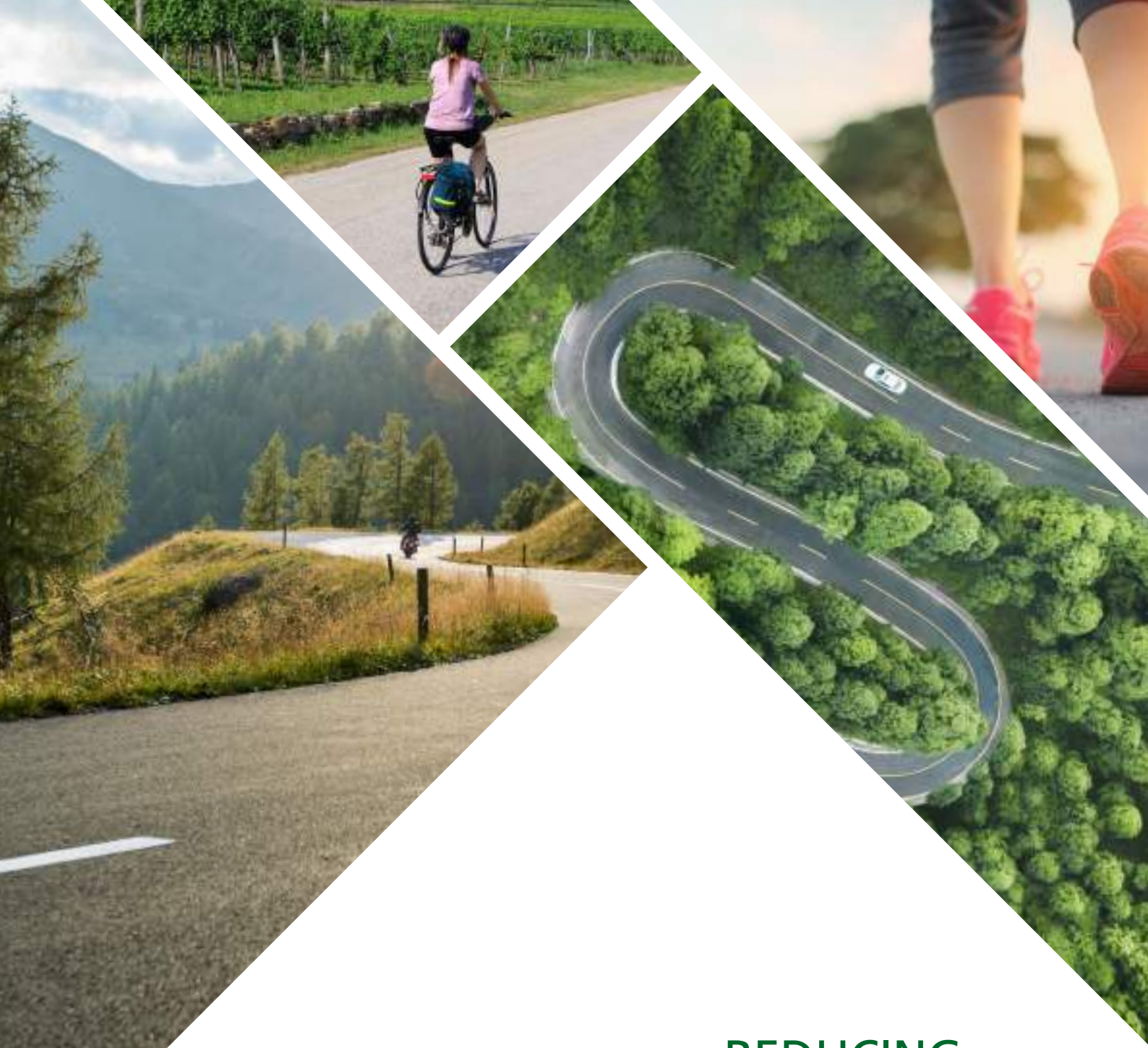

REDUCING ROAD DEATHS ON RURAL ROADS

PIN Flash Report 46

March 2024

European Transport Safety Council

PIN Panel

Austria (AT)	Klaus Machata, Road Safety Board (KFV)
Belgium (BE)	Jean-Fran ois Gaillet, VIAS institute
Bulgaria (BG)	Milen Markov, Alexander Dimov, State Agency Road Safety
Croatia (HR)	Zoran Brezak, Ministry of Interior
Cyprus (CY)	George Morfakis, Road Safety Expert, Alexis Avgoustis, Ministry of Transport
Czechia (CZ)	Veronika Valentov , Jindřich Frič, Transport Research Centre (CDV)
Denmark (DK)	Pernille Ehlers, Danish Road Safety Council
Estonia (EE)	Maria Pashkevich, Road Administration
Finland (FI)	Esa R ty, Finnish Crash Data Institute (OTI)
France (FR)	Manuelle Salath , French Road Safety Observatory (ONISR)
Germany (DE)	Hannes Strauss, German Road Safety Council (DVR)
Greece (EL)	George Yannis, Technical University of Athens
Hungary (HU)	G bor Pauer, Institute for Transport Sciences (KTI)
Ireland (IE)	Sinead Bracken, Sharon Heffernan, Velma Burns, Road Safety Authority (RSA)
Israel (IL)	Nachala Henig, Assaf Sharon, Road Safety Authority
Italy (IT)	Valentino Iurato, Ministry of Transport
Latvia (LV)	Juris Kreicbergs, Road Traffic Safety Directorate
Lithuania (LT)	Vidmantas Pumputis, Ministry of Transport and Communications
Luxembourg (LU)	Yanik Scolastici, Ministry for Mobility and Public Works
Malta (MT)	Patrick Cachia Marsh, Transport Malta
Netherlands (NL)	Peter Mak, Ministry of Transport
Norway (NO)	Artemis Kihle Olavesen, Norwegian Public Roads Administration
Poland (PL)	Dagmara Jankowska-Karpa, Motor Transport Institute (ITS)
Portugal (PT)	Rui Ribeiro, Autoridade Nacional Seguran a Rodovi ria (ANSR)
Romania (RO)	Florin Catană, Romanian Traffic Police
Serbia (RS)	Milan Tešić, Road Traffic Safety Agency
Slovakia (SK)	Martin Vaško, Ministry of Transport
Slovenia (SI)	Saša Jevšnik Kafol, Traffic Safety Agency
Spain (ES)	Cristina Rodenas, Ministry of Interior
Sweden (SE)	Anna Vadeby, National Road and Transport Research Institute (VTI)
Switzerland (CH)	Yvonne Achermann, Swiss Council for Accident Prevention (BFU)
United Kingdom (UK)	Mike Dark, Department for Transport Nathan Harpham, Transport Research Laboratory (TRL)

PIN Observers

Stelios Efstathiadis, Road Safety Institute Panos Mylonas, Greece
Antida Aversa, Automobile Club d'Italia (ACI), Italy

PIN Steering Group

Henk Stipdonk, Netherlands Institute for Transport Policy Analysis (KiM) (PIN Co-chair)
Heather Ward, University College London (UCL), (PIN Co-chair)
Letty Aarts, Institute for Road Safety Research (SWOV)
Jo o Cardoso, National Laboratory of Civil Engineering (LNEC)
Lars Ekman, Swedish Transport Administration
Eduard Fern ndez, CITA
Astrid Linder, National Road and Transport Research Institute (VTI)
Kristina Mattsson, Swedish Transport Administration
Jes s Moncl s, MAPFRE Foundation
Guro Ranes, Norwegian Public Roads Administration
Joost Segers, Toyota Motor Europe
Hannes Strauss, German Road Safety Council (DVR)
Pete Thomas, Loughborough University
Peter Whitten, European Commission
George Yannis, Technical University of Athens
Antonio Avenoso, ETSC
Graziella Jost, ETSC
Jenny Carson, ETSC
Maria Meinero, ETSC

For more information

European Transport Safety Council
20 Avenue des Celtes
B-1040 Brussels
Tel: +32 2 230 4106
jenny.carson@etsc.eu
www.etsc.eu/pin

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REDUCING ROAD DEATHS ON RURAL ROADS

PIN Flash Report 46

Authors
Jenny Carson
Graziella Jost
Maria Meinero

PIN co-chairs
Henk Stipdonk
Heather Ward

March 2024

In memory of our friend and colleague
Professor Richard Allsop OBE

Acknowledgements

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The PIN programme relies on panellists in the participating countries to provide data and to carry out quality assurance of the figures provided. This forms the basis for the PIN Flash reports and other PIN publications. In addition, all PIN panellists are involved in the review process of the reports to ensure the accuracy and reliability of the findings.

ETSC is grateful for the financial support for the PIN programme provided by the German Road Safety Council (DVR), Toyota Motor Europe, the Norwegian Public Roads Administration, the MAPFRE Foundation and CITA, the International Motor Vehicle Inspection Committee.

About the PIN Programme

The ETSC Road Safety Performance Index (PIN) is a policy tool to help national governments and the European Union improve road safety. By comparing performance between countries, it serves to identify and promote best practice in Europe and bring about the kind of political leadership that is needed to create a road transport system that maximises safety.

Launched in June 2006, the index covers all relevant areas of road safety including road user behaviour, infrastructure and vehicles, as well as road safety policymaking more generally. The programme covers 32 countries: the 27 Member States of the European Union, together with Israel, Norway, the Republic of Serbia, Switzerland and the United Kingdom.

National research organisations and independent researchers participate in the programme and ensure that any assessment carried out within the programme is based on scientific evidence.

About The European Transport Safety Council (ETSC)

ETSC is a Brussels-based, independent non-profit organisation dedicated to reducing the numbers of deaths and injuries in transport in Europe. Founded in 1993, ETSC provides an impartial source of expert advice on transport safety matters to the European Commission, the European Parliament, and European countries. It maintains its independence through funding from a variety of sources including membership subscriptions, the European Commission, the European Parliament, and public and private sector support.

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REDUCING ROAD DEATHS ON RURAL ROADS

European Transport Safety Council

OVER **10,600** PEOPLE WERE KILLED ON **EU RURAL ROADS** IN **2022**

MORE THAN 50% OF ROAD DEATHS OCCUR ON RURAL ROADS

52% Rural

9% Motorways

39% Urban

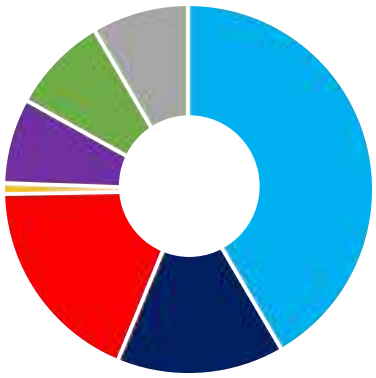
56% OF PEOPLE KILLED ON RURAL ROADS ARE CAR PASSENGERS OR DRIVERS

9% OF ROAD DEATHS ON RURAL ROADS ARE PEDESTRIANS

8% OF ROAD DEATHS ON RURAL ROADS ARE CYCLISTS

20% OF ROAD DEATHS ON RURAL ROADS ARE MOTORCYCLE RIDERS

ABOUT 50% OF ALL PEOPLE KILLED IN A COLLISION WITH A CAR ON A RURAL ROAD WERE VULNERABLE ROAD USERS



- 42% Car driver
- 15% Car passenger
- 18% PTW driver
- 1% PTW passenger
- 8% Cyclist
- 8% Pedestrian
- 8% Other

REDUCTION IN ROAD DEATHS SINCE 2012

ETSC'S RECOMMENDATIONS

- Separate traffic by a median barrier. Install side barriers when needed.
- Improve infrastructure safety.
- Separate faster vehicles from slower ones and lighter vehicles from heavier ones.
- Implement safe intersections.
- Increase enforcement of traffic rules.

EXECUTIVE SUMMARY

INTRODUCTION

Across the EU*, around half of all road deaths occur on rural non-motorway roads, so EU and national strategies to reduce road harm must put substantial efforts into reducing the risks on this road type.

In the last decade, the number of rural road deaths in the EU decreased by 25%. The number of deaths on other road types decreased more slowly, by 18% over the same period.

These reductions leave us far from the EU target, inspired by Vision Zero, of a 50% reduction in road deaths by 2030 compared to 2019 and the EU aspiration of zero road deaths by 2050.

Rural roads are the most dangerous roads because of the risks posed by high speeds and high traffic volume, the mix of different road users, multi-functionality, lower infrastructure safety and low enforcement levels.

Comparison of the safety levels between countries is difficult because of the variety of rural roads and a lack of detailed data on vehicle-distance travelled, and no consistent definition of what a rural road is.

DATA ANALYSIS

Rural road risk: deaths per distance travelled

Only a few countries collect separate data on distance travelled on rural roads. Rural road users in Sweden, Ireland and Slovenia enjoy a lower level of road risk than users in other countries where distance travelled data are collected. But it is important to note that all the countries collecting distance travelled data have seen a reduction in road risk over the last decade.

Speed compliance

On rural non-motorway roads with speed limits between 70 km/h and 80 km/h, between 53% and 82% of car and van speed observations in free-flowing traffic were within the speed limit in 2022.

On rural roads with speed limits between 90 km/h and 110 km/h, between 43% and 88% of cars and vans speed observations in free-flowing traffic were within the speed limit in 2022.

Deaths by road user category

On average across the EU27, 56% of people killed on rural roads are car passengers or drivers, 20% are motorcycle riders or passengers, 9% are pedestrians and 8% are cyclists.

The three most common collision scenarios on rural roads are collisions where the main opponent is a car, a (light or heavy) goods vehicle, or where no other vehicle is involved. Single-vehicle collisions tend to be more underreported than multiple-vehicle collisions. Single bicycle collisions are particularly prone to be underreported in police records.

COUNTERMEASURES

Better data

Key Performance Indicators (KPIs) can give a more complete picture of the level of road safety and can help to detect the emergence of problems.

The EU has chosen an initial eight KPIs which will form the basis for monitoring progress in joint road safety work at EU, Member State, regional and local levels including KPIs focused on infrastructure, speed compliance and vehicle safety standards.

* This report is based on research and analysis across the countries monitored by the ETSC Road Safety Performance Index (PIN) programme. While this group of countries includes several non-EU countries, we usually use EU aggregate data rather than an aggregate of all PIN countries. That is because the EU Member States have agreed on collective targets and Key Performance Indicators (KPIs) for road safety, and the PIN programme seeks to monitor progress against these targets over time. Where available, all individual PIN country data are given both in the figures, and in the annexes.

Better infrastructure

Shortcomings in infrastructure are a contributory factor in many collisions on rural roads. Some of the most common unsafe features of rural road infrastructure include a lack of separation between the different directions of traffic and between motorised traffic and pedestrians or cyclists, obstacles in the roadside area, as well as inappropriate curve design.

The EU Road Infrastructure Safety Management (RISM) Directive requires governments to carry out regular road safety audits, identify high-risk sites and prioritise safety when building new roads. The revised directive, which came into force in 2019, has extended the scope of the original legislation to include all motorways, primary roads and roads outside urban areas that have received EU funding.

In addition, a new network-wide road safety assessment has been introduced and the requirements to protect vulnerable road users have been strengthened.

EU Member States face a considerable challenge in assessing, analysing and investing in upgrades to their rural road infrastructure to meet the extended scope and new requirements (e.g. Network Wide Assessment) of the revised RISM directive and the revised TEN-T regulation requirements.

A well-designed rural road should have separate lanes or paths for slow traffic meaning interaction between cars and trucks. and slow traffic only occurs at intersections. Self-explaining and self-enforcing roads aim to prevent road users from driving at inappropriate speeds. They also seek to prevent driving errors and aim to prevent motorists from committing traffic offences across the whole road network. Following the revision of the EU RISM Directive, this concept is now included in EU legislation and guidance on the design of 'forgiving roadsides' and 'self-explaining and self-enforcing roads' is being developed by the European Commission, with Member State experts.

Bearing in mind that average collision rates are higher on horizontal curves than on straight sections of rural two-lane roads and collision rates increase the tighter the curves are, several countries are experimenting with new road markings which help road users, particularly motorcyclists, with cornering safely.

Safer speed limits and improving speed enforcement

Exceeding the speed limit is by far the most recorded road traffic offence and speeding remains a problem on rural roads. Most of the PIN countries with a significantly lower road mortality rate than the EU average apply 70 km/h or 80 km/h standard speed limits on rural roads.

According to the Safe System approach, safe speed limits on rural roads without a median barrier should not be higher than 70 km/h and not higher than 100 km/h on roads with median and side barriers. The design of these roads should also match a credible speed limit.

A combination of mobile roadside police checks together with automated enforcement, including mobile and fixed cameras, as well as time-over-distance cameras, has proved to be an effective tool in addressing speeding, also on rural roads.

Improving safety and accessibility for vulnerable road users (VRUs)

Walking and cycling are valuable modes of transport in rural areas but are also leisure and tourism activities. Obstacles to bicycle use in rural areas include a lack of safe cycling routes, longer distances and uphill stretches. The impact on rural road safety of the rise in the use of electric bicycles should also be considered given that cyclists on electric bicycles tend to travel further and faster than those on traditional bicycles. It is important to design infrastructure that more effectively separates cyclists from faster-moving traffic and also to reduce the relative speed between the different road users.

Pavements tend to be lacking in villages in rural areas. In addition, risks are highest on rural roads where there are few pedestrians and no separation or protection from fast-moving traffic. And yet, research has shown that rural citizens still walk for at least 19% of their trips. The provision of quality rural pedestrian infrastructure, including pavements separated from the road, can and should address these issues.

Informing pupils of safe routes to school and developing a school mobility plan is a measure schools can adopt to make travelling to school safer, including in a rural context.

Vehicle safety technologies

From July 2024, technologies such as automated emergency braking (AEB) and intelligent speed assistance (ISA) are mandatory on all new vehicles sold in the EU, and will help improve road safety on all road types. Governments and speed data providers should ensure that speed limit maps are comprehensive and regularly updated.

Mandatory automated emergency calling systems, known as eCall, are especially useful in a rural context where an unconscious driver may not be seen by others who can raise the alarm. Legislation for fitment of eCall on motorcycles should be prioritised.

MAIN RECOMMENDATIONS TO NATIONAL GOVERNMENTS

- Investigate all fatal and serious injury collisions and implement best practices in high-risk site management.
- Improve infrastructure safety on the whole network, applying the concepts of 'self-explaining roads' and 'forgiving roadsides'.
- Implement safe intersections by applying roundabouts, (pedestrian) underpasses or physical interventions to strongly reduce speed at intersections.
- Apply the road safety impact assessment, network wide assessment, road safety audits and inspections to the rural road network and regularly review findings for action.
- When possible, separate traffic in opposite directions by a median barrier and, when needed, install side barriers.
- Where there may be cyclists and pedestrians present or the potential to attract them and taking into consideration the optimal cycling or walking route, then invest in separate cycle and pedestrian facilities, on new or renewed roads always, and in retrofit elsewhere.
- Separate faster vehicles from slower ones and lighter vehicles from heavier ones, and separate vehicles that are making conflicting movements.
- Establish clear road hierarchies, which better match the use of each road to the functions that the road serves in terms of living space, access and through movement, speed limit, layout and design based on the principles of the Safe System approach.
- Develop and encourage speed limit-setting authorities to apply national speed limit guidelines based on the Safe System approach.
- Increase enforcement of traffic rules, in particular speeding and drink and drug-driving, especially at high volume roads with a long distance high volume mobility function.
- Divert heavy traffic, in particular trucks and buses, from rural roads nearby, especially single carriageways without median barrier, to motorways, primary or TEN-T roads with higher safety levels.

MAIN RECOMMENDATIONS TO THE EU

- Set up, as planned in the EU Road Safety Strategy, an expert group to develop a framework for road classification that better matches speed limit to road design and layout in line with the Safe System approach.[1]
- Set up, as planned in the EU Road Safety Strategy, a forum of European road safety auditors to facilitate exchange of experience on Safe System methodologies.
- Renew efforts for the preparation of 'common specifications' for road markings and road signs to support EU Member States within the framework of the EU Road Infrastructure Safety Directive (RISM) 2019/1936.
- Review the implementation effects of the revised RISM directive and consider further improvements in the second half of the 2020-2030 strategy period.
- Encourage Member States, through a European Commission Recommendation, to apply safe speed limits in line with the Safe System approach (including enforcement) for the different road types such as 30km/h on urban roads in residential areas and areas where there are high number of cyclists and pedestrian, 70km/h on undivided rural roads and a top speed of 120km/h or less on motorways.
- Introduce a Key Performance Indicator (KPI) on the proportion of roads within the road network with speed limits set at safe and credible levels (e.g. 70km/h on undivided rural roads).

[1] European Commission (2020) EU Road Safety Policy Framework 2021-2030- Next Steps towards "Vision Zero", https://bit.ly/3Nmth6K

INTRODUCTION

It's a scene you've seen in movies a thousand times before. The hero gets into their car, and drives off down an open road into the sunset.

Meanwhile, in cities across Europe, drivers stuck in traffic jams stare up at billboards advertising SUVs. The image is the same: an empty road, stunning rural scenery, and the promise of 'freedom'. But as with the movies, the images on the poster don't reflect the lived experience of the driver, but instead tap into a powerful place in our imagination: the chance to get away from it all.

