

BURDEN OF FATAL INJURIES IN THE EUROPEAN UNION



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KEY POINTS

- Europe as a whole has the third highest rate of injury related deaths among the WHO regions. More than 790,000 people lose their lives annually due to injuries in the European region, which represents about 15% of all injury deaths worldwide.
- The EU accounts for 30% of this burden, while the fatality rate is around half of the world average rate. Injuries are responsible for about 235,000 deaths annually, including 50,000 from road traffic events. This is equivalent to more than 640 deaths per day or 27 fatal injuries per hour.
- Unintentional injuries are the fourth leading cause of mortality in the EU15 and the third leading cause of mortality in the new member states; among those, road traffic injuries and falls account for the highest number of deaths, whereas deaths from suicides and self inflicted fatal injuries are also in the top 10 causes of death in the EU25.
- The personal and socio-economic costs of injuries are profound. As well as the possibility of death, individuals may face a lifetime of disability and endure lengthy expensive rehabilitation. They may require support and intervention from a range of agencies – health, social protection, housing, education, rehabilitation etc. Injuries are a major cause of long-term disability and absence from work. They also have a profound impact of the lives of family members.
- Injuries are estimated to cost billion of euros per year in direct and indirect costs. In particular, the cost of road traffic injuries has been estimated in EU15 to 45

billion euros per year (equivalent to up to half the budget of the EU). The majority of costs for deaths and serious injuries are in time lost from work.

- By contrast, the resources allocated for injury research and prevention are scarce; a 1996 report from the World Health Organisation indicates that funding for the prevention of these injuries is less than \$1 per disability adjusted life year in comparison to the \$26 for HIV/AIDS at the top of the relevant list.
- There is growing evidence of cost-effective interventions and strategies to reduce the risk and the consequences of injury. The lifetime economic benefits of avoiding one single fatal accident might be as much as €1 million. The economic benefits of exercise strengthening programmes to reduce the risk of major non-fatal fractures due to falls in older people can be highly cost saving. There is some evidence that investing in community multi action injury prevention programmes may be highly cost-effective.
- There are still major gaps in knowledge. Much work has inevitably concentrated on fatal injuries because of the greater availability of data. Less is known about the long-term consequences of non-fatal injuries but it is estimated that there are at least 6.7 million hospital treatments for such injuries. This estimate is highly conservative, as many injuries are treated within primary care or other agencies.
- There are also great variations in the risk of injury across member states; high-income countries present substantially lower injury mortality rates. With the integration of new member states, injury mortality rate in EU raised from 39 deaths per 100,000 people to 45 deaths per 100,000 people (age-standardised rates). Interventions need to be tailored across and within countries to address the different local context.

- Risks for population groups vary. Overall the probabilities of injury related death for men are twice those for women. Injuries are the leading cause of death in both EU15 and new member states for those aged 1-24, but 40% of all injuries occur in older people, despite the fact that they comprise about 20% of the population.
- At a EU level potential actions can include enhanced initiatives to share and exchange information on injuries and improve reporting of non-fatal injury events. Actions should be coordinated across sectors linking public health and health promotion strategies, with transport, and occupational safety and health. While economic evidence is growing, the specific costs and benefits of different strategies need to be calculated for different countries where resource levels may be very different. It may also be more effective to target specific population groups (at “high injury risk”), and the needs of older people may be such a priority.
- Greater injury prevention through the implementation of cost-effective actions is consistent with the EU’s Lisbon Process with the target of ensuring full employment and promoting social inclusion by 2010. The EU should disseminate information on cost- effective approaches to countries to encourage the uptake at member state level of actions, which are outside the competence of the EU.

IMPLICATIONS FOR POLICY MAKERS

- It is imperative that injury prevention becomes a top priority and resources allocated for these efforts are increased accordingly.
- The avoidance of one single fatal accident would correspond to savings of one million euros.
- There are important disparities between EU15 and new member states in regards to injury mortality.
- There is an important potential for injury prevention, focusing the efforts primarily, but not exclusively, on reducing the burden of injuries in new member states.
- The immediate impact of the changes in the population pyramid on the burden of fatal injuries sustained by older adults should be considered and the reduction of injuries among the elderly should be considered among top priorities for injury prevention.
- Half of childhood lives lost could have been saved if all member states (EU15) had matched the accomplishments of the country with the lowest mortality rate. Furthermore, if new member states matched the achievements of EU15 states, the preventable fraction of injuries would be even higher.

EXECUTIVE SUMMARY

Injuries are a major problem impairing the health and welfare of citizens of the European Union. To address this important issue, DG SANCO of the European Commission set up the Task Force on the Burden of Injuries (BOI) within the framework of the Working Party on Accidents and Injuries (WP-AI), in December 2003. The main goal of this Task Force was to produce a brief report for the WP-AI to portray the burden of injuries in the European Union, targeting policy oriented people in the EU. The emphasis of this report, produced on a voluntary basis, was given to fatal injuries. The Centre for Research and Prevention of Injuries (CEREPRI) undertook the analysis of data provided mainly by the World Health Organisation Statistical Information System (WHOSIS). As the sources of nationally/EU representative data concerning non-fatal injuries were not readily available nor the Injury Data Base (IDB) derived data, and in the view of the upcoming work within the APOLLO project that would explore in-depth the morbidity from injuries, the focus of this report was on fatal injuries as the most serious advert impact of accidents.

Furthermore, an effort has been initiated by the Commission to develop a long-term strategic plan for injury prevention in the European Union to attain the goal of significantly reducing injuries over the next five years. The development of such a plan would be helpful both to member states and the Commission in looking at future ways of working together to develop and implement efficient injury prevention programmes.

INTRODUCTION

Injuries are one of the most serious public health problems facing developed societies (1), while measuring the impact and characteristics of injuries is critical to our efforts to identify priorities and policies aimed at reducing the burden of injuries. (2) The term “injury” refers to many different events including major impacts and collisions such as in road traffic accidents and falls, exposure to various chemicals, electricity, radiation or toxic substances, interacting with the body in amounts or at rates that exceed the threshold of human tolerance. In some cases, injuries result from the sudden lack of essential agents, such as oxygen or heat, such in the case of drowning and frostbite. (3, 4)

In everyday language the terms “accident” and “injury” are interchangeably used, however, during the last 20 years safety officials and public health authorities specifically recommended the use of the latter term as the term “accident” presumes a certain degree of unpredictability and this might discourage efforts for its prevention. Injuries are both predictable and preventable by studying, understanding and modifying the etiologic factor, namely the energy. (5) The identification of aetiological factors is of utmost importance in order to design effective injury prevention programmes that will substantially contribute to a reduction in the burden of injuries.

Usually when we think of injuries they are grouped into: *unintentional injuries* (such as road traffic injuries, home and leisure injuries, and occupational injuries) and

intentional injuries (such as suicide and self-inflicted injuries, homicide and injuries purposely inflicted by other persons, including domestic violence and child abuse, and injuries due to wars, terrorist attacks, etc.). There are other small categories, namely injuries as a result of law enforcement in the line of duty, and those of undetermined nature.

Data collection

While there are many gaps in our knowledge we do in fact know an awful lot about injuries in Europe. There are many different systems for recording such information. Injuries as a *cause of death and morbidity* are registered by national statistical services and subsequently reported to WHO using the International Classification of Diseases (ICD-9 and ICD-10) and the International Classification of External Causes of Injuries. Information on both the location and nature of the injury (N-code), and the external cause of injury (E-code) can be recorded. Registration of deaths from injury is satisfactory in most countries. There are, however, issues concerning the reliability of data concerning suicide in some countries because of some religious factors (e.g. the taboo of death through suicide), where an underestimation is probably the case.

One of the main problems faced is the lack of robust information on the causes and consequences of non-fatal injuries. While mortality data does include information on external cause recorded using the E-code, thus providing supplementary information about the cause of injury, morbidity data is still coded by some national statistical services using the N-code exclusively, which cannot offer such detailed information. It is essential that all statistical services are encouraged and assisted by the World

Health Organisation (WHO) and other statistical organisations to also use E-codes when recording hospital discharge data, so that injury prevention efforts can focus on the exact cause of these accidents. The ICD10 matrix for presenting injuries is mostly recommended (annex 1).

Hospital discharge injury data, in the form they are recorded currently, cannot provide detailed information about the mechanism of injuries. Data concerning acquired *disability from injuries* at European level is lacking and encouraging the development of such a EU database should become a priority.

The United Nations has some data on disability obtained from national surveys in some countries and is currently working on improving this database (<http://unstats.un.org/unsd/demographic/sconcerns/disability/disab2.asp>).

Other important databases are provided by different injury surveillance systems that function in some EU countries, and at EU level, there is European Home and Leisure Accidents Surveillance System (EHLASS), recently re-named Injury Database (IDB) that records injuries occurring during leisure time using the respective coding systems EHLASS 86 and EHLASS 96. This database comprises very detailed information concerning the nature and mechanism of the injuries and has about 500,000 injury cases collected from 58 collaborating hospitals from all over EU.

Regarding specific injuries at international and EU level, data on fatal and non-fatal road traffic injuries could be provided by the International Road Traffic Accidents Database (IRTAD) and the European Union (EU) Community Road Traffic Database

(CARE), which gather the information reported by the National Departments of Road Traffic Statistics in each country. The EUROSTAT gathers data on work injuries severe enough to require at least three days absence from work and data on fatal injuries, while the IDB of the European Commission, DG SANCO covers fatal and non-fatal leisure injuries.

Inevitably much of the focus of data collection is on fatal injuries and also those injuries that require treatment through the hospital system. One gap in knowledge to be addressed is to identify the extent to which injuries are treated in the primary care systems and at what cost and with what consequences. Some injuries may also be treated in other sectors as well. An examination of primary care utilisation data across Europe and its relevance to injuries is required. Again primary care also has its own international classification system for recording diagnoses including injuries. For example, EUROSTAT gathers data on work related injuries severe enough to require at least three days absence from work, where musculoskeletal problems (along with stress and anxiety problems) are the major cause of work absenteeism across Europe. Another potential source of information may be national registers for disability.

While much of the data collection systems issues need to be dealt with at member state level, a key aim at an EU level may be to promote greater coordination and sharing of such a disparate set of information resources across Europe, and perhaps working with member states encouraging a dialogue towards a greater harmonization of data collection methods.

THE PUBLIC HEALTH BURDEN OF INJURIES

Injuries are a major public health burden. There are more than 5 million fatal injuries each year worldwide, out of which 1.2 million are due to road traffic accident. (6) In other words, one in ten deaths worldwide is due to injuries, with unintentional injuries representing two thirds of this burden and intentional injuries the remaining third. It is estimated that more 100 million-injury cases are severe enough to require medical attention (about 2,500 per 100,000 people) and there are more than 60 million years lost due to disability from injuries. (6) When analysing the causes of years of life lost due to premature morbidity (YLL), injuries rank on the third place (more than 1,900 YLL per 100,000 people) after infectious diseases and cardiovascular illnesses. (6) By contrast, the resources devoted to injury prevention are scarce. One 1996 report from the WHO indicates that funding for the prevention of these injuries is less than \$1 per disability adjusted life which compares to the \$26 for HIV/AIDS at the top of the relevant list. (7) This figure, however, refers exclusively to WHO funding for injury prevention and should be treated with caution. In truth we simply do not have a good estimate of the total resources devoted to injury prevention, as funding is provided across many different sectors. Moreover, it is sometimes difficult to define what should be classed as an injury prevention measure and what its cost is. For instance if a regulation is introduced to improve the safety of motor vehicles – how is this included in estimates – is this the cost of introducing and enforcing the legislation, or is it the cost to the vehicle manufacturer etc. One clear role at EU level is to map resources and funding actually devoted to injury prevention.

Among WHO Regions, Europe ranks third after the African Region and the Region of South-Asia among territories with the high mortality rates due to injuries (Figure 1).

More than 790,000 people lose their lives due to injuries in this region, which represents about 15% of all injury deaths worldwide, corresponding to a mortality rate of 90 deaths per 100,000 European citizens; in the United States, the respective injury mortality rate is 53 per 100,000 people. It is estimated that more than 15 million injury cases are severe enough to require medical attention in the European Region, and there are about 6 million years lost due to disability in this setting. The European Union, however, counts for only 30% of this burden in Europe and the age-standardised injury mortality rate in EU is about a half of the world average rate (figure 2). Specifically, the injury mortality rate (age-standardised) in EU15 is about 39 deaths per 100,000 people, while in EU25 the age-standardised mortality rate is about 45 deaths per 100,000 people. The European Union, either as EU15 or as EU25 seems to be one the safest regions worldwide (Figure 2). Compared to the United States, EU15 is a safer region, while EU25 also has a lower mortality rate from injuries than the US (Figure 3). By type of *unintentional injuries*, WHO Region of Europe has the lowest mortality due to road traffic injuries compared to all other WHO regions, but the highest mortality due to poisonings and falls (Figure 4), while for *intentional injuries*, Europe has a high toll of self-inflicted injuries (data not shown). Within Europe, there are important discrepancies with regards to injury mortality; thus, regions with very low child and adult mortality, namely the Euro A and Euro B regions- have significantly lower unintentional injury mortality rates for all types of injuries except for the falls (where Euro A region is the “leader”), and less intentional injuries (self inflicted, violence, war) compared to Euro C- the region with low child and high adult mortality (Figure 5, 6).

THE PUBLIC HEALTH BURDEN OF INJURIES IN THE EUROPEAN UNION

The European Union is one of the safest regions in the world, but there is still important potential for prevention. The age- standardised injury mortality rate (all injuries, all ages, both genders) in the EU15 was about 39 deaths per 100,000 people before the integration of new member states in May 2004, while after this step, this rate raised to about 45 deaths per 100,000 people. This means that each year about 235,000 citizens of the European Union lose their lives due to injuries. Non-fatal injuries account for are more than 6.7 million hospitalisations in EU25 (1,500 per 100,000 people), while there are 3.9 million years of life lost (YLL) due to injuries. Finally, injuries are the second cause of years of potential life lost in both the EU15 and EU25 (data not shown).

MORTALITY FROM INJURIES

Overall, unintentional injuries represent the fourth leading cause of mortality in the EU15 accounting for 33 deaths per 100,000 people- crude rate- (Table 1) while they are the third leading cause of mortality in new member states, 50.3 deaths per 100,000 (crude rate, Cyprus not included), with deaths from suicide and self inflicted injury, 20.1 per 100,000 also appearing in the top 10 causes of death. Indeed suicide is the single most significant contributor to injury related mortality in the EU25 (Figure 7).

There are important discrepancies between new member states and the EU before the integration of these in May 2004 (EU15), which may reflect the impact of poverty on injury risk, as average income is a powerful inverse predictor of injuries. (9)

Compared to EU15, new member states have 50% less GDP per capita, less live births (per 1,000 people), higher infant mortality and crude mortality rate (from all causes) and a lower life expectancy at birth compared to EU15. Discrepancies also exist in regards to the mortality rate due to injuries, which is significantly higher for new member states (Table 1 and 2, and Figure 7). More specifically, Baltic States (Lithuania, Estonia and Latvia) have the highest mortality rates due to unintentional injuries (more than 80 deaths per 100,000 people) that is almost two-times higher than the respective rates in Finland and France- countries with the worst mortality rate in the EU15- and five-times higher than those in the United Kingdom and the Netherlands- countries with the lowest mortality rate in the EU15. The highest mortality due to intentional injuries is recorded in Baltic countries (about 50 deaths per 100,000 people), while Greece, Spain and Italy have the lowest such mortality rates (less than 10 deaths per 100,000 people).

