

## Summary:

# Road traffic risk in Norway 2005-2007

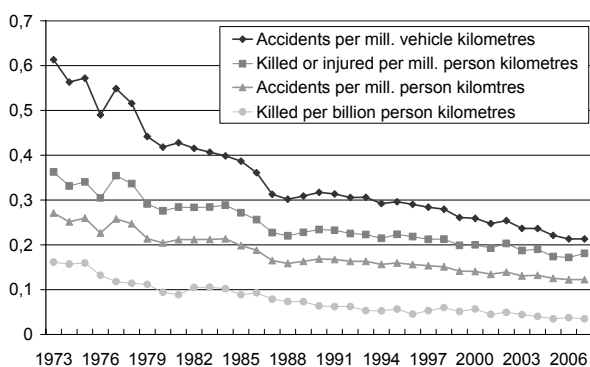
The Institute of Transport Economics regularly updates the Norwegian road traffic risk figures. Estimates for the years 2005-2007 show that road traffic risk has been reduced compared to previous years. Risk levels have decreased over time for all road user groups in Norway, but the reductions are stronger for motorcyclists. Nevertheless, bicyclists, pedestrians and car occupants have also experienced substantial risk reductions over time. The distribution of risk according to both age and gender is fairly stable within each road user group. There are substantial risk reductions for older road users, especially as car drivers and pedestrians. When the injury risks of car drivers and passengers are distributed according to day of the week and time of day, we find that injury risks are extremely high on Saturday nights.

## Norwegian risk estimates are updated regularly

The Institute of Transport Economics regularly estimates road traffic risk in Norway using official accident data from Statistics Norway and Norwegian Travel Surveys.

## Risk decrease over time in Norway

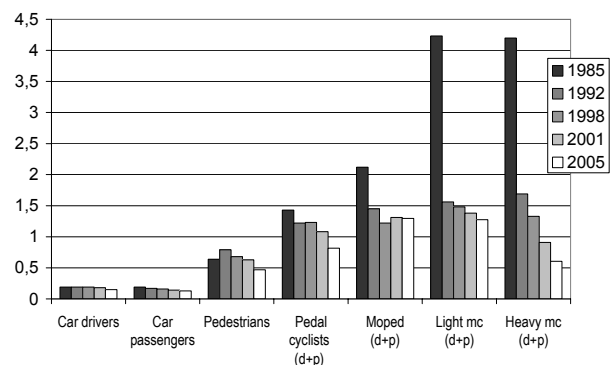
The risk of being involved in an accident with personal injury, the risk of injury and the risk of fatality have all decreased over time in Norway (Figure S1). The reductions in risk were large in the 1970s and 1980s but have continued beyond 2000. Fluctuations in the levels of injury and accident risk seen in the mid-seventies were caused by changes in accident reporting in 1977 and 1978.



Source: TØI report 986/2008

Figure S1 Accident risk, injury risk and fatality risk in Norwegian road traffic 1973-2007.

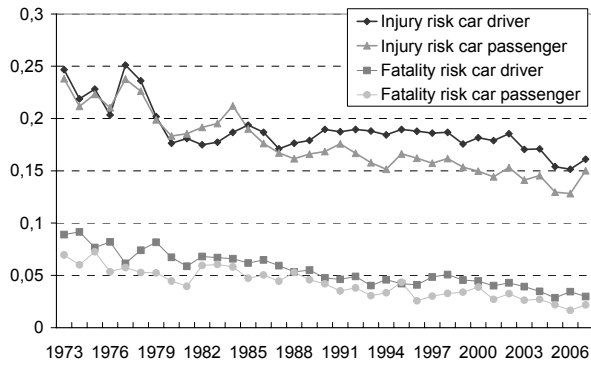
Risk levels have decreased over time for all road user groups in Norway, but the reductions are stronger for motorcyclists, and most notably for users of heavy motorcycles (cf. figure S2). The main reason why heavy motorcycle users are safer is probably that the typical driver is more mature and experienced now than in the 1980s.



Source: TØI report 986/2008

Figure S2 Number injured or killed per million person kilometre in Norway in 1985, 1992, 1998, 2001 and 2005 by road user group. (d+p) indicates drivers and passengers.