The reality can be very different. In 2022, some 10,000 people died on the rural roads of Europe – more than half of all road deaths. Rural roads can be dangerous, compared to other road types. They often lack central and side barriers, and allow for large speed and weight differentials between the vehicles that use them, from lorries to vulnerable cyclists and pedestrians. Single-vehicle crashes, where a fatigued driver misjudges a turn and runs off the road, are common. Head-on collisions frequently occur, and are often lethal.

But the dream of the open road doesn't need to turn into a nightmare. Rural roads can and are being made safer with interventions that do not need to be costly. Road safety audits and analysis of high-risk sites, setting appropriate speed limits and enforcing those limits, creating separated paths for cyclists and walkers, removing obstacles at the roadside…these are a few examples of what can and should be done.

By following the principles of the Safe System, countries and regions across Europe are making substantial changes. In this report, we take a look at progress in reducing deaths on rural roads across Europe over the last decade. And, with help from our panel of experts from across Europe, we look at some remarkable interventions that are saving lives. France, Spain and the Belgian region of Flanders have reduced the speed limit across their entire rural road networks. Sweden has invested heavily in '2+1' roads, which introduce a central barrier and a safety-first design. In Scotland, experiments with special road markings for motorcyclists to guide them through sharp turns, have achieved remarkable results. In the West Pomerania region of Poland, 800 km of high quality cycle routes have been built in five years.

So with political leadership, and the appropriate investment of time and resources, even small changes can make a big difference. Safer rural roads need not remain a dream but can become everyday reality.

You will have noted that this report has a special dedication. Professor Richard Allsop OBE, our long-time friend and colleague, and one of the masterminds of the ETSC Road Safety Performance Index programme, died during the preparation of this PIN flash. Richard dedicated time and attention to every PIN report we have published since the programme began. His contribution to ETSC, and the cause of road safety in Europe, was immeasurable and he will be sorely missed.

PART I

INSUFFICIENT PROGRESS IN REDUCING RURAL ROAD DEATHS IN EUROPE

COVID-19 PANDEMIC

This report covers the period 2012-2022. In 2020 the COVID-19 pandemic hit the world. The initial response to the pandemic was to severely restrict travel. This resulted in unprecedented reductions in traffic volumes in most PIN countries during 2020. In many countries traffic volumes did not reach pre-pandemic levels in 2021 either, so data in both 2020 and 2021 should be considered with this in mind. Due to the many possible short and long-term effects of the pandemic, in our analyses of the trends and data we have not tried to correct for the influence of COVID-19.

01

At least 10,637 people lost their lives on rural roads other than motorways in the EU27 in 2022. Rural roads are the most dangerous roads because of the risks posed by high speeds and high traffic volume, the mix of different road users, multi-functionality, lower infrastructure safety and low enforcement levels. Rural roads contribute to more than 50% of all road deaths across the EU. Yet road users are safer on rural roads today than in 2012.

Comparison of the safety levels between countries is difficult because of the variety of rural roads and a lack of detailed data on vehicle-distance travelled, and no consistent definition of what a rural road is. But measures to improve the safety on this part of the network are known. They include safe road design, safe infrastructure management, and better enforcement of traffic rules, in particular speed limits.

INDICATOR

Rural roads other than motorways are the most dangerous roads but they are difficult to compare internationally because of different geographical circumstances, definitions, the great variety of rural road design and a lack of detailed data on traffic volumes. Rural roads can, with or without access to buildings next to the road, be single or dual carriageways with one or two lanes each way, with or without a median barrier and with or without side barriers. Some do not have access control and in some cases they are not used by pedestrians, cyclists or agricultural traffic. A rural road can just as likely be an isolated narrow mountain road limited to 70km/h as a busy four-lane bypass limited to 110km/h.

Speed limits on rural roads also vary between Member States and within Member States.[2] In most cases the use of rural roads is not limited and the great diversity of road users travelling, riding, cycling or walking at different speeds either along or across these roads poses serious threats to the safety of the most vulnerable.

To encompass the diversity of so-called 'rural roads', the terms 'outside urban areas, excluding motorways' or 'outside built-up areas, excluding motorways' are used by the scientific community. To keep it simple in this report, the most common terminology of 'rural roads' is used. According to CARE, deaths on rural roads are those that occurred on a road other than a motorway outside urban area boundary signs. This definition works for the majority of PIN countries, but some, like Great Britain, do not have boundary signs to distinguish between urban and rural roads. In Great Britain, the distinction is based on the boundaries of urban areas defined for planning purposes and their numbers of inhabitants. Rural roads in Great Britain include major and minor roads that sit outside urban areas (these urban areas have a population of more than 10,000 people in England and Wales or more than 3,000 in Scotland). This definition has been used in the report for Great Britain.

This report uses as the main indicator of the safety of rural roads the average annual change in road deaths on rural roads since 2012 (Fig.1). In addition, countries are compared on the difference between the change in deaths on rural roads and the corresponding change in deaths on urban roads since 2012 (Fig.3). Austria, Croatia, Czechia, Denmark, Estonia, Finland, Ireland, Latvia, Lithuania, Slovenia, Sweden and Switzerland have estimates of vehicle-distance travelled on rural roads (Fig.8) and they use various methodologies to calculate the estimates.

The data were retrieved from the CARE database when available and completed or updated by PIN Panellists. The full dataset is available in the Annexes.

[2] Your Europe, Road rules and safety, http://tinyurl.com/5fddn8hw

1.1 PROGRESS IN REDUCING ROAD DEATHS OUTSIDE URBAN AREAS

In the last decade, the number of rural road deaths in the EU25[3] decreased by 25%, from 14,162 in 2012 to 10,644 in 2022. The number of all other road deaths decreased by 18% over the same period.

This result is far from the EU target inspired by Vision Zero of a 50% reduction in road deaths by 2030 compared to 2019 and the EU aspiration of zero road deaths by 2050.

In the last ten years the number of rural road deaths decreased on average by 3% annually in the EU25.[4]

In the PIN countries, Belgium and Estonia achieved the highest average annual reduction of 6%, followed by Greece and Norway with a 5% reduction over the period 2012-2021 and 2012-2022 respectively. Latvia and Portugal also achieved a 5% reduction over the period 2012-2022 and 2018-2022 respectively. In three countries the number of rural road deaths increased on average annually over the last ten years. The number of rural road deaths increased on average by 8% annually in Serbia and by 1% in Israel and the Netherlands.

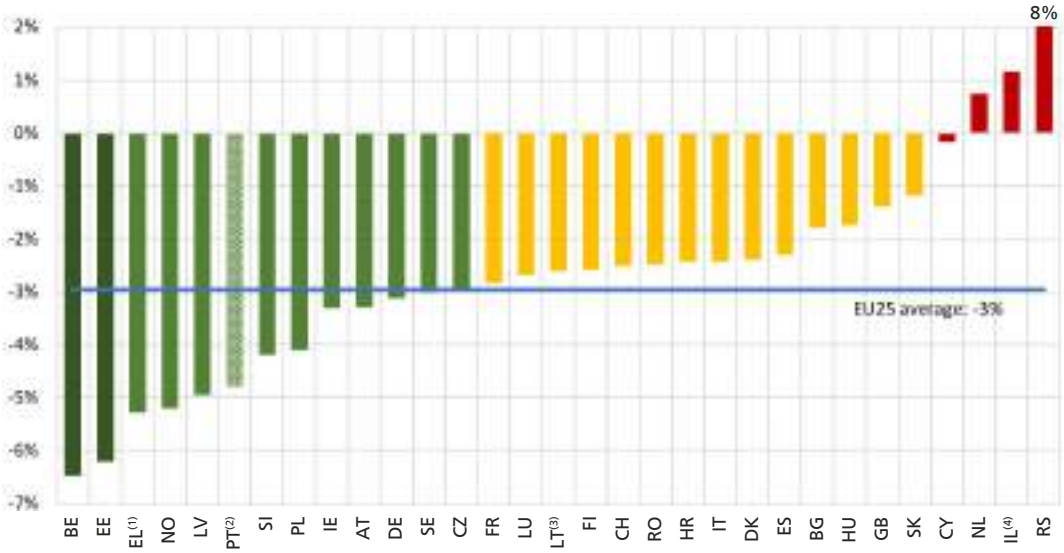


Figure 1. Average annual change in the number of road deaths on rural roads over the period 2012-2022.
(1)2012-2021,
(2)2018-2022,
(3)2016-2022,
(4)IL – data include rural roads, motorways and off-roads. EU25: EU27 minus LT and MT due to lack of updated data. MT has been excluded from the graph as data are missing for the majority of the years. The annual number of rural road deaths in LU are particularly small and, therefore, subject to substantial annual fluctuations. Annual numbers of deaths in CY and EE are also relatively small and, therefore, may be subject to relatively strong annual fluctuations.

FINLAND
SUICIDES INCLUDED IN COLLISION STATISTICS

Suicides are included in Finnish collision statistics, contrary to other EU countries, and this should be taken into account when looking at Finnish data. In-depth accident investigations concluded that around 19% of fatal motor vehicle collisions which took place on rural roads were suicides and 9% of fatal pedestrian and cyclist collisions on rural roads were suicides, between 2018 and 2022.

Finnish in-depth accident investigations of fatal motor vehicle collisions occurring on rural roads (excluding suicides) reveal that about 36% of at-fault drivers were driving under the influence of alcohol and 27% exceeded the speed limit by at least 30km/h. Moreover, of those who did not use an appropriate safety device such as a seat belt, 56% of the vehicle occupants killed on rural roads could have survived by using the device.

[3] EU25: EU27 minus LT and MT due to lack of updated data.
[4] Ibid.

1.2 PROGRESS ON RURAL ROADS COMPARED TO URBAN ROADS AND MOTORWAYS

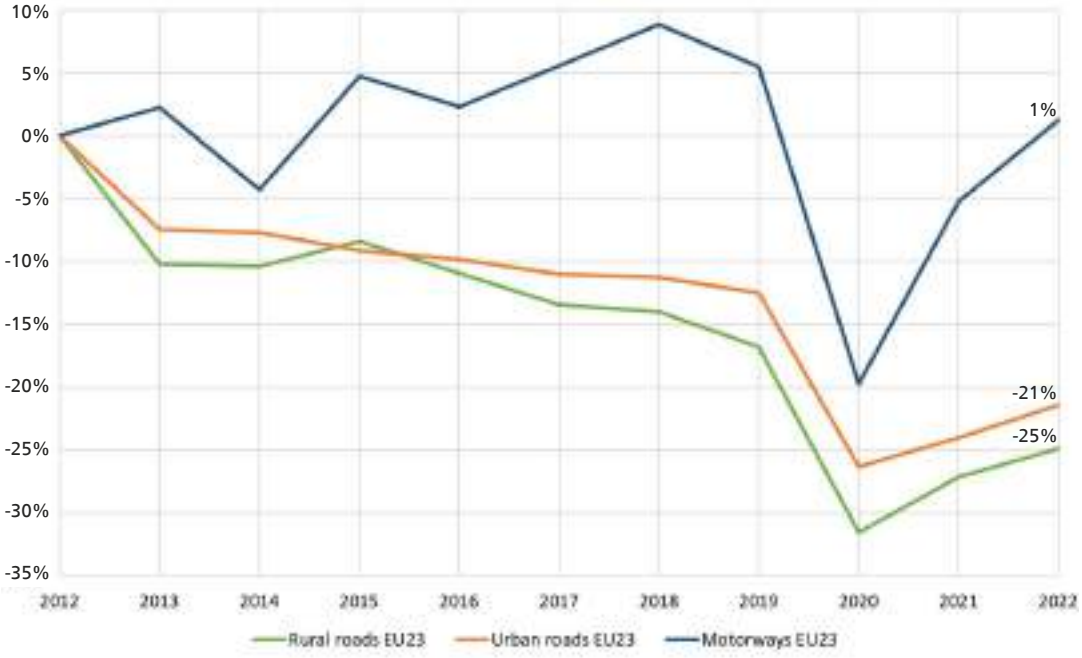
Figure 2 presents the relative reduction in rural road deaths since 2012 compared with road death reductions on urban roads and motorways since 2012.

Rural road deaths decreased by 25% between 2012 and 2022, which is faster than road deaths on any other road category in the EU23.[5]

Urban road deaths in the EU23 decreased by 21% between 2012 and 2022 and motorways deaths in the EU23 increased by 1% over the same period (although the data do not take into account changes in the number of kilometers of road types, particularly for motorways).

Rural road deaths stagnated between 2013 and 2018, then started to decrease in 2019. Rural road deaths decreased by 18% in just one year between 2019 and 2020 following measures aimed at controlling the Covid-19 pandemic which severely restricted the movement of people. Road deaths on rural roads increased by 6% between 2020 and 2021 and by 3% between 2021 and 2022.

Figure 2. Change in the number of deaths on rural roads, urban roads and motorways in the EU over the period 2012-2022
EU23: EU27 minus EE, LT, MT and SK due to lack of updated data.



1.2.1 Progress on rural roads compared to urban roads

In the EU24[6] the progress in reducing deaths on rural roads exceeded by 0.5% annually the progress in reducing deaths in urban areas. This difference is small, mostly because the development strongly varies among the PIN countries (see Figure 3).

In 14 PIN countries progress in reducing deaths on rural roads exceeded progress in reducing deaths in urban areas (Figure 3). In Belgium progress in reducing deaths on rural roads exceeded by 4% annually on average the progress in reducing deaths on urban roads. In France and the Netherlands progress in reducing deaths on rural roads exceeded by 3% annually on average the progress in reducing deaths in urban areas.

[5] EU23: EU27 minus EE, LT, MT and SK due to lack of updated data.
[6] EU24: EU27 minus LT, MT and SK due to lack of updated data.

In contrast, in 17 PIN countries progress in reducing deaths on rural roads was slower than inside urban areas. In Serbia progress in reducing deaths on rural roads was slower by 16% annually than progress in reducing road deaths inside urban areas. In Lithuania (over the period 2016-2022) and Luxembourg (over the period 2012-2022) the average annual progress in reducing deaths on rural roads was slower by 5% and 4% respectively than progress in reducing road deaths on urban roads.

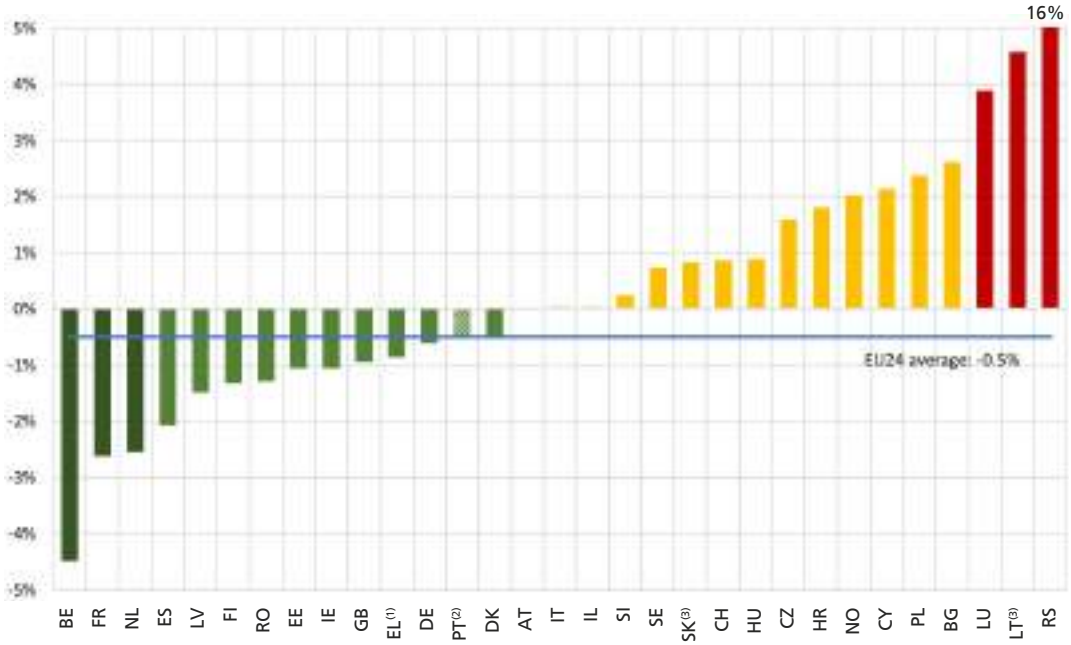


Figure 3. Difference between the average annual change in the number of deaths on rural roads and the corresponding average annual change in the number of deaths on urban roads over the period 2012-2022.
(1)2012-2021,
(2)2018-2022,
(3)2016-2022.
EU24: EU27 minus LT, MT and SK due to lack of updated data. MT has been excluded from the graph for inconsistencies in the data series. The annual number of rural road deaths in LU are particularly small and are therefore subject to substantial annual fluctuations. Annual numbers of road deaths in CY and EE are also relatively small and, therefore, may be subject to relatively strong annual fluctuations.

1.3 MORE THAN 50% OF ALL ROAD DEATHS OCCUR ON RURAL ROADS

Across the EU25[7], around 52% of all road deaths occur on rural roads (Figure 4).

Across the PIN countries, more than 70% of all road deaths in Norway occur on rural roads whilst in Finland, Sweden, Ireland, Austria, Luxembourg, Czechia, Bulgaria and Denmark the figure is more than 60%. This could be partly explained by a higher share of rural roads among the different road types in these countries.[8] In Cyprus, Croatia, Portugal, Romania, Slovakia and Greece there are more road deaths in urban areas than on rural roads. A higher share of road deaths occurs on motorways in Spain, Slovenia and Belgium compared to the other PIN countries. This could be partly explained by higher traffic volumes on motorways in these countries (e.g. in transit countries and countries with a longer motorway network).

[7] EU25: EU27 minus EE and MT due to lack of updated data.
[8] ERF (2022), European Road Statistics, http://tinyurl.com/pfu7767p The reader should bear in mind that the definition of road types varies from country to country, thus the data are not comparable. Reporting rates may vary between rural and urban areas.

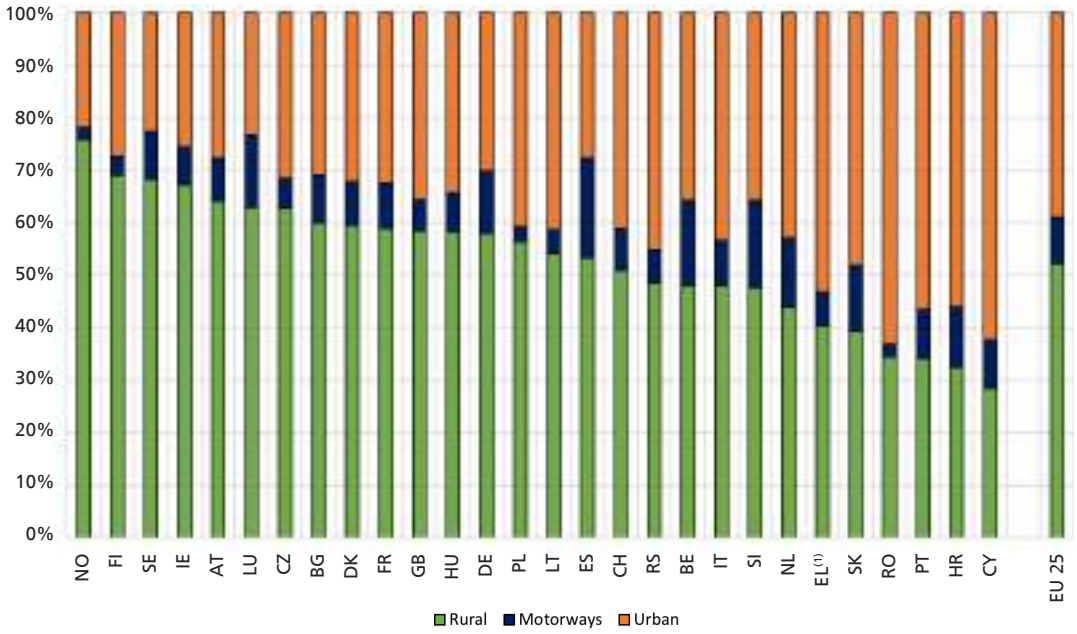


Figure 4. Proportion of road deaths per road type (2020-2022 average) in PIN countries ranked by the share of road deaths on rural roads.
(1)2019-2021. EU25: EU27 minus EE and MT due to lack of updated data.

1.4 PROGRESS IN REDUCING SPEED: KEY TO SUCCESS IN REDUCING DEATHS ON RURAL ROADS

The highest reductions in mean speed on rural roads in Europe have been witnessed in France (Fig. 5) over the period 2019-2022 on roads with an 80km/h speed limit, and in Austria over the period 2012-2022 on roads with a 100km/h speed limit. In these two countries cars and vans slowed down by 0.7% annually.

