Injury Mortality and Morbidity Reporting Systems in France
(Unintentional Injuries of Children and Adolescents)

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In spite of increased attention given to traffic injuries, and, because of their high frequency and lethality, the passing of road safety legislation in the 1970's, a global interest in accidents as an important public health problem is of recent date, as is an epidemiological understanding of non-traffic related injuries. Before 1980 the only usable data for purposes of prevention were mortality statistics and some limited studies, the latter carried out almost exclusively on in-patients, primarily in surgery departments and intensive care units.

Between 1970 and 1980, injury mortality rates decreased dramatically in neighboring countries, whereas this decrease was very slow in France, especially in the case of deaths related to home and leisure injuries. For the past ten years, injuries have been the first cause of hospital admission of children, ranking ahead of respiratory infections.

Therefore, in the early 1980's, the Ministry of Health sponsored morbidity surveys in the field of childhood injuries, children being considered as the highest risk group [1, 2, 3]. These surveys concentrated on measuring the magnitude of the problem, identifying the most frequent injury circumstances, and assessing the feasibility of a permanent surveillance system. Since that period, several different systems for gathering morbidity data have been put in place, but none of them can pretend to being truly representative at a national, or even a regional level. For this reason, the analysis over time of changes in injury pathology in relationship to prevention programs has relied primarily on mortality data. However, these data, in spite of their being exhaustive, valid nationally and relatively reliable, raise a number of methodological problems, which make certain international comparisons risky.

This paper deals only with unintentional injuries, and the data presented concern almost exclusively children and adolescents. Both the terms "accident" and "injury" are used. In France, as is the case in other European countries, the word "accident" is still used in a scientific and epidemiological context, and in French does not have the pejorative connotation it has acquired in English (fatalistic, unavoidable, therefore not preventable).

Finally, this paper emphasizes methodological issues in the collection and analysis of mortality and morbidity data. It is for this reason that reference is made to fairly early morbidity data [1, 4, 5], because they are the only data analyzed from the dual perspectives of their statistical and epidemiological quality and of the difficulties in data collection.

Mortality

The data presented here come from two sources: national statistics published by INSERM* [6], and, in the case of international comparisons, the WHO World Health Statistics Annual [7]. The figures are for 1990 whenever possible. E-codes from the WHO International Classification of Diseases (ICD), used for the tables of figures, are listed in the annex.

Level of Accidental Mortality among Children and Youths

Injuries (and most particularly unintended injuries) in France, as in the rest of the developed world, are the primary cause of death from the age of one year and for all of childhood and adolescence. In 1990, 840 children aged 1 to 14 years died accidentally (representing 33.4 percent of all deaths for that age), and 3,527 youths aged 15 to 24 died accidentally (53.0 percent of deaths). This interest in unintentional injuries only is justified by the fact that

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intentional injuries in France are a problem of much less magnitude; for example, among 15 to 24 year olds in 1990, 791 suicides were recorded (12.1 percent of the causes of death) and 70 homicides.

The analysis of rates by age and sex (Table I) shows characteristics found in most of the countries:

- higher rates among the youngest children, adolescents and young adults than among children aged 5 to 14 years;
- a higher mortality among males at all ages;
- the increasing of this higher male mortality with age (sex ratio = 1.6 at ages 1 to 4 years, and 3.1 at ages 15 to 19 years).

It is difficult to interpret the very high rates observed among children under one year of age because of obvious methodological problems (with the certification of cause of death) which will be discussed below.

Rates of accidental mortality in France are among the highest observed in European countries (Table II). Among children 1 to 14 years old, higher rates than those in France are noted in two North European countries—Germany and Belgium—and in three southern countries: Greece, Spain and Portugal. (It should be noted in the case of Luxembourg that rates calculated for a single year are not usable because of the very small size of the population).

Causes of Accidental Death

Beginning at age one year, traffic accidents predominate (Table III) and represent 78 percent of fatal accidents among adolescents aged 15 to 19 years. The second most important cause of accidental death is by drowning. The very high number of fatal suffocations before the age of one year poses methodological problems which will be discussed below.

Main Methodological Issues

The analysis of accidental death before the age of one year is difficult.

