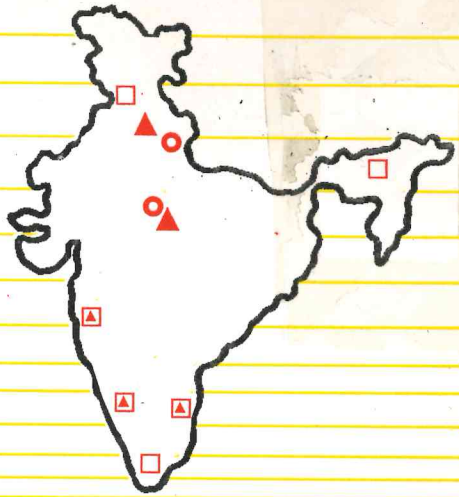
CANCER REGISTRY ABSTRACT



NEWSLETTER OF THE NATIONAL CANCER REGISTRY PROJECT OF INDIA

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NEWS LETTER OF THE NATIONAL CANCER REGISTRY PROGRAMME-ICMR VOL.VIII NO.1 FEBRUARY 2001.

CONTENTS

Acknowledgements

The presentation of manuscripts were designed and entered in computer by Ms. Asha .N.M, Regional Cancer Centre, Trivandrum and Mr. Jayaprakash and Mr. Harikrishnan of Natural Background Radiation Cancer Registry, Karunagappally.

Editorial

Cancer occurs in all climates and population groups and variations in the occurrence of cancer in different population groups have been studied with advantage for cancer control and furthering the knowledge of the etiology of this dreaded disease. The National Cancer Registry Project of India (NCRP), designed to study cancer occurrence in the country, is almost two decades old. Dr. Jussawalla and Dr. Usha Luthra strived hard to establish cancer registries in India. The ICMR launched the NCRP in 1982 and established 12 registries and their functioning was strictly on International Standards. But, thereafter, the progress has been slow. India is vast country with widely varying lifestyle, customs and cultural practices. Studies of cancer pattern, cancer morbidity, cancer mortality and their variations in different socio-cultural settings are essential and are bound to yield leads for cancer control and research. Cancer Registries are often equated to 'survey' and that it is not to be considered as research! Registry information provides the most relevant and essentially needed information for cancer control. It is the warp and weft of the fabric of Cancer Research. Observations made on man is most appropriate to plan, implement, and evaluate disease control measures. Registry data provides unequalled opportunities for Epidemiological and Etiological research. Burkitts Lymphoma may be quoted as an example in this regard. What is observed in man is applicable to man.

All the registries under NCRP were in urban centers except the one in Barshi, but 70-80% of India's population lived in rural areas. Thus there is a limitation to the information on cancer in India obtained only from NCRP registries alone and the need for more information on cancer in the rural population is apparent.

Many teaching hospitals in the country have fully equipped oncology departments. Some effort is essential for organising cancer registries in these departments. This activity will also strengthen the teaching of oncology in these centers. One of the strong recommendations of the Wahi committee was to have cancer registration in the area covered by RCCs, but the situation now is that even a Hospital Cancer Registry is non existent in Regional Cancer Centers.

It is to supplement the available data on cancer in India that CRAB invited cancer data from different sources. Thus, we have, in this issue, data from five Hospital Based and seven Population Based Registries presented in a comparable manner. It is to support the big efforts made by ICMR in the field of cancer registration in India that we embarked on this venture. May be, all the registries reported now do not have all of the quality standards set up by ICMR registries. But in most of the registries, the involved scientists are in the ICMR registry network, which assures basic authenticity to the data presented. Improvements can be made and will be made faster if the support of NCRP - ICMR is available to them.

Cancer Registry data collection is not an end in itself. The use of the data should be apparent and visible to the health administration, medical administration, to the researchers and to the people. In this connection the two monographs from the Tata Memorial Hospital Registry and a report on the Cancer control effort in Barshi with IARC participation are unique examples.

Dear Sirs! We Remember you for ever.

Dr. D. J. JUSSAWALLA

(13-04-1915 to 29-01-1999)

Dr. D. J. Jussawalla born on 13th April 1915 started his career as a Cancer Surgeon from 1941 when he was appointed in Tata Memorial Hospital. Dr. Jussawalla became Director, Tata Memorial Centre in 1973 and served in that capacity for 7 years. He was a brilliant Cancer Surgeon of the country and made his pioneering mark as a radical surgeon, mastered and practiced the techniques of all extensive major operations, especially in cancer registry.

He was a visionary and opened many other avenues for cancer control besides its therapy. To help the poor and the under privileged cancer patients, he founded the Indian Cancer Society in 1951. He nurtured and expanded its activities for over 48 years by establishing Cancer Detection Centres, Population Based Registry (1963) and a full-fledged Cancer Rehabilitation Centre (1968). He was the first to establish a Department of Cytology and a Department of Chemotherapy in India at the Tata Memorial Hospital, Mumbai in 1956. He founded the Indian Journal of Cancer (1963), the Indian Association of Oncologists (1977). The Indian Cancer Society has now branches in all major cities in India. Cancer Registries of Indian Cancer Society are functioning in Nagpur, Pune and Aurangabad.

He was associated actively with UICC from 1954 and with WHO. He worked with these prestigious organisations in various capacities. He was the president of the 1st ever UICC - International Cancer Congress held in New Delhi in 1994. As the director of Tata Memorial Centre, he undertook expansion of the centre and introduced Regional Specialisation in Surgical Oncology. He was advisor to several Cancer Organizations and Hospitals in India besides being an active Member of many National and International Associations connected with cancer. He was also President of many of these Associations.

Dr. Jussawalla was also a Professor of Oncology at the Bombay University and during his lifetime trained many young surgeons who have dissipated the expertise in cancer surgery across the country.

He had several publications to his credit in National and International Journals.

Inspite of his exceptionally outstanding achievements, he remained a humble human being all along. As a person, he was most soft-spoken, very humane and particularly kind and considerate to poor and under privileged patients. Out of his deep concern for their welfare, he organised facilities to provide them with free food, medicine, shelter, jobs etc.

Dr. Jussawalla established the Lady Ratan Tata Medical & Research Centre in 1984, which is also the National Headquarters of the Indian Cancer Society. He remained Director of this centre till his end.

In recognition of his outstanding contributions in the field of cancer in India, Dr. Jussawalla was honoured with many national awards including **'Padmabhushan'**. In the Indian context, he was a pioneer and an outstanding scientist in the field of cancer and worked relentlessly to initiate newer avenues and left behind a great legacy for others to emulate and draw inspiration. He breathed his last on 29th January 1999 after a brief illness. May his soul rest in peace.

Dr. B. B. Yeole,
P. Gangadharan.

Dr. P. D. SHROFF

Senior Investigator, Hospital Based Cancer Registry,
Tata Memorial Hospital, Mumbai

Dr. Pannalal Dwarakdas Shroff joined Tata Memorial as a House Surgeon in July 1944 and served this hospital in various capacities till his death on 19th November 1997. Before his appointment as a Clinical Consultant in OPD in July 1951 he was awarded Ewing's scholarship to undertake clinical research studies at the hospital. He was elected as a Fellow of College of Physicians & Surgeons. He was an accomplished surgeon and carried out all types of surgical procedures both major and minor with perfection. Dr. Shroff was a great clinician too. His contributions in various fields of Oncology, in patient care, medical record management and cancer registry had been noteworthy. He retired from regular service in 1982 and joined as Clinical Investigator for the Tata Memorial Hospital Cancer Registry Project of National Cancer Registry Programme, Indian Council of Medical Research, New Delhi. His meticulous attention to details in recording clinical information and his interpretation of results of investigation will always be remembered by one and all in our department. His dedication to his assigned duties will always be a model for the younger generation.

He was the first epidemiologist in the country to have participated in a multinational, multicentric epidemiological study of cancer of cervix. As early as 1953, he, in collaboration with Dr. Ernest Wynder of US studied the epidemiologic risk factors in cervix cancer in a multicentric study involving Bombay & Madras cancer centres & US. (American Jl. of Ob & Gy. 68, 4, 1016-1052, 1954). He had published scientific papers in several journals.

Dr. Shroff was a constant guide and teacher to all the staff of the hospital. He took special care and attention in training the cancer registry staff and he was responsible for the high standard attained by our registry in the national and international levels. No word of respect and praise will be too high for this professional gentleman. His absence will always be felt and has left a big void in the Tata Memorial Hospital environment.

The Cancer Registry and TMH staff share the profound grief and sorrow in his passing away on 19th November 1997 and pray God Almighty that his departed soul may rest in peace.

Mr. D.N. Rao
Dr. B. Ganesh
P. Gangadharan
& Staff
Hospital Cancer Registry
TMH.

Congratulations

Dr. B.B. Yeole Deputy Director, Mumbai Cancer Registry received the prestigious ***Sandoz Oration Award*** for 1996 jointly with Dr. Ranju Rather of AIIMS, Delhi for his contribution to Cancer Control Programme.

{**Mrs. K. Jayant** was awarded the prestigious ***Sandoz Oration Award*** in 1990. The topic of oration was ***"Epidemiological studies with implication for cancer control programme"***.}

Dr. K. Ravichandran was awarded the doctoral degree (PhD) in epidemiology for his dissertation titled ***"A hospital based case-referent study on gastric cancer in Madras"*** by the University of Tampere, Tampere, Finland, on 28th June 1997.

Dr. C.K. Gajalakshmi was awarded the Doctor of Medical Sciences (ScD) in epidemiology for her dissertation titled ***"Contralateral breast cancer in Madras, India: Risk factors and survival"*** by the University of Tampere, Tampere, Finland on 1st July 1997.

Dr. B.B. Yeole, Mumbai Cancer Registry was awarded Ph.D. degree by University of Tampere, Finland in 1997. The subject of his dissertation was ***"Prediction of Cancer Incidence cases for India"***.

Dr. D.K. Jain, Deputy Director General, NCRP, ICMR who has been guiding & directing the Tumor Registry operations since 1982 was awarded Ph.D. degree by the Chaudhary Charan Singh University (formerly Meerut University) in 1998. The subject of his thesis was ***"Statistical Methodologies in Epidemiological Studies with special reference to Cancer in India"***.

The thesis work was supervised by **Dr. B.N.L. Bansal & Dr. Padam Singh.**

Contd.

Dr. Cherian Varghese, Associate Professor, Hospital Cancer Registry, Trivandrum was awarded Ph.D. degree by the University of Tampere, Finland in 2000. The subject of his dissertation was ***"Prevalence and Determinants of Human Papillomavirus (HPV) Infection in Kerala, India".***

Dr. P.T. Latha, Social Investigator, Hospital Cancer Registry, Trivandrum, since 1982 was awarded Ph.D. degree by the University of Kerala in 2000. The subject of her dissertation was ***"Psychosocial Adjustments of female Cancer Patients in Southern Districts of Kerala"***. Dr. Latha has, since then been promoted to the academic post as 'Lecturer' and posted to Pain and Palliative Care Unit of the Regional Cancer Centre.

Ms. G. Padmakumari Amma, Medical Statistician, Hospital Cancer Registry has been promoted to the academic post of 'Lecturer' in the Hospital Cancer Registry, Trivandrum. Ms. G. Padmakumari Amma has been with the Hospital Cancer Registry since 1982.

Mrs. D. Chandrika, coding clerk in Hospital Cancer Registry, Trivandrum since 1985 has successfully completed the 6 months Medical Records Technician's course at Jawaharlal Institute of Post-Graduate Medical Education and Research, Pondicherry.

Awards

Dr. M. Krishnan Nair was awarded the ***'Jeevanraksha'*** medal by the Aids and Cancer Society of India, May 1998.

Dr. V. Shanta was conferred an honorary degree of ***Doctor of Science (D.Sc)*** for her exceptional service in the field of cancer treatment and research by Sri. Venkateswara University, Thirupathy in 1998.

Dr. M. Krishnan Nair received the ***Chunakkara Gopalakrishnan Endowment*** award, May 1999.

Dr. M. Krishnan Nair has received the ***Rajeev Gandhi*** award from Rajeev Gandhi Institute for Contemporary studies, August 1999.

Dr. M. Krishnan Nair has received the ***'Karmaseshi'*** award from K. R. Elankath Smaraka Trust for his services for cancer patients.

IARC AND CANCER CONTROL IN INDIA

IARC appreciates Rural Registry Achievements in Cancer Control: Opens new vistas for Cancer Control in Rural India.

Cervical Cancer Prevention Programme, Barshi

Barshi is a little known, intensely rural, area in Sholapur district of Maharashtra. Agriculture is the main occupation of the people. The Nargis Dutt Memorial Cancer Hospital was set up in Barshi in 1982 by Ashwini Rural Cancer Research and Relief Society and Kathale Trust with technological support from Tata Memorial Centre, Mumbai. In 1987, the 1st population based Rural Cancer Registry in the country was set up in the adjoining areas of this hospital by the Indian Council of Medical Research under its National Cancer Registry Programme in collaboration with Tata Memorial Centre. The Principal Investigator of the project was Mrs. K. Jayant who had since 1950's pioneered cancer Epidemiology & Biostatistics studies in Mumbai. The cancer survey she conducted during late sixtees in Alibag in rural Maharashtra had provided significant leads to undertake Cancer Control programmes in rural population.

The Barshi Registry operation covered rural areas of Barshi Tehsil in Solapur district and Paranda & Bhum tehsils in Osmanabad district (Maharashtra) with a population of about 0.4 million. Incidence rates for cancer at all sites has been generated for this population since 1988. Cancer of the cervix uteri is the leading cancer in women in this area (AAR- 27.5 per 100,000 in 1988-92) and accounts for almost 50% of all cancers in women.

Undertaking the arduous task of cancer registry operations in this rural, under privileged population with low health awareness and health care facilities many innovative methods were pursued. The efforts not only helped cancer registration but also provided new inroads for cancer control in this rural area.

Improved stage at diagnosis of cervical cancer with increased cancer awareness in this population due to the registry activity was observed (Jayant K et al, 1995. Int. J. Cancer 63, 161-163). Furthermore, the 3 year survival was significantly higher in cases registered in 1990-'91 (44.0%) than in those registered in earlier years (26.6%). This improvement was attributed to cancer education activities undertaken by the Registry (Jayant K. et al, 1996, British Journal Cancer 74, 285-287). To test this hypothesis, a health education cum intervention study was undertaken in Madha tehsil in Solapur district by IARC in collaboration with Aswini Cancer Research & Relief Society, Barshi .The results are encouraging and will soon be published. Another study undertaken to evaluate the unaided visual inspection by trained paramedical workers in detecting cervical cancer showed good agreement between the visual findings of paramedical workers and those of a gynecologist (Nene B M et al., 1996, Int. J. Cancer 68, 770-773). These studies have culminated in the Cervical Cancer Prevention Programme, which has been taken up by the Nargis Dutt Memorial Cancer Hospital in collaboration with Tata Memorial Centre and International Agency for Research on Cancer. Bill & Melinda Gates Foundation fund the study.

A randomised control trial is undertaken in the rural population of Osmanabad district to evaluate the relative performance of the screening tests for cervical cancer.

The screening procedures under study are

a) Visual Inspection after application of 4% acetic acid.
b) Cervical Cytology.
c) HPV testing by hybrid capture II.
   - In detecting high grade Cervical Dysplasia (CIN II & III).
   - In preventing invasive Cervical Cancer.
   - In preventing deaths from invasive cancer.

The cost effectiveness of each of the three screening approaches will be determinated before routine use in health care settings.

The study will cover over 150,000 eligible women with about 40,000 of them being allocated to each of the three study arms and a control arm, the unit of randomisation being a cluster of villages under a primary health centre.

Dr. K. A Dinshaw, Director, Tata Memorial Centre who is the principal investigator of the Rural Cancer Registry at Barshi, since 1997, is the lead investigator from Tata Memorial Centre and Dr. Sankaranarayanan & Dr. Parkin are the lead investigators from IARC. The other Investigators are Dr. P. S. Dale, Dr. V. R. Keskar, Dr. Rajeskwarkar, Mr. M. K. Chauhan, Mr. A. M. Budhuk from Nargis Dutt Memorial Cancer Hospital Barshi, Mrs. K. Jayant and from Tata Memorial Centre Dr. S. S. Shastri, Dr.A. N. Bhisey, Dr. R Chinoy, Dr. S. Krishnamurthy, Dr. S. G.Malvi, Dr. J. N. Kulkarni, Dr. F. Tongaonkar, Dr. R. A. Kerbar, Dr. S. K. Shrivastava, Dr.D. Saranath.

Now hear this!

AN END GAME FOR CANCER IN U.S.

John R Seffrin Ph.D.

Cancer was the most feared and most mysterious of the major life threatening diseases. As we begin the 21st century, cancer is still, both in perception and reality a very real concern for public health. Today it is not a question of whether we will control cancer but rather when and how quickly.

At the beginning of the 20th Century, cancer was 8th leading cause of Death, but now is the second. The infectious diseases have either been wiped out completely or largely controlled. However, as they began to decline the comparative impact of cancer grew.

On November 14, 1996 representatives from American Cancer Society, the National Cancer Institute and the US Centres for Disease Control and Prevention made an exciting announcement. In the US both mortality and incidence rates have decreased progressively with each passing year. These declines in incidence and mortality rates can be attributed to a number of factors including improvements in Public & Professional education, Primary Prevention, Early detection and treatment and collaboration with other organizations and agencies.

Representatives from the American Cancer Society and other organizations are working to develop framework for a bipartisan renewal of National Cancer Act. Though at the same time implanting a sense of fear and loathing in the public imagination has already been equalled.

The ACS has also set new goals for cancer control in US. A 25% reduction in cancer incidence rate and a 50% reduction in overall age-adjusted cancer mortality.

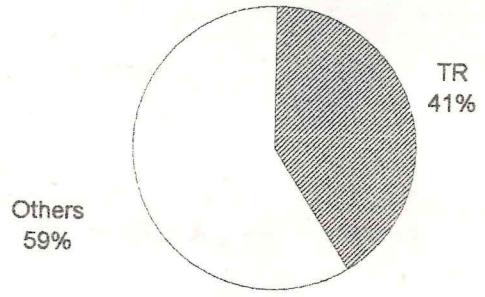
CA..4-5 : v.50.No.1.January/February 2000.

CANCERS AMENABLE FOR CONTROL IN INDIA. POPULATION BASED REGISTRY INFORMATION.

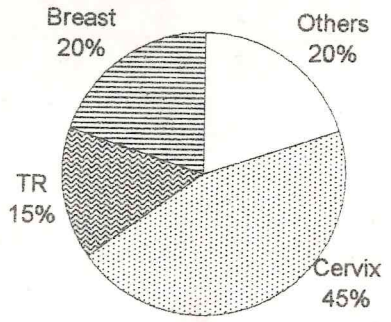
P. Gangadharan, Anitha Nair, Asha.N. M

Cancer control, in brief, envisages reduction in mortality from cancer. Less people will die of cancer, if less people develop cancer and even if they develop the disease, it should be cured and morbidity lessened. Hence prevention, early detection, treatment, reduction of disability, rehailitaion, palliative care forms part of a comprehensive cancer control programme. Amenable to control is related to the current knowledge about the disease. In this presentation the percentage of tobacco related cancers in men and among women, tobacco related cancers, breast cancer and cervix cancer alone are shown. These are either amenable for prevention or early detection. The tobacco related cancers considered here are oral and pharyngeal (Except salivary gland and nasopharyngeal cancer), Oesophagus, Stomach, Pancreas, Lung, Larynx and Urinary Bladder cancer. The association of these cancers with tobacco smoking and / or chewing have been shown in several studies. It must be cautioned that all the above cancers cannot be controlled by tobacco habit curtailment alone. In cancer, which is a known multifactorial disease with independent and interactive factors, eradication of the disease will not happen with elimination of Tobacco factor alone.

BARSHI, 1996 – RURAL MAHARASHTRA.

