independent data set (collected by unbiased parties)

Care was taken when interpreting information gathered from within the judicial process where the attribution of blame was a primary objective. Discussions within WP4 (Recommendations for Transparent and Independent Road Accident Investigations) have also demonstrated the importance of independence and transparency.

(d) To use the information collected to contribute knowledge and information relevant to road and vehicle safety policy at EU and national level

It was recognised that data from the fatal accident study are required for a variety of reasons. First and foremost, the data are needed to provide the EC with data that can be used in decision making for road safety policy and regulation. Therefore, some fundamental questions need to be addressed for example:

- Which road users are killed?
- What are the circumstances?
- What are the countermeasures?

It was recognised that the data could be used by a multitude of stakeholders in the road transport system but specifically road infrastructure experts, highway engineers and vehicles designers. It was intended that the data would be used to evaluate trends and to conduct inter-country comparisons where possible. There could be a link to national activities since most safety actions take place under subsidiary concerns.

2.1 Project teams

The data collection areas for the accidents will be from the countries with the largest fatality populations in Europe (Italy, France and Germany) as well as northern (Sweden, Finland) and middle European (UK, Netherlands) countries. Independent groups with no interest in commercial aspects of the study outcomes conducted data gathering and accident investigation activities. These are listed below and detailed in Figure 1:

- Vehicle Safety Research Centre (VSRC), Loughborough University, UK (task 5.1 co-ordinators)
- Netherlands Organisation for Applied Scientific Research (TNO), Delft, Netherlands
- Institut National de Recherche sur les Transports et leur Sécurité (INRETS), Lyon, France
- Chalmers University of Technology (Chalmers), Gothenburg, Sweden
- Accident Research Unit at Medical University Hanover (ARU-MUH), Hanover, Germany
- The Finnish Motor Insurers' Centre (VALT/FMIC), Helsinki, Finland
- Department of "Idraulica, Trasporti, Strade", University of Rome (DITS), Rome, Italy

Figure 1 Map indicating WP5 partners and their locations

3 Data collection methodology

It was determined that the data should be collected according to a harmonised and systematic protocol and therefore, particular attention was paid to ensuring that the data collection methodology could be easily adopted by all partners. The requirements of road safety stakeholders were also an essential consideration and therefore the methodology was developed with these issues at the forefront.

3.1 Steps in Methodology Development

The following processes were used in the development of the methodology used in task 5.1;

(a) Workshop on data requirements
A workshop was held in October 2004 entitled "Establishing Requirements for a New European In-Depth Accident Causation Database". The aim of this workshop was to provide the future users of accident data the opportunity to feed into the process of identifying general and specific research and policy questions which future accident databases will be expected to address. This process was useful for both Task 1 and Task 2 of WP5. A report was produced to summarise the workshop which focussed on the issues raised during the workshop session on the general and specific requirements for accident causation information and the subsequent feedback session on this topic. The nature of the issues that arose could be divided into 8 categories (information domains), which included:

1. Pre-crash factors
2. Road infrastructure
3. Driver behaviour/human factors
4. Other road-users' behaviour
5. Vehicle technology
6. Passive safety considerations
7. Cost benefits
8. Other factors

As may be expected there was some overlap in the questioning that was suggested for each information domain, due to differences in the workshop participants' understanding and pre-conception of the definition of each. Inter-domain relationships were also of interest. The feedback from the workshop has been constantly referred to whilst developing the data variables to ensure consistency with user needs.

(b) Consultation of National Experts
Data requirements were also sought from National Experts in the EU Member States. Information and background on WP5 was presented to the National Experts in November 2004 and their feedback requested on data needs and requirements according to the nature of the project. All feedback was taken on board during the variable development process.

(c) Research questions to ask of the data
Research questions to ask of the data were discussed by the WP5 partners and were summarised into three main categories as detailed below.

General

- What kinds of vehicles are involved in fatal accidents (age, type)?
- What kinds of features in road infrastructure are involved in consequences of fatal accidents (trees, guide rails, poles…)?

- What kinds of features in road infrastructure are involved in fatal accidents (lane arrangements, speed limits)?
- Which type of roads are fatal accidents most commonly occurring on?
- Which gender/age is more likely to be killed in fatal accidents?
- Which hours (or day period) are the most dangerous in terms of number of fatal accidents?
- Questions on the age and model of cars that CARE can't answer.
- Were there any technical vehicle breakdowns before the crash?
- Were there visibility limitations that could prevent laser, radar or positioning (e.g. GPS) systems to work?

Design improvements/countermeasures

- Which fatal accidents can we do something about technically (vehicle or road infrastructure)?
- Which protective measures have the highest benefit for reducing fatal accidents?
- What type of countermeasures could save lives?
- Dependent on results of vehicles involved, systems and regulations should be developed for specific road users.
- Dependent on results of accident manoeuvre information, we should be able to determine which detection systems/assistance are needed.
- Which barriers were broken before the accident? It should answer which driver assisting equipment should be developed (red light detector, lane departure, etc.).

Outcome factors

- Which "accident type" (e.g. single vehicle-, meeting-, cross-section accident etc.) is most commonly fatal?
- Which "collision type" (e.g. frontal-, side-, rear end collision or roll over) is most commonly fatal?
- What are the most common causes of fatal accidents? (situation, environment, alcohol etc.)
- How do weather conditions affect road accidents?

3.2 Development of Methodology – Determination of Protocol and Data Variables

To start this process, a review of the existing procedures and protocols in EU Member States and the US was undertaken to ensure that the project would benefit from best practices. Existing procedures and protocols that were examined in detail included the UK Cooperative Crash Injury Study (CCIS), the UK On-the-Spot Project (OTS), the German In-Depth Accident Study (GIDAS), the US Fatal Accident Reporting System (FARS), and the Swedish Factors Influencing the Causation of Accidents and Incidents project (FICA).

An initial data variable list was produced containing 1138 variables. This was initially reviewed by the VSRC and exclusions were made for variables that were outside the project objectives, e.g. injury related criteria. After close examination of the remaining 193 potential data variables, a provisional variable compilation list ensued.

In order to determine which variables should be collected in the database, each variable was discussed in turn under the main headings of accident level, roadway level, vehicle level, and road user level. WP5 partners reviewed the provisional variable list during email circulation and at the technical meetings.

Each variable on the list was reviewed by each partner against specific questions. These included:

- Is the definition of each data variable suitable?
- Would collecting this data variable contribute usefully to the aims and objectives of the project and therefore is it deemed necessary to collect the data variable?
- Can the data variable be collected with respect to the determined definition?
- What is the expected reliability of the proposed data variable?
- What proportion of cases (per partner) could this data variable be gathered for?

The decision was made that if the proportion of cases for a data variable was less than 30% for all partners in total, then the WP5.1 partners would consider removing the variable concerned. Additionally, if the number of positive partner responses for collecting the data variable was less than 50%, then careful deliberation needed to be given as to whether the variable was to be retained on the prospective list or not.

Each ‘potential’ variable that had not already been agreed upon was discussed. This process included discussion for each variable’s inclusion and definition, and partners’ comments regarding possible problems with the collection of particular variables.

The list received numerous iterations for which numerous revisiting of the WP5 objectives was necessary. The needs of the data users as well partners’ comments regarding possible problems with particular variables were also taken into account.

After preparation of the final variable list, the preparation of the glossary and database commenced.

4 WP5 Task 1 Database

A project database was developed (for both task 5.2 and task 5.1 of WP5) which links together the human, vehicle and environmental data collected for each accident.

The SafetyNet WP5 Database system consists of a software application written in Visual Basic for Application (VBA) completely embedded inside a Microsoft Access 2003 Data Base Management System (DBMS).

The application contains two completely separate parts that have the same structure with regards to user interface forms and database tables and relationships: these are known as the Input Application (IA) and the Output Application (OA).

Using the IA, each partner could insert and modify data, images and pictures.
Using the OA, it is now possible to view accidents data and images inserted by all partners participating in the project.

The IA is a local application that works offline during the data entry and editing, as well as the Output Application during the road accidents browsing. When data transferring is requested, the Input Application and the Output Application can connect to the central server through a Secure File Transfer Protocol (SFTP).

A central database implemented on a MySQL Server DBMS has been created with databases structures similar to the ones of IA and OA. This database collects all road accidents information inserted from different partners in local Microsoft Access databases.

The central server is equipped with backup and redundancy mechanisms to ensure a secure data storage.

The last release of the application is v.2.1. Further information regarding the database can be obtained form the WP5 Data Glossary (SafetyNet Deliverable D5.5).

5 Database pilot phase

While the database was in construction it was necessary to devise a test program. This Database Pilot Phase was designed to thoroughly explore the database and find areas where possible improvement or refinement was necessary.

The pilot phase provided the partners with an opportunity to test all the processes that had been developed during the previous months. This method involved an amount of data collection, data input and a thorough test of the database as a whole. These actions were all recorded and discussed at a technical meeting before any changes to the database were agreed.

The partners were required to collect a minimum of 5 cases each from the relevant authorities resulting in a minimum of 35 cases for the pilot. This number was felt sufficient to enable the 5.1 partners to further develop and streamline the database. This amount of cases also allowed the group to ‘iron out’ any problems with the database at an early stage.

When reviewing the database content it was important to examine it from a number of perspectives. This was completed through a detailed case review of the 5 cases with the aim to gain an understanding of the accident without the original accident report. Additionally an in-depth review of one randomly selected case was completed which closely examined the variables and coding issues both in the database and between partners. This amount of cases also allowed the group to ‘iron out’ any problems with the database at an early stage.

The initial results and comments generated from this process were recorded and discussed between the 5.1 partners at a technical meeting in Delft, The Netherlands in March 2006.

The pilot phase of task 5.1 was an essential test of functionality of the prototype database. As this was to be a test-bed for the full data collection task it was decided to use actual fatal accident cases.

Each partner was required to collect a minimum of 5 cases from the relevant authorities resulting in a minimum of 35 cases for the pilot. This number was felt sufficient to enable the 5.1 partners to further develop and streamline the database. This amount of cases also allowed the group to ‘iron out’ any problems with the database at an early stage.

Cases for the pilot study were selected on a case-by-case basis to include a broad range of road users and accident types. This was important as it allowed the database capabilities to be fully exploited.

The case collection for full scale data input was based on a representative sample. This method was designed to ensure the validity of analysis and results from across Europe. Further to the physical process of entering fatal cases onto the pilot database it was important to review the information gathered from the technical discussions. This information provided the 5.1 group with a direct way of feeding back useful data into the database development process.

6 Case Example

The following case example is included to illustrate the data collection method used in task 5.1 of WP5 and to clarify the level of detail that was involved in each individual fatal accident case collection;

Accident Involving Peugeot 306 and Volvo Coach

Accident Level
A fatal accident occurred between a Peugeot 306 and a Volvo Coach on Friday the 13th August 2004 at 18.25, the road layout was a gentle but gradually tightening bend (figure 2) from both directions and there were no junctions in the vicinity. The accident involved a car and coach; no other vehicles were involved.

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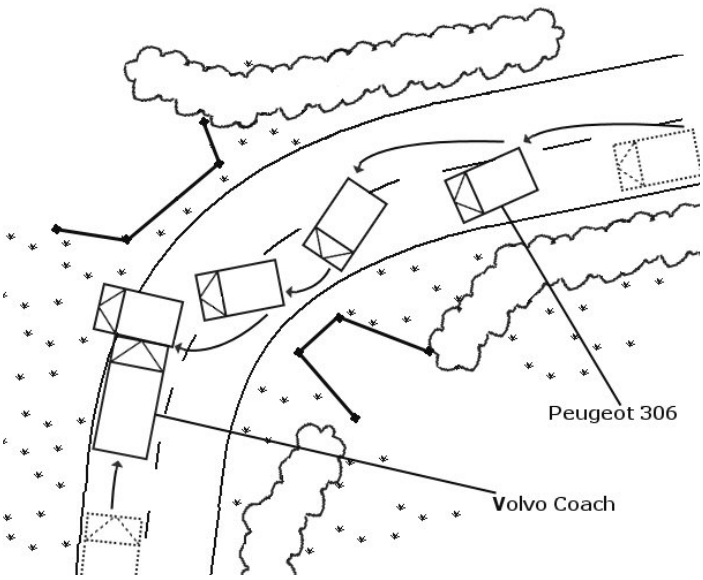


The Peugeot 306 loses control in a left hand bend and begins to rotate Anticlockwise, the driver then overcorrects the slide therefore presenting the Peugeot's nearside to the front of the oncoming coach.

