

Traffic Safety Basic Facts 2004

Motorways

Motorways are the safest roads by design: slow traffic is not allowed, traffic travelling in opposite directions is separated by safety barriers, junctions are grade separated, and there are more lanes in order to enable straightforward overtaking. On the other hand, high speed limits and drivers exceeding beyond that limit have a large impact on the severity of traffic crashes.

In this fact sheet safety and exposure data concerning motorways are presented. The results are from the EC CARE database, which includes 14 of the 25 EU member states. Information on Germany and all 'new' EU countries (accessed in May 2004) is not available. For referencing purposes (road length, vehicle kilometres), data from the IRTAD database has been used.

Summary

On average 2.500 people are killed each year on motorways in 14 EU countries

On average, 2.500 people are killed each year on motorways in the 14 EU countries that are included in this study. This represents about 7,9% of all 32.000 traffic fatalities in these countries. Most fatalities are among male drivers.

Motorways make up roughly 0,9% of the total paved road network length, but 19% of the motor vehicle kilometres are on them. The traffic volume is about 33.000 vehicles per day, compared to 2.000 on other roads.

The number of fatalities is stable in the EU14, while the motor vehicle kilometres are increasing. This means that the fatality rate is decreasing.

Fatalities on Motorways

Table 1 offers a general view on the number of fatalities on motorways.

Table 1: Fatalities on motorways by country and year, and the share of motorway fatalities in the number of fatalities on all roads in the last available year.

Country	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Share 2002*
BE	217	197	207	199	187	222	209	236	192	-	12,9%
DK	21	32	31	30	32	30	40	29	38	48	10,4%
EL	1	2	1	148	72	61	105	61	86	-	4,6%
ES	423	374	354	313	313	353	327	354	375	321	6,0%
FR	589	461	456	448	470	492	476	519	486	521	6,8%
IE	1	1	6	2	3	0	1	4	4	5	1,3%
IT	756	690	782	752	848	711	-	-	-	-	11,3%
LU	0	0	0	0	0	0	0	0	0	0	0%

NL	164	161	190	182	156	108	132	138	124	123	12,5%
AT	136	173	159	100	115	134	139	126	156	126	13,2%
PT	92	85	99	116	104	105	123	128	112	115	7,0%
FI	4	5	16	7	3	10	9	13	11	16	3,9%
SE	33	31	31	20	40	24	25	25	30	27	4,8%
UK	199	158	183	168	192	175	200	188	198	226	6,3%
Total	2636	2370	2515	2485	2535	2425	-	-	-	-	7,9%
Yearly change		-10%	+6,1%	-1,2%	+2,0%	-4,3%					

- data not available

Date of query: February 7, 2005

* IT: 1998 / BE, EL: 2001

Source: CARE Database / EC

When compared to the total number of fatalities, it can be calculated that on average in the last available year, 7,9% of the fatalities are on motorways in these 14 EU countries. Some countries (Austria, Belgium, Italy, and the Netherlands) have relatively high shares of motorway fatalities.

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Length of roads and vehicle kilometres

In order to compare the safety level of motorways for different countries one has to take into account exposure like road length or traffic volume (kilometres travelled). Table 2 offers various exposure indicators on each country's road network and use of that network.

Table 2: Characteristics of motorways.
Sum and average only for available countries.

Country	Average length (km) (1991-2002)		Proportion of motorway length with respect to the total network	Development of the length of motorways (linear trend)	Proportion of motor vehicle kilometres on motorways, compared to all motor vehicle kilometres	Average Intensity on motorways in number of vehicles per day
	all roads	motorways				
BE	144.500	1.680	1,2 %	0,4%	32,7%	44.500
DK	71.400	840	1,2 %	2,9%	18,3%	25.500
EL	40.200	-	-	-	-	-
ES	664.700	2.670	0,40%	2,6%	-	18.600
FR	929.400	8.420	0,91%	2,8%	18,5%	30.000
IE	92.900	70	0,08%	6,9%	1,2%	14.100
IT	304.830	6.420	2,1 %	0,3%	-	28.200
LU	2.900	120	4,1 %	0,1%	-	-
NL	110.900	2.200	2,0 %	0,8%	36,5%	52.200
AT	106.400	1.590	1,5 %	0,8%	22,0%	25.700
PT	80.100	680	0,85%	4,7%	-	23.900
FI	78.800	410	0,52%	5,1%	7,2%	21.100
SE	210.500	1.260	0,60%	3,6%	12,5%	17.900
UK	402.800	3.380	0,84%	1,1%	16,6%	59.700
Total	3.240.000	29.740				
Weighed average			0,93%	1,8%	19%	33.000

- data not available

Date of query: October 2004

Source: IRTAD Database

From further IRTAD data it can be calculated that 0,93% of the European road network is a motorway. The motorway length is increasing by 1,8% each year, while the total road network is increasing by 0,8%.

