DEPARTMENT OF EPIDEMIOLOGY AND BIOSTATISTICS

Dr. C. Ramesh, Prof. & Head

The Department of Epidemiology and Biostatistics of Kidwai Memorial Institute of Oncology which is a Regional Cancer Centre for Treatment and Research on Cancer in Bangalore (An autonomous Body under the Government of Karnataka includes both Population Based Cancer Registry of Bangalore (Since 1982) and Hospital Based Cancer Registry (since 1984) and are included under the network of National Cancer Registry Programme of India (ICMR) and thus has one of the oldest cancer registries in the country. Besides the Registry work, the faculty of the Department is involved in Teaching covering topics on Epidemiology and Biostatistics for various Super speciality, Post graduate medical courses and also Para medical courses such as Nursing and students of Allied Science courses offered by the Institute. The statistical consultation is offered to the students in the data analysis of their Dissertation/Doctoral thesis. The department also conducts few projects in collaboration with Scientific Organizations. The faculty of the department provides statistical support for various projects, Dissertations, paper publications of the staff of the Institute. The staff of the Registry is involved in training of Social Workers working in several cancer hospitals regarding the cancer registry operations. The department faculty consists of One Professor, One Associate Professor and One Assistant professor and the non teaching staff of the department includes Field supervisor, Statisticians and Assistant Social Scientists. The faculty of the department provides statistical support to projects in clinical trials and also in basic science conducted by different departments of the Institute. The faculties of the department are frequently invited as Resource Persons for Workshops/Training programmes on Epidemiology, Biostatistics and Research Methodology organized by several professional organizations.

Hospital Based Cancer Registry (*HBCR*):

Principal Investigator: Dr. M. Vijayakumar, Director

Co-Principal Investogator: Dr. C. Ramesh, Prof.& Head

Cancer Registration System at KMIO has been in existence since the inception of this Institute in June 1973. As a part of the National Cancer Registry Programme (ICMR) the HBCR is sending data in the pre-devised format on all cancer patients to the Technical wing of the NCRP (since 1084). The Hospital Based Cancer Registry of KMIO has been the main source of registration for the Population Based Cancer Registry. About 40% of the cases registered in PBCR are from KMIO. The HBCR records more than A total number of 17617 new cases have been registered during the year

2012 and 235465 follow-up visits have been recorded. In other words, about 56 new cases and about 770 follow-up patients visits KMIO daily for treatment. A total number of 15821 patients have been treated as inpatients during the year 2012. The Hospital has bed strength of 552.

Magnitude of Cancer at HBCR, KMIO, BANGALORE –1984 – 2012

YEAR	REGD.CASES	CANCER CASES	PERCENT
1984	7426	5281	71.1
1985	8890	6057	68.1
1986	9003	6384	70.9
1987	9442	6637	70.3
1988	10789	7149	66.3
1989	10546	7216	68.4
1990	10588	6969	65.8
1991	10099	7050	69.8
1992	10822	7355	68.0
1993	10292	7071	68.7
1994	10688	7008	65.6
1995	11072	7035	63.5
1996	10779	7247	67.2
1997	10638	6970	65.5
1998	10946	7062	64.5
1999	11885	7417	62.4
2000	12326	7026	57.4
2001	13501	7907	58.6
2002	14229	8141	57.2
2003	14994	8178	54.7
2004	14856	7788	52.4
2005	15239	8095	53.1
2006	15465	7987	51.7
2007	16131	8764	54.3
2008	16125	8549	53.0
2009	16600	9038	54.0
2010	17238	9306	54.0
2011	17669	9515*	54.0
2012	17617	9728*	54.0
Total	**365895**	**219930**	**60.1**

* Estimated Cancer Cases

HOSPITAL STATISTICS OF 2012:

New Registration	17617
Follow Up cases ((No.of Visits)	235465
Admissions	6271
Readmissions	9550
Discharges	11095
Deaths	547

Leading Cancer Sites: 2010

Males			**Females**		
Sites	**No.**	**%**	**Sites**	**No.**	**%**
Pharynx	535	13.1	Cervix	1293	26.1
Oral Cavity	510	12.5	Breast	834	16.9
Oesophagus	313	7.6	Oral	561	11.3
Leukaemia	311	7.6	Ovary	281	5.7
Lung	280	6.8	Oesophagus	246	5
Total	**1949**	**46.3**		**3215**	**62.99**