Additional information can be obtained by examining the injury mortality rate *within age groups and genders*. Unintentional injuries are the *fourth and the third leading causes of death in the EU15 and new member states* (Table 1 and 2), while injuries due to motor vehicle accidents, falls, as well as suicide and self-inflicted injuries are responsible for the highest number of deaths (Figure 7). The probability of dying from injuries is twofold higher for men compared to women, but the risk varies at different ages (Figure 8 and 9). Women are more prone to sustain falls, which account for about 40% of all their injury deaths. Other types of injuries are recorded almost exclusively among men. These include injuries caused by machinery, cutting and piercing instruments and accidents caused by firearm missiles (Tables 3, 4). By age

group, injury mortality rate is highest for older people (twenty-times higher than the respective rate among children)- Figure 10.

By age group, motor vehicle injuries affect disproportionately the group of adolescents and young adults, while most fatal falls occur among the elderly (figure 11).

Among children, adolescents and young adults aged 1-24 years old, unintentional injuries constitute the *leading cause of death in both EU15 and new member states* (Figures 12-15), with the discrepancies between new member states and EU15 as mentioned above. Among children, road injuries and drownings. At these ages, motor vehicle injuries and suicide and self-inflicted injuries are responsible for most injury related deaths (Tables 3, 4).

In adulthood, injuries are the third leading mortality cause in both EU15 and new member states (most of them being motor vehicle injuries), after malignant neoplasm circulatory diseases, while suicide and self-inflicted fatal injuries occupy the fifth place (Figures 16 and 17 and Tables 3 and 4). Unintentional injury mortality rate among adults is twofold higher in new member states compared to EU15.

The European population in nearly all member states is ageing and significant modifications of the population pyramid have been observed, due to the significant drop of births and the increased life expectancy. Falls, motor vehicle accidents and suicides are the most frequent injuries at these ages (Tables 3, 4, figure 11). Policy

makers should consider the significant changes in the profile of the population expected to have immediate implications on the burden of injuries sustained by older adults. According to WHO data, every year almost 100,000 elderly (>65 years) in the EU25, which is more than 250 people every day, die of the most preventable cause of death, namely injuries. Despite the fact that senior citizens constitute about the 20% of the population, they comprise more than 40% of the total number of deaths due to injuries.

Of course the situation is complex, and it is not simply the injury per se that leads to death, it is also dependent on access to health services within different countries. The potential for prevention may be great, in an ideal scenario, as much as 40% unintentional injury deaths would be prevented and almost 30,000 lives in the EU25 if death rates could be reduced to that of the country with the lowest mortality rate.

Regarding motor vehicle traffic accidents, the mortality rate for both sexes is 11.5 per 100,000 people. There was a consistent downtrend, starting from 22 per 100,000 in 1970 and ending at 10 per 100,000 in 2000, that is, a decline of 54% during the last 30 years (data not shown). Similarly, deaths due to work related accidents have declined during a 20-year period, from 3 per 100,000 in 1980 to 1.5 per 100,000 in 2000 (data not shown).

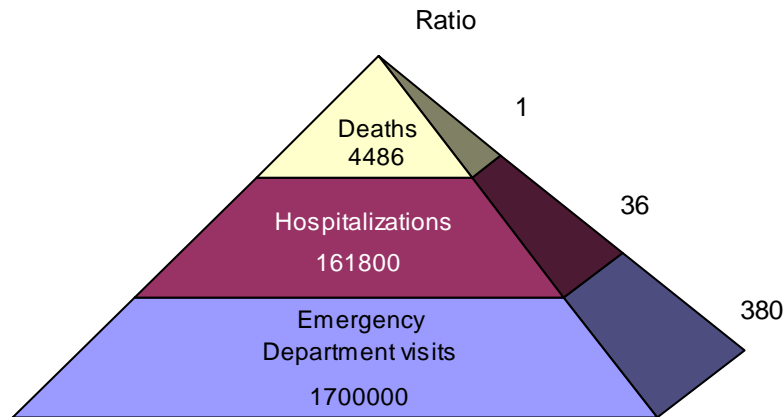
Figures 18-20 present the situation of three leading causes of injury death by country in the EU. Regarding motor vehicle traffic accidents, the average mortality rate for both sexes, all ages, is about 10 per 100,000 people in EU25, ranging from 24 deaths per 100,000 people in Lithuania to 4 deaths per 100,000 people in Malta (Figure 18).

Greece, Latvia and Portugal have also high mortality rates from motor vehicle traffic injuries (more than 20 deaths per 100,000 people). On the converse are countries such as Sweden and the United Kingdom, with less than 6 deaths due to motor vehicle traffic injuries per 100,000 people. The average mortality rate for injuries due to falls (both sexes, all ages) is about 12 per 100,000 people in EU. Fall related injury deaths are a major problem in countries such as Hungary, Denmark and Finland. Spain, Greece and the Netherlands have the lowest mortality rates due to fall injuries (Figure 19). Deaths from suicide and self inflicted injuries represent the leading cause of injury death in EU (13 deaths per 100,000 persons). Suicide rates are extremely high in Lithuania, Latvia and Hungary (9 to 13 times more than the respective rates in Greece, Malta and the United Kingdom). There are however, significant upward trends in specific populations in other countries in Europe, for instance in both Ireland and Scotland there have been marked increases in suicide for young adults in recent years.

MORBIDITY FROM INJURIES

Of course the impact of injuries should not be measured by mortality rates alone, as many injuries are no fatal but have significant short and long-term impacts on individual quality of life. In Greece for example, for each fatal injury correspond 380 visits to Emergency Departments annually for injury reasons, and 36 hospitalizations, respectively (all ages).

**Injury pyramid for all causes of injury,
all ages, Greece, average numbers per year**



Source for injury deaths: National Statistical Service of Greece, average number for 1998-2001
Source for estimation of hospitalizations and Emergency Department visits: EDISS (Emergency Department Injury Surveillance System), data 1998-2001

There is no culture on analysing hospitalisation injury data, however, and the data presented here are preliminary estimates provided by the WHO project Burden of Injuries 2002. Non-fatal injuries that are treated in the hospitals are more than 6.7 million in EU25 (1,500 per 100,000 people). For severe injuries, individuals may require long-term rehabilitation and adaptation of living arrangements. As resulting from these estimates, hospital discharges (per 100,000 people) for injuries are especially high in Austria, Latvia, and Finland and low in Malta, Portugal and the Netherlands (Figure 21).

One well recognized international approach that looks not only at the impact that health problems have on mortality but also on morbidity is the Disability Adjusted Life Year. The WHO's Global Burden of Disease project provides such data for all health problems worldwide and on a regional basis. Data from the World Health Report 2004 report in the WHO European region that injuries, both intentional and unintentional account for 14% of all burden of disease. Using this analysis the importance of effective injury prevention becomes even clearer as the total burden is greater than that for all cancers (11%) and only superseded by neuropsychiatric disorders (20%) and cardiovascular disease (23%). (6)

One target group for whom non fatal injuries are particular important are older people, where the long term costs to the health, social care, and rehabilitation systems of fractures and other injuries due to falls can be grave. Their impact on quality of life can be profound reducing independence and perhaps imposing care-giving burdens onto family members. It is estimated that at EU level, each fatal injury corresponds to 50 severe injuries that require hospitalisation and may often lead to temporary or permanent disabilities and 600 injuries that demand medical care in Emergency Departments. This is an area however where we have good evidence on the effectiveness and cost-effectiveness of a number of health promoting strategies which can reduce the consequences of falls, for instance through special exercise programmes. (10)

We also recognise that many so-called minor injuries are not dealt with in the secondary (hospital) care system but by general practitioners and other primary care

professionals. These injuries can have significant resource and economic consequences through lost time from work, school or home responsibilities. They also reduce the time available of the primary care system to deal with other pressing health concerns. More needs to be done to understand to fully understand this situation and to identify what cost effective approaches to injury prevention may be merited.

THE ECONOMIC COSTS OF INJURIES

The personal and socio-economic costs of injuries are profound. As well as the possibility of death, individuals may face a lifetime of disability and endure lengthy expensive rehabilitation. They may endure long-term behavioural and emotional impairment. They may require support and intervention from a range of agencies – health, social protection, housing, education, rehabilitation etc. Injuries are a major cause of long-term disability and absence from work. These costs and consequences are do not just impact on individuals alone but also on their families and indeed more generally to society through the impact injuries can have on individuals ability to remain economically productive. The very nature of injuries inevitably means that they impact on many different sectors, and that actions to prevent or reduce the impact of such injuries ideally requires a coordinated approach between a range of agencies and experts, as well as working with companies, trade unions and community groups.

Despite their significance, there have been few attempts to comprehensively estimate the total economic consequences of injuries, although there have been a number of European studies that have documented the costs of specific injuries, e.g. falls to older

people, completed suicides, or looked at the costs associated with specific risk situations or settings such as road traffic accidents or farm injuries. This in part is due to methodological and practical challenges both in obtaining data and assessing its economic cost across different sectors. Few cross country studies looking at the economic costs of injuries have been conducted and often where this has happened different methodologies have been used making comparisons very difficult.

One exception has been the development of the EUROCCOST study supported by the Commission (11-12), which undertook to estimate the **direct medical care costs** associated with hospital presenting injuries across 10 EU countries. Findings from this project were used to extrapolate hospital costs of €10.8 billion across all EU- 15 countries for all admitted injured patients. Table 5 shows the total hospital costs due to admitted injury patients for the participating EUROCCOST countries and their share in Gross Domestic Product (GDP), and total health expenditure. There is remarkable divergence in share of healthcare costs for injuries across countries, which requires careful investigation – e.g. a threefold difference between costs in Austria and the UK.

The study also observed peaks in costs per capita for injuries among children of 0-4 years old, and among 15-24 year old males, due to high incidence rates among these age groups. Costs per capita increase exponentially in older age groups (age 65+), due to the combined effect of high incidence and high costs per patient. Though women sustained only 45% of the total number of injuries, they account for 59% of the costs.

This is mainly because many of the injuries suffered by older women require a high level of care.

Mean costs per patient were also estimated across the EU-15 to be highest for traffic injuries and the lowest for occupational injuries (See Figure 22). The costs per capita are a combination of these mean costs per patient and the incidence rates. The mean costs per capita for injury patients are €35.

In summary the EUROCCOST group concluded that the economic costs of injury are a significant indicator of population health, and that they are a major source of hospitals costs in Europe, meriting greater attention in public health policy across all European countries. Injuries among older people in particular generate high hospital costs.

Moving beyond direct health care costs

The work of the EUROCCOST project is an important step forward in helping to aid decision makers across different sectors consider whether and how to invest in injury prevention initiatives. Direct medical care costs are however just one component of total economic costs of injuries- other costs are incurred in social care, through rehabilitation services, in the criminal justice system, through the loss of human life and the loss of economic productivity to name but a few. Understandable there have been few studies which have sought to measure all of these costs, but again to aid in priority setting particularly where there is a need for intervention outside the health sector (as is the case with most injury prevention strategies) it is important to provide some information on these wider costs. This indeed is recognised by the EUROCCOST

group who are now looking at incorporating measures of lost economic output into future analysis.

While there are many caveats with the way in which such costs should be measured one recent study from London is illustrative of the need to do more work in this area. The figures in this study, which the authors claim to be conservative, for the city of London alone are nearly double the health care services combined across the 10 countries in the EUROCCOST study. Undertaken in London in 2002 the study estimated that the total cost for all injuries, intentional and unintentional was £19.7 billion per annum. (13) Direct costs are estimated at £290m for medical and social care, with the majority of costs accounted for by the human costs in terms of the loss of life or incurrance of serious injury, valued using a standard contingent valuation approach by the UK Department of Transport. This estimated that the value to society of each life lost was more than £700,000, while for serious injuries it was over £100,000 and more than £7000 for slight injuries. A similar approach was used to estimate the value of lost outputs or productivity with £17m criminal justice also attributed to the criminal justice system. (See Table 6)

While care should be taken in the interpretation of this data which is very London specific (and also which the authors claim to be a conservative estimate of total costs) it nevertheless is an indication that substantial economic costs are incurred outside the health and social care systems, and that the health and social care costs of fires, falls, poisoning and other accidents may together be far greater than the costs of road traffic accidents in many settings.

What do we know about cost-effectiveness of strategies to prevent or reduce the consequences of injuries across Europe?

It is not, of course, enough to know that there are substantial costs associated with poor mental health or even that effective interventions are available to help promote and regain positive mental health and well-being. Since scarcity is a permanent and pervasive feature of all societies, the level of resources available for all health problems will never be enough to meet all needs. In the face of such scarcity, choices have to be made. By combining information on both the costs and the effectiveness of different policies and interventions, economic techniques such as cost-effectiveness or cost-benefit analyses can provide decision-makers with data that can inform and assist decisions on how to make the best use of available resources to maximize benefits. This can be a powerful tool for strengthening the case for investment in injury prevention.

The evidence base on the cost-effectiveness of interventions for injury prevention is growing although the focus of many studies has been in North America, Western Europe or Australia alone and their results may not be relevant for other settings. A continuing challenge is to further improve our understanding of cost-effectiveness in other national contexts, especially in central and Eastern Europe, taking account of local circumstances, available resources and system structures. A review of such interventions taking into account their relevance to different settings is now underway.

To give some idea of the usefulness of cost-effectiveness we can briefly (for illustrative purposes only) look at one such evaluation of a community public health injury prevention programme in Sweden (14) The intervention consisted of a number of different health promoting actions targeted at children, older people, road traffic, the workplace and the sports ground. The costs of investing in the programme were measured as well as the impact on the economy of reducing injuries such as a reducing in lost working time and benefits for the health care system. Overall the economic benefits of reducing injuries were twice those of investing the programme 20m SEK in costs avoided compared with 10m costs for running the programme. Such evidence can be a powerful argument for investment in injury prevention.

A newly published study about the cost-effectiveness of a potential countrywide car restraint loan scheme in Greece showed that if we consider a modest rental fee (15 euros) for the car seat for children, the annual cost per life year saved would be of 418 euros (15), while the cost for prevented casualty would be of about 32,000 euros.

One of the challenges of course in the area of injury prevention that can act as an obstacle to investment in cost-effective strategies is the issue of '*silo budgeting*'. This can occur where mental health services are funded by a number of different sectors, and when there are tensions and difficulties in agreeing a coordinated approach to funding proven cost-effective interventions. For instance, a highly cost-effective intervention may increase costs substantially in one sector (e.g. transport) but may generate benefits and a reduction in costs in another sector (e.g. health care) or may actually benefit companies more than governments. A co-ordinated response across

different departments, different budget holders and involving other community stakeholders is therefore required.

CONCLUSIONS

Injuries affecting a large segment of population are those related to motor vehicle accidents, falls, suicide and self-inflicted injuries. Among children (1 to 14 yrs), adolescents (15-19 yrs) and young adults (20-24 yrs), unintentional injuries constitute the *leading cause of death in both the EU15 and new member states*. By type of major groups of injuries, elderly people account for the highest burden of deaths due to falls, while motor vehicle injuries, suicide and violence are also major causes of injury death among elderly.

