



# REGIONAL CANCER CENTRE

THIRUVANANTHAPURAM

**1998-99**

PRINTED AT ST. JOSEPH'S PRESS, TVM-14

616-994006054830

N9

# REGIONAL CANCER CENTRE

THIRUVANANTHAPURAM-695 011, KERALA, INDIA

## REPORT OF ACTIVITIES 1998-99

### Telephone Numbers

Admn. Office & OP	442541
Director's Office	443128
" Res	322316
Fax No.	447454
Telegram	CANCENT
e-mail	rcctvm@md2.vsnl.net.in

## CONTENTS

I.	Introduction	1
II.	Departmental Activities	3
	1. Division of Radiotherapy	3
	2. " Surgical Oncology	7
	3. " Endoscopy	14
	4. " Paediatric Oncology	15
	5. " Medical Oncology	18
	6. " Dental Care	20
	7. " Clinical Services & Medical Records	23
	8. " Nursing Services	27
	9. " Pharmaceutical Services	32
	10. " Pain & Palliative Care	33
	11. " Blood Bank	40
	12. " Cytopathology	41
	13. " Imageology	48
	14. " Nuclear Medicine	50
	15. " Radiation Physics	52
	16. " Cancer Epidemiology & Clinical Research	58
	17. " Research	63
	18. " Laboratory Medicine & Tumour Biology	95
	19. " Clinical Laboratory	101
	20. " Information Systems	104
	21. " Community Oncology	106
	22. " E.C.D.C. Ernakulam	117
	23. " E.C.D.C. Palakkad	122
	24. " Library & Information Service	126
III.	Conferences/Seminars/Training/Workshops attended by staff	129
IV.	Papers Presented in Conferences etc.	147
V.	Papers Published	155
VI.	Administration	169
	1. Members of the Governing Body	169
	2. Members of the Executive Committee	170
	3. Major decisions of the Executive Committee	170
	4. Major decisions of the Governing Body	171
VII.	List of Staff	172
VIII.	Acknowledgement	185
IX.	Accounts	187

## INTRODUCTION

The Annual Report for the year 1998-99 has a special significance as a record of the continuing achievements of the R.C.C. in the last year of this century. As we are about to enter the threshold of the next millennium, evaluation of the services in the past gives us gratification as well as motivation and hopes for a better future in the years to come. In our crusade, our team believes in the motto "to strive, to seek, to find and not to yield".

Under the scheme of modernisation of Radiotherapy, the Department of Atomic Energy of the Government of India granted Rs.145 lakhs till 1998-99. The scheme was started when Dr. P.K. Iyengar was the Chairman and Dr. R. Chidambaram continued to support us. Health and Family Welfare Ministry of Government of India is providing grant at the rate of Rs. 75 lakhs per annum since 1997-98. During 1998-99 a Simulator was purchased at a cost of Rs. 183.97 lakhs, utilising Rs. 105.59 lakhs from the Grant provided by Department of Atomic Energy. The balance amount required for the purchase was met from the grant provided by Health and Family Welfare Ministry. A high dose rate Brachytherapy equipment at a cost of Rs. 71.58 lakhs was also purchased utilising the grant provided by Health and Family Welfare Ministry. Endoscopy unit was started in the R.C.C. in April, 1998 with a single Fibroptic upper G.I. scope and a Neuropharyngioscope. Steps were taken for setting up a comprehensive Video Endoscopic unit very soon. When fully functional, this unit will be a harbinger for modern diagnostic and therapeutic services. A new modality of Photo Dynamic Therapy has been implemented during this year as a palliative procedure in advanced head and neck cancers and as a curative procedure in early cancers.

Another area in which much stress was given during the year under report is in Pain and Palliative care services. With the help of the Department of Health, Kerala Government, plans were prepared for ramifying the services to the entire State and making morphine easily available at the periphery. A Palliative Care Centre was inaugurated in the R.C.C. in November 1998 by Cine actor Bharath Suresh Gopi. This will be the first training centre for palliative care in a major cancer institute. We hope that in future this Centre will conduct courses in palliative care, inservice training, short term training

programmes and training programmes leading to degree and diploma in palliative care. Smt. Kumari Thankam, Staff Nurse was sent to U.K. for advanced studies on palliative care in Oxford Brookes University. Miss. Gilly Burn of the Cancer Relief India, is helping us a lot for Palliative Care Services. The visit of the famous actress Smt. Suhasini had a great fillip for further development of this division.

As in the previous years this year also we gave paramount importance to Community Oncology Services, the details of which are given under the Community Oncology Division. The Executive Committee has approved our ambitious project "RCC Institute of Epidemiology Surveillance and Preventive Oncology (RESPO)". When functional this institute will play a very important role in carrying out prevention strategies, trends on cancer treatment results and important epidemiologic studies including training programmes; all these are of international standards.

Studies on the "Natural Background Radiation Cancer Registry" at Karunagappally are nearing completion and we expect to generate certain valuable information. In addition to Palakkad and Ernakulam we have started Early Cancer Detection Centres at Kollam, Palhanamthitta and Kodungalloor.

Right from the beginning we were giving great accent on research activities and at present there are several research projects, aided by foreign agencies to the tune of Rs. 1.25 crores; the details of these are given elsewhere. Ten members of faculty got the opportunity to undergo foreign training in different countries during this year. The fifth Cancer Registry training was conducted in this Centre in February 1999. Dr. Federico Welsh, Dr. John Young and Dr. Steve Roegers from the National Cancer Institute USA, served as foreign faculty.

This report contains the activities of the various divisions and also the audited statement of accounts for the year 1998-99.

## 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. C.S. Rafeeka Beegum	Addl. Professor
Dr. Suresh Chandra Dutt	Assoc. Professor
Dr. S. Parameswaran	Assoc. Professor
Dr. V. Narayana Bhattathiri	Assoc. Professor
Dr. Jayaprakash Madhavan	Assoc. Professor
Dr. K. Parnadas	Assoc. Professor
Dr. K. Ratheesan	Assoc. Professor
Dr. Thomas Koilparambil	Assoc. Professor
Dr. Francis V. James	Assoc. Professor
Dr. Beola Sarah Mathew	Lecturer
Dr. Ajithkumar	Lecturer

This division is responsible for the primary care of cancer patients attending Regional Cancer Centre. It functions as 3 units with 16 radiotherapists. As the patient management involves multidisciplinary management with radiotherapy, surgery and chemotherapy, regular clinics of 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 meeting (monthly). The staff are also actively involved in conducting clinics at peripheral centres at Ernakulam and Karunagappally for regular follow-up of patients.

#### Clinical Activities

The division has taken the responsibility of 9002 new cancer patients registered at Regional Cancer Centre during 1998-99. During this period there were 85907 review cases. Out of 6901 hospital admissions, 3120 were under the care of the division. Teletherapy was used in 6248 patients and brachytherapy was used in 548 patients.

Split up of Brachytherapy	Number
ISI, (Interstitial Implants)	- 81
Surface Mould treatments	- 13
Intra luminal application for ca. oesophagus	- 40
Manual after loading for gynaec tumours	- 100
Selectron for gynaec tumours	- 288
Micro selectron for gynaec tumour	- 20
Micro selectron for oesophagus	- 2
Micro selectron for bronchus	- 2

### Academic activities

Teaching and training in Radiotherapy was provided for the students :

Dr. Ramachandran V

Dr. Sajeed A

Dr. Roy Vergis

Dr. Susan Mathews

Dr. Sivaramakrishnanan R

Dr. Reghuthaman C K

Dr. Asha Arjunan

M.D.Radiotherapy

DMRT

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

Dr. B. Rajan organised a CME on Breast Cancer at RCC, Trivandrum on behalf of Indian College of Radiation Oncology on 27<sup>th</sup> February, 1999. Dr. SC. Sharma, President of Indian College of Radiation Oncology presided. Prof. Richard Peto and Dr. Christina Davies from clinical trial service unit, Oxford gave key lectures.

### Awards

1. **Dr. M. Krishnan Nair** was awarded the 'Jeevanrasksha' Medals by the AIDS & Cancer Care society of India, May, 1998.
2. **Dr. Suresh C. Dutt** is elected as the President of Association of Radiation oncologists of India, Kerala Chapter.

### Ongoing Research Projects

1. **Randomised trial of Radiotherapy + Mitomycin C in locally advanced head and neck cancers.**



Dr. R. Chidambaram, Chairman, Atomic Energy Commission (II from left) inaugurated Simulator, in R.C.C. on 23-4-1999

*(Funding agency: International Atomic Energy (IAEA), Australia)*

Principal Investigator      Dr. M. Krishnan Nair  
Co-Investigators             Dr. K. Ramadas, Dr. V.N. Bhattathiri  
   Dr. K. Ratheesan

**2. Radiosensitivity treatment outcome and ras gene mutation in carcinoma rectum**

*(Funding agency: Dept. of Atomic Energy (DAE), Mumbai)*

Principal Investigator      Dr. Jayaprakash Madhavan

**3. Evaluation of AGNOR, Transferrin receptor and radiation induced Micro/Multinucleation as indices of Proliferation and radiosensitivity in Oral Cancer.**

Principal Investigator      Dr. V.N. Bhattathiri

**4. ATLAS - Adjuvant Tamoxifen in Breast Cancer - Longer against shorter Randomized clinical trial.**

*(Funding agency: ATLAS-Clinical Trial Services Unit, Oxford, UK.)*

Principal Investigator      Dr. B. Rajan

**5. Droloxifene for metastatic breast cancer.**

*(Funding agency: M/S Pfizer Ltd. Mumbai)*

Principal Investigator      Dr. M. Krishnan Nair

Co-Investigators             Dr. K. Ratheesan, Dr. N. Geetha

**6. International multicentre Trial on Liposomal Adriamycin (TLCD-99) Vs Adriamycin in metastatic breast cancer.**

Principal Investigator      Dr. M. Krishnan Nair

Co-investigator             Dr. Jayaprakash Madhavan,  
   Dr. N. Geetha.

**7. Is Clinical response to treatment with Methotrexate of oral cancer proportional to the degree of folate deficiency.**

Principal Investigator      Dr. V.N. Bhattathiri

**8. A multicentric randomised double blind study of Idoxifene Vs Tamoxifen for metastatic breast cancer in post menopausal women.**

(Funding agency: Smithkline Beecham Health Care Ltd.)

Principal Investigator Dr. M. Krishnan Nair  
Co-investigator Dr. S. Parameswaran, Dr. N. Geetha.

**9. Randomized study of Gemcitabine Vs. Epirubicin in patients with metastatic breast cancer.**

(Funding agency: M/S Eli Lilly Ranboxy Ltd., New Delhi.)

Principal Investigator Dr. B. Rajan  
Co-Investigators Dr. Rafeeka Beegum  
Dr. Beela Sarah Mathew,  
Dr. T.V. Ajith Kumar.

**10. Role of indigenous medical products as adjuvant to Radical radiotherapy in oral cancers- A randomized controlled study.**

**11. Antineoplastic evaluation of alkaloidal principles of amora rehituka based on flow cytometry (ICMR)**

**12. Radical radiotherapy + Interferon Vs radiotherapy for advanced buccal cancers.**

Principal Investigator Dr. K. Ramadas  
Co-Investigators Dr. B. Rajan,  
Dr. Beela Sarah Mathew,  
Dr. F. Joseph

**13. Evaluation of the chemopreventive potential of Vit.A in the prevention of recurrence and second primaries in head and neck cancer.**

(Funding agency: IARC, WHO, Franco.)

Principal Investigator Dr. K. Ramadas  
Co-Investigators Dr. Beela Sarah Mathew, Dr. Aswin  
Dr. F. Joseph, Dr. M. Krishnan Nair

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 presented - (Chapter IV)*

*Papers published - (Chapter V)*

## DIVISION OF SURGICAL ONCOLOGY

Dr. M. Iqbal Ahamed - Assoc. Professor  
Dr. Paul Sebastian - Assoc. Professor  
Dr. K. Chitrathara - Asst. Professor  
(on deputation leave)  
Dr. Jem Prabhakar - Asst. Professor  
(on deputation leave)  
Dr. Cherian Koshy - Asst. Professor  
Dr. Namrata Dhakkad - Asst. Professor  
Dr. Manoj Pardey - Asst. Professor  
Dr. Shaji Thomas - Lecturer

### Anaesthesiology

Dr. Gladys Jeevy - Assoc. Professor  
Dr. K. Gopalakrishnan - Consultant Anaesthetist  
Dr. Rachel Cherian Koshy - Asst. Professor  
Dr. Mary Thomas - Lecturer

The surgical oncology division continues to work as a unit, operating five days a week and conducting out patient service all the six days and special out patient clinics twice weekly for long term review patients.

During the reporting year a total of 1380 surgical procedures were carried out, of which 740 were major procedures done under general anaesthesia (Table - 1). Apart from this, a new modality of photo dynamic therapy using the drug Foscan, as part of a multicentric trial has also been carried out as a palliative procedure in advanced head and neck cancers and as a curative procedure in early recurrent cancers of oromandibular area. The minor procedures included incisional and excisional biopsies and all curative procedures done under local anaesthesia.

TABLE - 1

Major operations	-	743
Minor procedures	-	637
Foscan PDT	-	23
<b>Total</b>	<b>-</b>	<b>1403</b>



The division used to carry out diagnostic endoscopic procedures, like cystoscopic, nasopharyngoscopic, colposcopic examinations. Since last year, these investigatory procedures are being performed by the divisions of endoscopy and the community oncology.

As in the previous years head and neck cancers including thyroid cancers formed more than half of the major operative work (54%) (Table - 2).

**TABLE - 2**

**Region wise distribution of major operations**

Region	Number	Percent
Head and neck	399	53.70
Breast	135	18.17
Genitourinary	96	12.92
Gastrointestinal and retroperitonium	52	7.00
Bone and soft tissues	42	5.65
Skin including malignant melanoma	19	2.56
<b>Total</b>	<b>743</b>	<b>100.00</b>

In the head and neck region, oromandibular cancer (65.6%) was the major site of disease. Surgery was considered as the primary modality of treatment in locally advanced tongue cancers unsuitable for interstitial radium implantation. The majority of the tongue lesions were either locally advanced, which necessitated segmental mandibulectomy and primary reconstruction using myocutaneous flaps or were associated with nodal disease where some form of neck dissection was also carried out. On the other hand, the majority of buccal mucosa lesions were either radio-resistant or recurrent lesions. Salvage surgery in these patients often necessitated primary reconstruction. Surgery as the primary modality of treatment was considered only in those patients with locoregionally advanced disease with skin involvement and/or metastatic nodal disease. Apart from this, 38 patients were treated for metastatic nodal disease only, the primary being controlled either by radiation therapy or previous surgery. Some of these patients had extensive disease with skin involvement and local flaps were used for skin cover after ablative resection. A total of 153 flaps were used in 136 patients, 17 patients requiring two flaps each for lining and cover. In a few patients, folded pectoralis major and latissimus dorsi myocutaneous flaps were used for the above

purpose. The site wise distribution of head and neck cancers and the various 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
Tongue	112	28.07
Buccal mucosa	85	21.30
Lower alveolus	46	11.53
Floor of mouth	10	2.51
Lip (upper and lower)	9	2.26
Metastatic neck node	38	9.52
Upper alveolus and nasal sinus	18	4.51
Oropharynx	7	1.75
Thyroid	56	14.04
Major salivary glands	12	3.01
Larynx	6	1.50
<b>Total</b>	<b>399</b>	<b>100.00</b>

**TABLE - 4**

**Flaps used for reconstruction after radical excision in head and neck region**

Flap	No.
Pectoralis major myocutaneous flap	120
Deltpectoral faciocutaneous flap	16
Nasolabial myocutaneous flap	7
Sternomastoid myocutaneous flap	3
Platysma myocutaneous flap	3
Latissimus dorsi myocutaneous flap	2
Tongue flap	1
Trapexius myocutaneous flap	1
<b>Total</b>	<b>153</b>

Myocutaneous flaps were also used in other areas after radical excision and also in three cases of breast reconstruction after mastectomy.

Modified radical mastectomy was the standard procedure being carried out for breast cancer. A total of 135 breast cancer patients were treated during the reporting year, and the number of breast conservation has shown a decline (9), compared to previous year, for the lack of patient interest. However three patients opted for breast construction, and the results were satisfactory.

As in the previous years, the gastrointestinal and genitourinary cancer formed about 20% of the total operative work. In gastrointestinal malignancies, stomach and colorectal together constituted the major sites (Table - 5) and in stomach cancers, a curative resection could be achieved only in about 50% of cases.

**TABLE - 5**

**Region wise distribution of abdominal cancers**

Region	No.
Oesophagus	4
Stomach	13
Colorectum	16
Retroperitoneum	6
Suprarenal	1
Others	8
<b>Total</b>	<b>48</b>

Gynaecological malignancies formed about 8% of the total operative work. Interval cytoreduction has been routinely performed in ovarian cancers.

**TABLE - 6**

**Site wise distribution of Genitourinary cancers**

Site	No.
Cervix and uterus	38
Ovary	23
Vulva and vagina	2
Prostate	8
Penis	12
Bladder	1
Inguinal nodes	12
<b>Total</b>	<b>96</b>

Bone and soft tissue tumours constituted 5.6% of total number of cases. Bone tumours were almost always treated by amputation or disarticulation. However, in soft tissue sarcomas of the extremities, a planned limb salvage surgery could be carried out in majority of patients.

**Anaesthesia**

In the head and neck surgeries 60% of cases were after radiation or previous surgery with trismus and distorted airway anatomy. Hence blind nasal intubation was done in these cases without going in for tracheostomy. Nasal endotracheal tube was retained over night in 231 cases. They tolerated the tube and respiratory distress due to post operative oedema around the airway and falling back of tongue are avoided.

Tracheostomy was not done in any case for intubatory purpose. There was no anaesthetic death during the reporting year.

In 65% cases there were co-existing systemic diseases as hypertension, ischemic heart disease, pulmonary tuberculosis, asthma and mental illness. They were taken up for surgery after treating the illness and making them almost up to the optimal condition for anaesthesia in view of the progressive nature of carcinoma.

For post-operative analgesia in abdominal surgeries epidural catheter was kept for 2 or 3 days and analgesics given.

**Academic Activities**

Post graduate students in general surgery from Medical College, Trivandrum and in oral and maxillofacial surgery from Dental Colleges in Trivandrum and Calicut, and from A.B.Shetty Dental College, Mangalore had regular postings in this division.

Intra divisional journals clubs and symposia were conducted regularly on Saturdays.

**Research Projects**

- Pesticide exposure of pesticides and risk of breast cancer**  
(Funding agency : Environmental Epidemiology branch, National Cancer Institute, USA)

Supervisor Dr. Iqbal Ahamed

- Population based screening for oral premalignant lesions through inspection and oral examination.**

(Funding agency : IARC, Lyon, France)

Co-investigators Dr. M. Iqbal Ahamed, Dr. Manoj Pandey

3. **Evaluation of oral visual inspection in the control of oral cancer**  
(Funding agency : IARC, Lyon, France)  
Co-investigators Dr. M. Iqbal Ahamed, Dr. Manoj Pandey
4. **Evaluation of chemoprevention of oral cancer with long term administration of vitamin A in subjects at high risk.**  
(Funding agency : IARC, Lyon, France)  
Co-investigators Dr. M. Iqbal Ahamed, Dr. Manoj Pandey
5. **Trivandrum rural cohort in tobacco related mortality (TRM)**  
(Funding agency : IARC, Lyon, France)  
Co-investigators Dr. M. Iqbal Ahamed, Dr. Manoj Pandey
6. **Case-control study of gall bladder cancer**  
(Funding agency : IARC, Lyon, France)  
Co-investigators Dr. Manoj Pandey
7. **Trivandrum quality of life study**  
(Pilot project completed)  
Principal Investigator Dr. Manoj Pandey
8. **Psycho-social and vocational rehabilitation of cancer survivors.**  
(Funding agency : Centre for development studies, Trivandrum)  
Principal investigator Dr. M. Iqbal Ahamed
9. **Evaluation of chemoprevention of second primary in patients with head and neck cancer with administration of vitamin A.**  
(Funding agency : IARC, Lyon, France)  
Co-investigators Dr. Manoj Pandey
10. **Phase III open labelled single group study into the effect of foscan mediated PDT on recurrent, squamous cell carcinomas of oral cavity.**  
(Funding agency : Nova scotia, UK)
11. **A multicentric open labelled single and multiple dose study of foscan mediated PDT for the palliative therapy of recurrent, refractory or second primary SCC of head and neck in patients considered to be incurable by surgery or radiotherapy.**  
(Funding agency : Nova scotia, UK)



Inauguration of the Photodynamic Unit in the Division of Surgical Oncology. R.C.C

12. Randomized controled, double blind study into the safety and efficacy of piroxicam as post operative anaigesic.
13. The primary progesterone therapy for operable breast cancer a randomized multi-centre control trial.

*(Funding agency : Indian breast group TATA Memorial Hospital, Dr. E.Borges Marg, Parel, Mumbai)*

Chief investigator Dr. M.Iqbal Ahamed

#### **Awards/ Honours /Fellowship/ Training**

##### **Dr. Manoj Pandey**

Selected to be featured on the Who's Who in the World : 2000. 17th Edition.

##### **Dr. Namrata Dhakkad**

Awarded a ICRET fellowship by UICC. Underwent training at Memorial Sloan Kettering Cancer Centre, New York, for "Radical pelyic surgery and reconstruction" under guidance of Dr. William J. , Hoskins, M.D, chief of gynaecological services, 15<sup>th</sup> August to 30<sup>th</sup> September 1998.

##### **Dr. Cherlan M. Koshy**

Attended one month training on statistical methods in medicine, health, environment, November, 1998.

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

***Papers presented - (Chapter IV)***

***Papers published - (Chapter V)***

## DIVISION OF ENDOSCOPY

Dr. Raghukumar - Lecturer (on deputation)

The Division of Endoscopy started functioning on 23<sup>rd</sup> April 1998. Dr. M. Krishnan Nair, Director, inaugurated the department in the presence of the Staff of RCC.

With the help of a Fibro-optic upper GI scope and a fibro-optic nasopharyngoscope a total number of 1416 cases of endoscopies were done during the last one year.

Upper GI scopy	-	782
Nasopharyngoscopy	-	385
Bronchoscopy	-	64
Cystoscopy	-	185

The following therapeutic procedures were done during the last one year.

1. Oesophageal stenting for inoperable carcinoma of oesophagus
2. Sclerotherapy for oesophageal varices
3. Band ligation of oesophageal varices
4. Bronchial and oesophageal brachytherapy

Orders have been placed to purchase a full Video endoscopic unit including bronchoscope, upper GI scope, ERCP scope, and colonoscope. More advanced therapeutic and palliative procedures can be done for patients with inoperable malignant condition of upper GI, colon and bronchial tree in the near future.

The endoscopy unit at present is functioning in one of the rooms adjacent to the operation theatre complex near the Medical Oncology OP-wing. Construction and fabrication work has already started for the endoscopy unit in one of the operation theatre rooms.

### Future plans

We are planning to start training programme for the surgery and medical post graduate students in the field of therapeutic endoscopy.

In the near future we hope this division will become the only centre in South India where all kinds of diagnostic and therapeutic endoscopic procedures will be done under one roof.

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



Dr. M. Krishnan Nair, Director, inaugurated the Endoscopy Unit in R.C.C. on April 1998

## DIVISION OF PAEDIATRIC ONCOLOGY

Dr. P. Kusumakumary	-	Assoc. Professor
Dr. T. Priyakumary	-	Lecturer
Dr. Mini S.	-	Lecturer

The division continues to work for the primary care of patients up to the age of 14 years registered in this centre.

### Clinical Activities

Paediatric Oncology out patient service functions six days a week. The distribution pattern of paediatric patients registered during the reporting year is given below.

	Number	Percentage
Acute lymphatic leukaemia	108	29.3
Acute myeloid leukaemia	16	4.3
Chronic myeloid leukaemia	2	0.5
Brain tumours	49	13.3
Lymphomas	24	6.5
Soft tissue sarcomas	5	1.4
Neuroblastomas	31	8.4
Wilm's tumour	10	2.7
Bone tumours	24	6.5
Retinoblastoma	8	2.2
Germ cell tumours	11	3.0
Hepatic tumours	3	0.8
Histiocytosis	9	2.4
Carcinomas	13	3.5
Rhabdomyosarcoma	18	4.9
Non malignant	38	10.3
Total number of new patients	369	100.0
Total number of out patient visits		6560

As in the previous years the most common malignancy reported was acute leukaemias (33.6%). 87% of acute leukaemias were acute lymphoblastic leukaemia.

All new patients underwent detailed diagnostic work up and appropriate treatment was given. Paediatric tumour board, with a

multidisciplinary team consisting of paediatric oncologist, paediatric surgeon, pathologist and radiation oncologist was conducted Monday at 2 PM and major management decisions were taken by this team.

### Academic & Research activities

The division actively participated in the teaching and training programme for under graduates and post graduates from Medical College, Trivandrum.

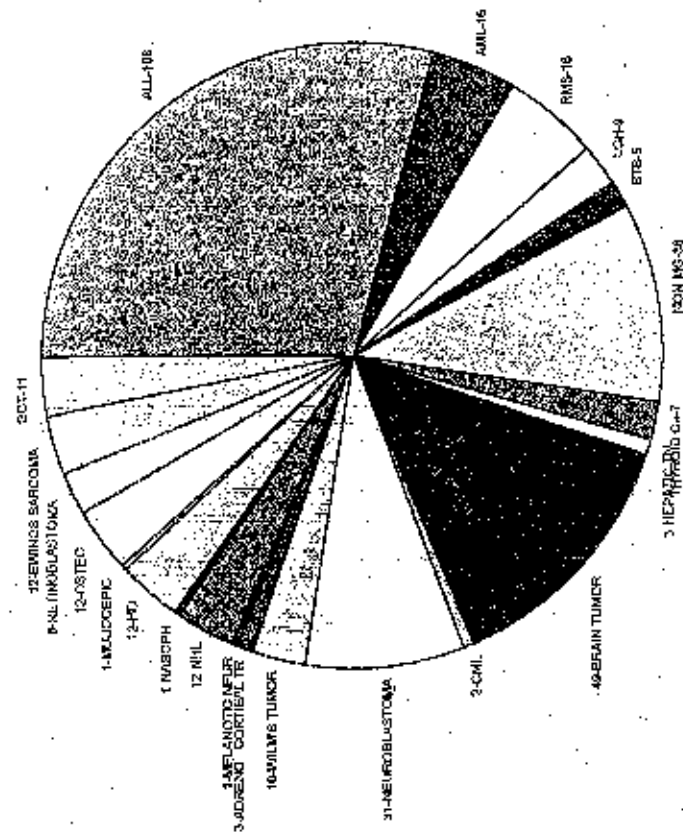
Organised a CME programme on Paediatric Haematology and Oncology at RCC, Trivandrum; 6 January, 1998.

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

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

Distribution Pattern of Paediatric Patients



## DIVISION OF MEDICAL ONCOLOGY

- Dr. V.P. Gangadharan - Assoc. Professor  
Dr. N. Geetha - Asst. Professor  
Dr. B.M. Hussain - Lecturer (on leave)

The division is responsible for the diagnosis and management of haematological and lymphoreticular malignancies and solid tumours, where chemotherapy is needed.

About 1500 new cases were seen in this unit during the reporting year. Special procedures like bone marrow aspiration, bone marrow biopsy, liver biopsy and central venous catheter installations were done as outpatient procedures.

About 1000 patients were admitted in the ward for administration of high profile chemotherapy and management of emergencies and complications. Critically ill patients were closely monitored and managed in the ICU.

### Academic activities

Post graduate residents in general medicine were given preliminary medical oncology training. Teaching sessions included case discussion, seminars and journal discussions. Diagnosis and management of haematological malignancies and the current trends in the management of medical oncology problems were taught to them.

In addition, ward nurses were trained in patient care especially the cases of immuno-compromised and neutropenic patients.

Periodic lectures were conducted in 'MEDISAT' programme of General Medicine Department at Medical College, Trivandrum and for the training programme of house surgeons.

### Research projects

- Cytogenetic and hematologic remission in CML with Interferon  $\alpha$  2b.**  
Co-Investigator Dr. V.P. Gangadharan
- GM-CSF in AML - Role in induction.**  
Co-investigator Dr. V.P. Gangadharan
- Neo adjuvant chemotherapy and limb Salvage in Osteosarcoma.**  
Co-investigator Dr. V.P. Gangadharan

- A multicentric randomised double blind study of Idoxifene 40 mg/day vs tamoxifene 20mg/day as first line hormonal therapy for metastatic breast cancer in postmenopausal women.**

(Funding agency: Skithkline Beecham Health Care Ltd)

Co-Investigator Dr. N. Geetha

In this the efficacy of Idoxifene 40 mg/day and tamoxifene 20 mg/day are compared in receptor positive women with metastatic breast cancer.

- Phase III comprehensive study of combination treatment with TLCD-99 liposomal doxorubicin and cyclophosphamide Vs doxorubicin and cyclophosphamide in metastatic breast cancer.**

Co-Investigator Dr. N. Geetha

Since the cardiac toxicity of liposomal doxorubicin is less, dose escalation is attempted and the toxicities and efficacy are compared.

- A randomized, open label comparative multicenter trial of voriconazole Vs. Ambsome for empirical antifungal therapy in immunocompromised patients with persistent fever and neutropenia.**

Co-Investigator Dr. N. Geetha

### Training

#### Dr. N. Geetha

Visitorship in the Department of Radiation Oncology, University of San Francisco, California, May 20-28<sup>th</sup>, 1998.

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

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*



## DIVISION OF DENTAL CARE

Dr. Nalina Kumari, K.R. - Lecturer

This division provides facilities for extraction, biopsy, pre and post radiation care of teeth, maxillofacial prosthesis, oral prophylaxis conservative therapy for oral cancer patients, management of precancerous and other oral lesions are also done. Preparation of bite blocks and mould are also rarely undertaken. The division functions 6 days of the week. Patients are referred to the division by the division of Radiotherapy for required treatment.

The following are the highlights of activities:

- Minor operations for biopsies
- Dental extractions
- Oral prophylaxis
- Conservative therapy
- Occlusal adjustments
- Preparation of mould
- Preparation of maxillofacial prosthesis
- Preparation of bite blocks
- Management of precancerous and other oral lesions
- Pre and Post radiation care of teeth

TABLE 1

Patient attendance during the year 1998-'99.

Total number of cases attended	4734
Total number of new cases	706
ECDC patients	7
CCL patients	8
Pre-cancer patients attended	7

TABLE -2

Services rendered during the year 1998-'99.

Service	Number
Biopsies taken	531
Teeth extraction	1895
Post radiation care of teeth	478

Maxillofacial prosthesis prepared	19
Conservative therapy (filling)	10
Oral prosthesis done	70
Bite blocks and mould prepared	4
Occlusal adjustments done	4

TABLE - 3

Site-wise distribution of biopsies done in 1998-'99

Site of biopsy	No.	Percentage
Right buccal mucosa	89	16.76
Left buccal mucosa	104	19.59
Right commissure	13	2.45
Left commissure	11	2.07
Hard palate	20	3.77
Soft palate	8	1.51
Right retromolar region	13	2.45
Left retromolar region	11	2.07
Dorsum of tongue	25	4.71
Left border of tongue	60	11.30
Right border of tongue	41	7.72
Tip of tongue	5	0.94
Under surface of tongue	7	1.32
Floor of the mouth	19	3.58
Left lower alveolus	39	7.34
Right lower alveolus	20	3.77
Left upper alveolus	13	2.45
Right upper alveolus	4	0.75
Left lower sulcus	4	0.75
Right lower sulcus	5	0.94
Left upper sulcus	4	0.75
Lower lip	14	2.64
Upper lip	2	0.38
Total	531	100.0

### Pre and Post Radiation Care of Teeth

It is found that post radiation caries, osteoradionecrosis and sensitivity of teeth are the main complications developing after 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 dental extraction was usually resorted to such patients. In this context, the division contemplated developing a preventive programme to tackle the problem of post radiation caries of teeth, sensitivity etc. in young patients. This resulted in the introduction of fluoride therapy for treating this condition.

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

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

The number of patients who availed of the fluoride treatment has risen to 288. These patients had not yet been any complaints in relation to their teeth.

### Other Activities

1. Biteblocks and moulds were prepared for treatment of oral cancer patients in connection with their treatment with radiation and radium implantation.
2. Maxillofacial prosthesis for correcting the deformities of the face after doing surgery in some cases of oral cancer.
3. For cases of leukoplakia, SMF, lichen planus etc. monthly check-up is conducted to assess the condition of patients who are under treatment.

### Research Activities

This division rendered support to the Research Division and Radiotherapy department.

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

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

## DIVISION OF CLINICAL SERVICES AND MEDICAL RECORDS

Mr. R. Raveendran Nair	- Administrative Officer (Clinical Service)
Mr. V. Surendran Nair	- Asst. Public Relations Officer.
Mr. G. Rajasekharan Nair	- Medical Records Officer

This division is concentrating more on patient related activities. For the convenience of overall activities the medical records also included in the clinical service under the reporting period onwards. During the reporting year the section has undertaken the management of newly started PAY CLINIC from 31.7.1998 onwards. The following are the main activities of the division.

- OP service: This is managed with the support of nurses and other paramedical workers.
- New registration and income assessment
- Case sheet assembling after registration
- Patient identity card preparation
- Follow-up
- Issue of all laboratory reports, certificates etc.
- Interim filing of case sheets
- Summary typing
- Pay ward booking and its allotment
- Conduct of follow-up clinics at ECDC, Ernakulam
- Co-ordination of CCL, ESI and other schemes
- Assistance to the patient for getting finance aid
- Conduct of pay clinic
- Filing and retrieval of case sheets for follow-up, admission, research, cancer registry.
- Maintenance of death register and death reporting to the registrar
- Send follow-up letters and other patient correspondence
- Maintaining of various registers
- Coding and indexing
- Data entry at various level
- Filing of all laboratory reports
- Abstract and update the case sheet for outside clinic
- Printing and issue of various forms
- Telephone exchange operation
- Security service
- Garden maintenance

A computer chart tracking has been introduced during this period and one more computer terminal has extended for entering the ICD code, treatment etc.

During the reporting year, RCC has provided free of investigation and treatment except chemotherapy drug to 53% of total patients and 20% of patients have been provided both investigation and treatment at a concessional rate. The centre has spent Rs. 37,01,243/- towards the cost of anticancer drug and other supportive medicine to poor patients.

During the year under report 151 new cancer patients received Cancer Care for Life benefits, 573 patients received benefits from ESI scheme, 194 patients received benefits from central health scheme and 103 patients received benefits from other schemes.

The public relation service has been engaged in the following:

- Media relations and co-ordination
- Guidance to patients and public
- Co-ordination of conference, work-shop and public functions
- Managing trip schedule of various vehicles
- Patient welfare activities
- Issuing press release to various media
- Assistance for publishing article on our activities in various media and preparing write ups for the centre.
- Receive complaints about the services from patients and bring to the notice of the concerned officials.

In addition to the above routine work the wing has been succeeded in the following:

- With the help of State Bank of Travancore, the wing has installed sign boards in various parts of the centre. (Vinyl fluorescent and power coated aluminium boards which cost about Rs. 75,000/-)
- The wing has started to publish a house magazine named Samanwayam from January 1999 (Trimonthly) intended for publishing news about the centre, articles from staff members and other valuable informations.

**R. Raveendran Nair** was invited as external examiner for the final year students M.App. Science (Medical Documentation) Course at M.G. University, Kottayam.

This section has given training to 3 students of Hospital Administration, 3 students of Medical Documentation from M.G. University, Kottayam, 16 students of MSW from Loyola College, Trivandrum.

We acknowledge thanks to all who has contributed to the poor patients welfare fund.

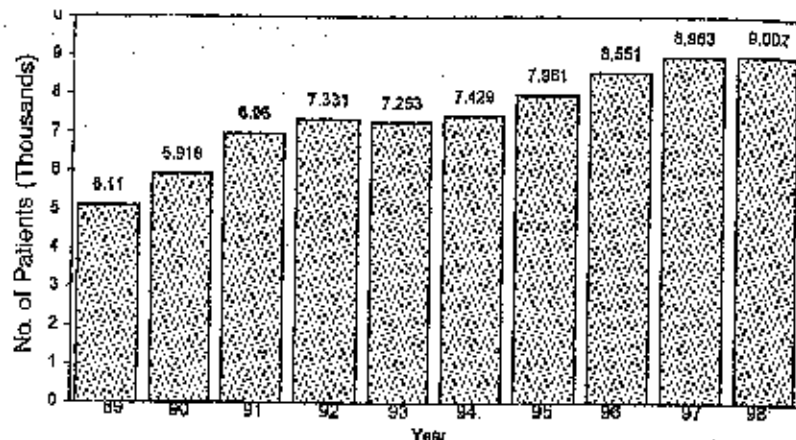
**Table 1.**  
**Patient attendance during current and previous year**

	Current year(1998)	Previous year
New cases registered	9002	8963
Review cases	85807	96097
Radiation Oncology	62976	73125
Surgical Oncology	2670	3488
Medical Oncology	12206	11758
Paediatric Oncology	8055	7726
Total patients (New & Old)	94909	105060
Daily average patient	316	350
Average attendance per patient	10.5	11.7
No of inpatient admission	6901	6609
Radiation Oncology	3120	3292
Surgical Oncology	764	732
Medical Oncology	2149	2059
Paediatric Oncology	868	526
Total appointment given	67103	64142
Attendance from appointment	57448(86%)	55806(87%)
Average length of stay	10	10
Hospital Deaths	437	398

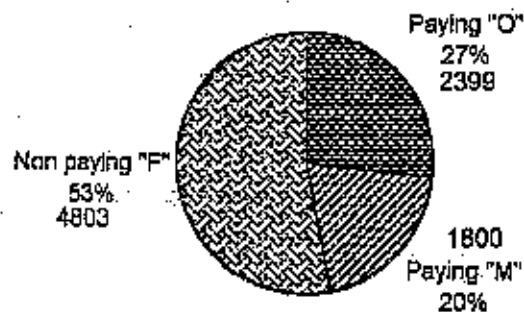
**TABLE 2.**  
**District wise distribution of new cases reported at RCC: 1998**

District	No.	Percentage
Trivandrum	2492	27.7
Kollam	1820	20.2
Pathanamthitta	563	6.2
Alapuzha	495	5.5
Kottayam	256	2.8
Idukki	105	1.2
Ernakulam	711	8.0
Trichur	385	4.2
Palghat	250	2.8
Malappuram	325	3.6
Waynad	41	0.5
Calicut	242	2.7
Kannur	315	3.5
Kasargod	35	0.4
Others	967	10.7
<b>Total</b>	<b>9002</b>	<b>100</b>

**Number of Patients registered during the last 10 years (1989-1998)**



**Percentage of paying & non paying cases for the year 1998 (New Registration)**



**Total Cases : 9002**

## DIVISION OF NURSING SERVICES

Sr. Vijaya CNO & Assoc. Prof. of Nursing  
 Ms. Usha Bai D Nursing Officer (Temporary)  
 Ms. Graceamma Joseph ANO (I/O)

The division aims at rendering comprehensive quality care to suffering cancer patients on a holistic viewpoint, which includes the physical, social, emotional, cognitive and spiritual needs of the individual patient. This includes extending pain relief and palliative care services to patients with advanced cancer.

### Outpatient Services

Out patient department consists of cancer clinics, speciality clinics, blood bank, laboratory, imageology and nuclear medicine. Nurses have a major role in coordinating the outpatient services by providing necessary informations, direction and guidance to patients and in assisting various investigative procedures and diagnostic tests.

### Chemotherapy Unit

This unit functions as day care with 20 beds and a few seating arrangements. An average 90-100 patients daily avail the service of this unit. The unit is totally managed by nursing staff except for seeking medical consultancy services in medical emergencies. Total responsibility of preparation and administration of cancer chemotherapeutics is vested on the nursing staff.

