Results of the Permanent Study on Home and Leisure Injuries

Years 1999 - 2001
EPAC Network

Synthesis

Institut de Veille Sanitaire

Introduction

1. Injuries and accidents

The classic definition of an injury used by the World Health Organisation (WHO) is the following: "Injuries are caused by acute exposure to physical agents such as mechanical energy, heat, electricity, chemicals, and ionizing radiation interacting with the body in amounts that exceed the threshold of physiological tolerance. In some cases (for example, drowning and frostbite), injuries result from the sudden lack of essential agents such as oxygen or heat". Included in injuries are drowning (lack of oxygen), hypothermia (lack of heat), strangulation (lack of oxygen), decompression injury, decompression sickness (excess of nitrogen) and poisoning (by toxic substance). Excluded from injuries are the consequences of a persistent or repeated stress, such as carpal tunnel syndrome, chronic back pain, poisoning due to infection, as well as mental disorders and chronic handicaps, even though they could possibly be consequences of physical injuries.

Injuries are divided into two groups:

- intentional injuries which include suicide and suicide attempts, acts of aggression and violence, and acts of war
- unintentional injuries, which make up injuries specifically, are usually divided into
  – traffic injuries
  – occupational injuries
  – home and leisure injuries

A home and leisure injury, or HLI, is usually an unintentional injury which is neither a traffic injury nor an occupational injury.

HLIs are usually grouped according to their place or activity:

– Domestic injuries, taking place at home or in its immediate surroundings: garden, courtyard, garage and other outbuildings.
– Injuries that occur outside: in a store, on the sidewalk, near the home, etc.
– School injuries, including injuries on the way to school, during physical education classes and on school grounds.
– Sport injuries.
– Vacation and leisure injuries.

There can be crosschecking among the HLI categories: for example a sport injury can also be a school injury or a leisure injury. Furthermore certain injuries, like bicycle injuries, can be considered simultaneously traffic injuries and HLIs.

2. Home and leisure injuries: a major public health problem

Home and leisure injuries are very numerous. Counting them is difficult and depends notably on their seriousness which determines the sort of medical attention sought and the type of care given to the injured.

In France, nearly 20 000 people die each year due to HLIs, that is 3.6% of the causes of death. This number has been decreasing since the beginning of the '80s, probably due to the information and prevention campaigns directed against injuries in the past 20 years. Yet, it still remains high when compared with the same mortality data in other countries of the European Union and given that many deaths appear to be avoidable with certain adapted prevention, regulation, education etc. measures. It will probably increase in the coming years, given the large number of deaths by HLIs in the elderly and the predicted increase of the proportion of elderly in the population. In the 15 European Union countries, we grieve about 80 000 deaths by HLI each year, and several million in the world.

Among those people who have had a HLI and who have not died from it, some have sequelae. Few studies examine the consequences of serious injuries which are the source of a large number of disabilities. A better documented field is the one in which HLIs have led to hospital treatment. In France in 1993, it was estimated that one out of eight hospitalizations was due to an injury. As for recourse to outpatient treatment (doctors and paramedics practicing in cities) for HLIs, it is necessary to have adapted studies of patients or of the concerned professionals. Finally, the least serious HLIs are the least well known, to the extent that no treatment is sought or only lead to non-specific self-medication.

The quantitative distribution of HLIs according to their perceived seriousness measured by their consequences or their treatment has been the subject of several publications. According to certain estimates, across all age categories, for each HLI death, other simultaneous HLIs lead to 40 hospitalisations, 340 emergency department admissions, and 450 consultations with general practitioners. For youth under the age of 25, for one death by HLI, the corresponding numbers are 150, 2 700 and 4 900. These relationships among treatments sought give an idea of the relative frequency of HLIs according to their seriousness.

The cost of HLIs has rarely been studied in France. A study done by the National Workers' Health Insurance (*Caisse nationale de l'assurance maladie des travailleurs salariés—CnamTS*) in 1997 of insured people found that the average estimated cost (direct costs plus stoppage of work costs) is between 100 and 500 euros per injury per year in France. This estimate is certainly inferior to reality because only the costs that were of interest to the CnamTS were retained and the calculation was limited to a short period after the injury. Abroad, larger studies have demonstrated that expenditure related to HLIs could be 1 000 euros per injured person in direct costs and nearly 10% of total health costs.

