

# Ovarian cancer | in Australian women

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## Preface

This report is the first in Australia to describe the epidemiology of ovarian cancer nationally and local variations in States.

In September 2001, the Commonwealth government announced funding of \$500,000 over two years to improve ovarian cancer control: the National Ovarian Cancer Centre funded by the Commonwealth Government is managed by the National Breast Cancer Centre. A national report on ovarian cancer is the first step in a Strategic Plan to identify priority actions to reduce morbidity and mortality from ovarian cancer over the next four years. In developing the Plan, consultations have been held with consumers, cancer organisations and health professionals across Australia.

The report draws on routinely recorded information in the Australian state and territory cancer registries and information available through the National Cancer Statistics Clearing House to present a snapshot. Simple statistics present facts about women with ovarian cancer in the 1980s and 1990s, including women's ages, where they lived and where they were born and what is known about survival from this cancer nationally and in New South Wales, South Australia, Western Australia and Queensland. In addition, a small amount of information was available on management of ovarian cancer in a report from the hospital-based cancer registries in South Australia.

## Impact of ovarian cancer in Australian women

### Cancer of the ovary in Australian women in 1998

- 1,216 women diagnosed with it
- 769 women died from it
- 6,458 years of life lost under 75
- relative survival nationally of 42% at five years after diagnosis in 1992-1997
- \$13.5 million in direct health costs for ovarian cancers classified as malignant (financial year 1993/94)
- most women (90%) had surgery and chemotherapy (71%) for ovarian cancer in South Australia in 1984-1998

## Guide to ovarian cancer

Epithelial ovarian cancers arise in the epithelium or the outer cells covering the ovary. They are the most common type of ovarian cancer (nine out of 10) and develop in the two ovaries with equal frequency. Epithelial cancers are rare in girls and young women.

Cancer may develop, although extremely rarely, in the Fallopian tubes; this cancer and its management are very similar to epithelial cancers.

Germ cell and sex-cord stromal cell ovarian cancers are also rare. Germ cell cancers originate in the cells that mature into eggs, and usually only affect women under 30 years of age, while sex-cord stromal cell cancers originate in the cells that release female (and male) hormones and can occur at any age.

Parity is a strong protective factor for ovarian cancer. A woman's risk of ovarian cancer falls if she has had children and decreases with each pregnancy: having one child reduces risk by 30% and having 4 or more by 60% (Mant & Vessey, 1994). The combined oral contraceptive pill also protects against ovarian cancer, by approximately 50% in women who have ever taken the pill and by up to 80% in women who take it long-term (Mant & Vessey, 1994; Weiss et al. 1996). The strong gradient of decreasing risk of ovarian cancer from the north to the south in Europe is probably due to earlier trends to smaller families and greater use of the oral contraceptive pill in the north than the south.

## Borderline malignancies

One group of epithelial cancers, not as aggressive as others, are described as 'borderline' or having 'low malignant potential' (LMP). This group of tumours was first described as having histopathological features and biological behaviour intermediate between benign and frankly malignant tumours and, in 1973, were accepted by the World Health Organisation as 'borderline' tumours. Although borderline tumours are relatively common, few epidemiological studies of them have been reported (Bjørge et al 1997).

Ovarian borderline tumours generally occur at younger ages and with a more favourable stage distribution than other ovarian cancers. Among women diagnosed in Norway in 1954-1993, the median age at diagnosis was 53 years and, at time of diagnosis, >90% of cancers were localised to the ovaries (Bjørge et al 1997). Prognosis is generally good regardless of whether diagnosed early or late.

Different countries at different times have included ovarian borderline malignancies in their incidence and survival data. As a result, incidence counts may be higher than in countries and cancer registries that do not include these cancers (see pages 16, 18-19), and survival will be higher (see 'International comparisons of survival', page 41). Furthermore, uncertainties in distinguishing between ovarian cancers and borderline tumours will also contribute to variation in rates due to a shifting dividing line between the two.

The nine US SEER (Surveillance, Epidemiology, and End Results; Appendix 2) registries include borderline cancers (Parkin et al. 1992), undoubtedly contributing to the high incidence and good survival in the USA. Five-year relative survival from cancer of the ovary in 1992-1997 was 11 percentage points higher in the USA than in Australia, where survival is similar to that of many other countries in Europe (AIHW, 2001b).

Most cancer registries in Australia exclude these cancers (AIHW, 2001) although apparently not Victoria; Figure 14 includes a note of changes in international coding

practices in 1995. The NSW Cancer Registry has not changed its coding of ovarian cancer in the late 1990s and incidence in NSW has not increased.

## Spread of disease

The NSW Cancer Registry requests information on extent of disease at diagnosis for all cancers. It uses a simple international system that classifies ovarian cancers as 'localised' to the ovaries, 'regional' when there is extension of cancer from one or more ovaries into the pelvis or cancer in regional lymph nodes, and 'distant' when there is metastasis beyond the pelvis or in other organs. The US SEER registries also use this classification system.

## Data sources

Information on ovarian cancer in NSW women was available mainly in published reports and also the New South Wales Central Cancer Registry Database on the Website: <http://www.nswcc.org.au>; these data are copyright to the Central Cancer Registry, 2001. The NSW Central Cancer Registry is managed by the NSW Cancer Council and funded by the NSW Department of Health. Australian data were available in two reports of the Australian Institute of Health and Welfare, released in November 2001. Sources of international data are acknowledged in the text.

## Implications

The differences in stage distribution between US and Australia cancers and the uncertainty around the inclusion or exclusion of 'borderline' cancers support the recommendations of the September 2001 Workshop on ovarian cancer (National Breast Cancer Centre, 2001).

**that there is a need to ensure consistency in data collection, nomenclature usage, clinical classification and peer-review of clinical data. The implementation of a national clinical audit of gynaecological oncology clinics was recommended including the establishment of a national minimum data set.**

The fact that 70% of ovarian cancers are advanced at time of diagnosis, contributes to the difficulties of precise staging information.

**These tumours can be difficult to diagnose, particularly when the malignant process is already widespread; the diagnosis of ovarian cancer is only an educated guess in many women with advanced abdominal malignancy. (Weiss et al. 1996)**

## Incidence and mortality in Australian women

A total of 1,216 women were diagnosed with cancer of the ovary in 1998, 3.3% of all women with cancer, and 769 died from the cancer (5.2% of all deaths from cancer in women). Based on these figures, the Australian Institute of Health and Welfare has estimated that cancer of the ovary was responsible for 6,458 years of life lost before the age of 75 years (AIHW, 2001a).

**Table I: Numbers and percentage of new ovarian cancers and number of deaths from ovarian cancer in Australian women in 1998 by age groups**

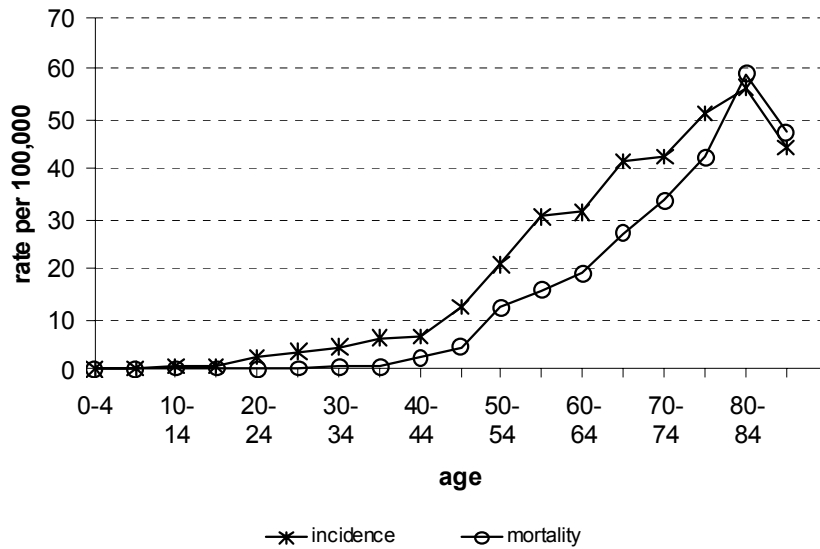
Age at diagnosis	New cases		Deaths	
	N	%	N	%
0-14 years	5	0.4	1	0.2
15-39 years	124	10.2	11	1.4
40-49 years	128	10.5	46	6.0
50-59 years	251	20.6	139	18.1
60-69 years	261	21.5	166	21.6
70-79 years	277	22.8	226	29.4
80+ years	170	14.0	180	23.4
<b>Total</b>	<b>1216</b>		<b>769</b>	



## Age-specific incidence and mortality

About 1% of women developed ovarian cancer by the age of 75 years. Ovarian cancer increases with age from 40-44 to 75-79 years but falls in the oldest age groups (Figure 1).

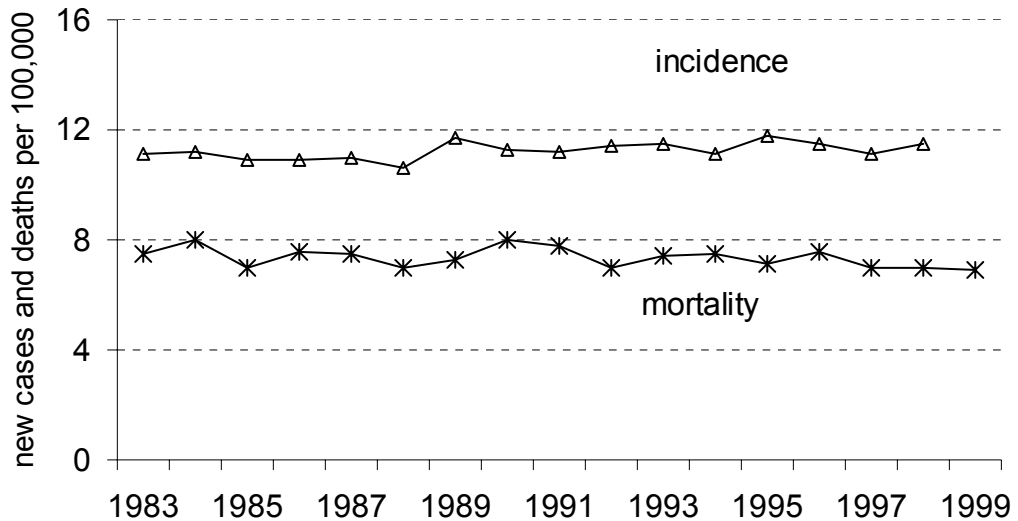
**Figure 1. Age-specific incidence and mortality of ovarian cancer in Australian women in 1998**



## Incidence and mortality trends in 1983-1998

Incidence of cancer of the ovary changed very little between 1983 and 1998, and has been steady since 1990. Mortality was reasonably stable from 1983 to 1993 and then fell slightly by 1.4% a year from 1993 to 1998 (AIHW, 2001a).

