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# European Injury Data Base (EU-IDB): data analysis 2020

M. Giustini, G. Fondi, D. Bejko, R. Bauer, H. Valkenberg, A. Pitidis
for the EU-IDB Working Group

EPIDEMIOLOGIA
E SANITÀ PUBBLICA

# ISTITUTO SUPERIORE DI SANITÀ

# European Injury Data Base (EU-IDB): data analysis 2020

Marco Giustini (a), Gianni Fondi (a), Dritan Bejko (b),
Robert Bauer (c), Huib Valkenberg (d), Alessio Pitidis (e)
for the EU-IDB Working Group

*(a) Dipartimento Ambiente e Salute, Istituto Superiore di Sanità, Rome, Italy*
*(b) Injury Data Base Network, Eurosafe, Amsterdam, The Netherlands*
*(c) Austrian Road Safety Board, Wien, Austria*
*(d) Consumer Safety Institute, Amsterdam, The Netherlands*
*(e) B2C Innovations, Milan, Italy*

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**Rapporti ISTISAN 23/12**

Istituto Superiore di Sanità
**European Injury DataBase (EU-IDB): data analysis 2020.**
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2023, iii, 41 p. Rapporti ISTISAN 23/12

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 databank. 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*: Accidents; Injuries; Surveillance; Prevention domains; External causes

Istituto Superiore di Sanità
**Banca dati europea sugli infortuni (EU-IDB): analisi dei dati 2020.**
Marco Giustini, Gianni Fondi, Dritan Bejko, Robert Bauer, Huib Valkenberg, Alessio Pitidis per il gruppo di lavoro EU-IDB
2023, iii, 41 p. Rapporti ISTISAN 23/12 (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*: Incidenti; Lesioni; Sorveglianza; Domini di prevenzione; Cause esterne

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Per informazioni su questo documento scrivere a: marco.giustini@iss.it

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**IDB WORKING GROUP 2020**

The IDB Working Group that contributed to this report by providing 2020 injury data and supporting IDB activities is composed as follows:

Robert BAUER, Gerard FURIAN
*Kuratorium für Verkehrssicherheit (Austrian Road Safety Board) – Austria*

Bjarne LAURSEN, Christina Bjørk PETERSEN
*Statens Institut for Folkesundhed (Danish National Institute of Public Health) – Denmark*

Liina VESKIMÄE
*Tervise Arengu Instituut (National Institute for Health Development) – Estonia*

Kari HAIKONEN
*Terveyden ja Hyvinvoinnin Laitos (Finnish National Institute for Health and Welfare) – Finland*

Marco GIUSTINI, Gianni FONDI
*Istituto Superiore di Sanità (National Institute of Health) – Italy*

Alessio PITIDIS
*B2C Innovations – Italy*

Annika SMILGA–VEIDE
*Slimību profilakses un kontroles centrs (Centre for Disease Prevention and Control of Latvia) – Latvia*

Milda GARBUVIENE
*Higienos institutas (National Institute of Hygiene) – Lithuania*

Dritan BEJKO
*Injury Data Base Network, Eurosafe, Amsterdam – The Netherlands*

Katharina K. PUCHER
*Directorate of Health (Ministry of Health) – Luxembourg*

Jessica PASTORE, Betty BISDORFF
*Luxembourg Institute of Health – Luxembourg*

Huib VALKENBERG, Susanne NIJMAN
*VeiligheidNL (Consumer Safety Institute) – The Netherlands*

Johan LUND, Kamilla AUSTNES
*Helsedirektoratet (Norwegian Directorate of Health) – Norway*

Tatiana ALVES
*Instituto Nacional De Saúde Doutor Ricardo Jorge (National Institute of Health Doutor Ricardo Jorge) – Portugal*

Pernilla FAGERSTRÖM
*Socialstyrelsen (Swedish National Board of Health and Welfare) – Sweden*

Banu EKINCI, Seçil SİS
*T.C. Sağlık Bakanlığı (Ministry of Health) – Turkey*

# INTRODUCTION

The EU-IDB (European Injury Database) is an epidemiological surveillance system focused mainly on the external causes of injuries. It is based on hospital Emergency Department (ED) registers. 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 or regulations related to products such as: toys, electric appliances, tools or building structures, as well as medication and drug use.

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 emergency rooms 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 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 includes all kinds of injuries recorded with a standard format at European level.

The EU-IDB data collection format consists of two types of datasets at different analytical levels:

- Full Data Set (IDB-FDS);
- Minimum Data Set (IDB-MDS).

The IDB-FDS contains a more detailed description of the accident, in particular concerning the external circumstances of injury such as: place of occurrence, mechanism of injury and activity carried out by the patient when injured. In the FDS format, 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.

The IDB-MDS contains less pieces of information as details on items involved in the injury are not included. Thus, information needed for its completion is usually already included in current population-based health care registries at ED attendances or hospital discharge level. IDB-MDS 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).[1]

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). Furthermore, the IDB-FDS provides 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.

Currently, the EU-IDB database contains analytic data on more than 23 million cases reported by up to 25 European countries from 2008 to 2020. From up to 19 countries more comprehensive information is available about the circumstances and causes of around 4.2 million injury cases, including details on items involved and narratives on the injury event.

The EU-IDB surveillance system is a collaborative network of EU-IDB National Data Administrators (NDAs) operating within the aforementioned 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.

The scope of the present report is 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. 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. 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] The ECHI initiative started in 1998 as a project responding to the European Commission's call to establish a shortlist of public health indicators which would serve as the core of a European public health monitoring system (more details in https://health.ec.europa.eu/indicators-and-data/european-core-health-indicators-echi_en)

# 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).

The NDAs provided the IDB data for 2019 and 2020 to the ISS. Whenever possible, the ISS converted FDS data into MDS format. Currently, the IDB database consists of a sample of 23,36 million ED attendances in MDS format, recorded from 25 countries, and 4,25 million ED attendances registered from 19 countries in FDS format (Table 1).

**Table 1. EU-IDB total data (2008-2020) for FDS and MDS databases**

| Country | FDS data | MDS data |
|---|---|---|
| Austria | 166,842 | 166,842 |
| Cyprus | 12,313 | 81,878 |
| Czech Republic | 32,666 | 32,662 |
| Denmark | 355,415 | 3,546,121 |
| Estonia | - | 1,063,883 |
| Finland | - | 245,009 |
| Germany | 46,832 | 46,825 |
| Greece | 772 | 772 |
| Hungary | 3,681 | 3,681 |
| Iceland | - | 117,935 |
| Ireland | - | 24,937 |
| Italy | 157,726 | 9,516,283 |
| Latvia | 218,028 | 218,028 |
| Lithuania | - | 2,485,809 |
| Luxembourg | 127,187 | 466,650 |
| Malta | 124,664 | 124,543 |
| Netherlands | 1,083,541 | 1,083,490 |
| Norway | - | 372,192 |
| Poland | 675 | 14,659 |
| Portugal | 594,906 | 594,228 |
| Romania | 4,101 | 13,969 |
| Slovenia | 710,422 | 935,846 |
| Spain | 23,438 | 23,534 |
| Sweden | 358,721 | 1,977,731 |
| Turkey | 232,724 | 229,743 |
| **Total** | **4,254,654** | **23,340,425** |

Focusing on the data provided to the ISS after the last call for uploading data in April-May 2022, new IDB data (relating to 2020) are provided by 12 countries, as shown in Table 2. Data provided in FDS format only were converted into MDS format. Norway and Denmark, 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 2020 data provided to ISS by the NDAs after the last call**

| Country | FDS 2020 data | MDS 2020 data | Aggregated data |
|---|---|---|---|
| Austria | 8,609 | - | |
| Denmark | - | - | 475,357 |
| Estonia | - | 128,213 | |
| Finland | | 26,630 | |
| Latvia | 14,109 | | |
| Lithuania | - | 251,538 | |
| Luxembourg | 17,188 | 47,905 | |
| Netherlands | 74,267 | 74,267 | |
| Norway | - | - | 102,221 |
| Portugal | 183,838 | - | |
| Sweden | - | 475,635 | |
| Turkey | 14,298 | - | |
| **Total** | **312,309** | **1,004,188** | **577,578** |

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.

The 2020 IDB-MDS data account for fewer than 1 million cases, whilst the 2020 IDB-FDS data regards more than 300 thousand cases. Whenever possible, data from Denmark (n. 475,357) and Norway (n. 102,221) 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 a reduction in the number of cases. Considering countries with a significant and constant sample over time (e.g., Sweden, Denmark and the Netherlands), a decrease in ED cases of about 10% was observed. It is likely to be an effect of the COVID-19 pandemic that has reduced the number of ED admissions for injuries.

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 2022 and regarding the ED attendances registered in 2020.

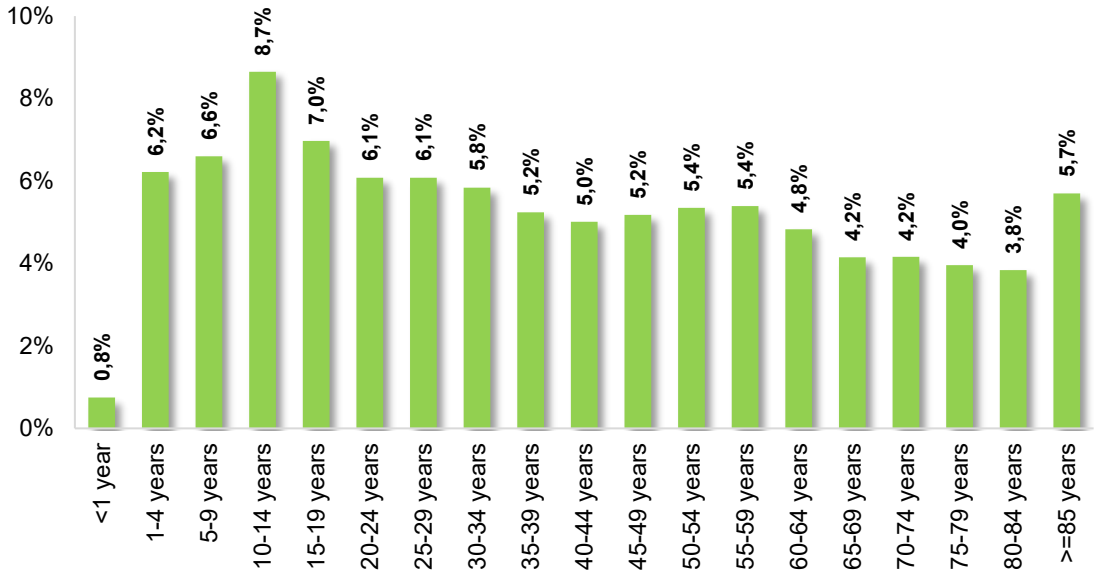
# 2. IDB-MDS: DATA 2020

## 2.1. Figures and percentages

Data from Estonia (EE), Finland (FI), Lithuania (LT), Luxembourg (LU), the Netherlands (NL) and Sweden (SE) have been sent to the ISS in MDS format directly. Data from Austria (AT), Latvia (LV), Luxembourg (LU), Portugal (PT) and Turkey (TR) have been sent in FDS format and translated into MDS format according to the aforementioned 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 2020 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 data collection covers only some "domains of prevention". Overall, for 2020 1,826,366 ED cases are available (individual and aggregated cases). Analytical data (i.e., individual cases) are 1,041,204 regarding all injuries, and 183,858 (IDB data from Portugal) concern only Home and Leisure Accidents (HLA).

Figure 1 shows the distribution of all injuries ED cases by *age group* (55.1% male and 44.9% female). Including data from Denmark and Norway, about 1 out of 4 (24.6%) of ED attendances involve people aged between 0 and 14 years, about 1 out of 7 (16.8%) involves people aged between 15 and 24 years, less than 1 out of 2 (41.4%) involves people aged between 25 and 64 years and 1 out of 5 (17.2%) involve people with ≥ 65 years.




*Data from Portugal, Denmark and Norway not included*

**Figure 1. Distribution (%) of IDB-MDS attendances by age groups (EU-IDB, data 2020)**

The percentage distribution by wider *age groups* and countries is shown in Figure 2. Portugal (34.1%), the Netherlands (26.4%) and Finland (26.4%) show the highest percentage of ED

attendance among the age group ≥ 65 years. Finally, data from Turkey highlight the lowest percentage of people aged ≥ 65 years (5.0%).

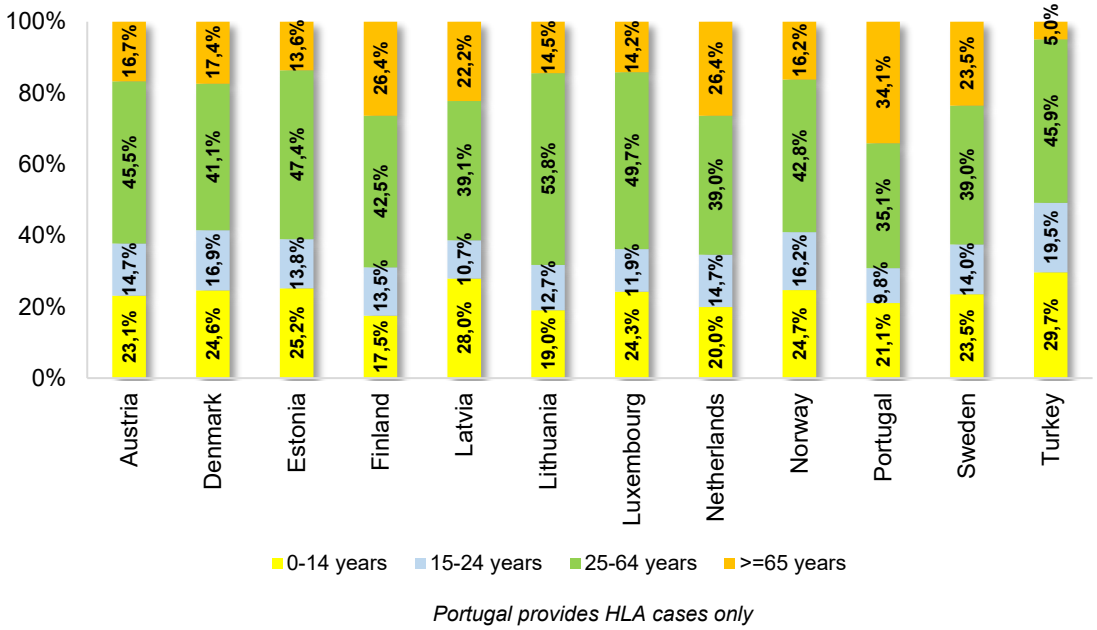



**Figure 2. Distribution (%) of IDB-MDS attendances by age groups and countries (EU-IDB, data 2020)**

As mentioned above, data in MDS format has 19 age groups, while aggregated data provided only 4. For this reason, data from Denmark and Norway has been excluded from the following correlation analysis performed with all the *age groups*. According to Spearman's rho rank correlation coefficient *(rs)* shown in Table 3, some significant correlations between countries can be observed. There are countries whose distribution by *age groups* correlates with that of many other countries (e.g., Austria correlates with Estonia, Lithuania, Sweden and Turkey), while there are countries whose distribution of cases by *age group* does not correlate with any other country (e.g., Portugal, which provides HLA data only).

**Table 3. Spearman rho correlation matrix of age group by countries (EU-IDB, data 2020)**

| | AT | EE | FI | LV | LT | LU | NL | PT | SE | TR |
|---|---|---|---|---|---|---|---|---|---|---|
| AT | 1.0000 | | | | | | | | | |
| EE | 0.7895* | 1.0000 | | | | | | | | |
| FI | 0.5573 | 0.4247 | 1.0000 | | | | | | | |
| LV | 0.4239 | 0.6749 | 0.2704 | 1.0000 | | | | | | |
| LT | 0.7491* | 0.7877* | 0.4274 | 0.3133 | 1.0000 | | | | | |
| LU | 0.6421 | 0.8526* | 0.1439 | 0.6538 | 0.6877 | 1.0000 | | | | |
| NL | 0.5351 | 0.3035 | 0.8355* | 0.3414 | 0.1895 | 0.1526 | 1.0000 | | | |
| PT | -0.1228 | -0.1439 | 0.1720 | 0.4011 | -0.4491 | -0.0684 | 0.4842 | 1.0000 | | |
| SE | 0.6965* | 0.6702 | 0.6757 | 0.6257 | 0.4895 | 0.6000 | 0.7982* | 0.2789 | 1.0000 | |
| TR | 0.7684* | 0.8807* | 0.3256 | 0.4590 | 0.6684 | 0.7860* | 0.3228 | -0.2070 | 0.6526 | 1.0000 |

(*) p<0,05 - Bonferroni-adjusted significance level

Overall, 13.0% 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). 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 12.5%.