### Medical Oncology

Nurses in this unit are caring for patients with leukaemias, lymphomas, osteosarcoma and other cancers requiring intense chemotherapy. Nurses role include preparation and administration of cancer chemotherapeutics, management of toxic effects of chemotherapy, providing psychological support and counseling services, teaching patients on infection control measures and home care. Nurses render individualized quality care to patients as bystanders are not permitted other than visiting hours.

### Radio-Iodine Unit

It has a bed capacity of 7 and patients with thyroid cancers are admitted for isolation after taking radio active iodine treatment. Mostly patients capable for self care are admitted to this unit and the nurses are

on call to the unit through a hot line system. Patients are oriented on radiation hazards and the need for isolation on intake of radio active iodine.

### **Surgical Oncology**

This unit comprises of operation theater and surgical ward. Common surgical procedures include head and neck surgeries, mastectomy, thyroidectomy, abdominoperineal resections, hysterectomy and AK/BK amputations and so on. Nurses in this unit are actively involved in the pre-operative, intra operative and post operative care of surgical patients. Nurses visit patients in the pre-operative period and provide them psychological support, reassurance and necessary informations on surgery and anesthesia.

### **General Ward**

In general ward nurses have diverse roles and responsibilities as they have to care for patients from all divisions of RCC except paediatric cases. Since majority of the patients are elderly, dependent and in the advanced stages of cancer, nurses have a task in providing individualized quality care round the clock, in the absence of bystanders with the patients.

### **Payward Block**

The unit gets patients with all kinds of cancers like paediatric, surgical, medical and palliative. Though bystanders are allowed with the patient, nurses make an earnest effort to render quality care to each patient.

### **Barchytherapy**

The unit has a bed capacity of 10 and accommodates patients for interstitial implantation, intraluminal radiotherapy, intracavitary applications like Low Dose Rate selectron and High Dose Rate selectron. Nursing staff are given training on radiation hazards and radiation precautions.

### **Paediatric Oncology**

Children with leukaemia, lymphoma, neuroblastoma, Wilm's tumour and brain tumours are cared in the unit. Mothers are permitted to stay with children in the unit. The ward is equipped with well furnished playroom and mothers room. Nurses spend much time in engaging children with diversional activities and mothers with psychological support.



First batch of Palliative Care Trainees (Doctors and Nurses) with Faculty and Health Secretary Sr. V. Vijayachandran

### **Palliative Care**

Palliative care services include pain clinic and palliative care ward. In the pain clinic, nurses assess intensity of pain and other symptoms, dispense pain medications, provide counseling and relaxation therapy and other symptom control measures. Nurses visit patients on admitted in various palliative care wards and provide counseling and relaxation therapy and teaches home care to patients and relatives. A group of nurses have been specially trained on palliative care and their services are utilized in various wards.

### **Special Oncology Nursing Activities**

Selected nurses are given special training on exercises and massage for relief of lymphoedema, complementary therapies such as simple stroke, relaxation and foot massage, and carers training on basic home care skills. Carers training has been implemented in every ward on special drugs. These activities of the nursing division are much accepted and appreciated by the patients and relatives.

### **Staff Development Programmes**

Educational sessions are conducted for nursing staff in their respective units monthly, where nurses present case studies, or doctors take special classes on relevant topics. Besides, there are also discussions on ward problems and other issues in maintaining the standard of nursing care.

Separate meetings for head nurses and staff nurses in general are also held every month. Echo sharings of conferences / workshops attended by staff are presented in this meeting. This is also a forum for any announcements and instructions. Inservice training programme for all the nursing staff has been organized in batches periodically.

Nurses who show special aptitude, interest or skill are given opportunities for attending workshops / conferences of national and international level. They are helped and encourage to present relevant papers in such programmes.

### **Palliative Care Training**

An ongoing one month training programme on palliative care for registered nurses sponsored by Directorate of Health Services of Kerala State is organized by the nursing division. The first batch consisting of 12 staff nurses, successfully completed the training and the second batch is beginning very shortly.

Kumari Thankam BSc(N) has been sponsored by Cancer Relief India to undergo diploma in palliative care medicine at Oxford from June '98.

### Observation / Orientation Programmes

This division provides for observation / orientation programme for BSc(N) and MSc(N) students from National / International level. All the three colleges of nursing under the State Directorate of Medical Education send their BSc(N) / MSc(N) students regularly for such programme with specific objective. The students of BSc(N) and MSc(N) from college of nursing, Trivandrum are given one month clinical posting in the oncology nursing units regularly. The undergraduate and post graduate students from self financing colleges also benefit from this orientation programmes besides a few colleges from outside the Kerala State.

### Volunteer services

The nursing division co-ordinates the volunteer's service for the centre. Also organizes regular training programmes and other inputs.

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

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

### CLINICAL POSTING AND ORIENTATION PROGRAMME FOR NURSING STUDENTS AT RCC, TRIVANDRUM FOR THE YEAR 1998-'99.

Date	Programme	Institution	No. of Students
04.04.98 to 16.05.98	Clinical posting in oncology (4 weeks)	3rd year BSc(N) students, College of Nursing, Trivandrum	50
06.04.98 to 26.05.98 & 31.05.98	Clinical posting (2 weeks)	3rd year BSc(N) students School of Medical Education Gandhi Nagar, Kottayam	50
12.05.98 to 30.06.98	Orientation & Clinical Posting (3 weeks)	3rd semester MSc(N) students, Med. Surg. Speciality, College of Nursing, Trivandrum	04
16.05.98 to 23.05.98	Orientation and Clinical posting (1 week)	4th semester MSc(N) students College of Nursing, Kozhikode	04
27.08.98 & 11.07.98	Observation visit	3rd year BSc(N) students College of Nursing, Kozhikode	35
06.07.98 to 08.07.98	Orientation programme	3rd semester MSc(N) students of Nursing, Trivandrum	04
13.08.98 & 29.08.98	1 day orientation programme	3rd year BSc(N) College of nursing, Trivandrum	33
01.09.98 to 15.09.98	Clinical posting in oncology	3rd semester MSc(N) students College of Nursing, Trivandrum	04
18.08.98	Clinical posting	3rd year BSc(N) students, School of Medical Education, Gandhi Nagar, Kottayam	51
10.11.98	One day orientation and observation visit	3rd year BSc(N) students, School of Medical Education, Kottayam	56
21.12.98	Observation visit	4th year BSc(N) student, Rifaia College of Nursing Jamia Hamdard, New Delhi	17
15.03.99 to 27.03.99	Clinical posting in Oncology	3rd year BSc(N) students College of Nursing, Trivandrum	26
08.03.99 to 26.03.99	Training in oncology nursing (2 weeks)	Mrs. Elsamma Thomas, Staff Nurse Mrs. Jasmino V N, Staff Nurse, Pathanamthitta District Hospital	02

## DIVISION OF PHARMACEUTICAL SERVICES

Dr. Gangadevi T. - Addl. Professor (MO I/C)  
 Sri. Sivasankara Pillai K. - Pharmacist cum Store Keeper

This division renders services to supply quality medicines/equipments, chemicals/reagents and other disposable items which are required for in patients, out patients, diagnostic departments, research division, other departments and peripheral clinics of RCC. The division continues to issue medicines and other items through computerised system by which the daily stock position is ascertained and stock replenished.

The central store of this division has 38 anti-cancer drugs, all injectable first and second line of antibiotics, analgesic, anti-pyretic, anti-histaminic, diuretics, laxative drugs and costly disposables like removable suction, cavafix, catheters, haemostatics (apharesis) kits, fluids and pain clinic drugs like morphine sulphate tabs and liquid morphine.

A considerable number of patients are getting free drugs from this centre. Number of patients for the period under reporting is as follows.

Total patients reported for treatment	-	6157
No. of patients benefitted with free drugs	-	1309
Total patients benefitted with CCL	-	149
Total patients benefitted with ESI	-	168

## DIVISION OF PAIN AND PALLIATIVE CARE

Dr. F. Joseph	-	Prof. of Radiation Oncology (Advisor)
Dr. Vasudevan Mappat	-	Anaesthesiologist (in-charge until 24-8-1998)
Dr. Rachel Cherian Koshy	-	Assistant Professor of Anaesthesiology (in-charge since 25-8-1998)
Dr. Manjula	-	Resident Medical Officer

Dr Paul Sebastian (Associate Professor of Surgical Oncology) and Dr Francis V James (Associate Professor of Radiation Oncology) offered their services whenever required. The services rendered have been with the help of a dedicated team of nurses, nursing assistants and with the support of the Patient Welfare Officer Ms. P.T. Latha from time to time. Professor A.K. Chandrashokharan, Principal, College of Pharmaceutical Sciences and Smt. Pankajakshy, Asst. Prof., College of Pharmaceutical Sciences have been responsible for continued supply of liquid morphine which is a boon to patients who cannot swallow tablets.

Palliative care is the active total care of patients and their families by a multi-professional team at a time when the patient's disease is no longer responsive to curative treatment and life expectancy is relatively short. There is ongoing effort to restore a holistic approach that considers not only physical but also psychological, social and spiritual concerns. Majority of cancer patients present in an advanced stage when curative forms of therapy are not effective. In our set up where resources are scarce, provision of good palliative care for advanced cancers is a cost effective option. It is well established that provision of symptom relief, an empathetic approach, honest adequate communication, a multidisciplinary team approach can go a long way in providing better quality of life even for the "incurable" patient and his family. The importance of Pain Relief and Palliative Care Services is being increasingly recognised the world over and this is one of the three major thrusts of the WHO comprehensive cancer control programme (the others being prevention and early detection and curative treatment). The need was felt to set up a model palliative care demonstration and teaching unit. Hence there has been a major re organisation and revamping of this division since August 1998 under the able guidance and encouragement from Dr. M. Krishnan Nair,



Director of R.C.C, and supervision of Dr F.Joseph, Deputy Director. The Out patient Pain Clinic was shifted to the sixth floor. Here more space is available for a multidisciplinary team approach. At times patients find it difficult to reach the sixth floor; but once they have reached, the atmosphere is more conducive than a busy outpatient set up to offer a palliative approach.

The WHO step ladder approach is used to manage pain. Patients with moderate pain are given a trial of codeine or morphine to assess their requirement and response. Patients with severe pain are quickly controlled with titrated doses of intravenous morphine and then sent home on equivalent oral doses or hospitalised for better symptom control and for teaching the patient and family to cope and take care of themselves. Control of symptoms other than pain is also undertaken. Patients who do not get adequate relief are considered for admission and thereafter sometimes for invasive methods of pain relief or referred to the oncologist for a review and possible palliative anticancer treatment. Referrals from various wards are also attended. A concerted effort was made to improve the quality and range of services offered and to conduct teaching programmes and research into various aspects of pain relief and palliative care as relevant in the Indian context.

Abdominal paracentesis, Ryle's tube insertion, dressing of fungating infected wounds and fistulae, intravenous fluid administration, nebulisation for relief of bronchospasm, application of infra red heat, TENS and simple nerve blocks, trigger point injections etc. are undertaken in the outpatient unit itself.

**Palliative Care Centre** was officially commissioned on 24<sup>th</sup> November 1998 by the cine star Bharath Suresh Gopi. Among the distinguished guests present were Dr Jan Stjernsward, Director of Global Cancer Concern and Ms Gilly Burn, Founder Director of Cancer Relief India. The Palliative Care Centre comprises the outpatient pain clinic, dressing room, counselling room, office room, seminar hall and the inpatient wing. Provision has been made for future development of a physiotherapy and rehabilitation service also.

**In-Patient Wing** became functional on 15<sup>th</sup> January 1999. The main focus is on patient comfort and improved quality of life. The inpatient unit has 4 single pay ward rooms and 8 general beds. Admission to the inpatient wing is through the outpatient pain clinic. A Day Care unit has also been set up with the active involvement of several volunteers, who have donated furniture as well as television set, music



Inauguration of Palliative Care Centre on 24-11-1998 by Bharath Suresh Gopi (from R to L) Ms. Gilly Burn, Dr. F. Joseph, Bharath Suresh Gopi, Dr. M. Krishnan Nair, Dr. Jan Stjernsward, Dr. Rachel C. Koshy.

Coeliac plexus blocks	8
CT guided coeliac plexus blocks	2
Lingual nerve block	1
Lumbar sympathetic block	1
Stellate ganglion block	2
Brachial plexus block	1

---

<b>Total</b>	<b>33</b>
--------------	-----------

---

Inpatient admissions (January 15<sup>th</sup> -March 31<sup>st</sup> 1999) - 70 patients

#### Academic activities

A one day continuing education programme was organised for doctors, nurses, pharmacists and social workers from all over Kerala on 24-11-1998. It was attended by 85 delegates.

Intensive one month hands on Palliative Care training for doctors and nurses was started in March 1998. This Programme has been sponsored by the Directorate of Health Services.

The teaching programmes of the Palliative Care Centre have gained momentum and are being conducted successfully with active involvement and co-operation of faculty members from various divisions of R.C.C.

The following scientists have delivered lectures and provided training on palliative care to doctors, nurses and volunteers at RCC.

**Dr. M.V. Pillai.** Management of break – through pain, 14<sup>th</sup> January 1999.

**Mrs. Patricia Atkinson.** Hospice Movement and Palliative care, its role and relevance in cancer care, 18<sup>th</sup> January, 1999.

**Dr. David Seamark MRCGP, Dr. Clave Seamark MRCGP, Honiton Group Practice, Devon, Exeter 14 8 DD, UK.** The interface between General Practice and Palliative Care, February, 1999.

**Ms. Helen Pasant, Ms. Gilly Burn** conducted a 2 day palliative care workshop in February, 1999 for nurses and volunteers.

**Dr. Rachel Cherian Koshy** was appointed by the Govt of Kerala as Convenor of Task for implementing Palliative Care in all districts of Kerala.

**Dr. Rachel Cherian Koshy** was nominated as member of subcommittee for simplification of narcotic drug licensing procedure in Kerala state. (to improve oral morphine availability for needy cancer patients).



Famous actress Ms. Suhasini visiting Pain and Palliative Care Division of R.C.C.

Ms. PT. Latha has submitted her doctoral thesis on "Psycho-social adjustments of female cancer patients in southern districts of Kerala on January, 1999.

**Conference organised**

One day continuing education programme in Palliative Care for Doctors, Nurses, Pharmacists and Social Workers at RCC, Trivandrum on 25/11/1998.

**Patient Welfare Service started functioning from 3/8/1998)**

Patient Welfare Officer - 1  
 Staff nurse - 1  
 Volunteers - 2 (daily on rotation)

New patients were given orientation about hospital routines, about consultation with doctors and also took efforts to clear their doubts. Information regarding investigations, treatment, low cost charity centre accomodation, railway concession, cancer patients pension scheme, Prime Ministers welfare fund, ESI, reimbursement, melam masala wolfare scheme, appointment system for follow-up visits are provided.

Emotional support was extended to the needy patients at the time of first visit (265 patients). Counselling was given for both outpatients and inpatients with problems like fear of treatment, depression, over anxiety (40 patients).

Financial support was provided to 47 patients through volunteers, well to-do patients and poor patient welfare fund.

<b>Service for Mastectomy patients</b>	<b>Number</b>
Post mastectomy care and exercise	51 patients
Prosthesis provided	261 "
Lymphoedema management by exercise and massage	43 "
Pressure bandage	15 "
Blood donation	11 "

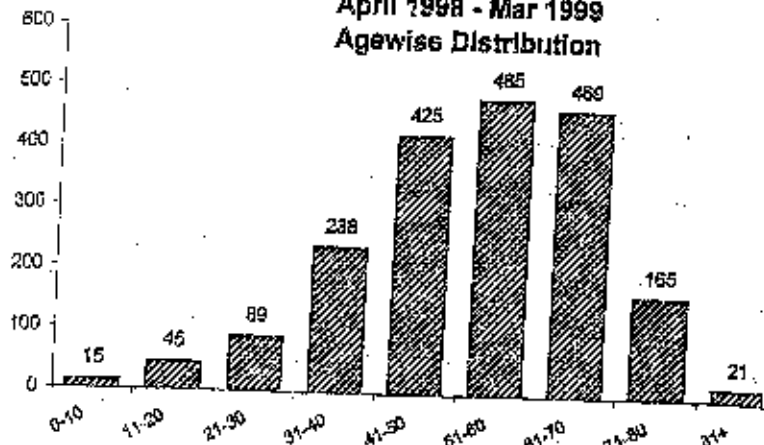
*Conferences, etc. attended - (Chapter III)*

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

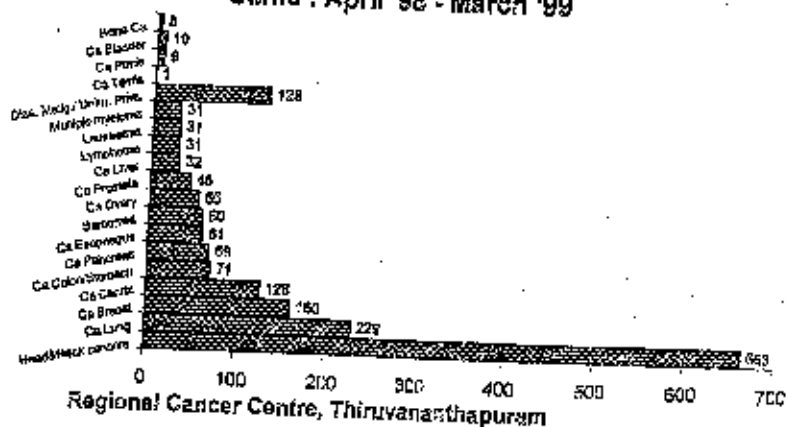
Total : 1952

**New patients registered in Pain Clinic :  
April 1998 - Mar 1999  
Agewise Distribution**



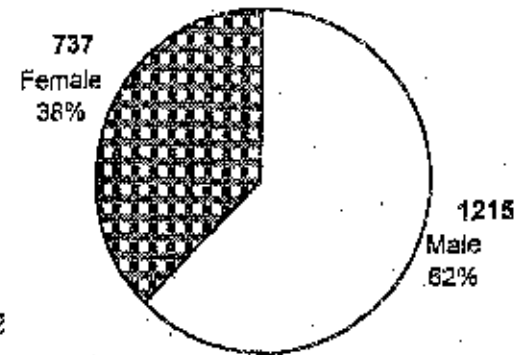
Regional Cancer Centre, Thiruvananthapuram

**Diagnosis of new patients registered in Pain  
Clinic : April '98 - March '99**



Regional Cancer Centre, Thiruvananthapuram

**Pain Clinic - Sex Distribution of new  
patients : April 1998 - March 1999**



Total : 1952

Regional Cancer Centre, Thiruvananthapuram

## DIVISION OF BLOOD BANK

Dr. Jayalekshmi P.	-	R.M.O.
Mr. Meera Sahib P.	-	Senior Scientific Officer
Mrs. Ganga Devi C.	-	Senior Technician

During the reporting year there was an increase in the number of component preparations of platelet rich plasma as well as on single donor plasma, as compared to previous years.

An automated Elisa Reader, washer, printer (Brio) was installed in October, 1998. The blood bank has produced the most advanced equipment, automatic cell separator machine, haemonetics, MCS. With this machine the equivalent of six to eight units of platelets can be separated from a healthy donor at a time and the procedure can be repeated even on the 5<sup>th</sup> day, without any health hazard to the donor.

### Blood Bank Statistics (01/04/98 to 31/03/99)

Blood grouping	-	17200
Cross matching	-	5986
Blood donors	-	4852
Hbs Ag done (donors)	-	4852
Hbs Ag +ve	-	77
HIV +ve (donors)	-	9
HCV +ve	-	7
Hbs Ag done (patients)	-	1100
Hbs Ag +ve (patients)	-	164
HIV done (patients)	-	2606
HIV +ve (patients)	-	Nil

### Components Prepared

Packed Red Cells (PRC)	-	4347
Platelet Rich Plasma (PRP)	-	2995
Single Donor Plasma (SDP)	-	327
Platelet pheresis	-	36

### Conferences attended (Chapter - III)

## 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. Rekha A. Nair	-	Asst. Professor
Dr. Raveendran Pillai K	-	Asst. Professor
Dr. Anitha Mathews	-	Lecturer
Sri K. Sujathan	-	Cytotechnologist
Dr. Laxmi Narayanan	-	Senior Scientific Officer

### Diagnostic Services

Various immunohistochemical tests for precise diagnosis of lymphoma, leukaemia and undifferentiated solid tumours and ER, PR status of breast carcinomas were some of the achievements during the year.

### Gynaec Cytology

Cervical smears were examined from 5686 cases of which 4685 cases were from various projects. These include a comparative study of pap smear, cervicoscopy, colposcopy and biopsy (1218), interobserver variation and performance, augmentation in cervical screening (3400) and collaboration with Christian Fellowship Community Health Care at Ambilikkai, Tamilnadu (75) and 901 were from hospital cases. High grade squamous intraepithelial lesions were reported from 20 cases (5 from hospital cases and 14 from project cases).

### Non-Gynaec and Aspiration Cytology

From a total of 6878 fine needle aspirations, 1716 malignancies were diagnosed. The major sites of aspiration were thyroid (1948), lymph nodes (1666) and breast (1159). Total number of malignancies at various sites is depicted in Fig. B. Some of the rare and interesting lesions diagnosed by cytology are carcinoma in pleomorphic adenoma, thymoma, adenomatoid tumour, adrenocortical carcinoma metastasis to thigh, anaplastic large cell lymphoma and rhabdomyosarcoma of breast. We reviewed the slides from various early cancer detection centres (30 cases).

### Fluid Cytology

A total of 1129 samples of aspirated fluids from body cavities and natural secretions were examined. Maximum number of samples were CSF (455) from acute leukaemia cases at the time of diagnosis after induction and on follow-up.

### ***Bone marrow aspirates and imprints***

Bone marrow aspirated and imprints were studied from 2045 cases of which 488 were malignancies. Acute leukaemias were the predominant lesion diagnosed (284 cases). Acute lymphoblastic leukaemias were higher than acute myeloid leukaemia. Special stains for typing leukaemias include POX, PAS, NSE and LAP. Nineteen blast crises of chronic myeloid leukaemia were diagnosed, of which 11 were typed as myeloid and 8 were lymphoblastic. A case of ATLL confirmed by serum HTLV-1 titre was diagnosed this year. Details are given in Fig. 3.

### ***Sputum Cytology***

Sputum samples were examined from 999 cases by collecting 3-5 samples from each case and making 2-3 smears from each sample. A total of 59 malignancies were reported. The predominant malignancies were adenocarcinomas (34 cases) and squamous cell carcinomas (12 cases).

### ***Histopathology***

Histopathological examinations were done in 6180 cases, of which 4099 cases were surgical specimen from the centre and 2081 were review slides of patients referred from other hospitals. Immunohistochemical staining was done in 273 cases. Frozen section facilities were provided in 47 cases. A total of 3901 malignancies were reported. The predominant sites of malignancy were oral cavity, breast, cervix and lymph node.

Some of the rare and interesting lesions were giant cell tumour of bone osteosarcomatous transformation, broad ligament mucinous cystadenocarcinoma with sarcomatous focus, meconium peritonitis of tunica vaginalis sac, malignant oesophageal stromal tumour, parathyroid carcinoma, primary sarcoma of the lung, extraskeletal mesenchymal chondrosarcoma, PNET of lung, hepatosplenic T gamma/delta cell lymphoma. Malignant lesions of major sites are depicted in Fig. 1.

### ***Academic activities***

The staff of this division have participated in the daily morning clinics and monthly special clinics and other academic activities. Some of the staff were invited to conduct CME's/workshops/ seminars or to give orations in different centre in India.

The division carries out full time cytotechnician's and cytotechnologist's training courses of 6 months and 1 year duration

respectively as part of man power generation in cancer control activities. The division is accredited by Indian Academy of Cytologists (I.A.C.) for diagnostic and examination purposes. We have been honoured by the Indian Academy of Cytologists this year by selecting our centre for the conduct of National Examination for Cytotechnicians and Cytotechnologists.

We are also involved in the teaching and training programme of medical and paramedical students of Medical College, Trivandrum and paramedical students of Mahatma Gandhi University, Kottayam. Short term training courses of one month duration are also imparted to pathology post graduates of Dental College, Trivandrum and Medical College, Calicut.

We have organised a lecture cum slide discussion on cytology by Dr. Seena Mathew, Pathologist, John Hopkins Hospital, Baltimore, USA, March, 1999.

Organised a CME on 'Role of Pathology in the diagnosis and management of acute leukaemias, March, 1999.

### ***Research projects***

- 1. ATLAS oestrogen receptor (ER) detection on breast cancer in collaboration with Oxford, U.K**  
Pathologist Dr. Elizabeth K. Abraham
- 2. Anti metastatic protein nm23 and adhesion molecule CD44 in breast cancer**  
(Funded by STEC)  
Co-investigator Dr. Elizabeth K. Abraham
- 3. Cell cycle regulation in uterine cervical cancer - Ph.D thesis.**  
Collaborator Dr. Elizabeth K. Abraham
- 4. Study of EBV Association in Gastric Cancer**  
(Funded by Monbusho International Scientific Programme of Japanese Govt.)  
Co-investigator Dr. Jayasree K.
- 5. Biologic grading of malignant lesions in the bronchopulmonary mucosa - an immunohistochemical analysis.**  
(Funded by Kerala State Science, Technology and Environment Committee)  
Co-investigator Dr. Raveendran Pillai K.

6. **Inter observer variation and performance augmentation**  
(Funded by IARC)  
Co-investigator Dr. Raveendran Pillai K.
7. **Evaluation of unaided visual inspection, cervicospopy and pap smear in screening for cervical cancer**  
(Funded by IARC)  
Co-investigator Dr. N. Sreedevi Amma.
8. **Trivandrum Oral Cancer Screening Project (TOCS)**  
(Funded by IARC)  
Co-investigators Dr. N.Sreedevi Amma, Dr. Elizabeth K. Abraham
9. **Biological prognostic markers in oral squamous cell carcinoma**  
(Funded by ICMR)  
Co-investigator Dr. Elizabeth K. Abraham
10. **Genomic instability in breast cancer**  
(Funded by Dept. of Science, Technology & Environment, Govt. of Kerala.)  
Co-investigator Dr. Elizabeth K. Abraham
11. **Molecular epidemiology of cancer of the oral cavity and oropharynx**  
(Funded by IARC)  
Co-investigator Dr. Elizabeth K. Abraham
12. **Evaluation of AgNoR, Transferrin Receptors and Radiation induced micromultinucleation as indices of proliferation and radiosensitivity in oral cancer**  
(Funded by Dept. of Science, Technology and Environment, Govt. of Kerala)  
Co-investigators Dr. Chandralekha B., Dr. Jayasree K.
13. **Etiopathological studies in Hodgkin's disease with emphasis to the role of Epstein Barr Virus**  
(Funded by Dept. of Science, Technology and Environment, Govt. of Kerala)  
Co-investigator Dr. Elizabeth K. Abraham

14. **Effect of tobacco on human buccal mucosa- a cytomorphological study. Thesis work for the award of BSc. (life science) degree, Indira Gandhi National Open University.**  
Co-investigator Dr. Ramachandran Pillai

#### Award/Honours/Fellowship/Training

**Dr. N. Sreedevi Amma**, Editorial board of Journal of Cytology, IAPM Kerala chapter, Governing body member of Amala Cancer Hospital Trichur, Governing body member of RCA.

**Dr. B. Chandralekha**, Member of IAC, Treasurer IAC, Editorial board member of Journal of Cytology, IAPM Kerala Chapter and Executive member of RCA.

**Dr. Elizabeth K. Abraham**, Member of IAPM, IAC, Review committee member of IJMR, Research committee member of RCC and Governing body member of RCA.

**Dr. Jayasree K.**, had undergone training in in-situ hybridization and technique of polymerase chain reaction for two weeks, October-November 1998, Department of Public Health, Faculty of Medicine, Kagoshima University, Japan.

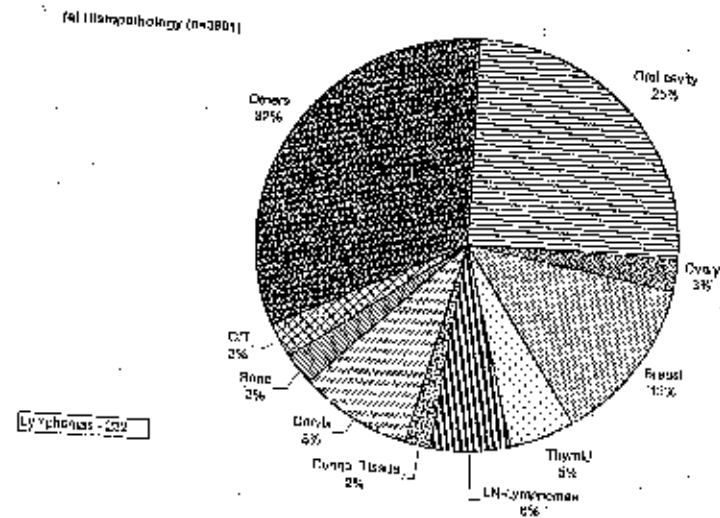
**Dr. Raveendran Pillai K**, Executive member of life science chapter of Kerala Academy of sciences.

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

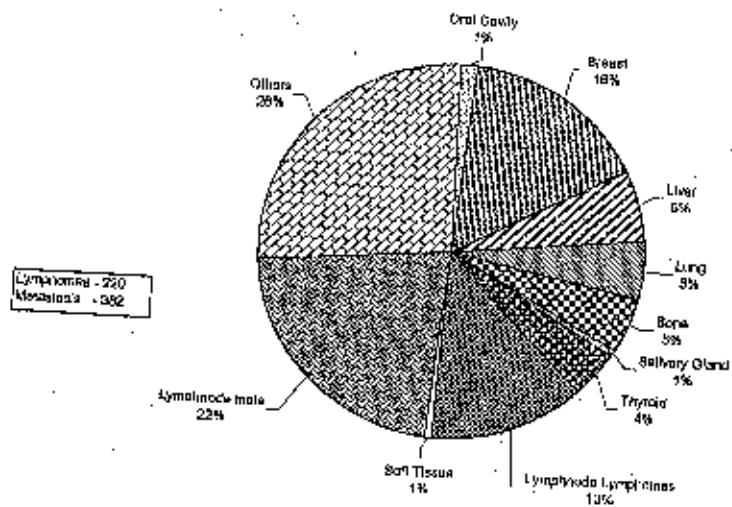
*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

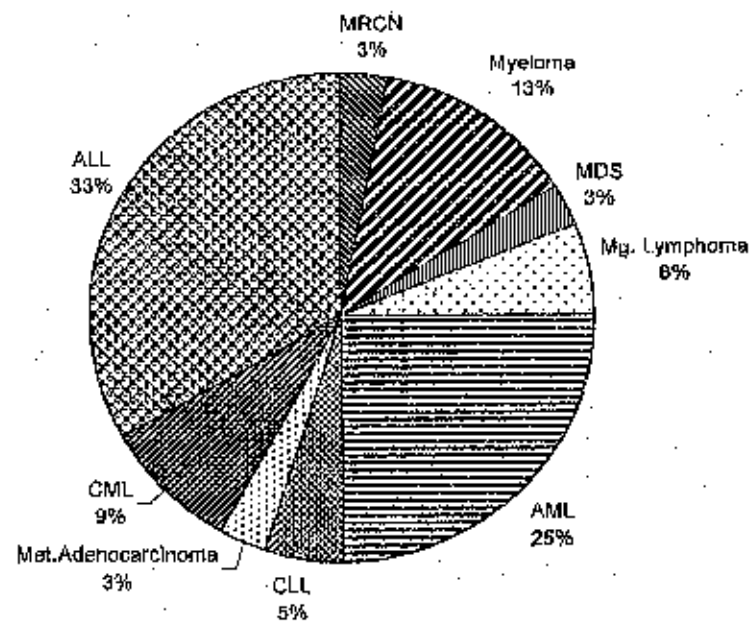
**Fig. 1 : Malignant Lesions in Major Sites**



**Fig. 2 : Aspiration Cytology (n = 1716)**



**Fig. 3 : Haematological Malignancies (n = 488)**





## DIVISION OF IMAGEOLOGY

Dr. K. Sasidharan	- Professor
Dr. Alex K. Ittyavirah	- Assoc. Professor (Resigned duty on 10/07/98)
Dr. K. Ramachandran	- Assoc. Professor
Dr. A.S. Krishnakumar	- Assoc. Professor
Dr. Fathima T.K.	- Resident Medical Officer (Joined duty on 19/08/99 and relieved duty on 16/03/99)
Dr. Bejoy Thomas	- Lecturer (Joined duty on 11/01/99)

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

Plain X-ray	-	13,347
X-ray tomography	-	12
Barium study	-	185
I/V contrast study (IVP & Venogram)	-	2
I/Thecal contrast study (Myelogram)	-	12
Mammogram	-	867
CT Scan	-	5607
C.T. & guided procedures	-	210
Ultrasound	-	6252
Doppler studies	-	238
Ultrasound Guided FNAC	-	60

### Academic activities

Six weeks training on ultrasonography for post graduate degree/ diploma holders continued this year also and 18 candidates completed the training. Teaching of undergraduates and post graduates on basic principles of modern imaging techniques was continued. The film reading sessions every day morning and the monthly meeting of Trivandrum Radiology Club provided opportunities for discussion of interesting and problematic cases for diagnosis.

Dr. Ramachandran K was examiner of the Dr. MGR Medical University, Chennai, for DMRD on 8<sup>th</sup> October, 1998 and for MD, DMRD Examinations from 8-10 April, 1999.

Dr. Ramachandran K was examiner of the Calicut University for DMED, Medical College, Calicut on 21<sup>st</sup> November, 1998.

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

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

## DIVISION OF NUCLEAR MEDICINE

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

The division provides diagnosis and therapy with open radioactive sources. Thyroid disorders occupy the centre stage of activities in this unit. A total of 10171 patients attended the division for evaluation of various thyroid disorders. The break up of investigations for thyroid area is shown in Table 1.

**Table 1**

Category	Number
Total number of thyroid cases	10,171
Thyroid scans	2,303
Thyroid uptake	1,427
Thyroid ultrasound	243
Thyrotoxicosis	183
Ca. thyroid	410

There was an increase in the number of patients registered for immunoassay test, as compared to that of previous year. A break up is shown in Table 2.

**Table 2**

Sl. No.	Assay	Number
1.	T3	10,360
2.	T4	10,360
3.	TSH	10,360
4.	HCG	7,800
5.	AFP	1,200
6.	CEA	1,400
7.	Ca-125	1,350
8.	FT3	420
9.	FT4	420
10.	ATG	400
11.	AMC	400
12.	Cortisol	400

13.	GH	180
14.	Progesterone	50
15.	Testosterone	360
16.	17 OH progesterone	120
17.	TG	2,000
18.	FSH	720
19.	LH	720
20.	PRL	960
21.	PSA	650
22.	PTH	360
23.	ACTH	60

Radionuclide scans on the gamma camera were as follows.

Bone	-	1,032
Renal	-	361
Liver	-	24
Meckel's	-	5

Currently we are planning to introduce newer scanning agents such as Tetrofosmin. Therapy was given for 133 cases of thyrotoxicosis and 247 cases of carcinoma thyroid.

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

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

## DIVISION OF RADIATION PHYSICS

Dr. V.Padmanabhan	-	Professor
Sri.C.A.Davis	-	Assoc. Professor
Sri.Thayal Singh Elias	-	Asst. Professor
Sri.L.S.Arunkumar	-	Asst. Professor
Dr.Raghu Ram.K.Nair	-	Asst. Professor
Sri.P.Raghukumar	-	Lecturer

### Highlights of activities

#### Clinical Physics

Calibration of Radiotherapy Equipments

Quality Assurance

Treatment Planning

Dose Computation

Radiation Safety

Intercomparison Studies using TLD (WHO/BARC)

Daily Maintenance, checking & repair of all Teletherapy & Brachytherapy equipments

#### Patient Services

Treatment planning and related dose computation were carried out routinely for patients undergoing external beam therapy and brachytherapy. Few cases were treated in the newly installed Microselectron HDR. Radiotherapy simulator (Siemens simview 300) installed on 24-2-1999 and 127 cases done till March, 1999. The number of patients treated during the reporting year is as follows:

	Number of patients
External beam radiotherapy	: 6248
Brachytherapy	
Intracavitary Ca Cx micro selectron HDR	: 24
Oesophagus	: 2
Bronchus	: 2
Selectron LDR	: 288
Manual	: 100
Oesophagus	: 40
Interstitial implants	: 81
Mould	: 13
<b>Total</b>	<b>: 550</b>

Mould Room	:	24
Pop Shell	:	456
Orfit / Acqua plast	:	309
Bite block	:	59
Wax bolus	:	13
Mould	:	
<b>Total</b>	<b>:</b>	<b>861</b>

### Academic activities

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

1. Diploma in Radiological Technology (DRT)
2. B.Sc.(MLT), DMLT
3. B.Sc. Nursing
4. M.Sc. Nursing
5. MBBS
6. DMRT
7. DMRD
8. MDS(Oral Radiology)
9. MD (Radiotherapy)
10. MD (Radiodiagnosis)

### Training programme

Conducted CRA/DRT Refresher Programme. Upto March 99, a total of 65 students have been trained in Imageology / Nuclear Medicine and 22 students in Radiation Physics / Radiotherapy. Dr.RaghuRam.K.Nair, Mr.L.S.Arunkumar, & Dr.K.Ramachandran coordinated the programme.

### Research projects (completed)

1. Fabrication and evaluation of pencil shields used in Radiotherapy for  $Co^{60}$  gamma rays and 4MV X-rays.

Ms.V.K.Harita M.Sc Applied Physics

Ms.Indu.S.Gopal, Dept of Physics, Kariavattom.

### Guides

Mr.L.S.Arunkumar, Dr.V.Padmanabhan and Dr.S.Devanarayanan.

Pencil shields of different dimensions corresponding to optical shadows of diameters 1 cm, 1.5 cm. and 2.0 cm. on the skin surface were fabricated locally as per the clinical requirement and they were

evaluated dosimetrically both in Theratron 780 and Clinac 4. All the shields are found to be acceptable and used routinely.

2. **Development of indigenous wedge filters for megavoltage X-rays and Cobalt 60 Gamma radiations used in Radiotherapy.**

(Funded by : Dept. of Science, Technology & Environment, Kerala).

Principal Investigator Mr.L.S.Arunkumar

Co-Investigators Dr.V.Padmanabhan, Dr.M.KrishnanNair

A total of 23 wedges were fabricated. For  $Co^{60}$  there were for field size  $12 \times 12 \text{ cm}^2$ ,  $10 \times 10 \text{ cm}^2$  &  $8 \times 8 \text{ cm}^2$ , for wedge angles  $15^\circ$ ,  $22.5^\circ$ ,  $30^\circ$ ,  $37.5^\circ$ ,  $45^\circ$ ,  $52.5^\circ$  &  $60^\circ$  in lead and for non conventional angles  $22.5^\circ$ ,  $37.5^\circ$  &  $52.5^\circ$  were fabricated in lipowitz. For 4MV X-ray the field sizes were  $10 \times 10 \text{ cm}^2$ ,  $15 \times 15 \text{ cm}^2$  &  $20 \times 20 \text{ cm}^2$ . The wedge angles used were the same as for Cobalt beam. Dosimetry of each wedge was worked out using small volume ion chamber and water phantom system.

3. **Natural background radiation registry (Physics studies ongoing)**

(Funded by : The Department of Atomic Energy Govt. of India.)

Dr.RaghuRam.K.Nair supervises the Physics studies.

Radiation measurements stand completed. Data analysis in progress.

