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*Int J Cancer*. Author manuscript; available in PMC 2014 September 17.

Published in final edited form as:
*Int J Cancer*. 2004 April 10; 109(3): 418–424. doi:10.1002/ijc.11719.

# CERVICAL CANCER AS A PRIORITY FOR PREVENTION IN DIFFERENT WORLD REGIONS: AN EVALUATION USING YEARS OF LIFE LOST

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## Abstract

The relative importance of cancer of the cervix among several important causes of mortality (from cancer and other diseases) has been evaluated by estimating the years of life lost (YLL) by young and middle-aged women (25–64 years old) in different regions of the world. The life years were weighted to reflect their importance to the individual and to society. On a global basis, cancer of the cervix is responsible for about 2% of the total (weighted) YLL, fewer than for other causes of mortality in this age group. However, it is the most important cause of YLL in Latin America and the Caribbean. It also makes the largest contribution to YLL from *cancer* in the populous regions of SubSaharan Africa and South-Central Asia where the actual *risk* of loss of life from this cause is higher, although overshadowed by noncancer deaths (from AIDS, TB and maternal conditions). The overall picture is not very sensitive to the age weighting function used. The fact that most of the loss of life is preventable, and that simple technologies have been developed that make this practicable, means that cervical cancer has an even higher profile from the perspective of resource allocation in low income settings.

### Keywords

YLL; cervical neoplasm; disease burden

Cervical cancer is the second most frequent cancer and the fifth most frequent cause of death from cancer among women in the world, with an estimated 471,000 new cases and 233,000 deaths in the year 2000.[1] The relative importance of cervical cancer is even greater for women in developing countries, where more than 80% of cases occur, and where it comprises about 15% of cancers in women, with a lifetime risk of about 2%.[2] In some

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countries of SubSaharan Africa, Latin America and Asia, incidence rates are very high, and the lifetime risk of cervical cancer may be as high as 6–7%.

However, the importance of cervical cancer as a cause of loss of life needs to be considered in relation to other diseases among populations that reside in developing countries in order to appreciate the time and resources that should be expended on control strategies. In this report, we examine years of life lost (YLL) as an indicator of disease burden for cervical cancer and for several other important causes of mortality. The YLL concept was introduced over 50 years ago[3] to refine the traditional mortality rates by providing a weighting for deaths at different ages. These methods became more widely used in the late 1970s in health services planning. There are many variations in the calculations used, depending upon the weights used (the value of years of life at different ages),[4–6] the "normal" lifespan against which to compare premature death (fixed upper limit or life table expectations of life),[3,7–10] and the "discount rate" to apply to life-years (taking into consideration the life-years that would have been lived in the future). Discounting gives decreasing weights to the life-years saved over calendar time, admitting that life-years in the future are valued less highly than at present.[11,12] The weighting of life at different ages has appealed particularly to economists, who are, implicitly at least, interested in economic productivity of individuals, which varies of course by age. Nevertheless, it might also be argued that social roles, including ages of raising children, should be taken into account when age-weighting.[13] In this article, we focus upon women in the age range of 25–64 years because they represent the years of adult life when women bear major family and economic responsibilities[14] and for practical considerations of deficiencies in the availability and validity of mortality data in the elderly. For comparative purposes, we chose 3 other cancers: breast cancer (a major cancer of women worldwide and in developing countries), stomach cancer (third in importance in women, in terms of both incidence and mortality) and lung cancer (the most common cancer worldwide among both sexes combined and the second most common cause of death from cancer among women in developing countries).[15] We also examined 3 other important causes of mortality among women in developing countries: tuberculosis, which is estimated to be the second most important cause of death worldwide in women aged 15–59[16] and a major priority for preventive intervention by the World Health Organization,[17] maternal conditions, estimated to be the leading cause of death in women aged 15–44 worldwide,[16] and AIDS, which is currently responsible for some 3 million deaths worldwide, with over 95% of the total estimated to occur in developing countries.[18]

## MATERIAL AND METHODS

### Regions and countries

The world population was divided into 13 regions that correspond to the classification used by the United Nations in preparing population estimates and projections.[19] Seven areas are included in the "developing world" (SubSaharan Africa, Latin America and the Caribbean, Eastern Asia/China, Eastern Asia/Other, South Eastern Asia, South Central Asia and the Middle East/North Africa), and 6 are in the developed world (North America, Eastern Asia/Japan, North/Western Europe, Southern Europe, Eastern Europe and Australia/New Zealand). The various regions and population sizes are shown in Figure 1. Numbers of

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deaths, YLL and rates of mortality and YLL were calculated for these regions and for individual countries within 6 of these regions (Fig. 1): Zimbabwe, Peru, United States, India, Romania and Denmark (in addition to the region-defining countries of China and Japan). The estimation of YLL in these countries is included, in addition to the world areas, since they reflect a wide spectrum of development and have quite diverse patterns of adult mortality.

