



DENMARK

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Denmark recorded 199 road fatalities in 2019 – 28 more than in 2018, representing an increase of 16.4%. In 2019, the mortality rate rose to 3.4 deaths per 100 000 population. Seniors above 75 years of age have a mortality rate above young people. The Danish Road Safety Commission has set the ambitious target of no more than 120 deaths by 2020. The Commission is also preparing the new plan for 2021-30.

Impact of Covid-19

In response to the Covid-19 pandemic, Denmark introduced lockdown measures on 13 March 2020, which affected the movement of people and goods on the road and, in turn, the exposure to road crashes. The number of road deaths decreased by 29% in the period March-May 2020, compared to the average for 2017-19. During the same period traffic volume decreased by 20%.

Table 1. Road fatalities by month

	Average 2017-19	2020	% change
January	14	18	28.6
February	11	9	-18.2
March	14	10	-28.6
April	11	14	27.3
May	15	5	-68.8
June	18	12	-33.3
July	16	15	-6.3
August	18	12	-33.3
September	14	21	50
October	17	11	-35.3

Table 2. Road motor vehicle traffic by month, billion veh-km

	Average 2017-19	2020	% change
January	4.1	4.2	2.4
February	3.8	3.9	2.6
March	4.4	3.5	-20.5
April	4.4	3.3	-25
May	4.8	4.1	-14.6
June	4.7	4.6	-2.1
July	4.5	4.7	4.4
August	4.9	4.9	0
September	4.6	4.6	0
October	4.7	4.6	-2.1

Trends

In Denmark, **the number of road deaths in 2019 rose by 28 cases.**

According to latest available data, 199 persons lost their lives in traffic crashes in Denmark in 2019. This represents a 13.7% decline on the 175 road deaths in 2017 and a 16.4% decline on the 171 road deaths in 2018.

The **longer-term trend for road deaths** in Denmark has shown significant progress. Between 2000 and 2019, the number of annual road fatalities fell by 60%.

The greatest reductions were achieved in the 2000-13 period when road fatalities fell by 62%. Since 2013, the reduction in the number of road deaths has slowed down.

The number of **traffic deaths per 100 000 inhabitants** in Denmark has fallen by 63% between 2000 and 2019. In 2019, 3.4 traffic deaths per 100 000 inhabitants were recorded, compared to 9.3 in 2000. By way of comparison, the average in the European Union was 5.1 deaths per 100 000 inhabitants in 2019.

Measured as **traffic deaths per billion vehicle-kilometres** (vkm) driven, the fatality risk of Denmark showed significant long-term progress. In 2018 this metric stood at 3.1, 71% lower than in 2000.

Denmark recorded 0.6 **road fatalities per 10 000 registered vehicles** in 2019. This represents a decrease of 71% compared to the year 2000, when the rate of deaths to registered vehicles stood at 2.1.

Country Profile

Population in 2019: 5.8 million

GDP per capita in 2019: 59 951 USD

Cost of road crashes: 1.3% of GDP (2019)

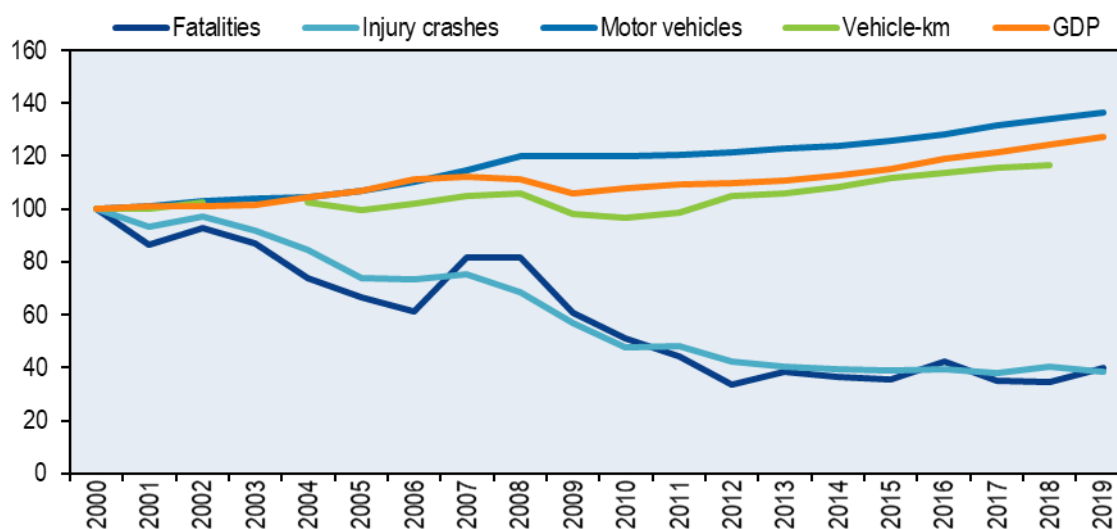
Road network: 74 727 kilometres (motorways 2.2%)

