Cross country variation of fractures in the childhood population. Is the origin biological or “accidental”?

Editor,—The interesting paper by Lyons et al revealed that the annual incidence rate of fractures among children aged 0–12 years was two to three times higher in Wales than in other western European countries. This discrepancy prompted us to briefly report on differences among the Young (CEREPRI), for Research and Prevention of Injuries among the Young (CEREPRI). All types of childhood injuries treated at the emergency departments of the participating hospitals, which have well circumscribed catchment areas in rural and urban Greece, are routinely recorded in this database. The catchment area includes the Greater Athens area, where about 40% of the country’s population resides, Magnesia county in Greece mainland, and Corfu county on the island of Corfu. Our methodology was similar to that followed by Lyons et al thus allowing for reasonable comparisons.

A total of 8557 fractures were recorded during the fracture year 1996–98 among children 0–14 years old and the estimated annual incidence rate was 12 fractures/1000 children. No significant variation was noted among children from the different sites participating in EDISS. This rate is just one third of that recorded in the Welsh childhood population. In line with what is reported by Lyons et al, and other investigators, boys were also over represented in the Greek data set (male:female ratio: 1.9) and this preponderance increased with age. Altogether 2.7% of the injured children presented with multiple fractures, a figure that is higher than that reported by Lyons et al (1.8%) and may reflect the higher road traffic injury toll in Greece. In fact, one third of the multiple fracture injuries were the result of a road traffic crash, whereas traffic accidents accounted for less than 5% among injured children with one fracture.

The distribution of children by injured body part was comparable to that of the Welsh population, with fractures of radius and ulna accounting for 45% of the total, followed by fractures of fingers (3.9%), humerus (6.9%), and carpals/metacarpals (4.8%). The similarity in the pattern of fractures among children who sought emergency hospital care in the two countries can be considered as an indicator of the high quality registration system in both sites and enhances the possibility that the observed difference of the fracture incidence rate is genuine. It is worth noting, however, that despite the low overall incidence of fractures in the Greek childhood population, the proportion of skull fractures was more than twice as high as that reported in the Welsh and in a related Swedish study. Cycle helmet use may not be optimal, but according to data derived from EDISS, use of protective devices for road traffic injuries is unacceptably low, and playgrounds do not usually comply with international standards. Therefore, the underlying causes for the discrepancy in skull fracture incidence should be carefully monitored in Greece, whether it is caused by reluctance to wear helmets or otherwise, and corrective action taken.

One third of the recorded fracture injuries in both studies occurred in residential areas, where children spend most of their time, followed by school areas and public premises. An average of 40% of fractures resulted from sports and leisure activities. Cultural differences and different sports and leisure time preferences between the two population groups, however, become obvious when the injuries are further analyzed by type of sport activity. Thus, ball related injuries were predominant in our population (70% of sports related injuries among Greek compared with 40% among Welsh children), whereas wheeled sports activities were almost twice as common in Welsh compared with Greek children (35% and 20% respectively).

In conclusion, comparison of data from these studies indicate that the incidence of fractures in the Greek childhood population is similar to that observed in Sweden but much lower than that reported by Lyons and his colleagues. It is important however, without careful consideration of differences in data collection, coding, and processing methods. To test this hypothesis, comparative, population based crude and fracture specific injury incidence data and children from southern and northern European countries could be used to elucidate whether the observed differences simply reflect a corresponding difference in accident incidence or whether they are mainly related to differences in the incidence of fractures. If the latter is the case, further investigation focusing on possible differences in bone mass density or dietary intake should be considered in the interpretation of the observed variation of fractures on different population groups.

M MUSTAKI
M LARIOU
Department of Hygiene and Epidemiology, Athens University Medical School, Greece

E PETRIDOU
Department of Hygiene and Epidemiology, Athens University Medical School, 75 Mikes Anais, Gouda, Attika, Athens 11527, Greece

Correspondence to: Dr Petridou in Athens epetrid@cc.uoa.gr


Speed reductions, inequalities, and transport

Editor,—We read the editorials in the BMJ and Injury Prevention about speed limits with interest and would like to share some of the Scottish experience.

