

Understanding the burden and costs of unintentional injuries and violence to European health systems



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Summary

Introduction

Injuries and violence are a major public health problem in the WHO European Region. Violence is a leading cause of death and with injury, is a major contributor to health care costs. Identifying the burden and costs of injuries and violence to the health care system can be a useful starting point for demonstrating the 'size of the problem' to policy makers and in influencing decision-making.

Understanding more about the burden and costs to the health care system can be a powerful tool to alert policy makers to their responsibilities in preventing injuries and violence.

This project aimed to estimate the costs of injuries and violence to the health care systems across the WHO European Region. The objectives were to review costing approaches used in the existing literature, identify data to enable robust estimates of the costs of injury and violence and to develop an analytical framework that can be applied uniformly across WHO European Region countries.

Methods

We used an incidence-based approach and attributed total health care costs within a specified year (2019) in a 'bottom up' approach. Our analytical model was limited to the direct costs of emergency department visits and inpatient hospital stays. We used injury incidence data from the Global Burden of Disease study and used estimates from the literature to estimate the number of hospital admissions for injury cases and the length of stay for admitted injury cases. Unit costs were taken from the WHO-CHOICE database.

Results

In 2019, an estimated 78.4 million people in the WHO European Region suffered injury or violence that required medical care. Road traffic and other transport injuries were responsible for 7.6 million emergency department visits (9.7%), other unintentional injuries (falls, burns etc.) for 67.9 million (86.7%) and self-harm and interpersonal violence for 2.8 million (3.6%). An estimated 14.9 million people were admitted to hospital following violence or injury, accruing 58.6 million days in hospital. Total expenditure on health in the WHO European Region was an estimated USD PPP 3,002 billion in 2019. The total hospital costs arising from violence and injury in 2019 were an estimated USD PPP 39.4 billion; USD PPP 13.3 billion from emergency department visits and USD PPP 26.1 billion from inpatient hospital stays. Other unintentional injuries accounted for the largest share of the burden (USD PPP 35.1 billion), followed by road traffic and other transport injuries (USD PPP 3.1 billion), and self-harm and interpersonal violence (USD PPP 1.3 billion). The top five countries ranked by expenditure were the Russian Federation (USD PPP 6.3 billion), Germany (USD PPP 5.6 billion), France (USD PPP 4.6 billion), the UK (USD PPP 3.5 billion) and Italy (USD PPP 2.8 billion), accounting for 58% of all health expenditure on injuries and violence in the WHO European Region. Ranked by expenditure per capita, the top five countries were Monaco (USD PPP 232.20 per capita), Luxembourg (USD PPP 188.45 per capita), Switzerland (USD PPP 110.09 per capita), Norway (USD PPP 97.47 per capita) and Andorra (USD PPP 86.75 per capita).

Conclusions

Injuries and violence are preventable, and increased spending on evidence-based prevention interventions is warranted to prevent the realisation of the cost burden to the health system. Estimates of the economic costs of injuries and violence cannot be used by themselves as a means of priority setting. However, they are a useful starting point for influencing policy making, planning and investment in prevention and provide a powerful advocacy tool to promote the inclusion of injury and violence prevention in policy planning.

Introduction

WHO Global Health Estimates show that nearly half a million (493,471) deaths occurred due to violence and injuries in the WHO European Region¹ in 2016, accounting for 5.3% of all deaths. In total, 18 million years of life were lost to violence and injury; 9.6% of all years of life lost in the WHO European Region in 2016 (WHO, 2020). Violence was the third leading cause of death in the WHO European Region in 2016 and a growing body of global research has identified the heavy burden that interpersonal violence places on individuals' health and social prospects across the life course (WHO, 2014). In addition to these individual impacts, violence affects families, communities, and wider society, placing significant impacts on public services including health, criminal justice, social services, and other sectors such as education. Unintentional injuries also result in burden on health care systems through the impacts of non-fatal injuries resulting in disabilities (WHO, 2020).

Injuries are a major contributor to health care costs in the European region. Identifying the burden and costs of unintentional injuries and violence to the health system can be a useful starting point for demonstrating the 'size of the problem' to policy makers and in influencing decision-making, and investment in (and commissioning of) interventions. Advocacy is an important tool for violence and injury prevention (Schopper et al., 2006) and understanding more about the burden and costs to the health system can be a powerful tool to alert policy makers to their responsibilities in preventing injuries and violence.

Various studies have been implemented at country level to understand the burden and estimate the costs of injury and violence to the health system. For example, the costs of violence alone to the NHS in England and Wales have previously been estimated at GBP 2.9 billion (based on 2008/09 cost data; Bellis et al., 2012). More recently, in Wales the cost of addressing the short-term impacts of violence alone across the health system (e.g., hospital attendance) was estimated at GBP 46.6 million in 2018/19 (USD 68.0 million). However, country level studies are based on a variety of methods and approaches, which make aggregation and comparability across countries difficult. A uniform method of analysis to estimate the costs of unintentional injuries and violence to the health system across the WHO European Region is therefore needed.

Aim & objectives

This report outlines the methodological considerations for this project, the overarching aim of which is to answer the following research question:

- "What is the burden and cost of unintentional injuries and violence to the health system across the WHO European Region?"

The project objectives are to:

- Review the existing international literature and approaches used in other costing studies related to unintentional injuries and violence.

¹ Member States of the WHO European Region are: Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Monaco, Montenegro, the Netherlands, North Macedonia, Norway, Poland, Portugal, the Republic of Moldova, Romania, the Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Türkiye, Turkmenistan, Ukraine, the United Kingdom and Uzbekistan.

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- Review existing pan-European studies on the burden and costs of unintentional injuries and violence and related public health areas to health systems in the European Region.
- Identify data that will enable robust estimates of the burden and costs of unintentional injuries and violence to the health system in the European Region to be made.
- Develop an analytical framework that can be applied uniformly across WHO European Region countries to estimate the cost of unintentional injuries and violence to the health system.

Methods

Our study uses cost of illness (COI) methodology, one of the main analytical tools used to describe the health and economic impact of disease and injury. COI studies may be based on a range of approaches and there are three key features (Box 1) that differentiate between the different types of COI studies. We used an incidence-based approach and attributed total health care costs within a specified year (2019) in a 'bottom up' approach.

Box 1. Types of COI studies

Prevalence or an incidence approach. Prevalence-based COI studies are more common than incidence-based studies and are based on the total number of cases over a predetermined period, usually a year. Incidence-based studies refer only to the new number of cases of a condition or group of conditions arising in a predefined period. For conditions with long-term consequences, prevalence-based studies usually result in larger estimates of the economic costs.

Top-down or bottom-up approach. Incidence-based studies require that the methods chosen to estimate the economic costs are performed 'from the bottom-up'. In this approach, the quantity of health inputs used is first estimated from a patient sample and multiplied by estimates of the unit costs of the inputs used. The top-down approach usually consists of allocating total cost estimates for a given population using statistical databases and/or registers. In the top-down approach, a population attributable fraction (PAF) is usually calculated and applied to the corresponding medical cost.

Temporal relationship. Approaches to COI studies can also differ depending on whether the temporal relationship between the initiation of the study and the data collection is retrospective or prospective; prevalence- and incidence-based studies can be both performed either prospectively or retrospectively. In practice, prospective studies can be expensive and time-consuming, particularly for conditions that have a long duration.

The perspective of COI studies may also differ. They may only consider direct costs (e.g., health care costs), or may also consider indirect costs to patients and other sectors of the economy (e.g., through productivity losses).

Literature review

To inform the project, we carried out a review of the existing literature to locate studies and projects conducted in the 53 WHO European region countries that:

- Have examined the burden, and/or economic and social costs of unintentional injuries and violence to health systems in the WHO European Region among a general injury population.
- Report on the burden of and/or provide estimates for resource use or costs of unintentional injuries and violence to health systems among a general injury population in the European Region.

Literature searches were undertaken in Medline, Cinahl and PsycINFO to identify relevant studies published since 2011. A search strategy was developed using a combination of free text and database index terms. One researcher screened the titles and abstracts of the articles identified via

the database searches and a random sample of 20% were screened by another researcher for quality purposes. Full text copies of any articles identified as potentially relevant were retrieved and screened for relevance. Any study that aimed to estimate the economic impact of injuries and violence using COI methods was eligible to be included. Additional searches were conducted based on forwards and backwards citation searching (using the identified articles) in Google Scholar.

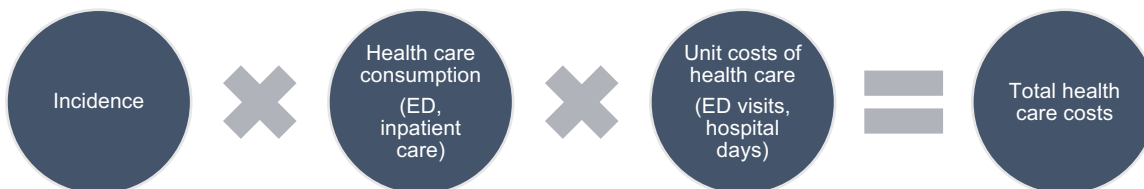
Analytical framework

The reliability of the cost estimations for violence and injury are dependent on both the availability and the quality of the data on incidence, health system consumption and unit costs. As our project involved analysis of data across the 53 countries of the WHO European region, we expected to encounter difficulties with insufficient data and a lack of standardised and comparable data across different types of health resources. A discussion of the data sources explored for use in our analytical framework is provided in Appendix 1.

To develop an analytical framework (see Figure 1) that could be applied uniformly across the 53 countries in the WHO European region, from the outset it was necessary to adopt a simple model of health resource use focused on hospital costs. We therefore adopted the approach used in the EURO COST model (Polinder et al., 2005) to guide the development of our analytical model.

Two types of health resource use and their associated unit costs were included in our analytical framework:

- Number of emergency department (ED) visits and cost per visit
- Number of patients hospitalised and cost per inpatient day in hospital



Reproduced from Polinder, 2007

Figure 1. EURO COST framework

Healthcare resource use

Emergency department visits

We estimated the number of injuries that resulted in an ED visit by excluding injuries whose nature was categorised as 'minor' in the GBD 2019 dataset from the incidence total. This provided a proxy measure of the number of ED visits for each country. However, it is important to note that variability across the WHO European region countries in both the design of their health systems and in access to healthcare, mean that there will be differences in the incidence of injury seen in the ED. Minor injuries, for example, may be treated by GPs or in minor injury units in some countries, whereas in others, EDs may treat a larger share. Polinder et al. (2007) note that access and organisational issues have a major impact on ED attendance following injury.

Hospitalisation and length of stay

To approximate the number of hospital admissions for injury cases in each country we used a recent estimate from an EU-IDB report that 11.7% of all injury cases are admitted to hospital (Kisser et al., 2021). Calculation of the length of stay for admitted injury cases was based on the mean estimate of 6.4 days from Polinder et al. (2005). This estimate was based on data collected from hospital discharge registers in 10 European countries.

Valuation of unit costs

The next step in our analysis involved putting a value to the health system resource use in each of the WHO European Region countries. However, we encountered challenges with compiling a set of valid and comparable unit costs for all 53 countries. Costing data can be difficult to find and may be obtained from a variety of sources, including, for example, published studies and reports, national databases, healthcare provider administrative or billing systems/fee schedules, and expert opinion.

First, we considered using injury-related estimates from the literature. The EUROCOST study (Polinder et al., 2005) was the only source of costing data that we identified for a general injury population. Ten European countries participated in the study (Austria, Denmark, Greece, Ireland, Italy, Netherlands, Norway, Spain, England, and Wales) and the medical costs of injury occurring in 1999 were calculated based on the costs of inpatient days in hospital and ED visits preceding hospitalisation. We therefore sought another source of cost data that provided better coverage across the WHO European Region countries. The WHO-CHOICE database (Stenberg et al., 2018) provides estimates for country-specific costs related to healthcare use for all countries, and this resource therefore provided the coverage that we needed. WHO-CHOICE estimates are produced for the cost per inpatient bed day, estimates of the cost per ED visit are not available.

We extracted WHO-CHOICE mean, low, and high estimates for the costs of an inpatient bed day at a 'primary-level hospital'. This cost excluded costs for drugs and diagnostic tests but included personnel, capital infrastructure and equipment, laboratory, maintenance, and other operational costs. In the absence of country-specific estimates for the cost per ED visit, as a proxy, we used the lower WHO-CHOICE estimate for an inpatient bed day. WHO-CHOICE unit costs are provided in international dollars (USD PPP) for reference year 2010. We used purchasing power parity (PPP) exchange rates to convert the USD unit costs into local currencies and the EPPI-Centre Cost Converter tool to convert costs to a 2019 price year. PPP exchange rates were used to back calculate the unit costs in 2019 USD PPP (Table 1).

Table 1. Unit costs

Country	2010 USD PPP		2019 USD PPP	
	ED visit	Inpatient bed day	ED visit	Inpatient bed day
Albania	37.69	105.19	43.63	121.78
Andorra	282.24	732.88	346.62	900.05
Armenia	25.34	64.65	33.95	86.62
Austria	244.91	669.20	312.84	854.81
Azerbaijan	44.96	125.81	41.91	117.26
Belarus	71.03	188.68	80.69	214.34
Belgium	250.43	637.16	311.19	791.75
Bosnia and Herzegovina	40.88	105.37	49.67	128.01

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Country	2010 USD PPP		2019 USD PPP	
	ED visit	Inpatient bed day	ED visit	Inpatient bed day
Bulgaria	75.60	190.31	89.28	224.75
Croatia	103.91	271.12	130.84	341.38
Cyprus	186.83	487.69	218.48	570.30
Czechia	142.21	374.96	174.90	461.15
Denmark	255.84	677.56	314.30	832.39
Estonia	113.49	288.24	138.83	352.59
Finland	221.39	580.97	270.00	708.53
France	210.86	545.08	263.28	680.59
Georgia	22.86	56.84	29.80	74.10
Germany	244.5	617.52	301.14	760.57
Greece	162.5	437.22	204.05	549.01
Hungary	117.68	293.87	132.12	329.92
Iceland	221.34	579.00	259.42	678.61
Ireland	253.65	685.01	289.03	780.55
Israel	162.47	414.11	191.60	488.35
Italy	188.98	523.50	236.92	656.31
Kazakhstan	61.39	161.99	63.36	167.19
Kyrgyzstan	8.27	21.49	11.15	28.98
Latvia	94.48	245.68	116.26	302.31
Lithuania	102.3	255.54	125.82	314.30
Luxembourg	633.13	1643.80	815.33	2,116.85
Malta	155.02	412.02	182.60	485.32
Monaco	1097.47	2724.25	1,370.18	3,401.19
Montenegro	69.18	179.34	87.55	226.97
Netherlands	264.98	721.94	313.11	853.06
North Macedonia	57.38	147.55	72.88	187.40
Norway	412.81	1,035.61	457.89	1,148.71
Poland	112.99	293.56	129.98	337.61
Portugal	154.65	389.43	187.18	471.35
Republic of Moldova	12.74	32.22	17.56	44.41
Romania	79.57	202.22	97.64	248.14
Russian Federation	106.32	296.04	128.00	356.39
San Marino	335.79	846.50	439.57	1,108.12
Serbia	57.83	147.20	67.95	172.95
Slovakia	137.39	344.52	139.28	349.27
Slovenia	164.97	411.12	206.69	515.09
Spain	183.95	490.99	221.58	591.42
Sweden	258.86	656.12	303.54	769.37
Switzerland	311.94	846.91	384.28	1,043.32
Tajikistan	6.59	18.01	6.99	19.09

Costs of injuries and violence to European health systems

Country	2010 USD PPP		2019 USD PPP	
	ED visit	Inpatient bed day	ED visit	Inpatient bed day
Türkiye	85.18	219.40	90.28	232.53
Turkmenistan	39.54	102.01	40.30	103.96
Ukraine	30.81	76.56	44.77	111.24
United Kingdom	217.32	570.07	259.31	680.21
Uzbekistan	12.52	32.15	10.89	27.97

Source: WHO-CHOICE estimates of cost for inpatient and outpatient health service delivery, 'Cost per inpatient bed day by hospital level (without drugs)'. Results in 2010 International Dollars (USD PPP; available from https://cdn.who.int/media/docs/default-source/health-economics/who-choice-estimates-of-cost-for-inpatient-and-outpatient-health-service-delivery.pdf?sfvrsn=b814d37e_3&download=true); Cost per ED visit taken from the WHO-CHOICE 'low estimate' for an inpatient bed day; 2019 USD PPP unit cost estimates were calculated using OECD purchasing power parities (available from <https://data.oecd.org>) and the Campbell and Cochrane Economics Methods Group-EPPI Centre cost convertor web-based tool (available from <https://epi.ioe.ac.uk/costconversion/>).

