



THE NETHERLANDS

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The Netherlands recorded 661 road fatalities in 2019, representing a 2.5% decrease when compared to 2018. The safety of the elderly population is a growing concern, as people over 70 years have a mortality rate three times higher than the general population. Road safety policy in the Netherlands is guided by a Safe System approach. The current strategic road safety plan has the ambition of achieving zero road casualties by 2050. To contribute to that ambition, the government will release EUR 50 million per year to support municipal and provincial road authorities in taking effective road safety measures.

Note: Statistics in the Netherlands distinguish between reported and real numbers of casualties. The former category covers casualties reported by the police. Real numbers are higher, as they take into account data available from sources such as court files and death certificates. This report uses the real number of fatalities, unless there is a specific reference to the reported numbers.

Impact of Covid-19

The Netherlands did not introduce full lockdown measures in 2020 in response to the Covid-19 pandemic. The measures implemented varied over time.

According to preliminary data, traffic on the main road network decreased by 17% in the first three quarters of 2020 compared to 2019 (KiM, 2020). People used public transport less often, while the share of walking and cycling increased. In the first three quarters of 2020, the number of registered road deaths decreased by 4% compared to the average for the first three quarters of 2017-19.

Table 1. Road fatalities by month

	Average 2017-19	2020	% change
January	42	37	-11.9
February	36	34	-5.6
March	45	43	-4.4
April	46	51	10.9
May	44	49	11.4
June	51	47	-7.8
July	53	48	-9.4
August	44	45	2.3
September	52	41	-21.2
October	53	27	-49.1
November	45	43	-4.4
December	45	36	-20.0
Total	555	501	-9.9

Source: STAR-data, retrieved on 3 February 2021.

Trends

The Netherlands registered an overall small **decrease in the number of road deaths in 2019**. According to the latest available data, 661 persons lost their lives in traffic crashes in the Netherlands in 2019. This represents a 2.5% decline on 2018. In 2018, 678 road deaths were reported, a 10.6% increase on 2017.

The **longer-term trend for road deaths** in the Netherlands has been downwards trending. Between 2000 and 2019, the number of annual road fatalities fell by 43%. However, the reduction in the number of road

casualties significantly slowed in the most recent years, with the number of road deaths actually increasing by 3% during the 2010-19 period.

The number of **traffic deaths per 100 000 inhabitants** in the Netherlands has fallen by 48% between 2000 and 2019. In 2019, 3.8 traffic deaths per 100 000 inhabitants were recorded, compared to 7.3 in 2000. By way of comparison, the EU average in 2019 was 5.1.

Country Profile

Population in 2020: 17.4 million

GDP per capita in 2019: USD 52 602

Cost of road crashes: 2% of GDP (2018)

Road network in 2020: 141 000 kilometres (motorways 4%)

Registered motor vehicles in 2020: 11.7 million (cars 74%; goods vehicles 9%, motorcycles 6%; mopeds 11%)

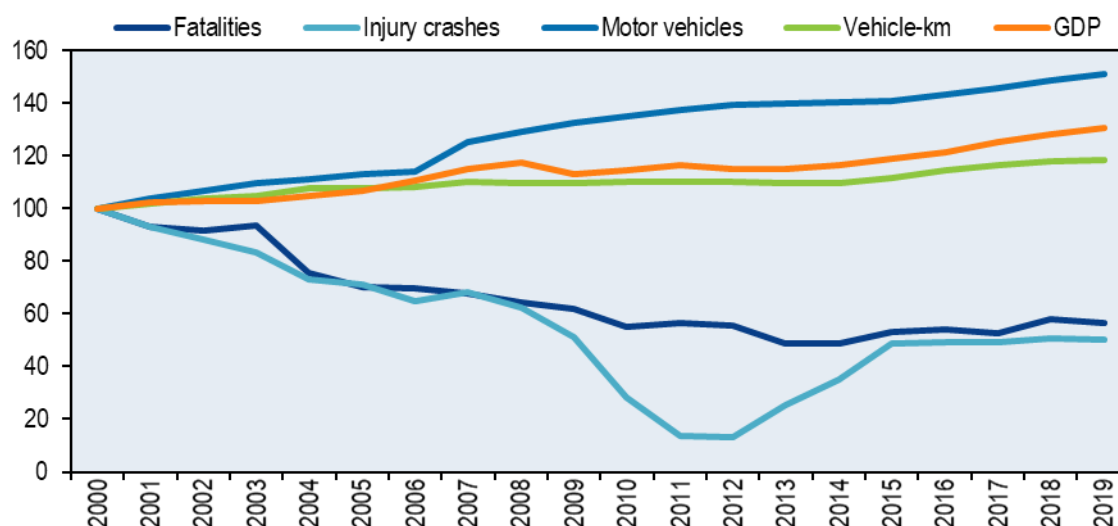
Volume of traffic: +18% between 2000 and 2019

