

# Urban-rural differences in gynaecological cancer occurrence in a central region of Italy: 1978-1982 and 1998-2002

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## Summary

Differences in gynaecological cancer incidence and mortality in the urban and rural areas of the Umbria region (central Italy) were investigated. All women with primary invasive breast cancers, uterine cervix and uterine corpus, and ovarian cancers diagnosed during the periods 1978-1982 and 1998-2002 were identified and analysed according to place of residence (either urban or rural). Mortality data were supplied by the National Institute of Statistics (ISTAT) for the period 1978 to 1982, whereas for the 1994-2002 period they were supplied by the Regional Nominative Causes of Death Registry (ReNCaM). Incident cases considered were taken from an ad hoc survey for the first period and from the Umbrian Population Cancer Registry database for the second one. For each site the age-adjusted incidence (AAIR) and mortality (AADR) rates were calculated. The expected number of rural cases was obtained from indirect standardisation with urban incidence and mortality rates of several sites. The significance of the observed expected ratios (SIRs for incidence and SMRs for mortality) and the corresponding 95% confidence intervals were based on the Poisson distribution. Urbanisation levels were established following the classification of the Italian Institute of Statistics. For all sites, excluding the ovary during the most recent period, the SIR relative to rural areas was below 1, but the rates were statistically significant only for breast cancer in both periods (SIR 0.81, 95% CI 0.74-0.88 and SIR 0.82, 95% CI 0.77-0.88, respectively) and for cervix uteri in the first period (SIR 0.77, 95% CI 0.59-0.94). The lower breast cancer incidence in the rural area could also be due to lesser compliance with screening procedures which, up until 2002, were not provided in the form of mass-screenings throughout the region by the Regional Health Department. These results underscore the need for continued efforts to provide preventive health services to medically underserved women throughout Umbria, including rural communities. Underutilisation of preventive healthcare services may result in failure to identify healthcare problems that might be successfully managed with medication or lifestyle changes, as well as missed opportunities to prevent potentially life-threatening diseases.

*Key words:* Urban-rural differences; Gynaecological cancer incidence; Gynaecological cancer mortality.

## Introduction

There is some evidence that there are urban-rural differences in cancer incidence and mortality, related to socioeconomic status and exposure to certain risk factors [1-4]. There are also differences in the utilisation of and/or access to preventive health exams and curative services by some subpopulations [5]. Conditions including many forms of cancer may now be identified early in disease progression. Today, clear evidence has been identified that the health of women can be improved through preventive health screening. Low income, low educational level and generally having poor access to healthcare are all associated with a decreased likelihood of obtaining preventive health examinations [6, 7]. The picture is somewhat more complicated for rural residents because they, on average, have longer travel times to their source of regular medical care than the urban population. Previous research quantifying the relationship between rural residence and preventive care utilisation showed that

cancer tends to be diagnosed at more advanced stages among rural populations, suggesting that rural residents are less likely to receive timely cancer screening tests [8-10]. Moreover, rural residence has been found to be a strong predictor of mammography under-use [11].

In the Italian central region of Umbria, which had 432,833 female residents on 01/01/2000, oncological university centres are located in the two main cities of Perugia and Terni, with four smaller oncological services located in other smaller towns. The Umbria region covers a territory of 8,456 square kilometres and presents a population density close to 103 inhabitants per square kilometer. The road distances between these two oncological centres and the rest of the region's municipalities are small, making it possible to hypothesise equalities in access to Regional services that are, for the most part, public.

This study aimed to verify the differences in gynaecological cancer incidence and mortality in the urban and rural areas of Umbria and to clarify the underlying reasons, if any, particular to local access to health services and/or exposure to different risk factors. The periods considered were 1978-1982 and 1998-2002.

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Table 1. — Cancer incidence in urban and rural zones of the Umbria region.

	Urban AAIR	SE	Rural AAIR	SE	Rural Obs/exp	SIR	95% CI
1978-1982							
C50 Breast	96.0	5.9	78.4	9.2	467/577	0.81	0.74-0.88
C53 Uterine cervix	14.6	2.3	11.5	3.2	67/87	0.77	0.59-0.94
C54 Body of uterus	21.2	2.8	19.0	4.0	114/131	0.87	0.72-1.03
C56 Ovary	13.2	2.2	12.1	3.2	72/79	0.91	0.71-1.11
1998-2002							
C50 Breast	137.7	6.5	116.7	9.6	783/951	0.82	0.77-0.88
C53 Uterine cervix	7.6	1.5	7.4	2.4	49/53	0.92	0.68-1.17
C54 Body of uterus	24.8	2.7	24.8	4.4	169/170	0.99	0.85-1.14
C56 Ovary	17.1	2.3	18.6	3.8	131/125	1.05	0.88-1.22

SE: Standard error.

