



**REGIONAL  
CANCER  
CENTRE**

**THIRUVANANTHAPURAM**

**1996-97**

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## INTRODUCTION

The year under report was remarkable as a year of fulfillment and progress as far as this centre is concerned. The long cherished dream came true with completion of the clinical building complex of the RCC and its dedication to the nation by our beloved Chief Minister Sri. E.K. Nayanar on the 8th of November, 1986 in the presence of Sri M. Vijayakumar, Hon'ble Speaker, Kerala Legislative Assembly and Sri. A.C. Shanmukhadas, Hon'ble Minister for Health and Family Welfare. It is indeed a matter of gratification that the Chief Minister who laid the foundation stone could also open the building within a short span of time. The Inpatient Block was opened on the same day by Sri. A.C. Shanmukhadas.

Now the centre has to its credit a modern building complex with an approximate plinth area of 22,300 sq. metres which makes it one of the biggest cancer centres in Asia. The first phase of the hospital block started functioning in 1989. It comprises the outpatient block with an area of 5,300 sq.metres. It has the O.P. facilities, diagnostic services including C.T. Scan, Nuclear Medicine, the Blood Bank, Clinical Pathology, Cytology and RIA Labs. Two Operation Theatres, Post Operative Wards, Medical Oncology wards are also located in this building. The Air-conditioning and Electrical installations as well as the Computer Centre are also accommodated in this building. Rs. 2.75 crores was spent for the completion of this building. This was also inaugurated by Sri. E.K. Nayanar, Hon'ble Chief Minister on 17th August, 1989.

The second phase of construction with an area of 17,000 sq.metres is in 2 blocks - an 8 storey inpatient block and a 6 storey Radiotherapy-cum-Payward Block. In the inpatient block paediatric ward, inpatient wards with 150 beds, palliative care facilities with 15 beds, Day Care Centre for chemotherapy with 24 beds, operation theatre and post operative areas, chemo wards, Administrative Office, Central Stores, CSSD, Canteen, Mortuary, Cancer Research, Conference Complex, Medical Physics Division, Library and an area for Bone Marrow Transplant are located. The Payward is a 6 storey building. The Radiotherapy and Brachytherapy facilities and 48

payward rooms are located in this building. The total expenditure for this building was Rs. 19.23 crores. The six storey Radiotherapy block was constructed at a cost of Rs. 175 lakhs and was inaugurated on 25 January, 1994 by Sri. K. Karunakaran, former Chief Minister of Kerala. It has 58 payward rooms and facilities for installation of Teletherapy units, Simulator, Computers and patient waiting area.

We are happy to place on record our appreciation and gratitude to M/S. PRS Builders for carrying out the civil work as expeditiously and excellently as possible and also M/S. K.G. Sukumaran and Associates-Kochi, M/S Blue Star Ltd. for the Air Conditioning, M/S Harrison Malayalam Ltd. for the electrification, etc. We acknowledge with gratitude the valuable guidance and help rendered by the Chairman and Members of the Building Committee from time to time.

A commendable achievement this year is that a library with all modern facilities started functioning in the new building complex. It is being utilised not only by the staff and students of the centre but also by those of the Medical College, Trivandrum.

As part of technology transfer and improvement programme, this year also we gave training to 10 of our staff in foreign countries like Japan, China, Jerusalem, USA, UK and Austria. This year we were fortunate enough in getting down the services of nearly 13 overseas faculty members. The University of Kerala gave sanction for starting the much needed M.Sc. Medical Physics course in this centre during this year. As in the previous years our centre gave paramount importance to research activities and we are proud of the excellent performance by virtue of which we could muster several research projects aided by national and foreign agencies. Dr. M. Krishnan Nair was the recipient of the prestigious Dorab Tata Award of the year, for his outstanding contributions in the field of cancer research.

We express our gratitude to the Govt. of Kerala and the Govt. of India for their unstinted co-operation and help, without which the centre would not have grown as an institute par excellence.

The report contains the activities of various divisions and the audited statement of accounts of this centre for the year 1996-97.



Sri. E.K. Nayanar, Hon'ble Chief Minister of Kerala dedicated to the Nation, the New Building Complex of Regional Cancer Centre on 8th November, 1996 in the presence of Sri. M. Vijayakumar, Hon'ble Speaker, Kerala Legislative Assembly, Sri. A.C. Shanmukhadas, Hon'ble Minister for Health and Sri. C.P. Neir, Chief Secretary to Government.

## DEPARTMENTAL ACTIVITIES

### DIVISION OF RADIOTHERAPY

Dr. M. Krishnan Nair	- Director & Professor
Dr. F. Joseph	- Dy. Director & Professor
Dr. B. Rajan	- Professor
Dr. T. Gangadevi	- Addl. Professor
Dr. P.G. Jayaprakash	- Addl. Professor
Dr. Suresh Chandra Dutt	- Assoc. Professor
Dr. C.S. Rafeeka Beegum	- Assoc. Professor
Dr. S. Parameswaran	- Assoc. Professor
Dr. V. Narayana Bhattathiri	- Assoc. Professor
Dr. Jayaprakash Madhavan	- Assoc. Professor
Dr. K. Ramadas	- Asst. Professor
Dr. K. Ratheesan	- Asst. Professor
Dr. Thomas Koilparambil	- Asst. Professor
Dr. Francis V. James	- Asst. Professor
Dr. Rema Jyothirmayi	- Lecturer
Dr. Rojymon Jacob	- Lecturer

The Division of Radiotherapy is responsible for the primary care of cancer patients attending Regional Cancer Centre. It functions as 3 units with 18 Radiotherapists. As the patient management involves multidisciplinary management involving Radiotherapy, Surgery and Chemotherapy, regular clinics involving different divisions are being conducted. In association with various departments of Medical College, the following clinics are also conducted. Paediatric tumour board (weekly), Gynaecological tumour board (monthly), Gastroenterology tumour board (monthly), Surgery tumour board (monthly) and Clinico- Pathological Conference (monthly). The staff are also actively involved in conducting clinics at peripheral centres like Ernakulam and Karunagappally for regular follow-up of patients.

## Clinical Activities

This division was taking the primary responsibility of 8551 new cancer patients registered at Regional Cancer Centre during 1996-1997. During this period there were 90126 review cases. Out of 6063 hospital admissions 3738 were under the care of the Radiotherapy department. Regional Cancer Centre being well equipped, there are more radiotherapy referrals. Teletherapy was used in 5826 patients. Brachytherapy was employed in 520 patients.

### Split up of Brachytherapy

Selectron (for gynaec tumours)	- 292
Manual afterloading Caesium (for gynaec tumours)	- 89
Intracavitary Radiotherapy for oesophagus	- 71
Interstitial implants	- 53
Surface mould treatments	- 15

### Academic Programmes

This division functions as undergraduate and postgraduate training centre for Medical College, Trivandrum. List of Postgraduate students:

Dr. Joseph Edison	- finished on 28-06-1996 MD course
Dr. Ajith Kumar T.V	- finished on 07-12-1996 MD course
Dr. Beela Sarah Mathew	- finished on 12-10-1996 MD course
Dr. Aswin Kumar	- finished on 10-01-1997 MD course
Dr. Sivanandan	- MD course
Dr. Sharmila Mary Joseph	- MD course
Dr. Anish Kumar R.P.	- MD course
Dr. Indumathy K.V.	- finished on 17-10-1996 DMRT course
Dr. Sathish	- DMRT course
Dr. Sonia S	- DMRT course
Dr. Reghuthaman C.K	- DMRT course

There were regular journal clubs weekly. Eight guest lectures were conducted by overseas faculties. Training for house surgeons, nursing students and other paramedical staff was continued.

## Awards and Distinctions

1. Dr. M. Krishnan Nair was awarded Roll of Honour of UICC during 1996. He was also the recipient of the prestigious Dorab Tata Award.
2. Dr. F. Joseph was nominated as a member, Faculty of Medicine, University of Kerala.
3. Dr. V.N. Bhattathiri, Member, Board of studies in Radiotherapy, Banaras Hindu University.
4. Dr. K. Ramadas, UICC-ICRETT Fellowship at the Royal Marsden Hospital, London.
5. Dr. Francis V. James, Clinical Research Fellowship of Institute of Cancer Research & Royal Marsden Hospital, London.

### Research Projects

The list of ongoing clinical Research Trials is given below.

1. Clinical Trial of 5Fu and Interferon alpha 2b in Hepatocellular carcinoma.
2. Randomised trial of Radiotherapy ± Mitomycin C in locally advanced head and neck cancers.
3. Randomised trial of Radiotherapy ± Concurrent interferon in carcinoma of nasopharynx.
4. Radical Radiotherapy ± interferon for advanced buccal cancers.
5. Concurrent methotexate and interferon in cancers of tongue.
6. Adjuvant trial of 5Fu ± Levamisole in carcinoma colon.
7. Plasma and tumour tissue glutathione in oral cancers.
8. Multimodal assaying for prediction of oral cancer Radiosensitivity.
9. Relation of micromultinucleation of markers of proliferation in oral cancers.
10. Radiosensitising with Withaferin in head and neck cancers.
11. Radiotherapy ± Chemotherapy in high grade gliomas.
12. Vincristine for pleurodesis.
13. Droloxifene for metastatic breast cancer.

The Department also co-operated with various studies by other divisions in Regional Cancer Centre and departments in Medical Colleges.

*Conferences, etc. attended - (Chapter III)  
Papers Published/Presented - (Chapter IV)*

## DIVISION OF SURGICAL ONCOLOGY

Dr. Paul Sebastian	Assoc. Professor (on leave)
Dr. M. Iqbal Ahamed	Assoc. Professor
Dr. K. Chitrathara	Asst. Professor
Dr. Jem Prabhakar	Asst. Professor
Dr. Cherlan Koshy	Asst. Professor
Dr. Manoj Pandey	Lecturer

### Anaesthesiology

Dr. Gladys Jeevy	Assoc. Professor
Dr. Rachel Cherian Koshy	Asst. Professor

The work of the division of surgical oncology showed a decline during the reporting year due to the paucity of staff; both surgeons and anaesthetists. Nevertheless with the existing meagre staff, maximum number of operative work was done.

A total of 559 major surgical procedures were carried out during the year (Table-1). The minor procedures included incisional and excisional biopsies and all curative procedures done under local anaesthesia. 246 patients had undergone cystoscopic examination, more than 90% of them being cases of carcinoma cervix for staging purpose. Colposcopic, rigid sigmoidoscopic and flexible nasopharyngoscopic examinations were also carried out.

Table - 1

Major operations	-	559
Minor operations	-	481
Endoscopic procedures	-	337
Total	-	1377

As in the previous years, head and neck malignancies constituted the majority of the operative work (46%). The region wise distribution of major surgical procedures carried out is shown in Table -2.

Table - 2  
Major operations

Region	No.	Percent
Head & Neck	258	46.1
Breast	138	24.7
Gastrointestinal & Retroperitoneal	40	7.2
Genito urinary	78	13.9
Bone and soft tissue	25	4.5
Skin including malig.melanoma	20	3.6
<b>Total</b>	<b>559</b>	<b>100.0</b>

In the head and neck region, carcinoma of buccal mucosa (81) and that of the tongue (61) formed the major site of disease; the former more often being radioresistant or post radiation recurrent disease, and salvage surgery in almost all these cases required primary reconstruction. 107 flaps were used in 79 such patients, twenty seven patients needing two flaps each, after full thickness excision of the cheek. Majority of the patients with tongue cancer had locally advanced disease not suitable for interstitial radium implantation or had regional lymph node involvement; in either case surgery was considered as the primary treatment of choice. In nearly 60% of these patients excision of the locally advanced primary lesion necessitated reconstruction, and pectoralis major myocutaneous flap was the most frequently (27) used flap. The site wise distribution of head and neck cancers and the different flaps used for reconstruction are given in tables 3 and 4 respectively.

Table - 3  
Site wise distribution of Head and Neck Cancers

Site	No.	Percent
Buccal Mucosa	81	31.4
Tongue	61	23.6
Metastatic neck node	34	13.2
Thyroid	33	12.8
Lower Alveolus	9	3.5
Paranasal sinus	10	3.9

Salivary tumours	10	9.9
Larynx and Hypopharynx	5	1.9
Floor of mouth	4	1.5
Others (scalp, skin, lip etc.)	11	4.3
<b>Total</b>	<b>258</b>	<b>100.0</b>

**Table - 4**

**Flaps used for reconstruction after radical excision in Head and Neck Cancers.**

Pectoralis major myocutaneous flap	- 104
Deltopectoral fasciocutaneous flap	- 41
Platysma myocutaneous flap	- 4
Sternomastoid myocutaneous flap	- 3
Nasolabial flap	- 2
Trapezius myocutaneous flap	- 2
Latissimus dorsi myocutaneous flap	- 2
Tongue	- 1
Free flap	- 1
<b>Total</b>	<b>- 156</b>

In addition, split thickness skin grafting was done in 20 patients. In one patient radial forearm free flap was used for reconstruction after wide excision of the buccal mucosa lesion.

More than 50% of thyroid surgery was in the form of completion thyroidectomy in patients being referred after the primary surgery done elsewhere. However, there was no incidence of recurrent nerve injury.

Modified radical mastectomy, either Patey's mastectomy or total mastectomy with axillary clearance, is the standard procedure being carried out for breast cancer. In 12 patients the primary diagnosis was achieved by fine needle aspiration cytology, and in three patients frozen section following lumpectomy yielded the diagnosis. There were more patients with suitable lesion in whom breast conservation surgery could be considered, but the patients declined the option, for fear of disease. Frozen section facility was more frequently used, particularly in those cases of breast and thyroid disease where FNAC was inconclusive.

**Table - 5**

**Region wise distribution of abdominal cancers.**

Colorectum	- 12
Stomach	- 5
Oesophagus	- 7
Retroperitoneum	- 6
Staging Laparotomy	- 2
Others	- 8
<b>Total</b>	<b>- 40</b>

There was a reduction in the total number of patients with abdominal malignant disease being treated during the reporting year. A curative resection could be carried out only in 50% the patients with upper gastrointestinal (stomach and oesophagus) malignancies.

**Table - 6**

**Site wise distribution of genitourinary cases**

Ovary	- 20
Cervix	- 21
Vagina	- 4
Uterus	- 4
Kidney	- 1
Bladder	- 2
Penis	- 9
Scrotum	- 2
Prostate	- 2
Testis	- 1
Inguinal nodes	- 12
<b>Total</b>	<b>- 78</b>

Wertheim's hysterectomy and modified Wertheim's hysterectomy were carried out in 15 cases of carcinoma cervix. An optional debulking procedure could be carried out in 13 out of 20 cases of ovarian cancer. In one patient posterior exenteration was performed, in another patient with vaginal melanoma, anterior exenteration was carried out.



Bone and Soft tissue tumours constituted 4.5% of total number of cases. Bone tumours were almost always treated by amputation or disarticulations. However, in soft tissue sarcomas of the extremities, a planned limb salvage surgery could be carried out in majority of patients.

## Anaesthesiology Section

659 surgical cancer patients were worked up for anaesthesia during the above period and 559 patients were given anaesthesia; 546 cases general anaesthesia and 13 sub-arachnoid blocks.

50% of patients had other systemic diseases. All patients had a detailed pre-anaesthetic check up and treatment given in consultation with the concerned specialists and their general condition improved as much as was compatible with the urgency of surgery, so that peri-operative crisis was avoided. High risk cases were undertaken after getting the informed high risk consent.

No per-operative critical events or mortality has occurred.

### Age group

- 12-20 yrs. - Mostly for disarticulation or Amputation limb. 12 years old - for spindle cell sarcoma breast surgery and one for amputation.
- 21-40 yrs. - Mostly breast and few head and neck
- Above 4 yrs. - Mostly head and neck and the rest abdominal surgeries
- 71-96 - Head and neck mostly

In head and neck cases the anaesthetist shares the airway with the surgeon and intubation and management are challenging events. Anaesthesia is often given to patients with different degrees of trismus, due to radiation or previous surgery. All are managed by awake blind nasal intubation. No tracheostomy is done for ventilation purposes.

During intra operative period NSAIDS such as Keterol, Paracetamol, or Tramadol were used as analgesics. This results in an awake pain free patient with stable vitals at the end of surgery. Narcotics are avoided in head and neck cases as far as possible.

After the oral reconstructive surgery the nasal endotracheal tube is retained for a day to keep the airway patent, as there is the possibility of airway obstruction by secretions, oedema or the tongue falling back. They tolerated the tube well and extubated next morning uneventfully.

In Thyroid cases T3, T4, TSH levels were checked and kept within normal limits before surgery. In completion Thyroidectomy cases with tumour infiltration into the tracheal wall or adherent to the trachea, the endotracheal tube is retained for a day or two (tolerated well) and extubated after assessing the patency of airway and watching for any stridor. By this technique prophylactic tracheostomies have been avoided.

Most post chemo patients have thrombosed veins. In all these cases and in prolonged abdominal surgeries, for securing good IV lines and to measure C.V.P in all compromised patients, Central Venous Cannulation is done (Subclavian, Internal Jugular or Basilic).

For postoperative pain relief in abdominal and thoracic cases, epidural Buprenorphine or Morphine or Sensorcaine is used.

Diabetics who are on oral medication are switched on to plain insulin and the blood sugar controlled before the surgery. Serial blood sugar estimations are done intraoperatively using Glucometer and plain insulin is given accordingly.

In all cases HbsAg and HIV screening is done and positive cases taken up with due precautions. Autologous blood transfusions are given to a few patients with rare blood groups. Blood is collected on the operation table itself just before starting the anaesthesia and blood volume is maintained with blood volume expanders.

Patient who have metabolic abnormalities are managed with serial blood gas analysis and biochemical estimation as and when needed.

Standard intra-operative monitoring include continuous measurement of oxygen saturation in blood, blood pressure and pulse recording, and tidal CO<sub>2</sub> measurement, urine output and CVP. The sterilisation of the operation complex is being meticulously done once in a week.

## Academic Activities

Post graduate students in general surgery from Medical College, Trivandrum, and in Oral and Maxillofacial surgery from Dental College, Trivandrum and from A.B. Shetty Dental College, Mangalore, had regular postings in this division. Also post graduates in plastic surgery from Medical College, Calicut were posted for a short period during the reporting year.

Intra divisional journal clubs and symposia are conducted regularly. The division also takes part in all academic activities of the centre.

## Research Projects

1. Exposure of pesticides and risk of breast cancer. Dr. Iqbal Ahamed is the supervisor of this project conducted in collaboration with the Environmental Epidemiology Branch, National Cancer Institute, USA.
2. Population based screening for oral premalignant lesions through inspection and oral examination. Dr. M. Iqbal Ahamed and Dr. Manoj Pandey are co-investigators in this study co-ordinated by IARC, Lyon, France.

## Fellowships & Training Programmes

1. Dr. Rachel Cherian Koshy was awarded the NCI fellowship for training in cancer pain management for six months, from September 1996 to March 1997; at John Hopkins Hospital, Baltimore, USA.
2. Dr. K. Chitrathara has undergone training in Urology for six months in Medical College Hospital, Trivandrum from July, 1996 to December, 1996.

## Post graduate Thesis/Dissertations

1. *Dr. K. Chitrathara*

Supervisor of dissertation "Post Chemotherapy cytoreduction in Ovarian Carcinoma" - submitted by Dr. Maya to the Royal College of Obst. & Gynaecology, 1996.

2. *Dr. M. Iqbal Ahamed*

Co-supervisor of thesis "Pectoralis major myocutaneous flaps - A clinical study" submitted by Dr. Eapen Thomas for the degree of MDS to the University of Kerala, 1997.

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*

## DIVISION OF PAEDIATRIC ONCOLOGY

Dr.P.Kusumakumary	- Assoc. Professor
Dr.T.Priyakumary	- Lecturer
Dr.A. Shanavas	- Lecturer

This division is responsible for the primary care of all the patients up to the age of 14 years registered in this centre.

### Clinical Activities

Paediatric Oncology out patient service functions on a referral basis six days a week. There was no increase in the number of new patients registered this year as compared to that of previous years. The pattern of malignancies reported this year is given below.

Acute Lymphatic Leukaemia	-	114
Acute Myeloid Leukaemia	-	24
Chronic Myeloid Leukaemia	-	5
Brain tumours	-	42
Lymphomas	-	26
Soft tissue Sarcomas	-	19
Neuroblastomas	-	29
Wilm's Tumour	-	11
Bone Tumours	-	20
Retinoblastoma	-	11
Germ cell Tumours	-	15
Hepatic Tumours	-	3
Histiocytosis	-	14
Carcinomas	-	13
Miscellaneous	-	5
Non malignant	-	19
Total number of new patients	-	370
No. of out patient visits	-	6070

As in the previous years the most common malignancy reported was acute leukaemias (39.3%). 82% of acute leukaemias was formed by acute lymphoblastic leukaemia. There was a considerable increase

in the number of leukaemia patients compared to those of previous years.

All new patients underwent detailed diagnostic work up and appropriate treatment was given. Paediatric tumour board, the multidisciplinary team consisting of Paediatric Oncologist, Paediatric Surgeon, Pathologist and Radiation Oncologist met every Monday at 2 pm and major management decisions were taken by this team as in previous years.

### Academic & Research activities

This division actively participated in the teaching and training programme of under graduates and post graduates of Medical College, Trivandrum.

Dr. Kusumakumary P. was awarded a fellowship to visit the Lymphoma leukaemia biology/haematological malignancy diagnosis service division of the University of Leeds.

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*

## DIVISION OF MEDICAL ONCOLOGY

Dr. V.P. Gangadharan	- Assoc. Professor
Dr. Geetha	- Asst. Professor
Dr. N.P. Prakash	- Lecturer

The major work of the Division is diagnosis and management of haematological and lymphoreticular malignancies. 3-5 new cases and 50-70 review cases are seen in our outpatient clinic daily. Special procedures like bone marrow aspiration, bone marrow biopsy, liver biopsy and central venous catheter installation are done as out patient procedures.

Nearly 15-20 patients are admitted in the wards for inpatient care. Ward rounds is taken daily morning and critically ill patients are closely monitored.

Post graduate residents in general medicine join the division for their speciality training. Teaching sessions include case discussions, seminars and journal clubs. Diagnosis and management of haematological malignancies and the recent trends in the management of all medical oncology problems are taught to the post graduate residents. In addition, ward nurses are also trained regarding patient care especially the care of immuno compromised and neutropenic patients.

This division conducts classes, participates in topic discussions - MEDISAT in the medicine department of Medical College, Trivandrum and also in the training programme of house surgeons.

### Oncology Trials

1. Gemcitabine in Non Small Cell Lung Cancer
2. Alfa 2b interferon in CML Chronic phase cytogenetic and haematological response.
3. Amifostine as chemoprotector in Osteosarcoma.

*Conferences, etc. attended - (Chapter III)*  
*Papers Published/Presented - (Chapter IV)*

## DIVISION OF DENTAL CARE

Dr. Nalina Kumari. K.R. Lecturer

This division plays an important role in the detection of oral cancer, pre and post radiation care of teeth and clinical and research activities of the centre.

### I. Highlights of Activities

- A.**
1. Minor operations for biopsies
  2. Dental extractions
  3. Preparation of bite blocks and prosthetic appliances
  4. Preparation of moulds
  5. Management of precancerous and other oral lesions
  6. Pre and post radiation care of teeth

### B. Clinical Activities

This clinic attends to outpatients as well as inpatients. The outpatients are referred by the Radiotherapy Department which has been providing the facilities of extraction and biopsy for oral cancer patients. We introduced the post radiation care treatment using fluoride therapy in November, 1996. Biteblocks and mould preparations are also carried out. The Dental clinic works on all days of the week except Sundays.

### Services rendered by the division of dental care during 1996-97

Total No. of cases attended to	-	2869
New cases	-	419
Total No. of extractions	-	4882
Supplementary registered cases	-	11
C.C.L	-	1
No of Biopsies	-	418

No of biteblocks and mould preparation	-	127
Total No of patients treated for pre and post radiation care of teeth (from 1-11-96 to 31-3-97)	-	38

## II Performance of the Dental Division Biopsies done in 1996-97

Sl.No	Site of biopsy	No.	Percentage
1.	Right Buccal Mucosa	72	17.22
2.	Left Buccal Mucosa	86	20.57
3.	Right Commissure	21	5.02
4.	Left Commissure	15	3.57
5.	Hard palate	19	4.55
6.	Soft palate	3	0.71
7.	Right retromolar region	10	2.39
8.	Left retromolar region	11	2.63
9.	Dorsum of tongue	20	4.78
10.	Left border of tongue	33	7.89
11.	Right border of tongue	25	5.98
12.	Tip of tongue	3	0.70
13.	Under surface of tongue	8	1.91
14.	Floor of mouth	17	4.07
15.	Left lower alveolus	23	5.50
16.	Right lower alveolus	12	2.87
17.	Left upper alveolus	10	2.39
18.	Right upper alveolus	3	0.71
19.	Left lower sulcus	11	2.63
20.	Right lower sulcus	5	1.20
21.	Left upper sulcus	3	0.71
22.	Right upper sulcus	1	0.24
23.	Lower lip	5	1.20
24.	Upper lip	1	0.23
25.	Left oropharynx	1	0.23

## Pre and Post Radiation Care of Teeth

A pre and post radiation care of teeth unit was introduced during November, 1996. It is found that post - irradiation caries of teeth is the main complication developing after the radiation treatment in patients who are suffering from cancer of the oral cavity, upper part of the oesophagus, lower part of the nasopharynx, maxillary sinuses, parotid gland etc. To avoid this, total extraction of teeth was usually resorted to in such patients. It was in this context, that the division contemplated developing a preventive programme to tackle the problem of post radiation caries of teeth especially in young patients. This resulted in the introduction of fluoride therapy for treating this condition.

During the five months period ended in 31-3-97, 38 patients were given pre and post radiation care of teeth treatment with fluoride. The result is very encouraging. Of the 38 patients, 27 of them have been undergoing pre and post radiation care of teeth. The remaining 11 patients who had undergone radiation are having complaints of teeth such as sensitivity, dental caries, pain, sharp teeth, chipping of enamel of teeth etc. Both these groups of patients showed marked improvement of dental health following the treatment.

The pre and post radiation treatment is recommended to cover the following

1. Oral prophylaxis
2. Conservative dental treatments
3. Preparation of vinyl fluoride carriers
4. Application of fluoride gel
5. A good dental follow-up programme

It is hoped that with adequate patient education and their cooperation, the problems after radiation can be completely eliminated with fluoride treatment. The duration of treatment depends upon the time taken to improve the dental health in each patient.

A good dental follow-up programme, utilizing conservative procedures for irradiated tissues, will minimise the complications that do occur and diminish the need for extensive rehabilitation procedures for these patients.

### III Other Activities

1. Biteblocks and moulds are prepared by this division for treatment of oral cancer patients in connection with their treatment with radiation and radium implantation.

2. In cases of Leucoplakia, SMF, Lichen plannus etc. monthly checkup is conducted to assess the condition of these patients who are under treatment.

#### 3. Research Activities

This division renders support for research work done by Research Division and Radiotherapy department during the year under report.

This division is working with the limited staff and equipment facilities.

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*

## DIVISION OF CLINICAL SERVICES

Mr.R. Raveendran Nair - Administrative Officer in Clinical Services

Mr.V.Surendran Nair - Asst. Public Relations Officer.

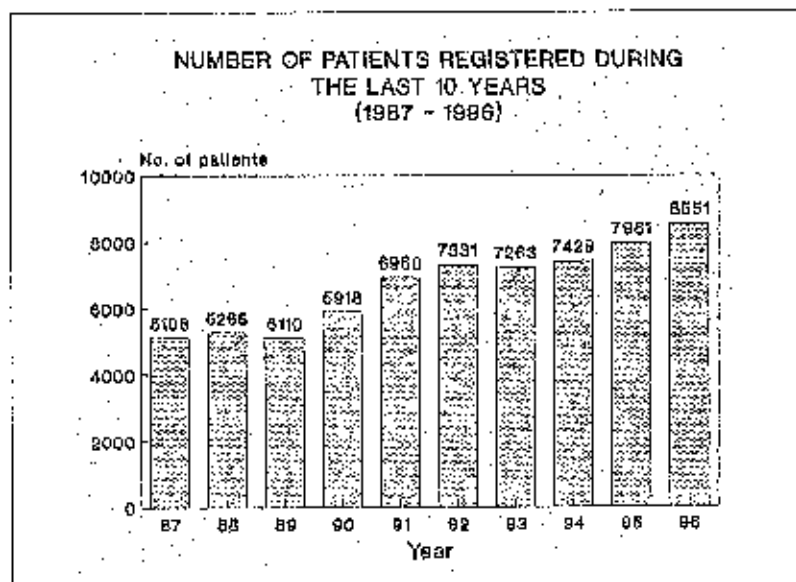
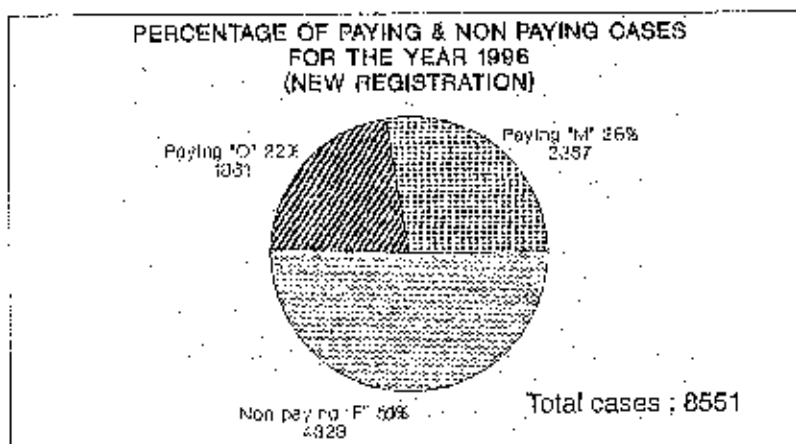
This section is concentrating more on patient related activities. The type of work handled by the division is the same as that of previous year. As part of clinical services, a public relation wing has been established during the year and Mr. V. Surendran Nair has been posted as Asst. Public Relations Officer. The major objective of this wing is to streamline public relation activities of the centre including information gathering and retrieval.

An overall 16% increase in the workload has been noticed. The following data will depict the magnitude of activities of this division.