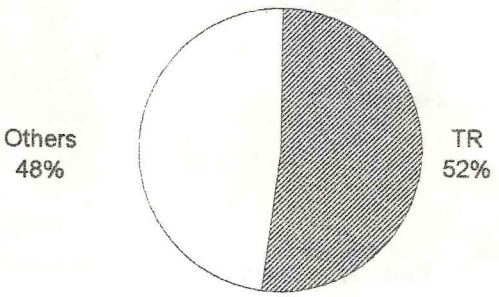


Male – 93, AAR – 43.6

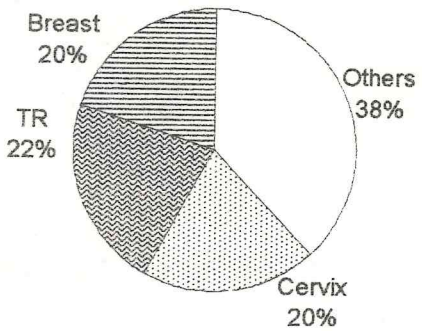


Female – 105, AAR – 52.4

BANGALORE, 1996 - KARNATAKA

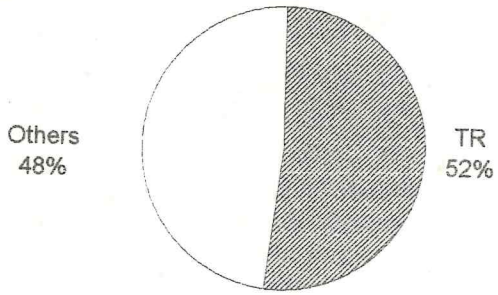


Male – 1399, AAR – 82.6

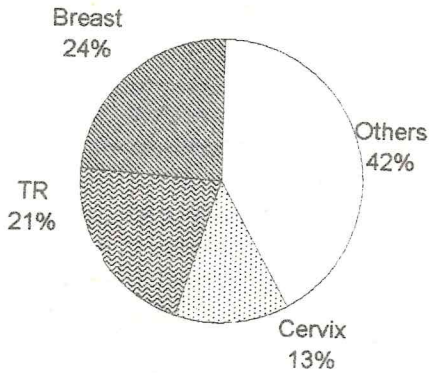


Female – 1622, AAR – 102.7

MUMBAI, 1996 - MAHARASHTRA

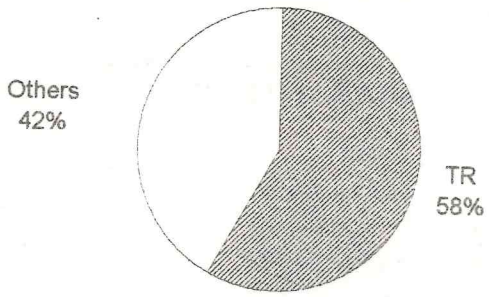


Male – 4401, AAR – 114.2

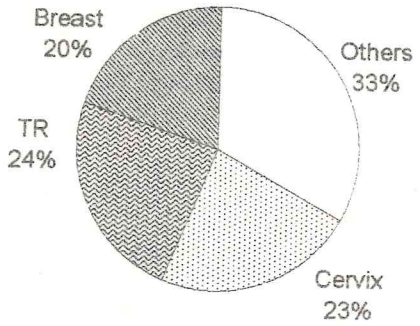


Female – 4061, AAR – 116.8

CHENNAI, 1996 - TAMILNADU

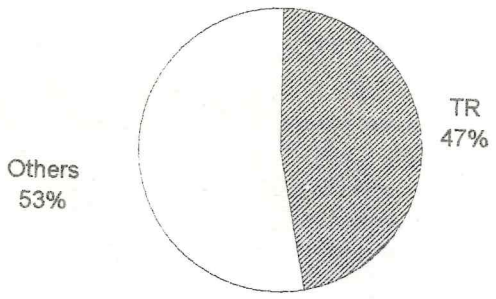


Male – 1721, AAR – 103.1

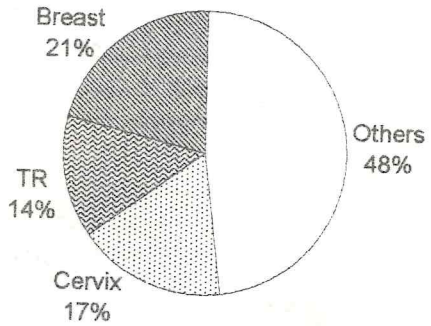


Female – 1889, AAR – 116.4

DELHI - 1996

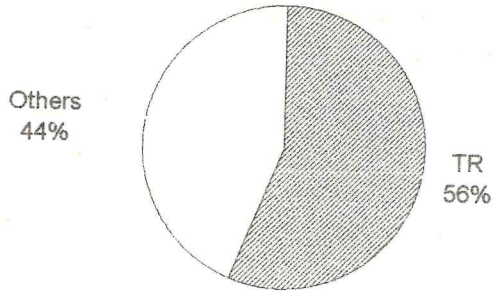


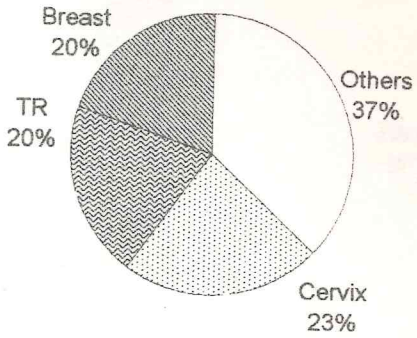
Male – 4200, AAR – 122.0



Female – 3988, AAR – 127.5

BHOPAL, 1995 – MADHYA PRADESH

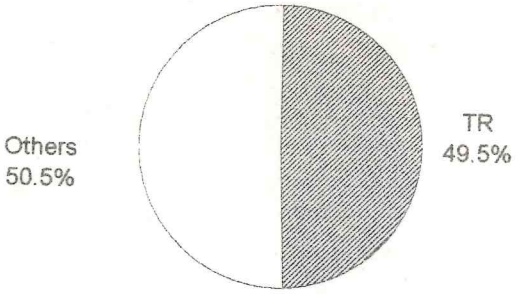


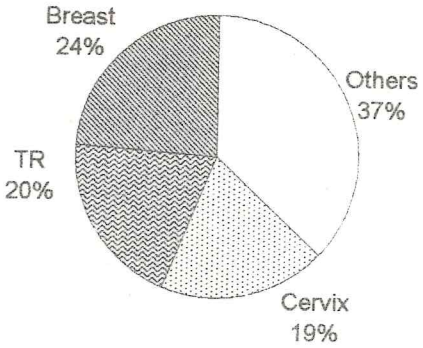


Male – 402, AAR – 102.0

Female – 331, AAR – 90.3

PUNE, 1995 – MAHARASHTRA.

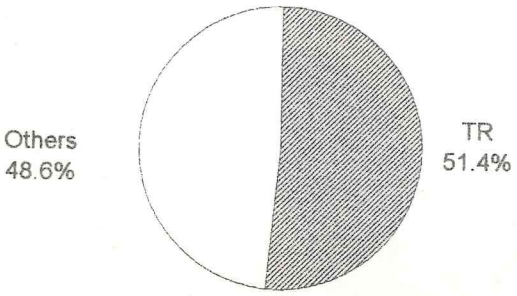


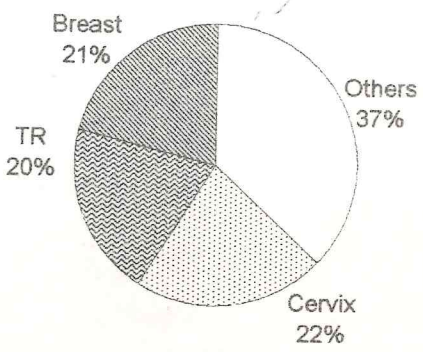


Male - 918, AAR-103.2

Female - 979,AAR-112.9

NAGPUR, 1995 – MAHARASHTRA.

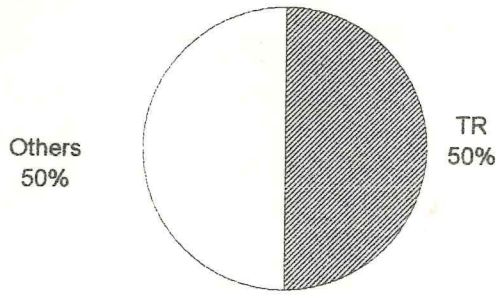


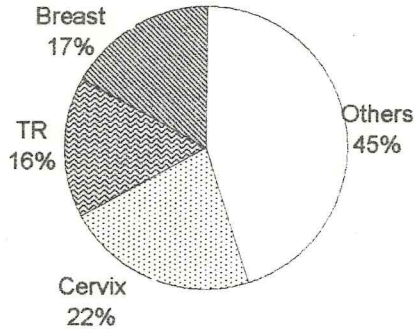


Male - 675,AAR-102.9

Female - 672,AAR-105.0

AURANGABAD, 1995 – MAHARASHTRA.

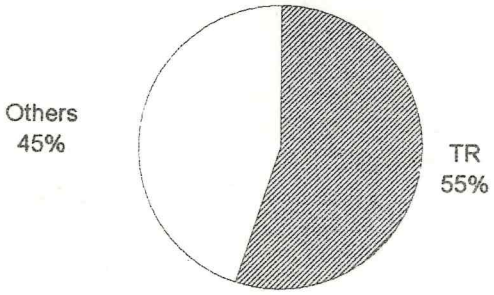


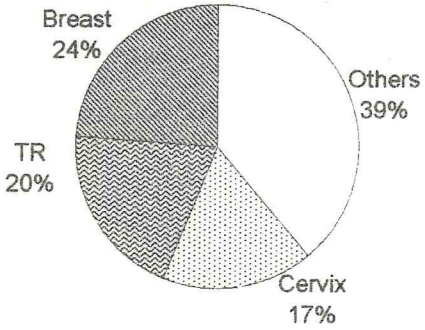


Male - 138, AAR-61.7

Female - 123, AAR-56.8

AHMEDABAD, 1996 – GUJARAT.

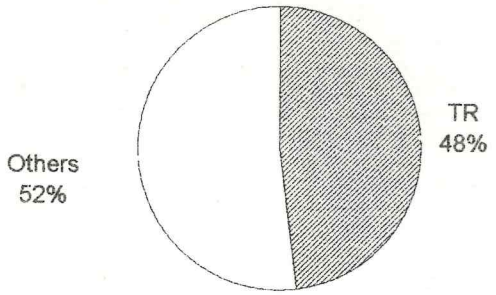


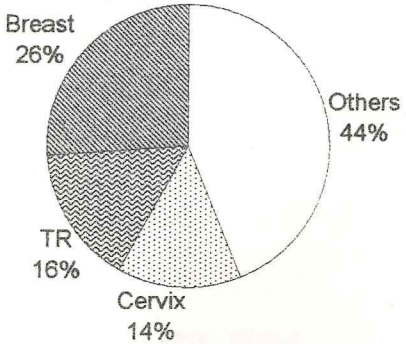


Male – 1524, AAR – 116.0

Female – 1121, AAR – 89.7

URBAN TRIVANDRUM, 1991-'95 KERALA.

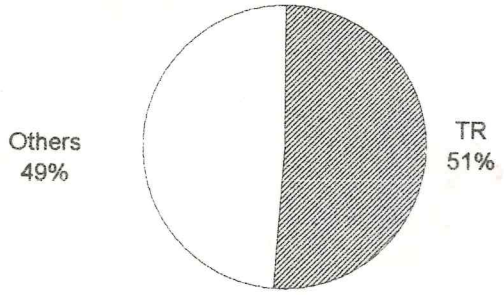


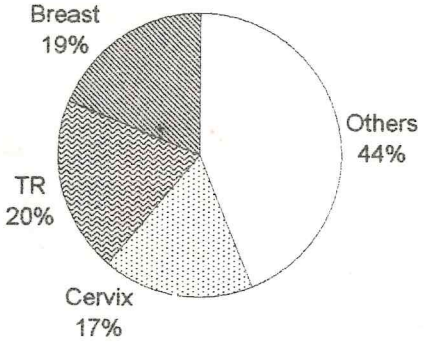


Male – 1024, AAR – 94.4

Female – 995, AAR – 82.5

RURAL TRIVANDRUM – 1991-95 KERALA.

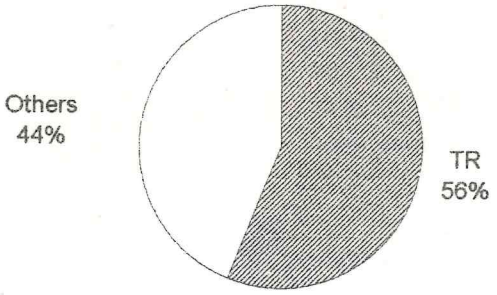


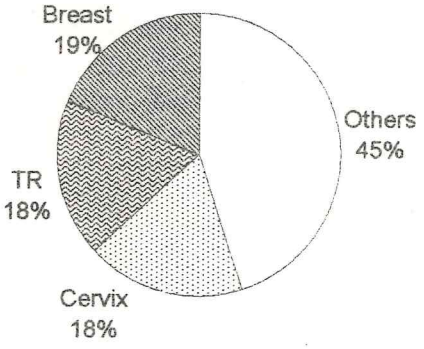


Male – 870, AAR – 78.3

Female – 915, AAR – 71.5

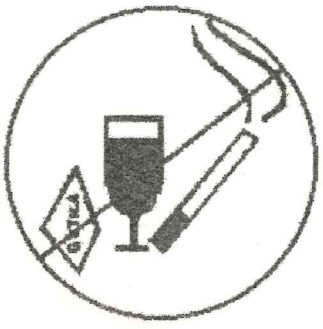
KARUNAGAPALLY RURAL – 1993-97 KERALA.

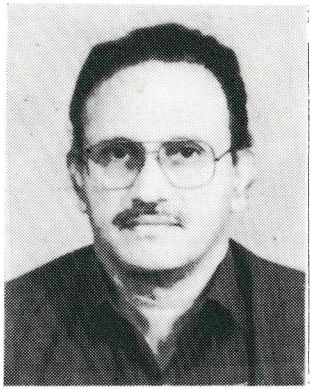




Male – 895, AAR – 102.7

Female – 742, AAR – 75.5





We are happy to inform that **Dr. M. Krishnan Nair, MD, FFR**, Director, Regional Cancer Centre and Principal Investigator, Hospital Cancer Registry, Trivandrum has been awarded **"Padmasri"**.

PUBLICATIONS FROM REGISTRIES

HOSPITAL CANCER REGISTRY, TATA MEMORIAL HOSPITAL - MUMBAI.

MONOGRAPHS

1. Head and Neck Cancer - End Result Report.

Dr. K. A. Dinshaw, D. N. Rao, Dr. P. D. Shroff and G. Chattopadhyay, Hospital Cancer Registry, Tata Memorial Hospital, Mumbai 1996.

This is the second End Result Report on Head and Neck Cancer seen in Tata Memorial Hospital. The analysis presents the end results of 5736 Head and Neck Cancers, which received treatment during 1987-89. Survival analysis of patients with ICD- 140-149,160 & 161 are considered in the report. Survival Rates are also given according to stage, age, nodal status, treatment and several other variables.

5 year Relative Survival Rate for Head & Neck cancer using life table of Maharashtra State population are given below. (In brackets are given lower and upper confidence limits.)

Head & Neck Cancer 1987 - 1989.
Five Year Relative Survival Rates.

Site	Cases	Relative survival rate (%) 5 years	
Oral Cavity			
Lower Lip	62	47	(33, 60)
Anterior Tongue	522	35	(31, 40)
Lower Alveolus	340	34	(29, 39)
Upper Alveolus	71	22	(11, 32)
Floor of Mouth	88	23	(14, 32)
Buccal Mucosa	728	37	(33, 40)
Retromolar	69	27	(16, 38)
Hard Palate	90	34	(24, 45)
Oropharynx			
Base of Tongue	818	16	(14, 19)
Soft Palate	142	27	(19, 35)
Tonsil	346	14	(10, 18)
Oropharynx	189	15	(10, 21)
Hypopharynx			
Post Cricoid	171	14	(8, 20)
Pyriform Fossa	1000	19	(17, 22)
Hypopharynx	84	9	(2, 16)
Larynx			
Vocal Cord	259	68	(62, 75)
Supra Glottis	491	28	(24, 32)
Nasopharynx	125	22	(14, 30)
Salivary Glands	36	32	(15, 48)
Max Antrum	105	28	(19, 37)

2. Breast Cancer - Incidence, Risk Factors and Survival Rate.

D. N. Rao & K. A. Dinshaw, Hospital Cancer Registry, Tata Memorial Hospital, 1999.

1122 Breast Cancer cases seen during 1987-89 in Tata Memorial Hospital are analyzed with regard to Treatment, Stage of disease and Survival status. At the end of five years, 63% overall survival rate was observed and relative survival rate was 66.6% during the period.

The relative survival rates are also reported according to treatment, age group, nodal status and stage of disease.

Five Year Relative Survival Rates According To Stage

Stage	Relative survival rate (%) 5 years
I	97.3
II	73.1
IIIA	51.9
IIIB	44.8
IV	37.6
Nos	47.2

The highest 5 year Relative Survival rate - 100% was seen for patients with stage I disease who underwent surgery. Kaplan Meir Survival Curves have been presented for various treatment - stage- age- groups. Descriptive Epidemiology of Breast Cancer has been included in this report.

ABSTRACTS OF ARTICLES.

Role of Reproductive Factors in Breast Cancer in A Low-Risk Area: A Case- Control Study

D. N. Rao, B. Ganesh & P. B. Desai

A case -control study of 689 breast cancer patients seen at Tata Memorial Hospital during 1980-'84 was carried out. During the same period 711 females who attended the hospital without a history of benign breast lesions or gynaecological complaints were selected as controls. Patients were interviewed by trained investigators to collect data on reproductive factors, menstrual history, and tobacco smoking and chewing habit, diet (veg/non-veg) and alcohol consumption. Cases and controls were stratified into four age groups (<35 years, 35-44, 45- 54, and 55+ years) and three places of residence (Bombay, Maharashtra, others). The adjusted relative risk (RR) for unmarried women compared with married women was 2.3. Nulliparous women had a 2.2 fold higher risk than parous women. Late age at marriage (=>30 years) and late age at first pregnancy (=>30 years) showed excess risks of 2.5 and 5.4 compared with women married at the age of 14 years and age at first pregnancy of <=14 years. Three or more pregnancies was associated with a 40-50% reduction risk ($p<0.01$) .Non - vegetarian diet, literacy status, history of stillbirth and abortion did not emerge as significant risk factors. These findings in a low- risk population were consistent with those reported from high-risk populations.

Br. J. Cancer, 70, 129-132, 1994

Risk Assessment of Tobacco, Alcohol and Diet in Cancers of Base Tongue and Oral Tongue - A Case Control Study

D . N. Rao & P.B. Desai

This is a retrospective case-control study of male tongue cancer patients seen at Tata Memorial Hospital, Bombay, during 1980-84.The purpose of the study was to identify the association of tobacco, alcohol, diet and literacy status with cancers of two sub sites of tongue, namely, anterior tongue(AT) (ICD 1411-1414) and posterior tongue(BT) (ICD 1410). There were 142 male AT patients and 495 BT patients interviewed during the period. 635 interviewed male patients who were free of any disease were considered as control.

Bidi smoking was found to be a significant risk factor for BT and tobacco chewing for AT patients. Alcohol users showed about 45% to 79% excess risk for both sites of tongue cancer. Illiteracy and non-vegetarian diet proved to be significant factors for AT patients only. The study brings out that the location of cancer has a direct bearing with type of tobacco use and other related habits and this inturn may provide meaningful interpretation of variations observed in the incidence of tongue cancer around the world.

Ind.J. of Cancer, 35, 65-72, June1998

Epidemiological Observations on Cancer of the Oesophagus - A Review of Indian Studies

D. N. Rao, P. B. Desai, & B. Ganesh

This is an epidemiological review on cancer of the oesophagus. In this all aspects of epidemiological factors based on national and international studies on oesophageal cancer have been brought out. The problem of this cancer in Indian context has been documented. The association of tobacco and alcohol habits with oesophageal cancer has been confirmed from the studies conducted in India. There is an urgent need to educate the people about the harmful effect of these two habits and governments and voluntary organisations should take effective steps for its prevention .

Ind. J. of Cancer, 33, 55-75, June1996

Risk Assessment of Tobacco, Alcohol and Diet in Oral Cancer A Case-Control study

D. N. Rao, B. Ganesh, R. S. Rao & P. B. Desai

A retrospective case- control study of 713 male oral cancer patients seen at Tata Memorial Hospital, Bombay during 1980-1984 was undertaken to assess the association between chewing, smoking and alcohol habits. Male controls were chosen among those patients who attended the hospital during the same period and were diagnosed as free from cancer, benign tumours or infectious disease. Statistical analysis was based on unconditional logistic regression and the confidence interval for RR was calculated using the standard error of the estimates. Established factors such as tobacco chewing and bidi smoking showed a significant association with oral cancer. For the alcohol habit, the relative risk was 1.42 and a dose response relationship, in terms of frequency and duration of the habit, was also observed. The illiterate group showed an almost 2 fold significant excess risk compared to the literate group. After adjusting for confounding variables such as age, residence, literacy and known factors such as tobacco chewing and bidi smoking, the study has brought out the significance of a non-vegetarian diet as a high-risk factor for oral cancer compared to a vegetarian diet. Further studies are required to identify specific items in the non-vegetarian diet which may be associated with oral cancer.

