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European Injury Data Base (EU-IDB): data analysis 2021-2022

A. Carannante, M. Giustini, G. Fondi, R. Bauer, T. Fian, H. Valkenberg, S. Nijman, T. Alves, A. Pitidis for the EU-IDB Working Group

EPIDEMIOLOGIA E SANITÀ PUBBLICA

ISTITUTO SUPERIORE DI SANITÀ

European Injury Data Base (EU-IDB): data analysis 2021-2022

Anna Carannante (a), Marco Giustini (a), Gianni Fondi (a), Robert Bauer (b), Tabea Fian (b), Huib Valkenberg (c), Susanne Nijman (c), Tatiana Alves (d), Alessio Pitidis (e) for the EU-IDB Working Group

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Rapporti ISTISAN 24/22

Istituto Superiore di Sanità
European Injury DataBase (EU-IDB): data analysis 2021-2022.
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2024, iii, 47 p. Rapporti ISTISAN 24/22

The EU-IDB (European Injury Database) contains cross-national data on the external causes and circumstances of injuries treated in the Emergency Departments of hospitals. Its primary purpose is to facilitate the development and evaluation of injury prevention policies and programmes, which aim to control external risks. The information is complementary to death and hospital discharge statistics and specific surveillance systems on road and workplace accidents. Unique is the wealth of information about external circumstances of injuries as needed for evidence-based prevention actions. The IDB data are collected by dedicated national agencies and provided to the Istituto Superiore di Sanità (the National Institute of Health in Italy) which hosts the database. At the European level, the system is legally based on the Council Recommendation C164 on the prevention of injury and the promotion of safety and the Regulation (EC) 1338/2008 on community statistics on public health and health and safety at work.
Key words: Public health surveillance; Accidents, home; Accidents, traffic; Violence; Primary prevention

Istituto Superiore di Sanità
Banca dati europea sugli infortuni (EU-IDB): analisi dei dati 2021-2022.
Anna Carannante, Marco Giustini, Gianni Fondi, Robert Bauer, Tabea Fian, Huib Valkenberg, Susanne Nijman, Tatiana Alves, Alessio Pitidis per il gruppo di lavoro EU-IDB
2024, iii, 47 p. Rapporti ISTISAN 24/22 (in inglese)

La banca dati europea sugli infortuni (*European Injury Database*, EU-IDB) contiene dati transnazionali sulle cause e le circostanze esterne delle lesioni trattate nei Dipartimenti di Emergenza degli ospedali. Il suo scopo principale è quello di facilitare lo sviluppo e la valutazione delle politiche e dei programmi di prevenzione delle lesioni, che mirano a controllare i rischi esterni. Le informazioni sono complementari alle statistiche sui decessi e sulle dimissioni ospedaliere e ai sistemi di sorveglianza specifici sugli incidenti stradali e sul lavoro. Unica è la ricchezza di informazioni sulle circostanze esterne degli infortuni, necessarie per azioni di prevenzione basate sull'evidenza. I dati dell'IDB sono raccolti da agenzie nazionali dedicate e forniti all'Istituto Superiore di Sanità che ospita la banca dati. A livello europeo, il sistema si basa giuridicamente sulla Raccomandazione del Consiglio Europeo C164 sulla prevenzione degli infortuni e la promozione della sicurezza e sul Regolamento (CE) 1338/2008 sulle statistiche comunitarie in materia di sanità pubblica e salute e sicurezza sul luogo di lavoro.
Parole chiave: Sorveglianza in sanità pubblica; Incidenti domestici; Incidenti stradali; Violenza; Prevenzione di base

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INTRODUCTION

Injury surveillance is a critical component of public health systems in Europe, playing a vital role in preventing injuries and reducing their impact on individuals and healthcare systems. As a systematic collection, analysis, and interpretation of injury data, injury surveillance provides the foundation for informed decision-making and effective policy development.

Key benefits include:

- *Identifying trends*
  Surveillance data helps recognize common causes and high-risk groups, guiding targeted interventions.
- *Evaluating interventions*
  By analysing data over time, authorities can assess and improve the effectiveness of injury prevention programs.
- *Resource allocation*
  Insight into injury burdens aids in efficiently distributing healthcare resources.
- *Policy development*
  Data-driven insights support the creation of safety regulations and legislation to reduce injury rates.
- *Public awareness*
  Data informs educational campaigns to raise awareness and promote safe behaviours.
- *Comparative analysis*
  Standardized data allows for cross-country comparisons and sharing of best practices.
- *Addressing emerging issues*
  Surveillance helps identify new injury risks, enabling proactive responses.

The European Injury Database (EU-IDB) plays a pivotal role in facilitating injury surveillance across Europe, serving as a comprehensive resource for collecting and analysing data on injuries The EU-IDB is an epidemiological surveillance system focused mainly on the external causes of injuries. It is based on hospital Emergency Department (ED) registers and data are collected in a cross-national sample of hospitals using a common format for recording injuries treated in hospitals.

This data collection is complementary to current population-based vital statistics on injuries: mortality registers, hospital discharge registers, dedicated registers (i.e., road traffic or labour accidents) and health surveys.

The EU-IDB statistics consent to assess the burden of injuries (according to age, gender and type of injury) by external cause: mechanism of injury, intent, place of occurrence (home, school, sport, leisure, work and road). Furthermore, detailed information is included on items, objects or substances involved in the accident (underlying or causing the injury). This information on causes of injuries can improve the use and design of regulations related to products such as: toys, electric appliances, tools or building structures, as well as medication and drug use.

In addition, EU-IDB, in case of intent is interpersonal violence, supplies information as sex and age group of perpetrators, relationship victim/perpetrator and context of violence, while if intent is intentional self-harm violence gives information about the object/substances and

proximal risk factor involved in the event, providing a unique and precious source of information related to violence events.

The EU-IDB data collection methodology has been developed through the years thanks to successive European projects within the framework of the former European Health Programmes. The original basis was the former European Home and Leisure Accident Surveillance System (EHLASS), which has been expanded to the other domains of accident and violence, so the IDB surveillance data actually include all kinds of injuries recorded with a standard format at European level.

Hospital ED Injury data (secondary health care system) represent very useful information on the health burden of non-fatal injuries. According to the Pyramid of Injuries of the World Health Organization (WHO), deaths represent just the top of the figure while the larger basis of the phenomenon is represented by ED attendances, the most part of the observed injuries and of the related costs of hospital treatment. The methodology of the EU-IDB is a well consolidated standard for collecting injury data in EDs, having the potential to fulfil the Eurostat methodological requirements for European health statistics. The normative bases of the system at European level are the Resolution EUR/RC55/R9 15 September 2005 on accident prevention in the European Region of the WHO (WHO/Europe, 2005), the Council Recommendation C164 on the Prevention of Injury and the Promotion of Safety 2007 (Europe, 2007) and the Regulation (EC) 1338/2008 (Europe, 2008).

The EU-IDB surveillance system is a collaborative network of EU-IDB National Data Administrators (NDAs) operating within the above-mentioned EU legal framework. The NDAs have been designated by their governments as centres of expertise in injury surveillance. The European Association for Injury Prevention (EuroSafe) coordinates the network, assisted by an Advisory Board designated by the EU-IDB NDAs. The Istituto Superiore di Sanità (ISS, the National Institute of Health in Italy) is now hosting the database on its platform. The continuation and further development of the IDB collaborative network across Europe requires a stronger political commitment from EU institutions and member state governments. A binding arrangement for all countries to provide ED-based injury data, in a standard format at European level focused on external causes of injuries and related products, would be extremely helpful in ensuring continued EU-level exchange of vital injury data in the future years.

As previously described (Giustini *et al.*, 2023), the EU-IDB data collection format consists of two types of datasets at different analytical levels, Full Data Set (IDB-FDS) and Minimum Data Set (IDB-MDS).

In the IDB-FDS data set the accident is more detailed description and data on involved substances, products or counterparts are also collected (EuroSafe, 2016a). Most of the countries collect data in the IDB-FDS format in a small sample of hospitals, because the detailed level of information usually requires dedicated and trained staff and assigned financial resources to be collected.

Therefore, IDB-FDS surveillance provides information for the quali-quantitative analyses of external circumstances and injury patterns, such as prevalence studies or analysis of determinants or outcome of injuries (machine learning techniques included) and the IDB-FDS make available detailed information on the products involved in the injury and the narrative of the event in natural language. So that these data could be used for product alert systems and applications of Artificial Intelligence (AI) techniques, such as Natural Language Processing (NLP) procedures for automatic detection of product or mechanism of injury related risks, violence included.

The IDB-MDS, instead, contains less pieces of information as details on items involved in the injury are not included and can be extracted from data coded according to ICD-10 (the International Classification of Diseases – Tenth Revision), ICD-9-CM (International Classification of Diseases – Ninth Revision – Clinical Modification), or the NOMESCO (Nordic

Medico-Statistical Committee) classification, but can be derived from IDB-FDS data too. The IDB-MDS format has been studied for large samples, without noteworthy additional burden to staff, patients and hospital administrations, apart from resources needed for its first implementation and the data flow management (EuroSafe, 2016b). It could be derived by automatically converting current data. The main purpose of IDB-MDS is to provide public health indicators as incidence rates of road, workplace or home accidents, injuries due to assaults or deliberate self-harm. Those are studied to be compatible with the European Core Health Indicators (ECHIs) in the domain of accidents (home and leisure and road traffic accidents in particular) and violence (self-harm included).

Currently, the EU-IDB database contains analytic data on more than 25,7 million cases reported by up to 25 European countries from 2008 to 2022. From up to 19 countries more comprehensive information is available about the circumstances and causes of around 4,9 million injury cases, including details on items involved and narratives on the injury event.

This report aims to illustrate by means of descriptive analyses the main data contained in the IDB system and the core indicators derivable from it in each country and across them. The report's results are important feedback to the national IDB data providing agencies and the external target groups of the report are decision makers and stakeholders in the areas of public health and health information, injury prevention and safety promotion at EU and national level.

Finally, the general public and experts in the field of injury and violence prevention or product safety might also be interested in the contents of the IDB surveillance system.

1. GENERAL OVERVIEW

The ISS hosts the IDB since August 2020 after the signature of a Memorandum of Understanding with the EuroSafe Consortium. The ISS received the Existing Data (ExD) for the years 2008-2018, both in FDS and in MDS formats, from Swansea University (the former IDB data host).

Lately, the ISS received from NDAs the IDB data for 2021 and 2022 and, whenever possible, FDS data were converted into MDS format. Currently, the IDB database consists of 25,73 million ED attendance cases in MDS format, recorded from 25 countries, and 4,94 million ED attendances registered from 19 countries in FDS format (Table 1).

Table 1. EU-IDB total data (2008-2022) for FDS and MDS databases

Country	FDS	MDS
Austria	197,205	197,205
Cyprus	12,313	81,878
Czech Republic	32,666	32,662
Germany	46,832	46,825
Denmark	355,415	3,546,121
Estonia	–	1,192,758
Spain	23,438	23,534
Finland	–	316,696
Greece	772	772
Hungary	3,681	3,681
Ireland	–	24,937
Iceland	–	117,935
Italy	157,726	9,516,283
Latvia	250,165	250,170
Lithuania	–	3,079,276
Luxembourg	146,298	466,649
Malta	136,534	136,413
Netherlands	1,260,700	1,260,649
Norway	–	372,192
Poland	675	14,659
Portugal	989,577	770,242
Romania	4,101	13,969
Sweden	358,721	3,011,625
Slovenia	710,422	935,846
Turkey	259,670	260,926
Total	**4,946,911**	**25,673,903**

Table 2 shows the 2021-2022 data provided to the ISS after the last call for uploading data in April-May 2023, relating to, are provided by 12 countries. Data provided in FDS format only were converted into MDS format. Denmark and Norway, as expected, sent only data in aggregated format. The ISS carried out data cleaning and quality control for all these data to provide a dataset fully compliant with the latest version of the IDB-FDS/MDS Data Dictionary. Data quality control algorithms were developed in the STATA environment, checking the code's correctness and consistencies between variables.

Table 2. EU-IDB 2021-2022 data provided to the ISS by the NDAs after the last call

Country	FDS data	MDS data	Aggregated data
Austria	30,363	–	
Denmark	–	–	495,277
Estonia	–	128,875	
Finland	–	71,687	
Latvia	32,137	–	
Lithuania	–	593,467	
Luxembourg	19,112	54,024	
Netherlands	177,159	177,159	
Norway	–	–	227,378
Portugal	394,671	–	
Sweden	–	5,054	
Turkey	26,946	–.	
Total	**680,388**	**2,059,106**	**722,655**

Every IDB dataset is joined by a national metadata file (recorded in Excel) which provides further information as to the quality of the samples and the method used for the estimation of IDB-rates. The IDB Manual requests that the sample of hospitals is balanced with respect to size (small, middle, large), type of hospitals (general hospital, child hospital, trauma centre, university hospital) and sociological characteristics of their catchment areas (urban and rural area), which seems to be the case for most IDB countries. Not all countries can validate their samples of hospitals in comprehensive demanding way. In small countries, even very few hospitals can cover the majority if not all of ED attendances such as in Luxembourg. Other countries cover very large proportions of their hospitals such as Denmark, Estonia, Lithuania or Sweden. Finland and the Netherlands deliver a random sample of about 10% of all recorded ED attendances. Austria, Portugal, Norway, Latvia and Turkey cover only a little proportion of their hospitals. Italy provided validated data in MDS format until 2018, and not yet validated until 2022. For this reason, Italian data are not considered in this report, which covers validated data only, from 2021-2022.

The 2021-2022 IDB-MDS data account for 2,059,106 cases, whilst the 2021-2022 IDB-FDS data cover 680,388 cases. Whenever possible, data from Denmark (n. 495,277) and Norway (n. 227,378) provided in aggregate form (28x9 table of ECHIs) have been added to these cases.

Compared to the previous year, the number of countries providing data remained stable, but there was an increase in the number of cases, due to the end of COVID-19 pandemic.

While IDB-FDS data provide the basis for qualitative analyses of external circumstances and injury patterns (accident investigation), the main purpose of IDB-MDS is to provide public health indicators such as road, workplace or home accident incidence rates, injuries due to assaults or deliberate self-harm.

This report will focus mainly on the analysis of data in MDS format. The data collected in FDS format will be used to explore the results of the additional modules. The following analyses will cover the data sent to the IDB system in the year 2023 and regarding the ED attendances registered in 2021-2022.

2. IDB-MDS: DATA 2021-2022

2.1. Figures and percentages

Data from Estonia (EE), Finland (FI), Lithuania (LT) and Sweden (SE) have been sent to the ISS in MDS format directly. Data from Austria (AT), Latvia (LV), Luxembourg (LU), The Netherlands (NL), Portugal (PT) and Turkey (TR) have been sent in FDS format and translated into MDS format according to the above-mentioned algorithm. Denmark (DK) and Norway (NO) provided cases in aggregated form only, according to the 28x9 ECHIs template.

Data from these countries will be included in the 2021-2022 data analyses whenever possible. The IDB standards demand that the IDB data collection covers all types of injuries, all age groups, and admissions as well as ambulatory treatments. Not all countries meet these requirements: in some countries (*e.g.,* Portugal) data collection covers only some "domains of prevention".

Overall, for 2021-2022, 3,265,878 ED cases are available (individual and aggregated cases). Analytical data (*i.e.,* individual cases) are 2,543,223 regarding all injuries, of which 394,671 (IDB data from Portugal) concern only Home and Leisure Accidents (HLA).

Figure 1 shows the distribution of all injuries ED cases by age group (54.4% male and 45.6% female). The 9.3% of ED attendances involves people aged between 10 and 14 years, followed by people aged between 15 and 19 years, with the 7.3% of ED attendances, and between 5 and 9 years with 6.5%. The 5.8% involves people aged 85 years or older.

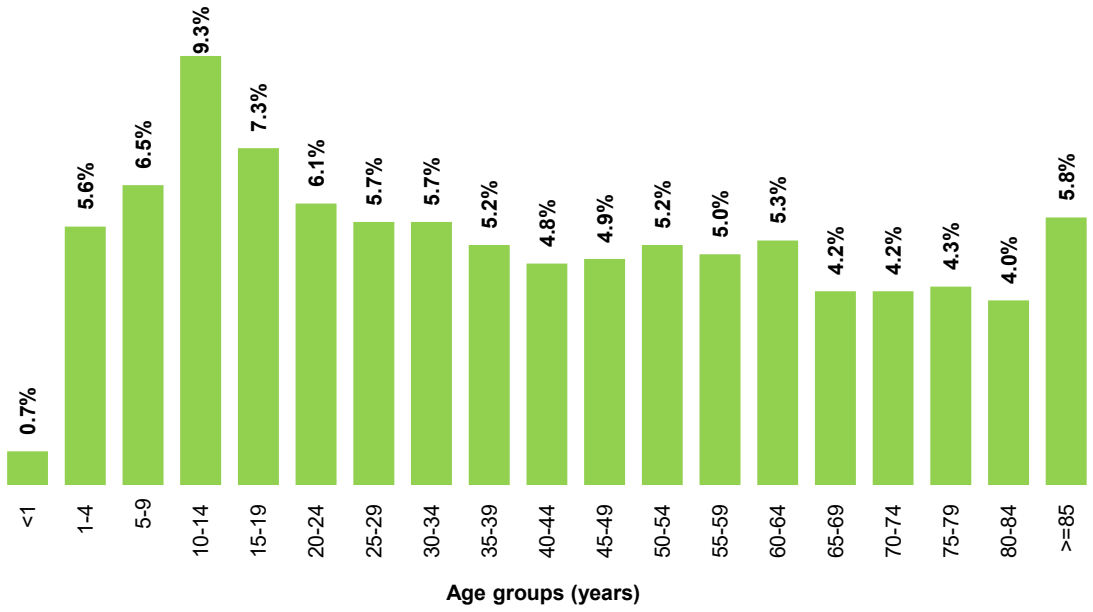


Figure 1. Distribution (%) of IDB-MDS attendances by age groups (EU-IDB, data 2021-2022)

The percentage distribution by wider age groups and countries is shown in Figure 2. Portugal (31.7%), the Netherlands (26.5%) and Sweden (25.2%) show the highest percentage of ED attendance among the age group ≥ 65 years, whilst data from Turkey highlight the lowest percentage of people aged ≥ 65 years (5.0%).

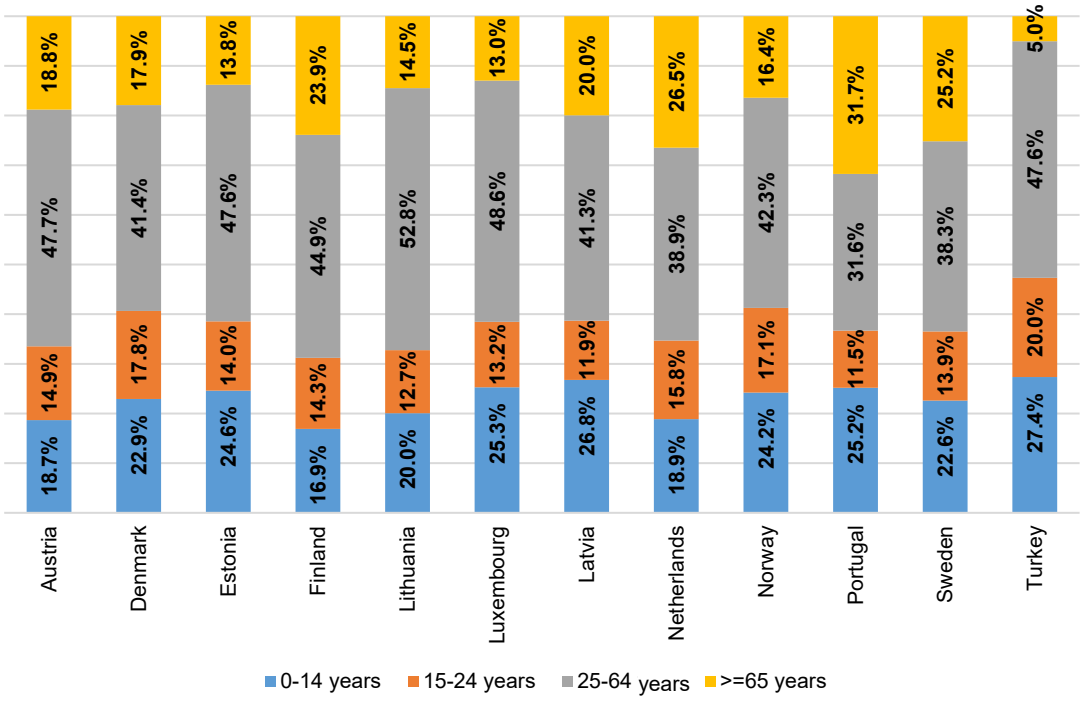


Figure 2. Distribution (%) of IDB-MDS attendances by age groups and countries (EU-IDB, data 2021-2022)

Overall, 11.7% of the ED attendances have been hospitalized. IDB-MDS data show great differences by country, which are not only due to different injury morbidities (Figure 3).