Registered motor vehicles in 2019: 3.2 million (cars 79%; goods vehicles 13%; motorcycles 5%)

Volume of traffic: +17% between 2000 and 2019
Speed limits: 50 km/h on urban roads; 80 km/h on rural roads; 130 km/h on motorways

Limits on Blood Alcohol Content: 0.5 g/l

Figure 1. Road safety, vehicle stock, traffic and GDP trends
Index 2000 = 100



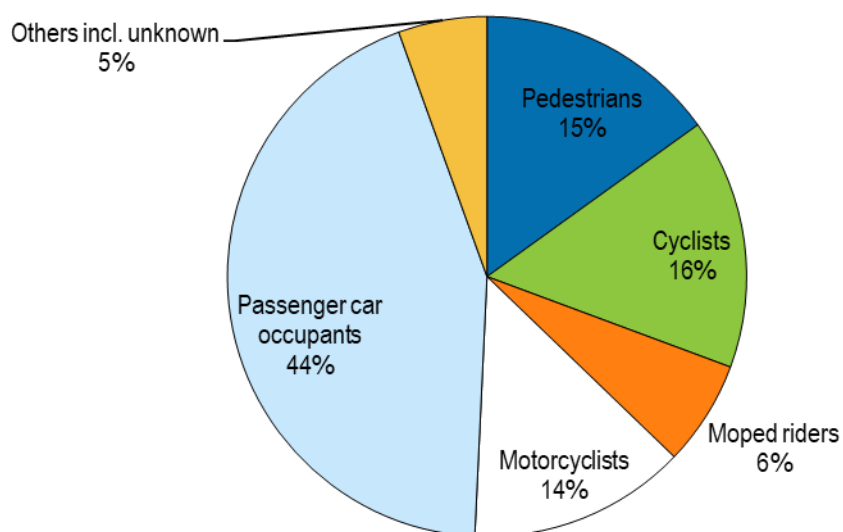
Note: Registered vehicles do not include mopeds.

The picture for **fatalities by road user groups** shows that passenger car occupants continue to be the group the most affected by road crashes. In 2019, car occupants accounted for the largest share of road deaths with 44% of the total. They were followed by cyclists (16%), pedestrians (15%) and motorcyclists (14%).

Most user groups experienced an increase in the number of traffic fatalities in 2019 with respect to 2018. The largest increase was registered among car occupants with a 34% increase. They were followed by moped riders (3 more deaths), motorcyclists (6 more deaths) and cyclists (3 more deaths). Pedestrians registered the same number of road deaths in 2018 and 2019.

The long-term trend shows that traffic in Denmark has become safer for most of road user groups. The strongest declines were registered among moped riders and pedestrians. Since 2000, fatalities have fallen by 72% for moped riders and 70% for pedestrians. The remaining road user groups saw similarly impressive gains as road deaths dropped by 50% or greater for each group since the beginning of the century. However, motorcyclists saw a 12.5% increase in the number of road deaths since 2000, with 27 fatalities in 2019 compared to 24 in 2000.

