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Cancer Registration in Victoria, Australia, 1982–1987

Graham Giles, Helen Farrugia and Bronwyn Silver

THE Victorian Cancer Registry (VCR) became population based in 1982, building upon a hospital based register that had functioned since 1940 and which had covered about 60% of the State's cancer incidence [1]. The VCR is situated in Melbourne where 70% of Victorians reside. With a population of 4.16 million at the last census in 1986 [2], Victoria has a quarter of Australia's population in less than 3% of its geographic area. 22% of Victoria's population is migrant with major contributions from Great Britain (6%), Italy (2.6%), Greece (1.6%) and Yugoslavia (1.4%).

Cancer reporting [including *in situ* tumours but excluding non-melanocytic skin cancers (NMSC)], is set up under legislation that makes notification mandatory for all hospitals and pathology laboratories. The VCR also receives all death certificates in computer compatible format. As patients may visit more than one hospital and have additional biopsies subsequent to their original diagnosis, further registrations are recorded and linked on the computer system, updating the date of last contact. Information routinely collected includes personal identifiers, sex, dates of birth, diagnosis and death, primary site coded to the International Classification of Diseases Ninth Edition (ICD-9) [3], histology coded to the International Classification of Diseases for Oncology [4], Aboriginality and country of birth. All multiple tumours are recorded on the VCR's computer system but the International Agency for Research on Cancer's guidelines are followed for incidence reporting [5]. The reliability and accuracy of VCR registry data are considered to be high. In 1987, the percentage of cases obtained from death certificates only was 2.7%, and the proportion of cases histologically verified was 90%.

Correspondence to G. Giles.
The authors are at the Victorian Cancer Registry, 1 Rathdowne Street, Carlton South, Vic 3053, Australia.
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The VCR is housed by the Anti-Cancer Council of Victoria and is seen as a valuable component of the Council's cancer control activities. The Council is able to use VCR data to evaluate the success of its major preventive programs in smoking and sunlight exposure; and screening/early detection programs for breast, cervix and skin cancer. For this reason, the VCR records *in situ* cervix and breast cancers and collects information on level and thickness for all melanomas. Victoria has recently established a central registry for cervical smear data with a recall system. A similar system for mammographic screening is likely to be introduced in the near future and the cancer registry will be able to assess the impact of these public health measures. In addition, the Council is committed to a cohort study of 50 000 Melbourne residents, 30 000 of whom were born in either Italy or Greece [6], and the VCR will be used to detect cancers occurring in the study population.

Data for the period 1982 to 1987 form the basis of this communication. Data for 1982 were published in *Cancer Incidence in Five Continents*, Vol V [7] and in *Cancer in Australia* [8]. Annual data for 1982–1987 have been published in standard reports [9–14]. Incidence data for 1982–1983 have been used for an atlas of Victoria [15]. VCR data have also been used extensively in Canstat a series of pamphlets on cancer epidemiology [16]. As the VCR does not routinely collect data on NMSC, it conducts a quinquennial national household survey to estimate the incidence of treated NMSC [17]. This survey was first conducted in 1985 and was repeated in 1990. The world standardised rates of NMSC in Victoria in 1985 were 497 and 418 per 100 000 males and females respectively. Trends in skin cancer (NMSC and melanoma) have also been reported [18–20]. The VCR is used extensively to facilitate epidemiological and clinical research. Projects include analyses of putative clusters of cancer [21], surveys of surgical management of breast cancer [22], follow-up studies of cervical cytology [23] and analyses of cancer rates in migrants [24].

