Worldwide pattern of mortality from motor vehicle accidents, 1950–1990

Summary

Trends in age-specific and age-standardized death certification rates from motor vehicle accidents over the period 1950–1990 were analyzed for 48 countries from four continents, available from the World Health Organization mortality database. In most developed western and Asian countries, mortality rates increased until the late 1960s or early 1970s, and declined thereafter to reach values often lower than those of the early 1950s, although the number of circulating vehicles has substantially increased over the same calendar period. The extent of the decline was, however, different in various countries, as well as in the two sexes and in various age groups, thus leading to complex cohort and period patterns. In general, countries (like the U.S.A. or U.K.), where the number of motor vehicles had increased earlier, have now comparatively higher rates at younger than at middle and older age, while the opposite is observed in countries with later spread of motor vehicles. Further, there were a few countries, including Kuwait, Venezuela and several other Latin American countries, Australia and New Zealand, and several southern and eastern European countries, with exceedingly high rates from motor vehicle accidents, and where comprehensive interventions on this important cause of death are therefore a public health priority.

In several developed countries, the rise and subsequent fall in death rates from motor vehicle accidents has been one of the major changes in mortality from any cause over the current century, and in several aspects one of the major successes on a public health scale. The recent declines in mortality, in fact, have been achieved against a generalized background increase in the number of circulating vehicles, and reflect a large number of advancements in the adoption of safety measures, improvements in the structure of vehicles and road organization, besides the adoption of selected legislation measures and better treatment of casualties. Information on mortality from road traffic accidents is easily available for the United States and a few western European countries, in the absence, however, of an overall summary figure of pattern and trends in mortality in other countries of the world. There are, in fact, substantial differences in traffic accident mortality in various areas of the world.

We decided, therefore, to include in a single report a summary overview of main trends in mortality from motor vehicle accidents over the last four decades, using data for 48 countries from four continents available from the World Health Organization (WHO) database.

Materials and methods

Death certification numbers from road traffic accidents over the period 1950–1990 and estimates of the resident population, stratified for sex and five-year age group, were derived from copies of the original computer tapes of the WHO database, which includes data for the following 48 countries:

Americas. The WHO database contains some data on mortality and population for 49 American countries or territories. Excluded were all countries with less than 2 million population. Out of the
24 countries left, only those with age-stratified mortality and population figures of sufficient detail were retained: 12 countries were excluded at this stage. The analysis is based on data from Canada, the United States, and the remaining 10 Latin American countries: Argentina, Chile, Costa Rica, Dominican Republic, Ecuador, Mexico, Panama, Puerto Rico, Uruguay and Venezuela.

Asia. Eight countries provided sufficient detail of data on road traffic accident mortality from Asia: Hong Kong (not an independent country, but a self-governing Commonwealth), Israel, Japan, Kuwait, Philippines, Singapore, Sri Lanka and Thailand.

Europe. Data were available for the 26 major European countries, excluding Albania, Romania, the former Soviet Union and a few small countries like Andorra, Liechtenstein, Malta, etc.

Oceania. Data were available for Australia and New Zealand.

During the calendar period considered (1950–1990), four different Revisions of the International Classification of Diseases (ICD) were used (from the Sixth to the Ninth Revision)18–21. No major change was introduced in the procedure of coding of road traffic accidents, which had the ICD codes E810–835 for Sixth and Seventh, E810–823 for Eighth, and E810–819 for the Ninth Revision. Classification of road accidents deaths was thus recoded, for all calendar periods and countries considered, according to the Ninth Revision of the ICD21.

From the matrices of certified deaths and resident populations, age-specific rates for each five-year age group and calendar period were computed. Besides overall age-standardized rates, based on the world standard population22, truncated ones at age 15–64 (and further subdivided in younger, 15 to 34, and middle age, 35 to 64 years) were chosen for presentation.

Truncated rates are of interest for at least two reasons, since: i) they provide information specifically on trends in young and middle age and ii) death certification in the elderly is generally less reliable, and may, therefore, introduce spurious trends.

In a few countries, data were missing for part of one or more calendar periods. When a single year was missing within a quinquennium, numerators and denominators were interpolated linearly from the previous and subsequent calendar year. No extrapolation was made for missing data at the beginning or the end of the calendar period considered, or when data on one or more quinquennia were not available.

Presentation of results. For each country one table and three figures are presented.

The table includes, for each calendar year and sex, the absolute number of deaths and the overall age-standardized and truncated 15–64 years mortality rates.

The first figure includes world-standardized rates (all age and truncated 15–34 and 35–64) for each five-year calendar period in both sexes.

Age-specific rates from 15–19 to 65–69 years were plotted against the central year of birth cohort in the second figure for males and in the third for females. The points corresponding to the same age group were joined to provide more clearly spaced graphs. Thus, in this graph, the cohort effect can be read in the ordinate.

To provide graphical representation of the range of variation in mortality from road traffic accidents, histograms of overall age-standardized death rates in the most recent calendar quinquennium (1985–89, whenever available) are given.

Results

North America. In North America, mortality from road vehicles accidents increased for both sexes until the late 1960's, to reach 38.8/100000 males in Canada and 39.4/100000 in the United States, and approximately 14/100000 females in both countries. A reversal of trends followed, with steady and substantial declines for males to reach 21/100000 in Canada and 25/100000 in the United States. Some decline was observed for females, too, although a levelling of rates was evident over the last few years. Overall death rates in 1985–1989 were 8.5/100000 females in Canada and 10.2 in the United States. The downward trends were generally greater in middle age as compared to both younger and older age. For both sexes, however, mortality was still comparatively high on a worldwide scale, particularly in the United States.

Latin America. The pattern of trends was heterogeneous in various Latin American countries. Thus, after earlier rises, substantial declines were observed in Argentina from 1970–1974 onwards (from 27.8 to 13.8/100000 males, from 8.3 to 4.3/100000 females), in Chile (from 30.8 to 11.5/100000 males, from 5.7 to 2.3/100000 females), in Puerto Rico, Costa Rica, Mexico and Venezuela starting from the late 1970's, and in Ecuador starting from the mid-1980's. Mortality from motor vehicle accident, however, remained exceedingly high in Venezuela in the late 1980's (42.2/100000 males, 10.3/100000 females), and also, particularly for males, in Ecuador, Panama, Mexico and Puerto Rico.

In Panama, after earlier rises, from the mid-1970's onwards rates have remained stable and showed little evidence to decline. In most Latin American countries considered, excluding Venezuela and Ecuador, rates for females were lower than...