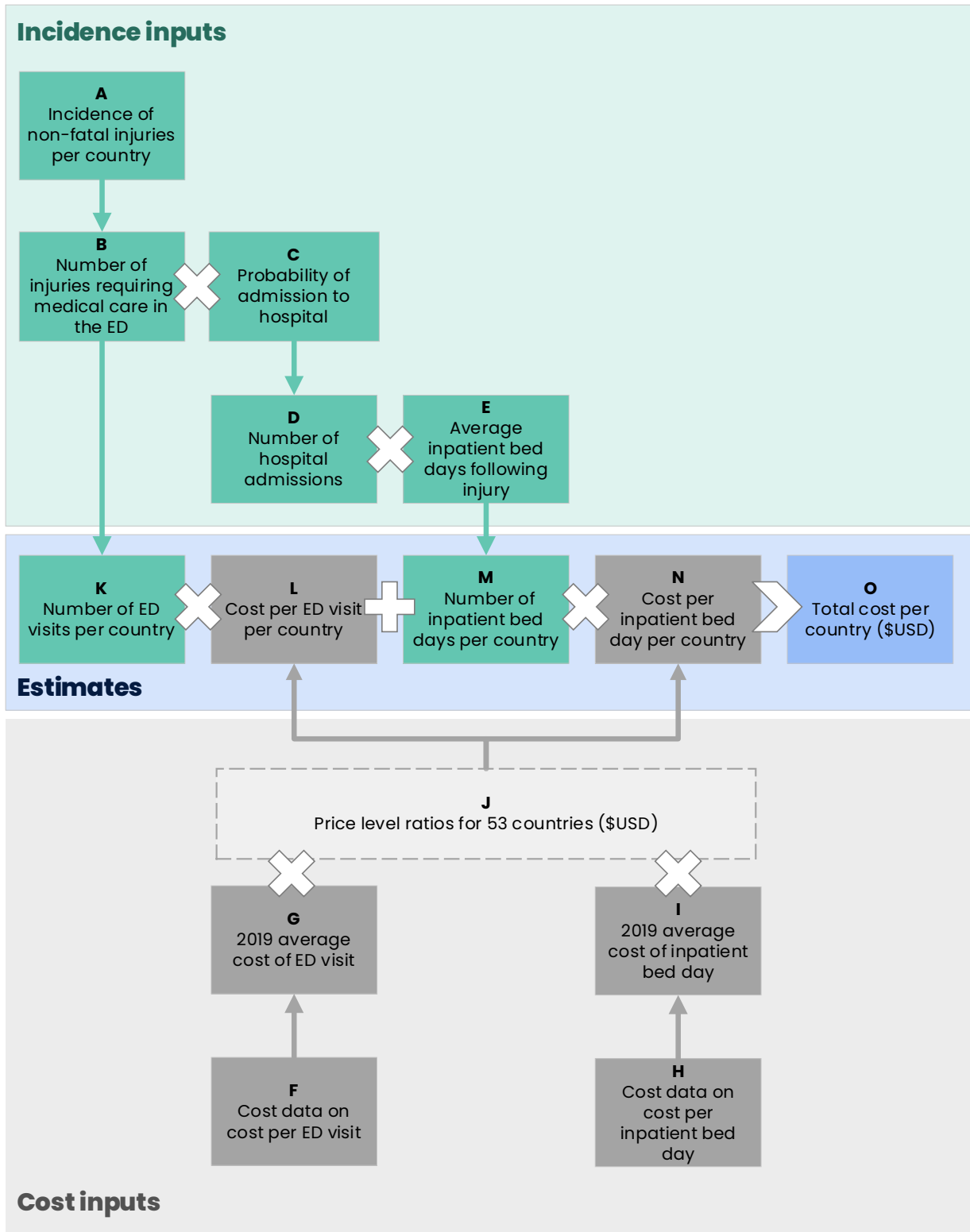


Figure 2. Analytical framework

Key:

A = GBD 2019 Incidence
 B = GBD 2019 Incidence – ‘minor injuries’ excluded
 C = Average probability of injury cases being admitted to hospital from ‘Injuries in the European Union 2009-2018’
 D = Product of B multiplied by C
 E = Mean length of stay estimate from Polinder et al., 2005

F, G = Lower estimate of the cost of an inpatient bed day (‘primary-level hospital’) from WHO-CHOICE database
 H, I = Cost of an inpatient bed day (‘primary-level hospital’) from WHO-CHOICE database
 J = Price level ratios for conversion to local currencies

Literature review

The literature review sought to identify studies conducted in WHO European region countries since 2011 that have examined the costs of unintentional injuries and violence to the health system among a general injury population. An initial 1,529 references were identified, and 134 articles were selected for full text review based on title and abstract screening. At this stage the included articles were categorised according to whether the focus of the article was about cost arising from a cause of injury or from the nature of injury.

Costs in 56 studies were examined by cause of injury categories and in 78 studies by nature of injury categories (including 11 studies that examined the costs of trauma). The 56 studies that examined the causes of injuries were retained for full-text screening. Following full text screening, a further 34 studies (including three reviews) were excluded, and 16 studies formed our final total of included studies.

Categorised by the GDB cause of injury categories, two studies examined costs of injuries in general, five studies examined costs of road injuries, four studies examined costs of unintentional injuries and four studies examined costs of self-harm and interpersonal violence. Twelve WHO European region countries were represented across the included articles: Croatia (n=1); Denmark (n=2); United Kingdom (n=2); Finland (n=1); France (n=1); Germany (n=3); Greece (n=1); Italy (n=4); The Netherlands (n=3); Poland (n=1); Switzerland (n=1); and Türkiye (n=1). Two studies presented costs for more than one country.

In eight studies, cases were identified from patient admissions to hospital and/or attendance at the emergency department. Two studies of occupational injuries identified cases from data registries and two studies by the same author used a combination of emergency department attendance and police data registries. Four studies used other sources to identify cases; two studies used data collected from population surveys, one study used data from a specific cohort of children placed in care, and one study included adults registered in the WHO/EURO Multicentre Study on Suicidal Behaviour.

All except one of the included studies provided some detail about the cost categories included in their analyses of healthcare costs. One further study examined health insurance fund expenditure on covering the medical expenses of occupational injuries. Where specified, cost categories varied across the included studies and are summarised below.

- Inpatient, n=12 studies
- Outpatient, n=10 studies
- ED, n=7 studies
- Primary care/General Practitioner, n=6 studies
- Transportation/ambulance, n=3 studies
- Long-term care (e.g., nursing home), n=3 studies
- Medication (prescribed and non-prescribed), n=7 studies
- Psychiatric care, n= 4 studies

- Other: psychotherapy (1 study); other specialists (3 studies); paid care (1 study); aids/home adaptations/equipment (1 study)

Cost estimates were presented at both a national and individual level (i.e., mean cost per case). For ease of reference all cost estimates were converted into 2019 USD PPP using the EPPI-Centre Cost Converter. Four studies presented national estimates across nine countries for different injury categories. In the Netherlands, Polinder et al. (2016) estimated the costs of minor and severe injuries at USD PPP 3 billion a year. Focusing on the costs of road traffic injuries in Italy, Chini et al. (2016) estimated healthcare costs of USD PPP 124 million annually. Two studies (Badun, 2017; Tompa et al., 2021) reported on the cost of occupational injuries, presenting estimates across six countries, Croatia, Finland, Germany, Italy, the Netherlands, and Poland. Costs for occupational injury ranged from USD PPP 178 million in Croatia to USD PPP 14,945 million in Germany.

At the individual level, cost estimates ranged from USD PPP 161 for costs of emergency department attendance for a child with unintentional injuries to USD PPP 16,578 for the mean costs of treating injuries from self-harm. Costs varied according to the study's focus and cost categories included. Across four studies of road traffic injuries, cost estimates at the individual level were in region the of USD PPP 1,000 per case. One study that considered the costs up to two years after a road traffic injury estimated costs of USD PPP 10,701 per case. Costs were generally higher among the studies that examined interpersonal violence, ranging from USD PPP 2,210 per case of frequent bullying to USD PPP 5,424 per case for adults with a history of childhood maltreatment.

Costs of injuries and violence to European health systems

Table 2. Summary of studies included in the literature review

Reference Country	Injury / violence type	Study aims	Case identification	Cost categories (direct/healthcare)	Published cost estimate(s)	
					Reference year	Total cost (USD PPP 2019) Cost per case
Akgul Karadana et al., 2013 Türkiye	Road traffic injuries	To determine the epidemiology of traffic accidents and analyse the costs	Patients admitted to the ED due to traffic accidents (2000-2009)	Unclear what cost categories were included	Unclear	TL 984 (USD PPP 1,000)
Badun, 2017 Croatia	Occupational injuries	To estimate the financial costs of occupational injuries and illnesses	Non-fatal injuries identified from Croatian Health Insurance Fund	Based on health insurance fund expenditures to cover medical expenses. Also included sick leave and legal costs to the government and health insurance fund	2015	HRK 604.6 million (USD PPP 177.8 million)
Chini et al., 2016 Italy	Road traffic injuries	To provide an estimate of the healthcare use and costs of non-fatal road traffic injuries	All emergency visits with at least one diagnosis of trauma (ICD9-CM 800-959) that listed 'road' as the place of accident	Costs included ED visit, transportation, hospital admission and rehabilitation	2008	EUR 80 million (USD PPP 123.8 million) EUR 522 (USD PPP 808)
Cooper et al., 2016 England	Unintentional injuries	To estimate the costs of falls, poisonings, and scalds in children <5 years old	Children aged under 5 years attending ED/MIU or admitted to hospital following a fall, poisoning, or scald	Health service resource use including GP visits, ED, outpatient visits, health visitor, inpatient days, prescribed medication	2012	GBP 2,000–3,000 per admission ≥2 days (USD PPP 3,227-4,841) GBP 700–1,000 per admission ≤1 day (USD PPP 1,130-1,614) GBP 100–180 per ED attendance without admission (USD PPP 161-291)
Czernin et al., 2012 Switzerland	Self-harm	To assess direct annual cost of suicide attempts	Adults aged 18 years and above who attempted suicide registered in the WHO/EURO Multicentre Study on Suicidal Behaviour (ICD-10 X60-X69)	Direct medical costs for inpatient/outpatient psychiatric and hospital care	2003	CHF 3,373,025 in two hospitals (USD PPP 2.9 million) CHF 19,165 (USD PPP 16,578)
Jantzer et al., 2019 Germany	Interpersonal violence	To quantify the costs and the loss of quality of life attributable to bullying	Adolescents aged 12–16 years surveyed about experiences of bullying within the last 3 months (defined as non-bullied, occasional victims, frequent victims)	Included costs of outpatient medical care (paediatrician, GP, and surgeon visits); inpatient treatment (general ward, ICU); psychotherapy; medication	2014	EUR 1,793 (frequent bullying) (USD PPP 2,510)
Kellezi et al., 2016 England	Unintentional injuries	To report costs of primary and secondary healthcare	Patient aged 16-70 years admitted for 'unintentional injury' at an acute hospital	Costs included use of health services, medication, aids and home adaptations, equipment	Unclear	GBP 4,691 (USD PPP 7,128)

Costs of injuries and violence to European health systems

Reference Country	Injury / violence type	Study aims	Case identification	Cost categories (direct/healthcare)	Reference year	Published cost estimate(s)	
						Total cost (USD PPP 2019)	Cost per case
		for a general injury population					
Kruse et al., 2011 Denmark	Interpersonal violence	To analyse the healthcare costs of violence against women	Victims of violence identified through National Patient Register or Crime Register; contact with ED with injuries due to violence or contacted police and reported violent incident	Healthcare costs included hospital (inpatient, outpatient, and emergency department) and psychiatric hospital treatment; primary healthcare; and pharmaceuticals	2006		EUR 1,800 (USD PPP 2,210)
Kruse, 2015 Denmark	Road traffic injuries	To analyse the socioeconomic costs of traffic injuries	Identified from Police Accidence Register and Emergency Department data	Costs included contact with general practitioners, practicing specialists, dentists etc, hospital admission and outpatient visits, and prescription medication	2009		EUR 1,079 (USD PPP 1,235)
Papadakaki et al., 2017 Greece, Germany, and Italy	Road traffic injuries	To examine costs of road traffic injury from the victim perspective	Hospitalised in ICU/HDU with injury sustained in road traffic crash	Costs included inpatient and outpatient hospital costs, paid carers' costs, ambulance transport, medication, equipment, medical tests, and treatment by health professionals.	2013/14		Greece: EUR 734 (USD PPP 1,246) Germany: EUR 2,266 (USD PPP 3,228) Italy: EUR 5,697 (USD PPP 8,278)
Petrinco et al., 2011 Italy	Injury	To identify which types of injuries are responsible for the major component of health burden and to estimate relative costs	Children aged 0-14 hospitalised for injury (ICD-9-CM codes 800-995)	Costs of additional inpatient days and additional outpatient care	2003		EUR 1,700 additional expense in year following injury (USD PPP 2,939)
Polinder et al., 2016 The Netherlands	Injury	To describe the total direct and indirect costs of minor and severe injuries	Injuries (ICD-9-CM codes 800-994*)	Incidence-based Dutch Cost of Injury model; lifetime care costs including GP, ambulance, hospital, and long-term care (nursing home and rehabilitation)	2012	EUR 2.0 billion (USD PPP 2.7 billion)	
Prigent et al., 2021 France	Interpersonal violence	To estimate the cost of abuse and neglect in children in placement before their 4th birthday	Children in placement before their 4 th birthday	Healthcare use including inpatient care, psychiatric care (hospitalisation and outpatient visits)	Unclear		EUR 3,180 (USD PPP 4,020)
Thielen et al., 2016 The Netherlands	Interpersonal violence	To estimate the excess costs of health service uptake and productivity losses in adults with a history of child maltreatment	Adults aged 18-65 years surveyed about experiences of maltreatment in childhood (emotional neglect, psychological, physical, and sexual abuse before age 16)	Costs of mental health service use (e.g., GP, social worker, psychologist, psychiatrist, outpatient/ inpatient mental healthcare) and medications	2013		EUR 4,049 (USD PPP 5,424)

Costs of injuries and violence to European health systems

Reference Country	Injury / violence type	Study aims	Case identification	Cost categories (direct/healthcare)	Reference year	Published cost estimate(s)	
						Total cost (USD PPP 2019)	Cost per case
Tompa et al., 2021 Finland, Germany, Italy, The Netherlands, Poland	Occupational injuries	To develop a framework for estimating the economic burden of work injuries and diseases and implement it for selected EU countries	Non-fatal injury incidence from European Statistics on Accidents at Work (4 or more days lost); ad hoc module from Labour Force Survey (3 or fewer days lost)	Direct costs included formal healthcare. Assumed a nominal healthcare cost per case for injuries with 3 or fewer days lost; data from Italian Health Ministry (unspecified) for injuries with 4 or more days lost. Also included out-of-pocket expenses, informal caregiving, and healthcare administration.	2015	Finland: EUR 484 million (USD PPP 558.7 million) Germany: EUR 10,914 million (USD PPP 14,945 million) Italy: EUR 8,491 million (USD PPP 12,107 million) The Netherlands: EUR 2,137 million (USD PPP 2,834 million) Poland: EUR 1,882 million (USD PPP 1,137 million)	
Van der Vlegel et al., 2020 The Netherlands	Road traffic injuries	To provide a detailed overview of the costs of non-fatal road traffic injuries by road user type	Patients aged 18 years and above admitted to hospital for an injury sustained in a traffic accident	Costs included transportation to the ED, stay and care at a hospital ward, stay at ICU and diagnostic procedures, stay and care at an institution (e.g., nursing home), home care and contact with practitioners (e.g., general practitioner, physiotherapist)	2017		EUR 8,200 up to 2 years after injury (USD PPP 10,701) In-hospital: EUR 4,500 (USD PPP 5,872) Post-hospital: EUR 3,700 (USD PPP 4,829)

Conversion to 2019 USD PPP was calculated using the Campbell and Cochrane Economics Methods Group-EPPI Centre cost converter web-based tool. Available from <https://epi.ioe.ac.uk/costconversion>.