	Current year	Last year
New cases registered	8551	7981
Review case	90126	77511
- Radiation Oncology	68554	.....
- Surgical Oncology	4334	.....
- Medical Oncology	11158	.....
- Paediatric Oncology	6070	.....
Total patient (New & Old)	98677	85492
Daily average patient	329	285
Average attendance per patient	11	10
No of inpatient admission	6063	6365
- Radiation Oncology	3738	.....
- Surgical Oncology	745	.....
- Medical Oncology	1197	.....
- Paediatric Oncology	383	.....
Total appointment given	56687	63165
Attendance from appointment	48103 (84.8%)	50847 (80.5%)
Average length of stay	13	13
Hospital Deaths	409	302

RCC is providing investigations and treatment except chemotherapy free of charge to 50% of the total patients. Chemotherapy service has been given to 309 new patients costing Rs.37,90,450/- as per the recommendation of the academic forum.

RCC is providing treatment on credit basis to ESI, Army Group, Air Force, Ex-service, CGHS, VSSC, Tata Tea Ltd, Indian Organic Ltd, FACT, Steel Authority, Unit Trust, etc.



## DIVISION OF NURSING SERVICES

Sr. Vijaya

- Chief Nursing Officer

### Main activities

#### 1. Out patient service

Nursing staff are distributed in Out-patient Clinics, Blood bank, Clinical laboratory, Pain clinic, Imageology, Nuclear Medicine and Chemotherapy. Their service in those areas is of great help to all patients by way of psychological support, health education and proper guidance to various tests and treatment wings. The Out-patient Clinics are extended to the new block too.

#### 2. Chemotherapy unit

The unit functions as a day care and has an extension of 20 beds now. An average 70-80 patients on appointments are given chemotherapy including the Cisplatin regime daily. This unit is totally managed by nursing staff except in cases of emergencies when they seek the expert consultation of the concerned medical officer. No bystanders are allowed in the unit. Nurses in this unit are trained to be conscious of maintaining high standard of nursing care by administering all toxic drugs with great precaution and to avoid any extravasation into tissue.

#### 3. Patient care service in inpatient Division

##### a. Medical Oncology

The unit has a bed strength for 19 patients including an ICU. Nurses need expert technical competence in looking after patients with acute and chronic leukaemia, germ cell tumours with aggressive chemotherapy and all other advanced cancer cases and palliative care respectively.

##### b. Radio Iodine Unit

Patients are isolated in this special unit with the oral intake of radio-iodine. It has a bed capacity for 7 patients. Nurses are on call to the unit through a hot line system.

### **c. Surgical Oncology**

The unit has a bed strength for only 19 beds including an ICU. Patient care is exclusively by the nursing staff since bystanders are not allowed.

### **d. General Ward**

The unit was opened in Nov. '96. It has a bed strength of 73 beds including an ICU, and a critical care unit. Nursing staff are provided at a rate 1:10 for the morning shift and a lesser number for the other 2 shifts. Bystanders are allowed to visit the patients only during evening visiting hours. Most of the patients coming to this unit belong to poor category and are very sick requiring close care.

### **e. Payward Block**

There are 49 beds in this unit. There is always a long waiting list for admission to this unit. Through bystanders are allowed to be with the patient, nurses make an earnest effort to render comprehensive nursing care to each patient. There is always one nurse in each shift assisted by a nursing assistant.

### **f. Brachytherapy**

The unit has a bed capacity for 10 patients for interstitial implantation mould treatment, intracavitary application such as selectron, intraluminal Radiotherapy or with radium implantation. All staff in this unit get special coaching on radiation hazards and patient care.

### **g. Paediatric Oncology**

The unit was shifted to the new block in Nov.96 with a bed capacity for 45 children. A play room with all necessary play items and furniture was donated by the Lions Club, Trivandrum. Mothers are permitted to stay with their children and nurses educate them regarding the nature of ailments.

### **h. Palliative care**

Activities of palliative care include services given to OP as well as IP patients. One nurse assists the doctor in the pain clinic daily. There is a group of nurses who have been oriented to palliative care

for taking turns in the IP wards and rendering palliative care to advanced cancer cases. Their activities include visiting their patients daily, carrying out specific nursing care including selected complementary therapies, teaching home care aspects of cancer care to the patient and close relatives.

## **4. Staff Development Programme**

Every nursing unit conducts regular educational programmes in their respective wards by way of arranging classes by doctors or other experts, case presentations, case studies, etc. There is also a monthly meeting of the nursing staff for academic discussions and duty posting.

Nursing standards are set and a few units are getting ready to get them audited. In all the IP wards, problem oriented nursing care records are maintained.

## **5. Observation visits and orientation programmes**

During the year under report various groups of nursing category have visited the centre and have benefited from special classes and orientation to patient care units.

## **6. Nursing assistants training programme**

The 1st batch of nursing assistants training programme during their apprenticeship have taken active role in setting up the General ward which was newly opened. They helped in taking 3 shift duty along with the nursing staff. Their programme would be completed by June 97.

## **7. Volunteers training programme**

As part of the palliative care, we introduced a volunteer's programme for nearly 70 women belonging to several volunteer organisations in Thiruvananthapuram. In the first phase they were given a day's intensive training programme on cancer care and they were engaged in patient direction in the hospital as well as visiting the palliative care patients at their homes. This programme entered its second phase when these volunteers were given a week's training



in Home care procedures so that they could be of some service when they visited the palliative care patients at home.

8. A bystanders programme is also being initiated now. This involves teaching the patient-bystanders, the general aspects of cancer and demonstrating the most important aspects of the patient's care that needs to be continued at home.

***Conferences, etc. attended - (Chapter III)***

***Papers Published/Presented - (Chapter IV)***

## **DIVISION OF PAIN AND PALLIATIVE CARE**

Dr. Vasudevan Mappat - Anaesthesiologist

1557 new cases and 4092 repeated cases were seen at the Pain Clinic, from 1st April, 1996 to 31st March, 1997.

WHO:	Step -I	:	65
	Step -II	:	528
	Step -III	:	964

The Pain Clinics at E.C.D.C, Kaloor and E.C.D.C; Palakkad are catering to the needs of patients in the respective areas.

This division works as a team with the active participation of members of other divisions and the College of Pharmaceutical Sciences.

***Conferences, etc. attended - (Chapter III)***

***Papers Published/Presented - (Chapter IV)***

## DIVISION OF BLOOD BANK

Dr. Jayalekshmi P.	- Blood Bank Officer
Dr. Kustumam K.	- Medical Officer
Mr. Meera Sahib P.	- Senior Scientific Assistant

There are no additions in the equipment. There was an increase in the number of donors, component preparations such as packed red cells, platelet rich plasma, Fresh frozen plasma, as compared to those of previous years.

### Blood Bank Statistics (1/4/96 to 31/3/97)

Blood grouping	-	13,000
Cross matching	-	4990
Blood donors	-	4048
Hbs Ag done	-	4048
Hbs Ag +ve (donors)	-	47
HIV done (donors)	-	4048
HIV +ve (donors)	-	Nil
HIV -ve (Patients)	-	1801
HIV +ve (Patients)	-	1
VDRL (donors)	-	4048
VDRL +ve (donors)	-	21

### Components Prepared

Whole blood	-	647
Packed Red Cells (RRC)	-	3224
Platelet Rich Plasma (PRP)	-	1832
Fresh Frozen Plasma (FFP)	-	691
Single Donor Plasma (SDP)	-	446

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*

## DIVISION OF CYTOPATHOLOGY

Dr. N.Sreedevi Amma	- Deputy Director & Professor
Dr. B. Chandralekha	- Professor
Dr. Elizabeth K. Abraham	- Addl. Professor
Dr. Jayasree K	- Asst. Professor
Dr. Anitha Mathews	- Lecturer
Dr. Rekha A. Nair	- Asst. Professor
Dr. Raveendran Pillai K	- Cytotechnologist
Sri K.Sujathan	- Cytotechnologist

### Introduction

Microscopic confirmation of the diagnosis by cytology, haematology and histopathology is the main function of this division, besides academic and research activities. The staff of this department have contributed to patient management and Post graduate education by participating in the daily noon clinics, monthly special clinics and clinicopathological conferences. Some of the senior staff have been invited to conduct CMES/Workshops/Seminars, etc. in different centres in India.

An important achievement during this year was that we were able to standardise and start the full panel of immunohisto-chemical tests for the diagnosis of lymphomas and other undifferentiated tumours.

During the year under report with the help of Dr.M.Balaraman Nair, Retired DME, Kerala, we were able to organise a lecture on "Tumours in the Tropics" by Dr.Robin Cooke, Consultant Pathologist and clinical professor, University of Queensland in Sept. 1996. We also had a slide discussion and exchange of learning material with Dr.M.G. Joseph, Associate Professor of Pathology, St. Joseph's Health Centre, London, Canada in December 1996.

## Highlights of Activities

### 1. Diagnostic Services

#### *Gynaec Cytology*

Cervical Smears were examined from 4539 women out of which 2788 cases were from various projects and 1751 cases from hospital patients.

#### *Non-Gynaec and Aspiration Cytology*

From a total of 7282 FNACS, 1275 malignant lesions were diagnosed. The predominant sites from which malignant lesions were reported are lymph nodes (472) Breast (192) and Lung (84). The predominant sites of aspiration were Thyroid (2697), Lymph nodes (1526), Breast (1009), Lung (178) and Liver (132). Percentage of malignant lesions in major sites is shown in fig 1(b).

Some of the rare cases diagnosed by FNA are Intracranial meningioma, metastasis to L5 Vertebra, Squamous cell carcinoma of lung metastasis to kidney, Parapharyngeal Chordoma, Acute lymphatic leukaemia with initial presentation as testicular mass, initial diagnosis of a mediastinal germ cell tumour by sputum cytology and squamous cell carcinoma of oesophagus metastasis to pelvis. It may be noted that most of these lesions were in deep seated internal organs where biopsy for diagnosis would amount to a major surgical procedure.

#### *Fluid Cytology*

1043 samples of aspirated fluids body cavities and natural secretions like urine were examined, from which 165 malignancies were reported. Maximum number of specimens were CSF aspirates from acute leukaemia cases (421).

#### *Bone marrow aspirates and imprint smears*

Bone marrow aspirates and imprints were studied from 1691 cases (311 cases more than that of the previous year). Acute leukaemias were the predominant lesion diagnosed (551 cases) and the most common type reported was Acute lymphatic leukaemia (400 cases). Rare cases diagnosed by bone marrow imprint are Hairy cell leukaemia (3 cases) and metastatic carcinoma (4 cases).

#### *Sputum Cytology*

Sputum samples were examined from 766 cases by collecting 3-5 samples per case. A total of 51 malignancies of different types were reported. Adenocarcinomas were the commonest type reported (21 cases) followed by squamous cell carcinoma (12).

#### *Histopathology*

Histopathological examinations were done in 4822 samples of which 3009 cases were surgical specimens from the centre and 1813 were review slides of patients referred from other hospitals. Out of this frozen section facilities were given to 42 cases. A total of 3277 malignancies were reported. The predominant sites of malignancy were oral cavity, lymph node Breast, Cervix, Thyroid and GIT. Percentage of malignant lesions in major sites are shown in Fig 1 (a). Some of the rare and interesting cases worth mentioning are Hairy cell leukaemia with histoplasmosis in liver and spleen, Amyloidosis of spleen, undifferentiated small cell carcinoma of the ovary, angiosarcoma of atrium, and pigmented squamous cell carcinoma of the nasal cavity.

### 2. Teaching and Training

The Cytology division is accredited by Indian Academy of Cytologists (I.A.C) for diagnostic and examination purposes. We carry out full time cytotechnician and cytotechnologist training courses of 6 months and 1 year durations respectively.

We are also involved in the teaching and training programme of Medical and paramedical students of Medical College, Trivandrum. Short term training is also imparted to pathology post graduates of Dental College, Trivandrum and Medical College, Calicut.

### 3. Research Programmes

The staff of this division give support to various extramurally aided projects - the HPV, NBRR, immunobiology of Trophoblastic Tumours, Oral and Breast Cancer projects.

#### **Projects**

**1. Cervicospoty project** - was started last year and is continuing - This is an IARC aided project to compare the value of unaided visual

inspection of the cervix, cervicoscopy cervical smear, colposcopy and biopsy in diagnosing cervical intraepithelial lesions and early carcinoma.

## 2. *Immunophenotyping and molecular biology of Non Hodgkins Lymphoma (NHL) in Kerala.*

With the help of an NCI fellowship, Dr. Rekha A Nair has studied the immunophenotype and molecular biology of 200 cases of NHL from our centre. The patients were referred from hospitals all over Kerala. The study included T-cell, B-cell phenotyping, proliferation markers and role of Epstein Barr Virus (EBV) in these cases by in situ hybridisation. 62% were B cell lymphomas and 38% T-cell lymphomas. More than 90% of T-cell lymphomas were associated with EBV. The percentage of T-cell lymphomas is quite high compared to that of western countries (Europe and USA) where the corresponding incidence is 12%.

## 3. *Evaluation of phenotypic and functional characteristics of lymphocytes in the peripheral blood stem cell population mobilised by Cytoxan versus Taxol*

*Investigators* - Amithabh Mazumdar, Udit Verma,  
Raveendran Pillai K.

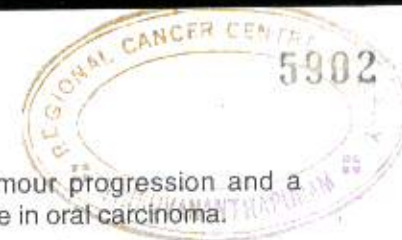
This study was undertaken in George Town University Medical Centre, Washington, USA by Dr. K.Raveendran as part of the NCI fellowship programme.

*Aim* - To compare the effect of anticancer drugs Taxol and Cytoxan on the cytotoxic mechanism of the lymphocytes. The alteration of lymphocyte kinetics, apoptosis, cytotoxicity and interleukin-2 activation have been studied in C5+B16 mice using various techniques.

## 4. *AgNORs in early diagnosis and prognosis of oral squamous cell carcinoma* : A multivariate analysis.

*Investigators* - Raveendran Pillai.K, Kannan.S, Sujathan.K.

This study was to examine the AgNoR counts in normal, premalignant and malignant oral mucosa and to evaluate their



potential as a biological marker for tumour progression and a prognostic predictor for treatment outcome in oral carcinoma.

## 5. *Significance of Zinc, Copper, Iron and Ceruloplasmin in oral premalignant and malignant lesions.*

*Investigators* - Raveendran Pillai. K, Kannan .S

Serum levels of zinc, copper, total iron, total protein and ceruloplasmin have been estimated in patients with oral leucoplakia and carcinoma and compared with age and sex matched controls to evaluate whether they have any value as biomarkers of disease progression and diagnostic significance in differentiating malignancy.

## 6. *Biological grading of malignant lesions in the broncho pulmonary mucosa - An immunocytochemical analysis.*

*Investigators* - Raveendran Pillai, Kannan .S, Sujathan .K

This is an ongoing project.

## 7. *Cytodiagnosis of serous effusions*: A combined approach to morphological features in Papanicolaou and May Grunwald Giemsa stained smears and Cell Block preparation. (This is an ongoing project).

*Investigators* - Sujathan .K, Raveendran Pillai .K, Kannan .S

## Awards, Fellowships & Honours

### Award

Indira Vasudeve National award of IABMS for the best Research paper on cancer for the year 1996 was awarded to Sri. Sujathan .K

### Fellowships

1. **Dr.Rekha A. Nair** was awarded the National Cancer Institute (NCI) fellowship for 6 months from July 1996 - Dec. 1996 to work on "immunohistological characteristics of lymphoid neoplasia" at the Lymphoma Biology Division of the NCI, Bethesda, U.S.A. under the guidance of Dr. Ian .T. Magrath. She also had training in haematopathology under Dr.Elaine .S. Jaffe, Chief of haematopathology of NCI. Dr. Rekha took up a project study on the

Immunophenotypic and molecular biologic characteristics of NHL in Kerala during this period.

**2. Dr. Raveendran Pillai .K** was awarded the NCI fellowship for 4 months from January to May 1996 to undergo training in laboratory protocols of Bone Marrow Transplantation procedures at the Georgetown University Medical Centre, Washington, and Nicholson Research Centre, Maryland, USA. He got training in stem cell collection, processing, Interleukin - 1 $\alpha$  activation and quality assurance procedures for autologous and allogeneic bone marrow transplantation, HLA typing by serological and sequence specific oligonucleotide probe (DNA typing) methods, PCR based detection of chromosomal rearrangements in malignancy, and flow cytometric analysis of S-phase in paraffin embedded tissues. He has also undertaken a project to evaluate the phenotypic and functional characteristics of lymphocytes in the peripheral blood stem cell population mobilised by cytoxan versus taxol in C5+B16 mice.

#### **Association with professional bodies**

##### **Dr.N. Sreedevi Amma**

Member of IAC (Indian Academy of Cytologists), A&E committee of IAC, Editorial board of Journal of cytology, IAPM (Indian Association of Pathologists and microbiologists), Kerala chapter and RCA (Regional Cancer Association).

##### **Dr.B. Chandralekha**

Member of IAC, Treasurer IAC, Editorial Board, Journal of cytology, IAPM Kerala Chapter and Executive member of RCA.

##### **Dr. Elizabeth K. Abraham**

Member of IAPM, IAC, Review committee of IJMR and member of RCA.

##### **Dr. Jayasree .K**

Member of IAC, Indian division of International Academy of pathology, IAPM Kerala Chapter and Indian Society of Blood transfusion and immunohaematology.

##### **Dr. Anitha Mathews**

Member of IAC and Kerala Chapter of IAPM.

##### **Dr. Rekha A. Nair**

Member of IAC and Kerala Chapter of IAPM.

##### **Dr. Raveendran Pillai K.**

Member of Indian Association of Biomedical Scientists (IABMS) and Executive member of Life Science chapter of Academy of Sciences. Doctoral thesis examiner in Calicut University and guide for Ph D programme in Kerala University.

##### **Sri. Sujathan K.**

Member of IABMS and Indian Society of cell biologists (ISCB).

#### **Faculty members in workshops/seminars/CME/special lectures**

##### **Dr. N. Sreedevi Amma**

1. Head and neck surgery workshop organised by AOI & RCC, Trivandrum. Took part in two panel discussions and discussed the following topics.
  1. Pathology and cytology of "Tumours of Maxilloethmoidal complex".
  2. Pathology & Cytology of Thyroid neoplasia.

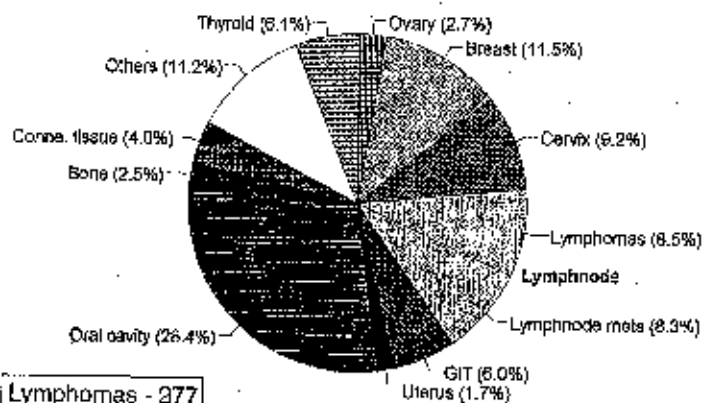
##### **Dr. Elizabeth K. Abraham**

1. Took part in two panel discussions in the Head and Neck surgery workshop & discussed the following topics.
  1. Pathology of oral cancer
  2. Pathology of Laryngeal carcinoma.
2. Talk on "Pathological terms with special reference to lymphomas" - Senior level NCRP (ICMR) Workshop on working of cancer registries, RCC, Trivandrum, March, 1997.
3. Panel discussion on "Rhabdomyosarcomas" - July 1997 at RCC, Trivandrum.

*Conferences, etc. attended - (Chapter III)*

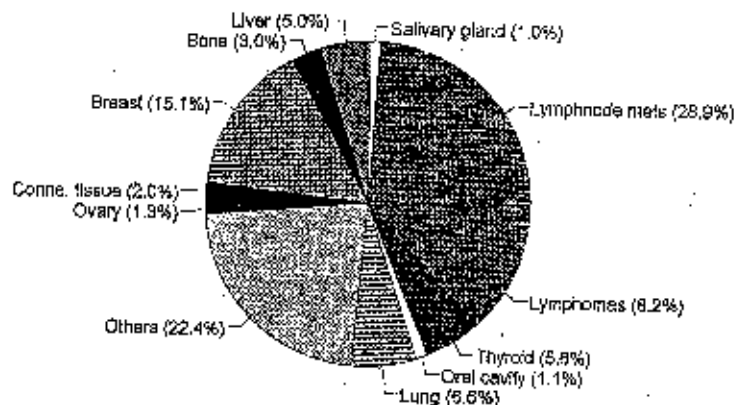
*Papers Published/Presented - (Chapter IV)*

**Fig.1 Malignant Lesions in Major Sites**  
**(a) Histopathology (n=3277)**



Lymphomas - 277  
 Metastasis - 273

**(b) Aspiration Cytology (n=1275)**



Lymphomas - 104  
 Metastasis - 368

## DIVISION OF IMAGEOLOGY

Dr. K. Sasidharan	- Professor
Dr. Alex K. Ittyavirah	- Assoc. Professor
Dr. K. Ramachandran	- Assoc. Professor
Dr. A.S. Krishnakumar	- Asst. Professor

Diagnostic and interventional studies done during the period under report are as follows:

Plain X-ray	- 8791
X-ray tomography	- 24
Barium study	- 132
I/V contrast study	- 6
I/Thecal contrast study	- 20
Mammogram	- 927
Ductogram	- 6
C.T. Scan	- 7119
C.T. & U/S guided procedures	- 397
Ultrasound	- 3259
Doppler studies	- 379

### Academic Activities

Six weeks training on ultrasonography for post graduate degree/diploma holders continued this year and 15 candidates completed the training. Training of undergraduates and post graduates in basic principles of modern imaging techniques continued. The film reading sessions everyday morning and the monthly meeting of The Trivandrum Radiology Club provided opportunities for discussion of interesting and problematic cases for diagnosis.

### Ongoing Projects

1. Malignant breast disease, mammographic-ultrasound correlation.
2. Doppler ultrasound study in trophoblastic disease.

*Conferences, etc. attended - (Chapter III)*  
*Papers Published/Presented - (Chapter IV)*

## DIVISION OF NUCLEAR MEDICINE

Dr. V.M. Pradeep - Assoc. Professor & Head  
 Dr. A Sreekumar - Lecturer

The division of Nuclear Medicine continued to provide diagnostic, therapeutic and research activities involving the use of open radioactive sources. The bulk of the activities was devoted to thyroid studies. These included thyroid scans and uptake, radioimmunoassays and treatment for thyroid cancers and thyrotoxicosis. New research projects were initiated into clinical and biological studies of the thyroid. The details of the work in thyroid clinic are outlined in Table 1.

**Table 1**

No.	Category	Cases
1.	New cases registered	10,742
2.	Thyroid scans	2,811
3.	Thyroid uptake	1,460
4.	Thyroid ultrasound	4,875
5.	Thyrotoxicosis	185
6.	Ca. Thyroid	260

Immunoassay section showed further increase in work load. The detailed break-up is shown in Table 2.

**Table 2**

No.	Assay	No.
1.	T3	10,200
2.	T4	10,200
3.	FT3	360
4.	FT4	360
5.	TSH	10,200
6.	TG	960

7.	PTH	180
8.	ATG	360
9.	AMC	360
10.	FSH	600
11.	LH	600
12.	PROLACTIN	840
13.	TESTOSTERONE	240
14.	PROGESTERONE	84
15.	17-OH-PROGESTERONE	25
16.	CORTISOL	360
17.	ACTH	96
18.	GH	144
19.	BETA-HCG	2,400
20.	AFF	1,080
21.	CEA	1,080
22.	CA125	480
23.	PSA	240
24.	INSULIN	125
<b>TOTAL</b>		<b>41,574</b>

Treatment of 220 cases of Ca. thyroid and 150 cases of thyrotoxicosis were carried out.

### Academic Activities

1. Training to CRA, MBBS, MD, MS students.
2. 'A comparative study of bonding strength of dental filling materials': Co-guide MDS thesis.
3. Organising Secretary "Workshop on Nuclear Medicine in Oncology" February, 26- 28, 1997, Regional Cancer Centre.
4. "Nuclear Medicine Imaging: Abdominal Malignancies" : Workshop on Nuclear Medicine in Oncology", February 26-28, 1997, Regional Cancer Centre, Trivandrum.
5. Projects on basic biology of thyroid disease continuing.

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*

## DIVISION OF RADIATION PHYSICS

Dr.V.Padmanabhan	- Professor
Sri.C.A.Davis	- Assoc. Professor
Sri.Thayal Singh Ellas	- Asst. Professor
Sri. L.S.Arun Kumar	- Asst. Professor
Dr.Raghu Ram K.Nair	- Asst. Professor
	(Joined on 3.1.'97)

### Main activities

#### 1. Clinical Physics

- Calibration of Radiotherapy equipment
- Quality assurance
- Treatment planning
- Dose Computation
- Radiation Safety
- Inter comparison studies using TLD (WHO/BARC)
- Teaching, Training and Research
- Daily maintenance, checking and repair of all teletherapy and brachytherapy equipments.

#### 2. Patient Service

Treatment planning and related dose computation were carried out routinely in the case of patients undergoing external beam therapy and brachytherapy. XRT Dose calculation computerised during the current year. The number of patients planned and treated during the year was as follows.

External beam radiotherapy (Clinac out of order for 2 months)	5826
Brachytherapy	
Intracavitary treatment for Carcinoma Cervix using selectron after loading system (Selectron not working with its full capacity)	292

Intracavitary treatment for carcinoma cervix using manual after loading system	89
Intracavitary treatment for carcinoma oesophagus (conventional method)	71
Interstitial Implants for carcinoma tongue, cheek, lip etc.	53
Mould treatment (Palate Mould)	15
	<hr/> 520
Mould Room facilities	
POP shell	62
Orfit shell / Aquaplast shell	312
Bite blocks	184
Wax bolus	77
Mould for Brachytherapy	15
	<hr/> 650

Styrofoam cutter for mantle field treatment was put to use from November, 1996.

#### 3. Academic programme

Teaching and training in Medical Physics were imparted to the following categories of students.

1. Certified Radiological Assistants (CRA)
2. B.Sc. (MLT)
3. M.B.B.S
4. DMRT
5. DMRD
6. MDS (Oral Radiology)
7. MD (Radiotherapy)
8. MD (Radiodiagnosis)

#### 4. Training Programme

1. Practical field training for two months was given to two students of the Diploma in Radiological Physics (Dip RP) course of BARC, Mumbai.



## 2. CRA Refresher Programme

Up to March'97 a total of 25 Students have been trained in Imageology / Nuclear Medicine and 14 students in Radiation Physics / Radiotherapy.

## 5. Research project ( completed)

1. Microwaves, ionising radiations and Modern High Energy X-ray, Linear Accelerators.

1. Ms. Lekshmi
  2. Ms. Parvathi.S.
- M.Sc. Applied Physics Students  
Department of Physics Kariavattom.

### Guides

1. Dr.V.Padmanabhan
2. Mr.T.S.Elias
3. Dr.S.Devanarayanan (Dept. of Physics, Kariavattom)

The measurement of Physical parameters were done on Varian clinac 4 MV X-ray machine. Physical parameters studied include absorbed dose, Half value layer and penumbra. It was concluded that both clinac 4MeV and Co<sup>60</sup> units besides its use for several years are well maintained as seen from the measured values and they are in perfect condition for radiation treatment.

## 5. Research projects (ongoing)

1. *Patient and organ dose measurements in C.T. Scanners- a field study*

Principal Investigator Dr.V.Padmanabhan  
Co. Investigator Mr.G.Ramakrishnan  
(Medical College Thiruvananthapuram)  
Funding Agency STED

The yearly report on the project was submitted to STED with the following findings.

Out of the 8 different manufacturers C.T. Scanners available in various institutions, the following dose values were measured, the most common examination being head CT.

## In head Computer tomography

	Plain mR	with contrast mR
Maximum Value	3856	7690
Mean	1592	2480

The mean surface doses measured are reported in Table below.

## The mean surface doses

Eye dose during head (P)	1664.21	mR
Eye dose during head (P) ( C )	2426.71	mR
Eye dose during PNS	1478.10	mR
Thyroid surface dose during Head (P)	344.22	mR
Thyroid surface dose during head (P) ( C )	490.58	mR
Thyroid surface dose during PNS	259.79	mR
Ovary dose during abdomen	2074.97	mR
Ovary dose during L Spine	3061.95	mR
Testis dose during Abdomen	268.62	mR
Testis dose during L. Spine	302.13	mR
Thyroid dose during C Spine	409.19	mR

The dose levels were within permissible levels. The radiation levels in the room and entrance were also within permissible levels.

2. *"Development of indigenous Wedge filters for mega voltage X-rays and Co<sup>60</sup> gamma radiation used in Radiotherapy"*

Principal investigator - Mr.L.S.Arun Kumar  
Co. Investigators - Dr.V.Padmanabhan  
- Dr.M. Krishnan Nair  
Funding Agency - STED

Completed the actual design of clinac (4M.V) Wedge for field sizes 10 x 10cm<sup>2</sup>, 15 x 15 cm<sup>2</sup>, 20 x 20 cm<sup>2</sup> and for angles 15, 22.5, 30, 37.5, 45, 52.5 and 60 degrees. The materials used for making these wedges are Lipowitz, Lead and Brass.

For Co<sup>60</sup> gamma rays (Theratron 780c), the plotting of isodose curves for field sizes 8 x 8 cm<sup>2</sup>, 10 x 10 cm<sup>2</sup> and 12 x 12 cm<sup>2</sup> are completed for materials such as Brass and Copper are in progress. The design of wedge for field sizes 10 x 10 cm<sup>2</sup> and 12 x 12 cm<sup>2</sup> using Lead & Lipowitz are completed and are ready for moulding.

Wedge filters are currently not manufactured in India. These treatment aids need to be imported at exorbitant prices. This is available for discrete values of wedge angles; wedges with intermediary angles are not available. But wedges with intermediary values are often needed in some clinical situations where with these wedges only, satisfactory dose distribution can be achieved. Presently in such situations, wedges with available angles are used or a combination of wedges are tried.

