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% amonst 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).

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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^2. 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

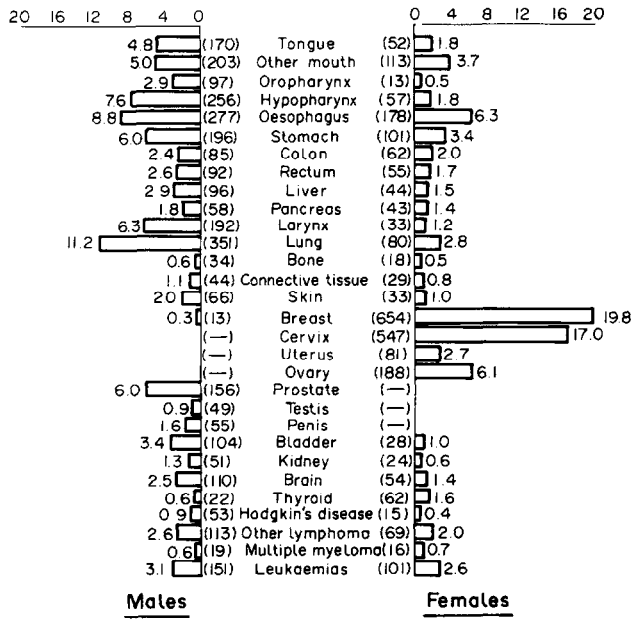

Fig. 1. Age-standardised (world) incidence rate per 100 000 for major sites, Bombay, India, 1988. (Number of registered cases are given in parentheses.)

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Table 1. Percentage change of overall age-adjusted (world) incidence rates for selected sites, Bombay, 1968–1972 to 1983–1987

Site	ICD-9	Males			Females		
		1968–1972	1983–1987	% Change	1968–1972	1983–1987	% Change
Tongue	141	12.6	7.0	−44.4	3.1	2.4	−22.6
Other mouth	143.5	6.7	5.5	−17.9	5.4	4.0	−25.9
Oropharynx	146	5.6	3.0	−42.2	1.2	0.6	−50.0
Hypopharynx	148	7.7	7.7	0.0	1.8	1.8	0.0
Oesophagus	150	15.2	10.7	−32.9	10.8	7.9	−26.9
Stomach	151	9.3	6.8	−26.9	5.8	4.0	−31.0
Colon	153	4.6	3.0	−34.8	3.3	2.5	−24.2
Rectum	154	4.4	3.0	−31.8	2.6	2.3	−11.5
Liver	155	1.4	3.2	+128.6	0.6	1.7	+183.3
Pancreas	157	1.8	2.3	−27.8	0.9	1.4	+45.6
Larynx	161	13.6	8.4	−38.2	2.6	1.5	−42.8
Lung	162	13.5	13.2	−2.2	3.1	2.8	−4.7
Bone	170	1.0	0.8	−20.0	1.1	0.7	−36.4
Connective tissue	171	0.9	1.3	+44.4	0.8	0.7	−12.5
Skin	172–73	2.3	2.0	−13.0	1.4	1.6	−11.4
Breast	174	0.3	0.3	0.0	20.1	23.0	+14.4
Cervix	180	—	—	—	23.2	18.1	−22.0
Uterus	182	—	—	—	1.3	2.1	+61.6
Ovary	183	—	—	—	4.8	6.1	+27.0
Prostate	185	8.0	6.5	−18.7	—	—	—
Testis	186	0.7	1.0	+42.8	—	—	—
Penis	187	1.9	1.7	−10.5	—	—	—
Bladder	188	2.9	3.4	+17.2	1.1	0.9	−18.2
Kidney	189	1.2	1.3	+ 8.3	0.7	0.7	0.0
Brain and nerves	191.2	1.2	2.3	+91.7	1.1	1.6	+45.5
Thyroid	193	0.7	0.7	0.0	1.8	1.4	−22.2
Hodgkin's disease	201	1.0	1.1	+10.0	0.6	0.5	−16.7
Other lymphomas	200, 202	2.4	3.5	+45.8	1.3	2.1	+61.6
Multiple myeloma	203	0.5	0.8	+60.0	0.4	0.9	+125.0
Leukaemias	204–208	3.3	3.8	+15.2	2.4	2.6	+ 8.3
All sites	140–208	143.1	118.8	−17.0	121.7	109.3	−10.2

commonest site of malignancy, with an incidence of 11.8 per 100 000 (world standard population) followed by the oesophagus (8.8), hypopharynx (7.6), larynx (6.3) and stomach (6.0). In females, the breast was the leading site, having a rate of 19.8 per 100 000, followed by the cervix (17.0), oesophagus (6.3), ovary (6.1) and stomach (3.4).