**Research projects (ongoing)**

1. **Dosimetry of early head and neck cancers, mantle field treatment and cervical cancer using Indigenous remote afterloader applications with special reference to radiation protection.**

(Funded by Atomic Energy Regulatory Board, Mumbai)

Principal Investigator Mr.T.S.Elias

Co-Investigators Dr.V.Padmanabhan  
Mr.C.A.Davis, Mr.L.S.Arunkumar

Data collection is in progress

2. **Development of indigenous afterloader system in the treatment of Carcinoma of Cervix Uteri**

(Funded by : Dept of Science & Technology, New Delhi and Regional Cancer Centre, Trivandrum)

Principal Investigator Mr.T.S.Elias

Co-Investigators Dr.V.Padmanabhan, Mr.C.A.Davis,  
Dr.M.Krishnan Nair

The development of the system is in progress. BRIT has been approached for  $Cs^{137}$  Source. Grant extra Rs. 5 lakhs sanctioned.

3. **Dose measurements in patients undergoing diagnostic X-ray examinations including special investigations.**

(Funding agency : Atomic Energy Regulatory Board, Mumbai)

Principal Investigator Dr.RaghuRam.K.Nair

Co-Investigators Mr.L.S.Arunkumar,  
Dr.V.Padmanabhan,  
Dr.M. Krishnan Nair

Studies have been completed in 384 patients for various organ doses. The study is in the second year and data is being collected.

4. **A Phase III multicentre, open labelled single group study into the effect of Foscan – Medicated PDT on recurrent squamous cell cancers of oral cavity.**

(International trial by M/s Quarta Nova USA.)

Co-Investigator Mr.C.A.Davis

Twenty patients have been treated in this trial at this Centre

**Research projects (New)**

1. **Fabrication of beam direction device for external beam radiotherapy**

(Submitted to STEC (Govt. of Kerala) under consideration)

Principal investigator Mr. T.S. Elias

Co-investigator Mr. C.A. Davis, Dr. V. Padmanabhan,  
Dr. B. Rajan

**Awards /Honours/Fellowship/Nominations / Training**

**Dr.V.Padmanabhan**

1. MD (Radiotherapy) examiner - The T.N Dr.M.G.R Medical University, Chennai on 8.10.98.
2. Momento on 25 years service to Medical Physics - AMPI (Karnataka) chapter

3. *External Examiner Ph.D / Public viva Examination* - Cancer Institute, Adayar on 14.12.98.
4. *Convenor, Ph.D open defense* - University of Kerala on 7.4.99.
5. *MD/DMRD Examiner* - University of Kerala on 24-25 June-98, 23-24 Dec-98.
6. *Member, Board of Trustees* - AMPI, IARP
7. *Life member* - AROI, Indian Society for Radiation Biology (ISRB).
8. *Member, National Hon. Advisory Committee and Chairman, Scientific Session Imaging Physics* - ICMP 98, New Delhi.
9. *Member, Organising Committee* - 24<sup>th</sup> IARP Conference, Kakrapar Atomic Power Station, Surat
10. *Member, Selection Committee* - Regional Cancer Centre - Lecturer, Radiation Physics on 5-8-98.

#### Mr. C.A. Davis

- 1) *Microelectron HDR & Plato Treatment Planning system* at Azienda Ospedaliera Pisana, PISA, Italy and at M/s Nucletron Oidelft BV, Netherlands from 8.5.98 to 24.5.98.
- 2) *Foscan Photo Dynamic Therapy (PDT) at National Medical Laser Center, University College, London Medical School, London* on 10.9.98.
- 3) *Vice President of KAMP (1997-99)*
- 4) *Member Executive Committee of ISRP (1998-2000)*

#### Dr.Raghu Ram.K.Nair

Two weeks training in Radiotherapy Simulator in the University Hospital, University of Regensburg, Germany, January, 1999 by Siemens.

#### Mr.T.S.Elias

1. Undergone a training on teaching course ESTRO, Belgium
2. Under the auspices of KAMP & R.C.C released a book on Short questions on Physics of Radiotherapy & Radiotherapy techniques. [7.8.98]
3. Review Committee meeting held at R.C.C, Trivandrum "Remote Afterloading System". [7.8.98].

#### Ph.D Thesis

1. **Mr.G.Ramakrishnan** was awarded Ph.D degree by the University of Kerala for his thesis entitled "Quality control and physical parameter in diagnostic units" (1998)  
Guide : Dr.V.Padmanabhan.
2. **Mr.L.S.Arunkumar** submitted his thesis on "Design, fabrication and dosimetric aspects of beam modifying devices in Radiotherapy. University of Kerala (1998)  
Guide : Dr.V.Padmanabhan
3. **Ph.D Thesis by Dr.G.Ramakrishnan (1999)** University of Kerala, Trivandrum  
Topic : *Quality Control & Physical Parameters in Diagnostic Units*

The major observations in the study are:

Majority of x-ray machines are not subjected to any form of acceptance or quality control tests.

X-ray machines installed in narrow rooms, absence of Pb lined doors, no collimation etc.

Among routine x-ray examinations highest skin entrance dose was measured for LS spine lateral (16.69mSv) and in special procedures Barium meal (75.92 mSv) Testis doses were higher due to the absence of gonadal shielding.

In dental radiography panoramic exposure yielded a significant reduction in dose when compared to full mouth routine dental radiography.

Mammography mean glandular dose measured was 5.61 mGy. In CT procedures, head plain with contrast contributed for maximum dose (22.56 mSv)

For DSA a maximum dose was measured (321.43 mSv) during posterior head four vessel angiography.

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

**Papers presented - (Chapter IV)**

**Papers published - (Chapter V)**

## **DIVISION OF CANCER EPIDEMIOLOGY AND CLINICAL RESEARCH**

Dr. Cherian Varghese	Assoc. Professor
Dr. Aleyamma Mathew	Asst. Professor
Ms. Padmakumary Amma	Medical Statistician
Mr. P Gangadharan	Emeritus Medical Scientist (ICMR), Consultant.

The division runs the Hospital Cancer Registry, Population based cancer registries in Trivandrum and Karunagapally and conducts epidemiological and clinical cancer research. This division is the nodal point for planning, implementation and evaluation of cancer control programmes and provides consultancy for various studies.

This division received a project to establish a cancer care centre in Pathanamthitta district hospital at Kozhencherry and a unit with facilities for cancer detection, surgical oncology, medical oncology and palliative care is getting ready for inauguration in July 1999.

A cancer patient follow-up clinic was established in Kannur in association with the Malabar Cancer Care Society.

The UNFPA has sanctioned a project as an operational research programme in cancer control in the Northern Districts of Kerala.

Progress is being made to provide cancer care online and will be the first Telemedicine project in the country. This is a joint activity with the Electronics Research & Development Corporation, India, Trivandrum.

This division provides training to MSW students from Loyola college and students of medical documentation from MG University, Kottayam on a regular basis.

### **The RCC Institute of Epidemiology, Surveillance and Preventive Oncology (RESPO).**

The division has expanded into a major training and research organisation and to make this more fruitful a proposal was made to establish an Institute within RCC. This proposal is accepted by the Executive Committee and will be realized very soon.

### **5<sup>th</sup> Cancer Registry Training Programme, Regional Cancer Centre, Trivandrum.**

The 5<sup>th</sup> Cancer Registry Training Programme was held from 6<sup>th</sup> to 14<sup>th</sup> January 1999. There were 27 participants from different cen-

tres in India. They included Hospital based Cancer Registries (HCR) and Population based Cancer Registries (PBCR) under ICMR, NCRP and non-ICMR registries. There were participants from other Cancer Hospitals and Medical Colleges interested in starting cancer registries.

The course was inaugurated by Dr. N. Babu, Vice-Chancellor, University of Kerala, in a meeting presided over by Sri. V. Vijayachandran, Secretary to Health and Family Welfare, Govt of Kerala. Dr Welsch and Dr John Young offered felicitations and Dr MK Nair, Director RCC, welcomed the gathering. Mr P Gangadharan, Emeritus Medical Scientist, RCC, was honoured in the meeting for his contributions towards the National Cancer Registry Programme and the Regional Cancer Centre, Trivandrum. Dr D K Jain was also felicitated in the meeting for his efforts in NCRP.

The course material and reference books were provided by the National Cancer Institute, USA and the course manual ran into 400 pages. The topics included, methods of cancer registration, ICD-O coding, staging and extent of disease classifications, abstraction of case records etc. A pre test and post test were held and the post test scores showed remarkable improvement in the scores.

### **The faculty included**

Dr John L Young Jr. Professor of Epidemiology, Emory University, Atlanta, Georgia.

Mr. Steven Roeffers, Clinical Instructor, Emory University, Atlanta, Georgia.

Dr Federico Welsch, Associate Director for International Affairs, National Cancer Institute, USA.

Dr. DK Jain, Deputy Director, ICMR, New Delhi.

Mr P Gangadharan

Dr Aleyamma Mathew

Dr Cherian Varghese (Co-ordinator)

Regional Cancer Centre, Trivandrum.

### **Workshop on Cancer Registration and Surveillance**

A workshop was organised for Medical Records Officers and staff of the vital statistics offices in Trivandrum Corporation and the adjoining community development blocks on 11<sup>th</sup> of July, 1998. There were 35 participants and the workshop dealt with all aspects of medical documentation with special reference to cancer registration and surveil-

lance. The workshop was inaugurated by the Worshipful Mayor of Trivandrum Corporation, Sri.V. Sivankutty.

### Ongoing projects

#### 1. Hospital Cancer Registry.

The Hospital Cancer Registry (HCR) covering the Regional Cancer Center and Medical College Hospitals in Trivandrum has abstracted, analyzed and presented the report for the year 1996. The HCR database is a source for various research programs.

#### *Cancer pattern in RCC, Trivandrum, in 1996*

Six thousand seven hundred and fifty seven (6757) cases were reported during the year 1996. The distribution of cancer cases with respect to site, age and sex are given in Tables 1 & 2. The male:female ratio was 1.2:1. 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 two percentage of cases had microscope verification of diagnosis. In the 5267 previously untreated cases 10 % were in the early stages. Among the who reported for treatment 25.8% were palliatively treated and 58.8% were treated with a curative intent. Analysis by type of treatment showed that 46.92% received radiation as the only form of treatment and 67.86% in combination with other forms of therapy.

#### *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 5. The system wise distribution of cancers are shown in Fig. 2.

#### *Childhood Cancers*

Childhood cancers formed 4.6% (312) of the total cancer cases. The leading sites were leukaemia 132(42.3%), central nervous system 40(12.8%) and lymphoma 27 (8.6 %).

#### 2. Trivandrum Cancer Registry (Population based)

A population based cancer registry has been established covering the population of Trivandrum Corporation and the adjoining Community Development blocks-Trivandrum rural, Kazhakuttam and Chirayinkil (covering a population of 10,66,322 as per 1991 census). The establishment of this registry was made possible by a financial assistance from the Unit of Descriptive Epidemiology, IARC, Lyon,



Participants and Faculty of the V Cancer Registry Training Programme from 6th to 14th January 1999 at R.C.C.

France. About 30 hospitals and vital statistics offices in 18 panchayats and Trivandrum Corporation are covered by the social investigators to collect data on cancer cases from the population. The report for the year 1991-92 was published in the WHO publication "Cancer Incidence in Five Continents Vol. VII 1998" and is a testimony to the credibility of the data generated. Tables 4 and 5 presents the age-specific and age-adjusted cancer incidence data for the years 1991-1995 for men and women respectively. Figs,3 and 4 presents the leading cancer sites in men and women.

**3. Molecular Epidemiology of Paediatric Leukaemia and Lymphoma in Kerala, India (1997-1999).**

(Funding agency Key Kendall Leukaemia Fund, UK)

Investigators	Dr. Cherian Varghese, Dr. Kusumakumary, Dr. Thomas Abraham, Dr. Rekha, Dr. M. Krishnan Nair.
Collaborators	Dr. Gareth Morgan, Prof. R. Cartwright (Uni. of Leeds)

A unique attempt to study the risk factors and molecular markers of paediatric acute Leukaemia in Kerala, India. This study has recruited 97 cases and 130 controls so far.

**4. Pesticide exposure and breast cancer (1997-1999)**

(Funding agency National Cancer Institute, USA).

Investigators	Dr. Cherian Varghese, Dr. Aleyamma Mathew, Dr. Iqbal Ahammed, Dr. M. Krishnan Nair.
Collaborators	Dr. Susan Sturgeon, Dr. Reshmi Sinha (NCI, USA)

An exploratory study to address the levels of pesticide residues in breast cancer cases. 125 cases have been accrued and analysis is in progress.

**5. Occupation and cancer.**

(Funding agency International Agency for Research on Cancer, Lyon).

Investigators	Dr. Cherian Varghese, Dr. Aleyamma Mathew
---------------	--



Collaborator Dr. P. Boffetta (Unit of Environmental Epidemiology, IARC, Lyon)

The data management and analysis of this study are in progress.

**6. Natural Background Radiation Cancer Registry, Karungappally.**

This registry continues to monitor the cancer incidence and mortality in the region. Systematic measurement of radiation levels and studies on other variables in the population are in progress. The cancer incidence data from this registry was published in the WHO publication "Cancer Incidence in Five Continents, Vol VII, 1998".

**Crude, Age-adjusted and truncated (35-64 years) incidence rates and total cancer cases in Trivandrum Cancer Registry 1991-1995**

Area	CR	AAR (WP)	TR	Total cases
Urban Male	77.0	94.4	160.3	1024
Urban Female	73.0	82.5	167.2	995
Rural Male	64.4	78.3	140.6	870
Rural Female	64.6	71.5	135.0	915
Total Male	70.5	85.8	150.5	1894
Total Female	68.6	76.4	150.4	1910

CR: Crude rate, AAR(WP): Age-adjusted incidence rate (World population), TR: Truncated rates

**Awards /Fellowships /Honours/Training**

**Dr Cherian Varghese**

1. *WHO/IARC Travel Fellowship* to attend the IARC, International Course on Infections that increase the risk of cancer. Annecy, France, 13-18 December, 1998.
2. *Young investigator Travel award* to attend the International Symposium Workshop on Epidemiology & Prevention of Cancer. Bangkok, Thailand, Nov 2-5 1998.
3. *Travel Scholarship* to attend the International Association of Cancer Registries Annual Meeting in Atlanta, Georgia, USA. August 1998. "Hospital cancer registry, RCC, Trivandrum, A model for Developing countries"

**Dr. Aleyamma Mathew**

Advisory board member of the Journal of the Academy of clinical microbiologists.

**TABLE I  
REGIONAL CANCER CENTRE - TRIVANDRUM: CANCER CASES BY AGE AND SITE - MALES: 1996**

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	3	1	3	2	4	2	1	17	0.47
141 Tongue	-	-	-	1	-	1	7	7	13	28	30	29	32	33	13	13	207	5.72
142 Salivary G	-	-	-	2	-	1	-	3	2	-	4	1	1	3	1	1	20	0.55
143 Gum	-	-	-	-	1	1	1	3	1	5	12	9	15	7	6	10	71	1.96
144 Floor of mouth	-	-	-	-	-	-	-	1	5	6	9	7	8	6	1	1	44	1.22
145 Other mouth	-	-	-	-	1	-	7	8	25	28	20	53	40	41	32	22	280	7.74
146 Oropharynx	-	-	-	-	-	-	1	3	6	11	12	22	24	14	14	8	115	3.18
147 Nasopharynx	-	-	-	-	-	-	1	1	2	4	1	2	1	2	1	3	23	0.64
148 Hypopharynx	-	-	-	-	-	-	1	2	6	14	17	17	17	20	15	7	116	3.21
149 Pharynx, etc	-	-	-	-	-	-	-	-	-	-	1	1	-	1	-	-	3	0.08
150 Oesophagus	-	-	-	-	1	1	-	10	8	21	22	27	41	40	30	17	226	6.25
151 Stomach	-	-	-	1	-	1	5	5	8	7	15	16	19	14	11	9	111	3.07
152 Small Intes.	-	-	-	-	-	-	1	-	1	-	-	1	1	-	-	-	4	0.11
153 Colon	-	-	-	-	-	3	3	3	9	6	10	5	6	4	4	3	57	1.58
154 Rectum	-	-	-	1	-	1	6	6	5	9	9	6	8	8	3	6	70	1.94
155 Liver	-	-	-	2	1	3	10	20	9	11	10	8	10	5	5	2	98	2.71
156 Gall bladder	-	-	-	-	-	-	-	1	2	-	-	3	1	1	-	-	8	0.22
157 Pancreas	-	-	-	-	-	-	-	-	4	5	5	6	7	2	4	-	33	0.91

Table 1 Contd....

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	%
158	Retropcrit	-	-	-	-	-	-	3	-	1	3	1	2	-	1	-	-	11	0.30
160	Nasal cavity	-	-	-	-	-	-	2	2	3	3	2	4	7	3	2	2	30	0.83
161	Larynx	-	-	-	-	-	1	2	4	6	19	21	30	45	52	23	12	218	603
162	Lung	-	-	-	-	1	1	6	5	20	39	60	99	89	89	52	16	477	13.19
163	Pleura	-	-	-	-	-	-	1	2	-	-	-	1	-	2	-	-	6	0.17
164	Thymus	-	-	-	1	1	1	1	-	-	-	-	2	-	1	-	-	7	0.19
170	Bone	-	2	9	25	7	8	-	-	1	3	1	-	-	-	-	-	56	1.55
171	Conn. Tissue	5	-	-	4	5	6	4	3	8	5	1	4	4	4	2	2	57	1.58
172	Skin male	-	-	-	-	1	2	1	1	4	1	3	2	3	6	5	2	31	0.86
173	Skin other	-	-	-	-	1	-	2	2	3	4	5	4	6	3	6	8	44	1.22
175	Breast male	-	-	-	-	-	-	-	-	-	1	-	2	2	1	1	1	8	0.22
185	Prostate	-	-	-	-	-	-	-	-	-	-	4	4	9	12	11	8	48	1.33
186	Testis	6	1	-	-	3	6	5	2	-	1	-	-	1	-	-	-	25	0.69
187	Penis, etc	-	-	-	-	-	2	3	2	3	3	4	5	4	6	1	2	35	0.97
188	Uri, Bladder	-	-	-	-	-	-	-	-	3	6	3	7	7	11	16	8	61	1.69
189	Kidney	6	-	1	-	2	1	1	1	3	-	8	6	-	2	1	1	33	0.91
190	Eye	5	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	7	0.19
191	Brain	2	15	8	5	5	6	14	13	5	4	1	5	6	3	3	1	96	2.65
192	Nervous sy	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-	-	3	0.08
193	Thyroid Gl	-	1	1	3	5	7	7	13	10	9	2	7	8	7	5	5	90	2.49

64

Table 1 Contd....

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	%
194	Other endo. Gl	2	3	2	1	-	-	-	1	-	1	-	-	-	-	-	-	10	0.28
195	Ill def. site	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	0.06
196	Sec. Lymph M	1	-	-	1	1	-	2	6	7	18	8	14	14	12	6	8	98	2.71
197	Sec. Res. etc	-	-	-	-	-	-	-	3	3	3	6	8	12	7	4	6	52	1.44
198	Sec. Other	-	1	-	-	-	1	-	4	2	4	6	13	14	14	9	6	74	2.05
200	Lymphosarc	-	2	2	7	7	7	4	6	9	12	3	7	9	14	6	7	102	2.82
201	Hodgkins D	1	6	4	3	5	4	3	3	2	4	3	1	1	1	-	1	42	1.16
202	OTH. Lymph	1	4	3	3	5	4	9	5	8	7	12	9	12	13	7	8	110	3.04
203	Multi. Myel	-	-	-	-	-	-	-	1	1	3	8	6	14	16	4	4	57	1.58
204	Leuk. Lymph	26	22	16	15	8	6	1	4	3	3	3	2	3	1	-	-	113	3.13
205	Leuk. Myelo	4	3	7	11	6	11	8	5	14	5	5	7	3	2	7	4	102	2.82
208	Leuk. Uns	-	-	-	-	1	-	2	-	-	1	-	1	-	2	-	1	8	0.22
	Total -el	60	62	54	91	72	86	125	161	228	320	351	469	506	494	321	216	3616	

65



Table 2 Contd....

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	%
191	Bronch	3	5	7	5	7	4	4	11	10	2	3	5	2	2	-	-	64	2.04
193	Thyroid G1	-	-	6	17	23	39	26	51	21	32	14	15	7	10	6	2	269	8.56
194	Other endo. G1	4	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	6	0.19
195	Ill def. site	4	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	5	0.16
196	Sec. lymph N	1	-	-	-	1	1	6	2	3	4	3	7	3	5	3	-	39	1.24
197	Sec. Res. etc	-	-	1	-	-	2	-	3	7	-	4	5	4	6	6	2	40	1.27
198	Sec. Other	-	-	-	-	1	1	1	2	6	5	6	1	5	4	4	5	41	1.31
200	Lymphosare	-	2	1	2	2	1	4	-	4	-	5	4	-	9	3	4	41	1.31
201	Hodgkins D	-	1	-	7	1	2	2	-	-	-	1	-	1	2	-	1	18	0.57
202	Orth Lymph	-	-	-	1	2	2	4	3	5	4	4	6	9	8	-	4	52	1.66
203	Mult Myel	-	-	-	-	-	-	-	2	2	3	5	6	4	6	2	3	33	1.05
204	Leuk Lymph	18	7	14	11	2	1	1	2	2	2	4	1	2	1	1	1	70	2.23
205	Leuk Myelo	5	2	6	6	4	9	4	3	2	4	1	2	3	3	1	1	56	1.78
208	Leuk UNS	2	-	-	-	-	1	-	-	-	-	2	-	-	-	-	-	5	0.16
	Total	58	27	51	70	64	120	154	268	302	382	326	385	324	318	156	136	3141	

Table 3

Average annual age-specific, age-adjusted (WP) and truncated (35-64 years) incidence rate per 100,000 persons.

Sex: Female, Year: 91-95, Trivandrum Cancer Registry

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+	CR	AAR	SE	TAR
140	Lip	-	-	-	-	-	-	-	-	0.7	1.0	-	2.4	3.1	7.9	2.3	0.4	0.5	0.1	0.6	
141	Tongue	-	-	-	-	-	0.8	0.9	2.7	3.6	5.1	14.1	27.3	20.8	24.9	34.4	18.5	4.2	5.2	0.5	107
142	Salivary, G1	-	-	0.4	0.4	-	-	0.5	-	-	1.5	1.0	-	-	1.6	5.3	-	0.3	0.1	0.0	0.4
143	Gum	-	-	-	-	-	-	-	0.4	0.6	2.9	2.0	2.4	7.3	7.8	7.9	16.2	1.2	1.4	0.3	2.3
144	Floor of mouth	-	-	-	-	-	-	-	-	3.6	2.0	3.6	-	3.1	2.6	6.9	0.6	0.7	0.1	1.5	
145	Other mouth	-	-	-	-	-	-	0.5	1.3	2.4	5.8	23.1	23.7	33.1	18.7	37.0	41.6	4.8	6.2	0.5	12.9
146	Oropharynx	-	-	-	-	-	-	0.5	0.4	0.6	4.4	8.0	15.4	15.9	12.1	13.2	23.1	2.5	3.1	0.4	6.4
147	Nasopharynx	-	-	-	0.4	0.1	0.4	0.5	-	-	1.5	2.0	2.4	1.2	1.6	2.6	2.3	0.5	0.6	0.2	1.1
148	Hypopharynx	-	-	-	-	-	-	-	-	1.2	2.2	5.0	2.4	4.9	17.1	2.6	13.9	0.3	1.6	0.3	2.4
149	Pharynx, etc	0.4	-	-	-	-	-	-	-	-	-	-	2.4	-	-	-	-	0.1	0.1	0.0	0.3
150	Oesophagus	-	-	-	-	-	-	0.9	0.9	-	3.6	9.0	13.0	8.6	26.4	15.9	18.5	2.5	3.1	0.4	5.1
151	Stomach	-	-	-	-	-	-	0.9	-	2.4	5.1	13.0	15.4	15.9	37.3	21.1	25.4	3.5	4.5	0.5	7.6
152	Small intes.	-	-	-	-	-	-	0.5	-	-	0.7	2.0	-	1.2	-	-	2.3	0.2	0.3	0.0	0.6
153	Colon	-	-	-	0.4	0.8	-	0.5	0.9	1.8	4.4	5.0	7.1	3.7	7.8	10.6	11.6	1.6	1.9	0.3	3.6
154	Rectum	-	-	-	-	-	-	1.4	0.9	1.8	1.5	6.0	11.9	4.9	9.3	13.2	18.5	1.8	2.2	0.3	3.9
155	Liver	0.4	-	-	-	-	0.4	1.8	1.8	3.0	3.6	3.0	8.3	7.3	15.5	5.3	16.2	2.0	2.4	0.3	4.1
156	Gall bladder	-	-	-	-	0.4	-	-	-	-	0.7	2.0	1.2	-	-	2.6	-	0.2	0.3	0.0	0.6

Table 3 Contd....

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+	CR	AAR	SE	TAR
157	Pancreas	-	-	-	-	0.4	-	1.4	0.9	1.2	5.1	5.0	5.9	3.7	10.9	10.6	6.9	1.6	1.9	0.3	3.4
158	Retroparot	-	-	-	-	0.8	-	-	-	-	-	-	-	1.2	4.7	2.6	-	0.3	0.3	0.0	0.2
159	Other dig. sys.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
160	Nasal Cavity	-	-	-	-	-	-	-	-	0.6	-	-	-	3.7	1.6	5.3	6.9	0.4	0.5	0.1	0.6
161	Larynx	-	-	-	-	-	-	0.5	0.4	2.4	2.2	9.0	15.4	20.8	31.1	15.9	23.1	3.1	3.9	0.4	7.1
162	Lung	-	-	-	-	0.4	-	0.5	0.9	3.6	7.3	16.1	40.3	51.4	31.1	66.1	27.7	6.3	8.0	0.6	16.7
163	Pleura	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
164	Thymus	-	-	-	0.4	0.4	0.4	0.5	-	1.2	-	-	1.2	-	-	-	-	0.3	0.2	0.0	0.4
165	Other resp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.7	0.0	1.0
170	Bone	-	-	2.0	0.8	0.4	-	0.4	0.6	0.7	2.0	1.2	1.2	3.1	-	-	-	0.6	0.7	0.0	1.0
171	Conn. tissue	0.8	-	0.8	-	-	0.8	1.4	-	0.6	1.5	3.0	3.6	6.1	4.7	-	2.3	1.0	1.2	0.0	2.1
172	Skin melan	-	-	-	-	-	-	0.5	-	-	0.7	1.0	1.6	2.4	6.2	5.3	2.3	0.5	0.6	0.2	0.8
173	Skin other	-	-	-	-	-	-	-	0.9	0.6	0.7	6.0	5.9	2.4	7.8	7.9	9.2	1.1	1.3	0.3	2.5
175	Breast male	-	-	-	-	-	-	-	0.4	-	-	-	-	-	1.6	2.6	2.3	0.1	0.2	0.1	0.1
185	Prostate	-	-	-	-	-	-	-	-	0.7	3.0	8.3	20.8	31.1	37.0	78.5	3.6	4.6	0.5	4.4	
186	Testis	-	0.4	-	0.8	0.4	0.8	-	0.9	1.8	-	-	-	1.2	-	-	-	0.4	0.4	0.0	0.7
187	Penis, etc	-	-	-	-	-	-	-	0.9	-	-	4.0	4.7	3.7	-	7.9	6.9	0.7	0.9	0.1	1.9
188	Utr. Bladder	-	-	-	-	-	-	-	-	1.2	1.5	3.0	10.7	3.7	10.9	26.4	13.9	1.6	2.0	0.3	2.9
189	Kidney	1.2	-	-	-	-	-	-	-	-	1.5	3.0	2.4	2.4	4.7	5.3	2.3	0.7	0.9	0.2	1.4
190	Eye	0.4	-	-	-	-	-	-	0.6	-	-	-	-	1.2	-	-	-	0.1	0.1	0.0	0.3

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+	CR	AAR	SE	TAR
191	Brain	1.6	1.6	1.2	1.2	1.5	1.2	0.9	0.9	3.0	2.9	3.0	5.9	3.7	7.8	5.3	9.2	2.1	2.3	0.3	3.0
192	Nervous sy.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
193	Thyroid GI	-	-	0.4	0.8	1.9	1.2	1.8	3.1	3.0	1.5	6.0	1.2	4.9	4.7	2.6	2.3	1.7	1.7	0.3	3.2
194	Other endo GI	0.4	0.4	0.4	-	-	-	-	-	-	1.5	-	-	-	-	-	-	0.2	0.2	0.0	0.3
195	Ill def. Site	0.4	-	-	-	-	-	-	-	-	-	1.0	-	2.4	-	-	-	0.1	0.2	0.0	0.5
196	Sec. Lymph N	-	-	-	-	-	-	-	-	3.0	2.9	5.0	11.9	12.2	4.7	7.9	23.1	1.9	2.3	0.3	5.1
197	Sec. Res. etc	-	-	-	-	-	-	0.5	0.9	1.8	3.6	3.0	3.6	4.9	6.2	5.3	-	1.0	1.2	0.0	2.8
198	Sec. Other	0.8	-	-	0.4	-	0.5	-	1.2	3.6	3.0	4.7	4.9	7.8	7.9	18.5	1.4	1.7	0.3	2.7	
199	Prim. MNK	-	-	0.4	-	0.4	1.4	1.8	4.8	5.8	13.0	22.5	18.4	34.2	29.1	55.4	4.8	5.9	0.5	9.8	
200	Lymphosarc	-	-	-	0.4	-	-	-	2.4	0.7	1.0	1.2	2.4	1.6	10.6	4.6	0.6	0.8	0.2	1.2	
201	Hodkins D	-	2.0	0.4	-	0.4	1.2	0.5	-	0.6	-	2.0	1.2	1.2	3.1	-	-	0.7	0.7	0.0	0.8
202	Oth. Lymph	0.4	1.2	-	0.4	0.4	0.8	1.8	0.9	4.2	5.1	7.0	-	8.6	3.1	5.3	2.3	1.8	2.0	0.2	4.2
203	Multi Myel	-	-	-	-	-	-	-	-	1.2	2.2	4.0	5.9	6.1	10.9	2.6	9.2	1.2	1.5	0.3	2.9
204	Leuk Lymph	4.4	1.6	1.9	1.2	1.9	1.2	-	1.3	-	-	2.0	-	3.7	3.1	2.6	2.3	1.6	1.7	0.1	1.1
205	Leuk Myelo	0.4	0.4	0.4	0.8	1.1	0.4	0.9	0.4	0.6	3.6	1.0	1.2	3.7	3.1	-	6.9	1.0	1.1	0.1	1.7
206	Leuk Monoc.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
207	Leuk Misc.	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
208	Leuk Mns	0.4	-	0.4	-	0.4	-	-	-	-	0.7	1.0	1.2	1.2	-	-	2.3	0.3	0.3	0.0	0.6
	Total	12.0	7.6	6.3	10.0	12.4	10.4	22.5	24.3	57.6	103.3	205.3	297.8	331.4	426.4	454.3	535.7	70.5	85.8	2.6	150.5

C.R. - Crude Rate, AAR - Age Adjusted Rate, TAR, Truncated Adjusted Rate (35-64), SE - Standard Error

Table 4  
Average annual age-specific, age-adjusted (WP) and truncated (35-64 years) incidence rate per 100,000 persons.

Sex: Female, Year : 91-95, Trivandrum Cancer Registry

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+	CR	AAR	SE	TAR	
140	Lip	-	-	-	-	-	-	-	-	-	-	-	-	1.9	1.1	1.4	2.3	1.8	0.2	0.2	0.1	0.4
141	Tongue	-	-	-	-	-	0.4	0.4	0.9	1.4	2.2	6.8	10.7	9.1	9.6	11.7	21.2	2.1	2.4	0.3	4.5	
142	Salivary, Gf	-	-	0.4	0.4	-	0.4	0.4	0.4	-	-	1.0	1.0	1.1	-	4.7	1.8	0.4	0.4	0.1	0.5	
143	Gum	-	-	-	0.4	-	-	-	0.4	-	2.2	1.0	1.9	9.1	9.6	14.1	8.8	1.2	1.4	0.2	2.1	
144	Floor of mouth	-	-	-	-	-	-	-	-	-	-	-	1.0	1.1	-	-	1.8	0.1	0.1	0.0	0.3	
145	Other mouth	-	-	-	-	-	-	-	0.4	-	1.5	3.9	9.7	20.4	20.6	14.1	35.3	2.7	3.1	0.4	4.9	
146	Oropharynx	-	-	-	-	-	0.4	-	-	-	1.5	1.0	1.0	1.1	2.7	2.3	1.8	0.4	0.4	0.1	0.7	
147	Nasopharynx	-	-	-	0.4	-	-	0.4	-	0.7	0.7	1.0	1.0	2.3	-	-	-	0.3	0.3	0.0	0.9	
148	Hypopharynx	-	-	-	-	-	0.4	-	0.4	-	1.5	2.9	1.0	1.1	2.7	4.7	-	0.5	0.6	0.0	1.1	
149	Pharynx, etc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	
150	Oesophagus	-	-	-	-	-	-	-	-	-	0.7	2.9	5.8	3.4	5.5	7.0	3.5	0.8	0.9	0.2	1.8	
151	Stomach	-	-	-	-	-	0.4	0.4	-	1.4	3.7	3.9	3.9	6.8	15.1	7.0	7.1	1.5	1.7	0.3	3.0	
152	Small intes.	-	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	0.0	0.0	0.0	0.1	
153	Colon	-	-	-	-	-	0.4	-	0.4	2.1	0.7	2.9	1.0	4.5	6.9	4.7	1.8	0.8	0.9	0.2	1.8	
154	Rectum	-	-	-	0.4	0.3	0.4	0.4	0.4	1.4	1.5	2.9	3.9	9.1	8.2	23.1	12.3	1.7	1.9	0.3	2.8	
155	Liver	-	-	-	-	0.3	-	0.4	-	1.4	0.7	1.9	1.9	5.7	2.7	11.7	1.8	0.8	0.9	0.2	1.7	
156	Gall bladder	-	-	-	-	-	-	-	0.4	-	-	1.0	3.9	1.1	-	1.3	1.8	0.3	0.4	0.1	0.9	
157	Pancreas	-	-	-	-	-	-	-	-	-	3.0	2.9	3.9	3.4	4.1	7.0	1.8	0.8	0.9	0.2	2.0	
158	Retropit	-	-	-	-	-	-	-	-	0.7	-	-	-	-	1.4	7.0	-	0.2	0.2	0.0	0.1	

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+	CR	AAR	SE	TAR
159	Other dig. sys.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
160	Nasal cavity	-	-	-	-	-	-	-	-	-	1.5	2.9	-	3.4	-	7.0	3.5	0.5	0.6	0.1	1.2
161	Larynx	-	-	-	-	-	-	-	-	-	-	-	-	1.1	1.4	2.3	3.5	0.2	0.2	0.1	0.1
162	Lung	-	-	-	-	-	0.7	0.9	0.4	-	-	1.9	1.9	10.2	8.2	9.4	8.8	1.2	1.3	0.2	2.0
163	Pleura	-	-	0.4	-	-	-	-	-	-	-	-	1.0	-	-	-	-	0.1	0.1	0.0	0.1
164	Thymus	-	-	-	-	-	-	-	0.4	0.7	0.7	-	-	-	-	-	-	0.1	0.1	0.0	0.4
165	Other resp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
170	Bone	-	-	1.9	0.7	0.3	-	0.9	-	1.4	-	1.0	-	-	1.4	-	-	0.5	0.5	0.0	0.4
171	Conn. tissue	-	-	0.4	0.7	0.3	0.4	0.4	-	-	1.5	3.9	2.9	-	2.7	2.3	-	0.6	0.7	0.0	1.3
172	Skin male	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	1.8	0.1	0.1	0.0	0.1
173	Skin other	-	-	-	-	0.3	-	-	0.4	-	0.7	2.9	1.0	5.7	8.2	2.3	8.8	0.9	1.0	0.2	1.6
174	Breast	-	-	-	-	1.3	2.5	9.2	20.6	41.2	42.7	57.1	49.5	47.5	52.1	53.9	44.1	15.5	17.4	0.8	42.0
179	Uterus Nos	-	-	-	-	0.3	0.4	-	0.4	0.7	0.7	-	1.9	-	-	2.3	1.8	0.3	0.3	0.1	0.6
180	Cervix	-	-	-	-	-	0.4	4.4	8.5	20.6	31.5	36.0	40.8	38.5	39.8	58.6	24.7	10.2	11.8	0.7	27.8
181	Placenta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
182	Body uterus	-	-	-	-	-	-	0.9	0.4	4.1	3.7	3.9	9.7	7.9	6.9	11.7	5.3	1.7	2.0	0.3	4.5
183	Ovary	-	-	0.4	2.2	1.3	1.4	1.3	2.7	5.5	11.2	11.7	4.9	9.1	19.2	9.4	7.1	3.4	3.7	0.4	7.4
184	Vagina	0.4	-	-	-	-	-	-	-	0.7	0.7	1.9	2.9	2.3	2.7	-	1.8	0.5	0.6	0.0	1.3
188	Uri. Bladder	-	-	-	-	-	0.4	-	-	-	0.7	1.0	-	-	6.9	-	1.8	0.3	0.4	0.0	0.3
189	Kidney	-	-	-	-	-	1.1	0.4	-	2.1	-	1.0	-	1.1	1.4	2.3	1.8	0.4	0.5	0.1	0.7
190	Eye	0.3	-	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.0	0.0
191	Brain	1.3	0.4	2.7	1.1	-	1.8	2.6	0.9	1.4	-	1.0	5.8	6.8	4.1	4.7	1.8	1.7	1.8	0.2	2.2

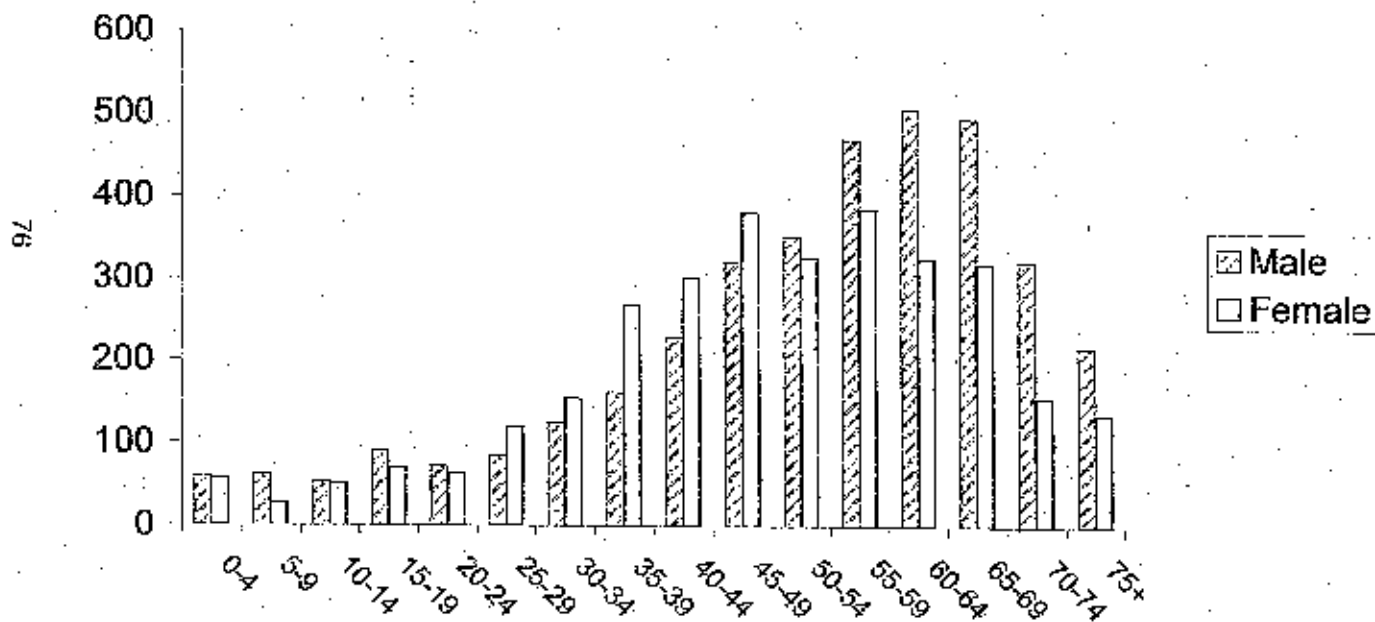
ICD 9	Site	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+	CR	AAR	SE	TAR	
192	Nervous sys.	-	-	-	-	-	0.9	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-	
193	Thyroid G1	-	-	-	0.8	0.7	5.4	6.0	9.2	7.2	11.7	5.2	8.8	2.9	5.7	8.2	2.3	5.3	0.1	0.1	0.0	0.3
194	Other endo G1	-	-	-	-	-	0.4	-	-	-	-	-	-	-	-	-	-	4.5	4.2	0.4	7.2	
195	Ill def. Site	-	-	-	-	-	-	-	-	-	-	1.0	-	-	1.4	-	-	0.1	0.1	0.0	0.2	
196	Sec. Lymph N	-	-	-	-	-	0.4	-	0.4	-	-	4.9	1.9	-	1.4	-	-	0.0	0.0	0.0	0.0	
197	Sec. Res. etc	-	-	-	-	-	0.4	0.4	0.4	0.4	1.4	3.0	2.9	1.9	2.3	4.1	14.1	0.9	1.1	0.2	1.9	
198	Sec. Othier	-	-	0.4	0.4	0.4	-	0.4	0.4	-	1.5	1.0	1.9	-	5.5	14.1	7.1	0.8	0.9	0.2	0.8	
199	Prim. UNK	-	0.4	0.4	-	-	0.7	0.7	3.6	1.4	6.7	11.7	9.7	10.2	19.2	32.8	30.0	9.5	4.0	0.4	6.7	
200	Lymphostare	-	-	-	-	-	0.7	0.4	-	0.7	0.7	1.0	1.9	2.3	5.5	4.7	-	0.6	0.6	0.0	1.0	
201	Hodkins D	-	-	-	0.4	-	0.4	-	-	0.7	0.7	1.0	-	-	-	2.3	-	0.2	0.2	6.0	0.4	
202	Chl. Lymph	-	-	-	0.4	0.3	-	-	0.4	1.4	3.7	5.8	1.0	5.7	6.9	2.3	1.8	1.0	1.2	0.2	2.9	
203	Mult Myel	-	-	-	-	-	-	-	-	0.7	1.5	-	2.9	4.5	6.9	4.4	3.5	0.8	0.9	0.2	1.4	
204	Leuk Lymph	1.7	2.9	1.9	0.7	0.3	0.7	-	0.4	-	0.7	1.0	-	-	2.7	-	-	0.9	1.0	0.0	0.4	
205	Leuk Myelo	0.8	-	0.4	0.7	0.7	2.1	1.3	0.9	2.7	2.2	3.9	2.9	2.3	1.4	2.3	3.5	1.4	1.4	0.2	2.4	
206	Leuk Menoc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	
207	Leuk Misc	-	-	-	-	-	-	-	0.4	-	0.7	-	-	-	-	-	-	0.0	0.0	0.0	0.0	
208	Leuk Uns	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	
Total		5.4	3.3	10.1	9.6	11.4	22.9	35.9	53.0	108.9	142.1	206.5	208.8	247.0	315.6	376.8	275.8	68.6	76.4	1.78	150.4	

C.R. - Crude Rate, AAR - Age Adjusted Rate, TAR, Truncated Adjusted Rate (35-64), SE - Standard Error

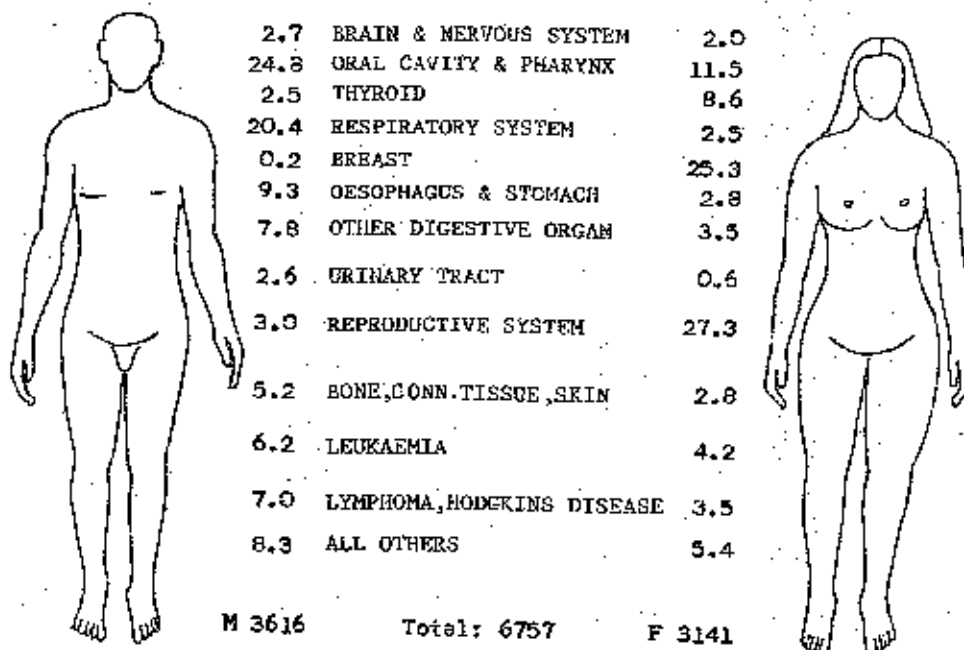
Table 5  
Ten leading sites of cancer in males and females  
Regional Cancer Centre, Trivandrum, 1996.