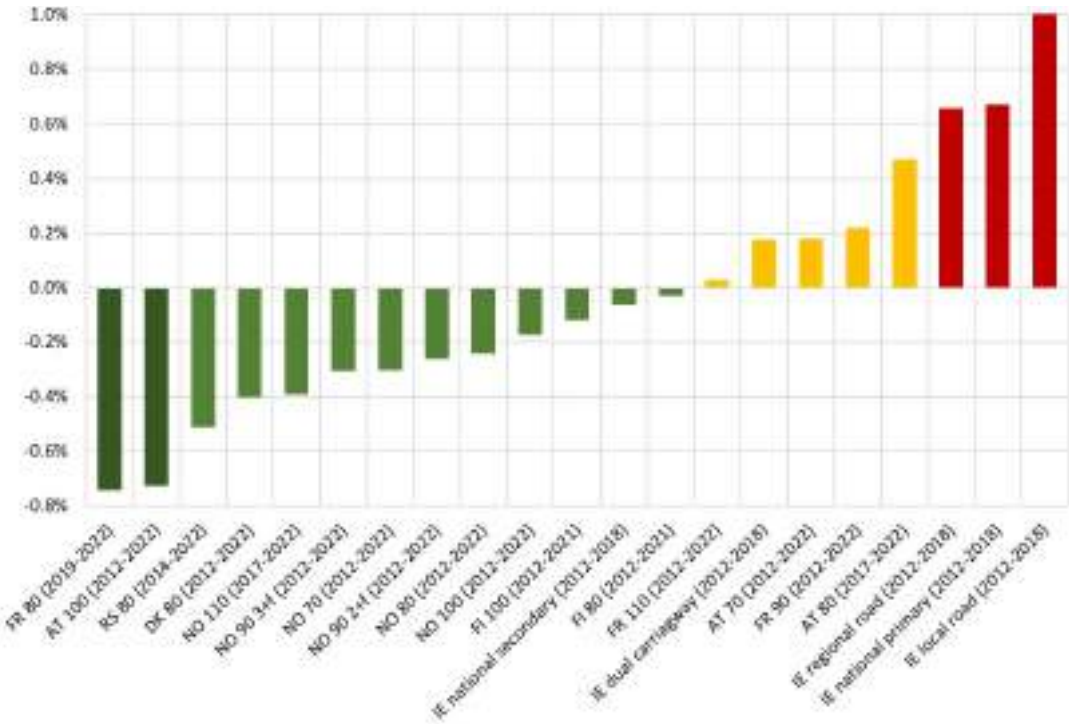
Serbia saw a 0.5% annual decrease over the period 2014-2022 on roads with an 80km/h speed limit.

On the other hand, in Ireland, speeds increased by 2% annually on local rural roads over the period 2012-2018 and by 0.7% annually on national primary roads and regional roads over the period 2012-218.

Although mean speeds are not available in Czechia, it is known that speeds also increased: numbers of drivers exceeding the speed limit by more than 10km/h increased from 8% in 2014 to 14% in 2022 for car drivers and from 9% in 2014 to 11% in 2022 for drivers of vehicles over 3.5 t.[9]

[9] Observatoř (czrso.cz)

Figure 5. Average annual change in mean speed of cars and vans on rural roads (from earliest available baseline to latest available year).



In 2022, 52% of road deaths in the EU occurred on rural non-motorways roads (Fig. 4), which are often designed as single carriageways with no median barrier to separate opposing traffic flows.

Due to the relatively low level of infrastructure safety, high speeds and composition of road users, rural roads are considered to be the most dangerous roads in terms of design.

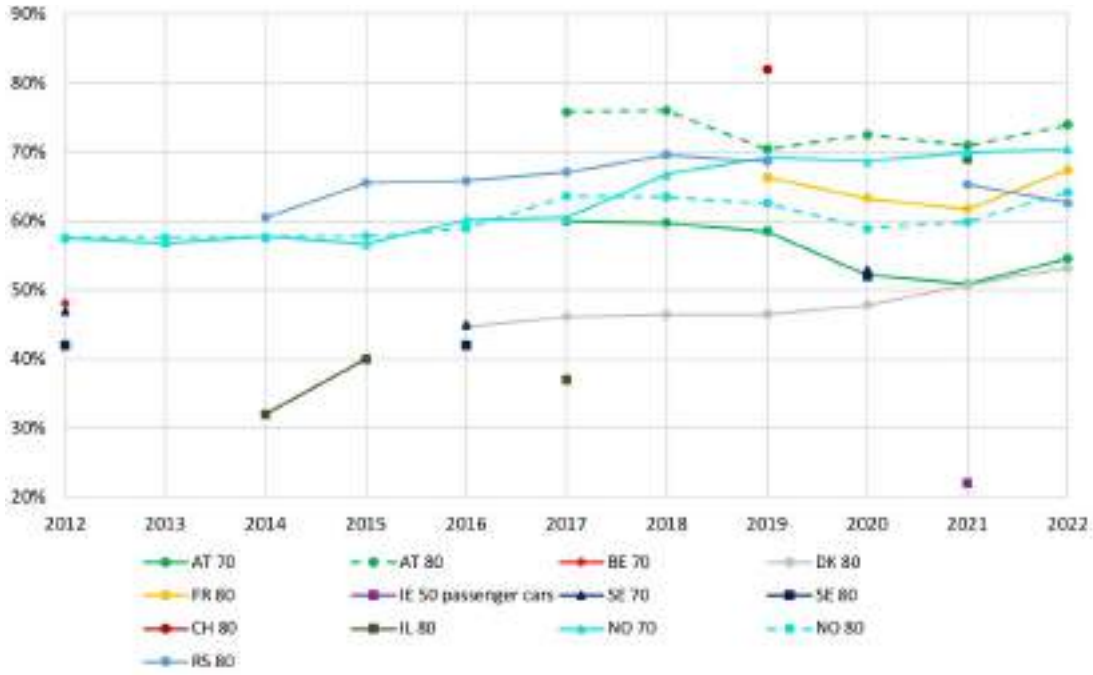
Speed limits should be safe and credible and supported by the design of the road taking into account its functions and use.

Rural roads with similar design characteristics might have different legal speed limits in different countries. In countries with lower legal speed limits, the proportion of observed cars and vans within the speed limit could be lower than in those countries where rural roads have higher speed limits.[10] On rural roads with higher speed limits, the posted speed limit might be too high considering the road design characteristics.

Among countries monitoring speed on rural non-motorway roads with speed limits between 70km/h and 80km/h, between 53% and 82% of car and van speed observations in free-flowing traffic were within the speed limit in 2022 (Fig. 6). In Ireland, on 50km/h rural roads, 22% of car and van speed observations were within the speed limit in 2022.

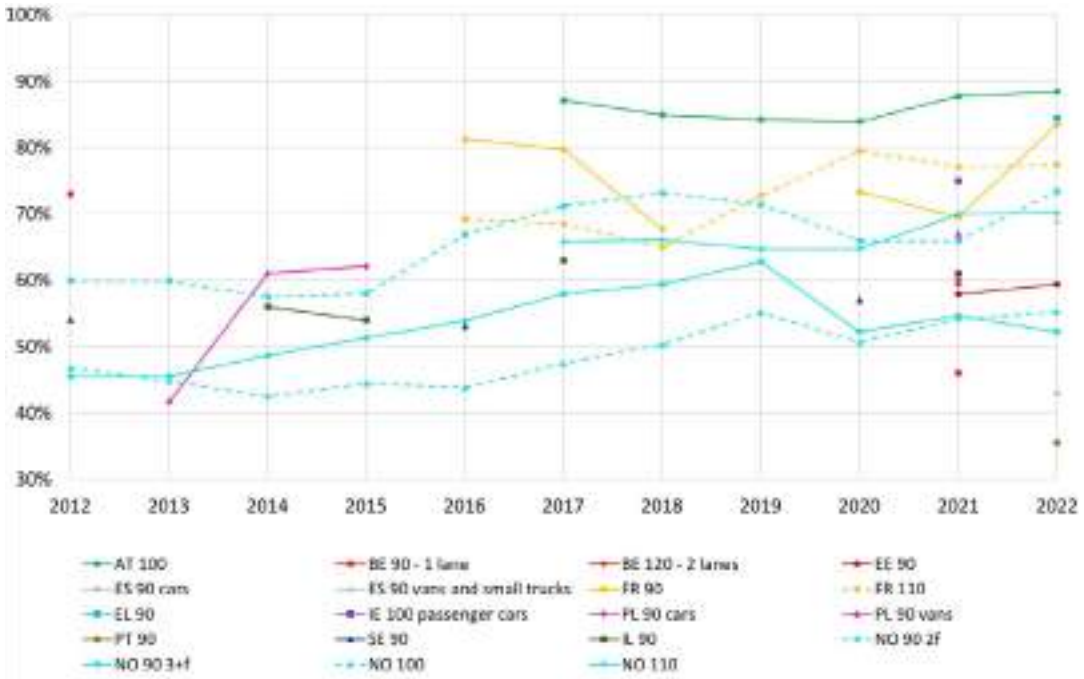
[10] ETSC (2019), PIN Flash 36, Reducing speeding in Europe, www.etsc.eu/pinflash36

Figure 6. The proportion of observed cars and vans within the speed limit in free-flowing traffic on rural roads with speed limits between 50km/h and 80km/h over the period 2012-2022 based on countries' individual data collection methodologies.



Among countries monitoring speed on rural roads with speed limits between 90km/h and 110km/h, between 43% and 88% of cars and vans speed observations in free-flowing traffic are within the speed limit in 2022 (Fig. 7). On average, the proportion of car and van speed observations in free-flowing traffic is higher on rural roads with higher speed limits.

Figure 7. The proportion of observed cars and vans within the speed limit in free-flowing traffic on rural roads with speed limits between 90km/h and 110km/h over the period 2012-2022 based on countries' individual data collection methodologies.



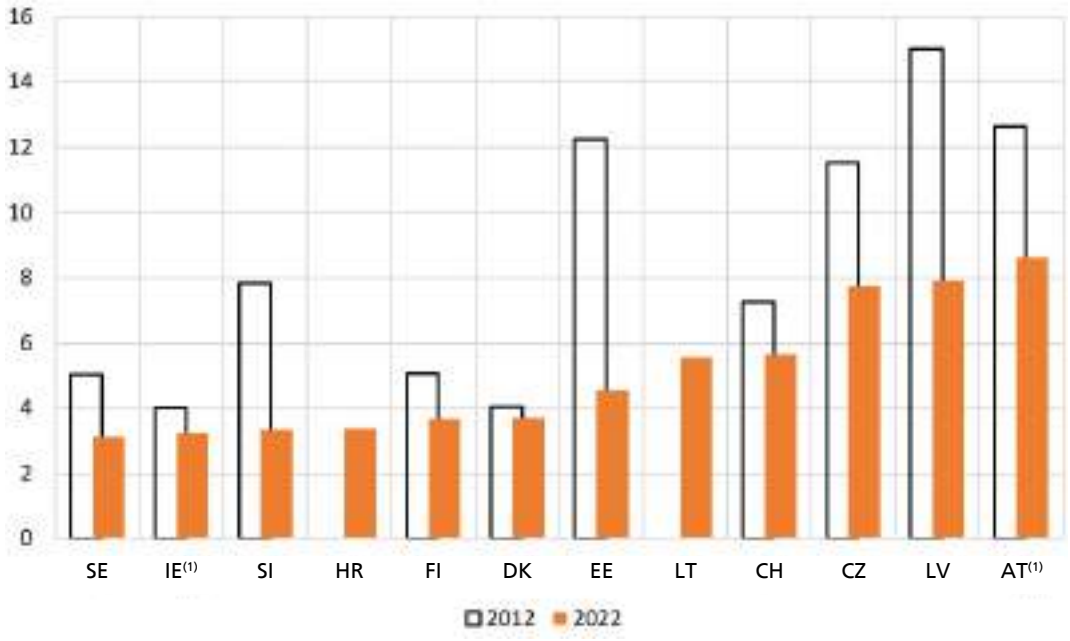
1.5 ROAD DEATHS PER VEHICLE-DISTANCE TRAVELLED

Only a few countries collect separate data on distance travelled on rural roads (Figure 8) allowing the calculation of road risk (deaths per billion kilometers travelled). Rural road users in Sweden, Ireland and Slovenia enjoy a lower level of road risk than users in other countries where distance travelled data are collected.

All the countries collecting distance travelled data have seen a reduction in road risk over the last decade.

In Slovenia and Latvia, road risk was halved between 2012 and 2022. Yet, comparisons between countries are difficult because of the differences in methods of collecting travel data on rural roads.

Figure 8. Road deaths per billion km travelled on rural roads in 2022 and 2012 for comparison.
(1)2012, 2021



1.6 CAR PASSENGERS AND VULNERABLE ROAD USERS ON RURAL ROADS

On average across the EU27, 56% of people killed on rural roads are car passengers or drivers (Fig. 9).

The proportion between PIN countries varies, however. In Bulgaria, Finland, Lithuania and Luxembourg more than 65% of people killed on rural roads are car passengers or drivers. On the other hand, in Slovenia, the Netherlands, Switzerland and Estonia the proportion is below 40%. It is important to consider that the proportion of vulnerable road users can also depend on powered two-wheeler (PTW) traffic volumes.

In the EU27, 35% of road deaths on rural roads are vulnerable road users, of which 20% are PTW riders or passenger, 9% are pedestrians and 8% are cyclists.

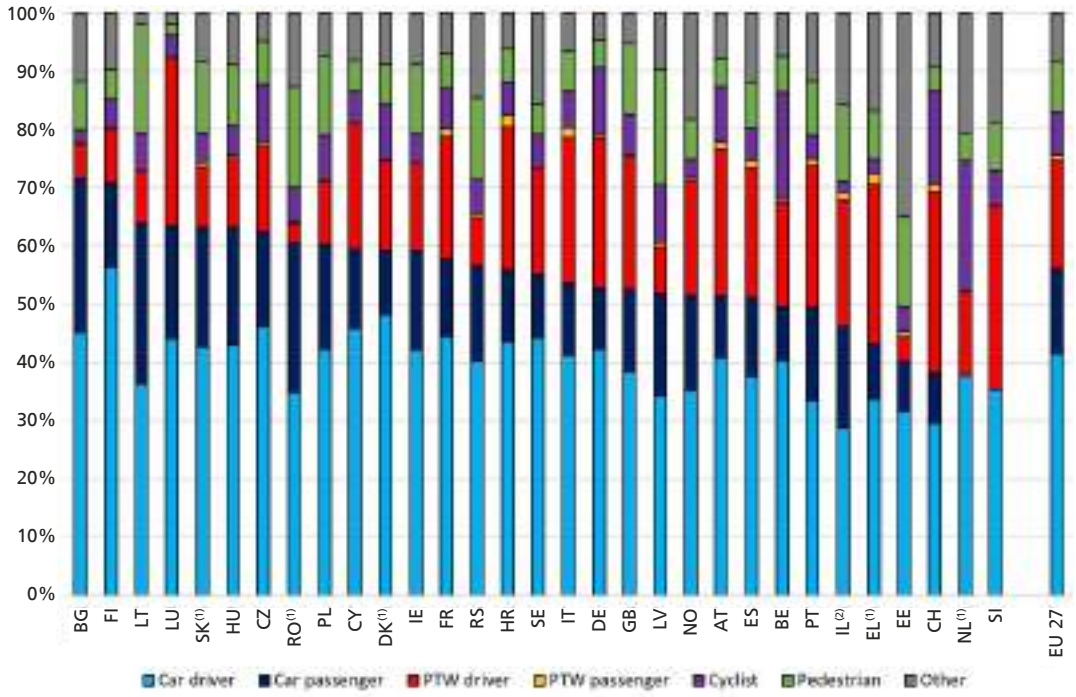
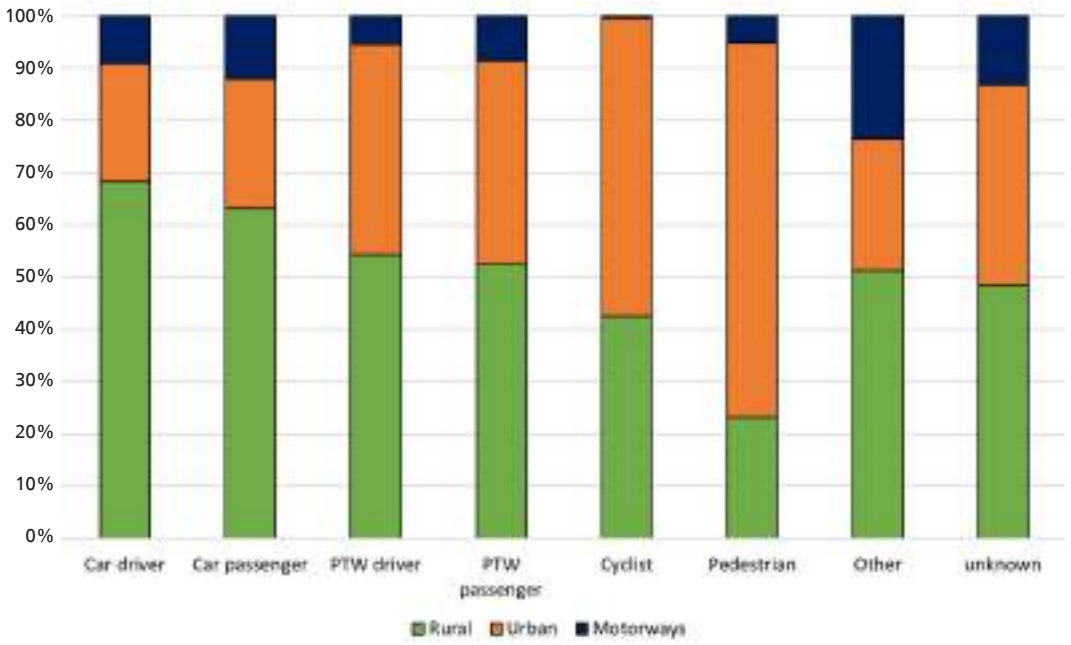


Figure 9. Proportion (%) of road deaths by road user group on rural roads ranked by the share of car driver and passenger road deaths taken together (2020-2022 average). (1)2019-2021, (2)IL – data includes rural roads, motorways and off-road crashes.[11] EU average calculated for the period 2019-2021.

Among all those killed on roads across the EU27 (average years 2020-2022), higher proportions of car occupants are killed on rural roads (68% and 63% of car drivers and passengers respectively), compared to urban areas (23% and 25% of car drivers and passengers respectively) or motorways (9% and 12% of car drivers and passengers respectively) (Fig. 10). The same applies to PTW riders, with 54% and 53% of PTW riders and passengers respectively killed on rural roads. On the other hand, a higher proportion of cyclists and pedestrians is killed in urban areas. In fact, 57% of cyclists killed and 72% of pedestrians killed, are killed in urban areas. 43% of cyclists killed and 23% of pedestrians killed, are killed on rural roads. 5% of all pedestrians killed, are killed on a motorway. It is likely that this can be understood from the proportion of distance travelled by these road users and the higher speeds of cars and PTWs on rural roads as compared to urban roads.

[11] Off-road crashes are collisions that mainly happen outside urban areas.

Figure 10. Proportion (%) of road deaths by road user group and road type in the EU27 (average 2019-2021)

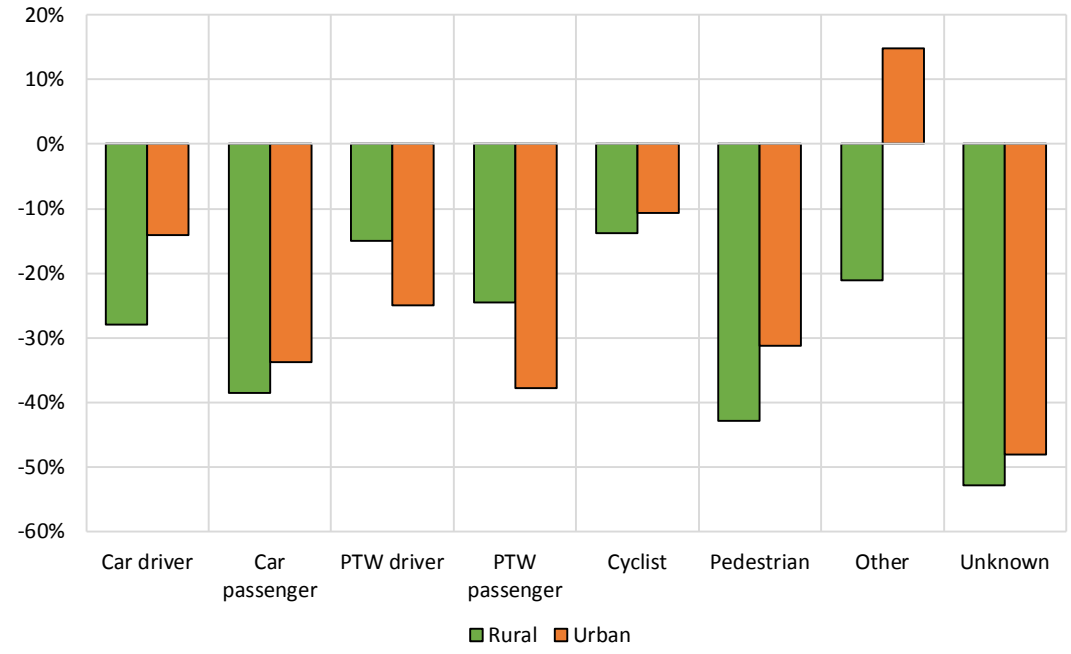


Since 2012, road deaths on rural roads saw a reduction for all categories of road users (Figure 11).

The highest reduction can be observed for pedestrians – 43% fewer pedestrians were killed on rural roads in 2021 compared to 2012.

For car passengers and car drivers the reductions are 38% and 28% respectively. At the same time, on urban roads, the biggest reduction in road deaths has been for PTW passengers (-38%), followed by car passengers (-34%) and pedestrians (-31%).

