



EUROPE

INJURIES AND VIOLENCE IN EUROPE

**Why they
matter
and what can
be done**

**Injuries and violence
in Europe:
why they matter and
what can be done**

The World Health Organization was established in 1948 as the specialized agency of the United Nations responsible for directing and coordinating authority for international health matters and public health. One of WHO's constitutional functions is to provide objective and reliable information and advice in the field of human health. It fulfils this responsibility in part through its publications programmes, seeking to help countries make policies that benefit public health and address their most pressing public health concerns.

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Injuries and violence in Europe: why they matter and what can be done

By:
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Inge Baumgarten and Patrizia Vida**

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Dinesh Sethi, Francesca Racioppi, Inge Baumgarten
and Patrizia Vida

Acronyms

CCTV	closed-circuit television	ICD-9	ICD, ninth revision
CIS	Commonwealth of Independent States	ICD-9 BTL	ICD-9 basic tabular list
DALY	disability-adjusted life-year	ICD-10	ICD, tenth revision
ECMT	European Conference of Ministers of Transport ECMT	LMIC	low- and middle-income countries
EU	European Union (25 countries after 1 May 2004)	NGO	nongovernmental organization
GBD	Global Burden of Disease (WHO study)	RTI	road traffic injury
GDP	gross national product	SMR	standardized mortality rate
HIC	high-income countries	WHOSIS	WHO Statistical Information System
ICD	WHO International Classification of Diseases	UNECE	United Nations Economic Commission for Europe
		UNICEF	United Nations Children's Fund

Foreword

Every year, intentional and unintentional injuries kill nearly 800 000 people in the WHO European Region. Injuries are the leading cause of death of people under 45 years of age. This is only part of the problem, however; for every fatality, injuries send an estimated 30 people to hospital and necessitate outpatient treatment in hospital emergency departments for 300 others. Injuries therefore incur costs to the health sector and society at large estimated at billions of euros per year, and make demands on already overstretched health system resources. Most of the burden falls disproportionately on the most vulnerable groups: children, elderly people and the socially and economically deprived, particularly in the eastern half of the Region. Many households suffer not only pain, disability or death but also a loss in earning capacity. This in turn may lead to more poverty and greater social vulnerability.

Yet some Member States' success in reducing injury mortality shows that injuries are preventable and that a very large number of deaths could be averted. If all countries in the Region equalled the performance of those reporting the lowest mortality, nearly 500 000 lives could be saved every year and many millions of non-fatal injuries and disabilities could be avoided. These figures reveal the urgent need to take action to address this problem, and raise questions about how so great a tragedy could have attracted so little attention from the public health community and society at large.

Part of the answer is that, until recently, injuries were regarded as unavoidable, random events. Other reasons are that responding to injuries requires more than one sector, and that a lack of ownership and leadership has led to fragmented activity and a lack of coordination. In the past, the responsibility for safety was not seen as a societal obligation but as lying with individuals.

Consequently, much effort has been spent on trying to improve individual behaviour, rather than providing hazard-free environments and addressing the underlying determinants and risk factors.

This publication was written to help policy-makers and practitioners embrace a new science-based approach that clearly recognizes injuries as an important public health threat, amenable to prevention through organized efforts by society. It calls on the health sector to champion injury prevention, and to help coordinate a multisectoral response. Tackling unintentional injuries and violence together offers several advantages, because the care of victims requires similar health service responses, preventive activities are needed to deal with common risk factors, such as alcohol, and joint surveillance and evaluation can make savings by avoiding duplication of effort.

Reducing injuries requires strong and sustained commitment across all levels of government and society, and the resources, capacity and policy frameworks for effective multidisciplinary action. By placing the prevention of injuries in the Region on the agenda for discussion by the fifty-fifth session of the WHO Regional Committee for Europe in September 2005, Member States took an unprecedented step in this direction. We at WHO hope that this book will be used across the Region as an advocacy tool, to highlight the magnitude of the problem and its preventability and to support policy-makers, professionals and activists in the health sector in putting injury and violence prevention higher on the policy agenda across all sectors.

Marc Danzon
WHO Regional Director for Europe

Executive summary

This book is aimed at policy-makers, civil society, and practitioners who want to advocate injury prevention in the WHO European Region. (A summary for policy-makers is also available.¹) Its purpose is to highlight the magnitude of the burden of injuries in the Region, describe the inequalities in injuries, stress the risk factors and offer an evidence-based approach to decreasing the burden.

Reasons for concern about unintentional injuries and violence

- Every year nearly 800 000 people die from injuries in the European Region.
- They are the leading cause of death for people under the age of 45 years.
- The costs to the health sector and society run into billions of euros.
- There are inequalities in the burden between and within countries in the Region.
- The risk of dying from injuries in the Region's low- and middle-income countries is nearly four times that in high-income countries.
- Inequality of risk is due to differences in socio-economic determinants of health and environmental exposures.
- Many high-income countries are among the safest in the world, indicating great opportunities to prevent unintentional injuries and violence.
- The public health and societal responses to the risk factors for injuries have been inadequate.
- The countries with low injury mortality have demonstrated many cost-effective strategies, which require intersectoral collaboration and community participation.

Key messages to policy-makers

- If all countries could attain the lowest death rate for injuries in the Region, 500 000 lives (68% of those lost to injuries) could be saved. For children, this would mean preventing 75% (about 15 000) of injury deaths.
- Strong and sustained political commitment across all levels of government is needed to respond effectively to the demands of civil society for a safer Region.
- Preventing unintentional injuries and violence is a societal responsibility, which requires a paradigm shift away from allocating responsibility to individuals.
- Creating hazard-free environments and promoting community safety require organized efforts and an approach involving the health, education, leisure, housing, transport and justice sectors, as well as civil society.
- All unintentional injuries and violence share a number of risk factors; tackling these would result in the greatest public health gains.
- Reducing inequalities of wealth can lead to greater social cohesion and contribute to decreases in injuries and violence and a better quality of life and health standards.
- Legislative and fiscal policy is needed to reduce access to and unlicensed production of alcohol, along with other interventions to modify drinking behaviour.
- The health sector has an important role to play in tackling the worsening inequalities in injuries in the Region.
- Much can be gained from transferring and adapting to other parts of the Region the experience of some of countries that have succeeded in reducing injuries. These transfers need to be sensitive to both the content of interventions and contexts for implementation.
- Evidence shows that using a combination of environmental modification, legislation, financial

¹ *Injuries and violence in Europe. Why they matter and what can be done. Summary.* Copenhagen, WHO Regional Office for Europe, 2005 (http://www.euro.who.int/InformationSources/Publications/Catalogue/20050907_1, accessed on 13 October 2005).

incentives and mass media campaigns obtains better results.

Strong evidence shows that a number of interventions can save lives and mitigate the effects of injuries. For example, the following savings would result from the expenditure of €1 each on:

Universal licensing of handguns	€79
Smoke alarms	€69
Child safety seats	€32
Bicycle helmets	€29
Home visits and parent education against child abuse	€19
Prevention counselling by paediatricians	€10
Poison control services	€7
Road safety improvements	€3

Framework for action

This book proposes a public health framework for action, highlighting some of the key steps that need to

be taken to reduce the burden of unintentional injuries and violence:

- developing national plans for unintentional injury and violence prevention, which may require legislation and the development and enforcement of safety standards and regulations;
- forming an intersectoral committee to ensure that injury prevention is properly integrated across different departmental policies;
- improving national surveillance to provide a better understanding of the burden;
- strengthening national capacity to respond to the burden of injuries, especially through primary prevention and to provide services to injury victims;
- promoting evidence-based practice and facilitating the exchange of knowledge and experience across the Region; and
- recognizing gaps in knowledge and prioritizing research and development in primary prevention and trauma care.

Introduction

Whether unintentional or intentional, injuries are a leading cause of mortality and disability and a profound drain on health and social resources (1,2).

They significantly affect not only the health of and health services for victims but also the economic and social development of the WHO European Region. Injuries received relatively little attention until recently, however, partly because they have been regarded as random, unavoidable events, called accidents. In the last few decades, thinking has shifted towards an evidence-based approach that regards injuries as preventable (3). This has taken injuries away from the realm of chance and placed them squarely in the realm of science, where they can be studied and means of prevention can be proposed (4). The health sector can play a key role by prioritizing injury prevention and advocacy as essential public health activities, and by engaging in partnerships with other sectors to develop preventive plans.

Inequalities in injuries in the Region

The European Region shows the biggest difference in injury mortality between poor and wealthy countries in the world. Changes in the physical, political, social and cultural environments in the eastern half of the Region have led to large increases in injuries and mortality from unintentional injuries and violence, reaching levels among the world's highest. In contrast, some countries in western Europe are the world's safest in these categories. Further, Europe is undergoing a demographic transition, with aging populations and falling birth rates in most countries (5). Certain groups are more vulnerable to injuries, including children, older people and the poor.

These contrasts present both a threat and an opportunity. While high death rates from injury could continue or worsen, using experience from countries with good safety records can improve the situation. Achieving such records has involved giving greater visibility to injuries, recognizing their preventability, listening to demands from civil society and organizing efforts to implement effective preventive strategies. Creating safer environments requires a multisectoral

approach that puts safety first in health and social policies (6).

About this book

The purpose of this book is to highlight the magnitude of the burden of injuries in the WHO European Region, to describe inequalities in injuries, to stress the risk factors and to offer an evidence-based approach to decreasing the burden.

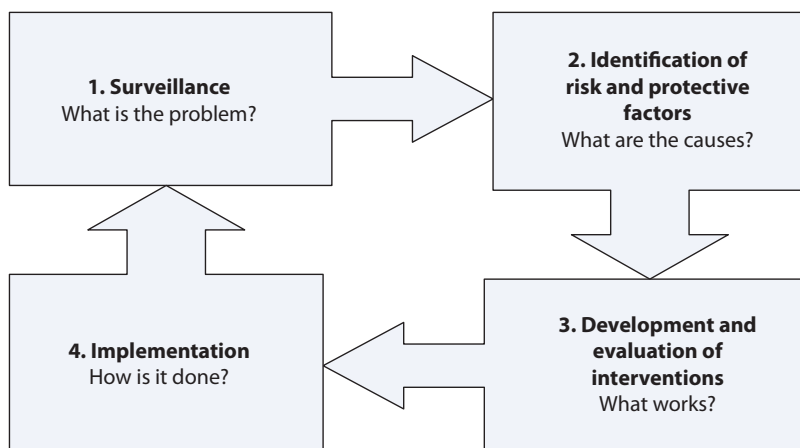
This book is aimed at policy-makers, civil society and practitioners who want to advocate for injury prevention in the European Region. Chapter 1 describes the burden of injuries and the high costs to the health sector and society, with emphasis on inequalities and the socioeconomic determinants of injuries. Chapter 2 addresses injuries by cause, using the public health approach and covering the size of the problems, the risk factors and effective preventive measures. Chapters 3 and 4 cover vulnerable groups and important settings, and include some examples of relevant programmes. Chapter 5 discusses types of violence, and the book ends with recommendations for action.

The data sources used are the Global Burden of Disease (GBD) study 2002 version 3 database (7), the WHO European database of mortality indicators by 67 causes of death, age and sex (8), and the WHO statistical information system (WHOSIS) (9). Annexes 1–4 present details on the methods used, conceptual approaches to prevention, additional results and a summary of international policies relevant to injury prevention, respectively.

Public health approach

This book uses the public health approach to injury prevention. This is a systematic process following the four logical steps illustrated in Fig. 1. The first is surveillance, to find out the extent of the problem, where it occurs and whom it affects. Second, risk factors are identified to understand why a certain group of people is at risk. Step three is to develop and evaluate interventions to find out what works, and step four, the wide implementation of proven strategies. The

Fig. 1. The public health approach to injury prevention



advantage of this approach is that it subjects injury prevention to concrete measures rather than leaving it to chance, and it can be used by actors in varied disciplines.

Definitions

Injury and violence

An injury is physical damage that results when a human body is suddenly subjected to energy in amounts that exceed the threshold of physiological tolerance, or from a lack of one or more vital elements (for example, oxygen). The energy could be mechanical, thermal, chemical or radiant (10). It is usual to define injuries by intention. The main causes of unintentional injuries are motor vehicle accidents, poisoning, drowning, falls and burns.

Violence is the intentional threat or use of physical force against oneself, another person or a group or community that results in injury, death, psychological harm, maldevelopment or deprivation. Intentional injuries (or violence) can be divided into the categories of: self-directed (as in suicide or self-harm), interpersonal (child, partner, elder, acquaintance, stranger) or collective (in war and by gangs), and other intentional injuries (including deaths due to legal intervention) (11).

In addition to intention and cause, injuries can also be addressed according to their settings – such as the home, workplace or road – and to activity – such as sports or other leisure activities.

Country groups

This book discusses the 52 Member States in the Region in various groupings, on the basis of income, groups in databases of the WHO Regional Office for Europe, and location. First, they are classified as high-income countries (HIC) and low- and middle-income countries (LMIC), according to annual gross national income per capita in 2001 as defined by the World Bank (Table 1):

- low income: US\$ 745 or less
- middle income: US\$ 746–9205
- high income: above \$9206 (12).

Table 1. Country groups by gross national income per capita, 2001

HIC	LMIC
Andorra, Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, the Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, the United Kingdom	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Poland, the Republic of Moldova, Romania, the Russian Federation, Serbia and Montenegro, Slovakia, Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, Uzbekistan

Unless otherwise specified, the European Union (EU) refers to the 25 Member States after 1 May 2004. Table 2 shows the grouping of countries in the WHO European health for all databases. In addition, countries have been classified by geographical subregions (13) to plot variations in standardized mortality rates (SMRs) for injury (Table 3).

Table 2. Country groups in the WHO Regional Office for Europe databases, 2005

Group	Countries
EU before 1 May 2004	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom
EU after 1 May 2004	Austria, Belgium, the Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom
Commonwealth of Independent States (CIS)	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan
Central Asian republics	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

Table 3. Country groups by geographical subregions, 2005

Group	Countries
Nordic countries	Denmark, Finland, Iceland, Norway, Sweden
Western Europe	Austria, Belgium, Germany, France, Ireland, Luxembourg, Netherlands, Switzerland, United Kingdom
Southern Europe	Greece, Israel, Italy, Malta, Portugal, Spain
Central Europe	Czech Republic, Hungary, Poland, Slovakia, Slovenia
South-eastern Europe	Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Romania, Serbia and Montenegro, The former Yugoslav Republic of Macedonia
Baltic countries	Estonia, Latvia, Lithuania
North-western CIS	Belarus, Georgia, Republic of Moldova, Russian Federation, Ukraine
Southern CIS	Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan

1. Scale of the problem in the Region

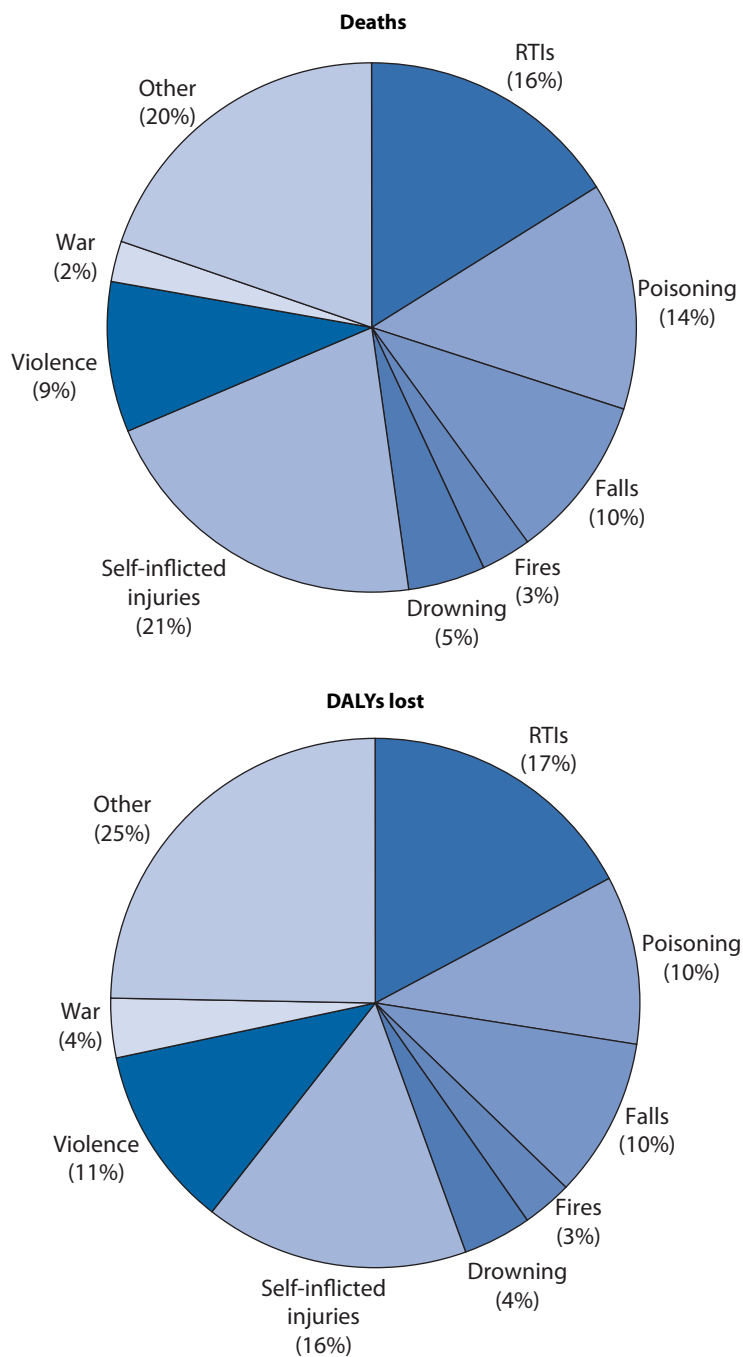
Key facts

- Injuries are the leading cause of death in people aged 1–44 years.
- Health service costs due to injuries are very high. Home and leisure injuries account for 5% of inpatient costs.
- Costs to society are also very high, for example, road traffic injuries (RTIs) alone result in a loss of 2% of gross domestic product (GDP).
- Injury deaths show upward trends in many countries.
- There are inequalities in injury deaths in the WHO European Region, with some of the world's highest rates in the LMIC and some of the lowest in the HIC.
- Poor people are more likely to die from injury than wealthy ones; this is an important issue of social justice. Injuries and violence are a cause of premature death in people living in relative poverty. Social exclusion, the loss of social support networks and changes in social capital have been witnessed in many countries of the CIS and eastern Europe.

Groups most affected

When all age groups are taken together, injuries rank third after cardiovascular diseases and cancer, and in 2002 were estimated to cause about 800 000 deaths (8.3% of the total). Intentional injuries were responsible for one third of injury deaths overall. The three leading causes of injury death in the Region were self-inflicted injuries, RTIs and poisoning (Fig. 2). Injuries

Fig. 2. Proportion of deaths and DALYs lost from injuries by cause in the European Region for both genders (2002)



Source: GBD 2002 estimates [web site] (7).

are also a leading cause of disease burden, measured using the disability-adjusted life-year (DALY: a year of healthy life lost to premature death or disability) (see Annex 1). In 2002, nearly 21 million DALYs (14% of the total) were lost due to injuries in the Region. The three leading injury causes of DALYs lost were RTIs, self-inflicted injuries and interpersonal violence.

Injuries disproportionately affect males and younger people. Males comprise three out of four people who die from injury (586 000), and account for 77% of the DALYs lost (7). Injuries cause 21% of the deaths but 44% of the DALYs lost in people aged 0–29 years (Fig. 3). This higher burden in young people reflects both a greater number of years of life lost, and more years lived with disability for the survivors. Preventing the health effects of injuries on this age group will therefore lead to disproportionately greater statistical health benefits. Injuries cause the largest number of deaths in people aged 45–59 and the largest proportion of DALYs lost in those aged 15–29.

Table 4 ranks the 15 leading causes of death and lists individual causes of injury, which are highlighted.

This emphasizes the priority that injury deserves in relation to other causes by age group. For example, RTIs, drowning, self-inflicted injuries, poisoning, interpersonal violence, falls and fires were among the top 15 causes of death in children 5–14 years old, while the leading six causes in people aged 15–29 were RTIs, self-inflicted injuries, interpersonal violence, poisoning, drowning and war, with falls ranking eleventh. The top causes of DALYs show a similar pattern (see Annex 3, Table 3).

The relative importance of deaths from intentional injury varies by stage of life. It is lowest in children under 5 years, and highest in people aged 15–29 (Fig. 4). Later chapters explore the causes of these differences.

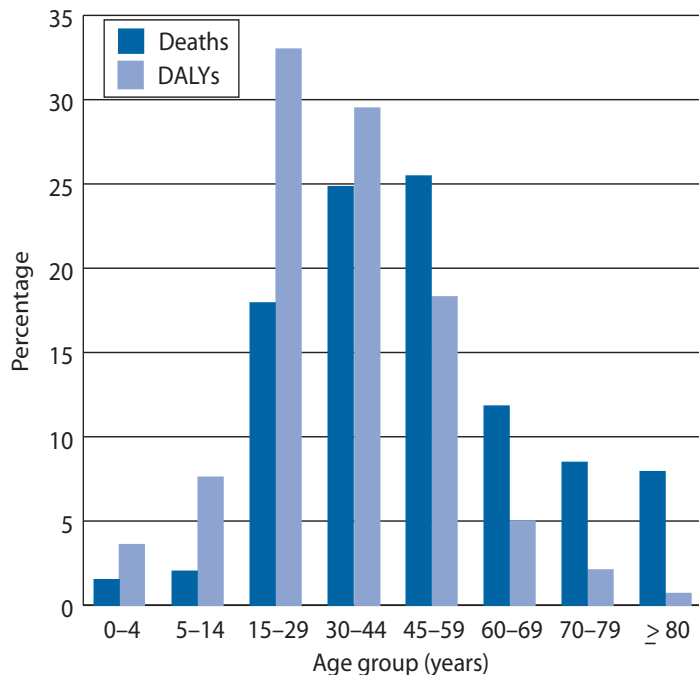
Costs

Deaths are only part of the picture; for every injury fatality, an estimated 30 people are hospitalized and 300 require outpatient treatment in hospital emergency departments (14) (Fig. 5). Applying this ratio

to the 800 000 injury fatalities in the Region yields an estimate that about 24 million non-fatal injuries per year would require hospitalization, and 240 million would need attention in an emergency department. Many more people would seek help from their general practitioner or treat themselves. These numbers are a measure of the prevalence of serious injuries, showing the resulting drain on health resources and lost productivity. Very little is known about the large numbers of people who suffer short or long-term disabilities as a result of their injuries.

Injuries are an important cause of health service expenditure, and make demands on already overstretched health service resources. Although health care costs for injuries are not widely available for the Region, estimates have been made for this report. The figures are staggering. For example, in 1999 hospital admissions

Fig. 3. Percentage of deaths and DALYs lost from all injuries by age in the European Region for both genders, 2002

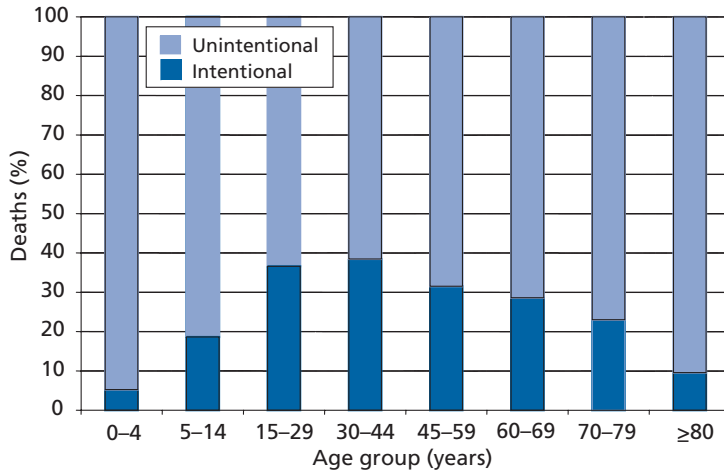


Source: GBD 2002 estimates [web site] (7).