Results

The most recent WHO global health estimates show that deaths occurring due to violence and injuries in the 53 countries of the WHO European Region accounted for 5.3% of all deaths and 9.6 of all years of life lost in 2016 (WHO, 2020).

According to the Global Burden of Disease (GBD) study, there were a total of 523,538 injury deaths in 2019 in the 53 WHO European Region countries. By type of injury these included 250,971 deaths (47.9%) from unintentional injuries, 178,287 deaths (34.1%) from self-harm and interpersonal violence, and 94,280 deaths (18.0%) from transport injuries. Based on the disability-adjusted life year (DALY) measure, 30.5 million DALYs were lost from injuries across the 53 WHO European Region countries in 2019: 6.3 million were related to transport injuries, 16.1 million to unintentional injuries and 8.1 million to self-harm and interpersonal violence.

Burden of injury and violence

We compiled injury pyramids for all 53 countries in the WHO European Region using GBD 2019 study data. The country-level data is provided in Appendix 2. The injury pyramid summary for all 53 countries in the WHO European Region is shown in Figure 3.

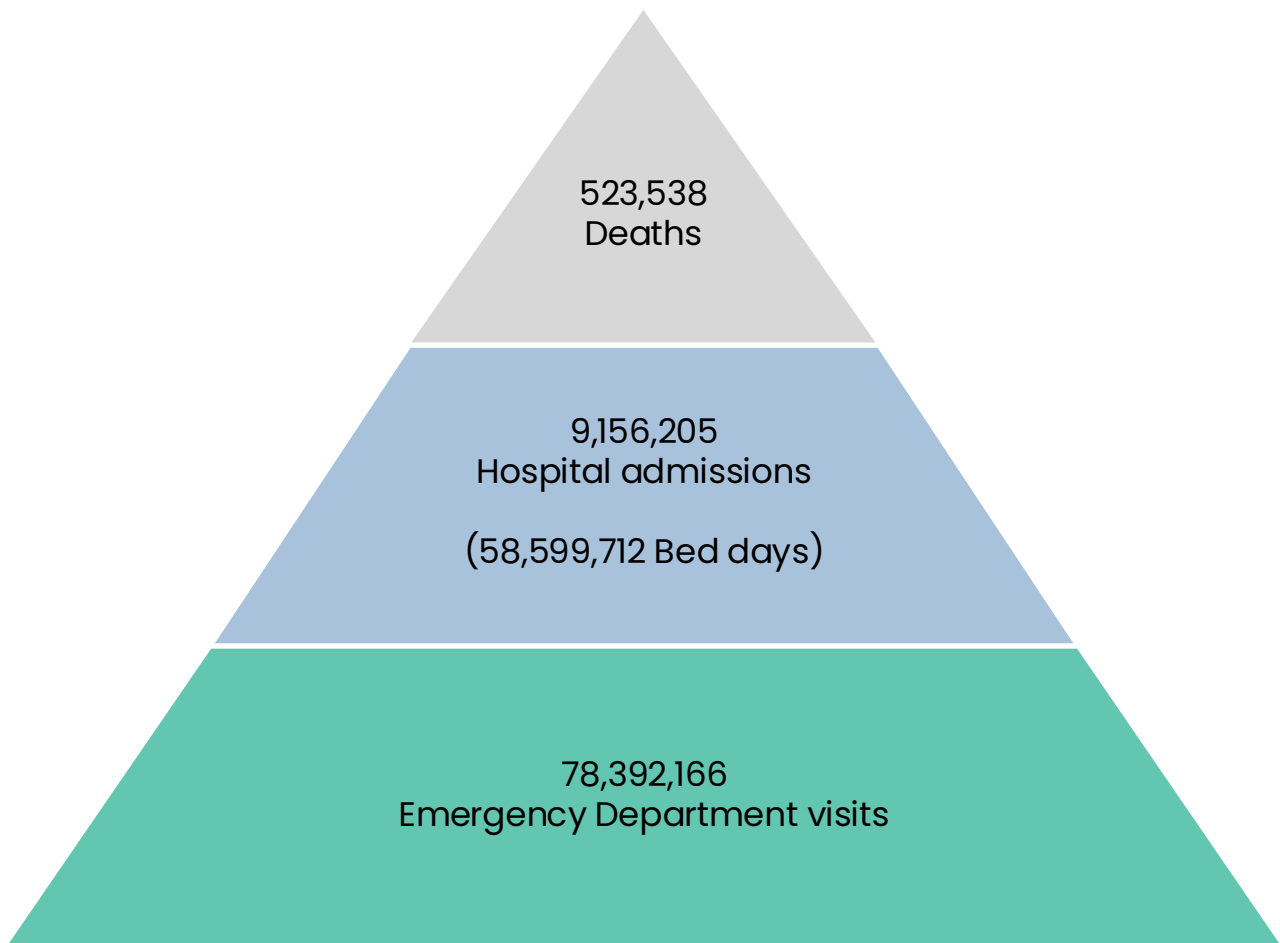


Figure 3. WHO European Region Injury Pyramid

Estimates by WHO European Region countries

In 2019, 78.4 million people in the WHO European Region experienced injury or violence that required medical care and resulted in 58.6 million days in hospital. Noting that the number of injuries will inevitably vary by country size, the Russian Federation had both the highest number of injuries requiring medical care (n=15,913,183) and days in hospital following injury (n=11,895,423). Accounting for population size, the incidence of injuries per 1,000 population (including minor injuries) was over 200 per 1,000 population in seven countries: Albania, Croatia, Czechia, Poland, Serbia, Slovakia, and Slovenia.

Table 4 on the next page shows the incidence of injuries in 2019 for each country in the WHO European Region that (i) required medical care; and (ii) days in hospital for injuries requiring hospitalisation. A full breakdown of the data is also provided in Table 8, Appendix 1.

Estimates by injury type

Broken down by injury type (Table 3), an estimated 9.7% of ED visits were road traffic and other transport injuries, 86.7% were other types of unintentional injuries (e.g., falls, drowning etc.) and 3.6% were self-harm and interpersonal violence.

Table 3. Healthcare resource use by type of injury

Injury type	ED visits		Days in hospital		Deaths	
	Number	%	Number	%	Number	%
Road traffic and other transport injuries	7,642,919	9.7	5,713,235	7.3	94,280	18.0
Other unintentional injuries	67,940,537	86.7	50,786,910	64.8	250,971	47.9
Self-harm and interpersonal violence	2,808,709	3.6	2,099,566	2.7	178,287	34.1
Total (all injury types)	78,392,166	-	58,599,712	-	523,538	-

Source: Global Burden of Disease (GBD) 2019. Incidence numbers extracted from Institute for Health Metrics and Evaluation (IHME) GBD Results. Used with permission. All rights reserved. Available from <https://vizhub.healthdata.org/gbd-results/>. Number of ED visits was calculated by subtracting 'minor injuries' from all GBD nature of injury types.

Costs of injuries and violence to European health systems

Table 4. Healthcare resource use by country

Country	All injuries		ED visits		Hospital admissions			Deaths	
	Number	Rate per 100,000	Number	Rate per 100,000	Number	Rate per 100,000	Days in hospital	Number	Rate per 100,000
Albania	578,463	20,128.3	310,553	10,806.0	36,273	1,262.1	232,144	834	29.0
Andorra	9,927	13,003.8	6,496	8,509.3	759	993.9	4,856	41	53.7
Armenia	326,264	11,567.2	195,667	6,937.1	22,854	810.2	146,265	1,133	40.2
Austria	1,089,778	12,272.4	703,162	7,918.5	82,129	924.9	525,628	4,318	48.6
Azerbaijan	1,138,660	11,127.6	680,197	6,647.2	79,447	776.4	508,461	3,122	30.5
Belarus	1,629,186	16,840.9	994,091	10,275.9	116,110	1,200.2	743,103	8,176	84.5
Belgium	1,646,501	14,304.3	1,083,490	9,413.0	126,552	1,099.4	809,931	7,634	66.3
Bosnia and Herzegovina	614,290	18,278.6	346,974	10,324.4	40,527	1,205.9	259,370	1,204	35.8
Bulgaria	1,349,986	19,141.9	750,035	10,635.0	87,604	1,242.2	560,666	3,497	49.6
Croatia	858,401	20,785.8	537,309	13,010.7	62,758	1,519.6	401,649	2,754	66.7
Cyprus	152,701	12,426.5	94,739	7,709.7	11,066	900.5	70,819	543	44.1
Czechia	2,235,461	21,215.6	1,314,810	12,478.2	153,570	1,457.5	982,847	5,507	52.3
Denmark	652,350	11,255.4	417,337	7,200.6	48,745	841.0	311,968	2,327	40.1
Estonia	198,029	14,922.6	119,975	9,040.8	14,013	1,056.0	89,684	702	52.9
Finland	859,142	15,559.8	558,609	10,116.9	65,246	1,181.7	417,572	3,141	56.9
France	9,140,494	14,193.4	6,001,009	9,318.4	700,918	1,088.4	4,485,875	46,110	71.6
Georgia	524,690	13,914.5	311,978	8,273.5	36,439	966.3	233,210	2,089	55.4

Costs of injuries and violence to European health systems

Country	All injuries		ED visits		Hospital admissions			Deaths	
	Number	Rate per 100,000	Number	Rate per 100,000	Number	Rate per 100,000	Days in hospital	Number	Rate per 100,000
Germany	9,713,807	11,682.5	6,382,175	7,675.7	745,438	896.5	4,770,804	39,801	47.9
Greece	1,030,683	9,747.3	644,943	6,099.3	75,329	712.4	482,108	3,885	36.7
Hungary	1,874,078	19,178.4	1,110,467	11,364.0	129,703	1,327.3	830,096	5,953	60.9
Iceland	39,932	11,068.5	24,932	6,910.7	2,912	807.2	18,637	111	30.8
Ireland	557,313	11,383.0	345,774	7,062.4	40,386	824.9	258,473	1,222	25.0
Israel	1,059,576	12,309.3	642,670	7,466.0	75,064	872.0	480,409	2,431	28.2
Italy	5,695,338	9,535.5	3,805,982	6,372.2	444,539	744.3	2,845,048	25,833	43.3
Kazakhstan	2,549,622	13,594.9	1,510,873	8,056.2	176,470	941.0	1,129,408	13,787	73.5
Kyrgyzstan	743,849	11,763.0	445,347	7,042.6	52,017	822.6	332,906	2,854	45.1
Latvia	300,225	15,664.8	182,774	9,536.6	21,348	1,113.9	136,627	1,476	77.0
Lithuania	469,211	16,468.8	290,214	10,186.2	33,897	1,189.8	216,941	2,492	87.5
Luxembourg	76,233	12,296.2	48,728	7,859.7	5,691	918.0	36,425	260	41.9
Malta	51,596	10,244.7	32,696	6,492.0	3,819	758.3	24,441	136	27.1
Monaco	4,060	10,962.9	2,198	5,934.5	257	693.2	1,643	21	57.6
Montenegro	124,539	19,755.7	70,981	11,259.7	8,291	1,315.1	53,060	309	49.1
Netherlands	1,914,002	11,023.3	1,269,995	7,314.3	148,335	854.3	949,347	7,764	44.7
North Macedonia	406,203	19,213.3	227,060	10,739.9	26,521	1,254.4	169,732	743	35.1
Norway	720,925	13,479.6	395,941	7,403.1	46,246	864.7	295,973	2,433	45.5

Costs of injuries and violence to European health systems

Country	All injuries		ED visits		Hospital admissions			Deaths	
	Number	Rate per 100,000	Number	Rate per 100,000	Number	Rate per 100,000	Days in hospital	Number	Rate per 100,000
Poland	7,715,279	20,043.0	4,530,697	11,770.0	529,185	1,374.7	3,386,787	21,047	54.7
Portugal	870,336	8,458.1	565,359	5,494.3	66,034	641.7	422,617	4,885	47.5
Republic of Moldova	506,124	16,276.8	304,752	9,800.7	35,595	1,144.7	227,808	2,382	76.6
Romania	3,681,779	18,857.5	2,070,221	10,603.4	241,802	1,238.5	1,547,532	9,753	50.0
Russian Federation	26,176,207	17,960.6	15,913,183	10,918.7	1,858,660	1,275.3	11,895,423	140,330	96.3
San Marino	3,831	11,210.6	1,915	5,603.4	224	654.5	1,432	14	40.6
Serbia	1,630,539	22,031.2	921,209	12,447.0	107,597	1,453.8	688,622	3,925	53.0
Slovakia	1,196,077	21,930.6	687,231	12,600.7	80,269	1,471.8	513,719	2,758	50.6
Slovenia	501,945	23,756.2	298,961	14,149.3	34,919	1,652.6	223,479	1,400	66.3
Spain	4,684,015	9,938.2	2,973,960	6,309.9	347,359	737.0	2,223,095	16,175	34.3
Sweden	1,327,616	12,929.7	701,601	6,832.9	81,947	798.1	524,461	4,686	45.6
Switzerland	1,256,408	14,651.0	810,953	9,456.5	94,719	1,104.5	606,203	4,284	50.0
Tajikistan	1,084,638	11,616.6	640,111	6,855.6	74,765	800.7	478,495	2,999	32.1
Türkiye	6,434,464	7,707.6	4,058,073	4,861.0	473,983	567.8	3,033,491	22,226	26.6
Turkmenistan	614,627	9,980.3	357,927	5,812.0	41,806	678.8	267,558	1,701	27.6
Ukraine	7,659,818	17,325.6	4,660,929	10,542.4	544,397	1,231.4	3,484,138	43,935	99.4
United Kingdom	7,420,973	11,112.8	4,597,256	6,884.3	536,960	804.1	3,436,541	21,125	31.6
Uzbekistan	4,052,308	12,288.3	2,437,644	7,392.0	284,717	863.4	1,822,188	15,272	46.3

Costs of injuries and violence to European health systems

Country	All injuries		ED visits		Hospital admissions			Deaths	
	Number	Rate per 100,000	Number	Rate per 100,000	Number	Rate per 100,000	Days in hospital	Number	Rate per 100,000
EURO A	53,573,345	11,946.1	34,263,003	7,640.2	4,001,919	892.4	25,612,280	208,840	46.6
EURO B	32,216,655	13,312.3	19,041,903	7,868.3	2,224,094	919.0	14,234,203	95,465	39.4
EURO C	41,362,499	17,426.4	25,087,260	10,569.5	2,930,192	1,234.5	18,753,228	219,233	92.4
High income countries	65,326,243	12,852.7	41,184,362	8,102.9	4,810,333	946.4	30,786,134	243,268	47.9
Upper-middle income countries	47,779,519	14,765.4	28,719,021	8,875.1	3,354,382	1,036.6	21,468,042	212,829	65.8
Low-middle income countries	14,046,737	14,638.4	8,488,783	8,846.3	991,490	1,033.3	6,345,535	67,441	70.3
WHO European Region	127,152,500	13,704.5	78,392,166	8,449.1	9,156,205	986.9	58,599,712	523,538	56.4

Source: Global Burden of Disease 2019. Incidence numbers extracted from Institute for Health Metrics and Evaluation (IHME) GBD Results. Used with permission. All rights reserved. Available from <https://vizhub.healthdata.org/gbd-results/>. Number of ED visits was calculated by subtracting 'minor injuries' from all nature of injury types.