### Mortality data

The data used were age-specific (5-year interval) mortality rates, for women aged 25–64 years, for cancers of the cervix (ICD-10 C53), breast (C50), stomach (C16) and lung (C 33 and 34), as well as for tuberculosis (A15-19 and B90), AIDS (B20-24) and maternal conditions (O00–O99).[20] The rates used were either data for the most recently available year or estimates for the year 2000. For some of the countries, and causes of death, recent data on age-specific mortality rates were available from the WHO Mortality Database.[21]. From this source, mortality rates for tuberculosis, maternal conditions and AIDS were available but only for 10-year age groups.

For cancer mortality in the regions, as well as in the individual countries, the GLOBOCAN 2000 estimates were used.[15] The rates are provided only for broad age groups (0–14, 15–44, 45–54, 55–64 and 65+), and hence, for each population and cancer site, Poisson regression models were fitted to the 4 midpoints of the age-specific curve, enabling estimation of the 5-year age-specific rates by interpolation. Three models were examined: the simple log-linear model with age as a covariate and 2 further models allowing for curvature in the relationship of mortality with age (*e.g.*, age+age$^2$ and age+age$^2$+age$^3$ models). The most parsimonious model that fitted the data was chosen and used to derive the age-specific mortality.

For non-cancer mortality (TB and maternal conditions), estimates of regional age-specific mortality rates by world region were obtained from country-specific rates from the WHO Mortality Database[21] applied to their corresponding region or from the Global Burden of Disease (GBD) study.[22] The rates from the GBD study were available for age groups 0 – 4, 5–14, 15–44, 45–59 and 60+. As with the cancer rates, the 5-year age-specific rates of these diseases were obtained from the best fitting log-linear model of mortality adjusted for age.

For AIDS, the UNAIDS Epidemic Update[23] provides estimates of numbers of deaths among women aged 15–49 years in 1999. Their distribution by age was estimated using data on AIDS mortality for countries with available AIDS-related mortality in the WHO Mortality Database and finding the best fitting curve that described mortality as a function of age, as described above, or by modeling distributions from countries with known distributions based on comparable transmission mode trends. Age-specific rates at 5-year intervals were obtained for the age range 15–49 years; in addition, the models were extrapolated to obtain estimates of the 5-year age-specific mortality rate in the age range 50 – 64 years.

Given the estimated 5-year age-specific mortality rates for the 7 diseases, the numbers of deaths, by cause, sex and age group, were estimated for the 13 regions and 6 countries using the UN population estimates for 2000.[19]

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### Years of life lost

Age at death (in years) was taken as the midpoint of the 5-year category in which it occurred. To calculate YLL, we took the expected life span at the age of death from a single standard life table. This was the Coale and Demeny West Level 26[24] life table, which has an expectation of life at birth of 82.5 years.

The calculation for a single death is made according to the following formula:

$$\mathrm{YLL}=\frac{\mathrm{KC}e^{\mathrm{ra}}}{(\mathrm{r}+\beta)^2}[e^{-(\mathrm{r}+\beta)(\mathrm{L}+\mathrm{a})}[-(\mathrm{r}+\beta)(\mathrm{L}+\mathrm{a})-1]-e^{-(\mathrm{r}+\beta)\mathrm{a}}[-(\mathrm{r}+\beta)\mathrm{a}-1]]+\frac{1-\mathrm{K}}{\mathrm{r}}(1-e^{-\mathrm{rL}}),$$

where a is the age at death, L is the standard life expectancy at age a, r is the discount rate, and K, β and C are associated with the age-weighting function.[25] As recommended by Murray *et al.*, a discount rate of 0.03 is used.[14] K is the age-weighting modulation factor, whereby effects of the nonuniform age-weights may remain or be removed from the calculation by giving K a value ranging from 1 to 0, respectively; β controls the age at which the maximum value occurs; C is a constant that helps determine the value of the maximum point.

Two age-weighting functions were used. That employed by Murray *et al.*[14,25] has a β of 0.04 and C of 0.1658, which gives a peak-relative weight of 1.52 at 25 years of age (Fig. 2). We used a second function, with a β of 0.033 and C of 0.1368, which gives approximately the same peak-relative weight about 5 years later at age 30. Figure 2 shows a contrast of the 2 age-weighting functions.

Results are expressed as absolute numbers of deaths and (weighted) YLL by cause and region/country and the percentage that each individual cause contributes to the total deaths or YLL in the population. To permit comparisons between regions/countries with very different population size, the rate of YLL per 1,000 women aged 25–64 years was calculated. Finally, to isolate the effects of differences in age-specific mortality (rather than differences in the age composition of the different populations), age-standardized rates of YLL were calculated,[9] using the age weights of the world standard population.[26]

## RESULTS

Table I shows the estimated number of deaths by cause and the percentage that each disease contributes to total mortality. Of the 7.1 million deaths from all causes among women aged 25–64 years in the world in 2000, some 6.1 million (86%) were in the developing world. AIDS was the major cause of death in women in this age range worldwide (12.4% deaths) and in developing countries (14.2%). The most important cause of death in developed countries was breast cancer (8.4% of all deaths). Cancer of the cervix is responsible for around 2.1% of deaths worldwide, and the percentage is similar in developing (2.2%) and developed countries (1.9%).