More recently, since 2010, road safety has improved for all users with the exception of motorcyclists and cyclists for whom the number of fatal casualties has increased by 19% on the last decade (from 26 to 31). Cycling continues to be a very popular mode of transport in Denmark; however, the share of cycling in travel share is slightly decreasing. In 2019, cycling accounted for 14.5% of all journeys and 38% of these journeys were less than 4 kilometres.

Figure 2. Road fatalities by road user group in percentage of total, 2019

Road deaths by age group in 2019 showed some changes compared to 2018. There was a decrease from 6 to 5 in the number of road deaths among 0-14 year-olds and a decrease from 21 to 19 among 65-74 year-olds. On the contrary, 21-24 year-olds saw road deaths increasing from 7 to 13, while deaths increased by 52% (from 29 to 44) among the 75 and over age group and by 12% (from 91 to 102) among the age group 25-64 years-old.

Looking at the longer-term trend, since 2000, the number of road deaths decreased for all groups. The strongest reduction in fatalities over this period occurred among 0-14 and 15-17 year olds, who both registered 80% fewer deaths, respectively.

Seniors over 75 years of age now have a mortality rate largely higher than young people with a rate of 9.4 per 100 000 inhabitants. The elderly suffer a greater proportion of road deaths while using non-motorised means of transport such as bicycles or walking than other age groups in Denmark.

Figure 3. Road fatality rates by age group, 2010-19
Deaths per 100 000 population in a given age group

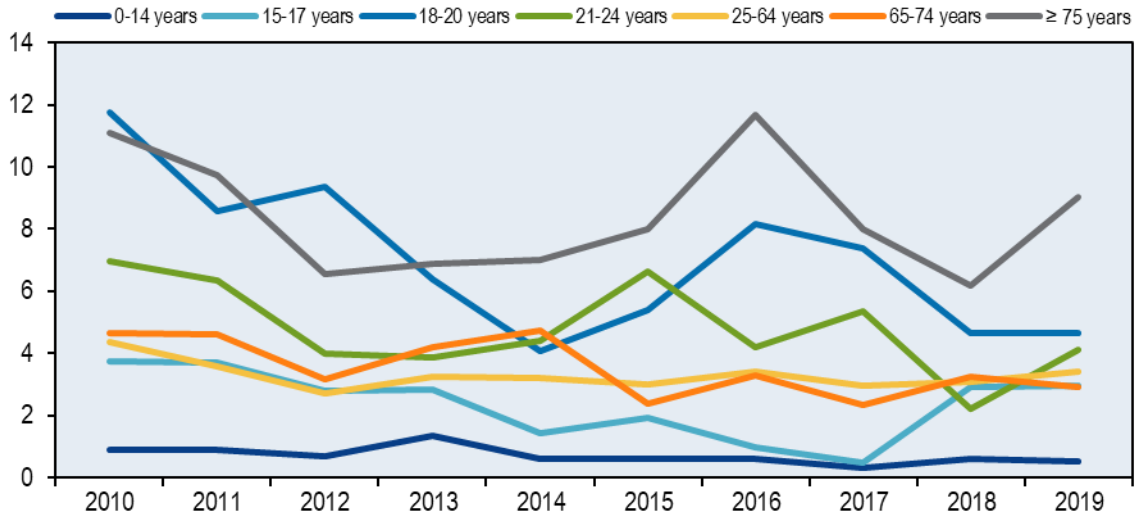
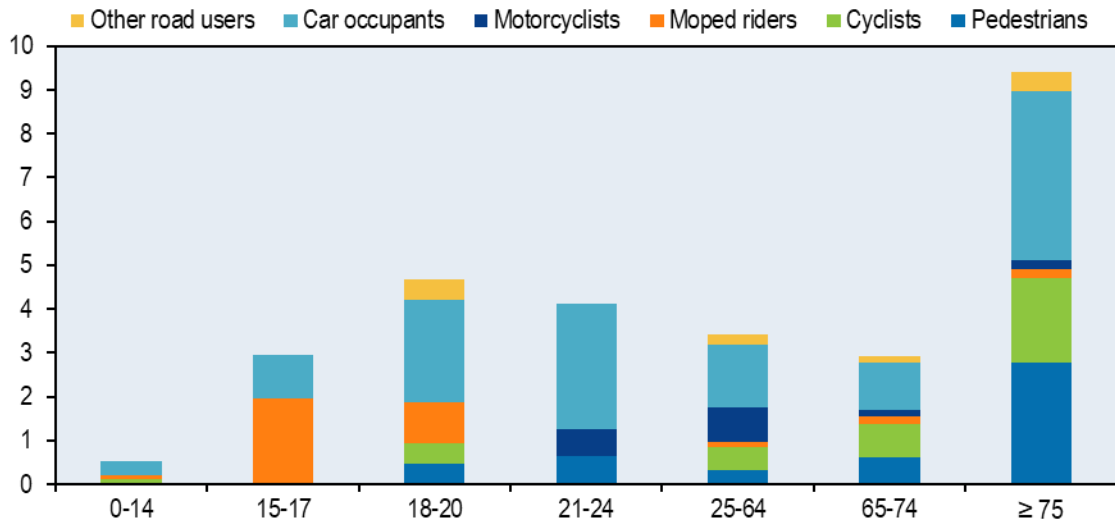


