

# Global Breast Cancer Mortality Statistics

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## Abstract

*Breast cancer mortality is declining in the United States, as well as in certain other industrialized areas—such as Canada, Austria, Germany, and the United Kingdom—possibly due to increased utilization of mammographic screening, early detection of disease, and availability of improved therapies. At least some of the decline has been attributed, however, to the higher fertility rates of the cohort of women born between 1924 and 1938 who bore children during the post-World War II period.*

*In contrast, certain European nations—Spain, Portugal, Greece, Hungary, Poland, and Italy—have not reported these favorable trends.*

*The lowest breast cancer mortality rates are reported in Asian regions, leading researchers to speculate that dietary, cultural, and/or environmental factors might be implicated in the etiology of the disease. (CA Cancer J Clin 1999;49:138-144.)*

## Introduction

Although breast cancer is a serious health concern and a major public health challenge in the United States, the problem is not unique to this country. Breast cancer occurs throughout the world and, as measured by death rates, is an even more serious health concern in certain other regions than in North America. Moreover, new evidence suggests that breast cancer

mortality is currently declining in the United States, as well as in other countries where the disease historically has been a leading cause of death.

Breast cancer rates in different regions are interesting for reasons that go beyond assessing the magnitude of the public health problem represented by the disease. Worldwide patterns of breast cancer occurrence and trends in rates across time have yielded important clues about the possible causes of breast cancer, potential preventive strategies, and the effectiveness of early detection, as well as the impact of changing patterns of care. This review presents breast cancer mortality statistics from a global perspective and provides a number of possible interpretations.

## Sources of Data

Cancer mortality data are collected by health ministries and vital statistics bureaus of most national governments. It is possible to collate information from the various published reports of these agencies and governments, but this difficult task has been made easier by the work of international health agencies.

The International Union Against Cancer, for instance, periodically publishes a monograph summarizing cancer mortality statistics worldwide, the most recent edition of which appeared in 1998.<sup>1</sup> The World Health Organization maintains the WHO Databank that consolidates data on mortality from all different causes.

Utilization of the Internet has made these data even more accessible. The CANCER-Mondial web site of the International Agency for Research on Cancer

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This article is also available online at <http://www.ca-journal.org>.

(IARC) ([www-dep.iarc.fr](http://www-dep.iarc.fr)) provides convenient online access to the WHO Cancer Mortality Databank and to incidence data that have been submitted to IARC for various projects. The site has built-in analytic tools that allow researchers to access incidence and mortality data by cancer site, year, and region or nation.

## Comparing Cancer Rates

### AGE

Comparisons of cancer rates across time or region are complicated by several factors, the most important of which is variation in the age structures of different populations. Because risk of cancer is age-dependent, simple or crude incidence or death rates in a country with a large number of older persons will be quite different than rates for countries with small numbers of older persons.

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### *New evidence suggests that breast cancer mortality is currently declining in the United States.*

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To compensate for variations in the age structures of different populations or of changes in age structure across time, epidemiologists and demographers employ a statistical technique called *age-standardization*. An age-standardized rate (ASR) is a summary measure of the cancer rate that a population would have if it had a standard age-structure.

The most frequently used standard for international comparisons is the World Standard Population. This is a hypothetical population of 100,000 grouped according to five-year age intervals: Two-thirds of those in this hypothetical population are younger than age 40 and one-third are older than 40. Using ASRs

allows comparisons of different regions or populations at different points in time as though there were no differences in the underlying age structures.

### GEOGRAPHY, DEMOGRAPHICS, GENETICS

After the effects of age differences are properly taken into account, other important factors that contribute to geographic and temporal variation may emerge. Breast cancer has some genetic bases, expression of which will vary in different racial and ethnic groups. Moreover, breast cancer has generally been associated with affluence; thus, socioeconomic differences among countries will account for some additional variation.

Breast cancer mortality is also affected by patterns of early detection and by the quality of available medical care. Recently expanded use of mammographic screening in some areas may result in increasingly different mortality rates than those reported in regions where screening is less common. Quality of treatment may also have improved in regions with increased screening, contributing to additional declines in mortality.

