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Injuries in Estonia

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Injuries, as a topic, are reported on by the media every day, albeit mostly only examining individual facets of it. This publication provides readers with a comprehensive overview of injuries in Estonia, and may be of interest to ministers, policy advisers and workers in the fields of health and medical care. The overview presents the rates of injuries and deaths resulting from injury in Estonia in recent years, as well as examining the costs related to injuries and the impact they have on the workforce. The differences in the causes of intentional and unintentional deaths from injury between the sexes and different age groups are also highlighted. Estonia's position is compared to that of other Member States of the European Union. The overview primarily focuses on the distribution of injuries rather than their causes or the factors contributing to them, such as alcohol consumption.

Introduction

Since the number of deaths from infectious and non-infectious diseases has reduced at a much faster rate than deaths resulting from injury, the proportion of deaths from injuries in the overall mortality rate has risen moderately. Injuries are the fourth most common cause of death worldwide after cardiovascular diseases, tumours and respiratory diseases. They represent a key public health problem, causing more than 5 million deaths and accounting for 9% of lives lost through premature death globally every year. It is a problem which affects everyone, since the majority of us are exposed to the short-term or long-term consequences of injuries which we ourselves or those close to us sustain. For every death resulting from injury there are dozens of injuries requiring hospital treatment, hundreds of calls which are responded to by the ambulance service and thousands of doctor's appointments. In many cases injuries are accompanied by short-term or long-term complaints, disabilities, depression and behavioural changes. Injuries can also lead to emotional, physical and financial strain on loved ones and on society as a whole. Global trends indicate further growth in loss of health through injuries.

Deaths in Estonia continue to outstrip births: the population has decreased over the last 15 years (1995–2010) by nearly 100,000. Average life expectancy has risen by 6.5 years, with the newborn expected to live on average 74 years in 1.34 million population of Estonia. The number of deaths from injury among the young is one of the factors in the rapid aging of the population, which brings with it a host of problems. For example, the proportion of chronic illnesses increases; the proportion of working age people decreases; and as a result, more and more resources are needed for health care in an overall environment of resource constraints. Compared to other illnesses, injuries expend more resources because the effects these have are wide-ranging and

Injuries account for 9% of all premature deaths worldwide.

long-term, impacting on both the social and health systems while families of those injured are affected as well.

Injuries are exceptional: they can be avoided. They are the result of a combination of environmental conditions, behaviour and personal risk – all components that can be changed. There are many international examples of effective and cost-effective preventive measures, many of which are implemented to a greater or lesser extent in Estonia (q.v. concept paper of Estonian injury prevention strategy). These include the automatic protection offered by seatbelts and airbags in cars; the use of non-flammable materials in children's pyjamas; user-friendly requirements for electrical equipment; better road markings; and round corners on furniture. These are all simple and effective ways of avoiding injuries.

Current policy brief aims to provide an overview of injuries and their consequences in Estonia. It also briefly compares Estonia's position with that of other European Union (EU) Member States (MS).

1. Occurrence of injuries in Estonia

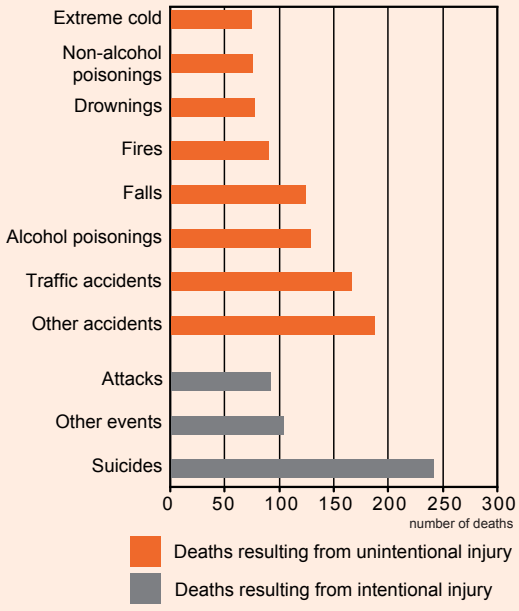
1.1. Injury mortality

Injuries are avoidable.

1358 people died from injuries and poisoning in Estonia in 2008, with deaths resulting from injury representing 8.1% of all deaths. The most common cause of deaths from injury (67%) was unintentional injury (Figure 1).

22% of deaths resulting from unintentional injury were poisonings; 20% were traffic accidents; ca. 11% were related to extreme cold and fires; and 10% were caused by falls. 63% of poisonings were due to excessive consumption of alcohol. Alcohol is also a factor in other injuries – from 2000 to 2002, for example, a recent study found that 64% of those killed in traffic accidents had blood alcohol levels over the legal limit as autopsies indicated. Taking into account those killed in accidents caused by drunk drivers, the role and number of alcohol-related deaths increases further.

Figure 1. **Main causes of deaths from intentional and unintentional injuries, 2008.**



