



ORGANISATION FOR ECONOMIC
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EUROPEAN CONFERENCE
OF MINISTERS OF TRANSPORT

TRANSPORT RESEARCH CENTRE

YOUNG DRIVERS

The Road to Safety



Summary Document



JOINT TRANSPORT RESEARCH CENTRE

In January 2004, the Organisation for Economic Co-operation and Development (OECD) and European Conference of Ministers of Transport (ECMT) brought together their transport research capabilities in setting up the **Joint Transport Research Centre**.

The Centre has 50 full members from Asia-Pacific, Europe and North America, including all members of the OECD and ECMT.

The Centre's mandate is to promote economic development and contribute to structural improvements of OECD and ECMT economies through co-operative transport research programmes addressing all modes of inland transport and their intermodal linkages in a wider economic, social, environmental and institutional context.

Young Drivers: The Road Safety is the product of one of three road safety projects conducted concurrently by the Centre, along with *Achieving Ambitious Road Safety Targets* and *Speed Management*.

For more information regarding the Joint OECD/ECMT Transport Research Centre, including its full programme of research activities and other recent publications, please consult www.cemt.org/JTRC/index.htm.

For more information regarding the Centre's project on young drivers, please consult www.cemt.org/JTRC/WorkingGroups/YoungDrivers/index.htm.

KEY FINDINGS

The following is a synopsis of the key findings of the Joint OECD/ECMT Transport Research Centre's report, *Young Drivers: The Road to Safety*.

The great over-representation of young drivers in crashes and road fatalities is a serious public health problem that exacts an unacceptable toll in human, social and economic terms. Young drivers account for about 27% of driver fatalities across OECD countries, although people in the same age group represent only about 10% of the population. Furthermore, between 20% and 30% of total traffic fatalities result from crashes involving a young driver.

Young male drivers' crash fatality rates are as much as three times those of young female drivers, and remain much higher even when adjusted to factor in their higher rates of exposure. In some countries, young males' relative risk, compared to that of other drivers, is increasing.

The high levels of young driver risk result principally from factors of inexperience, age, and gender. This risk is aggravated by the circumstances under which many young people drive – young people, especially men, are over-represented in crashes at high speed, at night, with similarly aged passengers, involving alcohol, and often when not wearing seatbelts.

In addressing this problem:

- Important reductions in young driver risk will result from higher overall road safety levels, which require effective legislation, enforcement and standards, particularly dealing with speed, alcohol, drugs and seatbelts.
- Especially before the age of 18, any increase in the driving age will result in fewer crashes and fatalities. Licensing conditions for motorised two-wheeled vehicles should be sufficiently stringent to avoid migration toward less safe forms of transport.
- High levels of accompanied practice before licensing for solo driving, involving a variety of driving circumstances, will result in lower levels of fatalities. While at least 50 hours of pre-licensing practice are recommendable, experience in one country showed that increasing this to about 120 hours reduced crashes in the two years following licensing by about 40%.

- Exposure to risk is particularly great immediately following licensing for solo driving, and can be reduced by protective restrictions that are progressively lifted as the novice gains experience, as seen in graduated licensing (GDL) systems. Compared to older drivers, young drivers' crash risk increases at a much greater rate with each alcoholic drink consumed, and, thus, young, novice drivers should be subject to blood alcohol content (BAC) restrictions of no more than 0.2 g/l. Also, initially restricting driving with young passengers and at night has been shown to greatly reduce risk, and should be strongly considered.
- Young, novice drivers should be subject to initial probationary periods in which higher demerit points can be assigned for infractions or for non-compliance with licensing conditions, leading to concrete repercussions, such as loss of licence.
- The fundamental goals of the licensing system, including training and testing, should be to create drivers who are safe, as well as technically competent. Novice drivers need to gain greater self-assessment skills and understanding of the factors behind risk.
- Persuasive communications should accompany other countermeasures, with a view to changing attitudes and creating greater understanding of risk, noting that attitudes regarding safety are formed years before the driving age, and are highly influenced by role models' behaviour.
- Important new reductions in young driver risk could result from technological applications, such as Intelligent Speed Adaptation, Adaptive Cruise Control, Electronic Stability Control, black boxes, alco-locks and smart cards. More research should be conducted in this area, particularly focusing on the impact on young drivers.
- Non-road-safety measures, such as the availability of public transport at reasonable cost and regulations regarding the availability of alcohol, can also reduce young drivers' risk exposure.
- Despite the demonstrated potential to save many lives, road safety measures are seldom popular prior to their implementation. Thus, strong political leadership will be required to address the challenge of young driver risk. The public should be engaged on the basis of research-based evidence showing the costs and benefits of given countermeasures, and of inaction.
- The greatest absolute growth in young driver risk, fatalities and injuries can be expected in non-OECD countries, including some that are members of the ECMT. International co-operation can reduce the costs of understanding the young driver problem and developing effective countermeasures. All countries need to co-operate in promoting best practices to reduce risk internationally.