This problem is due especially to possible confusion between "sudden infant death" and "suffocation". As previously noted, the accidental death rate in children less than one year old is very high, higher than in all other European countries, except Greece and Portugal (Table II), and the rate of suffocations is also abnormally high. The possibility of confusing suffocation with sudden infant death stands out clearly in the comparative analysis of the change over time of these two conditions between 1970 and 1980 (Table IV). (Sudden infant death as an entity was recently identified and diffusion of the diagnosis has only been occurring since the 1980's). Most probably, rather than a change in the distribution and rate of these conditions, there has been a change in the diagnostic and coding habits. When certifying the cause of death of a child found dead in his bed, the physicians who used to code "suffocation" are now coding "SID" (with only about 30 percent of SID diagnoses being established after an autopsy). It is also likely that an unknown proportion of "suffocations" and "sudden deaths" are in fact infant homicides.

There is a higher percentage of "injuries undetermined whether accidentally or purposely inflicted" than in other Northern European countries.

This is particularly the case for children under one year of age. It is likely that physicians, when coding the death certificate, are quite reluctant to record a diagnosis of intentional traumatic death. Furthermore, there are a number of deaths (certified as "accidents", "suicides" and "homicides") where the intention to cause death is not clear and misclassifications are made either by mistake or deliberately, because the diagnosis of intentional death seems socially and culturally unacceptable (primarily in the case of adolescent suicide or infant homicide). Some cases of adolescent suicide are probably coded as accidents, as shown by the trends over time of these two categories of

death, the current decrease in accident rates corresponding to a similar increase in suicide rates [8]. This is most probably related to changes in coding habits rather than to real changes in rates.

There are a certain number of accidental deaths (whose importance varies with age) classified among deaths of undetermined cause and considered as belonging to the category of "symptoms, signs and ill-defined conditions."

This is especially true in the case of violent and suspicious deaths which are the object of a medico-legal investigation, the results of which cannot be communicated at the time of the compiling of mortality statistics. In 1983-1985, the percentage of these cases among all deaths was 2 percent for all ages, but reached 6 percent in the 15-24 year old group at the national level, and 35 percent in the city of Paris [9].

The cause of the accident is often not specified.

In the French language, and in the minds of most people, including the physicians in charge of coding death certificates, the word "accident" is more or less synonymous with "traffic accident". Therefore, most of these accidental deaths of unknown cause are probably deaths from traffic injuries. This proportion of "undetermined cause of accidental death" is more or less constant for age (from 7 to 10 percent between the ages of 1 to 24 years; Table III).

This "linguistic issue" most probably leads to an underestimation of traffic injuries, and also to an overestimation of home and leisure injuries when the latter percentage is calculated by subtracting traffic and occupational accidents from all accidental deaths.

In cases of accidental death delayed beyond the date of the accident, the death may be certified as being from other causes (complication of infection, for example).

In the case of traffic accidents, there is a standardized European definition which considers as having died accidentally "any person killed outright or dying from the sequelae of the accident within 30 days". In France, the accepted period is 6 days [10]. Such large differences make international comparisons hazardous.

There are discrepancies between information sources.

The results may show different figures for the same type of accidental death. This is the case for traffic accidents for which deaths are identified from death certificates and recorded by INSERM in the annual statistics on medical causes of deaths [6], but are also registered by the police from accident reports, then recorded in the statistics of the National Interministerial Observatory for Road Safety [10].

Morbidity

Any analysis of morbidity data should be carried out within the context of the French health system, a complex system associating a large public sector, composed primarily of hospitals, and an important private sector with hospitals and physicians' offices. Both sectors are reimbursed for care by the national public health insurance system, and both sectors care for injury victims.

The 1981 Studies

These studies originated with and were financed by the Ministry of Health within the framework of discussion in Europe on the development of a European accident surveillance system. They were carried out in three geographically-defined areas: in a health care district of the Paris region (Yvelines, [1]); in the north of France (Lens and Montmédy [2]); and in a city in the east of France (Bar le Duc, [3]). They dealt with medically treated injuries of out-patients, and data collection involving the entire health care system, including private medical facilities. Based on well-defined populations, they enabled the calculation of frequencies (Table V). There has not been a more recent survey of this type, as the calculation of frequency is a difficult objective to attain in a complex health system.