When looked at in terms of weighted years of life lost (Table II), cervical cancer contributes over 2.7 million YLL among women between the ages of 25 and 64 worldwide, some 2.4

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million of which occur in developing areas and only 0.3 million in the developed countries. These represent around 2% of the YLL from all causes of disease. Only in Latin America and the Caribbean (LAC) is cervical cancer the leading component of YLL among the 7 conditions studied. However, it is the leading cause of *cancer*-related YLL in 3 regions: South Central Asia (SCA), Latin America/Caribbean (LAC) and SubSaharan Africa (SSA); in most other regions, cancer of the breast is the leading cause of cancer-related YLL (China is the exception; lung and stomach cancer are the larger contributors to YLL than either breast or cervical cancer).

In comparison with other diseases in Table II, cervical cancer is ranked fifth in total YLL worldwide among the studied conditions, following AIDS, maternal conditions, tuberculosis and breast cancer. The major contributor to YLL from AIDS is SubSaharan Africa; cancer of the cervix is a more important cause of YLL than AIDS in Latin America/Caribbean, China, Japan, other Eastern Asia, European countries and Australia/New Zealand. The contribution to the total YLL from maternal conditions are highest in South Central Asia (13.2%) and SubSaharan Africa (8.5%), while the largest contribution to YLL from tuberculosis is in South Central Asia (10.6%).

The results are summarized in Figure 3, which contrasts the cause-specific total years of life lost in developing countries and developed countries. The YLL due to cervical cancer is higher than that of AIDS, maternal conditions, TB and stomach cancer in developed countries. The number of YLL from cervical cancer is similar to that from breast cancer in developing countries, and higher than the YLL from lung and stomach cancer.

The actual number of deaths or YLL, or percentages of the total, are a useful method of evaluating the relative importance of different diseases within a single population but are not appropriate as a method of comparing between populations because of their different sizes and age distributions. For this purpose, rates (of mortality, YLL) per 1,000 persons are required, and, if age structure differences are to be eliminated as a reason for the variation, age-standardized rates are necessary. Table III compares the numbers of YLL due to cervical cancer (and as a percentage of the total YLL from all diseases), with the crude and age-adjusted rate (per 1,000) of YLL. The rates of YLL clearly show that the risk of losing years of life from cervical cancer is higher in developing than developed countries; the age-standardized rate is more than 2.5 times greater, while the percentage of total YLL due to cervix cancer (2%) is similar. The highest risk is observed in SubSaharan Africa, South Central Asia and Latin America/Caribbean, with age-standardized rates of 3.95 and 4.10 and 3.21 years of life lost per 1,000 women, respectively.

The modified age-weighting function places greater weight on life-years at older ages. The YLL from all conditions studied is higher, but the effect is greater for conditions in which death occurs at relatively older ages than for causes of death that are more common in younger women. Thus, the total YLL for maternal conditions increased by 16% (from 9.41 million to 11 million) and from AIDS by 18% (from 22.8 million to 26.8), while YLL from the 4 cancers increased by 27.3% (from 9.2 million to 11.7) (Table IV). The overall effect on the percentage contribution of the 7 conditions to the total YLL, however, is rather small.

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## DISCUSSION

Calculation of YLL for many different diseases requires detailed schedules of disease, age and sex-specific mortality. These are simply not available for many diseases, or countries of the world, and we used a variety of estimation procedures in consequence. AIDS-related mortality is rarely reported in relation to age,[27] so we were obliged to interpolate age-specific numbers of deaths in high-risk populations (Africa and Southeast Asia) from observed distributions in certain developed countries based on predominant transmission modes. Estimation of age-specific mortality rates by cause in developing country populations may require a variety of bold assumptions, for example, in the GBD exercise.[25] Data on cancer, thanks to the availability of a worldwide network of cancer registries, are more available and of better quality than for other diseases, but, even so, a lot of uncertainty applies to the precise numbers.

We used the same life tables to calculate expected duration of life at a given age rather than country or region-specific life tables. This has intuitive appeal on the grounds of equity (observed life expectancy is a function of existing inequalities of disease experience), while the focus in this article is a comparison of the potential benefits of prevention or avoidance of a variety of conditions. Using the same life table for all countries and regions is preferred over using country/region-specific life tables because the former does not place varying values on lives from different countries/regions. For example, the death of a 40-year-old woman from the United States would be given more value than the death of a 40-year-old woman from Zimbabwe if country-specific life tables were used since women from the United States have a longer life expectancy than women from Zimbabwe.[14] Life table expectation of life has the advantage over the fixed upper limit (65, 70, 75 *etc*.) in recognizing the reality that healthy (and productive) years of life are attainable even at advanced age, which the fixed upper limit does not take into account.[9,10] Nevertheless, it can be argued that quality of life, however this might be measured, declines with age, and this is the rationale, even if it is not baldly stated as such, behind the weighting of life years, giving them a lower value as age advances.[5,28]

We used the age-weights chosen by Murray *et al*.[25] in the primary analyses for comparability. When comparing our YLL results to those of the Global Burden of Disease study, we found our estimates to correspond fairly well, with the exception of AIDS. The AIDS estimates in the GBD study were much lower than our estimates, especially for developing areas. Our estimate for AIDS in SubSaharan Africa among women aged 25–64 years was 16 times greater than that of the GBD estimate for a comparable age group in the same area.[14] The large difference between the GBD estimate and our estimate for AIDS in SubSaharan Africa may be attributed to the different modeling techniques used between the 2 studies. For this region, the GBD study was based mainly on mathematical models,[25] whereas our study was more based on empirical models, such as determining the distribution of deaths based on models from countries with comparable transmission mode trends.