Site	No	Male		Female	
		%	Site	No	%
Lung	477	13.19	Breast	791	25.18
Mouth	280	7.74	Cervix	530	16.87
Lymphoma, HD	254	7.02	Thyroid	269	8.58
Oesophagus	226	6.25	Ovary	229	7.29
Leukaemia	223	6.17	Mouth	150	4.78
Larynx	218	6.03	Leukaemia	131	4.17
Tongue	207	5.72	Lymphoma, HD	111	3.54
Hypopharynx	116	3.21	Tongue	88	2.80
Oropharynx	115	3.18	Brain	64	2.04
Stomach	111	3.07	Oesophagus	62	1.97

**Fig.1. Distribution of cancer cases by Age group -1996  
(Male-3616, Female 3141)**

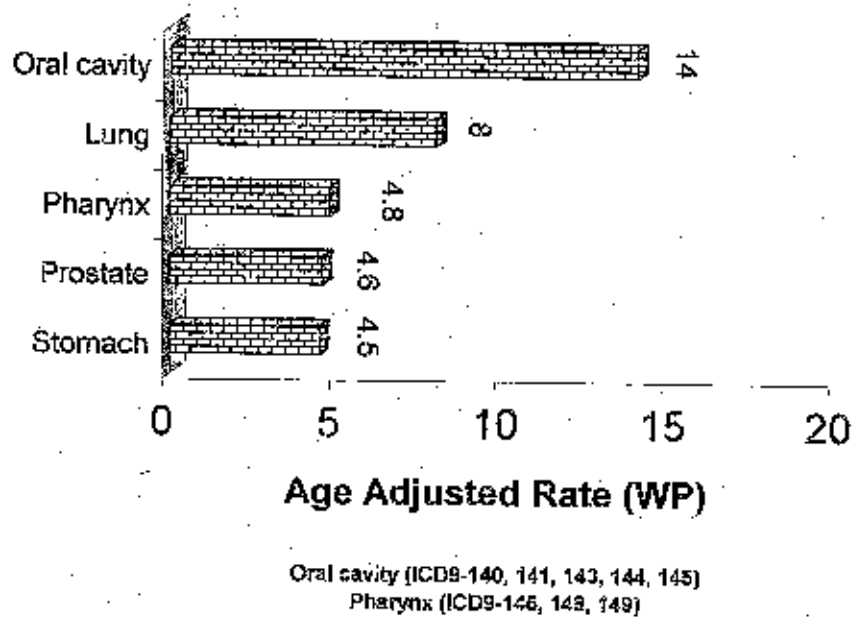


**FIG. 2: REGIONAL CANCER CENTRE, TRIVANDRUM  
SYSTEMWISE DISTRIBUTION OF CANCER CASES -- 1995**



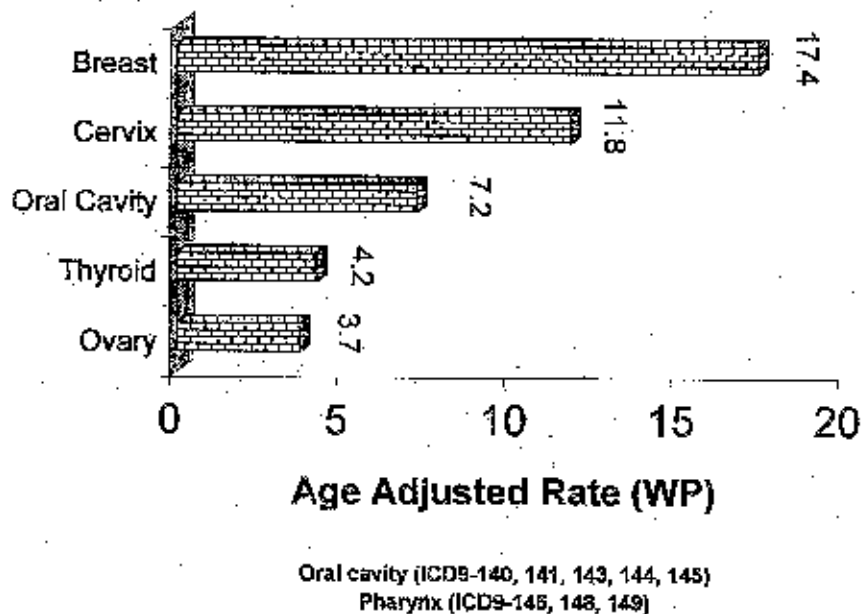


**Fig. 3 Leading sites-Trivandrum Cancer Registry (1991-95) Male**



78

**Fig. 4 Leading sites-Trivandrum Cancer Registry (1991-95) Female**



79

## NATURAL BACKGROUND RADIATION CANCER REGISTRY, KARUNAGAPPALLY, 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 & Environment Group, BARC.

### FIELD OFFICE: VAVVAKKAVU, KARUNAGAPPALLY TALUK

Officer-in-charge - Ms. P. Jayalekshmy (Sociologist)  
Cytotechnologist - Mr. K.S. Mani  
Senior Research Fellow (Statistics) - Mr. S. Jayadevan  
Radiation level measurements supervised by - Dr. Raghu Ram K. Nair

The objectives and study method as detailed in the 1996-1997 annual report of the Regional Cancer Centre, Trivandrum remained the same during 1998-1999. The main objective of the study was to investigate whether the cancer occurrence was related to the natural radiation occurring in the area. The progress achieved during 1998-99 is reported here under.

Natural Background Radiation Cancer Registry project was started in January 1990 and is continuing. Radiation level measurements were done by portable Scintillometer inside 66306 houses and 75,052 readings were taken outside the houses. These were entered in the computer and the distribution of the radiation levels in the entire taluk is obtained and are summarised in the Table below. It was observed that Neendakara panchayat has higher radiation levels than

other panchayats. Between panchayat wards there was wide variations in the radiation levels.

Radiation levels	Inside house level % of houses	Outside house level % of houses
< 5mGy/Yr	93	85
> 5mGy/Yr	7	15

A total of 2291 cancer cases were identified for the 7 year period 1990-96 in the taluk which gave the crude incidence rates of 92.4/100,000 males and 74.0/100,000 females. Adjusted to World population these rates were 102.6 for males 79.8 for females. Data analysis is continuing.

Annual radiation levels measured by TLD have been completed in 1088 houses, SSNTD in 603 houses. Soil analysis for Uranium, Thorium and Potassium has been completed in 203 samples, Thoron-in-breath studies done in 129 persons. Results of these are being studied. TLD measurements were done to obtain annual dose. From the spot scintillometer readings annual dose was estimated which, when compared with the TLD measured annual dose gave a correlation  $r > 0.95$ . This enabled us to pursue radiation measurements using scintillometer.

A strong component of the project has been the cancer patient services. These have helped to improve community support and also to enhance the scientific quality of studies.

Cancer patient follow-up clinics were held every month. 688 patients were followed up in the clinics which were conducted by oncologists from RCC. Cytology services, Cancer registration, Radiation level measurements and enumeration were going on simultaneously. 469 cytology smears were examined, FNAC was done in 385 patients. Sputum cytology examination was done for 54 patients. These services have helped many cancer patients and we received good support for these activities from the medical doctors in the taluk. The cytology services have resulted in a high rate of microscopic verification of cancer cases in this registry.

### Community oriented programme on cancer awareness

On 19.07.98 a seminar on "Environment Conservation" and a question answer session on "CANCER" was held in Chavara by 'NBRR' with support from 'The State Committee on Science, Technology &

Environment, Kerala. Several leading personalities participated in the programme including Sri. Premachandran (M.P), Dr. M. Krishnan Nair (Director RCC), Sri. M.K.Bhaskaran (President, Kollam Jilla Panchayath), Sri. Devendrakumar Singh (District Collector) and Dr. T. Vijayakumar (STEK).

**Other programmes conducted by the NBRR were:**

- Cancer awareness talk (27/01/98) - Kerala Kaumudi Readers Club, Alumkadavu, Karunagappally.
- Cancer Screening and Detection (26/09/98) - "ECHO" Club, Geethanjali, Kayamkulam.
- " (25/03/99) - Thevalakkara PHC under "Peoples Plan Programme".
- Cancer awareness talk (14/08/99) - Puthukkad Arts & Sports Club Puthukkad P.O, Chavara.

**Fellowships**

Mr. Jayadevan got ICRETT travel fellowship to attend a training programme on the analysis of cancer incidence data in Japan.

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

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

**DIVISION OF RESEARCH**

- Dr. Prabha Balaram - Addl. Professor
- Dr. Ravindran Ankathil - Assoc. Professor
- Dr. S. Kannan - Asst. Professor
- Dr. P. Remani - Asst. Professor
- Dr. Molykutty John - Asst. Professor
- Dr. Thomas Abraham - Scientific Officer

Understanding the biology of carcinogenesis and making this knowledge available for application in diagnosis, assessing prognosis and management have always remained the prime objective of this division. Research projects from various external funding agencies covering various basic and application oriented aspects of cancer biology have helped us to work towards achievement of the above objective. The results of these studies are in various stages of publication (21 publications) in national and international journals and have been presented at various scientific meetings. Efforts are still on and lots more needs to be done to unveil the never ending enigma of cancer.

**Ongoing research projects**

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

*(Funding agency: Council of Scientific and Industrial Research, New Delhi)*

- Principal Investigator Dr. Prabha Balaram
- Co-Investigators Dr. T.N.Rajalekshmi, Dr. Molykutty John

This study, continuation of the previous year, aims at identifying the molecular alterations and viral associations involved, if any, in gestation trophoblastic diseases GTD. Serological studies revealed antibodies against viruses such as CMV, HSV and RSV (Respiratory Syncytial Virus) in both normal placenta and molar placenta with a higher geometric mean titre of antibodies to HSV and RSV in the GTD cases. Presence of HPV antigen in 20-30% tissues of GTD was confirmed by immunohistochemistry and PCR techniques suggesting an association of HPV with GTD. The association of RSV and HSV is being studied.

Among the various cell cycle regulatory genes, apoptotic genes and antimetastatic genes studied immunohistochemically, expression of c-erbB2, p53, Rb and PCNA showed significant difference in GTD in comparison to gestational age matched placenta. The results also suggest an interaction of the nm23 gene with the Rb, bcl2, p53 in both normal placenta and GTD and with ras in GTD suggesting concomitant overexpression of ras and nm23 to be an indicator of GTD. Analysis of the cell cycle regulatory genes suggest GTD to be a disease of accumulation of cells in the S phase and not due to a higher rate of proliferation when compared to normal placenta and hence it cannot be termed a hyperproliferative condition.

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

*(Funding agency: Board of Research in Nuclear Sciences, Dept. of Atomic Energy, GOI)*

Principal Investigator: Dr. Prabha Balaran

Co-Investigators: Dr. Ramdas K, Dr. Ratheesan K,  
Dr. Nalinakumary KR, Dr. Anita Balan

As a continued study from the previous year, the results show the expression of Rb and c-myc 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. This finding has been confirmed by mRNA studies and suggests a strong correlation of Rb gene expression with differentiation. The p53 expression in precancerous lesions was affected by tobacco habits more than by alcohol while the Rb protein was affected both by tobacco and alcohol habits. Focal areas of p53 and Rb positivity was noticed in many of the precancerous and cancerous lesions suggesting field cancerisation effect. Even though the c-myc gene, another cell cycle regulatory gene, though showed a correlation with the expression of the p53 gene, did not show any difference based on the habits. The study is in progress.

**3. Molecular epidemiology of cancer of the oral cavity and oropharynx: A multicenter case-control study.(1996-1999)**

*(Funding agency: International Agency for Research on Cancer, Lyon)*

Principal Investigators Dr. Prabha Balaran (RCC),  
Dr. Nubia Munos (IARC)

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

The study was carried out to analyse the prevalence of human papilloma virus in oral cancer patients and hospital controls. The study involves samples from 5000 oral cancer patients and an equal number of age and sex matched hospital controls from 28 countries, 600 of them being from 9 centres in India, namely, Trivandrum, Madras and Bangalore. The prevalence of HPV and its subtype infection are correlated with patient characteristics such as age, sex, habits, (tobacco, alcohol use), associated infections, sexual behaviour etc. The data is in the process of being analysed.

**4. Genomic instability in breast cancers (1998-2000)**

*(Partly funded by Department of Science, Technology & Environment, Govt. of Kerala)*

Principal investigator Dr. Prabha Balaran

Co-investigators Dr. Iqbal Ahmed, Dr. Elizabeth Abraham

The study was started in order to evaluate the nature of genomic instability observed in patients with cancer and benign lesions of the breast. The major parameters being analysed are the alterations in the cell cycle regulatory genes, the apoptotic and proliferative indices, the metastatic potential, the inherent DNA damage repairing capacity by comet assay, and the status of the BRCA1 and BRCA2 genes using PCR and SSCP analysis. The role of the antimetastatic gene nm23 expression is controversial in literature and our results show no correlation of nm23 expression with the metastatic potential of the tumour. Preliminary results suggest a down regulation of some of the adhesion proteins and apoptosis in invasive breast cancers.

**5. Evaluation of metastatic potential in GTD using adhesion proteins and antimetastatic genes as indicators (1998-2001)**

*(Funding agency: Indian Council of Medical Research, New Delhi)*

Principal Investigator Dr. Prabha Balaran

Co-Investigators: Dr. Chandrika Devi, Dr. Molykutty John

Expression of adhesion proteins play the most important role in the metastasis of tumours. Placenta, in many ways, behave like a malignant tissue. The status of the adhesion proteins in this tissue is not known. GTD, a pathological condition of the placenta is very often

invasive and markers are not as yet available to identify the lesions with high invading capacity. In this study we address the question whether the expression and alteration of adhesion proteins could be helpful in identifying invasive lesions of GTD. Preliminary data suggest down regulation of some of the adhesion proteins in the invasive cases of GTD much more than that in the normal placenta of corresponding gestational ages. The study is continuing with the aim of assessing the usefulness of the above parameters either alone or in combination with other parameters to identify lesions with higher invasive capacity.

#### 6. Establishment of Familial Cancer Registry

Investigators Dr. Ravindran Ankathil,  
Dr. Aleyamma Mathew,  
Dr. M. Krishnan Nair

The study is continued with the objectives to investigate the incidence of familial cancers at the Regional Cancer Centre, through pedigree analysis, to compile the pedigrees and estimate the relative cancer risk of the family members and to establish a registry for the familial cancers.

Among cancer patients registered at RCC, the most frequently occurring familial cancers are those of Oral cavity (29%), Breast (22.5%), Colorectum (16.1%), Uterine cervix (10.7%), Lung (6.5%), Thyroid (4.3%) Ovary, Stomach and Prostate.

#### 7. Evaluation of haematologic and cytogenetic response of interferon treatment in CML patients (1998-1999)

(Funding agency: Fulford India (Pvt.) Ltd.)

Investigators Dr. Ravindran Ankathil,  
Dr. V.P. Gangadharan, Dr. N. Geetha

Chronic myeloid leukaemia (CML) is characterized cytogenetically by the reciprocal translocation t(9;22) (q34;q11). This results in a derivative chromosome 22, the philadelphia (Ph<sup>+</sup>) chromosome, which is present in 90 to 95% of CML patients. Ph<sup>+</sup> chromosome serves as a marker for the malignant clone and allow the cytogenetic diagnosis and follow up of the disease. Recently, Interferon alpha therapy has been useful in suppressing a relapse of Ph<sup>+</sup> positive cells. Interferons have the potential to control progression in the chronic phase and with the definitive suppression of cytogenetic clonal evolution, provide effective treatment of more advanced stages of the

disease. This study, which aims to evaluate the hematologic and cytogenetic response of Interferon alpha treated CML patients, is being continued.

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

(Funding agency: Kerala State Dept. of Science & Technology)

Principal Investigator Dr. Ravindran Ankathil

Co-Investigators Dr. Elizabeth Abraham, Dr. Joy Augustine

This aim of this project, which has entered into the third year of study, is to elucidate the association between Hodgkin disease (HD) and Epstein Barr Virus. The study subjects included a total of 82 HD patients consisting of 12 paediatric cases and 70 adult cases. For comparison, 85 age and sex matched healthy normal controls were also included. Eighty patients (97%) and 57 controls (67%) had IgG antibody in their sera against the Epstein Barr Viral Capsid Antigen (EBVCA). Compared to controls, HD patients had significantly higher antibody titres against EBVCA, thereby indicating that HD is clearly influenced by the presence of EBV. Immunohistochemical staining for EBV specific Latent Membrane Protein-1 (LMP-1) was restricted to Reed-Sternberg cells and their variants in almost all cases. Overall, 58 patients (71%) showed positivity for EBV LMP-1. Based on the age groups, highest percentage of EBV positivity was observed in children (83%) and elderly adults (77%). According to histologic subtype, highest EBV positivity was in lymphocyte depletion (80%) and mixed cellularity (75%) subtypes. Hence the data generated from serological and immunohistochemical studies suggest that EBV plays a major role in the etiopathogenesis of a significant proportion of patients with Hodgkin disease.

#### 9. Genetic susceptibility studies in breast and ovarian cancer families (1997-2000)

(Funding agency: Dept. of Science & Technology, Govt. of India)

Principal Investigator Dr. Ravindran Ankathil

Co-Investigators Dr. Thomas Abraham,  
Dr. Jayaprakash Madhavan,  
Dr. V.P. Gangadharan

We have identified several families in which breast and/or ovarian cancer aggregate among family members. Information is lacking concerning possible genetic defects or genetic susceptibility risk

in close relatives of these cancer families. This study aims to develop a sensitive and practical genetic assay by which genetically susceptible high risk relatives in breast and ovarian cancer families, might be specifically identified and distinguished from their low risk relatives. The affected and unaffected family members in these cancer families will be analyzed at the molecular and cytogenetic levels, for genetic susceptibility markers. At the cytogenetic level, constitutional chromosomal abnormalities, chromosomal fragile sites and mutagen induced chromosome sensitivity were investigated employing peripheral blood lymphocyte microcultures. G banded karyotype analysis of all the study subjects showed normal pattern. No constitutional chromosome abnormalities of any numerical or structural types were encountered in these subjects. But with respect to mutagen sensitivity, there was significant difference between the study subjects. Mutagen induced chromatid break/cell (b/c) values in familial and sporadic breast cancer patients were significantly higher than the b/c values observed in unaffected relatives and controls. The lymphocytic DNA from the familial breast cancer patients had been isolated and kept at -80°C for future analysis of the germline mutations of the breast cancer susceptibility gene BRCA1.

#### **10. Biological prognostic markers in oral carcinoma (1997-2000)**

*(Funding agency: Indian Council of Medical Research)*

Investigators            Dr. S. Kannan, Dr. V.N. Bhattathiri,  
   Dr. Elizabeth K. Abraham,  
   Dr. K.R. Nalinakumari

The treatment response and survival in oral cancer patients vary widely from one patient to another. The present clinical as well as pathological features of the lesions possess only limited ability to predict treatment response. In order to assess the biological behaviour of the tumour and for individualized management, the present study analyzed the expression pattern of a set of proteins involved in the crucial steps of cell cycle progression in oral carcinoma. The cell cycle regulators such as p53, CDK-4, CDK-6, Cyclin-D1, p21, p16 and Ki-67 is being immunohistochemically analyzed in the pre-treatment biopsies. In addition to this, an angiogenic factor VEGF and anti-apoptotic protein bcl-2 and percentage of apoptotic cells (TUNEL method) are also being analyzed in these tissues.

The preliminary analysis showed some interesting associations between expression pattern of these proteins and tumour behaviour.

The univariate analysis showed that VEGF has some significant association with recurrence, and expression pattern of bcl-2, p53 and cyclin D1 of which strongest relation is with recurrence. As VEGF showed strong association with recurrence, we also studied the relation between recurrence and other clinico-biological variables. None of the clinical variables showed any relation with recurrence while except bcl-2, other biological variables showed significant relation. Multivariate analysis clearly demonstrated that VEGF expression pattern alone has independent relation with early disease recurrence in oral carcinoma and thus can be a potential marker to assess tumor aggressiveness.

#### **11. Cell membrane changes in relation to tumour progression, invasion and metastasis in oral and breast cancers using lectins (1996-1999)**

*(Funding agency: Dept. of Science, Technology and Environment, Govt. of Kerala.)*

Principal Investigator    Dr. P. Remani  
Co-Investigator            Dr. Elizabeth K. Abraham

The invasive squamous epithelial cells synthesize and secrete the glycoconjugates, including glycoproteins, glycolipids and gangliosides on to the cell membrane surfaces. The terminal sugar substitution on the glycoconjugates have common structures which project from the cell surfaces intercellularly. Lectins have been shown to have specific affinity for complimentary binding sites on terminal sugar linked to horse radish peroxidase or biotinylated. The lectins have been used to localize terminal sugars in tissue sections. The study is conducted with the objectives aim to investigate staining properties of primary oral and breast cancer tissues with jack fruit lectin and peanut lectin to see whether these lectins can be used to predict the distant metastasis of these tumours. Scrape smears and wax embedded tissue sections from 72 cases of oral cancer and aspiration smears and wax embedded tissue sections from 46 cases of breast cancer cases were used for the study. Jack fruit lectin and peanut lectin were used for staining. The number of tumour cells with membrane and cytoplasmic staining were noted and expressed in percentage. The frequency of lectin binding cells varied from 52% to 100% among the different patients studied.

#### **12. Cell surface changes in leukemic cells - A study using plant lectins (1999-2002)**

*(Funding agency: Dept. of Science, Technology and Environment, Govt. of Kerala.)*

Principal Investigator Dr. P. Remani

Co-Investigator Dr. Rekha A. Nair

Classification of various leukemias according to the cellular origin of their pathologic cell is of diagnostic and therapeutic importance. However such a classification is hampered by the scarcity of lymphoid or myeloid subpopulations at specific stages of their differentiation. Lectins have proven to be valuable tools in the investigation of the molecular differences between tumour cells and normal cells by their ability to detect distinct changes in the cell surface glycoproteins. Previous studies have shown that peanut agglutinin binds to immature mouse thymocytes, fetal liver lymphocytes and hemopoietic stem cells in mouse bonemarrow and spleen. In this study, our aim is to investigate the cell membrane alterations in cells from patients with leukemia using lectins isolated from indigenous plants of Kerala. The main objectives of this study are (1) to assess the agglutinability of plant lectins to leukemic cells (2) to evaluate the responsiveness of leukemic lymphocytes to stimulation by plant mitogens (3) to study the binding properties of lectins to different types of leukemic cells and to see whether, these lectins can be used for the typing of leukemias.

**13. Evaluation and classification of radiation induced acute immediate nuclear cytoplasmic changes in oral epidermoid carcinoma cells (1997-1999)**

*(Funding agency: Dept. of Science, Technology and Environment, Govt. of Kerala.)*

Principal Investigator Ms. L. Bindu

The study is continued to identify and characterize the various radiation induced changes in the nuclei and cytoplasm of cells from oral cancers and classify these changes on the basis of their relation to radiation dose. Sixty histologically confirmed squamous cell carcinoma of oral cavity which had undergone fractionated radiotherapy to a dose of 5250 cGy 15 Fr and 6000 cGy 25 Fr were selected. Pre and post treatment (after 2nd, 5th, 8th and 11th fractions) smears, stained with Papanicolaou technique were evaluated for various radiation induced nuclear and cytoplasmic changes and analyzed, to see which of these has relation to the radiation dose. The results showed that parameters such as cytolysis, karyolysis, nuclear pyknosis and

micro and multinucleation frequency have significant association with total dose of radiation. The pre-radiation cytolysis of 10.7% of cells was raised to 40.1% at 11th fraction. Karyolysis increased from 1.5% of cells in pre-treatment smears to 10.3% at 11th fraction. Percentage of cells with nuclear pyknosis varied from 19.4% to 44.3%. Similarly frequency of micronuclei increased from 1.1% to 7.4%. The findings suggest that various nuclear abnormalities show statistically significant increase with radiation dose. This may be useful in the development of in vivo models to cell kill in human cancer radiotherapy.

**14. Role of cathepsin D in gestational trophoblastic diseases**

*(Funding agency: Science & Technology, Govt. of Kerala)*

Principal Investigator Dr. Molykutty John

(Young Scientist award project for the year 1997)

Cathepsin D expression was noted as extensive granular cytoplasmic immunostaining in both cyto and syncytiotrophoblastic cells in nearly all cases of placental tissue, spontaneous abortion cases and in hydatidiform mole. Higher cathepsin D expression was noticed in GTD and especially in the persisting lesions. A similar phenomenon was noticed with lesions in the chemotherapy group. The strong immunoreactivity for cathepsin D in trophoblastic tumours suggest its role in trophoblastic cell transformation, proliferation and invasion. The activities may be important both in higher rate of proliferation and in the maintenance of the higher proliferative rate in trophoblastic tumours. The study is in progress.

**15. Expression of epidermal growth factor and transforming growth factor alpha in relation to aggressiveness in GTD. (1999-2001)**

*(Funding agency: Indian Council of Medical Research, New Delhi)*

Investigators:

Dr. Molykutty John,

Dr. Prabha Balaram,

Dr. Chandrika Devi C.G

GTD, reported to be a hyperproliferative condition of the placenta was analysed for the expression and concentration of epidermal growth factor and transforming growth factor alpha and their receptor EGFR. The growth factors and receptor were highly overexpressed in the GTD lesions and the concentrations of these were more than 1000 fold increased in GTD. The results suggest that

the increased growth factors and receptor could result in an autocrine stimulation of proliferation of the trophoblasts. The study is in progress.

**Academic credits**

**Dr. Prabha Balaram**

**Examinership**

**M.Phil and Ph.D Examination**

- Mahatma Gandhi University, Kerala	1
- Anna University	1

**Referee for projects and publications**

Thesis  
evaluated

Nos  
1998-'99

Indian Council of Medical Research, Govt. of India	2
Council of Scientific and Industrial Research, Govt. of India	4
Department of Science and Technology, Govt. of India	3
Biosciences Journal	2
Biomedicine	3

**Assistant Editor**

- Biomedicine

**Executive Committee member**

- Indian society for  
Radiation Biology

**Courses conducted**

- Two months Immunology  
training for Microbiology  
students, Medical College,  
Trivandrum - Annual

**CME organised**

- National CME programme  
and workshop on immuno-  
histochemistry and in-situ  
hybridization Jan. 18-22,  
1999, Trivandrum.

Lecture on Environment and Cancer for Faculty improvement programme for postgraduate teachers of MG University, Kottayam. 26 April 1999.

**Dr. Ravindran Ankathil**

**Ph.D Examinorship**

- Calicut University

Human Karyotype Analysis -

Principles and practical  
applications to students of B.Sc  
MLT course of MG University, Kerala.

**Molykutty John**, Awarded American Cancer Society Fellowship for Beginning Investigators (ACSBI) fellowship of UICC for 12 months (1998-1999).

**Research Supervision**

**Dr. Prabha Balaram**

- |  |  |
|--|--|
| 1. Genomic instability in breast cancer  | Ongoing doctoral programme<br>- Ms. Priya Srinivas   |
| 2. Molecular biology of gestational trophoblastic disease  | Ongoing doctoral Programme<br>- Ms. Swapna Enose     |
| 3. Molecular alterations in oral cancer with special emphasis on oncogenes and tumour suppressor genes | Ongoing doctoral programme<br>- Ms. Prishla Varghese |
| 4. Adhesion protein as metastatic markers  | Ongoing doctoral programme<br>- Ms Maya Madhavan     |
| 5. Immunomodulatory activities of rasayana   | Ongoing doctoral programme<br>- Ms. Smriti Krishna   |

**Dr. Ravindran Ankathil**

- |  |  |
|--|--|
| 1. Cytogenetic and epidemiological studies in breast and colorectal cancer families                          | Ph.D degree awarded in June, 1998.<br>- Jyothis B.     |
| 2. Etiopathological studies in Hodgkin's lymphoma  | Ph.D degree awarded in June, 1999.<br>- Ms. Chandini R |
| 3. Genetic susceptibility studies in breast/ ovarian cancer families   | Ongoing doctoral programme<br>- Vinodkumar B           |
| 4. Cytogenetic and hematologic response in studies of biotherapy in patients with hematological malignancies | Ongoing doctoral programme<br>- Hariharan S            |
| 5. Cytogenetic studies in myelodysplastic syndromes  | Ongoing doctoral programme<br>- Roshini Thomas         |
| 6. Genetic studies in Down Syndrome patients with and without malignancies                                   | Ongoing doctoral programme<br>- Sheeja V.R             |



7. Cytogenetic studies in fetal abortuses

MD thesis  
- Dr. Vidya Lekshmy,  
SAT Hospital.

**Dr. S. Kennan**

Studies on cell cycle regulatory proteins in oral carcinoma

Ongoing doctoral programme  
- R. Jayasurya

**Dr. Remani P**

Plant lectins and their applications in oncology

Ongoing doctoral programme  
- Ms. Smitha LS

**Routine investigations undertaken**

- |  |     |       |
|--|-----|-------|
| (1) Karyotyping from peripheral blood lymphocyte microcultures |     | - 309 |
| (2) Bonemarrow karyotyping                                     |     | - 157 |
| (3) Serum immunoglobulin estimation                            | IgG | - 361 |
|  | IgM | - 361 |
|  | IgA | - 361 |

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

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

## DIVISION OF LABORATORY MEDICINE & TUMOUR BIOLOGY

Dr. M. Radhakrishna Pillai - Assoc. Professor

Scientific investigation at the fundamental and applied levels of life are crucial in our search for answers to why the disease cancer develops, ways in which the process can be arrested and how it can be prevented. Molecular medicine, the primary focus of this department is now at the translational research level aiming at the ultimate effective prevention, control and cure of cancer. Our preliminary results are now getting appreciated and recognized, well reflected in the eighty seven lakhs of rupees obtained as research funding. During the year 14 of our reports were published in leading international journals. These significant advances have helped in the understanding of the complex relationships existing between tumor associated gene function, apoptosis, treatment outcome and the role of viruses in oncogenesis.

We have had continuing success with breast cancer research. Recent investigations have demonstrated the clinical significance of intralosomal mean vessel density (ILVD), as a marker of tumor angiogenesis. The role of growth factors in mediating angiogenesis has also been well documented. Transforming growth factor beta (TGF $\beta$ ) belongs to a family of polypeptides with diverse biological functions. We could demonstrate an inverse association between TGF $\beta$  expression and ILVD as evident by CD34 labeling. TGF $\beta$  expression did not correlate with either apoptosis or cell proliferation. CD34 and TGF $\beta$  expression also had no relationship with histopathological grade. No correlation was observed between CD34 and apoptosis, although a statistically significant correlation was observed between CD34 and Ki 67 expression. Although TGF $\beta$  is known to inhibit growth of fibroblasts, epithelial cells and endothelial cells in vitro, a focal injection in vivo is known to stimulate angiogenesis. Thus TGF $\beta$  can stimulate as well as inhibit angiogenesis. To our knowledge, this is the first time that an inverse correlation between TGF $\beta$  expression and angiogenesis has been demonstrated. These results suggest that breast cancer cells synthesize TGF $\beta$  which, through paracrine mechanisms, may inhibit proliferation of vascular endothelium rather than their own growth. Moreover the data also suggest that decreased expression of TGF $\beta$  was associated with an increase in neovascularization, which in turn would increase the tumor proliferative fraction.

Human papillomavirus (HPV) and epithelial cancer research program continues to produce exciting results. We had previously demonstrated the molecular epidemiology of high risk human papillomaviruses (HPVs) in relation to many squamous carcinomas including those of the cervix, oral cavity, larynx, hypopharynx and esophagus. However other molecular factors involved during HPV infection in these tumors still remain to be elucidated. We have recently described possible mechanisms involved in HPV mediated carcinogenesis. Both p53 mutation dependent and mutation independent pathways are associated with HPV mediated carcinogenesis, the former mainly in upper aero-digestive tumors (UADT) and the latter in cervical tumors. In cervical tumors, inactivation of the p53 tumor suppressor protein by the E6 gene product of high risk HPVs and mutation of the p53 gene in UADT is associated with alterations in the apoptotic regulatory bcl-2 and bax genes leading to down regulation of programmed cell death (PCD) and increased cell proliferation. HPV infection also results in increased tissue angiogenesis and activation of telomerase. Moreover, altered kinetics of telomere fragments is evident in HPV infected tissue. We therefore believe that the combined manifestations of all these factors may contribute to the development of a "condemned mucosa syndrome" which would then facilitate the development of cancers of the UADT and cervix. A possibly distinct step in the pathogenesis of both types of tumors may only be in the mode of p53 inactivation whereas all other events appear to be strongly correlated to the presence of HPV. The development and validation of such a molecular model has significant clinical priority. It can be used to identify target populations or individuals for intervention, to monitor the effects of intervention and to determine which individuals or groups at increased risk of developing cancer.

We have also defined the pathogenetic processes modulated by ras genes in the development of rectal cancer. Although activation of the ras family of oncogenes is well established in colorectal carcinogenesis, little is known on the relation between ras gene mutation and apoptosis in the development of rectal carcinoma. There was significant correlation between histology of rectal tissue and the presence of ras mutations. While normal rectal mucosa showed no evidence of ras gene mutation, 17% of adenomas showed the presence of K - ras 12 (13) point mutation. Almost 57% of all invasive rectal tumors showed K - ras 12 (13) mutation. There was also significant correlation between reduced apoptosis and presence of K - ras mu-

tation in invasive tumors. Normal rectal mucosa and adenomas showed the least extent of apoptosis while the values were much higher in invasive tumors. The extent of apoptosis also correlated to the expression of bcl-2, accumulation of p53 and Ki-67 expression. These results therefore emphasize the importance of ras gene mutation and programmed cell death in the development of rectal carcinoma.

Our radiobiology program has produced results of considerable significance. We were able to develop a cell kinetic model to explain tumor response to radiotherapy for cervical carcinoma. We defined the role of pre-treatment expression of the tumor suppressor p53 protein and the anti apoptotic protein bcl-2 and their relationship to tumor response to radiotherapy in cervical carcinoma. Correlation analysis was done between pre-treatment status of the two gene products and clinical outcome following radiotherapy. There was no correlation between p53 immunoreactivity or presence of mutant p53 protein and disease status after treatment. Expression of bcl-2 protein however showed significant pre-treatment correlations with the final disease outcome. Bcl-2 protein functions in an anti-oxidant pathway to prevent apoptosis. Since radiotherapy efficacy depends on adequate DNA damage caused by free radical generation, increased expression of bcl-2 may result in tumors becoming less responsive to radiation. Mutation of the p53 gene however was found to be a rare event in cervical cancer. Since bcl-2 is negatively regulated by p53, it could be presumed that the p53 detected in the tumor cells may be non-functional or inactive possibly due to interaction with proteins such as E6 or mdm-2.