The largest study, the Yvelines survey, was used as the feasibility study for the French Accident Surveillance System. It raised various methodological issues which are described below.

Multiplicity of information sources needed for the calculation of frequency.

The private health care sector is an important source of cases in the Yvelines study (principally private hospitals; Table VI), as in the one at Bar le Duc where 22 percent of cases were found in the offices of private physicians [3].

In the Yvelines study, limiting the registration to the public hospitals would have led to calculating an annual rate of incidence of 5.1 percent, instead of the final observed rate of 8.33 for 100 subjects under 15 years of age.

Under the assumption that all severe cases are registered in public hospitals, most epidemiological surveys disregard private facilities. In the Yvelines study, the fracture rate was the same in private and public hospital cases, and some cases registered in the private sector were quite serious.

On the other hand, inclusion in the registration of school infirmaries and day care centers (which explains the higher rates noted in the study at Bar le Duc, Table V), led to gathering data on what were essentially benign cases.

Finally, it should be noted that the comparison of the cases recorded in public facilities with those from private facilities showed significant differences as concerns the characteristics of injuries, with a higher percentage of sports related injuries in the private hospitals.

Underreporting

The comparison of reported and missing cases showed significant differences and selection bias. Cases were not missed at random, and for example, the rate of poisoning was higher among missing cases. Because cases of child poisoning were rapidly admitted to the hospital, in a high percentage of cases the form was not filled out in the emergency room. Therefore, there is a need for regular verification of registration (emergency room and out-patient department log books).

The reporting level was lower in private hospitals (50 percent) than in public ones (75 percent). This is but one of the problems found in collaborating with the private sector (poor quality of the log books; poor quality, or even the absence of medical records). The response rate of private practitioners (investigated through a postal survey) was 47 percent (34 percent for GPs and 52 percent for pediatricians).

Missing Data

The percentage of missing data is especially high for those related to the accident circumstances and causative agents (site of accident, activity of the victim, products involved), and especially when the information has to be retrospectively searched for in the medical files (the location of accident was missing in 12 percent of the reporting forms filled out in hospital emergency rooms, and in 44 percent of the cases retrospectively recorded in medical files). These data are essential to prevention programs.

Coding Problems

Ad hoc codes had to be designed for describing the circumstances of accidents and identifying the causative agent of injuries, since the E-code of ICD (9th revision) was not designed for describing home and leisure injuries of children.

Severity Scoring

In the Yvelines study, the AIS and ISS were used, but these scales had poor discriminatory power and low predictive value for long-term functional prognoses in cases of domestic, school and sports injuries.

Current Sources of Information and Methodological Issues

Current knowledge of injury morbidity in France comes from four main sources of information: 1) routine statistics (hospital discharge diagnoses, road traffic accident statistics, anti-poison center data); 2) surveillance systems: the French survey of EHLASS (European Home and Leisure Accident Surveillance System, hospital based and product oriented) and the national household survey run by the French national public health insurance system, the CNAMTS("Caisse Nationale d'Assurance Maladie des Travailleurs Salariés"); 3) alert systems; 4) research (mainly epidemiological).

Routine Statistics

Hospital statistics cover only hospitalizations in public facilities and in-patients. The three principal problems encountered in the utilization of morbidity statistics compiled from discharge diagnoses are: not taking into account out-patients, especially in emergency services; not using the E-code from the ICD manual; and counting hospitalizations and not subjects, which over-represents serious injuries which have resulted in several hospitalizations.

As concerns traffic accidents, data furnished by SETRA (Service d'Etudes Techniques des Routes et Autoroutes [10]) include, besides the number of deaths, the number of seriously injured persons, mildly injured and uninjured persons, by age, sex, urban/rural milieu, time of day, user category (driver or passenger of a four-wheeled vehicle, pedestrian,

driver or passenger of a two–wheeled vehicle, other), type of vehicle, type of road, weather conditions. The main problem posed by these statistical data is that of under–reporting of cases, inversely proportional to the seriousness of the injuries. This is especially a problem in the case of mildly injured and uninjured persons.