Modification of the age-weighting function makes little difference to comparisons between countries (or regions) for a given disease. However, when comparing between diseases within a country (or region), the choice of age-weighting may be more important. The

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appropriate weights are dependent on social, cultural and economic circumstances, and quite likely differ between countries or societies. Although there has been disagreement over the relative evaluation of various ages, many studies have been in general agreement that prevention of death among young adults is more important than among very young children, and prevention of death in very young children is more important than much older adults.[4,5,28]

Age weighting and discounting may seem to be given rather arbitrary values. They, however, were added to reflect social and economic views. Discounting is commonly used in economics to reflect the preference of current benefits to future benefits of the same magnitude. In terms of disease burden, one way of looking at this concept is that it prevents focusing funds on eradication programs (which might eventually prevent more deaths) at the expense of addressing the needs of current populations.[14] In terms of prevention and treatments, those that decrease burden and death in the middle-age groups, the group with the highest weight value, will have the greatest benefit. Additionally, those that focus on decreasing burden immediately will be given greater value.

Despite some limitations, we believe that the overall picture revealed by our calculations is a realistic one. Although the years of life lost from tuberculosis, maternal conditions and AIDS overshadow the YLL from cervical cancer in most developing areas, the sheer magnitude of the burden of cervical cancer is alarming. It is responsible for more than 150,000 deaths and 2.3 million (weighted) YLL worldwide and is the biggest single cause of YLL from cancer in the developing world. Furthermore, for several regions, in Latin America and the Caribbean and Eastern Europe, cancer of the cervix makes a greater contribution to lost years of life than diseases such as tuberculosis, maternal conditions or AIDS.

The YLL measure also highlights the disproportionate burden of cervical cancer in developing countries in comparison to developed ones. In terms of number of new cases, the ratio between developing and developed countries is 4.8:1 (306,000:64,000),[15] while the ratio of YLL is greater than 7:1.

Before the introduction of intensive screening programs in the countries of Europe and North America, the mortality rates from cervical cancer were quite high and comparable to those seen in developing countries today. It is accepted that organized screening with cervical cytology (the Pap smear) was responsible for the improvements.[29] In addition to cytology, other screening methods designed specifically for low-resource settings are available, including visual inspection with acetic acid (VIA)[30,31] and treatment with cryotherapy. These approaches offer the possibility of lowering the rates of YLL in developing countries down to levels equivalent to those of developed countries,[32] and the opportunity to implement effective prevention, an opportunity that does not necessarily exist to the same extent for other diseases of comparable burden, should not be missed.

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## Acknowledgments

Grant sponsor: IARC special training award supported by the Bill & Melinda Gates Foundation through the Alliance for Cervical Cancer Prevention; Grant sponsor: National Cancer Institute, NIH, Department of Health and Human Services; Grant number: CA09142

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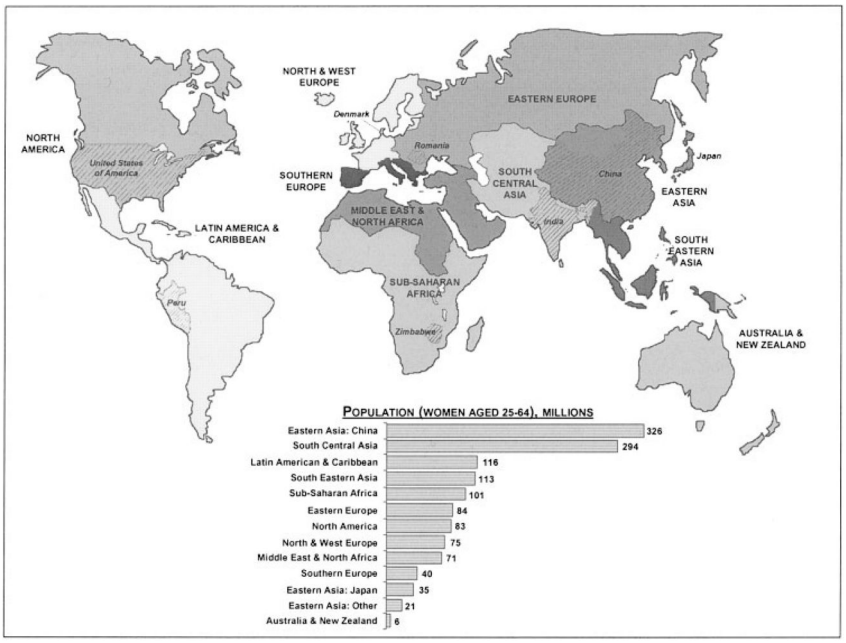


**Figure 1.**

Map showing the 13 world areas studied and the population sizes of women aged 25–64 years in 2000.