Figure 2; Accident scenario

Vehicle Level

Vehicle 1 (Figure 3)

- Peugeot 306 Meridian hatchback
- Manufactured 2000
- 2.0HDI Diesel, Manual
- Front wheel drive
- 66Kw power output
- Equipped with ABS

Figure 3

Vehicle 2 (Figure 4)

- Volvo Coach
- Manufactured 1990
- Rear wheel drive
- Equipped with TELMA electro magnetic retardation device
- One Male driver and 19 passengers

Figure 4

Roadway level

- The accident occurred on an “unclassified” rural road with one lane in each direction. The carriageways were not physically divided
- The speed limit for this road was 60mph(97kmh)with the coach restricted to 50mph(80kmh)
- Road conditions were wet but drying rapidly
- Weather conditions were fine and dry; it was daylight
- The Peugeot’s approach (figure 5) was downhill into a gently tightening left hand bend
- The coach was also slightly downhill into a right hand bend
- There was only one sign present indicating a bend warning for the Peugeot
- The road is known locally as a ‘cut through’ between two major roads

Fig 5; Approach of Peugeot

Fig 6; Approach of Volvo Coach

Fig 7; Vehicle rest positions

Fig 8; Damage to Peugeot

Road user Level

Driver Vehicle 1

- The driver of the Peugeot 306 was a 29 year old female. She was a resident of the country but it is unclear whether she was familiar with the road.
- The driver was wearing a seat belt and the steering wheel hub airbag was deployed along with the struck-side seat back airbag.
- The body area most heavily injured was the head; she died in hospital on the 20th August 2004, 8 days after the accident.

Driver Vehicle 1

- The driver of the Volvo coach was a 40 year old male who was also a resident of the country; again it is unclear whether he was familiar with the road.
- The driver of the coach, as indicated by the onboard tachograph, braked initially when he saw the Peugeot out of control; he then applied the TELMA system in an attempt to avoid the collision.
- The driver was wearing his seatbelt but the coach was not equipped with any airbags. Neither the driver, nor any of the 19 passengers, sustained any injuries apart from shock.

Additional information

Through the police vehicle examination it became clear that the Peugeot 306 had new rear pads and disks fitted earlier in the day; this could possibly be determined as a vehicle defect.

From witness statements and most importantly the statement from the first witness at the scene, it became clear that an unlit cigarette and lighter was found on the Peugeot drivers lap. This could have been a distraction or causative issue.

After the accident the signing and road surface was also renewed and this could have been a factor in the accident considering the minimal signage and the state of the road surface (drying after rain).

7 Data collection in Participating Member States

The data collection infrastructure for each of the different partners is detailed in this section.

France

Description of the area from which the partner collected data;
The data collection area was the whole of France. INRETS had access to all fatal accident police reports (*les procès verbaux)*.

The sampling methodology (including an explanation of the representivity):
In order to ensure a more representative sample a two stage stratified sampling technique was carried out to select the sample of 140 road accidents. The total French fatality data was first grouped by type of road user fatality (car occupant, 2 wheeled motor vehicle-users, pedestrian, cyclist, lorry driver and others) and each road user category was then stratified by the type of road class where the accident took place. The table below shows the population stratified by road user fatality and road class.

	Car Occupants	Pedal Cyclists	Pedestrians	2-wheeled motor vehicle users	Lorry drivers	Other	Total
Motorway	230	0	35	48	39	15	367
Main road (RN)	729	21	112	197	24	19	1102
Secondary Road (RD)	1726	113	194	608	35	57	2733
Local street	298	43	209	259	2	25	836
Other	45	12	32	29	0	5	123
Total	3028	189	582	1141	100	121	5161

Table 1 Cross tabulation of road user fatality and road class, France

The next step was to devise a sampling plan. The sample size of 140 accidents was equivalent to 2.7% of the population therefore the number selected from each sub-group was also roughly equal 2.7% of the population sub-group. For example there were 230 car occupant fatalities on motorways; therefore in the sample there were 6 of this type of accident studied in detail. The table below shows the sampling plan that was used.

	Car Occupants	Pedal Cyclists	Pedestrians	2-wheeled motor vehicle users	Lorry drivers	Other	Total
Motorway	6	0	1	1	1	0	9
Main road (RN)	20	1	3	5	1	1	31
Secondary Road (RD)	47	3	5	16	1	2	74
Local street	8	1	6	7	0	1	23
Other	1	0	1	1	0	0	3
Total	82	5	16	30	3	4	140

Table 2 Proposed sampling plan for INRETS, France

The Netherlands

Description of the area from which the partner collected data
TNO operated in the area Zuid-Holland (or so-called province Zuid-Holland). This province is split up into 4 regions: Rotterdam-Rijnmond, Haaglanden, Hollands Midden en Zuid-Holland Zuid. The area covers 344575 ha from which 13086 ha are meant for traffic use. 21% of the total surface is built or paved.

The sampling methodology (including an explanation of the representivity):
TNO collected fatal accidents, which are investigated by the four accident investigation police groups TOD (representing each of the four regions). In particular, TNO co-operated with the Rotterdam-Rijnmond police force. This followed previous successful cooperation on similar kind of work conducted by the TNO team.

The “traffic participant”, “road type” and “month of the year” were the sampling criteria and the percentage of collected accidents per category (fulfilling those criteria) was based on the national data for the whole Netherlands.

The tables below show the national figures of different parameters (accident severity, size of the area, population and vehicle fleet) for both Zuid-Holland and The Netherlands in total.

In general it can be concluded that the province Zuid-Holland is representative to the national figures. As far as the accident severity is concerned, some under- or over-representation can be observed for the group of slight injured of the province with respect to the national figures.

A small difference can also be seen between the percentage of the provincial covered area and the national one.

	Severity (2001-2003)				
	Light injured	**Trans. to hospital**	**Hospita-lised**	**Fatalities**	**Total**
Netherlands	52398 (42%)	36436 (30%)	32643 (26%)	3008 (2%)	124476
Zuid- Holland	8233 (35%)	9921 (41%)	5179 (22%)	417 (2%)	23750 (19%)

Table 3 Accident severity in Netherlands/Holland

	Sample area	
(Year 2000)	**The Netherlands**	**Zuid-Holland**
Population (x1000)	15864	3398 (21%)
Area (ha) (x1000)	4153	345 (8%)
Traffic network (ha) (x1000)	113 (2.7%)	13 (3.7%)
Vehicles (x1000)	7930	1590 (20%)
Covered area (ha) (x1000)	480 (12%)	72 (21%)
Uncovered area (ha) (x1000)	3672 (88%)	273 (79%)

Table 4 General information about roads and vehicles in the Netherlands/sample

Details of the links with local infrastructure/police for data collection preparation:

The TNO accident research team established a very good co-operation with the Accident Investigation Police Force (TOD) and with the regional police. Police accident data was available anytime without special agreements. TNO committed the data protection to the Ministry of Justice and are responsible for future usage of the data.

D.I.T.S.

Italy

Description of the area from which the partner collected data

The data collection area that was used to collect the target number of accidents (480) was the whole country.

The sampling methodology (including an explanation of the representivity):

A preliminary analysis was carried out on three different data sources (national statistical report, police report and insurance report) in order to determine the most suitable data source in terms of data availability and reliability. Results showed that insurance report was the most suitable data source.

All the reports were therefore provided by an insurance company (with approximately the 4% of the whole national market). It was decided that nationwide coverage by this company would guarantee data representativity.

The reference period to reach the target number of 480 fatal accidents was estimated to be 15 – 24 months.

Details of the links with local infrastructure/police for data collection preparation:

Links with the involved insurance company were established early on in the project and were maintained throughout.

Any problems or concerns that have arisen:

The links with the Insurance Company involved very delicate negotiations - especially issues concerning data dissemination.

VALT

Finland

Description of the area from which the partner collected data
Data were collected from the whole country.

	Number of accidents 2003	
Month	N	%
January	17	*6.5*
February	15	*5.8*
March	16	*6.2*
April	18	*6.9*
May	25	*9.6*
June	22	*8.5*
July	21	*8.1*
August	28	*10.8*
September	30	*11.5*
October	24	*9.2*
November	13	*5*
December	31	*11.9*
TOTAL	260	*100*

Table 5 Occupant fatal motor vehicle accidents studied by investigation teams in 2003 by month

	Number of accidents 2003	
Functional class of the road/street	N	%
Main road (class I)	105	*40.4*
Main road (class II)	14	*5.4*
Regional road	37	*14.2*
Connecting road	51	*19.6*
Main street	12	*4.6*
Feeder street	12	*4.6*
Another street or local plan street	10	*3.8*
Private road or area (e.g. yard)	15	*5.8*
Pedestrian and cycle traffic route	1	*0.4*
Railway or tramway	.	*.*
Other	3	*1.2*
TOTAL	260	*100*

Table 6 Occupant fatal motor vehicle accidents studied by investigation teams in 2003 by road type

	Number of accidents 2003	
Population density	N	%
Densely populated area	41	*16.3*
Close to densely populated area	26	*10*
Sparsely populated area	185	*73.4*
Not known	8	*.*
TOTAL	260	*100*

Table 7 Occupant fatal motor vehicle accidents studied by investigation teams in 2003 by population density

	Number of persons killed 2003	
Vehicle type	N	%
Passenger cars and vans	246	*83*
Heavy vehicles	11	*4*
Motorcycles and mopeds	34	*12*
Others	4	*1*
TOTAL	295	*100*

Table 8 Number of persons killed in occupant fatal motor vehicle accidents investigated by investigation teams in 2003 by vehicle type

The sampling methodology (including an explanation of the representivity)

The sample of 60 accidents was taken from total of about 330 accidents annually.

Details of the links with local infrastructure/police for data collection preparation

According to current legislation, the Finnish Accident Investigation Organisation has the right to receive information from police etc. Links were already established for ongoing accident investigation. In the main, the investigations included information derived by investigators who attended the scene soon after the accident. However, the investigations were carried out later if the call out was delayed for some reason.

The information about the accident was reported by the emergency centre or the local senior police officer to the investigation team. The investigation team leader made sure that those who raised the alarm were aware that the accidents were within the scope of the investigation programme.

The authorities were requested to supply investigation material that they collected to the investigation team after it had begun its operation. The Finnish Motor Insurers' Centre agreed with the authorities and with the state institutions on the co-operation concerning the accident investigations and the use of their findings.

Any problems or concerns that have arisen:

None.

Sweden

Description of the area from which the partner collected data

The data were collected from “Region West” which included three (“Västra Götaland”, “Värmland” and “Halland”) of twenty-one counties in Sweden (see Figure 9). The area of these counties represents approximately 10 % of the Swedish area.