Despite their importance, HLIs do not have the recognition they ought to in the field of public health. This is perhaps the reflection or the consequence of the misleading perception of the risk they implicate. In the National Institute for Health Education and Prevention's (*Institut national de prévention et d'éducation pour la santé—Inpes*) polls on health, domestic, sport and leisure, and school injuries come in after traffic injuries and occupational injuries despite the fact that the latter are fewer in number. To explain the relative lack of interest in HLIs, several hypotheses can be put forth—particularly there is a semantic obstacle: in layman's terms, an injury is often considered as "inevitable" precisely because *"it's an accident"*, so its determinism is accepted. This ancestral conception is opposed to the concept of the "harnessing of destiny" or the "possibility of prevention" resulting from knowledge established by epidemiology. The fact that the causes and circumstances leading to HLIs are very diverse leads to a confused perception of their importance. One could also evoke the reflex to refuse protective or preventative recommendations which are seen as constraining individual freedoms or limiting the pleasure of certain activities (particularly in sports).

3. The Permanent Study on Home and Leisure Injuries (*L'Enquête Permanente sur les Accidents de la vie Courante – EPAC*)

Epidemiological data sources on HLIs in France are not numerous. Until the end of the 1990s, aside from a few ad hoc studies, only three sources were available: the causes of death registration system, which is permanent and comprehensive; the studies undertaken between 1987 and 1995 in a few regions by the CnamTS; and the permanent study on HLIs (EPAC), the French part of the European Home and Leisure Injury Surveillance System (EHLASS).

The EHLASS system was implemented in 1986 by the Minister of Health (Directorate General of Health) in several hospitals in France. Managed since the end of 2000 by the National Institute for Public Health Surveillance (*Institut de veille sanitaire – InVS*), it has since then been named EPAC and has been the subject of a declaration made by the National Council for Statistical Information (*Conseil national de l'information statistique*). The basis of data collection rests on the registration of services sought in emergency department for HLIs in certain hospitals, including data on the injured person (age, sex, place of residency), admission (date and time of emergency department admission, treatment, possible hospitalization), characteristics of the injury (mechanism, place, activity, type of lesion, part of body injured), products (agents, elements) having caused or being implicated in the injury. Finally, a short description of the injury is recorded in free text. Hospitals which participate in this network do so voluntarily and receive a grant for data collection.

This sort of data collection exists in all countries which have an active public health policy in the field of HLIs and injuries. It is the case across the Atlantic in Canada and the United States, and in the European Union in countries like Denmark, Greece and the Netherlands, for example.

This data collection has been subject to much criticism, as much at the European level as on the French one. There are numerous inconveniences to such a system: its high cost, (despite the fact that it is anyway only limited to a few establishments), the constraints of quality maintenance, the fact that it routinely only supplies descriptive results, and the difficulty of extrapolating results for the general population. However, it is admitted that there is not really any other solution: descriptive data collection is essential as a basis for epidemiological work on HLIs. It is therefore necessary to preserve it by investing the necessary means to ensure the quality and distribution of its results. A revision of EPAC's characteristics was undertaken in France in order to take into account these critiques.

The present report pertains to the three years 1999, 2000, 2001, during which seven hospitals collected data. Between 1999 and 2001, these hospitals collected a total of 140 310 records. The Limoges University Hospital only collected data in 1999 and 2000, and the one in Besançon only collected data in the pediatric emergency department.

The distribution of records by hospital is as follows:

– Centre hospitalier général d'Annecy : 30% of the records
– Centre hospitalier universitaire de Besançon : 10%
– Centre hospitalier de Béthune : 5.4%
– Centre hospitalier universitaire de Bordeaux : 33%
– Centre hospitalier universitaire de Limoges : 7.2%
– Centre hospitalier universitaire de Reims : 8.8%
– Centre hospitalier de Vannes : 5.5%