## Materials and Methods

Mortality data were supplied by the National Institute of Statistics (ISTAT) from 1978 to 1982, whereas for the 1994-2002 period they were supplied by the Regional Nominative Causes of Death Registry (ReNCaM), based on the Registry Population Offices of the Umbrian municipalities linked with death certificates collected by local health districts and later used for national surveys by ISTAT [12].

Incident cases considered were taken from the Umbrian Population Cancer Registry database recorded from 01/01/1998 to 31/12/2002. All cases were collected, coded, stored and analysed in accordance with standard methods recommended for cancer registries [13,14], using the ICD X [15]. Incidence rates referring to the period 1978-1982 are in relation to cases resulting from the *ad hoc* survey carried out in the eighties [16].

The cancer sites considered were classified as: uterine cervix - C53, uterine corpus - C54, unspecified - and the ovary - C56. For each site the age-adjusted incidence (AAIR) and mortality (AADR) rates were calculated. The Umbrian population in the 1991 census was used as the standard.

The expected number of rural cases was obtained from indirect standardisation with urban incidence and mortality rates of several sites. The significance of the observed/expected ratios: standardised incidence ratio (SIR) and standardised mortality ratio (SMR) and the corresponding 95% confidence intervals (CI) were based on the Poisson distribution [17].

Urbanisation levels were established following the classification of the Italian Institute of Statistics [18]. Eighteen urban municipalities were considered with an overall female population of 308,903. Seventy-four rural municipalities were considered with a population of 123,930 females on 01/01/2000.

## Results

Table 1 reports the incidence data relative to urban and rural municipalities for the 1978-1982 and 1998-2002 periods. For all sites, excluding the ovary for the most recent period, the SIR relative to rural areas was below one, but the rates were statistically significant only for breast cancer in both periods and for the uterine cervix in the first period.

The data relative to breast cancer showed that over 20 years both urban and rural standardised incidence rates increased by about 40 per 100,000 inhabitants while the difference between the two zones remained close to 20 points. As with breast cancer incidence, mortality also showed significant SMRs. Rates increased about two

points and the difference between areas remained about six per 100,000 (Table 2).

Both standardised incidence and mortality from ovarian cancer increased over the period by three to six points. Only the obs/exp ratio relative to mortality in the 1978-1982 was statistically significant (SMR = 0.72, 95% CI = 0.47-0.98) (Tables 1 and 2).

The comparison between incidence and mortality rates from uterine cancer is difficult because of the frequently unspecified site coding on death certificates. Data relative to new cases emphasises a decrease in uterine cervix cancer rates in both of the two areas and an increase in uterine corpus cancers (Table 1). Only the SIR relative to cervical cancer in the first period studied was statistically significant (SMR = 0.77, 95% CI = 0.59-0.94).

Taking into consideration the total uterine cancer mortality rate, the decrease of standardised rates in both areas is primarily due to uterine corpus cancer mortality. The differences between urban and rural areas were significant only for the period 1978-1982 (Table 2).

Figures 1-3 report incidence and mortality curves by age relative to sites presenting significant SIR or SMR. Both incidence and mortality from breast cancer present lower values in rural zones than in urban locations across practically all age groups (Figure 1). The patterns relative to cervical cancer incidence are unsteady because of the high variability of rates, due in part to low values (Figure 2), such as the mortality patterns concerning the age distribution of total uterine and ovarian cancers (Figure 3).

## Discussion

The aim of this paper was to verify if comparable patterns could be found in gynaecological cancers when comparing Umbrian women from urban and rural areas from 1978-1982 and 1998-2002.

Significant differences were found in breast cancer incidence and mortality, which in the Umbria region results, as in many other countries, to be the first oncological cause of incidence and mortality in women [12].

Table 2. — Cancer mortality in urban and rural zones of the Umbria region.

	Urban AAIR	SE	Rural AAIR	SE	Rural Obs/exp	SIR	95% CI
1978-1982							
C50 Breast	32.7	3.5	26.9	4.8	163/198	0.82	0.70-0.95
C53 Uterine cervix	1.1	0.6	1.8	1.2	11/7	1.58	0.78-2.36
C54 Body of uterus	1.3	0.7	0.7	0.8	4/8	0.50	0.13-0.77
C55 Uterus unsp.	13.0	2.2	9.5	2.9	54/78	0.69	0.52-0.87
C53-55 Total uterus	15.4	2.4	12.0	3.2	69/93	0.74	0.58-0.93
C56 Ovary	5.9	1.5	4.5	2.0	26/36	0.72	0.47-0.98
1998-2002							
C50 Breast	34.3	3.2	28.4	4.5	233/273	0.85	0.75-0.96
C53 Uterine cervix	1.8	0.7	1.9	1.1	15/15	0.99	0.55-1.43
C54 Body of uterus	1.7	0.7	1.8	1.1	16/13	1.20	0.68-1.72
C55 Uterus unsp.	3.8	1.0	2.9	1.4	28/32	0.87	0.58-1.17
C53-55 Total uterus	7.3	1.4	6.6	2.2	59/60	0.96	0.72-1.10
C56 Ovary	8.9	1.6	9.6	2.6	73/73	1.00	0.78-1.22

SE: Standard error.