Key to WHO European sub-regions: EURO A = Andorra, Austria, Belgium, Croatia, Cyprus, Czechia, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom; EURO B = Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Montenegro, North Macedonia, Poland, Romania, Serbia, Slovakia, Tajikistan, Türkiye, Turkmenistan, Uzbekistan; EURO C = Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine.

Costs to the health system

Across the WHO European Region, the 78.4 million ED visits for injury and violence cost USD PPP 13.3 billion in 2019 (Table 5). The 58.6 million days spent in hospital due to injury and violence resulted in a total cost of USD PPP 26.1 billion across the 53 countries in 2019.

Estimates by WHO European Region countries

The countries in European sub-region A (EURO A) accounted for 68% of the spend on ED visits (USD PPP 9.1 billion) and just under half (49%) of the spend on inpatient care (USD PPP 17.8 billion). High income countries (HIC) accounted for 75% of the spend on ED visits (USD PPP 10.0 billion) and 56% of the spend on inpatient care (USD PPP 19.5 billion).

Table 5. Health costs by country (2019 USD PPP million)

Country	ED visits	Inpatient hospital care	Total hospital costs
Albania	13.55	28.27	41.82
Andorra	2.25	4.37	6.62
Armenia	6.64	12.67	19.31
Austria	219.98	449.31	669.29
Azerbaijan	28.50	59.62	88.13
Belarus	80.21	159.28	239.49
Belgium	337.17	641.26	978.44
Bosnia and Herzegovina	17.23	33.20	50.44
Bulgaria	66.96	126.01	192.97
Croatia	70.30	137.11	207.41
Cyprus	20.70	40.39	61.09
Czechia	229.96	453.24	683.21
Denmark	131.17	259.68	390.85
Estonia	16.66	31.62	48.28
Finland	150.82	295.86	446.68
France	1,579.95	3,053.04	4,632.99
Georgia	9.30	17.28	26.58
Germany	1,921.92	3,628.52	5,550.44
Greece	131.60	264.68	396.28
Hungary	146.71	273.86	420.57
Iceland	6.47	12.65	19.12
Ireland	99.94	201.75	301.69
Israel	123.13	234.61	357.74
Italy	901.72	1,867.22	2,768.94
Kazakhstan	95.73	188.83	284.56
Kyrgyzstan	4.97	9.65	14.62
Latvia	21.25	41.30	62.55
Lithuania	36.52	68.18	104.70

Costs of injuries and violence to European health systems

Country	ED visits	Inpatient hospital care	Total hospital costs
Luxembourg	39.73	77.11	116.84
Malta	5.97	11.86	17.83
Monaco	3.01	5.59	8.60
Montenegro	6.21	12.04	18.26
Netherlands	397.64	809.85	1,207.49
North Macedonia	16.55	31.81	48.36
Norway	181.30	339.99	521.28
Poland	588.91	1,143.74	1,732.64
Portugal	105.83	199.20	305.03
Republic of Moldova	5.35	10.12	15.47
Romania	202.13	384.00	586.14
Russian Federation	2,036.81	4,239.44	6,276.25
San Marino	0.84	1.59	2.43
Serbia	62.59	119.10	181.69
Slovakia	95.72	179.43	275.15
Slovenia	61.79	115.11	176.91
Spain	658.96	1,314.78	1,973.74
Sweden	212.97	403.51	616.47
Switzerland	311.64	632.46	944.10
Tajikistan	4.47	9.14	13.61
Türkiye	366.35	705.38	1,071.73
Turkmenistan	14.42	27.82	42.24
Ukraine	208.65	387.57	596.21
United Kingdom	1,192.11	2,337.58	3,529.69
Uzbekistan	26.55	50.97	77.52
WHO European Region	13,277.82	26,142.65	39,420.46
EURO A	9,098.86	17,792.33	26,891.19
EURO B	1,531.07	2,950.11	4,481.18
EURO C	2,647.88	5,400.20	8,048.09
High income countries	10,004.62	19,530.47	29,535.09
Upper-middle income countries	3,023.21	6,144.74	9,167.95
Low-middle income countries	249.99	467.44	717.43

Key to WHO European sub-regions: EURO A = Andorra, Austria, Belgium, Croatia, Cyprus, Czechia, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom; EURO B = Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Montenegro, North Macedonia, Poland, Romania, Serbia, Slovakia, Tajikistan, Türkiye, Turkmenistan, Uzbekistan; EURO C = Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine.

Estimates by injury type

By injury type (Table 6), unintentional injuries accounted for by far the largest share of the costs for ED visits (USD PPP 11.8 billion) and inpatient hospital stays (USD PPP 23.3 billion).

Table 6. Health costs by type of injury (2019 USD PPP millions)

Injury type	ED visits	Inpatient hospital care	Total hospital costs
Road traffic and other transport	1,026.0	2,046.8	3,072.8
Other unintentional	11,829.9	23,261.6	35,091.6
Self-harm & interpersonal violence	421.9	834.2	1,256.1

Total healthcare expenditure

In total, the hospital costs of injuries and violence across the 53 countries of the WHO European Region were USD PPP 39.4 billion in 2019. Of this, USD PPP 13.3 billion (34%) was from ED visits and USD PPP 26.1 billion (66%) was from inpatient hospital stays.

The top five countries by expenditure were: the Russian Federation (USD PPP 6.3 billion), Germany (USD PPP 5.6 billion), France (USD PPP 4.6 billion), the UK (USD PPP 3.5 billion) and Italy (USD PPP 2.8 billion). Hospital costs for injuries and violence across these five countries accounted for 58% of all spending in the WHO European Region.

The total costs for emergency department and inpatient hospital expenditure on injuries and violence in each country were divided by the population size to estimate the costs per capita (Table 7). Costs per capita ranged from USD PPP 2.31 per capita in Kyrgyzstan to USD PPP 232.20 per capita in Monaco. Current health expenditure in each country is also provided. However, direct comparison is not available as the WHO indicator for current health expenditure is the sum of both public and private expenditure across a wider range of health resources than it was possible to consider in relation to the costs of injury and violence.

Table 7. Costs per capita and total health spending (2019 USD PPP)

Country	Population (2019) ^a	Current Health Expenditure ^b		Estimated hospital costs of injury & violence	
		In millions	Per capita	In millions	Per capita
Albania	2,873,884	2,095.70	726.98	41.82	14.55
Andorra	76,343	286.68	3,716.27	6.62	86.75
Armenia	2,820,602	4,780.22	1,616.18	19.31	6.85
Austria	8,879,940	54,340.89	6,134.13	669.29	75.37
Azerbaijan	10,232,753	6,088.26	605.93	88.13	8.61
Belarus	9,673,971	11,329.86	1,198.62	239.49	24.76
Belgium	11,510,568	66,979.24	5,846.90	978.44	85.00
Bosnia and Herzegovina	3,360,712	4,874.92	1,476.80	50.44	15.01
Bulgaria	7,052,532	12,582.61	1,797.51	192.97	27.36
Croatia	4,129,752	8,836.54	2,167.81	207.41	50.22

Costs of injuries and violence to European health systems

Country	Population (2019) ^a	Current Health Expenditure ^b		Estimated hospital costs of injury & violence	
		In millions	Per capita	In millions	Per capita
Cyprus	1,228,837	2,642.82	3,017.27	61.09	49.71
Czechia	10,536,871	37,029.63	3,477.03	683.21	64.84
Denmark	5,795,878	34,926.25	6,015.46	390.85	67.44
Estonia	1,327,039	3,466.81	2,616.81	48.28	36.38
Finland	5,521,537	26,057.66	4,710.22	446.68	80.90
France	64,399,759	368,975.17	5,492.53	4,632.99	71.94
Georgia	3,770,811	3,877.66	970.20	26.58	7.05
Germany	83,148,141	559,439.10	6,738.67	5,550.44	66.75
Greece	10,574,024	25,940.75	2,418.81	396.28	37.48
Hungary	9,771,796	21,069.18	2,155.91	420.57	43.04
Iceland	360,775	1,910.92	5,636.41	19.12	52.98
Ireland	4,896,019	29,474.81	6,010.07	301.69	61.62
Israel	8,607,920	28,337.60	3,326.25	357.74	41.56
Italy	59,727,932	239,147.78	2,905.50	2,768.94	46.36
Kazakhstan	18,754,258	14,200.92	272.97	284.56	15.17
Kyrgyzstan	6,323,643	1,670.36	62.14	14.62	2.31
Latvia	1,916,556	4,028.95	1,166.80	62.55	32.64
Lithuania	2,849,083	7,814.84	1,369.98	104.70	36.75
Luxembourg	619,973	4,148.01	6,220.74	116.84	188.45
Malta	503,635	1,993.79	2,531.91	17.83	35.41
Monaco	37,034	120.01	2,905.84	8.60	232.20
Montenegro	630,396	1,245.68	735.16	18.26	28.96
Netherlands	17,363,262	107,981.58	5,335.30	1,207.49	69.54
North Macedonia	2,114,176	2,736.74	436.89	48.36	22.87
Norway	5,348,279	38,455.77	8,007.40	521.28	97.47
Poland	38,493,601	83,788.36	1,014.04	1,732.64	45.01
Portugal	10,289,923	36,150.49	2,221.44	305.03	29.64
Republic of Moldova	3,109,491	2,307.07	284.31	15.47	4.97
Romania	19,524,211	37,015.88	738.56	586.14	30.02
Russian Federation	145,742,287	248,572.11	653.42	6,276.25	43.06
San Marino	34,178	137.38	3,050.92	2.43	71.05
Serbia	7,401,056	11,741.36	641.03	181.69	24.55
Slovakia	5,453,924	12,356.47	1,342.07	275.15	50.45
Slovenia	2,112,902	7,551.65	2,219.10	176.91	83.73
Spain	47,131,372	186,993.99	2,711.19	1,973.74	41.88
Sweden	10,267,922	63,658.95	5,671.39	616.47	60.04
Switzerland	8,575,589	72,906.14	9,666.34	944.10	110.09
Tajikistan	9,337,003	2,337.42	61.87	13.61	1.46
Türkiye	83,481,684	99,009.20	396.47	1,071.73	12.84

Costs of injuries and violence to European health systems

Country	Population (2019) ^a	Current Health Expenditure ^b		Estimated hospital costs of injury & violence	
		In millions	Per capita	In millions	Per capita
Turkmenistan	6,158,420	6,321.45	500.01	42.24	6.86
Ukraine	44,211,095	39,909.27	248.13	596.21	13.49
United Kingdom	66,778,659	339,059.28	4,312.89	3,529.69	52.86
Uzbekistan	32,976,948	13,786.80	98.57	77.52	2.35

Source: ^a UN Population Division Portal. Available from <https://population.un.org/dataportal/home>

^b WHO Global Health Expenditure Database. Available from <https://apps.who.int/nha/database/ViewData/Indicators/en>.

Discussion

This report provides an estimate of the costs of injuries and violence to the health systems in the countries of the WHO European Region. Our analytical framework focused on hospital costs and an incidence-based approach was used that could be applied uniformly to estimate the number of hospital visits and admissions due to injury and violence.

Over 78 million people in the WHO European Region suffered injury or violence that required medical care at an estimated cost of USD PPP 39.4 billion in 2019. Other unintentional injuries (falls, burns etc.) accounted for the largest share of the burden (USD PPP 35.1 billion), followed by road traffic and other transport injuries (USD PPP 3.1 billion), and self-harm and interpersonal violence (USD PPP 1.3 billion). The top five countries ranked by expenditure were the Russian Federation (USD PPP 6.3 billion), Germany USD PPP 5.6 billion), France (USD PPP 4.6 billion), the UK (USD PPP 3.5 billion) and Italy (USD PPP 2.8 billion), accounting for 58% of all health expenditure on injuries and violence in the WHO European Region. Ranked by expenditure per capita, the top five countries were Monaco (USD PPP 232.20 per capita), Luxembourg (USD PPP 188.45 per capita), Switzerland (USD PPP 110.09 per capita), Norway (USD PPP 97.47 per capita) and Andorra (USD PPP 86.75 per capita).

The costs of injuries and violence to the health systems of the WHO European Region are substantial but there are limitations to the estimates calculated. We encountered both methodological and data limitations and it is important to note that international comparisons of injury incidence and injury costs should be undertaken with caution. Polinder et al. (2004) have demonstrated the complexity associated with attempts to compare and analyse injury incidence and costs across countries. To minimise some of the artificial differences that may arise between countries, we used injury incidence and cost estimates from the same sources for all 53 countries. For injury incidence we used the GBD 2019 and for costs we used the WHO-CHOICE database. A key limitation is that the same estimates were used across countries, injury types and age groups for both the number of hospital admissions and number of inpatient days. Only direct medical costs for ED visits and inpatient stays were included, and it was not possible to consider a broader range of costs, for example, for outpatient care, primary care, rehabilitation, and nursing homes.

Injuries and violence are preventable, and increased spending on evidence-based prevention interventions is warranted to prevent the realisation of the cost burden to the health system. Estimates of the economic costs of injuries and violence cannot be used by themselves as a means of priority setting. However, they are a useful starting point for influencing policy making, planning and investment in prevention and provide a powerful advocacy tool to promote the inclusion of injury and violence prevention in policy planning.