Surveillance Systems

EHLASS (European Home and Leisure Accident Surveillance System)

The decision to finance a European system for recording accidents of daily living was made in 1985 by the Council of European Ministers. In France, the system is run by the ministers of health and of consumer affairs. It depends on participation by hospitals which record emergency room consultations and who send these data on a monthly basis to a national Center. It is managed by the Ministry of Health (Direction Générale de la Santé).

This system was put in place gradually starting in the Summer of 1986, with three hospitals starting in 1987 and eight hospitals beginning in 1988. In 1993, seven hospitals furnished 28,597 accident cases, of which 46 percent concerned children under the age of 15 years [11].

Monographs are regularly produced on a particular age group (children), a type of accident (burns, poisonings . . .), a particular causative agent (for example, slides, toys, baby and child equipment), a specific place (playground, farm . . .), an activity (sports . . .), or a type of lesion (hand, eye . . .).

The principal methodological problems are linked to the choice of public hospitals only, to the exclusion of any private facilities, leading to numerous missed cases, and the sampling method. Hospitals are recruited on a voluntary basis and the sample is not representative at a national level; the catchment area of each hospital is not well defined nor is the size of the background population. It is therefore not possible to calculate frequencies or to publish national estimates.

Results are presented in the form of tables showing distribution in percentages, not rates. The coding of causative agents allows exchange of information between European countries. Unfortunately, as is also the case in the other European countries, data concerning products involved in accidents are generally presented in the form of a simple listing, without the possibility of relating the frequency of accidents linked to a particular product to the actual risk exposure (number of users of a product and length of time of utilization, in particular at a national level).

Recently, a synthetic score of gravity was developed, describing the dangerousness of a product and combining the following variables: number of cases involving the product, rate of hospitalization, length of stay, number of deaths.

The quality of data, especially those related to accident circumstances, has improved considerably since the implementation of the system. In 1993 the percentage of information not supplied on the reporting forms was 3.9 percent for the location of accident, 4.6 percent for the activity of the victim, and 4.7 percent for the causative agent (Table VII). In 1987 these percentages were respectively 11.3, 16.0 and 26.7. Furthermore, present percentages are lower than those of the Dutch and British systems [12, 13] and comparable to those of EHLASS in Denmark which has the best quality data [14].

CNAMTS Survey of Home and Leisure Accidents ("Les accidents de la vie courante")

This is a retrospective postal survey of beneficiaries insured by departmental offices of the national public health insurance system, which has been carried out every year since 1987. The studies are done by the local offices recruited on a voluntary basis. Each office agrees to participate during several consecutive years in the study (3 to 4 years normally). Thus the data base of offices participating in the national study varies over time, in number and in geographic distribution. The rate of response to the questionnaires of around 75 to 80 percent also varies according to the offices and over time. Starting with the participation of 6 departmental offices, the system included 21 in 1991. But in 1994, only 3 offices are participating and the study will doubtless be suspended, but should be restarted in 5 years in order to evaluate changes in accident frequencies.

The representativeness at a national level was doubtless better than for EHLASS during maximum operation of the system, but nevertheless questionable because: 1) the recruitment of the offices is done on a voluntary basis; 2) the agricultural sector is not included because it has its own health insurance system (therefore farm accidents to children, for example, are not recorded, though known as a major problem); 3)though rather high, the response rate is 75 percent to 80 percent (probably inducing selection bias).

The questionnaire sent to families deals with all types of injuries, including those which were not medically treated. The recall period is one year, probably inducing recall bias, especially for the most benign injuries. The information on accident circumstances is of better quality than in EHLASS, but the reliability of medical information is questionable.

Rates are calculated and national estimates are given. Within the period 1987–1992, 148,000 persons were investigated and 42,000 accidents recorded, 14,000 concerning children and adolescents under the age of 17 years. The annual incidence rate for this age group was estimated to be 12 percent and it was estimated that, at a national level, 1,157,000 home and leisure accidents to children occur every year in France, leading to 144,000 hospital admissions [12].

Specific studies are published (children's accidents between 1987 and 1991; accidents in the elderly, 1987–1990; sequelae of accidents, 1989; accidents in immigrant children, 1987–1990; animal related injuries, 1987–1988; sports injuries, 1987–1988; injuries in the kitchen, 1987–1988).

