



TATA MEMORIAL CENTRE

A grant-in-Aid Institution Under
Department Of Atomic Energy. Govt. of India



ANNUAL REPORT 2013-14



Caring^{with} Quality

Caring with Quality



Deeply impressed by the greatness of conception, care and patience of Tata Memorial Hospital, Sir Roger Lumley, Governor of Bombay Residency, in his inaugural speech on the 28th February, 1941, said about cancer “You are attacking it on the three fronts of **Treatment, Education and Research**, all three of them essential and interdependent”. This mission statement has been fulfilled by Tata Memorial Centre, having adopted this as its motto and spearheaded this attack on cancer by providing the most specialized, state of the art technologies for the delivery of cancer care. The anchor that has paved the way towards excellence is the focus of the theme “Caring with Quality.”



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Tata Memorial Hospital

Centre for Cancer Epidemiology

**Advanced Centre for Treatment,
Research and Education in Cancer**



A N N U A L R E P O R T 2 0 1 3 - 1 4



Mission & Vision of the Tata Memorial Centre

Mission statement: “The Tata Memorial Centre mission is to provide comprehensive cancer care to one and all through our motto of excellence in service, education and research”.

Vision of the Tata Memorial Centre

“As the premier cancer centre in the country, we will provide leadership for guiding the national policy and strategy for cancer care by:

Promoting outstanding **service** through evidence based practice of oncology.

Emphasis on **research** which is affordable, innovative and relevant to the needs of the country.

Committed to impart **education** in cancer for students, trainees, professionals, employees and the public”.

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Message From Director - TMC

The preceding year wears the noteworthy imprint of widening the spectrum of cancer care in India.

Globally, an unwelcome causality of urbanization and development is an upsurge in incidence of life-threatening diseases like cancer. As India takes giant strides in the spheres of modernization and advancement, we are faced with the unfortunate reality of increasing cancer cases. Consistent efforts have been made by the Department of Atomic Energy through the expertise and experience of TMC to tame and combat this ominous opponent.

As a part of increasing awareness and promoting cancer treatment in India, a greater focus was given to region wise control of the disease. We are well aware of the fact that India comprises of varied socio-economic segments and only a small section of such reside in metropolitan cities or can utilize medical facilities available in them. It thus becomes a huge part of national healthcare responsibility to ensure effective and prompt delivery of healthcare across the nation instead of concentrating it in a handful of developed pockets. Cutting through boundaries of class and region, making cancer care accessible and affordable to one and all is the TMC's constant aim and endeavor to achieve these objectives.

To assess the quantum and nature of cancer with regards to location, registry units have been installed at Sangrur, Chandigarh and Vizag. We should gain considerable insights by the end of 2014.

Management of cancer in regions was planned in 2013-2014 as a 3 dimensional strategy plan. The first was to create a hub and spoke model. Second, was to establish a composite infrastructure and the third, to conjoin it with technique and technology for enabling excellent and effective operations.

Two prototypes, one in Punjab and the other in Andhra Pradesh have been developed along the lines of the hub-spoke model. In both the locations, land has been acquired and the projects are making headway.

At Vizag, based on a user mandate from clinicians and administrators of TMH a blueprint was formulated for the structure and development of the land. The compound wall has been constructed and over 4000 trees have been planted along the boundary wall. An expert architect Ms CRN Rao has been appointed, through a tendering process, to carry forward the construction of the buildings. According to estimates, the outpatient service should be functional by mid-2014 and the hospital should be fully operational by 2016 end-2017 beginning.

In Punjab, the venture had a twin agenda of creating a hub in Chandigarh and a spoke in Sangrur/ Mansa. The hub would essentially be an onco-specialilty hospital, whereas the spoke would be an auxiliary branch. While land has been allotted in Chandigarh, in Sangrur construction work has commenced on war footing. The unit which includes setting up of a day care center, radiotherapy bunkers and a minor procedure room should be in readiness for operation by end of 2014.

In order to converge and support the brick and mortar with human resources and technology, efforts have been advanced towards selection and training of medical professionals (doctors, nurses and technical staff) and the simultaneous procurement of technology and instrumentation. This is to ensure that there is no wastage of time once the civil work is completed and the unit can start functioning with immediacy. TMC has also extended support

to the Government of Punjab for procurement of drugs and instrumentation. This would ensure the maintenance and supply of quality care and treatment at reasonable cost made available to cancer patients even in remote places.

Besides Sangrur, Punjab govt. has commissioned three other auxiliary units in states of Bhatinda, Patiala and Amritsar. TMC has provided technical and operational assistance in all these projects.

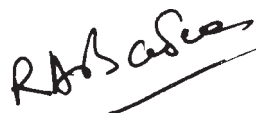
The efforts to promote uniform cancer care across India under the auspices of National Cancer Grid have gained momentum. The primary aim of the grid was to integrate cancer centers in the country in order to create a flat ground for information exchange, data collection, research, training and treatment. Twenty nine centers across India participated in two meetings held this year wherein management guidelines for common cancers were evolved with consensus from all participating centers. This endeavor has been keenly assisted by King's College London and National Cancer Institute, Washington DC, USA.

The path breaking results of cervical screening with visual inspection with acetic acid (VIA), showed a 30% reduction in death. If implemented across India it has a potential of saving over 22,000 lives annually. TMC has taken the baton of introducing it in many states and promoting its implementation by training the trainers. We have also documented a sharp fall in cervical cancer by awareness of adopting safeguard measures like improved hygiene, use of barrier contraception and circumcision.

This year, again in succession to the last, we had the proud privilege of one of our research papers being selected over 800 submissions for podium presentation at San Antonio Breast Cancer Conference. The research findings have been described as notable and bear significant clinical implications globally.

Multidisciplinary information exchange amongst related disciplines of natural, social and applied sciences has been a much desired enterprise. Such platforms for crosstalk are spring boards for creation and invention. We have been successful in getting Center for Development of Advanced Computing (CDAC), Mumbai Indian Institute of Technology, George Washington University and National Institute of Biomedical Genomics (NIBMG) Kalyani, West Bengal under one umbrella, to work on transcriptome, a project that has been successfully run through TMC (scientists from ACTREC and clinicians from TMH) and, expected to be completed by the end of 2014 or beginning of 2015.

In all, it has been a fructuous year for all efforts undertaken by TMC in the areas of national cancer care, education and research.



Dr R A Badwe





Message From Director - TMH

2013 has seen the institution expand its activities outside its traditional bastion of Mumbai with projects at Vizag, Chandigarh, Sangrur, in addition to the cancer registries that are being setup all over the country. This notwithstanding, there has been a lot of activity at Parel as well, towards our mission of providing the best cancer care to all who seek treatment at the hospital. We are constantly mindful of the fact that the existing infrastructure at the hospital is stretched given the patient load. The majority of our efforts and initiatives are therefore directed at being patient friendly.

Towards these goals we augmented our semiprivate bed strength where wait lists were over 6- 8 weeks by converting the old private wards in the main building to semi private accommodation. The private rooms are now exclusively housed in the new Homi Bhabha block. This helps in accommodating more patients while maintain the 60:40 general to private ratio.

Our smart card transactions have now been expanded to cover the inpatient services and the general category patients as well. The smart card ensures that all services at the hospital are now cashless, saving time patients spent in long queues. In addition, smart card kiosks are set up all over the outpatient areas to help patients to check balances, expenditures, deposits as well as status of their reports. Patients now also get SMS alerts of their smart card transactions.

Towards a green environment our paperless operations have been expanded with no printing of patient reports and pharmacy memos. Patients can however view and prints reports at any time from any location as these are available on the web with restricted access only to the patient and his / her treating clinician.

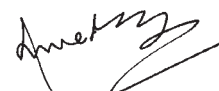
Infrastructure has been augmented with the installation of high value equipment that includes a digital mammography, augmentation of the minimal invasive surgical capabilities, surgical microscopes and anesthesia delivery systems.

There has been a major revamp of the hospital Institutional Review Board with space allocated for a dedicated trial pharmacy. In addition, our pediatric ward and outpatient clinic have had a major revamp through a generous philanthropic gesture, making it more child friendly for our young patients.

Our service to the Rajiv Gandhi Jeevan Arogya Yojana for patients below the poverty line initiated by Government of Maharashtra has been well appreciated, with the hospital recognized as the leader in the care of cancer patients under this scheme.

A financial management system with the help of the ECIL is also fully implemented putting in place greater accountability and ease in our accounting process.

These efforts are reflected in the fact that we have won the best Oncology hospital award by CNBC – ICICI Lombard for the 4th year in running. I place on record the contribution of each and every one of our staff who many a time, work well beyond the call of normal duty.



Dr. A. K. D'Cruz



Message from Director – Academics, TMC

Tata Memorial Centre is a stand – alone Post Graduate and Super Speciality institute as one of the constituent institute of Homi Bhabha National Institute (Deemed University) under Dept. of Atomic Energy, Govt. of India. The institute is recognized by Medical Council of India, New Delhi for conducting MD, DM/M.Ch programmes in oncology and other related subjects (e.g. Anesthesiology, Radiology, Radiotherapy, Nuclear Medicine, Microbiology, Immuno-Hematology & Blood Transfusion Medicine, Pathology, Palliative Medicine).

During 2013 the intake capacity of Post-Graduate students was increased by three-fold to provide specialized and trained human resource in Oncology and related subjects in the country. Under Homi Bhabha National Institute, a Two-year certified Fellowship programme in subsets of oncology and other subjects is conducted with 20 Fellowships per year.

There are Six-month training programs for sponsored candidate from State Government Medical colleges, Central Government Hospital, Public Sector Undertaking Hospitals and Regional Cancer Centres across the country. Specialized training is provided in the field of oncology and related subjects to doctors from South East Asia Region and South African Countries.

Post Doctoral Fellowship programs and Ph.D programs are conducted at Advanced Centre for Training, Research and Education in Cancer at Kharghar, Navi Mumbai in Life Sciences and Health Sciences.

Specialists have been trained for the comprehensive cancer centres in Punjab and Andhra Pradesh which are to be commissioned.

Prof. K. S. Sharma





TATA MEMORIAL CENTRE

Executive Summary

The Tata Memorial Centre (TMC) comprising Tata Memorial Hospital (TMH), the Advanced Centre for Treatment, Research and Education in Cancer (ACTREC), and Centre for Cancer Epidemiology (CCE) is a grant-in-aid institution under the administrative control of Dept. of Atomic Energy, Govt. of India. The mandate of TMC is Service, Research and Education. The TMC continued to provide the highest standard of patient care through its services and research, and capacity building by imparting knowledge through various educational activities.

Tata Memorial Hospital (TMH)

Our Services

The year saw an overall increase of 3.29% in new cases registered as compared to last year. During the year, 35,197 new cases were registered in addition to the 5739 cases registered in Preventive Oncology. About 20,305 referral cards were issued for investigations like mammography, pathology and second opinion. Total beds increased by 2% in 2013. (566 in 2012 to 579 in 2013).

The Disease Management Groups (DMG) formed for each cancer site, ensured evidence based diagnosis and treatment deciding holistically on the treatment modality viz., surgery, radiation and chemotherapy as combination or independent, for each individual patient. This also ensured better outcome and quality of life for the patient. There are 11 DMGs namely, Head and Neck, Breast, Gynaecology, Thoracic, Bone and Soft Tissue, Gastrointestinal, Uro Oncology, Neuro-oncology, Paediatric solid tumours, Adult Hematolymphoid, and Pediatric Hematolymphoid.

The Department of Surgical Oncology has 31 surgeons on the faculty, supported by registrars, specialty fellows and research fellows.

The Surgical oncology department has spearheaded the field of cancer surgery in the country for several decades. Surgical services are comprehensive for cancers at all sites and are offered both at TMH and ACTREC for optimum utilization of operating rooms. During the year 11,104 major surgeries were performed and 18,418 minor surgical procedures.

Specific unique strengths of the department include an increasing application of minimally invasive surgery, skull-base procedures, major vascular replacements, and limb salvage and microvascular surgery. With the addition of a paneled cardiothoracic surgeon, more complex resections involving vascular repairs and reconstructions were undertaken. Immediate postoperative outcomes are comparable with the best in the world. The WHO surgical safety checklist introduced last year has now been universally introduced in all major operating rooms as a patient safety initiative.

The department of Anaesthesiology anaesthetized 32,180 patients. The recovery room catered to 9,267 patients and a total of 2,592 patients were admitted to post surgical and medical ICUs; of which 1,002 patients were ventilated and total of 2,975 patients were treated in the Pain Clinic. In 2013, the anesthesia services were expanded to cover four additional major operating rooms in TMH. Two additional operating rooms were scheduled on Saturdays. The department introduced hemodialysis machine in the ICU at TMH, which has facilities for intermittent hemodialysis (for hemodynamically stable patients) and Slow Low Efficiency Dialysis (SLED), for unstable patients. Since the introduction of this facility, critically ill patients at TMH are able to access renal replacement therapy rapidly and in-house.

The Radiation Oncology Department offers state of the art treatment to the patients. In the year 2013, 5562 patients underwent radical or palliative radiotherapy treatment at TMH.

The current facilities offer modern sophisticated, state-of-the-art treatments like 3-D conformal radiotherapy (**3-D CRT**), intensity modulated radiotherapy & radiosurgery (**IMRT & IMRS**), stereotactic radiotherapy/ radiosurgery and image guided radiation therapy (**IGRT**) apart from conventional radiotherapy. Intra-cranial stereotactic radiotherapy and radiosurgery are delivered using the "**Brain-Lab**" system comprising of micro-multileaf collimator (**mMLC**) and a dedicated planning system. The radiotherapy facilities at ACTREC are also used for complex treatments like **Total Body Irradiation (TBI) for Bone Marrow Transplant**

(BMT). Total Body Irradiation for BMT is being done using the Bhabhatron II Cobalt 60 Unit.

Brachytherapy forms an integral part of many treatment protocols in the Department. Various brachytherapy procedures are judiciously practiced in the department using both remote and manual after-loading systems for a wide range of clinical situations. Brachytherapy techniques have now evolved from the conventional 2D X-ray based to 3D CT / MRI Image Based Brachytherapy Planning. This is especially used for brachytherapy for gynecological, genitourinary, head and neck, breast cancers, soft tissue sarcomas & pediatric malignancies.

In-patient care of patients on radiation therapy is facilitated in the special Radiation Oncology ward. There are 38 dedicated beds for radiotherapy.

The medical oncology services for the planning and delivery of chemotherapy is achieved with a team of 21 specialists supported by registrars, fellows and observers. The respective disease management groups plan the treatment protocols depending on the site of the disease. Chemotherapy is delivered through day care and in-patient services.

The department of Nuclear Medicine aims to provide comprehensive nuclear oncology services. The new Time of Flight PET scanners are operational from January 2013 after comprehensive regulatory review. The department of Nuclear medicine and Molecular Imaging conducted 11,211 PET/CT and 5,191 SPECT/CT. With the addition of the second PET/CT scanner, the number of scans has doubled bringing down the waiting list for PET scans from 3 weeks to 2 days.

A total of 1,30,297 Radiological investigations, were conducted showing huge volume rise over the previous year.

The physical and psychological support plays an important role in the total rehabilitation of patients. The Occupational therapy services are provided to both in-patients and out-patients. 13,018 patients received Occupational Therapy services. The Speech Therapy Dept. rehabilitated 2,016 patients. Physiotherapy Department is committed to restoring patients to their highest level of function and catered to 8,070 patients. A total of 2,511 patients were seen by the Psychiatry Service. A total of 4,213 patients were seen in Stoma Clinic and comprehensive care was given to all types of patients with ostomy, fistulas, pressure sores, non-healing wounds,

drain management and incontinence. Stoma Care Services catered to 4,213 patients. The dental services cater to the large number of head and neck cancers requiring dental care and implants. The gastrointestinal services are an integral part of the Gastrointestinal DMG performing specialized procedures like endoscopies and ERCP's as well as taking care of the nutritional requirements of patients.

The Transfusion Medicine Department collected 21,735 units of blood and platelets and 56,106 components were prepared. It organized more than 80 blood collection camps.

The department of Pathology provides histopathology services for accurate diagnosis of cancers spanning from a rapid diagnosis with frozen section and cytology to molecular diagnosis. During the year, 24,51,673 Pathological investigations were performed and 23,920 Cyto Pathological investigations.

Post-operative support is complemented by other laboratory services like biochemistry, emergency laboratory. Infectious complications are assisted with an accurate diagnosis by the department of Microbiology which performed 1,53,049 microbiological tests.

The departments of general medicine and chest medicine provide the requisite support for preoperative evaluation of patients as well as other medical complications.

End-of-life care and pain relief is achieved through the services of the department of Palliative Medicine and Psychiatry which also offers home visits. Palliative Medicine Dept. attended to 7,202 patients in the clinics.

The Department of Preventive Oncology is actively involved in hospital as well as community based services for prevention, control and early detection of cancer. The department has cancer screening clinics where men and women are examined for common cancers.

Oral cancer screening clinic screened 4047 patients in the year 2013. Whenever necessary, further work-up was performed. Besides 331 cases of frank oral cancers, 373 cases of leukoplakia and 35 cases of erythroplakia were detected.

Breast cancer screening clinic examined 7,202 female patients and detected seven breast cancers. All attendees at the screening clinic were educated about the role of Breast Self Examination.





Cervix Cancer screening clinic screened 7,202 female patients throughout the year.

Preventive Oncology conducted a special drive for screening of Army troops and their spouses. 384 army troops were screened for oral cancer and 253 spouses were screened for breast and cervical cancers.

The department conducts an outreach programme, the Tata Memorial Hospital Mobile Outreach Programme (TMHMOP) which is being implemented since April 2010 in the urban slums of Mankhurd. The TMHMOP project plan envisages one time health education programme and screening for three common cancers among women (namely; uterine cervix, breast and oral cavity). The project will cover total population of 1,35,000 which includes approximately 30-35 thousand eligible women. The population covered till date is 1,00,000. Total 70 precancers of cervix, 105 precancers of oral cavity, 4 malignancies of cervix, 6 malignancies of breast and 2 malignancies of oral cavity have been detected among 12,930 women screened out of total 15,758 eligible women covered till date. 13,069 women have attended the health education programme.

Total 1,149 tobacco users were counseled in Tobacco Cessation Clinic out of which 945 were males and 204 were female users. Tobacco cessation services were also provided in the community for specific target populations. A community based tobacco cessation programme was conducted for 358 tobacco using women in Mankhurd. Tobacco cessation services were provided for the 'Zari Workers' population in Shivaji Nagar. Approximately 170 Zari Workers have been covered under the programme so far. Tobacco cessation services have been extended for Army troops. Awareness on health hazards of tobacco were provided for approximately 300 Army troops at their workstations. Overall, 146 tobacco users were provided counseling services, during their screening.

All the above services are supported by specialist nurses who manage patients from the outpatient clinics through various procedures and examinations under the able guidance of the Nursing Superintendent.

The Evidence Based Management (EBM) conference

The EBM meeting for 2013 was focused on Thoracic & Foregut Cancers and Multiple Myeloma. The meeting was a huge success with 400 participants as delegates. Two EBM

books were released during this conference. These EBM books cover all the information on evidence based management practices related to the sites of discussion in the conference.

The Hospital Day Oration

The Hospital Day Oration on "Personalized Medicine in Clinical Oncology; True or False Promise" was delivered by Prof. Michael Brada, Professor of Clinical Oncology (Emeritus), The Institute of Cancer Research, U.K., Honorary Consultant in Clinical Oncology, University College London Hospitals, Consultant in Clinical Oncology, Leaders in Oncology Care (LOC), London, U.K. on 2nd March, 2013.

Clinical Research

Along with Dept. of Atomic Energy–Clinical Trial Centre (DAE-CTC) unit, the clinical research secretariat (CRS) has been promoting research through support for clinical trials, propagating the practice of evidence based medicine and education and training of researchers and trial coordinators.

A landmark trial in metastatic breast cancer, which has been supported by DAE CTC funds, was presented in the international breast cancer conference. Several path breaking clinical trials in various spheres of oncology have been supported by the CRS/DAE-CTC. This support has been in the form of infrastructural support, trained manpower, study design, statistical assistance, data management and analyses, data monitoring etc. In addition to continuing support for the existing trials, CRS supported 15 new clinical trials through DAE-CTC fund. CRS has provided statistical assistance for 90 new studies. Software assistance was provided for 5 projects. Twenty seven studies were supported this year for informed consent translation.

An important objective of CRS/ DAE-CTC has been to propagate and promote the practice of evidence based medicine especially in cancer. With this goal, the Evidence Based Management meetings were started about a decade ago and are held annually.

The CRS/ DAE-CTC aims to train researchers on the conduct of clinical trials in a scientific manner and with proper ethical guidelines. Two courses are conducted every year on "Clinical Research Methodology Course" and "Good Clinical Practice Workshop".

Clinical Research Methodology Course focuses on various aspects of the design, conduct and reporting of clinical trials. Topics covered range from the formulation of a research question, proper study design, conduct of research, and analysis of data obtained, proper interpretation and publication of results. This year 214 participants have been trained for conducting clinical trials with this course.

Good Clinical Practice Workshop is another annual event which emphasizes on Principles of GCP, Informed Consent process, Investigator Responsibilities and Monitoring and Adverse Event Reporting. In 2013, we had 316 participants who were trained in GCP and received GCP certification in 2 GCP training workshops.

Academic Activities

The TMC provides an academic environment that addresses the needs of students seeking academic pursuits in oncology, helps to build capacity by imparting knowledge through various educational activities.

Prof. K.S. Sharma, Director (Academics) is the In-Charge of all educational activities at TMC. Tata Memorial Centre is affiliated to Homi Bhabha National Institute (HBNI) Mumbai, a Deemed University, for Post Graduate training in oncology and other broad specialities. Recently, the President of India has granted the status of "Grant-in-Aid Institution" to Homi Bhabha National Institute under the Department of Atomic Energy.

The academic section conducts postgraduate courses in the superspecialities of Surgical oncology, Plastic Surgery, Gynaecological Oncology, Head and Neck Oncology, Paediatric Medical Oncology, Radiation oncology, Gastroenterology and Critical Care. The MD program is conducted in Anaesthesiology, Radiology, Pathology, Transfusion Medicine, Microbiology, and Nuclear Medicine.

Doctoral programs in basic sciences like Epidemiology and Medical Physics are also conducted.

Several short term courses are offered in the areas of radiotherapy technology, medical imaging technology, Masters in Nursing, Infection Control, Palliative care, cytotechnology and other laboratory technologies.

The institute offers training to large numbers of observers and fellowships each year.

Awards

Tata Memorial Hospital received the ICICI LOMBARD & CNBC – TV 18 India Health Care Award 2013 for Best Single Specialty Hospital Oncology.

Tata Memorial Hospital was awarded Financial Inclusion and Payment System (FIPS) Certificate of Excellence for the Project Implementation of Smart Card for Cashless Transactions and Paperless Operations.

Tata Memorial Centre was awarded the 'Rajbhasha Shield' among aided Institutes for the year 2012-13 by Dept of Atomic Energy in the 15th All India Rajbhasha Sammelan of DAE held at Institute of Mathematical Sciences, Chennai as an honour for effective implementation of the policies of Official Language and the exemplary work done in the field of promoting Hindi.

ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER (ACTREC)

ACTREC is a comprehensive cancer centre with the mandate to provide treatment to patients enrolled in the conduct of clinical trials and to develop indigenous technology with a 94 bedded hospital for treating cancer patients through its radiation, medical and surgical oncology programs. The Cancer Research Institute focuses on basic and applied research encompassing normal, tumour and stem cell biology, cell signalling and molecular interactions, immunology, genetics, genomics, proteomics and structural biology.

During the year 2013, there were a total of 204 on-going projects at ACTREC. A sum of Rs.5.71 crores was received from governmental agencies such as DBT, DST, ICMR, LTMT, etc., to meet the expenditure on 37 on-going projects. In addition, 21 new extramurally funded projects received funding of Rs.5.93 crores. ACTREC accrued 101 indexed research publications.

The Clinical Research Centre registered a total of 4,070 new patients and 3,967 new admissions. The radiation therapy program saw 1,021 new referrals this year. In September 2013, a Digital Subtraction Angiography (DSA - Cathlab) facility donated by a philanthropic trust was commissioned for image guided interventional radiology. The Neurosurgery service has pioneered the use intraoperative image-guided surgery techniques. The Bone Marrow Transplant Division performed 78 transplants including





45 autologous and 33 allogeneic and nine haploidentical transplants. The 17 bedded Leukemia/Lymphoma Ward catered to nearly 760 in-patients.

Research in the Clinical Pharmacology Unit focused on the optimization of treatment protocols. A dedicated phase 1 clinical trial unit has been commissioned.

The Translational Research Lab examined the role of DNA/ chromatin fragments in oncogenic transformation.

The Centre implemented the Rajiv Gandhi Jeevandayee Arogya Yojana, covering several districts of Maharashtra including Raigad, Mumbai and suburbs.

The Cancer Research Institute (CRI) is structured into 24 Principal Investigator-led laboratories and several research support facilities. The research programs focus on cancers at the chromosomal, DNA, RNA and protein level. Efforts in oral cancer focus on identification of genomic alterations at the level of copy number across the genome. The molecular basis of oral and cervical cancer was examined including analysis of the prevalence of Human Papilloma Virus. Global expression profiling of cervical cancers using microarray technology and genomics of cervical cancer using Next Generation sequencing technology were studied to understand its pathogenesis. Genome wide expression studies were carried out and in medulloblastoma, a malignant brain tumor commonly seen in children, and Next Gen exome sequencing of WNT subgroup medulloblastomas and oligodendrogliomas was performed. Elucidation of the functions of keratin, vimentin and their associated proteins in epithelial homeostasis and cancer was attempted, and their use as biomarkers was validated in oral and breast cancers. Screening of myeloid cells from chronic myeloid leukemia - chronic phase by two dimensional gel electrophoresis - mass spectrometry was carried out in a bid to identify novel/ additional therapeutic targets. Normal and tumour immunology continued to be a major research focus and involved the examination of the intricate interactions between gd T cells and various regulatory cells, receptors and immune processes in a bid to understand the immune scenario and reasons for immune dysfunction in breast, oral, lung, nasopharyngeal, gall bladder cancer and leukemia.

Cellular pathways that regulate neoplastic progression, were examined. The role of histone alteration(s) in cancer and DNA damage response, functional and structural role of histone variants in nucleosomal organization, transcriptional regulation and identification of differential binding proteins required for their localization within chromatin were examined. Genes involved in signaling pathways that control self-renewal of normal and cancer stem cells were studied to understand the mechanisms that govern adult stem cell regulation and cancer. Early detection of molecular changes associated with the acquisition of cisplatin and paclitaxel resistance in ovarian cancer cells was evaluated. Under glycobiology, the mechanism by which metastasis associated surface expression of b1,6 branched N-oligosaccharides promotes invasion, and how O-GlcNAcylation on serine/ threonine residues of nuclear and cytoplasmic proteins modulates protein and cellular functions were studied. Compounds that intervene key steps involved in metastasis and angiogenesis were investigated. The mechanism of action of chemopreventive agents from curcumin, tea and grapes against chemical induced carcinogenesis were identified and delineated.

The structural, mechanistic and cell biological aspects of protein degradation by the self compartmentalized ubiquitous, ATP dependent regulatory protease called the proteasome is being studied. Dissection of the structure, function and specificity of the proapoptotic protease HtrA2/Omi which performs critical cellular functions and is associated with cancer is being attempted. A sensitive, *in vivo/ in situ* Raman optical spectroscopic method for routine non-invasive screening and online diagnosis is under development. As a part of the structural and functional characterization of cancer associated proteins, the functional domains of BRCA1 and 2 have been cloned and purified, and the transactivation domain and BRCT domain have been crystallized as native domains; complex MERIT-40 protein has also been purified and functionally characterized.

The Academic Programs of the Centre include a Doctoral program in the Life Sciences. There were 99 graduate students registered for the Ph.D. degree and 243 graduate students/ staff visited the Centre to receive specialized training in research methodologies.

TATA MEMORIAL CENTRE

Chairman: **Dr. R. K. Sinha,**
Chairman, AEC & Secretary to Govt. of India,
Dept. of Atomic Energy.

Members: **Dr. C.B.S. Venkataramana,**
Additional Secretary, DAE, Mumbai.

Mr. V. R. Sadasivam,
Jt. Secretary (F), DAE, Mumbai.

Dr. N. K. Ganguly,
Former Director General (ICMR) and
Distinguished Biotechnology Fellow & Advisor,
Translation Health Science & Technology Institute,
National Institute of Immunology, New Delhi.

Dr. V. K. Iya,
Former Director, Isotope Group, BARC.

Shri. Praveen P. Kadle,
Managing Director & CEO,
Tata Capital Limited, Mumbai.

Mr. S. J. Phansalkar,
Sr. Programme Officer,
Sir Dorabji Tata Trust, Bombay House, Mumbai.

Mrs. R. F. Savaksha,
Secretary & Chief Accountant,
Sir Dorabji Tata Trust, Bombay House, Mumbai.

Dr. Ravindra D. Bapat,
Chairman, Haffkine Bio-Pharmaceutical Corpn. Ltd., Mumbai.

Member Ex-Officio: **Dr. R. A. Badwe,** Director, TMC

Permanent Invitees: **Dr. A. K. D'Cruz,** Director, TMH

Dr. K. S. Sharma, Director (Academics), TMC

Dr. S.V. Chiplunkar, Director, ACTREC

Dr. D. Raghunadharao, Director,
Homi Bhabha Cancer Hospital &
Research Centre, Vishakapattanam.

Secretary: **Dr. Venkata V.P.R.P.,** CAO, TMC



AWARDS

- ▶ Tata Memorial Hospital was awarded Financial Inclusion and Payment System (FIPS) Certificate of Excellence for the Project Implementation of Smart Card for Cashless Transactions and Paperless Operations.



Tata Memorial Centre was awarded the 'Rajbhasha Shield' among aided Institutes for the year 2012-13 by Dept. of Atomic Energy in the 15th All India Rajbhasha Sammelan of DAE held at institute of Mathematical Sciences, Chennai on 16/01/2014 as an honour for effective implementation of the policies of Official Language and the exemplary work done in the field of promoting Hindi.

The 2013 EBM Conference focused on “Thoracic and Foregut Cancers and Multiple Myeloma” held during 1 -3 March 2013.

The Thoracic and Foregut Cancers module aimed to address some of the important aspects in the management of lung and foregut cancers, in the context of our country. The programme covered all aspects of management including epidemiology, screening, treatment and palliation. The program also introduced a separate session on molecular markers to emphasize the advancements in molecular pathology.

The Multiple Myeloma sessions were held on 1st March and 2nd March 2013.. The scientific program was structured to discuss current standard of care, controversial issues and future research areas in the management of myeloma. The programme highlights were optimum 1st line management, role of stem cell transplant, management of complications, relapsed disease and newer therapies.

The Hospital Day Oration was delivered by Prof. Michael Brada on “Personalised Medicine In Clinical Oncology; True Or False Promise” on 2nd March 2013.

Dr Michael Brada, Professor of Clinical Oncology (Emeritus), The Institute of Cancer Research, U.K and consultant to University



College London Hospitals UK, is an eminent scientist and committed humanitarian who has contributed significantly to the literature with his research work on brain and thoracic tumors. Prof. Brada has spent some 15 years improving care for brain tumour patients and is now turning his interests to radiotherapy research for sufferers of non small-cell lung cancer. As an international leader in neuro-oncology and in radiotherapy he authored or coauthored more than 250 peer-reviewed articles, editorials, and book chapters .

This year two EBM books were published - Guidelines for Thoracic and Foregut Cancers (Part A) and Guidelines for Multiple Myeloma (Part B). These are available free of cost on the TMC website.



Augmentation in the year 2013-2014



Molecular Pathology Lab inaugurated by Chief Minister of State of Maharashtra, Shri Prithviraj Chavan, April 23, 2013



The Mobile Screening Van under Chest inaugurated by Dr A K D'Cruz, Director TMH, January 19, 2013



Full field Digital Mammography with Tomosynthesis Department of Radiodiagnosis



Hybrid Digital Subtraction Angiography Department of Radiodiagnosis.



Visitors to TMC



Foundation Stone Laying Ceremony of National Hadron Beam Facility & Cancer Centre for Women & Children



Honorable Chief Minister of Punjab
Shri Parkash Singh Badal



Pediatric ward Inauguration by Amitabh
Bachchan

Visiting faculty:

Dr Amit Bahl, (Clinical Oncologist), Dr Chris French (Medical Physicist) and Mr Henri, (Dosimetrist) from Bristol, UK.

Dr. Johannes Schweizer, Vice President, Arbor Vita Corporation USA

Dr. Sharad Ghamande, Associate Director, Gynaecological Oncology, Georgia Medical Centre, USA

Other visitors:

Ms. Manisha Koirala

Executives of Glaxo Smithkline Pharmaceutical Ltd.

Social Initiative Group of Larsen and Toubro, Mumbai

Students:

The Institute of Electrical & Electronics Engineers, Inc. Thadomal Shahani Engineering College, Mumbai

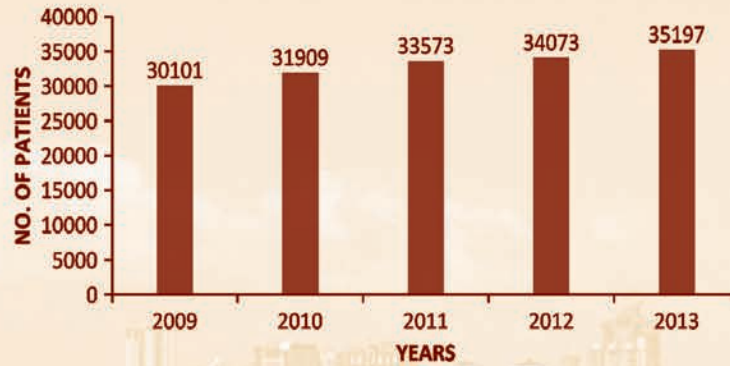
Padmabhushan Vasantdada Patil Pratishthan's Manohar Phalke Polytechnic, Mumbai

S. P. Jain Institute of Management and Research

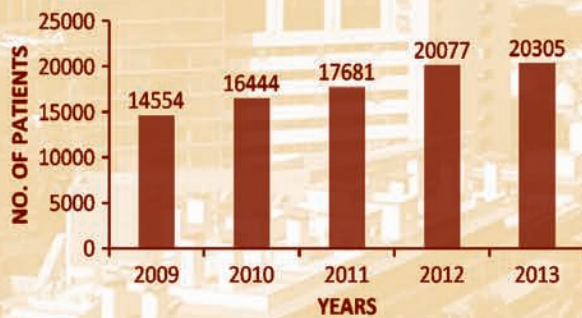
Maharshi Dayanand College of Arts, Science & Commerce

TRENDS

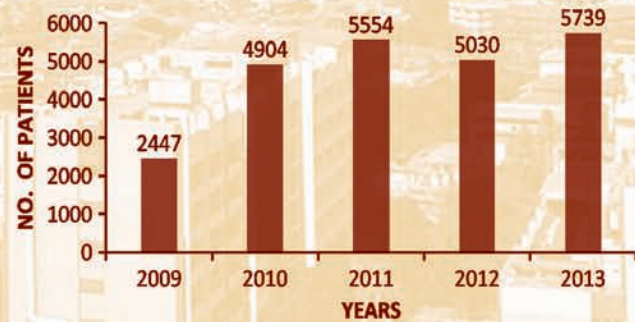
CASE FILE REGISTRATIONS



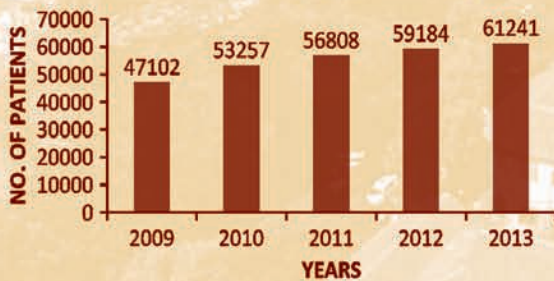
REFERRAL FOR INVESTIGATIONS



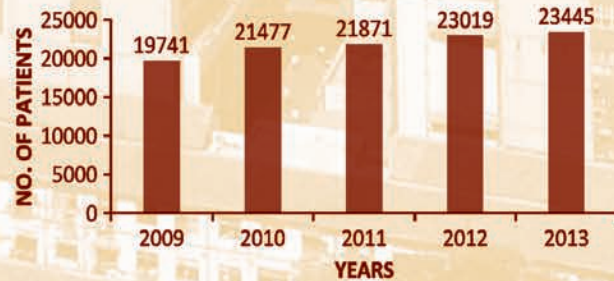
PREVENTIVE ONCOLOGY



TOTAL REGISTRATION



NO OF ADMISSION



The data is for the period January - December.



Performance Statistics

| | 2012 | 2013 |
|---|-----------|------------------|
| Total Registrations | 59,184 | 61,241 |
| Patient Chart Files | 34,073 | 35,197 |
| General Category | 20,628 | 22,035 |
| Private Category | 13,445 | 13,162 |
| Referrals for investigations | 20,077 | 20,305 |
| Preventive Oncology | 5,030 | 5,739 |
| Inpatient Admissions | 23,019 | 23,445 |
| Average Length of stay (Days) | 6.5 | 7 |
| Bed Occupancy % | 92 | 89 |
| Radio-Diagnosis | | |
| Conventional Radiography | 55,832 | 56,326 |
| C.T. Scan | 15,571 | 20,668 |
| Mammography | 9,369 | 9,957 |
| M.R.I Scan | 3,894 | 3,994 |
| Ultrasonography / Colour Doppler | 35,127 | 36,274 |
| Interventional Radiology | 2,019 | 3,078 |
| Nuclear Medicine & Molecular Imaging | | |
| PET-CT | 7,948 | 11,211 |
| SPECT-CT | 3,800 | 5,191 |
| CT Scan | 250 | 220 |
| General Medicine | | |
| Consultations | 11,060 | 14,770 |
| HIV Consultations | 231 | 240 |
| ECG | 29,685 | 29,780 |
| Echo cardiography | 6,500 | 7,446 |
| Pulmonary Function Tests | 3,165 | 3,459 |
| Pathology | | |
| Surgical Pathology | 49,378 | 50,991 |
| Fine Needle Aspiration Cytology | 7,814 | 8,107 |
| Frozen Section | 8,739 | 10,245 |
| Immunohistochemistry | 27,181 | 22,499 |
| Haematopathology | 4,42,593 | 4,60,936 |
| Biochemistry | 17,45,353 | 17,84,375 |

| | 2012 | 2013 |
|--|---------------|---------------|
| Molecular Pathology | 886 | 1,137 |
| Tumor Marker | 78,918 | 94,913 |
| Electrophoresis | 18,794 | 18,470 |
| Cytopathology | 23,450 | 23,920 |
| Microbiology | | |
| Bacteriology | 26,907 | 30,212 |
| Mycobacteriology | 8,941 | 8,804 |
| Mycology | 4,770 | 6,047 |
| Serology | 92,242 | 99,578 |
| Clinical Microbiology | 6,526 | 8,408 |
| Molecular Microbiology | 2068 | 4695 |
| Transfusion Medicine | | |
| Blood and Platelet Units Collected | 20,325 | 21,735 |
| Blood Grouping | 49,081 | 52,341 |
| Cross Matching | 29,930 | 32,191 |
| Blood Components | 52,726 | 56,106 |
| Platelet Pheresis | 2,687 | 3,150 |
| Specialised Procedures | 21,798 | 24,078 |
| Cytogenetic | | |
| Patients referred for Cytogenetic Study | 5,500 | 6,500 |
| Surgical Oncology | | |
| Major OT Procedures | 9,623 | 11,104 |
| Minor OT Procedures | 18,432 | 18,418 |
| Radiation Oncology | | |
| External Beam Therapy | 5,517 | 5,700 |
| Brachytherapy (Number of applications) | 2,292 | 2,589 |
| Treatment Planning / Beam Modification | 12,540 | 13,221 |
| Special Radiotherapy Techniques (IGRT, IMRT, SRS, SRT, TSET etc.) | 2,968 | 3,112 |
| Medical Oncology | | |
| Bone Marrow Transplants at ACTREC | 57 | 78 |
| Day Care-Pediatric | 6,177 | 11,480 |
| Day Care-Adult | 64,235 | 70,081 |
| Digestive Diseases and Clinical Nutrition | | |
| Outpatient Registration | 16,409 | 17,802 |
| Inpatient Admissions | 1,434 | 1,600 |
| Minor OT Procedures | 6,028 | 7,040 |
| Nutrition Clinic | 4,588 | 4,781 |



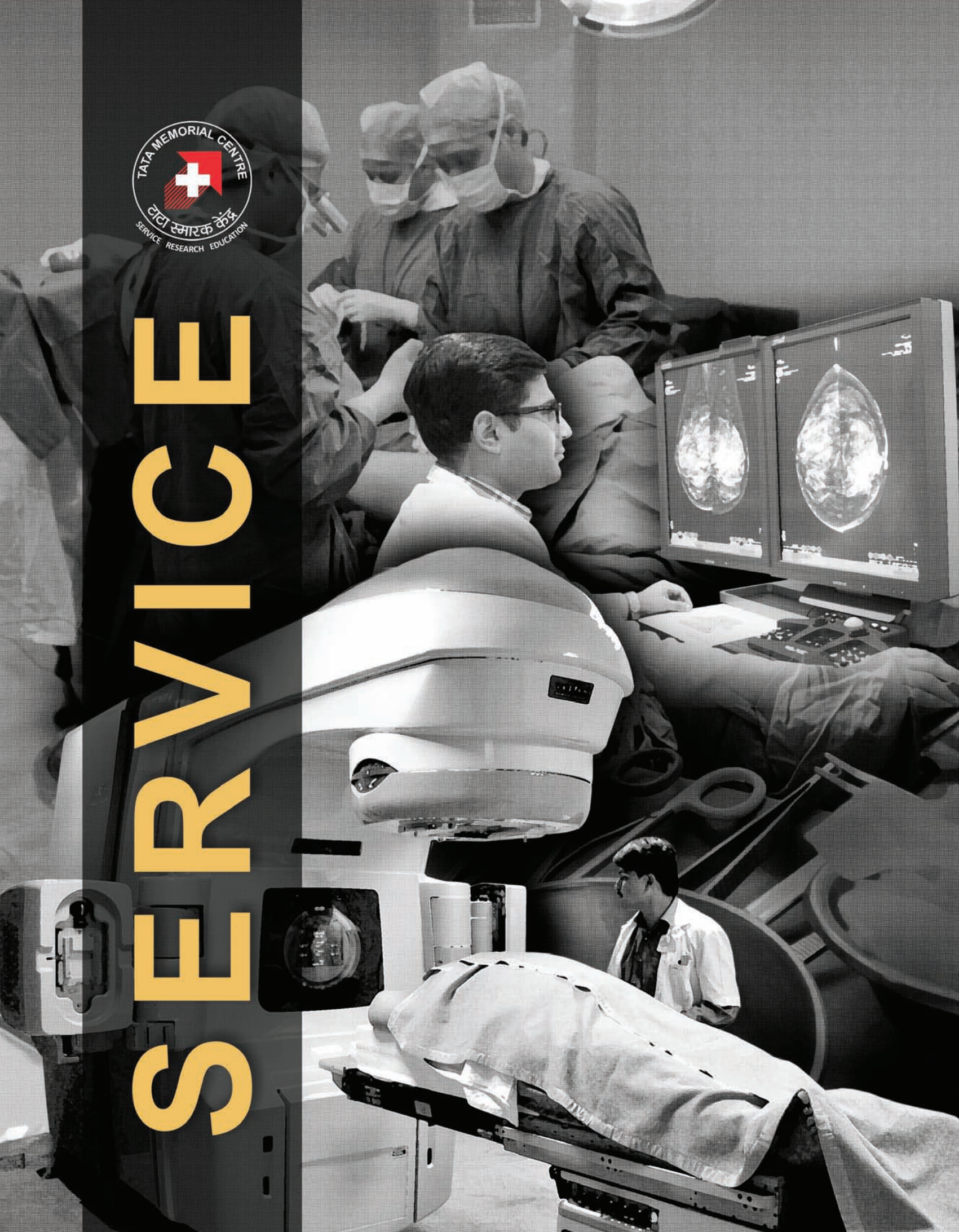


| | 2012 | 2013 |
|---|--------|----------|
| Anesthesiology, Critical Care & Pain | | |
| Patients given Anaesthesia | 28,106 | 32,180 |
| Patients in ICU | 1,993 | 2,592 |
| Patients in Recovery Wards | 6,158 | 9,267 |
| Patients on Ventilator | 595 | 1,002 |
| Patients seen in Pain Clinic | 1,917 | 2,975 |
| Tissue Bank (Allografts Produced) | 8,978 | 10,003 |
| Occupational Therapy | | |
| No. of Patients seen | 12,686 | 13,018 |
| Physiotherapy | | |
| No. of Patients seen | 7,210 | 8,070 |
| Psychiatry and Clinical Psychology | | |
| No. of Patients seen | 2,436 | 2,511 |
| Stoma Care | | |
| No. of Patient seen | 3,827 | 4,213 |
| Speech Therapy | | |
| No. of Patients rehabilitated | 2,365 | 2,016 |
| New Patients | 1,068 | 1,308 |
| Palliative Medicine | | |
| Patients seen | 6,615 | 7,202 |
| Home Care Visits | 1,936 | 1,715 |
| Dental | | |
| Patients seen | 5,543 | 6,306 |
| All Services | 11,427 | 11,121 |
| Prosthetic Services | 891 | 1,055 |
| Waste Management (Hydroclave) | | |
| Number of Loads Completed | 981 | 1,212 |
| Total Infectious Waste Treated (Kg) | 92,766 | 1,24,739 |
| Medical Social Work | | |
| Guidance | 19,850 | 23,500 |
| Counseling | 8,220 | 10,216 |

The data is for the period January - December.