Table 4. Number and rank of leading 15 causes of death for both genders in the European Region, 2002

Rank	Causes (deaths)						Total
	0–4 years	5–14 years	15–29 years	30–44 years	45–59 years	≥ 60 years	
1	Perinatal conditions (65 675)	RTIs (4 691)	RTIs (37 994)	Ischaemic heart disease (52 052)	Ischaemic heart disease (253 018)	Ischaemic heart disease (2 064 108)	Ischaemic heart disease (2 373 141)
2	Lower respiratory infections (31 971)	Lower respiratory infections (3 793)	Self-inflicted injuries (32 327)	Self-inflicted injuries (44 830)	Cerebrovascular disease (106 943)	Cerebrovascular disease (1 309 057)	Cerebrovascular disease (1 447 010)
3	Congenital anomalies (28 660)	Drowning (2 863)	Interpersonal violence (15 679)	Poisoning (32 292)	Trachea, bronchus, lung cancer (78 321)	Trachea, bronchus, lung cancer (276 456)	Trachea, bronchus, lung cancer (365 351)
4	Diarrhoeal diseases (11 827)	Leukaemia (1 766)	Poisoning (12 051)	RTIs (31 551)	Cirrhosis of the liver (59 089)	Chronic obstructive pulmonary disease (238 855)	Lower respiratory infections (280 883)
5	Meningitis (9 313)	Self-inflicted injuries (1 597)	Drowning (8 342)	Interpersonal violence (24 645)	Self-inflicted injuries (43 054)	Lower respiratory infections (203 298)	Chronic obstructive pulmonary disease (260 605)
6	Childhood diseases (4 913)	Childhood-cluster diseases (860)	War (7 810)	Cerebrovascular disease (24 023)	Poisoning (41 517)	Colon and rectum cancer (193 507)	Colon and rectum cancer (229 083)
7	Upper respiratory infections (2 517)	Cerebrovascular disease (848)	Tuberculosis (7 099)	Cirrhosis of the liver (22 949)	Breast cancer (38 097)	Hypertensive heart disease (157 267)	Hypertensive heart disease (179 849)
8	Drowning (1 817)	Poisoning (810)	Cerebrovascular disease (5 266)	Tuberculosis (22 445)	Colon and rectum cancer (29 247)	Stomach cancer (123 319)	Cirrhosis of the liver (170 600)
9	RTIs (1 698)	Interpersonal violence (765)	Lower respiratory infections (4 941)	HIV/AIDS (19 240)	Lower respiratory infections (27 532)	Diabetes mellitus (122 667)	Self-inflicted injuries (163 878)
10	Endocrine disorders (1 309)	Epilepsy (687)	HIV/AIDS (4 420)	Breast cancer (11 076)	Stomach cancer (26 786)	Alzheimer's and other dementias (101 353)	Stomach cancer (157 717)
11	Poisoning (1 024)	Congenital heart anomalies (674)	Falls (3 914)	Drowning (10 127)	RTIs (23 958)	Breast cancer (100 570)	Breast cancer (150 116)
12	Fire (976)	Falls (610)	Ischaemic heart disease (3 905)	Trachea, bronchus, lung cancer (10 000)	Tuberculosis (21 095)	Prostate cancer (89 331)	Diabetes mellitus (141 454)
13	Cerebrovascular disease (872)	Lymphomas, multiple myeloma (567)	Leukaemia (3 637)	Lower respiratory infections (9 347)	Interpersonal violence (20 036)	Cirrhosis of the liver (85 336)	RTIs (126 546)
14	Leukaemia (861)	Meningitis (554)	Drug-use disorders (3 527)	Inflammatory heart diseases (9 299)	Inflammatory heart diseases (19 351)	Pancreas cancer (70 212)	Poisoning (109 870)
15	Inflammatory heart diseases (838)	Fire (551)	Cirrhosis of the liver (2 848)	Drug-use disorders (8 417)	Hypertensive heart disease (18 280)	Inflammatory heart diseases (68 891)	Alzheimer's and other dementias (105 264)

Fig. 4. Proportion of intentional and unintentional injury deaths by age group in the European Region for both genders, 2002



Source: GBD 2002 estimates [web site] (7).

Fig. 5. The clinical pyramid for injuries



alone for injuries in the home and from leisure activities cost about €10 billion for the 15 countries of the EU before May 2004, or about 5.2% of total inpatient expenditure (15). For the Region, the annual health care costs of treating patients who subsequently die are estimated to be €1–6 billion and those of non-fatal injuries, €80–290 billion.¹ These extreme costs point

¹ Sensitivity analysis estimated the average cost of health care as €1250–7250 per fatal injury in the Region (16), calculated on the basis that there are 800 000 fatalities in the Region, and the average cost of health care as €4800–12 000 per non-fatal injury in the Region, calculated on the basis that there are 16 million non-fatal injuries in the Region.

to the obvious benefits of effective preventive strategies.

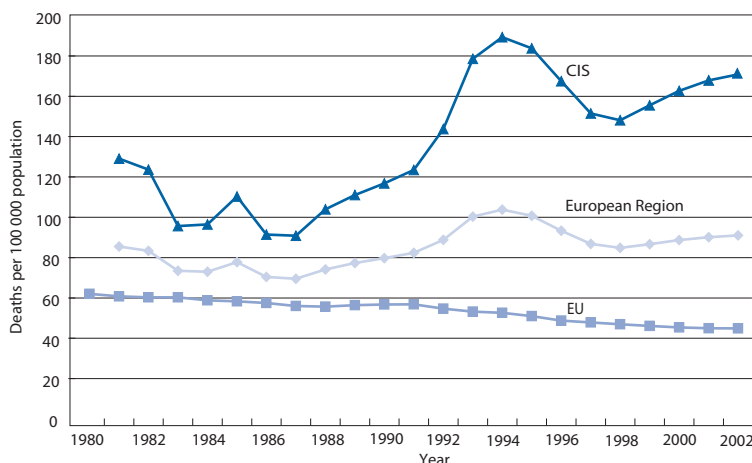
The economic costs of unintentional injuries and violence are vast and have only begun to be mapped. For RTIs alone, studies suggest that 1–3% of country GDP is lost per year in the Region (16). The estimated economic costs of motor vehicle accidents are on the order of €180 billion in the 15 countries of the EU before May 2004 (about 2% of GDP) (17). Most of these costs are related to injury, mainly as lost productivity. As to violence, data for the Region are scarce (18). In England and Wales, a study estimated that total costs of €34 billion were attributed to violent crime, including homicide, wounding and sexual assault. This tally includes both direct costs – such as those of the police, judicial system and health services – and indirect costs including lost productivity and physical and emotional costs (19). Despite these startling figures, economic valuations underestimate the real cost paid by society, as they do not capture the suffering caused to victims' families and social support networks, as well as to communities, workplaces and schools.

Trends

Recent trends show that injury mortality is rising in the Commonwealth of Independent States (CIS) and falling in the EU. Fig. 6 shows trends since 1980 in SMRs from injuries for the European Region, the EU and the CIS. These show two periods of increase for the CIS, one that peaked in 1994 and then a second starting in 1999. The Region as a whole shows a similar pattern, driven mainly by the changes in the CIS.

The upward trends in some of these countries are thought to be due to factors such as increases in motor

Fig. 6. Trends in SMRs for all injuries in the WHO European Region, 1980–2002



Source: Mortality indicators by 67 causes of death, age and sex (HFA-MDB) [online database] (8).

vehicle traffic, worsening inequalities of wealth, higher unemployment, decreases in social capital, increased availability of alcohol, and poor regulatory and enforcement mechanisms (13).

Inequalities and social determinants

There are large inequalities in the Region, with highest rates in the east and south (Fig. 7). In 2002, the Russian Federation had the highest SMR from injuries (229.1 per 100 000 population) and the United Kingdom the lowest (27.3 per 100 000). Thus, the risk of dying from injuries in the Russian Federation was over eight times that in the United Kingdom. The average for the CIS was almost four times that for the EU.

Another way of looking at the problem is to compare the risks of dying from injury in LMIC and HIC. The risks for males and females in LMIC are 4.1 times and 2.7 times, respectively, those in HIC. In addition, the mortality risk for males is far higher than that for females in LMIC (see Annex 3, Table 1).

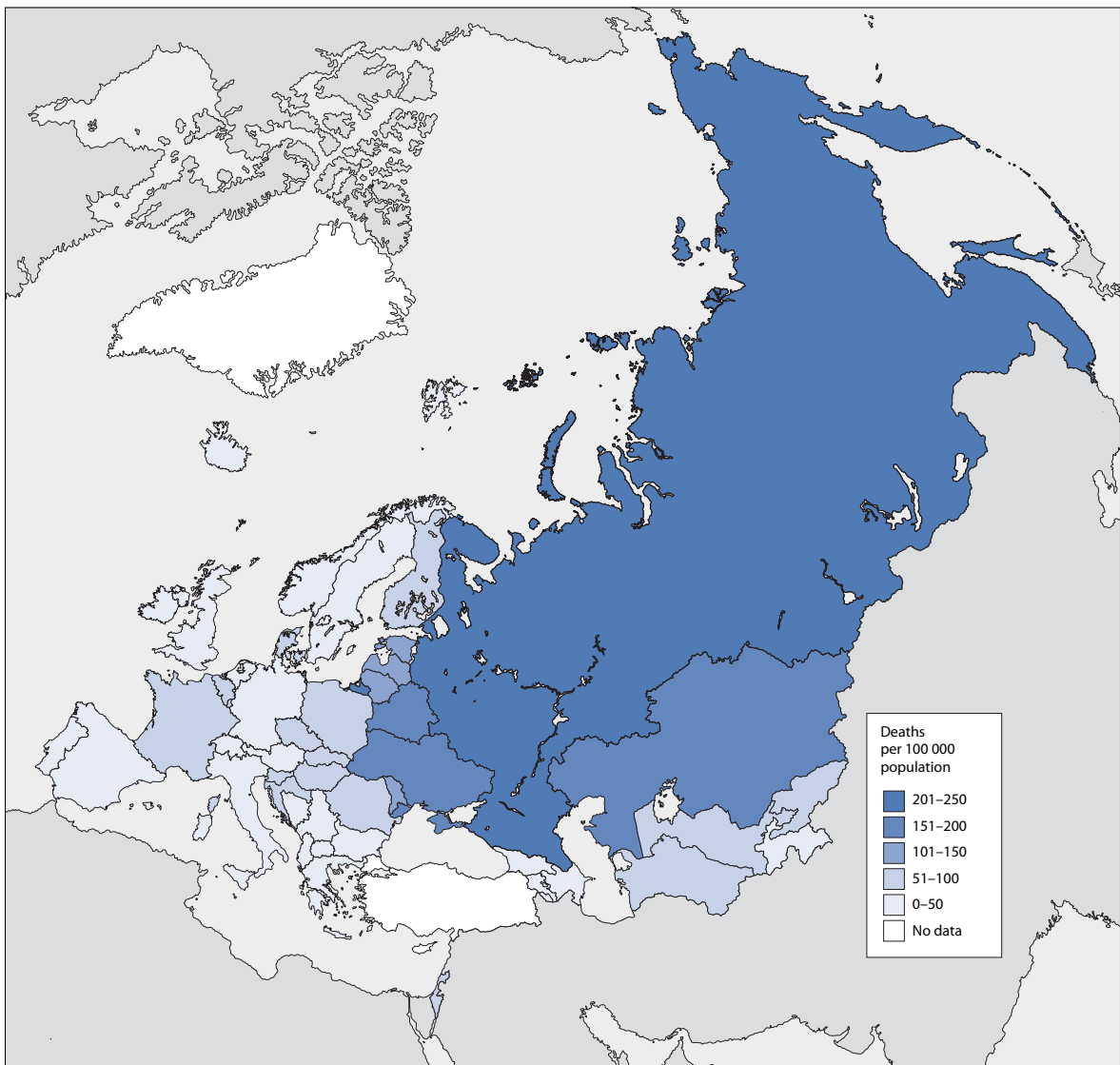
Poorer people are at higher risk of injury; this is well established. These inequalities are an important issue of social justice, but a better understanding of them enables the development of effective programmes to decrease mortality from injuries (20).

Injuries are linked to poverty and inequality in three ways. First, poor individuals and families are

especially vulnerable to injuries because of their exposure to risky situations, environments and behaviour. They also have the least access to means of reducing their exposure to risk. Second, poor people very often have less access to high-quality emergency medical and rehabilitative services. Third, once injured, the health service costs and lost earning capacity severely damage the family financial situation, which in turn can lead to further inequalities. Injury is more likely to affect the ability to return to work in the poor, as they are more likely to depend on physical activity for their livelihood (21).

This is important in the European Region for two reasons. First the countries of the CIS and eastern Europe are undergoing political change and a transition to market economies. This has not only been associated with huge political and social uncertainty but also resulted in inflation, unemployment, inequality and poverty. For example, poverty rates in some of the transition countries range from 30% to 80% (22). Second, even in HIC, social class differentials and poverty affect health and injury deaths. Absolute poverty continues to exist even in the richest countries of the Region, and the unemployed, ethnic minority groups, guest workers, refugees, disabled people and the homeless are particularly at risk. In the United Kingdom, children from lower social classes are 3–4 times more likely to die from injuries than those of higher classes (23). This is true for most types of injury, including drowning, falls, poisoning, RTIs, fires and homicides (24). Certain types of injuries have a particularly steep social gradient; for example, fire-related deaths show a gradient of 1 to 15 between the highest and lowest classes. In the Russian Federation, people with lower educational levels had twice the mortality from occupational injury than the more educated (25). Income inequality is associated with homicide and suicide rates, which have increased during the transition.

Fig. 7. SMRs for all injuries in the WHO European Region, 2002



Source: Mortality indicators by 67 causes of death, age and sex (HFA-MDB) [online database] (8).

Social capital, social exclusion, the sense of cohesion and social networks in a community will all influence people's capacity to withstand social conflict without resorting to violence. Suicide rates are higher for people experiencing exclusion or unemployment and lacking social support networks. Cultural attitudes toward violence also have an influence, and resorting to violence to resolve minor problems will escalate during periods of adverse change. Gender stereotypes and models of masculinity may be challenged during periods of poverty, and this may result in escalations of intimate partner violence, especially in societies where violence is the usual means of solving problems

(26). Sociological and psychological factors influence risk-taking behaviour, particularly in men, and socioeconomic stressors may also increase it (10). Unsafe physical and social environments need to be modified to mitigate risk exposures, as has been achieved in some HIC (6).

The reason why socioeconomic class influences the occurrence and outcomes of injuries is complex: it is thought to be a combination of psychosocial factors, education, material resources, physical and social environments, the organization of work and occupational exposure, and health behavioural and other factors, such as the existence of social capital

and social networks (27). The discussion of individual injury types and risk groups below emphasizes these factors. Comparisons highlight how the socioeconomic changes in many parts of the Region drive the differences between countries.

Risk factors: alcohol and drugs

Alcohol and drugs are risk factors for all unintentional injuries and violence (2,4,10,11,28). A lot of the excess adult mortality in the CIS and eastern European states has been attributed to alcohol use (29–34). Alcohol consumption is influenced by socioeconomic factors. Some of the key facts on alcohol and injuries are summarized here.

- Between 40% and 60% of all unintentional and intentional injury deaths are attributed to alcohol consumption (33).
- Alcohol is a crosscutting risk factor for both unintentional injuries and violence.
- Many countries have strong drinking traditions, and binge drinking is a concern.
- Much of the excess adult mortality in the CIS and eastern European countries has been attributed to alcohol.
- Aggressive marketing strategies of alcohol manufacturers have contributed to large increases in consumption by young people.
- Another factor in the hazardous use of alcohol is a lack of regulatory control of its production and smuggling, resulting in unprecedented levels of unintentional injuries and violence.

Messages to policy-makers

- Public health action is needed to tackle the worsening inequalities in injury mortality in the WHO European Region.
- Much can be gained from transferring experience gained in some of the HIC to other parts of the Region. Such transfers need to be sensitive both to the content of interventions and the contexts of implementation.
- Excessive alcohol consumption needs to be tackled through fiscal and regulatory measures and enforcement of laws to control illegal production and sale, and drink–driving.
- Reducing inequalities of wealth is a task for social and economic policy that can lead to greater social cohesion, decreases in injuries and violence and better standards of health (20).

2. Unintentional injuries by cause

Unintentional injuries are responsible for two thirds of injury deaths. This section examines the main causes of unintentional injury in greater depth and weighs up their importance, some of the risk factors and some of the evidence of effectiveness.

Road traffic injuries

Key facts

- RTIs kill 127 000 people and injure or disable 2.4 million each year in the European Region.
- Groups carrying a disproportionate share of RTI deaths include people aged 15–44 years (55%), males (75%) and pedestrians and cyclists (33%).
- Two thirds of road crashes occur in towns.
- Wider use of cost-effective measures to prevent RTIs – including legislation on and enforcement of speed limits and alcohol control; the use of helmets, seat-belts and child safety seats in traffic; and improved visibility of road users – could quickly show dramatic results.

RTIs are the leading cause of unintentional injury death for people aged 5–29 years (see Table 4). In 2002, the estimated 127 000 deaths from RTIs in the European Region comprised one in six injury deaths; 55% of the people killed were aged 15–44 years old and 75% were male. Age-specific rates were highest in people 80 and over, who suffer only 3% of all the RTI deaths, followed by people aged 15–29 years, who account for 30%. Although the younger group represents a bigger public health problem, older people have higher fatality rates once injured because they may be more severely injured and more frail (Fig. 8).

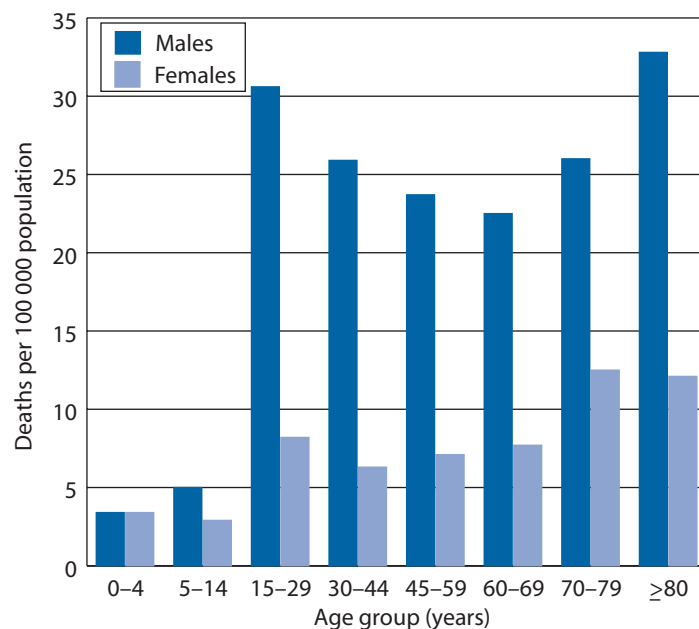
There were about 2 million crashes in the Region in 2002, resulting in 2.4 million injuries and disabilities; this is likely to be an underestimate, as it is based on data from the police,

rather than hospitals (35,36), which may undercount injuries by 30–60% (16,37). About 3.6 million DALYs were lost, 45% of them in the group aged 15–29.

People living in LMIC are 50% more likely to die from RTIs (see Annex 3, Table 1). The highest and lowest country SMRs can vary by a factor of 11. If the European Region had the same rate as that of the country with the lowest (the United Kingdom), it is estimated that the total number of lives saved would be nearly 55 000 per year (54% of RTI deaths).

The mode of transport used influences the severity of the injury sustained. The risk of dying for users of motorized two-wheelers is on average 20 times that of car occupants. The risks for cyclists and pedestrians per distance travelled are 7–9 times those for vehicle occupants (16). Two thirds of crashes occur in towns, where there is a greater mixture of vulnerable road users and vehicles. The level and proportion of mortality in pedestrians vary between countries, and reflect differences in both exposure and safety. They are lowest in the Nordic countries and highest in the

Fig. 8. Age- and gender-specific mortality rates for RTIs in the WHO European Region, 2002



Source: GBD 2002 estimates [web site] (7).

CIS and Baltic countries, as shown in Fig. 9.

Pedestrian safety should be considered because children and older people are more vulnerable to sustaining severe injuries when struck. Older people account for nearly half the pedestrian deaths in the Region. This is also an equity issue, since most safety interventions have been geared to protecting vehicle occupants, rather than pedestrians. Walking and cycling could be used as healthier transport alternatives, especially for shorter urban trips, but these will only be chosen as an option if safety is assured.

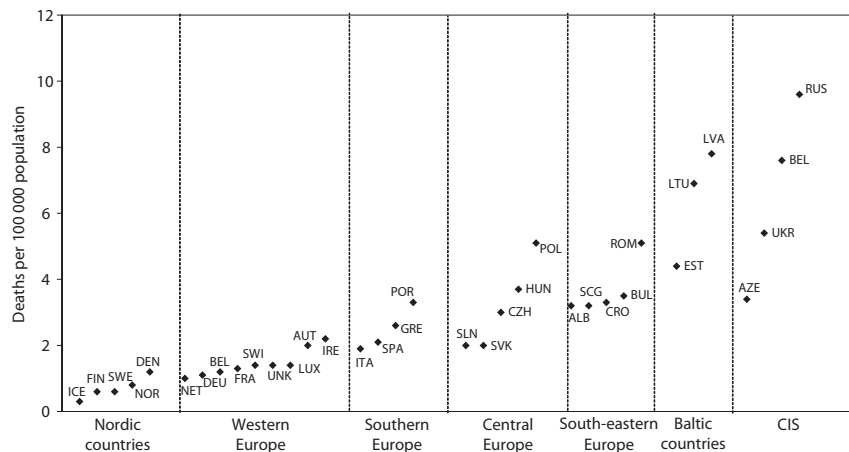
The main risk factors for RTIs are speed, alcohol, exposing vulnerable road users to motorized traffic, poor visibility and not using protective equipment. The probability of a pedestrian being killed increases eightfold as the speed of impact rises from 30 km/h to 50 km/h (38). Alcohol is an important risk factor in all road users, and young drivers and passengers 18–25 years old are particularly at risk of crashing (39). The likelihood of crashing increases with blood alcohol concentrations, particularly at concentrations above 0.04g/dl. At a concentration of 0.08g/dl, the risk is twice that at 0.05g/dl and, at 0.1 g/dl, it is three times as high (40,41). The legal limit is 0.05g/dl in most countries. Driving under the influence of drugs is also a risk factor, and mixing drugs with alcohol amplifies driving impairment (41).

Prevention

WHO has documented the growing evidence on successful measures and strategies to prevent RTIs (16,41). Effective measures include:

- minimizing exposure to high-risk road traffic;
- planning and designing roads for safety;
- improving the visibility of vehicles;
- providing smart and crashworthy vehicles;

Fig. 9. Crude mortality rates for pedestrians by country and subregion in the WHO European Region, 2002



Note. See Annex 5 for abbreviations of the names of countries.

Source: *Statistics of road traffic accidents 2002* (35).

- setting and ensuring compliance with safety rules, such as those to prevent speeding and drink–driving; and
- delivering effective post-crash care.

Crashworthy vehicles have devices such as airbags, knee bolsters and head restraints, which absorb mechanical energy in case of sudden impact. Smart vehicles have technologies such as audible seat belt reminders, and alcohol interlocks to prevent persistent drink–drivers from starting their cars when they are above the alcohol limit. Future technologies may include pedestrian detection, electronic driver assistance to improve safety in case of driver error and speed control to match speed limits and traffic flows (41).