Comparability of the Two Systems

EHLASS and the CNAMTS survey have the same scope (home and leisure injuries), and record the same information (age and sex of the victim, location of the accident, activity of the victim, mechanism of injury, type and site of lesions, outcome and treatment, causative agents). In both systems, circumstances and causative agents are described in a free text.

In spite of very different methodologies and levels of representativeness, there is an obvious consistency in the findings regarding the problem of childhood injuries. Both surveys show higher male morbidity (around 65 percent of the cases), the predominance of home injuries in young children, of sports injuries in adolescents after the age of twelve, a fracture rate around 25 percent, a hospitalization rate between 12 and 15 percent.

Alert Systems

Most of these systems are primarily designed to detect and notify the proper authorities of hazards and dangerous products, but may occasionally describe related accidents and their associated injuries as well. These systems are regional, national or access information at the level of Europe.

- Local alert systems are managed by Departmental Directorates for Consumer Products, Competition and the Repression of Fraud (DDCCRF). They facilitate the diffusion of bulletins on hazards.

- the system "3614–Sécuritam" uses the Minitel service (telephone/home computer combination and data base). It registers complaints on hazardous products and reports of injuries, and gives out information to any consumer on injuries and products, including morbidity data, using for this purpose EHLASS data and data from ad hoc studies. This system is run by the Consumer Safety Commission and the CNAMTS.

- The "European system of rapid exchange of information" is set in motion in the presence of serious and immediate danger. It may request that studies be done among manufacturers and potential victims, the results being transmitted to the appropriate authorities in Brussels.

Research

Epidemiological research on injury morbidity has been and is still being conducted by hospital departments, schools of medicine, "Regional Health Observatories", departmental committees for health education, and INSERM.

Recently, studies have been designed to identify long term consequences of accidental injury [16, 17, 18], with special emphasis on sports related injuries in children and adolescents which appear to have possible consequences in terms of functional prognosis [17, 18, 19].

It should be noted that all studies on children of migrants, a high risk group, are rendered difficult by strict laws on confidentiality.

Psychological and sociological research on risk factors and consequences of accidents is poorly developed, as are studies on economic aspects, although there is a recent interest in the cost of injuries, not only financial cost, but also social cost, including "invisible" components of this cost (changes in professional activities of parents, moving, schooling . . .).

Examples of the analysis of financial costs, as well as of certain social costs, may be found by studying reimbursement schemes used by insurance companies. Indeed, in addition to costs directly related to medical care involved in an accident, insurance companies, in their reimbursement process, take into account aspects of social costs such as those caused by suffering, inconvenience, anguish (*pretium doloris*, aesthetic damages, damages caused by inconvenience).

In France, a study was done using a reference population of 1411 subjects under 19 years of age injured in traffic accidents and reimbursed in 1986. It was estimated that traffic injuries to children in the sample cost insurance companies 152 million Francs ($28,700,000), or a cost of 107,526 Francs ($20,290) per child [20]. It was noted in the study that reimbursement varied by sex and that, for equivalent disability, it was always higher for boys. This phenomenon is very probably related to estimating techniques based on an evaluation of the probable future level of income of the accident victim.

Recommendations and Conclusions

Better epidemiological knowledge of accidents in France may be gained by improving routine statistics and by developing new studies and tools.

Improvement of Routine Statistics Through

- Better certification of the causes of death through physician training. These health professionals usually consider certifying and coding the cause of death as a boring administrative task and probably do not realize its importance, nor the use made of their work. Medical students should receive education on the importance of mortality statistics as a public health tool.

- Better identification of death from domestic and leisure injuries. In France, it is very difficult to introduce changes in the death certificate form, which is a legal document, and to add items for determining the place of occurrence of fatal accidents in cases other than traffic accidents. It would therefore be advisable to develop complementary documents allowing the description of deaths due to domestic accidents, as is the case in England with HAAD (Home Accident Deaths Database) [13].

- Systematic use of E-codes for hospital discharge diagnoses.

Use or Development of New Tools

- Use of the tenth revision of the ICD which includes optional codes for the place of accident and the activity of the victim.