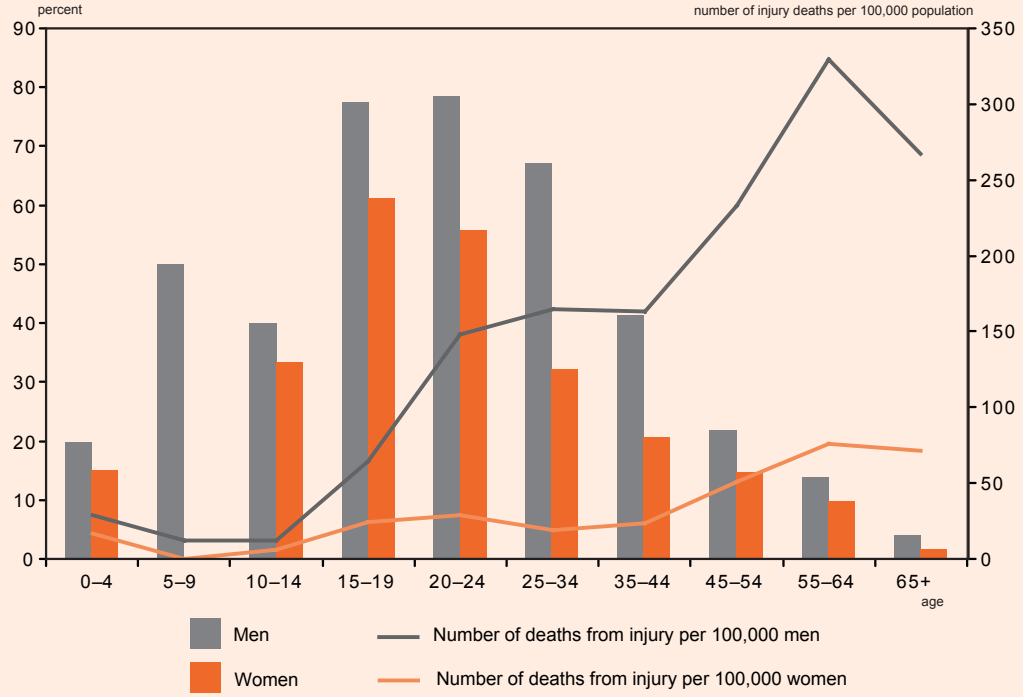
Source: Statistics Estonia, 2010

55% of deaths from intentional injury in 2008 were suicides. 21% were the result of attacks.

The number of deaths resulting from injury differs markedly by sex and age. Almost half of all deaths from injury and poisoning occur in the age range 45–69. The proportion of deaths caused by injuries is nevertheless highest in the 20–24 age group, at 66%. More than half of all deaths in an age group are the result of injuries among women between the ages of 15 and 24 and men between the ages of 5 and 39.

Injury mortality among men is much higher compared to women in all age groups (Figure 2). Given the difference in the proportion of men and women in the population, the greatest variances are in the 5–9 and 25–34 age groups, in which there are 12 times and

Figure 2. **Mortality from injuries as a proportion of overall mortality and number of deaths from injury per 100,000 people by age and sex, 2008.**



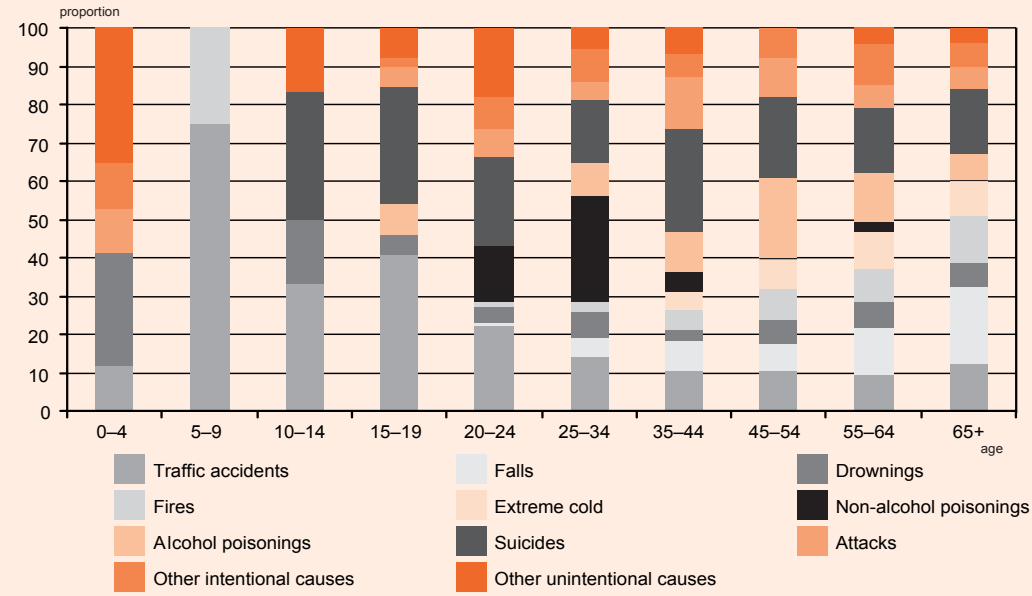
Source: Statistics Estonia, 2010

In 2008 there were 1358 deaths due to injuries and poisonings.

9 times more deaths among 100 000 men than among 100 000 women. This higher rate of injury mortality can partly be attributed to social expectations of sex roles leading to more risky and unhealthy lifestyles and more dangerous professions among men.

The causes of deaths resulting from injury differ markedly by sex and age (Figure 3). The proportion of traffic accidents in injury mortality is highest among children aged 5–9, representing 75% of all deaths from injury for the age group. From this age on the proportion of traffic accidents as a cause of death

Figure 3. **Proportion of causes of deaths from injury by age, 2008.**



Source: Statistics Estonia, 2010

More that half of the deaths were caused by injuries among women aged 15–24 and among men aged 5–39.

begins to decrease, being lowest in the 55–64 age group (9%). The proportion of falls increases from the age of 20, with most deaths from injury caused by falls occurring in the oldest age group (20%). Drownings are most common between the ages of 0–4 and 10–14 (29% and 17%, respectively). The proportion of fires is greatest in the 5–9 age group (25%) and among those aged 65 or more (12%). Extreme cold as a cause of death is seen from 35 years of age and is most prevalent in the 55–64 age group (10%). Alcohol poisonings are most common among those aged 45–54, accounting for 21% of injury mortality in this age group. Suicide as a cause of death is seen from 10 years of age. Its proportion is rather high among all age groups (ranging from 17% to 33%) and is greatest in the 10–14 and 15–19 age group (33% and 31%, respectively). Proportion of injury deaths caused by attacks are highest among those aged 35–44, and 0–4 with 13% and 12% share respectively.

The major causes of injury deaths among children are traffic accidents and drowning.

By county, the proportion of age standardised deaths resulting from injury is highest in Võru, Ida-Viru, Järva, Lääne-Viru, Harju and Põlva Counties, where such deaths account for more than 10% of all deaths in the counties (Figure 4). The proportion of age standardised deaths resulting from injury is lowest in Saare and Hiiu Counties, where injuries account for approximately 9% of all deaths.