Speed limits: urban roads 30/50 km/h; rural roads 60/80 km/h; motorways 100/130 km/h

Limits on Blood Alcohol Content (BAC): 0.5 g/l (including cyclists); novice drivers (first five years) 0.2 g/l

The Netherlands recorded 0.6 **road fatalities per 10 000 registered vehicles** in 2019. This represents a decrease of 63% compared to 2000, when the rate of deaths to registered vehicles stood at 1.5. In the 2010-19 period, the rate of deaths to registered vehicles increased by 8%.

Figure 1. Road safety, vehicle stock, traffic and GDP trends (real numbers), 2000-19
Index 2000 = 100



Note: Between 2010 and 2014 there were significant reporting problems for injury crashes.

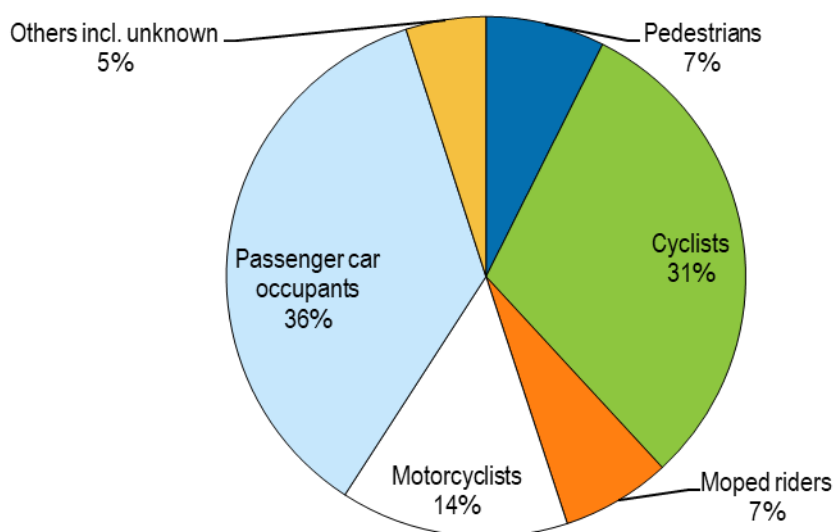
Data for **fatalities by road user groups** shows that vulnerable road users (pedestrians, cyclists and motorcyclists) account for more than half of all road deaths. In 2019, cyclists accounted for 31% of road deaths, motorcyclists 14% and pedestrians 7%. Occupants of passenger cars and vans represented 36% of road fatalities.

The largest decreases in 2019 were among cyclists, with 11% fewer deaths compared to 2018, and pedestrians with a 9% decrease. In 2019, road deaths increased among moped riders by 15%, motorcyclists 9% and occupants of passenger cars 2%, compared to 2018.

Long-term trends shows that traffic in the Netherlands has become safer for all road user groups. The strongest decline in fatalities was registered among occupants of passenger cars, moped riders and pedestrians, with a decrease of 57% between 2000 and 2019. The user group that has benefited least is motorcyclists, registering a decrease in fatalities of only 7% between 2000 and 2019. It has to be noted, however, that the increase in safety was particularly the case in the early part of this period. In the last ten years, only an improvement in the safety of pedestrians was registered.

Since 2010, while the number of road deaths saw a general increase of 3%, the number of cyclists killed increased by 25% and the number of motorcyclists killed by 11% (Figure 5).

Figure 2. Road fatalities by road user group (real numbers), 2019



Road deaths by age group in 2019 showed a decrease in road deaths among people aged 0-14 (8 fewer deaths compared to 2018), 30-69 (13 fewer deaths), 70-79 (6 fewer deaths) and over 80 (17 fewer deaths). The number of road deaths increased for the other age groups, with the largest increase for the 20-29 age group (from 87 deaths in 2018 to 112 in 2019).

