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Cancer mortality in the United States and Germany

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Abstract  Purpose: The USA and Germany are currently two of the world’s leading industrial nations with comparable standards of living and considerable similarities in lifestyle. Fifty years ago, i.e., in the years following the Second World War, the living conditions in the two countries were completely different. If it is true that the major part of cancer occurrence is lifestyle-related, we should see corresponding discrepancies and assimilations on the level of cancer occurrence. Methods: As an exercise in descriptive epidemiology, we compare the time trends in German and US cancer mortality in order to examine whether they parallel indeed the differences and changes in lifestyle factors of the two countries. Results: Overall, we found the cancer mortality of the two countries converging to rather similar rates. However, in detail, the data indicate various inconsistencies between the patterns of lifestyle factors and cancer mortality in the two countries: similar lung cancer rates, despite rather different patterns of cigarette consumption, or decreasing rectal cancer mortality, despite increasing prevalence of risk factors, are examples. Conclusions: Promising changes with regard to relevant risk factors indicate that the recent decline of cancer mortality in both countries will continue. Nevertheless, vigorous action towards primary prevention in Germany and more effective screening programs in both countries appear recommendable.

Key words  Cancer · Descriptive epidemiology · Epidemiology · Germany · Mortality · USA

Introduction

The USA and Germany are currently two of the world’s leading industrial nations with comparable standards of living and considerable similarities in lifestyle. However, 50 years ago, i.e., in the years following the Second World War, the living conditions in the two countries were completely different. If it is true that the major part of cancer occurrence is lifestyle-related, we should see corresponding discrepancies and assimilations on the level of cancer occurrence. Thus, as an exercise in descriptive epidemiology, a comparison of the USA and Germany appears particularly tempting: do the rates and secular trends of cancer incidence or mortality parallel the differences and changes in lifestyle factors of the two countries, as to be expected?

We approach this question by a comparison of the time trends in German and US cancer mortality. We confine ourselves to mortality data, because these are the only data which are nationwide available in both countries over decades. We restrict the investigation to data from West Germany, because the mortality data of the former GDR are available only from the beginning of the 1970s onwards and turned out to be insufficiently complete (Becker and Wahrenrod 1997). As indicators of relevant lifestyle factors, we include some data on the secular development of the production of major foods and stimulants which are known or assumed to be causally related to cancer risk.

Data material and methods

Mortality data and methods of evaluation

We calculated the secular trends of the age-standardized mortality rates for the various types of cancer on the basis of mortality and population data available for the two countries from the WHO.
The WHO database currently covers the calendar years from 1950 (USA) or 1952 (Germany) to 1997. However, for the USA, it does not include the mortality data for non-Hodgkin’s-lymphoma (NHL). Furthermore, for some other cancer sites (pancreas, testes, brain, NHL, and Hodgkin’s disease) the data are only available since 1955, and for urinary bladder and kidney cancer from 1968. For cancers of the kidney and brain the US data end with the year 1993. For all age standardizations the world population was taken as the reference population (Estève et al. 1994).

Data on smoking, alcohol, and food consumption

The data for the average cigarette consumption per adult per year in the USA were taken from the Tobacco Situation and Outlook Report (1996). The corresponding values for Germany stem from the Statistics Yearbook of the Federal Republic of Germany, published annually since 1953 by the Statistisches Bundesamt (1953 and subsequent editions). These books contain cigarette consumption data given partly per year and per adult (aged 15 or more) and partly per person. In the latter cases, we have converted to an annual consumption per adult by using the relevant population data.

The numbers for the percentage of active smokers in the population were taken, for the USA, from the Tobacco Situation and Outlook Report (1996) and, for Germany, for the years 1950–1970 from Stumpfe (1988) and for the years 1975–1996 from the annual surveys of the Institut für Demoskopie Allensbach (1974 and subsequent editions).

The figures for the average daily cigarette consumption of current smokers stem for the USA from Bouman and Wald (1993), and for Germany for the year 1950 from Nölle and Neumann (1955), for the years 1967–1989 from Junge et al. (1989), and for the year 1995 from Junge (1997).

Data for the per capita consumption of alcohol and selected foodstuffs are taken from the Surveillance Report ’39 (1996) and the FAO consumption statistics (Food and Agriculture Organization of the United Nations 1956) for the USA and the annual report of the Bundesministerium für Ernährung, Landwirtschaft und Forsten (1994). The data on food supply in Germany during World War II stem from a recent publication on the food economy in the years 1933–1945 (Crom und Gies 1997). The data on the availability of refrigerators in Germany are taken from surveys in the Statistisches Bundesamt (1953 and subsequent editions).


Results

Mortality trends

Figure 1 shows the evolution of the age-standardized mortality rates since the beginning of the 1950s in the USA and in Germany for 19 individual types of cancer and total cancer. It can be seen from this figure that the mortality rates for several types of cancer were very different in the two countries in the 1950s, but over the years have gradually become more similar or even the same. This applies, for example, to cancers of the oral cavity in women, esophageal cancer in both sexes, cancer of the colon, tumors of the pancreas – at least among women – the breast until the beginning of the 1990s, the cervix, and the uterine corpus in women, prostate cancer in men, Hodgkin’s disease in both sexes, and leukemias in women. For cancers of the stomach and of the testes, the mortality in Germany is significantly higher than that in the USA, but none-}

Fig. 1 Secular trends of age-standardized mortality rates for various cancer sites among males and females in the USA and Germany

theless displays a clear trend towards the level in the USA.

Persisting differences can be recognized for rectal tumors and for tumors of the bladder and the kidney. For rectal cancer the rates declined in the USA for every year from 1950 to the early 1990s, but in Germany only from 1975. At the moment, the rates are still substantially higher in Germany for both genders, but the decline in rates in the USA appears to have halted in the last 6 or 7 years. This suggests that rectal cancer mortality might be comparable between the two countries in the future. For urinary bladder and kidney, the rates are comparable for women, but about 50% or more higher in men for both sites.

Just a few types of cancer can be seen to have diverging trends, namely, oral cancer in men and cancers of the larynx and the lung in both sexes, i.e., cancers that are caused primarily by smoking and/or alcohol. It appears noteworthy that, for example, for oral cancer the rates are the same for women but have increased among German men by about 300% since 1975. Total cancer mortality, however, displays a clear trend towards more similar values for both sexes, in particular since the beginning of the 1990s.

Prevalence of risk factors

Tables 1 and 2 show long-term trends for the major risk factors smoking and diet (including alcohol consumption). The data paint the following picture:

1. Smoking (Table 1): the official figures on cigarette consumption per capita at the beginning of the 1950s and earlier are significantly lower for Germany than for the USA. However, with a lower daily cigarette consumption per person, it seems that during the 1950s the actual proportion of male smokers was higher in the German than in the American population. In addition, for the subsequent decades, the smoking statistics for Germany remain below those for the USA. It is only in recent years that the figures have become fairly similar due to a significant decline of smoking in the USA. In Germany, the percentage of smokers among the male population is also decreasing despite a gradual increase in the per capita consumption, but the decrease is slower than that in America. Among women, the proportion of smokers increases in both countries, but the onset of increase occurred later in Germany than in the USA. Germany still has the higher proportion of female smokers, but with a per capita consumption that remains low.

2. Alcohol (Table 1): Up until the end of the 1950s, alcohol consumption in Germany was lower than that in the USA. But whereas the US consumption