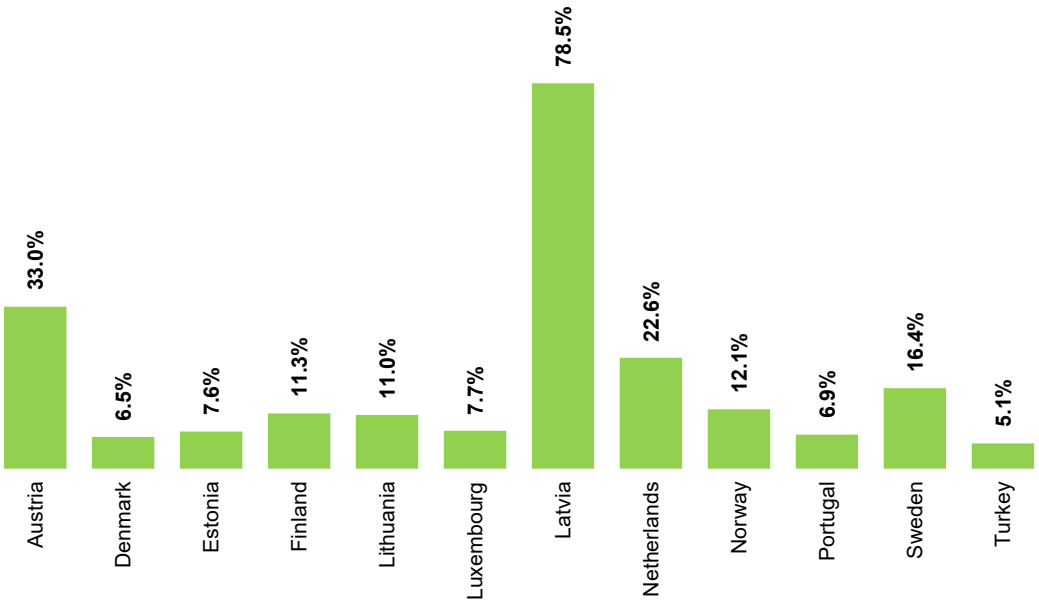


Figure 3. Hospital admissions (%) by countries (EU-IDB, data 2021-2022)

An important factor is the organisation of the national health care system, which results in different accessibility of secondary health care facilities (*e.g.*, in Finland more injured patients are treated in primary health care facilities). Conversely, Latvia primarily (but not limited to) provided injury data from a register collecting cases from all in-patient hospitals. This led to a "biased" and overestimated percentage of hospitalizations. Without data from Latvia, the proportion of hospitalizations drops to 11.3%.

According to the *intent*[1] definition, the MDS Data Dictionary allows the following modality:

- *accidental (unintentional) injury*.
- *deliberate (intentional) self-harm* (including suicide, para-suicide or unsuccessful suicide attempts, self-mutilation and intentional intoxication by alcohol or drugs).
- *assault related injury* (including injury inflicted by law enforcement agent during legal action, injury inflicted by state agency during attempts to enforce the law; execution or injury performed at the behest of judiciary or ruling authority, operations of war or civil conflict and sexual assaults).
- *unknown intent* (including undetermined intent, injury resulting from unknown incident, euthanasia).

The accidental injury was the predominant (92.1%); assault-related injury and deliberate self-harm are a residual share 1.3% and 1.4%, respectively.

Figure 4 shows the distribution of the cases by intent and sex of patient. Females are involved more than twice as often in deliberate self-harm than males (female 2.1%, male 0.8%). Additionally, deliberate self-harm cases have the most severe consequences in terms of hospitalization (46.4% of deliberate self-harm cases have been hospitalized).

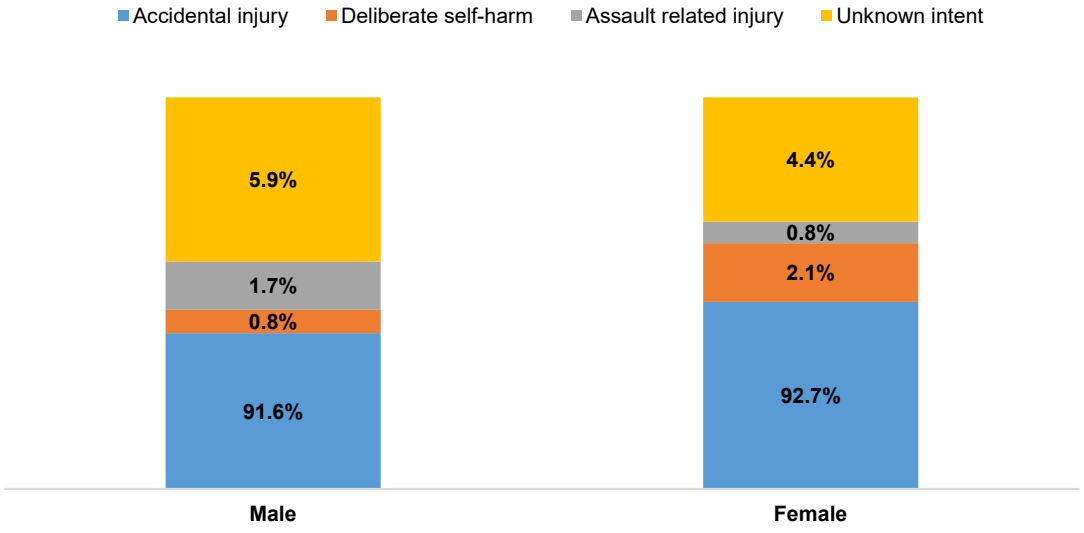
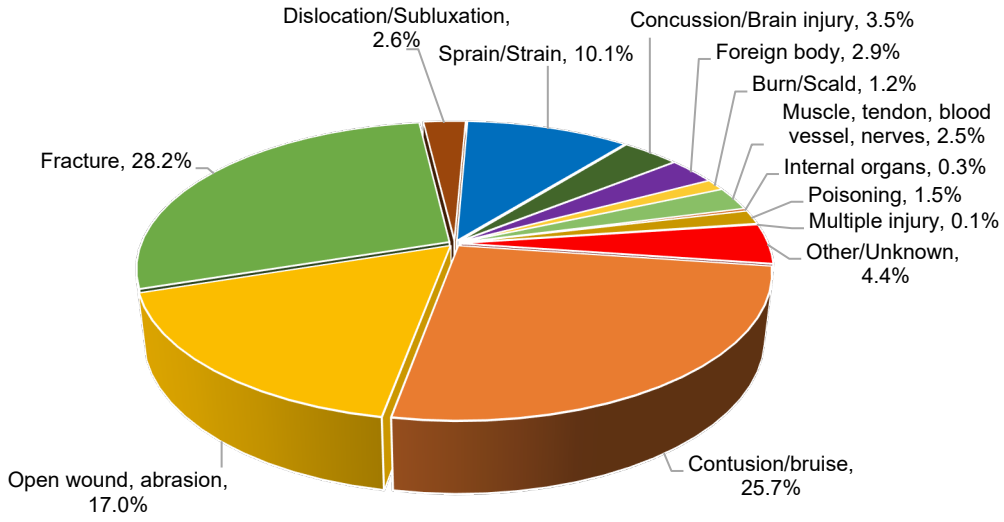


Figure 4. Distribution (%) of cases by intent and sex of patients (EU-IDB, data 2021-2022)

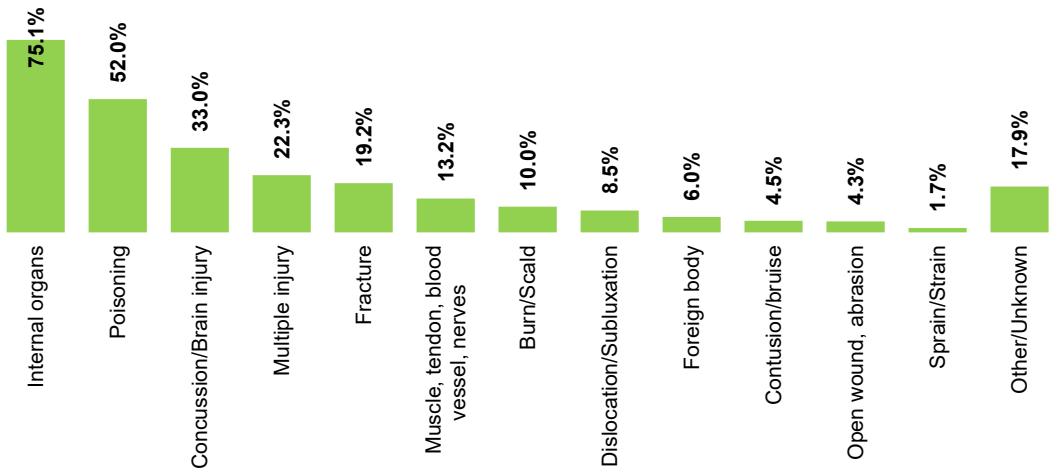
[1] The role of human purpose in the injury event. Intent data provide information about the role of human intent in the occurrence of an injury. This information can affect patient care and guide efforts to prevent injury recurrence.

The most frequently reported types of injury[2] are fracture (28.2%), contusion/bruise (25.7%) and open wound and abrasion (17.0%). Concussion/brain injury, poisoning and internal organs occur less frequently (3.5%, 1.5% and 0.3%, respectively) but with high severity (Figure 5). In fact, in term of hospitalization, the admissions vary widely according to the type of injury and the hospital admission was higher for internal organs injury (75.1%) followed by poisoning (52.0%) and concussion/brain injury (33.0%) (Figure 6). As with regards to the mechanism of injury (Figure 7), the most frequent mechanism is fall (68.5%), followed by road traffic injury with the 8.0%.



Portugal provides HLA cases only

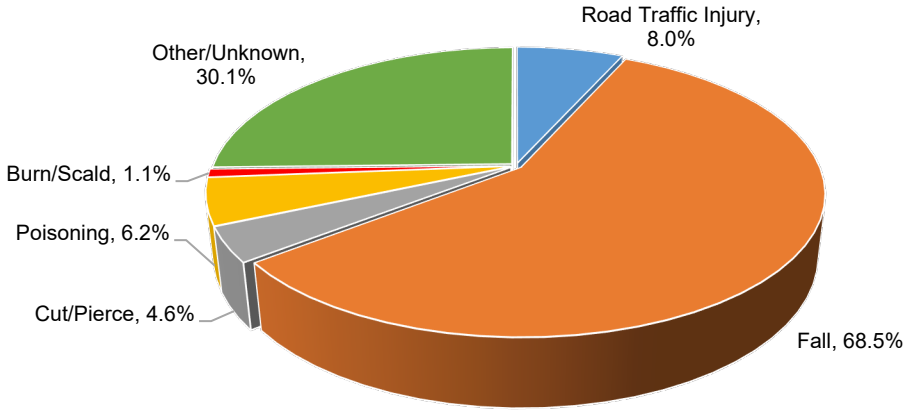
Figure 5. Distribution (%) of cases by type of injury (EU-IDB, data 2021-2022)



Portugal provides HLA cases only

Figure 6. Distribution (%) of hospital admission by type of injury (EU-IDB, data 2021-2022)

[2] Type of injury sustained. The main purpose of this data element (in combination with data element body part injured) is to enable injury cases to be grouped into diagnosis categories.



Portugal provides HLA cases only

Figure 7. Distribution (%) of hospital admission by mechanism of injury (EU-IDB, data 2021-2022)

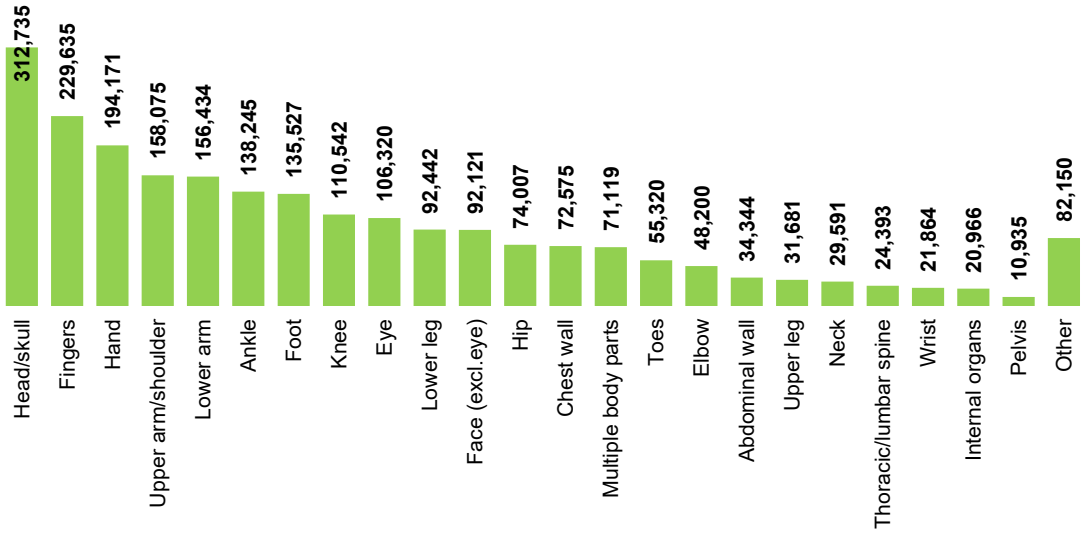
As shown in Table 4, the most frequent type of injury in road traffic accidents is fracture (35.4%), followed by contusion, bruise (29.5%), concussion/brain injury (8.7%) and open wound and abrasion (8.3%). Regarding falls, the most frequent types of injury are fractures (34.5%), contusions, bruises (29.3%), open wound and abrasion (10.2%) and sprain and strains (9.7%). For cut/pierce the most prevalent consequence are open wounds and abrasion (78.1%). As expected, the mechanism "poisoning" has "poisoning" as the most frequent type of injury (71.5%) as well as the mechanism "thermal mechanism" has "burn and scalds" as the main type of injury (89.2%). Data show some unlikely pairings, *e.g.*, poisoning as a mechanism of injury and fracture as a type of injury linked to it. Given the large number of cases, this could be a coding error, although in some circumstances it may not be an impossible scenario.

Table 4. Distribution (%) of cases by type of Injury and mechanism of injury (EU-IDB, data 2021-2022)

Type of injury	Road traffic injury	Fall	Cut Pierce	Burn Scald	Other	Unknown	Total
Contusion, bruise	29.5	29.3	4.2	1.0	0.8	29.5	18.8
Open wound and abrasion	8.3	10.2	78.1	0.6	1.2	17.1	14.6
Fracture	35.4	34.5	2.5	0.2	0.2	19.8	8.9
Dislocation and subluxation	2.6	2.5	0.1	0.0	0.0	2.9	1.5
Sprain and strain	7.2	9.7	0.2	0.0	0.1	7.7	3.7
Concussion/brain injury	8.7	5.4	0.1	0.1	0.1	2.7	3.4
Foreign body	0.1	0.0	2.6	0.6	0.5	8.2	4.1
Burns and scalds	0.1	0.0	0.0	5.2	89.2	0.5	0.9
Injury to muscle, tendon, blood vessels, nerves	1.7	2.1	4.2	0.0	0.0	3.3	1.9
Injury to internal organs	1.1	0.2	0.3	0.0	0.0	0.2	0.2
Poisoning	0.1	0.0	0.0	71.5	1.3	0.3	1.0
Multiple injuries	0.2	0.0	0.1	0.0	0.0	0.1	0.0
Other	0.7	0.6	4.2	20.1	4.2	3.8	2.0
Unknown	4.2	5.3	3.4	0.7	2.2	3.9	39.1

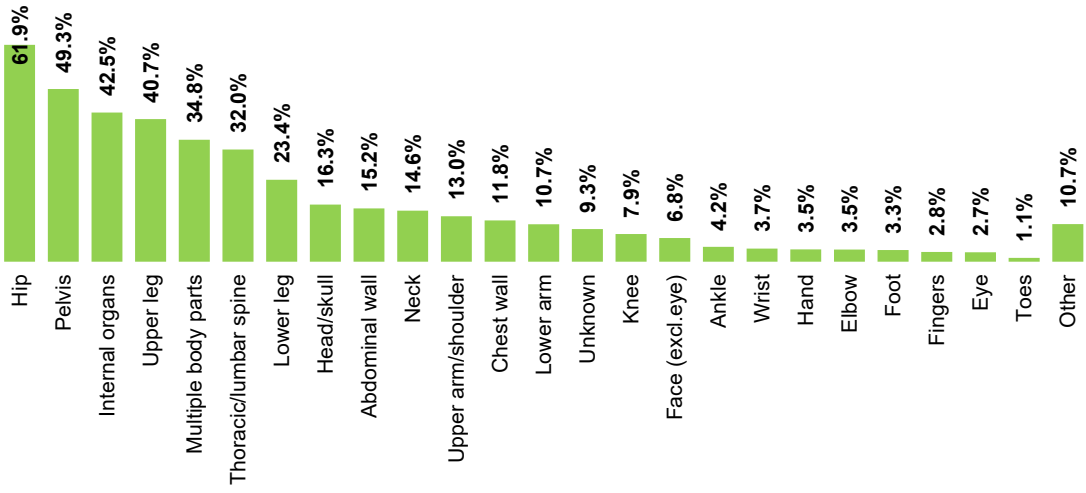
Data from Denmark and Norway not included - Portugal provides HLA cases only.

As shown in Figure 8, the most frequently reported part of the body injured[3] is head/skull (13.6%), followed by fingers (10.0%), hand (8.4%), upper arm/shoulder (6.9%), lower arm (6.8%), ankle (6.0%) and foot (5.9%). The percentages of admission to hospital vary widely according to the main body part injured. It is possible to identify a group of body parts with a very high probability of hospitalisation, either because they are typical injuries of an elderly population or because they are often associated with severe injuries. For the hip, pelvis and internal organs the admission rates are 61.9%, 49.3% and 42.5% respectively. For upper leg, multiple body parts and thoracic/lumbar spine the admission rates are 40.7%, 34.8% and 32.0% respectively (Figure 9).



Data from Denmark and Norway not included - Portugal provides HLA cases only

Figure 8. Distribution of cases (n.) by part of the body injured (EU-IDB, data 2021-2022)



Data from Denmark and Norway not included - Portugal provides HLA cases only

Figure 9. Distribution (%) of hospital admission by part of the body injured (EU-IDB, data 2021-2022)

[3] Region or part of the body where the injury is located. The main purpose of this data element (in combination with the data element type of injury) is to enable cases to be grouped into diagnosis categories.