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Appendix 1. Data sources for non-fatal violence & injury

Sources of data

This section describes the main data sources that were explored for use in the analytical framework. Although data on deaths from injury and violence are accessible for the 53 countries in the WHO European region, standardised and comparable data on non-fatal violence and injury are not consistently available (WHO 2020). Since the early 2000s, however, several collaborative projects (Box 2) have been initiated in the European Union (EU) member states to develop national injury surveillance and reporting systems. There are therefore different sources of information available across the EU and non-EU countries of the WHO European Region.

Box 2. EU collaborative projects on injury prevention

The EUROCCOST and APOLLO projects, carried out between 2001 and 2008 aimed to harmonise injury data collection and to make injury data more comparable across EU member states (Polinder et al., 2004; Polinder et al., 2008). The EUROCCOST project and a sub-project of APOLLO also aimed to harmonise approaches to costing the health system burden of injury in European countries (Polinder et al., 2005). The project identified a lack of sufficiently detailed data to enable the calculation of a comprehensive range of health costs for injury across a group of 10 European countries. For example, costs for ambulance transport, rehabilitation, and treatment in primary care could not be taken into consideration due to a lack of consistent and standardised data. Two more recent projects, JAMIE (Joint Action on Monitoring Injuries in Europe) and BRIDGE-Health (BRidging Information and Data Generation for Evidence-based Health Policy and Research) have continued to support the development of the European Injury database (EU-IDB) and work towards a common hospital-based surveillance system for injury prevention across all EU member states.

Four potential sources of data were identified and explored:

- Global Burden of Disease (GBD) 2019 study data, which provided coverage of all 53 WHO European Region countries. Data are available from the Institute for Health Metrics and Evaluation (IHME) GBD Results tool (<https://vizhub.healthdata.org/gbd-results/>).
- European Core Health Indicators (ECHI), which covers all EU member states where possible. Data are available from the ECHI Data Tool (<https://webgate.ec.europa.eu/dyna/echi/>).
- EU Injury Database (EU-IDB) data on injuries, which covers 23 European countries. Data and data reports are available from the EU-IDB dashboard (<https://www.siniaca-idb.eu>) and EuroSafe website (<https://www.eurosafe.eu.com/key-actions/injury-data>).
- European Union statistics from Eurostat on injuries from accidents and hospital discharges for ICD-10 codes injury, poisoning and certain other consequences of external causes (S00-T98). Data are available from the Eurostat Data Browser (<https://ec.europa.eu/eurostat/databrowser>).

Global Burden of Disease study

The Global Burden of Disease (GBD) study uses ‘injuries that require medical care’ as the case definition for non-fatal injuries (James et al., 2020). The GBD separates the concept of the cause of injury from the nature of injury². Types of data that contribute to the GBD study estimates are

² The major nature of injury categories in the GBD are amputations, burns, fractures, head injuries, minor injuries, other injuries, and spinal injuries.

inpatient data, outpatient data, surveillance data, survey data and literature studies that are population-representative. A non-fatal estimation process in DisMod-MR 2.1, a meta-regression tool, is used to determine the incidence of injuries warranting medical care. We extracted death and incidence data for injuries (all causes) and in the major categories of ‘transport injuries’, ‘unintentional injuries’ and ‘self-harm and interpersonal violence’ using the GBD Results tool. Data were grouped into the following age categories: under 5, 5-14 years, 15-49 years, 50-69 years, and 70 years and above. Data on the ‘nature of the injury’ (e.g., fractures, lacerations etc.) were also extracted.

European Injury Database

The EU-IDB contains standardised cross-national data on injuries treated in emergency departments in countries within the European IDB region, which includes the 27 EU member states and the UK, Iceland, Norway, Liechtenstein, Albania, North Macedonia, Montenegro, Serbia and Türkiye (Kisser et al., 2021). In 2018, IDB data (based on the minimum data set) were provided by 18 European countries³.

Eurostat

Eurostat data on injuries from accidents is based on self-report data from wave 2 (2014) and wave 3 (2019) of the European Health Interview Survey (EHIS). Wave 2 covered the EU member states, Iceland, Norway and Türkiye. The same countries were covered in wave 3 with the addition of Serbia. There are two measures which cover road traffic, home, and leisure accidents: (i) proportion of people reporting having an accident during the past 12 months which resulted in injury; and (ii) proportion of people reporting to have received medical care for treatment for the most serious accident in the past 12 months, which resulted in injury. Data on the medical care received after injury is only available for wave 2 (2014). Eurostat also reports data on hospital discharges for EU Member States, Iceland, Liechtenstein, Norway, Switzerland, Montenegro, North Macedonia, Albania, Serbia and Türkiye.

European Core Health Indicators for Injury

The ECHI, formerly known as the European Community Health Indicators, are used to monitor health at the EU level. There are currently three ECHI for injuries:

- ECHI 29(a): Injuries: home, leisure, school: self-reported incidence (I)
- ECHI 29(b): Injuries: home, leisure, school: register-based incidence (I)
- ECHI 30(a). Injuries: road traffic: self-reported incidence (I)

Data for ECHI 29a and ECHI30a are derived from Eurostat ‘injuries from accidents’ indicator and the data source for ECHI29b (register-based incidence) is the EU-IDB.

Comparison of data sources for non-fatal violence and injury

The GBD 2019 data were used as the primary source of data on non-fatal injury incidence as this was the only source identified that provided coverage, and therefore comparable and standardised data, for all 53 countries in the WHO European Region. Data from the other sources of European data were used to check and corroborate the estimates of the number of ED visits in each country. For this purpose, we estimated the number of ED visits in European countries for which data were

³ Austria, Germany, Italy, Latvia, Luxembourg, Malta, Netherlands, Portugal, Slovenia, Türkiye, Cyprus, Denmark, Estonia, Finland, Lithuania, Sweden, and UK (Wales only).

available in Eurostat (self-report from the 2014 EHIS), the ECHI (register-based) and the EU-IDB (register-based). A recent report from the EU-IDB network reports the average injury incidence rate for 23 European countries which have provided data to the EU-IDB between the years 2009-2018 (Kisser et al., 2021). We also extracted the ECHI rates for injuries that required treatment in a hospital for 2019 (ECHI-29b). The data source for this indicator is also the EU-IDB but it has been updated to include 2019 data. However, a limitation of the ECHI 29b indicator is that it only includes home, leisure, and school accidents. Kisser et al. (2021) found that home, leisure, and school accidents accounted for 56% of injuries based on their analysis of the 2009-2018 EU-IDB data.

We applied the EU-IDB average and ECHI 2019 rates to the estimated population in each country in 2019 to estimate the number of injuries for comparison against the GBD study data. We also explored the Eurostat dataset, which reports the proportion of people who reported receiving medical intervention for a road traffic, home or leisure accident which resulted in injury. This self-report data is taken from the 2014 EHIS and as no denominator is provided it was not possible to apply this data at a population level.

Comparison between the GBD and EU-IDB data sources was possible for 20 countries and between the GBD and ECHI indicator for 10 countries (Table 8 and data shown in full in Table 10 in Appendix 2). Estimates from the EU-IDB were higher than the GBD estimates in seven countries (Austria, Denmark, Iceland, Italy, Lithuania, Luxembourg, and Portugal) and lower in 12 countries (Cyprus, Latvia, Netherlands, Romania, Slovenia, Estonia, Finland, Germany, Malta, Norway, Spain, Sweden). A greater than 50% difference in the number of cases was seen in the data for Finland, Italy, Portugal, Romania, Slovenia and Türkiye. Adjusted estimates based on the ECHI 29b indicator were higher than GBD estimates in six countries (Austria, Estonia, Denmark, Latvia, Luxembourg and Türkiye) and lower in four countries (Lithuania, Netherlands, Norway, Sweden). There was a greater than 50% difference in the number of cases in Lithuania, Netherlands, Sweden and Türkiye.

Using the Eurostat hospital discharge data, it was also possible to compare the estimated number of injuries estimated from the GBD data for 26 countries (Table 11 in Appendix 2). There was a greater than 50% difference in the number of hospitalisations in Austria, Montenegro, Serbia, and Switzerland.

Table 8. Estimated injury cases in 2019 from different data sources

	Estimated injury cases in 2019		
	GBD study data ^a	EU-IDB data ^b	ECHI 29b indicator ^c
Austria	703,162	822,016	733,420
Cyprus	94,739	76,151	-
Denmark	417,337	556,057	-
Estonia	119,975	112,692	144,361
Finland	558,609	219,923	-
Germany	6,382,175	4,290,444	-
Iceland	24,932	33,209	-
Ireland	345,774	380,372	-
Italy	3,805,982	7,583,058	-
Latvia	182,774	157,330	200,093
Lithuania	290,214	302,886	143,177
Luxembourg	48,728	72,307	59,976
Malta	32,696	37,334	-
Netherlands	1,269,995	860,002	600,658
Norway	395,941	314,211	316,233
Portugal	565,359	1,154,632	1,083,048
Romania	2,070,221	1,248,964	-
Slovenia	298,961	108,603	-
Spain	2,973,960	2,887,739	-
Sweden	701,601	613,714	189,670
Türkiye	4,058,073	8,059,322	14,216,282*
United Kingdom	4,597,256	7,073,863	-

Source: ^a Global Burden of Disease 2019. Incidence numbers extracted from Institute for Health Metrics and Evaluation (IHME) GBD Results. Used with permission. All rights reserved. Available from <https://vizhub.healthdata.org/gbd-results/>. Injury cases estimated by subtracting 'minor injuries' from all nature of injury types. ^b Injuries in the European Union 2009-2018 (Kisser et al., 2021). Injury cases estimated from average injury rate for 2009-2018 applied to UN population estimates for 2019. ^c European Core Health Indicator 29b 'Injuries: home, leisure, school: register-based incidence'. Injury cases estimated from population injury rates applied to UN population estimates for 2019 and inflated by 20% to account for other types of injuries. *Data for Türkiye flagged as 'unreliable or uncertain'.

Appendix 2. Additional data tables

Table 9. Global Burden of Disease 2019 injury incidence

Country	All GDB 'nature of injury' categories			Excluding 'minor' injuries ^a			Deaths
	Incidence of 'injuries that require medical care'	Injuries that require hospitalisation ^b	Injury days in hospital	Incidence of 'injuries that require medical care'	Injuries that require hospitalisation ^{**}	Injury days in hospital	
Albania	578,463	67,565	432,413	310,553	36,273	232,144	834
Andorra	9,927	1,160	7,421	6,496	759	4,856	41
Armenia	326,264	38,108	243,889	195,667	22,854	146,265	1,133
Austria	1,089,778	127,286	814,631	703,162	82,129	525,628	4,318
Azerbaijan	1,138,660	132,995	851,171	680,197	79,447	508,461	3,122
Belarus	1,629,186	190,289	1,217,849	994,091	116,110	743,103	8,176
Belgium	1,646,501	192,311	1,230,793	1,083,490	126,552	809,931	7,634
Bosnia and Herzegovina	614,290	71,749	459,194	346,974	40,527	259,370	1,204
Bulgaria	1,349,986	157,678	1,009,142	750,035	87,604	560,666	3,497
Croatia	858,401	100,261	641,672	537,309	62,758	401,649	2,754
Cyprus	152,701	17,835	114,147	94,739	11,066	70,819	543
Czechia	2,235,461	261,102	1,671,052	1,314,810	153,570	982,847	5,507
Denmark	652,350	76,195	487,645	417,337	48,745	311,968	2,327
Estonia	198,029	23,130	148,031	119,975	14,013	89,684	702
Finland	859,142	100,348	642,226	558,609	65,246	417,572	3,141
France	9,140,494	1,067,610	6,832,702	6,001,009	700,918	4,485,875	46,110
Georgia	524,690	61,284	3,92,217	311,978	36,439	233,210	2,089
Germany	9,713,807	1,134,573	7,261,265	6,382,175	745,438	4,770,804	39,801
Greece	1,030,683	120,384	770,456	644,943	75,329	482,108	3,885
Hungary	1,874,078	218,892	1,400,911	1,110,467	129,703	830,096	5,953
Iceland	39,932	4,664	29,850	24,932	2,912	18,637	111
Ireland	557,313	65,094	416,602	345,774	40,386	258,473	1,222
Israel	1,059,576	123,758	792,054	642,670	75,064	480,409	2,431
Italy	5,695,338	665,215	4,257,379	3,805,982	444,539	2,845,048	25,833
Kazakhstan	2,549,622	297,796	1,905,893	1,510,873	176,470	1,129,408	13,787
Kyrgyzstan	743,849	86,882	556,042	445,347	52,017	332,906	2,854
Latvia	300,225	35,066	224,424	182,774	21,348	136,627	1,476
Lithuania	469,211	54,804	350,745	290,214	33,897	216,941	2,492
Luxembourg	76,233	8,904	56,986	48,728	5,691	36,425	260

Costs of injuries and violence to European health systems

Country	All GDB 'nature of injury' categories			Excluding 'minor' injuries ^a			Deaths
	Incidence of 'injuries that require medical care'	Injuries that require hospitalisation ^b	Injury days in hospital	Incidence of 'injuries that require medical care'	Injuries that require hospitalisation**	Injury days in hospital	
Malta	51,596	6,026	38,569	32,696	3,819	24,441	136
Monaco	4,060	474	3,035	2,198	257	1,643	21
Montenegro	124,539	14,546	93,095	70,981	8,291	53,060	309
Netherlands	1,914,002	223,555	1,430,755	1,269,995	148,335	949,347	7,764
North Macedonia	406,203	47,445	303,645	227,060	26,521	169,732	743
Norway	720,925	84,204	538,906	395,941	46,246	295,973	2,433
Poland	7,715,279	901,145	5,767,325	4,530,697	529,185	3,386,787	21,047
Portugal	870,336	101,655	650,594	565,359	66,034	4,22,617	4,885
Republic of Moldova	506,124	59,115	378,338	304,752	35,595	227,808	2,382
Romania	3,681,779	430,032	2,752,203	2,070,221	241,802	1,547,532	9,753
Russian Federation	26,176,207	3,057,381	19,567,238	15,913,183	1,858,660	1,1895,423	140,330
San Marino	3,831	448	2,864	1,915	224	1,432	14
Serbia	1,630,539	190,447	1,218,861	921,209	107,597	688,622	3,925
Slovakia	1,196,077	139,702	894,091	687,231	80,269	513,719	2,758
Slovenia	501,945	58,627	375,214	298,961	34,919	223,479	1,400
Spain	4,684,015	547,093	3,501,395	2,973,960	347,359	2,223,095	16,175
Sweden	1,327,616	155,065	992,419	701,601	81,947	524,461	4,686
Switzerland	1,256,408	146,748	939,190	810,953	94,719	606,203	4,284
Tajikistan	1,084,638	126,686	810,788	640,111	74,765	478,495	2,999
Türkiye	614,627	71,788	459,446	4,058,073	473,983	3,033,491	1,701
Turkmenistan	6,434,464	751,545	4,809,890	357,927	41,806	267,558	22,226
Ukraine	7,659,818	894,667	5,725,867	4,660,929	544,397	3,484,138	43,935
United Kingdom	7,420,973	866,770	5,547,326	4,597,256	536,960	3,436,541	21,125
Uzbekistan	4,052,308	473,310	3,029,181	2,437,644	284,717	1,822,188	15,272
European WHO Region	127,152,500	14,851,412	95,049,036	78,392,166	9,156,205	58,599,712	523,538

Source: Global Burden of Disease 2019. Incidence numbers extracted from Institute for Health Metrics and Evaluation (IHME) GBD Results. Used with permission. All rights reserved. Available from <https://vizhub.healthdata.org/gbd-results/>. ^a Injuries categorised as minor under the GDB nature of injury were subtracted from the total incidence figures. ^b Number of hospitalisations calculated by assuming a probability hospitalisation of 11.68% (Kisser et al., 2021).

