HOW SAFE IS WALKING AND CYCLING IN EUROPE?

PIN Flash Report 38

January 2020

ETSC
European Transport Safety Council

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The PIN programme relies on panellists in the participating countries to provide data for their countries 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.

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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 Member States. It maintains its independence through funding from a variety of sources including membership subscriptions, the European Commission, and public and private sector support.

ABOUT THE ROAD SAFETY PERFORMANCE INDEX PROJECT

ETSC's Road Safety Performance Index (PIN) programme was set up in 2006 as a response to the first road safety target set by the European Union to halve road deaths between 2001 and 2010. In 2010, the European Union renewed its commitment to reduce road deaths by 50% by 2020, compared to 2010 levels.

By comparing Member State performance, the PIN serves to identify and promote best practice and inspire the kind of political leadership needed to deliver a road transport system that is as safe as possible.

The PIN covers all relevant areas of road safety including road user behaviour, infrastructure and vehicles, as well as road safety policymaking. Each year ETSC publishes PIN Flash reports on specific areas of road safety. A list of topics covered by the PIN programme can be found on http://etsc.eu/projects/pin/.

"How safe is walking and cycling in Europe?" is the 38th PIN Flash report. The report covers 32 countries: the 28 Member States of the European Union together with Israel, Norway, the Republic of Serbia and Switzerland.

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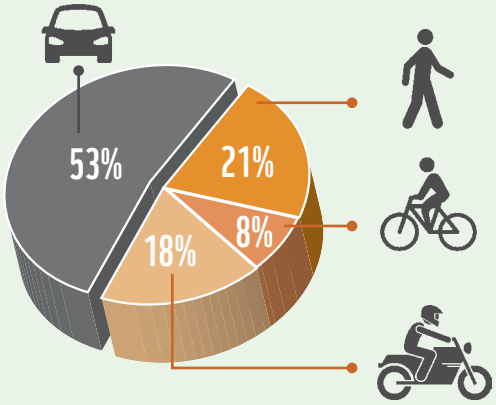
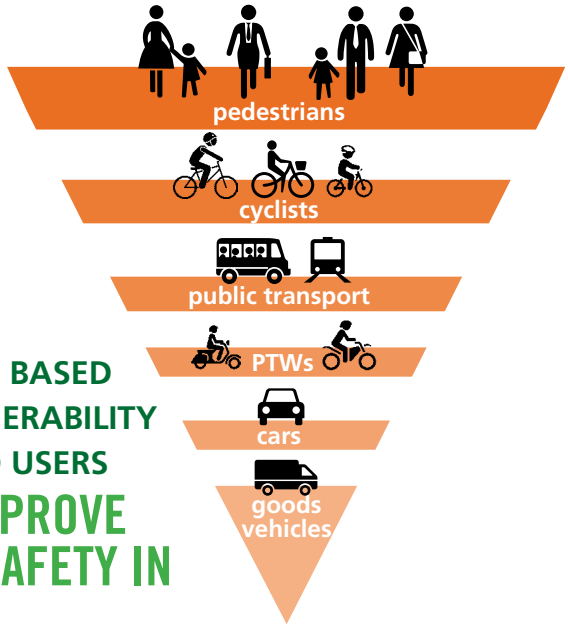
2160 CYCLISTS
KILLED
EACH YEAR IN THE EU





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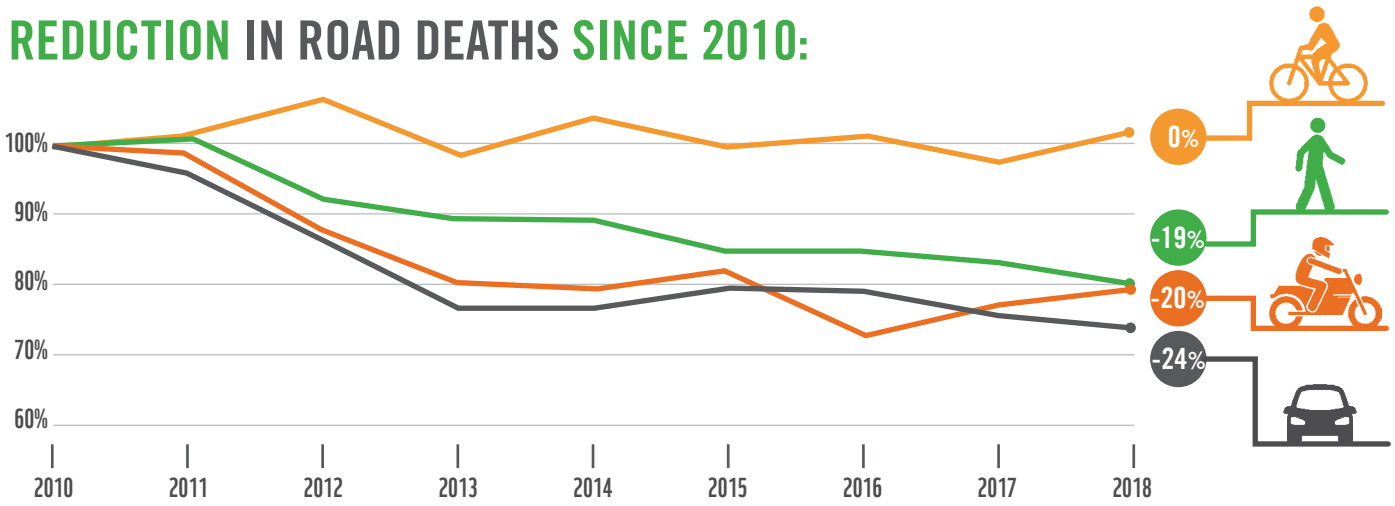
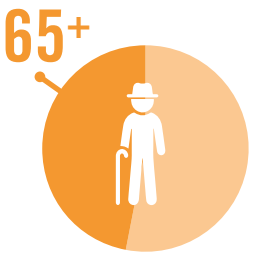
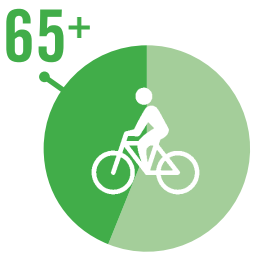




47% OF PEDESTRIANS KILLED



44% OF CYCLISTS KILLED

ARE 65 YEARS OR OLDER

RECOMMENDATIONS

- 30 km/h zones supported by traffic calming
- Reduced motor vehicle traffic
- Safe pedestrian crossings, intersections and footways
- Separate cycling paths
- Improved enforcement

EXECUTIVE SUMMARY

At least 51,300 pedestrians and 19,450 cyclists were killed on EU roads over the period 2010 to 2018. 5180 pedestrians and 2160 cyclists lost their lives in 2018 alone.

Deaths among pedestrians and cyclists, the most vulnerable road users, account for 29% of all road deaths across the EU. These groups are also the least likely to harm other road users.

The proportion of pedestrians and cyclists killed has also increased slightly since 2010. In 2018, pedestrians killed represent 21% and cyclists 8% of all road deaths compared to 20% and 7% respectively in 2010.

Big disparities exist between countries in terms of the relative safety of walking and cycling.

Underreporting of road deaths and injuries in official statistics is also a bigger problem for pedestrians and cyclists than for other road users. Underreporting is highest for cyclists, especially in single bicycle collisions where no motorised vehicle is involved.

REDUCING DEATHS AMONG PEDESTRIANS

The number of pedestrian deaths has decreased by 2.6% on average each year in the EU over the period 2010 to 2018 compared to a 3.1% annual reduction in motorised road user deaths over the same period. In 13 EU countries pedestrian deaths were reduced at a faster pace than motorised road user deaths. Norway and Slovenia have achieved a rapid annual reduction in the number of pedestrian deaths of 9% and 8% respectively over the period 2010-2018. The progress stagnated in France and Italy. Pedestrian deaths increased by, on average, 1% each year in the UK and 0.5% in Hungary.

People over 65 years old represent 20% of the EU population but account for as many as 47% of all pedestrian deaths.

70% of all reported pedestrian deaths in the EU occur on urban roads. Given the high level of urbanisation in Europe and frequent interaction between pedestrians and motorised transport in cities and towns, such a proportion is not surprising.

In the EU, 99% of pedestrian deaths follow a collision with a motor vehicle: 68% involve a car, 10% a heavy goods vehicle (HGV), 9% a van, 3% a bus or coach, around 4% a power-two-wheeler (PTW) and 6% other vehicles. 1% follow a collision with a bicycle.

REDUCING DEATHS AMONG CYCLISTS

The number of cyclist deaths has decreased by only 0.4% on average each year in the EU over the period 2010 to 2018 compared to a 3.1% annual reduction in motorised road user deaths over the same period. In some countries, reductions in cyclist deaths are, to a large extent, related to the overall developments in road safety as cyclist deaths are reducing at the same pace as motorised road user deaths. Only in nine PIN countries were cyclist deaths reduced at a faster pace than motorised road user deaths. Lithuania reduced cyclist deaths by 11% annually - four percentage points faster than its reduction of motorised road user deaths. Latvia and Slovenia follow with 7% annual reductions in cyclist deaths which is four percentage points higher than reductions in motorised road user deaths.

People above 65 years old account for 44% of all cyclist deaths in the EU.

57% of all reported cyclist deaths in the EU occurr on urban roads and 42% on rural roads.

In the EU, 83% of cyclist deaths follow a collision with a motor vehicle: 53% involve a car, 13% a heavy goods vehicle, 7% a van, 2% a bus or coach, 2% a PTW and 6% other vehicle. 16% of all cyclist deaths occur following a single bicycle collision where no other vehicle is involved and 1% is bicycle to bicycle collisions. Single bicycle collisions are particularly prone to be underreported in police records.[1]

[1] Schepers P. et al. (2017), Science direct, Bicycle fatalities: trends in crashes with and without motor vehicles in the Netherlands, http://bit.ly/2MUH998

REDUCING SERIOUS INJURIES AMONG PEDESTRIANS AND CYCLISTS

30,000 pedestrians and 32,000 cyclists were recorded as seriously injured in 2018 in the 21 EU countries that could provide data based on national definitions of serious injuries.

Given high levels of underreporting of pedestrian and cyclist collisions, the actual numbers of both serious injuries and deaths of pedestrians and cyclists are likely to be higher.

Serious injuries of pedestrians decreased by 6% in 2018 compared to 2010 in the EU21. Over the same period, cyclist injuries increased by as much as 28% in the same group of countries.

STRATEGIC PLANNING

Governments should put in place strategic planning to improve pedestrian and cyclist safety, including ambitious targets and priority areas for action, establish a proactive approach, involve all relevant stakeholders in the preparation and execution of the plans, set clear deadlines and dedicate an appropriate budget for implementation. Some governments among the PIN countries have developed and are implementing national walking and cycling strategies but the level of detail and ambition on safety differ.

A number of local authorities in the EU have started working on preparing and implementing Sustainable Urban Mobility Plans (SUMPs) but improvements are needed to ensure that these plans are closely linked to road safety priorities. Including road safety, in particular for pedestrians and cyclists, in all steps of the planning and implementation cycle would ensure that the main road safety problems and the key stakeholders necessary to tackle them are identified and mobilised.

The EU road safety policy framework 2021-2030[2] includes a list of key performance indicators (KPIs), developed in cooperation with Member States. The KPIs on speed, protective equipment and vehicle safety are related to pedestrian and cyclist safety. Tracking the progress for each KPI will help decision makers in developing well-informed and more targeted policies. ETSC recommends to additionally explore and develop a KPI on the safety of pedestrian and cyclist infrastructure.

Recently the European Parliament, the Committee of the Regions as well as ETSC and other stakeholders have called for the European Commission to come forward with a cycling strategy for the EU. ETSC is now calling for the adoption of an EU-wide safe active mobility strategy to encourage a co-ordinated European response to the challenge of making walking and cycling as safe as possible.

INFRASTRUCTURE SAFETY, LAND USE PLANNING AND SPEED

Infrastructure and speed govern the interaction between road users, and play an important role in determining road user safety. Infrastructure can contribute to reducing speeds and separating pedestrians and cyclists from motorised vehicles. This can reduce both pedestrian and cyclist deaths and severe injuries when collisions do occur, or even prevent those collisions from happening.

The revised EU Road Infrastructure Safety Management (RISM) directive 2019/1936[3] mandates, for the first time, to systematically take vulnerable road users, including pedestrians and cyclists, into account in all infrastructure safety management procedures on the roads covered by the directive. Pedestrians and cyclists mostly travel on urban roads. Although not mandatory, EU Member States are encouraged to extend the safety management principles of the RISM directive to their urban roads.

Infrastructure can contribute to reducing speeds and separating pedestrians and cyclists from motorised vehicles

At speeds of below 30 km/h, cyclists can mix with motor vehicles in relative safety. Traffic calming measures in 30 km/h zones are essential to discourage drivers from exceeding the speed limit. Enforcement on roads limited to 30 km/h also has a contribution to make

[2] European Commission, Staff working document (19.6.2019), EU Road Safety Policy Framework 2021-2030 – Next steps towards "Vision Zero", https://bit.ly/2XXX8Xh

[3] Directive (EU) 2019/1936 of the European Parliament and of the Council of 23 October 2019 amending Directive 2008/96/EC on road infrastructure safety management, http://bit.ly/2XTGwkd

where engineering measures by themselves are insufficient to bring drivers to safer speeds.

According to the Safe System approach, cyclists should not mix with motor vehicle traffic where motor vehicle speeds exceed 30 km/h. Member States need to prioritise the provision of separate cycling infrastructure on the roads with the highest speeds and those with the highest volumes.[4] Care should also be taken to separate cyclists and pedestrians by giving each of them, where possible, enough space so that they do not intrude on each other's space. Increasingly urban planning must also take into account new personal modes of transport such as e-scooters, taking into consideration how to keep their riders as well as pedestrians and cyclists sharing space with them out of harm's way.

Pedestrian safety is improved when pedestrians can walk on safe footways, not on the carriageway. When crossing the road it is important that pedestrians can see the traffic without obstacles obstructing their view and vice-versa.

Special attention should be paid to the issue of turning vehicles, which are an important contributor to pedestrian and cyclist deaths and serious injuries. Member States should prioritise re-designing intersections to minimise risk to vulnerable road users.

VEHICLE SAFETY

Following an agreement reached in 2019, the revised EU General Safety Regulation and Pedestrian Safety Regulation have been updated with improved passive and active safety requirements for all new vehicles sold in the EU.[5] Many of those new vehicle safety requirements, such as Intelligent Speed Assistance (ISA), Automated Emergency Braking (AEB) with vulnerable road user detection, enlarged head impact protection zones, direct vision requirements and Blind Spot Detection Systems for heavy goods vehicles will contribute to improving pedestrian and cycling safety. To accelerate the market penetration of safe vehicles, Member States and local authorities should introduce public procurement requirements and urban access regulations to promote safer vehicles.

MANAGING ROAD USER BEHAVIOUR TO IMPROVE SAFETY

Integrating walking and cycling into the traffic system requires motorised road users to act in a way so that pedestrians and cyclists can predict and react to them safely, and vice-versa. Children, whose behaviour in traffic might be unpredictable, are an exception, thus drivers have to be alert and reduce their speed in locations where the presence of children is likely. Such behaviour can be achieved through an optimal combination of appropriate laws, self-explaining and self-enforcing infrastructure, traffic law enforcement, safe vehicles and education on safe road use.

NO DATA DOESN'T MEAN THERE ISN'T A PROBLEM

Pedestrian and, in particular, cyclist collisions are underreported in police reports when compared to other data sources such as hospital records, coroner data, court files or others. In many countries, road safety work is guided by road death and serious injury data collected by the police. Safety of underreported road user groups might not receive sufficient attention from policy makers. The scope of the underreporting problem, especially for single bicycle collisions with no motorised vehicle involved, should be researched and tackled.

As the use of e-bikes is growing across the EU, the road safety implications of electrically-assisted bicycles should also be further researched.

When a pedestrian falls down and is injured or dies while walking on a footway or carriageway, these injuries or deaths are not currently considered as road casualties. The importance of this issue is generally overlooked. Especially in light of an ageing population, making walking safer will have to take account of the specific needs of older people. Walking should be treated the same way as other modes of travel and those injured in single pedestrian falls should be considered as road casualties. The scope of the problem should be evaluated and acted upon.

[4] OECD (2013), Cycling, Health and Safety, http://goo.gl/qPHEf4

[5] Regulation (EU) 2019/2144 of the European Parliament and of the Council of 27 November 2019 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://bit.ly/2RZ6xh5

MAIN RECOMMENDATION TO ALL LEVELS

- Develop a policy of modal priority for road users, particularly in urban areas, the hierarchy being based on safety, vulnerability and sustainability. Walking should be at the top of the hierarchy, followed by cycling and use of public transport.

MAIN RECOMMENDATIONS TO MEMBER STATES

- Design and implement walking and cycling safety strategies, which include targets and infrastructure measures to improve walking and cycling safety.
- Encourage local authorities to adopt zones with a speed limit of 30 km/h supported by traffic calming measures in residential areas, areas used by many pedestrians and cyclists and on the way to schools.
- Develop, and encourage responsible authorities to apply, national safe infrastructure design guidelines for traffic calming measures, intersections, pedestrian crossings or cycling infrastructure design. Renew the guidelines regularly based on the latest research and innovation.
- 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.
- Intensify traffic law enforcement, especially for speeding in urban areas, where there are high numbers of pedestrians and cyclists.
- Consider how to improve registration of deaths and serious injuries of pedestrians and cyclists and tackle underreporting. Analyse single bicycle collisions, including how they are recorded, as a matter of priority.
- 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.

MAIN RECOMMENDATIONS TO EU INSTITUTIONS

- 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.
- Create an EU fund to support priority measures such as for cities to introduce 30 km/h zones supported by traffic calming measures, particularly in residential areas and where there are a high number of pedestrians and cyclists, and on the way to schools.
- Introduce a KPI on the proportion of roads within the road network with speed limits set at safe and credible levels (e.g. 30 km/h in areas with a lot of vulnerable road users).
- Together with Member States, develop KPIs on pedestrian, cyclist and power two wheeler 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.

Within the context of the future revision of the Road Infrastructure Safety Management Directive (RISM):

- Extend the application of the instruments of the RISM Directive to cover all EU co-financed roads, all primary roads including all main rural and main urban roads.

MAIN RECOMMENDATIONS TO MEMBER STATES AND EU INSTITUTIONS

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

- Deliver on the estimated number of deaths and serious injuries prevented by adopting strong and timely secondary regulation implementing the GSR.
- Require a high level of performance of Intelligent Speed Assistance systems to be fitted in all new vehicles.

INTRODUCTION

The European Union (EU) is facing a multitude of interconnected demographic, public health and environmental challenges: the climate is changing; road deaths are stagnating; urbanisation is increasing, air pollution is worsening, obesity is rising and the population is ageing.

But there is an increasing recognition at local, but also national and EU level, that boosting the levels of active mobility, particularly walking and cycling, can play an important role in overcoming many of these challenges. Such a policy will also have economic benefits. Based on conservative estimates, even current levels of cycling in the EU produce benefits valued at around 150 billion euros per year.[6]

In contrast, the negative external costs of motorised road transport such as congestion, pollution and climate change are estimated at 800 billion euros per year in a recent study for the European Commission.[7]

This report examines the most recent available data on the current safety levels of cycling and walking across the EU and other countries that provide data to ETSC as part of its Road Safety Performance Index (PIN) programme.

As with reports on other topics, ETSC found a very mixed picture across different countries. On the one hand, the Netherlands and Denmark with a large amount of comparatively safe cycling and walking – and, on the other, Romania and others that have a long way to go.

Unfortunately, the available data do not give the full picture. Underreporting of deaths and injuries is a particular problem for pedestrians and especially cyclists. When a lone cyclist falls off a bike and dies or is seriously injured, the police may not be called, and the death may not show up in the main national road death statistics.

In addition, when a pedestrian falls down and is injured or dies while walking on a footway or carriageway, these injuries or deaths are not currently considered as road casualties.

It is also difficult to get data on the amount of walking and cycling in order to give figures for the numbers of deaths and injuries per km travelled or time spent. It is easy to achieve zero cyclist deaths when no-one feels safe enough to ride a bike.

Despite these limitations, it is possible to see the kinds of policies that are working, and there are examples from national experts throughout the report. As always, the Safe System approach requires a combination of safe infrastructure, safe speeds, safe road users and good quality emergency response.

But incremental changes will not be enough. For a serious shift to walking and cycling, particularly for local journeys in densely populated areas, the very design of urban spaces will need to change. Motorised traffic will need to slow down when it comes into spaces used by vulnerable road users; separated infrastructure and smart intersection design will be essential; school streets without cars may need to become the norm.

In all this, there will be a role for the EU, national and local governments and ETSC presents recommendations for policymakers throughout the report, with the main ones brought together in the Executive Summary.

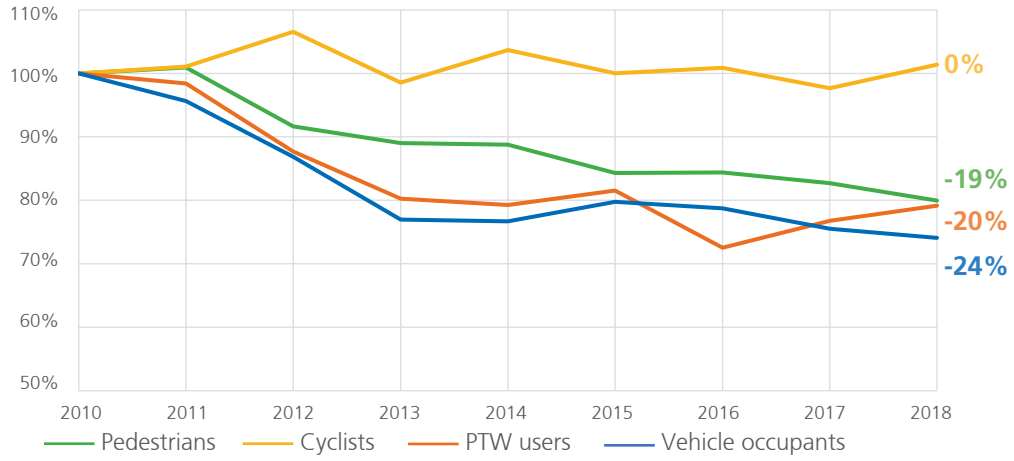
[6] European Cyclist Federation, The benefits of cycling, http://bit.ly/36L0zV0
[7] European Commission (2019), Internalisation of transport external costs, http://bit.ly/2S1nDeq

OVERVIEW: PEDESTRIANS AND CYCLISTS ACCOUNT FOR 29% OF ALL ROAD USER DEATHS IN THE EU

Pedestrian deaths in the EU decreased by 19%, powered two wheeler (PTW) rider deaths by 20% and vehicle occupant deaths by 24% over the period 2010-2018. Cyclists were the only road user group that saw a stagnation (Fig.1). It is broadly assumed that levels of cycling have increased since 2010 but data on km cycled or on the number of trips made by cycling are lacking in many EU countries.

It should be noted that there is a high level of underreporting of collisions involving pedestrians and in particular cyclists, especially in single bicycle collisions where no other vehicle is involved. The actual numbers of pedestrian and cyclist road deaths are likely to be higher than the reported numbers (see 8.1).

Figure 1. Progress in reducing the number of pedestrian, cyclist, PTW user and vehicle occupant deaths reported by the police in 28 EU countries over the period 2010-2018.

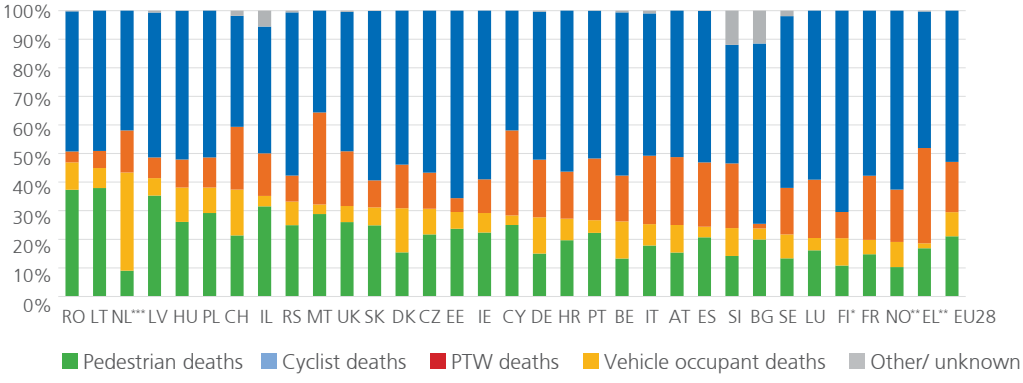


Pedestrians and cyclists are the most vulnerable road users and their use of the roads is being encouraged for reasons of health and sustainability. Pedestrians account for 21% of all road deaths across the EU while cyclists represent a further 8%, compared to 20% and 7% respectively in 2010. Big disparities exist between countries (Fig.2), though this is partially due to the differences in the modal share.

For example, countries where cycling is common, such as the Netherlands and Denmark, have a higher proportion of cyclist deaths compared to countries where cycling is not as widespread. However, this does not imply that cycling in the Netherlands and Denmark is unsafe. In fact, these countries are some of the safest places to cycle with extensive cycling infrastructure networks. In the Netherlands, for example, on average, a person cycles 865 km annually, and cyclists account for one third of all road deaths. In Denmark, on average, a person cycles 500 km per year and cyclists account for 15% of all road deaths.

The largest proportion of pedestrian deaths is observed in Lithuania and Romania where pedestrians account for 39% and 38% of all road deaths respectively. They are followed by Latvia with 35%, Israel with 32%, Poland with 29% and Hungary and the UK with 26%.

Figure 2. Pedestrian, cyclist, power-two-wheeler (PTW) user and vehicle occupant deaths reported by the police as a proportion of all reported road deaths ranked by the proportion of deaths that were pedestrians and cyclists taken together (2016-2018 average). *FI – provisional data for 2018. **EL and NO 2016-2017. ***NL – Statistics Netherlands data.



INDICATOR – ROAD DEATHS

The average annual change in the number of recorded deaths among pedestrians and cyclists and a corresponding reduction of motorised road user deaths between 2010 and 2018 (Fig.3 and Fig.10) is used as the main indicator of progress. In some countries, progress in reducing pedestrian and cyclist deaths can be related to the overall progress in reducing road deaths. Country progress is compared since the year 2010, the base year for the EU target to halve the number of road deaths by 2020.