Tables 5a and 5b report data per part of the body injured. “Contusion, bruise” involves mainly head/skull (14.6%), hand (9.5%), fingers (7.1%) and foot (6.9%). “Open wound and abrasion” affect head/skull (22.2%), fingers (20.3%) hand (11.7%) and face (9.8%). “Fracture” involves mainly lower arm (19.9%), upper arm/shoulder (12.4%), and fingers (9.6%). “Dislocation and subluxation” can be observed mainly for upper arm/shoulder (42.7%), elbow (17.4%), fingers (12.7%) and knee (12.4%). “Sprain and strain” for ankle (45.3%) and knee (20.0%), “Concussion brain injury” for head/skull (79.4%), “Foreign body” for eye (62.0%), internal organs (14.2%) and face (13.2%), “Burns/scalds” for hand (25.8%) and eye (14.3%), “Injury to muscle, tendon, blood vessel and nerves” for lower leg (21.3%), foot (15.7%), hand (14.6%) and upper arm/shoulder (13.6%), finally, “Poisoning” and “Multiple injuries” are the most frequent type of injuries for multiple body parts (83.5% and 5.8%, respectively).

Table 5a. Distribution (%) of cases by body part injured and type of injury (EU-IDB, data 2021-2022)

Body part	Contusion, bruise	Open wound and abrasion	Fracture	Dislocation and subluxation	Sprain and strain	Concussion brain injury	Foreign body
Head/skull	14.6	22.2	0.8	0.0	0.0	79.4	1.1
Face (excl. eye)	2.5	9.8	3.1	3.1	0.1	0.7	13.2
Eye	4.8	4.6	0.3	0.0	0.0	0.5	62.0
Neck	1.4	0.3	0.6	0.6	4.6	0.1	5.5
Thoracic/lumbar spine	0.3	0.0	2.9	0.0	1.1	0.0	0.0
Chest wall	6.0	0.3	4.5	0.0	0.3	0.6	0.0
Abdominal wall	4.0	0.6	0.6	0.0	0.0	0.1	0.2
Internal organs	0.3	0.4	0.0	0.0	0.0	0.0	14.2
Pelvis	0.1	0.0	1.5	0.0	0.0	0.2	0.0
Upper arm/shoulder	5.2	0.8	12.4	42.7	3.4	0.6	0.0
Elbow	3.4	1.1	1.1	17.4	1.9	0.0	0.0
Lower arm	1.7	4.4	19.9	0.0	0.0	0.0	0.0
Wrist	0.2	0.2	0.5	0.9	7.9	0.0	0.0
Hand	9.5	11.7	8.9	0.3	0.8	1.5	0.1
Fingers	7.1	20.3	9.6	12.7	7.1	0.9	0.0
Hip	3.8	0.1	6.6	5.8	0.8	0.6	0.0
Upper leg	0.9	1.6	2.1	0.0	0.0	0.0	0.0
Knee	5.8	2.4	1.2	12.4	20.0	0.0	0.0
Lower leg	2.0	4.6	7.2	0.0	0.0	0.0	0.0
Ankle	1.9	0.7	5.4	1.6	45.3	0.0	0.0
Foot	6.9	3.9	6.1	0.7	5.8	3.1	0.1
Toes	2.8	1.3	4.4	1.6	0.9	0.3	0.0
Multiple body parts	0.9	0.4	0.2	0.0	0.0	0.0	0.0
Other	6.0	1.2	0.1	0.0	0.0	8.3	3.2
Unknown	7.7	7.3	0.1	0.0	0.0	3.0	0.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 5b. Distribution (%) of cases by body part injured and type of injury (EU-IDB, data 2021-2022)

Body part	Burns/ scalds	Injury to muscle, tendon, blood vessel and nerves	Injury to internal organs	Poisoning	Multiple injuries	Other	Unknown
Head/skull	7.5	0.6	6.0	0.0	10.3	4.5	13.1
Face (excl. eye)	1.6	0.1	0.0	0.0	0.1	0.4	1.4
Eye	14.3	0.1	0.0	0.0	0.0	1.3	1.6
Neck	0.3	1.3	0.0	0.0	0.6	0.6	0.3
Thoracic/lumbar spine	0.1	1.6	0.0	0.0	0.0	0.2	0.2
Chest wall	0.7	0.4	0.1	0.0	1.0	0.4	0.7
Abdominal wall	0.7	0.5	0.1	0.0	0.5	0.5	0.3
Internal organs	0.2	0.2	93.6	0.0	0.2	0.2	0.0
Pelvis	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Upper arm/shoulder	0.4	13.6	0.0	0.0	0.3	0.5	0.8
Elbow	0.1	1.3	0.0	0.0	0.0	0.1	0.1
Lower arm	0.9	1.9	0.0	0.0	1.9	0.9	0.2
Wrist	0.3	2.3	0.0	0.0	0.1	0.1	0.0
Hand	25.8	14.6	0.0	0.0	6.4	3.9	2.6
Fingers	1.0	10.6	0.0	0.0	1.4	14.7	1.2
Hip	0.1	0.7	0.0	0.0	0.0	0.1	0.3
Upper leg	0.7	7.7	0.0	0.0	0.3	0.4	0.2
Knee	0.1	3.0	0.0	0.0	0.2	8.4	1.4
Lower leg	0.5	21.3	0.0	0.0	1.5	1.1	0.5
Ankle	0.1	1.5	0.0	0.0	0.1	0.3	0.2
Foot	8.1	15.7	0.0	0.0	1.7	3.0	3.4
Toes	0.1	0.1	0.0	0.0	0.0	0.7	0.2
Multiple body parts	4.2	0.0	0.1	83.5	51.8	54.4	0.7
Other	28.3	0.4	0.0	0.0	19.3	1.4	6.9
Unknown	3.9	0.3	0.0	16.4	2.4	1.9	63.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

2.2. Rates

The NDAs provided 2021 and 2022 reference populations for the following countries: Austria (2021, 2022), Denmark (2021), Estonia (2021), Finland (2021, 2022), Lithuania (2021, 2022), Luxembourg (2021), Latvia (2021, 2022), the Netherlands (2021, 2022), Norway (2021, 2022), Portugal (2021, 2022), and Sweden (2021, 2022). So, it is possible to estimate incidence rates for all countries that provided 2021 and 2022 data (Table 6). However, it should be kept in mind that Portugal only provides data for Home and Leisure accidents. We estimated the incidence rate of all injuries for Portugal by applying a coefficient obtained from the median value of the ratio between Home and Leisure Accident (HLA) and all injuries, calculated for each country (median value=0.65 for 2021 and 0.64 for 2022).

Concerning the representativeness and robustness of the estimated rates, data from Denmark, Estonia, Lithuania, Norway and Sweden cover the whole country; data from Luxembourg about 80%; data from Portugal cover about 27%; data from Finland, Latvia, and the Netherlands approx. 10-15% and data from Austria about 2%.

Table 6. All injury rates (EU-IDB, data 2021 and 2022)

Country	Rates per 100,000 2021	Rates per 100,000 2022
Austria	7,275	7,712
Denmark	8,481	n.a.
Estonia	9,683	n.a.
Finland	6,452	6,450
Latvia	9,812	11,321
Lithuania	10,352	n.a.
Luxembourg	7,406	8,327
Netherlands	3,268	3,694
Norway	5,965	6,203
Portugal*	10,460	11,625
Sweden	4,871	5,054
Turkey	not available	not available

* We estimated the incidence rate of All injuries for Portugal (10,460 and 11,625 cases per 100,000 for 2021 and 2022 respectively) by applying a coefficient obtained from the median value of the ratio between Home and Leisure Accident (HLA) and all injuries, calculated for each country (median value=0.65 and 0.64 for 2021 and 2022 respectively).

Looking at the two years (2021 and 2022) together, the median IDB rate for all injuries is equal to 7,406 cases per 100,000 inhabitants, ranging from 3,268 cases per 100,000 inhabitants in the Netherlands in 2021 to 11,625 cases per 100,000 inhabitants estimated for Portugal in 2022. The median rate confirms an increase in the incidence rate compared to the previous year (-17%).

As pointed out in the recent paper (Giustini *et al.*, 2023), there are various reasons for these differences, which are not only due to different injury morbidity. An important factor being the organisation of the national health care system, which results in different accessibility of secondary health care facilities. The hospital ED based IDB-rate will be lower, if more injury patients are treated in primary health care facilities (*e.g.*, in the Netherlands). Other influencing factors are biased national hospital samples, varying percentages of injuries from foreign residents (workers and tourists), while the denominator for IDB-rates is always the resident population. For example, Luxembourg has a significantly higher percentage of non-residents visiting EDs than other countries (about 11%).

In 2021 and 2022, the population of the 27 Member States was 447.0 million (Eurostat, average population on 1 January 2021-2023), which leads to estimated 33,106,900 injury patients treated in EDs of EU hospitals each year. Eurostat reports for the 27 Member States of the EU (EU-27) in 2021 (the last year for which mortality data are available for all Member States) 232,125 fatalities due to injuries (external causes of death). The general hospitalization rate is 11.7%, which for 2021-2022 leads to an estimated 3,558,800 inpatients in the EU-27 (and 29,240,000 “pure” ED attendances).

This leads to the “injury pyramid” shown in Figure 10. Based on this pyramid, we can estimate that there are about 17 hospitalizations, and 126 ED attendances not followed by hospitalization for each death. For these data, the median of the countries all-injury rates was used (including a projection of the Portugal all-injury rate).

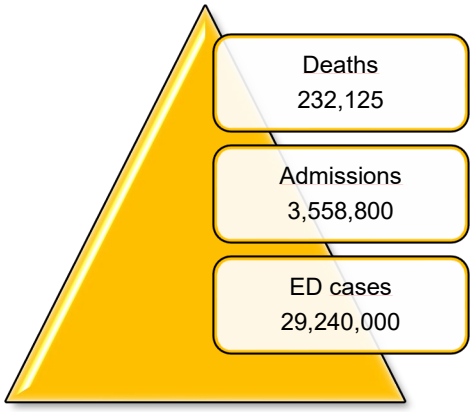


Figure 10. WHO injury pyramid for the EU-27: estimated number of injuries (EU-IDB, data 2021-2022)

According to the mechanism of injury, injury rates and estimated EU-27 cases are shown in Table 7. Probably, some mechanisms (especially road traffic injury)[4] could be affected by an underreporting bias due to many unspecified cases (about 40% of cases report "other" or "unknown" as a mechanism of Injury).

Table 7. IDB rates and estimated EU-27 cases by mechanism of injury (EU-IDB, data 2021-2022)

Mechanism of injury	IDB rates 2021-2022 (average)	Estimated EU cases/year 2021-2022
Road traffic injury	488.1	2,181,824
Fall	3299.0	14,746,460
Cut/pierce	458.8	2,050,687
Poisoning	84.9	379,640
Burn/scald	58.1	259,814
Other/unknown	2838.9	12,689,990

According to the type of injury, injury rates and estimated EU-27 cases are shown in Table 8. Information about the type of injury seems to be easier to obtain in the EDs than information about the external causes of the accidents (*i.e.,* mechanism or activity). Indeed, for this variable, the percentage of unidentified events (other or unknown) is about 6%.

The ECHIs aim to provide comparable information to monitor the state of health at EU level. The data collected by the epidemiological surveillance of the EU-IDB can be converted into three of these indicators:

- ECHI 29b (Home and leisure accidents).
- ECHI 30b (Road traffic accidents).
- ECHI 31 (Workplace accidents).

[4] According to the 2021-2022 IDB-FDS data, 0.38% of the road traffic accidents have Treatment and follow up coded as 07 (deceased before arrival/deceased at ED) or 08 (deceased during hospitalisation). Since the road traffic deaths in EU-27 were 20,669 in 2020, applying the aforementioned percentage we can estimate about 5.6 million of ED attendances for road traffic accidents.

Table 8. IDB rates and estimated EU-27 cases by type of injury (EU-IDB, data 2021-2022)

Type of injury	IDB rates 2021-2022 (average)	Estimated EU cases/year 2021-2022
Contusion, bruise	1677.7	7,499,206
Open wound and abrasion	1146.5	5,125,007
Fracture	2269.5	10,144,643
Dislocation and subluxation	193.6	865,545
Sprain and strain	676.0	3,021,628
Concussion/brain injury	271.2	1,212,485
Foreign body	179.5	802,470
Burns and scalds	86.3	385,742
Injury to muscle and tendon, blood vessels and nerves	293.9	1,313,828
Injury to internal organs	21.7	96,986
Poisoning	98.2	439,081
Multiple injuries	12.8	57,384
Other/unknown	447.0	1,998,309

According to the ECHIs and/or mechanism of injuries, injury rates and estimated EU-27 cases are shown in Table 9. About 56% of all injuries occur at home or during leisure activities (28% at home), while less than 5% are at school. About 11% occur during sports activities. Overall, in two-thirds of accidents, there are a lot of opportunities for prevention through investing appropriate resources in a particularly at-risk groups to contrast accidents with the serious outcome (child, elderly, falls).

Table 9. IDB cases, rates and estimated EU-27 cases by prevention domains (EU-IDB, data 2021-2022)

Prevention domains	IDB figures average 2021-2022	IDB rates average 2021-2022	Estimated EU cases 2021-2022
Home and Leisure accidents (ECHI 29b)	847,633	4142.9	18,518,931
Road Traffic accidents (ECHI 30b)	86,192	481.7	2,153,308
Workplace accidents (ECHI 31)	76,592	492.3	2,200,754
Interpersonal violence	22,174	137.4	614,036
Deliberate Self-Harm	20,853	79.4	354,863
Home accidents	379,091	2072.5	9,264,253
School accidents	58,725	302.2	1,350,965
Sport accidents	134,886	822.2	3,675,284

IDB injury rates by prevention domain and age groups are shown in the Figure 11.

Home accidents hold by far the biggest share of injuries in all age groups, except for the 10-19 age group where sports accidents are the first cause of injury. In the 30-59 years' age group workplace accidents are the second cause of injury, whilst road traffic accidents are the second cause of injury over 60 years' age group. School accidents are the second cause of injury among people under 14 years old of age. Interpersonal violence and deliberate self-harm are noteworthy for persons with 15-24 years.

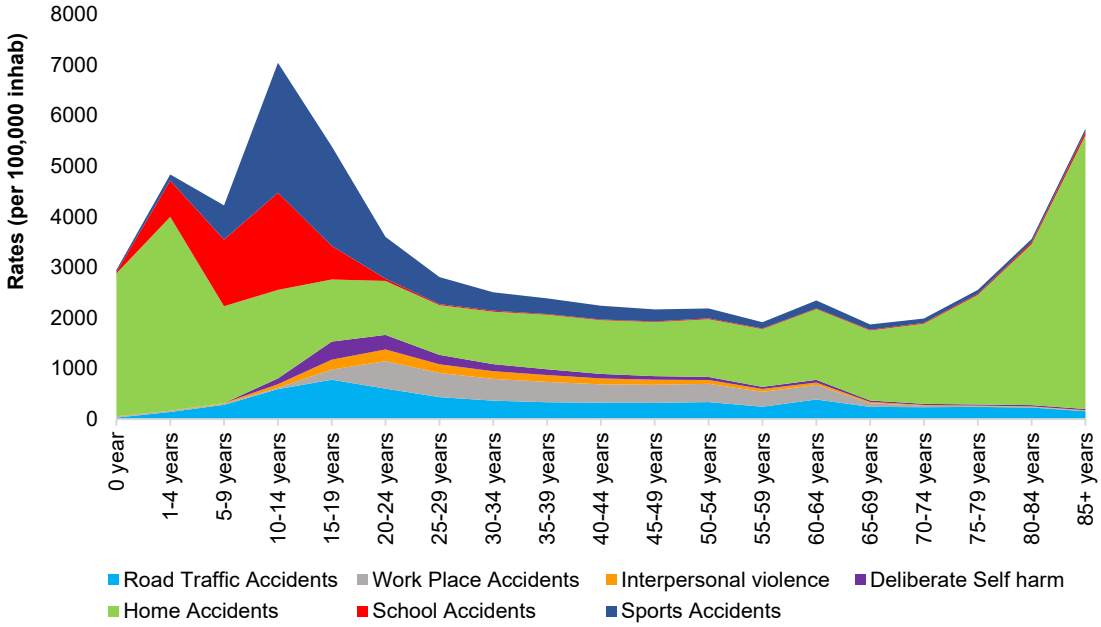


Figure 11. IDB rates (per 100,000) by prevention domains and age groups (EU-IDB, data 2021-2022)

2.3. Trends

As known, both the median and the mean are central tendency measures, commonly used when characterising a data set. Each of them has pros and cons. The mean uses every information in the data set (pros) but it is sensitive to extreme elements. So, if the dataset has very high or very low values, the mean will give an unrealistic picture (cons). The median is suitable for analysing small samples because it is not sensitive to extreme values, and where data dispersion is too much, the median value gives a true picture (pros). On the other hand, the median has no bearing on the shape of data distribution and is not suitable for mathematical calculation (cons). Hence it is not used in many statistical analyses.

The use of the median (*see* Figure 10) of the country rates is a simple and straightforward way of estimating the European rate, but it does not consider countries' difference in population number.

In the following analyses, the weighted average will be used to estimate the IDB rates in Europe. The weighted average considers the importance and frequency of relative factors within a data set. It is a more accurate method than using a simple average calculation.

To estimate the IDB European rates, the crude rates of the countries will be weighted for their respective resident populations.

The rates are weighted as follows:

$$IDB\ EU\ rates = \frac{\sum_{i=1}^{n}(r_i \times w_i)}{\sum_{i=1}^{n} w_i}$$

where: r_i= crude rate of the *i-th* country
w_i= resident population of *i-th* country

Please, note that according to the above-stated formula, the 2021-2022 IDB EU rates show different values respect to what has been reported in the previous section where each country rate had the same weight. Indeed, the EU-IDB all-injury weighted rate is 6,734 cases per 100.000 inhabitants. The corresponding unweighted all-injury rate is 7,860 cases per 100.000 inhabitants, while, as mentioned above, the median value is equal to 7406.

Table 10 shows the weighed and unweighted EU-IDB rates, by prevention domains. As highlighted, the weighted rates are lower than the non-weighted ones. The only exception is road traffic accidents whose weighted rate is higher than the unweighted one. Data from Portugal were included only for HLA prevention domain.

Table 10. EU-IDB rates (per 100,000) by prevention domains (EU-IDB, data 2021-2022)

Prevention domains	EU-IDB rates 2021-2022 (weighted)	EU-IDB rates 2021-2022 (not weighted)
Home and leisure accidents (ECHI 29b)	3944	4529
Road traffic accidents (ECHI 30b)	456	479
Workplace accidents (ECHI 31)	385	574
Interpersonal violence	89	147
Deliberate self-harm	66	84
Home accidents	1388	2230
School accidents	201	358
Sport accidents	696	849

According to Figure 12, the IDB EU all-injury rates trend is relatively stable from 2013 to 2019, with a dramatic drop in 2020 (-19.1%), probably due to the COVID-19 pandemic, but already noticeable in the previous year (-27.1%). Indeed, the COVID-19 changed health-seeking behaviours because individuals became hesitant to seek potentially necessary medical care. As such, there were potential changes in the pattern of injuries and presentations to emergency departments for injuries. Moreover, the decrease highlighted with the EU-IDB data is consistent with the decrease in nonfatal injury-related ED visits in the U.S. between 2019 and 2020 (-17.1%) (Law *et al.*, 2022).