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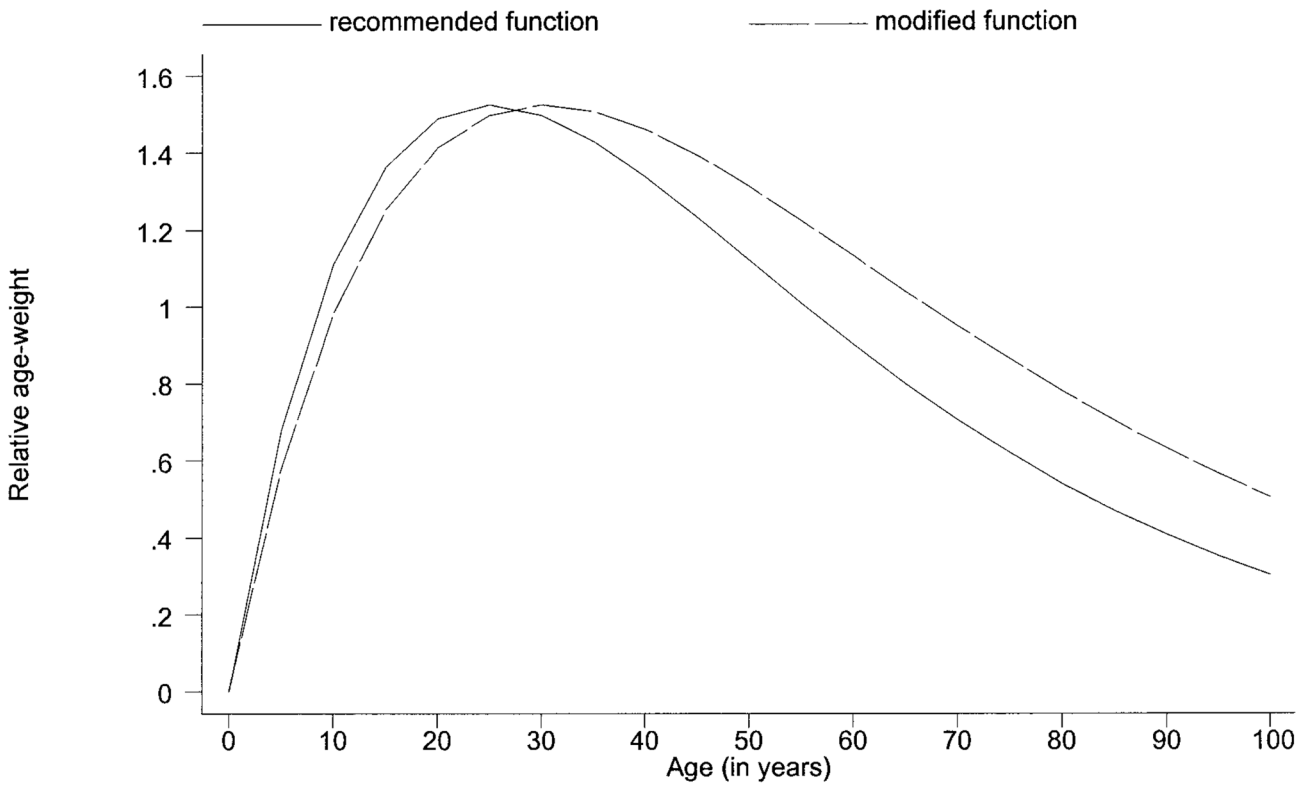


**Figure 2.**
The recommended and modified age-weighting functions.

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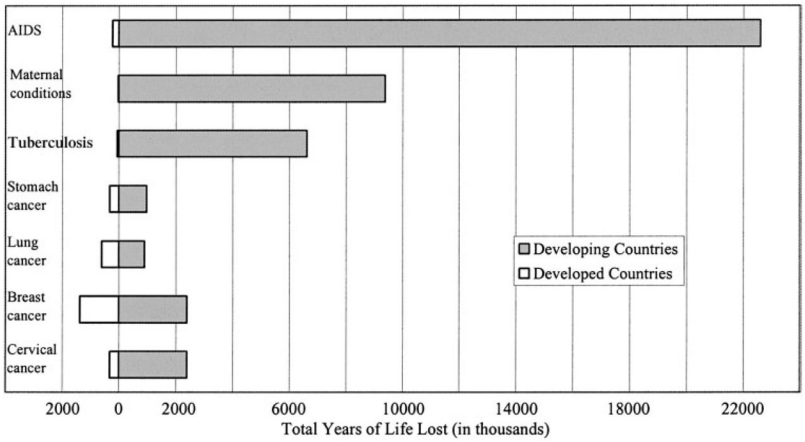


**Figure 3.**

Cause-specific total years of life lost among women aged 25–64 years for developing and developed countries, in 2000.