Tobacco Related Cancers (TRC):

TRC Sites	**Male**		**Female**		**Total**
	No.	**%**	**No.**	**%**	**No.**
	1933	**46.3**	**1007**	**31.6**	**2940**
Oral Cancers	**517**	26.7	541	53.7	1058
Pharynx	564	29.2	103	10.2	667
Esophagus	344	17.8	248	24.6	592
Larynx	176	9.1	17	1.7	193
Lung	277	14.3	86	8.5	363
Uri.Bladdar	55	2.8	12	1.2	67

Number (#) and Proportions of Childhood Cancers

Gender	**All age group**	**Childhood Cancer**	
	#	**#**	**%**
Males	4202	254	6.0
Females	5104	167	3.3
Total	**9306**	**421**	**4.5**

Population Based Cancer Registry (*PBCR*)

Principal Investigator: Dr. M. Vijayakumar, Director

Co-Principal Investogator: Dr. C. Ramesh, Prof & Head

The Population Based Cancer Registry at Kidwai Memorial Institute of Oncology (KMIO) was established during June 1981 with the main objective of assessing the magnitude and type of various cancers in Bangalore, and to provide a framework for controlling the impact of cancer in the community apart from carrying out research investigations on cancer aetiology through epidemiological studies. This registry was included under the network project of the National Cancer Registry Programme (NCRP) of Indian Council of Medical Research (ICMR) and the actual registration of cancer cases commenced from Ist January 1982.

The registry covers Bangalore Urban District which consists of Bruhat Bangalore Mahanagara Palike (BBMP) which consists of 198 wards and 38 death registration units; Bangalore Urban District has an area of 741km^2 with an estimated population of 7.5 million as of 2009.

All new cases of cancer diagnosed in a defined population during a specified period of time are considered as incident cases. Hence all new cases of cancer diagnosed in the defined area of Bangalore Urban District during the year 2009 (1st Jan to 31st Dec) formed the incident cases. A total number of 6643 cases (including DCOs) have been registered as incident cases during this period with 2961 males and 3682 females.

Since the Cancer Registration System is active, the registry staff visit various sources of registration namely, all Government Hospitals, Private Hospitals, Nursing Homes, Diagnostic Labs besides Base Institution(KMIO) and Death Registration Units in the defined area and actively pursue and collect information on cancer cases reported and interview the patients wherever possible.

At KMIO each and every patient registered will be interviewed at their first presentation to the hospital and collect socio-demographic details in the first stage. Later, the case records of these patients are obtained to the registry to extract information on clinical variables such as method of diagnosis, stage of the disease, site of cancer, treatment details, etc. (only for KMIO cases). The inclusion criteria for registration of cases is that patients who have lived in the defined areas of Bangalore Urban District for a minimum period of one year at the time of first diagnosis of cancer.

Cancer incidence is defined as the occurrence of new cancer cases in a defined population during a specified time period. Incidence reflects the number of primary tumors rather than the number of individuals with cancer. All malignant tumors including those where the pathologist may have merely suspected a malignant change are registered. Cases under code 'O' (benign) or '1' (uncertain

whether benign or malignant or borderline malignancy) or '2' (carcinoma in situ) are not included in our files. Cancer cases where the death certificate is the only source of information are however included.

Incident cases and Age Adjusted Rates (per 1,00,000 Population), by Sex: 1982-2013

