Countdown to 2010

Only two more years to act!

2nd Road Safety PIN Report

ETSC
European Transport Safety Council

Road Safety PIN

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ETSC
European Transport Safety Council

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The European Transport Safety Council

The European Transport Safety Council (ETSC) is an international non-governmental organisation which was formed in 1993 in response to the persistent and unacceptably high European road casualty toll and public concern about individual transport tragedies. ETSC provides an impartial source of advice on transport safety matters to the European Commission, the European Parliament and to national governments and organisations concerned with safety throughout Europe.

ETSC brings together experts of international reputation and representatives of a wide range of national and international organisations with transport safety interests to exchange experience and knowledge and to identify and promote research-based contributions to transport safety.

Contents

Executive summary

This 2nd PIN Report provides an overview of European countries' performance in four areas of road safety. It builds on the 1st Road Safety PIN Report published in June 2007[1]. It shows how countries have progressed in reducing road deaths between 2001 and 2007, and how they perform in protecting two particularly at risk road user groups: the elderly people and motorcyclists. It also gives an overview of the striking disparities in motorway safety as the EU adopts a European Directive on road infrastructure safety management.

These rankings have been carried out during the second year of the Road Safety Performance Index (PIN) between September 2007 and June 2008. They cover 30 countries, including all 27 Member States of the European Union, together with Israel, which has joined the PIN programme during this second year, Norway and Switzerland.

Progress toward the target

The European Union has set itself the ambitious target of reducing the yearly number of road deaths by 50% between 2001 and 2010. Comparison of developments up to 2007 shows that **France, Portugal** and **Luxembourg** have progressed best over the past six years. If these three countries maintain their efforts they will reach the target ahead of 2010. **Belgium**, **Germany** and **Switzerland** have also reduced their road death toll considerably since 2001 and may halve the number of road deaths by 2013.

While the first four countries have a medium level of safety, **Germany** and **Switzerland** have been frontrunners in Europe for some time. This confirms that fast progress in road safety is possible for all countries, whatever their starting point. Other countries have progressed to a lesser extent. In **Romania, Slovenia, Lithuania**, **Slovakia** and **Poland**, the number of road deaths was higher in 2007 than in 2001.

For the first time since 2001, 2007 saw no reduction in the total number of road deaths in the EU. If current trends continue, the European Union will only reach its target in 2018. Strong leadership is needed to bring about renewed efforts ahead of 2010 and make up for lost time.

Reducing motorcyclist deaths

At least **6,200** Powered Two Wheeler (PTW) riders were killed in road crashes in 2006 in the EU 25. Accounting for only 2% of the total kilometres driven, PTW riders represented 16% of the total number of road deaths.

It is well known that motorcyclists face a much higher risk of being killed than other road users. For the same distance travelled, the risk for riders to be killed in road accidents is on average 18 times the risk of being killed in traffic for car drivers. This figure is shocking in itself, but the country-by-country variation in the rider/driver risk ratio is just as striking: from 6 times in **Norway**, safest for motorcycling, to 50 times in **Slovenia**, the most dangerous for riders by any measure.

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[1] ETSC (2007) Raising Compliance with Road Safety Law, First Road Safety PIN Report is available on www.etsc.be/PIN-publications.php

Whereas the total number of road deaths has declined in the past decade in Europe, the number of killed PTW riders rose in 13 out of 27 countries. Between 2001 and 2006, in particular, PTW rider deaths decreased on average by less than 1.5% yearly across Europe.

Riding a motorcycle will inevitably carry more risk than driving a car. However, the examples of best performing countries show that the implementation of dedicated safety measures can substantially improve PTW safety.

Motorway safety

Over 3,200 people are killed annually on EU motorways. The number represents just 8% of the total number of road deaths in the EU and has been going down steadily. Yet, the striking disparities in motorway safety between European countries are a cause for concern.

Among the PIN countries, motorways are safest relative to vehicle-km driven in **Switzerland, Denmark** and the **Netherlands**. In the past decade, **Switzerland** and **Slovenia** scored the highest average year-to-year reductions in deaths per billion vehicle-km on motorways. Drivers on Southern and Central European countries' motorways, however, are exposed to higher risks of death.

It is not acceptable that the safety on motorways differs so considerably among European countries especially at the time of the development of the Trans-European Transport Network. The EU should not miss this opportunity and should adopt an infrastructure safety Directive to guarantee that safe infrastructure management is applied across Europe.

Reducing older people's deaths

Over eight thousand people aged 65 years old and over are killed in the EU27 annually. Per population, the risk of death in a road accident for an elderly road user is on average 16% higher than for a younger road user. The country comparison shows that the differences between countries are huge. **Malta**, the **UK** and **Sweden** are the safest places for elderly people using the roads, whereas **Lithuania, Cyprus** and **Poland** are the most dangerous ones.

Today older people account for some 17% of the European population. If current demographic trends continue by 2050 they will make up 30%. If their road safety level is not improved, one road death out of three is likely to be an elderly person in 2050. This report recommends the adoption of a series of measures to avoid each one of us finding ourselves at growing risk of being killed on the road as we grow old.

Introduction

Every year, about 40,000 people die in Europe as a consequence of road crashes. Many more are injured. While the number of deaths is falling, studies have shown that faster progress is possible if all effective means are applied (Elvik, Erke 2006).

The European Union has set itself a target of halving the yearly number of road deaths between 2001 and 2010. The European Commission's Mid-term Review of progress toward this target has however shown that Europe is off target and greater efforts are needed (EC 2006), at both the European and national levels.

Against this background, the European Transport Safety Council (ETSC) set up in April 2006 the Road Safety Performance Index (PIN) as an instrument to spur European countries to greater efforts to enhance road safety. In a series of rankings, the Road Safety PIN ranks countries' performance in many areas of road safety work. The findings are presented in a series of newsletters (PIN Flashes) and discussed in national debates (PIN Talks).

During the second year, the Road Safety PIN measured countries' performance in four areas of road safety. The four indicators are all from the last layer of the road safety pyramid – final outcome (see Fig. 1).

- To measure progress towards the target we compared the reduction in the number of people killed since 2001.
- To evaluate the risk level of powered two-wheeler users we compared the number of PTW rider deaths per billion PTW km ridden.
- To assess the safety on motorways, we compared the number of people killed per billion km driven on motorways.
- The road safety of older people was expressed in terms of the number of road deaths among people aged 65 years and older divided by their number in the population.

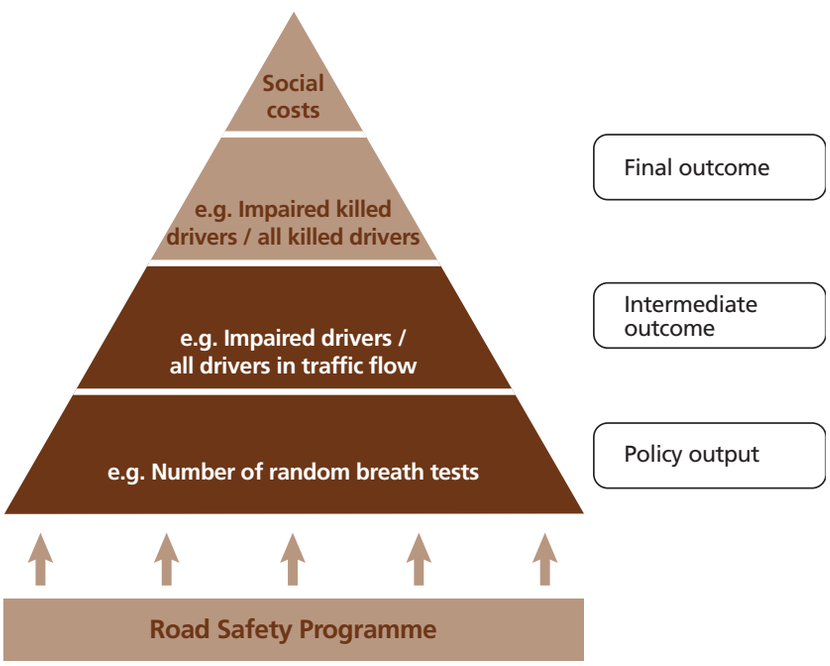


Fig. 1 Road safety target hierarchy for the area of drink driving, based on Koornstra et al 2002

The data collected to calculate the indicators are from the national statistics supplied by the PIN Panellist in each country. The CARE, SafetyNet, and IRTAD databases were used for verification. Numbers of inhabitants were retrieved from the Eurostat database.

In this Report, the findings of country rankings are presented in four chapters. In a last chapter, the reader will find recommendations from these findings.

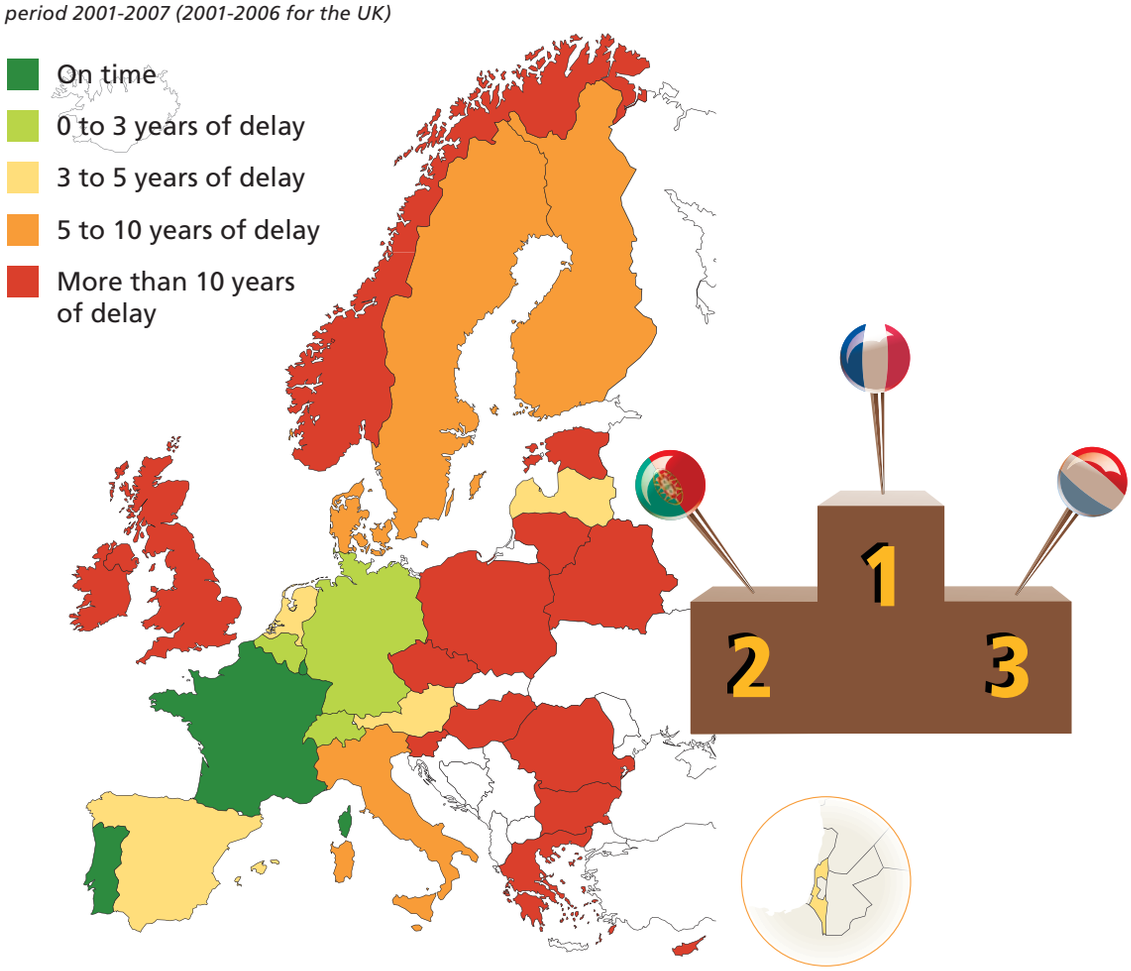
1| EU falling short of the target

The European Union has set itself the ambitious target of cutting back the number of annual road deaths by 50% over nine years from 2001 to 2010.

Between 2001 and 2007, **France, Portugal** and **Luxembourg** have progressed best. They have cut road deaths by 43%, 42% and 38% respectively over the past six years. If these three countries maintain their efforts they will reach the target ahead of 2010. **Belgium, Germany** and **Switzerland** have also reduced their road death toll considerably since 2001 and may halve the number of road deaths by 2013. In **Romania**, **Slovenia**, **Lithuania**, **Slovakia** and **Poland**, however, the number of road deaths was higher in 2007 than in 2001.

Expected year of reaching the EU target

Estimation based on the average annual reductions over the period 2001-2007 (2001-2006 for the UK)



For the first time since 2001, 2007 saw no reduction in the total number of deaths in the EU. If current trends continue, the European Union will only reach its target in 2018. While the former EU-15 taken together will reach the target in 2013 if maintains progress so far, slowest progress has been made in Central and Eastern European countries. 2010 is fast approaching. Strong leadership is needed to bring about renewed efforts ahead of 2010 and make up for lost time.

About **43,000** people were killed in road traffic crashes in the European Union in 2007. It is **11,000** less than in 2001 but for the first time since the adoption of the EU target, 2007 saw no reduction compared with the previous year. If recent trends continue, the European Union and its Member States will not be able to deliver the reduction in deaths that its citizens were led to expect with the set EU target. To reach the EU target in 2010 by equal year-to-year percentage reductions, a reduction of at least **37%** between 2001 and 2007, or an average year-to-year reduction of at least **7.4%** is needed. Between 2001 and 2007, however, road deaths have been reduced by only **20%** (Fig. 1). The European Union's yearly reduction in road deaths is around **4%** on average (Fig. 2).

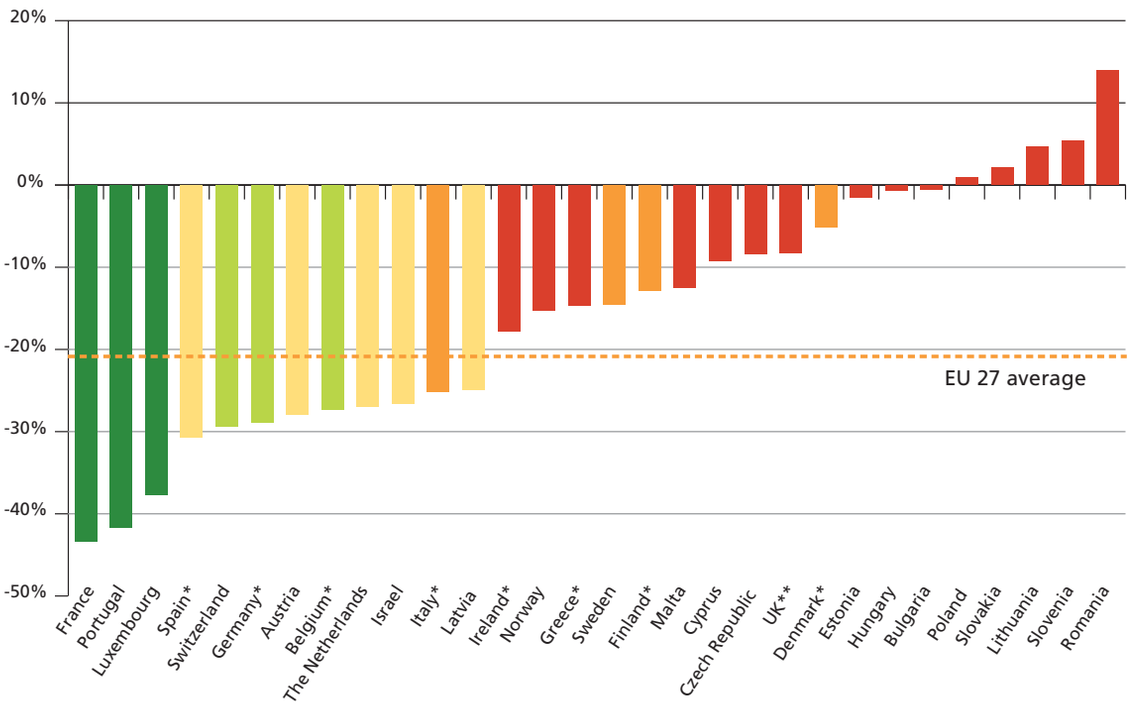


Fig.1 Percentage change in road deaths between 2001 and 2007
* BE, DK, FI, DE, GR, IE, IT and ES: provisional figures or national estimates based on provisional figures were used for 2007 as final figures for 2007 were not yet available at the time of print.
** 2006 figures were used in the case of the UK as numbers of road deaths in 2007 were not yet available at the time of print.

There is clearly the need to accelerate progress during the two remaining years of the target period. Experience shows that every country has the potential to improve its situation and to make fast progress, independently of its starting point. However, only concerted and lasting efforts that are supported by the public and politicians alike can lead to success. Today, **France**, **Portugal** and **Luxembourg** set the example.

The Indicator

This ranking uses as an indicator the numbers of people killed on the road per year. A person killed in traffic is someone who died immediately or within 30 days from injuries sustained in a crash.

The data collected to calculate the indicators are from the national statistics supplied by the PIN Panellist in each country.

Provisional figures or national estimates were used for 2007 in case of **Belgium, Denmark, Finland, Germany, Greece**, **Ireland**, **Italy** and **Spain**. 2006 figures were used in the case of the **UK** as number of road deaths in 2007 was not yet available at the time of print.

Numbers of deaths in **Luxemburg** and **Malta** are small and therefore subject to substantial annual fluctuation.

We also used the **road mortality** indicator (Fig. 5). It refers to the number of road deaths per million inhabitants and it is a measure of risk to citizens from road traffic accidents.

The full dataset is available in the Annex. The method to estimate the average annual percentage change in number of deaths over 2001-2006 and the expected year of reaching the target is described in the Methodological Note. See PIN Flash 10 Methodological Note on www.etsc.be/PIN-publications.php.

1.1 The frontrunners...

Best results in reducing road deaths over 2001 to 2007 have been achieved by some Western European countries with a medium level of safety (Fig. 1). **France**, **Portugal** and **Luxembourg**, already among the top-three for reductions up to 2006, are keeping their lead position also in 2007 with outstanding reductions of **43%**, **42%** and **38%** respectively.

France, **Portugal** and **Luxembourg** have reduced road deaths by more than **8%** yearly, on average, and are well on their way to hitting the EU target at national level. If efforts are maintained, **France** and **Luxembourg** could reach the target already this year, while **Portugal** is expected to reach it next year (Map).

France has made exemplary progress since 2001 in reducing deaths on its roads and is not letting up the pressure either. Between 2001 and 2007 the number of road deaths has dropped by 43%, which represents the best progress of any EU country over this period. Among the EU's underperformers in 2001, France sends an important message to less well performing countries: take heart. Progress is possible wherever you stand. Also that political commitment is a key to achieving long lasting results. Alongside political will from the highest level came a new "Zero Tolerance" of speeding offences and the introduction of a fully automated speed management system. This led to an improvement of traffic law enforcement in France and "ending drivers feeling of impunity". The number of withdrawn penalty points has continued to rise leading drivers to check their speed to avoid losing their licence.

Following on from the French government's previous policy to "fight against road violence" earlier this year President Sarkozy proposed a whole raft of new and forward thinking measures to tackle deaths on the roads. For combating drink driving this includes the introduction of alcolock rehabilitation programmes and alcolocks in all school buses. The focus on speeding remains with more fully automated speed cameras being rolled out. Police will also have the possibility to confiscate the vehicle if the driver is exceeding over the speed limit by more than 50 km/h, if it is the driver's second offence, or if they are driving without a license. France is aiming to reach a target of no more than 3,000 deaths per year by 2012. In 2007 4,620 people lost their lives on French roads.

In **Luxembourg**, in 2004, the new elected government made road safety one of its top priorities. Transport Minister Lucien Lux has since initiated numerous measures, including important changes to the Traffic Law. Since 1 October 2007, Luxembourg has a legal blood alcohol content (BAC) of 0.5g/l (instead of 0.8g/l), and 0.2g/l for novice and professional drivers. The new law also extends police powers to allow for on-the-spot withdrawal of the driving licence in cases of the most serious drink driving and speeding offences. The Minister also announced the deployment of automatic speed cameras but has not yet specified the time frame. Luxembourg is also working to increase the share of motorised journeys that are made by public transport to 25%.

"Even if we consider that 2001 was a bad year with an exceptionally high number of people killed, it is remarkable that we have had a close to 40% reduction in road deaths over six years. This would not have been possible had road safety not been one of the key elements of our government strategy. We expect that the new measures will help to consolidate the promising trend."
Christian Ginter, Ministry of Transport, Luxembourg

Despite a rise in the number of people killed in 2007, **Portugal** still recorded the second best reduction since 2001. Road deaths have been cut by almost 9% yearly on average since 1997, the best reduction in Europe over the past decade, ahead of **France** (-5.5%) and **Germany** (-5%).

"In Portugal, traffic volume has been stable or slightly reduced in recent years. However, this does not explain all the observed reductions in fatalities and serious injuries, which most probably result from work carried out in Portugal in safety education, emergency services, enforcement and engineering over the past decade."
Joao Cardoso, LNEC, Portugal

Spain (-31%), **Germany**, **Switzerland** (-29%), **Austria**, **Belgium**, the **Netherlands**, **Israel** (-27%) and **Latvia** (-25%) have also reduced their road toll considerably since 2001 and may halve the number of road deaths by 2016.

Switzerland, for example, one of the best-performing countries in road safety (Fig. 5), was able to cut road deaths by 29% over the last six years. "*The main reason for this good result has been a better control of two of the main causes of accidents, speeding and drink driving*," says Stefan Siegrist from the Swiss Council for Accident Prevention (bfu). Both the number of drivers checked for speed and the number of drivers checked for alcohol doubled between 2000 and 2006.

This increase in police enforcement has been backed up by a reduction in the legal BAC from 0.8 g/l to 0.5 g/l and an improved sanction regime for repeat offenders. The new Traffic Law, which came into effect on January 2005, also empowered the police to run random breath tests. In 2006 about 203 million vehicles were checked for speed. This means that on average each vehicle is checked for speed 37 times in one year. Unfortunately, speed controls are only rarely conducted on rural roads (about 3% of total controls), so this could be the focus of further efforts.

*"The 27% decrease in road deaths over 2001-2007 in **Israel** may be attributed to a host of factors: stronger emphasis on alcohol checks by the police, which grew from a few hundred in 2001 to over 90,000 in 2007; massive improvements in road infrastructure, with new motorways, dual carriageways and lots of roundabouts built; continued enhancement of passive vehicle safety, such as higher Euro NCAP ratings for new cars, the introduction of ABS and ESP; improved training of young drivers; and better emergency medical services. In 2005 Israel's Ministry of Transport adopted a national road safety plan with quantitative targets, and a new national road safety authority was established with more independence and a greater budget."*

Professor Shalom Hakkert, Ran Naor Foundation for the Advancement of Road Safety Research, Israel

*"In 2004, **Spain** adopted a strategic road safety plan for 2005-2008 aimed at 40% reduction in traffic deaths. A penalty point system was introduced in July 2006. Some 500 fixed radars were installed along the national road network. In December 2007, a reform of the Criminal Code was enacted which made drink driving (BAC above 1.2g/l), speeding (by more than 60km/h in urban areas or by more the 80km/h in interurban areas) and driving without licence criminal offenses. Besides increased enforcement, road safety authorities use the national media on a daily basis trying to raise the level of intolerance towards traffic offences among the public. The reduction in the number of deaths in the first months of 2008 may be the sign that these reforms are bearing fruit."*

Zori Bertolin, DGT, Spain

1.2 ... cannot do the work for the others!

Slowest progress in reducting road deaths has been made in Central and Eastern European countries where 2001-2007 reductions did not exceed 1.6%. In **Romania, Slovenia, Lithuania**, **Slovakia** and **Poland**, numbers of deaths actually rose over the last six years. **Latvia** is the only exception with an outstanding reduction of 25%. In **Lithuania**, which holds the worst safety record overall, the situation has not picked up sustainably since the mid-nineties.

These countries, which will very likely not be able to reach a 50% reduction in the remaining two years, must re-double their efforts if they are not to thwart the progress of others and hold back the Union as a whole.

"Since ETSC started to monitor progress, Lithuania has held the worst safety record overall. Sadly, our politicians still pay too little attention to road safety. Yet, the new measures announced by the government are giving hopes to the road safety community that the situation might change here as well. Transport Minister Butkevi ius initiated some measures, including the deployement of 150 automatic speed camera and important changes to the Traffic Law. Sanctions for all major traffic offences were tightened. It has also been envisaged to lower the legal BAC from 0.4‰ to 0.2‰ for novice drivers and vehicles over 3.5t. The big challenge now will be to improve infrastructure safety and renew the car fleet. The average age of the vehicle fleet is high (14 years). 80% of the vehicles are older than 10 years, which means that Lithuanian road users do not benefit from the latest active and passive safety systems."