Figure 11. Reductions in road deaths on rural and urban roads by road user group in the EU27 between 2012 and 2021



1.7 RURAL ROAD DEATHS TAKING INTO ACCOUNT THE MAIN OTHER PARTICIPANT IN THE COLLISION

The three most common collision scenarios on rural roads are collisions where the main opponent is a car, a (light or heavy) goods vehicle, or where no other vehicle is involved (Fig. 12). According to data available in the EU CARE database, in 2021 in the EU27, 3,779 people were killed in a collision involving a car as the other vehicle on rural roads, accounting for 36% of all road deaths on rural roads (the proportion of crashes involving a car as the other vehicle for all other roads is 41%).

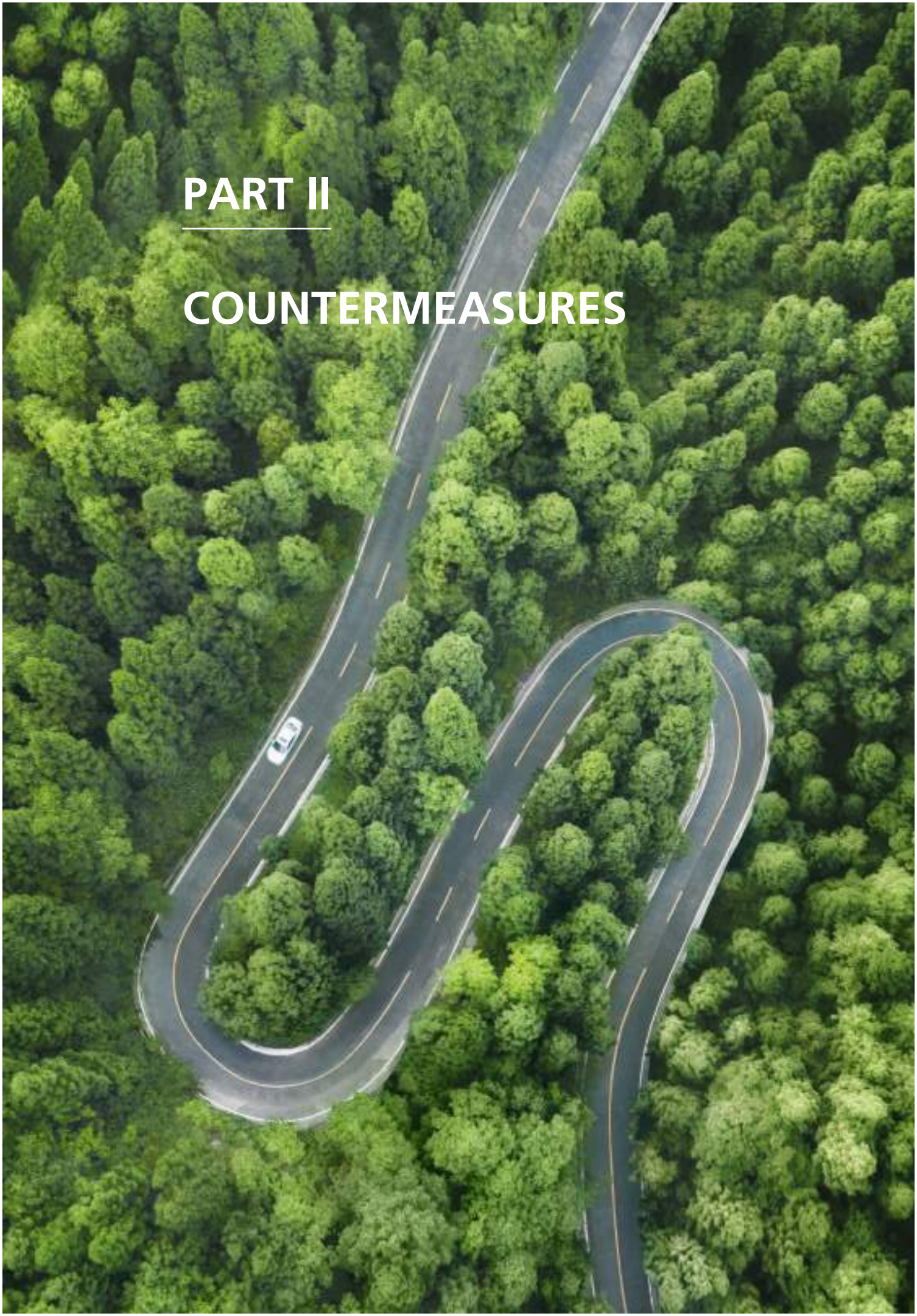
About 50% of all people killed in a collision with a car on a rural road were vulnerable road users, of which 26% were pedestrians or cyclists (the proportion is 56% for deaths on all other roads). 3,838 road users died on rural roads with no other vehicle involved, accounting for 37% of all rural road deaths (the proportion is 28% for deaths on all other roads). The majority of these are car occupants. 2,234 people were killed in a collision involving a goods vehicle (as the other vehicle), accounting for 21% of all rural road deaths (22% for deaths on all other roads).

Single vehicle collisions have a tendency to be more underreported than multiple vehicle collisions. Single bicycle collisions are particularly prone to be underreported in police records.[12]

Fatalities — In a collision with...	Pedestrian	Cyclist	Moped	PTW	Car	LGVs + HGVs	Bus or Coach	Other	No other vehicle	Total
Pedestrians		3	1	16	573	178	8	33		812
Cyclists	2	26	2	17	425	149	14	25	154	814
Moped Occupants	0	0	3	3	121	25	1	5	67	225
PTW Occupants	5	5	3	52	792	242	4	55	702	1860
Car Occupants	4	4	2	13	1679	1371	70	182	2549	5874
LGVs + HGVs Occupants	1	1	1	0	118	215	7	30	229	602
Bus or Coach Occupants	0	0	0	0	0	15	1	3	1	20
Other	1	1	0	2	71	39	2	10	136	262
Total	13	40	12	103	3779	2234	107	343	3838	10469

Figure 12. EU27 rural road deaths by travel mode (rows) in 2021 taking into account the main other participant (columns) in the collision. Methodological note: the data cover deaths in single-vehicle collisions and collisions involving one or more road users. For the majority of fatal collisions, only one other vehicle is involved in the collision. For multi-vehicle collisions, the 'main vehicle' is the heaviest of the vehicles involved as this tends to be responsible for the most serious consequences. As a result, the figures in each column likely underestimate the number of cases a particular vehicle was involved in a collision. Source: EU CARE database. 2022 data are not yet available.

[12] Schepers, P., Stipdonk, H., Methorst, R. & Olivier, J. (2017). Bicycle fatalities: Trends in crashes with and without motor vehicles in the Netherlands. Transportation Research Part F: Traffic Psychology and Behaviour, vol. 46, p. 491-499. http://bit.ly/2MUH998



PART II

COUNTERMEASURES

02

Due to the risks imposed by high speeds, multifunctionality, lower infrastructure safety and the mix of different road users travelling at different speeds, rural roads are often dangerous roads with relatively high risk levels compared to motorways.[13]

Deaths on rural roads can be prevented through a combination of well-known and cost-effective measures including setting safe speed limits and enforcement, safe road design and safe infrastructure management. New vehicle technologies also offer options to enhance safety.

The Directive 2019/1936 of the European Parliament and of the Council published in October 2019 promotes the application of the principles of infrastructure safety management not only to the Trans-European Road Network but also to other primary rural roads and motorways where many more die. The Directive introduces more transparency, a network-wide risk assessment[14] and strengthens the requirements to protect vulnerable road users. The Directive also requires the European Commission to look at the possibility of creating guidelines for road markings and signs in order to ensure they can be detected by automated and assisted driving systems – a cost benefit analysis was undertaken but little progress has been made to date on reaching an agreement on this front.

ETSC had been calling for all main urban and rural roads to be covered by the Directive, but this was not taken up. Moreover, road authorities will be able to designate some 'low-risk' roads, or roads with little traffic that are excluded from the legislation.

2.1. INFRASTRUCTURE

According to the Safe System approach, infrastructure which is adapted to the type of traffic that uses it is an essential component in preventing death and injury.

Shortcomings in infrastructure are a contributory factor in collisions on rural roads.

Some of the most common unsafe features of rural road infrastructure include a lack of separation between the different directions of traffic, obstacles in the roadside area, as well as inappropriate curve design. Research in France[15] found that 38% of all road deaths occurring on single carriageway roads outside urban areas occurred on the top 10% of these roads when ranked according to traffic volumes or their strategic importance. On these roads, a relatively comfortable road layout favours traffic but the necessary protections (a central reservation or overtaking limitations, traffic calming layouts at intersections, provision for cyclists and pedestrians) are often not in place. As a result, they account for a higher share of casualties than the share they represent in kilometers.

EU legislation exists to help Member States carry out road safety audits and a EU Key Performance Indicator will measure the progress of Member States towards improving the safety of their road infrastructure design. Road design concepts such as self-explaining and self-enforcing roads seek to reduce the number of collisions on the whole road network.

[13] Vadeby, A., (2016) Traffic safety effects of narrow 2+1 roads with median barrier in Sweden, http://tinyurl.com/4h86ku2f
[14] European Commission webpage: Road infrastructure guidelines http://tinyurl.com/3t3xn9vu
[15] ONISR (2019) Accidents stakes on the main network of rural single carriageway roads http://tinyurl.com/3r4ydxys

Self-explaining and self-enforcing roads are concepts of road design that seek to reduce the number of collisions on the whole road network. Self-explaining and self-enforcing roads seek to prevent driving errors and aim to prevent motorists from committing traffic offences.

2.1.1 EU Infrastructure Safety Directive

The EU Road Infrastructure Safety Management (RISM) Directive requires governments to carry out regular road safety audits, identify high-risk sites and prioritise safety when building new roads. The revised EU Road Infrastructure Safety Management Directive, which came into force in 2019, has extended the scope of the original legislation to beyond the trans-European transport network roads (TEN-T) and now includes all motorways, primary roads and roads outside urban areas that have received EU funding and do not serve properties bordering them. This change helps to educate regional road authority staff about the RISM Directive tools and the management of road safety deficits on the network under their management.

In addition, a new network-wide road safety assessment has been introduced and the requirements to protect vulnerable road users, including users of PTWs, have been strengthened.

The extent to which this legislation applies to rural roads in the EU can be found in Table 1. The proportion of the TEN-T network that is rural roads (excluding motorways) ranges from below 10% in Sweden (5%) and Austria (6.9%) to above 90% in Finland (99%), Estonia (94%) and Latvia (93%).

In terms of the proportion of primary roads that are also rural roads and not motorways, this ranges from below 5% in France (0.4%), and Latvia (3%) to almost 80% in Ireland and Lithuania.

These tables suggest that EU Member States face a considerable challenge in assessing, analysing and investing in upgrades to their rural road infrastructure to meet the extended scope and new requirements (e.g. Network Wide Assessment) of the revised RISM and the revised TEN-T regulation requirements.

According to the timetable set out in the RISM Directive, EU Member States have until this year to carry out their network-wide assessment and create safety categories to classify roads. Member States will need to report on the outcomes of these activities to the European Commission and update their national guidelines to reflect the new RISM requirements by the end of 2024. These undertakings will require significant resources to accomplish. The following step of actual upgrades to infrastructure to meet the required safety standards, will require a substantially greater investment.

	What length of rural roads, excluding motorways, fall under the TEN-T network? What proportion of the TEN-T network is rural roads?		What length of rural roads, excluding motorways, fall under the definition of Primary roads? What proportion of all rural roads are Primary roads?		What length of rural roads, excluding motorways, fall under Definition 3[16]? What proportion of all rural roads are Definition 3 roads?	
	Length (km)	Proportion	Length (km)	Proportion	Length (km)	Proportion
AT	127	7%	500			
BE (Flemish region)	116	84%				
CY	140	34%[17]	20	7%		
CZ			4,148	11%		
DE			40,000	6%		
EE	1,218	94%	1,520	9%		
FI	4,300[18]	99%	5,600[19]	8%		
FR (1)	1,736	22%	3,288	0.4%		
FR (2)	1,736	22%	29,745	4%		
IE	1,171	51%	775	79%		
IT	2,656	27%	1,513	15%	1,143	12%
LV	1,557	93%	1,602	3%	0	0%
LT	1,505	69%	1,193	79%		
SE	5,657	5%	7,910	7%	107,053	93%
SK	775	51%	3,337[20]			
CH	158	47%	271	42%		
NO	3,998	82%				

Table 1. Extent to which the RISM directive applies to rural roads in PIN countries
FR(1): National road network operated by the State. Source: Ministry of transport
FR(2): Network operated by county councils and communities - Source: ONISR estimates.

Data source: PIN Panellists

Beyond the requirements of the RISM directive, Table 2 shows that the majority of countries that were able to provide data for this report also apply the tools of the RISM Directive to rural roads that do not fall under its scope. 13 PIN countries reported that they apply road safety audits to roads that do not come under the scope of the RISM Directive. On the other hand, only 9 PIN countries reported applying the network-wide road safety assessment tool. Network-wide road safety assessments were introduced in the revision of the RISM Directive in 2019. New guidelines on how to carry out these assessments were published by the Commission in 2023.[21]

[16] Definition 3: Roads and road infrastructure projects not falling under the definition of TEN-T network and Primary roads which are situated outside urban areas, which do not serve properties bordering on them and which are completed using Union funding, with the exception of roads that are not open to general motor vehicle traffic, such as bicycle paths, or roads that are not designed for general traffic, such as access roads to industrial, agricultural or forestry sites.

[17] CY: if we include the proposed network that is part of the TEN-T, the proportion is 30%

[18] FI: TEN-T comprehensive network excluding motorways and urban areas.

[19] FI: RISM Directive network: TEN-T comprehensive network and arterial routes defined by a Decree on arterial roads, excluding motorways and urban areas. *Note: The length of only arterial routes excluding motorways and urban areas is 4580km (part of the TEN-T network is not included in the arterial roads).*

[20] SK: all roads including urban roads.

[21] European Commission, Road infrastructure guidelines, New EU-wide guidelines to assess safety of road infrastructure, http://tinyurl.com/3t3xn9vu

Table 2. Application of the tools of the RISM Directive to roads outside its scope

	Are you applying any of the tools below to rural roads not included within the scope of the RISM directive?			
	Road safety impact assessment	Road safety audits	Road safety inspections	Network-wide road safety assessments
AT			Only for pilot projects	
BE (Flemish region)	NO	NO	YES, on demand	YES, through high-risk site management programme
CY	NO	NO	NO	NO
CZ	NO	YES, in case of co-financing from the State Fund for Transport Infrastructure (SFDI) programme Safety on Class II and III roads[22]	YES, on demand	NO
DE	YES	YES	YES	YES
DK	YES	YES	YES	NO
FI	YES	YES	NO	NO
FR[23]	YES	YES	YES	YES
EL	NO	YES	YES	NO
IE	YES	YES	YES	YES
IT[24]	NO	NO	NO	NO
LV	NO	YES	NO	NO
LT	YES	YES	YES	YES
PT[25]	YES	YES	YES	YES[26]
SE	YES	YES	YES	YES
SK	NO	NO	NO	NO
CH	YES	YES	YES	YES
NO	YES	YES	YES	YES

Data source: PIN Panellists

[22] Both Class II and Class III roads are owned by the regions. Class II roads provide connections important for the regions, have a total lane and shoulder width of 7.5-9.5m and a design speed of 50-80km/h, Class III roads provide services to settlements not served by higher class roads, have usually a road width including shoulder of 4-7.5m and a design speed of 30-70km/h.

[23] FR: for National road network operated by the State.

[24] IT: In Italy, Anas (the body managing the road network of national interest) has started carrying out inspections using the iRAP methodology on roads outside urban areas that do not fall within the RISM field of application. Around 750km of roads have already been inspected, partly with the support of ACI (Automobile Club of Italy).

[25] PT: Road safety impact assessment and road safety audits are mandatory for all roads of the National Road Network. They are not applied to municipal and other roads. Network-wide road safety assessments and road safety inspections are mandatory for roads under the RISM Directive only.

[26] EuroRAP 5,000km 2020, http://tinyurl.com/3j73ekdw

2.1.2 EU Key Performance Indicators

Key Performance Indicators (also referred to as Safety Performance Indicators in some countries) can give a more complete picture of the level of road safety than just numbers of road deaths and serious injuries and can help to detect the emergence of problems at an earlier stage.[27] The EU's Road Safety Policy Framework 2021-2030 introduced, for the first time, a list of Key Performance Indicators (KPIs) which will be used to measure overall road safety performance. The KPIs were further detailed in the EU Strategic Action Plan on Road Safety.[28]

In an initial phase, the EU chose eight KPIs which will form the basis for monitoring progress in joint road safety work at EU, Member State, regional and local levels. The long-term goal is to collect comparable data, bearing in mind that some differences in national rules will constrain comparison for some indicators. Countries outside the EU may well find it helpful to adopt or adapt these KPIs and follow the EU monitoring and thus benefit from the experience gained by the participating Member States. Indeed, through the WESTBELT project (a project of Technical Community), some Western Balkans Regional Partners have already started collecting road safety KPIs on seatbelts and child restraint systems using a methodology derived from the EU methodology.

THE EIGHT EU KPIs ARE:

1. Percentage of vehicles travelling within the speed limit;
2. Percentage of vehicle occupants using the safety belt or child restraint system correctly;
3. Percentage of riders of powered-two-wheelers and bicycles wearing helmets;
4. Percentage of drivers driving within the legal limit for blood alcohol content (BAC);
5. Percentage of drivers not using a handheld mobile device;
6. Percentage of new passenger cars with a Euro NCAP safety ranking equal or above a predefined threshold;
7. Percentage of distance driven over roads with a safety rating above an agreed threshold;
8. Time elapsed in minutes and seconds between the emergency call following a collision resulting in personal injury and the arrival at the scene of the collision of the emergency services.

The EU KPI relating to infrastructure therefore concerns the 'percentage of distance driven over roads with a safety rating above an agreed threshold'. No methodology for collecting the data was prescribed by the Commission nor was a threshold defined. As a first effort towards producing values for all the EU Road Safety KPIs, the 'Baseline' project, supported by the European Commission and coordinated by the VIAS Institute, was launched in 2020.[29] 18 Member States participated in the project. Each participating country provided between one and eight national KPI values, across all the EU KPIs, that were comparable across countries and which met the minimum methodological requirements of the European Commission.

Six EU Member States provided data for the KPI on infrastructure safety: Finland, Latvia, Lithuania, Malta, Portugal and Sweden. The Baseline report on the infrastructure KPI believes the relatively low number of Member States providing values for this KPIs suggests the indicator is seen as 'problematic'. The report also suggests that comparability between Member States could be improved by adopting a common EU classification of roads.[30]

Within the 'Trendline' project[31] (follow-up to the Baseline project), the methodological guidelines for the Infrastructure KPI were revised to include a reference to the EGRIS Network Wide Assessment (NWA) proactive methodology as developed within the scope of the RISM Directive.[32]

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[27] ETSC (2018), Briefing: 5th EU Road Safety Action Programme 2020-2030, https://bit.ly/2LuTDBW
[28] ETSC (2019), Briefing EU Strategic Action Plan on Road Safety, https://bit.ly/36Ua5Xe
[29] Baseline project http://tinyurl.com/yj8z7nb8
[30] Ibid
[31] https://trendlineproject.eu/
[32] Dragomanovits, A. & Van den Berghe, W. (2023). KPI Infrastructure Methodological Guidelines. Report produced as part of the Trendline project, supported by the European Union. http://tinyurl.com/2a8z6mex

For this report, 12 PIN countries (AT, CZ, EE, FR, HR, LV, LT, NL, PT, SE, SI and RS) report that they are collecting data on the EU Infrastructure KPI. 6 PIN countries (AT, FR, EL, SE, SI and RS) also reported having a target linked to the EU Infrastructure KPI (See Table 3).

Table 3. PIN countries collecting data for the EU Infrastructure KPI and national infrastructure KPIs and targets

	Infrastructure KPI	Infrastructure KPIs and Target
AT	YES	EU KPI - % of distance driven over roads with a safety rating above an agreed threshold. Targets: • Motorways and expressways: 1 road death per billion km (currently: 1.6 road deaths per billion km) • Rural roads: 5.6 (currently 9.3 road deaths per billion km) • Urban roads: 5.0 (currently 5.1 road deaths per billion km) Safety Rating – as soon as data are available: Indicator showing the safety related quality of road sections – including roadsides
BE	n/a	
BG	NO	
CY	NO	
CZ	YES	EU KPI - % of distance driven over roads with a safety rating above an agreed threshold.
DE	NO	
DK	NO	
EE	YES	The road safety strategy 2016-2026 has 4 qualitative indicators for infrastructure safety: 1) Installation of an additional median barrier on a national road (km) 2) Installation of an additional roadside barrier on a national road (km) 3) Kilometres of additional central line rumble strips on a national road 4) Additional kilometres of pavements and cycle paths on local roads
ES	NO	n/a
FI	tbd	n/a
FR	YES	Target: 26.12% of motorised traffic is on motorways or dual carriageways of the trunk[33] road network
EL	NO	Target: 80% of TEN-T network with ≥3 stars i-RAP/EC (baseline year: 50% estimation to be confirmed after the network-wide road safety assessment)
HR	YES	n/a
HU	tbd	n/a
IE	NO	EU KPI - % of distance driven over roads with a safety rating above an agreed threshold (to be developed further in EU discussion)
IT	tbd	Under discussion
LU	n/a	n/a
LV	YES	No target
LT	YES	No target
MT	NO	n/a

[33] National road network operated by the State.