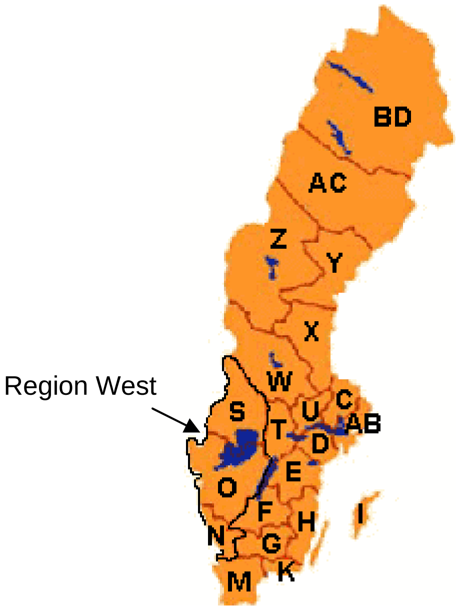


Figure 9; Map of Sweden and its counties

The sampling methodology (including an explanation of the representivity):

The fatal accidents in “Region West” represented approximately 25 % of the fatal accidents occurring in Sweden, Figure 10. There are around 120 fatal accidents occurring in “Region West” each year which is why a data collection over a 24 month period was considered necessary.

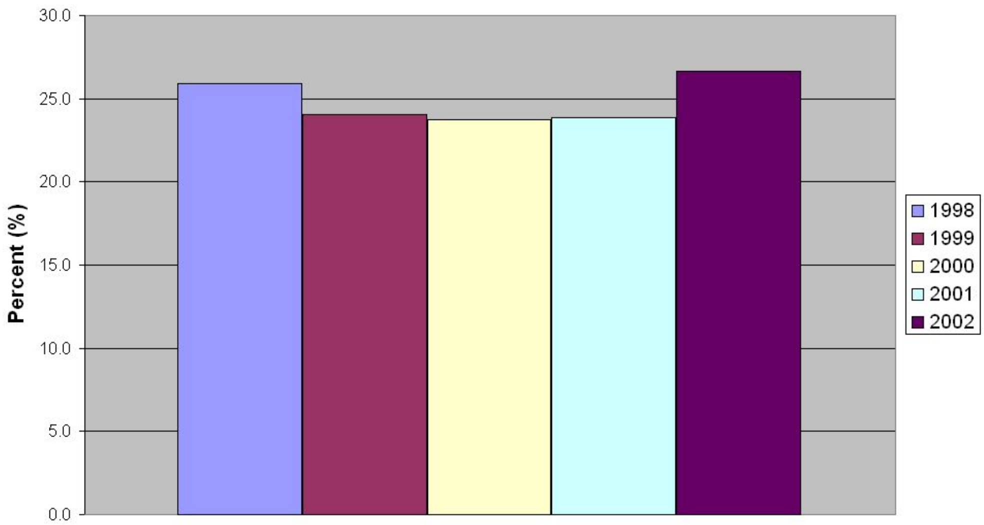


Figure 10 Percentage of fatal accidents in Region-West compared to the whole country.

The fatal accidents represented around 3 % of all accidents reported both in "Region West" and in the whole country, Table 9.

Table 9 Severity/Year, Region West (RW) compared to whole country (SE)

	Years				
Severity	**1998**	**1999**	**2000**	**2001**	**2002**
	%	%	%	%	%
Fatal SE	1	1	3	3	2
Fatal RW	1	1	3	3	3
Severe SE	4	5	17	17	18
Severe RW	4	4	17	17	17
Slight SE	17	18	68	67	67
Slight RW	17	16	79	79	80

"Region West" was also considered representative for all the different accident types.

Fatal accidents (%)		
Accident Type	**RW**	**SWE**
Single	4.3	4.1
Meeting	11.4	12.9
Passing	3.4	3.6
Rear end	0.4	0.4
Turning	1.6	1.4
Junction	2.0	1.7
Cycle/Moped	2.2	1.7
Pedestrian	6.9	5.3
Other	2.7	2.4
Animal:deers & moose	1.9	1.7

Table 10 Accident type, Region West (RW) compared to whole country (SE)

Details of the links with local infrastructure/police for data collection preparation:
A link to the Swedish Road Administration (SRA) was made.

Any problems or concerns that have arisen:
None

United Kingdom

VSRC Vehicle Safety Research Centre

Description of the area from which the partner collected data

- UK Police fatal accident reports were collected for the 5.1 task.
- VSRC collected data from the East Midlands region, including the three English counties of Nottinghamshire, Derbyshire and Leicestershire, Figure 1111.

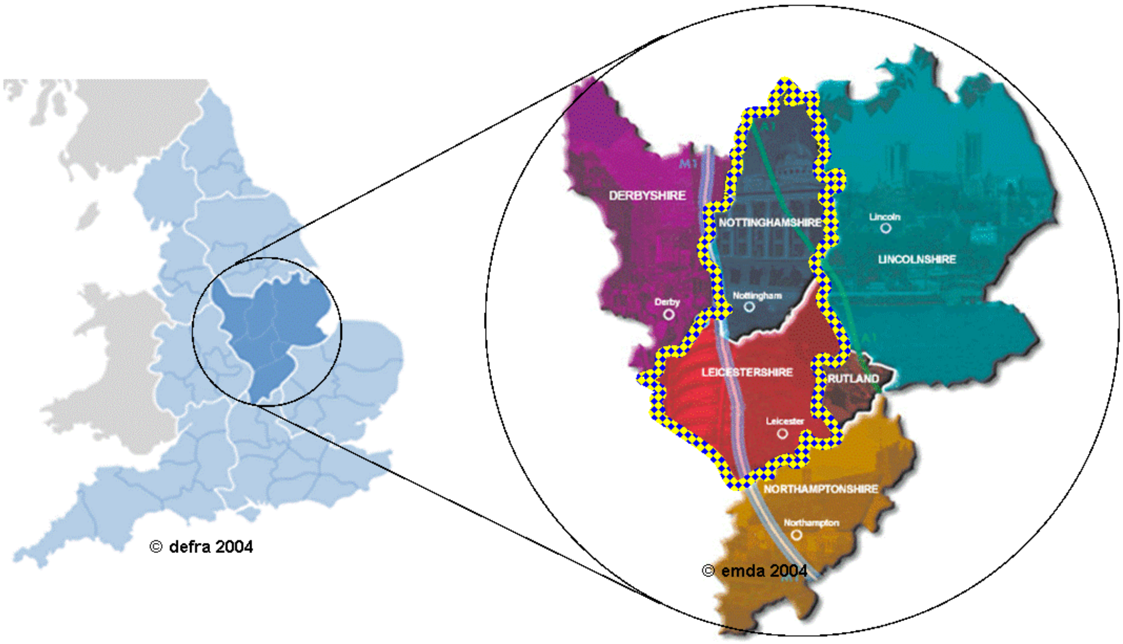


Figure 11; UK sampling region for 5.1

The sampling methodology (including an explanation of the representivity):

- VSRC is contributed 270 cases to the database.
- The average number of fatalities in the East Midlands (from 1997-2002) was 359 per year in the region, and the number of fatal accidents during 2003 and 2004 for the individual counties are shown in Table 11.

Transport

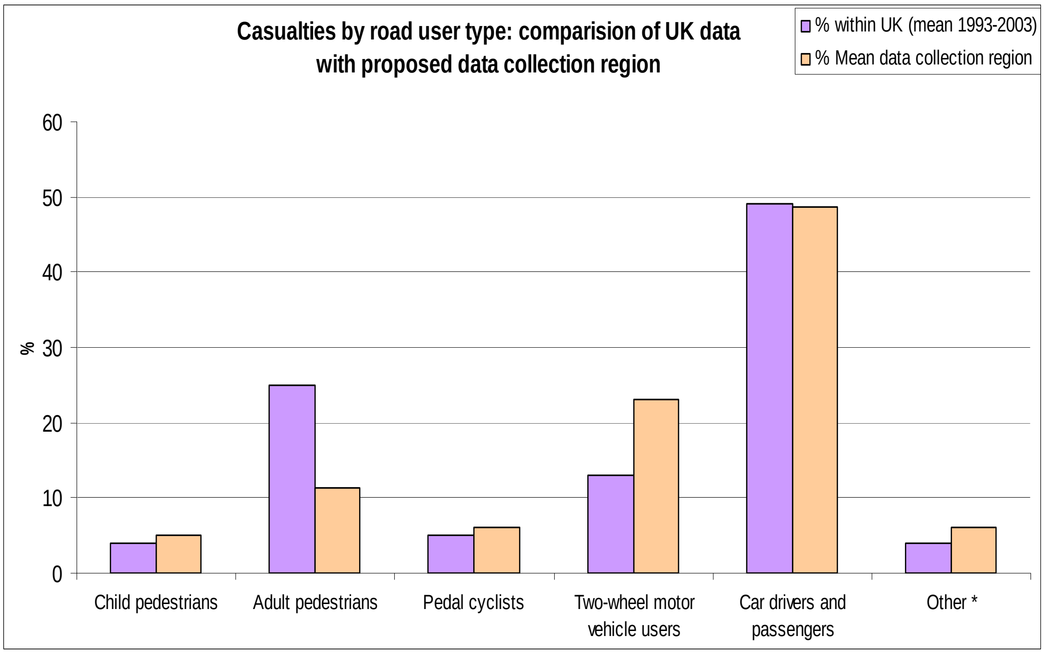
Project co-financed by the European Commission, Directorate-General Transport and Energy

Area	Severity of injury (% of total)			All Accidents in 2003
	Fatal	Serious	Slight	
Nottinghamshire	**82 (1.5%)**	826 (15.3%)	4492 (83.2%)	5400
Leicestershire*	**56 (1.2%)**	358 (7.8%)	4193 (91%)	4607
Total in these counties	**138**	2325	16448	19078
Total UK	**3508 (1.2%)**	33707 (11.6%)	253392 (87.2%)	290607

*Excluding Rutland

Table 11 2003 Traffic Casualties for the UK and sample area in 2003

- It was anticipated that numbers for 2004 would be similar to those for 2003 resulting in approximately 270 fatal accidents within the data collection area.
- The sample was representative of the UK's fatal accidents because all the accidents from the specified regions were used as cases in the database, and these regions are representative of the wider UK picture, in terms of the proportion of fatalities within all road accidents, and road user fatality types, Figure 12.



** goods vehicles, bus, coach, horse riders, agric vehicles, trams users, and pedestrians of uncertain age*

Figure 12; Casualties killed and seriously injured in UK and sample area 1993-2003

Details of the links with local infrastructure/police for data collection preparation:

Nottinghamshire, Leicestershire and Derbyshire police agreed to be involved in the project and gave their permission for VSRC to access their records. Permission was also sought from one other East Midlands police force (Lincolnshire) although this was not granted.

Any problems or concerns that have arisen:

None.

Germany

Description of the area from which the partner collected data

It was the task of MUH to collect data of fatal traffic accidents in Germany. For this purpose accidents which where documented by the police were used. MUH used the following sources to get information about relevant accidents;

- national statistical data
- police reports
- In-depth-investigations by scientific teams (GIDAS).

The region of data acquisition was Lower Saxony. Lower Saxony is one of 16 governmental states within the country of Germany (Figure 13).

Figure 13; Germany with the state of Lower Saxony highlighted.

The sampling methodology (including an explanation of the representativity):

Representativity of the data is shown in the following table (Table 12).

(Statistical data taken from the ´Statistisches Bundesamt Deutschland´ for the year 2003)

	Lower Saxony	Germany	percentage of Germany
area in km^2	47 618	357 030	13.3 %
population	7.993 mill.	82.532 mill.	9.7 %
population density (inhabt./km^2)	168	231	n.a.
registered vehicles	5.379 mill.	54.082 mill.	10 %
people killed in traffic	774	6 163	12.6 %
Autobahn kilometers	1 354	12 044	11.2 %
kilometres of all road types	28 186	231 420	12.2 %

Table 12 Statistical comparison between Lower Saxony and the whole of Germany.

As can be seen, the state of Lower Saxony has a little more than 10 % of the area of Germany. With a population density of only 168 inhabitants per km^2 Lower Saxony is a rather rural state within Germany. Nevertheless the traffic related data from Lower Saxony lies within a small margin of only between 10 and 13 % of the German data and can therefore be used to obtain representative data for the whole of Germany.