Figure 4. Road fatality rate by age and road user group, 2019
Fatalities per 100 000 population



Analysis of **fatalities by road type** shows that the rural network is the deadliest. In 2019, 60% of deaths occurred on rural roads, 32% on urban roads and 8% on motorways. This repartition has remained relatively stable in the past two decades.

In 2019, in comparison to 2018, the number of road deaths increased by 31% on urban roads and by 18% on rural roads. However, fatalities decreased by 24% on motorways compared to the previous year.

Since 2000, fatalities in urban areas decreased by 65% on urban roads, by 59% on rural roads and by 43% on motorways.

Figure 5. Road fatalities by road type

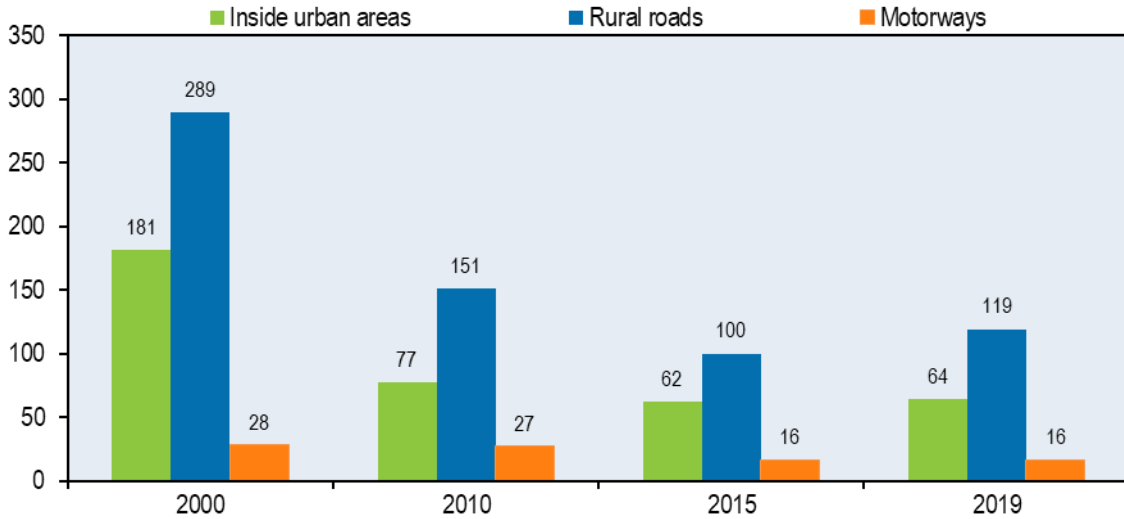
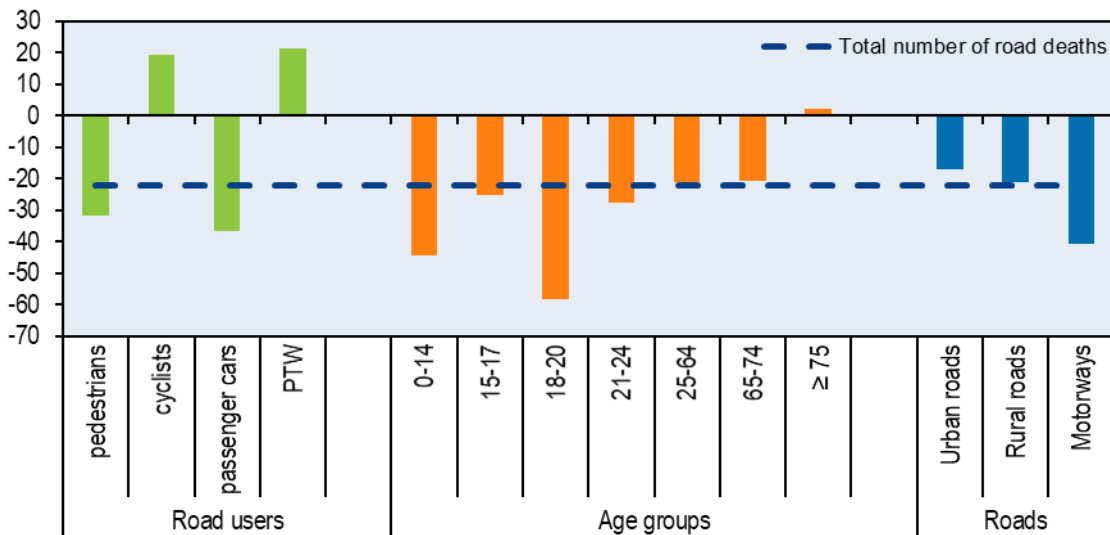