Cycling, walking and sustainable transport policies benefit health. Road design and the exposure of vulnerable road users to traffic risks are a key issue. These mean not only developing walkways and bicycle lanes for short journeys, but also emphasizing sustainable transport policies with less reliance on automobiles. The consequent reductions in pollution, noise and climate change and increases in physical activity would result in other health benefits, such as reduced respiratory illness, noise-related psychological distress and obesity. Emerging evidence suggests that building more roads encourages car use, while traffic restrictions reduce congestion and improve safety, as shown by the London congestion charge (42).

To protect vulnerable road users in particular, it is generally agreed that vehicle speed should not exceed 50 km/h in urban areas, and 30 km/h in residential areas, which have greater potential for collision. A wide variety of measures has been shown to be effective, such as legislation on and enforcement of speed limits with speed cameras and radar guns, and road features such as speed bumps. Conditions in countries, however, need to be taken into account before interventions are transferred.

Enforcing legislation setting a limit of less than 0.5 g/dl blood alcohol is a key issue in tackling drink-driving, and high-visibility random breath testing is effective in changing driver behaviour

(41,43). Levels of zero or lower than 0.5 g/dl are recommended for novice and professional drivers, as are forfeiting of licence after an offence and mandatory relicensing for people dependent on alcohol and/or drugs. Eliminating drink-driving from the Region would lead to great reductions in RTI mortality.

Legislation and enforcement are also required for the wearing of seat-belts, use of helmets and child safety seats, and the improvement of vehicle and pedestrian visibility (41). Along with speed and alcohol control, these are cost-effective interventions that would result in quick gains for policy-makers and the populations that they serve (Boxes 1 and 2).

Box 1. Quick and visible gains from high-level political commitment in France

France offers an example of strong political leadership leading to improved road safety. Since RTIs were the leading cause of death in young people, President Jacques Chirac made road safety a national priority in his Bastille Day speech in July 2002. This led to the formation of an inter-ministerial committee and the formulation of a national action plan, which empowered various agencies at the national and local levels.

This led to a 34% reduction in RTI deaths over a two-year period (2002–2004) through the implementation of preventive measures such as speed control, traffic calming, seat-belt use and control of drink-driving. The health sector played an important contributory role (44,45).

Box 2. Road safety and increased physical activity through cycling in Finland

The first Finnish National Cycling Policy Programme was adopted in 1993. Its main objectives were to double the level of bicycle use and halve cycling fatalities by the year 2000. A general economic assessment in 1993 estimated that the net benefits of doubling cycling would exceed the investment costs by some €100–200 million per year through reductions in injuries and other positive health effects. The Programme contained 85 measures; an evaluation of it in 2000 showed the following.

1. Cycling had become an important and integrated part of the transport system, policy and planning.
2. The number of passenger-km travelled by bicycle returned to the level of the early 1980s (about 1.6 million passenger-km).
3. The number of cycling fatalities was halved (from 101 in 1990 to 53 in 2000).
4. The improvements included better networks of cycle paths, the publication of maps and development of initiatives such as cycling police, bicycle rental and storage, weekly cycling tours and cycling promotional campaigns.

An updated programme to promote cycling was presented in 2001, aiming to double cycling by 2020 and improve safety. The positive development in road safety has continued, and there were only 26 cycling fatalities in 2004, a further reduction of 50%, attributed mostly to the Programme, in spite of reduced cycling due to poor weather in 2004 (46).

Messages for policy-makers

- If all countries had the same rate as the lowest in the Region (the United Kingdom), 55 000 RTI deaths (54% of the total) could be prevented.
- Sustainable transport policies, with less reliance on cars, can also improve safety for cyclists and pedestrians. Such policies would give precedence to cycling and walking for short journeys and better public transport for longer journeys.
- Building more roads encourages car use, while traffic restrictions reduce congestion and improve road safety.
- The evidence shows that controlling speed, reducing drink-driving, using safety equipment and reducing exposure can save lives.
- Multisectoral safety programmes need to be implemented to decrease RTI deaths.

Poisoning

Key facts

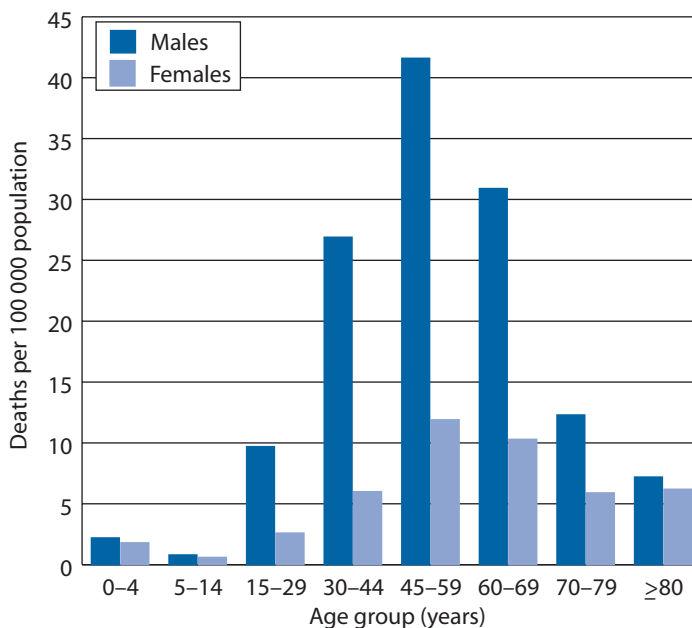
- Poisoning caused about 110 000 deaths and 2.1 million DALYs lost in 2002.
- The risks of death for males and females in LMIC are 18 times and 15 times, respectively, those in HIC.
- Alcohol is responsible for up to 70% of deaths from poisoning in some countries.

Poisoning is the third leading cause of death from injury in the Region. Poisoning mortality rates in males in LMIC in the European Region are the highest in the world, particularly in the group aged 30–59, which accounts for 67% of all poisoning deaths (Fig. 10). The risk of dying from poisoning in LMIC is about 17 times that in HIC (see Annex 3, Table 1). Males are about three times more likely than females to die from poisoning.

Risk factors

A range of toxins has been implicated in poisoning, including harmful chemicals, pesticides, pharmaceuticals and paraffin (10). Children are particularly

Fig. 10. Age- and gender-specific mortality rates for poisoning in the WHO European Region, 2002



Source: GBD 2002 estimates [web site] (7).

at risk when harmful substances are stored in non-childproof containers or within easy reach. Unfortunately, information on the nature of the toxins and circumstances in which they were consumed is often lacking.

The evidence suggests that acute alcohol poisoning contributes to 70% of premature death from poisoning in some of the CIS and Baltic countries (47); WHO data (8) indicate that alcohol poisoning in some of these countries accounts for about 60–70% of all poisoning deaths. Alcohol is not only implicated in poisoning but also a risk factor for death from interpersonal violence, suicide, RTIs and other injuries (28,48). Surveys from some countries have shown that about 5% of the population engages in binge drinking. Others have reported that extensive illicit brewing and trade, and a relative fall in price compared to other goods, have exacerbated the situation in the CIS since the 1980s (49).

Prevention

Estimates suggest that uniform implementation of safety measures in the Region could prevent over 90% of poisoning deaths (95 000). Measures to prevent

deaths from harmful chemicals and pharmaceuticals include the use of child-resistant closures, packaging drugs in smaller quantities, safer storage and restricted availability of some substances, and the creation of control centres for better management of poisoning. Evidence has shown that the use of child-resistant closures has reduced child poisoning rates by as much as 80% (50,51). They have been successfully introduced in many countries through a combination of surveillance, advocacy, legislation and enforcement (Box 3).

Measures to reduce alcohol poisoning include legislative and fiscal policy to reduce access and interventions to cut down on binge drinking, particularly by males. Alcohol is a risk factor for more than one injury type, as well as other acute and chronic conditions, so preventive policies to regulate the supply and use of alcohol will reduce morbidity and mortality from more than one cause.

Messages for policy-makers

- If mortality rates in the Region were reduced to equal the lowest national rate (the Netherlands), 95 000 deaths from poisoning could be prevented.
- Legislative and fiscal policy needs to be implemented to reduce access to alcohol and unlicensed alcohol production.
- Measures to reduce deaths include requiring the use of child-resistant closures, requiring the safe storage and restricting the availability of dangerous substances, and having a network of poison control centres.

Drowning Key facts

- Drowning caused 38 000 deaths and nearly 1 million DALYs lost in 2002. It is the third leading cause of death in children aged 5–14 years.
- The risk of dying from drowning in LMIC is nine times that in HIC.
- Alcohol is a risk factor for drowning, particularly in young males.

Drowning is the process of experiencing respiratory impairment from submersion in liquid, and may therefore occur in any expanse of water, ranging from pools, bath-tubs, wells, ditches, ponds and larger areas such as rivers, lakes and seas (53).

The group aged 30–44 years accounted for 27% of the deaths from drowning in the European Region in 2002. In addition, 890 000 DALYs were lost. Mortality peaks in males in the group aged 45–59 years, and in females, in the groups aged under 5 and 80 years and over (Fig. 11).

Box 3. Child-resistant packaging for chemicals, the Netherlands (52)

In the Netherlands as elsewhere, children under 5 years suffered a relatively high number of unintentional poisonings by household chemicals and pharmaceuticals, resulting in a large number of hospital admissions. The main objective of the programme was to reduce the problem of accidental poisoning and legislation sought to make child-resistant packaging compulsory for household chemicals and pharmaceuticals.

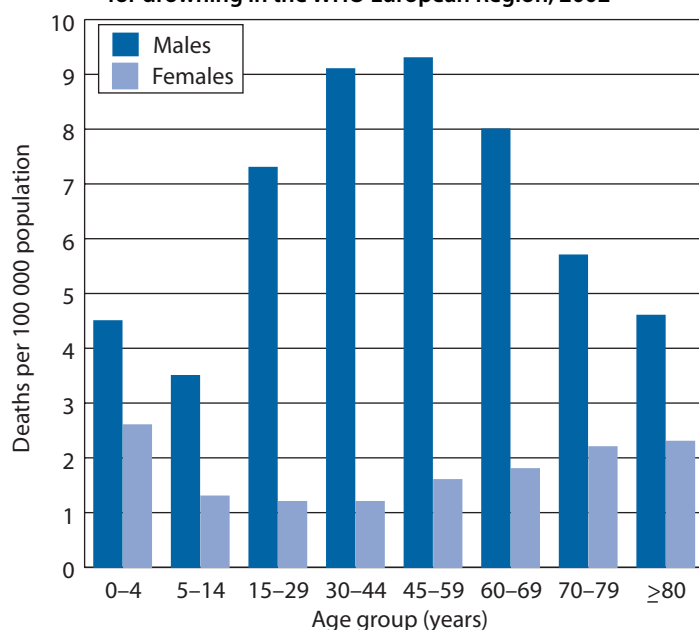
The programme started in 1981, targeting the 1 million children in the Netherlands who are under 5 years of age and is continuing. It required partnership between the Ministry of Health, Welfare and Sport, the Consumer Safety Institute, the National Poison Information Centre and manufacturers.

Surveillance data on poisoning collected by the Institute were used to advocate legislation. In response, the Ministry called for child-resistant packaging of certain hazardous substances as part of the commodities act. The process included consultations with manufacturers and other stakeholders.

Products are tested for child-resistant closures by laboratory facilities established by the Inspectorate for Commodities. The range of substances has been extended in response to the changing pattern of poisoning and new chemicals.

A 1988 evaluation showed a decrease of 50% in hospitalization from poisoning because of these measures. Educational campaigns in the 1990s resulted in similar decreases. The Netherlands now has the lowest poisoning rate in the European Region.

Fig. 11. Age- and gender-specific mortality rates for drowning in the WHO European Region, 2002



Source: GBD 2002 estimates [web site] (7).

Rates are much higher in males than females at all ages and, on average, males are more likely than females to drown by a factor of 3.7 in HIC and 4.8 in LMIC (see Annex 3, Table 1). The likelihood of death from drowning in LMIC is nearly nine times that in HIC. Drowning is the leading cause of mortality in children aged 1–4 years in many countries. Rates are highest in the CIS and Baltic countries (see Annex 3, Fig. 1).

Risk factors

Males' higher drowning rates are due to increased exposure to water, riskier behaviour such as swimming alone, and drinking alcohol before swimming and boating (54–56). Alcohol is a risk factor for adolescents and adults, but also impairs parental supervision of children, the lack of which is often associated with drowning. Epilepsy is a risk factor for drowning in bath-tubs or pools. Ethnic minority groups have an increased risk because of decreased opportunities to learn to swim. Access to water is an important risk factor and varies according to the setting, such as exposure to unfenced pools or uncovered wells, and living near water, ditches, dams and lakes (53).

Prevention

Many preventive measures can decrease the toll from drowning. These include the fencing of pools and other water areas such as wells, better supervision of children in baths and swimming areas, improved swimming skills and the provision of lifeguards and water flotation devices at swimming areas to reduce risk. Fencing of homes near waterways, and promptly draining bath-tubs are also useful measures. Training in swimming and water safety can help save lives. Timely resuscitation also has a role to play in decreasing fatality.

If all the countries in the Region had the same mortality rate as the country with the lowest (the United Kingdom), 31 000 lives could be saved.

Messages for policy-makers

- Reducing the Region's mortality rates to that of the lowest national rate could prevent about 31 000 deaths from drowning.
- Interventions include fencing of water areas, better supervision of children, improved swimming skills and the provision of lifeguards and water flotation devices.
- The health, leisure and education sectors should work together to reduce the toll.

Falls

Key facts

- Falls are an important cause of morbidity and disability in young people, but an important cause of death in older people.
- Males in LMIC are at twice the risk of dying as those in HIC.
- Most falls occur in or around the home, especially to children and older people.
- Socioeconomic deprivation and unsafe building design are risk factors for children.

Falls occur in every age group, and are particularly common in children and elderly people. Three factors

govern the severity of the injury sustained: the height from which a person falls (with the likelihood of serious injury increasing if it is greater than 1 m), the degree to which the impact surface absorbs shock and which part of the body hits (10).

There were nearly 80 000 deaths from falls in the Region in 2002. People aged 80 and over have the highest mortality (40%); they are not only more likely to fall but also more frail than others (Fig. 12). The group losing the highest proportion of DALYs is that aged 15–44 years (49.5%), reflecting not only premature death but also a longer period living with disability.

Mortality varies according to country and locality. On average, males in LMIC have almost twice the risk of dying from falls as those in HIC, while females are at slightly higher risk in HIC. Males in HIC are 2.6 times as likely as females to die from falls (see Annex 3, Table 1).

Risk factors

About 30% of people over 65 who live independently fall each year. About one in five falls requires medical attention and about one in ten results in a broken bone (57). In older people, the following risk factors

for falls have been identified: muscle weakness, history of falls, gait deficit, balance deficit, use of assistive devices, arthritis, visual defects, impairment in activities of daily living, depression, cognitive impairment and age over 80 years (58).

Many of the falls in young adults are occupational, related to unsafe practices. In children more fatal falls occur in urban areas, usually from buildings or other structures, with unsafe building design a risk factor. Socioeconomic deprivation, poor supervision and unsafe playgrounds, and the use of baby walkers are also associated with falls (10).

Prevention

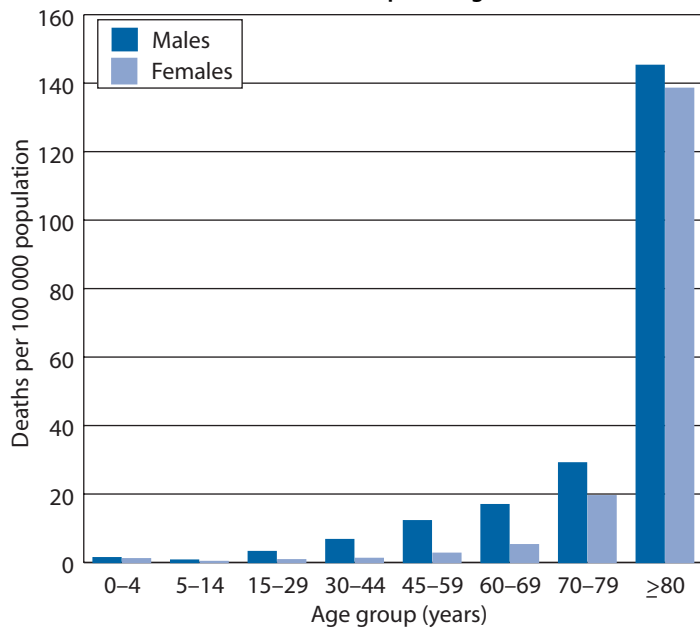
Interventions to prevent falls can be targeted at individuals or communities, and can include modification of environments such as the home. For older people, at the individual level, the following show some evidence of effectiveness: promotion of physical activity and balance training, checking for side effects of psychotropic drugs, the use of assistive devices, and cognitive and behavioural therapy to reduce the fear of falling, which can restrict the lives of older people who have fallen repeatedly. Home modification measures include rectifying hazards within the home such

as loose carpets, clutter on stairs, slippery surfaces, and using appliances such as grab rails. Community programmes aimed at assessed risk factors and people prone to falling can be successful (59), although the evidence comes from the United States of America, and would need to be evaluated for generalizability. Evidence on the use of hip protectors is conflicting.

Effective interventions for children include using appropriate ground surfacing and reducing the height of climbing frames in playgrounds, using balcony guards, stair gates and safety glass in windows in buildings and using window bars in high-rises (58,59). Product safety assessment is important; for example, baby walkers have been shown to be dangerous.

The implementation of these cost-effective interventions can often result

Fig. 12. Age- and gender-specific mortality rates for falls in the WHO European Region, 2002



Source: GBD 2002 estimates [web site] (7).

in quick and visible gains in reducing mortality and morbidity. If all the countries in the Region had the same mortality rates as that with the lowest (the United Kingdom), almost 36 000 lives could be saved.

Messages for policy-makers

- Reducing the Region's mortality rates to the lowest national rate could prevent nearly 36 000 deaths from falls.
- Effective interventions include a combination of risk assessment followed by environmental modification and the promotion of physical activity and balance training.
- The health sector needs to work with the housing sector to reduce the burden from falls.

Burns

Key facts

- Burns are an important cause of disfigurement and death in children and adults.
- The risk of death in LMIC is eight times that in HIC.
- Smoking and alcohol are risk factors for house fires.

Burns and scalds can arise from fires, and contact with hot surfaces and liquids, radiation, electricity and chemicals. As well as fire, smoke inhalation can kill. Although house fires are associated with the highest mortality, burns due to contact with hot liquids and cooking accidents cause much morbidity, long hospital stays and often permanent scarring and disability (60). This report uses the most readily available data, which are on burns resulting from fires, flame and smoke inhalation.

About 24 000 people died from fires in the Region in 2002. Mortality was highest in children under 5 years old and people over 30; the highest death rates were for people aged 80 years and over and males (Fig. 13). While deaths were highest in the group aged 45–59 years (28%), the burden was greatest in those aged 30–44 (27%). The risks of death for males and females in LMIC are nine times and six times, respectively, those in HIC (see Annex 3, Table 1).

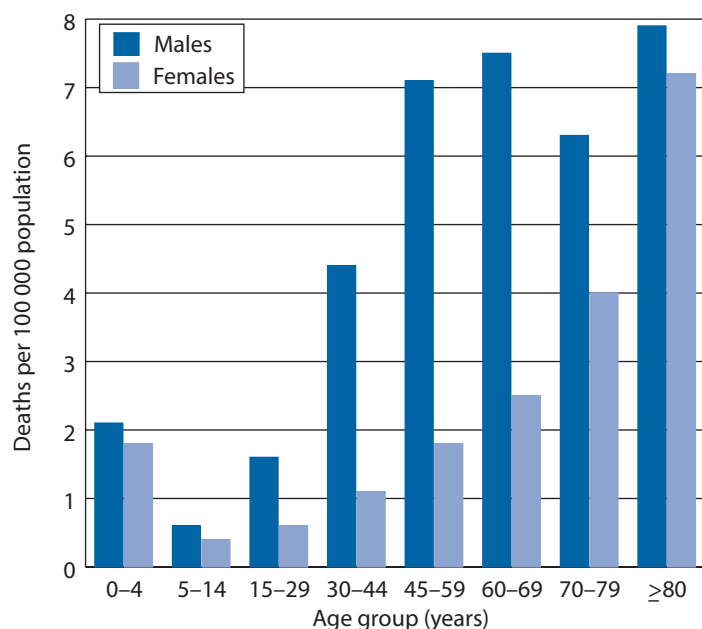
Risk factors

Burns occur mainly in the home and workplace. Risk factors need to be better understood and information on the circumstances, agents and location of burns needs to be taken into account (60). Risk factors include smoking, which is particularly lethal when combined with hazardous alcohol use, especially if the user falls asleep. Low socioeconomic status is associated with poor parental supervision of children, poor housing stock and dangerous cooking practices (59–62). For women and children, burns occur mainly in the kitchen at home, either through upsetting receptacles with hot liquids or oils, or stoves exploding.

Prevention

Working smoke detectors, flame-resistant clothing and raised cooking surfaces are measures with proven or promising effectiveness (58,62). The use of smoke alarms can lead to an 80% decrease in injury and death from fires (63). Community-based programmes that combined counselling on home

Fig. 13. Age- and gender-specific mortality rates for fires and smoke inhalation in the WHO European Region, 2002



Source: GBD 2002 estimates [web site] (7).

safety by a clinician with a discount voucher for smoke alarms appeared to be more effective in encouraging alarm installation than counselling alone (Box 4).

Fire fighters' proactively checking and promoting fire safety standards can improve safety in the community. Applying safe building designs and encouraging safety inspections to enforce regulations are also important. Other preventive measures include the use of safer stoves, enclosing open flames or using fire guards, promoting the use of fire-retardant sleepwear for children, avoiding smoking in bed and encouraging the use of child-safe lighters. Scalding can be prevented by decreasing the temperature of water heater thermostats and by using safer cooking utensils (59).

Simple first-aid measures can be particularly effective in reducing burn injury. These include: removing clothing, applying cold water, extinguishing flames

and, in the case of chemical burns, applying copious quantities of water.

Messages for policy-makers

- If mortality rates in the Region were reduced to the lowest national rate (the Netherlands), nearly 19 000 deaths from fire-related burns could be prevented.
- Effective interventions include using smoke alarms, setting the thermostats of water heaters lower and using safer stoves, utensils and fuels for cooking.
- Immediate and simple first-aid measures can decrease the severity of burns.
- The health sector needs to work with the housing sector, consumer safety organizations and fire services to promote safety in the home.

Box 4. Gloucestershire Home Safety Check Scheme, United Kingdom (64)

The county of Gloucestershire, United Kingdom has a scheme to target the groups most vulnerable to unintentional injuries in the home – families with children under 5 and people who are over 60 or disabled – but the service is open to all. The main objective of the programme is to reduce the number of injuries.

Trained field workers visit homes, offer advice on any identified hazards, and carry out essential repair work free of charge. In partnership with Gloucestershire Fire and Rescue Service, they provide and install free smoke alarms. The workers also provide regular smoke alarm servicing, in which they replace alarm batteries free of charge. They also check the safety of electric blankets.

In addition, the scheme works with other agencies to make a range of safety equipment available without cost to needy families. Staff members give talks and present displays to mother-and-toddler groups. They work from the local health promotion department, in collaboration with the Fire and Rescue Service, local officials responsible for product and consumer safety, local health visitors, district nurses and local charities.

Evaluation is under way; the results for self-reported behaviour show that over 80% found the visits useful and reported increased knowledge and safer behaviour.