The different composition of the available sample year by year influenced the trend in the weighted rates. Indeed, while the year 2013 can be considered as a true benchmark in terms of representativeness (about 20 countries), in following years the IDB sample has been gradually getting poorer. Thus, if the IDB network loses some high incidence countries, the overall weighted rate will be affected showing a decrease not due to the phenomenon per se. However, there is a core of countries always in the IDB network (Austria, Finland, Lithuania, Latvia, the Netherlands, Norway, Portugal and Sweden) for which it is possible to graph the weighted all injury rate trend without the bias of different sample composition (see the red dashed line). Please, note that, for these countries the number of hospitals providing data remained constant over time. Therefore, there is no evidence of a selection bias in this IDB sample both in the reference population and in the number of hospitals. This sample shows a flat all injury rate trend through 2019, then a marked drop only in 2020 (-20.3%) -and not already evident in 2019 as in the trend for the whole "true" sample (see the blue line)- and a subsequent rise in 2021 and 2022 (+25.4%), going back to pre-covid19 levels. Assuming that the 2013 sample had remained unchanged over time, and that the rates for this virtual sample followed the trend observed in the restricted sample, we have the trend shown by the dotted black line. This suggests that the current figure for the number of ED injury attendances in EU27 may be higher than previously estimated (37,669,200 *vs.* 33,106,900).

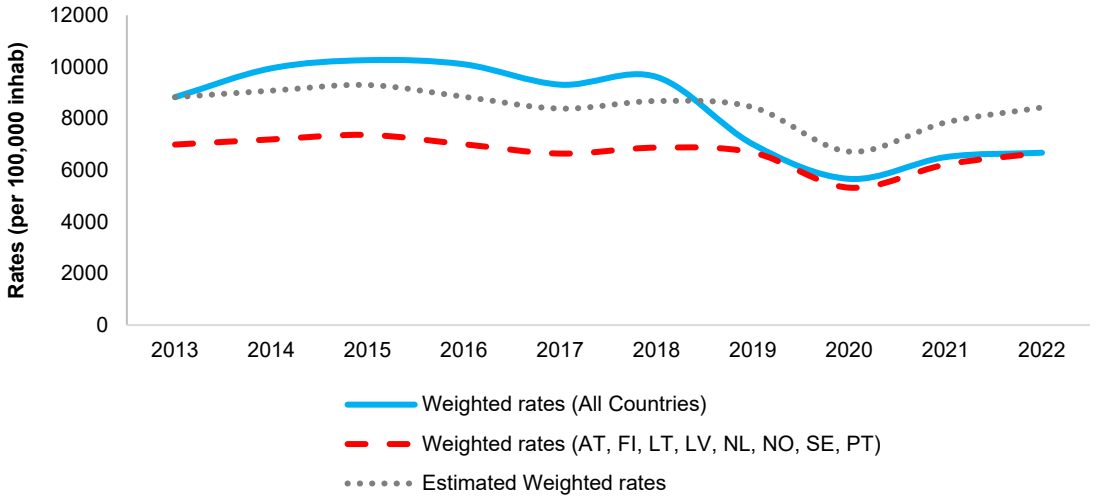


Figure 12. EU-IDB all Injury weighted rates by year (EU-IDB, data 2013-2022)

The average rate reflects different trends country by country. As shown in Figure 13, not all countries experienced a "COVID-19" effect in 2020. The change in all-injury rates between 2019 and 2020 shows huge variability, ranging from -50.8% (Austria) to +23.4% (Finland). The different impact of COVID-19 on the health care status of the countries as well as the different organization of the health systems can explain only part of this variability.

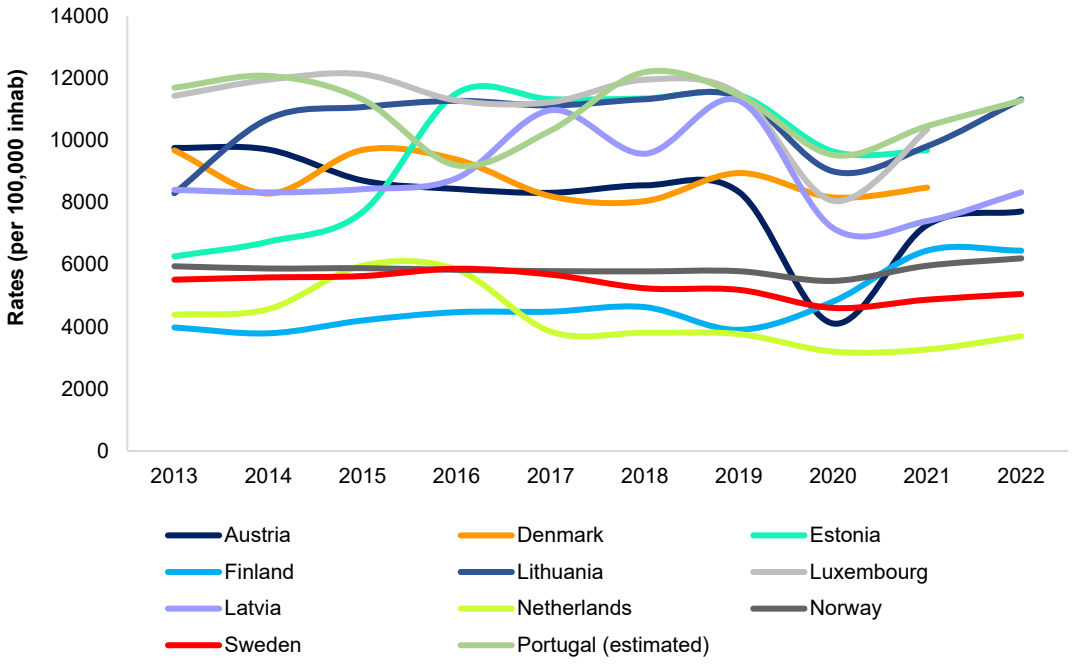


Figure 13. EU-IDB all injury rates by year and countries (EU-IDB, data 2013-2022)

According to the prevention domains, the EU-IDB rates trends are shown as index values in Figure 14. All but one (i.e., deliberate self-harm accidents) the prevention domains showed a dramatic decrease from 2019 and 2020, ranging from -25.3% for interpersonal violence, to -40.6% in school accidents. Consistent with other studies which for the US estimated a reduction of 23-29% (Harmon *et al.*, 2021), the EU-IDB road traffic accidents-related rates decreased by 27.7%. Interestingly, there was not a decrease in self-harm-related rates between 2019 and 2020. Maybe, unlike the general trend, isolation, uncertainty, and stress due to the pandemic contributed to unchanged ED attendance for self-harm injuries.

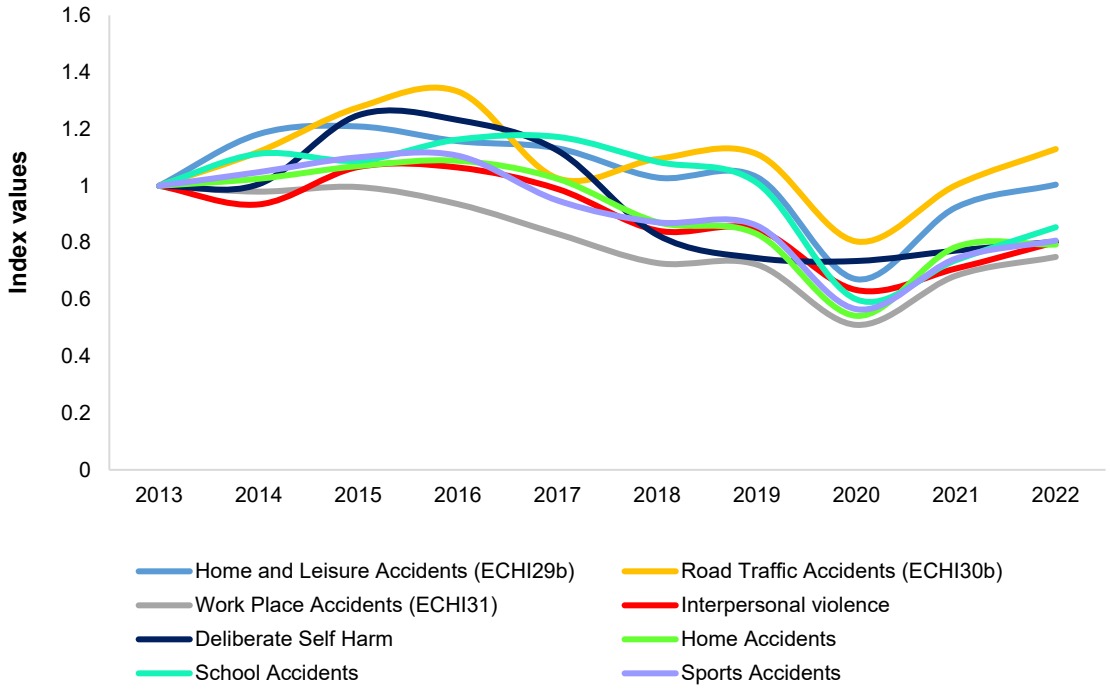


Figure 14. EU-IDB Injury weighted rates by prevention domains and year (EU-IDB, data 2013-2020)

The Figure 15 shows the share of all injury ED attendance by age group and year of attendance. The percentage of ED attendance for 0-14 years was relatively stable from 2013 to 2018, hovering around 20%. A noticeable increase occurred in 2019, reaching 23.2%, and it has remained above 22% since then, suggesting a higher demand for emergency care for this age group in recent years. Data show a gradual decline in the share of ED attendance for 15-24 age group from 2013 (15.1%) to 2017 (13.1%). Since then, the percentage has remained fairly stable, around 13-14%, indicating a levelling off of the trend. The age group 25-64 years consistently has the highest share of ED attendance, though it shows a slight decreasing trend over the years. Indeed, the share dropped from 46.0% in 2013 to 40.8% in 2022, suggesting a relative decrease in ED visits or a redistribution of attendance towards other age groups. There is a gradual increase in the percentage of ED attendance for 65-79 years, rising from 11.2% in 2013 to 13.1% in 2022. This indicates an increasing need for emergency services among the aging population within this age range. Finally, the 80+ years group shows a notable increase in ED attendance, from 7.4% in 2013 to 10.4% in 2022. The trend suggests an increasing demand for emergency care among the oldest segment of the population, likely reflecting health challenges associated with advanced age.

The data indicate a shifting pattern of ED attendance over the years, with an increasing share among the youngest (0-14 years) and older age groups (65+ years). The 25-64 age group remains the largest in terms of attendance, although its share is gradually declining. These trends could be due to various factors, including demographic shifts, changes in healthcare access, or variations in health issues prevalent in different age groups.

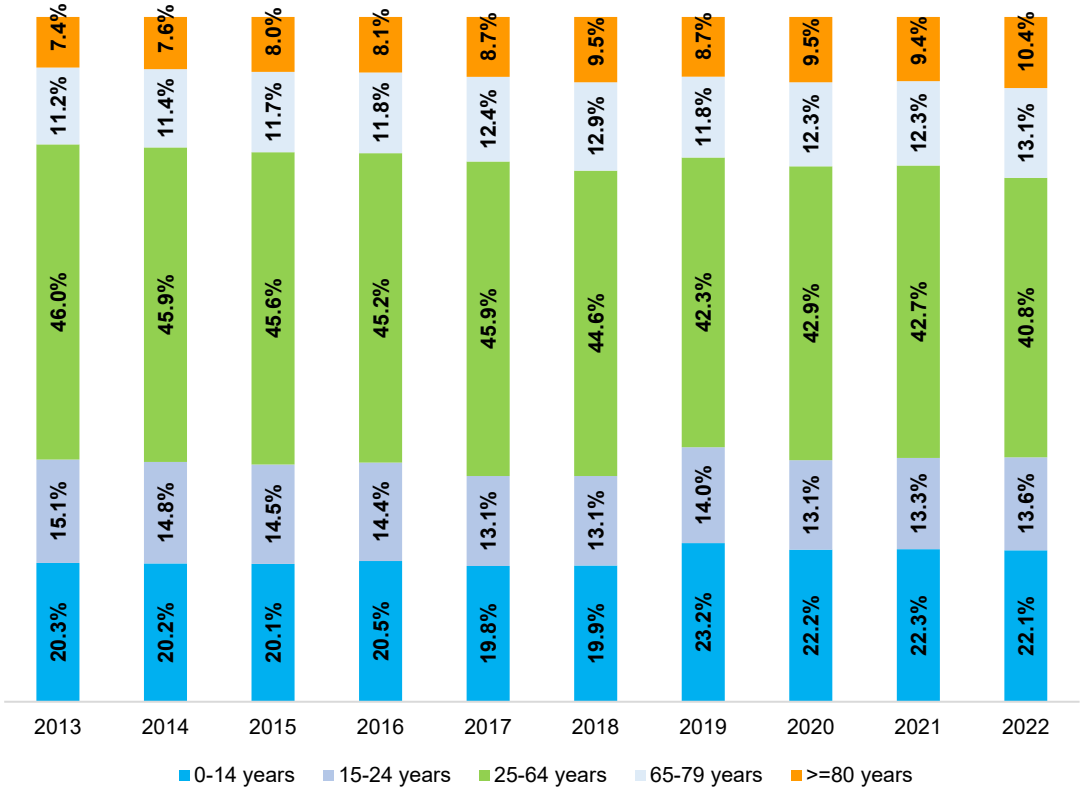


Figure 15. Share of all injury ED attendance by age group and year of attendance (EU-IDB, data 2013-2020)

3. IDB-FDS: DATA 2021-2022

The IDB-FDS includes a lot of details of an injury event, particularly external circumstances of the incidence as place of occurrence, mechanism, activity carried out by the patient when injured and involved substances or products.

At present, IDB-FDS data are collected and shared by six European countries (Austria, Latvia, Luxembourg, the Netherlands, Portugal and Turkey). IDB-FDS data are frequently used to analyse the specific risks of certain activities (*e.g.*, do-it-yourself activities, some types of sport), places (*e.g.*, home bathrooms, school gyms, nursing homes) or consumer products (*e.g.*, power tools, trampolines, firework, furniture, playground-equipment, etc.).

The Core IDB-FDS dataset includes 19 data elements and a free text narrative field. Five optional modules relating to specific injury types can also be completed.

Below is a brief description of the main findings from the analysis of the five modules: Admission, Violence, Intentional self-harm, Transport and Sport.

3.1. Admission module

The admission module provides additional information about the number of days of hospitalization. The purpose of treatment/follow-up is to give a simple indication of the severity and therefore an indication of the burden of injuries.

Information whether the patient was only examined and sent home with or without treatment, treated and referred for further treatment (that include treatment and referred for further treatment as an outpatient and treated and referred to general practitioner for further treatment), admitted to hospital (include treated and admitted to the hospital and deceased during hospitalization), transferred to another hospital, deceased before admission (include decease before arrival/deceased at emergency department-ED) is also collected.

The distribution of treatments can be observed in Figure 16. As previously mentioned, Latvia provided injury data from a register collecting cases from all in-patient hospitals. This led to a "biased" and overestimated percentage of hospitalisations. Excluding data from Latvia, the hospitalizations in the FDS sample dropped from 11.1% to 9.5%. About 44.2% of patients are sent home, with or without treatment and about 33.4% are treated but not admitted. The proportion of injured deceased before arrival or deceased in the ED or during hospitalisation is about 0.16% (*i.e.*, about 1 in 607 ED cases), most of which 942 out of 1068 (88.2%), deceased during hospitalisation.

The average hospitalisation days is 7.7 days (25^{th} and 75^{th} percentile respectively equal to 2 and 10 days). Females show a longer length of stay (8.4 *vs.* 6.9 days), probably due to the higher average age of hospitalised patients (64.9 *vs.* 49.7 years).

As expected, the number of days in hospital rises according to age from 2.5 days in under 1 age group to 10.9 days in the 80-84 age group and 11.0 days in patients older than 85 years (Figure 17). Interestingly, the rate of hospitalisation also increases with age showing a U-shape. Indeed, in children under one year of age, the hospitalisation rate is 10.9%; it decreases to 4.1% between the ages of 10 and 14 and then increases progressively with age, reaching 26.8% over the age of 85 years.

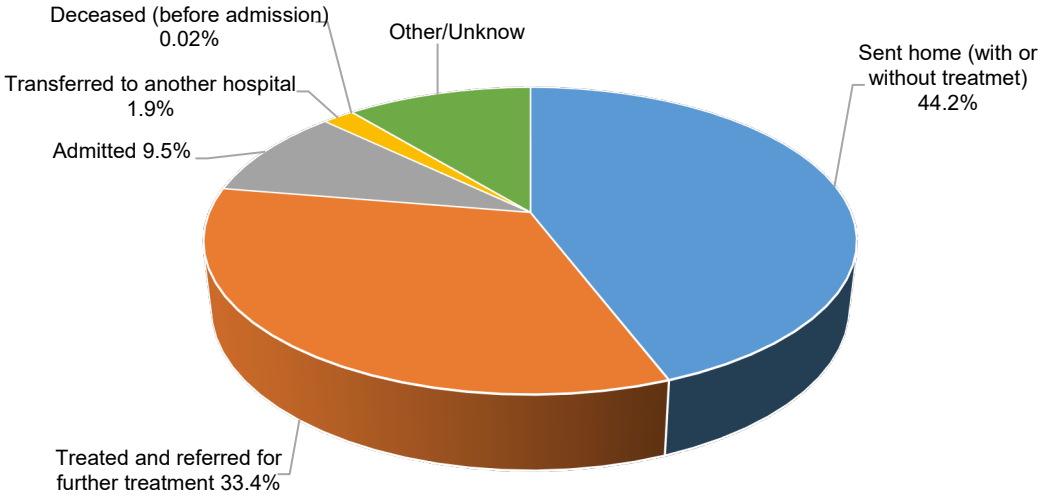


Figure 16. Destination of patients admitted to Emergency Departments (EU-IDB, data 2021-2022)

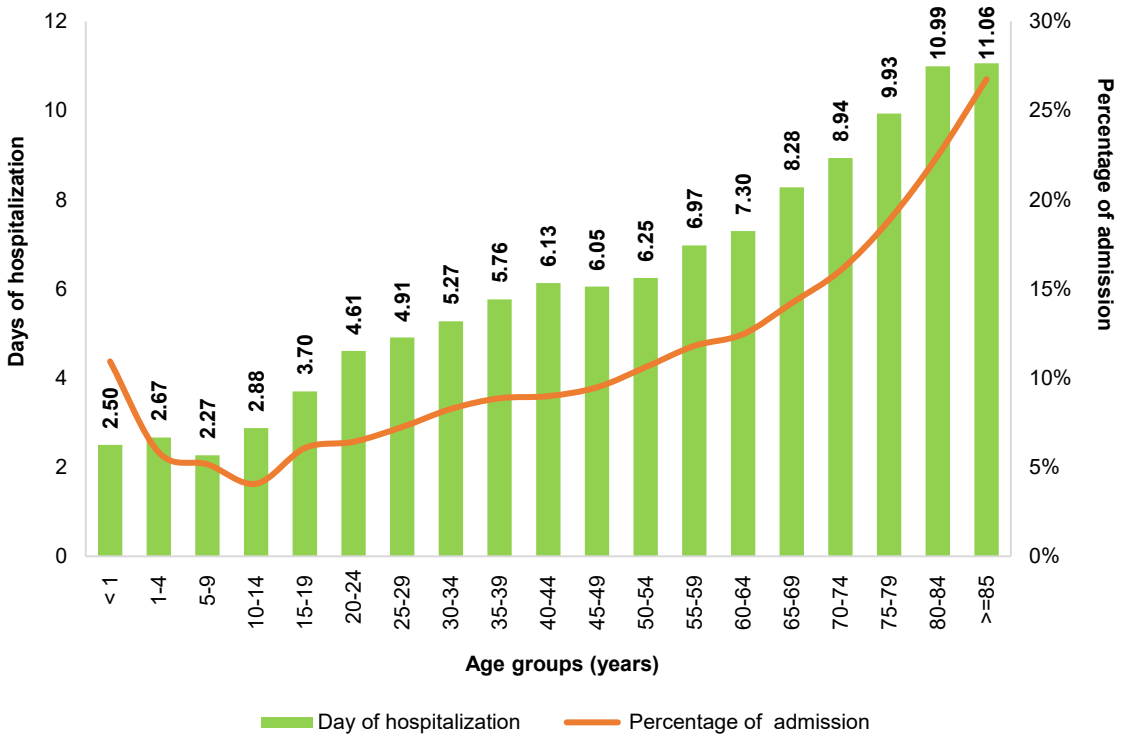


Figure 17. Days in hospital and percentage of admission by age groups (EU-IDB, data 2021-2022)

Figure 18 shows the distribution of cases by mechanism of injury, percentage of admission and average length of stay (in days). Injuries due to blunt forces and thermal mechanism have the higher length of stay (7.6 days and 7.0 days on average), whilst injuries due to threat to breathing,

exposure to chemical or other substance and other mechanical force show the higher percentage of admission (34.7%, 33.9% and 31.8%, respectively).