Vidmantas Pumputis, Ministry of Transport, Lithuania

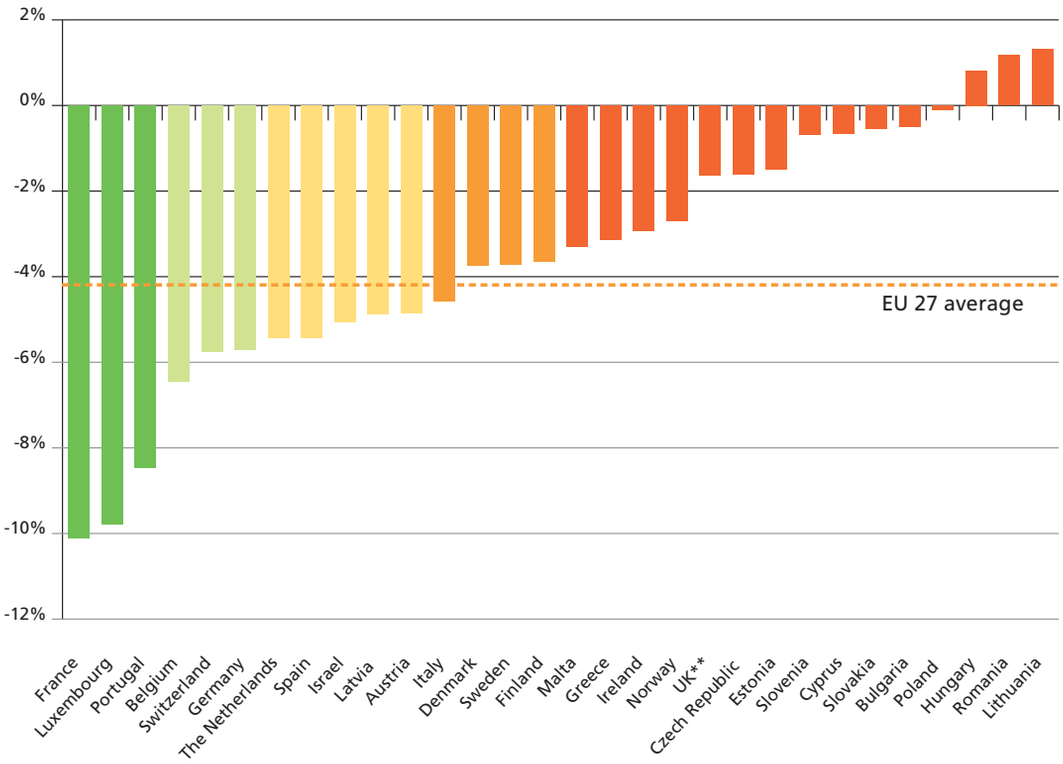


Fig.2 Estimated average annual percentage change in road deaths over the period 2001-2007 (UK 2001-2006)

* BE, DK, FI, DE, GR, IE, IT and ES: provisional figures or national estimates based on provisional figures were used for 2007 as final figures for 2007 were not yet available at the time of print.

**2006 figures were used in the case of the UK as numbers of road deaths in 2007 were not yet available at the time of print.

Number of deaths in LU and MT are small and therefore subjected to substantial annual fluctuation.

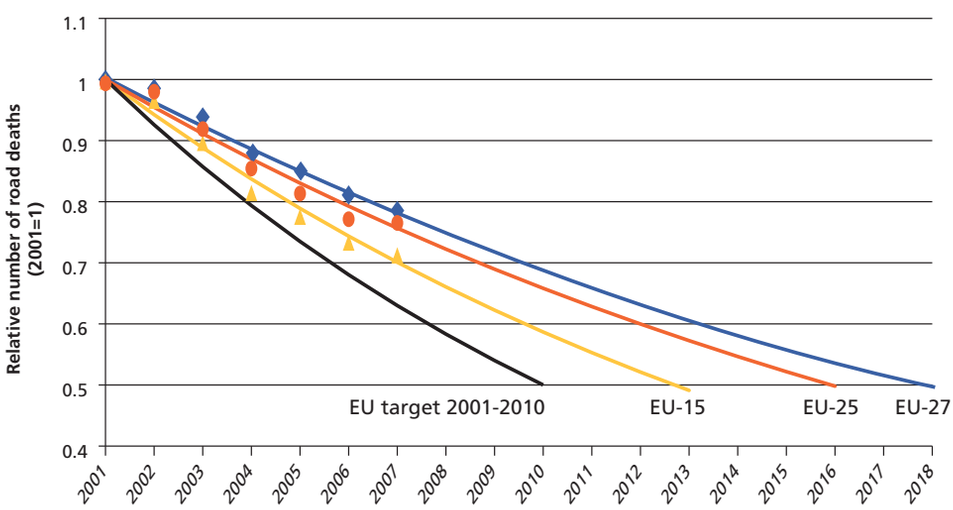


Fig.3 Estimated trends in road deaths in the EU-27, based on developments in 2001-2007

If current trends continue, the EU-27 is likely to reach its target only in 2018. The EU-15 countries, which originally set the target, are likely to halve the number of deaths in 2013.

1.3 2007 setback with some cause for hope

About **43,000** people were killed in road traffic crashes in the European Union in 2007. It is 11,000 less than in 2001. On the other hand, for the first time since the adoption of the EU target, 2007 saw no reduction in road deaths compared with the previous year.

With a 7% drop in deaths, **Ireland** and **Spain** recorded last year the biggest reductions. **Italy** and **Hungary** follow closely with 6% reduction.

"The introduction of the "objective responsibility" principle on 1 May 2008, under which the owner of the vehicle is responsible for traffic offences by the driver, removed the final legal obstacle from using automatic speed cameras in Hungary. Penalties have been increased, and a drink driving "zero tolerance" policy was enacted under which drunk drivers see their license withdrawn immediately if caught. All these changes can explain a 35.7% drop in road deaths in the first quarter of 2008. However, it seems unrealistic that Hungary will reach either the EU target (-50% road deaths) or even the less ambitious Hungarian Transport Policy goal (-30% deaths) by 2010."
Peter Hollo, KTI, Hungary

"Ireland's efforts to reduce roads deaths were helped by the implementation of a comprehensive set of measures in the 2007-2012 Road Safety Strategic Plan. The last two years saw the introduction of random breath testing and tougher penalties for drink driving offences, with disqualification periods for drunk drivers now ranging from 1 to 6 years. To enforce this new legislation the number of full time police officers in the Traffic Corps has increased from 500 to 1,200 since 2004. Finally, this legislation has also been underlined by hard hitting mass media TV campaigns which have brought about a progressive cultural shift against drink driving, realization of its mortal impact and support for more severe penalties and lower BAC."
Michael Rowland, Road Safety Authority, Ireland

A worrying number of countries have seen a rise in the number of road deaths compared to 2006, including countries with a long tradition of road safety such as **Denmark** (+34%), **Finland** (+12%), **Sweden** (+6%) and **Switzerland** (+4%). Unfortunately, the **Czech Republic** (+15%) did not manage to sustain in 2007 the exceptional 17% drop in 2006. **Poland**, after two consecutive years of reduction, saw a 6% increase, setting the country back to its 2001 level.

"Unfortunately, in 2007 we were unable to sustain the 2006 historically low record of 306 road deaths. Last year, 409 people lost their lives on Danish roads. It's a far cry from the new target of maximum 200 killed in this country by 2012. Speed has increased on all road types, as did motorcycle deaths. There is an urgent need to increase enforcement level, especially on rural roads. Hopefully the installation of safety cameras, even if only too few, will help curb speeding in this country."
Jesper Solund, Road Safety Council, Denmark

"We have witnessed a yo-yo effect resulting from the road safety measures brougth into the force in mid-2006. Their effect has worn out mostly due to insufficiencies in the enforcement of the new legislation. The number of killed PTW riders has doubled over the period of last three years"
Vojtech Eksler, CDV, Czech Republic

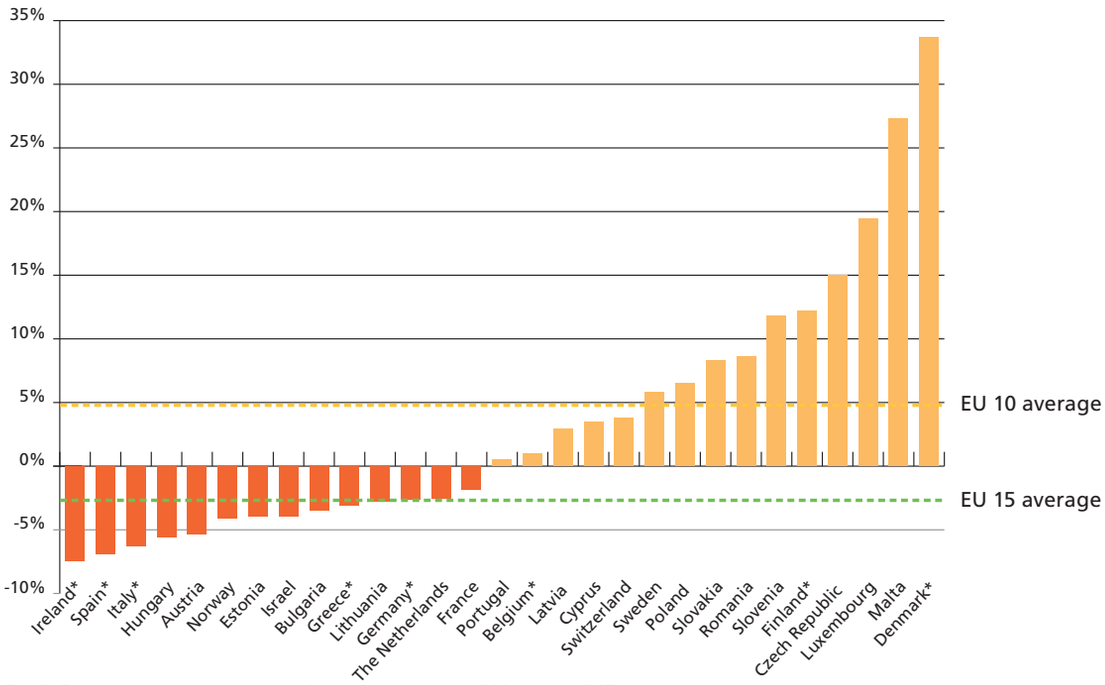


Fig.4 Percentage change in road deaths between 2006 and 2007

* BE, DK, FI, DE, GR, IE, IT and ES: provisional figures or national estimates based on provisional figures were used for 2007 as final figures for 2007 were not yet available at the time of print.

Number of deaths in LU and MT are small and therefore subjected to substantial annual fluctuation.

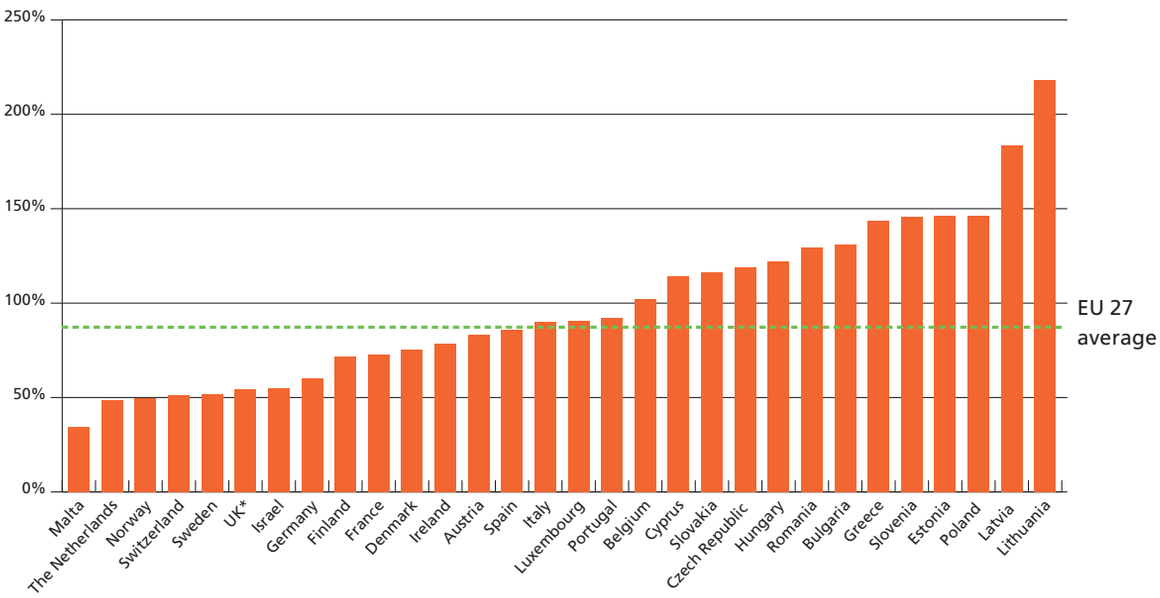


Fig.5 Road deaths per million population in 2007

* BE, DK, FI, DE, GR, IE, IT and ES: provisional figures or national estimates based on provisional figures were used for 2007 as final figures for 2007 were not yet available at the time of print.

**2006 figures were used in the case of the UK as numbers of road deaths in 2007 were not yet available at the time of print.

The EU-27 road mortality was 87[1] in 2007 compared to 142 in the USA (in 2006) and 79 in Australia[2].

[1] 43,003 / 495,129 = 86.9

[2] 42,642 / 299,398 = 142 (USA) and 1,613/20,434=78.9 (Australia) (source: IRTAD)

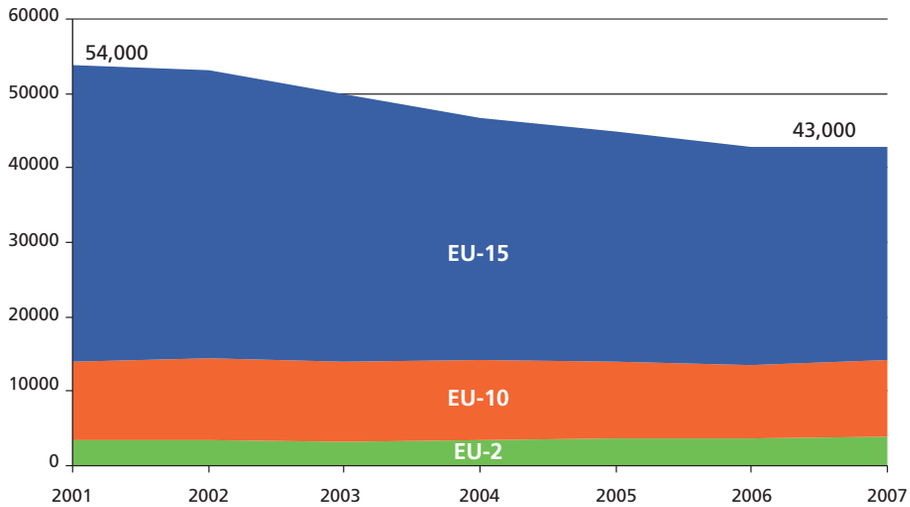


Fig.6: Share in the trend of the total number of road deaths in the EU27 for groups of member states[3]

1.4 The Portuguese experience
"The public expect the government to continue its efforts"

Since 2001, road deaths went down by 42%, the second best reduction in road traffic deaths among all European countries. What is the background to this success? ETSC has spoken with Paulo Marques, President of the newly created Road Safety Authority in Portugal.

ETSC: In 2003, Portugal adopted its first National Road Safety Plan. How far has it been implemented? Has it received the necessary political support?

The National Road Safety Plan has been a very important document. It has identified the main problems in road safety and proposed actions to deal with these problems. Unfortunately, it has not received full support from the politicians and not all the measures detailed in the plan could be achieved. But this is hardly surprising taking into account that the plan includes more than 100 actions and does not indicate the entity responsible nor costs and terms for each action.

> *"The 42% reduction is the consequence of the work carried out for more than ten years, and more specifically the actions taken to accelerate progress since 2003.*

ETSC: Which are the actions that have been implemented successfully?

Two of the most important measures taken on the basis of the Road Safety Plan include the revision of the Traffic Law and the implementation of an extensive high risk site removal scheme. The new Traffic Law allows police to issue on the spot penalty fines, which has really made an impact on people's behaviour. The fines themselves have also been increased. Other than that, we introduced new theoretical and practical driving tests and increased the provisional period for novice drivers from two to three years.

[3] EU15: the ‚old EU', EU 10: the ‚new' Member States, EU 2: Romania and Bulgaria

ETSC: How did the Portuguese public react to these measures?

The public have accepted these measures very well and they will accept even more drastic measures. We have recently run a survey in which we polled opinions regarding the introduction of a penalty point system and fixed speed cameras, among other things. It turned out that the public agree with these measures.

In Portugal, people are very well informed about road safety and levels of injuries and deaths.

> *The public, much as they are reluctant to change their own behaviour in traffic, want the government to do more.*

ETSC: The 2003 Road Safety Plan called for a targeted minimum compliance of 90% for front seat belt use and 60% for rear seat belt use by 2010. But front seat wearing rates have remained almost constant in recent years: 87% in 1999, 86% in 2003 and 2006. Rear seat wearing rates have improved: 11% in 1999, 25% in 2003, and 45% in 2006 but still have some way to go to reach the target. What is being done to address this issue?

I am optimistic that we will reach the objective of 90% for seat belt use in front seats. Seat belt wearing rates are much higher for front seat occupants than for rear seat passengers. This is why the police authorities have increased the enforcement of seat belt use, particularly in the back seat. We have also set up campaigns providing information to drivers and passengers that show the consequences of travelling unbelted.

ETSC: Originally, the Portuguese Road Safety Plan aimed at halving the number of road deaths by 2010. This target takes a baseline of 1998-2000 as a starting point. However, based on the good results so far, the government decided to shorten the target period and achieve the 50% drop by 2009. What are the ambitions beyond 2009?

We are presently developing a National Road Safety Strategy which will include new quantitative targets for the period 2008-2015 and the actions to achieve them. This will be organized in two periods: 2008-2011, and 2011-2015. The National Road Safety Strategy will be launched in 2008.

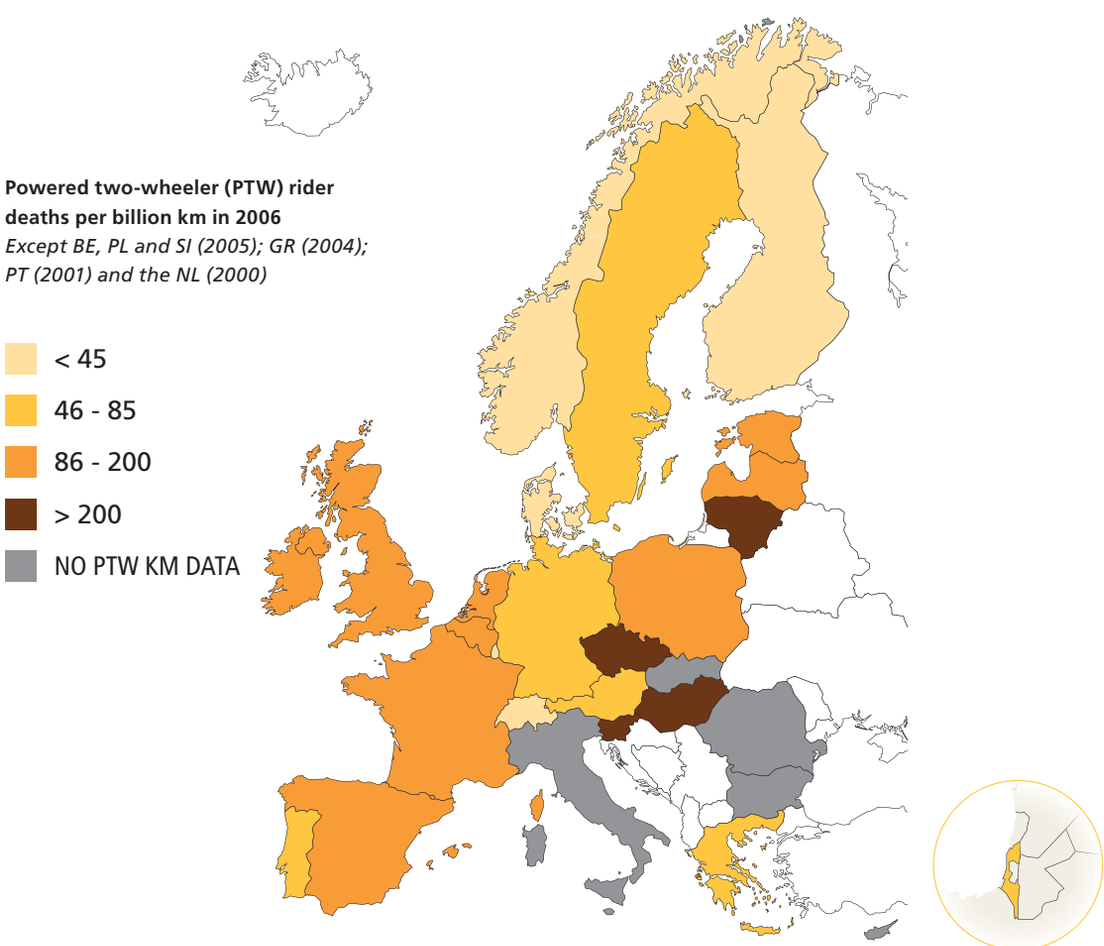
In April 2007, Paulo Marques was appointed President of Portugal's National Road Safety Authority, a new government agency in charge of road accident prevention and safety policies.

2| Reducing motorcyclist deaths in Europe

In 2006 at least **6200** Powered Two Wheeler (PTW) riders were killed in road crashes in the EU 25 representing **16%** of the total number of road deaths while accounting for only **2%** of the total kilometres driven.

It is well known that motorcyclists face a much higher risk of being killed than other road users. For the same distance travelled, the risk for riders to be killed in road accidents is on average 18 times the risk of being killed in traffic for car drivers. This figure is shocking in itself but the country-by-country variation is just as striking. This ranking shows that **Norway**, **Switzerland**, **Denmark** and **Finland** are the least dangerous places to ride, whereas **Central and Eastern** European countries are the most dangerous.

Powered two-wheeler (PTW) rider deaths per billion km in 2006
Except BE, PL and SI (2005); GR (2004); PT (2001) and the NL (2000)



This chapter also shows that, while the number of road deaths has declined considerably in the past decade in Europe, the number of killed PTW riders rose in 13 out of 27 countries. This rise can only partly be attributed to the increase in use of PTWs and should urgently receive special attention from policy makers at the national and European levels.

2.1 A great disparity of risks

PTW riders in **Norway**, **Switzerland**, **Denmark** and **Finland** enjoy a lower level of risk than riders in the rest of Europe (Map, Fig. 1). In these countries with a relatively good overall level of road safety, average rider deaths are between 30 and 45 per billion kilometres. A second group of countries, consisting of a road safety champion (**Sweden**) but also of countries with a medium (**Israel**, **Portugal**, **Austria**) or even a poor overall level of safety (**Greece**), are just below the EU average of 86 per billion km.

In **Spain**, **Ireland**, the **Netherlands**, **France**, **Great Britain**, **Belgium**, **Estonia** and **Poland**, rider deaths are above the average of 86 but below 200; while in **Latvia**, **Hungary**, **Czech Republic** and **Slovenia**, riders were exposed to death rates above 200 per billion km.

Significant disparities in terms of riders' safety exist in Europe. While the difference in overall road safety performance between the worst and the best performing European country is a factor 3 (PIN Flash 6), the difference for PTW riders is a factor of 10. The Slovenian riders have 10 times higher risk of being killed in road traffic per kilometre ridden than their Norwegian counterparts have.

This indicator of risk for PTW riders could not be calculated for **Bulgaria, Cyprus**, **Italy, Lithuania**, **Luxembourg**, **Malta**, **Romania** and **Slovakia** due to the lack of data on the number of kilometres ridden by motorcyclists. The number of motorcyclists killed in **Italy** is available only until 2004, in **Greece** and **Slovenia** until 2005 and only since 2002 in **Lithuania**.

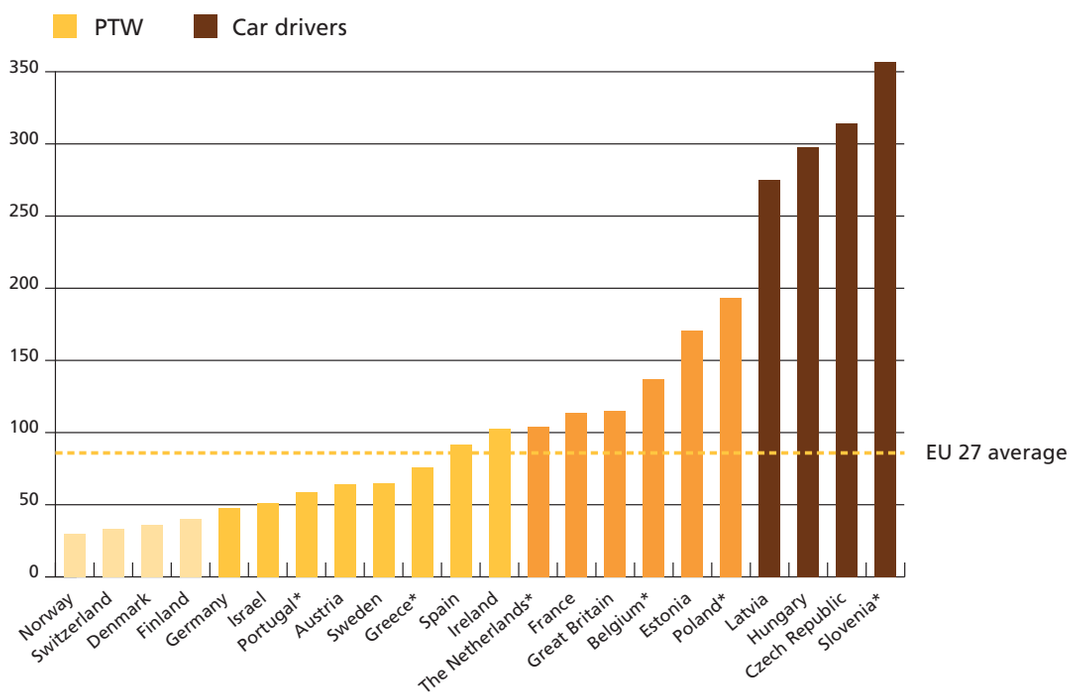


Fig.1: Power two-wheeler rider deaths per billion km in 2006.
*BE, PL and SL (2005); GR (2004); PT (2001) and the NL (2000)

Powered Two-Wheelers (PTW)

As the diversity of two wheeled motor vehicles in Europe has increased, the general term Powered Two-Wheeler has recently been used to encompass all relevant vehicles, the main types being mopeds, scooters and full-sized motorcycles. In this report, the terms '**motorcycle**' and '**PTW**' **are used synonymously** and, except where specified, **refer to all types of such vehicles**. Differences in machines and their use between mopeds and other PTW are important and are discussed here as far as the data allow.

In recent years there has been much discussion about whether a PTW user falls into the category of vulnerable road user since they can pose risks to other users such as pedestrians and cyclists. Although motorcyclists are to some extent protected by helmets and clothes, they are vulnerable road users in the sense that they are not protected by a vehicle body, seat belts or the other protection systems that car occupants enjoy, while the speed at which they move exposes them to risks of motorised traffic.

The indicator

Few studies have investigated the safety of motorcyclists and even fewer have tried to quantify their risk level. They usually express the risk of being killed by dividing the number of PTW users killed per million inhabitants, or per 100,000 motorcycles registered, or per billion PTW-kilometres ridden. The first two indicators are available for most European countries, but they take no account of exposure to risk, i.e. the number of motorcycles on the road and the distances ridden. Thus, countries with a higher number of trips by powered two-wheelers inevitably register high PTW death rates per population and may register high rates per motorcycle registered, but not necessarily high rates per distance travelled. This report therefore uses as **main indicator** the **number of PTW rider deaths per billion PTW kilometres ridden**.