**Figure 3: Incidence and mortality of ovarian cancer in Australian women in 1983-1998**



Source: AIHW & AACR: *Cancer in Australia 1998*. Canberra: 2001a

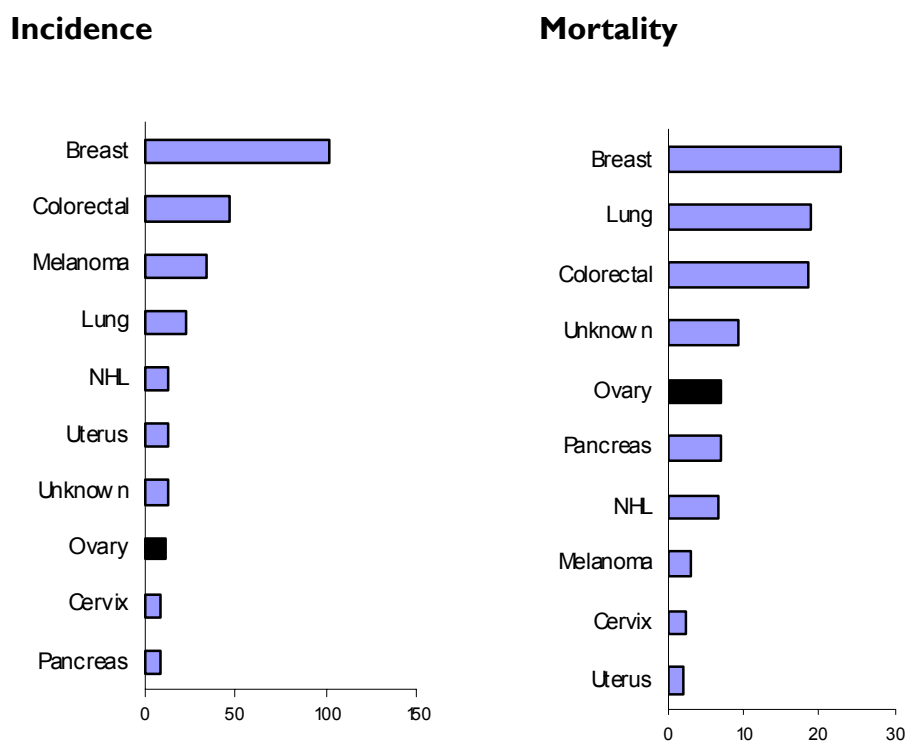
Note: age-standardised rates Australia 1991 Standard Population; rates are expressed per 100,000 population

## Commonly occurring cancers in 1998

Cancer of the ovary was the 8<sup>th</sup> most common cancer and the 5<sup>th</sup> most common cause of death from cancer in women in 1998 (AIHW, 2001a). The ranking of the most frequently occurring cancers is based on the number of new cases and deaths (Appendix 1).

In 1998, the age-standardised incidence rate of cancer of the ovary was 11.5 per 100,000 women and the lifetime risk to 74 years was 1 in 99. The age-standardised mortality rate, standardised to the Australia 1991 Standard Population, was 6.9 per 100,000 in 1998; 6,548 person years of life were lost to 74 years of age.

**Figure 4: Age-standardised rates of the most commonly occurring cancers in Australian women in 1998.**

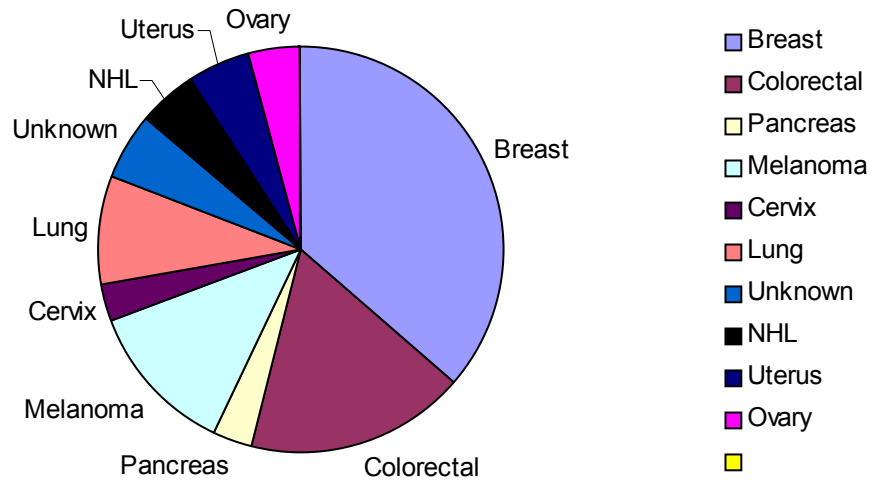


Source: AIHW & AACR: Cancer in Australia 1998. Canberra: 2001a

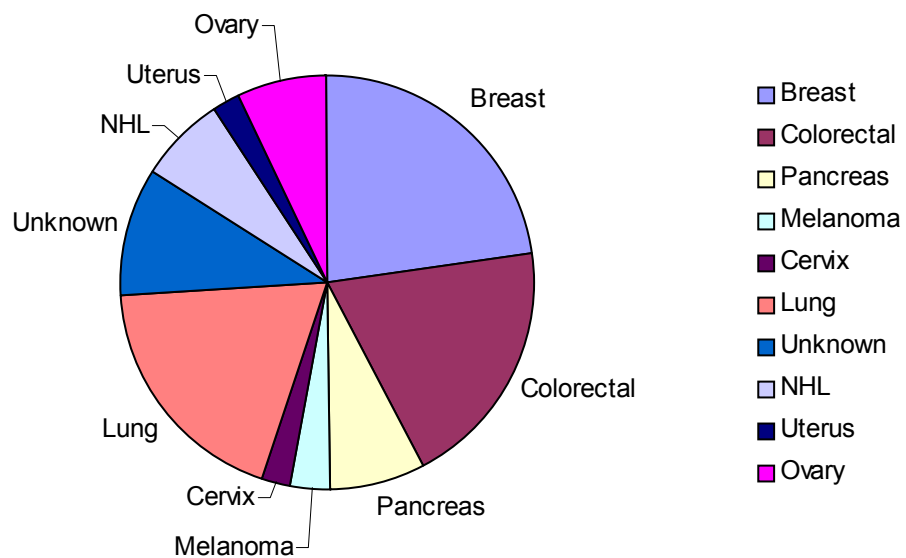
# Most commonly occurring cancers in Australian women in 1998

**Figure 5: New cases of cancer and deaths from cancer in Australian women in 1998.**

## New cases of cancer



## Deaths from cancer

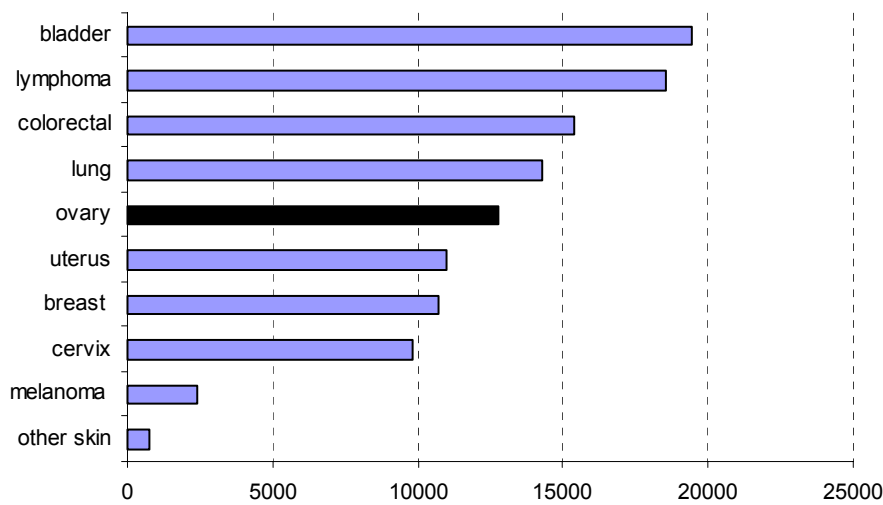


Source: Cancer in Australia 1998, AIHW & AACR 2001

## Estimated average lifetime costs of cancer

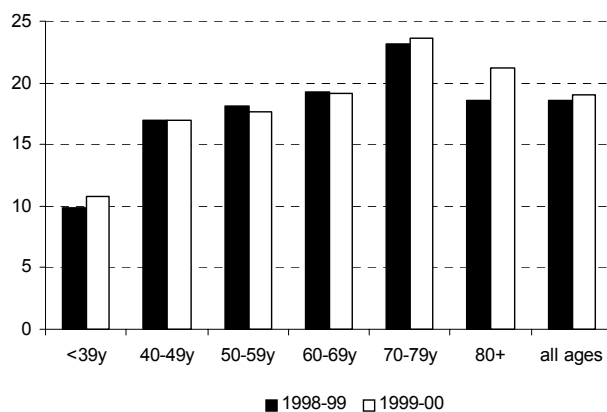
The approximate total average costs of treatment per case of cancer were estimated across the entire lifetime in *Health System costs of cancer in Australia 1993-94* (Mathers et al. 1998). The higher lifetime costs of treatment for ovarian cancer than other cancers in women reflects the greater individual need for medical care. Direct costs, mainly (87%) hospital costs, of ovarian cancer classified as malignant were \$13.5 million in the 1993/94 financial year; this figure also includes medical services, pharmaceuticals, and allied health services (Mathers et al. 1998). Total direct costs for all ovarian cancers, including those classified as malignant, benign, in situ and of uncertain behaviour was \$31.3 million or 2.3 times greater.

**Figure 6: Estimated lifetime treatment costs per case of cancer in financial year 1993/94**



Hospital costs were by far the greatest proportion (87%) of the direct costs of ovarian cancer in 1993/94. Numbers of patient days and hospital separations for ovarian cancer were available by age in 1998/99 and 1999/00 and are presented in Figures 7 and 8.