### POLITICS, ECONOMICS, CULTURE

Other factors that complicate international comparisons of cancer statistics include political, social, and economic changes that alter national boundaries or cause large-scale migrations. For example, the political reorganization of the former Union of Soviet Socialist Republics into many independent states has resulted in the issuance of many national reports rather than a consolidated one, as had previously been the case. The opposite also occurs, as in the case of the unified Germany, where separate national reports are now consolidated. When migration accompanies political and economic change, it often is not possible to know whether changes in cancer rates are the result of truly changing risk in a region or changes in the population.

Timeliness of reporting can also present a problem. When many different agencies are involved, summary reports inevitably will be delayed by the different timetables of the contributors. Finally, differences in standards of reporting and disease classification also must be taken into account. Widespread adoption of the International Classification of Diseases has minimized this problem, however, and for most common diseases, including most cancers, general uniformity in reporting has been achieved.

### **Incidence Versus Mortality**

Population-based registries in many nations, states, and regions around the world monitor cancer incidence. Incidence is defined as the occurrence of new diagnoses of disease. Data from a large number of registries are summarized periodically in a standardized format in the publication, *Cancer Incidence in Five Continents*.<sup>2</sup>

Unfortunately, cancer incidence data are available for less of the world's population than are mortality data. Many countries have no population-based cancer registries and many others have registries for cities, districts, or provinces but not for the entire country. Reporting of cancer incidence data often is voluntary and less complete than legally mandated death certification.

The following brief report focuses on mortality data because they are the most uniformly reported. In general, because of the seriousness of breast cancer as a disease, regions with high incidence rates also experience high mortality.

### **Breast Cancer Mortality**

Since 1993, 56 regional or national entities have reported breast cancer mortality data that have been tabulated in the WHO Databank. Of this number, 26 have reported data for as recently as 1995. Figure 1 shows the most recent age-

standardized female breast cancer death rates per 100,000 population for countries that report 1,000 or more breast cancer deaths annually.

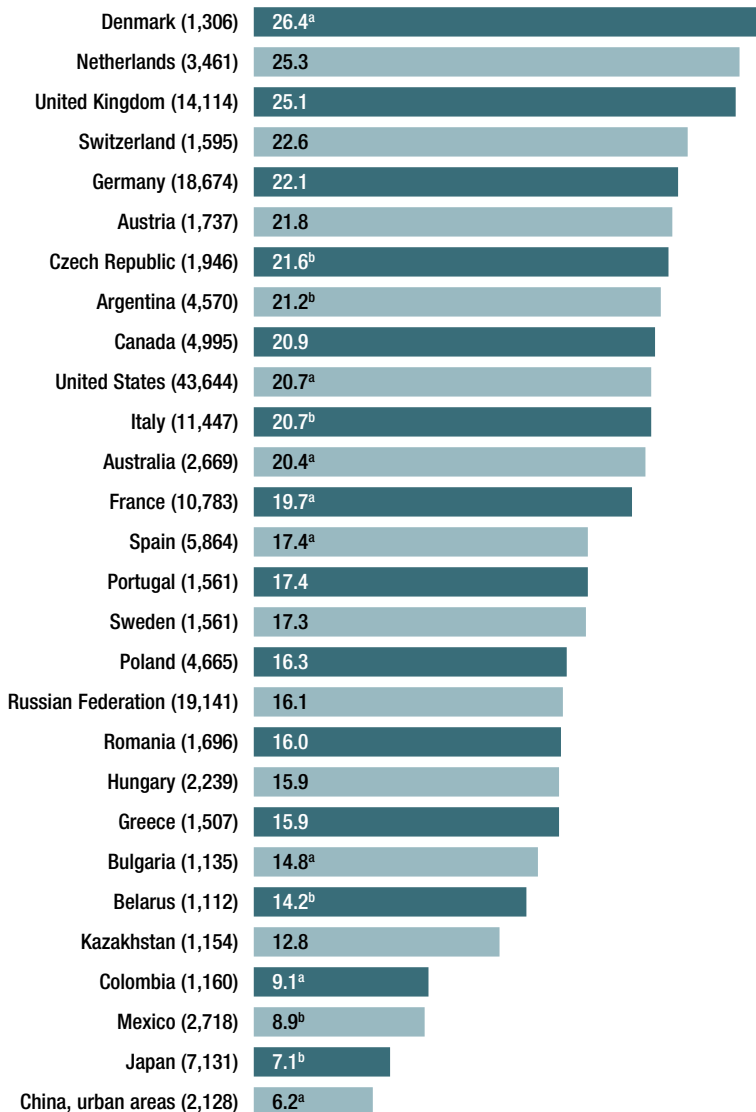
These data illustrate the wide variation in global breast cancer mortality. The rate for the segment of the Chinese population for which data were reported (6.2/100,000), for example, is less than a quarter that of the highest rate, reported for Denmark (26.4/100,000). Although the ASR for the United States (20.7/100,000) is based on the largest number of cases, it is 78% that of the rate in Denmark. There are a total of nine nations with over 1,000 annual breast cancer deaths that have ASRs higher than that for the United States. On the other hand, the breast cancer mortality ASR for the United States is nearly three times that of Japan (7.1/100,000).