MUH collected accident data for the period 1st January 2003 to 31st of December 2003.

7.1 Actual Sampling in Fatal Accident Database

Table 13 shows the sampling rates for different accident types in the Fatal Accident database. There is some variation in the sampling rates for different road-user groups but this is probably partly based on differences in transport mode usage in the different partner Member States. For example, 25% of The Netherlands' cases comprise cyclist accidents but this reflects the fact that there is a high percentage of cyclists generally in the Netherlands compared to other Member States.

The table should also be viewed to examine representativity within each Member State as well. Again it can be seen that some variations are evident (e.g. Italy and Finland) although overall no extreme variations are evident.

Sample period		**2003 + 2004**								**2003**			
		UK*		**Italy**		**Finland**		**Sweden**		**Netherlands**		**France**	
Car/MPV		Freq	% total	Freq	% Total	Freq	% Total	Freq	% Total	Freq	% Total	Freq	% Total
	5.1	150	52.5	248	45.3	38	56.7	75	60	21	43.8	82	58.6
	National	3440	51.1	5939	50.8	467	61.9	454	45	345	34	3028	60.1
Pedestrians													
	5.1	48	16.8	133	22	7	10.4	18	14.4	5	10.4	16	11.4
	National	1445	21.5	1491	12.8	108	14.3	122	12.1	97	9.5	582	11.6
Motorcyclists													
	5.1	61	21.3	94	19.5	10	9.2	18	14.4	10	20.8	30	21.4
	National	1278	19	2915	24.9	69	14.9	129	12.8	189	19.5	1141	22.6
Cyclists													
	5.1	16	5.6	55	10.4	6	8.9	8	6.4	12	25	5	3.6
	National	248	3.7	622	5.3	65	8.6	62	6.2	188	20.5	189	3.8
Trucks													
	5.1	8	2.8	13	1.6	3	4.4	2	1.6	0	0	3	1.4
	National	225	3.3	600	5.1	35	4.6	-	-	63	6.1	100	2

Table 13; Fatal Accident Sampling Frequencies by Road User Type and Partner

8 Results

Description of the Database

The following table (Table 14) shows a breakdown of fatal accidents investigated by participating partner according to road-user type. This table is intended as a summary of the data - more in-depth analyses of the data are included both below and in separate analysis appendices.

	Country	Freq' Vehicles	Freq' road users	Freq' Fatalities
Passenger Cars		**1344**	**2257**	**756**
	DE	177	281	112
	FI	52	92	35
	FR	140	235	90
	IT	524	911	248
	NL	43	58	28
	SE	128	216	93
	UK	280	464	150
Motorcycles/Mopeds		**283**	**323**	**252**
	DE	33	36	32
	FI	11	12	10
	FR	35	37	30
	IT	111	135	94
	NL	6	8	6
	SE	18	22	19
	UK	69	73	61
Pedestrians (Shoe Vehicle)		**259**	**259**	**244**
	DE	-	18	17
	FI	-	10	8
	FR	-	16	16
	IT	-	138	133
	NL	-	5	4
	SE	-	23	18
	UK	-	49	48
Trucks		**210**	**231**	**21**
	DE	32	35	2
	FI	13	14	4
	FR	22	23	4
	IT	62	72	4
	NL	14	16	-
	SE	22	24	2
	UK	45	47	5
Bicycles		**128**	**128**	**120**
	DE	19	19	18
	FI	7	7	6
	FR	8	8	5
	IT	56	56	55
	NL	13	13	12
	SE	8	8	8
	UK	17	17	16
Vans		**81**	**116**	**26**

	DE	9	15	7
	FI	5	9	2
	FR	9	10	5
	IT	33	52	4
	NL	7	9	2
	SE	3	5	3
	UK	15	16	3
Buses/Minibuses		**31**	**61**	**4**
	DE	5	21	1
	FI	3	3	-
	FR	1	1	-
	IT	8	8	-
	NL	2	12	2
	SE	4	6	-
	UK	8	10	1
Agricultural Vehicles		**24**	**28**	**8**
	DE	6	7	1
	FI	2	2	-
	FR	-	-	-
	IT	9	11	5
	NL	3	4	-
	SE	2	2	1
	UK	2	2	1
Other Vehicle Types		**30**	**41**	**18**
	DE	3	3	-
	FI	2	9	2
	FR	3	3	3
	IT	16	20	10
	NL	3	3	1
	SE	2	2	1
	UK	1	1	1
	Totals	**2,390 Vehicles**	**3,444 Road users**	**1,449 Fatally injured Road Users**

Table 14; Numbers of Accidents Collected in Each member State by Road User Type

Fatal Accidents - Basic Facts

The Safetynet WP5.1 project collected 1296 retrospective fatal accident cases from the years 2003 and 2004. Cases were collected from 7 countries (sometimes labelled EU-7 in figures and tables) and included all road and road user types.

Data included in this basic fact-sheet reflects the work completed by the WP1 task as this provides stand alone WP5 results and the ability to compare with the overall European CARE data analysed by WP1.

Road accident fatalities in Europe

Included in the WP5 sample are 1,449 fatally injured road users from the EU-7 sample, this is approximately 1.5% of the total EU fatalities over the same period (2003/4). The proportion of fatalities increases to ~3% when considering only the EU-7 countries included in WP5. The 1,296 fatal accidents involved a total of 2,390 vehicles and a total of 3,444 road users (both fatal non-fatal).

Age and Gender

The distribution curve for age groups (Figure 14) shows a similar pattern to those demonstrated by larger (EU-15) comparisons. The highest number of fatalities is between 18 and 35 years of age with another slight peak present between the ages of 65 to 85 – this is more distinct in the WP5 sample than other studies.

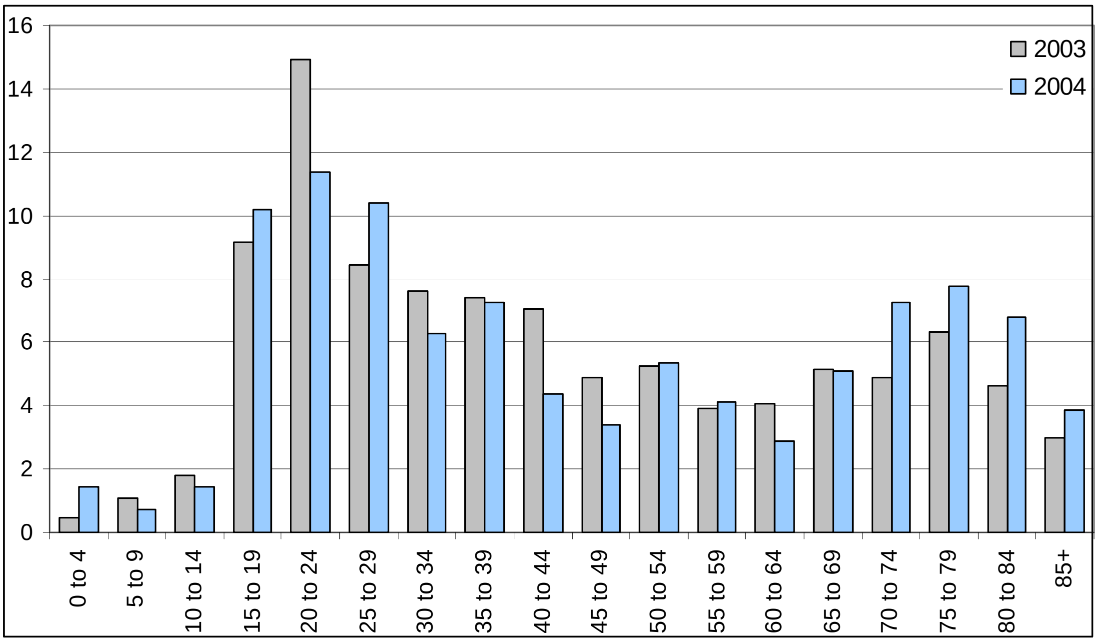


Figure 14: Fatalities by age group for EU7 (N=1,449)

Figure 15 shows the clear difference between the number of male and female fatalities with females representing less than one quarter of the total.

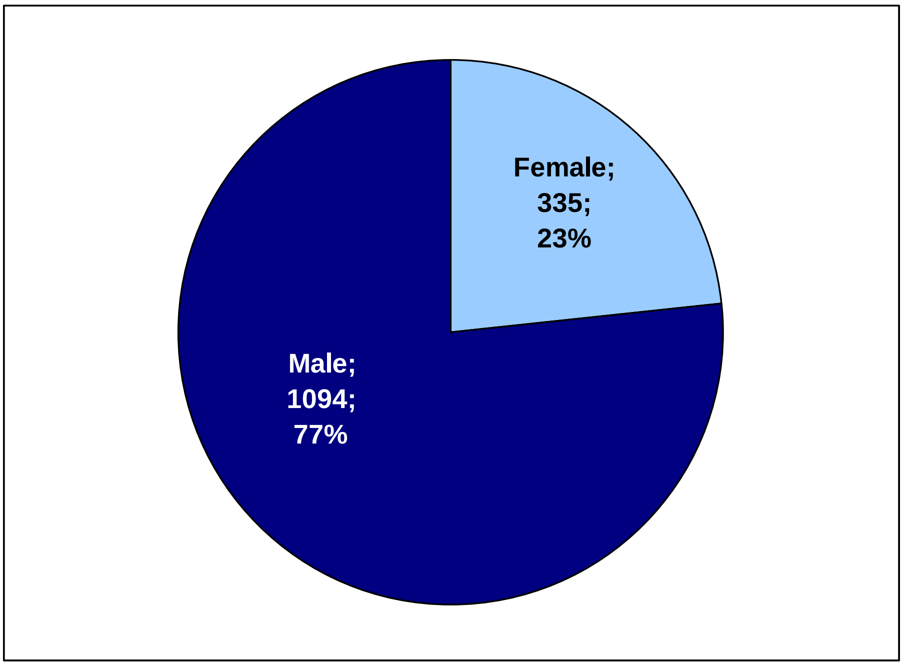


Figure 15: Fatalities by gender for EU-7 (N=1,449)

Figure 16 shows the proportion of fatally injured road users by gender and age banding. The proportion of fatally injured males between 20 and 39 is over 80% whereas the highest proportion of female fatalities is recorded as 44% between the ages of 55 to 59.

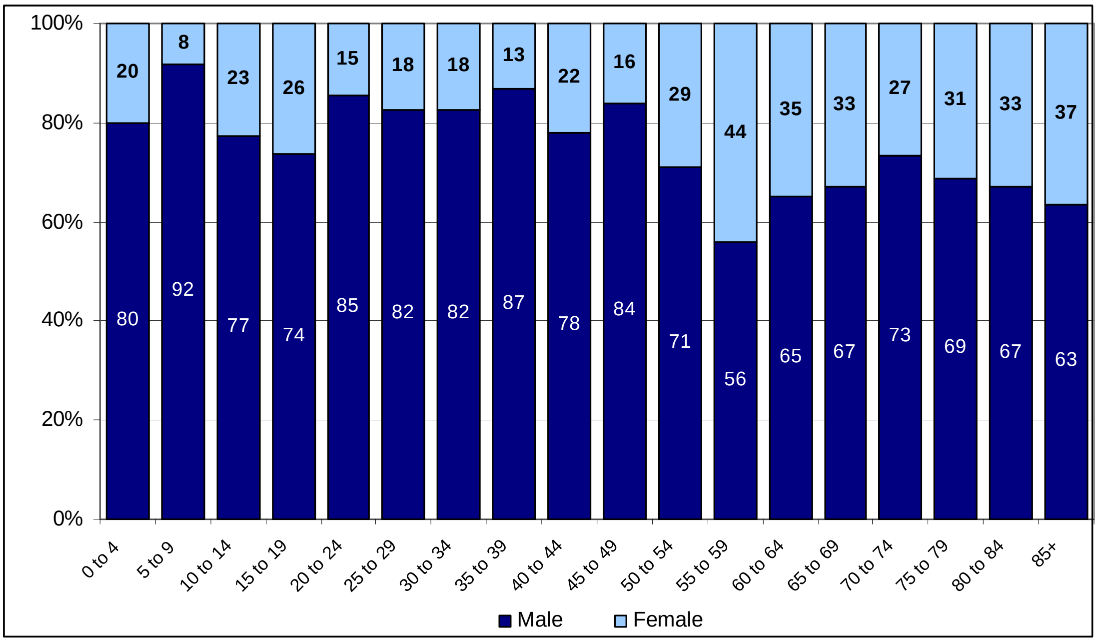


Figure 16: Distribution of fatalities by gender and age group in EU-7 (N=1,449)

The proportion of car driver and passenger fatalities differs considerably between male and female road users. The situation is almost reversed for female car occupants from the male proportions of 35% car driver and 15% car passenger.
Fatally injured female road users are also more common for pedestrians with the number being almost double that of male pedestrians.