SERVICES



The Adult Hemato-Lymphoid - DMG



Medical Oncology

Dr. Hari Menon
Dr. Navin Khattry
Dr. Manju Sengar
Dr. Bhausahab Bagal
Dr. Uma Dangi
Dr. Hasmukh Jain
Dr. Seema Gulia

Nuclear Medicine

Dr. V Rangarajan
Dr. Archi Agrawal

Medical Social Worker

Mrs. Sunita Jadhav
Mrs. Bhagyashree

Pathology

Dr. Tanuja Sheth
Dr. Sumeet Gujral
Dr. Subramanian P. G.
Dr. Sridhar Epari
Dr. Nilesh Patkar
Dr. Prashant Tembhare

Radiation Oncology

Dr. Sidharath Laskar
Dr. Nehal Khanna
Dr. Goda Jayant Sastri

Cytogenetics

Dr. Pratibha Kadam-Amare
Dr. Hemani Jain

Pharmacology

Dr. Vikram Gota

Psychiatry

Dr. Jayita K. Deodhar

Convener:
Dr. Hari Menon

Secretary:
Dr. Navin Khattry

The ADULT HEMATOLYMPHOID DISEASE MANAGEMENT GROUP (AHL-DMG) consists of members from the department radiology, radiotherapy, pathology, cytogenetics and molecular laboratory, pharmacology along with social worker system and other support staff.

Service

The AHL-DMG multidisciplinary group caters to the management of a variety of hematological malignancies in a comprehensive manner.

Unique aspects and strength of the DMG

- It is the largest group in the country catering exclusively to malignant hematology.
- Structured management of hematological malignancies that is both evidence based and comprehensive.
- Emphasis on adequate therapy and personalized therapy based on profiling of the patient at the clinical, cytogenetic and molecular level.
- Identifying eminently curable malignancies and fully supporting their treatment if required through various assistance programs within and outside the Institute.
- Rapid diagnosis and institution of therapy in life threatening situations

through a multidisciplinary coordinated approach.

- Laboratory and pathology unit that are established standardized and on par with the other centers of excellence worldwide that helps diagnosis and management of even rare forms of hematological malignancies appropriately.
- Outcomes comparable to other high volume centers across the world.
- The DMG has established a support group to address patient concerns and help them get through their therapy. The group is ever growing with a large number of survivors doing voluntary work for the group.

All new patients registered with the DMG are screened through the Joint clinics (JC) after evaluation and staging workup. In the JC the best treatment options available to the patients are discussed and planned. Another important aspect of the JC has been to make the patient familiar with the medical social worker and also taking decision for adopting (fully / partially) those patients with curable malignancy who are unable to start or sustain therapy due to financial / psychosocial challenges.

Patients for whom intensive therapy matters and would make a difference in their outcomes have been identified and helped

through the Medical Social Workers in the form of financial and logistic support to stay in Mumbai and facilitate treatment. The Lymphoma leukemia Foundation assists patients with financial support.

The DMG conducts outpatient services at TMH and at ACTREC (BMT-Bone Marrow Transplant & Chemotherapy). The OPDs for Leukemia, Lymphomas and Myeloma are run separately in separate slots for new cases and follow-up. The new patient with CML are followed up at TMH and once they have achieved a stable response subsequent follow up is done at ACTREC. Besides the routine BMT OPD at ACTREC a separate BMT OPD at TMH is operational by the BMT team to counsel potential patient for transplant.

Quality improvement measure

The DMG maintains ongoing quality improvement measures with continuous audits of protocols, chemotherapy regimens, their morbidity and mortality, treatment compliance in long-term therapy and implementation of modifications derived thereby.

Key Benchmarks

Volume Indicators

The number of registrations in the AHL DMG has progressively increased. There were 3467 patients registered, nearly 6% more than the previous year. There were 51624 patients seen in the outpatients on follow up in 2013. The lymphoma/myeloma clinic and the leukemia clinic registered 1200 and 357 patients respectively in 2013.

In the transplant unit, 33 patients underwent allogeneic stem cell transplant while 45 underwent autologous transplants. The transplant unit attended to 403 patients in the out patient clinics for counseling and transplant and had 3,914 patients in the follow-up clinics.

The DMG saw 5,000 patients in the follow-up clinics.

Outcome indicators

Outcomes measured as 200-Day Mortality - January – December 2013 (actual numbers) is described as per disease in the table-1.

Research

The AHL DMG conduct several investigator initiated studies (total-18) and sponsored trials (total-22). Many of the outcomes for these trials have been published in international and national journal and conferences (national and international). The unit has consistently presented a total of 15 papers at the American Society of Hematology Congress (ASH) in the past 3 years. The DMG contributed to 8 publications in peer reviewed journal and had 10 presentations at various international conferences. The unit hosted the Evidence Based conference on Myeloma in 2013, which was well attended at the national level.

Education

The AHL DMG has evolved a dedicated teaching program to assist in the training of the DM students, MD pathology students, fellows and PhD students. There are currently 14 DM candidates per year into the department of Medical oncology who are rotated in the AHL DMG. Registrars are also encouraged to participate in research projects with consultants, which includes opportunities for clinical studies, and laboratory based projects. The hemato-oncology and molecular laboratories have consultants who are actively involved in the training of fellows and residents in pathology. There is also an active interaction with basic scientists at ACTREC to identify pathways for designing interventions in malignant hematology. The DMG members are invited as faculty to international and national meetings. They also participate in postgraduate training programs for doctorate courses.

Table-1

| Diagnosis | < 30 | >30 - < 200 | >200 | Total |
|------------------------------|-----------|-------------|-----------|------------|
| Acute Lymphoblastic Leukemia | 32 | 22 | 06 | 60 |
| Acute Myeloid Leukemia | 18 | 23 | 10 | 51 |
| Acute Promyelocytic Leukemia | 05 | 01 | 00 | 06 |
| Chronic Lymphocytic Lymphoma | 01 | 02 | 04 | 07 |
| Chronic Myeloid Leukemia | 02 | 01 | 01 | 04 |
| Hodgkin's Lymphoma | 03 | 02 | 06 | 11 |
| Multiple Myeloma | 05 | 03 | 05 | 13 |
| Non Hodgkin's Lymphoma | 24 | 29 | 05 | 58 |
| Total | 90 | 83 | 37 | 210 |



Bone & Soft Tissue - DMG



Surgical Oncology:

Dr. Ajay Puri
Dr. Ashish Gulia

Radiation Oncology:

Dr. Siddhartha Laskar
Dr. Nehal Khanna

Medical Oncology:

Dr. Purna Kurkure
Dr. Jyoti Bajpai
Dr. Jaya Ghosh
Dr. Girish Chinnaswamy
Dr. Tushar Vora

Pathology:

Dr. Nirmala Jambhekar
Dr. Bharat Rekhi
Dr. Saral Desai

Radiodiagnosis:

Dr. S L Juvekar
Dr. Subhash Desai
Dr. Sunita Dhanda

Nuclear Medicine:

Dr. V. Rangarajan
Dr. Nilendu Purandare

Physiotherapy:

Dr. Ajeeta Sabnis
Dr. Sarika Mahajan

Occupational Therapy:

Dr. Rebeka Marri
Dr. Jagmohan Meena

Palliative Care:

Dr. Sunil Dhiliwal

Convener:

Dr. Siddhartha Laskar

Secretary:

Dr. Bharat Rekhi

The DMG endeavours to deliver comprehensive patient care in an effective and efficient manner, besides conducting research that is directed towards optimising treatment for malignancies related to bone & soft tissue. It has also been a focus of the DMG, but, also to have educational / training programs to develop trained manpower within & outside the country in the management of bone & soft tissue malignancies.

Service

To streamline its functioning, each sub-speciality ensures that all patients attending the clinics, are seen on all days of the week. The preliminary evaluation is completed the first day of the visit itself. This ensures early initialization of the treatment process.

A multidisciplinary joint clinic (MDJC) to decide on an integrated patient management plan is conducted once a week for all patient categories, which is attended by surgeons, pathologists, medical oncologists, radiation

oncologists, radiologists, and palliative care specialists. Inputs from all sub-specialties involved in patient care at one place, allows discussion on vital issues needed for optimisation of the management plan.

For betterment of patient care, self education and dealing with complex situations, there are the following clinics: A joint clinic-pathological meetings to discuss diagnostic dilemmas. This clinic has evolved over the years and forms a vital component in dealing with conflicting diagnosis and in difficult diagnostic scenarios.

- A joint clinic to discuss patient rehabilitation which is attended by rehabilitation specialists.
- A monthly meeting of the DMG that addresses issues related to academics, administration and patient care.

Efficient functioning of the DMG mandates self-appraisal and audits at regular intervals. The DMG has successfully completed an internal audit of patient care for the first quarter of 2013. This audit with clinical endpoints, reviewed various parameters of patient care within the DMG.

Factual Data & Key Cancer Benchmarks

Volume Indicators (Each subspecialty):

| Surgery | Radiation Oncology | Medical Oncology | Pathology | Radiology | Nuclear & Bio-Imaging |
|--------------------------|-------------------------|------------------|-----------|--|--|
| Major: 713 Minor: 655 | EBRT: 430 Brachy: 26 | 450 | 2625 | X-Rays: 2072 CT Scan: 928 MRI: 452 USG: 818 IR: 82 | PET-CT: 517 Nuclear Medicine: 425 |
| Total: 1368 | Total: 456 | | | | |

Complications & Mortality:

Radiotherapy (Average of all acute toxicities – RTOG scale):

| | Grade 0 | Grade I | Grade II | Grade III | Grade IV |
|---------|---------|---------|----------|-----------|----------|
| BST DMG | 25% | 40% | 30% | 5% | 0% |

5 Year survival rates

Two year Survival Rates: Based on data from TOSS trial

EWING'S SARCOMA:

Disease free survival: 68.4 %

Overall survival: 73.7 %

OSTEOSARCOMA:

Disease free survival: 37%

Overall survival: 47.3%

CHONDROSARCOMA:

Disease free survival: 70.8 %

Overall survival: 79.2 %

SOFT TISSUE SARCOMA:

Disease free survival: 69.0 %

Overall survival: 77.5 %

Original research that has improved clinical care:

TOSS Trial: Adequate cost effective follow-up protocol for bone and soft tissue sarcomas. This study evaluated the adequacy of post operation surveillance regimes in patients with extremely soft tissue sarcomas and the effect of frequent investigations on the overall survival. The hypothesis was that a less intensive follow-up protocol would not be inferior to the conventional follow-up protocol in terms of Overall Survival.

Audit Projects:

Topical Antibiotic Use & Impact On Surgical Site Infection

The addition of topical vancomycin prior to wound closure in patients operated for bone tumors does not decrease the incidence of

surgical site infection (SSI). A longer follow up may determine its efficacy in reducing the incidence of late infections.

Outcome of Definitive RT For Pelvic Ewing's Sarcoma

Definitive external beam radiation therapy using 3D-CRT or IMRT for patients with inoperable pelvic Ewing's Sarcoma resulted in satisfactory local control and functional outcome without significant treatment related toxicities.

Multimodality Treatment For Synovial Sarcomas (SS) Of The Extremities; Oncologic Outcomes:

On univariate analysis female gender, tumor size < 5 cm, type of surgery performed (limb sparing against amputation), free margins



and use of radiotherapy were factors found to be significantly associated with improved survival in patients with localized disease. There was no observed difference in survival according to the use of chemotherapy.

Research

Members of the DMG are also involved in both clinical & basic research activities. The large majority of research conducted within the DMG has been investigator initiated prospective and retrospective studies. The primary focus of most research have been aimed at looking at treatment outcomes in terms of disease control, survival, treatment related complications & functional outcomes.

From the surgical point of view the major thrust areas of research have been in the development & refinement of indigenous prosthesis for expanding the scope of limb salvage. Indigenisation has helped significantly reduce the cost to patients undergoing prosthetic surgeries. Studies are being undertaken to evaluate efficacy of non-surgical treatment methods for treatment of Aneurysmal Bone Cyst and Fibromatosis. There has also been a focus to evaluate the impact of nutritional status on incidence of surgical complications.

The Radiation Oncology studies have been focussed at trying to improve local controls for inoperable tumors using dose escalation strategies and the use of Image Guidance (IGRT) and conformal techniques for reduction of acute and late adverse effects of radiotherapy. The optimal use of Brachytherapy has been a major thrust area for radiation oncology. Studies have been conducted to compare brachytherapy with other conformal techniques of radiation therapy. An ongoing study for inoperable Osteosarcoma, Chondrosarcoma and Chordoma addresses the efficacy of escalated doses of external beam radiation therapy for these relatively radio-resistant malignancies and also proposes to dosimetrically compare conventional photon radiotherapy with proton beams. Another ongoing study is evaluating the impact of pre-operative radiotherapy for soft tissue sarcomas.

The focus within the department of Pathology has been to further refine sarcoma diagnosis with incorporation of molecular tests, especially in difficult cases and also to identify predictive markers in sarcomas.

The department of Medical Oncology has been involved in evolving newer strategies to optimize chemotherapy for osteosarcomas e.g. the use of antiangiogenic agents and the use of dose dense regimens. Efforts have been to evolve optimal sequencing strategies for chemotherapy and also to evaluate strategies for perioperative chemotherapy.

The departments of Diagnostic Radiology and Nuclear Imaging have ongoing studies evaluating the role of perfusion imaging to assess tumor necrosis and also evaluating the role of PET-CT scan as a tool for pre-treatment staging and treatment response assessment. Optimization and reduction of radiation exposure to patients undergoing CT scanning is also looked into.

Physical rehabilitation forms a very important component in the holistic management of patients treated for musculoskeletal malignancies. Appropriate post therapy rehabilitative strategies have a significant impact on the final functional outcome and facilitate recovery from neurological and musculoskeletal compromise.

The BST DMG is also involved in a multinational study "International Sarcoma Kindred Study" that is aimed at establishing a database of biospecimens, pedigree and epidemiological data to be used as a clinical and research resource.

Education:

Continuing training and education has been a major focus in the agenda of the DMG. Each subspecialty has been involved in CME's & human resource development programs related to various aspects of management of Bone & Soft Tissue tumors. The training programs involve both clinical & non-clinical members of the DMG. There have been visitors from within & outside the country at regular intervals visiting us on short & long term programs.

Clinical Trials:

| Total No. of Clinical Trials | | Completed Trials | | Ongoing Trials | | Overall Patients Accrued | |
|------------------------------|-----------|------------------|-----------|----------------|-----------|--------------------------|-----------|
| Inv. Initiated | Sponsored | Inv. Initiated | Sponsored | Inv. Initiated | Sponsored | Inv. Initiated | Sponsored |
| 12 | 01 | 03 | Nil | 09 | 01 | 1168 | 04 |

Surgical Oncology
 Dr. Vani Parmar
 Dr. Indraneel Mittra
 (Prof. Emeritus)
 Dr. Nita Nair
 Dr. Prabha Yadav
 Dr. Rajendra Badwe
 Dr. Rucha Kaushik
 Dr. Shalaka Joshi

Medical Oncology
 Dr. Bhawna Sirohi
 Dr. Jaya Ghosh
 Dr. Jyoti Bajpai
 Dr. Seema Gulia
 Dr. Sudeep Gupta

Statistician
 Ms. Rohini Hawaldar

Radiation Oncology
 Dr. Ashwini Budrukhar
 Dr. Rajiv Sarin
 Dr. Rakesh Jalali
 Dr. Shagun Misra
 Dr. T. Wadasadawala

Dept. of Pathology
 Dr. Asawari Patil
 Dr. Sangeeta Desai

Trial Co-ordinator
 Dr. Tanuja Shet
 Mr. Bipin Bandre
 Ms. Shabina Siddique
 Mr. Vaibhav J. Vanmali

Department of Radio-Diagnosis
 Dr. Meenakshi Thakur
 Dr. Seema Kembhavi
 Dr. Subhash Ramani

Dept. of Bio-Imaging
 Dr. Sneha Shah
 Dr. Venkatesh Rangarajan

Basic Scientist
 Dr. Abhijit De
 Dr. Narendra Joshi
 Dr. Pradyumna Mishra
 Dr. Ujjwala Warawdekar

Dept. of Physiotherapy
 Dr. Anuradha Daptardar



The Breast Disease Management Group (DMG), a multidisciplinary team has established itself as a closely knit working group. The DMG clinics have also been increased with streamlining of senior consultants in all specialties to offer early comprehensive treatment decisions to patients.

Service:

Treatment policy decisions that have been incorporated into standard practice are evidence based. The evidence-based guidelines are being updated, revised and improved upon, based on recent new evidence impacting on patient care.

Some unique strengths of the DMG are large number of Oncoplasty and primary reconstructive procedures for breast conservation, a patient support program called PRAYAS enabling financial support to high risk women to receive adjuvant chemotherapy; and targeted chemotherapy.

The DMG conducts critical self audits at regular intervals to ensure timeliness of delivery of patient care.

Key benchmarks

Volume indicators

The DMG is amongst the highest volume centres in the country, Volume indicators and Research: The working group registered 3857 (10% more than last year) women in the current year with equal numbers of private and general category patients. The number of major surgeries performed in 2013 was 1829 (compared to 1900 procedures in 2012), with 3179 minor procedures. There has been more teaching and training of individuals, additional advanced and multiple procedures such as associated oophorectomy, oncoplasty, reduction mammoplasty, partial and whole breast reconstructions and venous access port placement, etc. (66% increase compared to 2012 in additional procedures). Radiation therapy was offered to 1,340 (6% increase since 2012) and the Department of Medical Oncology administered systemic therapy to 2,963 women (compared to 3,315 in 2012 indicating a 10% decrease in absolute number of cases).

Convener:
 Dr. Vani Parmar

Secretary:
 Dr. Tanuja Shet

Outcome Indicators:

1. **30 day mortality and complication rates** – There was a minimal increase in mortality of 0.38% in 30-day mortality and 15% morbidity with seroma infection, wound dehiscence, resuturing etc.

2. **Audits conducted over the year** established our outcome indicators for different groups of patients as follows:

a) Patients presenting with locally advanced breast cancer and diagnosed with oligometastases have better outcome as compared to women presenting with multiple metastatic disease at first presentation, and their outcome is similar to women with locally advanced non-metastatic breast cancer.

b) A positive cut margin and outcome after breast conservation surgery. (LRFS)

The analysis showed that the local recurrences are higher in patients with post lumpectomy close margins. In the current treatment protocol patients with close excision margin are treated by Radiotherapy alone. The role of surgical re-excision of the margin in this subset needs evaluation for improving patient outcomes.

c) The role of pre axillary surgery chemotherapy (PACT) in women with breast cancer who present after excision biopsy of the primary tumour.

70.4% women who received PACT post excision of the primary tumour underwent breast conservation surgery. While 58.1% of those who did not receive PACT underwent BCT and 41.9% underwent MRM. A trend towards increased risk of recurrence was noted for younger age RR: 0.998 (95% CI .98-1.02), LN positivity RR 2.8 (95% CI 1.7-4.4) and larger tumour size RR 1.6 (95% CI 0.5-4.8) (P=NS). To evaluate the safety of PACT. The Kaplan Meier curve showed no difference in survival, thus suggesting no detrimental effect of NACT post lumpectomy.

d) Quadrant and outcome in early breast cancer: The results suggested that there was significant impact of tumor location and it was not an independent risk factor ($p=0.840$) in the overall study population.

e) Clinical Outcomes of Prospectively Treated 140 Women with Early Stage Breast Cancer using Accelerated Partial Breast Irradiation using 3 Dimensional CT Based Brachytherapy.

5-year DFS 92%.

5-year OAS 97%.

5-year local control rates: 97.5%.

Local recurrences: 4.

Same quadrant: 1.

Different quadrant: 3.

Research:

The breast DMG conducts several investigator-initiated and sponsored research studies. Some of the studies initiated earlier were published and presented in high impact journals and international conferences respectively.

Currently 15 investigator initiated and 5 sponsored trials are on going in the DMG, with special areas of interest for example: peri-operative interventions, strategies for triple negative breast cancer.

Results of 'M1 study' addressing 'Role of Surgery of the primary and axillary node dissection in metastatic breast cancer at presentation – A randomized trial' showed the median Overall Survival in patients receiving locoregional treatment (LRT) and No-LRT arms were 18.8 and 20.5 months and the corresponding 2-year OS were 40.8% and 43.3%, respectively. There was no significant difference in Overall Survival between LRT and No-LRT arms.

These studies have resulted in changes in the treatment guidelines.

Progress has been made on *translational and basic research* front with analysis of tumor tissue on RNA (and mRNA) sequencing being completed on the fresh tumor samples to assess effect of progesterone and to evaluate hypoxic modulation in the tumor to understand biology of cancer metastases and factors that might influence the same. The cell line studies have also made some

progress with early results suggesting specific alterations in some genes.

These studies are ongoing and also animal studies to understand the biology of metastatic breast cancer.

Education:

With increase in the numbers of students on training (MCh) and with addition of 6-month and 1-year specialist registrar posts, attempts are on to ensure that the individuals are adequately trained hands-on. Trainees from Punjab and other institutes, in addition to short-term Observers have been imparted appropriate training. Regular structured meetings ensure that the students are well exposed to the latest developments in cancer management and imbibe the right information. Specific audits and protocols have been assigned to the team members to ensure completeness of data and follow up.

Quality of life and rehabilitation: The group is continuing accrual in the randomized phase III study to evaluate the beneficial effects of

yogic exercises versus conventional arm exercises on cancer recurrence and quality of life domains.

A support group for patients meets regularly to address concerns and queries of breast cancer patients and their caregivers.

The postoperative counselling and group physiotherapy classes also spearheaded by several volunteers and support groups has gone a long way in easing and expediting the post operative recovery of breast cancer patients undergoing surgery.

Many DMG staff participated as faculty at national and international conferences and as examiners for academic degree courses in various universities. Members of the DMG also functioned as editors, members of editorial boards and peer reviewers for high-impact national and international medical journals. DMG staff contributed to 27 peer reviewed indexed publications in 2013 and played a major role in finalizing the ICMR practice guidelines for breast cancer management for India.



Gastrointestinal - DMG



Surgical Oncology
Dr. S. V. Shrikhande
Dr. M Goel
Dr. A Saklani
Dr. B Sirohi

Medical Oncology
Dr. P Patil
Dr. Hardik Shah
Dr. B Sirohi

**Digestive Disease
and Clinical Nutrition**
Dr. S Mehta

Pathology
Dr. M Ramadwar
Dr. M Menon
Dr. K Deodhar

Radiodiagnosis
Dr. S Arya
Dr. S Kulkarni
Dr. N Shetty
Dr. Ashwin P

Nuclear Medicine
Dr. V Rangarajan
Dr. N Purandare
Dr. Archi Agrawal

Radiation Oncology
Dr. S K Shrivastava
Dr. MA Muckaden
Dr. R Engineer
Dr. S Chopra

Anesthesiology
Dr. PN Jain

Epidemiology
Dr. R Dikshit

Convener:
Dr. S. V. Shrikhande

Secretary:
Dr. S. Mehta

The Gastro-Intestinal (GI) DMG forms the main stay in surgery at any institution; it deals not only with its GI malignancies, but also needs to manage those that invade or infiltrate its territory, especially the liver.

The DMG has expanded and includes subspecialties like endosonography, nutritional care, pain management, interventional radiology and epidemiology for comprehensive patient care. The DMG conducts clinics for nutrition, pain management and interventional radiology.

The DMG is divided into two working groups viz., Hepatobiliary and Colorectal. The increase in the operating rooms has helped to reduce the surgical waiting period.

Meetings for audits, mortality and morbidity, service issues and internal review are held weekly. Clinical trial meetings are held bi-monthly, to discuss the progress of ongoing studies and the inclusion of new ones.

Quarter-yearly meetings for GIST support group that include patients and care-providers are held over the weekend.

For improving patient services, incident reporting of sentinel and non-sentinel events have been implemented along with guidelines for management of gastric cancer.

The DMG has printed manuals for GI Oncosurgery and Medical Oncology.

The members are encouraged to present papers and posters at conferences and some senior faculty have authored books and contributed chapters in the field of surgery.

Service

The GI-DMG had a total registration of 5,974 (general 3,326 & 2,648 private) patients of which, 2,072 were treated and 1,185 operated upon (868 in TMH & 317 in ACTREC). The operated cases included 127 emergency operations (120 in TMH & 7 in ACTREC). 4,789 patients were managed medically and treated either with chemotherapy, palliation, or attended the clinic for a second opinion.

Volume indicators- number of patients treated at each subsite

| DMG | Subsite | No. of new patients |
|------------------|--------------------------------------|---------------------|
| Gastrointestinal | Stomach and GEJ | 395 |
| | Hepatocellular carcinoma | 101 |
| | Gall Bladder | 391 |
| | Cholangiocarcinomas | 51 |
| | Colorectal cancers | 692 |
| | Gastro-intestinal stromal tumors | 54 |
| | Pancreatic and Peri-ampullary tumors | 240 |
| | Neuro-endocrine tumors | 33 |
| | Others | 115 |
| | Total | 2072 |

As per this sub-site, the DMG performed 868 and 317 surgical procedures at TMH and ACTREC respectively. These included 132 pancreatic surgeries, 45 liver resections, 78 gall bladder surgeries, 114 gastrectomies, and 159 colonic surgeries, 20 retroperitoneal resections and 50 rectal surgeries at TMH, besides a few miscellaneous procedures. The DMG performed 250 colorectal surgeries, 28 gall bladder surgeries and 24 stomach surgeries at ACTREC.

Outcome indicators – mortality rates

Mortality in Elective Surgery: 7 /748 (0.9 %)

Mortality in Emergency Surgery: 6 /120 (5 %)

In Medical Oncology:

Overall Mortality June to Nov 2013: 07 /56 (12.5 %) Inpatients

Mortality in Elective chemotherapy (June to November 2013): 01 /53 (1.88%)

Trends in the Clinical Service – 2013

| Year | Reg. | Adm. | Surgery TMH | | | Surgery ACTREC | Mortality |
|------|------|------|-------------|-----------|-------|----------------|-----------|
| | | | Elective | Emergency | Total | | |
| 2012 | 5967 | 2210 | 608 | 179 | 787 | 158 | 12 |
| 2013 | 5974 | 1291 | 748 | 120 | 868 | 317 | 13 |

Diagnostic Endoscopy: Volume and Safety Indicators:

| Endoscopy Procedure | Total Number | Morbidity | Mortality |
|--|--------------|-----------|-----------|
| Diagnostic Upper GI endoscopy: (UGI, Transnasal and Side viewing endoscopy) | 3518 | 0.46 % | 0.08% |
| Diagnostic Lower GI endoscopy: (Colonoscopy and Sigmoidoscopy) | 1242 | | |
| Diagnostic EUS | 66 | | |
| ERCP | 169 | | |
| Total | 4995 | | |

Total Adverse Events: 27/4995: 0.54%

Morbidity: 23/4995: 0.46%

Mortality: 4/4995 – 0.08%





Therapeutic Endoscopy: Volume and success Indicators:

| Endoscopy Procedure | Volume | Success Rate |
|---|-------------|--------------|
| Enteral tube placements (nasogastric, nasojejunal, PEG) | 555 | 99.09 % |
| Dilatations | 431 | 99.76 % |
| ERCP | 136 | 96.32 % |
| Luminal Stenting (Esophageal, Enteral, Colonic) | 44 | 100 % |
| Others (Polypectomy, APC, FB removal) | 120 | 100 % |
| Total | 1286 | – |

Interventional Radiology:

A total of 1283 procedures were performed for GI DMG patients; the major risk involving ones with numbers are shown in the following table.

| | |
|-------------------------------|------------|
| Percutaneous biliary drainage | 229 |
| Radiofrequency ablation | 84 |
| TA Chemoembolization | 118 |
| TA Radioembolization | 16 |
| Total | 447 |

Research

| No. of clinical trials | | Completed trials | | Ongoing trials | | Overall patients accrued |
|------------------------|----------------|------------------------|----------------|------------------------|----------------|--------------------------|
| Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | |
| 5 | 2 | 1 | 0 | 4 | 2 | 946 |

Education

Various workshops have been conducted by the DMG that included live demonstration of Whipple's resection, liver resection, laparoscopic intersphincteric resection, right radical hemicolectomy etc.

Professors of the DMG are on the ICMR committee in various capacities to provide guidelines for the management of various gastrointestinal malignancies in the country.

Surgical Oncology

Dr. Amita Maheshwari
Dr. Rajendra Kerkar
Dr. Thumkur Shylasree

Radiation Oncology

Dr. Shyam K. Srivastava
Dr. Reena Engineer
Dr. Umesh Mahantshetty
Dr. Supriya Chopra

Medical Oncology

Dr. Sudeep Gupta
Dr. Jaya Ghosh
Dr. Jyoti Bajpai
Dr. Seema Gulia

Pathology

Dr. Bharat Rekhi
Dr. Kedar Deodhar
Dr. Santosh Menon

Microbiology

Dr. Rohini Kelkar

Cytology

Ms. Dulhan Ajit

Radiodiagnosis

Dr. Meenakshi Thakur
Dr. Nilesh Sable

Cancer Biology

Dr. Shubhada Chiplunkar
Dr. Tanuja Teni
Dr. Murali K. Chilakapati
Dr. Pritha Ray
Dr. Rita Mulherkar

Nuclear Medicine

Dr. Venkatesh Rangarajan
Dr. Sneha Shah

Preventive Oncology

Dr. Surendra Shastri
Dr. Gauravi Mishra
Dr. Sharmila Patil

Occupational Therapy

Dr. Manjusha Vagal
Dr. Rebecca Marri
Dr. Shruti Velaskar



The Gynecology DMG is a multidisciplinary group that meets to discuss complex cases and integrated treatment. Regular meetings to discuss academic and administrative issues ensure better patient care and active research involvement.

Meetings are held with the Pathology department to discuss complex and diverse diagnostic issues.

Responsibility for clinical work, research, education and service improvement are shared by all. The Womens' Cancer Initiative conference is held annually and diverse topics in women health care are discussed during the same.

Service

The year 2013 saw 3,167 new registered patients (2071 General & 1096 Private), giving a 65: 35 ratio.

The DMG performed a total of 747 major surgeries, 649 at TMH and 98 at ACTREC. These included 204 cervical cancers, 118 uterine cancers, 398 ovarian cancers, 129 other cancers and 240 minor surgical procedures. Radical radiotherapy was

administered to 478 patients and palliative radiotherapy to 233 patients. 542 cervical cancers received radiotherapy and 99 endometrial, ovarian and vulval cancers were treated with radiotherapy. Brachytherapy procedures were performed in 1,678 cases both intracavitary and interstitial. Chemotherapy was administered to 490 cervical cancers and 580 ovarian cancers.

The post-surgical 30-day Mortality was 0.6 %.

In case of Gestational Trophoblastic Neoplasia, the long term overall survival in high risk cases was 88.8 % and for those with low risk, was 100 %.

The 8-year disease free survival in carcinoma of cervix varied with the stage of disease; 62% for upto stage II A, 56 % for stage II B and, 40 % for stage III B.

Of those on post surgery chemotherapy, 68.42 % had neuropathy that was not of stage IV, 36.84 % had vomiting and, 10.52 % had hypersensitivity.

In those operated upfront, 85.71 % complied with adjuvant chemotherapy protocol and, 75 % had optimal cytoreduction following chemotherapy alone.

Convener:

Dr. Sudeep Gupta

Secretary:

Dr. Amita Maheshwari



Research

| Total No. of clinical trials | | Completed trials | | Ongoing trials | | Overall patients accrued |
|------------------------------|----------------|------------------------|----------------|------------------------|----------------|--------------------------|
| Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | |
| 23 | 12 | 1 | 2 | 22 | 10 | ~2823 |

Eduation

All members actively participate in national & international conferences and research activities, resulting in scholarly publications.

Surgical Oncology

Dr Anil D'cruz
Dr Devendra Chaukar
Dr Prathamesh Pai
Dr Pankaj Chaturvedi
Dr Gouri Pantvaitya
Dr Anuja Deshmukh
Dr Sudhir Nair
Dr Deepa Nair

Radiation Oncology

Dr Rajiv Sarin
Dr Jai Prakash Agarwal
Dr Sarbani Ghosh-Laskar
Dr Ashwini Budrukhar
Dr Tejpal Gupta
Dr Vedang Murthy

Medical Oncology

Dr Kumar Prabhash
Dr Vanita Noronha
Dr Amit Joshi

Radiodiagnosis

Dr Supreet Arya
Dr Shashikant Juvekar

Pathology

Dr Shubhada Kane
Dr Munita Bal
Dr Rajiv Kumar
Dr Asawari Patil

Plastic Surgery

Dr Prabha Yadav
Dr Vinay Shankadhar
Dr Dushyant Jaiswal

ENT Surgery

Dr Chris E Desouza

Dental Surgery

Dr Kanchan Dholam
Dr Karthik Sadashiva

Speech Therapy

Dr Gurmit Bachher

Nuclear Medicine

Dr V. Rangarajan
Dr Nilendu Purandare
Dr Sneha Shah
Dr Archi Agrawal

Cancer Biology

Dr Shubha Chiplunkar
Dr Murali Chilkapati
Dr Manoj Mahimkar
Dr Girish Maru
Dr Rita Mulherkar
Dr Tanuja Teni
Dr Milind Vaidya
Mrs Sharda Sawant



The Head and Neck DMG provides state of the art care in all phases of management for patients with head and neck cancer, using a multidisciplinary approach to ensure the best possible outcomes. It also promotes the importance of scientific research, responsible medical care and a healthy environment through public education and anti-tobacco advocacy.

Head and Neck DMG is the largest disease management group at TMC. The group has a strong presence of supportive and rehabilitative services in addition to the clinical services to improve the overall quality of outcomes of Patients being treated with head and neck cancer.

Service

A team of experts customizes each patient's treatment plan by designing the most effective combination of surgery, radiation,

and/or chemotherapy to suit the patients' needs. These plans are based on the most up-to-date understanding of treating cancer generally and the individual patient specifically. In the year 2013, 24% of total patient registrations at TMH were in the Head and Neck DMG (8,335), 40% (3,375) of who required admission, accounting for 14% of the total hospital admissions.

Two thousand three hundred and sixty (2,360) major and 6,454 minor OT procedures were carried out during the year. A total of 1,438 patients received radiotherapy of which 79% were treated with radical intent (including concurrent chemo radiotherapy or adjuvant chemo radiotherapy). One thousand and twenty eight patients received chemotherapy (CT) at the hospital of which 60% received neo-adjuvant chemotherapy (this excludes the former group).

Convener:

Dr. J. P. Agarwal

Secretary:

Dr. Shubhada Kane

A multi-disciplinary clinic attended by specialists from all the disciplines is held every day to decide on the management of every patient registered with the Head & Neck DMG.

A multidisciplinary Skull Base Clinic is run by the service weekly.

A clinical ward grand round is conducted once a week for the entire service and is attended by all three subunits. This ensures uniformity of treatment across the service. In addition the round serves as an academic activity for fellows and residents. Weekly audits are conducted for patients on radiotherapy for ensuring compliance, toxicity assessment and a critical review of patients on treatment at the TMH.

Key Quality Indicators

Volume Indicators

Surgical Oncology: Two thousand three hundred and sixty major and 6,454 minor OT procedures were carried out during the year. Majority of the surgeries were carried for oral cavity tumors (1,572). Four hundred and two free flap procedures were also carried out. Fifty six skull base surgeries were also performed.

Radiation Oncology: A total of 1,438 patients received radiotherapy of which 79% were treated with radical intent (including concurrent chemoradiotherapy or adjuvant chemoradiotherapy). Thirty one brachytherapy procedures were carried out.

Medical Oncology: One thousand and twenty eight patients received chemotherapy (CT) at the hospital of which 60% received neo-adjuvant chemotherapy (this excludes the former group).

Pathology: The department of pathology evaluated 18,303 cases in 2013, 2,560 of which was frozen section, 12,015 was histopathology and 3,728 cytology.

Radiology: Ten thousand seven hundred and sixty five radiological procedures were undertaken for the head and neck DMG. These include 3,474 CT scans and 78 therapeutic interventional procedures.

Dental and Prosthetic Surgery: The Department is actively involved in general dental services as well as prosthodontics with 6,306 consultations in the year 2013

Speech Therapy Department: Seven thousand two hundred and fifty three patients received speech and swallowing therapy in 2013

Outcome Indicators

MORBIDITY DATA

Surgery: 30 Day mortality: 0.23%

Complication rates:

Major complication: 9.25%

Minor Complication: 17.18%

Overall rate of post surgery wound complication: 26.44%

Infection rate: 6.55%

Radiotherapy: Less than 5% of patients had grade 3-4 reactions on radiotherapy, with only 1 death on RT. About 1% patients needed tube feeding on RT

Medical Oncology: Grade 3-4 on treatment diarrhea, mucositis, neutropenia was seen in 10, 5, 25% of patients receiving NACT and chemoradiotherapy, respectively. Seven percent patients had febrile neutropenia.

PALLIATIVE

Outcome Indicators: 5 Year survival rates:

Early stage (I and II) squamous cell carcinoma of the gingivobuccal complex cancers: Two and five-year disease-free survival- 65% and 52%

Late stage (III and IV) squamous cell carcinoma of the gingivobuccal complex cancers: Two and five-year disease-free survival- 63.8% and 53.3%

Loco-regionally advanced squamous cell carcinoma of the head and neck treated with chemoradiotherapy: 5 year disease free survival - 58 %

65% Larynx preservation with the use of NACT

NACT in technically unresectable oral cavity cancer: 40% patient underwent surgery, 2 year survival rate of 42% as compared to median survival of 10 months in patients not undergoing surgery.

Palliative radiotherapy for advanced head and neck cancer: 55% PFS at 12 months

Palliative chemotherapy for advanced head and neck cancer: Median survival with IV chemotherapy – 5 months, with oral chemotherapy – 6.5 months

PROCESS INDICATORS: Compliance to Evidence Based medicine Guidelines

Materials and Methods: We retrospectively reviewed 200 patients in whom joint clinic decisions had been taken regarding their

management of head and neck cancers. The joint clinic decisions were reviewed by a panel of three head and neck oncologists (2 surgeons, 1 radiation oncologist). The joint clinic decisions were compared with the available evidence based medicine guidelines and a percentage was calculated depending on adherence to the guidelines. If the guidelines were not followed, the reasons for the same were also documented. The guidelines used as gold standard for comparison were those from the EBM guidelines published by the Tata Memorial Hospital as a part of their EBM proceedings.

Results- 87.5% compliance to guidelines

Research

Research within the DMG focuses on evaluating standards of care in randomized settings, challenging dogma and evaluating new technology/ drugs and has the potential of generating high quality evidence to support translation into standard of care. The DMG members actively participate in National and International multicentric trials and have been responsible for conceptualizing, designing and implementing several prospective trials with either intramural or extramural support. The DMG members also participate in several pharma support trials. At present there are 36 Investigator Initiated and 5 pharma sponsored trials that are actively accruing patients.

List of important clinical outcomes of completed research which has improved clinical care

1. The interim analysis of the project "Elective neck dissection for the management of the N0 neck in early cancer of the oral tongue: need for a randomized controlled trial", lead to an important RCT – A randomized double blinded study of elective versus therapeutic neck dissection in the treatment of early node negative squamous cell carcinoma of the oral cavity.
2. Management of Advanced laryngeal cancers: To prove the efficacy of concurrent chemotherapy and radiotherapy vis- a- Vis surgery followed by radiotherapy we have embarked on a pivotal randomized controlled trial titled "Phase III randomized control trial of comparing concurrent chemo radiotherapy Vs Surgery with PORT in

advanced larynx and Hypopharynx cancers.

3. The study entitled "Validation and assessment of voice-related quality of life in Indian patients undergoing total laryngectomy and primary tracheoesophageal puncture", helped streamline post laryngectomy voice rehabilitation. Currently more than 90 percent of our laryngectomy patients have voice prosthesis and nearly 90% of them are able to use it successfully.
4. Advanced oral cavity cancer forms the largest subset of head and neck cancers in our country and the neighboring countries with sparse literature on effective adjuvant therapy for this group. A phase III trial of surgery followed by conventional radiotherapy (5 fractions / week) Vs concurrent chemo-radiotherapy Vs Accelerated radiotherapy (fractions / week 6) in high risk, locally advanced, stage III & IVa, resectable squamous carcinoma of oral cavity was initiated in the DMG from 2005 and has completed its target accrual of 900 patients.
5. The study on the Prevalence and clinical impact of Human Papilloma Virus in patients with head Neck squamous cell cancer treated with radiotherapy with or without chemotherapy, has generated information which will influence on the management of head and Neck squamous cell cancers.