Table 10. Comparison of data sources on injury incidence: GBD, EU-IDB and ECHI

Country	GBD 2019			EU-IDB injury (all causes)		ECHI 2019	
	Injury (all causes)	Nature of injury (minor)	Injury (no minor)	Ave. injuries per 1,000 population (2009-18)	Estimated* injury cases (2019)	Injury required hospital treatment per 100,000	Estimated* injury cases
Albania	578,463	267,911	310,553	-	-	-	-
Andorra	9,927	3,431	6,496	-	-	-	-
Armenia	326,264	130,597	195,667	-	-	-	-
Austria	1,089,778	386,616	703,162	92.57	822,016	6,085.8	540,415
Azerbaijan	1,138,660	458,463	680,197	-	-	-	-
Belarus	1,629,186	635,095	994,091	-	-	-	-
Belgium	1,646,501	563,011	1,083,490	-	-	-	-
Bosnia and Herzegovina	614,290	267,316	346,974	-	-	-	-
Bulgaria	1,349,986	599,952	750,035	-	-	-	-
Croatia	858,401	321,092	537,309	-	-	-	-
Cyprus	152,701	57,962	94,739	61.97	76,151	-	-
Czechia	2,235,461	920,651	1,314,810	-	-	-	-
Denmark	652,350	235,013	417,337	95.94	556,057	-	-
Estonia	198,029	78,054	119,975	84.92	112,692	8,015.7	106,371
Finland	859,142	300,532	558,609	39.83	219,923	-	-
France	9,140,494	3,139,485	6,001,009	-	-	-	-
Georgia	524,690	212,713	311,978	-	-	-	-
Germany	9,713,807	3,331,632	6,382,175	51.60	4,290,444	-	-
Greece	1,030,683	385,740	644,943	-	-	-	-
Hungary	1,874,078	763,611	1,110,467	-	-	-	-
Iceland	39,932	15,000	24,932	92.05	33,209	-	-
Ireland	557,313	211,539	345,774	77.69	380,372	-	-
Israel	1,059,576	416,906	642,670	-	-	-	-
Italy	5,695,338	1,889,356	3,805,982	126.96	7,583,058	-	-
Kazakhstan	2,549,622	1,038,748	1,510,873	-	-	-	-
Kyrgyzstan	743,849	298,503	445,347	-	-	-	-
Latvia	300,225	117,450	182,774	82.09	157,330	7,692.8	147,437
Lithuania	469,211	178,997	290,214	106.31	302,886	3,702.9	105,499
Luxembourg	76,233	27,505	48,728	116.63	72,307	7,128.2	44,193
Malta	51,596	18,900	32,696	74.13	37,334	-	-
Monaco	4,060	1,862	2,198	-	-	-	-
Montenegro	124,539	53,558	70,981	-	-	-	-
Netherlands	1,914,002	644,007	1,269,995	49.53	860,002	2,549.0	442,590
North Macedonia	406,203	179,144	227,060	-	-	-	-
Norway	720,925	324,985	395,941	58.75	314,211	4,356.8	233,014
Poland	7,715,279	3,184,582	4,530,697	-	-	-	-
Portugal	870,336	304,977	565,359	112.21	1,154,632	7,755.5	798,035
Republic of Moldova	506,124	201,372	304,752	-	-	-	-
Romania	3,681,779	1,611,558	2,070,221	63.97	1,248,964	-	-
Russian Federation	26,176,207	10,263,024	15,913,183	-	-	-	-
San Marino	3,831	1,916	1,915	-	-	-	-
Serbia	1,630,539	709,331	921,209	-	-	-	-
Slovakia	1,196,077	508,845	687,231	-	-	-	-
Slovenia	501,945	202,984	298,961	51.40	108,603	-	-
Spain	4,684,015	1,710,055	2,973,960	61.27	2,887,739	-	-

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Sweden	1,327,616	626,015	701,601	59.77	613,714	1,361.1	139,757
Switzerland	1,256,408	445,455	810,953	-	-	-	-
Tajikistan	1,084,638	444,527	640,111	-	-	-	-
Türkiye	6,434,464	2,376,391	4,058,073	96.54	8,059,322	12,547.8**	10,475,155
Turkmenistan	614,627	256,700	357,927	-	-	-	-
Ukraine	7,659,818	2,998,888	4,660,929	-	-	-	-
United Kingdom	7,420,973	2,823,717	4,597,256	105.93	7,073,863	-	-
Uzbekistan	4,052,308	1,614,664	2,437,644	-	-	-	-

Source: a Global Burden of Disease 2019. Incidence numbers extracted from Institute for Health Metrics and Evaluation (IHME) GBD Results. Used with permission. All rights reserved. Available from <https://vizhub.healthdata.org/gbd-results/>. Number of ED visits calculated by subtracting 'minor injuries' from all nature of injury types; b Injuries in the European Union 2009-2018 (Kisser et al., 2021). *Population injury rates applied to UN population estimates to estimate number of injury cases in 2019. **Data flagged as 'unreliable or uncertain'.

Table 11. Comparison of data sources on injury incidence: Eurostat indicators 1

Country	% persons reporting an accident resulting in injury			% person reporting medical intervention for an accident resulting in injury			
	Road traffic	Home	Leisure	Health care	Hospitalisation	Ambulatory care	No health care
Austria	1.6	3.2	6.7	77.0	16.8	60.1	23.0
Belgium	2.0	2.9	3.1	77.7	46.2	31.5	22.3
Bulgaria	0.4	1.2	0.7	78.9	34.9	44.0	21.1
Croatia	1.4	2.1	1.4	69.0	49.6	19.4	31.0
Cyprus	1.7	1.3	1.6	79.7	57.8	21.9	20.3
Czechia	0.9	9.4	6.9	55.1	19.5	35.6	44.9
Denmark	1.1	2.2	5.1	81.4	57.9	23.6	18.6
Estonia	0.8	3.9	3.7	74.8	43.6	31.2	25.2
Finland	1.3	3.7	8.9	73.5	32.4	41.1	26.5
France	1.8	3.7	4.0	82.0	53.4	28.6	18.0
Germany	2.0	6.3	10.1	72.7	36.8	35.9	27.3
Greece	1.5	2.7	2.2	70.4	45.0	25.4	29.6
Hungary	2.2	5.8	3.6	63.4	49.7	13.7	36.6
Iceland	2.1	2.2	7.8	76.9	26.9	49.9	23.1
Ireland	1.2	2.7	5.4	-	-	-	-
Italy	2.2	2.6	2.4	73.6	28.5	45.1	26.4
Latvia	1.5	3.3	3.6	67.7	35.2	32.5	32.3
Lithuania	0.8	3.3	3.1	72.6	35.9	36.7	27.4
Luxembourg	2.0	4.2	8.3	73.5	46.2	27.3	26.5
Malta	2.3	3.6	4.3	62.8	30.0	32.8	37.2
Netherlands	2.1	5.8	8.9	56.8	26.3	30.5	43.2
Norway	1.0	2.3	5.0	65.1	20.7	44.3	34.9
Poland	1.0	2.2	1.1	76.7	57.7	19.0	23.3
Portugal	1.2	3.1	2.4	78.7	58.0	20.7	21.3
Romania	0.2	1.3	0.7	42.1	16.4	25.7	57.9
Serbia	-	-	-	-	-	-	-
Slovakia	0.6	3.4	3.7	76.6	47.6	29.0	23.4
Slovenia	2.1	7.4	6.2	70.5	43.8	26.7	29.5
Spain	1.9	3.4	3.8	72.2	59.5	12.6	27.8
Sweden	1.5	3.5	6.3	67.5	43.9	23.6	32.5
Turkey	2.0	2.6	2.6	56.8	49.6	7.2	43.2
United Kingdom	2.1	3.0	2.5	67.4	40.6	26.8	32.6

Source: Eurostat/European Health Interview Survey 2014 'Injury from accidents' indicators. Only road traffic, home and leisure accidents are covered. Data extracted with the Eurostat Data Browser. Available from <https://ec.europa.eu/eurostat/databrowser>.

Table 12. Comparison of data sources on injury incidence: Eurostat indicators 2

Country	Number of hospital discharges by diagnosis (in-patients) in 2019	
	All causes (A00-Z99)	Injury (S00-T98)
Austria	-	257,723
Belgium	1,920,874	183,861
Bulgaria	2,412,523	144,040
Croatia	656,688	46,612
Cyprus	-	7,704
Czechia	2,041,847	174,112
Denmark	-	-
Estonia	-	15,826
Finland	-	-
France	12,305,748	851,308
Germany	-	-
Greece	-	-
Hungary	1,861,220	131,771
Iceland	38,250	2,873
Ireland	-	58,064
Italy	6,748,534	592,324
Latvia	-	27,036
Liechtenstein	2,047	439
Lithuania	-	38,334
Luxembourg	-	-
Malta	-	-
Montenegro	72,665	4,019
Netherlands	1,518,813	145,552
North Macedonia	-	-
Norway	868,780	80,760
Poland	6,387,607	401,237
Portugal	866,428	74,387
Romania	4,128,294	182,746
Serbia	-	51,025
Slovakia	1,031,585	76,828
Slovenia	361,323	29,040
Spain	4,873,767	454,660
Sweden	1,406,276	127,256
Switzerland	1,447,378	189,778
Turkey	-	-
United Kingdom	-	-

Source: Eurostat 'Health care activities'. Data extracted with the Eurostat Data Browser. Available from <https://ec.europa.eu/eurostat/databrowser>. The data are the total number of hospital discharges by diagnosis among in-patients. Discharges by diagnosis refer to the principal diagnosis, i.e., the main condition diagnosed at the end of the hospitalisation based on the ICD-10 classification.

Appendix 3. Individual country profiles

Albania

Sub-region: B

Population size in 2019: 2,873,884

Health spending per capita in 2019 (USD PPP): 275

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	834	271	353	209
Number of hospital admissions	36,273	3,903	31,319	1,050
Number of emergency department visits	310,553	33,420	268,141	8,992

Health system costs in 2019

Cost per ED visit: USD PPP 43.63 [ALL 1847.57]

Cost per hospital inpatient bed day: USD PPP 121.78 [ALL 5156.44]

ED visits	Inpatient	Total
USD PPP 13,550,514	USD PPP 28,270,072	USD PPP 41,820,586
ALL 573,768,568	ALL 1,197,037,863	ALL 1,770,806,431

Andorra

Sub-region: A

Population size in 2019: 76,343

Health spending per capita in 2019 (USD PPP): 2,744

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	41	9	23	9
Number of hospital admissions	759	49	691	19
Number of emergency department visits	6,496	419	5,913	164

Health system costs in 2019

Cost per ED visit: USD PPP 346.62 [EUR 219.47]

Cost per hospital inpatient bed day: USD PPP 900.05 [EUR 569.89]

ED visits	Inpatient	Total
USD PPP 2,251,721	USD PPP 4,370,708	USD PPP 6,622,429
EUR 1,425,734	EUR 2,767,423	EUR 4,193,156

Armenia

Sub-region: B

Population size in 2019: 2,820,602

Health spending per capita in 2019 (USD PPP): 524

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	1,133	251	442	440
Number of hospital admissions	22,854	2,109	19,830	915
Number of emergency department visits	195,667	18,054	169,779	7,834

Health system costs in 2019

Cost per ED visit: USD PPP 33.95 [AMD 5277.61]

Cost per hospital inpatient bed day: USD PPP 86.62 [AMD 13464.77]

ED visits	Inpatient	Total
USD PPP 6,642,860	USD PPP 12,668,926	USD PPP 19,311,786
AMD 1,032,652,500	AMD 1,969,422,685	AMD 3,002,075,185

Austria

Sub-region: A

Population size in 2019: 8,879,940

Health spending per capita in 2019 (USD PPP): 5,242

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	4,318	561	2,268	1,489
Number of hospital admissions	82,129	3,467	76,325	2,338
Number of emergency department visits	703,162	29,680	653,469	20,014

Health system costs in 2019

Cost per ED visit: USD PPP 312.84 [EUR 241.14]

Cost per hospital inpatient bed day: USD PPP 854.81 [EUR 658.90]

ED visits	Inpatient	Total
USD PPP 219,977,177	USD PPP 449,313,902	USD PPP 669,291,079
EUR 169,561,268	EUR 346,336,996	EUR 515,898,264

Azerbaijan

Sub-region: B

Population size in 2019: 10,232,753

Health spending per capita in 2019 (USD PPP): 193

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	3,122	830	1,539	753
Number of hospital admissions	79,447	7,145	69,503	2,799
Number of emergency department visits	680,197	61,177	595,059	23,961

Health system costs in 2019

Cost per ED visit: USD PPP 41.91 [AZN 22.74]

Cost per hospital inpatient bed day: USD PPP 117.26 [AZN 63.64]

ED visits	Inpatient	Total
USD PPP 28,504,017	USD PPP 59,623,537	USD PPP 88,127,554
AZN 15,470,323	AZN 32,360,189	AZN 47,830,512

Belarus

Sub-region: C

Population size in 2019: 9,673,971

Health spending per capita in 2019 (USD PPP): 399

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	8,176	1,061	4,063	3,052
Number of hospital admissions	116,110	14,249	97,363	4,498
Number of emergency department visits	994,091	121,995	833,586	38,510

Health system costs in 2019

Cost per ED visit: USD PPP 80.69 [BYR 57.44]

Cost per hospital inpatient bed day: USD PPP 214.34 [BYR 152.57]

ED visits	Inpatient	Total
USD PPP 80,213,996	USD PPP 159,278,450	USD PPP 239,492,446
BYR 57,095,742	BYR 113,373,249	BYR 170,468,991

Belgium

Sub-region: A

Population size in 2019: 11,510,568

Health spending per capita in 2019 (USD PPP): 4,960

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	7,634	956	4,301	2,376
Number of hospital admissions	126,552	5,044	117,591	3,916
Number of emergency department visits	1,083,490	43,188	1,006,774	33,529

Health system costs in 2019

Cost per ED visit: USD PPP 311.19 [EUR 238.65]

Cost per hospital inpatient bed day: USD PPP 791.75 [EUR 607.19]

ED visits	Inpatient	Total
USD PPP 337,172,234	USD PPP 641,263,867	USD PPP 978,436,101
EUR 258,576,037	EUR 491,782,695	EUR 750,358,732

Bosnia and Herzegovina

Sub-region: B

Population size in 2019: 3,360,712

Health spending per capita in 2019 (USD PPP): 554

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	1,204	219	535	450
Number of hospital admissions	40,527	4,489	34,662	1,375
Number of emergency department visits	346,974	38,434	296,765	11,775

Health system costs in 2019

Cost per ED visit: USD PPP 49.67 [BAM 33.80]

Cost per hospital inpatient bed day: USD PPP 128.01 [BAM 87.12]

