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.1 This discrepancy prompted us to briefly report on the epidemiological profile of fractures in the childhood population of Greece and discuss the implications of the observed differences.

Our data derive from the Emergency Department Injury Surveillance System (EDISS) database which is run by the Center for Research and Prevention of Injuries among the Young (CEREPRI).2 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 three year period 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,3 and other investigators,4 boys were also over represented in the Greek data so that the male:female ratio was 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 more than three times higher than the high 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 43% of the total, followed by fractures of fingers (15.9%), humerus (6.9%), and carpal/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 Welsh5 and in a related Swedish study.6 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 spent the 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 in Wales. The question is: could this variation simply be attributed to different exposure levels and/or different prevention strategies that are followed in the respective countries, or does it reflect the expression of a biological mechanism, possibly related to nutritional factors, that accounts for fewer Greek children suffering from fractures. The latter hypothesis cannot be properly addressed, 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 among children from southern and northern European countries could be used to elucidate whether the observed differences simply reflect a corresponding difference in the distribution of high risk children 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 of bone mass density or dietary intake should be considered in the interpretation of the observed variation of fractures on different population groups.

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

E PETRIDOU
Department of Hygiene and Epidemiology, Athens University Medical School, 75 Mykonos Av, Goudi, Athens 11527, Greece

Department of Epidemiology, Harvard School of Public Health, Boston, USA

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

residents have rated the consultation as satisfactory. Where there is good consultation there is also a high level of satisfaction with the programme. The programme research findings No 68. Edinburgh: City of Edinburgh Council


Population preventable fraction of bicycle related head injuries

EDITOR.—The article by Dr Kopjar in a recent issue of the journal discussing the use of the population preventable fraction concerning bicycle related head injuries and helmet use was very interesting. Dr Kopjar uses the odds ratio (OR), obtained from case-control studies of the effectiveness of bicycle helmet use to prevent head injury, to provide an estimate of the relative risk (RR) required in the formula for the population attributable fraction. In the article, Dr Kopjar stated that "Incidence of head injuries is low, suggesting that the estimates of risk presented herein can be used as a valid proxy for the RR." This point deserves further comment. There are two distinct types of case-control studies: the incidence density type and the cumulative incidence type. We 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 pseudo-rates 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 through 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 at risk) are approximately equal (keeping in mind that the odds of disease is not available from a case-control study, only the OR):

\[
\text{Risk} = \frac{10 \text{ cases}}{100 \text{ total at risk}} = \frac{10 \text{ cases}}{990 \text{ non-cases}} = \text{odds}
\]

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 provide an unbiased estimate of the incidence rate ratio, with no rare disease assumption.

B HAGEL
J F BOIVIN
Joined Departments of Epidemiology and Biostatistics and of Occupational Health, McGill University, 1020 Pine Avenue West, Montreal, PQ H3A 1A2, Canada bhagel@polys.mcgill.ca

field, one that Jerry Moller has long called for, which will incorporate the “beliefs and behaviours of individuals and the social and cultural structure” (Moller quoted in Rothe, p92, and originally, Moller’) into accident prevention. Without it our understanding is that of a mere spectator; we fail to appreciate the intricate interplay of causes of unintentional accidents and injuries and in so doing, fail to make real headway to creating effective prevention strategies.

S GRUNDY
Department of Child Health,
University of Newcastle-upon-Tyne, UK


UPDATE ON ISCAIP

From the Chair of ISCAIP

As many readers will be aware, the elections for the new ISCAIP Board were held in 2000. I feel deeply honoured to have been elected Chair and wish to thank all concerned for their support. My colleagues on the Board are an outstanding team of highly respected injury prevention professionals and I am confident that we, together with the membership, can take ISCAIP into the new century with a renewed sense of purpose and urgency.

I want especially to record my appreciation of the inestimable contribution of Fred Rivara, founding Chair of ISCAIP, in laying the foundations of the organisation and in presiding over a smooth transition to the new regime. Fred’s leadership has been truly inspirational and unlikely to be equaled in the foreseeable future. I am delighted to report that Fred has agreed to participate in ISCAIP Board discussions in his capacity as Immediate Past Chair and we look forward to his continued involvement with the Society.

Since taking up the position, I have embarked on a steep learning curve. In its short life, ISCAIP has built up an impressive worldwide network of individual and corporate members, and in defending over a smooth transition to the new regime. Fred’s leadership has been truly inspirational and unlikely to be equaled in the foreseeable future. I am delighted to record my appreciation of the inestimable contribution of Fred Rivara, founding Chair of ISCAIP, in laying the foundations of the organisation and in presiding over a smooth transition to the new regime. Fred’s leadership has been truly inspirational and unlikely to be equaled in the foreseeable future. I am delighted to report that Fred has agreed to participate in ISCAIP Board discussions in his capacity as Immediate Past Chair and we look forward to his continued involvement with the Society.

Since taking up the position, I have embarked on a steep learning curve. In its short life, ISCAIP has built up an impressive worldwide network of individual and corporate members, and in defending over a smooth transition to the new regime. Fred’s leadership has been truly inspirational and unlikely to be equaled in the foreseeable future. I am delighted to report that Fred has agreed to participate in ISCAIP Board discussions in his capacity as Immediate Past Chair and we look forward to his continued involvement with the Society.

1st International Conference on the Global Burden of Injury

17-29 October 2001, Stockholm. The aim of the conference is to bring together injury prevention professionals and researchers from high and low income countries, and to launch their good practice guidelines. 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).