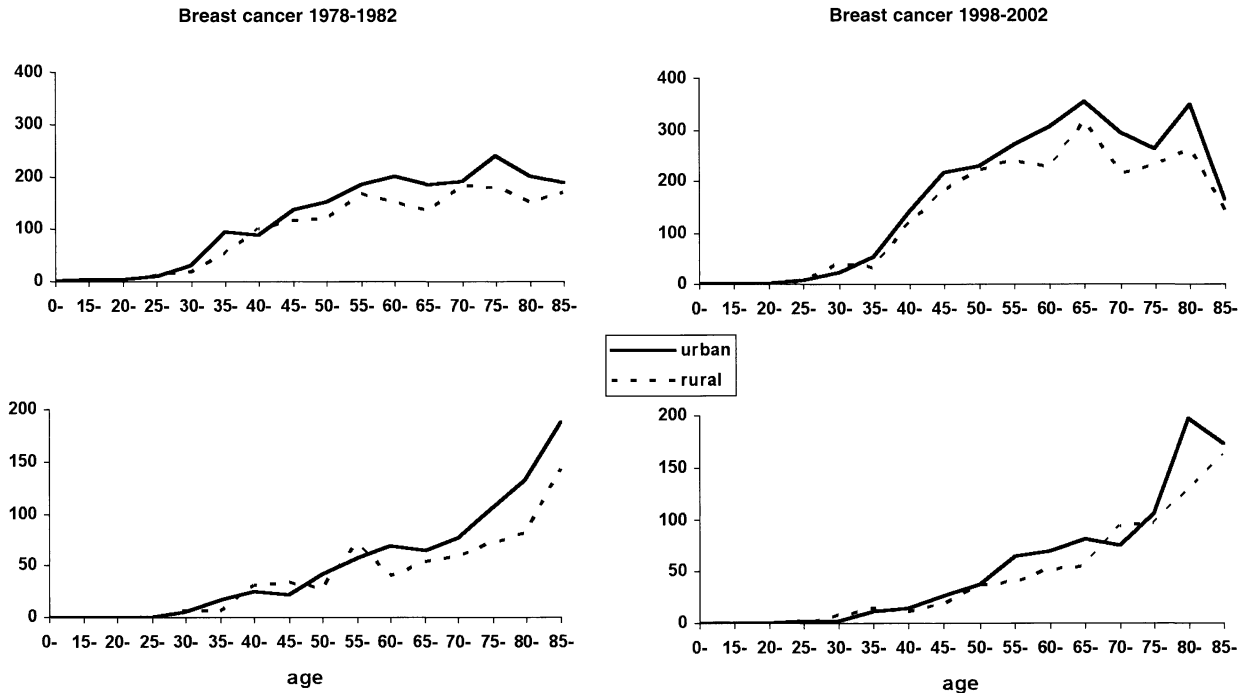


Figure 1. — Incidence (on the top) and mortality by age from breast cancers in urban and rural zones of the Umbria region.

Robsahm and Tretli affirm that in Norway breast cancer incidence was associated with residence in urban areas, advanced age at first childbirth and high levels of education [19]. Ocaña-Riola *et al.* report a significantly higher relative risk associated to urbanisation and low RR in

relation to illiteracy [20]. In Italy there are regional differences in breast cancer mortality and the exceedingly high female breast cancer rates in urban areas [21]. However women living in rural areas present a higher risk of being diagnosed with breast cancer at a higher stage

