Chapter 13

Cancer survival in Rizal, Philippines

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Introduction

The Republic of the Philippines consists of more than 7000 islands with a total land area of 300 000 km^2. Rizal province is located adjacent to Metropolitan Manila on Luzon, the second largest island, between latitudes 14°18′N and 14°50′N, and between longitudes 121°7′W and 121°29′W (Fig. 1).

The area covered by the registry comprises 26 municipalities, 14 of which are in Rizal province and 12 in Metropolitan Manila. It encompasses a land area of 1624 km^2 — 0.54% of the total size of the country. Gently rolling hills and a few rugged ridges which comprise the southern foothills of the Sierra Madre mountain range define the area's eastern topography, while the western part is mostly flat. Within the metropolitan municipal area are located industrial plants of diverse specialization, from food processing to pharmaceutical and chemical industries, from textile manufacturing to the separation of metals from their ores and other metallurgical operations. Of the 14 municipalities of Rizal province, 11 are 'urbanizing' and three are rural.

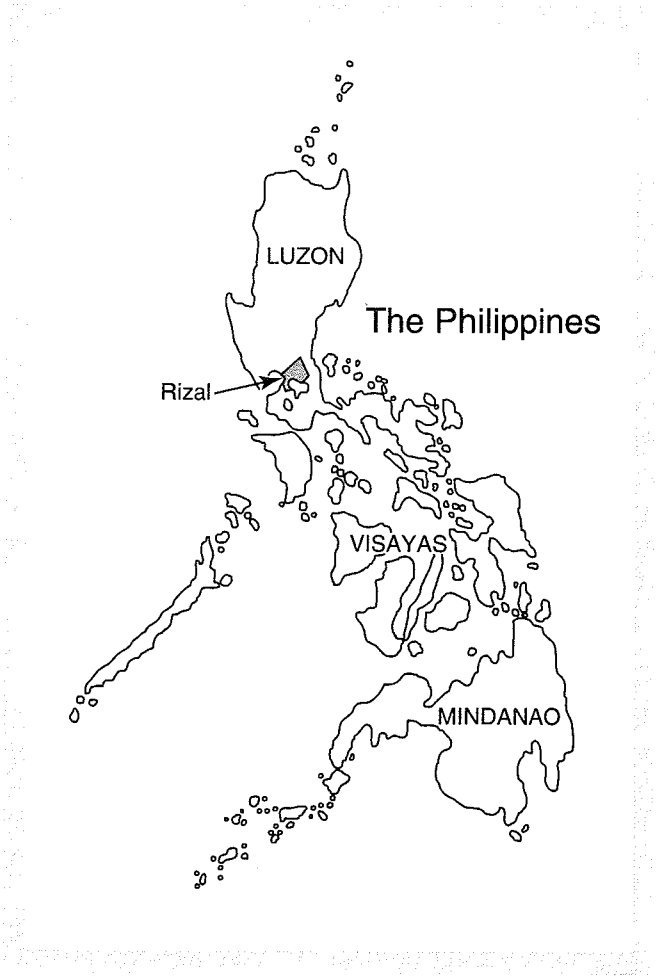

Figure 1. Map showing location of Rizal registry area, Philippines

The population covered by the registry was 5.3 million in 1995, with a male–female ratio of 1:1.06. The population is predominantly young: 33.6% of the population are under 15 years of age and 2.5% over 65. Three-quarters of the population live in the urban catchment areas of the registry.

No information on population-based survival from cancer in the Philippines is available to date. Here we present the results of an analysis of survival of cancer patients diagnosed in the year 1987 from Rizal province, together with background information on cancer registration, health services and follow-up methods used.

Cancer registration in Rizal province

The first population-based cancer registry in the Philippines was established in 1974 as one of the activities of the Community Cancer Control Program of the province of Rizal, which at that time comprised 26 municipalities (12 of its municipalities were incorporated into Metropolitan Manila in 1975). From 1974 to 1979, the registry collected data passively, relying on notifications from Government and private physicians and hospitals. Since data collection by passive means was not satisfactory, active registration was started in 1980, with trained registry research assistants abstracting data from hospitals and death certificates.