ED visits	Inpatient	Total
USD PPP 17,232,578	USD PPP 33,203,140	USD PPP 50,435,718
BAM 11,727,696	BAM 22,596,522	BAM 34,324,217

Bulgaria

Sub-region: B

Population size in 2019: 7,052,532

Health spending per capita in 2019 (USD PPP): 698

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	3,497	770	1,456	1,272
Number of hospital admissions	87,604	9,681	75,519	2,404
Number of emergency department visits	750,035	82,885	646,569	20,581

Health system costs in 2019

Cost per ED visit: USD PPP 89.28 [BGN 62.90]

Cost per hospital inpatient bed day: USD PPP 224.75 [BGN 158.34]

ED visits	Inpatient	Total
USD PPP 66,962,521	USD PPP 126,006,928	USD PPP 192,969,448
BGN 47,176,473	BGN 88,774,472	BGN 135,950,944

Croatia

Sub-region: A

Population size in 2019: 4,129,752

Health spending per capita in 2019 (USD PPP): 1,040

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	2,754	433	1,579	742
Number of hospital admissions	62,758	7,347	54,041	1,369
Number of emergency department visits	537,309	62,903	462,682	11,724

Health system costs in 2019

Cost per ED visit: USD PPP 130.84 [HRK 434.36]

Cost per hospital inpatient bed day: USD PPP 341.38 [HRK 1133.34]

ED visits	Inpatient	Total
USD PPP 70,299,801	USD PPP 137,113,785	USD PPP 207,413,586
HRK 233,387,973	HRK 455,203,402	HRK 688,591,375

Cyprus

Sub-region: A

Population size in 2019: 1,228,837

Health spending per capita in 2019 (USD PPP): 1,996

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	543	213	242	88
Number of hospital admissions	11,066	520	10,191	354
Number of emergency department visits	94,739	4,455	87,250	3,034

Health system costs in 2019

Cost per ED visit: USD PPP 218.48 [EUR 134.63]

Cost per hospital inpatient bed day: USD PPP 570.30 [EUR 351.43]

ED visits	Inpatient	Total
USD PPP 20,698,339	USD PPP 40,388,298	USD PPP 61,086,637
EUR 12,754,553	EUR 24,887,731	EUR 37,642,284

Czechia

Sub-region: A

Population size in 2019: 10,536,871

Health spending per capita in 2019 (USD PPP): 1,844

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	5,507	901	3,020	1,586
Number of hospital admissions	153,570	16,499	132,627	4,444
Number of emergency department visits	1,314,810	141,255	1,135,505	38,051

Health system costs in 2019

Cost per ED visit: USD PPP 174.90 [CZK 2214.81]

Cost per hospital inpatient bed day: USD PPP 461.15 [CZK 5839.70]

ED visits	Inpatient	Total
USD PPP 229,961,513	USD PPP 453,244,746	USD PPP 683,206,258
CZK 2,912,050,010	CZK 5,739,531,581	CZK 8,651,581,591

Denmark

Sub-region: A

Population size in 2019: 5,795,878

Health spending per capita in 2019 (USD PPP): 6,003

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	2,327	319	1,297	712
Number of hospital admissions	48,745	2,111	45,268	1,366
Number of emergency department visits	417,337	18,072	387,571	11,694

Health system costs in 2019

Cost per ED visit: USD PPP 314.30 [DKK 2134.61]

Cost per hospital inpatient bed day: USD PPP 832.39 [DKK 5653.26]

ED visits	Inpatient	Total
USD PPP 131,170,772	USD PPP 259,680,421	USD PPP 390,851,193
DKK 890,853,909	DKK 1,763,634,638	DKK 2,654,488,547

Estonia

Sub-region: C

Population size in 2019: 1,327,039

Health spending per capita in 2019 (USD PPP): 1,599

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	702	91	344	267
Number of hospital admissions	14,013	1,543	11,964	506
Number of emergency department visits	119,975	13,210	102,434	4,331

Health system costs in 2019

Cost per ED visit: USD PPP 138.83 [EUR 76.66]

Cost per hospital inpatient bed day: USD PPP 352.59 [EUR 194.69]

ED visits	Inpatient	Total
USD PPP 16,655,620	USD PPP 31,621,341	USD PPP 48,276,962
EUR 9,196,917	EUR 17,460,704	EUR 26,657,621

Finland

Sub-region: A

Population size in 2019: 5,521,537

Health spending per capita in 2019 (USD PPP): 4,450

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	3,141	342	1,842	956
Number of hospital admissions	65,246	2,400	61,053	1,793
Number of emergency department visits	558,609	20,550	522,710	15,349

Health system costs in 2019

Cost per ED visit: USD PPP 270.00 [EUR 233.07]

Cost per hospital inpatient bed day: USD PPP 708.53 [EUR 611.62]

ED visits	Inpatient	Total
USD PPP 150,823,430	USD PPP 295,860,739	USD PPP 446,684,169
EUR 130,194,556	EUR 255,394,386	EUR 385,588,942

France

Sub-region: A

Population size in 2019: 64,399,759

Health spending per capita in 2019 (USD PPP): 4,492

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	46,110	4,693	29,858	11,558
Number of hospital admissions	700,918	28,572	655,519	16,827
Number of emergency department visits	6,001,009	244,623	5,612,316	144,070

Health system costs in 2019

Cost per ED visit: USD PPP 263.28 [EUR 194.48]

Cost per hospital inpatient bed day: USD PPP 680.59 [EUR 502.73]

ED visits	Inpatient	Total
USD PPP 1,579,951,019	USD PPP 3,053,039,936	USD PPP 4,632,990,955
EUR 1,167,051,360	EUR 2,255,167,638	EUR 3,422,218,998

Georgia

Sub-region: B

Population size in 2019: 3,770,811

Health spending per capita in 2019 (USD PPP): 291

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	2,089	748	902	439
Number of hospital admissions	36,439	3,230	32,414	796
Number of emergency department visits	311,978	27,651	277,513	6,814

Health system costs in 2019

Cost per ED visit: USD PPP 29.80 [GEL 25.25]

Cost per hospital inpatient bed day: USD PPP 74.10 [GEL 62.79]

ED visits	Inpatient	Total
USD PPP 9,296,938	USD PPP 17,279,874	USD PPP 26,576,812
GEL 7,878,420	GEL 14,643,328	GEL 22,521,748

Germany

Sub-region: A

Population size in 2019: 83,148,141

Health spending per capita in 2019 (USD PPP): 5,440

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	39,801	4,866	22,644	12,291
Number of hospital admissions	745,438	30,829	695,342	19,267
Number of emergency department visits	6,382,175	263,949	5,953,273	164,953

Health system costs in 2019

Cost per ED visit: USD PPP 301.14 [EUR 226.18]

Cost per hospital inpatient bed day: USD PPP 760.57 [EUR 571.26]

ED visits	Inpatient	Total
USD PPP 1,921,918,378	USD PPP 3,628,523,339	USD PPP 5,550,441,716
EUR 1,443,549,050	EUR 2,725,376,623	EUR 4,168,925,672

Greece

Sub-region: A

Population size in 2019: 10,574,024

Health spending per capita in 2019 (USD PPP): 1,501

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	3,885	1,339	1,915	631
Number of hospital admissions	75,329	5,475	67,793	2,061
Number of emergency department visits	644,943	46,876	580,418	17,649

Health system costs in 2019

Cost per ED visit: USD PPP 204.05 [EUR 114.89]

Cost per hospital inpatient bed day: USD PPP 549.01 [EUR 309.11]

ED visits	Inpatient	Total
USD PPP 131,599,731	USD PPP 264,682,040	USD PPP 396,281,771
EUR 74,095,649	EUR 149,026,046	EUR 223,121,696

Hungary

Sub-region: C

Population size in 2019: 9,771,796

Health spending per capita in 2019 (USD PPP): 1,062

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	5,953	899	3,007	2,047
Number of hospital admissions	129,703	11,814	114,357	3,531
Number of emergency department visits	1,110,467	101,150	979,086	30,232

Health system costs in 2019

Cost per ED visit: USD PPP 132.12 [HUF 19175.40]

Cost per hospital inpatient bed day: USD PPP 329.92 [HUF 47884.73]

ED visits	Inpatient	Total
USD PPP 146,710,281	USD PPP 273,864,638	USD PPP 420,574,919
HUF 21,293,653,699	HUF 39,748,944,134	HUF 61,042,597,834

Iceland

Sub-region: A

Population size in 2019: 360,775

Health spending per capita in 2019 (USD PPP): 6,275

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	111	17	55	40
Number of hospital admissions	2,912	127	2,696	89
Number of emergency department visits	24,932	1,092	23,080	760

Health system costs in 2019

Cost per ED visit: USD PPP 259.42 [ISK 37618.46]

Cost per hospital inpatient bed day: USD PPP 678.61 [ISK 98405.56]

ED visits	Inpatient	Total
USD PPP 6,467,804	USD PPP 12,647,314	USD PPP 19,115,118
ISK 937,901,038	ISK 1,833,996,454	ISK 2,771,897,492

Ireland

Sub-region: A

Population size in 2019: 4,896,019

Health spending per capita in 2019 (USD PPP): 5,429

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	1,222	180	574	468
Number of hospital admissions	40,386	1,718	37,458	1,210
Number of emergency department visits	345,774	14,712	320,699	10,363

Health system costs in 2019

Cost per ED visit: USD PPP 289.03 [EUR 239.00]

Cost per hospital inpatient bed day: USD PPP 780.55 [EUR 645.44]

ED visits	Inpatient	Total
USD PPP 99,938,210	USD PPP 201,751,341	USD PPP 301,689,551
EUR 82,638,706	EUR 166,827,780	EUR 249,466,486

Israel

Sub-region: A

Population size in 2019: 8,607,920

Health spending per capita in 2019 (USD PPP): 3,456

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	2,431	630	1,064	737
Number of hospital admissions	75,064	3,998	67,724	3,342
Number of emergency department visits	642,670	34,229	579,826	28,615

Health system costs in 2019

Cost per ED visit: USD PPP 191.60 [ILS 750.34]

Cost per hospital inpatient bed day: USD PPP 488.35 [ILS 1912.51]

ED visits	Inpatient	Total
USD PPP 123,134,340	USD PPP 234,608,931	USD PPP 357,743,270
ILS 482,223,749	ILS 918,785,113	ILS 1,401,008,862

Italy

Sub-region: A

Population size in 2019: 59,727,932

Health spending per capita in 2019 (USD PPP): 2,906

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	25,833	5,651	15,373	4,809
Number of hospital admissions	444,539	29,706	405,515	9,317
Number of emergency department visits	3,805,982	254,334	3,471,879	79,769

Health system costs in 2019

Cost per ED visit: USD PPP 236.92 [EUR 160.59]

Cost per hospital inpatient bed day: USD PPP 656.31 [EUR 444.87]

ED visits	Inpatient	Total
USD PPP 901,720,084	USD PPP 1,867,219,616	USD PPP 2,768,939,700
EUR 611,217,433	EUR 1,265,666,808	EUR 1,876,884,242

Kazakhstan

Sub-region: C

Population size in 2019: 18,754,258

Health spending per capita in 2019 (USD PPP): 273

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	13,787	2,868	4,885	6,034
Number of hospital admissions	176,470	19,780	148,439	8,252
Number of emergency department visits	1,510,873	169,347	1,270,879	70,648

Health system costs in 2019

Cost per ED visit: USD PPP 63.36 [KZT 8664.05]

Cost per hospital inpatient bed day: USD PPP 167.19 [KZT 22861.87]

ED visits	Inpatient	Total
USD PPP 95,730,882	USD PPP 188,827,589	USD PPP 284,558,470
KZT 13,090,287,952	KZT 25,820,377,579	KZT 38,910,665,532

Kyrgyzstan

Sub-region: B

Population size in 2019: 6,323,643

Health spending per capita in 2019 (USD PPP): 62

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	2,854	1,029	928	898
Number of hospital admissions	52,017	5,801	44,337	1,879
Number of emergency department visits	445,347	49,666	379,597	16,084

Health system costs in 2019

Cost per ED visit: USD PPP 11.15 [KGS 195.14]

Cost per hospital inpatient bed day: USD PPP 28.98 [KGS 507.09]

ED visits	Inpatient	Total
USD PPP 4,967,125	USD PPP 9,648,478	USD PPP 14,615,603
KGS 86,906,328	KGS 168,812,703	KGS 255,719,032

Latvia

Sub-region: C

Population size in 2019: 1,916,556

Health spending per capita in 2019 (USD PPP): 1,167

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	1,476	217	732	527
Number of hospital admissions	21,348	2,631	17,877	841
Number of emergency department visits	182,774	22,522	153,054	7,198

Health system costs in 2019

Cost per ED visit: USD PPP 116.26 [EUR 58.39]

Cost per hospital inpatient bed day: USD PPP 302.31 [EUR 151.84]

ED visits	Inpatient	Total
USD PPP 21,248,798	USD PPP 41,303,523	USD PPP 62,552,321
EUR 10,672,379	EUR 20,745,025	EUR 31,417,404

Lithuania

Sub-region: C

Population size in 2019: 2,849,083

Health spending per capita in 2019 (USD PPP): 1,370

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	2,492	291	1,193	1,008
Number of hospital admissions	33,897	4,336	28,185	1,376
Number of emergency department visits	290,214	37,124	241,306	11,784

Health system costs in 2019

Cost per ED visit: USD PPP 125.82 [EUR 57.09]

Cost per hospital inpatient bed day: USD PPP 314.30 [EUR 142.60]

ED visits	Inpatient	Total
USD PPP 36,515,420	USD PPP 68,183,984	USD PPP 104,699,403
EUR 16,567,630	EUR 30,936,164	EUR 47,503,794

Luxembourg

Sub-region: A

Population size in 2019: 619,973

Health spending per capita in 2019 (USD PPP): 6,221

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	260	41	143	76
Number of hospital admissions	5,691	272	5,250	169
Number of emergency department visits	48,728	2,332	44,949	1,446

Health system costs in 2019

Cost per ED visit: USD PPP 815.33 [EUR 702.72]

Cost per hospital inpatient bed day: USD PPP 2116.85 [EUR 1824.48]

ED visits	Inpatient	Total
USD PPP 39,729,272	USD PPP 77,106,237	USD PPP 116,835,508
EUR 34,242,183	EUR 66,456,940	EUR 100,699,123

Malta

Sub-region: A

Population size in 2019: 503,635

Health spending per capita in 2019 (USD PPP): 2,532

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	136	23	83	30
Number of hospital admissions	3,819	142	3,551	126
Number of emergency department visits	32,696	1,219	30,402	1,076

Health system costs in 2019

Cost per ED visit: USD PPP 182.60 [EUR 107.30]

Cost per hospital inpatient bed day: USD PPP 485.32 [EUR 285.19]

ED visits	Inpatient	Total
USD PPP 5,970,272	USD PPP 11,861,715	USD PPP 17,831,987
EUR 3,508,280	EUR 6,970,238	EUR 10,478,517

Monaco

Sub-region: A

Population size in 2019: 37,034

Health spending per capita in 2019 (USD PPP): 2,906

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	21	2	13	6
Number of hospital admissions	257	15	233	8
Number of emergency department visits	2,198	130	1,996	72

Health system costs in 2019

Cost per ED visit: USD PPP 1370.18 [EUR 1012.10]

Cost per hospital inpatient bed day: USD PPP 3401.19 [EUR 2512.34]