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**TABLE I**

NUMBER OF DEATHS BY CAUSE (THOUSANDS) AND PERCENTAGE OF TOTAL DEATHS AMONG WOMEN AGED 25–64 YEARS, IN THE YEAR 2000

| Region/country | Cervical cancer | Breast cancer | Lung cancer | Stomach cancer | Tuberculosis | Maternal conditions | AIDS | All causes |
|---|---|---|---|---|---|---|---|---|
| SubSaharan Africa | 19.0 (1.1%) | 12.1 (0.7%) | 1.3 (0.1%) | 5.2 (0.3%) | 62.0 (3.7%) | 128.4 (7.8%) | 688.0 (41.6%) | 1653.6 |
| Zimbabwe | 0.5 (0.9%) | 0.2 (0.3%) | 0.0 (0.1%) | 0.1 (0.2%) | 1.2 (2.2%) | 2.7 (5.0%) | 14.2 (26.6%) | 53.5 |
| Latin American/Caribbean | 18.5 (3.8%) | 17.1 (3.5%) | 5.7 (1.2%) | 6.2 (1.3%) | 1.2 (0.3%) | 3.3 (0.7%) | 11.5 (2.4%) | 484.4 |
| Peru | 0.9 (3.9%) | 0.6 (2.7%) | 0.2 (0.7%) | 0.5 (2.2%) | 0.1 (0.2%) | 0.2 (0.7%) | 0.7 (2.9%) | 23.6 |
| North America | 3.7 (1.7%) | 20.2 (9.3%) | 17.6 (8.1%) | 1.3 (0.6%) | 0.1 (0.0%) | 0.3 (0.1%) | 5.2 (2.4%) | 216.4 |
| United States | 3.4 (1.7%) | 18.1 (9.0%) | 15.7 (7.8%) | 1.1 (0.6%) | 0.1 (0.0%) | 0.3 (0.1%) | 4.6 (2.3%) | 200.5 |
| Eastern Asia: China | 12.3 (1.1%) | 20.2 (1.8%) | 30.7 (2.7%) | 28.6 (2.5%) | 57.8 (5.1%) | 19.6 (1.7%) | 4.3 (0.4%) | 1131.3 |
| Eastern Asia: Japan | 1.1 (1.7%) | 5.2 (7.8%) | 3.1 (4.6%) | 5.0 (7.5%) | 0.1 (0.2%) | 0.1 (0.1%) | 0.0 (0.0%) | 66.1 |
| Eastern Asia: Other | 0.8 (1.1%) | 1.3 (1.7%) | 1.3 (1.7%) | 2.9 (4.0%) | 0.7 (0.9%) | 0.1 (0.2%) | 0.0 (0.0%) | 74.0 |
| South Eastern Asia | 16.0 (2.6%) | 20.8 (3.4%) | 8.0 (1.3%) | 3.9 (0.6%) | 2.4 (0.4%) | 0.9 (0.1%) | 90.4 (14.7%) | 616.9 |
| South Central Asia | 61.8 (3.3%) | 45.6 (2.5%) | 5.8 (0.3%) | 8.7 (0.5%) | 177.9 (9.6%) | 160.2 (8.6%) | 62.0 (3.3%) | 1857.8 |
| India | 53.2 (4.1%) | 30.0 (2.3%) | 3.6 (0.3%) | 6.0 (0.5%) | 126.6 (9.9%) | 109.9 (8.6%) | 43.0 (3.3%) | 1284.6 |
| Middle East/Northern Africa | 4.9 (1.5%) | 11.8 (3.6%) | 2.1 (0.6%) | 2.3 (0.7%) | 17.8 (5.4%) | 31.4 (9.6%) | 14.1 (4.3%) | 327.7 |
| Eastern Europe | 7.8 (1.8%) | 22.6 (5.3%) | 7.3 (1.7%) | 10.0 (2.4%) | 2.8 (0.6%) | 0.4 (0.1%) | 2.0 (0.5%) | 423.9 |
| Romania | 1.0 (4.0%) | 1.4 (5.5%) | 0.5 (2.0%) | 0.4 (1.5%) | 0.2 (0.9%) | 0.1 (0.3%) | 0.0 (0.1%) | 25.9 |
| Southern Europe | 1.8 (2.0%) | 10.0 (11.3%) | 2.6 (2.9%) | 1.9 (2.1%) | 0.1 (0.1%) | 0.1 (0.1%) | 0.7 (0.8%) | 88.5 |
| North/Western Europe | 3.7 (2.2%) | 22.7 (13.2%) | 8.7 (5.1%) | 2.5 (1.5%) | 0.1 (0.1%) | 0.1 (0.1%) | 1.7 (1.0%) | 171.8 |
| Denmark | 0.1 (1.6%) | 0.5 (11.4%) | 0.4 (9.3%) | 0.0 (0.8%) | 0.0 (0.0%) | 0.0 (0.1%) | 0.0 (0.5%) | 4.7 |
| Australia/New Zealand | 0.2 (1.8%) | 1.6 (13.8%) | 0.7 (5.9%) | 0.1 (1.0%) | 0.0 (0.0%) | 0.0 (0.2%) | 0.0 (0.1%) | 11.7 |
| Developed countries | 18.3 (1.9%) | 82.2 (8.4%) | 40.0 (4.1%) | 20.8 (2.1%) | 3.1 (0.3%) | 1.1 (0.1%) | 9.6 (1.0%) | 978.3 |
| Developing countries | 133.3 (2.2%) | 128.8 (2.1%) | 54.9 (0.9%) | 57.9 (0.9%) | 319.7 (5.2%) | 343.9 (5.6%) | 870.3 (14.2%) | 6145.7 |
| All areas | 151.6 (2.1%) | 211.1 (3.0%) | 94.9 (1.3%) | 78.7 (1.1%) | 322.8 (4.5%) | 345.0 (4.8%) | 879.9 (12.4%) | 7124.0 |

*Int J Cancer*. Author manuscript; available in PMC 2014 September 17.