Figure 6. Evolution of road deaths by user category, age group and road type, 2010-19



Economic costs of road crashes

The socio-economic costs of road crashes are calculated using so-called transport economic unit prices. These are regularly calculated and updated for The Ministry of Transport by the Transport Division in the Management Department of the Technical University of Denmark.

Unit prices for the socio-economic costs of road crashes include not only directly measurable expenses – such as hospital and healthcare charges, the cost of police and emergency services, lost earnings and the cost of material damage – but also the so-called welfare loss, representing a valuation for lost lives and capacity. The welfare loss can be taken as an expression of what road users think it is “worth” to prevent road crashes over and above directly measurable costs (COWI, 2010).

Traffic crashes are estimated on the basis of unit costs for deaths, severely injured persons and slightly injured persons.

In 2019, the cost of traffic crashes was around EUR 3.9 billion.

Table 3. Costs of road crashes, 2019

	Total (EUR)
Fatalities	952 million
Seriously injured persons	1 357 million
Slight injuries	119 million
Property damage costs	1456 million
Total	3.9 billion
Total as % of GDP	1.3%

Note: Based on calculation of social costs made by DTU Management (Danish Technical University).

Behaviour

The behaviour of road users is an important determinant of a country’s road safety performance. **Inappropriate speed**, in particular, is one of the main causes of road crashes. In Denmark, speeding was thought to be a contributing factor in 32% of fatal crashes in 2019.

The Road Directorate regularly publishes a speed barometer, where the speed development on different road types is monitored. Over time, there has been a general decline in the mean speed.

The table below summarises the main speed limits in Denmark.

Table 4. Passenger car speed limits by road type, 2020

	General speed limit	Comments
Urban roads	50 km/h	Sections with 30, 40 or 60 km/h
Rural roads	70-80 km/h	90 km/h for specific sections
Motorways	130 km/h	About half of the motorway network has a signed speed limit of 110 km/h especially around cities

Over the past five years, **alcohol-related injury crashes** have in general decreased faster than road crashes. To a certain extent, this can be explained by ongoing awareness campaigns and low social tolerance for drink-driving. In 2019, 10% of personal injury crashes involved alcohol.

The maximum authorised blood alcohol content (BAC) is 0.5 g/l for drivers of any motorised vehicle requiring a driving licence (including professional drivers). There is no maximum authorised BAC for cyclists or pedestrians. The drink-driving penalty is higher for novice drivers who have had their licence for fewer than three years.