Councils throughout Scotland are conducting trials of advisory 20 mph limits as part of a Scottish Executive initiative. In Lothian these are generally in residential areas and often linked with Safe Routes to Schools projects run by the councils in partnership with Lothian Safe Routes, SPOKES (an Edinburgh based cycle group), Lothian Health, and the police. In addition a small number of mandatory 20 mph zones exist, with proposals in Edinburgh for a city wide 20 mph limit in residential areas and on shopping streets.

Road traffic accidents (RTAs) are not spread evenly across communities, with disadvantaged children having a much worse experience of RTAs. In Edinburgh the City of Edinburgh Council has made traffic calming measures in areas with high accident rates a feature of the city’s road safety strategy since the early 1990s. These have been mainly engineering measures to calm traffic in more disadvantaged parts of the city. This has resulted in a reduction in speeds and a 39% reduction in reported accidents in areas calmed under the “casualty reduction” programme (compared with 29% reduction where “environmental traffic management” was the aim and 4% reduction where measures were in connection with bus priority routes). This is against a picture of relatively stable accident levels in the council areas during the 1990s. This suggests that getting areas with high accident levels can produce good results and ties in with other Scotland wide data (where increased walking and cycling was also demonstrated).

Engineering measures are costly, with the council spending some £1.2 million for the “casualty reduction” programme. While it remains to be seen whether the much less expensive advisory 20 mph schemes will be of similar benefit, there are two lessons about implementing and enforcing these schemes. As these 20 mph schemes are merely advisory, they can only be enforced if motorists are driving dangerously. Anecdotal evidence from early 20 mph schemes suggest that, while speeds are in general reducing, a significant proportion of motorists have not moderated their speed. These motorists are often local residents who believe they “know the road” (Lothian and Borders Police, personal communication). This emphasises the importance of community consultation before schemes are introduced and regular feedback to the community after they are in place—in Scotland only around a third of

www.injuryprevention.com
residents have rated the consultation as sufficient. Where there is good consultation there may assume an underlying cohort for each type from which cases and controls are sampled. The primary difference between the incidence density and cumulative incidence case-control studies is how we view the cohort and what information the control group provides. The incidence density case-control study views the underlying cohort as being stable and dynamic. The control group in an incidence density case-control study is intended to provide an estimate of the fraction of population time exposed and unexposed. The OR, then, is a ratio of pseudorates and provides an unbiased estimate of the incidence rate ratio, with no rare disease assumption (table 1). Thus it does not matter whether the disease is rare, only that controls be selected independently of exposure status to be representative of the distribution of the exposure in the source population which produced the cases.

The cumulative incidence case-control study is where the rare disease assumption is important. The cohort underlying the cumulative incidence case-control study should be thought of as closed and fixed. Incident cases are sampled throughout a defined time period and controls are residual non-cases (that is, those individuals at risk who did not become cases over this period). In this situation, the control group does not provide a representation of person time. Instead, the relationship between the odds and the risk is what is key. That is, when the disease is rare, the odds of disease (cases/non-cases) and the risk of disease (cases/total) are approximately equal (keeping in mind that the odds of disease is not available from a case-control study, only the OR):

\[ \text{Risk} = \frac{10 \text{ cases}/1000 \text{ total at risk}}{1000 \text{ total at risk} - 10 \text{ cases}} = 0.0001 \]

The case-control studies that provide the OR estimates used in Dr Kopjar’s article could be seen as the incidence density type. The OR would then be an unbiased estimate of the incidence rate ratio, with no rare disease assumption.

### Table 1 Hypothetical example of how the odds ratio is an unbiased estimate of the incidence rate ratio in an incidence density case-control study. The sampling fraction for cases is 10% and the control group provides the estimate of the fraction of person-time exposed and unexposed. This example is based on data from Thompson et al.