Int. J. Cancer :58, 469-473. 1994

Estimate of Cancer Incidence in India - 1991

D. N. Rao & B. Ganesh

Cancer incidence and eighteen site-specific age standardised rates in India were estimated for the year 1991. With the establishment of National Cancer Registry Programme, incidence rates are available from six metropolitan registries and one rural registry. Using population census data for India in 1991, about 609,000 new cancer cases were estimated to have been diagnosed in the country in 1991. The estimated age standardised rates per 100,000 were 96.4 for males and 88.2 for females. The five most common cancers were lung (10.6%), pharynx (9.1%), oesophagus (6.7%), tongue (6.6%) and stomach (5.7%) among males and cervix (23.5%), breast (19.3%), ovary (5.5%), oesophagus (4.4%), and mouth (3.9%) among females. A comparison of estimated AARs for two largest countries in Asia (China and India) showed differences in the pattern of cancer.

Ind. J. of Cancer, 35, 10-18, Mar.1998

Survival Analysis of 5595 Head and Neck Cancers - Results of Conventional Treatment in A High - Risk Population

D.N Rao, P. D. Shroff, G Chattopadhyay & K A Dinshaw

This is a study of 5595 head and neck cancer patients treated during 1987-89 at TMH, Mumbai. The study included 1970 oral cancers (ICD 140-145), 1495 oropharyngeal cancers (ICD 146) and 750 laryngeal cancers (ICD 161). The clinical extent of disease at presentation was based on TNM group staging (UICC 1978). For the majority of sites, patients attended the hospital during stage III and stage IV of the disease; the only exception was for cancers of the lower lip, anterior tongue and vocal cord when between 46.2% and 56.5% of patients with localized cancer (stage I and II). Generally, surgery either alone or with radiation has been administered for oral cancer patients whereas radiation either alone or in combination with chemotherapy was administered for other head and neck sites. The overall 5-year survival rate was in the range of 20-43% for oral cancer, 8-25% for pharyngeal cancers and 25-62 % for laryngeal cancer. The 5-year relative survival rates were more or less in agreement with the results published by the Eurocare study for head and neck cancers. The importance of primary prevention in head and neck cancer is stressed.

Br. J. of Cancer, 77(9), 1514-1518,1998

Alcohol as an Additional Risk Factor in Laryngo- Pharyngeal Cancer in Bombay - A Case Control Study

D.N. Rao, P.B. Desai & B. Ganesh

A retrospective case-control study of 1968 male pharyngeal and laryngeal cancers seen at the Tata Memorial Hospital, Bombay from 1980 to 1984 was undertaken to assess the association between the cancers and chewing, smoking and alcohol habits. Male controls were chosen from persons who attended the hospital during the same period and who were free from cancer, benign tumor and infectious disease. Statistical analysis was based on unconditional logistic regression method. Bidi smoking and alcohol drinking emerged as significant factors for pharyngeal and laryngeal cancers. Illiterate had 50 to 60 % excess risk for pharyngeal cancer. Non-vegetarian diet did not emerge as significant factor.

Cancer Dete. and Preven.,No.540, 23(1) 37-44, 1999

Data Management, Storage and Retrieval in a Specialised Hospital set up for Patient Care and Research

D. N. Rao

Medical data management in a specialised hospital requires different techniques and approaches compared to

general hospital environment. At the Tata Memorial Hospital, Mumbai, a specialised centre for diagnosis and treatment of cancer, we have been maintaining over 300,000 medical records of past 25 years. The design, identification number and coding system and content of medical records have been made user friendly not only to specialized doctors but also to technicians, scientific and para medical personnel and administrators. Over 70 types of forms to cover demographic information, past and present medical history, signs and symptoms, investigation details, diagnosis, treatment details and follow up information are currently in use. These forms have been designed and made computer compatible for data entry, storage and retrieval. ND Norsk Data Computer with its SIBAS DATA BASE software has been in use since 1986. Micro filming of old medical records has also been carried out to store medical records. Cancer database contains about 1,70,000 patients information with details of site of disease, pathological details, treatment and follow up information, available on-line, for patient care and research. The standard international codes for oncology, clinical staging and treatment procedures are used for data dissemination to national and international cancer registries. Dedicated computers for whole body CAT scan, radiotherapy treatment planning, Linear accelerator and autoanalysers are some of the computers in use for diagnostic and therapeutic purposes. Harvard Graphics and statistical software are available for data communication and research activities.

Poster presentation at the 16th International CODATA Conference at New Delhi, Nov. 8-12, 1998.

CONFERENCES

Mr. D.N. Rao attended the 4th International Congress on Oral Cancer held at Ogaki, Nagoya, Japan, Sept.20-23, 1995.

BOMBAY CANCER REGISTRY - PBCR.
Indian Cancer Society,
Jerbai Wadia Road, Mumbai.

PREDICTION OF CANCER INCIDENCE CASES FOR INDIA
Abstracted from Ph. D. Thesis of Dr. B. B. Yeole

[For full report contact Dr. B. B. Yeole, Indian Cancer Society, Parel, Bombay-12]

Objectives of the Study

1. To study the time trends in cancer incidence by age, sex for all major sites in Greater Bombay.
2. To interpret these time trends for common cancers.
3. To predict cancer incidence cases for future period (up to 2002 A.D) by age, sex, period and site for Greater Bombay.
4. To predict cancer incidence cases for India by age, sex, site and residence (Urban/Rural) for the year 2001 AD.
5. To estimate various health indicators for cancer care for India in 2001 AD.

For studying time trends age-period-cohorts modelling has been used. The data on new cancer cases was used for 20 year period (1968-1987), has been analysed for most prominent 30 sites, for each using four 5 year periods and seventeen 5 year age groups. Using these data cancer incidence cases are predicted for Greater Bombay for next 15 year period (1988-2002). The incidence cases are predicted for three 5 year periods for some prominent sites for each sex and seventeen 5 year age groups. Using trend analysis for Bombay and current information on incidence from 10 population based cancer registries, new cancer incidence are predicted for India for 2001 by residence (urban/rural), age, sex, period and site. Resources and various services needed for cancer care in India for 2001 AD has been estimated by using predicted cancer incident cases and information available for resources and services for cancer care for Finland in 1979.

Present trend analysis showed, that cancers of tongue, mouth, oropharynx, oesophagus stomach, larynx in both sexes and cervix for females have registered a decline in incidence, over the period of observation. During the same period, cancers of liver, pancreas, bladder, brain and thyroid in both the sexes and breast, endometrium and ovary in females, and testis in males showed increasing trends in incidence, while cancers like hypopharynx, lung, bone, connective tissue and lymphomas in both the sexes did not show any significant change in the incidence. During the first 5 year period of observation (1968-1972), 18,652 (11,080 males and 7,572 females) cancer cases were registered in Bombay. In the last 5 year period of prediction (1998-2002), 46,241 (23,004 males and 22,873 females) cancer cases were predicted for Bombay. The sex ratio of 683 females per 1000 males in 1968-1972 will be increased to 976 females per 1000 males in 1998-2002 in Bombay. When these incidence cases are related to respective person years, it showed that in males the crude incidence rate increased from 685 in 1968-1972 to 742.7 per million person years in 1998-1972 showing 8% increase, and in females the crude incidence rate increased from 656.7 to 839.5 per million person years showing 28% increase during the same period. The age specific incidence rates for all sites together by 5 year age groups show that the incidence was increased in younger age groups (up to 40) and for later ages, it has been decreasing for all the age groups in both the sexes. The age adjusted incidence rates adjusted to the world standard population for all cancers together showed decrease during the same period in both the sexes. The age adjusted incidence rate per million person years has decreased from 1400.9 to 1072.1 in males and 1217.8 to 1073.7 in females from 1968-1972 to 1998-2002. When the age adjusted incidence rates per million population were compared by sex, it was noted that the rates in 1968-1972 were less by 13% in females. While in 1998 -2002 the rates are almost equal in both the sexes.

In India, in 2001, 566 thousand new cancer (incidence) cases are predicted. The predicted cases have more females (2,99,755) than males (2,65,927).

As per this study it is seen that the care of cancer to a large extent requires inpatient care in the hospitals and will be concentrated in the Regional Cancer Centres. Resources for the care of cancer are being used in all age categories. However the use of services will be heavily concentrated among those in the age group 45 to 64. It was also estimated that women will be requiring more days of treatment than men. As for required days for the treatment of cancer is concerned it is estimated that 42.5% will be used for active treatment and 62.1% of out patient visits in the regional hospitals will be allotted for this purpose. For terminal care 27.1% of all days of care will be required for cancer patients. Surgical treatment will be most demanding among the different forms of active care in terms of days of care. According to the special fields of medicine most of the services for the care of cancer would be made available within the fields of surgery, internal medicine, and radiation.

It has been estimated that 590 thousand beds, 700 thousand nurses, 70 thousand physicians and 8,000 crores of rupees will be required for total cancer care in 2001 for India.

Various Estimates of Cancer Incidence in India

Site	Estimated by Jain (1991) (in Thousands)		Estimated by Murthy (1990) (in Thousands)		ICMR (in Thousands)		Estimated in present study (in Thousands)	
	Males	Females	Males	Females	Males	Females	Males	Females
Oral cavity	39.0	31.0	43.2	38.0	44.8	23.7	33.3	9.8
Pharynx	53.0*	14.0*	42.6	-	41.5	11.1	20.5	6.4
Oesophagus	31.0	26.0	29.6	28.0	40.0	33.4	15.0	10.9
Larynx	-	-	-	-	18.8	1.6	14.8	3.8
Lung	34.0	7.0	40.2	-	47.6	7.0	21.3	6.2
Bladder	-	-	-	-	11.8	3.0	4.0	3.5
Tobacco Related Cancers	157.0	78.0	230.0	94.0	204.8	79.8	108.9	40.6
Breast	-	80.0	-	79.7	-	99.9	-	66.8
Cervix	-	100.0	-	139.0	-	83.3	-	80.8
Lymphoma	-	-	-	-	25.9	16.0	12.9	7.3
Leukaemia	-	-	-	-	19.0	14.7	15.7	9.1
All Sites	**393.0**	**413.0**	**432.6**	**490.7**	**476.3**	**448.5**	**265.9**	**300.0**

*Includes Larynx

Present estimate seem to be more realistic, as they have been made in a scientific way, i.e. based on the age-period-cohort model. Hence they account for both period and cohort effect. Trends observed in the past for each site have been assumed to continue in the future, hence the predicted values will be nearer to the realistic values. In the present study the predictions are made for rural and urban areas separately, using different incidence patterns prevailing in India and hence they are more representative. While estimating incidence rates for urban/rural areas in the present study the latest incidence information available from all the ten registries in India have been used. In other studies, estimates of incidence cases were based only on three or four urban registries.

ABSTRACTS OF ARTICLES.

Descriptive Epidemiology of Cancers of Male Genital Organs in Greater Bombay

B. B. Yeole & D. J. Jussawala

For different reasons, cancers of the prostate, testis and penis are important diseases for men. The incidence of prostate and testicular cancers are more commonly seen in developed countries, while penile cancer occurs more frequently in the developing countries. In Mumbai the incidence of prostatic and testicular cancers is low whereas penile cancer incidence is high when compared with international

reports. In Mumbai, the incidence of prostatic cancer increases only after the age of 50. The age specific incidence rates for testicular cancers are bimodal whereas the incidence of penile cancer increases exponentially with age, after the age 30.In Mumbai, the incidence of prostate cancer was six times higher in the Parsis as compared to other communities. The incidence of cancer of the testis is lowest in Hindus and cancer of penis is not seen in Muslims. The incidence of prostate cancer was highest among Gujarathis and there was an absence of penile cancer in Urdu speaking men. In Bombay the incidence of cancers of the prostate, testis and penis seem to be associated with marital status. An association between incidence and education level was found in cancer of the testis. There seems to be an increase in age adjusted incidence rates for cancers of the prostate and testis over a time - period of 30 years, whereas penile cancer incidence was decreasing over the same period.

Ind. J. of Cancer, V. 31. 30 -39 Dec.1996

Descriptive Epidemiology of Thyroid Cancer in Greater Bombay

B. B. Yeole

In this paper an attempt has been made to present a descriptive epidemiology of thyroid cancer in Bombay, and it is discussed in relation to age, demographic and socio economic composition of the population, using most recent five year data. Time trend analysis of this cancer by sex has also been discussed using the last 30 years data. When international incidence of thyroid cancer was ranked in descending order for various countries, the incidence recorded for Bombay was found to be at the lowest level in both sexes. Thyroid cancer is about three times more frequent among women than men, but this relative excess varies with the histologic type and age. As in the case of majority of cancers, the incidence curve for thyroid cancer rises with age. However in men, the increase continues consistently with advancing age, while in women it begins to level off after the age 30,leading to an almost equal sex ratio in old age. In Bombay the incidence of thyroid cancer in men was found to be the highest in Muslims and in Christian women. No association was observed between thyroid cancer and education level attained by these patients .The four main histologic types of thyroid cancers i.e. papillary, follicular, anaplastic and medullary are also observed in Bombay. It has been noted that there is an increasing trend in the age-adjusted incidence rate for thyroid cancer in both the sexes in Bombay in the period under review 1964 to 1993 but was found to be statistically significant only in males.

Ind.J. of Cancer, V. 35.57 - 64 June 1998

Uterine Cervical Adenocarcinomas and Squamous Carcinomas in Bombay: 1965 - 1990*

Sarala Krishnamurthy, B. B. Yeole & D. J Jussawalla

'To learn if the increased incidence of uterine cervical adenocarcinomas in developed populations exists in developing ones, we studied age-adjusted (world) incidence rates of pathologic types of cervical cancer from 1965 through 1990 in the Population -Based Bombay Cancer Registry and in the National Cancer Registry's hospital - based frequencies of 1985 -1987'. The t-test was used to measure the statistical significance of change. International comparisons were made.

In Bombay, the incidence rates of adenocarcinoma per 10^6 women rose from 5.0 in 1965 to 12.9 in 1990 ($p<0.05$). However, cervical cancers overall declined from 244 per 10^6 in 1965 to 176 in 1990 ($p<0.001$), squamous carcinomas declined from 167 to 129 per 10^6 ($p<0.05$), other types of cervical cancers declined from 10.9 to 2.9 per 10^6 women (ns) and non-pathologically diagnosed cervical cancers declined from 61 to 31 per 10^6 women ($p<0.05$). Adenocarcinomas were 2.5% of

all cervical cancers in Bombay's overall population in 1965, and were 7.0% in 1990; they were only 3.3 % in 5 Indian hospital registries but were a higher percent in Tata Hospital Bombay and internationally. The peak age of adenocarcinoma patients was 50-55 years in Bombay, unlike a younger peak age in the West, and 60-65 years for squamous carcinomas.

This Occidental-type trends might be due to increased awareness of cervical adenocarcinomas and/or changes associated with industrialisation. Such trends might occur in other developing countries in future. Greater awareness of cervical adenocarcinoma and its early diagnosis by endocervical brush cytology are required in such populations.

J.Obst.. Gyna.. Res. Vol .23, No.6: 521 - 527, 1997

Descriptive Epidemiology of Lymphatic Malignancies in Greater Bombay

B B. Yeole & D.J. Jussawalla

Lymphoid malignancies as a group constitute one of the important cancers in India as elsewhere in the world. Information on incidence, mortality, survival and trends, are available from most of the developed countries. There are very few reports available from the rest of the world. The basic data for this study was obtained from the Bombay Cancer Registry, the first population based registry in India. Descriptive Epidemiology of these malignancies was obtained by utilizing 5-year data of incidence and mortality of different cell types in males and females. For studying time trends in the incidence of these cancers, data of the past 30 years has been used. As a group, the lymphatic malignancies represent only 5% of the incidence and 3.9 % of the mortality of all cancers in Greater Bombay. Males in general seem to be more affected by lymphomas than females. Non-Hodgkin's lymphomas are the commonest lymphatic malignancies to be detected in Bombay. The incidence curves show striking differences by cell type. In Bombay the incidence of these cancers was found to be the highest in the Parsis. Our data indicates that there is an increasing trend in incidence in all cell types of lymphomas, in both sexes. To obtain the details of the risk factors of these malignancies more analytical epidemiological studies have to be undertaken from Indian data and more importance to lymphomas in the early detection and control of cancer should be given.

Oncology reports 5 : 0-00, 1998

Descriptive Epidemiological Assessment of Cancers of Breast, Ovary and Uterine Corpus in Greater Bombay

B. B. Yeole & D. J. Jussawalla

An attempt has been made to make a descriptive epidemiological assessment of cancers of breast, uterine corpus and ovary in Greater Bombay. Comparison between these cancers has been made in relation to age and demographic and socio-economic composition of the population, utilising the recent five year data. The incidence of these cancers in Bombay has been compared with national and international findings. Time trend analysis of these cancers has also been discussed, using the data for the past 30 years, collected by the Bombay Cancer Registry. A linear regression model based on the logarithms of the incidence rates was utilised for studying the time trends. In Bombay during the period 1989-1993, 4110 breast cancer cases were registered representing 11.2% of the total number of cancers seen and 23.5 % of cancers in females. The average A.A.R for incidence and mortality of breast cancer was found to be 29.4 and 12.5 per 100,000 population respectively. During the same period 326 cases of uterine corpus cancers and 1,096 ovarian cancers were recorded in Bombay.

Breast cancer is extremely rare in premenarchial age .The age specific incidence is seen to vary for each of these cancers. The incidence is seen to be very high in all the three cancers among Parsis, when compared with the other religious groups. Breast and ovarian cancers were found to be the highest in Gujaratis, whereas, cancer of the uterine corpus was predominant in Maharashtrians. The incidence of all three cancers increased with educational level of the patients. This was found to be maximum for married women followed by the widows and was lowest in unmarried women. The trend of incidence data for all these three cancers in Greater Bombay parallels changes in age-adjusted incidence rate in the corresponding sites observed in other registries of the world.

Oncology Reports 4: 455-462,1997

Descriptive Epidemiology of Bone Cancer in Greater Bombay

B. B. Yeole & D. J. Jussawalla

Bone tumours are comparatively uncommon, constituting only 0.5 % of the total world cancer incidence. As bone tumors consists of several distinct clinico-pathological entities, descriptive epidemiology of tumours at this site can be based only on studies where they can be distinguished. Ewing's sarcoma Chondrosarcoma and Osteosarcoma are the principal tumors involving bones. The basic data utilized for this study was collected from the Bombay Cancer Registry which was established in 1963, and is the first population based registry in India. For studying the descriptive epidemiological variables the most recent 5year incidence rates have been used. As a group, bone cancer represent 0.9% of the total number of incident cancer seen in Greater Bombay. Males in general seem to have a higher incidence of bone cancers than females.Ewing's sarcoma was found to be the commonest bone cancer in Bombay. The age specific incidence curves present striking differences according to cell types of bone cancer. Time trends in the incidence of these cancers, over the past 30 years have been presented. Our data indicate that there is a decreasing trend in incidence of bone cancers in females, whilst the rates are stable in males. Ionising radiation is the only environmental agent to cause this cancer. The discovery of other risk factors is the key to prevention and will depend upon the experimental work undertaken to develop sub-clinical measures of risk that can be applied in interdisciplinary studies to identify more completely the cause of bone cancers.

Ind. J. of Cancer Vol .35 101-106, Sept 1998

Descriptive Epidemiological Assessment of Urinary Bladder and Kidney Cancers in Greater Bombay

B. B. Yeole & D. J. Jussawalla

For studying the descriptive epidemiology of cancers of the urinary bladder and kidney, the data reported by Bombay Cancer Registry for the most recent five years have been utilised. For studying time trends in these cancers, data of the past 30 years have been used. In Bombay, bladder cancer is very uncommon in the first three decades of life; but after the age of 30, the incidence rates increase with age, in log-linear fashion, in both sexes. The incidence of kidney cancer is almost absent between the ages 5 to 35;but later upto the age of 70, it shows a steady increase. The incidence of urinary bladder and kidney cancer are found to be associated with the marital status in both sexes. No association was observed between the incidence and the educational level attained by the patients having urinary bladder and kidney cancers. An increasing trend was found in the age adjusted incidence rates of cancers of the urinary bladder and kidney in both sexes during the period 1964-1993.

Ind. J. Med. Res. 106, 517-523 Dec. 1997

Vasectomy and Prostate Cancer : A Case - Control Study in India

E.A. Platz, B.B. Yeole, E. Cho, D.J.Jussawalla, E. Giovannucci & A. Ascherio

A case-control study consisting of 175 prostate cancer cases and 978 controls with cancer diagnoses other than prostate cancer was conducted at hospitals covered by Bombay Cancer Registry in Bombay, India. History of vasectomy, demographic and lifestyle factors were obtained by structured interview. Multiple logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CI).

Standardizing by age, 8.7% of cases and 8.3% of controls had vasectomy. The OR for prostate cancer comparing men who had had a vasectomy to those who did not was 1.48 (95% CI:0.08-2.72) controlling for age at diagnosis, smoking status, alcohol drinking, and other demographic and lifestyle factors. Risk of prostate cancer associated with vasectomy appears to be higher among men who underwent vasectomy at least two decades prior to cancer diagnosis or who were at least 40 years old at vasectomy.