The registry staff visit the hospitals (N=99) and clinics in the geographical area covered by the registry and enter information about resident cases on the registry abstract form. Death certificate notifications (DCNs) mentioning cancer are

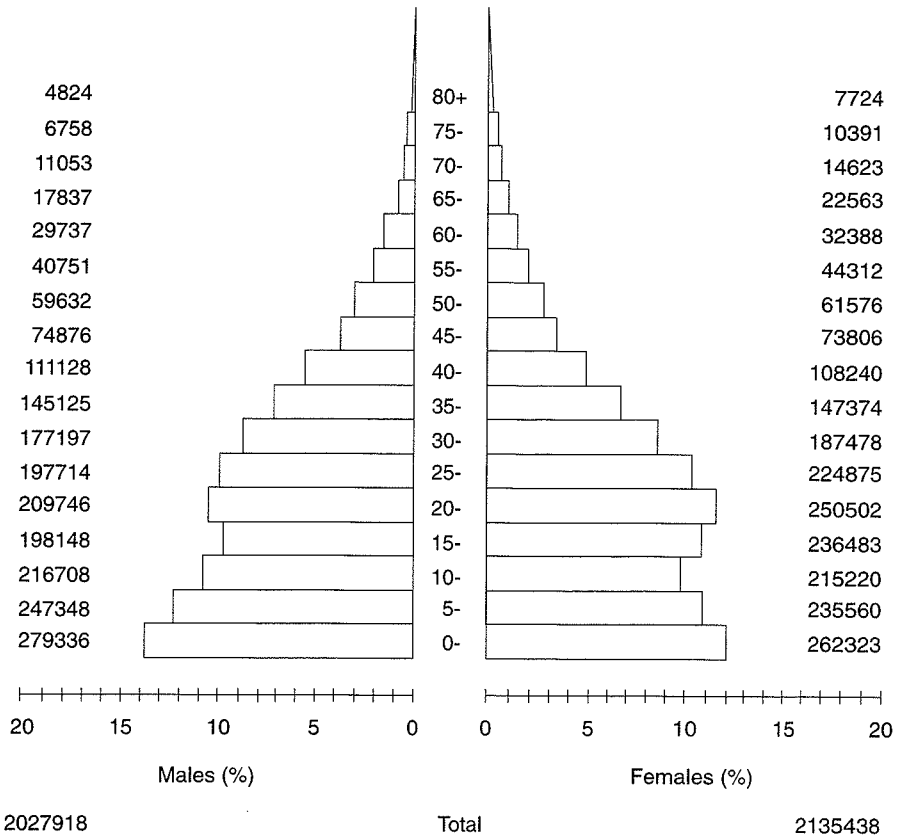

Figure 2. Average annual population of Rizal registry area, 1983–87

gathered from the municipalities on a special abstract form. These abstracts are checked for completeness and consistency.

To avoid duplication, the abstracts are matched with the file of all previous registrations. Deaths of persons not previously registered are traced back to hospitals, physicians and the person's home address. If no further information is found, these cases are registered as 'death certificate only' (DCO). The proportion of cases with histological verification and the percentage registered as DCO are regularly monitored as indicators of the quality of cancer registration.

After elimination of duplicates, the data are coded and entered into the computer. The *International Classification of Diseases for Oncology,* First Edition (ICD-O) is used to code primary sites and histology (WHO, 1976). *International Classification of Diseases, Ninth Revision* (ICD-9) codes are used for reporting purposes (WHO, 1978).

Detailed descriptions of cancer registration in Rizal have been published (Laudico *et al.*, 1989, 1993). Incidence data from this registry were published in Volumes V and VI (Muir *et al.*, 1987; Parkin *et al.*, 1992) of *Cancer Incidence in Five Continents*. Cancer incidence data for the periods 1980–82 and 1983–87 were also published in joint technical reports on cancer in the Philippines (Laudico *et al.*, 1989, 1993).

Cancer incidence in Rizal

Table 1 provides the numbers, crude and age-standardized incidence rates for cancers in Rizal province for the period 1983–87 (Parkin *et al.*, 1992). The overall crude and age-standardized incidence rates per 100 000 were 77.0 and 178.4 among males and 87.7 and 174.0 among females, respectively.

The leading cancer sites among males are lung (24.8%), followed by liver (12.5%), prostate (6.1%), stomach (5.5%) and colon (4.2%). The predominant cancers among females are breast (24.1%), uterine

cervix (12.3%), lung (6.5%), thyroid (5.6%) and ovary (5.1%). A pattern of increasing incidence of breast, lung and colorectal cancers has recently become evident.