There are important disparities between EU15 and the new member states concerning injury mortality, possible one of the consequences of the lower GDP in this region. There is an important potential for injury prevention, focusing especially, but not exclusively, on reducing the burden of injuries in new member states. The superiority of primary injury prevention over secondary prevention and treatment is widely accepted. Prevention implies a potential for the reduction of incidence. A study by Petridou et al. concerning the “preventable” fraction of childhood injuries showed that half of childhood lives lost (that is 50%) could have been saved if all member states in (EU15) had matched the accomplishments of the country with the lowest mortality rate. (9) If the new member states would match the achievements of EU15 states, the preventable fraction of injuries could be even higher.

There are still major gaps in knowledge. Much work has inevitably concentrated on fatal injuries because of the greater availability of data. Much less is known about the long-term consequences of non-fatal injuries. These have significant resource consequences and a more systematic method of measuring such injuries would be welcome.

At an EU level potential actions can include enhanced initiatives to share and exchange information on injuries and improve reporting of non-fatal, non-hospital system based events. Actions should be coordinated across sectors linking public health and health promotion strategies, with transport, and occupational safety and health. While economic evidence is growing, the specific costs and benefits of different strategies need to be calculated for different countries where resource levels may be very different. It may also be more effective to target specific population groups, and the needs of older people may be such a priority.

Greater injury prevention through the implementation of cost-effective actions is consistent with the EU's Lisbon Process with the target of ensuring full employment and promoting social inclusion by 2010. The EU should disseminate information on cost effective approaches to countries to encourage the uptake at Member State level of actions, which are outside the competence of the EU.

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Figure 1. Injury mortality rate (per 100,000 people) all ages, by intent, WHO Regions
 (Data source: WHO Burden of Diseases Project, estimates for 2002, data analysed by
 CEREPRI, University of Athens, Greece)

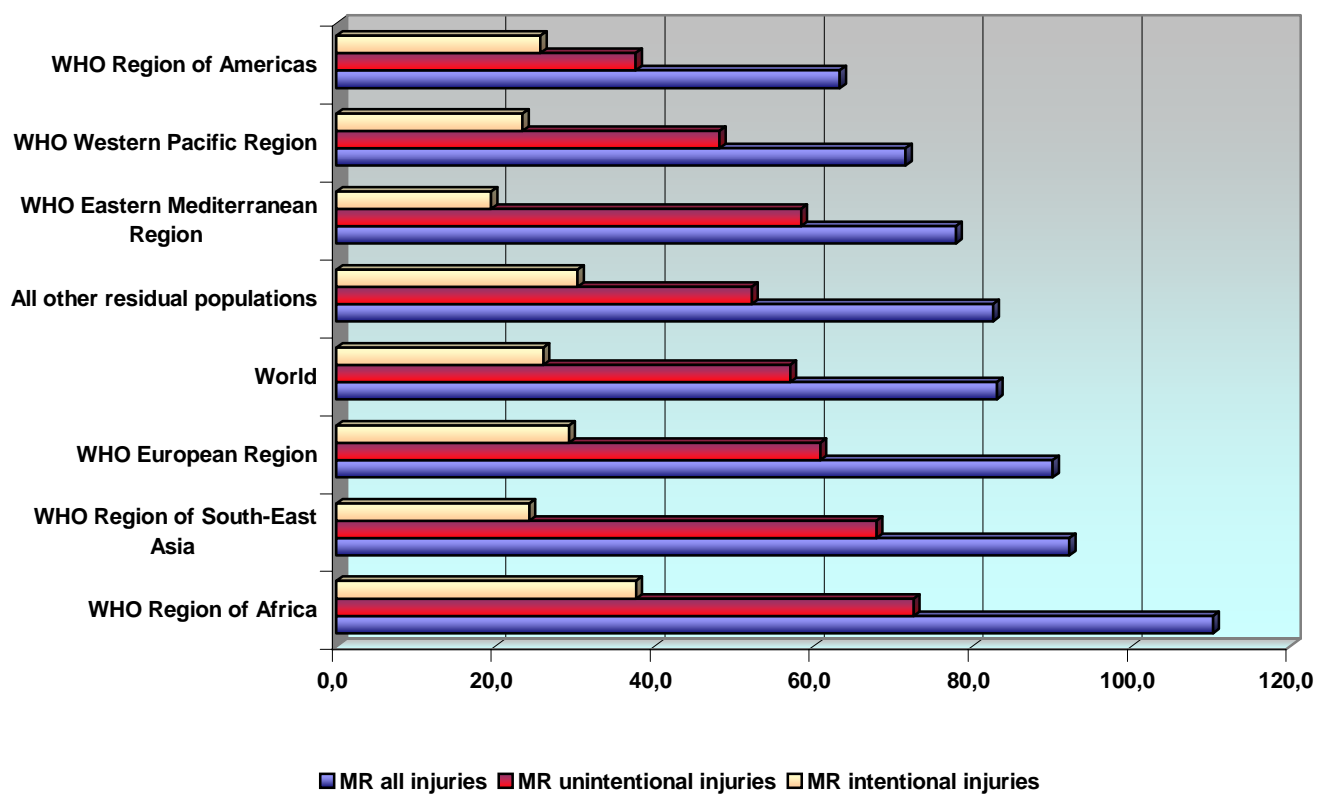


Figure 2. Injury mortality rate (per 100,000 people), all ages, all injuries, WHO Regions, EU15, and EU25 (Data source: WHO Burden of Diseases Project, estimates for 2002; WHO European Health For All- HFA database, last available year -data analysed by CEREPRI, University of Athens, Greece)

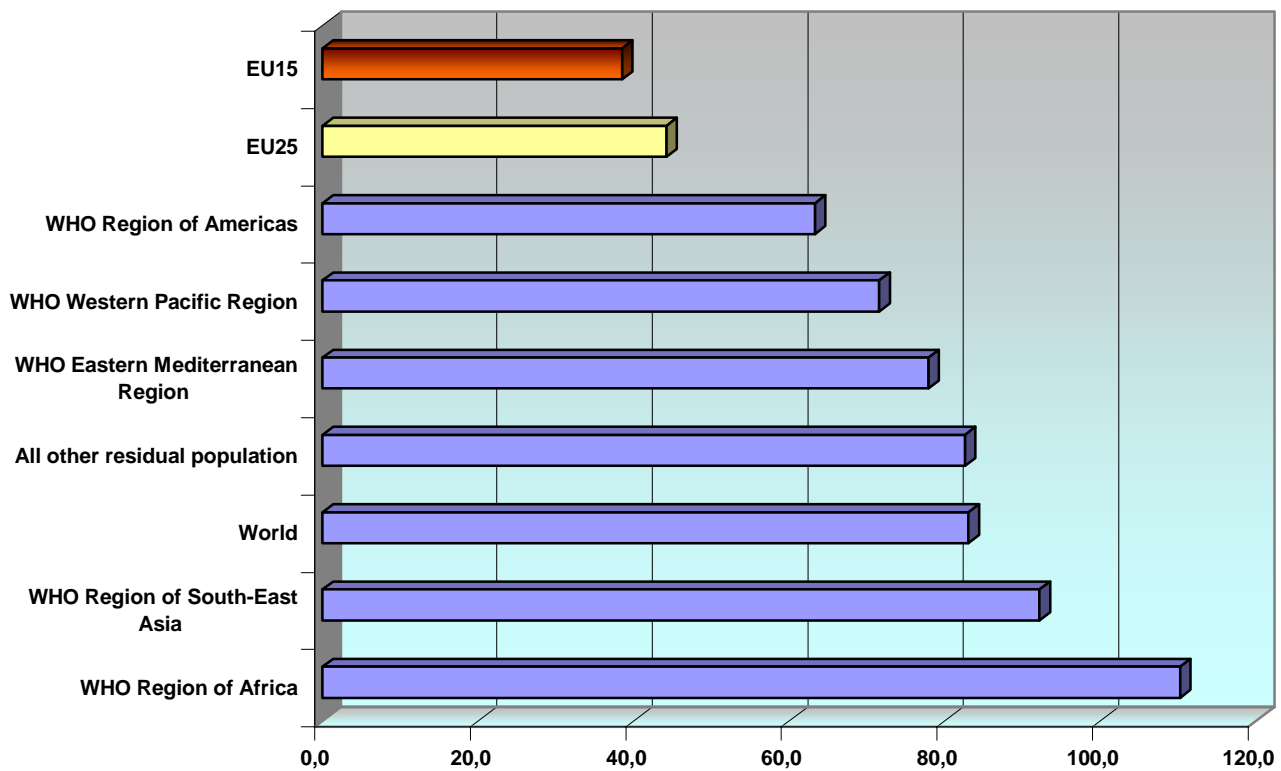


Figure 3. Age adjusted injury mortality rates in EU15, EU25 and the United States of America (Data sources: WHO, CDC).

Country	Injury Mortality	Rank
EU-15	38.5	1
EU-25	45.0	2
USA	53	3

Figure 4. Unintentional injury mortality rate (per 100,000 people), all ages, all injuries, in WHO (Data source: WHO Burden of Diseases Project, estimates for 2002, data analysed by CEREPRI, University of Athens, Greece)

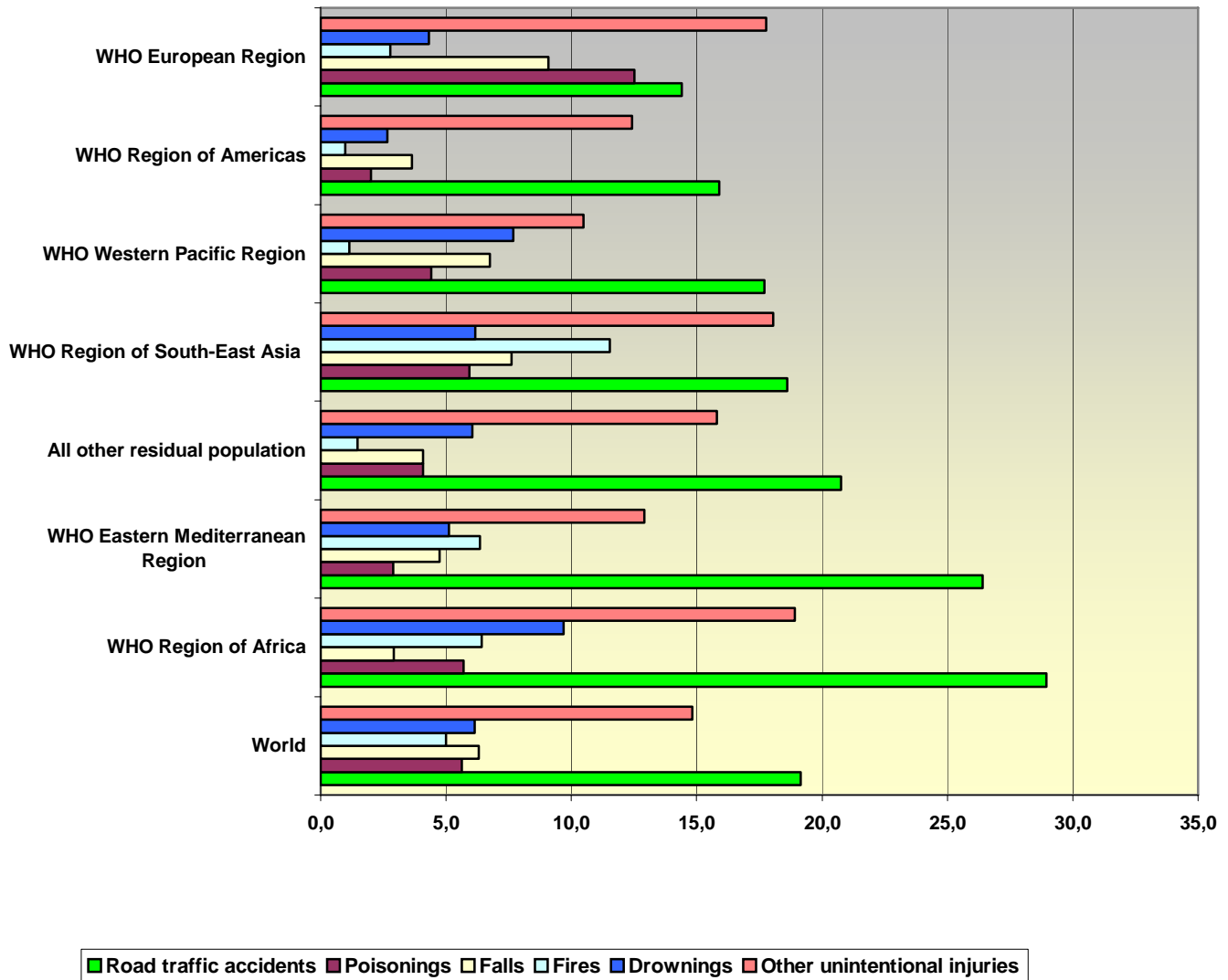
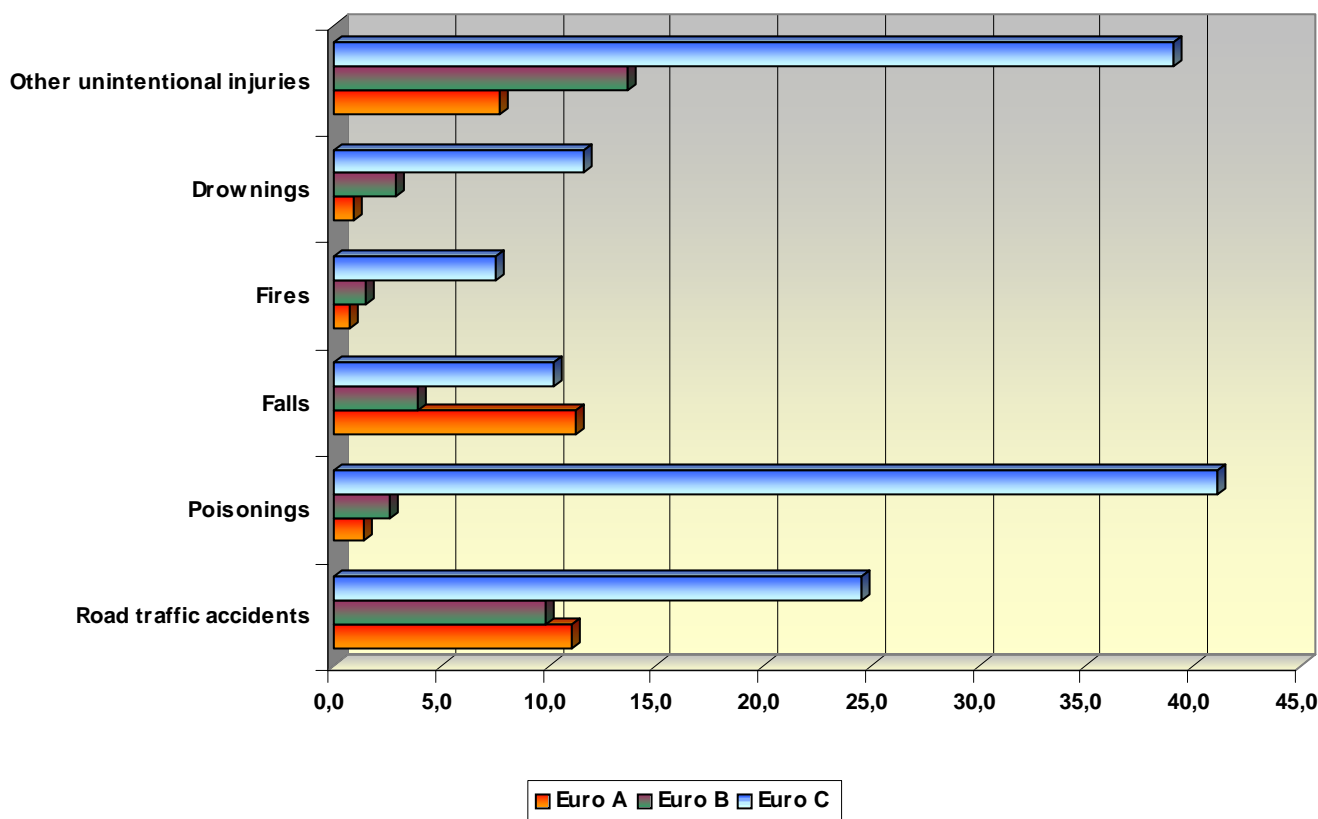