3. Unintentional injury and two vulnerable groups

Children

Key facts

- Injuries are the leading cause of death in children aged 0–14 years, accounting for 36% of the total.
- Injuries kill nearly 28 000 children under 15 each year, or 3 per hour, and result in about 4.2 million hospital admissions and 52 million emergency department visits for children.
- Childhood injuries may lead to long-term physical and psychological disability.
- Injuries exact huge health service and social costs, in addition to the shattered lives of families who have lost a child.
- RTIs and drowning are leading causes of childhood death.
- Deprived children are 3–4 times more likely to die from injuries; this is associated with single parenthood, low maternal education, low maternal age at birth, poor housing, large family size and parental drug or alcohol use.

In 2002, 27 900 children below 15 years of age lost their lives from all injuries in the WHO European Region. This is equivalent to about 76 deaths per day. The leading causes of these deaths are RTIs, drowning, poisoning, self-inflicted injuries, fires, violence and falls (see Table 4). Nearly 89% of the deaths are due to unintentional injuries, so most of this section deals with them. Nevertheless, children are also vulnerable to violence, which led to 3000 deaths in 2002.

Deaths are the tip of the iceberg; according to a study from the Netherlands, for each death in children aged 0–14 years from home and leisure unintentional

injuries, there were 160 hospital admissions and 2000 emergency department visits (65). Were this ratio to prevail for all injury deaths in the European Region, there would be 4.5 million hospital admissions for child injuries and 56 million emergency department visits in this age group alone. Further, injuries can have long-term physical and psychological consequences for children, with serious effects on health in later life. Data on these are not readily available.

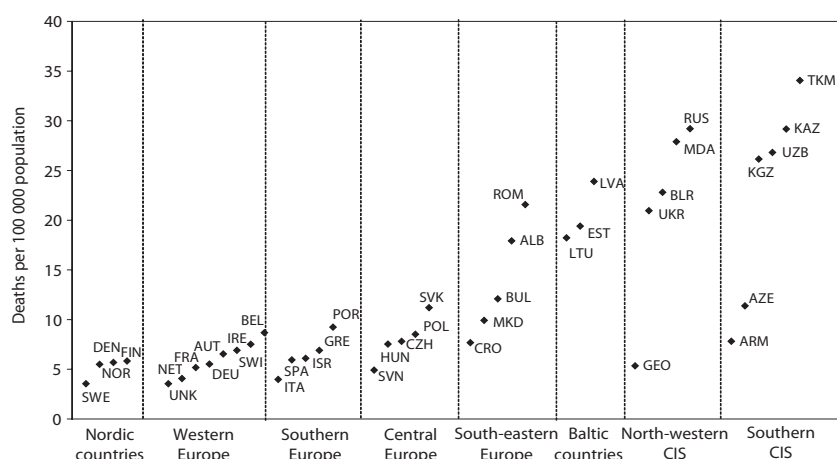
Inequalities in childhood injury deaths

Childhood injury deaths appear to vary between different parts of the Region (Fig. 14). The rates are highest in some CIS countries (see Annex 3, Fig. 2). The likelihood of dying for the groups aged 0–4 and 5–14 in LMIC is 5.1 times and 4.2 times, respectively, that in HIC.

Risk factors

Childhood injury deaths show a social gradient (23), irrespective of the cause. They are strongly associated with poverty, single parenthood, low maternal education, low maternal age at birth, poor housing, large family size and parental alcohol or drug abuse. Risk factors specific to each cause are discussed in Chapter 2.

Fig. 14. Average SMRs for all injuries in children aged 1–14 years by country and subregion in the WHO European Region, 2000–2002 or most recent three years



Note. See Annex 5 for abbreviations of the names of countries.

Source: WHO Statistical Information System (WHOSIS) [web site] (9).

During the period 2000–2002, injuries killed 59 850 children aged 1–14 in the Region, equivalent to 19 950 per year.² Nearly 15 000 deaths (75% of the total) could be averted every year if the whole European Region had the same rates as the safest country (Sweden) (see Annex 3, Table 2).

Prevention

Over the last 20 years or so, countries have halved injury death rates in the Region, which shows that injuries can be prevented by public health action (66). The reduction is more pronounced in HIC. In spite of the difficulties in evaluating legislative, environmental and educational interventions, a large evidence base describes what works and should be more widely implemented (51,67). Much of this evidence is summarized in Chapter 2.

Children are vulnerable road users, and the measures to reduce RTIs discussed in Chapter 2 need to be widely implemented. In the Region's HIC, RTI mortality has been declining since the 1970s and 1980s, in spite of a 50% increase in motorized traffic. This decline implies that road safety has improved, which it undoubtedly has. Two other factors also need to

be taken into account, however: the improvement of emergency medical services and trauma care have and the considerable reduction in children's exposure to traffic as pedestrians over the last 20 years due to increased car use. The second factor also contributes to a reduction in exercise and an increase in obesity. The relative contributions of these factors need further study.

Chapter 2 also lists measures to reduce drowning (although different contexts may require novel approaches to implementation (68)), poisoning, fire-related deaths and falls (58,69).

Research has shown that using a combination of approaches – including mass-media campaigns, legislation and financial incentives to use safety and protective equipment – results in more progress (58,70). Home visitation programmes consisting of safety checks, and advice and incentives for safety seem to be effective (71). Giving the responsibility for safety solely to individuals – through educational campaigns, for example – may be convenient in policy terms, but does not work as well as the multisectoral and multilevel approaches described here (Boxes 5 and 6).

Box 5. Child Safety Action Plan project: working for safer daily living for children throughout Europe (72)

To reduce the burden of childhood injuries, the Child Safety Action Plan project is working with 18 countries to develop national plans. Its aims are to increase awareness of the issue, and develop plans for effective action by government, industry, professionals and organizations working in relevant areas, and families themselves. The project is led by the European Child Safety Alliance in partnership with the European Commission, WHO, UNICEF and the European Public Health Association.

Participating country partners are being encouraged to engage government departments and a wide range of stakeholders throughout a guided planning process to ensure ownership of multidisciplinary national plans to reduce child injury. By the project's end in December 2007, contributions to safer daily living for children in Europe will include:

- national child safety action plans;
- data on child injury in Europe allowing comparisons within and between countries using standardized measures; and
- a collection of models of good practice in reducing the risks of child injury and recommendations for future priorities for Europe.

² A methodology similar to that used by the United Nations Children's Fund (UNICEF) Innocenti Research Centre (66) was used (see Annex 1 for details). The numbers are different from GBD estimates (7) because: the data were disaggregated by different age bands, and some countries were excluded because the data were incomplete (Bosnia and Herzegovina, Cyprus, Serbia and Montenegro, Tajikistan and Turkey) or they had populations of less than 1 million (Andorra, Iceland, Malta, Monaco and San Marino).

Box 6. Starting Out Safely in Glasgow, Scotland, United Kingdom (73)

Starting Out Safely was a three-year pilot project in Scotland run by the Greater Glasgow National Health Service and the Royal Society for the Prevention of Accidents, in response to professional concerns over the number of babies and young children attending accident and emergency departments throughout Glasgow with unintentional injuries sustained at home.

The project delivered four packs at key stages within the first three years of a child's life: within the first few months after birth, and around the child's first three birthdays. Each pack provided a mixture of information and practical aids to increase new parents' awareness of home safety. For example, one pack included a bath thermometer and electric socket covers, with leaflets on child safety and general fire safety. Another included cupboard catches and advice on kitchen safety. The packs were delivered by health support workers who acted as a resource for parents, and provided health and safety advice as necessary.

The project was seen as positive. It provided new parents with not only some basic child safety equipment but also an opportunity to raise their awareness of home safety in general.

Messages for policy-makers

- Reducing mortality from childhood injury in the Region to the lowest national rate (Sweden's) could prevent about 15 000 deaths per year. This could be achieved if the many proven strategies for injury prevention were widely implemented.
- Using a combination of mass-media campaigns, legislation and financial incentives for safety interventions gives better results.
- A multisectoral approach is required, including the health, education, leisure, housing and transport sectors, as well as civil society.

Older people

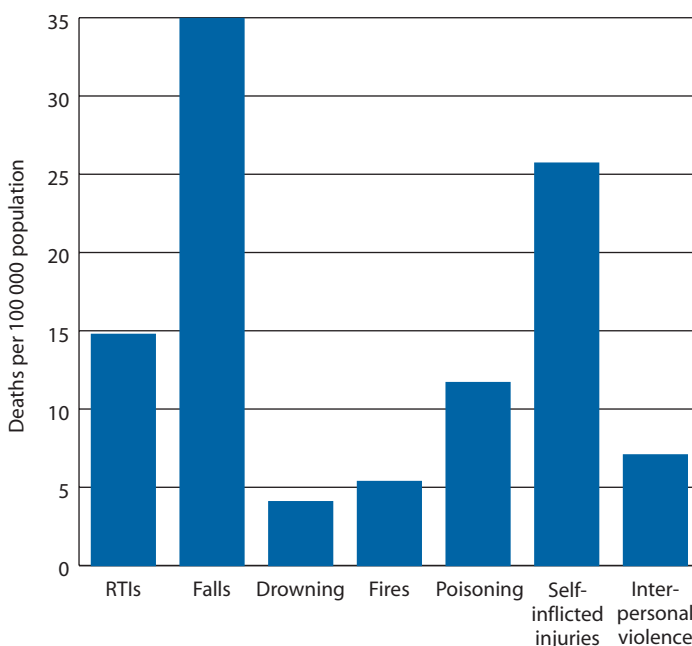
People aged 65 years of age and over have higher death rates from injuries than other age groups. They are more likely to be injured because of various medical problems and impairments of vision, gait and balance; their injuries are more likely to be severe because of osteoporosis and frailty, and once injured they are more susceptible to fatal complications and longer ill health because of their diminished capacity for recovery. Falls are a particular problem, and older people who experience them, as well as other injuries, have longer hospital stays and greater mortality.

The ageing of the Region's population adds importance to the problem.

Although people over 60 years of age make up 18.6% of the population, they account for 28.2% of injury deaths. Estimates are that, 28% of the European population will be aged 65 years or more by 2050, which implies that the injury problem is likely to increase (5).

The three leading causes of injury death in older people in the Region are self-inflicted injuries, falls and RTIs (Fig. 15). The death rates in this age group

Fig. 15. SMRs for people over 65 by injury cause in the WHO European Region, 2002



Source: Mortality indicators by 67 causes of death, age and sex (HFA-MDB) [online database] (8).

are among the highest, but injuries represent a smaller proportion of total deaths and DALYs than in other adult age groups, because, once injured, elderly people have a higher fatality. The three countries with

the highest injury mortality from falls are Hungary, the Czech Republic and Malta. Injury prevention in older people is discussed under the section on falls in Chapter 2 (Box 7).

Box 7. Twelve years as a safe community: Vorarlberg, Austria (74)

The province of Vorarlberg has 350 000 inhabitants and was designated a safe community in 1997 after it started 14 pilot projects in 1993. Since 2002, the project has been integrated throughout the province, with government support.

The objectives, similar to those of Safe Communities initiatives around the world, are to reduce injuries in the community through safety promotion. From 2001 to 2004, over 1700 activities were carried out, reaching 155 000 people (46% of the population). These included educational initiatives such as first-aid courses, safety training of older people and new mothers, bicycle and helmet training, a project to make safe paths to school, discounts for safety equipment and safety checks.

Using a before-and-after design with a control group, measurements were made, including the documentation of activities; media-coverage, telephone and postal surveys to assess acceptance, usefulness, and knowledge, attitudes and behaviour related to risk and safety; and the counting of deaths and hospital admissions due to injury. The evaluation results showed that more than two thirds of Vorarlberg's population was aware of the initiative in 2004, with a measurable increase in media coverage of injury prevention activities. More than 90% of the population thought the Safe Communities initiative was useful and supported future work. Injury risk was reported to have decreased by 8%, compared to a 6% fall in the control group. Fatal injuries decreased by 39% (versus 15% in the control group); although hospital admission rates showed no difference, the duration of hospital stay decreased by a total of 30 000 hospital days, corresponding to a saving in medical treatment costs of around €12 million for the province's health budget.

4. Unintentional injury by setting

The setting and the activity in which an injured person was engaged provide important information on risk factors essential to developing prevention strategies. Although injury data rarely include such information, this chapter addresses injuries in the workplace and home.

The workplace

Data reported to WHO suggest that the number of deaths from occupational injuries in the European Region fell from 25 000 in 1991 to 13 500 in 2001 (8). This decrease may be due to better safety and working practices and improvements in emergency medical care, especially in HIC, and due to incomplete data collection in other countries. Underreporting is a particular problem in countries where health and workplace infrastructures such as occupational safety standards have collapsed and insurance systems weakened. Data from the International Labour Organization are probably more complete, and estimates based on them suggest that the total number of occupational injury deaths in the Region may actually be about 2–4 times (27 000–54 000) the WHO total (75).

Risk factors

Whatever their number, work-related injuries are preventable. The injury risk is very unevenly distributed by the type of work. There are differences in magnitude of 1–2 between different sectors and occupations. The high-risk sectors are agriculture, mining, construction and fishing, and people working in small and medium-size enterprises and the informal sector are also at higher risk. Workers in agriculture, the informal sector and smaller enterprises cannot prevent injuries when safety infrastructures are lacking; a public health approach is therefore much needed.

Working children

Child labourers and young and inexperienced workers are the most at risk. The available data suggest that the percentage of working children in the

Region varies, but that no country is immune to the problem of child labour in hazardous work. There are 2.5 million working children in the developed economies and another 2.5 million in the transition economies such as those of the CIS. Data show that the proportion of children aged 5–14 years who work ranges from 37% in the Republic of Moldova to 3% in Portugal (76).

The proportion of child labour at risk from working under hazardous conditions varies; it is estimated at 40% in Ukraine. The rate of workplace injuries and other health problems varies from 19% in Turkey to 2% in Portugal. In Italy about 17 000 workplace injuries to people under 17 years are registered annually. The vast majority of working children work informally in various sectors (for example, agriculture and family businesses) where occupational safety standards may be lacking.

Prevention

Experience has shown that legislation and enforcement are important starting points. Education on occupational health and safety should start at school, and include staff training, a culture supporting occupational safety and the use of standards and guidelines to improve safety. Improved registration of occupational injuries is needed for the better targeting of preventive activities.

Messages to policy-makers

- Awareness that occupational injuries are preventable needs to be raised.
- Legislation and enforcement are needed to obligate employers to set and maintain safety standards.
- Occupational health has a strong role to play in training, data collection and action for prevention of mishaps.

The home

The home is an important setting for unintentional injuries, especially for falls, fires and poisoning. This justifies preventive programmes that engage the housing sector.

Data for the whole Region are not readily available. In the EU before 1 May 2004, an estimated 20 million home and leisure injuries required medical attention, and 2 million led to hospital admission, with 83 000 deaths in one year. Over half of these injuries occurred in or around the home (77). Data from the United Kingdom suggest that there were around 2.7 million unintentional injuries in homes that required medical treatment in 2002, costing some €36 billion (59).

Risk factors

The most common injuries in the home are due to falls, collisions, burns and poisoning. People who spend more time in and around the home, such as the elderly, the very young and the disabled, sick and unemployed, are exposed to hazards for longer than others (59).

Houses contain many hazards that may increase the likelihood of an injury (Box 8). Inappropriate design or disrepair, particularly of safety features, can increase the risk of an injury. For example, small children may climb horizontal bars on balcony railings, and a small unevenness in a floor surface can be a tripping hazard.

As with other causes, social deprivation is associated with injury in the home. Deprived families often live in substandard housing with a higher number of hazards including overcrowding, undue clutter with equipment and unsafe facilities (79,80).

Prevention

Effective home safety strategies have several key elements: policy considerations, preventive countermeasures, institutional approaches and the design and enforcement of regulations that contribute to the creation of physically safer environments and reduce the number of home unintentional injuries (50). Safety features should be incorporated and hazards avoided in new and old dwellings.

Messages to policy-makers

- Policies should set minimum standards for housing safety. Regular home safety checks should be established to enforce these standards.
- The health sector should work with stakeholders from the housing and construction sectors to take responsibility for safer homes.

Box 8. Large analysis and review of European housing and health status (LARES) project (78)

To help create a better understanding of the links between housing and health, surveys were carried out in eight European cities in 2003. Findings from the LARES project showed that:

- almost 1 in 4 respondents had a home accident in the 12 months before the survey;
- one third of respondents had more than one injury in or around the home;
- children and the elderly had more fall-related injuries than other age groups;
- most injuries were minor, but about one in six required medical attention;
- older people were more likely to require medical treatment;
- young adults (aged 15–30 years) had more cuts and burn-related injuries than other age groups; and
- the top causes of injury requiring medical attention were falls, cuts, collisions and burns.

In addition, unintentional injury victims in the LARES surveys were asked about which dwelling-related issues they considered to be associated with their injuries. The risk factors they named included: noise at night, overcrowding, low temperature in the dwelling, poor natural lighting or glare, the presence of a staircase and insufficient workspace in the kitchen.

5. Violence by type

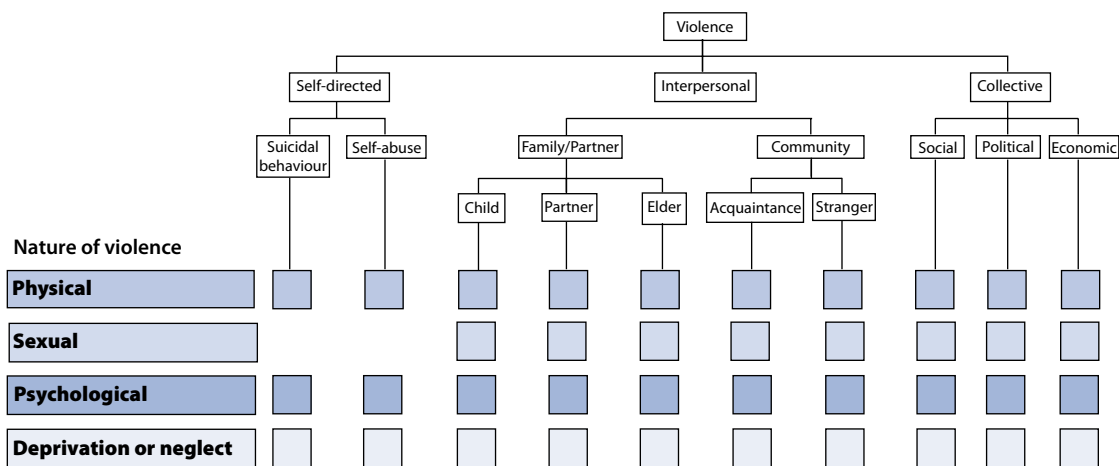
Violence is responsible for about 32% of all injury deaths, and 31% of the burden of injuries. In 2002, violence accounted for about 257 000 deaths and 6.5 million DALYs lost in the Region (7).

Violence can be classified as self-directed, interpersonal and collective (in war and by gangs) (Fig. 16) (11). This chapter is concerned with the first two, which are the main problems in the Region. Nevertheless, collective violence in the past continues to affect the current health of populations exposed to it, including refugees and asylum seekers, and collective violence is occurring in some eastern countries in the Region.

Violence is often seen as an inevitable part of human life. WHO's *World report on violence and health* challenged this notion, showing in its ecological model that violence can be predicted and is a preventable health problem (11). The model classifies risk factors for violence on four levels: individual, relationship, community and societal. Risk factors are conditions that increase the possibility of becoming a victim or perpetrator of violence. No single factor explains why a person or group has a high or low risk. Rather, violence is an outcome of complex interactions of many factors. Although some risk factors may be unique to a particular type, the various types of violence more commonly share a number of risk factors.

1. At the individual level, personal history and biological factors influence how people behave and their likelihood of becoming victims or perpetrators of violence. Individual-level factors are: having been a victim of child maltreatment, psychological or personality disorders, alcohol or substance abuse and a history of aggression, whether as perpetrator or victim.
2. Personal relationships (such as those with family, friends, intimate partners and peers) may also influence the risks of violence. Examples include having a poor relationship with a parent or having violent friends.
3. Risk factors related to social settings (such as schools, neighbourhoods and workplaces) may include high levels of unemployment and population density and mobility, and the existence of a local drug or gun trade.
4. Social factors influence whether violence is encouraged or inhibited, including economic and social policies that maintain socioeconomic inequalities, the availability of weapons and social and cultural norms that condone dominance by class (for example, males over females, parents over children) or violence as an acceptable method of resolving conflict.

Fig. 16. Typology of violence



Source: Krug et al. (11).

Self-directed violence

Key facts

- Self-inflicted injuries are the leading cause of injury deaths: 164 000 in 2002.
- At all ages, males are much more likely to take their own lives than females.
- Suicide is 2.5 times more prevalent in LMIC than in HIC.
- Alcohol abuse is involved in one quarter of suicides.

Self-directed violence refers to violence where the victim is also the perpetrator. In many legal systems, a death is certified as suicide if the circumstances are consistent with it, and if murder, accidental death and natural causes are ruled out. Practices will vary from country to country, and there may be a stigma to suicide. Although this will limit inter-country comparisons to some extent, there is a broad accuracy in country ranking (11). This section mainly deals with suicide, although this is only one of the self-harm behaviours that results in injury.

Self-inflicted injuries and suicide are the leading cause of injury deaths in the European Region. The countries with the highest suicide rates are Lithuania (41.1 per 100 000), the Russian Federation (33.8 per 100 000) and Belarus (33.5 per 100 000).

Mortality is highest in people aged 80 and over, although the group aged 30–59 suffers 54% of all deaths and 55% of all DALYs lost from self-inflicted injury (Fig. 17). Self-inflicted injuries are the single leading cause of death in those aged 15–29 years in LMIC and those aged 30–44 in HIC. At all ages, males are much more likely to take their own lives than females, although females are more likely to practice non-fatal self-harm. Males have five times the risk of suicide of females in LMIC and three times the risk of females in HIC (see Annex 3, Table 1). Completed suicide is 2.5 times more likely in LMIC than HIC.

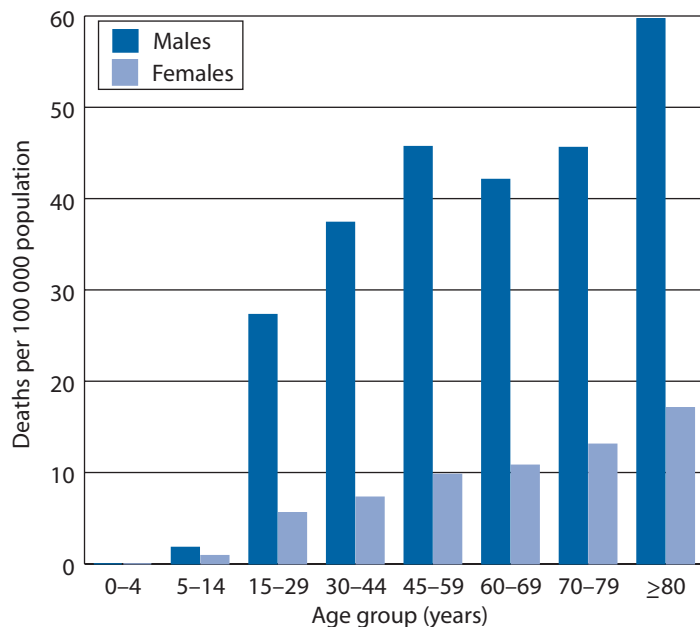
Risk factors

Risk factors for suicidal behaviour are numerous and interact. Apart from

age and gender, they can be divided into psychological, biological, social and environmental factors. Many people who commit suicide may have demonstrated features of the following psychological factors: major depression and mood disorders (12–15% lifetime risk), schizophrenia (10% lifetime risk), anxiety, conduct and personality disorders, impulsiveness and hopelessness (81,82). Hopelessness can be associated with nine out of ten cases of suicide (83). Drugs and alcohol use also play an important part; a quarter of suicides involve alcohol abuse (84). A previous suicide attempt is also a good predictor: 10% of those who attempt suicide will eventually do so fatally, although most people committing suicide have not attempted it previously. Suicide may also be the consequence of severe and painful illness, especially when disabling. As many as one in four of those who attempt suicide have such an illness, particularly the elderly (85).