NL	YES	The infrastructure KPI is split into three sub-indicators: safe roads, safe cycling infrastructure and safe intersections: Safe roads – proportion of motorised vehicles driving on roads considered 'sufficiently safe' Safe cycling infrastructure – proportion of cyclists using cycling infrastructure considered 'sufficiently safe' Safe intersections – proportion of road users at intersections considered 'sufficiently safe' The definitions of 'sufficiently safe' are described in the 'Safe infrastructure' background document.[34]
PL	NO	
PT	YES	The National Road Safety Plan - Vis o Zero 2030 – includes 4 KPIs related to infrastructure inside and outside urban areas. For roads outside urban areas they are: • Percentage of the road network length either with median barrier or with a speed limit equal to or lower than 70km/h. • Percentage of the road network with forgiving roadsides. • Percentage of pedestrian and cyclist crossings treated according to the Safe System principles in relation to the total number of pedestrian and cyclist crossings. • Percentage of road intersections treated according to the Safe System principles in relation to the total number of road intersections.
RO	NO	
SE	YES	The national infrastructure KPIs are: • The share of traffic volumes on roads with median barriers, on the national road network and with speed limits between 90 –120km/h. The target for 2030 is 96%. • The share of traffic volume on roads with median barriers, on the national road network with speed limits between 80 –120km/h. The target for 2030 is 70%
SI	YES	National infrastructure related KPIs (2023-2030): • Number of collisions with deaths and serious injuries per billion kilometres driven on the national road network. The target is 140 between 2028 and 2030, down from 360 between 2018 and 2020. • Number of road safety analyses carried out (for all collisions with deaths and for those collisions with serious injuries where there is a suspicion that the cause lies in the infrastructure) and measures implemented to eliminate the irregularity. ‣ The target for analyses made is 83 by 2025, 63 by 2028 and 50 by 2030. The baseline value of 17 analyses was taken from year 2022 • Number of stretches of road where speed is measured by 'time over distance' cameras. ‣ The target is 10 by 2030 up from 0 in 2022.
SK	NO	n/a
UK	n/a	n/a
GB	NO	n/a
CH	NO	n/a
IL	NO	n/a
NO	NO	n/a
RS	YES	National infrastructure KPI: The percentage of motorways that meet the strictest road safety requirements, i.e. with a safety rating of 60% or above. The target is defined in the National Road Safety Strategy 2023-2030, by year: 2025 (85%); 2028 (90%) and 2030 (95%).

Data source: PIN Panellists

[34] Kennisnetwerk SPV (2023) Veilige infrastructuur (in Dutch) http://tinyurl.com/bddx6h65

2.1.3 Self-explaining and self-enforcing roads

Self-explaining and self-enforcing roads are concepts of road design that seek to reduce the number of collisions on the whole road network. Self-explaining and self-enforcing roads seek to prevent driving errors and aim to prevent motorists from committing traffic offences.

Following the revision of the EU RISM Directive, this concept is now included in EU legislation and guidance on the design of 'forgiving roadsides' and 'self-explaining and self-enforcing roads' is being developed by the European Commission, with Member State experts.

The concept of self-explaining roads rests on a functional classification of the road network elements, and on a clear differentiation of infrastructure characteristics applied to each road category. The objective of self-explaining road design is that different classes of roads should be distinctive in design and function and, within each class, features such as the width of the carriageway, road markings, signing and use of street lighting should be consistent throughout a route. The self-explaining road concept is inherent in the design of the highest and safest road class – motorways. Yet on rural roads, which are the most dangerous given their characteristics, consistency in design is often lacking, and progress towards it will take time and substantial investment because of the extent and variety of the inherited road network to be adapted.

The layout of self-enforcing roads aims to prevent road users from driving at inappropriate speeds and undertaking inappropriate driving manoeuvers. Self-enforcing roads employ engineering measures such as alignment, markings, road narrowing, rumble-strips, chicanes, and road humps. One example of how engineering measures can be used to create a self-enforcing rural road can be found in southern Sweden where different speed restriction measures including road narrowing, gateways and chicanes were placed on rural roads, evaluated and found to work well at reducing speeds. Controlling for the minimum radius of the measure and the speed limit, the report found that road narrowing outperforms both Gates and Chicanes, with them having 16% and 30% higher speeds respectively.[35] Further research showed that the average speed reduction across all the sites covered by the study produced a mean speed 4.9km/h below the speed limit.[36] Rumble strips milled into the hard shoulder have also been proven to be an effective measure for reducing 'run off the road to the right' collisions, the most frequent type of collision involving serious injury on rural roads.[37]

[35] Hammad, S., Johnsson, C., Laureshyn, A., & Nor n, H. (2023), Evaluation of speed-enforced measures on rural roads. https://tinyurl.com/mv72xsjv

[36] Ref. Johnsson, C. and Laureshyn, A (2024), Speed-securing measures on rural roads in Sweden: an observational study [Unpublished manuscript], Transport and Roads, Lund University.

[37] Sicherheitswirkung, Dauerhaftigkeit und L rmemission von eingefr sten R ttelstreifen. [Safety effect, durability and noise emission of milled rumble strips.] Bericht zum Forschungsprojekt F1100.61108009 der Bundesanstalt f r Strassenwesen BASt. http://tinyurl.com/mpa6ckkz

Image 1: Gateway

Image 2: Road narrowing

Image 3: Chicane

CZECHIA

In Czechia, a study investigated the differences between the design of horizontal road markings in curves on regional roads. The study found that a higher proportion of drivers did not encroach on the opposite carriageway when there was only a centerline between lanes compared to when there were only edge lines. When edge lines were installed on the right-hand curves (in the direction of travel), a significant decrease in speed was observed.[38]

Significant changes in the speed of vehicles before or during curves show that the arrangement does not correspond to a self-explaining and forgiving road when the driver is forced by its arrangement to suddenly change their behaviour to avoid a collision.[39] [40]

Image 4. Photos to illustrate road markings
Image taken from the article How does road marking in horizontal curves influence driving behaviour? European Transport Research Review, Full Text (springeropen.com)

Example photographs of Czech rural road marking scenarios (adapted from Mapy.cz)

[38] Havr nek, Pavel, Robert Zůvala, Jakub Špaňhel et al. (2020) How does road marking in horizontal curves influence driving behaviour? http://tinyurl.com/anh337uh
[39] Ambros, Jiř , Veronika Valentov (2016) Identification of Road Horizontal Alignment Inconsistencies – A Pilot Study from the Czech Republic. http://tinyurl.com/54e7xm5n
[40] Ambros, Jiř , Veronika Valentov , Ondřej Gogol n et al. (2017) Improving the Self-Explaining Performance of Czech National Roads. http://tinyurl.com/2k2m25a2

FINLAND
GUIDELINES FOR SAFE ROADSIDE INFRASTRUCTURE

Guidelines for safe roadside infrastructure on new roads and also guidelines on how to improve roadside safety on existing roads have been available in Finland since the 1990's.[41] In order to achieve a safe forgiving roadside on every main road, the focus has been on improving the existing road environment. Guidelines on how different hazardous obstacles could be cost-effectively shielded, removed or changed to render them 'crash safe' are available. For instance, the guidelines cover issues such as how to change existing safety barriers into 'crash-safe' barriers that fulfill the requirements of the EN-standards, what are the requirements for lighting columns on public road network and when should rumble strips be used on hard shoulders.

Consequently, over the years, hazardous roadside obstacles in the road environment have been consistently either removed, protected with new safety barriers, or changed to crashworthy ones, e.g. safe lighting poles. In addition, old road barriers that have not been tested in crash tests have either been renewed or modified to be crash-safe. In addition, following the requirements of the RISM Directive, hazardous obstacles on the main road network have been inventoried and will form one of the main classification criteria of the network wide road safety assessment.

SPAIN
PREVENTION OF COLLISIONS WITH WILD ANIMALS

Collisions involving wild animals have been increasing in recent years in Spain, largely due to the increase in the wildlife population. The Ministry of Transport has established a procedure to be applied to the national road network (RCE: Red de Carreteras del Estado) to identify those sections of road with a higher number of incidents involving animals. Appropriate countermeasures such as specific warning signs to drivers, wildlife crossings, fencing maintenance, are concentrated on these sections. To date, 136 sections have been identified with the majority being on rural roads.[42]

2.1.4 Infrastructure for motorcycle safety

Bearing in mind that average collision rates are higher on horizontal curves than on straight sections of rural two-lane roads and collision rates increase the tighter the curve,[43] in the rural Tyrol region of Austria road markings were placed on curves as part of a 2016 study to assess the effects of special road marking on PTW driving lines and collision occurrences. During the study, special road markings (ellipse- and bar-shaped markings – see Image 5.) were applied at 8 selected sites with the aim of influencing the choice of driving line by motorcyclists through bends.

[41] Finland's guidelines for road cross-section planning (in Finnish) - http://tinyurl.com/4mz4f7pf and Finland's guidelines for road railing design (in Finnish) http://tinyurl.com/4mz4f7pf

[42] Sections with a special frequency of road incidents involving animals (TEFIVA) in the RCE http://tinyurl.com/5t4tpt7y

[43] Goldenbeld, C., Schermers, G., van Petegem, J.W.H (2017), Low curve radius, European Road Safety Decision Support System, developed by the H2020 project SafetyCube. Retrieved from www.roadsafety-dss.eu on 11/01/2024. http://tinyurl.com/49dzjdkm

Image 5: special road marking on PTW driving lines
© KFV (Kuratorium f r Verkehrssicherheit), Austria

An analysis that was carried out during the three years before and after the introduction of the road markings found that the number of collisions with personal injury at the eight sites decreased from 12 before, to seven after the application of the road markings.[44]

A significant shift in the driving lines of motorcycle riders at the crown of the bend from the inside to the outside of the lane after the introduction of the special markings was also identified. A subsequent study carried out in 2020 confirmed these original results.[45]

Similar results were also found in Scotland where 'gateway' road markings and associated information signage aiming to help motorcyclists adapt their riding on approach to a bend were trialed at twenty-two sites covering 750 square miles. During the three years of the project, researchers found that at the trial sites there was a significant reduction in the speed of motorcyclists, a significant improvement in the road position both on the approach and apex of the bend and a significant improvement in braking behaviour. Additionally, since the start of the trials there have been no motorcycle injury collisions at any of the previously identified collision cluster sites where the markings had been deployed.[46]

In Slovenia, a curve of rural road was used as a test site for seeing how improved signage and road re-design could reduce the speed of motorcyclists. In the 14 years before the project there had been 17 collisions on the selected section of road. 14 had been attributed to excessive speed and 3 to the vehicle being on the wrong side of the road. After red/white elements were added to road safety barriers the average speed in the curve, for both cars and motorcycles, was reduced on average by 11%.[47]

In Spain, pilot tests installing road markings and explanatory signage to help PTW users safely navigate dangerous curves have also been carried out. The markings aim to help the user decide on the best position within their lane to achieve the safest route along the curve.

[44] Presentation by Martin Winkelbauer, at an online event Reducing road deaths among motorcycles on the 13th of December 2023, http://tinyurl.com/4dnbhst6
[45] KFV (2021), Special road markings for motorcycle traffic (in German - Sondermarkierungen Motorradverkehr) https://bit.ly/3k5TvP6
[46] Stedmon, A.W. (2022). Safeguarding Vulnerable Road Users: Motorcycle Safety in Scotland using Applied Psychology to Influence Rider Behaviour - Summary Report of PRIME Road Marking Trials 2020 to 2022. http://tinyurl.com/y3hvev43
[47] BRUMEC, U., et al Challenges to reduce speed of motorcycles in Stari log curves. http://tinyurl.com/3fxrmj8m

In France, the 'safe trajectory'[48], i.e. the safest place for a motorcyclist to be and look when taking a left hand or right hand curve, is taught as part of driver licence training as well as during refresher events. A reduction in speed is also a crucial element of the 'safe trajectory'. (Figure 6)

Image 6 'Safe trajectory' taught in France during driver licence training and at refresher courses

SWEDEN
THE EXPERIENCE OF '2+1 ROADS' IN SWEDEN

Since 1998 Sweden has embarked on a large programme of converting traditional 13m wide single rural roads into so-called 2+1 roads. A 2+1 road consists of two lanes in one direction of travel and one lane in the opposite direction. In each direction, the two-lane section, which provides a safe overtaking zone, alternates with a one-lane section at intervals of approximately 2km. Vehicles travelling in opposite directions are separated by a wire rope system, which prevents overtaking manoeuvres on the one-lane section.[49]

Image 7. Swedish 2+1 road

Sweden has about 5000km of roads with separated traffic flow, covering about 45% of the traffic flow on national rural roads. 2700km of these are 2+1 roads. An evaluation study carried out in 2009[50] found that road deaths were reduced by up to 76% following the upgrade to 2+1 roads. The risk of being killed (deaths/vehicle-km travelled) on '2+1 roads' was found to be about the same as that on motorways with a speed limit of 110km/h. In addition, the evaluation found that, in contrast to what motorcyclists feared, there was no increase in collisions involving motorcyclists. On the contrary, the risk for motorcyclists decreased, in part because of median barriers which prevented motorcyclists from colliding with opposing traffic.

Since 2009, the 2+1 road solution has also been applied to narrower rural roads, measuring 9–10m wide. An evaluation of the traffic safety effects of these narrow 2+1 roads was carried out in 2016. For almost all of the studied roads, the speed limit was raised from 90km/h to 100km/h when the road was rebuilt. The evaluation found that the total number of deaths and seriously injured decreased by 50% after the introduction of the 2+1 solution on narrower roads.

Sweden has set a target that by 2030 70% of total traffic volume would occur on roads with median separation with speed limits between 80 and 120km/h. At the end of 2022, this figure already stood at 65%.[51]

[48] The 'Safe Trajectory' http://tinyurl.com/bdekz3ys
[49] Breen, J.et al. (2008), An independent review of road safety in Sweden. http://tinyurl.com/3dttnzm5
[50] Carlsson, A. (2009) Evaluation of 2+1 roads with cable barrier. VTI Report 636A. English summary available. http://tinyurl.com/yu9jp2vc
[51] Hurtig, P., et al (2022) Analysis of Road Safety Trends. http://tinyurl.com/yj8n983u

FINLAND
WINTER MAINTENANCE GUIDELINES REDUCE COLLISIONS

In 2019, Finland brought in winter maintenance guidelines[52] for rural road. The new guidelines focus in particular on the safety and reliability of heavy goods transportation. The level of winter maintenance provided to a road varies. On roads with high volumes of heavy goods traffic, the level of winter maintenance is enhanced compared to other roads. Similarly, roads with commuting traffic are also prioritised for enhanced winter maintenance. Winter maintenance measures include snow removal, antiskid treatment, clearing the view at junctions and cleaning snow from road signs. Preliminary results since the introduction of the new guidelines show that the number of collisions resulting in personal injury during the winter months and in winter weather on roads with enhanced winter maintenance has decreased more than average.[53]

GERMANY
SPOTLIGHT ON ROAD SAFETY IN RURAL AREAS

There are approximately 166,000km of rural roads in Germany. Despite a reduction in road deaths, rural roads are still the deadliest road type in Germany: they are twice as deadly as urban roads and five times more deadly than motorways. While only 25 percent of collisions occur on rural roads, they account for close to 60 percent of all road deaths. Recognising the need for urgency, safety on rural roads has been a focus for the German Road Safety Council (DVR) between 2021 and 2024.

Some examples of what DVR has been doing to improve rural road safety include making rural roads, in particular visibility on rural roads, the focus of the annual work-related travel joint campaign[54] with the German Social Accident Insurance (DGUV) in 2022; highlighting cycling in the countryside and how it contributes to the mobility transition while also presenting road safety challenges at the 2023 DVR 'Forum'[55] event; and continuing the DVR and the Federal Ministry of Transportation's joint campaign on rural roads by focussing on dangerous behaviour behind the wheel and aiming to prevent collisions with other vehicles such as agricultural vehicles or bicycles.

Ongoing at the time of writing this report, DVR is carrying out a thorough analysis of the single-carriageway B179 in Brandenburg (southeast of Berlin), viewing it as a typical rural main through-road, in order to be able to demonstrate how rural roads are used and how safe infrastructure for all road users can be developed. As part of the basic analysis, camera-based real-time data from all road users have been recorded and usage requirements and conflict situations/potential conflicts have been analysed using AI-based methods. Deficits in the road infrastructure were identified in a road safety audit. The results are being used to develop measures to improve road safety.

DVR believes that all stakeholders have a role to play in improving road safety on rural roads and all levels of government. To assist governments in their decision making, DVR has passed a number of resolutions including a commitment to reduce the speed limit to 80km/h on narrow rural roads, to increase speed enforcement and to remind people of the dangers when travelling on rural roads.

[52] Winter road maintenance guidelines (in Finnish) http://tinyurl.com/4fvpn46k
[53] Development of winter traffic safety 2015–2022 (in Finnish) http://tinyurl.com/yv74xm63
[54] http://tinyurl.com/3n5sfwt6
[55] http://tinyurl.com/7rf73at6

Most rural roads in Europe are not fit for 'gigaliners'

In the European Union, 3,310 people lost their lives in police-reported road collisions involving a Heavy Goods Vehicle (HGV) of 3.5t or above in 2018.[56] In 2018, 54% of road deaths in collisions involving HGVs occurred on rural non-motorway roads, 23% within urban areas, and 23% on motorways.[57]

54% of road deaths in collisions involving HGVs occurred on rural non-motorway roads.

Occupants of Heavy Goods Vehicles make up 12% of all road deaths involving an HGV. Car occupants represent half of all deaths in collisions involving HGVs - the largest share of any road user group. Vulnerable road users account for nearly a third (28%). Of these, 13% are pedestrians, 7% are cyclists and 8% are powered two wheeler riders (PTWs) i.e. motorcycle and moped users.

The relatively large mass of an HGV translates into a higher severity of injury for other road users involved in a collision. Data from countries that collect distance travelled by vehicle type show that fatal road collisions involving HGVs are much more frequent than those involving other vehicles. On a per-km basis, up to three times as many people die in collisions involving HGVs as die in collisions involving only non-goods vehicles.[58]

The European Commission's 2023 proposal to revise Directive 96/53 on the maximum weights and dimensions of heavy vehicles aims to lift restrictions on the cross-border transport of Longer and/or Heavier Vehicles (LHVs) without requiring them to be zero emission. This contradicts new requirements for zero emission trucks up to 44 tonnes.[59]

Typical Longer and/or Heavier Vehicles (LHVs), also known as 'gigaliners' or 'megatrucks', are truck and trailer combinations that are typically 25.25 metres in length, nearly 9 metres longer than standard lorries in Europe, and typically weighing 60 tonnes. Such vehicles are as long as six passenger cars and a little shorter than, but weighing as much as, a fully loaded Boeing 737-300.

ETSC has serious concerns about Longer and Heavier Vehicles' impact on road safety. Those 'gigaliners' have been permitted until now under strict conditions, as part of trials or special bilateral agreements, but all the impacts of wider adoption have not been fully assessed.

One of the main concerns beyond all the risks associated with HGVs within the current allowed weights and dimensions is that greater LHV circulation could lead to a faster degradation in the road infrastructure which would also require more frequent maintenance.

Operating LHVs on the existing road network would require infrastructure to be adapted to the manoeuvring capacity of those vehicles, their static and dynamic load, and their impact forces during a collision. Work zones on the roads could become particularly dangerous. Another concern arises in relation to parking, resting and re-fuelling facilities, where conflicts with other road users are likely.

[56] ETSC (2020), PIN Flash 39 How to improve the safety of goods vehicles in the EU? http://tinyurl.com/mu6fsacv
[57] Ibid
[58] Ibid
[59] 2023/0265(COD), Road vehicles: maximum weights and dimensions, http://tinyurl.com/bd7rjtht

Similarly, existing truck safety infrastructure facilities, such as runaway truck ramps (truck arrester beds), interchange ramps and weaving sections, lay-bys (which are too short, especially in tunnels) and emergency lanes are not designed for LHVs. If clearance and weights increase, the barriers on and under bridges and traffic separating barriers would generally have to be strengthened. At present roadside and lane separation barriers are built to comply with the current Weights and Dimensions legislation.

Fire safety is also a concern for all HGVs in tunnels, this would be exacerbated by LHVs. In case of roll-over crashes involving LHVs, they would be more likely to block the entire clear width of traffic lanes due to their greater length which might cause more secondary crashes.[60]

While certain advanced safety technologies, such as a new generation of blind spot detection systems, could mitigate some risks, currently available technologies would not mitigate all the risks of longer and heavier vehicles. Moreover, type approval tests are being done with HGVs within the current weights and dimensions limits, not with LHVs. Work ongoing at UNECE on the Automatic Emergency Braking requirements for HGVs is already experiencing severe difficulties in providing a satisfactory standard for interactions with pedestrians and cyclists. At present this is due for implementation in 2027 but only for pedestrians.

Other negative aspects include the visibility restriction they create for other road users, the difficulties of being safely overtaken by other vehicles and the threat to vulnerable road users in blind spot areas.