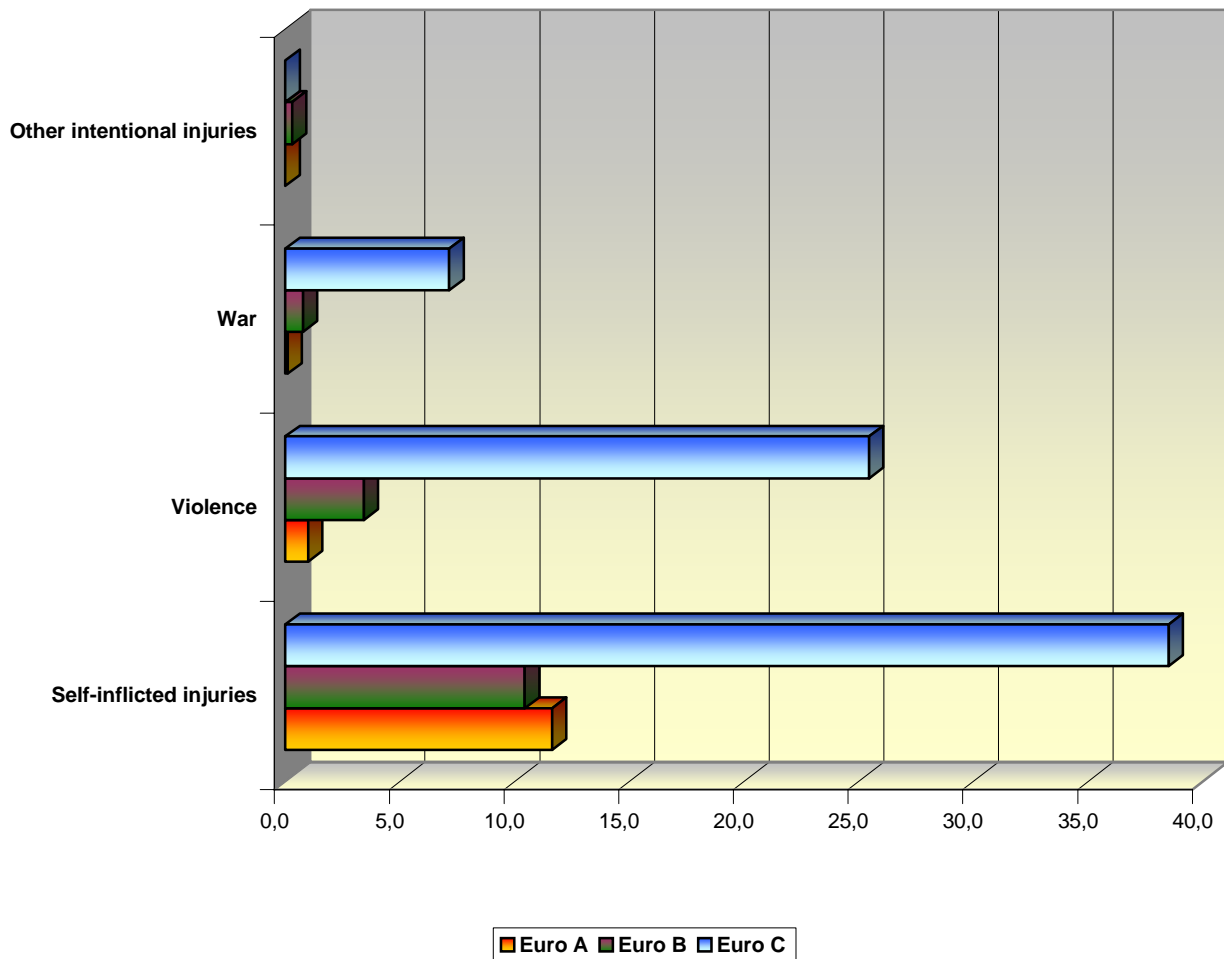
Figure 5. Unintentional injury mortality rate in WHO European Sub-regions *(Data source: WHO Burden of Diseases Project, estimates for 2002, data analysed by CEREPRI, University of Athens, Greece)



* Euro-A sub-region comprises 27 countries with very low child and very low adult mortality: Andorra, Austria, Belgium, Croatia, Cyprus, the Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, the Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom. Euro-B comprises 16 countries with low child and low adult mortality: Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Poland, Romania, Serbia and Montenegro, Slovakia, Tajikistan, FYRO, Turkey, Turkmenistan and Uzbekistan. Euro-C comprises 9 countries with low child and high adult mortality: Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, the Republic of Moldova, the Russian Federation and Ukraine.

Figure 6. Intentional injury mortality rate in WHO European Sub-regions *(Data source: WHO Burden of Diseases Project, estimates for 2002, data analysed by CEREPRI, University of Athens, Greece)

*Euro-A sub-region comprises 27 countries with very low child and very low adult mortality: Andorra, Austria,



Belgium, Croatia, Cyprus, the Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, the Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom. Euro-B comprises 16 countries with low child and low adult mortality: Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Poland, Romania, Serbia and Montenegro, Slovakia, Tajikistan, FYRO, Turkey, Turkmenistan and Uzbekistan. Euro-C comprises 9 countries with low child and high adult mortality: Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, the Republic of Moldova, the Russian Federation and Ukraine.

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Table 1. Basic figures and overview of the injury problem in EU-15

Population (number of inhabitants)	375587000		
Gross Domestic Product (GDP) per capita (euros)	23400		
Live births (per 1000 population)	10.7		
Life expectancy at birth (years)	Men: 75.8 Women: 81.9		
Infant mortality (per 1000 live births)	4.5		
Crude Mortality Rate (MR) per 100000 people	988.8		
Leading causes of death (all ages)	Rank	Cause of death	Crude MR (per 100000 people)
	1.	Diseases of the circulatory system	406.3
	2.	Malignant neoplasms	248.4
	3.	Pneumonia	38.4
	4.	Accidents and adverse effects	32.9
	5.	Other diseases of the respiratory system	30.9
	6.	Diabetes mellitus	21.2
	7.	Bronchitis, chronic and unspecified, emphysema and asthma	21.1
	8.	Mental disorders	20.5
	9.	Signs, symptoms and other ill-defined conditions	20.5
	10.	Other diseases of the digestive system	19.2
Hospital discharges (estimates), injury and poisoning per 100000	1606.4		

Data Sources: Eurostat 2004. EU enlargement The new EU of 25 compared to EU15; European Union- Key facts and figures about European Union (available at: http://europa.eu.int/abc/keyfigures/index_en.htm, accessed November 4, 2004); last available data from WHO mortality database (WHOSIS), analysed by CEREPRI, Athens, Greece (years last available: Austria 2000, Belgium 1996, Denmark 1998, Finland 2000, France 1999, Germany 1999, Greece 1999, Ireland 1999, Italy 1999, Luxembourg 2000, Netherlands 1999, Portugal 1999, Spain 1998, Sweden 1999, UK 1999). WHO Regional Office for Europe: HFA database; <http://www.nationmaster.com/>

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Table 2. Basic figures and overview of the injury problem in **New Member States**

Population (number of inhabitants)	74718472		
Gross Domestic Product (GDP) per capita (euros)	11060		
Live births (per 1000 population)	9.4		
Life expectancy at birth (years)	Men: 70.0 Women: 78.0		
Infant mortality (per 1000 live births)	6.9		
Crude Mortality Rate (MR) per 100000 people*	1047.7		
Leading causes of death (all ages) *	Rank	Cause of death	Crude MR (per 100000 people)
	1.	Diseases of the circulatory system	525.0
	2.	Malignant neoplasms	243.3
	3.	Accidents and adverse effects	50.3
	4.	Signs, symptoms and other ill-defined conditions	25.0
	5.	Chronic liver disease and cirrhosis	23.5
	6.	Bronchitis, chronic and unspecified, emphysema and asthma	22.1
	7.	Pneumonia	20.9
	8.	Suicide and self- inflicted fatal injury	20.1
	9.	Other diseases of the digestive system	16.3
	10.	Senility	16.1
Hospital discharges (estimates), injury and poisoning per 100000	1343.6		

* Data for Cyprus not available

Data Sources: Eurostat 2004. EU enlargement The new EU of 25 compared to EU15; European Union- Key facts and figures about European Union (available at: http://europa.eu.int/abc/keyfigures/index_en.htm, accessed November 4, 2004); last available data from WHO mortality database, analysed by CEREPRI, Athens, Greece (Czech Republic, Estonia, Lithuania, Hungary, Latvia, Slovakia: 2000; Malta and Slovenia: 1999) WHO Regional Office for Europe: HFA database; <http://www.nationmaster.com/>

Figure 7. Injury mortality rates in **EU15 and New Member States**, all ages, by type of injury (last available data from WHOSIS*, data analysed by CEREPRI, Athens, Greece)

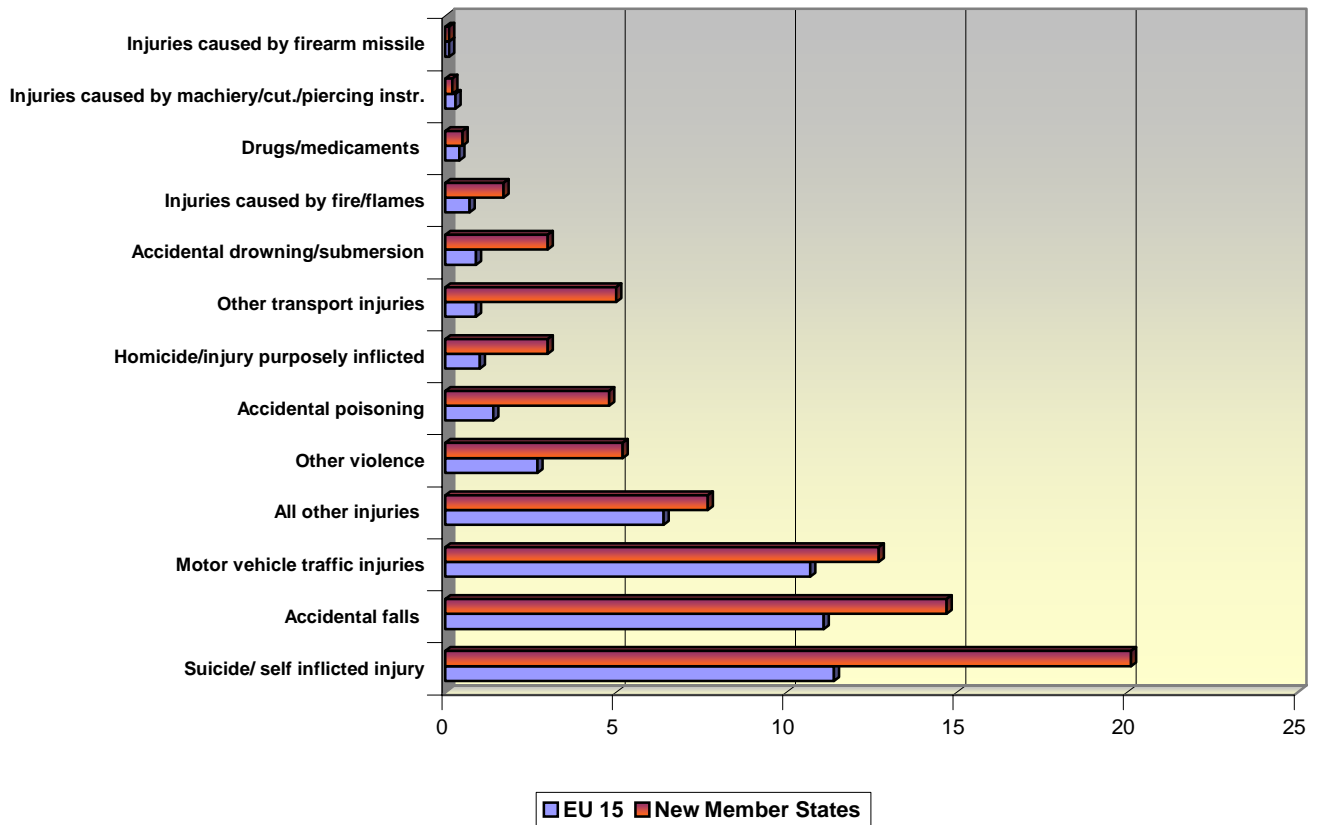


Figure 8. Probability of dying from injuries in the EU (Data source: WHO mortality database, last available data, analysed by CEREPRI, Athens, Greece)

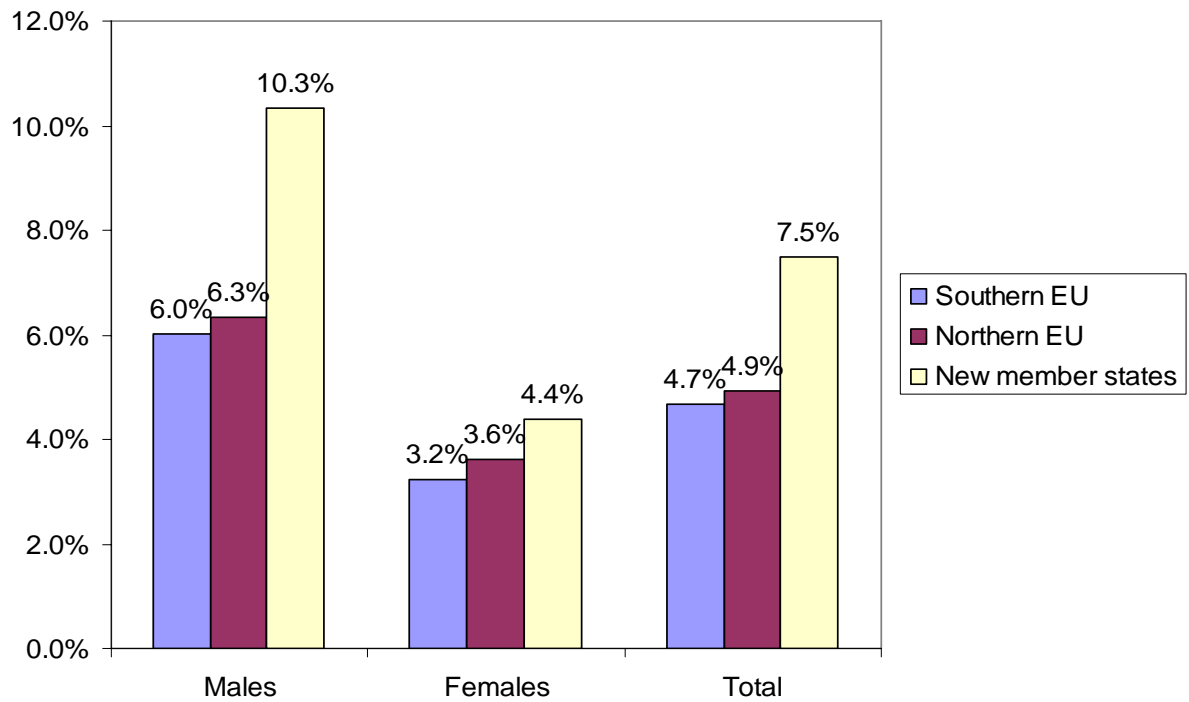


Figure 9. Injury mortality rates by age and gender in the EU (Data source: WHO mortality database, analysed by CEREPRI, Athens, Greece)