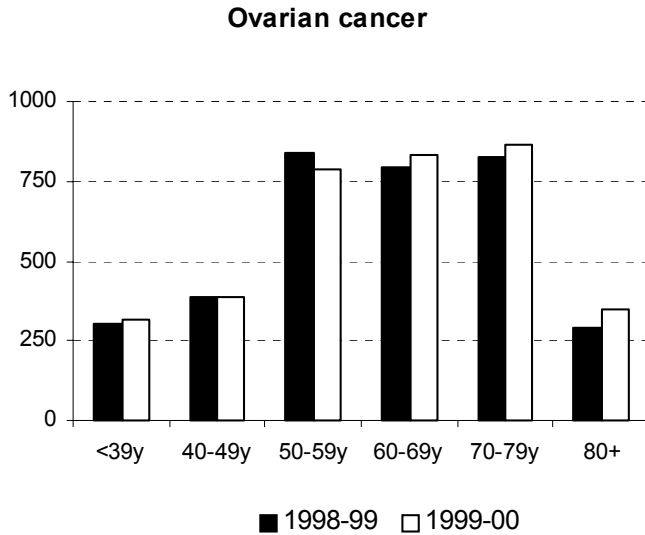
**Figure 7: Number of hospital bed days in 1998-1999 and 1999-2000 per case of ovarian cancer in 1998 by age.**



Source: AIHW National Hospital Hospital Morbidity Database

There were 3,500 hospital separations a year for ovarian cancer in 1998/99 and 1999/00. Most (70%) of these were in women 50-79 years of age.

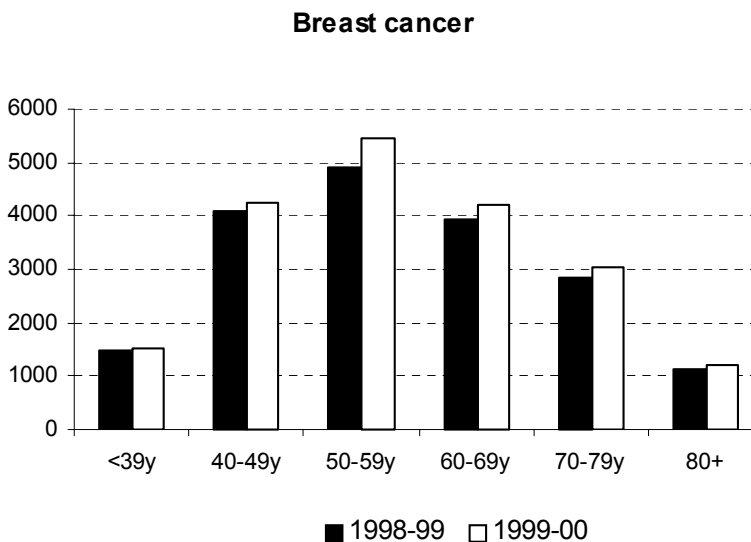
**Figure 8: Total number of hospital separations for ovarian cancer in 1998-1999 and 1999-2000 by age.**



Source: AIHW National Hospital Hospital Morbidity Database

In comparison, there were just under 20,000 hospital separations each year for breast cancer, of which 70% were in women 40-69 years of age.

**Figure 9: Total number of hospital separations for breast cancer in 1998-1999 and 1999-2000 by age.**



Source: AIHW National Hospital Hospital Morbidity Database

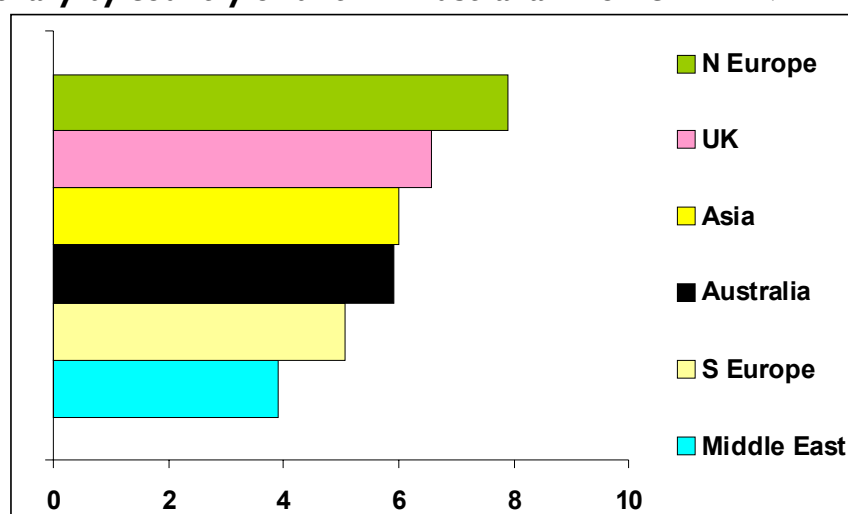
## Mortality by country of birth in 1979-1988

Age-standardised mortality rates in migrants from England and Wales, Ireland, Scotland and the Netherlands in 1979-1988 were 10% or more lower than in their country of origin. Rates were at least 10% higher in women from Greece, Yugoslavia and the USA than in their countries of origin (Giles et al. 1995).

**Table 2: Age-standardised mortality rates of ovarian cancers in Australian residents by country of birth and rates in their country of origin**

	Australia	Country of origin
Australia	5.9	5.9
New Zealand	7.8	7.3
England & Wales	6.6	8.6
Ireland	6.5	7.6
Scotland	6.3	8.0
Germany	7.8	8.0
Netherlands	7.2	8.0
Greece	4.8	2.8
Italy	4.9	4.6
Yugoslavia	5.5	7.6
USA	6.1	4.3

**Figure 10: Age-standardised mortality rates from cancer of the ovary by country of birth in Australian women in 1979-1988**



Source: Giles et al 1995

## Incidence and mortality in States and Territories

Although average annual numbers of women diagnosed with cancer of the ovary were similar in NSW and Victoria in 1994-1998, a higher proportion of all deaths in Australia occurred in NSW than Victorian women. The smaller proportion of deaths despite similar numbers of new cases may be due to the registration in Victoria of cases, presumed to be borderline ovarian cancers (see Figure 14). These are not registered in NSW.

**Table 3. Average annual numbers and percentage of women with ovarian cancer in States and Territories in 1994-1998**

State or Territory	New cases		Deaths	
	N	%	N	%
NSW	369	31.9	256	33.9
Victoria	366	31.6	218	28.8
Queensland	192	16.6	115	15.2
WA	89	7.7	64	8.5
SA	87	7.5	66	8.7
Tasmania	36	3.1	24	3.2
ACT	14	1.2	11	1.5
NT	5	0.4	2	0.3
<b>Australia</b>	<b>1158</b>	<b>100</b>	<b>756</b>	<b>100</b>

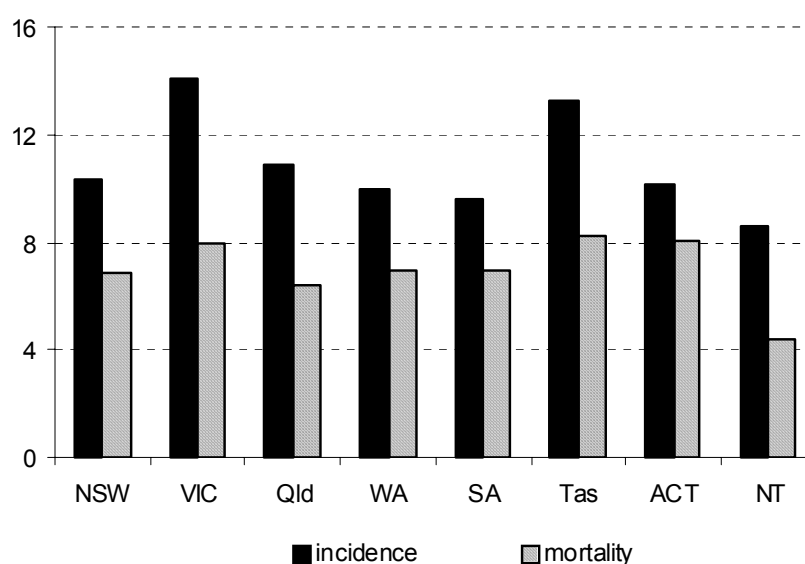


The high incidence in Victoria and Tasmania may be a consequence of local cancer registration practices and needs to be explored further.

**Table 4. Age-standardised incidence and mortality and incidence to mortality ratios of ovarian cancer in States and Territories in 1994-1998.**

State or Territory	Incidence	Mortality	Incidence: Mortality ratio
NSW	10.4	6.9	1.5
Victoria	14.1	8	1.8
Queensland	10.9	6.4	1.7
WA	10	7	1.4
SA	9.6	7	1.4
Tasmania	13.3	8.2	1.6
ACT	10.2	8.1	1.3
NT	8.6	4.4	2.0

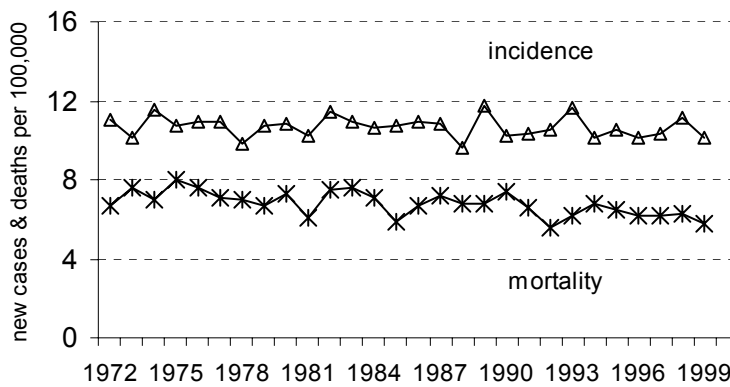
**Figure 11. Age standardised incidence and mortality rates of ovarian cancer in States and Territories in 1994-1998**



## Trends in NSW in 1972 to 1997

Incidence of ovarian cancer fell by 4.5% from 1972 to 1997 and mortality by 13%; the incidence/mortality ratio increased by 11%.

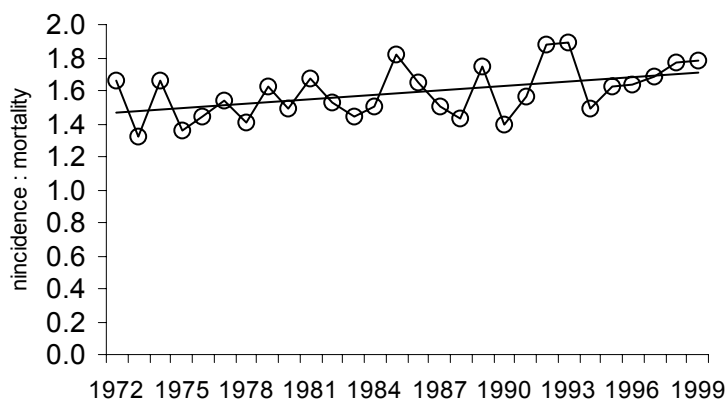
**Figure 12. Incidence of ovarian cancer in NSW women in 1972 to 1997**



## Incidence to mortality ratios in NSW women

The increasing incidence : mortality ratios in 1972 to 1998 in NSW were a result of divergence between the reasonably stable incidence and the falling mortality rates.