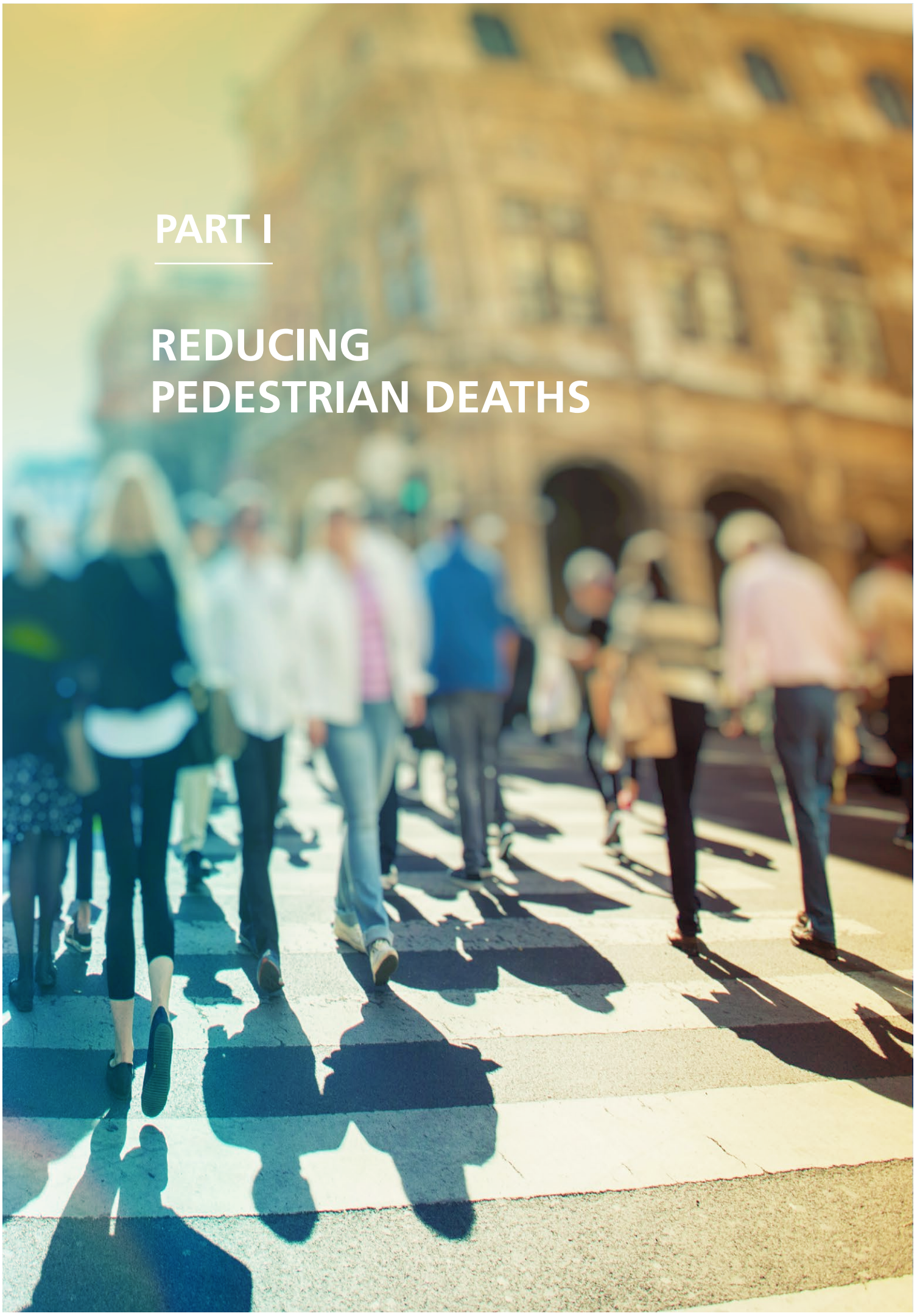
Countries are also presented according to the recorded numbers of pedestrian and cyclist deaths per million inhabitants (Fig.4 and Fig.11). Population data were retrieved from the Eurostat database. A better indicator would have been to estimate the road risk of pedestrians and cyclists based on the number of trips made or the distance or time walked and cycled. However, such data are not available in the majority of the PIN countries. Data on distance cycled were only available in Austria, Belgium, Denmark, Finland, Germany, Great Britain, the Netherlands, Switzerland and Sweden for at least one year since 2010. Data on distance walked were only available in Belgium, England, Finland, Ireland, Sweden and Switzerland. These countries use different methodologies to collect travel data, making it hard to compare them.

The numbers of recorded road deaths and serious injuries used in this PIN Flash report were retrieved by the European Commission from the CARE database on ETSC's request. Additional data, if needed, and qualitative information were provided by the PIN panellists (see inside cover). Some data used in this report are available in the annexes, the full data set is available at www.etsc/pinflash38. Data for the Netherlands were provided by the PIN panellist from Statistics Netherlands records instead of the police records for Fig.1, 2, 3, 4, 6, 8, 10, 11, 12, 13 and 15. Statistics Netherlands corrects collision data reported by the police by comparing and complementing police data with death certificates and court files of unnatural deaths. For other countries, this PIN Flash report makes use of the number of reported road deaths by the police and therefore does not take into account underreporting. Past studies have shown that underreporting is higher for pedestrians and, especially, cyclists.[8]

The analysis builds on previous rankings on the numbers of unprotected road users killed: ETSC's 5th Road Safety PIN report (2011) and PIN Flash 29 (2015) "Making walking and cycling safer". The publications are available at www.etsc.eu/PIN. The policy part of this report builds on ETSC's 2016 publication "The European Union's role in promoting the safety of cycling".[9]

[8] For more information, see for instance ETSC (2018), An Overview of Road Death Data Collection in the EU, PIN Flash 35, https://etsc.eu/pinflash35/

[9] ETSC (2016), The European Union's role in promoting the safety of cycling, http://bit.ly/2XPQcfm



PART I

REDUCING PEDESTRIAN DEATHS

1.1 PROGRESS IN REDUCING DEATHS AMONG PEDESTRIANS

Pedestrian deaths were reduced in 22 out of 28 EU countries between 2010 and 2018 (Fig.3).[10] Yet 5180 pedestrians were killed in the EU in 2018 alone, representing 21% of all road deaths. 51,300 have been killed since 2010.

The number of pedestrian deaths has decreased by 2.6% on average each year in the EU over the period 2010 to 2018 compared to a 3.1% annual reduction in motorised road user deaths over the same period. Fig.3 shows that, in some countries, reductions in pedestrian deaths are, to a large extent, related to the overall developments in road safety. This is the case in Norway, Greece, Lithuania, Switzerland, Belgium, Portugal, Latvia, the Czech Republic, Serbia and Romania where pedestrian deaths were reduced at a similar pace as motorised road user deaths.

Norway and Slovenia recorded average annual reductions in the number of pedestrian deaths of 9% and 8% respectively over the period 2010-2018 (Fig.3). In Slovenia, pedestrian deaths were reduced by, on average, almost five percentage points faster each year than motorised road user deaths. Lithuania and Greece follow with 7% annual reductions in pedestrian deaths which corresponds to the progress in reducing the number of motorised road user deaths in these countries.

Progress in reducing pedestrian deaths stagnated in Cyprus, France and Italy while over the same period motorised road user deaths in these countries were decreasing by around 3% each year.

Pedestrian deaths increased on average by 1% each year in the UK and 0.5% in Hungary while over the same period motorised road user deaths decreased by around 1%.

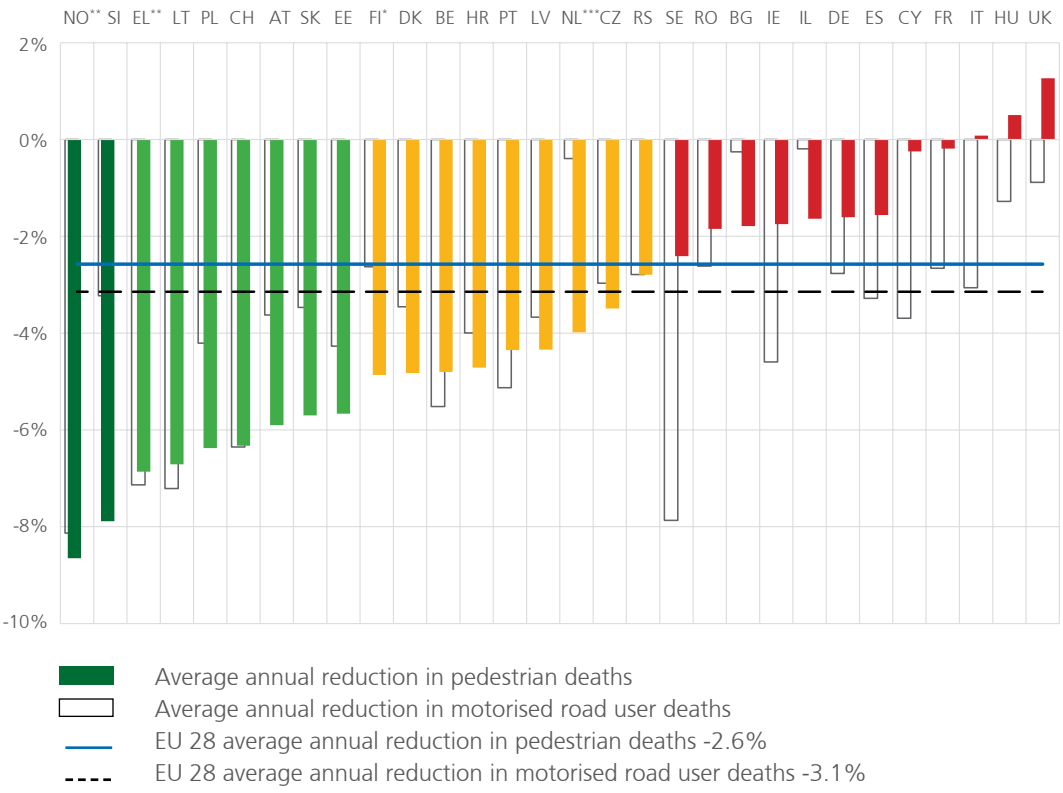


Figure 3. Average annual change in pedestrian deaths compared to the average annual change in motorised road user deaths reported by the police over the period 2010-2018.
LU and MT are excluded from the figure due to fluctuations in statistically small numbers of pedestrian deaths but their numbers are included in the EU28 average.
**EL and NO 2010-2017.
***NL – Statistics Netherlands data.

[10] The average annual decrease is based on the entire time series of all the nine annual numbers of pedestrian deaths between 2010 and 2018, and estimates the average exponential trend. For more information read the methodological note, PIN Flash 6: https://bit.ly/2LVVUtY

BELGIUM

AN INCREASING NUMBER OF PEDESTRIAN AND 30 KM/H ZONES

In Belgium, pedestrian deaths decreased by on average 5% and serious injuries by 2% each year over the period 2010-2018. 74 pedestrians lost their lives in 2018 compared to 108 in 2010.

"Multiple cities and towns in Belgium are pedestrianising specific areas and introducing or extending 30 km/h zones supported by traffic calming measures. Over the past five years, the city of Brussels has rolled out a plan to clear the city centre of traffic by creating a pedestrian zone which will be one of the largest in Europe once completed. The Brussels government has also decided to implement a default 30 km/h speed limit across the city from January 2021 which could further improve pedestrian and cyclist safety if drivers comply with the speed limit. The announcement of the policy was accompanied by the news that automated speed enforcement capacity in the city will be increased and 30 high risk sites will be treated. A publicity campaign encouraging drivers to respect the new limit ahead of its formal launch has also been running across the city since the announcement."

Stijn Daniels, VIAS institute, Belgium

POLAND

CONSIDERATIONS TO IMPROVE PEDESTRIAN SAFETY THROUGH TRAFFIC CODE; SAFER PEDESTRIAN CORSSINGS

Road deaths of pedestrians were reduced by on average 6% each year in Poland over the period 2010-2018. 803 were killed in 2018 compared to 1236 in 2010.

"Recently the Polish Prime Minister proposed to introduce changes in the traffic code, such as pedestrian priority when entering a pedestrian crossing and a uniform speed limit of 50 km/h in urban areas. Currently Poland is the only EU country that has a higher night time speed limit of 60 km/h in urban areas. If adopted, the new measures could potentially improve pedestrian safety if supported by traffic law enforcement activities."

"The national government has issued a recommendation on the lighting at pedestrian crossings that is being widely implemented in Poland. In addition, local authorities started installing built-in motion sensors at pedestrian crossings or in the traffic signs which detect pedestrians approaching the crossing and start flashing to warn the drivers about a pedestrian in a vicinity."

Dagmara Jankowska-Karpa, Motor Transport Institute, Poland

1.2 DIFFERENCES IN PEDESTRIAN MORTALITY AMONG EU COUNTRIES IS A FACTOR OF TEN

Norway, the Netherlands and Sweden have the lowest pedestrian mortality rate (Fig.4) among the PIN countries. In Norway, two pedestrians are killed per year per million inhabitants, three in the Netherlands and four in Sweden.

But big disparities in pedestrian safety exist in Europe. Pedestrian road mortality varies by almost a factor of ten between countries at either end of the range.

By far the highest pedestrian road mortality among EU countries is in Romania with 36.5 deaths per million population which is more than triple the EU average of 10.4.

Despite the positive developments in reducing the number of pedestrian deaths (Fig.3), pedestrian mortality in Latvia, Lithuania and Poland is still among the highest in the EU - 27, 25 and 22 per million inhabitants respectively.

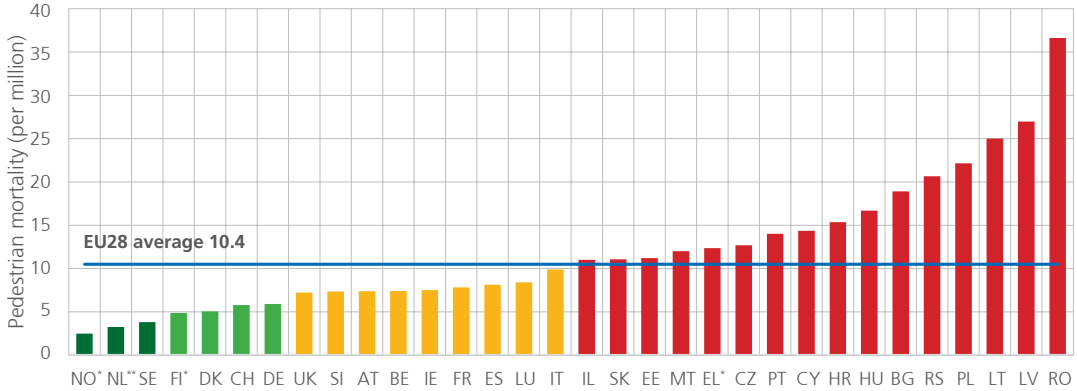


Figure 4. Pedestrian deaths reported by the police (2016-2018 average) per million inhabitants in 2018. *FI – provisional data for 2018. **EL and NO – 2016-2017. ***NL – Statistics Netherlands data.

Another indicator of the level of pedestrian safety is the risk as a function of the number of trips, distance or time spent walking. In the majority of PIN countries such data are not available.

Only Belgium, Finland, Sweden and the UK could provide data on km walked (Table 1). All of these countries use different methodologies to collect the data. It can be noted that pedestrian mortality in Belgium and the UK is around 7 per million inhabitants while pedestrian road risk (pedestrian deaths per km walked) is almost twice as high in Belgium as in the UK. These differences prove that data on km walked are essential to estimate the risks of walking.

Table 1. Distance walked per year per inhabitant (km), pedestrian deaths per million inhabitants and pedestrian deaths per billion km walked in countries that could provide travel data for at least one year.
Data collection methodologies differ between countries. Data source on km walked: PIN panellists.

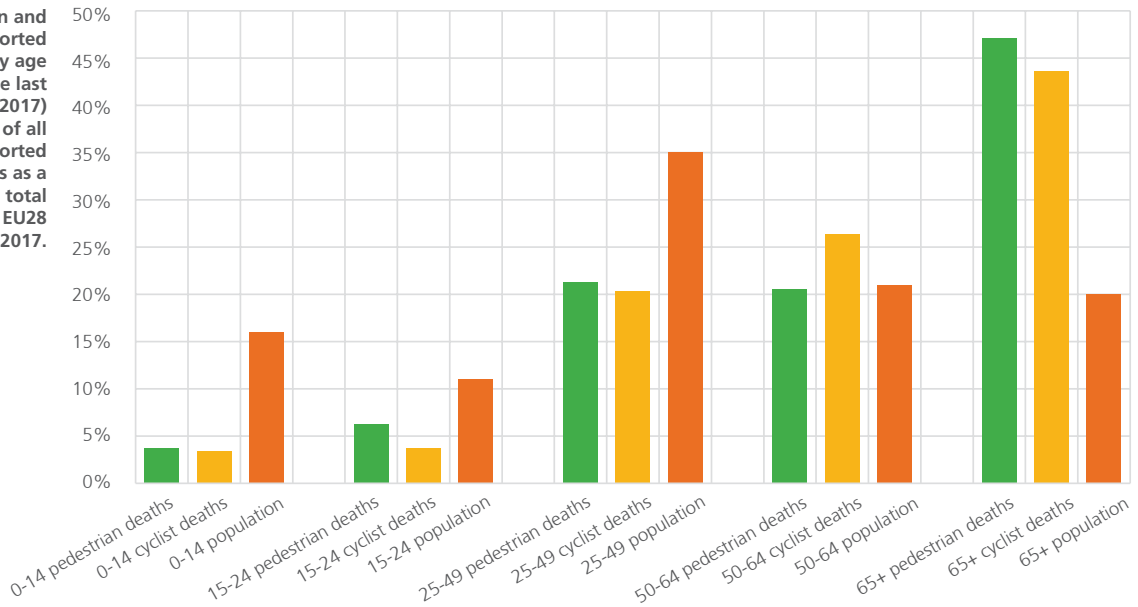
	Distance walked per year per inhabitant (km)	Pedestrian deaths per mln inhabitants in 2018	Pedestrian deaths per bln km walked	Average years, pedestrian deaths	Average years, distance walked
BE	208	7	38	2015-2017	2016
FI	365	5	15	2015-2017	2016
SE	214	4	19	2014-2016	2014-2016
UK	329	7	22	2016-2018	2016-2018

1.3 HALF OF ALL KILLED PEDESTRIANS IN THE EU ARE ABOVE 65 YEARS OLD

People above 65 years old represent 20% of the EU population and account for as many as 47% of all pedestrian deaths (Fig.5).

The age group 50 to 65 accounts for 21% of all pedestrian deaths and 21% of the EU population, the age group 25 to 49 for 21% of all pedestrian deaths and 35% of the EU population, the age group 15 to 24 for 6% of all pedestrian deaths and 11% of the population and children under 15 for 4% of all pedestrian deaths and 16% of the population.

Figure 5. Pedestrian and cyclist deaths reported by the police by age group (years) in the last three years (2015-2017) as a proportion of all such deaths so reported and age groups as a proportion of the total population in the EU28 in 2017.



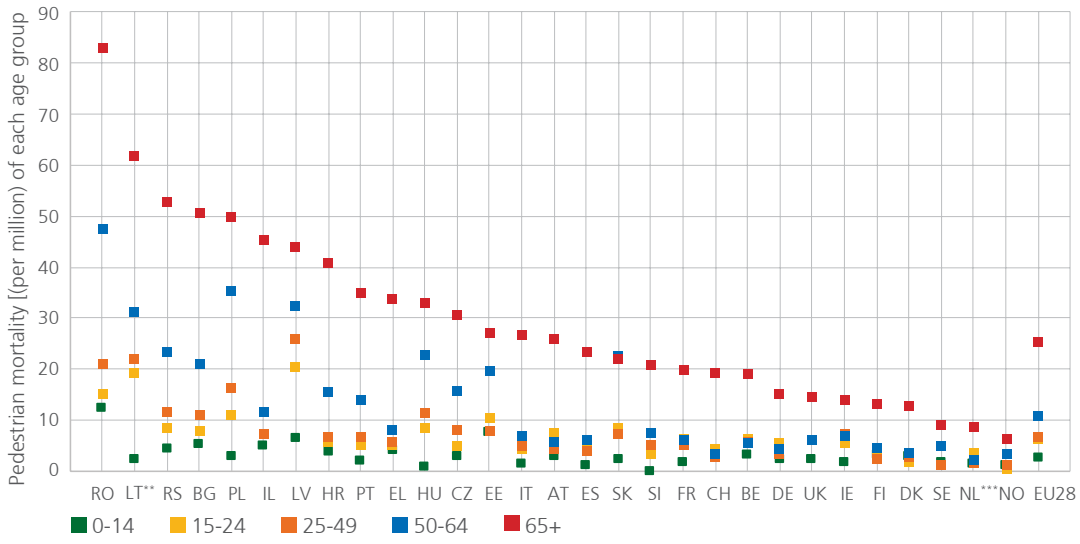
In the EU, pedestrian road mortality is consistently lowest for children at 2 deaths per million child population (0-14 years old) (Fig.6). For young people (15-24 years old), there are around three times as many deaths - 6 per million population of that age group. The number for adults under 50 is similar - 7 deaths per million population of that age group. The highest pedestrian mortality rates are for people aged 50-64 and over 65 with 10 and 24.5 deaths per million population in those age groups respectively.

In Romania, 12 child pedestrians are killed per million child population – six times more than the EU average of 2. Estonia follows with 8, Latvia with 7 and Bulgaria with 6. Child pedestrians have the lowest mortality in Slovenia with zero, followed by Hungary, Norway and Spain with 1 child pedestrian death per million child population.

The mortality of people over 65 is high in Romania at 83 deaths per million elderly population – more than 3 times higher than the EU average of 24.5. Romania is followed by Lithuania with 62, Israel with 53, Bulgaria with 51 and Poland with 50 deaths per million elderly population. Elderly pedestrians have the lowest mortality in Norway with 6 deaths per million elderly population, the Netherlands and Sweden with 9, Denmark and Finland with 13 and Ireland with 14 per million.

However, the data used for this indicator do not allow estimation of the extent to which the differences in mortality rates between the age groups are down to the amount of walking, amount of involvement in collisions or ability to survive a collision - each factor is likely to vary with age.

Figure 6. Pedestrian deaths reported by the police (2015-2017 average) per million inhabitants in 2017 by age group (years) ranked by 65+ mortality.
CY, LU and MT are excluded due to fluctuation in statistically small numbers of deaths but their numbers are included in the EU28 average. *LT – 2015. **NL – Statistics Netherlands data, age groups: 0-14, 15-20, 21-30, 31-50, 51-60, 60+.



IRELAND
AN ANALYSIS ON BEHAVIOURS AND PERCEPTIONS OF OLDER ROAD USERS

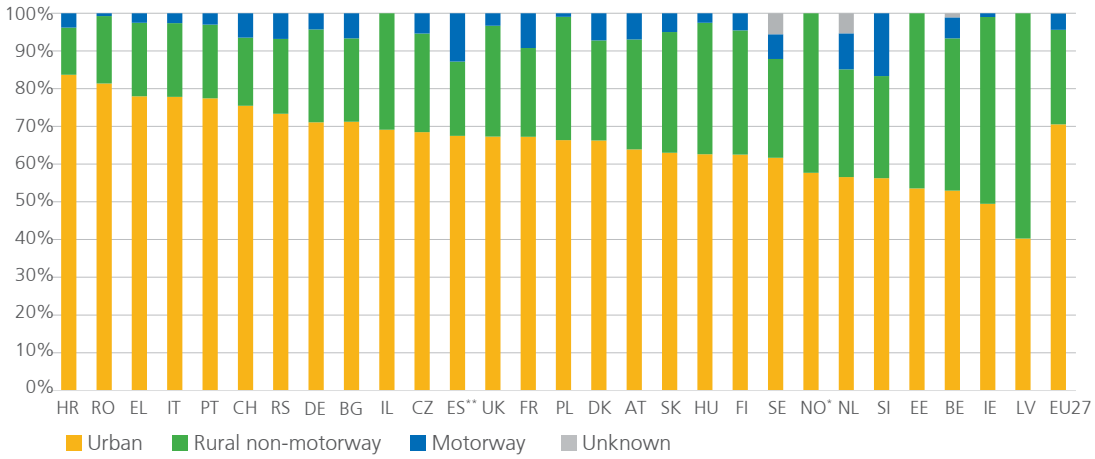
Analysis commissioned by the Irish Road Safety Authority (RSA) showed that walking is a popular form of transport for older adults. 66% of people aged 50 to 74 indicated walking as one of the most frequently used modes of transport. This proportion dropped to 50% for people aged 75+.[11]

The analysis revealed that many older adults walk slowly and cannot walk as far as they used to. They often cross the road at locations other than official pedestrian crossings which is due to a lack of crossings or a large distance to the nearest crossing. Older adults are cautious in traffic to be able to cope or compensate for poor behaviours of other road users. They perceive cyclists and drivers, particularly young drivers, as the biggest threats to their own safety, while environmental issues e.g. lack of footways, poor quality footpaths, overgrown hedging, lack of pedestrian crossings and inappropriate locations of crossings are also common concerns.

The report recommended that the RSA should cooperate with local authorities in developing and maintaining appropriate walking facilities, ensure appropriate road design and promote awareness of the needs of older adults among other road users.[12]

[11] Tilda (2016), Report for the Road Safety Authority on behaviours and perceptions of older road users.
[12] Ibid

Figure 7. Pedestrian deaths reported by the police: proportion by road type (2015-2017 average).
CY, LU and MT are excluded from the figure due to fluctuation in statistically small numbers of deaths but their numbers are included in the EU27 average.
EU27 average: EU28 excluding LT due to insufficient data.
NO* – 2016-2017.
**ES – motorways and autovias data are presented together. There are no motorways in EE, LV and MT.



1.4 PEDESTRIAN DEATHS BY ROAD TYPE

70% of all pedestrian deaths occurred on urban roads in the EU in 2017 (Fig.7). Given the high and increasing level of urbanisation in Europe and frequent interaction between pedestrians and motorised transport in cities and towns, such a figure is not surprising. The largest proportion of pedestrian deaths on urban roads is observed in Croatia with 84%[13], Romania with 81%, Greece and Italy with 78% and Portugal with 77%.

Another 25% of pedestrian deaths in the EU occur on rural roads. Collisions with pedestrians far from urban centres may be subject to a higher underreporting. The proportion of pedestrian deaths on rural roads is much higher than the EU average in Latvia (60%), Ireland (49%) and Estonia (46%).

4% of pedestrian deaths in the EU occur on motorways. Pedestrians are legally not allowed to use motorways, so the ones killed might be vehicle users who have left their vehicles for some reason or workers in work zones, along with some individuals who entered the motorway on foot illegally.

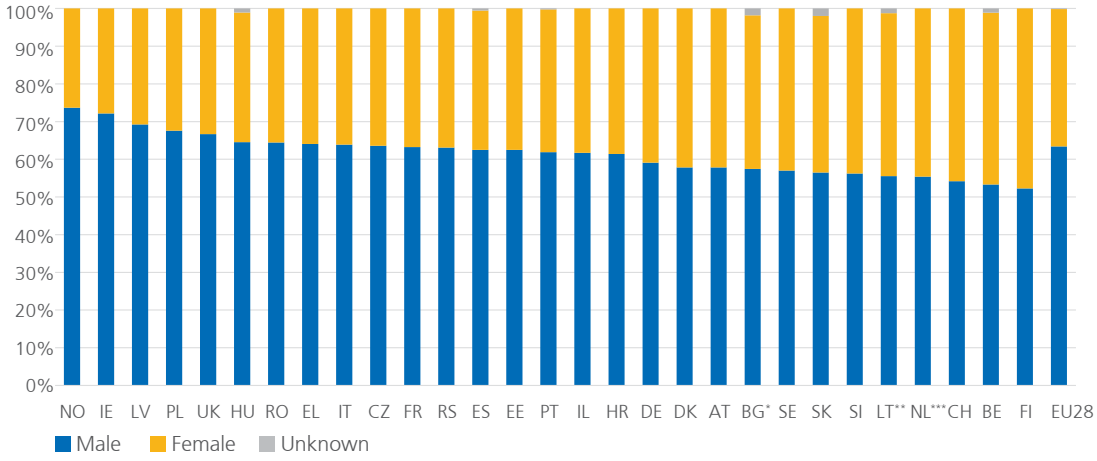
1.5 GENDER DIFFERENCES IN PEDESTRIAN DEATHS

There is extensive evidence to show that more males than females are killed in road collisions in the EU, which is also the case for pedestrians, but to a lesser degree than for all road users in general.[14]

5900 females and 10,200 males were killed as pedestrians in the last three years in the EU, representing 36% and 63% of all pedestrian deaths respectively (Fig.8). By comparison, females represent about one quarter and males three quarters of all road deaths.[15] The proportion of females and males killed as pedestrians has not changed since the beginning of the decade.

The highest proportion of males among pedestrians killed is in Norway (74%), Ireland (72%), Latvia (69%) and Poland (68%). As always, differences between countries may be related to differences in distance walked.

Figure 8. Pedestrian deaths reported by the police: proportion by gender (2015-2017 average).
CY, LU and MT are excluded from the figure due to fluctuations in statistically small numbers of deaths but their numbers are included in the EU28 average.
*BG – 2016-2017.
**LT – 2015.
***NL – Statistics Netherlands data.



[13] In Croatia, a road is considered urban if there are 3 or more houses or buildings on one or both side of the road. In the majority of other PIN countries, deaths on urban roads are those that occur inside urban area boundary signs.
[14] ETSC (2013), Back on track to reach the EU 2020 road safety target? 7th Road Safety PIN Report, http://bit.ly/2MTykfQ
[15] European Commission, Annual accident report 2017, http://bit.ly/374hmnd

1.6 99% OF ALL PEDESTRIAN DEATHS IN THE EU ARE A CONSEQUENCE OF AN IMPACT WITH A MOTOR VEHICLE

In the EU, 99% of pedestrian deaths follow a collision with a motor vehicle: 68% involve a car, 10% a heavy goods vehicle (HGV), 9% a van, 3% a bus or coach, around 4% a PTW and 6% other vehicles (Fig.9). 1% follow a collision with a bicycle.

Pedestrian falls on a footway or carriageway without a vehicle involved can result in a serious injury or death, but they are not currently considered to be road casualties in the EU[16] (see 8.3).

The largest proportion of pedestrians killed by cars is in Croatia with 76%, Poland and Italy with 74%, and Romania, Serbia, Slovakia and Latvia with 71%.

A large proportion of pedestrian deaths as a consequence of an impact with a heavy goods vehicle occurred in Slovenia (35%) and Finland (23%).