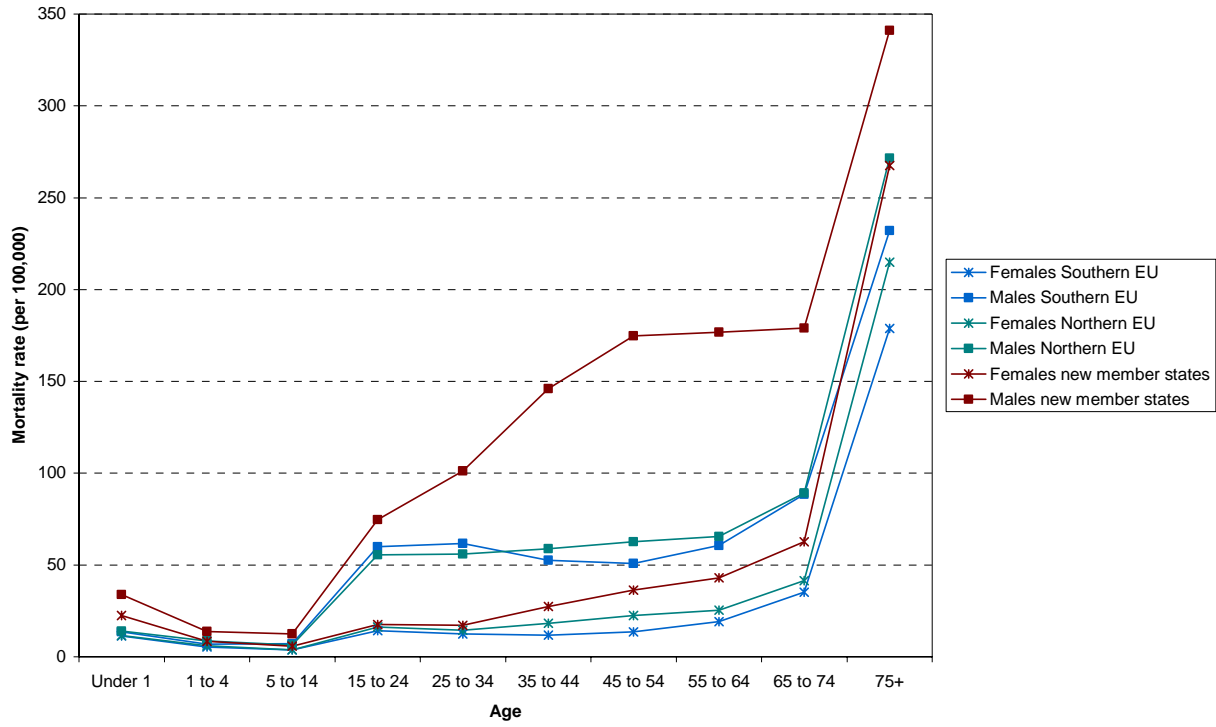


Figure 10. Injury mortality rates (per 100,000 people) by age groups, all injuries, both genders, in EU25

Average of data for the 3 last available years, WHO mortality database, analysed by CEREPRI,
Athens,
Greece

* Data for Cyprus not available

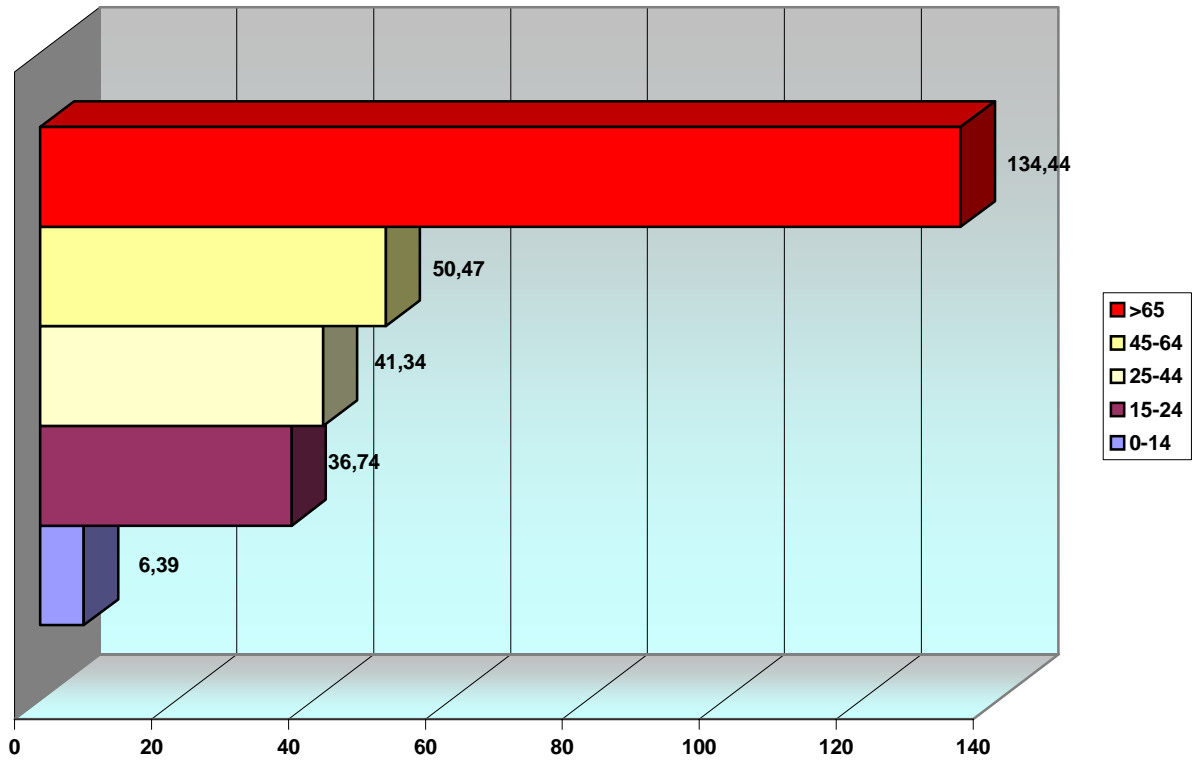


Figure 11. Injury mortality rates for selected type of injuries (per 100,000 people) by age group, both genders, in EU25

Average of data for the 3 last available years, WHO mortality database, analysed by CEREPRI,
Athens,
Greece

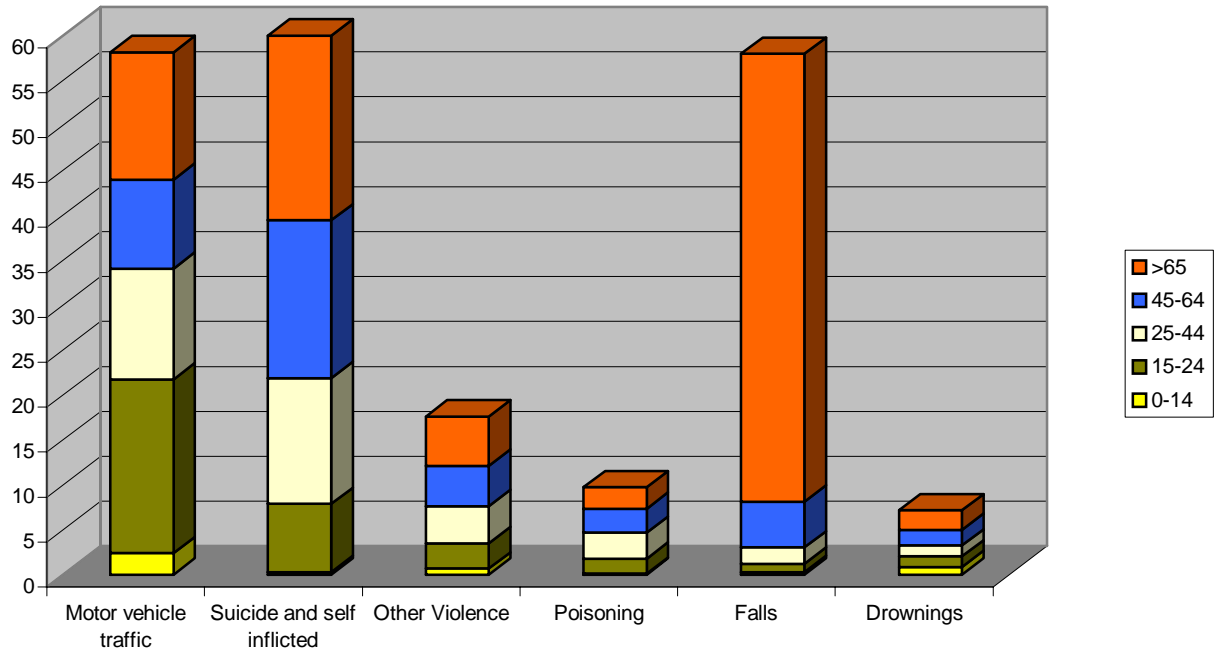


Figure 12. Leading causes of death in **childhood** (1 to 14 yrs.), EU15
Last available data from WHO mortality database, analysed by CEREPRI, Athens,
Greece

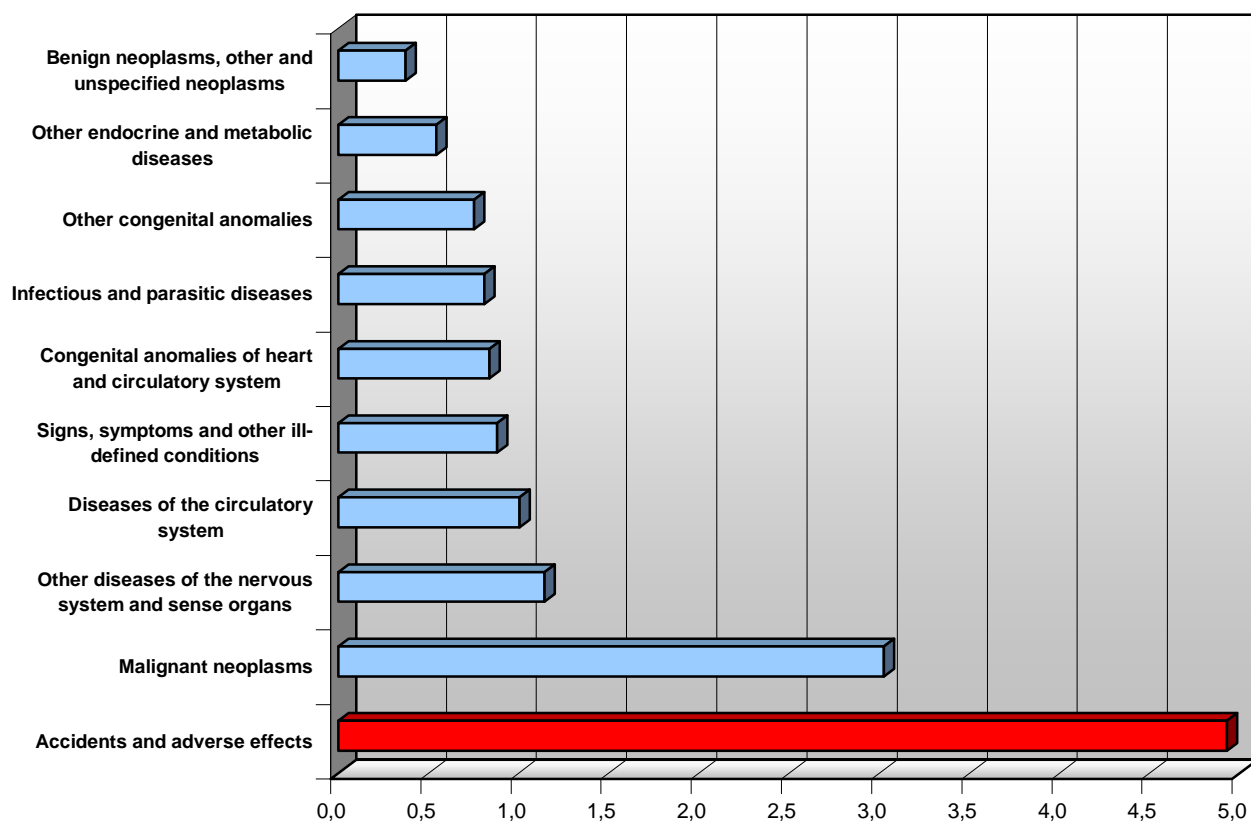


Figure 13. Leading causes of death in **adolescence and young adulthood** (15 to 24 yrs.), EU15, last available data from WHO mortality database, analysed by CEREPRI, Athens, Greece

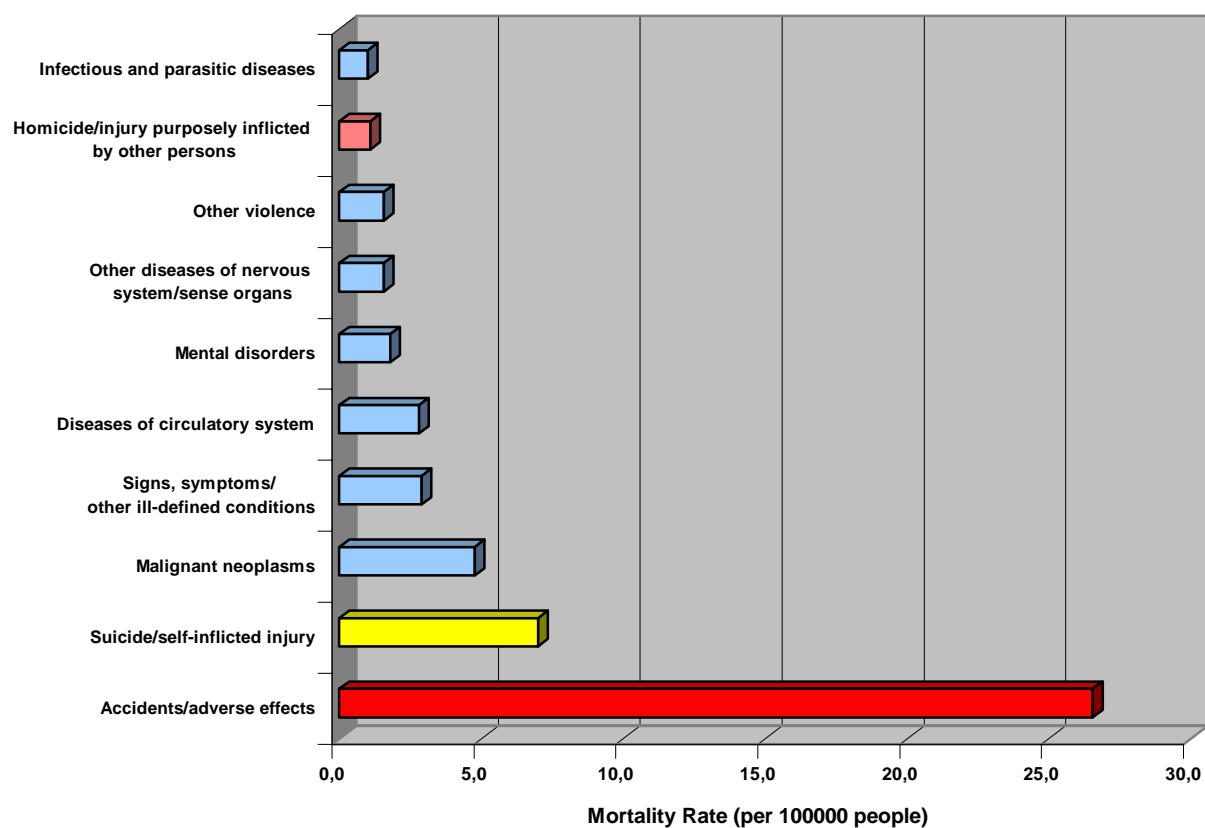


Figure 14. Leading causes of death in **childhood** (1 to 14 yrs.), New Member States*
Last available data from WHO mortality database, analysed by CEREPRI, Athens,
Greece