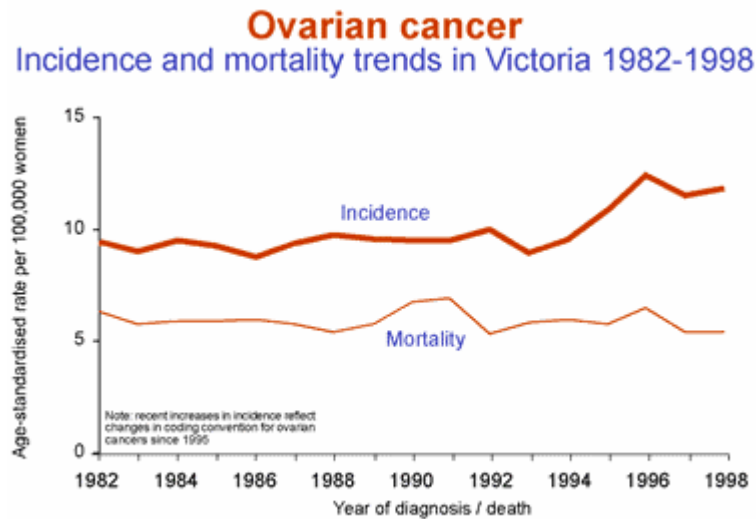
**Figure 13. Incidence: mortality ratios for ovarian cancer in NSW in 1972 to 1997**



## Ovarian cancer in Victoria

Incidence in Victoria increased by around 20% after a change in the coding convention for ovarian cancer in 1995 while mortality was reasonably stable throughout the period.

**Figure 14. Incidence and mortality for ovarian cancer in Victorian women in 1982 to 1998**



## Variations in ovarian cancer in NSW

### Socioeconomic status in NSW

Socioeconomic status (SES) was examined in Local Government Areas in the Sydney Statistical Division. The incidence rate ratio of 0.97 (p-value=0.2) indicated that there was no clear relationship between the incidence of ovarian cancer and SES (Lewis et al, 1999).

**Table 5: Age-standardised incidence of ovarian cancer by SES of Local Government Areas in the Sydney Statistical Division, 1991-1995**

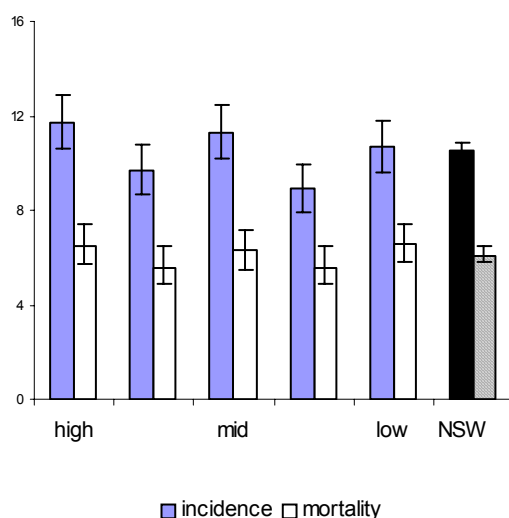
SES category	Number	ASR <sup>1</sup>	99% CI	
high	299	11.7	10.0	13.5
medium-high	141	11.1	8.8	13.8
medium	176	10.7	8.7	13.0
medium-low	259	10.5	8.9	12.3
low	238	10.6	8.9	12.5
Incidence rate ratio (IRR) <sup>2</sup>		0.97		

<sup>1</sup> age-standardised rate

<sup>2</sup> average reduction in incidence by category from high to low

Incidence in 1995-1999 varied across SES categories, although only one area an incidence rate lower than in the NSW population. Otherwise, all confidence intervals around rates indicated a degree of overlap with the rate for the whole of NSW.

**Figure 15. Age-standardised incidence and mortality rates of ovarian cancer in NSW in 1995-1999 by SES (SEIFA index).**

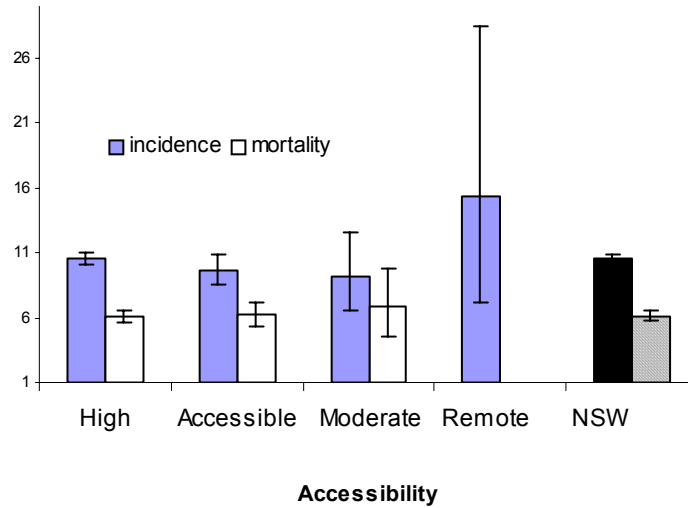


Source: NSW Central Cancer Registry Reporting Module, 2001

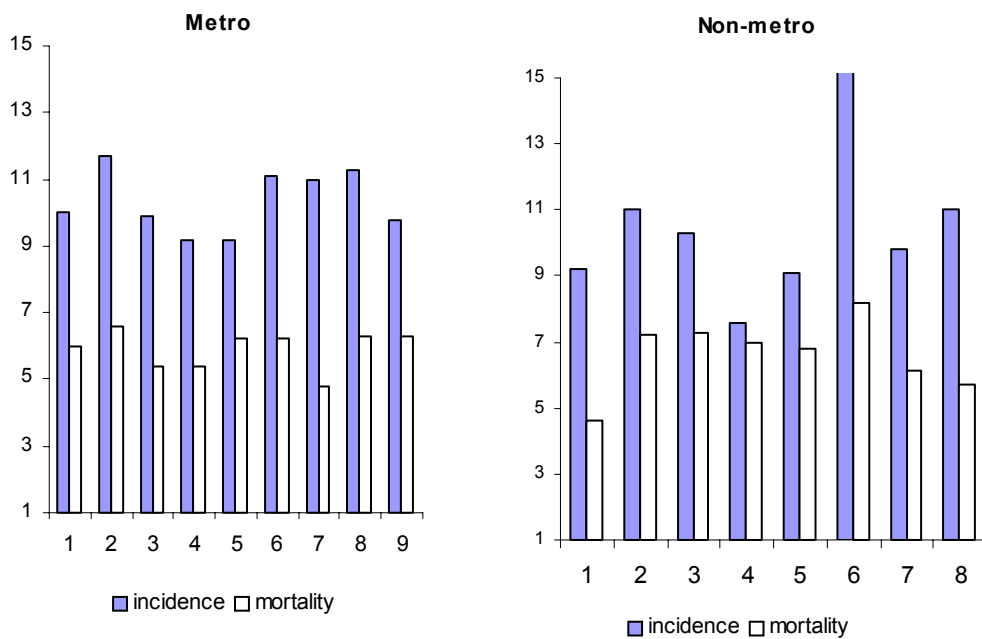
## Accessibility in NSW

Although mortality was slightly higher in moderately accessible than in more accessible areas, the confidence intervals around rates indicated that mortality was similar in all areas.

**Figure 16: Age-standardised incidence and mortality rates of ovarian cancer in NSW in 1995-1999 by accessibility (ARIA index).**



**Figure 17: Age-standardised incidence and mortality rates of ovarian cancer in NSW in 1995-1999 by Area Health Services in metropolitan and non-metropolitan regions**

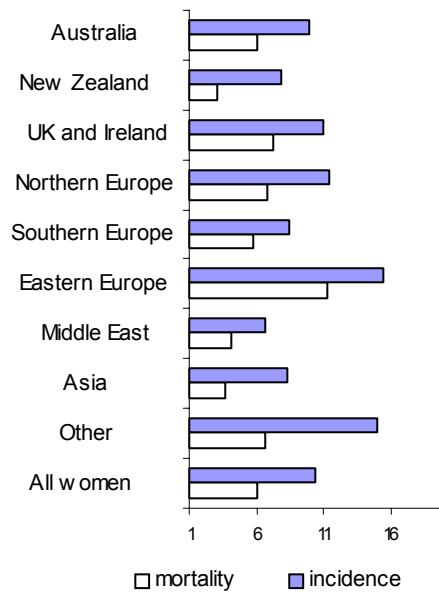


Source: NSW Central Cancer Registry Reporting Module, 2001

## Country of birth in NSW

Incidence and mortality in women born in Australia and New Zealand were lower than women born in Northern and Eastern Europe and the UK. Women from Southern Europe had lower rates than Australian born women.

**Figure 18: Age-standardised incidence and mortality rates of ovarian cancer in NSW in 1995-1999 by country of birth.**



The NSW Cancer Registry has released a reporting module on their Website (NSW Central Cancer Registry Reporting Module, 2001; <http://www.nswcc.org.au>). Figures 15 to 18 were based on data available in the Reporting Module.

## Hospital-based cancer registries in South Australia

### Management recorded in the hospital-based cancer registries in South Australia

Three units that specialise in gynecological oncology contribute to the hospital-based cancer registries in South Australia. They are the Gynaecology Oncology Units in the Royal Adelaide Hospital, Flinders Medical Centre and the Queen Elizabeth Hospital and North Western Adelaide Health Service (South Australian Cancer Registry, 2000). The information about management of ovarian cancer presented below was taken from a report on 889 women diagnosed in 1984-1998.

Most women (90%) had surgery as part of their management, 71% had chemotherapy, 6% hormonal therapy, and 5% radiotherapy. Five percent of women had none of these: they were older, had more advanced cancer at the time of diagnosis, and were more likely to have been diagnosed in 1984-91 than in 1992-1998.