ETSC is also concerned that the free movement of 'mega-trucks' would lead to a 'reverse modal shift' shifting freight from rail or inland waterways (which have a considerably better safety record) to road.[61] This would in turn mean more trucks on the road and a rise in road deaths and injuries.

[60] ETSC (2011) Position Paper: Longer and Heavier Vehicles http://tinyurl.com/3x6mwunn
[61] CER (2023) Orientation on Weights & Dimensions of Road Vehicles http://tinyurl.com/5972h6vn

RECOMMENDATIONS TO NATIONAL GOVERNMENTS

- Improve infrastructure safety on the whole network, applying the concepts of 'self-explaining roads' and 'forgiving roadsides'.
- Implement safe intersections by applying roundabouts, (pedestrian) underpasses or physical interventions to strongly reduce speed at intersections.
- Apply the road safety impact assessment, network wide assessment, road safety audits and inspections to the rural road network and regularly review findings for action.
- When possible, separate traffic in opposite directions by a median barrier and, when needed, install side barriers.
- Where there may be cyclists and pedestrians present or the potential to attract them and taking into consideration the optimal cycling or walking route, invest in separate cycle and pedestrian facilities, on new or renewed roads always, and in retrofit elsewhere.
- Establish clear road hierarchies, which better match the use of each road to the functions that the road serves in terms of living space, access and through movement, speed limit, layout and design based on the principles of the Safe System Approach.
- Separate faster vehicles from slower ones and lighter vehicles from heavier ones, and separate vehicles that are making conflicting movements.
- When possible, build safe overtaking areas for two lane roads (following the concept of 2+1 roads as in Sweden and other countries).
- Replace dangerous intersections by roundabouts. Other intersections with or without traffic signals should provide protection for vehicles turning across the path of opposing traffic.
- Invest in high quality infrastructure features such as road markings and road signs to enable Advanced Driver Assistance Systems such as Lane Departure Warning/Keeping and Intelligent Speed Assistance to work in proper synergy.
- Divert heavy traffic, in particular trucks and buses, from rural roads nearby, especially single carriageways without median barrier, to motorways, primary or TEN-T roads with higher safety levels.
- Do not support the revision of Directive 96/53 on the maximum weights and dimensions of heavy vehicles allowing Longer and Heavier Vehicles to circulate across national borders in the EU.

RECOMMENDATIONS TO THE EU

- Set up, as planned in the EU Road Safety Strategy, a forum of European road safety auditors to facilitate exchange of experience on Safe System methodologies.
- Renew efforts for the preparation of 'common specifications' for road markings and road signs to support EU Member States within the framework of the EU Road Infrastructure Safety Directive (RISM) 2019/1936.
- Review the implementation effects of the revised RISM directive and consider further improvements in the second half of the 2020-2030 strategy period.
- In light of the EU Road Infrastructure Safety Directive (RISM) 2019/1936, prepare the technical guidance on 'road design quality requirements' for Vulnerable Road Users, 'design of forgiving and self-explaining/enforcing roads' and 'reporting of collisions and their severity'. The guidelines should be based on independent research.
- Make sure that the principle of conditionality[62] of the EU funds for road safety is guaranteed by all DGs and EU Agencies (TEN-T Agency, DG REGIO). Extend this principle to EU external aid.
- Do not support the revision of Directive 96/53 on the maximum weights and dimensions of heavy vehicles, allowing Longer and Heavier Vehicles to circulate across national borders in the EU.

[62] https://tinyurl.com/5xeef5uy

ETSC recommendations for a future revision of the Road Infrastructure Safety Management Directive (RISM):

- Support common EU curricula for auditors and inspectors, including specific training on the needs of VRUs: pedestrians, cyclists, PTWs, the elderly and road users with reduced mobility.
- Following the establishment of guidelines, establish minimum requirements for:
  - The harmonised management of high-risk sites;
  - 'Forgiving roadsides' and 'self-explaining' and 'self-enforcing' roads.
- Further disseminate the safety results of the European map to be published under the requirements of the new Directive highlighting different safety level categories to help inform citizens on route choice.

2.2. SPEEDS AND SPEED LIMITS

Around 52% of all road deaths in the EU occur on rural non-motorway roads which are often designed as single carriageways with no median barrier to separate opposing traffic flow. Due to the relatively low level of infrastructure safety, high speeds and a composition of different road users, rural roads are considered to be the most dangerous roads in terms of design.

According to the Safe System approach, safe speed limits on rural roads without a median barrier should not be higher than 70km/h and not higher than 100km/h on roads with median and side barriers.

In this context safe speed is such that 90% of the collisions that would occur at those recommended speeds would not result in a serious injury.[63] The design of these roads should also match a credible speed limit.

Rural roads are often designed for traffic travelling longer distances. Rural road speeds are therefore often well above the speeds of slow traffic such as pedestrians, cyclists and mopeds. A well-designed rural road should have separate lanes or paths for slow traffic meaning interaction between cars and trucks and slow traffic would only occur at intersections.

Standard speed limits on rural non-motorway roads vary across EU Member States (Table 4). Most of the PIN countries with a significantly lower road mortality rate than the EU average of 46 deaths per million inhabitants[64] apply 70km/h or 80km/h standard speed limits on rural roads. These countries are Norway (21 deaths per million inhabitants), Sweden (22), Denmark (26), Switzerland (28), Ireland (31), Finland (34) and Israel (37). In Sweden, for instance, the Swedish Transport Administration has a plan under which all roads with an Annual Average Daily Traffic above 2,000 vehicles per day and without median barriers should have a maximum speed limit of 80km/h.[65]

[63] SWOV (2021) Speed and speed management. https://goo.gl/y1N75r
[64] ETSC (2023) 17th Annual Road Safety Performance Index. http://tinyurl.com/5a8hsp7u
[65] Analysis of road safety trends 2022 http://tinyurl.com/yj8n983u

Table 4. Standard speed limits on single carriageway rural non-motorway roads in the PIN countries.
(1) Sweden – the default speed limit on rural roads is 70km/h, but many roads also have an 80km/h limit and some still a 90km/h limit.
(2) France – the standard 80 km/h speed limit was introduced in July 2018 on single undivided carriageways without median barrier.
(3) Spain – the standard 90 km/h speed limit was introduced in January 2019.

Single carriageway rural non-motorway roads			
70 km/h	**80 km/h**	**90 km/h**	**100 km/h**
Belgium Flanders	Cyprus	Belgium Wallonia	Austria
Sweden(1)	Denmark	Bulgaria	Germany
	Finland	Czechia	Ireland (national roads)
	France(2)	Estonia	UK (97 km/h)
	Ireland (non-national roads)	Greece	
	Malta	Croatia	
	Netherlands	Hungary	
	Switzerland	Italy	
	Israel	Luxembourg	
	Norway	Latvia	
	Serbia	Lithuania	
		Poland	
		Portugal	
		Romania	
		Slovenia	
		Slovakia	
		Spain(3)	

FRANCE
SPEED LIMITS ON RURAL ROADS REDUCED FROM 90KM/H TO 80KM/H

As a response to a stagnation in road safety progress, the standard speed limit on 400,000km of undivided single carriageway rural roads in France was lowered from 90km/h to 80km/h in July 2018. The measure led to the prevention of 349 deaths over the first 20 months from July 2018 to February 2020 on the roads with the new limit, while on the rest of the network 48 more died (compared to the reference period 2013-2017).[66]

The decision to lower the speed limit on rural roads sparked a backlash from groups representing some motorists who believed the new measure would add significantly to their journey times. Data collected by Cerema showed the increase in travel time after the implementation of the measure to only be one second per km driven, on average. Nevertheless, following the protests, the French government brought in a new Mobility Law in December 2019 which enabled local authorities to raise the speed limit again on single undivided rural roads, under certain conditions following an assessment of the road safety situation.

The speed limit was raised again to 90km/h on only 9% of the departmental network (34,000km of out the 370,000km of departmental network in Metropolitan France) as of December 2021. The number of deaths decreased on the 80km/h roads by 16% from 1260 deaths in 2019 to 1061 in 2021. On the 90km/h roads, the number of deaths remained stable from 210 in 2019 to 209 in 2021 (-0.5%).[67] Acceptability of the measure improved over time going from 30% in favour in April 2018 to 48% 2 years later.[68]

FINLAND
REDUCING SPEED LIMITS DURING WINTER MONTHS

Every year in Finland, during the winter months (typically November to March) speed limits are lowered by 20km/h, from 100km/h to 80km/h, on a major part of the Finnish rural road network. It is estimated that these lower wintertime speed limits annually prevent 8 deaths and 36 people being injured. The policy is well accepted and understood by road users.[69]

66 CEREMA (2020) Lowering the speed limit to 80km/h, final assessment report (in English). http://tinyurl.com/27u5v8s6
67 French Road Safety Observatory (ONISR) (2022), Increasing the Speed Limit to 90km/h on certain departmental roads, Report for the years 2020 – 2021. http://tinyurl.com/48cbkj4r
68 ONISR (2020) 80km/h speed limit on rural single carriageways. http://tinyurl.com/4dyv7rsc
69 Safety effects of lower speed limits during winter months. Analysis of collisions between 2010 and 2014. (In Finnish) http://tinyurl.com/22es3wz8

THE NETHERLANDS
SPEED LIMITS ON ROADS CLASSED AS 'SUFFICIENTLY SAFE'

The KPI for 'safe infrastructure' in the Netherlands takes into account, amongst other things, the speed limit on a road. Outside built-up areas for instance, for a road to be classified as 'sufficiently safe', it should have either a speed limit of 80km/h or 60km/h. The conditions that a road needs to meet in order to determine whether 60km/h or 80km/h is the most appropriate speed, and hence also to define a road as 'sufficiently safe', are outlined in the 'Safe Infrastructure' background document[70] published by the Road Safety Knowledge Network (Het Kennisnetwerk SPV). A summary can be found in the table below. Aspects such as the presence of slow-moving traffic, a median barrier, intersections and obstacle-free areas to the side of the road are all taken into account. Only when traffic on a road is light and the speed limit is set at 60km/h are cycle paths not a required measure.

Table 5. Characteristics of a 'sufficiently safe' road outside built up areas (from the 'Safe Infrastructure' background document published by Dutch Road Safety Knowledge Network (Het Kennisnetwerk SPV).

Outside built up areas	Measure intending to avoid				
Speed limit in km/h	**Conflict with oncoming traffic**	**Single vehicle collisions**	**Conflicts with crossing traffic**	**Conflict with parked vehicles**	**Passing conflicts between motorised traffic and slow traffic**
60 with light motorised traffic	No measures necessary	No measures necessary	Speed humps or tables (plateau)	No parking on or alongside the road	Motorised traffic and slow moving traffic mix
60 with heavy motorised traffic	No measures necessary	No measures necessary	Speed humps or tables (plateau)	No parking on or alongside the road	Cyclist on a cycle path
80	Median barrier	A verge that can be driven on and an obstacle-free zone at the side of the road	Crossings and access roads not permitted	No parking on or alongside the road	Cyclist and moped riders on cycle/ moped path or a parallel road

The N228 at Willeskop (the Netherlands) where the speed limit is 60km/h.[71]

A picture of the N206 provincial road with an 80km/h speed limit from a driver's perspective

[70] Kennisnetwerk SPV (2023) Veilige infrastructuur (in Dutch) http://tinyurl.com/bddx6h65

[71] Image licensed under Creative Commons. For full attribution information, see: https://commons.wikimedia.org/wiki/File:N228_Willeskop.JPG

2.2.1 Speed enforcement

Exceeding the speed limit is by far the most recorded road traffic offence and speeding remains a problem on rural roads.

Due to the function of these roads, on rural roads with high traffic volumes it is more difficult to enforce reduced speeds by infrastructural interventions. This is why police enforcement is important. Speed enforcement aims to dissuade drivers from exceeding the speed limit by penalising those who do. This not only affects the speed of drivers who feel typified by those that actually get caught (specific deterrence), but also those who see or hear that drivers keep being caught (general deterrence). Speed enforcement will remain essential until the speed problem is solved in a structural way by road design, engineering measures and in-vehicle technology as prescribed in the Safe System approach.[72]

A combination of mobile roadside police checks together with automated enforcement, including mobile and fixed cameras, as well as time-over-distance cameras, has proved to be an effective tool in addressing speeding, also on rural roads.[73]

Levels of speed compliance depend on many factors. Credible speed limits, that is to say a speed limit which appears logical to (the majority of) drivers, can improve speed compliance levels. In its EU Road Safety Strategy the European Commission sets proposals for 'safe roads and roadsides' within the Safe System approach which means that 'road engineering involves matching road function, design, layout and speed limits to accommodate human error in a way that road collisions do not lead to death and serious injury'. The European Commission plans to set up an expert group to develop a framework for road classification that better matches speed limit to road design and layout in line with the Safe System approach.

SWEDEN
2022 STUDY SHOWS THAT SPEED CAMERAS INCREASED SPEED COMPLIANCE

Results from a 2022 study in Sweden show that traffic safety cameras increased speed compliance – both close to and between cameras - and reduced road deaths. Close to the camera, speed compliance increased by 22 to 56% depending on the speed limit and between cameras by 11 to 15%. On roads with speed cameras and a speed limit of 80 or 90km/h, speed compliance close to cameras was about 95% and between cameras around 60%. Overall, mean speeds have been reduced by 3.5km/h (with the largest reductions for the 80km/h speed limit). Deaths decreased by 39% on road sections with cameras between 2003 and 2018.[74]

SWEDEN
GEOFENCING LOGGING TRUCKS PROJECT

Geofencing is a technology whereby the speed of a vehicle automatically reduces as it enters a specific area. SCA Skog, a timber company, and the Swedish Transport Administration have been working together to test geofencing technology on timber trucks. This was the first time geofencing was tested in a rural area in Sweden. Around 40 trucks were fitted with the geofencing technology and four rural towns/sections of road were selected. The sections ranged from 500m to 2.2km and the programmed speed was 30-50km/h.

The project ran until the end of 2023. Following the end of the project the Swedish Transport administration will follow up with surveys of the drivers' experience and carry out traffic counts to identify the volume of traffic and the road network users. It will also estimate the potential benefits that geofencing could have for the traffic flow – if all heavy vehicles were to use the system.

[72] Speed and Speed Management in Road Safety Policy (2020). http://tinyurl.com/4wykyrvf
[73] SWOV (2014) Speed cameras: how they work and what effect they have. https://bit.ly/3FMwd5F
[74] Vadeby, A., Howard, C. (2022) Speed Cameras in Sweden. Effects on Speed and Traffic Safety, VTI Report 1107 (In Swedish with summary in English). https://bit.ly/3GxAJp5

RECOMMENDATIONS TO NATIONAL GOVERNMENTS

- Develop, and encourage speed limit-setting authorities to apply national speed limit guidelines based on the Safe System approach.
- Increase enforcement of traffic law, in particular enforcement of speed limits, with fixed and mobile safety cameras, as well as drink-driving and seatbelt use.
- Set enforcement plans with yearly targets for numbers of checks and compliance with traffic laws, in particular addressing the priority areas of speeding, drink- and drug-driving, illegal use of a mobile phone, red-light running, failing to wear seatbelts, child restraints or helmets. Share those enforcement plans with the European Commission to facilitate the exchange of best practice on enforcement across the EU.
- Introduce owner or keeper liability as opposed to driver liability to facilitate enforcement of speed limits.
- Mandate authorities to review and regularly update speed limits (e.g. every five years) using specifications identified in the national speed limit guidelines.
- Prepare for Intelligent Speed Assistance: improve speed limit signs when needed, set up and regularly update digital maps with information on speed limits.
- Develop digital mapping for Intelligent Speed Assistance systems and promote their market penetration.
- Raise the public's understanding that speeding is very dangerous and that reducing speeds by only a few km/h can significantly reduce the number and severity of collisions.
- Contribute to the EU Key Performance Indicator with the timely collection and delivery to the European Commission of data on the percentage of vehicles travelling within the speed limit.

RECOMMENDATIONS TO THE EU

- Set up, as planned in the EU Road Safety Strategy, an expert group to develop a framework for road classification that better matches speed limit to road design and layout in line with the Safe System approach.[75]
- Encourage Member States, through a European Commission Recommendation, to apply safe speed limits in line with the Safe System approach (including enforcement) for the different road types such as 30km/h on urban roads in residential areas and areas where there are high levels of cyclists and pedestrians, 70km/h on undivided rural roads and a top speed of 120km/h or less on motorways.
- Apply the Directive on Cross Border Enforcement 2015/413 in full, setting targets for high level of follow-up of non-resident offenders and applying all means to reach the target as soon as possible.
- Introduce a KPI on the proportion of roads within the road network with speed limits set at safe and credible levels (e.g. 30km/h in areas with a lot of vulnerable road users).
- Initiate a technical assistance programme to support less well-performing Member States to develop and pilot a national strategy on speed management. The approach might also include technical exchanges and twinning with other better-performing countries.
- Work with Member States to enable the necessary conditions for the functioning of Intelligent Speed Assistance, including regarding the availability of speed limits in a digital format.
- Consider the feasibility and acceptability of nonover-ridable Intelligent Speed Assistance for professional drivers as a first step towards its possible adoption.
- Mandate top speed limiters on vans, as is the case for trucks and buses.
- Consider the feasibility of limiting the maximum top speed of all new vehicles as an effective way of reducing road casualties, but also air pollution, carbon dioxide emissions and noise.
- Adopt a new EU Key Performance Indicator on the enforcement effort (e.g. number of checks) and results (number of violations detected and sanctioned) over time in the priority area of speeding.
- Increase enforcement of traffic rules, in particular speeding and drink and drug-driving, and especially at high volume roads with a long distance high volume mobility function.

[75] European Commission (2020) EU Road Safety Policy Framework 2021-2030- Next Steps towards "Vision Zero". https://bit.ly/3Nmth6K

2.3. VULNERABLE ROAD USERS ON RURAL ROADS

Walking and cycling are valuable modes of transport in rural areas but they are also frequent leisure and tourism activities in these areas. Obstacles to bicycle use in rural areas include a lack of safe cycling routes, longer distances and uphill stretches. Long distances are also the main obstacle to walking, as well as missing or unsafe walking routes in villages. There are measures that can address some of these issues, including the provision of quality rural pedestrian and bicycle infrastructure.[76]

2.3.1 Cyclists

43% of cyclists killed in the EU in 2022 were killed on rural roads.

8% of the deaths on rural roads are cyclists. In the UK, average data from between 2016 and 2021 showed that 56% of pedal cycle deaths occurred on rural roads compared to 29% of motorised traffic.[77] In the Netherlands, just over 40% of all cyclists killed died on rural roads and 55% of those died at an intersection.[78]

The impact on rural road safety of the rise in use of electric bicycles should also be considered given that cyclists on electric bicycles tend to travel further[79] and faster[80] than those on traditional bicycles. In countries where cycling is common, there has been a significant increase in the use of electrically assisted bicycles over the last decade. In the Netherlands, for example, in 2019, electric bicycles accounted for approximately 18% of all bicycle trips and for more than one-quarter (26%) of the total distance cycled. In 2013 those figures were 8% and 12% respectively.[81] Projections for the sales of electric bicycles predict that, in Europe, sales of electric bicycles will go from 3.7 million sold in 2019, to 17 million sold in 2030.[82]

Research in the Netherlands shows that older people in particular tend to use their electric bicycles for touring[83], potentially leading to more older cyclists in rural areas.

