

Road crash casualties in the Netherlands

Summary

The annual number of road crash casualties in the Netherlands increased considerably in the 1950s and 1960s. That trend reversed at the beginning of the 1970s and the annual number of road crash casualties has been decreasing gradually ever since. In 2008 there still were 750 fatalities in Dutch traffic. Almost half of all fatalities are occupants of passenger cars or light goods vehicles. Cyclists constitute the largest share of in-patients. Proportionally speaking – that is, relative to the size of the population – many fatalities occur among young people and young adults (aged 16-24) and the elderly (aged 65 or above). By contrast, relatively few fatalities occur among children (aged 0-15). Two-thirds of fatalities occur outside urban areas.

Background

Virtually everyone, young and old alike, participates in traffic on a daily basis. This means that traffic casualties unfortunately also occur on a daily basis. This fact sheet outlines the development in the number of road crash casualties in the Netherlands up to the present time and focuses on the period 1997-2008. The fact sheet opens with a brief review of the different kinds of data and data sources used.

How do we measure road safety?

The road safety level can be expressed in many different ways. More or less direct road safety units of measurement are the number of crashes or the seriousness of crashes in terms of the number of fatalities or the number of casualties with different injury severities. In addition, units of measurement can also be derived from the foregoing, like for example the crash rate or casualty rate: the number of casualties or number of crashes relative to a certain level of exposure such as distance travelled. This fact sheet focuses on road safety in the Netherlands in terms of the annual number of fatalities and in-patients. The SWOV Fact sheet [Risk in traffic](#) provides more information about the term risk and about levels of risk in the Netherlands. For a comparison of road safety in the Netherlands with that in other countries, please see the SWOV Fact sheet [Dutch road safety in an international perspective](#). Further information on road safety can be found in the SWOV Fact sheet [Measuring \(un\)safety of roads](#).

How do we measure the number of traffic casualties?

Definition of fatality and in-patient

The (international) definition of a fatality is someone who dies within 30 days of a road crash as a result of its consequences. An in-patient is someone who has been admitted to hospital after a crash for at least one night and who does not die within 30 days.

Sources of casualty data

Information on the numbers of road crash casualties is obtained from different sources. The most important sources are:

- The Dutch Ministry of Transport's Centre for Transport and Navigation, DVS (previously the Transport Research Centre, AVV) collects and publishes police data on road crashes in the National Road Crash Register (BRON).
- Data on causes of death of Dutch vehicle occupants is obtained from Statistics Netherlands (CBS). 'Road crash' is included in the statistics as an unnatural cause of death.
- Data from hospitals is recorded in the National Medical Registration (LMR), which is managed by PRISMANT.

Each data source has its own focus: BRON contains numerous details about the circumstances of a crash, while the LMR database provides more comprehensive information about the nature of the injuries sustained.

How complete are the registrations?

None of the data sources for numbers of road crash casualty referred to above are complete.

Based on Statistics Netherlands data, including judicial information, and the fatalities registered by the police in the DVS database, Statistics Netherlands, in close consultation with the DVS, prepares a new set of statistics of the number of fatalities on Dutch roads (including non-Dutch vehicle occupants). This derived number is considered the *real* number of fatalities.

In addition, an estimate of the *real* number of in-patients has been published by the Ministry of Transport, Public Works and Water Management (AVV/DVS) and SWOV since the 1990s. This real number is determined using an increment method developed by SWOV which links the different sources (Polak, 1997; 2000; Reurings et al., 2007).

The registration rate is the percentage of registered casualties in BRON relative to the estimated real number of casualties. This differs strongly for the different injury severities:

- The registration rate for fatalities is approximately 90%.
- The registration rate for in-patients is approximately 55%.

Major differences in registration rate also exist between different types of crashes. Crashes in which at least one motor vehicle is involved have a higher registration rate than crashes involving only slow traffic. The registration rate has also dropped over the years, especially that of in-patients (see also *Table 1*).