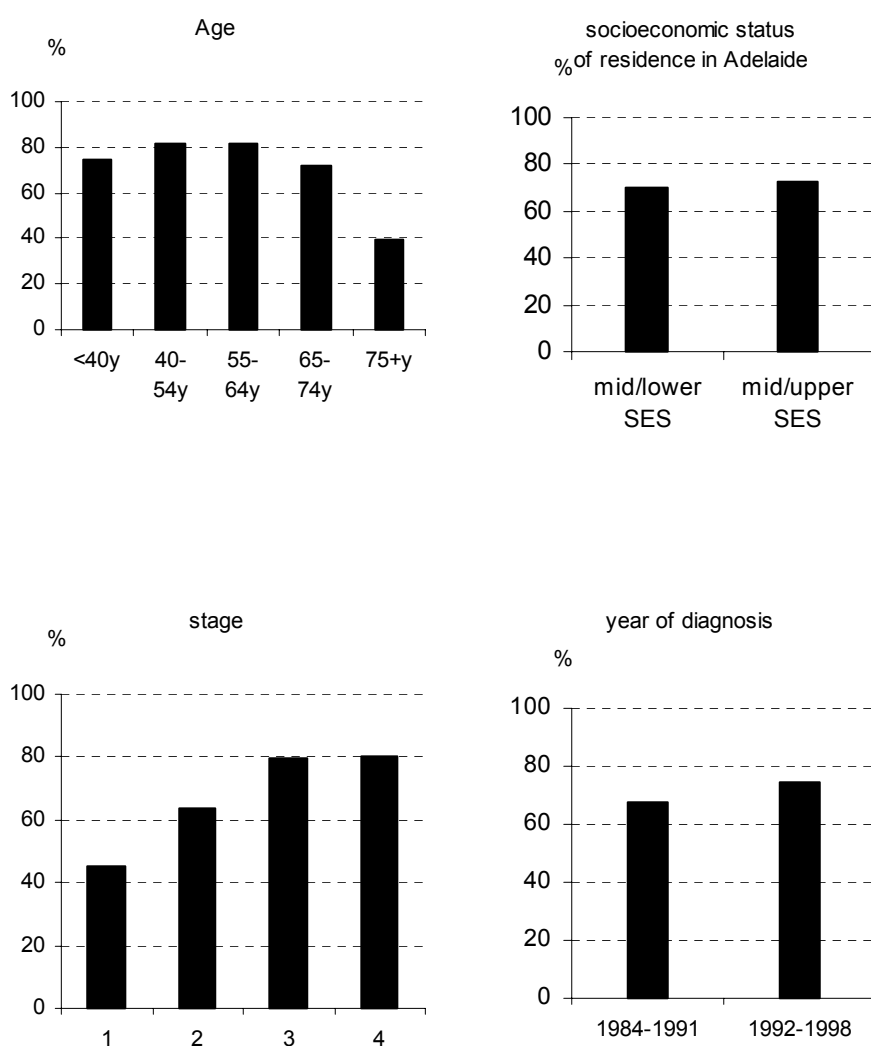
More women who had surgery were younger and had less advanced cancers; they were more likely to have the most common type of ovarian cancer, epithelial cancer, than the rarer types.

The small number having radiotherapy were more likely to have been diagnosed in 1984-1991 than in 1991-1998 and to have had cancers of an intermediate stage.

## Chemotherapy recorded in hospital-based cancer registries in South Australia

Most women had chemotherapy: more women (around 81%) 40-64 years of age than younger (74.5% at <40 years) or older women (72% at 65-74 years and 39.8% at 75 years and older). A slightly higher percentage of women from middle to higher SES areas of Adelaide had chemotherapy than women from middle to lower SES areas. More women (80%) with advanced cancers (stages 3 and 4) had chemotherapy than women with less advanced cancers (stages 1 and 2). By 1992-1998, three-quarters of women with ovarian cancer (74.5%) had chemotherapy, up from 67.8% in 1984-1991.

**Figure 19. Percentage of women having chemotherapy in hospitals in South Australia by age, residence in Adelaide, stage and time period**

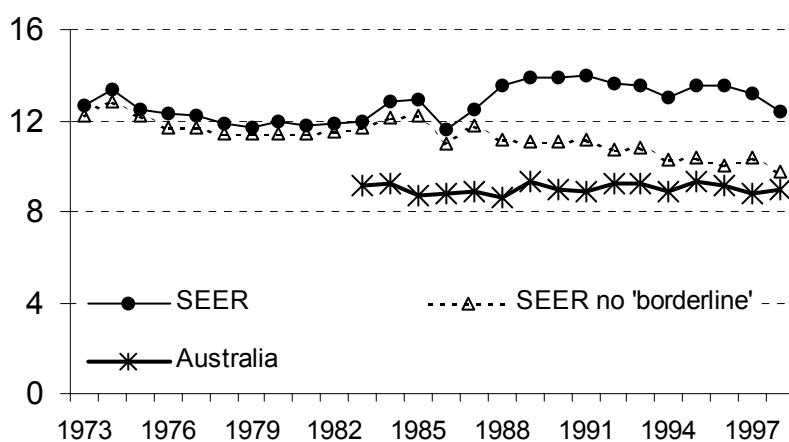




## Incidence in Australia and the US SEER registries

The nine US SEER registries (see Appendix 2) began to include 'borderline' tumours in their registration of ovarian cancer cases in 1987, increasing the incidence, compared with Australia, from that year on. After excluding these tumours, ovarian cancer was 10% lower in 1994-97 than 1972-74 whereas incidence in Australia has been relatively stable. Australian rates, however, may include these histologies since Victoria, and probably Tasmania, registered them from 1995. Local incidence, therefore, may have also fallen in the 1990s if borderline tumours had been excluded.

**Figure 20: Incidence in Australia and the 9 US SEER Registries in 1982 to 1998**

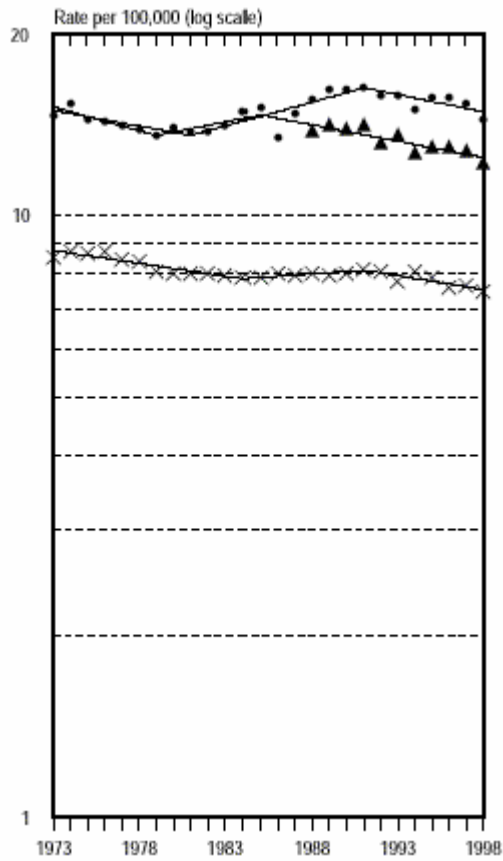


Note: US and Australian rates standardised to the World standard population

## Incidence in the US SEER registries

Incidence in the US SEER registries has included borderline malignancies since 1987. When excluded from the figures, incidence is much less and, after 1987, the downward incidence trend parallels the fall in US mortality rates.

**Figure 21: Age-standardised incidence and mortality rates of ovarian cancer in white women in SEER registries.**



- incidence
- ▲ incidence minus borderline malignancies
- X mortality

## SEER incidence and mortality by age

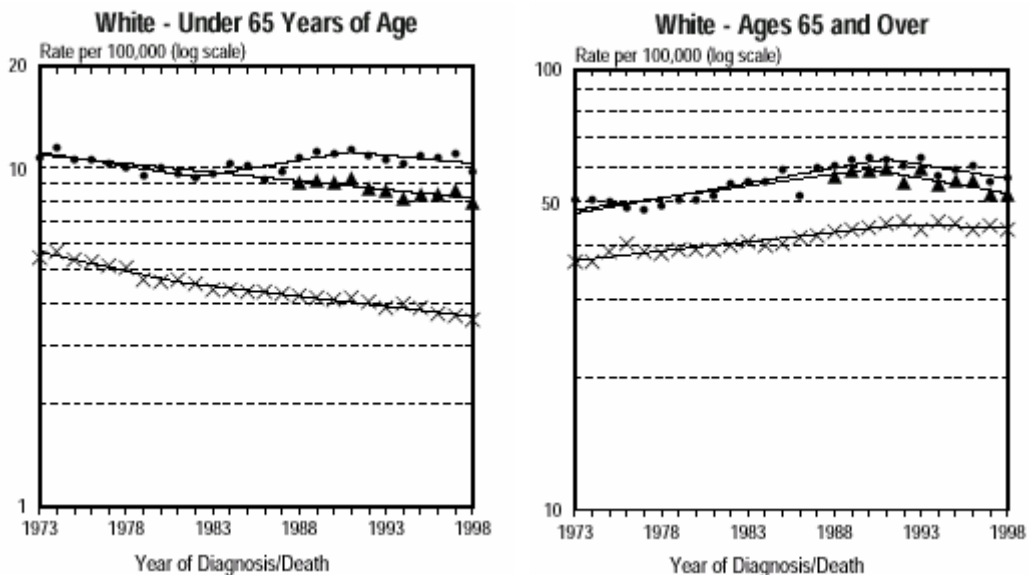
Almost all ovarian cancers diagnosed in women to 64 years are epithelial (Weiss et al. 1996). Incidence of ovarian cancer of all histologies has been falling by 1.1% a year since 1991 in US white women younger than 65 years (Ries et al 2001).

Excluding borderline ovarian malignancies, however, incidence rates have been falling steadily since 1971.

Mortality in women younger than 65 years years fell continuously by 2.5% a year in 1973-1981 and 1.4% a year in 1982 to 1998 (Ries et al 2001).

In women 65 years and older, incidence increased by 1.6% a year to 1991 and mortality by 1% to 1992 before falling (mortality only slightly) to 1998.