The great majority of killed motorcycle and moped users are riders: in 14 countries supplying data to SafetyNet, there are 11 rider deaths for every passenger death[4]. This chapter therefore concentrates on risk to the riders themselves and does not compare numbers of passenger deaths.

The data collected to calculate the indicators are from the national statistics supplied by the PIN Panellist in each country. The SafetyNet, Eurostat and IRTAD databases were used for verification. Altogether 22 out of the 30 countries covered under the Road Safety PIN have provided estimates of kilometres travelled by PTW, but they use various methodologies to estimate them[5].

[4] EU15 excl. DE. SafetyNet, WP1, Traffic Safety Basic Facts 2006 Motorcyclists and mopeds http://www.erso.eu/safetynet/fixed/WP1/2006/BFS2006_SN-SWOV-1-3-MotorcyclesMopeds.pdf

[5] SafetyNet, WP2, First classification of EU member states on Risk and Exposure Data http://www.erso.eu/safetynet/fixed/WP2/D2.2.2%20First%20Classification%20of%20RED_v2.pdf

Another way to measure the relative safety of motorcyclists is to compare it with other road users (Fig. 2). For the same distance travelled, the risk of a rider being killed in a road accident is on average 18 times the corresponding risk for a car driver[6]. The variation in this ratio among countries is also striking. In **Norway** it is 6 times, whereas in **Slovenia** it is more than 50 times!

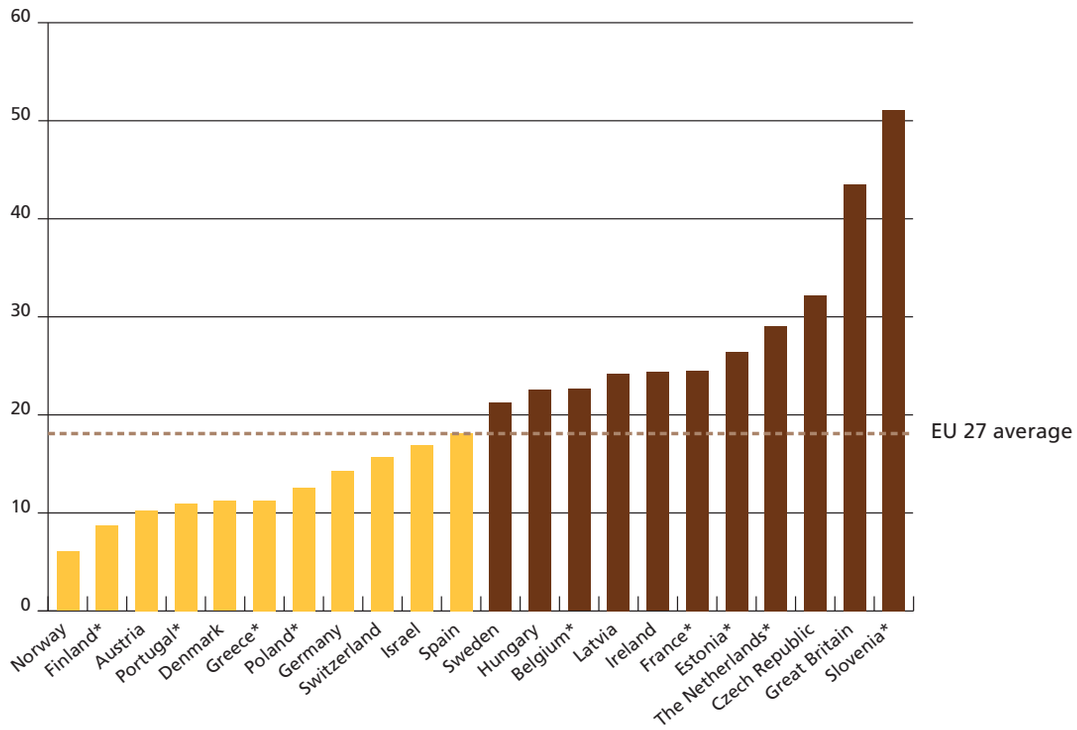


Fig.2: Ratio of death rate per billion km ridden by PTW riders to corresponding rate for car drivers in 2006.
*PL, BE, FI, FR, EE and SI (2005); GR (2004); PT (2001) and NL (2000)

2.1.1 Some sources of disparity in risk

Like the risk to users of other types of vehicle, the aggregate risk for PTW riders differs between countries for many reasons other than road safety policy and measures. These other reasons include climate, topography, seasonal variation, the age-distribution of the users, and the mix of commuting, work and leisure journeys for which the vehicles are used.

But in the case of PTW riders there is another particular and substantial source of difference between countries. This is the proportion of PTW use that is formed by riding of mopeds (PTW with engine volume less than 50 ccm), which differ in characteristics and pattern of use from larger and more powerful PTW.

Comparing the levels of risk for moped riders and other PTW riders requires estimates of their separate vehicle-km travelled, which are available for only a few countries. Instead, comparison of the proportion of moped rider deaths in the total number of PTW rider deaths can help different countries to identify and prioritise safety measures for PTW.

Fig. 3 shows how the proportion of PTW riders killed who were moped riders differed among 22 countries over a recent 3-year period. This proportion is the lowest in **Slovenia** and **Great Britain** and the highest in **Spain** and the **Netherlands**. In other countries, moped rider deaths are between about 10 and 30 per cent of all PTW deaths.

[6] Estimation for the EU25 excl. GR, IE, IT, LV, LT, LU, MT, NL, PT and SK

The effect of this proportion on the levels of risk shown in Fig. 1 depends on how the risk to moped riders compares with that to other PTW riders in different countries. In 7 countries providing the required estimates of distance ridden, the risk of death per billion km ridden for moped riders ranged from about 25% to 200% of the risk for other PTW riders.

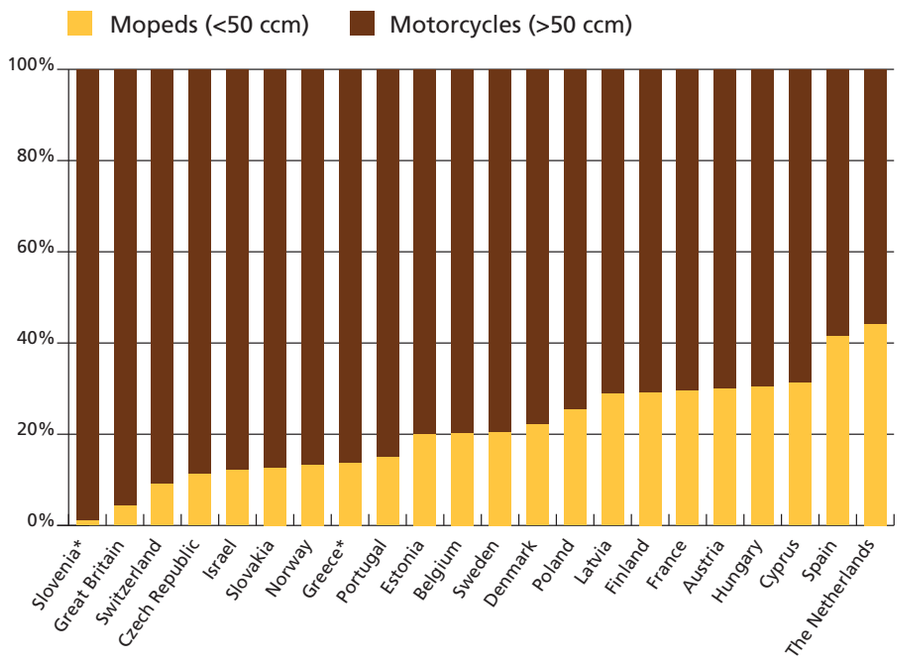


Fig.3: Mopeds rider deaths as a percentage of other PTW rider deaths over the years 2004-2006* GR, SI (2003-2005)

2.1.2 Disparity of the scale of the problem

Not only does the risk of motorcycling vary widely across Europe, but so also does the scale of PTW rider death compared with death to other kinds of road users. Figure 4 shows the number of PTW rider deaths as a percentage of the total of PTW riders and car driver deaths. This percentage ranges from about 11 in **Estonia** to over 50 in **Cyprus** and **Ireland**. In **Estonia** there are 8 car driver deaths for every motorcyclist death, whereas in **Cyprus** and **Ireland** there are more motorcyclist deaths than car driver deaths.

The order of countries in this table differs considerably from the rankings in terms of PTW risk per km ridden, showing that the scale of PTW rider death depends not only on the level of risk to which these riders are exposed, but also to the extent to which people in different countries choose to use this form of transport.

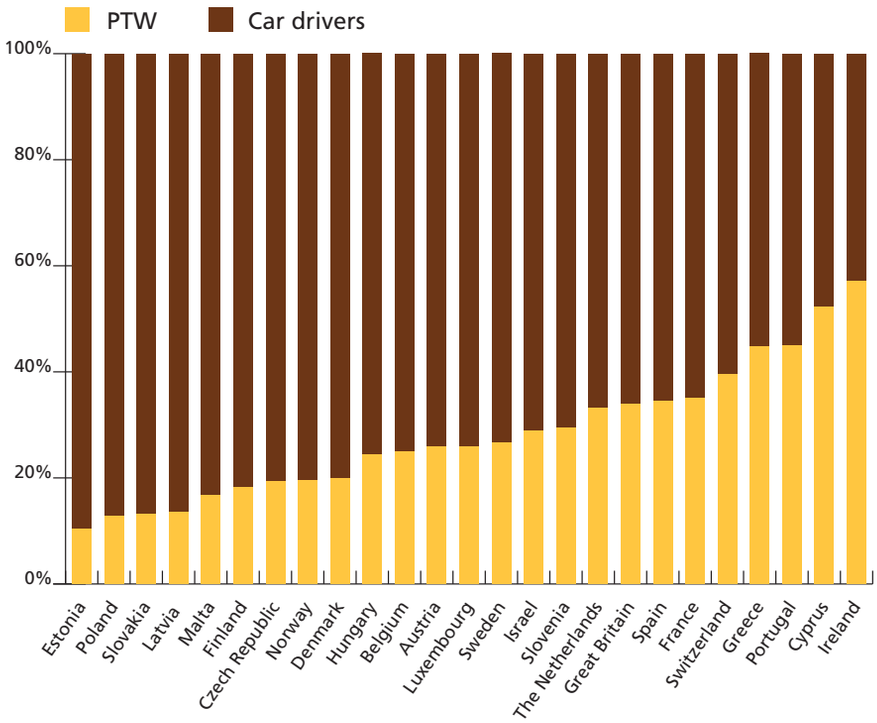


Fig.4: PTW rider deaths as a percentage of the total of PTW riders and car driver deaths in 2006[7]

2.2 Insufficient progress - *In reducing motorcyclist deaths*

Between 1997 and 2006, the highest reductions in PTW rider deaths were recorded in **Latvia, Estonia and Portugal** (Fig.5). In eleven other countries, motorcycle rider deaths decreased on average. In thirteen countries, however, the numbers of PTW deaths rose on average over the past ten years. Taking Europe as a whole, PTW rider deaths have been stagnating between 1997 and 2006.[8]

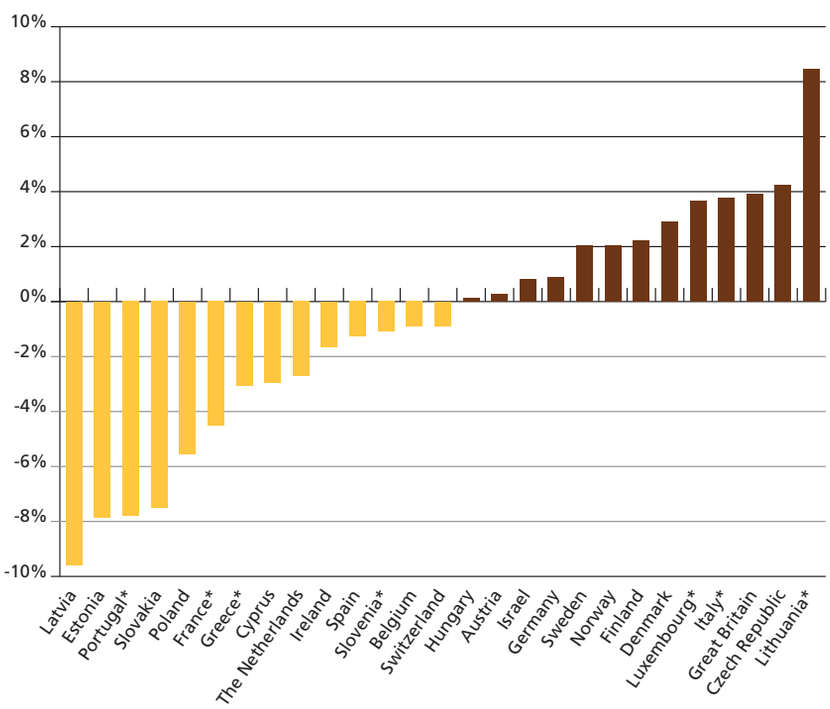


Fig. 5: Average yearly percentage change in PTW rider deaths over the period 1997-2006.
GR and SI (1997-2005), FR (2003-2006), PT (2000-2006), IT (2001-2004), LU (2001-2006) and LT (2003-2006).

[7] Except Greece and Slovenia 2005 data
[8] Estimations for the EU25 excl. FR, GR, IT, LU, MT, PT and SI

PTW contribution to the EU reduction target

It has been estimated that to reach the EU target of cutting road deaths by 50% between 2001 and 2010, a year-to-year reduction in death of at least 7.4% is needed (PIN Flash 6). Between 2001 and 2006, the reduction of PTW rider deaths is contributing fully to the overall reduction in **Portugal** and **Slovenia**. **Belgium**, **France**, **Lithuania** come close. But the average annual reduction in PTW rider deaths between 2001 and 2006 is around 1.5%[9], far less than needed for PTW to contribute their share to the European target. If this were the rate of reduction in the total road deaths, the EU would reach its target only by 2045.

Few studies have been carried out on the reasons for the difference in death reduction between motorcyclists and other road users, in particular car drivers. The argument often put forward by motorcyclists – the increase in motorcycle use – can only explain part of it.

The distance travelled by powered two-wheelers has increased by some 24% in the EU since 1996, but this is only a little more than the increase in distance travelled by cars, which has been 18%[10].

2.2.1 **Insufficient progress** – *In reducing the risk of being killed*

To take the increase in motorcycling into account, we looked at the average yearly changes in PTW rider deaths per billion km ridden over the same period of time (1997-2006).

Fig. 6 shows that fewer countries registered an increase in risk, namely the **Czech Republic**, **Finland, Hungary** and **Great Britain.** But the number of countries for which this comparison can be made is fewer than for changes in road deaths. **Slovenia** appears as European champion in reducing risk to PTW riders despite the significant increase in PTW travel. In Scandinavia, although PTW rider deaths increased in all four countries over the past decade (Fig. 5), the risk of being killed for the same distance travelled increased only in **Finland** (Fig. 6).

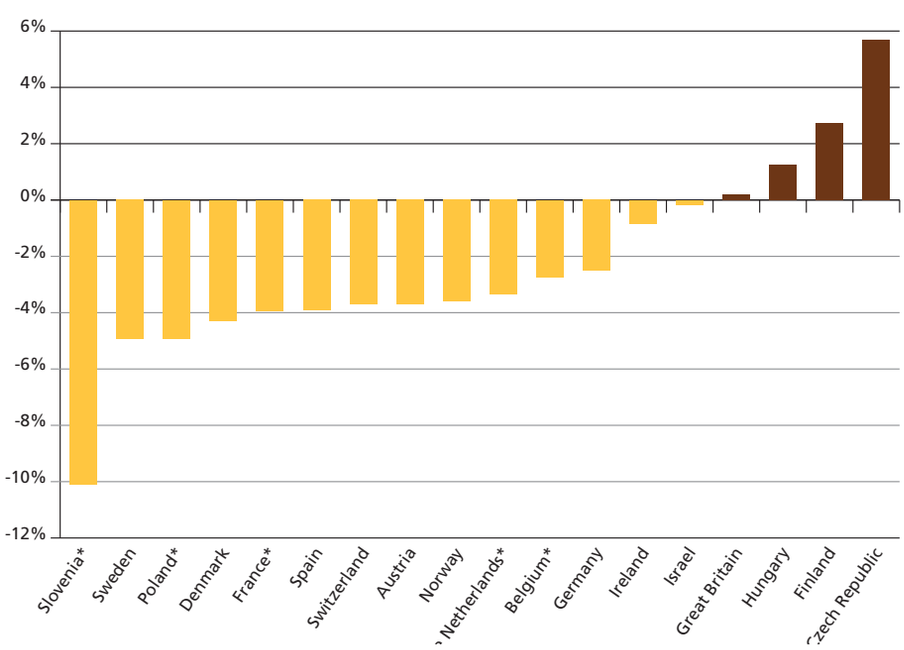


Fig. 6. Average yearly percentage change over the period 1997-2006 in PTW rider deaths per billion km ridden *BE, PL, SI (1997-2005), FR (2003-2006), NL (1997-2000)

[9] Estimation for the EU25 excl. FR, GR, IT, LT and SI
[10] Estimation based on 1996-2004 Eurostat data

2.3 Decision makers called to act

While riding a motorcycle will inevitably carry more risk than driving a car, evidence shows that the implementation of dedicated safety measures can substantially improve PTW safety. The measures should aim at improving the behaviour of motorcyclists, but also the behaviour of other road users and providing a safer environment for PTW riders.

"We are glad to see that the general road safety improvements recorded in Switzerland over the past few years are benefiting motorcycle and moped users as well. We have implemented good practices in rider training, licensing, enforcement and infrastructure and will continue to do so. But the knowledge currently available does not allow us to explain the relative low risk Swiss riders enjoy compared to their counterparts in other countries."

Stefan Siegrist, bfu, Switzerland

Improve the behaviour of motorcyclists

The rider's skills, training, experience and attitudes are fundamental to safe motorcycling. Governments should ensure that riders receive appropriate training when they start to use a motorcycle (or re-start after a period of not motorcycling) and that they receive further training as they progress from smaller to larger motorcycles.

Motorcyclists should be made aware of the difficulties other road users have in detecting power two wheelers and evaluating their speed.

Governments should develop enforcement strategies targeted at motorcyclists. Although the use of helmet is mandatory for motorcycle and moped riders and passengers in the EU, wearing rates are still well under 100% in most of the countries that are collecting data on helmet use. The rates are significantly lower for moped riders than for motorcyclists. The percentage of especially moped riders not wearing a helmet, or not wearing it properly, has been stagnating, or even on the increase during the past few years in several countries.

Motorcycles generally escape safety cameras, as they are not required to have a licence plate in front and therefore in most cases remain unidentified.

In **France**, where road safety efforts have focused on moderating driving speeds, motorcyclists have reduced their speed since 2002 but not to the same extent as other road users (Fig. 7). In 2006 as least 30% of motorcyclists were still riding 10 km over the legal speed limit, against 15% for cars and heavy good vehicles.

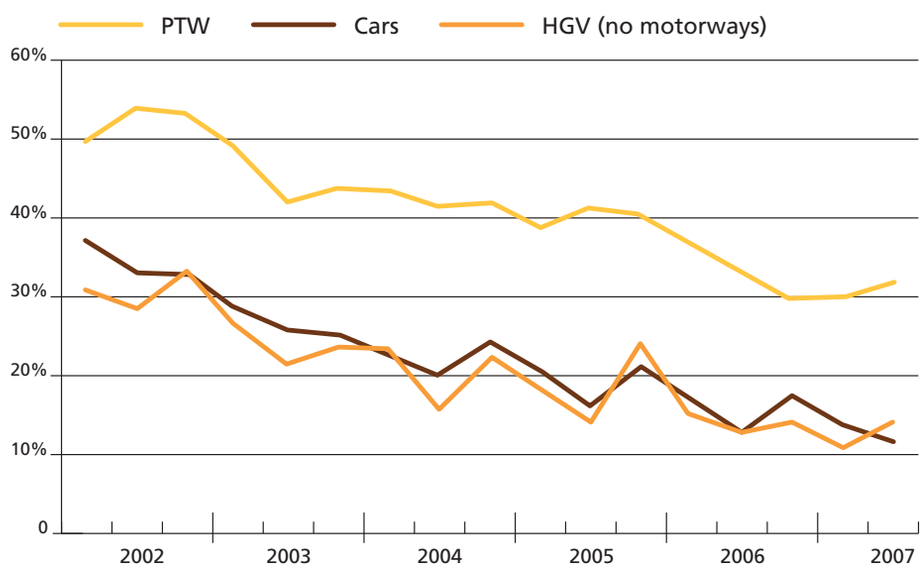


Fig. 7. Percentage of vehicles travelling 10 km above the legal speed limits. ONISR, October 2007.

Starting in 2006, the French government acknowledged the specific problem of overrepresentation of motorcyclists in fatal accidents compared to the rest of Europe and adopted a new set of measures. Safety cameras have progressively been replaced by new ones capable of catching motorcyclists from the rear and thereby allowing their identification based on registration plates. The number of mobile speed controls targeting motorcyclists also increased.

"Different factors may explain the French specificity. The riding culture has built on a culture of risk taking. Riders are slowly starting to acknowledge their responsibility. The use of protective vests and gloves is also particularly low among French riders."

Jean Chapelon, ONISR, France

Unsatisfactory levels of safety of PTW riders in some Central European countries can be partly explained by a poor level of enforcement and the unfavorable development in machine stock. In the Czech Republic, the share of new motorcycles has been increasing from 25% in 1997 to 60% within a decade. Almost half of motorcycles sold have very powerful machines with a cubic capacity over 500 ccm.

"The problem of motorcycling has been recently addressed in the revised Traffic Code. This introduced a penalty for riders hiding their registration plate in traffic in order to avoid identification. Police must now target motorcyclists who are not respecting the traffic law."

Vojtech Eksler, CDV, Czech Republic

Provide a safer environment for PTW riders

Many national and European road safety policies are targeted at car occupants and fail to take into account the specific needs of vulnerable road users. Moreover, drivers need to be made aware of the characteristics, needs and vulnerability of motorcyclists.

The "Think Once, Think Twice, Think Bike" campaign from the UK Government urged drivers to be more alert and look out for motorcyclists, especially at junctions.

"Every sixth road accident victim in Spain is a motorbike rider. This is why the Directorate General for Traffic gathered all stakeholders concerned to develop a Strategic Plan for motorcycles and mopeds. The Plan prioritises 36 measures, 19 of which will be implemented in 2008."

Pilar Zori Bertolin, DGT, Spain

Improve the safety of the machines

Improvements to the design and construction of cars over the last 20 years have resulted in very substantial reductions in deaths and injuries on the road. This has not been the case with changes to the design of motorcycles. ABS brakes for high capacity motorbikes have been commercially available for 20 years, and are now being fitted to a wide range of machines, but penetration is still much lower than for ABS in cars.

Motorcycles are complex, powerful vehicles and there remain a number of areas where their safety performance could be further improved. In its Motorcycling Strategy of 2005, the UK Government has said that it will consider the benefit of a consumer information assessment programme for motorcycles to assess whether it might lead to improvements in motorcycle safety in the way that the Euro NCAP programme has led to significant improvements in car design.

"Several measures have been implemented in Austria to improve the safety of motorcyclists: graduated licensing, multi-phase rider training, voluntary training courses, speed enforcement and awareness raising campaigns. Typical motorcycle routes were improved, e.g. with the installation of the optimised guard rails. Yet, if Austrian riders have a relatively lower death rate ratio PTW/car drivers (fig 2) than in other countries, motorcyclist deaths have been stagnating over the past ten years."
Martin Winkelbauer, KfV, Austria

"We really must focus on addressing this target group if we want to make European roads safer for everybody."
Martin Winkelbauer, KfV, Austria

The World Health Organisation and World Bank have advised that care should be taken to avoid the adoption of policies which could encourage the growth of motorised two-wheeler traffic by giving advantages to PTW users.

"In Norway, I believe all the most cost effective measures have been implemented – mandatory helmet use, strict licensing, engine tuning ban, daytime running lights for motorbikes. The question that needs to be raised now is whether there should be any place for these motorised toys in the transport system at all".
Rune Elvik, TOI, Norway

ETSC Review "Vulnerable riders - Safety implications of motorcycling in the European Union" summarises the following recommendations:

To Member States:

- Enforce the compulsory wearing of helmets
- Install speed cameras able to detect speeding riders and enforce motorcyclists' compliance with speed limits
- Improve rider training
- Rider training should focus on hazard recognition and risk assessment as well as vehicle control skills.
- Improve driver training
- Driver training should ensure that candidates understand the vulnerability of motorcyclists and "look out for them" when driving
- While implementing the Driving Licence Directive, Member States should seek to encourage riders to undertake progressive access to PTWs by recognising the experience gained on lower PTW categories.
- Provide consumer information regarding helmet safety and educate riders regarding the importance of proper fastening
- Address the specific needs of PTW users in road design and maintenance (provide good winter maintenance, use of anti-skid surfaces, make roadsides more forgiving)

To European Institutions:

- Mandate the fitment of Antilock Braking Systems (ABS), alongside evaluate the safety impact of other advanced braking systems for smaller PTWs and, if more cost-effective, consider them as an alternative to ABS
- Investigate the extent to which airbags are viable PTW safety measures
- Stimulate the introduction of eCall as a standard for new machines
- Develop minimum standards regarding protective clothing.

2.4 The Great Britain experience
"More older riders on the roads"

In Great Britain, powered two wheeler rider deaths are on the rise since 1996. The risk for British riders of being killed in traffic stands at 40 times that for car drivers. To help us understand the reasons and find possible remedies, ETSC has spoken with Samantha Jamson, Senior Research Fellow at the Institute for Transport Studies, University of Leeds (UK) and Chair of ETSC Working Party on safety of motorcyclists.

ETSC: It seems that motorcyclists do not benefit from the overall good level of road safety in the U.K. How would you explain this?

The role of motorcycling, its benefits and the concerns about its safety have been recognised by the UK government only relatively recently. In 2005, the Department for Transport (DfT) published a comprehensive "Motorcycling Strategy" listing 44 measures.