10% of all pedestrians killed were struck by a bus or a coach in Denmark, 9% in Israel, 7% in Sweden and 6% in Latvia, the UK and Finland.

23% of all pedestrian deaths occurred after an impact with a van in Portugal, 19% in Romania, 13% in Greece, Spain and Hungary.

The highest share of pedestrian deaths due to collisions with PTWs is in Greece where they represent 18% of all pedestrian deaths, followed by Italy with 8% and Spain with 7%. This proportion is likely to reflect the common use of these vehicles in those countries but measures can be taken to address this issue.

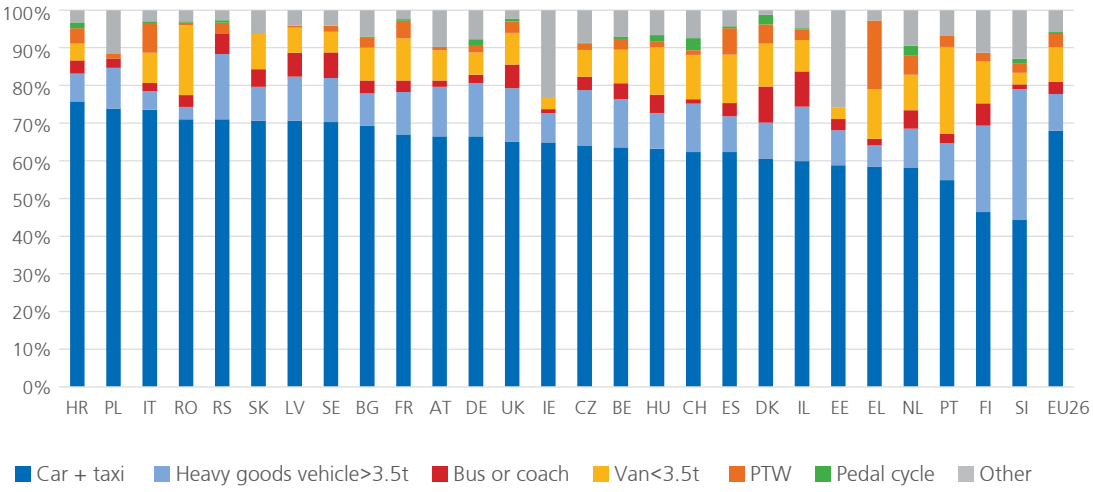
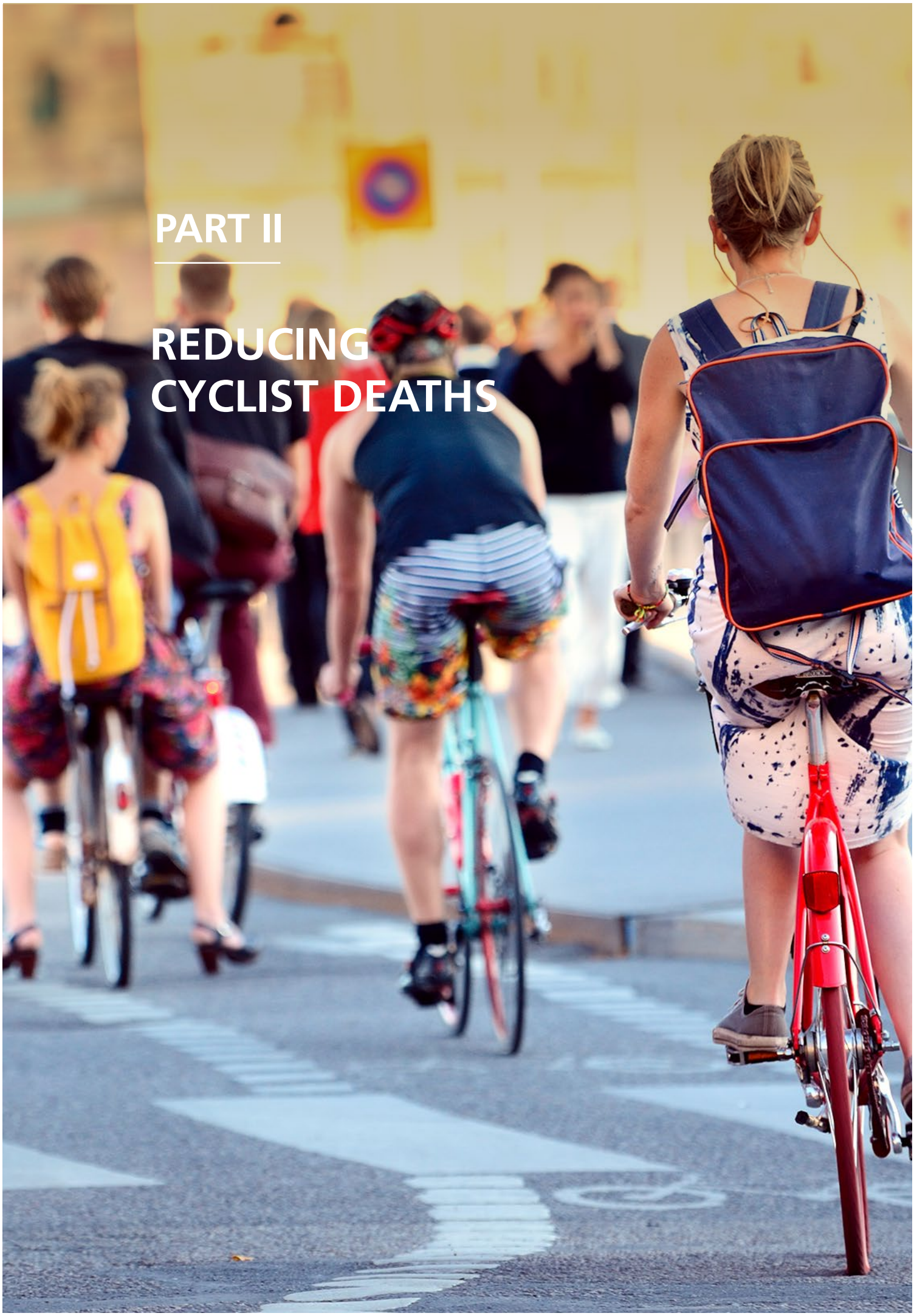


Figure 9. Proportion of pedestrian deaths reported by the police that occurred in collisions with different types of vehicles in the last three years (2015-2017).
EU26 average: EU28 excluding LT and MT due to insufficient data. NO is excluded from the figure due to insufficient data. CY and LU are excluded from the figure due to fluctuation in statistically small numbers of deaths but their numbers are included in the EU26 average.

[16] European Commission (2018), Pedestrians and cyclists, http://bit.ly/348VDYX



PART II

REDUCING CYCLIST DEATHS

2.1 LACK OF PROGRESS IN REDUCING DEATHS AMONG CYCLISTS

2160 cyclist deaths were recorded in traffic collisions[17] in the EU in 2018. 19,450 have been killed since 2010. Cyclists accounted for 8% of all road deaths in the EU in 2018 compared to 7% in 2010.

The number of cyclist deaths has decreased by only 0.4% on average each year in the EU over the period 2010 to 2018 compared to a 3.1% annual reduction in motorised road user deaths over the same period. In Portugal cyclist deaths were reduced at a similar pace as motorised road user deaths. Only in the nine countries presented in Fig.10 were cyclist deaths reduced at a faster pace than motorised road user deaths.

Since the beginning of the decade, cyclist deaths went down in 12 EU countries, stagnated in two and increased in 10 (Fig.10)[18].

Lithuania reduced cyclist deaths by 11% annually - four percentage points faster than its reduction of motorised road user deaths. Latvia and Slovenia follow with 7% annual reductions in cyclist deaths which is four percentage points higher than reductions in motorised road user deaths.

Deaths of cyclists have increased in Ireland by 8% each year on average since 2010 compared to a 5% annual decrease in motorised road user deaths. In the Netherlands, cyclist deaths increased by 2% annually while reductions in motorised road user deaths have stagnated.

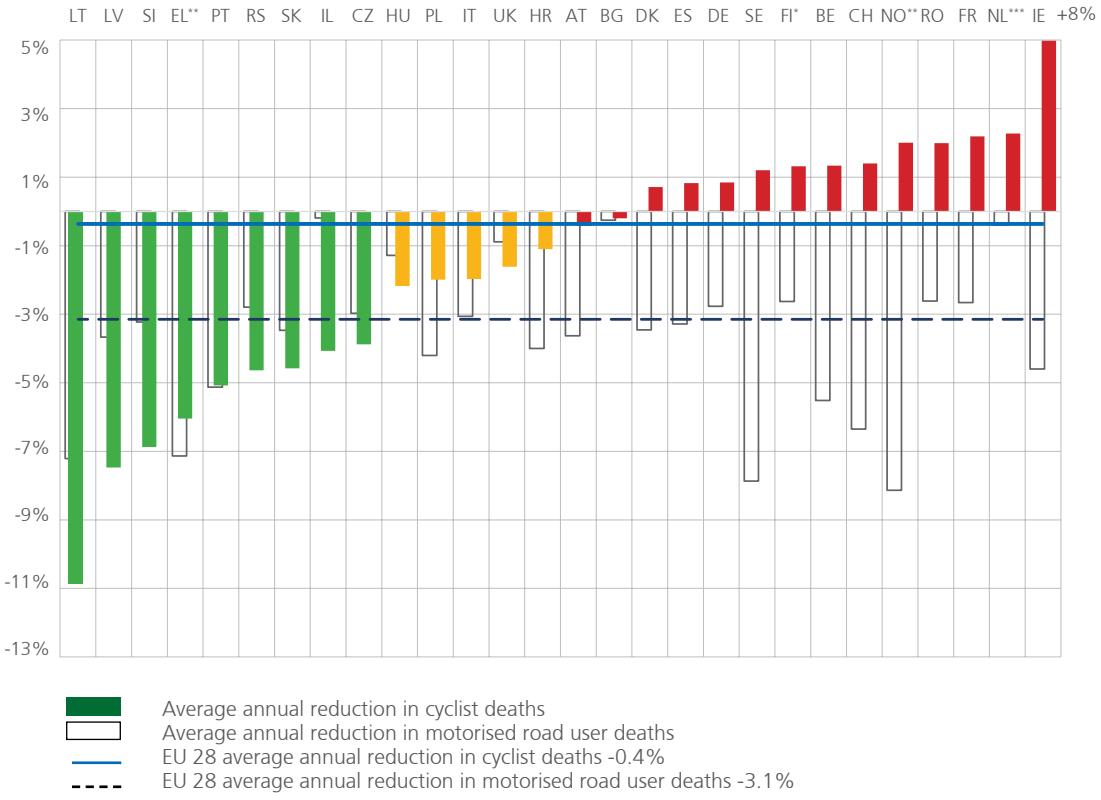


Figure 10. Average annual change in cyclist deaths compared to the annual average change in motorised road user deaths reported by the police over the period 2010-2018. CY, EE, LU and MT are excluded due to fluctuation in small numbers of deaths but their numbers are included in the EU28 average. FI* – provisional 2018 data. **EL and NO – 2010-2017. NL*** – Statistics Netherlands data.

[17] Including single bicycle collisions with no other vehicle involved or falls after an interaction with another road user that did not actually end in a physical contact.

[18] The average annual decrease is based on the entire time series of all the nine annual numbers of cyclist deaths between 2010 and 2018, and estimates the average exponential trend. For more information read the methodological note, PIN Flash 6: https://bit.ly/2LVVUtY

Although data on km cycled are lacking in many countries, it is recognised that cycling is becoming more popular and that this may be related to the stagnation in reducing cyclist deaths in the EU. Among countries that collect data on km cycled, Denmark registered a 0.5% annual increase in distance cycled (between 2010-2018), the Netherlands and Sweden -0.6% (2010-2017 and 2011-2016 respectively), Great Britain – 1.1% (2010-2018). All of these countries, with the exception of Great Britain, saw an increase in cyclist deaths.

Cyclist collisions are disproportionally underreported in police reports when compared to other data sources.[19] [20] Previous research has revealed that this is especially the case for single bicycle collisions with no motor vehicle involved[21] [22] (see 8.1). It is, therefore, highly likely that the actual number of cyclist deaths on EU roads is higher than the numbers reported by the police.

BELGIUM

ROAD SAFETY MEASURES NEED TO CATCH UP WITH A GROWING LEVEL OF CYCLING

There was a 1% annual increase in cyclist deaths over the period 2010-2018 in Belgium. 88 cyclists were killed in 2018 compared to 73 in 2010.

According to the national travel survey, the levels of cycling in the country are increasing rapidly. In 2016, 12% of all trips were made by cycling compared to 8% in 2012. An increase in cycling is also obvious when measured by distance travelled – 5% of all distance travelled was cycled in 2016 compared to 3% in 2012.[23]

"Part of the underlying reality is that cycling is becoming more popular; another part is that much still has to be done to make the traffic system safer for cyclists. A huge challenge in Belgium remains to let more cycling go hand in hand with improvements in road safety."

Stijn Daniels, VIAS institute, Belgium

IRELAND

A LAW TO COMBAT DANGEROUS OVERTAKING OF CYCLISTS

Cyclist deaths on Irish roads have increased by, on average, 8% each year over the period 2010-2018. 5 were killed in 2010 compared to 9 in 2018.

A new law to combat dangerous overtaking of cyclists has recently been introduced to improve cyclist safety. Drivers overtaking cyclists leaving a gap of less than one metre (in locations limited to < 50km/h) or less than 1.5 metre in locations limited to > 50km/h will face a fixed fine of € 120 and three penalty points.[24]

SPAIN

MEASURES TO IMPROVE CYCLIST AND PEDESTRIAN SAFETY INCLUDE PROPOSALS TO REDUCE SPEED LIMITS, TRAFFIC CALMING AND INTELLIGENT TRANSPORT SYSTEMS

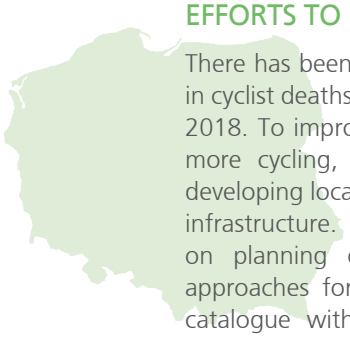
In Spain, cyclist deaths have been increasing by around 1% annually over the period 2010-2018.

To improve pedestrian and cyclist safety, in 2019, the Spanish Directorate General for Traffic (DGT) proposed to reduce the current standard speed limit in urban areas from 50 km/h to 20 km/h on residential curbless one way roads and to 30 km/h on single lane two-way roads. 50 km/h could remain a standard speed limit on two way streets with two or more lanes each way.

62% of cyclist deaths occur on rural non-motorway roads. Spain has been working to address the issue of cyclist casualties on national roads going through built-up areas by installing traffic calming measures to reduce vehicle speed, including speed signs and road markings, transverse rumble strips and dynamic speed control systems.

Various ad hoc signalling systems able to detect cyclists have been installed across Spain. Warning lights are activated when cyclists are detected to warn the drivers to take the necessary precautions.

POLAND
EFFORTS TO IMPROVE CYCLING SAFETY



There has been a 2% average annual decrease in cyclist deaths in Poland over the period 2010-2018. To improve cyclist safety and encourage more cycling, some local authorities started developing local strategies that focus on cycling infrastructure. National cycling guidelines on planning of safe cycling infrastructure, approaches for managing safe cycling and a catalogue with exemplary solutions for safe cycling were issued in 2019. The application of the national guidelines is not mandatory but local authorities are strongly advised to use them when developing local cycling strategies.

2.2 CYCLIST MORTALITY AMONG EU COUNTRIES VARIES BY A FACTOR OF SIX

Fewer than two cyclists per million inhabitants are killed each year in Greece, Israel, Malta, Spain and the UK (Fig.11). The highest cyclist mortality is in the Netherlands with 12 cyclist deaths per million inhabitants, Romania with nine and Hungary with eight. Cyclist mortality differs by a factor of over six on both ends of the range. In some countries, these values reflect strong differences in the use of bicycles.

The level of cycling risk should be evaluated as a function of the number of trips taken by bicycle or the bicycle distance or time travelled in order to provide a better picture of the priority areas to increase cycling safety. Only a handful of countries collect such data.

As an indicator on cyclist safety, cyclist mortality (deaths per million inhabitants) is limited as it does not take into account the levels of cycling. Thus, data of the mortality indicator can represent either, or, likely, a mixture of:

a. the level of safety for cycling or

b. cycling distance travelled in some countries is high relative to the others and therefore, the number of cyclist deaths is linked to the level of distance cycled.

Almost all people walk and use motorised transport but not everyone cycles. Therefore, travel data of cycling is particularly important in determining the actual level of cycling safety.

While data on distance cycled is only available in a handful of countries (see 2.3), the Eurobarometer travel survey on urban mobility conducted in 2013 provides an overview on modal share in urban areas in all EU countries.[25]

According to the survey, 71% of respondents cycle at least few times per week in the Netherlands, 57% in Finland, 56% in Denmark, 45% in Hungary, 44% in Germany and 43% in Sweden.[26] In all of these countries except Sweden, cyclist road mortality is higher than the EU average.

On the other hand, the Eurobarometer survey shows that only 3% of respondents cycle at least once per week in Malta, 10% in Cyprus, 12% in Bulgaria and Greece, 14% in the UK and 15% in Ireland.[27] All of these countries have a cyclist mortality rate which is lower than the EU average.

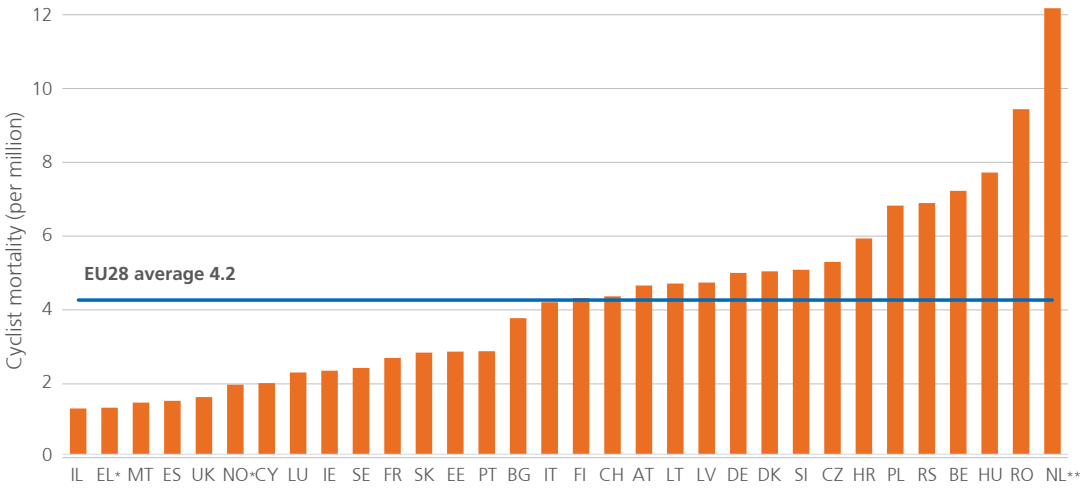


Figure 11. Average annual cyclist deaths reported by the police (2016-2018 average) per million inhabitants in 2018.
*EL and NO – 2016-2017.
**NL – Statistics Netherlands data.

[25] European Commission, Eurobarometer (2013), Attitudes of Europeans Towards Urban Mobility, https://bit.ly/2TcEe0k
[26] Ibid
[27] Ibid

2.3 DATA ON DISTANCE CYCLED

An indicator to measure the risk of cycling as well as to evaluate improvements in cycling safety over time requires data on distance cycled, number of trips made or time spent cycling. Only Austria, Belgium, Denmark, Finland, Germany, Great Britain, the Netherlands and Sweden have reported travel data for at least one year since 2010 (Table 2). These countries use different methodologies to collect travel data and, consequently, comparisons between countries are not possible.

Table 2 illustrates the differences between an indicator on cyclist road mortality (deaths per million inhabitants) and an indicator on cycling risk (deaths per km cycled).

In the Netherlands, on average, a person cycles 865 km annually. The Netherlands have the highest cyclist mortality rate in the EU with 12 cyclist deaths per million inhabitants (Fig.11). However, when km cycled is taken into account, the risk is 13 deaths per billion km cycled, which is not necessarily an indicator of an unsafe cycling environment.

Similarly, Denmark has some of the highest cycling rates in the EU with 508 km cycled per year per inhabitant. Cyclist mortality in Denmark is above the EU average with 5 cyclist deaths per million inhabitants but cycling risk is 10 deaths per billion km cycled – the lowest rate among countries that could provide travel data.

Cycling travel data from more countries would be helpful in explaining how increased levels of cycling affect developments in cyclist deaths and serious injuries in the EU.

Overview of these limited data indicate that countries with a relatively high amount of distance cycled have lower cyclist death risk compared to countries where cycling is not as common (Fig.12).

Table 2. Distance cycled per year per inhabitant (km), cyclist deaths per million inhabitants and cyclist deaths per billion km cycled in countries that could provide data for at least one year on km cycled. Data collection methodologies differ between countries. Data source: PIN panellists.

	Distance cycled per year per inhabitant (km)	Cyclist deaths per mln inhabitants in 2018	Cyclist deaths per bln km cycled	Average years, cyclist deaths	Average years, distance cycled
AT	217	5	24	2013-2015	2014
BE	578[28]	7	13	2015-2017	2016
DK	508	5	10	2016-2018	2016-2018
DE	400[29]	4	12	2016-2018	2018
FI	300	5	16	2015-2017	2016
NL	865	12	13	2015-2017	2015-2017
SE	194[30]	2	13	2014-2016	2014-2016
GB	80[31]	2	19	2016-2018	2016-2018

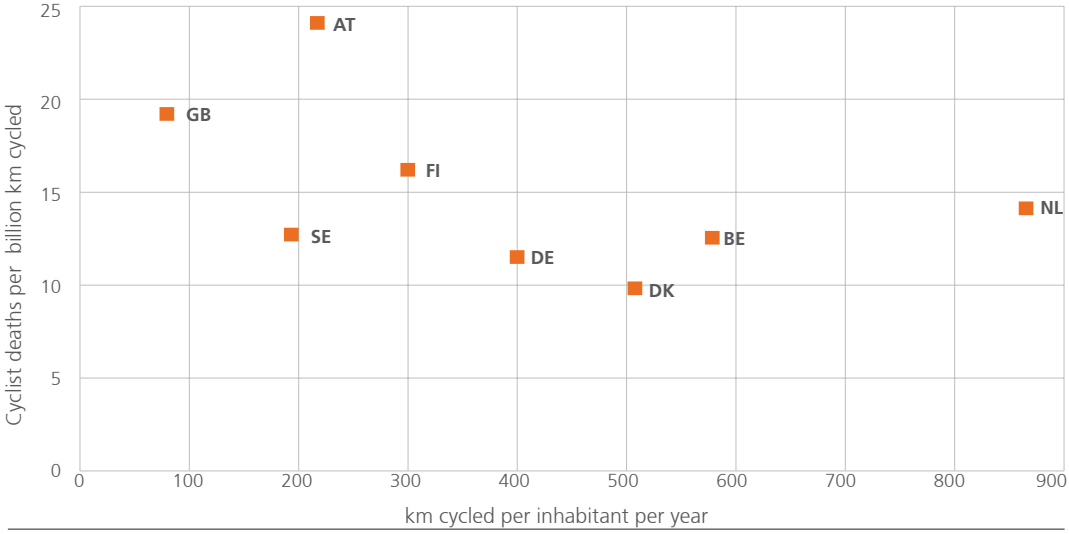


Figure 12. Cyclist deaths per billion km cycled. AT – 2014 , CH – 2015, BE, FI – 2016, DK and UK 2016-2018 average, NL – 2015-2017 average, SE 2014-2016 average.

[28] Data source for distance cycled: Belgian National travel survey, Monitor (2016), http://bit.ly/2phxyjN
[29] Data source for km cycled: http://bit.ly/37OPqEj
[30] Data source for km cycled: The Swedish National Travel survey (RVU Sweden), http://bit.ly/2NKdEaB
[31] Data source for km cycled: Road traffic statistics (TRA), Data on road traffic by road and vehicle type, produced by Department for Transport, http://bit.ly/2NOQoZ7

2.4 ONE IN TWO KILLED CYCLISTS IN THE EU ARE ABOVE 65 YEARS OLD

As is the case with pedestrian deaths, the elderly (above 65 years old) account for a high proportion among killed cyclists (Fig.5). 44% of all cyclists killed in the EU are above 65 years old while they represent 20% of the EU population. Factors that can explain this higher mortality are physical, such as the increased fragility of their bodies, their decreasing ability to keep balance, use of medicinal or prescription drugs or general deterioration of reaction speed. Traffic behaviour might be impacted due to a relatively high and increasing share of pedelec use, inducing higher speeds.

People in the age group of 50-65 years account for 26% of all cyclist deaths, 25-49 year olds for 20%, 15-24 year olds for 4% and children under 15 for 3% (Fig.5).

In the EU, the cyclist mortality for children under 15 years is 1 per million child population, 2 for young people aged 15 to 24 and for adults aged 24-49 and 5 per million for the age group 50-64 (Fig.13). The greatest cyclist mortality is for people 65 or older, with 10 deaths per million elderly population.

People over 60 years have the greatest mortality as cyclists in the Netherlands with 43 deaths per million population which is by far the highest rate in the EU. However, Dutch data used in this figure come from Statistics Netherlands and are

2.7 83% OF ALL CYCLIST DEATHS IN THE EU ARE A CONSEQUENCE OF AN IMPACT WITH A MOTOR VEHICLE

Collisions with passenger cars make up slightly more than half (53%) of the total number of cyclist deaths in the EU (Fig.16). Collisions with heavy goods vehicles account for 13% of cyclist deaths, vans 7%, buses 2% and other vehicles 6%. 16% of cyclists die in single bicycle collisions where no other vehicle is involved and 1% in collisions with other bicycles.

The proportion of cyclist deaths as a result of a collision with a car is markedly higher than the EU average in Bulgaria (75%), Croatia (69%), France (66%), Slovenia (65%), Poland (63%) and Italy (60%).

The largest share of cyclist deaths as a consequence of an impact with a heavy goods vehicle are in Denmark (25%), Latvia (23%), Slovakia and Serbia (22%) and Switzerland (20%).

The largest proportion of cyclist deaths as a consequence of an impact with a van are in Romania (17%), Hungary (14%), Israel and Latvia (13%) and Slovakia, Portugal and Spain (12%).

Collisions with PTWs are rather rare according to reported collisions and in most EU countries do not account for more than 3% of all cyclist deaths.

Single bicycle collisions account for 51% of cyclist deaths in Greece, 39% in Austria, 38% in Finland, 36% in the Czech Republic and 35% in Sweden.

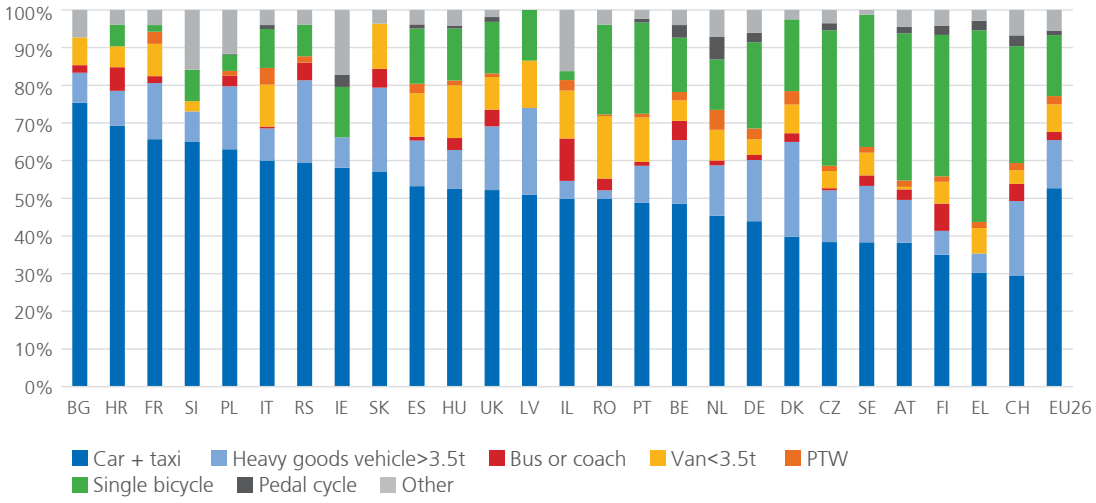


Figure 16. Cyclist deaths reported by the police: proportion that occurred in collisions with different types of vehicles in the last three years (2015-2017). EU26 average: EU28 excluding LT and MT due to insufficient data. NO is excluded from the figure due to insufficient data. EE, LU and CY are excluded from the figure due to fluctuation in statistically small numbers of deaths but their numbers are included in the EU26 average.