EXECUTIVE SUMMARY

This document summarises the report entitled *Young Drivers: The Road to Safety*, published by the Joint Transport Research Centre of the Organisation for Economic Co-operation and Development (OECD) and the European Conference of Ministers of Transport (ECMT). That report is the result of two years of collective effort by a group of experts in the field of young driver risk from throughout OECD and ECMT member countries. The project focused on the high levels of risk associated with young, novice drivers of passenger vehicles, including fundamental causes and concrete options for action. *Young* drivers are defined as those below the age of 25, keeping in mind that the minimum licensing age varies from country to country. However, it should be noted that many of the proposed countermeasures would be relevant for all novice drivers.

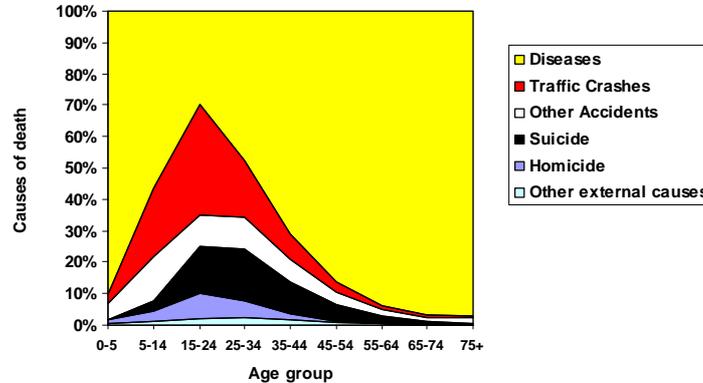
Globally, 16-24 year-old drivers are greatly over-represented in crash and traffic fatality statistics. They pose a greater risk than other drivers to themselves, their passengers and other road users. This problem imposes great social and economic costs on individuals, families and societies.

The ECMT Ministers have established the target of a 50% reduction in traffic-related deaths in the period 2000-2012. Similar commitments have been made within the European Union and by many national governments. A 2003 United Nations General Assembly Resolution recognised the high cost of traffic crashes on global human health, and resulted in the UN Road Safety Collaboration led by the World Health Organisation (WHO). Addressing the issue of young driver risk – particularly that of young men – will be essential to achieving the goals of these initiatives.

What is the scope and nature of the problem?

Traffic crashes are the single greatest killer of 15-24 year-olds in OECD countries. Figure 1 shows how traffic deaths rise sharply in this age group.

Figure 1.
Cause of death by age group
 OECD Countries, most recent year available

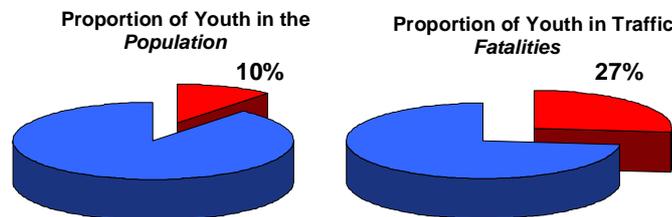


Source: World Health Organization Mortality Database (Most recent year available for each country).

Note: Most recent data from the following countries: Australia (2001), Austria (2002), Belgium (1997), Czech Republic (2002), Denmark (1999), Finland (2002), France (2000), Germany (2001), Greece (2001), Hungary (2002), Iceland (2001), Ireland (2001), Italy (2001), Japan (2002), Netherlands (2003), Norway (2001), Poland (2002), Korea (2002), Luxembourg (2002), Spain (2001), Sweden (2001), United Kingdom (2002) and United States (2000).

It is estimated that over 8 500 young drivers of passenger vehicles were killed in OECD countries in 2004.¹ This included almost 4 000 in the US, over 750 in Germany, 645 in France, and over 300 in both Japan and Spain. As Figure 2 shows, this means that young drivers represent about 27% of all drivers killed in OECD countries, although people in the same age groups only account for about 10% of the population.

Figure 2.
Proportion of youth in traffic Fatalities and population
 OECD Countries, 2004



Source: International Road Traffic Accident Database (IRTAD)
 Note: Information not available for some OECD countries

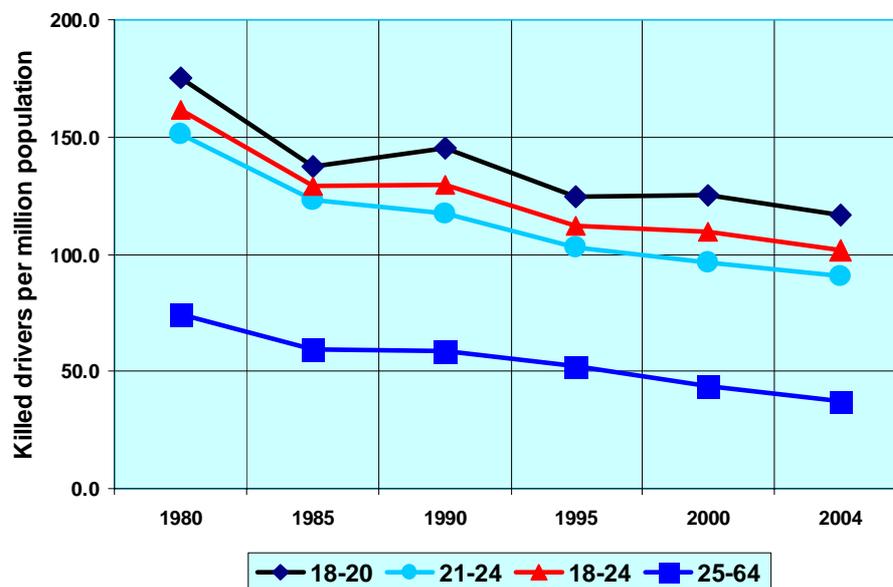
1. Based on figures from the International Road Traffic Accident Database (IRTAD).