Reductions in risk for other road user groups are more moderate. Indeed, for car drivers and passengers figure S2 does not seem to reveal any risk reduction at all but the fall here is concealed by the dramatic reduction for motorcyclists. Figure S3 shows that there have actually been substantial risk reductions over time for car drivers and passengers as well, especially in the period leading up to the late 1980s. After 2005 there are indications of risk increase.

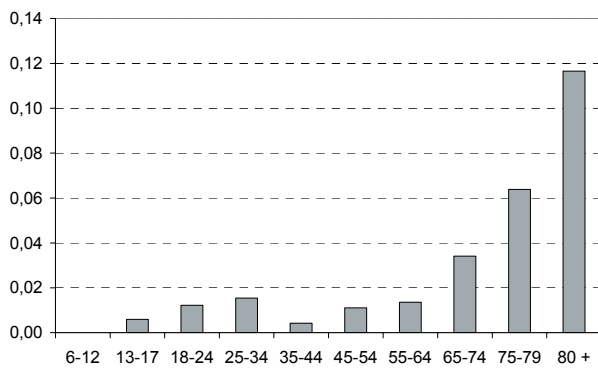


Source: TØI report 986/2008

Figure S3 Risk developments for car drivers and passengers in Norway 1973-2007. Drivers and passengers injured per million person kilometre; drivers and passengers killed per billion person kilometre.

### The young and the elderly are most at risk

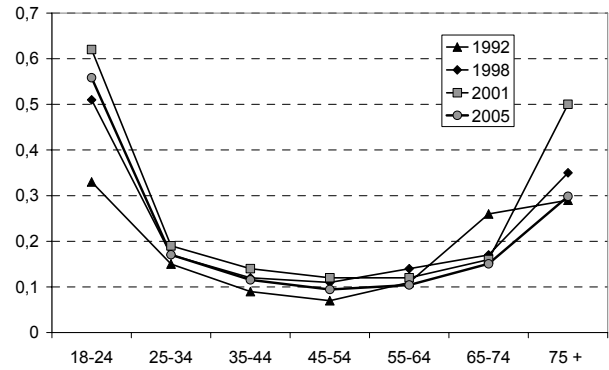
Among car drivers the young and the elderly have higher accident risk, with youngest drivers being most at risk. Among pedestrians and pedal cyclists, elderly people are most at risk. The risk of fatality for pedestrians is particularly high among the elderly cf. figure S4.



Source: TØI report 986/2008

Figure S4 Pedestrians killed per million person kilometres distributed by age in 2005.

Among car drivers young people have traditionally been most at risk and this is still the case. In particular the youngest car drivers (18-19 years) have increased risk of having accidents involving serious personal injury and death. The average injury risk for car drivers is much more evenly distributed over age, and this pattern has been remarkably stable over time cf. figure S5.



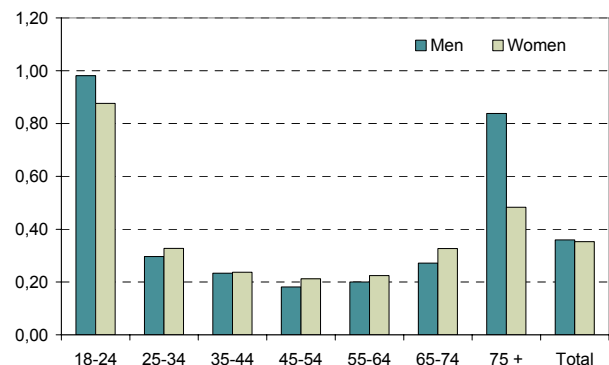
Source: TØI report 986/2008

Figure S5 Car drivers killed or injured per million person kilometre distributed by age in 1992, 1998, 2001 and 2005.

### Risk differs between men and women

Among car drivers there are risk differences between men and women. Male drivers have higher risk of fatality in road traffic than female drivers. Women are on the other hand more at risk of having a personal injury. The reason for these differences is probably that male drivers' accidents on average take place at higher speeds and consequently are more serious than those of female drivers.

If one considers the risk of being involved in an accident with personal injury, regardless of whether the injured party is the driver or not, male and female drivers are on average at risk to the same degree. There are however clear differences between age groups and between gender within age groups, cf. figure S6.