Although not statistically significant, the result of this hospital-based case-control study are consistent with the hypothesis of a positive association between vasectomy and prostate cancer. Because routine prostate cancer screening is not common in this population, detection bias was unlikely to account for this association.

Int. J. of Epid. Vol.26,No. 5,Pg.933-38.1997

PAPERS IN CONFERENCES.

Dr. Yeole presented a paper "Prediction of Cancer Incidence Cases for India 2001". International Conferences on Environmental and Occupational cancer in developing countries. Rio-de Janeiro, Brazil, 1998. (Fellowship by 'Fundacentro', Brazil).

Dr. Yeole attended the 32nd annual conference of International Association of Cancer Registries, Atlanta, Georgia, U.S., 1998. (Fellowship by Local Organizing Committee).

MADRAS METROPOLITAN CANCER REGISTRY & HOSPITAL CANCER REGISTRY
Cancer Institute (WIA) Adayar, Chennai.

ABSTRACTS OF ARTICLES

Cancer Registration in Madras Metropolitan Tumour Registry, India

Shanta .V, Gajalakshmi .C.K, Swaminathan .R, Ravichandran .K & Vasanthi .L

The Madras Metropolitan Tumour Registry (MMTR) was established at the Cancer Institute (WIA), Madras, in 1981-1982. Cancer is not a notifiable disease in India, and hence registration per force has to be active. The MMTR covers a population of 3.8 million. Mortality statistics are obtained from the department of vital statistics, death registers in hospitals and by active follow-up of registered cases. A total of 28,980 (13,012males, 15,968 females) cases were registered during 1982-1991. The average annual world-standardised age-adjusted rates (AAR) per 100,000 are 104.2 in males and 129.0 in females. The lifetime cumulative risk (0-74 years) of cancer in Madras is one in eight. Stomach (AAR:15.2) is the leading site of malignancy among males, followed by cancers of the lung (AAR:9.8) and oral cavity (AAR:9.4). Among females, cancer of the cervix (AAR:44.0) is the commonest,

followed by breast (AAR:21.7) and oral cavity cancers (AAR:9.8).

Euro.J. of Cancer; 30A(7): 974-978,1994

Methodology for Long -Term Follow-Up of Cancer Cases in a Developing Environment

Gajalakshmi .C.K & Shanta .V

The utility of data collected on patients will be rendered insignificant without adequate follow-up information. Efficient methods should be used to follow cases in order to get vital status information in hospital (HBCR) and Population Based Cancer Registries (PBCR). Based on our experience we have evolved methods to follow cancer cases and this has been discussed in this paper. Active follow up of cases has enhanced follow-up rate from 50% to more than 85% at HBCR and "death in period" from 19% to 41% during the period 1982 to 1991 in PBCR. Active follow-up is mandatory for the cases registered at HBCR. In addition to collecting data from VSD on cancer deaths, active follow-up is desirable to get maximum death information on cases registered at PBCR in a developing environment. Computerisation of follow-up data is necessary in order to further improve the efficiency of the follow-up system.

Ind. J. of Cancer; 32, 4, 160- 169, Sept. 1995

Leukaemia after Irradiation for Endometrial Cancer in Ontario

Holowaty .E.J, Darlington .G.A, Gajalakshmi.C.K, Toogood .P.B & Levin .W

In human studies, the risk of leukaemia after ionising radiation has been found to be increased more often than for any other cancer. It is useful to study patients with cancer treated with radiation because exposure can be measured accurately, follow-up may be long, and often a comparable and sizable nonexposed group exists. Women with endometrial cancer represent an excellent population for study.

A population-based matched case-control study, nested among all patients with endometrial cancer diagnosed in Ontario, was undertaken to describe the relationship between radiation therapy and leukaemia risk. Among 13,843 subjects treated from 1964 to 1987 who survived at least 1 year, 47 confirmed cases of leukaemia were identified. Four control subjects were matched to each patient based on age, calendar year of diagnosis, and length of survival free of a second neoplasm. Medical records were abstracted, and radiation dose administered to active bone marrow was determined by dosimetry.

An elevated risk of all leukaemias other than chronic lymphocytic leukaemia was observed, but only within the first 10 years after endometrial cancer treatment (odd ratio 12.0: 90% confidence interval 2.8-52.1). There was insufficient statistical evidence that dose or type of radiation therapy influenced risk. Nor was there any evidence that risk was influenced by age at endometrial cancer diagnosis or by calendar period at diagnosis.

It is concluded that there is an increased risk of leukaemia associated with radiation therapy for patients with endometrial cancer, but only within the first 10 years after treatment.

Cancer. 76: 644- 649, 1995.

Tobacco Related Cancer in India

Gajalakshmi .C.K, Ravichandran .K & Shanta .V

Tobacco is the single most important cause of avoidable morbidity and early mortality in many countries. Tobacco-related cancer (TRC) cases constitute 48.2% in men and 20.1% in women of the total cancers seen in India. The age-adjusted rate (AAR) of TRC ranges from 44 to 67 among males and from 23 to 27 among females in different registries in India. Of these, only

15% were in the lung. The religion-specific risk ratio of the TRC sites in Madras suggests that when Muslims were compared with Hindus, pharynx and lung were the two sites that showed higher risk in males, while the pharynx, lung and oesophagus had higher risk in females. When Christians were compared with Hindus, lung cancer was found to have higher risk and cancer of the oesophagus lower risks in males, while cancer of the mouth had lower risk in females. The overall percentage increase in AAR of TRCs in males was 39.7 and in females was 20.1 for the period 1987-'91, compared with 1982-'86, with variation in the percentage increase in all the TRC sites in Madras. The change in the incident rate of the TRCs seen in Madras is consistent with the change in the per capita consumption of tobacco over the years.

Eur J Cancer Prevention; 5(1): 63-68.1996

Cervical Cancer Screening in Tamil Nadu, India - A Feasibility Study of Training the Village Health Nurse

Gajalakshmi .C.K, Krishnamurthi .S, Revathi .A & Shanta .V

Uterine cervical cancer is the most common malignancy among females in developing countries, including India. The success of cervical cancer screening programmes in North America and Western Europe has been the result of centralised cervical-cytology screening. This is not possible in the villages (n=17,000) of Tamil Nadu where 58 percent of females in rural areas are illiterate, health infrastructure is mediocre, and cervical cytology is unknown. The present study was undertaken to examine if the village health nurse (VHN) could be trained quickly to identify a cervical abnormality by visual inspection so that we could 'down stage' the cancer to earlier stages, more amenable to treatment. WHNs also would be trained to take an adequate pap smear. A total of 101 VHNs were trained in batches and returned to their villages. Within two years, 6,459 eligible women in the study area were screened. The agreement between the gynecologists and the VHNs in identifying cancer among those with abnormal cervix was 95 percent, and 80 percent of the pap smears taken by VHNs were adequate by WHO criteria, making the feasibility study highly successful.

Cancer Causes Control; 7: 520-524. 1996

Global Variation in Cancer Survival

Sankaranarayanan .R, Swaminathan .R & Black .R.J

(On behalf of the study group on **"Cancer Survival from developing countries").**

Population-based cancer registries from Algeria, China, Costa Rica, Cuba, India, the Philippines, and Thailand are collaborating with the IARC in a study of cancer survival in developing countries. Comparisons with the SEER program results of the National Cancer Institute in the United States, and the EUROCARE study of survival in European countries revealed considerable differences in the survival of patients with certain tumours associated with intensive chemotherapeutic treatment regimes (Hodgkin's disease and testicular tumours), more modest differences in the survival of patients with tumours for which early diagnosis and treatment confer an improved prognosis (carcinomas of the large bowel, breast and cervix), and only slight differences for tumours associated with poor prognosis (carcinomas of the stomach, pancreas and lung). With limited resources to meet the challenge of the increasing incidence of cancer expected in the next few decades, health authorities in developing countries should be aware of the importance of investing in a range of cancer control activities, including primary prevention and early detection programs as well as treatment.

Cancer; 78: 2461-64. 1996

Prognostic Variables and Survival in Paediatric Acute Lymphoblastic Leukaemias, Cancer Institute Experience

Shanta .V, Maitreyan .V, Sagar .T.G, Gajalakshmi .C.K & Rajalakshmy .K.R

This presentation is an analysis of front-end prognostic variables in achieving a complete response, a continuous complete remission, and disease-free survival in paediatric acute lymphoblastic leukaemia at the Cancer Institute, Madras, India between 1983 and 1988. The clinical characteristics at presentation showed that virtually 100% of patients belong to the poor risk category, age<3 years or >6 years 72.2%, WBC>10,000/mm^3 59.8% blast count > 50%-39.2%, organomegaly 91.8%, and L2 morphology 66.0%. All patients had more than one risk factor. Between 1983 and 1988, 97 children were treated on a pilot protocol designed in collaboration with the Lymphoma Biology Division of the Paediatric Oncology Branch of the National Cancer Institute, U.S. The protocol was designed for a poor prognostic group. The significance of implicated poor prognostic factors was analysed using the Cox proportional hazard model. Age at presentation was the only variable that emerged as an independent risk factor, and sex appeared to be a modifier. No other variable attained significance. Survival data were calculated by the Kaplan-Meier method. The relapse-free and event-free survivals up to 10 years were 50.7% and 38.1%, and compare reasonably well with results reported for similar groups elsewhere for the same period.

Paediatric Hematol Oncol; 13(3): 205-216. 1996

Life Style and Risk of Stomach Cancer: A Hospital Based Case Control Study.

Gajalakshmi .C.K & Shanta .V

Stomach cancer (SC) is the most frequent cancer among males and third most common cancer among females in Madras, India. The incidence rate of SC is higher in Southern India compared to Northern India. A hospital-based case-control study on 388 incident cases of SC was carried out in Madras as part of a multicentre study in India to identify the risk factors for SC. Cases were matched to cancer controls based on age (+/-5 years), sex, religion and mother tongue. Categorical variables for income group, level of education and area of residence were included in all models to control for confounding.

Smokers had a twofold risk of SC (95% confidence interval CI = 1.25-3.78) compared to non smokers and the risk seen among current smokers (odds ratio [OR] = 2.5; 95% CI: 1.36-4.44) was significantly different from that seen among ex-smokers (OR = 1.5; 95% CI: 0.67-3.54). The risk among those who smoke bidi (OR = 3.2; 95% CI: 1.80-5.67) was higher than that seen among cigarette (OR = 2.0; 95% CI: 1.07-3.58) and chutta (OR = 2.4; 95% CI: 1.18-4.93) smokers. Significant dose response relationships were observed with age began smoking bidi ($P < 0.001$) and with lifetime exposure to bidi ($P < 0.001$), cigarette ($P < 0.01$) and chutta ($P<0.05$) smoking. The habits of drinking alcohol and chewing did not emerge as risk factors. An interaction effect was not seen between the lifestyle habits. Attributable risk (AR) for smoking among ex-smokers was 33% and current smokers 60%. Population AR for smoking was 31%.

Smoking tobacco is an independent risk factor for SC.

Int. J Epid; 25: 1146-53. 1996

A Population Based Survival Study of Female Breast Cancer in Madras, India.

Gajalekshmi .C.K, Shanta .V, Swaminathan .R, Sankaranarayanan .R & Black .R.J

Breast cancer is the second most common cancer among women in Madras and southern India after cervix cancer. The Madras Metropolitan Tumour Registry (MMTR), a population-based cancer registry, collects data on the outcome of cancer diagnosis by both active and passive methods. A total of 2080 cases of invasive female breast cancer were registered in MMTR during 1982-'89. Of these, 98 (4.7%) cases were registered on the basis of death certificate information only (DCO), and there was no follow-up information for 235 (11.3%). These were excluded, leaving 1747 (84%) for survival analysis. The mean follow-up time was 43 months. The overall Kaplan-Meir observed survival rates at 1, 3 and 5 years were 80%, 58% and 48% respectively; the corresponding figures for relative survival were 81%, 61% and 51%. A multifactorial analysis of prognostic factors using a proportional hazards model showed statistically significant differences in survival for subjects in different categories of age at diagnosis, marital status, educational level and clinical extent of disease. Increasing age at diagnosis was associated with decreased survival. Single women displayed poorer survival (37.4%) at 5 years than those married and living with spouses (50.0%). The survival rate among those who had more than 12 years of education was higher (70%) at 5 years than that of illiterate subjects (47%). An inverse relationship was seen between survival rates and clinical extent of disease. The need for research to determine feasible public health approaches, allied to co-ordinate treatment facilities to control breast cancer in India, is emphasised.

Br. J. of Cancer; 75 : 771- 775, 1997

Data Quality in Madras Metropolitan Tumour Registry : A Self Appraisal

Swaminathan .R, Gajalakshmi .C.K & Shanta .V

The challenge of cancer registration in developing countries is enormous. In India, cancer is not a notifiable disease and registration of cases is essentially done by active method. There would be limitations in the mortality data in any developing environment, especially in the certification of death and registration. In Chennai (Madras), registration of mortality data is almost complete since 1989. The indices of data quality discussed here can be classified under (I) completeness of coverage and (ii) validity and correctness of abstracting and coding of data. M/I ratio is a measure of the completeness of coverage with the aid of mortality statistics. M/I ratio was 27% in 1982-'84, 46% in 1985-'90 and 58% in 1992-'94 in Chennai. The increase in M/I ratio was consequent to the modified method of mortality data collection that was introduced in Chennai in 1992, which has been recommended for implementation by other registries. The trend of DCNs and DCOs in Chennai has shown a decreasing trend from 12.3% and 8.0% in 1982-84 to 9.4% and 4.1% in 1992-'94 respectively. Cases identified by specific exercises to detect missing cases have been reduced to 1.5% in 1992-'94 indicating improvement in the methods evolved for case finding. The results of reabstraction exercises done by social investigators revealed minimal errors only (major:0-0.2%; minor:0.2-2.3%). Overall, there is scope for improvement and such critical evaluation of the performance should serve as a catalyst to achieve more in future.

Challange (ESO); 1(10): 1 & 4, 1997

A Study on Pancreatic Cancer in Chennai, India.

Gajalakshmi .C.K, Swaminathan .R & Shanta .V

A total of 299 pancreatic cancer (PC) cases were registered in Chennai during 1982-'1993 with an age-adjusted incidence rate (AAR) of 1.0 per 100,000. The present study shows an increasing trend in the risk of PC with an increase in the literacy level among males ($P<0.001$). The relative survival rates at 1, 3 and 5 years were 35.7, 14.4 and 6.1%, respectively. Age at diagnosis, sex, religious group and literacy level did not emerge as significant prognostic factors for survival from PC. It is reiterated that emphasis should be placed on primary prevention of pancreatic cancer as opposed to early detection, by controlling the use of tobacco.

Cancer letter; 122: 221-226. 1998

Registration of Cancer Mortality Data in A Developing Environment : Chennai Experience

Gajalakshmi .C.K, Shanta .V & Rama .R

This study was carried out to evolve a method to improve the registration of cancer mortality data in Chennai (Madras, India).

Data on cancer deaths have been collected from the Vital Statistics Department (VSD) by a population-based cancer registry (PBCR) in Chennai only since 1982. The low mortality-to-incidence ratio during 1982-84 suggested under-registration of mortality data. Since 1985, the PBCR has taken special effort to ascertain the vital status of cancer cases by sending reply-paid postcards and / or making house visits. The data on all deaths occurring in Chennai, irrespective of stated cause of death in the death certificate, have been collected from the VSD since 1992.

Deaths that occurred in Chennai and obtained by sending reply-paid postcards and / or making house visits were registered in VSD as non-cancer causes of death; hence, these data were not collected from VSD. The sensitivity and positive predictive values of death certificates on cancer diagnosis based on 1992 and 1993 mortality data were 57 percent and 99.5 percent, respectively.

Since the accuracy of death certificate information on cancer diagnosis is relatively low in a developing country such as in India, collecting data on all deaths will improve the mortality data registration in PBCRs.

Cancer Causes Control; 9: 131-136.1998

Risk Factors for Contralateral Breast Cancer in Chennai, India.

Gajalakshmi .C.K, Shanta .V & Hakama .M

This is the first cohort study conducted in India to identify risk factors for contralateral breast cancer (CBC) among patients with first primary breast cancer.

Patients with first primary breast cancer diagnosed in 1960-1989 at the Cancer Institute (WIA) in Chennai, India were followed-up until 31 December 1994. The risk of CBC was assessed among unilateral breast cancer (UBC) patients who survived for >12 months following the diagnosis of breast cancer and did not develop a second cancer (n=2665) and among those who developed a CBC > or = 12 months after the diagnosis of breast cancer (n=39).

The age-adjusted-incidence of CBC among women with UBC was seven times the incidence (per single breast) in the general population. Among women with UBC the relative risk (RR) was 4.5 (95% CI : 1.1-19.6) comparing those with and without a history of breast cancer in the mother, and 2.8 (95% CI : 1.2-6.7) comparing age at first birth 21-25 versus earlier. The RR was 0.3 (95% CI : 0.1-0.6) comparing those with and without hormone therapy for their UBC. Radiotherapy for the

UBC had no significant effect on the incidence of CBC.

Positive family history of breast cancer and later age at first childbirth emerged as stronger risk factors for CBC than UBC. Hormone therapy reduces the risk of CBC.

Int J Epidemiol; 27: 743-750. 1998

Survival from Cancer in Chennai.

Shanta .V, Gajalakshmi .C.K & Swaminathan .R

Survival from the top ten cancers and tobacco related cancers in Chennai, the largest series from the Indian registries, registered during 1984-'89, have been reported in this monograph. The methodology for long term follow up of cancer patients in Chennai registry has been in vogue since 1985. The methods of follow-up included matching of the mortality information (irrespective of cause of death) obtained from vital statistics division of corporation of Chennai with the cancer cases in the registry, repeated scrutiny of medical records, perusal of population health registers, postal/telephone enquiries and house visits. Cases lost to follow-up ranged between 8-20%. The 5 year relative survival (RS) was less than 10% for cancers of the oesophagus, stomach, pancreas and lung. It was between 10-40% for cancers of the tongue, oral cavity, oropharynx, hypopharynx, larynx, bladder, NHL and all leukaemias. The 5 year RS was 40.2% for Hodgkins disease, 46.1% for lip cancer, 49.5% for female breast cancer and 60% for cervical cancer. A decreasing survival with increasing age at diagnosis was observed for most cancers studied. An inverse relationship between survival and clinical extent of disease was forth coming. The need to strengthen the passive health information systems and relational investments in cancer control like early detection of epithelial cancers amenable for treatment, especially the accessible sites (cervix, breast and oral cavity), in the primary prevention of those not controlled by available therapy and in improving drug affordability and supportive care for the lymphoid and haemopoeitic malignancies are emphasised.

In: Monograph on cancer survival in developing countries. (eds) Sankaranarayanan .R, Black .R.J & Parkin .D.M. IARC scientific publications No. 145, IARC, Lyon, France, 1998.

Data-Base of Cancer Survival in Developing Countries

Swaminathan .R, Black .R.J & Sankaranarayanan .R

Ten population based cancer registries from five countries in Asia and South America have contributed data on survival for inclusion in the "IARC monograph on cancer survival in developing countries". They are Shanghai & Qidong registries from China, Bangalore, Barshi, Mumbai (Bombay) and Chennai (Madras) from India, Chiang Mai and Khon Kaen from Thailand, Rizal from Philippines and the national cancer registry of Cuba. The study period varied between January 1, 1982 to December 31, 1992 among the registries with the index date being the incidence date. The closing date varied between December 31, 1993 and December 31, 1995. Exclusions based on the cases registered based on a DCO ranged between 0-42.7%. Other exclusions ranged between 0-11.9%. Validation checks revealed errors to the tune of 0-1.4%. The database included the following variables: registry identification number, gender, age at incidence date, primary site of cancer, morphology, clinical extent of disease, incidence date, date of death/closing date/date of loss to follow-up, vital status of the patient on this date and survival time. A variety of methods (both active and passive) of cancer registration and follow-up practices and coding for site and morphology were observed among the participating registries. Follow-up of cervical and breast cancers among females

and lung and other tobacco related cancers in both sexes have been carried out in most registries.

In: IARC monograph on cancer survival in developing countries (eds) Sankaranarayanan .R, Black .R.J & Parkin .D.M. IARC scientific publications No.145, IARC , Lyon, France, 1998.