Since 2000, the number of road deaths declined for all age groups, except for people above the age of 70, who saw an increase in road deaths of 18% between 2000 and 2019. More recently, since 2010, against a general increase of 3% in the number of road deaths, fatalities decreased for all age groups up to 69 years, but increased for the older age groups (Figure 5).

Historically, young people represent a high-risk group in road safety. However, in the Netherlands in 2019, the age group the most at risk in traffic was those over 80, with a mortality rate of 15.8 deaths per 100 000 inhabitants: more than four times that of the general population.

Figure 3. Road fatality rates by age group (real numbers), 2010-19
Deaths per 100 000 inhabitants in a given age group

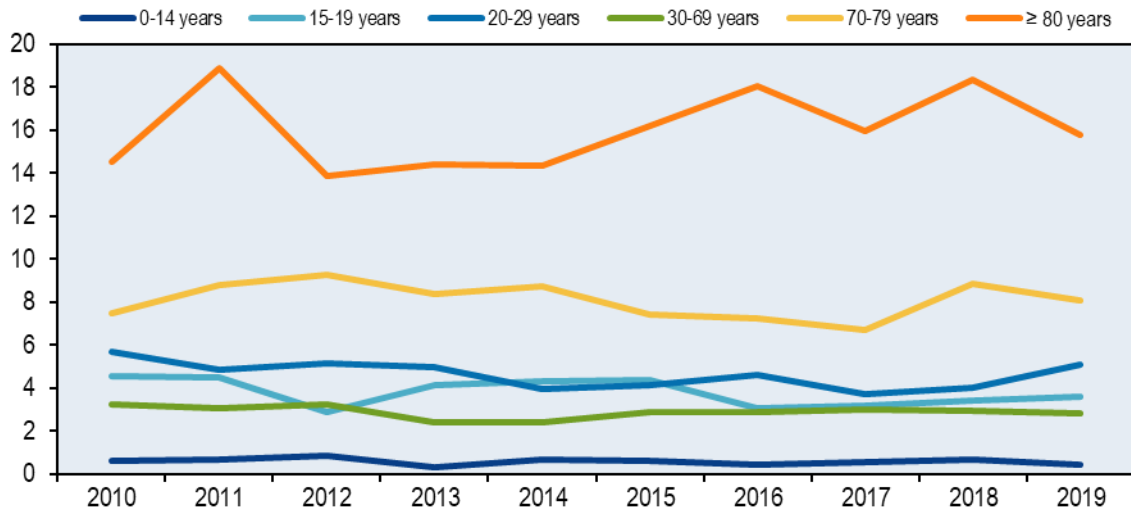


Figure 4. Road fatality rate by age and road user group (real numbers), 2019
Deaths per 100 000 inhabitants

