TØI report 694/2003
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Oslo 2003, 64 pages Norwegian language

Summary:

Road Traffic Risk in Norway 2001-2002

In road safety research, risk is normally understood as the probability of accident or injury per unit of road traffic exposure. Road traffic risk is normally calculated as the number of accidents or injuries per distance travelled. Risk figures are useful in order to compare how different groups (road users, age groups, moments in time etc.) are at risk in road traffic. Risk figures are thus also useful in order to select road safety measures that may be most efficient.

At the Institute of Transport Economics we have for a number of years calculated road traffic risk figures by use of our estimations for road transport in Norway which are yearly published in the publication "Transport performance in Norway" (in Norwegian with English summary and English table headings), and by use of the national Norwegian travel survey which is conducted every four years.

The figures published in "Transport performance in Norway" show the total amount of transport and traffic conducted by motorised vehicles in Norway each year. These figures are important as estimates of exposure in risk calculations. The Norwegian travel surveys (NTS) are another important source of road traffic exposure, complementing the transport performance figures. NTS figures can be used to distribute the total exposure between age- and gender groups and they are the only possible nationwide source to calculate exposure for pedestrians and bicyclists.

NTS 2001, which is used in order to calculate new and revised risk figures, is probably of better quality than the former Norwegian travel surveys. In NTS 2001 special measures were adopted in order to improve the representativity of the sample of young and elderly road users, groups that were underrepresented in the former travel surveys. NTS 2001 has, in addition, far more respondents than the former travel surveys, making it more representative than the former surveys.

Calculations based on figures of transport performance show that the overall risk, and the risk figures for car and motorcycle drivers and passengers have decreased substantially during the last 20 to 30 years. The reductions were greatest from the middle of the 1970s toward the end of the 1980s. From the end of 1980s onward, the risk reductions have been quite moderate. For large motorcycles the risk reductions have been quite dramatic, and these vehicles are now at approximately the same risk as mopeds and bicycles. The main reason is probably that the use of protective clothes and helmets have increased, but above all that drivers of large motorcycles today are predominantly adults, not youngsters as they were twenty or thirty years ago. For light motorcycles and mopeds road traffic risk seems to have increased during the last years.

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It is interesting to note that the risk development of car drivers and passengers is in accordance with the development in the use of seat belts. The use of seat belts of car drivers increased dramatically in Norway from 1979 onward, when one implemented fines for not using the belt. In this period the risk of car drivers was below that of car passengers. From the middle of the 1980s onward belt use by car passengers increased steadily, and accordingly the injury risk of car passengers was reduced to a level below that of car drivers.

Calculations based on NTS 2001 show that the distribution of injury risk between road user groups, gender and age groups has been fairly stable since 1998. Among car drivers, the young and the elderly are most at risk. Risk figures for the youngest drivers are lower than in 1998, and the figures for the oldest drivers are somewhat higher. The reason for theses changes is probably that NTS 2001 gives better exposure data for these groups. Among the elderly drivers there is in addition reason to believe that road traffic risk in fact may have increased. There are indications that the elderly people keep on driving at higher ages than before, increasing the average risk for the oldest age group (75 +). There is ample evidence that road traffic risk increases with age among the elderly.

For car drivers we have also calculated the risk of material damage and the risk of being involved in accident for different age/gender groups. The calculations show that there are small differences between men and women when it comes to the risk of being involved in accidents and the risk of damaging the car. Male drivers are somewhat more at risk than female drivers in the younger age groups; female drivers are somewhat more at risk among the middle aged and elderly. When it comes to the risk of own personal injury, we find however, that female drivers are more at risk than male drivers. The same tendency was also found in 1998.

Also among car passengers, young people (18-24) are most at risk. The relatively high risk of the youngsters may be attributed to the fact that they often are passengers in cars driven by young drivers. Among car passengers there is a slight tendency toward increasing risk with age. This may partly be explained in the same way; elderly passengers are often passengers in cars driven by elderly drivers. But, in addition, elderly are more at risk because they get injured more easily given an accident than other groups do.

Among pedestrians the elderly are much more at risk than other age groups. Especially elderly women are at risk as pedestrians, and the reason might be that they are more prone to receiving fractures due to accidents than other groups. Also among bicyclists the elderly seem to be most at risk. The risk figures for bicyclists are somewhat more uncertain than for the other road user groups. The reason is that the yearly number of injured bicyclists is low, statistically speaking, especially when it is distributed by gender and age groups. There is in addition reason to believe that exposure data are somewhat more uncertain for bicyclists than for e.g. car drivers. Still, the risk figures show a distribution by age, which fairly resembles the figures found in calculations from 1992 and 1998.

For car drivers and passengers also the risks of personal and material damage distributed by weekdays and time of day have been calculated. The risk figures follow the same pattern as has been documented earlier; the risk of personal injury is especially high during Friday night and Saturday night. Also the risk of material damage is higher during the nights at weekends, but not to the degree as the risk

of personal injury. Apart from that, the overall picture is that the risk of personal injury is highest during the nighttime, whereas the risk of material damage is highest in the afternoon on workdays. Sunday morning (after 06:00) is in general the safest time to drive.

The report also presents risk figures distributed by counties and speed limits. In NTS 2001 all journeys are located geographically, making it possible to distribute the amount of kilometres driven by counties and different roads. In order to distribute the amount of travel on counties and speed limits, the electronic road map system "ELVEG" has been used. A restricting factor has been that ELVEG does not cover local roads, and consequently trips on local roads are not included in the calculations. Also local trips, which start and end within the same local geographical unit, are not included. Accordingly, risk is not estimated for all speed limits, and only stretches of road with speed limits 60 km/h and above have been used in the calculations of risk of different counties.

According to the calculations made, road traffic risk is highest on the stretches of road with the lowest speed limits, and the counties of Østfold, Aust-Agder, Telemark and Møre og Romsdal have the highest road accident risk.

The calculations based on NTS 2001 correspond fairly well with the risk figures from 1998. As mentioned, the risk reduction of young drivers is probably due to the fact that the sample in NTS 2001 was more representative among the young than the sample in 1998. Among young people there is reason to believe that those most active are the ones that are hardest to get to answer surveys, and consequently their exposure will be underestimated in a travel survey, giving too high risk figures. The risk figures of young drivers from 2001 are thus more correct than those from 1998.

The same mechanism applies for the risk figures at Friday and Saturday night. They are also lower than in 1998. It is well documented that young drivers are particularly at risk at night during weekends, and more representative exposure figures for this group will consequently also give lower estimates of risk at Friday and Saturday nights.