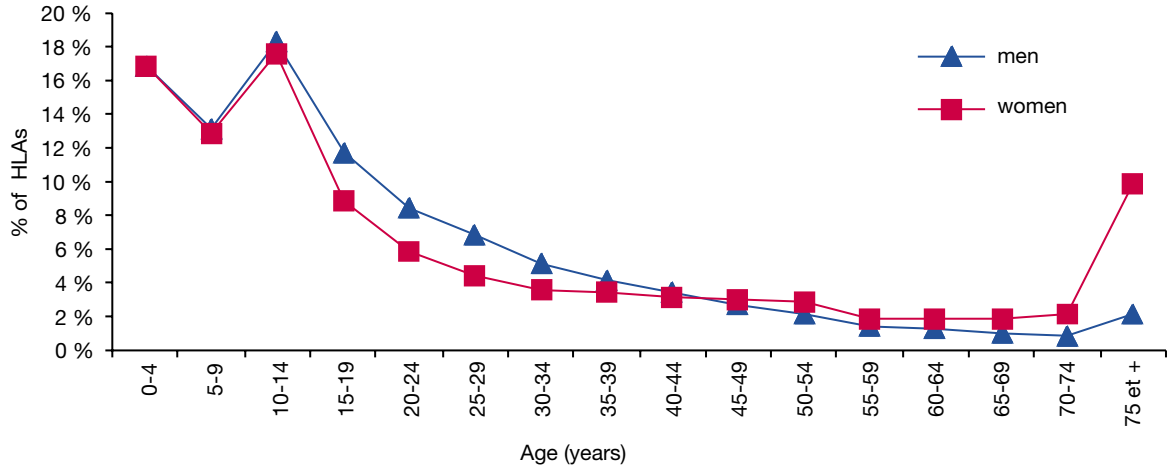
In the absence of quality analyses and taking into account the probable faults of comprehensiveness, factors from one hospital to another or from one period to another, the conclusions that can be drawn from this collection for the years 1999 to 2001 can only be general and need to be put into perspective so that the missing data has the same structure as the data that has been collected. With this hypothesis, already applied in previous analyses, the results of *proportions among categories* can be presented such as the distribution by age and sex of HLIs, the distribution by type of activity, lesions etc., or the *relative* ballpark figures of certain HLIs compared to others.

Results retained for this synthesis pertain to HLIs recorded by EPAC between 1999 and 2001. The full report also contains results on HLIs among children and elderly people, on HLIs leading to death in the emergency department, on specific injuries (fractures, burns, eye injuries), on sports injuries, on injuries related to certain products, as well as a bibliography.

General results EPAC 1999-2000-2001

Distribution of injuries by age and sex

Figure 1. Distribution of HLIs according to age and sex



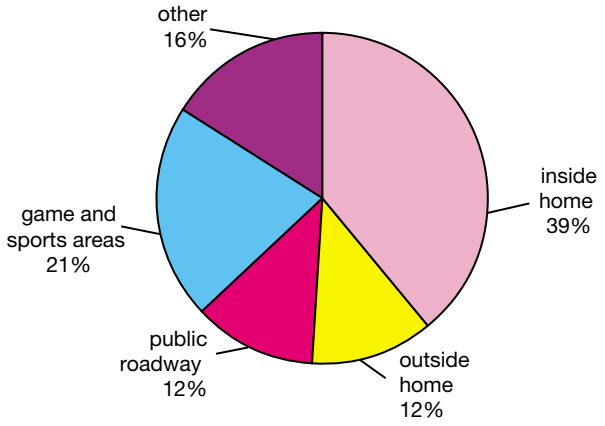
There were 140 310 home and leisure injuries recorded between 1999 and 2001 by the EPAC network in the hospital emergency departments of Annecy, Besançon, Béthune, Bordeaux, Limoges, Reims, and Vannes. The age and sex are available for almost all the cases (140 226 HLIs). The frequency of injuries decreases with age, until about 70 years, and increases from that point on. This increase is greater for women, probably because of their over-representation in the general population. The marked male over-representation up to 65 years is equivalent to a sex ratio between 1.2 and 1.9.

Chronologic distribution

The monthly distribution of emergency department visits for HLIs is heterogeneous: there are significantly more visits in the spring ($p < 10^{-4}$), specifically in May. The hourly distribution is that of the activity of the emergency departments having participated in the study: sustained activity beginning at 9 AM, with a peak in the late afternoon, until about 10 PM, and few visits between midnight and 7 AM.