* Data for Cyprus not available

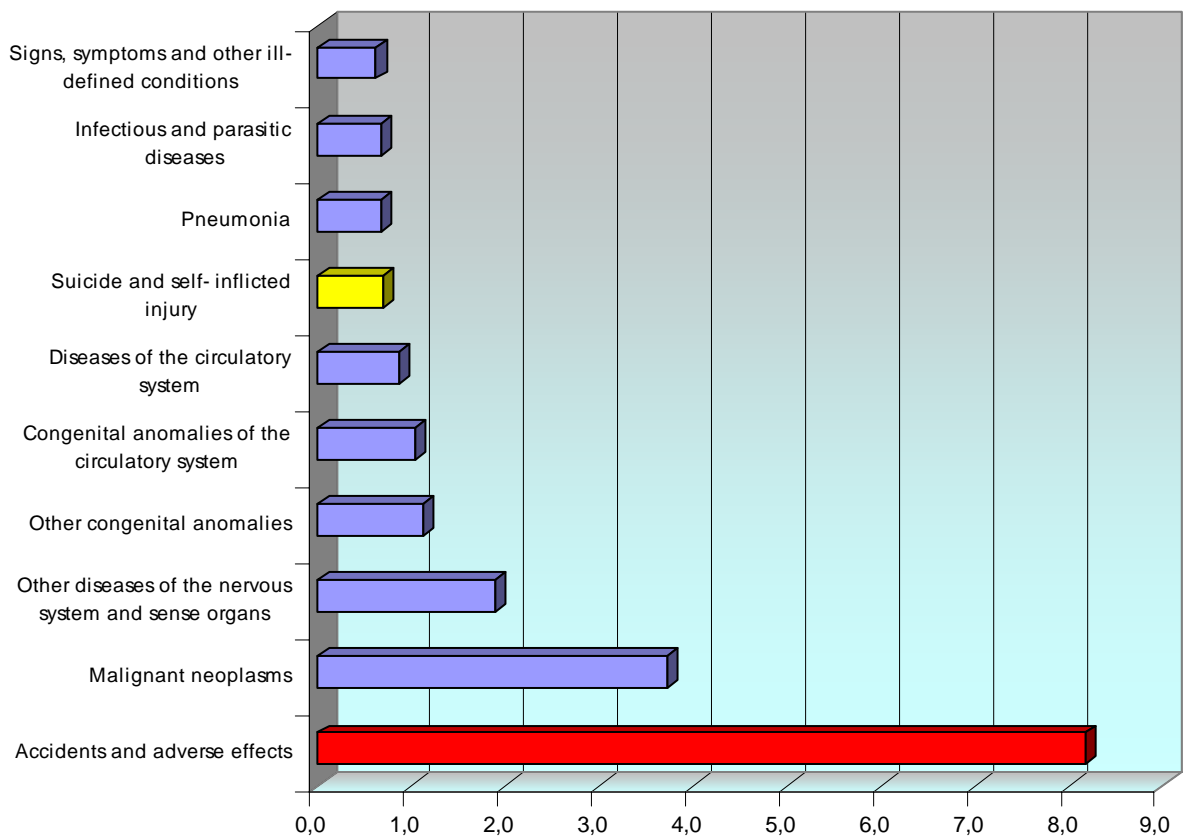
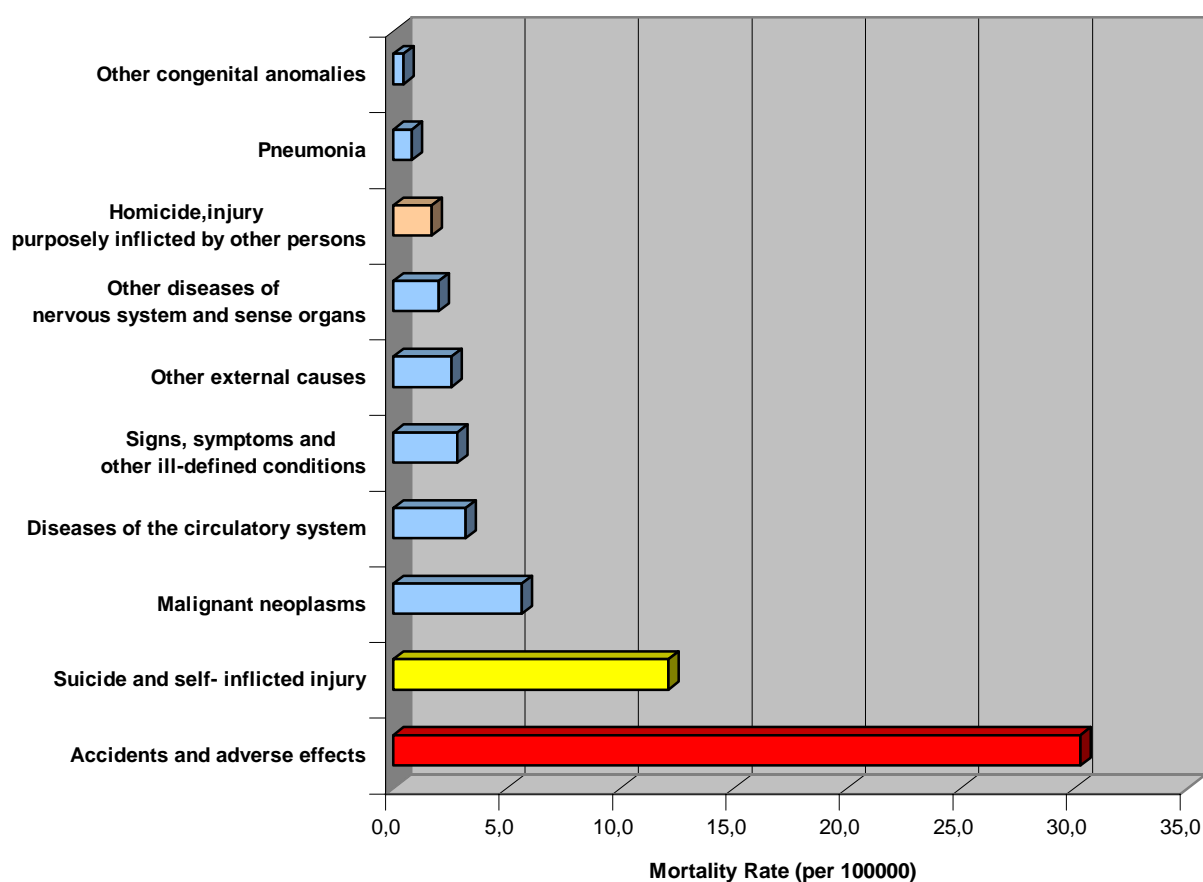


Figure 15. Leading causes of death in **adolescence and young adulthood** (15-24 yrs.), New Member States*; Last available data from WHO mortality database, analysed by CEREPRI, Athens, Greece

* Data for Cyprus not available



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Table 3. Injury mortality rates by type of injury and gender, EU15 (last available WHO data, analysed, by CEREPRI, Athens, Greece)

Females											
Type of injury	All	Under 1	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75+
Motor vehicle traffic accidents	5.4	2.2	1.9	1.9	8.8	4.9	3.9	4.0	4.9	7.4	10.
Other transport accidents	0.4	0.0	0.1	0.2	0.5	0.3	0.3	0.3	0.4	0.6	0.7
Accidental poisoning	0.8	0.2	0.2	0.1	0.5	0.7	0.7	0.7	0.6	0.9	2.5
Accidental falls	12.9	0.4	0.4	0.1	0.3	0.4	0.7	1.5	2.7	9.7	123
Accidents caused by fire and flames	0.6	0.3	0.4	0.2	0.2	0.2	0.3	0.4	0.4	0.7	3.0
Accidental drowning and submersion	0.4	0.4	0.9	0.2	0.2	0.1	0.3	0.3	0.5	0.8	1.1
Accidents caused by machinery and by cutting and	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1
Accidents caused by firearm missile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All other accidents including late effects	5.4	5.5	1.4	0.5	0.8	0.7	1.1	2.0	2.9	6.6	40.
Drugs medicaments causing adverse effects in	0.4	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.8	3.0
Suicide and self-inflicted injury	5.9	0.0	0.0	0.2	2.8	4.6	6.6	8.0	8.4	9.0	11.
Homicide and injury purposely inflicted by other	0.6	1.6	0.3	0.3	0.7	0.8	0.8	0.6	0.5	0.5	0.7
Other violence	1.7	0.9	0.4	0.2	0.9	1.1	1.4	1.7	1.7	2.2	6.6
Overall	34.5	11.6	5.9	3.9	15.6	13.9	16.2	19.8	23.5	39.3	203
Males											
Type of injury	All	Under 1	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75+
Motor vehicle traffic accidents	16.3	2.3	1.9	3.3	31.3	21.1	14.8	13.1	13.3	17.4	28.
Other transport accidents	1.4	0.0	0.3	0.3	1.7	1.5	1.4	1.5	1.6	1.8	2.6
Accidental poisoning	2.0	0.1	0.2	0.1	2.0	3.9	2.7	1.9	1.2	1.5	2.8
Accidental falls	9.3	0.7	0.6	0.3	1.4	1.8	3.2	5.5	8.6	16.5	105
Accidents caused by fire and flames	0.9	0.3	0.7	0.2	0.4	0.5	1.0	0.9	1.0	1.6	3.5
Accidental drowning and submersion	1.4	0.6	1.7	0.5	1.1	1.1	1.2	1.5	1.8	2.3	3.3
Accidents caused by machinery and by cutting and	0.5	0.1	0.0	0.1	0.3	0.4	0.5	0.6	0.8	1.0	0.6
Accidents caused by firearm missile	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2
All other accidents including late effects	7.4	6.7	1.6	0.8	3.0	3.7	4.6	6.7	8.3	14.6	49.
Drugs medicaments causing adverse effects in	0.4	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.5	1.3	3.7
Suicide and self-inflicted injury	17.2	0.0	0.0	0.4	11.0	17.5	21.2	21.3	21.4	25.4	46.
Homicide and injury purposely inflicted by other	1.4	1.6	0.6	0.2	1.5	2.0	1.9	1.6	1.2	0.8	1.0
Other violence	3.7	1.3	0.6	0.4	3.2	4.2	4.3	4.3	4.1	4.6	10.
Overall	62.1	14.0	8.2	6.6	57.0	57.9	57.0	59.2	64.0	88.9	258
Both sexes											
Type of injury	All	Under 1	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75+
Motor vehicle traffic accidents	10.7	2.3	1.9	2.6	20.3	13.1	9.4	8.6	9.0	11.9	16.
Other transport accidents	0.9	0.0	0.2	0.3	1.1	0.9	0.8	0.9	1.0	1.1	1.4
Accidental poisoning	1.4	0.2	0.2	0.1	1.2	2.3	1.7	1.3	0.9	1.2	2.6
Accidental falls	11.1	0.5	0.5	0.2	0.9	1.1	1.9	3.5	5.6	12.7	117
Accidents caused by fire and flames	0.7	0.3	0.5	0.2	0.3	0.4	0.6	0.6	0.7	1.1	3.2
Accidental drowning and submersion	0.9	0.5	1.3	0.4	0.6	0.6	0.7	0.9	1.1	1.4	1.8
Accidents caused by machinery and by cutting and	0.3	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.3
Accidents caused by firearm missile	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
All other accidents including late effects	6.4	6.2	1.5	0.6	1.9	2.2	2.9	4.3	5.5	10.2	43.
Drugs medicaments causing adverse effects in	0.4	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.4	1.0	3.2
Suicide and self-inflicted injury	11.4	0.0	0.0	0.3	7.0	11.2	14.0	14.6	14.8	16.4	23.
Homicide and injury purposely inflicted by other	1.0	1.6	0.4	0.2	1.1	1.4	1.4	1.1	0.8	0.7	0.8
Other violence	2.7	1.1	0.5	0.3	2.1	2.7	2.9	3.0	2.8	3.3	7.8
Overall	48.0	12.8	7.1	5.3	36.7	36.3	36.8	39.5	43.3	61.6	222

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Table 4. Injury mortality rates by type of injury and gender, in 9 new member states- data for Cyprus
not available (last available WHO data, analysed by CEREPRI, Athens, Greece)

Females											
Type of injury	All	Under 1	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75+
Motor vehicle traffic accidents	5.8	1.2	1.6	2.3	6.8	4.2	4.8	5.2	7.1	9.0	13.7
Other transport accidents	1.9	0.6	0.8	0.6	2.2	1.6	1.4	2.1	2.0	2.7	5.2
Accidental poisoning	1.8	0.0	0.4	0.2	1.0	1.2	2.4	2.9	3.2	2.4	2.9
Accidental falls	15.0	0.9	0.5	0.2	0.5	0.7	1.3	2.5	5.6	19.4	186.
Accidents caused by fire and flames	0.9	0.3	0.6	0.2	0.1	0.2	0.5	0.9	1.3	1.6	4.9
Accidental drowning and submersion	1.2	0.6	1.6	0.7	0.5	0.7	1.0	1.3	1.6	2.2	2.5
Accidents caused by machinery and by cutting and	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0
Accidents caused by firearm missile	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0
All other accidents including late effects	3.7	12.4	1.6	0.7	0.8	1.1	2.5	3.7	4.7	6.1	20.1
Drugs medicaments causing adverse effects in	0.4	0.0	0.1	0.0	0.0	0.1	0.2	0.4	0.8	1.0	1.9
Suicide and self-inflicted injury	7.7	0.0	0.0	0.4	3.6	4.7	8.8	11.8	11.7	13.0	18.6
Homicide and injury purposely inflicted by other	1.6	5.5	0.5	0.2	1.0	1.4	2.4	2.3	1.7	1.5	3.0
Other violence	2.3	1.2	0.5	0.2	1.0	1.1	2.1	3.1	3.0	3.6	8.1
Overall	42.4	22.5	8.4	5.8	17.6	17.1	27.5	36.3	42.9	62.7	267.