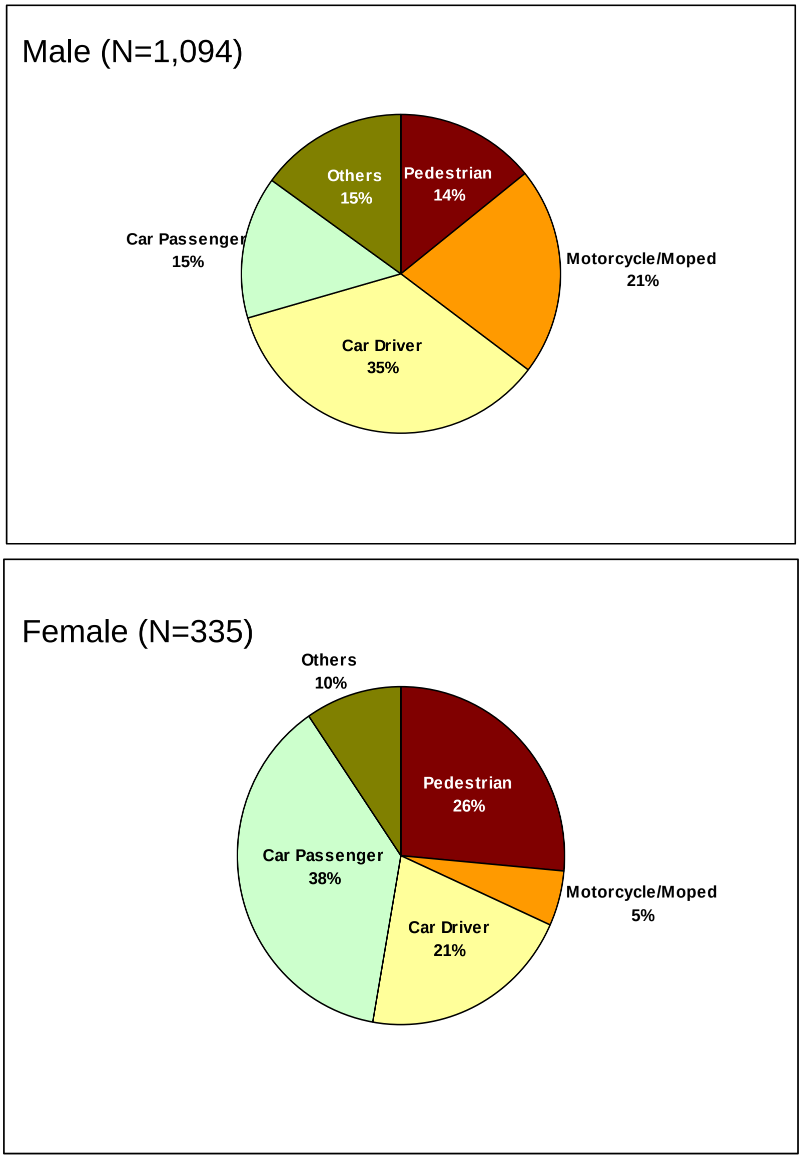


Figure 17: Distribution of fatalities by gender and mode of transport in EU-7
[No disaggregation is possible between Motorcycles and Mopeds as is the case with the CARE based data analysis. For the WP5.1 analysis these are combined as Motorcycle/Moped or Powered Two Wheelers (PTW)]

Type of Road

Across the EU-7 only 8% of accidents occur on 'motorways'. This varies between the Netherlands (with 18%) and the UK (with 3%). One third of accidents across the EU-7 occur in an urban environment with the remainder in a rural setting (figure 18).

The largest proportion of urban accidents occurs in Italy (46%) with the lowest in Sweden (16%). The reverse of this is true for rural accidents.

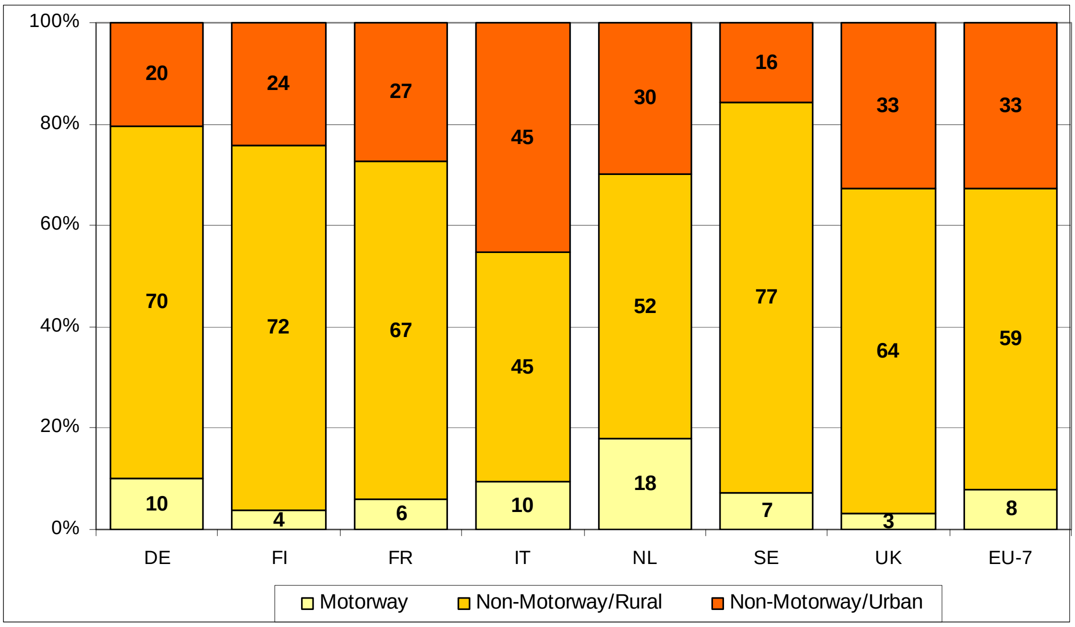


Figure 18: Distribution of fatalities by type of road (N=1,449)

Mode of transport and road user type

Car drivers (as with WP1 CARE analysis), represent the largest user group among road accident fatalities in all EU-7 countries. In combination with Car passengers they represent 47% of all road user fatalities at EU-7 level (ranging from 64% in Sweden to 45% in Italy).

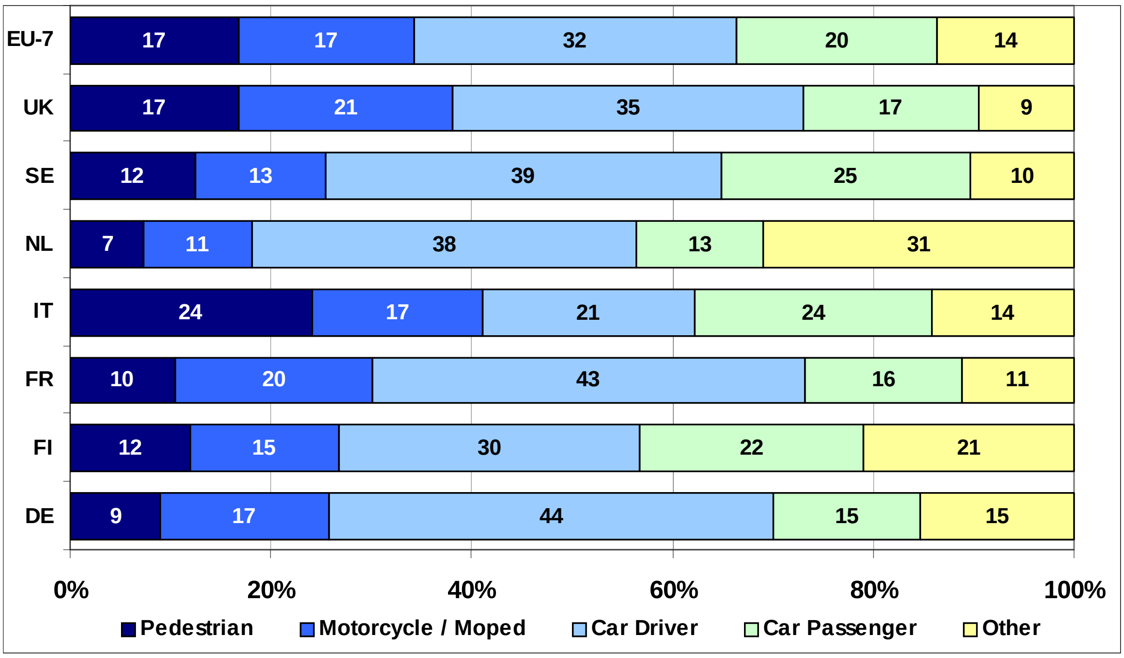


Figure 19: Road user fatalities by country (N=1,449)

The proportion of fatalities by road user type varies with type of road and is influenced by the modes of transport used typically on each road type (figure 20).

This can be seen when considering the proportion of non-motorised fatalities occurring in an urban setting where pedestrians account for 38% of the total, compared to rural areas and motorways where car occupant fatalities are more prevalent.

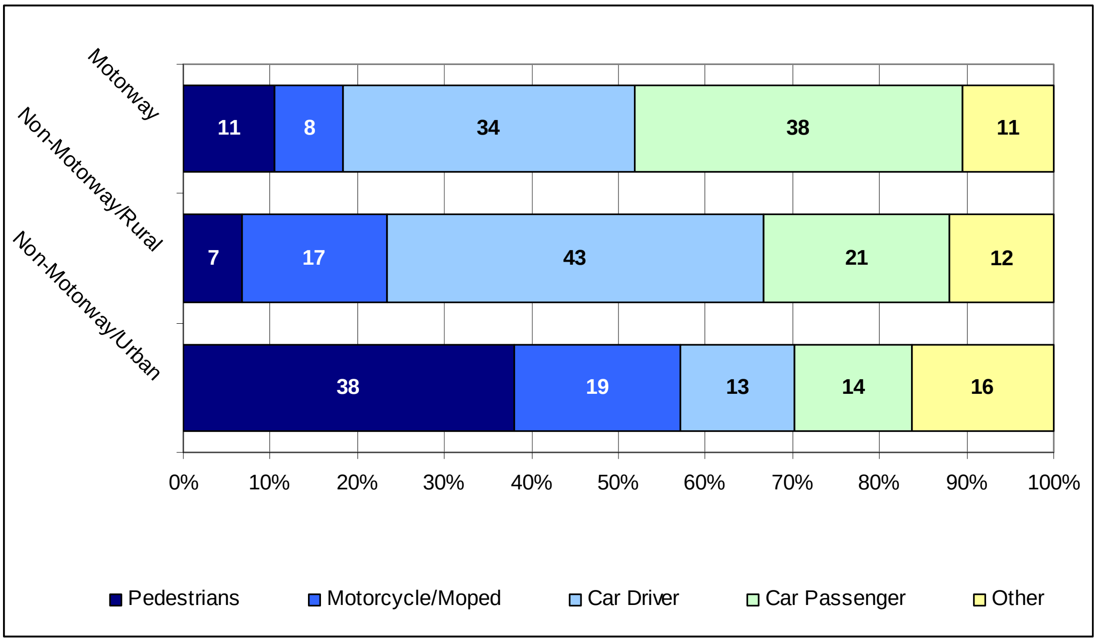


Figure 20: Fatalities by road user type and type of road in EU-7 (N=1,449)

The distribution of fatalities by time of day and day of week is less distinct than that shown in the WP1 data although patterns can still be seen (figure 21). Peaks in fatality numbers are still shown in the afternoon (except Thursday) with an increase in the early hours of Sunday and Monday morning.