Basic research activities of the DMG include :

- genomic profiling,
- Analysis of genetic host factors, HPV, EGFR and Hypoxia markers and their association with clinical outcome in subjects with locally advanced squamous cell carcinoma of head and neck.
- International Cancer Genome Consortium - India Project (TMC - ICGC – India)

Education

The DMG provides extensive training of post-graduate students, residents, fellows and the allied medical professionals in comprehensive head and neck cancer care. There is collaboration with other research institutes and medical institutions to assure countrywide access to new research findings and technical developments.





The DMG trains more doctors in Head and Neck oncology to meet the increasing need in this country.

Senior registrars rotate through the individual specialities in Head and Neck, and there are 4 specialist registrars who spend one year on the service.

Two Head and Neck surgical fellows and one dental and prosthetic fellow are selected through an entrance examination. These fellowships provide comprehensive, multidisciplinary training to individuals committed to a career in Head and Neck Surgical Oncology.

Four students are enrolled each year for M.Ch. in Head and Neck Surgery. This has been initiated since 2013.

Achievements of DMG Members

DMG members serve on important National and International bodies as experts in the field of Head and Neck Oncology. In addition they are also a part of important peer reviewed journals in the field. Several are involved in the anti-tobacco campaign in the country. They are also active in training and education programmes not only at the HBNI but also in Academic Institutes in the country and abroad.

Radiation Oncology
Dr. Tejpal Gupta
Dr. Rakesh Jalali
Dr. Goda Jayant Sastri

Neurosurgery
Dr. Aliasgar Moiyadi
Dr. Prakash Shetty

Pediatric Medical Oncology
Dr. Purna Kurkure
Dr. Girish Chinnaswamy
Dr. Tushar Vora

Pathology
Dr. Shubhada Kane
Dr. Epari Sridhar

Radiodiagnosis
Dr. Nikhil Merchant
Dr. Supreet Arya
Dr. Subhash Ramani
Dr. Ashwin Polnaya
Dr. Amit Janu

Adult Medical Oncology
Dr. Hari Menon

Basic Neuro-Oncology
Dr. Neelam Shirsat

Nuclear Medicine
Dr. V. Rangarajan

Psychiatry
Dr. Jayita Deodhar

Occupational Therapy
Dr. Akshya Nagrulkar

Clinical Psychology
Mrs. Savita Goswami

Neuro-Oncology Fellow
Dr. Uday Krishna



The Neuro-oncology DMG provides comprehensive care for patients in TMC with brain and spine tumors, conducting clinics on all working days of the week including those for follow-up cases.

For ease of surgery and better patient care, the operating microscope (both at TMH and ACTREC), have been upgraded for performing fluorescence guided resections (ALA-based).

Service

Installation of state-of-the-art 3D sononavigation has bolstered surgeries in ACTREC and it has already been utilized in over 100 special procedures. The use of this adjunct during surgery has resulted in improved resection rates and the findings have been published in the reputed Acta Neurochirurgica, the European Journal of Neuro-surgery.

The neuro-surgery service also has a special interest in "awake surgery for eloquent" region tumors. Along with anesthesia colleagues, over 50 such procedures were performed. In close collaboration with the Head-Neck DMG, endoscopic resection of various skull base lesions has been performed.

Comprehensive MR imaging is the backbone of diagnostic neuro-oncology; the DMG relies heavily on specialized MR sequences such as spectroscopy, perfusion & diffusion Imaging for resolving diagnostic dilemma.

Radiation Oncology has been at the forefront of utilizing modern technology for treatment planning and delivery of high-precision radiotherapy techniques such as three-dimensional conformal radiotherapy (3D-CRT), stereotactic radiosurgery/radiotherapy (SRS/SRT), and image-guided intensity-modulated radiation therapy (IG-IMRT).

Besides its routine use, chemotherapy is also instituted in young patients in order to avoid the late effects of radiotherapy to a developing brain and also to delay radiation therapy in some select settings.

Neuro-pathology has evolved and includes Fluorescence in-situ hybridization (FISH) and PCR based evaluation for prognostic and predictive markers in gliomas and primitive embryonal cell tumours.

The volunteers from Brain Tumor Foundation (BTF) maintain patient data, follow-up and streamline the services of DMG; they hold annual social & cultural programmes that include active patient participation and their felicitation.

Convener:
Dr. Aliasgar Moiyadi
Secretary:
Dr. Tejpal Gupta



A weekly Joint Neuro-Oncology Meeting (JNOM) discusses difficult and challenging cases; a consensus decision best suited to the patient's interest is taken jointly at this multi-disciplinary meeting.

1,539 patients were registered this year; of which, 70 % were of general and 30 % of private category. The maximum of 62 % were in the age group of 20 – 60 years.

Over 300 major surgeries have been performed in the year encompassing the

entire spectrum of craniotomies, endoscopic procedures, spinal tumors, and stereotactic surgeries.

Seventy-two special procedures performed included 26 sono-navigation guided resections, 11 fluorescence guided, 15 'awake craniotomies' and 20 endoscopic.

Gross Total Resection (GTR) was achieved in 47 % of all malignant gliomas and in 88 % of all resectable gliomas.

30-day Morbidity & Mortality rates for Elective cases

| | Morbidity (Minor) | Morbidity (Major) | Mortality |
|--------|-------------------|-------------------|------------|
| TMH | 11.6% | 23.1% | 5.2% |
| ACTREC | 14.1% | 15.4% | 3.2% |
| | Total | 38.5 | 8.4 |

5-year Survival rates

| Diagnosis | | 5-year overall survival |
|-------------------|-------------------|-------------------------|
| Craniopharyngioma | 80% | |
| Meningioma | Benign/ Low Grade | 89% |
| Medulloblastoma | Average-Risk | 85% |
| | High-Risk | 65% (3-yr) |
| Glioblastoma | Median Survival | 17 months |
| | 2-year survival | 29 months |
| | 5 year survival | 11 months |

The use of intraoperative image guidance (sononavigation) has resulted in improved resection rates (upto 88% complete resection in select groups). Hyperfractionated radiation therapy (1Gy twice daily, 6-8 hours apart) for craniospinal irradiation and tumor bed boost in children with average-risk medulloblastoma without upfront chemotherapy has resulted in preserved neuro-cognitive function in the short and medium-term without unduly increased risk of relapse or death. Routine administration of carboplatin concurrently with craniospinal irradiation in high-risk/metastatic embryonal CNS tumors has improved 3-year outcomes. The use of image-guided intensity-modulated radiation therapy (IMRT) for benign/low-grade intracranial tumors has resulted in excellent local control and overall survival with minimal acute and medium-term morbidity.

Radiotherapy Indicators

| Techniques of RT | ACTREC | TMH |
|------------------|-----------|------------|
| Conventional RT | 21 | 52 |
| 3D-CRT | - | 180 |
| SRS + Special RT | - | 5 + 21 |
| IG-IMRT | 63 | 48 |
| Total | 84 | 306 |

Research:

| No. of clinical trials | | Completed trials | | Ongoing trials | | Overall patients accrued |
|------------------------|----------------|------------------------|----------------|------------------------|----------------|--------------------------|
| Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | |
| 13 | 02 | 02 | 01 | 11 | 01 | ~350 |

Pediatric Medical Oncology

Dr S D Banavali
Dr Brijesh Arora
Dr Gaurav Narula

Nuclear Medicine

Dr. V Rangarajan
Dr Sneha Shah
Dr Seema Medhi

Surgical Oncology

Dr Sajid Qureshi

Pathology

Dr. Sumeet Gujral
Dr. Tanuja Seth
Dr. P. G. Subramanian
Dr. Sridhar Epari
Dr. Prashant Tembhare
Dr Nikhil Patkar

Psychiatry and Clinical Psychology

Dr. Jayita Deodhar
Ms Savita Goswami

Trial Coordinators

Ms. Krutika Kadam
Mr Amey Paradkar

Radiation Oncology

Dr. Siddharth Laskar
Dr. Nehal Khanna

Clinical Pharmacology

Dr. Vikram Gota

Molecular Hematology & Cytogenetics

Dr. Pratibha Kadam Amare
Dr. Anuradha Chougule

Occupational Therapy

Dr. Shruti Velaskar
Dr. Jagmohan Lal Meena

Medical Social Worker

Mrs. Neelima Dalvi
Mr. Parab



The important function of Pediatric Hematolymphoid DMG is to provide service of international standards to patients, conduct research in novel locally-relevant therapeutic strategies and educate trainees to expand the treatment net for Pediatric hematolymphoid cancers in India.

Service:

Pediatric Haematolymphoid Group(PHLG) sees approximately 700 patients every year, which is the highest in the country and among the highest in the world. The cumulative patient visits every year exceeds 35,000 as majority of these require intense, curative and prolonged therapies with multiple outpatient and inpatient visits. PHLG has set up an organized psychosocial-economic support group to provide holistic care of children and their families during treatment consisting of social workers, data managers, counselors, psychologists, and multiple NGOs to ensure accommodation, travel support, emotional & nutritional help, transfusion support and education etc.

Indicators:

A total of 694 new patients were registered and 34,718 cases were seen during follow-up. There were 400 new cases of acute leukemias and 123 new cases of lymphomas which are among the highest seen by any Pediatric cancer unit in the world.

The establishment of social support group has dramatically decreased the abandonment rates (TR&A) from >20% in 2009 to 9.5% in 2010. This has further reduced to 5% in 2012. The overall induction mortality rates in leukemias have reduced from 8% in 2010 to 4.5% in 2013 by a process of triage, constant supervision & aggressive management of treatment related complications. Number of patients being treated as per standard TMH protocols has improved from 79% in 2010 to 89% in 2013 with reduction in the rates of TR&A and second opinions. The pediatric cancer registry maintains details of epidemiology and outcomes of all pediatric hematolymphoid cancers. The disease free survival amongst BMT patients is 70% and transplant related mortality is 6%.

Convener:

Dr. Brijesh Arora

Secretary:

Dr. Gaurav Narula



Research:

The DMG has undertaken a total of 57 research studies. Seventeen of the 43 studies were student research (11 completed), 37 studies were initiated by investigators (9 completed) and 3 studies were sponsored clinical trials. The DMG published 10 articles related to its research activity and members also contributed 8 chapters to various books.

| No. of clinical trials | | Completed trials | | Ongoing trials | |
|------------------------|----------------|------------------------|----------------|------------------------|----------------|
| Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials |
| 54 | 3 | 26 | 1 | 28 | 2 |

Education

Teaching sessions for all students (residents and nurses) are conducted weekly. Pediatric Oncology trainees are also guided to participate in research projects, which include clinical studies, laboratory based projects, retrospective analysis and are also encouraged to publish during their training period.

Surgical Oncology

Dr. Sajid Qureshi

Medical Oncology

Dr. Purna Kurkure

Dr. Girish Chinnaswamy

Dr. Tushar Vora

Dr. Maya Prasad

Pathology

Dr. Mukta Ramadwar

Dr. Saral Desai

Radiodiagnosis

Dr. Seema Kembhavi

Dr. Palak Popat

Nuclear Medicine

Dr. V. Rangarajan

Dr. Sneha Shah

Radiation Oncology

Dr. Siddharth Laskar

Dr. Nehal Khanna

Palliative Care

Dr. M A Muckaden

Dr. Navin Salins

Honorary

Ophthalmologist

Dr. Nandan Shetye



The DMG treats patients both in TMH and ACTREC.

On the initial visit of the patient to the out-patient clinic, a detailed socio economic assessment and counseling is carried out to identify those requiring emergency management and those with severe financial constraints. The DMG has a weekly comprehensive social support system that ensures issues related to compliance to treatment and its abandonment; thereby increasing survival rates. Deserving patients

are selected by the dietician, who provides free mid-day meals during their visits or stay in the hospital.

Each patient in the Paediatric solid tumor DMG is registered in the database supported by Indian Pediatric Oncology Initiative (IPOI) of Jiv Daya foundation.

Monthly meetings are held to discuss pathological problems, academic progress, administrative work-flows, auditing mortality and morbidity issues.

Convener:

Dr. Sajid Qureshi

Secretary:

Dr. Seema Kembhavi

Volume Indicators

| Diagnosis | General | Private | Total |
|--------------------------------|------------|-----------|------------|
| Soft Tissue Sarcoma (STS) | 84 | 26 | 110 |
| Neuroblastoma | 45 | 20 | 65 |
| Germ Cell Tumor (GCT) | 30 | 7 | 37 |
| Renal Tumor | 37 | 8 | 45 |
| Others | 46 | 11 | 57 |
| No malignancy | 6 | 4 | 10 |
| Retinoblastoma | 34 | 7 | 41 |
| Chest wall Ewings Sarcoma (ES) | 12 | 4 | 16 |
| Hepatoblastoma | 24 | 1 | 25 |
| No investigation | 4 | 6 | 10 |
| Total | 322 | 94 | 416 |



Outcome Indicators in surgeries performed

| Diagnosis | TMH | ACTREC | Total |
|---------------------------|------------|------------|------------|
| Major | 100 | 54 | 154 |
| Minor | 18 | 26 | 44 |
| Pediatric vascular access | 58 | 02 | 60 |
| Adult vascular access | 00 | 49 | 49 |
| Total | 176 | 131 | 307 |

The morbidity was 7.1 % (22/307) with a 30-day mortality of 0.6 % (2/307).

5-year Survival rate

| Cancer | Event-free survival (%) | Overall survival (%) |
|--|-------------------------|----------------------|
| Non Rhabdoid Soft & Tissue Sarcoma (NRSTS) | 61 | 77 |
| GCT | 88 | 91 |

The percentage compliance with evidence based clinical guidelines was 70 %.

68 new and 650 on follow-up patients attended the After Completion of Therapy (ACT) Clinic for long term survivors of childhood cancers.

Research:

| No. of clinical trials | | Completed trials | | Ongoing trials | | Overall patients accrued |
|------------------------|----------------|------------------------|----------------|------------------------|----------------|--------------------------|
| Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | |
| 20 | 02 | 10 | 00 | 10 | 02 | 1264 |

Surgical Oncology

Dr C S Pramesh
Dr G Karimundackal
Dr Sabita Jiwnani

Medical Oncology

Dr Kumar Prabhash
Dr Vanita Noronha
Dr Amit Joshi

Radiation Oncology

Dr J P Agarwal
Dr Sarbani Ghosh
Dr Shagun Misra

Pulmonary Medicine

Dr Sandeep Tandon

Pathology

Dr N A Jambhekar
Dr Saral Desai

Nuclear Medicine

Dr V Rangarajan
Dr Nilendu Purandare

Radiodiagnosis

Dr S K Ramani
Dr A Mahajan
Dr Amitkumar Janu

Physiotherapy

Dr Anuradha Daptardar



The Thoracic Oncology Disease Management Group (DMG) has specialised surgeons, medical and radiation oncologists with ongoing support from a pulmonary physician, specialized pathologists, radiologists and physiotherapists. The DMG also has external participation from cardiac surgeons, endocrine specialists, basic scientists and technology experts.

Service

The Thoracic Oncology DMG is a specialized multidisciplinary group, treating a wide variety of lung, esophageal, chest wall and mediastinal tumors.

Specific unique strengths of the DMG include

- Largest thoracoscopic surgery programme
- Increasing number of complex thoracic surgical procedures including the surgical treatment of tracheo-bronchial tumors, advanced mediastinal and chest wall tumors
- Management of complex airway problems including tracheobronchial stenting and laser therapy
- Evidence Based Management of advanced lung and esophageal cancers with molecular-based personalized targeted therapy and chemotherapy
- State of the art radiotherapy techniques including tomotherapy, image-guided and stereotactic body radiotherapy

- Immediate postoperative, post chemotherapy and radiation therapy outcomes comparable with similar high volume centres

The “high-risk” multidisciplinary meeting with thoracic surgeons, anesthesiologists, critical care specialists and pulmonary physicians is a unique feature of the DMG and optimizes patients with multiple comorbidities prior to surgery. Active participation from the physiotherapy department on postoperative rounds ensures individualized attention to specific patients. Patients with advanced cancers are referred early to the palliative medicine department.

Quality improvement measures

The DMG maintains ongoing quality improvement measures with continuous audits of peri-operative, post-chemotherapy and post-radiotherapy morbidity and mortality, estimation of postoperative infections and treatment compliance.

Key benchmarks

Volume indicators

The DMG is amongst the highest volume centres worldwide, treating over 1,300 patients with lung cancer, over 1,400 patients with esophageal cancer and overall, more than 3,500 new patients annually. The

Convener:

Dr. C S Pramesh

Secretary:

Dr. Sarbani Ghosh

thoracic surgical unit performed 621 major surgeries and over 2,000 minor procedures in 2013, making it amongst the highest volume units for thoracic surgery in the world. A total of 369 and 92 patients received radiation therapy for lung and esophageal cancers respectively.

Outcome indicators

The overall postoperative mortality rate was 2.3 percent. Postoperative mortality rates after esophagectomy (9/183) and lung resections (5/115) were 4.8%, and 4.3% respectively. There were no postoperative mortalities after chest wall resections (n=37), mediastinal resections (n=23) and pulmonary metastatectomies (n=76) respectively. Morbidity and mortality rates were comparable with high volume specialised thoracic surgery centres in the west.

Ninety two patients received radiation for esophageal cancer (grade 3 or 4; toxicity 7%, mortality 1.1%). A total of 369 patients underwent radiation therapy for lung cancer (301 palliative and 68 radical) with 3% mortality with concurrent chemoradiation and 29% esophagitis and lung toxicity.

Research

The thoracic DMG conducts several investigator-initiated and sponsored research studies. Some of the studies initiated earlier were published and presented in high impact journals and international conferences respectively. The randomized trial comparing posterolateral thoracotomy with nerve sparing thoracotomy was an oral presentation and, won an award in the World Conference on Lung Cancer at Sydney, Australia. Ongoing randomized trials include the trials comparing radical three-field vs two-field esophagectomy for operable esophageal cancer, and neoadjuvant chemotherapy with neoadjuvant chemoradiation for locoregionally advanced esophageal cancer. In addition, several new studies were initiated this year and planned for the next year. DMG staff contributed to 17 peer reviewed indexed publications in 2013.

The CHEST (Cancers of the Hypopharynx and Esophagus Trial) screening trial is underway in Ratnagiri district with over 18,000 individuals having been screened for upper aerodigestive tract cancers. Fifteen patients with esophageal cancer and 13 with oral cancers were diagnosed and treated. With the deployment of more screening equipment and vehicles, the number of high risk

individuals screened is set to increase further. Extensive health education and awareness of health hazards of tobacco use is an integral part of the programme. A large randomized trial screening for lung cancers and oral cancers is being planned in urban Mumbai and is expected to start next year.

Education

The DMG contributes dedicated teaching sessions and on-the job training for the MCh (Surgical Oncology), DM (Medical Oncology) and MD (Radiation Oncology) courses. In addition, a two-year fellowship in thoracic surgical oncology is offered under the Homi Bhabha National Institute and is the only one of its kind in the country. The teaching programme is highly structured and includes didactic lectures, seminars and case presentations. Regular orientation lectures are taken for all new registrars and fellows working in thoracic surgery nine times a year.

The DMG has several trainees; ten thoracic surgical fellows, nine senior MCh (Surg Onco) registrars, fifteen junior MCh (Surg Onco) registrars, six medical and twelve radiation oncology registrars rotate through the DMG every year. In addition, training is provided in diagnostic bronchoscopy to 24 physicians from across the country annually.

The DMG participated in the annual surgical oncology workshop (Oncosurg 2013) for post-graduate students and practising surgeons, which is a three-day operative workshop attended by more than 300 delegates. The DMG also organized the 11th Evidence Based Management meeting in esophageal, gastric and lung cancers. Several renowned clinicians and researchers from all over the world participated with over 250 delegates registering for the meeting. The meeting also marked the release of the updated EBM guidelines for management of esophageal cancers which have been uploaded on to the website for unrestricted and free access to all.

Achievements of members

Many DMG staff participated as faculty at national and international conferences, examiners for academic degrees and as editors/members of editorial board/reviewers of scholarly journals. DMG members were also instrumental in the establishment of the Indian Society for Diseases of the Esophagus and Stomach (ISES), which was inaugurated by Prof Mark Ferguson, Executive Director, International Society for Diseases of the Esophagus.

Surgical Oncology

Dr.Ganesh Bakshi
Dr.Gagan Prakash

Medical Oncology

Dr.Kumar Prabash
Dr.Vanita Noronha
Dr.Amit Joshi

Radiation Oncology

Dr.S. K. Shrivastava
Dr.U. Mahantshetty
Dr.Vedang Murthy

Radiology

Dr.Meenakshi Thakur
Dr.Suyash Kulkarni
Dr.Nilesh Sable
Dr.Palak Popat

Nuclear Medicine

Dr.V. Rangarajan
Dr.Nilendu Purandare
Dr. Archi Agrawal

Pathology

Dr.Sangeeta Desai
Dr.Santosh Menon

Cytopathology

Ms Ajit Dulhan

Basic Sciences, ACTREC

Dr.S V Chiplunkar
Dr.Kishore Amin
Dr.Ashok Varma

Medical Records and Epidemiology

Dr.Ganesh B.
Dr.Rajesh Dikshit

Cancer Cytogenetics

Dr.P. S. Kadam Amare



The Urology Oncology DMG is a multi-disciplinary group with aims to deliver optimum patient care as well as bring all clinical and translational research under one umbrella to ensure optimum outcomes.

New registrations are evaluated jointly by all specialists on a daily basis. After a detailed evaluation and an appropriate workup is complete, patients are reviewed by senior DMG member (consultant) followed by discussion in Joint Clinic for a management plan.

Service

The DMG has undertaken activities to enhance quality of service and shorten timelines by providing emergency treatment and adjuvant therapy whenever indicated.

Over the years, “nil” 30 day mortality has been achieved. With development of organ preserving surgeries and non-surgical management protocols, the DMG has developed treatment approaches with the aim of organ and function preservation. The results of treatment are continually monitored with audits and morbidity assessment meetings. More than 600 major surgical procedures were performed in 2013,

besides a large load of diagnostic and therapeutic endoscopic procedures and minor surgical procedures.

The DMG registered 2,111 new patients in 2013 of which 968 were general and 1,143 were private category patients. The DMG attended to 3,578 surgical patients. They performed 711 and 367 major surgeries at TMH and ACTREC respectively and 3,030 minor surgeries including cystoscopies and biopsies. The Radiotherapy out-patient department managed a total of 2,976 patients. This included treatment by three Dimensional Conformal Radiotherapy (3D CRT) and Intensity Modulated Radiotherapy (IMRT). During the year, 27 laproscopic surgeries were performed, including 16 nephrectomies and 11 other procedures. There were a total of 367 patients, of which 85 received radical treatment, 52 received post-operative radiotherapy, and 230 received palliative treatment. Four hundred and ninety patients received chemotherapy including hormonal and targeted therapy.

Outcome indicators The 30 day mortality was observed to be 0% with low complication rates, and 5 year survival rates which are comparable with international figures.

Convener:

Dr. Umesh Mahantshetty

Secretary:

Dr. Ganesh Bakshi



Research

The thrust has been on more clinical trials in bladder and penile cancers (relatively more common in India), while more areas in prostate and kidney cancers are being addressed.

Table Showing Research Activities for 2013:

| No. of clinical trials | | Completed trials | | Ongoing trials | | Overall patients accrued |
|------------------------|----------------|------------------------|----------------|------------------------|----------------|--------------------------|
| Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | Investigator initiated | Sponsor trials | |
| 12 | 4 | 0 | 0 | 10 | 1 | 475 |

Ongoing clinical trials in the field of radiotherapy and surgery are as follows:

- o The role of helical tomotherapy based IMRT in muscle invasive bladder cancer
- o Prospective Phase III randomized trial of prostate only or whole pelvic radiotherapy in high risk prostate cancer (POP-RT trial)
- o Audit of muscle invasive carcinoma of bladder treated by radical cystectomy and adrenocortical carcinomas
- o Translational research to identify cases with a genetic predisposition to Prostate cancer and role of circulating micro RNA in diagnosis and progression of prostate cancer
- o A chemotherapy trial on patients with advanced renal cell carcinoma

Education

The academic activities consist of lectures by faculty and invited speakers, workshops and seminars for post-graduates from superspeciality programs.

DMG Support Services

Physiotherapy



The Physiotherapy Department is committed to restoring patients to their highest level of function and independence. It interacts regularly with the various DMGs to discuss optimum treatment protocols for the patients thereby ensuring full rehabilitation with better outcomes and increased patient satisfaction.

Service

The department served **8070** patients in the year 2013.

The preoperative Pulmonary Rehabilitation program for patients undergoing thoracic surgery continues to ensure respiratory

optimization. Post Operative Group Therapy Rehabilitation program for breast cancer patients helps the patient to adapt functionally, psychologically and emotionally to the disease. Diagnosis and Management of Cancer Related Fatigue in head and neck cancer and lung cancer was recently introduced. The other services include rehabilitation of shoulder and neck dysfunction and trismus, post operative respiratory care, mobilization and ambulation in orthopedic oncology, pain relief and treatment of sub mucous fibrosis.

Lymph edema treatment in concurrence with the International Consensus of Lymph edema management is now provided in the physiotherapy department by a certified Lymph edema therapist.

Research

A randomized controlled trial evaluating the role of exercise in women undergoing treatment for breast cancer is ongoing.

Education

Two annual workshops on “Rehabilitation in Breast Cancer” and “Cancer Rehabilitation” were conducted. Orientation programs were conducted for the final year students of Bachelor of Physiotherapy (BPT). Training was imparted to interns, observers, ICU technicians and trainee nurses round the year.

Occupational Therapy



Service:

The department provides physical, functional, psychological or emotional assistance to maximise personal productivity, well being, and quality of life to cancer patients. Lymphedema care to assist patients with Lymphedema adds to the quality of life is a unique feature of this department.

In the year 2013, 13018 patients received Occupational Therapy services and overall 111 orthoses, 13 prostheses, 26 temporary prosthesis, 19 pylons casted on patients and 17 low temperature thermoplastic splints were prepared.

Education:

Training Interns in Occupational Therapy in affiliation with several public hospital in Mumbai.

The section conducts Post Graduate Training Program in Oncology for Occupational Therapists.

Observers from various faculties like Occupational Therapy, Palliative Medicine, and Nursing visit the section.



Dr. Anuradha Daptardar, OIC
Dr. Vincent Singh P.
Dr. Ajeeta S. Hasabnis
Dr. Manali V. Kamat
Dr. Sarika G. Mahajan

Dr. Manjusha Vagal, OIC
Dr. Rebecca Marri
Dr. Shruti Velasker
Dr. Jagmohan Meena

Anaesthesiology, Critical Care and Pain



Dr Jigeeshu Divatia, Head
Dr Kailash Sharma
Dr Parmanand Jain
Dr Raghubir Gehdoo
Dr Atul Kulkarni
Dr Vijaya Patil
Dr Aparna Chatterjee
Dr Sheila Myatra
Dr Madhavi Shetmahajan
Dr Nayana Amin
Dr Vandana Agarwal
Dr Sumitra Bakshi
Dr Priya Ranganathan
Dr Reshma Ambulkar
Dr Madhavi Desai
Dr Raghu Thota
Dr Bhakti Trivedi
Dr Shilpushp Bhosale
Dr Amol Kothekar
Dr Malini Joshi
Dr Jeson Doctor
Dr Swapnil Parab
Dr Sohanlal Solanki
Dr Amrita Parekh
Dr Raman Sareen

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Number of patients treated at TMH and ACTREC

| | |
|--|-----------------|
| Major cases | 7756 +2143 |
| Emergency | 630 |
| Other procedures | 11809 |
| Radiotherapy | 1605 +174 |
| CT scan and Interventional Radiology | 454 |
| Critical Care services ICU and recovery admissions | 959 +2244+ 8656 |
| Pain Services | 1975 |

Research

The department has more than 30 clinical studies which were either completed or ongoing in 2013.

Education

The department is affiliated to the Homi Bhabha National Institute (HBNI-Deemed University) and has MCI recognised postgraduate degree courses (M.D.) in Anaesthesia and has 32 Sr. Residents, and 44 Post Graduate students. The teaching programme is structured in the form of didactic lectures with seminars and case presentations. Short term courses and conferences viz., Anaesthesia Review Course, National Difficult Airway Conference and Education in Cancer Pain annually for doctors, nurses (Hospital CPR course) and Critical Care Unit technicians are also conducted.

Members of the department have been invited as faculty and experts at several national and international conferences in 2013.

The department supports Major and Minor Operating facilities at TMH and ACTREC. In addition, anaesthesia services are also provided for CT scans, interventional radiology procedures, GI endoscopy procedures and paediatric radiotherapy at TMH and radiotherapy procedures and MRI procedures at ACTREC. The department also manages a 14 bedded Critical Care Unit and 7 bedded Critical Care Unit at TMH and ACTREC respectively. The Critical Care Units are equipped with facilities for mechanical ventilation, hemodynamic monitoring and renal replacement therapy, and a 23-bedded post-operative recovery room. The pain division offers acute pain services for post-operative patients and runs separate chronic pain clinics for general and private patients.

Service

In 2013, the department introduced hemodialysis machine in the Critical Care Unit at TMH, which has facilities for intermittent hemodialysis (for hemodynamically stable patients) and SLED (Slow Low Efficiency Dialysis for unstable patients). Since the introduction of this facility, critically ill patients at TMH are able to access renal replacement therapy rapidly and in-house.

The surgical oncology department has spearheaded the field of cancer surgery in the country for several decades. Operative services are comprehensive for cancers at all sites and are offered both at TMH and ACTREC for optimum utilization of operating rooms.

Service

Specific unique strengths of the department include an increasing application of minimally invasive surgery, skull-base procedures, major vascular replacements, limb salvage and microvascular surgery. With the addition of a paneled cardiothoracic surgeon, more complex resections involving vascular repairs and reconstructions were undertaken and surgeries performed with cardiovascular surgical cover. Immediate postoperative outcomes are comparable with the best in the world. The WHO surgical safety checklist introduced last year has now been universally introduced in all major theatres as a patient safety initiative.

The Department of Plastic and Reconstructive Surgery provides the best of primary reconstruction, secondary reconstruction and a variety of problem solving and salvage surgeries to patients of all DMG's mainly head and neck, breast and bone & soft tissue.

Each unit maintains ongoing quality improvement measures with regular audits of peri-operative morbidity and mortality, estimation of postoperative infections and treatment compliance. The introduction of an



operation theatre committee has helped streamline the functioning of operation rooms, equipment, staffing and rationalizing OR traffic. The observers' cell has rationalized the number of observers in each unit to optimize training and limit overcrowding.

As one of the leading centres in the country for free micro vascular tissue transfers (Free Flaps) both in numbers and quality, we performed 500 free flaps, 46% increase from 341 in 2012, with a 95% success rate (equal to world standards), making a significant difference to the quality of life to patients. In addition, 350 pedicle flaps and other major surgeries were performed.

Education

The department has initiated the MCh (Plastic Surgery) and enrolled three students. The teaching programme is structured and includes didactic lectures, seminars and case-presentations. Regular appraisals are conducted every 4 months for periodic evaluation of the students' progress.



Dr Prabha Yadav

Dr Dushyant Jaiswal

Dr Vinay Kant Shankhdhar



Palliative Medicine



Dr. Mary Ann Muckaden,
Head.

Dr. Jayita Deodhar

Dr. Naveen Salins

Palliation is an important component of quality care for cancer patients.

The department provides comprehensive care to the terminally ill patients for pain relief and supports their psychological, spiritual and social needs.

The department participates in DMG activities.

Service

The department has 3,077 new registered patients with 4,125 on follow-up. There were 957 outside referrals from out-patient's department of palliative medicine. In view of rising demand for home-based palliative care, a second team for the same began in September 2013, funded by Empathy Foundation, and has already visited 1046 households in a span of 3 months.

For the benefit of all care-providers and the patients, the department has compiled teaching materials by eminent faculty in Palliative Care. Rural visits are encouraged to promote these services to those who cannot visit TMC.

The Jivdaya project captures patient data on a daily basis to ensure proper palliative care. Feedback forms are available to rectify any lacunae within the department of Palliative Medicine.

The department of Palliative Medicine has bi-weekly clinics for adults and children.

Research

The department focuses on research on quality of life issues.

Education

The department holds case presentation and journal clubs and, it also routinely conducts, nursing education and training of social workers.

The recently introduced MD Palliative Medicine program has an intake of 2 students per year.

There is a proposal to include palliative medicine in undergraduate curriculum along with formation of a Geriatric Palliative Medical Clinic.

The Psychiatric Unit is committed to provide comprehensive psychological and psychiatric assessment and care of patients attending the hospital with a definitive or suspected diagnosis of cancer or undergoing screening, with psychological and psychiatric problems. Besides being a multidisciplinary mental health profession, the department also conducts psychometric and neuropsychological testing and IQ assessments.

Service

The department has seen 2511 patients in 2013, including 1155 new referrals and 1356 reviews. This is apart from its participation in other DMG meetings.

Research

Research projects on validation of instruments for screening distress in psychiatry and palliative care setting along with ongoing collaborations in neurocognitive assessments and psychiatric disorders are being conducted by the department.



Education

The Psychiatric Unit conducts in-house training programmes for M. Sc Nursing, Oncology Nursing, Palliative Care and Rehabilitation services.

The Psychiatric Unit arranged psychoeducational and support programme on occasion of World Mental Health Day in October on 'Caring for family members'.

Monthly meets support the Brain Tumour Foundation and Childhood Cancer Survivors Group (Ugam).

Dr. Jayita Deodhar
Head
Mrs. Savita S. Goswami
Ms Lekhika N. Sonkusare

Pathology



Dr. N.A. Jambhekar, Head
Dr. S.V.Kane,
Head, Dept. of Cytopathology
Dr. S.B. Desai,
OIC Molecular Pathology
Dr. Sumeet Gujral
Dr. Tanuja Shet
Dr. Mukta Ramadwar
Dr. Kedar Deodhar
Dr. Bharat Rekhi
Dr. Munita Bal
Dr. Santosh Menon
Dr. Rajiv Kumar
Dr. Ayusha Sahay
Dr. Neha Mitta
Dr. Asawari Patil,
OIC, ACTREC Pathology
Dr. E. Sridhar
Dr. Saral Desai
Mrs. U.A. Joshi,
OIC, Surgical Pathology Laboratory
Mrs. Manisha Kulkarni,
OIC, Pathology Academic Program
Mrs. N. M. Prabhudesai
Mr. N. V. Shinde
Dr. O. A. Shetty
Ms. J. J. Chowalloor

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Immunohistochemistry work is completely automated resulting in better quality of slides and rapid reporting with better turn around time. This has facilitated expansion of the scope of laboratory to include with 10 additional markers. A dedicated Molecular Pathology laboratory has hastened specimen processing, especially for solid tumors.

The online Intradepartmental Anatomic Pathology Order/ Procedure requests has facilitate the tracking of tissues within various sections of the laboratory; thus reducing the turn around time by one day.

The disease management group has representatives from pathology department to ensure active participation in patient care and management.

Education

The department is recognized for courses in MD Pathology. In addition, the department trains other doctors and technicians in oncopatholgy and, accepts postgraduate observers from all over the country. The medical staff and students are encouraged to pursue their academic and research activities and, participate in national and chapter meetings within their sub-specialities.

The upgraded pathology museum along with its own library and lectures in digital format creates an intellectual atmosphere that satiates the needs of oncopathology as a super specialty.

All sections of the Diagnostic laboratories are NABL accredited.

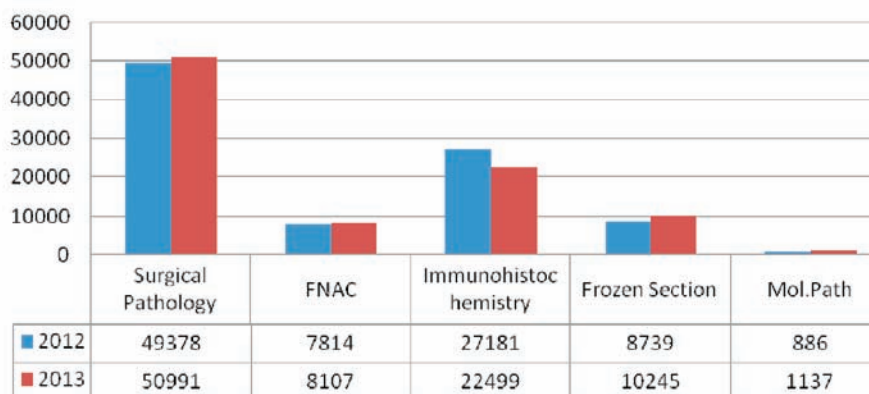
The clinical activities include providing diagnostic services to the in-house patients and this expertise is offered throughout the country.

Service

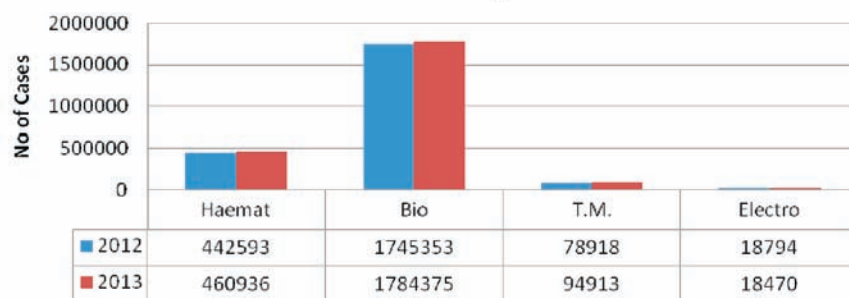
The department incorporates several services including surgical pathology, immunohistochemistry, fine needle aspiration, cytology, molecular pathology, biochemistry, hematopathology and the ICMR funded National Tumour Tissue Repository.

Performance Statistics: Departmental factual information regarding total number of cases in each section of the department in comparison with the previous year.

Anatomic Pathology Accruals



Clinical Laboratory Accruals



** TM – Tumor Markers , (biochemistry+electrolytes), Haematopathology

Cytopathology

The Department offers rapid diagnosis of gynecological and non gynecological cancers, along with adequacy testing and immunocytochemistry to enhance diagnostic accuracy.

Service

Work load for the year 2013 comprised of a total of 23,920 samples, comprising of 95,632 smears. These include 4,786 gynecological, 11,027 non-gynecological and 8,107 Fine Needle Aspiration Cytology samples. An overall increase of 458 samples was observed mainly in the non-gynecological samples compared to the workload of 2012. An 11% increase in CSF samples, 9% in respiratory tract samples and 7% in effusion samples were observed.

Imprint Cytology for “on-site adequacy testing” for image guided biopsy was introduced in 2013, which has improved diagnostic accuracy of deep seated lesions and facilitated the early diagnosis in difficult cases. Immunocytochemistry on cytology smears for routine diagnostic purposes has improved patient management.

A three tier screening of cytology smears is practiced to minimize the errors. Steps have been taken to improve the quality of cytology techniques. Clinical audits of all sites (e.g. Gynec, bronchial, fluid, urine, etc) screened are conducted.



Research

The research interests of the department focus on the role of liquid based cytology as an ancillary technique for the diagnosis of thyroid cancers. Other areas include techniques to advance the quality and accuracy of cytological diagnosis of cancers including exfoliative and scrape cytology.

Education

The Department has trained 23 pathologists in the interpretative aspect of diagnostic cytopathology. The Department is the nodal centre for the National EQAS program in Diagnostic Cytopathology.

Dr. Shubhada V. Kane,
Head,

Mrs. Dulhan Ajit, OIC

Mrs. M. S. Uke

Ms. S. B. Dighe

Haemtopathology



Dr. P.G. Subramanian, OIC

Dr. Sumeet Gujral

Dr. Nikhil V Patkar

Dr. Prashant Tembhare

Dr. Ashok Kumar

Mrs. Shaila C Shinde

Mr. Y Badrinath

Dr. Shruti Chaudhary

Hematopathology laboratory is a service laboratory for the diagnosis of hematological malignancies, monitoring of patients while on therapy for all malignancies and preoperative and postoperative hematological workup of surgical patients.

The laboratory is equipped with the state of art hematology analysers and coagulation analysers, interfaced with hospital information system. Leukemias and lymphomas are diagnosed by using techniques like immunophenotyping of blood, bone marrow and body fluids and hematolymphoid malignancies are diagnosed using flow cytometry. The laboratory also

| Name of the Tests | Total No. of Tests performed |
|---|------------------------------|
| Routine Hematology | 3,23,821 |
| Coagulation studies | 1,51,505 |
| Bone Marrow Aspiration Smears and body fluids | 6,841 |
| Cytochemistry | 2,840 |
| Flow cytometric Immunophenotyping | 5,299 |
| Molecular Hematopathology | 1,244 |

detects minimal residual disease in cases of Acute Leukemias.

Molecular diagnostics is now routine for the management of haematolymphoid malignancies.

More than 30 high end molecular diagnostic assays are offered to patients. The department is recognized as a national referral laboratory.

Services

The services provided by the laboratory are vital for the diagnosis and management of haematolymphoid malignancies.

The laboratory started minimal residual disease testing for acute lymphoblastic leukemia in children. This is used to tailor treatment for individual patients, based on response to initial treatment. This prevents intensive treatment in good responders; reducing cost and side effects of treatment.

Research

The important areas of research activities include:

- Minimal Residual Disease (MRD) in acute lymphoblastic leukemia and acute myeloid leukemia
- The influence of gene mutations in acute myeloid leukemia and in Waldenström's macroglobulinemia.

Education

The educational activities of the department involves MD, DM, and a 2-year Hematopathology fellowship. In addition, it also conducts hands on workshop for CBC & Flow Cytometry and annual CMEs for pathologists and technologists. The lab initiated Bench to Clinic courses for technicians and pathologists viz., complete blood count and Immunophenotyping. The laboratory imparts training in morphology, cytochemistry and flow cytometry.

The Department is engaged in the delivery of biochemistry and Tumor Marker Services. The department offers emergency services in clinical chemistry and hematology. The department is equipped with fully automated analyzers .

Service

A battery of around 250 biochemical investigations on blood and body fluids samples from patients attending the hospital are performed. The total number of investigations carried out during the year is **18,97,758** , with an increase of about 13 % over the last year.

The tumor marker services include a variety of tumor markers that assist in the accuracy of diagnosis of various cancers and are also used for the prognosis of these cancers. Electrophoresis and estimation of immunoglobulins and drug analysis is routinely done and this facility is availed by majority of the hospitals in and around T.M.H.

The turn around time for reports is approximately 3 hours.

Research

The departmental research activities include study of prognostic factors in Multiple Myeloma patients.