Although age-standardised rates have limitations, some points are worth stressing. The age-adjusted rate for the tongue is the highest in the world in both the sexes. The rates for oropharynx, hypopharynx and pharynx are higher only in France-Bas-Rhin males and in Singapore females. The incidence rates reported by this registry for small intestine, colon, rectum, skin, bladder, kidney and eye are the lowest internationally [7].

Time trends for the major sites are shown in Table 1 as percentage changes between 1968–1972 and 1983–1987. The overall age-adjusted incidence rate per 100 000 at all sites decreased by 17% in males and by 10% in females during the study period. When the individual sites are considered, the incidence of cancer of the tongue and oropharynx declined, where that of the hypopharynx has remained constant in both sexes. In the digestive system, the downward trend was in both sexes at almost all the sites. In the respiratory system, cancer of the larynx significantly decreased in both the sexes while the incidence of the lung cancer has remained constant in males. There was an increase of 14.4% in the incidence of breast cancer in women. In males there was a decrease in the incidence of prostate and penile cancer and an increase in testicular malignancy. In females there was a decrease of 22% in the incidence of cancer of the cervix and an increase in ovarian cancer incidence. In the urinary system there was a decrease in bladder cancer incidence in males whereas a reverse trend was noted in females. The incidence of kidney cancer remained constant in both sexes. A significant increase was observed in the incidence of cancers of the brain and nervous system in both sexes. There was an increase in the incidence of lymphomas, multiple mylomas and leukaemias in both sexes.

Several studies in India have shown that chewing and/or smoking tobacco are the main risk factors involved in cancers of the upper digestive tract. The changing pattern in these cancers should be viewed in the light of the prevalent tobacco habits in the various cohorts and the risk factors associated with specific tobacco habits. Recently, a study of cancer incidence over 2 decades of cancers involving the upper alimentary and respiratory tracks in Bombay was carried out [8]. In this study cancers of the tongue, oropharynx and larnyx in males have declined in incidence over the past 2 decades. This decline has been shown to be a cohort effect. A synoptic measure of risk in each birth cohort, obtained by estimating a site-specific cumulative

incidence rate over an appropriate age range, was found useful in assessing the risk differentiates in successive birth cohorts. The changing pattern of cancer incidence at sites such as the tongue, oropharynx and larynx, where bidi (a small amount of tobacco dust rolled in a dried leaf. Tobacco content varies from 0.2 to 0.3g) smoking is the predominant risk factor, were in conformity with the pattern expected on the basis of changing tobacco habits in the birth cohorts. However, for other sites (hypopharynx and lung), where chewing or cigarette smoking is an equally or more important risk factor than bidi smoking, more detailed information on relevant tobacco habits in the birth cohorts is necessary, for interpreting the absence of a consistent trend in successive birth cohorts. The recent trends in per capita consumption, by type of tobacco (chewing/bidi/cigarette) suggest an emerging cancer pattern in the country, at variance with the pattern expected from the current trends existing in Bombay.

Data from the Bombay Cancer Registry show an increase in the age-adjusted incidence rates of breast cancer [9] and a decrease in the age-adjusted incidence rate of cervical cancers [10] in women. There has been a decline in the incidence of cervical cancer over the past 2 decades. To explain the observed decline, cohort-specific age–incidence curves were drawn and the cumulative rates over common age ranges estimated. The log linear model fitted separately for each of the religious groups showed that the decline could be explained as a cohort effect in the younger cohorts. Furthermore, a significant decline was observed in Hindus only, in whom the mean age at marriage had increased from 12 years in 1921–1931 to about 17 years in the 1960s. This was not seen in Christians, who even in 1911 married at a mean age of 17.

Analysis of trends in breast cancer show an increase in the age-adjusted rate in women from 1965 to 1985. The average percentage change increases in crude, age-adjusted and truncated rates over the 20-year period are highly significant. Evaluation of these trends in the light of known aetiological factors suggests, that the increase in breast cancer incidence is related to a gradual decrease in the proportion of women having their first child before 20 and to an increase in the proportion of single, unmarried women. These findings were also applicable to the subgroup of Hindu women (80% of the population) who had a significant increase in breast cancer during this period, which is a clear cohort effect. The younger birth cohorts in general present higher rates than the 5-year older cohorts. However, the Muslim and Christian subgroups were found to have stable rates.

In the digestive system a significant decrease was noted in oesophageal, stomach, colon and rectum cancers. The factors responsible for this significant decrease in incidence of these cancers are being studied. All increases in incidence for brain cancers, lymphomas, multiple myelomas and leukaemias may be due to the availability of modern diagnostic facilities. Trends at other sites have not been interpreted as they are based on very small numbers.

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