**Figure 22: Age-standardised incidence and mortality rates of ovarian cancer in SEER registries.**



- incidence X mortality
- ▲ incidence minus borderline malignancies

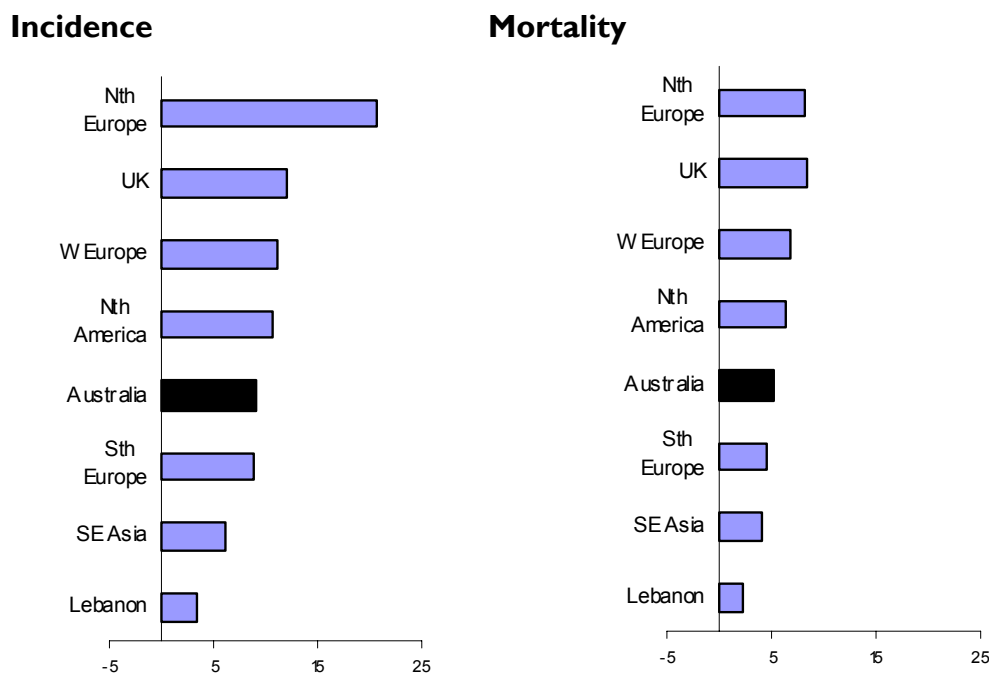
## International variation in incidence and mortality: 2000

The highest rates of ovarian cancer occur in white women in Europe and North America, with particularly high rates in Scandinavian countries. Women in Central and South America and Asia tend to have relatively low rates, possibly influenced by under-reporting of this cancer in these regions.

The incidence of ovarian cancer had been relatively constant for several decades in most parts of Europe and North America but has increased 50% to 100% in some parts of Asia in the 1970s and 1980s (Weiss et al. 1996). The estimated incidence in China in 2000 was 3.2 per 100,000, compared with 7.5 in Hong Kong and 11.1 in Singapore (GLOBOCAN, 2001).

**United Kingdom and Ireland.** Incidence rates were reported to have increased by 20% over the last 20 years in England and Wales and 25% in Scotland; incidence estimates in 2000 were higher in Ireland (13.9 per 100,000) than the UK (12.2 per 100,000) (GLOBOCAN, 2001). Cancer of the ovary was the 4<sup>th</sup> most common cancer and the 4<sup>th</sup> largest cause of death from cancer in women in England and Wales in 1997, compared with the 8<sup>th</sup> most common cancer and 6<sup>th</sup> most common cause of death from cancer in Australian women in 1998 (AIHW, 2001a). Reasons for the apparently greater impact of ovarian cancer in the UK than Australia are not clear. Current registration practices for borderline malignancies in UK cancer registries are unknown but, judging by the much higher rates in Northern Europe, borderline cancers may be excluded from registration.

**Figure 23: Estimated age-standardised incidence and mortality rates of ovarian cancer internationally in 2000, standardised to the World standard population.**



Source: GLOBOCAN, 2001

## Survival from ovarian cancer

Relative survival in women in Australia

### ***Key facts***

#### **Age:**

- in Australia, five year relative survival from ovarian cancer is highest in women diagnosed at the youngest ages, 15-44 years and falls with increasing age.

#### **Spread of disease:**

- Women diagnosed when the cancer is localised have better relative survival at five years after diagnosis than women with cancers that have spread beyond the ovaries.
- Five year relative survival in NSW women is lower (40%) than in white women in the USA (50%) but this may be due to US cancer registries including 'borderline' ovarian malignancies.

## Ovarian cancer and survival

Ovarian cancer generally has an unfavourable stage distribution. Among ovarian cancers diagnosed in Norway in 1954-1997, 61% had distant metastases and only 29% were localised cancers (Bjørge et al, 1997). Tumours in the 1990s were no more favourable than in the 1950s although increasing accuracy of staging over time may have caused a stage shift of tumours in the 1990s (Bjørge et al, 1997). Younger women usually have a more favourable stage distribution than older women. Approximately 60% of women younger than 40 years had stage I ovarian cancers and 30% had stage III and stage IV compared with 70% stage IV and 18% stage I cancers in women 70 years and older in the US National Cancer Database in 1986-1991 (Averette et al. 1995). A greater incidence of less aggressive cancers (germ cell and sex-cord stromal cell) at younger ages probably contributes to the more favourable survival. The definition of 'cancer of the ovary' in reports from cancer registries includes all types of ovarian cancers, so we are unable to present survival for epithelial ovarian cancers alone.

## What is relative survival?

Relative survival is the ratio between what actually happened to a group of women and what would have normally occurred to them in the absence of the disease. A survival rate of less than 100% indicates that the disease made a difference to the survival of the group, and that their survival is less than expected for women in the general population of the same age.

## Interpretation

Five-year relative survival reflects events in health care during the period of diagnosis of the cancer patients studied and up to five years after the end of the period. Trends in relative survival rates would be expected to reflect trends in cancer treatment, so that increases in survival from ovarian cancer suggest improvements in treatment. Changes in coding practice in registration of ovarian cancer, however, also influence survival rates. The Victorian Cancer Registry indicated that it changed its registration of ovarian cancers in 1995, as a result of which incidence increased, suggesting that borderline malignancies were included. These tumours have a most favourable stage distribution (>90% localised; Bjørge et al, 1997). If borderline malignancies were included as cases in Victoria or in other Australian States, then survival rates would improve solely as a consequence of their inclusion.

## Data sources

Information on relative survival from cancer of the ovary in Australia women was published in the report *Cancer survival in Australia. Part 1: National summary statistics*, produced by the Australian Institute of Health and Welfare and the Australasian Association of Cancer Registries and released in November 2001. Information on relative survival in NSW women was available in Supramaniam et al (1999).

## Survival in Australian women in 1972 to 1995

**Age.** Age was important in predicting survival from ovarian cancer. Survival was best in younger age groups and fell with increasing age. Survival improved in all age groups from 40-49 to 70-79 years between 1982-1986 and 1992-1997.

**Time since diagnosis.** Relative survival from cancer of the ovary in women diagnosed in 1992-1997 was 72.9% at one year and 42% at five years (AIHW, 2001b). The survival proportion at ten years after diagnosis was 33.3% in women diagnosed in 1987-1991.

**Time period.** Relative survival increased significantly between 1982-1986 and 1992-1997, one-year survival by 8.8 percentage points, five-year by 7.6 percentage points, and seven-year by 6.6 percentage points.

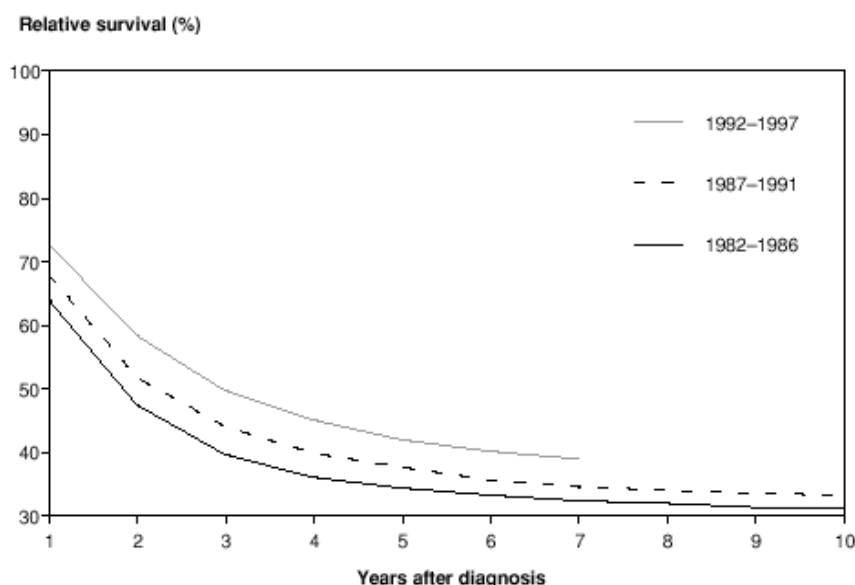
**Table 6: Numbers of new cases and deaths and five-year relative survival proportions in Australian women in 1992-1997 by age groups: ovarian cancer**

Age at diagnosis	New cases	Deaths	relative survival proportion (%)
0-19 years	77	11	85.8
20-29 years	189	21	88.9
30-39	345	89	73.9
40-49 years	883	352	59.0
50-59 years	1,344	708	46.8
60-69 years	1,514	999	33.2
70-79 years	1,516	1,154	26.0
80-89 years	665	586	18.1
90-99 years	88	87	0.0
All ages	6,621	4,006	42.0

Source: Australian Institute of Health and Welfare & the Australasian Association of Cancer Registries. *Cancer survival in Australia. Part 1: National summary statistics*. Canberra, 2001

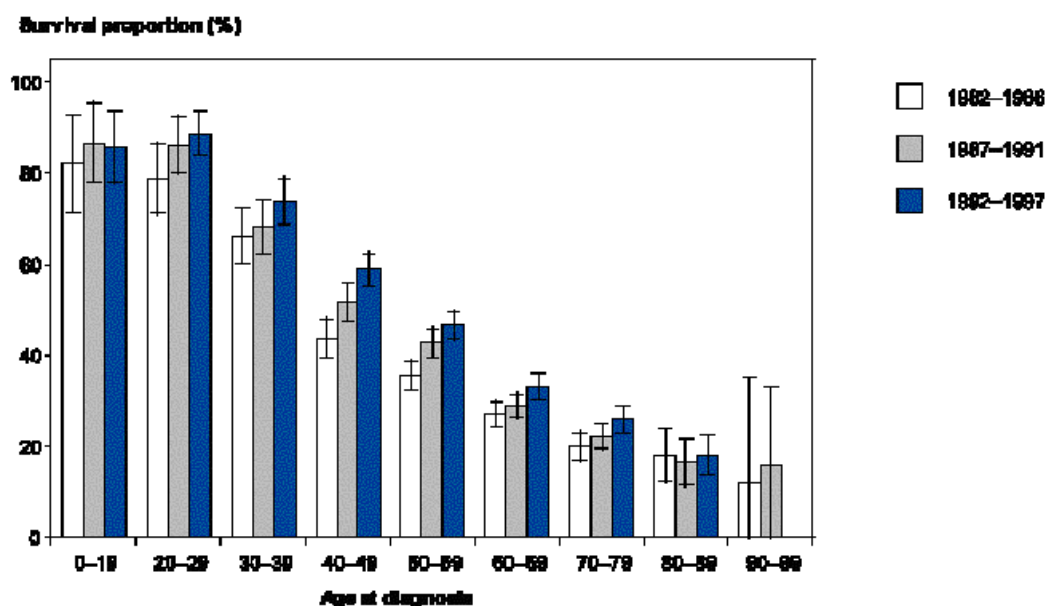
Five-year relative survival improved from 34.4% in 1982-1986 to 40% in 1987-1991 and 42% in 1992-1997.