Location of injuries

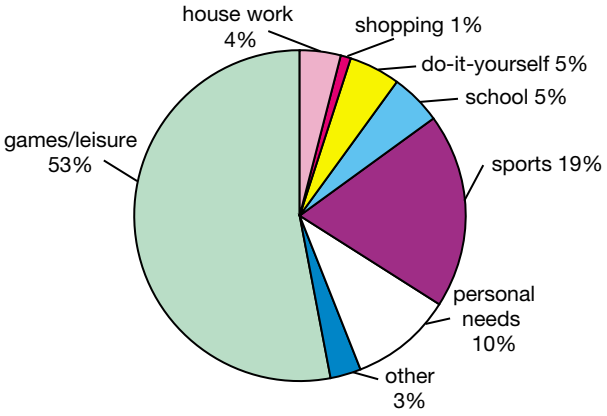
Figure 2. Distribution of HLIs by location



HLIs occur mainly within the home (39%). For children under the age of 15, location is independent from sex. Beyond that age, there is an unequal distribution in location in relation to sex: most HLI's occur inside home. From 15 to 34 years old, men have HLIs mostly in sports and game areas. From 35 years on, the proportion of HLIs occurring outside the home increases for men. For women, the home is the main location for HLIs. It represents about half the location of injuries from the age of 20 onwards. This proportion increases with age and constitutes two out of three HLIs from 75 years on.

Activity at the time of injuries

Figure 3. Distribution of HLIs by activity

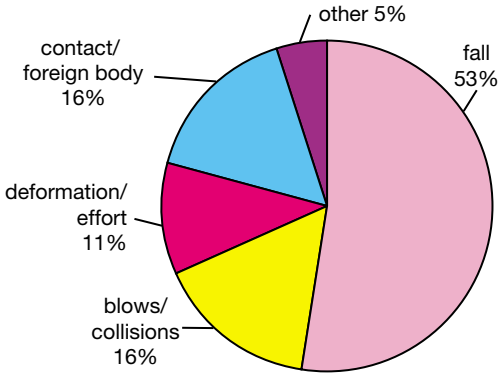


"Games and leisure" make up more than half (53%) of the activity taking place at the time of the injury. This proportion is independent of sex (52% for men and 55% for women). Then come sports related injuries (19%), "personal needs" ones (10%), then do-it-yourself and school related injuries (5% each), and shopping injuries (3%). A male over-representation is observed in do-it-yourself activities (86% of HLIs for men, sex ratio 6) and sports (72%, sex ratio 2.6) and a female over-representation in so-called "personal needs" activities (47% of HLIs for men, sex ration 0.9) and in house work activities (35%, sex ratio 0.5).

Games and leisure injuries are very common in early childhood (more than two out of three HLIs). They later decrease, but still remain, no matter what the age, a common circumstance for HLIs (one in two HLIs). Injuries in the school setting make up between 9% and 14% of HLIs for 5 to 20 years olds; sports related injuries are common especially between 10 and 40 years old—they make up more than one out of three HLIs between 15 and 25 years. From age 25 on, HLIs are often related to housework (especially for women) and to do-it-yourself activities (especially for men).

Mechanisms of injuries

Figure 4. Distribution of HLIs by mechanism

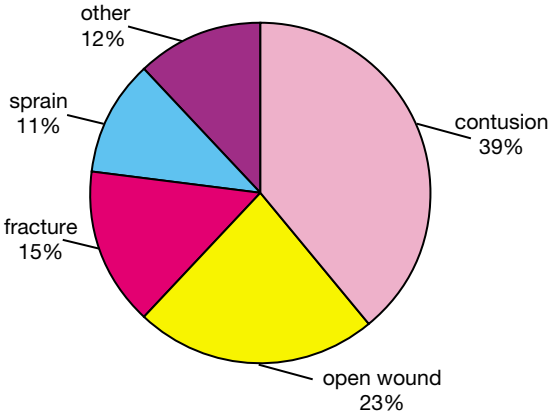


Falls make up by far the most frequent mechanism at the origin of HLIs (53%). Then come blows/collisions and "contact/foreign body" (16% each) ahead of "deformation/effort" (11%). This distribution of HLI mechanisms is the same in men and women.