Analysing the mechanisms of injury in detail, falls show a rather high length of stay (for instance, falling/stumbling by tripping on same level: 9.9 days; falling/stumbling/jumping/pushed on stairs/steps: 8.3 days).

Some rare events show a very high length of stay as follows:

– struck by specified explosive blast: 16.3 days.
– cooling: 12.1 days.
– contact with fire or flame: 9.3 days.
– drowning/near drowning while in a body of water: 9.2 days.
– poisoning by chemical or other substance: 8.6 days.
– abrading, rubbing: 8.5 days.
– strangling: 8.0 days.

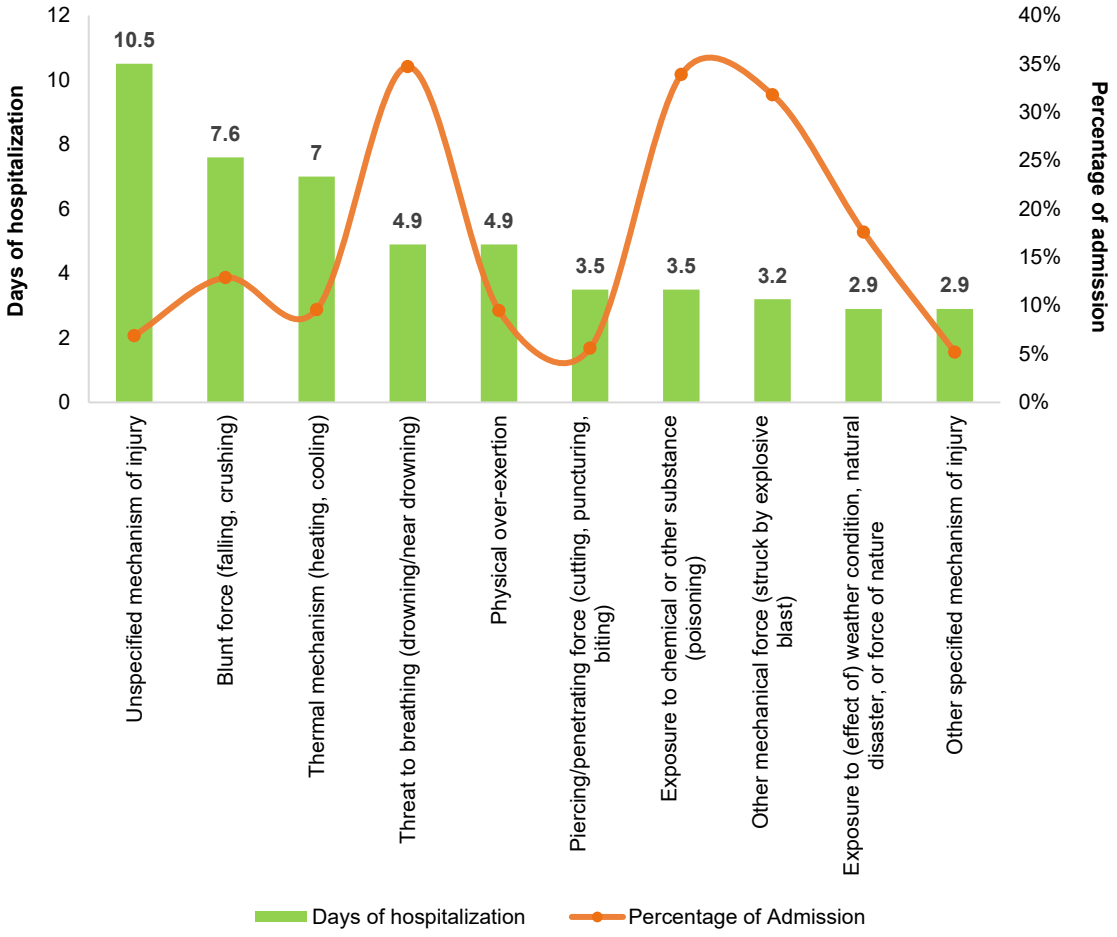


Figure 18. Days in hospital and percentage of admission by mechanism of injury (EU-IDB, data 2021-2022)

Figure 19 shows the distribution of cases by activities when injured, percentage of admission and average length of stay (in days). Injuries due to vital activities (eating, drinking, sleeping,

resting) have at higher length of stay (8.9 days on average), whilst being taken care of by health/non-health care professionals show a higher percentage of admission (45.7%).[5] Analysing the activities when injured in detail, those involving most extended inpatient stays include:

- unspecified vital activity: 10.2 days.
- being taken care of by health care professional: 9.4 days.
- other specified vital activity: 9.1 days.
- personal hygiene: 9.0 days.
- unspecified leisure or play: 9.0 days.
- sleeping, resting: 8.7 days.
- cooking and cleaning: 8.6 days.

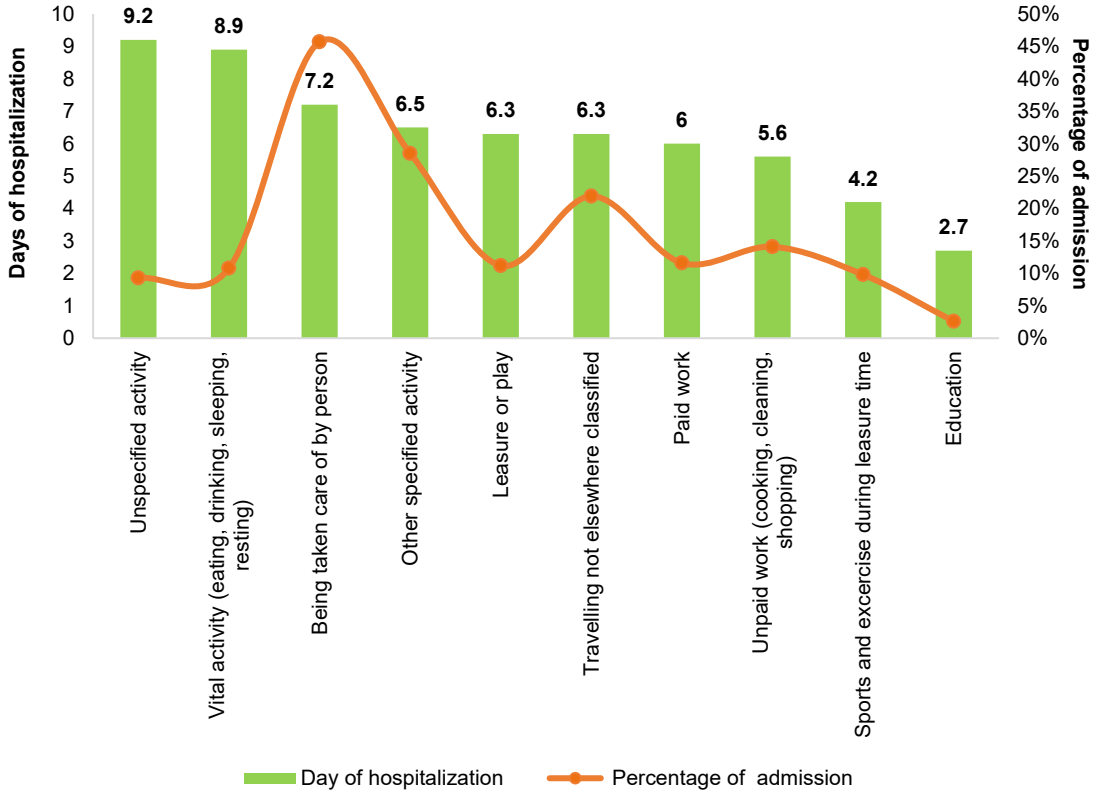


Figure 19. Days in hospital and percentage of admission by activities when injured (EU-IDB, data 2021-2022)

Figure 20 shows the distribution of cases by place of occurrence, percentage of admission and average length of stay (in days). Injuries at medical services (hospital, outpatient clinic, health centre, health professional's office), home and residential institution (home for the elderly, nursing home, prison, military institution) have the higher length of stay (9.3 days, 8.6 days and 8.3 days on average respectively), whilst injuries in residential institutions, farm or other place of primary production and transport area (public highway, street or road) show the higher percentage of admission (21.7% , 17.2%, 16.2%, respectively).

[5] Inpatients from different wards sometimes are treated for the injury at the ED, then return to the hospital ward.

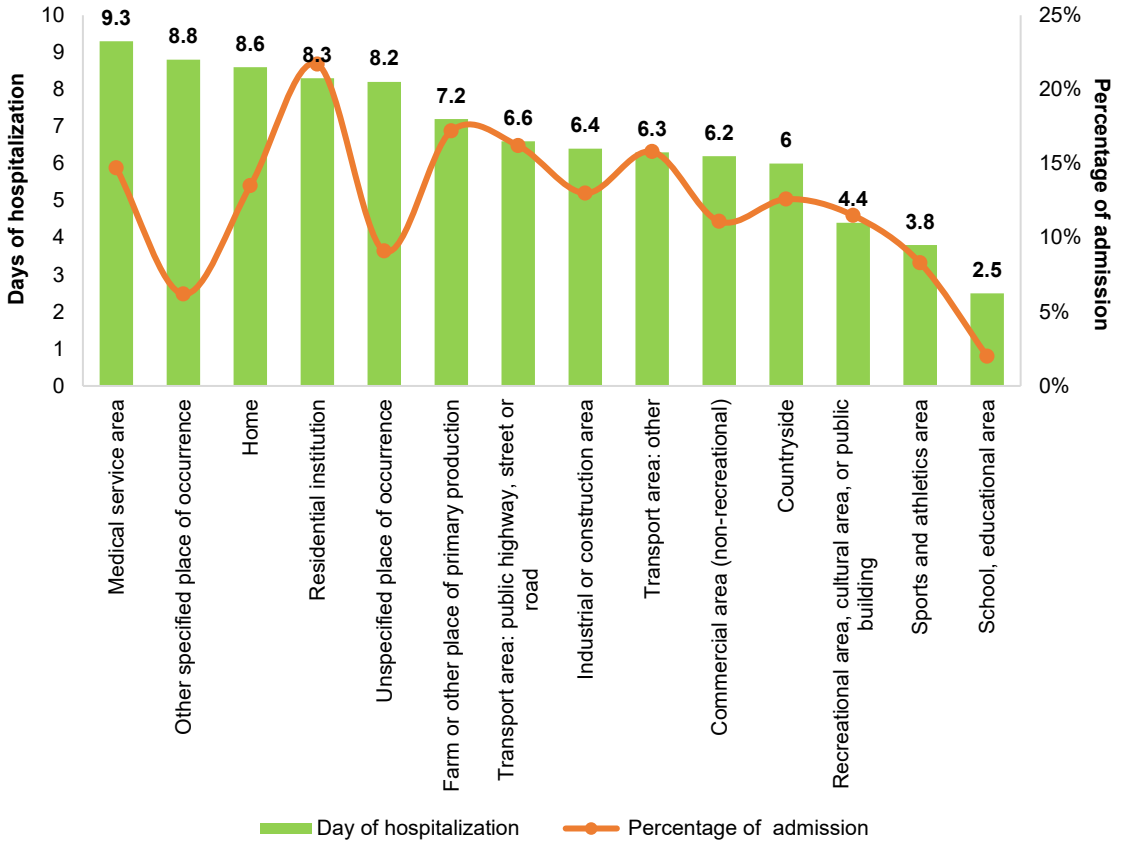


Figure 20. Days in hospital and percentage of admission by place of occurrence (EU-IDB, data 2021-2022)

Regarding the intent variable, as shown in Table 11, more than 40% of intentional self-harm cases got admitted (42.0%; 4.9 days of hospitalization on average). The proportion of admission and the number of days of hospitalization for unintentional injury, assault and other violence are 17.9%/6.3 days; 16.3%/4.3 days and 13.6%/4.3 days respectively.

Table 11. ED cases, admitted cases, percentage of admission and average length of stay, by intent (EU-IDB, data 2021-2022)

Type of intent	ED cases	Admitted	% of admission	Day of hospitalization
Unintentional	223,059	48,666	17.9	6.3
Intentional self-harm	3,408	2,465	42.0	4.9
Assault	5,183	1,010	16.3	4.3
Other violence	247	39	13.6	4.3
Undetermined intent	162	83	33.9	8.2
Not possible to record/report for legal reasons	0	10	100.0	13.1
Other specified intent	111	28	20.1	6.2
Unspecified intent	372,728	23,189	5.9	11.1
Total	**604,898**	**75,490**	**11.1**	**7.7**

3.2. Violence module

Intentional injury surveillance systems collect mainly information about injured persons. However, to better understand the type of violence (*e.g.,* violence committed by family members *vs.* violence committed by strangers), it is important to collect information about the person(s) inflicting the injury. Such information could help determine the prevalent types of violence in society and help practitioners develop effective prevention strategies. The violence module provides additional information about intentional injuries, excluding intentional self-harm. The module consists of four data elements (victim/perpetrator relationship; sex of perpetrator, age group of perpetrator and context of assault) and should be used if intent is coded 3 (assault) or 4 (other violence). When analysing data about violent injuries, some types of intentional injury events that tend to be missed or poorly described must be considered. For example, abuse of partners, children, and elders may masquerade as unintentional injury events.

Overall, 6,479 cases of violence were reported in 2021-2022 (72.5% by males and 27.5% by females), equalling to 0.95% of the total of all ED attendances. The average age of the victim is 32.0 years (male 31.9 years; female 32.8 years). 6,193 (95.6%) and 286 (4.4%) cases were described as assault and other violence respectively.

Figure 21 shows the distribution of violence cases by relationship victim/perpetrator. As expected, in almost half of the cases (48.1%), the relationship between victim/perpetrator is not specified. Excluding unspecified relationship events, when the relationship is indicated, in about half of cases (46.2%) the perpetrators are close to the victim: acquaintance or friends[6], spouse or partners, parent and other relatives were 18.3%, 16.0%, 11.9% respectively. This percentage is slightly lower from the previous year of analysis, 2020, were in more than half of the cases, add up to 50.7% of violent accidents were perpetrated from persons close to the victims.

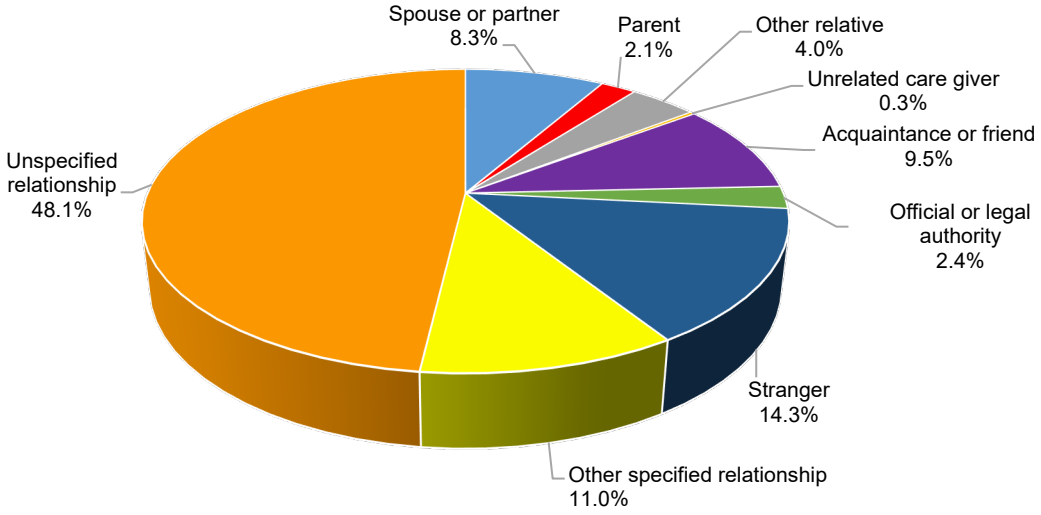


Figure 21. Distribution (%) of violence cases by relationship victim/perpetrator (EU-IDB, data 2021-2022)

[6] It includes: parent's partner, date (new or causal relationship), roommate, cellmate, dormitory mate at an orphanage, boarding school, or care facility, business relation (employer, employee, co-worker, client, including sex workers), neighbour, institutional co-member (gang member, school mate), an attachment through feelings of affection or personal regard, perpetrator known to the victim but not considered a friend.

Figure 22 shows the distribution of violence cases by the gender of the perpetrator. In more than 3/4 of cases (84.2%), the gender of the perpetrator is not reported. When the sex of the perpetrator is indicated (i.e., excluding unknown gender), a significantly higher prevalence of males can be observed (male-to-female ratio=8.3). When the abuser is acquaintance or friends, the percentage of cases in which the gender of the perpetrator has not been reported drops to 53.2%. In these particularly well-described cases, the male-to-female ratio is equal to 9.3. The case where the male-to-female ratio is highest (19.3) is when the perpetrator is a stranger. Note that, when indicated, the share of males as the gender of perpetrator is divided up as follows: 75.9% violence to other males and 24.1% violence to females.

The share of females as the gender of perpetrator is divided as follows: 40.0% violence to males and 60.0% violence to other females.

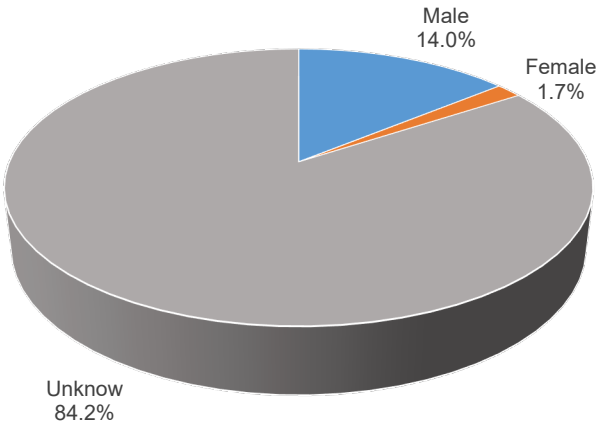


Figure 22. Distribution (%) of violence cases by gender of perpetrator (EU-IDB, data 2021-2022)

Figure 23 shows the distribution of violence cases by age group of the perpetrator. Again, in most ED attendances (75.6%), the age group of the perpetrator has not been reported. As expected, when filled in, in most cases, the aggressor is an adult (15.7%).

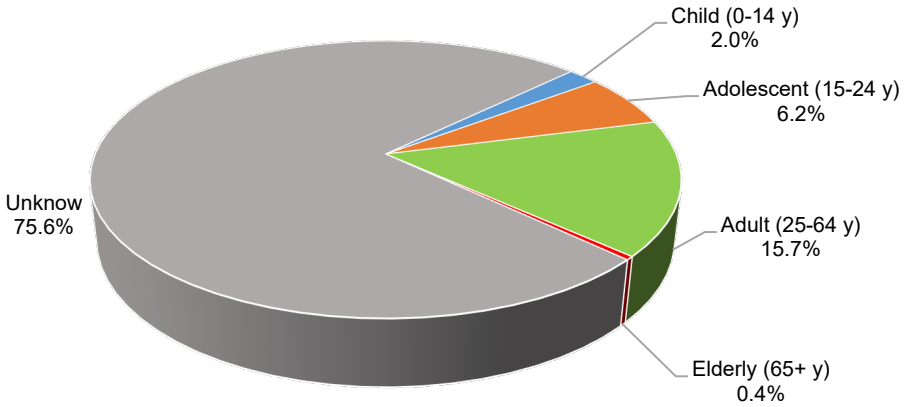


Figure 23. Distribution (%) of violence cases by age group of perpetrator (EU-IDB, data 2021-2022)

Little is known about the type of assaults during which injuries occur (*e.g.*, family quarrels, drug-related incidents, gang-related violence, etc.). To better understand violence-related injuries, it is important to collect information about the circumstances in which injury-causing assaults occur because this information can help guide the development of prevention strategies.