Health care services

The crude mortality rate for Rizal province and Metropolitan Manila in 1985 was 5.9 and 6.3 per 1 000, respectively, while the infant mortality rate was 42.1 and 38.7 per 1000, respectively (Ludovice *et al.*, 1988). The registry catchment area has the most developed health care infrastructure in the Philippines, ensuring access to primary health care services for all the population of the region. Services are provided at subsidized cost in Government facilities. However, there is as yet no health insurance scheme for reimbursement of health care costs for most people, either in Government or in private hospitals or clinics.

There are two comprehensive cancer treatment facilities in Manila. One belongs to the Philippine General Hospital, affiliated to the University of the Philippines; it comes directly under the authority of the Office of the President and has been in operation since the 1950s. The other is located at St. Luke's Medical Centre, a private hospital in Quezon City. There are 99 hospitals, 32 clinics of the Department of Health for outpatient consultations, and scores of private-practice clinics in Metropolitan Manila; there are eight hospitals with radiotherapy facilities. There are now three major Government hospitals (two in Manila, one in Quezon City) with cancer diagnostic facilities (pathology, cytology, haematology, radiological and nonradiological imaging, tumour markers) and therapy facilities (surgery, radiotherapy, chemotherapy, immunotherapy). Imaging and immunocytochemistry services are available in two centres.

A framework for the Philippine Cancer Control Programme was developed in 1987 by the Department of Health. An Advisory Council of the Programme was set up by the Department of Health to advise on policies, priorities and activities in cancer control. The Programme conducts control activities specifically for lung, cervical and breast cancers, which began in 1991. In a knowledge/attitudes/practice (KAP) study in the pilot areas of the Programme in 1989 (Tiglao *et al*, 1990), more than 66.7% of the sample population did not recognize the magnitude of the cancer problem, 33.3% did not know specific procedures to detect cancer or existing treatments for cancer and where they could be obtained, 74.7% perceived the availability and accessibility of treatment as very difficult, and only 15.4% believed that treatment could be effective. Rizal province was one of the pilot areas of the Programme.

There was no organized early-detection programme in the region during the registration period. Intensive cancer awareness campaigns have been carried out annually since 1975. Currently, a randomized intervention trial in collaboration with the International Agency for Research on Cancer (IARC), France, is under way in the region to evaluate the role of physical examination of the breast in the control of breast cancer. Given the preventable nature of cervical cancer, plans are being developed for a cervical cancer screening programme under the Department of Health's Women and Safe Motherhood Project.

Survival analysis

Subjects

The cancer sites chosen for the survival analysis were lung, breast, cervix, liver, stomach, prostate, colon, rectum and oral cavity, and leukaemia. The number of cases registered, proportion of cases with histological verification, proportion of DCO registrations and number of cases included in the survival analysis for these cancers are shown in Table 2. A total of 1929 cases in these sites were registered in the year 1987. Of these, 330 (17.1%) were DCO registrations; the percentage of DCO cases by site ranged from 3.4% to 42.1%, with the highest proportions in sites with poor survival. These cases, along with a further 199 (with no follow-up information or age/sex unknown or incompatibility in sex, site and histology combination) were excluded from the analysis. The exclusions for individual sites varied between 9.8% to 52.5%. This left 1400 (72.6% of the incident cases) eligible for survival analysis.

Follow-up methods

Both active and passive methods were used to follow up subjects. Seven field assistants were trained to abstract pertinent cancer information from hospital records. They were also trained in the preparation and administration of the follow-up questionnaire. They interviewed patients and/or informants to determine the patient's status (alive and well, alive with disease, migrated, died, unknown) and the date the patient was last known to be alive. The registry records of the study population were reviewed and the patient's status as well as the date of last contact

Table 1. Annual average cancer incidence per 100 000 person-years in Rizal, Philippines, 1983–87