The percentage of falls diminishes up to age 25-30 and then increases. Falls affect mostly children (60% of HLIs for under 10 years) and the elderly (89% of HLIs for 75 years and older). Blows/collisions make up nearly one HLI in five for those under 30.

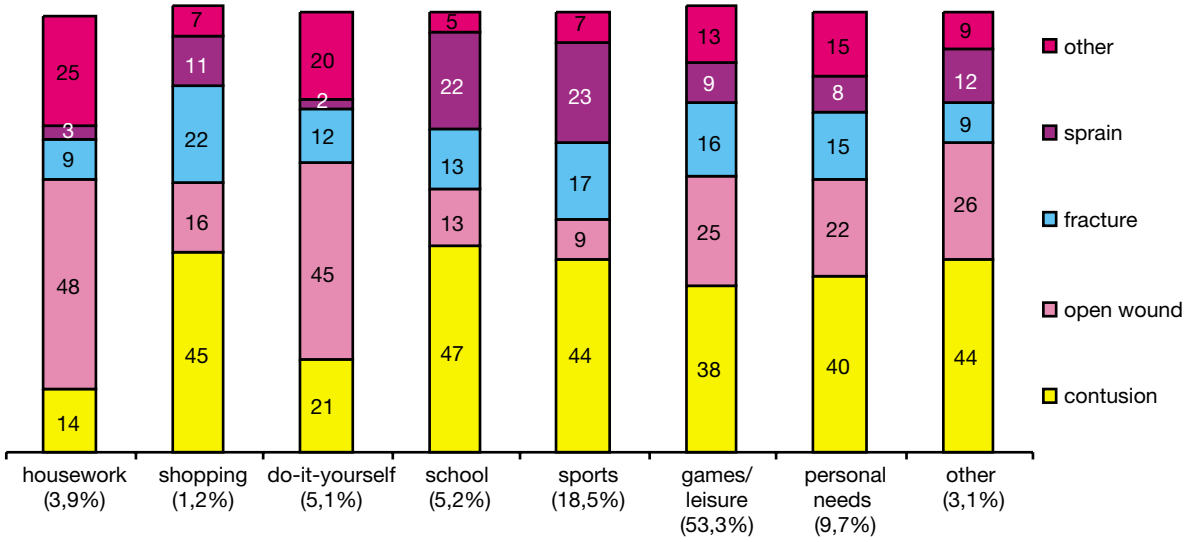
Lesions caused by injuries

Figure 5. Distribution of HLIs by lesion



Contusions are the main lesions contracted in HLIs (39% of the lesions), followed by open wounds (23%), fractures (15%), and sprains (11%). There is no difference in the distribution of lesions between men and women.

Figure 6. Distribution of HLIs by lesion, according to the activity

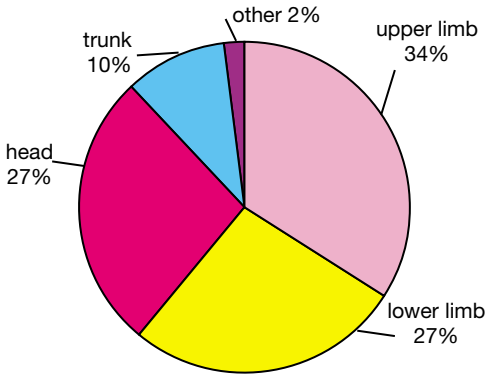


Only 14% of HLIs related to housework and 21% related to do-it-yourself activities are contusions. For those two activities, the open wound is very common: respectively 48% and 45% of HLIs. Fractures are most frequent in injuries occurring during shopping (22% of the cases), during sports (17%), game and leisure activities (16%). Sprains occur most frequently in the school setting (22% of HLIs) and during sports (23%).

Contusions are frequent with children and young adults (about 40% of HLIs before 25 years), and then decrease. Open wounds make up more than 30% of HLIs before 10 years, are common for 10 to 20 year olds (14%), and for those over 20 years old make up about a quarter of HLIs. Fractures are rare among the very young (7% of HLI for those under 5 years), they then increase to finally make up 40% of HLIs for those 75 and older. Sprains are especially frequent for those between 10 and 30 (between 15% and 20% of HLIs).