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**TABLE II**

TOTAL YEARS OF LIFE LOST (THOUSANDS) AND PERCENTAGE OF ALL CAUSES AMONG WOMEN AGED 25–64 USING THE RECOMMENDED AGE-WEIGHTING FUNCTION, IN 2000

| Region/country | Cervical cancer | Breast cancer | Lung cancer | Stomach cancer | Tuberculosis | Maternal conditions | AIDS | All causes |
|---|---|---|---|---|---|---|---|---|
| SubSaharan Africa | 337.8 (0.9%) | 222.2 (0.6%) | 22.3 (0.1%) | 89.4 (0.2%) | 1407.7 (3.7%) | 3275.7 (8.5%) | 17,900.0 (46.5%) | 38,500.0 |
| Zimbabwe | 8.5 (0.6%) | 3.2 (0.2%) | 0.8 (0.1%) | 1.4 (0.1%) | 28.3 (2.1%) | 68.6 (5.2%) | 374.7 (28.1%) | 1,332.3 |
| Latin American/Caribbean | 341.0 (3.9%) | 304.1 (3.5%) | 92.8 (1.1%) | 103.7 (1.2%) | 24.9 (0.3%) | 91.3 (1.0%) | 293.5 (3.3%) | 8,774.8 |
| Peru | 16.1 (3.6%) | 11.8 (2.6%) | 2.5 (0.6%) | 8.9 (2.0%) | 1.2 (0.3%) | 4.4 (1.0%) | 17.6 (3.9%) | 449.3 |
| North America | 68.1 (1.9%) | 343.5 (9.6%) | 265.7 (7.4%) | 20.9 (0.6%) | 1.3 (0.0%) | 8.3 (0.2%) | 114.9 (3.2%) | 3,580.2 |
| United States | 62.6 (1.9%) | 308.0 (9.3%) | 236.0 (7.1%) | 18.2 (0.5%) | 1.1 (0.0%) | 7.4 (0.2%) | 102.8 (3.1%) | 3,323.7 |
| Eastern Asia: China | 216.3 (1.1%) | 367.5 (1.8%) | 490.5 (2.4%) | 462.6 (2.3%) | 1,077.3 (5.3%) | 571.7 (2.8%) | 115.1 (0.6%) | 20,200.0 |
| Eastern Asia: Japan | 18.6 (1.8%) | 85.0 (8.3%) | 45.2 (4.4%) | 79.6 (7.7%) | 1.6 (0.2%) | 2.3 (0.2%) | 0.1 (0.0%) | 1,028.7 |
| Eastern Asia: Other | 14.3 (1.1%) | 24.1 (1.9%) | 20.3 (1.6%) | 51.2 (4.0%) | 13.8 (1.1%) | 4.0 (0.3%) | 0.2 (0.0%) | 1,292.7 |
| South Eastern Asia | 294.1 (2.5%) | 392.8 (3.4%) | 133.5 (1.1%) | 67.5 (0.6%) | 42.9 (0.4%) | 24.2 (0.2%) | 2321.7 (19.8%) | 11,700.0 |
| South Central Asia | 1,089.5 (3.1%) | 845.1 (2.4%) | 97.5 (0.3%) | 146.9 (0.4%) | 3,682.9 (10.6%) | 4,616.9 (13.2%) | 1614.3 (4.6%) | 34,900.0 |
| India | 936.3 (3.9%) | 547.8 (2.3%) | 58.5 (0.2%) | 99.9 (0.4%) | 2,595.5 (10.9%) | 3162.8 (13.2%) | 1115.3 (4.7%) | 23,900.0 |
| Middle East/Northern Africa | 86.0 (1.4%) | 221.7 (3.7%) | 35.0 (0.6%) | 40.6 (0.7%) | 362.7 (6.0%) | 798.2 (13.2%) | 364.3 (6.0%) | 6,053.3 |
| Eastern Europe | 139.9 (2.1%) | 381.5 (5.6%) | 113.2 (1.7%) | 158.6 (2.3%) | 56.0 (0.8%) | 11.3 (0.2%) | 49.4 (0.7%) | 6,776.3 |
| Romania | 19.2 (4.7%) | 24.0 (5.9%) | 8.2 (2.0%) | 5.9 (1.4%) | 4.6 (1.1%) | 2.2 (0.5%) | 0.7 (0.2%) | 408.5 |
| Southern Europe | 32.4 (2.3%) | 164.4 (11.7%) | 40.5 (2.9%) | 29.2 (2.1%) | 1.1 (0.1%) | 2.4 (0.2%) | 17.8 (1.3%) | 1,409.7 |
| North/Western Europe | 66.9 (2.4%) | 372.9 (13.6%) | 131.6 (4.8%) | 38.4 (1.4%) | 2.0 (0.1%) | 4.2 (0.2%) | 41.3 (1.5%) | 2,735.0 |
| Denmark | 1.4 (1.9%) | 8.5 (11.8%) | 6.4 (8.9%) | 0.6 (0.8%) | 0.0 (0.1%) | 0.1 (0.1%) | 0.6 (0.9%) | 71.9 |
| Australia/New Zealand | 3.7 (1.9%) | 27.8 (14.3%) | 10.4 (5.3%) | 1.9 (1.0%) | 0.1 (0.0%) | 0.6 (0.3%) | 0.3 (0.1%) | 194.0 |
| Developed countries | 329.6 (2.1%) | 1,374.9 (8.8%) | 606.5 (3.9%) | 328.7 (2.1%) | 62.0 (0.4%) | 29.1 (0.2%) | 223.7 (1.4%) | 15,700.0 |
| Developing countries | 2,379.0 (2.0%) | 2,377.6 (1.9%) | 891.7 (0.7%) | 962.0 (0.8%) | 6,612.3 (5.4%) | 9,381.9 (7.7%) | 22,600.0 (18.5%) | 122,000.0 |
| All areas | 2,708.6 (2.0%) | 3,752.5 (2.7%) | 1,498.3 (1.1%) | 1,290.7 (0.9%) | 6,674.3 (4.9%) | 9,411.0 (6.9%) | 22,800.0 (16.6%) | 137,000.0 |