Although Luxemburg has a high proportion of motorways in its network, none of the 70 fatalities per year have been reported to be on a motorway.

On average, 19% of the motor vehicle kilometres are on motorways. The variation between countries is large; from 1% in Ireland to more than 35% in the Netherlands.

On average, 19% of the vehicle kilometres are on 0,9% of the road network: motorways

Plotting the intensity to the proportion of the network being a motorway, see figure 1, it is remarkable to see that high proportions of motorway length go hand in hand with intense use of the motorways. In the United Kingdom the high intensity seems to be related to the relatively small network of motorways.

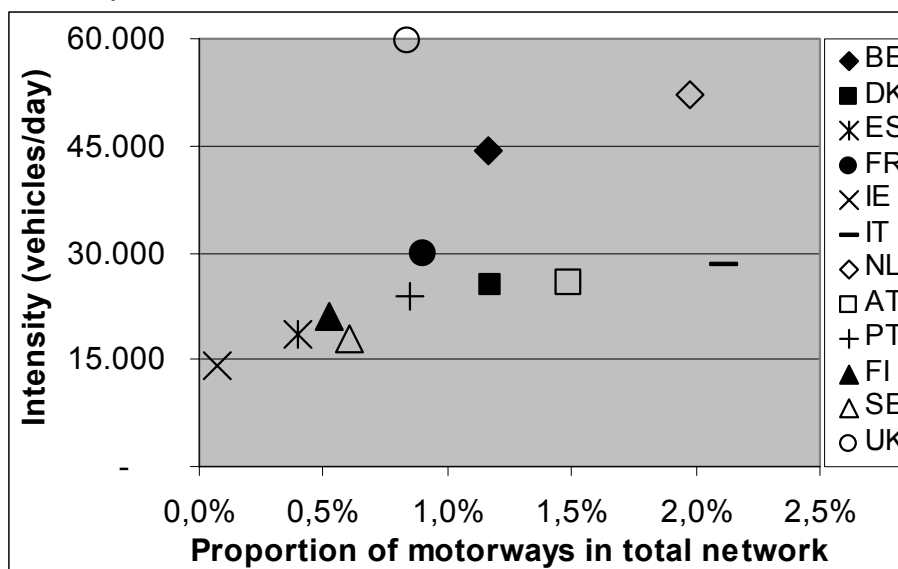


Figure 1. Average intensity versus motorway proportion

Finland and Sweden have the lowest rates of fatalities per road length

These rates are higher than average for Belgium, Italy and Portugal

Fatality Rates

In order to compare the safety level of motorways for different countries one has to take into account exposure expressed in road length or vehicle kilometres. Combined with the number of fatalities the rate can be calculated.

Table 3 shows the rate by the number of fatalities per 1000 kilometres length of motorways. This rate is higher on motorways than on the other roads by an average factor 6.

Table 3: Rate - fatalities per 1000 km road length of motorways, Average rate (1993-2002)

Country	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Average
BE	131	118	124	119	111	132	124	139	111	-	123
DK	28	41	39	38	38	35	43	30	39	48	38
EL	-	-	-	-	-	-	-	-	-	-	-
ES	-	-	-	-	-	-	-	-	-	-	-
FR	79	60	57	54	55	55	51	56	50	52	57
IE	42	14	-	-	-	-	11	39	32	-	27
IT	118	107	121	117	132	110	-	-	-	-	117
LU	0	0	0	0	0	0	0	0	0	0	0

NL	77	74	87	82	70	48	59	61	55	-	68
AT	88	110	100	63	72	83	86	77	95	77	85
PT	159	144	144	-	152	126	139	-	-	-	144
FI	13	15	41	18	7	23	19	25	20	27	21
SE	33	29	27	16	29	17	17	17	20	18	22
UK	59	47	54	49	54	51	-	-	-	-	52
Average											69

- data not available

Source: CARE-database / EC, IRTAD

Date of query: October 2004

Finland and Sweden have the lowest rates, Belgium, Italy and Portugal have higher rates. None of these countries show extreme positions in figure 1. The average yearly decrease of the fatality rate is 1,3%.