We also characterized the role of pre-treatment tumor growth fraction in cervical cancer and its relationship to the clinical course of the disease. The extent of tumor proliferation significantly affected treatment outcome. Slower growing tumors responded poorly to radiotherapy. Expression of the growth factors epidermal growth factor (EGF) and its receptor (EGF-R) also showed significant pre-treatment correlations with the final disease outcome. Both these factors were expressed more by patients with residual disease or developing recurrent disease. The opposite was the case for transforming growth factor alpha (TGF  $\alpha$ ) where patients responding well had higher values. The other growth factor investigated, TGF- $\beta$  also showed a conspicuous differential expression in the two groups of patients, with those doing well showing mostly mild to moderate expression while most of the patients who fared poorly were negative for the growth factor.

### Ongoing research projects (1998-99)

- 1. Tumor response to radiation therapy in carcinoma of the uterine cervix - the role of ras gene mutation**  
(Funding Agency : Indian Council for Medical Research.)  
Principal Investigators Dr M. Krishnan Nair,  
Dr M. Radhakrishna Pillai
- 2. Radiosensitivity, treatment outcome and ras gene mutation in rectal carcinoma.**  
(Funding agency : Department of Atomic Energy, Govt. of India.)  
Principal Investigators Dr Jayaprakash Madhavan,  
Dr M. Radhakrishna Pillai
- 3. Molecular regulation of programmed cell death.**  
(Funding Agency : Department of Science & Technology, Govt. of India)  
Principal Investigator Dr M. Radhakrishna Pillai
- 4. Programmed tumor cell death and proliferative fraction ratio in the staging of thyroid cancer.**  
(Funding Agency : Indian Council for Medical Research.)  
Principal Investigators Dr V.M. Pradeep,  
Dr M. Radhakrishna Pillai
- 5. Telomere dynamics, telomerase activation and epithelial tumor progression.**  
(Funding Agency : Council for Scientific and Industrial Research.)  
Principal Investigator Dr M. Radhakrishna Pillai
- 6. Cellular immortality and apoptosis during tumor progression in the uterine cervix.**  
(Funding Agency : Indian Council for Medical Research.)  
Principal Investigator Dr M. Radhakrishna Pillai
- 7. Significance of programmed cell death in pediatric acute lymphoblastic leukemia**  
(Funding Agency : Dept of Science & Technology, Govt. of India.)  
Principal Investigator Dr P Kusumakumary,  
Dr M. Radhakrishna Pillai.

- 8. Programmed tumor cell death and proliferative fraction ratio in the staging of breast cancer.**  
(Funding Agency : Kerala State Committee for Science, Technology & Environment)  
Principal Investigator Dr M. Radhakrishna Pillai
- 9. Tumor cell immortalization and de novo programmed cell death in tumor response to radiotherapy.**  
(Funding Agency : Department of Atomic Energy, Government of India)  
Principal Investigator Dr M. Radhakrishna Pillai

### Research supervision: Doctoral And Post-Doctoral Programme

#### Ph.D degree awarded

**Ms. S. Lakshmi:** Patho-biological factors in cervical oncogenesis

**Ms. S. Asha Nair:** The histogenesis of squamous cell carcinoma of the uterine cervix

#### Post doctoral trainee

**Dr. T.T. Sreelekha:** Gene mutation and tumor response to radiotherapy

#### Ongoing doctoral programme

**Ms. Lakshmi Kesari:** Programmed cell death in breast cancer.

**Mr. R. Radhakrishnan:** Cellular and molecular profile of Non Hodgkin's lymphoma.

**Mr. G. Srinivas:** Programmed cell death, chemotherapy response and prognosis in pediatric acute lymphoblastic leukemia.

**Mr. Pradip Nair:** Molecular manifestations of tumor progression in the uterine cervix.

#### MD thesis completed

**Dr. Shobha Abraham,** Dept. of Pathology, Medical College Hospital. Angiogenesis and Tumor Proliferation in meningioma.

**Dr. Sreekala,** Dept. of Obstetrics & Gynecology, SAT Hospital, Medical College.

Clinical significance of human papillomavirus in premalignant and malignant lesions of the uterine cervix.

#### Ongoing M.D thesis

**Dr. Preethi TR**, Dept. of Pathology, Medical College Hospital.

The role p53 gene expression in epithelial ovarian tumors.

**Dr. Vijayalakshmi**, Dept. of Pathology, Medical College Hospital.

Apoptosis in thyroid neoplasms.

**Dr. Preetha**, Dept. of Pathology, Medical College Hospital.

Significance of the tumor proliferative compartment in follicular neoplasms of the thyroid.

**Dr Sajini**, Dept. of Pathology, Medical College Hospital.

The clinico-pathological relevance of human papillomavirus infection in lesions of the larynx.

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

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

## DIVISION OF CLINICAL LABORATORY SERVICES

Smt. Padmavathy Amma B. - Technical Officer

The clinical laboratory services were able to cope with heavy work load over the years despite dearth for staff. During the year under report we procured a fully automated dry chemistry system from *Johnson & Johnson*. When fully operational this machine will boost the efficiency of the lab in leaps and bounds. One great concern among the patients and staff is the increasing number of blood and blood products transmittable diseases like HIV and HBsAg. To circumvent the problem our lab has taken up measures to use *VACUTAINER™* blood collection system for the purpose of blood collection for all patients. This will open up new frontiers in contamination free blood collection, which will prove safe to both patients and staff alike.

As on previous years the clinical lab continues to be indispensable in both diagnosis and patient care. It is still being considered as one of the efficient laboratories in the State with neighbouring laboratories seeking help for their quality assessment programs. The lab now functions round the clock, doing almost all the investigations on the night shift, which is a great boon to critical care patients. Examination of 380 samples on an average per day is quite commendable taking into consideration, the limitations.

The hematological requirements are taken care of by utilising the potential of the fully automatic *COULTER ONYX*, *COULTER A<sup>C</sup> T<sup>S</sup>* and also the coagulation analyzer. The analyzer flagged samples are also manually scanned by our technicians giving exemplary result which is greatly appreciated by the clinicians.

Biochemical parameters are processed by three semi-auto wet chemistry analyzers of *E-MERCK*, one semi-auto and one full automatic dry chemistry analyzer from *Johnson & Johnson* with added support from blood gas and flame photometer of *CIBA CORNING*. Blood glucose monitoring for patients undergoing surgery and critical care is simplified and done quickly by one step glucometer.

The reporting has also been modernized and access time reduced by the uploading of reports to the centralized computer server. Priority to analysis and reporting are given to patients who are categorized according to their clinical condition and clinical management

required. The results are sent within 5 minutes time to a maximum of only 45 min according to the priority. Results demanding urgency and immediate attention of the clinicians are conveyed over the telephone for efficient patient management. The results of the laboratory are very reliable by participating in external quality evaluation program with Christian Medical College, Vellore and stringent internal quality control program. The laboratory has set a range of acceptable reporting values calibrated. The values falling above or below the expected range are further analyzed for concurrent values before reporting.

This year Mrs. B. Padmavathy Amma, Technical Officer and Mr. K.R. Rajesh, Lab Technician were actively involved in setting up a modern well equipped clinical laboratory at Govt. hospital, Pathanamthitta. The RCC lab also provides a training and orientation course for two technicians from this laboratory.

#### Collaborating Research Projects

Name of the project	Investigating Officer/s
1. Atlas Trial	Dr. B Rajan
2. Droloxifen Trial	Dr. K Rathesasan & Dr. N Geetha
3. Gemcitabine Trial	Dr. V P Gangadharan & Dr. Ramdas
4. TLC-D-99 Trial	Dr. Jayaprakash Madhavan, Dr. Cherian Varghese
5. Idoxifene Trial	Dr. S Parameswaran & Dr. N Geetha
6. PDT Trial	Dr. Iqbal Ahmed

#### Training

This division also provides training program for MSc Biochemistry students from both Rajiv Gandhi Centre for Biotechnology and Mahatma Gandhi University, for a period up to 3 months. Short term training is also given for students from various universities undergoing MBA in hospital administration. MCA students from Kerala University also undergo periodic training in software development and use in a multi-disciplinary environment like the laboratory.

#### Investigations carried out during the year 1998-'99

Biochemical Investigations	Total samples done	Haematological Investigations	Total samples done
Blood Glucose	37244	Hemoglobin	80134
Urea	36998	WBC	77214
Creatinine	35774	Platelet	76546
Uric acid	7894	PCV	4730
COT	4854	DC	55230
Bilirubin	19817	E.S.R.	5780
SGOT	20698	Bleeding time	5900
SGPT	20563	Clotting time	5900
SAP	18359	Prothombin time	1835
Total Protein	4987	APTT	44
Albumin	4987	Thrombin time	9
Cholesterol	310	<b>Urine Analysis</b>	
HDL	45	Sugar	9517
Triglycerides	45	Albumin	8127
LDH	2576	Acetone	2386
Amylase	54	Bile pigment	2486
Magnesium	11	Urobilinogen	2374
Acid Phosphate	647	Microscopy	3598
Prostatic Specific	631	<b>Biochemical Analysis Continued</b>	
Sodium	4887	Electrophoresis	498
Potassium	4887	Calcium	4028
CSF Sugar	246	Phosphorous	251
CSF Protein	246	HBsAg	5862
CSF Microscopy	201	ABG	333

## DIVISION OF INFORMATION SYSTEMS

- Ms. Bindu S.S - Systems Analyst (till 04/08/98)  
Dr. Aleyamma Mathew - Systems Manager in charge  
(from 05/08/98)  
Mr. Neelakantan G. - Sr. Systems Analyst (from 01/10/98)  
Mr. Manoj G - Jr. Systems Analyst

This division is responsible for the development and maintenance of application software for the computerization of various activities of Regional Cancer Centre. So far, this division introduced computers in Outpatients Departments (Registration, Appointment, Admission), Pharmacy and Store, Investigation Departments (Cytology, Histopathology, Clinical Lab). All the above departments are connected to the central database in Ingres RDBMS in Unix platform. This division also maintains a database of members of Cancer Care for Life (Scheme 2 and 3) and also issues membership certificates. In addition to the above applications, which are directly connected to the central system, Cash counters, Accounts division and division of Radiation Physics are also supported by this division in development and maintenance of application software.

During the year, new applications were introduced in medical records for Coding and tracing the movement of records. Applications were also developed in the central computer for integrating cash counters with other departments, and for issuing rail concessions. To extend the computerization to new departments, the need for a more powerful machine was felt and action initiated for the purchase of a new server computer. Design and development of new application for wards and investigation departments are started. These applications would help in reducing the clerical works in wards and other departments as well as facilitate integration of functions and better and easy management.

This division helps the academic staff in preparation of papers for publication and presentation materials. The trouble shooting and routine maintenance (hardware and software) of the other independent personal computers installed at various divisions are also being done by this division.

### Student Projects

1. Three student from LBS Centre for Science & Technology developed an Inventory Control System while undergoing project work for PGDCA programme.

2. A student from National College, Thiruvananthapuram, developed a Computerized personal Information System as part of B.Sc. (Computer Science) of Kerala University.

### Projects Supported

As in earlier years, during this period also this division supported various projects undertaken by RCC. The important among them are:

1. National Cancer Registry Programme (ICMR) - Hospital Cancer Registry
2. Natural Background Radiation Registry - Karunagappally
3. Trivandrum Oral Cancer Screening Trial - Trivandrum
4. Leukaemia Research Project
5. Trivandrum Population Based Cancer Registry Programme (IARC, France)

## DIVISION OF COMMUNITY ONCOLOGY

- Dr. Babu Mathew - Professor  
Dr. Ramani.S.Wesley - Assoc. Professor

### Highlights of activities

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. Participation in the "Janakeeya Assoothranam Programmes" of the state as per the directive from the state planning board. The division helped primary health centres in planning, organising and implementing this project, effectively in 11 places this year.
5. Establishment of village level comprehensive cancer control programmes and early cancer detection camps in the villages.
6. Breast screening of nuns and screening of high risk women with computer software for breast self examination.
7. Community based cancer research in the form of chemoprevention studies in prevention of oral cancer by visual screening, cervicoscopy for downstaging of uterine cervical cancer and the utilization of trained house surgeons for cancer survey and surveillance.
8. Management of early cancer detection clinic in the centre and maintenance of a pre cancer registry.

### Early cancer detection clinic

An early cancer detection clinic at RCC is functioning in this department to examine patients with warning signals of cancer.

We have a supplementary registration system in this clinic and have registered 1931 patients. There were 35 oral cancers, 19 breast cancers, 16 cervical cancers and 23 other cancers detected through this clinic. Number of Leukoplakias and other precancerous conditions has decreased drastically to 102 cases during the last year.

### Treatment of premalignancies

Patients with pre-cancerous lesions of oral and cervix are treated. 1218 colposcopies, 186 colpo directed biopsies, 7 LEEP diathermic excisions were done for cervix. Oral biopsies and excisions were done for 102 patients.

**Breast screening clinic** is conducted on Tuesdays and Thursdays. This division has evaluated CANSCAN Breast Self Examination Software for early detection of breast cancers in women. 7 new cancers were detected through this userfriendly software.

Since 10% of breast cancer patients who come to RCC are nuns, we have initiated a cancer awareness cum screening programme for 116 nuns and have detected 2 cancers and 5 atypias.

### Early cancer detection clinics (ECDC) at peripheral centres

ECDC at **Kollam** started last year is referring patients with precancers and cancers to this clinic for confirmation of diagnosis, colposcopy, LEEP etc. Early cancer detection work was started in **Kodungalloor** named as **Health Care Institute** from 6-7-1998 onwards. We have trained doctors, nurses, health workers and volunteers who act as keytrainers for conducting comprehensive Village Level Cancer Control Programmes at Kodungalloor. Cancer camps are conducted once in two months at Kodungalloor by doctors from RCC. The division has helped in training medical officers and other health staff concerned with ECDC, Pathanamthitta.

### A project office for community based cancer research activities

This office which was opened at Mangalapuram with 36 enumerators and 10 other staff is functioning well. Regular clinics are held here on Tuesdays and Saturdays for detecting oral precancerous lesions. Special clinics on Sundays and field visits by doctors are conducted to increase the compliance of patients.

### Public education

1. A cancer awareness cum tobacco awareness programme was given for key trainer teachers who in turn train teachers of all the districts. The division has assisted in preparing a module for teachers and a chapter in text book on tobacco control for students.
2. Teachers, PTA and student representatives(891) were given tobacco education and cancer education classes.

3. 52 cancer awareness programmes were given to members of voluntary agencies. 1542 community volunteers, 1077 NSS volunteers, 63 sociology students, 78 panchayath members, 22 factory workers and some hotel staff were specially trained in cancer awareness as key trainers. 1542 volunteers were trained for cancer survey and screening.
4. Trained voluntary workers of HOPE Foundation. They are involved in group activities like early detection of TB and cancer. The idea is to set out a new plan for cancer detection/prevention by regular house visiting in this district. They brought about 93 cases for confirmation of diagnosis.

#### **Generation and distribution of health education materials**

Five sets of audio-visual slides containing 36 colour slides and 24 blue toned slides with cassettes were given to key health educators. The health education materials generated during previous years were distributed among community volunteers and other target groups.

Five programmes through AIR Trivandrum Station and 2 programmes from FM station Kannur were broadcast and two talk show in ASIANET were telecast during the period under report.

#### **Professional education and colposcopy training**

30 doctors, 3 gynaecologists, 70 health workers and 108 nurses were trained in low cost cancer detection strategies and fundamentals of colposcopy to initiate cancer control in Tamilnadu. We had given intensive training for medical officers of ECDC, Ernakulam, Kollam, Pathanamthitta and Ambilikkai. 1385 health workers, 428 nurses and 28 health supervisors were given training in cancer control. Short term training is given to nursing students of private hospitals and Medical College Hospital, Trivandrum.

#### **Visit by foreigners, policy makers etc.**

WHO authorities, medical authorities, planners and policy makers from other states (Tamil Nadu and Orissa) to study the pattern of cancer control activities of RCC, this being declared as WHO collaborating centre. We have helped two other states (Ambilikkai, Tamil Nadu and Orissa) in organising low cost strategies for early cancer detection this year. The work done by this department was much appreciated by them.

#### **Project Consultancy**

Assistance in the design, implementation and analysis has been provided to researchers, postgraduate students (for dissertation and thesis) MSc nursing and MSW students and college/school students to prepare their project work. In addition we have participated in the academic activities of the centre and contributed to the research activities of other divisions.

#### **Welfare activities for the poor**

With the help of social investigators and doctors of this division we have provided counselling, financial help, and arranged accommodation facilities to poor patients and acted as liaison between rural camp patients and RCC.

**Provision of information** to many patients, bystanders, voluntary agencies through person to person communication, leaflets, pamphlets, books, and exhibits were given routinely. Psycho-social support is given by this division for removal of cancer stigma and for motivation of patients to undergo treatment.

#### **Articles in lay press**

Pukayilayum Arogyavum (Vijnanakairali) and Pukayila upekshiku (Mathrubhumi Arogyamasika) were published by Dr. Babu Mathew. Cancer Niyanthranam (Vayile Cancer), Sthanarbudam and Garbasaya cancer in 'Nammude Arogyam (October 1998) were published by Dr. Ramani Wesley.

#### **Anti-tobacco programmes and campaigns**

In addition to the tobacco cum cancer awareness mentioned in table 1, we have celebrated 'World No Tobacco Day' by participating in training 350 volunteers at Palakkad and conducted an awareness programme for women voluntary agencies.

#### **Exhibitions**

Five exhibitions were conducted which was viewed by more than 6 lakh people. Science Fests by Kerala University had conducted an exhibition which lasted for one month and RCC had a separate hall for exhibition.

#### **Cancer camps**

Thirty three cancer detection camps were conducted during the period under report, the details of which are shown in table 2.



### Village level Comprehensive Cancer Control Programmes

Six new villages were included in VCCCP during this period. 1542 trained unemployed educated youths surveyed their community and detected many cancers and precancers as shown in table 2.

#### Research projects

##### 1. Evaluation of unaided visual inspection, cervicospopy and pap smear in screening for cervical cancer

(Funding agency: IARC)

Principal Investigator Dr. N. Sreedevi Amma  
Co-Investigators Dr. Ramani Wesley,  
Dr. Thara Somanathan,  
Dr. Namraitha, Dr. Syamala Kumari B  
Dr. Sankaranarayanan (IARC),  
Dr. D.M. Parkin (IARC).

The study is continued to evaluate whether visual inspection of cervix using 3% acetic acid (cervicospopy) permits improved detection of invasive and pre invasive lesions compared to unaided visual inspection and to determine whether cervicospopy can improve the sensitivity of pap smear. The second phase of this study is going on this year including schillers test, cervicospopy, colposcopy and biopsy for all relevant cases to evaluate low cost technologies. We have recruited 1218 women this year of which 8 cancers, 8 high grade lesions and 93 low grade lesions were detected.

##### 2. Evaluation of Oral Visual Inspection in the control of Oral Cancer

(Funding agency: IARC)

Principal Investigator Dr. Babu Mathew  
Co-Investigators Dr. M. Krishnan Nair, Dr. Manoj Pandey,  
Dr. Elizabeth Nifan, Dr. Giji Thomas,  
Dr. Thara Somanathan,  
Dr. Iqbal Ahammed,  
Ms. Binu and Dr. Ramadas.  
Dr. R. Sankaranarayanan (IARC),  
Dr. P. Pisani (IARC),  
Dr. D.M. Parkin (IARC)

The aim of this community based randomised intervention trial is to evaluate the effectiveness of mouth self examination by trained workers in preventing mouth cancers, detecting invasive oral cancer at an early stage and preventing deaths from oral cancer. Approximately 90,000 subjects aged 34 and above, living in two community development blocks of Trivandrum district, are recruited and randomised to screening and control arms. The subjects are advised to give up tobacco habits. Pre cancers and cancers are being treated. The study group are followed up for oral cancer incidence and mortality. The first phase of the study was completed on May 31, 1998. Among the 49,179 subjects screened by trained workers in the intervention area, 1350 patients were found to have precancerous lesions. 308 biopsies and 120 surgical excisions were done. The second phase of the study is ongoing.

##### 3. Evaluation of chemoprevention of oral cancer with long term administration of Vitamin A in subjects at high risk

(Funding agency: IARC)

Principal Investigator Dr. Babu Mathew  
Co-Investigator Dr. M. Krishnan Nair,  
Dr. N. Sreedevi Amma, Dr. Ramadas,  
Dr. Sudhakaran P.R., Dr. P.P. Nair  
Dr. R. Sankaranarayanan (IARC),  
Dr. D.M. Parkin (IARC)

##### 4. Role of omega 3 fatty acids on population of Kerala

Principal Investigator Dr. Babu Mathew  
Co-investigator Dr. P.R. Sudhakaran, Dr. P.P. Nair and  
Dr. R. Sankaranarayanan  
Collaborators Department of Biochemistry,  
University of Kerala, John Hopkin's  
University, Baltimore, U.S.A.

##### 5. Study of tobacco related mortality in Trivandrum District

(Funding agency: IARC)

Chief Investigator Dr. Babu Mathew  
Co-Investigator Dr. M. Krishnan Nair  
External Investigators Dr. Richard Peto,  
Dr. R. Sankaranarayanan

**Table 1**  
**Details of cancer awareness programmes 1998-99**

SL.NO	DATE	PLACE	ORGANISED BY	NO ATTENDED	TYPE OF PARTICIPANTS
1	19/4/98	Kayamkulam	ECHO	48	Panchayat members & Lay Public
2	26/4/98	Poojappura	Maternal & Child Health Hospital	73	Lay Public
3	30/5/98	Palakkad	Lions Club & SBT	350	Lay Public
4	31/5/98	RCC	RCA	47	Members of Womens Voluntary agencies
5	7/5/98	Ambilikkai	Christian Fellowship Community Health Centre & IARC	30	General Practitioners
6	8/5/98	Ambilikkai	"	70	Health workers
7	9/5/98	Ambilikkai	"	108	Nursing students
8	17/6/98	Pathanamthitta	Cancer Care Unit	325	Anganwadi workers & Laypublic
9	23/6/98	Poovachal	Poovachal Panchayath	350	Health workers & Anganwadi workers
10	3/7/98	RCC	RCA	45	Members of Women's club
11	6/7/98	Kodungaloor	Health care institute	320	Volunteers
12	18/7/98	Edava	"We Want Health"	42	Lay public
13	20/7/98 to 22/7/98	Mangalapuram	TOCS project	26	Health enumerators
14	25/7/98	Trichur	Jubilee Mission Hospital	253	Nuns
15	22/8/98	Palakkad	SBT	150	Lay Public
16	23/8/98	Palakkad	Victoria College	350	NSS students
17	26/8/98	RCC	RCC	45	House Surgeons
18	28/8/98	RCC	RCC	48	Volunteers
19	5/9/98	Vazhuthacaud	Univeristy of Kerala	65	Lay Public
20	19/9/98	Malayinkil	Malayinkil panchayath	550	Healthworkers, ICDS workers & Anganwadi workers
21	29/9/98	Sreekariam	Loyola Coliege	38	MSW students
22	4/10/98	Vellayani	NSS of Agricultural College	56	Students
23	21/10/98	Poojappura	State Council of Education and Training	20	Teachers (Keytrainees)
24	24/10/98	Sreekariam	Loyola Colloge	25	MSW students
25	26/10/98	Palayam	Young Men's Club	40	Lay Public
26	7/11/98	Kottiyam	Little Way Association	55	Nuns
27	9/11/98	Kannur	Malabar Cancer Care Society	256	Community Volunteers
28	21/11/98	Parassala	Rotary Club	35	Volunteers
29	23/11/98	Kizhakumbhagam	St. Thomas High School	560	Students, parents & Teachers
30	27/11/98	Peroorkada	PTA, Concordia VHSS School	325	School students & PTA members
31	2/12/98	Thampanoor	Hotel Horizon	22	Hotel Staffs
32	4/12/98	Pathanapuram	World Vision	368	Community volunteers and ICDS staffs
33	8/12/98	Nilamel	Zoology Association, Nilamel College	58	College students
34	16/12/98	Karunagappally	Muslim Association	56	Parallel Colloge Students

112

119

35	27/12/98	Thirupuram	NSS of MG College, Trivandrum	53	NSS volunteers
36	29/12/98	Muttada	Mar Ivanious College	46	NSS volunteers
37	9/1/99	Maruthankuzhy	Udayanoor Devi Temple Trust	128	Lay Public
38	12/1/99	RCC	RCC	15	Nursing Assistants
39	21/1/99	Kesavadasapuram	Zoology Association of MG College	98	College Students
40	23/1/99	RCC	State Family Planning Centre	28	Health inspectors
41	30/4/99	Ranni	YWCA	40	Elete Women
42	1/2/99	Pullenppara	Pullenppara PHC	65	Anganwadi workers & Health workers
43	3/2/99	RCC	RCC	18	Nursing Assistants
44	5/2/99	Dhanuvachapuram	Zoology Association of VTM NSS College	75	College Students
45	10/2/99	Statue	Wise Men's Club	70	Members of Wise Men's Club
46	12/2/99	RCC	RCC	18	Nursing Assistants
47	20/2/99	Punalur	Little Way Association	61	Nuns
48	27/2/99	Attingal	Govt. College, Attingal	285	College Students and Higher Secondary Students
49	5/3/99	Konni	Lion's Club	426	Anganwadi workers & Health workers
50	15/3/99	RCC	Nursing College	16	B.Sc Nursing students
51	12/3/99	Kalayapuram	Gregorious Orthodox Church	92	Lay public
52	13/3/99	Pampadi	SBT & Redcross	172	Anganwadi workers & Health workers

**Table 2**  
**Details of cancer detection camps 1998-'99**

Sl.	Date	Place	Organised by	Total Screened	New cancers	Old cancers	Oral pre-cancers	Other pre-cancers
1	3-4-98	Ottasekharangalam	RCA & Rotary Club	318	2	0	8	2
2	17-4-98	Nilamel	Zoology Association Nilamel	215	5	0	28	0
3	18-4-98	Plamoodu	Plamood Residents Association	18	0	0	1	0
4	24-4-98	Changanoor	Rotary Club	89	1	0	22	8
5	6-5-98	Amaravila	Thankappan Memorial Jubilee Trust	72	0	1	4	1
6	15-5-98	Thirunelveli	Rotary Club & RCA	125	4	0	36	5
7	1-7-98	Puthukurichy	Janakeeyasoothranam	120	0	0	12	0
8	12-7-98	Peroorkada	Lion's Club	604	1	0	12	0
9	26-7-98	Madathara	Jubilee Mission Hospital	268	9	1	2	10
10	12-8-98	Kodungalloor	HealthCare Institute (VCCCP)	421	14	0	21	15
11	31-8-98	Vazhuthacaud	Kerala University	10	0	0	0	0
12	21-9-98	Nellimood	SBT	186	3	1	14	5
13	26-9-98	Kayamkulam	ECHO	286	3	0	20	20
14	3-10-98	Vettukad	Vincent de-Paul Society	85	1	0	21	15
15	17-10-98	Kollam	Vincent de-Paul Society	150	3	0	26	16

16	23-10-98	Cherthala	SNDDP	105	1	1	13	2
17	25-10-98	Pozhijoor	Vincent de-Paul Society	138	3	3	19	8
18	4-11-98	Secretariat	Secretariat Employees Association	64	0	0	1	2
19	8-11-98	Kannur	Malabar Cancer Society	240	4	0	18	6
20	11-11-98	Kodungalloor	Health Care Institute	412	12	4	13	14
21	16-11-98	Secretariat	Secretariat Employees Association	64	0	0	1	2
22	31-12-98	Thirupuram	NSS, MG College	32	0	0	1	0
23	4-1-99	Chandanathoppu	Chinmaya Mission	185	2	0	15	2
24	8-1-99	Perinad	Coir Vyavasaya Samithi	141	2	0	7	0
25	29-1-99	Pathanapuram	World Vision (VCCCP)	238	3	1	15	8
26	16-2-99	Amballoor	Amballoor Panthayath	358	3	0	6	3
27	19-2-99	Pullanpatta	Pullanpatta PHC (VCCCP)	122	2	0	4	5
28	7-3-99	Kodungalloor	Health Care Institute (VCCCP)	280	3	0	8	6
29	21-3-99	Jagathy	People's Art Club	240	1	0	4	6
30	26-3-99	Kaniyapuram	NSS Karayogam	220	3	0	19	10
31	27-3-99	Neyyattinkara	Mother India Social Service Association	94	2	0	8	7
32	28-3-99	Kannur	Malabar Cancer Care Society	130	1	0	9	8
33	29-3-99	Kannur	Malabar Cancer Care Society	465	6	2	38	12
TOTAL				6497	93	14	425	206

Conferences, etc. attended - (Chapter III)

Papers Presented - (Chapter IV)

Papers Published - (Chapter V)

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

Dr. Syamalakumari - Cytopathologist

The Early Cancer Detection Centre, Ernakulam is in its fifteenth year of service. It started functioning on 15<sup>th</sup> August, 1984 with the help of Rotary Club of Cochin, Cochin Corporation under the direct control of Regional Cancer Centre, Trivandrum.

The centre is focussing mainly the early detection of cancer, providing awareness to the public regarding the prevention and early detection. Even though the centre is giving main importance to cytology; histopathology work is also doing by manual procedure. Most of the cases are referred and voluntary cases are also reporting. Pap smear test, FNAC, sputum cytology and cytology of body fluids sending from other hospitals are doing here. This centre is conducting cancer detection clinics every day, cancer detection camps and awareness programmes with the help of voluntary agencies and Govt. organizations in this district and neighbouring districts.

The centre is doing colposcopy directed biopsy for patients with dysplasia on pap smear examination and these biopsies are reported here itself. The district cancer control programme project (DCCP) is also functioning well in the reporting year.

A total of 11954 persons were screened during this year (ECDC-6291, DCCP-5663) in which 10749 number of cytology done cases, 448 cancer and 525 precancers are detected. The cancer cases are referred to Regional Cancer Centre, Trivandrum, and other institutions at request for treatment and further managements. Precancerous cases are referred to respective clinicians and followed at regular intervals.

The follow-up clinic started during 1985 is continuing and an average of 130 patients are benefitted. The pain clinic started as part of DCCP is also helpful for terminally ill patients.

Table - 1  
Resume of work done 1998-'99

Particulars of work done	ECDC	DCCP	Total
Cervical smears	3848	3602	7450
Fine Needle Aspiration	1577	837	2414
Sputum	91	...	91
Histopathology	52	...	52

Colposcopy	32	...	32
Colpodirected Biopsy	15	...	15
Body fluids	21	...	21

**Table - 2**  
**Gynecological cytology**

Lesion	Centre	Follow-up	Camp	Total
Normal	159	56	32	247
Inflammation	1904	699	88	2691
Atypical glandular cells	30	5	...	35
Trichomonas infection	372	79	21	472
TV with mild dysplasia	10	6	1	17
TV with moderate dysplasia	2	...	...	2
Fungal infection	4	3	...	7
HPV infection	1	...	1	2
Herpes simplex virus infection	142	45	7	194
TV with virus infection	15	3	2	20
Viral infection with mild dysplasia	1	2	...	3
Viral infection with moderate dysplasia	2	1	1	4
Viral infection with severe dysplasia	2	...	...	2
Mild dysplasia	38	19	...	57
Moderate dysplasia	6	2	1	9
Severe dysplasia	7	4	..	11
Autolytic atrophy	3	...	...	3
Carcinoma in-situ	8	4	...	12
Invasive squamous cell carcinoma	51	2	...	53
Adenocarcinoma	3	...	...	3
Miscellaneous	2	2	...	4
<b>Total</b>	<b>2762</b>	<b>932</b>	<b>154</b>	<b>3848</b>

**Table - 3**  
**Non-gynaecological cytology**

Lesion	Centre	Camp	Total
<b>Oral lesions</b>			
Benign	74	2	76
Pre-malignancy	53	3	56
Suspicious	3	..	3
Malignant	96	..	96
Radiation changes	1	..	1
<b>Total</b>	<b>227</b>	<b>5</b>	<b>232</b>

<b>Breast</b>	539	6	545
Benign	80	..	80
Malignant	19	..	19
Miscellaneous	..	..	..
<b>Total</b>	<b>638</b>	<b>6</b>	<b>644</b>
<b>Thyroid</b>	297	8	305
Benign	3	..	3
Suspicious	19	..	19
Malignant	9	..	9
Miscellaneous	..	..	..
<b>Total</b>	<b>328</b>	<b>8</b>	<b>336</b>
<b>Lymphnode</b>	270	1	271
Benign	1	..	1
Suspicious	..	..	..
Malignant	..	..	..
a. Primary	8	..	8
b. Secondary	45	..	45
Miscellaneous	2	..	2
<b>Total</b>	<b>326</b>	<b>1</b>	<b>327</b>
<b>Salivary Gland</b>	30	..	30
Benign	7	..	7
Malignancy	..	..	..
<b>Total</b>	<b>37</b>	<b>..</b>	<b>37</b>
<b>Liver</b>	10	..	10
Benign	7	..	7
Malignancy	1	..	1
Miscellaneous	..	..	..
<b>Total</b>	<b>18</b>	<b>..</b>	<b>18</b>
<b>Lungs</b>	4	..	4
Benign	5	..	5
Malignancy	..	..	..
<b>Total</b>	<b>9</b>	<b>..</b>	<b>9</b>
<b>Other Sites</b>	164	4	168
Benign	1	..	1
Suspicious	20	..	20
Malignancy	11	6	17
Miscellaneous	..	..	..
<b>Total</b>	<b>196</b>	<b>10</b>	<b>206</b>

*Body fluids*

Ascitic fluid			
Benign	3	..	3
Malignancy	4	..	4
<b>Total</b>	<b>7</b>	<b>..</b>	<b>7</b>
<i>Pleural fluid</i>			
Benign	6	..	6
Malignancy	5	..	5
Miscellaneous	1	..	1
<b>Total</b>	<b>12</b>	<b>..</b>	<b>12</b>
<i>Pericardial fluid</i>			
Benign	1	..	1
Malignancy	1	..	1
<b>Total</b>	<b>2</b>	<b>..</b>	<b>2</b>
<i>Nipple discharge</i>			
Benign	58	..	58

**Table - 4**  
**Sputum Cytology**

Lesion	Total
Benign	72
Malignancy	16
Miscellaneous	3
<b>Total</b>	<b>91</b>

**Table - 5**  
**Histopathologic Examination**

Specimen	Benign	Ca-in-situ	Malignant	Total
Gynaecological	21	2	4	27
Breast	8	-	3	11
Oral	3	-	1	4
Other sites	8	-	1	9
Miscellaneous	-	-	-	1
<b>Total</b>				<b>52</b>

**Work done DCCP - April 1998 - March 1999**

Total number of persons screened	5,663
Female	4,836
Male	827
<b>Oral</b>	
Non-malignancy	303
Pre-malignant lesions (Clinical/Cytological)	215
Malignancy	11
Miscellaneous	21
Total oral smears	438
<b>Breast</b>	
Non-malignancy	150
Malignancy	17
Miscellaneous	55
Total breast aspiration	222
<b>Cervix</b>	
Non-malignancy	3,432
Pre-malignant lesions	158
Malignancy	12
Total cervical smears	3,602
<b>Thyroid</b>	
Benign	223
Malignancy	8
Suspicious	2
Atypia	7
Miscellaneous	25
Total thyroid aspiration	265
<b>L.N</b>	
Benign	18
Granulomatous	27
Miscellaneous	3
Malignancy	6
Total L.N aspirations	54
<b>Other Sites</b>	
NMC	134
Suspicious	1
Malignancy	5
Miscellaneous	156
<b>Total</b>	<b>296</b>

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

Dr. R. Ananda Kamath    Cytopathologist  
 Smt. Veena V.S.        Cytotechnologist  
 Dr. Lakshmi S.         "

The major work in this centre is screening for early detection of cancer cases referred from other hospitals and patients coming voluntarily. Prime importance is also given to conduct cancer detection camps and awareness programmes in remote areas of Palakkad and other northern districts of Kerala. Diagnosed cases were referred to RCC or wherever easily accessible to the patient for proper treatment and management.

The pain and palliative care clinic started in 1997 is going on in full swing according to WHO guidelines and 62 new patients registered this reporting year. A doctor from RCC visiting once in a month is giving guidance in management of incurable and advanced cases. Follow-up of cancer patients treated in RCC or in other cancer hospitals and few chemotherapy cases were also attended.

The cytologic study of cervical smears, sputum, fluids, FNA from lymphnodes, breast, thyroid was analysed and presented below.

### Resume of work done during the year 1998-'99.

Total number of persons screened        -    5,371  
 Number of persons screened in the centre    -    1,361  
 Number of persons screened in the camp     -    4,010

### Number of smears taken for cytological examinations

Centre    -    613  
 Camp     -    742  
 Total     -    1,355  
 Number of camps attended                    -    14

### Pain and palliative care clinic

New cases                                         -    62  
 Total number of patients visit             -    295

Table -1

Details of cytological smears for the year 1998-'99

Specimen	E CDC	Camp	Total
Gynaecologic cytology	208	605	813
Oral cytology	98	56	154
Sputum cytology	187	-	187
Breast	50	27	77
Thyroid	17	11	28
Lymphnode	19	8	27
Fluid	1	-	1
Nipple discharge	13	6	19
Other sites	20	29	49
<b>Total</b>	<b>613</b>	<b>742</b>	<b>1,355</b>

Table - 2

Analysis of Gynaecological specimens 1998-'99

Lesion	Centre	Camps	Total
Normal	22	110	132
Inflammation	98	381	479
Inflammation with squamous metaplasia	12	9	21
Inflammation with glandular cell proliferation	12	16	28
Fungal infection	4	12	16
Trichomonas vaginalis infection	8	23	31
TV infection with mild dysplasia	-	5	5
Mild dysplasia	17	20	37
Moderate dysplasia	5	1	6
Severe dysplasia	2	2	4
Glandular cell atypia	2	7	9
Carcinoma in-situ	2	0	2
Suspicious	3	0	3
Squamous cell carcinoma	10	4	14
Adeno carcinoma	-	1	1
Radiation changes	3	4	7
Miscellaneous	8	10	18
<b>Total</b>	<b>208</b>	<b>805</b>	<b>813</b>

**Table -3**  
**Analysis of Non-Gynaecologic lesions for the year 1998-'99**

Specimen	Centre	Camp	Total
<b>Oral smear</b>			
Normal	44	30	74
Inflammation	24	14	38
Dysplasia	9	8	17
Atypical/Suspicious	6	0	6
Malignant	15	4	19
<b>Total</b>	<b>98</b>	<b>56</b>	<b>154</b>
<b>Sputum</b>			
Non-malignant	165	—	165
Atypia/Suspicious	3	—	3
Malignant	19	—	19
<b>Total</b>	<b>187</b>	<b>—</b>	<b>187</b>
<b>Breast</b>			
Non-malignant	42	25	67
Atypia/Suspicious	4	2	6
Malignant	4	0	4
<b>Total</b>	<b>50</b>	<b>27</b>	<b>77</b>
<b>Thyroid</b>			
Non-malignant	17	10	27
Malignant	—	1	1
<b>Total</b>	<b>17</b>	<b>11</b>	<b>28</b>
<b>Lymphnode</b>			
Non-malignant	15	8	23
Malignant	3	—	3
Others	1	—	1
<b>Total</b>	<b>19</b>	<b>8</b>	<b>27</b>
<b>Fluid</b>			
Malignant	—	1	1
<b>Total</b>	<b>—</b>	<b>1</b>	<b>1</b>
<b>Nipple discharge</b>			
Non-malignant	12	6	18
Atypical	1	—	1
<b>Total</b>	<b>13</b>	<b>6</b>	<b>19</b>
<b>Other sites</b>			
Non-malignant	19	27	46
Atypia	—	2	2
Malignant	1	0	1
<b>Total</b>	<b>20</b>	<b>29</b>	<b>49</b>

**Table - 4**  
**Pain and palliative care clinic, 1998-'99.**

	Numbers
New cases	- 63
Repeated old cases	- 233
Total number of visits	- 295
<i>WHO Steps</i>	
Step I	- 8
Step II	- 55
Step III	- 232

**Award**

The University of Kerala awarded Ph.D. to Smt. Lakshmi S., Cytotechnologist for her thesis on "Patho-Biological factors in Cervical Oncogenesis".

