BEST IN EUROPE ROAD SAFETY CONFERENCE

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1. **Setting goals**– ***Effective road safety target setting***

Dr. Rune Elvik, Institute for Transport Economics, Oslo

This paper reports a study of the effectiveness of quantified road safety targets set by local or national governments. A total of 28 quantified road safety targets have been assessed, of which 12 set by local governments and 16 set by national governments. A statistically significant difference in safety performance associated with quantified road safety targets is found, when countries or local governments that have set targets are compared to countries or local governments that have not set quantified targets. The largest difference in safety performance is associated with long-term, ambitious targets set by national governments. On the average, countries or local governments that have set quantified road safety targets have experienced a 0.8% greater annual reduction of the number of road accident fatalities after targets were set than countries or local governments that did not set such targets. It is impossible to establish a causal relationship between quantified road safety targets and safety performance. The possible effects of three confounding factors to the results of the study were assessed. The confounding factors assessed included regression-to-the-mean, differential turns of the business cycle, and selective recruitment. Selective recruitment means that quantified targets tend to be adopted in countries that are particularly concerned about road safety, and might therefore have performed better than other countries in any case. Although these confounding factors may have influenced study results to a certain extent, it is unlikely that the entire difference in safety performance associated with quantified road safety target can be attributed to the confounding factors.

Key words: Road safety target, quantified target, evaluation, before-and-after study

2. <u>Sharing responsibility</u> – *Central and local government partnership*
Fred Wegman, Institute for Road Safety Research (SWOV), The Netherlands

Road safety should be seen as an important, negative result of mass-motorisation. This, even in spite of the fact that the present day traffic is a lot safer than it was. The growth in mobility does not seem to be accompanied by an equal growth in road safety. Road accidents are not an inescapable phenomenon; they can be (positively) influenced. The approach to road safety has not always been the same. Periods can be distinguished, each with different paradigms. For example, accidents as a chance phenomenon, accidents are caused by the accident-prone, accidents are mono-causal, and humans are the weak link. There are two paradigms dominant in road safety science at the beginning of the 21st century. The first to implement the theoretically effective measures better and on a greater scale; and to more effectively use the financial resources. This is the basic idea of the recent EU communication about road safety. The second paradigm involves the idea that the present road traffic system is inherently or intrinsically unsafe, and that a considerable greater road safety can only be achieved by regarding safety as an important design criterion of the road transport system. This idea has been developed further, and is now part of the safety policy in the Netherlands. The name that has been given to this approach is: *sustainably safe road traffic*.

In sustainably safe road traffic "man is the measure of all things". This means not just taking action if accidents occur, but creating those road traffic conditions that drastically reduce the chance of accidents in advance; this by infrastructure design. If accidents still happen, the process which determines the severity of these accidents should be influenced so that serious injury is virtually excluded.

This radical vision can only be achieved in practice if there is sufficient social and political support. Support is, on the one hand, determined by how serious society really takes road safety. On the other hand, how much is society prepared to pay (in whatever form) for 'more safety'. An important way to measure political support in the Netherlands is the so-called quantitative road safety target. Such a target for 2000 exists since 1985. It is to be expected that Government and Parliament will soon set a new target for 2010. The views of the road safety actors are important for a) acquiring social support and b) for creating favourable possibilities for actually implementing the policy.

What follows is how to achieve this target. In the Netherlands, it is not just the idea of taking effective and socially profitable (cost-effective) measures; measures and policy should also fit in the sustainably safe vision. A great deal of effort has been spent on getting the vision accepted by road safety professionals; and after this to stimulate all (which means 100%) the actors (municipalities, provinces, police forces and traffic and safety organisations) to actual implementation. In this, the national government plays a goading role; not one of determining everything. Central and local governments are partners, each with their own responsibilities.

In 1997 a covenant was signed between the Minister of Transport, the provinces, the municipalities, and the water boards. This was the so-called Start-up Programme on Sustainable Safety. In this covenant, the partners obliged themselves to carry out a concrete programme of measures. In this, there are the following components: new rules and regulations, infrastructural measures, enforcement, education and information, transfer of knowledge, and making the plans for the second phase. The covenant is for a period of 5 years. Demonstration projects are carried out and carefully monitored.