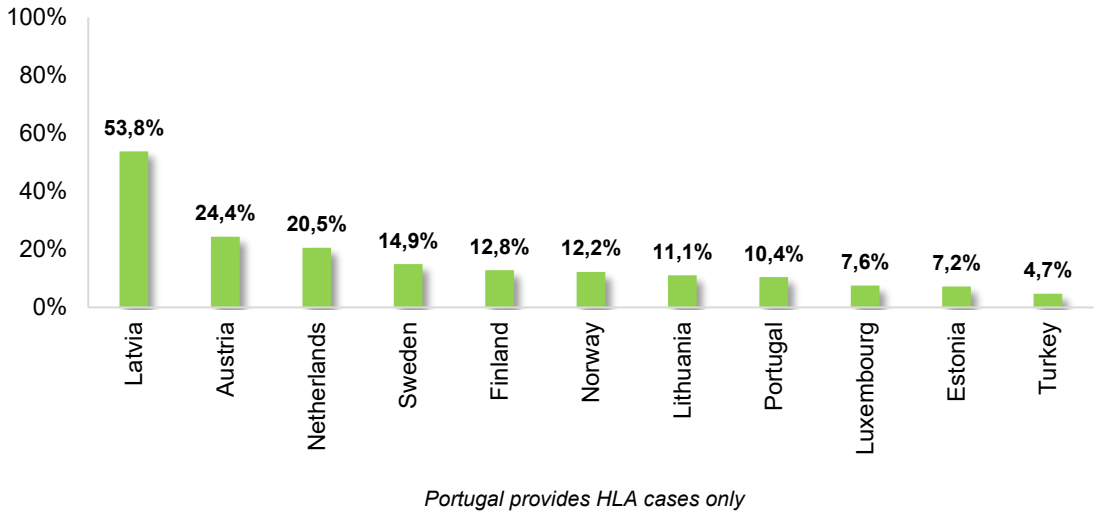



**Figure 3. Hospital admissions (%) by countries (EU-IDB, data 2020)**

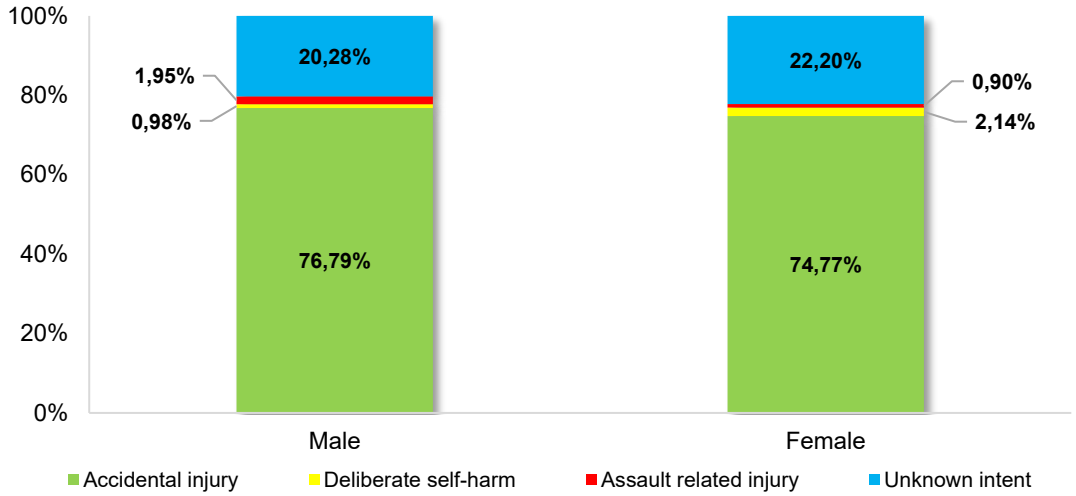
According to the *intent*[2], the MDS Data Dictionary allows the following modality:

- *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).

About 3 out of 4 cases regard accidental injury (75,9%); assault-related injury and deliberate self-harm are a residual share (both 1,5%).

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 0.9%). Additionally, deliberate self-harm cases have the most severe consequences in terms of hospitalization (48,4% of deliberate self-harm cases have been hospitalized).

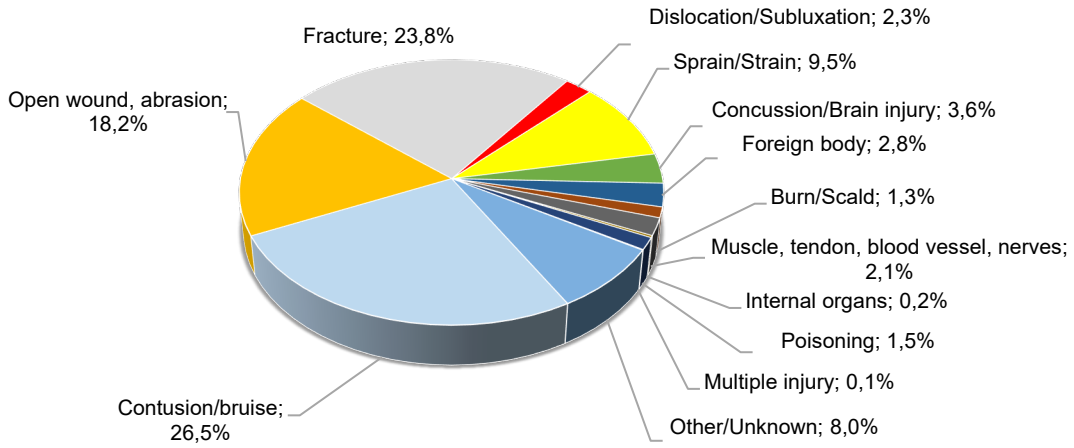
[2] The role of human purpose in the injury event. Intent data provide information about the role of human intent in the occurrence of an injury. This information can affect patient care and guide efforts to prevent injury recurrence.




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

**Figure 4. Distribution (%) of cases by intent and sex of patients (EU-IDB, data 2020)**

As shown in Figure 5, the most frequently reported *types of injury*[3] are contusion/bruise (26.5%), fracture (23.8%) and open wound and abrasion (18.2%). Concussion/brain injury and poisoning occur less frequently (3.6% and 1.5%, respectively) but with high severity.

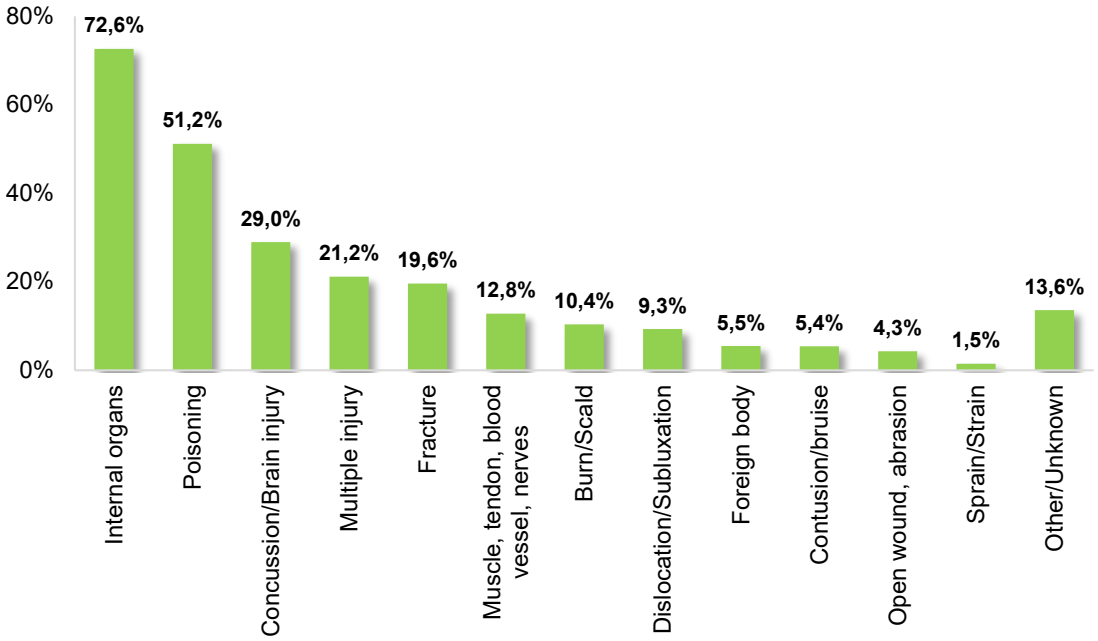



*Portugal provides HLA cases only*

**Figure 5. Distribution (%) of cases by type of injury (EU-IDB, data 2020)**

[3] 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.

The admissions vary widely according to the *type of injury*. For concussion and poisoning, the admission rates are 29.0% and 51.2%, respectively. Rare (0.2%) but very severe is the injury to internal organs, whose percentage of admission is more than 72% (Figure 6).




*Portugal provides HLA cases only*

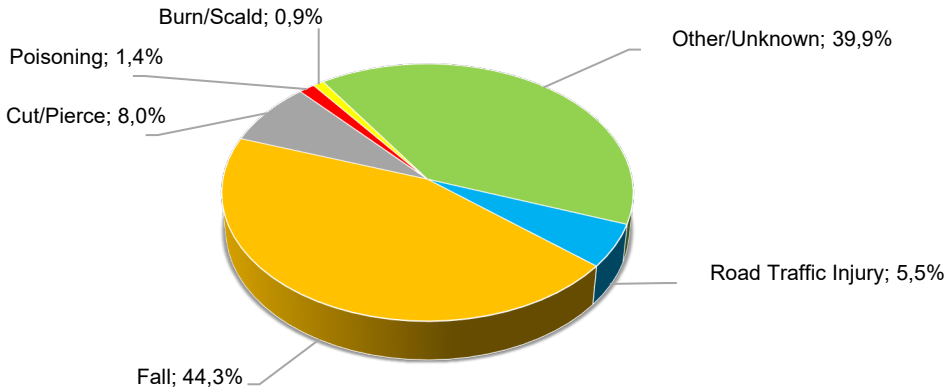
**Figure 6. Distribution (%) of hospital admission by type of injury (EU-IDB, data 2020)**

As with regards to the *mechanism of injury*[4] (Figure 7), the most frequent mechanism are *falls* (44.3 %). However, unlike the *type of injury*, it should be noted that the *mechanism of injury* often (39.9%) reports a generic coding (other or unknown) only. Indeed, in ED it is easier to get information about the *type of injury* than about the external causes of the injuries.

As shown in Table 4, the most frequent *type of injury* in road traffic accidents is fracture (35.1%), followed by contusion, bruise (29.9%) and concussion/brain injury (8.2%). Regarding falls, the most frequent types of injury are fractures (33.7%), contusions, bruises (29.5%) and sprain and strains (9.5%). For cut/pierce in about 4 out of 5 cases, the consequence are open wounds and abrasion (79.0%). As expected, the mechanism "poisoning" has "poisoning" as the most frequent type of injury (71.9%) as well as the mechanism "thermal mechanism" has "burn and scalds" as the main type of injury (90.1%)[5].

[4] The way in which the injury was sustained (i.e., how the person was hurt). Physical injury results when human tissue is acutely exposed to some form of energy and sustains some form of damage. An injury may also result from an insufficiency of any of the vital elements (e.g., in drowning/near drowning, strangulation, or freezing). The process by which injury occurs may be described as the "mechanism of injury."

[5] Table 4 shows some unlikely pairings, e.g., poisoning as a mechanism of injury and burn/scald 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.




*Portugal provides HLA cases only*

**Figure 7. Distribution (%) of hospital admission by mechanism of injury (EU-IDB, data 2020)**

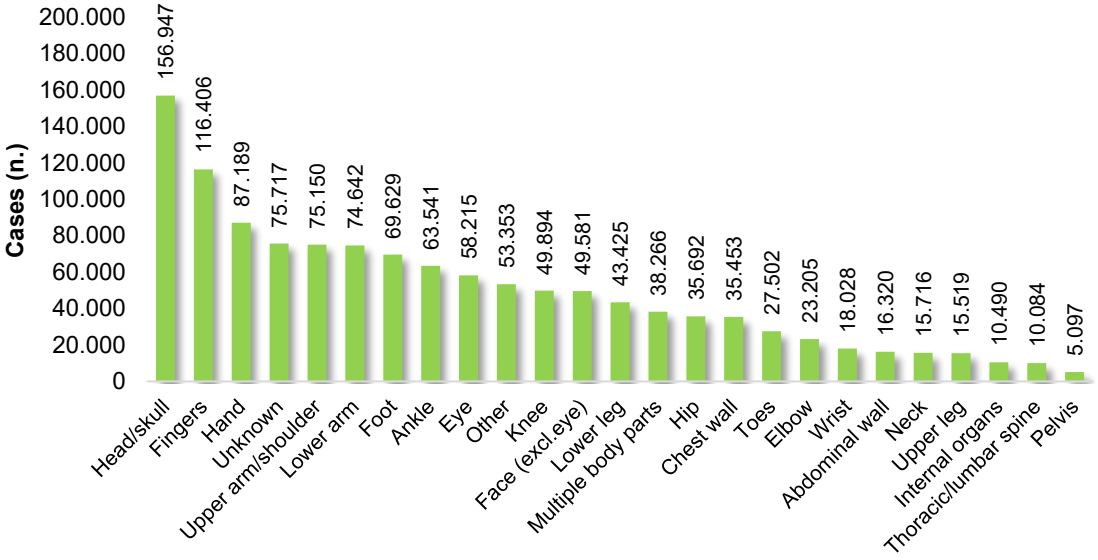
**Table 4. Distribution (%) of cases by type of Injury and mechanism of injury (EU-IDB, data 2020)**

| Type of injury | Road traffic injuries | Fall | Cut pierce | Poisoning | Burn/ scald | Other | Unknown | Total |
|---|---|---|---|---|---|---|---|---|
| Contusion, bruise | 29.9 | 29.5 | 3.8 | 0.9 | 0.6 | 29.2 | 20.7 | 25.9 |
| Open wound and abrasion | 9.3 | 11.4 | 79.0 | 0.4 | 1.1 | 18.1 | 15.9 | 17.7 |
| Fracture | 35.1 | 33.7 | 2.4 | 0.1 | 0.2 | 19.0 | 10.5 | 23.9 |
| Dislocation and subluxation | 2.3 | 2.6 | 0.1 | 0.0 | 0.0 | 2.9 | 1.7 | 2.3 |
| Sprain and strain | 7.2 | 9.5 | 0.2 | 0.0 | 0.0 | 7.5 | 4.7 | 7.4 |
| Concussion/brain injury | 8.2 | 5.5 | 0.1 | 0.1 | 0.0 | 2.5 | 3.2 | 4.0 |
| Foreign body | 0.1 | 0.1 | 1.8 | 0.4 | 0.4 | 9.9 | 3.7 | 3.3 |
| Burns and scalds | 0.1 | 0.0 | 0.0 | 5.7 | 90.1 | 0.6 | 1.1 | 1.2 |
| Injury to muscle and tendon, blood vessels and nerves | 1.6 | 1.9 | 4.0 | 0.0 | 0.0 | 3.0 | 2.3 | 2.3 |
| Injury to internal organs | 1.1 | 0.2 | 0.3 | 0.0 | 0.0 | 0.2 | 0.2 | 0.3 |
| Poisoning | 0.1 | 0.0 | 0.1 | 71.9 | 1.3 | 0.3 | 0.9 | 1.5 |
| Multiple injuries | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 |
| Other | 0.8 | 0.7 | 5.6 | 19.5 | 4.0 | 3.5 | 2.3 | 2.3 |
| Unknown | 4.0 | 4.9 | 2.6 | 0.7 | 2.0 | 3.4 | 32.7 | 7.9 |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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

As shown in Figure 8, the most frequently reported *body part injured*[6] is head/skull (12.8%), followed by fingers (9.5%), hand (7.1%), upper arm/shoulder (6.1%), lower arm (6.1%), and foot (5.7%).