- Development of severity scales adapted to sports, leisure and home injuries and of scoring systems for accident-related disabilities and handicap.

Development of Research

- In the field of long term consequences of all types;

- In economic aspects;

- Aimed at identifying the best preventive strategies targeted to specific groups, which presupposes studies of social, cultural and psychological risk factors.

In conclusion, before the 1980's, there was nearly complete ignorance of the problem of home injuries in France and much effort has been made to increase knowledge and improve prevention. Though the present level of the epidemiological research and the quality of morbidity statistics are not yet satisfactory, the evolution of mortality shows very positive trends.

In children aged 1–4 years, age group with the highest rate of home injuries, the non-traffic related accident mortality rate has been reduced by half between 1980 and 1990 (Table VIII). This has been accomplished without preventive measures or laws as numerous and visible as those enacted in the field of traffic safety in the 1970's. Obviously an awareness has been created among both communities and professionals. Of course, these figures raise the question of the linkage between epidemiological data and preventive efforts when the action has been broad, not targeted, and when no evaluation indicators more refined than mortality data have been developed.

Finally, we should note that, as is the case with all the European countries, France should now adapt its statistical information gathering systems to a European scale.

References

1. Tursz A, Crost M, Guyot MM, Pivault M. Childhood accidents: a registration in public and private medical facilities of a French health care area. *Public Health 1985; 99*: 154–164.

2. Davidson F, Maguin P. Les accidents chez les enfants. Etude épidémiologique d'une zone rurale et d'une zone urbaine. *Arch. Fr. Pédiatr. (English abstract). 1984; 41*: 67–72.

3. Spyckerelle Y, Des Fontaines-Merckx VH, Gervaise F, Royerp, Legras G, Deschamps JP. Etude de l'incidence et des caractéristiques des accidents de l'enfant dans une ville de 20,000 habitants. *Rev. de Péd. (English abstract). 1984; 20*: 159–166.

4. Tursz A, Crost M, Pivault M, Guyot MM, Rumeau-Rouquettec. Enregistrement des accidents de l'enfant dans les structures de soins et de prévention d'un secteur sanitaire. *Rev. Epidém. et Santé Publ (English abstract). 1984; 32*: 286–294.

5. Tursz A. Epidemiological studies of accident morbidity in children and young people: problems of method. *World Health Statistics Quarterly. 1986; 39*: 257–267.

6. INSERM. Statistiques des causes médicales de décès. Paris: INSERM. Publication annuelle.

7. World Health Organization. World Health statistics annual. Geneva : WHO. Yearly publication.

8. Tursz A, Souteyrand Y, Salmi R. Adolescence et risque. Paris: Syros, 1993; 266 p.

9. Carre JR, Zucker E. Mortalité et morbidité violentes dans la population des jeunes de 15 à 24 ans. Paris, Haut conseil de la population et de la famille. Paris : La documentation française, 1989.

10. Observatoire National Interministeriel de Securite Routiere. Accidents corporels de la circulation routière. Bagneux: Service d'Etudes Techniques des Routes et Autoroutes (SETRA). Publication annuelle.

11. Duval C, Nectoux M, Darlot JP EHLASS. Rapport France 1993. Direction Générale de la Santé. Paris, 1994.

12. Stichting Consument en Veiligheid. PORS 1988–89 Review. Home and Leisure Accident Surveillance System. Amsterdam. 1990; 79 p.

13. HASS. Home Accident Surveillance System. Home and Leisure Accident Research. 16th Annual Report. 1992 data. London : Department of Trade and Industry. Consumer Safety Unit. 1993; 75 p.

14. EHLASS. European Home and Leisure Accident Surveillance System. Annual Report. Denmark: National Consumer Agency, National Board of Health, 1993.

15. Caisse Nationale d'Assurance Maladie des Travailleurs Salaries. Les accidents de la vie courante des enfants de 0 à 16 ans. Résultats 1987 à 1991. Dossier "Etudes et Statistiques" n°24. Paris: CNAMTS. 1994; 71 p.

