Trends in Cervical Cancer Mortality in South Africa

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Background. Cervical cancer is an important cause of death throughout the world, especially in less developed countries. Reports of trends in cervical cancer mortality from less developed countries have been limited by poor data quality and inaccurate population estimates. This paper examines trends in cervical cancer mortality in South Africa from 1949 to 1990 and discusses the impact of cytology screening on these trends.

Method. Analysis of national mortality statistics and reconstructed population data.

Results. The age-standardized mortality rates for Whites declined after the mid 1960s, while that for coloureds rose, particularly before the 1970s. These trends were affected predominantly by trends among women in the 35–64 age range.

Conclusion. The pattern of mortality in successive birth cohorts for Whites is consistent with a reduction in age-specific mortality following the advent of cytological screening. The same pattern is not evident in trends for Coloureds, among whom screening has apparently had a minor impact if any at all. The apparent lack of impact of screening in those groups of women most at risk of cervical cancer lends weight to demands for the implementation of equitable and rational screening programmes for cervical cancer in South Africa and internationally.

Keywords: cervical cancer, trends, screening, South Africa, mortality

On a global scale, death from cervical cancer results in a greater number of years of life lost than for any other cancer affecting women.1 Mortality rates for cancer of the cervix are known to vary widely between countries, with age-standardized rates for 1980 ranging from 0.77 per 100 000 in Israel to 14.87 per 100 000 in Chile.2 In South Africa the age-standardized mortality rates for cervical cancer have been estimated to range from 3.6 for metropolitan Whites3 to 30.2 for non-metropolitan Coloureds and 25.7 for metropolitan Blacks (poor data quality precludes the estimation of a rate for non-metropolitan Blacks, among whom the rate may be even higher). It is thus clear that Coloureds and Blacks in South Africa are at especially high risk of dying from cervical cancer.

While trends in developed countries have been declining, little is known of trends in less developed countries.3 A previous study of trends in cervical cancer mortality in South Africa for the period 1949–1979 described diverging trends for Whites and Coloureds. However, this study was limited by a reliance on population data from specific census years, and by the variable accuracy of population data between censuses.5 This paper extends the description of trends in mortality from cervical cancer in South Africa using reconstructed population data,3 and discusses the possible effect of screening and other factors on these trends.

METHOD

Mortality figures were obtained from national records of vital statistics.6–8 Population data have been derived from a report published by the Human Sciences Research Council5 that provided a reconstruction of the census age structure of the Asian, White and Coloured populations for the period 1946–1985. This reconstruction has been extended by applying the 1980 to 1985 rate of growth for each race/sex/age group to the 1985 estimate to obtain estimates for 1986 to 1990. Meaningful examination of mortality trends for Black South
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Africans is not possible owing to deficiencies in mortality data.

The mortality figures and reconstructed population data are used here to estimate mortality trends for the period 1949–1990. The analysis includes: 1) an examination of trends in age-standardized (World standard population) mortality rates for each race group; 2) an examination of trends in age-specific mortality rates within each race group; and 3) an examination of the age-specific mortality rates of birth cohorts for each race group (analyses 2 and 3 above for Asians are not shown as the small numbers render the age-specific rates unstable, precluding meaningful interpretation). Age-specific mortality rates for 10-year birth cohorts were calculated by taking the average mortality rate for the specific age over the 10-year period of death for that cohort. The mortality rate for the 5-year age specific groups was plotted at the lower point of the interval for each age group.

RESULTS

For Whites, there has been a steady decline in the average number of deaths per year since a peak in the late 1960s, while for Coloureds and Asians there has been a steady increase over the period under study (Table 1).

Trends in Age-Standardized Mortality Rates: 1949–1990

There are diverging trends in cervical cancer mortality for Whites and Coloureds, with the overall trend for Coloureds increasing, and that for Whites decreasing (Figure 1). By the 1980s the rate for Coloureds was several times higher than that for Whites. For Whites the rates are relatively constant before declining from the mid to late 1960s. For Coloureds most of the increase occurs before the mid 1960s, with the trend levelling off to some extent after this time. The rates for Asians fall between those for Whites and Coloureds, and fluctuates widely from year to year with a declining trend since the mid 1970s.