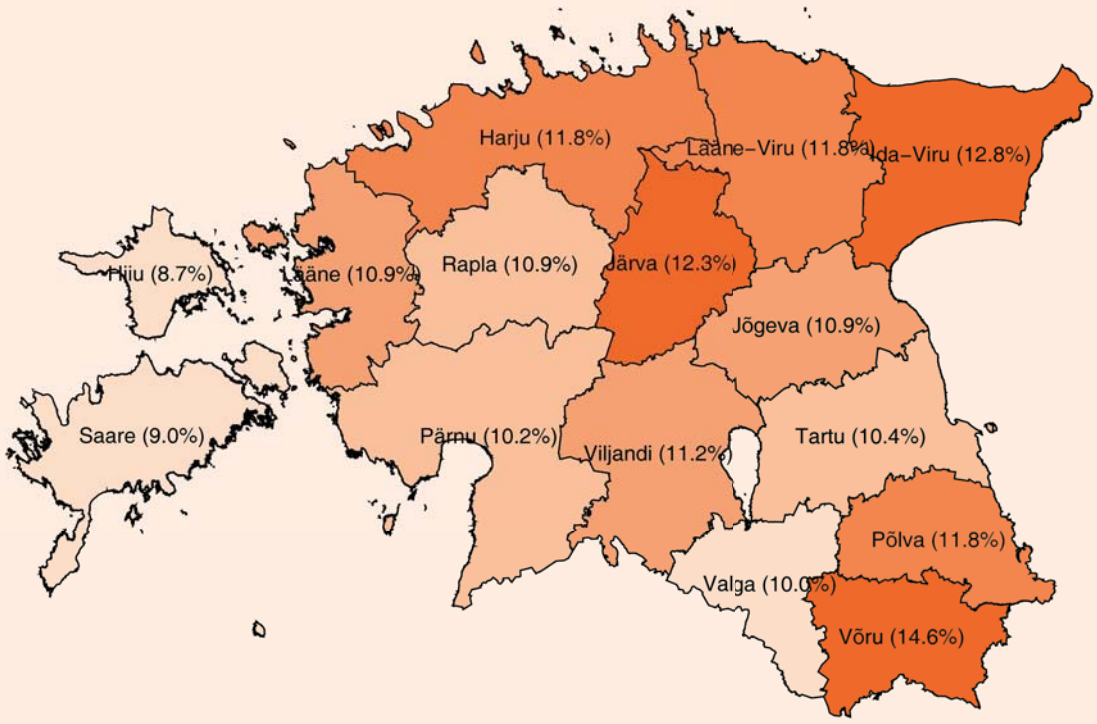
For adults the most common causes of injury deaths are traffic accidents, poisonings and suicides. And for people aged over 64 the most common causes of injury deaths are falls.

1.2. Injury morbidity

In 2008 there were 287,608 cases of injuries requiring medical intervention, 55% involving men. Similar to the proportion of deaths from injury in the overall mortality rate, injuries represented 12% of the cases of illness registered over the year (16% for men and 9% for women). The greatest number of injuries occurred among men in the 25–34 age group, which accounted for 18% of all injuries affecting men. The largest number of new injuries among women was in 65 and older age group, representing 16% of all injuries affecting women.

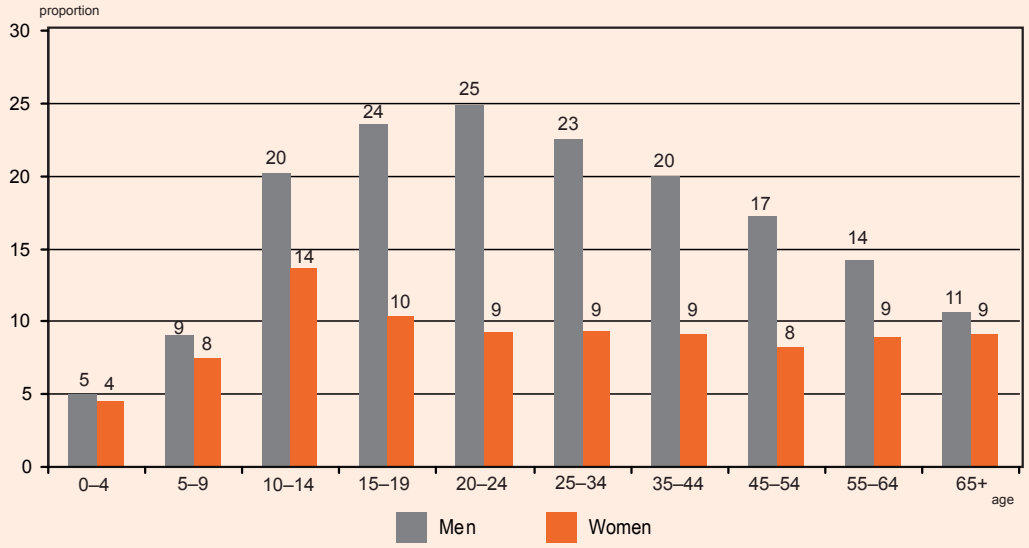
The highest proportion of injuries in the overall disease incidence of a sex-age group in 2008 was among men aged 20–24, at 25% (Figure 5). The same figure for women was

Figure 4. **Deaths resulting from injuries as a proportion of all deaths (age standardised) by county, 2006–2007.**



Source: Statistics Estonia, 2010

Figure 5. **Incidence of injuries as a proportion of overall disease incidence (except tumours) by sex and age, 2008.**



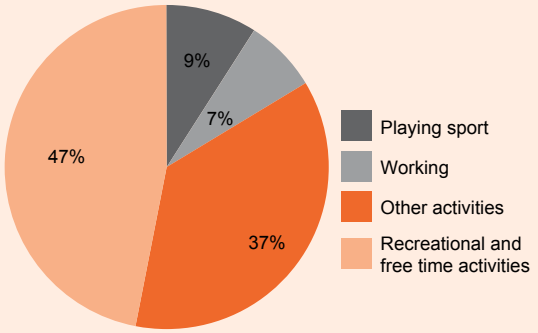
Source: National Institute for Health Development 2010

Nearly half of the injuries are sustained during recreational and free time activities.