Whilst riding a motorcycle used to be an alternative, cheap method of transport in past decades, nowadays its popularity as a leisure activity has increased. In addition, our research has shown that the age at which riders gain their motorcycling licence and purchase their first bike has increased steadily over the years. These recent changes also suggest that the UK roads currently have a significant proportion of motorcyclists who could either be using newly learned skills or be relying on skills that were developed some years ago and which may have subsequently degraded through lack of use. This phenomenon has also been noted elsewhere in Europe, in Australia and the US.

"While riding a motorcycle used to be an alternative method of transport, nowadays its popularity as a leisure activity has increased.

The ways in which motorcyclists build up their experience has also changed. Recent recruits to motorcycling tend to move up to powerful machines much more quickly - due in particular to higher incomes - than their younger counterparts.

ETSC: How do you think the situation will evolve?

Motorcycling, whether for work or leisure, is still attracting new recruits across all demographics. This is why efforts need to be stepped up in particular in the field of rider training and general awareness. Motorcycle riders, because of their inherent vulnerability, need to attain a level of skill that will enable them to ride defensively and to avoid putting themselves at unnecessary risk. Campaigns would benefit from targeting younger riders who are more likely to engage in speed-related aggressive riding and older leisure riders who tend to own larger capacity machines. Schemes such as free courses offered at the point of sale or regular refresher courses should be encouraged as well. Car drivers also need to be educated to actively search for motorcyclists in their visual field, particularly at junctions.

ETSC: Motorcycle deaths are not decreasing fast enough in Europe in general and are even increasing in some Member States.

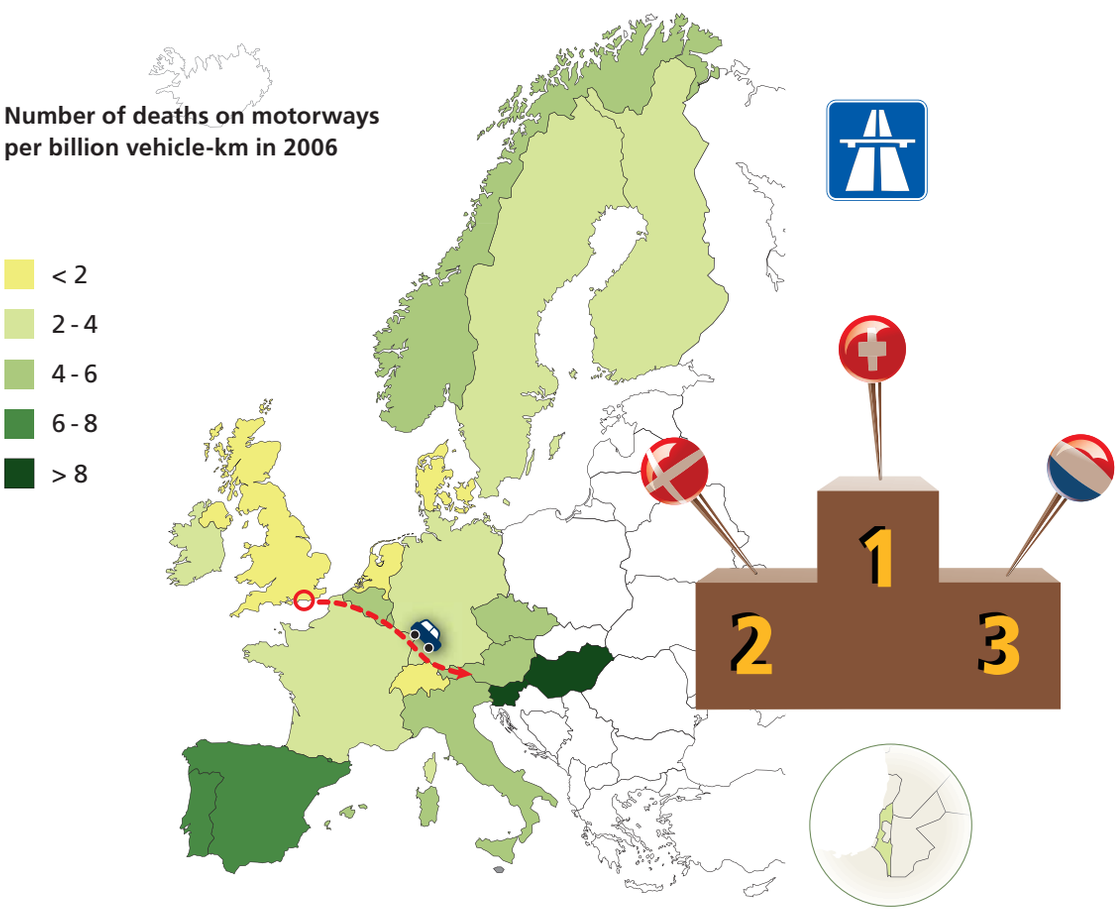
Yes, indeed and it seems that the situation has not been reversed during 2007 unfortunately. It is particularly disturbing to read that, in Europe, PTW riders have on average 18 times the risk of being killed than car drivers, while in GB this differential is 40 times. There is a clear call for action from governments, industry and road users to urgently improve the safety of powered two wheelers.

Dr. Samantha Jamson is Senior Research Fellow at the Institute for Transport Studies, University of Leeds (UK) and Chair of ETSC Working Party on safety of motorcyclists. She has worked on a variety of research projects, in particular focusing on issues such as behavioural adaptation. Samantha co-wrote with Kathryn Chorlton The Older Motorcyclist, a report commissioned by the DfT. Jamson and Chorlton (2005) The Older Motorcyclist. DfT research Report No 55.

3| Reducing deaths on motorways

Motorways are the safest roads by design. Yet in 2006 at least **3270** people were killed on the motorway network in the EU 25, representing about 8% of the total number of road deaths. Although motorways account for only 1% of the length of all paved roads, more than one quarter of all kilometres are driven on this part of the road network. The proportion of the traffic driven on motorways has been increasing over the past decade.

This ranking shows that, among the PIN countries, motorways are safest in **Switzerland, Denmark** and the **Netherlands**. In the past decade, **Switzerland** and **Slovenia** scored the highest average year-to-year reductions in deaths per billion vehicle-km on motorways. Drivers on Southern and Central European countries' motorways, however, are exposed to higher risks of death.



It is not acceptable that the safety on motorways differs so considerably among European countries especially at the time of the development of the Trans-European Transport Network. The EU should not miss this opportunity and should adopt an infrastructure safety Directive that would guarantee that safe infrastructure management is applied across Europe.

The proposal for a Directive is well timed as many new Member States are in the process of upgrading and expanding their road networks, including motorways. Furthermore, the Commission should consider safety impact assessment, safety audits, network safety management and safety inspections to be a condition for all EU-funding of infrastructure. Every year between 1.5 and 2 bln EUR are spent on EU major roads through various European funds.

3.1 Comparison between countries

Motorway users in **Switzerland**, **Denmark**, the **Netherlands** and **Great Britain** enjoy a lower level of risk than users in the rest of Europe (Map, Fig. 1). In these four countries, less than two people are killed on average for every billion vehicle-km. In **Sweden**, **France**, **Ireland**, **Germany, Finland** and **Israel** the risk of death is below the EU average of 4 deaths per billion vehicle-km[11]. In **Austria**, **Norway**, **Belgium**, the **Czech Republic**, **Italy, Portugal** and **Spain,** death rates are above the EU average of 4 but below 7 deaths per billion vehicle-km. On **Slovene** and **Hungarian** motorways**,** more than 8 people are killed for every billion vehicle-km.

Big disparities in terms of motorway safety exist in Europe. The difference between the worst and the best performing countries is a factor of 6. For example, the level of risk that a person travelling on motorways from London to Budapest experiences in **Belgium** is more than double what they experienced in **Britain**. Then in **Germany** it is between the two, but in Austria it is again twice what it was in Britain, and in **Hungary** it is twice as high again, that is more than 4 times the level in Britain!

This indicator of risk on motorways could not be calculated for **Cyprus**, **Greece, Ireland, Luxembourg**, **Poland** or **Slovakia** due to the lack of data on the number of vehicle-km. The number of deaths on motorways is not available in **Bulgaria**, **Lithuania** or **Romania**. There are no motorways in **Estonia**, **Latvia** and **Malta**.

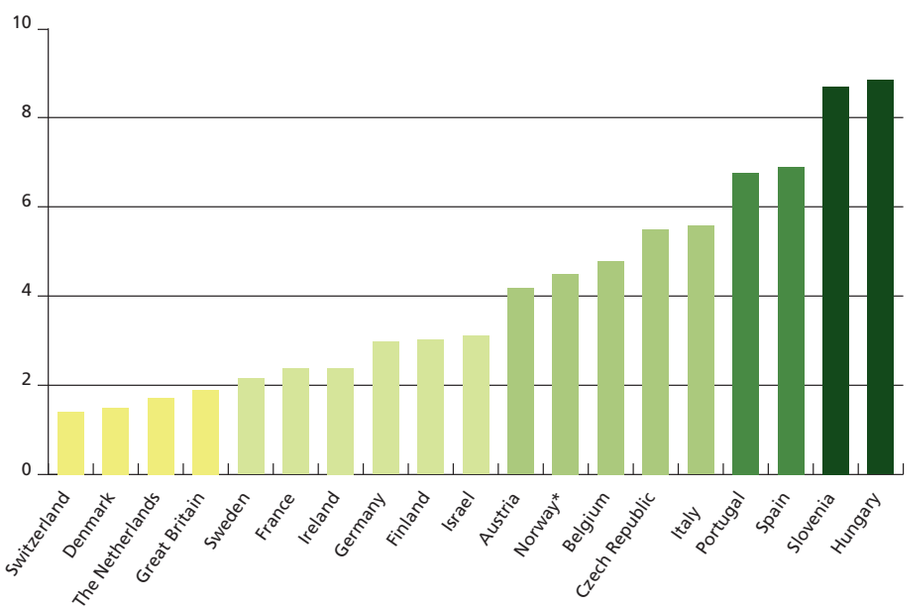


Fig. 1: Number of deaths on motorways per billion vehicle-km in 2006.
** 2005 ** Motorway and Autovia (express roads) together. Rates for Finland, Ireland, Israel and Norway are based on few deaths per year and are therefore subject to wide fluctuation*

[11] Exact value 3.7 (Countries considered AT, BE, CZ, DE, DK, ES, FI, FR, GB, HU, IE, IT, NL, PT, SE, SI)

The indicator

This report uses as an indicator of the safety on motorways the risk of death per unit vehicle-distance driven, namely the number of deaths on motorways divided by the number of kilometres driven by vehicles on motorways (in billion).

Motorways are roads with dual carriageways, at least two lanes each way; entrance and exit signposted; grade separated interchanges; central barrier or central reservation; no crossing movements at the same level; no stopping permitted unless in an emergency. Use of motorways on foot and by some types of vehicle is restricted in various ways in different countries.

Although motorways are high speed roads, they are safer than other types of roads by design and regulation. Many more road users die on **rural** and **urban roads.** These are more difficult to compare internationally because of different definitions of road types and lack of detailed data on vehicle-km travelled.

This chapter looks at road users in general. In 14 countries (EU15 except Germany), the great majority of killed road users on motorways are car occupants. Powered two wheeler users account for around 10 % of all deaths, goods vehicle occupants 8% and pedestrians 7%[12].

The data collected to calculate the indicators are from the national statistics supplied by the PIN Panellist in each country. The CARE and IRTAD databases were used to supplement and verify. The full dataset is available in the Annex. Altogether 18 out of the 30 countries covered under the Road Safety PIN provided data on km travelled on motorways, but they use various methodologies to collect them.

3.1.1 **Progress** - *In reducing the risk of being killed*

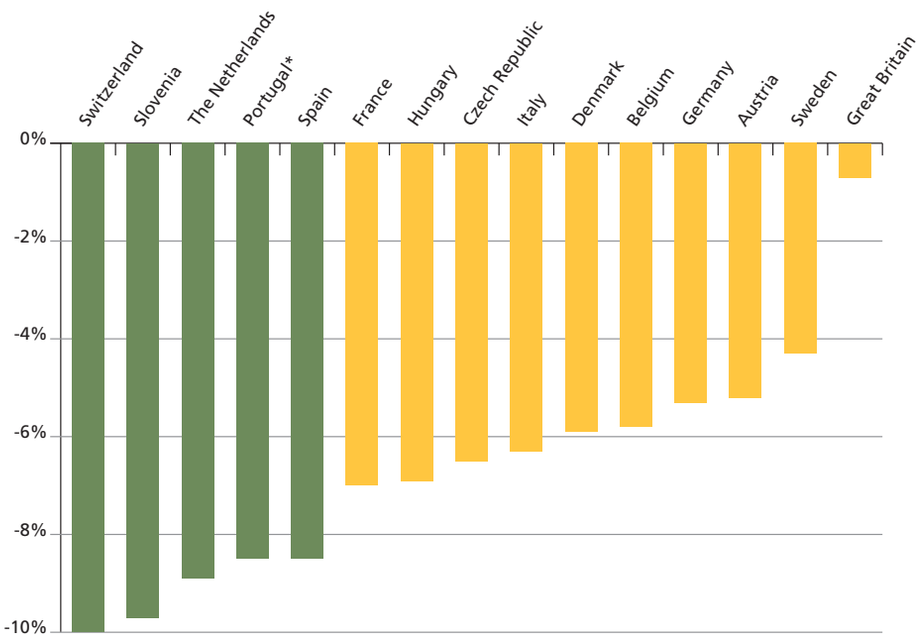


Fig. 2. Average yearly percentage change over 1997-2006 in deaths on motorways per billion vehicle-km[13].
** PT (1999-2006)*

[12] ERSO, Traffic Safety Basic Facts 2006, motorways, Fig. 4, p.6 http://www.erso.eu/safetynet/fixed/WP1/2006/BFS2006_SN-NTUA-1-3-Motorways.pdf 3.2 Progress

[13] NO, IL and FI are excluded from Fig. 2. The annual numbers of deaths in Finland and Norway are below 20 and thus subject to substantial random fluctuation. IL could not be included because vehicle-km are available only for 2005 and 2006.

In the period 1997 to 2006, the highest average yearly reductions in the risk of being killed on motorways were achieved by **Switzerland** and **Slovenia** (Fig. 2). In these two countries, the number of deaths per billion vehicle-km decreased each year on average by an outstanding 10%. **The Netherlands, Portugal** and **Spain** follow with annual reductions over 8%.

For the EU as a whole, the risk of death on motorways per vehicle-km has been decreasing on average by less than **6%** yearly over the last decade (Fig. 2)[14] while the number of deaths has been decreasing by less than **2%** over the same period[15].

The reduction in risk of death on motorways can be partly attributed to the improvement in vehicle passive safety, the improvements in traffic management through Intelligent Transport Systems (ITS), and also to the increase in traffic density contributing to greater speed homogeneity and traffic slowing down. Progress in better than average countries can also be attributed to better road user behaviour and infrastructure safety.

3.1.2 In reaching the EU target

It has been estimated that to reach the EU target of cutting road deaths by 50% between 2001 and 2010, a year-to-year reduction in deaths of at least 7.4% is needed from 2001 onwards (PIN Flash 6, Oct. 2007). Among the EU countries, the reduction of deaths on motorways is fully contributing to the overall reduction in **France**, **Austria, Denmark** and **Belgium** (Fig. 3).

But the average annual reduction in road deaths occurring on motorways between 2001 and 2006 was only 5% for the EU as a whole.

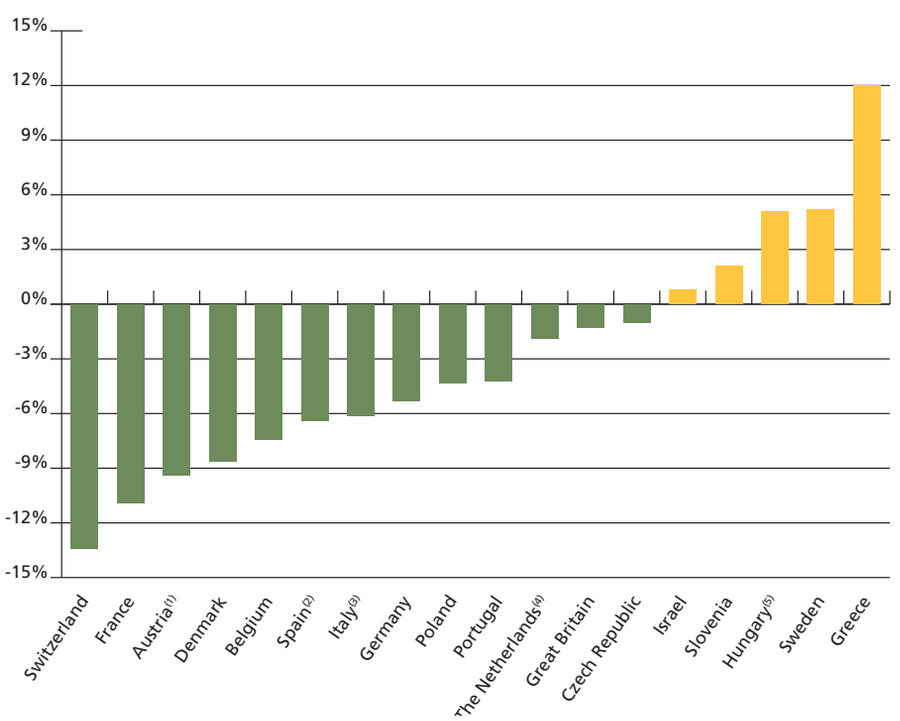


Fig. 3. Average yearly percentage change in the number of deaths on motorways over the period 2001-2006[16]

[14] Exact value 5.6% (Average based on AT, BE, CZ, DE, ES, DK, FI, FR, GB, HU, IT, NL, SE, SI)
[15] Exact value 1.4% (Average based on EU25 except EE, LT, LV, LU, MT)
[16] CY, FI, IR, LU, NO and SK are excluded from Fig. 3 as the annual numbers of deaths are below 20 and thus subject to substantial random fluctuation.

The number of deaths occurring on motorways has clearly tended to increase in **Greece**, **Sweden, Hungary** and **Slovenia**. In **Greece**, the increase in deaths on motorways from 86 to 147 is worrying and can be only partly attributed to an increase of the motorway network length.

3.3 Background

Experience from the countries with the safest motorway networks shows that a high level of safety on motorways is a result of a comprehensive mix of measures, including safe road design and engineering, safe infrastructure management and enforcement - particularly speed enforcement. Of course, other factors such as the vehicle fleet and mobility patterns play a role too, but these are hard to quantify.

3.3.1 The champions

In **Switzerland**, the number of persons killed on the motorway network has decreased by an outstanding 15% per year on average between 2001 and 2006 (Fig. 3). 31 people died on motorways in 2006 compared to 71 in 2001, making Swiss motorways the safest ones in Europe in 2006. Though a reduction in road deaths has been achieved also on urban and rural roads, it has been less impressive.

Speed enforcement on the motorway has become a high priority with the implementation of new speed cameras and increased mobile checks. The number of drivers caught for speeding has more than doubled between 2002 and 2006. Average speed has been reduced by 3% (Fig. 4). Finally, road safety and enforcement activities were extensively discussed in the media.

Denmark recently introduced important changes to the Traffic Law, including the introduction of a penalty point system in September 2005. A driver travelling 30% above the speed limit will get one penalty point. The licence is withdrawn after 3 points. Despite the generous allowed margin of 30%, 8 out of every 10 points imposed so far are for travelling above the speed limit. In April 2004, the general speed limit on motorways was increased from 110 to 130 km/h after major infrastructure safety upgrades. For around half of the network the drivers are still required to keep to the 110 km/h limit. The stricter limit is clearly posted. The speed limit for heavy good vehicles (HGV) was also increased from 70 to 80 km/h to reduce the problem of speed heterogeneity. Police enforcement was increased, together with awareness campaigns.

"19 people died on Danish motorways in 2006. This is the lowest level for 30 years. Unfortunately we have most probably not been able to sustain such a decrease because 2007 witnessed an increase in road deaths."
Jesper Solund, Danish Road Safety Council

The good performance of the **Netherlands** is the consequence of the work carried out in developing an integrated approach of safe road design and traffic management, vehicle safety and awareness campaigns combined with police enforcement. As a result, road deaths on motorways have continued to decrease - by almost 5% per year on average between 1997 and 2006.

This excellent record has been achieved without road safety audits and road safety inspections being mandatory. Dutch researchers have estimated that further improvements could be achieved if the requirement for road safety audits (RSA) and inspections (RSI) were strengthened. Relatively few are carried since it is up to the road authority whether or not to have an RSA or RSI.[17]

[17] Experience from countries that are running road safety audits and road safety inspections (UK, Australia, New Zealand, Denmark, France, Norway…) confirms that RSA and RSI are cost effective road safety measures. (SWOV Fact sheet, Road Safety Audit and Road Safety Inspection, March 2007)

Dutch motorways are equipped with accident detection cameras transmitting information at once to traffic management centres. In case of accidents or congestion, drivers are alerted via variable messages and required to slow down to 50 or 70 km/h. Other ITS applications include dynamic route information panels, ramp metering and rush hour lanes, mainly to reduce congestion.

The Dutch government is about to bring in pay-as-you-drive road pricing for trucks in 2011, and cars by 2016. Pay-as-you-drive systems charge road users according to the distance driven. This is expected to alter congestion and reduce road use, both having safety benefits.

The **UK** has the longest experience with safety audits. They have been compulsory since 1991 for all new national roads and improvements on existing trunk roads and motorways. They have become a well-accepted practice in modifying the road network.

"Mean speeds on UK motorways have remained reasonably stable but this could possibly be due to increased congestion. Unfortunately exceeding the 70miles/h mandatory speed limit is still a widespread phenomenon in free flowing traffic. The government's target of reducing killed and serious injuries is being met but whereas serious injuries have been falling, deaths have recently remained fairly stable. We are currently investigating why this is but, as yet, we do not have the answers."

Brian Barton from the UK Highways Agency.

Hard shoulder running during peak hours

Hard shoulder running during peak hours may be an efficient instrument for rapidly achieving improvement of the traffic flow on heavily congested motorways at reasonable financial cost. Experiences in the UK, the Netherlands, France and Germany show that road accidents, travel time and pollution can also be reduced.

The M42 near Birmingham is one of Britain's busiest motorways, leading to high congestion levels at peak times and accident rates higher than the national average. The Active Traffic Management scheme (ATM) implemented there aims to utilise new technologies and infrastructure alongside improved management techniques. The ATM scheme includes:

- Driver information signs
- Mandatory lower speed limits during periods of congestion and when approaching incidents
- Use of the hard shoulder during periods of congestion
- Incident management control centres
- The provision of emergency refuge areas every 500 m each with emergency roadside telephones

Since the introduction of the ATM scheme, no one was killed on the M42 and accident rates decreased by 25%.[18]

30 rush-hour lanes are also in operation in the Netherlands. Serious accidents decreased by 40% over the period 2004-2006 compared to 2001-2003, while the overall reduction on the whole motorway network was 30%.[19]

[18] http://www.highways.gov.uk/news/newsroom.aspx?pressreleaseid=156569
[19] AVV, Monitor ZSM 2006, August 2007

3.3.2 The fast movers

Over the past decade, **Slovenia** achieved the second best reduction of the number of deaths per billion vehicle-km after Switzerland. Still the risk of dying on the motorway is the highest among the countries that provided data. Most of the motorway network has been built since 1994 and the implementation of the National Motorway Construction Programme. Safety standards have already been implemented, but the formal implementation of the latest best practice in infrastructure design will allow further improvements.

"The current generation of drivers has more traffic experience than the generation of their parents; a phenomenon that is known as "collective learning"" says Tomaž Pavcic. However, speeding is a widespread phenomenon as drivers do not expect traffic surveillance and tend to drive faster cars. "We hope to improve the situation in future years with the first cameras being implemented on motorways as part of the Strategic National Safety Plan".

Spain still holds a sad record of people killed per vehicle-km on motorways but the government is taking action to tackle the problem. 2006 saw the first road safety inspections on motorways and national roads (25.000 km that account for 45% of km driven in Spain). Yet road safety audits and inspections are not mandatory. The Royal Automobile Club of Catalunya (RACC) also assessed the passive safety elements of 7,000 km of motorways and autovias, on the basis of the EuroRAP Road Protection Score protocol.

"*We found that more than 50% of the road assessed had room for improvement, especially regarding roadside protection. Run off accidents account for 40% of fatal accidents outside built-up areas in Spain"* says Lluis Puerto from the RACC Foundation. High risk sites are also progressively being treated. "*The adoption of an EU Directive would certainly give the sharp edge to incite the government to accelerate progress*."

"It is generally agreed that part of the good reduction of the total number of road deaths in Portugal over the past decade has been due to the transfer of high speed traffic from rural roads to newly built motorways. However, even some of the newly built motorways do not always provide the highest safety level for the same amount of construction costs. The adoption of an EU Directive would be instrumental in preventing other countries from repeating the same mistakes".

Joao Cardoso, LNEC, Portugal

In **France**, where a fully automated speed camera system was introduced in late 2003 and speeding sanctions stepped up, average speed of cars has dropped by 6% from 2002 to 2006 (PIN Annual Report 2007). In the same period, the number of deaths per vehicle-km has been decreasing each year by an outstanding 17% on average (and deaths by 16%) on motorways. This confirms the research findings, according to which the relative change in the number of fatal crashes is proportional to the 4th power of the relative change in speed.[20]

However, excessive and inappropriate speed remains present in one fatal accident out of 3. In 2006, half of the vehicles were travelling above the legal speed limit on 110 km/h motorways and almost one third on 130 km/h stretches.

[20] Nilsson (2004) *Traffic safety dimensions and the power model to describe the effect of speed on safety*

3.4 Room for improvement

"Deaths on motorways have been on the rise since 2001 in Hungary following the very unfortunate decision to raise the maximum speed limit from 120 km/h to 130 km/h. Most of the drivers break the limit as they do not expect being caught. Many fail to wear a seat belt. The government must now increase police enforcement and provide appropriate rescue service."

Peter Hollo, KTI, Hungary

"Recently efforts have been made to increase awareness of the danger of tailgating and enforce safe following distance in several countries. In the Czech Republic, however, every third vehicle travelling on the motorway is not keeping safe distance from the vehicle travelling in front."