Furthermore, for each young driver killed, it is likely that more than 1.3 passengers or other road users also die in the same crashes, based on findings from the US and the Netherlands. National data from various countries indicate that crashes involving a young driver account for between 20% and 30% of total road traffic fatalities. Clearly, young drivers play a disproportionate role in the overall public health problem of road traffic safety risk.

While data are not generally available for countries that are not part of the OECD, it must be assumed that their young driver situations are similar. This would include some ECMT countries where overall road safety levels are lower than those of most OECD members. Worldwide, WHO data show that, in 2002, traffic crashes were the second greatest cause of death for persons aged 15-29, and the greatest for men in the same age group.

As Figure 3 reveals, across a representative cross-section of OECD countries, death rates for 18-24 year-old drivers are typically about double those of older drivers. Furthermore, while death rates for young, novice drivers have decreased in many countries in recent decades, these reductions have mirrored overall improvements in road safety, and death rates for 18-24 year-old drivers typically remain more than double those of older drivers. In other words, despite overall improvements in road safety, the specific problem of young driver risk is not being resolved.

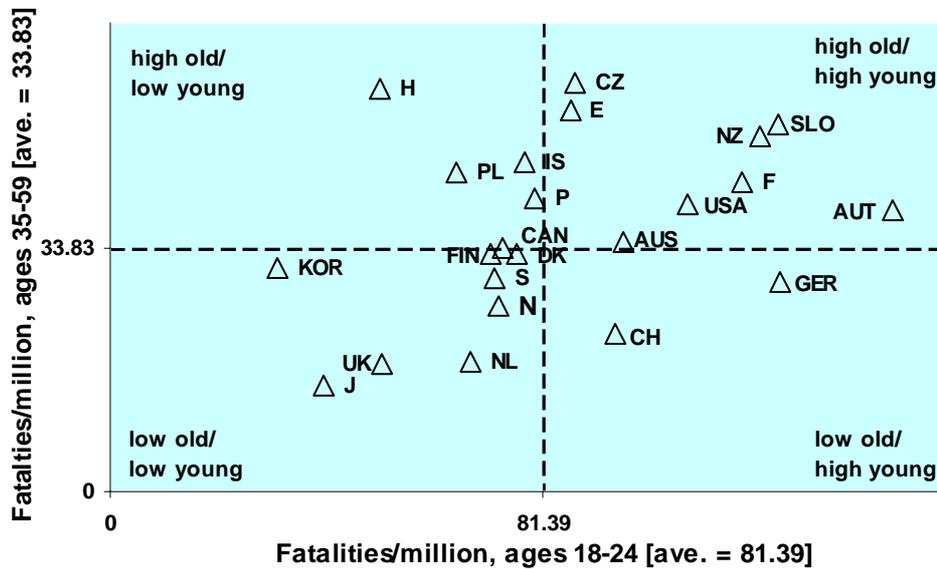
Figure 3.
Driver fatalities per million population for different age groups, over time
Austria, Great Britain, the Netherlands, Sweden, Switzerland and US



Source: IRTAD.

In general, the situation for young, novice drivers is better in countries with higher overall standards of driver safety. Figure 4 shows us that those countries with lower average death rates for drivers aged 35-59 are also very often also those with lower rates for drivers aged 18-24.

Figure 4.
**Relative risk – Driver fatalities per million population
 for the 18-24 and 35-59 age groups**
 OECD Countries, 2003



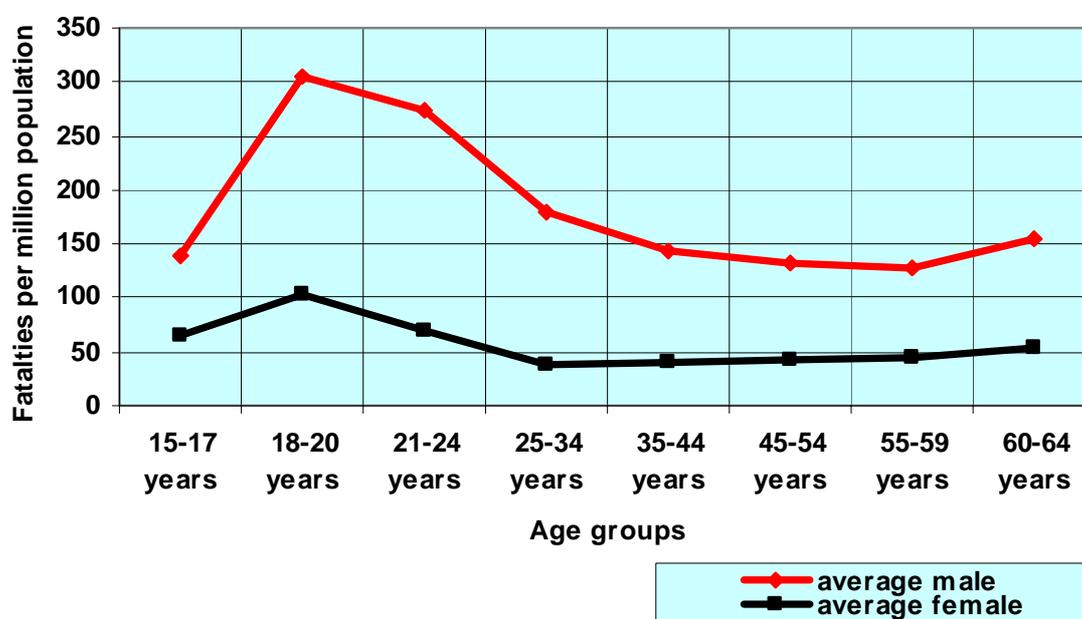
Source: IRTAD.