Males											
Type of injury	All	Under 1	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75+
Motor vehicle traffic accidents	20.1	1.9	2.5	3.5	24.0	23.4	23.0	24.5	23.5	24.7	32.8
Other transport accidents	8.3	1.1	1.2	1.6	8.4	9.6	10.1	10.4	10.6	10.7	14.1
Accidental poisoning	7.9	0.0	0.5	0.2	3.6	6.6	12.7	15.9	14.4	7.6	5.3
Accidental falls	14.3	0.5	1.2	0.3	2.3	3.7	9.2	14.9	22.6	38.0	157.
Accidents caused by fire and flames	2.5	0.5	1.0	0.3	0.5	1.2	2.9	4.5	4.9	5.4	7.1
Accidental drowning and submersion	5.1	0.3	3.8	2.4	4.3	4.7	6.3	6.6	7.2	5.4	5.5
Accidents caused by machinery and by cutting and	0.4	0.0	0.1	0.1	0.2	0.3	0.6	0.7	0.4	0.5	0.6
Accidents caused by firearm missile	0.1	0.0	0.0	0.0	0.2	0.2	0.1	0.2	0.1	0.1	0.1
All other accidents including late effects	11.9	20.2	2.5	1.4	4.3	7.8	14.5	20.1	22.4	20.4	27.0
Drugs medicaments causing adverse effects in	0.6	0.0	0.1	0.1	0.1	0.1	0.2	0.6	1.5	2.7	4.0
Suicide and self-inflicted injury	33.3	0.0	0.0	1.4	20.3	31.3	47.4	55.5	50.6	45.5	66.9
Homicide and injury purposely inflicted by other	4.4	6.6	0.4	0.3	2.3	5.5	6.8	7.2	5.7	4.7	4.6
Other violence	8.3	2.7	0.6	0.7	4.1	6.9	12.1	13.5	13.0	13.4	15.6
Overall	117.2	33.9	13.9	12.4	74.6	101.3	145.9	174.7	176.8	179.0	341.

Both sexes											
Type of injury	All	Under 1	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75+
Motor vehicle traffic accidents	12.7	1.5	2.1	2.9	15.6	14.0	13.9	14.6	14.6	15.3	19.8
Other transport accidents	5.0	0.8	1.0	1.1	5.4	5.7	5.7	6.2	5.9	5.9	8.1
Accidental poisoning	4.8	0.0	0.4	0.2	2.3	3.9	7.6	9.2	8.3	4.5	3.7
Accidental falls	14.7	0.7	0.9	0.3	1.4	2.2	5.3	8.6	13.4	26.9	177.
Accidents caused by fire and flames	1.7	0.4	0.8	0.3	0.3	0.7	1.7	2.6	2.9	3.2	5.6
Accidental drowning and submersion	3.0	0.4	2.7	1.6	2.4	2.7	3.6	3.9	4.1	3.5	3.5
Accidents caused by machinery and by cutting and	0.2	0.0	0.1	0.1	0.1	0.2	0.3	0.4	0.2	0.3	0.2
Accidents caused by firearm missile	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.0
All other accidents including late effects	7.7	16.4	2.1	1.1	2.6	4.5	8.5	11.7	12.8	11.9	22.3
Drugs medicaments causing adverse effects in	0.5	0.0	0.1	0.0	0.1	0.1	0.2	0.5	1.1	1.7	2.6
Suicide and self-inflicted injury	20.1	0.0	0.0	0.9	12.1	18.2	28.1	33.1	29.4	26.2	34.2
Homicide and injury purposely inflicted by other	3.0	6.0	0.4	0.2	1.7	3.5	4.6	4.7	3.5	2.8	3.5
Other violence	5.2	2.0	0.6	0.5	2.6	4.0	7.1	8.2	7.5	7.6	10.5
Overall	78.5	28.4	11.2	9.2	46.6	59.9	86.8	103.8	103.9	109.8	291.

Figure 16. Leading causes of death in **adulthood** (25 to 64 yrs.), EU15

Last available data from WHO mortality database, analysed by CEREPRI, Athens, Greece

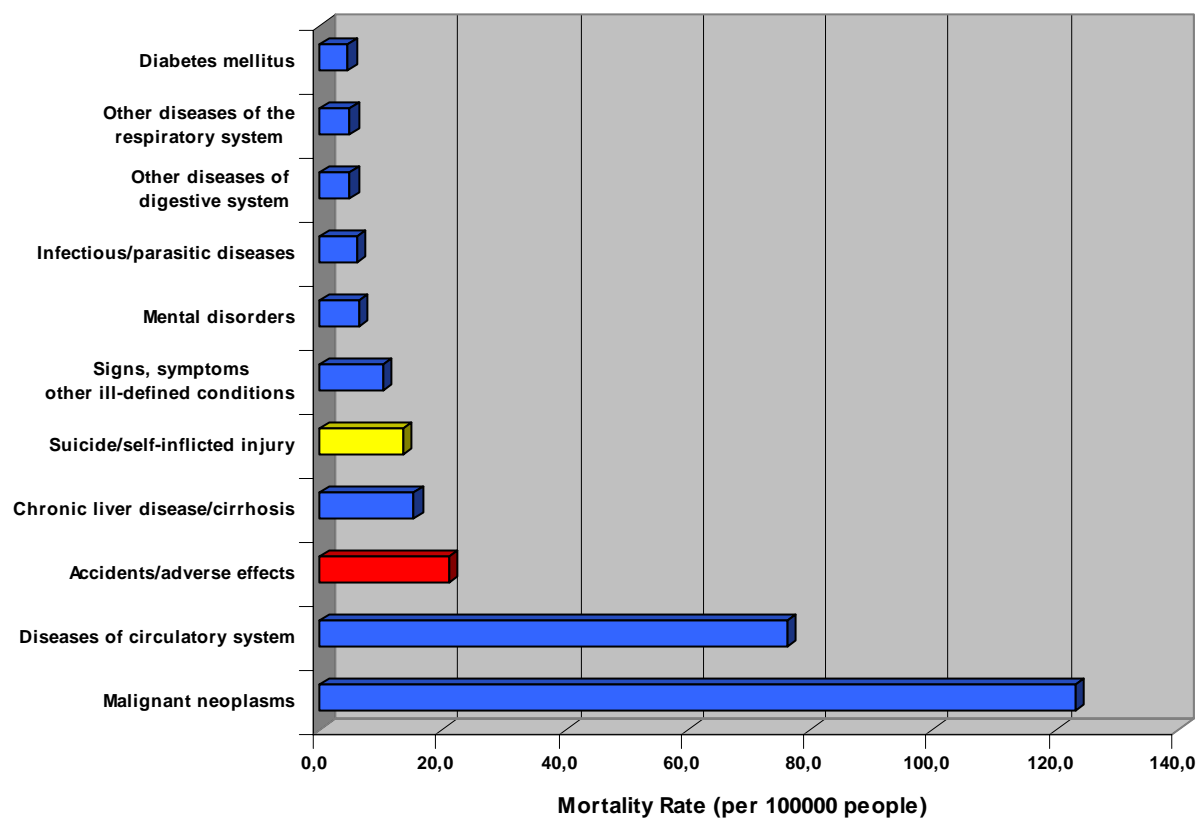


Figure 17. Leading causes of death in **adulthood** (25-64 yrs.), New Member States*; Last available data from WHO mortality database, analysed by CEREPRI, Athens, Greece

* Data for Cyprus not available

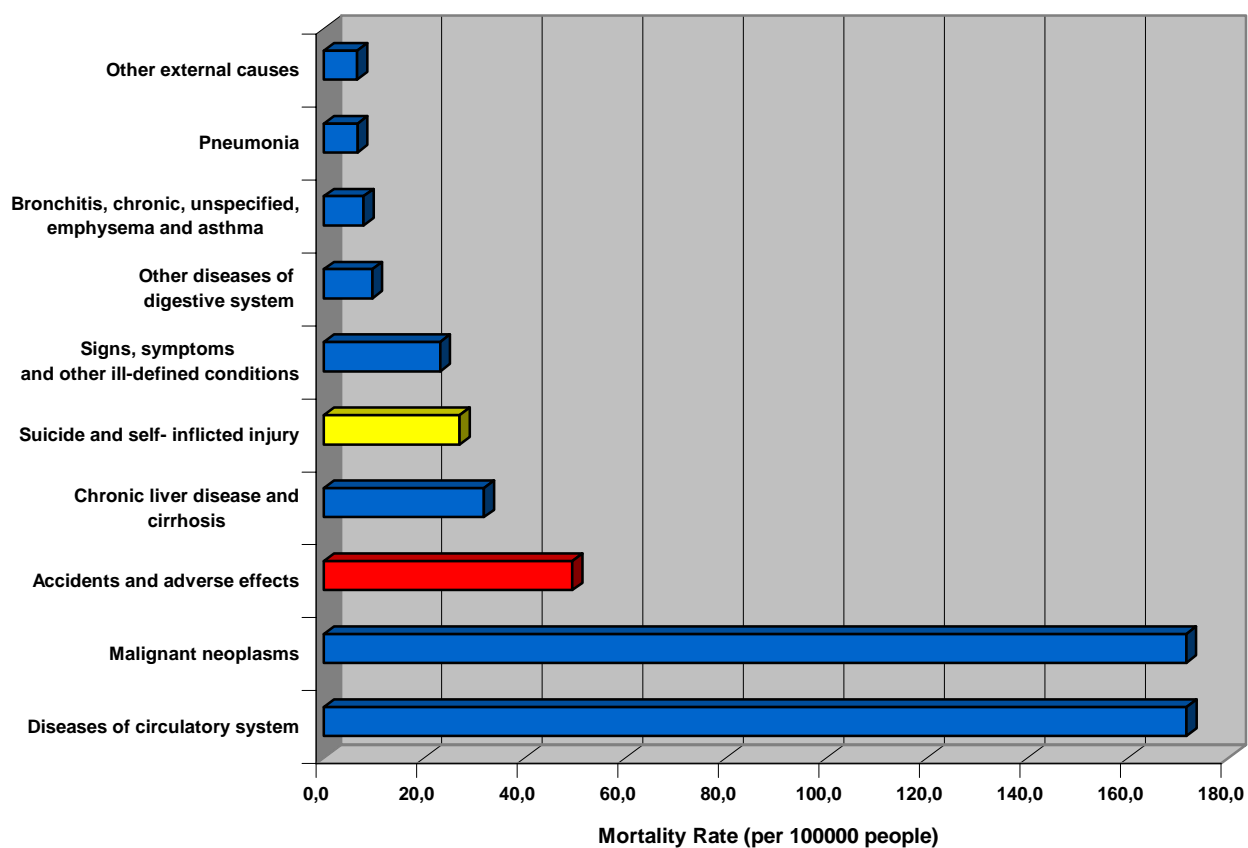


Figure 18. Injury mortality rate for motor-vehicle traffic injuries (crude rates), all ages, both genders, EU15 and new member states*, by country

Last available data from WHO mortality database, analysed by CEREPRI, Athens, Greece

* Data for Cyprus not available

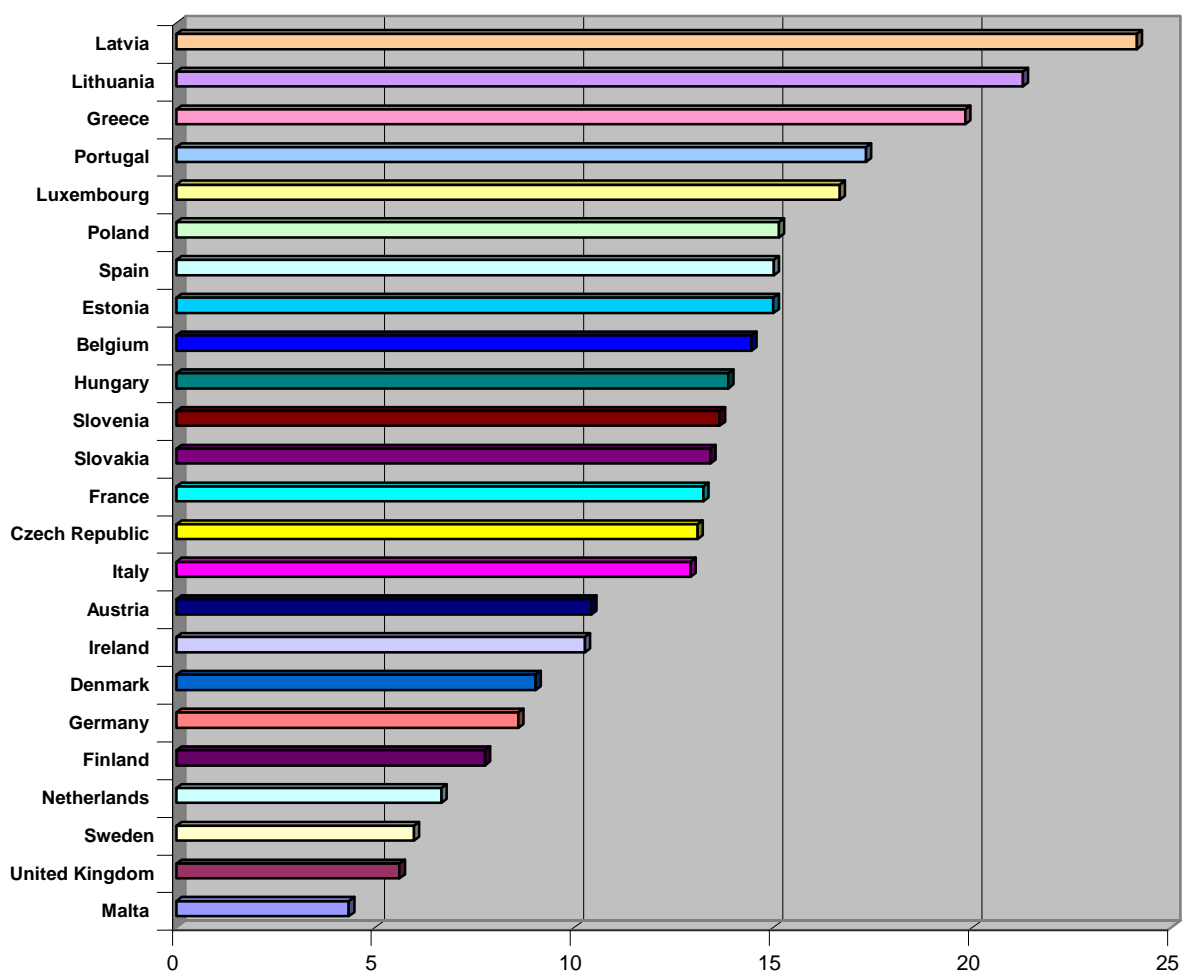


Figure 19. Injury mortality rate for fall related injuries, all ages, both genders, EU15 and new member states*, by country
Last available data from WHO mortality database, analysed by CEREPRI, Athens, Greece

