

# The South Australian Cancer Registry: a Means of Assessing Cancer Incidence, Mortality and Case Survival

Anton Bonett, David Roder and Lesley Milliken

In 1977, a Cancer Control and Surveillance Unit was established by the South Australian government. The infrastructure of the Unit was the State's Cancer Registry which was established simultaneously. By 1990, approximately 70 000 invasive cancer cases had been notified to the Registry for a population which had increased from 1 287 550 in 1977 to 1 400 000. In 1990, 2940 cancers were notified in males and 2640 in females. The leading sites in males were the prostate, lung, colon and melanoma of the skin, while in females they were the breast, colon, melanoma of the skin and lung. An increase in age-standardised incidence rates for all cancer sites combined has been documented for the 1977-1990 period. The magnitude of the increase was 7% in males and 12% in females. Meanwhile, there were 1544 male cancer deaths and 1203 female cancer deaths in 1990. Amongst males, age-standardised mortality rates tended to decline in the 1980's, due largely to a reducing age-standardised incidence of lung cancer. By comparison, an increased lung cancer incidence in females contributed to an overall increase of 6% in the age-standardised mortality rate for cancers of all sites combined in this sex during the life of the Registry. During the period 1977-1990 there was a 55% increase in the number of new invasive cancers in males and females combined. Most of this increase can be attributed to the ageing of the South Australian population and to a much lesser degree to population growth. During the same period there was a concomitant increase of 43% in the number of deaths where the underlying cause of death was cancer. Case survival rates are found to be very similar in South Australia to those reported for the United States, with about 51% of cases surviving their cancers 5 years after diagnosis. 5-year survival rates for the diagnostic period, 1983-1990, were generally better than for 1977-1982. The evidence for improved survival was strongest for cancers of the oesophagus, colon, cervix, prostate and testes, and for low-grade and medium-grade lymphomas and chronic myeloid leukaemias. When case survival rates were calculated for childhood tumours, significant improvements were found for acute lymphatic leukaemias and non-Hodgkin lymphomas for the diagnostic period, 1983-1990, when compared with 1977-1982.

*Eur J Cancer*, Vol. 28A, No. 11, pp. 1923-1926, 1992.

## INTRODUCTION

SOUTH AUSTRALIA is one of the six Australian states. Its Cancer Registry is reputed to be the best in the country; it is the only registry that provides case survival rates. This report describes the operation of the Cancer Registry during 1977-1990 and summarises cancer incidence, mortality and case survival in South Australia.

## OPERATION OF THE REGISTRY

### *Type of data*

All new cases of cancer in South Australian residents are notified to the Registry, with the exception of basal cell and squamous cell carcinomas of the skin, and *in situ* cancers of all sites other than melanomas and bladder cancers. *In situ* melanomas and bladder tumours are not included in routine reports of the Registry, but they are available for *ad hoc* studies. Information is collected on the demographic characteristics of

cases, and on the primary sites and histological characteristics of the cancers, the basis for diagnosis, and on deaths of cancer patients, irrespective of the cause.

In the period, 1977-1990, 95% of all cancers were verified histologically, although there were variations for certain sites. For example, the basis of diagnosis for pancreatic and bile duct cancers relied mainly on radiological diagnosis. Cases reported by death certificate only are not accepted automatically by the Registry, but are followed-up intensively to establish the basis of diagnosis. A decision is then taken by a clinician as to whether the case should be added to the Registry file.

### *Sources of data*

The main source of data is compulsory notification, from pathology laboratories, medical record departments of hospitals, radiotherapy departments and oncologists. The Registrar-General of Births, Deaths and Marriages reports cancer deaths on a regular basis, where cancer is the underlying cause or a significant contributor to death. Tapes of deaths in South Australia from all causes have been supplied to the Registry since 1979, and direct computer matching with Registry files has been carried out to detect deaths of cancer cases from causes other than cancer. This enables us to compute relative survival rates.

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Revised and accepted 1 May 1992.

Table 1. South Australian Cancer Registry: Incidence of invasive cancer, 1990. Number of new cases, the percentage distribution, the crude incidence rates and the directly age-standardised incidence rates (world) per 100 000 males and females for leading sites\*†