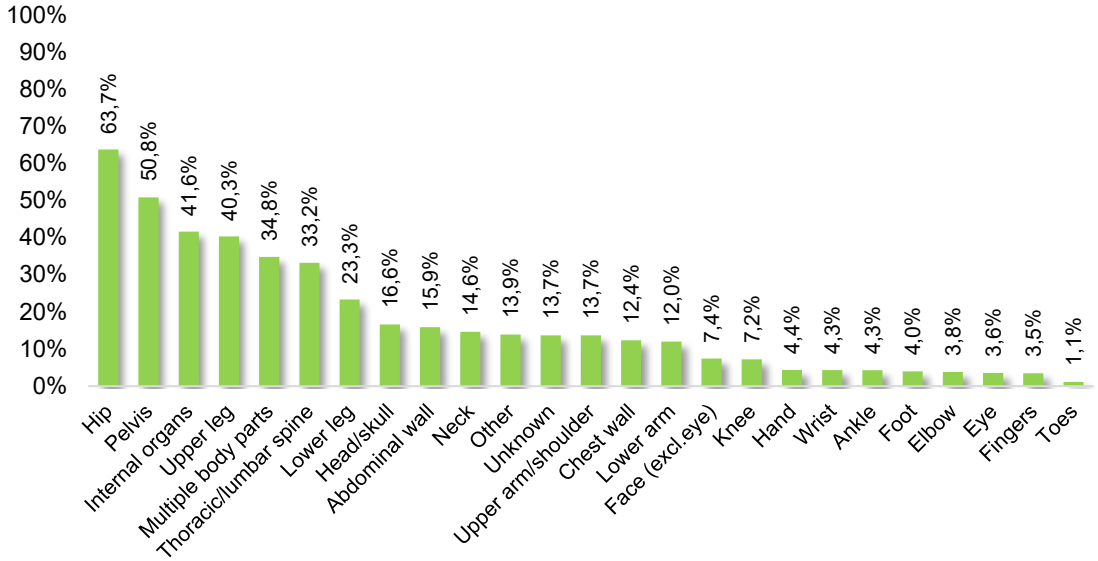
[6] Region or part of the body where the injury is located. The main purpose of this data element (in combination with the data element type of injury) is to enable cases to be grouped into diagnosis categories.




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

**Figure 8. Distribution of cases by injured body part (EU-IDB, data 2020)**

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 63.7%, 50.8% and 41.6% respectively. For upper leg, multiple body parts and thoracic/lumbar spine the admission rates are 40.3%, 34.8% and 33.2% respectively (Figure 9).




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

**Figure 9. Distribution (%) of hospital admission by injured body part (EU-IDB, data 2020)**

"Contusion, bruise" is the most frequent *type of injury* for neck (31.5%), chest wall (55.8%), abdominal wall (75.2%), elbow (43.6%), hand (32.2%), knee (34.2%) and foot (35.1%).

"Open wound and abrasion" is the most frequent *type of injury* for head/skull (33.2%), face (45.2%) and fingers (39.6%).

"Fracture" is the most frequent *type of injury* for thoracic/lumbar spine (74.2%), pelvis (84.0%), upper arm/shoulder (49.3%), lower arm (78.1%), wrist (41.9%), hip (55.6%), upper leg (41.1%), lower leg (47.6%) and toes (49.1%).

"Sprain and strain" is the most frequent *type of injury* for ankle (64.1%).

Finally, "Foreign body" is the most frequent *type of injury* for eye (44.3%) and internal organs (48.2%).

Tables 5a and 5b report in details these data per body parts injured.

**Table 5a. Distribution (%) of cases by body part injured and type of injury (EU-IDB, data 2020)**

| Body part | Contusion, bruise | Open wound and abrasion | Fracture | Dislocation and subluxation | Sprain and strain | Concussion brain injury | Foreign body |
|---|---|---|---|---|---|---|---|
| Head/skull | 15.5 | 24.1 | 0.8 | 0.1 | 0.0 | 77.4 | 0.0 |
| Face (excl.eye) | 2.7 | 10.4 | 3.1 | 3.0 | 0.1 | 0.7 | 14.0 |
| Eye | 5.0 | 4.7 | 0.3 | 0.0 | 0.0 | 0.5 | 64.3 |
| Neck | 1.6 | 0.3 | 0.7 | 0.5 | 5.0 | 0.1 | 5.3 |
| Thoracic/lumbar spine | 0.3 | 0.0 | 2.6 | 0.1 | 1.2 | 0.0 | 0.0 |
| Chest wall | 6.2 | 0.3 | 4.5 | 0.0 | 0.3 | 0.7 | 0.0 |
| Abdominal wall | 3.9 | 0.6 | 0.5 | 0.0 | 0.0 | 0.2 | 0.3 |
| Internal organs | 0.3 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 12.6 |
| Pelvis | 0.2 | 0.0 | 1.5 | 0.0 | 0.0 | 0.2 | 0.0 |
| Upper arm/shoulder | 5.2 | 0.8 | 12.6 | 41.2 | 3.6 | 0.8 | 0.0 |
| Elbow | 3.2 | 1.1 | 1.0 | 19.5 | 2.0 | 0.0 | 0.0 |
| Lower arm | 1.8 | 4.3 | 19.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| Wrist | 0.5 | 0.2 | 2.6 | 1.1 | 8.1 | 0.0 | 0.0 |
| Hand | 8.9 | 12.0 | 6.8 | 0.3 | 0.7 | 1.2 | 0.0 |
| Fingers | 7.1 | 21.3 | 9.8 | 13.3 | 7.0 | 0.8 | 0.0 |
| Hip | 3.9 | 0.1 | 6.8 | 5.8 | 0.8 | 0.6 | 0.0 |
| Upper leg | 0.9 | 1.7 | 2.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| Knee | 5.4 | 2.3 | 1.1 | 10.8 | 18.5 | 0.0 | 0.0 |
| Lower leg | 2.1 | 4.4 | 7.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ankle | 1.9 | 0.7 | 4.9 | 1.4 | 45.1 | 0.0 | 0.0 |
| Foot | 7.7 | 4.2 | 6.3 | 1.0 | 6.4 | 2.9 | 0.0 |
| Toes | 2.9 | 1.3 | 4.6 | 1.8 | 1.0 | 0.3 | 0.0 |
| Multiple body parts | 1.1 | 0.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| Other | 9.0 | 2.3 | 0.2 | 0.0 | 0.0 | 9.7 | 3.0 |
| Unknown | 2.8 | 1.9 | 0.0 | 0.0 | 0.0 | 3.9 | 0.3 |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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

**Table 5b. Distribution (%) of cases by body part injured and type of injury (EU-IDB, data 2020)**

| Body part | Burns/ scalds | Injury to muscle, tendon, blood vessel and nerves | Injury to internal organs | Poisoning | Multiple injuries | Other | Unknown |
|---|---|---|---|---|---|---|---|
| Head/skull | 7.3 | 0.5 | 4.9 | 0.0 | 13.8 | 4.6 | 12.6 |
| Face (excl.eye) | 1.9 | 0.1 | 0.1 | 0.0 | 0.4 | 1.0 | 2.0 |
| Eye | 14.8 | 0.3 | 0.0 | 0.0 | 0.3 | 1.4 | 2.6 |
| Neck | 0.4 | 1.7 | 0.0 | 0.0 | 0.8 | 0.7 | 0.5 |
| Thoracic/lumbar spine | 0.0 | 1.1 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 |
| Chest wall | 0.8 | 0.5 | 0.1 | 0.0 | 2.4 | 0.5 | 0.8 |
| Abdominal wall | 0.6 | 0.6 | 0.1 | 0.0 | 0.6 | 0.7 | 0.4 |
| Internal organs | 0.1 | 0.2 | 94.6 | 0.0 | 0.0 | 0.3 | 0.1 |
| Pelvis | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| Upper arm/shoulder | 0.6 | 12.5 | 0.0 | 0.0 | 0.8 | 0.9 | 0.9 |
| Elbow | 0.0 | 1.4 | 0.0 | 0.0 | 0.3 | 0.3 | 0.1 |
| Lower arm | 1.1 | 2.3 | 0.0 | 0.0 | 2.8 | 1.0 | 0.2 |
| Wrist | 0.4 | 2.5 | 0.0 | 0.0 | 0.1 | 0.3 | 0.1 |
| Hand | 24.9 | 15.9 | 0.0 | 0.0 | 10.8 | 3.9 | 2.4 |
| Fingers | 1.1 | 10.2 | 0.0 | 0.0 | 1.4 | 14.4 | 1.3 |
| Hip | 0.1 | 0.5 | 0.0 | 0.0 | 0.1 | 0.1 | 0.3 |
| Upper leg | 0.9 | 6.9 | 0.0 | 0.0 | 0.4 | 0.6 | 0.3 |
| Knee | 0.1 | 2.0 | 0.0 | 0.0 | 0.3 | 7.2 | 2.3 |
| Lower leg | 0.5 | 20.7 | 0.0 | 0.0 | 2.2 | 1.1 | 0.4 |
| Ankle | 0.1 | 1.2 | 0.0 | 0.0 | 0.1 | 0.5 | 0.2 |
| Foot | 7.7 | 16.8 | 0.0 | 0.0 | 2.5 | 2.4 | 3.6 |
| Toes | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.7 | 0.3 |
| Multiple body parts | 4.7 | 0.1 | 0.2 | 86.5 | 41.7 | 54.3 | 0.9 |
| Other | 28.3 | 1.7 | 0.1 | 0.0 | 14.7 | 1.2 | 8.5 |
| Unknown | 3.4 | 0.3 | 0.0 | 13.4 | 3.3 | 1.5 | 59.0 |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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

## 2.2. Rates

The NDAs provided 2020 reference populations for the following countries: Austria, Denmark, Estonia, Finland, Lithuania, Luxembourg, Latvia, the Netherlands, Norway, Portugal, Sweden and Turkey (Table 6). So, it is possible to estimate incidence rates for all countries that provided 2020 data. However, it should be kept in mind that Portugal only provides data for HLA. We estimated the incidence rate of all injuries for Portugal by applying a coefficient obtained from the median value of the ratio between HLA and all injuries, calculated for each country (median value=0.62).

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 30%; data from Finland, Latvia, and the Netherlands approx. 10%; data from Austria about 2% and data from Turkey around 0.5%. The median IDB rate for all injuries is equal to 6,326 cases per 100,000 inhabitants, ranging from 3,199 cases per 100.000 inhabitants in the Netherlands to 9,644 cases per 100,000 inhabitants in Estonia. The median rate confirms the decrease in the incidence rate compared to the previous year (-24%).

**Table 6. Reference population, all injuries figures and rates (EU-IDB, data 2020)**

| Country | Reference population | IDB-MDS all injuries | |
|---|---|---|---|
| | | n. | rates per 100,000 |
| Austria | 209,715 | 8,609 | 4,105 |
| Denmark | 5,822,763 | 475,537 | 8,164 |
| Estonia | 1,328,976 | 128,213 | 9,644 |
| Finland | 553,374 | 26,630 | 4,812 |
| Latvia | 196,615 | 14,109 | 7,176 |
| Lithuania | 2,794,090 | 251,538 | 9,002 |
| Luxembourg | 508,178 | 40,814 | 8,051 |
| Netherlands | 2,321,228 | 74,267 | 3,199 |
| Norway | 5,367,580 | 102,221 | 5,476 |
| Portugal | 3,113,289 | 183,858 | 5,906* |
| Sweden | 10,327,589 | 475,635 | 4,605 |
| Turkey | 305,132 | 14,298 | 4,686 |

* HLA data. We estimated the incidence rate of all injuries for Portugal (9,456 cases per 100,000) by applying a coefficient obtained from the median value of the ratio between HLA and all injuries, calculated for each country (median value=0.62)

As pointed out in the recent report *Injuries in the European Union 2009-2018* (EuroSafe, 2021), 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 2020, the population of the 27 Member States was 447.3 million (Eurostat, Population on 1 January 2020), which leads to estimated 28,297,600 injury patients treated in EDs of EU hospitals. Eurostat reports for the 27 Member States of the EU (EU-27) in 2017 (the last year for which mortality data are available for all Member States) 219,357 fatalities due to injuries (external causes of death). The general hospitalization rate is 10.7%, which for 2020 leads to an estimated 3,028,400 inpatients in the EU-27 (and 25,269,600 "pure" ED attendances). This leads to the "injury pyramid" shown in Figure 10. Based on this pyramid, we can estimate that there are about 14 hospitalizations and 115 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).

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[7]) could be affected by an underreporting bias due to a large number of unspecified cases (more than 40% of cases report "other" or "unknown" as a mechanism of Injury).

[7] According to the 2020 IDB-FDS data, 0.35% 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 18,800 in 2020, applying the aforementioned percentage we can estimate about 5.4 million of ED attendances for road traffic accidents.

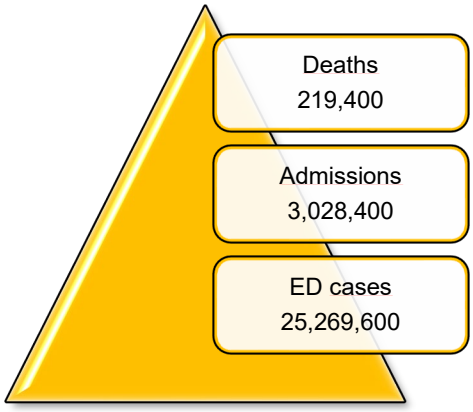



**Figure 10. WHO injury pyramid for the EU-27: estimated number of injuries (EU-IDB, data 2020)**

**Table 7. IDB rates and estimated EU-27 cases by mechanism of injury (EU-IDB, data 2020)**

| Mechanism of injury | IDB rates 2020 | Estimated EU cases 2020 |
|---|---|---|
| Road traffic injury | 373.7 | 1,671,417 |
| Fall | 2748.4 | 12,294,259 |
| Cut/pierce | 508.9 | 2,276,299 |
| Poisoning | 98.9 | 442,556 |
| Burn/scald | 69.4 | 310,392 |
| Other/unknown | 2531.3 | 11,322,881 |

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 less than 10%.

**Table 8. IDB rates and estimated EU-27 cases by type of injury (EU-IDB, data 2020)**

| Type of injury | IDB rates 2020 | Estimated EU cases 2020 |
|---|---|---|
| Contusion, bruise | 1479.9 | 6,619,732 |
| Open wound and abrasion | 1175.5 | 5,258,345 |
| Fracture | 1772.1 | 7,927,140 |
| Dislocation and subluxation | 147.3 | 658,909 |
| Sprain and strain | 594.4 | 2,658,756 |
| Concussion/brain injury | 212.1 | 948,553 |
| Foreign body | 197.5 | 883,596 |
| Burns and scalds | 94.7 | 423,657 |
| Injury to muscle and tendon, blood vessels and nerves | 188.7 | 843,972 |
| Injury to internal organs | 16.5 | 73,625 |
| Poisoning | 106.2 | 474,977 |
| Multiple injuries | 15.1 | 67,444 |
| Other/unknown | 474.6 | 2,123,058 |

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 (HLA);
- ECHI 30b (Road traffic accidents);
- ECHI 31 (Workplace accidents).

