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Original Paper

Cervical Cancer Mortality in Belgium, 1955–1989. A Descriptive Study

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This study describes trends in cervical cancer mortality among women in Belgium from 1954 to 1989. Data are analysed by means of the standardised mortality rate, age- and cohort-specific mortality rates and standardised cohort mortality ratios. The age-standardised mortality rate decreased progressively from 6.3/100 000 women-years in the first period (1955–1959) to 3.8/100 000 in 1985–1989, indicating a decline of 39.7% over the seven quinquennial periods. A decrease was observed in almost all age groups between 30 and 69 years. In the last 15 years, no further decline, but even a discrete increase, occurred for the age categories younger than 50 years. The successive cohorts born between 1915 and 1939 expressed a continuing lower risk of cervical cancer mortality. This trend was not observed for the most recent generations, for whom even a slight increase of the standardised cohort mortality ratio could be distinguished. © **1997 Published by Elsevier Science Ltd.**

Key words: cervical cancer, mortality, trend, Belgium
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INTRODUCTION

ALTHOUGH IT accounts for approximately 4% of all cancer deaths in women, cervical cancer is the fifth most common malignancy in women in the European Community [1], the second most common cancer in women in the world [2–5] and the third most common cancer in women in Belgium (National Register of Cancer, Belgium 1992). Monitoring trends allow potential factors which could influence the occurrence and mortality of cervical cancer to be determined. Generally, these factors can either act for a long period of time so cause differences between generations (such as sexual behaviour, prevalence of smoking, contraceptive use and genital hygiene) or be period-specific, such as the introduction of screening, changes in disease coding, improvement in diagnosis and treatment, etc.

Standardisation of mortality is a useful tool for making data comparable and for obtaining a simple picture of trends. The analysis of distinct age groups, birth cohorts and mortality is necessary for an estimation of future trends. An increase in mortality in younger age groups is especially alarming, because it may predict an increased burden of cervical cancer occurrence in the future as described for England and Wales [6, 7], Scotland [8], New Zealand [9] and Australia [10]. The overall decreasing trend in mortality, typical for most of the developed countries, is not seen in Greece, Spain and Hungary [1–3]. Time trends show that the large overall decline in mortality is observed in countries where well-organised screening programmes are in operation, particularly in Scandinavia, where screening was introduced rapidly and covered substantial areas of the region [2, 11–13]. Nevertheless, because of the lack of randomised controlled trials it is difficult to assess the impact of screening on mortality. In many countries, the decline in mortality preceded screening programmes [11, 14]. In Belgium, attendance to cervical cancer screening, organised by mobile teams, always remained low (<20%) [15] and was therefore abandoned at the beginning of the 1980s. Meanwhile, spontaneous screening by gynaecologists and GPs increased gradually. A recent survey by telephone indicated that approximately 82% of women between 25 and 64 years of age in Flanders (North Belgium) have been screened within the past 3 years [16]. The aim of this study was to examine trends in mortality from cervical cancer in Belgium between 1955 and 1989.

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MATERIALS AND METHODS

The number of deaths from cervical cancer and the number of women living in Belgium (in 5-year age groups) were derived from the National Institute of Statistics. Data were available for each calendar year from 1954 to 1989. Only women aged 20 years and older were included. Deaths from cancer of the cervix uteri were coded as 171 for the period 1954–1968 (ICD-VI and VII) and 180 for the period 1969–1989 (ICD VIII and IX). The direct method of standardisation based on a European reference population was used to transform data to age-standardised rates. Crude data were grouped into quinquennial periods by taking the average mortality of five consecutive years for each age category. Birth cohorts represent all the women born within the specified interval. Because the periods and age groups have 5-year intervals, the range of successive cohorts is 10 years and overlapping [17]. For example, women 35–39 years old in 1955–1959 belong to the cohort born between 1915 and 1924, while women aged 30–34 years in the same period were born in the interval 1920–1929. Those 10-year wide cohorts can be identified by the mid-year of the interval: in this example, respectively, 1920 and 1925. The ratio of age-specific mortality rates from adjacent cohorts is assumed to be constant because of this overlapping phenomenon [18]. The assumption that the ratios of age-specific rates in a cohort to those in the next are constant is also required for standardisation, because any method of standardisation carries the risk of oversimplification when there is great variation between generations in age structure.