<table>
<thead>
<tr>
<th>Hypothetical cohort</th>
<th>Helmet</th>
<th>No helmet</th>
<th>Total</th>
<th>Incidence rate ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cases</strong></td>
<td>220</td>
<td>535</td>
<td>757</td>
<td>0.316</td>
</tr>
<tr>
<td>Bicycle riding hours</td>
<td>149</td>
<td>554</td>
<td>11376</td>
<td>263300</td>
</tr>
<tr>
<td>Incidence density sampling from the population experience:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cases</strong></td>
<td>222</td>
<td>535</td>
<td>757</td>
<td>0.316</td>
</tr>
<tr>
<td>Controls</td>
<td>496</td>
<td>1338</td>
<td>2634</td>
<td></td>
</tr>
</tbody>
</table>
attended a satellite meeting of the Society organised by our enthusiastic Asian representative. We are confident that the international organising committee for the next conference in Montreal in 2002 will be as keen as we are to continue the tradition and ensure a strong ISCAIP presence on that occasion also. Perhaps I should try to spell out my own hopes and aspirations for ISCAIP. Our foremost strength lies in the potential to foster collaboration and I believe we should seek, through both electronic and conventional means, to develop this role further. Second, the membership of the Society represents an unsurpassed critical mass of expertise and (to use an old fashioned phrase) sapiential authority. Let’s use our collective clout to maximise the effectiveness of injury prevention policies and practices in every corner of the globe through the dissemination of research based evidence and guidelines. Finally, the Delhi conference brought home to me (and I’m sure many others) just how dramatically different are the circumstances and obstacles faced by injury prevention professionals in India and other developing countries compared with the US, Europe, or Australia. Most ISCAIP members are all to well aware of this, of course, yet how many of us have found ways of coping constructively with the implications? Dinesh Mohan has called for the institution of imagi-native collaborative projects between researchers working in low income countries (containing most of the world’s population) and high income countries. Are injury prevention professionals ready to respond to this challenge? If so, how? Should we seek additional resources to oil the wheels of such “north-south” collaboration and, if so, where will we find them? I appeal to all readers of Injury Prevention to reflect on these questions and to try to articulate some answers. I can think of no more urgent task for ISCAIP—or indeed for the international injury prevention community as a whole—in the 21st century.

D H STONE
Chair, ISCAIP,
Glasgow, Scotland
d.h.stone@dhnmed.gla.ac.uk


CALENDAR

10th Annual Conference on International Safe Communities
21–23 May 2001, Anchorage, Alaska, USA.
The theme is Safe Work, Safe Play Around the Clock. Further information and online registration: www.alaska-ips.org or from Conference Manager, Diana Hudson, The Alaska Injury Prevention Center, PO Box 210736, Anchorage, Alaska, USA 99521-0736 (tel: +1 907 929 3958, fax: +1 907 929 3940, email: diana_hudson@hotmail.com).

International Child Passenger Safety Technical Conference
2–6 June 2001, Indianapolis, Indiana, USA.
This conference will offer workshops on child passenger safety certification, boosters and belts for school age kids, legislation and advocacy, model law enforcement programs, restraint programs for children with special needs, transportation in other vehicles, and more.

DETR Good Practice Conference
20–22 June 2001, Bristol, UK.
The DETR, the UK government department with responsibility for road safety, is staging this conference to disseminate good practice in road safety engineering and speed management, and to launch their good practice guidelines.

Further information: Kevin Clinton, RoSPA, Road Safety Dept, Edgbaston Park, 353 Bristol Road, Birmingham B5 7ST, UK (tel: +44 (0)121 248 2125, fax: +44(0)121 248 2001).

Nordic Safe Communities Conference
Further information: Moa Sundestrøm, Karolinska Institute, Division of Public Health Sciences, SE-171 76 Stockholm, Sweden (tel: +46 8 517 77948, fax: +46 8 334693, email: moa.sundestr@socmed.sll.se).

4th International PhD Course on Safety Promotion Research
A course for researchers and PhD students in public health sciences and those interested in injury prevention and safety promotion research.
Further information: Moa Sundeström, Karolinska Institutet, Department of Public Health Sciences, Division of Social Medicine, Norrbacka, SE-171 76 Stockholm, Sweden (tel: +46 8 517 77948, fax: +46 8 334693, email: moa.sundstrom@socmed.sll.se, web site: www.ki.se/phs/education).

1st International Course on the Global Burden of Injury
The aim of the course is to provide a general scientific platform for the understanding of global trends and international differences in injury mortality and morbidity; for PhD and postgraduate students and senior researchers.
Further information: Moa Sundeström, Karolinska Institutet, Department of Public Health Sciences, Division of Social Medicine, Norrbacka, SE-171 76 Stockholm, Sweden (tel: +46 8 517 77948, fax: +46 8 334693, email: moa.sundestr@socmed.sll.se, web site: www.ki.se/research/courses/postgrad_catalogue/fall2000_en.html).

6th World Conference on Injury Prevention and Control
12–15 May 2002, Montreal, Canada.

www.injuryprevention.com