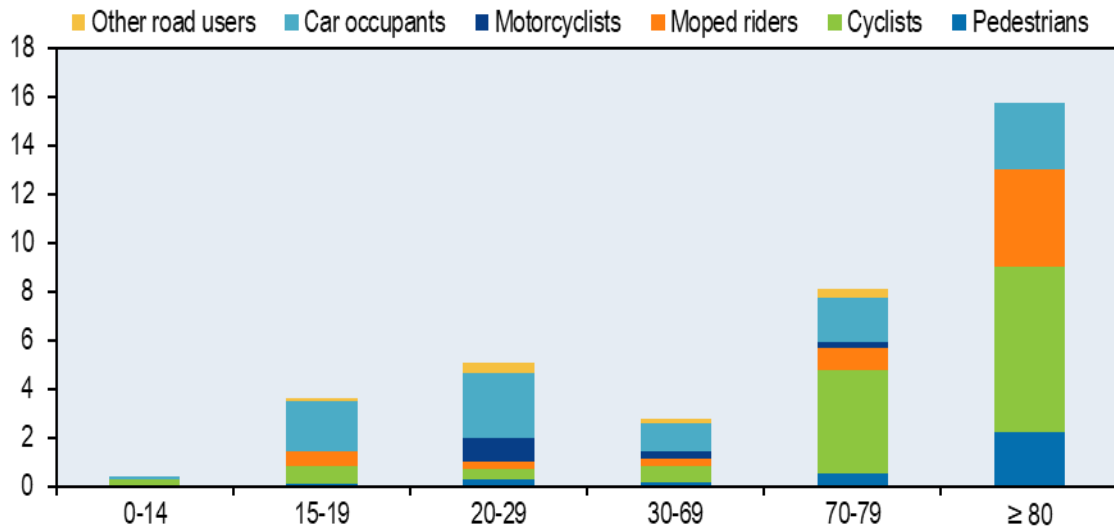
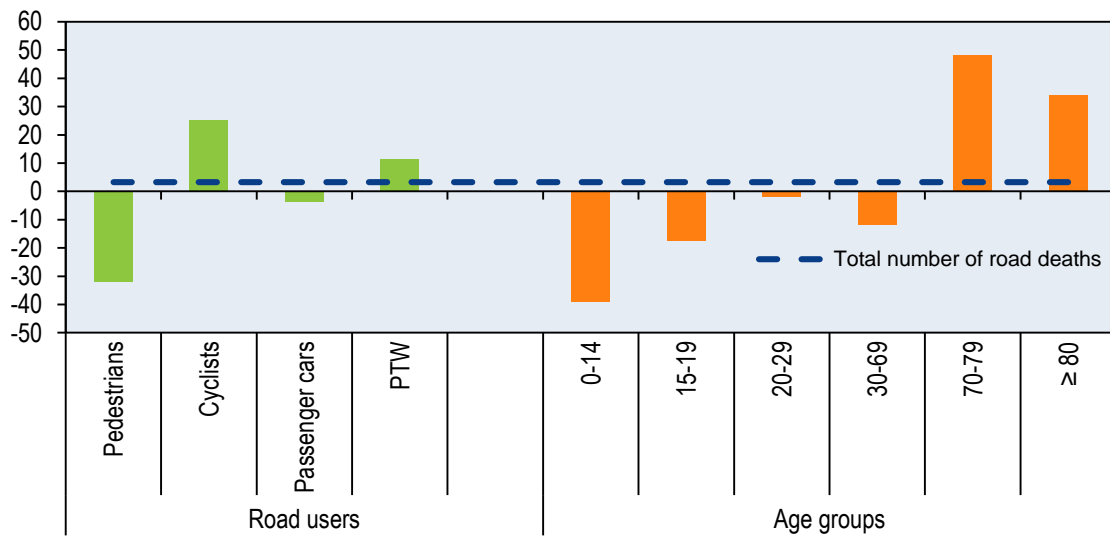


Figure 5. Evolution of road deaths by user category and age group, 2010-19



Fatality data are essential for understanding road safety issues but represent only a part of the picture. Information on **serious injuries from crashes** is also critically important. However, injury data are much more difficult to obtain, validate and compare. In 2019, an estimated 21 400 people were seriously injured in traffic in the Netherlands (defined here as a person admitted to hospital after a road crash for an injury with a Maximum Abbreviated Injury Scale score of two or more [MAIS2+] who has not died within 30 days of the crash), a similar number as in 2018. With regard to the European definition that uses MAIS3+ as the measure for serious injuries, 6 900 people were estimated to have been seriously injured in 2019, which was again similar to the number in 2018. Nearly two-thirds of the serious road injuries relate to cyclists, the majority of whom are injured in crashes not involving a motor vehicle.

Economic costs of road crashes

Road crashes represent a significant cost for society, estimated in 2018 at around EUR 17.1 billion, equivalent to more than 2% of the Dutch GDP (KiM, 2019). Medical costs (2%), production loss (6%), loss of quality of life (based on a willingness-to-pay approach) (56%), property damage (26%), settlement costs (8%) and congestion costs (2%) have been included in the estimate.

The economic costs of traffic crashes in 2018 were 5% higher than in 2010. Two-thirds of this increase (around EUR 0.5 billion) is caused by a higher number of seriously injured traffic victims compared to 2010 (KiM, 2019).

Table 2. Costs of road crashes, 2018

	Unit cost (EUR)	Total (EUR)
Fatalities	2.85 million	1.9 billion
Serious injuries (MAIS2+)	310 000	6.3 billion
Slight injuries	37 000	4.8 billion
Property damage costs	4 000	4.1 billion
Total		17.1 billion
Total as % of GDP		2.0%

Behaviour

The table below summarises the main speed limits in the Netherlands.