Site	MALES			FEMALES		
	Number	Crude rate	ASR	Number	Crude rate	ASR
Lip	8	0.1	0.3	9	0.1	0.3
Tongue	64	0.8	2.0	62	0.7	1.7
Salivary gland	23	0.3	0.7	29	0.3	0.6
Mouth	75	0.9	2.5	121	1.4	3.5
Oropharynx	20	0.2	0.6	25	0.3	0.7
Nasopharynx	262	3.3	6.3	127	1.5	3.0
Hypopharynx	10	0.1	0.3	6	0.1	0.1
Oesophagus	71	0.9	2.3	50	0.6	1.5
Stomach	342	4.3	11.1	267	3.1	7.4
Colon	257	3.2	7.8	238	2.8	6.6
Rectum	240	3.0	7.3	188	2.2	5.0
Liver	771	9.6	20.7	316	3.7	8.3
Gallbladder	40	0.5	1.3	43	0.5	1.3
Pancreas	127	1.6	4.1	103	1.2	3.1
Larynx	123	1.5	4.0	35	0.4	1.0
Lung	1530	19.1	48.8	487	5.7	13.4
Bone	78	1.0	1.5	63	0.7	1.1
Connective tissue	81	1.0	1.6	68	0.8	1.5
Melanoma of skin	21	0.3	0.6	14	0.2	0.3
Other skin	67	0.8	2.1	55	0.6	1.5
Breast	16	0.2	0.5	1794	21.1	40.9
Cervix uteri				913	10.8	20.1
Corpus uteri				214	2.5	5.5
Ovary				379	4.5	8.2
Prostate	377	4.7	15.2			
Testis	43	0.5	0.7			
Penis	25	0.3	0.6			
Bladder	115	1.4	3.7	46	0.5	1.4
Kidney	93	1.2	2.4	64	0.8	1.5
Brain	119	1.5	2.2	71	0.8	1.1
Thyroid	87	1.1	2.1	415	4.9	7.7
Hodgkin's disease	34	0.4	0.7	24	0.3	0.4
Non-Hodgkin lymphoma	157	2.0	3.9	101	1.2	2.2
Multiple myeloma	27	0.3	0.9	18	0.2	0.5
Lymphoid leukaemia	134	1.7	1.5	93	1.1	1.3
Myeloid leukaemia	121	1.5	2.3	115	1.4	2.0
All sites	6176	77.0	178.4	7443	87.7	174.0
All sites except skin	6109	76.1	176.3	7388	87.0	172.6

ASR: Age-standardized incidence rate (world population)

or date of death (if applicable) were noted. The incident cases of 1987 were also matched with death certificates from the 26 municipalities and the four cities of Metropolitan Manila for the period 1 January 1987 to 31 December 1993 and the date, cause and place of death were noted. Unmatched cases were then matched with the various case-finding lists from the various hospital data sources, to determine whether the patient had consulted other hospitals in the catchment area. Every case which matched the case-finding lists was then followed up at the hospital concerned to confirm the identity of the patient and to gather additional pertinent information, such as diagnosis, tumour stage, treatment, date and status at last contact. Cases were also followed up by contacting the person's attending physician or the

Table 2. Cancer cases registered and data quality indices, Rizal, Philippines, 1987

Site	ICD 9	No. of cases registered	Data quality indices		Cases excluded from analysis		Cases included for survival analysis	
			% DCO	% HV	DCO	Others	No.	%
Oral cavity	143-5	44	6.8	88.6	3	3	38	86.4
Stomach	151	118	26.3	60.2	31	11	76	64.4
Colon	153	108	11.1	82.4	12	10	86	79.6
Rectum	154	88	3.4	90.9	3	6	79	89.8
Colorectum	153-4	196	7.7	86.2	15	16	165	84.2
Liver	155	240	42.1	25.0	101	25	114	47.5
Lung	162	430	17.7	65.8	76	24	330	76.7
Breast	174	417	8.6	88.2	36	51	330	79.1
Cervix	180	227	4.4	89.4	10	36	181	79.7
Prostate	185	81	9.9	82.7	8	15	58	71.6
Lymphatic leukaemia	204	51	0.0	100.0	0	5	46	90.2
Myeloid leukaemia	205	55	0.0	100.0	0	9	46	83.6
All leukaemia	204-8	176	28.4	68.8	50	18	108	61.4

DCO: Death certificate only; HV: Histological verification

hospital where the person was first diagnosed to determine his/her current status and the date of last contact. Additional information on staging (tumour size, lymph node involvement, direct extension, or distant metastasis) and treatment or outcome of treatment was also recorded, where possible: unfortunately, this information was not available for most of the cases. For patients who were lost to follow-up after their discharge from the hospital, the date of discharge was recorded as the date of last contact. People who could not be followed up in the hospital or via their attending physicians because records were no longer available were followed up at their place of residence to determine their current status. Patients with incomplete addresses were followed up through their local health centres or rural health units.