16. Tiret L, Garros B, Maurette P, Nicaud V, Thicoipe M, Hattonf, Erny P. Incidence, causes and severity of injuries in Aquitaine, France: a community based study of hospital admissions and deaths. Am J Publ Health. 1989; 79: 316–321.

17. Tursz A, Crost M. Séquelles des accidents d'enfants. In: Tursz A. Epidémiologie et prévention des accidents dans l'enfance et l'adolescence. Symposium franco–israëlien (English abstract). Paris. INSERM. 1989; pp 55–71.

18. Yacoubovitch J, Lelong N, Cosquer M, Tursz A. Etude épidémiologique des séquelles d'accidents à l'adolescence. Arch Péd (English abstract). In press.

19. Tursz A, Crost M. Sports related injuries in children. A study of their characteristics, frequency and severity with comparison to other types of accidental injuries. Am J Sports Med 1986;14 : 294–299.

20. Lamy H. Les conséquences financières des accidents de la voie publique chez les enfants: la prise en charge par les compagnies d'assurance. Mémoire de DESS "Economie et gestion du système de santé". 1988; 99 p.

Table I: Accident Mortality Rate per 100,000 Children and Young People Aged 0-24 Years, According to Sex and Age, in France, in 1990

	Age (Years)					
	< 1	1-4	5-9	10-14	15-19	20-24
Male	45.3	14.6	7.8	8.7	46.6	86.2
Female	30.3	9.1	4.7	4.9	15.2	16.3
Total	38.0	11.9	6.3	6.9	31.3	51.6

Source: INSERM

Table II: Accident Mortality Rate per 100,000 Children and Young People Aged 0-24 Years, According to Age and Sex, in the 12 Countries of the European Union in 1990

	Age (Years)							
	< 1		1-4		5-14		15-24	
	M	F	M	F	M	F	M	F
Belgium*	26.5	26.3	14.7	9.3	11.5	6.3	63.8	17.5
Denmark	9.2	0	9.4	6.3	11.4	7.0	34.4	11.1
France	45.3	30.3	14.6	9.1	8.3	4.8	66.5	15.7
Germany	24.5	18.2	17.7	9.6	9.2	5.6	51.2	13.8
Greece	42.0	40.2	12.5	6.2	12.5	6.2	70.3	17.3
Ireland	10.9	3.9	13.8	8.1	9.5	5.4	44.0	15.4
Italy**	20.6	9.4	7.9	5.2	8.0	3.1	52.6	10.6
Luxembourg	77.5	42.5	21.3	11.0	9.1	9.5	73.3	20.2
Netherlands	15.8	9.3	11.8	8.8	8.5	5.5	26.0	8.1
Portugal	70.1	47.8	19.7	14.0	16.5	9.6	84.8	12.9
Spain**	35.5	22.3	14.7	10.5	11.4	5.6	73.0	18.5
United Kingdom	12.5	7.4	9.7	6.1	8.0	4.4	39.7	8.8

Source: WHO
*Belgium: 1987
**Italy, Spain: 1989

Table III: Cause of Accidental Death According to Age in Children and Young People Aged 0-24 Years in France, in 1990

Causes	Age (Years)											
	< 1		1-4		5-9		10-14		15-19		20-24	
	N	%	N	%	N	%	N	%	N	%	N	%
Traffic	36	13	127	35	134	61	177	68	1,029	78	1,759	80
Poisonings	1	0	8	2	2	1	4	1	12	1	19	0.5
Falls	2	1	29	8	13	6	10	4	15	1	66	3
Fire and Flames	5	2	36	10	11	5	12	5	14	1	13	0.5
Drowning	7	2	63	18	17	8	19	7	46	3	43	2
Suffocations and Foreign Bodies	223	78	46	13	11	5	6	2	11	1	20	1
Other Including Late Effects	1	0	26	7	11	5	12	5	62	5	83	4
Undetermined	10	4	26	7	20	9	20	8	129	10	206	9
Total	285	100	361	100	219	100	260	100	1,318	100	2,209	100

Source: INSERM

Table IV: Evolution of the Number and Rate (per 100,000 Live Births) of Suffocations and Sudden Infant Death in Children under 1 Year of Age in France Between 1970 and 1990