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

**Papers presented - (Chapter IV)**

**Papers published - (Chapter V)**



## DIVISION OF LIBRARY AND INFORMATION SERVICES

Sri .M.Chandrakumaran Nair - Senior Librarian

Information support activities of the library were more strengthened and streamlined to fulfil the major task of developing an efficient oncology information system to provide the necessary cancer related information to the clinicians, researchers, students, health planners and administrators. As part of the modernisation of the library organisation and services, a project submitted to the State Science, Technology and Environment Department (STED) had been sanctioned and with their financial assistance a Local Area Network has been organised in the library. It has been observed that the use of library resources has been increased in the context of the wide use of communication and network technologies.

### Local Area Network

The noteworthy work accomplished during the period was the establishment of Local Area Network in the library as part of the oncology information system stipulated in the STED project. The network is working on Windows NT platform with a PII server and 5 PII nodes. The problems met with the easy access, quick and efficient processing and retrieval of relevant information could be solved to a great extent by introducing this LAN. Efforts are being made to organise a campus network at possible level in the medical college campus so that effective resource sharing could be achieved at least locally.

### Extension of library hours

In view of high demand from the internal users, the library hours were extended to 7pm on Mondays, Wednesdays and Fridays effective from 1st January 1999 onwards. All arrangements have been made for circulation and reference facilities during the extended hours.

### External users

Several doctors, researchers, students from medical colleges, engineering colleges, university departments, research institutions and organisations visited the library and used the library resources. On an average 20 external people are visiting the library per day.

### Collection development

Subscription to Journals has been given high priority in collection development. Based on the review by the library committee, three

journals were discontinued and four journals were added. Subscription to three journals viz. 'Oral Surgery, Oral Medicine, Oral Pathology, Oral radiology, Oral endodontics', 'Acta Oncologica', 'Pediatric Hematology Oncology' were sponsored by M/s Piramal health care Limited, Fulford India Limited and Dabour respectively. Another journal 'Blood' was a gift subscription from Dr.Santhosh Kumar of our Centre. The gap in journal subscription was compensated to some extent by collecting the reprints free of cost from the authors concerned, on request.

### Details of the additions to the library

Type of Documents	Added during 1998-99	As on March 1999
Books, monographs &		
Back volumes	569	6374
Current journals	1	106
Reprints & reports	345	3001
Audio-video cassettes	9	95

### Internet and e-mail facilities

Internet and e-mail facilities provided in the library were profusely used. In addition to online database search, these were increasingly used for clinical purposes also. The entire e-mail requirements of all the divisions are met by the library.

### CD ROM and online databases search

Cancer CD, the most comprehensive database on cancer covering both MEDLINE and EMBASE was subscribed to the library. This database provided enormous support for clinicians and researchers and on an average seven searches were made per day. MEDLINE data, available free of cost from 1966 onwards on the Internet was also used by the academic community.

### RCC publications database

Substantial contributions were made by the academic staff during the report year. 58 research papers published by the academic staff were added to the RCC publications database along with its informative abstracts. Now this database is made accessible in the LAN and is capable of searches on any sought level.

### Reprographic services

In view of the huge volume of photocopying requirements, a heavy duty group model) photocopier - Modi Xerox 5828 of Xerox corporation with sorting and stapling facility was acquired. Financial assistance for purchasing the same came from the various ongoing clinical and research projects of the Centre. The entire professional, official and project copying requirements of all divisions of the Centre were met by the two copiers maintained in the library.

### Institutional membership and Inter-Library loan

In order to support the document delivery services, the inter library borrowing arrangements with institutions like British Library, Centre for Development Studies and SCTIMST were continued.

### Training

Library extended all services to the participants of the various Training Programmes conducted by the Centre except the borrowing facility. As per the apprenticeship training approved by the Government of India, training was given to two library and information science graduates.

### 'Onconews', 'Current Contents Bulletin' and Projection facility

Fortnightly RCCL Current Contents Bulletin carrying the contents pages of journals and other documents added to the library resources and the 'Onconews', the quarterly press clippings bulletin covering oncology and allied areas were distributed. To strengthen the current awareness services, library made use of the current contents available free of cost on Internet also. Reprint service, facilities for projection, circulation of projection equipments and its accessories, cassette viewing etc. were continued.

### Project

#### Development of an Oncology Information System : An integrated cancer information source

(Funded by Department of Science, Technology and Environment, Government of Kerala)

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

*Papers presented - (Chapter IV)*

*Papers published - (Chapter V)*

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

Dr. Ajith Kumar T.V.  
Lecturer in Radiotherapy

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

Dr. R. Ananda Kamath  
Cytopathologist

Dr. Anitha Mathews  
Lecturer in Pathology

European Society of Oncology –  
Workshop, Cambridge, 1998.

20<sup>th</sup> Annual conference of the AROI,  
Cuttack, 3-6 December, 1998.

16<sup>th</sup> Annual conference, Indian  
Society for Medical Statistics,  
Vellore, November, 1998.

Faculty member, 5<sup>th</sup> cancer registry  
training programme, RCC,  
Trivandrum association with Rollins  
School of Public Health, Emory Uni-  
versity, Atlanta, USA, 6-14 January,  
1999.

18<sup>th</sup> Annual convention Indian Asso-  
ciation for cancer research, New  
Delhi, India, February, 1999.

Faculty member, Workshop on De-  
sign and Analysis of data on clinical  
trials, G.B. Pandh Hospital, New  
Delhi, February, 1999.

Faculty member, CME on breast  
cancer, RCC, Trivandrum, on behalf  
of Indian College of Radiation On-  
cology, 27 February, 1999.

CME on palliative care awareness  
programme, RCC, Trivandrum, No-  
vember, 1998.

6<sup>th</sup> International and National confer-  
ence of the Indian Association of Pal-  
liative Care, Kozhikkode, 19-21 Feb-  
ruary, 1999.

Faculty member, Workshop on  
cancer registration and surveillance,  
RCC, Trivandrum, July, 1998.

" 47<sup>th</sup> Annual national conference and pre-course instructional course of IAPM, Kanyakumari, December, 1998.

" International slide seminar on tumour pathology, an update, Bombay, January, 1999.

" Faculty member, CME programme on current trends in breast cancer, Kottayam, March, 1999.

Mr. Arun Kumar LS.  
Asst. Prof. in Radiation Physics  
Dr. Beela Sarah Mathew  
Lecturer in Radiotherapy

Ms. Bindu B  
Staff Nurse

Ms. Bindu. L  
Cytotechnologist

"

"

Blood Bank (All staff)

Mr. Chandrakumaran Nair M.  
Senior Librarian

9<sup>th</sup> Annual meeting of KAPM, Kozhikode, January, 1999.

20<sup>th</sup> Annual conference of the Association of Radiation Oncologists of India, Cuttack, 3-6 December, 1998.

CME programme on pain and palliative care, Kasturba Medical College, Manipal, 7-8 November, 1998.

Seminar on Communication Skills, Trivandrum, 19 May, Cytotechnologist 1998.

CME programme and national workshop on Immunohistochemistry and in-situ hybridization, Trivandrum, 18-22 January, 1999.

22<sup>nd</sup> All India Cell Biology Conference, Trivandrum, 20-22 February, 1999.

Annual conference of ISBTI (Kerala chapter), Medical college, Trivandrum, 3 May, 1998.

18<sup>th</sup> IASLIC National seminar, Kerala Agricultural University, Thrissur, December, 1998.

"

Dr. Chandralekha B  
Prof. of Cytopathology

"

Dr. Cherian M. Koshy  
Asst. Prof. in Surgical Oncology

"

Dr. Cherian Varghese  
Assoc. Prof. in Epidemiology

"

"

"

"

Ms. Christeen V  
Staff Nurse

National training programme on modern information handling, All India Institute of Medical Sciences, New Delhi, 15-20 February, 1999.

28<sup>th</sup> Annual national conference of Indian Academy of Cytologists, Panaji, Goa, November, 1998.

International slide seminar on tumour pathology: an update, Mumbai, January, 1999.

Training on statistical methods in medicine, health and environment, Calcutta, November, 1998.

6<sup>th</sup> International and national conference of Indian Association of Palliative Care, Calicut, February, 1999.

Annual meeting of international association of cancer registries, Atlanta, Georgia, USA, August, 1998.

Workshop on Epidemiology and Prevention of Cancer, Bangkok, Thailand, 2-5 November, 1998.

International course on infections that increase the risk of cancer, Annecy, France, 13-18 December, 1998.

Indo-German collaboration in oncology, Lonavala, Maharashtra, February, 1999.

Invited lecture, 8<sup>th</sup> Biennial National Conference of the Indian Society of Oncology, New Delhi, March, 1999.

CME on palliative care awareness programme, RCC, Trivandrum, 25 November, 1998.

Mr. Davis CA  
Assoc. Prof. in Radiation Physics

Investigators meeting for Scotia  
Photodynamic trials in India,  
Renaissance Hotel, London, 7-13  
September, 1998.

"

Training on microselectron HDR  
& Pato treatment planning sys-  
tem, Ospedale, S. Chiara, PISA,  
Italy and M/s Nucletron Oldelft BV,  
The Netherlands, 8-24 June,  
1998.

Mr. Elias TS.  
Assoc. Prof. in Radiation Physics

Invited lecture on Imaging in  
medicine, Department of Com-  
puter Science, University of  
Kerala, 15 January, 1999.

"

9<sup>th</sup> Annual meeting of KAPM,  
Kozhikode, 3 January, 1999.

Dr. Elizabeth K. Abraham  
Addl. Prof. in Cytopathology

47<sup>th</sup> Annual national conference  
of IAPM, Kanyakumari, Decem-  
ber, 1998.

"

3<sup>rd</sup> update on breast disease,  
TMH, Bombay, December, 1998.

"

National CME programme and  
workshop on immuno histochem-  
istry and in-situ hybridisation,  
RCC, Trivandrum, 18-22 January,  
1999.

"

Faculty member, CME on breast  
cancer, RCC, Trivandrum, 27  
February, 1999.

Ms. Elsamma Joseph  
Staff Nurse

CME programme on pain and  
palliative care, Kasturba Medical  
College, Manipal, 7-8 November,  
1998.

Dr. Francis V. James  
Assoc. Prof. in Radiotherapy

Training of Radiotherapy simulation  
University of Regensburg, Ger-  
many, January, 1999.

Dr. Gangadharan V.P.  
Assoc. Prof. in Medical Oncology

Invited speaker, CME programme,  
Dept. of Neuro Surgery, MCH,  
Kottayam, August, 1998.

Invited speaker, Prof. V.C. Mathew  
Roy Memorial CME, October,  
1998.

"

Annual conference of ISHBT,  
Chennai, November, 1998.

"

Standard practices In  
hematopoltic transplantation,  
TMH, Bombay, November, 1998.

"

Invited speaker, - Golden Jubilee  
Celebration, Bishop Benzigar  
Hospital, Kollam November,  
1998.

"

Invited speaker, CME  
programme, Amala Cancer Hos-  
pital, Trichur, January, 1999.

"

Invited speaker, Biennial confer-  
ence of ISMPO, Jodpur, January,  
1999.

"

Invited speaker, Newer pyrim-  
idines - Cancer drug update 99-  
ICMIO, Bangalore, January,  
1999.

"

Invited speaker, All Kerala OBG  
Congress, Cochin, February,  
1999.

"

Invited speaker, Chemotherapy of  
Hepatocellular carcinoma- Guest  
Club - Cochin, February, 1999.

Dr. Geetha N.  
Asst. Prof. in Medical Oncology

Investigator meeting for Global  
Droloxifene DRL 301, Palm  
Springs, California, USA, 14-15  
May, 1998.

"

34<sup>th</sup> Annual meeting of the Ameri-  
can Society of Clinical Oncology,  
Los Angeles, California, USA, 15-  
19 May, 1998.

"

Observer, Dept. of Radiation On-  
cology, University of San

	Fransisco, California, 20-28 May, 1998.
"	Organisation and management of Blood Transfusion Services, Plans and policies, International conference, Mumbai, India, 21-25 November, 1998.
"	9 <sup>th</sup> International anticancer treatment congress, Paris, 2-5 February, 1999.
Dr. P. Jayalakshmi R.M.O in Blood Bank	State level review meeting on Blood Transfusion Services in Blood Bank and Strategies for Safe blood, Dept. of Gastroenterology, and the Blood Bank, MCH, Trivandrum, 14 February, 1999.
Ms. Jayalakshmi P. Sociologist	Workshop on cancer registration NCRP, ICMR, Chennai, April, 1999.
Dr. Jayaprakash Madhavan Assoc. Prof. in Radiotherapy	9th International Congress on Anti-cancer treatment, Paris, 2-5, February, 1999.
Dr. Jayasree K Asst. Prof. in Cytopathology	IAPM, Kerala chapter meeting, Calicut, May, 1998.
"	Kyushu international conference of African development, Kagoshima, Japan, October, 1998.
"	20 <sup>th</sup> Annual conference of IAC, Goa, November, 1998.
"	National CME programme and workshop on immuno histochemistry and in-situ hybridization, RCC, Trivandrum, January, 1999.
"	International slide seminar on tumour pathology, an update, Bombay, January, 1999.

Dr. Krishnakumar AS. Assoc. Prof. in Imageology	International seminar on emerging public health issue in South Asia, SCTIMST, Trivandrum, 22 May, 1998.
"	CME on recent trends in the management of CVA, SCTIMST, 11 October, 1998.
"	International seminar on vascular and interventional radiology, SCTIMST, 6-8 November, 1998.
"	CME on recent advances in the respiratory diseases, Dept. of Respiratory Medicine, Medical College, Trivandrum, 13 December, 1998.
"	CME on breast cancer, RCC, Trivandrum, 27 February, 1999.
Dr. Krishnan Nair M. Director & Prof. of Radiotherapy	Laser Training programme, PDT Trial, London, 20, September, 1998.
"	WHO Cancer control meeting and collaborative research, London and France, 19-23 October, 1998.
"	International workshop on Health effects of Thorotrast, radon and other Alpha-Emitters, Tokyo, 16-25 January, 1999.
Ms. Kumari Thankam Staff Nurse	Diploma in palliative medicine, Oxford, UK, 1998-'99.
Dr. P. Kusumakumary Assoc. Prof. in Paediatric Oncology	Invited lecture: CME in Pediatrics. SAT Hospital, Trivandrum, 28 June, 1998.
"	Faculty member: National training project in Practical Pediatric Oncology, Chennai, 22-23 August, 1998.
"	4 <sup>th</sup> International conference of Psycho Oncology Society, Ham-

burg, Germany, 3-6 September, 1998.

2<sup>nd</sup> national conference of paediatric hematology oncology, PGIMER, Chandigarh, 24-25 October, 1998.

Invited lecture: National conference of IAPM, Kanyakumary, December, 1998.

National CME programme and workshop on immunohistochemistry and in-situ hybridization, RCC, Trivandrum, January, 1999.

Conference on Indian association of palliative care, Calicut, February, 1999.

Clinical update on Managerial skills, College of Nursing, Trivandrum, 16 February, 1999.

Global cancer concern foundation course on palliative care, PPCS, Calicut, November, 1998.

7<sup>th</sup> Annual conference on gynaecologic society of India, Pondichery, 9-11 October, 1998.

NATCON IASO 98, Kh Ujarao, 30 October to 1 November, 1998.

6<sup>th</sup> International congress on oral cancers, New Delhi 15-18 February, 1999.

Update on managerial skill, College of Nursing, Trivandrum, 22-23 July, 1998.

State level review meet on Blood Transfusion Service and Strategies for Safeblood, Dept. of Gastroenterology and the Blood

Dr. Lakshminarayanan  
Senior Scientific Officer

Ms. Latha P.T.  
Social Investigator

Ms. Letha M.B.  
Staff Nurse

Dr. Manjula  
R M O in Palliative Care

Dr. Manoj Pandey  
Asst. Prof. in Surgical Oncology

Ms. Mariamma James  
Head Nurse

Mr. Meera Sahib P.  
Senior Scientific Officer

Bank, MCH, Trivandrum, 14 February, 1999.

Kerala dental conference, Technopark, Trivandrum, 13-15 November, 1998.

6<sup>th</sup> International congress on oral cancer, New Delhi, 15-18 February, 1999.

18<sup>th</sup> Annual convention of the Indian association for cancer research, New Delhi, 19-21 February, 1999.

CME on palliative care awareness programme, RCC, Trivandrum, 25 November, 1998.

6<sup>th</sup> International and National conference of the Indian Association of Palliative Care, Kozhikkode, 19-21 February, 1999.

CME on palliative care awareness programme, RCC, Trivandrum, 25 November, 1998.

Workshop on Cancer Registration, NCRP (ICMR), Cancer Institute (WIA) Chennai, 2-4 April, 1998.

Invited lecture : Seminar on Radiation sources, measurement and safety, ISRP, Bhabha Atomic Research Centre, Mumbai, 24 August, 1998.

Symposium on Medical Physics, Curie Centre of Oncology, Bangalore, 6 September, 1998.

International Conference on Medical Physics (ICMP), AIIMS, New Delhi, November, 1998.

9<sup>th</sup> Annual meeting of Association of Medical Physics of Kerala and

Dr. Nalinakumary KR.  
Lecturer in Dental Care

Smt. Nirmala  
Staff Nurse

Ms. Nisha P. Rajan  
Staff Nurse

Smt. Padmakumary  
Medical Statistician

Dr. Padmanabhan V  
Prof. In Radiation Physics

Dr. Paul Sebastian  
Assoc. Prof. in Surgical Oncology

inaugural meeting of Directorate of Radiation Safety, Kozhikode, 3 January, 1999.

Invited speaker, CME programme on breast cancer AROI, Kerala Chapter and Medical College Kottayam, March, 1999.

Dr. Prabha Balram  
Addl. Prof. of Basic Research

Seminar on Recent Trends in Ultramicrotomy and Cryotechnique, Trivandrum, 9 April, 1998.

Invited speaker, National Conference on Molecular Diagnostics, Trivandrum, 27-29 June, 1998.

Invited speaker, National CME Programme and Workshop on Immunohistochemistry and In-situ Hybridization, Trivandrum, 18-22 January, 1999.

22<sup>nd</sup> All India Cell Biology Conference, Trivandrum, 20-22 February, 1999.

11<sup>th</sup> Kerala Science Congress, Kasargode, Kerala, 27<sup>th</sup> February to 1<sup>st</sup> March, 1999.

Dr. Pradeep VM  
Assoc. Prof. in Nuclear Medicine

Association of physicians and surgeons, Thrissur, November, 1998.

AROI meeting, Calicut, 14 March, 1999.

Sri. Prasanna Kumari .S.  
Staff Nurse

CME on palliative care awareness programme, RCC, Trivandrum, 25 November, 1998.

Dr. T. Priyakumari  
Lecturer in Paediatric Oncology

10th year of celebration and conference of Pediatric Neurology, Co-Bank Towers, Trivandrum, April, 1998.

Paediatric cardiology update, Co-Bank Towers, Trivandrum, August, 1998.

Dr. Rachel Cherian Koshy  
Asst. Prof. of Anaesthesia

2<sup>nd</sup> National conference of the paediatrics haematology oncology, PGIMER, Chandigarh, October, 1998.

Panelist, 'Palliative Procedures in malignancy', Midterm Conference of Association of Surgeons of India, Kerala chapter, June, 1998.

Invited speaker: Meeting of DMOs presided over by health Secretary Shri. V. Vijayachandran, Trivandrum, 29 July, 1998.

Faculty member, House Surgeons' Training programme on palliative care, RCC, Trivandrum, 26 August, 1998.

Faculty member, Volunteers' Training programme on palliative care, RCC, Trivandrum, August 28 1998.

Resource person/invited speaker at short term training programme for staff nurses, Calicut, 9 September, 1998.

6<sup>th</sup> National and international conference of Indian association of palliative care, 19-21 February, 1999.

Dr. Radhakrishna Pillai M.  
Assoc. Prof. in Laboratory Medicine & Tumour Biology

Invited speaker, International symposium on apoptosis, Panjab University, Chandigarh, India, October, 1998.

Invited speaker, 18<sup>th</sup> Annual convention of Indian Association for Cancer Research & National Symposium on Molecular Biology of Cancer, New Delhi, February, 1999.

- " 6<sup>th</sup> International Congress on Oral Cancer, New Delhi, February, 1999.
- " Invited speaker, Workshop on Indo-German collaboration in Oncology: into the next millenium, Lonavala, Maharashtra, February, 1999.
- " Invited speaker, CME on breast cancer, Department of Radiotherapy, Medical College, Kottayam, 28, March, 1999.
- Radiation Physics (All staff) Seminar on Radiotherapy machines-state of the art by Mr. Luding Roppelt Siemens Erlange, RCC, Trivandrum, 21 July, 1998.
- " 4<sup>th</sup> Dr. T.P.Ramachandran Oration by Dr. KS.Parthasarathy, Radiation protection in diagnostic radiology under the auspices of KAPM, 3 January, 1999.
- Radiotherapy (All staff) CME on breast cancer, RCC, Trivandrum, 27 February, 1999.
- " Visual presentation on Radiotherapy machines - state of the art-by Mr. Luding Roppelt, Seimens Erlangen, RCC, Trivandrum, 21 August, 1998.
- " 4<sup>th</sup> Dr. T.P. Ramachandran Oration under the auspices of Association of Medical Physicists of Kerala, 3 January, 1999.
- Dr. Raghukumar Lecturer Training programme on therapeutic ERCP, Surgical Gastro enterology, SRMC, Chennai.
- " 2<sup>nd</sup> International endotherapy conference, Coimbatore, 10-11 July, 1999.

Dr. Raghu Ram K. Nair  
Asst. Prof. in Radiation Physics

- International symposium on Recent advances in genetic Epi- demiology and population moni- toring. DAE, Madras, 23-26 March, 1998.
- " CME program of the Society of Radiographers, Ernakulam, 10-11 October, 1998.
- " CME program in Radio isotopes in Oncology & Imageology, Medi- cal College, Kottayam, 20 De- cember, 1998.
- " Training in Radiotherapy Simula- tor, University Hospital, University of Rengensburg, Germany, Janu- ary, 1999.
- Dr. Rajan B.  
Prof. in Radiotherapy International ATLAS co-ordinators meeting, Milan, September, 1998.
- " 1<sup>st</sup> European Breast Cancer Con- ference, Florence, Italy, 29<sup>th</sup> September to 3<sup>rd</sup> October, 1998.
- " 20<sup>th</sup> Annual conference of the Association of Radiation Oncologists of India, Cuttuck, 3-6 December, 1998.
- " Invited speaker, CME on current trends in breast cancer, Medical College, Kottayam, 28 March, 1999.
- " National ATLAS co-ordinators meeting, Bombay, February, 1999.
- Dr. K Ramachandran  
Assoc. Prof. of Imageology 1<sup>st</sup> Annual conference of the Indian Society of Vascular and interventional radiotherapy. Sree Chitra Thirunal Institute for Medical Sciences and Technol- ogy, Trivandrum, 6-8 November, 1998.



- " CME programme in radiology, Dept. of Radiodiagnosis, Medical College, Kottayam, Radiology Club of Kottayam and IRIA Kerala State branch, 1999.
- " 5<sup>th</sup> Annual conference of Calicut chest club and continuing medical education programme in pulmonology and critical care, Calicut, 24 January, 1999.
- " Invited lecture: Association of gynaecologists, Kollam meeting, 7 February, 1999.
- Dr. K. Ramadas  
Assoc. Prof. in Radiotherapy
- 6<sup>th</sup> International Oral Cancer Congress, New Delhi, February, 1999.
- Dr. K. Ratheesan  
Assoc. Prof. in Radiotherapy
- Investigators meeting on Droloxifene DRL-301 study, Los Angeles, USA, May, 1998.
- " 34<sup>th</sup> ASCO conference, Los Angeles, USA, 16-20 May, 1998.
- " Training in Radiation Oncology, University California, San Francisco, USA, May, 1998.
- " 9<sup>th</sup> International Conference on anticancer treatment, Paris, February, 1999.
- Dr. Raveendran Pillai K.  
Asst. Prof. in Cytopathology
- National seminar on recent trends in microbiology, Kalady, March, 1999.
- Dr. Ravindran Ankathil  
Assoc. Prof. in Basic Research
- Workshop on Fluorescence in-situ Hybridization, Bangalore, 1-3 June, 1998.
- " 6<sup>th</sup> European Conference on Cytogenetics and Molecular Genetics of Human Solid Tumours, Medical University of Saarland, Saarbrücken, Germany, 15-18 October, 1998.

- " 19<sup>th</sup> Annual Conference of Indian Association of Biomedical Scientists at Kasturba Medical College, Mangalore, 30<sup>th</sup> October to 1<sup>st</sup> November, 1998.
- " Invited speaker, National CME and workshop on Immuno-histochemistry and In Situ Hybridization at Trivandrum, 18-22 January, 1999.
- " 1<sup>st</sup> Conference of South Asian Pacific Society of Human Genetics and 24<sup>th</sup> Annual Conference of Indian Society of Human Genetics, Mumbai, 1-3 February, 1999.
- " Invited speaker, CME on Breast Cancer, Indian Society of Radiation Oncologists, Trivandrum, 27 February, 1999.
- " Invited speaker, CME on Current Trends in Breast Cancer, Medical College, Kottayam, 28 March, 1999.
- Dr. Rekha A Nair  
Asst. Prof. in Pathology
- Observer trainee in flow cytometry in lymphoma and leukaemia, CMC Vellore, September, 1998.
- " International slide seminar on tumour pathology-an update, Mumbai, January, 1999.
- " National CME programme and workshop on immunohistochemistry and in-situ hybridization, RCC, Trivandrum, January, 1999.
- Dr. Remani P  
Asst. Prof. of Cancer Research
- " Seminar on Recent Trends in Ultramicrotomy and Cryotechnique, Trivandrum, 9 April, 1998.
- " Seminar on Communication skills. Trivandrum, 19 May, 1998.

" National Conference on Molecular Diagnostics, Trivandrum, 27-29 June, 1998.

" Training in Flow cytometry, Kansai Medical University, Osaka, Japan, 19<sup>th</sup> August to 16<sup>th</sup> November, 1998.

" 3<sup>rd</sup> Asian Pacific Organization for Cell Biology Congress, Osaka, Japan, 24-28 August, 1998.

" 2<sup>nd</sup> Congress of Asian Society for Hyperthermic Oncology, Tokyo, Japan, 28-30 September, 1999.

" National CME Programme and Workshop on Immuno histochemistry and in-situ Hybridization, Trivandrum, 18-22 January, 1999.

" 22<sup>nd</sup> All India Cell Biology Conference, Trivandrum, 20-22 February, 1999.

" 11<sup>th</sup> Kerala Science Congress, Kasargod, 27<sup>th</sup> February to 1<sup>st</sup> March, 1999.

Ms. Sally Abraham  
Head Nurse GCC Foundation Course on pain and palliative care, Calicut, 13-23 November, 1998.

Dr. Shaji Thomas  
Lecturer in Surgery ASI State Conference (peripheral), Kollam, October, 1998.

" Live workshop on mandibular reconstruction at Amala Cancer Centre, Trichur, January, 1999.

" Meeting of association of Plastic Surgeons of India, Kerala chapter, Tiruvalla, April, 1999.

Ms. Shanty Abraham  
Staff Nurse CME on palliative care awareness programme, RCC, Trivandrum, 25 November, 1998.

Ms. Sindhu G.  
Staff Nurse

Dr. Sreedevi Amma N.  
Deputy Director &  
Prof. of Cytopathology

Dr. A. Sreekumar  
Lecturer in Nuclear Medicine

Mr. Sreekumar B  
Coding clerk

CME on palliative care awareness programme, RCC, Trivandrum, 25 November, 1998.

International and national conference of Indian Association of Palliative Care, Calicut, 18- 22 February, 1999.

Annual national conference on IAPM, Kanyakumary, December, 1998.

National CME programme and workshop on immuno histochemistry and in-situ hybridisation, RCC, Trivandrum, January, 1999.

Annual meeting of IAPM Karnataka chapter, Kolar, Karnataka, January, 1999.

CME on Breast Cancer, RCC, Trivandrum, 27 February, 1999.

Symposium on treatment plan in Radiation therapy. New Delhi, April, 1998.

Workshop on communication skills and counselling skills, RCC, Trivandrum, May, 1998.

CME programme, update in hepatology, Kottayam, 14 February, 1999.

CME programme on breast cancer, RCC, Trivandrum, 27 February, 1999.

AROI meeting and CME, Calicut, 14 March, 1999.

Workshop on Cancer Registration, NCRP(ICMR), Cancer Institute (WIA) Chennai, 2-4 April, 1998.

Ms. Suchithra C.S.  
Staff Nurse

CME on palliative care, awareness programme, RCC, Trivandrum, 25 November, 1998.

"

International and national conference of Indian Association of Palliative Care, Calicut, 18-22 February, 1999.

Mr. Sujathan K.  
Cytotechnologist

20<sup>th</sup> National Conference of Indian Academy of Cytologists, Goa, November, 1998.

Ms. Thankamma O.N.  
Head Nurse

Clinical update on managerial skills, College of Nursing, Trivandrum, 16 February, 1999.

Ms. Vijayalekshmi Ammal  
Head Nurse

Clinical update on managerial skills, College of Nursing, Trivandrum, 22-23 July, 1998.

Sr. Vijaya Puthusseril  
CNO & Assoc. Prof. Nursing

Faculty member, expert committee meeting for SHO-IND-NRH031/98 project on development of standards for nursing Practice, RAK College of Nursing, New Delhi, January, 1999.

Faculty member, 6<sup>th</sup> International and national conference of Indian Association of Palliative Care, Calicut, February, 1999.

## PAPERS PRESENTED IN CONFERENCES, SEMINARS, WORKSHOPS ETC.

1. Abraham K George, Nallnakumari KR. Intra osseous carcinoma, Report of a case and discussion on its etio-pathogenesis. 31<sup>st</sup> Kerala Dental Conference, Technopark, Trivandrum, November 13-15, 1998.
2. Aleyamma Mathew. Attributable risk to cancer: Cause-specific survival estimation. 15<sup>th</sup> Annual conference of Indian Society for medical statistics, Vellore, India, 1998.
3. Aleyamma Mathew. Clinical epidemiology of male lung cancer patients: Comparison between tobacco users and non-users. 18<sup>th</sup> Annual convention, Association for cancer research, New Delhi, February, 1999.
4. Aleyamma Mathew. Cancer survival estimation (Invited lecture), Cancer Registry Training Programme, RCC, Trivandrum, 14-16 January, 1999.
5. Aleyamma Mathew. Host and disease related factors determining survival in patients with breast cancer. (Invited lecture) CME on breast cancer, Trivandrum, February, 1999.
6. Aleyamma Mathew. Statistical methods in clinical trials. (Invited lecture), Workshop on design and analysis of data on clinical trials, New Delhi, 15-18 December, 1999.
7. Anitha Mathews. Pathology of cancer (Invited lecture), Workshop on cancer registration and surveillance, RCC, Trivandrum, July, 1998.
8. Anitha Mathews. Broad ligament mucinous cystadenocarcinoma with sarcomatous features. Annual national conference of IAPM, Kanyakumari, December, 1998.
9. Anitha Mathews. Pathology and prognostic factors in breast cancer (Invited lecture) CME on current trends in breast cancer, Kottayam, March, 1999.
10. Arunkumar L.S., Padmanabhan V, Harita VK, Indu S. Gopal, Krishnan Nair M. Corneal shields for 4MV X-rays used in radiotherapy. Fabrication and dosimetric evaluation. 9<sup>th</sup> Annual meeting of KAPM, Kozhikode, 3 January, 1999.

11. Beela Sarah Mathew. Testicular germ cell tumours in prepubertal children. 20<sup>th</sup> Annual conference of the association of Radiation Oncologists of India, Cuttack, 3-6 December, 1998.
12. Chandrakumaran Nair M. Organisation of oncology information system: A tool for people's plan and health care delivery. 28<sup>th</sup> IASLIC National seminar, Kerala Agricultural University, Thrissur, December, 1998.
13. Chandralekha B. Cytology of diagnostic problem cases of lymphoma. 28<sup>th</sup> annual conference of IAC, Panaji, Goa, November, 1999.
14. Cherlan M Koshy. Folded PMMC flaps in palliative surgery of head and neck cancers. International Congress of Palliative Care, February, 1999.
15. Cherian Varghese. Hospital Cancer Registry, RCC, Trivandrum, a model for developing countries. Association of cancer registries annual meeting, Atlanta, Georgia, USA, August, 1998.
16. Cherian Varghese. Cancer Control in India, Indo-German collaborative group meeting in Lonavala, Maharashtra, February, 1999.
17. Cherian Varghese. Cervical cancer screening in Trivandrum (Invited lecture), 8<sup>th</sup> biennial national conference of the Indian Society of Oncology, New Delhi, March, 1999.
18. Elias TS, Padmanabhan V., Davis C.A. Remote afterloading system-Indigenous. 9<sup>th</sup> Annual meeting of KAPM, Kozhikode, 3 January, 1999.
19. Elias TS. Imaging in medicine. (Invited lecture), Department of Computer Science, University of Kerala, 15 January, 1999.
20. Elizabeth K Abraham. Peripheral T-cell lymphoma-Morphologic, immunohistochemical and molecular data on 55 cases. 47<sup>th</sup> Annual national conference of IAPM, Kanyakumari, December, 1998.
21. Elizabeth K. Abraham. Immunohistochemistry of solid tumours (Invited lecture). CME and National workshop on immunohistochemistry and in-situ hybridisation, Trivandrum, January, 1999.
22. Elizabeth K. Abraham. Pathological prognostic factors of breast cancer (Invited lecture). CME on breast cancer, Trivandrum, February, 1999.
23. Gangadharan VP. Recent advances in brain tumours (Invited lecture). CME on Neuro Surgery, Medical College, Kottayam, August, 1998.
24. Gangadharan VP. Concepts in the management of neutropenic sepsis (Invited lecture). Prof. VC. Mathew Roy memorial CME, October, 1998.
25. Gangadharan VP. Medical oncology- yesterday, today and tomorrow (Invited lecture). Golden Jubilee celebration of Bishop Benziger Hospital, Kollam, November, 1998.
26. Gangadharan VP. Management of acute leukaemia (Invited lecture). CME programme, Amala Cancer Hospital, Trichur, January, 1999.
27. Gangadharan VP. MDS-current concepts and management (Invited lecture). Biennial conference of ISMPO, Jodhpur, January, 1999.
28. Gangadharan VP. Newer pyrimidines – cancer drug update-99 (Invited lecture). ICMIO, Bangalore, January, 1999.
29. Gangadharan VP. Management of ovarian tumours (Invited lecture). All Kerala obstetrics and gynecology congress, Cochin, February, 1999.
30. Gangadharan VP. Chemotherapy of hepato cellular carcinoma (Invited lecture) guest club, Cochin, February, 1999.
31. Gangadharan VP. Recent advances in the management of trophoblastic tumours (Invited lecture) CME programme, Department of obstetrics and gynaecology, Trichur, March, 1999.
32. Geetha N. Choriocarcinoma in India. 9<sup>th</sup> International Anticancer Treatment Congress, Paris, 2-5 February, 1999.
33. Jayalekshmi P. Palliative Care – Need for a national plan in developing countries. 2<sup>nd</sup> International Hospice conference, Bombay, February, 1998.
34. Jayalekshmi P. Quality of Life in long term female cancer survivors. 3<sup>rd</sup> International seminar on Psycho-Oncology, Bombay, February, 1998.
35. Jayasree K. Immunohistochemistry in cytological diagnosis (Invited lecture). CME programme and national workshop on immunohistochemistry and in-situ hybridization, Trivandrum, January, 1999.

36. Kusumakumary P. Paediatric solid tumours (Invited lecture), SAT Hospital, Trivandrum, 28 June, 1998.
37. Kusumakumary P. Approach to diagnosis of paediatric cancer neuroblastoma, (Faculty for the south zone workshop). National training project in practical paediatric oncology, Chennai, 22-23, August, 1998.
38. Kusumakumary P. Psycho-social problems of parents of children with cancer, (Invited lecture). 4<sup>th</sup> International conference of psycho-oncology society, Hamburg, Germany, 3-6 September, 1998.
39. Kusumakumary P. Evaluation of treatment in Wilms's tumour (Invited lecture), 2<sup>nd</sup> National conference of Paediatric Hematology Oncology, PGIMER, Chandigarh, 24-25 October, 1998.
40. Lakshmi S., Radhakrishna Pillai M and Krishnan Nair M. Prognostic relevance of growth factor expression in cervical cancer. Annual convention, Indian association for cancer research, AIIMS, New Delhi, February, 1999.
41. Lakshminarayanan. Immunohistochemistry and histological techniques (Invited lecture). Nagpur, November, 1998.
42. Lakshminarayanan. How to avoid artefacts in frozen section, the problems in the technique and how to improve quality (Invited lecture). Annual national conference of IAPM, Kanyakumari, December, 1998.
43. Lakshminarayanan. Trouble shooting in immunohistochemistry. National CME programme and workshop on immunohistochemistry and in-situ hybridisation, RCC, Trivandrum, January, 1999.
44. Latha PT. Quality of life of oral cancer patients. International conference on Indian association of palliative care, Calicut, February, 1999.
45. Nalinakumari K. R., Abraham K. George. Topical fluoride therapy in post-irradiation tooth decay. A clinical study. 31st Kerala Dental Conference, Technopark, Trivandrum, 13-15 November, 1998.
46. Nalinakumari K.R., Krishnan Nair M. Delivery of fluoride during and after radiation therapy for oral cancer. A comparison of pre-fabricated plastic acrylic carriers and surface gel injector method. 6<sup>th</sup> International Congress on Oral Cancer, New Delhi, 15-18 February, 1999.

47. Nalinakumari K.R., Abraham K. George, M. Krishnan Nair. Prevention of post irradiation tooth decay with and without oral prophylaxis. A pilot study. 18<sup>th</sup> annual convention of the Indian association for cancer research, New Delhi, 19-21 February, 1999
48. Padmanabhan V. Dose measurements in diagnostic radiology, Seminar on Radiation Sources, measurement and safety. ISRP, Mumbai Chapter, 24 August, 1998.
49. Padmanabhan V. Madam Curie and Radium-facts you may like to know (Invited lecture). 9<sup>th</sup> Annual meeting of KAPM, Kozhikode, 3 January, 1999.
50. Paul Sebastian. Role of surgery in the management of breast cancer (Invited lecture). CME programme on breast cancer, Medical College, Kottayam, March, 1999.
51. Pradeep V.M. Radioisotopes in the management of diseases of thyroid, Physicians and Surgeon's Association, Thrissur, November, 1998.
52. Pradeep V.M. Advances in Nuclear Oncology, AROI, Calicut, 14 March, 1999.
53. Priya Kumari T. Non-Hodgkins lymphoma in children, disease pattern and treatment outcome. 2<sup>nd</sup> national conference of the paediatrics haematology, PGIMER, Chandigarh, October, 1998.
54. Rachel Cherian Koshy. Welfare programme for citizens whose life span is predicted short (Extension of palliative care to the whole of Kerala) (Invited lecture), meeting of DMO's presided over by health secretary Shri. V. Vijayachandran, Trivandrum, 29 June, 1998.
55. Rachel Cherian Koshy. Palliative care - an overview (Invited lecture) House surgeons training programme, RCC, Trivandrum, 26 August, 1998.
56. Rachel Cherian Koshy. What is palliative care? (Invited lecture). Volunteers training programme, RCC, Trivandrum, 28 August, 1998.
57. Rachel Cherian Koshy. Management of cancer pain and communication in palliative care (Invited lecture), short term training programme for staff nurses, Calicut, 9 September, 1998.
58. Rachel Cherian Koshy. Interventional pain management in palliative care. 6<sup>th</sup> National and international conference of Indian Association of Palliative Care. 19-21 February, 1999.