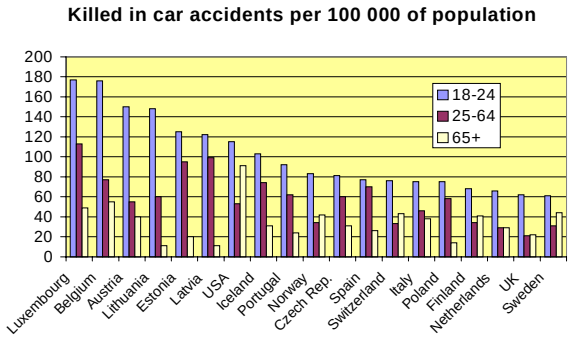
One example of the Start-up programme is the agreement concerning 30 km/h streets. Of the 48000 km of streets which have been designated as potential 30km/h-streets in the Netherlands, the Start Up programme agreed to design and construct 35% of these with low-cost measures in a period of 5 years to the year 2002.

In the meantime, plans for the next phase of sustainable safety are being made. These will form a part of the National Traffic and Transport Plan, which will be published in 2000.

3. <u>Reducing high risks</u> – *Young novice driver measures*

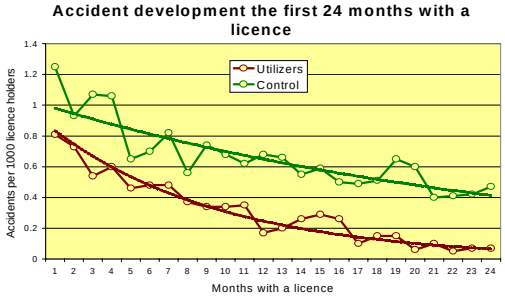
Nils-Petter Gregersen, Swedish Transport Research Institute (VTI)

The overrepresentation of young drivers in accidents is a problem that is present in most countries. The diagram below shows the situation in a sample of countries regarding number of killed persons in car accidents per 100 000 of population in different age groups.



Much research has been done to explain the reasons why young drivers are at high risk and the knowledge base has grown rapidly. Today there is a high level of such knowledge, which is available for application into driver training programs. One such aspect is the importance and nature of experience. Most of the accident reduction during the first years with a licence is explained by increased experience behind the wheel. In Sweden, this knowledge has been used as a base for lowering the age limit for practising from 17½ to 16 years. In 1993 it became possible to practice with a professional or a lay instructor during two years before driving alone behind the wheel. This was a way to avoid the paradox that experience normally is gained during the most dangerous first period of being a driver, that is, after obtaining a licence.

A comprehensive evaluation of the lowered age limit was carried out at VTI and the results showed high level of utilisation, 2.5-3 times increase of amount of practising and a dramatic reduction of accident risk. The accident risk of those who made use of the new possibilities was almost 40% lower than the situation before the change. The total reduction of accident risk among all 18-19 years old drivers was 15%. The accident development among utilises and a control group over the first two years with a licence is shown in the figure above.

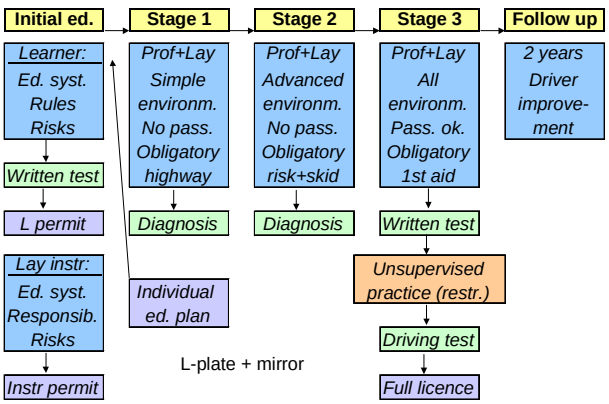


Even if the safety effects of the reform was dramatic, there is, however, still a large over-risk among the young drivers in Sweden. The national reduction was 15% that indicates that there is still much to be done to reduce their accident involvement. The list below summarises current state of the art regarding what competencies that are necessary to become a safe driver.

A safe driver is not only skilled, but also sensible and wise:

- *Knows how to control the car*
- *Knows and understands the rules*
- *Knows how to drive in traffic*
- *Has much experience*
- *Has calibrated own skill*
- *Is aware of risks*
- *Does not drive with dangerous motives*
- *Is planning trips safely*
- *Is aware of possible outcome of peer-pressure*
- *Is aware of possible influence of social and personal preconditions*
- *Is reflecting on the consequences of own behaviour*

Many of these competences have not traditionally been covered in driver training even if we know they are important. The focus has been on the three first aspects of the list. The awareness of the complexity of young driver safety has encouraged the Swedish Government and the Swedish National Road Administration (SNRA) to develop a new staged driver education and a new educational content/ national curriculum. The strategy in the new system, which is currently examined by the Government, has been to implement frontline knowledge about driver behaviour and young drivers and to make use of the advantages of the 16 years age limit. The structure of the suggested system is shown in the figure below. A more comprehensive description is available at the SNRA (www.vv.se).