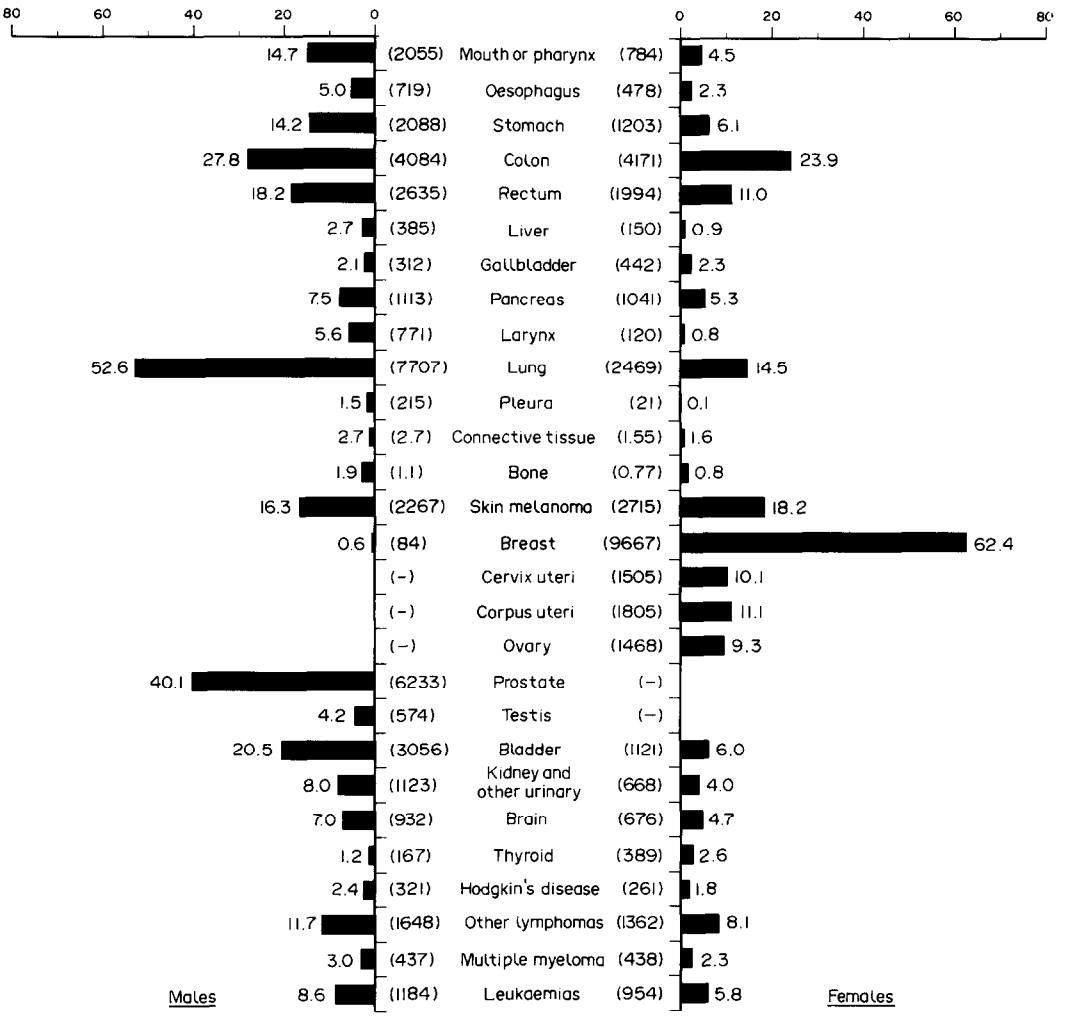

Fig. 1. Age-standardised (world) incidence rates from major cancer sites. Victoria, Australia, 1982–1987. No. of registered cases is given in parentheses.

In its first 6 years of operation the VCR recorded 82 531 newly diagnosed primary cancers. Incidence rates calculated per 100 000 person-years for the sexes separately, and standardised to the World standard population are illustrated in Fig. 1. The overall rate is 298 per 100 000 man-years and 235 per 100 000 woman-years. The leading sites are immediately apparent from the length of the bars in the figure. Taken together, colorectal cancer is the most common type; taken separately, colon ranks third in men and second in women and rectum ranks fifth in both sexes. Lung followed by prostate, colon, bladder and rectum are the five leading sites in men. Breast followed by colon, melanoma, lung and rectum are the five leading sites in women. Other common cancers include stomach, kidney and pancreas and lymphomas and leukaemias. In women, cancer of the corpus uteri, cervix uteri and ovary rank highly. The prominence of melanoma and lip cancer in the Victorian rates is noteworthy; both of these malignancies are unusually common in Australia because of the predominantly fair skinned population living in tropical, subtropical and Mediterranean climates. Melbourne is situated at 38° south latitude, equivalent to Palermo or San Francisco in the Northern Hemisphere.