Table 3. Passenger car speed limits by road type, 2020

	General speed limit
Urban access roads	30 km/h
Urban distributor roads	50 km/h
Rural access roads	60 km/h
Rural distributor roads	80 km/h
Regional through roads	100 km/h
National through roads (motorways)	130 km/h

Note: The maximum speed differs between motorways, some have a lower speed limit of 120 km/h, 100 km/h or even 80 km/h. Since March 2020, the speed limit on all motorways is 100 km/h between 6:00 a.m. and 7:00 p.m., unless a lower speed limit is put in place. This is a measure to reduce NOx. For an explanation on road categorisations, see Advancing Sustainable Safety at www.sustainablesafety.nl.

The behaviour of road users is an important determinant of a country's road safety performance. **Driving under the influence of alcohol** is a major cause of road crashes in the Netherlands, as in most IRTAD countries. Until 2006, the maximum authorised BAC was 0.5 g/l for all drivers of motor vehicles, but in 2006 a lower limit of 0.2 g/l was applied for novice drivers during their first five years. For cyclists the legal limit is also 0.5 g/l.

Alcohol-related fatalities are defined according to the SafetyNet definition: any death occurring within 30 days as a result of a fatal crash in which any active participant was found with a blood alcohol level above the legal limit.

In 2015, driving under the influence of alcohol accounted for approximately 75 to 140 (12% to 23%) road deaths in the Netherlands. Around two-thirds of all severe crashes involving alcohol are caused by a relatively small group of "heavy alcohol offenders" (offenders with a BAC of 1.3 g/l or higher). In 2016, the social costs due to this group were estimated to be between EUR 0.8 to 1.8 billion per year (Goldenbeld, Blom and Houwing, 2016).

Another way to look at drink-driving is to measure how often people drive on the road whilst under the influence of alcohol. This can be measured in roadside surveys, as is done regularly in the Netherlands. Drink-driving on weekend nights increased from 1.4% in 2017 to 2.3% in 2019 (I&O Research, 2020). The percentage of heavy alcohol offenders (BAC equal to or greater than 1.3%) is approximately 0.3%. Research conducted in 2007-09 shows that in the Netherlands 3.4% of drivers are in control of a vehicle **under the influence of drugs and/or medicines**. The exact number of road traffic casualties due to drug use in traffic is unknown, partly because Dutch legislation prohibits post-mortem drug testing. A hospital study conducted in 2007-09 indicated that approximately 10% of seriously injured drivers tested positive for drugs (SWOV, 2020a). Since 1 July 2017, legal limits for drug use in traffic have been operational in the Netherlands.

There have been no recent measurements of the prevalence of drug use in Dutch traffic. According to the international ESRA survey (E-Survey Road safety Attitudes), 5% of Dutch car drivers reported having driven within 1 hour of using illegal drugs (Goldenbeld and Buttler, 2020).

Dutch drug experts are worried about the influx of new types of drugs in society in general, as well as their use by road users. For example, the number of traffic incidents reported by the Dutch police involving the recreational use of nitrous oxide (i.e. laughing gas) had increased to 1 000 in the first half of 2019, compared to 400 in the same period in 2018 and less than 200 in 2016 and 2017 (CAM, 2019).

Holding a **phone while driving** has been illegal in the Netherlands since April 2002. Additional legislation relevant to distracted driving is applicable in cases where behaviour that explicitly endangers road safety is observed. In July 2019, further legislation was introduced to forbid handheld phone use while cycling. In 2019, more than 121 000 road users in the Netherlands were fined for handheld phone use, an increase compared to 2018, when just over 80 000 were fined for this offence. In the period July-December 2019, more than 21 000 fines for handheld phone use were given to cyclists in the Netherlands. In 2019 and 2020 the fine for handheld phone use while driving was EUR 240 and the fine for handheld phone use while cycling was EUR 95.

An observational study, conducted in September 2020, indicated that 91% of observed drivers of personal cars, vans and trucks were not actively involved with an electronic communication device (calling or touching a screen) whilst driving (NDC Nederland, Goudappel Coffeng, 2020). This shows a decrease compared to an earlier study in 2018, when the share of drivers not actively using a communication device whilst driving was 85%. In 2019, over one-quarter of Dutch cyclists (28%) used a communication device while cycling, with such devices mostly used for listening to music (22% of cyclists) (Broeks and Bijlsma-Boxum, 2019).

In 2018, the international ESRA2 was conducted among Dutch drivers. One section of the survey asked about **fatigue** and 21.6% of Dutch car drivers reported that they had been driving in the past 30 days while having trouble keeping their eyes open, slightly above the European average of 19.7% (Goldenbeld and Nikolaou, 2019).