Life events may be precipitating factors, including personal loss, interpersonal conflict, a broken or disturbed relationship, and legal or work-related problems. Child abuse or mistreatment, bullying in school and intimate partner violence can increase the risk of suicide either immediately or in later life. Social and personal difficulties are found to be

Fig. 17. Age- and gender-specific mortality rates for suicide in the WHO European Region, 2002



Source: GBD 2002 estimates [web site] (7).

associated with one third of suicides. Conversely, marriage seems to have a protective effect, except in those who may marry very young or in cultures where marriage is associated with social and economic discrimination against women. Other factors are social isolation, deterioration in interpersonal relationships and withdrawal from social support networks. Social isolation is a contributing factor in suicidal ideation in the elderly (86). In adolescents, relationship difficulties with parents and friends and social isolation are important factors (87).

Social and environmental factors related to suicidal behaviour include place of residence, employment or immigration status, a religious affiliation and economic conditions. Rates of suicide are higher in rural than urban areas, presumably due to social isolation (11). Suicide rates increase during periods of economic recession and unemployment, suggesting an explanation for the recent increases in eastern Europe and the CIS (88,89). Religious beliefs opposed to suicide are thought to be associated with a lower risk, although stigma and certification practices may lead to underrecording where such beliefs predominate.

The lethality and availability of the chosen suicide method influences the outcome. The success of methods such as hanging, ingestion of pesticides, barbiturate overdoses, jumping from a height and firearms varies according to the setting and the determination to succeed. Men tend to use more violent means than women.

Prevention

If all countries in the Region had the same suicide rate as the country with the lowest rate (the United Kingdom), an estimated 88 000 lives per year would be saved. A range of strategies needs to be applied to the prevention of suicide.

At the individual level, treatment of mental disorders can lead to successful outcomes, but is contingent on early identification and treatment of disorders and alcohol and substance abuse. Successful social interventions include restricting access to substances such as barbiturates or paraquat and removal of carbon monoxide from domestic gas and car exhaust fumes with catalytic converters. Handgun ownership has a strong association with suicide in

homes, and stricter licensing for ownership and storage has been shown to be an effective measure (90). Widespread media reporting can lead to imitation suicides, and responsible and appropriate reporting is imperative (91).

In addition, protective factors requiring further research include parenthood, social support, family connectedness and self-esteem (11).

Messages for policy-makers

- Reducing suicide mortality rates in the Region to that of the lowest national rate (the United Kingdom) could prevent about 88 000 deaths annually.
- Effective interventions include the early identification and treatment of at-risk groups, removal of carbon monoxide from domestic gas, restricting access to pesticides and harmful substances, and gun control.
- Promoting social policies to reduce poverty and social isolation would be beneficial in the long term.

Interpersonal violence

Key facts

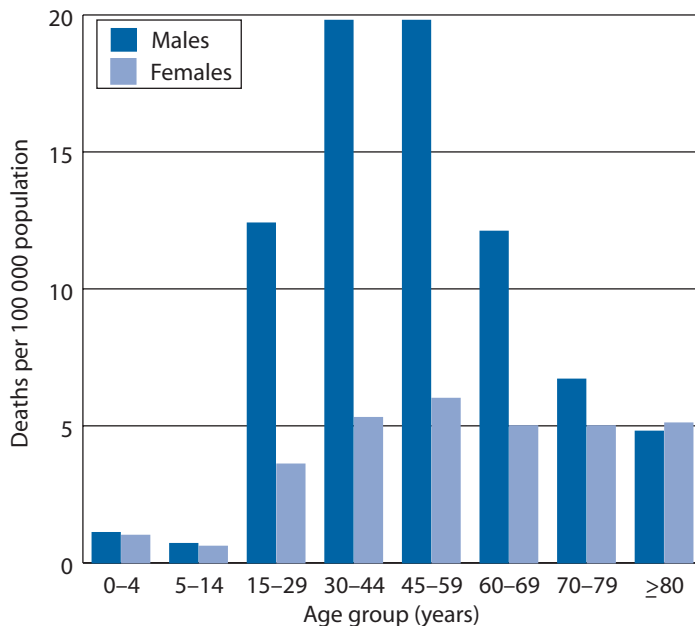
- Interpersonal violence killed about 73 000 people in the European Region in 2002: 200 per day or 8 per hour.
- For every death in the Region, there are 20–40 hospital treatments: about half a million every year.
- Males are much more likely to die violently than females at all ages. Males are also more likely to be the perpetrators of violence.
- The risk of violent death for people in LMIC is 14 times that in HIC.
- Harmful alcohol use is involved in up to 40% of cases of violent death.

Interpersonal violence can take place between individuals or small groups, and can be psychological as well as physical. It is an insidious and frequently deadly social problem and includes child maltreatment; youth, intimate partner and sexual violence; and elder abuse. It takes place in the home, in the streets and other public settings, in the workplace and in institutions such as schools, hospitals and residential care facilities. Data are

only readily available for violence resulting in death. DALYs measure the physical consequences of violent injuries, but do not capture the psychological and reproductive health consequences – which can be large and are not measured by typical information systems (11). Routine data are not available for separate types of violence, but inferences can be made by age and gender group.

Interpersonal violence is the fifth leading cause of injury death. The highest death rates for males are among those aged 30–44 years and, for females, those aged 45–59 years (Fig. 18). Most deaths (34%) occur in people aged 30–44, but the largest number of DALYs lost (39%) are in the group aged 15–29.

Fig. 18. Age- and gender-specific mortality rates for interpersonal violence in the WHO European Region, 2002



Source: GBD 2002 estimates [web site] (7).

At all ages, males are much more likely to meet a violent death than females. Males have thrice the risk of females in LMIC and twice the risk in HIC (see Annex 3, Table 1). When country income is compared, males and females in LMIC are 16.2 times and 9.7 times, respectively, as likely to die violently as their counterparts in HIC. The risk of dying from homicide in the country with the highest death rate (28.0 deaths per 100 000 in the Russian Federation) is 32 times that

in the country with one of the lowest (0.9 per 100 000 in the United Kingdom).

Deaths comprise just part of the picture. It is estimated that, for every homicide in someone aged 10–24 years, 20–40 other young people receive treatment in a hospital and hundreds more treat themselves (11). In addition to injuries, most types of violence have enormous additional health consequences, including depression and anxiety disorders, suicide attempts, obesity and eating disorders, psychosomatic illnesses and risky behaviour such as alcohol and drug abuse, unsafe sex and smoking (11).

Risk factors for different types of interpersonal violence are discussed elsewhere in this chapter. Alcohol is associated with a large proportion of violent attacks: for example, 40% in the Russian Federation (92).

Prevention

If death rates for interpersonal violence in the Region were the same as that of the country with the lowest rate (the United Kingdom), about 55 000 lives would be saved or 87% of the deaths from this cause avoided.

Effective strategies to prevent violence include enrichment and life-skills training programmes for pre-school children, incentives to complete secondary education, home visitation, parent training and mentoring, reducing alcohol availability, improving institutional policies (in schools, workplaces, hospitals and residential institutions), public information campaigns, reducing access to weapons, reducing inequalities and strengthening police and judicial systems (11).

Messages for policy-makers

- Reducing mortality rates for interpersonal violence in the Region to the lowest national rate (the United Kingdom) could prevent about 55 000 deaths annually.
- Cross-cutting interventions are beneficial for different types of interpersonal violence and may give the best returns on investment.

- Short-term national plans should include preventing child maltreatment through parent training and home visitation, strengthening the police and judicial systems, criminalizing violence, promoting the safe storage of and controlling firearms, reducing the availability of alcohol and training health professionals in case detection and management of violence against women, child abuse and elder abuse.
- Longer-term plans should include preventing youth violence through training and supporting parents, training children and adolescents in life-skills, supporting educational achievement, reducing income inequalities and high concentrations of poverty, changing cultural norms to make violence unacceptable and reducing the portrayal of violence in the media.
- Strategies need to be multisectoral, and the health sector should provide a coordinating role.
- A better knowledge base needs to be developed for the primary prevention of violence.

Child abuse

There were 1500 reported homicides of children under 15 years in the Region in 2002, with a rate for the group aged 0–4 years double that for those aged 5–14 years. Many child deaths are not routinely investigated, and the extent of the problem is underreported. Common causes of death are blows to the head or abdomen, and suffocation (93–95).

Population-based surveys are critical to understanding the scale of non-fatal abuse in children. Figures suggest that severe physical punishment (being hit with an object on a part of the body other than

the buttocks, being burned) is widespread, and examples from the Region suggest incidence rates of 5–8% (96,97). Lifetime prevalence of the occurrence of sexual victimization in childhood is as high as 20% in women and 5–10% in men, suggesting that the problem is endemic (98,99). Emotional abuse and neglect are other common manifestations of child abuse. The child sex trade and trafficking of children are organized forms of child abuse, driven by economic interests. About 75 000 children are estimated to be involved in the sex trade in eastern Europe (100,101).

The consequences of child abuse may manifest themselves in later life, and include violent behaviour and mental illnesses, with depression, anxiety, alcohol abuse, substance abuse, suicide attempts, sleeping problems, post-traumatic stress disorders and obesity increasing 4–12-fold (11). The intensity and duration of the abuse influence the consequences. Abuse can also influence the adoption of risky behaviour such as harmful alcohol use, poor diet, smoking and lack of exercise and thus contribute to conditions such as heart disease, cancer and respiratory illness in adulthood. Further, a history of abuse is associated with subsequent intimate partner abuse (102). Child abuse incurs substantial costs not just to the health and criminal justice systems, but also in lives lost, human suffering and the long-term physical, psychological and behavioural consequences (Box 9).

Risk factors

Sexual abuse is more common after the onset of puberty, and the perpetrators are more likely to be male, regardless of the victim's gender. Females more often perpetrate physical abuse, although males are more

Box 9. Cost of child abuse and neglect: report of the National Commission into the Prevention of Child Abuse in England and Wales, United Kingdom, 1996

The Commission reported, in *Childhood matters*, that the cost of child protection was €1 billion annually. Personal social services were responsible for 71% of expenditure; the Home Office, 21%; the Health Service, 6%; and the Welfare Service, 2%. It was also estimated that the consequences of maltreatment in childhood were responsible for at least 10% of the expenditure on mental health services and the correctional prison services, as one in five victims became offenders. Hence, a further €494 million could be added to the cost of child abuse and neglect in England and Wales. Thus, the argument that more money should be spent on prevention is obvious when the abuse and neglect of children costing the England and Wales governments over €1.5 billion per year. Few child protection systems, however, employ strategies for prevention (103,104).

likely to inflict fatal injuries. Relational risk factors include households with a poor, young, single parent; low education; drug abuse; isolation; and unemployment (105). A prior history of abuse increases the risk of inflicting abuse. There is a strong relationship between intimate partner violence and child abuse.

Community risk factors are poverty and a lack of social capital (106,107). At the societal level, economic forces, normative gender roles and parent-child relations, and child and family policies such as those relating to parental leave, social protection and the responsiveness of the health and criminal justice systems can all affect the resources available and ability of parents to care for their children.

Prevention

Parent training and home visitation programmes carried out by professionals clearly have a strong effect in reducing the abuse of children by parents (108,109). Therapeutic approaches to modifying behaviour in violent parents have had some success. Training police, teachers and health professionals to recognize and manage abuse is also important. The health sector has a critical role in the early detection of violence against children. Improved laws against violence in the home and the physical punishment and humiliation of children at home and in school and other settings, and the mandatory reporting of child abuse are examples of societal-level approaches (11).

Messages for policy-makers

- Child abuse is a prevalent social problem with far-reaching consequences.
- Needed interventions include home visitation services and parent training to target those at risk.
- Health professionals, police and teachers should receive training in early case detection and management.

Interpersonal violence in young men aged 15–29

Key facts

- Interpersonal violence is the third leading cause of death (over 12 000 deaths per year) and the fifth leading cause of disability in young people.
- In all countries, young males are both the principal perpetrators and victims of violence.

- The European Region has some of the highest and lowest mortality rates in the world.
- The risk of violent death in LMIC is 11.3 times that in HIC.
- Witnessing violence in the family, poor parenting, poor education, inequalities of wealth, dense concentration of poverty, the availability of firearms, and alcohol and substance abuse are risk factors.
- Alcohol is associated with up to 40% of homicides.

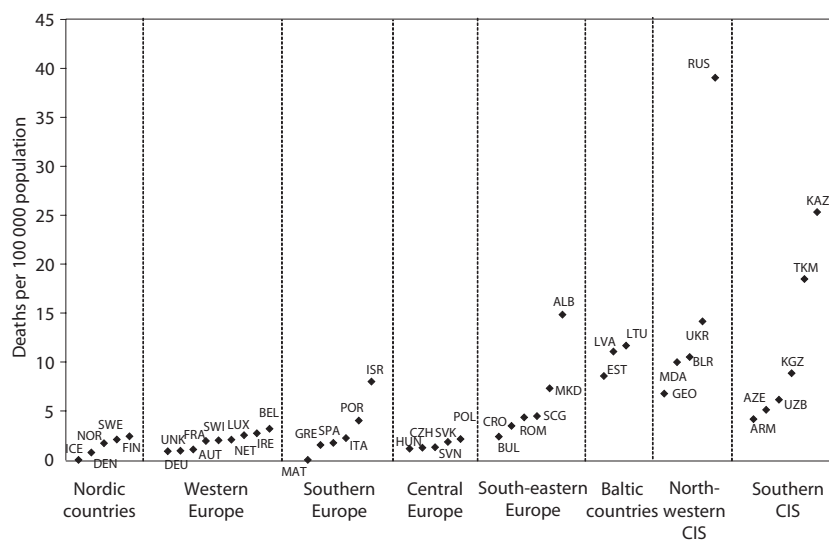
Interpersonal violence is the third leading cause of death in males aged 15–29 years, after RTIs and self-inflicted injuries, and the fifth leading cause of disability (700 000 DALYs in 2002). For every death, 20–40 hospital treatments are estimated to take place. Youth violence includes a range of aggressive acts, from bullying and fighting to assaults and homicide. Reports suggest that around 45% of schoolchildren have been bullied at some time (110,111).

There are marked inequalities in mortality from youth violence in the Region: the highest rates are in LMIC, while those in HIC are the lowest in the world. A comparison of countries shows that the lowest rates are in the Nordic countries and western and central Europe (Fig. 19). The countries with the highest rates are in the north-western and southern CIS.

Risk factors

The ecological model is useful for considering risks. Individual risk factors include childhood aggressive behaviour, impulsivity, low educational achievement and aggressive beliefs and attitudes. Relationship or family risk factors include being subjected to harsh physical punishment and humiliation, witnessing violence in the home, having poor parental supervision and associating with delinquent peers. At the community and societal levels, there is evidence that young males who live in neighbourhoods with high crime rates and poverty are prone to violence. Alcohol and drugs are precipitants to violent behaviour and are associated with both victims and perpetrators. The depiction of violence in the media may have some role. Violence is more prevalent in societies that have undergone armed violence or repression, and in those undergoing great social and economic turmoil, such as the Region's LMIC (21,29). It is also higher in societies showing large inequalities

Fig. 19. SMRs per 100 000 population for interpersonal violence in males aged 15–29 by country and subregion in the WHO European Region, 2002



Note. See Annex 5 for abbreviations of the names of countries.

Source: Mortality indicators by 67 causes of death, age and sex (HFA-MDB) [online database] (8).

in wealth and lacking social protection policies. In addition, environmental toxins such as lead are associated with aggressive behaviour (11).

Prevention

Most of the evidence comes from interventions at the individual and relationship level, which are targeted during infancy and childhood to prevent behavioural problems, as well as in adolescence and early adulthood. Pre-school enrichment programmes improve educational achievement and self-esteem and are associated with less violence in later life. Social development programmes to reduce aggressive and antisocial behaviour try to improve social skills with peers and promote cooperative behaviour by teaching young people to manage anger, adopting a social perspective, resolving conflicts and solving social problems (111,112). These are most effective if delivered in pre-school or school and targeted to high risk groups. A programme to reduce bullying using behavioural techniques has reduced the incidence of bullying by half in Bergen, Norway, and is being successfully implemented in the United Kingdom (11,111,113).

Home visitation and training in parenting are examples of programmes aimed at the relationship level. The former involves regular visits to a child's home by a health professional and provides training, support,

counselling and monitoring for low-income mothers and families at increased risk of abusing their children. The Triple-P Positive Parenting Programme combines a mass-media campaign with both consultations with primary carers to improve parenting practices and intensive support to parents with children at risk of behavioural problems; it has been shown to be cost-effective in reducing violence (114,115).

Promising community- and societal-level programmes include those providing child-care, pre-

school enrichment, safe routes to school, improved street lighting, extracurricular and after-school activities for children and adolescents (such as sports) to reduce involvement in underage drinking and antisocial behaviour, improved school environments and monitoring and removal of toxins from the environment. Reducing the availability of alcohol and drugs is important. Changing cultural and social environments – by such means as reducing concentrations of poverty and income inequalities, altering night-time environments in city centres (Box 10), reducing economic and social barriers to development, creating job programmes, reducing access to firearms, and strengthening the criminal justice system – are intuitively and ethically appealing societal approaches requiring further evaluation (108,112,116,117).

Messages for policy-makers

- Youth violence is a preventable public health problem but requires resources and commitment.
- Programmes of pre-school enrichment, social development, home visitation, parenting skills, improved educational attainment and mentoring reduce violence. Social and economic policies such as reducing inequalities in wealth and the concentration of poverty are also important.

Box 10. City Centre Safe, Manchester, United Kingdom (116)

City Centre Safe is a police-led multiagency scheme in the United Kingdom, set up in response to increased alcohol-related youth violence associated with growing capacity in Manchester's pubs and nightclubs. The scheme aims to raise awareness of alcohol-related violence, reduce assaults and provide a safer night-time environment through an integrated programme of interventions. Licensing regulations are enforced through regular visits to all pubs and clubs in the city by police and licensing officers, while a server training programme covering social responsibility and health and safety has been developed for bar staff and licensees. Pubs and clubs seeing the highest levels of assaults are targeted with action plans to improve performance, followed by multiagency visits to monitor compliance. City Centre Safe has also developed the Best Bar None Award to reward pubs and clubs that provide a high level of customer care and safety, as measured by low crime rates and good management practice. Successful venues are recognized at a high-profile annual award ceremony.

In the wider night-time environment, the scheme incorporates a city-wide closed circuit television (CCTV) network, an alcohol by-law preventing drinking in the street, an alcohol arrest referral scheme (offering treatment to offenders), an extensive late-night transport system and a radio system linking police, transport staff, door supervisors, licensing officers and CCTV operators. In addition, City Centre Safe has developed the "Think Safe, Drink Safe" social marketing campaign, which encourages responsible drinking and personal safety through posters and information leaflets and provides links to initiatives addressing alcohol and behaviour in schools.

Evaluation of the scheme shows it has had a positive impact on alcohol-related violence, with serious assaults having decreased by 12.6% since it was initiated in 2001. The scheme is recognized nationally as good practice and many components including the Best Bar None scheme are being introduced elsewhere in the United Kingdom and internationally.

Intimate partner violence

Key facts

- Intimate partner violence is endemic in all cultures, and the lifetime prevalence of assault is 10–60%.
- In the WHO European Region, homicide is the eighth leading cause of death (5200 deaths per year) and the thirteenth leading cause of disability (188 000 DALYs per year) in women aged 30–45 years.
- Women in LMIC have 10 times the risk of violent death than those in HIC.
- Although the precise number of deaths attributed to intimate partner violence is not known, studies show that it may account for up to 40–70% of all murders.
- Intimate partner violence, whether physical, sexual and/or psychological, may remain hidden and can occur over long periods.
- Victims have an increased risk of suicidal behaviour, depression, anxiety and psychosomatic disorders.
- The criminal justice and health sectors appear to be reluctant to target intimate partner violence.

- Risk factors are: having witnessed violence in the family, received poor parenting, had a poor education, and inequalities in wealth, concentrations of poverty, easy availability of firearms and alcohol and substance abuse.

While youth violence tends to be visible, intimate partner violence (and other relationship violence) is notoriously hidden from view. The weapons used are less likely to be guns and knives, but rather fists, feet and other objects. Justice systems are more likely to take action against violence in the community than that in the home, whether on intimate partner violence, child or elder abuse. The cultural context influences what is considered as acceptable behaviour. Although the victims of relationship violence include men, most are women.

Between 20% and 60% of women report having experienced intimate partner violence during their lives, with 10% having experienced it in the previous year (11,118). The category includes any behaviour that causes physical, sexual or psychological harm

to those in the relationship. One of the commonest forms of violence against women is that performed by a husband or intimate partner. Homicide rates in women are high, and intimate partners or ex-partners in the context of an abusive relationship perpetrate a large proportion of such homicides. Figures are scarce, but studies from Australia, Canada, Israel, South Africa and the United States suggest that this is the case for 40–70% of female murder victims. Death data presented here are therefore proxies and also include deaths caused by acquaintances and strangers.

Nearly 19 000 females of all ages lost their lives from interpersonal violence in 2002, and 5200 of these (27.5%) were women aged 30–44 years. Interpersonal violence is the fourth leading cause of injury death in this group, after self-directed violence, RTIs and poisoning. In the European Region, mortality rates in LMIC are 10 times those in HIC; the rates are highest in the Baltic countries and the CIS, and lowest in the Nordic countries and western Europe (Fig. 20). The highest mortality rates are in the Russian Federation, Kazakhstan and Latvia.

Surveys from Albania, Germany, Sweden, Tajikistan and the United Kingdom suggest that 10–64% of women have been assaulted by an intimate partner at some time in their lives (11,118–120). Abuse can occur over a long period and women may experience more than one form of violence, including sexual coercion and

psychological abuse such as intimidation, humiliation and controlling behaviour. It can remain undetected for many years and most victims may not seek help or report the abuse to the authorities. For example, official estimates from the Russian Federation suggest that there are 250 000 violent crimes against women annually, but that most go unreported (121).

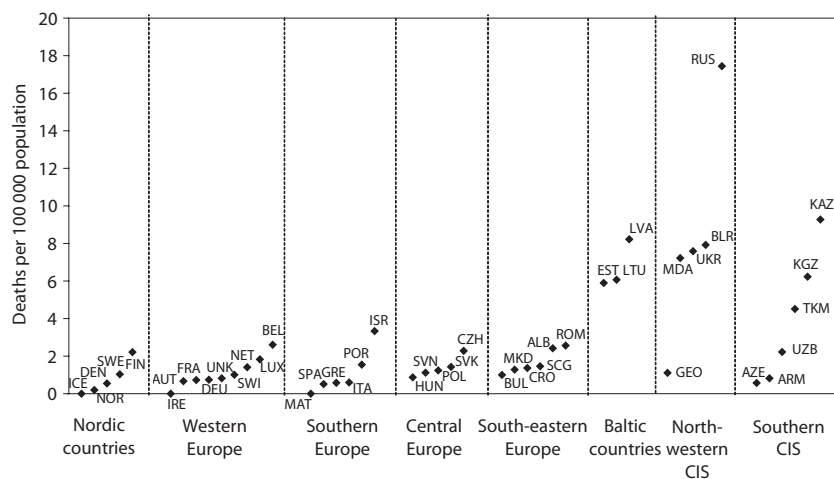
The health effects can extend beyond physical injuries to psychological and reproductive ill health, including depression, anxiety, phobias, substance abuse, and sleep and psychosomatic disorders (11). Intimate partner violence results in increased suicidal behaviour. A study of the burden of disease in Australia has shown that, intimate partner violence was the leading contributor to death, disability and illness in women aged 15–44, and responsible for 9% of the total disease burden (122).