To assess trends across this short series of years, the data were divided into two 3-year periods; 1982–1984 and 1985–1987. Rates were also calculated for age ranges 0–4 to 60–64 and for 65–69 to 85 plus for the two triennia and were standardised using appropriate strata from the World standard population. Changes in the all-age standardised rates between 1982–1984 and 1985–1987 are given as percentages in Table 1 by sex. Rates by sex, triennium and age group are given in Table 2. Table 1 contains many apparently large changes in rates between the two triennia. Most of these changes are not statistically significant at the 5% level; for example, the 100% increase in cancer of the pleura in women is based on 14 cases in 1985–1987 compared to only 7 cases in 1982–1984. Such large proportional increases in uncommon tumours may be due to chance but cannot be easily dismissed. Similar increases are observed for thyroid cancer in both sexes and cancer of the lip in women.

Statistically significant percentage changes include falls in stomach cancer and increases in melanoma in both sexes; falls in cancer of the lung, bladder and prostate in men and an increase in soft tissue cancer in men. Overall, the male cancer rate declined by 4% ($P<0.05$), and the female cancer rate remained virtually unchanged. Declines in male lung and bladder cancer were matched by non-significant decreases in cancer at these sites in females. The trends in stomach cancer, melanoma and male lung and bladder cancer were anticipated from trends in other countries of similar economic development to Australia [25]. The decline in lung cancer in females, albeit

Table 1. Percentage rate of change of standardised (world) incidence rates for selected cancers or groups of cancers for males and females. Victoria, Australia, 1982–1987

Site	ICD(9)	Change (%) (1985–1987/1982–1984) Males	Females
Lip	140	−8.4	+17.6
Oral cavity	141, 3–5	−14.5	−6.1
Pharynx	146–8	−8.4	−1.1
Oesophagus	150	−5.1	−1.7
Stomach	151	−13.0*	−15.2*
Colon	153	+6.1	−0.6
Rectum	154	−8.7	−3.3
Liver	155	−15.5	−9.8
Gallbladder	156	−14.9	+0.4
Pancreas	157	−10.3	−3.2
Larynx	161	−12.8	+6.9
Lung	162	−7.0*	−5.3
Pleura	163	+0.7	+100.0
Bone	170	−19.0	−9.8
Soft tissue	171	+49.3*	−17.1
Melanoma	172	+24.4*	+16.4*
Breast	174–5	−17.7	+1.5
Cervix uteri	180		+7.4
Corpus uteri	182		+8.1
Ovary	183		−5.9
Prostate	185	−9.5*	
Testis	186	−6.0	
Bladder	188	−10.8*	−3.5
Kidney	189	−3.9	−1.0
Brain	191–2	+6.5	+3.0
Thyroid	193	+26.9	+16.5
Hodgkins disease	201	−22.6	−3.2
Other lymphomas	200, 202	+6.2	−8.0
Multiple myeloma	203	−8.6	+7.7
Leukaemias	204–8	−10.4	−3.0
Total, all sites except 173		−4.1*	+0.8

*$P<0.05$.

statistically insignificant, was surprising. Australian lung cancer mortality in females had been increasing through the middle 1980s [26] and the prevalence of females smoking has not changed as dramatically as that for males in recent decades, although the tar content of cigarettes has fallen [27]. Melanoma increases are consistent with trends observed elsewhere. These have been linked with lifestyle factors which lead to increased recreational sunlight exposure. Future increases in ambient ultraviolet light levels due to ozone depletion are of concern, particularly in the southern parts of Australia [20]. The increase in soft tissue cancers has been observed in Australian mortality trends [26]. The increase in soft tissue cancer is more pronounced in males aged under 65 (+62%) and is partly explained by a 10-fold increase in Kaposi's sarcoma (0.05 to 0.55 per 100 000 man-years between 1982–1984 and 1985–1987) linked with the HIV epidemic.