Table 4 shows the rate, defined as the number of fatalities per billion vehicle kilometres on motorways.

Table 4: Rate - fatalities per 10⁹ motor vehicle kilometres on motorways, Average rate (1993-2002)

Country	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Average
BE	9,4	8,2	8,2	7,7	7,0	8,3	7,3	7,8	6,3	-	7,8
DK	3,8	5,4	4,7	4,2	4,0	4,1	4,5	3,2	3,9	4,9	4,3
EL	-	-	-	-	-	-	-	-	-	-	-
ES	22,7	-	-	-	-	-	-	-	-	-	23
FR	8,0	5,9	5,5	5,2	5,3	5,4	4,9	5,1	4,6	4,7	5,5
IE	4,8	4,7	10,3	2,9	-	-	-	-	-	-	5,7
IT	11,5	10,4	11,2	-	-	-	-	-	-	-	11
LU	0	0	0	0	0	0	0	0	0	0	0
NL	4,4	4,2	4,8	4,4	3,7	2,4	-	-	-	-	4,0
AT	10,5	13,0	11,7	7,2	7,9	9,0	8,9	7,8	9,3	7,4	9,3
PT	22,0	18,8	19,8	19,6	-	16,5	16,4	15,7	-	-	18
FI	1,8	2,1	6,3	2,6	1,0	3,2	2,7	3,5	2,8	3,8	3,0
SE	-	4,5	4,3	2,7	4,9	2,9	2,6	2,5	-	-	3,5
UK	3,2	2,3	2,6	2,2	2,4	2,1	2,3	-	-	-	2,4
Average											7,5

- data not available

Source: CARE-database / EC, IRTAD

Date of query: February 7, 2005

Finland, Sweden and the United Kingdom have the lowest rates of fatalities per vehicle kilometre

These rates are higher than average for Spain, Italy and Portugal

Finland, Sweden and the United Kingdom have the lowest rates. Spain Italy and Portugal have rates higher than average. The lack of recent data complicates conclusions from this table. No clear trend can be detected, although France and the Netherlands show a declining rate.

From IRTAD data, it can be calculated that the fatality rate per motor vehicle kilometre is about 3 times higher on non-motorways than on motorways.

Plotting the average rate to the intensity from table 2 (see figure 2), a diffuse picture is obtained. Countries with highest rates do not have extreme intensities.

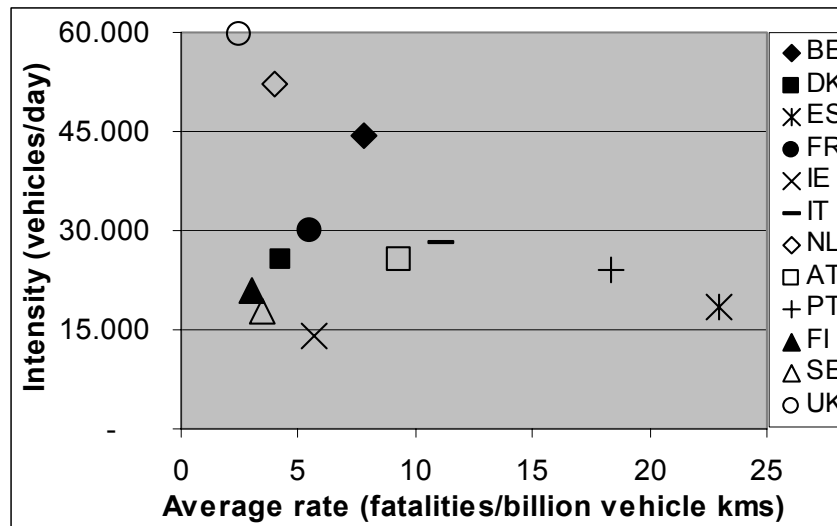


Figure 2. Rate versus Intensity on motorways

European Road Assessment Program

Something similar, but studying individual roads, is the aim of the EuroRAP project. The EuroRAP project rates motorways by the number of accidents per billion vehicle kilometres. On their website intermediate results can be found for a limited number of countries. www.eurorap.org

Fatalities by Collision Type

Table 5 shows the number and share of different collision types on both motorways and other roads. The number of unknown and other collision types (not possible to create a common value) is large; they makes almost one third.