59. Radhakrishna Pillai M. Apoptosis, Angiogenesis and proliferation, a trifunctional model for tumour progression (Invited lecture). International symposium on apoptosis, Punjab University, Chandigarh, October, 1998.
60. Radhakrishna Pillai M. De novo apoptosis, tumour proliferation, ras gene mutation and tumour response to radiotherapy for cervical cancer (Invited lecture), 18<sup>th</sup> annual convention of Indian association for cancer research, New Delhi, February, 1999.
61. Radhakrishna Pillai M. Cellular manifestations of tumour progression in the oral mucosa: role of human papillomavirus, apoptosis, angiogenesis, proliferation and tumour associated genes p53, bcl-2 and bax (Invited lecture), 6<sup>th</sup> International congress on oral cancer, New Delhi, February, 1999.
62. Radhakrishna Pillai M. Genetic variations in Indian populations: implications for tumour response to therapy (Invited lecture). Workshop on Indo-German collaboration in oncology into the next millennium, Lonavala, Maharashtra, February, 1999.
63. Radhakrishna Pillai M. Oncogenes and tumour suppressor genes in breast cancer (Invited lecture). CME on breast cancer, Department of Radiotherapy, Medical College, Kottayam, 28 March, 1999.
64. Raghu Ram K. Nair, Krishnan Nair M, K.S.V. Nambi, Santhosh V. Jayadevan S, Jayalekshmi P, Gangadharan P: Natural background radiation and cancer incidence in Karunagappally taluk. DAE symposium on recent advances in Genetic Epidemiology and population monitoring, Madras, 23-26 March, 1998.
65. Raghu Ram K. Nair. Radiation protection and instrumentation in Nuclear Medicine. CME program of Society of Radiographers, Ernakulam, 10-11 October, 1998.
66. Raghu Ram K. Nair. Radioisotopes In Medicine. CME program, Medical College, Kottayam, 20 December, 1998.
67. Rajan B. Removing bias in cancer survival estimates by active follow-up and information on determinants of loss to follow-up. 20<sup>th</sup> Annual conference of the Association of Radiation Oncology of India, Cuttack, December, 1999.
68. Rajan B. Adjuvant tamoxifen in early breast cancer (Invited lecture) CME on current trends in breast cancer, 28 March, 1999.

69. Ramachandran K. Magnetic Resonance Imaging. Talk in Malayalam broadcasted by All India Radio, Trivandrum, 1 December, 1998.
70. Ramachandran K. CT Thorax., 5<sup>th</sup> Annual conference on Pulmonology and Critical Care, Calicut, 24 January, 1999.
71. Ramachandran K. Imaging in Gynaecology and Obstetrics (Invited lecture). Association of Gynaecologists, Kollam, 7 February, 1999.
72. Ramakrishnan G, Padmanabhan V. Patient dose measurements in CT scanners-A field study. 9<sup>th</sup> Annual meeting of KAMP, Medical College, Kottayam.
73. Ramakrishnan G, Padmanabhan V. Dose measurements in diagnostic radiology, Trivandrum Radiology Club, 29 January, 1999.
74. Ratheesan K. 9<sup>th</sup> International Conference on Anticancer Treatment, Paris, February, 1999.
75. Raveendran Pillai K. Oral cancer; its magnitude and management issues, Biospectrum-99. National seminar in recent trends in microbiology, Kalady, March, 1999.
76. Rekha A Nair. Immunohistochemistry of lymphomas and leukaemias (Invited lecture). CME programme and national workshop on immunohistochemistry and in-situ hybridization, Trivandrum, January, 1999.
77. Remani P. Expression of N-acetylc D-galactosamine on leukaemic membranes. 3<sup>rd</sup> Asian pacific organization for cell biology congress, Osaka, Japan, 24-26 August, 1998.
78. Remani P. Relation of transmembrane fluidity to cell survival following hyperthermic oncology, Tokyo, Japan, 28-30 September, 1998.
79. Remani P. Jack fruit lectin binding in colorectal carcinoma. 22<sup>nd</sup> All India cell biology conference, Trivandrum, 20-22 February, 1999.
80. Remani P. Methods for evaluation of thermosensitivity in cervical cancer cell line, Kasargode, 27 February - 1 March, 1999.
81. Shaji Thomas. Folded PMMC flap in Head and Neck Reconstruction. ASI state conference (peripheral), Kollam, October, 1998.
82. Sreedevi Amma N. Cytology of non neoplastic lesions of cervix including ASCUS and AGUS (Invited lecture). Preconference

workshop, Annual National Conference of IAPM, Kanyakumary, December, 1998.

83. Sreedevi Amma N. Immunohistochemistry in problem solving (Invited lecture). National CME programme and workshop on Immunohistochemistry and in-situ hybridisation, Trivandrum, January, 1999.
84. Sreedevi Amma N. Cervical cancer control in India with particular reference to work done in Kerala (Oration). Annual meeting of Karnataka chapter of IAPM, Kolar, Karnataka.
85. Sreekumar A. Radioisotop imaging on hepato biliary system, CME programme update in hepatology, Kottayam, 14 February, 1999.
86. Suchithra C.S., Vijaya Puthusseril, Sindhu G. Relevance of training home carers for cancer care. International conference of Indian Association for Palliative Care, Calicut, February, 1999.
87. Sujathan K. Differential expression of jack fruit lectin specific glycoconjugates in metastatic adenocarcinoma and reactive mesothelial cells as a diagnostic aid in effusion cytology. Annual national conference of IAC, Goa, November, 1998.
88. Vijaya Puthusseril. Curriculum development for undergraduate nursing on introduction of palliative care (Invited lecture), 6<sup>th</sup> international and national conference on Indian association for palliative care, Calicut, February, 1999.

## PAPERS PUBLISHED

1. Ajithkumar TV, Elizabeth K Abraham, Krishnan Nair M. Osteosarcoma arising in a mature cystic teratoma of the ovary. *J Exp Clin Canc Res*, 1999;89-91
2. Ajithkumar TV, Nileena N, Elizabeth K Abraham, Francis V James, Krishnan Nair M. Bone marrow relapse in primary mucinous carcinoma of the skin. *Am J Clin Oncol (GCT)*, 1999;22(3).
3. Ajithkumar TV, Sajjod A. Electrocardiographic diagnosis. *J Appl Med*, 1998; 24(9):653.
4. Aleyamma Mathew. My academic experiences in Finland. News letter of the National Cancer Registry Project of India, 1998; 7(1): 33-36.
5. Aleyamma Mathew. ABC of medical statistics -III: The p-values. *Kerala Surgical Journal* 1999; 6(1): 1-6.
6. Aleyamma Mathew. ABC of medical statistics -IV: Confidence intervals. *Kerala Surgical Journal* 1999; 6(1):7-10.
7. Aleyamma Mathew, B Ganesh, B Rajan and Matti Hakama. Cancer survival estimation -the need to correct bias due to outcome related follow-up loss. *Natl Med J Ind*, 1999;12:89-90.
8. Aleyamma Mathew, Manoj Pandey, NS Murthy. Survival estimates: Caveats and pitfalls. *Eur J Surg Oncol* 1999;25:321-329.
9. Aleyamma Mathew and NS Murthy. A step towards quality medical research. *Natl Med J India*, 1998; 11 (8): 283-286.
10. Aleyamma Mathew and NS Murthy. The pitfalls of eager use of p-values. In *Evergreen problems in Epidemiology* (ed) L Tenkanen, Publications 3. University of Tampere School of Public Health, 1999;35-42.
11. Aleyamma Mathew, NS Murthy and Manoj Pandey: Internet in medical research, *Indian Association for Cancer research, Newsletter*, 1998; 14 (3); 5-6.
12. Ambili M, Jayasree K, Sudhakaran PR. 60k Gelatinase involved in mammary gland involution is regulated by beta estradiol *biochemica Et Biophysica Acta*, 1998;1403:219-231.
13. Anitha Mathews, Elizabeth K Abraham, Sreedevi Amma N, Krishnan Nair M. Pigmented squamous cell carcinoma of nasal cavity: a case report. *Histopathology*, 1998;33:184-185.

14. Arunkumar LS, Padmanabhan V, Harita VK, Indu.S Gopal, Krishnan Nair M, Vijayakumary KP. Fabrication and evaluation of pencil shields for Co<sup>60</sup> gamma radiations used in radiotherapy. *J Med. Phy.* 1998; 23(3):152-154.
15. Asha Nair S, Balaraman Nair M, Jayaprakash PG, Rajalekshmy TN, Krishnan Nair M, Radhakrishna Pillai M. ras and c-myc Oncoproteins during tumour progression in the uterine cervix. *Tumori.* 1998; 5:583-588.
16. Beena VT, Anil S, Remani P, Vijayakumar T: Expression of lectin binding in oral submucous fibrosis. *Ind. J. Dent. Res.* 1998; 9: 85-90.
17. Bhattathiri VN, Bindu L, Remani P, Chandralekha B and Krishnan Nair M. Serial cytological assay of micromultinucleation during fractionated radiotherapy of oral cancers: A new test of radiocurability. *Acta Cytologica*, 1998; 42 : 1084-1090.
18. Bhattathiri VN, Bindu L, Remani P, Chandralekha B and Krishnan Nair M. Radiation-induced acute immediate nuclear abnormalities in oral cancer cells. *Acta Cytologica*, 1998; 42(2) : 1084-1090.
19. Bhattathiri VN, Chandralekha B, Remani P, Davis CA, Krishnan Nair M. Prediction of radiosensitivity of oral cancers by serial cytological assay of nuclear changes. *Radiother Oncol*, 1998; 49: 61-65.
20. Brada M, Sharpe G, Rajan B, Britten J, Wilkins P, Guerrero D, Hines F, Traish D, Ashley S. Modifying radical radiotherapy in high grade gliomas, shortening the treatment time through acceleration. *Int J Rad Oncol Bio Physics*, 1999;43(2):287-292.
21. Chandrakumaran Nair M. Health information for the developing world. An overview with special reference to India. In *Five decades of Indian librarianship*, (Ed) G Devarajan. New Delhi, Ess Ess Publications, 1999;138-173.
22. Cherian M Koshy, Rachel Cherian Koshy. Quality of life in cancer. The emerging arbiter. *Natl Med J Ind.* 1998;2(1):48-49.
23. Cherian M Koshy, Rachel Cherian Koshy. Tobacco related cancers – Portends for the future. *Health for Millions*, 1998;24(5).
24. Cherian M Koshy, Rachel Cherian Koshy. Diet and Cancer Prevention – The Expanding Mandate, *Kerala Medical Journal*, 40(1):26-28.

25. Cherian Varghese, Padmakumary P, Asha NM, Vijayaprasad. Epidemiologic loads for breast cancer control in Kerala, S. India. *J of Clinical Epidemiology* 1998; 1:19-24.
26. Cherian Varghese, Sreedevi Amma N, Chithrathara K, Namrata Dhakad, Preethi Rani, Latha Malathy, Krishnan Nair. Genital hygiene and other risk factors for cervical dysplasia in Kerala, India. *Bulletin of the World Health Organization*, 1999;77:281-283.
27. Gangadharan P, Krishnan Nair M, Pradeep VM. Thyroid cancer in Kerala. In *Thyroid cancer: an Indian perspective*, (Ed) D.H. Shah et al. Radiation Medicine Centre (BARC) and Tata Memorial Hospital, Mumbai. Quest publications, 1999;17-31.
28. Gangadharan VP. Acute promyelocytic leukaemia – the era of ATRA. *Ind J Med & Paed Oncol* 1998;19:9-21.
29. Gangadharan VP. Benign intracranial hypertension and all trans retinoic acid. *JK Practitioner*, 1998; 5(2):139-140.
30. Gangadharan VP. Multiple Myeloma – A clinical study. *Kerala Medical Journal*, 1998; 39:2.
31. Gangadharan VP. GM-CSF as adjuvant in induction therapy of AML. *Ind J Cancer*, 1999; 36(1):32-37.
32. Gangadharan VP, Chithra Thara K, Preetha Somari. Cancer and pregnancy. *JK Practitioner* 1999;6(2):125-129.
33. Geetha N, Alex Ittyavirah, Ajithkumar TV, Sreedevi Amma N, Krishnan Nair M. Primary lymphoma of the liver (letter). *Med Paediatr Oncol* 1998; 30:261-262.
34. Geetha N. Arsenic trioxide in the treatment of acute promyelocytic leukaemia. *Indian journal of Medical and Paediatric Oncology*. 1998; 19:111-113.
35. Geetha N, Chandralekha B, Aswin Kumar, Alex K Ittyavirah, Ramadas K, Joseph F. Carcinoma of the pancreas presenting as an orbital tumour. A case report. *Am J Clin Oncol*, 1998; 21:532-533.
36. Geetha N, Hussain BM, Ajithkumar TV, Alex K. Ittyavirah, Krishnan Nair M. Splenic Metastasis in germ cell tumour. *Australasian Radiology*, 1998; 42:252-253.
37. Geetha N, Hussain BM, Ratheesan K, Ramachandran K, Krishnan Nair M. Intra spinal leukaemia with cord compression. *Med and Paed Oncol*, 1999; 32:132-133



38. Geetha N, Kusumakumary P, Elizabeth K. Abraham, Vijayamohan S, Krishnan Nair M. Primary rhabdomyosarcoma of the breast, a case report and review of literature. *Ind J Med & Paed. Oncol* 1998; 19(3):97-100.
39. Geetha N, Kusumakumary P, Ramachandran K, Krishnan Nair M. A vascular necrosis of the femoral heads in neuroblastoma, a case report. *Paed Haematol Oncol*, 1998; 15:443-446.
40. Geetha N, Lali VS, Nileena N, Krishnan Nair M. Late recurrence of childhood acute lymphoblastic leukaemia. *Am J Clin Oncol*, 1999; 22:191-192.
41. Geetha N, Nileena N, Beela Sarah Mathew, Thomas Koilparampil K, Lali VS, Rajan B. Anaplastic myeloma, a report of two cases. *JK Practitioner*, 1999; 6:234-235.
42. Geetha N, Ravindran Ankathil, Ramachandran V, Vinodkumar B, Ramachandran K, Rekha Nair A, Rajan B. Near tetraploid acute lymphoblastic leukaemia with skeletal lesions : A unique entity? *Med Paed Oncol* 1999; 32 : 461-463.
43. Geetha N, Sreedevi Amma N, Kusumakumary P, Lali VS, Krishnan Nair M. Acute lymphoblastic leukaemia occurring as a second malignancy, a case report and review of the literature. *Paed Haematol Oncol*, 1999; 16:267-270.
44. Giji Thomas, Manoj Pandey, Krishnan Nair. Osteoradionecrosis of the mandible. *Kerala Surgical Journal* 1999; 6(1): 47-49.
45. Jyothish B, Ravindran Ankathil, Chandini R, Vinodkumar B, Sunil Nayar G, Divresh Roy D, Jayaprakash Madhavan, Krishnan Nair M: DNA repair proficiency - a potential marker for identification of high risk members in breast cancer families. *Cancer Letters*, 1998;124: 9-13.
46. Kothari KC, Manoj Pandey, Wadhwa MK, Patel DD. Congenital infantile fibrosarcoma. *Eur J Surg Oncol* 1999 ;25: 95-7.
47. Kusumakumary P. High dose therapy with stem cell rescue in childhood solid tumours. *Paed Hematol Oncol*, 1998;11(2): 10-12.
48. Kusumakumary P, et al. Psycho-social problems: parents of children with cancer, *Psychol Oncology*, 1998;7(4):159.
49. Kusumakumary P, Ajith Kumar TV, Krishnan Nair M. Soft tissue swelling of role presenting symposium in acute lymphoblastic leukaemia. *Indian Paediatrics*, 1998;35:1121-1124.

50. Kusumakumary P, Anitha Mathews, Francis V. James, Chellam VG, Hariharan S, Varma RR, Krishnan Nair M. Clear cell sarcoma kidney: Clinical features and outcome. *Paed Hematol Oncol*, 1999;16(2):169-174.
51. Kusumakumary P, Priya Kumari T, Chellam VG, Krishnan Nair M. Langerhans cell histiocytosis in children less than 2 years of age. *Indian Paediatrics*, 1998;36:29-36.
52. Kusumakumary P, Shanavas A, Priya Kumari T, Chellam VG, Krishnan Nair M. Non-Hodgkin's lymphoma in children - Disease pattern and survival. *Paed Haematol Oncol*, 1998; 15:509-517.
53. Lakshmi Kesari A, Chellam VG, Beela Sarah Mathew, Krishnan Nair M, Radhakrishna Pillai M. Transforming growth factor beta related to extent of tumour angiogenesis but not apoptosis and proliferation in breast carcinoma. *Breast Cancer*. 1999; 6:29-36.
54. Lakshmi S, Balaraman Nair M, Jayaprakash PG, Krishnan Nair M, Radhakrishna Pillai M. Epidermal growth factor and its receptor in cervical cancer. *Oncology Reports*. 1998; 4(5):1103-1106.
55. Manoj Pandey. Caveats and pitfalls of medical research [Letters]. *Natl Med J India* 1998 ; 11: 152.
56. Manoj Pandey. Lipoma of the nasopharynx. *Indian J Cancer* 1998; 35: 132-3.
57. Manoj Pandey. Prognostic factors in Breast Cancer. I. Pathologic and tumor related factors. *Kerala Surgical Journal*, 1999; 6: 17-24.
58. Manoj Pandey, Aleyamma Mathew, Elizabeth K Abraham, Iqbal M Ahmed . Malignant Mucosal Melanoma. A distinct biological entity. *Quarterly Journal of Surgical Sciences* 1999;35:39-48.
59. Manoj Pandey, Aleyamma Mathew, Elizabeth K Abraham, Iqbal M Ahmed, Krishnan Nair M. Primary malignant melanoma of the mucous membranes. *Eur J Surg Oncol* 1998; 24 : 303-307.
60. Manoj Pandey, Aleyamma Mathew, Krishnan Nair M. Global perspective of tobacco load and lung cancer: a lesson for third world countries. *Eur J Cancer Prev*. 1999; 8(4): 271-9
61. Manoj Pandey, Aleyamma Mathew, Krishnan Nair M. Cancer Vaccines: A step towards prevention and treatment of cancer. *Eur J Surg Oncol* 1999 ; 25: 209-14.

62. Manoj Pandey, Aleyamma Mathew, Sharma SK. Tumor suppressor genes in lung cancer. *Indian J Chest Diseases [Editorial]*, 1998;40(2) : 85-7.
63. Manoj Pandey, NC Arya, M Kumar, AK Asthana, A Pradhan, A Gautam, Vijay Shukla K. Carcinoma gallbladder presenting as scalp tumor. *Eur J Surg Oncol* 1998; 24(6) 605-7.
64. Manoj Pandey, Cherian Varghese, Aleyamma Mathew, Krishnan Nair M, A Gautam, Vijay K Shukla K. Malignancy load on general surgeons: The need to change general surgical training curriculum. *Eur J Surg Oncol* 1999; 25.
65. Manoj Pandey, Maneesh Wadhwa, Kiran Kothari, Harshat Patel, Shanti Patel, Devendra Patel. Primary non - Hodgkins lymphoma of the gastro - intestinal tract. *Eur J Surg Oncol* 1999; 25:164-7.
66. Manoj Pandey, Giji Thomas, Krishnan Nair M. Osteoradionecrosis mandible. *Kerala Surg J* 1999; 6: 47-49.
67. Manoj Pandey, Iqbal Ahmed M. When writing to biomedical journals does style matters? *Kerala Surgical Journal* 1998; 5: 73 - 81.
68. Manoj Pandey, Iqbal Ahmed M, Aleyamma Matthew, Elizabeth K Abraham. Malignant melanoma of the upper aero-digestive tract. *Int J Oral Maxillofacial Surg* 1999;28: 45-9.
69. Manoj Pandey, Jha R, Singh M. Audit: an educational aspect. *Journal of the Society of Surgeons of Nepal* 1998 ; 1(2): 15-17.
70. Manoj Pandey, Jha R, Singh M. Septic Abortion: The need to revise the health approach to women in developing countries. *Singapore J Gynecol Obstet* 1998; 29: 20-21.
71. Manoj Pandey, Krishnan Nair M. Lymph node mapping. *Indian Association of Surgical Oncology News letter*, 1998;12:10-12.
72. Manoj Pandey, Krishnan Nair M. Lymph node mapping with Identification and biopsy of sentinel lymph node: Fashion or necessity. *Cancer Strategy* 1999;1(1): 1-6.
73. Molykutty John, Prabha Balaram. Immunolocalisation of autoantibodies in gestational trophoblastic diseases. *Amala Research Bulletin*, 1998; 18:29-32.
74. Molykutty John, Rajalekshmi TN, Balaraman Nair M, Swapna Enose, Krishnan Nair M and Prabha Balaram. Proliferating cell nuclear antigen (PCNA) expression in gestational trophoblastic diseases. *Neoplasma*, 1998; 45(5):301-304.
75. Molykutty John, Rajalekshmi TN, Balaraman Nair M, Krishnan Nair M and Prabha Balaram: Immunolocalisation of transforming growth factor alpha in hydatidiform mole. *Tumori*, 1999; 85: 179-183.
76. Molykutty John, Rajalekshmi TN, Krishnan Nair M and Prabha Balaram: Correlation of the expression of epidermal growth factor receptor (EGFR) in relation to the histopathological features in gestational trophoblastic diseases. *Singapore Journal of Obstetrics and Gynecology* 1999; 30(1):44-48.
77. Naresh C. Arya, Manoj Pandey, A. Gautam, Vijay Shukla K. An unusual presentation of primary chondrosarcoma of bone. *J Indian Med Asso* 1998; 96:192.
78. NS Murthy and Aleyamma Mathew. Prevention and control of uterine cervical cancer- Alternative strategies for developing countries. *Ind J Soc Prev Med*, 1998; 30 45 - 52.
79. NS Murthy, Aleyamma Mathew, BB Yeole and Nina Haapanen. The analysis of cohort data: logistic regression, poisson regression or cox-proportional hazards model? In *Ever green problems in Epidemiology* (ed) Leena Tenkanen. Publications 3. University of Tampere School of Public Health, 1999;51-66.
80. Padmanabhan V, Ramakrishnan G. Patient and organ dose measurements in computed tomography scanners - A field study. *J Med Phy* 1998; 3:99-100.
81. Paradeep V.M, Gangadharan P, Krishnan Nair M. Thyroid cancer: Experiences at the Regional Cancer Centre, Trivandrum. (eds). D.H. Shah, A.M. Samuel, R.S. Rao. *Thyroid cancer, an Indian perspective*; Radiation Medicine Centre, BARC and Tata Memorial Hospital. Quest publications, Bombay, 1999.
82. Pradip Nair, Gangadevi T, Jayaprakash PG, Balaraman Nair M, Krishnan Nair M, Radhakrishna Pillai M. Increased angiogenesis in the uterine cervix associated with human papillomavirus infection. *Pathology Research and Practice*. 1999; 195:163-169.
83. Priya Kumary T, Shanavas A, Kusumakumary P. Intussusception at the onset of acute Lymphoblastic leukaemia in a child: *Indian Paediatrics*, 1999; 35(5):470-472.
84. Rachel Cherian Koshy. A case for oral morphine for cancer patients. *Health for the millions*. 1998;13.

85. Rachel Cherian Koshy, Cherian M Koshy. Prescriptions. Need for caution and attention to detail: Kerala Medical Journal, 1998;39(2):10-11.
86. Rachel Cherian Koshy, Gladys Jeevy, Paul Sebastian, PN Gupta. Coronary spasm following intravenous calcium in a patient who underwent total thyroidectomy. Ind J Anaesthesia, 1999;45:66-69.
87. Rachel Cherian Koshy, D Rhodes, S Devi, SA Grossman. Cancer pain management in developing countries: a mosaic of complex issues resulting in inadequate analgesia. Supportive care in cancer. 1998; 6:430-437.
88. Radhakrishna Pillai M, Jayaprakash PG, Krishnan Nair M. Tumour proliferative fraction and growth factor expression as markers of tumour response to radiotherapy in cancer of the uterine cervix. J Canc Res Clin Oncol. 1998; 124(8):456-461.
89. Radhakrishna Pillai M, Jayaprakash PG, Krishnan Nair M. Bcl-2 immunoreactivity but not p53 accumulation associated with early tumour response to radiotherapy in cervical carcinoma. J Canc Res Clin Oncol, 1999; 125:55-60.
90. Radhakrishna Pillai M, Lakshmi Kesari A, Chellam VG, Jayaprakash Madhavan, Pradip Nair, Krishnan Nair M. Spontaneous programmed cell death in infiltrating duct carcinoma: association with p53, bcl-2, hormone receptors and tumour proliferation. Pathology Research and Practice. 1998;194(8):549-557.
91. Radhakrishna Pillai M, Lakshmi S, Sreekala S, Ganga Devi T, Jayaprakash PG, Rajalakshmi TN, Chandrika Devi CG, Krishnan Nair M, Balaraman Nair M. High risk human papillomavirus infection and E6 protein expression in lesions of the uterine cervix. Pathobiology. 1998; 66:240-246.
92. Radhakrishna Pillai M, Phanidhara A, Lakshmi Kesari A, Pradip Nair, Krishnan Nair M. Cellular manifestations of human papilloma virus infection in the oral mucosa. J Surg Oncol, 1999; 71:10-15.
93. Raghu Ram.K.Nair. On environmental background radiation levels using TLD (letter). J Rad Protect Environ, 1998;19:116.
94. Ramachandran K, Sasidharan K, Kusumakumary P. Malignant rhabdoid tumour of the kidney (letter). Ind J Rad Imag, 1999;9(1):35-37.
95. Ramakrishnan G, Padmanabhan V. Patient doses in Mammography. J Med Phy, 1998; 23(3): 158.
96. Ravi D, Ramadas K, Beela Sarah Mathew, Nalinakumari KR, Krishnan Nair M, Radhakrishna Pillai M. Angiogenesis during tumour progression in the oral cavity is related to reduced apoptosis and high tumour cell proliferation. Oral Oncol, 1998; 34: 543-548.
97. Ravi D, Ramadas K, Beela Sarah Mathew, Nalinakumari KR, Krishnan Nair M, Radhakrishna Pillai M. De Novo programmed cell death in oral cancer. Histopathology. 1999; 34:241-249.
98. Ravindran Ankathil, Jyothish B, Jayaprakash Madhavan, Krishnan Nair M. Deficient DNA repair capacity - A predisposing factor and high risk predictive marker in familial colorectal cancer. J. Exptl Clin Cancer Res 1999; 18:33-37.
99. Remani P, Ostapenko VV, Akagi K, Tanaka Y. Relation of transmembrane fluidity to cell survival following hyperthermia in HeLa cells. Jpn J Hyperthermic Oncol, 1998;14 (Suppl): 150.
100. Remani P, Rekha A Nair, Jaya P, Bhattathiri VN, Vijayakumar T and Krishnan Nair M. Expression of N acetyl D-galactosamine on leukemic cell membranes. Cell structure and function, 1998; 23 (Suppl): 88,.
101. Sarah Jefferles, B Rajan, Sue Ashely, Daphne Traish, Michael Brada. Hematological toxicity of cranio-spinal irradiation. Radiotherapy and Oncology, 1998;48(1):23-27.
102. Sasidharan K, Alex Ittyavirah K, Kusumakumary P, Ramachandran K, Krishnakumar AS, Chellam VG. Ultrasonographic features of paediatric renal tumours with histologic correlation. Ultrasound International, 1998; 4(4):223-231.
103. Sasidharan K, Ramachandran K, Alex K Ittyavirah, Krishnakumar AS, Kusumakumary P, Chellam VG. Ultrasonographic features of paediatric renal tumours with histopathological correlation. Ultrasound - International Journal. 1998; 4:223-228.
104. Sankaranarayanan R, Remani Wesley, Thara Somanathan, Namrata Dhakad, Shyamalakumary B, Sreedevi Amma N, Maxwell Parkin D, Krishnan Nair M. Visual Inspection of the uterine cervix after the application of acetic acid in the detection of cervical carcinoma and its pre-cursors. Cancer, 1998; 83: 2150-2156.
105. Sreelekha TT, Jayaprakash Madhavan, Remani P, Rekha A Nair, Krishnan Nair M, Radhakrishna Pillai M. Spontaneous pro-

grammed cell death in infiltrating duct carcinoma association with p53 bcl-2 hormone receptors and tumour proliferation. *Pathology Research and Practice*. 1998;198(8):549-557.

106. Sreelekha TT, Jayaprakash Madhavan, Remani P, Rekha A Nair, Krishnan Nair M, Radhakrishna Pillai M. Ras oncoprotein expression and jack fruit lectin binding in rectal carcinoma. *GI Cancer*, 1999; 3:23-30.

107. Srinivas G, Kusumakumary P, Krishnan Nair M, Panicker KR, Radhakrishna Pillai M. Bcl-2 protein and apoptosis in paediatric acute lymphoblastic leukaemia. *International Journal of Molecular Medicine*, 1998; 1(4):755-759.

108. Swapna Enose, Molykutty John, Rajalekshmi TN, Vijayasree SR, Krishnan Nair M and Prabha Balaram: Lack of association of gestational trophoblastic diseases with syphilis and AIDS. *Indian J Pathol Microbiol*, 1998; 4(3):277-279.

109. Tayal Singh Elias, Manoj G, Davis CA, Arunkumar LS, Padmanabhan V. Generalised software on routine radiotherapy calculations (DOS Version) *J Med Phy*, 1998; 23(3):198-199.

110. Urmila J Nair, Jagadeesan Nair, Babu Mathew, Bartsch Helmut. Glutathione S-transferase M1 and T1 null genotypes as risk factors for oral leukoplakia in ethnic Indian betel quid/tobacco chewers. *Carcinogenesis*, 1999; 20:743-748.

111. Vijayakumar T, Bhattachari VN, Remani P, Bindu L, Chandralekha B, Krishnan Nair M. Relation of lectin binding to invasiveness and lymphnode metastasis in oral cancers. *Br J Radiol*, 1998; 71 (Suppl): 21.

112. Vijay K Dixit, P. Chaturvedi, Manoj Pandey, AK. Agarwal, Vijay Shukla K. Hepatic duct stones masquerading as Klatkin's tumor. *J Asso Physicians India* 1999; 47: 236-7.

113. Vijay Shukla K, NC Arya, A Pitale, Manoj Pandey, Vijay K Dixit, CD Reddy, Gautam A. Metallothionein expression in carcinoma of the gallbladder. *Histopathology* 1998; 33: 154-7.

114. Vijay Shukla K, A Gupta, H Singh, Manoj Pandey. Cardiff repair of incisional hernia. An University Hospital experience. *Eur J Surg* 1998; 164: 271-4.

115. Wadhwa MK, Manoj Pandey, SM. Patel, KC. Kothari, DD Patel. ABO, rhesus blood group distribution In Gujarat. *Ind J Med Paed Oncol* 1998; 19: 137-41.

116. Winter H, KK Cheng, C Cummins, R Maric, P Silcocks, C Varghese. Cancer incidence in the Asian Population of England (1990-1992). *British Journal of Cancer* 1999; 79:645-654.

**Papers in proceedings**

1. Aleyamma Mathew and Manoj Pandey. Attributing risk to cancer: Cause-specific survival estimation. Proceedings of 16<sup>th</sup> annual conference of Indian Society for Medical Statistics (ed). J. Richard, S Muthurathnam, Department of Biostatistics, Christian Medical College, Vellore, India, 1999; 60-67.

2. Babu Mathew, Sankaranarayanan R, Binu Jose Jacob, Giji Thomas, Pisani P, Somanathan T, Manoj Pandey, Ramdas K, Elizabeth K Abraham, Iqbal Ahamed M, Najeeb S, Parkin DM, Krishnan Nair M. Early findings from an oral cancer screening intervention trial in Kerala, India. Varma AK (ed.) Proceedings of International oral cancer congress, Mc Millan India Ltd., New Delhi, Oral Oncology 1999 ; 6: 163-8.

3. Babu Mathew, Sankaranarayanan R, Binu Jose Jacob, Giji Thomas, Pisani P, Somanathan T, Manoj Pandey, Ramdas K, Elizabeth K Abraham, Iqbal Ahamed M, Najeeb S, Parkin DM, Krishnan Nair M. Preliminary results from an Oral cancer screening intervention trial in Kerala, India. Oral Oncol Vol VI, Proceedings of the VI International Oral Cancer Congress. (ed). A.K. Varma. McMillan Press, New Delhi 1999; 163-166.

4. Beena Panicker, Swapna Alex, Chandrika Devi CG and Prabha Balaram: Bcl2, c-myc, Rb and p53 gene expression in hydatidiform mole. Proc. 11th Kerala Science congress, Kasergode, 1999; 182-183.

5. Chandrankumari Nair M. Regional Cancer Centre Library, a resource centre for oncology information In: KELPRO souvenir. Trivandrum, Kerala Library Professionals Organisation, 1998; 21-24.

6. Giji Thomas, Manoj Pandey, Aleyamma Mathew, Elizabeth K Abraham, Tara Somanathan, Ramdas K, Iqbal Ahamed M, Krishnan Nair M. Soft tissue sarcoma of the oral and maxillofacial region. Varma AK (Ed.) Proceedings of International oral cancer congress, Mc Millan India Ltd., New Delhi, Oncology 1999; 6: 259-62.

7. Giji Thomas, Manoj Pandey, Aleyamma Mathew, Tara Somanathan, Anita Francis, Elizabeth K Abraham, Krishnan Nair.

- Primary intraosseous carcinoma of the jaw. *Oral Oncology*, Vol VI, Proceedings of the VI, International Oral Cancer Congress, McMillan Press, New Delhi, 1999; 249-252.
8. Manoj Pandey, Giji Thomas, Aleyamma Mathew, Elizabeth K Abraham, Thara Somanathan, Ramadas K, Iqbal Ahmed M, Krishnan Nair M. Soft tissue sarcomas of the oral and maxillofacial region. *Oral Oncology*, Vol VI, Proceedings of the VI, International Oral Cancer Congress. McMillan Press, New Delhi, 1999; 259-262.
  9. Prishla Varghese, Asha SR, Ramdas K, Joseph F and Prabha Balaram: Downregulation of retinoblastoma and c-myc oncoprotein is related to dysplastic changes in oral lesions. Proc. 11th Kerala Science congress, Kasargode. (ed). M.R. Das, State Committee on Science Technology and Environment, Govt. of Kerala, Trivandrum. 1999; 177-179.
  10. Priya Sreenivas, Elizabeth K Abraham, Iqbal Ahmed; Chellam VG, Vijayalekshmi NR, Krishnan Nair K, Prabha Balaram. P53 and PCNA expression as indicators of metastasis in infiltrating ductal carcinomas. Proc. 11th Kerala Science congress, Kasargode. (ed). M.R. Das, State Committee on Science Technology and Environment, Govt. of Kerala, Trivandrum. 1999; 183-185.
  11. Radhakrishna Pillai M, Ramadas K, Nalinakumari KR, Ravi D, Krishnan Nair M. Cellular manifestations of tumour progression in the oral mucosa: role of human papillomavirus, apoptosis, angiogenesis, proliferation and tumour associated genes p53, bcl-2 and bax. In: *Oral Oncology Vol VI* (Varma AK-ed). Proceedings of the 6<sup>th</sup> International Congress on Oral Cancer, New Delhi, 1999, Macmillan India Ltd. New Delhi, 1999; 51-54.
  12. Remani P, Akagi K, Tanaka Y, Bhattathiri VN. Methods for evaluation of Thermosensitivity in cervical cancer cell line. Proceedings of the 11th Kerala Science Congress, Kasargode. (ed). M.R. Das, State Committee on Science, Technology and Environment, Government of Kerala, Trivandrum. 1999; 175-177.
  13. Sheela VR, Dinesh Roy D, Ravindran Ankathil: Cytogenetic and Epidemiologic study of Down Syndrome in Kerala. Proceedings of the 11<sup>th</sup> Kerala Science Congress, Kasargode. (ed), M.R. Das, State Committee on Science, Technology and Environment, Government of Kerala, Trivandrum. 1999; 172-174.

14. Swapna Alex, Beena Panicker, Chandrika Devi CG and Prabha Balaram: Is nm23 a regulatory protein in the cell proliferation pathway? Proc. 11th Kerala Science congress, Kasargode. (ed). M.R. Das, State Committee on Science, Technology and Environment, Government of Kerala, Trivandrum. 1999; 179-182.

#### Selected abstracts

1. Babu Mathew for the TOCS study group. TOCS: Characteristics of trial participants and oral precancers. VI International Oral Cancer Congress, February 15-18, New Delhi. Abstract book: P 10.
2. Giji Thomas for the TOCS study group. Treatment of oral precancers and outcome. VI International Oral Cancer Congress, February 15-18, New Delhi. Abstract book: P 13.
3. Giji Thomas, Manoj Pandey. Soft Tissue Sarcomas of the Oral and Maxillofacial Region. X IAOMR & I Asia Pacific symposium of Oral and Maxillofacial Radiologists Souvenir 1998; 13.
4. Giji Thomas, Manoj Pandey, Aleyamma Mathew, Thara Somanathan T, Francis A, Elizabeth K Abraham, Krishnan Nair M. Primary Intraosseous carcinoma of the jaw. VI International Oral Cancer Congress, New Delhi, February 1999. Abst. Book, P 142.
5. Manoj Pandey for the TOCS study group. Treatment of oral cancers and outcome. VI International Oral Cancer Congress, February 15-18, New Delhi. Abstract book: P 14.
6. Manoj Pandey for TOCS group. Management of Screen detected oral cancer. Int Oral Cancer Congress, New Delhi, Feb 15-18, 1999.
7. Manoj Pandey, Remany Wesley, Cherian Varghese, Sreedevi Amma N, Gangadharan P, Krishnan Nair M. Cervical Cancer screening in Kerala: VII Annual Conference of Gynaecologic Society of India, Pondicherry, October 9-11, 1998. Abst Book D1/5.5.
8. Manoj Pandey, Giji Thomas, Aleyamma Mathew, Thara Somanathan, Elizabeth K Abraham, Ramdas K, Iqbal Ahmed M, Krishnan Nair M. Soft tissue sarcoma of the oral cavity. International Oral Cancer Congress, New Delhi, February 1999; Abst book P 71.

9. Namrata Dhakad, Iqbal Ahamed. Role of interval cytoreduction in advanced ovarian cancer. 17<sup>th</sup> International congress. Rio de Janeiro Brazil, 1998;325.
10. Ramdas K for the TOCS study group. Characteristics of the oral cancers in the study group. VI International Oral Cancer Congress, February 15-18, New Delhi. Abstract book; P 11.
11. Sankaranarayanan R for the TOCS study group. Summary of results: process and intermediate outcome measures. VI International Oral Cancer Congress, February 15-18, New Delhi. Abstract book: 15.
12. Sankaranarayanan R for the TOCS study group. Trivandrum Oral Cancer Screening Study (TOCS): Design and organisation. VI International Oral Cancer Congress, February 15-18, New Delhi. Abstract book: P 9.
13. Thara Somanathan for the TOCS study group. Histological characteristics of precancers and cancers. VI International Oral Cancer Congress, February 15-18, New Delhi. Abstract book: P 12.