The proposed work is aimed at the design and fabrication of wedge shaped filters for various angles, both conventional and non-conventional values. The design of the wedges are complete for lead and lipowitz, for conventional and non-conventional values angles. The fabrication of the same is in progress. Dosimetry of each wedges filter will be worked out using small volume ion-chamber and water phantom system for both Cobalt<sup>60</sup> gamma radiations and for mega voltage X-rays. The design and fabrication of the same for other materials shall be attempted.

3. *Natural background Radiation Registry (Physics studies ongoing)*

Dr.M.Krishnan Nair  
Mr.P.Gangadharan  
Dr.V.Padmanabhan  
Ms.P.Jayalekshmi and  
Mr.S.Jayadevan

The study has been organised as three district activities, complete enumeration of the population by house to house visits, radiation level measurements external and internal, and cancer registry. Dr.Raghu Ram K. Nair, Asst. Professor, Radiation Physics joined the project.

## Physics studies

External radiation level measurements are mainly conducted by spot readings taken by portable  $\mu$  R Scintillometer both inside and outside houses. Two panchayats out of 12 are to be covered. Soil analysis, Thoron in breath measurement and SSNTD studies are in progress.

The Technical report 1 1990-'94 gives the various radiation measurement levels in the six Panchayat areas analysed so far.

## 7. Research projects (New)

1. *Development of indigenous Remote afterloading system in the treatment of carcinoma of Cervix Uteri.*

Principal Investigator - Mr.T.S. Elias  
Co. Investigators - Dr.M. Krishnan Nair  
Dr.V.Padmanabhan  
Small Systems, Bangalore  
Funding Agency - D.S.T. New Delhi.

## Objectives

Production of software controlled remote afterloading system for the treatment of Ca - Cervix.

The Project was sanctioned in March '97.

Mr.T.S. Elias attended D.S.T. Steering committee meeting at New Delhi during November '96.

2. *Dosimetry of early head and neck cancers, mantle field treatments and Cervical Cancer using indigenous remote afterloader applicators with special reference to radiation protection.*

Principal Investigator - Mr.T.S.Ellas  
Co. Investigator - Dr.V.Padmanabhan  
- Mr.C.A.Davis &  
- Mr.L.S.Arun Kumar

Funding Agency - Atomic Energy Regulatory Board (AERB), Mumbai.

### Objectives

Enhancing the accuracy in dose delivery in radiotherapy of early tumours and protection to nearby critical organs.

The project was sanctioned in March, '97.

3. *Development of indigenous remote afterloading System in the treatment of Carcinoma of Cervix Uteri.*

Principal Investigator - Dr.M. Krishnan Nair

Co. Investigator - Mr.T.S.Elias  
- Dr.V.Padmanabhan  
- Mr.C.A.Davis  
- Small Systems, Bangalore.

Funding Agency - Regional Cancer Centre

### Objectives

Production of a software controlled remote afterloading System for the treatment of carcinoma of Cervix Uteri.

The project was sanctioned in August, 1996.

### 8. Nominations

#### V. Padmanabhan

Reviewer

1. Indian journal of Radiology and Imaging
2. State Committee on Science, Technology & Environment, Committee Government of Kerala.  
MD/DMRD examiner, Department of Radiation Diagnosis, Medical College, Trivandrum 15/11/96.

#### V. Padmanabhan

Currently holding the position of President of KAMP

#### T.S. Elias

Reviewer of new research project for DST (Medical Instruments) New Delhi.

#### C.A.Davis

1. Nominated as convenor of expert Scientific Committee for selection of HDR Brachytherapy machine for the Regional Cancer Centre, Trivandrum.
2. Nominated as convenor of Expert Committee for selection of Radiotherapy simulator for Regional Cancer Centre, Trivandrum.
3. Elected as Vice President of AROI State Chapter
4. Elected as Secretary, Aurora - the cultural Forum of Regional Cancer Centre.
5. Life Member of AROI

#### L.S.ArunKumar

1. Currently holding the position of Secretary & Treasurer of Association of Medical Physicists of Kerala (KAMP).
2. Actively involved with the newly started Orientation Programme for Radiographers in Radiotherapy of the Centre and acting as the *Co-ordinator* of the programme. Four batches of trainees have successfully completed the programme during the current year.
3. Appointed as Skilled Assistant for DMRT & MD (Radiotherapy) examination at Regional Cancer Centre, Trivandrum during November, 1996.

### 9. Invited talks

#### V. Padmanabhan

Current concepts on Radiation and Hygiene.

9<sup>th</sup> Annual conference of Indian Society for Dental Research, Dental College, Trivandrum 02.11.'96.

**V. Padmanabhan**

Presidential address 7<sup>th</sup> annual KAMP meeting medical college, Kottayam 01.12.'96.

**V. Padmanabhan**

Current concepts in radiation protection. International CME programme in clinical Radiobiology 28, -31 January, 1997.

**V. Padmanabhan**

Chair person, scientific session in Nuclear Medicine 17<sup>th</sup> annual conference on Medical Physics Cancer Institute, Adayar, Madras 13.12.'96.

**V. Padmanabhan**

Understanding Nuclear Medicine

All Kerala Government Radiographers Association. Roentgen centenary celebrations & Becquerel Day Trivandrum Souvenir 31.1996.

**C.A. Davis**

"Electron Beam therapy" at CME programme on Recent Advances in Oncology at Dept. of Radiotherapy, Medical College, Trichur on 23<sup>rd</sup> March '97.

**T.S. Elias**

Application of Physics in Radiotherapy. Inaugural address at Physics Association, Lakshimpuram College of Arts and Science, Nagercoil, January 1997.

**T.S. Elias**

Instrumentation in Radiological Physics. Guest lecture for Biomedical Engineering students (M. Tech & Ph.D. students) I. I. T. Madras, October '96.

**L.S. Arun Kumar**

Delivered two guest lectures on "Molecular effects of Ionising Radiations" for the postgraduate students during January 1997 at the Women's College, Trivandrum.

**Raghu Ram K. Nair** gave a talk "Glimpses of Radionuclide imaging" under the CME programme of Tamilnadu Hospital, Madras, 28.8.1996.

## 10. Meetings Organised

Dr. A.C. Paul, Health Physics Unit, Indian Rare Earths Ltd, Alwaye, delivered the second Dr. T.P. Ramachandran Memorial oration on 01.12.'96 at Medical College, Kottayam. KAMP members and other staff participated in the function. The topic

"Recent advances in occupational Radiation Protection"

The system of the dose limitation enunciated by ICRP has the following tenets:-

No practice shall be adopted unless its introduction produces a net positive benefit.

All exposure shall be kept as low as reasonably achievable (ALARA), economic and social factors being taken into account.

The dose equivalent to the individuals shall not exceed the limits recommended for the appropriate circumstances by the commission.

A review of the dose limits was mentioned. The discipline of Radiation protection has been able to evolve, grow and establish firm footing more scientifically than any other branch of occupational health protection.

## 11. Directorate of Radiation Safety (DRS)

This division actively took part in the formation of DRS. The appointment of the Director for this directorate is awaited from the Government on the basis of recommendations of the D.M.E.

## 12. M.Sc. Medical Physics

The Syndicate of the University of Kerala has recommended the starting of M.Sc. Medical Physics course at the Regional Cancer Centre during the academic year 1997 -98. Sanction from the Government is awaited.

### 13. Life Membership in Personal bodies

All academic staff became life members in ISRP (K) Indian Society for Radiation Physics (Kalpakkam Chapter) and Indian Association for Radiation Protection (IARP), Mumbai.

### 14. Books

#### **V.Padmanabhan**

Physics of Doppler Ultrasound and its application in Medical Physics for Human Health Care 163 - 166, 1997.

Editors: P.K. Bhatnagar, A.S. Pradhan A.R. Reddy.

#### **V.Padmanabhan**

Becquerel and Radioactivity in Glimpses in Imageology 7 - 11, 1997.

Editor: Dr. Alex K. Ittyavirah

#### **V.Padmanabhan, M.S. Ranimol, T.G. Boban**

Solid state Nuclear Track Detectors, Glimpses in Imageology 31 - 43.

Editor: Dr. Alex K. Ittyavirah.

#### **V.Padmanabhan, L.S. Arunkumar**

Medical Physicist in radiotherapy (Malayalam)  
Kerala Basha Institute Cancer issue 819 - 821, December, 1996.

#### **L.S. Arun Kumar**

Arun Kumar L.S. "New Recommendations of International Commission on Radiological Protection (ICRP) on Radiation Protection in diagnostic radiology in Glimpses in Imageology", December, 1996.

Edited: Dr. Alex K. Ittyavirah

#### **Raghu Ram K. Nair**

New Pathways in chest radiography, Glimpses in Imageology IV - 13 - 16, 1997.

*Conferences, etc. attended - (Chapter III)*  
*Papers Published/Presented - (Chapter IV)*

## DIVISION OF CANCER EPIDEMIOLOGY AND CLINICAL RESEARCH

Dr.R.Sankaranarayanan	- Assoc. Professor (On leave)
Dr.Cherian Varghese	- Assoc. Professor of Cancer Epidemiology & Clinical research
Dr. Aleyamma Mathew	- Asst. Professor of Computational Statistics & Epidemiology

In the period under report the Division of Cancer Epidemiology & Clinical Research initiated new research and academic activities in addition to the regular programmes. Dr Chris Todd (Director, Health Services Research Group, University of Cambridge), Dr Gareth Morgan (Consultant Haematologist, University of Leeds), and Drs Susan Sturgeon and Reshmi Sinha (National Cancer Institute, USA) visited our Division and interacted with the faculty on collaborative research programmes. Doctors from Burma (under a WHO training programme) were given an exposure to cancer control programmes with special reference to Epidemiological methods.

### International Seminar on Psycho-social issues with special emphasis on Psycho-social Oncology.

The International seminar on Psycho-Social issues in health care with special emphasis on Psycho-Social Oncology was held on March 6,7 & 8, 1997 at RCC, Trivandrum. A total of 89 delegates from different parts of India participated in the seminar and the Faculty members numbered 14 including 4 foreign scientists; Dr. James Brennan, Clinical Psychologist, Bristol Oncology centre, UK, Dr. Naomi Pfeffer, Sociologist and Anthropologist, University of North London, Ms. Clare Moynihan, Medical Sociologist, Royal Marsden Hospital, UK, Ms. Linda Benn, Head of Counselling services, BACUP, UK. Each session of the programme was started by a series of plenary lectures followed by proffered papers on different issues like burden of cancer, quality of life of cancer patients, quality of life of epilepsy patients, psycho-social aspects and rehabilitation therapy of cancer patients,

genetic counselling, communication with cancer and epilepsy patients, music therapy, home care nursing, Gestalt therapy, family burden in cancer, impact of social change in the mental health of Keralites, etc. There was also a symposium on 'Management of Psycho-Social problems in cancer' moderated by Dr. S Chaturvedi, NIMHANS, Bangalore. The seminar concluded with a discussion on measures for setting up of Psycho-Social Oncology services in India.

### **The RCC Seminars in Oncology**

A series of Symposia titled 'The RCC Seminars in Oncology' were held this year. Dr MR Das, Director, Rajeev Gandhi Centre for Biotechnology, Trivandrum inaugurated the programme and the first in the series was on Molecular Biology of Cancer and was presented by the Division of Cancer Research.

### **New Research Projects**

#### **Molecular Epidemiology of Paediatric Leukaemia and Lymphoma in Kerala, India.**

This project has been funded by the Kay Kendall Leukaemia Fund and will be undertaken in collaboration with Dr. Gareth Morgan and Prof. R Cartwright in the University of Leeds. Exposure details of cases and controls will be collected in India and molecular analysis of biological samples will be done in the RCC and in the University of Leeds. Investigators; Dr Cherian Varghese, Dr Kusumakumary, Dr Thomas Abraham. Funding (UK PD 53,000). Duration 1997-1999.

### **Ongoing projects**

#### **Pesticide exposure and breast cancer. (Collaborator; National Cancer Institute, USA).**

The work has been stabilized and the main study is ongoing. Forty patients have been recruited so far into this study and detailed dietary data and other information has been collected in addition to biological samples. We have acquired a new deep freezer (-80°C) for storing biological samples.



Sri. A. C. Shanmukhadas, Hon'ble Minister for Health & Family Welfare inaugurating the International Seminar on Psycho-social issues in health care with special emphasis on Psycho-Social Oncology, March 6-8, 1997. Organized by RCC, Trivandrum and Co-sponsored by the State Committee on Science, Technology and Environment, Govt. of Kerala.

### **Human Papilloma virus and cervical neoplasia.**

(Collaborators; Institute of cancer research, Cancer Research Campaign, UK).

This cohort study is now screening women for the third round and 2000 women have been screened in the period under reporting. A microbiological study has been undertaken in a subset of the women to identify the common infecting organisms in the genital tract.

### **Surveillance programme for monitoring cancer incidence and mortality in Trivandrum.**

(Collaborators; Unit of Descriptive Epidemiology, International Agency for research on Cancer, Lyon).

This programme has established a reliable population based cancer registry and cancer incidence rates for the region are now available. The registry also offer the potential for undertaking epidemiological studies in the population covered.

### **Occupation and cancer.**

(Collaborators; Unit of Environmental Epidemiology, International Agency for research on Cancer, Lyon).

This case-control study to address the occupational risk factors for cancers of the lung and leukaemias has collected data from 442 cases and 1212 controls in the reporting year.

### **Natural Background Radiation Cancer Registry, Kerunagappally, Kollam District.**

*(Funded by the Department of Atomic Energy, Govt of India)*

Principal Investigator - Dr. M Krishnan Nair

Co-Principal Investigator - Dr. N. Sreedevi Amma

Co Investigators - Mr. P. Gangadharan, Dr. V. Padmanabhan, Dr. T. Gangadevi, Dr. Paul Sebastian, Dr. S. Parameswaran, Dr. Jayaprakash Madhavan, Dr. Ravi Ankathil, Dr. V.M. Pradeep, Dr. Cherian Varghese

BARC Collaborator	- Dr. U.C. Mishra, Director, Health Safety & Environmental Group, BARC.
Field Office	: Vayvakkavu, Karunagappally Taluk.
Officer-in-charge	: Ms. P. Jayalekshmy

The Natural Background Radiation Registry (NBRR) project was started in 1990 when a project proposal submitted by RCC was accepted by the Department of Atomic Energy and funds sanctioned by them.

The Chavara, Neendakara coastal area of Karunagappally taluk in Kollam district has been known as a High Natural Background Radiation area since the early fifties and a WHO Committee had recommended in 1957, epidemiologic studies in the area. This was one of the few areas in the world where such high natural radiation occur. Another comparable area with such high radiation was in China. The Chinese study was started in the late 70's and there are a number of potential scientific areas which make studies in the two areas comparable and can yield a meaningful scientific outcome. The density of population in Karunagappally taluk was around 2000/sq.km; the Chinese areas had much less population. The Karunagappally belt had 3 times more external Gamma levels than the areas in China.

The Karunagappally study proceeds along three distinct areas. They were identified so as to provide appropriate scientific answers to the social apprehensions and the scientific curiosity that these high natural radiation causes cancer in the population living in Karunagappally.

The study methodology is on the following lines.

- a. Complete enumeration of the population
- b. Radiation level measurements
- c. Cancer registration

#### a) Complete enumeration of the population

Complete enumeration to obtain the necessary baseline data was undertaken by house to house visits by enumerators to obtain socio-demographic information, information on life style factors which

would be either confounding or competing risk factors, etc. This helped the study in two aspects. First it was possible to clearly identify various populations at risk, secondly, defined cohorts could be identified for undertaking cohort study and analysis.

The first round enumeration has been completed by March, 1997. This involved interviewing and obtaining information from almost 385,000 people living in 60,000 house-holds, spread over 12 panchayats. The survey proceeded from ward to ward, Panchayat after Panchayat and repeat visits are going on to locate and interview persons who were missed during the 1st visit. More than two visits have become necessary to several houses. The data is being entered in the computer.

#### b) Radiation level measurements

- (1) Technical guidance and equipments for radiation level measurements were provided by Environmental Assessment Division, BARC - Dr.KSV Nambi, head EAD, (BARC). External Gamma radiation level measurements was undertaken by portable micro R scintillometer taken from house to house and recording the radiation by a spot reading of the meter, both inside and outside of houses at a height of one meter.
- (2) Cumulated annual dose estimation was done by placing TLD capsules in chosen houses, replaced every three months and the measurements obtained for the three month period from the retrieved TLD by using a TLD reader. This is ultimately correlated with the annual estimated dose from the micro R scintillometer readings.
- (3) Soil samples taken from every one sq.km grid and measuring the levels of Thorium, Uranium and Potassium by a multi channel analyser.
- (4) Solid State Nuclear Track Detector (SSNTD) technique is used to obtain cumulated annual measurements of Radon-Thoron levels inside houses. These are measured for 12 months in chosen houses.
- (5) Thoron-in-breath measurements in exhaled breath in chosen individuals.



### c) Cancer Registration:

To evaluate critically the cancer occurrence in relation to background radiation in Karunagappally, large number of person years of observation has to be built up. The methodology adopted for this was by organising a population based cancer registry which was started in 1990 covering the entire population of the taluk. This is India's second rural population cancer registry and Kerala's first population cancer registry. Cancer cases are located from almost 85 sources-from Karunagappally, Kollam Town, Regional Cancer Centre, Hospital Cancer Registry-Trivandrum, & Radiotherapy departments at Kottayam and Alleppy Medical Colleges and several pathology laboratories. A standard cancer registration system methodology has been adopted and a sustainable registration system initiated.

The cancer incidence rate has now been obtained for the 5 year period 1990-1994 for the Karunagappally population. This includes all the Panchayat areas. The incidence rates, crude rate & age adjusted rates for certain population groups in India and for Karunagappally rural population are shown in Table 1.

**Table-1**

**Incidence rates (all cancer) - crude & age adjusted rates for certain population groups in India.**

POPULATION GROUPS	Year	Male		Female	
		CR	AAR	CR	AAR
AHMEDABAD	83-87	83.7	142.3	71.5	110.6
BANGALORE	93	67.5	116.3	85.7	140.9
BHOPAL	93	57.3	114.1	57.3	106.6
MUMBAI	93	70.9	137.6	80.3	132.9
DELHI	93	77.9	134.5	92.3	150.0
CHENNAI	93	77.0	117.5	90.6	128.9
BARSHI (R)	93	41.9	54.5	46.5	53.3
TRIVANDRUM	93	71.0	111.9	64.2	83.9
KARUNAGAPPALLY (R) 90-94		90.9	101.5	73.0	80.6
US. CONNECTICUT (W) 83-87		459.4	321.7	457.4	278.7

R- Rural population, W - White Population.

### Major forms of cancers in Karunagappally

In men, Oral cavity & pharynx, G.I & respiratory system seems to be equally affected. Among females, Breast, Female genital system and mouth and throat were the predominant cancers. The 10 leading sites of cancer among males and females are shown in table 2.

### Cancer Patients Services : Out reach centre of RCC

Apart from the scientific objectives pursued, the field office has been a vital source of service to the community. Several cancer awareness programmes and detection clinics were organised through the field office within the panchayat. Such field clinics conducted by doctors from RCC were attended by high risk persons. 41 such field clinics were held in which 12,131 persons were examined during 1990-1997. In order to help the cancer patients for periodic follow-up examinations, a follow up clinic was held every month and 84 such clinics were conducted in which 2528 cancer patients could get their follow-up check-up in time. This immensely helped the cancer patients of the area to have the check-up with least effort, expenditure and time.

Several hospitals and medical doctors in the taluk have availed the cytology laboratory services at the field office. The total number of cytology examinations done during the period were 7017 which comprised 4514 pap smear examinations, 2160 aspiration cytology and 343 sputum cytology. During such examinations 201 cancer cases were newly diagnosed and 49 recurrent cancer cases were identified. This service is receiving increased acceptance by the public and the medical profession.

The preliminary findings of the study were presented during the 4th International Conference on high levels of natural radiation held in Beijing, China in October 1996, by which great attention and interest have been generated for the study internationally.

The hard work put in by the project staff, numbering 33, the co-operation from the medical officers and administrators in the taluk, the services of the medical officers and the staff of the Regional Cancer Centre, and the Hospital Cancer Registry and the co-operation and trust of the people of the taluk in the study have made it possible to achieve progress in the study.

**Table-2**  
**Ten leading sites of cancer in males and females**  
**Karunagappally taluk 1990-1994.**

Males		Females	
Site	%	Site	%
Lung	14	Cervix	19
Mouth*	7	Breast	18
Stomach	6	Thyroid	6
Oesophagus	5	Mouth*	6
Tongue	5	Oesophagus	4
Larynx	4	Tongue	4
Lymphoma, HD	4	Brain	3
Leukaemia	4	Lung	3
Prostate	3	Stomach	3
Liver	3	Leukaemia	3
<b>Total</b>	<b>55</b>		<b>69</b>

\* Alveolus, Floor of Mouth, Buccal Mucosa

Preliminary analysis of 6 panchayats; 3 high background area (Neendakara, Chavara & Alappad) and 3 normal background areas (Thazhava, Clappana & Kulasekharapuram) did not indicate any higher incidence of cancer in the high background radiation areas. However, cervix cancer incidence was higher in the high background radiation areas compared to the normal background areas. Converse was true for breast cancer. It is felt that this may be the result of socio-economic differences between the two areas, lower socio-economic strata in a population always show higher incidence of cervix cancer compared to their better placed groups. Further studies are progressing.

#### **Fellowship & Award**

**Smt. Aleyamma Mathew:** Received fellowship from the Govt. of Finland for defending doctoral thesis at the School of Public Health, Tampere, Finland, October - December, 1996.

**Smt. Aleyamma Mathew:** Awarded doctoral degree in Epidemiology from the University of Tampere, Finland, 14th, December, 1996. Thesis title: Removing bias in cancer survival estimates by active follow-up and information on determinants of loss to follow-up.

*Conferences, etc. attended - (Chapter III)*  
*Papers Published/Presented - (Chapter IV)*



Shri. B. Vijayachandran, Secretary, Health & Family Welfare, Govt. of Kerala inaugurating the 'Senior Level Workshop on Working of Cancer Registries' organized by RCC, Trivandrum and NCRP (ICMR) at Trivandrum from March, 17-19, 1997. Also seen Dr. M. Krishnan Nair, Director, RCC. Mr. Thomas Sreeba, Director, Directorate of Economics & Statistics, Govt. of Kerala and Dr. A. Nandakumar, Dy. Director General (Sr. Grade ICMR).

## **DIVISION OF HOSPITAL CANCER REGISTRY AND MEDICAL RECORDS (NCRP, ICMR)**

Mr. P. Gangadharan - Emeritus Medical Scientist (ICMR)  
Dr. Cherlan Varghese - Assoc. Professor  
Smt. Padmakumary - Medical Statistician

The Hospital Cancer Registry covering the Regional Cancer Centre and Medical College Hospitals in Trivandrum has abstracted, analysed and presented the report for the year 1994 and the combined report for the years 1993-1994. Under the Emeritus Scientist position awarded to Mr.P Gangadharan, a database of all HCR cases from the year 1982 has been generated. This database has information on 66147 cases (1982-1994). The HCR has acquired a computer and printer and a dedicated data entry programme was prepared by Mr. Manoj, Systems Analyst in the computer Division. Using this software the data for the year 1995 was entered as soon as the proforma was completed and online data entry checks have been introduced to avoid errors. Inaccuracies in the abstract are corrected by the social investigator and corrected data entered. This has improved the quality and the timeliness of the data from the HCR.

The staff of HCR participated in the academic and research activities of RCC and the database of HCR is a source for various research programmes.

### **Senior Level NCRP(ICMR) Workshop on 'Working of Cancer Registries'**

Training of Tumour Registrars has been an important area of HCR, Trivandrum. In connection with the Annual Review Meeting of the NCRP a Workshop on 'Working of Cancer registries' was held at the Regional Cancer Centre, Trivandrum, from 17th to 19th March 1997. There were 39 participants from the Population cancer registries and Hospital cancer registries in India. The Workshop introduced

ICD-O second edition and covered in detail, lymphomas and gastrointestinal cancers. Individual registries presented their findings on the quality control exercises. The faculty were from NCRP, Tata Memorial Hospital, Bombay, Kidwai Memorial Institute of Oncology, Bangalore, Medical College, Trivandrum, in addition to the staff of RCC, Trivandrum.

Mr. P. Gangadharan and Dr. Cherian Varghese attended the Annual Review Meeting of the NCRP held in ICMR, New Delhi and presented 'A case-control study on stomach cancer' and Hospital Cancer Registry Report of 1993-1994, Trivandrum, respectively.

### Cancer pattern in 1994

Six thousand three hundred and forty five (6345) cases were reported during the year 1994. The distribution of cancer cases with respect to site, age and sex are given in Tables 1&2. The male:female ratio was 1.1:1. The peak age frequency in males was observed in the 7th decade and in females in the 6th decade. The age distribution of males and females are shown in Fig. 1. Ninety percentage of cases had microscopic verification of diagnosis. In the 5017 previously untreated cases, 10.1% were in the early stages. Among those who reported for treatment 17.5% were palliatively treated and 57.5% were treated with a curative intent. Analysis by type of treatment showed that 34.42% received radiation as the only form of treatment and 68.5% in combination with other forms of therapy. Surgery alone or in combination with other therapy was received by 26.7% of patients and was the second commonest form of treatment.

#### Leading cancers;

Lung was the commonest site of cancer among males and among females it was breast cancer. The ten leading sites of cancer are shown in Table-3. The system wise distribution of cancers are shown in Fig.3.

#### Childhood cancers (0-14 yrs);

Childhood cancers formed 308 (4.1%) of the total cancer cases. The leading sites were leukaemia 123(39.9%), central nervous system 42 (13.6%) and lymphoma 38(12.3%).



Faculty and participants of the Senior Level Workshop on 'Working of Cancer Registries' RCC, Trivandrum, March, 17-19, 1997.

Table-3

Ten leading sites of cancer in males and females HCR,  
Trivandrum 1994.

Site	Male		Site	Female	
	No.	%		No.	%
Lung	436	13.03	Breast	746	24.83
Mouth	267	7.98	Cervix	501	16.69
Pharynx	215	6.43	Thyroid	192	6.40
Oesophagus	202	6.04	Ovary	186	6.20
Leukaemia	184	5.50	Mouth	146	6.16
Tongue	179	5.35	Leukaemia	115	3.83
Lymphoma, HD	177	5.29	Tongue	104	3.47
Larynx	153	4.56	Lymphoma, HD	94	3.13
Stomach	133	3.97	Brain	67	2.23
Brain	113	3.38	Lung	61	2.03

### Fellowship

*Smt. P.T Latha* Awarded European School of Oncology  
Fellowship: Sep. 1996.

## MEDICAL RECORDS SECTION

Mr. G. Rajasekharan Nair - Medical Records Officer.

The major activities of this division during the period are as follows:-

### Case assembling

Case paper retrieval for I.P. & O.P. departments, filing

Case preservation, Physical maintenance, Coding, Indexing,

Summary reporting, Deficiency checking.

Case paper distribution.

- for research
- for services, I.P., O.P., Imageology, Radiation Physics, Cytology, Histopathology, Nuclear Medicine, Settling of pay ward accounts.
- for Tumour Registry.
  - I.P. Registers and I.P. Statistics.
  - Maintenance of discharge summary registers.
- Case paper distribution for follow-up clinics.
  - At Ernakulam
  - Karunagappally
- Maintenance of Death Registers, Death Certificate Registers, etc.
- Death reporting to Registrar of Births & Deaths, Corporation of Trivandrum.
- Follow-up of appointment of missed patients.
- Tracing partially treated cases and those advised treatment but not followed cases and their follow-up.
- Arrange for patient correspondence with advice from Doctor in-charge of the cases.

This division is making arrangements for printing, arranging and issuing of various types of medical record forms, registers, covers and other accessories properly in time.

A total of 1615 X-rays were received in this division and arranged according to chronological order of each year and those X-rays issued whenever requested for patient service and study purposes.

A total of 5260 investigation results (Haematology, Biochemistry, Urine analysis, Ultrasound Scan, Histopathology, Surgery, Cytology, Operation report, Aspiration report, etc.) were received and those reports were filed in the concerned case records in time.

Sri. Venkatachalam, Demonstrator and two other Medical Record Technical Trainees from JIPMER, Pondicherry visited this division for a spot study of Medical Records maintenance and organisations.

The following table shows the distribution of case records to various divisions of this centre during the period.