According to the *ECHIs* and/or *mechanism of injuries*, injury rates and estimated EU-27 cases are shown in Table 9. About 57% of all injuries occur at home or during leisure activities (29% at home), while less than 5% are at school. About 9% 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 2020)**

| Prevention domains | IDB figures 2020 | IDB rates 2020 | Estimated EU cases 2020 |
|---|---|---|---|
| HLA (ECHI 29b) | 926,122 | 3721.5 | 16,646,934 |
| Road traffic accidents (ECHI 30b) | 94,609 | 368.8 | 1,649,883 |
| Workplace accidents (ECHI 31) | 89,781 | 416.9 | 1,865,028 |
| Interpersonal violence | 26,793 | 130.5 | 583,551 |
| Deliberate self-harm | 22,476 | 81.9 | 366,385 |
| Home accidents | 469,653 | 1958.2 | 8,759,629 |
| School accidents | 71,974 | 267.7 | 1,197,503 |
| Sport accidents | 140,498 | 607.6 | 2,717,937 |

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

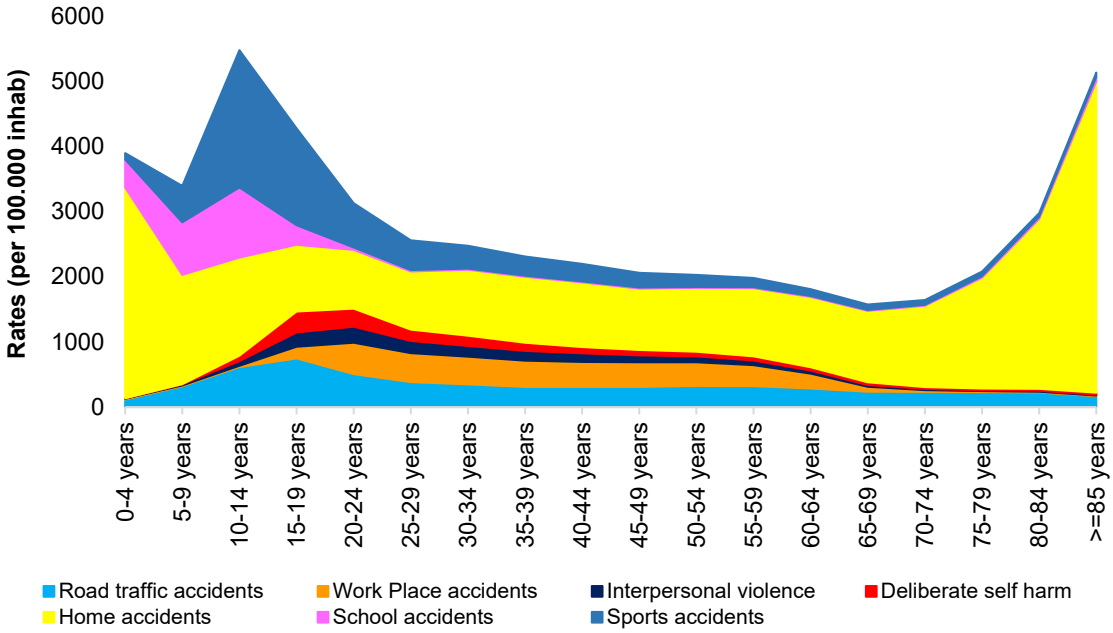



**Figure 11. IDB rates (per 100,000 inhabitants) by prevention domains and age groups (EU-IDB, data 2020)**

Home accidents hold by far the biggest share of injuries in all age groups, with the exception of the 10-19 age group where sports accidents are the first cause of injury. In the 30-59 years' age group work place 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 9 years old of age. Interpersonal violence and deliberate self-harm are noteworthy for persons with 15-24 years.

## 2.3. European IDB 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 take into account 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 takes into account 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 2020 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 4999 cases per 100.000 inhabitants. The corresponding unweighted all-injury rate is 5862 cases per 100.000 inhabitants. In estimating the all-injury rate data from Portugal has been excluded because Portugal provided only HLA. Data from Turkey have been also excluded because of the poor representativeness of the resident population (too small a sample size).

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.

According to Figure 12, the IDB EU all-injury rates trend is relatively stable from 2013 to 2019, with a dramatic drop in 2020 (-19.8%), probably due to the COVID-19 pandemic. 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.

**Table 10. EU-IDB rates (per 100,000) by prevention domains (EU-IDB, data 2020)**

| Prevention domains | EU-IDB rates 2020 (weighted) | EU-IDB rates 2020 (not weighted) |
|---|---|---|
| HLA (ECHI 29b) | 2,888 | 3,721 |
| Road traffic accidents (ECHI 30b) | 423 | 369 |
| Workplace accidents (ECHI 31) | 334 | 417 |
| Interpersonal violence | 88 | 130 |
| Deliberate self-harm | 72 | 82 |
| Home accidents | 1,241 | 1,958 |
| School accidents | 183 | 268 |
| Sport accidents | 601 | 608 |

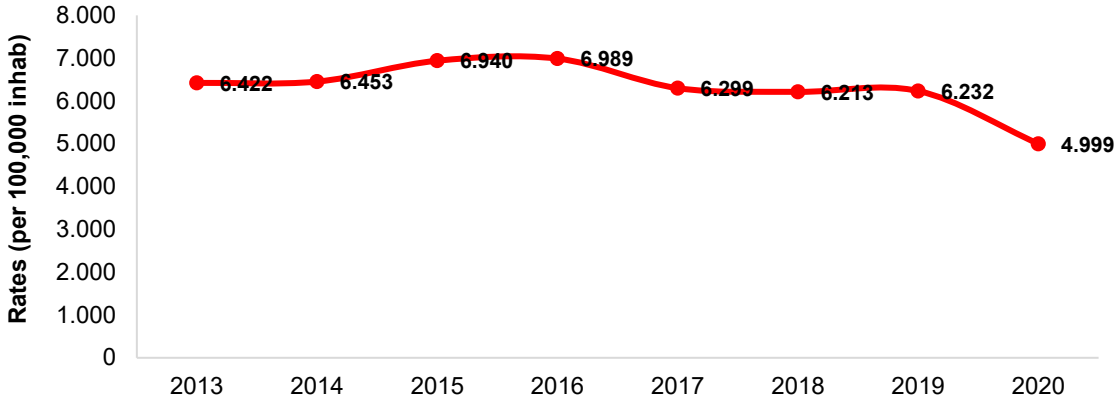



**Figure 12. EU-IDB all injuries weighted rates (per 100,000 inhabitants) by year (EU-IDB, data 2013-2020)**

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 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.[8]

Limiting the analysis to the countries that have provided ED data covering all (or almost all) of the countries' territory, two different situations can be observed: Sweden and Denmark show a constant decreasing trend already evident in the years preceding the COVID-19 pandemic, whilst Estonia, Latvia and Luxembourg show a turning point between 2019 and 2020 (Figure 14).

[8] Please, note that, for each country, in 2019 and 2020 the number of hospitals providing data has remained constant, as have the reference populations. So, there is no evidence of a selection bias in the IDB sample both in the reference population and in the number of hospitals due to the COVID-19 effect.

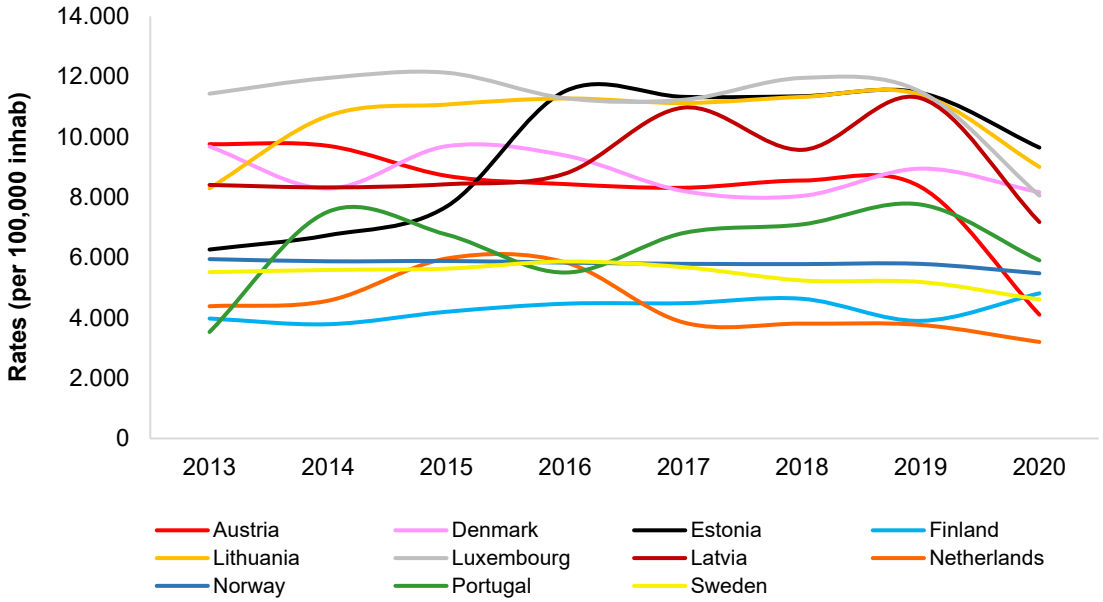



**Figure 13. EU-IDB all injury rates (per 100,000 inhabitants) by year and countries (EU-IDB, data 2013-2020)**

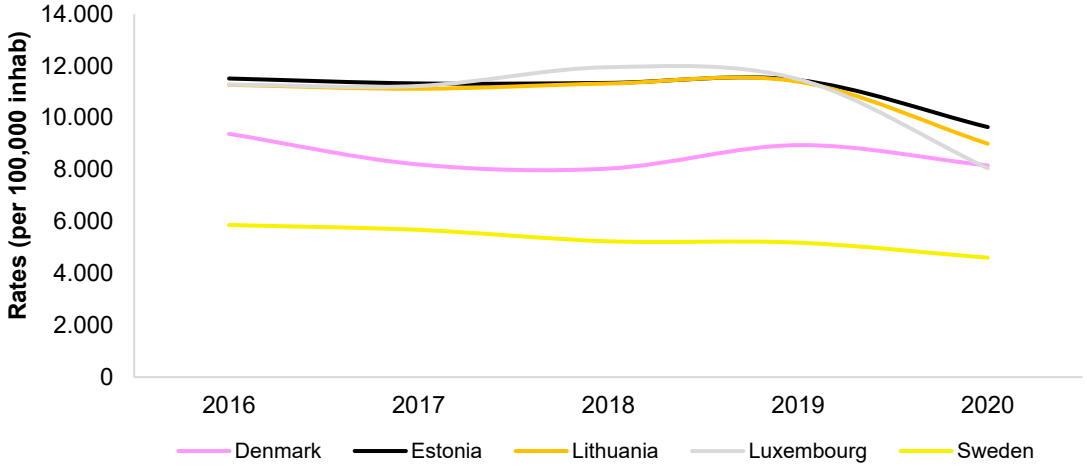



**Figure 14. EU-IDB all injures rates (per 100,000 inhabitants) by year and countries. Only data covering the whole country (EU-IDB, data 2016-2020)**

According to the *prevention domains*, the EU-IDB rates trends are shown as index values in Figure 15. All but one (i.e., deliberate self-harm accidents) the *prevention domains* showed a dramatic decrease from 2019 and 2020, ranging from -25.6% in home accidents, to -34.3% 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 26.2%. 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.

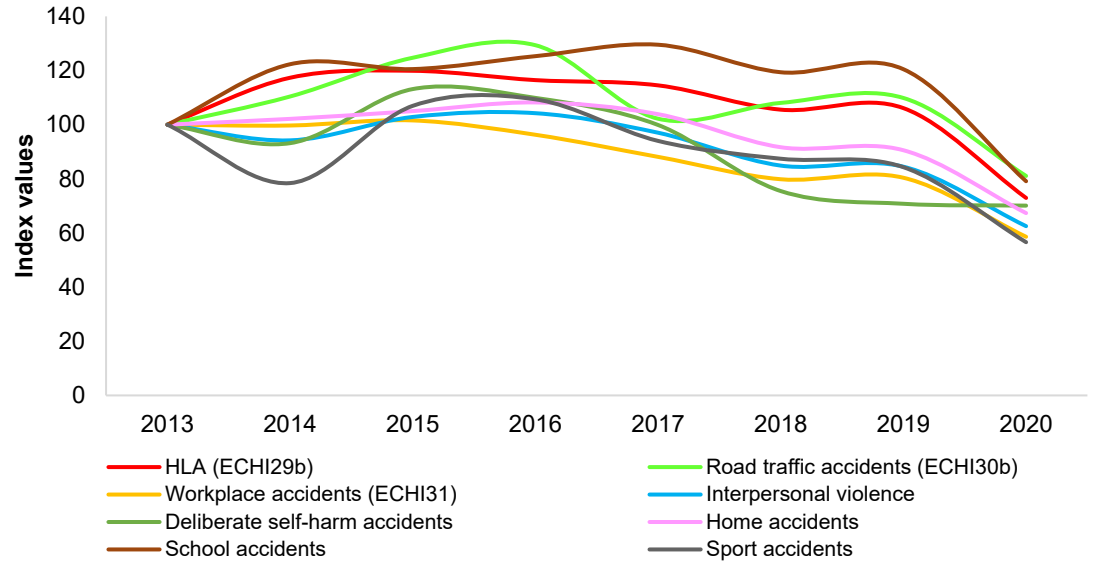



**Figure 15. EU-IDB injuries weighted rates by prevention domains and year (EU-IDB, data 2013-2020)**

The trend by *gender* of the weighted all-injury rates is shown in Figure 16. Both genders show the same all-injury trend highlighted in Figure 12 (males -19.6%; females -19.9%).

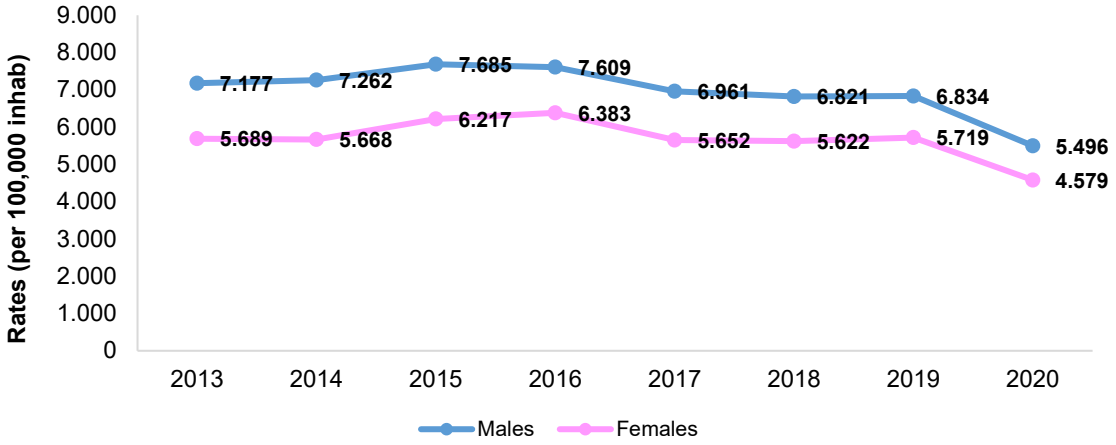



**Figure 16. EU-IDB all injuries weighted rates (per 100,000 inhabitants) by gender and year (EU-IDB, data 2013-2020)**

The COVID-19 impact is different taking into account all ED attendances or only the hospitalizations. As shown in Figure 17, both the all-injury rates for ED attendances (ED cases) and all-injury rates for hospitalizations (Admitted) drops between 2019 and 2020. But the former decrease by 18.9% whereas hospitalisations fall by 31.0%.[9]

[9] Note that this methodology leads to a different estimate of the "Injury pyramid" compared to the one shown in the previous Figure 10. Indeed, by applying the rates shown in Figure 16, the pyramid would be as follows: death 219,400; admissions 3,368,500; ED cases: 17,721,300.

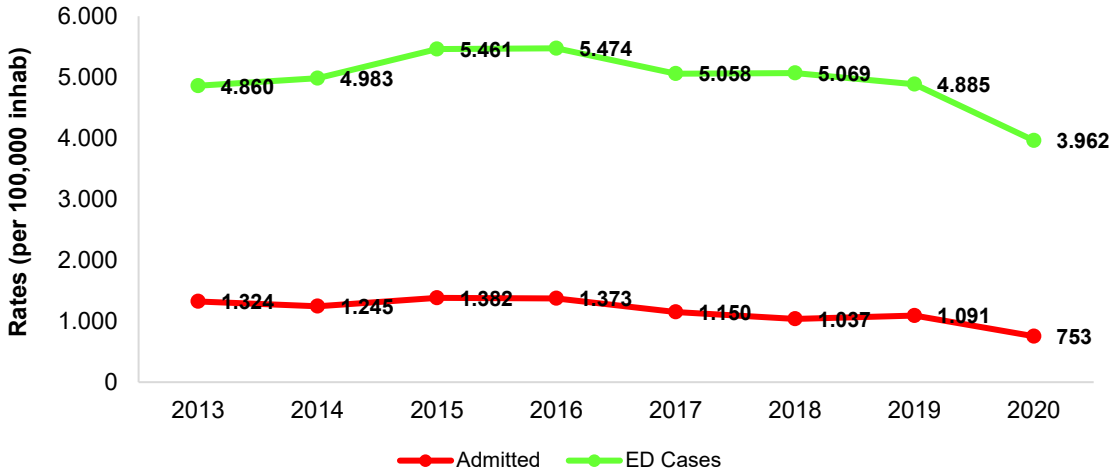



**Figure 17. EU-IDB all injuries weighted rates (per 100,000 inhabitants) by treatment and year (EU-IDB, data 2013-2020)**

All age groups show a decrease in all-injury weighted rates. As shown in Figure 18, the all-injury rate dramatically decreases in the 15-24 age group (-25.5%), while the decrease in the 0-14 years (-18.6%) and 25-64 years (-18.6%) is less significant.