How many road crash casualties are there in the Netherlands?

We first briefly discuss the development in the number of road crash casualties over an extended period (from 1950) before concentrating on trends from 1997 onward later in this fact sheet.

Data on fatalities is the most reliable for an overall picture of the historical development in the number of road casualties. *Figure 1* shows the number of registered fatalities from 1950. Between 1950 and the beginning of the 1970s, a sharp increase can be observed from just over a thousand fatalities in 1950 to over three thousand in 1972. From 1973 to the present time, the annual number of road casualties has gradually and continuously decreased. In the 1950s, the trend in number of fatalities was determined mainly by fatalities among cyclists and pedestrians. Thereafter, a sharp increase occurred in the number of casualties among moped riders and especially car occupants, and these modes of transport increasingly determined the overall pattern. The number of casualties has been decreasing for virtually all modes of transport since 1973. Only motorcycles and freight and light goods vehicles do not completely conform to this pattern.

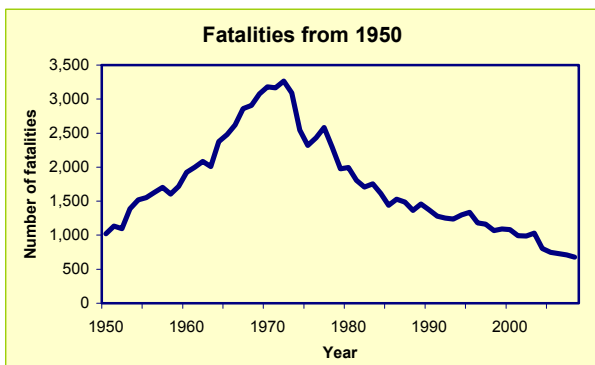


Figure 1. *Registered number of fatalities in the Netherlands in the period 1950-2008. Source: Statistics Netherlands (CBS)/Ministry of Transport, Public Works and Water Management.*

What factors influence the number of road casualties?

In the first place road safety is inextricably linked to mobility. After all, the more one travels, the longer and/or more frequently one is exposed to potentially dangerous traffic and the more frequent the number of encounters with other road users. In addition, there are roughly three types of factors that influence road safety (SWOV, 2007):

1. Infrastructural measures to regulate traffic such as the construction of trunk roads and motorways, separate bicycle paths and dedicated lanes.

2. Road safety measures; these are measures aimed at reducing the probability of a crash or minimizing the consequences. These measures can be divided into the following categories:
 - the construction and modification of infrastructure and the introduction of appropriate regulations for such infrastructure;
 - law enforcement, public information, and education;
 - vehicle safety.
3. External factors that influence road safety, among other things through mobility. External factors include, for example, the composition of the population and weather conditions (see also the SWOV Fact sheet [The influence of weather on road safety](#)).

The development of the numbers of road casualties categorized according to mode of transport, age group and gender is discussed below.

How has the number of road casualties developed since 1997?

Figure 2 shows the development in the number of road casualties in the last twelve years. The figure includes both registered numbers and real numbers. The sudden sharp drop in the number of fatalities in 2004 is immediately noticeable. Although a study has been carried out into the matter (Stipdonk, 2005), only a partial explanation has been found for this unexpectedly sharp drop. Data are now also available for the years after 2004. For this reason, attention was again devoted to this deviation from the trend in the so-called Annual Report of 2007 (Weijermars et al., 2008). This analysis confirmed that the sharp drop in 2004 was permanent in nature and not coincidental. In addition, this study has revealed that the drop in 2004 did not occur in all groups of fatalities. When categorized according to mode of transport, in 2004 a deviation from the trend is only visible for car occupants.

Figure 3 shows the development in the number of in-patients during the last twelve years. In contrast to the number of fatalities, a clear decrease in the number of in-patients does not seem to have occurred in the last ten years. The severity of crash injury, however, has decreased (see Van Kampen, 2007).