Appointment, late appointment, without appointment (Out patient)	-	87,108	
Academic and Research Study	-	4,859	
ECDC clinic, Ernakulam	-	1,197	
N.B.R.R. Karunagappally	-	336	
		1996	1995
Total new cases registered	:	8551	7981
Hospital deaths	:	409	301

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*

HOSPITAL CANCER REGISTRY - TRIVANDRUM : CANCER CASES OF 1994 : AGE BY SITE ---MALES

Icd-9 Site	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+	Total	%
140 Lip	-	-	-	-	-	-	-	-	-	2	-	2	1	6	1	1	13	0.42
141 Tongue	-	-	-	-	1	2	2	6	16	19	28	41	29	13	10	12	179	5.80
142 Salivary Gl.	-	-	-	1	1	-	2	2	1	3	1	2	3	3	2	5	26	0.84
143 Gum	-	-	-	-	-	-	-	2	2	5	4	7	5	10	7	12	54	1.75
144 Floor of Mouth	-	-	-	-	-	-	-	-	2	2	7	10	9	8	6	5	49	1.59
145 Other Mouth	-	-	-	-	1	3	1	7	14	23	33	42	43	50	29	19	265	8.59
146 Oropharynx	-	-	-	-	-	1	1	3	3	8	14	26	27	17	11	6	117	3.79
147 Nasopharynx	-	1	-	1	2	1	1	3	2	3	1	5	2	4	2	-	28	0.91
148 Hypopharynx	-	-	-	-	-	1	3	2	4	15	12	15	15	12	7	8	94	3.05
149 Pharynx Etc.	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	3	0.10
150 Oesophagus	-	-	-	-	-	-	3	4	4	13	14	49	31	36	18	21	193	6.26
151 Stomach	-	-	-	-	-	2	3	7	6	9	13	12	14	13	5	7	91	2.95
152 Small Intes.	-	-	-	-	-	-	-	1	-	-	1	1	-	-	-	-	3	0.10
153 Colon	-	-	1	-	2	-	4	4	3	5	3	10	6	3	2	3	46	1.49
154 Rectum	-	-	-	-	-	1	2	5	7	2	5	4	6	7	6	1	46	1.49
155 Liver	2	-	1	-	-	2	3	2	9	8	8	9	5	5	4	2	62	2.01
156 Gall Bladd.	-	-	-	-	-	-	1	-	1	-	-	-	2	-	-	-	4	0.13
157 Pancreas	-	-	-	-	-	1	4	4	8	4	6	5	2	4	1	-	39	1.26
158 Retroperit	2	-	-	-	-	-	1	-	1	1	1	-	1	1	1	-	9	0.29
159 Other Dig Sys	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	0.03
160 Nasal Cav.	-	-	-	-	-	3	-	2	2	3	1	5	6	4	7	5	38	1.23
161 Larynx	-	-	-	-	1	-	-	3	7	7	13	29	33	25	17	15	150	4.86
162 Lung	-	-	-	1	2	1	3	9	15	36	56	76	92	65	46	24	426	13.81
164 Thymus	1	-	-	-	2	1	1	-	2	1	1	1	-	1	-	-	11	0.36

170 Bone	-	1	8	11	12	2	2	3	1	3	3	1	-	3	-	-	50	1.62
171 Conn. Tiss.	-	-	3	4	1	1	6	3	5	3	5	3	7	1	3	-	45	1.46
172 Skin. Mela	-	-	-	-	-	-	-	-	-	-	1	-	2	3	-	1	7	0.23
173 Skin. Other	-	-	-	-	-	1	2	3	6	7	6	7	3	8	7	8	58	1.88
175 Breast Male	-	-	-	-	-	-	-	-	-	3	-	-	2	1	-	2	8	0.26
185 Prostate	-	-	-	-	-	-	1	-	-	-	4	5	8	9	11	8	48	1.49
186 Testis	2	1	-	3	2	7	6	4	6	4	-	1	1	2	-	1	40	1.30
187 Penis Etc.	-	-	-	-	-	-	1	2	2	2	5	3	1	6	2	2	26	0.84
188 Uri. Blad.	-	-	-	-	-	2	1	-	2	5	4	10	6	10	10	8	58	1.88
189 Kidney	4	1	-	-	-	-	-	-	2	4	1	3	4	1	-	3	23	0.75
190 Eye	11	-	1	-	-	1	-	-	-	-	-	-	-	1	1	1	16	0.52
191 Brain	4	13	2	4	6	11	9	13	10	5	5	8	3	4	3	-	100	3.24
192 Nervous Sy.	-	-	-	-	-	1	1	-	-	-	-	-	1	-	-	-	3	0.10
193 Thyroid Gl.	-	-	-	2	-	2	5	6	6	3	3	4	3	7	3	1	51	1.65
194 Oth.Endo. Gl.	3	1	1	1	1	-	-	-	2	-	-	1	-	-	-	-	10	0.32
195 Ill. Def. Sit.	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	0.06
196 Sec. Lymph. N	-	1	-	-	-	-	2	1	6	7	10	14	17	10	7	6	81	2.63
197 Sec. Res. Etc	-	-	-	-	-	-	2	-	3	5	7	6	9	6	8	5	51	1.65
198 Sec. Other	1	-	-	-	-	-	3	4	6	3	6	8	9	10	6	7	53	2.04
200 Lymphosarc.	1	3	-	2	1	1	2	4	5	9	2	6	4	5	5	7	57	1.85
201 Hodgkins. D.	-	4	5	5	2	5	2	3	4	2	3	1	-	-	3	1	40	1.30
202 Oth. Lyph.	2	-	5	2	5	4	3	4	9	7	5	7	11	11	-	3	78	2.53
203 Mult. Myel.	-	-	-	-	1	-	2	1	4	5	4	4	6	9	8	8	52	1.69
204 Leuk. Lymph	27	14	13	16	9	5	4	2	1	1	2	2	1	4	1	-	102	3.31
205 Leuk. Myelo	3	2	3	5	9	6	11	3	2	4	4	5	2	1	1	5	66	2.14
206 Leuk. Monoc.	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	0.03
208 Leuk. Uns.	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	-	3	0.10
Total	63	42	43	59	69	68	101	122	191	252	307	452	432	399	261	223	3084	

64

65

Table 2

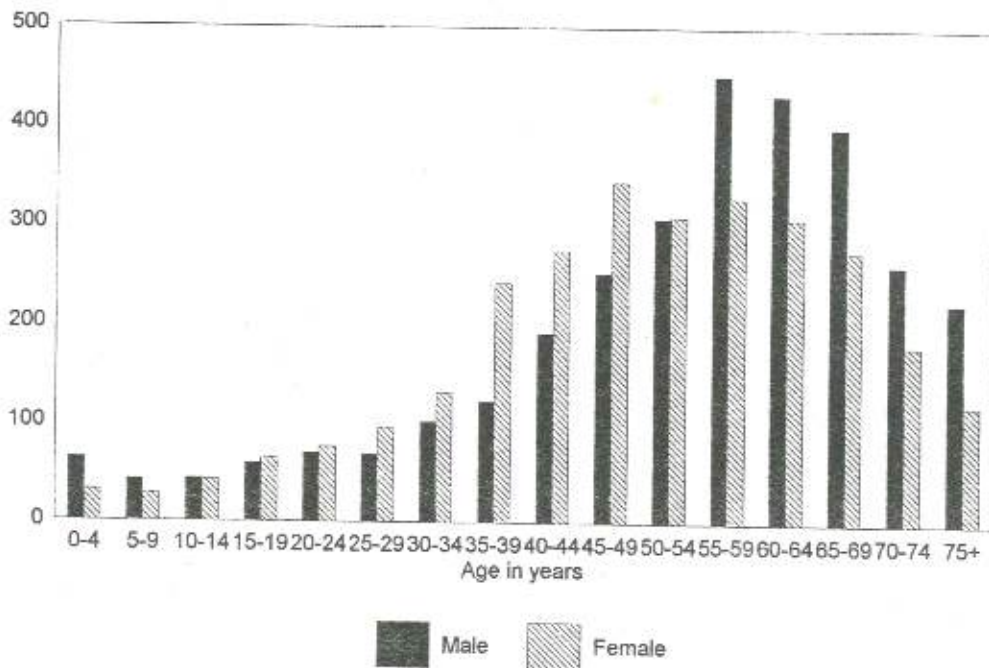
## HOSPITAL CANCER REGISTRY - TRIVANDRUM : CANCER CASES OF 1994 : AGE BY SITE --- FEMALES

Icd-9	Site	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+	Total	%
140	Lip	-	-	-	-	-	-	1	-	-	-	-	2	4	1	4	4	16	0.56
141	Tongue	-	-	-	-	-	-	-	3	7	13	11	17	28	10	8	12	104	3.56
142	Salivary Gl	-	-	1	1	1	-	-	-	1	2	3	-	1	3	1	-	15	0.53
143	Gum	-	-	-	1	-	-	1	2	1	4	2	4	8	8	7	5	43	1.51
144	Floor of Mouth	-	-	-	-	-	-	-	-	-	1	2	1	-	-	-	3	7	0.25
145	Other Mouth	-	-	-	-	-	-	2	3	4	10	13	19	26	40	13	10	146	5.13
146	Oropharynx	-	-	-	-	-	-	1	1	1	-	2	2	1	-	2	1	11	0.39
147	Nasopharynx	-	-	1	1	-	2	-	-	1	1	-	3	-	1	-	-	10	0.35
148	Hypopharynx	-	-	-	-	-	-	-	-	1	1	-	3	-	1	-	-	11	0.39
149	Pharynx Etc.	-	-	-	-	-	-	5	3	1	1	1	3	1	2	1	1	19	0.67
150	Esophagus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	0.04
151	Stomach	-	-	-	-	-	1	-	2	2	2	6	11	8	8	6	3	48	1.69
152	Small Intes.	-	-	-	-	1	-	-	6	4	2	1	1	1	8	5	3	32	1.13
153	Colon	-	-	-	-	1	-	1	1	1	-	-	-	-	-	-	-	3	0.11
154	Rectum	-	-	-	-	1	1	-	3	3	2	2	2	5	3	1	1	20	0.70
155	Liver	2	-	-	-	1	1	1	4	2	1	3	3	3	3	3	2	36	1.27
156	Gall Bladd.	-	-	-	-	-	-	-	1	-	-	-	1	-	-	1	-	3	0.11
157	Pancreas	-	-	-	-	1	-	1	-	1	4	-	-	-	-	1	-	8	0.28
158	Retropert.	-	-	-	-	-	-	2	-	1	1	1	-	-	-	2	-	7	0.25
160	Nasal Cavity	-	-	-	-	-	-	1	-	2	3	-	1	4	3	-	1	15	0.53
161	Larynx	-	-	-	-	-	-	-	-	1	3	-	1	4	3	-	1	15	0.53
182	Lung	-	-	-	-	1	2	1	3	4	4	8	8	8	10	2	5	56	1.97
163	Pleura	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	0.04
164	Thyroid	-	-	-	1	1	-	-	-	-	1	-	-	2	1	1	-	5	0.18
																		3	0.11
170	Bone	1	1	6	13	5	1	2	1	-	1	2	-	-	-	-	-	33	1.16
171	Conn. Tissue	-	-	5	3	6	4	4	3	2	5	3	2	1	3	1	-	42	1.48
172	Skin, Mela	-	-	-	-	1	-	-	1	1	-	1	2	1	1	3	1	12	0.42
173	Skin, Other	-	-	1	2	-	2	-	4	4	2	3	3	3	3	4	3	33	1.16
174	Breast	-	-	-	-	8	22	48	112	123	119	86	63	55	45	29	8	721	25.36
175	Uterus Nos.	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	2	0.07
180	Cervix	-	-	-	-	-	2	9	31	88	68	72	99	72	50	39	21	501	17.92
181	Placenta	-	-	-	1	-	-	-	-	1	1	-	-	-	-	-	-	3	0.11
182	Body Uterus	-	-	-	-	-	-	1	1	12	12	9	9	11	7	5	1	68	2.39
183	Ovary	1	2	4	15	9	6	10	12	16	31	20	18	15	12	6	9	186	6.54
184	Vagina	-	-	-	-	-	-	1	-	-	4	4	2	3	3	3	-	20	0.70
188	Uri. Blad.	-	-	-	-	-	-	1	-	-	-	-	2	3	3	1	1	11	0.39
189	Kidney	3	1	1	-	1	1	-	-	1	-	2	1	1	1	-	-	13	0.46
190	Eye	4	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	6	0.21
191	Brain	1	10	5	5	2	5	10	2	4	5	5	2	3	3	-	-	62	2.16
192	Nervous Sy.	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2	0.07
193	Thyroid Gl.	-	-	1	13	21	28	15	13	14	19	7	9	9	11	4	3	157	5.87
194	Oth. Endo. Gl.	4	-	1	-	1	-	1	-	1	-	-	-	-	1	-	-	6	0.21
195	Ill Def. Sit	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	0.04
196	Sec. Lymph. N	1	-	-	-	-	-	1	-	2	2	1	4	4	3	2	2	21	0.74
197	Sec. Res. etc	-	-	1	-	-	-	1	2	5	2	4	6	3	4	8	2	38	1.34
198	Sec. Other	-	-	-	-	1	-	1	4	-	4	4	3	4	4	2	1	28	0.98
200	Lymphosarc.	-	1	1	-	2	2	2	3	1	2	6	1	3	5	-	1	30	1.05
201	Hodgkins. D.	-	-	-	2	1	-	3	-	-	2	1	1	1	-	1	-	12	0.42
202	Oth. Lymph.	1	-	3	1	1	3	1	5	3	3	7	8	5	2	3	3	51	1.79
203	Mult. Myel.	-	-	-	-	-	-	-	2	3	-	4	1	5	4	5	3	27	0.95
204	Leuk. Lymph.	15	10	7	4	6	3	-	4	1	-	4	1	1	-	-	-	56	1.97
205	Leuk. Myelo.	1	2	3	1	3	6	3	6	3	5	3	5	4	-	3	2	50	1.76
	Total	31	28	42	64	76	95	131	242	274	344	300	328	307	274	179	120	2844	



**Fig.1. Age distribution in years, 1994**

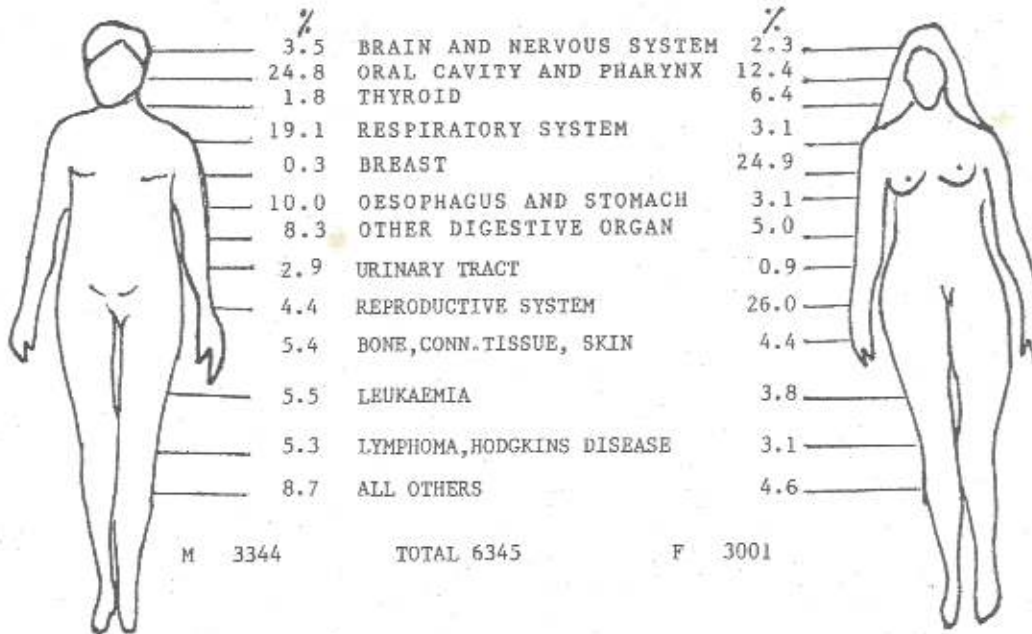
(Males 3084, females 2844)



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**HOSPITAL CANCER REGISTRY, TRIVANDRUM**

**FIG. 3: SYSTEM-WISE DISTRIBUTION OF CANCER CASES -1994**



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## DIVISION OF RESEARCH

Dr. Prabha Balaram	- Addl. Professor
Dr. Ravindran Ankathil	- Asst. Professor
Dr. S. Kannan	- Asst. Professor
Dr. P. Remani	- Asst. Professor
Ms. Molykutty John	- Lecturer
Dr. Thomas Abraham	- Scientific Officer
Ms. Padmavathy Amma	- Technical Officer

This division had 20 ongoing research projects in areas of cancer biology relating to molecular aspects, cytogenetic aspects, biochemical aspects, tumour markers etc. with a total budget nearing Rs.21,00,000 from various national and international funding agencies. 22 papers were published in national and international journals. The main aim of research in the division is to understand the basic mechanisms and its application in the clinical management of cancer patients.

### Project -1

#### **Immunobiology of Gestational Trophoblastic Disease and Correlation to tumour regression (1994-1997)**

*(Funded by Department of Science and Technology, Govt. of India)*

Principal Investigator	: Dr. Prabha Balaram
Co-investigators	: Ms. Molykutty John, Dr. T.N. Rajalekshmi, Dr. V.P. Gangadharan, Dr. Joy Augustine

The major risk factors in Gestational Trophoblastic diseases as observed in this study are low socio economic status, late age of marriage, sexual abstinence of long duration etc. Parity and consanguinity were seen to be of high risk in our population. Females belonging to the O+ blood group appeared to be at a higher risk and those belonging to B+ blood group appeared to be at a lower risk when compared to the population frequency of these blood groups.

The biological characteristics of these tumours were different from that of the normal counterpart. The growth factors EGF and TGF alpha were multifold increased. Univariate analysis showed the expression indices of these growth factors to be good prognostic indicators. Analysis of EGFR suggested presence of truncated forms of these receptors thereby remaining constitutively active. The erbB2 oncoprotein also suggested alterations in the egf-egfr-erbB2 pathway of signal transduction. The alterations in the EGFR and erbB2 proteins are being investigated further.

Surface changes in the trophoblasts in GTD could be detected using Jack fruit lectin staining. The staining pattern showed close correlation with the serum  $\beta$ HCG regression pattern of the tumour suggesting its use as good prognostic indicator and identifying lesions with potential to persist in spite of evacuation.

Immunologically the results of this study showed that trophoblasts are immunogenic and could induce the production of antitrophoblast antibodies in circulation. Immunogenicity also could be evidenced by the enhancement in T cell immune responses and production of lymphokines. IL-1 $\beta$  is seen in higher amounts in the molar lesions and suggest a stimulatory role for this lymphokine in maintaining and invasiveness of the trophoblasts.

The study of the proliferation markers point out no difference in the proliferative rates in the molar and normal placentae. There appears to be a cell accumulation due to processes other than enhanced proliferation such as arrest of cells in certain stages of the cell cycle, defective apoptosis etc.

Multivariate analysis of the various markers studied shows the serum  $\beta$ HCG levels at 4 weeks of evacuation (with a cut off level of 300 MIU/ml) combined with cytological atypia and or lectin binding pattern to yield a more and sensitive prognostic indicator in GTD.

### Project - 2

#### **Role of viral genes, oncogenes and tumour suppressor genes in relation to aggressiveness in gestational trophoblastic diseases (1996-1999)**

*(Funded by the Council of Scientific and Industrial Research, New Delhi)*

Principal Investigator	: Dr. Prabha Balaram
------------------------	----------------------

Co-Investigators : Dr. T.N. Rajalekshmi  
: Mrs. Molykutty John

GTD is a group of diseases encompassing abnormalities of placenta with the benign but hyperproliferative hydatidiform mole at one end and the malignant choriocarcinoma at the other end of the spectrum. India has a comparatively high incidence rate of this disease ranging from 1.3 to 12/1000 deliveries with Kerala showing the highest hospital incidence. The virtually unique responsiveness of this disease to chemotherapy, consistent production of human chorionic gonadotropin, tissue of origin of fetal chorion, which is genetically different from the host and unknown etiology are some of the characteristics that makes this disease interesting to biologists. The genesis and natural course of GTD still remains obscure and confounding. Recurrent cases are rare and the disease is mostly related to individual pregnancies.

Immunohistochemical evaluation of molar placenta showed that 75% were positive for HSV antigen Vs. 33% in normal placenta, 86% positive for RSV Vs 74% in normal placenta. 50% were positive for HPV antigen Vs. 35% in normal placenta. The positivity in molar placenta was intense in case of HPV, HSV and RSV. The syncytiotrophoblasts showed more marked staining than the cytotrophoblasts. Circulating antibodies to HSV was detected in 19% of molar placenta and 15% of normal placenta while 0.7% of molar placenta and 0% of normal placenta showed the presence of circulating antibodies to HIV. Circulating antibodies to RSV was positive in 60% of molar placenta and 75% of normal placenta. The positive titre was much higher in the molar patient's sera with 11% of molar patients showing a titre of >500 in contrast to 3% in normal pregnant women suggesting a role of RSV in the molar placenta. The results suggest a possible viral association in GTD. **ErbB2:** The result of the study demonstrate statistically increased expression of c-erbB2 oncoprotein in GTD (P value <0.001) when compared to normal placenta. The basal layer which is thought to be involved in proliferation was totally negative for this protein suggesting that this protein expression is more related to the differentiation process. **RAS:** There was a significant elevation in the ras oncoprotein in molar placenta when compared to the controls. The ras oncoprotein showed 60% positivity in molar placenta when compared to 10% staining in normal. The staining pattern was mainly cytoplasmic and

granular in cytotrophoblasts and syncytiotrophoblasts. Only few samples of normal placenta showed mild staining pattern when compared to molar placenta which showed mainly moderate to intense staining. **c-myc and bcl2:** Expression of c-myc and bcl 2 proteins were not very different in the molar placenta and the normal placenta suggesting no probable alteration of these genes in the proliferative activity of the trophoblasts. The numbers studied are 24 GTD and 10 normal placenta. Since these belong to different gestational age groups, a comparison cannot be carried out at this stage. **Tumour suppressor proteins:** The expression of tumour suppressor proteins p53 and Rb show the RB protein to be more highly expressed in the molar placenta. p53 was positive in 61% of the molar placenta and 50% of the normal placenta. Taking into account the intensity and percentage positivity, 28%(10/36) of the molar placenta showed high expression while only 10%(1/10) of the normal placenta showed high expression. In the case of RB protein, 91%(42/46) cases in the molar placenta and 82% (18/22) of the normal placenta showed positivity with 67% in molar placenta and 46% in normal placenta showing moderate to intense positivity.

### Project - 3

#### Genomic instability in relation to progression in oral cancers and precancers. (1996-1999)

( Funded by the Board of Research in Nuclear Sciences, Dept. of Atomic Energy, GOI)

Principal Investigator : Dr. Prabha Balaram  
Co-Investigators : Dr. Ramadas K, Dr. Ratheesan K,  
Dr. Nalinakumary K.R, Dr. Anita Balan

The expression of p53, Rb and c-myc proteins were evaluated in oral precancers and cancers in order to assess their involvement in malignant transformation. Expression of Rb and c-myc appeared to be related to malignant transformation more than the alteration in the p53 gene with the expression of Rb protein being down regulated with the carcinomatous changes.

#### Project - 4

##### **Molecular epidemiology of cancer of the oral cavity and oropharynx: A multicenter case-control study.(1996-1997)**

*(Funded by the International Agency for Research on Cancer,Lyon)*

Principal Investigators : Dr. Prabha Balaram(RCC)  
Dr. Nubia Munos(IARC)

Co-Investigators : Dr. Ramadas K(RCC)  
Dr. Nalinakumary K.R(RCC)  
Dr. Elizabeth Abraham(RCC)

The study involves collection of personal data on habits,diet and life style and collection of blood and oral biopsies/smears from oral cancer patients and hospital patients. The analysis is done on samples collected from various centres round the world with regard to the prevalence of HPV and on the status of other suppressor genes. The results will be published after the samples are analysed.

#### Project - 5

##### **Prognostic evaluation of Nucleolar Organizer region associated proteins in premalignant and malignant oral lesions (1993-1996)**

*(Funded by Dept. of Science and Technology, Govt. of Kerala)*

Principal Investigators : Dr. Ravindran Ankathil,  
Dr. Jayaprakash Madhavan

Collaborating Investigators : Dr. V.T. Beena, Dept. of Oral Pathology, Dental College, Trivandrum

This was a 3 year project and the work has been completed. To summarise, the AgNOR technique, was applied to oral tissue sections of 185 oral cancer (OC), 42 oral leucoplakias (OL) 37 Oral Submucous Fibrosis (OSMF) and 10 normal subjects to investigate whether any correlation held good in these different tissues. Compared to the AgNOR counts in normal oral epithelium, there was a gradation in

increase in the mean AgNOR counts from oral leucoplakia to oral submucous fibrosis to oral carcinoma ( $P < 0.01$ ). This suggests that AgNOR count parallels with the degree of neoplastic transformation of oral epithelium. Three OSMF patients who showed very high AgNOR counts as that of oral cancer patients, later developed oral carcinoma. Among the oral cancer tissues, the moderately and poorly differentiated subtypes showed higher AgNOR counts and scattered distribution pattern that the well differentiated subtype which showed a clustered distribution pattern. These results suggest that AgNOR technique can be utilised as a diagnostic and prognostic indicator in premalignant and malignant oral lesions.

#### Project - 6

##### **Reversion of Ph' chromosome positivity in CML patients by Interferon treatment (1995-1996)**

*(Funded by Fulford Foundation, India)*

Investigators : Dr. Ravindran Ankathil,  
Dr. V.P.Gangadharan

Chronic Myeloid Leukaemia is genetically characterized by fusion of the BCR/ABL genes which involves reciprocal translocation t(9;22) (q34;q11) resulting in the cytogenetically distinct Philadelphia (Ph') chromosome observed in more than 90% of CML patients. In most CML patients, the Ph' chromosome is present even after haematologic remission is induced by chemotherapy. Interferon Alpha therapy has been useful in suppressing a relapse of Ph' positive cells. This study aims to evaluate the cytogenetic response of CML patients undergoing alpha interferon therapy.

#### Project - 7

##### **Chromosome sensitivity studies in colon cancer families (1994-1997)**

*(Funded by Dept. of Science, Technology and Environment, Govt. of Kerala)*

Investigators : Dr. Ravindran Ankathil,  
Dr. Jayaprakash Madhavan

This project has entered into the third year of its work and considerable amount of work has been carried out within the past three years. We have registered and analysed the pedigrees of all the colorectal cancer (CRC) patients who attended our centre during the period 1994-1997. We have identified 18 colorectal cancer families in which two, three or more family members were affected with the disease. But there is paucity of information on the genetic determinism for familial CRC predisposition. Therefore, we investigated constitutional chromosome abnormalities and bleomycin induced chromosome sensitivity of 20 familial and 25 sporadic colorectal cancers (SERC) patients and 45 unaffected family members (first/second degree relatives) to determine whether these parameters could give any clue on genetic predisposing factors by which the high risk members in CRC families could be identified. The test assay used bleomycin induced chromatid breaks in short term microculture of peripheral blood lymphocytes of the subjects. Neither the CRC patients nor the unaffected family members showed any constitutional chromosomal abnormalities. However, with regard to bleomycin sensitivity, there was significant difference between the CRC patients and unaffected relatives. The mean b/c values of  $1.64 \pm 0.42$  for FCRC patients and  $1.08 \pm 0.34$  for the SCRC patients were significantly higher than the mean b/c values of  $0.62 \pm 0.18$  for the unaffected relatives. ( $P < 0.001$ ). Three unaffected members from 3 CRC families, who have history of bowel complaints for the last few years, also showed bleomycin hypersensitivity at the initiation of the study. They expressed b/c values as high as those of CRC patients. It is presumed that these 3 individuals may be at an increased risk for cancer susceptibility and they are being followed up to detect early any signs of developing colorectal cancer.

### Project - 8

#### Establishment of a Familial Cancer Registry (1995-2000)

Investigators : Dr. Ravindran Ankathil,  
Dr. Aleyamma Mathew,  
Ms. Latha P.T. Ms. Anitha Nayar,  
Dr. M. Krishnan Nair.

Some kinds of cancers including the common ones as colon cancer, breast cancer, ovarian cancer, prostate cancer etc and the

uncommon ones as retinoblastoma, medullary thyroid cancer etc. show a tendency to aggregate in families. We have started taking details of family history of cancer among all the cancer patients registered in our centre. Pedigrees of all those with positive family history analysis is an early acceptable and predictive method for identification of family cancer clusters. The objectives of this study are to :

- 1) Investigate the incidence of familial cancers at the Regional Cancer Centre through pedigree analysis
- 2) To compile the pedigrees and estimate the relative cancer risk of the family members and 3) formation of a registry for familial cancers.

### Project - 9

#### Etiopathological studies in Hodgkin's Disease with special emphasis to the role of Epstein Barr Virus (1996-1999)

*(Funded by Kerala State Department of Science and Technology)*

Investigators : Dr. Ravindran Ankathil  
Co-Investigators : Dr. Elizabeth Abraham  
Dr. Joy Augustine

Hodgkin's Disease (HD) seen in the developing countries like India, differs from that seen in developed countries. At the Regional Cancer Centre, HD represents 0.7% of the total 6000 new cancer cases registered every year. Mixed Cellularity HD and Nodular Sclerosing HD are the predominant histologic subtypes. A body of circumstantial evidence indirectly links Hodgkin's disease with Epstein Barr Virus (EBV) infection. However, few data are available from India concerning those association. So this study aims to elucidate the association between EBV and HD in 100 patients attending the OP Clinics of our Centre. In those patients, we wish to study the serum antibody titres against EBV antigens, the expression of EBV-latent membrane protein (LMP-1) and EBV-encoded RNA (EBER-1) using immunohistochemical and RNA/RNA in situ hybridization techniques, the correlation of EBV positivity with the age, subtype and clinical outcome of HD patients, utility of EBV positivity as a

prognostic index and determine whether the proportional frequency, age and subtype distribution of EBV positive HD are similar in India and the west. It is hoped that this study may contribute to understand whether the variation in HD epidemiology found in developed and developing countries like India, might reflect difference in EBV association.

### **Project -10**

#### **Lectins as diagnostic markers in haematological malignancies(1994-1997)**

*(Funded by Dept. of Science, Technology and Environment, Govt. of Kerala)*

Principal Investigator : Dr. P. Remani  
Co-Investigators : Dr. P. Kusumakumary,  
Dr. G. Rajasokharan Pillai

The main objectives of this study are (1) To isolate and purify those plant lectins which specifically react with leukaemic cells. (2) To see whether the lectins can be used for the diagnosis or prognosis of lymphomas and leukaemias and (3) to see whether this lectins can be used for the typing of different types leukaemias. Three lectins, namely Jack fruit lectin, Peanut lectin and Wild Jack Lectin were isolated from the indigenous plants. These lectins were purified and conjugated with Horse-radish peroxidase and used for tissue staining studies. Peripheral blood and bone marrow smears from 124 cases of leukaemias and Imprint smears and Histologic sections from 46 and 86 cases of lymphomas were used for the study. Results of the lectin binding studies in leukaemic cells showed that in Acute lymphocytic leukaemia and chronic lymphocytic leukaemia lymphoblasts showed negative staining. In acute myeloid leukaemia and chronic myeloid leukaemia blast cells showed positive staining. Normal cells of the neutrophilic series exhibited intense staining. Lymphocytes and monocytes were negative. In Hodgkin's disease Histocytes and epithelial cells showed intense binding. Reed Sternberg cells showed binding of moderate degree. Immunoblasts showed weak staining. In Non Hodgkin's lymphoma lymphocytes did not show any staining. The cleaved cells in follicular lymphoma showed moderate staining as compared to similar cells in non

neoplastic lymphnodes. Vascular endothelial cells showed a more intense staining. The intensity of staining to cleaved cells in diffuse lymphoma was less than that was noted in Follicular lymphoma.