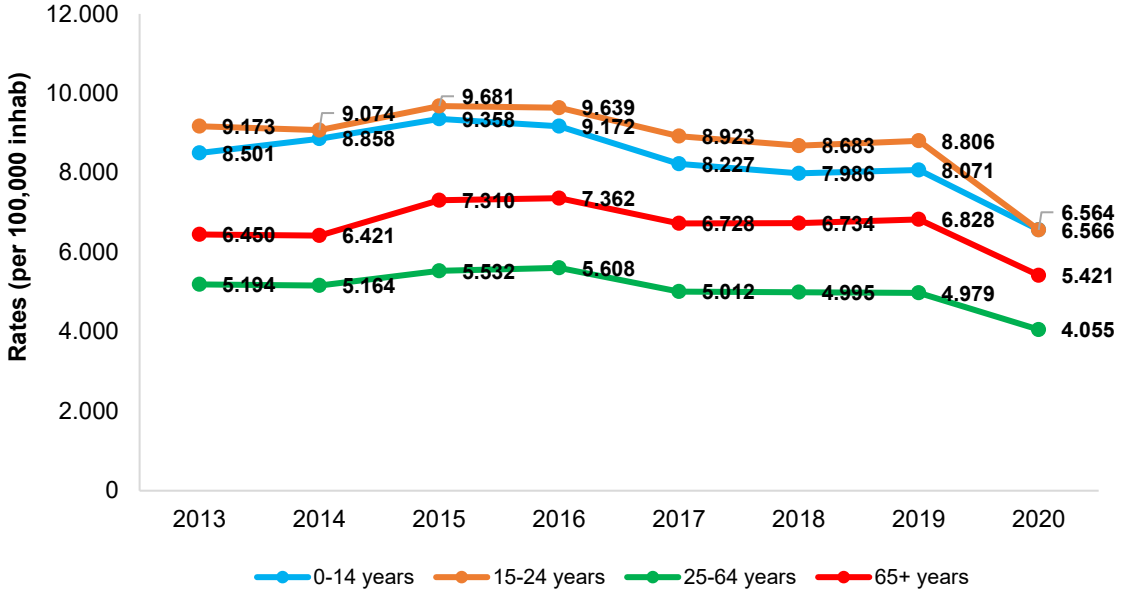



**Figure 18. EU-IDB all-injury weighted rates (per 100,000 inhabitants) by age groups and year (EU-IDB, data 2013-2020)**

# 3. IDB-FDS: data 2020

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 is 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. Information whether the patient was only examined and sent home without treatment, treated, referred for further treatment, admitted to hospital is also collected. The purpose of *treatment/follow-up* is to give a simple indication of the severity and therefore an indication of the burden of injuries.

The distribution of treatments can be observed in Figure 19. 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 to 12.2%. About 47% of patients are sent home, with or without treatment and about 32% are treated but not admitted. The proportion of injured deceased before arrival or deceased in the ED or during hospitalisation is about 0.13% (i.e., about 1 in 770 ED cases), most of which (347 out of 390, i.e., 89%), deceased during hospitalisation.

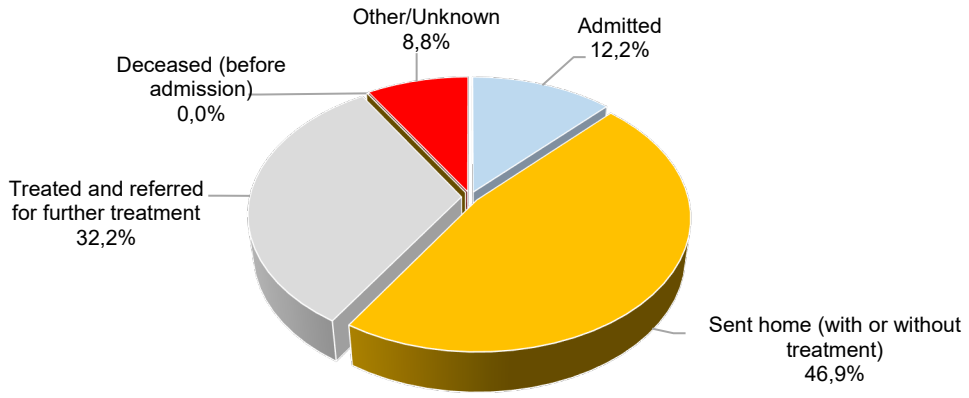



**Figure 19. Destination of patients admitted to emergency departments (EU-IDB, data 2020)**

The average hospitalisation days is 7.8 days (25th and 75th percentile respectively equal to 2 and 10 days). Females show a longer length of stay (8.6 *vs.* 6.8 days), probably due to the higher average age of hospitalised patients (65.8 *vs.* 49.9 years).

As expected, the number of days in hospital rises according to age: from 2.3 days in under 1 age group and 5-9 age group to 10.9 days in the 80-84 age group (Figure 20). 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 13.3%; it decreases to around 7% between the ages of 1 and 29 and then increases progressively with age, reaching 40% over the age of 85 years.

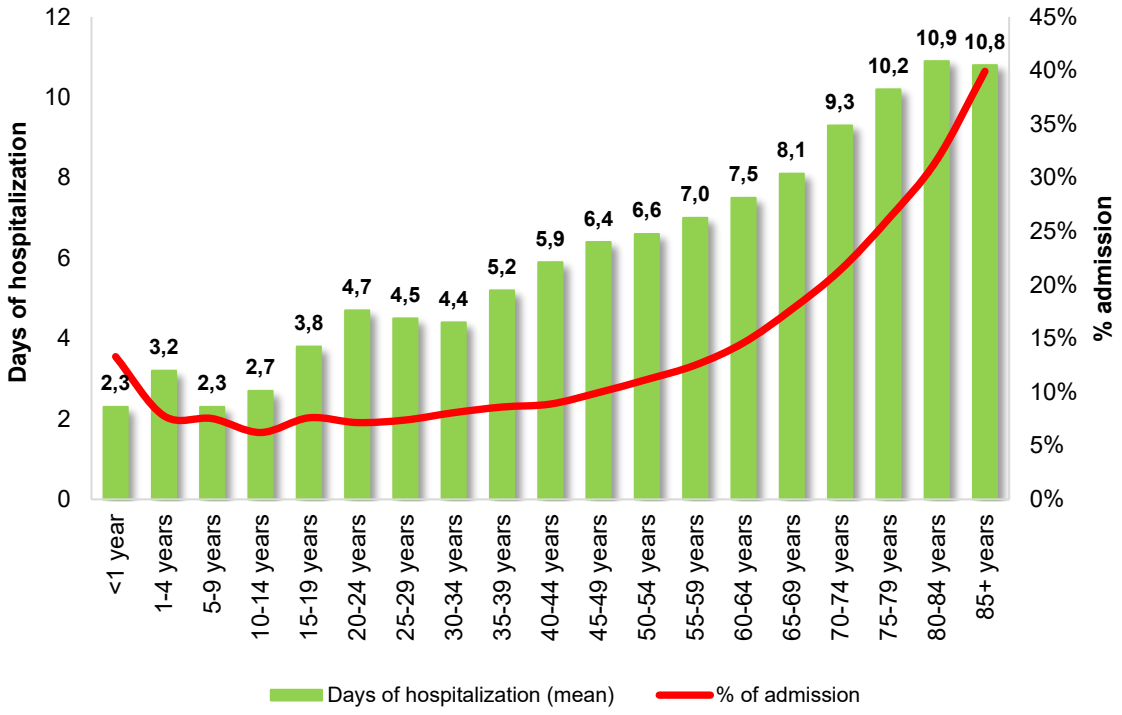



**Figure 20. Days in hospital and percentage of admission by age groups (EU-IDB, data 2020)**

Figure 21 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 (7.7 days and 6.6 days on average), whilst injuries due to threat to breathing or exposure to weather, natural disaster, or other force of nature show the higher percentage of admission (44.4% and 37.5% 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: 9.8 days).

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

- poisoning by other specified chemical or other substance: 33.0 days;
- inhalation of smoke from burning object/substance: 12.0 days;
- severing a body part with an axe, panga, machete, or cutlass: 10.3 days.

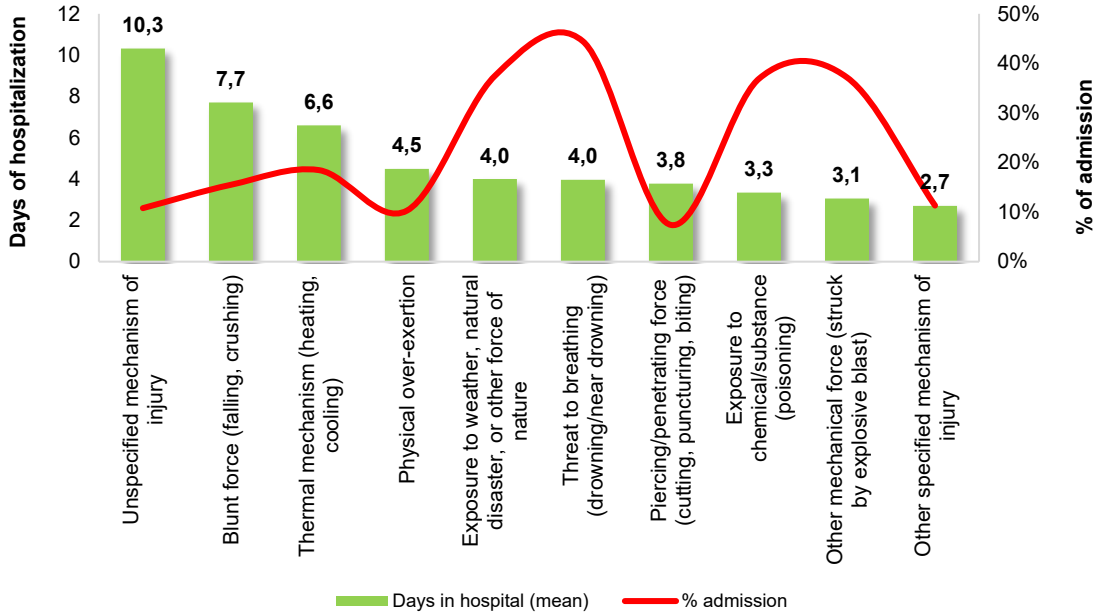



**Figure 21. Days in hospital and % of admission by mechanism of injury (EU-IDB, data 2020)**

Figure 22 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 (10.1 days on average), whilst being taken care of by health/non health care professionals show a higher percentage of admission (47.9%).[10]

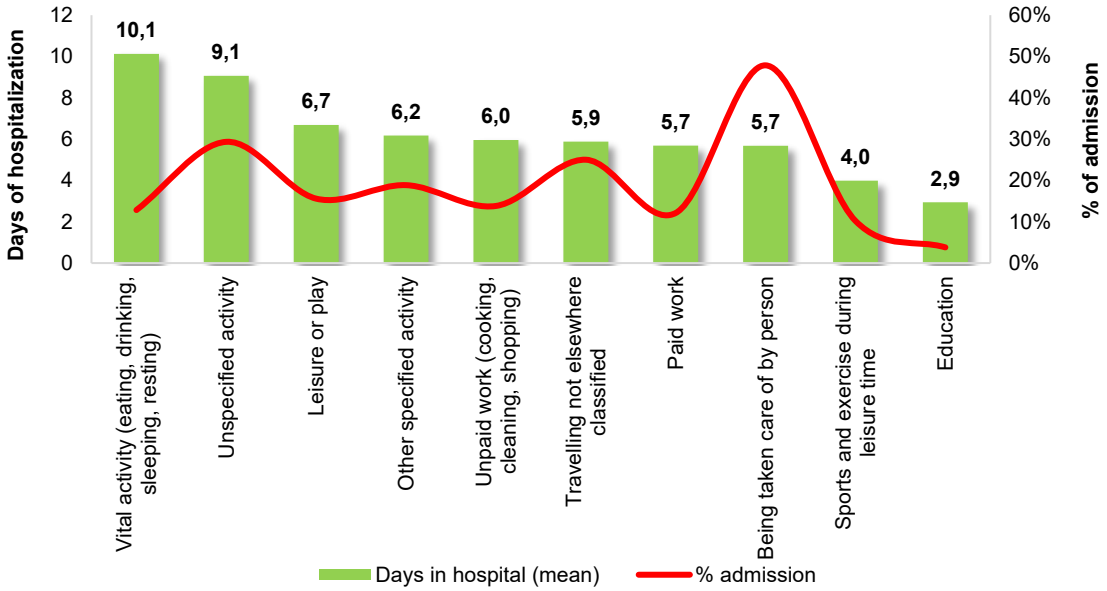



**Figure 22. Days in hospital and % of admission by activities when injured (EU-IDB, data 2020)**

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

Analysing the activities when injured in detail, those involving most extended inpatient stays, include:

- cooking, cleaning: 9.2 days;
- sleeping, resting: 9.0 days;
- personal hygiene: 10.6 days;
- unspecified leisure or play: 8.6 days;
- other specified vital activity: 10.6 days;
- unspecified vital activity: 10.7 days.

Figure 23 shows the distribution of cases by *place of occurrence*, percentage of admission and average length of stay (in days).

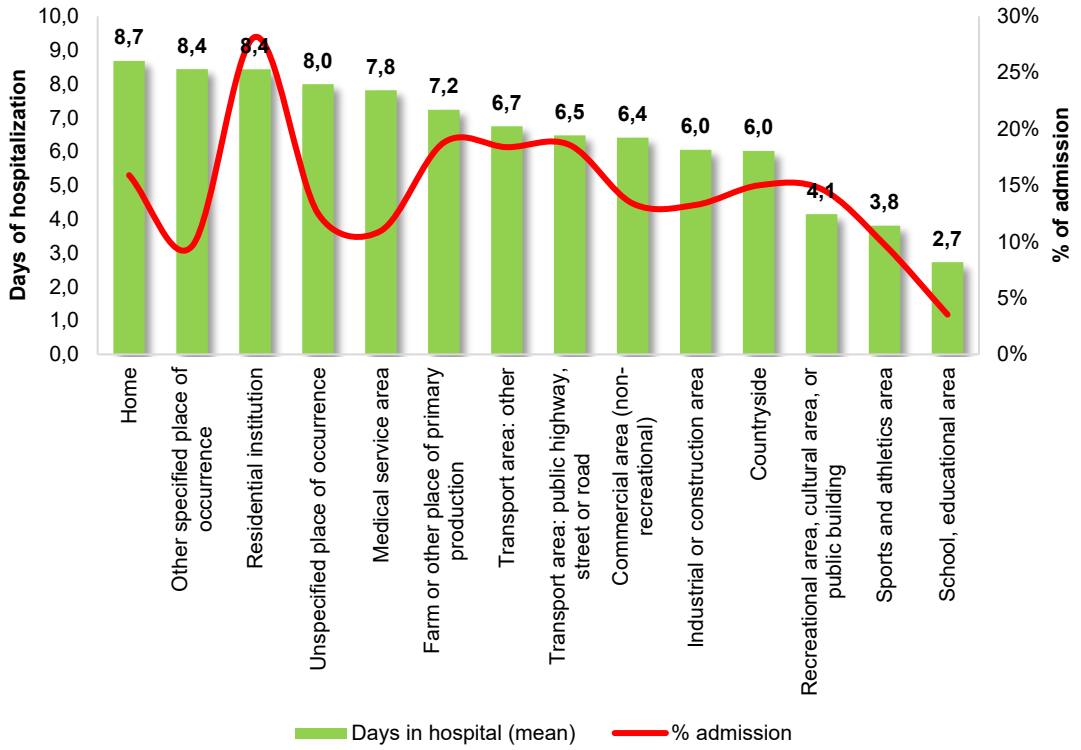



**Figure 23. Days in hospital and % of admission by place of occurrence (EU-IDB, data 2020)**

Injuries at home, residential institution (home for the elderly, nursing home, prison, military institution) and medical services (hospital, outpatient clinic, health centre, health professional's office) have the higher length of stay (8.7 days, 8.4 days and 7.8 days on average respectively), whilst injuries in residential institutions or on public highways, streets or roads show the higher percentage of admission (28.2% and 18.6%, respectively).