As shown in Figure 24, in 72.7% of cases, the context of the aggression is not specified and in the 20.4% of cases, the context was altercation. A sensitive issue is sexual violence (Figure 25). In 2021-2022, 27 (0.4%) ED cases of sexual assault have been recorded. In 6 of these (22.2%), the perpetrator was an acquaintance or friend, in 2 cases (7.4%), a spouse or partner and in 2 cases a parent (7.4%). Instead, in 3 cases (11.1%) the perpetrator was stranger. It's difficult to obtain further information from patients who have undergone trauma from such violent events. That is the reason why these Figures are strongly underestimated.

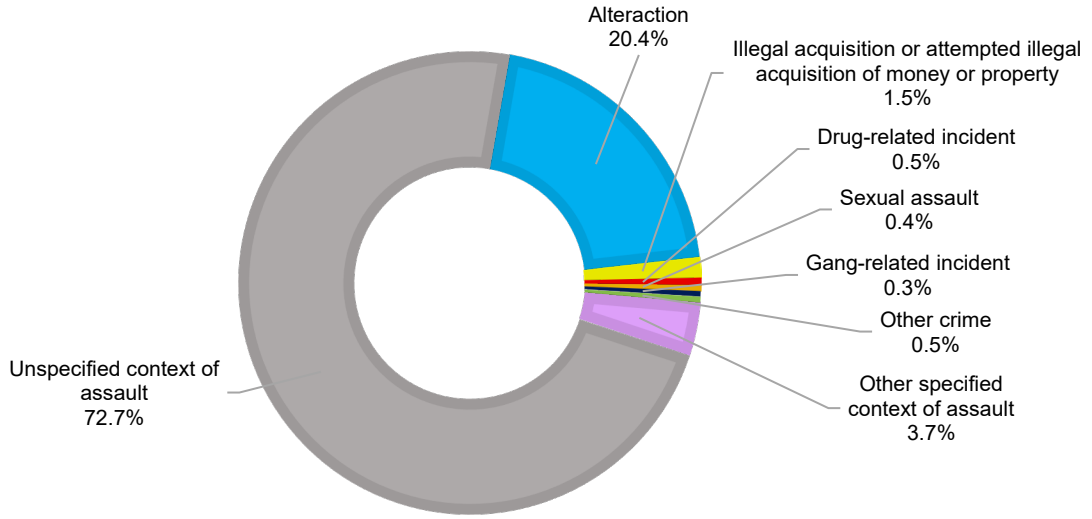


Figure 24. Distribution (%) of violence cases by context of assault (EU-IDB, data 2021-2022)

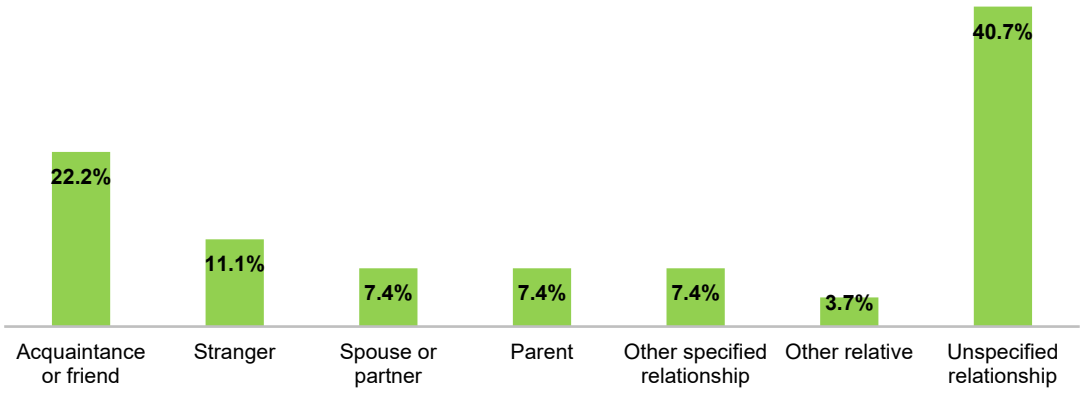


Figure 25. Distribution (%) of sexual assault by relationship victim/perpetrator (EU-IDB, data 2021-2022)

3.3. Intentional self-harm module

The intentional self-harm module provides additional information about self-inflicted injuries.

The module consists of two data elements (proximal risk factor and previous intentional self-harm) and should be used if intent is coded 2 (intentional self-harm). As for the violence module, some types of intentional self-harm events tend to be missed or poorly described. Nevertheless, the data from this module can help practitioners identify circumstances that put individuals at risk for intentional self-harm and guide the development of prevention strategies.

Overall, 5,873 cases of intentional self-harm were reported in two years, 2021-2022 (35.5% male and 64.5% female), equal to 0.86% of the total ED attendances. The average age of the victim is 34.0 years (male 36.3 years; female 32.6 years).

Figure 26 shows the distribution of the first 20 objects/substances (84.4% of all objects/substances) involved in intentional self-harm events. The distribution of the main objects/substances associated with self-harm shows that, in most cases, people attend the Emergency Department for self-harm from poisoning or intoxication due to unspecified antidepressants (n=978; 16.7%), other specified analgesic, antipyretic or anti-rheumatic (n=763; 13.0%), alcohol (n=491, 8.4%), and unspecified pharmaceutical substance for human use (n=472; 8.0%).

Noteworthy, is the presence of razors (n=198; 3.4%), knives (n=194; 3.3%), as well as "street"/recreational drugs (n=114; 1.9%) and cocaine or crack (n=47; 0.8%) among the top 20 objects/substances.

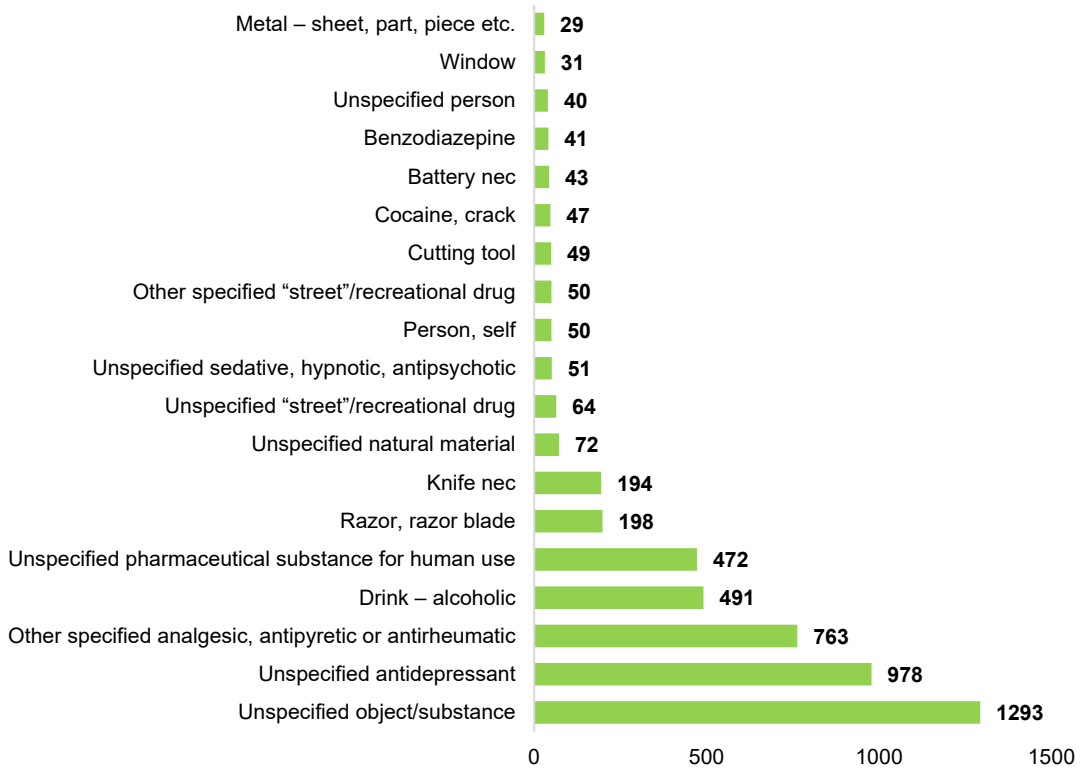


Figure 26. First 20 object/substance involved in intentional self-harm events (EU-IDB, data 2021-2022)

Overall, drugs and substances of abuse are directly or indirectly involved in 40.8% and 3.7% of self-harm attempts, respectively.

Focusing on the three main categories of objects/substances related to self-harm (Figure 27), alcohol, drugs and substances the different self-harm mechanism used by males and females is highlighted.

Alcohol and substances are mostly used by males (67.8% and 69.5%, respectively), whilst drugs are mostly used by females (71.8%).

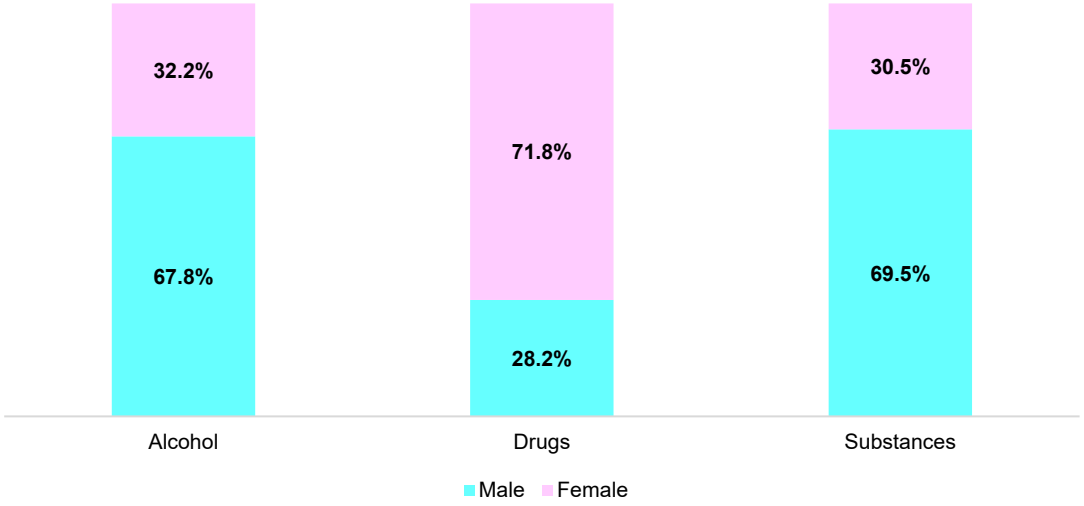


Figure 27. Distribution (%) of alcohol, drugs and substances involved in intentional self-harm events, by sex of patients (EU-IDB, data 2021-2022)

Table 12 shows the distribution of intentional self-harm injuries by proximal risk factor. Information on the proximal risk factor has not been reported in more than 9 out of 10 cases (92.9%). When filled in, two are the main proximal risk factor: conflict in a relationship with a family member, partner, or friend (2.3%), and psychological/psychiatric condition (3.9%). The mean age of subjects who attended the ED for intentional self-harm is 33.9 years, with large differences by proximal risk factor, ranging from 23 years for abuse to more than 49 years for physical problems, the latter surprisingly males mostly (male 70.0% vs. female 30.0%)

Table 12. Distribution of intentional self-harm injuries by proximal risk factor (EU-IDB, data 2021-2022)

Prevention domains	ED cases (n.)	Mean age (years)
Conflict in relationship with family member, partner, or friend	133	30.0
Death of a relative, partner, or friend	7	25.4
Physical problem	10	49.3
Psychological/psychiatric condition	226	31.2
Abuse	4	23.0
Other specified proximal risk factor	38	30.9
Unspecified proximal risk factor	5,455	34.1
Total	**5,873**	**33.9**

Figure 28 shows the distribution of intentional self-harm injuries by previous intentional self-harm. For most cases (96.2%), it was impossible to obtain information about previous attempts at self-harm. Those with a previous history of self-harm are mainly females (78.7%) or with psychological/psychiatric problems (51.2%).

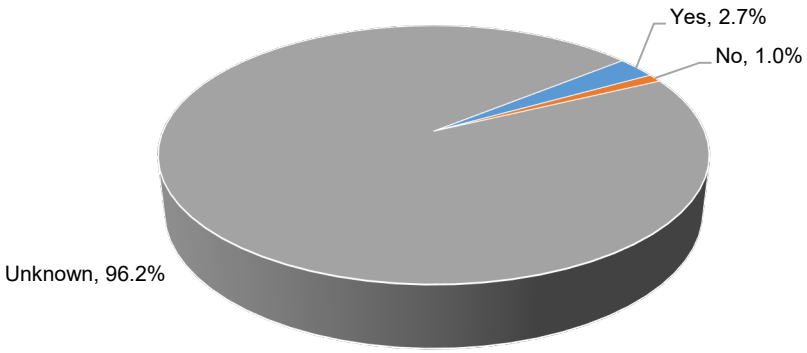


Figure 28. Distribution (%) of intentional self-harm injuries by previous intentional self-harm (EU-IDB, data 2021-2022)

3.4. Transport module

Transport related injury events are among the leading causes of injuries that result in death and hospitalisation. This module is designed to collect data about the circumstances in which these injuries occur. It has three data elements: mode of transport, role of the injured person, and counterpart. Overall, 46,471 cases of transport injury events were reported in 2021-2022 (58.6% male and 41.4% female), equal to 6.8% of the total ED attendances. The average age of the injured person is 40.6 years (male 38.5 years; female 44.2 years).

Figure 29 shows the distribution of transport injury events by month of injury.

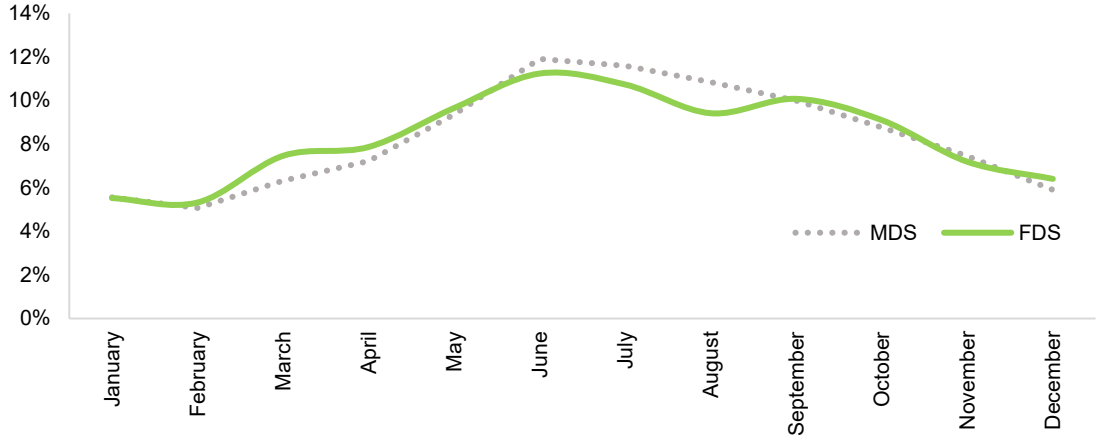


Figure 29. Distribution (%)of transport injury events by month of injury (EU-IDB, data 2021-2022)

As the previous year of analysis (2020), the countries supplying data on transport-related injury events belong to central-northern Europe mainly (Austria, Latvia, Luxembourg, the Netherlands and Turkey), the Figures seem consistent with the increased custom to travel in the summer months. The monthly trend seems consistent with that estimated from the broader MDS database for the year 2021-2022.

Figure 30 shows the percentage distribution of transport injury events by *time of attendance*. The percentage distribution of ED accesses correlates with road mobility: ED access due to road accidents is higher in peak traffic hours (41.5% of ED attendances due to transport injury events between 2 and 6 pm).

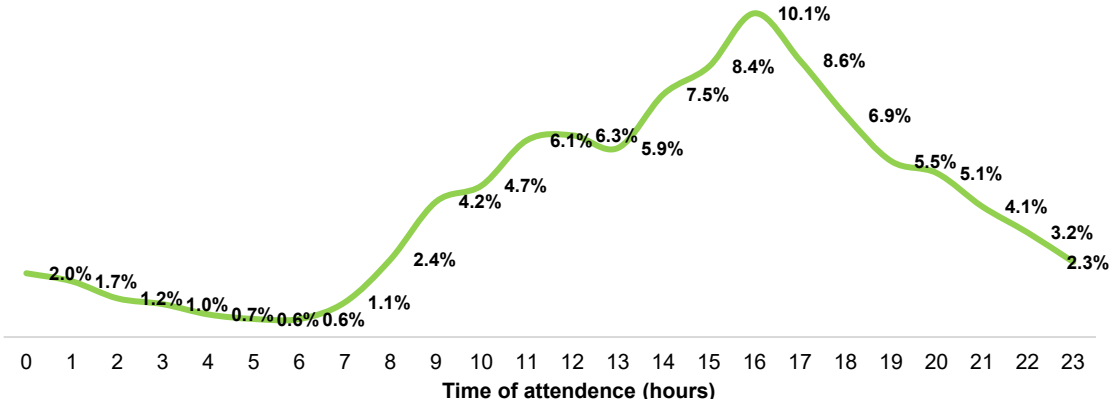


Figure 30. Distribution of transport injury events by time of attendance (EU-IDB, data 2021-2022)

To prevent transport injuries, a key factor is to identify the mode of transport, i.e. the means by which the injured person was travelling from one place to another (on foot, using pedal cycle, in an on-or off-road vehicle, on watercraft).

Figure 31 shows the distribution of transport injury events by mode of transport.

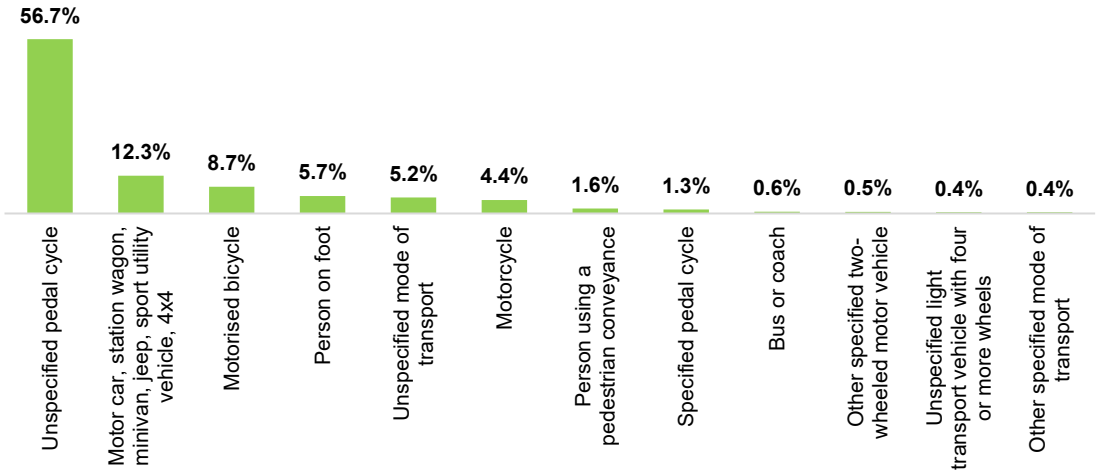


Figure 31. Distribution (%) of transport injury events by mode of transport (EU-IDB, data 2021-2022)

The Netherlands, Austria, and Luxembourg, where bicycles where extensively used, are among the countries providing the IDB data on transport injury events. The distribution of ED attendance by mode of transport could be uneven for that reason.