Note: Data from year 2003, except for Australia (1999), Canada (2002), Hungary (2002), Japan (2002) Spain (2002) and average value of period 1999-2003 for Iceland.

Abbreviations used in Figure 4: H: Hungary, CZ: Czech Republic, E: Spain, SLO: Slovenia, NZ: New Zealand, IS: Iceland, PL: Poland, F: France, P: Portugal, USA: United States of America, AUT: Austria, AUS: Australia, CAN: Canada, FIN: Finland, DK: Denmark, KOR: Korea, S: Sweden, GER: Germany, N: Norway, CH: Switzerland, NL: Netherlands, UK: United Kingdom, and J: Japan.

Death rates for young men are consistently much higher than those of their female counterparts, often by a factor of three or more, as seen in Figure 5. Large differences remain after taking into consideration the fact that men drive more than women. Whether adjusted for exposure or not, the high crash fatality and injury rates of young, male novice drivers represent a major public health issue.

Figure 5.
Road user fatalities per million population
by gender and age
 Various OECD Countries, 2003



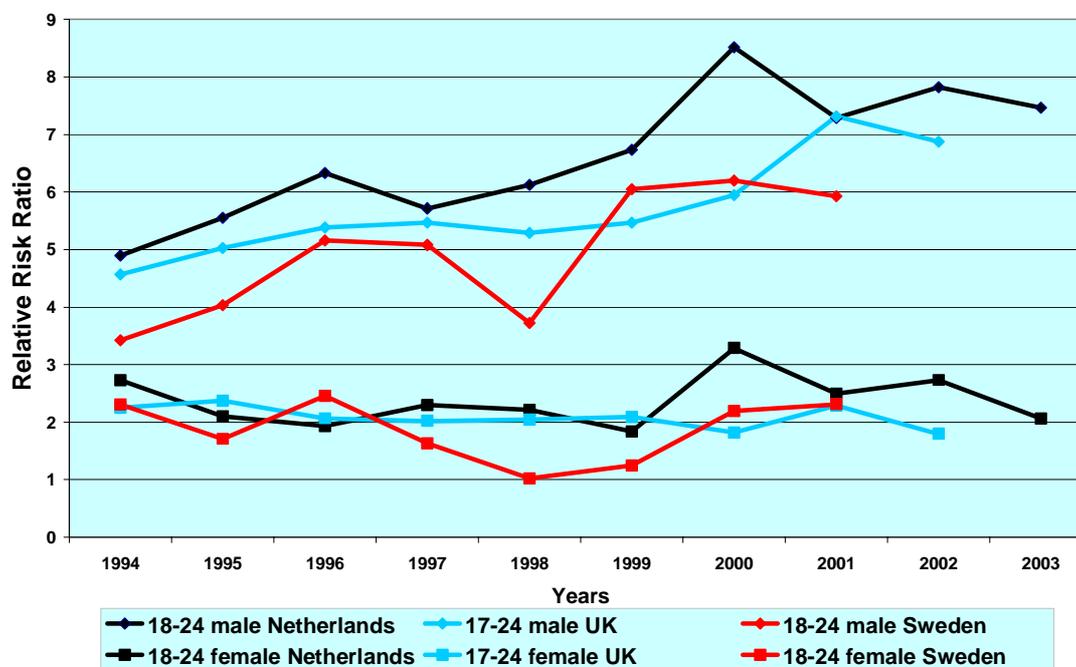
Source: IRTAD

Note: Data is from 2003 for the following countries: Austria, Australia, Czech Republic, Denmark, Finland, France, Germany, Iceland, Japan, Korea, Netherlands, New Zealand, Norway, Poland, Portugal, Slovenia, Sweden, Switzerland, United States and United Kingdom.

Data from the Netherlands, Sweden and the UK, seen in Figure 6, have shown that young male drivers' relative risk, compared to that of older drivers, has increased considerably over the last decade, although this has not been the case for young female drivers.² Where the UK is concerned, in 1994, a young male driver's risk of being in a fatal crash was a little over 4.5 times that of a driver aged 30-59; in 2002 this had risen to be 7 times greater.

2. Figure 6 shows, for each year, the number of fatal crashes in which male and female young drivers were involved per kilometre, divided by the number of fatal crashes that all drivers aged 30 to 59 were involved in per kilometre. Thus, when the figure for a particular country for young female drivers is 2, this means that young female drivers in that country had twice as great a chance of being involved in a fatal crash per kilometre than all drivers in the same country between 30 and 59 years of age.