14% in the 10–14 age group, although as age increased the proportion of injuries decreased slightly. The peak period for injuries in men lasted from youth to age 54 – injuries formed from a fifth to a quarter of all new incidents of illness.

Almost half of all injuries requiring medical intervention were sustained under ordinary conditions in the course of recreational and free time activities (Figure 6). This group together with injuries incurred while playing sport together formed 56% of all injuries. The greatest sex-based differences in the occurrence of injuries were in injuries sustained while working (5% for women and 9% for men) and those sustained while playing sport (8% for women and 10% for men).

Figure 6. **Breakdown of injuries by activity during which the injury was sustained (based on health care service use data), 2008.**



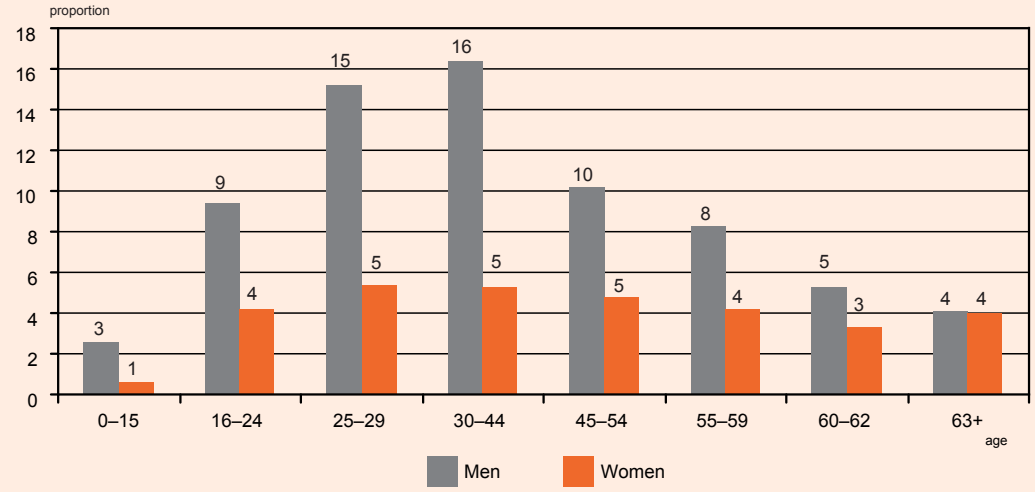
Source: National Institute for Health Development 2010

1.3. Long-term consequences of injuries

The long-term consequence of an injury is permanent damage to health, i.e. a disability. At the start of 2008 there were 117,646 people in Estonia with a disability or who had been declared incapable of work. Approximately 37% of those were in working age (i.e. in the 15–64 age group).

1988 people had a disability ascertained after an injury in 2008, representing 5% of all disabilities ascertained during the year. 3508 people had a permanent incapacity for work ascertained due to injuries, accounting for 8% of all ascertained cases of permanent incapacity for work in 2008. Further, in 825 people the injury caused disability ascertained was first-ever. Likewise, 927 of the permanent incapacity for work cases caused by injury were first-ever. In almost 38% of the work

Figure 7. **First-ever disabilities and incapacity for work resulting from injury as a proportion of all first-ever disabilities and incapacitations by sex and age, 2008.**



Source: Social Insurance Board 2009

Injuries were the cause for 825 first-ever disability and 927 permanent incapacity for work in 2008

incapacitated persons, the persons lost more than 80% of their capacity to work.

Figure 7 presents proportions of injury caused first-ever disabilities and incapacities to work from all first-ever disabilities and incapacitations by sex and age in 2008. These proportions are highest among men aged 30–44 and women aged 25–29. Additionally, these proportions are almost two times higher for men.

1.4. Sick leave days and burden of disease

Discussions of morbidity and mortality often overlook the broader social effects: the cost of treating conditions; downturns in production; the burden on families; and so on. Since the potential impact of injuries is extensive, an initial overview of the extent of their influence on society is best obtained by examining sick leave days and burden of disease.

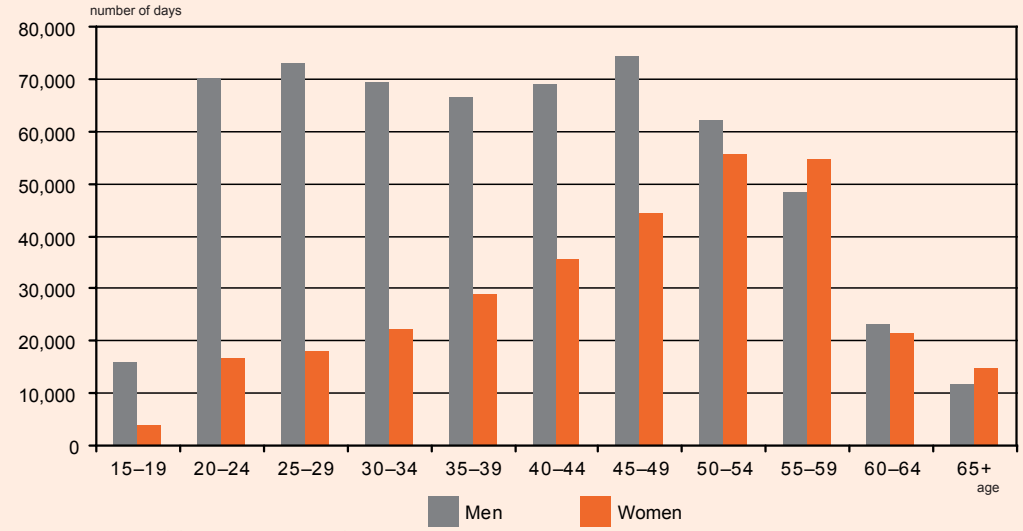
In 2006 the Estonian Health Insurance Fund compensated 901,521 sick leave days resulting from injuries, which represented 11% of all sick leave days for the year. The average number of days compensated per one case was 1.6 times higher for injuries than for other illnesses (18.8 and 11.6 days per person, respectively). This refers to the greater length of time taken to recover from injuries and thus to more complicated cases than with other forms of morbidity.