3. <u>Reducing high risks</u> – *Young novice driver measures*
Dr Gregor Bartl, Austrian Road Safety Board (KfV)

As early as 1 January 1992 the driving license on probation for all novice drivers, regardless of age, was introduced in Austria. The law prescribes a probation period of two years. During this period holders of a driving license on probation have to observe a .01%-limit of blood alcohol concentration. Offences against the .01%-limit as well as serious traffic offences (extremely exceeding the speed limit, causing an injury or fatality etc.) lead to an obligatory participation in a psychological driver improvement course and to an extension of the two years probation period for an additional year.

Five years after the introduction of the driving licence on probation an analysis was carried out concerning the number of passenger car drivers involved in accidents with personal injuries and fatalities. In this analysis holders of a driving licence on probation were compared with all the other drivers. The results indicate a continuous decrease of accident involvement of 32.5% within the group of novice drivers. Whereas the decrease within the group of all the other drivers was merely 8.9% in the period of time observed.

In the year of the introduction of this law (1992) 19.2% new licences less were issued compared to the year before. Even when taking into account this declining number of novice drivers the analysis still indicates an accident reduction of 18.7% (number of novice drivers involved in accidents with personal injuries and fatalities related to the declining number of holders of driving licences on probation). Drunk driving accidents of novices decreased in this period of time even more significantly.

Evaluation studies of the psychological driver improvement courses for drunk drivers proved an almost 50% lower rate of repeated drunk driving offences of drivers who participated in such a course compared to a control group without course participation.

In addition to this driving license on probation system with individual rehabilitation for violators only, now in Austria the implementation of a general preventive approach for all novice drivers is under discussion. A proposal of a multiphase driver training is going to be elaborated by a national expert group. The substantial elements are: On the one hand before the acquisition of the driving license, more safety orientated contents in the basic driver education and harmonisation with the driver test, on the other hand after the acquisition of the license, two times one hour feedback in real traffic with a driving teacher and a specific one day safe driving course on a test track – designed to avoid self over-estimation of participants' driving skills – in combination with a ninety minutes psychological course.

This concept has partly been applied during the last year on a voluntary basis. This campaign "Road Expert", offered and financially supported by the Minister of traffic, included such a safe driving course with a psychological discussion. About 5,000 novice drivers participated and their feedback was highly positive. Almost all participants recommended that all novice drivers should participate in such a course.

3. <u>Reducing high risks</u> – *Young novice driver measures*
Cornelia Royeck, German Road Safety Council (DVR)

For fifteen years now, the German Road Safety Council (DVR) has been running prevention campaigns against "alcohol in road traffic and at the workplace" with the support of the Association of Insurances for Occupational Safety, the Federal Ministry of Transport, Housing and Building and several member organizations of DVR.

In 1999, 28,350 accidents resulting from alcohol impairment occurred in Germany, thereby 24,886 persons were slightly injured, 12,110 were severely injured, and 1,114 persons were killed. Of those involved in road accidents who tested positive for alcohol, 52% were young road users between the age of 18 and 34 years. The campaign "Darauf fahr' ich ab... Nur nüchtern am Steuer – I really go for that ... Be sober at the wheel" focuses on this target group and their leisure and work environments. The aim of this road safety campaign, which started in three pilot regions (county and city of Schleswig-Flensburg, greater Saarbrücken, and the county Niederschlesischer Oberlausitzkreis) in 1996, was to persuade both young drivers and young passengers that they should strictly separate drinking from driving. Elements of the campaign were information materials such as leaflets, posters and brochures as well as a direct communication with the target group using personal letters to young women between 16 and 24, and young males between 18 and 24 signed by the lord-mayor which informed them about the risk to be involved in an accident in their usual surroundings. Within the letters for the women, telephone cards were included to provide them a possibility to call somebody to pick them up instead of being driven by a drunken driver. The campaign was complemented by additional police enforcement and alcohol tests.