Figure 6.
**Young drivers' relative risk of involvement
 in a fatal crash, by gender, over time
 Netherlands, Sweden, UK**



Source: Lynman *et al.*, 2003

Young drivers have high numbers of crashes when driving at night and/or on weekends, when carrying similarly aged passengers, and as a result of speeding. Alcohol and driving without seat belts remain key factors in young driver crashes and resulting deaths and injuries. Drug-driving, especially involving cannabis, is increasing, particularly among young men, and becomes especially dangerous when mixed with alcohol, and for habitual users. Young people are over-represented in single-car and loss-of-control crashes, and crashes where the driver is turning across oncoming traffic.

Apart from the enormous social costs, young driver crashes impose a huge economic cost burden on societies. In the US alone, government estimates state that crashes involving 15-20 year-old drivers cost \$40.8 billion in 2002.

What are the key factors behind the problem?

Why do young drivers have such high crash rates? The response can be summarised under three general headings: experience, age and gender. The universal problem of young, novice drivers is inexperience. As most people learn to drive while they are young, inexperience explains much of the high levels of young driver risk. Furthermore, a minority of young drivers fails to manage a complex range of additional risk factors – many of which are related to age and gender – and is thus involved in a further disproportionate number of fatal crashes.

Experience

Where experience-related factors are concerned, learning to drive takes time and needs extensive practice in order to reach a sufficient competence level – this is true for everyone, not just the young. With time, the actions of driving – changing gears, looking in the rear-view mirror, steering, correctly assessing situations, reacting appropriately, etc. – become automated. However, for the novice driver, these actions require consideration, increasing overall mental workload and possibly distracting attention from the road. Thus, novice drivers' attention is easily overloaded, and their ability to combine simultaneous actions is relatively poor. At the same time, because serious crashes are relatively rare events, new drivers are not provided with the sort of negative feedback that might induce them to drive more carefully, while they might also be motivated to arrive at a destination as quickly as possible, as well as by other factors, such as peer pressure or a desire to “show off”.

Age

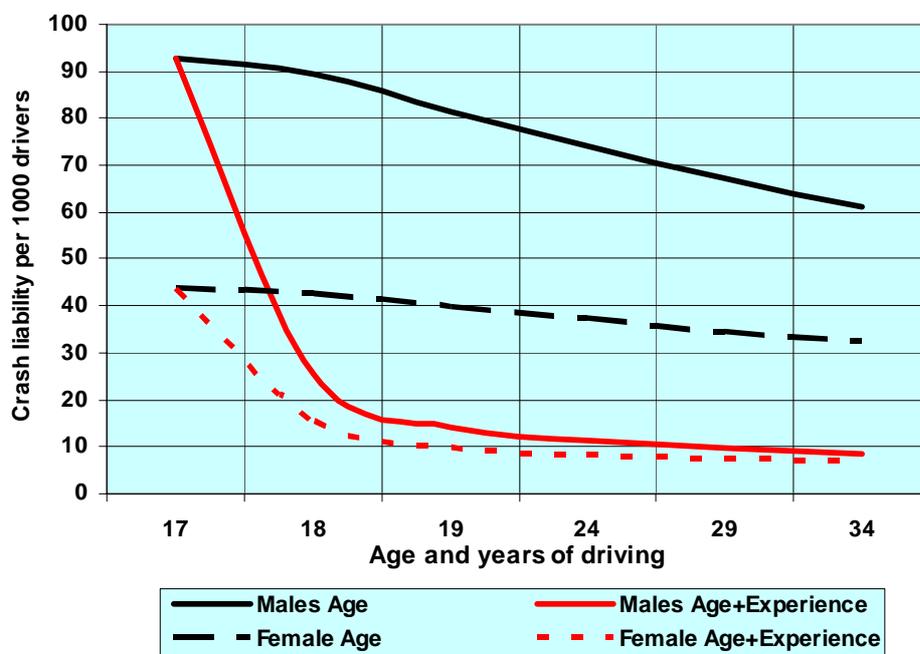
Data show that novice driver crash involvement decreases as the licensing age for solo driving increases, indicating that age factors play a role in causing crashes. Indeed, physical and emotional immaturity, as well as the lifestyles associated with youth, can increase crash risk and severity. Young people are typically in a period of rapid maturation, whereby they test boundaries and assert independence. They are at a stage in life that is often intensely social, including being active at night and on weekends, in groups, and sometimes involving alcohol and/or drugs.

Gender

Young men drive more than young women, and have more fatal crashes per kilometre driven. Furthermore, research has revealed that they are generally more inclined toward risk-taking, sensation-seeking, speeding and anti-social behaviour than their female counterparts. They are also more likely to over-estimate their driving abilities and more susceptible to the influence of their friends.

It is precisely the interaction of experience and age-related factors, exacerbated by gender differences, that makes young drivers' risk situation unique. The impacts of both age and experience are shown in Figure 7, where the black lines represent the crash risks of men and women first getting their licence at each different age level, and the red lines show the progression of the crash risk level of men and women who get their licences at 17 years of age. In other words, the black lines show the impact of age, while the red lines show that of experience. Obviously, the impact on risk of one year of experience is particularly important. However, the higher initial risk associated with acquiring a licence at a younger age cannot be ignored. Furthermore, while men have more crashes than women at any age, the impact of gender is particularly strong among the young and exacerbates the negative effects of both age and inexperience.