**Figure 24. Survival in time periods**



Compared with 1982-1986, five-year relative survival was substantially greater in 1992-1997 in women 40-59, somewhat greater in women 60-79 years but relatively unchanged in women younger than 40 years and 80 years or older. Treatment may have changed little over time for younger women, who have a higher percentage of more favourable cancers, and older women. Less change in management options over time may have contributed to the relatively unchanging survival at these ages.

**Figure 25. Survival by age and time period**



Note: 95% confidence intervals are shown for each age group.

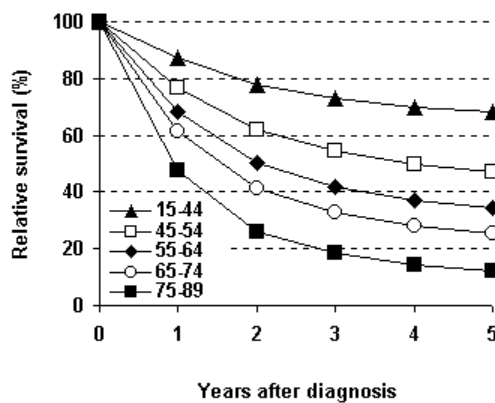
Source: Australian Institute of Health and Welfare & the Australasian Association of Cancer Registries. *Cancer survival in Australia. Part 1: National summary statistics*. Canberra, 2001



## Survival in NSW women in 1980 to 1995

The youngest women had the best five-year relative survival (68.1%) and the oldest women had the poorest (12.4%) in NSW in 1980-1995. Compared with women 65-74 years of age, risk of death from ovarian cancer at five years was lower in women aged 15-44 (53% lower), 45-54 (41%) and 55-64 years (22%), after adjusting for period of diagnosis and spread of disease. Women aged 75-89 had a 63% higher risk of death from ovarian cancer at five years than women aged 65-74 (Figure 26).

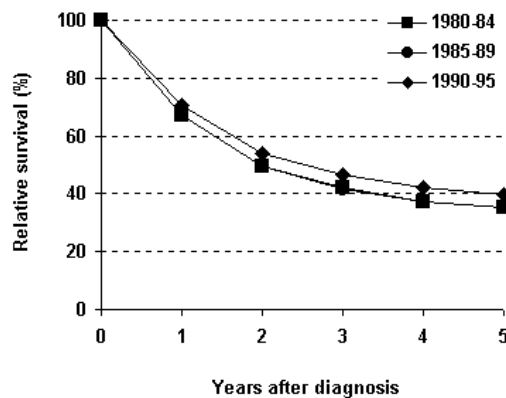
**Figure 26: Survival from ovarian cancer in NSW women in 1980-1995 by age**



Five-year relative survival was 40% in NSW women in 1990-1995.

Survival in 1980-1984 and 1985-1989 was unchanged; as a consequence the lines for these periods in Figure 27 overlap completely. Between 1980-84 and 1990-95, however, the relative risk of death from ovarian cancer at five years fell 34% in NSW women, after adjusting for age and spread of disease (Figure 27).

**Figure 27: Survival from ovarian cancer by year of diagnosis in NSW women**

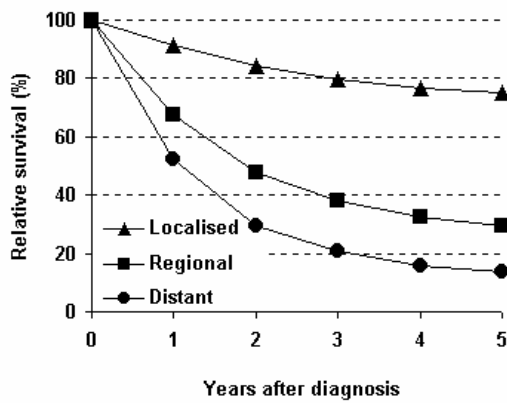


Five-year relative survival in NSW women was best when the cancer had not spread ('local' spread; 75%) and poorest when it had spread beyond the ovaries into the pelvis or to the lymph nodes ('regional spread'; 30%) or beyond the pelvis, including to other organs ('distant spread'; 14%) (Figures 28 & 29). In white women in 1992-1997 in the USA, these survival proportions were 95%, 80% and 30% (Ries et al 2001).

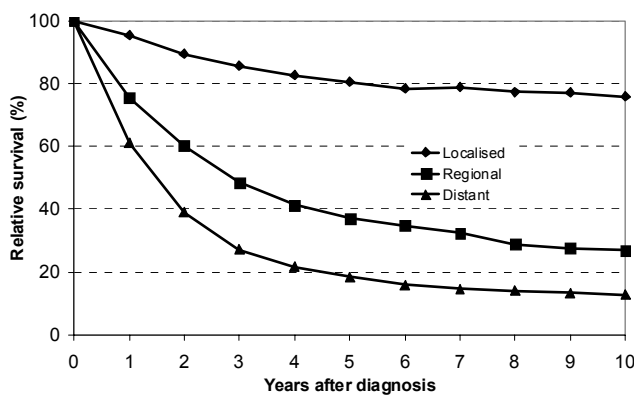
The risk of death from ovarian cancer at five years for women with metastatic spread was more than six times that of women with localised disease, after adjusting for age and period of diagnosis. The risk of death from ovarian cancer at five years for women with regional spread was more than three times that of women with localised disease.

Relative survival continued to fall between 5 and 10 years after diagnosis (Figure 29).

**Figure 28: Survival by extent of cancer at diagnosis in 1980-1995**



**Figure 29: Survival by extent of cancer at diagnosis in 1989-1998**

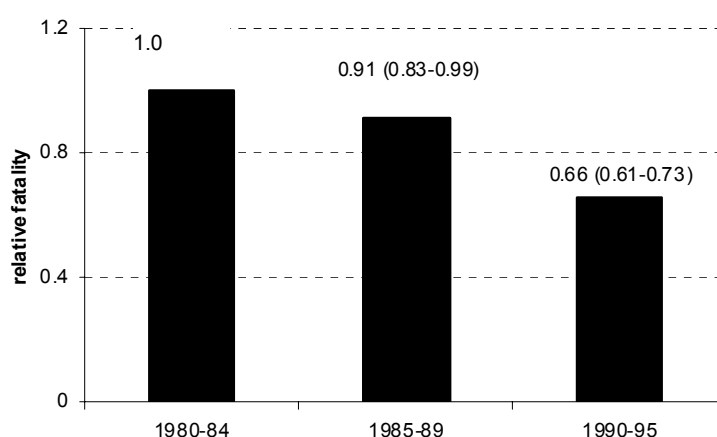


When comparing survival between Australia and the USA, differences in recording ovarian cancers of low malignant potential have already been mentioned: their inclusion as cases in the USA enhances relative survival rates, given their good prognosis (see ‘International comparisons of survival’, page 40). In addition, however, inaccuracy in classification of cancers by degree of spread will influence the trend in fatality from localised to metastatic disease. The substantial differences in relative survival proportions by category of spread between NSW and the USA suggest that staging information in Australia may be insufficient to ensure accurate staging (Table 7).

**Table 7: Five-year relative survival proportions in NSW in 1980-1995 and in US white women in 1992-1997.**

Extent of disease	NSW 1980-1995			USA 1992-1997		
	N	%	relative survival proportion (%)	N	%	relative survival proportion (%)
Localised	1241	25	75.2	2436	25	95.2
Regional	1131	22	29.5	975	10	79.6
Distant	2092	41	13.6	5750	59	29.6
Unknown	608	12	46.8	585	6	25
Total	5072			9745		

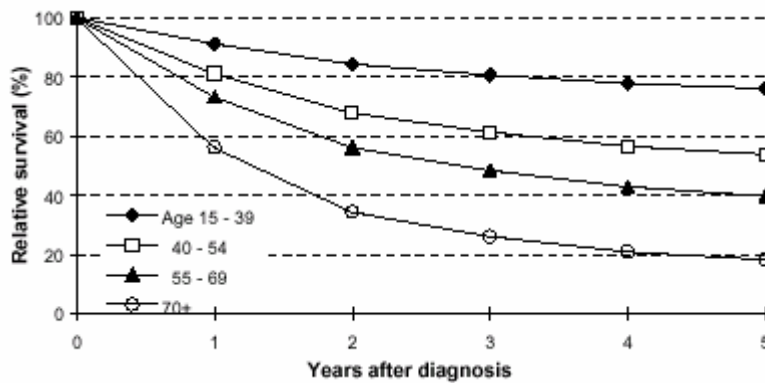
**Figure 30: Relative fatality of ovarian cancer by period of diagnosis in 1980-1995 in NSW**



## Survival in Western Australia

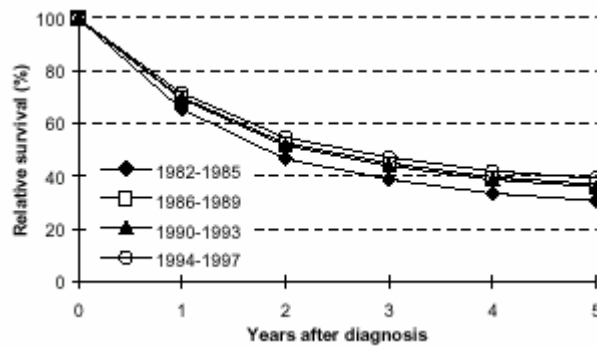
In Western Australian women, five-year relative survival from cancer of the ovary was 35.8% (32.8 – 38.7) in 1982-1997 (Western Australian Cancer Registry, 2000). Five-year relative survival in 1994-1997 was highest in women 15-39 years (76.1%) and fell with increasing age from 40-54 years (53.8%) and 55-69 years (39.7%) to the lowest survival (18.1%) in women 70 years of age and older.

**Figure 31: Relative survival in Western Australia in 1994-1997 by age and time since diagnosis**



Five-year relative survival was low (30.7%) in 1982-85, increasing to around 36% in 1986-1989 (36.9%) and 1990-1993 (35.9%) and to 39.2% in the most recent period, 1994-1997.