*Int J Cancer*. Author manuscript; available in PMC 2014 September 17.

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## TABLE III

YEARS OF LIFE LOST (WEIGHTED) FROM CANCER OF THE CERVIX IN WOMEN AGED 25–64, IN 2000[1]

| Region/country | Number | % | Crude rate (per 1,000) | Age-standardized rate (per 1,000) |
|---|---|---|---|---|
| SubSaharan Africa | 377.8 | 0.9 | 3.33 | 3.95 |
| Zimbabwe | 8.5 | 0.6 | 4.25 | 5.75 |
| Latin America/Caribbean | 341.0 | 3.9 | 2.95 | 3.21 |
| Peru | 16.1 | 3.6 | 2.95 | 3.39 |
| North America | 68.1 | 1.9 | 0.83 | 0.80 |
| United States | 62.6 | 1.9 | 0.85 | 0.82 |
| Eastern Asia: China | 216.3 | 1.1 | 0.66 | 0.74 |
| Eastern Asia: Japan | 18.6 | 1.8 | 0.53 | 0.50 |
| Eastern Asia: Other | 14.3 | 1.1 | 0.73 | 0.79 |
| South Eastern Asia | 294.1 | 2.5 | 2.55 | 2.86 |
| South Central Asia | 1,085.5 | 3.1 | 3.66 | 4.10 |
| India | 936.3 | 3.9 | 4.47 | 4.91 |
| Middle East/Northern Africa | 86.0 | 1.4 | 1.22 | 1.40 |
| Eastern Europe | 139.9 | 2.1 | 1.65 | 1.58 |
| Romania | 19.2 | 4.7 | 3.20 | 3.16 |
| Southern Europe | 32.4 | 2.3 | 0.82 | 0.80 |
| North/Western Europe | 66.9 | 2.4 | 0.89 | 0.85 |
| Denmark | 1.4 | 1.9 | 0.94 | 0.89 |
| Australia/New Zealand | 3.7 | 1.9 | 0.61 | 0.60 |
| Developed countries | 329.6 | 2.1 | 1.02 | 0.98 |
| Developing countries | 2,379.0 | 2.0 | 2.27 | 2.54 |
| All areas | 2,708.6 | 2.0 | 1.98 | 2.10 |

[1]Numbers (thousands) and percent of total, and rates per 1,000 (crude and age-standardized).

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**TABLE IV**

ESTIMATED WEIGHTED YEARS OF LIFE LOST (THOUSANDS) BY CAUSE AND PERCENTAGE OF ALL YLL FOR DEATHS AT AGE 25–64, WITH 2 WEIGHTING FUNCTIONS: WORLD, 2000

| Disease | Age-weighting function | |
|---|---|---|
| | Recommended | Modified |
| Cervical cancer | 2,708 (2.0) | 3,409 (2.0) |
| Breast cancer | 3,753 (2.7) | 4,726 (2.8) |
| Lung cancer | 1,498 (1.1) | 1,924 (1.1) |
| Stomach cancer | 1,291 (0.9) | 1,645 (1.0) |
| Tuberculosis | 6,674 (4.9) | 8,152 (4.8) |
| Maternal conditions | 9,411 (6.9) | 11,000 (6.5) |
| AIDS | 22,800 (16.6) | 26,800 (15.9) |
| All causes | 137,000 (100) | 169,000 (100) |