Vojtech Eksler, CDV, Czech Republic

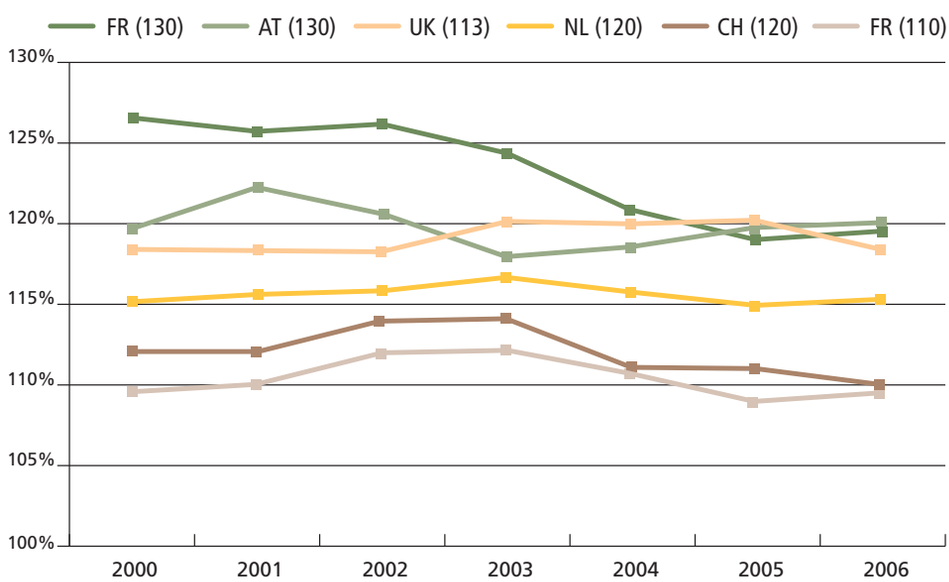


Fig. 4. Development in mean speed on motorways for some countries showing decreased motorway deaths

In 2004, 99% of the new vehicles sold could reach 150 km/h or more, which is above every permanent motorway speed limit in Europe.

3.4.1 Section speed control

Section speed control is a relatively new way of enforcing speed limits. Automatic section controls are in use especially on motorways and tunnels in several countries in Europe, including the **Netherlands, Italy,** the **Czech Republic** and **Austria**. First results show safety benefits from this type of speed enforcement. While a camera enforces vehicle speed at a single point, section control allows measuring the average speed of a vehicle over a distance of usually 3 km. This helps to make drivers adhere to speeds along entire road sections, which results in more fluid traffic.

For road users, speed enforcement on motorways can provide highly visible evidence reinforcing their subjective assessments of the risks of being caught speeding.

3.4.2 TUTOR: Section speed control in Italy

A fully automated section speed control scheme has been implemented on high-risk sections of the motorways operated by Autostrade per l'Italia (1250 km of motorways at the end of 2007). The system called "Tutor" checks the mean speed of vehicles over a 5 to 30 km road section and automatically generates a fine in case of speeding.

The risk of death was halved during the first year of implementation on 460 km of motorways. Accident and injury rates also went down by 19 and 27% respectively. The mean speed decreased by 16%. In 2008, the application of the Tutor system will be extended to an additional 902 km of motorway sections, covering more than 30% of the Italian motorway network.

	Sep 2005 - Aug 2006	Sep 2006 - Aug 2007	Change
Death rate	0.84	0.41	-50.9%
Injury rate	23.60	17.28	-26.8%
Accident rate	50.04	40.47	-19.1%

Table 2. Source: Autostrade per l'Italia S.p.A.

3.4.3 Heavy good vehicles posing safety risk

The heavy good vehicle (HGV) traffic on motorways has been increasing faster than car traffic in most European countries. HGVs have to respect lower speed limits than light vehicles and thus might cause heterogeneity of speeds in free flowing traffic. Every day in Europe some motorway sections are blocked for a many hours due to accidents involving HGVs. HGVs are forbidden to overtake on most part of the Dutch motorways during day time. **Belgium, France** and **Czech Republic** are currently considering forbidding HGVs to overtake other HGVs on 2-lane motorway carriageways.

Variable road pricing for HGVs could be another solution for reducing HGV traffic during peak hours. Toll prices could vary depending on the section travelled and the period of the day.

3.4.4 The need for action at the EU level

Present road designs result from many decades of construction and maintenance in times when safety issues were not considered to the same extent. Today, several road features no longer meet the latest safety requirements. Moreover, traffic conditions may have changed since the road was designed and built. Even recently upgraded motorway networks in some Southern and Central European countries register high risks of death. This suggests that knowledge about safe design and effective risk management may not yet be fully applied.

Against this background, the European Commission adopted a proposal for a Directive on road infrastructure safety management. The Directive would require Member States to apply the following four instruments on the Trans-European Road Network (TERN):

- **Road safety impact assessments:** demonstrate the road safety implications of different planning alternatives for a road project, whether construction of new infrastructure or rehabilitation of existing infrastructure, as in the case of environmental impact assessment
- **Road safety audits:** an independent technical check aiming at identifying unsafe features of a road project, including proposals for remedy

- **Network safety management** targeting remedial measures to parts of the network with high concentrations of accidents (high-risk road sections) and/or a high potential to avoid accidents in the future.
- **Safety inspections:** as part of regular road maintenance, enable the detection and hence reduction of accident risk in a preventive way through low cost measures.

These procedures already exist and are applied at varying degrees in some Member States. Aim of this proposal for a Directive is therefore to extend the above-mentioned measures to the whole of the EU, without defining technical standards or requirements, but **leaving the Member States free to keep already existing procedures** if they have them in place **or to introduce procedures in their own way** if not[21].

"Every year between 1.5 and 2 bln EUR are spent on major roads through various EU funds," said Enrico Grillo Pasquarelli, Director of Land Transport, DG TREN, European Commission. "It's clearly a duty of the budgetary authority of the EU (Council and the European Parliament) to ensure this money is spent to build safe roads, and the proposed Directive will give the Commission the kind of benchmark it needs when assessing requests for funding coming from Member States".

Non-binding guidelines would have limited effectiveness in accelerating progress on road infrastructure safety beyond what national governments are already committed to do, or are likely to commit themselves to do without a requirement to do so as part of the EU.

According to the principle of subsidiarity, the application of these rules would be mandatory only on those 85,000 km of main roads belonging to the TERN. It is hoped that this Directive would have a spill-over effect that will also bring about an associated improvement in the safety management of the rest of the road network.

The EU project ROSEBUD estimated that the application of the four procedures to the Trans-European roads would reduce the number of deaths by more than 600 and injuries by 7000 every year. ROSEBUD also estimated that 400 lives per year could be saved if the safety management was applied to motorways only, and 1300 if applied to motorways and main roads.

Cost-effective approach to infrastructure safety management

A methodology known as Network Safety Management (NSM) has been developed jointly by the Federal Highway Research Institute (BAST) in Germany and the Technical Department for Transport, Road and Bridge Engineering and Road Safety of the French Ministry for Ecology (SETRA). NSM is a tool for road administrators to help them in identifying highway sections to be treated with high priority. In NSM, the key parameter to assess the safety performance of road sections is the so-called safety potential. The safety potential describes the potential savings in accident costs that could be reached by remedial measures. It is defined as the amount by which accident costs per km length of road would be reduced if a road section had a best practice design.

The advantage of the safety potential compared to the classic accident parameters is that it allows different road types and roads with different traffic volumes to be assessed at the same time. Furthermore, as the safety potential is given in terms of accident cost, it can be related to the cost of the improvement measures. Since resources are limited, those sections where improvements can be expected to have the highest benefit-cost ratio can to be treated first.[22]

[21] http://ec.europa.eu/transport/roadsafety/infrastructure/safety_mgnt_en.htm
[22] Ganneau F. and Lemke K., Network Safety Management – From case study to application, http://www.setra.equipement.gouv.fr/IMG/pdf/ip304-e.pdf

3.5 The EuroRAP experience

John Dawson is chairman of EuroRAP, the first regional Road Assessment Programme, which he has led since its genesis in 2000. John is also chairman of IRAP, the International Roads Assessment Programme, which was established in 2006. He is also Secretary of the FIA Foundation for Automobile and Society. More on www.eurorap.org

ETSC: How did EuroRAP start?

EuroRAP was created following the success of EuroNCAP in raising the safety standard of the typical new car from two to four stars. EuroRAP has been able to bring together all the stakeholders in a safe road system – motoring and touring clubs, road authorities and manufacturers - and create, for the first time, a common international system to measure the safety of roads independent of national proprietary standards.

EuroRAP provides three protocols that can be applied to any country:

- **Risk Rate Mapping**: the numbers of killed and seriously injured road users per billion vehicle-km are shown on a colour-coded road map
- **Performance Tracking**: Identifies whether fewer people are being killed or seriously injured on a road over time and identifies the countermeasures that are most effective
- **Road Protection Scores (RPS):** assesses how much or how little protection a road environment will provide the occupants of a car in the event of a crash. On the basis of this score, each road is given a star rating varying from 1 to 4, with 4-star representing a road which is engineered to minimise the likelihood of a crash resulting in a fatal injury to car occupants.
  RPS provides information that is not readily available through accidents histories. Accidents are always random and accident rates subject to statistical fluctuation. Over time as accident numbers decrease, identification of higher risk sites through variations in observed accident numbers will become more difficult. The RPS aims to provide a consistent assessment of the potential long-term risk of a given road design.

The power of being able to measure the safety of roads in a way that is understandable to both professionals and the public has meant EuroRAP has quickly become active in many European countries and has generated sister programmes on every other continent in both developed and developing countries.

ETSC: Who are you reaching out to with EuroRAP?

The key channel of communication is through motoring clubs or research charities. The star rating is a familiar consumer measure used by clubs for decades to rate all kinds of services. Mapping, atlases, club magazines, websites and now online planners and route guidance systems already distribute the risk maps and star rating results on the safety of roads to millions of consumers. The new EuroRAP *Road Safety Atlas* project will provide a formal reference document to support distribution of the information across the continent.

> *"Every few years, thousands of road sections across Europe see more casualties than a major rail crash, yet the cost of saving casualties represents a fraction of that spent on rail, air and factory safety, where laws are more stringent.*

ETSC: The latest PIN ranking of motorway safety shows that Switzerland, Denmark and the Netherlands are leading the way. Also Slovenia, Portugal and Spain have been particularly successful in cutting death rates over the past decade. What, in your view, can explain their good results?

The differing safety levels of national motorways or any roads result from the system - a combination of the quality of roads, drivers and vehicles. The UK, the Netherlands and Sweden have been frontrunners in designing safer roads. This combines with important factors such as high seat belt wearing and use of modern safer cars. The safety quality of underperforming countries' motorways is highly variable. For example, in Spain there are sections where the safety quality is good but much where it falls well below usual motorway standard. Even some relatively newly built sections are not 4-star.

"In the top three safest EuroRAP countries, improved roads are expected to be the major source of future casualty reduction.

Still in the safest EuroRAP countries, improved roads are expected to be the major source of future casualty reduction. Analysis of national road casualty reduction strategies shows that road infrastructure improvements are expected to deliver the greatest savings compared to improvements to vehicles, and even driver and road user behaviour. This is particularly so in countries where, however imperfectly, traffic law is already generally respected.

Our latest UK star-rating reports 2006-07 shows that only 60% of the UK motorways tested scored the top 4-star grade. We urgently need to improve our run-off scores. A quarter of motorway roadsides scored only 2-star. This reflects, for example, the presence of trees fairly close to the carriageways on some unprotected motorway roadsides. Improving injury protection on a 3-star motorway to 4-star rating would reduce fatal and serious accidents by 28%.

"Safety improvements to eliminate 2 and 3-star roads on the TERN would provide a high-profile template for making roads safer in all EU Member States.

ETSC: Should road safety improvements be left to the national authorities or should it be a coordinated EU effort? In this respect, how important may be the proposed Infrastructure Directive for achieving this goal?

The European Union can lead the way by requiring that Europe's premium network of trade routes, the TERN, has 4-star minimum safety standard. It can require that national authorities demonstrate they have in place basic competence in safety management. The current Infrastructure Directive is most important to help raise standards in Central and Eastern Europe and ensure they are met by any new Member State.

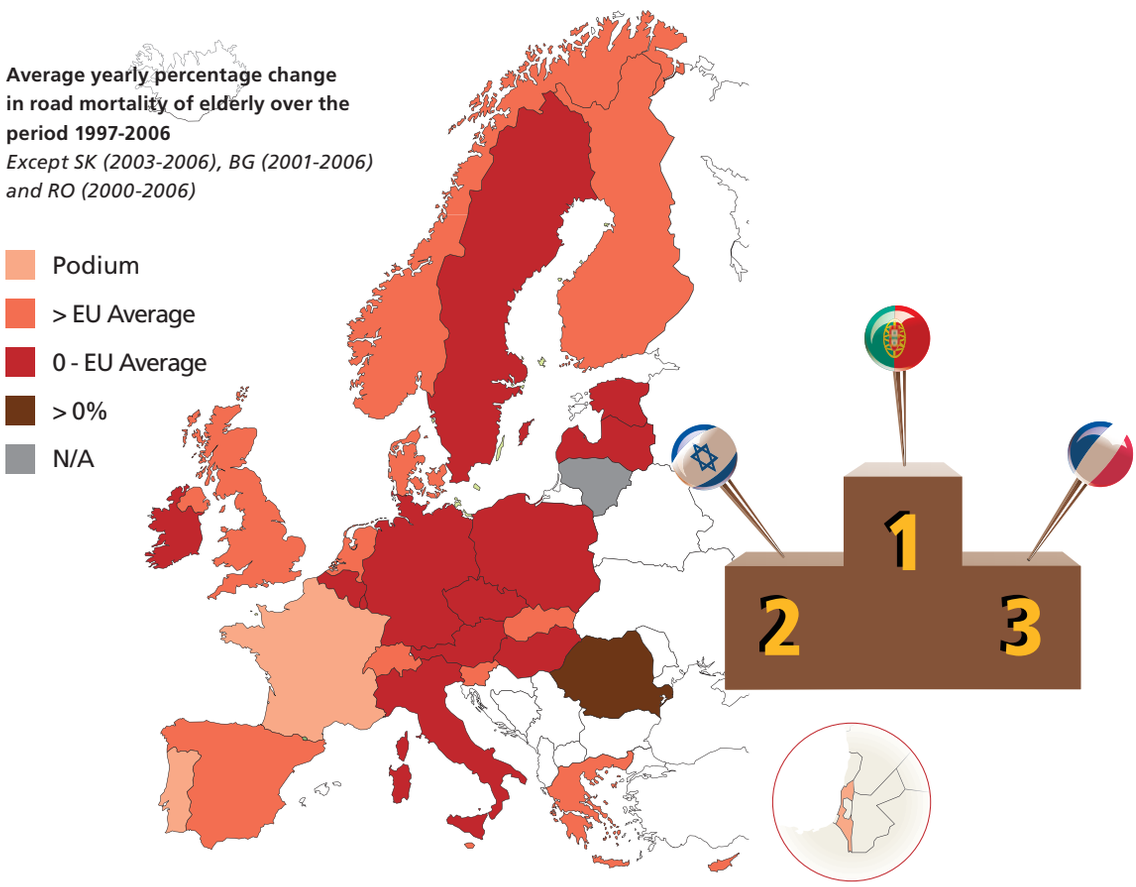
EuroRAP has pledged to work with the Commission to support its transparency strategy. EuroRAP proposes to assess the TERN's safety performance using both risk mapping and inspection of crash protection standards. EuroRAP urges national authorities to make available road accident data. This would allow independent assessment of safety performance of any public funded infrastructure.

"Road casualties bleed away 2% of European GDP. Improving the safety of roads infrastructure is one of the easiest, most affordable and highest return ways of improving European competitive performance. The reduction of road deaths and injuries offers higher economic rates of returns than available in any other field of public policy."

4| Reducing Older People's Deaths on the Roads

At least **8,260** people 65 years old and over were killed in the EU27 in 2006. Per population, the risk of death in a road accident for an elderly road user is on average 16% higher than for a younger road user. The country comparison shows that the differences between countries are huge.

Portugal, Israel and **France** scored the best year-to-year reduction in older people's deaths on the roads over the past decade.



Per population, **Malta**, the **UK** and **Sweden** are the safest places for older people using the roads. Only in **Latvia**, **Malta**, **Estonia**, **Spain**, **Lithuania** and **Slovenia** do older people have a lower risk of dying on the road than the rest of the population.

If the risk rates of older people and others decline at the same pace, by 2050 one death out of three is likely to be an elderly person. Providing safe mobility to senior citizens deserves special attention and requires a re-think of policies and strategies. Moreover, due to population ageing, older people will represent an increasing share of the total population.

The **Netherlands**, **Finland, Cyprus** and **Denmark** are the countries which are likely to face the strongest pressure on the development of road deaths due to population ageing.

4.1 Improving older people's safety

Over the past decade, **Portugal** and **Israel** scored the highest average annual reduction of 8% and 7% respectively in *elderly road mortality* expressed as number of deaths among older people per 100,000 elderly population. **France** ranks third with an annual average reduction of over 6%. A group of 11 countries composed of **Cyprus, Denmark, Slovenia, Greece, Switzerland, Norway, Slovakia, Finland,** The **Netherlands, Spain** and the **UK** follows with reductions above the EU average of 3.7%. Slowest progress has been recorded in **Latvia** and **Bulgaria** where it has been less than 2%. In **Romania** numbers of deaths of people aged 65 and over per 100,000 elderly population actually rose over the last six years.

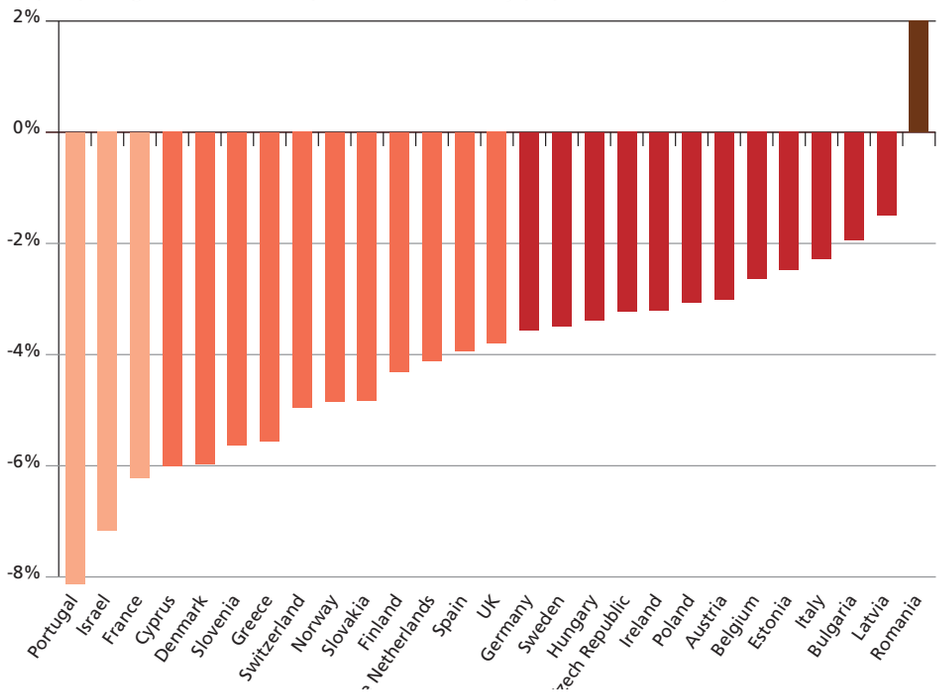


Fig. 1: Average yearly percentage change in road mortality of older people over the period 1997-2006.
*SK (2003-2006) and BG (2001-2006), RO (2000-2006).

LU and MT are excluded from Fig.1 because the annual numbers of deaths in those countries are below 20 and thus subject to substantial random fluctuation. LT is excluded from Fig.1 because numbers of elderly deaths are available only since 2004.

Who are the older people?

In this report an older person is a person aged 65 or older. While this definition is somewhat arbitrary, 65 is in many countries the age at which one can begin to receive state pension benefits.

However, by using rigid age boundaries we do not take into account the fact that ageing is a process that does not start at the same age for each and every individual, nor does it progress at the same pace. There can be large differences in driving skills between people of the same age, as well as in their physical and mental abilities. It is very well possible that some 80 year olds are in better shape than certain 40 year olds.[23]

This ranking looks at elderly people in general. As for other age groups, their level of safety is to a large extent determined by the transport mode they use.

According to 2005 data provided by 18 countries to CARE, 38% of elderly people killed were pedestrians, 26% died when driving a car, 14% as car passengers, and 5% as motorcyclists or moped riders. Others, including pedal cyclists, accounted for 17%[24].

[23] SWOV Fact Sheet (2008), The elderly in traffic

[24] ERSO, Traffic Safety Basic Fact (2007), Table 5 and Fig.4 www.erso.eu/safetynet/fixed/WP1/2007/BFS2007_SN-KfV-1-3-Elderly.pdf

The indicator

The road safety of elderly people is expressed here in terms of the number of road deaths among people aged 65 years and older divided by their population size (in 100,000 inhabitants). Road deaths by population give a good estimate of the overall impact of road risk on the age group. Unfortunately an estimation of time spent in traffic or the amount of travel among the senior population is available only for a very few countries. Exposure in traffic resulting from different mobility needs and patterns is therefore not taken into consideration when comparing countries.

We may measure the relative safety of older people by comparing their road mortality with that of the rest of the population, i.e. population of the age group 0-64. (Fig.2).

Numbers of deaths used in this report come from the national statistics supplied by the PIN Panellist in each country. The CARE database was used to verify these. The full dataset is available in the annex. The number of older people killed in traffic is available in Bulgaria since 2000, in Lithuania since 2004, in Romania since 1999 and in Slovakia since 2002.

Numbers of inhabitants were retrieved from the EUROSTAT database and refer to the registered population in each country and age group on the 1st of January of the respective year.

The improvements in safety of older people are to a large extent a function of the overall improvements in road safety. Countries that have made the biggest improvements in road safety since 2001, namely **France, Portugal, Switzerland** and **Denmark** are among the best performers also in improving the safety of older people.

This suggests that reduction in the total number of deaths is boosting progress in reducing older people's deaths. The case of Portugal is emblematic: Portugal scored the best reduction both in overall deaths[25] and in elderly deaths over the past decade.

"The reduction of elderly deaths followed the good reduction of the total number of road deaths observed in Portugal over the past decade. The measures implemented so far did not target specifically the safety of elderly people. However, lots of efforts were put into improving pedestrian safety.

Our Road Safety Plan (2003-2010) includes a 60% reduction target for pedestrian deaths. Around 40% of the pedestrians killed are aged 65 or over. We run campaigns raising awareness about pedestrian vulnerability. Infrastructure improvement schemes were implemented in several urban and suburban areas, with greater care over the location and signing of pedestrian crossings".

Joao Cardoso, LNEC, Portugal

[25] ERSO Annual Statistical Report 2007 (pag.11), www.erso.eu

Elderly contribution to EU reduction target

It has been estimated that to reach the EU target of halving the number of road deaths between 2001 and 2010, a year-to-year reduction of at least 7.4% is needed (PIN Flash 6). Between 2001 and 2006, the annual average reduction of deaths among older people has been only 3%, while it has been 5% for the rest of the population[26].

4.2 Safety of older people compared to the rest of the population

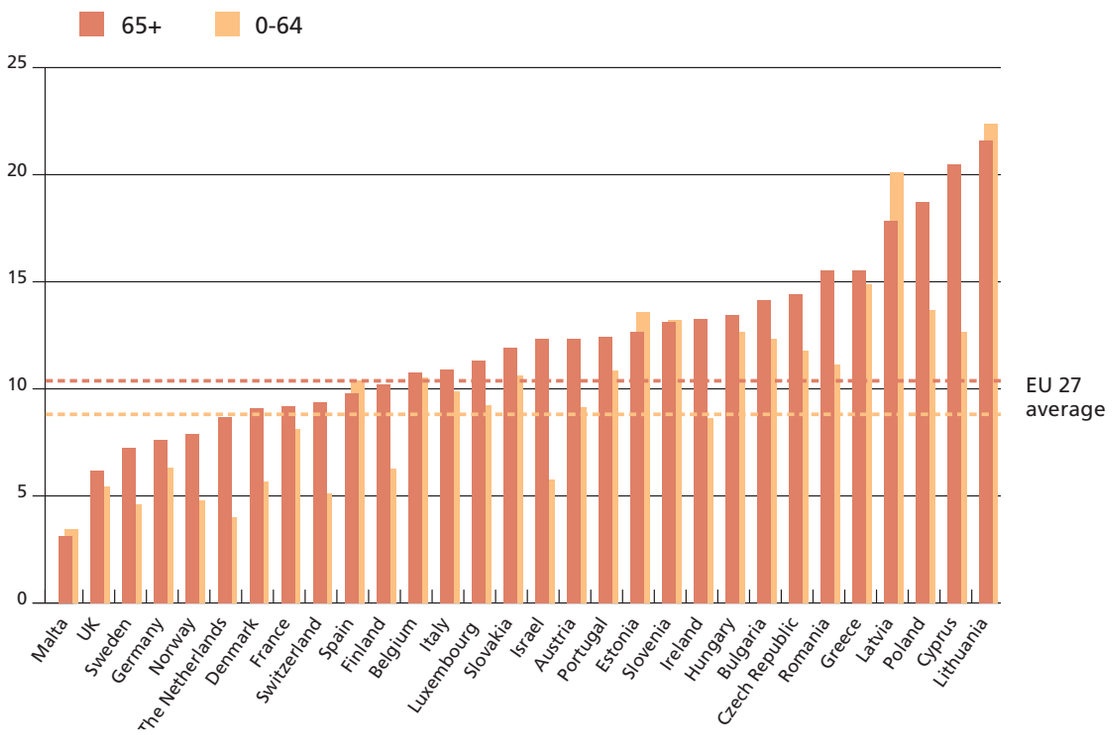


Fig. 2: Elderly road mortality rate with the road mortality rate of the rest of the population (0-64) for comparison. Average values for years 2004, 2005 and 2006.

The risk of an older road user being killed in a road accident is on average 16 percent higher than the corresponding risk for a younger road user. However, death rates vary greatly between Member States. Senior road users in **Lithuania** have on average 7 times the corresponding risk of being killed per population of their Maltese counterparts.