* Data for Cyprus not available

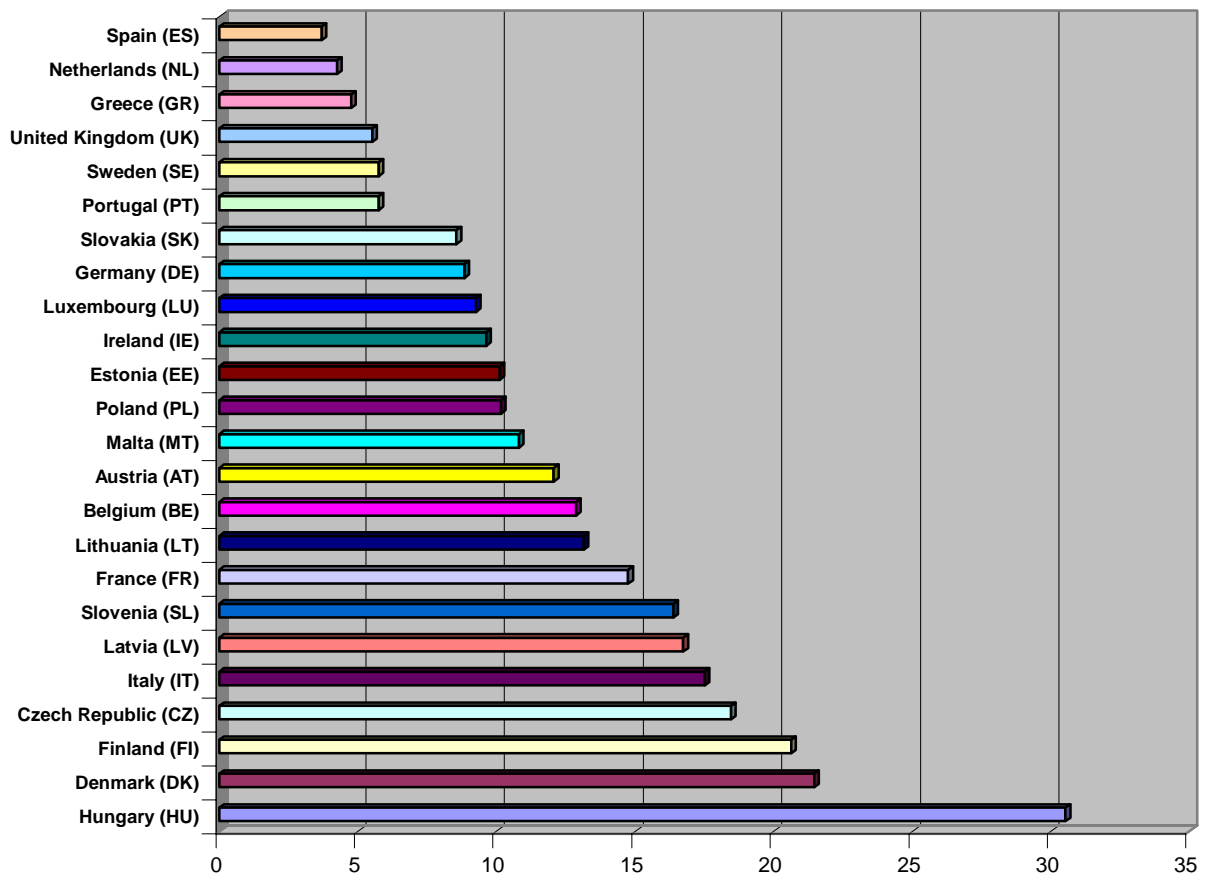


Figure 20. Injury mortality rate for suicide and self-inflicted fatal injuries, all ages, both genders, EU15 and new member states*, by country

Last available data from WHO mortality database, analysed by CEREPRI, Athens, Greece

* Data for Cyprus not available

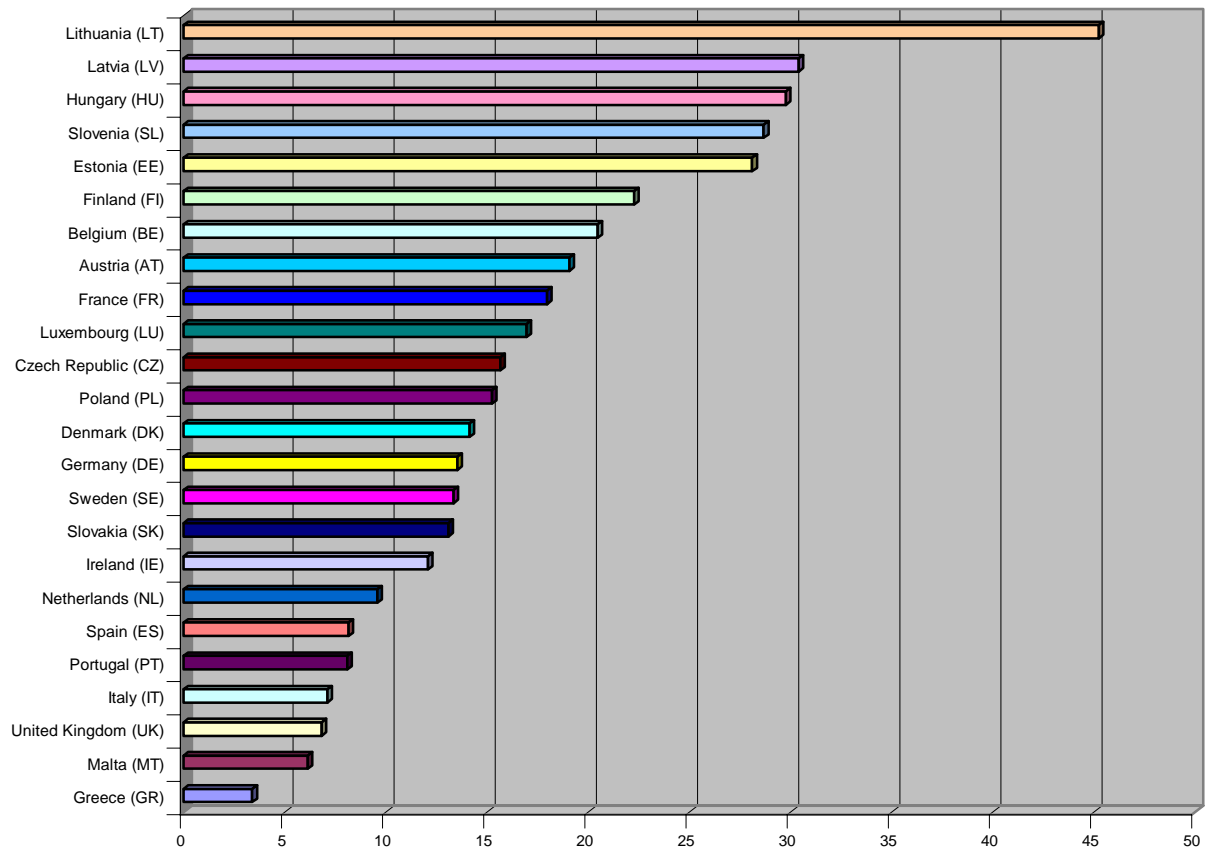


Figure 21. Estimates for hospital discharges, injury and poisoning per 100,000 people, last available data from WHO Health for All database (all ages, both genders, EU15 and new member states*), by country

* Data for the United Kingdom not available

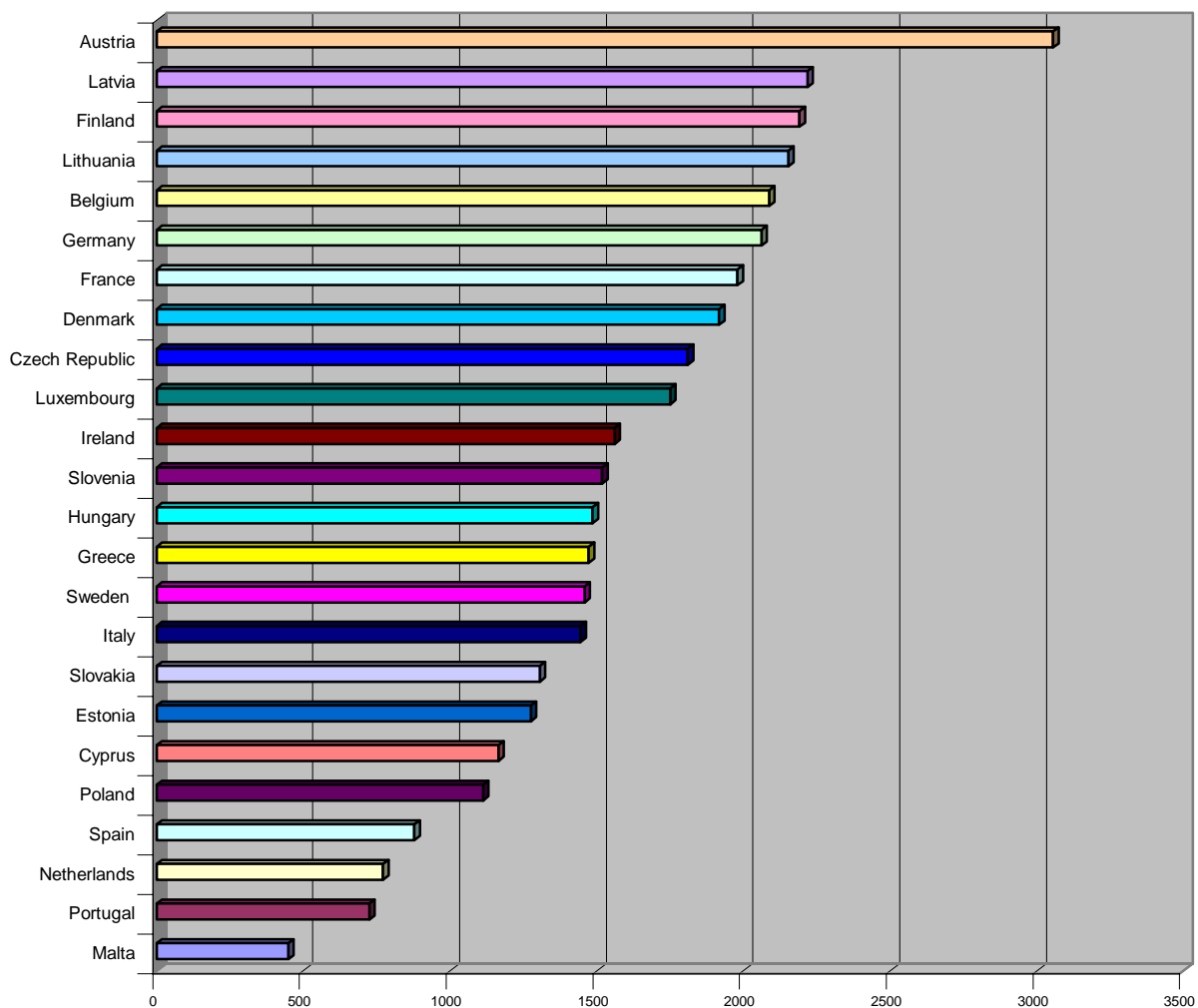


Table 5: Total hospital costs due to all admitted injury patients and their share (%) in GDP and total health expenditure

	total hospital costs (*mln €)	costs as % of GDP	costs as % of total health expenditure
Austria	609	0.10	4.4
Denmark	273	0.17	2.6
Greece	316	0.28	2.3
Ireland	98	0.11	1.9
Italy	2147	0.19	2.4
Netherlands	304	0.08	1.0
Norway	189	0.02	2.0
Spain	540	0.10	1.1
United Kingdom	965	0.07	1.3

Figure 22: Mean costs per patient (€) by accident groups for EU-15

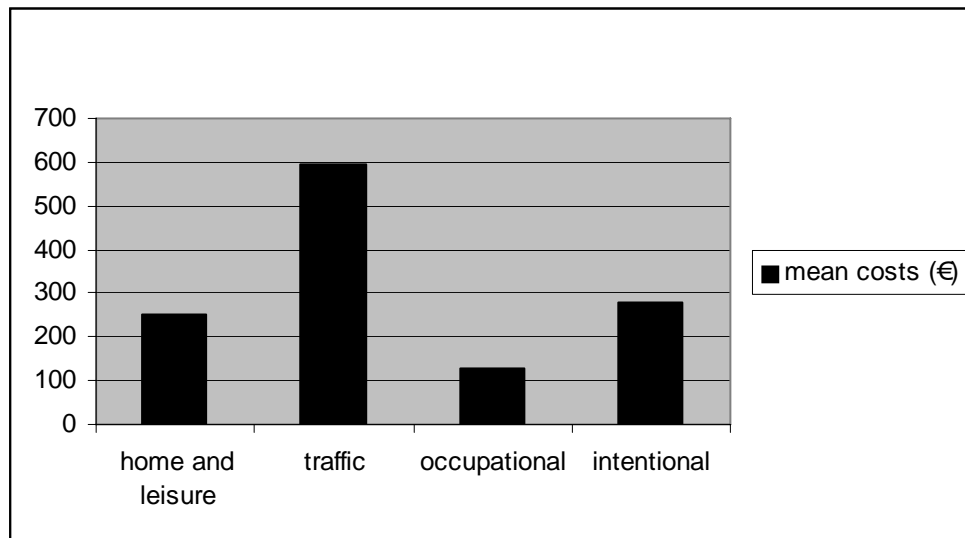


Table 6: Estimate of the total societal cost of injuries in London 2002 (2000 prices used).

Injury Cause	Human	Lost Outputs	Criminal Justice System	Medical And Social	Total
Road Traffic Accidents	1115	258	4	29	1406
Other transport	303	60	1	3	368
Fires, falls, poisonings and Other accidents	13528	2351	10	235	16124
Assault	691	164	1	12	868
Suicide, self harm and Undetermined injury	631	283	1	10	924
Total	16268	3116	17	290	19690

Burden of Fatal Injuries in the European Union
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Annex 1 (Data source CDC, USA)

ICD 10 matrix

Preliminary External Cause of Injury Mortality Matrix for ICD-10, June 12, 2001

Mechanism or cause	Legal Intervention					
	All injury	Unintentional	Suicide	Intent or Manner Homicide	Undetermined	War
All injury	V01-Y36, Y85-Y87, Y89	V01-X59, Y85-Y86	X60-X84, Y87.0	X85-Y09, Y87.1	Y10-Y34, Y87.2, Y89.9	Y35-Y36, Y89(.0, .1)
Cut/pierce	W25-W29, W45, X78, X99, Y28, Y35.4	W25-W29, W45	X78	X99	Y28	Y35.4
Drowning	W65-W74, X71, X92, Y21	W65-W74	X71	X92	Y21	
Fall	W00-W19, X80, Y01, Y30	W00-W19	X80	Y01	Y30	
Fire/ hot object or substance	X00-X19, X76-77, X97-X98, Y26-Y27, Y36.3	X00-X19	X76-X77	X97-X98	Y26-Y27	Y36.3
Fire/flame	X00-X09, X76, X97, Y26	X00-X09	X76	X97	Y26	
Hot object/substance	X10-X19, X77, X98, Y27	X10-X19	X77	X98	Y27	
Firearm	W32-W34, X72-X74, X93-X95, Y22-Y24, Y35.0	W32-W34	X72-X74	X93-X95	Y22-Y24	Y35.0
Machinery	W24, W30-W31	W24, W30-W31				
All Transport	V01-V99, X82, Y03, Y32, Y36.1	V01-V99	X82	Y03	Y32	Y36.1
Motor Vehicle Traffic						
Occupant		V30-V39 (4-9) V40-V49 (4-9) V50-V59 (4-9) V60-V69 (4-9) V70-V79 (4-9) V81.1 V82.1, V83-V86 (0-3)				
Motorcyclist		V20-V28 (3-9), V29 (4-9)				
Pedal cyclist		V12-V14 (3-9), V19 (4-6)				
Pedestrian		V02-V04 (1, 9) V09.2				
Other		V80 (3-5)				
Unspecified		V87 (0-8), V89.2				