In Germany, although the majority of bicycle collisions occur inside urban areas, a higher proportion of electric bicycle collisions occur in rural areas, perhaps indicating that electric bicycles are used more for leisure trips than traditional bicycles.[84]

2.3.1.1 Rural cycling infrastructure

Bicycle (and pedestrian) planning has traditionally been viewed from an urban design perspective, rather than a rural or regional planning perspective. But cycling in rural areas is different from cycling in urban areas.[85] Research carried out on fatal cycling collisions on Swedish roads found that the most common cycling collision scenario on rural roads was that the cyclist was struck while cycling along the side of the road.[86] In the Netherlands, more than half (55%) of all cyclist deaths on rural roads occurred at an intersection.[87] The high share of cyclist deaths at intersections in the Netherlands compared to other countries may be explained by a number of reasons, but the high number of separated cycle paths in the Netherlands could be a factor. In two regions in Czechia, several types of reoccurring situations that resulted in fatal cycling crashes were identified: rear-end collisions of motor vehicles into cyclists occurred the most frequently. 75% of these collisions took place outside built-up areas on roads where motor vehicles are allowed drive up to 90km/h.[88]

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76 ITF (2021) Innovations for Better Rural Mobility. http://tinyurl.com/39j3vckh
77 Department for Transport, UK (2021) Reported road casualties in Great Britain: pedal cycle factsheet. http://tinyurl.com/yhcjv36e
78 SWOV (2023). SWOV-factsheet Fietsers (Cyclists) (in Dutch). http://tinyurl.com/bdveyrdd
79 KiM (2020) Cycling Facts: New insights http://tinyurl.com/2sf45r2y
80 Schleinitz, K., Petzoldt, T., Franke-Bartholdt, L., Krems, J., & Gehlert, T. (2017). The German Naturalistic Cycling Study - Comparing cycling speed of riders of different e-bikes and conventional bicycles. http://tinyurl.com/2s3wskn5
81 KiM (2020) Cycling Facts: New insights http://tinyurl.com/2sf45r2y
82 http://tinyurl.com/msr7u886
83 KiM (2020) Cycling Facts: New insights http://tinyurl.com/2sf45r2y
84 Schleinitz K., Petzoldt T., (2023) Development of German pedelec (and bicycle) crashes between 2013 and 2021 http://tinyurl.com/yc2vbkmz
85 Aytur, S., Satinsky, S., Evenson, K., Rodriguez, R. Pedestrian and Bicycle Planning in Rural Communities. http://tinyurl.com/43aw5pcf
86 Kullgren, A., Stigson, H., Ydenius A., Axelsson, A., Engstr m, E., & Rizzi, M., (2019) The potential of vehicle and road infrastructure interventions in fatal bicyclist accidents on Swedish roads—What can in-depth studies tell us? http://tinyurl.com/zb4maj72
87 SWOV (2023). Cyclists. SWOV fact sheet http://tinyurl.com/247hk9t2
88 B l, M., B lov , M., Dobi š, M., Andr šik, R., 2016. Circumstances and Causes of Fatal Cycling Accidents in the Czech Republic. Traffic Injury Prevention 17 (4), 394–399. doi:10.1080/15389588.2015.1094183. https://doi.org/10.1080/15389588.2015.1094183

It is important to design infrastructure that more effectively separates cyclists from faster moving traffic and also to reduce the relative speed between the different road users.[89]

Safe cycling infrastructure ideally includes separated cycling paths and conflict-free traffic signals as well as cycle paths that meet design guidelines in terms of their width and quality amongst other aspects.[90]

Hospital data from the Netherlands show that safety problems there related to cycling in rural areas are especially likely at intersections where cyclists meet with motorised traffic and the cyclist needs to give way to motorised vehicles.[91] Changing the design of intersections on rural roads, in particular the introduction of speed reduction measures, can directly influence the behaviour of car drivers at an intersection and the interaction between them and cyclists.[92]

In Germany, the district of F rth developed guidelines on how to integrate cycling into everyday mobility in rural areas. The guidelines suggest measures such as improving cycling infrastructure by, for instance, marking the edges of cycle paths, introducing 30km/h on main roads through rural towns and villages and enhancing multimodality by integrating cycling with public transport.[93]

Cycle path markings (on separated cycle paths) have also been researched in the Netherlands where a pilot study found that, while an uninterrupted 10cm white line demarcating the edge of the cycle path received only an average score for safety, it was the marking preferred by cyclists, of the options presented, and scored most highly overall when considering aspects such as cost and sustainability.[94]

Transport Infrastructure Ireland has also developed a Rural Cycleway design standard[95] to guide developers in rural areas looking to plan, design and develop rural cycle networks. A similar document is also available in France.[96]

The Safe Cycling Routes Toolkit (SCRT), developed with the support of EU funds, is a modular interactive online decision-making support tool which guides users through the process of defining new cycling routes as well as improvements to existing ones, with respect to cycling safety.[97]

EU CYCLE PROJECT
BUILDING SAFE CYCLING ROUTES IN RURAL AREAS

The EU Cycle project[98] is an EU-funded project that gathered good practices and shared policy learning on how to develop cycling projects. A number of the projects featured in the project's final database of good practice cycling projects cover rural cycling. Some examples include Poland and Italy.

Poland
Building a regional cycle network

The region of West Pomerania in Poland set about building a long-distance cycle network in 2015. The aim was to promote cycling tourism in the region. In five years, it has created the backbone of an entire regional cycling network, with 800km of high-quality cycle routes – including 350km of new cycle tracks either opened or under construction. Most of the network (64%) could follow existing infrastructure – cycle tracks (22%), public roads with low traffic (35%) and asphalted non-public forest roads (7%). The remaining 410km (36%) had to be constructed.

[89] Anders Kullgren, Helena Stigson, Anders Ydenius, Amanda Axelsson, Emma Engstr m & Matteo Rizzi (2019) The potential of vehicle and road infrastructure interventions in fatal bicyclist accidents on Swedish roads—What can in-depth studies tell us?, Traffic Injury Prevention, 20:sup1, S7-S12, DOI: 10.1080/15389588.2019.1610171 http://tinyurl.com/zb4maj72
[90] SWOV (2020) Infrastructure for pedestrians and cyclists. SWOV fact sheet http://tinyurl.com/39crtns9
[91] Duivenvoorden, K., (2021) Speed up to safe interactions. The effects of intersection design and road users' behaviour on the interaction between cyclists and car drivers http://tinyurl.com/ym22k5vr
[92] Ibid
[93] http://tinyurl.com/ym4t9yea
[94] Anton van Osta and Jakob Tiellemans (2016) Evaluatie pilot 'Zichtbaarheid fietspaden N631' (In Dutch. Evaluation of the 'Visible cycle paths N631' pilot project) http://tinyurl.com/2rnkwt8d
[95] Transport Infrastructure Ireland (2022) Rural Cycleway Design (Offline & Greenway) http://tinyurl.com/454vraf3
[96] Note de recommandations techniques du CEREMA http://tinyurl.com/3kfhbtr6
[97] https://sabrina-scrt.eu/scrt/
[98] http://tinyurl.com/yp9ktdsd

Italy
Cycling route of the Apulian Aqueduct

The Aqueduct Cycle Route is the first cycle path away from motorised traffic and in a natural environment built in Puglia. The cycle path is also a greenway as the surface is built of a stabilised granular mix without asphalt or other types of aggregate matter. It is widely used by locals and tourists on foot and by bike.[99]

Italy - Cycling route of the Apulian Aqueduct
www.aqp.it/pianeta-acqua/ciclovia-acquedotto-pugliese

FRANCE
'GREEN LANES' – ROADS RESERVED FOR CYCLISTS AND PEDESTRIANS

In order to speed up the creation of its cycle routes, the La Manche region of France decided to designate certain departmental and communal roads as 'green lanes'. These roads are reserved for cyclists and pedestrians and only local residents are allowed to drive on them at low speeds. Initially a 3.5km stretch was designated, but a further 1.5km stretch is also due to be designated.[100]

SPAIN
SAFE CYCLING ROUTES NETWORK

The Safe Cycling Routes Network initiative managed by the Spanish General Directorate for Traffic (DGT) aims to allow cyclists to ride on safe and protected routes, by implementing a series of measures on those sections of road most frequented by cyclists. In these sections, measures are applied such as: route signage; temporary reduction of the speed limit depending on the type of road; increased enforcement, particularly of offences related to overtaking distance, inappropriate speed and illegal manoeuvres both by drivers and cyclists. Currently, more than 4,600km of road are marked as Safe Cycling Routes.[101]

2.3.1.2 Overtaking cyclists on rural roads

According to the Safe System, vulnerable road users and motorised vehicles should not mix in traffic travelling above 30km/h. Rural roads with a speed limit of 80km/h where cyclists and pedestrians must share the road with motorised traffic, therefore, are not structurally 'Safe System' roads.

Close overtaking is a stressful experience for cyclists and can be a deterrent to cycling, let alone on rural roads where speeds are higher.[102] How and when motorised vehicles overtake cyclists is often determined legally and stipulated in a country's highway code. The primary aim of these laws is to improve the safety of the cyclist. In Slovakia for instance, at least 1m should be given when overtaking cyclists at speeds up to 50km/h and 1.5m in other cases.[103] In the UK, the highway code was updated in 2022 and now states that at least 1.5m should be given when overtaking cyclists at speeds of up to 30mph, and more when overtaking at higher speeds. Evidence exists however that despite legal requirements, close overtaking of cyclists on rural roads is still a regular occurrence.

[99] http://tinyurl.com/df3bd57m
[100] News article http://tinyurl.com/3jyj33xx
[101] http://tinyurl.com/3c4trjp3
[102] https://sabrina-scrt.eu/scrt/
[103] http://tinyurl.com/5n7cufdw

The research is clear that larger overtaking distances are needed at higher speeds for cyclists to feel safe.

One approach might be to suggest overtaking cyclists as if they were cars i.e. with a full lane change. This would make the situation less stressful and safer for cyclists.[104] Research carried out in Germany to determine when cyclists should be rerouted from cycling along rural roads to riding instead on a separated cycle path suggested setting a limit based on the frequency with which cyclists on roads were involved in critical overtaking manoeuvres.[105] Other elements to consider include volume and speed of motor vehicle traffic, the percentage of heavy truck traffic, the openness of the road as well as the volume of bicycle traffic, and its share of vulnerable cyclists.

2.3.2 Pedestrians

Long distances are the main obstacle to walking in rural areas, as well as missing or unsafe walking routes in villages and non-village areas in the countryside. While pavements are found on the majority of roads in urban areas, and while recreational footpaths have improved, pavements tend to be lacking in villages in rural areas.[106] In addition, risks are highest on rural roads where there are few pedestrians and no separation or protection from fast moving traffic.[107] And yet, research has shown that rural citizens still walk for at least 19% of their trips.[108] The provision of quality rural pedestrian infrastructure, including pavements separated from the road, can and should address these issues.[109]

Child pedestrians and safe routes to school

Informing pupils of safe routes to school and developing a school mobility plan is a measure schools can adopt to make travelling to school safer, including in a rural context. In Slovenia, for instance, it is compulsory for every primary school to have a school route or path plan. In Austria, the Road Safety Board (KFV) and AUVA (the Austrian Worker's Compensation Board) have worked closely with a large number of primary schools to design 'safe routes to school maps'.[110] In Denmark, guidelines and handbooks are available for schools and municipalities wishing to draw up mobility and safety plans around schools.[111] In Germany, the Federal Highway Research Institute (BAST) has developed 'Safe ways to schools' guidelines,[112] which include an effectiveness check.

SLOVENIA
SAFE WALKING IN RURAL AREAS

In Slovenia work is being undertaken in rural areas where there are no pavements, to improve the safety of pedestrians. Where it is not possible to build a pavement (which must have a minimum width of 1.5 metres), instead banks at the side of the road are being widened and strengthened to the maximum possible so that pedestrians no longer need to walk on the road, thereby reducing the possibility of a collision between pedestrians and vehicles.

Pedestrian safety around schools in rural areas is also being strengthened through the 'Safe way to school' project. Road markings, colourful signs and bollards are all designed to warn drivers that they are approaching a school and that they should be cautious and slow down. An evaluation of the speeds of

[104] Kircher, K., Forward, S., Wall n Warner, H., (2022) Cycling in Rural Areas. An overview of national and international literature http://tinyurl.com/2f6767hd
[105] BAST (2020) Management of cycling on rural roads. http://tinyurl.com/bdebv4es
[106] Methorst, R. (2021) Exploring the Pedestrians Realm: An overview of insights needed for developing a generative system approach to walkability https://tinyurl.com/3e3y6wr6
[107] Ibid.
[108] KiM (2015), Fietsen en lopen: de smeerolie van onze mobiliteit. (In Dutch: Cycling and Walking: the lubricant of our mobility.) http://tinyurl.com/3bttdxeh
[109] ITF (2021), Innovations for Better Rural Mobility. http://tinyurl.com/39j3vckh
[110] Austrian Worker's Compensation Board (AUVA) Safe routes to school maps. https://bit.ly/3QpFir8 (In German)
[111] Danish Road Safety Council, Safe school traffic. https://bit.ly/3BIU8Vf
[112] BAST (2019), Safe school routes made easy. https://bit.ly/3P1w6bf (In German)

drivers before and after the project found that speeds in the areas where the measures had been implemented were reduced following the introduction of the measures. In a survey of drivers after the introduction of the measures, it was also confirmed that the measures clearly indicate the presence of children. This confirmed the objective of the project to make the roads self-explanatory.[113]

Being aware that vulnerable road users and motorised vehicles should not mix in traffic travelling above 30km/h, Slovenia, in its Resolution on the national road safety programme 2023–2030, has prioritised examining the possibility of standardising the criteria for the establishment of 30km/h speed limit zones in residential neighbourhoods and around schools, kindergartens and playgrounds.

UK
UPDATING THE HIGHWAY CODE

In January 2022, the UK updated its Highway Code with the aim of improving, amongst other things, the safety of people walking, cycling and riding horses. The guidance on safe passing distances and speeds when overtaking vulnerable road users includes leaving at least 1.5m (5 feet) when overtaking people cycling at speeds of up to 30mph, and giving them more space when overtaking at higher speeds; passing people riding horses or driving horse-drawn vehicles at speeds under 10mph and allowing at least 2m (6.5 feet) of space; and allowing at least 2m (6.5 feet) of space and keeping to a low speed when passing people walking in the road (for example, where there's no pavement).[114]

SPAIN
IMPROVEMENT OF PEDESTRIAN CROSSINGS

In Spain, action is being taken to improve the safety of vulnerable road users on rural roads. The General Directorate of Traffic (DGT) has published recommendations to improve the safety of pedestrian crossings on rural roads and on road sections crossing towns.[115] According to the recommendations, when a road crosses a pavement or cycle path, action must be taken to guarantee that crossing happens safely. Depending on the volume of road traffic and its speed and the volume of vulnerable user traffic, measures are applied such as central shelters differentiated from the road by a curb, narrowing of the road or the installation of signs or traffic lights operated by vulnerable users (automatically activated when detecting the presence of a pedestrian or cyclist, or manually using a button).[116] An example published by DGT of the adaptation of rural pedestrian paths was carried out in the municipality of Oleiros, in the province of A Coru a, through the installation of pavements and protections for pedestrians on a road with high volumes of traffic, both of pedestrians and motor vehicles.[117]

2.3.3 Public transport

Integrating active mobility with other transport modes is important to allow for intermodal travel between rural areas, peri-urban areas (suburbs) and cities. Connections to mobility hubs, as well as bicycle parking and storage facilities at bus and train stations are effective tools to support first- and last-mile cycling.[118] Crossings near bus stops should be designed to allow safe crossing and low vehicle speeds locally.

[113] Brumec, U., & Versolak Hrabar, N., (2016) How can we enhance the safety of school children with usage of human factor knowledge in road design http://tinyurl.com/2pfkys6s
[114] http://tinyurl.com/4f3najte
[115] DGT (2023) Adapting pedestrian crossings on inter-urban roads. http://tinyurl.com/mr3u6w2j
[116] DGT (2023) Signals activated by vulnerable road users. http://tinyurl.com/yn6kr5ac
[117] Inter-urban pedestrian paths (Cat logo de experiencias urbanas en movilidad segura y sostenible) http://tinyurl.com/ythzanar
[118] ITF (2021) Innovations for Better Rural Mobility. http://tinyurl.com/39j3vckh

IRELAND
CONNECTING IRELAND RURAL MOBILITY PLAN

The Connecting Ireland Rural Mobility Plan Commitment is to ensure that 'over 70% of those living outside cities will have access to a public transport service that provides at least three return trips each weekday to a nearby town'. The plan aims to deliver over 100 new connections to local towns and over 60 new connections to cities and regional centres. Since the plan was adopted, passenger numbers have been increasing, particularly on rural links. There has also been an increase in the number of young people using bus services.[119]

RECOMMENDATIONS TO NATIONAL GOVERNMENTS

- Where there are numbers of cyclists and pedestrians present or the potential to attract them then invest in cycle and pedestrian facilities, separate paths along the roadway are recommended.
- Lower speed limit to 30km/h around schools in rural areas.
- Establish clear road hierarchies, which better match road function to speed limit, layout and design based on the principles of the Safe System approach.
- Design and implement walking and cycling safety strategies, which include targets and infrastructure measures.
- Collect travel data for all road users (pedestrians, cyclists, PTWs, cars, vans, HGVs) by road types.
- Collect, and report to the European Commission, data to deliver the Key Performance Indicators included in the EU Road Safety Policy Framework 2021-2030.

RECOMMENDATIONS TO THE EU

- Together with Member States, develop KPIs on pedestrian, cyclist and powered two wheeler (PTW) infrastructure safety.
- Encourage EU Member States to adopt maximum 30km/h areas around schools and crossing villages and areas where there are high levels of cyclists and pedestrians, or where there could be potential to increase cycling and walking by investing in infrastructure.
- Deliver an EU safe active mobility strategy which sets road safety measures and targets to increase the amount of distance safely travelled by walking and cycling.
- Together with Member States, develop KPIs on pedestrian, cyclist and powered two wheeler (PTW) infrastructure safety.
- Encourage Member States to collect travel data in a harmonised way for all road users (pedestrians, cyclists, PTWs, cars, vans, HGVs) by road type.

[119] http://tinyurl.com/mtn98k4t

2.4. VEHICLE SAFETY

The 'General Safety Regulation' adopted in 2019 comprises a number of updated minimum safety requirements for new vehicles, most of which came into force in July 2022.[120] The legislation mandates a range of new vehicle safety features such as Automated Emergency Braking (AEB) and overridable Intelligent Speed Assistance (ISA) as standard on new vehicles sold on the EU market. New heavy goods vehicles will also have to be fitted with advanced systems capable of detecting pedestrians and cyclists located in close proximity of the vehicle in July 2022 and comply with improved direct vision requirements as of 2026. Passive safety of cars will also be improved by extending the crash test zone to include the windscreen between the A-pillars for better pedestrian and cyclist protection.

All these technologies are designed to improve safety on all roads and will therefore also contribute to improving the safety of rural roads. Particular technologies such as lane keeping assistance technologies, also required on all new cars and vans according to the EU's General Safety Regulation, or lane departure warning systems on all new trucks and buses, could be particularly relevant to some rural road collisions where run-off-road and verge collisions are more frequent.[121]

Other Intelligent Transport Systems such as eCall could also be relevant to rural road safety, particularly with regard to single vehicle crashes when vehicles, may leave the road during a collision, rendering them invisible to other road users.

eCall, the automated emergency call system that alerts emergency services in the event of a collision, has been mandatory on all new car models since 2018. The possibility to extend this technology to PTWs is still being evaluated. The EU-funded I_HeERO[122] project concluded that an eCall for two- and three-wheeled vehicles would need to differ significantly from the one used in passenger cars due to different collision dynamics with injury patterns and severity. The project also defined the minimum requirements for a motorcycle-specific eCall system, embedded in the vehicle. More recently, a second EU-funded project, known as sAFE[123], allowed manufacturers to conduct real tests with Public Safety Answering Points (PSAPs) for motorcycle eCall devices with the aim of refining the PTW eCall concept developed by I_HeERO.

[120] Regulation (EU) 2019/2144 on type-approval requirements for motor vehicles and their trailers, and systems, components and separate technical units intended for such vehicles, as regards their general safety and the protection of vehicle occupants and vulnerable road users. http://tinyurl.com/yck7z5sx
[121] SWOV (2023), SWOV-factsheet: Veilige bermen. (In Dutch: SWOV Factsheet: Safe verges) http://tinyurl.com/2zjaks8z
[122] Factsheet: What is eCall? http://tinyurl.com/33wbhhh2
[123] https://safe112.eu/

RECOMMENDATIONS TO NATIONAL GOVERNMENTS AND TO THE EU

Following the adoption of the revision of the General Safety Regulation (GSR) on new minimum vehicle safety standards:

- Include more vehicle categories in the eCall regulation, motorcycles most importantly in the rural context.
- Consider the feasibility and acceptability of non-overridable Intelligent Speed Assistance in the future.
- Encourage Member States to go well beyond the requirements of the ITS Directive to provide digital speed limit data to cover all roads on their network.
- Use public procurement to require vehicle safety features such as direct vision, Intelligent Speed Assistance, Automated Emergency Braking with pedestrian and cyclist detection and alcohol interlocks in public sector fleets and fleets providing the public with services until such time as all vehicles on the roads have such features.

RECOMMENDATIONS TO NAVIGATION SYSTEMS PROVIDERS

- Offer the possibility to use safe routes as a selection criterion (using for example EuroRAP star rating information).
- When diverting traffic, in particular trucks and buses, avoid rural roads nearby, especially single carriageways without median barrier, and choose instead motorways, primary or TEN-T roads with higher safety levels.