Some of the countries with good overall road safety records and a long tradition of safety such as **The Netherlands, Israel, Switzerland, Norway, Finland, Denmark** and **Sweden** have relative high ratios of road mortality between older people and the rest of the population (Fig. 3).

[26] Estimates for EU27 except Lithuania and Slovakia (exact values: 3.2 and 4.8%)

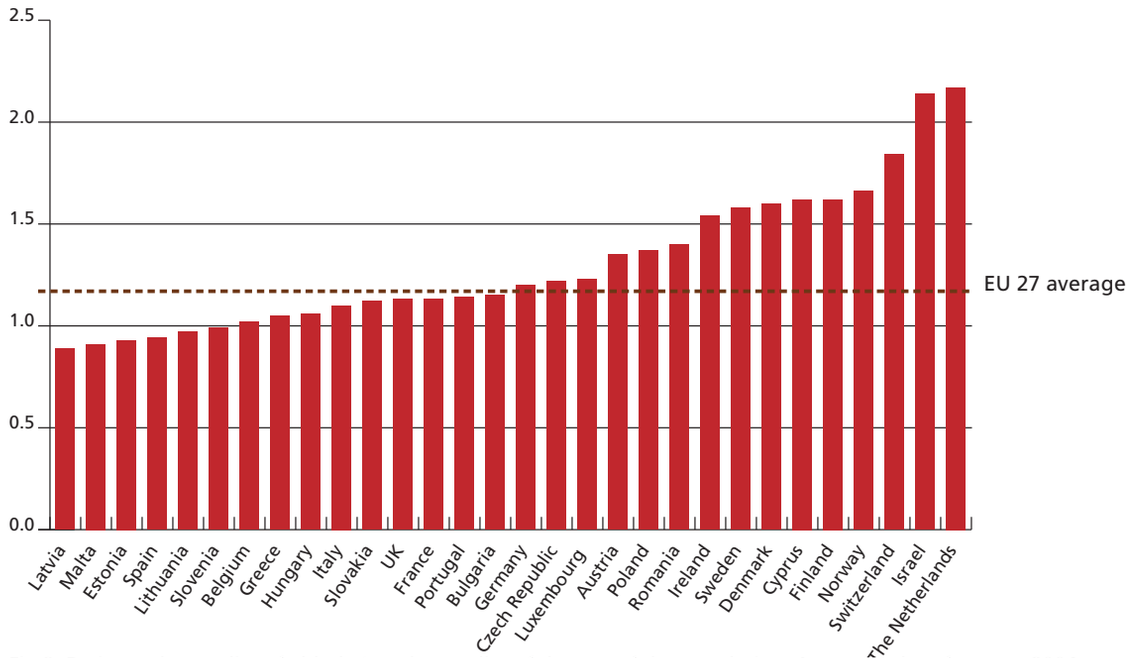


Fig.3: Ratio road mortality of elderly / road mortality of the rest of the population. Average values for years 2004, 2005 and 2006

In **Israel, The Netherlands** and **Switzerland,** the risk of an older person being killed in road traffic is twice as high as for younger road users.

Latvia, Malta, Estonia, Spain, Lithuania and **Slovenia** have a lower rate of road mortality among older people than in the rest of the population. Another group of countries, **Belgium, Greece, Hungary, Italy, Slovakia, France, UK, Portugal** and **Bulgaria,** have a ratio below the EU average of 1.2.

"Unfortunately, in Latvia, most older people have low-incomes. As a result, they are less mobile than other age groups. While 17% of all inhabitants are over 65, only around 8% of driving licence holders are elderly. This might partly explain the low ratio show in Fig.3.
However, over 50% of elderly people killed in traffic were pedestrians. Pedestrians are particularly at risk in Latvia. We urgently need to implement the actions planned in the Road Safety Programme 2007-2013 to improve the safety of pedestrians such as infrastructure improvements to protect pedestrians and cyclists from motorised traffic, better street lighting and signing around pedestrian crossings, better enforcement of violations by drivers and pedestrians near pedestrian crossings".
Aldis Lama, Ministry of Transport, Latvia

"We recently identified the problem of older people being particularly at risk compared to other European countries. We are now researching for possible remedies. We expect to come up with proposals later in 2008".
Rob Methorst, Ministry of Transport, The Netherlands

"In the Netherlands, older people cycle a lot more than in other European countries. They are relatively fit and enjoy a high level of mobility. This can partly explain the bad ratio shown in Fig. 3. Nevertheless, the health effects of bicycle use are presumed to be very positive; thus bicycle use is promoted for this reason".
Divera Twisk, SWOV, The Netherlands

4.3 Demographic changes and their impact on road deaths

The European population is undergoing major changes in its demographic structure with the proportion of older people growing at a fast rate. While the economic consequences of this trend are clear, the implications for traffic safety may be ambiguous.

Older people nowadays account for some 17% of the European population. Because of the decline in birth rates, the increase in life expectancy and the maturing of the baby-boom generation, 25% of the population will be over 64 in 2030 and 30% in 2050.

Assuming a constant mortality rate over time (or the same pace of decrease in both), it is possible to estimate the impact of the changes in the proportion of elderly in the total population on number of deaths on roads in future.

In the EU27 one road death out of five is aged 65 or over. In 2050 one road death out of three is likely to be an older person. This is illustrated in Fig.4, which is fairly similar to a graph of the forecast proportion of older people in the entire European population. That is because for the EU as a whole the mortality rates of older people and remaining populations are actually quite similar (10 and 9 respectively).

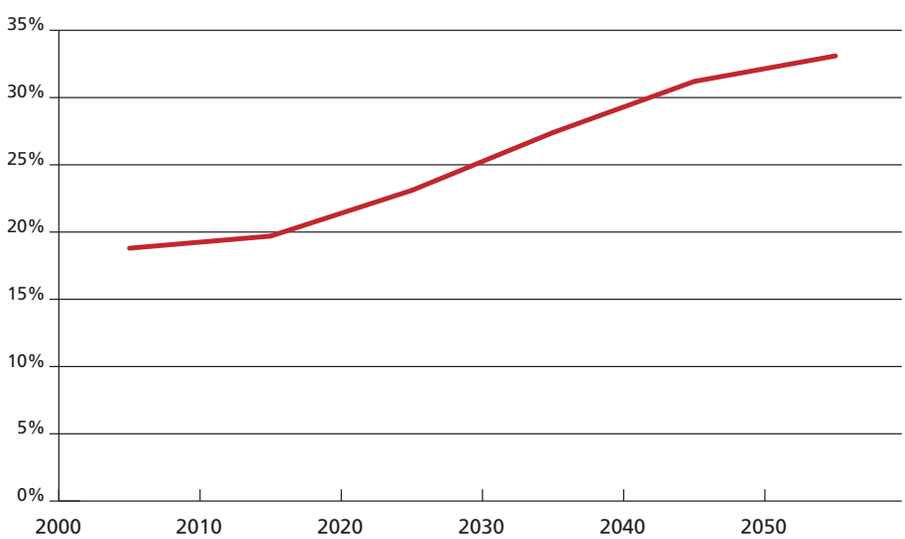


Fig. 4: Expected % proportion of older people's deaths among all road deaths in Europe according to forecast population

The situation is however different for particular countries, as their respective mortality rates may differ considerably as shown earlier in Fig.2. We may estimate the expected number of deaths based on the population forecast figures, employing the mortality rates determined for the two age groups for the period 2004-2006 and assuming that these will remain constant. In order to isolate the effect of population ageing from the change in the total population figures, we have undertaken a relevant adjustment based on the assumption of linearity between the number of deaths and the size of population.

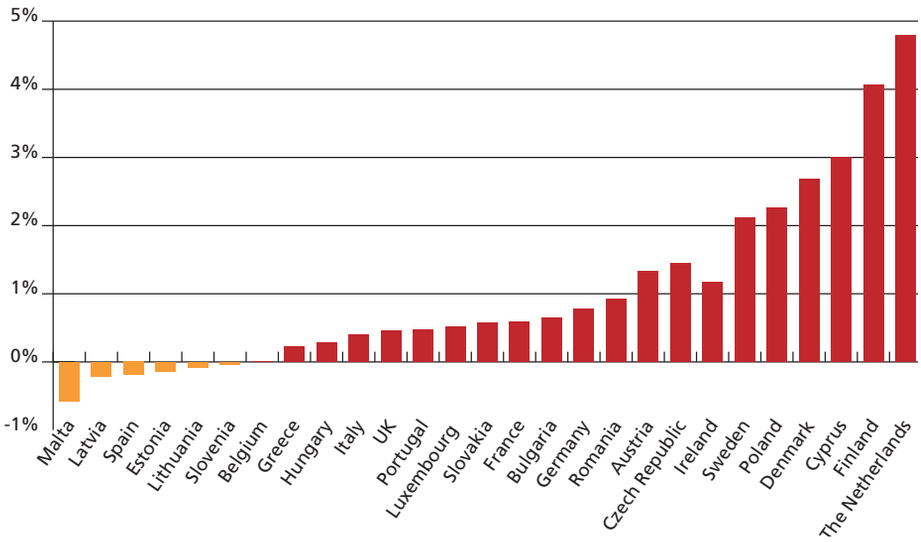


Fig.5: Expected effect of population ageing on annual number of road deaths in 2020 assuming constant mortality rates for the two age groups over the time

In 21 countries out of 27, the ageing of the population is likely to contribute to an increase of the number of road deaths. In these countries, the increase in the share of the population aged 65 years or older and having a relatively high road mortality rate will weigh negatively on the overall level of safety.

This effect is forecast to be greatest in The **Netherlands**, where the total number of road deaths in 2020 can be expected to be almost 5% higher than in 2005 just due to an increased share of elderly people having a higher mortality rate than the rest of the population. In another 8 countries the effect is estimated to exceed 1%.

In only 6 countries, the population ageing phenomenon is likely to lead to a tiny reduction in road deaths of some decimal percentage points by 2020.

4.4 Recommendations

Older people are more vulnerable to trauma than other age groups as the fatality risk from the same physical impact increases with age for all human beings after the age of 20 years. When a road accident occurs it affects an elderly person in a more serious manner. It is therefore particularly important to prevent older people from getting involved in road accidents in the first place. To bring this about, behaviour, vehicles and infrastructure should be improved.

4.4.1 Behaviour

Older drivers have to deal with age-related limitations, but they are generally able to compensate for them. Ageing is accompanied by the narrowing of the visual field, poorer contrast sensitivity, increased time required to change focus, slower eye movement, problems with depth perception and slower decision making. These impairments make older people more sensitive to complex traffic situations where a number of different tasks must be performed at the same time. To compensate for these functional limitations many older drivers try to avoid driving at night, in bad weather, in congested areas and during peak periods. More particularly, mandatory age-based screening for keeping the drivers licence has not been shown to be effective in preventing accidents (OECD, 2001).

Older people are particularly in danger when walking or cycling in the road environment. Road safety provisions aiming at improving their visibility seem particularly effective. The data from the European In-Depth Pedestrian Database developed under the project APROSYS confirm findings of several UK pedestrian epidemiology studies according to which the chances that a pedestrian will receive fatal injuries from an accident increases with age.

Mobility context

The travel patterns of senior citizens have changed considerably over the past decades. The mobility needs of older people have increased and are expected to increase even more in the future. Older people will drive longer distances and more than in the previous generation, but also will spend more time exposed to motor traffic while walking and cycling, both of which are associated with high fatality risks.

To achieve safe mobility of older people, effective transportation alternatives to the car should be offered so that older people who no longer can or wish to drive can continue to travel. Governments are called upon to devote considerable effort to making it possible for people to choose other modes when they have problems driving and eventually for all their needs. (ECMT, 2002)

There are also increasing heterogeneities in terms of mobility needs among older people. The mobility context of many older people nowadays is not comparable to that of those living some decades ago. As for the needs to further distinguish different age groups among older people, the network The European Network for Safety among Elderly (EUNESE), working especially with safety issues for older people, has grouped older people into two age-groups 65-79 and 80+ and also pointed at gender aspects
http://www.euroipn.org/eunese

Older drivers: At risk, but not risky

Older drivers have higher fatality rates. This is not so much due to a larger risk of being involved in a crash, but more so to their physical vulnerability. One thing that older drivers do have in common is their low annual mileage. This may have an influence on their crash rate, as drivers travelling fewer kilometres have increased crash rates per kilometre compared to those driving more kilometres. In addition, they generally drive less on motorways, instead they tend to drive on streets with intersections, which are less safe. Older people are not often involved in single vehicle accidents, but they are overrepresented in multi-vehicle crashes. Accidents involving older drivers typically occur at intersections, with the dominant accident type described as turning against oncoming traffic that has right-of-way on a main road.

Davidse R. (2007), Assisting the older driver; Intersection design and in-car devices to improve the safety of older driver
ERSO (2006), Older drivers http://www.erso.eu/knowledge/Fixed/07_old/olderdrivers.pdf

Getting the older people involved: the example of the Senior-OLA in Sweden

'OLA' is a systematic approach used by the Swedish Road Administration (SRA) to gather all stakeholders on a voluntary basis to tackle a specific road safety issue.
The Senior-OLA involved the SRA, Pensioners organisations, the Swedish Society for Road Safety (NTF), driving schools, the Swedish association of local authorities and regions, the national public transport association and car manufacturers. At a first meeting (O – Objective facts) all stakeholders gather to agree upon the problems. During the second meeting (L – List of solutions), the actors discuss suggestions for action, both within their own organisation's sphere of competence and within others organisations' spheres of competence. At the third and last meeting (A – Addressed action plans), each stakeholder presents an action plan detailing the actions they commit to implement.

Under this Senior-OLA, NTF, pensioners' organisations and elderly councils ran a project involving pensioners in a vast mapping of the traffic environment from an elderly perspective. In groups of 3 or 4, pensioners observed and reported hazards in the infrastructure to NTF which passed the information further on to the responsible road operators. Most common faults reported were holes or dangerous objects in the pavements and too short crossing time at signalled crossings. Over 5 000 faults were reported. More than 3 000 elderly people took part in the work and 45% of the faults were treated by road operators immediately or within a couple of years.

For more information on OLA www.vv.se/ola, on Senior-OLA
http://www.vv.se/templates/page3____16248.aspx (in Swedish);
http://www.vv.se/templates/page3____19602.aspx (in English).
Contact person for the Senior-OLA at SRA: jorgen.persson@vv.se and at NTF Eva Andersson, eva.andersson@ntf.se, www.ntf.se

4.4.2 Vehicles

Cars and crash-tests are in general designed to meet the needs of a healthy adult. While there have been special protection systems developed to meet the special needs of children, the needs of older people have remained mainly unexplored.

However, with a growing number of older people, the car manufacturers have to start to develop vehicles which take the needs of older people into consideration. Safety requirements for older people usually include designs to simplify the operation of cars and easily self-adjusting interiors to compensate for the changed body movement.

Operating a car is becoming a more and more sophisticated matter due to the increased rate of equipment of vehicles with modern technologies, which could have an adverse effect on road safety. Some of these technologies may pose a greater challenge for elderly drivers than for the younger generation. This issue should be kept in mind and addressed.

Measures to mitigate injury to elderly car occupants

- Smart seat belt load limiter
- Reduced restraint load (airbag, seat belt)
- Improved impact energy management (alternative seat belt design, knee airbags)

Toyota Mobility Programme - Manufacturer's answer to the needs of the elderly

Toyota became the first car company to provide specially designed products to facilitate access to vehicles for disabled and less-able people in Japan and it currently offers different solutions (including manufacturing options) in over 30 vehicles, such as special seats, ramps and rear-lifts, as well as hand throttles and brakes.

In Europe, a pilot project of the Toyota Mobility Programme is currently underway following a comprehensive study phase. The key aim of the pilot project is to offer a range of mobility solutions to European customers, which integrate technologies into the vehicle rather than offer them as an add-on feature. So far the programme has introduced two passenger seats. Firstly, the Toyota Genuine Swivel Seat (top picture), a mechanical seat that can be swivelled outwards manually over the doorsill using a lever attached to the base. Secondly, the Toyota Genuine Lift-Up Seat (bottom picture), which combines the features of the Swivel Seat with a lift mechanism. Electrically-powered and operated with a switch on the side of the seat or with a remote control, it moves out of the car and can be lowered. The seats are fully designed and developed by Toyota and comply with all related EC directives, thereby meeting the European safety requirements.
http://www.toyota-europe.com/cars/conversion/mobility/index.aspx

4.4.3 Infrastructure

Most general road safety improvements in infrastructure design are also to the benefit of old road users. Some road designs are particularly beneficial for the older people road users. As drivers, older people need an infrastructure that is simple to take in and allows time for manoeuvring.

As senior drivers are more likely to be involved in intersection accidents than other drivers, particular attention should be given to junction design especially in urban and periurban areas. Scientific studies and road design manuals suggest replacing stop signs with full control by traffic signals, provision of roundabouts, physical provisions facilitating turning across opposing traffic and fully controlled opposed turn phases.

"The very old, the very young and the disabled are most at risk on European roads", said Dr Dinesh Sethi from WHO's Regional Office for Europe. "In particular as the elderly are less agile and resilient, the likelihood of being killed as a pedestrian is more than twice that for younger adults. As a consequence, concern for their vulnerability is increasing and there is an urgent call for a re-think of transport policies to address the specific needs of our growing aging population."

General infrastructure improvement for pedestrians would also highly benefit the safety of elderly users. Crossings have to be adapted to the needs of elderly people, since they are generally the slowest pedestrians. In-depth Finnish and Swedish studies and police reports suggest that safety of elderly people is further improved at sites where visibility, orientation and clarity is improved.[27]

OECD report **"Ageing and Transport, Mobility needs and safety issues"** summarises the following recommendations:

To Member States:

- Provide support for older people to continue driving safely
- Provide alternative transport options to the private car
- Develop safer infrastructure in general, especially for pedestrians
- Plan for land-use with older people's mobility needs in mind
- Support and fund projects enabling life-long mobility
- Provide educational campaigns to promote mobility and safety for elderly people

To European institutions:

- Support and fund projects enabling life-long mobility
- Involve elderly people in developing policy
- Stimulate development of safer vehicles for older people (encourage elderly-friendly design as well as evaluate the impact of new technologies on older drivers)

OECD/ECMT (2001), Ageing and Transport, Mobility needs and safety issues

[27] Breitman et al. (2007)
Hakamies-Blomqvist, Siren & Davidse, (2004) VTI-report 497A
Leden et al., (2006). Safe pedestrian crossings for children and elderly, Accident analysis and prevention, Vol.38 (2), pp. 289-294

4.5 The Nordic experience

The 2001 OECD Report "Ageing and Transport, Mobility needs and safety issues", helped to dispel the myths and misconceptions about the safety of older road users. Recommendations included providing safe and sustainable mobility means for older people and supporting independent and healthy ageing. To help us better understand the safety and health aspects of older people's mobility, ETSC has spoken with Liisa Hakamies-Blomqvist, co-chair of the OECD Report and Director of NordForsk, a Nordic research board.

ETSC: What are the main challenges for road safety and the current transport system posed by the ageing of the European population?

It goes without saying that the transport system should seek to prevent older people from dying when using the roads. But this should not be done at the expense of mobility. The most straightforward way of reducing road deaths of older people would be to keep them out of the road. However, this would have a dramatically adverse impact on their health and quality of life. If you limit the mobility of the older people, you will lower their chance to lead an active life. Road safety gains will be offset by increased health problems, loss of autonomy and increased need of public support.

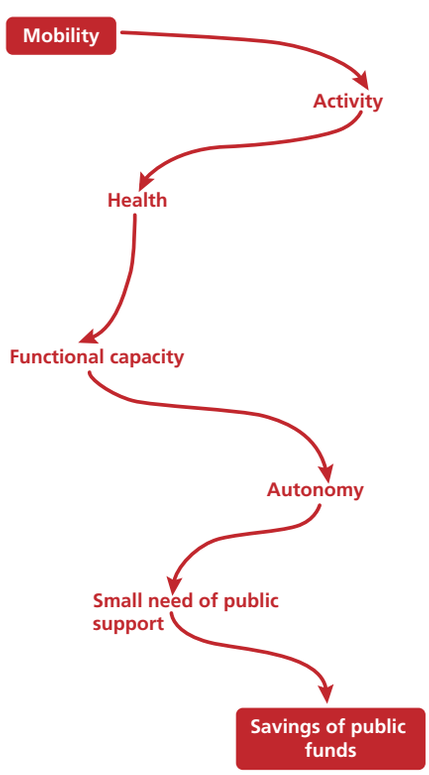


Fig. 6. The virtuous chain of greater mobility of elderly people

"Towards the creation of an inclusive transport system that allows older people to be active traffic participants.

To support healthy ageing, national, regional and local governments and community groups should join efforts towards the creation of an *inclusive* transport system that allows older people to be active traffic participants. This will, however, lead to their higher exposure to traffic hazards. We need to find a right balance between safety and mobility that is acceptable to the society.

ETSC: The OECD Report lists a series of priority actions, among them support for older people to continue driving safely.

Elderly safety is a gender issue. Europe increasingly becomes a continent of older women due to life expectancy trends. Older women are more likely to give up driving their private cars, despite accident statistics showing that they are safer drivers than men. Unfortunately, however, elderly women are even more fragile than elderly men as vulnerable road users. This is why we recommended governments to encourage women to drive as much and as long as possible. Moreover, an increased share of older drivers in the driving population may have a beneficial effect by calming the traffic down.

Older people are very vulnerable as public transport users, cyclists and pedestrians. It is therefore of the utmost importance to improve pedestrian and cyclist safety in order to provide them with safe alternatives to private cars.

We also recommended improvements in vehicle design and transport infrastructure that would benefit the elderly in particular, as well as other road users.

> *"Without these and other improvements each one of us will find him or herself at growing risk of being killed on the road as we grow old.*

ETSC: The OECD Report urged national governments to recognise the urgency of these emerging issues. Do you see this happening?

Older people are becoming an important segment of the population in European countries. We will hopefully each become an elderly person one day. The transport system should thus be calibrated to their needs instead of marginalising them. At the moment, we still tend to apply solutions in an unsystematic way, trying to adapt the system at the margin. But the challenges of the ageing society force politicians to rethink the whole concept of transportation system.

Dr in Psychology, Liisa Hakamies-Blomqvist was Scientific Director of the Swedish National Road and Transport Research Institute (VTI) from 1996 to 2005. She co-chaired the OECD expert group on Ageing and Transport and her pioneering work in this field is well known and appreciated worldwide. Liisa is now Director of NordForsk.

NordForsk is a Nordic research board based in Oslo operating under the Nordic Council of Ministers for Education and Research. NordForsk is responsible for Nordic cooperation within research and researcher training. www.nordforsk.org

5| Recommendations

5.1 To Member States

- Improve reliability and comparability of indicators using SafetyNet recommendations
- Regularly monitor road user behaviour according to latest standards
- Communicate compliance data to relevant stakeholders
- Use the data to monitor achievements and identify shortcomings to be addressed
- Set themselves quantitative targets based on compliance indicators
- Seek to reach these targets by applying proven enforcement strategies according to the EC Recommendation on enforcement

Motorcycle safety

- Enforce the compulsory wearing of helmets
- Install speed cameras able to detect speeding riders and enforce motorcyclists' compliance with speed limits
- Improve rider training
- Rider training should focus on hazard recognition and risk assessment as well as vehicle control skills.
- Improve driver training
- Driver training should ensure that candidates understand the vulnerability of motorcyclists and "look out for them" when driving
- While implementing the Driving Licence Directive, Member States should seek to encourage riders to undertake progressive access to PTWs by recognising the experience gained on lower PTW categories.
- Provide consumer information regarding helmet safety and educate riders regarding the importance of proper fastening
- Address the specific needs of PTW users in road design and maintenance (provide good winter maintenance, use of anti-skid surfaces, make roadsides more forgiving)

Infrastructure safety

- Apply the following four instruments as required in the proposal for a Directive on road infrastructure safety management:
  - **Road safety impact assessments:** demonstrate the road safety implications of different planning alternatives for a road project, whether construction of new infrastructure or rehabilitation of existing infrastructure, as in the case of environmental impact assessment
  - **Road safety audits:** carry out an independent technical check of each road project with the aim of identifying any unsafe features and making proposals for remedying them
  - **Network safety management:** target remedial measures at parts of the network with high concentrations of accidents (high-risk road sections) and/or a high potential to avoid accidents in the future
  - **Safety inspections:** as part of regular road maintenance, enable the detection and hence reduction of accident risk in a preventive way through low cost measures.

These procedures already exist and are applied at varying degrees in some Member States. The forthcoming Directive will extend the above-mentioned measures to the whole of the EU. It will not define technical standards or requirements, but leave the Member States free to keep already existing procedures if they have them in place or to introduce procedures in their own way if not.

Elderly people's safety

- Provide support for older people to continue driving safely
- Provide alternative transport options to the private car
- Develop safer infrastructure in general, especially for pedestrians
- Plan for land-use with older people's mobility needs in mind
- Support and fund projects enabling life-long mobility
- Provide educational campaigns to promote mobility and safety for older people
-

5.2 To European Institutions

- Support countries in setting up data collection and evaluation procedures
- Stimulate the use of harmonized protocols for accident, exposure and performance indicator data
- Use the evidence gathered under the Road Safety PIN to devise relevant policies including European standards on traffic law enforcement
- Support the implementation of in-car enforcement technologies such as seat belt reminders, alcolocks and Intelligent Speed Assistance technologies

Motorcycle safety

- Mandate the fitment of Antilock Braking Systems (ABS), alongside evaluate the safety impact of other advanced braking systems for smaller PTWs and, if more cost-effective, consider them as an alternative to ABS
- Investigate the extent to which airbags are viable PTW safety measures
- Stimulate the introduction of eCall as a standard for new machines
- Develop minimum standards regarding protective clothing

Infrastructure safety

- Support the implementation of the new Directive on infrastructure safety
- Insist on the application of the four instruments of the Infrastructure Safety Directive in its use of funds both in the EU and in Third Countries. Their strict application should be a pre-condition for EU funding

Elderly people's safety

- Support and fund projects enabling life-long mobility
- Involve older people in developing policy
- Stimulate development of safer vehicles for older people:
- Encourage elderly-friendly design and evaluate the impact of new technologies on older drivers.