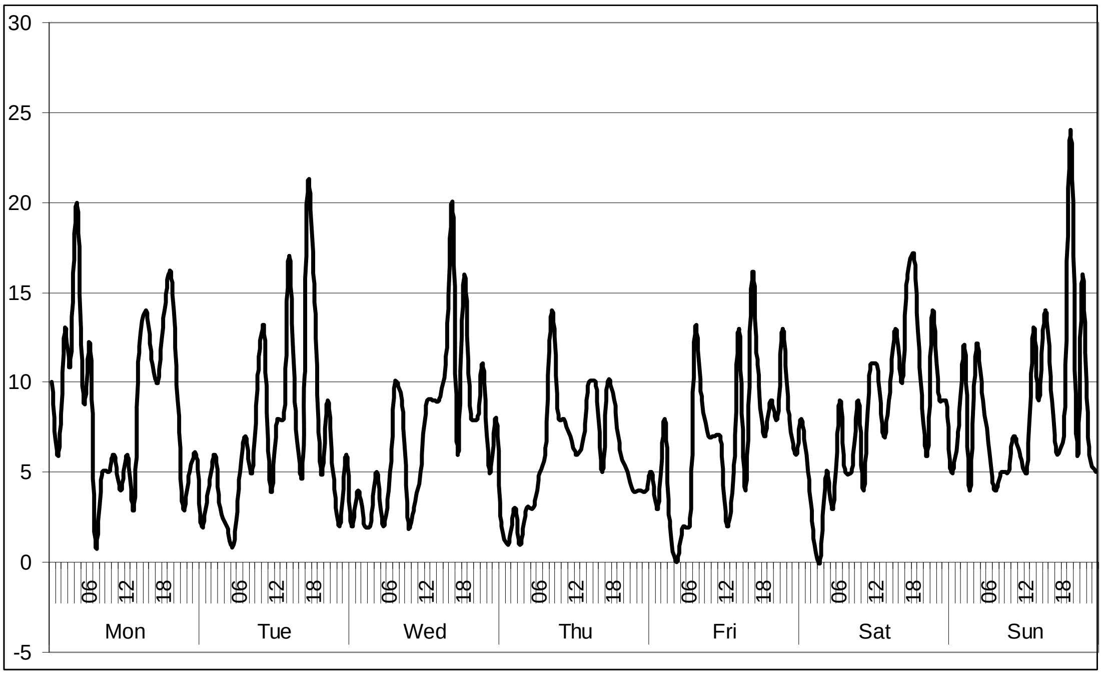


Figure 21: Fatalities in EU-7 by day of week and time of day (N=1,449)

General Results Overview

The completed WP5.1 European fatal accident dataset contains information on all road user types on all road classes from the years 2003 to 2004.
All road user types include 10 separate vehicle classifications shown below with the proportions in figure 22

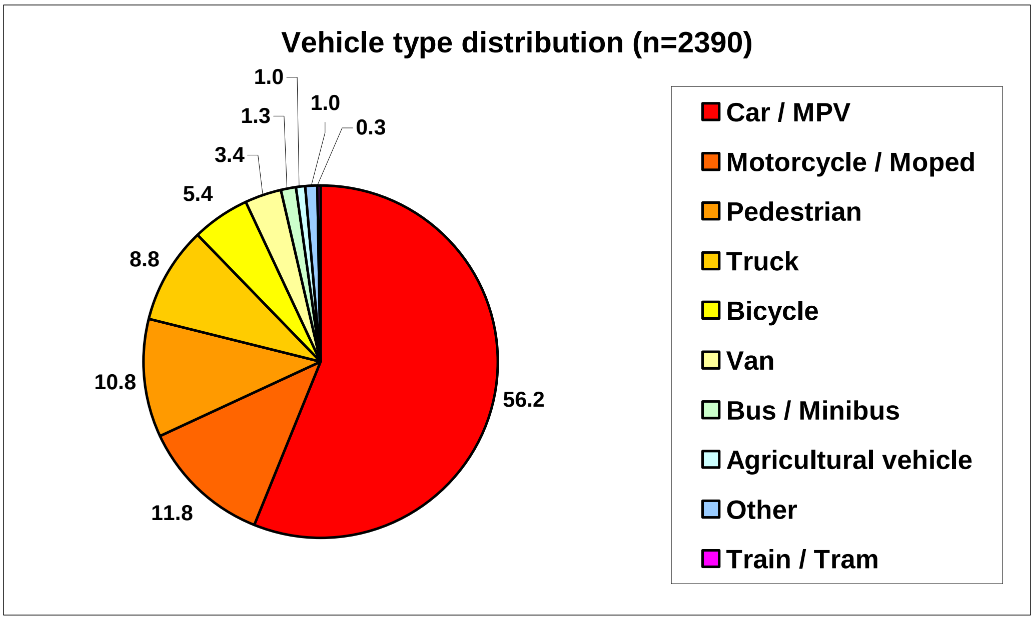


Figure 22: Vehicle type distribution for complete SafetyNet Task WP5.1 sample (N=2,390)

Based on all vehicles recorded in the WP5 database nearly 60% were passenger cars. Motorcycles/Mopeds and pedestrians are the second two largest groups accounting for approximately 10% each.

Figure 23 shows the proportions of fatalities only by road user class for all countries combined

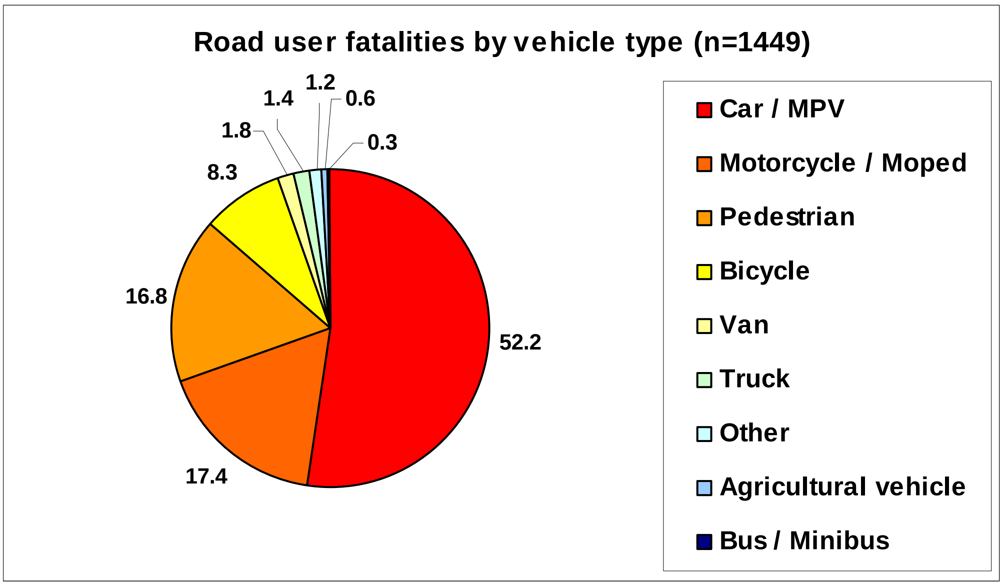


Figure 23: Proportion of total road user fatalities by vehicle type.

The largest group of fatalities is attributed to passenger cars. This is perhaps unsurprising considering they are proportionally the largest group. The increase in percentage shown for the second to fourth largest groups gives an indication of the vulnerability of Motorcycle riders, Pedestrians and Bicycle riders. Figure 24 below shows this effect to be much clearer in the proportion of fatalities by vehicle class.

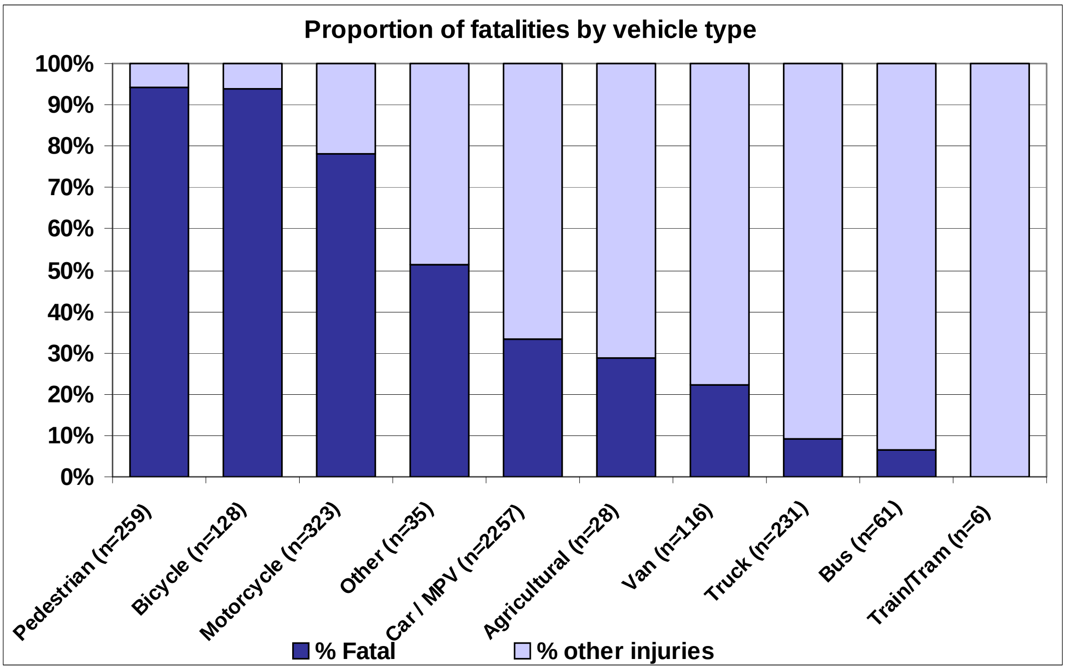


Figure 24: Proportion of fatalities by vehicle type (N=3,444)

On average, approximately 90% of Pedestrians, Cyclists and Motorcycle riders are fatally injured. Conversely only 34% of car occupants (including drivers and passengers) in the sample were fatalities.

Figure 25 shows the age-banding for fatally and non-fatally injured road users. For known ages, the highest proportion of road-users for occupants of any severity were to be found in the younger age bandings (from 15 to 39 years) with a peak in the 20 to 24 age-banding.