### **Project - 11**

#### **Cell membrane studies in relation to tumour progression, invasion and metastasis of oral and breast cancers using lectins.**

*(Funded by Department of Science, Technology and Environment, Govt. of Kerala)*

Principal Investigator : Dr. P. Remani  
Co-investigator : Dr. Elizabeth Abraham

The objectives of this study are (1) to study the cell membrane changes in malignant conditions of oral cavity and breast using jack fruit lectin and peanut lectin (2) To investigate the relationship between lectin binding and presence of lymphnode metastasis (3) To see the relation of lectin binding to histological differentiation (4) To see whether these lectins can be used to predict the distant metastasis of oral and breast tumours. The project has just been started.

### **Project - 12**

#### **Indigenous plant lectins and their use as reagents in Immunology and Pathology (1995-1997)**

*(Funded by Dept. of Science, Technology and Environment, Govt. of Kerala)*

Principal Investigator : Dr. P. Remani  
Co-Investigator : Dr. Joy Augustine,  
Dr. T. Vijayakumar

Plant lectins are of great use in the detection of complex carbohydrates of the cell membrane. Due to their high specificity lectins are used in membrane studies of normal and cancerous cells. The ability of lectins to bind carbohydrate and their specificity with respect to the type of lymphocytes they stimulate had been well

explained. The high specificity of the lectins is being utilized for the identification and separation of cells. The main objectives of this study are (1) to isolate and purify new tissue specific plant lectins from the indigenous plants (2) to study the different properties of these lectins, like mitogenicity, cytotoxicity, tissue necrosis and cell surface binding (3) to study the cytochemical and histochemical application of the newly purified lectins.

### Project - 13

#### Development of Multifactorial Index of Radiocurability in oral cancers

*(Funded by Dept. of Science, Technology and Environment, Govt. of Kerala)*

Principal Investigator : Dr. V.N. Bhattathiri  
Co-Investigators : Dr. P. Remani,  
Dr. Ravindran Ankathil,  
Dr. B.Chandralekha,  
Mr. C.A. Davis,  
Dr. Aleyamma Mathew.

The objective of this project is to assess the three predictive assays, namely demonstration of micronuclei (MN) induction in tumour cell following delivery of first four fractions of radiotherapy and studying radiation induced lectin-binding alteration of tumour cell membrane early during a course of radiation. The project proposes to try and integrate these to develop an 'index of radiosensitivity'. The study will include only well or moderately differentiated squamous cell carcinoma of the oral cavity.

The patients were grouped into two (1) those who developed tumour recurrence (Resistant) and those who did not (sensitive) and the pattern of micronucleus induction compared. Results showed that both groups of tumours had micronucleated cells (MNC) even before treatment with statistically significant dose related increase with radiotherapy. The sensitive group had a higher mean increase in MNC count than the resistant group. The increase in the MNC count occurred earlier in the resistant group than in the sensitive. The higher MNC induction in the sensitive tumours suggests that usefulness of the assay as a test of radio sensitivity. The diffusing

patterns of MNC increase suggest that differences in proliferation rate is an important cause of tumour failure. Serial cytological assays of micronucleus induction can identify both radiosensitivity and proliferation characteristics of tumours, and thus turn out to be a useful test of radiocurability.

### Project - 14

#### Multimodal assaying for prediction of Intrinsic radiosensitivity of oral cancers (1993-1997)

*(Funded by International Atomic Energy Agency)*

Principal Investigator : Dr. V.N. Bhattathiri  
Co-Investigators : Dr. P. Remani,  
Dr. Ravindran Ankathil,  
Dr. T. Vijayakumar

This project aims to do (a) tumour tissue glutathione (TRGSH) measurement as a test of intrinsic capacity to withstand radiation. (b) use of alterations in lectin binding pattern in exfoliated tumour cells as a real time test of cell membrane damage. Results showed that High GSH content of tumours is associated with high propensity for growth and discrimination, but lower radio resistance. This is because of high GSH content is due to high activity of GGT, which is located in the cell membrane, and radiation damage to cell membrane probably results in their loss with loss of proliferative ability and cell death. GSH levels in plasma may reflect the immune status of the patient, with low GSH indicating low immune capability. But in patients with high GGT activity a high plasma GSH level may also stimulate the tumours. Lectin binding studies showed that proportion of tumour cells showing lectin staining decreased with the increasing dose of radiation. Individual tumours showed one of three types of changes: rapid decrease, slow decrease or no decrease. Forty four percentage patients with slow or rapid decrease had control of primary tumours at 5-8 months whereas none without decrease had. Since lectins bind to specific carbohydrate residues on the cell surface, the decrease in staining reflects the loss or masking of these binding sites due to radiation induced membrane damage. The different types of change reflects the difference in propensity for this. The correlation between type of change and the treatment results indicate that this might prove to be a useful predictive test of radiosensitivity.

## Projects recently sanctioned

- The expression of Cathepsin D in Gestational Trophoblastic Disease (GTD) in relation to tumour aggressiveness and metastasis. (1997 - 1999)  
(Funded by State Committee on Science, Technology and Environment, Govt. of Kerala- Young Scientist Award Project)  
Investigator : Molykutty John
2. Evaluation and classification of radiation induced acute immediate nuclear and cytoplasmic changes in oral epidermoid carcinoma cells. (1997 - 1999)  
(Funded by State Committee on Science, Technology and Environment, Govt. of Kerala)  
Investigators : Bindu L, Dr. V.N. Bhattathiri
3. Biological prognostic markers in oral squamous cell carcinoma (1997 - 2000)  
(Funded by Indian Council of Medical Research, New Delhi)  
Investigators : Dr. S. Kannan, Dr. V.N. Bhattathiri, Dr. Elizabeth Abraham
4. Evaluation of AgNOR, Transferrin receptor and radiation induced micronucleation as indices of proliferation and radiosensitivity in oral cancers.  
(Funded by Dept. of Science, Technology and Environment, Govt. of Kerala)  
Principal Investigator : Dr. V.N. Bhattathiri  
Co-investigators : Dr. P. Remani, Dr. K. Jayasree, Dr. B. Chandralekha, Mr. C.A. Davis

## Collaborative Projects

1. Cohort study on human papilloma virus and cervical neoplasia  
Investigators : Dr. M. Krishnan Nair, Dr. Prabha Balaram, Dr. Sreedevi Amma, Dr. Cherian Varghese  
Foreign : Dr. Julian Peto, Institute of Cancer Research, collaborator Cancer Research Campaign, Sutton, UK.

## 2. Prevalence of Human Papilloma Virus infection of oral cavity in the general population

- Investigators : Dr. M. Krishnan Nair, Dr. Prabha Balaram, Dr. Sreedevi Amma, Dr. Cherian Varghese  
Foreign : Dr. Julian Peto, Institute of Cancer Research, Cancer collaborator Research Campaign, Sutton, UK.

## 3. Implementation of NCI protocols MCP-841

- Investigators : Dr. M. Krishnan Nair, Dr. V.P. Gangadharan, Dr. Kusumakumari P., Dr. Prabha Balaram, Dr. Ravindran Ankathil, Dr. Rajasekharan Pillai, Dr. Cherian Varghese

Foreign Collaborator : National Cancer Institute, USA.

## 4. Growth factors in Gestational Trophoblastic Diseases

- Investigators : Ms. Molykutty John, Dr. Prabha Balaram  
Foreign : Dr. Gregory Schultz, Institute of Wound Research, University of Florida, USA

## 5. Molecular alterations of MMPs and TIMPs in GTD

- Investigators : Ms. Molykutty John  
: Dr. Gregory Schultz, Institute of Wound Research, University of Florida, USA

## Academic Credits

### Dr. Prabha Balaram

1. Examiner - M.Sc. Degree examination in cell biology and immunology - Cochin University of Science and Technology, Kerala.



- Ph.D Mahatma Gandhi University, Kottayam
  - Ph.D - Calicut University
  - Ph.D - Bombay University
- Faculty**
- Advanced courses in biology, Dept. of Life Sciences, University of Calicut

### Guest Lectures

1. Immunology of Oral Cancer  
Department of Toxicology, German Cancer Research Centre, Heidelberg, Germany
2. Genes, Cancer and disease  
Department of Botany, University of Kerala.
3. RCC Seminars in Oncology

### Positions held

- Referee**
- Indian council of Medical Research projects and publications
  - Department of Science and Technology, Projects
- Vice President**
- Kerala Academy of Sciences
- Joint Secretary**
- Life Sciences Chapter - Kerala Academy of Sciences

### Dr. Ravindran Ankathil

1. **Examiner** - Ph.D, Calicut University
2. **Guest Lectures**
  1. **Faculty** : Refresher course for college teachers of Calicut University at Calicut July 6th 1996.
  2. RCC seminars in Oncology

### Ms. Molykutty John

#### Award

- Awarded the Young scientist Award in Health Sciences of the State Committee on Science, Technology and Environment, Government of Kerala.

### Routine Investigations undertaken

- |   |      |
|---|------|
| 1. Karyotyping from peripheral blood lymphocyte Microcultures | -108 |
| 2. Bone marrow karyotyping                                    | - 66 |
| 3. Serum Immunoglobulin estimation                            |      |
| IgG   | -132 |
| IgM   | -132 |
| IgA   | -132 |

### Clinical Laboratory Services

Clinical Laboratory remains itself as a formidable contributor in diagnosis, treatment and follow up monitoring of patients. The investigations carried out include routine haematology through CBC to immunophenotyping, routine biochemical investigations through kinetic assays to blood gas analysis. Services are extended even to patients from the neighbouring hospitals, which has gained us a formidable reputation in the state. To cope up with the increasing demand for better patient care, 24 hours lab services has been enforced this year.

**Investigations carried out during the year**

Biochemical investigations				Haematological investigations	
Blood sugar	22110	RFT		Hb	69780
	LFT	Blood urea	27100	Total WBC	67810
Serum bilirubin	18752	Serum Creatinine	25112	Total RBC	66120
SGOT	17678	Uric acid	5052	Platelets	65218
SGPT	17913	Creatinine clearance	3026	Diff. count	64150
Alkaline phosphatase	19006			ESR	16760
Total Protein	3676	Calcium	2920	PCV	47670
Albumin	3676	Phosphorus	1322	Bleeding time	5865
				Clotting time	5865
Cholesterol	250	Electrolytes		Prothrombin time	465
HDL cholesterol	236	Sodium	3865	Blood picture	20230
Triglycerides	228	Potassium	3865	Immunohisto. staining	
LDH	1850			Myelo peroxidase	4870
Amylase	101	CSF		PAS	490
Magnesium	39	Sugar	512	Non spec. esterase	120
Acid phosphatase	1210	Protein	512	Leu. alk. phosphatase	312
Prostatic specific acid phosphatase	836	Chloride	254	Bone marrow	4041
		Microscopy	386		
HBsAg	4356	Other fluids	210		
Electrophoresis	292	GTT	36		
<b>Total</b>			<b>166525</b>	<b>Total</b>	<b>357722</b>

**Urine analysis**

Albumin	8340
Sugar	8230
Acetone	2060
Bile pigment	3100
Bile salt	1050
Urobilinogen	1126
Reaction	512
Spec. gravity	340
Bence Jones protein	42
Microscopy	5742
<b>Total</b>	<b>27542</b>

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*

## DIVISION OF LABORATORY MEDICINE AND TUMOUR BIOLOGY

Dr. M. Radhakrishna Pillai

- Assoc. Professor

Like good wine, cancer research gives better and clearer results as ideas, hypotheses and theories mature and progress. The Division of Laboratory Medicine and Tumour Biology completes its third year with this report. Cancer is a disease with roots in the molecular organization of cells. Changes in various molecular factors such as genes contribute to the development and progression of this disease as well as influencing response of the disease to treatment. Our research concentrates on the identification and characterization of these molecular changes and its implications for cancer diagnosis and management. We hope that the advances made in our understanding of cell and molecular biology from the laboratory bench will eventually provide new vistas of opportunity to the cancer scientist and clinical oncologist. Some of the recent achievements made in this direction are outlined below.

Our continuing studies on the molecular epidemiology of cervical cancer has provided more interesting results. We have established a proof-of-principle for cellular factors involved in the process of cervical tumour progression. The distribution of human papilloma virus (HPV) subtypes among patients with lesions in the uterine cervix and apparently normal subjects in the Trivandrum area were established. HPV infection was rare in normal cervical tissue with only 9% of tissue samples showing the presence of HPV. The high risk HPV 16 was detected in 4% of these subjects. In patients with low grade pre malignant lesions 46% of cervical biopsies showed the presence of HPV, with 15% of the samples infected with the high risk subtype. The incidence of high risk HPV infection was significant in the more serious pre malignancy (74%) and invasive cancer (88%). Productive high risk HPV infection characterized by the expression of the E6 transforming protein was also significant in high grade pre malignancy (77%) and invasive cancer (87%) while it was only 38% in low grade pre malignancy and absent in normal cervical tissue. When all normal cervical tissue samples and low grade pre malignant lesions were

grouped together and compared to high grade pre malignancy and invasive cancer in terms of risk, the odds ratio of a high risk HPV (HPV types 16/18) infected tissue positive for E6 being in the latter group was 16.20.

We have also evaluated the role of various growth factors during tumour progression in the uterine cervix. Expression and quantitation in tissue of epidermal growth factor (EGF), transforming growth factors alpha and beta (TGF $\alpha$  and TGF $\beta$ ) and the epidermal growth factor receptor (EGFR) was done. The study seeks to define the role of the growth factors in relationship to various clinical and pathologic aspects of the disease. In addition it also seeks to explain whether the factors can predict response to radiation therapy and hence help in the management of such patients. A total of 588 patients with various grades of tumour progression in the uterine cervix were included for analysis in the study. A characteristic pattern of growth factor expression was evident in various phases of tumour progression. Normal cervical tissue and CIN 1 lesions showed expression of EGF, EGF-R, TGF  $\alpha$  and TGF $\beta$  in mild to moderate amounts in the basal cells and occasionally in lower spinal cells. However, advanced premalignant lesions (CIN II/III) showed high levels of EGF, EGF-R and TGF $\alpha$  in all layers of the epithelium while maintaining normal levels of TGF $\beta$ . Invasive cancer cells also showed a similar expression profile. These observations have serious implications for the elucidation of mechanisms involved in tumour progression. While EGF and TGF  $\alpha$  are known to cause increased expression of their common receptor (EGF-R) and result in cell proliferation, TGF $\beta$  is a known antagonist of cell proliferation and can also down-regulate proliferation associated gene expression. Distinct differences were also noted in the expression of the growth factors between patients remaining disease free after treatment (group 1) and those with residual/recurrent disease (group 2). Higher levels of expression of EGF and EGFR was found to be associated with Group 2 patients. On the contrary TGF $\beta$  was associated with patients remaining disease free (group 1). These findings suggest the possibility that these growth factors may be used in the assessment of tumour response to radiotherapy. It therefore appears that growth factors play a significant role in both the progression of cervical pre-malignancy and the biological behaviour of invasive cervical cancer.

Cell differentiation plays an important role in the biology and genesis of cancer. Cytokeratins are a family of related intermediate

filament proteins whose expression is tightly linked to epithelial differentiation. The differential expression of these proteins during the process of tumour progression is of significance. Cytokeratins are therefore ideal morphological markers to evaluate tumour progression. Characteristic patterns of cytokeratin expression were evident at various stages of cervical carcinogenesis. Expression of cytokeratins type 13 & 16 and 1, 10 & 11 were dependent on the degree of differentiation of the lesion. On the contrary, types 14, 18 and 19 were associated with de-differentiation being expressed strongly by proliferating basal cells and poorly differentiated basaloid cells. Similarly, expression of involucrin - a cytoplasmic protein synthesized during squamous maturation was also dependent on the differentiation of the lesion. These results therefore provide mechanistic details on the cellular architecture of cells during tumour progression in the uterine cervix and provides a model to explain the histogenesis of cervical carcinoma.

We have also had continued success in studies on the intrinsic mechanisms of drug resistance in various tumours including high grade Non Hodgkin's lymphoma. Chemotherapy has proven to be effective in the management of high grade Non Hodgkin's lymphoma (NHL). However drug resistance remains a major clinical obstacle to effective disease control. One such well documented system involves multi drug resistance (MDR), characterized by the over expression of a 170KD membrane protein called p-glycoprotein (Pgp). The protein functions as an active efflux pump involved in the active transport of drugs out of the cell resulting in reduced net intracellular drug concentration. Analysis of p-glycoprotein in lymph node tissue samples was done by immunocytochemistry and Western Blot. Patients were followed up for time periods ranging from 7 to 26 months after chemotherapy or until recurrent/residual disease was diagnosed. Of the 109 patients studied, 36 had either residual or recurrent disease. All these patients had a second lymph node biopsy done which was also analyzed for p-glycoprotein. P-glycoprotein was detected by immunocytochemistry in only 5 of the 73 patients who remained disease free, while it was expressed in 26 of the 36 patients with residual/recurrent disease. All the 36 tissue samples of the latter group and 42 of the 73 biopsies of the disease free group were re-analyzed by Western Blot. Only one of the 42 samples from the disease free group showed a positive Western blot reaction while 30 of the 36 samples from patients with recurrent/residual disease gave a positive

reaction. Thirty four of the 36 repeat biopsy samples from patients with recurrent/residual disease were positive for p-glycoprotein. Correlation analysis, thus showed significant relationship between prognosis and detection of p-glycoprotein. Moreover, the odds ratio of a tumour positive for p-glycoprotein not responding to chemotherapy was 35.36. Thus evaluation for p-glycoprotein may prove to be a useful prognostic marker for high grade NHL. Such information may also prove useful in designing or altering chemotherapy protocols in such patients.

Our Radiobiology Programme continued with studies to define the role of factors associated with tumour growth fraction in cervical cancer and its relationship to the clinical course of the disease. In addition, it also seeks to explain whether cell kinetics has an association with tumour response to radiotherapy and hence can help in the management of patients. A total of 312 patients have so far been evaluated at the time of first diagnosis. Of those, 152 patients have been evaluated through their course of radiotherapy. In these patients a correlation has been done between pretreatment status of tumour growth fraction associated markers and clinical outcome following a radiotherapy. Such patients were either disease free (group 1; n = 106) or with residual/recurrent disease (group 2; n = 46). The current follow-up period was up to 12 months. A tissue biopsy and smears of exfoliated cells were taken from all patients before any treatment. To study the transition of parameters analyzed during radiotherapy, cervical smears were obtained, before teletherapy, after 1000 cGy, 2,000 cGy, 3,000 cGy and on completion of 4,000 cGy. All pretreatment biopsies were analyzed for labelling index, using bromo deoxy uridine labelling of DNA and Ki67 antigen expression. In addition, evaluation of Argrophilic nucleolar organiser region (AgNOR), expression of epidermal growth factor (EGF), epidermal growth factor receptor (EGF-R), transforming growth factors alpha and beta, tumour suppressor protein p53, and the anti-apoptotic product bcl-2 was also done. Pretreatment analysis of AgNORs significantly correlated to disease status after treatment. This may be due to an effect of cell proliferation. Lower AgNOR counts were significantly associated with group - 2 patients suggesting that increased proliferative activity may be a positive prognostic indicator. The results obtained during various phases of radiotherapy also revealed consistent higher counts in group 1 patients. EGF & EGF-R both also showed significant pretreatment correlations with the final

disease outcome. Both these markers were expressed more by patients belonging to group 2. The opposite was the case for TGF  $\alpha$  where patients belonging to group - 1 showed higher values. The other growth factor investigated was TGF- $\beta$  and its expression in the two groups of patients was significantly different. Group 1 patients showed mostly mild to moderate expression while most of group 2 patients were negative for the growth factor. This conspicuous difference was also evident during the various phases of radiotherapy. Pretreatment expression of bcl-2 was conspicuously different in the two groups of patients. The majority of patients in group 1 showed mild expression while in group-2, the majority showed a moderate to intense expression. Similarly during various phases of radiotherapy, group-2 patients showed consistently higher levels of bcl-2. These studies have laid the preliminary basis for future research into the mechanisms of radio resistance.

### Extra Mural Research Grants (1996-97)

1. *Funding Agency* : Kerala State Committee for Science, Technology & Environment.  
*Project title* : The mutant p53 protein in breast cancer.
2. *Funding Agency* : Indian Council for Medical Research.  
*Project title* : Cellular manifestations of p53 and bcl-2 expression in ovarian cancer.
3. *Funding Agency* : Indian Council for Medical Research.  
*Project title* : Tumour response to radiation therapy in carcinoma of the uterine cervix: the role of ras gene mutation
4. *Funding Agency* : Department of Atomic Energy, Govt. of India  
*Project title* : Radiosensitivity, treatment outcome and ras gene mutation in rectal carcinoma.
5. *Funding Agency* : Department of Science & Technology.

*Project title* : Molecular Regulation of Programmed Cell Death.

### Doctoral and Post-Doctoral Programme

The Division has one post doctoral trainee and 5 PhD candidates working in the Doctoral Programme of the University of Kerala, and supported by fellowships from the Council for Scientific and Industrial Research and University Grants Commission.

- Dr. T.T. Sreelekha : Gene mutation and tumour response to radiotherapy
- Ms. S. Lakshmi : Patho-biological factors in cervical oncogenesis
- Ms. S. Asha Nair : The histogenesis of squamous cell carcinoma of the uterine cervix
- Ms. Lakshmi Kesari : Molecular evaluation of Indian Breast Cancer.
- Mr. R. Radhakrishnan : Cellular and molecular profile of Non- Hodgkins lymphoma.
- Mr. G. Sreenivas. : Apoptosis in paediatric acute lymphoblastic leukaemia.

### M.D/ M. S Theses

- Dr. Jessey MM** : Molecular pathology of gastric cancer.  
Dept. of Pathology,  
Medical College Hospital
- Dr. Sreekala S** : Human papilloma virus infection and cervical cancer  
Dept. of Obstetrics & Gynaecology,  
Medical College Hospital
- Dr. Pushkas** : Human papilloma virus infection associated cellular alterations in laryngeal lesions  
Dept. of E.N.T.,  
Medical College Hospital

- Dr. Shobha Abraham** : Angiogenesis and Tumour  
Dept. of Pathology, Proliferation in Meningioma.  
Medical College Hospital
- Dr. Preethi TR** : The role of p53 gene expression in  
Dept. of Pathology, Epithelial Ovarian Tumours.  
Medical College Hospital
- Dr. Bindu CS** : Hormone receptor status and cell  
Dept. of Pathology, proliferation in the in the grading of  
Medical College Hospital Breast cancer

### Collaborating Faculty, Project Investigators and Co-Investigators

#### From Regional Cancer Centre

- Prof. M. Krishnan Nair Director, Regional Cancer Centre  
Dr. F. Joseph Professor, Radiation Oncology  
Dr. P.G. Jayaprakash Assoc. Professor, Radiation Oncology  
Dr. V.M. Pradeep Assoc. Professor, Nuclear Medicine  
Dr Jayaprakash Madhavan Assoc. Professor, Radiation Oncology  
Dr V.P Gangadharan Assoc. Professor, Medical Oncology  
Dr P Kusumakumari Assoc. Professor, Medical Oncology  
Dr Iqbal Ahamed Assoc. Professor, Surgical Oncology  
Dr K Ramadas Asst. Professor, Radiation Oncology  
Mr Arunkumar Asst. Professor, Radiation Physics  
Dr K Chitrathara Asst. Professor, Surgical Oncology  
Dr KR Nalinakumari Lecturer, Dental Surgery

#### From Medical College Hospital, Trivandrum

- Dr. V.G. Chellam Professor of Pathology  
Dr. Basanti Nair Assoc. Professor of Pathology,  
Dr. P.P. Nair Assoc. Professor of Surgery

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*



Dr. Dan Ash of Cookridge Hospital, Leeds inaugurating the Inst. CME Programme in Clinical Radiobiology on 28th January, 1997. Also seen in the picture, Dr. M. Krishnan Nair and Dr. N. Babu, Vice Chancellor of the University of Kerala.

## DIVISION OF INFORMATION SYSTEMS

Mr. Jayasankar G.	- Systems Manager (till 30/6/96)
Dr. Alayamma Mathew	- Systems Manager in charge (1/7/96 to 9/10/96)
Dr. Cherian Varghese	- Systems Manager in charge (10/10/96 till date)
Ms. Bindu S.S.	- Systems Analyst
Mr. Manoj G.	- Jr. Systems Analyst
Mrs. Suseela Devi B.	- Data Entry Operator
Mrs. Jayanthi J.K	- Data Entry Operator

The Information Division was started in 1990 with a 486 DX 25 MHz under UNIX platform. The existing server along with applications have been used for registration, appointment & generate patient information, Inpatient admission, Cytology, Histopathology, Pharmacy, Purchase and CCL scheme. Applications have been developed for Central Store and Clinical Laboratories too.

The server was upgraded to Pentium 100 Mhz, 32 MB RAM, so that the online patient management data which contains about 150 MB can be utilized for fast retrieval in the above said divisions.

### New applications implemented

1. Treatment time calculation for teletherapy machines in Radiation Physics.
2. To trace the details of patient records in Medical records.
3. POPCan for population based cancer registry programme.

### Project Works

1. Final Semester students of College of Engineering, Chengannur have completed their project in UNIX System Programming. The project was to reduce the workload of the system administrator by providing a conferencing facility.

2. One MCA student from Manonmaniam Sundaranar University has done a work for the Clinical Laboratories for maintaining the Stock & Quality Control of the Instruments & reagents.
3. Final Year students from College of Applied Science, Puthuppally have been implementing a project for the blood bank.

### **Projects Supported**

1. HCR - NCRP(ICMR)
2. HPV
3. NBRR - Karunagapally
4. TOCS - Mangalapuram
5. Leukaemia Research Project.

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*

## **DIVISION OF COMMUNITY ONCOLOGY**

Dr. Babu Mathew	- Professor
Dr. Ramani.S.Wesley	- Asst. Professor
Sri.C. Sreekumar	- Social Investigator

During the period under report, the thrust areas of the division were as follows:

1. Human Resource Development: Training of Doctors, Health workers, Members of Voluntary Organisations and General Public for cancer control activities.
2. Generation and distribution of Health education materials, and utilization of mass media for cancer awareness.
3. Anti-tobacco workshops and campaigns throughout the state with the support of voluntary agencies.
4. Establishment of ECDC at District Head quarters for Cancer Control Programmes and Early Cancer detection .
5. Community based cancer research in the form of Chemo-prevention studies in prevention of Oral cancer by visual screening, Cervicoscopy for down staging uterine cervical cancer and the utilization of trained House Surgeons for cancer survey and surveillance.
6. Management of Early Cancer Detection Clinic in the centre and maintenance of a pre cancer registry.

### **Professional Training and Health Education**

- a) The training of House Surgeons posted in the Community Medicine department with the financial support of WHO (INDCAN 006) continued in the current year also. Three batches were trained during the period under report.
- b) Inservice training to Doctors: Five batches of Assistant Surgeons were given training on cancer control during their inservice training programme in the family planning centre, Trivandrum.



- c) Four batches of health inspectors and 2 batches of supervisory ANMS were given inservice training on cancer control during the period under report.
- d) Two workshops were given to the key Saksharatha Workers at Nemom and Moovattupuzha.
- e) Sixty four cancer awareness programmes were given to members of the Voluntary Organisations, factory workers, Community volunteers, Police officers and General public. The details of which are shown in Table 1.

### **Generation and Distribution of Health Education Materials**

Two leaflets on oral, breast and cervical cancers were generated for project purpose.

Two programmes through AIR were broadcast and 1 programme through ASIANET was telecast during the period under report. The health education materials generated during the previous years and the current year were distributed among community volunteers and other target groups.

### **Anti-tobacco Programmes and Campaigns**

"The World No Tobacco Day", 1996 was observed for about a week during this year. The theme of the year was economics of tobacco. 3000 copies of a book in Malayalam based in the theme was printed. Workshops were held at Emakulam, Pathanamthitta and Trivandrum for Panchayath Presidents of GramaPanchayaths, Presidents of Block Panchayaths and members and Presidents of Jilla Panchayaths in these areas. In addition, key persons working in the health services department, local administration department and social administrative department were invited for the workshop. Total of 412 persons attended the workshop. Due to local problems the workshop fixed at Kannur could not be held.

A mass run was held at Trivandrum from Kanakakunnu palace to VJT hall. A painting competition was held for children in the museum premises and a public meeting was held at VJT hall Trivandrum on 31st May 1996. Regional Cancer Association, ADIC India,

Yuvachaitanya and Bharath Scouts and Guides collaborated with RCC in observing the World No Tobacco Day.

### **Establishment of ECDC at Kollam**

Kollam Cancer Care Society was established with the help of RCC, DMO and Collector, Kollam. Training was given to 744 health workers and 106 General Practitioners through eight programmes. 72 Panchayath Presidents and 84 Nehru Yuvakendra volunteers were also trained for the proper functioning of ECDC, Kollam. Besides 3 batches of specialists like surgeons, gynaecologists, dental surgeons, and ENT surgeons were given practical training in RCC for the functioning of ECDC, Kollam.

### **Cancer Detection Camps**

Twenty early cancer detection camps were conducted during the period under report. The details of which are shown in Table 2.

### **Community based Cancer Research**

A major study with the financial support of IARC, Lyon France and Association for International Cancer Research, St. Andrews U.K. was initiated in the month of July. The aim of the study is to evaluate the efficacy of Oral visual inspection by trained investigators in the control of Oral cancer. The study is initiated in 13 panchayaths in Trivandrum district.

Another study on Evaluation of Chemo-prevention of Oral Cancer, the long term administration of Vitamin A in subjects at high risk sponsored by IARC, Lyon France and John Hopkins University, Baltimore U.S.A was initiated in January 1996. However, following NCI alert on administration of Vitamin A, the study is shelved for the time being.

The study on the performance evaluation of Unaided Visual Inspection, Cervicoscopy and Papsmear in the detection of Cervical cancer and precancers is ongoing from July 1996, for which the financial support is received from IARC. 3000 women were recruited, 415 colposcopies were done during the academic year.

Data on tobacco related mortality with financial assistance of global epidemiology headed by Richard Peto from the TOCSS study and control area and Trivandrum Corporation have been collected.

A collaborative study with Department of Biochemistry, University of Kerala and John Hopkins University, Baltimore, U.S.A on the role of Omega 3 Fatty Acids on the population of Kerala was initiated and is in the progress.

Analysis of the data on the collaborative project on Chemo-prevention of Oral cancer with Human Nutrition Research Centre, John Hopkins University, Baltimore, U.S.A is going on.

A WHO sponsored project sanctioned under INDCAM 006 utilising trained house surgeons for cancer survey and surveillance in the Pangappara Primary Health Centre and Vellanad PHC is in progress.