This process revealed the following: a definite vital status (alive/dead) of the cases was known at the closing date for 976 (69.7%) of the cases studied, while the rest (30.3%) were lost to follow-up before the closing date. Among those lost to follow-up, 119 (8.4%) were known to be alive for less than one year, 113 (8.2%) between one and four years and 192 (13.7%) for over five years.

Analytical methodology (see Chapters 2, 3 and 5)

The index date for calculation of survival time was the incidence date. The survival time for each case was the time between the index date and the date of death *or* date of loss to follow-up *or* 31 December 1993. Cumulative observed and relative survival rates were calculated using Hakulinen's method (Hakulinen, 1982; Hakulinen *et al.*, 1994). The expected survival rates for a group of people in the general population similar to the patient population with respect to age, sex and calendar period of observation were calculated using the model life tables for developing countries for the Far Eastern Region (UN, 1982). Age-standardized relative survival (ASRS) was calculated for all ages and for the age group 0–74 years by directly standardizing the site-specific and age-specific relative survival to the site-specific age distributions of the estimated global incidence of major cancers in 1985 for comparison with other countries.

Results

The cumulative one-year, three-year and five-year site-specific observed and relative survival rates for both sexes combined and site-specific five-year survival rates for males and females are shown in Table 3. The lowest five-year relative survival was for lung cancer (7.2%) and the highest was for breast cancer (45.6%). A five-year survival in excess of 40% was observed for only three cancer sites: oral cavity, colon and breast. For all other sites it was less than 33%.

The site-specific and age-specific number of cases and five-year relative survival, ASRS for all ages and ASRS for the 0–74 age group are shown in Table 4. Owing to the small number of cases in each age category, no distinct impact of age on relative survival could be detected for most cancer sites. Survival was generally better in the younger age groups with the

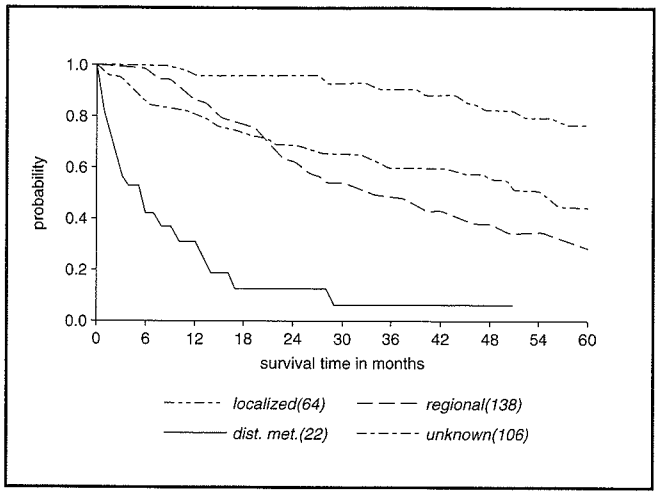

Figure 3. Survival from breast cancer by clinical extent of disease in Rizal, Philippines

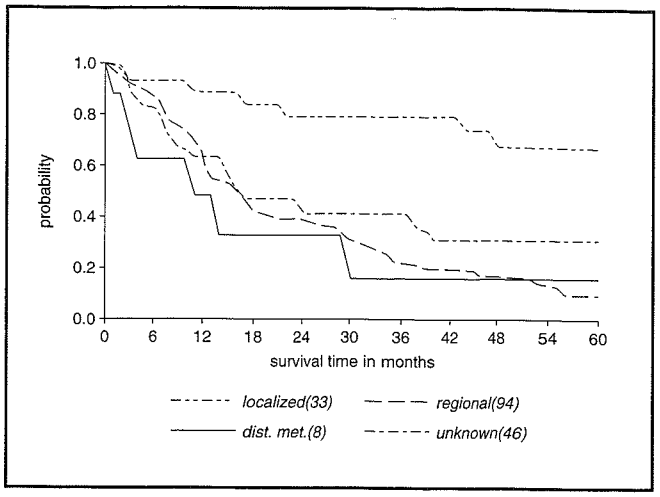

Figure 4. Survival from cervical cancer by clinical extent of disease in Rizal, Philippines

exception of breast cancer, where the lowest survival was encountered in the under-35 age group compared with other age groups.