Since 1 July 2007, the Traffic Act has included a zero tolerance level for driving under the **influence of drugs**.

Distraction is an important factor to analyse when explaining crash circumstances. In 2019, inattention was thought to have been a contributing factor in 41% of fatal crashes.

In-depth crash investigations have shown that distraction is often an issue both inside and outside the vehicle.

Driving while using a hand-held mobile phone is not allowed. The use of hands-free devices is legal.

Seat belt use has been compulsory in front seats since the early 1970s and in rear seats since the late 1980s. Rear seat belts are not compulsory in cars made before 1990, and very old cars need not have front seat belts either. Such cars account for a very low share of the Danish car fleet.

Child restraints are also compulsory. Small children, typically up to 3-4 years-old have to use a child safety seat. Children over this age can use a booster cushion in connection with a safety belt. When they reach the height of 140 cm, normal seat belt use is permitted.

Table 5. Seat belt and helmet wearing rates
Percentages

	2010	2012	2016	2018	2019
Front seats					
General (driver and passengers)	92	94	96	97	..
Urban roads (driver)	90	94	96	..	
Rural roads	95	95	96	..	..
Motorways (driver)	95	..	98	..	..
Rear seats					
General	76	81	91	93	..
Helmet					
Riders of mopeds	96	..	90	..	95
Riders of motorcycles	99	..	98	99	..

Helmets are required to be worn by all motorcycle and moped riders. The compliance rate by motorcyclists was around 99% in 2018. This rate has been constant since 2006. For riders of mopeds the compliance rate is estimated at 95% in 2019.

There is no mandatory helmet-use law for cyclists.

Road safety management and strategies

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

Since records began in the 1930s, the 167 deaths recorded in 2012 marked the fewest road deaths in a calendar year in Denmark. Between 1990 and 2012, the number of fatalities decreased by nearly 70%. In particular, between 2008 and 2012, the reduction in fatalities accelerated, with a nearly 60% reduction. Effective safety measures, tough winter conditions in 2010 and 2011, and the economic downturn contribute to explaining the sharp decrease in the number of fatalities in the period 2008 to 2012. Between 2013 and 2017, the number of road deaths stagnated at around 180 annual road deaths, with the exception of 2016, when it increased to 211. The overall downward trend can also be explained by a reduction in speed. Although mean speeds have decreased only slightly, top speeds have reduced more significantly. This may be related to economic considerations due to fuel becoming more expensive. The penetration into the fleet of new vehicles with advanced safety equipment has also had a positive impact.

There is no single lead agency concerning traffic safety in Denmark. The **responsibility for the organisation of road safety** is spread across the ministries of transport, justice, interior and health, associated agencies and in the municipalities. Overall, this organisation works well because stakeholders share the same goal and work in close co-operation with each other. The Danish Road Safety Commission is an advisory body

composed of politicians from each party in the parliament and technical advisors. It sets targets and areas of interaction. It does not manage a budget, thus it relies on the relevant stakeholders to take up the commission's recommendations. Traffic safety work in Denmark is largely locally based.