### **Early Cancer Detection Clinic of RCC**

An early cancer detection clinic of RCC is functioning to examine persons with warning signals of cancer, even in off OP hours and by prior appointment. 197 persons were examined during the period under report.

Details from 52 oral precancer cases detected during the year were fed into the oral precancer registry to study the natural history of development of precancerous lesions during this period. 12 cases of cancers were detected through ECDC. 1305 papsmoears, 415 colposcopies, 48 FNAC, 93 cervical biopsies, 38 oral biopsies were taken during the period under report.

### **Other important activities**

Regular clinics are held at Mangalapuram project office on all Saturdays for screening oral and cervical cancer patients. Cervical cancer screening for ESI patients at Peroorkada is done monthly. Oral, breast and cervical cancer screening is done for the people in coastal areas after preliminary screening by volunteers of HOPE.

### **Articles in laypress**

Dr. Babu Mathew has written a chapter in "Vijnanakairali" on the importance of early detection of cancer. Three articles were written

in three local newspapers like Indian Express, Mathrubhumi and Deshabhmani.

Sri C. Sreekumar has written two articles in Malayalam in "Anganjyothi", a publication of Social Welfare Department, Government of Kerala (December, 1996 issue) and in Janayugam Weekly July, 1996 about the hazards of tobacco and the influence of Cancer on society.

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*

Table 1.

## DETAILS OF CANCER AWARENESS PROGRAMMES 1996-97

Sl. No.	Date	Place	Organised	No. Attended	Type of Particulars
1	2	3	4	5	6
1	10/4/96	Neyyattinkara	Family Welfare Centre	23	Health inspectors
2	20/4/96	RCC	RCC	62	Nurses
3	23/4/96	RCC	RCC	43	House Surgeons
4	14/5/96	Karakonam	CSI Mission	150	Health workers
5	17/5/96	Puliyarakonam	Sathya Saibaba Trust	75	Lay Public
6	26/5/96	Nemom	CANFED	62	Saksharatha Workers
7	29/5/96	Ernakulam	ECDC Ernakulam	127	Lay Public
8	30/5/96	Pathanamthitta	District Collector, Pathanamthitta	42	Panchayath Presidents
9	31/5/96	RCC	IUHPE and RCC	83	Social Workers
10	31/5/96	Palayam	Red Cross Society & Antinarcotic Council	53	Social Workers
11	26/6/96	Palode	CANFED	85	Local Public(tribes)
12	03/7/96	Mannamoola	Concordia School	200	Students
13	03/7/96	Parassala	Jyothi Centre	154	Social Workers
14	08/7/96	Trivandrum	Co-operative College	295	Students
15	10/7/96	Vetikavala	Block and Panchayath	299	Health Workers

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1	2	3	4	5	6
16	11/7/96	RCC	RCC	55	Nurses
17	13/7/96	Veli	ISRO	156	Factory Workers
18	24/7/96	Neyyattinkara	Health Education Officer	9	Health Workers
19	31/7/96	Trivandrum	Telecommunications	150	Office Staff
20	05/8/96	Bhimappally	Councillor, TVM Cooperation	51	Teachers and parents
21	11/8/96	Kannur	Malabar Cancer Care Society	228	Police Officers
22	11/8/96	Kurumathoor	Malabar Cancer Care Society	341	Community Volunteers
23	12/8/96	Thaliparambu	Malabar Cancer Care Society	82	Community Volunteers
24	17/8/96	Paruthippara	Telecommunication	154	Office Staffs
25	20/8/96	East Fort	NSS Homeopathic Medical college	294	Students, Other systems
26	31/8/96	Vertucad	Catholic Welfare Society	108	Lay Public
27	03/9/96	Vanchiyoer	Tele-communication	102	Office staff
28	04/9/96	Moovattupuzha	Saksharatha Samithi	68	Saksharatha Samithi Workers
29	05/9/96	Malappuram	WDSCO	72	Community Volunteers
30	10/9/96	RCC	RCC	44	House Surgeons
31	2/10/96	Nemom	Sathyasai Trust	106	Lay Public
32	5/10/96	Vanchiyoer	Tele-communication	325	Lay Public

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1	2	3	4	5	6
33	06/10/96	Perayam	C.S.I. Church	84	Lay Public
34	18/10/96	Ayoor	Sevikasangam	71	Religious leaders
35	19/10/96	RCC	RCC	5	M.Sc Nursing students
36	29/10/96	RCC	DHS	19	Health workers
37	30/10/96	Calcutta	Chitaranjan National Cancer Institute	750	Lay Public
38	10/11/96	Kayamkulam	Rotary Club	160	Lay public
39	11/11/96	Punalur	D.M.O. Quilon	19	Medical Officers
40	12/11/96	Quilon	D.M.O. Quilon	149	Health Workers
41	18/11/96	Kottarakkara	D.M.O. Quilon	23	Medical Officers
42	19/11/96	Kottarakkara	D.M.O Quilon	192	Health inspectors
43	20/11/96	Quilon	D.M.O Quilon	43	General Practitioners
44	21/11/96	Quilon	D.M.O Quilon	235	Health Inspectors
45	21/11/96	Kannamoola	C.S.I. Seminary	63	Students
46	22/11/96	Quilon	Upasana Hospital	34	Nursing Students
47	25/11/96	Karunagappally	D.M.O Quilon	21	General Practitioners
48	26/11/96	Karunagappally	D.M.O Quilon	168	Health Workers
49	02/12/96	RCC	RCC	7	B.Sc. Nursing Students
50	12/12/96	Patchamala	World Vision	74	Lay Public
51	19/12/96	Nemom	Yajnasala	67	Community Volunteers
52	21/12/96	Peringamala	Iqbal College	65	Volunteers

1	2	3	4	5	6
53	22/12/96	Pathanapuram	NSS	30	Students
54	5/1/97	Palghat	Malabar Cancer Society & SBT	65	Community Volunteers
55	8/1/97	Cochin	Cochin harbour	362	Employees
56	14/1/97	Calicut	Dental College	126	Dental Students
57	17/1/97	RCC	Kottiyam Hospital	30	Nurses
58	22/1/97	RCC	RCC	52	House Surgeons
59	24/1/97	RCC	Holy Cross Hospital	28	Nurses
60	25/1/97	Nedumangad	IMA	25	Medical
61	19/2/97	Sherthalai	Autocast	427	Factory workers
62	5/3/97	Kumarapuram	H.S. Kumarapuram	53	Teachers
63	15/3/97	Thumba	VSSC	90	Factory workers
64	16/3/97	Kunnicode	Kunnicode PHC	225	Lay Public

**Table 2**  
**DETAILS OF CANCER DETECTION CAMPS (1996-97)**

Sl. No.	Date	Place	Organised by	Total Screened	New cancers	Old cancers	Oral Pre-cancers	Other pre-cancers
1	2	3	4	5	6	7	8	9
1	7-6-96	Quilon	S.B.T Quilon	149	6	0	6	8
2	18-6-96	Statue	YWCA	19	0	0	1	0
3	23-6-96	Manvitta	Keltron	86	2	0	4	0

1	2	3	4	5	6	7	8	9
4	25-6-96	Karakoram	CSI hospital	96	3	0	4	0
5	31-7-96	Kaudiar	Airforce	150	0	0	1	1
6	7-8-96	Punatur	Rehabilitation Plantation	168	1	0	4	0
7	31-8-96	Kaudiar	Airforce	93	0	0	0	1
8	7-9-98	Padanthalmoor	Social service society Kanniyakumari	365	5	0	0	17
9	21-9-96	Urambu	Social service society Kanniyakumari	68	1	0	4	2
10	2-10-96	Nemom	Sathya Sai Association	34	0	0	4	0
11	25-10-96	Chenkalkhoola	S.B.T	94	1	1	0	0
12	29-11-96	Achenkovil	Forest Department	74	1	0	7	7
13	21-12-96	Palode	NSS, Mar Ivanios College	99	0	0	1	0
14	22-12-96	Kilimanoor	SAT Hospital	20	0	0	0	0
15	18-1-97	Kodungaloor	Lion's Club	262	3	2	7	15
16	1-2-97	Korani	Mangalapuram PHC	68	1	0	0	0
17	23-2-97	Kayamkulam	Lion's Club	79	3	0	0	0
18	2-3-97	Kottarakara	Dr's of DCCP	35	0	0	0	0
19	16-3-97	Kunnikode	Dr's DCCP	205	0	0	20	0
20	24-3-97	Ottapalam	Seventh Day Adventist	75	5	0	0	0
Total				2239	32	3	73	51

## DIVISION OF E.C.D.C, ERNAKULAM

The centre is in its thirteenth year of service and in the year under report had very good achievements. Apart from giving service in prevention and early detection of cancer, the follow up clinic is a great help for the patients of central and northern Kerala. An average of 120 patients per clinic is benefited. The pain Clinic started during 1995 as part of pain and palliative care in district level is another solace. A pain clinic each, one at the Centre and other at cancer ward of Government Hospital, Ernakulam is being conducted. Distribution of medicine including Oral Morphine is free. 323 cancer patients are benefited from this scheme.

A total of 12520 persons were screened during the current year from which 10296 nos. of cytology done 581 nos. of premalignancies and 453 nos. of malignancies. Our Fine needle Aspiration Cytology includes CT and ultrasound guided FNACs which needed cytology confirmation of various deep seated tumours in Lung, Pancreas, Liver, Kidney etc.

The persons with high grade dysplasias in pap cytology and those having abnormality in P/S examination are subjected to colposcopic examination and if needed, colposcopic directed biopsies. The biopsies are reported below. The strict follow up of the above persons are done promptly.

The prestigious project, "Ernakulam District Cancer Control Programme" which is managed by this centre is in its fourth year of functioning. A total number of 24896 persons were screened in 500 clinics conducted at various parts of Ernakulam District in which 1610 premalignant and 148 malignant cases were detected.

The cervicoscopy project (WHO) is also running in full swing and a total number of 1273 cases were done of which 523 had done colposcopy.

The detailed work report is attached.

### Resume of work done 1996-'97

Sl.No.	Particulars of work done	ECDC	DCCP	Total
1.	Persons screened	7364	5156	12520
2.	Cervical smears	3675	3375	7050
3.	Oral smears	218	416	634
4.	Sputum	165	...	165
5.	Fine Needle Aspiraton	1897	491	2388
6.	Histopathology	126	...	126
7.	Colposcopy	304	...	304
8.	Colposcopy directed Biopsy	54	..	54
9.	Body fluid	42	...	42
10.	Nipple discharge	17	...	17

### Gynaecological Cytology

Sl.No	Lesions	Centre	Follow-up	Total
1.	Normal	167	53	220
2.	Inflammation	2285	591	2876
3.	Atypical squamous metaplasia	1	2	3
4.	Trichomonas Infection	152	29	181
5.	TV with mild dysplasia	12	8	20
6.	TV with moderate dysplasia	1	...	1
7.	Fungal infection	21	1	22
8.	HPV Infection	23	7	30
9.	Herpes Simplex Virus infection	43	12	55
10.	TV with virus	4	...	4
11.	Virus with mild dysplasia	3	...	3
12.	Virus with moderate dysplasia	4	1	5
13.	Virus with severe dysplasia	1	...	1
14.	Glandular cell hyperplasia	20	4	24
15.	Glandular cell atypia	61	20	81
16.	Mild dysplasia	38	10	48
17.	Moderate dysplasia	8	...	8
18.	Severe dysplasia	10	3	13
19.	Autolytic atrophy	1	...	1
20.	Carcinoma in-situ	5	3	8
21.	Invasive squamous cell Ca.	56	3	59
22.	Adenocarcinoma	1	1	2
23.	Endometrial Carcinoma	2	...	2
24.	Radiation changes	2	...	2
25.	Miscellaneous	6	...	6
<b>Total</b>		<b>2927</b>	<b>748</b>	<b>3675</b>

### Non-Gynaecological Lesions

Sl.No	Lesion	Total
<b>I Oral</b>		
1.	Benign	39
2.	Pre-malignant	77
3.	Suspicious	4
4.	Malignant	96
5.	Radiation changes.	2
	<b>Total</b>	<b>218</b>
<b>II Breast</b>		
1.	Nonmalignant lesions	689
2.	Suspicious	1
3.	Malignancy	121
4.	Miscellaneous	1
	<b>Total</b>	<b>812</b>
<b>III Thyroid</b>		
1.	Benign	433
2.	Suspicious	3
3.	Malignancy	10
4.	Miscellaneous	1
	<b>Total</b>	<b>447</b>
<b>IV Lymphnode</b>		
1.	Benign	310
2.	Suspicious	1
3.	Malignancy	
	a. Primary	3
	b. Secondary	56
4.	Miscellaneous	6
	<b>Total</b>	<b>376</b>
<b>V Salivary Gland</b>		
1.	Benign	20

2.	Suspicious	2
3.	Malignancy	13
	<b>Total</b>	<b>35</b>
<b>VI Liver</b>		
1.	Benign	5
2.	Malignancy	14
	<b>Total</b>	<b>19</b>
<b>VIII Other Site</b>		
1.	Benign	157
2.	Suspicious	5
3.	Malignancy	22
	<b>Total</b>	<b>184</b>
<b>IX Body fluids</b>		
1.	Ascitic fluid	
	1. No malignant cells	6
	2. Malignancy	2
	<b>Total</b>	<b>8</b>
2.	Pleural fluid	
	1. No malignant cells	27
	2. Malignancy	4
	<b>Total</b>	<b>31</b>
3.	C.S.F	
	No Malignant cells	1
	<b>Total</b>	<b>1</b>
4.	Gastric fluid	
	No Malignant cells	2
	<b>Total</b>	<b>2</b>
<b>X Nipple Discharge</b>		
1.	No malignant cells	16
2.	Malignancy	1
	<b>Total</b>	<b>17</b>
<b>Total</b>		<b>2134</b>

### Sputum Cytology

No.	Lesion	Total
1.	No malignant cells	133
2.	Fungal Infection	3
3.	Atypical and suspicious	3
4.	Squamous cell carcinoma	14
5.	Anaplastic carcinoma	2
6.	Mucoepidermoid carcinoma	5
7.	Miscellaneous	5
<b>Total</b>		<b>165</b>

### Histopathologic Examination

Sl.No.	Specimen	Benign	Ca-in-situ	Malignant	Total
1.	Gynaecological	49	9	6	64
2.	Breast	16		4	20
3.	Oral	5		4	9
4.	Other site	22		5	27
5.	Miscellaneous	6		..	6
<b>Total</b>		<b>98</b>	<b>9</b>	<b>19</b>	<b>126</b>

### Ernakulam District Cancer Control Programme Work during July 1993 - March 1997.

Total number of clinics	500
Total number of persons screened	24,896
Male	4,613
Female	20,283
<b>Oral</b>	Non-malignancy 995
	Pre-malignant lesions (Clinical/Cytological) 910
	Malignancy 51
	Suspicious of malignancy 4
	Miscellaneous 80
	Total oral smears 1,427
<b>Breast</b>	Non-malignancy 264
	Malignancy 17
	Suspicious of malignancy 1
	Miscellaneous 192
	Total breast aspiration 474
<b>Cervix</b>	Non-malignancy 14,542
	Pre-malignant 700
	Malignancy 55
	Total cervical smears 15,297
<b>Thyroid</b>	Benign 488
	Malignancy 1
	Suspicious 4
	Atypia 5
	Miscellaneous 80
	Total thyroid aspiration 578
<b>L.N</b>	Benign 76
	Granulomatous 26
	Suspicious 0
	Miscellaneous 5
	Malignancy 13
	Total L.N aspirations 120
<b>Other Sites</b>	Benign 161
	Suspicious 3
	Malignancy 11
	Miscellaneous 351
	Total other smears 526



## DIVISION OF E.C.D.C, PALAKKAD

Dr. R. Ananda Kamath - Cytopathologist

### Activities

The centre continued all the activities undertaken during the previous year. These comprised of examination of patients at the centre, referred from other institution and at cancer detection camps organised by voluntary agencies, collection of smears from these either directly or by FNAC, processing and reporting these, referring diagnosed cases to R.C.C or elsewhere for proper treatment and affording pain and palliative care to incurable and advanced cases as per WHO guidelines. The output of work has been analysed and presented along with.

**Table -1**  
**Break up of cytological smears during 1996-97**

Sl. No	Specimen	Centre	Camp	Cancer Cases		Total
				Centre	Camp	
1	Cervical smears	428	449	8	3	877
2	Buccal smears	103	22	16	2	125
3	Breast	38	4	2	1	42
4	Sputum	150	--	4	--	150
5	Others	76	9	7	3	85
	<b>Total</b>	<b>795</b>	<b>484</b>	<b>37</b>	<b>3</b>	<b>1279</b>

**Table - 2**  
**Analysis of Gynaecological smears**

Cervical smears	Centre	Camp	Total
Normal	57	121	178
Inflammation	255	230	485
Inflammation with squamous metaplasia	33	16	49
Trichomonas Vaginalis infection	66	69	135
Mild dysplasia	..	1	1
Moderate dysplasia	1	1	2
Severe dysplasia	1	..	1
Ca-in-situ	1	..	1
Nuclear Atypia	1	4	5
Malignancy	8	3	11
N M C	3	4	7
Radiation changes	1	..	1
Necrotic material	1	..	1
<b>Total</b>	<b>428</b>	<b>449</b>	<b>877</b>

**Table -3**  
**Analysis of Non-Gynaecological smears 1996-97**

Specimen	Centre	Camp	Total
<b>Buccal smears</b>	<b>103</b>	<b>22</b>	<b>125</b>
Non-malignant	75	18	93
Suspicious	12	2	14
Malignant	16	2	18
<b>Breast</b>	<b>38</b>	<b>4</b>	<b>42</b>
Non-malignant	35	3	38
Suspicious	1	..	1
Malignant	2	1	3

<b>Sputum</b>			
Non-malignant	150	..	150
Fungus	141	..	141
Suspicious	5	..	5
Malignant	3	..	3
	1	..	1
<b>Miscellaneous</b>			
Non-malignant	76	9	85
Suspicious	67	6	73
Malignant	2	..	2
	7	3	10
<b>Total</b>	<b>367</b>	<b>35</b>	<b>402</b>

*Conferences, etc. attended - (Chapter III)  
Papers Published/Presented - (Chapter IV)*

**Table 4**  
**Cmpus conducted in 1996-97**

Sl. No.	Date	Place	Sponsors
1.	16-06-96	Narivalamunda, Malappuram Dist.	Malabar Cancer Care Foundation
2.	22-09-96	Thalakulathoor, Kozhikkode Dist.	Malabar Cancer Care Foundation
3.	06-10-96	Sanjeevani Hospital, Palakkad Dist.	Sri Sathya Sai Seva Organisation
4.	13-10-96	Maruthankara, Kozhikkode Dist.	Malabar Cancer Care Foundation
5.	10-11-96	Thamarassery, Kozhikkode Dist.	Malabar Cancer Care Foundation
6.	24-11-96	Pudupadi, Kozhikkode Dist.	Malabar Cancer Care Foundation
7.	08-12-96	Vellinghi, Palakkad Dist.	Yuva Dhara Arts & Sports Club
8.	15-12-96	Karumathur, Ernakulam Dist.	Ideal Relief Wing, Ernakulam unit
9.	11-01-97	Vannamada, Palakkad Dist.	Sumaruru Sidha Sanmarga Sangam
10.	26-01-97	Kulakkattukurissi, Palakkad Dist.	V.T.B. College, N.S.S. unit
11.	02-03-97	Kakkodi, Kozhikkode Dist.	Malabar Cancer Care Foundation
12.	24-03-97	SDA Hospital, Ottappalam, Palakkad Dist.	Ashakiranam, Shornoor

**Table -5**  
**Pain and palliative care clinic, 1996-97**

New cases		58
Old repeat cases		10
WHO	Step I	5
	Step II	16
	Step III	37
Total Number of visits		341

## **DIVISION OF LIBRARY AND INFORMATION SERVICES**

The Library and information Division attained a new face with the opening up of the new library building by our Director on 13th November, 1996. Obviously, this has been the realisation of a long cherished dream for a well equipped library of our health professionals and researchers. The library continued all its activities providing effective information support for the patient management, research and various other academic activities of the Centre. As in the previous years, apart from the internal users, the library resources are being increasingly used by several doctors, researchers, students from Medical Colleges, University departments, Research Institutes and other research organizations.

### **Reorganization of the Library**

The noteworthy work done during the report year was the shifting of the library resources to the new building and their reorganization. Apart from the spacious reading area for journals, circulation counter, scholars cubicles and stack area, the facilities included in the new set up are separate rooms for projection facility, databases search, audio-video cassettes, photocopying, acquisition and technical processing and for reference. It has been observed that the use of library resources increased considerably in the new environment.

### **Internet search facility and Electronic Mail**

Another major activity was the introduction of internet facility which was established on a dial up basis through the VSNL router installed at Technopark Campus in Trivandrum. Being a real boon to our researchers and doctors, the facility provides quick access to the nascent information in their super speciality area available anywhere in the world. The facility is also being used for downloading of forms, packages, protocols etc. as and when required. Several searches have been made in the internet both for research and patient management.

Facilities were provided in the library for the prompt collection and distribution of incoming E-Mails and sending the mails from our Centre.

## Collection

As in the previous year, high priority has been accorded to subscription to the journals. For the Calendar year 1996, the library subscribed to 104 journals. On the basis of the review by the Library Committee, two journals (one of which rather expensive) were discontinued, and 3 journals were added. The other documents added were as follows:

	Added during 1996-97	Collection as on March '97
Books, Monographs, back volumes	564	5276
Current journals	3	104
Reports & Reprints	201	2231
Audio video Cassettes	10	80

Steps are being initiated for resource sharing - the sharing of journals among at least with the nearby libraries, in view of increasing price like of journals.

## Database search facility

Database facilities were extensively used during the year under report. Library subscribed to Cancer CD which contains data both from EMBASE and MEDLINE. This CD ROM database is being heavily used (more than 150 searches a month) for patient management and cancer research. In addition to the Internet, ONLINE search facilities were also provided in the NICNET connectively through the SCTIMST VSAT which facilitates access to MEDLARS databases and union catalogue of biomedical serials in India. In addition to internal users, the MEDLARS search facility is being used by students and doctors from medical college, University departments and research institutes.



A view of the Library of the Regional Cancer Centre, Trivandrum.

## **RCC Publications**

In the Inhouse database of RCC Publications, 50 papers contributed by the academic staff were added with abstracts. The database, which used micro CDS/ISIS ver. 3 package for its generation, contains citations with abstracts of about 520 RCC Publications starting for 1981. Data relating to the various conferences, symposia and seminars attended to by the staff are also being added to the database concerned.

## **Institutional membership and Inter Library loan**

Inter library loan arrangements with the libraries of SCTIMST, Centre for Development Studies, British Library, etc. were continued.

## **Other information services**

As part of Current Awareness Programme, a fortnightly Current Contents Bulletin carrying the contents pages of journals and other documents added to the collection was distributed. On the basis of our users profile, the database search services provided by BARC library and information services division, using the INIS databases was utilised for rendering the SDI service to our concerned community. Quarterly Press Clippings service on oncology and allied areas covering the popular English dailies in India was also continued. Copies of articles and reprints that are not available in the library were collected on demand from various other centres. Entire professional, official and project photocopying requirements of all the divisions were met by the library.

The library remained open on all the days from Monday to Saturday 9am to 5pm except on ten national holidays.

Efforts are being made for the modernization of the library further, in spite of budgetary constraints, leading to the new concept of a 'library without walls'.

*Conferences, etc. attended - (Chapter III)*

*Papers Published/Presented - (Chapter IV)*

**CONFERENCES/SEMINARS/TRAININGS/  
WORKSHOPS, ETC. ATTENDED - BY  
VARIOUS STAFF.**

Dr. Alex K. Ittyavirah  
Asso. Prof. in Imageology

17th Annual conference of Indian  
society for Dental Research, Faculty  
member, Trivandrum, November, 1996.

6th National Conference on Ultrasound  
US CON, Lucknow, December, 1996.

Workshop on international sonograph  
and congress on clinical obstetrics and  
Gynaecology, Trivandrum, January,  
1997.

International workshop on the use of  
lasers in medicine, Trivandrum,  
February, 1997.

Medical Imaging update, Faculty  
member, Trichur, March, 1997.

Workshop on working of cancer  
registries, NCRP (ICMR) Faculty  
member, Trivandrum, March, 1997.

International seminar on Psycho-  
social issues in health care with special  
emphasis on psychosocial oncology.  
RCC, Trivandrum, March, 1997.

CME on recent trends in Oncology.  
Thrisur, March, 1997.

CME programme on recent advances  
in pathology, MCH, Trivandrum,  
October, 1996.

IAPM, Kerala chapter, MCH,  
Trivandrum, October, 1996.

Dr. Aleyamma Mathew  
Asst. Prof. in Statistics  
& Epidemiology

Dr. Ananda Kammath P  
Cytopathologist

Dr. Anitha Mathews  
Lecturer in Pathology

Smt. Anitha Nayar  
Social Investigator

Mr. Arun Kumar L.S  
Asst. Prof. in Radiation Physics

Dr. Babu Mathew  
Prof. in Community Oncology

Dr. Beela Sarah Mathew  
Lecturer in Radiotherapy

Dr. Bhattathiri V N  
Asso. Prof. in Radiotherapy

Annual National Conference of IAPM  
and pre-conference CME on Bone  
marrow pathology, Bangalore,  
December, 1996.

National Sociological Seminar,  
Trivandrum, November, 1995.

Workshop on quality assurance of  
treatment planning system, RPSD,  
BARC, Mumbai, August, 1996.

7th Annual conference of KAMP,  
Medical College, Kottayam, December,  
1996.

17th Annual conference on Medical  
Physics, Cancer Institute, Madras,  
December, 1996.

Workshop on Brachytherapy, Adayar,  
Madras, December, 1996.

17th annual conference on medical  
physics Adayar, Madras, December,  
1996.

International workshop on the use of  
lasers in medicine, SCT, Trivandrum,  
February, 1997.

8th Annual conference of ISPPD,  
Trivandrum, 1996.

Governing Body meeting of the  
Emakulam Cancer Society, Ernakulam,  
November, 1996.

Expert committee meeting of ICMR on  
pan masala, Resource person,  
February, 1997.

18th annual conference AROI,  
Aurangabad, December, 1996.

18th annual conference AROI,  
Aurangabad, December, 1996.

Smt. Bindu L Cytotechnologist	9th Kerala Science Congress, Trivandrum, January, 1997.
Ms. Bindhu S S Systems Analyst	2nd all India Ingress users convention, Chennai, January, 1997.
Mr. Chandrakumaran Nair Senior librarian	Training on modern technologies for information handling AIIMS, New Delhi, September, 1996.
"	National convention of Medical Library Association of India, Hyderabad, November, 1996.
Dr. Chandralekha B Prof. of Cytopathology	Midterm conference of Indian Society of Gastroenterology, Kerala chapter, MCH, Alappuzha, August, 1996.
"	CME Programme IAPM, Kerala chapter, MCH, Trivandrum, October, 1996.
"	26th Annual Conference and pre- conference workshop on cytology of paediatric tumours of IAC, Calcutta, November, 1996.
"	Workshop on head and neck surgery, Faculty member, AOF & RCC, Trivandrum, January, 1997.
Dr. Cherian Koshy Asst. Prof. in Surgery	20th Annual conference of ASI, Kerala Chapter, Trivandrum, February, 1997.
"	Annual conference of Association of plastic surgeons of India, Kerala Chapter, Cochin, March, 1997.
"	International Seminar on psycho-social Issues in health care with special emphasis on psycho-social oncology. RCC, Trivandrum, March, 1997.

Dr. Cherian Varghese Asso. Prof. in Epidemiology	Scientific meeting of the International Epidemiology Association, Magoya, Japan, August 1996.
"	Workshop on working of cancer registries, NCRP, ICMR, Organiser, Trivandrum, March, 1997.
"	International seminar on psycho-social issues in health care with special emphasis on psycho-social oncology, Trivandrum, March, 1997.
Dr. Chitrathara K Asst. Prof. in Surgery	Annual conference of association of Obst & Gynac, Kerala Chapter, Trivandrum, 1996.
"	Training in urology, MCH, Trivandrum, July-December, 1996.
"	20th Annual Conference of ASI, Kerala Chapter, Trivandrum, February, 1997.
Mr. Davis C.A Asso. Prof. in Radiation Physics	Training in advance after loading Brachytherapy, Cookridge hospital, Leeds, UK and Christie hospital, Manchester, UK, April-May 1996.
"	Workshop on pulsed Brachytherapy, Nuclear - oldefit, Tours, France, May, 1996.
"	First international brachytherapy meetings, GEO/ESTRO-ABS-GLAC, Tours, France, May, 1996.
"	Training in multileaf collimator conformal therapy and 3D planning at the Royal Marsden Hospital, London and Royal Marsden Hospital, Sutton, May, 1996.
"	Training in Plaque therapy technique for retinoblastoma and melanoma of eye, St. Bartholomew's Hospital, London, May, 1996.

"	Attended demonstration of gammamed HDD Brachytherapy machine, General Hospital, Singapore, October, 1996.
"	7th Annual meeting of KAMP, Kottayam, December, 1996.
"	International workshop on the use of lasers in medicine, SCT, Trivandrum, February, 1997.
"	Treatment planning system, Theraplan plus - demonstration, M/s Theratronics, Bangalore, March, 1997.
"	CME programme on recent advances in oncology, MCH, Trichur, March, 1997.
Dr. Elizabeth K. Abraham Addl. Prof. in Cytopathology	CME Programme IAPM, Kerala Chapter, MCH, Trivandrum, October, 1996.
"	National Conference of IAPM, Bangalore, December, 1996.
"	Workshop on working of cancer registries, Faculty member, RCC, Trivandrum, March, 1997.
Smt. Elsamma Joseph Staff Nurse	4th International Conference on Palliative Care, Gwalior, February, 1997.
Dr. Francis V James Asst. Prof. in Radiotherapy	Annual conference of British Oncology Association, Cardiff, UK, 1996.
Dr. Gangadharan V.P Asso. Prof. in Medical Oncology	Workshop on Osteosarcoma, Madras, January, 1996.
"	Symposium on growth factors - Madras, March, 1996.
"	State meet of Indian Society of Blood Transfusion and Haematology - Kottayam, March, 1996.