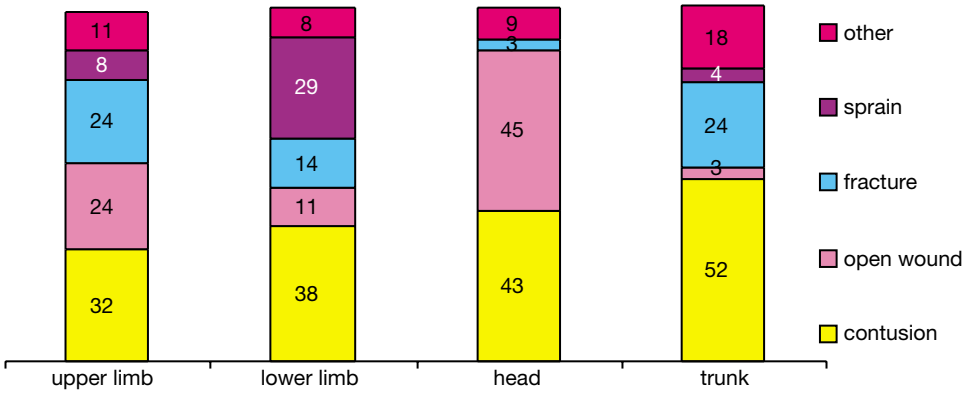
Parts injured during injuries

Figure 7. Distribution of HLIs according to part injured



Lesions affect especially the upper limbs (34%), then the lower limbs and the head (27% each) and the trunk (10%). The distribution of lesions according to body part is the same for men and women.

Figure 8. Distribution of HLIs by lesion, according to body part injured

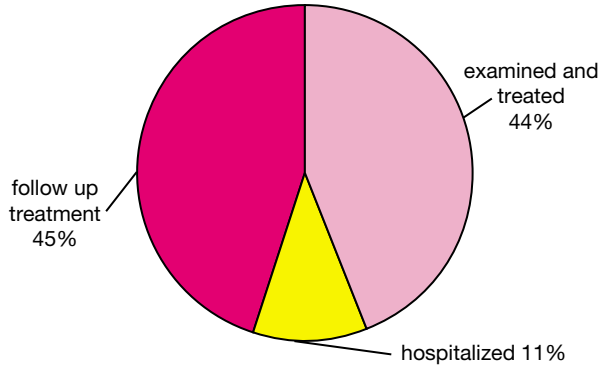


Contusions are the most common lesions, but the proportions vary according to body part injured: 32% of HLIs affect an upper limb, 38% a lower limb, 43% the head and 52% the trunk. Aside from contusions, the upper limbs are the seat of open wounds and fractures (24% each); the lower limbs suffer from sprains (29%) and fractures (14%); the head open wounds (45%); and the trunk fractures (24%).

In children, the part injured the most often is the head (61% for children 0 to 5 years and 38% for children 5 to 9 years), then the upper limbs (20% of 0 to 5 year olds, 33% of 5 to 9 year olds). For adolescents and adults, the distribution of injured parts varies little: injuries to the lower limbs make up 38% of HLIs at 20 years and 25% at 60 years. Beyond 60 years, the trunk and the head are most often injured (respectively 29% and 26% of HLIs from 75 years on).

Care, treatment, hospitalization

Figure 9. Distribution of treatment of HLIs



Nearly half of HLIs (44%) are benign, in that they do not entail treatment or the injured person can return home after treatment. An equivalent proportion (45%) necessitates treatment with follow up visits. The remaining 11% necessitate hospitalization after an emergency department visit. The proportions of the different types of care are independent of the injured person's sex. The rate of hospitalization is of 8% for those injured under 10 years old; it decreases with age to 5% for those between 20 and 24 years old, then increases to reach 42% of injured people 75 and over.

The average length of hospitalization is 5.5 days. This average is the result of a great inequality between many very short hospital stays (39% of hospital stays last 0 or 1 days, and 17% 2 days) and a small number of very long stays (16% of the length of hospital stays exceed 10 days, 3% of which exceed 25 days).

The average length of hospitalization increases with age: less than 4 days up to 25 years, between 4 and 8 days for the 25-65 years, and over 8 days for the elderly. The length of stay does not differ significantly between the sexes.