Seat belt use has been compulsory in the Netherlands in front seats since 1975 and in rear seats since 1992. In 2020, the rate of seat belt use was on average 97%, based on observations of 11 429 vehicle occupants travelling on motorways and urban through roads. For vans and trucks, the wearing rate was lower (88%) than for car occupants (99%) (NDC Nederland, Goudappel Coffeng, 2020).

Helmet wearing has been compulsory on a motorcycle since 1972 and on mopeds (up to 50 cc, maximum speed 45 km/h) since 1975. A helmet is not compulsory on light mopeds (up to 50 cc, maximum speed 25 km/h) and bicycles. The light moped category constitutes a major road safety problem, as these are regularly modified to much higher speeds. Since 1 January 2017, the speed pedelec (an electric bicycle with a higher-powered motor and capable of higher speeds than a normal pedelec) is categorised as a moped – helmet use on them is therefore mandatory. The speed pedelec helmet can be an ordinary moped helmet that complies with the ECE22.05 standard, or it can be a helmet that meets the NTA8776:2016 standard, which has been developed specifically for speed pedelecs (SVOV, 2017). In 2020, the Ministry of Infrastructure and Water Management proposed a law to make helmet wearing mandatory for users of light mopeds.

Road safety management and strategies

There are several **factors of influence on the Netherlands' road safety performance** as captured by the above indicators.

The traffic system changed considerably around the year 2000. The design of the underlying road network improved and enforcement of policing risk-taking behaviours (speeding, drink-driving, failing to use seat belts and helmets) was intensified, although in more recent years there has been a decrease in police enforcement. Educational programmes were developed for all age groups and types of road user. A decentralised organisation of road safety with provinces and municipalities as the main parties was key to the success of this strategy.

The European New Car Assessment Programme (Euro NCAP) for passenger cars has played a major role in stimulating the production of safer vehicles. Passive vehicle safety systems, such as airbags and seat belts, have helped reduce injuries to passengers, and active safety systems, such as improved car bonnets and exterior airbags, have helped protect pedestrians and cyclists in the event of a crash.

Improvements in medical care, including regional organisation, mobile medical teams and air ambulances, have further contributed to the decrease in fatalities. The national road safety policy emphasis has shifted to vulnerable road users (Weijermars et al., 2014).

Responsibility for the organisation of road safety in the Netherlands lies with the Ministry of Infrastructure and Water Management, Directorate-General Mobility - Roads and Traffic Safety section. It is responsible for co-ordinating intergovernmental working processes and road safety decision making at central governmental level, as well as co-

ordinating national mass media campaigns. Regional and local governments have authority over their own roads and the safety of their infrastructure. The Ministry is responsible for road safety policy and, together with decentralised governments, sets policy targets.

The Ministry also carries out periodic reviews of legislation, rules and standards against best practice. It makes recommendations for improvement, monitoring and evaluation by establishing and supporting data systems for monitoring road safety. Co-operation between the Ministry of Infrastructure and Water Management, Statistics Netherlands and SWOV allows the compilation and dissemination of national statistics relating to road safety.

Road safety policy in the Netherlands is guided by the philosophy of a **Safe System Approach** (OECD/ITF, 2008), which is known as sustainable safety. It is based on several key concepts, including that the human being is the reference point for countermeasures that are taken, and that prevention is preferable to a curative approach. The policy follows three safe design principles. The first addresses the functionality of roads, meaning that all roads should serve one function and have their place in a hierarchical network. The second applies to (bio)mechanical principles, which state that there should be homogeneity of mass, speed and direction. Roads sides and vehicles should be designed to be physically forgiving, and that the design of roads should also accommodate the safety of two-wheelers. Finally, the principles look at the psychology of the road user.

This is not only done by making road alignment predictable, but also by ensuring that all elements of the road design are easy to understand, especially at speed, and encourage safe decision making while driving. Ideally, this should be tuned to the older road user, as this is a growing sector of the population requiring particular support to move safely in traffic. Besides the three design principles, two organisational principles are put in place: firstly, road safety as a shared responsibility of all stakeholders, particularly when looking at vulnerabilities that may make certain road users more inclined to crash or suffer serious injury; and secondly, the organisational principle of "learning and innovation", which recognises the importance of getting accurate information about how the system is functioning and how it should be adapted to new developments or persistent malfunctioning.