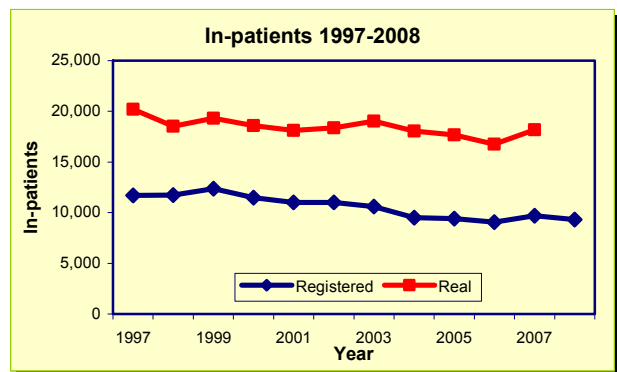
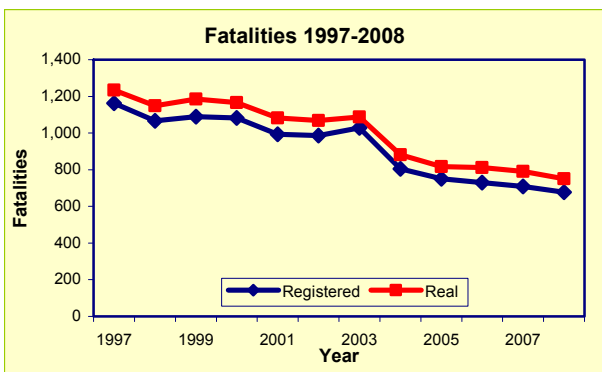


Figure 2. Registered and actual number of fatalities in the period 1997-2008. Source: Ministry of Transport, Public Works and Water Management/Statistics Netherlands (CBS).

Figure 3. Registered and real number of in-patients in the period 1997-2008. Source: Ministry of Transport, Public Works and Water Management/SWOV/LMR.

Table 1 specifies both the numbers of fatalities and the numbers of in-patients for the years 2000-2008. In 2008, 750 fatalities occurred in Dutch traffic. This number is equal to the maximum target of 750 fatalities in 2010 (Ministry of Transport, Public Works and Water Management, 2008). Table 1 also specifies the registration rate. The registration rate for in-patients in particular clearly decreased in recent years from over 60% in the year 2000 to 53% in 2007. Data on the number of in-patients in 2008 is not yet available.

Every year, a large number of road casualties are also treated in hospital emergency departments. For years the number of emergency casualties has been fluctuating around 100,000 a year. However, because the registration rate of this group of casualties is low (10-15%), it is difficult to say much more about developments concerning this group.

Year		2000	2001	2002	2003	2004	2005	2006	2007	2008
Fatalities	Registered	1,082	993	987	1,028	804	750	730	709	677
	Registration rate	93%	92%	92%	94%	91%	92%	90%	90%	90%
	Real	1,166	1,083	1,069	1,088	881	817	811	791	750
In-patients	Registered	11,505	11,028	11,018	10,596	9,487	9,401	9,051	9,683	9,310
	Registration rate	62%	61%	60%	56%	53%	53%	54%	53%	NK
	Real	18,600	18,110	18,380	19,040	18,060	17,680	16,750	18,190	NK

Table 1. Registered and real number of fatalities and in-patients together with the registration rate in the period 2000-2008. NK = Not Known. Source: Ministry of Transport, Public Works and Water Management/SWOV/ PRISMANT/Statistics Netherlands (CBS).

How are road casualties distributed across different modes of transport?

In addition to looking at all road casualties in the Netherlands together, it is also possible to consider subgroups in traffic. There are many subgroups of interest, such as casualty groups that differ in terms of circumstances of the crash, personal characteristics (or those of the crash opponent), locational characteristics or combinations of the foregoing. We will first look at the categorization of fatalities according to mode of transport. Real numbers of road casualties will be used for the categories.