Statistical Methods for the Analysis of Cancer Survival Data

Black .R.J & Swaminathan .R

In the context of population based registry data, the aim of survival analysis is to estimate the probability of survival expressed as time elapsed since diagnosis for individuals within groups say, type of cancer, sex, age and place of residence. In practice, follow-up of persons registered with cancer is not complete, either because subjects are lost to follow-up during the period 't', or because the end of the period of possible follow-up occurs before the end of 't'. In practical terms, for survival analysis, we require the time elapsed between the date of incidence and the date of death or date of loss to follow-up or date of withdrawal which ever occurs first. The accuracy of these survival times depends on the method of follow-up used. The actuarial method was used to compute observed survival from cancer in developing countries. It involves construction of a life table which permits calculation of the cumulative probability of survival at time t_{i+1} from the conditional probabilities of survival during consecutive intervals of follow-up time up to and including t_{i+1}. Observed survival is influenced by mortality both from the cancer of interest and from causes other than a particular cancer of interest. This led to the development of the methodology of relative survival, which is the ratio of the observed and expected survival (who are at risk of death only from causes other than cancer under study). For many types of cancer, the risk of dying as a result of cancer itself is clearly associated with the subject's age at diagnosis. Hence Age Standardised Relative Survival (ASRS) was calculated to facilitate comparison between different groups.

In: IARC monograph on cancer survival in developing countries (eds) Sankaranarayanan .R, Black .R.J & Parkin .D.M. IARC scientific publications No. 145, IARC, Lyon, France, 1998.

An Overview on Cancer Survival in Developing Countries

Sankaranarayanan .R, Black .R.J, Swaminathan .R & Parkin .D.M

This is the first time that the results of a standardised analysis of population based cancer survival data from developing countries have been presented and discussed. Variation in survival were forthcoming for many cancer sites between the developing country population studied. The variations were less marked for cancer sites such as hypopharynx, oesophagus, stomach, liver, gall bladder, lung and bone. The 5year age standardised relative survival rates were generally higher for young adults than for older age groups for most cancer sites. This was less evident for colorectal and breast cancers. The declining survival with increasing age was most marked for cervical cancer in all registries. For tumours associated with poor prognosis such as oesophagus, liver, lung and pancreas, the differences in survival observed between developed and developing country regions were minimal. There were greater differences in survival for cancer sites such as head and neck, large bowel, breast, melanoma, cervix, ovary and urinary bladder, which have moderate to good prognosis. The difference in survival was even more striking for testicular cancer, lymphoma and leukaemia. (i) Setting up of population based cancer registries (PBCR) in many developing countries, (ii) high resolution studies of diagnosis, treatment and outcome for a sample of patients from PBCR, (iii) community based intervention

trials to identify effective low cost screening tests and (iv) balanced investment in the development of adequate diagnostic and treatment facilities are emphasised.

In: IARC monograph on cancer survival in developing countries (eds.) Sankaranarayanan .R, Black .R.J & Parkin .D.M. IARC scientific publications No. 145, IARC, Lyon, France, 1998.

Head and Neck Cancer: A Global Perspective on Epidemiology and Prognosis

Sankaranarayanan .R, Masuyer .E, Swaminathan .R, Ferlay .J & Whelan .S.L

Head and neck cancers (ICD-9 categories 140-149 and 161) are common in several regions of the world where tobacco use and alcohol consumption are high. The age standardised incidence rate of head and neck cancer (around 1990) in males exceeds 30/100,000 in regions of France, Hong Kong, the Indian sub-continent, central and eastern Europe, Spain, Italy, Brazil, and among US blacks. High rates (>10/100,000) in females are found in the Indian sub-continent, Hong Kong and Philippines. The highest incidence rate reported in males is 63.58 (France, Bas-Rhin) and in females 15.97 (India, Madras). The variation in incidence of cancers by subsite of head and neck is mostly related to the relative distribution of major risk factors such as tobacco or betel quid chewing, cigarette or bidi smoking, and alcohol consumption. Some degree of misclassification by subsites is a clear possibility in view of the close proximity of the anatomical subsites. While mouth and tongue cancers are more common in the Indian sub-continent, nasopharyngeal cancer is more common in Hong Kong; pharyngeal and/or laryngeal cancers are more common in other populations. While the overall incidence rates show a declining trend in both the sexes in India, Hong Kong, Brazil and US whites, an increasing trend is observed in most other populations, particularly in Central and Eastern Europe, Scandinavia, Canada, Japan and Australia. The overall trends are a reflection of underlying trends in cancers of major subsites which seem to be related to the changing prevalence of risk factors. The five year relative survival varies from 20-90% depending upon the subsite of origin and the clinical extent of disease. While primary prevention is the potential strategy for long-term disease control, early detection and treatment may have limited potential to improve mortality in the short term.

Anticancer Res.; 18(6b): 4779-86, 1998

OTHER STUDIES FROM CANCER REGISTRY, CHENNAI.

Pilot studies on tobacco use in Chennai, India.

Gajalakshmi .C.K, Peto .R & Shanta .V

Proceedings of the 10th World Conference on Tobacco or Health held in 1997 at Beijing.

Mortality data base in Chennai.

Gajalakshmi .C.K, Peto .R & Shanta .V

Proceedings of the "International workshop on certification of causes of death" February 22-24, 1999 Mumbai, India. Co-sponsored by the Tata Institute of Fundamental Research, Bombay Muncipal Corporation, World Health Organisation, World bank and Centres For Disease Control And Prevention (USA).

MEMBER IN THE COMMITTEE :

Dr. C.K. Gajalakshmi is member in "State Advisory Board on National Cancer Control programme for Tamil Nadu State" since June 1998.

CONFERENCE/MEETING ATTENDED

❖ **Dr. C.K. Gajalakshmi** was an invited speaker in the following conferences/meetings and presented papers on:

i) "Anxiety and depression among cancer patients" at the WHO. symposium on cancer pain and palliative care, Madras, India on January 17, 1995.

ii) "Findings of epidemiological study on female breast cancer in Madras" at the 10th conference on special cancer studies of the Monbusho (Ministry of Education, Science and Culture) International scientific research programme at Aichi Cancer Centre, Nagoya, Japan on March 2&3, 1995.

iii) "Epidemiology of Female Breast Cancer" at the XII Annual conference of the Association of Radiation Oncologists of India, Tamil Nadu chapter, Madras, India on September 9-10, 1995.

iv) "Trends in tobacco related cancers in Madras Metropolitan Area" at the International conference on head and neck oncology and workshop on speech rehabilitation, Indore, India, November 3-5, 1995.

v) "A study of pancreatic cancer" in the International Gastro Surgical Club, Indian chapter held in Madras, India February 1996.

vi) "Cancer survival in Madras, India" in the 30th annual meeting of International Association of Cancer Registries held at Edinburgh, United Kingdom September 3-5,1996.

vii) "Cancer Trials" at the training programme organised by ICMR central biostatistical monitoring unit for traditional medicine research located at the Institute For Research In Medical Statistics, Chennai, India on July 16, 1998.

viii) "Diet and Cancer" in the Round table "Interaction between environmental pollutants and other cancer risk factors" at the 'International conference on environmental and occupational cancer in developing countries', Rio de Janeiro, Bazil, July 30-August 01, 1998.

ix) "Diet and Breast Cancer" in symposium 'Conference on Environmental And Occupation In Developing Countries', at the XVII International Cancer Congress (UICC), Rio de Janeiro, Brazil, August 23-28, 1998.

x) "Occupational cancer and it's Control" in the 16th refresher course on "Occupational Health" conducted at the Regional Labour Institute, Govt. of India, Ministry of Labour in Chennai, India from September 14- 25, 1998.

xi) "Results of cancer survey conducted in Chennai" at the meeting on Sept. 17, 1998, at TIFR, Bombay, India.

xii) "Second cancers following uterine cervical cancer" at the XII annual review meeting of cancer registries under the NCRP of ICMR held on 24th October 1994 at the Cancer Institute (WIA), Chennai.

xiii) "Role of cancer registry in improving the mortality to incidence ratio (M/I): Madras experience" in the world conference for cancer organisation held at Melbourne, Australia, during 3-7 March 1996.

xiv) "Cancer Mortality in Madras, India" and "Quality control measures for cancer registration in Madras Metropolitan Tumour Registry" in the XIV annual review meeting of the National Cancer Registry

Programme held at Bangalore, India, on 13th March 1996.

xv) "Anthropometric variables and risk of female breast cancer in Madras" in the XIV International scientific meeting of the International Epidemiological Association held at Nagoya, Japan 27-30th August 1996 - poster presentation.

xvi) "Importance of data quality measures in cancer registry", "Method of mortality data registration in PBCR, Chennai" and "Overview of epidemiological studies carried out by the registry at the Cancer Institute" in the national level workshop on "Cancer Registration & Epidemiology" held at Cancer Institute (WIA), Chennai, during April 2-4, 1998.

xvii) "Health consequences of tobacco use" in the public education meeting on Tobacco or Health organised on the occasion of World no-tobacco day 1998 on May 31st 1998 Central Leather Research Institute (CLRI), Chennai, India.

xviii) "Cancer registration in Chennai, India - Methods and issues" at the 32nd Annual conference of the International Association of Cancer Registries (IACR) in Atlanta, Georgia, USA, August 17-19, 1998.

xix) "Risk factors for breast cancer in Chennai, India" at the XVII international cancer congress (UICC) in Rio de Janeiro, Brazil, August 23-28, 1998.

xx) "Diet and breast cancer in Chennai, India" at the International symposium - workshop on Epidemiology and Prevention of cancer in Bangkok (Thailand) from November 2-5, 1998.

Participation In Workshops/Seminars.

❖ **Dr. C.K. Gajalakshmi**

i) "Development studies" organised by the subcommittee for development studies. The academy of Finland, Helsinki, Finland, March 5, 1997.

ii) "Meta - Analysis of chemotherapy in head and neck cancer (MACH_NC) investigator's meeting" held at Paris, France, on January 17-18, 1997.

iii) "Challenge" meeting in Rio de Janeiro, Brazil on August 24, 1998.

iv) WHO workshop on national treatment policy, low cost technology and curriculum development for training (Sponsored by Dte. Gen. of health services, Ministry of health and FW, Govt. of India), organised by the department of radiation oncology, AIIMS, New Delhi, India on April 25th and 26th, 1999.

❖ **Dr. Nalini Sreedharan**

i) Participated in the XII annual conference of the Association of Radiation Oncologists of India, Tamil Nadu chapter, Madras, India on September 9&10, 1995.

ii) Co-ordinated the coding excercises for GI tract and reproductive system cancers in the national level workshop on "Cancer Registration & Epidemiology" held at Cancer Institute (WIA), Chennai, during April 2-4, 1998.

❖ **Dr. K. Ravichandran**

i) Presented the results of the "Reabstraction exercises conducted for the social investigators of HCR and MMTR to ascertain the data quality" at the senior level workshop on cancer registration

(ICMR) held at Regional Cancer Centre, Thiruvananthapuram March 17-19, 1997.

ii) Presented the results of data quality excercises conducted in HCR in the national level workshop on "Cancer Registration & Epidemiology" held at cancer institute (WIA),Chennai, during April 2-4, 1998.

iii) Lecture on 'Occupational Cancer' for the occupational health refresher course in Indian Labour Institute, Chennai, India on 6th August 1996.

❖ **Mr. R. Swaminathan**

i) "Analysis of cancer survival data using various statistical models" International workshop on statistical inference under non-standard conditions, Chandigarh, India 8-12 January 1996 (oral presentation.)

ii) "Cancer incidence and survival in Madras, India" in the XIV Annual Review Meeting of NCRP held at Bangalore, India on 13th March 1996 - oral presentation.

iii) "Cancer survival in Rizal, Phillipines" in the 30th Annual Meeting of International Association of Cancer Registries held at Edinburgh, United Kingdom, during 3-5 September 1996.

iv) "Survival from top ten cancers in Chennai, India and "Data quality measures in Madras Metropolitan Tumour Registry" in the Senior Level Workshop on Cancer Registration (ICMR) Regional Cancer Centre, Thiruvananthapuram March 17-19 , 1997.

v) 'A survival study of Hodgkin's disease in Madras, India'. 'International workshop on analysis of censored data' at university of Pune, 26th December 1994 to 1st January 1995.

vi) The XV annual review meeting of the NCRP presented the salient features of hospital cancer registry 1994 data.

vii) Presented the results of data quality exercises conducted in National Level Workshop on "Cancer Registration & Epidemiology", Cancer Institute (WIA), Chennai, during April 2-4, 1998.

WORKSHOP CONDUCTED/TRAINING GIVEN AT THE REGISTRY :

i) Ms. Priya Jagannathan, MPH, student participant under the Berkely professional studies program was guided by Dr. C.K. Gajalakshmi to do her project on "A comparison of characteristics of rural and urban women with breast cancer: risk factors, knowledge and attitude towards breast cancer" from Oct. 1994 to may 1995.

ii) Mr. Soebagijono, from Indonesia was trained in "cancer registration" from 1st to 31st December 1994 as part of the ICRETT fellowship of UICC awarded to him.

iii) Dr. Rajkumar, co-investigator of the Ambilikkai rural cancer registry in Dindigul district, Tamilnadu, underwent training on "cancer registration" from 12th to 17th December 1994.

iv) Training cum workshop on "cancer registration" for the medical record officers/technicians and social workers working in the Government and private hospitals in Madras and Government hospitals in Tamilnadu held at the Cancer Institute on February 3-4, 1995.

v) A national level workshop on "Cancer Registration & Epidemiology" was organised during April 2-4, 1998 for the staff of the registries in the network of

NCRP of ICMR and others from Kolkatta and Karunagappally. The focus was on data quality besides lectures on salient features of cancer registration & epidemiology and extensive exercises on coding.

vi) Mr. A.M. Budukh, Bio-statistician Barshi rural cancer registry, was trained on survival analytic methods under the supervision of Dr. C.K. Gajalakshmi and Mr. R. Swaminathan, December 13-19, 1998.

vii) A training cum workshop was organised for the birth and death clerks/registrars of the corporation of Chennai (Madras) - on 27th March 1999 to improve the quality of mortality data collection.

TRAINING RECEIVED IN INDIA AND ABROAD

i) Dr. C.K. Gajalakshmi had training in "Survival Analysis" for one month (Sep. 8th - Oct. 7th) in the department of public health at the Aichi Medical University, Nagoya, Japan in 1994.

ii) Mr. R. Swaminathan underwent training in "Survival Analysis" at the unit of Descriptive Epidemiology, IARC, between 30th May and 30th June, 1995.

iii) Dr. K. Ravichandran underwent training in ORACLE software for 2 weeks from June 12th, 1995 at the Software Technology Group International Ltd., Madras.

iv) Mr. R. Swaminathan underwent a training in "Relative Survival Analytic Techniques And Its Standardisation" on a "Special Training Award" of IARC in the Unit Of Descriptive Epidemiology, IARC, Lyon, France between 15th July and 12th October 1996.

v) Dr. K. Ravichandran, Mr. S. Devarajan and Mr. S. Balasubramonian underwent training in Medical Literature and Analysis Retrieval System (MEDLARS) at National Informatics Centre, Chennai, India in November 1996.

vi) Mrs. R. Rama attended the workshop on "Research methods in oncological studies with computer applications" held at institute of cytology and preventive oncology (ICMR), New Delhi during 21-25 July 1997.

vii) Mr. R. Swaminathan received "Special Training Award" IARC during 10th August and 18th October 1997, to analyse the survival data from selected developing countries at IARC.

ACADEMIC ACHIEVEMENT

i) Dr. C.K. Gajalakshmi has successfully completed a part-time regular certificate course on "UNIX & C" in 1996 conducted jointly by Anna University and DC ELCOT software Ltd., Madras.

M M T R and CANCER CONTROL PROGRAMME IN CHENNAI

i) A pilot study to evaluate cervicoscopy and pap smear techniques for uterine cervical cancer screening in Chennai - A collaborative study with IARC - Dr. V. Shanta, Dr. C.K. Gajalakshmi, Dr. D.M. Parkin and Dr. R. Sankaranarayanan.

- The aim of this pilot study was to compute specificity and sensitivity of cervicoscopy as against pap smear in detecting abnormal lesions in uterine cervix.

- Two areas were randomly chosen in Chennai. Those in the age group of 35-64 and resident of Chennai were invited for the cervical cancer-screening programme. The response rate was about 20%. We are in the process of analysing the data.

ii) To assess the risk attributed to smoking the following studies are being conducted in Chennai (in collaboration with Prof. Richard Peto, ICRF, UK).

- Retrospective study: habit data on deceased individuals during the period 1995-97 have been collected.
- Retrospective study: Door to door survey is being carried out to get data on the habits of the residence of Chennai. They will be followed up till death.

iii) Organised "Health survey camp" for 2 days at the community hall of Bharathidasan colony welfare association on March 28th and 29th 1999 to increase the awareness on "Tobacco hazards" among residents in Chennai.

POPULATION CANCER REGISTRY, DELHI.
Rotary Cancer Hospital, New Delhi.

Organisation and Highlights of Delhi Cancer Registry

Dr. Jasmine George

The Delhi Cancer Registry, apart from carrying out routine work like cancer data collection and compilation of reports, since the last two years has undertaken two case control studies on carcinoma of the gall bladder and carcinoma of the prostate. The registry also organises teaching programs for medical social service officers (MSSOs) regarding medical terminologies and coding of medical information.

The biennial national conference of Indian society of Oncology was held at Delhi in March 1999. A symposium on 'Cancer Epidemiology' was organised as part of the scientific programme. Dr. Kusum Verma, project chief of the Delhi Cancer Registry presented a paper on "Epidemiology of Gall Bladder Cancer" in this symposium. The senior staff of the registry have been attending the pre-ARM workshops and the annual review meetings of the NCRP.Mr.B.B.Tyagi SRO (Stat) attended the pre-ARM workshop held at Thiruvananthapuram from 17-19th March 1997. Dr.Jasmine George SRO (Med.) obtained a fellowship to undergo training in Epidemiology leading to Ph.D. She obtained her Ph.D. in March 1997 from University of Tampere, Finland. Mr. Shambu Prasad & Mr. Sushil Kumar Rai MSSO's of the Delhi cancer registry participated in the pre-ARM workshop held a Barshi September 1999.

A new cancer control programme was initiated by the Institute of Rotary Cancer Hospital (IRCH) recently and Dr. Kusum Verma was involved in the programme wherein mass screening for cancer was undertaken.

The population based Delhi Cancer Registry was established in January 1986 with financial assistance from ICMR. It is situated at the Institute Rotary Cancer Hospital (IRCH), All India Institute of Medical Sciences (AIIMS), New Delhi.

The registry collects morbidity and mortality data on cancer patients from 155 major government/private hospitals and more than 250 private nursing homes. Mortality data are also

collected from the Dept. of Vital Statistics of the Delhi Muncipal Corporation and the New Delhi municipal committee. The geographical area covered by the registry is the Delhi urban area which is 685.34 sq.km as per 1991 census. The population at risk as on 1st July 1995 in the Delhi urban area was 10 million with 5.44 million males and 4.56 million females. The estimated sex ratio in the general population for the year 1995 was 1.19 : 1 (M:F) .

Cancer Registration, 1995

A total of 7611 cases (males 3751 and females 3860) were registered during the year 1995.Males comprised 49.3% of the total and females 50.7%. The MV % was 79.0, DCO (%) 9.7 and (M/I) %26.0. The crude incidence rate for females was higher than that of the males as in the previous years. The leading sites of cancer by crude incidence rate for males and females per 100,000 persons for the year 1995 is presented in Table 1.

Table 1. Leading Cancer Sites by age-adjusted incidence (AAR) (WP) rate per 100,000 person - Year 1995

DELHI CANCER REGISTRY

Rank	ICD_9	Site - Male	AAR	Rank	ICD_9	Site-Female	AAR
1	162	Lung	11.0	1	174	Breast	29.3
2	161	Larynx	8.5	2	180	Cervix	23.4
3	185	Prostate	6.1	3	156	Gall Bladder	9.4
4	141	Tongue	6.1	4	183	Ovary	8.7
5	188	Uri.Bladder	5.9	5	151	Oesophagus	4.4
6	150	Oesophagus	5.4	6	191,192	Brain	3.2
7	200,202	Lymphoma	4.4	7	200,202	Lymphoma	3.1
8	143-145	Mouth	4.2	8	143-145	Mouth	2.7
9	191,192	Brain	4.2	9	182	Body Uterus	2.7
10	156	Gall Bladder	3.7	10	162	Lung	2.7
All Sites (140-208)			**112.7**	**All Sites (140-208)**			**130.4**

The most common site of cancer among males by AAR (world) is also the lung followed by cancer of larynx, prostate, tongue, and urinary bladder. In the females, the predominant site by AAR (World) is the breast followed by cervix, gall bladder, ovary and oesophagus.

The truncated incidence (35-64 yrs) among females for all sites was 274.3 per 100,000 persons. This is higher as compared to those for males for all sites which was 190.1. The predominant cancers among females by truncated incidence rate was breast followed by cancer of the cervix, gall bladder, ovary and oesophagus.

In the males the leading site of cancer by truncated incidence was lung followed by cancer of the larynx, tongue, oesophagus,and stomach.

