Estimation of the incidence of Home and Leisure Injuries in France based on attendance at hospital Emergency Departments

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Background

- Knowing how many people suffer Home and Leisure Injuries (HLIs) at the national level is an essential step in finding out how many such injuries occur and designing prevention measures.
- The permanent study on Home and Leisure Injuries (Enquête permanente sur les accidents de la vie courante - Epac) is the only nationwide survey in France of attendance at Emergency Departments (ED) as a result of HLIs. The exhaustive nature of the information collected means that this survey provides accurate descriptive data about these injuries and the circumstances in which they occur.
- Methods based on simple extrapolation from the volume of hospital activity cannot be used to interpret this survey in order to provide a rigorous estimation of the national incidence of ED attendance as a result of HLIs.
- A national approach has therefore been developed in order to estimate the numbers of people who had attended ED on at least one occasion as a result of an HLI on the basis of the Epac 2006 survey data and additional information about the care activities of the hospitals provided by the French Medical Information System Programme (Programme de médicalisation des systèmes d’information - PMSI), which produce discharge case records.

Methods

Data sources

- The Permanent study on Home and Leisure Injuries (Epac) - The Epac is carried out in ten hospitals which are scattered over the whole of Metropolitan France and located in geographical areas selected for their heterogeneity (urban, seaside, mountain and country areas).
- All HLIs seen at the ED of these hospitals were included, also injuries involving bicycles or other non-motorised wheeled vehicles. The data were collected exhaustively (every day and at all times of day) by dedicated staff specifically assigned to this task and trained in coding procedures [3].
- Epac contributes to the European Injury Data Base (IDB) (2), which has been managed by the French Institute for Public Health Surveillance (Institut de veille sanitaire - InVS) in France since 2005.
- The Epac hospitals used in this study were those that recorded data throughout 2006, in Metropolitan France and in paediatric patients over 15 years of age. In the end, the model was designed using the data from five hospital sites, in the cities of Annecy, Bithénon, Léoges, La Havre and Vannes.
- Hospital data from the French Medical Information System Programme (PMSI) - The PMSI constitutes an exhaustive record of admissions to all the hospitals in France. It is intended to collect the characteristics of hospital admissions allowing the government to base hospital funding on actual needs.
- Stays at hospital as a result of injuries were selected for inclusion if the diagnosis corresponded to Chapter XIX (injuries, poisonings) of ICD10, the Tenth Edition of the International Classification of Diseases. Some additional diagnostic codes related to injuries in chapters V11, V111 and X10.
- It was not possible to distinguish between different types of injuries (road, occupational or HLIs) or to take into account hospital admissions without attendance at an ED. Therefore, the hospitalisations selected, in the same hospitals as the Epac survey, were not a sub-set of attendances at emergency as a result of HLIs.

Statistical methods

- A mixed Poisson model [3] was used to model the ratio of the number of people attending ED for HLIs over hospitalisations for injuries. Subsequently, this ratio is higher in women, whereas the link between locally-available data on HLIs and national medico-administrative data. Its application to children under 15 years of age remains to be investigated, since the mean ratio of ED attendance for HLIs over hospitalisations for injuries is very variable.
- The incidence may have been underestimated as a result of the elimination of multiple attendances at ED in the Epac study.
- The PMSI data were used to estimate the national burden of HLIs, after the removal of HLIs seen at the ED of these hospitals which overlap injuries (road, occupational or HLIs) or take into account hospital admissions without attendance at an ED. Therefore, the hospitalisations selected, in the same hospitals as the Epac survey, were not a sub-set of attendances at emergency as a result of HLIs.

Results

Discussion

The estimations of the incidence of attendance at ED as a result of HLIs obtained by this novel method [5;6] were similar to those obtained by cross surveys in France, and show the importance of the phenomenon for public health (5:4).

The small number of hospitals participating in the Epac network included in this analysis is a major limitation of this method. The five ED used in this model represent only a small part of the 651 ED in France. However, the variability of the ratio related to the hospital effect was relatively minor compared to that related to age.

The increase in the value of the ratio in women of about 60, which is due to a decrease in the number of hospitalisations for injuries at this age, whereas the number of attendances at ED remains stable, is still unexplained.

The incidence may have been underestimated as a result of the elimination of multiple attendances at ED in the Epac database. It is indeed possible that people attending the same hospital and sharing the same date of birth and being in the same city may have been wrongly classified as cases of multiple attendances, and therefore excluded from the analysis.

This approach offers an interesting solution that could provide national estimations of the number of HLIs by exploiting the link between locally-available data on HLIs and national medico-administrative data. Its application to children under 15 years of age remains to be investigated, since the mean ratio of ED attendance for HLIs over hospitalisations for injuries is very variable.

This predictive model is very useful for investigating HLIs. Under certain conditions, notably the number of people investigated and the variability of this ratio, this method could be applied to some HLIs types in particular facts in elderly people. It would also be possible to improve the predictive model and to consolidate the estimations of HLIs incidence by including more hospitals and more data, by using the data of several years. Complementary analyses, especially in order to check the robustness of the results obtained, the estimations of the incidence of HLIs resulting in attendance at ED were repeated for four of the five hospitals, eliminating one hospital each time. The results are shown in Figure 4.

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References


TABLE 2

Estimations of the number of people injured in HLIs, and the incidence of HLIs leading to attendance at an ED in people aged 15 or over, Metropolitan France, 2006

<table>
<thead>
<tr>
<th>Number</th>
<th>Male</th>
<th>Population</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(15-1,059,514)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1,803,553)</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1,401,534</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>2,264,004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined</td>
<td>3,665,534</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FIGURE 3

Values observed and values predicted by the model according to age with the intervals of confidence (dotted line) and prediction (dashed line) for men and for women.