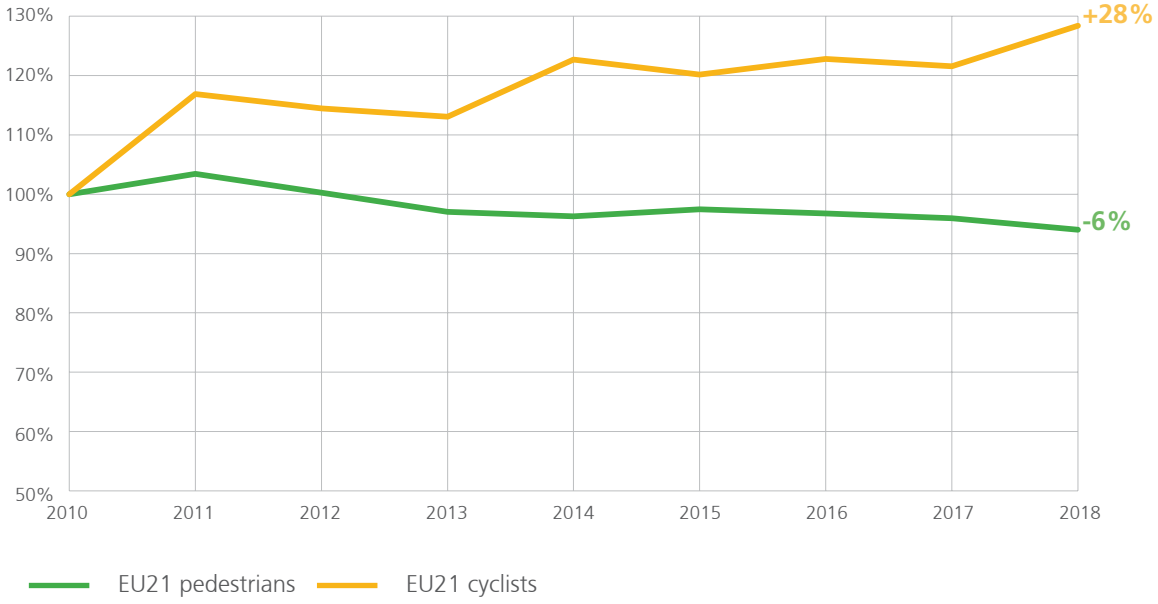
30,000 pedestrians and 32,000 cyclists were recorded as seriously injured in 2018 in the 21 EU countries that could provide data, based on national definitions of serious injuries. 280,000 pedestrians and 262,000 cyclists sustained serious road traffic injuries over the period 2010-2018 in the same group of countries. There are around seven seriously injured pedestrians for every pedestrian death and 19 seriously injured cyclists for every cyclist death in the EU.

30,000 pedestrians and 32,000 cyclists were recorded as seriously injured in 2018 in 21 EU countries that could provide data.

Given high levels of underreporting of pedestrian and, especially, cyclist collisions, the actual numbers of both, serious injuries and deaths of pedestrians and cyclists are likely to be higher (see 8.1).

In the EU21, reported serious injuries among pedestrians decreased by 6% in 2018 compared to 2010 (Fig.17). Over the same period, reported cyclist injuries increased by as much as 28% in the same group of 21 EU countries.

Figure 17. Progress in reducing the number of reported serious injuries (based on national definitions) of pedestrians and cyclists in 21 EU countries that could provide data over the period 2010-2018.
EU21 average: EU28 excluding EE, EL, FI, IT, LT, MT and NL.



3.1 PROGRESS IN REDUCING REPORTED SERIOUS INJURIES OF PEDESTRIANS

In the EU21 the annual progress in reducing the number of reported serious pedestrian injuries has been just 1% on average each year since 2010 (Fig.18) compared to 2.6% annual reductions in pedestrian deaths over the same period (Fig.3).

Over the period 2010-2018, the annual number of recorded serious road traffic injuries among pedestrians decreased in 15 out of the 21 EU countries that could provide data.[33] Fig.18 should be treated with caution as recording rates of serious injuries could have improved in some countries, or deteriorated in others, following changes in police resources or police priorities (see Indicator: serious injuries).

The number of pedestrians seriously injured went down on average each year by 7% in Cyprus, 5% in Luxembourg and 4% in Croatia.

Serious road traffic injuries of pedestrians increased by on average 3% annually in Israel and Norway and 1% in Hungary.

[33] The average annual decrease is based on the entire time series of all the nine annual numbers of serious injuries of pedestrians between 2010 and 2018, and estimates the average exponential trend. For more information: see methodological note, PIN Flash 6: https://bit.ly/2LVVUtY

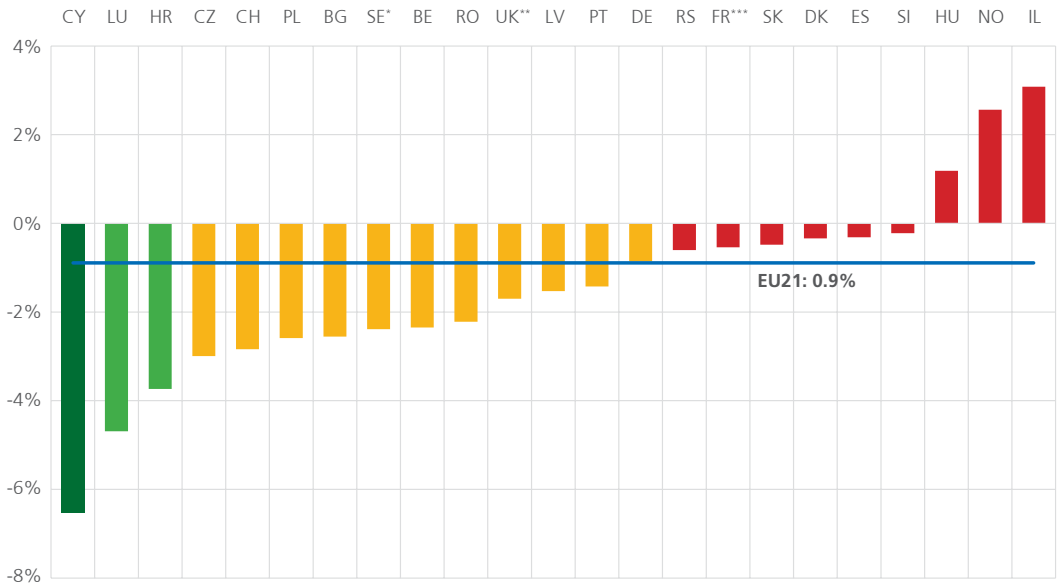


Figure 18. Average annual change in the reported number of seriously injured pedestrians over the period 2010-2018 based on national definitions of a serious injury. EU21 average: EU28 excluding EE, EL, FI, IT[34], LT, MT and NL due to insufficient data. Substantial changes in the reporting system were introduced in AT in 2012 and in IE in 2014, therefore AT and IE are excluded from the figure but their numbers of serious injuries are included in the EU21 average. ***FR – 2010-2017. *SE – hospital data, **UK – 2010-2015 data as reporting system changed in 2016.

INDICATOR: SERIOUS INJURIES

In 2016, the European Commission, for the first time, published an estimate for the number of people seriously injured on EU roads based on the MAIS3+ definition: 135,000 in 2014. No updates are available, as data collection is proving difficult for most EU countries.

This move to monitor serious injury data at EU level required the adoption by all EU Member States of a common definition of what constitutes a serious road injury. The agreed definition is a hospital in-patient with an injury level of MAIS 3 or more.[35] Only a few countries have MAIS3+ data for earlier years or by road user, therefore Member States should also continue collecting data based on their previous definitions so as to be able to monitor rates of progress at least until these rates of progress can be compared with those under the new definition.

It is not possible to compare the number of seriously injured between PIN countries according to national definitions of serious injury, as both the definitions and the levels of reporting vary widely.

In most of the PIN countries, serious road injuries based on the national definition are recorded by the police. Within each country a wide range of injuries are categorised by the police as serious under the applicable definition. They range from lifelong disability with severe damage to the brain or other vital parts of the body to injuries whose in-hospital treatment takes only a few days and which have no long term consequences.

National serious injury definitions supplied by PIN panellists are available in the annexes. Fourteen countries (BE, CY, DE, EE, ES, FR, EL, IE, LV, LU, PT, UK, CH, IL) use similar definitions for serious injuries: spending at least one night in hospital as an in-patient or a close variant of this. In practice, however, in most European countries, there is unfortunately no standardised communication between police and hospitals and the qualification of injuries as "serious" is often made by the police without professional medical judgement.

Sample studies have shown that the actual number of serious injuries is often considerably higher than the officially recorded number in police reports, especially for vulnerable road users. In general, the lower the injury severity, the higher the underreporting in police statistics tends to be.

The comparison takes as a starting point the average annual change in the number of seriously injured pedestrians and cyclists since 2010 according to the national definitions of serious injuries (Fig.18 and Fig.21). Doing so implies that ETSC accepts the possibility that these changes are partly due to reporting rate changes.

The number of seriously injured road users based on national definitions were supplied by the European Commission from its CARE database upon ETSC's request and complemented if needed by the PIN panellists. Dutch data on serious injuries by age group were provided by SWOV based on MAIS2+ definition. Data on serious injuries for Sweden are from hospital records and were provided by the PIN panellist.

[34] A study to estimate the number of serious road traffic injuries was commissioned in Italy and revealed that 9% of all seriously injured in Italy are pedestrians and 10% are cyclists, http://bit.ly/34ya7Cd

[35] The Maximum Abbreviated Injury Scale (MAIS) is a globally accepted and widely-used trauma scale used by medical professionals. The injury score is determined at the hospital with the help of a detailed classification key. The score ranges from 1 to 6, with levels 3 to 6 considered as serious injuries in the EU.

3.2 SERIOUS INJURIES OF PEDESTRIANS BY AGE GROUPS

As is the case with pedestrian deaths, a large proportion of seriously injured pedestrians in the EU are people above 65 years old, accounting for 30% of all seriously injured people (Fig.19). Yet, the elderly pedestrian death rate is higher – they account for 47% of all pedestrian deaths.

17% of seriously injured pedestrians are children (0-14 years old) and 12% are young adults (15-24 year old).

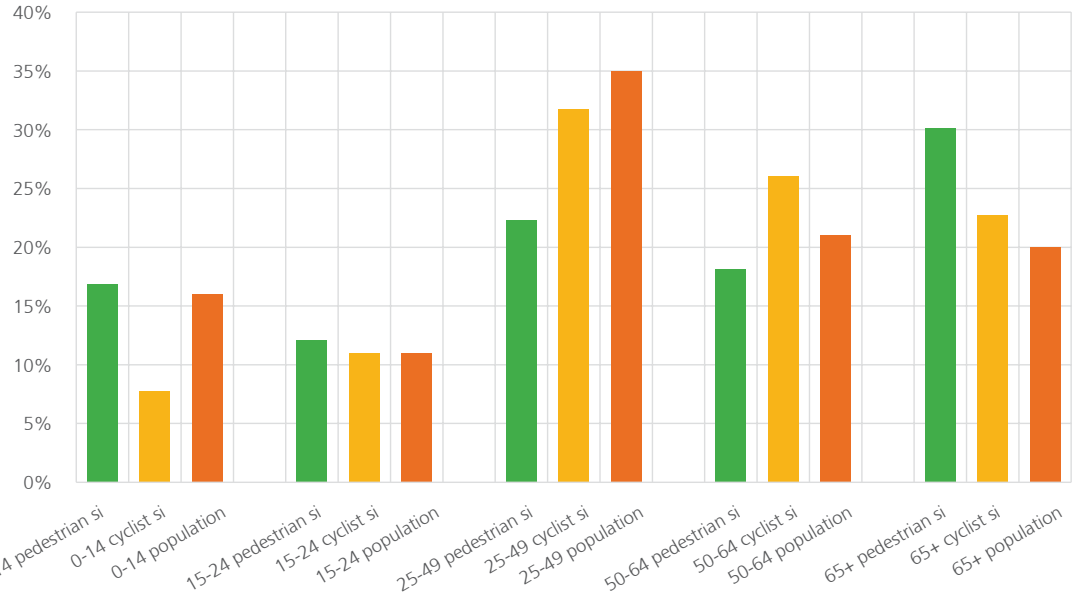


Figure 19. Proportion of reported seriously injured pedestrians (according to national serious injury definitions) by age group (years) in the last three years (2015-2017) and age groups as a proportion of the total population in the EU26. EU26 average: EU28 excluding IT and LT due to insufficient data.

Fig.20 shows the proportion of recorded serious injuries of pedestrians by age group by country based on national definitions of serious injuries. The figure should be interpreted with caution as levels of reporting as well as national definitions of serious injuries differ between countries (see Indicator: serious injuries).

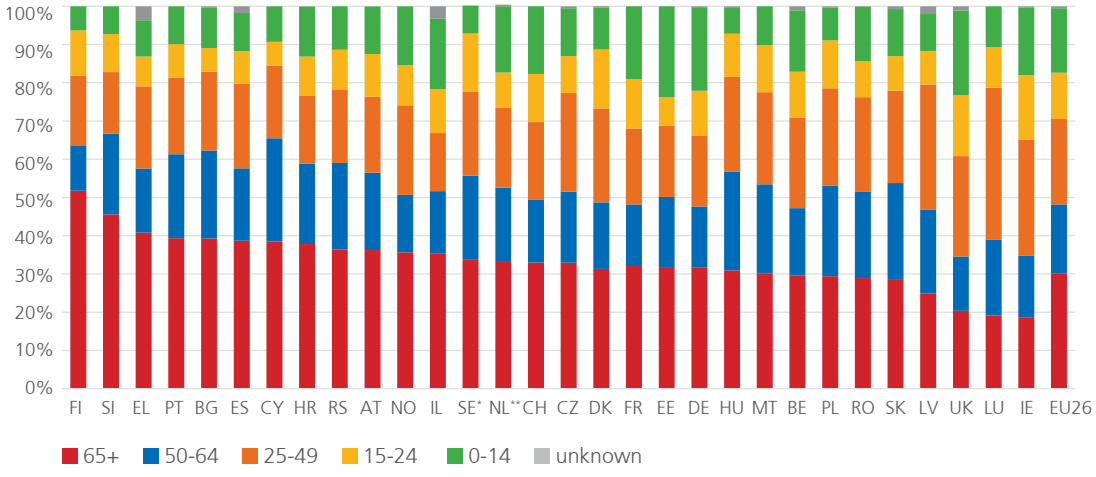


Figure 20. Proportion of reported pedestrian serious injuries by age group (years) in the last three years (2015-2017) based on national definitions of a serious injury. EU26 average: EU28 excluding IT and LT due to insufficient data. *SE – hospital data. NL – MAIS2+ data.

3.3 PROGRESS IN REDUCING REPORTED SERIOUS INJURIES OF CYCLISTS

There has been a 2% annual average increase in the number of recorded serious injuries among cyclists in the group of 21 EU countries that collect data (Fig.21) compared to a 0.4% annual reduction in cyclist deaths over the period 2010-2018 (Fig.10).

Recorded serious road traffic injuries of cyclists were reduced annually by, on average, 5% in Cyprus, 3% in Bulgaria and 2% in the Czech Republic.

Serious road traffic injuries of cyclists increased by, on average, 9% annually in Romania and Norway, 7% in Portugal, 5% in Luxembourg, 4% in Poland, Slovenia, Switzerland, Spain and the UK.

Fig.21 should be treated with caution as recording rates of serious injuries could have improved in some countries, and deteriorated in others, following changes in police resources or police priorities (see Indicator: serious injuries).

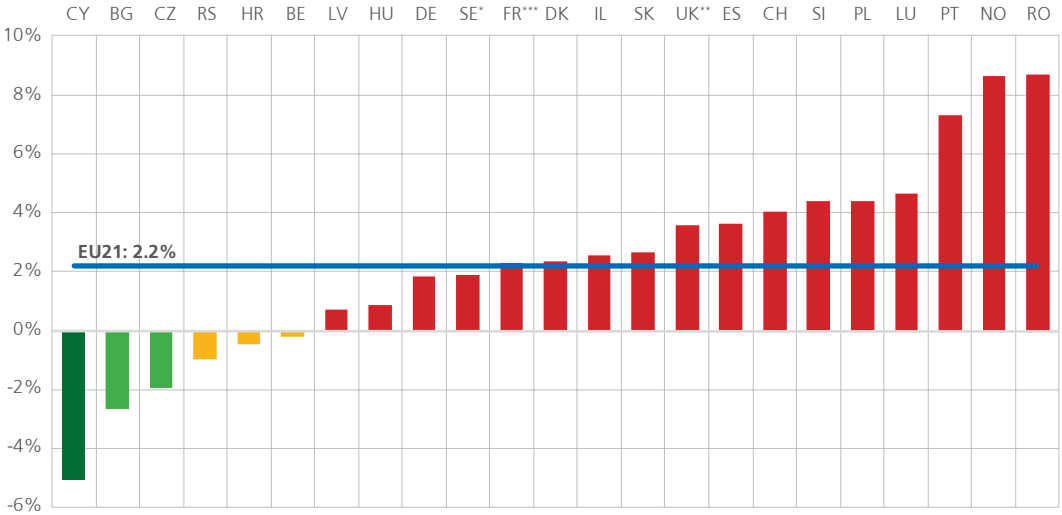


Figure 21. Average annual change in the reported number of seriously injured cyclists over the period 2010-2018 based on national definitions of a serious injury. EU21 average: EU28 excluding EE, EL, FI, IT, LT, MT and NL due to insufficient data. Substantial changes in the reporting system were introduced in AT in 2012 and in IE in 2014, therefore AT and IE are excluded from the figure. The numbers of serious injuries from AT and IE are included in the EU21 average.
***FR – 2010-2017.
*SE – hospital data.
**UK – 2010-2015 data as reporting system changed substantially in 2016.

3.4 SERIOUS INJURIES OF CYCLISTS BY AGE GROUP

23% of all seriously-injured cyclists are above 65 year old. People in the age group of 50-64 account for 26% (see Fig.19).

Fig.22 shows the proportion of recorded serious injuries of cyclists by age group by country based on national definitions of serious injuries. The figure should be interpreted with caution as levels of reporting as well as national definitions of serious injuries differ between countries (see Indicator: serious injuries).

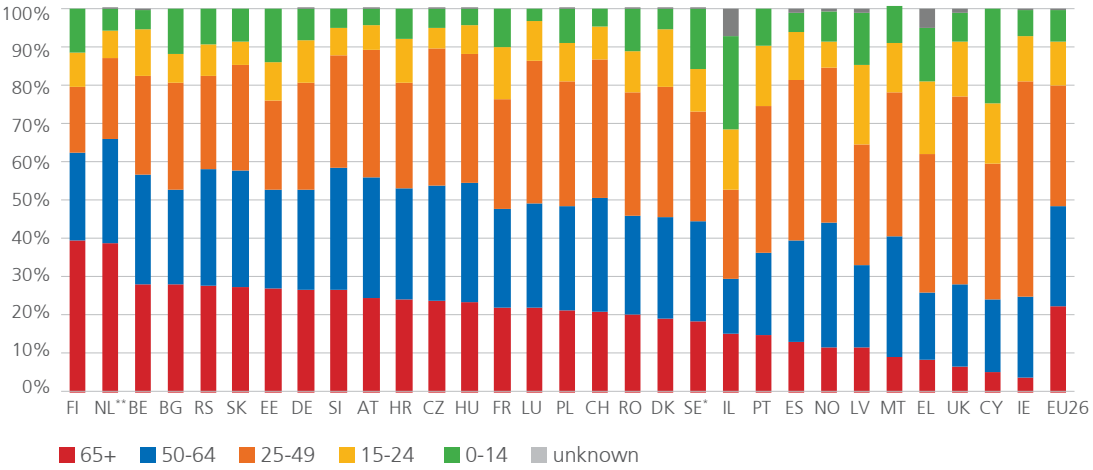


Figure 22. Proportion of reported cyclist serious injuries by age (years) in the last three years (2015-2017) based on national definitions of a serious injury. EU26 average: EU28 excluding IT and LT due to insufficient data.
*SE – hospital data.
**NL – MAIS2+ data.

PART IV

IMPROVING PEDESTRIAN AND CYCLIST SAFETY STRATEGIC PLANNING

4.1 NATIONAL WALKING AND CYCLING STRATEGIES

Effective strategic planning for pedestrian and cyclist safety should involve the following elements:

- setting targets;
- setting priority areas;
- establishing a proactive approach;
- involving all relevant stakeholders in the preparation and execution of the plans;
- setting clear responsibilities and deadlines for delivery;
- dedicating an appropriate budget.

Governments may include some pedestrian and cyclist safety measures in national road safety strategies. In addition, some countries develop and implement specific national walking and cycling strategies (Table 3).

The level of detail and ambition in national walking and cycling strategies differs between countries. While some strategies contain concrete actions, identify responsible stakeholders and set ambitious road safety and active travel targets, others are less concrete.

The reader should bear in mind that countries which do not have walking and cycling strategies might have strong measures for improving pedestrian and cyclist safety in national road safety plans. If walking or cycling strategies do not include targets to reduce pedestrian and cyclist deaths or injuries, targets might be included in the national road safety plans.

UK

£1.2 BLN FOR THE IMPLEMENTATION OF THE CYCLING AND WALKING INVESTMENT STRATEGY

In 2017, England adopted a Cycling and Walking Investment Strategy.[36] The strategy aims to double levels of cycling from 0.8 billion cycling stages in 2013 to 1.6 billion[37] in 2025 and increase levels of walking to 300 stages per person per year. The English government also set itself a target to increase the proportion of children aged 5 to 10 that usually walk to school from 49% in 2014 to 55% by 2025.

£1.2 billion were allocated for the implementation of the strategy over the period 2016-2021. The largest proportion of the budget – £861 million – is dedicated to walking and cycling infrastructure and its maintenance.

Some of the key interventions are:

- Encourage local councils to invest around 15% of their local transport infrastructure funding in safe and efficient walking and cycling infrastructure;
- enforce against parking on cycle lanes;
- appointment of a walking and cycling champion to raise the profile of active travel.[38]

FINLAND

NATIONAL WALKING AND CYCLING PROMOTION STRATEGY AIMS TO CREATE BETTER WALKING AND CYCLING CONDITIONS, REDUCE EMISSIONS AND IMPROVE PUBLIC HEALTH

Finland's national program for promoting walking and cycling was adopted in 2018. The programme sets a target to increase the modal share of walking and cycling by 30% by 2030.[39]

In terms of public health, the goal is a so-called plus vision: the reduction of emissions and prevention of road deaths and serious injuries of pedestrians and cyclists will result in better public health and will help to save millions of euros for society. The strategy covers measures to improve safety, including the funding of dedicated safe, convenient and connected walking and cycling infrastructure, good maintenance of walking and cycling paths and improved land use planning.

[36] DfT (2017), Cycling and walking investment strategy, http://bit.ly/2BRtQ35
[37] Cycling activity in the UK strategy is measured as cycle stages as in the UK National Travel Survey. The basic unit of travel in the National Travel Survey is a trip, which consists of one or more stages. A new stage is defined when there is a change in the form of transport. Counting cycle stages rather than trips allows for the inclusion of journeys that involve cycling but where this is not the main form of transport (for example, cycling to a railway station to catch the train to work).
[38] DfT (2018), Government Response to Call for Evidence Cycling and Walking Investment Strategy: Safety Review, https://bit.ly/2r1ln87
[39] Liikenne- ja viestintäministeriö (2018), https://bit.ly/33vxR98

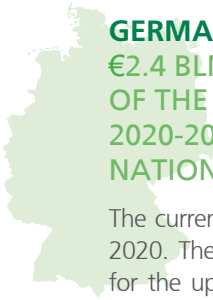
Table 3. National or local walking and cycling strategies.

	Is there a national walking strategy?	Is there a national cycling strategy?	Road safety target for pedestrians and cyclists in the national walking and/or cycling strategies	Travel target for increased walking and cycling (km) in the national walking and/or cycling strategies
AT	●	●	No target	
BE	●	●	No target	No target
BG	●	●		
CY	●	●		
CZ	●	●	Decrease the number of cyclists killed by at least 35 and seriously injured by 150 between 2009 and 2020	Increase km cycled by 10% between 2013 and 2020
DE	●	●	No target	Increase modal share of cycling from 8% in 2012 to 13% in 2020
DK	●	●		No specific target, but an ambition to increase cycling
EE	●	●	City of Tartu: collisions with cyclists should not increase	
ES	●	●		
FI	●	●	No target	Increase modal share of walking and cycling from 30% in 2018 to 35-38% in 2030. 450 mln new trips walked and cycled in 2030 (1965 mln in 2030 compared to 1510 mln in 2016)
FR*	●	●	No target	Increase modal share of cycling to 9% in 2024
EL	●	●		
HR	●	●		
HU	●	●		
IE	●	●	No target	Increase commuting by bicycle to 10% in 2020
IT	●	●		
LU	●	●		Increase modal share of walking and cycling combined to 25% in 2020
LV	●	●	No target	Increase the number of people cycling at least once per week from 23% in 2016 to 30% in 2020 and of people cycling at least five days per week from 6% in 2016 to 10% in 2020
LT	●	●		
MT	●	●	Tentative target: reduce injuries involving cyclists by 50% between 2010 and 2050	Tentative target: double proportion who choose cycling as a mode of transport for trips shorter than 5 km between 2010 and 2050
NL	●	●		
PL	●	●		
PT	●	●	Reduce cyclist deaths and serious injuries by 50% between 2020 and 2030	Increase modal share of cycling nationally to 7.5% in 2030 and to 10% in cities
RO	●	●		
SE	●	●	No target	Increase the share of passenger-km travelled on foot, bicycle or public transport from 20% in 2011-2016 to 25% in 2025
SI	●	●		
SK	●	●		Increase modal share of cycling to 10% in 2020
EN	●	●	Each year reduce the number of cyclists killed or seriously injured per billion miles cycled on English roads by 2020	Double cycling stages from 0.8 billion per person per year in 2013 to 1.6 billion in 2025. Increase walking stages per person per year to 300 in 2025
CH	●	●		
IL	●	●	No target	No target
NO	●	●		Increase modal share of cycling 8% in 2023
RS	●	●		

● yes ● under preparation ● information not available ● local strategies in some cities or regions ● no

FR* - national plan for cycling and active modes covers some measures on walking.

Annual budget of €3.5 million was available for implementing the measures of the strategy in 2018 and 2019. The budget was increased to €24.5 million euros in 2020 - €10 million is dedicated for walking and cycling improvement on the state owned road network and €14.5 million for cities and municipalities.



GERMANY

€2.4 BLN FOR IMPLEMENTATION OF THE NATIONAL CYCLING PLAN 2020-2030 AND A PROPOSAL FOR A NATIONAL PEDESTRIAN STRATEGY

The current German national cycling plan ends in 2020. The preparatory work of the new strategy for the upcoming decade is taking place. During public consultations, more than 2000 ideas from stakeholders and individuals were collected. The new strategic guidelines include a Vision Zero approach for fatal cycling collisions. It also recognises that developing extensive and safe infrastructure which includes cycle lanes, safe junctions, parking infrastructure and bicycle sharing systems is critical for the attractiveness of cycling.[40] €2.4 bln is dedicated for the implementation of the national cycling strategy 2020-2030.

The German Environment Agency prepared a national pedestrian strategy with a target to increase the proportion of pedestrian trips from 27% to 40% in urban areas and from 24% to 35% in rural areas by 2030. The strategy endorses Vision Zero and proposes compulsory quality standards for sidewalks and crossings and calls for appropriate financial and human resources for improved walking conditions.[41]

The pedestrian association "Fuss e.V." has developed pedestrian safety audit specifications to help evaluate road design with pedestrian safety as a focus. The organisation has also published guidelines for the implementation of pedestrian strategies at local level that municipalities can implement on a voluntary basis.[42] [43]

4.2 SUSTAINABLE URBAN MOBILITY PLANS (SUMPs)

70% of reported pedestrian deaths and 57% of reported cyclist deaths in the EU occur on urban roads (see 1.4 and 2.5). Therefore, cities, towns and villages have a major role to play in improving pedestrian and cyclist safety.

Since the adoption of the European Commission's Urban Mobility Package in 2013, the Sustainable Urban Mobility Plan (SUMP) concept has been promoted as a strategic planning instrument for local authorities. The European Commission has recently updated the SUMP guidelines[44], accompanied by topic guides, including a guide on road safety.[45]

A number of local authorities in the EU have started working on preparing and implementing SUMPs but improvements are needed to ensure that these plans are closely linked with road safety priorities. Integrating road safety, in particular for pedestrians and cyclists, in all the steps of a planning and implementation cycle would ensure that the main road safety problems and the key stakeholders necessary to tackle them are identified.