Paediatric Cancers

A total of 419 cancer cases were seen in the age group 0-14 yrs. Of these 277 (66%) were males and 142 (34%) females. The percentage distribution of most frequent cancer in the paediatric age group by site is shown in Table 2 & Table 3.

Table 2. Paediatric Cancers Male -1995

ICD_9	Site/Type	Nos	%
204	Leuk.Lymphatic	61	22.0
191	Brain	39	14.1
201	Hodgkins D.	32	11.5
200,202	Lymphoma	26	9.4
205	Leuk.Myeloid	19	6.9
194	Other Endocr. Gl.	16	5.8
190	Eye	16	5.8
189	Kidney	12	4.3
170	Bone	9	3.2
186	Testis	8	2.9
All sites		**277**	

Leukaemia was the most common type of cancer among boys forming nearly 29%. This was followed by brain tumours & Hodgkins disease (11.5%) & NHL (9.4%). Eye tumours mostly comprising of Retinoblastomas formed 5.8%.

Table 3. Paediatric Cancers Females -1995

ICD_9	Site/Type	Nos	%
204	Leuk.Lymphatic	32	22.5
191	Brain	19	13.4
201	Hodgkins D.	10	7.0
194	Other Endocr. Gl.	9	6.3
189	Kidney	9	6.3
171	Conn.Tissue	8	5.6
170	Bone	7	4.9
205	Leuk.Myeloid	6	4.2
183	Ovary	6	4.2
190	Eye	6	4.2
All sites		**142**	

In the girls too, leukaemia (26.7%) was the most common cancer followed by brain (13.4%) and Hodgkins disease (7.0%). Eye tumours formed 4.2% of the total cases in children

Trends In the incidence rates over the years for the three most common sites among males - Lung, Larynx & Tongue and among females - Breast, Cervix & Ovary is presented in Table 4 & 5.

Table 4. Trends In Incidence Rates (1987- 1995) Crude (CR) World Age- Adjusted (AAR) and Truncated Incidence Rate (TCR) (35 -64 Years) Rate Per 1,000 Persons - Males

	LUNG -162			LARYNX - 161			TONGUE - 141		
YEAR	CR	AAR	TCR	CR	AAR	TCR	CR	AAR	TCR
1987#	4.2	8.0	13.5	2.8	5.2	10.2	1.8	3.1	6.9
1988	5.9	11.2	21.0	4.5	7.8	17.2	2.9	5.0	12.4
1989	6.4	11.9	23.3	5.0	8.6	19.7	4.3	7.7	14.3
1990	6.7	12.9	22.5	5.8	11.0	21.3	3.1	5.7	11.1
1991	6.8	13.0	24.5	4.6	8.8	17.6	3.8	6.6	13.6
1992	6.5	12.5	22.1	5.2	10.0	18.4	3.5	6.0	13.5
1993	7.5	15.0	26.2	5.5	10.4	20.9	4.0	7.1	15.4
1994	7.3	13.6	24.3	5.3	9.6	18.8	3.0	5.0	11.4
1995	6.1	11.0	20.4	4.5	8.5	14.2	3.6	6.1	9.2

Provisional

Table 5. Trends In Incidence Rates (1987- 1995) Crude (CR) World Age- Adjusted (AAR) and Truncated Incidence (TCR) (35 -64 Years) Rate Per 1,000 Persons - Females

	BREAST-174			CERVIX - 180			OVARY - 183		
YEAR	CR	AAR	TCR	CR	AAR	TCR	CR	AAR	TCR
1987#	12.8	19.3	50.8	9.3	13.3	34.0	2.9	4.2	9.7
1988	17.0	26.2	64.9	17.4	27.2	69.5	5.1	7.8	17.9
1989	18.3	28.3	70.0	19.6	30.1	76.9	5.5	8.7	21.1
1990	18.2	28.9	71.2	19.4	29.8	76.6	4.6	7.4	15.2
1991	18.6	29.9	75.1	17.1	26.9	68.6	5.5	8.6	20.7
1992	18.1	28.6	71.2	18.6	29.6	74.4	5.2	8.2	19.2
1993	18.9	29.6	75.9	19.6	31.3	79.2	5.5	8.7	21.4
1994	18.3	27.7	67.2	17.0	25.4	62.0	5.7	8.1	19.2
1995	19.5	29.3	69.5	15.4	23.4	57.0	5.8	8.7	18.1

#Provisional

Mortality

The mortality registration system of Delhi is inadequate. Due to a great load of cases, large areas to be covered, limited staff & frequent changes of residence, house to house visits to ascertain death is not feasible in Delhi. So information on deaths is collected from respective hospitals and also from the MCD and NDMC. The crude mortality rate, Age Adjusted Mortality Rate (AAMR) and Truncated Mortality Rate (TMR) among males for the year 1995 was 18.0, 30.3 and 50.2 respectively and in females 17.2, 28.0 and 54.8 respectively per 100, 000 persons.

On - going Epidemiological Studies

As a result of the high incidence of gall bladder carcinoma in Delhi compared to the other registries, a case- control study on gall bladder carcinoma among men and women is being conducted with financial assistance from ICMR. The incidence of prostate cancer among males of Delhi showed an increasing trend and hence case- control study on prostate cancer is being conducted with the support of ICMR.

POPULATION CANCER REGISTRY, BANGALORE
Kidwai Memorial Institute of Oncology, Bangalore, Karnataka.

ABSTRACTS OF ARTICLES

Descriptive Epidemiology of Childhood Cancers in Bangalore, India

A. Nandakumar, N. Anantha, L. Appaji, Kumara Swamy, Geetashree Mukherjee, Thalagavadi Venugopal , Sreerama Reddy & Murali Dhar

While fairly complete and reliable incident data on childhood cancers are available from the registries in India, mortality and survival information is not. Information on the latter was obtained by the Bangalore Cancer Registry through active follow -up including visits to homes of patients. Between 1982 and 1989, 617 childhood cancers were registered, giving an age standardized incidence rate of 84.8 and 48.4 per million in male and female children respectively. Active follow-up provided survival information in 532 or 86.2% of these cases. Overall observed five year survival was 36.8 % (both genders combined) with a relative survival of 37.5 % when childhood mortality in general population was taken into account. The five year relative survival was highest for Thyroid carcinoma (100%) followed by Hodgkins disease (73%) and retinoblastoma (72.9%). Survival was comparatively low, being 9.9 percent in acute non lymphatic leukemia and less than 20 percent in rhabdomyosarcoma and the category grouped as 'other malignant neoplasms'. Survival in Hodgkin's disease was influenced by clinical stage at presentation, but was not statistically significant possibly due to small numbers.

Cancer Causes and Control, 7, 407-412, 1996

Importance of Anatomical Subsite in Correlating Risk Factors in cancer of the Oesophagus - Report of a Case-Control Study

A. Nandakumar, N. Anantha, V. Pattabhiraman, P. S. Prabhakaran, M. Dhar, K. Pttaswamy, T. C. Venugopal, N. M.S. Reddy, Rajanna, A.T. Vinutha & Srinivas

In Bangalore, cancer of the oesophagus is the third most common cancer in males and fourth most common in

females with average annual age-adjusted incidence rates of 8.2 and 8.9 per 100,000 respectively. A case-control investigation of cancer of the esophagus was conducted based on the Population Based Cancer Registry, Bangalore, India. 343 cases of cancer of the oesophagus were age and sex matched with twice the number of controls from the same area, but with no evidence of cancer. Chewing with or with out tobacco was a significant risk factor. In both sexes chewing was not a risk factor for upper third of oesophagus. Among males non-tobacco chewing was a significant risk factor for the middle third but not for the other two segments and tobacco chewing was a significant risk factor for the lower third of the oesophagus, but not for the other two segments. Bidi smoking in males was a significant risk factor for all three segments being highest for upper third, less for the middle third and still less for the lower third. The risk of oesophageal cancer associated with alcohol drinking was significant only for the middle third.

Br. J. of Cancer 73, 1306-1311, 1996

HOSPITAL CANCER REGISTRY, TRIVANDRUM.
Regional Cancer Centre, Trivandrum, Kerala.

ABSTRACTS OF ARTICLES

Oesophageal Cancer

Nicholas Day & Cherian Varghese

Time trends for oesophageal cancer rates range widely. The most noteworthy feature is the weakness of the association between the trends in the rates of oesophageal cancer and those of the main, identified aetiological factors. This is in contrast to cancer of the lung and larynx, for which trends are closely related to levels of tobacco use and for the larynx, alcohol consumption. As proposed by Cheng *et al* (1992), there are as yet unidentified factors in the aetiology of oesophageal cancer that are major determinants of the observed changes.

Cancer Surveys : 9/20, 4354, 1994

Cancer Incidence in the South Asian Population of England (1990-1992)

H. Winter, K. K .Cheng, C. Cummins, R. Maric, P. Silicocks & C. Varghese

Cancer incidence among English South Asians (residents in England with ethnic origins in India, Pakistan or Bangladesh) is described and compared with non South-Asian and Indian subcontinent rates. The setting for the study was areas covered by Thames, Trent, West Midlands and Yorkshire cancer registries. The study identified 356 555 cases of incident cancer (ICD 140- 208) registered between 1990 and 1992, including 3845 classified as English South Asian. The main outcome measures were the age specific and directly standardized incidence rates for all cancer sites (ICD9 140-208). English South Asian rates for all sites combined were significantly lower than non-South Asian rates but higher than Indian subcontinent rates. English South Asian rates were substantially higher than Indian subcontinent rates for a number of common sites including lung cancer in males, breast cancer in females and lymphoma in both sexes. English South Asian rates for childhood and early adult cancer (0-29 years) were similar or higher than non-South Asian rates. English South Asian rates were significantly higher than non-South Asian rates for Hodgkin's disease in males, cancer of the tongue, mouth, oesophagus, thyroid gland and myeloid leukaemia in females, and cancer of the hypopharynx, liver and gall bladder in both sexes. The results are

consistent with a transition from the lower cancer risk of the country of ethnic origin to that of the country of residence. They suggest that detrimental changes in lifestyle and other exposures have occurred in the migrant south Asian population.

British J. of Cancer 79 (3/4), 645-654 1999

Diet and Stomach Cancer: A Case - Control Study in South India

A. Mathew, P. Gangadharan, C. Varghese & M. K. Nair

A retrospective case control study was conducted in Trivandrum, India, to evaluate the dietary risk factors for stomach cancer. One hundred and ninety patients with stomach cancer registered at Regional cancer Centre (RCC), Trivandrum, Kerala, India during the period 1988-1991 was considered as cases. A minimum of one control (n=305), matched for age (+/- 5 years), sex, religion and residential area was selected from the visitors to RCC during the same period. Interviews were carried out using a predetermined structured food frequency questionnaire. The information collected also included socio-demographic-economic background, tobacco chewing, tobacco smoking and alcohol habits. Data were analysed using a multiple logistic regression model. Odds ratio for all dietary variables were estimated. Increased risks were observed with higher consumption of rice (OR 3.9; 95% CI 1.6 -10.0). Risk was high for those consuming spicy food (OR 2.3; 95% CI 1.1- 5.0), high consumption of chilli (OR 7.4; 95% CI 4.0 - 13.5) and consumption of high temperature food (OR 7.0; 95% CI 3.7- 12.9). On multivariate analysis, high consumption of rice, high consumption of chilli and consumption of high temperature food alone were found to be independent risk factors.

European J. of Cancer Prevention 9. 89- 97: 2000

POPULATION CANCER REGISTRY, BHOPAL.
Gandhi Medical College, Bhopal.

Cancer Patterns of Lung, Oropharynx and Oral Cavity Cancer in Relation to Gas Exposure at Bhopal

Rajesh P. Dikshit & Shiela Kanhere

The grave tragedy caused by leakage of toxic gases in Bhopal on the night of 2nd December 1984, brought in its wake unprecedented suffering and a variety of medical problems entirely unknown to the modern medical world . No epidemiological study has been reported so far which addresses this issue. The ICMR thus established a PBCR in Bhopal to investigate the cancer experience of Bhopal population after gas exposure. Lung, oropharynx and oral cavity were the three most common cancer sites. The Bhopal population is stratified into 56 municipal wards. These wards were divided into 36 gas- affected and 20 gas- unaffected wards.

MIC (Methyl isocyanate) which escaped into the atmosphere from the Union Carbide factory is extremely toxic and causes chromosomal change in humans. It is carcinogenic and its geno toxicity was due to carbamylation of DNA in E.coli. MIC gives off monomethyl amines, which can yield nitrosamines which are believed to be carcinogenic in humans. The data obtained from the Population Cancer Registry is analysed in the study. The analysis was performed only on male cases as the number of female cases for these cancer sites was too low and thus insufficient for statistical analysis.

A minimum of 6 years would be required to observe the effect of gas accident on cancer risk. In the present study based on a descriptive as well as a case control study, there was a marginally increased risk for oropharynx, and increased risk but not significant risk for lung cancer and no excess risk for oral cavity cancer until 1992 as a result of gas exposure at Bhopal. However the findings are not conclusive. The Bhopal population should be closely monitored in the future to observe the effect of gas exposure on cancer risk in Bhopal

Cancer Causes and Control 10:627-636, 1999.

EXCERPTS FROM 'Life Line'

A quarterly from the WHO South East Asia Region on Tobacco and Alcohol issues Vol.2. June 1999.

- 'The use of cottage and home produced oral tobacco products (Gutka) is steadily getting entrenched in many countries of South East Asia Region'.
- 'WHO Predicts that 10 million people will die annually from tobacco related diseases by 2030 and of these 70 % will be in developing world'.
- 'As with Malaria, the tobacco epidemic is a cross-border issue, the tobacco industry like the mosquito operate across the borders'.
- 'Some countries like Guatemala & Israel are following the US example in claiming tobacco-attributable health care costs on the **Polluter Pays** principle. Industry pays for the damage it causes'.

CANCER STATISTICS FROM NON-ICMR REGISTRIES

Compiled by P. Gangadharan, Anitha Nair, Asha. N. M

Cancer Registries were organised by ICMR in several centres and all except the registry in Barshi were in urban areas. There is a feeling that these registries alone give an incomplete picture of the Cancer Scenario in the country. This prompted us to invite organizations to send their cancer data sets for publication in a standard format to CRAB. In response to this we received cancer data sets from 5 hospital based and 7 population based registry data for publication in the 'CRAB'. We have, in this issue all that was sent to us and also the population and hospital data published from Ahmedabad and Kolkatta. This eminently supplements the information that we already have from ICMR registries. These enrich our knowledge about cancer in India. The list of registries who have provided data are the following.

HOSPITAL BASED DATA	POPULATION BASED DATA
1. Dr. Borooah Cancer Institute, Guwahati, Assam (RCC)	1. PBCR - Kolkatta
2. Regional Cancer Centre, Gwalior (RCC)	2. PBCR - Ahmedabad
3. Chittaranjan National Cancer Institute, Kolkatta (RCC)	3. PBCR - Pune City
4. M P Shah Cancer Hospital, Ahmedabad (RCC)	4. PBCR - Aurangabad
5. G. Kuppuswami Naidu Memmorial Hospital, Coimbatore	5. PBCR - Nagpur
	6. PBCR - Trivandrum
	7. PBCR - Karunagappally

Hospital Based Registries

Contributors

Realising the importance of the problem, the willing co-operation given so readily by many workers has made this publication possible. Hence the editors hope that scientists will give due recognition to this fact and use the names of following authors as reference while quoting the data from a particular hospital database.

Dr. Borooah Cancer Institute, Guwahati, Assam (RCC)	- Dr. Gazi G Ahmed
Regional Cancer Centre, Gwalior (RCC)	- Dr. A. K. Govila
Chittaranjan National Cancer Institute, Kolkatta (RCC)	- Dr. M. Siddiqi,
	- Dr. Urmi Sen,
	- Mr. S.S. Mondal
M P Shah Cancer Hospital, Ahmedabad (RCC)	- Dr. D. D. Patel
G. Kuppuswami Naidu Memmorial Hospital, Coimbatore	- Dr. V. Nagarajan

HOSPITAL CANCER REGISTRY

Dr. B. BOROOAH CANCER INSTITUTE, GUWAHATI-ASSAM (RCC)

Dr. Gazi G Ahmed, Director

Dr. Barooah Cancer Institute was established in 1973 and designated as a Regional Cancer Centre in 1980. The centre serves several N.E states. However, 86% of cancer cases seen in the institute was from Assam. Within Assam, large proportion of cases (30%) attended from Kamarup district. Most of the facilities required for a comprehensive Cancer Centre exist in the Dr. Borooah Cancer Institute.

3714 cancer cases were diagnosed during 1997-1998. A high percentage of cases were seen as Oesophagus cancer and Pharynx cancer among males. Among females also esophageal cancers had a high frequency, slightly higher than the frequency of Ca. Breast. Leading cancer among women was cervix cancer. Other significant observations were the high frequencies of Larynx and Lung cancer in men. These sites occur with equal frequency among males. In females also the frequencies of these two cancers are similar. Gall Bladder cancer (M:F 0.4:1), as usual, has a high female preponderance. However, thyroid cancer which is another known female preponderant cancer has only a slight female excess M: F 0.9: 1.

HOSPITAL CANCER REGISTRY

REGIONAL CANCER CENTRE, GWALIOR (RCC)

Dr. A. K. Govila, FAMS DEAN

The Cancer Hospital and Research Institute, Gwalior has grown and blossomed as the premier institute for cancer diagnosis, treatment and research in the state of Madhya Pradesh. The genesis of the institute is that in March 1971 Smt. & Shri. Shitla Sahai lost their only son Rajeev due to Sarcoma, the bereaved parents vowed to establish a Cancer Hospital at Gwalior. They created a charitable trust 'Jan Vikas Nyas' in March 1971, which started functioning in July 1977. This institute is one of the twelve Regional Cancer Research Centres recognized by Government of India for cancer diagnosis, treatment and research in the country.

The centre has Medical Oncology, Surgical Oncology, Palliative Care unit and intensive care unit and several supportive units.

The institute has an outpatient department, ward of 250 beds and 24 special rooms. It also has other allied departments like Medicine, OBGY, Anesthesia and ENT.

The Institute is also involved in community services for creating awareness on cancer by propagating the warning signals of cancer and conducting screening clinics. The Institute has undertaken the work of community services in Early Detection of Cancer in Morena and Bhind districts of Madhya Pradesh. The institute has a scheme "Cancer Se Jeevan Raksha" under which one can become a member by paying Rs.500/-. After registration of one year he/she (Cancer patient) becomes eligible to the benefits under the scheme.

The research unit established in 1981 under the eminent scientist Dr. C. N. Haksar is working on the development of natural and systemic anti cancer drugs. This unit is also co-ordinating the research activities of various departments of the institute and collaborates with other institutes of Gwalior working in allied fields.

HOSPITAL CANCER REGISTRY

CHITTARANJAN NATIONAL CANCER INSTITUTE, KOLKATTA (RCC)

Dr. M. Siddiqi, Director, Dr. Urmi Sen, Mr. S. S. Mondal

Chittaranjan National Cancer Institute (CNCI) was established five decades back and is the most predominant Regional Cancer Centre in Eastern India. CNCI is a comprehensive centre for cancer treatment and research in West Bengal. The Hospital Cancer Registry was started in 1996 in CNCI, which registered 3661 new cancer patients in 1996 and in 1997 the new cases were 3802. In 1997 the average age of male cancer patients seen in this registry was 55 years, among females it was 48 years. 88% of cases were microscopically diagnosed. Among males, cancers of digestive organs accounted for 19.4% and oral cavity cancers were 17.7%. Among females, cervix cancer accounted for 41.18% and breast cancer 17.03%. Lung cancer formed 12.8% of male cancers. Among females, gall bladder cancer was the fourth leading site. Tobacco related cancers were 53.65% of all cancers in males and 12.78% in females. 28% of cases diagnosed did not receive any treatment and 40.6% of cases completed treatment. 44% cases received radiation.

HOSPITAL CANCER REGISTRY

M P SHAH CANCER HOSPITAL, AHMEDABAD (RCC)

Dr. D. D. Patel, Director

Gujarat Cancer Society was founded on April 2,1961. Following the initial period of intensive spadework, the first patients were examined on October 2, 1965 and the M P Shah Cancer Hospital, Ahmedabad was commissioned on December 14, 1966 by the late Prime Minister Smt. Indira Gandhi.

The M P Shah Cancer Hospital developed into the Gujarat Cancer and Research Institute on Feb-1, 1972. The Gujarat Cancer and Research Institute is one of the largest comprehensive cancer treatment centres in India and it is recognized as a Regional Cancer Institute by the Govt. of India. Patients referred from all over Gujarat and adjoining states of Rajastan, Madhya Pradesh and Maharashtra come to the Institute. The Institute is also recognized by the International Union Against Cancer, Geneva as a comprehensive Cancer Center. It registers about 12,000 patients every year of which over 8,000 are cancers.