Few studies measure costs, but one from the United Kingdom estimated the costs of domestic violence at nearly €33 billion per year, equivalent to about 2.2% of GDP (123).

Risk factors

Individual-level factors that influence whether a man assaults a woman include a history of violence in his family, poor parenting, witnessing abuse of his mother, harmful alcohol use and poor educational attainment. A study from a Moscow centre provid-

Fig. 20. SMRs for interpersonal violence in females aged 30–44 by country and subregion in the WHO European Region, 2002



Note. See Annex 5 for abbreviations of the names of countries.

Source: Mortality indicators by 67 causes of death, age and sex (HFA-MDB) [online database] (8).

ing psychological support for battered women found that 33% of cases of violence were triggered by the husband's alcohol abuse (124). Relationship factors include low income and discord in the relationship. Intimate partner violence is more common among people with low income, and poverty may be linked to a woman's inability to leave her partner, overcrowding, hopelessness and disagreements about money (125–128).

Women are more likely to suffer violence in societies

with rigid gender roles, inequalities in power between men and women, and attitudes and economic constraints that make it difficult for a woman to leave her partner. The increase in intimate partner violence in societies in transition has been attributed to the availability and consumption of alcohol, family conflicts caused by poverty and changes in earning capacity and gender roles, and the loss of social capital and networks. Concentrations of poverty, the availability of firearms and alcohol and substance abuse are also risk factors. A survey from the Russian Federation reported alcohol consumption as the main factor triggering 85% of family violence (124). Minor events that threaten power relations between the sexes can trigger violence, including a woman's disobeying or arguing with a man, questioning him about money or girlfriends, not having food ready on time or refusing to have sex, and a man's suspecting a woman of infidelity.

Prevention

Responses to intimate partner violence have concentrated mainly on providing services and support for victims. Preventive interventions have concentrated on legal reforms, and systematic evaluations are few.

Prevention at the individual level works to change the attitudes and behaviour of people who have already become violent, and includes programmes that explore gender roles and teach anger management. Relationship-level interventions include training in relationship skills and family therapy. Community-level programmes include raising public awareness, stimulating community action and providing care and support for victims. These involve training health professionals, police and lawyers in better recognizing abuse and providing care, support and referral to shelters and other services (125, 126). Efforts are also needed to address gender norms and factors common to all types of injuries, such as poverty reduction. More research is needed to identify those at risk so as to target preventive strategies, and to evaluate programmes.

Messages for policy-makers

- Prevention includes programmes that explore gender roles and teach anger management and relationship skills.

- Efforts are needed to reduce gender inequality and change social and cultural norms that permit violence against women.
- Health professionals, police and lawyers need training in recognizing abuse victims and providing them with care, support and referral to shelters and other services.
- Training, resources and research are required for prevention programmes, especially those for primary prevention. There should be greater investment in studies evaluating primary prevention programmes.

Sexual violence

Key facts

- Up to one in four women have reported rape or attempted rape.
- Sexual violence profoundly affects the mental and physical health of the victim.
- Trafficking of women for sexual exploitation is a major problem in some of the countries in the European Region.

Sexual violence includes date rape, sexual coercion in marriage, sexual harassment, rape by strangers, child sex abuse, systematic rape during armed conflict and forced prostitution and trafficking. While males perpetrate most acts on females, rape of men by men and coercion of boys by women also occur.

The problem of sexual violence is very prevalent, with nearly 1 in 4 women and 1 in 20 men reporting a sexual assault during their lifetimes and up to a third of girls reporting forced sexual initiation (111). Data collected by the criminal justice system underestimates the size of the problem, as only 5–25% of women report rape to the police. Reasons for underreporting and not seeking help include shame, stigma and fear of social exclusion, being victimized again, rejection and punishment. Hundreds of thousands are forced into sex work and trafficking or are subjected to sexual violence in workplaces, schools and other institutions.

Sexual violence can have both short and long-term health consequences. It can result in injuries, including to the genitalia, and death in extreme cases. Pregnancy is an unwanted consequence of as many as one in six rapes in females aged 12–45 years, depending on the

country (11). Other consequences include HIV/AIDS and other sexually transmitted infections, gynaecological complaints (such as problems of sexual functioning and pain during intercourse) and severe and prolonged psychological problems (such as depression, post-traumatic stress disorder, conduct and sleeping disorders) that may lead to suicide.

Risk factors

At the individual level, certain groups such as sex workers are at high risk of sexual violence, although it also occurs between intimate partners. Factors such as youth, alcohol and drug consumption, a history of sexual violence and having many sexual partners are associated with increased risk. Men who commit sexual violence are more likely to have witnessed family violence and have distant, uncaring fathers. Other factors increasing the risk of sexual violence include poverty, community tolerance for sexual violence, belief in men's entitlement to sex and subservience from women, rigid gender roles and the occurrence of other forms of violence. The social environment influences the likelihood of and the reaction to rape.

Prevention

Responses to the problem of sexual violence have concentrated mainly on services and support for victims. Preventive interventions have concentrated on legal reforms, and systematic evaluations are few.

Primary prevention is needed in schools and in the community. School-based programmes to prevent date rape, increase awareness of sexual violence and promote gender equality have had some promising results (129). At a societal level, the promotion of gender equality and legislation to facilitate conviction of offenders, particularly by removing the requirement for corroboration of victims' evidence, are needed. Actions to protect women from sexual trafficking include creating economic programmes in countries at risk, raising awareness in women at risk and strict enforcement of national and international laws (11).

Health professionals have a large role to play in supporting victims of sexual assault, both medically and psychologically, and collecting evidence to assist the prosecution of offenders. Proper medico-legal documentation can play a role in successful prosecution. The training of health professionals should

increase awareness of the problem of sexual violence, its detection and how to manage cases effectively. Forensic examination should be made available. HIV/AIDS prophylaxis is increasingly used following rape. Guidelines for managing cases and collating evidence have been used to improve standards (127).

Messages for policy-makers

- Systematically evaluated programmes to stop sexual violence are inadequately developed, and investment in primary prevention studies should increase.
- Health and other professionals need training for the better detection, documentation and case management of sexual violence.
- Research is needed on the scale and consequences of sexual violence and on effective strategies for primary prevention and victim support.
- International efforts are required for better control of trafficking.

Elder abuse

Key facts

- Four to six percent of older people suffer abuse.
- Mistreatment in institutions may be more widespread than acknowledged.

Elder abuse comprises acts of commission or omission resulting in harm. It can be physical, psychological, emotional, financial, material or sexual. Older people are particularly prone to economic abuse. Particularly in institutions, inappropriate medication is a form of elder abuse. This serious social problem is likely to grow with the increasing proportion of elderly people in the Region.

Surveys suggest that 4–6% of older people suffer abuse in the home and the percentage in institutions may even be higher (130,131). Figures on the extent of the problem are scant. Homicide rates in the elderly are high; in 2002, 11 090 people aged 60 and over were murdered in the Region. The number of deaths attributable to elder abuse, however, is not completely known.

Risk factors

Perpetrators are likely to have alcohol- and drug-related problems and personality disorders. Strained

family relations may manifest in resentment and violence as older people become more dependent. If the caregiver is financially dependent on the older person, this may be a source of conflict. In some parts of the CIS, social support and family networks have weakened in the face of rapid socioeconomic change and older people are having to fend for themselves – often in areas with high crime rates – which makes them doubly vulnerable. Males and females seem to be equally vulnerable.

Abuse is more likely to occur in institutions that are run in their own interests rather than those of residents and those with a poor social and physical environments, poorly trained staff or low standards of care. Inattention to the treatment of elderly people by health systems leads to discriminatory practices.

Prevention

There need to be better training of caregivers, comprehensive care plans and policies to improve the physical and social environments of institutions. Better training in recognizing the problem for caregivers, police, social service and health professionals is also crucial.

Programmes to assist victims include dedicated help lines, shelters and strengthened services from the social, health and volunteer sectors (11). Educational campaigns have been used to change attitudes among the public and professionals in the health, social, education and justice sectors. Nongovernmental organizations (NGOs) and self-help groups – including

support groups, visitors and networks for the elderly – can play a critical role. Programmes involve both national and local action, usually under the auspices of social services, health care, legal systems and NGOs working to stop family violence. Strengthening the legal and policy framework, and legislating mandatory reporting of abuse are ways forward, but organizational, ethical and cultural factors are also important (132). Systematic evaluations of interventions to prevent elder abuse are few.

Most countries in the WHO European Region need to give greater attention to recognizing the problem and developing national and local strategies to combat it. This involves creating an environment in which older people have the right to live with dignity, can participate fully in civic life and have their needs met, and negative attitudes towards aging are discouraged (133).

Messages for policy-makers

- There needs to be greater awareness of the problem of elder abuse.
- Stronger laws and policies are needed to protect older people.
- The capacity of the health, social service and justice systems to recognize and deal with the problem needs to be developed.
- A better knowledge base needs to be developed.
- More effective prevention strategies are urgently needed.

6. Needs for future action: conclusions and recommendations

Key facts

- Unintentional injury and violence are the leading cause of death for people under the age of 45. The costs to the health sector and society are very high.
- The burden is unequal between and within the countries in the WHO European Region, because of socioeconomic differences and degrees of risk factor exposure. In many countries, the responses of public health and society have been inadequate.
- Unintentional injuries and violence are preventable. If the whole Region had the same injury rates as the countries with the lowest, two out of three injury deaths would be avoided.
- Many cost-effective strategies can be found in the countries with low injury mortality. Such strategies require intersectoral collaboration.
- Political commitment is needed to respond to the demands of civil society for a safer Region.

This chapter summarizes the action that needs to be taken to decrease the daily human suffering caused by unintentional injury and violence.

Reducing mortality rates in the Region to the lowest national rates – those of the United Kingdom for RTIs, falls, drowning, self-inflicted injury, interpersonal violence and all injuries, and the Netherlands for poisoning and fires – could prevent two out of three injury deaths, thus saving 500 000 lives (Table 5) (see Annex 1

for methods). The present inequalities in mortality and disability from injuries in the Region and within countries are ethically unacceptable, particularly in view of the strong evidence that prevention works. Organized efforts could dramatically reduce the senseless loss of life. That some countries in the Region are among the safest in the world challenges policy-makers and society at large to save thousands of lives. This report highlights inequalities and the potential for prevention. Lessons from the best-performing countries need to be better understood and transferred to other contexts (134).

Many cost-effective strategies can save not only lives but also costs to society. Table 6 summarizes some of these (135–137). While many interventions have been proved to be effective, as discussed in earlier chapters, they have not all been costed, and more empirical research is needed. The methodologies used for costing may vary, making comparisons difficult. More cost–benefit analysis of injury prevention programmes is needed.

Reducing the burden: what the health sector can do

Resolutions of the World Health Assembly and the WHO Regional Committee for Europe call on the health sector to play a lead role in coordinating a multisectoral approach to injury prevention (see Annex 4). How can it do this?

Table 5. Potential lives saved if mortality rates for the WHO European Region were the same as the lowest national rates, 2000–2002 or three most recent years

Injury type	Average deaths per year	Deaths expected	Lives saved	
			Number	Percentage
RTIs	100 710	46 043	54 667	54
Poisoning	101 519	6 201	95 317	94
Falls	72 104	35 679	36 425	51
Drowning	34 026	3 313	30 713	90
Fires	21 742	2 888	18 853	87
Self-inflicted injuries	145 493	57 936	87 557	60
Interpersonal violence	61 717	7 051	54 666	89
All injuries	746 512	238 199	508 313	68

Note: Population was 849 496 543.

Public health approach

The health sector has a broader contribution to make than just care and rehabilitation. It should be actively involved in taking the steps of the public health approach: surveillance, research into risk factors and interventions, working with other sectors to implement prevention and control activities, evaluating programmes, advocating prevention

Table 6. Financial savings from selected injury prevention interventions

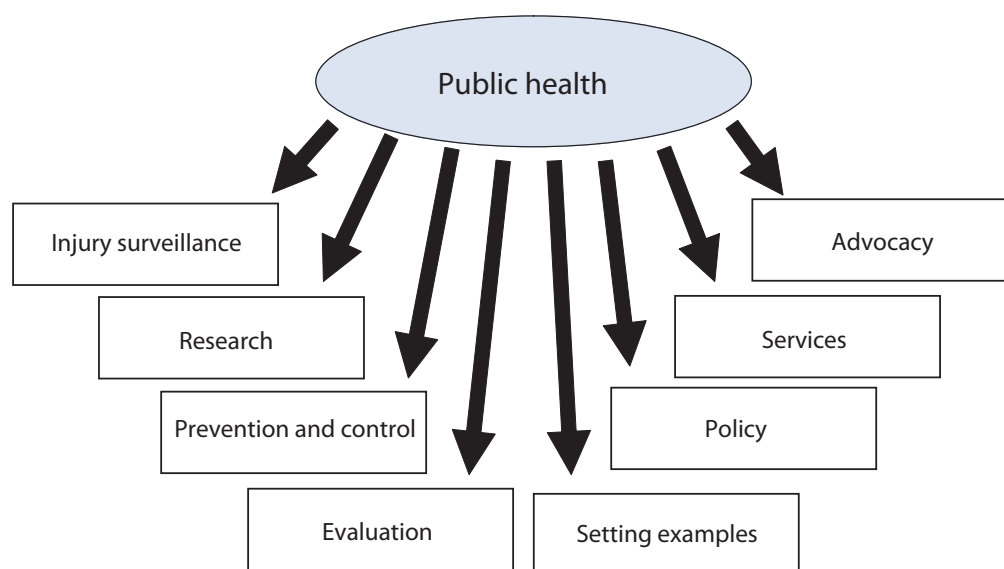
Expenditure of €1 each on:	Savings (€)
universal licensing of handguns	79
smoke alarms	69
child safety seats	32
bicycle helmets	29
home visits and parent education against child abuse	19
prevention counselling by paediatricians	10
poison control services	7
road safety improvements	3

and developing health and social policies to make safety a priority (Fig. 21). Box 11 gives an example of how the health sector has worked with civil society for injury prevention.

High-quality care

High-quality health care is associated with better outcomes after injury; in some countries, it has led to reductions of 30% in mortality from trauma. Much of this evidence of a fall in the past few decades comes from some HIC (139). There is little documentation of similar improvements in other countries of the Region, perhaps because evaluative studies have not been undertaken. This implies that a more evidence-based approach to trauma care is needed. Such an approach would encompass the continuum of care from the pre-hospital phase, acute care in emergency departments and hospitals, to victim rehabilitation and reintegration.

The practice and quality of trauma care vary in different parts of the Region, and reasons for a sub-optimal quality of care may include the following.

Fig. 21. The role of the health sector in injury prevention

Source: Peden et al. (41).

Box 11. An example of advocacy by the health sector and civil society in the United Kingdom

The health sector can play an important role not only in providing care and support but also in primary prevention, including advocacy of evidence-based strategies. For example, the British Medical Association, the Casualty Surgeons Association, the Royal College of Surgeons, the British Paediatric Association and the Child Accident Prevention Committee (now Trust) all had key roles in the coalition that helped to introduce the mandatory use of front seat-belts in the Transport Act of 1981 (138).

- Injury care interventions have been inadequately tested when compared to interventions for other health problems, such as cardiovascular diseases or cancer (140).
- Evidence on the organization of injury care in different settings is inadequate (141).
- Research investment is far too small in relation to the size of the problem (142).
- Investment in services and human resources has been insufficient.

The systematic evaluation and improvement of service quality could save lives and prevent disability and other long-term negative health effects. While this book focuses mainly on primary prevention, tertiary prevention should also be considered in the development of comprehensive programmes to prevent violence and injury (143).

Tackling unintentional injuries and violence together

Unintentional injuries and violence should be tackled together because a joint approach offers an opportunity for synergy to maximize returns on public health action. This approach offers important advantages.

- The public health approach is common to both, with interventions based on the size of the burden, risk factors and evidence on what works.
- Unintentional injuries and violence have common economic, social, political and environmental determinants and common risk factors, such as alcohol and drugs.
- Both raise ethical considerations such as a right to safety, social justice and equity, especially when considering vulnerable populations, who are disproportionately affected.
- Health service responses to victims of unintentional injuries and violence often involve the same care providers.
- Common approaches to hospital surveillance and community surveys offer increased efficiency.
- Because of the overlap between unintentional injuries and violence, a joint approach has a stronger potential for advocacy by highlighting the magnitude of the problems and potential solutions to policy-makers.

Safety as society's responsibility

A paradigm shift is needed to start thinking of safety as a societal obligation to protect citizens from injuries. Unintentional injuries and violence are now regarded as largely avoidable, and prevention policies need to be placed on the public health agenda to meet civil society's concerns about safety.

Action to prevent injuries requires a shift away from allocating responsibility solely to individuals and towards organized safety promotion. In support of this, the Sixth World Conference on Injury Prevention and Control accepted the Delhi Declaration on People's Right to Safety, calling for physical, social and psychological well-being to be ensured as a human right (144). This concept should be endorsed in the European Region. The Swedish parliament, for example, has charged local municipalities with ensuring the safety of citizens.

Safety can only be ensured if both national and local governments, and society as a whole, take action to create safe physical and social environments. This means a multisectoral commitment to putting safety first, which includes designing safer roads, night environments, housing, playgrounds and products, and ensuring that people's daily activities are as hazard-free as possible. Opportunities to create wealth and reduce socioeconomic inequalities are also needed to decrease the daily toll of unintentional injuries and violence (20). Vulnerable populations need special attention to decrease current inequalities.

The exchange of expertise and knowledge across the European Region can be used to promote and identify good practice. Lessons learned from the successes in the Region and globally can act as inspirations for action. Considerable knowledge is available about interventions that work, and efforts are underway to document programmes that have been implemented (145). Interventions and programmes of proven or promising effectiveness need careful consideration and adaptation to rapidly evolving regional contexts. There are gaps in the knowledge base on effective interventions and particularly how to implement them. These questions can only be answered by putting injury prevention higher on the agenda of research bodies and funders.

For national and local action to take place, injury prevention plans need to be developed with

stakeholders from different sectors and levels of society, including NGOs and community leaders (146). Part of the plan may require the development and enforcement of legislation and safety standards and regulations. An intersectoral injury prevention committee or group is needed to ensure that prevention is properly integrated across individual departmental policies. Such a group needs to ensure that local-level organizations have adequate resources and opportunities.

A cornerstone for such activity is better surveillance of morbidity, risk factors and place of occurrence of injuries and the documentation of violence that does not result in injury (12,147). Emergency departments and hospitals have a tremendous potential to supply this information, but systems need to be in place and staff trained to realize it (14,126). Information should be shared across different departments, albeit anonymously, to aid partnership. The health sector, educators and others can help provide support to parents and young children to prevent injuries and violence, an investment that can have large returns in later life. Interventions targeting the many common risk factors for injuries – such as alcohol and poverty – will result in greater returns.

Advancing the injury prevention agenda requires high political commitment. Decision-makers should

note that the implementation of cost-effective interventions can often result in quick visible gains in reducing mortality and morbidity.

Public health framework for action

To help policy-makers consider public health measures to reduce the burden from unintentional injury and violence, WHO has developed the following framework for action by countries.

- Develop national plans for unintentional injury and violence prevention.
- Form an intersectoral committee to ensure that injury prevention is properly integrated in different departments' policies.
- Improve national surveillance to reach a better understanding of the burden and risks of injuries.
- Strengthen national capacity to respond to the burden of injuries through both primary prevention and care.
- Promote evidence-based practice by facilitating the exchange of knowledge and experience across the Region.
- Recognize gaps in knowledge and prioritize research and development in both primary prevention and care, as well as studies on costs.

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Annex 1. Methods used

Background of statistical information

This report relies on three main sources of information for the statistical data, tables, figures and annexes:

1. the WHO GBD study 2002 version 3 database (1)
2. WHOSIS (2)
3. the WHO European database of mortality indicators by 67 causes of death, age and sex (3).

In addition, data from the United Nations Economic Commission for Europe (UNECE) and the European Conference of Ministers of Transport (ECMT) were used for the section on RTIs (4,5). Data for the European Region are collected annually.

How injuries can be measured

Deaths and other health outcomes from injuries are categorically attributed to one underlying cause using the rules and conventions of the WHO International Classification of Diseases (ICD). Most countries use the ninth revision of ICD (ICD-9), the ICD-9 basic tabular list (BTL) or the tenth revision of ICD (ICD-10) (6,7).

Table 1 shows the ICD codes used for the external causes of injury. Other unintentional injuries include, for example, exposure to animate and inanimate mechanical forces, electric current, radiation, extreme ambient temperature or forces of nature, and contact with heat, hot substances and venomous plants and animals. The category other intentional injuries includes those from legal interventions.

GBD database

The GBD database combines mortality data derived from national vital registration systems with information obtained from surveys, censuses, epidemiological studies and health services. It gives the most comprehensive view of global mortality and morbidity available (8). The GBD 2000 project analysed the burden of injury based on the methods developed for the 1990 project, albeit with more recent epidemiological and health service data (8–10). The GBD data are disaggregated into the six WHO regions, and this book presents data for 2002 for the European Region. The cause list used for the GBD 2000 project has 4 levels of disaggregation that include 135 specific diseases

Table 1. External causes of injury and their corresponding ICD codes

Type of injury	Code		
	ICD-9	ICD-9 BTL	ICD-10
All injuries	E800–E999	B47–B56	V01–Y98
Unintentional injuries	E800–E949	B47–B53	V01–X59, Y40–Y86, Y88, Y89
RTIs	E810–E819, E826–E829, E929	B471–B472	V01–V89, V99, Y850
Poisoning	E850–E869	B48	X40–X49
Falls	E880–E888	B50	W00–W19
Fires	E890–E899	B51	X00–X09
Drowning	E910	B521	W65–W74
Other unintentional injuries	E800–E807, E820–E848, E870–E879, E900–E909, E911–E949	B49, B52 (minus B521), B53, B47 (minus B560)	V90–V98, W20–W64, W75–W99, X10–X39, X50–X59, Y40–Y86, Y88, Y89
Intentional injuries	E950–E978, E990–E999	B54–B55, B56 (minus B560)	X60–Y09, Y35–Y36, Y870–Y871
Self-inflicted injuries	E950–E959	B54	X60–X84, Y870
Interpersonal violence	E960–E969	B55	X85–Y09, Y871
War	E990–E999	B561	Y36
Other intentional injuries	E970–E978	B569	Y35

and injuries (11). Overall mortality is divided into three broad groups of causes:

1. communicable diseases, maternal causes, conditions arising in the perinatal period and nutritional deficiencies;
2. noncommunicable diseases; and
3. intentional and unintentional injuries, with external cause codes.

The DALY is used to quantify the loss of healthy life due to injury or disease. This measure is a composite score of both the years of life lost due to premature death and the years of life lived with disability (8). One DALY lost is one year of healthy life lost to either premature death or disability.

The GBD data were used to derive regional ranks and calculate rates and rate ratios. The 15 leading causes of death and DALYs lost are reported by age group for both genders in the WHO European Region as a whole and for countries by income.

WHO European database of mortality indicators by 67 causes of death, age and sex (off-line version)

The WHO European database contains data on health indicators, including mortality, morbidity and disability from multiple causes, including external causes of injuries (2). These data allow trend analysis and international comparisons for several health statistics. These data also contain age-standardized mortality indicators.