Almost half of all car trips in urban areas in the EU are over distances shorter than 5 km and many of these can be made by walking or cycling.[46] However, safety fears are a major barrier to the uptake of walking and cycling.[47] A 2013 "Eurobarometer" survey showed that 73% of European citizens consider road safety to be a serious problem in cities.[48] Traffic safety was also the main barrier to taking up cycling identified in a recent survey undertaken in nine European cities.[49]

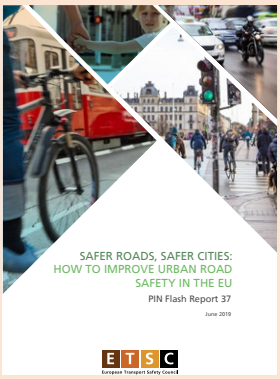
A 2019 OECD report concluded that modal shift away from private motor vehicles could significantly improve road safety in dense urban areas as areas where people cycle the most also have the lowest total road mortality.[50] Making active travel an attractive and safe alternative to motorised transport will result in decreased traffic noise, CO_2 emissions, pollution and

[40] BMVI, Das große Fahrrad-Dossier, http://bit.ly/2QNaJOC
[41] Umwelt Bundesamt (2018), Geht doch! Grundzüge einer bundesweiten Fußverkehrsstrategie, http://bit.ly/2PVg461
[42] Fuss. E.V. (2018), Fußverkehrs-Checks Fußverkehrs-Audits – Informationen zur Durchführung von Fußverkehrs-Checks
[43] Fuss e.V, (2018), Schritte zur Einführung einer kommunalen Fußverkehrsstrategie – Handlungsleitfaden
[44] Eltis (2019), Guidelines for developing and implementing a Sustainable Urban Mobility Plan (2nd edition), http://bit.ly/2to2Mro
[45] Eltis, Download Topic Guides and Practitioner Briefings, http://bit.ly/36hy2XI
[46] European Commission, Mobility and Transport, Clean transport, Urban transport
[47] ITF (2018), Cycling Safety, Summary and conclusions of the ITF round table on cycling safety
[48] European Commission (2013), Attitudes of Europeans Towards Urban Mobility, https://bit.ly/1fPbjIQ
[49] SWOV, VIAS, TOI, TU Dresden and POLIS, (2019) Stimulating safe walking and cycling within a multimodal transport environment, in preparation
[50] OECD-ITF (2019), Road Safety in European Cities, https://www.itf-oecd.org/road-safety-european-cities

congestion in urban areas and at the same time improve health and quality of life. Such a policy requires taking road space from motorised traffic and transforming it into space to facilitate walking and cycling.

The European Commission has recently announced a Safe City Award.[51] Highlighting good practice examples in implementing road safety measures at European level will hopefully have a positive effect in encouraging more cities to focus on road safety within SUMPs.

For more information on urban road safety, read the ETSC PIN Flash report 37 (2019) Safer roads, safer cities: how to improve urban road safety in the EU. The publication is available at http://www.etsc.eu/pinflash37



4.3 KEY PERFORMANCE INDICATORS (KPIs)

Key Performance Indicators (KPIs) are important tools for decision makers when identifying priority areas for interventions, tracking progress and evaluating the outcomes of implemented measures.

The EU road safety policy framework 2021-2030[52] includes eight road safety key performance indicators (KPIs), developed in cooperation with Member States. In an initial phase, eight have been chosen to form the basis for monitoring progress in joint road safety work at EU, Member State, regional and local level.[53] Member States are due to start collecting data in 2020. The EC will analyse the data, together with Member State experts, and begin reporting as of 2021.[54]

The KPIs on speed, protective equipment and vehicle safety are related to pedestrian and cyclist safety.

The KPI on speed encourages Member States to collect data on the proportion of vehicle speeds within the legal speed limit by vehicle and road type. Vehicle speed is a particularly important factor in pedestrian and cyclist safety as, to a very large extent, vehicle speed determines the outcome of a collision between a pedestrian or cyclist and a vehicle. However, it is important that speed limits are safe, are set based on the road function and road user composition, and are supported by road design so as to make the speed limit credible. Therefore, the European Commission should work together with Member States towards defining criteria for the safety and credibility of speed limits and introduce an additional KPI on the proportion of roads within the road network with speed limits set at safe and credible levels. Such an additional indicator would address road authorities, whose responsibility is to make sure that legal speed limits are safe and credible, a pre-requisite for implementing the Safe System approach to road safety.

Another KPI encourages Member States to collect data on the proportion of cyclists wearing helmets. ETSC recommends to additionally explore and develop a KPI on infrastructure

[51] Commission staff working document (19.6.2019), EU Road safety policy framework 2021-2030 – next steps towards "Vision Zero", https://bit.ly/2XXX8Xh
[52] European Commission (2019) EU Road Safety Policy Framework 2021-2030 - Next Steps towards "Vision Zero". https://bit.ly/2XXX8Xh
[53] Ibid
[54] Ibid

related to pedestrian and cyclist safety. This has been done in Sweden (see below). An infrastructure indicator would highlight the responsibility of the system designer to provide a safe walking and cycling environment.

The KPI on vehicle safety aims to collect data on the market penetration of safest cars according to the Euro NCAP test results with a high level of protection for those outside and inside of a car.

SWEDEN

TWO ROAD SAFETY PERFORMANCE INDICATORS FOR PEDESTRIAN AND CYCLIST INFRASTRUCTURE SAFETY

Road safety in Sweden is managed through objectives: there are fourteen road safety performance indicators (KPIs) of which twelve have ambitious targets. Two KPIs focus on improvements of pedestrian and cyclist infrastructure safety:

- The share of safe pedestrian, bicycle and moped crossings on main municipal road networks should be 35% by 2020 compared to 19% at a starting point. 27% of crossings on main municipal roads matched this criteria in 2018. The proportion of safe crossings is reported in the national road database and can be estimated every year. A pedestrian, bicycle and moped crossing is defined as safe if it is grade separated or if 85% of motorists drive through it at a maximum of 30 km/h speed. The latter is most effectively achieved by speed humps in direct proximity to the pedestrian, bicycle and moped crossing.

- The share of municipalities with good-quality maintenance of most prioritised pedestrian and bicycle paths should be 70% by 2020 compared to 18% at a starting point. 36% matched this criteria in 2018. The indicator is measured once every two years by circulating a survey to municipalities with at least 40,000 inhabitants. Good quality is defined in terms of standard requirements for winter and summer maintenance, gravel and leaf sweeping, as well as good implementation of the standard requirements.

4.4 THE EUROPEAN UNION'S ROLE IN PROMOTING SAFE ACTIVE MOBILITY

There have been a number of initiatives calling for the European Commission (EC) to come forward with a cycling strategy for the European Union:

- the Luxembourg EU presidency agreed a "Declaration on Cycling" calling for the EC to develop an EU level strategic document on cycling (2015);[55]
- the European Parliament's response to the EC's mid-term review of EU transport policy called on the EC to adopt an EU road map for cycling (2015);[56]
- the Committee of the Regions issued an opinion on "An EU Road Map for Cycling" (2016);[57]
- the Paris Declaration of the Transport, Health and Environment pan-European Programme (PEP) called for a pan-European Master Plan for Cycling Promotion (2014);[58]
- ETSC report in cooperation with international cycling safety experts and the European Cyclist Federation (ECF), called for an EU cycling strategy (2016);[59]
- ECF published a "EU Cycling Strategy. Recommendations for Delivering Green Growth and an Effective Mobility in 2030" with input from other organisations including ETSC (2017).[60]

ETSC would widen the scope of this, calling for an EU wide strategy on safe active mobility which would encourage co-ordinated European action on cycling and walking. Such a strategy should stress the importance of providing safe and attractive infrastructure to encourage more walking and cycling.

[55] Luxembourg Presidency (2015), Luxembourg EU Presidency Declaration on Cycling calling for the European Commission to develop an EU level strategic document on cycling, http://goo.gl/Hi1BVE
[56] European Parliament (2015), Report on the Transport White Paper Mid Term Review, http://bit.ly/2M1v6X2
[57] Committee of the Regions (2017), Opinion of the European Committee of the Regions — An EU Roadmap for Cycling, http://bit.ly/35vxZpM
[58] Paris Declaration of the Transport, Health and Environment pan-European Programme (2014), http://bit.ly/2QlA3fZ
[59] ETSC (2016), The European Union's role in promoting the safety of cycling, http://bit.ly/2Jt5qkv
[60] European Cyclist Federation (2017), EU Cycling Strategy. Recommendations for Delivering Green Growth and an Effective Mobility in 2030, http://bit.ly/2rbyCWZ

4.5 RECOMMENDATIONS ON STRATEGIC PLANNING

RECOMMENDATION TO ALL LEVELS

- Develop a policy of modal priority for road users, particularly in urban areas, the hierarchy being based on safety, vulnerability and sustainability. Walking should be at the top of the hierarchy, followed by cycling and use of public transport.

RECOMMENDATIONS TO CITIES AND TOWNS

- Adopt and implement a local road safety strategy based on the Safe System approach and set road safety targets.
- Include road safety as an essential component in developing and implementing Sustainable Urban Mobility Plans (SUMPs). Apply Safe System approach and prioritise the safety of pedestrians and cyclists.

RECOMMENDATIONS TO MEMBER STATES

- Design and implement walking and cycling safety strategies, which include targets and infrastructure measures to improve walking and cycling safety. Ensure that strategies are closely linked with road safety priorities and that increasing walking and cycling will not lead to more deaths and seriously injured.
- Support local authorities in work on improving pedestrian and cyclist safety by providing expertise and budget.
- Collect and report to the European Commission data to deliver the Key Performance Indicators included in the new EU Road Safety Policy Framework 2021-2030.

RECOMMENDATIONS TO EU INSTITUTIONS

- Adopt specific targets to reduce deaths of vulnerable road users.[61]
- Prepare, publish and implement an EU safe active mobility strategy which sets road safety and targets to increase the distance travelled by walking and cycling.
- Within the context of the Urban Mobility Action Plan, draft guidelines for promoting best practice in traffic calming measures, based upon physical measures and techniques of space-sharing in line with Connected Intelligent Transport Systems developments, to support area-wide urban safety management, in particular when 30 km/h zones are introduced.

Regarding Key Performance indicators:

- Introduce a KPI on the proportion of roads within the road network with speed limits set at safe and credible levels (e.g. 30 km/h in areas with a lot of vulnerable road users).
- Together with Member States, develop KPIs on pedestrian, cyclist and power two wheeler infrastructure safety.

[61] ETSC (2019), Briefing: 5th EU Road Safety Action Programme 2020-2030, http://bit.ly/2JvAaSc

PART V

INFRASTRUCTURE SAFETY, LAND USE PLANNING AND SPEED

5.1 INFRASTRUCTURE SAFETY FOR PEDESTRIANS AND CYCLISTS

Infrastructure and speed govern the interaction between road users and determine road user safety. Infrastructure can play a key role in reducing speeds and separating pedestrians and cyclists from motorised vehicles. The aim should be to minimise potential conflicts between motor vehicles and vulnerable road users by engineering out potentially unsafe features on roads.[62] This can reduce both pedestrian and cyclist deaths and severe injuries when collisions do occur, or even prevent collisions from happening.

In accordance with the Dutch Sustainable Safety principles, the first step in deciding how to maximise the level of pedestrian and cyclist safety on the road network should be the categorisation of the roads according to the traffic function they must fulfil such as being a through, distributor or access road or an urban space.[63]

Part of the current problem is that in many EU Member States the road system, with notable exceptions, has not been designed with cyclists in mind

Infrastructure can also spur more walking and cycling and stimulate public demand for more and better solutions.[64] Part of the current problem is that in many EU Member States the road system, with notable exceptions, has not been designed with cyclists in mind.[65] However, some countries started addressing the growing need for cycling infrastructure.

Audits of existing infrastructure and planned construction, traffic management schemes and maintenance work are useful first steps. Planning pedestrian and cycle networks should be undertaken with the same accuracy used for the road network: planning has to be the first activity to ensure a safe and continuous layout.[66] Cycling facilities should be appropriate to the street context. For example, minimising the speed and volume of traffic on local streets could encourage people to walk and cycle, whereas on a major roads, efforts to minimise the differentials between motorised traffic and unprotected pedestrians and cyclists could prove more difficult. In this context full separation would be the only method possible.[67]

5.2 THE EU ROAD INFRASTRUCTURE SAFETY MANAGEMENT (RISM) DIRECTIVE – A MODEL THAT COULD COVER ALL MAIN ROADS USED BY PEDESTRIANS AND CYCLISTS

The new EU Directive 2019/1936 on Road Infrastructure Safety Management (RISM)[68] requires Member States to integrate safety in all phases of planning, design and operation of road infrastructure on the Trans-European Road Network (TEN-T), motorways and designated primary roads across the EU, as well as all EU-funded roads (except urban roads) as from 2024.[69]

[62] Ibid
[63] SWOV (2006), Advancing Sustainable Safety. National Road Safety Outlook for 2005-2020. SWOV, Leidenscham, 2006, http://goo.gl/L5gMGC
[64] OECD (2013), Cycling, Health and Safety, http://goo.gl/qPHEf4
[65] Ibid
[66] Tira M. and Zazzi M. (2007), Pianificare le reti ciclabili territoriali, Gangemi, Roma
[67] Transport for London (2014), London Cycling Design Standards, https://goo.gl/FxNSuF
[68] Directive (EU) 2019/1936 of the European Parliament and of the Council of 23 October 2019 amending Directive 2008/96/EC on road infrastructure safety management, http://bit.ly/2XTGwkd
[69] Ibid

The RISM procedures include regular road safety inspections, identification and treatment of high-risk sites and prioritisation of safety when building new roads and conducting a network-wide road safety assessment.[70]

The updated directive mandates, for the first time, to systematically take vulnerable road users (VRU), including pedestrians and cyclists, into account in all infrastructure safety management procedures on the roads covered by the directive. The European Commission (EC) will develop guidance on road design quality requirements for their protection. Other EC guidance under preparation will also cover VRU safety including for example the design of forgiving and self-explaining/enforcing roads. Under the requirements of the revised directive, the EC will exchange best practice on the training of auditors. This should also include measures to improve VRU safety.

Pedestrians and cyclists mostly travel on urban roads. Although not mandatory, EU Member States are encouraged to extend the road safety management principles to main urban roads.

5.3 USING EU INFRASTRUCTURE FUNDING TO LEVERAGE PEDESTRIAN AND CYCLIST SAFETY

Recently, the European Commission together with the European Investment Bank launched a "Safe Transport Platform – Road Safety Advisory" to promote safety as a key element for transport investment, and to provide technical or financial advice for potential applicants. Examples of eligible projects include traffic calming measures, facilities for cyclists and pedestrians and – on an experimental basis – measures to improve the safety of vehicle fleets (e.g. procurement of safe public transport buses).[71]

All EU funding streams used for infrastructure, such as the regional development fund or cohesion fund, should apply conditionality criteria to ensure that new projects comply with the Road Infrastructure Safety Management (RISM) directive[72] to guarantee minimum safety criteria, also for walking and cycling.

EuroVelo, the European cycle route network, is a network of 15 long distance cycle routes connecting and uniting the whole European continent. They can be used for short commutes or for longer tourist journeys[73]. This entire network should be recognised as part of the TEN-T network and the Connecting Europe Facility (CEF) instrument should be accessible for supporting its development and expansion.[74] The European Commission should participate in the coordination of the EuroVelo and provide financial and technical assistance for the coordination, know-how transfer and communication on the European level.

In all projects on other TEN-T networks the potential for pedestrian and cycling traffic in the affected area should be evaluated and necessary elements of pedestrian and cycling infrastructure in project planning, design and construction should be integrated. Depending on the network and type of project, the following measures should be integrated:

1. Walking and cycling infrastructure along TEN-T corridors.

2. Safe and comfortable pedestrian and cycle crossings across TEN-T corridors;

3. Upgrade of other roads affected by TEN-T projects to safe standard for walking and cycling;

4. Walking and cycling connections in TEN-T urban nodes.

[70] Ibid
[71] European Commission (2019), Safer Transport Platform: European Investment Bank and European Commission join forces to support investment in transport safety with special focus on roads, https://bit.ly/2CRsAxN, European investment advisory hub, https://bit.ly/2uBloQ
[72] Directive (EU) 2019/1936
[73] http://www.eurovelo.org
[74] ETSC (2012), Raising the Bar – Review of Cycling Safety Policies in the European Union, http://goo.gl/wUmdg3

5.4 SAFE AND CREDIBLE SPEED LIMITS

The Safe System approach, which has been endorsed in the EU Road Safety Policy Framework 2021-2030[75], requires the road traffic management system to limit speeds to survivable levels, taking into account that humans make mistakes and their bodies have a limited tolerance for kinetic forces in case of a road collision.[76] Which speed is considered safe depends on the road design and its function, traffic volume, the composition of traffic and potential conflict types.[77]

The new EU road safety policy framework 2021-2030 commits the EC to set up a new 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.[78] Speed management requires a holistic approach including vehicle safety (Intelligent Speed Assistance (ISA)), infrastructure measures and speeding enforcement. A new EC Recommendation could cover these elements.[79]

For more information about speed and speed limits read ETSC (2018) PIN Flash 36, Reducing speeding in Europe. The report is available at www.etsc.eu/pinflash36

5.5 TRAFFIC CALMING, 30 KM/H ZONES AND TRAFFIC REDUCTION

Traffic calming involves efforts to reduce motorised vehicle speed in residential and urban core zones, so as to facilitate sharing road space with pedestrians, cyclists and motorised vehicles.[80] At low speed, drivers have more time to react to the unexpected and avoid collisions.

The probability of a pedestrian being killed in a collision with a passenger car going at 50 km/h is more than five times the risk than at 30 km/h.[81]

At speeds below 30 km/h, pedestrians and cyclists can mix with motor vehicles in relative safety. This relative safety can be reduced if large volumes of traffic, especially HGVs, are present.

At lower speed, drivers have more time to react to the unexpected and avoid collisions

A combination of traffic calming measures in 30 km/h zones is essential to discouraging drivers from exceeding the speed limit. Different traffic calming measures are more suited to different functions of roads depending on the road hierarchy. Traffic calming should also discourage motorised traffic, except for traffic that needs access to that specific area.[82]

Enforcement on roads limited to 30 km/h has a contribution to make where engineering measures by themselves are insufficient to bring drivers to safe speed.

There is a growing public support and increasing acceptance in the EU of lower urban speed limits. According to expert estimations, below 10% of all urban roads are limited to a 30 km/h speed limit in Hungary. In Cyprus, around 15 to 20% of urban roads are 30 km/h zones supported by traffic calming measures. In Sweden, around 32% of municipal roads have a 30 km/h speed limit – the road length of 30 km/h roads increased from 9,700 km in 2010 to 13,600 km in 2018. In Switzerland, 40% of surveyed participants indicated that they live in 30 km/h zones and 5% in 20 km/h zones. The Welsh government announced plans to set a 32 km/h (20mph) default speed limit on urban roads throughout the country.

Among other PIN countries that have to various extents introduced 30 km/h speed limits in urban areas are Austria, Belgium, Finland, France, Germany, Italy, Denmark, Poland, Portugal, Slovenia, Sweden, Serbia, the Netherlands,

[75] European Commission (2019), EU Road Safety Policy Framework 2021-2030 - Next Steps towards "Vision Zero", https://bit.ly/2XXX8Xh
[76] Stipdonk H. (2019), The mathematical relation between collision risk and speed; a summary of findings based on scientific literature, http://bit.ly/36kV93L
[77] SWOV (2012), Fact sheet, Towards credible speed limits, https://goo.gl/h91gxy
[78] European Commission (2019), EU Road Safety Policy Framework 2021-2030, Next Steps towards "Vision Zero", https://bit.ly/2XXX8Xh
[79] ETSC (2019), ETSC Response to EU Strategic Action Plan on Road Safety, http://bit.ly/2JvAaSc
[80] OECD (2013), Cycling, Health and Safety, http://goo.gl/qPHEf4
[81] Kröyer et al., 2014, Accident Analysis Prevention, Relative fatality risk curve to describe the effect of change in the impact speed on fatality risk of pedestrians struck by a motor vehicle.
[82] ETSC (2015), 30 km/h limits gaining rapid acceptance across Europe, https://bit.ly/2D3lhll

the Czech Republic and the United Kingdom. Opinion polls in several countries repeatedly show a majority of the public support lower speed limits in urban areas.[83]

Heavy traffic flow is a major deterrent to walking and cycling. Conflict between vulnerable road users and motor vehicles can be reduced by the introduction of car-free areas.[84] Traffic and speeds may also be reduced by road closures. The closure of minor streets can offer lightly trafficked routes for pedestrians and cyclists. An area-wide approach should be adopted to avoid displaced traffic leading to more collisions elsewhere. Even at low speeds, mixing with heavy traffic, especially heavy goods vehicles, is hazardous.

5.6 SEPARATION

According to the Safe System approach, bicycles should not mix with motor vehicle traffic, where motor vehicle speed exceeds 30 km/h. Above 30 km/h separate infrastructure for bicycles should be built. Member States need to prioritise separation of bicycles from motor vehicles on the roads with the highest speeds and those with the highest volumes.[85]

Separation is also relevant when discussing the use of pedestrian footways by cyclists or e-scooters. Cycling on footways, at least by adults, is illegal in most European countries. Some cities have seen a rise of e-scooters whose circulation in traffic is not always regulated. Recently, some Member States adopted legislation establishing e-scooter circulation in traffic and most apply similar rules as for bicycles. Yet, cyclist and e-scooter traffic on pathways is not strongly enforced and is often tolerated because of the dangers imposed on these road users by motorised traffic. However, this as well as problems related to shared e-scooter parking on footways, is of concern to pedestrians, particularly the elderly, people who are visually impaired and people with reduced mobility.

Rather than imposing danger to pedestrians by cyclists or e-scooter riders using footpaths, conversion of car lanes or parking space to cycling infrastructure should be prioritised. In specific instances where no on-carriageway solution can be found, and where visibility is good, it may be appropriate to convert the footway to shared use. Widening of the footway, clear signs and markings will help to make shared use more acceptable[86]. However, even in this case, a clear distinction of cycling and walking space is important to avoid pedestrian-cyclist or pedestrian-e-scooter rider conflicts.

5.7 INTERSECTIONS

About 28% of all reported fatal cyclist collisions occur at junctions in EU countries reporting data.[87] Intersection design and treatment is one of the most important infrastructure-related safety interventions.[88] Visibility, predictability and speed reduction should be incorporated as key design principles at intersections. Thus, Member States should prioritise treating intersections and especially those which have already been seen to have had collisions resulting in death or serious injury. There is also a case to be made for looking beyond high-risk sites. In some cases intersections may need to be treated because they are barriers to cycling, even if safety records are sound. Large intersections can be so intimidating to cyclists that they avoid cycling routes that cross them – or take alternative transport.

About 28% of all reported fatal cyclist collisions occur at junctions in EU countries reporting data

[83] Ibid
[84] ETSC (1999), Safety of Pedestrians and Cyclists in Urban Areas
[85] OECD (2013), Cycling, Health and Safety, http://goo.gl/qPHEf4
[86] OECD (2013), Cycling, Health and Safety
[87] European Commission (2018), Traffic safety basic facts, Cyclists, http://bit.ly/36okGJj
[88] OECD (2013), Cycling, Health and Safety, http://goo.gl/qPHEf4

5.8 PEDESTRIAN CROSSINGS

For pedestrians, two important safety features in traffic are that they can walk on safe footways, not on the carriageway, and that when crossing, they can see the other traffic without any obstacles obstructing their view, while the other traffic can clearly see them.

Pedestrian crossings are perceived to be safe places to cross the road but safety of pedestrian crossings is an issue. They need to be carefully designed and appropriately sited if they are to improve safety.[89] Road lighting, refuges and raised pedestrian crossings can all improve the safety of crossing. However, bus stops on refuges in the middle of streets can be particularly hazardous for pedestrians, if only because pedestrians who want to catch the bus may run to the bus without looking out cautiously. Narrowing roads at pedestrian crossings is very effective as it helps drivers to slow down and reduces the distance a pedestrian has to complete in order to cross the road, which is particularly useful for elderly and people with mobility impairments.

Unregulated pedestrian crossings can be safe if well-designed. A motor vehicle should only be allowed to approach a sustainably safe pedestrian crossing at a maximum speed of 30 km/h.[90]

Well-designed signal–controlled pedestrian crossings can improve safety on higher speed and high traffic volume roads.

School crossing patrols provide managed means of safer crossing for children as a particularly vulnerable group.

5.9 FACILITIES FOR PEOPLE WITH REDUCED MOBILITY OR VISUAL IMPAIRMENT

A significant proportion of people have some degree of reduced mobility. Their needs must be understood before facilities, especially pedestrian crossings, are designed or redesigned. Blind or partially-sighted people can have problems in finding their way in pedestrian areas. Different surface textures or directional guidance paving can help them. Street furniture can be a hazard and should not be placed on the natural routes taken by blind or partially-sighted people. Changes in level should avoid the exclusive use of steps. Dropped kerbs at pedestrian crossings assist those with mobility impairments while tactile surfaces help those with visual impairments.[91]

5.10 COOPERATIVE INTELLIGENT TRANSPORT SYSTEMS

Intelligent Transport Systems (ITS) are digital technologies providing intelligence placed at the roadside or in vehicles. Cooperative ITS (C-ITS) focus on the communication between those systems – whether it is a vehicle communicating with another vehicle, with the infrastructure, or with other C-ITS users. Vehicles and infrastructure equipped with C-ITS can, for example, communicate a warning to each other.[92]

C-ITS services focused on pedestrians and cyclists include, for example, crossings that detect the presence of pedestrians to warn approaching vehicles to stop. C-ITS also includes communication with pedestrians and cyclists that could be done through smartphones as well as separate devices, for example in helmets or bicycles.

However, C-ITS services communicating with vulnerable road users are quite a way off from deployment. The current focus should be on roadside systems as well as vehicle systems capable of detecting vulnerable road users as recently mandated in the revised General Safety Regulation for motor vehicles. Meanwhile, more targeted research at services and functions that help vulnerable road users should be conducted.

It should be clear that the responsibility should not be apportioned to a pedestrian or cyclist that does not carry or use any connected device - any wearable technology should be voluntary. The devices should also be clearly labelled that they are safety information system and not safety critical system so that road users have realistic expectations regarding their safety benefits, and prevent overreliance on them.

[89] European Commission (2018), Pedestrians and cyclists, http://bit.ly/348VDYX
[90] SWOV fact sheet, Crossing facilities for cyclists and pedestrians, http://bit.ly/35wzZz1
[91] ETSC (1999), Safety of Pedestrians and Cyclists in Urban Areas, http://goo.gl/1S8hKo
[92] ETSC (2017), Briefing, Cooperative Intelligent Transport Systems (C-ITS), http://bit.ly/2XlNnCQ

5.11 RECOMMENDATIONS ON INFRASTRUCTURE SAFETY, LAND USE PLANNING AND SPEED

RECOMMENDATIONS TO MEMBER STATES

- Develop, and encourage speed limit-setting authorities to apply, national speed limit guidelines based on the Safe System approach. When developing guidelines, take into account factors such as road design, roadside (e.g. land use and topography), traffic composition and flow, presence of vulnerable road users and vehicle quality.
- Develop, and encourage responsible authorities to apply, safe infrastructure design guidelines, such as guidelines for traffic calming measures, intersections, pedestrian crossings or cycling infrastructure design. Renew the guidelines regularly based on the latest research and innovation.
- Establish clear urban and rural road hierarchies, which better match road function to speed limit, layout and design based on the principles of the Safe System approach.
- Encourage local authorities to adopt zones with a speed limit of 30 km/h supported by traffic calming measures in residential areas, areas used by many pedestrians and cyclists and on the way to schools.
- Construct highly visible, recognisable and uniform pedestrian crossings (e.g. raised crossings) to ensure that vehicle users can anticipate on each others expected behaviour.[93]
- Install traffic calming measures at intersections in 30 km/h zones. For higher speed intersections, roundabouts should be constructed if traffic volumes are sufficiently low.
- Provide high motor vehicle-volume crossings and intersections with traffic lights. Adjust traffic lights to reduce pedestrian waiting time and extend the time available for crossing the road.
- Ensure good mutual visibility for all road users at all intersections.
- Break up wide pedestrian crossings by constructing a dividing strip in the middle, or by extending the pavement at the crossing.[94]
- Introduce traffic calming measures in the vicinity of unregulated pedestrian crossings.
- Give priority in road maintenance to the quality of surfaces on footways, cycle paths and the parts of carriageways most used by crossing pedestrians and cyclists.
- Provide shorter and safer routes for pedestrians and cyclists by ensuring that routes are direct and that the quickest routes are also the safest.
- Arrange for cycle traffic and motorised traffic to be physically separated where the speed or the traffic flow of the latter is too high.