"	Symposium on chemotherapy, Goa, June, 1996.
"	Symposium on haemopoetic growth factors, New Delhi, September, 1996.
"	18th All Kerala congress of obstetrics and gynaecology, Trivandrum, January, 1997.
"	9th Biennial conference of the Indian Society of Medical & Paediatric Oncology, Madurai, February, 1997.
"	Regional meet of Indian Society of Paediatric Oncology and Haematology, New Delhi.
Dr. Geetha Sukumaran Lecturer in Cytopathology	Midterm conference of Indian Society of Gastroenterology, Kerala chapter, Alappuzha, August, 1996.
"	CME Programme IAPM, Kerala chapter, Trivandrum, October, 1996.
Dr. Gladys Jeevy Asso. Prof. in Anaesthesiology	13th South Zone Conference of Indian society of Anaesthetists, Cochin, May, 1996.
"	Indian Society of Anaesthetists, Nagarcoil, Tamil Nadu, August, 1996.
"	21st Annual conference of Kerala State Branch of Indian society of Anaesthesiologists, Chair-Person, Quilon, October, 1996.
"	Workshop on head and neck surgery, RCC, Trivandrum, January, 1997.
"	3rd National conference on Critical care and the Annual conference of the Indian society for parenteral and enteral nutrition (ISPEN), Madras, January, 1997.



"	International seminar on psycho-social issues in health care with special emphasis on psycho-social oncology. RCC, Trivandrum, March, 1997.
Dr. Iqbal Ahamed M Asso. Prof. in Surgery	National Symposium on Enteral and Parenteral Nutrition. Trichur, May, 1996.
"	IASO MIDCON-96. International conference and CSE, Chair-Person. Ahmedabad, October, 1996.
"	20th Annual conference of ASI, Kerala chapter. Trivandrum, February, 1997.
"	International workshop on Laser applications. Trivandrum, February, 1997.
Dr. P.G. Jayaprakash Assoc. Prof. of Radiotherapy	AROI Conference, Wardha, Maharashtra, September, 1996.
Dr. Jayaprakash Madhavan Assoc. Prof. of Radiotherapy	CME at Kanchipuram, Tamilnadu, May, 1996.
"	AROI, Tamilnadu chapter, Madurai, September, 1996.
Smt. Jayalakshmy Scientific Assistant	Training programme on rehabilitation, mastectomies, Mumbai, December, 1996.
"	International conference on palliative care, Gwalior, February, 1997.
Dr. Jayasree K Asst. prof. in Cytopathology	International workshop on problem solving for better health, Cochin, April, 1996.
"	IAPM, Kerala chapter, MCH, Trivandrum, October, 1996.
Dr. Jem Prabhakar Asst. Prof. in Surgery	IASO MIDCON - 96. International conference and CSE. Ahmedabad, October, 1996.

"	20th annual conference of ASI, Kerala Chapter. Trivandrum, February, 1997.
"	International workshop on Laser applications, Trivandrum, February, 1997.
Dr. Krishnakumar A.S Asst. Prof in Imageology	Annual conference of endocrine society of India, Ernakulam, 1996.
"	Gynaecological Society of India, Kerala Chapter, Trivandrum, January, 1997.
"	International workshop on medicine, SCTIMST, Trivandrum, February, 1997.
"	National workshop on nuclear medicine, RCC, Trivandrum, February, 1997.
Dr. Krishnan Nair M Director & Prof. in Radiotherapy	4th International Conference on high background radiation areas. Beijing, China and Tokyo, October, 1996.
"	13th Asia Pacific Conference. Penang, Malaysia, November, 1996.
Dr. Kusumakumary Asso. Prof. in Paediatric Oncology	CME programme in Paediatrics, Kottayam, April, 1996.
"	Training in molecular epidemiology and biology of leukaemia/lymphoma in children of Kerala, UK, September, 1996.
"	8th Annual meeting of AROI, Kottayam, November, 1996.
Mrs. Latha P.T Social Investigator	International palliative care workshop, UK, October, 1996.
"	Training on quality of life research studies, Royal Marsden hospital, UK, November, 1996.
"	National Sociological Seminar, Trivandrum, November, 1996.

"	Reach to recovery programme for the mastectomies, Tata Memorial Hospital, Mumbai, December, 1996.
"	4th International Conference of the Indian Association of Palliative Care. Gwalior, India, February, 1997.
"	International seminar on psycho-social issues in health care with special emphasis on psycho-social oncology, Organizer. Trivandrum, March, 1997.
"	Workshop on working of cancer registries, NCRP (ICMR), Trivandrum, March, 1997.
Smt. Lizyamma Jacob Head Nurse	Workshop on research in cancer clinical trials, Epidemiology and Audit, Bombay, February, 1997.
Mr. Manoj G Jr. Systems Analyst	Workshop on working of cancer registries, NCRP (ICMR), March, 1997.
Dr. Manoj Pandey Lecturer in Surgery	IASO MIDCON' 96. International Conference and Continuing Surgical Education, Ahamedabad, October, 1996.
"	Annual Conference of Association of Surgeon of India. Mumbai, December, 1996.
"	5th Annual Conference of Indian Society of Gastroenterology Kerala Chapter. Trivandrum, January, 1997.
"	20th Annual Conference of ASI, Kerala Chapter. Trivandrum, February, 1997.
"	Annual Conference of Association of plastic surgeons, Kerala Chapter. Kochi, March, 1997.

"	2nd International seminar on psychosocial issues in health care with special emphasis on psycho-social oncology. Trivandrum, March, 1997.
Sri. P. Meera Sahib Sr. Scientific Assistant	Indian society for blood transfusion and immune haematology, Kerala chapter, Ernakulam, March, 1997.
Mr. Mohanachandran Clinical Research Assistant	Medical records training, JIPMER, Pondichery.
Mrs. Molykutty John Lecturer in Cancer Research	45th Annual conference of Indian association of pathologists and microbiologist, Bangalore, 1996.
"	9th Kerala Science Congress, Trivandrum, January, 1997.
Dr. Nalina Kumari K R Lecturer in Dental Care	97th Annual conference of the Indian society for Dental Research. Dental College, Trivandrum, November, 1996.
"	18th Annual Conference of the Indian Society of pedodontics and preventive Dentistry. Dental College, Trivandrum, January, 1997.
"	international Seminar on psycho-social issues in health care with special emphasis on psycho-social oncology. RCC, Trivandrum, March, 1997.
Dr. Padmanabhan V Prof. in Radiation Physics	9th Annual conference of Indian society for dental research, Trivandrum, November, 1996.
"	7th Annual KAMP meeting, MCH, Kottayam, December, 1996.
"	17th Annual conference on medical physics, Cancer Institute, Madras, December, 1996.
"	All Kerala Government Radiographers Association Roentgen centenary

	celebration & Becquerel day, Trivandrum, December, 1996.
"	CME programme in clinical radiology, Trivandrum January, 1997.
"	6th National symposium on environment, Coimbatore, January, 1997.
"	Workshop on Nuclear Medicine in Oncology, RCC, Trivandrum, February, 1997.
"	International workshop on the use of lasers medicine, SCT, Trivandrum, February, 1997.
Dr. Parameswaran Assoc. Prof. in Radiotherapy	International symposium on Orthopaedic Oncology. Madras, January, 1996.
Dr. Prabha Balaram Addl. Prof. in Cancer Research	DBT Task force meeting on medical biotechnology, New Delhi, May, 1996.
"	9th Kerala Science Congress, Trivandrum, January, 1997.
Dr. Pradeep Assoc. Prof. in Nuclear Medicine	Workshop on nuclear medicine in oncology, Organizer, RCC, Trivandrum, February, 1997.
Dr. Prakash N.P. Lecturer in Medical Oncology	Briefing session in clinical trial of Gemcitabin, New Delhi, March, 1997.
Dr. Priya J. Medical Officer	Indian society for blood transfusion and immune haematology, Kerala chapter, Ernakulam, March, 1997.
Dr. Priyakumary T. Lecturer in Paediatric Oncology	International seminar on psycho-social issues in health care with special emphasis on psychosocial oncology, Trivandrum, March, 1997.
Dr. Rachel Cherian Koshy Asst. Prof. in Anaesthesiology	13th South Zone Conference of Indian Society of Anesthesiologists. Cochin, May, 1996.

"	Annual Scientific Meeting of American Pain Society, Washington D.C, November, 1996.
"	Training in cancer pain management, Johns Hopkins Hospital, Baltimore, USA, September, 1996 - March, 1997.
Dr. Radhakrishna Pillai M. Asso. Prof. in Laboratory Medicine & Tumour Biology	International Atomic Energy Commission meeting on radiation responsiveness criteria for human tumours as a determinant for therapeutic modality planning, Austria, October, 1996.
"	International training course on molecular biomarkers in environmental cancer epidemiology. NCI, Shanghai, China, November, 1996.
"	Indo-French Symposium on apoptosis and multi drug resistance, Pune, February, 1997.
Dr. Raghu Ram K. Nair Asst. Prof. in Radiation Physics	CME programme of Tamil Nadu Hospital. Madras, June, 1996.
"	Training in the Radiological Physics & advisory division of BARC, Radiation Medicine Centre, Bombay, October, 1996.
"	Annual meet of the Association of Medical Physicist of Kerala (KAMP), Kottayam, November, 1996.
"	All India workshop on nuclear medicine in oncology. Faculty member, RCC, Trivandrum, February, 1997.
Sri. Rajan A. Maintenance Engineer	Seminar Infotec '96. Technical seminar, Kochi, November, 1996.
Dr. Rajan B. Prof. in Radiotherapy	Obst & Gynaecologist of India, Kerala chapter, Trivandrum, April, 1996.

	18th annual conference, AROI, Aurangabad, December, 1996.		
Dr. Ramachandran K Asso. Prof. in Imageology	Training in advances in radiology (RIA, Madras, October, 1996.		International course on molecular biomarkers in environmental cancer epidemiology, Shanghai, People's Republic of China, November, 1996.
"	Workshop on international sonography and congress on clinical obstetrics and gynaecology, January, 1997.		Workshop on imaging and documentation systems, M/S biorad USA, January, 1997.
"	International workshop on lasers in medicine, SCTIMST, Trivandrum, February, 1997.		22nd National conference of the Indian society of human genetics, Bangalore, January, 1997.
"	Update in Medical imaging, IRIA Kerala, Trichur, March, 1997.		9th Kerala Science Congress, Trivandrum, January, 1997.
"	CME, Chaitanya eye hospital, Trivandrum, March, 1997.		CME programme in clinical radiobiology, RCC, Trivandrum, January, 1997.
Dr. K. Ramadas Asst. Prof. in Radiotherapy	UICC ICRET fellowship, London, UK, June, 1996.		International seminar on psycho-social issues in health care with special emphasis on psycho-social oncology, RCC, Trivandrum, March, 1997.
"	18th AROI conference, Aurangabad, December, 1996.	Dr. Rekha A Nair Asst. Prof. in Cytopathology	Training on immunohistological characteristics of lymphoid neoplasia, NCI, Bethesda, USA, July-Dec, 1996.
Dr. K. Ratheesan Asst. Prof. in Radiotherapy	International symposium on Orthopaedic Oncology, Madras, January, 1996.	Dr. Remani P Asst. Prof. in Cancer Research	9th Kerala Science Congress, Trivandrum, January, 1996.
Dr. Raveendran Pillai K Cytotechnologist	Training in laboratory protocols of bone marrow transplantation procedure, George Town University Medical Centre, Washington and Nicholson research centre, Maryland, USA, January-May, 1996.	"	2nd International Kyoto life science symposium on lymphocyte selection, tolerance and autoimmunity, Kyoto, Japan, May, 1996.
"	Workshop on HLA-typing, The American society for histocompatibility and immunogenetics. Bill young DOD marrow programme, Maryland, USA, April, 1996.	"	Training in Techniques of studying cell membrane changes with hyperthermia and lectin using flow cytometer, Osaka, Japan, May-July, 1996.
Dr. Ravindran Ankathil Asst. Prof. in Cancer Research	17th Annual conference of the Indian association of biomedical scientists, Pondichery, October, 1996.	"	6th Annual meeting of the Japan cytometry society and workshop on FCM analysis, Osaka, Japan, June, 1996.

"	Workshop on imaging and documentation systems by BIORAD, USA in Trivandrum, January, 1997.
"	CME programme on clinical radiology, Trivandrum, January, 1997.
"	NEAC symposium on medicinal plants and cancer, Trivandrum, February, 1997.
Dr. Remani S. Wesley Asst. Prof. in Community Oncology	Training on Colposcopy and Leep, Madras, May, 1996.
Smt. Sally Abraham Head Nurse	4th International conference on palliative care, Cancer hospital and research institute, Gwalior, M.P, February, 1997.
"	International seminar on psycho-social issues in health care with special emphasis on psycho-social oncology, RCC, Trivandrum, March, 1997.
Sri. Sanjai D. Lab Technician	Indian society for blood transfusion and Immune haematology, Kerala chapter, Ernakulam, March, 1997.
Dr. Sasidharan K Prof. in Imageology	IRIA workshop cum conference on Imaging, Madras, October, 1996.
"	Workshop on international sonography and congress on clinical obstetrics and gynaecology, Trivandrum, January, 1997.
"	International MR symposium, Mumbai, February, 1997
"	C.T. of PNS. Medical Imaging update, IRIA, Kerala, Trichur, March, 1997.
Smt. Sisy Das Staff Nurse	4th International Conference on Palliative Care, Gwalior, February, 1997.

Dr. Sreedevi Amma N Dy. Director & Prof. of Cytopathology	Midterm conference of Indian Society of Gastroenterology, Kerala chapter, MCH, Alappuzha, August, 1996.
"	CME Programme IAPM, Kerala chapter, MCH, Trivandrum, October, 1996.
"	26th Annual Conference and pre-conference workshop on cytology of paediatric tumours IAC, Calcutta, November, 1996.
"	Workshop on head and neck surgery, Faculty member, AOI & RCC, Trivandrum, January, 1997.
Dr. Suresh Chandra Dutt Asst. Prof. of Radiotherapy	World conference of Psycho-oncology, Newyork, USA, October, 1996.
"	Annual State conference of IMA, Kodungalloor, November, 1996.
"	17th AROI Conference, Aurangabad, December, 1996.
Dr. Thara Somanathan Lecturer in Cytopathology	CME Programme, IAPM Kerala chapter, Trivandrum, October, 1996.
Sri. Thayal Sing Elias Asst. Prof. in Radiation Physics	Training in Tumour Proportion, Manipal, May, 1996.
"	Training for development of remote afterload system, Bangalore, November, 1996.
"	2nd meeting of the steering committee, Bangalore & New Delhi, November, 1996.
"	17th annual conference on Medical Physicists, Chennai, December, 1996.
Dr. Vasudevan Mappat Anaesthesiologist	4th International conference on Palliative Care, Gwalior, February, 1997.

Sr.Vijaya Puthusseril  
CNO & Asso. Prof. of Nursing

International conference on Home care  
Developments and Innovations,  
Jerusalem, Israel, May, 1996

International seminar on Psycho-social  
issues in health care with special  
emphasis on Psycho-social oncology,  
RCC, Trivandrum, March, 1997.

Training programme on psychological  
and behavioural aspects of medical  
care. MCH, Trivandrum, March, 1997.

## PAPERS PUBLISHED/PRESENTED IN CONFERENCES, ETC.

1. Anil S, Remani P, Beena V.T, Raj G. Nair, Vijayakumar T: Immunoglobulins in the saliva of diabetic patients with periodontitis. *Annals of Dentistry* 55:30-33, 1996.
2. Ankathil R, Bhattathiri V.N, Francis J.V, Ratheesan K, Jyothish B, Chandini R, Roy D, Abraham K.E, Nair M.K: Mutagen sensitivity as a predisposing factor in familial oral cancer. *Int.J.Cancer Pred. Oncol*, 69(4):265-267, 1996.
3. Ankathil R, Geetha N, Remani P, Gangadharan V.P, Pillai G.R, Nair M.K: Clinical implication of cyto-genetic classification in adult acute lymphoblastic leukaemia patients - *J.cancer Res Clin Oncol* 122:370-373,1996.
4. Ankathil R, Roy D, Abraham K.E, Beena V.T, Vijayakumar T: Evaluation of argyrophilic nuclear organizer region (AgNORs) count as a diagnostic and prognostic indicator in premalignant and malignant oral lesions. *Proc. 9th Kerala Science Congress*, 225-227,1997.
5. Arunkumar L.S: New recommendations of international commission on radiological protection (ICRP) on radiation protection in diagnostic radiology. ed. Ittyavirah K.A, *Glimpses in Imageology*, 1996.
6. Arunkumar L.S, Sushama P, Padmanabhan V, Nair M.K: Radon level estimation in a newly constructed brachytherapy block using SSNTD radon dosimeters (abst). *Medical physics*, 21, (3), 150-152, 1996.
7. Balaram P, Molykutty J, Rajalekshmy T.N, Nair M.B, Augustine J, Schuttz G, Nair M.K: Expression of epidermal growth factor receptor in gestational trophoblastic diseases. *J.cancer Research and Clinical Oncology* 123:161-166, 1997.
8. Balaram P, Molykutty J, Remani P, Nair M.B: Lectin binding as a prognostic marker in gestational trophoblastic disease. *INVIVO* 10:607-612, 1996.

9. Bhattathiri V.N, Bindhu L, Remani P, Chandralekha B, Davis C.A, Nair M.K: Serial cytological assay of micronucleus induction. A new tool to predict human cancer radiosensitivity. *Radiother-Oncol* 4, 39-142, 1996.
10. Bhattathiri V.N, Remani P, Davis C.A, VijayaKumar T, Nair M.K: Effect of irradiation on erythrocyte agglutination by Jack Fruit Lectin. *Proc. 9th Kerala Science Congress*. 385-387, 1997.
11. Boban T.G, Ranimol M.S, Padmanabhan V, Nair M.K, Nambi K.V.S: Radiation Measurements in High Natural Background Radiation Areas in Kerala. *9th Kerala Science Congress*, 1996.
12. Chandini R, Ankathil R, Jyothish B, Abraham K.E, Vijayakumar T: Silver stained nuclear organizer region associated proteins (AgNORs) as a prognostic predictor in Non- Hodgkins Lymphomas - *Proc. 9th Kerala Science Congress*, 222-224, 1997.
13. Chandrakumaran Nair M: Information use pattern of agricultural economists in India : a Bibliometric study. In *Bibliometric Studies*, ed. by Devarajan G, New Delhi; ESS ESS Publications, 207-228, 1997.
14. Chandralekha B: Fine needle aspiration cytology of Head and Neck excluding thyroid and lymphnodes. *Proc. CME on An update in Fine Needle Aspiration Cytology*, 42-51, 1996.
15. Chitrathara K, Dhakkad N: Post Chemotherapy Cytoreduction in Ovarian Carcinoma. *Annual Conference of Association of Obs. and Gynaecology, Kerala Chapter, Trivandrum*, 1996.
16. Chitrathara K, Dhakkad N, Sebastian P, Prabhakar J, Gangadharan V.P: A case of rectosigmoid perforation following radiation for carcinoma of cervix. *J. Obstetrics and Gynaecology of India*.
17. Davis C.A: Micro HDR Brachytherapy systems - a comparison. *Proc. 2nd International Congress on Radiation Oncology, (Abs.)* 654/S 138, 1997.
18. Enose S, Molykutty J, Rajalekshmi T.N, Nair M.K, Balaram P: Viral Etiology of Gestational Trophoblastic Diseases (GTD) - *9th Kerala Science Congress*, 244-245, 1997.
19. Gangadharan V.P: Clinical implication of cytogenetic classification in adult ALL.
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## ADMINISTRATION

### MEMBERS OF THE GOVERNING BODY OF THE REGIONAL CANCER CENTRE SOCIETY

1. Sri E.K.Nayanar  
Hon'ble Chief Minister of Kerala      Chairman
2. Sri A.C.Shanmukhadas  
Hon'ble Minister for Health      Vice-Chairman
3. Sri. V.Vijayachandran, IAS  
Secretary to Govt., H&FWD      Alt.Vice-Chairman
4. Sri S.Varadachari, IAS  
Commr, & Principal Secretary  
Finance Department      Member
5. Sri P.K.Sivanandan, IAS  
Principal Secretary to Govt.  
Planning Department      Member
6. Dr.P.Sivasankara Pillai  
Director of Medical Education  
Thiruvananthapuram      Member
7. Dr.B.Umadethan  
Principal, Medical College  
Thiruvananthapuram      Member
8. Dr.A.N.Sinha,  
Chief Medical Officer(NCD)  
Govt. of India nominee      Member
9. Dr.A.D.Damodharan  
Chairman, STEC      Member
10. Dr.M.Krishnan Nair  
Director, RCC, Trivandrum      Convener

### MEMBERS OF THE EXECUTIVE COMMITTEE OF THE REGIONAL CANCER CENTRE SOCIETY

1. Sri. V.Vijayachandran, IAS  
Secretary to Govt., H&FWD      Chairman
2. Sri K.M.Chandrasekhar, IAS  
Commr, & Secretary to Govt  
Finance Department      Member
3. Sri S.Varadachari, IAS  
Commr, & Principal Secretary  
Finance Department  
(From 26-9-'96)      -do-
4. Sri P.K.Sivanandan, IAS  
Principal Secretary to Govt.  
Planning Department      -do-
5. Dr.P.Sivasankara Pillai  
Director of Medical Education  
Thiruvananthapuram      -do-
6. Dr.B.Umadethan  
Principal, Medical College  
Thiruvananthapuram      -do-
7. Dr.M.Krishnan Nair  
Director, RCC, Trivandrum      Convener

### BUILDING COMMITTEE MEMBERS OF THE R.C.C (FROM 4/96 TO 3/97)

1. Sri. K. Sarat Kumar  
Chief Engineer,  
P.W.D, Trivandrum      Chairman
2. Sri. C.H. Narayanan Naik  
Chief Engineer,  
Buildings & Local works,  
P.W.D, Trivandrum      -do-
3. Sri. T. Chandran  
Chief Architect  
P.W.D, Trivandrum      Member

4. Dr. P. Sivasankara Pillai  
Director of Medical Education  
Trivandrum -do-
5. Dr. B. Umadethan  
Principal,  
Medical College, Trivandrum. -do-
6. Dr. M. Krishnan Nair  
Director,  
Regional Cancer Centre,  
Trivandrum. -do-
7. Sri. K.R. Bhaskaran Nair  
Controffer of Finance,  
Regional Cancer Centre,  
Trivandrum. -do-
8. Sri. G. Raveendranathan Nair  
Chief Construction Engineer,  
Regional Cancer Centre,  
Trivandrum. Convener

### MAJOR DECISIONS OF THE EXECUTIVE COMMITTEE DURING 1996-97

#### A) Promotions:

The following promotions were sanctioned:

1. Dr.Jem Prabhakar as Asst.Prof. of Surgical Oncology
2. Dr.Cherian Varghese as Assoc.Prof. of Epidemiology
3. Dr.P.G Jayaprakash as Addl.Prof. of Radiotherapy
4. Dr.F.Joseph designated as Professor & Dy.Director

The committee resolved to appoint Dr. Mani Nainan former Principal, Medical College, Alappuzha as Registrar and Superintendent of the R.C.C.

#### B) Deputation to foreign countries

1. Dr.Hekha .A. Nair Lecturer in Cytopathology - National Cancer Institute, U.S.A for 6 months from 1/7/1996.

2. Sr.Vijaya, Chief Nursing Officer to Jerusalem, Israel in May, 1996.
3. Sri. C A.Davis, Assoc.Prof. of Radiation Physics to Cookridge Hospital, Leeds, U.K and to Royal Marsden Hospital.
4. Sri.P.Gangadharan, Emeritus Scientist to Beijing, Kyoto, Japan in October, 1996.
5. Dr.M.Radhakrishna Pillai, Assoc.Prof. of Laboratory Medicine to Shanghai, China in November,1996.
6. Dr.Ravindren Ankathil, Asst.Prof. of Cancer Research to Shanghai, China in November, 1996.
7. Dr.P.Kusuma Kumari, Assoc.Prof. of Paediatric Oncology to Leeds, U.K in September, 1996.
8. Dr.M.Krishnan Nair, Director to National Cancer Institute, U.S.A.

#### C) Purchase Sanctions

The committee resolved to sanction the following:

1. H.D.R Brachytherapy equipment
2. Additional probes for ultrasound scanner

The committee resolved to appoint Dr.R.Paghu Kumar, Lecturer in Surgery, Medical College Hospital on deputation to organise an Endoscopy Department in the RCC.

The committee resolved to sanction the Interim relief to RCC Non-academic staff at the same rates as sanctioned to the State Govt.employees.

The committee resolved to the Governing Body to request the Govt. of India to designate the Regional Cancer Centre, Trivandrum as national Cancer Institute.

The members of the committee placed on record their hearty congratulations to Dr.M.Krishnan Nair, Director, RCC for the prestigious Dorab Tata Award which was awarded to him in recognition of his outstanding contributions in the field of cancer Research on the 2nd March, 1996 at Lucknow during the VIIIth Biennial National Conference of the Indian Society of Oncology and Indo American Cancer Congress in Lucknow.

## MAJOR DECISIONS OF THE GOVERNING BODY OF THE RCC SOCIETY DURING 1996-97

1. The Governing Body discussed in detail the modalities of free treatment being offered in the RCC. Even though free treatment is given to 60% of patients, the Governing Body felt that absolute free treatment may be given to poorest section and resolved to direct the Executive Committee to submit specific proposal.
2. The Governing Body resolved to give free diet and drugs to at least 30% of the patients who belong to less affluent sections of the society.
3. The Governing Body also resolved to explore the possibility of getting a grant from Government of Kerala for Chemotherapy at a rate of Rs.20,000/- per patient for at least 1750 patients who are presumably below the poverty line.
4. It was resolved to launch a new Cancer Care for life scheme by the middle of April, 1997 with the following features. The CCL scheme will have two plans: Plan-A & Plan-B.

### Plan-A will be as follows:

The Membership fee will be Rs.500/- per person, with discount for family membership. Benefits under the scheme will be limited to 100 times the membership fee. Thus for a member joining the scheme, the value of benefits admissible will be Rs.50,000/-

### Plan-B will be as follows:

The membership fee will be Rs.10,000 per person. The maximum financial support for treatment under this plan will be limited to Rs.5 lakhs irrespective of the reference to institutions within or outside the country. The enrolment for the time being will be limited to a period of months and 3% of the amount collected will be paid to the Banks as incentive.

5. The Governing Body approved the Budget Proposals of the RCC Society for the year 1996-97 and 1997-98.
6. The Governing Body resolved to forward a proposal to Govt. of Kerala and requested the Chief Minister of Kerala to recommend to the Prime Minister to designate the Regional Cancer Centre as National Cancer Institute and the Director has been directed to submit specific proposal.

## ENGINEERING DEPARTMENT

The Civil work for the in-patient Tower Block was completed. Shri.E.K. Nayanar, Hon'ble. Chief Minister of Kerala dedicated the Regional Cancer Centre Building to the Nation on 08-11-1996. The function was presided over by Shri.M.Vijayakumar, Hon'ble. Speaker, Kerala Legislative Assembly. The in-patient Block was inaugurated by Shri. A.C. Shanmukhadass, Hon'ble. Minister for Health. All floors were occupied except operation theatre and palliative care unit. Due to the paucity of funds the operation Theatre, C.S.S.D, B.M.T area couldn't be completed. A Laundry Building and a Nurses Hostel are under construction. The Chemotherapy Unit with Day care facilities, and Biochemistry Lab are set up in the new block. M/s.P.R.S Builders have carried out the Civil works and have given a good finish to the new block. M/s.Blue star Limited did Airconditioning and M/s.Harrisons Malayalam Limited electrification, and the elevators are supplied by M/s.Kone elevators India Limited.

G. Ravindranathan Nair, Chief Construction Engineer retired from service on 21st March, 1997.

The Building committee met 3 times and took timely decisions regarding the second phase of the construction programme.

## LIST OF STAFF

Dr. M. Krishnan Nair	Director
Dr. N. Sreedevi Amma	Deputy Director
Dr. F. Joseph	"
Dr. Mani Ninan	Registrar cum Superintendent
Prof. A. Joseph	Hon. Secretary (Academic)
<b>Radiotherapy</b>	
Dr. M. Krishnan Nair	Director & Professor
Dr. F. Joseph	Deputy Director & Professor
Dr. B. Rajan	Professor
Dr. T. Gangadevi	Addl. Professor
Dr. P.G. Jayaprakash	"
Dr. C.S. Rafæeka Beegum	Assoc. Professor
Dr. S. Parameswaran	"
Dr. V. N. Bhattathiri	"
Dr. Jayaprakash Madhavan	"
Dr. Suresh Chandra Dutt	"
Dr. Ramadas	Asst. Professor
Dr. K. Ratheesan	"
Dr. Thomas Koilparampil	"
Dr. Francis V. James	"
<b>Surgical Oncology</b>	
Dr. Paul Sebastian	Assoc. Professor (on leave)
Dr. Iqbal Ahammed	Assoc. Professor
Dr. K. Chitrathara	Asst. Professor
Dr. Cherian M. Koshy	"
Dr. Jem Prabhakar	" (on leave)
Dr. Manoj Pandey	Lecturer

Dr. Gladys Jeevy  
Dr. Rachel Cherian Koshy  
Sri. R. Harikumar

Sri. Mohanan Pillai  
Sri. P.S. Suresh  
Sri. Thankappan Chettiar

### Paediatric Oncology

Dr. P. Kusumakumary  
Dr. T. Priyakumary  
Dr. A. Shanavas

### Medical Oncology

Dr. V.P. Gangadharan  
Dr. N. Geetha  
Dr. Prakash N.P.  
Dr. Mirsa Hussain

### Dental Wing

Dr. K.R. Nalina Kumari  
Smt. M. Sulochana Bai

### Clinical Services

Sri. R. Raveendran Nair

Sri. V. Surendran Nair

### Pain & Palliative Care

Dr. Vasudevan Mappat

### Blood Bank

Sri. P. Meera Sahib  
Smt. C. Gangadevi  
Sri. Sanjal D.

Assoc. Professor  
Asst. Professor  
Chief Anaesthesia  
Technician  
Theatre Technician  
Helper  
"

Assoc. Professor  
Lecturer  
"

Assoc. Professor  
Asst. Professor  
Lecturer  
"

Lecturer  
Dental Hygienist

Administrative Officer  
(Clinical Service)  
Asst. Public Relations  
Officer.