The hospital at present has departments of Surgical Oncology, Gynac Oncology, Medical Oncology, Paediatric Oncology Orthopaedic, Reconstructive Surgery and Radiation Oncology. They are ably supported by departments of Internal Medicine, Hematology, Radio-diagnosis, Anesthesiology, Nuclear Medicine, Pathology, Blood Bank and departments of Cancer Biology.

It comprises of a 450 bedded Comprehensive Cancer Care Hospital and a major cancer research centre. GCRI is also a centre for the PostGraduate Medical School viz. B J Medical College and Gujarat Medical University, Ahmedabad. The Institute has been recognized by Gujarat University for Post Graduate teaching in Surgery, Medicine, Gynaecology, Radiotherapy and Pathology. The institute is also recognized for superspeciality courses of MCh (Surgical Oncology) and DM (Medical Oncology) as well as DSOP (Diploma in Surgical Onco-pathology). Short training courses in nursing, laboratory training and radiography are also undertaken.

The Institute has also been recognized for doctoral degrees in life sciences by Gujarat University and doctoral degree in Applied Biology and Cancer Research by M S University, Baroda.

HOSPITAL CANCER REGISTRY

G. KUPPUSWAMY NAIDU MEMORIAL HOSPITAL, COIMBATORE

Dr. V. Nagarajan, Director

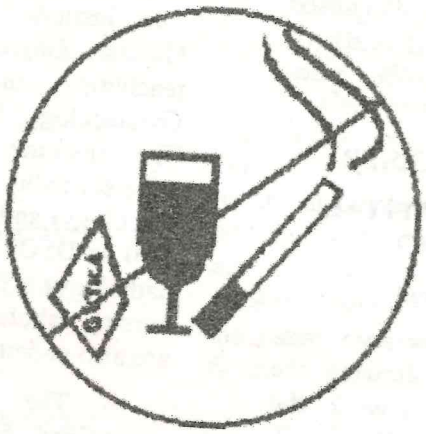
Coimbatore City, (Kovai) situated in the North West Tamil Nadu is a centre for textile industry. Coimbatore District is in Tamil Nadu-Kerala Border area. The Valavadi Narayanaswamy Cancer Centre, Kovai is the pioneer institute for cancer care in this region. It is a wing of G Kuppuswamy Naidu Memorial Hospital (G.K.N.M. Hospital). The G.K.N.M. Hospital was started in 1952 and its Radiology department with a deep X-ray therapy unit was started in 1958. The cancer centre offering total cancer therapy was started in 1970 with the help of a large donation from Valavadi Narayanaswamy Naidu Charity Trust.

A large proportion of the patients attends the hospital from Kerala and Karnataka. 10% of the beds of GKNM hospital are reserved as free patient beds.

The Cancer Centre has all diagnostic facilities, Histopathology Biochemistry, Microbiology, Cytology, Ultrasonography, Mammography, Gamma camera etc. It has a well-equipped Surgical Oncology division, Radiotherapy, facilities for I^{131} therapy & P-32/ Sr-90 therapies and Chemotherapy.

The Coimbatore Cancer Foundation, a voluntary agency situated in the premises of the GKNM hospital, is engaged in all counselling for cancer patients and relatives.

The Cancer Centre conducts extensive Cancer screening and Cancer Education programmes in the region.



Site Distribution of Cancer Cases
Hospital Cancer Registry (Non ICMR) - Males
Number of cases and Relative Frequencies

ICD-9	Site	Assam 97-98		Gwalior 96-99		Caicutta 97		Ahmedbad 96		Coimbatore 95-96	
		No	%	No	%	No	%	No	%	No	%
140	Lip	13	0.5	12	0.3	13	0.7	14	0.3	5	0.3
141	Tongue	200	8.0	313	9.1	109	5.9	533	10.3	136	8.0
142	Salivary gland	4	0.2	21	0.6	18	1.0	36	0.7	16	0.9
143	Gum	29	1.2	89	2.6	24	1.3	67	1.3	17	1.0
144	Floor of Mouth	12	0.5	14	0.4	9	0.5	29	0.6	14	0.8
145	Other Mouth	85	3.4	223	6.5	154	8.3	256	5.0	93	5.5
146	Oropharynx	207	8.3	96	2.8	74	4.0	240	4.7	43	2.5
147	Nasopharynx	44	1.8	14	0.4	18	1.0	29	0.6	13	0.8
148	Hypopharynx	354	14.2	1	0.0	134	7.3	395	7.7	130	7.6
149	Pharynx etc.	69	2.8	137	4.0	57	3.1	67	1.3	19	1.1
150	Oesophagus	421	16.9	112	3.2	77	4.2	335	6.5	141	8.3
151	Stomach	70	2.8	78	2.3	64	3.5	62	1.2	71	4.2
152	Small Intestine	1	0.0	1	0.0	1	0.1	8	0.2	1	0.1
153	Colon	15	0.6	43	1.2	16	0.9	60	1.2	25	1.5
154	Rectum	50	2.0	80	2.3	43	2.3	113	2.2	41	2.4
155	Liver	32	1.3	266	7.7	72	3.9	82	1.6	61	3.6
156	Gall bladder	34	1.4	110	3.2	32	1.7	32	0.6	6	0.4
157	Pancreas	3	0.1	45	1.3	26	1.4	30	0.6	6	0.4
158	Retroperitoneum	0	0.0	0	0.0	11	0.6	21	0.4	2	0.1
159	Gastro intestine	0	0.0	0	0.0	17	0.9	4	0.1	0	0.0
160	Nasal cavity	17	0.7	10	0.3	10	0.5	45	0.9	14	0.8
161	Larynx	156	6.3	385	11.2	78	4.2	240	4.7	93	5.5
162	Lung	171	6.9	248	7.2	237	12.8	543	10.5	121	7.1
163	Pleura	3	0.1	0	0.0	1	0.1	1	0.0	0	0.0
164	Thymus	7	0.3	0	0.0	0	0.0	36	0.7	4	0.2
170	Bone	18	0.7	88	2.6	60	3.2	97	1.9	19	1.1
171	Conne. Tissue	42	1.7	93	2.7	60	3.2	96	1.9	44	2.6
172	Melanoma skin	17	0.7	63	1.8	7	0.4	30	0.6	5	0.3
173	Skin	15	0.6			53	2.9	84	1.6	21	1.2
175	Male Breast	2	0.1	12	0.3	11	0.6	12	0.2	2	0.1
185	Prostate	9	0.4	58	1.7	22	1.2	90	1.7	42	2.5
186	Testis	28	1.1	71	2.1	41	2.2	70	1.4	23	1.3
187	Penis	20	0.8	48	1.4	40	2.2	65	1.3	36	2.1
188	Urinary Bladder	23	0.9	77	2.2	38	2.1	99	1.9	57	3.3
189	Kidney	8	0.3	39	1.1	17	0.9	55	1.1	21	1.2
190	Eye	8	0.3	15	0.4	3	0.2	25	0.5	2	0.1
191	Brain	40	1.6	178	5.2	19	1.0	118	2.3	48	2.8
192	Nervous system	3	0.1			0	0.0	3	0.1	0	0.0
193	Thyroid	14	0.6	10	0.3	13	0.7	25	0.5	25	1.5
194	Oth.endo.gland	2	0.1	0	0.0	1	0.1	10	0.2	2	0.1
195	Ill.def.site	2	0.1	0	0.0	0	0.0	40	0.8	4	0.2
196	Sec.lymph node	138	5.5	0	0.0	0	0.0	205	4.0	30	1.8
197	Sec.resp.etc	17	0.7	0	0.0	0	0.0	88	1.7	9	0.5
198	Sec .other	0	0.0	0	0.0	0	0.0	54	1.0	24	1.4
199	Primary unk.	0	0.0	0	0.0	46	2.5	28	0.5	2	0.1
200	Lymphosarcoma	0	0.0	138	4.0	0	0.0	83	1.6	7	0.4
201	Hodgkin's dis.	9	0.4	29	0.8	12	0.6	83	1.6	51	3.0
202	Non hodgkins.	41	1.6	0	0.0	66	3.6	55	1.1	67	3.9
203	Mult. Myeloma	13	0.5	22	0.6	4	0.2	34	0.7	23	1.3
204	Leuk.lymphatic	12	0.5	87	2.5	22	1.2	136	2.6	33	1.9
205	Leuk.myeloid	11	0.4	122	3.5	17	0.9	176	3.4	35	2.1
206	Leuk. Mono.	0	0.0	0	0.0	0	0.0	2	0.0	0	0.0
207	Leuk. Oth. Spe.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
208	Leuk.Unsp.	0	0.0	0	0.0	0	0.0	9	0.2	0	0.0
	Total	**2489**	**100.0**	**3448**	**100.0**	**1847**	**100.0**	**5150**	**100.0**	**1704**	**100.0**

Site Distribution of Cancer Cases
Hospital Cancer Registry (Non ICMR) - Females
Number of cases and Relative Frequencies

ICD-9	Site	Assam 97-98		Gwalior 96-99		Calcutta 97		Ahmedbad 96		Coimbatore 95-96	
		No	%	No	%	No	%	No	%	No	%
140	Lip	5	0.4	4	0.1	1	0.1	6	0.2	4	0.2
141	Tongue	34	2.8	59	2.2	26	1.3	71	2.0	38	2.0
142	Salivary gland	4	0.3	7	0.3	15	0.8	10	0.3	15	0.8
143	Gum	20	1.6	38	1.4	17	0.9	33	0.9	16	0.8
144	Floor of Mouth	4	0.3	1	0.0	4	0.2	6	0.2	3	0.2
145	Other Mouth	44	3.6	49	1.8	79	4.0	63	1.8	70	3.7
146	Oropharynx	46	3.8	6	0.2	10	0.5	14	0.4	8	0.4
147	Nasopharynx	20	1.6	3	0.1	7	0.4	11	0.3	3	0.2
148	Hypopharynx	36	2.9	2	0.1	14	0.7	119	3.3	34	1.8
149	Pharynx etc.	9	0.7	17	0.6	3	0.2	16	0.4	6	0.3
150	Oesophagus	169	13.8	52	1.9	32	1.6	155	4.3	87	4.6
151	Stomach	33	2.7	35	1.3	31	1.6	44	1.2	23	1.2
152	Small intestine	1	0.1	0	0.0	1	0.1	8	0.2	0	0.0
153	Colon	7	0.6	21	0.8	17	0.9	29	0.8	19	1.0
154	Rectum	19	1.6	38	1.4	19	1.0	60	1.7	26	1.4
155	Liver	11	0.9	114	4.3	23	1.2	17	0.5	12	0.6
156	Gall bladder	80	6.5	195	7.3	97	5.0	29	0.8	2	0.1
157	Pancreas	4	0.3	22	0.8	7	0.4	16	0.4	2	0.1
158	Retroperit	1	0.1	0	0.0	3	0.2	22	0.6	0	0.0
159	Gastro Intestine	0	0.0	0	0.0	4	0.2	1	0.0	0	0.0
160	Nasal cavity	7	0.6	0	0.0	4	0.2	40	1.1	5	0.3
161	Larynx	26	2.1	19	0.7	10	0.5	16	0.4	15	0.8
162	Lung	27	2.2	55	2.1	33	1.7	72	2.0	23	1.2
163	Pleura	2	0.2	0	0.0	0	0.0	2	0.1	1	0.1
164	Thymus	1	0.1	0	0.0	0	0.0	20	0.6	0	0.0
170	Bone	19	1.6	36	1.3	28	1.4	54	1.5	8	0.4
171	Conne. Tissue	14	1.1	44	1.6	19	1.0	59	1.7	21	1.1
172	Melanoma skin	7	0.6	33	1.2	0	0.0	13	0.4	3	0.2
173	Skin	5	0.4	0	0.0	23	1.2	40	1.1	9	0.5
174	Breast	162	13.2	300	11.2	333	17.0	653	18.3	410	21.5
179	Uterus Nos	0	0.0	0	0.0	0	0.0	10	0.3	7	0.4
180	Cervix	236	19.3	999	37.3	805	41.2	947	26.5	645	33.8
181	Placenta	2	0.2	0	0.0	0	0.0	7	0.2	3	0.2
182	Body Uterus	12	1.0	17	0.6	36	1.8	33	0.9	45	2.4
183	Ovary	46	3.8	108	4.0	99	5.1	180	5.0	106	5.6
184	Vagina	12	1.0	17	0.6	37	1.9	109	3.1	41	2.2
188	Uri. Bladder	2	0.2	7	0.3	2	0.1	22	0.6	19	1.0
189	Kidney	3	0.2	11	0.4	3	0.2	25	0.7	12	0.6
190	Eye	6	0.5	7	0.3	3	0.2	18	0.5	3	0.2
191	Brain	17	1.4	56	2.1	7	0.4	49	1.4	13	0.7
192	Nervous Sys.	0	0.0	0	0.0	2	0.1	3	0.1	1	0.1
193	Thyroid	16	1.3	19	0.7	21	1.1	26	0.7	18	0.9
194	Oth.endo.gland	1	0.1	0	0.0	1	0.1	3	0.1	1	0.1
195	Ill.def.site	0	0.0	0	0.0	0	0.0	18	0.5	1	0.1
196	Sec.lymp.node	29	2.4	0	0.0	0	0.0	36	1.0	13	0.7
197	Sec.resp.etc	4	0.3	0	0.0	0	0.0	50	1.4	7	0.4
198	Sec .other	0	0.0	0	0.0	0	0.0	32	0.9	10	0.5
199	Unk. Primary	0	0.0	0	0.0	38	1.9	16	0.4	2	0.1
200	Lymphosarco.	0	0.0	38	1.4	0	0.0	41	1.1	7	0.4
201	Hodgkin's dis.	0	0.0	10	0.4	4	0.2	19	0.5	17	0.9
202	Non hodgkins.	12	1.0	0	0.0	17	0.9	23	0.6	29	1.5
203	Mult. Myeloma	1	0.1	7	0.3	7	0.4	22	0.6	14	0.7
204	Leuk.lymphatic	7	0.6	14	0.5	9	0.5	58	1.6	10	0.5
205	Leuk.myeloid	2	0.2	67	2.5	4	0.2	121	3.4	19	1.0
206	Leuk.Mono.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
207	Leuk.Othe.spe.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
208	Leuk.Unsp.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Total	**1225**	**100.0**	**2679**	**100.0**	**1955**	**100.0**	**3567**	**100.0**	**1906**	**100.0**

Population Based Registries

Contributors

Realising the importance of the problem, the willing co-operation given so readily by many workers has made this publication possible. Hence the editors hope that scientists will give due recognition to this fact and use the names of the following authors as reference while quoting the data from a particular database.

PBCR - Kolkatta	-	Dr. M.Siddiqi, Dr. Urmi Sen, Mr. S.S.Mondal
PBCR - Ahmedabad	-	Dr. D. D. Patel
PBCR - Pune City	-	Dr. B. B. Yeole, D. J. Jussawala, Asha Pratinidhi, Lizzy Sunny
PBCR - Aurangabad	-	Dr. B. B. Yeole, D. J. Jussawala, B. N. Rao, Lizzy Sunny
PBCR - Nagpur	-	Dr. B. B. Yeole, D. J. Jussawala, Sagdev Varsha, Lizzy Sunny
PBCR - Trivandrum	-	Dr. M. Krishnan Nair, Dr. Cherian Varghese
PBCR - Karunagappally	-	Dr. M. Krishnan Nair, P. Gangadharan, P. Jayalekshmi

CANCER INCIDENCE IN KOLKATTA

Dr. M. Siddiqi, Dr. Urmi Sen, Mr. S.S. Mondal

Chittaranjan National Cancer Institute (CNCI) is one of the major cancer centres in Eastern India. However it did not have a hospital cancer registry nor did Kolkatta had a Population Based Cancer Registry.

The Hospital Cancer Registry (HCR) was started under the guidance and encouragement of Dr. M. Siddiqi, Director, and CNCI from January 1st 1996. The population based cancer registry-Kolkatta was established in January 1997, with financial grant from Dept. of Health & Family Welfare, Govt. of West Bengal and with technical and financial support from International Agency for Research on Cancer, Lyon, France. Second year onwards, part of the financial burden of PBCR had been incorporated in the annual non-plan budget of the Institute. Both registries are functioning from the Dept. of Epidemiology & Biostatistics, Chittaranjan National Cancer Institute, Kolkatta.

The PBCR Kolkatta covers an area of 300.14 sq.km and falls within the area notified by the postal code 700 001 to 700 093. This basically covers the entire area, which comes under the Kolkatta Municipal Corporation limits and also part of the area under Kolkatta Metropolitan Development authority. The staff compliment of this registry includes five social investigators, who make regular visits to reporting centres for data collection besides doing the data entry work and one statistician. Besides, statistical officer, who is also in charge of the Medical Records of the CNCI, renders assistance whenever necessary.

The two specialized cancer hospitals in Kolkatta-Chittaranjan National Cancer Institute and Cancer Centre & Welfare Home, Thakurpukur are actively collaborating in this project. Besides, all Medical Colleges, private hospitals, nursing homes, diagnostic centres and also some of the practicing oncologists are involved in this project. About fifty reporting centres have so far been identified and attempts are being made to increase this number. More and more private practitioners are being persuaded to provide information of their patients to the registry.

In the year 1997, a total of 4081 cancer cases were registered. This number excludes 1844 DCN (Death Certificate) cases, which are being verified. The first year's enumeration of 4081cases have so far been analyzed and an interim report is being published. The registration work for the cancer cases enumerated for the year 1998 is almost complete. From this year house to house inquiry to identify the DCO cases would be undertaken, using pre paid postal inquiries.

As the number of tobacco related cancers is quite high as observed from the registry report, this department is also involved in the tobacco control activities in this region. A survey on the tobacco habits of the Kolkatta population has been completed. An opinion survey was also conducted to find out the attitude towards smoking, the intention to quit, awareness of ill effects of tobacco on health specially with respect to cancer and other cardio-vascular diseases and also on the effect of tobacco use on society. Another pilot Case Control study was completed on the role of diet in breast cancer etiology.

CANCER INCIDENCE IN AHMEDABAD

Dr. D. D. Patel

The Ahmedabad Agglomeration has an area 255 Sq. Kms. as per the 1991 census. It is the largest city in Gujarat state and ranks 7th in India. It is located on 23-1' North latitude and 72.7' East longitude and 50 mtrs above sea level. The city of Ahmedabad is a major industrial centre of India. The major Industries based at Ahmedabad are the textiles, chemicals and pharmaceuticals. The population of Ahmedabad Urban Agglomeration Area as per the 1991 census was 33,38,786 with a sex ratio of 890 females per 1000 males.

Cancer care is mainly offered by the Gujarat Cancer and Research Institute (GCRI), Ahmedabad. This is a 450 bedded comprehensive cancer care hospital and major cancer research centre. The institute is recognized by the Govt. of India as a Regional Cancer Centre since 1972 and is administered by an autonomous governing council.

Population data were estimated from 1982 and 1991 census figures. The figures for the year 1996 as on 1st July were obtained assuming that there was an exponential rate of growth for each sex. Since newer areas have been added to the Urban Agglomeration Area in 1991 census, while computing the population figures the areas included in 1991 census only were used as the basis.

The 5-year age group wise population, break-up is not available as yet in the 1991 census. Therefore the growth rates for age group wise population were

computed using the 1981 census data for urban parts of Ahmedabad district. The proportions obtained thus were applied to the Ahmedabad Urban Agglomeration population.

The population based cancer registry collects information from over 50 sources. There are 11 collaborating hospitals (Municipal hospital, Govt. hospitals and others) of which the Gujarat Cancer and Research Institute, Ahmedabad contributes a major share. The birth and death register of the Ahmedabad Municipal Corporation is also an important source of cases, 9 pathology laboratories also actively collaborate with PBCR each year.

Death Certificate Cases (DCO): These constituted 5.03 % only. In GCRI all cases are individually interviewed and details entered into a prescribed core-proforma. The residential status is directly ascertained and all individuals who have stayed within the Agglomeration area for a period or less than 12 months preceding the date of registration are excluded.

CANCER INCIDENCE IN POONA CITY: 1995

Dr. B. B. Yeole, D. J. Jussawala, Asha Pratinidhi, Lizzy Sunny

The Poona Cancer Registry is a Satellite of Bombay Cancer Registry became operative on 1st March 1973 in collaboration with B J Medical College and Sassoon Hospital. Poona City agglomeration covers 344.18Sq Kms has a population of 2.30 million (1991 Census). Density of population 6680/Km^2. As per 1991 census, 78.4% are Hindus, 8.8% Muslims and 3.2% Christians 6.8% neo Buddhist 1.9% Jains and 0.7% Sikhs. Gender ratio was 905 females per 1000 males. Cancer case findings are from Hospitals in Pune & Mumbai. Cancer is responsible for 4.3% of all deaths in Bombay. Using 1981& 1991 Census figures, the population in 1995 was estimated using exponential growth rate. During 1995, 1897 new cancer cases -918 males and 979 females were registered. Microscopic verification was 81.7 %. There were 676 cancer deaths during 1995 giving a M/I - 36%. The age adjusted death rate was 39.2 for males and 38.0 for females per 100,000 population.