Examining the breakdown of compensated sick leave days due to injury by sex, we see significant differences. For women, the number of days compensated increases until 50–54 age group before falling away (Figure 8). For men, the number of compensated days peaks at the age of 25 and steadily decreases thereafter, with only a slight rise in the 40–49 age group. The number of compensated days is three times as high among men aged 15–49 as it is among women in the same age group.

The amounts paid out in compensation of sick leave days due to injury by sex and age are shown in Figure 9. Men receive higher compensation than women in every age group both in total and also on a per-day basis. The greatest differences can be seen in those aged up to 44: men receive between 70% and 86% more compensation per day than women (an average of 50 kroons more) which is likely due to higher income levels among men.

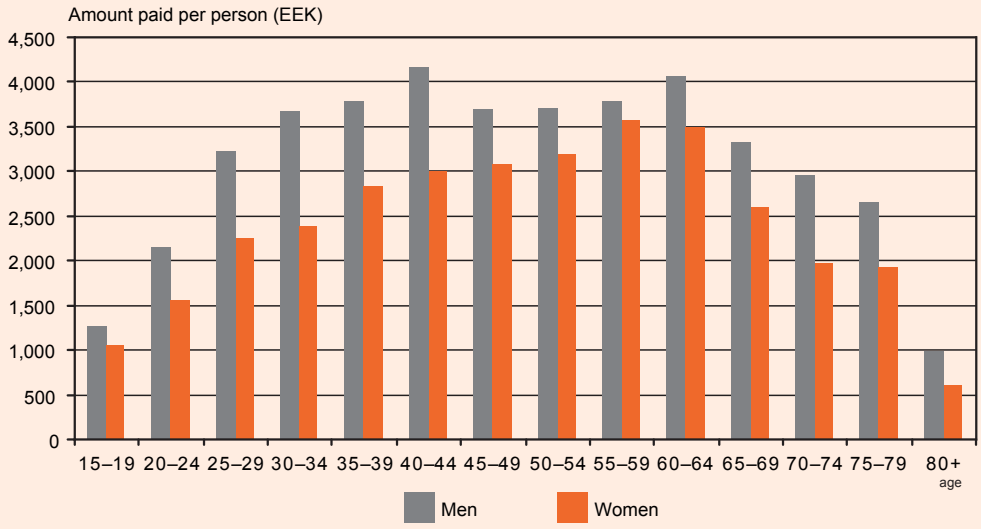
Time spent off work sick affects productivity, and as such, in an economic sense, it represents lost working hours. Years of life are also lost through premature death. A death is

Figure 8. **Number of days compensated for incapacity for work due to injury by sex and age, 2006.**



Source: Estonian Health Insurance Fund 2007

Figure 9. **Amount paid in working incapacity compensation per person by sex and age, 2006.**



Source: Estonian Health Insurance Fund 2007

considered to be premature if it occurs before reaching the life expectancy of the given age group – for example, in the case of a 20-year old man the loss would be 49.5 years, since Estonian men in this age group have an average life expectancy of 69.5 years. The years lost through suffering from illnesses and premature death together represent the burden of disease of the population. The most recent data on burden of disease in Estonia dates from 2006, when the population lost 57,234 years of life due to injuries (12% of the burden of disease total). 86% of the years lost to injury were on account of premature death. The biggest losses here were among men between the ages of 20 and 65.

2. Injury-related costs in Estonia

2.1. Direct treatment costs

Estonian Health Insurance Fund covered treatment of injuries for 411 million kroons in 2007.

The Estonian Health Insurance Fund (EHIF) funded the treatment of injuries in 2007 for 411 million kroons which accounts for 6% of all EHIF funded treatment costs during the year. Based on data from 2006, unlike other illnesses, more than half of all spending on treatment of injuries took place in hospitals. Compared to other illness, both the time spent in hospital by patients with injuries and the cost of a single day of treatment of these injuries were greater. Such differences are not only seen in the case of general hospital care, but also in acute care, rehabilitation and nursing care. For example, in hospital, cost per injury patient was 234 kroons higher compared to cost per patient with other diseases. One of the reasons for latter is the fact that treatment of injury patients took on average a day longer compared to other diseases. Further, injuries also require more resource-intensive treatment than other illnesses on average and hence hospitalisation is more common for this disease group while other sources of cost like medication have lower shares in total treatment costs.

2.1.1. The cost of sick leave days

The average sick leave compensation due to injuries was paid 7 days longer and 4 kroons more per day compared to other illnesses.

Apart from the cost of treating a condition, in the case of employed people the cost of income compensation (i.e. compensation for incapacity for work) must also be taken into account. Sick leave compensation was paid for more than 900,000 working days due to injuries in 2006, representing more than 150,000,000 kroons. The amount of sick leave compensation paid out due to injuries accounted for 10% of all such compensation paid out during the year. In the case of injuries, on average the sick leave compensated was 7 days longer compared to other diseases and the compensation per day was on average 4 kroons higher. Even though the cost difference of one compensated day may not be large, but the relatively large number of injuries and longer sick leaves nevertheless mean a significant financial difference.

2.2. Indirect costs

The estimated costs of loss of working time in the year 2006 were approximately 375 million kroons.

Treatment costs and sick leave compensation are direct costs which are relatively simple to calculate. Calculation of indirect costs, on the other hand, is much more complicated, since they are incurred in very different ways which are difficult to quantify, and often without direct financial value. Loss of working time and capacity are most frequently mentioned as indirect costs in connection with injuries, as well as lower productivity and a reduction in the taxation revenue. However, lost time and income of carers and families is even more difficult to quantify not to mention the monetary value of the physical and intellectual suffering of the injured party.