In 2008, the **Road Safety Strategic Plan 2008-20** (SPV) was developed by the Ministry and the decentralised authorities, and received support in parliament. The SPV is based on three cornerstones: co-operation, an integral approach and sustainable safety. In 2012, the strategic plan was revised following its four-yearly evaluation conducted by SWOV. This led to a Policy Stimulus Road Safety Initiative that contained extra measures aimed at road safety improvement for cyclists, older road users, infrastructure, and road users in general.

In 2017, a broad collaboration between 32 organisations called on the House of Representatives and the new government to make road safety a national priority. The parties created a manifesto, "Road safety: A national priority", in which they express

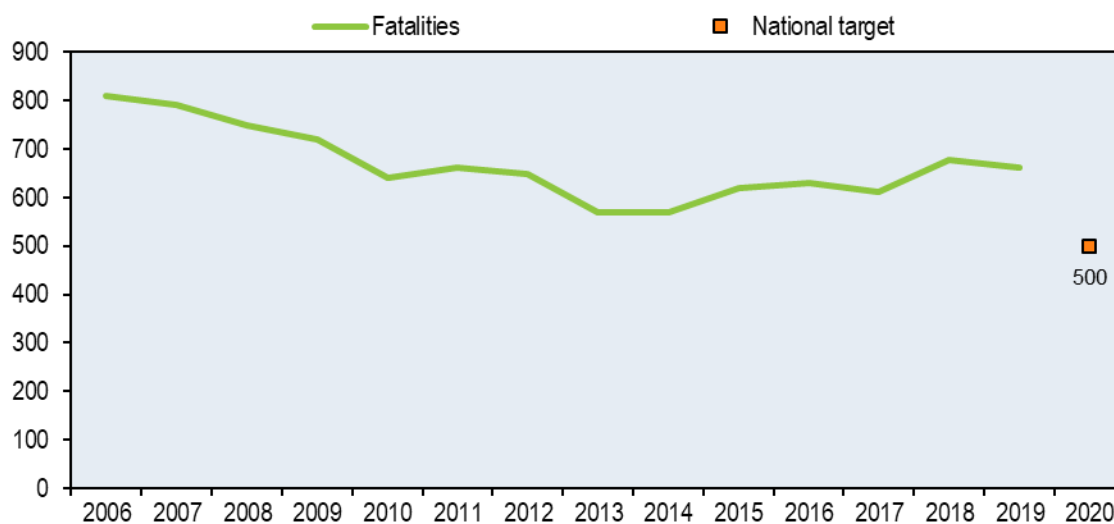
ambitions and proposals for safer traffic and fewer casualties. The incoming government will get to work with the recommendations of the manifesto.

In the same year, the ministry started the development of a new **strategic plan** for the period 2020-30. Regional and local governments and other key stakeholders involved in road safety participated in the process. In the new strategic plan, the ambition is to achieve zero traffic casualties by 2050. The plan describes the path to concrete measures within each of nine major policy themes (Ministry of Infrastructure and Water Management et al., 2019): safe infrastructure; heterogeneity in traffic; technological developments; vulnerable road users; inexperienced road users; driving under the influence; speeding; distraction in traffic; and traffic offenders.

A knowledge centre SPV and a data task force have been put in place to support the need for knowledge, the definition of indicators and collection of data.

The road safety targets for 2020 included reducing road fatalities to 500 and MAIS2+ road injuries to 10 600. In 2015, SWOV predicted that if ongoing developments and efforts continued, the targets for 2020 with respect to fatalities could be feasible (Weijermars et al., 2015). However, without additional safety measures, it would be near impossible to achieve the target for serious road injuries. In view of the observed increase in road fatalities since 2015, it is now nearly certain that the target of a maximum of 500 fatalities in 2020 will not have been met (Aarts et al., 2020).

Figure 6. Trends in road fatalities towards the national target, 2006-20



Measures

Various measures have been developed to make roads safer in recent years. These measures focus particularly on road users, vehicles and infrastructure but also give consideration to technological advances, both in enforcement and vehicle design.

Road users: Partly as an alternative for the alcohol lock (a breathalyser device that prevents the car from starting if the driver is over the legal BAC, but that in 2018 was no longer permitted to be used under Dutch administrative law), a new sanction for alcohol offenders was trialled in the Netherlands, the alcoholmeter. The alcoholmeter is an electronic ankle bracelet that monitors alcohol intake during a period of a temporary alcohol ban. The probation officer receives daily measurement results. The device is intended for alcohol offenders who have been placed under supervision by the probation office.