#### **WORLDWIDE PATTERNS OFFER ETIOLOGIC CLUES**

The overall pattern of breast cancer mortality reveals high rates for Western, industrialized nations, particularly those of northern Europe and North America, and lower rates for less industrialized and Asian nations. These differences in risk have been attributed to factors thought to be important in the etiology of the disease. For example, nulliparity is a well-established risk factor for breast cancer dating back to the eighteenth century observation that breast cancer occurred with higher frequency among nuns. It is also known that later age at first live birth increases risk. Both nulliparity and older age at first live birth are more prevalent among women in countries with high breast cancer death rates than in those who live in regions with low rates.

Another factor thought to account for international variations in breast cancer mortality is diet. The hypothesis that a diet rich in fat increases risk is judged by many to be consistent with the distribution of death rates. Wynder et al have observed, for example, that the typical diet

**Figure 1**  
**Global Breast Cancer Death Rates**



Age-standardized (world) breast cancer mortality rates per 100,000 women for 1995, 1994<sup>a</sup>, or 1993<sup>b</sup> and number of deaths in areas with more than 1,000 deaths annually. *Source: WHO Databank.*

of people in Japan, who have low breast cancer rates, is 10% to 25% of calories from fat sources, whereas the diet in the United States population—which has higher rates of breast cancer—is 40% to 45% of total calories from fat.<sup>3</sup>

This dietary hypothesis is complicated, however, by the observation that some populations have high dietary fat intake without high breast cancer rates. To explain the discrepancy, researchers have proposed that monosaturated fat sources, such as olive oil, actually are protective and that risk is most specifically associated with polyunsaturated fat.<sup>4</sup> This may be why, they speculate,

These investigators noted that some of the decline is attributable to the lower mortality rates for women born between 1924 and 1938, who are now reaching ages where their breast cancer mortality experience most affects the overall rate. These researchers have hypothesized that the increased fertility rates experienced by these women during the years following World War II reduced their risk of developing breast cancer and, therefore, of dying of breast cancer. These investigators also have observed a more general decline in death rates affecting women diagnosed after 1980. This may be attributable to the effects of earlier diagnosis re-

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Mediterranean countries such as Greece, Italy, and Spain do not have the highest breast cancer mortality rates, in spite of relatively high fat consumption.

It should be noted, however, that the dietary differences between populations may be coincidental with many other differences. The observation of a correlation of risk with diet does not represent proof of a causal association, and recent reviews of the epidemiologic literature have supported different conclusions about the significance of dietary fat as a cause of breast cancer.<sup>5-8</sup>

