International comparisons: they do help and are essential for avoiding type III error

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In commenting on the report of child injury league tables issued by UNICEF, Ramsay asked the rhetorical question: Do international comparison help? Chalmers and Pless gave a conservative reply in the Editorial in Injury Prevention—“we certainly hope so.” Unlike Langley, I would like to give a more affirmative reply: I am convinced that international comparisons do help and are in fact essential for avoiding type III error, that is giving the right answer for the wrong question.

The UNICEF report concerned two kinds of questions: why were there large variations in child injury mortality among countries that are part of the Organisation for Economic Co-operation and Development? And why did changes in child injury mortality differ from 1971–75 to 1991–95 among these countries? However, by using traditional, individual based epidemiological research methods to answer these questions, we run the risk of committing the type III error. Rose cautioned that we need to distinguish between two kinds of aetiological questions: the first asks about the “causes of cases” whereas the second asks about the “causes of incidence.”

Schwartz and Carpenter extended Rose’s argument, illustrating it by using the causes of stroke. The causes of interindividual variation in risk within a population (for example, diabetes, genetic vulnerability) may be distinct from the causes of differences in the disease rate over time (that is, global economic crisis) or between populations (that is, differences in social norms in response to economic crisis). All of these factors, in turn, are distinct from the cause of the disease itself—that is, damage to the brain caused by an interruption of the blood supply.

To highlight the importance of the foregoing distinction for injury prevention research, we have modified the example of Schwartz and Carpenter. We asked what factors might influence differences in the occurrence of injury in two countries (see fig 1). We assume two countries that are involved in increasing trade through globalization, and with different societal responses in terms of domestic policies and social investments. Country A adopts the approach of treating worker injury as an unpredictable and unpreventable event, and consequently encourages norms emphasizing individual responsibility. Increased economic competition, such as induced by the Multilateral Agreement on Investment (MAI), may lead to a reduction of safety standards and less community advocacy in injury prevention. In contrast, the response of the second country (population B), whose emphasis is on treating injury as a preventable problem, may be to increase safety standards and to promote more community advocacy in injury prevention in the face of threats from MAI.

Taking an extreme example, in the first country, then, unsafe environments become ubiquitous (100%); in the second, they are eliminated (0%). The simplified example...
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could provide useful insights for avoiding type III error.

The ability to make valid comparisons among countries should lead not only to recognition of important differences but also to a better understanding of successful preventive measures. None the less, international comparisons of injury remain a relatively neglected area of research. One reason is because most researchers seem more interested in identifying individual level risk factors—the dominant paradigm in epidemiology. A second reason is that most researchers do not receive international perspectives in their training. A third reason is that valid and comparable data for cross national comparisons are so hard to obtain.

The International Collaborative Effort on Injury Statistics has done much to improve the international comparability and quality of injury data. Nevertheless, the effort is still some distance from the ultimate goal to provide the data needed for understanding the causes of injury and the most effective means of prevention. The UNICEF report was an important attempt to explain cross country and cross time period variations in injury. Even so, most of the speculations were based on studies within individual countries. Only in figure 9 do we see a cross national comparison of when and what national legislation was enacted. However, even these comparisons were questioned by Chalmers and Pless, who pointed out that none of the laws in Germany differed substantially from measures taken in other, less successful countries. Clearly, further accurate and insightful data are needed on societal-level characteristics for making international comparisons and for avoiding type III error in injury prevention research.

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13 http://www.cdc.gov/nchs/about/otheract/ice/ice.htm