RECOMMENDATIONS TO EU INSTITUTIONS

- Develop and adopt a European Commission Recommendation on applying safe speed limits, covering infrastructure, vehicle and enforcement areas.
- Encourage Member States to adopt zones with a speed limit of 30 km/h in residential areas and areas used by many pedestrians and cyclists, and a maximum speed of 50 km/h elsewhere in urban areas. These should be coupled with self-explaining infrastructure measures to support the enforcement of the speed limits.
- Create an EU fund to support priority measures such as for cities to introduce 30 km/h zones supported by traffic calming measures, particularly in residential areas and where there are a high number of pedestrians and cyclists and on the way to schools.
- Include the EuroVelo cycle network as part of the TEN-T and earmark CEF funds for its continued development.

Within the context of the Road Infrastructure Safety Management (RISM) Directive 2019/1936:

- The swift preparation, in light of the revised directive, of the technical guidance on road design quality requirements for vulnerable road users, methodology on road safety assessments and safety ratings, design of forgiving and self-explaining/enforcing roads and reporting of collisions and their severity and the preparation of common specifications for road markings and road signs to support EU Member States.
- Extend the application of the instruments of the RISM Directive to cover all EU co-financed roads, all primary roads including all main rural and main urban roads.

[93] European Commission (2018), Roads, http://bit.ly/2Nkjpuc
[94] SWOV, Factsheet, Pedestrian safety, http://bit.ly/31Zg1u2

PART VI

VEHICLE SAFETY

6.1 NEW VEHICLE SAFETY STANDARDS IN THE EU

Collisions with motorised vehicles account for 99% of pedestrian and 83% of cyclist deaths in the EU. While pedestrians and cyclists create very few risks for other road users, they are constantly put at risk by motorised traffic. Different factors influence impact severity between motor vehicles and pedestrians or cyclists, the most important being vehicle speed of travel, mass and the level of protection provided by the vehicle to those outside the vehicle.

Following a deal reached in 2019, the EU's General Safety Regulation and Pedestrian Safety Regulation have been updated with improved passive and active safety requirements for all new vehicles sold in the EU. Many of the new vehicle safety requirements are directly related to improving pedestrian and cycling safety.[95]

Under the new rules, all motor vehicles, including heavy goods vehicles, buses, vans and cars, will have to be equipped with safety features, including Intelligent Speed Assistance (ISA)[96] and Alcohol Interlock interfaces. Supplementary advanced safety measures will be required for cars and vans, including Automated Emergency Braking (AEB) with vulnerable road user detection and enlarged head impact protection zones capable of mitigating pedestrians and cyclists injuries.[97] Most of the measures will come into effect in 2022 for new models and in 2024 for existing models.

In addition to the general requirements (such as ISA, Lane Departure Warning and AEB), heavy goods vehicles and buses will have to comply with direct vision standards, which will significantly reduce blind spots, as from 2025 for new models and from 2028 for existing models. The direct vision standards will be accompanied by advanced systems capable of detecting pedestrians and cyclists located in close proximity of the vehicle.

CITY ACCESS RESTRICTIONS FOR VEHICLES THAT PRESENT A HIGH RISK TO PEDESTRIANS?

Many European cities now restrict motor vehicles from entering congested or heavily polluted areas. Low-emissions zones are usually linked to European pollution standards, known as Euro standards.

In London, the city authority is currently implementing restricted access criteria for heavy goods vehicles (HGVs) based on safety requirements. The direct vision standard and safety permit for HGVs could be implemented by other cities.[98]

But cities could also consider introducing access restrictions for cars considered to present a high risk to pedestrians and cyclists. Such restrictions could be based, for example, on vehicle mass, or on the Vulnerable Road User protection scores awarded by Euro NCAP.[99]

Research shows that the risk of severe injury or death for a pedestrian is higher in collisions with Sport Utility Vehicles (SUVs) and vans compared to passenger cars. Three design factors influence more severe collisions: SUVs and vans are stiffer, they have higher bumpers and are heavier.[100]

[95] Regulation (EU) 2019/2144 of the European Parliament and of the Councils of 27 November 2019 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://bit.ly/2RZ6xh5

[96] ISA is a vehicle safety technology already available on several models of new cars in EU showrooms. ETSC is calling for ISA systems that use a sign-recognition video camera and a GPS-linked speed limit database to help drivers keep to the current speed limit. Such a system will limit engine power when necessary to help prevent the driver from exceeding the current speed limit. The system can be overridden, or temporarily switched off. As well as improving road safety, reducing emissions and saving fuel, the system can help drivers avoid speeding fines. https://etsc.eu/briefing-intelligent-speed-assistance-isa/

[97] Council of the European Union, Press release (2019), EU beefs up requirements for car safety, http://bit.ly/2NndrZx

[98] TfL, Direct vision standard and HGV safety permit, http://bit.ly/2MXnpC3

[99] Euro NCAP, Vulnerable road user protection, http://bit.ly/36cyBSO

[100] Kröyer H. R.G. (2015), Science direct, Is 30 km/h a 'safe' speed? Injury severity of pedestrians struck by a vehicle and the relation to travel speed and age, http://bit.ly/2JHnCXM

6.2 PEDESTRIAN AND CYCLIST INTERACTION WITH GOODS VEHICLES AND BUSES

10% of all pedestrian deaths and 13% of all cyclist deaths in the EU are a consequence of a collision with a heavy goods vehicle. 9% of pedestrians killed and 7% of cyclists killed were struck by a van. 3% of all pedestrian deaths and 2% of all cyclist deaths occur after a collision with a bus.

Collisions between pedestrians or cyclists with heavy goods vehicles (HGVs) are less frequent than collisions with light motorised vehicles but they tend to be more severe because of the size and mass of an HGV. In the Netherlands, 36% of collisions between a cyclist and an HGV result in a death of a cyclist compared to 8% in collisions with a passenger car. The cyclist death rate is even higher (46%) when the cyclist is in the HGV's blind spot at the time of a collision.[101]

In the Netherlands, 36% of collisions between a cyclist and an HGV result in a death of a cyclist compared to 8% in collisions with a passenger car

Pedestrians and cyclists are among the road users that occupy the smallest amount of road space and are sometimes in drivers' blind spots: right in front or directly to the roadside of the truck or bus. The dimensions of the HGV windows at the front and sides lead to large blind spots in the driver's field of view. Those blind areas change when the vehicle is turning, particularly because the trailer unit always turns along a shorter radius than the cabin unit. That results in the driver being unable to see pedestrians and cyclists who are already close to, or approaching the vehicle when turning.[102]

The European XCYCLE project analysed most common cyclist and HGV collision scenarios in three countries that could provide data. In Italy, the most common scenario was cyclists going straight ahead and goods vehicles ignoring stop signs. In Great Britain, the most frequent scenario involved HGVs of 7.5t or heavier turning left and a bicycle moving straight ahead. In France, the most common scenario involved HGVs of 3.5t or heavier with the trailer moving forward and a bicycle going straight ahead.[103]

A study conducted by the VIAS institute analysed 29 blind spot collision cases between a pedestrian or cyclist and an HGV that occurred in Antwerp. A conclusion is that the blind spot at the front right of the cabin as well as the blind spot directly in front of the cabin pose a major risk for vulnerable road users. In more than half of blind spot collisions, a vulnerable road user was directly or indirectly visible to the HGV driver. This indicates that an appreciable proportion of the collisions were attributable to the complexity of the HGV driver's driving task.[104]

In response to the road safety problem related to HGV blind spots, the EU has adopted direct vision requirements in the revised General Safety Regulation (see 6.1) which will come into effect in almost a decade. All HGVs will also have to be fitted with Blind Spot Detection Systems (BSIS) which will warn drivers of possible collisions with cyclists and pedestrians. The average age of heavy goods vehicles in the EU is 12 years[105] and it will take many years until there is a large scale market penetration of HGVs with direct vision cabins. To accelerate the process, Member States and local authorities should introduce public procurement requirements for safe vehicles, including buses, or urban access regulations for safe HGVs, as in London.[106]

Member States and local authorities should introduce public procurement requirements for safe vehicles, including buses, or urban access regulations for safe HGVs, as in London

[101] SWOV fact sheet (2015), Blind spot crashes, http://bit.ly/2SU1Q8N
[102] ETSC (2014), Weights and dimensions of heavy goods vehicles – maximising safety, http://bit.ly/2qRURkF
[103] Xcycle, D 2.1 – Present state of affairs, http://bit.ly/2QOPYCq
[104] Vias institute (2018), In-depth investigation of crashes involving heavy goods vehicles, http://bit.ly/36udcEj
[105] ACEA
[106] TfL, Safer lorry scheme, http://bit.ly/32ZhjXs, TfL, Direct vision standards and HGV safety permit, http://bit.ly/2MXnpC3, TfL, Bus safety, http://bit.ly/2Jy3yat

6.3 RECOMMENDATIONS ON VEHICLE SAFETY

RECOMMENDATIONS TO MEMBER STATES

- 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.
- Attend UNECE working groups dealing with vehicle regulations and insist on the highest possible standards with regards to the implementation of the General Safety Regulation.

RECOMMENDATION TO EU INSTITUTIONS

- Research the relationship between vehicle design and pedestrian and cyclist injury outcomes.

RECOMMENDATIONS TO MEMBER STATES AND EU INSTITUTIONS

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

- Deliver on the estimated number of deaths and serious injuries prevented by adopting strong and timely secondary regulation implementing the General Safety Regulation;
- Insist on the highest possible vehicle regulations standards at UNECE with regards to GSR implementation;
- Require a high level of performance of Intelligent Speed Assistance systems to be fitted in all new vehicles;
- Develop crash test dummies representative of more aspects of variability such as age, gender, size and stature for those users outside of the vehicle.

PART VII

HUMAN BEHAVIOUR

The infrastructure and vehicle developments presented in the sections above can only be fully effective if they are supplemented by appropriate road user behaviour. The Dutch sustainable safety principles also put an onus on street designers to provide environments and infrastructure that are clear to people. One should also consider that some highway layouts can promote aggressive behaviour.[107]

Integrating walking and cycling into the traffic system requires that motorised vehicle users act in a way that pedestrians and cyclists can predict and react safely, and vice versa (with the exception of children whose behaviour might be unpredictable, thus drivers have to be alert in locations where children presence is likely). Such behaviour can be achieved through an optimal combination of self-explaining infrastructure, education on safe road use, as well as enforcement of traffic laws.[108]

7.1 TRAFFIC LAW ENFORCEMENT FOR DRIVERS

Sustained intensive enforcement that is well explained and publicised has a long-lasting effect on driver behaviour. Traffic law enforcement is a very cost-effective means of enhancing road safety.[109]

Enforcement of rules relating to risky behaviour such as speeding, overtaking without keeping a proper lateral distance, distraction, drink or drug driving and compliance with driving and resting hours in relation to fatigue could all benefit pedestrian and cyclist safety.

Sanctions should be linked to relative risk and graded, for example, for speeds higher than 30 km/h. However, it should be noted that this will only make a difference with high levels of speed enforcement and efficient handling of sanctions.

Traffic law enforcement should be a priority in national policing plans. Resources should be earmarked and targets set in line with best practice in preparing national enforcement plans.

For more information about speed and speed limits read ETSC (2018) PIN Flash 36, Reducing speeding in Europe. The report is available at www.etsc.eu/pinflash36

7.2 BICYCLE HELMETS

Head and brain injuries sustained by cyclists could be reduced by bringing cycle helmets into general use. The most recent and extensive meta-analysis of case-control studies of the protective bicycle helmets effect estimates that the risk of severe head injury of cyclist wearing a helmet decreased by 69% and that of fatal head injury by 65%.[110]

A bicycle helmet offers protection against head injury at impact speeds of up to about 20 km/h. The more the impact speed exceeds 20 km/h, the faster the protective effect of the helmet lessens.[111]

One of the longstanding arguments against bicycle helmet use is the risk compensation hypothesis - increased feeling of safety due to wearing a helmet results in cyclists exhibiting

[107] Transport for London (2014), London Cycling Design Standards, https://goo.gl/FxNSuF
[108] ETSC (2012), Raising the Bar – Review of Cycling Safety Policies in the European Union. http://goo.gl/3hwdui
[109] ETSC (2015), Enforcement in the EU Vision 2020, http://goo.gl/A3TXnN
[110] International Journal of Epidemiology, Olivier, J. & Creighton, P. (2016), Bicycle injuries and helmet use: a systematic review and meta-analysis, http://bit.ly/2qWGewJ. The estimates in this meta-analysis are based on 40 case-control studies.
[111] Ibid

more risky behaviour.[112] A study published in 2018, the first one to carry out a systematic literature review on risk compensation, concluded that there is little to no support for the hypothesis that bicycle helmet use is associated with engaging in risky behaviour.[113]

Designers of awareness-raising campaigns and activities for the use of helmets should aim to send a balanced message, one which does not dissuade people from cycling by portraying it as an inherently dangerous activity.[114] Due to the health benefits of cycling, road safety interventions that reduce the numbers of cycling may have a public health disbenefit.[115]

Several countries collect data on cyclists' helmet wearing rates. The proportion of cyclists wearing helmets are 51% in the Czech Republic (2019), 47% in Ireland (2018), 52% in Switzerland for conventional bicycles, 65% for pedelecs and 92% for speed pedelecs (2019), 43% in Finland (2018), 42% in Sweden and Denmark (2018), 31% in Austria[116] (2018), 22%[117] in France (2018) and 18% in Germany (2018). In 2015, bicycle helmet wearing rate in Poland was 20%.

Some European countries mandate use of cycle helmets for young age groups but the extent of legislation varies from country to country (Table 4).

Table 4. Cycle helmet wearing regulations.

Bicycle helmets mandatory:	Bicycle helmet not mandatory:
Austria under 12	**Belgium**
Czech Republic under 18	**Bulgaria**
Estonia under 16	**Cyprus**
Spain under 16 in all roads and above 16 only outside urban areas	**Germany**
Finland mandatory for all, but no sanctions	**Denmark**
France under 12	**Greece**
Croatia under 16	**Ireland**
Hungary for all, outside urban areas with speed limit above 40 km/h	**Malta** Exception: children under 10 travelling as bicycle passengers
Latvia under 13	**Italy**
Lithuania under 18	**Luxembourg**
Sweden under 15	**Netherlands**
Slovenia under 18	**Poland**
Slovakia under 15	**Portugal**
Israel under 18	**Romania**
	UK
	Switzerland
	Norway
	Serbia

[112] Esmaeilikia M. (2018), Bicycle helmets and risky behavior: a systematic review. Science direct, http://bit.ly/32PreOa
[113] Ibid
[114] ETSC (2012), Raising the Bar – Review of Cycling Safety Policies in the European Union. http://goo.gl/3hwdui
[115] De Jong, P., The Health Impact of Mandatory Bicycle Helmet Laws (February 24, 2010). Risk Analysis, 2012, http://bit.ly/2FrqmWY
[116] There are substantial differences in helmet wearing rates between cyclist types: bicycle wearing rates is 20% for everyday cyclists, 26% for leisure cyclist and 89% for sport cyclists.
[117] On weekdays in built up areas

DENMARK

INCREASE IN HELMET USE AMONG CYCLISTS AND A DECREASE IN CYCLIST HEAD INJURIES

In Denmark, the wearing rates of cycle helmet use has been increasing steadily. 6% of cyclists wore helmets in 2004 compared to 42% in 2018. Over the same period, the proportion of head injuries among cyclists was reduced from 34% to 25%.

"The helmet wearing rates are increasing due to continuous campaigns promoting helmet use that target different age groups. As a result, the general acceptance and positive attitudes toward bicycle helmets are increasing. Moreover, nowadays there is a variety of helmets that suit road users' demands for better comfort and better looks."

Pernille Ehlers, Danish Road Safety Council

7.3 PEDESTRIAN AND CYCLIST BEHAVIOUR

Pedestrians and cyclists should receive at least a minimum level of road safety education and awareness of the risks imposed by the current traffic system through training and education. The full understanding of road signs and signals, especially for cyclists, is a minimum requirement. Additional efforts are needed to train cyclists so that they can correctly predict traffic situations and assess other users' behaviour.[118]

In 2019 the Danish Road Directorate studied cyclist behavior at intersections with traffic lights. The study showed, that on average 5% of cyclists were observed violating the rules. The most common violations were making a right turn on a red light and cycling on the footway. The share of cyclist violations was higher at intersections with no separate bicycle infrastructure (14%) than in intersections with a separate bicycle lane (5%).[119]

While cyclist offences are less dangerous to other road users compared to motorised vehicles, they are generally more visible. Violations by motorised users, such as speeding, not giving priority to pedestrians or overtaking cyclists with less than a meter distance are not often visible or too common to be noticed.

Pedestrian or cyclist behaviour effected by distraction can have road safety implications. Some countries started conducting observations on distracted walking and cycling. In Lisbon, Portugal, 15% of observed pedestrians are using a mobile phone while walking. 14% pedestrians use a mobile phone while crossing the road on the crosswalk in Israel. 0.1% of cyclists were observed using a mobile phone while cycling in Ireland in 2018. As from 2020, France will also start conducting observations on pedestrian distraction.

For more information on road safety education read ETSC report (2019), The state of traffic safety and mobility education in Europe. The report is available at https://etsc.eu/the-status-of-traffic-safety-and-mobility-education-in-europe/

GREAT BRITAIN

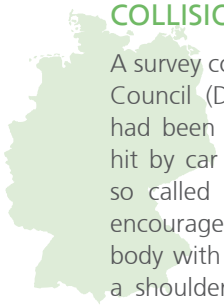
PEDESTRIAN DISTRACTION IDENTIFIED AS A CONTRIBUTORY FACTOR IN 3% OF FATAL COLLISIONS, DRIVER DISTRACTION IN 8%

In 3% of all fatal collisions that occurred in Great Britain in 2018, careless, reckless or in a hurry pedestrian behaviour was identified as a contributory factor. This category also includes pedestrians using mobile phones.[120] A motor vehicle driver distraction remains more common in fatal collisions as it was identified as a contributory factor in 8% of all fatal cases in 2018. 2% of all fatal collisions happened when the driver was using a mobile phone, 5% due to in-vehicle distraction and 1% due to distraction outside the vehicle.

[118] TSC (2012), Raising the Bar – Review of Cycling Safety Policies in the European Union, http://goo.gl/3hwdui
[119] Cyklisters adfærd i signalregulerede kryds (2019), http://bit.ly/2S00Q2r
[120] Contributory factors for reported road accidents (RAS50), http://bit.ly/36JPsfb

GERMANY

A CAMPAIGN TO PREVENT CYCLISTS GETTING HIT IN DOOR OPENING COLLISIONS



A survey commissioned by the German Road Safety Council (DVR) revealed that 6% of respondents had been involved in a collision when a cyclist is hit by car doors opening. The DVR promotes the so called "Dutch Reach": vehicle occupants are encouraged to open the door reaching across the body with the more distant hand which facilitates a shoulder check. The door should only be fully opened when the road is clear. Bicycle riders are still encouraged to cycle carefully alongside parked vehicles and to pay attention to the first signals that indicate passengers are getting out of the vehicle. If in doubt, they should slow down or even stop.[121]

[121] DVR, Dooring-Unfälle: Mehr als jeder dritte Fahrrad Fahrende fürchtet sich davor, http://bit.ly/2YVUwuc

7.4 RECOMMENDATIONS ON HUMAN BEHAVIOUR

RECOMMENDATIONS TO MEMBER STATES

- Intensify traffic law enforcement for all motorised vehicles, including powered-two-wheelers, especially of speeding, in urban areas where there are high numbers of pedestrians and cyclists.
- Strengthen enforcement against illegal parking when pedestrian and cyclist facilities are abused by parking on footpaths and cycle' paths.
- Link sanctions to relative risk: graded sanctions should be applied for higher speeds on 30 km/h and 50 km/h roads where there are higher numbers of pedestrians and cyclists.
- Map high risk sites for pedestrians and cyclists and use this to inform and direct enforcement actions of especially speeding.
- Introduce and enforce sanctions for pedestrians and cyclists for exposing themselves or other road users to unnecessary risks.
- Ensure that pedestrians and cyclists have a minimum level of traffic education and awareness of the risks imposed by the current traffic system through training and education.
- Encourage helmet wearing among cyclists without discouraging cycling.
- Encourage cyclists to have adequate lighting and pedestrians to use reflectors when travelling in the dark.

RECOMMENDATIONS TO EU INSTITUTIONS

- Support Member States in preparing national enforcement plans with annual targets for compliance in the areas of speeding, drink driving and distraction, especially in urban areas where there are high numbers of pedestrians and cyclists.
- Introduce minimum requirements for cycle lighting and reflective elements.
- Revise standards for testing bicycle helmets to offer high levels of protection.

PART VIII

DATA AND RESEARCH

8.1 UNDERREPORTING OF PEDESTRIAN AND CYCLIST DEATHS AND INJURIES

Pedestrian and - to a large extent - cyclist collisions are disproportionally underreported in police reports[122] [123] [124] when compared to other data sources such as hospital records, coroner data, court files or others. Road safety work in many countries is based on the data collected by the police and road safety of underreported road user groups might not receive sufficient attention from policy makers. The scope of underreporting problem, especially for single bicycle collisions with no motorised vehicle involved, should be researched and tackled. Such research takes place in the Netherlands and Finland.

In the Netherlands, the actual number of road deaths is determined by Statistics Netherlands by linking three data sources: coroner reports and court files, both on deaths from unnatural causes and police data. Since 2010, around 30%[125] of all cyclist deaths are not recorded by the police but are captured by Statistics Netherlands.

In Finland, Statistics Finland cross-checks data from the police records with hospital and death certificate data. Hospital data allow to capture cyclist collisions that were included in the police database but were not originally recorded as such by the police. In 2018, 33% of all cyclist deaths were originally not reported as cyclist collisions by the police but they were captured in police records by Statistics Finland. In 2017, this proportion was 48%, in 2016 – 27% and in 2015 – 23%.[126]

It is highly likely that other countries are affected by road death and serious injury data underreporting by the police, especially for pedestrians and even more so for cyclists, as some collision types are difficult or not possible for the police to capture. For example, single bicycle collisions or bicycle collisions with pedestrians are particularly prone to be underreported as police might not even be called to attend the scene of such collisions.[127]

The absence of procedures to link and complement road death data recorded by the police in many countries deprive them from defining the actual scope of the problem. When linkage procedures are in place, it is still difficult to retrieve detailed information about the circumstances of the collision as police were not present at the scene. However, capturing underreporting levels reveals the actual scope of the road safety problem.

FINLAND
IN-DEPTH INVESTIGATION OF SINGLE BICYCLE COLLISIONS

According to the EU definition of a road death, deaths from natural causes and confirmed suicides should be excluded from national road death statistics. Finnish in-depth accident investigation teams analysed 57 fatal single bicycle collisions that occurred over the period 2010-2017. 65% (37 out of 57) were a result of a natural death and they were excluded from the road death statistics.

In Finland, accident investigation teams do not capture all natural deaths in traffic. An ongoing research aims to identify how to capture natural cyclist and driver deaths more accurately and to understand what medical impairments lead to a death in traffic.

[122] ITF (2018), Cycling Safety, Summary and conclusions of the ITF round table on cycling safety.
[123] European Commission (2018), Pedestrians and cyclists, http://bit.ly/348VDYX
[124] Airaksinen N. (2018), Polkupyöräilijöiden, mopoilijoiden ja moottoripyöräilijöiden tapaturmat – vammojen vakavuus ja tapaturmien tilastointi, http://bit.ly/2qebzuQ
[125] Information provided by the PIN panellist.
[126] Information provided by the PIN panellist.
[127] ETSC (2018), PIN Flash 35, An overview of road death data collection in the EU, www.etsc.eu/pinflash35

8.2 PEDELECS

There are many types of e-bikes. The most popular is a pedelec where the pedalling is supported by a battery-powered electric motor. Pedelec has the maximum electrical assistance power of 0.25kW which is cut when the cycle reaches a 25 km/h speed[128] and is considered to be a bicycle in the EU. The pedelec does not have to be type approved like motorised vehicles and is regulated through CEN standards.[129]

There are also higher powered e-bikes which are regulated with type approval and are viewed as motorised vehicle, even when they are pedal-assisted. Two relevant categories of these vehicles are "powered cycles" of speeds up to 25 km/h and power cut out at 1000 watt and mopeds – of speeds up to 45 km/h and power up to 4000 watts. The higher power e-bikes are beyond the scope of this report and need specific investigation regarding their road safety impact.[130]

In the last few years, the use of pedelecs in Europe has been increasing and is expected to continue growing especially for use in longer journeys. In Europe, close to 1.7 million pedelecs were sold in 2016, which represents more than 8% of the bicycle market. Pedelecs represented more than 45% of new bicycles sold in Belgium in 2018, 25% of bicycles sold in the Netherlands and 15% in Germany in 2016[131], 12% in Sweden in 2017[132] and 12% sold in Denmark in 2018. Pedelec use is growing in France – these bicycles represented 5% of all bicycle market in 2016, 10% in 2017 and 13% in 2018. Pedelecs are particularly popular with older people who appreciate the extra assistance provided by the electric motor but they are gaining popularity among other age groups too.[133]

The road safety consequences of the potentially higher average speed that pedelecs can achieve and higher weight of pedelecs compared to classical bicycles are not yet clear. The extra weight can affect mounting and dismounting the bike as well as handling at lower speeds.[134] Many pedelecs have front-wheel traction, but on classic mechanical bikes the power is sent to the back wheel. When the power is sent to the front wheel there is an increased chance of skidding – which is not desirable in terms of safety.[135]

The speed difference between pedelecs and traditional bikes is most noticeable on inclines, but in all other situations, the difference in cruising speed is of the order of 2km/h. As documented in Switzerland, Germany and in the Netherlands, pedelec riders appear to use motor assistance primarily to attain similar speeds to cyclists, only with less effort.[136] [137]

In many countries, police collision reports may not clearly distinguish traditional bicycles from pedelecs or even higher powered e-bikes

An Austrian study estimated that electric pedal-assisted bicycles are generally ridden at higher speeds than traditional bicycles with pedelec cyclists reaching speeds of around 25km/h on open, unobstructed stretches of road.[138]

A study by GDV suggests that the use of pedelecs does not result in a higher risk of collision.[139] A Dutch study revealed that pedelec users are more likely to be involved in a collision that requires treatment at an emergency department. However, collisions involving pedelecs are about as severe as collisions with traditional bicycles.[140] Road casualty statistics in Switzerland show that the proportion of serious injuries among riders of e-bikes is higher than among riders of classic cycles. However, the two populations are not comparable since e-bike riders are older and therefore more vulnerable in the event of a collision. Controlling for age,

[128] European Committee for Standardization, CEN/TC 333 – Cycles, http://bit.ly/35YzZHU
[129] Ibid
[130] ECF, Electric bicycle (pedelec) regulation, http://bit.ly/2YVrCdK
[131] Ibid
[132] Sjöberg H., PLkvt, Trafikverket, Statistik över elcykelolyckor 2013-2017
[133] ITF (2018), Cycling Safety, Summary and conclusions of the ITF round table on cycling safety, http://bit.ly/34Xz7m4
[134] Schepers J.P. et al., The Safety of Electrically Assisted Bicycles Compared to Classic Bicycles, http://bit.ly/2rFjG3G
[135] Ibid
[136] ITF (2018), Cycling Safety, Summary and conclusions of the ITF round table on cycling safety
[137] Schleinitz K. et. al. (2015), The German Naturalistic Cycling Study – Comparing cycling speed of riders of different e-bikes and conventional bicycles. Safety Science, http://bit.ly/2Qgx0FU
[138] KFV (2019), Sicher Leben #19, Geschwindigkeitsunterschiede ausgewählter Fahrradtypen, https://www.kfv.at/e-bikes/
[139] GDV (2014), Pedelec-Naturalistic Cycling Study, https://goo.gl/HZ3SpM
[140] Schepers J.P. et al., The Safety of Electrically Assisted Bicycles Compared to Classic Bicycles, http://bit.ly/2rFjG3G

no difference between pedelec and classic bike crash severity can be found in the Netherlands, Germany and Switzerland.[141]

A study in Sweden concluded that collisions involving pedelecs in many aspects are similar to collisions involving traditional bicycles. The most common collision type is a single pedelec collision, while the most common contributory factor is poor infrastructure maintenance, particularly icy surfaces. The risk of serious injury increased with a pedelec cyclists' age.[142]

More research on safety implications of pedelecs compared to traditional bicycles is needed before drawing conclusions. A challenge to obtaining greater insights is a lack of data. In many countries, police collision reports may not clearly distinguish traditional bicycles from pedelecs or even higher powered e-bikes.[143]

Several countries have already introduced a field in police reports that indicate pedelec and higher powered e-bikes as bicycle categories. Casualties on higher powered e-bikes started to be registered in Denmark in 2012 and on pedelecs in 2018. Data show that 10% of all injured or killed cyclists in Denmark were pedelec riders in 2018. In Belgium, there is a separate field in police reports for pedelecs and in 2018, cyclist deaths on pedelecs accounted for 24% of all cyclist deaths. UK is currently considering introducing such fields in the review of the data collection process.