Year	Incident cases			Percent increased	AAR/100000	
	Male	Females	Total		Male	Females
1982	973	1167	2140	-	90.7	117.5
1983	918	1087	2005	-6.3	83.5	105.8
1984	934	1093	2027	-5.3	81.8	105.9
1985	1030	1074	2104	-1.7	88.7	98.9
1986	1056	1186	2242	4.8	87.4	105.9
1987	1191	1351	2542	18.8	99.3	118.4
1988	1291	1437	2728	27.5	102.5	121
1989	1336	1435	2771	29.5	100.8	114.2
1990	1379	1640	3019	41.1	101.9	128.4
1991	1407	1692	3099	44.8	103	131.9
1992	1505	1661	3166	47.9	100.8	117.6
1993	1612	1858	3470	62.1	103.4	126.3
1994	1451	1679	3130	46.3	87.3	106.8
1995	1606	1794	3400	58.9	92.2	110.8
1996	1486	1730	3216	50.3	82.3	97.2
1997	1500	1717	3217	50.3	82.7	99.3
1998	1625	1868	3493	63.2	87	103.4
1999	1707	2011	3718	73.7	86.1	103.5
2000	1896	2199	4095	91.4	94.4	110.9
2001	1938	2261	4199	96.2	93.3	112.9
2002	2008	2359	4367	104.1	96.7	116.1
2003	2039	2445	4484	109.5	96.5	116.1
2004	2157	2735	4892	128.6	95.2	120.2
2005	2430	2827	5257	145.6	102	118.6
2006	2655	3282	5937	177.4	108.6	133.5
2007	2971	3665	6636	210.1	117.4	143
2008	3068	3717	6785	217.1	11830	132.2
2009	2961	3682	6643	210.3	109.6	134.4
2010*	3380	4131	7511	-	-	-
2011*	3557	4347	7904	-	-	-
2012*	3696	4517	8213	-	-	-

*Provisional Estimates

Number (#), Relative proportion (%) and Age Adjusted Incidence Rate (per 1,00,000 population) : Ten leading sites of cancer

Site	Male				Female		
	#	%	AAR	Site	#	%	AAR
Lung	267	9	10.6	Breast	1006	27.3	35.9
Stomach	230	7.8	8.6	Cervix Uteri	516	14	18.7
Prostate	202	6.8	8.6	Ovary	195	5.3	6.9
Oesophagus	187	6.3	7.2	Oesophagus	171	4.6	6.9
NHL	137	4.6	4.6	Mouth	168	4.6	6.6
Rectum	129	4.4	4.7	Corpus uteri	169	4.6	6.6
Tongue	125	4.2	4.5	Stomach	149	4	5.5
Mouth	113	3.8	4.1	Lung	117	3.2	4.6
Liver	113	3.8	4.6	NHL	89	2.4	3.2
Colon	106	3.6	3.9	Thyroid	82	2.2	2.5
Other Sites	1362	45.7		**Other Sites**	1028	27.8	
All Cancers	**2961**	**100**		**All Cancers**	**3682**	**100**	

Number (#) Proportion (%) of Cancers in Childhood to all Cancers

Gender	All Cancer	Childhood Cancer	
	#	#	%
Males	2961	88	3.0
Females	3682	71	1.9
Total	**6643**	**159**	**2.4**

Tobacco Related Cancer Incidence Rates (Crude Rates-CR and Age Adjusted Rates – AAR per 1,00,000 population) in Bangalore

Sites	Males				Females			
	#	%	CR	AAR	#	%	CR	AAR
Lip	3	0.3	0.1	0.1	2	0.4	0.1	0.1
Tongue	125	12.1	3.2	4.5	33	5.8	0.9	1.3
Mouth	113	10.9	2.9	4.1	169	29.8	4.8	6.5
Other oropharynx	27	2.6	0.7	1.1	3	0.5	0.1	0.1
Hypopharynx	105	10.1	2.7	4.1	17	3	0.5	0.6
Pharynx Uns	30	2.9	0.8	1.1	11	1.9	0.3	0.4
Oesophagus	187	18.1	4.8	7.2	171	30.1	4.8	6.9
Larynx	93	9	2.4	3.6	17	3	0.5	0.7
Lung	267	25.8	6.8	10.6	117	20.6	3.3	4.6
Bladder	86	8.3	2.2	3.6	**28**	**4.9**	0.8	1.1
All TRCs	**1036**	**35.0**	**26.5**	**40**	**568**	**15.4**	**16**	**22.3**

Facilities Available in the Department:

Department compiles Hospital Statistics on each and every patient registered at our Institute and prepares Reports annually pertaining to cancer patients. The data compiled are provided to various governmental and non governmental agencies.