The observed survival rates by clinical extent of disease for breast and cervical cancers are depicted in Figs. 3 and 4, respectively. Survival rates were higher for people with early clinical disease compared with those with advanced lesions. For breast cancer, the figures were 77.2% for localized disease, 29.2% for regional disease and 6.4% for distant metastatic disease; the corresponding figures for cervical cancer were 67.8%, 11.2% and 16.2%, respectively.

Discussion

Our study is based on a fairly small dataset. Difficulties in the use of active methods to supplement the passive follow-up system meant that our efforts were restricted to cases registered in 1987. Moreover, we wished to explore the possibility of conducting survival studies in our setting and to develop methods to improve follow-up. This is the first population-based cancer survival study in the Philippines and, in spite of the rather limited data obtained, the results on the outcome of cancer care in our region are informative.

A large proportion of cases were excluded from the study for various reasons. The fact that many of these were DCO cases will probably have resulted in an overestimation of survival rates. But a careful look at the results obtained for cancer sites such as oral cavity, breast, cervix and leukaemias shows a survival that is generally poor. From a review of the sporadic reports in hospital-based case series for various sites, these results can probably be attributed to advanced stage of cancer at diagnosis, incomplete treatment and inadequate supportive care because of economic constraints. A majority of cancers of the oral cavity were categorized as stages III and IV. Surgery was the main method of treatment and the resection rate was estimated to be only 1% for liver cancer (Eufemio *et al.*, 1973), 46% for stomach cancer (Samson *et al.*, 1985) and 57–91% in colorectal cancers (Ceniza *et al.*, 1986). Adenocarcinoma of the lung was predominant among females and squamous-cell carcinoma among males. However, there were few differences in survival between the sexes.

The age-adjusted relative survival rates for breast and cervical cancer in our region are at the lower end of the range observed in other developing countries, and lower than the survival figures observed in the USA 25 years ago (Sankaranarayanan *et al.*, 1996). The five-year relative survival from cervical cancer is poorer than for breast cancer. Given the difficulty of obtaining stage-related information in a routine cancer registration process, particularly in developing countries, the results for these two cancers indicate that a fairly reasonable categorization of the clinical extent of disease has been achieved, although a certain amount of misclassification cannot be ruled out. The probable determinants for late diagnosis of breast cancer among Filipino women were economic factors, lack of awareness of cancer and fear of being diagnosed with cancer (Ngelangel & Lyndon, 1992; Ngelangel *et al.*, 1993). A report on survival based on a large hospital case series revealed a three-year survival rate of 50% from cervical cancer (Sotto, 1987). The low survival in leukaemia is probably due to inadequacies in treatment and general supportive care.

Implications

This survival study has established that, with some additional effort, it was possible to augment the

Table 3. Observed and relative survival by site and sex, Rizal, Philippines, 1987

Site	ICD 9	Number included	All ages and both sexes combined						% Survival rate at 5 years of follow-up					
			Observed survival (OS)			Relative survival (RS)			Male			Female		
			1 yr	3 yr	5 yr	1 yr	3 yr	5 yr	Number	OS	RS	Number	OS	RS
Oral cavity	143-5	38	57.5	33.9	33.9	59.8	38.5	42.5	14	20.4	26.8	24	38.2	46.9
Stomach	151	76	25.7	11.5	9.9	26.7	13.0	12.0	41	14.4	18.3	35	4.3	4.9
Colon	153	86	57.4	38.0	33.7	59.7	42.4	40.5	42	38.9	46.8	44	28.9	34.8
Rectum	154	79	59.9	31.2	20.2	61.7	34.4	23.9	49	17.4	21.1	30	23.1	26.3
Colorectum	153-4	165	58.4	35.1	27.5	60.4	38.8	32.9	91	28.6	34.6	74	26.5	31.2
Liver	155	114	19.9	14.1	12.5	20.5	15.5	14.7	82	11.3	13.3	32	16.3	19.0
Lung	162	330	27.0	9.9	5.9	28.0	11.1	7.2	267	5.7	7.0	63	6.7	7.9
Breast	174	330	82.4	57.2	41.4	83.9	60.5	45.6				330	41.4	45.6
Cervix	180	181	68.5	36.5	26.5	69.6	38.3	29.0				181	26.5	29.0
Prostate	185	58	66.0	29.3	15.6	70.2	35.3	21.3	58	15.6	21.3			
Lymphatic leukaemia	204	46	41.1	28.5	23.7	41.4	28.9	24.4	26	33.0	33.4	20	16.0	16.7
Myeloid leukaemia	205	46	24.0	10.7	10.7	24.5	11.2	11.6	23	5.4	5.9	23	16.2	17.3
All leukaemia	204-8	108	31.2	17.9	16.3	31.6	18.6	17.3	56	17.7	18.8	52	15.3	16.3