GDP per capita is one starting point in determining the social cost of working time lost. In 2006 the GDP per capita in current prices in Estonia was 152,120 kroons or 417 kroons per day (Bank of Estonia, 2007). Using the number of compensated sick leave days as a basis, we can obtain an estimate of cost of working time loss which is approximately 375 million kroons. The actual loss for society is even greater, since with the contribution of those sick or injured the GDP would have been greater than that measured. It is important to note that even in the current restricted form of calculation the indirect costs are of the same magnitude as treatment costs of injuries.

The second and even broader approach for establishing indirect costs takes into account also the economic cost of premature deaths based on burden of disease studies. As previously mentioned, the Estonian population lost 57,234 years of life as a result of injuries according to data from 2006. The Bank of Estonia states that GDP per capita in current prices in 2006 was 152,120 kroons. Surviving until their age of average life expectancy with-

out incurring any life-ending injuries, these individuals would have contributed at least an additional 8.7 billion kroons to the national economy over the years.

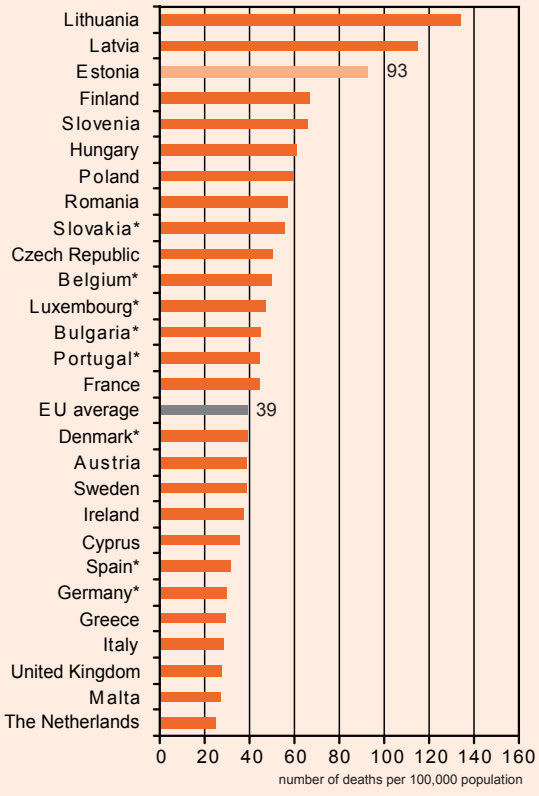
3. Occurrence of injuries in Estonia compared to other Member States of the EU

Compared to other Member States of the European Union, Estonia (like the other Baltic States) stands out for its large number of deaths resulting from injury.

Compared to other Member States (MS) of the European Union (EU), Estonia (like the other Baltic States) stands out for its large number of deaths resulting from injury. According to WHO statistics, the safest country in the EU to live in is the Netherlands, where there are four times less injury deaths than in Estonia (Figure 10). If Estonia wanted to become the EU MS with the lowest rate of deaths from injury, it would need to have prevented almost 910 such deaths in 2008; around 530 would need to have been prevented to equal the EU average.

Examining the causes of deaths resulting from injury, it is notable, that many causes of injury deaths marginal in EU have prominent places in Estonia (Figure 11). In Estonia, the proportion of poisoning from all injury deaths is 3 times higher; the proportion of fire accidents is 4 times higher and proportion of assaults is nearly 3 times higher that in EU average. As a result, Estonia has a smaller proportion of deaths resulting from injuries sustained in traffic accidents and suicides, which comprise nearly half of all deaths from injury in the EU.

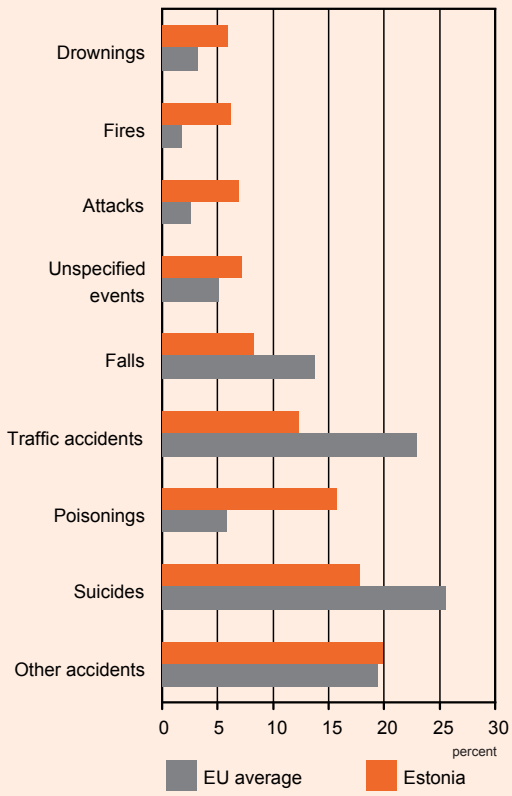
Figure 10. **Standardised number of deaths from injury per 100,000 people in the EU, 2010.**



*Data from these countries dates from earlier than 2007

Source: WHO HFA-M 2010

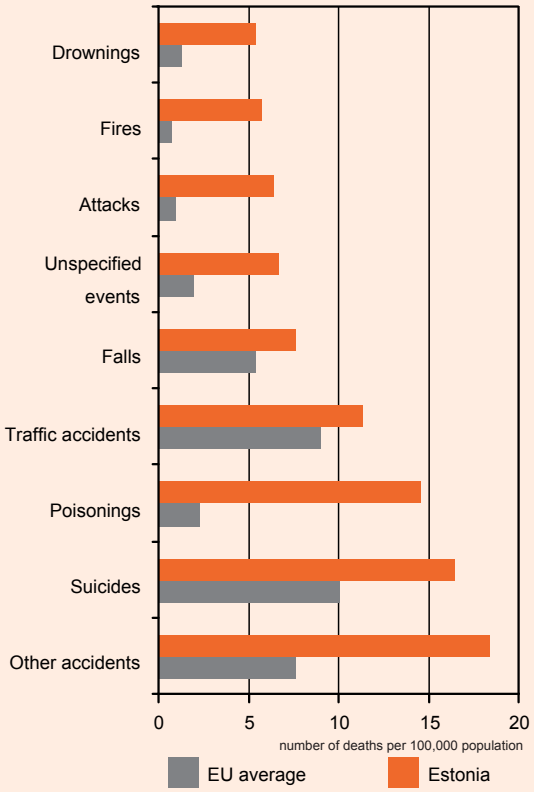
Figure 11. **The proportion of standardised injury mortality per 100,000 people in Estonia and in the EU as a whole, 2008.**