Figure 7.
Age, experience and gender – Crash liability
among male and female novice drivers
Great Britain



Source: Adapted from Maycock *et al.*, 2002.

Note: Based on police-reported data.

The reasons why age, gender and experience combine so destructively in some young people on the road, and why some young people are more risk prone than others, are highly complex. They involve a myriad of interacting factors, including physiological and emotional development, personality, social norms, the role of youth in society, individuals' socio-economic circumstances, impairments to capabilities, the driving task itself, and the type of driving that young, novice drivers often engage in. Certain personality types are particularly subject to high crash risk. Social norms, including peer pressure and the emphasis placed on rebellion in youth culture, can affect driving style, as do the examples provided by role models. Alcohol, drugs, fatigue, emotions and in-vehicle distractions, such as mobile telephones, all impair a driver's abilities. Based on economic considerations, young people may also drive older vehicles with fewer safety features. Recent research indicates that the parts of the brain responsible for inhibiting impulses and weighing the consequences of decisions may be under development until well after the teenage years, possibly impacting on driving behaviour. Furthermore, different testosterone levels partially explain the divergence in behaviour between young men and women. In short, young drivers' high risk levels are a product of both who they are and the environment in which they exist.

However, it is important to note that, while young drivers are a high risk group in themselves, most young drivers are not deliberately unsafe. The same may be said of young male drivers. While profiles exist for high-risk young drivers, current knowledge does not allow particular individuals to be singled out with countermeasures before they engage in dangerous driving.

This leaves policy-makers with a complex problem. While young, novice drivers must gain experience to be safer, the process of gaining that experience exposes them, and others, to risk. Also, the mobility associated with driving provides people with access to many social, economic and education opportunities. Individual young drivers are much more likely than older drivers to have crashes, and many do, but only a small share of these results in death or serious injury. With this in mind, how do we tackle the problem of young driver risk without limiting young people's access to experience and mobility, and without appearing to unfairly penalize youth or a sub-group of youth, such as young men?

What are our options for action?

Given the severity of the problem, it is imperative that governments take action to reduce young driver risk, especially as measures to improve the safety of young and newly qualified drivers can be readily identified.

Reducing the number of young, novice driver crashes and fatalities will require a focussed and co-ordinated approach, involving education, training, licensing, enforcement, communication and the selective use of technology, in combination with other road safety measures. The success of this approach will require public and political acceptance of the gravity of the problem and need to act, and the proactive participation of regulators and lawmakers; transport, health, safety and education administrations; the police; parents; and young drivers themselves. The goal of these efforts should be to create a situation in which overall road safety continually improves while the differences in risk levels between young and older drivers are greatly reduced, especially with regard to young male drivers.

A key first step in reducing young, novice driver risk is to work to ensure the highest possible overall standards of road safety. Given that young people suffer more crashes and fatalities, they can be expected to benefit to a great extent from general road safety measures, especially in countries where the road safety performance is relatively low. Effective enforcement will play a key role, and this can be focused on areas and times when young people are most at risk. It is also a basic prerequisite to implementing some of the more targeted measures noted below. High levels of safety in vehicle and road design will also have an important impact. However, the wide gap between young and older drivers' traffic fatality risks underscores the fact that general road safety measures are not enough – it is also essential to directly address the specific problem of young, novice driver risk.

It is important to implement countermeasures that will reduce the wide gap between young drivers' risk levels and those of older, more experienced drivers. Given the nature of the problem, actions need to be concentrated on breaking the historically developed dangerous link between, on the one hand, immaturity and inexperience and, on the other, unlimited access to unsupervised solo driving in the challenging environment that is traffic. Breaking this link inevitably involves measures that either limit the available choices, or alter the attractiveness of these choices.

Countermeasures for addressing the young driver problem should be put forward based on a careful balancing of the interests and responsibilities of young drivers, as well as of governments' broader social responsibility to provide a safe road transport system.

The licensing process itself presents important opportunities. While countries employ different licensing systems, common objectives for risk reduction are seen throughout the world and there are increasing similarities between different systems.

Licensing age

As noted above, the younger a person starts unrestricted solo driving, the more likely it is that he or she will have a fatal accident, particularly below 18 years-old. Thus, as a first step, it is extremely important to set an appropriate age for first unrestricted solo driving. Administrations should resist, on safety grounds, any pressure to lower current licensing ages; conversely, increasing the licensing age for solo driving would reduce fatalities. Conditions for driving motorised two-wheeled vehicles should be similarly stringent to prevent migration to less safe forms of transport.

Training

To date, formal training itself has not proven to be highly effective in reducing accident risk. Training should focus on creating drivers who are safe, and not just technically competent, meaning that there should be increased focus on self-assessment and understanding of the factors that increase risk, including the context in which driving is undertaken. Training, stated training objectives and the test should reinforce one another, and a structured approach should be undertaken to ensure that novice drivers get wide experience in all the necessary competencies.