Three research approaches were combined to evaluate this road safety campaign: a qualitative survey, a quantitative survey and the evaluation of data sources of third parties. In order to ascertain the effectiveness of the campaign, over 10,000 persons from the target group received and answered a questionnaire related to the attitudes relevant to the leisure time accidents and to their changes of behaviour in connection with the campaign. Discussions with representants of the target group as well as the result of the surveys show that the attitudes and modes of behaviour contain gender-specific components, although the behaviour of young men and women does overlap. The evaluation of the results of alcohol checks by the police shows a clear reduction in the number of intoxicated drivers and alcohol-associated accidents in the pilot regions, where the number of accidents resulting from alcohol impairment decreased by 27.5%.

The evaluation was very positive so that this campaign was continued in 1998 in 17 regions of 12 Laender, and in 1999 in 14 regions of 11 Laender, and this year in 6 regions of 3 Laender, having similar positive results.

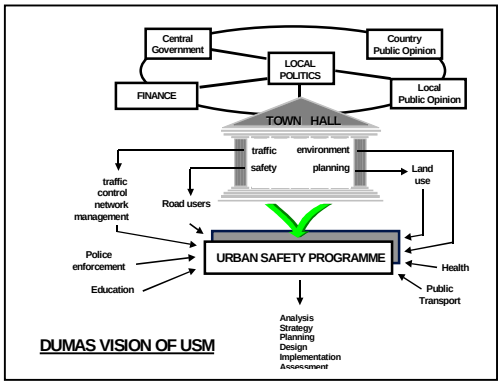
4. <u>Changing streets, protecting people</u> – *Making road safer for all*

Chris Lines & Klaus Machata, EU DUMAS project

DUMAS is a 1.2M ECU project with 10 Partners from 9 countries. The project brought together European experience and expertise on Urban Safety Management (USM), including practical examples from 10 towns. It promotes an area-wide strategic approach and the integration of other urban initiatives into safety strategies and programmes.

Every year over 43,000 people die in the EU countries; more than half of these in urban areas. Of these urban accidents, just over half occur at 'black sites', but the rest are 'scattered' throughout the area and are more difficult to treat. USM is the method for treating these. As more 'black site' treatments are done, the proportion of scattered accidents will increase, which will make the USM approach more important in the future.

The Research Phase produced a summary of the current knowledge on USM, plus a comprehensive analysis of four specific topics - Speed, Accident Data, Vulnerable Road Users and Traffic Management. DUMAS concluded that the measures are understood, but asks the question why are they not implemented on a larger scale ?



Design and assessment frameworks have been produced that give guidance to town planners and managers. These provide a checklist of issues which need to be addressed as part of the programme, with guidance as to how the processes need to be managed.

Town studies are an essential part of the DUMAS project. This phase investigated 10 study towns where safety activities have taken place and looked at the application of DUMAS concepts identified in the research phase. The political, legal, and social pressures were also studied.

The Baden Town Study demonstrates a number of the USM factors that, according to DUMAS, form the foundations of a successful design. These include an implementation and assessment process and an integrated traffic and safety plan. The presence of decision-makers with a view for broad perspectives and a forum to provide consultation with the public were also major factors, as was good co-operation between the "town hall" and key institutions at municipal level, such as the police and the public transport operators.

The formulation of an overall urban safety management strategy and the application of a wide range of measures, have **reduced accidents by 60%** between 1986 and 1999. **Baden is now one of the safest cities in Austria**. The measures include those specifically for safety improvements, but also include flow and speed management, improvement in public transport and increases in cycling. **The DUMAS vision of Urban Safety Management has been shown to work in Baden.**

Road accidents are predicted to be the 3rd largest cause of death in the world by 2020 and much more needs to be done to reduce the carnage in EU countries. Reliable proven methods are available for reducing accidents – we just need to have more of them. The DUMAS project has shown that urban scattered accidents can be reduced significantly by the application of the methods proposed.

The DUMAS partners have a vision of Europe where safety is a high priority, accident rates are falling, mobility is increasing and Urban Safety Management is common in towns and cities. If the DUMAS project can help bring this about, it will have succeeded.

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5. <u>Protecting people in crashes</u> – *Making cars safer*
Professor Adrian Hobbs, Transport Research Laboratory, UK

Improving vehicle safety is the most effective means of reducing road accident deaths and injuries. It is highly cost effective, has good public acceptance and is suited to widespread uniformly application.