Figure 4 shows the development in the number of fatalities categorized according to the casualty's mode of transport. Most fatalities occur among car occupants, which include those in light goods vehicles. This is linked to the fact that cars and light goods vehicles are responsible for most of the vehicle kilometres on Dutch roads. In 1997, 50% of fatalities occurred among car occupants. The corresponding figure for 2007 was 45%. The number of fatalities among car occupants is therefore decreasing more rapidly in relative terms. Consequently, the percentage of vulnerable road users among fatalities is increasing. If we focus on the last three years (2005-2007, not visible in the figure), the numbers of fatalities among pedestrians, cyclists and moped riders remain virtually the same, whereas the number of fatalities among car occupants exhibits a continuing decrease.

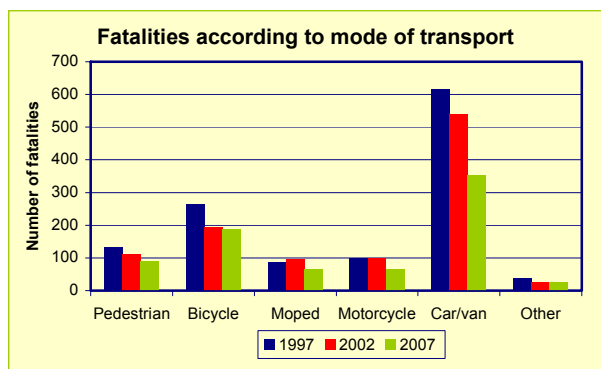


Figure 4. Real number of fatalities according to the casualty's mode of transport. Source: Statistics Netherlands (CBS)/Ministry of Transport, Public Works and Water Management.

Figure 5 shows the number of in-patients according to the casualty's mode of transport. It can be seen that the number of in-patients among car occupants is comparatively much lower than is the case for fatalities. Cyclists constitute the largest group among in-patients. Moreover, this group has increased in number in the last twenty years (Van Kampen, 2007).

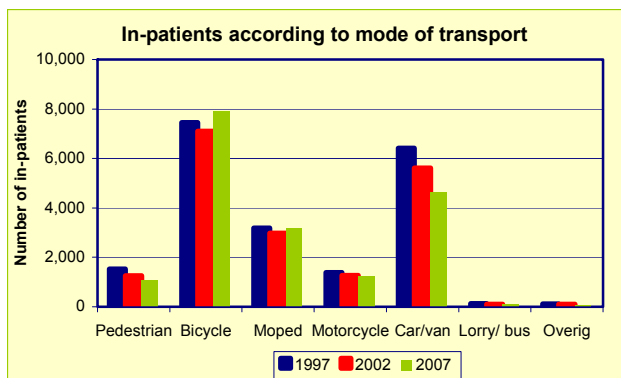


Figure 5. Real number of in-patients according to the casualty's mode of transport. Source: SWOV/Ministry of Transport, Public Works and Water Management/LMR.

In addition to the casualty's mode of transport, it is also possible to categorize according to conflict type (combination of colliding modes of transport) or the crash opponent's mode of transport. However, only data based on registered numbers is available for this purpose. Data based on real numbers is not available. The available data indicates that in 2007 over 30% of registered fatalities were casualties of a single-vehicle crash or a crash into an obstacle. Also for over 30% of fatalities, the crash opponent was a car. A lorry was the crash opponent for approximately 15% of fatalities. This share has increased somewhat in the last ten years, whereas the car's share as crash opponent has decreased.

SWOV Fact sheets are available about specific groups of road users, such as those for [Cyclists](#), [Moped and light-moped riders](#) and [Motorcyclists](#).

How are fatalities distributed across different age groups?