Increased pre-licence practice

Safe drivers are made and not born – extended practice should be recognised as a precondition for reaching higher cognitive skill levels. Thus, it is particularly important that substantial experience be attained in lower-risk conditions before unrestricted solo driving. High levels of accompanied practice before licensing for solo driving, conducted in a methodical manner that involves a variety of driving circumstances, will result in lower levels of fatalities. While at least 50 hours of pre-licensing practice are recommendable in any system, experience in one country showed that increasing this to approximately 120 hours reduced crashes in the two years following licensing by about 40%.³

Post-licence protective measures

The greatest risk is experienced immediately following licensing for solo driving, especially during the first year. Passing the driving test should not expose novice drivers to risk that they are not able to manage. Risk can be greatly reduced in the period following licensing by way of protective restrictions that are progressively lifted over time, as seen in graduated licensing (GDL) systems:

- Young drivers have been shown to be more susceptible to the effects of alcohol, even at lower levels, than older drivers. Thus, maximum BAC levels of zero or 0.2 g/l for young, novice drivers would be highly desirable.
- Also, important risk reductions have been shown to result from temporarily restricting driving with young passengers and/or at night. Implementation of such measures should be considered on the basis of a solid, evidenced understanding of the nature of the problem in each

3. In Sweden, in 1993, the minimum age for accompanied learning was lowered from 17½ to 16, while the minimum solo driving age remained 18. Approximately 45-50% of 16 year-olds obtained their learner's licence during the first 2½ years of the new programme. This resulted in an increase to a mean of 117.6 hours of accompanied learning before licensing, compared to a mean of 47.6 hours before the change. In the follow-up period of two years, the crash risk of young, novice drivers who had begun accompanied learning at 16 was reduced by 40%, adjusted to account for confounding factors, and the overall young, novice driver crash risk was reduced by 15%.

jurisdiction, taking into account such factors as the severity of the young driver problem, and the age at which people typically learn to drive.

These countermeasures could do much to address the circumstances that contribute to the seriousness of many young, novice driver crashes, such as driving at night, with passengers and/or under the influence of alcohol.

Enforcement

Clearly, many of the countermeasures inherent to the licensing process will not be relevant without effective enforcement, coupled with serious repercussions that act as disincentives for infringements and unsafe behaviour in general. Novices should thus be subject to a probationary period, during which they could lose their licence and/or have to undergo additional training if they do not comply with the rules of the road or licensing conditions. This could be accompanied by special demerit point scales for novice drivers, whereby they have lower thresholds for punitive action than other drivers. However, it is often difficult to target young, novice drivers in particular, although special plates can be helpful in this way. Thus, effective general enforcement is required, although this may focus on areas where young people – especially young men – are particularly over-represented, such as alcohol, speed, drug-driving and non-use of seat belts, and at times and locations where young people are particularly active.

New technologies

New technologies, such as black boxes, smart keys and alco-locks, offer opportunities to ensure compliance with the conditions attached to licensing. Furthermore, Intelligent Speed Adaptation, Adaptive Cruise Control and Electronic Stability Control could reduce both voluntary and involuntary dangerous driving among all drivers, including the young. More research is required where many of these technologies are concerned, noting that some of these may be of particular benefit in assisting young drivers with the driving task and in addressing problems specific to young and novice drivers.

Communications and education

Countermeasures, especially enforcement, should be accompanied by communications and education efforts aimed at altering the fundamental attitudes that exacerbate risk, targeting, in particular, inexperienced drivers, high-risk lifestyle groups, and males. It should also be noted that many safety-related attitudes are established well before the driving age, and are highly susceptible to the influence of role models. Parents and other adult role models could also be provided with information regarding how they might assist in reducing young drivers' risk levels.

Non-road safety measures

Non-road-safety measures – such as the availability and cost of public and school transport, the cost of operating a vehicle, the availability of alcohol to young people, and the location of services of interest to young people – can also have an impact on risk. All public policy decisions should take into account their potential road safety impact.

Global co-operation

International co-operation in the sharing of research and best practices will assist in reducing the costs of combating young driver risk. Dissemination of relevant advice from OECD/ECMT countries, including research findings from this report on young drivers, will be valuable and help a wide group

of developing countries deal with some of the major road safety problems they are facing. Countries can work together, through such mechanisms as the UN Road Safety Collaboration, to ensure that all countries attain the highest possible levels of road safety.

How do we manage change?

There is often resistance to change; the public and stakeholders may be reluctant to accept new measures, particularly if they impose higher costs or make it more difficult to obtain a licence, and decision-makers may be reluctant to support measures that are unpopular. Overcoming such barriers to the acceptance of effective measures can be facilitated by carefully managing the process of change.

To begin with, senior-level decision-makers must show courage and leadership in publicly acknowledging the problem and the need to act.

Proposed countermeasures should be realistic, and based on thorough research of the problem and the costs and benefits of proposed solutions, which must be clearly communicated.

Stakeholders should be consulted, including young drivers, parents, employers, driving instructors, testing agencies, the police, the health and education sectors, the insurance industry, and road users in general. In some instances, stakeholder groups will play a key role in educating decision-makers and the public regarding the nature of the problem, and in proposing solutions.

Different agencies within government and levels of government should co-ordinate closely, sharing resources and ideas.