CANCER INCIDENCE IN AURANGABAD CITY: 1995

Dr. B. B. Yeole, D. J. Jussawala, B. N. Rao, Lizzy Sunny

This registry is a Satellite registry of Bombay Cancer Registry became operational on 01.03.1973 in collaboration with Aurangabad Medical College Hospital. Aurangabad City covers 15.48 Km^2, with a population 0.59 millions (1991 Census). Density of population is 3700/Km^2. Information is obtained from 12 hospitals in Aurangabad City and Tata Memorial Hospital. Cancer is responsible for 3.8% of all deaths in the city. It was 8^{th} and 7^{th} leading cause of death in males and females. The estimated population of Aurangabad City as on 1^{st} July 1994 was 0.74 million. During 1994, 261new cancer cases were registered. Microscopic verification was 73.2%.

CANCER INCIDENCE IN NAGPUR CITY: 1995

Dr. B. B. Yeole, D. J. Jussawala, Sagdev Varsha, Lizzy Sunny

The Nagpur Cancer Registry is a Satellite of Bombay Cancer Registry became operative on 1^{st} March 1973 as a collaborative effort with Nagpur Medical College and hospitals at Nagpur. Nagpur City covers 236.93 Sq.Kms and population 1.63million (1991 Census). Density of population is 6880/Km^2. Information is collected from 8 hospitals and 12 nursing homes in Nagpur City and several hospitals in Bombay including Tata Memorial Hospital. It was 6^{th} and 7^{th} leading cause of death in males and females. The estimated population of Nagpur City as on 1^{st} July 1994 was 1.76 million. During 1994, 1347

new cancer were registered. Microscopic verification was 76.1 %. There were 432 cancer deaths giving a M/I - 32%. The age adjusted death rate was 31.8 for males and 32.3 for females per 100,000 population.

CANCER INCIDENCE IN TRIVANDRUM

Dr. M. Krishnan Nair, Dr. Cherian varghese

A surveillance system was initiated to monitor cancer incidence and mortality in Trivandrum Corporation and adjacent Community Development Blocks in 1994 with reference date as 1st January 1991. This system has developed into a Population Based Cancer Registry (PBCR). The Hospital Cancer Registry of the Regional Cancer Centre (RCC), Trivandrum which is the only comprehensive cancer treatment center in the district has helped to identify most of the incident cases.

The geographic boundaries of the Corporation of Trivandrum and the three adjacent Community Development (CD) blocks in Trivandrum District were the catchment area of the registry. These administrative regions are densely populated and enjoy a reasonable level of health care and mortality registration system. As per the 1991 census, population covered by the registry was 500,000 urban and 500,000 rural.

Regional Cancer Centre (RCC), Trivandrum which is a comprehensive cancer control agency and State referral center is located in Trivandrum.

Incident cancer cases were collected by an active registration process. The Hospital Cancer Registry of the RCC, Trivandrum registers all new cancer cases attending this hospital and has a database, which was accessed to identify cancer cases from the registry area. The staff of the registry visits the major hospitals and the pathology laboratories in the registry area. They abstract information on cancer cases on to a structured proforma. Information on cancer deaths was collected from the vital statistics offices of the 18 panchayats and Trivandrum Corporation. It is possible that one patient might go to different hospitals before and after reaching the RCC. The case summary and death certificates were matched to select the most reliable first indication of cancer diagnosis.

CANCER INCIDENCE IN KARUNAGAPPALLY

Dr. M. Krishnan Nair,
P. Gangadharan, P. Jayalekshmi

This is a special purpose cancer registry established to study the occurrence of cancer Vis-a-Vis the Natural Radiation. This is a project of Regional Cancer Centre and funded till 1999 by the Department of Atomic Energy.

The coastal areas of Karunagapally taluk, has been known for its radiation emitting sands and for the past several decades, the cancer causing potentials of these sands have been of great concern among the residents in the area.

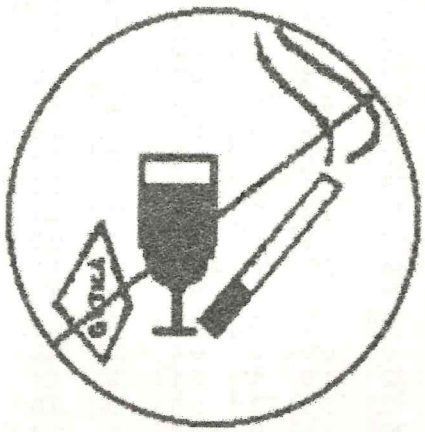
The taluk is spread over 192 km^2. The cancer registry was set up in 1990 covering the total population of the taluk, which according to 1991 census were 3,85,000. There was a 1.09% annual growth rate. This is a rural area, without any dedicated cancer treatment centre and without any laboratory doing histopathology. The taluk is divided into 12 panchayats.

An active registration system was followed for cancer case finding. Almost 60 data sources are contacted regularly which included hospitals in Karunagappally, Kollam town, laboratories in Trivandrum and the Hospital Cancer Registry, Trivandrum. Data was also collected from the panchayat death registers. The Hospital Cancer Registry, Medical College Hospitals contributed to 60% of the registered cases.

Of the taluk's population around 100,000 people are exposed to Natural Radiation in varying dose rates.

The study was conducted by establishing a field office in which a cytology service was started with full laboratory set up. This proved to be a very useful source for cancer diagnosis in the area.

During 1990-1997 a total of 2675 cancer cases were recorded, of which in 1990-1992 period there were 930 cases. The currently reported incidence rates are based on 1993-1997 data. The microscopic verification was 71% and M/I-46%. There were 1637 cases during the 5 year period 1993-1997. The population as on 1st July 1995 was estimated by using age specific population changes during 1981-1991 and applying this growth rate on 91 population of Karunagapally. During 1993-1997 the crude rate was 89.5 for males and 72.6 for females respectively. The AAR were 102.7 for males and 75.5 for females. The truncated adjusted rates were 179.7 and 142.6. The M/F ratio of AAR was 1.36:1.



Population Based Cancer Registries (Non ICMR) - Males
Number Of Cases & Age Adjusted Rates

ICD-9	Site	* Kolkatta 97		Ah.bad 96		Poona 95		Aur.bad 94		Nagpur94		Tvm 93-97		Knpy 93-97	
		No	AAR	No	AAR	No	AAR	No	AAR	No	AAR	No	AAR	No	AAR
140	Lip	10	0.3	5	0.3	13	1.5	1	0.6	1	0.2	11	0.5	4	0.5
141	Tongue	83	2.9	135	10.0	38	4.3	10	4.8	33	5.2	124	5.3	38	4.5
142	Salivary gland	15	0.5	16	1.2	6	0.8	1	0.6	4	0.6	13	0.5	3	0.3
143	Gum	0	0.0	19	1.4	18	2.3	2	0.8	10	1.6	29	1.3	6	0.7
144	Floor of Mouth	0	0.0	5	0.3	2	0.2	0	0.0	3	0.5	23	1.0	9	1.0
145	Other Mouth	83	3.0	85	5.1	43	4.6	6	2.5	17	2.7	154	6.9	44	5.1
146	Oropharynx	45	1.6	60	4.7	20	2.1	1	0.4	14	2.2	67	3.0	17	2.0
147	Nasopharynx	23	0.7	7	0.3	8	0.9	0	0.0	1	0.1	14	0.6	2	0.2
148	Hypopharynx	61	2.2	88	7.7	36	4.6	10	4.7	22	3.8	46	2.1	20	2.2
149	Pharynx etc.	80	2.9	17	1.5	6	0.8	1	0.6	4	0.6	1	0.0	4	0.4
150	Oesophagus	84	3.1	120	10.1	68	8.3	9	4.5	82	13.3	70	3.1	52	6.3
151	Stomach	73	2.5	27	2.0	49	5.4	3	1.4	30	4.8	81	3.6	44	5.1
152	Small Intestine	2	0.1	1	0.1	2	0.3	0	0.0	0	0.0	5	0.2	2	0.2
153	Colon	32	1.1	31	2.4	26	2.9	2	0.6	17	2.7	42	1.8	7	0.8
154	Rectum	49	1.6	37	2.8	28	3.3	2	0.8	16	2.5	52	2.2	19	2.3
155	Liver	60	1.9	23	1.8	27	3.1	2	0.9	10	1.5	56	2.3	35	3.9
156	Gall bladder	34	1.2	13	1.0	10	1.0	0	0.0	5	0.8	6	0.3	5	0.6
157	Pancreas	14	0.5	14	1.2	19	2.2	5	1.7	12	1.8	40	1.7	20	2.4
158	Retroperitoneum	0	0.0	6	0.5	2	0.3	0	0.0	2	0.3	8	0.3	2	0.2
159	Gastro intestine	0	0.0	3	0.2	3	0.4	0	0.0	0	0.0	0	0.0	2	0.2
160	Nasal cavity	19	0.6	16	1.0	9	1.1	1	0.3	3	0.5	9	0.4	7	0.8
161	Larynx	125	4.6	72	5.6	53	6.3	8	3.9	62	10.0	93	4.1	30	3.7
162	Lung	277	10.1	117	10.3	63	7.7	13	6.3	45	7.2	197	9.0	165	19.4
163	Pleura	1	0.0	0	0.0	3	0.2	1	0.5	0	0.0	0	0.0	0	0.0
164	Thymus	2	0.0	9	0.7	1	0.1	0	0.0	0	0.0	6	0.2	0	0.0
170	Bone	48	1.3	22	1.2	12	0.8	1	0.4	13	1.3	17	0.6	12	1.2
171	Conne. Tissue	39	1.1	21	1.3	14	1.1	2	0.5	8	1.1	22	0.9	7	0.7
172	Melanoma skin	6	0.2	5	0.4	3	0.2	0	0.0	3	0.5	18	0.8	4	0.5
173	Skin	33	1.0	27	2.1	7	0.9	0	0.0	5	0.9	36	1.6	15	1.7
175	Male Breast	34	1.2	9	0.8	1	0.1	0	0.0	6	0.7	3	0.1	1	0.1
185	Prostate	69	2.6	48	4.8	50	6.7	2	1.1	20	3.4	88	4.0	20	2.3
186	Testis	24	0.6	20	0.9	8	0.7	1	0.6	9	1.2	13	0.4	4	0.3
187	Penis	20	0.7	27	2.0	14	1.5	2	1.3	17	2.5	19	0.8	8	1.0
188	Urinary Bladder	65	2.4	38	3.1	26	3.2	0	0.0	12	2.1	46	2.1	25	3.0
189	Kidney	21	0.7	21	1.4	22	2.6	1	0.3	4	0.6	28	1.3	5	0.6
190	Eye	4	0.1	4	0.2	1	0.1	0	0.0	5	0.7	2	0.1	3	0.4
191	Brain	63	1.7	44	2.7	44	4.2	6	1.9	22	2.5	61	2.5	20	1.9
192	Nervous system	0	0.0	1	0.0	1	0.2	0	0.0	0	0.0	0	0.0	1	0.1
193	Thyroid	19	0.6	6	0.3	8	0.9	0	0.0	3	0.5	46	1.7	7	0.7
194	Oth.endo.gland	10	0.3	0	0.0	5	0.4	0	0.0	2	0.2	5	0.2	2	0.3
195	Ill.def.site	0	0.0	22	1.6	1	0.1	3	1.4	0	0.0	5	0.2	1	0.1
196	Sec.lymph node	0	0.0	40	3.3	7	0.6	0	0.0	14	2.1	53	2.4	2	0.2
197	Sec.resp.etc	0	0.0	20	1.5	6	0.7	1	0.4	9	1.4	36	1.5	4	0.5
198	Sec .other	0	0.0	5	0.3	6	0.6	1	0.6	6	1.0	47	2.1	1	0.1
199	Primary unk.	0	0.0	91	7.2	27	3.2	19	9.7	51	8.3	124	5.4	131	14.6
200	Lymphosarcoma	0	0.0	19	1.3	3	0.3	3	1.0	1	0.2	20	0.8	20	2.3
201	Hodgkin's dis.	33	0.8	17	0.8	14	1.3	2	0.7	5	0.6	20	0.8	3	0.3
202	Non hodgkins.	68	2.1	14	1.0	30	2.6	7	3.4	18	2.6	45	1.8	17	1.8
203	Mult. Myeloma	13	0.5	7	0.6	9	1.1	0	0.0	5	0.7	26	1.1	12	1.4
204	Leuk.lymphatic	26	0.6	23	1.2	17	1.6	2	0.4	21	2.2	45	1.8	22	2.6
205	Leuk.myeloid	17	0.4	39	2.2	26	2.2	6	1.6	17	2.0	37	1.4	6	0.6
206	Leuk. Mono.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
207	Leuk. Oth. Spe.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
208	Leuk.Unsp.	236	8.1	8	0.6	3	0.3	1	0.2	6	0.7	11	0.5	5	0.6
	Total	**2020**	**68.4**	**1524**	**116.0**	**918**	**103.2**	**138**	**61.7**	**675**	**102.9**	**2020**	**87.3**	**895**	**102.7**

*Kolkatta - Minimum Incidence Rates- Death Certificate analysis to be included

Population Based Cancer Registries (Non ICMR) - Females
Number Of Cases & Age Adjusted Rates

ICD-9	Site	* Kolkatta 97		Ah.bad 96		Poona 95		Aur.bad 94		Nagpur94		Tvm 93-97		Knpy 93-97	
		No	AAR	No	AAR	No	AAR	No	AAR	No	AAR	No	AAR	No	AAR
140	Lip	1	0.0	4	0.3	2	0.2	0	0.0	3	0.5	9	0.4	2	0.2
141	Tongue	32	1.5	26	2.4	9	1.2	4	2.1	7	1.2	70	2.7	16	1.7
142	Salivary gland	6	0.3	2	0.2	4	0.4	1	0.7	3	0.3	10	0.4	3	0.3
143	Gum	0	0.0	13	1.2	12	1.4	0	0.0	8	1.3	32	1.3	7	0.7
144	Floor of Mouth	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	4	0.2	1	0.1
145	Other Mouth	34	1.4	18	1.5	21	2.5	4	2.2	11	2.0	82	3.2	24	2.6
146	Oropharynx	8	0.4	3	0.3	5	0.6	1	0.6	3	0.5	10	0.4	4	0.4
147	Nasopharynx	6	0.2	4	0.2	3	0.4	0	0.0	2	0.3	6	0.2	1	0.1
148	Hypopharynx	7	0.3	20	1.6	8	1.0	0	0.0	11	1.8	7	0.3	3	0.3
149	Pharynx etc.	4	0.2	8	0.7	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0
150	Oesophagus	62	2.9	50	4.4	59	7.4	6	2.7	50	9.1	20	0.8	24	2.6
151	Stomach	49	2.0	21	1.4	23	3.0	0	0.0	14	2.1	41	1.6	15	1.6
152	Small Intestine	3	0.1	0	0.0	2	0.3	0	0.0	0	0.0	3	0.1	0	0.0
153	Colon	23	0.9	20	1.8	22	2.7	3	1.7	9	1.6	31	1.2	10	1.0
154	Rectum	38	1.5	22	1.9	24	2.7	2	1.2	15	2.3	44	1.8	16	1.7
155	Liver	29	1.2	4	0.3	9	1.1	1	0.6	4	0.5	23	0.9	5	0.5
156	Gall bladder	87	3.7	14	1.2	12	1.5	0	0.0	2	0.4	4	0.1	2	0.2
157	Pancreas	7	0.3	8	0.8	12	1.6	2	0.8	4	0.7	22	0.9	10	1.1
158	Retroperitoneum	0	0.0	7	0.7	3	0.4	1	0.7	0	0.0	6	0.2	2	0.2
159	Gastro intestine	0	0.0	1	0.1	0	0.0	1	0.2	1	0.2	0	0.0	0	0.0
160	Nasal cavity	6	0.3	11	0.9	8	0.9	0	0.0	3	0.5	9	0.4	3	0.3
161	Larynx	14	0.7	3	0.3	6	0.8	1	0.7	7	1.1	3	0.1	0	0.0
162	Lung	65	2.8	27	2.3	31	4.0	2	1.2	13	2.3	33	1.3	28	2.9
163	Pleura	1	0.0	0	0.0	2	0.3	1	0.5	0	0.0	1	0.0	0	0.0
164	Thymus	5	0.2	7	0.6	0	0.0	0	0.0	0	0.0	3	0.1	0	0.0
170	Bone	21	0.7	8	0.5	14	1.2	1	0.2	7	1.0	14	0.5	1	0.1
171	Conne. Tissue	26	0.9	17	1.2	8	1.0	3	1.1	11	1.5	15	0.6	3	0.3
172	Melanoma skin	6	0.3	2	0.2	1	0.1	1	0.6	3	0.4	5	0.2	0	0.0
173	Skin	19	0.8	14	1.0	5	0.6	2	1.0	4	0.7	26	1.0	8	0.7
174	Female Breast	487	18.4	271	21.4	231	26.3	21	9.7	143	22.3	505	19.5	148	14.9
179	Uterus Nos	16	0.7	7	0.5	8	1.1	0	0.0	3	0.4	4	0.1	2	0.2
180	Cervix	537	21.8	188	15.3	189	21.1	27	12.7	145	22.4	272	10.8	141	15.0
181	Placenta	1	0.0	5	0.2	1	0.1	0	0.0	1	0.2	1	0.0	1	0.1
182	Body Uterus	49	2.1	14	1.3	16	2.0	0	0.0	9	1.4	53	2.1	8	0.8
183	Ovary	107	3.9	53	4.4	61	6.8	10	4.2	47	6.6	119	4.5	31	3.0
184	Vagina	24	1.0	28	2.3	11	1.3	1	0.3	3	0.5	13	0.5	6	0.7
188	Urinary Bladder	15	0.6	4	0.4	11	1.2	0	0.0	2	0.3	11	0.4	3	0.3
189	Kidney	16	0.5	7	0.7	6	0.8	0	0.0	5	0.7	13	0.5	6	0.7
190	Eye	12	0.4	2	0.2	1	0.1	1	0.6	2	0.3	1	0.0	3	0.4
191	Brain	28	1.0	35	2.0	26	2.5	4	1.1	10	1.4	51	1.8	17	1.7
192	Nervous system	0	0.0	2	0.2	0	0.0	0	0.0	0	0.0	2	0.1	1	0.1
193	Thyroid	29	0.9	13	1.0	18	1.8	1	0.8	7	1.0	152	5.1	56	5.0
194	Oth.endo.gland	4	0.1	1	0.1	0	0.0	0	0.0	3	0.4	5	0.2	1	0.1
195	Ill.def.site	0	0.0	8	0.6	0	0.0	2	0.9	1	0.1	1	0.0	0	0.0
196	Sec.lymph node	0	0.0	5	0.4	4	0.5	0	0.0	4	0.7	19	0.8	2	0.2
197	Sec.resp.etc	0	0.0	14	1.4	4	0.5	2	1.1	10	1.8	29	1.2	0	0.0
198	Sec .other	0	0.0	3	0.2	7	0.9	1	0.3	2	0.4	35	1.3	2	0.2
199	Primary unk.	0	0.0	46	3.7	25	2.8	5	2.5	34	5.6	105	4.0	83	8.2
200	Lymphosarcoma	0	0.0	9	0.6	0	0.0	1	0.2	0	0.0	24	1.0	6	0.6
201	Hodgkin's dis.	6	0.2	6	0.4	2	0.2	1	0.3	8	0.9	6	0.2	2	0.2
202	Non Hodgkin's	37	1.5	8	0.6	28	3.0	4	1.6	8	1.0	32	1.2	7	0.6
203	Mult. Myeloma	16	0.6	9	0.9	4	0.5	0	0.0	6	0.9	27	1.1	9	0.9
204	Leuk.lymphatic	12	0.3	13	0.9	6	0.6	2	0.5	7	0.9	32	1.2	8	0.9
205	Leuk.myeloid	5	0.2	34	2.1	13	1.2	2	1.0	13	1.7	42	1.5	7	0.7
206	Leuk. Mono.	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1
207	Leuk. Oth. Spe.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
208	Leuk.Unsp.	100	4.2	1	0.1	1	0.1	1	0.2	4	0.5	7	0.2	3	0.3
	Total	**2061**	**82.0**	**1121**	**89.7**	**979**	**112.9**	**123**	**56.8**	**672**	**105.0**	**2094**	**80.2**	**742**	**75.5**

*Kolkatta - Minimum Incidence Rates- Death Certificate analysis to be included.

LOCATION OF CANCER REGISTRIES (NON-ICMR) REPORTED IN THE CURRENT SERIES