Source: WHO HFA-M 2010

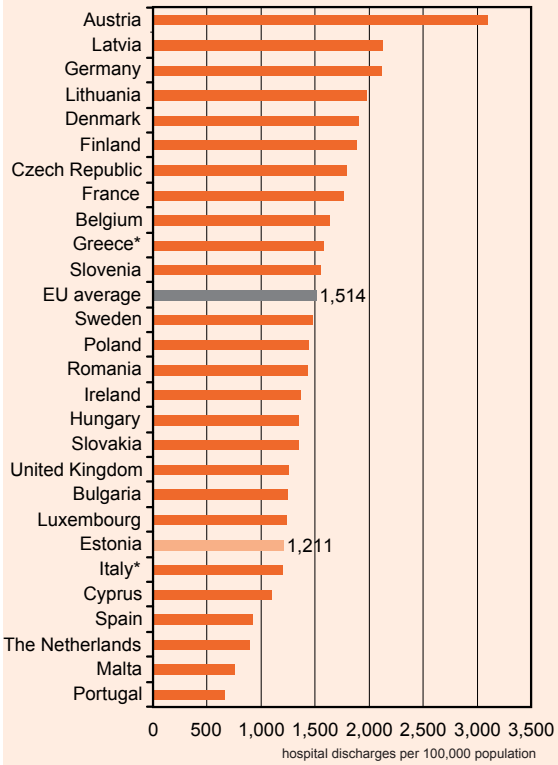
There were 8 times as many deaths from fires and more than 6 times as many deaths from attacks and poisonings in Estonia as there were in the EU on average in 2007.

Figure 12. **Standardised injury mortality per 100,000 people in Estonia and in the EU as a whole, 2008.**



Source: WHO HFA-M 2010

Figure 13. **Patients discharged having been diagnosed with injuries per 100,000 people (standardised) in Member States of the European Union, 2007.**



*Data from these countries dates from earlier than 2007

Source: WHO HFA-D 2010

Deaths due to injuries have been decreasing since 1995.

At the same time, the actual number of deaths resulting from traffic accidents in Estonia is still higher than the EU average (Figure 12). There are also 8 times as many deaths from fires, more than 6 times as many deaths from attacks and poisonings and more than 4 times as many deaths from drowning in Estonia as there are in the EU average.

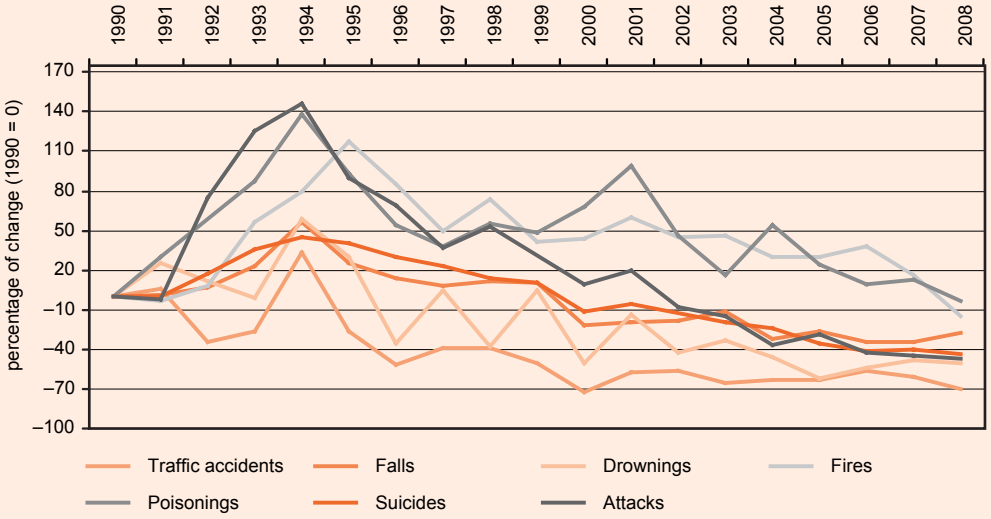
Although Estonia is in the top three in the EU in terms of death rate resulting from injury, the country's ranking in terms of injuries leading to hospital treatment is comparatively modest: the hospitalisation rate per 100,000 people is about a third lower compared to EU average, and almost three times lower than in lead MS Austria (Figure 13).

4. Injury trends in Estonia in recent years

Injury mortality in Estonia has been falling since 1995, as has injury mortality as a proportion of mortality as a whole. This trend can be seen across all causes of death from injury, but the sharpest decline has been in drownings, suicides and attacks, and the slowest in poisonings and fires (Figure 14). Despite the number of deaths from injury steadily decreasing since 1995, it was only in the first half of this decade that it returned to the level of the early 1990s. Deaths caused by fires and poisoning returned to the 1990 level in 2008.

The number of deaths from injury may have fallen, but the number of injuries reaching the health care system has risen steadily.

Figure 14. **Change in deaths (%) resulting from injury compared to 1990 level by cause of death.**



Source: WHO HFA-M 2010 and Statistics Estonia 2010

The number of injuries which need medical attention has increased.