Education

The department offers post-graduate courses and training programs in clinical biochemistry, tumor marker detection systems , and Therapeutic Drug Monitoring. . The department inducts Trainees and Observers for training in clinical chemistry.



Emergency Services

These are an essential component of any laboratory service providing round the clock testing of critical parameters that impact patient management.

They include routine biochemistry and hematology tests done during off hours. They perform about 400,000 biochemical tests like electrolytes, cardiac enzymes, calcium and magnesium, serum and urine osmolality and 68,000 hematology tests mostly CBC and coagulation studies. The service has recorded a 17% increase in the number of tests performed in one year.

Dr. (Mrs.) Meera S. Ghadge
Officer In Charge

Dr. Nitin A. Inamdar

Mrs. Purva P. Naik

Dr. Pranab Sadhukhan

Dr. Geeta Rathnakumar

Dr. Bhoopal J. Shinde

Mrs. Madhuri A. Godambe

Mr. D. P. Birwatkar



Molecular Pathology

Nucleic acid-based testing is an useful adjunct in management of several cancers. Molecular Pathology is a great tool for diagnosis, assessing disease prognosis and therapy response. A state-of-the-art evaluating Molecular Diagnostics and Translational Medicine Facility was inaugurated on 23rd March 2013 by the Chief Minister of Maharashtra.

Routine Molecular Diagnostics of solid tumors by PCR, RTPCR, Gene sequencing, and Fluorescence in situ Hybridization (FISH), is performed. Tests viz. HER2/Neu gene amplification in breast cancer, Alk1 gene rearrangement in Lung cancer help in

determining target based therapies. Detection of sarcoma translocations by qualitative PCR is one of the cheapest and the reliable tests in management of pediatric soft tissue tumors. Mehtylation specific PCR for Glioblastomas and Oligodendrogliomas was introduced into routine diagnostics. With the acquisition of Genetic analyzer ABI3500 (Gene sequencer) several new tests were standardized viz. Gene sequencing for BRAFV600E, IDH1 and IDH2 for Gliomas , C-KIT mutation analysis for Exon 9, 11, 13 and 17 for Gastrointestinal Stromal Tumors (GIST) which would predict the response to a specific drug as well as have prognostic implications.

Summary charts

Chart 1: PCR tests in Year 2013

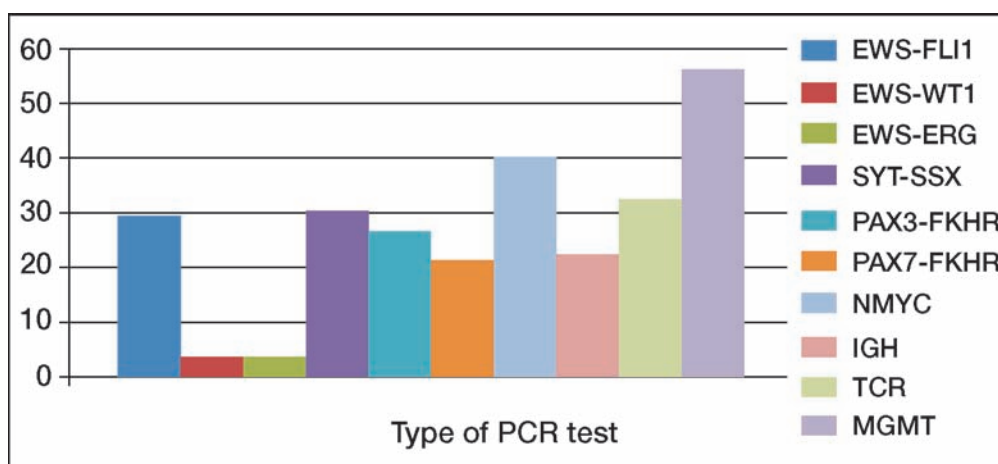
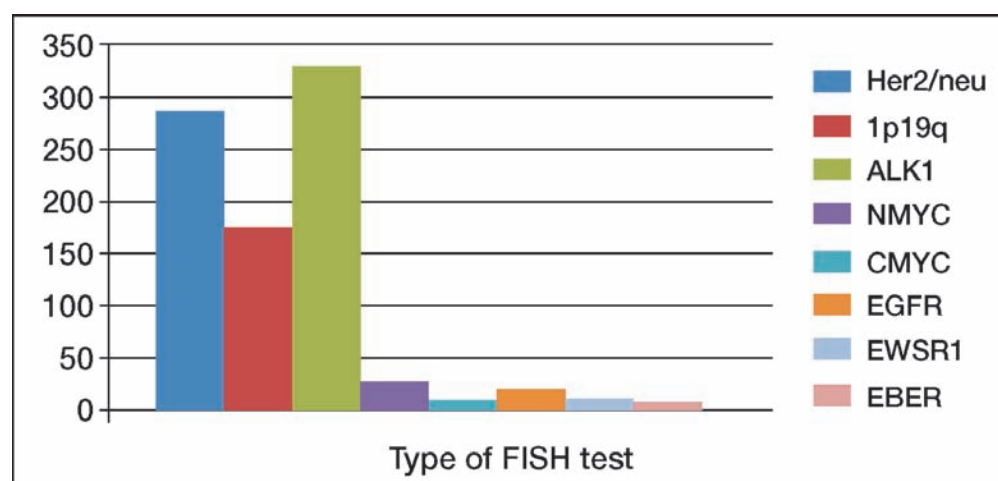


Chart 2: FISH tests in Year 2013



Data for January – December 2013

Service

The department performed tests on 1137 cases. Relocating of the laboratory to TMH has improved the turnaround time.

The quality control parameters are monitored and trend analysis for the routine diagnostic tests is performed on monthly basis, to discuss any shortcomings or to assess the progress and make changes accordingly. Standardization of BRAF, IDH1, IDH2 mutation analysis in Gliomas, cKIT mutation analysis for Exon 9, 11, 13 and 17 in GIST has been accomplished.

Research

Several research projects are going on in the facility. Currently eight Principal Investigator initiated projects are going on in the laboratory with the dedicated project staff working on each one of them.

Education

The department offers one year fellowship and impart training for performing PCR, FISH, Primer designing, Gene sequencing, Data Analysis and interpretation.

Weekly CMEs are conducted; where in each laboratory staff or research fellow presents papers pertaining to the molecular diagnostics or recent advances in molecular oncology.



Cancer Cytogenetics



Dr. Pratibha S. Kadam-Amare,
Head

Mrs Sharayu. Kabre

Ms. Hemani Jain

Cancer cytogenetic laboratory is recognized as a unique referral lab for cancer cytogenetics.

Service

The department performed 12,000 tests with an increase in numbers of 25%, with the introduction of additional markers for further

prognostic sub-classification of leukemias. The department serves as a referral centre and received 6,500 referral samples.

Research

There are two translational research projects on Multiple Myeloma and Acute Myeloid Leukemia (AML) and 9 clinical research trial projects on AML, Chronic Myeloid Leukemia (CML) and lymphoma.

Education

The department is actively involved in the training of post graduate students in Cancer Cytogenetics and Molecular Cytogenetics.

Microbiology

The department provides bacteriology, serology, mycobacteriology, mycology, molecular microbiology, sterility testing, infection control and waste management services to TMC.

The department monitors antimicrobial susceptibility trends in the hospital and provides clinicians with this data that helps in formulating hospital antibiotic policy.

The introduction of the automated identification and susceptibility system for bacterial pathogens and yeasts has reduced the Turn Around Time (TAT), thereby providing the clinicians with faster results and improving patient outcomes.

Service

A total of 1,66,399 patient samples were processed by TMC microbiology labs. These included bacteriology (34,896), mycology (6,047), mycobacteriology (8,804), serology (1,00,570), molecular microbiology (4,695), and clinical microbiology (9,408). The overall increase in workload on a year-on- year basis was 12.6%.

The department of medical microbiology at TMC (TMH and ACTREC) is NABL accredited and provides the following patient and hospital related services:

The bacteriology section performs culture and susceptibility testing for blood, body fluids, pus, urine, feces and all other clinical

samples. Reports of isolates are generally provided within 24 hours and susceptibility results within 48 hours. Blood culture isolates and ICU sample results are immediately conveyed to the clinicians, facilitating early specific treatment and/or antibiotic de-escalation whenever required.

All important serological parameters like screening for viral markers, are performed on a state of the art automated system and the results are generally available on the same day. Several tests for an accurate diagnosis of viral infections namely hepatitis viruses, dengue and malaria are provided. Rapid tests for the early diagnosis of sepsis help in monitoring critically ill patients.

Mycobacteriology services for the diagnosis and management of mycobacterium tuberculosis and non tuberculous mycobacterial infections are provided.

Identification of pathogenic fungi in clinical material is a part of the routine diagnostic armamentarium, both by manual and automated methodology.

Molecular tests for CMV, HBV, HCV, HPV are provided.

Sterility testing for Blood Bank products (PBSC, SDP, and RDP) is provided primarily to bone marrow transplant patients at ACTREC. Sterility testing for high risk units with air sampling is performed on a regular basis. Potable water from the hospital water supply systems, including the kitchen is regularly tested. Surveillance cultures are tested whenever indicated, such as an infectious outbreak suspicion etc.

The department provides infection control support to the hospital. This includes advisory services and training activities for nursing department and housekeeping staff and, also coordinating infection control meetings. The department also provides assistance in investigation of outbreaks and, related infection control issues are also addressed. The department monitors the emergence of multidrug resistant organisms and provides comprehensive antimicrobial susceptibility data to clinicians.



The department also handles hospital waste management wherein all waste from TMH are processed in a centralized waste management unit. The department labs conduct annual waste management audit and advises on waste management.

Research

The research activities focus on antimicrobial drug resistance mechanisms, rapid diagnosis of fungal and, mycobacterial infections and epidemiology of mycobacterial and fungal infections in cancer.

Education

The department conducts several educational activities. There are 2 MD (microbiology) students in the department. The department conducts an annual certificate course in hospital infection control and, organized the national conference and CME on infection control.

Transfusion Medicine



Dr. S.B. Rajadhyaksha,
Head

Dr. A.A.Tendulkar

Dr. P.D.Desai

Dr. Meenakshi Singh

The Department of Transfusion Medicine provides for the specific and ever increasing transfusion requirements of cancer patients. The wide spectrum of specialized blood products provided and the stringent quality assurance, contribute to its position as a premier transfusion service in the country.

Service

The department registered 26,966 donors and, collected 19,060 units of blood from

which, 56,106 components were prepared. More than eighty camps were organized. Forty Three Thousand Four Hundred Six blood transfusions comprising of packed cells, platelets, fresh frozen plasma and cryo-precipitate were issued.

This year the component separation was further enhanced for better availability and, attained an all time high of 97% of whole blood collection. Platelet donor recruitment drives contributed to expansion of the platelet donor pool. There was a 17% increase in the platelet units and 7% in the blood components prepared

Research

The emphasis of research activities was on judicious use of blood components and improving transfusion practices.

Education

The Department is actively involved in planning and organizing the annual academic activities of the Federation of Bombay Blood Banks (FBBB) for its 47 member blood banks. The Department received eleven observers for training in specialized areas including apheresis and component separation. There has been an increase in MD seats.

The department provides comprehensive nuclear oncology services.

Service

The presence of two CT-PET scanners including the new Time of Flight PET scanner has dramatically reduced the patients waiting period.

The diagnostic services include the entire spectrum of general nuclear medicine and hybrid imaging. In hybrid mode, specialized studies involving special procedures in CT or PET are done. Besides 18F FDG, the other PET radiopharmaceuticals offered as service are 18F Fluoride, 18F Mezonidazole, 18F Thymidine and Gallium-68 peptides.

For thyroid neoplasms, the thyroid uptake probe system is in place.

Interaction with other medical department helps address the individual requirements of cancer patients. Frequent interaction with the departments of medical physics, BARC and AERB keeps all abreast of the latest trends in radiation safety protocols and optimum utilization of the expensive equipment.

Regular audits are carried out for sentinel and non-sentinel events that translate to better patient care and management.

Research

All the staff members have represented their department at national and international conferences. Their contributions in publications are across national as well as international journals. The research focuses on the role of imaging modalities particularly, PET in staging of gastric and oesophageal cancers.



Education

The department has a reciprocal exchange programme for residents with those from the department of radiodiagnosis.

Besides, they actively participate in meetings, seminars and conferences held by various disease management groups.

Dr. Venkatesh Rangarajan,
Head

Dr. Nilendu Purandare

Dr. Sneha Shah

Dr. Archi Agrawal

Mrs. B. S. Shetye

Ms. P. V. Monteiro

Mrs. S. Mithun

Mr. Ashish K. Jha

Mrs. Mehjabeen A. M. Pathan

Radiodiagnosis



Dr. Meenakshi Thakur
Head

Dr. Supreet Arya

Dr. Shashikant Juvekar

Dr. Subhash Desai

Dr. Subhash Ramani

Dr. Suyash Kulkarni

Dr. Nitin Shetty

Dr. Abhishek Mahajan

Dr. Nilesh Sable

Dr. Palak Popat

Dr. Seema Kumbhavi

Dr. Ashwin Polnaya

Dr. Nikhil Merchant

Dr. Amit Janu

Mr. T.N. Mishra

Mr. W. M. Kulkarni

Mr. P. G. Wagh

Mr. S. V. Kulkarni

Mr. M. V. Salunke

Mr. S. R. Pandit

Mr. B. B. Sangle

The department provides diagnostic imaging services including conventional radiology, computerized radiography, Ultrasonography (USG) & Colour Doppler, Computerized Tomography (CT), Magnetic Resonance Imaging (MRI), mammography and interventional radiology. Its activities also include training for technologists, post-graduate education and clinical research.

The department procured a new **Full Field Digital Mammography with Tomosynthesis** facility that aids in resolving issues related to mammographic data produced due to tissue overlap. It also assists in detection of obscured breast cancers and; in case of dense breasts, it improves the sensitivity and specificity of mammography.

| Sr. No | PROCEDURES | 2013 |
|--------|-----------------------------|-----------------|
| 1 | CONVENTIONAL RADIOGRAPHY | 56,326 |
| 2 | INTERVENTIONAL PROCEDURES | 3,078 |
| 3 | MAMMOGRAPHY | 9,957 |
| 4 | ULTRASOUND / COLOUR DOPPLER | 36,274 |
| 5 | C.T. SCAN | 20,668 |
| 6 | M. R.I. SCAN | 3,994 |
| | Total | 1,30,297 |

The latest equipment is the **MIYABI (HYBRID CT – DSA)** in the interventional suite that provides speed, precision and access to difficult areas during radiological procedures; alleviating patient discomfort and increasing patient safety.

The following table shows the number of investigations performed using various diagnostic modalities. There has been a 6.5% overall increase in the number of tests with a maximum increase in the number of CT Scans performed.

Research

Dr. SM Desai is actively involved with BARC-Mumbai, RRCAT-Indore and IGCAR-Kalpakkam in medical application of synchrotron radiations and laser optics, x-ray microtomography and biomagnetism.

Dr. A Mahajan was selected for MRES exchange program at King's College London, UK.

Education

The department has 25 Junior and 15 Senior registrars and provides specialized training to fellows in Cancer Imaging and Interventional Radiology through post graduate training sessions in all aspects of radiodiagnosis.

The department conducts a two year full time Diploma course in **Medical Imaging Technology**. Short term courses are conducted for technologists in the fields of CT scan, MRI, Mammography and Interventional radiology.

The Department of Medical Physics works in close association with department of radiation oncology for radiotherapy of cancer patients. Calibrations, quality assurance, maintenance of teletherapy and brachytherapy machines, treatment planning and dosimetry, procurements of radioactive sources and radiation safety are some of the important functions of the department.

The department also advises other departments like diagnostic radiology, transfusion medicine, tissue bank, bio-imaging and at ACTREC for their requirements of radiation protection, QA, source procurement and disposal as per the guidelines of the Atomic Energy Regulatory Board (AERB).

Service

The medical physicists are responsible for treatment planning of patients undergoing external beam radiation and brachytherapy. They also calculate treatment time on machines and ensures that accurate dose is given to the patient. The department had 5,562 cases for external therapy 1,481 for complex techniques and 696 cases for brachytherapy.

The department monitors and implements, measures for radiation protection and safety as well as the preventive maintenance of all radiotherapy equipment, in conformance with the AERB rules. The department with the cooperation of BARC/AERB conducts regular seminars on radiation protection and quality assurance.



Research

The latest Image guided ultrasound system was installed as a part of the research project of the department.

Education

The department is recognized for the course for Ph.D in Medical Physics.

Dr. D. D. Deshpande,
Head

Mr. R. A. Kinhikar

Mrs. S. V. Jamema

Mr. Rituraj Upreti

Mr. Suresh Chaudhari

Mrs. V. Somesan

Mr. Y. G. Ghadi

Mr. S. N. Kale

Mr. R. B. Mhatre

Ms. Uditia Upreti

General Medicine



Dr. Aruna Alahari Dhir
Head.

Dr. Sheela P. Sawant

Dr. PTV Nair

Dr. Anuprita Daddi

The Department of General Medicine forms an integral part of patient care because, a large number of patients presenting to the hospital for cancer care have co-existing morbidities and medical complications due to cancer treatment. These include hypertension, diabetes, ischemic heart disease, thyroid diseases, respiratory diseases, thrombosis and drug induced cardiotoxicity.

Service

The department has started three specialized clinics to cater to the additional needs of cancer patients:

- a) **AIDS Malignancy Clinic** enrolls cancer patients who are HIV positive and multidisciplinary treatment is offered.
- b) **Cancer Thrombosis Clinic** manages patients of cancer with venous thrombo embolism.
- c) **Cardiomyopathy Clinic** manages patients who develop chemotherapy-induced cardiac complications.

The department provides diagnostic services like ECG, 2D and 3D echocardiography with Color Doppler, cardiopulmonary stress test, pulmonary function test and Cardio-Pulmonary Exercise Test (CPET).

The pulmonary function laboratory is well equipped with facility for spirometry and diffusion studies.

Cardio Pulmonary Exercise Testing (CPET) plays an important role in pre-op risk stratification of high risk lung and esophageal cancer patients.

The department provides portable ECG and echocardiography services for bedside care. Daily clinical rounds are taken in the Intensive Care Units and, in the wards as and when required.

The department evaluated 14,770 cases, performed 7,446 echocardiograms, 3459 pulmonary function tests and 29,780 electrocardiograms.

The special clinics were attended by: 78 new and 162 cases in aids malignancy; 124 new and 644 follow-up cases in cancer thrombosis and, 50 new & 162 follow-up in Cardiomyopathy Clinics.

Research

1. There is collaboration with investigators from University of North Carolina to study the pathobiology of HIV related cancers (NIH-ICMR).
2. Incidence of anthracycline induced cardiotoxicity in childhood cancer survivors.
3. Study on outcome of patients with anthracycline cardiomyopathy.

Education

The department conducts a fellowship program in infectious diseases, teaching ward rounds and training in echocardiography, infection control, palliative care and oncology nursing.

This clinic conducts routine activities of clinical medical as well as Occupational Health related administrative responsibilities, by co-ordinating with respective administrators. The clinic also manages needle stick Injuries, vaccinating staff against Hepatitis B, conducting pre- employment examination , preparing health-related policies and guidelines. The clinic promotes positive health by encouraging and conducting check-up for early detection of modifiable and treatable risk factor for lifestyle Diseases like Hypertension, Diabetes, Dyslipidemias.

In 2013, the Staff Clinic had approximately 42,327 consultations 353 pre-employment examinations, 477 Hepatitis B vaccinations and 78 needle stick injuries.



Pulmonary Medical Unit

Service

The Pulmonary Medical Unit consists only of Chest Physician, Dr S. P. Tandon. It is a part of the Thoracic DMG and assesses patients referred for respiratory evaluation and management. The Unit has successfully and systematically introduced pre-operative respiratory optimization and preoperative pulmonary rehabilitation jointly with the physiotherapy services and thoracic services for all lung and esophageal surgeries. This would certainly go a long way in reducing respiratory morbidity especially in high risk cases and also help the decision of a surgical option in patients with borderline respiratory fitness improving post aggressive PR. It also participates in Thoracic-Anaesthesia-Pulmonary High Risk Joint Clinics for Thoracic High Risk Surgeries. The Unit has been instrumental in creating an increased awareness of respiratory co morbidity amongst all clinicians in TMC resulting in a steep increase in Chest Physician referrals to Pulmonary Medical Unit over the past few years. In the year 2013 over 5000 outpatient cross-referral consultations were recorded as compared to an initial of 900 in the first year of its inception in 2006.

Research

The Pulmonary Unit has been involved as Co-Investigator in a number of projects across various DMGs. More clinically relevant projects are currently in the pipeline.

Education

The Unit has managed over the past few years to create an increasing awareness of the need for diagnosing and treating respiratory comorbidity, either pre-existent or iatrogenic (post therapy like chemo or RT) in cancer patients, resulting in a steady increase in referrals from all clinicians.

Dr S. P. Tandon

Dr. P. P. Rajput

Nursing



Mrs. Swapna Joshi
Nursing Superintendent

Mrs. Sulochana Retnamony
Dy. Nursing Superintendent

Ms. Manorama Anilkumar

Ms. Sindhu Nair

Ms. Carmine Lasarado

Ms. Shweta Ghag

Nursing Education:

Ms. Maria Carvalho
Professor cum Principal

Ms. Anita D'Souza
Profesor cum Vice Principal

Ms. Prathepa Jagdish
Lecturer

Ms. Anita Deodhar
Nurses Advisor

The nursing department is the backbone of this hospital. The department provides appropriate and qualified nursing staff to all the service departments. Specialized nursing is an important aspect of cancer nursing.

A team of trained specialist nurses provide care to cancer patients in the areas of breast cancer, cardiopulmonary resuscitation, central venous access devices (705 cases), infection control, pain management, palliative care, stoma therapy (4213 cases).

A separate team of nurses provides nursing care to patients with breast cancer including counseling following surgery.

Patients with gastrointestinal cancers have a special requirement in certain situations when they are provided with a stoma for either feeding or the passage of faeces or urine. These require specialized care which is provided by trained nurses through a clinic.

Long term venous access is another specific requirement of patients who receive chemotherapy. This insertion and care is provided by the specialist catheter nurses.

Prevention and control of healthcare associated infections is an important function of any healthcare facility. This is achieved with specialist Infection control nurses.

The critical care units at TMC are managed by specialized and highly skilled critical care nurses.

Chemotherapy is administered routinely in the day care units by nurses with specialized training in both the delivery of care and the management of complications. All the nursing staff are trained and capable of delivering cardiopulmonary resuscitation.

Research

The research interest of the department focus on the role of nutrition and nutritional problems in patients undergoing treatment for various cancers. There are several studies on the role of knowledge and practice of nursing care in specialized cancer nursing and coping strategies of patients undergoing treatment for cancer.

Education

Regular teaching classes, audits and performances are accessed by the senior staff to provide optimal service to the patients.

Besides, regular CPR training is offered to our staff and students to upgrade and hone their skills.

The department provides post graduate education in MSc Nursing and a Diploma in Oncology Nursing.

The Tissue Bank is a unique facility that provides processed, gamma-sterilized human bone and amnion for the treatment and rehabilitation of patients with a wide variety of disease conditions.

Service

In 2013 the Tissue Bank motivated 1179 amnion donors and 1320 bone donors, resulting in a 10% increase in the number of grafts in 2013. These included 6279 bone grafts, 2347 amnion dressings and 1377 chorion grafts.

Table 1:
Number and Type of Allografts Produced

| Grafts | 2012 | 2013 |
|-----------------------------|-------------|--------------|
| Amnion | 2140 | 2347 |
| Chorion | 937 | 1377 |
| Bone Granules | 1290 | 1464 |
| Demineralised Bone Granules | 3230 | 3465 |
| Freeze-Dried Bone Blocks | 1098 | 700 |
| Demineralised Bone Blocks | 215 | 91 |
| Frozen Bone | 118 | 142 |
| TOTAL | 9028 | 10003 |

8660 grafts were used in TMH and for over 400 hospitals and nursing homes across the country. In 63 TMH patients, 162 bone grafts were used for biological reconstruction of the defects produced by ablative surgery for cancer, helping to restore limb function. 6117 bone grafts were used outside TMH, to reconstruct skeletal defects, augment fracture healing and, in knee replacement and revision hip arthroplasty. The demand for bone granules for use in the treatment of periodontal osseous defects continued to increase from 2,738 in 2012 to 3,912 in 2013.

1,587 amnion dressings were used in 243 TMH patients for the management of radiation ulcers, bedsores and surgical wounds; thus contributing to better radiotherapy outcomes and improved quality of life. Additionally, 1,135 amnion dressings were used for the treatment of burns, bedsores and diabetic ulcers, in orbital and ocular surface reconstruction and, in vaginoplasties. 782 chorion grafts were used



as barrier membranes in guided oral tissue regeneration.

Research

The bank completed a project undertaken in collaboration with the Nuclear Physics Division, BARC, to determine the co-relation between trace elements and osteoporosis. Results of a study with IIT, TIFR, and UB-DAE, CBS, which looked at validating the tissue bank protocols and developing bone substitute scaffolds, were presented at the Annual Congress of the European Association of Tissue Banks. An IAEA supported project is being conducted with the department of radiation oncology to assess the clinical use of irradiated amnion dressings in the management of moist desquamation following radiotherapy.

Education

Lectures on tissue banking formed part of the training programmes of the National Deceased Donor Transplantation Network, Zonal Transplant Co-ordination Centre and Bombay Orthopaedic Society. Public and professional awareness programmes were held to promote tissue donation and utilization and, a hands-on training programme in tissue banking was held. Assistance was provided for setting up a Bone Retrieval Centre in Nagpur.

Dr. Astrid Lobo Gajiwala,
Head

Mrs. Urmila Samant

Mrs. Cynthia D'Lima



Dr. M. V. Joshi, Head
Mrs. M. C. Pusalkar
Mr. J. G. Sharma

The main focus of the Digital Library services as information resource centre is to facilitate on desk access to resources, support and satisfy the information needs for patient-care, academic and research activities and, also support creation, dissemination and effective use of new knowledge. It also supported information needs of medical and biomedical professionals from other hospitals, educational institutes and industry. The library offers range of services viz. core updated oncology information focusing on organizational activities, document supply, database search and Inter Library Loan. It also attended to general queries made by the members/visitors.

Services

The library holds a specialized collection of over 7810 printed books, more than 20000 bound journals, 15210 articles were indexed and continued subscription to 177 journals in print and electronic format. During this year, 129 electronic books, 115 e-journals and 4 databases were made accessible across the campus, further facilitating continuous campus wide access. Subscription to four new journals was initiated and subscription to e databases viz., CINHAI and BNF was renewed. The access to Science Direct through the DAE consortia was highly used and it satisfied clinical, social sciences and humanities information needs.

Apart from routine services, the library focuses on two main services viz., campus wide online access and document supply. The library resources are often used remotely via web access. The library witnessed a steady footfall (21,567 including TMH members and visitors) in the library for various types of information requirements: to study, use materials, use of computers and scanners, attend classes and tutorials, consult library staff, conduct literature research and refer to print materials.

Document supply is the most used service of the library and is availed by TMC members, libraries across country, industry and individual visitors. Six hundred and twelve (612) document supply requests for a total of 1819 scholarly articles were received by the library. Of these 75 % requests were received through web-based electronic form feeds and were electronically satisfied, thus reducing support time. The requests were supported from the library collection and through inter library loan service. However, the library observed decrease of 22% in document request, cause of which can be associated to campus wide access, and constant training for effective use of library & library resources.

Staff publications were collected and collated with appropriate preface, contents and indexes.

Research

Analytical research of usage data of resources accessible on subscription and on trials, help in deciding the renewals and additional subscriptions.

Education

The training programs were designed to impart information literacy skills to end users, and were continued through-out the year. These programs covered search skills, databases and search interfaces, bibliographic / citation management tools and were focused and designed for dedicated subject and type of end user group. About 80 end-users benefited through four tutorials organized during the year. The library inducted one library trainee for practical knowledge.

This department is involved in developing and integrating all medical and administrative data in electronic format with its management, storage, retrieval and distributing across the hospital network. This is with the view of keeping the environment near-paperless.

Its web based services provide the facility to individuals for registration, payment and donations. It also provides information regarding online patient services, schedule of charges, service directory for laboratory investigations, international patients' advisor, online donation and annual holiday list.

Service

Information Technology Department plays a pivotal role in the day to day functioning of Tata Memorial Hospital in all the three major areas i.e. Service, Education and Research. All activities of the hospital are computerized. Hospital Information System runs 24x7 on a DB2 Database with IBM power Server with High Availability & Disaster Recovery features. The front end software is developed in Visual Basic and NET. The main features of the system are modularity, scalability, built in security and flexibility to take care of unforeseen situations.

During 2013, many applications were developed which allowed better delivery of patient services. Software maintenance, hardware maintenance, network monitoring and supervision, user training, various trouble shooting procedures, solving day-to-day user problems, data analysis, conducting meetings with users etc. are the major departmental activities.



IT for Patient care:

The Smart Card facility makes in-house transaction cashless and enables viewing of medical records and avail of various travel concessions. For the ease of patients within the institution, electronic kiosks have been made available in convenient locations. SMS messaging services have been introduced for appointment reminders and the availability of their finalized reports, wherever applicable. Patient consent forms are now completed using finger-print scanning. Browser based Diagnostic Information System is available for the benefit of the clinicians. Registry is prepared for Tumor Marker laboratory along with development of Document Management Projects for Pathology and Haemato-pathology departments.

Web based modules have also been introduced for administrative activities like purchase, leave records, etc.

Mr. M.S. Mangrulkar
IT Manager - TMC

Mr. V.N. Marathe

Mr. S.K. Sinha

Mr. P.M. Kalsekar

Mrs. S.R. Joshi

Mrs. C. R. Nimje

Mr. M. S. Chavan



Medical Administration



Dr. Narayan HKV,
Medical Superintendent
Dr. S.Tandon
Mr. P. L. Naigoankar
Mrs. Swapna Joshi
Mr. R.G.Sawant
Mr. M.S.Patil
Ms. N. Dalvi
Dr. Anuradha Daptadar
Dr. Manjusha Vagal
Ms. Chitra V Hingnekar

The Medical Administration is responsible for supervision and facilitation of patient care activities. These activities include registration and evaluation of patients, ambulatory care, wait listing and admission, patient grievance redressal and, patient safety and quality assurance .

The functioning of the following departments is facilitated:

- Nursing
- Central Textiles Supplies Department
- Staff Clinic
- Medical Social Service.

Monitoring of feedback has been instrumental in timely interventions for rectifying mistakes. A non punitive approach has encouraged reporting of incidents compromising patient care. Standard Operating Procedures are made available on the online Information System - Disha.

The Quality Manager has conducted internal audits on periodic basis including the Research Component towards fulfillment of norms for accreditation by the **Association for the Accreditation of Human Research Protection Programs** (AAHRPP).

Several initiatives were taken to augment patient care services like Smart Card transactions, Information Kiosks for registration, etc.

Education

Medical Administration receives students of hospital administration as Interns and Observers and also conducts training programs for medical secretaries.

Medical Social Services is responsible for facilitating financial and social support to the needy cancer patients.

The Medical Social Worker addresses the challenges faced by poverty, illiteracy, lack of basic amenities in villages and low health budget. By facilitating accommodation and finance, they improve treatment compliance and minimizing dropouts. The financial support is extended by assessing patients' social status for waivers of hospital charges.

The support was extended to 23,500 patients, of which 3400 were given free treatment (No Charge category). Seventy patients were provided with free accommodation and nearly 900 patients were provided accommodation at Borges Home, which is the extended housing for patients. More than Rs Six million were raised from different philanthropic organizations and individual donors. Three hundred and sixty patients were helped with nutritional supplements and about Rs. 2,00,000/- were utilized for railway concessions.

Medical Social workers also organize several activities for patients on the occasion of festivals, excursions, and other educational programs.

Central Sterile Supplies Department

This service is the life line of the hospital. The department services the entire hospital including the 23 operation theatres with sterile equipment and supplies. The department is well equipped with five state of the art steam sterilizers, one ethylene



oxide sterilizer, one plasma sterilizer, two washer disinfectors and one ultrasonic cleaning machine. The department provides uninterrupted service for patient care needs with twenty loads of steam sterilizers, 30 cubic feet materials, one load of 5 cubic feet of gas sterilizer per day and 6-8 loads of 5 cubic feet of plasma sterilizer per day. Several other items like gowns, linen packs, gauze gloves etc are all sterilized and or provided to service the needs of the hospital.

Medical Social Service

Mr. M. S. Patil, OIC

Mrs. N. A. Dalvi

Central Sterile Supplies Dept.

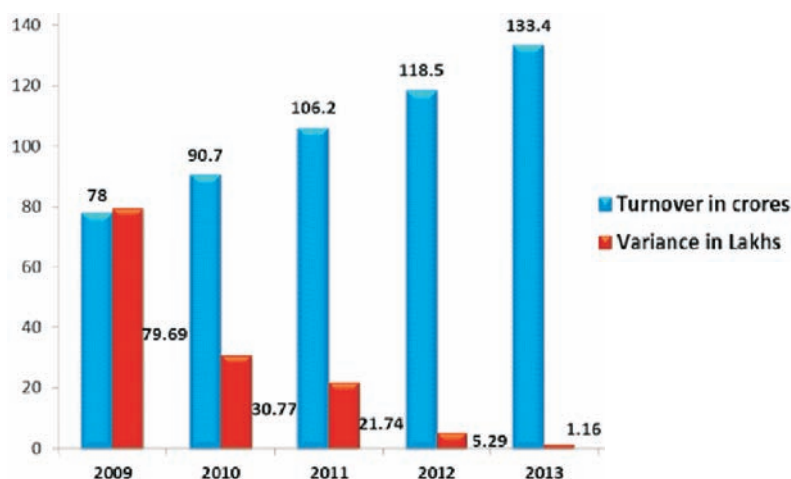
Mr. R. G. Sawant

Pharmacy

The in-house hospital pharmacy supplies drugs to majority of the patients treated. The pharmacy offers medicines at a discounted rate functions at a no profit no loss basis. An 11% increase in turnover was recorded in one year.

Pharmacy

Mr. P. L. Naigaonkar



Pharmacy Turnover



Dr. Venkata V.P.R.P,
Chief Administrative Officer, TMC

Mr. G.S. Dhanoa,
Chief Engineer, TMC

Mr. A.N. Sathe
Senior Administrative Officer

Mr. S.H. Jafri,
Senior Public Relations Officer

Mr. R.P. Jaiswar,
Senior Personnel Officer

Mr. P.K. Sukumaran,
H. R.D. Officer

Mrs. Indira Pasupathy,
Joint Controller (F & A), TMC

Mrs. S.E. Brid,
Purchase Officer

Mr. Johnson Lukose,
Deputy Chief Security Officer

Mr. G.S. Madhav,
Technical Officer

Mr. R. Kotian,
Administrative Officer

Mr. A.L. Kuvalekar,
Stores Officer

Administration

A sound administrative division functions in perfect unison with the medical departments to ensure smooth functioning of the Tata Memorial Centre.

The **Chief Administrative Officer** is ably supported by a team of officers such as Chief Engineer and his team, Sr. Public Relations Officer, Sr. Personnel Officer, Sr. Administrative Officer, HRD Officer, Joint Controller (F & A), Purchase Officer, Dy. Chief Security Officer, Administrative Officer and Stores Officer.

An approximate amount of Rs 17 lakhs was disbursed to employees as advance towards housing, motor cycle, motor car, computers, etc. The Administration supported 445 employees for National Deputation and 224 employees for International Deputation during the year. The administration added 414 members, received 710 claims of which 410 were sanctioned under Contributory Health Service Scheme (CHSS). During the year 2013, a total 102 requests were received under Right to Information Act, 2005 and information was provided within the stipulated period. In addition 16 appeals were received which were resolved within the stipulated time limit. During the year, the First **Appellate Authority** received 16 appeals which were resolved within the stipulated time.

Human Resource (HR) is focused on management and development of human resources within the organization to achieve its objectives. H.R management involves functions like recruitment and development, performance management and motivation of man power. During the year, the department recruited 53 medical and non medical personnel and a special recruitment drive for filling up the backlog of vacancies reserved for SC/ST/OBC/PH quota was conducted and a total 20 SC/ST/OBC/ quota vacancies were filled. Twenty employees superannuated during the year. Green initiative was undertaken in order to reduce the usage of papers.

Various short term and long term training programs were conducted for doctors, nurses and technicians. Training programs were also organized for paramedical and administrative staff and were deputed to programs at DAE and Institute of Secretariat Training and Management.

The **Accounts Department** is responsible for receipting; billing and settlement of accounts to the different categories on patients i.e. cash paying, smart card, trust and company referred. The department is also responsible for budgeting, utilization of the plan and non-plan grants, submission of various reports to DAE regarding utilization of funds and status of plan projects.

During the financial year 2013-14 Non-Plan grants of Rs.200.93 Crore was received which was fully utilized. Though the Revised Estimates was reduced from Rs.204.26 Crore every effort was made to provide services within the approved budget. The hospital receipts of the centre were Rs.189 Crore approximately. The expenditure for the period under report was Rs.390 Crore approximately. The Plan grant of Rs.146 Crore sanctioned and released during the year was fully utilized as proposed.

In order to cope with the patient load, services were provided on smart card for all categories of patients across the hospital. Tata Memorial Centre has also received a Certificate of Excellence for the project "Implementation of Smart card for cashless Transactions and Paperless Operations" during the Global Conference on Financial Inclusion & Payment Systems conducted by

Elets Technomedia Pvt. Ltd. The Integrated Financial Management System was developed and introduced during the year. Parallel run of the FMS with the existing system is being carried out.

Personnel Department organized training program for labor staff through Institute of Psychological Health (IPH) and Central Board for Worker's Education, Ministry of Labor & Employment, Govt. of India. The Centre has the backing of 852 number of labor staff who play an important role in the areas of cleanliness, transport of specimens, documents etc. which are important functions in delivery of care. All the labor staff were trained on behavioral aspects, communication, family budget, dignity of labor, absenteeism, etc. Weekly meetings were conducted with the recognized union to resolve the common issues for smooth functioning of the hospital work including patient care. Allocation of man power to different wards, departments and sections was fulfilled to maintain a high standard of cleanliness and hygiene. Personnel department also succeeded in providing mediclaim cashless benefit to labor staff governed under Brihanmumbai Municipal Corporation (BMC) rules and this benefit still continued.

The **Purchase Department** is involved in the procurement of consumables as well as capital equipment. It facilitated acquisition of capital equipments and consumables worth Rs. **60 Crores** from Import Cell through rate contract finalisation as well as the non-rate contract procurement. Consumables, spares, worth **Rs. 51 Crores** from Non Rate Contract and reagents, consumables and other essential services for the hospital worth **Rs. 100 crores** through its automated systems.

Condemnation and Disposal cell has disposed off routine scrap of 350 Kg. per day i.e. 128 tonnes approx. amounting to Rs. 14,77,113/- during the year.

The **Security Department** ensured safety and organized special talks on the importance of vigilance. Vigilance Awareness Week was organized from 28.10.2013 to 02.11.2013 and a pledge in Hindi and English was administered. As a part of Vigilance Awareness Week, Shri Vishwas N. Nangare - Patil, IPS, Additional Commissioner of Police, West Region, Mumbai delivered a lecture on "Promoting Good Governance – Positive Contribution of Vigilance".

During the year, five vehicles were condemned and replacement for the same was procured to strengthen the transport section. The department was applauded for the security arrangements during the visits of various dignitaries including the Honorable Prime Minister, Dr Manmohan Singh.

The **Engineering Department** comprises of Civil, Electrical and Mechanical sections, which facilitate smooth functioning of hospital by ensuing regular repairs and undertaking development of new engineering requirements to support the hospital. The air conditioners, equipments and other machinery, and utilities were maintained by this department.

The major projects undertaken at ACTREC by the department were a) Centre for Cancer Epidemiology, built up area approx. 60,000 sq. ft. with approx. cost of Rs. 23 crores. b) Radiological Research Unit, built up area approx. 60,000 Sq. ft. with approx. cost of Rs. 35 crores. c) Hematolymphoid Block, built up area approx. 1,40,000 Sq.ft. with approx. cost of Rs. 42 crores. d) Archive & Record Storage, built up area approx. 15,000 sq. ft. with approx. cost of Rs. 3.5 crores. All these buildings are designed as Green Building. These projects are likely to be completed in phased manner by 2016.

The department is also coordinating with the Engineering Procurement & Construction (EPC) Consultants for the upcoming Projects at Haffkine's plot (5 acres) recently allotted to Tata Memorial Hospital for construction of Hadron Beam Therapy with Woman and Children Wing, hostels for doctors and dormitory for patients.

The **House Keeping Department** ensures the high standard of cleanliness by way of meticulously planning the schedule of cleaning, allocating right manpower at the right places in right quantities with precise instructions and then ensuring that they are implemented correctly by personal inspections. Besides cleanliness, House Keeping Department also made floral arrangement for various events that had taken place at the Centre.

Tata Memorial Hospital has **Centralized Stores** which is segregated in to two sections i.e. Receiving and Issuing section. Main function of stores is receipt and issue of all the items except drugs. Stores system is fully computerized. All the receipt, issue and inventory control is done through computerized system. In the Stores





Department there are 375 items kept on stock to fulfill the urgent and regular requirement of the various Wards / OPDs / Labs. / Dept. etc.

Physical verification of stock items was carried out during the year and no discrepancy (zero %) was observed in ledger and physical balance of stock items during annual stock taking. Stores department maintains minimum inventory of stock items which are daily required by all user department and all are consumables in nature. During the financial year, the consumables procured amounting to Rs. 407 lacs and issued to various users of Rs.401 lacs.

The Food Service Department in liaison with dieticians offer dietary requirements in the wards for patients, catering service in the cafeteria, during conferences, hospital meetings and any other special events. The department has developed “3 E” approach to quality improvement. Exceptional Service, Enhanced Nutrition Care and Excellent Food. The department daily caters almost 1500 people - doctors, nurses and patients.

The **Public Relations Department** has been at the forefront in patient care delivery not only by observing and monitoring, but also by actively getting involved with both the admitted as well as OPD patients. The Public Relations staff regularly meets the patients, collect information from them with the help of questionnaires, so as to improve patient care services.

Helpline has been functioning under Public Relations Department with the view to co-ordinate and streamline the activities of various NGO'S and individual volunteers to offer maximum help to the patients in the form of financial help, counseling and guidance as well as distribution of various items like food, clothes, toys etc. received as donations.

Life Insurance policy claims are processed by the Public Relations Department to prevent any hardships to the relatives of patients and 186 death claims were processed during the year.

‘Hindi Fortnight’ an annual event was celebrated with various competitions in Hindi like essay writing, debate, spelling, knowledge of official words, singing etc.

Patient Support Services

TMC patients receive support from a large number of non-governmental organizations.

This support helps in the delivery of holistic care to patients. The following is a brief account of these organizations.