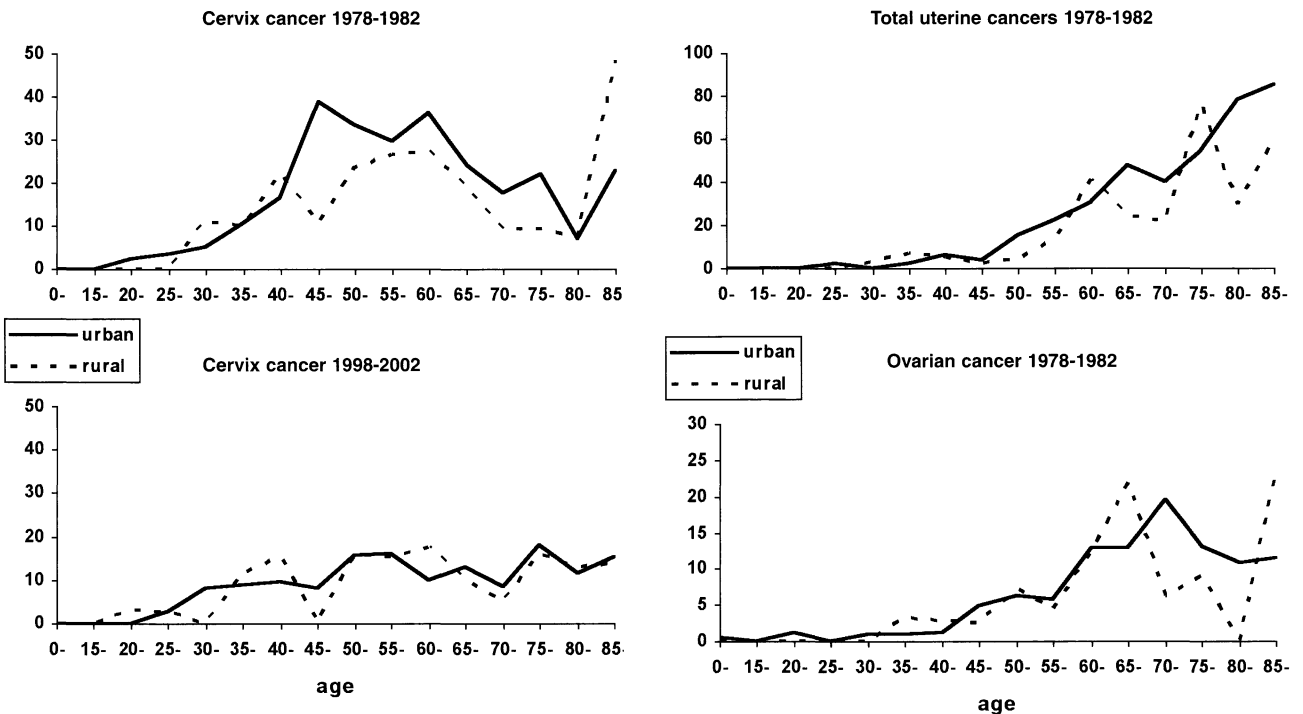


Figure 2. — Incidence by age from uterine cervix cancer in urban and rural zones of the Umbria region.

Figure 3. — Mortality by age from total uterine and ovarian cancers in urban and rural zones of the Umbria region.

[22, 23] and urban women tend to have better survival rates [19]. Considering the very similar patterns found for the two periods, it can be hypothesised that in Umbrian women the lower incidence could be also due to lesser compliance with screening procedures which, until 2002 were not provided in the form of mass-screenings throughout the region by the Regional Health Department.

That lesser compliance seems to be confirmed when examining the uterine cervix incidence for the two periods as well. Until Pap test screening became diffuse throughout the region, the incidence rates were significantly lower in rural areas, while for the second period both mortality and incidence rates were very similar.

Our results regarding both breast and cervical cancers support those of other authors [24-32]. In the USA, even taking into account the differences in health insurance systems, differences in the frequency of screening practices was found in urban and rural areas [24]. Coughlin *et al.* [24] confirm that women living in rural areas may be less likely than women living in urban areas to have had a recent mammography and Pap test. In general, the explanation for the less frequent utilisation of preventive services by rural women includes greater distances to medical facilities and less accessibility to services. Both of these factors are and were associated with lower educational and income levels in rural areas [25-28]. The few studies carried out in Italy confirm this hypothesis [29, 30].

Ovarian cancer presented a significant SMR in mortality rates relative to the period 1978-1982. During the second period both incidence and mortality obs/exp ratios were very close to 1. A similar picture is presented by other authors, who also show that ovarian cancer screening is very rare [31, 32].

## Conclusion

In conclusion, there are significant differences in breast cancer incidence and mortality between the urban and rural areas of Umbria, but not for other gynaecological cancers. The lower breast cancer incidence in rural areas could also be due to lesser compliance with screening procedures which until 2002 were not provided in the form of mass screening throughout the region by the Regional Health Department. These results underscore the need for continued efforts to provide preventive health services to medically underserved women throughout Umbria, including in rural communities. Underutilisation of preventive healthcare services may result in a failure to identify healthcare problems that might be successfully managed with medication or lifestyle changes, as well as missed opportunities to prevent potentially life-threatening diseases.

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