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Annex - Chapter 1

	2001	2002	2003	2004	2005	2006	2007	Annual average % change 2001.2007	Expected year of reaching the EU target
France	8,162	7,655	6,058	5,530	5,318	4,703	*4,620*	-10.1	2008
Luxembourg	*69*	62	53	49	46	36	*43*	-9.8	2008
Portugal	1,670	*1,668*	1,542	1,294	1,247	969	*974*	-8.5	2009
Belgium	1,486	1,306	1,214	1,162	1,089	1,069	*1,080**	-6.5	2012
Switzerland	*544*	*513*	*546*	*510*	*409*	*370*	*384*	-5.8	2013
Germany	6,977	6,842	6,613	5,842	5,361	5,091	*4,958**	-5.7	2013
The Netherlands	*1,083*	*1,069*	*1,088*	*881*	*817*	*811*	*791*	-5.4	2014
Spain	5,517	5,347	5,400	4,749	4,442	4,104	*3,821**	-5.4	2014
Israel	*542*	*525*	*451*	*480*	*448*	*414*	*398*	-5.1	2015
Latvia	558	559	532	516	442	407	*419*	-4.9	2015
Austria	958	956	931	878	768	730	*691*	-4.9	2015
Italy	*7,096*	*6,980*	*6,563*	*6,122*	*5,818*	*5,669*	*5,313**	-4.6	2016
Denmark	431	463	432	369	331	306	*409**	-3.7	2020
Sweden	*551*	*532*	529	480	440	445	*471*	-3.7	2020
Finland	433	415	379	375	379	336	*377**	-3.6	2020
Malta	16	16	16	13	17	*11*	*14*	-3.3	>2020
Greece	1,880	1,634	1,605	1,670	1,658	1,657	*1,605**	-3.1	>2020
Ireland	*411*	376	*335*	374	*396*	*365*	*338**	-2.9	>2020
Norway	*275*	*310*	*280*	*257*	*224*	*243*	*233*	-2.7	>2020
UK**	3,598	3,581	3,658	3,368	*3,337*	*3,300*	n/a	-1.6	>2020
Czech Republic	1,334	1,431	1,447	1,382	1,286	1,063	*1,222*	-1.6	>2020
Estonia	199	223	164	170	169	204	*196*	-1.5	>2020
Slovenia	278	269	242	274	258	262	*293*	-0.7	>2020
Cyprus	98	94	97	117	102	86	*89*	-0.7	>2020
Slovakia	614	610	645	603	560	579	*627*	-0.5	>2020
Bulgaria	1,011	959	960	943	957	1,043	*1,006*	-0.5	>2020
Poland	5,534	5,827	5,640	5,712	5,444	5,243	*5,583*	-0.1	>2020
Hungary	1,239	1,429	1,326	1,296	1,278	*1,303*	*1,230*	0.8	>2020
Romania	*2,454*	*2,414*	*2,232*	*2,446*	*2,623*	*2,573*	*2,794*	1.2	>2020
Lithuania	706	697	709	752	*773*	*760*	*739*	1.3	>2020
PIN	55,724	54,762	51,687	48,614	46,437	44,152	44,018	-4.2	2018
EU27	54,363	53,414	50,410	47,367	45,356	43,125	43,003	-4.2	2018
EU25	50,898	50,041	47,218	43,978	41,776	39,509	39,203	-4.5	2016
EU15	40,322	38,886	36,400	33,143	31,447	29,591	28,791	-5.8	2013
EU10	10,576	11,155	10,818	10,835	10,329	9,918	10,412	-0.4	>2020
EU2	3,465	3,373	3,192	3,389	3,580	3,616	3,800	0.7	>2020

Source: National statistics supplied by the PIN Panellists in each country

* Provisional figures or national estimates as final figures were not yet available at the time of print

** the latest year available (2006) data was used to estimate the percentage change since 2001 in the UK

The method to estimate the expected year of reaching the taget for individual countries is described in the Methodological Note See PIN Flash 10 Methodological Note on www.etsc.be/PIN-publications.php

Table 1 Expected year of reaching the target for individual countries
Estimation based on the average annual percentage reductions over the period 2001-2007
(Chapter 1 - Map, Fig. 2)

	2001	2002	2003	2004	2005	2006	2007	2007,2001 (%)
France	8,162	7,655	6,058	5,530	5,318	4,703	*4,620*	-43
Portugal	1,670	*1,668*	1,542	1,294	1,247	969	*974*	-42
Luxembourg	*69*	62	53	49	46	36	*43*	-38
Spain	5,517	5,347	5,400	4,749	4,442	4,104	*3,821**	-31
Switzerland	*544*	*513*	*546*	*510*	*409*	*370*	*384*	-29
Germany	6,977	6,842	6,613	5,842	5,361	5,091	*4,958**	-29
Austria	958	956	931	878	768	730	*691*	-28
Belgium	1,486	1,306	1,214	1,162	1,089	1,069	*1,080**	-27
The Netherlands	*1,083*	*1,069*	*1,088*	*881*	*817*	*811*	*791*	-27
Israel	*542*	*525*	*451*	*480*	*448*	*414*	*398*	-27
Italy	*7,096*	*6,980*	*6,563*	*6,122*	*5,818*	*5,669*	*5,313**	-25
Latvia	558	559	532	516	442	407	*419*	-25
Ireland	*411*	376	*335*	374	*396*	*365*	*338**	-18
Norway	*275*	*310*	*280*	*257*	*224*	*243*	*233*	-15
Greece	1,880	1,634	1,605	1,670	1,658	1,657	*1,605**	-15
Sweden	*551*	*532*	529	480	440	445	*471*	-15
Finland	433	415	379	375	379	336	*377**	-13
Malta	16	16	16	13	17	*11*	*14*	-13
Cyprus	98	94	97	117	102	86	*89*	-9
Czech Republic	1,334	1,431	1,447	1,382	1,286	1,063	*1,222*	-8
UK**	3,598	3,581	3,658	3,368	*3,337*	*3,300*	n/a	-8
Denmark	431	463	432	369	331	306	*409**	-5
Estonia	199	223	164	170	169	204	*196*	-2
Hungary	1,239	1,429	1,326	1,296	1,278	*1,303*	*1,230*	-1
Bulgaria	1,011	959	960	943	957	1,043	*1,006*	0
Poland	5,534	5,827	5,640	5,712	5,444	5,243	*5,583*	1
Slovakia	614	610	645	603	560	579	*627*	2
Lithuania	706	697	709	752	*773*	*760*	*739*	5
Slovenia	278	269	242	274	258	262	*293*	5
Romania	*2,454*	*2,414*	*2,232*	*2,446*	*2,623*	*2,573*	*2,794*	14
PIN	55,724	54,762	51,687	48,614	46,437	44,152	44,018	-21
EU27	54,363	53,414	50,410	47,367	45,356	43,125	43,003	-21
EU25	50,898	50,041	47,218	43,978	41,776	39,509	39,203	-23
EU15	40,322	38,886	36,400	33,143	31,447	29,591	28,791	-29
EU10	10,576	11,155	10,818	10,835	10,329	9,918	10,412	-2
EU2	3,465	3,373	3,192	3,389	3,580	3,616	3,800	10

Source: National statistics supplied by the PIN Panellists in each country
Figures in italic are different from CARE
* Provisional figures or national estimates as final figures were not yet available at the time of print
** the latest year available (2006) data was used to estimate the percentage change since 2001 in the UK
The method to estimate the Regression estimation of the average annual percentage change in number of deaths over the period 2001-2007 is described in the Methodological Note
See PIN Flash 10 Methodological Note on www.etsc.be/PIN-publications.php

Table 2 Percentage change in road deaths between 2001 and 2007 (Chapter 1 - Fig. 1)

	2001	2002	2003	2004	2005	2006	2007	2007-2006 (%)
Ireland*	*411*	376	*335*	374	*396*	*365*	*338**	-7
Spain*	5,517	5,347	5,400	4,749	4,442	4,104	*3,821**	-7
Italy*	*7,096*	*6,980*	*6,563*	*6,122*	*5,818*	*5,669*	*5,313**	-6
Hungary	1,239	1,429	1,326	1,296	1,278	*1,303*	*1,230*	-6
Austria	958	956	931	878	768	730	*691*	-5
Norway	*275*	*310*	*280*	*257*	*224*	*243*	*233*	-4
Estonia	199	223	164	170	169	204	*196*	-4
Israel	*542*	*525*	*451*	*480*	*448*	*414*	*398*	-4
Bulgaria	1,011	959	960	943	957	1,043	*1,006*	-4
Greece*	1,880	1,634	1,605	1,670	1,658	1,657	*1,605**	-3
Lithuania	706	697	709	752	*773*	*760*	*739*	-3
Germany*	6,977	6,842	6,613	5,842	5,361	5,091	*4,958**	-3
The Netherlands	*1,083*	*1,069*	*1,088*	*881*	*817*	*811*	*791*	-2
France	8,162	7,655	6,058	5,530	5,318	4,703	*4,620*	-2
Portugal	1,670	*1,668*	1,542	1,294	1,247	969	*974*	1
Belgium*	1,486	1,306	1,214	1,162	1,089	1,069	*1,080**	1
Latvia	558	559	532	516	442	407	*419*	3
Cyprus	98	94	97	117	102	86	*89*	3
Switzerland	*544*	*513*	*546*	*510*	*409*	*370*	*384*	4
Sweden	*551*	*532*	529	480	440	445	*471*	6
Poland	5,534	5,827	5,640	5,712	5,444	5,243	*5,583*	6
Slovakia	614	610	645	603	560	579	*627*	8
Romania	*2,454*	*2,414*	*2,232*	*2,446*	*2,623*	*2,573*	*2,794*	9
Slovenia	278	269	242	274	258	262	*293*	12
Finland*	433	415	379	375	379	336	*377**	12
Czech Republic	1,334	1,431	1,447	1,382	1,286	1,063	*1,222*	15
Luxembourg	*69*	62	53	49	46	36	*43*	19
Malta	16	16	16	13	17	*11*	*14*	27
Denmark*	431	463	432	369	331	306	*409**	34
UK**	3,598	3,581	3,658	3,368	*3,337*	*3,300*	n/a	n/a
PIN	55,724	54,762	51,687	48,614	46,437	44,152	44,018	-0.3
EU27	54,363	53,414	50,410	47,367	45,356	43,125	43,003	-0.3
EU25	50,898	50,041	47,218	43,978	41,776	39,509	39,203	-1
EU15	40,322	38,886	36,400	33,143	31,447	29,591	28,791	-3
EU10	10,576	11,155	10,818	10,835	10,329	9,918	10,412	5
EU2	3,465	3,373	3,192	3,389	3,580	3,616	3,800	5

Source: National statistics supplied by the PIN Panellists in each country
Figures in italic are different from CARE
* Provisional figures or national estimates as final figures were not yet available at the time of print

Table 3 Percentage change in road deaths between 2006 and 2007 (Chapter 1 - Fig, 4)

	Number of road deaths	Population	Road deaths per million population
Malta	14	407,810	34
The Netherlands	791	16,357,992	48
Norway	233	4,681,134	50
Switzerland	384	7,508,739	51
Sweden	471	9,113,257	52
UK**	3,300	60,852,828	54
Israel	398	7,282,000	55
Germany	4,958*	82,314,906	60
Finland	377	5,276,955	71
France	4,620	63,392,140	73
Denmark	409*	5,447,084	75
Ireland	338*	4,314,634	78
Austria	691	8,298,923	83
Spain	*3,821**	44,474,631	86
Italy	*5,313**	59,131,287	90
Luxembourg	43	476,187	90
Portugal	974	10,599,095	92
Belgium	1,080*	10,584,534	102
Cyprus	89	778,684	114
Slovakia	627	5,393,637	116
Czech Republic	1,222	10,287,189	119
Hungary	1,230	10,066,158	122
Romania	2,794	21,565,119	130
Bulgaria	1,006	7,679,290	131
Greece	1,605*	11,171,740	144
Slovenia	377*	2,010,377	146
Estonia	196	1,342,409	146
Poland	5,583	38,125,479	146
Latvia	419	2,281,305	184
Lithuania	739	3,384,879	218
PIN	44,018	514,192,592	86
EU27	43,003	441,610,268	87
EU25	39,203	422,929,789	84
EU15	28,791	210,854,704	73
EU10	10,412	212,075,085	141
EU2	3,800	18,680,479	130

Source: National statistics supplied by the PIN Panellists in each country, completed with Eurostat for population figures

* Provisional figures or national estimates as final figures were not yet available at the time of print

**UK: 2006

Table 4: Road deaths per million population in 2007 (Chapter 1 - Fig. 5)

Annex - Chapter 2

Country	Number of PTW rider deaths	PTW km driven (in billions)	PTW rider deaths per billion PTW-km	Note
Norway	37[1]	1236	30	
Switzerland	75	2,275	33	
Denmark	27[1]	757	36	
Finland	36	900	40	
Germany	861	17,788	48	
Israel	35	686	51	
Portugal	416	7,000	59	2001
Austria	134	2,090	64	
Sweden	67	1,034	65	
Greece	380	5,000	76	2004
Spain	724	7,902	92	
Ireland	29	282	103	
The Netherlands	175[1]	1,680	104	2000
France	1024	9,000	114	
Great Britain	599	5,200	115	
Belgium	148	1,083[2]	137	2005
Estonia	8	47	171	
Poland	193	1,000	193	2005
Latvia	17	62	275	
Hungary	125	420	298	
Czech Republic	89	284	314	
Slovenia	40	112	357	2005

Source: National statistics supplied by the PIN Panellists in each country, completed with Eurostat and IRTAD for km driven

[1] PTW passengers included

[2] Mopeds not included

Table 1. PTW rider deaths per billion PTW-km in 2006 (Chapter 2 - Map, Fig.1)

Country	Death rate for PTW	Death rate for cars	Ratio of death rate	Note
Norway	0.0299[(1)]	0.0049	6.1	
Finland	0.0356	0.0041	8.7	2005
Austria	0.0641	0.0063	10.2	
Portugal	0.0594	0.0054	10.9	2001
Denmark	0.0357[(1)]	0.0032	11.2	
Greece	0.0760	0.0067	11.3	2004
Poland	0.1930	0.0154	12.5	2005
Germany	0.0484	0.0034	14.3	
Switzerland	0.0330	0.0021	15.7	
Israel	0.0510	0.0030	16.9	
Spain	0.0916	0.0051	18.1	
Sweden	0.0648	0.0030	21.2	
Hungary	0.2976	0.0132	22.6	
Belgium	0.1367[(2)]	0.0060	22.6	2005
Latvia	0.2748	0.0114	24.2	
Ireland	0.1027	0.0042	24.4	
France	0.1304	0.0053	24.5	2005
Estonia	0.2198	0.0083	26.4	2005
The Netherlands	0.1042[(1)]	0.0036	29	2000
Czech Republic	0.3138	0.0097	32.2	
Great Britain	0.1152	0.0026	43.5	
Slovenia	0.3571	0.0070	51.1	2005

Source: National statistics supplied by the PIN Panellists in each country
(1) PTW passengers included
(2) Mopeds not included

Table 2. Ratio of death rate per billion km ridden by PTW riders to corresponding rate for car drivers in 2006
(Chapter 2 - Fig. 2)

Country	2004		2005		2006	
	mopeds (<50ccm)	motorcycles (>50ccm)	mopeds (<50ccm)	motorcycles (>50ccm)	mopeds (<50ccm)	motorcycles (>50ccm)
Austria	44	98	41	98	39	95
Belgium	31	115	27	121	33	122
Bulgaria	n/a	n/a	n/a	n/a	n/a	n/a
Cyprus	11	22	9	14	5	19
Czech Republic	8	67	15	79	6	83
Denmark[1]	8	23	2	17	7	20
Estonia	1	2	2	7	1	7
Finland	10	18	4	28	14	22
France	321	807	363	811	296	728
Germany	n/a	n/a	n/a	n/a	n/a	n/a
Greece[2]	52	328	53	368	n/a	n/a
Hungary	22	68	40	88	42	83
Ireland	n/a	n/a	n/a	n/a	n/a	n/a
Israel[3]	5	24	2	33	5	30
Italy	n/a	n/a	n/a	n/a	n/a	n/a
Latvia	3	19	5	8	7	10
Lithuania	n/a	n/a	n/a	n/a	n/a	n/a
Luxembourg	n/a	n/a	n/a	n/a	n/a	n/a
Malta	n/a	n/a	n/a	n/a	n/a	n/a
The Netherlands[1]	50	79	52	73	61	54
Norway[1]	8	33	4	31	3	34
Poland	48	148	48	145	54	148
Portugal	47	279	48	268	40	215
Romania	n/a	n/a	n/a	n/a	n/a	n/a
Slovakia[1]	8	17	1	33	2	26
Slovenia[2]	1	29	0	40	n/a	n/a
Spain	320	362	280	439	281	443
Sweden	16	51	6	41	15	52
Switzerland	9	110	6	85	11	64
Great Britain	24	533	21	528	29	570

Source: National statistics supplied by the PIN Panellists in each country, completed with Eurostat and IRTAD

[1] PTW passengers included [3] Mopeds (<51ccm)

[2] Greece 2003: 50 mopeds, 281 motorcyclists; Slovenia 2003: 0 mopeds, 32 motorcyclists

Table 3. Moped and Motorcycle rider deaths (Chapter 2 - Fig. 3)

Country	Number of PTW rider deaths	Number of car driver deaths	Total number of PTW rider and car driver deaths	Proportion of PTW rider deaths in these deaths	Proportion of car driver deaths in these deaths
Estonia	8	69	77	0.104	0.896
Poland	202	1385	1587	0.127	0.873
Slovakia	25	164	189	0.132	0.868
Latvia	17	108	125	0.136	0.864
Malta	1	5	6	0.167	0.833
Finland	36	161	197	0.183	0.817
Czech Republic	89	373	462	0.193	0.807
Norway	**37**[(1)]	152	189	0.196	0.804
Denmark	**27**[(1)]	108	135	0.2	0.8
Hungary	125	386	511	0.245	0.755
Belgium	155	467	622	0.249	0.751
Austria	134	384	518	0.259	0.741
Luxembourg	7	20	27	0.259	0.741
Sweden	70	192	262	0.267	0.733
Israel	35	86	121	0.289	0.711
Slovenia [(2)]	40	96	136	0.294	0.706
The Netherlands	**115**[(1)]	232	347	0.331	0.669
Great Britain	549	1066	1615	0.34	0.66
Spain	724	1377	2101	0.345	0.655
France	1024	1900	2924	0.350	0.65
Switzerland	75	115	190	0.395	0.605
Greece [(2)]	421	518	939	0.448	0.552
Portugal	255	314	569	0.449	0.551
Cyprus	24	22	46	0.522	0.478
Ireland	200	150	350	0.571	0.429

[(1)] PTW passengers included
[(2)] Greece, Slovenia: 2005

Table 4. PTW rider deaths as a percentage of the total of PTW riders and car driver deaths in 2006 (Chapter 2 - Fig. 4)

Country	Year											Average yearly % change	Note
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006		
Latvia	45	32	29	24	17	21	30	17	22	13	17	-9.6 %	
Estonia	8	11	5	6	6	6	3	5	3	9	8	-7.9 %	
Portugal	n/a	n/a	n/a	499	451	416	398	404	326	316	255	-7.8 %	2000-2006
Slovakia[(1)]	18	36	40	19	28	27	28	21	25	34	28	-7.5 %	
Poland	280	305	268	252	209	204	192	174	196	193	202	-5.5 %	
France	n/a	n/a	n/a	n/a	n/a	n/a	1321	1191	1128	1174	1024	-4.5 %	2003-2006
Greece	476	439	491	491	440	426	349	331	380	421	n/a	-3.1 %	1997-2005
Cyprus	28	29	26	30	26	18	19	16	33	23	24	-2.9 %	
The Netherlands[(1)]	183	166	151	167	175	144	173	165	129	125	115	-2.7 %	
Ireland	247	231	234	234	232	216	208	197	216	230	200	-1.6 %	
Spain	734	797	806	813	776	748	707	675	682	719	724	-1.3 %	
Slovenia	41	39	30	43	40	50	23	32	30	40	n/a	-1.1 %	1997-2005
Belgium	160	176	187	187	169	194	213	159	146	148	155	-0.9 %	
Switzerland	115	105	87	90	103	110	94	114	119	91	75	-0.9 %	
Hungary	93	111	97	83	77	93	88	90	90	128	125	0.1 %	
Austria	130	168	120	151	156	144	135	156	142	139	134	0.3 %	
Israel	16	37	45	23	42	31	39	38	29	35	35	0.8 %	
Germany	935	1085	960	1073	1041	1043	1000	1033	942	943	861	0.9 %	
Sweden	51	45	44	47	46	42	43	53	67	47	67	2 %	
Norway[(1)]	17	38	46	38	46	33	43	37	41	35	37	2 %	
Finland	27	24	22	21	17	20	26	31	28	32	36	2.2 %	
Denmark[(1)]	22	22	26	41	36	24	32	34	31	19	27	2.9 %	
Luxembourg	n/a	n/a	n/a	n/a	9	6	1	13	10	5	7	3.6 %	2001-2006
Italy	n/a	n/a	n/a	n/a	1111	1157	1135	1307	1339	n/a	n/a	3.7 %	2001-2004
Great Britain	414	477	466	525	573	554	580	665	557	549	599	3.9 %	
Czech Republic	65	69	63	82	86	71	105	83	75	94	89	4.2 %	
Lithuania	n/a	n/a	n/a	n/a	n/a	n/a	23	20	17	32	28	8.4 %	2003-2006
Bulgaria	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Malta	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Romania	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

Source: National statistics supplied by the PIN Panellists in each country

[(1)] PTW passengers included

Average yearly percentage change calculated for the period 1997-2006 (see Methodological Note PIN Flash 7 www.etsc.be/PIN-publications.php)

Table 5. Number of PTW deaths and their average yearly % change over the period 1997-2006 (Fig. 5)

Country	Year											Average yearly % change over 1997-2006 in PTW rider deaths per billion km ridden	Note
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006		
Slovenia	1.02	0.85	0.55	0.83	0.70	0.92	0.42	0.36	0.30	0.36	n/a	-10.1 %	1997-2005
Sweden	0.11	0.09	0.09	0.09	0.08	0.07	0.06	0.07	0.08	0.05	0.06	-4.9 %	
Poland	0.22	0.23	0.21	0.19	0.16	0.16	0.14	0.14	0.16	0.19	n/a	-4.9 %	1997-2005
Denmark[(1)]	0.06	0.05	0.05	0.08	0.06	0.04	0.05	0.05	0.04	0.02	0.04	-4.3 %	
France	n/a	n/a	n/a	n/a	n/a	n/a	0.17	0.15	0.14	0.13	0.11	-3.9 %	2003-2006
Spain	0.12	0.13	0.13	0.13	0.12	0.11	0.11	0.09	0.09	0.09	0.09	-3.9 %	
Switzerland	0.07	0.06	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.04	0.03	-3.7 %	
Austria	0.09	0.11	0.07	0.09	0.09	0.08	0.07	0.08	0.07	0.07	0.06	-3.7 %	
Norway[(1)]	0.02	0.05	0.06	0.04	0.05	0.03	0.04	0.03	0.04	0.03	0.03	-3.6 %	
The Netherlands[(1)]	0.13	0.11	0.09	0.10	0.10	n/a	n/a	n/a	n/a	n/a	n/a	-3.3 %	1997-2000
Belgium[(2)]	n/a	0.18	0.19	0.19	0.17	0.19	0.20	0.15	0.14	0.14	n/a	-2.7 %	1997-2005
Germany	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	-2.5 %	
Ireland	0.18	0.20	0.11	0.13	0.13	0.17	0.15	0.19	0.18	0.19	0.10	-0.8 %	
Israel	0.03	0.06	0.07	0.04	0.07	0.05	0.06	0.06	0.04	0.05	0.05	-0.2 %	
Great Britain	0.10	0.12	0.11	0.12	0.13	0.12	0.11	0.12	0.11	0.10	0.12	0.2 %	
Hungary	0.20	0.26	0.25	0.22	0.20	0.24	0.23	0.23	0.23	0.31	0.30	1.2 %	
Finland	0.03	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04	2.7 %	
Czech Republic	0.20	0.21	0.20	0.26	0.28	0.23	0.35	0.28	0.26	0.33	0.31	5.7 %	

Source: Source: National statistics supplied by the PIN Panellists in each country, completed with Eurostat and IRTAD
[(1)] PTW passengers included [(2)] mopeds not included

Average yearly percentage change calculated for the period 1997-2006 (see Methodological Note PIN Flash 7 www.etsc.be/PIN-publications.php)

Table 6. Average yearly percentage change in PTW rider deaths per billion km ridden over 1997-2006 (Chapter 2 - Fig. 6)

Annex - Chapter 3

Country	Number of deaths on motorways*	Vehicle-km on motorways (billions)	Deaths per billion vehicle-km in 2006
Switzerland	31	22.00	1.4
Denmark	19	12.65	1.5
The Netherlands[(1)]	92	53.48[(2)]	1.7
Great Britain	187	99.20	1.9
Sweden	28	13.00	2.1
France	296	125.00	2.4
Ireland	11	3.75	2.4
Germany	645	217.10	3
Finland	17	5.63	3
Israel	16	5.14	3.1
Austria[(3)]	80	19.17	4.2
Norway[(4)]	9	2.00	4.5
Belgium	163	34.08	4.8
Czech Republic	37	6.75	5.5
Italy[(5)]	456	81.89	5.6
Portugal	74	10.95	6.8
Spain[(6)]	827	120.00	6.9
Slovenia	29	3.34	8.7
Hungary[(7)]	55	6.22	8.8
EU (16) average	**3,016**	**812**	**3.7**
PIN (19) average[(8)]	**3,063**	**839**	**3.6**

Source: National data provided by PIN panellists, completed with CARE and IRTAD

* Motorways are roads with dual carriageways, at least two lanes each way; entrance and exit signposted; grade separated interchanges; central barrier or central reservation; no crossing movements at the same level; no stopping permitted unless in an emergency. Use of motorways on foot and by some types of vehicle is restricted in various ways in different countries.