CanKids: provides emergency medical assistance, adoption of retinoblastoma and Wilm’s tumor patients, non formal education at the “Chattai” clinics held in OPD, formal education at “CanShalla”, which is a special school for cancer children, parent support group forums and awareness and advocacy initiatives.

Cuddles Foundation: provides nutrition support by giving a constant supply of nutrition products to both indoor patients and out patients. Full time dieticians support the pediatric division; and a supply of infection control products are provided.

Indian Cancer Society: provides emergency funds for treatment initiation, and complete financial adoption of many patients every month. It also offers counseling and rehabilitation services to the patients.

JASCAP: provides financial assistance and maintains a book stall at the hospital in which they provide books on cancer information in various languages.

LittleMore: helps with birthday celebrations of the children, edutainment and educational support to the patients.

Make A Wish Foundation: Helps identify and fulfills the wishes of the patients taking treatment at the hospital. The wishes, involves giving them simple toys to celebrity visits, which is an all time favorite of the children.

Sadbhavana Kendra: provides counseling, financial support planning, funds for treatment, accommodation support and most importantly bereavement support to the families of the children whose children succumb to the disease.

St. Jude India Childcare Centers: Provides the children a clean and secure place to stay in while on treatment at the hospital. Their “home away from home” concept has been a big support to the department over the years.

Tarun Mitr Mandal: helps out with financial assistance and birthday gifts for all the pediatric birthday celebrations at the hospital.

V Care: Helps supervise the toy room in the pediatric ward, provides infection control kits for all the general patients in the pediatric

ward, financial assistance and also aid for the retinoblastoma patients.

V care helps counseling of all patients in the hospital through their volunteers.

Vasantha Memorial: provides counseling to the families and also helps with financial assistance for leukemia patients.

All these and many more organizations help us ensure that each and every child coming to the hospital is given proper care from the beginning to the end of their treatment.

ImPaCCT Foundation:

This is an acronym for “**Im**proving **Pa**ediatric **C**ancer **C**are and **T**reatment Foundation”, was established in October 2010 to ensure that every child with cancer coming to TMH receives treatment and other support regardless of the family background. Since childhood cancers are highly curable but the treatment is intensive and prolonged, it takes more than just finances to treat a child with cancer. Therefore, the activities of ImPaCCT Foundation are structured in order to meet these needs.

This foundation helps to raise funds, arrange accommodation, provide nutrition, arrange for blood donors, help in bereavement and thereby assist in holistic care to pediatric patients.

After Completion of Treatment (ACT) Clinic

Improvements in therapy for childhood cancers over last several decades has led to excellent survival in developed countries. Studies of large cohorts of childhood cancer survivors in Europe and North America have well documented the probability of various late effects & their adverse impact on Quality Of Life (QOL). The potential public health implications of such large number of high risk individuals in society have thus become evident. There is an increasingly perceived need for optimal delivery of life-long health care to this growing, vulnerable population. Pediatric oncologists in developing countries are currently preoccupied with refining delivery of care to attain survival rates which are comparable to developed world. However, they have an obligation to actively build long term follow up & survivorship programme as integral part of Pediatric Oncology initiative. Childhood cancer survivors receive highest quality care during

the active phase of their treatment, but can be lost in transition to the more passive follow up phase of survivorship.

A long term follow-up clinic for survivors of childhood cancer was initiated at Tata Memorial Hospital in February 1991 drawing inspiration from the model of care established at St. Jude Children Research Hospital, USA. This clinic was appropriately named **After Completion of Treatment (ACT)** clinic to emphasize that **ACTs** are needed beyond treatment to achieve **²CURE²** in its full dimensions. The aims of the clinic are

- ❖ To monitor growth, development & sexual maturation of survivors
- ❖ To monitor late effects of therapy.
- ❖ To address psycho-social problems of the survivors
- ❖ Rehabilitation for useful productive adulthood
- ❖ To provide feed -back for future protocol modification to obviate/ minimize late effects

From Feb 1991 to December 2012, cohort of 1436 survivors (off therapy and disease free for >2 years) has been created in ACT clinic. These survivors are followed up in a longitudinal manner at the frequency depending on probability of risk of late effects. 158 survivors were enrolled & added to this cohort while 788 survivors were followed up in ACT clinic from Jan 2013-Dec2013,...

UGAM

Adolescent & Young Adult Mumbai based survivors from ACT clinic, inspired by survivors from across the globe with whom they interacted during International Society of Pediatric Oncology (SIOP) Meeting in October 2007, came together on 7th June 2009,(first Sunday in June), celebrated as Cancer Survivors Day by the National Coalition for Cancer Survivorship (NCCS). They formed a voluntary support group,**UGAM** under the survivorship programme of Indian Cancer Society & have made pioneering efforts in bringing **Cancer Survivorship issues** from the closet to the public domain. **UGAM** means “**To Rise**” underscoring determination of childhood cancer survivors to rise above all obstacles in life & be **VICTORS**.. They are functioning with following vision and mission:





Vision-

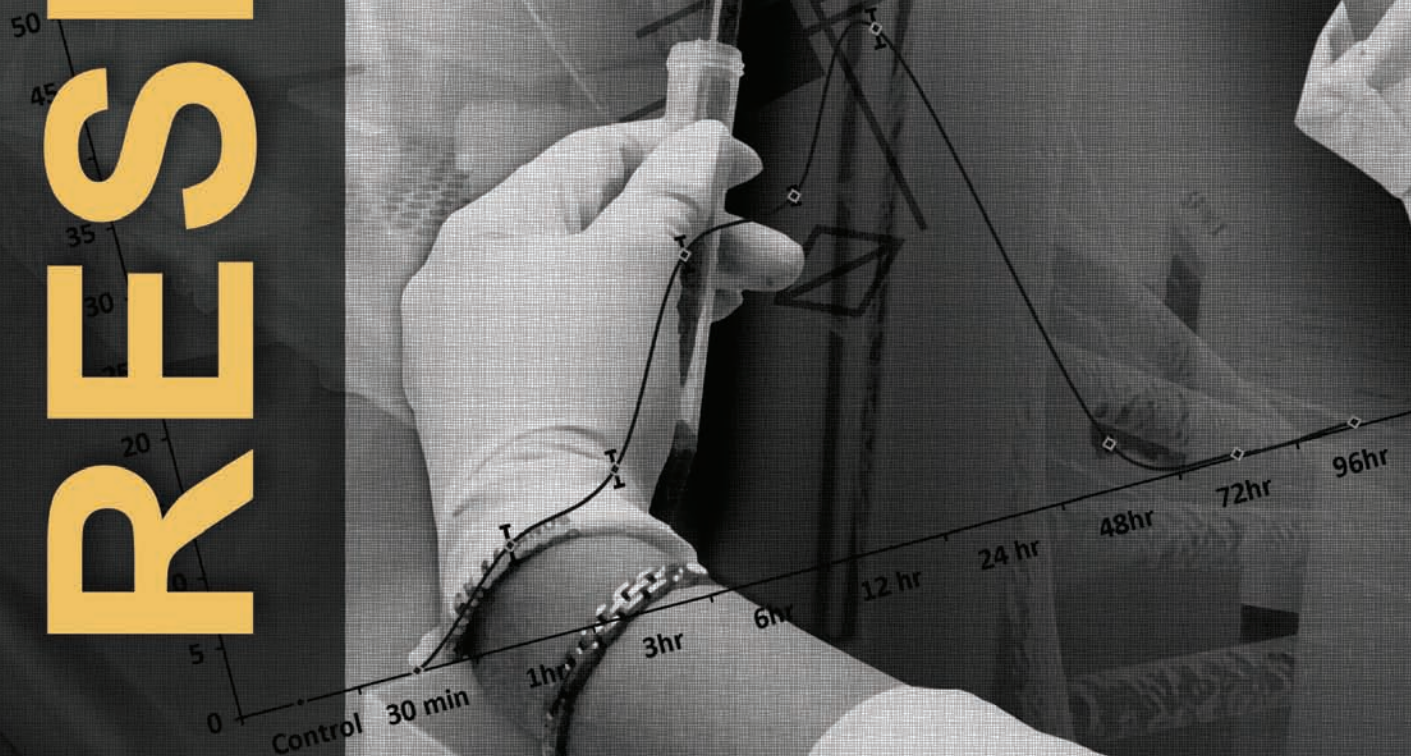
- To ensure that every childhood cancer survivor finds his/ her way to celebrate life after winning battle with cancer.
- To facilitate their life's journey on correct path & in right direction.

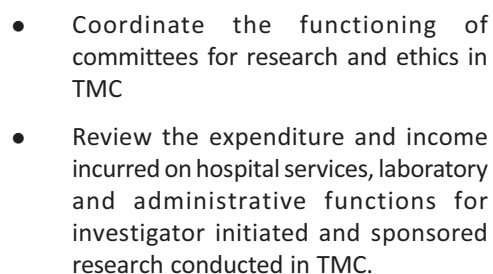
Mission-

- Self-empowerment of the young survivors.
- Helping children with cancer currently undergoing treatment.
- Social awareness and re-bonding with society.



RESEARCH





The committee had three meetings during the year to discuss different policies pertaining to clinical research. The specific issues discussed were insurance policy for research projects, accreditation of Ethics Committees by Association for the Accreditation of Human Research Protection Program (AAHRPP) and intramural funding.

The main objective of this council is to support and improve the quality of basic, translational and clinical research in TMC with specific focus on the following areas:

- Periodically review the progress of scientific and clinical research
- Set directions, priorities and thrust areas for research
- Suggest and review proposals for collaborations within TMC and with other National and International Institutions
- Review sponsored research proposals for feasibility

The aim of Clinical Research Secretariat (CRS) along with Department of Atomic Energy Clinical trials unit (DAE-CTC) is to facilitate high quality research at Tata Memorial Centre. Along with DAE-CTC unit CRS has been promoting research through support for clinical trials, propagating the practice of evidence based medicine and education and training of researchers and trial coordinators.

In 2013 one of the very important landmark randomized trial in metastatic breast cancer which has been supported by DAE CTC funds was presented in one of the international breast cancer conference. Apart from this, several path breaking clinical trials in various spheres of oncology have been supported by the CRS/DAE-CTC. This support has been in the form of infrastructural, trained manpower, study design, statistical assistance, data management and analyses, data monitoring etc. DAE-CTC funded 15 new clinical trials, provided statistical assistance for 90 new studies, Software assistance for 5 projects and supported translations for informed consent for twenty seven studies. It also supported ten conferences.



In its continuous efforts to promote the practice of evidence based medicine, the EBM meeting for 2013 focused on Thoracic & Foregut Cancers and Multiple Myeloma. Two EBM books were released during the conference.

The DAE-CTC conducts two courses in Clinical Research Methodology and Good Clinical Practices every year. Two hundred and fourteen participants were trained in conduct of clinical trials and three hundred and sixteen participants received training in Good Clinical Practice.

Dr. Ashwini Budrukhar,
Officer In Charge



Institutional Ethics Committee (IEC)

Dr J V Divatia
Member Secretary, IEC I

Dr S Laskar
Member Secretary, IEC II

The Institutional Ethics Committees (IECs) are constituted by the Director, Tata Memorial Centre (TMC) under authority vested by the Governing Council of the TMC.

As per the Drug Controller General India (DCGI) requirement, the IECs were registered in May 2013 and renamed as Institutional Ethics Committees (IEC-I, II). Both Institutional Ethics Committees function with the same purpose and SOPs.

IEC-I has Ethic Committee Registration No. ECR/170/Inst/MH/2013 issued under Rule 122DD of the Drugs & Cosmetic Rules 1945

IEC-II Ethic Committee Registration No. ECR/414/Inst/MH/2013 issued under Rule 122DD of the Drugs & Cosmetic Rules 1945.

IEC has a Federal Wide Assurance (FWA) with the Department of Health and Human Services (DHHS) through the Office for Human Research Protections (OHRP). The assurance number is FWA00006143. This is periodically renewed as required.

IEC is also registered with HHS and has IORG Nos. IRB00003414 & IRB00007802 for IEC-I & IEC-II respectively. This is periodically renewed as required.

The terms of reference are as follows:

- Ensure the highest scientific and ethical standards of research at TMC

- Review and approve proposals for clinical, basic or translational research projects (Intra and Extra mural) for scientific and ethical content
- Improve ethical standards and issue guidelines on ethical dilemmas related to patient care services
- To function as a forum to advise the administration in case of any ethical issues that may arise from patients, families or public
- To maintain our leadership as a national standard of reference in all fields
- To issue and periodically, update and revise SOP's and guidelines for effective functioning of IEC as and when necessary
- Continuing education in clinical research bioethics and ethical aspects of clinical practice by seminars, workshops and interactive discussions for all categories of staff members including nursing and paramedical staff
- To initiate and commission research studies on ethical aspects of practice in TMC

The IEC endeavours to provide guidance on a broad range of topics such as disclosures of diagnosis, diagnosis of brain death, indications for stopping resuscitation, true informed consent, etc.

The members of the IEC –I and IEC - II

Institutional Ethics Committee-I

Registration No. ECR/170/Inst/MH/2013

| Sr. No. | Name | Affiliation | Gender | Expertise |
|---------|--|---|--------|----------------------------|
| 1. | Dr. Tapan Saikia, Chairperson | Head of Medical Oncology & Research Director, Prince Aly Khan Hospital, Mazagaon, Mumbai | Male | Medical Oncologist |
| 2. | Dr. Nithya Gogtay, Co- Chairperson | Professor, Clinical Pharmacology, KEM Hospital | Female | Clinical Pharmacologist |
| 3. | Dr. J. V. Divatia, Member Secretary | Professor and Head, Department of Anaesthesia and Critical Care & Pain, Tata Memorial Hospital, | Male | Anaesthetist |

| Sr. No. | Name | Affiliation | Gender | Expertise |
|---------|-------------------------------------|---|--------|---------------------------------------|
| 4. | Dr. Pradnya Talawadekar, Member | Country Co-ordinator for India Association of Children Palliative Care Project | Female | Medico- Legal expert |
| 5. | Mr. P. K. Rao, Member | Founder/ Trustee of JASCAP, Jeet Association for support to Cancer patients since 1996 | Male | Lay person |
| 6. | Dr. A. Lobo Gajiwala, Member | Head, Dept. of Tissue Bank, Tata Memorial Hospital | Female | Theologian |
| 7. | Dr. N. Shirsat, Member | Associate Professor, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC) | Female | Basic Scientist |
| 8. | Dr. Medha Joshi, Member | Head, Dept of Library Sciences, TMH | Female | Social scientist/ Library Sciences |
| 9. | Dr. Sarbani Ghosh Laskar, Member | Associate Professor, Dept. of Radiation Oncology, TMH & Member- Secretary, Data Safety and Monitoring Subcommittee, TMH | Female | Radiation Oncologist |
| 10. | Dr. R. Jalali, Member | Professor, Dept of Radiation Oncology, TMH | Male | Radiation Oncologist |
| 11. | Dr. George Karimundackal, Member | Associate Professor, Dept. of Surgical Oncology, TMH | Male | Surgeon |
| 12. | Dr. Hari Menon, Member | Associate Professor, Dept of Medical Oncology, TMH | Male | Medical Oncologist |
| 13. | Dr. S.L. Juvekar, Member | Professor, Dept of Radiodiagnosis, TMH | Male | Radiologist |
| 14. | Dr. Tanuja Shet, Member | Professor, Dept. of Pathology, TMH | Female | Pathologist |
| 15. | Dr. Manju Sengar, Member | Associate Professor, Dept. of Medical Oncology, TMH | Female | Medical Oncologist |



| Sr. No. | Name | Affiliation | Gender | Expertise |
|---------|--|---|--------|----------------------------|
| 1. | Dr.(Mrs) Urmila Thatte, Chairperson | Professor & Head, Dept. of Clinical Pharmacology, KEM Hospital | Female | Clinical pharmacologist |
| 2. | Dr. Vinay Deshmane, Co-Chairperson | Consultant in Surgical Oncology & Breast Diseases, P.D. Hinduja National Hospital & Medical Research Centre | Male | Surgeon |
| 3. | Dr. Siddhartha Laskar, Member Secretary | Professor, Dept. of Radiation Oncology, Tata Memorial Hospital | Male | Radiation Oncologist |
| 4. | Dr. Vikram GS, Member | Clinical Pharmacologist, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC) | Male | Clinical Pharmacologist |
| 5. | Dr. Subodh Sirur, Member | Dermatologist, Mahatma Gandhi Memorial Hospital & Consultant at Medlawindia | Male | Medico-legal expert |
| 6. | Dr. Mrunal Marathe, Member | Counselor on Children's Palliative Care (CPC) | Female | Social Scientist |
| 7. | Mrs. Manisha Naikdalal, Member | Member of Ethics Committees at KEM, Hospital (ECRHS)& Hinduja Hospital(CREC) | Female | Lay Person |
| 8. | Dr. T. Teni, Member | Scientific Officer, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC) | Female | Basic Scientist |
| 9. | Dr. Vani Parmar, Member | Associate Professor, Dept. of Surgical Oncology, Tata Memorial Hospital | Female | Surgeon |
| 10. | Dr. Prachi Patil, Member | Associate Professor, Dept. of Digestive Diseases and Clinical Nutrition, Tata Memorial Hospital & Jt. Secretary, Data Safety and Monitoring Subcommittee, TMH | Female | Gastro- enterologist |
| 11. | Dr. M H Thakur, Member | Professor & Head, Dept. of Radio-diagnosis, Tata Memorial Hospital | Female | Radiologist |

| Sr. No. | Name | Affiliation | Gender | Expertise |
|---------|--------------------------------|--|--------|-----------------------------------|
| 12. | Dr. Umesh Mahantshetty, Member | Associate Professor, Dept. of Radiation Oncology, Tata Memorial Hospital | Male | Radiation Oncologist |
| 13. | Dr. P.N. Jain, Member | Professor, Dept. of Anaesthesia, Tata Memorial Hospital | Male | Anesthesiologist & Pain physician |
| 14. | Dr. Kedar Deodhar, Member | Associate Professor, Dept. of Pathology, Tata Memorial Hospital | Male | Pathologist |
| 15. | Ms. Rohini Hawaldar, Member | Scientific Officer, Tata Memorial Hospital | Female | Statistician |

The types of projects reviewed by the IEC are:

1. Investigator initiated projects or trials, soliciting funding from national funding agencies.
2. Investigator initiated projects or trials, soliciting funding from international funding agencies.
3. Investigator initiated projects without specific funding.
4. Multicentric academic trials with national collaborators.
5. Multicentric academic trials with international collaborators.
6. Pharmaceutical / Industry sponsored trials.
7. Intramural projects: Funding is provided for institutional projects (TMH & ACTREC) after a process of review and competitive scoring by the IEC.

IEC PROCESS:

All research projects/clinical trials involving human subjects are processed through the IEC. IEC ensures the scientific and ethical validity of the research and the protection of safety, rights and confidentiality of the research subjects.

The Member Secretary IEC assigns three lead discussants to review the scientific, ethical, and statistical aspects of each project as per the Standard Operating Procedure (SOP).

The revised SOPs are accessible on the TMC website- <http://tmc.gov.in/research/pdf/TMC-HEC-SOP.pdf>

Based on the CDSCO guidelines compensation, for Intramural Investigator initiated studies would be provided under "Support given on compassionate grounds".

IEC PERFORMANCE IN 2013:

IEC I

The committee conducted 11 full board committee meetings. A total of 69 research projects were meticulously scrutinized by IEC for scientific and ethical issues. Of these, a total of 40 projects were approved, 29 projects were subjected to modifications/ resubmission/ or are awaiting approval.

In addition to these 157 amendments, 173 violations/ waivers/ deviations, 156 status reports were discussed during these meetings.

IEC II

The committee conducted 12 full board committee meetings. A total of 82 research projects were scrutinized by IEC for scientific and ethical issues. Of these, a total of 55 projects were approved, 27 projects were subjected to modifications/ resubmission/ and are awaiting approval.

In addition to these 143 amendments, 92 violations/ waivers/ deviations, 100 status reports/safety reports were discussed during these meetings.

Three subcommittee meeting were conducted by the IEC-I. A total of 12 projects were discussed. All 12 projects reviewed were approved.

The average duration from IEC submission to decision was **15 weeks**.



Summary

IEC- I

| Projects discussed | | Approved | | Approved with modifications | | Resubmit | |
|--------------------|------|----------|------|-----------------------------|------|----------|------|
| 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| 78 | 69 | 69 | 40 | 6 | 23 | 3 | 6 |

IEC- II

| Projects discussed | | Approved | | Approved with modifications | | Resubmit | |
|--------------------|------|----------|------|-----------------------------|------|----------|------|
| 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| 74 | 82 | 62 | 55 | 5 | 24 | 7 | 3 |

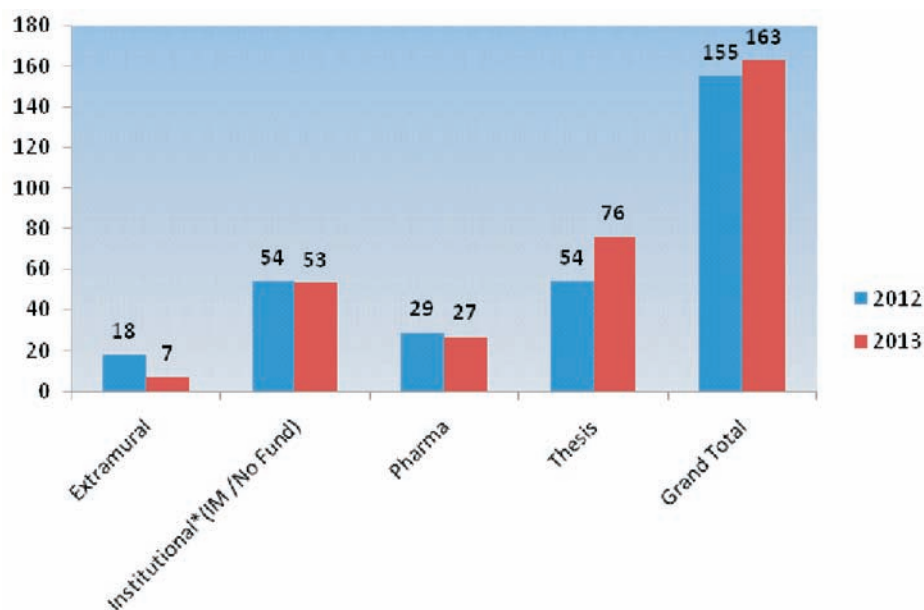
IEC- I expedited review

| Projects discussed | | Approved | | Approved with modifications | | Resubmit | |
|--------------------|------|----------|------|-----------------------------|------|----------|------|
| 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| 3 | 12 | 3 | 12 | 0 | 0 | 0 | 0 |

IEC- I & II

| Projects discussed | | Extramural | | Institutional* (Intra Mural / No Funding required) | | Sponsored (Pharma / Trade) | | P. G. Thesis (dissertation) | |
|--------------------|------|------------|------|--|------|----------------------------|------|-----------------------------|------|
| 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| 155 | 163 | 18 | 7 | 54 | 53 | 29 | 27 | 54 | 76 |

* Includes projects approved for funding, awaiting funding and short research conducted without funds.



Training

IEC SOP training conducted by Member Secretaries IEC and IRB Administrator for IEC members, researchers and research staff at TMH and ACTREC.

The Data Safety Monitoring Sub-Committee (DSMSC), a subcommittee of the Institutional Ethics Committee I & II at Tata Memorial Centre, is responsible for monitoring patient safety during the course of the study in a manner that ensures the scientific and ethical integrity of the study.

The mandate of the Committee is to:

- Assess and evaluate Serious Adverse Event reports on all trials being conducted at the TMH
- Monitor the overall progress of institutional clinical trials and for ensuring adherence to clinical trial and procedural requirements
- Ensure that the safety of participants, validity of data and projected accrual goals are maintained
- Adverse events are appropriately reported
- Provide regular reports to the Institutional Ethics Committee.

The composition of the DSMSC for the year 2012-2014 was as follows

| Sr. No. | Names | Affiliation | Gender | Expertise |
|---------|---|---|--------|-----------------------------|
| 1. | Dr. Sarbani Laskar, Secretary, DSMSC Member, IRB-I | Professor, Dept of Radiation Oncology, Tata Memorial Hospital | Female | Radiation Oncologist |
| 2. | Dr. Prachi Patil, Jt. Secretary, DSMSC Member, IRB-II | Assistant Professor & Assistant Gastroenterologist, Dept of Digestive diseases & Clinical Nutrition, Tata Memorial Hospital | Female | Medical Gastro-enterologist |
| 3. | Dr. Tejpal Gupta Member | Assistant Professor, Radiation Oncology, Advanced Centre for Treatment, Research & Education in Cancer (ACTREC) | Male | Radiation Oncologist |
| 4. | Dr. Vikram Gota Member (Member, IRB II) | Assistant Professor, Clinical Pharmacology, Advanced Centre for Treatment, Research & Education in Cancer (ACTREC) | Male | Clinical Pharmacologist |
| 5. | Dr. Devendra Chaukar Member | Associate Professor & Assistant Surgeon, Dept of Surgical Oncology, Tata Memorial Hospital | Male | Surgeon |
| 6. | Dr. Bharat Rekhi Member | Assistant Professor, Dept of pathology, Tata Memorial Hospital | Male | Pathologist |



Dr. Sarbani Ghosh Laskar,
Secretary, DSMS

Dr. Prachi Patil,
Jt. Secretary, DSMS

| Sr. No. | Names | Affiliation | Gender | Expertise |
|---------|------------------------------------|--|--------|--------------------------|
| 7. | Dr. Nilendu Purandare Member | Assistant Professor & Assistant Radiologist, Bio-imaging Unit, Tata Memorial Hospital | Male | Radiologist |
| 8. | Dr. Priya Ranganathan Member | Assistant Professor & Assistant Anesthetist 'E' Dept of Anesthesia, Tata Memorial Hospital | Female | Anesthetist |
| 9. | Dr. Jaya Ghosh Member | Assistant Professor, Dept of Medical Oncology, Tata Memorial Hospital | Female | Medical Oncologist |
| 10. | Dr. Vedang Murthy Member | Assistant Professor & Assistant Radiation Oncologist, Dept of Radiation Oncology, Advanced Centre for Treatment, Research & Education in cancer (ACTREC) | Male | Radiation Oncologist |
| 11. | Mr. Sanjay Talole Member | Scientific Officer 'D', Dept of Medical Records, Biostatistics & Epidemiology, Tata Memorial Hospital | Male | Statistician |
| 12. | Dr. Vanita Noronha Member | Assistant Professor, Dept of Medical Oncology, Tata Memorial Hospital | Female | Medical Oncologist |
| 13. | Dr. Gauravi Mishra Member | Additional Professor, Dept. of Preventive Oncology, Tata Memorial Hospital | Female | Preventive Oncologist |
| 14. | Dr. Sheela Sawant Member | Associate Professor, Dept. of General Medicine, Tata Memorial Hospital | Female | Physician |
| 15. | Dr. Gouri Pantvaidya Member | Associate Professor, Dept. of Surgery, Tata Memorial Hospital | Female | Surgeon |
| 16. | Dr. Sheila Nainan Myatra Member | Associate Professor, Dept of Anesthesia, Tata Memorial Hospital | Female | Anesthetist |
| 17. | Dr. Sumitra Bakshi Member | Associate Professor, Dept of Anesthesia, Tata Memorial Hospital | Female | Anesthetist |
| 18. | Dr. Seema Kembhavi Member | Associate Professor, Radiodiagnosis, Tata Memorial Hospital | Female | Radiologist |

Service

The committee conducted 12 meetings from Jan - Dec 2013. Besides the scheduled monthly meetings all Serious Adverse Events (SAEs) on regulatory trials were evaluated continuously (to meet the 10 days timeline) on mail by a group of 6 members consisting of the 2 secretaries of the IEC1 and 2, the 2 lead discussants assigned to each project and the 2 secretaries of the DSMSC

The three principle functions of the committee are:

1. Review of SAE reports
2. Monitoring of institutional (investigator initiated) trials and for cause monitoring of other trials as requested by the IECs.
3. Continuing Review Application / Annual status Report review.

Review of Serious Adverse Event Reports

The primary responsibility of the DSMSC is to review and address SAE and unexpected events involving risks to research participants.

Every month, on an average the committee receives 60 SAE reports of SAEs occurring at TMC (institutional and sponsored studies). A total of 623 SAE reports on 98 clinical trials were received and reviewed by the DSMSC from Jan 2013 - Dec 2013.

In addition the DSMSC also received 32 safety reports of SAEs from other centers for trials which are ongoing at Tata Memorial Hospital in 2013.

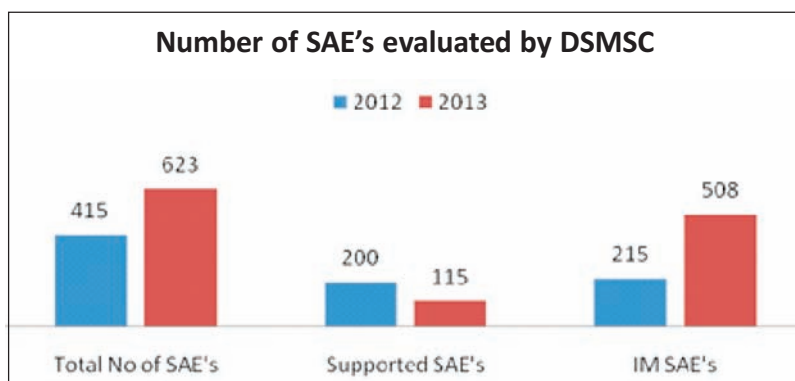
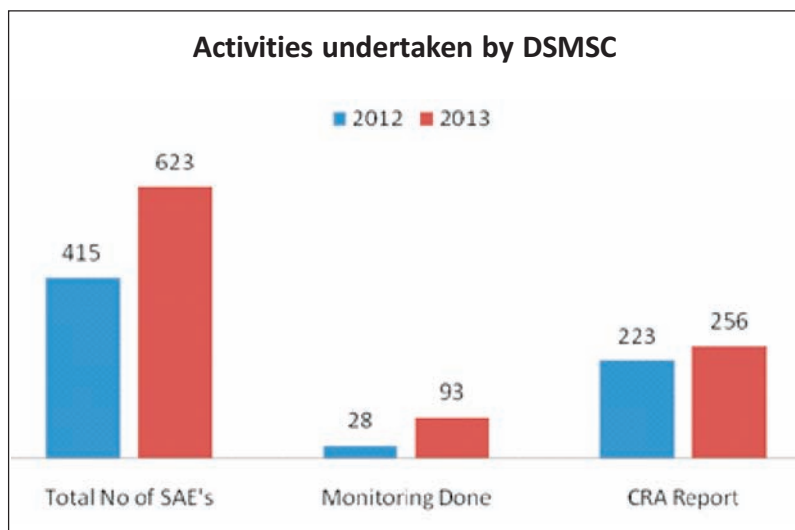
Monitoring of trials:

| Year | 2013 |
|------------------|------|
| Trials monitored | 93 |

Review of the Annual Status Reports/ Continuing Review Applications

A detailed review of the Annual Status Reports/Continuing Review Application has been initiated by the DSMSC since Feb 2010. The comments from the DSMSC are forwarded for discussion in the IEC.

A total of 256 Status report were received and reviewed by the DSMSC in 2013. The committee also revised the reporting form for SAE and set up a system of tracking significant events.



Research Projects

| Principle Investigator | Project Titles |
|------------------------|--|
| Mrs. Achrekar, Meera | An exploratory study to assess the sexual problems and coping strategies adopted by men with cancers of reproductive tract during post cancer treatment phase in a tertiary cancer hospital, Mumbai. |
| | An exploratory study to assess the stressors and coping strategies adopted by caregiver of patients who have undergone haematopoietic stem cell transplant in a tertiary cancer hospital. |
| Dr. Alahari, Aruna | Pathobiology and clinical profile of HIV - associated cancers in India and the West. |
| Dr. Amin, Nayana | Randomized trial to study the role of preintubation assessment of airway using fiberoptic bronchoscope in achieving one lung isolation using double lumen tubes and bronchial blockers. |
| | Audit on compliance of Pre-operative fasting guidelines among paediatric population in a tertiary cancer hospital. |
| Dr. Arya, Supreet | Retromolar trigone squamous cell cancers: The unexplored wisdom of MDCT in assessing bone invasion. |
| Dr. Badwe, Rajendra | A Randomized controlled study to evaluate the role of progesterone in prevention of chemotherapy induced neurotoxicity in women with breast cancer. |
| | Development of In Vitro, Ex Vivo, and In Vivo models using primary cancer cells/ tissues isolated from surgical or biopsy samples of cancer patients, and evaluation of potential therapeutics in these models. |
| | Impact of age as an independent prognostic factor for lymph nodes metastases and survival in breast cancer. |
| | Randomized controlled trial to detect the iatrogenic displacement of tumour cells to axillary lymph nodes following tumor manipulation in early breast cancer. |
| | Randomized controlled trial to evaluate the role of iatrogenic displacement of tumor cells to axillary lymph nodes. |
| | Upper limb morbidity in breast cancer patients. |
| Dr. Bagal, Bhausaheb | Protocol No. RI-01-002 - A randomised, multi-centre, double-blind, parallel group study to compare the pharmacokinetics, pharmacodynamics, safety and efficacy of two anti-CD20 monoclonal antibodies in combination with CHOP in patients with cd20-positive diffuse large B-cell lymphoma. |
| Dr. Bajpai, Jyoti | Anthracycline induced cardiotoxicity in osteogenic sarcoma Patients: A case control study. |
| Dr. Bakshi, Ganesh | Retrospective audit of adrenocortical carcinomas treated at Tata Memorial Centre. |
| Dr. Bakshi, Sumitra | ReSOOnS trial - Rectus sheath block for postoperative analgesia in gynaeco-onco surgical patients - a double blinded randomized controlled trial. |



| Principle Investigator | Project Titles |
|------------------------------------|--|
| Dr. Banavali, Shripad | Baseline high resolution CT scan thorax for detecting respiratory infection in patients with acute myeloid leukemia at presentation. |
| | Retrospective analysis of outcomes of patients with relapsed refractory and metastatic sarcomas who have received metronomic chemotherapy. |
| | Patterns of treatment and outcomes in fibromatosis at a tertiary cancer centre. |
| | “Protocol No. MK 0517-029-01- A Phase IIb, Partially-Blinded, Randomized, Active Comparator-Controlled Study to evaluate the pharmacokinetics/ pharmacodynamics, safety, and tolerability of fosaprepitant in pediatric patients for the prevention of chemotherapy-induced nausea and vomiting (CINV) associated with emetogenic chemotherapy”. |
| Dr. Basavaraj, Guruchannaba | To study expenditure on major Gastro-intestinal cancer surgery in Tata Memorial Centre. |
| Dr. D Cruz, Anil | Retrospective study of central compartmental nodal metastasis in well differentiated thyroid cancers between 2009-2012; correlation b/w max. tumour dimension and central compartmental nodal metastasis. |
| | Organ preservation protocol in India: Retrospective study from a tertiary cancer centre. |
| Mrs. De Carvalho, Maria | To find out effect of planned teaching on knowledge and practices of nurses regarding selected aspects of postoperative nursing care after reconstructive surgeries in head and neck cancer patients. |
| | A study to identify the problems faced by patients with ileal conduit and coping strategies adopted by them in a selected cancer hospital. |
| Dr. Chaturvedi, Pankaj | Evaluation of the prevalence of functional problems after oral cavity malignancy surgery using PSS HN(Performance Status Scale for Head and Neck) Scale. |
| Dr. Chaukar, Devendra | Ophthalmic outcomes after treatment of paranasal sinus tumors. |
| | Prospective evaluation of patients’ understanding of informed consent and adequacy of consent in cancer surgery . |
| | To study the radiological accuracy in determining the tumor thickness and depth of invasion for gingivobuccal complex cancers. |
| Dr. Chougule, Anuradha | EGFR mutation status in locally advanced NSCLC patients treated with definitive radiotherapy. |
| Mrs. D Souza, Anita | A study to assess the effectiveness of structured teaching programme on knowledge and practice of care givers of patients operated for head and neck cancer regarding care of tracheostomy at tertiary cancer institute. |
| | A study to assess the effectiveness of structured teaching programme on the knowledge and practice regarding use of incentive spirometry in patients undergoing surgery for gastro-intestinal cancer at tertiary cancer institute. |

| Principle Investigator | Project Titles |
|-----------------------------------|---|
| Dr. Dangi, Uma | Protocol No.116428- A Phase III, randomized, observer-blind, placebo-controlled, multicentre study to assess the safety and immunogenicity of GSK Biologicals' Herpes Zoster HZ/su candidate vaccine when administered intramuscularly on a two-dose schedule to adults aged 18 years and older with haematologic malignancies. |
| Dr. Deodhar, Jayita | Prevalence of depression in adult patients with advanced cancer newly referred for palliative care services. |
| | Prospective psychiatric, cognitive and quality of life evaluation in patients with low grade gliomas. |
| | A study to assess the feasibility of introducing early palliative care in ambulatory patients with advanced lung cancer. |
| Dr. Deodhar, Kedar | Improving cervical cancer prevention among HIV-infected women using novel HPV based biomarker assays: an Intramural-to-India study. |
| Dr. Desai, Subhash | Evaluation of role of CT based RECIST criteria in predicting post NACT response in patients with esophageal cancers. |
| Dr. Dholam, Kanchan | To validate the psychosocial perception scale for extra oral defects and compare the response of patients before and after facial rehabilitation. |
| | Association of history of dental extraction in patients with carcinoma of the alveolus and gingiva of the maxilla and mandible - An audit. |
| Dr. Dikshit, Rajesh | Role of HPV in etiology and progression of head and neck cancer. |
| Dr. Divatia, Jigeeshu | ARDSnet India - Snap shot of Acute Respiratory Distress Syndrome (ARDS) in India. |
| | Audit of Peri-operative anaesthetic management of pancreato- duodenectomy. |
| Dr. Gehdoo, Raghuveersingh | Post operative analgesia following gynaecological surgery - A retrospective comparison between epidural and IVPCA based analgesia. |
| Mrs. Goswami, Savita | Reliability and validity of the Marathi version of the hospital and anxiety depression scale in detecting adjustment, anxiety and depressive disorders in cancer patients. |
| Dr. Gujaral, Sumeet | An audit of one year surgical pathology reports of nodal and extranodal hematolymphoid neoplasms. |
| Dr. Gulia, Ashish | A Clinicopathological study of musculoskeletal synovial sarcoma - A retrospective audit. |
| | A retrospective audit of nuclear imaging records to assess the incidence of skeletal metastasis in musculoskeletal chondroid tumors. |



| Principle Investigator | Project Titles |
|-------------------------------|--|
| Dr. Gupta, Sudeep | Protocol No. CRAD001Y2201 - BOLERO-6 - A three-arm, randomized, open label, phase II study of everolimus in combination with exemestane versus everolimus alone versus capecitabine in the treatment of postmenopausal women with estrogen receptor positive, locally advanced, recurrent, or metastatic breast cancer after recurrence or progression on prior letrozole or anastrozole". |
| Dr. Gupta, Tejpal | Hyperfractionated-accelerated radiation therapy (HART) with concurrent chemotherapy followed by adjuvant systemic chemotherapy in children and young adults with metastatic/high-risk medulloblastoma or central nervous system-primitive neuro-ectodermal tumor (CNS-PNET). |
| Dr. Jain, Parmanand | Identification of optimally functional thoracic epidural analgesia-a prospective audit. |
| Dr. Jalali, Rakesh | Dosimetric correlation of radiotherapy doses to neural stem cell niche areas with outcome data in patients with newly diagnosed Glioblastoma treated with conventional adjuvant therapy. |
| Dr. Jambhekar, Nirmala | Validation of immunohistochemical detection of activating EGFR mutations against detection by molecular testing in lung cancer. |
| Dr. Joshi, Amit | LUX-Head & Neck 2: A randomised, double-blind, placebo-controlled, phase III study to evaluate the efficacy and safety of afatinib (BIBW 2992) as adjuvant therapy after chemo-radiotherapy in primary unresected patients with stage III, IVa, or IVb loco-regionally advanced head and neck squamous cell carcinoma. |
| Mrs. Joshi, Swapna | A prospective study of nutritional problems and coping strategies of mothers and its impact on nutritional status of children receiving chemotherapy for hematological malignancies. |
| | A study to develop and assess the effectiveness of an information booklet on knowledge of patients about care after receiving radioactive iodine therapy at a tertiary cancer hospital. |
| Dr. Kane, Shubhada | Detection of dysplasia in leukoplakia and erythroplakia of the oral cavity using conventional cytology and liquid based cytology : A comparative study. |
| | To evaluate the role of extracapsular spread in the nodal metastasis in patients of oral squamous cell carcinoma. |
| Dr. Kelkar, Rohini | PCR detection of Schistosoma haematobium DNA in bladder cancer tissue. |
| Dr. Kulkarni, Atul | Clinical utility of three different methods of ABG analysis. Can we pick up hidden disorders with Stewarts approach? |
| | Evaluation of CobraPLA (Perilaryngeal Airway) for airway management during general anaesthesia. |
| | Fluid challenges in Intensive Care (FENICE Trial). |
| | To evaluate the agreement between the measurement of Inferior vena cava diameter (IVCD) by conventional subcostal view and transhepatic (lateral) view using echocardiography in critically ill patients. |

| Principle Investigator | Project Titles |
|--------------------------------|---|
| | An International Single Day Point Prevalence study for severe sepsis and / or septic shock. International Surgical Outcomes Study (ISOS). |
| Dr. Laskar, Siddharth | Intensity Modulated Radiotherapy for sarcomas (osteosarcoma, chondrosarcoma and chordoma) of head / neck and pelvis and a dosimetric comparison with Proton Beam Therapy. |
| Dr. Mahantshetty, Umesh | Evaluation and validation of ultrasonography in radiotherapeutic management of cervical cancers. |
| Dr. Maheshwari, Amita | Pilot study to assess the feasibility of using sexual function and vaginal changes questionnaire in English speaking long-term gynaecological cancer survivors. |
| Dr. Menon, Hari | Protocol No. 1230.14 (POLO-AML-2)- A phase III randomised, double-blind, controlled, parallel group study of intravenous volasertib in combination with subcutaneous low-dose cytarabine vs. placebo + low-dose cytarabine in patients ≥ 65 years with previously untreated acute myeloid leukaemia, who are ineligible for intensive remission induction therapy. |
| | Outcomes of multiple myeloma in the era of novel agents: A retrospective study from tertiary cancer centre. |
| | Diagnostic utility of ^{18}F FDG-PET/CT in the detection of bone marrow disease in Hodgkin's lymphoma and their prognostic significance. |
| Dr. Muckaden, Mary | Validation of Cancer Dyspnoea Scale for advanced cancer patients in a tertiary cancer centre. |
| | Determining the correlates of fatigue and its impact on the quality of life in palliative care patients. |
| | "My Life with Cancer": Enabling adolescents with advanced cancer express their perceptions about life after diagnosis of cancer and possible adverse prognosis using narratives. |
| Dr. Myatra, Sheila | Prospective study to compare two different technique of Proseal LMA placement. |
| Dr. Nair, Nita | Retrospective audit of breast cancer patients with N2b and N3 disease. |
| Dr. Naronha, Vanita | Retrospective analysis of patients who have received radical concurrent chemoradiation for esophageal and gastroesophageal junction cancer. |
| Dr. Ostwal, Vikas | An open label multicentre phase IV study of Trastuzumab in combination with the standard chemotherapy (as per the routine clinical practice) as first-line therapy in patients with HER2 positive metastatic gastric cancer. |
| Dr. Pantvaidya, Gouri | Cross sectional study assessing prevalence of trismus and factors associated with it, after treatment for oral cancers. |
| Dr. Parmar, Vani | A retrospective audit to assess the effect of Tamoxifen on breast density in breast cancer patients. |
| Dr. Patil, Prachi | Prevalence of KRAS and BRAF mutations in subjects diagnosed with colorectal cancer- a prospective, single center study. |

| Principle Investigator | Project Titles |
|---------------------------|---|
| Dr. Patil, Vijaya | Does ultrasound improve success rate and decrease complications for lower thoracic and lumbar neuraxial blocks by trainee anaesthesiologist? |
| Dr. Pimple, Sharmila | Formative research to develop tobacco prevention and cessation intervention for LGBT community in India. |
| Dr. Prabhash, Kumar | Comparative study for efficacy and safety of Paclitaxel with Cisplatin/Carboplatin versus 5-Fluorouracil with Cisplatin/Carboplatin in resectable carcinoma esophagus or gastroesophageal junction carcinoma. |
| | Prognostic and predictive factors for use of palliative chemotherapy in advanced stage esophageal/gastroesophageal junction cancer. |
| | Protocol No. SLNR19- A Phase II Clinical Study to evaluate the efficacy and safety of NRC-AN-019 in cancer patients failing prior standard therapies. |
| Dr. Puri, Ajay | Retrospective audit of extremity melanoma cases presenting to Bone and Soft Tissue Disease Management Group. |
| Dr. Qureshi, Sajid | To evaluate the role of PET-CT in staging of pediatric round cell tumors. Can it eliminate the need for bone marrow biopsy? |
| Dr. Ramadwar, Mukta | Testing of MYCN gene amplification status in patients with neuroblastoma and correlation with histomorphological features. |
| Dr. Rangarajan, Venkatesh | Evaluation of the diagnostic accuracy of 18F - FDG PET/CECT in initial staging of cutaneous malignant melanoma. |
| | Retrospective study for comparison of MIBG scoring and correlation with the progression-free survival in stage IV neuroblastomas. |
| Dr. Rekhi, Bharat | Audit of biopsies from trunk and extremity-based soft tissue tumours. |
| Dr. Sarin, Rajiv | Dosimetric comparison of conventional radiotherapy with two techniques of Tomotherapy viz. Helical Tomotherapy (HT) and Fixed beam Tomotherapy (FBT) in patients with synchronous bilateral breast cancer (SBBC) A pilot study. |
| Dr. Shanmugham, Pramesh | Impact of definitive surgery on health related quality of life in patients with resectable esophageal cancer. |
| | The efficacy of PET-CT scan in guiding disease management options in patients with localized or locoregionally advanced squamous cell carcinoma [SCC] esophagus. |
| | VATS versus open thymectomy : A retrospective review. |
| Dr. Sharma, Kailash | Anaesthesia quality assessment in the recovery room. |
| Dr. Shrikhande, Shailesh | A single-arm open-label international multi-center study of efficacy and safety of sunitinib malate (su011248, sutent?) in patients with progressive advanced metastatic well-differentiated unresectable cancers. |