routine cancer registration follow-up system to provide a dataset suitable for survival analysis. In the absence of a reliable mortality registration system in our setting and in many other developing countries, information on incidence and survival are important for evaluating the outcome of primary and secondary prevention. The results of this study imply that much still needs to be done to educate the public about cancer and implement all aspects of cancer prevention. The results are perhaps explained by: (1) the lack of favourable knowledge, attitudes, and practices regarding cancer among the target population, which means that many cancer patients seek treatment only when the disease is already far advanced; (2) the lack of resources to organize and implement primary and secondary preventive measures properly; (3) the lack of resources for adequate cancer treatment; and (4) the natural course of the disease itself.

More focused studies are required to collect information on prognostic variables and treatment in order to define approaches to early detection and treatment in more detail and to review whether the full potential of existing health services is being realized. In 1996, the Asian Development Bank, in cooperation with the Philippines Department of Health, initiated the Philippine Adult Health Project. The project report (Havas & Ngelangel, 1996) concludes that there are considerable shortcomings in available data, medical education, national policy issues, treatment guidelines and practices, and quality control of testing and screening services. Changes in programmes, medical education, public policies, additional financial resources, collaboration with nongovernmental organizations, cooperation and compliance by the public, political and administrative support from the Government, and technical assistance from abroad will be necessary. A single strategy will not suffice by itself. The goal of the Philippine Cancer Control Programme is to improve the survival of cancer patients over the coming years, by implementing its various prevention and education programmes.

Acknowledgements

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Table 4. Site-specific and age-specific number of cases, five-year relative survival and ASRS, Rizal, Philippines, 1987

Site	ICD 9	Number of cases by age group						% Relative survival (RS) at 5 years						RS	ASRS%	
		≤34	35–44	45–54	55–64	65–74	75+	≤34	35–44	45–54	55–64	65–74	75+		All ages	0–74
Oral cavity	143–5	4	1	3	8	16	6	71.6	101.0	0.0	23.7	56.3	44.4	42.5	41.8	41.2
Stomach	151	5	10	9	20	19	13	20.4	10.3	21.7	14.7	8.5	0.0	12.0	9.6	13.9
Colon	153	13	9	11	21	16	16	38.5	30.8	43.4	67.1	26.0	39.6	40.5	41.1	42.1
Rectum	154	8	9	11	24	22	5	0.0	22.0	15.4	49.6	27.0	0.0	23.9	17.4	29.4
Colorectum	153–4	21	18	22	45	38	21	20.2	27.0	32.0	58.4	26.9	28.2	32.9	33.1	36.5
Liver	155	17	16	25	23	21	12	11.1	38.3	7.2	8.0	10.0	19.1	14.7	14.1	12.9
Lung	162	7	32	69	98	95	29	0.0	11.0	3.0	8.3	9.5	0.0	7.2	5.2	7.7
Breast	174	34	84	95	58	47	12	24.5	44.4	51.9	37.6	52.5	68.2	45.6	49.3	44.5
Cervix	180	19	42	54	39	24	3	32.1	42.4	29.7	17.8	18.5	0.0	29.0	24.6	28.0
Prostate	185	0	0	6	12	22	18	–	–	0.0	33.6	40.5	10.6	21.3	18.7	34.9
Lymphatic leukaemia	204	38	2	4	0	0	2	27.3	50.0	0.0	–	–	0.0	24.4	14.5	18.0
Myeloid leukaemia	205	27	5	2	6	2	4	15.0	0.0	33.4	18.4	0.0	0.0	11.6	11.1	13.7
All leukaemia	204–8	73	8	7	6	6	8	21.5	0.0	0.0	18.4	20.9	0.0	17.3	12.9	15.9

ASRS: Age-standardized relative survival

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