About the *intent* variable, as shown in Table 11, about half of intentional self-harm cases got admitted (46.1%; 4.6 days of hospitalization). The proportion of admission and the number of days of hospitalization for unintentional injury, assault and other violence are 19.3%/6.2 days; 21.1%/4.4 days and 13.4%/5.9 days respectively.

**Table 11. ED cases, admitted cases, percentage of admission and average length of stay, by intent (EU-IDB, data 2020)**

| Type of intent | ED Cases | Admitted | % Admission | Average stay (days) |
|---|---|---|---|---|
| Unintentional | 121,870 | 23,492 | 19.3 | 6.2 |
| Intentional self-harm | 2,907 | 1,341 | 46.1 | 4.6 |
| Assault | 2,270 | 491 | 21.6 | 4.4 |
| Other violence | 536 | 72 | 13.4 | 5.9 |
| Undetermined intent | 84 | 29 | 34.5 | 3.4 |
| Not possible to record/report for legal | 4 | 4 | 100.0 | 12.0 |
| Other specified intent | 100 | 30 | 30.0 | 4.9 |
| Unspecified intent | 184,558 | 18,524 | 10.0 | 10.7 |
| **Total** | **312,329** | **43,983** | **14.1** | **7.8** |

## 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, 2,806 cases of violence were reported in 2020 (72.7% by males and 27.3% by females), equalling to 0.84% of the total of all ED attendances. The average age of the victim is 32.9 years (male 32.6 years; female 33.8 years). 2,270 (80.9%) and 536 (19.1%) cases were described as assault and other violence respectively.

Figure 24 shows the distribution of violence cases by *relationship victim/perpetrator*. As expected, in almost half of the cases (47.8%), the relationship between victim/perpetrator is not specified. When the relationship is indicated (i.e., excluding unspecified relationship events), in more than half of the cases the perpetrators are close to the victim: acquaintance or friends, spouse or partners, parent and other relatives add up to 50.7% of violent incidents.

Figure 25 shows the distribution of violence cases by the *gender of the perpetrator*. In more than 3/4 of cases (77.0%), 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=16.4). When the abuser is an acquaintance/friend[11], the percentage of cases in which the gender of the perpetrator has not been reported drops to 34.7%. In these particularly well-described cases, the male-to-female ratio is equal to 21.1.

[11] Includes: parent's partner, date (new or casual 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.

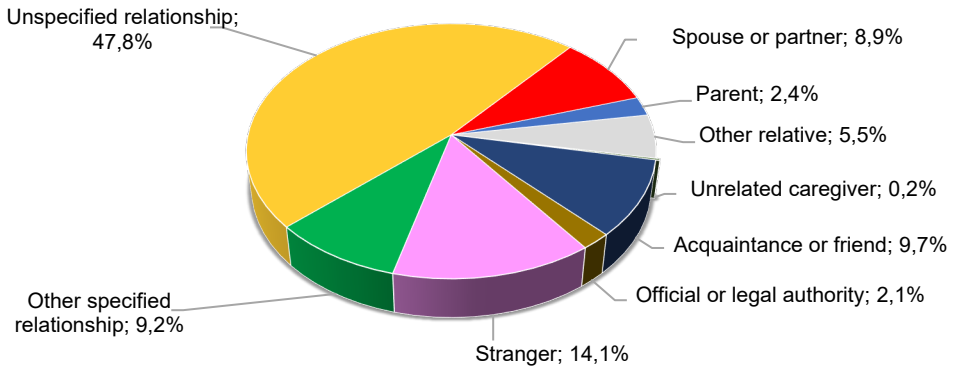



**Figure 24. Distribution (%) of violence cases by relationship victim/perpetrator (EU-IDB, data 2020)**

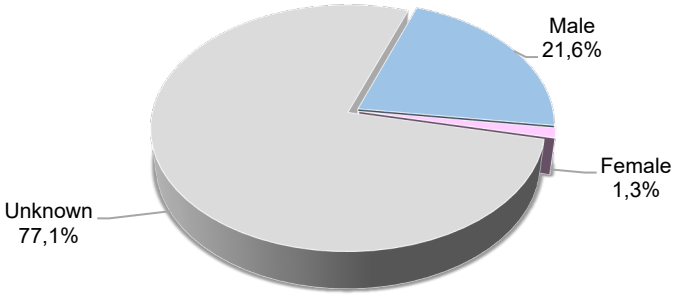



**Figure 25. Distribution (%) of violence cases by sex of perpetrator (EU-IDB, data 2020)**

Note that, when indicated, the share of males as the *gender of perpetrator* is divided up as follows: 74.5% violence to other males and 25.5% violence to females. The share of females as the *gender of perpetrator* is divided as follows: 64.9% violence to males and 35.1% violence to other females.

Figure 26 shows the distribution of violence cases by *age group of the perpetrator*. Again, in most ED attendances (76.4%), the age group of the perpetrator has not been reported. As expected, when filled in, in over 2/3 of the cases, the aggressor is an adult (67.7%).

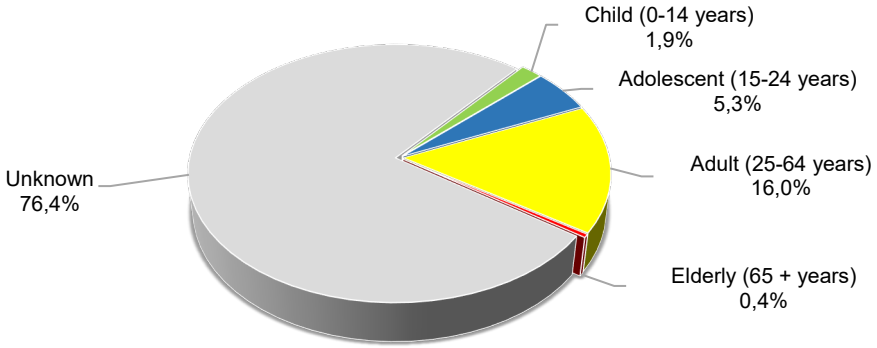



**Figure 26. Distribution (%) of violence cases by age group of perpetrator (EU-IDB, data 2020)**

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 27, in 70.8% of cases, the *context of the aggression* is not specified. A sensitive issue is sexual violence. In 2020, 17 ED cases of sexual assault have been recorded. In 7 of these (41.2%), the perpetrator was an acquaintance or friend and in 3 cases (17.6%), a spouse or partner. 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.

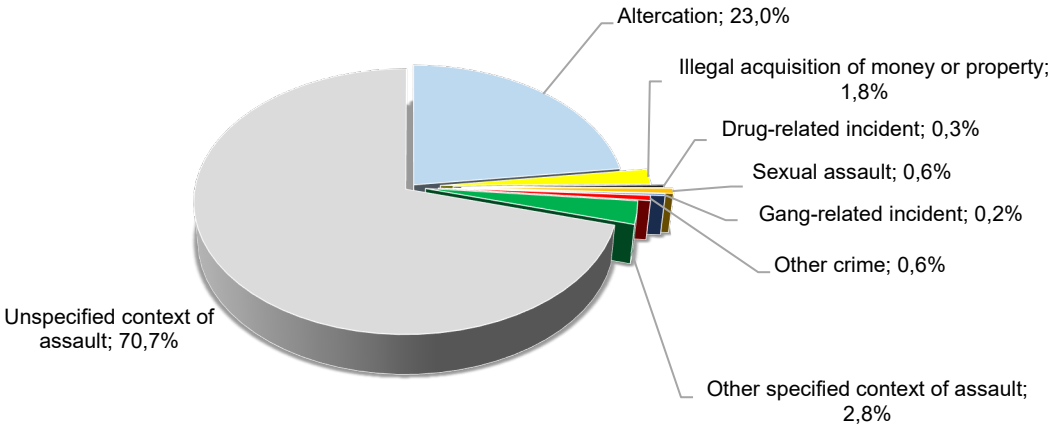



**Figure 27. Distribution (%) of violence cases by context of assault (EU-IDB, data 2020)**

## 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, 2,907 cases of intentional self-harm were reported in 2020 (37.6% male and 62.4% female), equal to 0.93% of the total ED attendances. The average age of the victim is 34.6 years (male 36.4 years; female 33.5 years).

Figure 28 shows the distribution of the first 20 objects/substances (78.9% of all direct objects/substances) directly involved in intentional self-harm events. The distribution of the main objects/substances directly associated with self-harm shows that, in most cases, people attend the Emergency Department for self-harm from poisoning or intoxication due to alcohol (13.4%), unspecified antidepressants (9.5%), other specified analgesic, antipyretic or anti-rheumatic (7.3%), unspecified pharmaceutical substance for human use (4.9%) and benzodiazepine (4.4%). Noteworthy is the presence of knives (1.8%), razors (1.4%) and other sharp objects (1.7%), as well as cocaine or crack (1.3%) among the top 20 objects/substances.

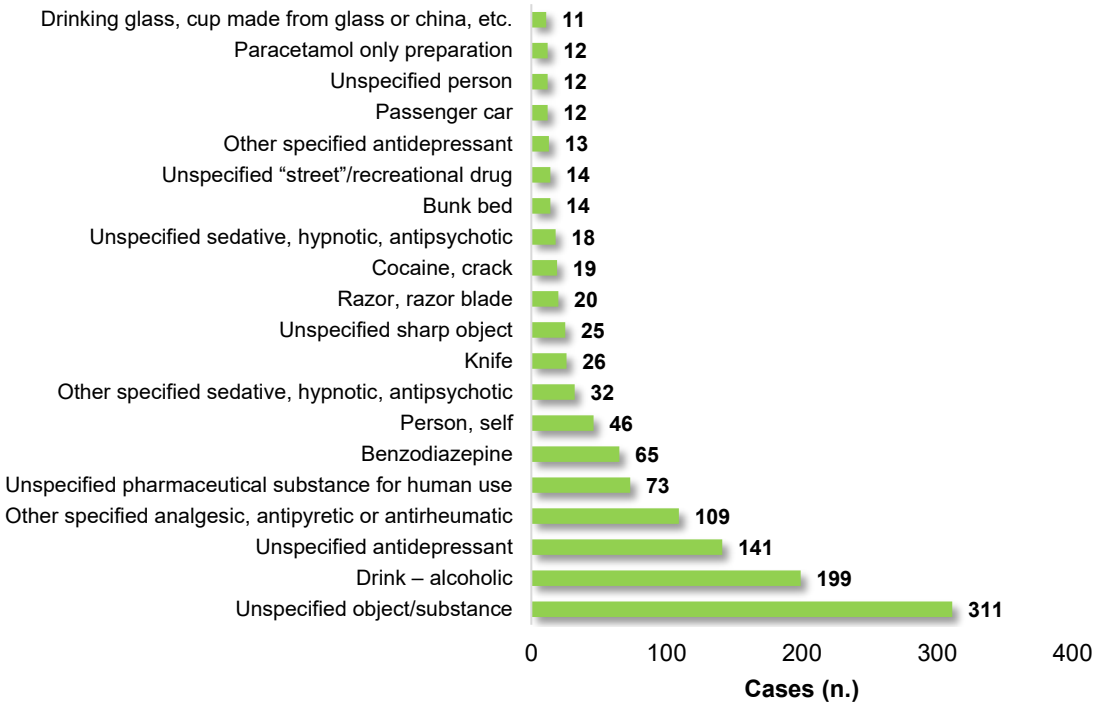



**Figure 28. First 20 object/substance directly involved in intentional self-harm events (EU-IDB, data 2020)**

Focusing on the two main categories of objects/substances directly related to self-harm (Figure 29), food or drink (i.e., alcohol 13.4%) and pharmaceutical substances for human use (i.e., drugs and medicine 38.8%), the different self-harm mechanism used by males and females is highlighted. Drugs and medicines are mostly used by females, while alcohol is mostly used by males.

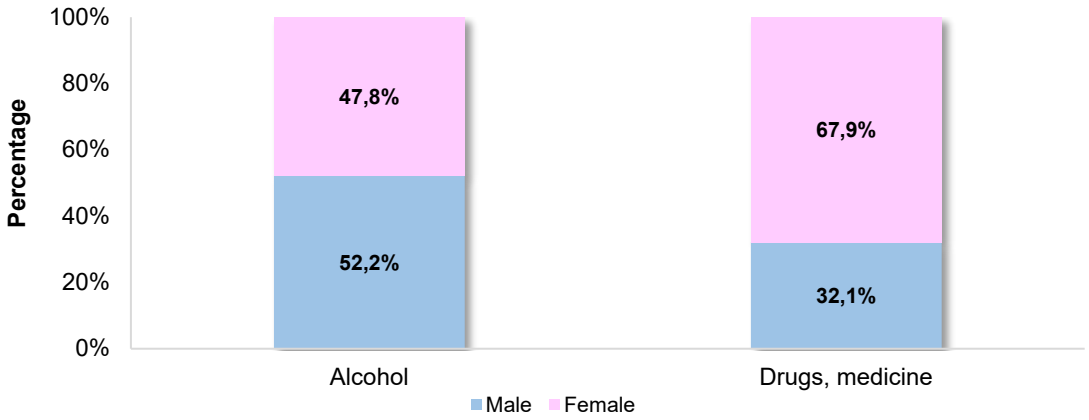



**Figure 29. Distribution (%) of alcohol and drugs or medicine involved in intentional self-harm events, by sex of patients (EU-IDB, data 2020)**

It is crucial to collect information about the most recent crises that led to the self-harm incident (i.e., *proximal risk factor*) to understand intentional self-harm injuries better.

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 3/4 of cases (77.9%). When filled in, two are the main proximal risk factor: conflict in a relationship with a family member, partner, or friend (12.5%), and psychological/psychiatric condition (8.0%). Conflict in relationships involved younger people than psychological/psychiatric conditions (average age 27.9 *vs.* 33.0 years) and, surprisingly, males mostly (male 67.8% *vs.* female 32.2%).

**Table 12. Distribution of intentional self-harm injuries by proximal risk factor (EU-IDB, data 2020)**

| Proxymal risk factor | ED cases (n.) | Admitted (%) |
|---|---|---|
| Abuse | 2 | 0.07 |
| Conflict in relationship | 363 | 12.49 |
| Death of a relative, partner, or friend | 7 | 0.24 |
| Income-related/financial problem | 3 | 0.10 |
| Legal system encounter | 1 | 0.03 |
| Physical problem | 6 | 0.21 |
| Psychological/psychiatric condition | 233 | 8.02 |
| Other specified proximal risk factor | 27 | 0.93 |
| Unspecified proximal risk factor | 2,265 | 77.92 |
| **Total** | **2,907** | **100.00** |

Figure 30 shows the distribution of intentional self-harm injuries by *previous intentional self-harm*. In more than 8 out of 10 cases, it was impossible to obtain information about previous attempts at self-harm. Those with a previous history of self-harm are mainly females (66.7%) or with psychological/psychiatric problems (46.2%).

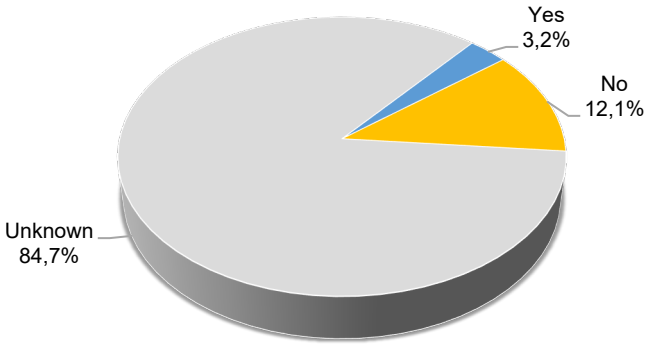



**Figure 30. Distribution (%) of intentional self-harm injuries by previous intentional self-harm (EU-IDB, data 2020)**

# 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, 18,733 cases of transport injury events were reported in 2020 (59.6% male and 40.4% female), equal to 6.0% of the total ED attendances. The average age of the injured person is 40.6 years (male 38.3 years; female 44.1 years).