In this study, the indirect method of standardisation was used to compare birth cohorts. Standardised cohort mortality ratios (SCMR) for each birth cohort were calculated as the total number of observed deaths in a cohort divided by total number of expected deaths if average age-specific rates were applied. The results were then multiplied by 100 [19, 20]. Only birth cohorts consisting of more than two age groups were considered because statistical precision diminishes at the extremes. Confidence intervals for SCMR values will become very wide especially in the youngest cohorts where the number of deaths is extremely low. Another drawback of the SCMR method appears when applying average age-specific mortality as a standard mortality for different cohorts, which is *de facto* a period-specific approach and which could lead to underestimation of the real cohort effect, if any [18, 20].

RESULTS

Standardised mortality from cervical cancer showed an overall steady decline from 1954 to 1989 (Figure 1). The average decrease in cervical cancer mortality was approximately 0.07 per 100 000 women per year (95% confidence interval 0.06–0.09) or 39.7% over the total studied period.

Age-specific mortality is presented in 5- and 10-year groups (Table 1, Figure 2). Only the oldest age group (80 years and older) showed an increasing overall linear trend, in contrast with other age groups. In the period 1975–1989, only the age class of 50–59 years continued to decrease. The recent trend was stable, rising slightly for women of 60–69 years or younger than 50 years.

Age-specific mortality is plotted according to birth cohorts in Figure 3. Birth cohorts 1920–1935 had lower mortality in approximately all age groups. This clear pattern was not seen in either the preceding or subsequent cohorts. From the cohort born in 1940 onwards, there was no notable change in age-specific mortality rates.

Mortality trends for successive cohorts are indicated by the SCMR curve in Figure 4. The SCMR was generally constant for generations born between 1880 and 1924 with the exception of some discrete peaks observed for the cohorts born around 1985, 1895 and 1920. A substantial decrease in mortality was observed from cohort 1920 to 1935, after which mortality in younger cohorts tended to increase again.

DISCUSSION

Mortality data in this report are similar to those reported for the Netherlands [14], England and Wales [7, 21], Scotland [8], New Zealand [6, 9] and Australia [10]. Nevertheless, in comparison with those reports, in Belgium there was

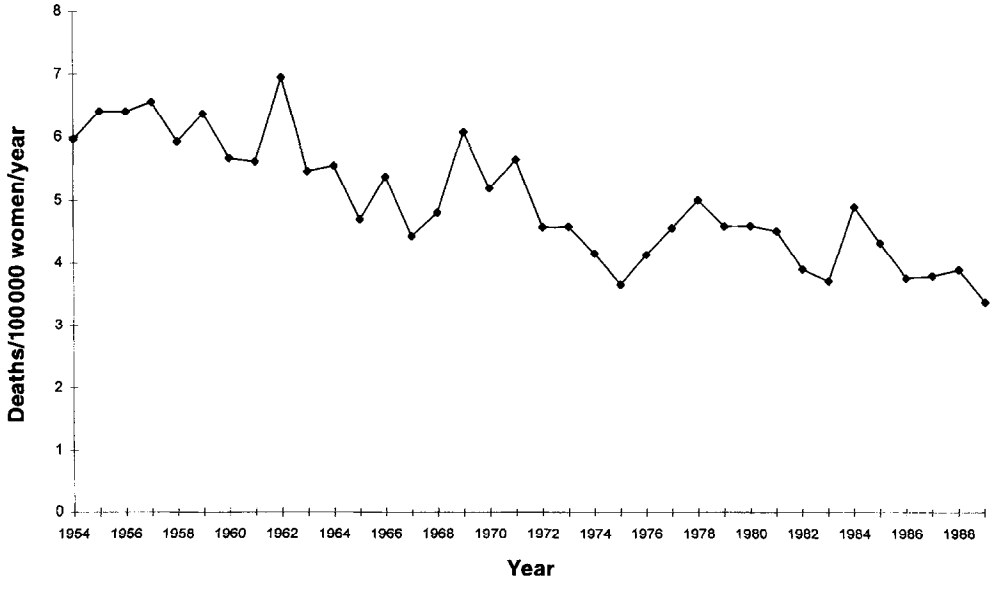

Figure 1. Standardised mortality rate for cervical cancer, Belgium, 1954–1989 (European population taken as a standard).