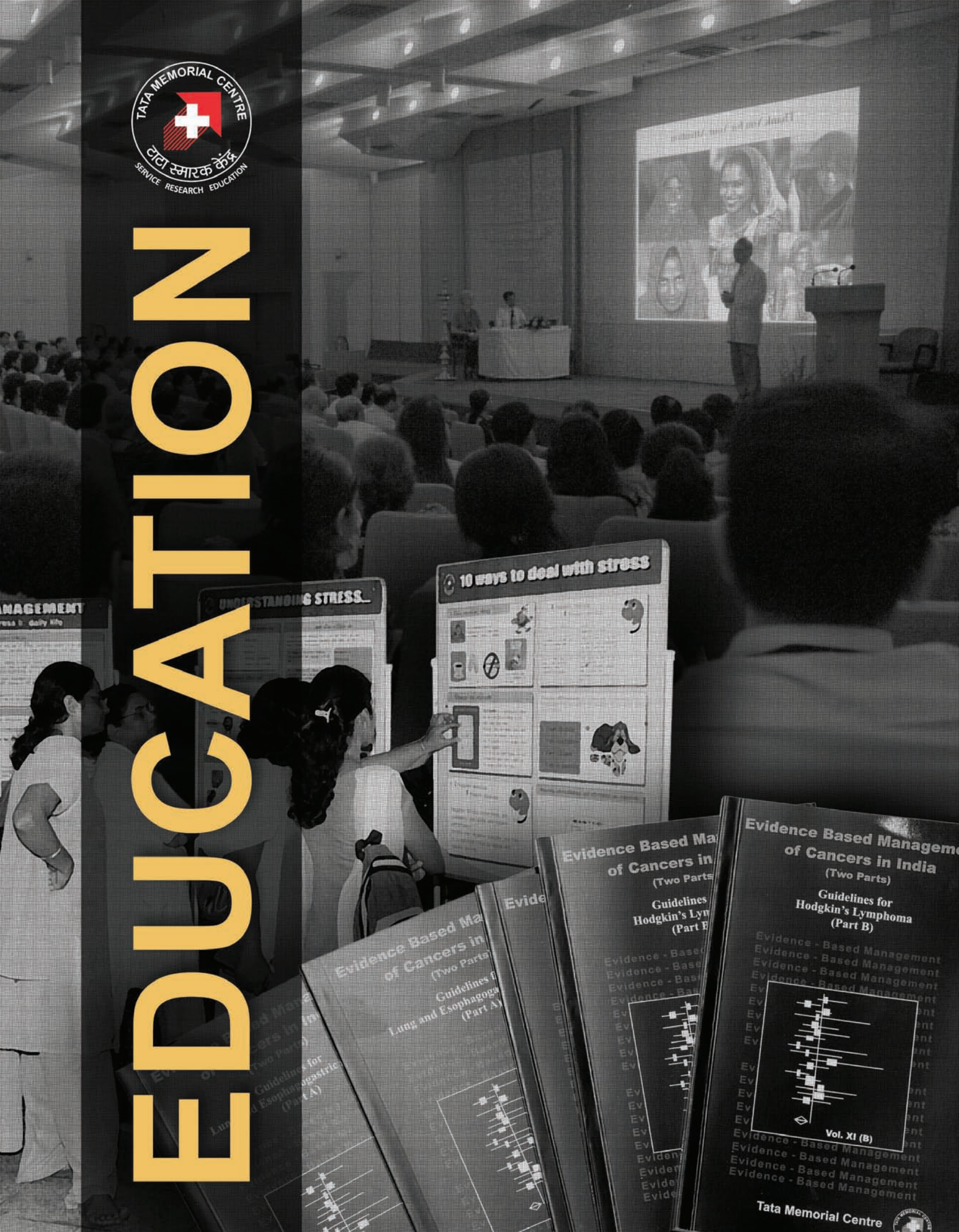




| Principle Investigator | Project Titles |
|-------------------------------|--|
| | Protocol No. DIREGL06283- An observational study to determine thromboembolism prophylaxis in oncology patients who are undergoing abdominal or pelvic surgery. |
| | A retrospective audit of quality of life (QoL) in patients who have undergone oncologic resection of the rectum. |
| | Protocol No. EMR 062202 559- A prospective, open label, multicentric data collection registry in order to describe treatment choices in management of metastatic colorectal cancer (mCRC) patients with unresectable hepatic and / or extra hepatic disease, across treatment lines (Asian Metastatic Colorectal Cancer Registry). |
| Dr. Shrivastava, Shyam | Dosimetric impact of variation in the abdominal wall fat and internal organ contours during radiotherapy for cervical cancers. |
| Dr. Sirohi, Bhawna | Randomized phase II study of BEZ235 or everolimus in advanced pancreatic neuroendocrine tumors. |
| | A Descriptive observational survey for measuring the prescription rate of cancer treatment modalities (Surgery, chemotherapy, radiotherapy) in group of reference oncological institutions from different low - and middle income countries (IAEA/ Programme of Action for cancer Therapy (PACT)/Observational survey. |
| Dr. Thakur, Meenakshi | Evaluation of solid breast masses by elastography with sonography and mammography correlation. |
| | MDCT in preoperative evaluation of patients with renal cell carcinoma with histopathological correlation. |



EDUCATION



MANAGEMENT
ress in daily life

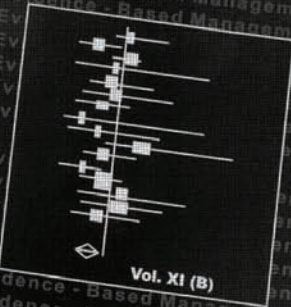
UNDERSTANDING STRESS

10 ways to deal with stress

Evidence Based Management of Cancers in India (Two Parts)
Guidelines for Lung and Esophagoga (Part A)

Evidence Based Management of Cancers in India (Two Parts)
Guidelines for Hodgkin's Lymphoma (Part B)

Evidence Based Management of Cancers in India (Two Parts)
Guidelines for Hodgkin's Lymphoma (Part B)



Tata Memorial Centre





Dr K.S. Sharma,
Director (Academics)
Head

Academics

Tata Memorial Centre is affiliated to Homi Bhabha National Institute (HBNI) Mumbai, a Deemed University, for imparting PG training in oncology and other broad specialty. Homi Bhabha National Institute under Department of Atomic Energy (DAE) was granted the status of "Grant-in-Aid Institution" by the President of India.

The Tata Memorial Centre (TMC) comprises of Tata Memorial Hospital (TMH), the Advanced Centre for Treatment, Research and Education in Cancer (ACTREC), and Centre for Cancer Epidemiology (CCE).

The TMC continues to provide the highest standard of patient care through its services and research, and builds capacities by imparting knowledge through various educational activities.

Tata Memorial Center is a recognized training center in cancer education and research by several national and international organizations, including WHO, IAEA and INCTR. The hospital offers education through Post-Graduate (PG) courses and training through short term observership and summer training programs. About 109 Post graduate medical students were registered in 2013 for PG courses in various disciplines. The hospital strengthened its capacity building and educational activities by initiating new super speciality courses in Plastic & Reconstructive Surgery and Head & Neck Surgery. A one year diploma in Fusion Technology has been approved by HBNI and will start from Academic year 2014.

The Memorandum of Understanding (MOU) is entered with Seth GS Medical College, (KEM Hospital) and the Tata Memorial Hospital for the purpose of the agreement to facilitate postgraduate medical training programs and research to involves hands on training of residents and fellows from TMC and KEMH. This envisages cooperation, coordination and utilization of the complementary facilities and capabilities of KEMH and TMC. This MOU will enhance the working relationship between the two hospitals and is also intended to facilitate long term collaborative research, development of faculties and related activities are mutually beneficial to the mission of these hospital. This arrangement is provided for total 10 PG/ Super speciality subjects.

Six months training programme at Tata Memorial Centre with the primary aim to train various specialists on sponsorship basis

in oncology and other supportive branches has benefited 977 trainees.

Observership programme at Tata Memorial Centre for various cancer specialists includes nearly 400 specialists each year.

A large number of overseas trainees and observers visit the Tata Memorial Centre every year from various countries including Bangladesh, Pakistan, West Indies, Korea, South Africa, Malaysia, Saudi Arabia, UK, Kenya, Yemen, Sri Lanka, Canada, Iraq, Maldives, Oman, Nepal, Myanmar, USA, Germany, etc.

Medical Oncology

The department of Medical Oncology has always been in the forefront to train doctors from all over the country and across the continents. There are 14 DM (Medical Oncologist) and 2 DM (Pediatric Oncology) seats at TMH. In addition there is one fellowship each in Pediatric Oncology and Bone Marrow Transplantation every year. In addition, there are many *national* and international observers who come for various periods to the department for training. The department of medical oncology molecular lab also trains candidates in the field of molecular oncology.

Radiation Oncology

Number of seats for PG students have increased through Medical Council of India and all students are trained in basic and advanced technology for External Beam and Brachytherapy. Trainees from various parts of India and overseas attend for short and long courses varying from one month to 2-3 years, are trained so that they can improve the treatment facilities in their parent institutions.

Teaching and training courses are conducted for IAEA in modern treatment methods. PhD course for medical physicists have been initiated through HBNI.

Surgical Oncology

To develop the national grid, the Surgical Oncology faculty educates the people in oncology. There are 16 surgical seats in TMH. The faculty has also initiated M.Ch (Head and Neck surgical oncology), M.Ch (Plastic surgery) and fellowship program in thoracic, plastic, breast, ortho, and skull based oncology.



| Sr.No | Name of the Postgraduate Course | Approved by | Affiliated To | Duration in Years | No. of Intake capacity year 2013 |
|-------|--|--|---|-------------------|----------------------------------|
| | Superspeciality Courses | | | | |
| 1 | M.Ch.(Surgical Oncology) | Medical Council of India, New Delhi Approved | Homi Bhabha National Institute (Deemed University) (HBNI) | 3 | 16 |
| 2 | M.Ch.(Gynecological Oncology) | | | 3 | 1 |
| 3 | M.Ch (Plastic Surgery) | | | 3 | 2 |
| 4 | M.Ch. (Head & Neck Oncology) | | | 3 | 4 |
| 5 | D.M.(Medical Oncology) | | | 3 | 14 |
| 6 | D.M. (Critical Care) | | | 3 | 2 |
| 7 | D.M. (Paediatric Oncology) | | | 3 | 2 |
| 8 | D.M. (Gastroenterology) | | | 3 | 2 |
| | Broad Speciality Courses | | | | |
| 9 | MD (Pathology) | | | 3 | 12 |
| 10 | MD (Anesthesiology) | | | 3 | 20 |
| 11 | MD (Radio-diagnosis) | | | 3 | 10 |
| 12 | MD (Radiotherapy) | | | 3 | 16 |
| 13 | MD (Microbiology) | | | 3 | 1 |
| 14 | MD (Immuno Hematology & Blood Transfusion) | | | 3 | 3 |
| 15 | MD (Nuclear Medicine) | | | 3 | 2 |
| 16 | MD (Palliative Medicine) | | | 3 | 2 |
| 17 | P.hD (Medical Physics) (04 Internal TMC Employee & 05 External BARC Employee) | HBNI | | 3 | — |
| 18 | P.hD (Epidemiology) (Out of Total 06, 01 Sponsored Candidate) | HBNI | | 3 | 6 |
| 20 | DNB (Nuclear Medicine) | NBE | | 3 | — |
| 19 | 02 Yrs Certified Fellowship | HBNI | National Board of Examination | 2 | 15 |
| 21 | M.Sc Nursing (Oncology) | Maharashtra Nursing Council & Indian Nursing Council | Maharashtra Nursing Council & Indian Nursing Council | 2 | 6 |
| 22 | Advance Diploma in Radiotherapy Technology | DTE & MSBTE, Mumbai | Maharashtra State Board of Technical Education (MSBTE) | 2 | 8 |
| 23 | Advance Diploma in Medical Imaging Technology | | | 2 | 15 |
| | Total | | | | 159 |



| Sr.No | Name of the Postgraduate Course | Approved by | Affiliated To | No. of Student Appeared 2013 | No. of Student Passed 2013 |
|-------|---|--|---|------------------------------|----------------------------|
| | Superspeciality Courses | | | | |
| 1 | M.Ch.(Surgical Oncology) | Medical Council of India, New Delhi Approved | Homi Bhabha National Institute (Deemed University) (HBNi) | 14 | |
| | Broad Speciality Courses | | | | |
| 2 | MD (Pathology) | | | 8 | 8 |
| 3 | MD (Anesthesiology) | | | 15 | 15 |
| 4 | MD (Radio-diagnosis) | | | 3 | 3 |
| 5 | MD (Radiotherapy) | | | 7 | 4 |
| 6 | M.Sc Nursing (Oncology) - 1st Year | Maharashtra Nursing Council & Indian Nursing Council | Maharashtra Nursing Council & Indian Nursing Council | 8 | 7 |
| | M.Sc Nursing (Oncology) - 2nd Year | Maharashtra Nursing Council & Indian Nursing Council | Maharashtra Nursing Council & Indian Nursing Council | 6 | 6 |
| 7 | Advance Diploma in Radiotherapy Technology | DTE & MSBTE, Mumbai | Maharashtra State Board of Technical Education (MSBTE) | 24 | 24 |
| 8 | Advance Diploma in Medical Imaging Technology | DTE & MSBTE, Mumbai | Maharashtra State Board of Technical Education (MSBTE) | 15 | 15 |

Training Programme January to December, 2013

105



| Sr. No. | Name of the Training Programme | Department | No. of Trainees |
|---------|--|---|-----------------|
| 1 | Certificate Course in Hospital Infection Control | Nursing Department | 15 |
| 2 | Certificate Course in Preventive Oncology | Preventive Oncology | 25 |
| 3 | Cyto- Pathology Technicians Training Course | Cyto - Pathology | 3 |
| 4 | Six months Advanced Hematology Training Course for Technologists | Haematology | 2 |
| 5 | Six Months Molecular Haematology Training Course for Technologists | | 2 |
| 6 | Six months training course in Flow Cytometry | | 2 |
| 7 | Advanced Clinical Biochemistry Technologist Training Course | Biochemistry | 4 |
| 8 | Advanced Cancer Cytogenetic Training Course | Cancer cytogenetics | 2 |
| 9 | Advanced CT Scan Imaging Training Course for Technologists | Radiodiagnosis | 2 |
| 10 | Advanced MRI Imaging Training Course for Technologists | Radiodiagnosis | 2 |
| 11 | Advanced Interventional Radiology Training Course | Radiodiagnosis | 2 |
| 12 | One Day Workshop on Paediatric Palliative Care | Palliative Medicine | 82 |
| 13 | Train the Trainers Program in Palliative Care | Palliative Medicine | 31 |
| 14 | PB Desai / UICC Fellowship | Onco - Pathology, Surgical Oncology, Radiation Oncology | 3 |
| 15 | Certified Training in Oncology for Doctors | - | 18 |
| 16 | Oncology Speech Rehabilitation for Graduate Speech Therapist | Head & Neck Oncology | 1 |
| 17 | Post Basic Diploma in Oncology Nursing | Nursing Department | 8 |
| 18 | Certificate Course for Medical Secretary | M.S. Office | 6 |
| 19 | Library Trainees | Library Sciences, TMH | 1 |
| 20 | Certificate Course in Intensive Care Nursing | Nursing Department | 4 |
| 21 | Certificate Course in Enterostomal Therapy | Nursing Department | 5 |
| 22 | Certificate Course for CVAD | Nursing Department | 5 |
| 23 | Apprenticeship Trg. Programme for PET/CT | Nuclear Medicine | 4 |
| 24 | Apprenticeship Training (BOAT) | Pathology, Cytology | 6 |
| 25 | Oncology Training (Defence Doctor) | Anaesthesiology | 1 |
| 26 | Nursing Management in Chemotherapy | Nursing Department | 7 |
| | Total | | 243 |

Conferences/Workshop/ Seminars organized during the Year 2013

| Name of Conference | Month & Date | Organising Department |
|--|-----------------|--|
| | January | |
| Symposium on Liver Imaging | 9th | Radio-Diagnosis |
| ONCORECON | 14th to 17th | Surgical Oncology |
| Teaching File meet | 18th | Radio-Diagnosis |
| Good Clinical Practice Workshop | 19th | IRB |
| Nurses Annual Day | 25th | Nursing |
| | February | |
| World Cancer Awareness Day | 4th | Preventive Oncology |
| Workshop on Cancer Breed | 4th & 5th | Thoracic Unit |
| National Conference HISICON 2013 | 7th to 9th | Microbiology |
| Global Postlaryngectomy Rehabilitation Academy (GPRA) Workshop | 23rd & 24th | Head & Neck Oncology |
| | March | |
| Evidence Based Management | 1st & 2nd | Clinical Research Secretariat |
| ONCORECON | 18th to 22nd | Surgical Oncology |
| Anaesthesia Review Course (ARC) | 29th & 31st | Anaesthesiology, Critical Care & Pain |
| | April | |
| Womens Cancer Workshop ONAI | 3rd | Nursing |
| Evaluation & treatment of voice disorders | 13th to 15th | Speech Therapy |
| ONCORECON | 15th to 18th | Surgical Oncology |
| | June | |
| Annual Function of Ugam Childhood cancer Survivor Support Group - Medical Oncology | 1st | Medical Oncology |
| 3rd Basic Haematopathology Course | 14th & 15th | Haematopathology Laboratory |
| ONCORECON | 17th to 20th | Surgical Oncology |
| Fundamental Critical Care Support | 29th & 30th | Anaesthesiology, Critical Care & Pain |
| | July | |
| Annual Workshop on Rehabilitation in breast Cancer | 6th - 7th | Occupational Therapy |
| 3rd Post graduate training programme in Oncology | 18th to 20th | Occupational Therapy |

| Name of Conference | Month & Date | Organising Department |
|---|----------------------------|--|
| | August | |
| Clinical Research Methodology | 3rd & 4th | Clinical Research Secretariat |
| BRASACON - 2013 | 16th & 17th | Surgical Oncology |
| Security awareness | 30th | Security |
| Workshop on “Preparping Sites for Quality Clinical Trials: The Need of the Hour” | 31st | IRB in collaboration with Auriga Research and Sense CR |
| | September | |
| Cellular Therapy National Conference | 7th | Medical Oncology |
| ONCORECON | 16th to 20th | Surgical Oncology |
| THEMATICC - 2013 | 20th & 21st | Anaesthesiology, Critical Care & Pain |
| Orthocon 2013 | 28th & 29th | Bone & Soft Tissue |
| | October | |
| World Mental Health Day | 3rd & 4th | Psychiatric Unit |
| Education in Cancer Pain (ECAP) | 5th & 6th | Anaesthesiology, Critical Care & Pain |
| Regional Training Course (IAEA/RCA) | 7th to 9th | Nuclear Medicine & Molecular Imaging (PET-CT) |
| KRM 2013: Convergence of Resources, Technologies And Services: Trends & Challenges | 21st to 23rd | Dept of Library Science |
| ONCORECON | 21st to 25th | Surgical Oncology |
| World Anaesthesia Day Haemodynamic & Airway Workshop | 25th | Anaesthesiology, Critical Care & Pain |
| WCI Conference | 19th to 20th & 26th & 27th | Gynaecology |
| Annual Art Festival | 24th | Medical Oncology |
| | November | |
| Molecular Diagnostics in Leukemias in Hematocon 2013 & Flow Cytometry and Minimal residual disease workshop in Acute Leukemia in Hematocon 2013, the 54th Annual Conference of Indian Society of Hematology and Blood Transfusion (ISHBT) | 6th | Haematopathology |
| ONCOSURG 2013 | 15th, 16th & 17th | Surgical oncology - Head & Neck Oncology |
| Nursing Research - Bridge to future of health care | 19th | Nursing Education |
| Quality Nursing Research | 20th | Nursing Education |
| Workshop - National Plastic Surgery Conference | 23rd-27th | Surgical oncology |
| International Psycho-Oncology Society's Academy Workshop | 29th , 30th | Psychiatric Unit |





| Name of Conference | Month & Date | Organising Department |
|--|-----------------|---------------------------------------|
| | December | |
| International Psycho-Oncology Society's Academy Workshop | 1st | Psychiatric Unit |
| National Difficult Airway Conference | 6th to 8th | Anaesthesiology, Critical Care & Pain |
| Oncology Nursing Workshop | 9th & 10th | Nursing |
| Cancer Rehabilitation - Physiotherapy Workshop | 13th & 14th | Physiotherapy |
| ONCORECON | 16th to 20th | Surgical Oncology |
| 3rd CME for Medical Laboratory Technologists | 21st & 22nd | Haematopathology laboratory |
| Immuno Histochemistry Workshop | 26th | Pathology |
| CME on Pathology | 27th | Pathology |
| HOPE - Paediatric Oncology Annual Programme | 28th | Medical Oncology |



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| Ms. Ajit, Dulhan | First Prize Best Oral Paper: "Is Exfoliative cytology is a modality of past". CYTOCON 2013, Organised by Indian Academy of Cytologists. |
| Dr. Bachher, Gurmeet | Awarded International Scholarship "The Michael & Helen Schaffer Foundation Scholarship" in Laryngectomy Care & Voice rehabilitation, Massachusetts Eye and Ear Infirmary, Boston. |
| Dr Badwe, Rajendra | National Award "Padma Shree" conferred by the President of India for the contribution to the field of Medicine. |
| | "Lal Bahadur Shastri" National Award for Excellence in Public Administration, Academics and Management. |
| | "Recognition Award" for his significant contribution to Oncology by UAE Cancer Congress. |
| Dr. Bal, Munita | Best Paper Award: "A retrospective review of correlation of 'T' stage with tumor thickness in early carcinoma of tongue" - FHNO 2013. |
| Dr. Batra, Swati | Best Poster Award: "Major Resections for pancreatic and gastric cancer in the elderly in India: Preparing for future challenges." 1st Indian Cancer Congress, Delhi, Nov 2013. |
| Dr. Chaturvedi, Pankaj | "Judy Wilkenfield Award" Campaign for Tobacco Free Kids, Washington DC- April 2013. |
| | Chairman, Head and Neck Oncology, Master Course , UAE Congress, Dubai- Oct 2013. |
| | Member, Governing Body, All India Institute of Medical Sciences, Jodhpur- July 2013. |
| | Member, Central Council of Health and Family Welfare and APEX advisory body of Ministry of Health and Welfare, New Delhi- August 2013. |
| | Member, IFOS Scientific Committee organized by IFOS Seoul 2013 20th World Congress- Jun 2013. |
| | Member, International Advisory Committee, American Head Neck Society, NY. |
| Dr. D'Cruz, Anil | Member of the Academic Committee of AIIMS Rishikesh. |
| | Member, Scientific Advisory Committee, National Institute of Biomedical Genomics, Kalyani. |
| | Member, Governing Board, Prince Aly Khan Hospital, Mumbai. |
| | Editor Manual Clinical Oncology (MCO) Lippincott Williams & Wilkins/UICC. |
| | Editor Hamilton Bailey's Demonstration of Physical signs in Clinical Surgery, Cambridge University Press. |
| Dr. Deodhar, Jayita | Office Bearer, Indian Psychiatric Society–West Zonal branch (2012-14). |

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| Dr. Desai, Priti | First Prize Poster Presentation: "A study of blood ordering practices and blood usage for elective surgical procedures at a tertiary care oncology centre", 9 th International Conference of South Asian Association of Transfusion Medicine (SAATM), Gurgaon, 2013. |
| Dr. Deshpande, D.D. | Chairman, Standing Committee on Training Courses and Radiation Professionals (SCTC & RP), AERB. |
| | Vice-chairman, "Safety Committee for Hadron Therapy Facilities (SCTHF), AERB. |
| Mr. Dhende, Suhas | Bhaskar Reddy Award-2013, standing first in the national cyto-technicians examination conducted by the Indian Academy of Cytologists, 2013. |
| Dr. Divatia, Jigeeshu | Dr. Vijaylaxmi Kamat Oration, RACE 2013, January 25, 2013, Chennai: Patient Safety during Surgery. |
| | Fellowship, American College of Critical Care Medicine (FCCM). |
| Dr. Gujral, Sumeet | Member, Drafting committee for NABL 112 standards document in hematology. |
| | Member, technical committee of National Accreditation board for testing and calibration laboratories (NABL) in medical testing. |
| | President, "The Cytometry Society" (TCS). |
| Ms. Ghag, Shweta | Joint Secretary, TNAI, Maharashtra State Branch. |
| Mr. Ghogale, Sitaram | Best Poster Award: "Role of CD116 expression in the diagnosis and monitoring acute myeloid & monocytic leukemia" 6th Annual Meeting The Cytometry Society, 2013 at Institute of Life Sciences, Bhubaneswar, Odisha. |
| Ms. George, Mary | First Prize for Poster, "Role of skin protectant in reducing the local complication in PICC line" Infusion Nurses Society (INS), USA 2013. |
| Dr. Ghosh-Laskar, Sarbani | Chairperson, Advisory Group meeting for the Platinum-SPARK trial from 11 May 2013. |
| | Expert/Advisory Group for the DAE to take over the administration of the BBCL, Guwahati, 2013. |
| Dr. Goel, M | Best Paper Award: "100 consecutive liver resections at TMC: Safe resections without low CVP & vascular occlusion techniques." 1st Indian Cancer Congress, Delhi, 2013. |
| Dr. Jalali, Rakesh | Co-editor, Neuro-Oncology Practice. |
| Dr. Jambhekar, Nirmala | First prize and Best Paper Award, "Co relation of p53, MDM2, and MIB-1 expression with response to neoadjuvant chemotherapy in high-grade osteosarcoma" Annual Scientific Congress of Malaysian Oncological Society (ASCOMOS) 2013. |
| Mrs. Jamema, S.V. | Consultant, International Atomic Energy Agency (IAEA) for developing training material for 3-D brachytherapy, Vienna, 2013. |
| | Expert, Development of Indigenous Linear Accelerator and MLC, SAMEER, IIT, Mumbai. |

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| Dr. Jayant | Completed Masters in Translational Research (MRes) from King's College, London. Dr Prakash obtained certification for fluorescence guided resections. |
| Ms. Joshi, Swapna | Secretary, TNAI Maharashtra State Branch. |
| Dr. Kane, Shubhada | Chairperson, National EQAS (External Quality Assurance Scheme) for diagnostic cytopathology. |
| | Jwaladevi Award, CYTOCON 2013, Indian Academy of Cytologists, Pondichery, 2013. |
| | Oration: "Diagnostic approach in non-epithelial tumors of oral cavity with reference to ancillary techniques." IAOMP, 2013. |
| | Member, ICMR Task Force for National Guidelines on Carcinoma Tongue & Carcinoma Larynx. |
| | Member, Editorial board of Indian Journal of Pathologists & Microbiologists. |
| | Executive Member, Indian Academy of Cytologists, 2013. |
| Dr. Kelkar, Rohini | Deputy Chief Editor,. Journal of Patient Safety and Infection Control. |
| Dr. Kulkarni, S.S. | Joint Secretary, Indian Society of Vascular and Interventional Radiology (ISVIR). |
| Ms. Kulkarni, Manisha | Best Paper Award: "A cost effective method for making Gram Stain Tissue Control Blocks & Standardization of Modified Gram Twort Staining Technique" 39th All India Medical Laboratory Technologists Association, Kanyakumari, Tamilnadu, 2013. |
| Dr. Mehta, Shaesta | Member, Governing Council, Gastroenterology Research Society. |
| Dr. Myatra, Sheila | Fellow of Indian college of Critical Care Medicine FICCM, Indian Society of Critical Care Medicine (ISCCM), March 2013. |
| | Elected Chairman of Mumbai Branch of ISCCM (Indian Society of Critical Care Medicine) - 2013-2015. |
| | Elected National Secretary of AIDiAA (All India Difficult Airway Association) - 2013-2016. |
| | Elected Treasurer of ISCCM (Indian Society of Critical Care Medicine) - 2013-2014. |
| | President Citation - Awarded by the President of Indian Society of Critical Care Medicine (ISCCM) during the 19 th National conference in Kolkota in March 2013 for contribution to the society and field of critical care in the country. |
| Dr. Muckaden, Mary Ann | Board Member, Executive Asia Pacific Hospice Network |
| | Co-chair International Children's Palliative Care Network (ICPCN). |
| | Chairperson ICPCN, Belarus. |
| Mr. Mishra, Trilokinath | Editor, Radiographers Journal (Regd) |
| | President, Society of Indian Radiographers (Regd) (A National Association of Radiographers) |



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| Mrs. Narkhede, Sarika | Best Poster Award: "Cytochemical myeloperoxidase staining using 4-chloro-1-Napthol is a safe, sensitive and reproducible alternative to benzidine di-hydrochloride" 3 rd CME for technologist, TMH, Mumbai 2013. |
| Dr. Norohna, Vanita | Best Paper Award "Are three drugs better than two and does docetaxel trump paclitaxel in induction therapy for locally advanced oral cavity cancers?" 3 rd Joint Best of ASCO meeting, Mumbai 2013. |
| | Editor-in-chief, South Asian Journal of Cancer. |
| | Member, Committee for formulation of lung cancer management guidelines for ICMR. |
| Dr. Pai, Prathmesh | Dr. C Das Oration: "Paradigm shift in management of sinonasal cancers", 26th North East Branch of AOI, 2013. |
| Dr. Pantavaidya, Gouri | Second Prize Best Oral paper; "Validation of Clavien-Dindo classification of surgical morbidity in head and neck surgery: A Prospective study", Indian Cancer Congress, New Delhi, 2013. |
| | Best Paper award: "Validation of Clavien-Dindo classification of surgical morbidity in head and neck surgery: A Prospective study" at UAE cancer Congress 3 rd to 5th Oct 2013. |
| | Best Poster Award: "Can clinical T stage be a predictor for depth of invasion(DOI)in early carcinoma of tongue?" at FHNO- National conference Jaipur on 28th Sep 2013. |
| Dr. Patil, Dipali | First Prize Poster Presentation, "An Audit of Platelet Transfusion in Tata Memorial Hospital" 2nd National Conference of Indian Society of Transfusion Medicine (ISTM), Bangalore, 2013. |
| Mrs. Patel, Bilkis | Jwaladevi Award-2013, Best Technique Paper: "Efficacy of Thoothbrush in Oral Scrape Cytology", CYTOCON 2013, Indian Academy of Cytologists, Pondichery. |
| Dr. Patkar, Shraddha | Best Free Paper (HPB) "Solid Pseudopapillary Epithelial neoplasm of pancreas: Defining the role of radical surgery." Indian Cancer Congress Delhi, 2013. |
| Dr. Rahul Krishnatry | Fellowship, SNO International Outreach, Pediatric Neuro-Oncology. |
| Dr. Rekhi, Bharat | Awarded International Membership Grant, Association of Molecular Pathologists (AMP), 2013. |
| Dr. Gehdoo, Raghuveersingh | Associate Editor, 'International Journal of Ultrasound and Applied Technologies in Perioperative Care (IJUTPC)', UK, since June 2009. |
| Dr. Ramani, S.K. | Member, National Advisory Board of Imaging in Oncology, ICC 2013. |
| Dr. Rajadhyaksha, Sunil | "J.G. Parekh Oration" delivered at the MHG Annual Conference 2013, Mumbai Haematology Group. |
| Ms. Retnamony, Sulochana | Member, Board of Directors – Asian Oncology Nurses Society. |
| Dr. Salins, Naveen | Associate Editor, Indian Journal of Palliative Care |
| Dr. Sarin, Rajiv | "IACR Annual Oration" delivered at 32 nd Annual Convention of the Indian Association for Cancer Research (IACR), Delhi. |

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| Dr. Subramanian, P.G. | Lead Assessor, NABL. |
| Dr. Agrawal, Komal | 2nd prize Best Oral Paper Presentation, “Story of Anaplastic large cell lymphoma- sometimes more than ALK status” Hematocon 2013, ISTM, Mumbai. |
| Dr. Shrikhande, S.V. | Member-at-large, Scientific Committee, Asia Pacific Hepato-Pancreato-Biliary Association (APHPBA). |
| | Nominated Chairman, Scientific Committee, Indian Chapter, International Hepato-Pancreato-Biliary Association (IHPBA). |
| | Editorial Board-Journal of cancer research and therapeutics, Langenbeck’s Archives of Surgery, Indian Journal of Coloproctology (Associate Editor), Indian Edition of Pancreas (Editor), World Journal of Gastrointestinal Surgery. |
| | Chairman, Gastric and Pancreatic Cancer, ICMR. |
| | Secretary, Colorectal Cancer, ICMR. |
| Dr. Sirohi, Bhawna | Secretary, EBMT Nuclear accident committee. |
| | Editor-in-Chief-Indian journal of Medical and Paediatric oncology. Editorial board: Pancreatic cancer India, Journal of Cancer research and therapeutics. |
| Dr. Tendulkar, Anita | First Prize Poster Presentation, “Recruiting platelet donors through Platelet Donation Drives”, 2 nd National Conference of Indian Society of Transfusion Medicine (ISTM), Bangalore, 2013. |
| Mr. Upreti, R.R. | Elected Member, Executive Committee (EC), Association of Medical Physicists of India (AMPI) for 2013 – 2015. |
| | Awarded ICC Best Paper: “Clinical outcome of prospectively treated 140 women with early stage breast cancer using accelerated partial breast irradiation using 3 dimensional CT based brachytherapy”. Indian Cancer Congress, New Delhi -Nov. 2013. |
| Dr. Yadav, Prabha | President - Elect, Association of Plastic Surgeons of India 2014-15. |







CECC

Centre for Cancer Epidemiology





Cancer Epidemiology

Dr. R. P. Dikshit
Dr. A. M. Budukh

The Centre for Cancer Epidemiology aims at cancer control by identifying cancer burden, identifying the role of genetic and lifestyle related factors in development of cancer.

The activities consist of identification of cancer burden in the population by establishing Cancer Registries, conducting cross sectional surveys and performing time trend studies and analyzing survival and mortality data.

The IARC Regional Hub was established to support and train healthcare personnel for cancer registration in South-East Asia including Cancer Registries in Bhutan and Bangladesh.

The Population Based Survival study in collaboration with Mumbai Cancer Registry was completed and the infrastructure for collecting and analyzing the data was upgraded.

Support was extended to Sri Lanka, Indonesia, and Mongolia. New cancer registries were established at Chandigarh, Aji Garh, Sangrur and Mansa districts.

The Million Death Study was continued and refined and the data is being analyzed.

In the area of analytical epidemiology that deals with identification of life style and genetic risk factors of cancer, it also helps to identify prognostic factors for cancer; the following studies are ongoing and the accrual and data analysis is continuing.

Gall Bladder Cancer: To establish life style, infectious and genetic factors responsible for gall bladder cancer.

Breast Cancer: The study with accrual of 1500 cases and controls was completed and the data is being analyzed to understand the role of obesity, physical activity, reproductive histories and genetic factors in development of breast cancer.

Lung Cancer: The study has enrolled 550 lifetime non smokers to understand role of indoor pollution in development of lung cancer.

The Brain Cancer study was initiated with recruitment of cases to understand the role of mobile phone usage in development of brain tumours.

A laboratory tool was established to develop low-cost and feasible methodology to detect the human papilloma virus infection from menstrual pads.

A study to understand the role of dietary factors and identify biomarkers prospectively from archived blood samples, entitled “Indian Study for Achievable Health of Adult (ISHA)” was initiated at Barshi in Solapur District. This study will be paperless. 364 villages have been enrolled (with population of around 100,000). This study will collect information on large number of individuals electronically, with follow up plans and, collection and storage of blood samples.

The centre continued to support field work and data management for field intervention studies for screening of oesophagus, hypopharynx and oral cavity.

A molecular epidemiological laboratory facility was established for the purpose of genotyping assays.

Education

Educational and training programs are conducted for a doctorate program in epidemiology and 6 students were enrolled. Training programmes in Cancer Registration were conducted in Mumbai, Bangkok, and Jakarta with 130 participants.

Department of Preventive Oncology is actively involved in hospital as well as community based services for prevention, control and early detection of cancer. The department also services community based setups through Tata Memorial Centre Mobile Outreach Programme (TMC MOP).

Service

Screening

The department screened 4047 patients in the year 2013 for oral cancers. This screening detected 331 cases of frank oral cancers, 373 cases of leukoplakia and 35 cases of erythroplakia. A total 228 patients were diagnosed with oral sub-mucous fibrosis and put under observation.

A total of 1149 tobacco users were counseled in Tobacco Cessation Clinic out of which 945 were males and 204 were female users.

Screening of women for breast and cervix cancers was performed in 7202 females.

Seven frank breast cancer cases were detected. The patients requiring further treatment were referred to the Breast DMG.

Cancer awareness activities conducted by the department staff played an important role in dissemination of knowledge to the needy population and increased desire on their part to get examined for Preventive Oncology services.

Research

Scientific research in relevant areas is continued by the department staff to generate relevant information required for policy making and improving public health delivery services.

Education

Department of Preventive Oncology aims at capacity building of medical and para-medical personnel in Preventive Oncology and tobacco cessation activities and in keeping with the guidelines laid down by WHO.

| Sr No | | Frequency |
|-------|---------------------------------|-----------|
| 1 | Patients Examined | 7202 |
| 2 | Mammography | 889 |
| 3 | Ultra Sonography | 521 |
| 4 | Fine Needle Aspiration Cytology | 7 |
| 5 | Nipple Discharge Cytology | 127 |

Cervical cancer screening methods include Visual inspection and Colposcopy.

| Sr No | | Frequency |
|-------|-------------------|-----------|
| 1 | Patients Examined | 7202 |
| 2 | Pap smears taken | 2315 |
| 3 | Biopsy taken | 469 |
| 4 | ECC taken | 81 |
| 2 | CIN I | 36 |
| 3 | CIN II | 2 |
| 4 | CIN III | 7 |
| 5 | HPV samples taken | 394 |
| 6 | Frank Ca Cervix | 18 |



Dr Surendra Shastri
Head
Dr Sharmila Pimple
Dr Gauravi Mishra



Medical Records, Biostatistics and Epidemiology

Dr. Ganesh B.
Mr. S. D. Talole
Mrs. S. H. Kothare

The Department of Medical records is the nerve centre for many of the activities of the hospital and is an integral part of the patient care services, research and education. The department is the custodian and is responsible for maintenance, archival and management of medical records registered in the hospital. The department updates and encodes diseases as per the International Classification of Diseases (ICD). The patient medical records are used to evolve the cancer registry. The department publishes data on cancer incidence and trends.

Services

The department maintained and issued 80000 case files during the year for patient appointments and research activities. Old files were weeded out after digitization. This helped in implementation of **Paperless Operations**, i.e. all reports are available on the system electronically. They support the design and implementation of the Clinical Information System (CIS) and the real-time follow up data capture at the clinics.

Research

The Hospital-based Cancer Registry is one of the major activities of the Department. During the year, the Cancer Registry collected demography and clinical data of patients registered in TMH in the years 2007-2008 from the case files indicating that in the year

2008, the leading cancer was found to be lung in males and breast in females.

The department conducts the "Patterns of Care & Survival Studies (POCSS) Project for Cancer Breast, Cancer Cervix and Head and Neck Cancers. The Project has collected data for 5028 breast cancer cases, 2295 cervix cancer cases and 7108 head and neck cancer cases till date.

The department has set up new Population Based Cancer Registries (PBCR). The department has initiated and completed setup for PBCR at Kalpakkam and Kudankulam in collaboration with WIA Cancer Institute, Adyar Institute, Chennai in November 2013.

The Department continues registry operation at six DAE PBCR registries: Ratnagiri, Sindhudurg, Tarapur, Karwar, Rawatbhata and Kakrapar. Under this scheme, health check-ups are being conducted to identify new cancer cases.