Males—1990					Females—1990				
Site	No.	%	CR*	ASR†	Site	No.	%	CR*	ASR†
Total number	2939	100.0	410.1	301.5	Total number	2640	100.0	365.4	246.7
Prostate	602	20.5	84.0	55.3	Breast	657	24.9	90.9	68.3
Lung	467	15.9	65.2	47.5	Colon	256	9.7	35.4	21.7
Colon	260	8.8	36.3	26.7	Melanoma skin	245	9.3	33.9	25.9
Melanoma skin	216	7.3	30.1	25.1	Lung	186	7.0	25.7	16.8
Rectum and R.S. jt and anal canal	158	5.4	22.0	16.2	Rectum and R.S. jt and anal canal	139	5.3	19.2	11.7
Lymphomas	133	4.5	18.6	14.7	Lymphomas	112	4.2	15.5	10.2
Leukaemias	123	4.2	17.2	13.6	Ovary	98	3.7	13.6	9.7
Stomach	112	3.8	15.6	11.1	Corpus uteri	94	3.6	13.0	9.7
Lip	107	3.6	14.9	11.9	Leukaemias	93	3.5	12.9	8.0
Bladder	99	3.4	13.8	9.8	Pancreas	71	2.7	9.8	5.1
Kidney and ureters	73	2.5	10.2	7.9	Cervix	67	2.5	9.3	7.4
Brain	54	1.8	7.5	6.0	Kidney and ureters	57	2.2	7.9	5.2
Pancreas	48	1.6	6.7	4.7	Stomach	53	2.0	7.3	3.8
					Lip	52	2.0	7.2	3.9
					Bladder	41	1.6	5.7	2.9
					Brain	39	1.5	5.4	4.3

\* SA estimated population, Australian Bureau of Statistics 1990.

† Standardised to the World Population.

#### Data entry

Pathology reports, notifications and death certificates are linked and a interactive search based on name and sex is carried out to determine whether or not the patient has been registered. Data are entered interactively with new registry numbers being assigned by computer. The system operated by the Unit is a 3 COM Ethernet Share LAN; the LAN is driven from a NEC APC Powermate 486 supporting a variety of 'Slave' machines; each machine runs MS-DOS. The LAN is augmented by a Laserjet III printer and a Dot Matrix printer. In addition,

a nine track 1600/3200 bpi tape drive is available for data import/export and back-up, as appropriate.

Registration of medical data and the maintenance of the computer system are the responsibility of the Registry's project officers, who are coordinated by the Tumour Registrar who is directly responsible to the Medical Director of the Cancer Surveillance and Control Unit. All documents relating to a single person are linked and stored in alphabetical sequence by full name. The data base also allows for TNM staging of melanomas and breast cancers.

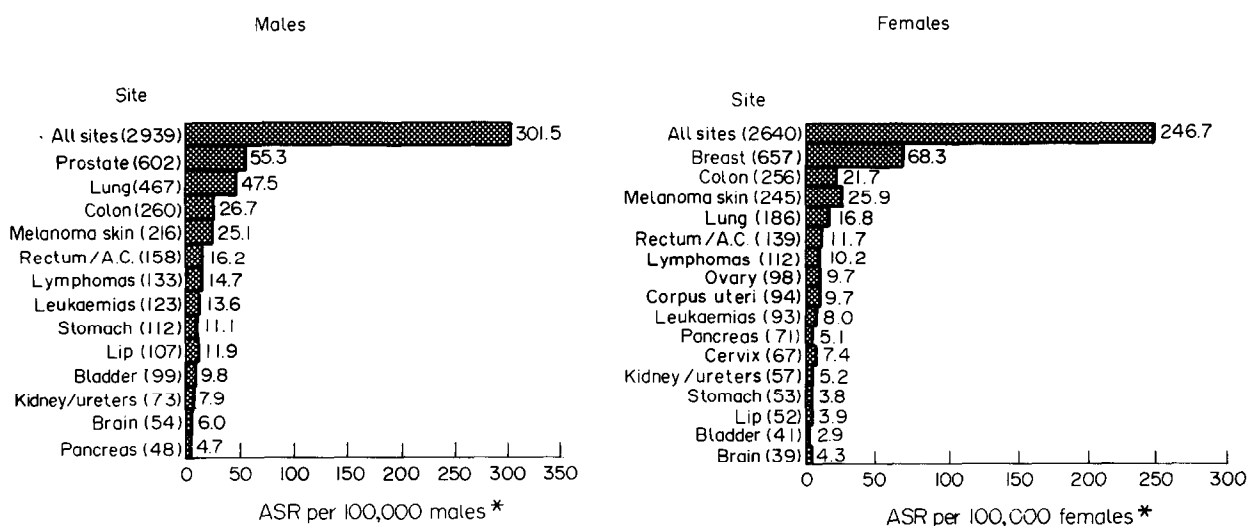


Fig. 1. Age-standardised (world) incidence rates per 100 000 for major cancer sites, South Australia, 1990. Number of registered cases is given in parenthesis. \*Standardised to the World Population.