Table 1. Age-specific mortality for 5-year calendar periods

Period	Age group													
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	<85
1955–59	0.00	0.56	2.45	3.10	8.23	10.46	10.95	15.34	16.12	17.70	20.60	18.48	23.37	16.04
	*0**	*15*	*53*	*56*	*138*	*205*	*210*	*271*	*236*	*221*	*199*	*123*	*88*	*25*
1960–64	0.07	0.19	1.60	3.16	7.21	8.93	11.39	14.04	15.12	16.41	16.07	20.20	21.26	20.74
	1	*3*	*26*	*53*	*98*	*123*	*177*	*217*	*214*	*193*	*144*	*128*	*76*	*38*
1965–69	0.07	0.35	0.51	2.26	4.80	9.60	10.07	9.99	12.65	13.87	17.95	17.85	25.14	19.81
	1	*5*	*8*	*37*	*80*	*131*	*133*	*150*	*185*	*180*	*180*	*123*	*100*	*44*
1970–74	0.00	0.25	0.56	1.75	4.61	6.50	11.87	10.30	11.55	13.84	15.93	19.77	19.17	21.79
	0	*4*	*8*	*27*	*75*	*107*	*152*	*133*	*164*	*185*	*176*	*151*	*82*	*53*
1975–79	0.11	0.06	0.58	2.00	3.22	5.16	8.05	10.13	11.36	12.08	17.28	19.34	23.86	23.28
	02	*01*	*09*	*28*	*49*	*83*	*129*	*128*	*140*	*158*	*201*	*167*	*119*	*69*
1980–84	0.10	0.27	1.07	1.94	2.81	4.97	6.23	8.39	10.56	14.78	16.13	20.21	24.32	34.07
	2	*5*	*19*	*29*	*39*	*75*	*98*	*131*	*126*	*168*	*189*	*191*	*144*	*120*
1985–89	0.00	0.52	0.55	1.89	3.73	5.45	4.76	6.01	10.68	14.23	12.80	16.81	18.05	27.14
	0	*10*	*10*	*33*	*56*	*76*	*70*	*92*	*160*	*156*	*131*	*163*	*121*	*123*

*In italics, actual number of deaths.

not such a steep increase in the mortality of younger birth cohorts. Several factors have an influence on cervical cancer mortality. Firstly, the changes in classification should be considered [22]. Four ICD death cause classification modifications occurred during the period of data collection. Nevertheless, standardised mortality data from 1954 to 1989 do not seem to alter according to the different revisions of ICD classification. This could imply that changes in codification are unlikely to contribute very much to changes in mortality. Nonetheless, improvements in diagnostics can lead to over- or underestimation in trends. Cases of cervical cancer were possibly diagnosed and coded as 'not otherwise specified cancer of the uterus' (NOS) more in the past than at present, which could underestimate the overall decrease in trends in cervical cancer mortality [23]. A decreasing trend of mortality due to unspecified uterine cancer can be traced for the period 1954–1979 and a stable level is observed from 1980 to 1989 (National Institute of Statistics). Thus, if NOS were accounted for, the decrease in cervical cancer mortality might even be higher in older cohorts, whereas the recent trend would be little affected.

Secondly, cancer of the cervix is considered to be caused by certain papilloma viruses, which are sexually transmitted [3, 24, 25]. The risk of cervical cancer is known to be related to number of sexual partners and to age at first intercourse [2, 26–29]. Thus, the lower mortality for cohorts born between 1920 and 1935 could be due to changes in sexual behaviour. The increasing risk in recent cohorts could be, at least partly, due to the sexual revolution of the 1960s [3, 9]. Data from England and Wales show a similar strong decline in mortality for women born between 1922 and 1939. Supporting the hypothesis of sexually transmitted infectious aetiology, a close relationship between the detection rate of sexually transmitted diseases and cervical cancer mortality was found for data from England and Wales [19]. Furthermore, the consequences of world wars can be observed in Adelstein's [30] and Cox's [9] studies. It has been proposed that wartime disturbances of sexual partnerships could increase the risk of cervical cancer. In agreement with this, women who were in their late teens or early twenties during the First or Second World Wars, the 1895 and 1920 cohorts, respectively, did have higher mortality from cervical cancer in our study.