The share of chain or rear-end crashes is much higher on motorways than on other roads

Table 5: Fatalities by collision type for last available year and for all countries

Collision Type	Motorways	Share	Other roads	Share
animal	0	0,0%	29	0,1%
chain or rear	480	17,9%	1.448	4,5%
frontal	161	6,0%	4.588	14,4%
lateral	219	8,1%	5.438	17,0%
parked vehicle	20	0,7%	123	0,4%
pedestrian	76	2,8%	2.724	8,5%
single vehicle accident	210	7,8%	2.963	9,3%
single vehicle accident, no obstacle	275	10,2%	2.273	7,1%
single vehicle accident, with obstacle	330	12,3%	2.540	8,0%
other / unknown	918	34,2%	9.815	30,8%
Total	2.689	100%	32.481	100%

Source: CARE Database / EC
*IT: 1998 / BE, EL: 2001

Date of query: October 2004

Some remarkable findings identified in this table are:

- The proportion of chain or rear-end accidents is much higher on motorways than on other roads.
- Although traffic in opposite directions is separated by safety barriers frontal collisions still have a share of 6% in fatalities on motorways, due to skidding crashes.

- Some countries (FR, IE) do not split their single vehicle accidents with respect to the presence of obstacles. Different types of single vehicle accidents make up one third (30%) of fatalities on motorways. On other roads the proportion of single vehicle accident fatalities is 24%.

Fatalities by Vehicle Group

Table 6 shows the number and share of different vehicle groups on both motorways and other roads.

Table 6: Fatalities by Vehicle Group for last available year and for all available countries

Vehicle Group	Motorways	Share	Other roads	Share
pedal cycle	5	0,2%	1.479	5,6%
moped	5	0,2%	1.815	6,9%
motor cycle	153	6,5%	3.623	13,7%
car or taxi	1.821	77,7%	17.384	65,8%
lorry, under 3.5 tonnes	118	5,0%	881	3,3%
heavy goods vehicle	204	8,7%	706	2,7%
bus or coach	0	0,0%	185	0,7%
agricultural tractor	26	1,1%	174	0,7%
other / unknown	12	0,5%	181	0,7%
Total	2.344	100%	26.427	100%

Source: CARE Database / EC

Date of query: October 2004

*IT: 1998 / BE, EL: 2001. Pedestrians are not included in this table

Almost 80% of fatalities on motorways are car occupants, whereas on other roads 66% of the fatalities are car occupants.

Most fatalities on motorways are car occupants

Fatalities by age, gender and modal split

Male drivers in the age between 20 and 49 years old make up more than one third of all fatalities on motorways. The number of motor vehicle kilometres in this group is expected to be high too, but there are no data available to calculate this risk. Drivers are 58% of the fatalities on motorways, passengers 33%, and pedestrians 8%.

35% of all fatalities on motorways are male 20-49 year old drivers

Table 7: Fatalities on motorways in 2002* for all 14 countries by Age, Gender and Modal split

Age group	Male			Female			Total
	driver	passenger	pedestrian	driver	passenger	pedestrian	
00-04	0	19	1	0	13	0	33
05-09	0	13	1	0	10	0	23
10-14	0	12	1	0	11	1	25
15-19	23	38	8	4	37	5	115
20-24	151	72	15	29	48	2	317
25-29	153	48	10	33	38	4	287
30-34	162	32	19	21	31	5	269
35-39	150	28	13	13	22	1	227
40-44	147	20	18	20	17	2	224
45-49	114	23	11	17	31	4	200
50-54	97	16	10	10	26	1	161
55-59	76	13	10	14	22	3	138
60-64	45	11	6	8	13	0	82
65-69	41	12	10	5	29	0	98
70-74	36	5	6	8	24	4	84
75-79	14	11	5	3	16	2	50
80-84	11	8	3	3	19	0	45
85-89	2	2	0	0	3	0	7
90-94	0	0	0	1	3	0	4
≥ 95	0	0	0	0	0	0	0
Total	1,241	392	149	190	423	35	2,467

Source: CARE Database / EC
*IT: 1998 / BE, EL: 2001

Date of query: October 2004

For females, the number of fatalities among passengers is higher than for drivers

For males, the number of drivers killed is three times higher than the number of passengers killed. Among females, the number of passengers killed is more than twice the number of drivers killed.