Figure 31 shows the distribution of transport injury events by *month of injury*. Bearing in mind that 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 2020.

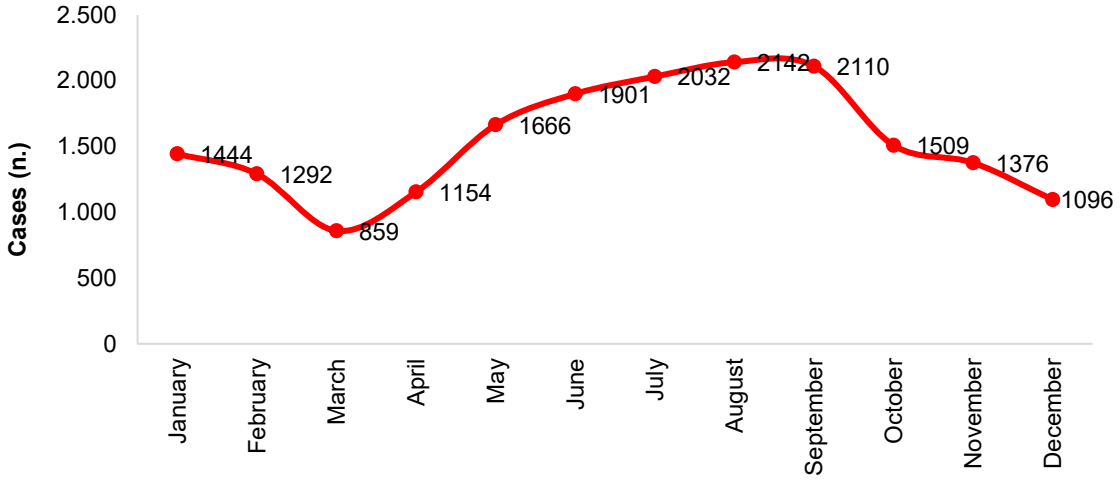



**Figure 31. Distribution of transport injury events by month of injury (EU-IDB, data 2020)**

Due to the COVID-19 pandemic in many countries there was a lockdown in March and April 2020 with a lot of people working from home. When joining the MDS 2020 with the 2019 data (i.e., using data from the same countries only) we were able to highlight the so called "COVID-19 effect". Indeed, in 2020 during the first wave in March-April and the second wave in November-December, the number of ED attendances decreased compared to the same period in 2019. On the other hand, during the summer time we had about the same number of ED attendances (Figure 32).

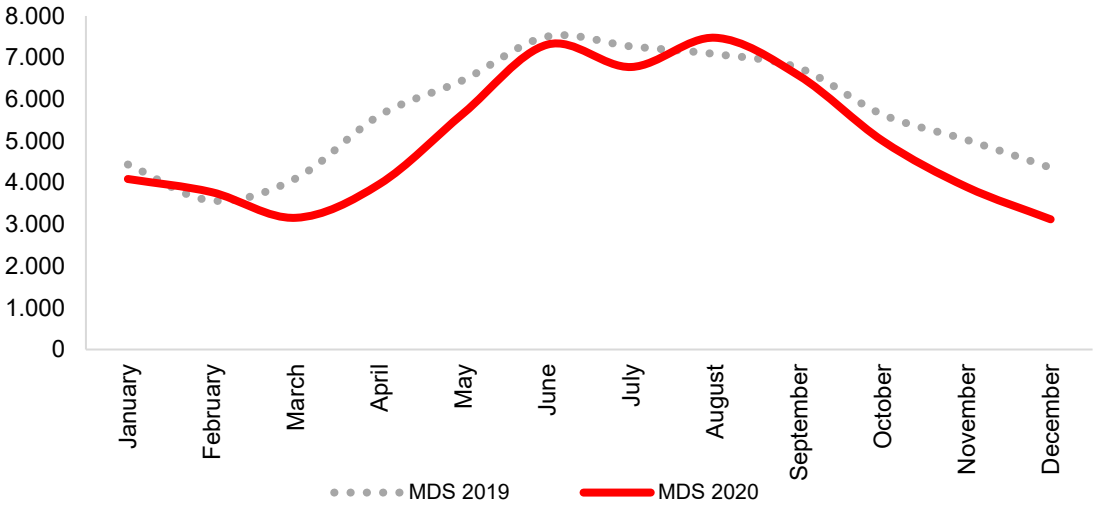



**Figure 32. Distribution of transport injury events by month of injury and year of attendance (EU-IDB, data 2019 and 2020)**

Figure 33 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 (39.2% of ED attendances due to transport injury events between 2 and 6 pm).

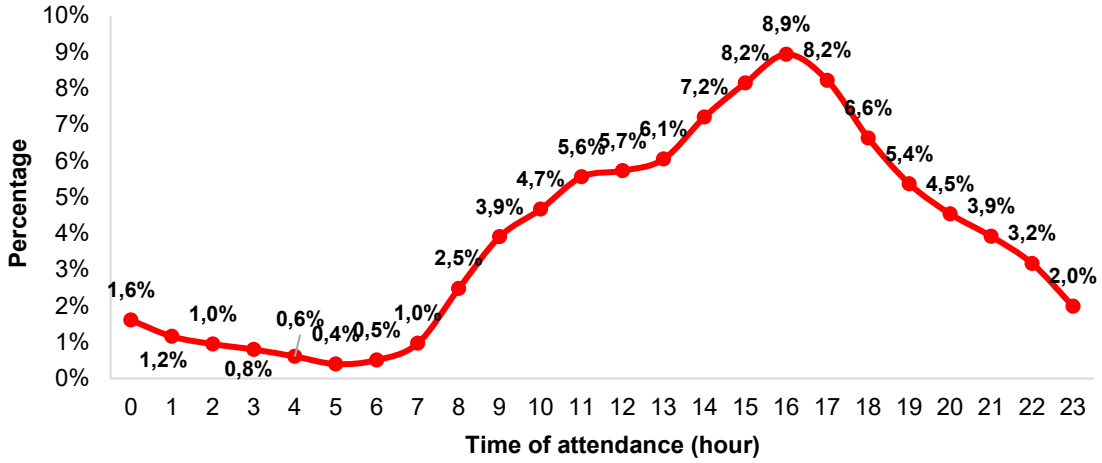



**Figure 33. Distribution of transport injury events by time of attendance (EU-IDB, data 2020)**

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 34 shows the distribution of transport injury events by *mode of transport*. 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.

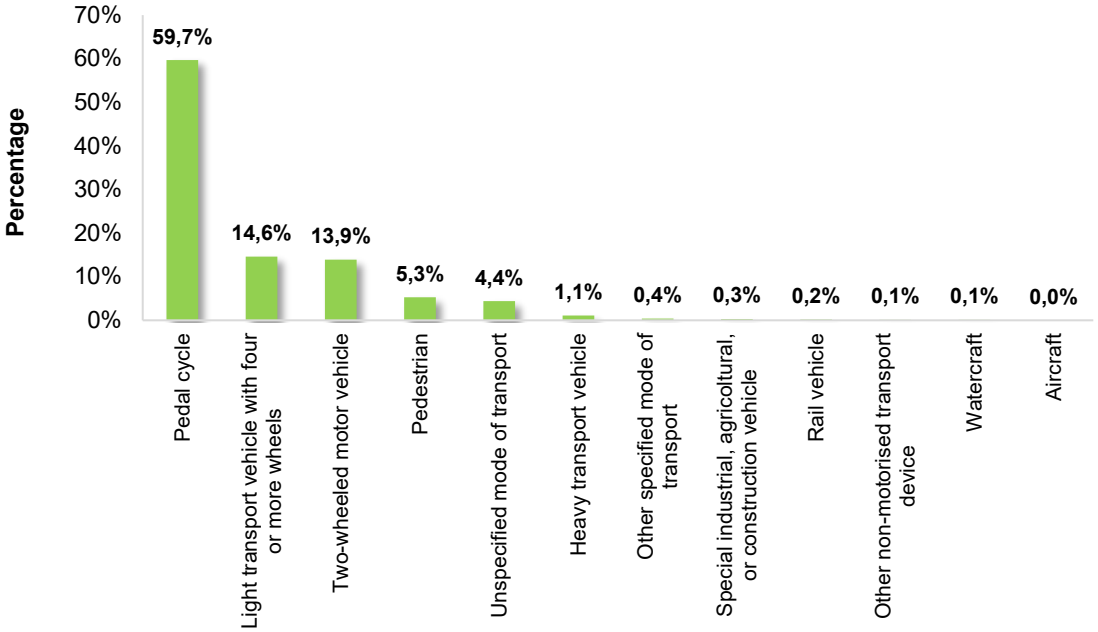



**Figure 34. Distribution (%) of transport injury events by mode of transport (EU-IDB, data 2020)**

As expected, the average age by *mode of transport* ranged from 31.4 years for pedestrians to 49.2 years for heavy goods vehicles (Figure 35).

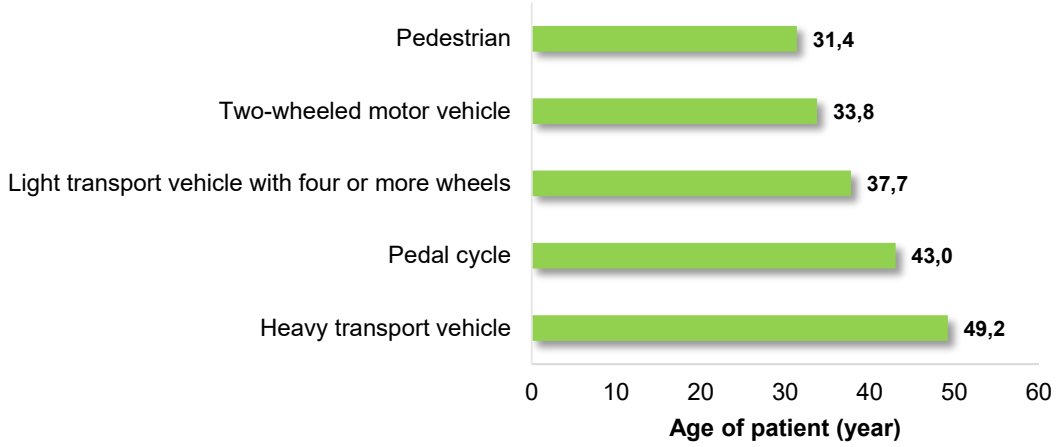



**Figure 35. Average age of ED attendances due to transport injury events, by mode of transport (EU-IDB, data 2020)**

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.

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

As expected, the greatest threat to pedestrians comes from cars/ commercial vehicles (48.5% involved as a counterpart). The dangers for cyclists mainly come from cars/ commercial vehicles (19.2%), other cyclists (16.6%) and two-wheeled motor vehicles (2.8%). A significant proportion (18.5%) 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 (39.2%) and cars/ commercial vehicles (59.3%). Most truck accidents (31.7%) occur due to loss of control (no counterpart), whilst in 14.4% of cases, another heavy transport vehicle is involved.

A person injured in a transport injury event can fulfil one of a variety of roles at the time of injury. Examples of common roles are the driver (or rider) of a vehicle (or animal) and passenger in a vehicle. 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.

Table 14 shows the distribution of transport injury events by the *role of the injured person*. As expected, drivers are mainly involved in accidental transport injury events (83.3%), and the proportion of persons on foot (4.8%) is consistent with what is shown in the previous Figure 34 (pedestrian: 5.3%).

**Table 13. Matrix between the role of injured person in road traffic accident and its counterpart (EU-IDB, data 2020)**

| Counterpart | Role of injured person in road traffic accident | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Codes** | **[1]** | **[2]** | **[3]** | **[4]** | **[6]** | **[7]** | **[8]** | **[9]** | **[11]** | **[12]** | **[98]** | **[99]** | **Tot.** |
| | **[1]** | 26 | 49 | 0 | 27 | 7 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | *113* |
| | **[2]** | 89 | 818 | 0 | 51 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 23 | *986* |
| | **[3]** | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *3* |
| | **[4]** | 62 | 136 | 0 | 79 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | *314* |
| | **[5]** | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *1* |
| | **[6]** | 482 | 946 | 3 | 593 | 1,348 | 18 | 0 | 1 | 0 | 0 | 1 | 152 | *3,544* |
| | **[7]** | 25 | 50 | 0 | 42 | 120 | 26 | 0 | 1 | 0 | 0 | 1 | 19 | *284* |
| | **[8]** | 2 | 0 | 0 | 1 | 2 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | *14* |
| | **[9]** | 10 | 2 | 0 | 3 | 1 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | *27* |
| | **[11]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | *2* |
| | **[12]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | *1* |
| | **[13]** | 18 | 30 | 0 | 19 | 77 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | *147* |
| | **[14]** | 5 | 2 | 1 | 11 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | *32* |
| | **[15]** | 61 | 911 | 7 | 207 | 209 | 57 | 5 | 9 | 0 | 0 | 3 | 7 | *1,476* |
| | **[98]** | 0 | 3 | 0 | 2 | 12 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | *18* |
| | **[99]** | 211 | 1,987 | 0 | 477 | 470 | 77 | 27 | 35 | 15 | 4 | 58 | 276 | *3,637* |
| | **Tot.** | *993* | *4,934* | *11* | *1,513* | *2,274* | *180* | *44* | *57* | *17* | *5* | *65* | *506* | *10,599* |

**Table 14. Distribution of transport injury events by role of the injured person. (EU-IDB, data 2020)**

| Role of the injured person | ED Cases (n.) | Admitted (%) |
|---|---|---|
| Driver, rider, or operator | 15,610 | 83.3 |
| Passenger | 1,631 | 8.7 |
| Person boarding a vehicle | 157 | 0.8 |
| Person on foot, bystander | 893 | 4.8 |
| Person on outside of vehicle | 98 | 0.5 |
| Vehicle occupant not otherwise specified | 40 | 0.2 |
| Other specified role of the injured person | 76 | 0.4 |
| Unspecified role of the injured person | 228 | 1.2 |
| **Total** | **18,733** | **100.0** |

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 2020 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 36 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. 27.3% 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 5%. Motorised vehicles between the ages of 15 and 24 accounted for about half of all ED attendances due to road traffic accidents.

The scenario is quite different in other countries, as shown in Figure 37. First of all, pedestrian accidents play a very important role up to the age of 14 (on average 1 in 4 accidents). The bicycle is involved in more than half of all accidents between 1 and 14 years of age, where vulnerable users (pedestrians and pedal cyclists) are involved in almost 80 per cent of road accidents overall. Between the ages of 20 and 34, car accidents are the most frequent (on average about 38% of all road traffic accidents). Finally, accidents with heavy vehicles are relatively frequent among older people (about 1 in 4 accidents 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.