(1) Data for the Netherlands only cover the national network administrated by Rijkswaterstaat
(2) Estimation based on the rough assumption that 40% of all motor vehicle-km are on motorways
(3) Motorways and express roads (Autobahn and Schnellstrasse)
(4) 2005
(5) Data for Italy only cover the network that belong to the Association of Italian toll motorway and tunnel concessionaires (AISCAT)
(6) Motorways and Autovia. Autovia are express roads where some of the motorway design requirements are not fulfilled
(7) National road network only
(8) EU (16) average plus Israel, Norway and Switzerland

Table 1. Number of deaths on motorways per billion vehicle-km in 2006 (Chapter 3 - Map, Fig. 1)

Country	Deaths per billion vehicle-km / Year											Average yearly % change over 1997-2006 in the risk of death on motorways
	1996(*)	1997(*)	1998(*)	1999	2000	2001	2002	2003	2004	2005	2006	
Norway							*7.4*	*9.6*	*2.6*	*4.5*		*- 21 %*
Switzerland	4.2	5.0	3.7	3.3	2.3	3.6	3.8	2.9	2.4	1.1	1.4	- 10 %
Slovenia	23.2	13.6	17.3	10.3	13.8	10.2	10.8	9.4	7.7	8.7	8.7	- 9.7 %
The Netherlands(1)	4.2	3.4	2.8	3.1	2.3	1.9	1.9	2.4	1.6	1.7	1.7	- 8.9 %
Portugal			13.9	13.3	12.8	10.3	9.9	10.0	9.0	7.9	6.8	- 8.5 %
Spain(2)	1.73	15.4	16.8	14.4	14.0	13.0	11.9	10.4	8.4	7.2	6.9	- 8.5 %
France	5.2	5.2	5.2	4.8	5.0	4.4	4.5	3.8	2.7	2.7	2.4	- 7.0 %
Hungary(3)	20.7	17.7	14.9	15.3	15.9	10.2	15.6	14.0	11.9	8.2	8.8	- 6.9 %
Czech Republic	16.0	11.4	13.3	12.2	11.2	10.5	12.0	9.9	11.0	7.2	5.5	- 6.5 %
Italy(4)	10.2	10.4	10.0	9.9	8.4	8.2	8.3	7.1	5.9	5.7	5.6	- 6.3%
Denmark	4.2	5.0	3.7	4.6	3.0	4.1	5.0	3.1	2.8	3.1	1.5	- 5.9 %
Belgium	7.4	6.9	7.5	6.9	7.6	6.2	5.4	4.3	3.8	4.8	4.8	- 5.8 %
Finland	*2.4*	*4.2*	*5.7*	*5.1*	*4.3*	*4.5*	*4.1*	*1.4*	*3.4*	*1.9*	*3.0*	*- 5.4 %*
Germany	5.6	5.0	4.2	4.6	4.5	3.8	4.1	3.8	3.2	3.1	3.0	- 5.3 %
Austria(5)	7.4	8.3	9.7	9.1	8.1	9.1	7.2	5.9	6.7	4.8	4.2	- 5.2%
Sweden	2.5	5.0	2.3	2.3	2.8	2.8	2.4	2.8	3.5	1.9	2.2	- 4.3 %
Great Britain	2.1	2.2	2.0	2.2	2.1	2.1	2.3	2.2	1.6	2.0	1.9	- 0.7 %
EU (15) average	**6.8**	**6.5**	**6.3**	**6.2**	**5.9**	**5.5**	**5.5**	**4.9**	**4.1**	**3.9**	**3.7**	**- 5.6 %**
PIN (17) average(6)	**6.7**	**6.4**	**6.3**	**6.1**	**5.8**	**5.4**	**5.4**	**4.9**	**4.0**	**3.8**	**3.6**	**- 5.7 %**

Source: National data provided by PIN panellists, completed with CARE and IRTAD

(*) Since the numbers of deaths on motorways are often small numbers subjected to randomness, the mean of three years (1996, 1997, 1998) was used as baseline dated 1997 instead of using the single value registered in 1997.
(Except Portugal: 1998, 1999, 2000)

(1) Estimated value based on the assumption that 40% of all motor vehicle kilometers travelled on motorways

(2) Motorways and Autovia included

(3) National road network only

(4) Data for Italy only cover the network that belongs to the Association of Italian toll motorway and tunnel (AISCAT)

(5) Motorways and express roads (Autobahn and Schnellstrasse)

(6) EU (15) average plus Israel and Switzerland

NO, and FI are excluded from Fig. 2. The annual numbers of deaths in Finland and Norway are below 20 and thus subject to substantial random fluctuation. IL could not be included because vehicle-km are available only for 2005 and 2006.

The methodology to estimate the average yearly % change in the risk of death is explained in the PIN Flash 8 Methodological Note available on www.etsc.be/PIN-publications.php

Table 2. Deaths on motorway per billion vehicle-km and their average yearly percentage change over the period 1997-2006 (Chapter 3 - Fig. 2)

Country	Deaths on motorway / Year							Average yearly % change
	2000	2001	2002	2003	2004	2005	2006	
Switzerland	43	71	76	58	51	25	31	- 13.4 %
Norway		*13*	*9*	*18*	*5*	*9*		*- 11.9 %*
Luxembourg	*10*	*8*	*10*	*6*	*7*	*5*	*5*	*- 11.3 %*
France	533	493	527	444	326	324	296	- 10.9 %
Austria(1)	135	157	128	108	125	92	80	- 9.4 %
Denmark	29	40	51	33	31	37	19	- 8.6 %
Finland	*17*	*19*	*19*	*7*	*17*	*10*	*17*	*- 8.6 %*
Belgium	233	193	170	137	124	158	163	- 7.4 %
Spain(2)	1 153	1 178	1 126	1 083	930	852	827	- 6.4 %
Italy(3)	589	598	625	553	468	451	456	- 6.1 %
Germany	907	770	857	811	694	662	645	- 5.3 %
Poland	44	57	40	36	35	32	54	- 4.3 %
Portugal	112	98	101	111	102	86	74	- 4.2 %
Cyprus	*11*	*11*	*15*	*10*	*11*	*12*	*10*	*- 3.1 %*
The Netherlands(4)	110	95	101	125	85	93	92	- 1.9 %
Great Britain	182	191	217	208	158	195	187	- 1.3 %
Czech Republic	45	43	53	48	58	45	37	- 1.0 %
Israel	13	25	25	20	28	26	16	0.8 %
Slovenia	26	20	23	22	21	25	29	2.1 %
Hungary(5)	49	32	54	58	60	47	55	5.1 %
Sweden	25	28	26	34	42	24	28	5.2 %
Slovakia	*13*	*7*	*19*	*16*	*20*	*19*	*15*	*8.2 %*
Ireland	*4*	*4*	*5*	*9*	*6*	*3*	*11*	*11.1 %*
Greece	61	86	69	58	116	111	147	12.0 %
EU (21) average	**4 128**	**4 236**	**3 915**	**3 436**	**3 283**	**3 247**	**3 289**	**-5.5 %**
PIN (23) average(6)	**4 224**	**4 337**	**3 995**	**3 515**	**3 334**	**3 294**	**2 962**	**-5.6%**

Source: National data provided by PIN panellists completed with CARE and IRTAD

(*) Since the numbers of deaths on motorways are often small numbers subjected to randomness, the mean of the numbers of deaths in the three years (2000, 2001, 2002) was used as baseline dated 2001 instead of using the single value registered in 2001.

(1) Motorways and express roads (Autobahn and Schnellstrasse)
(2) Motorways and Autovia
(3) Data for Italy only cover the network that belongs to the Association of Italian toll motorway and tunnel (AISCAT)
(4) Data for the Netherlands only cover the national network administrated by Rijkswaterstaat
(5) National road network only
(6) EU (21) average plus Israel and Switzerland

CY, FI, IR, LU, NO and SK are excluded from Fig. 3 as the annual numbers of deaths are below 20 and thus subject to substantial random fluctuation.

The methodology to estimate the average yearly % change in deaths is explained in the PIN Flash 8 Methodological Note available on www.etsc.be/PIN-publications.php

Table 3. Deaths on motorway and their average yearly percentage change over 2001-2006 (Chapter 3 - Fig. 3)

Annex - Chapter 4

Country	Older people's deaths per 100,000 older people's population / Year											Average yearly % change in road mortality of older people over 97-2006(**)
	1996(*)	1997(*)	1998(*)	1999	2000	2001	2002	2003	2004	2005	2006	
Portugal	28.2	25.1	24	21.3	20.8	19.2	17.6	17.3	12.9	12.4	11.9	-8.1 %
Israel	23.4	20.5	20.7	18.1	14.8	15.2	15.8	12.4	13.0	12.1	11.9	-7.2 %
Malta(1)	*9.5*	*6.9*	*6.7*	*11*	*4.3*	*14.5*	*16.1*	*7.8*	*1.9*	*5.6*	*1.8*	*-6.8 %*
France	16.3	15.4	16.1	14.5	13.3	13.3	12.9	10.5	9	9.8	8.8	-6.2 %
Cyprus	34.5	30	33.3	35.5	24.5	25.4	20.7	26	28.8	14.5	18.4	-6 %
Denmark	16.2	16.6	15.5	14.8	16.9	12.9	13	12.4	9.9	8.6	8.7	-6 %
Slovenia	22.3	21	21.2	24.3	19.9	15.9	15.9	17.7	16	13.1	10.3	-5.6 %
Greece	25.8	23	25	22.9	23.1	20.6	17.4	16.2	15.5	15.6	15.5	-5.5 %
Switzerland	15.1	13	14.1	12.3	14.8	11.4	9.4	11	10.5	9.2	8.5	-5 %
Norway	11.2	10.4	11.7	9.6	8.9	10	7.1	7.7	8	6.2	9.5	-4.8 %
Slovakia							14	13	12.9	9.6	13.3	-4.8 %
Finland	13.7	16.3	13.7	12.5	13.6	12.2	12.4	11.8	11.7	10.8	8.2	-4.3 %
The Netherlands	13.2	12.8	10.8	11.4	10.9	10.2	9.7	9.9	8.9	8.2	9	-4.1 %
Spain	13.9	14.2	13.8	13.8	12.6	12.6	11.9	11.5	10.3	9.9	9.1	-3.9 %
UK	8.5	8.5	8.3	8.2	7.3	7	6.8	6.9	6.2	6.4	5.9	-3.8 %
Germany	10.6	10.7	10.2	10	9.8	9.4	8.8	9.2	8	7.6	7.3	-3.6 %
Sweden	10.8	9.6	8.1	9.8	8.9	8.6	7.9	7.7	9	6.7	6.1	-3.5 %
Hungary	18.2	18.6	16	16	13.8	16	14.9	14.9	13.7	13	13.6	-3.4 %
Czech Republic	20.2	18.4	16.9	15.5	17.1	16.9	15	16.3	17.4	14	11.9	-3.2 %
Ireland	14	15.6	19	19.4	12.7	10.9	13.8	12	13.5	12.2	14.1	-3.2 %
Poland	21.8	24.1	23.7	23.1	19.3	20	20.3	17.9	19.2	18.3	18.1	-3 %
Austria	28.2	25.1	24.1	21.3	20.8	19.2	17.6	17.3	12.9	12.4	11.9	-3 %
Belgium	16.4	14.3	15.5	13.7	13.9	15.3	12.3	13.6	11.3	10.3	10.7	-2.6 %
Estonia	13.2	12.9	13.3	9.8	10.7	11	10.8	10.6	17.7	6.7	13.6	-2.5 %
Italy	13.9	14.6	12.8	13.7	13.9	13	13.7	12.6	11.6	10.5	10.5	-2.3 %
Bulgaria					16.8	15.6	12.8	13.8	12.9	15.6	13.8	-2 %
Latvia	18.2	20	18.3	19.1	17.8	15	14.3	18.7	21.3	16	16.3	-1.5
Luxembourg(1)	*5.2*	*15.2*	*11.6*	*11.5*	*16.1*	*13.1*	*14.5*	*9.5*	*20.4*	*10.8*	*3*	*-1.3 %*
Romania				13.7	13.9	14	15	13.5	15.4	15.5	15.8	2 %
Lithuania(1)									*21.6*	*19.7*	*23.4*	*n/a*
EU (22) average(2)	**14.3**	**14.3**	**13.8**	**13.5**	**12.8**	**12.4**	**12**	**11.4**	**10.5**	**9.9**	**10.2**	**-3.7 %**
PIN (25) average(3)	**14.4**	**14.3**	**13.9**	**13.5**	**12.8**	**12.4**	**12**	**11.4**	**10.5**	**9.9**	**9.6**	**-4 %**

(*) For the estimation of the average annual reduction, the mean value of the years 1996, 1997, 1998 was used as baseline dated 1997 instead of using the single value registered in 1997. See Methodological Note PIN Flash 9
Except: Slovakia (2002, 2003, 2004), Bulgaria (2000, 2001, 2002) and Romania (1999, 2000, 2001)

(**) Slovakia 2003-2006, Bulgaria 2001-2006, Romania 2000-2006

(1) *Luxembourg* and *Malta* are excluded from Fig.1 because the annual numbers of deaths in those countries are below 20 and thus subject to substantial random fluctuation. The estimation is not available for Lithuania because the number of elderly deaths is available only from 2004 to 2005

(2) EU (27) excluding BU, LI, MT, RO and SK (3) PIN (30) excluding BU, LI, MT, RO and SK

Sources: National data provided by PIN panelLists completed with CARE (number of deaths); Eurostat (population figures)

Table 1. Deaths of older people per 100,000 older people's population and their average yearly percentage change over the period 1997-2006 (Chapter 4 - Map, Fig. 1)

Country	Deaths of elderly people aged 65 or over per 100.000 elderly population aged 65 or over / Year				Deaths of population aged 0-64 per 100.000 population aged 0-64 / Year			
	2004	2005	2006	Average 2004-2006	2004	2005	2006	Average 2004-2006
Malta	1.92	5.60	1.84	3.1	3.45	4.01	2.86	3.4
UK	6.18	6.41	5.90	6.2	5.54	5.39	5.41	5.4
Sweden	9.02	6.69	6.07	7.2	4.59	4.51	4.68	4.6
Germany	8.08	7.56	7.27	7.6	6.86	6.25	5.91	6.3
Norway	8.01	6.20	9.52	7.9	5.20	4.63	4.47	4.8
The Netherlands	8.88	8.21	9.01	8.7	4.31	4.01	3.71	4
Denmark	9.94	8.62	8.75	9.1	6.29	5.68	5.08	5.7
France	8.97	9.81	8.83	9.2	8.89	8.25	7.21	8.1
Switzerland	10.55	9.20	8.47	9.4	6.25	4.82	4.29	5.1
Spain	10.33	9.86	9.13	9.8	11.39	10.41	9.43	10.4
Finland	11.67	10.82	8.17	10.2	6.31	6.52	6.01	6.3
Belgium	11.29	10.34	10.67	10.8	11.15	10.44	10.07	10.5
Italy	11.62	10.54	10.52	10.9	10.33	9.81	9.43	9.9
Luxembourg	20.42	10.79	3.03	11.3	9.28	10.00	8.43	9.2
Slovakia	12.90	9.59	13.28	11.9	10.98	10.50	10.40	10.6
Israel	13.02	12.07	11.90	12.3	6.33	5.79	5.16	5.7
Austria	14.16	11.51	11.46	12.3	10.17	8.95	8.31	9.1
Portugal	12.94	12.42	11.90	12.4	12.23	11.73	8.60	10.8
Estonia	17.68	6.70	13.65	12.7	11.59	13.70	15.48	13.6
Slovenia	15.99	13.10	10.32	13.1	13.30	12.78	13.54	13.2
Ireland	13.53	12.16	14.10	13.3	8.71	9.26	7.93	8.6
Hungary	13.66	13.06	13.58	13.4	12.66	12.58	12.81	12.7
Bulgaria	12.90	15.63	13.85	14.1	11.92	11.65	13.44	12.3
Czech Republic	17.36	14.08	11.88	14.4	12.91	12.34	10.12	11.8
Romania	15.38	15.46	15.76	15.5	10.57	11.53	11.24	11.1
Greece	15.50	15.62	15.51	15.5	15.04	14.81	14.75	14.9
Latvia	21.31	16.00	16.34	17.9	22.43	19.79	18.02	20
Poland	19.23	18.34	18.11	18.7	14.29	13.62	13.07	13.7
Cyprus	28.77	14.54	18.41	20.5	14.30	13.49	10.24	12.6
Lithuania	21.63	19.73	23.38	21.6	21.86	23.07	22.14	22.4
EU (27) average	**10.86**	**10.33**	**9.99**	**10.4**	**9.47**	**9.01**	**8.48**	**9**
PIN (30) average	**10.85**	**10.29**	**9.98**	**10.4**	**9.31**	**8.86**	**8.33**	**8.8**

Sources: National data provided by PIN panelists completed with CARE (number of deaths); Eurostat (population figures)

Table 2. Road mortality rate of older people with the road mortality rate of the rest of the population (0-64) (Chapter 4 - Fig. 2)

Country	Ratio road mortality of older people / road mortality of the rest of the population (0-64)			
	2004	2005	2006	Average 2004-2006
Latvia	0.95	0.81	0.91	0.89
Malta	0.56	1.4	0.64	0.91
Estonia	1.53	0.49	0.88	0.93
Spain	0.91	0.95	0.97	0.94
Lithuania	0.99	0.86	1.06	0.97
Slovenia	1.2	1.03	0.76	0.99
Belgium	1.01	0.99	1.06	1.02
Greece	1.03	1.05	1.05	1.05
Hungary	1.08	1.04	1.06	1.06
Italy	1.13	1.07	1.12	1.1
Slovakia	1.17	0.91	1.28	1.12
UK	1.12	1.19	1.09	1.13
France	1.01	1.19	1.22	1.13
Portugal	1.06	1.06	1.38	1.14
Bulgaria	1.08	1.34	1.03	1.15
Germany	1.18	1.21	1.23	1.2
Czech Republic	1.34	1.14	1.17	1.22
Luxembourg	2.20	1.08	0.36	1.23
Austria	1.39	1.29	1.38	1.35
Poland	1.35	1.35	1.39	1.37
Romania	1.46	1.34	1.40	1.4
Ireland	1.55	1.31	1.78	1.54
Sweden	1.97	1.48	1.30	1.58
Denmark	1.58	1.52	1.72	1.6
Cyprus	2.01	1.08	1.80	1.62
Finland	1.85	1.66	1.36	1.62
Norway	1.54	1.34	2.13	1.66
Switzerland	1.69	1.91	1.97	1.84
Israel	2.06	2.08	2.31	2.14
The Netherlands	2.06	2.05	2.43	2.17
EU (27) average	**1.15**	**1.15**	**1.18**	**1.16**
PIN (30) average	**1.17**	**1.16**	**1.2**	**1.17**

Sources: National data provided by PIN panellists completed with CARE (number of deaths); Eurostat (population figures)

Table 3. Ratio road mortality of older people / road mortality of the rest of the population (0-64) (Chapter 4 - Fig. 3)

Year	Population 65+	Population 0-64	SUM	Share	Deaths 65+	Deaths 0-64	SUM	Share	Share in %
2004-2006	81,177,782	409,598,844	490,776,626	0.165					
2005	81,046,436	406,834,477	487,880,913	0.166	8,438	36,510	44,948	0.188	19%
2010	86,084,004	406,753,670	492,837,674	0.175	8,963	36,503	45,465	0.197	20%
2020	102,015,931	394,392,520	496,408,451	0.206	10,622	35,393	46,015	0.231	23%
2030	121,244,423	373,539,748	494,784,171	0.245	12,624	33,522	46,146	0.274	27%
2040	137,018,681	349,973,236	486,991,917	0.281	14,266	31,407	45,673	0.312	31%
2050	141,312,931	330,737,304	472,050,235	0.299	14,713	29,681	44,394	0.331	33%

Mortality rates considered: 10.41 (65+) and 8.97 (0-64)
Sources: National data provided by PIN panellists completed with CARE (number of deaths); Eurostat (population figures)
See Methodological Note PIN Flash 9 available on www.etsc.be/PIN-publications.php

Table 4. Expected percentage proportion of older people's deaths among all road deaths in the EU27 according to forecast population (Chapter 4 - Fig. 4)

Country	Older people (65+)					Rest of population (0-64)					Expected impact in %
	2004-2006*			2020		2004-2006*			2020		
	Deaths	Population	Mortality	Population	Deaths	Deaths	Population	Mortality	Population	Deaths	
Malta	2	53,357	3.1	88,253	3	12	348,936	3.4	365.767	13	-0.6
Latvia	68	380,731	17.9	388.383	69	387	1,926,011	20	1,727,043	347	-0.2
Spain	706	7,226,885	9.8	9,027,131	882	3,726	35,820,324	10.4	36,531,482	3,800	-0.2
Estonia	28	223,793	12.7	232.809	29	153	1,123,961	13.6	1,014,963	134	-0.1
Lithuania	112	518,917	21.6	557.932	120	650	2,905,905	22.4	2,624,283	587	-0.1
Slovenia	41	3,129,963	13.1	410,715	54	223	1,690,779	13.2	1,605,975	212	-0.04
Belgium	193	1,796,212	10.8	2,216,773	239	913	8,655,006	10.5	8,573,248	905	0.01
Greece	322	2,012,388	16	2,412,976	386	1,345	9,070,472	14.8	9,014,067	1,337	0.2
Hungary	212	1,578,467	13.4	1,971,596	265	1,080	8,518,490	12.7	7,721,686	979	0.3
Italy	1,237	11,366,719	10.9	13,608,121	1,481	4,632	47,000,725	9.9	44,691,551	4,404	0.4
UK	592	9,587,621	6.2	12,258,320	757	2,743	50,352,255	5.4	50,671,545	2,760	0.5
Portugal	222	1,787,345	12.4	2,191,608	272	948	8,737,166	10.8	8,579,153	931	0.5
Luxembourg	7	64,843	11.3	85.794	10	36	393,724	9.2	435.062	40	0.5
Slovakia	75	626,297	11.9	861,409	103	506	4,762,916	10.6	4,409,225	468	0.6
France	931	10,117,258	9.2	13,139,331	1,209	4,255	52,431,938	8.1	50,431,961	4,092	0.6
Bulgaria	188	1,331,009	14.1	1,475,135	208	793	6,429,349	12.3	5,320,917	656	0.6
Germany	1,172	15,365,840	7.6	18,668,830	1,424	4,259	67,124,332	6.3	64,007,630	4,061	0.8
Romania	492	3,168,712	15.5	3,472,390	539	2,055	18,491,286	11.1	16,869,769	1,875	0.9
Austria	162	1,312,676	12.3	1,690,218	209	630	6,891,514	9.1	6,750,875	617	1.3
Czech Republic	207	1,438,071	14.4	2,059,003	297	1,036	8,789,633	11.8	7,842,845	925	1.4
Ireland	60	459,842	13	700.497	91	319	3,678,274	8,7	4,055,614	352	1.2
Sweden	113	1,553,655	7.2	2,033,347	147	342	7,457,949	4.6	7,542,135	346	2.1
Poland	938	4,830,728	19.4	6,749,916	1,311	4,528	33,321,395	13.6	30,315,336	4,120	2.3
Denmark	74	813,369	9.1	1,104,229	100	263	4,598,799	5.7	4,421,804	253	2.7
Cyprus	18	89,549	20.5	148,680	30	83	659,103	12.6	716.913	91	3
Finland	86	828,433	10.4	1,223,610	128	277	4,408,874	6.3	4,181,125	263	4.07
Netherlands	199	2,290,094	8.7	3,238,925	282	562	14,009,162	4	13,970,546	560	4.8
EU27	**8,457**	**81,135,808**	**10,4**	**102,015,931**	**10,646**	**36,757**	**409,598,277**	**8.97**	**394,392,520**	**35,131**	**0.08**

Source: Eurostat, Population forecast, baseline 2004
Baseline variant - 1st January population by sex and single year of age
* Average value for 2004-2006

Table 5. Expected effect of population ageing on annual number of road deaths in 2020 (Chapter 4 - Fig. 5)

Country	Older people (65 and over)		Population aged 0-64		Total	
	deaths	population	deaths	population	deaths	population
Austria	156	1,361,804	574	6,904,121	730	8,265,925
Belgium	193	1,809,017	876	8,702,365	1,069	10,511,382
Bulgaria	184	1,328,479	859	6,390,271	1,043	7,718,750
Cyprus	17	92,342	69	674,072	86	766,414
Czech Republic	173	1,456,391	890	8,794,688	1,063	10,251,079
Denmark	72	823,027	234	4,604,432	306	5,427,459
Estonia	31	227,113	173	1,117,571	204	1,344,684
Finland	71	868,717	265	4,408,238	336	5,276,955
France	901	10,207,129	3,808	52,791,644	4,709	62,998,773
Germany	1,154	15,870,074	3,937	66,567,921	5,091	82,437,995
Greece	320[1]	2,059,616	1,338	9,065,563	1,657	11,125,179
Hungary	216	1,590,712	1,087	8,485,869	1,303	10,076,581
Ireland	66	467,926	299	3,771,922	365	4,239,848
Israel	83	697,600	331	6,419,100	414	7,116,700
Italy	1,220	11,592,335	4,449	47,159,376	5,669	58,751,711
Latvia	63	385,629	344	1,908,961	407	2,294,590
Lithuania[2]	122	521,812	638	2,881,472	760	3,403,284
Luxembourg	2	65,974	34	403,126	36	469,100
Malta[3]	1	54,379	10	349,967	11	404,346
The Netherlands	210	2,330,459	520	14,003,751	730	16,334,210
Norway	65	682,469	177	3,957,750	242	4,640,219
Poland	919	5,075,823	4,324	33,081,232	5,243	38,157,055
Portugal	215	1,810,100	754	8,759,492	969	10,569,592
Romania	504	3,198,160	2,069	18,412,053	2,573	21,610,213
Slovakia	84	632,638	495	4,760,999	579	5,393,637
Slovenia	33	319,631	229	1,690,746	262	2,010,377
Spain	667	7,308,455	3,437	36,449,795	4,104	43,758,250
Sweden	95	1,565,377	350	7,482,375	445	9,047,752
Switzerland	101	1,192,465	269	6,266,663	370	7,459,128
UK	572	9,687,800	2,728	50,442,500	3,300	60,393,044
EU (27)	**8,261**	**82,710,919**	**34,789**	**410,064,522**	**43,050**	**493,038,185**
PIN (30)	**8,510**	**85,283,453**	**35,566**	**426,708,035**	**44,076**	**512,254,232**

Source: Eurostat (Population figures)
[1] Average of >65 and >66 deaths
[2] Older people 64 and over
[3] Older people 60 and over

Table 6. Number of deaths and number of population of 65+ and 0-64 in 2006

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