Source: TØI report 986/2008

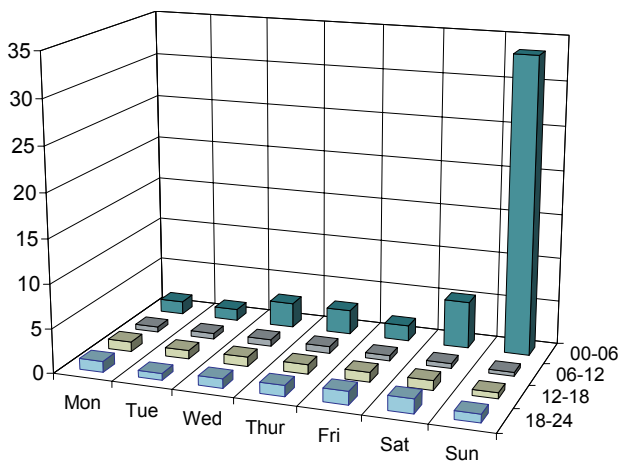
Figure S6 Car drivers involved in accidents with personal injury per million person kilometre distributed by age and gender, 2005.

The risk of being involved in an accident with personal injury shows a similar U-shape with age as the risk of being injured as car driver given in figure S5.

Interestingly, the risk increase among the elderly can not entirely be explained by the fact that they are more easily injured in an accident. The ratio of being involved to being injured is in fact larger among elderly drivers than among middle aged drivers.

## High risks on Saturday night

If we look at the injury risk of car drivers and passengers for different week days and times of day, we find that injury risks are extremely high on Saturday nights cf. figure S7.



Source: TØI report 986/2008

*Figure S7 Injury risk for car drivers and passengers by day of week and time of day in 2005. Relative numbers; over-all risk =1.*

Similar results were found also in 1998 and 2001, but the difference is even greater now: relative to overall risk, injury risk is almost 35 times greater on Saturday nights. The reason why the injury risk is so extreme on Saturday nights is probably that this when a lot of young inexperienced drivers are on the roads, with a relatively higher proportion of road traffic on small, badly lit local roads, and with a higher than normal proportion of drivers being influenced by alcohol and/or drugs.

## Methodology

In order to calculate the risk figures, average travel distances per day for combinations of road user, age and gender have been computed. These average values are extrapolated to represent a whole year (each day multiplied by 365) and to represent the whole population (averages multiplied by population numbers within each age/gender combination).

Accident figures collected from Statistics Norway are distributed according to similar age/gender/road user groups, and risk is computed by dividing the accident/injury/fatality numbers by the exposure figures.

For large groups like pedestrians and car drivers, such a method is fairly robust. For combinations of road user/age/gender containing few cases there can be large random variations in both the accident data as well as in the exposure data. There are for instance large random variations in the risk estimates for the youngest drivers. Thus in order to give more robust results 18-19 year-olds have been grouped together with 20-24 year-olds in the figures.

The extreme high risk on Saturday nights may also be exaggerated because of methodological issues. Car driving among 18-19 year old male drivers is remarkably low in 2005 compared to the results for 2001, and this may partly be because the number of 18-19 year olds is somewhat under-represented in the 2005 national travel survey. If that is correct, the risk figures for the youngest male drivers are overestimated, as are probably the risks on Saturday nights.

For small road user groups like motorcyclists the exposure data collected in the Norwegian national travel survey are so scarce that they cannot be utilized to calculate risk figures. For motorcyclists and moped users, risk calculations are based on "Transport volumes in Norway" published by The Institute of Transport Economics. Here exposure data for motorcyclists and moped users are calculated using survey estimates of annual mileage and vehicle register data for the number of vehicles. Thus for motorcyclists and moped users detailed risk figures distributed by age/gender are not available. However, new survey data collected with the aim of mapping motorcyclist exposure will be available in Norway fairly soon, thus more detailed risk estimates will be possible for these road users in the near future.

## Conclusion

We find a consistent reduction in the level of risk over time in Norway. This is not surprising given the fact that road safety measures are constantly improved, both in the road system and not least with respect to the passive safety of vehicles.

Still, in spite of these improvements in safety, the distribution of risk according to age and gender reveals a rather stable pattern, in particular in the “big” road

user groups such as car drivers and pedestrians. For most road user subgroups (by age/gender) we find only small differences in risk figures from one period to the next, indicating that the risk problem for young car drivers and drivers of two-wheeled vehicles remains a challenge for road safety work.

Nevertheless the small reductions identified in the different road user groups give substantial aggregate risk reductions over time.