ANNEXES

ISO Codes

Country	ISO Code
Austria	AT
Belgium	BE
Bulgaria	BG
Switzerland	CH
Cyprus	CY
Czechia	CZ
Germany	DE
Denmark	DK
Estonia	EE
Greece	EL
Spain	ES
Finland	FI
France	FR
Great Britain	GB
Croatia	HR
Hungary	HU
Ireland	IE
Israel	IL
Italy	IT
Lithuania	LT
Luxembourg	LU
Latvia	LV
Malta	MT
The Netherlands	NL
Norway	NO
Poland	PL
Portugal	PT
Romania	RO
Serbia	RS
Sweden	SE
Slovenia	SI
Slovakia	SK
The United Kingdom	UK

Table 1 (Fig. 1, 2, 3, 4, 8) Total number of rural road deaths over the period 2012-2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AT	330	309	271	310	288	262	279	283	229	230	231
BE	456	429	397	415	371	307	305	312	232	256	255
BG	348	354	371	379	428	420	339	351	284	322	320
CY	17	12	8	14	10	10	15	17	15	13	9
CZ	455	388	431	483	356	359	404	400	331	323	333
DE	2,151	1,934	2,019	1,997	1,853	1,795	1,867	1,758	1,592	1,498	1,593
DK	100	120	122	100	120	110	101	121	97	74	95
EE	66	66	56	53	51	34	54	35	42	44	31
ES	1,144	939	957	971	964	1,013	994	896	751	800	926
FI	186	193	159	189	188	173	172	169	152	160	133
FR	2,385	2,077	2,150	2,175	2,188	2,156	2,016	1,944	1,497	1,733	1,934
EL	432	336	338	352	352	337	272	268	225	272	255*
HR	119	117	91	112	97	119	114	105	76	93	92
HU	364	329	362	349	346	362	349	331	281	308	309
IE	112	145	127	121	124	107	78	103	95	93	106
IT	1,821	1,652	1,589	1,621	1,546	1,615	1,603	1,532	1,139	1,365	1,531
LU	20	24	23	28	19	16	26	16	15	18	21
LV	124	126	143	144	128	92	107	92	97	108	72
LT	n/a	n/a	n/a	n/a	75	95	98	91	99	68	73
MT	n/a	n/a	n/a	1	9	4	5	n/a	n/a	9	n/a
NL	280	203	205	245	228	223	243	253	247	232	258
PL	1,875	1,736	1,680	1,629	1,701	1,523	1,559	1,662	1,353	1,299	1,081
PT[(1)]	263	241	241	228	223	223	263	227	172	185	228
RO	779	677	651	720	698	694	660	608	537	629	578
SE	177	185	167	184	182	167	229	149	127	143	136
SI	68	56	53	66	62	44	51	61	45	57	31
SK	90	87	82	95	85	85	65	82	76	81	86
UK	1,086	1,124	1,142	1,093	1,151	1,131	1,084	n/a	n/a	n/a	n/a
GB	1,023	1,069	1,063	1,022	1,086	1,068	1,030	994	846	895	1018
CH	151	133	138	113	109	118	111	98	105	102	133
IL[(2)]	173	179	188	221	251	216	184	217	164	223	218
NO	113	132	101	85	92	72	80	71	67	63	89
RS	165	152	88	159	230	238	236	229	233	252	273
EU 25	**14,162**	**12,735**	**12,693**	**12,980**	**12,608**	**12,246**	**12,165**	**11,775**	**9,707**	**10,336**	**10,644**

Source: CARE database and national statistics provided by PIN Panellists in each country
EU25: EU27 excluding LT and MT due to lack of updated data
*Estimated
[(1)]PT - 2012 to 2017: Mainland; 2018 onwards: Total Portugal (including the autonomous regions of A ores and Madeira)
[(2)]IL - data includes rural roads, motorways and off-roads

Fig. 1 Average annual change in the number of road deaths on rural roads over the period 2012-2022

BE	-6.5%	
EE	-6.2%	
EL	-5.3%	2012-2021
NO	-5.2%	
LV	-4.9%	
PT	-4.8%	2018-2022
SI	-4.2%	
PL	-4.1%	
IE	-3.3%	
AT	-3.3%	
DE	-3.1%	
SE	-3.0%	
CZ	-3.0%	
FR	-2.8%	
LU	-2.7%	
LT	-2.6%	2016-2022
FI	-2.6%	
CH	-2.5%	
RO	-2.5%	
HR	-2.4%	
IT	-2.4%	
DK	-2.4%	
ES	-2.3%	
BG	-1.8%	
HU	-1.7%	
GB	-1.4%	
SK	-1.2%	
CY	-0.2%	
NL	0.7%	
IL	1.2%	
RS	7.8%	
EU25	**-3%**	

Fig. 3 Difference between the average annual change in the number of deaths on rural roads and the corresponding average annual change in the number of deaths on urban roads over the period 2012-2022

BE	-4.5%	
FR	-2.6%	
NL	-2.5%	
ES	-2.1%	
LV	-1.5%	
FI	-1.3%	
RO	-1.3%	
EE	-1.1%	
IE	-1.1%	
GB	-0.9%	
EL	-0.9%	2012-2021
DE	-0.6%	
PT	-0.5%	2018-2022
DK	-0.5%	
AT	0.0%	
IT	0.0%	
IL	0.0%	
SI	0.2%	
SE	0.7%	
SK	0.8%	2016-2022
CH	0.9%	
HU	0.9%	
CZ	1.6%	
HR	1.8%	
NO	2.0%	
CY	2.1%	
PL	2.4%	
BG	2.6%	
LU	3.9%	
LT	4.6%	2016-2022
RS	15.7%	
EU24	**-0.5%**	

Table 2 (Fig. 2 and 3, 4) Total number of urban road deaths over the period 2012-2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AT	151	115	123	128	110	107	102	104	89	99	109
BE	233	200	231	231	194	203	197	214	180	179	196
BG	233	227	251	269	238	200	213	232	144	164	170
CY	31	30	34	37	35	38	26	32	29	27	25
CZ	265	241	232	220	213	192	217	186	151	185	161
DE	1,062	977	983	1,048	960	976	984	932	810	746	881
DK	59	59	46	62	66	53	49	64	52	45	47
EE	23	23	22	21	20	14	13	17	17	11	18
ES	461	450	441	441	519	509	489	519	395	417	473
FI	56	57	62	75	63	57	62	36	62	57	57
FR	1,026	930	992	988	1,019	1,010	963	1,037	843	963	1,039
EL	499	464	401	388	427	340	367	370	325	314	336*
HR	230	209	191	219	176	186	175	164	142	163	145
HU	210	232	237	261	224	229	238	223	147	187	194
IE	46	35	60	34	52	43	47	32	39	28	45
IT	1,602	1,428	1,505	1,502	1,463	1,467	1,401	1,331	1,061	1,264	1,333
LU	7	15	9	5	8	6	1	3	5	5	10
LV	53	53	69	44	30	44	41	40	42	39	41
LT	n/a	n/a	n/a	n/a	76	84	71	89	70	70	43
MT	n/a	n/a	n/a	10	14	15	13	n/a	n/a	n/a	n/a
NL	208	201	158	194	213	218	267	243	200	212	307
PL	1,652	1,581	1,466	1,248	1,275	1,238	1,251	1,177	1,084	872	751
PT[(1)]	397	352	347	304	302	328	380	394	305	332	333
RO	1,246	1,160	1,146	1,154	1,189	1,221	1,183	1,213	1,074	1,110	1010
SE	78	43	65	55	58	58	62	46	52	36	47
SI	42	53	40	39	43	41	26	27	29	42	29
SK	n/a	n/a	n/a	n/a	108	102	91	94	95	97	105
UK	632	553	631	618	618	643	656	n/a	n/a	n/a	n/a
GB	643	544	616	600	613	626	646	653	535	559	593
CH	125	113	93	119	88	87	103	65	104	83	87
IL	117	132	131	134	125	148	132	138	141	141	133
NO	31	53	46	27	37	32	27	32	23	14	26
RS	489	455	432	374	325	291	258	246	229	241	238
EU 24	**9,870**	**9,135**	**9,111**	**8,967**	**8,897**	**8,778**	**8,754**	**8,636**	**7,277**	**7,497**	**7,757**

Source: CARE database and national statistics provided by PIN Panellists in each country
EU24: EU27 excluding LT, MT and SK due to lack of updated data
*Estimated
[(1)]PT - 2012 to 2017: Mainland; 2018 onwards: Total Portugal (including the autonomous regions of A ores and Madeira)

Fig. 4 Proportion of road deaths per road type (2020-2022 average) in PIN countries ranked by the share of road deaths on rural roads

	Rural	Motorways	Urban	
NO	76%	2%	22%	
FI	69%	4%	27%	
SE	68%	9%	23%	
IE	67%	7%	26%	
AT	64%	8%	28%	
LU	63%	14%	23%	
CZ	63%	6%	32%	
BG	60%	9%	31%	
DK	60%	8%	32%	
FR	59%	8%	33%	
GB	58%	6%	36%	
HU	58%	7%	34%	
DE	58%	12%	30%	
PL	56%	3%	41%	
LT	54%	5%	41%	
ES	53%	19%	28%	
CH	51%	8%	41%	
RS	48%	6%	45%	
BE	48%	16%	36%	
IT	48%	9%	43%	
SI	48%	16%	36%	
NL	44%	13%	43%	
EL	40%	6%	53%	2019-2021
SK	39%	12%	48%	
RO	34%	2%	63%	
PT	34%	9%	57%	
HR	32%	12%	56%	
CY	28%	9%	62%	
EU 25	**52%**	**9%**	**39%**	

Table 3 (Fig. 2, 4) Total number of motorways road deaths over the period 2012-2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AT	50	31	36	41	34	45	28	29	26	33	30
BE	113	128	108	110	102	98	102	116	86	81	84
BG	20	20	39	60	42	62	58	45	35	75	32
CY	3	2	3	6	1	5	8	3	4	5	3
CZ	22	25	25	32	42	26	37	31	35	23	33
DE	387	428	375	414	393	409	424	356	317	318	314
DK	8	12	14	16	25	12	21	14	14	11	12
EE	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ES	298	291	290	277	327	308	323	340	224	316	347
FI	13	8	8	6	7	8	5	6	9	8	6
FR	242	261	242	298	270	282	269	263	201	248	294
EL	57	79	56	53	45	54	61	50	34	38	41*
HR	44	42	26	17	34	26	28	28	19	36	38
HU	31	30	27	34	37	34	46	48	32	49	34
IE	5	8	5	7	6	4	9	5	12	15	4
IT	330	321	287	305	274	296	330	310	195	246	295
LU	7	6	3	3	5	3	9	3	6	1	5
LV	0	0	0	0	0	0	0	0	0	0	0
LT	n/a	n/a	n/a	n/a	37	12	4	6	6	10	4
MT	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NL	68	57	57	92	92	94	88	90	68	65	90
PL	44	40	58	61	50	70	52	70	54	74	64
PT[(1)]	58	44	50	61	38	51	57	67	59	44	57
RO	17	24	21	19	26	36	24	43	33	40	45
SE	15	20	28	13	20	12	22	22	18	14	22
SI	20	16	15	15	25	19	14	14	6	15	25
SK	25	14	19	27	20	25	23	19	29	27	21
UK	84	93	81	93	91	82	99	n/a	n/a	n/a	n/a
GB	88	100	96	108	93	99	107	105	79	103	100
CH	63	23	12	21	19	25	19	24	18	15	21
IL	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NO	1	2	0	5	6	2	1	5	3	3	1
RS	n/a	n/a	n/a	66	52	50	54	59	30	28	42
EU 23	**1,877**	**1,907**	**1,792**	**1,967**	**1,915**	**1,979**	**2,038**	**1,972**	**1,516**	**1,782**	**1,893**

Source: CARE database and national statistics provided by PIN Panellists in each country
EU23: EU27 excluding EE, LT, MT and SK due to lack of updated data
*Estimated
[(1)]PT - 2012 to 2017: Mainland; 2018 onwards: Total Portugal (including the autonomous regions of A ores and Madeira)

Fig. 5 Cars and vans mean speed on rural roads over the period 2012-2022

	Fig. 5 Average annual change in mean speed of cars and vans on rural roads (from earliest available baseline to latest available year).	
FR	-0.74%	80 (2019-2022)
AT	-0.73%	100 (2012-2022)
RS	-0.51%	80 (2014-2022)
DK	-0.40%	80 (2012-2022)
NO	-0.39%	110 (2017-2022)
NO	-0.31%	90 3+f (2012-2022)
NO	-0.30%	70 (2012-2022)
NO	-0.26%	90 2+f (2012-2022)
NO	-0.24%	80 (2012-2022)
NO	-0.17%	100 (2012-2022)
FI	-0.12%	100 (2012-2021)
IE	-0.06%	national secondary (2012-2018)
FI	-0.03%	80 (2012-2021)
FR	0.03%	110 (2012-2022)
IE	0.18%	dual carriagway (2012-2018)
AT	0.18%	70 (2012-2022)
FR	0.22%	90 (2012-2022)
AT	0.47%	80 (2017-2022)
IE	0.66%	regional road (2012-2018)
IE	0.67%	national primary (2012-2018)
IE	1.79%	local road (2012-2018)

Fig 6. The proportion of observed cars and vans within the speed limit in free-flowing traffic on rural roads with speed limits between 50km/h and 80km/h over the period 2012-2022 based on countries' individual data collection methodologies.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2022
AT 70						60%	60%	59%	52%	51%	55%	
AT 80						76%	76%	70%	73%	71%	74%	
BE 70	48%									60%		
DK 80					45%	46%	46%	47%	48%	51%	53%	
FR 80								66%	63%	62%	67%	71%
IE 50 passenger cars										22%		
SE 70	47%				45%				53%			
SE 80	42%				42%				52%			
CH 80								82%				
IL 80			32%	40%		37%				69%		
NO 70	58%	57%	58%	57%	60%	60%	67%	69%	69%	70%	70%	
NO 80	58%	58%	58%	58%	59%	64%	63%	63%	59%	60%	64%	
RS 80			61%	66%	66%	67%	70%	69%		65%	63%	

Fig 7. The proportion of observed cars and vans within the speed limit in free-flowing traffic on rural roads with speed limits between 90km/h and 110km/h over the period 2012-2022 based on countries' individual data collection methodologies.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2022
AT 100						87%	85%	84%	84%	88%	88%	
BE 90 - 1 lane	73%									46%		
BE 120 - 2 lanes										59%		
EE 90										58%	59%	
ES 90 cars											43%	71%
ES 90 vans and small trucks											69%	
FR 90					81%	80%	68%		73%	70%	83%	
FR 110					69%	68%	65%	73%	79%	77%	77%	
EL 90											84%	
IE 100 passenger cars										75%		
PL 90 cars		42%	61%	62%						60%		
PL 90 vans										67%		
PT 90											36%	
SE 90	54%				53%				57%			
IL 90			56%	54%		63%				61%		
NO 90 2f	60%	60%	57%	58%	67%	71%	73%	71%	66%	66%	73%	
NO 90 3+f	46%	46%	49%	51%	54%	58%	59%	63%	52%	55%	52%	
NO 100	47%	45%	43%	44%	44%	47%	50%	55%	51%	54%	55%	
NO 110						66%	66%	65%	65%	70%	70%	

Table 6 (Fig. 8) Motor vehicle kilometres driven in millions (in total) outside urban areas on roads other than motorways in 2012 and 2022

	2012	2022	Notes
AT	26,094	26,633	
BE	n/a	n/a	
BG	n/a	n/a	
CY	n/a	n/a	
CZ	39,447	42,907	
DE	n/a	n/a	
DK	24,700	25,700	
EE	5,381.6	6,818.1	
ES	107,773	n/a	
FI	36,605	36,252	All vehicles, all highways (streets and private roads excluded).
FR	466,000	465,000	Non-motorway traffic (including urban areas).
EL	n/a	n/a	
HR	n/a	27,271	
HU	n/a	n/a	
IE	40648	41878	
IT	n/a	n/a	
LU	n/a	n/a	
LV	8,252	9,088	Estimate made as 75% from total mileage
LT	10,196	13,114	
MT	n/a	n/a	
NL	n/a	n/a	
PL	n/a	n/a	
PT	64123	73,739	Estimated for total vehicle-kms travelled including all roads (inland) .
RO	n/a	n/a	
SE	35,159	43,452	National road database (Non motorway, state roads).
SI	8,695	9,288	
SK	n/a	n/a	
UK	n/a	n/a	
GB	n/a	n/a	
CH	20,765	23,488	
IL	49,694	65,900	Million km. including urban areas, rural roads and motorways.
NO	43,952	45,403	This is for the entire road network
RS	n/a	n/a	

Source: national statistics provided by PIN Panellists in each country

Fig. 8 Road deaths per billion km travelled on rural roads in 2022 and 2012 for comparison

	2012	2022	
SE	5.0	3.1	
IE	4.0	3.2	2012, 2021
SI	7.8	3.3	
HR		3.4	
FI	5.1	3.7	
DK	4.0	3.7	
EE	12.3	4.5	
LT		5.6	
CH	7.3	5.7	
CZ	11.5	7.8	
LV	15.0	7.9	
AT	12.6	8.6	2012, 2021

Table 7 (figure 9) Total number of road deaths on rural roads by road user group over the period 2020-2022 (or last three years available)

	Car driver	Car passenger	PTW driver	PTW passenger	Cyclist	Pedestrian	Other	
BG	45%	26%	6%	0%	2%	8%	12%	
FI	56%	14%	9%	0%	5%	5%	10%	
LT	36%	28%	9%	0%	6%	19%	2%	
LU	44%	19%	29%	0%	4%	2%	2%	
SK	43%	20%	10%	1%	5%	12%	8%	2019-2021
HU	43%	20%	12%	1%	5%	11%	9%	
CZ	46%	16%	15%	1%	10%	7%	5%	
RO	35%	26%	3%	0%	6%	17%	13%	2019-2021
PL	42%	18%	11%	0%	8%	14%	7%	
CY	46%	14%	22%	0%	5%	5%	8%	
DK	48%	11%	15%	0%	10%	7%	9%	2019-2021
IE	42%	17%	15%	0%	5%	12%	9%	
FR	45%	13%	21%	1%	7%	6%	7%	
RS	40%	16%	8%	1%	6%	14%	15%	
HR	44%	12%	25%	2%	6%	6%	6%	
SE	44%	11%	18%	0%	6%	5%	16%	
IT	41%	12%	25%	2%	6%	7%	7%	
DE	42%	11%	26%	1%	12%	5%	5%	
GB	38%	14%	23%	0%	7%	12%	5%	
LV	34%	18%	8%	1%	10%	20%	10%	
NO	35%	16%	20%	0%	3%	7%	18%	
AT	41%	11%	25%	1%	9%	5%	8%	
ES	38%	14%	22%	1%	5%	8%	12%	
BE	40%	9%	18%	1%	18%	6%	8%	
PT	34%	16%	24%	1%	4%	9%	12%	
IL*	29%	17%	22%	1%	2%	13%	16%	
EL	34%	10%	27%	2%	2%	8%	17%	2019-2021
EE	32%	9%	4%	1%	4%	15%	35%	
CH	30%	9%	31%	1%	16%	4%	9%	
NL	38%	0%	14%	0%	22%	5%	21%	2019-2021
SI	35%	0%	32%	0%	6%	8%	19%	
EU 27	**42%**	**15%**	**19%**	**1%**	**8%**	**9%**	**8%**	**2019-2021**

*IL - data includes rural roads, motorways and off-road crashes

Table 8 (figure 10, 11) Total number of road deaths on rural roads urban roads and motorways by road user group over the period 2012-2021 (or last ten years available) EU total

a. Rural roads

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Car driver	5,866	5,130	5,204	5,396	5,452	5,286	5,175	4,939	4,086	4,229
Car passenger	2,333	2,147	2,027	2,084	2,176	2,001	1,870	1,823	1,403	1,435
PTW driver	2,302	2,083	2,090	2,245	1,980	2,076	2,223	2,184	1,778	1,956
PTW passenger	118	126	100	100	110	94	75	96	88	89
Cyclist	916	788	845	820	830	798	831	838	794	789
Pedestrian	1,346	1,368	1,310	1,240	1,185	1,162	1,094	1,098	842	770
Other	1,043	869	983	953	960	847	1,009	903	757	823
Unknown	104	87	46	50	67	160	81	96	51	49

b. Urban roads

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Car driver	1,728	1,537	1,524	1,544	1,634	1,596	1,542	1,525	1,380	1,484
Car passenger	911	732	743	737	726	669	678	661	558	604
PTW driver	1,901	1,716	1,690	1,631	1,547	1,583	1,545	1,580	1,378	1,425
PTW passenger	106	105	105	103	83	94	74	72	64	66
Cyclist	1,124	1,083	1,116	1,100	1,149	1,109	1,151	1,180	1,059	1,004
Pedestrian	3,645	3,508	3,506	3,349	3,537	3,471	3,433	3,295	2,556	2,505
Other	365	380	392	402	363	364	444	423	370	419
Unknown	77	68	36	25	62	96	72	73	42	40

c. Motorways

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Car driver	662	670	632	710	693	702	671	687	533	558
Car passenger	436	409	398	425	403	378	367	361	239	291
PTW driver	171	193	156	176	200	203	222	213	184	203
PTW passenger	19	17	14	9	13	16	13	18	13	14
Cyclist	4	6	9	10	5	4	7	10	6	10
Pedestrian	207	203	211	210	227	220	228	227	171	208
Other	304	345	326	367	354	404	444	396	315	430
Unknown	27	20	20	19	25	50	68	27	7	19

Source: CARE database

Figure 10. Proportion (%) of road deaths by road user group and road type in the EU27 (average 2019-2021)

	Rural	Urban	Motorways
Car driver	68%	23%	9%
Car passenger	63%	25%	12%
PTW driver	54%	40%	6%
PTW passenger	53%	39%	9%
Cyclist	43%	57%	0%
Pedestrian	23%	72%	5%
Other	51%	25%	24%
Unknown	49%	38%	13%

Figure 11. Reductions in road deaths on rural and urban roads by road user group in the EU27 between 2012 and 2021

	Rural	Urban
Car driver	-28%	-14%
Car passenger	-38%	-34%
PTW driver	-15%	-25%
PTW passenger	-25%	-38%
Cyclist	-14%	-11%
Pedestrian	-43%	-31%
Other	-21%	15%
Unknown	-53%	-48%

European Transport Safety Council

20 Avenue des Celtes
B-1040 Brussels
jenny.carson@etsc.eu
Tel: +32 2 230 4106
www.etsc.eu/pin
@ETSC_EU

ETSC
European Transport Safety Council