

Injuries in Relation to Chronic Disease: An International View of Premature Mortality

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Abstract: Injuries are compared with heart disease, cancer, and cerebrovascular disease, using 1980 mortality data for the United States, France, Japan, West Germany and the United Kingdom. Emphasis is on premature mortality, measured by a rate of potential years of life lost between ages one and 65. Injuries are the leading cause of male premature mortality, and rank first, or second to cancer, in females. The United States sustains the greatest injury losses of these five countries. (*Am J Public Health* 1987; 77:1345-1346.)

Introduction

In the United States, injuries rank fourth as a cause of death behind heart disease, cancer, and cerebrovascular disease.¹ Injuries are also the leading cause of premature mortality.² This study compares the contribution to premature mortality from injury with those from the aforementioned chronic disease groups, for the United States, France, Japan, West Germany, and the United Kingdom.

Methods

Data are adapted from age-, sex-, and cause-stratified mortality tabulations for 1980, published by the World Health Organization (WHO).³ Cause of death is classified under an abbreviated three-digit code according to the basic tabulations list of the International Classification of Diseases, 9th Revision (ICD-9).⁴ Unlike cancer (ICD-9 rubrics 140-208) or cerebrovascular disease (430-438), heart disease and injuries are not published in the aggregate. Here heart disease encompasses the WHO categories of acute rheumatic fever (390-392), chronic rheumatic heart disease (393-398), hypertensive disease (401-405), acute myocardial infarction (410), other ischemic heart diseases (411-414), and diseases of pulmonary circulation and all remaining forms of heart disease (415-429). Injuries comprise accidents and adverse effects (E800-E949), suicide and self-inflicted injury (E950-E959), homicide and injury purposely inflicted by other persons (E960-E969), and residual violence (E970-E999).

Premature mortality is operationalized as an age-adjusted rate of potential years of life lost (PYLL) between ages one and 65.⁵ The 1980 US population serves as the standard. PYLL represent the summation of the number of deaths at each age, commencing at age one, multiplied by the number of years of life remaining up to the ceiling. Since WHO age data are grouped, usually decennially, remaining years of life for each age group have been computed as the difference between respective mid-points and age 65. All-cause death rates are age-adjusted by direct standardization,⁶ again using the 1980 US population as the reference.

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Results

In all comparison countries, injuries are exceeded as a cause of death by heart disease, cancer, and cerebrovascular disease (Table 1). Among the population aged one through 64, injuries rank ahead of cerebrovascular disease in all five countries and in France and Japan are second only to cancer. Injuries feature most prominently in the mortality structures of the United States and France, and least so in that of the United Kingdom. Intra-national comparisons between unadjusted and adjusted all-cause death rates attest to considerable age variation across populations.

Based on age-adjusted PYLL rates (Figure 1), injuries emerge as the dominant male premature mortality category in every country except the United Kingdom. The British injury rate is only marginally higher than their heart disease rate. Forty-eight per cent of PYLL among US males is attributable to injuries, and the US injury PYLL rate is more than 20 per cent greater than the next highest corresponding rate, that for France. Japan has a relatively low rate, with West Germany occupying an intermediate position. Heart disease and cancer rank second or third as a cause of male premature mortality. Cerebrovascular disease rates are uniformly low, although the relative impact of the disease on Japanese males is strong.

Age-adjusted premature injury mortality is highly male selective. The most extreme national example is the United States, whose male injury PYLL rate is about three-and-a-half times its female rate. Injuries are the leading cause of female premature mortality in the United States and France, but they are closely followed by cancer. Female cancer rates actually surpass injury rates in the remaining countries. The United States has the highest female injury PYLL rate and, paralleling the male situation, is followed by France, West Germany, Japan, and the United Kingdom. Female cerebrovascular disease rates are the lowest of all sex- and cause-specific PYLL rates under scrutiny. However, those for Japan and France resemble corresponding heart disease rates.