ED visits	Inpatient	Total
USD PPP 3,011,358	USD PPP 5,587,783	USD PPP 8,599,142
EUR 2,224,379	EUR 4,127,489	EUR 6,351,868

Montenegro

Sub-region: B

Population size in 2019: 630,396

Health spending per capita in 2019 (USD PPP): 735

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	309	64	108	138
Number of hospital admissions	8,291	961	7,005	324
Number of emergency department visits	70,981	8,231	59,977	2,773

Health system costs in 2019

Cost per ED visit: USD PPP 87.55 [EUR 30.20]

Cost per hospital inpatient bed day: USD PPP 226.97 [EUR 78.29]

ED visits	Inpatient	Total
USD PPP 6,214,526	USD PPP 12,042,798	USD PPP 18,257,324
EUR 2,143,721	EUR 4,154,202	EUR 6,297,923

Netherlands

Sub-region: A

Population size in 2019: 17,363,262

Health spending per capita in 2019 (USD PPP): 5,335

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	7,764	853	4,748	2,163
Number of hospital admissions	148,335	6,401	137,965	3,969
Number of emergency department visits	1,269,995	54,800	1,181,210	33,985

Health system costs in 2019

Cost per ED visit: USD PPP 313.11 [EUR 248.75]

Cost per hospital inpatient bed day: USD PPP 853.06 [EUR 677.71]

ED visits	Inpatient	Total
USD PPP 397,642,260	USD PPP 809,847,712	USD PPP 1,207,489,972
EUR 315,905,700	EUR 643,381,085	EUR 959,286,786

North Macedonia

Sub-region: B

Population size in 2019: 2,114,176

Health spending per capita in 2019 (USD PPP): 437

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	743	199	289	255
Number of hospital admissions	26,521	2,947	22,750	823
Number of emergency department visits	227,060	25,234	194,781	7,045

Health system costs in 2019

Cost per ED visit: USD PPP 72.88 [MKD 1385.36]

Cost per hospital inpatient bed day: USD PPP 187.40 [MKD 3562.40]

ED visits	Inpatient	Total
USD PPP 16,547,458	USD PPP 31,807,737	USD PPP 48,355,195
MKD 314,559,863	MKD 604,651,026	MKD 919,210,889

Norway

Sub-region: A

Population size in 2019: 5,348,279

Health spending per capita in 2019 (USD PPP): 8,007

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	2,433	252	1,586	595
Number of hospital admissions	46,246	1,614	43,220	1,411
Number of emergency department visits	395,941	13,820	370,038	12,083

Health system costs in 2019

Cost per ED visit: USD PPP 457.89 [NOK 4567.55]

Cost per hospital inpatient bed day: USD PPP 1148.71 [NOK 11458.54]

ED visits	Inpatient	Total
USD PPP 181,297,815	USD PPP 339,986,297	USD PPP 521,284,112
NOK 1,808,478,701	NOK 3,391,425,187	NOK 5,199,903,888

Poland

Sub-region: B

Population size in 2019: 38,493,601

Health spending per capita in 2019 (USD PPP): 1,014

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	21,047	4,287	9,561	7,199
Number of hospital admissions	529,185	61,353	454,195	13,637
Number of emergency department visits	4,530,697	525,282	3,888,659	116,756

Health system costs in 2019

Cost per ED visit: USD PPP 129.98 [PLN 232.30]

Cost per hospital inpatient bed day: USD PPP 337.71 [PLN 603.54]

ED visits	Inpatient	Total
USD PPP 588,906,285	USD PPP 1,143,736,224	USD PPP 1,732,642,508
PLN 1,052,473,289	PLN 2,044,046,492	PLN 3,096,519,781

Portugal

Sub-region: A

Population size in 2019: 10,289,923

Health spending per capita in 2019 (USD PPP): 2,221

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	4,885	1,092	2,268	1,524
Number of hospital admissions	66,034	3,463	60,266	2,306
Number of emergency department visits	565,359	29,648	515,972	19,739

Health system costs in 2019

Cost per ED visit: USD PPP 187.18 [EUR 107.85]

Cost per hospital inpatient bed day: USD PPP 471.35 [EUR 271.57]

ED visits	Inpatient	Total
USD PPP 105,825,832	USD PPP 199,202,136	USD PPP 305,027,968
EUR 60,972,506	EUR 114,772,103	EUR 175,744,609

Republic of Moldova

Sub-region: C

Population size in 2019: 3,109,491

Health spending per capita in 2019 (USD PPP): 284

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	2,382	392	1,232	758
Number of hospital admissions	35,595	5,091	29,096	1,408
Number of emergency department visits	304,752	43,587	249,111	12,054

Health system costs in 2019

Cost per ED visit: USD PPP 17.56 [MDL 102.09]

Cost per hospital inpatient bed day: USD PPP 44.41 [MDL 258.20]

ED visits	Inpatient	Total
USD PPP 5,351,249	USD PPP 10,116,589	USD PPP 15,467,839
MDL 31,113,283	MDL 58,819,966	MDL 89,933,249

Romania

Sub-region: B

Population size in 2019: 19,524,211

Health spending per capita in 2019 (USD PPP): 739

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	9,753	2,676	4,513	2,564
Number of hospital admissions	241,802	22,188	213,226	6,388
Number of emergency department visits	2,070,221	189,968	1,825,563	54,690

Health system costs in 2019

Cost per ED visit: USD PPP 97.64 [RON 167.49]

Cost per hospital inpatient bed day: USD PPP 248.14 [RON 425.67]

ED visits	Inpatient	Total
USD PPP 202,133,407	USD PPP 384,003,924	USD PPP 586,137,331
RON 346,744,841	RON 658,730,198	RON 1,005,475,039

Russian Federation

Sub-region: C

Population size in 2019: 145,742,287

Health spending per capita in 2019 (USD PPP): 653

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	140,330	23,415	55,467	61,448
Number of hospital admissions	1,858,660	332,577	1,430,336	95,747
Number of emergency department visits	15,913,183	2,847,402	12,246,031	819,750

Health system costs in 2019

Cost per ED visit: USD PPP 128.00 [RUB 3179.18]

Cost per hospital inpatient bed day: USD PPP 356.39 [RUB 8852.18]

ED visits	Inpatient	Total
USD PPP 2,036,809,849	USD PPP 4,239,442,319	USD PPP 6,276,252,168
RUB 50,590,814,637	RUB 105,300,374,812	RUB 155,891,189,449

San Marino

Sub-region: A

Population size in 2019: 34,178

Health spending per capita in 2019 (USD PPP): 3,051

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	14	3	6	4
Number of hospital admissions	224	15	201	8
Number of emergency department visits	1,915	129	1,720	65

Health system costs in 2019

Cost per ED visit: USD PPP 439.57 [EUR 295.50]

Cost per hospital inpatient bed day: USD PPP 1108.12 [EUR 744.92]

ED visits	Inpatient	Total
USD PPP 841,827	USD PPP 1,586,372	USD PPP 2,428,199
EUR 565,908	EUR 1,066,418	EUR 1,632,326

Serbia

Sub-region: B

Population size in 2019: 7,401,056

Health spending per capita in 2019 (USD PPP): 641

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	3,925	839	1,347	1,739
Number of hospital admissions	107,597	11,588	92,463	3,547
Number of emergency department visits	921,209	99,209	791,631	30,369

Health system costs in 2019

Cost per ED visit: USD PPP 67.95 [RSD 2818.03]

Cost per hospital inpatient bed day: USD PPP 172.95 [RSD 7172.98]

ED visits	Inpatient	Total
USD PPP 62,591,869	USD PPP 119,095,501	USD PPP 181,687,369
RSD 2,595,990,260	RSD 4,939,471,605	RSD 7,535,461,865

Slovakia

Sub-region: B

Population size in 2019: 5,453,924

Health spending per capita in 2019 (USD PPP): 1,342

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	2,758	509	1,435	814
Number of hospital admissions	80,269	7,455	70,705	2,108
Number of emergency department visits	687,231	63,831	605,349	18,051

Health system costs in 2019

Cost per ED visit: USD PPP 139.28 [EUR 75.13]

Cost per hospital inpatient bed day: USD PPP 349.27 [EUR 188.40]

ED visits	Inpatient	Total
USD PPP 95,720,306	USD PPP 179,426,346	USD PPP 275,146,652
EUR 51,633,448	EUR 96,786,159	EUR 148,419,607

Slovenia

Sub-region: A

Population size in 2019: 2,112,902

Health spending per capita in 2019 (USD PPP): 2,219

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	1,400	162	808	429
Number of hospital admissions	34,919	3,008	31,134	777
Number of emergency department visits	298,961	25,757	266,555	6,650

Health system costs in 2019

Cost per ED visit: USD PPP 206.69 [EUR 117.77]

Cost per hospital inpatient bed day: USD PPP 515.09 [EUR 293.50]

ED visits	Inpatient	Total
USD PPP 61,792,632	USD PPP 115,112,673	USD PPP 176,905,305
EUR 35,209,380	EUR 65,591,086	EUR 100,800,466

Spain

Sub-region: A

Population size in 2019: 47,131,372

Health spending per capita in 2019 (USD PPP): 2,711

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	16,175	3,158	8,918	4,100
Number of hospital admissions	347,359	18,647	320,727	7,984
Number of emergency department visits	2,973,960	159,652	2,745,952	68,356

Health system costs in 2019

Cost per ED visit: USD PPP 221.58 [EUR 140.30]

Cost per hospital inpatient bed day: USD PPP 591.42 [EUR 374.47]

ED visits	Inpatient	Total
USD PPP 658,958,995	USD PPP 1,314,782,946	USD PPP 1,973,741,941
EUR 417,236,362	EUR 832,487,692	EUR 1,249,724,054

Sweden

Sub-region: A

Population size in 2019: 10,267,922

Health spending per capita in 2019 (USD PPP): 5,671

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	4,686	420	2,776	1,490
Number of hospital admissions	81,947	2,972	75,331	3,644
Number of emergency department visits	701,601	25,447	644,959	31,195

Health system costs in 2019

Cost per ED visit: USD PPP 303.54 [SEK 2731.17]

Cost per hospital inpatient bed day: USD PPP 769.37 [SEK 6922.56]

ED visits	Inpatient	Total
USD PPP 212,965,309	USD PPP 403,506,013	USD PPP 616,471,321
SEK 1,916,189,440	SEK 3,630,609,910	SEK 5,546,799,350

Switzerland

Sub-region: A

Population size in 2019: 8,575,589

Health spending per capita in 2019 (USD PPP): 9,666

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	4,284	407	2,651	1,226
Number of hospital admissions	94,719	3,691	88,861	2,167
Number of emergency department visits	810,953	31,604	760,792	18,557

Health system costs in 2019

Cost per ED visit: USD PPP 384.28 [CHF 452.40]

Cost per hospital inpatient bed day: USD PPP 1043.32 [CHF 1228.27]

ED visits	Inpatient	Total
USD PPP 311,635,567	USD PPP 632,464,317	USD PPP 944,099,884
CHF 366,878,892	CHF 744,580,634	CHF 1,111,459,526

Tajikistan

Sub-region: B

Population size in 2019: 9,337,003

Health spending per capita in 2019 (USD PPP): 62

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	2,999	771	1,530	699
Number of hospital admissions	74,765	5,371	67,301	2,093
Number of emergency department visits	640,111	45,983	576,207	17,921

Health system costs in 2019

Cost per ED visit: USD PPP 6.99 [TJS 15.89]

Cost per hospital inpatient bed day: USD PPP 19.09 [TJS 43.41]

ED visits	Inpatient	Total
USD PPP 4,472,227	USD PPP 9,136,396	USD PPP 13,608,623
TJS 10,168,286	TJS 20,772,984	TJS 30,941,270

Türkiye

Sub-region: B

Population size in 2019: 83,481,684

Health spending per capita in 2019 (USD PPP): 396

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	22,226	8,324	9,392	4,510
Number of hospital admissions	473,983	41,458	408,788	23,736
Number of emergency department visits	4,058,073	354,950	3,499,900	203,223

Health system costs in 2019

Cost per ED visit: USD PPP 90.28 [TRY 173.90]

Cost per hospital inpatient bed day: USD PPP 232.53 [TRY 447.91]

ED visits	Inpatient	Total
USD PPP 366,351,937	USD PPP 705,375,378	USD PPP 1,071,727,315
TRY 705,687,983	TRY 1,358,734,260	TRY 2,064,422,243

Turkmenistan

Sub-region: B

Population size in 2019: 6,158,420

Health spending per capita in 2019 (USD PPP): 500

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	1,701	291	754	656
Number of hospital admissions	41,806	2,942	37,254	1,610
Number of emergency department visits	357,927	25,188	318,956	13,783

Health system costs in 2019

Cost per ED visit: USD PPP 40.30 [TMT 66.29]

Cost per hospital inpatient bed day: USD PPP 103.96 [TMT 171.02]

ED visits	Inpatient	Total
USD PPP 14,422,966	USD PPP 27,815,283	USD PPP 42,238,248
TMT 23,726,190	TMT 45,756,933	TMT 69,483,123

Ukraine

Sub-region: C

Population size in 2019: 44,211,095

Health spending per capita in 2019 (USD PPP): 248

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	43,935	7,471	17,222	19,241
Number of hospital admissions	544,397	78,358	434,894	31,145
Number of emergency department visits	4,660,929	670,872	3,723,403	266,654

Health system costs in 2019

Cost per ED visit: USD PPP 44.77 [UAH 317.40]

Cost per hospital inpatient bed day: USD PPP 111.24 [UAH 788.72]

ED visits	Inpatient	Total
USD PPP 208,646,967	USD PPP 387,565,507	USD PPP 596,212,474
UAH 1,479,401,081	UAH 2,748,014,216	UAH 4,227,415,297

United Kingdom

Sub-region: A

Population size in 2019: 66,778,659

Health spending per capita in 2019 (USD PPP): 4,313

Injury pyramid (GBD 2019)

	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	21,125	2,887	12,272	5,967
Number of hospital admissions	536,960	20,863	501,079	15,018
Number of emergency department visits	4,597,256	178,625	4,290,056	128,576

Health system costs in 2019

Cost per ED visit: USD PPP 259.31 [GBP 178.42]

Cost per hospital inpatient bed day: USD PPP 680.21 [GBP 468.03]

ED visits	Inpatient	Total
USD PPP 1,192,106,511	USD PPP 2,337,579,377	USD PPP 3,529,685,887
GBP 820,238,421	GBP 1,608,390,191	GBP 2,428,628,612

Uzbekistan

Sub-region: B

Population size in 2019: 32,976,948

Health spending per capita in 2019 (USD PPP): 99

Injury pyramid (GBD 2019)


	Injuries	Road and other transport	Other unintentional	Self-harm and interpersonal violence
Number of deaths	15,272	5,088	5,414	4,770
Number of hospital admissions	284,717	30,724	244,023	9,970
Number of emergency department visits	2,437,644	263,049	2,089,236	85,359

Health system costs in 2019

Cost per ED visit: USD PPP 10.89 [UZS 22421.86]

Cost per hospital inpatient bed day: USD PPP 27.97 [UZS 57576.90]

ED visits	Inpatient	Total
USD PPP 26,553,191	USD PPP 50,970,182	USD PPP 77,523,372
UZS 54,656,521,976	UZS 104,915,935,490	UZS 159,572,457,466



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