**Figure 32: Relative survival in Western Australia in four time periods from 1982-1985 to 1994-1997**

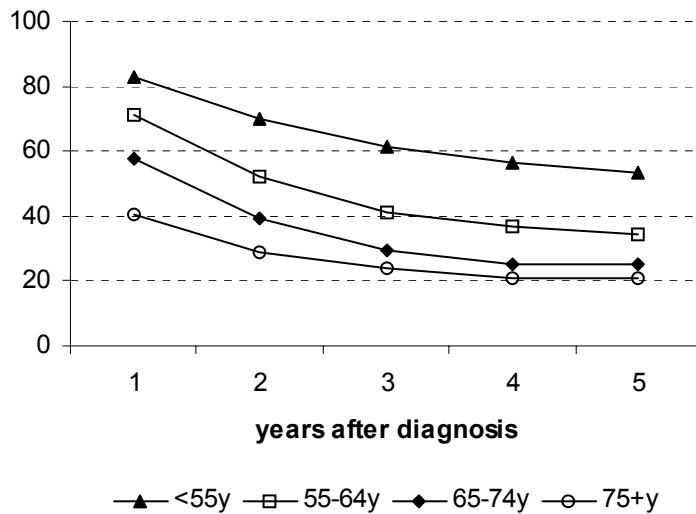


## Survival in South Australia

Five-year relative survival in South Australian women was 35% in 1977-1994, 36.5% in 1977-1997 and 36% in 1977-98 (South Australian Cancer Registry, 1997 & 2000). Ten-year relative survival was 31% and 15-year survival 29% in 1977-98 (South Australian Cancer Registry, 2000).

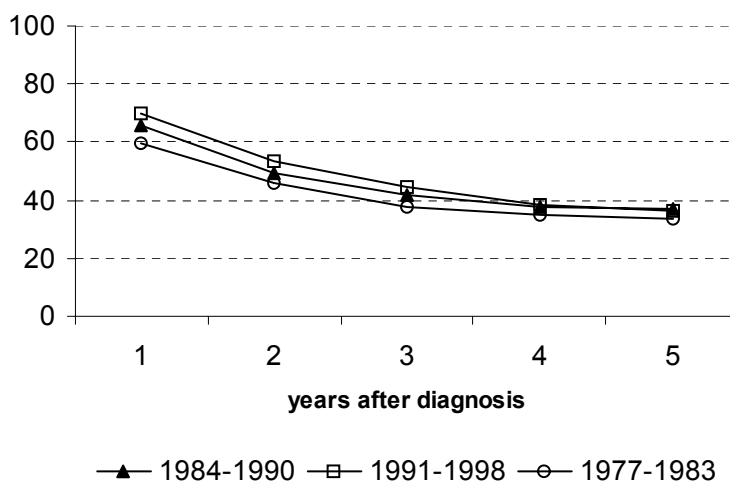
The best five-year relative survival in 1977-1998 was at younger ages, 53.2% in women up to 54 years of age and the poorest (20.8%) in women 75 years of age and older (South Australian Cancer Registry, 2000).

**Figure 33: Relative survival in four age groups in South Australia in 1977-1998 by time since diagnosis**



Relative survival appears to have improved more in the first three years than in the fourth and fifth years after diagnosis in South Australia.

**Figure 34: Relative survival in South Australia by time since diagnosis in 1977-1983, 1984-1990 and 1991-1998**



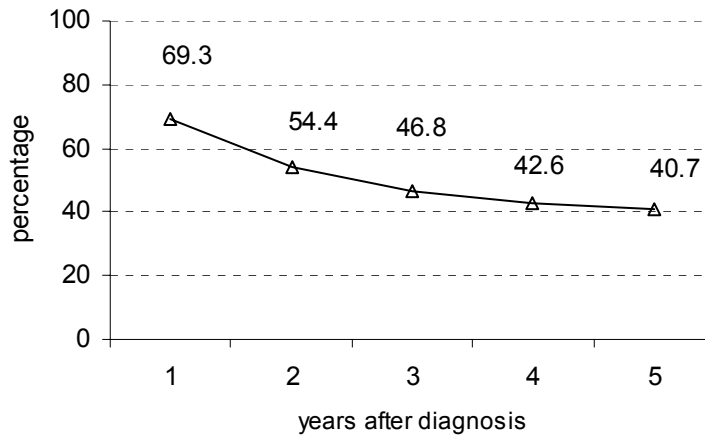
## South Australia

Detailed information in hospital-based cancer registries in South Australia was examined for 889 women with cancer of the ovary in 1984-1998 (South Australian Cancer Registry, 2000). The five-year relative survival (35%) in these women was very close to that in the whole population (36%) in 1977-1998 and, similarly to the whole population, was poorer with more advanced stage and older age. Additionally in the hospital-based cancer registries, women from residential areas of lower socioeconomic status (SES) in Adelaide had lower relative survival than women from Adelaide areas of higher SES or from rural areas.

## Survival in Queensland

A total of 2,285 women were diagnosed with ovarian cancer in Queensland in 1982 to 1995 (Baade et al, 2000). With increasing time after diagnosis, relative survival in 1982-1995 fell from 69.3% at one year to 40.7% at 5 years (Baade et al, 2000).

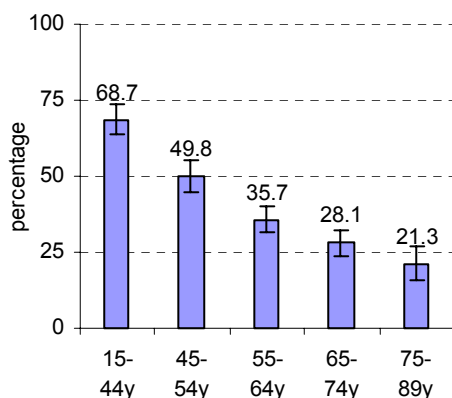
**Figure 35: Relative survival in Queensland in 1982-1995 by time since diagnosis**



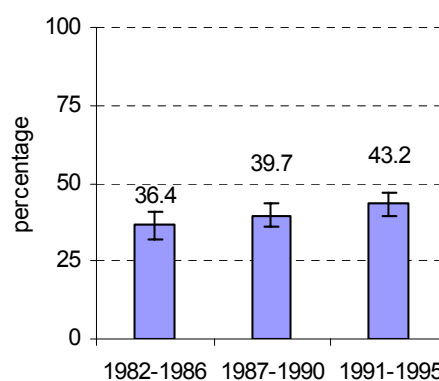
Five-year relative survival was high (69.7%) in women 15-44 years of age, substantially lower at 45-54 years (49.8%) and low in women 55 years and older (Figure 36).

Survival improved steadily across the three time periods (Figure 37).

**Figure 36: Relative survival in Queensland in 1982-1995 by age**



**Figure 37: Relative survival in Queensland in 1982-1995 by time**



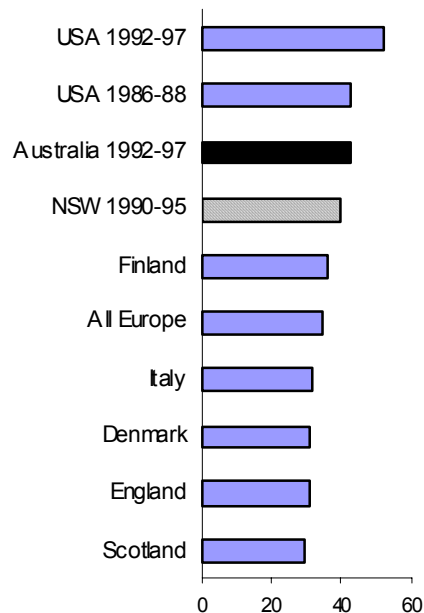
## International comparisons of survival

When comparing relative survival for cancer of the ovary internationally, the ‘borderline’ malignancies become important because, as noted, different countries at different times include these in their registration of ovarian cancers. The effect of their inclusion is apparent in US survival rates.

Five-year relative survival in the USA in 1992-1997 was 11 percentage points higher than in Australia. Between 1987 and 1988, annual five-year relative survival rates increased by 9 percentage points and one-year survival increased by seven percentage points between 1986 and 1990. By time period, rates were 40.2% in 1983-1985, and 49.6% in 1989-1991 and 51.5% in 1992-1997 (Ries et al 2001). It would seem reasonable to conclude that the difference in survival in the USA due to registration of the more favourable ‘borderline’ tumours is probably around 9 percentage points.

Since other Western countries have relative survival proportions around 28% to 38% (Berrino et al. 1999), it appears that stage-adjusted survival in the USA may not be much higher than elsewhere.

**Figure 38: Five-year relative survival proportions from ovarian cancer in Australia, the USA and selected countries in Europe.**



Source: Berrino et al. 1999



## Appendix I

**Table 8: Numbers and percentage of new cancers and deaths from cancer in Australian women in 1998**

Age at diagnosis	New cases		Deaths	
	N	% of all new cancer cases	N	% of all cancer deaths
Breast	10,665	28.6	2,526	17
Colorectal	5,158	13.8	2,159	14.5
Melanoma	3,493	9.7	344	2.3
Lung	2,488	6.7	2,076	14
Unknown	1,538	4.1	1,102	7.4
NHL	1,466	3.9	759	5.1
Uterus	1,399	3.8	246	1.7
Ovary	1,216	3.3	769	5.2
Pancreas	869	2.3	805	5.4
Cervix	868	2.3	264	1.8

## Appendix 2

### SEER registries in the USA

Data on ovarian cancer from the nine cancer registries of the *Surveillance, Epidemiology, and End Results (SEER)* program (Ries et al. 2001) have been used in this report.

**Figure 39. The nine US SEER registries**



## Notes

### New cases and deaths

This report has used the most recent incidence data for the whole of Australia from the National Cancer Statistics Clearing House at the Australian Institute of Health and Welfare ([WWW.aihw.org.au](http://WWW.aihw.org.au)) and mortality data from the Australian Bureau of Statistics.

### Age standardised rates (ASR)

Age standardised rates (ASRs) are given in the report. ASRs are summary rates calculated to help compare populations with different age structures and reflect the annual incidence and mortality that would have been expected if the populations of each area or time period being compared had an identical age structure. They are calculated as weighted average of age-specific rates using a standard population age distribution (Kricke A, Jelfs P 1996). The standard population could be a national or international one. Usually, the national population in a specific year is the standard and is indicated where used. Australia 1991 is used to standardise incidence and mortality rates in Australia, USA 1970 population for the USA rates and the standard European population for the UK rates. When comparing rates between countries, the standard 'World' population is most often used.

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