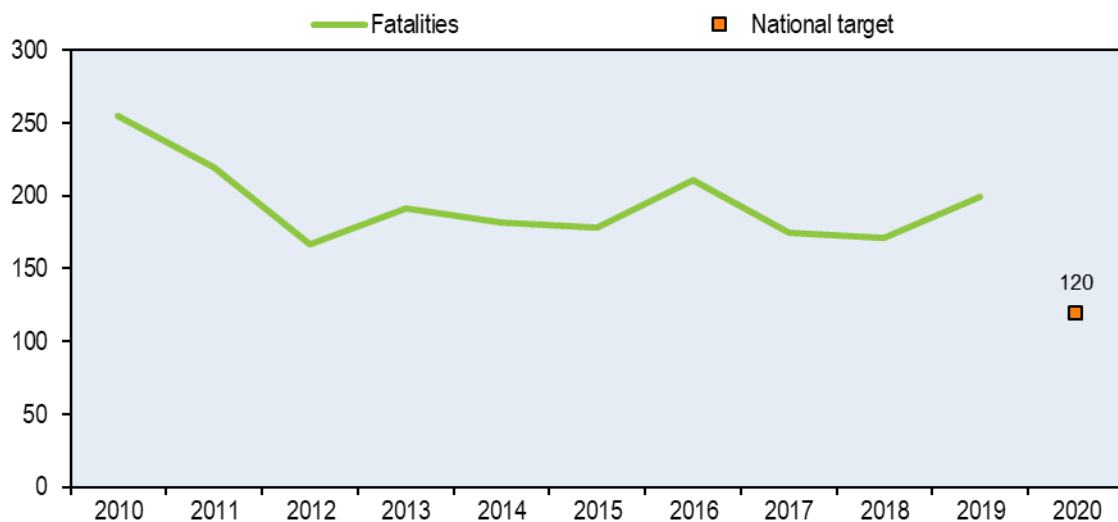
In May 2013, the new Traffic Safety Action Plan was launched with the following slogan "Every accident is one too many – a shared responsibility". The Action Plan includes ten focus areas (speeding, alcohol and drugs, inattention, failure to wear seat belts and helmets, pedestrians, cyclists and moped riders, young drivers under 24, crashes with oncoming traffic, single-vehicle crashes and crashes at rural junctions).

The Danish Road Safety Commission has set ambitious targets for 2020 of no more than 120 deaths, 1 000 serious injuries and 1 000 minor injuries by 2020. This follows the European Union target to halve the number of fatalities by 2020 in comparison to 2010. This is a more ambitious target than in previous action plans, and the aim is to reach the objective in a shorter timeframe.

For each focus area, a set of suggested measures has been proposed and a performance indicator defined. The 10 focus areas are reviewed on a regular basis up until 2020 by establishing measurement points as a basis for necessary actions.

The Danish Road Safety Commission is preparing the new plan for 2021-30.

Figure 7. Trends in road fatalities towards national target



Measures

Road users: In a pilot project, fixed speed enforcement cameras are provided at 20 sites across the country since 2018.

Definition, methodology, data collection

Key definitions:

- **Road fatality:** a person who died immediately or within 30 days of a crash.
- **Seriously injured persons:** those included in the police report under bodily injury and any type of injury other than "minor injuries only".
- **Slightly injured persons:** persons suffering from minor injuries only.

Traffic crash data are collected by the police using a common national system. Data are transferred to the Road Directorate every week. These data contain preliminary and final information. Final information about a crash should be sent within six weeks following the incident. This, however, is not always the case. In particular, information about alcohol levels awaiting laboratory analysis may delay this process.

In the Danish system, there are more than 90 different parameters for crash data. Some may be subjective. For example, "speed driven before the crash" is filled in by the police officer on the basis of witness statements. More accurate speed information is obtained when investigating fatal accidents or others chosen for in-depth study.

Serious injury data are based solely on police reports, and the severity of injuries is based on the judgement of the police officer. A hospital may be contacted to obtain additional information, but there is no systematic linkage with hospital data. Currently, a linking procedure is not possible as the Danish hospital registration system does not include the Abbreviated Injury Scale (AIS) score of patients; only diagnosis codes are included. Denmark is working on a process to convert diagnosis codes into AIS and Maximum Abbreviated Injury Scale (MAIS) scores.

Details of traffic-related casualties are recorded in the national patient register. Information from the national patient register reveals that the real number of injury crashes is much higher than those recorded by the police. Injuries to vulnerable road users are particularly under-reported in police records.

The weakness of the national patient register is that there is little information on the accident compared to police records. For example, there is little indication of the crash location and no information on vehicle occupancy.

Resources

Recent research

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Prato, C.G., S. Kaplan, A. Patrier, and T.K. Rasmussen (2019). Integrating police reports with geographic information system resources for uncovering patterns of pedestrian crashes in Denmark. *Journal of transport geography* 74, 10-23. <https://doi.org/10.1016/j.jtrangeo.2018.10.018>.