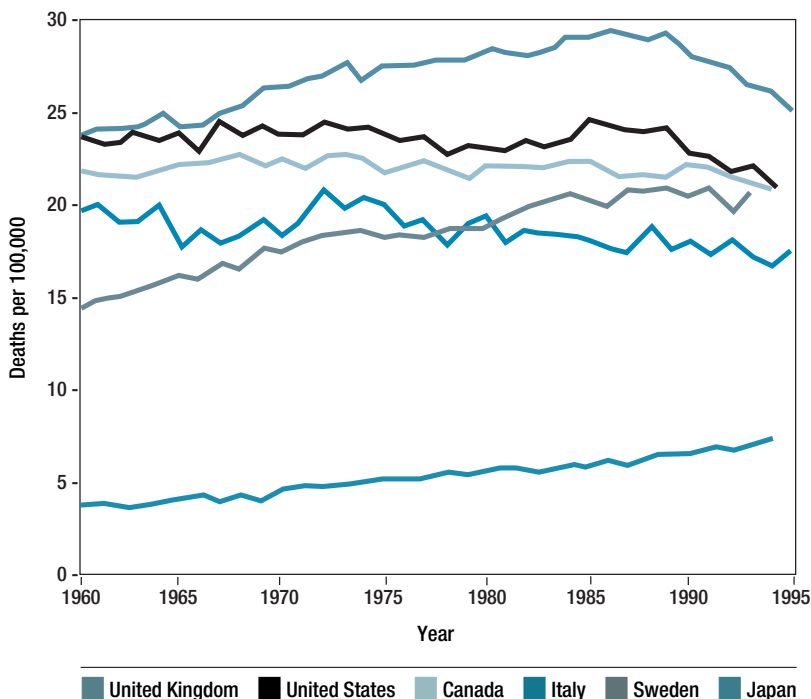
There are now sufficient data to suggest that breast cancer death rates in the United States are declining. The age-adjusted breast cancer mortality rate for white females in the United States dropped 6.8% from 1989 to 1993.<sup>9</sup> Wingo and colleagues have recently updated these data, showing that the decline extends through 1995.<sup>10</sup> Tarone and colleagues have shown that this decline is also evident among Canadian women.<sup>11</sup>

sulting from increased mammographic screening and increased survival resulting from greater use of adjuvant therapies.

Following their observation that breast cancer death rates fell about 10% between 1989 and 1993 in England and Wales, Beral and Hermon studied trends from 1950 to 1992 in 20 countries.<sup>12,13</sup> Although rates rose during the earlier part of that period, they leveled off or began to decline in all but four of the countries studied. These authors observed a birth cohort effect similar to that seen in the United States and Canada, with women born after 1920 having lower breast cancer death rates than women born earlier. This was associated with a reduction in childlessness and a lowering of the age at first birth characteristic of the later cohort.

Moreover, as was observed for the United States and Canada, there was evidence that a decline in breast cancer mortality in Austria, Germany, and the United Kingdom could be due to increased survival associated with earlier

**Figure 2**  
**Comparative Trends in Global Breast Cancer Death Rates**



Trends in age-standardized (world) breast cancer mortality rates per 100,000 women, 1960-1995.

Source: WHO Databank.

detection and improved treatment.

While countries with the highest breast cancer death rates have experienced reductions in recent years, rates in other countries are rising. La Vecchia and colleagues have shown that the favorable trends seen in northern Europe are not evident in Spain, Portugal, Greece, Hungary, Poland, and Italy, where increasing rates have been reported.<sup>14</sup> They suggest that the overall pattern may be one of leveling of risk across Europe as the result of increasingly uniform reproductive, hormonal, and dietary exposures.

Figure 2 shows the patterns of breast cancer mortality since 1960 in several countries where clear trends are evident. These data show the marked declines for the United Kingdom, the United States, Canada, and, to a lesser extent, Sweden. For Italy, the overall trend appears to be one of moderately increasing mortality, while in Japan there is an obvious long-term trend of increasing mortality. This increase in mortality is consistent with the observation that the incidence of breast cancer in Japan increased twofold between 1960 and the 1980s.<sup>15</sup>

## A Global Perspective

When viewed from a global perspective, breast cancer mortality rates reveal interesting features and trends that may not be discerned from national or regional data alone. The several-fold difference in risk between countries in North America and northern Europe compared with Asian regions suggests that environmental factors may be profoundly involved in the etiology of the disease.

The long-term trend of increasing breast cancer mortality has been reversed in several countries, with significant declines in death rates occurring in the 1990s. These reductions may be evidence of the value and impact of screening, early detection, and modern therapeutic strategies. Expansion of the network of cancer registries and reporting systems that make these observations possible can be very helpful for future monitoring of worldwide progress against this disease. **CA**

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