The fall in prostate cancer is unexpected and inexplicable. Interestingly, its fall is strongest in those aged over 65. In this age group, the total cancer rate fell by 5.3% in males between the two triennia. Prostate and male bladder cancer were the only sites to obtain significant decreases in incidence (−11% and −15%, respectively) in the over 65s. In the under 65s, melanoma increased in both sexes (27% in males and 18% in females), and in males lung cancer decreased by almost 11%.

On balance, the several site specific trends achieve a net reduction in the overall age-standardised rates. Although major cancers such as colorectum and breast have not declined, there is no evidence of significant increases in cancer rates with the exception of melanoma and some rare tumours such as soft tissue sarcomas. Indeed, the continuing abatement of smoking prevalence in Victoria presages continuing declines in tobacco related cancers such as lung, bladder and the upper aerodigestive tract, which will have a tangible impact on the total cancer burden.

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Table 2. Age-standardised (world) average annual incidence rates for selected cancers in Victoria, Australia, by sex, age group and time period

Age		Males				Females			
		0–64		65+		0–64		65+	
Site	ICD(9)	1982–1984	1985–1987	1982–1984	1985–1987	1982–1984	1985–1987	1982–1984	1985–1987
Lip	140	3.50	3.18	2.33	2.16	0.73	0.87	0.67	0.78
Oral cavity	141, 3–5	3.44	2.91	1.80	2.16	1.17	1.15	0.96	0.85
Pharynx	146–8	3.16	2.79	1.13	1.13	0.65	0.61	0.25	0.28
Oesophagus	150	2.49	2.26	2.64	2.61	0.79	0.91	1.51	1.37
Stomach	151	6.60	5.64	8.65	7.63	2.66	2.18	3.91	3.40
Colon	153	11.93	12.54	15.15	16.18	11.67	11.68	12.37	12.21
Rectum	154	9.01	8.70	10.10	8.75	5.66	5.77	5.59	5.11
Liver	155	1.54	1.26	1.35	1.19	0.46	0.44	0.46	0.39
Gallbladder	156	0.80	0.87	1.49	1.08	0.91	1.04	1.36	1.23
Pancreas	157	3.48	2.84	4.49	4.31	2.12	1.91	3.25	3.29
Larynx	161	3.73	3.28	2.21	1.90	0.47	0.53	0.25	0.26
Lung	162	24.39	21.80	30.23	29.01	8.08	7.71	6.82	6.41
Pleura	163	0.85	0.86	0.67	0.67	0.03	0.06	0.05	0.10
Bone	170	1.04	0.83	0.17	0.15	0.67	0.63	0.15	0.10
Soft tissue	171	1.47	2.38	0.68	0.83	1.30	1.02	0.40	0.39
Melanoma	172	10.71	13.60	3.80	4.46	13.55	15.98	3.27	3.60
Breast	174–5	0.25	0.31	0.37	0.21	44.44	45.29	17.53	17.63
Cervix uteri	180					7.53	8.62	2.21	1.83
Corpus uteri	182					6.50	7.42	4.11	4.05
Ovary	183					6.54	6.45	3.08	2.60
Prostate	185	7.13	7.02	35.27	31.37				
Testis	186	4.29	3.94	0.05	0.14				
Bladder	188	8.23	7.88	13.50	11.50	2.79	2.80	3.30	3.08
Kidney	189	4.56	4.59	3.61	3.26	2.39	2.41	1.61	1.54
Brain	191–2	5.16	5.05	1.63	2.17	3.49	3.45	1.13	1.29
Thyroid	193	0.80	1.02	0.28	0.35	1.98	2.34	0.44	0.48
Hodgkin's disease	201	2.29	1.86	0.44	0.26	1.57	1.55	0.28	0.24
Lymphomas	200,202	6.72	6.68	4.64	5.37	4.88	4.76	3.58	3.02
Myeloma	203	1.50	1.32	1.63	1.55	0.91	0.95	1.30	1.43
Leukaemias	204–8	4.87	4.42	4.29	3.80	3.50	3.74	2.45	2.02
All sites except 173		142.87	139.11	162.13	153.51	144.25	149.62	89.65	86.15

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