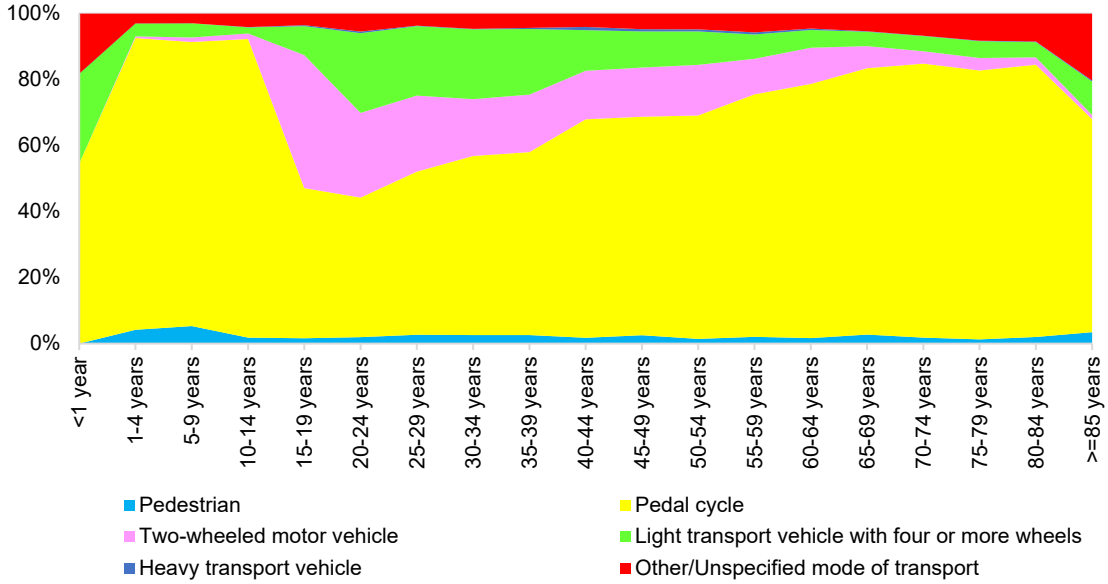



**Figure 36. Distribution of transport injury events in the Netherlands by mode of transport and age group (EU-IDB, data 2020)**

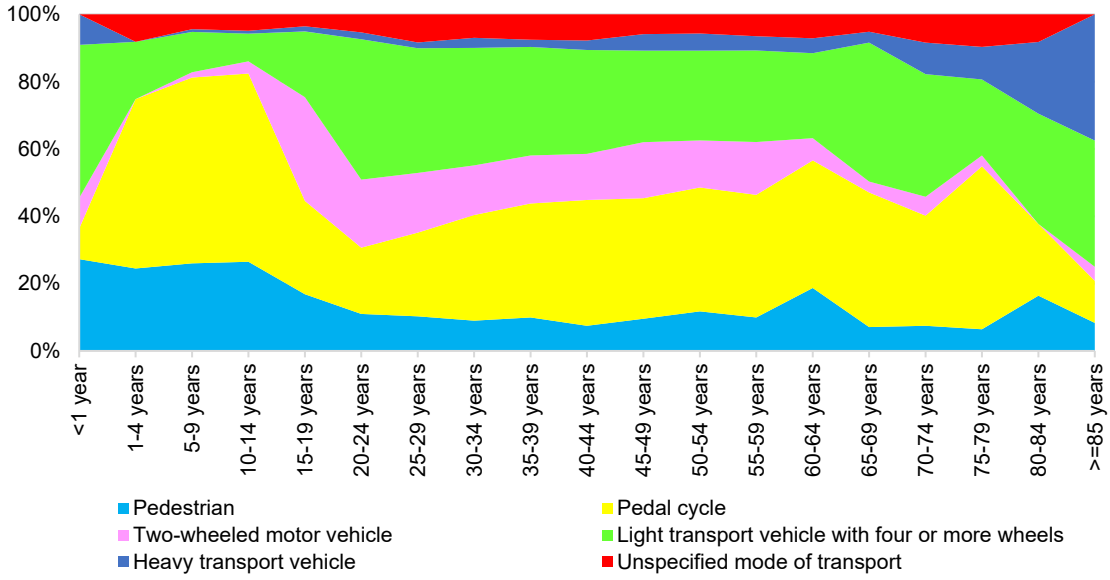



**Figure 37. Distribution of transport injury events in Austria, Latvia, Luxemburg and Turkey, by mode of transport and age group (EU-IDB, data 2020)**

## 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 particular activities and injuries between gender and age.

The sports injuries account for 4.9% of ED attendances (5.9% for males; 3.9% for females). About 1 out 23 of the ED attendances due to sport accidents (4.32%) happened at school (physical education class, school sports).

As shown in Figure 38, the frequency of sports accidents increases from the age group 5-9 years and peaks in the age group 10-14 years (16.2%).

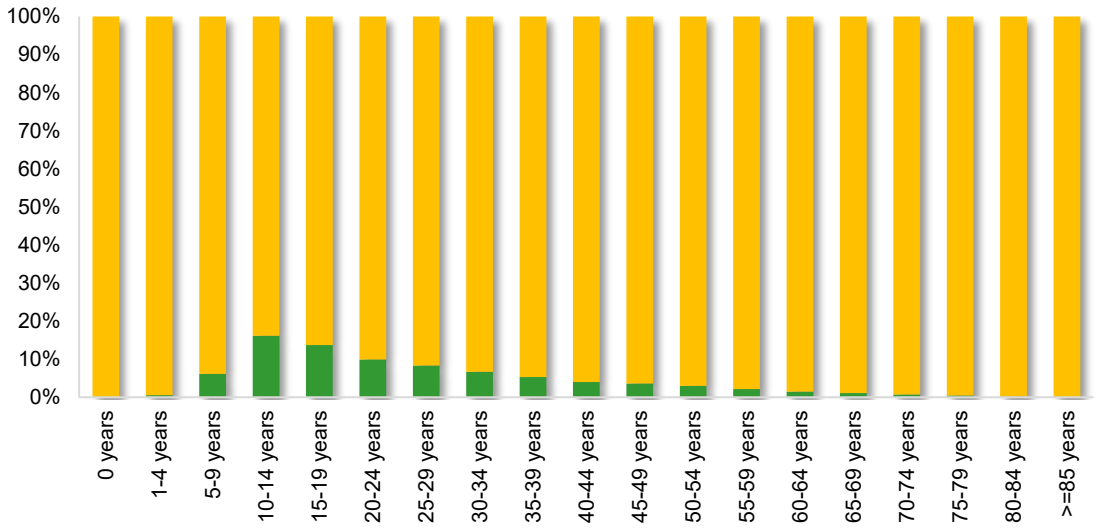



**Figure 38. Percentage of sport injury by age group (EU-IDB, data 2020)**

Table 15 shows the first 20 sport involved in injuries, by gender of patient.

The first 20 sports account for about 80% of sport injuries for both genders. As expected, there are differences according to gender. Football/Soccer (outdoor or indoor) overall account for 34.7% of all sport injuries in males but only 7.4% in females.

Conversely, equestrian activities (trail or general horseback riding, dressage, etc.) account for 13.9% of sports injuries in females but only 0.8% in males. Motor sport and combative sport involved males mostly, whilst gymnastic, hiking and handball females.

Table 16 shows the first 3 sport involved in injuries, by age group of patients. It's possible to define at least 4 broad age classes:

- 0-14 years, when many types of sport are involved in injuries, although *football* is the prevalent one;
- 15-49 years, characterised by injuries from football or trail or general horseback riding;
- 50-69 years, characterised by injuries from alpine/downhill skiing or jogging/running (although skiing accidents are beginning to be common from 35-39 years);
- 70+ years, when tennis and hiking are among the sports causing the most accidents.

**Table 15. First 20 sport injuries (%), by type of sport/activities and gender (EU-IDB, data 2020)**

| Type of sport/activities | Male | Females |
|---|---|---|
| Athletic activities | 1.6 | 1.9 |
| Basketball | 3.5 | 2.0 |
| Combative sports | 3.3 | 1.8 |
| Cycling | 6.9 | 4.6 |
| Football/Soccer | 34.7 | 7.4 |
| Gymnastics | 1.3 | 5.7 |
| Hockey (field/ice) | 2.2 | 1.5 |
| Ice skating/ice dancing | 0.8 | 1.7 |
| In-line skating/rollerblading/roller skating | 1.9 | 3.7 |
| Jogging/Running | 1.9 | 2.6 |
| Motor sports | 3.6 | 8.7 |
| Rugby | 1.0 | 3.2 |
| Scootering | 0.7 | 0.5 |
| Skateboarding | 3.4 | 2.7 |
| Alpine/downhill skiing | 3.6 | 3.7 |
| Snow boarding | 1.0 | 0.8 |
| Swimming | 2.7 | 2.8 |
| Tennis | 1.5 | 1.6 |
| Trail or general horseback riding | 0.8 | 13.9 |
| Volleyball | 1.4 | 3.0 |

**Table 16. First 3 sport injuries and cases (n.) by type of activities and age group (EU-IDB, data 2020)**

| Age group (years) | Cases (n.) | First 3 sports injuries | | |
|---|---|---|---|---|
| | | Rank 1 | Rank 2 | Rank 3 |
| 0-4 | 116 | Swimming | Gymnastics–trampoline/mini-trampoline | Soccer–outdoor |
| 5-9 | 1322 | Soccer–outdoor | In-line skating/ rollerblading | Trail or general horseback riding |
| 10-14 | 4259 | Soccer–outdoor | Skate boarding | Basketball |
| 15-19 | 2880 | Soccer–outdoor | Trail or general horseback riding | Basketball |
| 20-24 | 1487 | Soccer–outdoor | Trail or general horseback riding | In-line skating/ rollerblading |
| 25-29 | 1157 | Soccer–outdoor | Trail or general horseback riding | In-line skating/ rollerblading |
| 30-34 | 833 | Soccer–outdoor | Trail or general horseback riding | Cycling–Unspecified |
| 35-39 | 684 | Soccer–outdoor | Trail or general horseback riding | Alpine/downhill skiing |
| 40-44 | 537 | Soccer–outdoor | Trail or general horseback riding | Alpine/downhill skiing |
| 45-49 | 532 | Soccer–outdoor | Alpine/downhill skiing | Trail or general horseback riding |
| 50-54 | 465 | Alpine/downhill skiing | Trail or general horseback riding | Jogging/running |
| 55-59 | 357 | Alpine/downhill skiing | Trail or general horseback riding | Jogging/running |
| 60-64 | 242 | Hiking | Alpine/downhill skiing | Jogging/running |
| 65-69 | 170 | Alpine/downhill skiing | Tennis | Cycling–unspecified |
| 70-74 | 120 | Tennis | Swimming | Hiking |
| 75-79 | 79 | Tennis | Other specified individual athletic activity | Hiking |
| 80-84 | 32 | Tennis | Other specified individual athletic activity | Hiking |
| ≥85 | 9 | Other specified individual athletic activity | Gymnastics–unspecified | Volleyball |

Table 17 shows the first 3 type of injuries, by principal type of sport/activities. Fractures are by far the main types of injuries for all sports, ranging from 31.6% in swimming to 68.4% in in-line skating/skate boarding. Sprain and/or contusion injuries are generally very common. Injuries to muscle and tendon concern mainly skiing, tennis, hiking, volleyball, and jogging/running. Open wounds concern hockey, swimming and cycling. Finally, the luxation/dislocation in combat sports and concussions in equestrian sports should be highlighted.

**Table 17. First 3 types of injuries (n. %) by type of sport/activities (EU-IDB, data 2020)**

| Type of sports/activities | Cases (n.) | Type of injuries (%) | | |
|---|---|---|---|---|
| | | Rank 1 | Rank 2 | Rank 3 |
| Football | 3,721 | Fracture (49.4%) | Contusion, bruise (15.3%) | Distortion, sprain (13.4%) |
| Basketball | 448 | Fracture (44.4%) | Distortion, sprain (19.6%) | Contusion, bruise (12.3%) |
| Volleyball | 302 | Fracture (42.1%) | Distortion, sprain (18.9%) | Injury to muscle and tendon (12.3%) |
| Alpine/downhill skiing | 644 | Fracture (50.3%) | Injury to muscle and tendon (18.8%) | Contusion, bruise (9.0%) |
| Hockey | 433 | Fracture (41.6%) | Contusion, bruise (25.2%) | Open wound (7.9%) |
| Swimming | 415 | Fracture (31.6%) | Contusion, bruise (17.8%) | Open wound (11.8%) |
| Gymnastics | 459 | Fracture (54.5%) | Distortion, sprain (16.6%) | Contusion, bruise (15.3%) |
| Tennis | 234 | Fracture (44.9%) | Injury to muscle and tendon (19.7%) | Distortion, sprain (11.1%) |
| Combative sports | 416 | Fracture (45.0%) | Contusion, bruise (23.1%) | Luxation, dislocation (8.2%) |
| Equestrian activities | 1040 | Fracture (47.7%) | Contusion, bruise (23.9%) | Concussion (8.2%) |
| Hiking, mountaineering, orienteering | 159 | Fracture (60.4%) | Injury to muscle and tendon (15.1%) | Distortion, sprain (13.2%) |
| Cycling | 922 | Fracture (42.3%) | Contusion, bruise (19.5%) | Open wound (14.3%) |
| In-line skating, skate boarding | 1171 | Fracture (68.4%) | Contusion, bruise (14.1%) | Distortion, sprain (5.8%) |
| Jogging/running | 348 | Fracture (45.4%) | Distortion, sprain (19.3%) | Injury to muscle and tendon (12.6%) |

# CONCLUSIONS

This report aims to provide feedback on EU-IDB data in 2020, 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 ED, using a standardized coding system on the circumstances of an injury-event and its outcome. Emergency departments in hospitals provide the best setting for collecting information on large numbers of injuries at reasonable costs. The rather simple IDB-MDS facilitates data collection for comparable national indicators on the burden of injury. 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. 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 12 countries are involved in the EU-IDB-network, whereof 10 are EU Member States. 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 2020 have been analysed. The 2020 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 in particular. For 2020, EU-IDB estimated a total of about 3 million hospitals admissions in EU-27, and 25 million of ambulatory treatments in emergency departments of hospitals. These figures are lower than those in the above-cited 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 both to the comparison between a point figure (2020) and a period average (2008-2018), and, above all, 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. In light of 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 2020 data were also present in the past:

- 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;
- 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.

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.

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 in order to better use the wealth of information already stored in the IDB databank.

# REFERENCES

Europe. Council Recommendation of 31 May 2007 on the prevention of injury and the promotion of safety. *Official Journal of the European Union* C164, 18/7/2007. Available at https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32007H0718%2801%29; last visited 10/7/2023

Europe. Regulation (EC) No 1338/2008 of the European Parliament and of the Council of 16 December 2008 on Community statistics on public health and health and safety at work. *Official Journal of the European Union* L354, 31/12/2008. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008R1338; last visited 10/7/2023

Europe. Regulation (EU) 2016/679 of the European Parliament and of the Council of 17 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). *Official Journal of the European Union* L119/1, 04/05/2016. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32016R0679; last visited 10/7/2023

EuroSafe. *Injuries in the European Union 2009-2018.* Amsterdam: European Association for Injury Prevention and Safety Promotion; 2021. Available at https://www.eurosafe.eu.com/uploads/inline-files/Report%20Injuries%20in%20EU%202009-2018%20FINAL%20SEPT%2021_pdf.pdf; last visited 10/7/2023

EuroSafe. *IDB-Full Data Set Dictionary*. Version 1.4. Amsterdam: European Association for Injury Prevention and Safety Promotion; 2016a. Available at https://www.eurosafe.eu.com/uploads/inline-files/IDB%20FDS%20Data%20Dictionary%20May%202017_0.pdf; last visited 10/7/2023

EuroSafe. *IDB-Minimum Data Set Dictionary*. Amsterdam: European Association for Injury Prevention and Safety Promotion; 2016b. Available at https://www.eurosafe.eu.com/uploads/inline-files/IDB_MDS_Data_Dictionary_JAN%202017.pdf; last visited 10/7/2023

Harmon KJ, Dolan Fliss M, Marshall SW, Peticolas K, Proescholdbell SK, Waller AE. The impact of the COVID-19 pandemic on the utilization of emergency department services for the treatment of injuries. *Am J Emerg Med* 2021;47:187-191.

Law RK, Wolkin AF, Patel N, Alic A, Yuan K, Ahmed K, Idaikkadar N, Haileyesus T. Injury-Related Emergency Department Visits During the COVID-19 Pandemic. *Am J Prev Med*. 2022 Jul;63(1):43-50.

Palermo T, Bleck J, Peterman A. Tip of the iceberg: reporting and gender-based violence in developing countries. *Am J Epidemiol*. 2014 Mar 1;179(5):602-12. doi: 10.1093/aje/kwt295. Epub 2013 Dec 12.

WHO/Europe. *Resolution Prevention of injuries in the WHO European Region of the Regional Committee for Europe Fifty-fifth session. Bucharest, Romania, 12–15 September 2005*. Copenhagen: World Health Organization, Regional Office for Europe; 2015. (EUR/RC55/R9). Available at https://who-sandbox.squiz.cloud/en/about-us/governance/regional-committee-for-europe/past-sessions/fifty-fifth-session/resolutions/eurrc55r9; last visited 10/7/2023.

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