Trends in Age-Specific Mortality Rates: 1949–1990

For Whites there is a clear downward trend in the age-specific mortality rates for the 35–49 and 50–64 age groups (Figure 2). The trend is more marked in both age groups for the period after the mid 1960s. For Whites in the 65–79 year age group the trend is constant before tending slightly downwards after the mid 1970s.

![Figure 1](https://academic.oup.com/ije/article-abstract/25/3/488/756982)

**Figure 1** Cancer of the cervix by race group: world age-standardized mortality rates (5-year moving average)

<table>
<thead>
<tr>
<th>Year</th>
<th>Population group</th>
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<tbody>
<tr>
<td></td>
<td>Whites</td>
</tr>
<tr>
<td>1949–1955</td>
<td>97</td>
</tr>
<tr>
<td>1956–1960</td>
<td>112</td>
</tr>
<tr>
<td>1961–1965</td>
<td>127</td>
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<tr>
<td>1966–1970</td>
<td>133</td>
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<td>1971–1975</td>
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<tr>
<td>1976–1980</td>
<td>124</td>
</tr>
<tr>
<td>1986–1990</td>
<td>102</td>
</tr>
</tbody>
</table>
For the 20–34 year age group there is a slight downward trend.

For Coloureds there are slightly rising trends in the age-specific mortality rates for the 35–49 and 50–64 age groups (Figure 3). For the 50–64 year age group the increase occurs largely in the first 10 years of the period of observation. The increase for the 35–49 year age group extends across the full period of observation.

In the 20–34 year age group there is a small peak in the mid 1960s followed by a trough that extends to the mid to late 1970s before returning to levels similar to those in the 1950s. The trend in the 65–79 year age group rises to a peak in the mid 1970s before declining towards the end of the period.

**Age-Specific Mortality Rates for Birth Cohorts**

For Whites, women born between 1911 and 1940 experienced lower age-specific mortality at all ages than
women in the preceding 10-year birth cohorts (Figure 4). Examination of the mortality rates for cohorts on a logarithmic scale shows this pattern of declining age-specific mortality rates for successive birth cohorts to extend to all cohorts examined and down to the age of 30 years.

In the 1931-1940 and 1921-1930 birth cohorts the increasing trend in mortality rates with age levels off after the age of 45 years. This pattern is replicated in the 1911-1920 cohort after the age of 50 and in the 1901-1910 cohort after the age of 60. There is little difference in age-specific mortality between the 1931-1940 cohort and subsequent cohorts for those ages for which data are available.

For Coloureds the age-specific mortality rates for different birth cohorts approximate each other closely, with an early indication that the 1931-1940 and 1941-1950 cohorts may have experienced higher age-specific mortality rates in the 40-50 year age range than preceding cohorts (Figure 5).

**DISCUSSION**

The diverging trends in cervical cancer mortality for Coloureds and Whites evident in a previous report that examined the period 1949-1979 continue over the period of this study. Whites in South Africa appear to be experiencing the decline in mortality rates for cervical cancer that has been seen in many other parts of the world. The increasing rates reported for younger women in some countries (notably in Britain) are not evident in either of the race groups reported here. The increasing rates for Coloureds in South Africa is a result of the increase amongst women over the age of 34 years.

Interpretation of trends in cervical cancer is more difficult than for most other cancers because of the number of different influences acting on incidence and mortality. These influences include changes in sexual behaviour, smoking practices, hysterectomy rates, the changing incidence of associated infective agents, variable quality of denominator data, changing registration practices, changes in stages at presentation, changing case-fatality rates, migration patterns, changes in racial mix, and the effect of screening. The effect of screening may vary for different age groups, depending on the extent of coverage in different groups, and the effect may be obscured to varying degrees by the effects of one or more of the above influences. Furthermore, as has been demonstrated in a number of studies, the incidence of cervical cancer may increase in the short term in association with the introduction of screening as more pre-clinical cases are detected. The cumulative effects of the above influences on incidence and mortality allow only crude associations to be made between the introduction of screening services and trends in incidence and mortality.