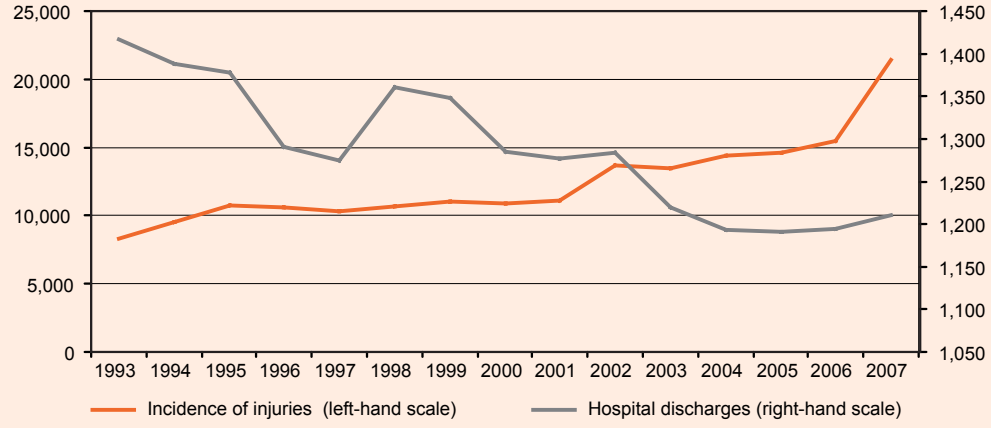
This growth has been especially rapid since 2001 (Figure 15). Due to a lack of research data we are unable to determine exactly how many new registered injuries represent actual growth in the number of injuries and how many represent some other factor, such as improved access to medical services. By way of comparison, the registration of new cases of illness has also risen, while the proportion of injuries in all new hospital cases has remained more or less the same over the years, increasing from 8% to just 11% (National Institute for Health Development 2010).

As with other illnesses, the number of people being hospitalised as a result of injuries has been decreasing since 1991.

Although the proportion of new cases of injuries from overall disease incidence has remained at much the same level over the years, there has been a clear redistribution of injuries by age groups. Between 1998 and 2006 the proportion of injuries in overall morbidity increased among the under-20s and decreased among older people (Figure 16).

The proportion of injuries from overall morbidity has increased among younger than 20 year olds and decreased among older persons.

Figure 15. **Incidence of injuries and hospital discharges with injuries from hospital per 100,000 people in Estonia between 1993 and 2007.**



Source: WHO HFA-D 2010 and National Institute for Health Development 2010

Figure 16. **Incident morbidity resulting from injuries in 2006 compared to 1998 (based on health care service use data).**

Source: National Institute for Health Development 2010

Summary

Injuries represent a major population health problem, since they can lead to shortened life expectancy, disabilities and temporary or permanent incapacity for work. 1358 people died from injuries in Estonia in 2008, representing 8% of all deaths for the year. The main causes of death from injury in the 0–9 age group are traffic accidents; suicides in the 10–24 age group; suicide and poisoning in the 25–34 age group; alcohol poisoning and suicide in the 35–64 age group; and falls among aged 65 and more.

287,608 people suffered from non-fatal injuries in 2008, representing 12% of all new cases of illness for the year. The proportion of injuries in all new cases of illness was 16% among men and 9% among women. The key age group in the proportion of injuries among men is 25–34 and among women is 65 or older.

Injuries, deaths resulting from injury and their causes differ by age and sex. Overall, injury mortality, injury morbidity, disabilities and permanent or temporary incapacity for work are twice as common in men as they are in women, with the exception of the older age groups.

On average, the treatment of injuries lasts longer than that of other illnesses. Such treatment is expensive due to the longer duration and the greater need for hospital-based treatment. 411 million kroons was spent on the treatment of injuries in Estonia in 2007, and based on data from 2006, spending on treatment cases and per treatment day were both higher than for other illnesses. In addition to the money spent on treating injuries, 150 million kroons was paid out in compensation for sick leave days, and here again the amount paid out per case was higher than for other conditions. Given the number of sick leave days and individuals' contributions to GDP, 375 million kroons was lost due to time spent off work by injured people in 2006.

Disabilities and incapacity for work that result from injuries are both longer-lasting and more complicated. For example, in case a person applied for first-ever disability, loss of working capacity of greater than 80% or a deep or severe disability was ascertained in more than two-thirds (69%) of injury patients compared to just 16% in the case of other illnesses in 2008.

A total of almost 8.7 billion kroons in labour contribution was lost in Estonia in 2006 due to injuries through mortality, morbidity, disabilities and incapacity for work. Part of this contribution would indeed have been made in the future, but had the contributions of these people not been lost, the GDP would have been even larger than that measured.

Compared to other Member States of the European Union, Estonia stands out for its high rate of injury mortality – ranked third overall behind Lithuania and Latvia. Almost four times as many deaths resulting from injury occur here compared to Netherlands (the EU country with injury mortality). In order to achieve the same figure as the Dutch, 910 injury deaths should have been prevented in 2007.

Although the rate of injury mortality in Estonia is high compared to other Member States, the progress Estonia has made in the last decade is notable. A decrease can be seen in all causes of death from injury, but has been most rapid in drownings, suicides and attacks. The decrease has been slower in the case of poisonings and fires, which reached 1990 level in 2008. Also worthy of attention is the fact that reduction of injury mortality in Estonia has slowed in recent years – the situation has improved to such an extent that further improvement will require a greater and more coordinated effort.

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Injuries in Estonia

Glossary

- **Morbidity** – the ratio of the total number of patients with a given disease to the total population in a given period.
- **Unintentional injury** – an injury which is unexpected and which has unintentional, damaging consequences.
- **Intentional injury** – an injury which was caused intentionally, either by the injured individual or another person.
- **Injury** – morbidity resulting from an accident in which the case is marked on treatment paperwork with an ICD-10 injury or accident code beginning with the letters S, T, V, W, X or Y. On account of the sources of data used regarding injuries in Estonia, overviews produced in the country tend to focus on more complex cases requiring medical assistance; less complex cases are not represented to the same extent.
- **Deaths resulting from injury** – cases of deaths whose causes are marked in the register of deaths as an accident using an ICD-10 classification code. The ICD-10 codes for deaths resulting from injury begin with the letters S and V.
- **Injury mortality** – the ratio of the total number of cases of deaths from injury to the total population in a given period.
- **Accident** – an unexpected incident which has unintentional, damaging consequences.

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