Since 1 July 2019, using communication devices while driving a vehicle has been extended from car drivers to other groups of road users including cyclists.

Since January 2020, the maximum punishment for impaired driving was increased from 3 months to 1-year of imprisonment.

In 2019, driving exams in the Netherlands were revised: the use of navigation systems have been made part of the practical exam, the skill of danger recognition has been added to the theoretical exam, the requirements for driving schools have been updated and education about the driving exam has received a much stronger visual component.

In 2020, section control on speeding was introduced on then rural road sections; another ten sections will follow in the course of 2021.

Vehicles: Since January 2021, a new law prescribes that agricultural vehicles have to be formally registered and equipped with a licence plate.

New types of light motorised vehicles, such as electric steps, e-scooters or stand-up tricycles, do not fall within the scope of European regulations authorising them for road use and they are therefore not legally allowed on Dutch public roads. To accommodate these kinds of innovations for possible future use on public roads, the Minister of Infrastructure and Water Management may designate these vehicles as "special mopeds" which would, subject to certain conditions very similar to those applying to light mopeds, have access to public roads.

Roads: In December 2019, the ministry and the decentralised authorities together decided to make EUR 500 million available over the period 2020-30 as an impetus for safer roads. This budget is meant as a contribution of 50% of the investment needed by provinces and municipalities. Besides this investment, the national government has made EUR 50 million available for improving the safety of dangerous main rural roads (regional through roads

and rural distributor roads). Half of this budget is for national roads and the focus is on making roadsides safer.

Definitions, methodology, data collection

A road crash is defined as a crash on a public road involving at least one moving vehicle and which leads to property damage or injury of persons involved.

A road fatality describes any person who dies immediately or within 30 days of a road crash and as a result of an injury sustained in that crash.

Someone who is seriously injured is defined as a person admitted to hospital after a road crash for an injury with a Maximum Abbreviated Injury Scale score of two or more (MAIS2+) and who has not died within 30 days. By contrast, a slightly injured person is a person, whether admitted to hospital or not after a road crash, with an injury with a Maximum Abbreviated Injury Scale score of one (MAIS1), or an injury that could not be scored against the AIS-scale.

In the Netherlands, Statistics Netherlands (CBS) works together with the Ministry of Infrastructure and Water Management (*Rijkswaterstaat*) to match police-reported fatalities with other records, including court files and death certificates, to determine the real number of road traffic fatalities. Both the police-reported number and the real number have been published annually since 1996. This report uses the real number of fatalities, unless there is a specific reference to "reported" numbers. In 2019, the percentage of police-reported fatalities was 89% of the real number.

A national information system for the police implemented in 2009 led to lower data quality and a smaller number of reported crashes. New procedures are intended to improve the police data in both quality and quantity. So far, however, only the number of reported crashes (injury and property damage) has increased since 2014, with the quality of the characteristics reported lagging behind.

Research on serious traffic injuries shows that the number of police-reported hospitalised casualties is not a good indicator for serious injuries due to miscoding of injury severity, underreporting and bias. SWOV matches the Dutch police data to hospital discharge records and the MAIS score is attributed based on the AIS scores derived from the International Classification of Diseases (ICD) of patients whose injuries were coded in ICD10. The estimated real number of serious injuries is now based on the linkage between data from both police and hospital databases. The definition of a serious injury is based on the MAIS score, not the police reported injury severity. Based on this method, the Netherlands is also able to report on MAIS2 or MAIS3+ injuries. Since 2019 the AIS-version used is AIS2005/08[©], leading to a lower number of MAIS3+ casualties than in the previous version (AIS1990). The number of MAIS2+ cases is comparable (SWOV, 2020b).

In March 2016, a smartphone app was launched, enabling road crash reporting by individuals, supported and (partly) verified by police or an insurance company. Crashes can also be reported via the online tool, www.mobielschademelden.nl. In 2020, around

7 000 additional crashes were reported this way, all relating to property damage only. Hopes are that serious crashes with bicycles and without motor vehicles involved can be reported more frequently with this app. Currently, less than 5% of these crashes are reported to the police, whereas they comprise more than half of all serious road injuries in the Netherlands, as is shown by hospital discharge records.

Resources

Recent research

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