Absolute numbers and rates per 100 000 for the population of the European Region are presented by gender and for the groups aged 0–4, 5–14, 15–29, 30–44, 45–59, 60–74 and 75 years or over. Data are compiled, validated and processed uniformly to improve the international comparability of statistics. This report uses the January 2005 version of the database, in which the most recent data presented are for 2002.

WHOSIS

WHOSIS presents the health and health-related epidemiological and statistical information available from the web site of WHO headquarters. The database of mortality statistics for country and region were the source for mortality data officially reported

by WHO Member States. They include data presented according to the ICD-9 and -10, from 1979 onwards. This book uses data for 2000–2002 or the three most recent years.

UNECE

UNECE annually collects data on road traffic crashes resulting in death or injury, based on replies submitted by Member States and official national and international sources. Of UNECE's 55 Member States, 52 also belong to the WHO European Region. Data for Liechtenstein are consolidated with those for Switzerland (5).

ECMT

ECMT collects data annually on road traffic crashes based on replies submitted by its 38 Member States (5).

Limitations of current routine information systems

The data used have a number of limitations.

1. Vital registration data for a few European countries (11), particularly those affected by transition and conflict, are lacking, and mortality data for Andorra, Monaco and Turkey are inadequate.
2. The GBD 2002 estimates are based on extrapolations of information compiled to estimate the burden of disease. Although they have been updated using recent studies, data measuring disability are still few.
3. DALYs do not capture data on all the health consequences of injury (12,13). For example, they do not account for the consequences of violence or injuries for mental and reproductive health.
4. Since systems and practices for recording and handling health data vary among countries, the availability and accuracy of the data reported to WHO may be variable.
5. The data come from different sociocultural contexts, and intentional injuries may be misclassified as unintentional or of undetermined intention. A limitation of the UNECE data on RTIs is that they are based on police reports, which may be incomplete or affected by underreporting, for example, in case of crashes of limited severity or involving single vehicles.

Comparisons between countries and their interpretation should thus be made with caution.

Calculations

SMRs and rate ratios

SMRs and rate ratios were calculated to determine the excess risk of dying from an injury (for all injuries and by cause) in LMIC. Mortality data were downloaded from the GBD database (1) and SMRs for different age groups were calculated for individual injury causes, using the European population for standardization (2). Confidence intervals were calculated but are not included because they are narrow. Table 1 in Annex 3 presents SMRs for males, females and both sexes, and rate ratios by gender and income.

Potential lives saved if the European Region had mortality rates equal to the lowest national rates

The total number of deaths was obtained from the WHO European mortality database (2). To calculate the estimated number of deaths that could be prevented, age-specific rates from the country with the lowest mortality rate were applied to the Regional population bands, using data for the period 2000–2002 or the three most recent years. A three-year period was chosen to increase reliability. The age-specific rates for the United Kingdom were used as the lowest for all injuries, RTIs, falls, drowning, self-inflicted injury and interpersonal violence, and those of the Netherlands,

for poisoning and fires. The total of potential deaths avoided was thus obtained by subtracting the estimated deaths from those actually recorded.

Children's lives lost and estimated potential lives saved

Country data for the Region for the period 2000–2002 (2) and the groups aged 1–4 and 5–14 years were downloaded from WHOSIS (3). Age standardization was carried out for each country to correct for variations in population structure using the European standard population (13). Data from the three most recent years were used for countries that had not reported during 2000–2002. The data presented in Fig. 14 and Table 2 in Annex 3 thus represent average annual mortality rates based on a three-year period. Countries were excluded because the data were incomplete (Bosnia and Herzegovina, Cyprus, Serbia and Montenegro, Tajikistan and Turkey), or they had populations of less than 1 million (Andorra, Iceland, Malta, Monaco and San Marino).

An estimate was also made of the lives saved if all countries had the same rate as one of the safest in the Region: in this case, Sweden. This was done for each age band, by applying the age-specific rates for Sweden to the population in each age band, obtaining the estimated total deaths for those aged 1–14 years for each country (14). Table 2 in Annex 3 presents the averages for the three-year periods.

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Annex 2. Conceptual approach to injury prevention

Haddon matrix

The Haddon matrix fits very well with the public health approach to prevention described in the Introduction, in which primary prevention corresponds to preventing injuries, secondary prevention to mitigating the effects of exposure to excess energy during the incident and tertiary prevention means providing post-injury care. This corresponds

to the epidemiological triad of human, mechanical and environmental factors that can interact in each phase of the crash. Table 1 gives an example of its application to road crashes, although it can be applied to other causes of injury.¹ The matrix is useful in the definition of risk factors and interventions for injury control, and emphasizes a multisectoral approach to prevention.

Table 1. The Haddon matrix as applied to RTI prevention

Phase (activity)	Factors		
	Human	Mechanical	Environmental
Pre-crash (crash prevention)	Information, attitudes and impairment of road users Police enforcement of road safety laws	Roadworthiness, lights, brakes and handling of vehicles Speed management	Road design Speed limits Pedestrian facilities
Crash (injury prevention)	Use of restraints Impairment of road users	Occupant restraints, other safety devices and crash-protective design of vehicles	Crash-protective roadside objects
Post-crash (life saving)	First-aid skill of first responders Access to medical care	Ease of access to victims Fire risk	Rescue facilities Road congestion

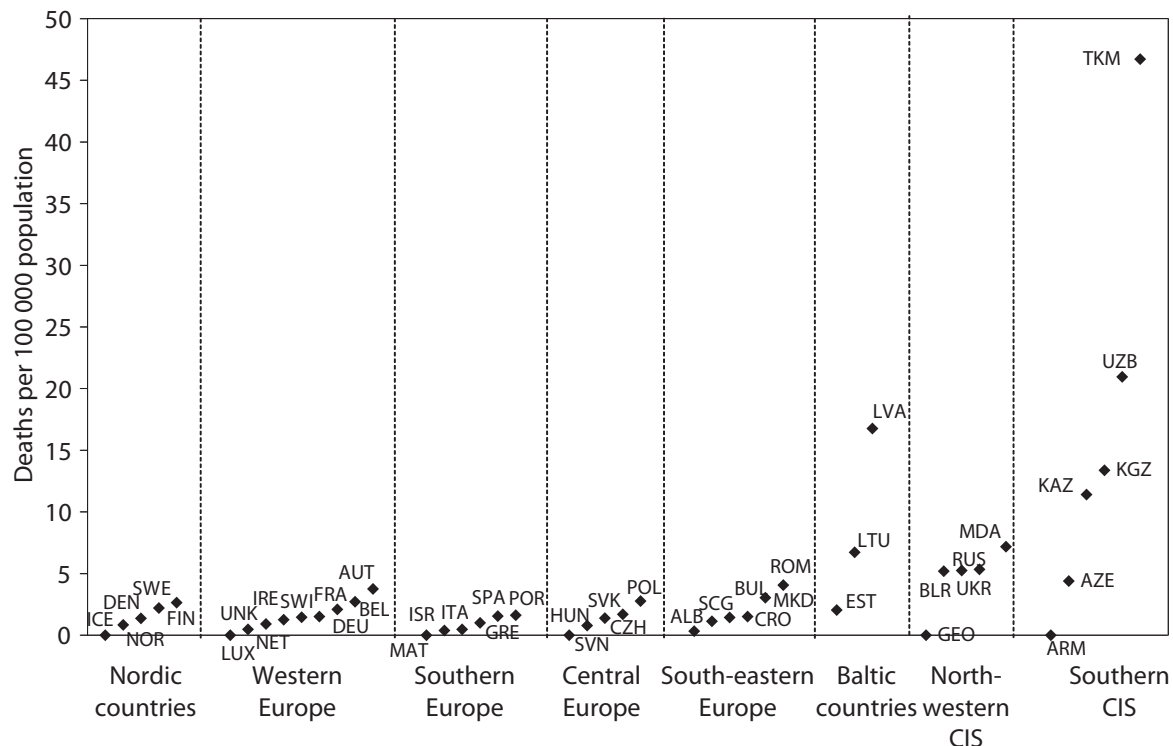
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Annex 3. Additional results

Table 1. SMRs with rate ratios from all injuries for males and females and LMIC and HIC

Injury by cause	Deaths per 100 000						Rate ratios				
	Males		Females		Both		LMIC:HIC			Males:Females	
	HIC	LMIC	HIC	LMIC	HIC	LMIC	Males	Females	Both	HIC	LMIC
All injuries	44.92	183.49	18.27	48.44	31.56	113.73	4.08	2.65	3.60	2.46	3.79
RTIs	15.81	24.47	4.83	7.78	10.31	15.90	1.55	1.61	1.54	3.27	3.14
Poisoning	1.68	30.18	0.56	8.45	1.12	18.93	17.93	15.10	16.87	3.01	3.57
Drowning	1.18	11.63	0.32	2.44	0.75	6.93	9.83	7.57	9.20	3.67	4.76
Falls	4.84	8.96	4.45	3.36	4.64	6.01	1.85	0.75	1.29	1.09	2.67
Fires	0.65	5.78	0.35	2.14	0.50	3.88	8.88	6.20	7.80	1.89	2.70
Suicide	13.24	37.20	4.20	7.30	8.70	21.70	2.87	1.74	2.50	3.15	5.10
Interpersonal violence	1.24	20.11	0.64	6.21	0.94	12.98	16.18	9.73	13.80	1.95	3.24

Fig. 1. SMRs for drowning in children aged 1–4 years by country and subregion of the WHO European Region, 2002



Note. See Annex 5 for abbreviations of the names of countries.

Source: Mortality indicators by 67 causes of death, age and sex (HFA-MDB) [online database] (8).

Table 2. Deaths from injuries in children aged 1–14 years and potential lives saved from matching the lowest national rate (Sweden's) in the WHO European Region, 2000–2002 or the latest three years

Country	Years studied	Injury deaths			Lives saved by matching Sweden's rate
		SMR	Average number per year	Share of all deaths (%)	
Albania	1999–2001	17.93	171	28.2	136
Armenia	2000–2002	7.83	58	26.7	28
Austria	2000–2002	5.52	70	37.9	23
Azerbaijan	2000–2002	11.35	238	11.0	153
Belarus	1999–2001	20.97	358	53.0	293
Belgium	1995–1997	8.69	149	43.0	87
Bulgaria	2000–2002	12.09	138	32.7	95
Croatia	2000–2002	7.68	57	40.6	29
Czech Republic	2000–2002	7.81	121	41.6	64
Denmark	1997–1999	5.84	53	32.3	20
Estonia	2000–2002	19.40	43	54.0	33
Finland	2000–2002	5.69	50	42.4	17
France	1998–2000	6.91	723	40.4	352
Georgia	1999–2001	5.36	45	24.3	13
Germany	1999–2001	5.18	627	32.7	195
Greece	1999–2001	6.12	94	37.4	38
Hungary	2000–2002	7.53	119	33.1	61
Ireland	1999–2001	7.52	59	37.8	30
Israel	1997–1999	6.90	113	31.6	55
Italy	1999–2001	3.98	307	26.6	30
Kazakhstan	2000–2002	29.19	1 090	41.8	952
Kyrgyzstan	2000–2002	26.17	415	29.6	357
Latvia	2000–2002	23.91	87	58.2	72
Lithuania	2000–2002	18.24	114	51.7	90
Netherlands	2001–2003	5.49	116	23.9	15
Norway	1999–2001	8.52	47	35.7	15
Poland	2000–2002	9.25	583	39.7	336
Portugal	2000–2002	27.91	145	33.3	88
Republic of Moldova	2000–2002	21.58	212	52.9	183
Romania	2000–2002	29.22	801	36.8	666
Russian Federation ^a	2000–2002	11.20	6 760	51.4	5 885
Slovakia	1998–2000	4.92	114	38.6	76
Slovenia	2000–2002	5.96	14	32.8	2
Spain	1999–2001	3.56	332	32.0	132
Switzerland	1998–2000	6.54	77	39.2	34
TFYR Macedonia ^b	1998–2000	9.93	42	28.7	25
Turkmenistan	1996–1998	34.08	632	17.6	569
Ukraine	2000–2002	22.81	1 740	46.8	1 457
United Kingdom	2000–2002	3.55	373	23.3	0
Uzbekistan	1998–2000	26.83	2 449	24.0	2 145
EU average ^c			196	34.2	82
European Region			19 998	35.7	15 115

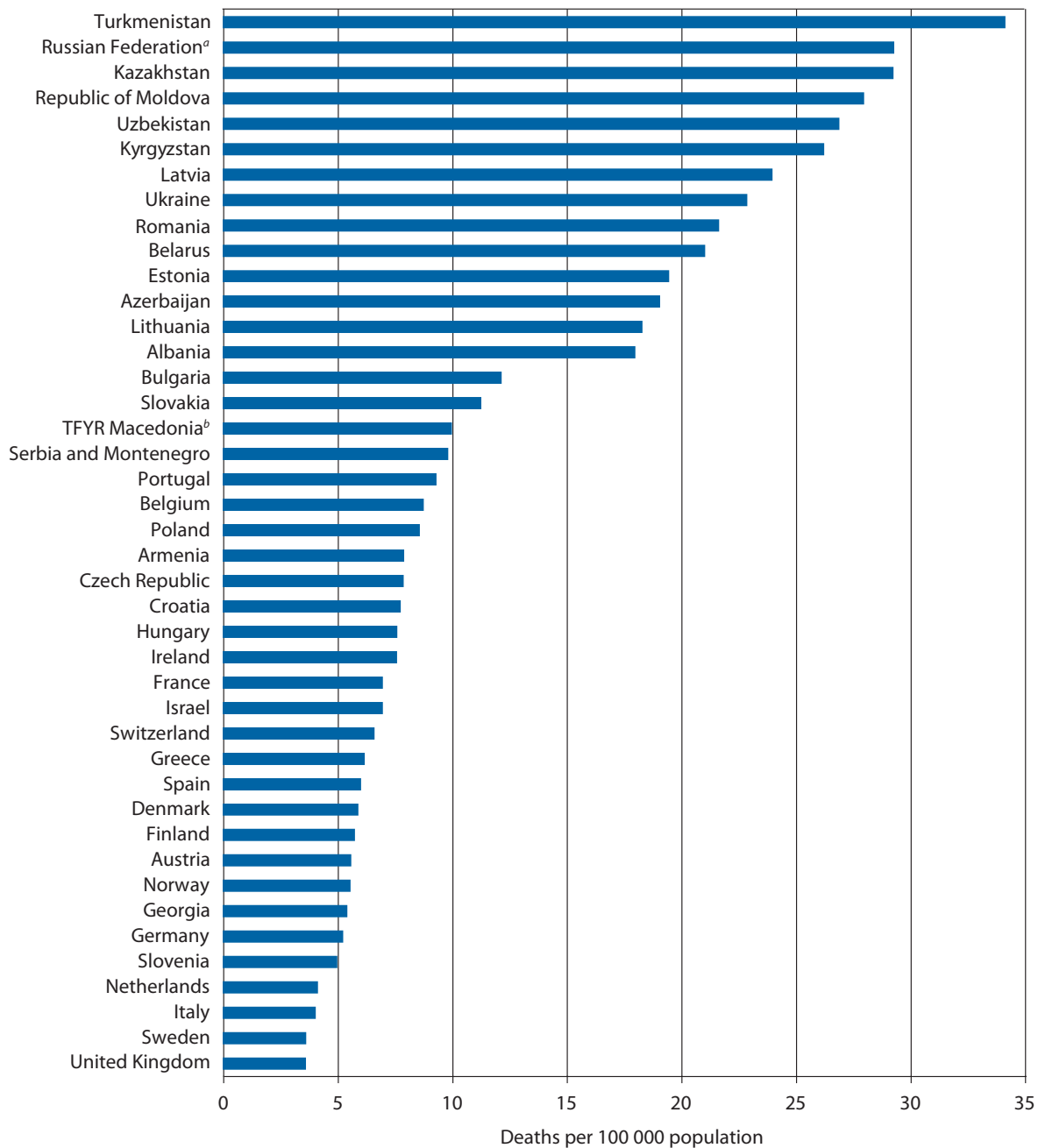
Note. It is estimated that, if the European Region had the same injury mortality rates as Sweden, 15 115 lives would be saved per year, including 1776 in the EU. In 1999–2001, there was an average of 55 such deaths in Sweden per year, accounting for 28.4% of all deaths.

^a Data from the Chechen Republic of the Russian Federation were not available and are therefore not reflected in the above figures.

^b The former Yugoslav Republic of Macedonia.

^c Average for the 25 Member States of the EU.

Fig. 2. SMRs for injuries in children aged 1–14 years in the WHO European Region, averages for a three-year period, 2000–2002 or most recent three years



^a Data from the Chechen Republic of the Russian Federation were not available and are therefore not reflected in the above figures.

^b The former Yugoslav Republic of Macedonia.

Table 3. Leading 15 causes of the burden of disease for both genders, WHO European Region, 2002

Rank	Causes (DALYs)						Total
	0-4 years	5-14 years	15-29 years	30-44 years	45-59 years	≥60 years	
1	Perinatal conditions (2 746 326)	Unipolar depressive disorders (630 014)	Unipolar depressive disorders (2 906 388)	Unipolar depressive disorders (3 207 080)	Ischaemic heart disease (4 138 146)	Ischaemic heart disease (10 052 480)	Ischaemic heart disease (15 751 529)
2	Congenital anomalies (1 711 043)	Asthma (328 038)	Alcohol-use disorders (1 951 455)	Alcohol-use disorders (1 800 519)	Cerebrovascular disease (2 314 520)	Cerebrovascular disease (7 397 061)	Cerebrovascular disease (10 792 758)
3	Lower respiratory infections (1 105 813)	Migraine (285 433)	RTIs (1 626 117)	Ischaemic heart disease (1 362 522)	Unipolar depressive disorders (1 885 355)	Alzheimer's and other dementias (266 385)	Unipolar depressive disorders (9 337 303)
4	Iodine deficiency (490 783)	RTIs (268 076)	Bipolar disorder (1 298 392)	Self-inflicted injuries (1 148 296)	Trachea, bronchus, lung cancers (1 206 462)	Trachea, bronchus, lung cancers (1 783 449)	Alcohol-use disorders (4 659 972)
5	Diarrhoeal diseases (487 172)	Falls (263 880)	Schizophrenia (1 199 883)	Hearing loss, adult onset (1 033 846)	Hearing loss, adult onset (1 184 063)	Chronic obstructive pulmonary disease (1 515 194)	Hearing loss, adult onset (3 874 536)
6	Meningitis (341 977)	Schizophrenia (258 702)	Self-inflicted injuries (1 124 217)	RTIs (977 111)	Cirrhosis of the liver (1 132 899)	Hearing loss, adult onset (151 286)	RTIs (3 606 166)
7	Childhood diseases (309 343)	Iodine deficiency (201 159)	Migraine (895 063)	Interpersonal violence (853 414)	Osteoarthritis (1 073 446)	Colon and rectum cancers (1 168 114)	Chronic obstructive pulmonary disease (3 451 849)
8	Protein-energy malnutrition (159 130)	Lower respiratory infections (188 207)	Interpersonal violence (888 595)	Cerebrovascular disease (843 716)	Chronic obstructive pulmonary disease (961 270)	Osteoarthritis (1 148 780)	Self-inflicted injuries (3 391 065)
9	Endocrine disorders (131 274)	Dental caries (131 248)	Drug-use disorders (760 726)	Poisoning (788 396)	Alcohol-use disorders (738 881)	Vision disorders, age-related (1 013 463)	Trachea, bronchus, lung cancers (3 243 467)
10	Falls (126 693)	Self-inflicted injuries (110 456)	Panic disorder (729 136)	Chronic obstructive pulmonary disease (783 939)	Self-inflicted injuries (720 756)	Diabetes mellitus (1 004 620)	Osteoarthritis (3 087 667)
11	Asthma (125 420)	Drowning (107 336)	Falls (590 348)	Cirrhosis of the liver (746 200)	Poisoning (695 500)	Hypertensive heart disease (809 967)	Alzheimer's and other dementias (2 934 277)
12	Anaemia (88 618)	Obsessive-compulsive disorder (94 685)	Maternal conditions (584 936)	Osteoarthritis (736 724)	Breast cancer (695 350)	Stomach cancer (737 448)	Lower respiratory infections (2 863 888)
13	Upper respiratory infections (85 019)	Anaemia (92 040)	Asthma (433 859)	HIV/AIDS (645 397)	Diabetes mellitus (677 142)	Unipolar depressive disorders (708 402)	Perinatal conditions (2 747 622)
14	RTIs (76 929)	Epilepsy (80 732)	Poisoning (402 169)	Tuberculosis (643 196)	Colon and rectum cancers (517 184)	Lower respiratory infections (688 926)	Cirrhosis of the liver (2 733 544)
15	Fire (73 761)	Otitis media (77 297)	Obsessive-compulsive disorder (385 566)	Drug-use disorders (509 820)	Vision disorders, age related (479 186)	Cirrhosis of the liver (688 154)	Interpersonal violence (2 301 502)

Table 4. Leading 15 causes of death for both genders in HIC, WHO European Region, 2002

Rank	Causes (deaths)						Total
	0-4 years	5-14 years	15-29 years	30-44 years	45-59 years	≥ 60 years	
1	Perinatal conditions (9 739)	RTIs (1 129)	RTIs (14 586)	Self-inflicted injuries (12 003)	Ischaemic heart disease (41 754)	Ischaemic heart disease (584 486)	Ischaemic heart disease (633 549)
2	Congenital anomalies (6 028)	Leukaemia (453)	Self-inflicted injuries (6 183)	RTIs (9 836)	Trachea, bronchus, lung cancers (35 197)	Cerebrovascular disease (370 449)	Cerebrovascular disease (389 278)
3	Endocrine disorders (567)	Congenital anomalies (438)	Drug-use disorders (1 798)	Ischaemic heart disease (6 923)	Cirrhosis of the liver (19 084)	Lower respiratory infections (160 692)	Trachea, bronchus, lung cancers (198 124)
4	Meningitis (412)	Endocrine disorders (253)	Poisoning (1 165)	Cirrhosis of the liver (6 185)	Breast cancer (18 488)	Trachea, bronchus, lung cancers (158 758)	Lower respiratory infections (167 661)
5	RTIs (375)	Drowning (136)	Leukaemia (1 019)	Breast cancer (5 141)	Cerebrovascular disease (14 028)	Chronic obstructive pulmonary disease (131 510)	Chronic obstructive pulmonary disease (136 895)
6	Lower respiratory infections (368)	Self-inflicted injuries (120)	Interpersonal violence (930)	Trachea, bronchus, lung cancers (4 064)	Colon and rectum cancers (13 381)	Colon and rectum cancers (115 361)	Colon and rectum cancers (131 057)
7	Drowning (235)	Epilepsy (112)	Congenital anomalies (795)	Cerebrovascular disease (3 923)	Self-inflicted injuries (11 552)	Alzheimer's and other dementias (93 341)	Alzheimer's and other dementias (94 340)
8	Leukaemia (206)	Interpersonal violence (105)	Cerebrovascular disease (691)	HIV/AIDS (3 693)	Mouth and oropharynx cancers (7 701)	Diabetes mellitus (83 899)	Diabetes mellitus (90 126)
9	Inflammatory heart diseases (170)	Lower respiratory infections (98)	HIV/AIDS (683)	Drug-use disorders (3 046)	RTIs (6 967)	Prostate cancer (64 599)	Breast cancer (85 838)
10	Interpersonal violence (144)	Cerebrovascular disease (94)	Falls (674)	Alcohol-use disorders (2 368)	Pancreas cancer (6 865)	Breast cancer (62 087)	Prostate cancer (66 458)
11	Alzheimer's and other dementias (120)	Meningitis (91)	Endocrine disorders (662)	Colon and rectum cancers (2 139)	Stomach cancer (6 763)	Hypertensive heart disease (61 549)	Hypertensive heart disease (64 365)
12	Diarrhoeal diseases (102)	Falls (91)	Lymphomas, multiple myeloma (643)	Lymphomas, multiple myeloma (1 959)	Lymphomas, multiple myeloma (6 382)	Stomach cancer (50 137)	Cirrhosis of the liver (61 419)
13	Fire (100)	Alzheimer's and other dementias (84)	Drowning (487)	Poisoning (1 789)	Oesophagus cancer (5 774)	Lymphomas, multiple myeloma (43 188)	Stomach cancer (58 499)
14	Cerebrovascular disease (94)	Fire (80)	Epilepsy (468)	Leukaemia (1 633)	Alcohol-use disorders (5 442)	Pancreas cancer (43 184)	Lymphomas, multiple myeloma (52 282)
15	Falls (92)	Lymphomas, multiple myeloma (79)	Lower respiratory infections (431)	Falls (1 598)	Diabetes mellitus (4 960)	Falls (38 655)	Pancreas cancer (50 925)