Education

The faculty participates in postgraduate teaching activities in biostatistics and epidemiology. They also train Cancer Registry personnel in operations for setting up newer registries in cities like Kolhapur etc. and Hospitals and in Abstraction, ICD Coding of diseases. The department has been imparting training to medical transcriptionists.

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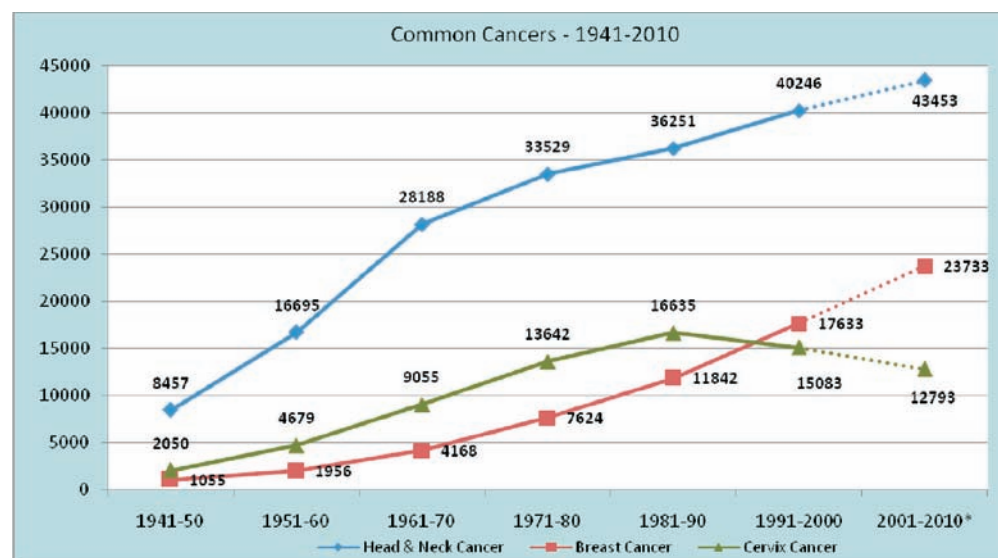


Fig 1 : Cancer Trend in TMH



Advanced Centre for Treatment, Research and Education in Cancer (ACTREC)



SERVICE

RESEARCH

EDUCATION



Message from the Director - ACTREC

The Advanced Centre for Treatment, Research and Education in Cancer (ACTREC) has achieved a seamless integration of basic and clinical research and has evolved as a comprehensive cancer centre in Navi Mumbai. In its verdant 60 acre campus are the Cancer Research Institute (CRI) and Clinical Research Centre (CRC) that provide a multidisciplinary approach to cancer research and patient care. With a 116 bed hospital equipped with state-of-the art technology and 25 PI led research groups, ACTREC has established itself as a unique model for translational research.

The Clinical Research Centre is fully functional and its programs encompass novel imaging protocols for cancer diagnosis, molecular hematopathology and clinical trials, driven by pharmacokinetic pharmacodynamic data with technology innovations that aim to minimize toxicity and achieve high precision cancer therapy. The hospital at ACTREC offers state of the art treatment modalities in radiation oncology, medical oncology including hematolymphoid cancers and bone marrow transplantation and, surgical oncology including advanced neurosurgery. The digital subtraction angiography (DSA – Cathlab) was commissioned at CRC-ACTREC. The neurosurgery unit initiated the use of intra-operative image guided surgery, especially navigable 3D ultrasound based surgery and fluorescence guided resection of malignant gliomas. The bone marrow transplant unit of ACTREC continues to undertake allogeneic and autologous bone marrow transplants and, unrelated donor and cord transplants with improved outcomes. The Clinical Pharmacology unit has optimized treatment protocols through pharmacokinetic and pharmacodynamic modeling, and early phase clinical trials. Studies are being undertaken to repurpose existing inexpensive drugs for clinical use in various cancers. As a step towards improved patient care, outpatient department and registrations were started for patients of Navi Mumbai.

The research programs at the Cancer Research Institute encompass the study of tumor biology and delineation of various pathways involved in cell proliferation, differentiation, apoptosis and metastasis. Advanced optical imaging and spectroscopy is enabling the study of cancer related changes at submicroscopic levels and, the structural changes and crystal structures of key proteins in oncogenic pathways are being unraveled. A state-of-the art core imaging facility was established that houses 3i Spinning Disk, STED 3X super resolution and multiphoton microscopes that will facilitate cell imaging at superfast speed in multicolor. As a member of the International Cancer Genome Consortium, the mutational landscape of gingivo buccal oral squamous cell carcinomas was defined. Molecular sub-grouping of medulloblastomas was achieved using differential expression of micro RNAs and their validation. The Next Generation sequencing facility at ACTREC is now functional. A new addition to ACTREC is the 'Fly lab' which utilizes *Drosophila* as a model system to study the signaling pathways regulating glial cell growth and development.

The academic program of ACTREC continues to attract young talent for the PhD program. The centre's campus is abuzz with academic fervor of the research scholars and the scores of young undergraduates and graduates who come to the centre for training. The centre also proactively engages its staff and patients in cultural and art events and, conducts Cancer Awareness Programs for the general public in a bid towards fulfilling its social responsibility.

The Centre for Cancer Epidemiology will soon be commissioned on the ACTREC campus and this will add a new dimension to the on-going basic and clinical research programs at ACTREC. In the years to come, ACTREC will establish itself as a centre that translates discoveries to effective patient care.



Shubhada Chiplunkar

The Advanced Centre for Treatment, Research and Education in Cancer (ACTREC), the research wing of the Tata Memorial Centre, is a comprehensive cancer centre located in Kharghar, Navi Mumbai. ACTREC comprises of the Clinical Research Centre, set up in 2005, which has the mandate to provide treatment to cancer patients enrolled in treatment protocols, conduct clinical trials and develop indigenous technology. It also has a 94 bedded hospital for treating cancer patients through its radiation, medical and surgical oncology programs. The Cancer Research Institute focuses on basic and applied research encompassing normal, tumour and stem cell biology, cell signalling and molecular interactions, immunology, genetics, genomics, proteomics and structural biology.

Over the years, the centre has focussed on integration of its basic and clinical research programs in a way that provides clear direction towards a translational platform, keeping the patient in mind always. Clinicians and scientists of the centre are engaged in a large number of collaborative projects within ACTREC, with clinicians from the Tata Memorial Hospital (TMH) as well as with national/international partners from Academia and Industry. During the year 2013, there were a total of 204 on-going projects at ACTREC. A sum of Rs. 5.71 crore was received from governmental agencies such as DBT, DST, ICMR, LTMT, etc., to meet the expenditure on 37 on-going projects. In addition, 21 new extramurally funded projects to the tune of Rs. 11.97 crore for a three year period were sanctioned by the above mentioned funding agencies, of which Rs.5.93 crore were received during the calendar year. In all, 101 indexed publications accrued from the research conducted by faculty of the Centre in 2013—these encompassed basic and applied research, clinical and translational research, and medical technology. The year also saw induction of 13 new staff members in medical and technical cadres, while eight employees superannuated.

During the year 2013, ACTREC continued to take rapid strides forward particularly in its patient care and research programs. A brief summary report of these programs follows...

At the forefront of new developments were the programs of the Clinical Research Centre

(CRC) at ACTREC, A total of 4070 new patients were registered and 3967 new admissions took place in the Centre's Hospital during the year 2013. In August 2013, patient registration services were started at the hospital at ACTREC to treat cancer patients from Navi Mumbai and Raigad district. Since then 57 new cases were registered at the Centre. The radiation therapy program saw 1021 new referrals this year. In September 2013, a Digital Subtraction Angiography (DSA - Cathlab) facility donated by a philanthropic trust was commissioned, and provides advanced image guided interventional radiology technique for diagnostic/therapeutic procedures. The Neurosurgery service has pioneered the use of state-of-the-art intraoperative image-guided surgery techniques, specifically navigable 3D ultrasound based surgery and fluorescence guided-resections of malignant gliomas at CRC-ACTREC, which have improved patient outcomes. The Bone Marrow Transplant Division of Hemato-Lymphoid Unit (Adult) continued to undertake allogeneic and autologous bone marrow transplants and, unrelated donor and cord transplants. During the year, 78 transplants (45 autologous, 33 allogeneic) were performed. Significantly improved outcomes were noted (100-day mortality ~6.0%; 365-day mortality ~18%), which are at par with international standards, at one-tenth the cost. Nine haploidentical transplants, which are technically very demanding, were also performed with encouraging results. The 17-bedded Leukemia/Lymphoma Ward catered to nearly 760 in-patients, while 30-40 out-patients per day were seen in the adult hematolymphoid OPD; simultaneously 20-30 solid tumor patients were also seen per day.

Research in the Clinical Pharmacology Unit focused on the optimization of treatment protocols through preclinical and clinical pharmacokinetic studies, pharmacokinetic-pharmacodynamic (PK-PD) modeling and early phase clinical trials. A dedicated phase 1 clinical trial unit has been created at CRC-ACTREC to enable us to take a leadership position in early drug development. It is also proposed to undertake extensive studies to repurpose existing inexpensive drugs for clinical use in various cancers. The Translational Research Lab examined the role of DNA/chromatin fragments in oncogenic



transformation and worked towards devising novel strategies to degrade these circulating fragments. The newly established Hematopathology laboratory aimed at studying the genetics of hematological malignancies and its influence on prognosis of disease and response to cancer chemotherapy.

The Centre implemented the Rajiv Gandhi Jeevandayee Arogya Yojana this year to improve access of eligible beneficiary families below poverty line/above poverty line (excluding white card holders) from several districts of Maharashtra including Raigad, Mumbai and suburbs.

The Cancer Research Institute (CRI) is structured into 25 Principal Investigator-led laboratories and several research support facilities. Established programs of CRI continued to focus on cancers that are a major cause for concern in the Indian context at the chromosomal, DNA, RNA and protein level. Current efforts in oral cancer focus on identification of genomic alterations at the level of copy number across the genome and identification of genes/gene clusters in the altered genomic loci, using array comparative genomic hybridization. The molecular basis of oral and cervical tumorigenesis was examined by studying overexpression of anti-apoptotic genes, and analysis of HPV prevalence and viral load. Global expression profiling of cervical cancers using microarray technology and genomics of cervical cancer using Next Generation sequencing technology were studied to understand its pathogenesis. Genome wide expression studies were carried out and differential miRNA expression was validated in medulloblastoma, a malignant brain tumor commonly seen in children and, Next Gen exome sequencing of WNT subgroup medulloblastomas and oligodendrogliomas was performed. Elucidation of the functions of keratin, vimentin and their associated proteins in epithelial homeostasis and cancer was attempted and, their use as biomarkers was validated in oral and breast cancers. Screening of myeloid cells from chronic myeloid leukemia - chronic phase by two dimensional gel electrophoresis - mass spectrometry was carried out in a bid to identify novel/additional therapeutic targets. Normal and tumour immunology continued to be a major research focus and involved the examination of the intricate interactions between gd T cells and various regulatory cells, receptors and immune processes, in a

bid to understand the immune scenario and reasons for immune dysfunction in breast, oral, lung, nasopharyngeal, gall bladder cancer and leukemia.

Cellular pathways that regulate neoplastic progression, such as those involving 14-3-3 proteins as also those inhibiting desmosome function were examined. The role of histone alteration(s) in cancer and DNA damage response, functional and structural role of histone variants in nucleosomal organization, transcriptional regulation and identification of differential binding proteins required for their localization within chromatin were examined. Genes involved in signaling pathways that control self-renewal of normal and cancer stem cells were studied to understand the mechanisms that govern adult stem cell regulation and cancer. Experimental concepts that can be translated into clinical applications for cancer diagnosis and personalized therapy were tested in small animal models using miniaturized medical imaging equipment. Early detection of molecular changes associated with the acquisition of cisplatin and paclitaxel resistance in ovarian cancer cells was evaluated. The mechanisms underlying Merlin-Hippo signaling regulation in glia development and growth control were elucidated in a bid to advance knowledge on growth control during normal development and in diseases like cancer. Under glycobiology, the mechanism by which metastasis associated surface expression of β 1,6 branched N-oligosaccharides promotes invasion and, how O-GlcNAcylation on serine/threonine residues of nuclear and cytoplasmic proteins modulates protein and cellular functions were studied. Compounds that intervene key steps involved in metastasis and angiogenesis were investigated. The mechanism of action of chemopreventive agents from curcumin, tea and grapes against chemical induced carcinogenesis were identified and delineated.

An ambitious structural biology program was initiated at the Centre a few years ago. The structural, mechanistic and cell biological aspects of protein degradation by the self compartmentalized ubiquitous, ATP dependent regulatory protease called the proteasome is being studied. Dissection of the structure, function and specificity of the proapoptotic protease HtrA2/Omi which performs critical cellular functions and is associated with cancer is being attempted. A

sensitive, in vivo/in situ Raman optical spectroscopic method for routine non-invasive screening and online diagnosis is under development. As a part of the structural and functional characterization of cancer associated proteins, the functional domains of BRCA1 and 2 have been cloned and purified and, the transactivation domain and BRCT domain have been crystallized as native domains; complex MERIT-40 protein has also been purified and functionally characterized.

The Academic Programs of the centre include an active Doctoral program in Life Sciences under the Homi Bhabha National Institute, a Deemed University. During 2013, a total of 99 graduate students worked towards the Ph.D. degree at ACTREC. Besides, 243 graduate students/staff from colleges and universities across the country visited the

centre to work on their Master's dissertation projects or to receive specialized training in research methodologies under the close supervision of ACTREC faculty. During the year, 17 national/international conferences, workshops, symposia, etc. were organized at the Centre, beginning with the Indian Cancer Genetics Conference 2013 held in January, and ending with the 9th National Research Scholars Meet in Life Sciences in December. The Centre also hosted 18 experts from India and abroad who delivered research seminars on topics relating to cancer biology.

As a social responsibility endeavor, the centre has been conducting Cancer Awareness Programs since last year. During 2013, five lecture series and cancer screening camps were conducted in Mumbai and Navi Mumbai.





CLINICAL RESEARCH CENTRE

Dr. Shubhada Chiplunkar (Director, ACTREC)

Dr. Sudeep Gupta (Dy. Director, CRC-ACTREC)

Dr. Rajiv Sarin (Director, ACTREC) - upto Sep. 2013

Anaesthesiology, Critical Care & Pain

Dr. Reshma Ambulkar
Dr. Bhakti S. Trivedi
Dr. Amol Kothekar
Dr. Malini P. Joshi
Dr. Raghu S. Thota

Biomedical Engineering

Dr. Amit Sengupta (*Technical Consultant*)
Mr. Shine Kumar Rajappan

Cancer Genetics

Dr. Rajiv Sarin (*Clinician Scientist*)
Mrs. Neena Bhatnagar*

Clinical Pharmacology

Dr. Vikram Gota
Mr. Anand Patil

Composite Lab. & Microbiology

Dr. Vivek Bhat (*Microbiology*)
Dr. Preeti Chavan (*Lab Manager*)

Epidemiology & Clinical Trial Unit

Dr. Tejpal Gupta (*OIC*)
Mrs. Sadhana Kannan (*Data Manager*)
Ms. Kasturi Awatgiri (*Clinical Trial Assistant*)

General Medicine

Dr. Prafulla Thakkar

Medical Administration

Dr. Prashant C. Bhat (*Asst. Med. Suptdt*)

Medical Oncology

Dr. Navin Khattri (*BMT*)
Dr. Manju Sengar
Dr. Amit Joshi (*BMT*)
Dr. Jaya Ghosh
Dr. Tushar Vora (*Paediatrics*)
Dr. Hasmukh Jain

Medical Physics

Ms. Reena Devi
Ms. Siji Paul

Nursing

Mrs. Meera Achrekar (*Asst. Nursing Suptdt*)

Pathology

Dr. Asawari J. Patil
Dr. Epari Sridhar
Dr. Saral Desai
Dr. Ranjan Basak (*Molecular Pathology*)
Dr. Nikhil Patkar (*Haematopathology*)
Dr. Prashant Tembhare (*Haematopathology*)

Quality Manager

Mrs. Chital Naresh

Radiation Oncology

Dr. Rajiv Sarin
Dr. Tejpal Gupta
Dr. Vedang Murthy
Dr. Supriya Chopra
Dr. Goda Jayant Sastri (*Clinician Scientist*)
Dr. Tabassum Wadasadawala

Radio Diagnosis

Dr. Seema Kumbhavi
Dr. Ashwin P. Polnaya
Dr. Amit Kumar Janu

Rehabilitation & Support Services

Mrs. Bhagyashree Tillu
(*Medical Social Worker*)
Mrs. Mohua Chatterji (*Physiotherapist*)

Surgical Oncology

Dr. Sajid Qureshi (*Paediatrics*)
Dr. Aliasgar Moiyadi (*Neurosurgery*)
Dr. Vinayak Shankhdhar (*Plastic Surgery*)
Dr. Sudhir Nair
(*Clinician Scientist - Head & Neck*)
Dr. Deepa Nair (*Head & Neck*)
Dr. Prakash Shetty (*Neurosurgery*)

Transfusion Medicine

Dr. Shashank Ojha
Dr. Aboli Marathe*
Mrs. Manda Kamble

Translational Research Lab

Dr. Indraneel Mittra (*Professor Emeritus*)
Dr. Pradyumna Kumar Mishra*
Mr. Naveen Kumar Khare

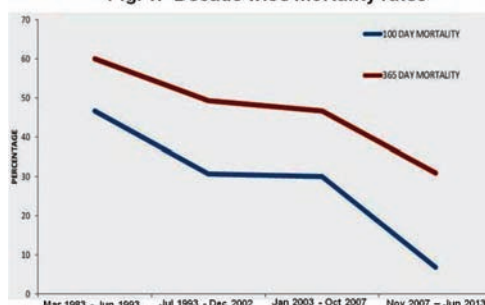
Bone Marrow Transplant Division of Hemato-Lymphoid Unit (Adult)

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The Bone Marrow Transplant Unit at ACTREC functions under the adult Hemato-lymphoid Unit of TMC. Over the years, the drop in mortality rates reveals a significant improvement in outcomes (Fig. 1). The 100-day mortality is around 6% now and the 365-day mortality is around 18%, of which 80% of deaths are due to relapse.

Fig. 1: Decade wise mortality rates



Service

During the year, 78 BMT procedures (autologous-45 and allogeneic-33) were performed. Of the 33 allogeneic transplants, 13 were performed on AML, 9 on ALL, 3 on CML, 2 on Hodgkin's disease, 4 on MDS and 2 on others. Of the 45 autologous transplants, 6 were performed on NHL, 13 on Multiple myeloma, 23 on Hodgkin's disease, 2 on

neuroblastoma and 1 other. This year, 9 haploidentical transplants, which are more challenging than unrelated donor transplants, have been performed with encouraging results. Around 760 patients have been treated as in-patients in the 17-bedded Leukemia/lymphoma ward over the past year, and 30-40 patients are seen daily as out-patients in the adult hematolymphoid OPD.

'Caring with quality' is a theme that is very dear to this unit, and it engages in patient-relative interaction programs on a regular basis.

Research

The Bone Marrow Transport Unit is engaged in several research projects. On-going projects include: (1) A pharmacokinetic - pharmacodynamic study assessing the ability of curcumin to decrease cytokines involved in mucositis in the autologous transplant setting, (2) Evaluation of various molecular prognostic markers and minimal residual disease (MRD) to potentiate therapy for acute myeloid leukemia (AML) patients: a two step molecular clinical investigation, (3) Pharmacokinetics driven optimization of Bu-Cy conditioning regimen to minimize hepatic veno-occlusive disease; and (4) Therapeutic monitoring of mycophenolate mofetil in allogeneic stem cell transplantation: a feasibility study,

Education

Members of the unit participated in several national and international conferences in India and abroad to present their clinical findings before their peers.



Dr. Navin Khattry
BMT Program Coordinator

Dr. Bhausaheb Bagal
Medical Oncologist





Dr. Vikram Gota
In charge

Mr. Anand Patil
Scientific Officer

The Clinical Pharmacology department focuses on the optimization of treatment protocols through preclinical and clinical pharmacokinetic studies, pharmacokinetic-pharmacodynamic (PK-PD) modeling and early phase clinical trials. Some of the important achievements of this year included the Initiation of therapeutic drug monitoring of posaconazole in September this year. Twenty nine BMT and acute leukemia patients receiving fungal prophylaxis were monitored for posaconazole levels and the dose was modified in six patients due to sub therapeutic trough concentration. Three phase I clinical trials sponsored by the pharmaceutical industry were initiated this year. One bioequivalence study initiated last year was analyzed and the findings were presented at the 15th World Conference on Lung Cancer at Sydney, Australia.

Research

The on-going projects include: (1) Preclinical evaluation of radioiodine labelled CD20 monoclonal antibodies for radioimmunotherapy of B-cell neoplasms and preclinical evaluation of ¹⁷⁷Lu/¹³¹I labeled Trastuzumab for radioimmunotherapy of her2+ breast cancer; (2) Bioequivalence study of two Rituximab formulations in patients with diffuse large B-cell lymphoma; (3) Population pharmacokinetics and pharmacogenetics study of 6-mercaptopurine in adult patients with acute lymphoblastic leukemia; (4) A prospective, observational, open-label, non-randomized, single dose, single centre, two way, parallel group, bioequivalence study of two formulations of pemetrexed in Indian adult chemo-naïve adenocarcinoma NSCLC patients; (5) Validation of a limited sampling strategy for therapeutic drug monitoring of mycophenolate mofetil in allogeneic stem cell transplantation – a feasibility study; (6) Pharmacokinetics driven optimization of Bu-Cy conditioning regimen to minimize hepatic veno-occlusive disease; (7) Pharmaceutical quality of anticancer generics versus innovator drug product: a comparative analysis; (8) Pharmacokinetics and pharmacogenetic study of 13-cis-retinoic acid in Indian children with high-risk neuroblastoma; (9) Evaluation of curcumin formulation and Ashwagandha root powder extract in the management of advanced high grade osteosarcoma. The department is also engaged in four preclinical pharmacokinetics and biodistribution studies on novel drug formulation development, in collaboration with other institutions.

Education

Members of the department participated in several symposia and conferences in India and abroad.

Hematopathology - Molecular Diagnostics and Translational Research Lab

This is a newly established translational research laboratory with its core focus on the genetics of hematological malignancies and its influence on disease prognosis and response to cancer chemotherapy; it also provides service to patients with blood cancer.

Over the past year, over 30 high end molecular diagnostic assays have been established and offered as a service. Molecular diagnostics services were provided to over 1200 patients. Referral samples are now being received from all over the country. Flow cytometric assays for detection of minimal residual disease in AML and B-ALL have been developed and are provided as a service to all hematolymphoid patients.

A pilot study on the evaluation of hematolymphoid tumor specific DNA ploidy analysis using eight color flow cytometry has been standardized and completed. As a part of AML MRD project, a novel marker - CD116 has been evaluated to explore its contribution in the detection of minimal residual disease. An 8 to 10 color T cell receptor (TCR) V-beta usage monitoring assay has been standardized for the assessment of T cell clonality in peripheral T cell lymphoma.

A course for training technologists in molecular diagnostics has been initiated and four students enrolled.



Dr. Nikhil Patkar,
Dr. Prashant Tembhare
Clinician Scientists

Dr. Syed Hasan
Scientific Officer



Dr. SL Juvekar
Officer-in-charge

Dr. SA Kembhavi,

Dr. Ashwin Polnaya,

Dr. Amit Kumar Janu

Radiodiagnosis

The department provides diagnostic imaging services and image guided interventional Radiology procedures. Advanced MR imaging such as diffusion tractography and functional MR imaging are also performed. CT and MRI examination is also performed on animals as a part of several animal research projects.

The Siemens interventional radiology equipment was installed, and 1374 conventional radiological investigations, 500 USG/Color Dopplers, of 3174 diagnostic CT scans (839 of these for radiotherapy planning), and 1089 MRI scans were performed.

On-going research projects encompass,

- Intensity modulated radiotherapy for sarcomas (osteosarcoma, chondrosarcoma and chordoma) of head/neck and pelvis, and a dosimetric comparison with proton
- Randomized phase I-II study of hyperfractionated accelerated radiation therapy with concurrent chemotherapy followed by adjuvant systemic chemotherapy in children and young adults with metastatic/high risk medulloblastoma or central nervous system-primitive neuro ectodermal tumors
- Biological imaging before, during and after simultaneous modulated accelerated radiation therapy in head and neck squamous cell carcinoma (Bio-SMART)
- Evaluation of the safety and efficacy of Vandetanib in thyroid carcinomas
- Diagnostic accuracy of diffusion weighted imaging for discrimination of malignant cervical lymph nodes in oral tongue squamous cell carcinoma.

Pathology

The department is NABL accredited and provides histopathology, frozen section, immunohistochemistry and cytopathology diagnostic services. On an average, 100 paraffin blocks are processed every working day. The laboratory is enrolled in an external

QC (Inter Laboratory Quality Assessment) program. The department handled 2183 histopathology cases, 889 frozen section cases, 661 immunohistochemistry cases and 105 cytopathology cases during the year.

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Dr. Asawari Patil
Officer-in-charge

Dr. Epari Sridhar

Dr. Saral Desai

Microbiology

The Microbiology laboratory provides the following patient related and hospital services. These consist of Bacteriology, Serology, Sterility testing for Blood Bank services, OT/ICU/Brachytherapy units, basic mycology, and Infection control services. The department tested a total of 7745 samples under the following heads: 4584 samples for bacteriology, 1000 samples for clinical microbiology, 992 samples for serology, 1029 samples for the Blood Bank and 140 samples for environmental surveillance.

The Microbiology department is collaborating in a research project on the 'Comparison of blood count parameters in venous and



fingertip (capillary) blood in oncology patients'.

The staff members of the department are encouraged to take part in refresher courses and training programs.

Dr. Vivek Bhat
Officer in charge

Composite Lab



Dr. Preeti Chavan
Officer in Charge

The Composite Lab provides round the clock medical laboratory services for the ICU, OTs, in patients and day care wards, and the RT unit. The lab is accredited by NABL. Biochemical investigations, immunoassays, therapeutic drug level measurement, are performed using fully automated clinical chemistry, chemiluminescence and blood gas analyzers. A total of 24,496 biochemical and 27,386 hematological investigations were performed during 2013. Cytological investigations covered 93 non gynec cytology and 34 FNAC tests.

The lab is engaged in a project for 'Comparison of blood count parameters in venous and fingertip (capillary) blood in oncology patients'.

All the staff of the department are encouraged to upgrade their knowledge skills through participation in CMEs, workshops and conferences.

The department of Transfusion Medicine (DTM) continually strives to maintain high quality standards in provision of safe blood in adequate quantities. The department supports the Bone Marrow Transplant unit with blood products. DTM also receives cord blood, bone marrow and PBSC, assesses documents, runs QC and preserves/issues them for unrelated stem cell transplants. The department has maintained a 'Voluntary Donor Club' for critical situations of platelet and rare group donors.

During the report period, 1829 blood units were collected. In all, 3244 blood groupings, 4408 cross matching were performed. In all, 3506 blood/blood components were processed (whole blood 497, packed cells 1256, platelets 1035, plasma 1215), and 3896 blood components were issued (indoor patients 3021, TMH 541, other hospitals 334). A total of 767 plateletpheresis procedures were performed and 1409 leucodepleted/2241 irradiated blood products were generated (platelets 767, RDPs 698 and packed cells 776). PBSC collections totalled 107 (autologous 70 for 68 patients, allogeneic 34 for 37 patients); one bone marrow harvest (autologous) was performed. Thirty two outdoor blood collection camps were conducted.



The staff members of the department attended several CMEs, training courses, and workshops, and presented their findings as oral and poster presentations at local and national conferences. The department routinely provides training and observership opportunities in blood banking to students from neighboring colleges and to staff of blood banks/hospitals across the country. During 2013, four MD students, one medical officer and three staff members from hospitals across the country came to DTM for training/as observers.

Dr. Shashank Ojha
Officer in charge

Dr. Aboli Marathe
Blood Bank Officer

Dr. Minal V. Pujarey
Blood Bank Officer

Mrs.MG Kamble
Scientific Officer

Translational Research



Dr. Indraneel Mittra
Team Leader

Dr. Pradyumna Kumar Mishra

Mr. Naveen Kumar Khare

The main focus of this lab is the systematic investigation of the role of circulating chromatin in cancer and chronic degenerative diseases. Findings have revealed that DNA and chromatin fragments (DNAfs and Cfs) isolated from human plasma/serum are readily taken up by cells in culture, get localized in their nuclei within minutes and associate with host cell chromosomes, evoking a cellular DNA-damage-repair-

response (DDR) that facilitates their incorporation into the host cell genomes. Their genomic incorporation leads to dsDNA breaks, chromosomal damage, translocations, cell growth arrest and activation of apoptotic pathways. These findings have the potential to generate a therapeutic approach to cancer. A novel method to degrade circulating chromatin has been devised with the use of Resveratrol-Cu, which can prevent metastasis, neutropenia and death from sepsis in a variety of mouse models.

Research

The lab is engaged in three research projects: (1) Chromatin from dead cells damage DNA of living cells by integrating into their genomes to trigger inflammation and cancer: DAE grant; (2) Prevention of DNA damage induced by chromatin fragments isolated from serum by anti-histone antibody nanoparticles: DAE grant; (3) Role of circulating chromatin in cancer and chronic degenerative diseases.

Education

Prof. Mittra presented his research findings at local and national meets and at one international CME.

The Bioengineering - Medical electronics lab (virtual Instrumentation design and work station) and Gynecology - Video Colposcopy research facility aims at Cancer Theranostics, to develop affordable diagnostic tools and treatment protocol through the amalgamation of clinical, experimental, theoretical and engineering research techniques. The focus is clinical down staging, using a bottom up approach wherein the health problem related to cancer is first identified at the level of community. Concurrently a research protocol is designed to find innovative technological/clinical solution and develop a point of care theranostics tool. The sensitivity and specificity of new innovations/experimentations is compared with known state of art diagnostic and treatment protocols, supported by theoretical models and simulations techniques.



Research

The department is actively engaged in five research projects. These include: (1) Study of the effect of hyperbaric oxygen in control of mammary tumor growth in C3H mice, (2) Development of novel label free cancer diagnostic and therapeutic platform by modulating tumor microenvironment – a baseline feasibility study in instrumentation development, (3) Evaluation of axillary nodes by fluorescein and Raman spectroscopy, (4) Studying vascular remodelling during metronomics therapy in cancer, and (5) Colposcopy, HPV and PAP evaluation of the cervix of women suffering from breast cancer and spouse of men suffering from head & neck cancer.

Education

The department participates in the centre's training program. During 2013, six students from biotechnology and biomedical engineering background worked as trainees on departmental projects, four for M.Sc., one for B.Tech. and one for research experience.

Dr. Amit Sengupta
Team Leader

Nursing



Mrs. Meera Achrekar
Asstt. Nursing Superintendent

Oncology nurses in ACTREC engage in collaborative practice with all members of healthcare team to help patients and families attain, maintain and recover optimal health and quality of life. Due attention is given to the implementation of patient safety goals and establishing standards of care, ensuring an adequate nurse patient ratio. Efforts are also put in towards maintaining the nurses' credentials, code of ethics, standards, and competencies, updating the knowledge base of the nursing staff through regular in service programs. Nursing audits are also undertaken on a regular basis to identify key performance areas such as sample collection, initial nursing assessment, blood transfusion practices and crash cart. The findings are disseminated to

the nursing staff and corrective actions are taken. Nurses are also encouraged to participate in research studies.

Service

The year 2013 saw an increase in the patient work load due to new registrations, commissioning of OPDs and interventional Radiology. The current bed strength in ACTREC is 71 admission beds, 10 beds for ICU and recovery, 13 beds for Day care, and three beds for MRI recovery. The patient load in the Day care ward, which caters to chemotherapy administration and patients requiring short term care, increased from 10,393 in 2012 to 11,421 in 2013. This year, 77 bone marrow transplants were performed in ACTREC, and these BMT patients were given specialized nursing care and attention.

Research

Studies were initiated on arterial blood gases, immediate post-operative care of neuro surgical patients, and pain assessment and use of pain management techniques.

Education

The department conducts induction program for new recruits and to update the knowledge and skills of nursing staff. The nursing staff members participated in national conferences and pursued postgraduate studies in Oncology Nursing.

Central Sterile Supply Department

Service

CSSD is mandated to maintain sufficient stocks of surgical instruments/items in good condition and to supply sterilized material for use in the OTs, ICU, BMT, OPD and wards, in order to control the incidence of hospital infection. Stringent internal quality control measures are in place and all the processing parameters for the sterilization cycle are controlled, monitored, recorded and the process chart printouts are preserved. During the report year, 3800 steam sterilizer cycles

and 240 ethylene oxide sterilizer cycles were run to process surgical instrument trays, linen packs and dressing material, etc and heat sensitive material like ICA trays, CT and MR applicator trays, anesthesia circuits, cautery cords, etc.

Education

Regular in-house training is provided to the technical staff to keep them updated about current trends and practices, and changes in procedures.

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Mrs. Shraddha Bidaye
Officer in-Charge



CANCER RESEARCH INSTITUTE

BASIC RESEARCH TEAM

Dr. Shubhada Chiplunkar (Director, ACTREC)

Dr. Surekha Zingde (Dy. Director, CRI-ACTREC) - upto Mar. 2013

Scientific Officers

- Dr. Kishore Amin
- **Dr. Dibyendu Bhattacharyya**
- **Dr. Kakoli Bose**
- Dr. Pradip Chaudhari
- **Dr. Murali Krishna Chilakapati**
- **Dr. Shubhada Chiplunkar**
- **Dr. Sorab Dalal**
- Mr. Uday Dandekar
- **Dr. Abhijit De**
- Mr. Shashadhar Dolas
- **Dr. Amit Dutt**
- **Dr. Shilpee Dutt**
- Mr. Nikhil Gadewal
- **Dr. Rukmini Govekar**
- **Dr. Rajiv Gude**
- **Dr. Sanjay Gupta**
- Dr. Syed Hasan
- Dr. Arvind Ingle
- Dr. Narendra Joshi
- Dr. Aarti Juvekar
- **Dr. Rajiv Kalraiya**
- Dr. Jyoti Kode
- Dr. Pradnya Kowtal
- **Dr. Manoj Mahimkar**
- **Dr. Girish Maru**
- **Dr. Rita Mulherkar**
- Dr. Gauri Pandit
- Dr. Asha Ramchandani
- **Dr. Pritha Ray**
- **Dr. Rajiv Sarin**
- Mrs. Sharada Sawant
- **Dr. Neelam Shirsat**
- **Dr. Tanuja Teni**
- Dr. Rahul Thorat
- **Dr. Milind Vaidya**
- **Dr. Ashok Varma**
- **Dr. Prasanna Venkatraman**
- **Dr. Sanjeev Waghmare**
- Dr. Ujjwala Warawdekar
- **Dr. Surekha Zingde***
- **Dr. BV Venugopalareddy**

Principal Investigators (PIs) are shown in bold

* Retired during 2013

Summary

The research interest of this lab is protein trafficking, with the primary intent to investigate the mechanism of intracellular intelligence that controls fundamental biological features such as size, shape, number, polarity and dynamics of intracellular objects. Studies in this lab focus on studying the size control mechanism of the Golgi apparatus, that of the nucleus and its implications in cancer, and regulation of the dynamics and number of ER exit sites. In *Saccharomyces cerevisiae*, disruption of the ARF1 gene yields larger and fewer Golgi cisternae because of depleted Arf GTPase. A similar phenotype has been noted with a thermosensitive mutation in Nmt1, which myristoylates and activates Arf. However, the reason why Arf depletion perturbs Golgi structure is still obscure. Data from this lab indicate that late Golgi structure is particularly abnormal in *arf1D* cells, with severely reduced number of late Golgi cisternae. This could be an outcome of selective changes in cisternal maturation kinetics. The *arf1D* mutation causes early Golgi cisternae to mature more slowly and less frequently, but does not alter the maturation of late Golgi cisternae. These changes quantitatively explain why late Golgi cisternae are fewer in number and correspondingly larger. In the nucleus project, assay systems have been developed to monitor size variation of the nucleus using fluorescent fusion of lamins and histones.

Research

The Bhattacharyya lab is involved in two research projects: (1) The size and shape control mechanism of Golgi apparatus. In this study, homotypic fusion of Golgi vesicles leading to cisternae formation was shown successfully using real time with the help of high speed confocal microscopy, using the observed partial depletion of Arf in *Saccharomyces cerevisiae* as a tool. (2) Study to investigate role of phosphatidylinositol 4-phosphate (PtdIns4P) binding effector GOLPH3/VPS74 in the size control mechanism of Golgi apparatus by depletion analysis using anchor away knock sideways method.



Education

The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute, and present has five research fellows: Ms. Madhura Bhawe, Ms. Abira Ganguly, Ms. Prasanna Iyer, Mr. Bhawik Kumar Jain and Mr. Pravin Marathe. The Bhattacharyya lab trains students of the M.Sc./M.Tech. programs and members participate in national conferences.

Dr. Dibyendu Bhattacharyya
Principal Investigator

Bose Lab



Dr. Kakoli Bose
Principal Investigator

Summary

The long-term objective of this lab is to achieve a broad understanding of structure, function and specificity of proapoptotic proteins involved in alternate apoptotic pathways and their role in cancer. The current focus is on two major proteins: human HtrA2/Omi (high temperature requirement protease A2) and human papillomavirus regulatory E2 protein. HtrA2/Omi is a unique trimeric serine protease that performs critical cellular functions, and is associated with critical diseases such as cancer and neurodegenerative disorders, making it an important therapeutic target. Intricate dissection of its structure and dynamics are being performed in a bid to identify its novel partners, which will shed light on its biological

role and thus provide a means to manipulate it with desired characteristics. Current work also covers HtrA1, -3 and -4. Research also aims at understanding the mechanism of interaction between high-risk papillomavirus (HPV) regulatory E2 protein and proteins of the extrinsic apoptotic pathway. This information will unravel a novel adapter-independent cell death pathway and will further the general understanding of papillomavirus E2 protein.

Research

Dr. Bose is involved in nine on-going research projects as PI including: (1) Role of HtrA2 domains in regulating its specificity and functions and its interaction with anti-apoptotic (2) PDZome: development of database using Schrodinger tools and other computational projects (3) Characterizing the ability of HPV E2 mutant in inducing apoptosis in HPV positive cell lines and in mouse model, (4) Characterizing multifaceted role of HtrA2 as a quality control protein (5) Understanding protein protein interactions involving a high temperature requirement serine protease and its substrates and binding partners.

Education

The lab is recognized for the Ph.D. program of the Homi Bhabha National Institute. There are six research scholars working on their Ph.D. theses: Ms. Nitu Singh, Mr. Lalith K. Chaganti, Mr. Raja Reddy Kuppilli, Ms. Saujanya Acharya, Mr. Ajay Wagh and Mr. Raghupathi K. The lab also participates actively in the training program of the Centre and, eleven students underwent training this year. All the lab members participated in national meetings.

Summary

Cancer has gained the proportions of an epidemic in recent years and, within five years, it will surpass heart disease as the leading cause of death. The high mortality rate due to cancer is attributed to late detection, owing to limitations of convention diagnostic methodologies. Screening and early detection are important tools for the overall management of cancer and to reduce cancer morbidity/mortality burden in the population. Thus, there is an urgent need to develop sensitive, preferably non invasive method for early diagnosis. Optical spectroscopic methods like infra red absorption, Raman and fluorescence spectroscopy are being contemplated as adjunct/alternative approaches. Among these, Raman is an ideal test for noninvasive and online diagnosis. This lab is actively pursuing the development of Raman based methods with the following focus areas: (a) Development of *in vivo/in situ* Raman methods for routine screening and diagnosis under clinical setting; (b) Developing Raman microspectroscopy methods for diagnosis/ screening using body fluids, cell smears and tissue micro sections to obviate need for on-site instrumentation; (c) development of Raman applications in reflexology, asthma and tuberculosis; (d) Developing various fiber probe designs for *in vivo* applications; and (e) Correlation of spectral features to biomolecules/cancer biology.

Research

The lab is engaged in six projects includings:-
(1) Development of *in vivo* laser Raman spectroscopy methods for diagnosis of oral precancerous conditions and cancer;
(2) A study of breast cancer progression in rodent models using Raman spectroscopy;
(3) Raman spectroscopy of serum and exfoliated cells for detection of oral cancers;
(4) Raman mapping of oral buccal mucosa;
(5) Setting up of laser facility for medical and technological applications at Anna University, Chennai.



Education

The Lab is recognized for the Ph.D. program of the Homi Bhabha National Institute. There are six research scholars working on their Ph.D. theses - Mr. Surya Pratap Singh, Ms. Rubina Shaikh, Mr. Piyush Kumar, Ms. Aditi Sahu, Mr. Tanmoy Bhattacharjee, and Ms. Priyanaka Sathe. The lab also participates in the training program of the Centre and, six students were trained for their M.Sc. dissertation or for research experience. The lab members also attended national conferences to present their research findings.

Dr. C. Murali Krishna
Principal Investigator

Chiplunkar Lab



Dr. Shubhada Chiplunkar
Principal Investigator

Dr. Jyoti Kode
Co-Investigator

Summary

The focus of research in Chiplunkar Lab is on understanding the immune scenario and reasons for immune dysfunction in cancer patients. The projects undertaken in this lab include (a) understanding the cross talk between bisphosphonate-stimulated tumor cells/ $\gamma\delta$ T cells and osteoclasts; (b) study of the role of Notch in regulation of $\gamma\delta$ T cells and regulatory T cells; (c) role of Toll like receptors in anti-tumor immunity mediated by $\gamma\delta$ T cells; (d) antibody dependent cellular cytotoxicity mediated $\gamma\delta$ T cells; (d) use of plant derived alkylamines in stimulating anti-tumor potential of $\gamma\delta$ T cells; and (e) epigenetic regulation and anti-tumor effector functions of gamma delta T cells. Other areas under investigation include (f) study of the tumor microenvironment and immune dysfunctions; (g) genomic and functional studies in T-ALL patients; (h) understanding the role of Th17 and regulatory T cells in gall bladder cancer; and (i) development of a simple and non-invasive method for

prognostication and monitoring of treatment response based on analysis of EBV DNA. Under the 'Science Initiative Program in Ayurveda', a study was undertaken to investigate the mode of action of *Bhasmas* by investigating the immune scenario generated in mice models treated with *bhasmas* and *anupans* (vehicle).

Research

Eight research projects are on-going: (1) Role of Notch in regulation of $\gamma\delta$ T lymphocytes and regulatory T cell function (2) Understanding the role of bisphosphonates and gamma delta T lymphocytes in patients with breast cancer and bone metastasis, (3) Immune dysfunction in oral cancer patients - role of tumour microenvironment, (4) Understanding the pathogenesis of gall bladder cancer: Role of TH17 and regulatory T cells, (5) Genomic and functional studies in leukemia patients exhibiting TCR $\gamma\delta$ gene rearrangement, (6) Epigenetic regulation and anti-tumor effector functions of gamma delta T-cells, (7) Role of galectin-3 in modulating tumor-specific immunity and lung metastasis in mice, (8) Bioactivity studies of Bhasmas.