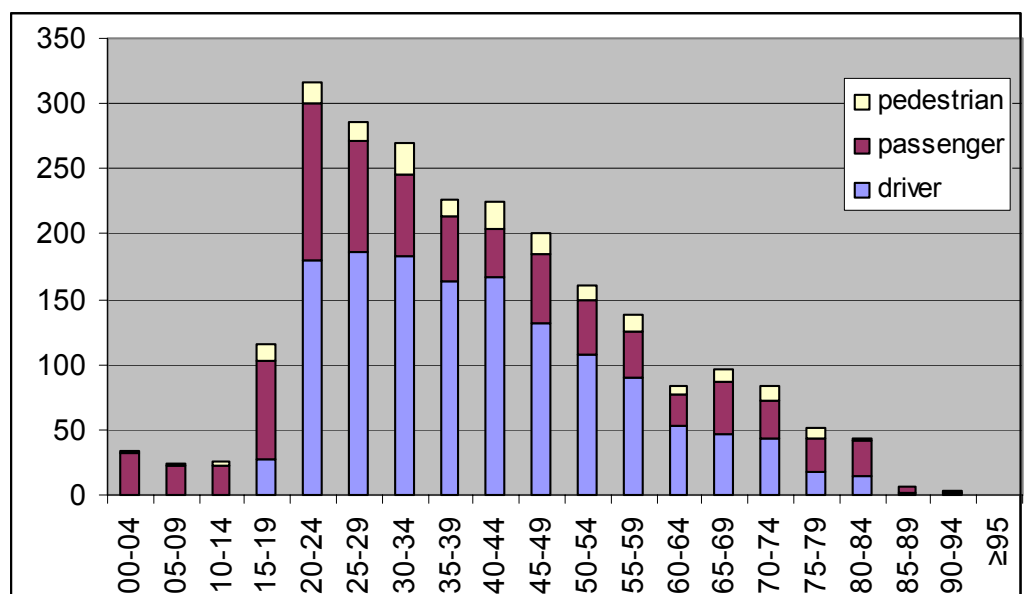


Figure 3. Fatalities on motorways by age group and person class

Definitions

This section gives more information on the selection of data from the CARE database and the country definitions.

For the selection of fatalities on motorways the following selection was applied: *Motorway* = "yes" and *Area Type* = "outside urban area". So motorway is explicitly defined here as outside urban area. Data has been queried mid October 2004 for all years (1993-2002) and countries. Not all countries have data for all years. When no data were available for 2002, the last available year was used: IT, UK: 1998 / BE, EL: 2001. In February 2005 data for the UK have been added for the years 1999-2002 in tables 1 and 4.

Table 8 Country codes

Country Code	Full name of country	Country Code	Full name of country
BE	Belgium	LU	Luxemburg
DK	Denmark	NL	The Netherlands
EL	Greece	AT	Austria
ES	Spain	PT	Portugal
FR	France	FI	Finland
IE	Republic of Ireland	SE	Sweden
IT	Italy	UK	United Kingdom (Great Britain + Northern Ireland)

Minor differences are due to rounding off numbers (caused by correction to the 30-day definition of a fatality) and exclusion of "unknown" in the tables.

According to the Glossary of Definitions of CARE the following information is applicable:

Inside urban area: Area inside urban area boundary signs (except IE, UK). Includes dual carriageways and national roads. Can include motorways (except DK, EL, IT). Opinion of the police (DK, SE).

Outside urban area: Area outside urban area boundary signs. Opinion of the police (DK, SE). Includes motorways.

Motorway: Public road with dual carriageways, and at least two lanes each way. Entrance and exit signposted. Road with grade-separated interchanges. Road with a central barrier or central reservation. No crossing permitted. No stopping permitted unless in an emergency. Entry prohibited for pedestrians, animals, pedal cycles, mopeds, agricultural vehicles; learner drivers (BE, EL, IE, PT, UK). Access restricted to motor vehicles (DK, AT, FI). Minimum speed between 50 km/h and 80 km/h (except FR, UK). Maximum speed between 100 km/h and 130 km/h.

Disclaimer

The information in this document is provided as it is and no guarantee or warranty is given that the information is fit for any particular purpose. Therefore, the reader uses the information at their own risk and liability.

For more information:

Further statistical information on motorway traffic fatalities is available from the CARE database at the Directorate General for Energy and Transport of the European Commission, 28 Rue de Mot, B-1040 Brussels.

Traffic Safety Basic Fact Sheets available from the European Commission include: *Cars-Occupants, Pedestrians, Motorcycle and Mopeds, Children and Motorways*.

Detailed data on traffic accidents are published annually by the European Commission in the *Annual Statistical Report*. This includes a glossary of definitions on all variables used.

For more information about the project "SafetyNet" which is co-financed by the European Commission, Directorate-General Energy and Transport please contact <http://safetynet.swov.nl/>.