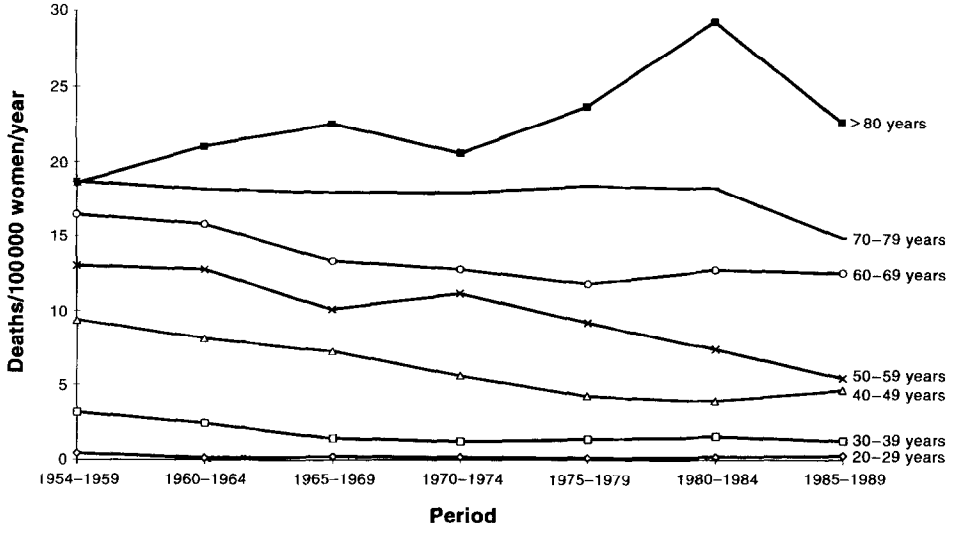

Figure 2. Age-specific mortality due to cervical cancer for 10-year age groups from 1954 to 1989, Belgium.