Analyses of trends in mortality from cervical cancer in a number of countries throughout the world for the period 1950 to the mid 1980s show mortality rates for cervical cancer have declined for most countries studied. In general, the association between well-organized screening programmes and a substantial decline in mortality, or limitation of an underlying increase, is consistent.

In South Africa cervical cytology laboratories were first established in the mid to late 1950s, and any effect of screening could be expected to be seen after the mid 1960s as cervical cytology screening became more common. Thus, the decline in the age-standardized
mortality rate for Whites and the levelling off of the rates for Coloureds that dates from the mid to late 1960s (Figure 1) may have been influenced by screening.

To the extent that screening in the public sector in South Africa has occurred, it has been conducted largely in obstetric and family planning clinics. Screening in the public sector has therefore focused on younger women, and the effect on mortality trends for women that use public sector services is thus expected to be seen mostly in younger and middle aged women. The levelling off in the rates for Coloureds is unlikely to be an effect of screening on a generally rising trend as the overall trend is largely due to the trends for women of 50 years or more (a group that has had minimal exposure to screening) (Figure 3). However, as some reduced risk persists for 10 years or more following a negative cervical smear screening may be to some extent responsible for the trend in Coloureds.

In the private sector, women (largely Whites) attending private general practitioners and gynaecologists are screened more regularly and continue to be screened until relatively older ages. Private pathology laboratories in Cape Town began screening cervical smears a few years later than laboratories in the public sector, but for the past two to three decades they have been processing at least as many cervical smears as those in the public sector. Furthermore, the private labs have been serving only about one quarter of the population served by the public labs. The decline in the mortality rates for Whites is largely a result of the decline in the rates for women between the ages of 35 and 64 years (Figure 2), and this is consistent with a screening effect.

The age at which the progressive increase in age-specific mortality rates with age for Whites is interrupted for each birth cohort (Figure 4) corresponds approximately with the period 1965-1985. This levelling off in the mortality rates for cohorts, and the declining mortality rates for successive cohorts born after 1901, is therefore also consistent with the effect of the introduction of cervical cytology screening.

The patterns of declining age-specific mortality rates with successive birth cohorts and the interruption of progressively increasing mortality rates with age during the 1965-1985 period is not found for Coloureds (Figure 5). As screening has occurred predominantly in the affluent (largely White) sector of South African society the contrasting patterns between Coloureds and Whites is consistent with screening being an important influence in the mortality trends described for Whites.

Explanations for the above patterns other than screening, such as changes in hysterectomy rates are unlikely to account substantially for the observed 50% decline in the age-standardized mortality rate. Increasing trends in the age-standardized rate for Coloureds is largely due to increasing trends in the older age groups, suggesting that factors other than sexual promiscuity such as the high rates of cigarette smoking among Coloureds and the advent and increased availability of oral contraceptives could be responsible for the rising trend. For the population groups included here, the quality of death registration during the period under study is believed to have been reasonable, and is unlikely to have had a significant influence on the trends.

Cervical cancer mortality rates for Blacks are higher than for other race groups. In addition to the influences referred to above, the disruption of established patterns of sexual relationships occurring as a result of rapid urbanization over the past decade that has predominantly affected Blacks, may have had an impact on risk for cervical cancer. However, the influence of recent rapid urbanization should be seen against a background of more than a century of disruption of normal social patterns for Blacks in South Africa by the migrant labour system. The influence of this system on the occurrence of syphilis was described in a seminal paper in 1949. Strong parallels can be drawn with cervical cancer as it is increasingly regarded as a sexually transmitted disease. The extent to which systems of 'social engineering' such as the migrant labour system has contributed to the high levels of cervical cancer in Blacks in this country may never be known.

The examination of trends in mortality provides circumstantial evidence that screening in South Africa has had an effect on mortality rates for cervical cancer, but that this effect is largely limited to Whites—a group that are least at risk of developing cervical cancer. It is important that South Africa implements a rational screening programme to redress this incongruity.

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REFERENCES