Anaesthesiologist

Asst. Technical Officer  
Sr. Lab. Technician  
Lab. Technician

### Cytopathology

Dr. N. Sreedevi Amma

Dr. B. Chandralekha  
Dr. Elizabeth K. Abraham  
Dr. Rajasekharan Pillai

Dr. K. Jayasree  
Dr. Rekha A. Nair  
Dr. Anitha Mathews  
Dr. K. Raveendran Pillai  
Sri. K. Sujathan  
Smt. T. P. Brinda  
Smt. S. Najeeya  
Smt. A. Salna  
Smt. S. Sulochana  
Smt. Renukadevi V.  
Sri. A. Nataraj

### Imageology

Dr. K. Sasidharan  
Dr. Alex K. Ittyavirah  
Dr. K. Ramachandran  
Dr. A.S. Krishna Kumar  
Smt. B. Vimala  
Smt. S.I. Sathyalekha  
Sri. S. Pradeep  
Sri. K. R. Udayakumar  
Sri. P.P. Prasad  
Sri. K.N. Shaileshkumar

### Nuclear Medicine

Dr. V. M. Pradeep  
Dr. Raghuram K. Nair  
Smt. Sheela V.  
Sri. Jose D'Cruz

Professor & Deputy  
Director

Professor  
Addl. Professor  
Assoc. Professor  
(on leave)  
Asst. Professor  
"

Lecturer  
Cytotechnologist Gr. I  
Cytotechnologist  
Lab. Technician  
"

"  
"  
"  
"  
Cytotechnician

Professor  
Assoc. Professor  
"  
Asst. Professor  
Radiographer  
"

"  
"  
"  
"

Assoc. Professor  
Asst. Professor  
Sr. Radiographer  
"





**Clinical Lab**

Smt. B. Padmavathy Amma  
 Smt. J. Usha  
 Smt. P. Renuka  
 Sri. S. Hariharan  
 Sri. K.R. Rajesh  
 Smt. B. Helen  
 Smt. S. Anitha  
 Sri. T. James

**Ethnopharmacology**

Dr. J. Stephen

**Pharmacy**

Sri. K. Sivasankara Pillai

**Information Systems**

Sri. G. Jayasankar

Sri. Manoj G.

Smt. Suseeladevi B.

Smt. Jayanthi J.K.

**Community Oncology**

Dr. Babu Mathew

Dr. Remani S. Wesley

Sri. C. Sreekumar

**E.C.D.C. Ernakulam**

Dr. Syamalakumari

Smt. Mercy Joseph

Sri. K.S. Jayalal

Smt. M. Gracy

Smt. Veena V.S.

Smt. Lathamalathiy

Sri. P.M. Abdul Rahiman

Technical Officer

Sr. Lab. Technician

"

Lab. Technician

"

"

"

"

Assoc. Professor

Pharmacist

Systems Manager

(on leave)

Junior Systems Analyst

Data Entry Operator

"

Professor (on leave)

Asst. Professor

Social Investigator

Cytopathologist

Cytotechnologist Gr.I

Sr. Cytotechnician

Staff Nurse

Cytotechnologist

Cytotechnician

Sr. Helper

Sri. G. Dass

Helper

**E.C.D.C. Palakkad**

Dr. R. Ananda Kammath

Smt. C. Radha

Sri. James Thomas

Smt. K.C. Nirmala

Sri. V. Soman

Sri. T. C. Louis

Cytopathologist

Cytotechnologist Gr.I

Cytotechnician

Staff Nurse

Helper

"

**Library & Information Service**

Sri. M. Chandrakumaran Nair

Smt. Sreedevikutty

Sr. Librarian

Typist

**Director's Office**

Sri. N. Ramaswamy Iyer

Smt. B. Savithri Amma

Sri. Antony P.

Secretary to Director

Junior Personal Assistant

Sr. Helper

**Administrative Office**

Sri. K.R. Bhaskaran Nair

Sri. K.J. Zacharias

Sri. R. Rajendran

Sri. G. Gnanaswaran

Sri. S.V. Sasidharan

Smt. B. Lalitha

Smt. N. Beena

Sri. K. Sasikumar

Smt. K.M. Jumailathu Beevi

Smt. C. Shylaja

Smt. C.K. Remila

Smt. Snehalatha H.B.

Smt. Sheelakumari R.

Smt. V. Usha

Smt. Sudevi R.

Smt. S. Mallikadevi

Controller of Finance

Administrative Officer

Finance Officer

Accounts Officer

Asst. Purchase Officer

Sr. Office Assistant

"

"

Office Assistant

"

"

"

Cashier

Data Entry Operator

Junior Personal Assistant

"

Smt. S. Anitha	Confidential Assistant
Sri. S.R. Sabu	Office Assistant
Sri. R. Sasikumaran Nair	Helper cum watchman
Sri. P. Krishnan Nair	Driver Gr.I
Sri. P. Sreekumaran Nair	Driver
Sri. T.P. Krishnadasan	"
Sri. N. Sasidharan Nair	"
Sri. G. Surendran	Sr. Helper
Sri. M. Subair	"
Sri. K. Devaraja Panicker	"
Sri. R. Anil Kumar	Helper
Sri. S. Rajayyan	"
Sri. C. Hari	"
Sri. K. G. Balachandran	"
Sri. L. Balachandran	"
Smt. P.S. Seethalekshmy	"
Smt. M. Amrithamma	"
Sri. C.S. Santhoshkumar	"
Sri. P.P. John Evidus	"
Sri. A. Krishnan Kutty	"
Sri. S. Senan	"
Sri. C. Vijayakumar	"
Sri. S. Suliman	"
Sri. K. Sivankutty	" (on leave)
<b>Engineering wing</b>	
Sri. G. Raveendranathan Nair	Chief Construction Engineer
Sri. A Rajan	Maintenance Engineer (Electrical)
Sri. L. VJayakumar	Asst. Maintenance Engineer (Mechanical)
Sri. Asokan Nair	First Grade Overseer
Smt. P. Suseela	Junior Personal Assistant
Sri. A.R. Santhoshkumar	Electrical Supervisor
Sri. N. Sasidharan	"
Sri. K.R. Rajendran	"

Sri. B. Rajeevan	"
Sri. Venugopalan Nair V.R.	Electrician
Sri. Giji P.S.	"
Sri. Abraham T. Chacko	"
Sri. Sivarajan L.	Electronic Technician

### Security Services

Sri. S. Vijayan Nair	Sergeant
Sri. K. Thankappan Nair	Security Guard
Sri. N. Achuthan Nair	"
Sri. G. Sukumaran Nair	"
Sri. R. Somasekharan Nair	"
Sri. K.P. Rajeswaran	"
Sri. B. Sahadevan	"
Sri. V. K. Krishnan Nair	"
Sri. R. Sasikumaran Nair	"
Sri. B. Stellace	"
Sri. Stephenson G.	"
Sri. Prabhakaran Nair B.	"

### Nursing Services

Vijaya Sr.	CNO & Assoc. Professor
Aleyamma M. Kumappally	Head Nurse
Aleykutty P.M.	"
Annamma Jacob	"
Geetha S.	"
Geetha Kumary B. S.	"
Gracemma Joseph	"
Lizyamma Jacob	"
Marlamma James	"
Modesty S.D. Sr.	"
Philomina Joseph	"
Saly Abraham	"
Saraswathy Amma E.	"
Sheela Rodriguez	"
Thankamma O.N.	"



Saraswathy Amma P.  
 Sasikalamma P.  
 Sasikala T.P.  
 Shamla Beevi A.  
 Shanty P.S.  
 Sheeba S.V.  
 Sheela Kumari P.N.  
 Sheena K. Dhamodhar  
 Shema C.  
 Sherly George  
 Sherly K.P.  
 Sherly M.  
 Shijikumari N.G.  
 Shobha S.  
 Sibi K.R.  
 Sindhu G.S.  
 Sindhu S.  
 Sindhu G.  
 Sindu T.S.  
 Sisy Das  
 Sivakumari P.R.  
 Sony Joseph  
 Sree Vidya A.  
 Sreelatha R.  
 Suchitra C.S.  
 Sujitha Kumari V.S.  
 Sukumaran  
 Suma P.V.  
 Suneethi M.S.  
 Sunithakumari R.  
 Swapna M.A.  
 Swapna C.R.  
 Syamala S.  
 Vasanthakumari V.M.  
 Vijaya A.K.



Sri. P.R. Kurup (extreme left) Hon: Minister for Transport handed over the donation from Kerala Transport Development Finance Corporation to the Regional Cancer Centre, in the presence of Sri. N.V. Mahadevan, Secretary to Government and Sry Rajasree Ajith Managing Director.

## ACKNOWLEDGEMENTS

Government of India, Ministry of Health & Family Welfare.  
Government of India, Department of Science and Technology.  
Government of Kerala, Department of Health & Family Welfare.  
Chief Secretary to Government of Kerala.  
Secretary, Health & Family Welfare.  
Indian Council of Medical Research, New Delhi.  
World Health Organisation, Geneva, Switzerland.  
World Health Organisation, New Delhi.  
International Union Against Cancer (UICC) Geneva, Switzerland.  
British Council Madras.  
American Cancer Society, New York.  
National Cancer Institute, Bethesda, Maryland, USA.  
Allegheny General Hospital, Pittsburg, USA.  
Christie Hospital & Holt Radium Institute, Manchester.  
Chester Beatty Research Institute, London.  
Bhabha Atomic Research Centre, Bombay.  
Director General of Health Services, Government of India, New Delhi.  
Director, Vikram Sarabai Space Centre, Trivandrum.  
Director, Sree Chitra Thirunal Institute of Medical Sciences & Technology, Trivandrum.  
Kerala State Committee on Science, Technology and Environment, Trivandrum.  
Director of Medical Education, Kerala.  
Director of Health Services, Government of Kerala, Trivandrum.  
Principal, Medical College, Trivandrum.  
Superintendent, Medical College Hospital, Trivandrum  
Superintendent, Sree Avittam Thirunal Hospital for women and Children, Trivandrum

Dean, Dental College, Trivandrum.  
Chairman, Atomic Energy Commission, Government of India.  
Secretary to Health & Family Welfare, Government of India.  
Dr. Federico Welsch, National Cancer Institute, Maryland, USA.  
Dr. Bela Shah, Sr. Deputy Director General, Indian Council of Medical Research, New Delhi.  
Director, Cancer Institute, Madras.  
Director, Tata Memorial Centre, Bombay.  
Controller of Stationeries, Government of Kerala, Trivandrum.  
Director of Census Operations, Kerala  
Director, Bureau of Economics and Statistics, Kerala  
M/s Instrumentation Ltd., Palghat  
Vice-Chancellor, University of Kerala  
Vice-Chancellor, M.G. University, Kerala  
Dr. M.V. Pillai, Naval Hospital, Bethesda, USA  
Dr. N.E. Day, Director, MRC Biostatistics Unit, Cambridge  
Mr. Stephen W. Duffy, Scientific Officer, MRC, Biostatistics Unit, Cambridge  
Board of Directors, Susan Daniel Memorial Cancer Relief Fund, Irvine, California  
JAICA Team, Government of Japan  
Drugs Controller, Trivandrum  
Director, College of Pharmaceutical Sciences, Trivandrum  
Dr. P.P. Nair, Johns Hopkins University, USA  
Dr. John L. Young, California State Health Dept. USA  
International Agency for Research on Cancer (IARC), Lyon, France  
Commonwealth Scholarship Commission, London  
Dr. David Erio Lee, Dr. Linda Rever, Dr. Tersesa Ulrey, Dr. Sudha A. Ved  
Dr. Karen Colton, Dr. K. Vinayakom, Georgetown University Medical Centre, Washington.

Kerala Transport Development Finance Corporation Limited.  
Sir Rattan Tata Trust, Bombay.  
Finnish Cancer Registry, Helsinki, & University of Tampere, Finland.  
Dr. S.R. Uttarwar, Director, Software Technology Park, Trivandrum.  
Institute for Cancer Research, Sutton, UK.  
Leukaemia Research Fund, UK.  
University of Leeds, UK.  
Prof. David Forman, University of Leeds, UK.  
Kay Kendall Leukaemia Research Fund, UK.  
Prof. J. Peto, Institute of Cancer Research, Sutton, UK.

**REGIONAL CANCER CENTRE  
( REG. No.  
BALANCE SHEET AS**

PREVIOUS YEAR		LIABILITIES	CURRENT YEAR	
Rs.	Ps.		Rs.	Ps.
23,32,65,587.83		CAPITAL FUND	28,85,34,804.89	
12,43,262.90		SPECIFIC FUNDS	17,08,239.90	
91,19,347.04		UNUTILISED GRANTS	1,59,23,766.04	
6,82,078.00		STAFF WELFARE FUND	9,47,758.00	
3,14,043.75		RADIOTHERAPY RESEARCH FUND	3,61,884.75	
2,80,99,180.10		CANCER CARE FOR LIFE FUND	2,94,47,809.10	
41,67,180.17		ADVANCE RECEIVED FOR RESEARCH PROJECTS	50,74,231.52	
92,01,826.34		SECURED LOANS	2,33,30,978.46	
		CURRENT LIABILITIES AND PROVISIONS:		
96,81,599.01		SUNDRY CREDITORS	1,00,58,348.55	
45,04,512.02		OTHER LIABILITIES	64,32,359.23	
6,82,62,479.53		PROVISION FOR DEPRECIATION	8,71,23,796.53	
36,85,41,076.75		TOTAL	44,89,43,976.97	

**SOCIETY, TRIVANDRUM  
567/81 )  
AT 31ST MARCH, 1997**

PREVIOUS YEAR		ASSETS	CURRENT YEAR	
Rs.	Ps.		Rs.	Ps.
16,45,32,961.71		FIXED ASSETS	26,59,77,582.82	
6,29,91,091.45		CAPITAL WORK IN PROGRESS	29,54,707.32	
2,98,58,918.00		INVESTMENTS	3,08,70,266.00	
		CURRENT ASSETS, LOANS AND ADVANCES:		
49,71,990.26		Closing stock	60,11,128.00	
14,92,441.00		Interest on deposits	20,69,732.00	
17,40,105.42		Advances to projects	29,29,481.12	
1,06,17,083.57		Advances- Others	95,37,568.58	
382,175.00		Deposits	3,81,959.00	
62,64,093.20		Balance with banks	52,51,689.12	
43,361.71		Cash in hand	21,051.31	
2,500,000.00		Grant in transit	50,00,000.00	
8,31,68,855.43		INCOME AND EXPENDITURE ACCOUNT	11,79,58,811.70	
36,85,41,076.75		TOTAL	44,89,43,976.97	

Notes forming part of accounts

for M/s. SEKHAR & JAYANTHI  
CHARTERED ACCOUNTANTS

GNANA SEKHAR S  
PARTNER

Place : Trivandrum,  
Dated : 23-02-98

DIRECTOR  
Dr. M. KRISHNAN NAIR

**REGIONAL CANCER CENTRE  
( REG. No.**

**INCOME AND EXPENDITURE ACCOUNT**

PREVIOUS YEAR		Expenditure	CURRENT YEAR	
Rs.	Ps.		Rs.	Ps.
28,80,848.24		Opening stock	49,71,990.28	
2,35,44,798.15		Purchases	2,29,37,870.95	
2,36,98,540.22		Salaries and Allowances	2,76,30,392.50	
75,300.00		Consultation Service fee	0.00	
2,82,558.50		Uniform and Liveries	2,83,929.00	
3,01,405.50		Rent, Rates and taxes	2,88,447.80	
4,90,993.44		Postage, Telephone & Telegram	7,39,378.85	
3,28,153.00		Travelling expenses	4,69,357.25	
4,73,863.45		Printing and Stationery	7,04,388.10	
1,61,100.50		Advertisement	7,25,269.50	
18,77,216.00		Electricity & Water charges	20,22,867.00	
27,000.00		Remuneration to Auditors	27,000.00	
43,44,130.33		Repairs & Maintenance	61,98,665.28	
11,31,910.00		Service contract charges	9,81,747.38	
6,16,513.50		Interest & Bank charges	16,87,241.00	
9,600.00		Training expenses	52,697.00	
2,43,153.92		Conference, Seminar and Work shop	1,50,616.00	
97,803.00		Computer expenses	89,032.00	
3,008.00		Books & Periodicals	5,533.75	
40,238.10		Landscaping and Gardening	42,997.10	
3,93,002.20		Proportionate Share of N.T.R.	4,22,235.25	
0.00		Publications	8,150.00	
39,355.88		Project Expenses	0.00	
69,132.90		Miscellaneous expenses	1,74,270.55	
33,716.00		Software	10,000.00	
1,27,24,825.00		Depreciation	1,88,61,317.00	
7,38,68,163.83		<b>TOTAL</b>	<b>8,95,25,389.52</b>	

Place : Trivandrum,  
Dated : 23/02/98

DIRECTOR  
Dr. M. KRISHNAN NAIR

**SOCIETY, TRIVANDRUM  
567/81 )**

**FOR THE YEAR ENDED 31ST MARCH, 1997**

PREVIOUS YEAR		Income	CURRENT YEAR	
Rs.	Ps.		Rs.	Ps.
1,21,94,610.65		Grant-in-aid, Govt. of Kerala	88,20,000.00	
0.00		Grant-in-aid, Govt. of India	11,12,130.00	
2,21,12,254.00		Investigation fees	2,41,70,259.00	
23,50,500.00		Ward charges	28,36,020.00	
90,05,888.80		Sale of Medicines	93,87,774.90	
45,369.00		Interest Income	3,77,666.00	
0.00		Clinical service charges	1,90,225.00	
55,168.00		Training fees	58,730.00	
0.00		Income from Projects	5,000.00	
10,500.00		Donation	5,000.00	
62,779.85		Miscellaneous Income	3,46,062.80	
49,71,990.26		Closing stock	60,11,128.00	
2,30,59,123.27		Excess of expenditure Over income	3,62,25,393.82	
7,38,68,163.83		<b>TOTAL</b>	<b>8,95,25,389.52</b>	

Notes forming part of accounts

for M/s. SEKHAR & JAYANTHI  
CHARTERED ACCOUNTANTS

GNANA SEKHAR S  
PARTNER



**REGIONAL CANCER CENTRE  
( REG. No.**

**CANCER CARE FOR  
INCOME AND EXPENDITURE ACCOUNT**

PREVIOUS YEAR		Expenditure	CURRENT YEAR	
Rs.	Ps.		Rs.	Ps.
63,000.00		Salaries and Allowances	65,000.00	
10,000.00		Advertisement and Publicity	2,000.00	
1,13,780.00		Printing & Stationery	85,400.00	
40,000.00		Postage, Telephone & Telegram	40,000.00	
		Vehicle Repairs & Maintenance		
18,704.00		-Fuel charges	25,512.35	
2,791.00		-Maintenance	12,045.00	
6,236.00		-Insurance	0.00	
4,805.40		-Spare parts	17,043.00	
17,88,507.00		Reimbursed to patients	18,71,624.10	
8,000.00		Miscellaneous expenses	5,850.00	
3,01,745.00		Commission to Federal Bank	1,88,510.00	
15,75,991.95		Excess of Income over Expenditure	14,35,437.55	
39,33,360.35		<b>TOTAL</b>	<b>37,48,422.00</b>	

Place : Trivandrum,  
Dated : 23-02-98

DIRECTOR  
Dr. M. KRISHNAN NAIR

**SOCIETY, TRIVANDRUM  
567/81 )**

**LIFE SCHEME**

**FOR THE YEAR ENDED 31ST MARCH, 1997**

PREVIOUS YEAR		Income	CURRENT YEAR	
Rs.	Ps.		Rs.	Ps.
		Interest on Fixed deposits and		
31,73,082.10		investments	34,11,265.00	
7,60,278.25		CGL Membership fee not Invested	3,37,157.00	
39,33,360.35		<b>TOTAL</b>	<b>37,48,422.00</b>	

for M/s. SEKHAR & JAYANTHI  
CHARTERED ACCOUNTANTS

GNANA SEKHAR S  
PARTNER

REGIONAL CANCER CENTRE  
( REG. No.

SCHEDULE OF FIXED

PARTICULARS	GROSS BLOCK			
	COST AS ON		SALE/ ADJUSTMENTS	COST AS ON
	1.4.1996	ADDITIONS		
BUILDINGS (OLD)	860,110.25	0.00	0.00	860,110.25
BUILDING	2,72,69,040.41	2,18,489.30	0.00	2,74,87,529.71
BUILDING-RT	1,74,58,885.70	0.00	0.00	1,74,58,885.70
BUILDING-PHASE II	0.00	7,81,85,565.89	0.00	7,81,85,565.89
BOUNDARY WALL	1,27,118.63	0.00	0.00	1,27,118.63
WATER SUPPLY & DRAINAGE	15,52,200.93	2,18,948.50	0.00	17,69,149.43
FURNITURE & FITTINGS	45,21,991.34	27,67,513.69	0.00	73,19,505.43
OFFICE EQUIPMENTS	10,18,880.23	5,63,393.70	0.00	15,82,273.93
TELEPHONE EQUIPMENTS	8,54,884.00	16,41,297.00	0.00	24,96,181.00
HOSPITAL & LAB EQUIP.	5,68,99,246.57	16,22,385.50	0.00	5,85,21,632.07
ELECTRICAL INSTALLATION	2,14,66,927.90	1,02,91,281.00	0.00	3,17,48,208.90
FIRE DETECTION	27,54,276.00	1,60,789.00	0.00	29,15,065.00
AIR CONDITIONING	1,40,58,650.35	7,88,852.00	0.00	1,54,48,502.35
COMPUTER HARDWARE	20,24,157.00	2,16,860.00	0.00	22,41,017.00
GAS PLANT & CYLINDERS	3,247,445.15	27,88,139.00	0.00	60,35,604.15
VEHICLES	3,79,328.80	0.00	0.00	3,79,328.80
LIB. BOOKS & JOURNALS	32,86,365.15	3,57,436.53	0.00	42,43,831.68
LIFT/ELEVATOR	58,25,810.00	0.00	0.00	58,25,810.00
ASSETS (DONATIONS)	3,37,612.00	0.00	0.00	3,37,612.00
TOTAL	16,43,82,961.71	10,14,44,821.11	0.00	28,59,77,562.82

SOCIETY, TRIVANDRUM  
567/81 )

ASSETS AS ON 31-03-97

UPTO 31.3.1996	DEPRECIATION BLOCK		NET BLOCK	
	ADDITIONS	TOTAL UPTO 31.3.1997	AS ON	AS ON
			31.3.1997	31.3.1996
5,46,556.85	25,678.00	3,72,234.85	4,87,575.30	5,18,553.30
78,09,271.64	9,93,662.00	86,02,934.64	1,82,79,595.07	1,38,89,758.77
22,81,429.69	7,38,873.00	30,40,302.69	1,44,18,593.01	1,51,77,458.01
0.00	39,59,276.00	38,59,276.00	7,52,28,287.99	0.00
42,784.88	4,217.00	47,001.88	80,116.75	84,338.75
8,24,484.63	1,41,700.00	9,66,184.63	8,02,964.50	7,27,716.30
17,27,686.36	5,59,192.00	22,86,868.36	50,32,637.07	27,94,306.48
4,82,249.56	1,68,485.00	6,50,744.56	9,28,469.37	5,26,630.67
5,43,208.70	2,92,339.00	8,35,195.70	16,59,985.30	3,11,627.80
3,53,45,953.00	34,76,558.00	3,88,21,751.00	1,99,99,591.01	2,15,53,893.51
72,78,253.65	30,70,943.00	1,09,48,196.65	2,08,02,012.26	1,41,81,674.25
6,00,281.10	3,47,215.00	9,47,499.10	19,67,566.90	21,53,894.90
58,25,386.40	21,98,798.00	80,24,164.40	74,24,337.95	88,33,283.95
14,10,826.80	3,32,076.00	17,42,902.80	4,88,114.20	6,19,330.20
7,84,436.63	7,87,675.00	15,72,111.63	44,53,482.50	24,63,008.50
2,95,681.56	10,730.00	3,12,411.56	66,918.04	83,648.04
13,08,537.25	4,40,584.00	17,47,181.25	24,98,700.43	19,79,857.90
14,10,278.35	6,62,350.00	20,72,608.35	87,53,200.95	44,15,530.63
1,40,743.80	29,530.00	1,70,273.80	1,67,333.70	1,96,868.70
8,82,82,479.53	1,88,61,317.00	8,71,23,796.53	17,88,53,786.29	9,82,70,482.18

## AUDITORS' REPORT

We have examined the attached Balance Sheet of the **REGIONAL CANCER CENTRE SOCIETY, REGN. No.567/81, THIRUVANANTHAPURAM** as at 31st March, 1997 and the Income and Expenditure account for the year ended on that date annexed thereto and report that:

1. The said Balance Sheet, Income and Expenditure account and the Schedules thereon are in agreement with books of accounts maintained by the society.
2. We have obtained all the information and explanation which to the best of our knowledge and belief were necessary for the purpose of our audit.
3. In our opinion, proper books of accounts have been maintained by the society.
4. In our opinion and to the best of our information and according to the explanations given to us, and subject to the following:
  - (i) Internal control in respect of fixed assets, stores and engineering items are not commensurate with the size and magnitude of activities of the society.
  - (ii) Accounts relating to various Research Projects were not audited by us.
  - (iii) Allocation of grant of Rs. 413.20 lakhs received from Government of Kerala between Capital and Revenue at Rs. 325.00 lakhs and Rs. 88.20 lakhs respectively are made on the basis of the addition to fixed assets or construction of building during the year 1996-97 as referred to in Note-1.
  - (iv) The land assigned by the State Government vide GO/619/88/RD dated 28.7.1988, measuring 69 cents at Palghat and the building constructed thereon for which the Patta has not been received as referred to in Note-5.

- (v) Land at Pulayanarkotta measuring 17 acres in Sy. No.2122 assigned by the Government of Kerala vide order No.GO/MS/1054/22/RD dated 17.11.1982 has not been brought to the accounts for want of clear documents of Title as referred to in Note No.6.
- (vi) The difference in the investment made against CCL FUND ACCOUNT amounting to Rs.7,497/- has been shown as Term Deposit Suspense Account as referred to in Note No.3 and
  - i. The Balance Sheet read together with notes thereon gives a true and fair view of the state of affairs of the society as at 31st March, 1997, and
  - ii. The Income and Expenditure Account read together with notes thereon give a true and fair view of the deficit of the society for the year ended 31st March, 1997.

for M/s. SEKHAR AND JAYANTHI  
Chartered Accountants

Place: Trivandrum,  
Dated: 23.02.1998.

Sd/-  
GNANA SEKHAR  
PARTNER  
Membership No. 201154

SCHEDULE

**NOTES FORMING PART OF ACCOUNTS**

1. Out of the grant received from Government of Kerala during the Financial Year 1986-97 amounting to Rs. 413.20 lakhs, an amount of Rs. 325 lakhs have been transferred to Capital Fund representing Fixed Assets acquired or constructed during the year and the balance of Rs. 88.20 lakhs have been treated as Revenue and taken to Income and Expenditure Account.
2. Investment against Cancer Care for Life Fund Account has been reconciled subject to a difference to Rs. 7,497/- which has been shown as Term Deposit suspense under the head 'Investments' in the Balance Sheet.
3. An amount of Rs. 3,50,000/- representing unidentified credit in the account with State Bank of Travancore brought forward from previous year, has been taken into account by crediting Bank Suspense Account.
4. The land assigned by the State Government vide GO/619/88-RD dated 28.7.1988 measuring 69 cents at Palghat and the building constructed there has not been brought to the accounts since clear documents of title has not been received.
5. Land at Pulayanarkotta measuring 17 acres assigned by the Government of Kerala vide Order No.GO(MS)No.1054/22/RD dated 17.11.1982 has not been brought to the accounts since the clear document of Title has not been received.
6. Claim made by the Executive Engineer, Special Building, P.W.D. amounting to Rs.3,45,615/- for deposit works carried out for RCC has not been acknowledged as debt and hence not provided for in the accounts.
7. Stationery is accounted on cash basis and no stock in hand is taken into account as on 31st March, 1997.

8. The balance in party accounts are subject to confirmation.
9. Previous year figures have been re-grouped wherever necessary.
10. During the year, construction of 3 floors of the building constituting Phase II has been completed and occupied in December 1996. The cost aggregating Rs. 7,91,85,566/- is capitalised on the basis of certificate furnished by management.

Place: Trivandrum,  
Dated: 23-02-1998

for M/s. SEKHAR & JAYANTHI  
Chartered Accountants

Dr.M.KRISHNAN NAIR  
DIRECTOR

S. GNANA SEKHAR  
PARTNER

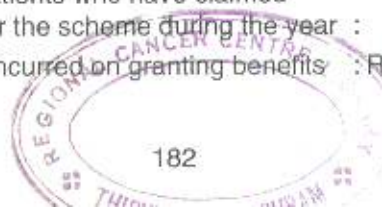
## CANCER CARE FOR LIFE

Modern medical management of cancer is expensive on account of the enormous cost for diagnosis and treatment. As such a number of patients especially of the weaker section do not comply with the stringent requirements of modern treatment. The RCC sought to relieve the problem to a certain extent by offering a welfare scheme called "Cancer Care for Life". It was introduced in June, 1986. Anyone who is not a cancer patient could become a member of the scheme making a one-time remittance of Rs. 101/- to a designated bank. No medical examination prior to enrolment in the scheme was prescribed. A membership card is issued to those joining the scheme. The membership in the scheme entitles the applicant to receive cancer diagnostic and treatment facilities free of cost at the RCC, Trivandrum in the unfortunate event of getting cancer anytime during his life-time after 2 years from the date of enrolment. In addition, during the course of the treatment, reimbursement of expenses for stay as per the Rules of the centre is also made.

In view of the escalation in the cost of medicines, diagnostic procedures and treatment modalities, enrolment in the scheme had to be discontinued in 1991. As there was demand from the public to allow enrolment in the scheme it was reintroduced in August, 1992, with a membership fee of Rs.500/- per person and a discount for family membership. Enrolment in the series continued upto March, 1996. The Governing Body of the centre has decided to launch another series of the scheme with slight modifications from April, 1997 onwards.

**Details of working of the scheme during 1996-97 are as follows.**

1. No of persons enrolled as on 31-03-97 : 2.23 Lakhs
2. Investment under the scheme : Rs. 308.70 Lakhs
3. No. of new patients who have claimed benefits under the scheme during the year : 152
4. Expenditure incurred on granting benefits : Rs. 18.72 Lakhs



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