Table 2. South Australian Cancer Registry: Mortality from cancer, 1990. Number of deaths, the percentage distribution, the crude mortality rates and the directly age-standardised mortality rates (world) per 100 000 males and females for leading sites\*†

Males—1990					Females—1990				
Site	No.	%	CR*	ASR†	Site	No.	%	CR*	ASR†
Total number	1544	100.0	215.5	153.7	Total number	1203	100.0	166.5	98.0
Lung	413	26.7	57.6	40.9	Breast	195	16.2	27.0	17.7
Prostate	178	11.5	24.8	15.5	Lung	135	11.2	18.7	11.7
Colon	113	7.3	15.8	11.4	Colon	131	10.9	18.1	9.7
Stomach	80	5.2	11.2	7.8	Pancreas	65	5.4	9.0	5.1
Rectum and R.S. jt and anal canal	72	4.7	10.0	7.2	Ovary	61	5.1	8.4	5.2
Lymphomas	66	4.3	9.2	7.2	Stomach	57	4.7	7.9	3.8
Pancreas	57	3.7	8.0	5.6	Lymphomas	54	4.5	7.5	4.1
Leukaemias	57	3.7	8.0	5.8	Rectum and R.S. jt and anal canal	48	4.0	6.6	3.6
Brain	47	3.0	6.6	5.4	Leukaemias	45	3.7	6.2	3.3
Melanoma skin	45	2.9	6.3	5.0	Brain	40	3.3	5.5	4.3
Bladder	43	2.8	6.0	3.9	Kidney and ureters	34	2.8	4.7	2.4
Kidney and ureters	38	2.5	5.3	3.9	Cervix	32	2.7	4.4	3.3
Oesophagus	30	1.9	4.2	2.9	Bladder	24	2.0	3.3	1.6
					Melanoma skin	23	1.9	3.2	2.2
					Corpus uteri	21	1.7	2.9	1.5
					Oesophagus	17	1.4	2.4	1.2

\* SA estimated population, Australian Bureau of Statistics 1990.

† Standardised to the World Population.

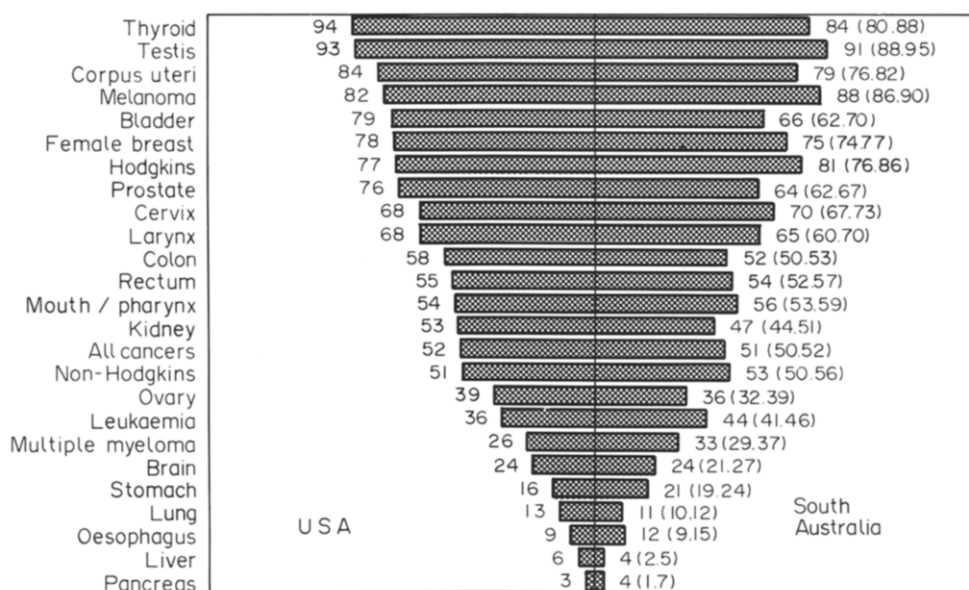


Fig. 2. 5-year Relative Survival Rates for major cancer sites, South Australia and the United States. 95% confidence limits are given in parenthesis. South Australia: diagnoses 1977–1990; censored 31 December 1990; USA: diagnoses 1981–1987; censored 31 December 1988.

#### Use of the data

Registry records are used to produce descriptive data by age and sex on an annual basis, and to respond to *ad hoc* requests from community, research, educational and occupational groups. The data are also used in teaching, with an emphasis on cancer epidemiology, and for resource allocation and the planning of radiotherapy and palliative care services. The registry has collaborated in case control studies into the aetiology of cancers of the breast, colon, rectum, pancreas, gall bladder and bile

ducts, mesothelioma and brain tumours. This is part of the SEARCH Programme of the International Agency for Research on Cancer (IARC), an agency of the World Health Organisation which is promoting multi-centre studies of those cancers which are too rare for effective study in any one location. Registry data have frequently been used to assess the risk of cancer in local areas in South Australia. Very often cancer rates in specific areas become a political issue, which can add to the level of confusion and concern among local residents.

Evaluation of the cervical, breast and colorectal screening programmes have been undertaken in collaboration with other units. Due to privacy issues, most of the analyses had to be undertaken in-house.