	Total Number Of Deaths	Suffocations		Sudden Infant Death	
		N	Rate per 100,000	N	Rate per 100,000
1970	15,437	521	61.3	217	25.5
1975	10,277	632	84.8	211	28.3
1980	8,010	596	74.5	823	102.8
1985	6,389	237	31.9	1,231	165.8
1990	5,599	223	29.7	1,369	182.4

Source: INSERM

Table V: Annual Incidence Rate of Injuries in Children According to Sex and Age in France

Incidence Rate (%)

Survey	Males			Females		
	0-4	5-9	10-14	0-4	5-9	10-14
Yvelines, France 1981-1982	11.7	9.4	10.1	8.0	5.3	6.0
Lens, Montmédy, France. 1981	12.6*	8.9	11.0	9.1*	6.6	7.0
Bar-le-duc, France.	16.2	14.1	21.7**	12.9	8.8	17.7**

*Children Aged 1-4 Years
**Children Aged 10-15 Years

Table VI: Yvelines Survey (1981-1982):
Number of Cases Registered According to the Source of Information and the Survey Length

Sources of Information	Number of Cases	Survey Length
Public Hospitals and SMUR* of the Survey Area	5,483	1 Year
Private Hospitals of the Survey Area**	2,550	1 Year
Dispensaries	15	1 Year
Private Practitioners	32	7 or 14 Days
Public Hospitals of Areas next to the Survey Area	197	1 Year (Retrospective Study)
Anti-poison Center	323	1 Year (Retrospective Study)
Death Certificates***	5	1 Year (Retrospective Study)

*SMUR: Service Mobile d'Urgence et de Réanimation (Mobile Emergency and Resuscitation Unit)
**Excluding Cases Also Registered in Public Hospitals (N = 29)
***Excluding Fatal Cases Registered in the Medical Facilities of the Survey (N = 8)

Table VII: Percentage of Information Not Supplied on the Reporting Forms Filled Out in the French "EHLASS" and in the Accident Surveillance Systems of Other European Countries

	EHLASS France 1993 (28,597) %	PORS Netherlands 1988-1989 (146 363) %	HASS United-Kingdom 1992 (115 257) %	EHLASS Denmark 1993 (67 531) %
Sex of the Victim	0	0.1	0.1	0
Age of the Victim	1.2	0	0.2	0
Location of the Accident	3.9	13.5	47.6	5.9
Type of Accident	0.7	0.8	9.3	1.9
Activity of the Victim	4.6	32.5	45.2	3.2
Causative Agent	4.7	--	19.0*	1.4
Type of Lesion	1.5	0.1	1.6	0
Outcome and Treatment	0.3	0.1	0.6	0

*1991

Table VIII: Evolution of the Rates of Overall and Accidental Mortality per 100,000 Children Aged 1-4 Years In France Between 1960 and 1990

	Overall Mortality	Accidental Mortality	Traffic Accident Mortality	Non-traffic Related Accident Mortality
1960	119.2	25.6	---	---
1965	91.8	25.7	8.0	17.7
1970	79.6	27.2	7.7	19.5
1975	67.4	24.7	6.5	18.2
1980	58.3	21.2	5.8	15.4
1985	45.4	13.0	4.2	8.8
1990	38.2	11.9	4.2	7.7

Source: INSERM

Annex
Catégories from Who's International Classification of Diseases (ICD) Included in Analysis of Accident Data

E 810-819	+	E 820-829	=	Transport Accidents
E 830-832	+	E 910	=	Water Transport Accidents + Accidental Drowning and Submersion
E 850-858	+	E 860-869	=	Accidental Poisoning
(Including E 868)			=	(Carbon Monoxide-accidental Poisoning)
E 880-888			=	Accidental Falls
E 890-899			=	Accidents Caused by Fire or Flames
E 911-915			=	Accidents Caused by Suffocation and Foreign Bodies
E 916-929	+	E 800-807		
+	E 830-838 (minus 830-832)		=	All Other Accidents and Late
+	E 840-848 +	E 900-909		Accidental Injury

Excluded are:

E 870-879	=	Misadventures to Patients During Surgical and Medical Care
E 930-949	=	Drugs, Medicaments and Biological Substances Causing Adverse Effects in Therapeutic Use