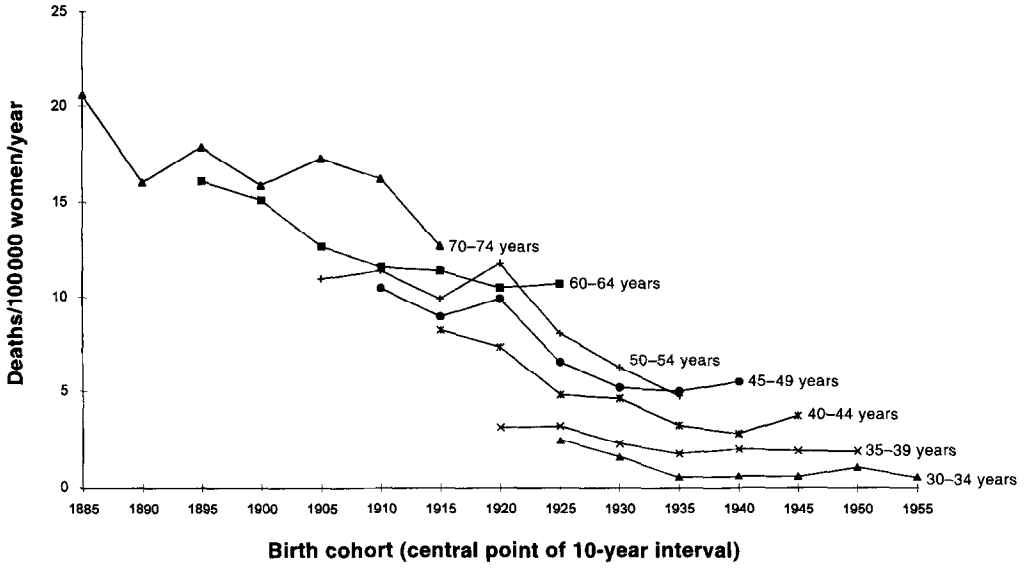

Figure 3. Age-specific mortality according to birth cohorts

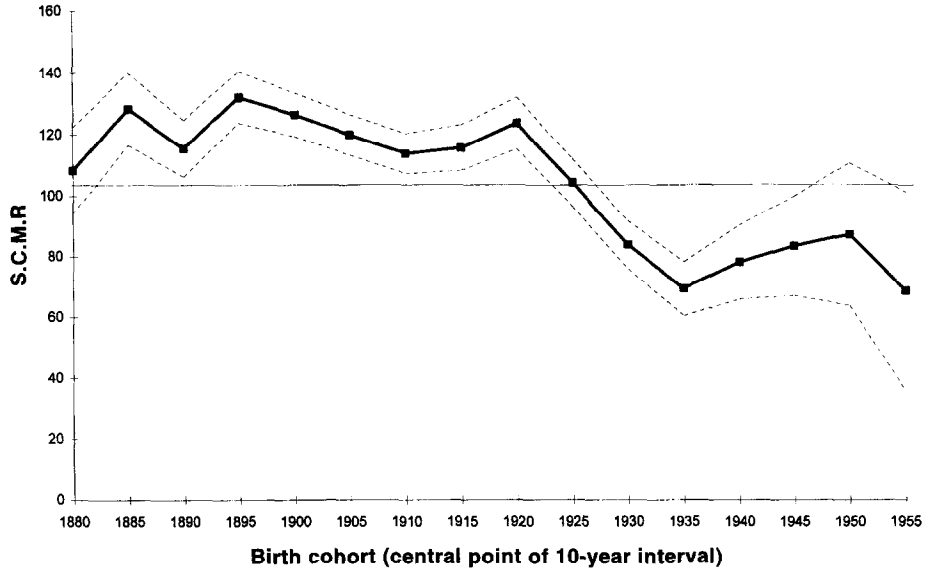

Figure 4. Standardised cohort mortality ratios for cervical cancer mortality in women born between 1880 and 1959. The broken lines represent 95% confidence intervals.

Cigarette smoking and the use of oral contraceptives may also contribute to the increasing rate, as they are known to have an influence on the development of cervical cancer [31, 32]. However, their contribution is difficult to estimate, controlling for sexual behaviour as a main factor. Studies which claim to control for sexual behaviour found an increased risk for smokers [24, 33]. The effect of contraceptives is still unclear, but some authors recently discovered that oral contraceptives might contribute to the increase in incidence of carcinoma of the cervix, especially adenocarcinomas [13, 34–36]. Smoking and contraceptives influence young cohorts more. The proportion of women who are non-smokers declined from 91.6% in the cohort born before 1915 to 54% in the cohort born between 1956 and 1965 in Belgium [15].

Factors which could lower the risk of cervical cancer should also be mentioned. Barrier contraceptive methods are considered to have a protective effect as well as improvements in genital hygiene, both of which might reduce the risk of transmission of aetiological agents. Improvements in genital hygiene may contribute to the decrease in mortality in women born between 1920 and 1935. The rising rate of hysterectomies may also contribute to the decreasing trend in cervical cancer mortality in cohorts born between 1920 and 1939 but studies conducted in Canada and the U.S.A. have shown that the increase in hysterectomy rates was not sufficient to explain the decrease in mortality rates during the same period [37, 38] and in The Netherlands only 6% of the decrease might be attributable to hysterectomies [14].

The impact of screening could be expected to decrease mortality [39, 40]. As the organised screening was gradually introduced in selected regions in Belgium in 1966, the effect, if any, could be expected approximately 10 years after its introduction [2, 3, 14]. However, no sign of decline in mortality as a result of screening is evident from the data, probably due to the prolonged introduction of the programme.

Trends in cervical cancer mortality could be regarded as a balanced effect of risk and protective factors over a period of time. Despite the general decline in cervical cancer mortality in Belgium, trends in recent birth cohorts suggest a higher risk of cervical cancer for recent generations of women. However, small numbers of deaths in younger cohorts and also changes in the prevalence of aetiological factors in the population that are not sufficiently known make it difficult to derive any firm conclusions about future trends.

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