The distribution of casualties across different age groups does not agree with the composition of the population in the Netherlands (see Figure 6). Children aged 0-15 constitute 20% of the total population but account for only 5% of the total number of fatalities. This is probably due to the group's limited mobility. For the elderly, on the other hand, the opposite applies: the percentage of those aged 65 and above among fatalities is approximately twice as high as the group's share in the population. An identical picture emerges with respect to the 18-24 age group. For the elderly, this is probably linked to greater physical vulnerability (see also the SWOV Fact sheet [The elderly in traffic](#)). For the group of young drivers, it stems from the higher probability of being involved in a crash during the initial phase of participation in motorized traffic (see also the SWOV Fact sheet [Young novice drivers](#)).

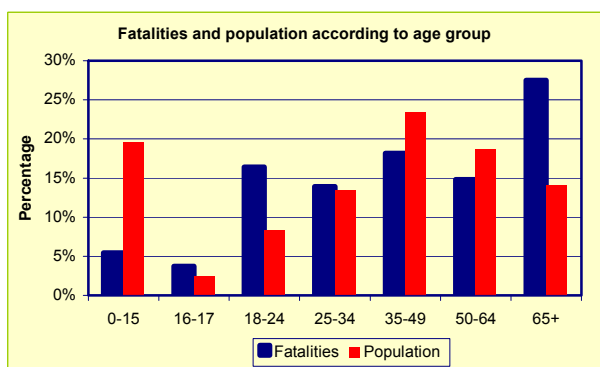


Figure 6. Shares of population and fatalities according to age group based on real numbers in the period 2003-2007. Source: Statistics Netherlands (CBS)/Ministry of Transport, Public Works and Water Management.

What is the ratio of men to women in the number of fatalities?

Real numbers of fatalities indicate that approximately 70% of fatalities are men and 30% are women. This proportion has barely changed in recent years. Clear, gender-based differences are, however, apparent in different modes of transport; differences that are also strongly linked to differences in

mobility between men and women. Among pedestrians and cyclists, the man-woman ratio is approximately 60% to 40%. Among moped riders, however, over 80% of fatalities are men and, among motorcyclists, more than 90% of fatalities are men.

How are fatalities distributed across different road types?

In addition to a casualty's characteristics, those of the crash location are also important when studying road safety. For categorization according to road type, only data on registered numbers is available. Approximately 35% of fatalities occur within urban areas (*Figure 7*). Of the fatalities that occur outside urban areas, i.e. 65% of the total, around a quarter occur on motorways (speed limits of 100-120 km/h).

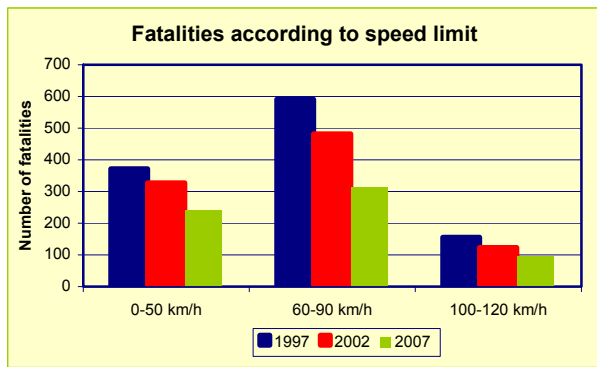


Figure 7. Registered number of fatalities according to speed limits in urban areas (0-50 km/h) and outside urban areas. Source: Statistics Netherlands (CBS)/Ministry of Transport, Public Works and Water Management.

Conclusion

Following an increase in the 1950s and 1960s, the number of fatalities has been continuously and gradually decreasing since 1973. In 2008, there were 750 fatalities in Dutch traffic. Almost half of fatalities are occupants of cars and light goods vehicles. Cyclists constitute the largest share of in-patients. Relative to the population as a whole, a proportionately large number of fatalities occur among young people and young adults (aged 16-24) and the elderly (aged 65 or above), while children (aged 0-15) account for comparatively few fatalities. Two-thirds of fatalities occur outside urban areas.

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