In Switzerland, police reports distinguish traditional bicycles from electric bicycles, both pedelecs and higher power e-bikes. Since 2014, pedelecs are a subgroup of bicycle category and a higher power e-bikes a subgroup of a small PTW in Germany. Portuguese data distinguish between bicycle and bicycles with a small motor but the motor may be electrical or internal combustion.

The number of injuries, and even deaths, following a pedestrian fall in traffic without a motorised vehicle involved is surprisingly high and represents a significant cost for societ

8.3 SINGLE PEDESTRIAN FALLS

The definition of an injury road collision in the EU concerns an incident on a public road that involves at least one moving vehicle and at least one casualty (person injured or killed).[144] Pedestrian falls on a footway or a carriageway, even where this may be due to the poor quality of the pavement or in reaction to the action of user and without impact with that other road user, are not considered to be a road casualty. Thus single pedestrian falls are not reported in police statistics.[145] Such injuries and deaths are captured by health sector statistics. The scope and problem of injuries due to pedestrian falls in traffic is overlooked.[146]

The number of injuries, and even deaths, following a pedestrian fall in traffic without a motorised vehicle involved is surprisingly high and represents a significant cost for society. The fear of falling also constitutes a mobility constraint for the elderly.[147]

Pedestrian falls, just like in other EU countries, are not considered as road casualties in Sweden. To estimate the scope of the single pedestrian fall problem, a study has been conducted. It revealed that 13% (34 out of 254) of all pedestrian deaths in traffic in Sweden that occurred over the period 2009-2013 were a result of pedestrian falls.[148] Over the same five-year period 15,600 pedestrians who fell sustained serious injuries. This corresponds to about 3150 pedestrians severely injured in falls every year, i.e. more than 30 times more pedestrians are injured in falls compared to collisions with a motorised vehicle. Predominantly women and older individuals are injured in falls in traffic. The study concludes that the most common cause of pedestrian falls is deficient winter road maintenance, as two thirds of all seriously injured pedestrians have slipped on ice or snow.[149]

A study on single pedestrian falls is currently being conducted in the Netherlands. Data collected for the study show that over the period 1996 to 2017, 46% (1610 out of 3526) of all pedestrian deaths in traffic in the Netherlands were pedestrian falls with

[141] Schepers, J.P et al. (2018), The safety of electrically assisted bicycles compared to classic bicycles in the Netherlands, International Transport Forum Discussion Paper.
[142] Helena Sjöberg, PLkvt, Trafikverket, STATISTIK ÖVER ELCYKELOLYCKOR 2013-2017
[143] Geoffrey R. (2011), E-bikes and urban transportation: emerging issues and unresolved questions, Springer Science + Business Media, LLC.
[144] European Commission, Directorate-general for mobility and transport, CARE database, CaDaS, http://bit.ly/2q3yKXY
[145] European Commission, Pedestrians and cyclists (2018), http://bit.ly/348VDYX
[146] ITF/OECD, Non-motor pedestrian accidents: a hidden issue, http://bit.ly/2MWX4nK
[147] Ibid
[148] Berntman M. (2015), Lund University, Fotgängares olyckor och skador i trafikmiljö med fokus på fallolyckor
[149] Ibid

no vehicle involved. 58% of pedestrians who died as a result of a fall were males and 42% females; 68% of males and 84% of females were aged 75 or older. Over the period 1996-2015, single pedestrian falls accounted for 79% (32,400 out of 41,000) of all serious pedestrian injuries in traffic based on MAIS3+ definition in the Netherlands.[150]

SWEDEN

WALKING SAFETY STRATEGY IDENTIFIES MEASURES TO IMPROVE PEDESTRIAN SAFETY, INCLUDING PREVENTION OF SINGLE PEDESTRIAN FALLS IN TRAFFIC

The Swedish walking safety strategy recognises that pedestrian injuries and deaths in collisions with motorised traffic as well as pedestrian falls in traffic with no vehicles involved have to be addressed when introducing measures to improve pedestrian safety. As society is ageing and urbanisation is increasing, pedestrian falls are likely to increase in the future. Among the focus areas aimed at improving walking safety are safe design of pedestrian infrastructure, good operation and maintenance for safe pedestrian infrastructure and development of vehicles for safe interaction with pedestrians.

The strategy contains clear responsibilities assigned to a number of stakeholders that are involved in delivering the commitments for each of the five focus areas.[151]

8.4 CYCLING AND WALKING UNDER THE INFLUENCE OF ALCOHOL OR DRUGS

Alcohol or drugs intoxication can be a contributing factor in fatal and serious pedestrian and cyclist collisions. Some EU countries have investigated the scope and characteristics of such collisions (Tables 5 and 6).

Based on information from countries where data are available, a general observation is that drunk pedestrians and cyclists involved in fatal collisions are heavily intoxicated and drunk cyclists are prone to be involved in single bicycle collisions.

A Swedish in-depth study showed that many people see benefits (practical, free, safe and better than taking a car) in alcohol impaired cycling while the risks (impaired ability, danger to oneself, danger to others) may not be taken into account. Many people believe there is a public acceptability to riding a bicycle while alcohol impaired.[152]

Almost all EU countries have introduced Blood Alcohol Content (BAC) limits for cyclists (Table 7). In many cases, the BAC limits for cyclists are the same as for motor vehicle drivers. In practice, drink cycling limits are not widely enforced.

Table 5. Information about killed alcohol intoxicated pedestrians from countries where the information was available. Data between countries are not comparable due to different methodologies.

	Intoxicated pedestrian casualties					
	% of intoxicated out of all tested	Male	Road type	Pedestrian intoxication level	Timeframe	Data
AT	4%	85%	85% on urban roads	53% of injured intoxicated pedestrians had a 1.6 g/l and 11% between 1.2 to 1.6 g/l	2018	Injuries
DK	20%			For all 20% killed pedestrians, BAC was equal or higher than 0.5 g/l	2018	Deaths and injuries
IE[154]	49%	88%	60% on rural roads	53% of injured intoxicated pedestrians had an alcohol concentration of 1.6 g/l and another 11% between 1.2 to 1 g/l	2008-2015	Deaths
FR[155]	37%		75% on rural roads	24% of all killed pedestrians had intoxication above 0.5 g/l and 13% has intoxication between 0.2 g/l and 0.5 g/l	2018	Deaths
FI[156]	21%			81% of killed intoxicated pedestrians had 1.2g/l of higher BAC	2013-2017	Deaths
RS	82%			On average 1.3 g/l	2016-2018	Deaths and injuries

[150] Methorst R. [in preparation, expected publication Summer 2020], Walking and sojourning as a source of wealth and well-being – What controls can policy actors turn to make it happen? An overview of insights needed for developing a generative systems approach to walkability. Technical University of Delft, Delft.
[151] Traffikverket (2017), Gemensam inriktning för säker gångtrafik 1.0
[152] Wallén Warner H. et. Al, VTI (2017), Alkohol och cycling, En multidisciplinär studie

Table 6. Information about killed alcohol intoxicated cyclists from countries where the information was available. Data between countries are not comparable due to different methodologies.

	Intoxicated cyclist casualties						
	% of intoxicated out of all tested	Male	Road type	Cyclist intoxication level	Single bicycle collision	Time-frame	Data
AT	5%	90%	88% in urban areas	42% of injured intoxicated cyclists were over 1.6 g/l and another 23% between 1.2 and 1.6 g/l	80%	2018	Injuries
DK	5%			For all 5% killed cyclists, BAC was equal or higher than 0.5 g/l		2018	Deaths and injuries
FI	18%			81% of killed intoxicated cyclists had 1.2g/l of higher BAC	50%	2013-2017	Deaths
SE[157]	15%	More often male		On average 1.8 g/l	Often single bicycle collision	2006-2015	Deaths
RS	9%	89%		On average 1.3 g/l		2016-2018	Deaths and injuries

Table 7. BAC limits for cyclists. *DE - cyclists who have more than 1.6 BAC lose their driving licence and they have to do a psycho-medical assessment to get it back. **PT - motorised user penalties also apply to cyclists, demerit points are added to a driving licence for drunk cycling.

0.0 g/l	0.2 g/l	0.4 g/l	0.5 g/l	0.8 g/l	1.6 g/l	no limits	Information not available
CZ	EE	LT	BE	AT	DE*	DK	LU
SK	PL		BG			FI	RO
	RS		CY			EL	NO
			ES			HU	
			FR			SE	
			HR			UK	
			IE			IL	
			IT				
			LV				
			MT				
			NL				
			PT**				
			SI				
			CH				

[153] Wallén Warner H. et. Al, VTI (2017), Alkohol och cycling, En multidisciplinär studie

8.5 RECOMMENDATIONS ON DATA AND RESEARCH

RECOMMENDATIONS TO MEMBER STATES

- Consider how to improve registration of deaths and serious injuries of pedestrians and cyclists and tackle underreporting. Analyse single bicycle collisions, including how they are recorded, as a matter of priority.
- Identify and improve methods to estimate the rates of walking and cycling.
- Collect travel data for all road users (pedestrians, cyclists, PTWs, cars, vans, HGVs) by road types.
- Add fields in police reports to indicate pedelec and higher speed e-bikes to keep track of serious and fatal collisions involving these e-bike riders.
- Keep records of single pedestrian falls in traffic that result in deaths and serious injuries.
- Give priority in road maintenance to the quality of surfaces on footways and the parts of carriageways most used by crossing pedestrians.
- Publish annual number of alcohol related road deaths and serious injuries according to the SafetyNet[154] definition, by road user types.

RECOMMENDATIONS TO EU INSTITUTIONS

- Maintain the current definition of pedelecs – with a designed speed of 25km/h and a pedal-assisted maximum continuous output of 250W which is cut when the vehicle reaches its designed speed.
- Research infrastructure changes needs for pedelecs.
- Encourage research on road safety implications of electrically assisted bicycles.
- Encourage Member States to collect travel data in a harmonised way for all road users (pedestrians, cyclists, PTWs, cars, vans, HGVs) by road types.
- Encourage Member States to keep records of single pedestrian falls in traffic that result in deaths and serious injuries. Consider extending the definition of what constitutes a road collision to include single pedestrian falls.
- Encourage Member States to adopt the SafetyNet recommended definition of an alcohol-related road deaths, whilst recognising BAC limits differ among EU countries.

[154] Any death or serious injury occurring as a result of a road accident in which any active participant (including pedestrians and cyclists) was found with a blood alcohol level above the legal limit,

ANNEXES

COUNTRY	ISO CODE
Austria	AT
Belgium	BE
Bulgaria	BG
Switzerland	CH
Cyprus	CY
Czech Republic	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
Luxmenbourg	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.4). Pedestrian deaths reported by the police (2016-2018 average) per million inhabitants in 2018.

	Fig.4 Pedestrian deaths per mln inhabitants, 2016-2018	Inhabitants in 2018
NO**	2.4	5,295,619
NL***	3.2	17,181,084
SE	3.7	10,120,242
FI	4.8	5,513,130
DK	5.0	5,781,190
CH	5.7	8,484,130
DE	5.8	82,792,351
UK	7.1	66,273,576
SI	7.3	2,066,880
AT	7.3	8,822,267
BE	7.3	11,398,589
IE	7.4	4,857,000
FR	7.7	64,812,000
ES	8.0	46,658,447
LU	8.3	602,005
IT	9.8	60,483,973
IL	10.9	8,972,000
SK	11.0	5,443,120
EE	11.1	1,319,133
MT	11.9	475,701
EL**	12.3	10,741,165
CZ	12.6	10,610,055
PT	13.9	9,792,797
CY	14.3	864,236
HR	15.3	4,105,493
HU	16.6	9,778,371
BG	18.8	7,050,034
RS	20.6	7,001,444
PL	22.1	38,433,558
LT	24.9	2,808,901
LV	26.9	1,934,379
RO	36.5	19,530,631
EU28	**10.4**	**510,250,308**

Data source: EU CARE data, Eurostat and PIN panellists.
**EL and NO - 2016-2017 data.
***NL - Statistics Netherlands data.

Table 2 (Fig.2). Pedestrian, cyclist, power-two-wheeler (PTW) user and vehicle occupant deaths reported by the police as a proportion of all reported road deaths ranked by the proportion of deaths that were pedestrians and cyclists taken together (2016-2018 average).

	2016-2018				
	Pedestrian deaths	Cyclist deaths	PTW deaths	Vehicle occupant deaths	Other/ unknown
RO	37%	10%	4%	49%	0%
LT	38%	7%	6%	49%	0%
NL***	9%	34%	15%	42%	0%
LV	35%	6%	7%	51%	1%
HU	26%	12%	10%	52%	0%
PL	29%	9%	11%	51%	0%
CH	21%	16%	22%	39%	2%
IL	32%	4%	15%	44%	6%
RS	25%	8%	9%	57%	0%
MT	29%	3%	32%	36%	0%
UK	26%	6%	19%	49%	0%
SK	25%	6%	9%	59%	0%
DK	15%	15%	15%	54%	0%
CZ	22%	9%	13%	57%	0%
EE	24%	6%	5%	66%	0%
IE	22%	7%	12%	59%	0%
CY	25%	3%	30%	42%	0%
DE	15%	13%	20%	52%	0%
HR	20%	8%	16%	56%	0%
PT	22%	4%	22%	52%	0%
BE	13%	13%	16%	57%	1%
IT	18%	7%	24%	50%	1%
AT	15%	10%	24%	51%	0%
ES	21%	4%	23%	53%	0%
SI	14%	10%	23%	53%	0%
BG	20%	4%	2%	63%	12%
SE	13%	8%	16%	60%	2%
LU	16%	4%	20%	59%	0%
FI*	11%	10%	9%	70%	0%
FR	15%	5%	22%	58%	0%
NO**	11%	9%	18%	62%	0%
EL**	17%	2%	33%	48%	0%
EU28	**21%**	**8%**	**18%**	**53%**	**0%**

Data source: EU CARE data and PIN panellists.
*FI - provisional data for 2018.
**EL and NO - 2016-2017 data.
***NL - Statistics Netherlands data.

Table 3 (Fig.3). Total number of pedestrian deaths recorded by the police over the period 2010-2018.

	2010	2011	2012	2013	2014	2015	2016	2017	2018
AT	98	87	81	82	71	84	73	73	47
BE	108	115	116	109	107	94	81	95	74
BG	174	149	135	108	156	164	118	157	123
CY	13	13	10	8	10	16	14	15	8
CZ	168	176	163	162	130	150	130	129	142
DE	476	614	527	561	527	545	500	489	458
DK	44	33	31	34	22	27	36	20	30
EE	13	24	29	24	30	24	22	10	12
EL**	179	223	170	151	125	128	149	118	n/a
ES	471	380	370	371	336	367	389	351	386
FI*	35	41	29	34	34	32	29	27	23
FR	485	519	489	465	499	466	553	480	470
HR	105	71	72	69	73	61	67	56	65
HU	192	124	156	147	152	149	152	170	165
IE	44	47	29	31	42	31	35	31	42
IT	621	589	576	549	578	602	570	600	609
LT	108	110	105	98	109	81	73	69	68
LU	1	6	6	5	3	7	8	4	3
LV	79	60	62	70	71	63	55	51	50
MT	3	9	3	5	6	5	8	7	2
NL***	72	74	68	56	49	57	51	58	54
PL	1,236	1,408	1,157	1,140	1,107	915	868	873	803
PT	195	199	159	144	145	146	123	130	156
RO	868	747	728	726	697	649	717	733	690
SE	31	53	50	42	53	28	42	37	34
SI	26	21	19	20	14	16	22	10	13
SK	113	75	66	65	58	80	71	49	59
UK	415	466	429	405	464	427	463	485	462
CH	75	69	75	69	43	58	50	47	48
IL	119	115	90	91	116	108	96	107	91
NO**	24	16	22	18	18	12	15	11	n/a
RS	172	187	157	175	128	158	140	141	151
EU28	**6,373**	**6,433**	**5,835**	**5,681**	**5,668**	**5,414**	**5,419**	**5,327**	**5,181**

	Annual change in pedestrian deaths 2010-2018	Annual change in motorised road user deaths 2010-2018
NO**	-8.7%	-8.1%
SI	-7.9%	-3.2%
EL**	-6.9%	-7.1%
LT	-6.7%	-7.2%
PL	-6.4%	-4.2%
CH	-6.3%	-6.4%
AT	-5.9%	-3.6%
SK	-5.7%	-3.5%
EE	-5.7%	-4.3%
FI*	-4.9%	-2.6%
DK	-4.8%	-3.5%
BE	-4.8%	-5.5%
HR	-4.7%	-4.0%
PT	-4.4%	-5.1%
LV	-4.3%	-3.7%
NL***	-4.0%	-0.4%
CZ	-3.5%	-3.0%
RS	-2.8%	-2.8%
SE	-2.4%	-7.9%
RO	-1.8%	-2.6%
BG	-1.8%	-0.3%
IE	-1.7%	-4.6%
IL	-1.6%	-0.2%
DE	-1.6%	-2.8%
ES	-1.6%	-3.3%
MT†	-0.7%	5.3%
CY	-0.2%	-3.7%
FR	-0.2%	-2.7%
IT	0.1%	-3.1%
HU	0.5%	-1.3%
UK	1.3%	-0.9%
LU†	7.1%	-2.0%
EU28	**-2.6%**	**-3.1%**

Data source: EU CARE data and PIN panellists.
*FI - provisional data for 2018.
**EL and NO - 2010-2017 data.
***NL - Statistics Netherlands data.
†LU and MT are excluded from Fig.3 as the numbers of pedestrian deaths are statistically small and subject to substantial annual fluctuations but LU and MT data are included in the EU28 average.

Table 4 (Fig.6). Pedestrian deaths reported by the police (2015-2017 average) per million inhabitants in 2017 by age group (years).

	Population of each age group in 2017				
	0-14	15-24	25-49	50-64	65+
RO	3,046,778	2,070,247	7,109,150	3,730,351	3,554,575
CY†	140,006	114,079	317,175	155,562	137,414
LT*	421,335	308,979	915,702	609,532	550,545
IL	2,463,000	1,309,000	2,773,700	1,169,400	998,200
BG	1,001,105	641,553	2,488,662	1,431,157	1,480,507
PL	5,772,456	4,063,506	14,013,398	7,633,314	6,494,013
RS	1,008,726	749,666	2,373,292	1,510,650	1,378,524
LV	305,632	179,897	659,623	402,351	388,810
LU†	96,923	71,037	229,364	117,993	86,087
MT†	66,122	53,754	176,961	88,956	89,432
HR	595,296	455,710	1,342,496	890,892	825,204
PT	1,349,734	1,029,326	3,241,664	2,035,106	2,136,967
EL	1,546,728	1,084,858	3,619,773	2,148,233	2,341,574
HU	1,417,864	1,065,842	3,510,435	1,926,339	1,857,890
CZ	1,665,779	986,735	3,893,890	2,015,910	2,037,131
EE	215,019	126,637	463,016	255,912	258,550
IT	8,104,852	5,866,945	19,899,227	13,004,054	13,669,378
AT	1,270,406	988,094	3,026,038	1,887,965	1,640,942
ES	6,998,767	4,525,869	16,703,724	9,518,323	8,958,422
SK	849,127	587,857	2,073,829	1,083,181	843,684
SI	310,032	194,287	711,007	450,580	400,975
FR	11,898,312	7,672,135	20,480,700	12,548,493	12,483,474
CH	1,272,620	916,286	2,986,414	1,756,215	1,552,596
BE	1,937,760	1,299,439	3,738,737	2,291,116	2,131,536
DE	11,176,967	8,693,197	26,493,552	18,711,071	17,717,563
UK	11,862,970	7,886,556	21,870,280	12,525,706	12,061,791
IE	1,004,722	598,969	1,729,280	825,997	671,424
FI	893,127	622,984	1,720,097	1,102,626	1,174,297
DK	959,678	739,992	1,832,637	1,133,113	1,115,770
SE	1,791,283	1,163,828	3,319,439	1,831,764	2,013,928
NL**	2,766,155	2,113,273	5,497,947	3,573,665	3,230,044
NO	937,325	661,952	1,816,397	979,690	894,960
EU28	**79,464,935**	**55,205,584**	**171,077,802**	**103,929,263**	**100,351,925**

	Fig.7 Pedestrian deaths by age group per million popoulation of each age group 2015-2017				
	0-14	15-24	25-49	50-64	65+
RO	12.3	15.1	21.1	47.5	82.9
CY†	2.4	2.9	8.4	8.6	75.2
LT*	2.4	19.4	21.8	31.2	61.8
IL	4.9	7.1	7.2	11.7	52.7
BG	5.3	7.8	11.0	21.2	50.7
PL	2.9	11.1	16.4	35.2	49.8
RS	4.3	8.4	11.5	23.6	45.4
LV	6.5	20.4	25.8	32.3	43.7
LU†	3.4	4.7	4.4	8.5	42.6
MT†	5.0	18.6	7.5	3.7	41.0
HR	3.9	5.9	6.7	15.3	40.8
PT	2.0	5.2	6.5	14.1	35.1
EL	4.1	5.2	5.8	8.2	33.7
HU	0.9	8.4	11.4	22.8	32.8
CZ	3.0	4.7	8.2	15.7	30.6
EE	7.8	10.5	7.9	19.5	27.1
IT	1.4	4.4	4.9	6.8	26.7
AT	2.9	7.4	4.2	5.6	25.8
ES	1.1	4.6	4.1	6.0	23.6
SK	2.4	8.5	7.2	22.5	22.1
SI	0.0	3.4	5.2	7.4	20.8
FR	1.8	6.3	5.1	6.0	19.9
CH	2.6	4.4	2.8	3.2	19.3
BE	3.1	6.4	5.7	5.4	18.9
DE	2.2	5.3	3.3	4.2	15.3
UK	2.2	6.0	6.0	6.1	14.6
IE	1.7	5.6	7.1	6.9	13.9
FI	3.4	2.7	2.5	4.5	13.1
DK	2.8	1.8	2.9	3.5	12.8
SE	1.7	1.4	1.2	4.7	9.1
NL**	1.4	3.8	1.5	2.1	8.6
NO	1.1	0.5	1.3	3.4	6.3
EU28	**2.5**	**6.3**	**6.7**	**10.6**	**25.1**

Data source: EU CARE data, PIN panellists and Eurostat.
*LT - 2015 data.
**NL - Statistics Netherlands data for the following age groups: 0-14, 15-20, 21-30, 31-50, 51-60, 60+.
†CY, LU and MT are excluded from Fig.6 as the numbers of pedestrian deaths are statistically small and subject to substantial annual fluctuations but their numbers are included in the EU28 average.
PT: continental population.

Table 5 (Fig.7). Pedestrian deaths reported by the police: proportion by road type (2015-2017 average).

	2015-2017 average			
	Urban	Rural non-motorway	Motorway	Unknown
HR	84%	13%	4%	0%
RO	81%	18%	1%	0%
EL*	78%	19%	3%	0%
IT	78%	20%	3%	0%
PT	77%	20%	3%	0%
CH	75%	18%	6%	0%
RS	73%	20%	7%	0%
DE	71%	22%	7%	0%
BG	71%	25%	4%	0%
IL	69%	31%	0%	0%
CZ	68%	26%	5%	0%
ES**	67%	20%	13%	0%
UK	67%	29%	3%	0%
FR	67%	24%	9%	0%
PL	66%	33%	1%	0%
DK	66%	27%	7%	0%
AT	64%	29%	7%	0%
SK	63%	32%	5%	0%
HU	63%	35%	3%	0%
FI	63%	33%	5%	0%
SE	62%	26%	7%	6%
NO*	58%	42%	0%	0%
NL	57%	29%	10%	5%
SI	56%	27%	17%	0%
EE	54%	46%	0%	0%
BE	53%	40%	6%	1%
IE	49%	49%	1%	0%
LV	40%	60%	0%	0%
EU27	**70.3%**	**25.3%**	**4.3%**	**0.1%**
MT†	95%	5%	0%	0%
CY†	87%	7%	7%	0%
LU†	68%	32%	0%	0%
LT	n/a			

Data source: EU CARE data and PIN panellists.
EU27 average: EU28 excluding LT due to insufficient data.
*NO - 2016-2017 data.
**ES - motorways and autovias data are presented together.
†CY, LU and MT are excluded from Fig.7 as the numbers of pedestrian deaths are statistically small and subject to substantial annual fluctuations but their numbers are included in the EU27 average.

Table 6 (Fig.8). Pedestrian deaths reported by the police: proportion by gender (2015-2017 average).

	2015-2017 average		
	Male	Female	Unknown
NO	74%	26%	0%
IE	72%	28%	0%
LV	69%	31%	0%
PL	68%	32%	0%
UK	67%	33%	0%
HU	65%	34%	1%
RO	64%	36%	0%
EL	64%	36%	0%
IT	64%	36%	0%
CZ	64%	36%	0%
FR	63%	37%	0%
RS	63%	37%	0%
ES	63%	37%	1%
EE	63%	38%	0%
PT	62%	38%	0%
IL	62%	38%	0%
HR	61%	39%	0%
DE	59%	41%	0%
DK	58%	42%	0%
AT	58%	42%	0%
BG*	57%	41%	2%
SE	57%	43%	0%
SK	57%	42%	2%
SI	56%	44%	0%
LT**	56%	43%	1%
NL***	55%	45%	0%
CH	54%	46%	0%
BE	53%	46%	1%
FI	52%	48%	0%
EU28	**63.4%**	**36.4%**	**0.2%**
CY†	64%	36%	0%
MT†	70%	30%	0%
LU†	53%	47%	0%

Data source: EU CARE data and PIN panellists.
*BG - 2016-2017 data.
**LT - 2015 data.
***NL - Statistics Netherlands data.
†CY, LU and MT are excluded from Fig.8 as the numbers of pedestrian deaths are statistically small and subject to substantial annual fluctuations but their numbers are included in the EU28 average.

Table 7 (Fig.9). Pedestrian deaths reported by the police: proportion that occurred in collisions with different types of vehicles in the last three years (2015-2017 average).

	2015-2017 average						
	car + taxi	HGV>3.5t	bus or coach	van<3.5t	PTW	pedal cycle	other
HR	76%	7%	4%	4%	4%	2%	3%
PL	74%	11%	3%	0%	1%	0%	11%
IT	74%	5%	2%	8%	8%	0%	3%
RO	71%	3%	3%	19%	1%	0%	3%
RS	71%	17%	5%	0%	3%	1%	3%
SK	71%	9%	5%	9%	0%	0%	6%
LV	71%	12%	6%	7%	1%	0%	4%
SE	70%	12%	7%	5%	2%	0%	4%
BG	69%	9%	3%	9%	3%	0%	7%
FR	67%	11%	3%	11%	5%	0%	2%
AT	67%	13%	2%	8%	1%	0%	10%
DE	67%	14%	2%	6%	2%	2%	8%
UK	65%	14%	6%	8%	3%	1%	2%
IE	65%	8%	1%	3%	0%	0%	23%
CZ	64%	15%	4%	7%	2%	0%	9%
BE	64%	13%	4%	9%	3%	1%	7%
HU	63%	10%	5%	13%	2%	2%	7%
CH	62%	13%	1%	12%	1%	3%	7%
ES	62%	10%	3%	13%	7%	1%	4%
DK	61%	10%	10%	11%	5%	2%	1%
IL	60%	14%	9%	8%	3%	0%	5%
EE	59%	9%	3%	3%	0%	0%	26%
EL	58%	6%	2%	13%	18%	0%	3%
NL	58%	10%	5%	9%	5%	2%	9%
PT	55%	10%	3%	23%	3%	0%	7%
FI	46%	23%	6%	11%	2%	0%	11%
SI	45%	35%	1%	3%	3%	1%	13%
EU26	**68.0%**	**9.8%**	**3.3%**	**9.2%**	**3.5%**	**0.6%**	**5.8%**
LU†	65%	26%	0%	8%	0%	0%	0%
CY†	74%	8%	2%	10%	0%	2%	4%
LT	n/a						
MT	n/a						
NO	n/a						

Data source: EU CARE data and PIN panellists.
EU26 average: EU28 excluding LT and MT due to insufficient data.
†CY, LU and MT are excluded from Fig.9 as the numbers of pedestrian deaths are statistically small and subject to substantial annual fluctuations but their numbers are included in the EU26 average.