Department of epidemiology and Biostatistics Faculty and Staff

SL.NO.	NAME	DESIGNATION
Faculties		
1	Dr.C.Ramesh	Prof. & Head
2	Sri. Vijay C R	Asst.Prof.
Staff of Hospital Based Cancer Registry		
3	Sri. D.J.Jayaram	Sr. Investigator
4	Sri. V.Bhadraiah	Asst. Social Scientist
5	Sri. R.Lingaraju	Asst. Social Scientist
6	Sri. M.K.M.Gowda	Asst. Social Scientist
7	Sri. B.J.Kumudini	Asst. Social Scientist
8	Sri. M.R.Balakrishnoji Rao	Field/ Medico Social Worker
9	Sri T. Venkatesh	Research Officer
10	Sri. K.Venkatesh	Statistical Asst.
11	Sri. A. Subramani	Coding Clerk
12	Sri. C.Kumar	Data Entry Operator
Staff of Population Based Cancer Registry		
1	Sri K.V. Krishna Reddy	Junior Biostatistician
2	Sri. B.R.Gopalkrishnappa	Field Supervisor
3	Sri N.M. Sreerama Reddy	Asst. Social Scientist
4	Sri Rajanna	Asst. Social Scientist
5	Sri T.C. Venugopal	Asst. Social Scientist
6	Sri Srinivasa	Asst. Social Scientist
7	Sri C.S. Dayananda	Asst. Social Scientist
8	Sri P. Manjunath	Asst. Social Scientist.
9	Smt. Shobha.H.N.	Second Division Asst.

Ongoing research Activities

1. KMIO has taken up the project on Patterns of Care and Survival Studies on Cancers of Breast, Cervix and Head & Neck funded by Indian Council of Medical Research through National Cancer Registry Programme
2. Barriers related to Screening, diagnosis and treatment of oral cancer in India
3. Risk factors for breast cancer in India: case-control study
4. Life-Long vegetarianism and risk of colorectal cancer in India: case-control study

PAPER PUBLICATIONS BY STAFF OF THE DEPARTMENT (2008 – 2013)

1. Acute toxoplasmosis in non stem cell transplant patients with haematological malignancies: a study from a Regional Cancer Institute in South India – Adurthi S, TP Sahoo, Kumar Chakka, B Radhika, L Appaji, PP Bapsy, **C Ramesh** and RS Jayshree, Hematol Oncol (2008), 26, 229-233

2. Evaluation of Radioprotective effects of Tinospora Cardifolia in patients on Radiotherapy for squamous cell carcinoma of the Head & Neck – A pilot study – Dr. Sunitha Amruthesh, Dr. Mubeen, Dr. K.P.R. Pramod, Dr. B.A. Venkatesh & **Dr. C. Ramesh,** Int. Journal of Contemporary Dentistry (2010), September, 1 (1)

3. Prevalence of high-risk human papilloma virus genotypes in Retinoblastoma- Bhuvaneswari Anand**, C Ramesh**, L Appaji, B S Arunakumari, A M Shenoy, Nanjunadappa, R S Jayashree, Rekha V Kumar, Br J Ophthalmol (2011), 95;1014-1018

4. P45 Invasive fungel infections in haematological malignancies at a regional cancer institute – Role of panfungal PCR – S Adurthi, T P Sahoo, M Shafiulla, B Radhika, L A Jacob, L Appaji, P P Bapsy, **C Ramesh,** R S Jayshree, EJC supplements (2011) Volume 9, issue 1, Page 18

5. Relationship between lymph node metastasis and Histopathological parameters in carcinoma cervix: A multivariate analysis – Pallavi VR, Devi KU, Mukherjee G, **Ramesh C,** Bafna UD, Journal of Obstetrics & Gynaecology (2012), Vol.32, No.1, 78-80

6. A review of global cancer burden: Trends, challenges, strategies and a role for surgeons- Are C, Rajaram S, Are M, Anderson BO, **ChaluvarayaSwamy R**, Vijayakumar M, Song T, Pandey M, Edney JA, Cazap EL. J Surg Oncol (2012) Aug (Epub ahead of print)

7. Aberrant promoter methylation of the RASSF 1A and APC genes in epithelial ovarian carcinoma development – Rahul Bhagat, Shilpa Chadaga, C.S. Premalatha, G. Ramesh, **C. Ramesh**, V.R. Pallavi, Lakshmi Krishnamoorthy. Cell Oncol (2012), 35:473-479

8. Trends in Oesophagus and Stomach cancer incidence in Bangalore, India – **BR Gopala Krishnappa, CR Vijay, C Ramesh,** PP Bapsy, MU Kumar, M Vijayakumar, SS Supe, The Gulf Journal of Oncology(2013), Issue 13