Consumer crash test information from EuroNCAP is bringing about rapid improvements by providing an incentive to manufacturers to make improvements. Legislation provides a minimum standard (but a high level of protection to fulfill Treaty obligations) which all cars must achieve. The European Union has recently introduced frontal and side impact requirements which manufacturers are significantly exceeding, as a consequence of EuroNCAP. Unfortunately, there is no evidence from EuroNCAP tests of improvements in pedestrian protection. The industry still needs to be convinced of the marketing benefits from providing pedestrian protection. This means that legislation is desperately needed. All the necessary research is complete, only prevarication continues.

For the future, EuroNCAP will develop in order to continue to provide the opportunity to recognise better car safety, to obviate the opportunities for misleading the public and to overcome the inevitable deficiencies which start to arise with the tests and the dummies. EuroNCAP is also concerned to take advantage of the growing knowledge of new priority issues such as compatibility.

6. **Best prospects** – ***Intelligent designs***
Risto Kulmala, Technical Research Centre (VTT), Finland

The emergence of the information society has also meant that new tools are being made available for road safety work. These new tools are especially linked to transport telematics or Intelligent Transport Systems (ITS). There are many ways in which ITS affect safety. A review performed by a working group of ETSC (1999) classified the systems and their impact on safety according to the three main dimensions contributing to the number of fatalities in road traffic: exposure in traffic, risk of a crash given the exposure, and risk of fatalities in a crash. ITS have the potential to improve safety along each one of the three mentioned dimensions:

There are a wide range of ITS applications addressing traffic volume and thus exposure. Practical experience as well as research results show that it is possible to reduce exposure by means of these applications. Many of these applications will be introduced as a matter of course as safety objectives go hand in hand with other traffic policy goals such as energy consumption and environment. A number of applications include benefits for drivers in terms of improved information and other services. That will facilitate the introduction of systems such as road pricing schemes, travel planners, route guidance and freight and fleet management. One of the ITS applications described has an outstanding potential in terms of accident savings. That is the electronic driver's licence, which directly addresses the driver's authorisation and ability to drive the vehicle.

A number of systems exist with high safety potential in reducing crash risk. On motorways, the most safety beneficial systems have the potential for reducing injuries and fatalities by about 10–15 per cent. These systems are motorway control systems, driver and vehicle monitoring systems, intelligent speed adaptation, collision avoidance systems, incident management and automated speed enforcement.

On other rural roads, current systems with the potential of reducing injuries and fatalities by more than 10 per cent are fewer than on motorways, but more effective. Intelligent speed adaptation has a 30 per cent and automated speed enforcement a 20 per cent injury reduction potential. The ITS systems with the highest safety potential are intelligent speed adaptation, automated speed enforcement, speed control systems with variable speed limits, and driver and vehicle monitoring systems

In urban areas, systems with most safety potential (injury reduction of 30 per cent for full implementation) are intelligent speed adaptation and urban traffic control.

ITS offer sensing and communicating systems that may improve the effectiveness of protective devices such as seat belts and air bags substantially, thereby contributing to the reduction of crash consequences. At the present level of development the largest safety potential exists in increasing seat belt wearing rate by means of belt interlock warning systems and by means of emergency notification (Mayday) systems.

In the short and medium term, by far the most promising prospect of improving road safety with the help of ITS is to implement intelligent speed adaptation (ISA, sometimes also called External Vehicle Speed Control EVSC). ISA systems not only have the potential of reducing crash risks considerably but they also will reduce the consequences of the crashes.

Different systems for ISA exist and are planned, ranging from informative to intervening systems. Speed recommendations can be given via in-vehicle systems signalling with light and sound if the driver exceeds the speed limit. Such systems are expected to reduce the number of injury accidents by ca. 10% and fatalities by ca. 18%. A voluntary system, where the driver can enable or disable control by the vehicle of the maximum speed has been estimated to affect safety in a similar fashion (Carsten & Fowkes 2000). The compulsory or intervening system has been estimated to reduce injury accidents by ca. 20% and fatalities by almost 40% (Carsten & Fowkes 1998, Gustafsson 1997, Lind 1997).

Várhelyi (1997) has estimated that automatic speed limiting on rural roads would reduce the total number of injury accidents in Sweden by about 10%.

ISA can also be implemented as a dynamic version, where in addition to fixed speed limits the system applies temporary limitations to maximum speed due to congestion, fog, slippery road surfaces, major incidents, outside schools at drop-off or pick-up times, etc. Dynamic ISA in conditions of low friction would decrease the total number of injury accidents by ca. 12% and ISA in darkness by 12% (Várhelyi 1997). Carstern and Fowkes (2000) estimate that the dynamic version of the compulsory ISA reduces injury accidents by 36% and fatal accidents by 59%.

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