As expected, the average age by *mode of transport* ranged from 31.6 years for pedestrians to 45.7 years for heavy transport vehicles (Figure 32).

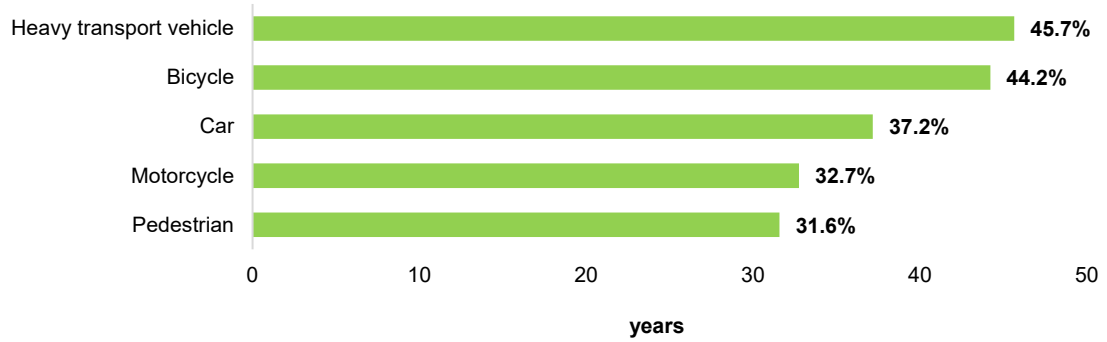


Figure 32. Average age of ED attendances due to transport injury events, by mode of transport (EU-IDB, data 2021-2022)

Many transport injury events involve a collision of the injured person, or the vehicle in which the injured person was travelling, with one or more other people, animals, vehicles, or objects.

These are referred to as counterparts, i.e. the other vehicle, object, person, or animal (if any) with which the injured person, or the vehicle in which the injured person was travelling, collided.

The data element *role of the injured person* describes how the injured person was involved with the specified mode of transport at the time of the injury event.

Figure 33 shows the percentage of the *role of the injured person* and, as expected, drivers are mainly involved in accidental transport injury events (82.9%), and the proportion of persons on foot or bystander (6.0%) is consistent with what is shown in previous Figure 31 (5.7%).

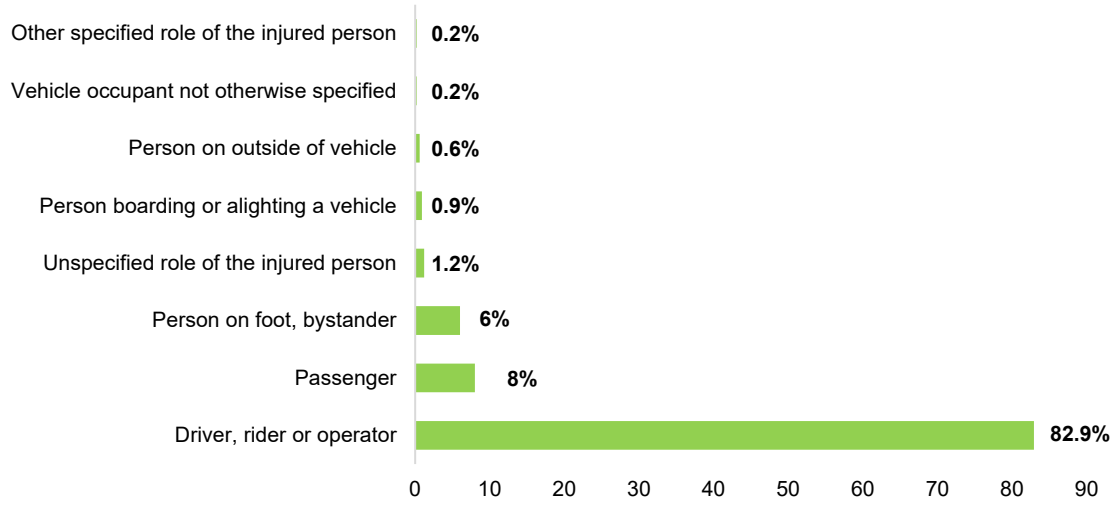


Figure 33. Distribution (%) of transport injury events by role of person injured (EU-IDB, data 2021-2022)

Table 13 shows the matrix between the *mode of transport* and its *counterpart*. Instead of labels, codes (according to the FDS data dictionary) in rows and columns are shown for space reasons.

Table 13. Matrix between the mode of transport and its counterpart (EU-IDB, data 2021-2022)

COUNTERPART \ MODE OF TRANSPORT	[1]	[2]	[3]	[4]	[5]	[6]	[7[	[8]	[9]	[11]	[12]	[98]	[99]	Total
[1]	99	110	0	37	0	5	2	0	1	0	0	0	1	6
[2]	218	1,936	4	166	0	11	0	1	1	0	0	0	1	86
[3]	1	1	2	0	0	0	0	0	0	0	0	0	0	1
[4]	155	426	0	212	0	12	1	0	0	0	0	0	1	54
[5]	1	0	0	1	1	1	0	0	0	0	0	1	2	0
[6]	1,236	2,411	8	1,470	1	2,887	25	0	2	0	0	0	20	417
[7]	72	109	0	83	0	308	88	0	0	0	0	0	1	41
[8]	10	6	0	0	0	4	0	5	0	0	0	0	0	0
[9]	30	4	0	7	0	13	1	0	19	0	0	0	0	0
[11]	0	0	0	0	0	3	0	0	0	1	0	0	0	0
[12]	0	0	0	0	0	0	0	0	0	0	2	0	0	0
[13]	0	0	0	0	0	0	0	0	0	0	0	2	0	0
[14]	52	65	2	52	4	173	6	0	2	0	0	0	1	6
[15]	171	3	2	12	0	30	0	0	0	0	0	0	0	0
[98]	176	1,097	57	490	3	418	105	9	11	9	0	1	16	11
[99]	22	12	4	2	0	21	1	0	1	0	0	0	8	0
Total	3,375	26,965	86	6403	9	6,264	498	62	137	10	33	11	180	2,438

1: pedestrian
2: pedal cycle
3: other non: motorized transport device
4: two: wheeled motor vehicle
5: three: wheeled motor vehicle
6: light transport vehicle with four or more wheels
7: heavy transport vehicle
8: rail vehicle
9: special industrial, agricultural, or construction vehicle
11: watercraft
12: aircraft
13: fixed or stationary object
14: animal
15: no counterpart
98: other specified counterpart
99: unspecified counterpart.

Excluding cases with unknown counterpart (*i.e.* unspecified counterpart=99), as expected, the greatest threat to pedestrians comes from cars/commercial vehicles (55.1% involved as a counterpart). The dangers for cyclists mainly come from cars/commercial vehicles (39.0%), other cyclists (31.3%) and two-wheeled motor vehicles (6.9%). A significant proportion (17.8%) of cyclist accidents occur without involving a counterpart. Light transport vehicles with four or more wheels (i.e. cars or commercial vehicle) are the most common counterpart in accidents involving two-wheeled motor vehicles (58.1%) and cars/ commercial vehicles (74.3%). Most truck accidents (45.9%) occur due to loss of control (no counterpart), whilst in 38.4% of cases, another heavy transport vehicle is involved.

Analysing the data in this module considering the *mode of transport*, it should be noted that most road accident data come from the Netherlands, where bicycles are being very extensively

used. Indeed, for the year 2021 and 2022 only Austria, Luxembourg, Latvia, the Netherlands and Turkey provided road accident data in FDS format. Of these, as many as 74 per cent relate to the Netherlands. So, it may be useful to analyse this information by separating the Netherlands from the rest of the countries. Figure 34 shows the distribution of ED attendances by the mode of transport in the road traffic accidents and age group for the Netherlands. As expected, pedal cyclists play an important role in all age groups. 45.0% of children less than 1 years are involved in road traffic accident with light transport vehicles (*e.g.,* car). The share of pedestrian between 1 and 9 years is about 4.6%. About 1 in 3 accidents between the ages of 15 and 24 involve motorcyclists, while in 1 in 5 accidents between the ages of 24 and 35 years the vehicle involved is a car or commercial vehicle.

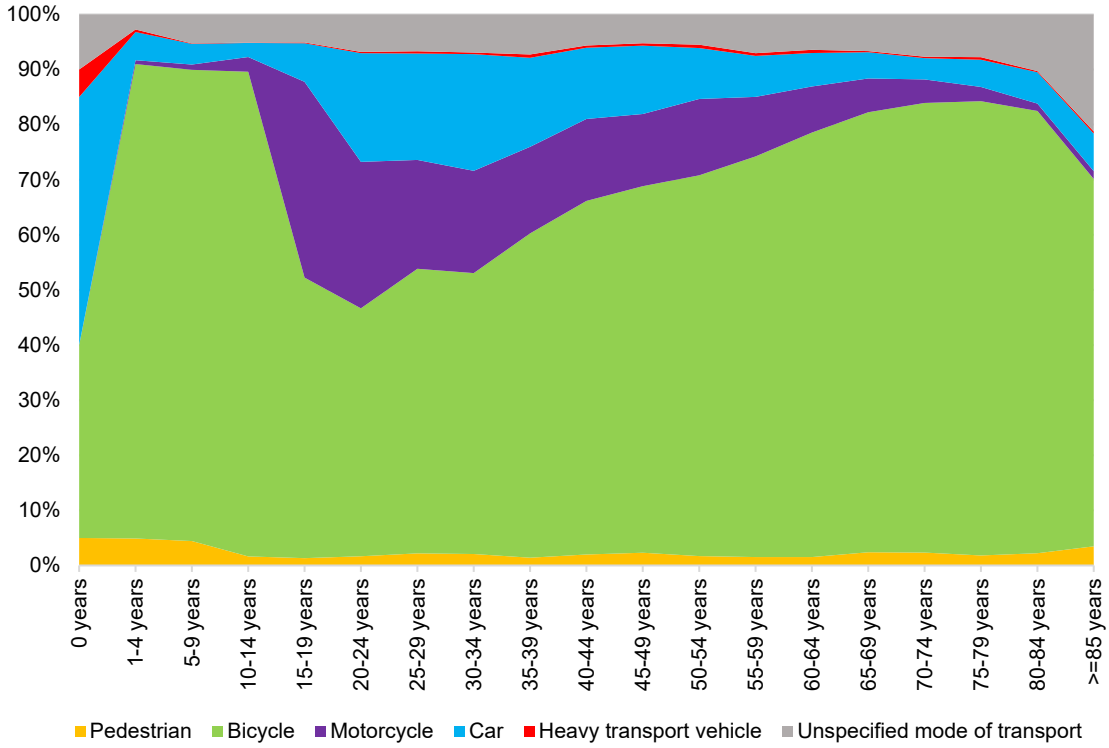


Figure 34. Distribution of transport injury events in the Netherlands by mode of transport and age group (EU-IDB, data 2021-2022)

The scenario is quite different in other countries, as shown in Figure 35. First, pedestrian accidents play a very important role up to the age of 14 (on average 32.0%). The bicycle is involved in 38.8% of accidents between 5 and 14 years of age, where vulnerable users (pedestrians and pedal cyclists) are involved in almost 70 per cent of road accidents overall. Between the ages of 20 and 39, car accidents are the most frequent (on average about 29% of all road traffic accidents). Finally, accidents with heavy vehicles are relatively frequent among older people (14.5% over the age of 80). It should, however, be borne in mind that in the sample analysed, road accidents involving persons over 80 years of age are rare and, therefore, the proportions observed may be the result of random fluctuations.

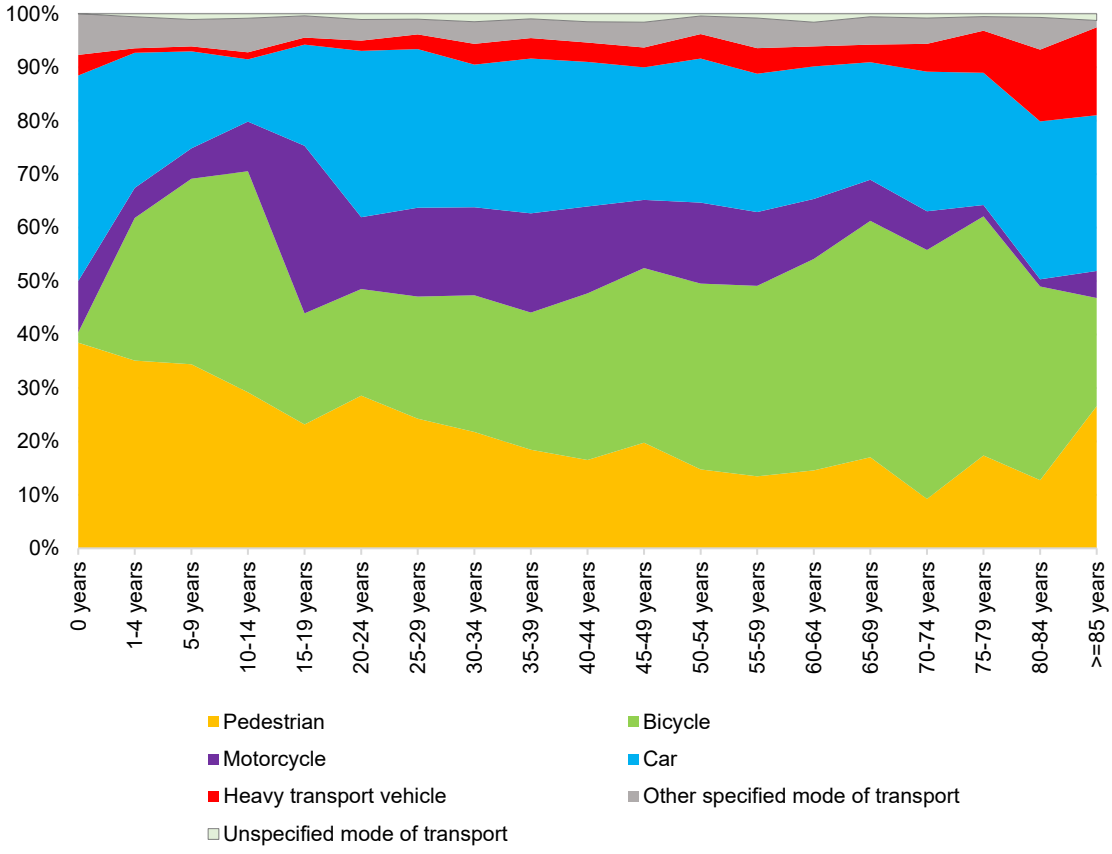


Figure 35. Distribution of transport injury events in Austria, Latvia, Luxemburg and Turkey, by mode of transport and age group (EU-IDB, data 2021-2022)

3.5. Sport module

This module concerns the type of sport or exercise activity in which the injured person was engaged at the time of the injury. Participation in a sport or exercise activity includes practice, training, and competition, as well as pre-event (*e.g.*, taping, dressing), warm-up, cool down, and post-event (*e.g.*, showering, dressing) activities. This detailed classification of sports and exercise activities will facilitate the comparison of activities and injuries between gender and age.

The Sport module should be coded if the Activity when injured is "Physical education class, school sports" (03.1) or "Organised sports and exercise during leisure time" (04.1) or "Other specified sports and exercise during leisure time" (04.8) or "Unspecified as to organised nature of sports and exercise during leisure time" (04.9).

The sports injuries account for 8.2% of ED attendances (10.0% for males; 6.2% for females) and the 1.5% happened at school (physical education class, school sports).

As shown in Figure 36, the frequency of sports accidents increases from the age group 5-9 years and peaks in the age group 10-14 years (24.2%).

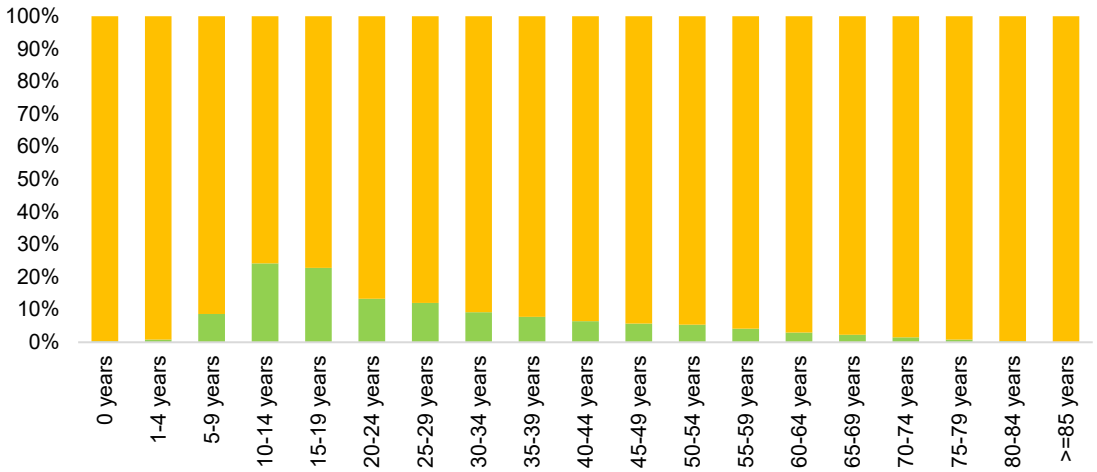


Figure 36. Percentage of sport injury by age group (EU-IDB, data 2021-2022)

In Figure 37 the percentages, for the 2021-2022, of injuries occurring in the main categories of type of sport or exercise activity, by sex of patient, were showed: the majority of male and female patients were involved in *Team ball sports injuries* (48.3% e 23.4%, respectively), that includes activities as basketball, football/soccer or volleyball, followed by the *Wheeled non-motored sports* (as cycling, skate boarding, scootering and in-line skating/rollerblading), with the 18.2% for the male and 15.1% for female, and *Ice or snow sports* (including skiing and snow-boarding) with the 8.3%, for male and 13.9%, for female patients. Note that accidents caused by *Equestrian activities* (i.e. Trail or general horseback riding, dressage, polo, etc.) involve mostly female: indeed, we observed a percentage of injuries of 16.1% for female *vs.* the 0.8% for male patients.