### DISCUSSION

During 1977 to 1990, 34 000 new male cancer cases and 29 300 female cases were reported to the Registry and during the same period there were 18 269 male cancer deaths and 13 900 female cancer deaths notified. Table 1 and Fig. 1 shows the numbers of new cases, the percentage distribution, the crude incidence rates and the world age-standardised incidence rates per 100 000 males and females for 1990. Table 2 shows the corresponding mortality data and Fig. 2 shows South Australian 5-year survival rates as compared with rates for the United States. While the cancer burden in South Australia will increase with further ageing of the population, there is evidence that age-standardised cancer rates are stable for most sites, and in some instances they

are falling. An analysis in time trends for the period 1977–1990 indicated that the 5% male and 12% female increase in age-standardised incidence rates were largely due to cancers of the lip, rectum and melanoma in both sexes and for cancers of the lung, breast and cervix in females.

An increase in age-standardised incidence of cervical cancer of about 80% was described for South Australian women under 50 years of age between 1978 and 1986 and a decrease of 20% amongst older women. There is now a suggestion that age-standardised incidence rates in the younger women which peaked in 1988 has now begun to decrease. The rate in older women has followed a similar trend in decreasing further. This may reflect increased screening activity which occurred in South Australia during the 1980s. There has also been a decrease in case fatality due to breast cancer of about 20% for patients diagnosed in 1985–1990 as compared to 1977–1980. Although it is too early to make any definite predictions due to lead time and length time bias the results are encouraging (Bonett, Hakulinen and Gibberd).

*Eur J Cancer, Vol. 28A, No. 11, pp. 1926–1928, 1992.*  
Printed in Great Britain

0964–1947/92 \$5.00 + 0.00  
Pergamon Press Ltd

## Cancer Incidence and Trends in Bombay, India

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THE BOMBAY Cancer Registry was established in June 1963 as a unit of the Indian Cancer Society at Bombay, with the aim of obtaining reliable morbidity data on cancer from a precisely defined urban population. The actual compilation of data began in 1964. Until then, no continuous survey had been undertaken anywhere in India. Thus, reliable data have only been available since 1964, and have been published in volumes II–V of *Cancer Incidence in Five Continents* [1–4].

The registry covers the resident population of Bombay (10 million, 1991 census), occupying an area of 603 km<sup>2</sup>. Bombay is in fact an island, joined to the mainland by bridges, and has a warm humid climate.

Information is obtained from all cancer patients, registered in 102 private and public hospitals in Bombay and under the care of 315 specialists practising in the city. Staff members of the registry visit the wards of all co-operating hospitals at least once a week to interview each cancer patient. All files maintained by various departments of these hospitals are also cross-checked individually.

Information routinely collected includes socioeconomic characteristics, the primary site and the histological (ICDO) type of tumour and diagnostic and treatment information [5]. Information on habits such as chewing and smoking tobacco and diet are also collected. Information from death certificates is routinely integrated in our data. Cases registered only through

death certificate alone contribute about 8% of the number of new cases registered per year. Overall, histological confirmation of cancer is obtained in about 80% of cases.

The data for 1988 have been published [6]. In Fig. 1, overall age-standardised rates are presented. In males, the lung was the

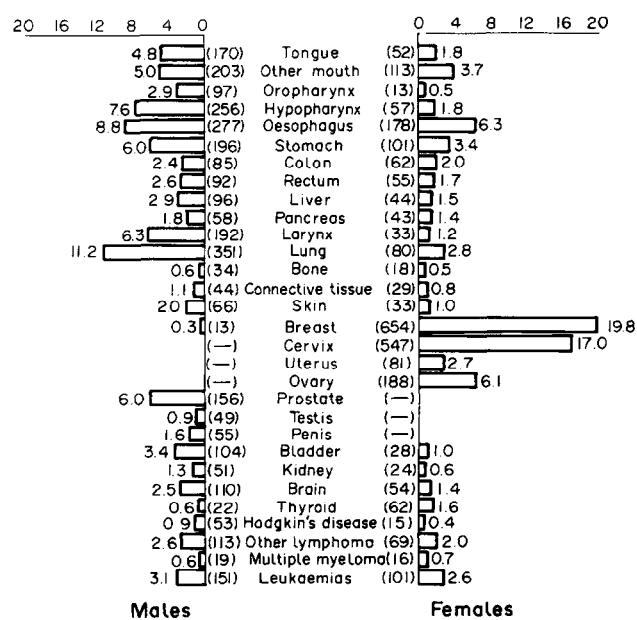


Fig. 1. Age-standardised (world) incidence rate per 100 000 for major sites, Bombay, India, 1988. (Number of registered cases are given in parentheses.)

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Received 1 Oct. 1991; accepted 9 Jan. 1992.