Finally, countermeasures should be phased in, showing concrete results at each step. Careful consideration needs to be given to ensuring that they do not impact unequally on more disadvantaged sectors of society. They should also be subject to analysis, and adjusted where they are not showing desired or adequate results.

Taking Action

Countermeasures need to be implemented in a strategic manner that shows results both immediately and over the longer term. In doing so, particular attention should be paid to the key elements that underlie and exacerbate risk. Furthermore, there are important differences between the various countermeasures in terms of their impact, their costs, and the timelines within which they can be implemented, which will condition the options for action. In particular, those that require new legislation will take considerable time to implement.

The following is a suggested step-wise implementation of countermeasures:

1. *Increase public awareness of the problem.* This could involve undertaking communications campaigns, based on well-researched information, sensitising the public to the nature of the risk and encouraging changes in attitudes and behaviour. Also, political leaders could highlight the problem in speeches and other interventions. This countermeasure may be undertaken immediately. In itself, it is not expected to yield high reductions in risk; however, it is a prerequisite for achieving greater public understanding of the problem and encouraging acceptance of other countermeasures. Furthermore, the combination of other countermeasures, particularly enforcement, with communications can yield changes in attitudes towards safety risk over the longer term. There are obvious costs involved, although

these are likely to be uncontroversial, given the importance of the message and the fact that the public is accustomed to seeing communications campaigns from public authorities.

2. *Implement overall road safety improvements that also address young driver risk.* This includes ensuring the existence of appropriate legislation and rigorous enforcement of road safety law, focusing on areas where young driver risk is especially high, including speeding, alcohol, drugs and seat belt use. It is an area where immediate action can be taken, based on existing laws and regulations, and short-term gains will be seen. There will be important costs, in the form of resources applied to enforcement, as well as in the implementation of high standards of safety in vehicles and infrastructure. Effective communication will thus be required to gain public support. However, public resistance may be expected, particularly to enforcement.
3. *Consider the road safety ramifications, especially for young drivers, of public policy decisions that are not directly related to road safety.* This includes, among others, such issues as the availability and cost of public transport, the costs of operating a vehicle, the availability of parking at schools and other areas frequented by young people, and the locations of bars and discos. The immediate impact of this may not be expected to be particularly large, although over time it could have important cumulative effects. This is an area where action could begin immediately, although more time would be required to formalise such practice. Resistance would be particularly expected in instances where decisions limit the options of individuals and businesses.
4. *Introduce high levels of pre-licensing accompanied practice.* This is potentially one of the most effective countermeasures. However, it may require new legislation, meaning that it cannot be implemented in the immediate term. Costs are relatively low both to administrations and the public, and primarily consist of demands on the time of young, novice drivers and those who accompany them. In countries where licensing begins at 18 years-old, resistance will be less if the accompanied practice is allowed to occur before that age. In countries where licensing begins earlier, there will be resistance from young drivers themselves, as this countermeasure will mean an effective increase in the age for unrestricted solo driving. However, consultation with the community, including co-operation with relevant community groups, may well reveal a widespread demand for action to reduce young driver risks.
5. *Implement protective restrictions during initial solo driving.* This countermeasure holds considerable potential. It should include BAC levels of no more than 0.2 g/l. Limited driving at night and/or with passengers should also be considered. Again, legislation is likely required, although the minimal BAC restrictions could possibly be implemented under existing drink-driving laws. The effective enforcement discussed in Point 2 is a key prerequisite to such measures. There will also be additional administrative costs associated with changes to the licensing system. Considerable resistance can be expected to these measures from young drivers themselves, although an effective communications strategy may reveal substantial support among society in general.
6. *Provide effective disincentives to inappropriate driving behaviour.* Enforcement of road safety law and special licensing measures will only be effective if they are backed up with concrete repercussions for non-compliance. Novice drivers should be subject to probationary periods during which inappropriate behaviour could result in loss of driving privileges or obligatory retraining, and this could be reinforced by way of special demerit point scales. Such countermeasures may require new legislation, but would not add important additional

costs to those associated with enforcement, as discussed above. While they may be subject to considerable resistance from young drivers, they would likely not be unpopular with society as a whole. Additional disincentives to unsafe driving by young drivers could be provided through vehicle insurance, and road safety administrations and insurance companies could examine means of co-operating in this area.

7. *Improve driver training and testing, including more focus on self-awareness and understanding the circumstances that lead to safer driving.* Such changes will need considerable prior analysis, and probably legislative action, meaning that they will require time for implementation. While they are important, they likely will not have the same impact as countermeasures that effectively limit exposure to risk and increase experience prior to solo driving, such as those noted in Points 3 and 4. Initially, there will be new costs associated with changes to the licensing system, and resistance may be particularly expected from the driver instruction industry.
8. *Understand the benefits of technological solutions for monitoring and enforcement, and for assisting the novice driver with the driving task, and selectively implement these where they prove to be effective.* This is a longer term initiative, particularly as it will involve research and development. While the potential is high, the actual gains to be achieved from new technologies are unknown. These will initially generate new costs for implementing technology in vehicles, which could result in resistance from drivers and vehicle manufacturers. Concerns regarding the legal ramifications of new technologies will also need to be addressed, particularly if they are perceived to relinquish the driver of full responsibility for operating the vehicle.

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