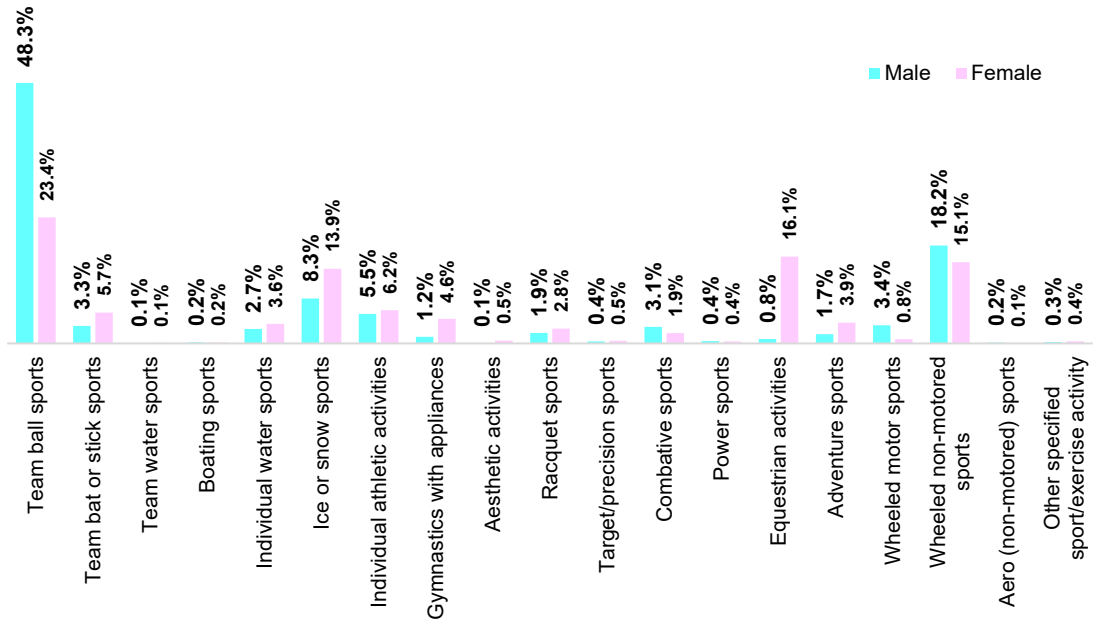


Figure 37. Distribution (%) of sport or exercise activity injuries by sex of patients (EU-IDB, data 2021-2022)

Table 14 shows by gender of patient the first 45 sports involved in injuries, which account for about 95% of sport injuries for both genders. As expected, there are differences according to gender. Soccer-outdoor account for 33.7% of all sport injuries in males but only 10.8% in females. Conversely, Trail or general horseback riding, account for 13.8% of sports injuries in females but only 0.7% in males. Cycling, Motor sport and combative sport involved males mostly, whilst gymnastic, hiking and handball females.

Table 14. First 45 sports injuries, by type of sport/activities and gender (EU-IDB, data 2021-2022)

Male	%	Female	%
Soccer – Outdoor	33.7	Trail or general horseback riding	13.8
Cycling – Mountain	6.3	Soccer – Outdoor	10.8
Cycling – Road	5.4	Ice skating/ice dancing	7.1
Basketball	4.1	In-line skating/rollerblading	6.1
Other specified individual athletic activity	3.2	Hockey – Field	5.3
Skiing – Alpine/downhill	3.0	Volleyball	4.2
Ice skating/ice dancing	2.9	Skiing – Alpine/downhill	4.1
Soccer – Unspecified	2.4	Swimming	3.1
Unspecified motor sport	2.4	Cycling – Road	2.8
Hockey – Field	2.1	Gymnastics – Unspecified	2.7
Swimming	2.0	Jogging/running	2.6
Skateboarding	1.9	Hiking	2.5
Soccer – Indoor	1.9	Basketball	2.4
Volleyball	1.7	Other specified individual athletic activity	2.3
Jogging/running	1.7	Tennis	2.1
Unspecified combative sport	1.6	Other specified team ball sport	2.1
In-line skating/rollerblading	1.3	Skateboarding	2.0
Cycling – Unspecified	1.3	Cycling – Mountain	2.0
Tennis	1.3	Handball – Team	1.7
Rugby	1.1	Unspecified combative sport	1.2
Football – Unspecified	1.1	Cycling – Unspecified	1.0
Snow boarding	1.0	Unspecified equestrian activity	0.8
Cycling – BMX	1.0	Gymnastics – Trampoline/mini trampoline	0.8
Boxing	0.9	Snow boarding	0.8
Hiking	0.9	Roller skating	0.7
Other specified team ball sport	0.8	Other specified adventure sport	0.7
Trail or general horseback riding	0.7	Dressage	0.6
Hockey – Ice	0.6	Unspecified team ball sport	0.6
Gymnastics – Trampoline/minitrampoline	0.6	Skiing – Nordic/cross country	0.5
Handball – Team	0.6	Soccer – Unspecified	0.5
Unspecified team ball sport	0.5	Badminton	0.5
Motocross	0.5	Rugby	0.5
Scootering	0.4	Other specified equestrian activity	0.4
Other specified power sport	0.4	Luge	0.4
Fishing	0.4	Rock climbing (with ropes) – outdoors	0.4
Football – Other specified	0.3	Walking	0.4
Gymnastics – Unspecified	0.3	Unspecified motor sport	0.4
Go-carting/carting	0.3	Other specified sport/exercise activity	0.4
Other specified adventure sport	0.3	Gymnastics – Floor exercise/tumbling	0.4
Luge	0.3	Boxing	0.4
Rock climbing (with ropes) – outdoors	0.3	Other specified power sport	0.3
Skiing – Freestyle	0.3	Soccer – Indoor	0.3
Badminton	0.3	Go-carting/carting	0.3
Other specified sport/exercise activity	0.3	Show jumping	0.3
Squash	0.2	Ballroom dancing, etc.	0.3

Table 15 shows the first 3 sport involved in injuries, by age group of patients. It's possible to define at least 3 broad age classes: although since the youngest age groups soccer is one the sports that causes the most accidents, among very young people (0-9 years) swimming accidents play an important role; 15-44 characterised by injuries from football, trail or general horseback riding or cycling; over 45 years old cycling (both road and mountain) is the sport activity that causes the most accidents followed by Ice skating/ice dancing. Among older people (70+ years) tennis and hiking are among the sports causing the most accidents.

To interpret these data, it should keep in mind that, as for the transport module, most sports accident data come from the Netherlands, where bicycles are being very extensively used. Indeed, for the year 2021 and 2022 only Austria, Luxembourg, Latvia, the Netherlands and Turkey provided road accident data in FDS format. Of these, as many as 74 per cent relate to the Netherlands.

There are some differences from what emerged from the analysis of the 2020 data. In the 2021-2022 data, skiing is not among the leading causes of injury, particularly between 50 and 69 years of age. This could be an indirect consequence of the COVID-19 pandemic that hit sports activities hard as the ski season ended. So, in 2020, skiing was only touched by the COVID-19 pandemic, while all other sports were heavily affected. Also, in 2021, just because of COVID-19, the ski season was skipped, so there could be no accidents on the ski slopes. During 2021 and more so in 2022, there was a return to a normal situation whereby people returned to sports activities that COVID-19 had greatly reduced.

Table 15. First 3 sports injuries, by type of sport/activities and age group (EU-IDB, data 2021-2022)

Age group (year)	Cases (n.)	Rank 1	Rank 2	Rank 3
0-4	116	Swimming	Soccer – Outdoor	Gymnastics – Trampoline / mini-trampoline
5-9	4,235	Soccer – Outdoor	In-line skating/rollerblading	Swimming
10-14	16,713	Soccer – Outdoor	Basketball	In-line skating/rollerblading
15-19	12,043	Soccer – Outdoor	Basketball	Hockey – Field
20-24	4,850	Soccer – Outdoor	Trail or general horseback riding	Hockey – Field
25-29	3,719	Soccer – Outdoor	Trail or general horseback riding	Cycling – Road
30-34	2,523	Soccer – Outdoor	Cycling – Mountain	Trail or general horseback riding
35-39	2,091	Soccer – Outdoor	Cycling – Mountain	Trail or general horseback riding
40-44	1,755	Soccer – Outdoor	Cycling – Mountain	Cycling – Road
45-49	1,669	Cycling – Mountain	Soccer – Outdoor	Ice skating/ice dancing
50-54	1,710	Cycling – Mountain	Cycling – Road	Ice skating/ice dancing
55-59	1,412	Cycling – Mountain	Cycling – Road	Ice skating/ice dancing
60-64	1,008	Cycling – Road	Ice skating/ice dancing	Cycling – Mountain
65-69	760	Cycling – Road	Ice skating/ice dancing	Cycling – Mountain
70-74	527	Cycling – Road	Ice skating/ice dancing	Tennis
75-79	298	Cycling – Road	Tennis	Hiking
80-84	134	Cycling – Road	Other specified individual athletic activity	Tennis
≥ 85	9	Other specified individual athletic activity	Gymnastics – Unspecified	Tennis

4. DISCUSSION

Injury surveillance is a cornerstone of effective public health management in Europe. By providing detailed insights into injury patterns and trends, it enables targeted interventions, efficient resource allocation, and evidence-based policy development. As Europe continues to face diverse public health challenges, robust injury surveillance systems are essential for protecting its populations and improving overall health outcomes.

This report aims to provide feedback on EU-IDB data in 2021-2022, and to show the potential of the information in a database that is unique in Europe.

The EU-IDB methodology allows countries to collect accident and injury data from a representative sample of Emergency department (ED), using a standardized coding system on the circumstances of an injury-event and its outcome. EDs in hospitals provide the best setting for collecting information on large numbers of injuries at reasonable costs.

The EU-IDB database complements existing data sources on injuries such as the routine causes of death statistics, hospital discharge registers and data sources specific to injury areas, including road traffic injuries and work-related accidents. IDB-data allow to estimate the health burden of injuries for various population groups and prevention domains such as home, leisure activities, sport, road traffic, workplace, deliberate self-harm or interpersonal violence.

The rather simple IDB-MDS facilitates data collection for comparable national indicators on the burden of injury. Further indicators such as costs of hospital services or Disability-Adjusted Life Years (DALYs) can be derived by combing IDB data with additional data.

Currently, the IDB database consists of 25,73 million ED attendance cases in MDS format, recorded from 25 countries, and 4,94 million ED attendances registered from 19 countries in FDS format. These countries share their data according to the IDB standards to provide a unique data source for comparable European injury indicators such as ECHI-29b (home and leisure injuries: register based incidence), and a complementary data source for ECHI-30b (road traffic injuries: register based incidence) and ECHI-31 (workplace injuries).

For this report, data from two years, 2021-2022, have been analysed. The 2021-2022 figures were also compared with those from previous years. The results show that despite some variabilities over the years, the system delivers stable and valid indicators for the extent of the injury problem in Europe and the EU. For 2021-2022, EU-IDB estimated a total of about 3,6 million hospitals admissions in EU-27, and 29 million of ambulatory treatments in emergency departments of hospitals. These Figures are higher than those reported in the previous report referring to 2020 (Giustini *et al.*, 2023), but consistent with the report Injuries in the European Union 2009-2018 (EuroSafe, 2021) which estimated 4,5 million patients admitted to hospitals annually, with a further 31,2 million seeking ambulatory treatment in emergency departments of hospitals. This difference is due to the decrease in the number of ED entries during the COVID-19 pandemic.

About 50% of all injuries occur at home, at school or during leisure activities. Considering this, there are many opportunities for reducing the number of injuries by increasing investments in preventing childhood injuries, sport injuries and falls in older people, by learning from the successes achieved in past decades in the fields of road and work-related safety.

Despite many difficulties, the EU-IDB sheds light on a very sensitive and tough problem: injuries due to violence, both interpersonal violence, and deliberate self-harm, which together account for about 3% of all ED attendances. This figure is probably underestimated because there is a lot of hesitation in reporting these kinds of incidents even to health personnel (Palermo *et al.*, 2014).

While the quality of data delivered is generally good, there is room for improvement in many areas. There are shortcomings, *e.g.,* regarding the geographic coverage of all EU Member States and collaborating countries, the representativeness of data samples, and the completeness of the records. Larger European countries seem to have problems in providing national coordination and consolidation of local injury surveillance efforts.

However, some issues with last IDB data were also present in the past:

- the lack of Data Providers loyalty without a specific economical support.
- Germany participated, but only with a somewhat skewed sample from one single reference hospital.
- UK is relying on data provided by Wales and in aggregated form only.
- Norway and Denmark provided, in the last years, data in aggregated form only.
- France collects emergency department data but does not share its data with the IDB network (Ideally it would join the IDB network soon).
- Italy provided data until 2018, then a particularly restrictive interpretation of the General Data Protection Regulation (GDPR) (Europe, 2016) prevented data from being sent to the EU-IDB.
- Portugal provided data about Home and Leisure only.

To our knowledge, Belgium, Poland, Spain and Romania could not designate a competent authority or agency to collect injury data according to the EU-IDB format, although the latter three countries have provided data to the network as part of the European Jamie project in the past. Finally, the IDB sample is not fully representative due to unbalanced case mix: except for Portugal, Mediterranean countries does not provide IDB data.

However, the continuation and wider implementation of the IDB across Europe requires a stronger political commitment from EU institutions and member state governments. A binding arrangement for all countries to provide ED-based injury data would be extremely helpful in ensuring continued EU-level exchange of vital injury data in the forthcoming years. Central services, *e.g.,* for operating the databank and providing public access to data, regular analyses and reports, and data clearinghouse services need additional funding to better use the wealth of information already stored in the IDB databank.

For the above, the EU-IDB is crucial for several reasons:

- It provides a standardized framework for collecting injury data, ensuring consistency and comparability across different countries and regions. This harmonization is essential for conducting reliable cross-national studies and benchmarking injury prevention strategies.
- By offering detailed insights into injury trends and patterns, the EU-IDB supports evidence-based policymaking. Policymakers can use its data to identify priorities, allocate resources, and develop targeted interventions to reduce injury rates effectively. This evidence-based approach ensures that policies are responsive to actual needs and conditions.
- The EU-IDB helps public health authorities understand the burden of injuries on healthcare systems and society. This understanding allows for more efficient allocation of resources, ensuring that emergency services and rehabilitation facilities are adequately prepared and that preventive measures are directed toward high-risk areas and populations.
- The EU-IDB enables the assessment of injury prevention programs by providing data on injury rates before and after implementing specific interventions. This evaluation capability is critical for refining strategies and improving their effectiveness, ultimately leading to better health outcomes.

- Data from the EU-IDB can be used to inform public health campaigns and educational initiatives, raising awareness about injury risks and promoting safer behaviours. By highlighting common injury causes and risk factors, the IDB contributes to more effective communication strategies that resonate with the public.
- The EU-IDB serves as a valuable resource for researchers studying injury prevention and public health. By providing access to comprehensive and standardized data, it facilitates academic and scientific research, encouraging innovation in injury prevention methods and interventions.
- As new injury risks emerge, such as those related to technological advancements or changing lifestyles, the EU-IDB provides timely data to identify and address these issues. This proactive approach helps prevent new injury trends from becoming significant public health problems.

CONCLUSION

The 2021-2022 data from the EU-IDB indicate a resurgence in the number of injuries treated in EDs across Europe, marking an increase from the previous reporting period, particularly when compared to the reduced figures during the COVID-19 pandemic. The pandemic had temporarily led to a decrease in certain types of injuries due to lockdowns, reduced travel, and decreased public interactions. However, as restrictions eased and normal activities resumed, the frequency of injuries returned to pre-pandemic levels, reflecting the return to usual social and occupational activities.

This resurgence in injury cases highlights the importance of continually adapting public health strategies to current social conditions. For example, the increase in self-harm and violence-related injuries could be a consequence of the psychological and social strains imposed by the pandemic, including economic hardship, social isolation, and increased domestic tensions. This trend suggests that post-pandemic recovery efforts should include not only economic and social support but also targeted mental health interventions to address the lingering impacts of the pandemic on individual and community well-being.

This report identifies home environments as the primary setting for injuries, with a significant portion occurring during domestic activities. This finding points to the necessity of reinforcing injury prevention measures within the home. Public health campaigns could focus on educating the public about common household hazards, such as falls, burns, and cuts, which are frequently associated with daily activities like cooking, cleaning, and home repairs. For older adults, who are particularly vulnerable to falls, interventions might include promoting home modifications, such as installing handrails, improving lighting, and removing tripping hazards.

The data also emphasize the need for more robust safety regulations in workplaces and public spaces, particularly in industries with higher injury rates, such as construction and manufacturing. Although workplace injuries have decreased in some areas due to stringent safety regulations, there is still room for improvement, particularly in enforcing safety protocols and providing ongoing worker education.

The substantial incidence of injuries related to interpersonal violence and self-harm requires a multifaceted approach that goes beyond immediate medical care. These types of injuries are often symptomatic of deeper social issues, such as poverty, substance abuse, and domestic violence. Addressing these root causes necessitates a coordinated effort between public health authorities, social services, and law enforcement. For instance, initiatives could include increasing access to mental health services, implementing community-based violence prevention programs, and providing support for at-risk populations.

Data, also, suggest mixed results regarding the effectiveness of current injury prevention measures. While the decrease in road traffic injuries, due to improved vehicle safety standards and stricter enforcement of traffic laws, indicates success in certain areas, the persistently high rates of violence-related injuries highlight significant gaps in existing prevention efforts.

The effectiveness of public health interventions can often be measured by their impact on specific types of injuries. For example, the data from the EU-IDB show that injuries related to road traffic accidents have seen a decline, which can be attributed to ongoing public safety campaigns, improved infrastructure, and technological advancements in vehicle safety. These successes provide a model for how similar approaches could be applied to other areas, such as domestic safety and violence prevention.

However, the data also reveal that current interventions may not be adequately addressing the complexity of violence and self-harm incidents. These issues often require a more nuanced

approach, integrating social support services, community engagement, and long-term mental health care. Public health policies should, therefore, consider a more holistic approach to violence prevention, one that includes early intervention in schools, community outreach programs, and accessible mental health care services.

The report points out significant variability in the quality and completeness of data across different countries participating in the EU-IDB. This variability can hinder the accuracy and comparability of the data, making it challenging to draw definitive conclusions about injury trends and the effectiveness of interventions across the EU. The inconsistencies stem from differences in data collection methodologies, varying levels of participation, and the scope of data reporting (*e.g.*, Full Data Set *vs*. Minimum Data Set).

Improving data quality requires a concerted effort to standardize data collection protocols across all EU member states. This could involve the development of centralized guidelines for data reporting, regular training for data collectors, and the implementation of quality control measures to ensure data accuracy. Furthermore, addressing issues related to the General Data Protection Regulation (GDPR) is crucial, as restrictive interpretations of these regulations have, in some cases, hindered the sharing of vital health data. A balanced approach that protects individual privacy while allowing for the essential flow of public health data is needed.

The potential for advanced data analysis techniques to enhance injury surveillance should also be explored. Technologies such as machine learning and natural language processing could be employed to analyse large datasets, identify emerging trends, and predict potential future risks. These tools can help public health authorities to be more proactive in their prevention efforts, potentially identifying new risk factors or vulnerable populations before they lead to significant increases in injury rates.

The findings from the 2021-2022 data have several critical implications for public health policy. The high rates of injury, particularly those related to violence and self-harm, suggest that existing public health strategies may not be fully effective in these areas. Policymakers need to reassess the current approaches and consider more targeted interventions that address the specific needs of high-risk populations.

For example, the persistently high incidence of violence-related injuries calls for a greater focus on preventive measures that address the social determinants of health, such as education, employment, and social support. Public health policies could include increased funding for mental health services, community-based violence prevention programs, and initiatives that promote social cohesion and economic stability. Additionally, integrating injury prevention into broader public health campaigns, such as those targeting alcohol and drug abuse, could help to reduce the incidence of injuries related to these risk factors.

Moreover, the report highlights the importance of cross-sector collaboration in addressing injury prevention. Effective injury prevention requires the involvement of multiple sectors, including health, education, transportation, and law enforcement. By working together, these sectors can develop comprehensive strategies that address the root causes of injuries and promote safer environments.

The EU-IDB has proven to be an invaluable tool for injury surveillance, but its full potential has yet to be realized. Future efforts should focus on expanding the database's coverage to include more comprehensive and representative data from all EU member states. This expansion will require stronger political commitment and the allocation of adequate resources to support data collection and analysis.

Research should also continue to explore the effectiveness of current prevention programs and identify new approaches to reducing injury rates. This could involve the evaluation of existing interventions to determine what works and what doesn't, as well as the development of innovative strategies based on the latest research and technology. For instance, public health authorities could

explore the use of digital health tools, such as mobile apps and online platforms, to deliver injury prevention education and support to a broader audience.

In conclusion, the EU-IDB provides a wealth of data that is critical for understanding and addressing the burden of injuries in Europe. However, to fully leverage this resource, there is a need for ongoing efforts to improve data quality, expand coverage, and develop more effective prevention strategies. By doing so, public health officials can make significant strides in reducing injury rates and improving the overall safety and well-being of European citizens.

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