## ADMINISTRATION

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

- |     |   |                    |
|-----|---|--------------------|
| 1.  | <b>Sri. E.K.Nayanar</b><br>Hon'ble Chief Minister of Kerala                                       | Chairman           |
| 2.  | <b>Sri. A.C.Shanmukhadass</b><br>Hon'ble Minister for Health                                      | Vice-Chairman      |
| 3.  | <b>Sri. V.Vijayachandran, IAS</b><br>Principal Secretary to Govt.,<br>H&FWD, Govt. of Kerala      | Alt. Vice-Chairman |
| 4.  | <b>Sri. Vinod Rai, IAS</b><br>Principal Secretary to Govt.<br>Finance Department, Govt. of Kerala | Member             |
| 5.  | <b>Sri. K.N.Kurup, IAS</b><br>Secretary to Govt.<br>Planning Board, Govt. of Kerala               | -do-               |
| 6.  | <b>Dr. B.Umadethan</b><br>Director of Medical Education<br>Thiruvananthapuram                     | -do-               |
| 7.  | <b>Dr. V. Mahadevan</b><br>Principal, Medical College,<br>Thiruvananthapuram                      | -do-               |
| 8.  | <b>Dr. S.C. Gupta</b><br>Eminent Scientist  | -do-               |
| 9.  | <b>Dr. M.S.Vallathan</b><br>Eminent Scientist   | -do-               |
| 10. | <b>Dr. M.H. Das</b><br>Director<br>Rajeev Gandhi Centre, Trivandrum                               | -do-               |
| 11. | The Secretary to Govt<br>Health & Family Welfare, Govt. of India                                  | -do-               |
| 12. | The Director General of<br>Health Services, Govt. of India  | -do-               |
| 13. | <b>Dr. M.Krishnan Nair</b><br>Director, RCC, Trivandrum.  | Convener           |

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

1. Sri. V. Vijayachandran, IAS                      Chairman  
Principal Secretary to Govt., H&FWD  
Govt. of Kerala
2. Sri. Vinod Rai, IAS                              Member  
Principal Secretary to Govt.  
Finance Department, Govt. of Kerala
3. Sri. K.N. Kurup, IAS                            -do-  
Secretary to Govt.  
Planning Board, Govt. of Kerala
4. Dr. B. Umadethan                              -do-  
Director of Medical Education  
Thiruvananthapuram
5. Dr. V. Mahadevan/Dr. S. Hariharan        -do-  
Principal, Medical College  
Thiruvananthapuram
6. Dr. M. Krishnan Nair                         Convener  
Director, RCC, Trivandrum

**MAJOR DECISIONS OF THE EXECUTIVE COMMITTEE  
DURING 1998-99**

**A) Promotions**

The following promotions were sanctioned

1. Dr. K. Jayasree as Assoc. Prof. of Cytopathology
2. Dr. K. Lakshminarayanan as Asst. Prof. in Cytopathology
3. Dr. N. Sreedevi Amma as Addl. Director
4. Dr. K. Raveendran Pillai as Asst. Prof. of Cancer Research (Cytopathology)
5. Dr. Manoj Pandey as Asst. Prof. of Surgical Oncology
6. Dr. Anitha Mathew as Asst. Prof. of Cytopathology

**B) Deputation to foreign countries**

The Executive Committee has sanctioned deputation to the following staff:

- |                           |  |
|---------------------------|--|
| 1. Dr. Remani S Wesley    | - Ontario, Canada                      |
| 2. Dr. Ravindran Ankathil | - Philadelphia, USA                    |
| 3. Dr. M. Krishnan Nair   | - Toshima-ku, Japan                    |
| 4. Dr. Babu Mathew        | - Lyon, France                         |
| 5. Dr. Cherlan Varghese   | - Bangkok, Thailand and Annecy, France |
| 6. Dr. Francis V. James   | - Germany                              |
| 7. Dr. Reghu Ram K Nair   | - Germany                              |
| 8. Dr. B. Rajan           | - Florence                             |
| 9. Dr. Kusuma Kumari      | - Hamburg, Germany                     |
| 10. Dr. Molykutty John    | - Florida, USA.                        |

**C) Purchase sanctioned**

1. Rs. 350 lakhs for commissioning of 4 Operation Theaters
2. Rs. 1.5 lakhs for new Cobalt Unit
3. Rs. 35 lakhs for Endoscopic Unit
4. Rs. 100 lakhs for SPECT Gamma Camera

**D) Appointments**

1. Sri. M.S. Dharan as Controller of Finance
2. Dr. K. Velayudhan Pillai as Registrar
3. Sri. G. Neelakantan as Computer Programmer

**E) Others**

1. The Committee resolved to organise Multi Disciplinary Clinic and Pay clinic.
2. The Committee resolved to recommend to raise the age of superannuation to 60 years.
3. The Committee resolved to pay an interim Non-Practising Allowance.

**MAJOR DECISIONS OF THE GOVERNING BODY  
OF THE RCC SOCIETY, 1998-99**

1. The Governing Body resolved to fix the qualifications, service conditions etc. for the post of Director.
2. The Governing Body resolved to revise the salary and service conditions of the Academic and Non-academic staff of the RCC on a par with the scales of pay of the S.C.T.I.M.S.T. w.e.f. 1/3/1997.

3. The Governing Body resolved to ban private practice and to start special clinics in the R.C.C.
4. The Governing Body resolved to introduce a new CCL scheme for the sake of expatriate Indians and their relatives.
5. The Governing Body resolved to constitute a Review Committee of the RCC with Dr. K.A. Dinshaw as Chairperson, Director, Tata Memorial Hospital, Dr. Indira Nath & Dr. Kusum Verma of AIIMS, Delhi, Dr. K.P. Kannan, Centre for Development Studies and Prof. A. Joseph, Secretary Academic, as members.

#### LIST OF STAFF

Dr. Krishnan Nair M	Director
Dr. Sreedevi Amma N	Addl. Director
Dr. Joseph F	Deputy Director
Dr. Rajan B	Superintendent
Prof. Joseph A	Hon. Secretary (Academic)

#### Radiotherapy

Dr. Krishnan Nair M	Director & Professor
Dr. Joseph F	Dy. Director & Professor
Dr. Rajan B	Supdt. & Professor
Dr. Gangadevi T	Addl. Professor
Dr. Jayaprakash P G	"
Dr. Rafeeka Beegum	"
Dr. Parameswaran S	Assoc. Professor
Dr. Bhattathiri V N	"
Dr. Jayaprakash Madhavan	"
Dr. Sureshchandradutt G	"
Dr. Ramdas K	"
Dr. Ratheesan K	"
Dr. Thomas Koilparambil	"
Dr. Francis V James	"
Dr. Beela Sarah Mathew	Lecturer
Dr. Ajithkumar TV	"

#### Surgical Oncology

Dr. Paul Sebastian	Assoc. Professor
Dr. Iqbal Ahamed	Assoc. Professor
Dr. Gladys Joëvy	Consultant

Dr. Gopalakrishnan	Consultant
Dr. Chitrathara K	Asst. Professor
Dr. Rachel Cheriyen Koshy	"
Dr. Cherian M. Koshy	"
Dr. Pabhakar J	Asst. Professor (on leave)
Dr. Namrata Dhakad	Asst. Professor
Dr. Manoj Pandey	"
Dr. Shaji Thomas	Lecturer
Dr. Mary Thomas	"
Dr. Raghukumar R	"
Sri. Hari Kumar R	Chief Anaesthesia Technician
Sri. Mohanan Pillai B	Theatre technician
Sri. Suresh P S	Senior helper
Sri. Thankappan Chettiyar K	"

#### Paediatric Oncology

Dr. Kusumakumari P	Assoc. Professor
Dr. Priyakumari. T	Lecturer
Dr. Mini S.	"

#### Medical Oncology

Dr. Gangadharan V P	Assoc. Professor
Dr. Geetha N	Asst. Professor
Dr. Prakash NP	Lecturer (on leave)
Dr. Mirsa Husain	Lecturer (on leave)
Dr. Elizabeth Somini Koshy	Resident Medical Officer

#### Dental wing

Dr. Nalinakumari KR	Lecturer
Smt. Sulochana Bai M	Dental Hygienist

#### Clinical Services & Medical Records

Sri. Raveendran Nair R	Admn. Officer (CS)
Sri. Surendran Nair V	Asst. Public Relations Officer
Sri. Rajasekharan Nair G	Medical Records Officer
Sri. Sreekumar B	Clerk Gr. I
Smt. Sarala devi PG	Cashier
Sri. Mohanachandran C	Clinical Records Asst.
Sri. Anil Kumar K	"
Smt. Siju R Nair	"



Smt. Sreelatha S	"
Smt. Mariamma MA	"
Sri. Thankappan Nair K	Telephone operator-cum-receptionist
Sri. Johnson X	Cashier-cum-receptionist
Sri. John S	Clerk

#### Cancer Epidemiology & Clinical Research

Sri. P. Gangadharan	Emeritus Scientist
Dr. Sankaranarayanan R	Assoc. Professor (on leave)
Dr. Cherian Varghese	Assoc. Professor
Dr. Aleyamma Mathew	Asst. Professor
Smt. Padmakumari Amma G	Medical Statistician
Smt. Latha PT	Social Investigator
Smt. Anitha Nayar	"
Smt. Jalajakumari V	Clerk Gr. I
Smt. Chandrika D	"
Smt. Jayalekshmy P	Scientific Assistant

#### Pain and Palliative Care

Dr. Vasudevan Mappat	Anaesthesiologist
Dr. Rachel C. Koshy	Asst. Professor
Dr. Manjula R	Resident Medical Officer

#### Blood bank

Jayalakshmi P	Resident Medical Officer
Sri. Meera Sahib	Asst. Technical Officer
Smt. Gangadevi C	Sr. Lab. Technician

#### Cytopathology

Dr. Sreedevi Amma N	Professor & Addl. Director
Dr. Chandralekha B	Professor
Dr. Elizabeth K Abraham	Addl. Professor
Dr. Jayasree K	Assoc. Professor
Dr. Rekha A Nair	Asst. Professor
Dr. Anitha Mathews	"
Dr. Raveendran Pillai K	"
Dr. Lakshminarayanan	"
Sri. Sujathan K	Cytotechnologist Gr. I
Smt. Najeeya S	Sr. Lab. Technician
Smt. Brinda TP	Lab. Technician

Smt. Sulochana S	"
Smt. Renuka Devi V	"
Smt. Saina A	"
Sri. Nataraj A	Cytotechnician

#### Imageology

Dr. Sasidharan K	Professor
Dr. Alex K Ittyavirah	Assoc. Professor (on leave)
Dr. Ramachandran K	"
Dr. Krishna Kumar S	Assoc. Professor
Smt. Vimala B	Radiographer
Smt. Sathyalekha SI	"
Sri. Pradeep S	"
Sri. Udayakumar KR	"
Sri. Prasad PP	"
Sri. Shaileshkumar KN	"
Sri. Hari. C.	Dark Room Assistant

#### Nuclear Medicine

Dr. Pradeep VM	Assoc. Professor
Dr. Sreekumar	Lecturer
Smt. Sheela V	Sr. Radiographer
Sri. Joe D'Cruz	"
Smt. Suja BR	Radiographer
Smt. Sheeja SR	"
Smt. Minyamma K	RIA Technician
Smt. Bindu B	"
Smt. Sindhu P	"

#### Radiation physics

Dr. Padmanabhan V	Professor
Sri. Davis CA	Assoc. Professor
Sri. Thayal Singh Elias	Asst. Professor
Sri. Arunkumar LS	"
Sri. Raghuram Nair K	"
Sri. Ramabhadran P	Sr. Radiographer
Sri. Sadasivan Nair N	Radiographer
Sri. Viswanathan C	"
Smt. Seetha P	"
Smt. Suseelamma S	"
Smt. Radhamony Amma TG	"
Smt. Leela M	"

Smt. Ambili Govind K  
 Smt. Mariamma Jacob  
 Smt. Sreekala R  
 Smt. Prameeladevi T  
 Sri. Sunil Kumar S  
 Smt. Geethamma K  
 Smt. Jayasree CG  
 Smt. Vidiullatha PA  
 Smt. Sheeba DR  
 Sri. Radhakrishnan Nair T  
 Sri. Sherif JS  
 Smt. Geetha P  
 Sri. Santhan H  
 Smt. Anitha C  
 Smt. Sreekala D

**Cancer Research**

Dr. Prabha Balaram Addl. Professor  
 Dr. Ravindran Ankathil Assoc. Professor  
 Dr. Kannan S Asst. Professor  
 Dr. Remani P  
 Dr. Molykutty John  
 Sri. Thomas Abraham Scientific Officer Gr. I  
 Smt. Bindu L Cytotechnologist  
 Smt. Leela A Sr. Animal house keeper  
 Sri. Vikraman Nair K

**Laboratory Medicine & Tumor Biology**

Dr. Radhakrishna Pillai M Assoc. Professor

**Clinical lab**

Smt. Padmavathi Amma B Technical Officer  
 Smt. Usha J Sr. Lab. Technician  
 Smt. Renuka P  
 Sri. Hariharan S Lab. Technician  
 Sri. Rajesh KR  
 Smt. Helen B  
 Smt. Anitha S

**Pharmacy**

Dr. T. Gangadevi T. Addl. Professor (I/C)  
 Sri. Sivasankara Pillai K Pharmacist

**Information Systems Division**

Sri. Neelakantan G Senior Systems Analyst  
 Sri. Manoj G Jr. Systems Analyst  
 Smt. Suseela Devi B Data Entry Operator  
 Smt. Jayanthi JK

**Community Oncology**

Dr. Babu Mathew Professor  
 Dr. Remani S. Wesley Assoc. Professor  
 Sri. Sreekumar C Social Investigator

**Library and Information Service**

Sri. Chandrakumaran Nair M Sr. Librarian  
 Smt. Sreedevikutty C Typist  
 Ms. Deepika Lakshman Library Assistant  
 Sri. Vishnu V

**Director's Office**

Sri. Ramaswamy Iyer N Secretary & CA to Director  
 Smt. Savithriamma B Jr. Personal Asst.  
 Sri. Antony P Dispatcher

**Administrative Office**

Sri. Bhaskaran Nair KR Controller of Finance  
 Dr. Velayudhan Pillai Registrar  
 Sri. Vidyasagar PK. Administrative Officer  
 Sri. Rajendran R Finance Officer  
 Sri. Gnaneswaran G Accounts Officer  
 Sri. Sasikumar SV Asst. Purchase Officer  
 Smt. Lalitha B Asst. Administrative Officer  
 Smt. Beena N Asst. Accounts Officer  
 Sri. Sasikumar K Sr. Office Asst.  
 Smt. Shylaja C Office Asst.  
 Smt. Jumailathu Beevi KM  
 Smt. Remila CK  
 Smt. Snehalatha HB  
 Smt. Sheela Kumari R Cashier  
 Smt. Sudevi R Jr. Personal Asst.  
 Smt. Mallikadevi S  
 Smt. Anitha S Confidential Asst.  
 Smt. Usha V Data Entry Operator

Sri. Krishnan Nair P	Driver Gr. I
Sri. Sreekumaran Nair	"
Sri. Krishnadasan TP	Driver
Sri. Sasidharan Nair N	"
Sri. Devarajapanicker K	Sr. Helper
Sri. Abdul Rahiman PM	"
Sri. Anilkumar R	"
Sri. Rajayyan S	"
Sri. Balachandran KG	"
Sri. Senan	"
Sri. Balachandran L	"
Sri. Subair M	"
Sri. Seethalekshmy PS	Despatcher
Sri. Krishnan Kutty R	Helper
Smt. Amrithamma M	"
Sri. Krishnankutty A	"
Sri. Santhosh Kumar CS	"
Sri. Sivankutty K	"
Sri. Sulaiman S	"
Sri. Vijayakumar C	"
Sri. Thomas Rajasekharan R	"

**Engineering wing**

Sri. Raveendranathan Nair G	Chief Engineer Consultant
Sri. Rajan A	Maintenance Engineer (MECH)
Sri. Vijayakumar L	Maintenance Engineer (ELE.)
Smt. Suseela P	Jr. Personal Asst
Sri. Santhoshkumar A R	Electrical supervisor
Sri. Rajendran KR	"
Sri. Rajeevan B	"
Sri. Sasidharan N	"
Sri. Venugopalan Nair VR	Electrician
Sri. Giji PS	"
Sri. Abraham T. Chacko	"
Sri. Sivarajan L	Electronics Technician

**Security Services**

Sri. Kunjiraman Nair P.	Security Officer-cum-Vigilance Officer
Sri. Vijayan Nair S	Sergeant
Sri. Thankappan Nair K	Security guard

Sri. Sasikumaran Nair R	"
Sri. Achuthan Nair B	"
Sri. Sukumaran Nair G	"
Sri. Somasekharan Nair R	"
Sri. Rajeswaran KP	"
Sri. Sahadevan B	"
Sri. Sasikumaran Nair R	(Jr) "
Sri. Stephenson C	"
Sri. Prabhakaran Nair B	"

**ECDC Ernakulam**

Dr. Syamalakumari B	Cytopathologist
Smt. Radha C	Cytotechnologist Gr. I
Smt. Mercy Joseph	"
Sri. Jayalal KS	Cytotechnologist
Ms. Lathamalathy L	Cytotechnician
Smt. Gracy M	Staff Nurse
Sri. Dass G	Helper
Sri. John Evidus PP	"

**ECDC Palakkad**

Dr. Aananda Kamath R	Cytopathologist
Ms. Veena VS	Cytotechnologist
Ms. Lakshmi S	"
Sri. James Thomas	Cytotechnician
Smt. Nirmala KC	Staff nurse
Sri. Louis TC	Helper
Sri. Soman V	Helper

**Nursing Services**

Vijaya Sr.	CNO & Assoc. Professor
Aleyamma M Kunnappally	Head nurse
Aleykutty PM	"
Annamma TA	"
Geetha S	"
Geetha Kumari BS	"
Graceamma Joseph	"
Lizyamma Jacob	"
Mariamamma James	"
Sally Abraham	"
Saraswathy Amma E	"

Sheela Rodreguez	"
Modesty SD	"
Sreelekha T	Head nurse/Clinical Instructor
Thankamma ON	Head nurse
Vijayalekshmi Ammal M	"
Mini N.	Dietician
Abraham Shini	Staff nurse
Ajitha R	"
Ajitha PK	"
Ajitha.T.L	"
Aleyamma Chacko	"
Aleyamma Koshy	"
Aleyamma Mathew	"
Ambika TB	"
Ambily S Nair	"
Ancy Jacob	"
Ancyamma.C.J	"
Ani CN	"
Aniamma Joseph	"
Anilakumari S	"
Anitha Kumari.P.V	"
Anitha Paulin	"
Anitha T	"
Anithakumari Amma.T	"
Anju S	"
Ansamma Varghese	"
Anupama B	"
Beena Kumari N	"
Beena Rani S	"
Benny CA	"
Bensamma Varghese	"
Biji Kunjachan	"
Biji PR	"
Bindhu B	"
Bindhu M	"
Bindu Bhaskar	"
Bindu PD	"
Bindu SS	"
Bini A	"
Binu O	"

Chandrika.P	"
Christeen V	"
Cine VC	"
Daisy Chacko	"
Elizabeth Eapen	"
Elsamma Joseph	"
Geetha KK	"
Geetha Kumari D	"
Geetha N	"
Geetha PT	"
Girija C	"
Girija K	"
Gracy M	"
Helen BRC	"
Ilin William	"
Indira Devi.G	"
Indu VS	"
Indulekha KS	"
Jaya TS	"
Jayakumari.S.K	"
Jayasree S	"
Jeena Issac	"
Jerline Joseph	"
Jessamma John	"
Jessy PS	"
Jessy Thomas	"
Jigy SP	"
Jikky M	"
Jino VK	"
Jyothi G	"
Jyothi Lakshmy D	"
Kumari Sindu S	"
Kumari Thankam S	"
Laila KP	"
Laliamma VJ	"
Laly George	"
Laly Joseph	"
Latha MB	"
Leena M V	"
Lija Jose	"

Lissy Varkey " "  
 Lizy Thomas " "  
 Madhuri Devi L " "  
 Mangalam.S " "  
 Manu G Zachariah " "  
 Mareena Silas " "  
 Mariamma S " "  
 Mariamma Joseph " "  
 Mariamma S. " "  
 Mariamma Ulahannan " "  
 Mary Kutty Mathew " "  
 Maya KB " "  
 Mini RS " "  
 Minilal KM " "  
 Moly MT " "  
 Nazeera Beevi B " "  
 Nisha P Rajan " "  
 Nisha Vidyadhar R " "  
 Philomina Joseph " "  
 Prasanna Kumari S " "  
 Prasanna Peter " "  
 Preethalakshmy LS " "  
 Rajila Beegum " "  
 Rani Chandran.V " "  
 Rani VS " "  
 Reena A Thankaraj " "  
 Reetha EG " "  
 Rejani Kumari KK " "  
 Rekha R " "  
 Rethidevi.G.S " "  
 Sajeena Beegum A " "  
 Sajitha.S " "  
 Saji Mathew " "  
 Salini PB " "  
 Saly Kurian " "  
 Santhamma Baby " "  
 Saramma Baby " "  
 Saraswathi P " "  
 Saraswathy Amma P " "  
 Shamla Beevi A " "

Shanty Abraham " "  
 Shanty.P.S " "  
 Sharo Thampy " "  
 Sheeba P " "  
 Sheeba SV " "  
 Sheeja DB " "  
 Sheeja MS " "  
 Sheela Kumari PN " "  
 Sheena K Damodharan " "  
 Sheena Lal L " "  
 Shema C " "  
 Sherly Jacob " "  
 Sherly M " "  
 Shijikumari.N.G " "  
 Shynmol K " "  
 Shobha S " "  
 Sibi.K.R " "  
 Simmy Panikar S " "  
 Sindhu GS " "  
 Sindhu Mol KR " "  
 Sindhu Raghavan " "  
 Sindhu S " "  
 Sindhu.G " "  
 Sindhumol MG " "  
 Sindu.T.S " "  
 Sini Lioid " "  
 Sisy Das " "  
 Sivakumari PR " "  
 Sona PS " "  
 Sony B " "  
 Sony Joseph " "  
 Sophiya Lilly N " "  
 Sosamma Chacko " "  
 Sree Vidya A " "  
 Subha Abraham " "  
 Suchitra CS " "  
 Sujitha Kumari VS " "  
 Sukumaran " "  
 Suma PV " "  
 Suneethi MS " "

Sunitha C  
 Sunithakumari R  
 Susan Varghese  
 Susha Koshy  
 Swapna MA  
 Swapna.C.R  
 Syamala S  
 Syamkumar SS  
 Vasanthakumari VM  
 Vasumathy G  
 Vijaya AK

"  
 "  
 "  
 "  
 "  
 "  
 "  
 "  
 "  
 "  
 "

## 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, Kerala.  
 Indian Council of Medical Research, New Delhi.  
 World Health Organisation, Geneva, Switzerland.  
 World Health Organisation, New Delhi.  
 International Union Against Cancer (UICC) Geneva, Switzerland.  
 American Cancer Society, New York.  
 National Cancer Institute, Bethesda, Maryland, USA.  
 Christie Hospital & Holt Radium Institute, Manchester.  
 Bhabha Atomic Research Centre, Bombay.  
 Director General of Health Services, Government of India, New Delhi.  
 Director, Sree Chiira 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.

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  
Drugs Controller, Trivandrum  
Director, College of Pharmaceutical Sciences, Trivandrum  
Dr.P.P.Nair, Johns Hopkins University, USA  
International Agency for Research on Cancer (IARC), Lyon, France  
Commonwealth Scholarship Commission, London  
Kerala Transport Development Finance Corporation Limited.  
Sir Rattan Tata Trust, Bombay.  
Dr. S.R. Uttarwar, Director, Software Technology Park, Trivandrum.  
Institute for Cancer Research, Sutton, UK.  
University of Leeds, UK, Kay Kendall Leukaemia Research Fund, UK.  
Prof. J. Peto, Institute of Cancer Research, Sutton, UK.  
Dr. T Sugahara, Japanese Research Foundation

# **REGIONAL CANCER CENTRE**

## **THIRUVANANTHAPURAM**

### **ACCOUNTS**

#### **1998-99**

**REGIONAL CANCER CENTRE  
(REG. No.  
BALANCE SHEET FOR THE**

PREVIOUS YEAR RS. PS	SCHEDULE	LIABILITIES	CURRENT YEAR RS. PS.
299,549,045.89	I	CAPITAL FUND	331,760,932.89
1,690,383.90	II	SPECIFIC FUNDS	1,917,510.90
27,127,239.40		UNUTILIZED GRANTS	21,023,196.00
1,203,229.00		STAFF WELFARE FUND	1,571,229.85
909,163.05	III	RAD. THERAPY RESEARCH FUND	3,828,896.50
33,160,810.10		CCL FUND	34,191,839.10
4,000,505.05	IV	ADV. RECEIVED FOR RESEARCH PROJECT	4,310,513.01
26,039,967.53	V	SECURED LOANS	16,839,529.20
		CURRENT LIABILITIES AND PROVISIONS	
8,683,533.93	VI	CURRENT LIABILITIES - OTHERS	15,837,486.24
	VII	CREDITORS FOR GOODS SUPPLIED	8,724,152.35
11,066,238.85			
105,485,771.53	IX	PROVISION FOR DEPRECIATION	123,258,605.53
<b>518,915,888.23</b>	<b>TOTAL</b>		<b>563,261,991.67</b>

Place: Trivandrum,  
Dated:

DIRECTOR  
DR. M. KRISHNAN NAIR

**SOCIETY, TRIVANDRUM  
567/81)  
YEAR ENDED 31.03.1999**

PREVIOUS YEAR RS. PS	SCHEDULE	ASSETS	CURRENT YEAR RS. PS
283,038,114.91		FIXED ASSETS	294,174,250.36
9,700,345.06	IX	CAPITAL WORK-IN-PROGRESS	10,465,470.06
33,002,145.00	X	INVESTMENTS	34,017,267.00
		CURRENT ASSETS AND LOANS AND ADVANCES	
3,445,605.00	XI	CLOSING STOCK	2,814,714.97
1,151,570.00		INTEREST ON DEPOSITS	1,515,225.00
3,194,829.70	XII	ADVANCES TO PROJECTS	3,222,015.70
11,690,438.72	XIII	ADVANCES - OTHERS	8,060,718.97
	XIV	INVESTIGATION FEES RECEIVABLE	6,733,610.00
361,959.00		SECURITY DEPOSITS	362,059.00
17,271,780.94	XV	BALANCE WITH BANKS	6,474,465.84
86,702.46	XVI	CASH IN HAND	68,138.81
4,500,000.00		GRANT IN TRANSIT	8,165,000.00
151,472,397.44		INCOME AND EXPEND. A/C	187,189,055.96
<b>518,915,888.23</b>	<b>TOTAL</b>		<b>563,261,991.67</b>

Notes forming part of accounts

For M/s SEKHAR & JAYANTHI  
CHARTERED ACCOUNTANTS

GNANA SEKHAR S  
PARTNER



**REGIONAL CANCER CENTRE  
(REG. NO  
INCOME AND EXPENDITURE ACCOUNT**

PREVIOUS YEAR RS. P5	LIABILITIES	CURRENT YEAR RS. P5.
6,011,128.00	Opening Stock	3,445,605.00
22,023,247.72	Purchases	26,969,879.05
34,917,650.72	Salaries & Allowances	41,291,623.61
199,906.75	Uniform and Liversies -	314,436.50
170,478.10	Rent, Rates & Taxes	329,582.00
591,592.36	Postage, Telephone & Telegram	866,017.43
821,444.25	Travelling Expenses	622,852.00
527,025.99	Printing & Stationary	660,358.25
14,377.00	Advertisement	19,349.50
3,361,778.00	Electricity / Water charges	3,572,623.00
76,500.00	Remuneration to Auditors	80,000.00
6,186,618.25	Repairs and Maintenance	3,371,757.37
860,314.17	Service contract charges	1,137,041.00
3,739,069.00	Interest and Bank charges	2,738,442.07
78,084.00	Training Expenses	32,564.00
150,601.00	Conference / Seminar/ Workshop	170,298.00
101,446.00	Computer expenses	228,890.00
7,511.25	Books and periodicals	3,167.50
42,142.50	Landscaping and Gardening	49,185.40
745,010.80	Proportionate share to NTR	948,682.00
126,483.78	Miscellaneous expenses	72,460.25
-	Software	2,800.00
18,361,975.00	Depreciation	17,772,834.00
64,157.95	Cancer education programme	178,642.75
<b>99,179,242.59</b>	<b>Total</b>	<b>104,777,280.68</b>

Place: Trivandrum,  
Dated:

DIRECTOR  
DR. M. KRISHNAN NAIR

**SOCIETY, TRIVANDRUM  
(REG. NO  
667/81)  
FOR THE YEAR ENDED 31.03.1999**

PREVIOUS YEAR RS. P5	LIABILITIES	CURRENT YEAR RS. P5.
11,025,000.00	Grant-in-aid Govt. of Kerala	11,036,000.00
2,868,556.64	Grant-in-aid Govt. of India	1,135,625.00
2,000,000.00	Grant-National Saving Department	
29,324,785.00	Investigation fees	38,111,793.00
3,664,492.00	Ward charges	
9,368,785.75	Sale of medicines	12,820,067.20
268,442.00	Interest income	674,092.00
2,833,120.00	Clinical service charges	1,386.00
113,828.00	Training fees	119,300.00
15,000.00	Income from projects	54,601.00
10,150.00	Donation	17,687.00
95,688.50	Miscellaneous Income	147,312.00
3,445,605.00	Closing stock	2,814,714.97
34,145,789.70	Excess of expenditure over income	37,845,802.51
<b>99,179,242.59</b>		<b>104,777,280.68</b>

Notes forming part of accounts

For M/s SEKHAR & JAYANTHI  
CHARTERED ACCOUNTANTS

GNANA SEKHAR S  
PARTNER

**REGIONAL CANCER CENTRE  
(REG. NO  
CANCER CARE  
INCOME AND EXPENDITURE ACCOUNT**

PREVIOUS YEAR		LIABILITIES	CURRENT YEAR
RS.	PS.		RS. PS.
70,000.00		Salaries & Allowances	75,000.00
69,483.50		Advt. And Publicity	47,050.00
34,132.00		Printing & Stationary	2,550.00
45,000.00		Postage/Telephone/Telegram	50,000.00
21,824.25		Full Charges	62,677.58
20,729.00		Maintenance	8,165.00
12,489.00		Spare parts	8,465.00
33,56,261.75		Reimbursement to patients	13,42,859.00
9,482.00		Miscellaneous Expenses	10,860.00
90,471.00		Commn. to Federal Bank	13,205.00
		Insurance	9,916.00
6,32,203.96		Excess of Inc. over expenditure	21,29,143.99
<b>43,62,106.46</b>		<b>Total</b>	<b>37,57,891.58</b>

Place: Trivandrum,  
Dated:

DIRECTOR  
DR. M. KRISHNAN NAIR

**SOCIETY, TRIVANDRUM  
567/81)  
LIFE FOR SCHEME  
FOR THE YEAR ENDED 31.03.1999**

PREVIOUS YEAR		LIABILITIES	CURRENT YEAR
RS.	PS.		RS. PS.
43,62,106.46		Interest on F.D. and Investment	37,57,891.58
<b>43,62,106.46</b>		<b>Total</b>	<b>37,57,891.58</b>

For M/s SEKHAR & JAYANTHI  
CHARTERED ACCOUNTANTS

GNANA SEKHAR S  
PARTNER

REGIONAL CANCER CENTRE  
(REGD. NO.

SCHEDULE OF FIXED

Item	Cost on 1.4.98	Additions	Gross Block Deduction	Cost on 31.3.99
	Rs. Ps	Rs. Ps	Rs. Ps	Rs. Ps
BUILDINGS. OLD	880,110.25			880,110.25
BUILDINGS.	27,739,808.71	557,251.35		28,297,058.06
BUILDINGS - RT	17,458,885.70	80,815.00	425,000.00	17,094,500.70
BUILDING PHASE II	70,185,565.99			70,185,565.99
BOUNDARY WALL	127,118.83			127,118.83
WATER SUPPLY AND DRAINAGE	1,830,987.43	13,729.00		1,944,716.43
FURNITURE AND FITTINGS	7,578,121.43	183,185.60		7,771,308.43
OFFICE EQUIPMENT	1,037,174.43	12,782.00		1,049,956.43
HOSPITAL AND LAB EQUIPMENTS	68,804,614.07	8,998,839.60		77,803,453.67
ELECTRICAL INSTALLATION	34,947,118.90	969,168.00		35,916,286.90
FIRE DEFECTION	3,841,120.00			3,841,120.00
AIR CONDITIONING	15,451,502.35	287,602.00		15,739,104.35
COMPUTER HARDWARE & SOFTWARE	2,428,981.00	77,190.00		2,506,171.00
GAS AND CYLINDER	6,397,860.15	31,649.50		6,429,509.65
VEHICLES	379,329.60			379,329.60
LIBRARY BOOKS AND JOURNALS	6,384,007.27	155,185.00		6,539,192.27
LIFT AND ELEVATOR	5,825,810.00	87,430.00		5,913,240.00
ASSETS (DONATIONS)	337,812.00			337,812.00
TELEPHONE EQUIPMENTS	2,728,681.00	116,529.00		2,845,210.00
<b>TOTAL</b>	<b>293,038,114.81</b>	<b>11,651,135.45</b>	<b>425,000.00</b>	<b>294,174,250.36</b>

SOCIETY, TRIVANDRUM  
567/81)

ASSETS AS ON 31.03.1999

UPTO 31.3.98	ADDITIONS	TOTAL UPTO 31.3.99	AS ON 31.3.99	NET BLOCK AS ON 31.3.98
Rs. Ps.	Rs. Ps	Rs. Ps	Rs. Ps	Rs. Ps
396,628.95	23,174.60	419,802.95	440,307.30	463,481.30
8,559,278.84	836,880.00	10,496,167.64	17,800,940.42	18,180,528.07
3,781,231.89	666,663.00	4,427,894.69	12,666,606.01	13,697,654.01
7,720,592.00	3,573,249.00	11,293,841.00	67,891,724.99	71,464,973.99
51,007.88	3,806.00	54,813.88	72,304.75	76,110.75
1,110,904.83	125,072.00	1,235,976.83	708,739.80	820,082.80
2,815,993.38	485,531.00	3,311,524.38	4,459,782.07	4,782,128.07
802,959.56	127,047.00	930,006.56	719,829.87	834,214.87
43,319,185.08	5,172,820.00	48,491,793.08	29,311,580.81	25,485,348.01
14,546,334.65	3,205,493.00	17,751,827.65	18,184,467.26	20,400,782.26
1,381,542.10	368,837.00	1,750,479.10	2,080,640.90	2,459,577.90
9,138,264.40	990,126.00	10,128,390.40	5,810,713.95	6,313,237.95
2,017,333.80	195,535.00	2,212,868.80	293,302.20	411,847.20
2,295,043.65	619,248.00	2,914,291.65	3,509,026.00	4,086,616.50
325,785.56	10,707.00	336,502.56	42,827.04	53,534.04
2,292,662.25	488,980.00	2,779,642.25	2,759,550.02	3,081,345.02
2,835,589.35	491,848.00	3,127,237.35	2,788,002.85	3,190,220.65
185,374.30	21,338.00	210,710.30	120,901.70	142,237.70
1,120,059.70	238,773.00	1,378,842.70	1,466,377.30	1,608,621.30
<b>105,485,771.53</b>	<b>17,772,834.00</b>	<b>123,258,605.53</b>	<b>170,915,844.83</b>	<b>177,652,342.38</b>

### AUDITORS' REPORT

We have examined the attached Balance Sheet of the REGIONAL CANCER CENTRE SOCIETY, Regn. No.567/81, Thiruvananthapuram as at 31st March, 1999 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 explanation 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 410.36 lakhs received from Government of Kerala between Capital and Revenue at Rs. 300.00 lakhs and Rs 110.36 lakhs respectively 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 10,225/- has been shown as Term Deposit Suspense Account as referred to in Note No.2 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, 1999, 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, 1999.

for M/s. SEKHAR AND JAYANTHI  
Chartered Accountants

Place: Thiruvananthapuram.  
Date: 17.11.1999

Sd/-  
S. GNANA SEKHAR  
PARTNER

SCHEDULE

**NOTES FORMING PART OF ACCOUNTS**

1. Out of the grant received from Government of Kerala during the Financial Year 1997-98 amounting to Rs. 410.36 lakhs, an amount of Rs. 300 lakhs have been transferred to Capital Fund representing Fixed Assets acquired or constructed during the year and the balance of Rs 110.36 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. 10,225/- 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 28.07.1988 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. The 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 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/- deposit works, carried out for RCC, has not been acknowledged as debt and hence not provided for in the accounts.
7. During 1995-96 the society had installed a solar water heating system for the Radio therapy and payward block of RCC at a cost of Rs. 4,25,000 and capitalised the amount as building cost. During the year an amount of Rs. 4,25,000 had been received as grant from ANERT, Govt. of Kerala for the Project. The grant is reduced from the cost of the asset and the depreciation of Rs.60,615 charged for earlier year has been taken to revenue and included in Miscellaneous Receipts.

8. Stationery is accounted on cash basis and no stock in hand is taken into account as on 31st March, 1999.
9. The balance in party accounts are subject to confirmation.
10. Previous year figures have been re-grouped wherever necessary.

Place: Thiruvananthapuram,  
Date : 17.11.1999

M/S. SEKHAR & JAYANTHI  
(Chartered Accountants)

Dr.M. KRISHNAN NAIR  
DIRECTOR

S.GNANA SEKHAR  
(Partner)

## SIGNIFICANT ACCOUNTING POLICIES

1. The Financial Statements are prepared on historic cost convention method.
2. Fixed Assets are accounted at cost; depreciation is provided on the rates as evaluated by the management. Full depreciation for the year, is provided in respect of additions.
3. Chemicals, medicines and consumables stores are valued at cost.
4. Grant from Governments are accounted, based on the sanction received.
5. Contributions in foreign currency are accounted on realisation basis.
6. Provident Fund is regularly contributed to the Employees Provident Fund and is deposited with Regional Employees Provident Fund Commissioner, Contributions towards gratuity is made through Group Gratuity Scheme of Life Insurance Corporation.

Place: Thiruvananthapuram,  
Date: 17.11.1999.

M/S. SEKHAR & JAYANTHI  
(Chartered Accountants)

DR.M. KRISHNAN NAIR  
(DIRECTOR)

S.GNANA SEKHAR  
(Partner)

## UTILISATION CERTIFICATE

Certified that the grant of Rs, 4,10,36,000/- (Rupees four crores ten lakhs thirty six thousand only) received during the financial year 1998-99 by the REGIONAL CANCER CENTRE SOCIETY, THIRUVANANTHAPURAM (Registration No. 567/81) from the Health and Family Welfare Department, Government of Kerala as per the Government orders:

			<i>Rs. in lakhs.</i>
G.O. (Rt)	1085/98	29.04.98	50.00
G.O. (Rt)	1581/98	27.06.98	50.00
G.O. (Rt)	2120/98	21.08.98	70.00
G.O. (Rt)	2749/98	30.10.98	50.00
G.O. (Rt)	3216/98	21.12.98	50.00
G.O. (Rt)	223/99	28.01.99	40.36
G.O. (Rt)	959/99	26.03.99	100.00
<b>Total</b>			<b>4,10,36</b>

have been utilised by the society during the Financial year 1998-99 for the purpose of overall development and maintenance of the institution and other working expenses, implementation of projects, construction of building, functioning of Early Cancer Detection Centre and National Tumour Registry.

for M/s. SEKHAR & JAYANTHI  
Chartered Accountants

Place: Thiruvananthapuram.  
Date: 17.11.1999.

S.GNANA SEKHAR  
(PARTNER)