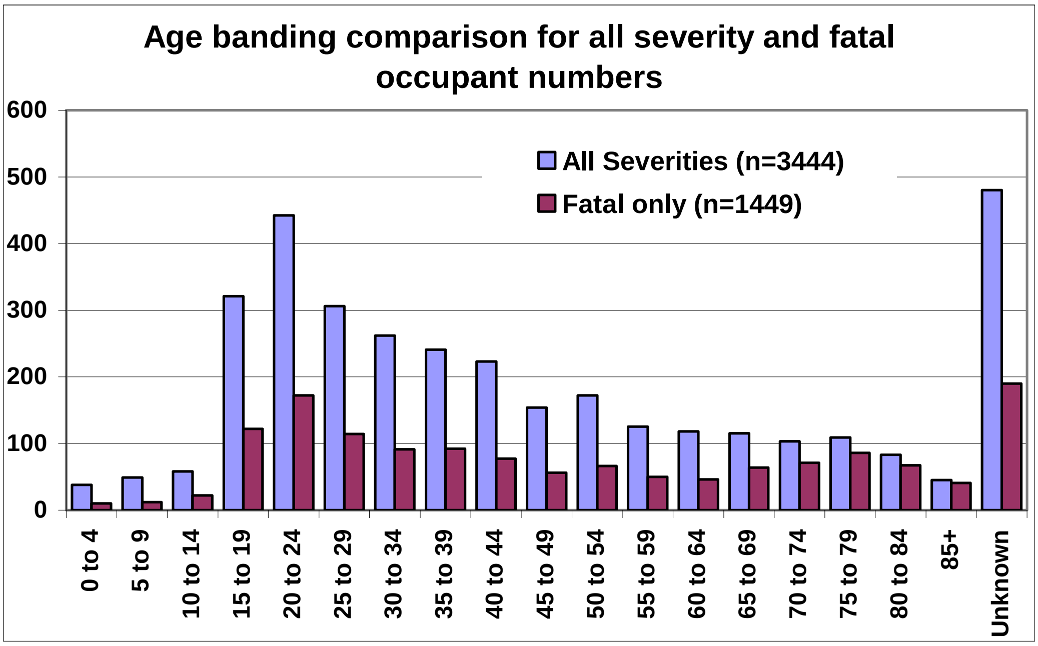


Figure 25: All severity and fatal road user age banding comparison

The proportion of fatalities by specific age-groups has also been studied as shown in figure 26. As can be seen from figure 26, over 90% of the road-users in the 85+ category were fatally injured compared to 28% of the 0 to 4 age category. In general, the age groups 65 and above have the highest recorded fatalities while ages below 10 have the least.

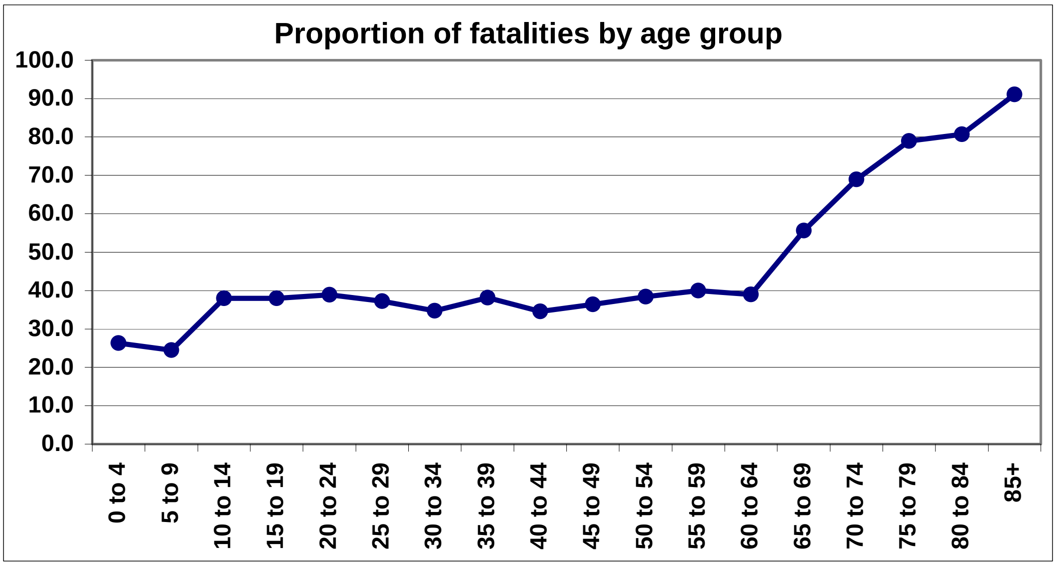


Figure 26; Proportion of fatalities by age group – all road users (N=3,185)

Table 15 shows fatal accident location by local area and road type.

	Two way traffic, painted line	Two way traffic, with barrier	Two way traffic w/o painted lines	Two way traffic w/o barrier	One way traffic	Other	U/K	Total
Mixed	161	10	14	10	0	10	0	205
Rural	1014	200	114	11	7	32	3	1381
Unknown	0	0	2	0	0	1	0	3
Urban	522	39	87	54	56	41	2	801
Total	1697	249	217	75	63	83	5	2390

Table 15: Fatal accident location by local area and road type (N=2,390)

71% (n=1697) of all vehicles involved in fatal accidents were using sections of road that were two way, separated only by painted lines. Of these, 1014 vehicles (~60%) were in a rural setting. The second largest group involved vehicles on road sections physically separated by a traffic barrier. These accident account for approximately 10% of the vehicles (n=249).

Figure 27 shows vehicle type classification by local area.

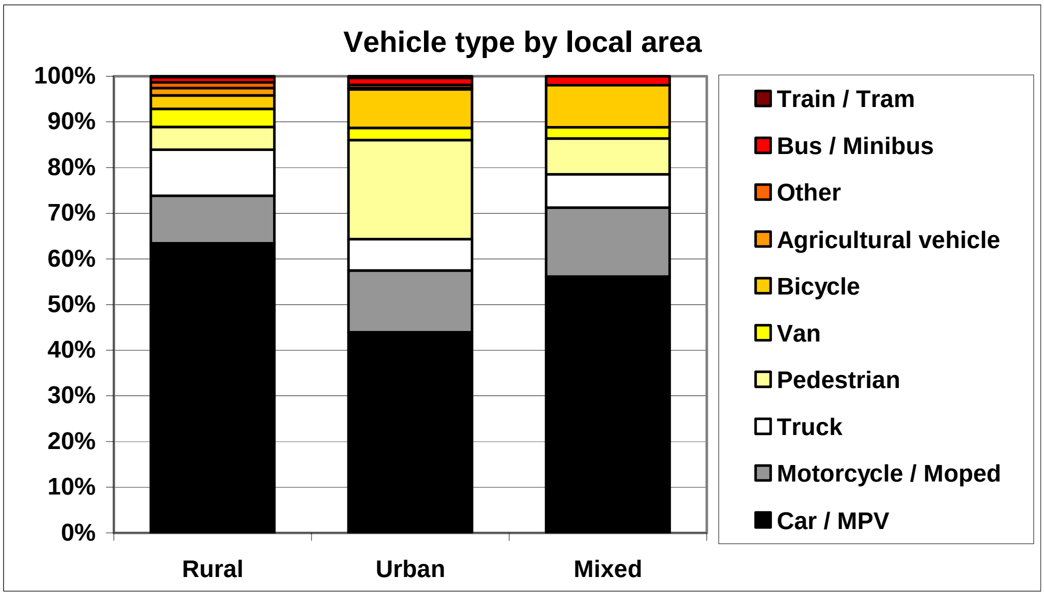


Figure 27: Vehicle type classification by local area (N=2,390)

Passenger cars dominate the proportions of vehicles involved in all three area classifications from urban roads at approximately 45% to rural roads and a peak at over 60%. Pedestrians show an unsurprising increase when the area classification is urban increasing from an average of ~6% for both rural and mixed area types to approximately 22%.

Figure 28 shows fatal accidents by road condition and light condition.

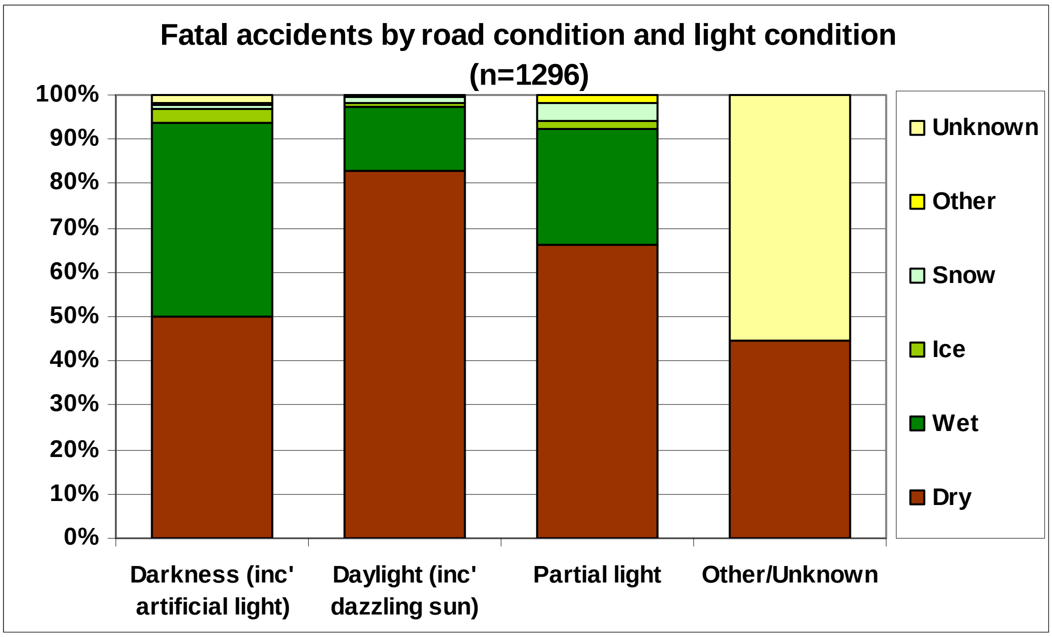


Figure 28: Fatal accidents by road condition and light condition (N=1,296)

Road conditions were found to be predominantly dry for all light conditions recorded. The highest proportion of dry roads is unsurprisingly recorded for daylight accidents with approximately 80% of accidents occurring with this road condition. Wet roads are proportionally higher in darkness accidents accounting for 35%. This compares to daylight and partial light accidents with 14% and 26% respectively.

Impairment records for the three road user groups (Drivers, Riders and Pedestrians) shown in figure 29 illustrate that approximately 10 to 13% of each group are under the influence of Alcohol, Drugs, Medication or a combination of sources.

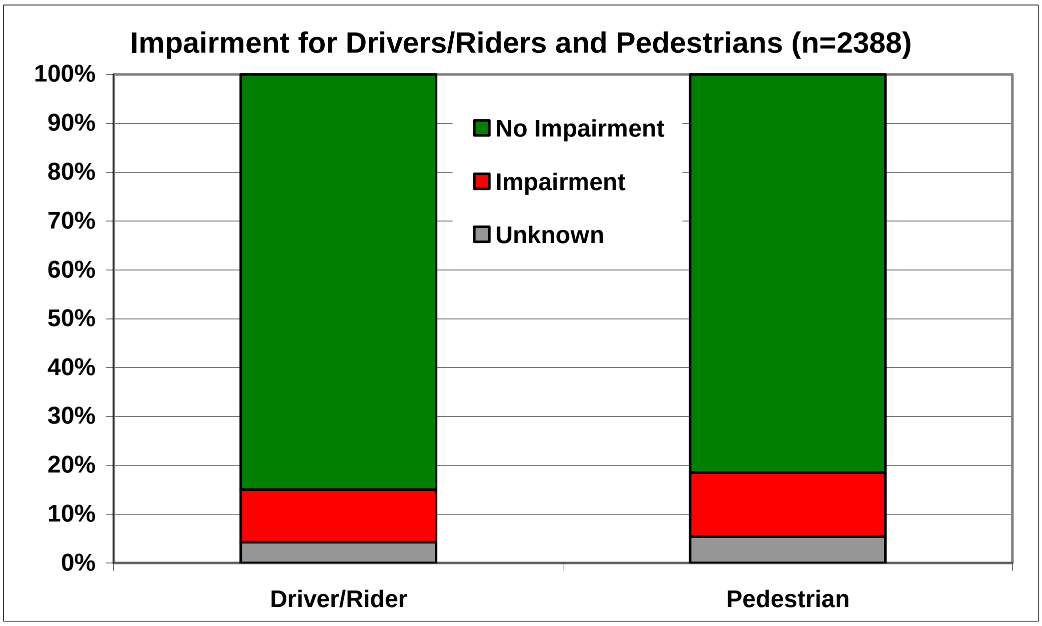


Figure 29: Impairment records for Drivers, Riders and Pedestrians (N=2,388, analysis excludes vehicle passengers))

The numbers of road users and type of impairment is shown if Table 16.