Rodrigues, F., C. L. Azevedo (2019). Towards Robust Deep Reinforcement Learning for Traffic Signal Control: Demand Surges, Incidents and Sensor Failures. IEEE Intelligent Transportation Systems Conference, Auckland, New Zealand, 3559-3566. <https://doi.org/10.1109/ITSC.2019.8917451>.

Danish Road Directorate – *Vejdirektoratet* (in Danish):

- Guide for Traffic Accident Reporting - Vejledning i indberetning af færdselsuheld https://www.vejdirektoratet.dk/api/drupal/sites/default/files/2019-03/indberetning_af_faerdselsuheld_web.pdf.
- Road Safety Audit – Prevent Accidents: Trafiksikkerhedsrevision - forebyg ulykker <https://www.vejdirektoratet.dk/api/drupal/sites/default/files/2019-03/trafiksikkerhedsrevision.pdf>.
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Aalborg University: <https://www.en.build.aau.dk/research/research-groups/traffic/>.

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Road safety and traffic data

	1990	2000	2010	2017	2018	2019	2019 % change over			
							2018	2010	2000	1990
Reported safety data										
Fatalities	634	498	255	175	171	199	16.4%	-22.0%	-60.0%	-68.6%
Injury crashes	9 155	7 346	3 498	2 789	2 964	2 808	-5.3%	-19.7%	-61.8%	-69.3%
Injured persons hospitalised	5 347	4 366	2 071	1 378	1 436	1 277	-11.1%	-38.3%	-70.8%	-76.1%
Deaths per 100,000 population	12.3	9.3	4.6	3.0	3.0	3.4	15.9%	-25.6%	-63.3%	-72.2%
Deaths per 10,000 registered vehicles	3.1	2.1	0.9	0.6	0.5	0.6	14.3%	-31.4%	-70.7%	-80.3%
Deaths per billion vehicle kilometres	17.3	10.7	5.6	3.2	3.1	..	..	..	..	..
Fatalities by road user										
Pedestrians	118	99	44	20	30	30	0.0%	-31.8%	-69.7%	-74.6%
Cyclists	110	58	26	27	28	31	10.7%	19.2%	-46.6%	-71.8%
Moped riders	44	47	11	9	10	13	30.0%	18.2%	-72.3%	-70.5%
Motorcyclists	39	24	22	11	21	27	28.6%	22.7%	12.5%	-30.8%
Passenger car occupants	284	239	137	99	65	87	33.8%	-36.5%	-63.6%	-69.4%
Other road users	39	31	15	9	17	11	-35.3%	-26.7%	-64.5%	-71.8%
Fatalities by age group										
0-14 years	48	25	9	3	6	5	-16.7%	-44.4%	-80.0%	-89.6%
15-17 years	35	30	8	1	6	6	0.0%	-25.0%	-80.0%	-82.9%
18-20 years	46	30	24	16	10	10	0.0%	-58.3%	-66.7%	-78.3%
21-24 years	58	55	18	17	7	13	85.7%	-27.8%	-76.4%	-77.6%
25-64 years	256	224	129	87	91	102	12.1%	-20.9%	-54.5%	-60.2%
65-74 years	..	48	24	15	21	19	-9.5%	-20.8%	-60.4%	..
≥ 75 years	..	86	43	36	29	44	51.7%	2.3%	-48.8%	..
Fatalities by road type										
Urban roads	249	181	77	53	49	64	30.6%	-16.9%	-64.6%	-74.3%
Rural roads	368	289	151	108	101	119	17.8%	-21.2%	-58.8%	-67.7%
Motorways	17	28	27	14	21	16	-23.8%	-40.7%	-42.9%	-5.9%
Traffic data										
Registered vehicles (thousands)	2 068	2 409	2 892	3 167	3 231	3 290	1.8%	13.8%	36.6%	59.1%
Vehicle kilometres (millions)	36 600	46 753	45 153	53 955	54 613	..	..	..	..	..
Registered vehicles per 1,000 population	402.7	452.0	522.5	550.9	558.9	566.6	1.4%	8.4%	25.4%	40.7%

Note: Registered vehicles do not include mopeds.