Table 8 (Fig.10). Total number of cyclist deaths recorded by the police over the period 2010-2018.

	2010	2011	2012	2013	2014	2015	2016	2017	2018
AT	32	42	52	51	45	39	48	32	41
BE	73	74	84	83	82	90	81	75	88
BG	27	17	32	31	29	29	35	22	21
CZ	80	63	78	74	68	84	53	57	56
DE	381	399	406	354	396	383	393	382	445
DK	26	30	22	33	30	26	31	27	28
EL**	23	13	21	15	19	11	18	11	n/a
ES	67	48	74	70	75	58	67	78	58
FI*	26	19	19	20	27	31	26	23	21
FR	147	141	164	147	159	149	162	173	175
HR	28	28	21	23	19	34	27	23	22
HU	92	85	84	68	98	83	73	81	70
IE	5	9	8	5	13	10	10	14	9
IT	265	282	292	251	273	251	275	254	219
LT	23	26	32	18	19	22	17	13	9
LV	13	15	18	13	16	9	7	11	9
NL**	162	200	200	184	185	185	189	206	228
PL	280	314	300	306	286	300	271	220	286
PT	33	45	32	29	35	25	33	25	24
RO	182	140	154	161	151	162	176	191	181
SE	21	21	28	14	33	17	22	26	23
SI	17	16	12	16	13	14	13	11	8
SK	21	18	25	16	24	16	12	18	15
UK	111	109	120	113	116	100	105	103	100
CH	34	39	36	21	34	39	33	37	39
IL	18	16	11	13	10	14	9	12	13
NO**	5	12	12	10	12	5	12	9	n/a
RS	65	56	69	59	50	68	57	48	38
EU28	**2,147**	**2,170**	**2,289**	**2,106**	**2,214**	**2,133**	**2,150**	**2,082**	**2,160**
CY†	2	2	1	2	1	1	0	4	1
EE†	9	11	10	9	2	3	5	2	4
LU†	1	2	0	0	0	0	1	0	3
MT†	0	1	0	0	0	n/a	1	0	1

	Annual change in cyclist deaths 2010-2018	Annual change in motorised road user deaths 2010-2018
LT	-10.9%	-7.2%
LV	-7.5%	-3.7%
SI	-6.6%	-3.2%
EL**	-6.0%	-7.1%
PT	-5.1%	-5.1%
RS	-4.6%	-2.8%
SK	-4.6%	-3.5%
IL	-4.1%	-0.2%
CZ	-3.9%	-3.0%
HU	-2.2%	-1.3%
PL	-2.0%	-4.2%
IT	-2.0%	-3.1%
UK	-1.6%	-0.9%
HR	-1.1%	-4.0%
AT	-0.4%	-3.6%
BG	-0.2%	-0.3%
DK	0.7%	-3.5%
ES	0.8%	-3.3%
DE	0.8%	-2.8%
SE	1.2%	-7.9%
FI*	1.3%	-2.6%
BE	1.3%	-5.5%
CH	1.4%	-6.4%
RO	2.0%	-2.6%
NO**	2.0%	-8.1%
FR	2.2%	-2.7%
NL***	2.3%	-0.4%
IE	8.4%	-4.6%
EU28	**-0.4%**	**-3.1%**
CY†	-9.5%	-3.7%
EE†	-16.5%	-4.3%
LU†	n/a	-2.0%
MT†	n/a	5.3%

Data source: EU CARE data and PIN panellists.
*FI - provisional data for 2018.
**EL and NO - 2010-2017 data.
***NL - Statistics Netherlands data.
†CY, EE, LU and MT are excluded from Fig.10 as the numbers of cyclist deaths are statistically small and subject to substantial annual fluctuations but their numbers are included in the EU28 average.

Table 9 (Fig.11). Cyclist deaths reported by the police (2016-2018 average) per million inhabitants in 2018.

	Cyclist deaths per mln inhabitants
IL	1.3
EL**	1.3
MT	1.4
ES	1.5
UK	1.5
NO**	1.9
CY	2.0
LU	2.2
IE	2.3
SE	2.3
FR	2.6
SK	2.8
EE	2.8
PT	2.8
BG	3.7
IT	4.1
FI	4.2
CH	4.3
AT	4.6
LT	4.6
LV	4.7
DE	4.9
DK	5.0
SI	5.2
CZ	5.2
HR	5.8
PL	6.7
RS	6.8
BE	7.1
HU	7.6
RO	9.4
NL**	12.1
EU28	**4.2**

Data source: EU CARE data, Eurostat and PIN panellists.
**EL and NO - 2016-2017 data.
***NL - Statistics Netherlands data.

Table 10 (Fig.13). Pedestrian deaths reported by the police: proportion by age group (2015-2017 average).

	2015-2017 average				
	0-14	15-24	25-49	50-64	65+
NL**	2.3	6.6	3.3	4.2	43.2
BE	1.7	5.1	2.9	7.3	20.8
RS	1.3	0.9	4.9	11.3	19.6
RO	2.4	4.2	5.8	15.2	17.3
PL	2.0	3.1	3.6	11.0	16.1
HU	0.5	4.1	4.7	14.4	16.1
LT*	2.4	0.0	5.5	11.5	14.5
CZ	0.2	2.0	3.2	10.9	13.7
DK	1.4	3.6	2.5	3.8	13.4
AT	0.8	1.0	2.1	5.8	12.4
DE	1.1	2.3	2.0	4.4	12.3
FI	0.7	1.6	2.1	6.7	11.9
HR	3.9	2.2	4.7	10.9	10.5
IT	0.5	2.3	2.8	4.1	9.7
SI	3.2	10.3	2.8	8.1	9.1
LV	1.1	0.0	2.5	7.5	8.6
CH	2.1	1.8	3.0	5.7	8.2
BG	1.3	1.0	2.4	5.8	8.1
SE	0.6	1.4	0.7	2.7	5.8
FR	0.6	1.8	1.6	3.5	5.2
SK	0.4	2.3	1.9	4.6	5.1
IE	0.7	0.6	2.9	2.8	4.5
PT	1.0	1.3	2.4	3.9	4.2
NO	1.1	0.0	1.3	2.4	3.4
EE	3.1	2.6	2.2	2.6	2.6
ES	0.2	1.0	1.2	1.9	2.6
IL	0.9	0.8	0.8	3.1	2.3
EL	0.6	1.8	0.6	2.2	1.3
UK	0.3	1.6	1.8	2.1	1.2
EU28	**0.9**	**2.4**	**2.5**	**5.2**	**10.0**
CY†	2.4	0.0	2.1	0.0	2.4
MT†	0.0	0.0	0.0	3.7	0.0
LU†	0.0	0.0	1.5	0.0	0.0

Data source: EU CARE data, Eurostat and PIN panellists.
*LT - 2015 data.
**NL - Statistics Netherlands data for the following age groups: 0-14, 15-20, 21-30, 31-50, 51-60, 60+.
†CY, LU and MT are excluded from Fig.13 as the numbers of cyclist deaths are statistically small and subject to substantial annual fluctuations but their numbers are included in the EU28 average.

Table 11 (Fig.14). Cyclist deaths reported by the police: proportion by road type (2015-2017 average).

	2015-2017 average			
	Urban	Rural non-motorway	Motorway	Unknown
RO	75%	25%	0%	0%
HR	74%	26%	0%	0%
CH	73%	27%	0%	0%
FI	70%	30%	0%	0%
PT	67%	33%	0%	0%
RS	65%	34%	1%	0%
DE	64%	36%	0%	0%
DK	63%	37%	0%	0%
HU	60%	40%	0%	0%
IT	60%	40%	0%	0%
BG	58%	42%	0%	0%
PL	56%	44%	0%	0%
NL	55%	44%	1%	1%
SI	54%	46%	0%	0%
AT	53%	47%	0%	0%
EL	53%	48%	0%	0%
SE	51%	35%	0%	14%
IL	49%	51%	0%	0%
CZ	48%	52%	1%	0%
SK	48%	50%	2%	0%
BE	47%	52%	0%	1%
NO*	46%	46%	0%	8%
UK	45%	54%	1%	0%
FR	44%	56%	0%	0%
IE	35%	65%	0%	0%
LV	33%	67%	0%	0%
ES**	33%	62%	5%	0%
EU27	**57.0%**	**42.4%**	**0.3%**	**0.2%**
CY†	20%	80%	0%	0%
EE†	20%	80%	0%	0%
LU†	0%	100%	0%	0%
MT†	0%	100%	0%	0%
LT	n/a			

Data source: EU CARE data, Eurostat and PIN panellists.
*NO - 2016-2017 data.
**ES - motorways and autovias data are presented together.
†CY, LU and MT are excluded from Fig.13 as the numbers of cyclist deaths are statistically small and subject to substantial annual fluctuations but their numbers are included in the EU28 average.

Table 12 (Fig.15). Cyclist deaths reported by the police: proportion by gender in the last three years (2015-2017 average).

	2015-2017 average		
	Male	Female	Unknown
IL	94%	6%	0%
ES	94%	6%	0%
PT	94%	6%	0%
RO	93%	7%	0%
BG*	93%	7%	0%
NO	92%	8%	0%
EL	90%	10%	0%
SK	87%	13%	0%
RS	87%	10%	3%
IT	87%	13%	0%
UK	85%	15%	0%
FR	85%	15%	0%
SE	83%	17%	0%
CZ	80%	20%	0%
SI	78%	22%	0%
HR	77%	23%	0%
HU	77%	23%	0%
IE	76%	24%	0%
PL	75%	25%	0%
AT	74%	26%	0%
DE	73%	27%	0%
LV	70%	30%	0%
BE	70%	29%	1%
FI	70%	30%	0%
DK	69%	31%	0%
CH	67%	33%	0%
NL***	67%	33%	0%
LT**	64%	32%	5%
EU28	**79%**	**21%**	**0%**
CY†	80%	20%	0%
EE†	50%	50%	0%
LU†	100%	0%	0%
MT†	100%	0%	0%

Data source: EU CARE data and PIN panellists.
*BG - 2016-2017 data.
**LT - 2015 data.
***NL - Statistics Netherlands data.
†CY, EE, LU and MT are excluded from Fig.15 as the numbers of cyclist deaths are statistically small and subject to substantial annual fluctuations but their numbers are included in the EU28 average.

Table 13 (Fig.16). Cyclist deaths reported by the police: proportion that occurred in collisions with different types of vehicles in the last three years (2015-2017 average).

	2015-2017 average							
	car + taxi	HGV >3.5t	bus or coach	van <3.5t	PTW	single bicycle	pedal cycle	other
BG	75%	8%	2%	7%	0%	0%	0%	7%
HR	69%	9%	6%	6%	0%	6%	0%	4%
FR	66%	15%	2%	9%	3%	2%	0%	4%
SI	65%	8%	0%	3%	0%	8%	0%	16%
PL	63%	17%	3%	0%	1%	4%	0%	12%
IT	60%	9%	0%	11%	4%	10%	1%	4%
RS	59%	22%	5%	0%	2%	8%	0%	4%
IE	58%	8%	0%	0%	0%	13%	3%	17%
SK	57%	22%	5%	12%	0%	0%	0%	4%
ES	53%	12%	1%	12%	2%	15%	1%	4%
HU	52%	10%	3%	14%	1%	14%	1%	4%
UK	52%	17%	4%	9%	1%	14%	1%	2%
LV	51%	23%	0%	13%	0%	13%	0%	0%
IL	50%	5%	11%	13%	3%	2%	0%	16%
RO	50%	2%	3%	17%	0%	24%	0%	4%
PT	49%	10%	1%	12%	1%	24%	1%	2%
BE	49%	17%	5%	5%	2%	14%	3%	4%
NL	45%	13%	1%	8%	5%	13%	6%	7%
DE	44%	16%	1%	4%	3%	23%	2%	6%
DK	40%	25%	2%	8%	4%	19%	0%	3%
CZ	38%	14%	1%	5%	1%	36%	2%	4%
SE	38%	15%	3%	6%	2%	35%	0%	1%
AT	38%	11%	3%	1%	2%	39%	2%	4%
FI	35%	6%	7%	6%	1%	38%	2%	4%
EL	30%	5%	0%	7%	2%	51%	3%	3%
CH	29%	20%	5%	4%	2%	31%	3%	7%
EU26	**53.0%**	**12.9%**	**2.2%**	**7.4%**	**2.1%**	**15.7%**	**1.1%**	**5.6%**
EE†	17%	0%	0%	11%	0%	0%	0%	72%
CY†	38%	0%	13%	50%	0%	0%	0%	0%
LU†	0%	0%	0%	0%	0%	100%	0%	0%
LT	n/a							
MT	n/a							
NO	n/a							

Data source: EU CARE data and PIN panellists.
EU26 average: EU28 excluding LT and MT due to insufficient data.
†CY, LU and MT are excluded from Fig.16 as the numbers of cyclist deaths are relatively small and subject to substantial annual fluctuations but their numbers are included in the EU26 average.

Table 14 (Fig.18). Total number of reported seriously injured pedestrians over the period 2010-2018 based on national definitions of a serious injury. National definitions of serious injuries are available at www.etsc.eu/pinflash38 "Download background tables" section.

	2010	2011	2012	2013	2014	2015	2016	2017	2018
BE*	559	637	603	546	533	566	526	531	476
BG	674	610	592	653	593	600	583	514	535
CY*	100	104	112	85	79	66	86	74	57
CZ	617	612	647	617	581	541	581	499	497
DE*	7,489	8,249	8,079	7,820	7,832	7,908	7,712	7,522	7,196
DK	268	297	251	258	261	232	263	258	284
ES*	1,959	1,915	1,922	2,060	1,903	1,999	1,989	1,940	1,833
FR*‡	4,584	4,593	4,211	4,199	4,323	4,331	4,289	4,439	n/a
HR	564	568	484	512	460	488	419	433	425
HU	961	791	761	890	848	974	935	927	898
LU*	54	53	64	38	35	52	48	41	34
LV*	145	131	111	110	96	97	130	115	121
PL	3,246	3,508	3,316	3,098	3,010	3,015	3,142	2,825	2,665
PT*	428	462	397	431	414	428	402	393	388
RO	2,894	2,885	2,859	2,640	2,688	2,819	2,588	2,471	2,400
SE	236	237	257	279	267	230	230	206	203
SI	129	139	110	99	124	124	134	126	115
SK	309	292	298	298	297	304	260	280	316
UK*†	5,367	5,654	5,741	5,160	5,203	5,104	5,304	5,769	5917
CH*	706	687	691	723	627	600	622	577	577
IL*	538	394	551	565	539	523	616	601	596
NO	67	96	81	108	107	116	85	85	n/a
RS	904	833	827	807	825	793	807	857	822
EU21	**31,805**	**32,888**	**31,882**	**30,860**	**30,614**	**31,003**	**30,777**	**30,516**	**29,908**
AT**	1,134	1,059	985	970	887	947	942	902	858
EE	n/a					127	103	119	92
EL*‡	265	210	208	159	141	139	111	108	n/a
FI	n/a					57	46	40	n/a
IE**	88	92	82	97	180	178	214	251	n/a
IT	n/a								
LT	n/a	n/a	n/a	241	216	133	n/a	n/a	n/a
MT	n/a					87	72	86	77
NL***	356	167	195	226	200	148	396	737	n/a

	Annual change in pedestrian serious injuries 2010-2018
CY*	-6.5%
LU*	-4.7%
HR	-3.7%
CZ	-3.0%
CH*	-2.8%
PL	-2.6%
BG	-2.6%
SE	-2.4%
BE*	-2.3%
RO	-2.2%
UK*†	-1.7%
LV*	-1.5%
PT*	-1.4%
DE*	-0.9%
RS	-0.6%
FR*‡	-0.5%
SK	-0.5%
DK	-0.3%
ES*	-0.3%
SI	-0.2%
HU	1.2%
NO	2.6%
IL*	3.1%
EU21	**-0.9%**
AT	n/a
EE	n/a
EL*‡	-12.1%
FI	n/a
IE	n/a
IT	n/a
LT	n/a
MT	n/a
NL	n/a

Data source: EU CARE data and PIN panellists.
EU21 average: EU28 excluding EE, EL, FI, IT, LT, MT and NL due to insufficient data or changes in data reporting system.
EU21: seriously injured according to each country national definition.
*Similar national serious injury definition.
†UK - 2010-2015 data as substantial changes in the serious injury reporting system were introduced in 2016 and number after 2016 are not comarable to the previous time series.
‡EL and FR 2010-2017 data.
**AT and IE - substantial changes in the serious injury reporting system were introduced in 2012 and 2014 respectively, data from the previous years are not comparable, therefore AT and IE are excluded from the Fig.20 but numbers are included in the EU average.
***NL serious injury data are based on police records and not on the national definition. Due to fluctuation in reporting rates, NL is excluded from the Fig.18.

Table 15 (Fig.21). Total number of reported seriously injured cyclists over the period 2010-2018 based on national definitions of a serious injury. National definitions of serious injuries are available at www.etsc.eu/pinflash38 "Download background tables" section.

	2010	2011	2012	2013	2014	2015	2016	2017	2018
BE*	849	996	922	975	1,042	912	942	852	932
BG	124	115	115	121	102	111	112	86	107
CY*	22	19	14	11	18	12	10	15	14
CZ	388	433	455	449	424	384	406	343	380
DE*	12,143	14,437	13,854	13,206	14,522	14,230	14,485	14,124	15,530
DK	392	509	502	492	504	512	497	475	580
ES*	467	591	571	645	671	652	736	694	620
FR*‡	1,361	1,416	1,352	1,344	1,446	1,516	1,455	1,652	n/a
HR	278	352	337	328	382	371	341	299	283
HU	1,046	966	1,030	1,083	1,155	1,101	1,124	1,071	1,052
LU*	10	14	20	18	12	15	22	22	14
LV*	39	53	37	45	34	31	39	32	68
PL	880	1,160	1,205	1,288	1,399	1,341	1,488	1,214	1,444
PT*	67	82	80	80	105	132	106	126	107
RO	436	568	723	704	786	951	891	879	914
SE	1,707	1,859	1,781	2,177	2,139	1,928	2,036	2,048	2,021
SI	125	147	198	154	199	222	179	189	189
SK	91	100	125	85	90	109	92	126	124
UK*	2,709	3,132	3,277	3,185	3,460	3,279	3,458	3,748	3,753
CH*	830	867	918	904	1,035	1,001	1,055	1,042	1,186
IL*	65	53	81	88	64	72	79	97	64
NO	54	55	58	82	74	87	85	91	n/a
RS	449	457	452	450	455	413	444	430	419
EU21	**24,666**	**28,825**	**28,230**	**27,882**	**30,269**	**29,635**	**30,294**	**29,991**	**31,671**
AT	1,518	1,860	1,604	1,442	1,673	1,674	1,730	1,826	1,977
EE	n/a					33	38	58	55
EL*‡	26	32	28	22	18	22	22	14	14
FI	n/a				58	53	54	40	n/a
IE	14	16	28	50	106	152	145	170	170
IT	n/a								
LT	n/a								
MT	n/a								5
NL	943	508	717	728	579	1,731	2,478	3,139	n/a

	Annual change in cyclist serious injuries 2010-2018
CY	-5.0%
BG	-2.6%
CZ	-1.9%
RS	-1.0%
HR	-0.5%
BE	-0.2%
LV	0.7%
HU	0.9%
DE	1.8%
SE	1.9%
FR‡	2.3%
DK	2.3%
IL	2.5%
SK	2.6%
UK**	3.6%
ES	3.6%
CH	4.0%
SI	4.4%
PL	4.4%
LU	4.6%
PT	7.3%
NO	8.6%
RO	8.7%
EU21	**2.2%**
AT	n/a
IE‡	n/a
EL	-8.7%
IT	n/a
LT	n/a
MT	n/a
NL	n/a
EE	n/a
FI	n/a

Data source: EU CARE data and PIN panellists.
EU21 average: EU28 excluding EE, EL, FI, IT, LT, MT and NL due to insufficient data or changes in data reporting system.
EU21: seriously injured according to each country national definition.
*Similar national serious injury definition.
†UK - 2010-2015 data as substantial changes in the serious injury reporting system were introduced in 2016 and number after 2016 are not comarable to the previous time series.
‡EL and FR 2010-2017 data.
**AT and IE - substantial changes in the serious injury reporting system were introduced in 2012 and 2014 respectively, data from the previous years are not comparable, therefore AT and IE are excluded from the Fig.20 but numbers are included in the EU average.
***NL serious injury data are based on police records and not on the national definition. Due to fluctuation in reporting rates, NL is excluded from the Fig.21.

Table 16. Current national definitions of seriously injured person in a road collision as used in Fig.18, 19, 20, 21 and 22.

	National definition of a seriously injured person (before introducing MAIS 3+ definition) in a road collision corresponding to the data Fig.9 and Fig.10
AT	Whether an injury is severe or slight is determined by §84 of the Austrian criminal code. A severe injury is one that causes a health problem or occupational disability longer than 24 days, or one that "causes personal difficulty". Police records. As of 1.1.2012, only 2 instead of 3 degrees of severities, slight, degree unknown, severe. Therefore and because of lower underreporting due to the new police recording system, the figure increased substantially.
BE	Hospitalised more than 24 hours. But in practice no communication between police and hospitals so in most cases allocation is made by the police without feedback from the hospitals. (Police records)
BG	The level of "body damage" is defined in the Penalty code. There are 3 – light, medium and high levels of body damage. Prior to introducing MAIS in the Police records the first level is "light injured", the second and third is "heavy injured". The medium and high level corresponded to MAIS 3+ levels, as it is defined in the CADaS Glossary.
CY	Hospitalised for at least 24 hours. Police records.
CZ	Determined by the treating doctor, if serious health harm (specified approximatelly along the types by the law) occurs. Police records.
DE	Hospitalised for at least 24 hours. Police records.
DK	All injuries except "slight". Police records.
EE	Hospitalised for at least 24 hours. Hospital data is used to find out how long the person (involved in an accident according to the police data) was hospitalised.
ES	Hospitalised for at least 24 hours. Police records.
FI	Serious injury in official statistics is defined as MAIS3+ (AAAM, Association for the Advancement of Automotive Medicine). The number of seriously injured MAIS3+ is formed by combining the official road accident participant statistics maintained by Statistics Finland and the Hospital Discharge Register (HILMO), using personal identity numbers as the link. ICD-10 codes from hospital data are converted to MAIS.
FR	Until 2004: hospitalised for at least 6 days. From 2005: hospitalised for at least 24 hours. Police records. People injured are asked to go to the police to fill in information about the collision, in particular if they spent at least 24 hours as in-patient.
EL	Injury and injury severity are estimated by police officers. It is presumed that all persons who spent at least one night at the hospital are recorded as seriously injured persons. Police records.
HR	ICD-International Classification of Deseases- used by medical staff exclusively, after admission to the hospital.
HU	Serious injury which necessitates hospitalisation for more than 48 hours within seven days after occurrence or caused fracture, except for finger, toe, nose fractures; or caused cut wounds, which resulted in serious bleeding or nerve, muscle or tendon injuries; or caused injury of inner organs; or caused burn of second or third degree or burn affecting more than 5% of body surface.
IE	Hospitalised for at least 24 hours as an in-patient, or any of the following injuries whether or not detained in hospital: fractures, concussion, internal injuries, crushing, severe cuts and lacerations, several general shock requiring medical treatment.
IT	Separate statistics on seriously and slightly injuries are n/a in the Road accidents dataset. Despite that, Italy calculated the number of serious injured according to EU reccomendations (MAIS 3+) and using data based on hospitals discharge records.
LU	Hospitalised for at least 24 hours as in-patient. Police records.
LV	From 2004: hospitalised more than 24 hours as in-patient. Police records.
LT	Seriously injured person loses more than 30 % of his/her working capacity or/and his or her body is being incurably mutilated.
MT	An injury accident is classified as 'Serious' injury (referred to in Malta accident statistics as 'Grievous' injury) if the person does not recover his/her previous health condition with 30 days. Police records.
NL	"Definition: ""A serious road injury is a road crash casualty who has been admitted to hospital with a minimum MAIS (Maximum Abbreviated Injury Score5) injury severity of at least 2 on a scale of 6, and who has not died within 30 days from the consequences of the crash."" Method: MAIS=2 or higher. Linked Police-Hospital records + remainder file + estimate of unobserved C/RC. MAIS3+ is a subset of MAIS2+"
PL	A person who sustained a serious disability, a serious incurable disease or a chronic life threatening disease, permanent mental disease, complete or substantial permanent incapacity to work in their current occupation or a permanent or substantial scarring or disfiguration of the body; the definition also includes persons who have suffered other injuries incapacitating their bodies or causing ill health for longer than 7 days". Police records.
PT	Hospitalised for at least 24 hours. Police records.

RO	Person seriously injured in traffic accident, person who has suffered: a) loss of a sense or organ or cessation of their operation; b) permanent physical or mental disability; c) a serious and permanent aesthetic wound; d) an abortion; e) fractures, except for nasal or zygomatic bone fractures, fingers, claviculus, monofocal fractures of 1-3 ribs or 1-3 tooth pulsations, if they did not require hospitalization for more than 24 hours; f) shock, concussion, internal injuries, crushing, severe cuts and tears or polytrauma that required hospitalization for more than 24 hours; g) abrasions, sprains, contusions or other such injuries that required hospitalization for more than two working days. Serious shock, or any other injury which leads to death more than 30 days after the collision. Police records.
SE	The definition of seriously injured was updated in 2007. A serious injury is now defined as a health loss following a traffic injury reflecting that a person does not recover the previous health condition within a reasonable amount of time. This series is used in the national annual follow up and there is a goal for 2020 (-25 % since 2007). Hospital records.
SI	Any injured persons who were involved in a road traffic accident and sustained injuries due to which their lives were in danger or due to which their health was temporarily or permanently damaged or due to which they were temporarily unable to perform any work or their ability to work was permanently reduced (Penal Code of the Republic of Slovenia). Police records.
SK	Serious bodily harm or serious disease, which is a) mutilation, b) loss or substantial impairment of work capacity, c) paralysis of a limb, d) loss or substantial impairment of the function of a sensory organ, e) damage to an important organ, f) disfigurement, g) inducing abortion or death of a foetus, h) agonising suffering, i) health impairment of longer duration. Health impairment of longer duration is an impairment, which objectively requires treatment and possibly involves work incapacity of not less than forty-two calendar days, during which it seriously affects the habitual way of life of the injured party.
UK	Hospitalised for at least 24 hours or any of the following injuries whether or not they are detained in hospital: fractures, concussion, internal injuries, crushing, burns (excluding friction burns), severe cuts and lacerations, severe general shock. Since 2016, changes in severity reporting systems for a large number of police forces mean that serious injury figures as reported to the police are not comparable with earlier years. These systems use a list of injuries which are automatically mapped to severity, rather than relying on the judgment of the police officer.
CH	Up to 2014: Hospitalised for at least 24 hours or if the injury prevented the person from doing its daily activity for 24 hours. Since 2015: Hospitalised for at least 24 hours. Police records. Further comments: In Switzerland, injury severity is still assessed by means of a simple definition by the police force present at the scene. Nothing is known of the type and long-term outcome of injuries. In order to improve the assessment of injury severity a first step was taken: since January 2015 the definition of injury severity was further specified and the police corps were trained. Also a new category "life-threatening injury" was introduced. For a further standardization the severity scale was linked to the NACA-Codes, used by all emergency services in Switzerland.
IL	Hospitalised more than 24 hours as in-patient. Police records.
NO	Very serious injury: Any injury that is life-threatening or results in permanent impairment. Serious injury: Any injury from a list of specific injuries; these would normally require admission to hospital as an in-patient. Police records.
RS	Using of the ICD-International Classification of Diseases. Categorization of an injury as a "serious injury" is made on the basis of expert assessment given by doctors during admission to hospital, during hospitalization or after the hospitalization. The Republic of Serbia has not yet adopted a definition for serious injury. Police records.

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