	Road user classification		
Impairment type	**Driver**	**Pedestrian**	**Total**
Alcohol	132	26	158
Combination	14	1	15
Drugs	15	2	17
Drugs and alcohol	9	0	9
Fatigue	37	0	37
Medication	13	2	15
None	1809	211	2020
Other	9	3	12
Unknown	91	14	105
Total	2129	259	2388*

Table 16: types of impairment for 2388 Drivers, Riders and Pedestrians (*analysis excludes vehicle passengers)

9 Summary of Results

The results of task 5.1 can be summarised as follows;

- 1,296 Fatal accident cases were collected in total and entered onto the WP5 database. These cases involved 1,449 fatally injured road-users from 7 participating EU Member States.
- The total number of fatally injured road-users represents 3% of the total population of fatally injured road-users in the participating countries during the data collection period
- The highest concentration of fatally injured road users were found in the 18 to 35 age category
- 77% of the 1,449 fatally injured road users were male and 23% female. For 20 cases, the gender was unknown
- Car drivers comprised 38% of the sample of fatalities involving males whereas for females, 38% were car passengers.
- Passenger car occupants were the highest road-user group in each sample. Overall 52% of the sample was car driver or passengers.
- Of 2,388 drivers, riders and pedestrians, 6.6% were found to be impaired through alcohol and less than 1% (0.7%) was found to be impaired through drugs. In the vast majority of cases (85%) no impairment was evident.

From analysis appendix 1

- The fatal accident dataset contains a total of 1,344 passenger cars containing 2,257 occupants. Of these, 756 were fatally injured of whom 465 were drivers and 291 were passengers.
- The majority of the accidents involving passenger cars occurred in rural environments (73%)
- 20% of fatalities in passenger cars occurred on a Monday (the most frequent) compared to 10% on a Thursday (the least frequent)
- In 41% of fatalities, the accident type was described as a 'Driving Accident' with no turn-off or intersection involved.
- Most passenger cars involved in the accidents recorded on the fatal accident database were manufactured between 1994 and 2002 reflecting a relatively modern fleet amongst the participating Member States.
- Of 1,344 cars involved in fatal accidents, 266 were involved in single vehicle accidents.
- Of 266 fatal Single Vehicle Accidents (SVA's), 52% occurred on a curved road and 35% occurred on a straight road.
- When the 'most harmful' events could be pin-pointed, the majority (~62%) involved collisions with trees.
- The head is the most severely injured body region for fatally injured passenger car occupants in SVA's accounting for anything between 34% and 50% of all injured body regions.
- Seat belt use for drivers fatally injured in SVA's was 33% but for passengers it was 50%
-

From analysis appendix 2

- Pedestrians represent the third largest group in the SafetyNet WP5 fatal accident dataset, accounting for nearly one fifth of the total fatalities recorded.
- By country Italy has the highest proportion of pedestrian fatalities with nearly two thirds of the sample; the country with the second largest proportion is the United Kingdom with nearly one fifth of the fatalities.
- Analysis of age and gender of pedestrian fatalities show that the group is predominantly male, accounting for nearly two thirds of the sample. The group is also skewed towards elderly pedestrians with almost two thirds over the age of 60. Only around 10% of the fatalities occur at ages below 30 years.
- Pedestrians fatally injured in road accidents were predominantly not under the influence of Alcohol, drugs or impaired in any other way. Only around 10% had records of alcohol use with a small proportion recoding drug use.
- Only 4 pedestrians from the sample of 179 were found to have worn high visibility clothing.
- Proportionally more pedestrians were found to have ‘Multiple body regions’ injured compared to car passengers. This is probably the result of the severity of the impacts.
- The second most common body region that caused the pedestrian fatality was an injury to the head. This is perhaps an unsurprising result as aggressive contacts with stiff vehicular structures such as windscreen pillars or the windscreen are very common.

From analysis Appendix 3

- A total of 263 fatal accidents involving 283 mopeds and motorcycles have been registered in the 5.1 Fatal Accident database.
- Most of these accidents happened during summertime; this reflects the use of this type of vehicles which increases with warm temperatures and dry road conditions
- Over half of powered two wheelers in the sample classify as category A - motorcycles with no power restrictions, according to the European driving license classification system.
- Over one third of motorcycle/moped accidents were classified as driving accidents. These accidents were initiated by a single vehicle loss of control.
- Nearly 40% of motorcycle and moped accidents occurred at or near junctions with GDV accident classifications recording either vehicles turning off or vehicles turning in or crossing.
- The most common accident type (44%) involved a motorcycle/moped in collision with a Car/MPV.
- Slightly over one fifth of all motorcycle/moped accidents (22%) occurred as a single vehicle accident.
- Almost half of all motorcycle/moped accidents occurred in a rural setting. Urban accidents accounted for 41% of all accidents.
- In the immediate location of the accident 45% of motorcycle/moped accidents showed a junction. 29% at t junctions and 13% at cross roads.
- 54% of motorcycle/moped accidents showed no junction influence

- Considering junction accidents the most frequent motorcycle/moped rider manoeuvre is “Driving round a right hand bend” (about 42%) which highlights a problem with road alignment near intersections.
- Overtaking a moving vehicle is a recorded rider manoeuvre in nearly one third (17%) of junction accidents.
- In most accident situations occurring at junctions a vehicle driver turns left or pulls out from a side road in front of a PTW rider approaching the intersection.
- Single vehicle accidents without junction influence are characterized by the rider driving round in a left or right hand bend (55%) or travelling along a straight road (32%).
- Motorcycle/moped accidents without junction influence show the most frequent rider manoeuvre to be “Driving along a straight road” (49%).
- “Driving round bends” (31%) and “Overtaking moving vehicle” (14%) are other frequent rider manoeuvres in motorcycle/moped accidents away from junctions.
- About 40% of all riders and passengers involved in motorcycle/moped accidents died as a result with only 5% reporting serious injuries.
- In about half of motorcycle and moped cases no crash avoidance manoeuvre is reported for riders, braking is evident in one third of cases while steering is recorded in only 11%.
- In general for all motorcycle and moped classes a collision with another vehicle represents the most harmful event.
- The area of most vehicle damage for car/MPV in collision with a motorcycle is the front of the car (approximately 47% of cases). This is followed by the right side (23%) and the left side (21%).
- The most common age group for motorcycle/moped riders is between 30 and 39 years of age.
- Almost all of the motorcycle and moped riders are male.
- In general there is a trend towards higher motorcycle engine power outputs and elevated pre-impact speeds (where reported).
- Over 90% of all motorcycle and moped accidents occurred on a dry road in dry weather without any influence from road surface contaminants.
- Nearly three quarters of accidents occurred in daylight with just under a quarter occurring in darkness (including darkness with artificial lighting).
- The majority of accidents occurred on a straight and level section of road way. Fewer than 40% had any bend influence.
- Two thirds of the motorcycle and moped riders are reported as using a protective helmet, only 8% record non-use.
- Information on protective clothing is limited, however there is an indication that full protective equipment is more often not worn.

From analysis Appendix 4

- Within the motorized vehicle sample single vehicle accidents (SVA) were proportionally very high. The majority of the SVA’s were classed as driving accidents.
- Turning off and turning in/crossing accident types are accidents that involve junctions and a degree of crossing traffic, these account for approximately one third of the accidents.

- The majority of accidents involving motorised vehicles occurred in two way traffic and, more commonly, road sections divided by a painted centre line.
- The second largest group of accidents were those occurring in two way traffic but physically divided by some type of barrier.
- Accidents on motorways were rare in the database.
- The majority of accidents occurred on roads with speed limits of between 81 and 100 km/h. Only a small number of accidents occurred on roads with a speed limit of above 100 km/h.
- Accident locality was predominantly rural, accounting for nearly three quarters of the total accidents.
- Traffic flow conditions were light or normal in over three quarters of the cases, accidents in heavy traffic featured less often.
- Just over half of the accidents involving motorised vehicles occurred on a straight road. Almost all the remaining accidents occurred in a curve with a very slight bias towards left hand bends.
- For single vehicle accidents only ~40% occurred on a straight road and ~60% on a bend, again a slight bias is shown towards the left.
- Just over half of the accidents occurred during daylight hours. A further 38% occurred when it was dark (including dark with artificial lighting).
- Nearly ninety percent of accidents occurred when the weather conditions were dry.
- Among the adverse weather conditions rain gained the largest share with approximately 10% of all motorised vehicle accidents.
- More vehicles had an accident on a wet road surface than those recorded as having an accident when weather conditions were raining, 22% compared to 9%.
- Bicycles and pedestrians had the majority of accidents in two way traffic, divided only by a painted line.
- Nearly half of bicycle and pedestrian accidents occurred at junctions with the largest share at T junctions, this was followed by crossroads.
- Cyclists and pedestrians tend to have accidents on roads with a lower speed limit than do motorised vehicles. The majority of bicycle and pedestrian accidents occur within 31-50 km/h speed limits.
- In contrast with motorised vehicles, most bicycles and pedestrians had an accident in an urban area.
- Cyclists and pedestrians more often had accidents when the traffic flow was normal or light, however, a greater percentage of pedestrians and bicycles had an accident in normal traffic flow than did motorised vehicles.
- The majority of cyclists and pedestrians were travelling on both a flat and straight road.
- For the majority of pedestrian accidents there was no pedestrian crossing facility present however for one fifth there was an uncontrolled, designated crossing.
- Nearly three quarters of cyclists did not have the option of using a dedicated cycle facility.
- The majority of bicycles had accidents in the daytime whereas only half of pedestrians had an accident during the day.

- 43% of pedestrians were travelling in the dark when they were involved in a fatal accident.
- For both bicycles and pedestrians, the weather was more often dry. Very few bicycle accidents occurred during adverse weather conditions.

10 Discussion

The aim of the SafetyNet work package 5.1 was to develop a European Fatal Accident database which would allow examination of road, vehicle and highway factors implicated in fatal accidents within the EU. In total, 1,296 fatal accident cases were collected from the 7 participating EU member States using a standardised protocol. The data from these accident cases have been collated, entered onto a database and analysed according to a number of selected research domains. Thus analysis includes a general data overview, an analysis of the nature and circumstances of fatal passenger car accidents, an analysis of the nature and circumstances of fatal pedestrian accidents, and an analysis of the nature and circumstances of fatal two-wheeler accidents.

A concern has been raised regarding the use of multi-source data in task 5.1. The raw data sources vary between police reports, judiciary records, road authority data and insurance reports. This varied approach raised questions regarding the independence of the data. However, as task 5.1 began by setting a level of data to be collected from a sample of source material this approach ensured that all partners could collect fatal accident case data to the same level. The effect of bias on the data is therefore considered minimal by the task 5.1 partnership.

The study itself clearly demonstrates that the development of a European Fatal Crash database is a realistic prospect and the WP5 partnership strongly recommend that a future activity should be conducted using the protocol developed with task 5.1. Clearly the data have limitations in that there were only 7 EU member states participating in the data collection but this could easily be overcome given appropriate resources and assessing the wider capability and willingness to collect such data from a wider partnership. The 5.1 data clearly have a number of purposes for policy-makers in national administrations and the EC and for other stakeholders. Whilst the method used has limited application to the vehicle manufacturers, it is suggested that a sufficient level of detail exists within the database for the data to be useful for local and regional highway authorities where even a case-by-case review of individual accident cases would be useful.