Discussion

This study reveals that, despite marked international variation, all comparison countries manifest high premature injury mortality levels, particularly among males. By indexing premature mortality, a PYLL rate is a more accurate gauge of the societal impact of a specific cause of death than a crude mortality rate. As such, it facilitates setting health planning priorities and designing intervention strategies.^{5,7,8}

Explanation is warranted concerning the decision to employ ages one and 65 as cut-off points in measuring PYLL. Part of the rationale for excluding infants is their unique causes of death and the frequent etiologic differences with respect to those causes they share with the older population.⁵ Furthermore, the notion of PYLL was conceived to draw attention to premature "preventable" deaths, and it can be argued that the infant mortality rate already performs that function for the population under age one.² Inclusion of infants in the calculations would actually accentuate the importance of injuries in the premature mortality mosaic. Injuries account for more infant deaths than heart disease,

TABLE 1—Percentage Distribution of Selected Causes of Death, and All-Cause Death Rates in Five Industrialized Countries, 1980

Cause of Death	United States		France		Japan		West Germany		United Kingdom	
	All ages	Ages 1-64	All ages	Ages 1-64	All ages	Ages 1-64	All ages	Ages 1-64	All ages	Ages 1-64
Heart Disease	38.6%	27.6%	21.8%	12.6%	19.3%	13.3%	32.9%	22.6%	34.1%	43.6%
Cancer	20.9	26.2	22.7	31.6	22.4	32.2	21.9	28.6	22.1	32.3
Cerebrovascular Disease	8.6	3.9	12.4	4.8	22.4	14.2	14.3	5.2	12.5	6.5
Injuries	8.1	21.2	9.2	21.5	4.3	17.9	5.9	17.1	3.7	10.0
Other Causes	23.8	21.1	33.9	29.5	31.6	22.3	25.0	26.5	27.6	7.6
All-Cause Death Rates ^a										
Unadjusted	875.8	304.1	1,018.6	278.9	618.2	198.2	1,160.2	219.3	1,182.4	313.2
Age-adjusted	875.8	304.1	827.8	266.5	754.5	195.0	921.9	263.7	954.7	273.6

^aDeath rates are expressed per 100,000 population. The 1980 US population serves as the standard in adjusting rates for age.

cancer, and cerebrovascular disease combined for both sexes in all five countries.

Sixty-five is a common age ceiling in measuring PYLL,^{2,9,10} although the nature of the age-specific data precluded using 70 in this instance. A ceiling above 70 is not recommended since at older ages a single underlying cause of death can be difficult to determine. This difficulty occurs because several pathologic outcomes frequently contribute to death, and the proportion of post mortem examinations conducted tends to vary inversely with decedent age.^{11,12} Incorporation of the 65 to 69 age group within the PYLL measure would reduce the relative importance of injuries in each country, but not greatly, due to the small weighting accorded elderly deaths (data available on request to author).

The degree to which reported international discrepancies in disease and injury patterns reflect different coding practices cannot be ascertained from the WHO data. This problem is diminished here through the use of broad diag-

nostic classifications, and by the fact that the data pertain to highly industrialized countries. Further research is necessary to examine foregoing injury patterns and differentials in terms of their external causes, such as motor vehicle crashes and homicide. Comparative international epidemiologic research not only serves an important etiologic function, but it also guides public health interventions.¹³

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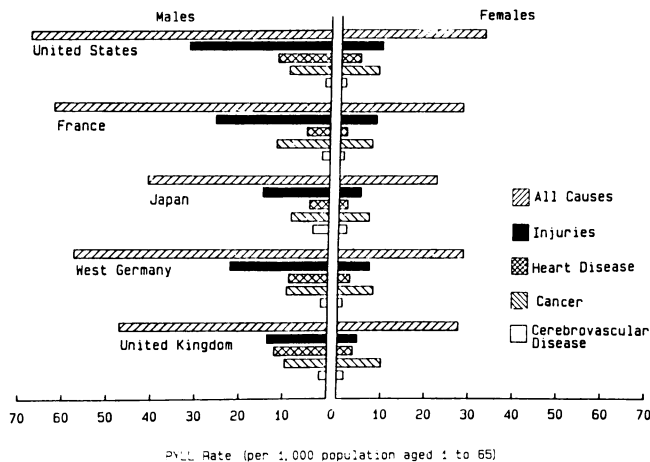


FIGURE 1—Age-Adjusted Rates of Potential Years of Life Lost (PYLL) for Selected Causes of Death and All Causes in Five Industrialized Countries, 1980