Table 5. Leading 15 causes of the burden of disease for both genders in HIC, WHO European Region, 2002

Rank	Causes (DALYs)							Total
	0-4 years	5-14 years	15-29 years	30-44 years	45-59 years	≥ 60 years		
1	Perinatal conditions (481 053)	Unipolar depressive disorders (244 636)	Unipolar depressive disorders (1 160 003)	Unipolar depressive disorders (1 397 982)	Unipolar depressive disorders (842 241)	Ischaemic heart disease (2 389 508)	Unipolar depressive disorders (3 952 965)	
2	Congenital anomalies (447 104)	Asthma (184 487)	Alcohol-use disorders (829 159)	Alcohol-use disorders (891 327)	Ischaemic heart disease (708 963)	Cerebrovascular disease (1 807 189)	Ischaemic heart disease (3 327 150)	
3	Endocrine disorders (67 539)	Schizophrenia (110 506)	Migraine (608 675)	Hearing loss, adult onset (491 734)	Trachea, bronchus, lung cancers (539 926)	Alzheimer's and other dementias (1 785 018)	Cerebrovascular disease (2 457 583)	
4	Asthma (62 173)	Migraine (95 790)	RTIs (598 443)	Chronic obstructive pulmonary disease (385 785)	Hearing loss, adult onset (494 734)	Trachea, bronchus, lung cancers (951 293)	Alcohol-use disorders (2 127 622)	
5	Childhood diseases (61 877)	Dental caries (61 767)	Bipolar disorder (488 610)	Self-inflicted injuries (315 361)	Chronic obstructive pulmonary disease (470 157)	Hearing loss, adult onset (770 054)	Alzheimer's and other dementias (1 928 915)	
6	Diarrhoeal diseases (34 366)	RTIs (60 650)	Schizophrenia (422 810)	RTIs (300 250)	Cerebrovascular disease (419 835)	Chronic obstructive pulmonary disease (755 062)	Hearing loss, adult onset (1 787 934)	
7	Meningitis (29 214)	Falls (43 625)	Drug-use disorders (400 211)	Drug-use disorders (275 679)	Cirrhosis of the liver (363 481)	Colon and rectum cancers (654 925)	Chronic obstructive pulmonary disease (1 689 879)	
8	Falls (26 372)	Endocrine disorders (41 821)	Panic disorder (272 795)	Cirrhosis of the liver (208 486)	Breast cancer (350 834)	Osteoarthritis (640 956)	Trachea, bronchus, lung cancers (1 589 964)	
9	Alzheimer's and other dementias (20 842)	Otitis media (28 551)	Asthma (251 952)	Cerebrovascular disease (201 137)	Osteoarthritis (346 001)	Diabetes mellitus (595 892)	RTIs (1 185 083)	
10	RTIs (17 731)	Epilepsy (26 186)	Self-inflicted injuries (211 081)	Ischaemic heart disease (198 230)	Alcohol-use disorders (327 421)	Lower respiratory infections (447 474)	Osteoarthritis (1 143 481)	
11	Protein-energy malnutrition (16 548)	Self-inflicted injuries (21 833)	Obsessive-compulsive disorder (145 906)	Breast cancer (165 757)	Diabetes mellitus (315 287)	Breast cancer (384 016)	Diabetes mellitus (1 071 874)	
12	Anaemia (16 454)	Bipolar disorder (18 022)	Falls (125 033)	Osteoarthritis (144 804)	Colon and rectum cancers (248 597)	Prostate cancer (319 508)	Colon and rectum cancers (971 862)	
13	Lower respiratory infections (13 930)	Leukaemia (17 505)	Anaemia (124 259)	Diabetes mellitus (137 281)	Self-inflicted injuries (194 051)	Unipolar depressive disorders (308 103)	Breast cancer (906 208)	
14	Dental caries (10 805)	Congenital anomalies (16 345)	Maternal conditions (97 996)	HIV/AIDS (116 878)	Rheumatoid arthritis (148 846)	Cirrhosis of the liver (273 745)	Cirrhosis of the liver (859 934)	
15	Drowning (8 778)	Alcohol-use disorders (15 130)	Post-traumatic stress disorder (91 437)	Falls (107 080)	Endocrine disorders (147 476)	Stomach cancer (255 383)	Self-inflicted injuries (842 772)	

Table 6. Leading 15 causes of death for both genders in LMIC, WHO European Region, 2002

Rank	Causes (deaths)						Total
	0-4 years	5-14 years	15-29 years	30-44 years	45-59 years	≥ 60 years	
1	Perinatal conditions (55 936)	Lower respiratory infections (3 695)	Self-inflicted injuries (26 144)	Ischaemic heart disease (45 129)	Ischaemic heart disease (211 264)	Ischaemic heart disease (1 479 622)	Ischaemic heart disease (1 739 591)
2	Lower respiratory infections (31 602)	RTIs (3 562)	RTIs (23 408)	Self-inflicted injuries (32 827)	Cerebrovascular disease (92 915)	Cerebrovascular disease (938 608)	Cerebrovascular disease (1 057 732)
3	Congenital anomalies (22 632)	Drowning (2 727)	Interpersonal violence (14 749)	Poisoning (30 503)	Trachea, bronchus, lung cancers (43 124)	Trachea, bronchus, lung cancers (117 698)	Trachea, bronchus, lung cancers (167 227)
4	Diarrhoeal diseases (11 725)	Self-inflicted injuries (1 477)	Poisoning (10 885)	Interpersonal violence (23 357)	Poisoning (40 705)	Chronic obstructive pulmonary disease (107 345)	Chronic obstructive pulmonary disease (123 710)
5	Meningitis (8 900)	Leukaemia (1 313)	Drowning (7 855)	Tuberculosis (22 224)	Cirrhosis of the liver (40 005)	Hypertensive heart disease (95 719)	Self-inflicted injuries (118 162)
6	Childhood diseases (4 897)	Congenital anomalies (1 091)	War injuries (7 638)	RTIs (21 715)	Self-inflicted injuries (31 502)	Colon and rectum cancers (78 146)	Hypertensive heart disease (115 483)
7	Upper respiratory infections (2 484)	Childhood diseases (851)	Tuberculosis (7 051)	Cerebrovascular disease (20 100)	Lower respiratory infections (22 946)	Stomach cancer (73 182)	Lower respiratory infections (113 221)
8	Drowning (1 581)	Poisoning (780)	Cerebrovascular disease (4 575)	Cirrhosis of the liver (16 764)	Tuberculosis (20 682)	Cirrhosis of the liver (49 394)	Cirrhosis of the liver (109 181)
9	RTIs (1 323)	Cerebrovascular disease (754)	Lower respiratory infections (4 510)	HIV/AIDS (15 547)	Stomach cancer (20 024)	Inflammatory heart diseases (46 757)	Poisoning (104 636)
10	Poisoning (990)	Interpersonal violence (660)	HIV/AIDS (3 737)	Drowning (9 523)	Breast cancer (19 609)	Lower respiratory infections (42 606)	Stomach cancer (99 218)
11	Fire (876)	Epilepsy (575)	Ischaemic heart disease (3 537)	Inflammatory heart diseases (8 248)	Interpersonal violence (19 167)	Diabetes mellitus (38 768)	Colon and rectum cancers (98 026)
12	Cerebrovascular disease (778)	Falls (520)	Falls (3 241)	Lower respiratory infections (7 861)	RTIs (16 990)	Breast cancer (38 483)	RTIs (82 302)
13	Endocrine disorders (743)	Lymphomas, multiple myeloma (488)	Cirrhosis of the liver (2 653)	War injuries (6 502)	Inflammatory heart diseases (15 936)	Pancreas cancer (27 028)	Inflammatory heart diseases (74 146)
14	Inflammatory heart diseases (668)	Fire (471)	Leukaemia (2 617)	Falls (6 194)	Hypertensive heart disease (15 878)	Self-inflicted injuries (26 206)	Interpersonal violence (68 835)
15	Leukaemia (655)	Meningitis (462)	Inflammatory heart disease (2 296)	Trachea, bronchus, lung cancers (5 936)	Colon and rectum cancers (15 866)	Asthma (25 379)	Breast cancer (64 278)

Table 7. Leading 15 causes of the burden of disease for both genders in LMIC, WHO European Region, 2002

Rank	Causes (DALYs)						Total
	0-4 years	5-14 years	15-29 years	30-44 years	45-59 years	≥ 60 years	
1	Perinatal conditions (2 265 274)	Unipolar depressive disorders (385 378)	Unipolar depressive disorders (1 746 384)	Unipolar depressive disorders (1 809 098)	Ischaemic heart disease (3 429 183)	Ischaemic heart disease (7 662 972)	Ischaemic heart disease (12 424 379)
2	Congenital anomalies (1 263 939)	Falls (220 255)	Alcohol-use disorders (1 122 295)	Ischaemic heart disease (1 164 291)	Cerebrovascular disease (1 894 685)	Cerebrovascular disease (5 589 872)	Cerebrovascular disease (8 335 175)
3	Lower respiratory infections (1 091 883)	RTIs (207 426)	RTIs (1 027 674)	Alcohol-use disorders (909 192)	Unipolar depressive disorders (1 043 114)	Trachea, bronchus, lung cancers (832 156)	Unipolar depressive disorders (5 384 339)
4	Iodine deficiency (489 024)	Iodine deficiency (200 508)	Self-inflicted injuries (913 136)	Self-inflicted injuries (832 934)	Cirrhosis of the liver (769 418)	Alzheimer and other dementias (821 368)	Self-inflicted injuries (2 548 294)
5	Diarrhoeal diseases (452 805)	Migraine (189 643)	Interpersonal violence (840 913)	Interpersonal violence (807 951)	Osteoarthritis (727 446)	Vision disorders, age-related (819 573)	Alcohol-use disorders (2 532 349)
6	Meningitis (312 762)	Lower respiratory infections (180 758)	Bipolar disorder (809 782)	Poisoning (739 488)	Hearing loss, adult onset (689 329)	Chronic obstructive pulmonary disease (760 132)	RTIs (2 421 083)
7	Childhood diseases (247 466)	Schizophrenia (148 196)	Schizophrenia (777 072)	RTIs (676 861)	Poisoning (680 538)	Hearing loss, adult onset (740 232)	Perinatal conditions (2 265 401)
8	Protein-energy malnutrition (142 582)	Asthma (143 552)	Maternal conditions (486 941)	Cerebrovascular disease (642 579)	Trachea, bronchus, lung cancers (666 536)	Hypertensive heart disease (565 191)	Lower respiratory infections (2 259 667)
9	Falls (100 322)	Drowning (102 126)	Falls (465 315)	Tuberculosis (633 367)	Self-inflicted injuries (526 705)	Colon and rectum cancers (513 189)	Interpersonal violence (2 174 731)
10	Upper respiratory infections (83 592)	Obsessive-compulsive disorder (92 148)	Panic disorder (456 341)	Osteoarthritis (591 919)	Chronic obstructive pulmonary disease (491 113)	Osteoarthritis (507 825)	Hearing loss, adult onset (2 086 603)
11	Anaemia (72 164)	Self-inflicted injuries (88 623)	Poisoning (360 636)	Hearing loss, adult onset (542 112)	Alcohol-use disorders (411 460)	Stomach cancer (482 065)	Poisoning (2 019 159)
12	Fire (67 706)	Anaemia (79 964)	Drug-use disorders (360 515)	Cirrhosis of the liver (537 714)	Tuberculosis (386 042)	Cirrhosis of the liver (414 409)	Osteoarthritis (1 944 186)
13	Endocrine disorders (63 735)	Dental caries (69 480)	War injuries (337 205)	HIV/AIDS (528 519)	Lower respiratory infections (381 585)	Diabetes mellitus (408 727)	Cirrhosis of the liver (1 873 610)
14	Asthma (63 247)	Fire (61 239)	Tuberculosis (310 595)	Chronic obstructive pulmonary disease (398 154)	Interpersonal violence (363 654)	Unipolar depressive disorders (400 300)	Chronic obstructive pulmonary disease (1 761 970)
15	RTIs (59 198)	Interpersonal violence (59 403)	Migraine (286 388)	Falls (310 657)	Diabetes mellitus (361 855)	Inflammatory heart diseases (300 728)	Trachea, bronchus, lung cancers (1 653 503)

Table 8. Injury deaths in males by age and cause in the WHO European Region, 2002

Cause	Deaths								Total
	0–4 years	5–14 years	15–29 years	30–44 years	45–59 years	60–69 years	70–79 years	≥80 years	
All causes	105 291	23 280	174 790	399 207	873 606	1 045 444	1 335 110	973 029	4 929 757
Injuries	6 840	10 788	116 809	162 727	158 824	68 158	38 741	23 123	586 011
Unintentional	6 520	9 130	70 038	99 278	106 201	47 554	26 511	18 493	383 726
RTIs	873	3 012	30 167	25 424	18 198	8 157	5 923	2 278	94 033
Poisoning	574	462	9 610	26 403	31 898	11 233	2 799	501	83 478
Falls	354	442	3 192	6 612	9 380	6 153	6 623	10 097	42 852
Fires	535	335	1 601	4 267	5 413	2 718	1 432	552	16 852
Drowning	1 175	2 096	7 173	8 939	7 105	2 920	1 288	318	31 015
Other	3 009	2 783	18 296	27 633	34 208	16 374	8 446	4 747	115 495
Intentional	320	1 659	46 771	63 450	52 623	20 604	12 230	4 630	202 285
Self-inflicted injuries	6	1 067	26 989	37 667	35 094	15 281	10 385	4 148	130 637
Interpersonal violence	289	423	12 208	19 438	15 195	4 389	1 535	336	53 813
War	24	165	7 474	6 139	2 201	928	309	146	17 387
Other	1	3	100	206	133	5	0	0	448

Source: GBD 2002 estimates [web site]. Geneva, World Health Organization, 2005 (http://www3.who.int/whosis/menu.cfm?path=whosis,burden,burden_estimates,burden_estimates_2002N, accessed 13 October 2005).

Table 9. Injury deaths in females by age and cause in the WHO European Region, 2002

Cause	Deaths								Total
	0–4 years	5–14 years	15–29 years	30–44 years	45–59 years	60–69 years	70–79 years	≥80 years	
All causes	84 076	15 019	56 296	143 654	383 860	612 094	1 321 138	2 017 985	4 634 121
Injuries	5 147	5 150	25 037	33 705	42 647	25 293	28 322	39 566	204 867
Unintentional	4 877	4 91	15 878	20 749	29 202	18 060	21 801	35 783	150 541
RTIs	825	1 679	7 827	6 127	5 759	3 846	4 432	2 018	32 513
Poisoning	450	349	2 441	5 889	9 619	4 526	2 079	1 038	26 391
Falls	264	168	723	1 180	2 194	2 282	6 925	23 047	36 783
Fires	441	216	583	1 069	1 464	1 094	1 410	1 204	7 481
Drowning	642	767	1 169	1 188	1 272	784	769	381	6 971
Other	2 257	1 013	3 136	5 296	8 894	5 527	6 185	8 095	40 402
Intentional	269	959	9 159	12 956	13 445	7 234	6 522	3 783	54 326
Self-inflicted injuries	0	530	5 338	7 163	7 960	4 776	4 630	2 844	33 241
Interpersonal violence	250	342	3 470	5 207	4 841	2 210	1 768	852	18 940
War	16	86	336	509	504	239	124	86	1 900
Other	3	0	14	76	141	9	0	2	245

Source: GBD 2002 estimates [web site]. Geneva, World Health Organization, 2005 (http://www3.who.int/whosis/menu.cfm?path=whosis,burden,burden_estimates,burden_estimates_2002N, accessed 13 October 2005).

Table 10. DALYs lost by males by cause and age in the WHO European Region, 2002

Cause	DALYs								Total
	0–4 years	5–14 years	15–29 years	30–44 years	45–59 years	60–69 years	70–79 years	≥80 years	
All causes	5 507 584	3 090 683	14 857 020	17 213 366	19 580 341	12 573 882	8 546 313	2 415 429	83 784 619
Injuries	472 799	1 100 941	5 514 281	4 994 898	2 952 065	722 209	239 329	54 979	16 051 502
Unintentional	453 934	975 243	3 559 496	3 098 155	2 030 477	526 154	174 154	44 736	10 862 348
RTIs	38 586	160 549	1 243 083	763 339	340 997	80 064	13 960	5 001	2 663 578
Poisoning	20 400	18 579	316 902	640 706	529 420	105 177	14 725	1 038	1 646 948
Falls	78 779	192 838	457 817	329 736	225 644	83 917	52 836	24 128	1 445 696
Fires	49 819	48 374	102 041	139 436	103 443	26 389	8 158	1 261	478 921
Drowning	41 602	78 387	240 420	220 927	116 582	27 052	6 660	679	732 308
Other	224 748	476 516	1 199 233	1 004 010	714 391	203 556	59 813	12 628	3 894 896
Intentional	18 865	125 698	1 954 785	1 896 744	921 588	196 056	65 175	10 243	5 189 154
Self-inflicted injuries	188	75 085	930 592	955 776	580 807	140 896	53 898	8 565	2 745 808
Interpersonal violence	11 264	40 575	689 817	666 391	285 322	44 463	9 142	984	1 747 959
War	7 171	9 818	329 380	268 507	53 066	10 645	2 121	685	681 393
Other	242	220	4 996	6 069	2 393	50	14	9	13 993

Source: GBD 2002 estimates [web site]. Geneva, World Health Organization, 2005 (http://www3.who.int/whosis/menu.cfm?path=whosis,burden,burden_estimates,burden_estimates_2002N, accessed 13 October 2005).

Table 11. DALYs lost by females by cause and age in the WHO European Region, 2002

Cause	DALYs								Total
	0–4 years	5–14 years	15–29 years	30–44 years	45–59 years	60–69 years	70–79 years	≥80 years	
All causes	4 600 470	2 443 165	10 534 565	10 887 839	12 704 220	9 823 037	10 226 794	5 220 440	66 440 530
Injuries	281 888	498 210	1 405 693	1 191 267	890 725	316 529	209 169	99 059	4 892 539
Unintentional	270 542	419 177	998 250	792 389	639 255	240 440	169 704	89 785	3 619 543
RTIs	38 345	107 535	383 064	213 787	123 993	43 223	27 555	5 150	942 654
Poisoning	16 094	14 354	85 269	147 691	166 080	45 991	12 031	2 244	489 755
Falls	47 925	71 056	132 558	88 022	72 950	46 016	70 010	59 742	588 279
Fires	23 943	17 214	29 105	33 424	30 752	11 310	8 331	2 637	156 715
Drowning	23 043	28 950	40 937	29 985	21 596	7 925	4 441	851	157 727
Other	121 193	180 069	327 317	279 479	223 884	85 974	47 336	19 161	1 284 413
Intentional	11 346	79 032	407 443	398 879	251 470	76 089	39 465	9 273	1 272 997
Self-inflicted injuries	0	35 378	193 628	192 527	139 953	49 491	27 656	6 646	645 280
Interpersonal violence	9 211	25 803	198 781	187 026	95 232	23 972	11 102	2 424	553 552
War	584	17 835	14 540	17 374	13 819	2 527	707	200	67 587
Other	16	493	1 951	2 466	98	0	3	6 578	11 606

Source: GBD 2002 estimates [web site]. Geneva, World Health Organization, 2005 (http://www3.who.int/whosis/menu.cfm?path=whosis,burden,burden_estimates,burden_estimates_2002N, accessed 13 October 2005).

**Table 12. Population of the WHO European Region
by age and gender, 2002**

Age group (years)	Population	
	Males	Females
0–4	25 832 260	24 576 350
5–14	60 004 350	57 337 060
15–29	98 719 990	95 717 680
30–44	98 064 390	97 580 380
45–59	76 724 830	81 109 240
60–69	36 314 210	44 109 310
70–79	22 766 650	35 431 680
≥80	6 952 960	16 645 550
Total	425 379 640	452 507 270

Source: GBD 2002 estimates [web site]. Geneva, World Health Organization, 2005 (http://www3.who.int/whosis/menu.cfm?path=whosis,burden,burden_estimates,burden_estimates_2002N, accessed 13 October 2005).

Annex 5. Abbreviations of country names

The following abbreviations of the names of the 52 countries in the WHO European Region are used in Fig. 9, 14, 19 and 20.

Country	Abbreviation	Country	Abbreviation
Albania	ALB	Latvia	LVA
Andorra	AND	Lithuania	LTU
Armenia	ARM	Luxembourg	LUX
Austria	AUT	Malta	MAT
Azerbaijan	AZE	Monaco	MON
Belarus	BLR	Netherlands	NET
Belgium	BEL	Norway	NOR
Bosnia and Herzegovina	BIH	Poland	POL
Bulgaria	BUL	Portugal	POR
Cyprus	CYP	Republic of Moldova	MDA
Croatia	CRO	Romania	ROM
Czech Republic	CZH	Russian Federation	RUS
Denmark	DEN	San Marino	SMR
Estonia	EST	Serbia and Montenegro	SCG
Finland	FIN	Slovakia	SVK
France	FRA	Slovenia	SVN
Georgia	GEO	Spain	SPA
Germany	DEU	Sweden	SWE
Greece	GRE	Switzerland	SWI
Hungary	HUN	Tajikistan	TJK
Iceland	ICE	The former Yugoslav Republic of Macedonia	MKD
Ireland	IRE	Turkey	TUR
Israel	ISR	Turkmenistan	TKM
Italy	ITA	Ukraine	UKR
Kazakhstan	KAZ	United Kingdom	UNK
Kyrgyzstan	KGZ	Uzbekistan	UZB

The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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Turkmenistan
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United Kingdom
Uzbekistan

Injuries lead to huge human, financial and other costs to society. In the WHO European Region, road traffic injuries, drowning, poisoning, falls, fires, self-inflicted injuries and interpersonal violence are estimated to kill over 2000 people, put 60 000 others in hospital and necessitate outpatient emergency treatment for 600 000 more every day. But the evidence shows that they can be predicted and prevented.

This book provides detailed data on the harm to individuals and societies that is done by unintentional injuries and violence. Describing injuries by cause and setting and violence by type, it specifies the damage done using the variables of gender, age and country income. It shows that the WHO European Region includes both high-income countries that are among the safest in the world, and low-to-middle-income countries with very high rates of death and disability from injuries and violence.

Having depicted the problem, the book turns towards solutions that can save not only lives but also social and economic costs, giving examples of programmes that could be more widely applied. A separate summary for policy-makers is also available. The authors argue that the most effective approach is for all sectors of society to tackle injuries and violence together, and propose a public health framework for action, highlighting some of the key steps that need to be taken. This book identifies unique opportunities for policy-makers, civil-society organizations and professionals in the health sector to improve health by reducing the burden of injuries on the WHO European Region.



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