The co-investigator is working on a project on understanding the cross talk between mesenchymal stromal cells and leukemic stem cells in acute myeloid leukemia.

Education

The Lab is recognized for the Ph.D. program of the Homi Bhabha National Institute. Eight research scholars are working on their Ph.D. theses – Mrs. Nirmala Shanoj, Mr. Dimpu Gogoi, Ms. Swati Phalke, Ms. Aparna Chaudhari, Mr. Asif Dar, Mr. Rushikesh Patil, Ms. Gauri Mirji and Mr. Sajad Bhat. The lab participates in the training program of the Centre. Regular academic activities are conducted.

Summary

The De lab uses molecular functional imaging as a tool for real time visualization and quantitative measurement abilities of cellular processes at the molecular or genetic level. Research in this lab involves the use of miniaturized medical imaging equipment suitable for testing multiple facets of experimental concepts in small animal models, which can be directly translated into imaging-guided clinical applications to serve both cancer *diagnosis* and personalized *therapy*. The present focus of the lab is to take advantage of preclinical imaging tools for understanding and therapeutic evaluation of human sodium iodide symporter (hNIS) gene targeted radio-iodine therapy for breast cancer. Several novel findings have been made on devising clinically relevant protocols for successful translation of this approach in breast cancer clinic. In another line of research, collaborative research is being undertaken to develop synthetic nano-scale translational medicines for breast cancer. Liposomal and polymer coated gold nanoparticle have been developed and their photo-thermal therapy efficacy is being tested in imaging guided breast cancer animal model. Various drug formulations have been evaluated to assist tissue-specific drug delivery. Optical imaging sensors are being developed for live monitoring of various cellular protein functions such as protein-protein interactions, protein phosphorylation, protease activation, etc. In this optical reporter based BRET technology, an HTS compatible screening protocol has now been standardized that allows functional screening in vitro, in live cell, and lead testing in physiologic mouse model system for identification of compounds against specific target cancer proteins. A project for the evaluation of anti-cancer potential of deuterium-depleted water on various cancer cell types has been initiated.



Research

The De Lab is involved in two ongoing research projects - (1) Human sodium iodide symporter (hNIS) expression as an endogenous marker for breast cancer diagnosis and therapy, and (2) Development of reporter gene engineering based optical imaging sensor for non-invasive functional validation of protein phosphorylation and protease. The following projects were initiated : (1) Identification and validation of potential chemical inducers for human sodium iodide symporter (hNIS) gene expression in breast cancer, and (2) Design and evaluation of novel polymer-lipid hybrid nanocarriers for improved systemic delivery of siRNA, in collaboration with the Bombay College of Pharmacy.

Education

The Lab is recognized for the Ph.D. program of the Homi Bhabha National Institute. There are three research scholars working on their Ph.D. theses – Ms. Sushmita Chatterjee, Ms. Madhura Kelkar and Ms. Shalini Dimri. The lab participates in the centre's training program and three trainees worked on their dissertation projects (1 B.Tech., 2 M.Sc.) and five for research experience. Lab members presented their research findings at national and international conferences. The lab also conducts in house data presentations regularly.

Dr. Abhijit De
Principal Investigator

Dutt Lab



Dr. Amit Dutt
Principal Investigator

Summary

The overall aim of the Dutt lab is to understand the biological basis of various human cancers to guide development of clinical therapeutics. Efforts involve integrated characterization of somatic alterations of cancer specimens by performing genome-wide analysis of copy number changes using SNP arrays, genomic re-sequencing using next generation sequencing platforms, and low throughput loss-of-function pooled RNAi mediated genetic screen using tumor derived cell lines (established in house). Effort also focuses on experimental evaluation of functional

relevance of somatic alterations identified by genomic approaches, using molecular and cellular approaches.

Research

Dutt lab is actively engaged in six research projects: (1) Defining the cancer genome of head and neck squamous cell carcinoma (HNSCC) with SNP arrays and Next Generation sequencing technology, (2) Genome-wide RNAi screen with human pooled tyrosine kinase shRNA libraries in head and neck squamous cell carcinoma (HNSCC) cell lines, (3) Progestogenomics: Identify the transcriptional targets of progesterone in human breast cancer, (4) Profiling the incidence of novel alteration discovered in human lung cancer, (5) Characterizing the somatic landscape of genetic alterations in human retroperitoneal liposarcomas, (6) Functional genomic characterization of therapeutically relevant vulnerabilities in TSCC.

Education

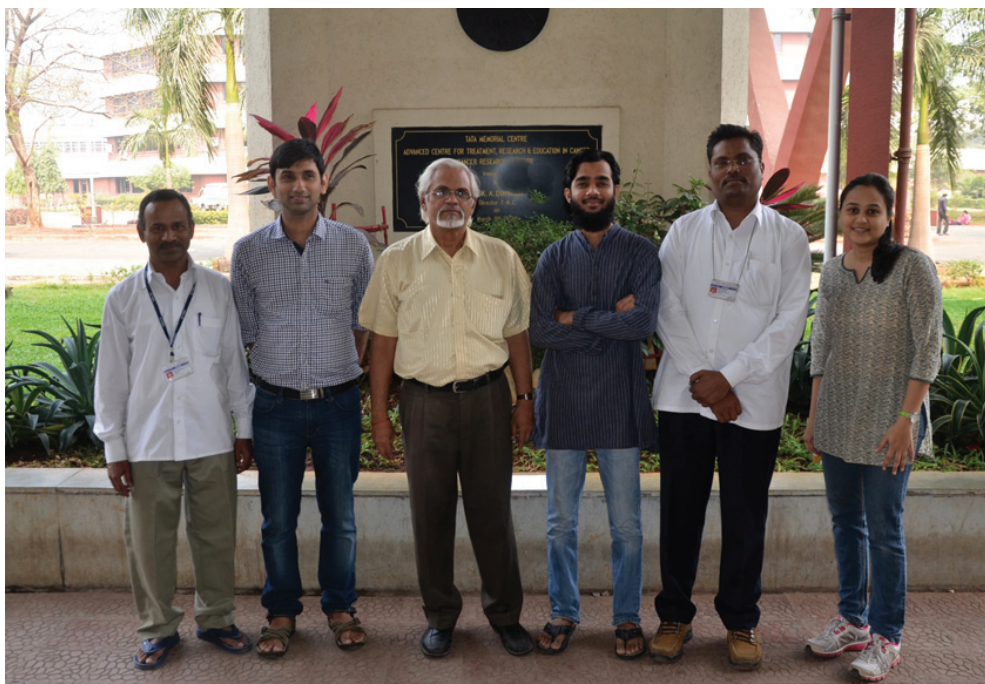
The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute and has four doctoral students - Mr. Pratik Chandrani, Mr. Pawan Upadhyay, Mr. Prajish Iyer, and Mr. Mukul Godbole. The lab also participates in the centre's training program, and six trainees worked under Dr. Dutt's supervision – one for the M.Sc. dissertation project and five for research experience. Lab members participate in the in house data presentations and present their research findings at national and international conferences.

Summary

On-going research programs in Gude lab investigate a compound intervening key steps involved in metastasis and angiogenesis. Metastasis is a multi-stage process involving the action of many genes, one of which is the Metastasis Associated 1 gene (MTA1) that was identified and is being examined for decrease in motility and change in expression and activity of cofilin, ezrin, RAC1 and vasodilator-stimulated phosphoprotein. The molecular mechanism indicated by inhibitory effect of Pentoxifylline was undertaken to understand role of STAT3 regulated gene products, upstream kinases and its nuclear translocation and binding to DNA involved in tumor development and tumor induced angiogenesis in A375 human melanoma cells. The action of Pentoxifylline was examined on Mitogen Activated Protein Kinase, Akt, anti-apoptotic proteins and vascular endothelial growth factor regulating angiogenesis in MDA MB 231 breast cancer cells. The antimetastatic action of Quercetin (QR) loaded GeluPearl nanosystems significantly reduced tumor volume in C57BL/6 mice compared to QR suspension. GPSSLN significantly reduced lung colonization and enhanced antimetastatic activity of drug against B16F10 melanoma. The effect of Temozolomide when loaded into poly lactic acid (PLA) nanoparticulate was studied on C6 glioma cells indicating inhibitory concentration of drug loaded PLA was significantly longer as compared to parent drug. The effect of PEGylated liposomal delivery of docetaxel was checked for its improved efficacy in B16F10 melanoma cell line.

Research

The research program of the lab encompasses seven research projects (1) The role of metastasis associated 1 (MTA1) in the metastatic process of breast cancer, (2) Effect of a methylxanthine derivative and anticancer drugs on integrin mediated adhesion and induced apoptosis in breast cancer cells (3) Effects of a methylxanthine derivative on



STAT3 mediated regulation of cytokines involved in tumor development and tumor induced angiogenesis in melanoma cells, (4) To investigate the molecular mechanism by which a single depot injection of progesterone provides survival advantage to triple negative breast cancer patients, (5) Lipid colloidal carriers for anticancer activity of orally delivered Quercetin, (6) The role of controlling epimerization in formulations of liposomal loaded docetaxel, (7) Poly lactic acid (PLA) nanoparticles sustain the cytotoxic action of temozolomide in C6 glioma cells.

Education

The Lab is recognized for Ph.D. program in Life Sciences of the Homi Bhabha National Institute and has two graduate students working on their dissertation – Mr. Peeyush Goel and Mr. M. Zahid Kamran. Four short term trainees sought training for Master's dissertation or research experience. The lab is actively engaged in weekly in house data presentation meetings. Faculty and students took part in national conferences.

Dr. Rajiv Gude
Principal Investigator

Gupta Lab



Dr. Sanjay Gupta
Principal Investigator

Summary

Variations in epigenetic profiles are critical determinants of cell lineage commitment, phenotypic variability and susceptibility to disease. Our lab is focused on understanding the role of histone alteration(s) in cancer and DNA damage response, in-depth functional and structural role of histone variants, H2A.1 and H2A.2 in nucleosomal organization, their transcriptional regulation and identification of differential binding proteins required for their localization within chromatin. The highlights of the ongoing programs on human gastric cancer have identified specific post-translational modification(s) of histones in patient tissue samples and their potential implication in better treatment modalities. Further, continuing research on histone variants, H2A.1 and H2A.2 highlighted their potential role in defining specialized biological mechanism, differentiation and de-differentiation opposed to normal cellular proliferation during liver regeneration and suggests overlapping functional relevance in

epigenetic reprogramming of genome. The DNA damage response project recognized the G1-phase specific reversible decrease in H3Ser10P at γ H2AX bearing mono-nucleosomes and deciphered its regulation by opposing activities of phosphatase, MKP-1 and kinase, MSK1 in response to DNA damage. The present work has shown that H3Ser10P is required for efficient repair of DNA damage and blocking the activity of MKP-1 increases the sensitivity against radiation and induces cell death.

Research

The lab has an active research program with the following research projects: (1) Histones, chromatin structure and their role in DNA repair during carcinogenesis, (2) Transcriptional regulation of histone H2A variant genes during hepatocarcinogenesis, (3) Epigenetics in gastric cancer: Analysis of histone modifications and histone modifying enzymes, (4) Chromatin organization: molecular role of H2A variants, (5) Molecular role of H2A variants and their implications in carcinogenesis: Identification of differential binding partners, (6) Synthesis and evaluation of potential histone methyl transferase (HMTase) inhibitors as anticancer agents in leukemia cell lines.

Education

The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute. There are seven doctoral students – Mr. Ajit Kumar Sharma, Ms. Monica Tyagi, Mr. Shafqat Ali Khan, Mr. Saikat Bhattacharya, Ms. Divya Velga, Ms. Asmita Sharda and Mr. Ramchandra Amnekar. The lab also participates in the centre's training program and, in 2013, eight trainees worked on small projects. Lab members participated regularly in the lab's in house data presentation and, also presented their research findings in oral and poster presentations at national and international conferences.

Summary

The lab investigates two important aspects of glycobiology. The first is investigation of the mechanism by which metastasis associated surface expression of β 1,6 branched N-oligosaccharides promote invasion. Increased α 2,6 sialylation on these oligosaccharides promotes adhesion to different substrates. These oligosaccharides differentially modulate cellular motility on extracellular matrix and basement membrane by restricting integrin receptors in specific membrane micro-domains. Together these properties facilitate cancer cell invasion. The poly-N-acetyl-lactosamine (polylacNAc) substitutions on these oligosaccharides promote lung specific metastasis by serving as high affinity ligand for galectin-3, expressed in high amounts in almost all the tissue compartments of lungs including the surface of vascular endothelium. It not only facilitates arrest but all the steps of extravasation and organ colonization. Blocking polylacNAc or competitive inhibition of binding to lung galectin-3, both inhibited lung metastasis. The other aspect (O-GlcNAcylation) explores how addition of a single monosaccharide (N-acetyl-glucosamine-GlcNAc) on serine/threonine residues of nuclear and cytoplasmic proteins modulates protein and cellular functions. O-GlcNAcylation on keratin 18 (K18) has been shown to modulate the filament assembly, stability, and proteosomal degradation of K8/18. Cells expressing site specific glycosylation mutants (single, double and triple mutants) of K18 are being compared to understand if site specific glycosylation regulates properties like filament assembly, disassembly, stability, degradation and phosphorylation.

Research

The lab is actively engaged in projects aimed at understanding the mechanism by which N-oligosaccharides on cancer cells and galectin-3 on target organ regulate processes critical for lung metastasis. This involves in depth study of the (a) Role of β 1,6 branched N-oligosaccharides and associated terminal



substitutions on tumor cells and their possible receptors on lungs in organ specific metastasis, (b) Altered cell surface glycosylation and organ specific metastasis, (c) Mechanisms involved in regulation of processes critical for cancer metastasis by β 1,6 branched N-oligosaccharides; (2) Role of glycosylation (O-glcNAcylation) in regulating keratins 8 and 18 function, (3) Investigating the molecular mechanism by which a single depot injection of progesterone provides survival advantage to receptor negative breast cancer patients, (4) Investigating the role of a mitogenic lectin from *Cephalosporium curvulum*, a pathogenic fungus causing mycotic keratitis.

Education

The lab is recognized for Ph.D. (Life Sciences) program of the Homi Bhabha National Institute and has five graduate students working towards the Ph.D. degree - Mr. Amit Ranjan, Mr. Akhil Kumar Agarwal, Mr. Manohar Dange, Mr. Shyam More, Ms. Poonam Kakade. The lab also participates in the centre's training program and nine trainees worked in the lab.

Dr. Rajiv Kalraiya
Principal Investigator

Mahimkar Lab



Dr. Manoj Mahimkar
Principal Investigator

Summary

The research activity of this lab aims on understanding the genetic basis of oral cancers. Currently, the main focus is to identify genomic biomarkers in the process of oral carcinogenesis. Cancer progresses through the accumulation of genetic and epigenetic changes, ultimately resulting in gross genomic instability. The genomic changes result in altered gene expression pattern of genes residing within; hence, this lab is focusing on two major aspects of oral cancer biology: (a) Ascertaining copy number alterations across the genome and, (b) Identification of genes/gene clusters underlying these altered genomic loci. Array comparative genomic hybridization analysis of advanced stage oral cancers revealed gain of chromosomal region 11q22.1-q22.2 to be associated with loco-regional recurrence and shorter survival. Currently these observations are being validated by FISH. Preliminary data indicates that amplification of this locus is associated even with nodal metastasis. Analysis of correlation between DNA copy number change and expression of protein/genes residing in this region along with its

functional relevance is on-going. Integrative analysis of DNA copy number change and gene expression data identified putative driver genes associated with oral carcinogenesis. *KRT76* was one of the differentially expressed genes implicated in the development oral pre-cancer and cancer. This group has observed a strong association of reduced K76 expression with increased risk of OPL and OSCC development. The buccal epithelium of DMBA treated hamsters show a similar trend of K76 expression. Oral cavity of *KRT76*-KO mice show pre-neoplastic changes in the gingivobuccal epithelium; however, no oral tumors are observed in these mice. Thus, data underlines the potential of *KRT76* gene alteration being an early event although it is not sufficient to drive the development of oral cancers.

Research

This lab is engaged in four projects: (1) Genomic profiling of oral precancerous lesions and early stages of oral cancer, (2) Analysis of genetic host factors, HPV, EGFR and hypoxia markers and, their association with clinical outcome in subjects with locally advanced squamous cell carcinoma of head and neck, (3) Transcriptomic analysis of tobacco carcinogen induced experimental lung tumors and chemoprevention studies using phytochemicals, (4) Integrative analysis of genomic and transcriptomic alterations associated with node-metastasizing oral cancers.

Education

The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute. At present, two graduate students – Ms. Priyanka Bhosale and Ms. Rasika Hudlikar are registered. The lab also participates in the centre's training program and, during 2013, ten trainees worked in this Lab.

Summary

The major focus of the on-going research programs of Maru lab encompassing chemo-modulation of carcinogenesis is directed towards the identification and delineation of the mechanisms of action of chemopreventive agents from Indian foods and beverages, and development of surrogate end-point biomarkers. Mechanism(s) of chemopreventive actions of monomeric (curcumin) and/or polymeric (polymeric black tea polyphenols-PBPs) or crude grape polyphenolic extracts from wine varieties against chemical-induced carcinogenesis were studied employing different experimental systems. Another aspect is the development and validation of a sensitive HPLC method and its application for the quantification of curcuminoids in human plasma from various clinical trials. The mechanisms implicated in anti-initiation and anti-promotion of carcinogenesis by chemopreventive agents show several commonalities and involve xenobiotic-induced activation/translocation or modulation of signaling kinases ultimately leading to effects on multiple signal transduction pathways/genes and tumor promoter, TPA-induced responses (cell proliferation, inflammation, and apoptosis).

Research

There are three on-going research projects: (1) *In vivo* evaluation of mechanism(s) of chemopreventive actions of selected antioxidants, (2) Evaluation of chemopreventive effects of curcumin/turmeric on lung tumorigenesis – this study shows curcumin-mediated decrease in cell proliferation and enhancement of apoptosis is responsible for the observed decrease in B(a)P-induced hyperplastic foci, adenoma, adenoma with cellular pleomorphism and adenocarcinoma in the lungs of treated mice. (3) Development and validation of a sensitive HPLC method for the quantification of curcuminoids in human plasma. There are several collaborative studies involving *in vitro* genotoxicity screening of *Nyctanthes arbour-*



tristis calyx extract and its carotenoid fraction, transcriptomic analysis of tobacco carcinogen induced lung tumors and, chemoprevention studies using black tea polyphenols in experimental animal model system, comparative evaluation of diagnostic efficacy of laser Raman spectroscopy and histopathology in an animal model of oral carcinogenesis, and study of breast cancer progression in rodent models using Raman spectroscopy.

The other research is on 'Evaluation of chemopreventive effects of crude polyphenols from wine varieties of Indian grapes and mechanism(s) of their action'. This study indicates Indian wine grape polyphenolic extracts (WGPE) pre-treatment had anti-initiating effect evident from the reduction of DNA adducts due to decreased activation of cytochrome P450 1A1/2B1 enzymes, increased antioxidant and phase II detoxifying enzymes and, enhanced apoptosis in liver and lung of B(a)P treated mice. Anti-promoting activity of WGPE was evident from decreased tumor multiplicity and increased latency period for tumor induction in mouse skin.

Dr. Girish Maru
Principal Investigator

Dr. Asha Ramchandani
Co-Investigator



Education

The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute. Mr. Gaurav Kumar was awarded the Ph.D. degree in Life Sciences by HBNI for his dissertation entitled 'Effect of curcumin and black tea polyphenols on carcinogen-induced

cell proliferation and apoptosis in experimental models'. Members delivered several invited talks at national conferences and meetings. The lab also participated in the Centre's training program and, training was provided to four trainees and to three B.Tech. students.

Mulherkar Lab

Summary

The focus of this lab during 2013 has been on understanding the pathogenesis of cervical cancer. Besides in depth studies on HPV, studies on global expression profiling of cervical cancers using microarray technology as well as genomics of cervical cancer using Next Generation Sequencing technology have been carried out. In addition, Dr. Warawdekar is pursuing a project on minimal residual disease in solid tumors, in collaboration with TMH.

Research

The lab is engaged in three research projects: (1) Identification of specific genetic alterations in cervical cancer by genome wide LOH and copy number analysis using SNP arrays, (2) Identification and validation of novel genetic variations in cervical cancer samples using Next Generation sequencing data, (3) Validation of differentially expressed genes in cervical cancer from microarray data. The co-investigator is engaged in a research project on 'An assessment of the effect of

preoperative hydroxyprogesterone on serial levels of circulating tumour cells in patients undergoing surgery for operable breast cancer'.

Education

The lab is recognized for Ph.D. (Life Sciences) of the Homi Bhabha National Institute and Ph.D. (Applied Biology) University of Mumbai. Ms. Asha Thomas was awarded the Ph.D. (Applied Biology) degree for her thesis entitled 'Gene expression profiling of cervical cancers to delineate prognostic molecular markers' and Ms. Poulami Das was awarded the Ph.D. (Life Sciences) degree for her thesis entitled 'Identification of specific genetic alterations in cervical cancer by genome wide LOH and copy number analysis'. Seven students received training in the lab this year, three under Dr. Mulherkar and four under Dr. Warawdekar. The lab also has an active weekly in house data presentation and journal club. Both faculty and students present their research findings in national conferences.

Summary

The research focus of Prasanna Lab is in understanding the mechanism of cellular homeostasis in health and in disease. Synthesis of proteins, their ability to change from a linear polypeptide chain into a final folded structure, the specific functions that they carry out and finally their degradation are tightly and spatio-temporally controlled processes. Any aberration in these processes can lead to patho-physiological conditions, as seen in a multitude of diseases. Dissecting the fundamental mechanism behind these processes will help in understanding the global aberrations observed in diseases like cancer and also in developing new strategies for therapeutic intervention.

Along these directions, the lab is currently focusing on: a) the structural, mechanistic and cell biological aspects of protein degradation by a self compartmentalized ubiquitous, ATP dependent regulatory protease called the proteasome b) the ATP dependent functions of human 14-3-3? a potential protein disaggregating chaperone c) using the program PNSAS developed in this lab to predict natural substrates of proteases, desmoglein 2 (Dsg-2) has been identified and experimentally validated as a physiologically relevant substrate of matriptase and the steady state levels of Dsg-2 regulated by matriptase may be important in controlling cell adhesion and perhaps invasive properties of some epithelial cancers. Besides these, in on-going attempts to come up with novel ways of identifying system wide interactions that are functionally relevant, great success has been achieved with proteasomal subunits (gankyrin). Using structural insights and bioinformatics tools, conservation of short sequences within non homologous proteins have been identified to discover putative interacting partners of two subunits of the proteasome. Coupled with micro array, proteomic studies, available X-ray crystal structures, modeling and docking studies,

these predictions are being validated using in vitro systems and cell based assays.

Research

The lab has an active research program encompassing several projects: (1) Structural and mechanistic aspects of protein degradation, (a) Identification of the substrate interacting subunit of the 26S proteasome, (b) Identification of novel functions of PSMD9; (2) Identification of a novel ATP binding site in 14-3-3 zeta and elucidation of its ATP dependent functions, (3) Identifying novel functions of Gankyrin, a subunit of the eukaryotic proteasome through global profiling, (4) Effect of Matriptase on Desmoglein-2, one of the novel putative substrates predicted by bioinformatics approach, and its functional relevance, Intramural research grant. (5) Identification of a novel ATP binding site in 14-3-3 zeta and elucidation of its ATP dependent functions, (6) A weighted coexpression network analysis approach to deciphering the role of proteasomal chaperone interactions in cancer, (7) Subjective validation of phosphorylation sites in proteins – mutual lessons from high throughput mass spectrometry studies and structural interrogation.

Education

The lab is recognized for Ph.D. in Life Sciences for Homi Bhabha National Institute. At present six research scholars – Mr. Nikhil Sangith, Ms. Padma Nanaware, Mr. Manoj Ramteke, Mr Indrajit Sahu, Ms. Mahalakshmi Ramachandran and Mr. Burhan ud din Sheikh, are working on their doctoral dissertation. The lab also participates in the centre's training program with eight trainees for their dissertation or for research experience. The lab has an active in house data presentation and journal club program in which all lab members participate.



Dr. Prasanna Venkatraman
Principal Investigator



Ray Lab

Summary

Acquirement of resistance to the standard platinum and taxol based drugs in ovarian cancer patients poses a considerable challenge for the clinicians. Alterations in apoptotic activities, drug transporter mechanism, DNA repair mechanism and dysregulation of cell survival factors play important role in acquisition of chemoresistance. Research in Ray lab is focusing on early detection of molecular changes associated with acquirement of cisplatin and paclitaxel resistance in ovarian cancer cells. Particular interest of the lab is in p53-PIK3CA interaction and IGF1R signaling. The role of 'tumor initiating' or 'cancer stem cells' in development of resistance is also an active area of research of the lab. Another interest is in understanding the role of Hox genes in subtype specific differentiation and ovarian cancer stem cells.

Research

The lab is engaged in the following on-going research projects - (1) Early detection of molecular changes associated with acquired chemoresistance in ovarian carcinoma, (2) Association of ovarian cancer stem cell with chemoresistance: Cause or consequence, (3) The role of HOX genes in biological and molecular heterogeneity of epithelial ovarian cancers and cancer stem

cells, (4) Identification of potential regulators of PIK3CA promoter in chemo resistant ovarian cancer cell : This is the first report that PIK3CA/Akt signaling, a crucial pathway for cell survival, growth and cell death is modulated by cisplatin and paclitaxel through p53 mediated interaction in ovarian cancer cells, (5) Analysis of the dynamics of apoptotic pathway during acquired chemo resistance of ovarian carcinoma using reporter gene technology, (6) Detection of underlying key molecular switches for acquirement of chemo resistance in patients with relapsed epithelial ovarian carcinoma, (7) Development of novel peptide imaging biomarker/s for early detection of cisplatin-resistant ovarian cancer and (8) Proteomic analysis of chemoresistant ovarian cancer cells.

Education

The lab is recognized Ph.D. program in Life Sciences of the Homi Bhabha National Institute. Four research scholars – Ms. Snehal Gaikwad, Mr. Ram Kumar Singh, Ms. Subhoshree Chatterjee and Mr. Bhushan Thakur, are working on their doctoral dissertation. Ray Lab also participates in the training program of the centre and, during 2013, six trainees worked for their dissertation projects or for research experience. The lab also has in-house data presentation on a regular basis and, members of the lab also participate in national conferences with oral or poster presentations.

Summary

Rukmini Lab was established in April 2013 and became functional by the end of September 2013 once the lab infrastructure including tissue culture room was in place. The focus of research in this lab is to understand the molecular basis of commitment of pluripotent hemopoietic stem cell to lymphoid and myeloid lineage using BCR/ABL induced myeloid and lymphoid leukemias as the model system. The study would involve molecular profiling of BCR/ABL-induced leukemias, namely chronic myeloid leukemia (CML) in chronic phase and blast crisis (both lymphoid and myeloid) as well as acute lymphoid leukemia. These molecular profiles could also serve to stratify patients and understand the correlation to clinical behavior of their disease, which could be of use in disease management. Moreover, differential molecular profiles could be used to identify therapeutic targets. Another area under investigation is erythrocyte senescence in CML, wherein neutrophilic protease cathepsin G is seen to impart senescent phenotype to erythrocytes. This observation led to this investigation on the unforeseen effects of neutrophilic proteases in tissues with neutrophilic infiltration during inflammation and on blood cells in conditions of neutrophilia.

Research

The research programs of Rukmini lab currently encompass two projects: (1) Proteomic and phosphoproteomic profiling of myeloid cells from patients with chronic myeloid leukemia, (2) Effect of neutrophilic proteases on the membrane proteome and cellular characteristics of MCF-7 cells.



Education

The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute. Ms. Mythreyi Narasimhan is the first PhD student. Under the centre's training program, nine students have obtained training. The lab conducts regular in-house data presentation and journal club activity and, lab members participate in local/national meetings.

Dr. Rukmini Govekar
Principal Investigator



Dr. Rajiv Sarin
Principal Investigator

Dr. Pradnya Kowtal
Co-Investigator

Dr. Gouri Pandit
Scientific Officer

Sarin lab

The primary focus of Sarin lab is to understand the molecular basis of inherited cancers; gene environment interactions in sporadic breast cancers and somatic mutations in oral cancers through genetic and functional analysis. During the report year, the clinic enrolled 561 new families with familial/inherited cancers. DNA samples from 805 members of these families were banked and/or tested for various predisposition genes associated with inherited cancer syndromes. Genetic testing reports were issued to 100 cancer families in post-test counseling sessions and used for risk management of mutation carriers.

Research

The research projects of Sarin Lab fall under the following broad categories: (1) Mutation spectrum of BRCA1/2 genes in the hereditary breast and ovarian cancer in Indian population (BRCA1/BRCA2) and their functional characterization; (2) Characterizing hereditary colorectal cancers for defects in mismatch repair, APC, MYH and STK11 genes and study of multi-step carcinogenesis model; (3) Molecular pathways in the origin of diverse tumors in individuals with germline TP53 mutations (Li Fraumeni Syndrome); (4) Hereditary endocrine and brain tumours

in RET and VHL gene mutations; (5) Establishing founder effect of germline mutations identified in Indian hereditary cancer families and, determining their population frequency in distinct geo-ethnic groups (Founder Mutations), (6) Breast cancer genetic, environment and lifestyle (BRCAGEL) study, a collaborative study with the University of South Carolina, (7) International Cancer Genome consortium (ICGC) India Project (8) Life course approach to study etiology of head and neck cancer - HeNCE life study, and (9) The International Sarcoma Kindred (TISKs), this multicentric international collaborative study is being coordinated with the Peter McCallum Centre, Australia.

Education

The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute, and has three doctoral postgraduate students – Ms. Nikhat Khan, Mr. Moquitul Haque, and Ms. Vasudha Mishra working on their doctoral dissertation under his guidance. Sixteen students underwent training. Lab members participate in-house data presentation and journal club, and also present their research findings at national conferences.

Shilpee Lab

Summary

Studies in Shilpee lab focus on the epigenetic regulation of chromatin structure and the DNA damage response (DDR) of a cell. DDR pathway is a well appreciated key player in conferring chemo and radiation resistance to the cancer cells. However, how epigenetics and chromatin structure are regulated, and contribute in modulating DNA repair of the therapy resistant cancer cells is unclear. Attempts are being made to gain insights into the radiation and chemo resistance-related molecular mechanisms that link chromatin and DNA damage repair using models of radiation resistance (glioblastoma) and chemoresistance (acute myeloid leukemia (AML)). For this purpose, radiation and

chemotherapy resistant sub cell lines have been developed from glioblastoma grade IV cell line and primary cultures as well as AML cell lines and primary cultures. This *in vitro* therapy resistant model is being used to understand the molecular mechanisms of therapy resistance in cancer.

Research

The lab has four on-going research projects: (1) Understanding therapy resistance in glioblastoma - role for histone modification and DNA damage repair pathway, (2) Targeting chemoresistant leukemic stem cells by understanding DNA damage repair pathway, (3) Identification of novel histone H3 and H4 'ubiquitination marks' in chemo-

resistant leukemic stem cells and, (4) Differential proteome analysis of resistant glioblastoma.

Education

The lab is recognized for Ph.D. course in Life Sciences of the Homi Bhabha National Institute. Presently four doctoral students – Ms. Ekjot Kaur, Mr. Sameer Salunkhe,

Ms. Jacinth Rajendra and Mr. Rahul Mojdra, are working on the Ph.D. dissertation. The lab participates in the centre's training program and five students worked as trainees. The lab conducts regular in house data presentation and journal club, and lab members are encouraged to present their research findings as oral and poster presentations at national conferences.



Shirsat Lab

Summary

Medulloblastoma is a common malignant brain tumor in children. Genome wide expression profiling studies including our study has demonstrated that medulloblastoma is comprised of 4 core molecular subgroups that are not only distinct in their underlying biology but also vary in their clinical characteristics like age related incidence, presence of metastasis and survival rates. In addition to the clinical parameters, molecular classification of medulloblastomas is now necessary for better risk assessment and management of the disease. Earlier, we had reported differential microRNA expression in the four molecular subgroups of medulloblastomas. This year we validated the differential miRNA expression in 103 medulloblastomas and developed a real time PCR assay for molecular classification that is particularly useful for formalin fixed paraffin embedded (FFPE) tissues, as miRNAs are relatively resistant to fragmentation during formalin fixation. The assay has an accuracy of 97% and was validated on an independent set of FFPE tissues from DKFZ, Germany. Further, Non-WNT, non-SHH medulloblastomas over-expressing *miR-182* or under-expressing *miR-592* were found to have significantly inferior survival rates indicating utility of these two miRNAs as markers for risk stratification of medulloblastomas. Next Gen. exome sequencing of WNT subgroup medulloblastomas and oligodendrogliomas was performed that identified 5-20 and 30-50 somatic mutations per medulloblastoma and oligodendroglioma

tumour tissue respectively. Experiments are in progress to understand the role of the novel potential tumour suppressor and oncogenes identified in WNT subgroup medulloblastomas.

Research

The research programs of Shirsat lab encompass four major projects: (1) Molecular sub-groups of medulloblastomas and correlation with clinical characteristics, (2) Delineation of miRNA control of WNT signaling driven medulloblastomas by development of transgenic mouse model, (3) microRNA control of WNT signaling pathway in medulloblastoma; a common paediatric malignant brain tumour and, (4) Identification of biomarkers for diagnosis and prognostication by Next Gen sequencing of oligodendroglial tumour exome.

Education

The Lab is recognized Ph.D. (Life Sciences) program of the Homi Bhabha National Institute and seven research scholars – Ms. Ratika Kunder, Ms. Pooja Panwalkar, Mr. Kedar Yogi, Mr. Satish Singh, Mr. Vijay Padul, Ms. Shalaka Masurkar and Ms. Raikamal Paul, are working on their doctoral dissertation. The Lab also provided training to six trainees. The lab has an active in-house data presentation and journal club program and, encourages lab members to attend national conferences and present their research findings through oral and poster presentations.

Dr. Neelam Shirsat
Principal Investigator

Sorab Lab



Dr. Sorab Dalal
Principal Investigator

Summary

This laboratory focuses on two different cellular pathways that regulate neoplastic progression. The first project is to understand the regulation of multiple cellular pathways by 14-3-3 proteins. Data from this lab have revealed that 14-3-3 proteins are required to maintain genome stability and that disruption of the 14-3-3 cdc25C complex can inhibit neoplastic progression. It is now proposed to screen for drugs that potentially disrupt this complex in cells and to determine the effects of these drugs on neoplastic progression. Recent results from this lab have also demonstrated that loss of 14-3-3 Δ leads to activation of some features of the Epithelial Mesenchymal Transition (EMT) and hypothesize that this could lead to an increase in metastasis. The second project is to determine molecular mechanisms underlying the biogenesis of desmosomes and to determine how an inhibition of desmosome

function leads to an increase in neoplastic progression, metastasis and alterations in development. The lab has also developed a new method for the generation of transgenic animals and, this is being used to address various questions of interest to the group.

Research

The lab has an active research program with six projects: (1) Role of plakophilin3 in regulating cell adhesion, desmosome formation, cell migration and EMT, (2) Identifying mechanisms regulating radio-resistance and tumor progression upon plakophilin3 loss, (3) Regulation of cell-cell adhesion and spermatocyte differentiation by 14-3-3g, (4) Regulation of centrosome duplication by 14-3-3 proteins and its consequences for regulating neoplastic progression, (5) Regulation of the epithelial mesenchymal transition (EMT) by 14-3-3 Δ , and, (6) Generation of stem cell lines and knockdown mice that lack specific gene products using RNA interference: Potential for the identification of novel therapeutic strategies - Phase II.

Education

The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute. There are six research scholars – Ms. Mansa Gurjar, Mr. Srikanta Basu, Mr. Kumarkrishna Raychaudhari, Ms. Sonali Vishal, Ms. Arunabha Bose and Mr. Akash Dubey working on their doctoral dissertation. Sorab lab also participates actively in the centre's training program and, during 2013, fourteen trainees worked either for their Master's dissertation or for research experience. The lab members meet twice a week for the in-house data presentation and journal club and, participate in local and national conferences to present their research findings as oral or poster presentations.

Summary

The on-going research programs of Teni lab focus on gaining an insight into the molecular basis of oral and cervical tumorigenesis. The projects aim to understand mechanisms underlying (1) over expression of anti-apoptotic Mcl-1 and survivin genes, (2) radioresistance using FIR regimens *in vitro* and proteomic approaches and, (3) the prevalence of HPV and significance of its viral load analyses as an indicator of treatment response in oral/cervical cancer. Data reveals that Mcl-1L is important for the survival and radioresistance of oral cancer cells. Further, WP1130 mediated USP9X inhibition or use of BH3 mimetic Obatoclax, potentially inhibits the clonogenic potential of the oral cancer cells and induces apoptosis in these cells. Studies also demonstrate that p63 activates survivin expression in the presence of a mutant p53 protein but suppresses survivin expression in the absence of a p53 protein in oral cancer cells. Further, radioresistance related proteins have been identified by proteomic approach using the radioresistant cell lines established in the lab during which enrichment of stem cell and EMT – like characteristics were also demonstrated. HPV16 presence was found to confer radiosensitivity to cervical tumors, as there was a decrease in the HPV16 viral load after treatment and in subsequent follow-ups.

Research

Teni lab is involved in seven on-going research projects: (1) Role of anti-apoptotic Mcl-1 gene in human oral cancers/cell lines and premalignant lesions, (2) Expression of survivin isoforms and p53 family members in tobacco chewing - associated oral cancers, (3) Regulation and targeting of MCL-1 in human oral cancers and, (4) Identification of radio-resistance related proteins in human oral cancers. The lab is also involved in other projects - (1) Evaluation of the diagnostic performance of HPV E6/E7 mRNA versus oncogenic HPV DNA as a secondary triage test for VIA positive women in cervical cancer screening program, (2) Prevalence and clinical



impact of human papillomavirus in patients with head and neck squamous cell cancer treated with radiotherapy or chemoradiotherapy and, (3) Quantitative estimation and evaluation of HPV16/18 DNA in pretreatment, post treatment and follow up evaluation in carcinoma cervix, II - IIIB treated with radical radiation or chemoradiation therapy: An observational study.

Education

The Teni lab is recognized for Ph.D. course in the Life Sciences of Homi Bhabha National Institute and has four doctoral students – Mr. Vinayak Palve, Ms. Rupa Vishwanathraman, Mr. Prasad Sulkshane and Mr. Mohd. Yasser, working on doctoral theses. The Teni lab also participates in the training program of the centre where this year seven trainees worked in the lab for Master's dissertation or research experience. The lab also has an in house program of data presentations and journal club every week. Faculty and students of the lab visited various conferences and workshops and presented their research findings in the form of oral or poster presentations.

Dr. Tanuja Teni
Principal Investigator

Vaidya Lab



Dr. Milind Vaidya
Principal Investigator

Mrs. Sharada Sawant
Co-Investigator

Summary

The focus of this laboratory is to investigate the functions of keratin, vimentin and their associated proteins in epithelial homeostasis/cancer and, further their use as biomarkers in oral and breast cancer. Significant correlation was seen between loss of K5/gain of K1, K8/18 and clinicopathological parameters like degree of dysplasia, fibrosis, recurrence and survival. Up/down regulation of vimentin expression in cell lines derived from leukoplakia and oral SCC respectively resulted in changes in cell motility, invasion and quantitative alterations in K14 and beta4 integrin expression. The role of K 8/K18 in malignant transformation/progression of carcinomas appears to be tissue specific. In order to study the role of keratin 8 phosphomutants in transformation/progression, the respective mutants were cloned under K14 promoter and lentiviral vector (pCCL) followed by virus production and injection in testes of mice for transgenic model development. I-TRAQ analysis of sequential stages of rat lingual carcinogenesis revealed alterations in known and novel proteins, which were further validated in rat and human tissues. 3D co-cultures of normal

oral epithelial cells and fibroblasts are being developed to study epithelial-mesenchymal interactions during oral carcinogenesis. CD44⁺ enriched population and parental AW13516 cells were injected in nude mice to study the role of cancer stem cells. Nude mice injected with CD44⁺ enriched population showed recurrence and, cells of recurrent tumors showed expression of stem cell markers like ABCG2, vimentin, EGFR, etc.

Research

Vaidya lab has an active research program encompassing four projects - (1) Use of cytokeratins as prognostic markers in human oral precancer and cancer, (2) Global protein profiling of sequential changes during rat lingual carcinogenesis and different stages of tongue cancer in human, (3) Role of keratin 8 phosphorylation in neoplastic progression of SCC, (4) Role of cytokeratin 8 and 18 in differentiation and transformation of epithelial cells. The results of this study indicate that K8 may play an important role in prevention of invasion and metastasis of mixed epithelia like breast. The lab is also collaborating on a project investigating the role of linker proteins in keratin mediated regulation of β 4 integrin signaling in neoplastic progression of squamous cell carcinomas.

Other research projects are: (1) Diagnostic implications of aberrant vimentin expression in oral precancer and cancer, (2) Significance of aberrant vimentin expression during early and late events of human oral oncogenesis, (3) Role of keratins 8, 18 and vimentin during epithelial mesenchymal transition (EMT) using oral organotypic co-culture model, (4) Enrichment and characterization of cancer stem like cells and its possible role in human oral cancer, (5) Evaluating biomarkers to predict response to neoadjuvant chemotherapy in locally advanced oral cavity cancer.

Education

The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute. Five graduate students – Ms. Sapna Iyer, Mr. Biharilal Soni, Ms. Crismita Dmello, Ms. Richa Tiwari and Mr. Pratik Chaudhari, are working on their doctoral theses. Fourteen

students underwent training in 2013. The lab meets regularly for data presentation and journal club. Both faculty and students attended national and international conferences and workshops and, presented their findings through oral and poster presentations.

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Varma Lab



Dr. Ashok Varma
Principal Investigator

Summary

The research focus of Varma lab is structural and functional characterization of cancer associated proteins. Presently several projects are on the verge of publication few are as follows: (1) BRCA1/2: Different functional domains of BRCA1 and 2 have been cloned, purified. Only few of them like transactivation domain and BRCT domain could crystallize as a native domain and also complex. The x-ray diffraction for transactivation domain and BRCT complex were analyzed using home source diffractometer available in our institute, (2) MERIT-40 protein has been purified and functionally characterized in the lab, (3) The binding partners of BRCA1, i.e RAP80 has been analysed. The molecular mechanism associated with RAP80 unravels the function associated with genetic alterations, (4) How histone H3 regulates interactions with binding partners has been

characterized. In addition, several proteins like ZBRK1, BARD1, BAP1, MDC1, 53BP1, Fanconi anemia and MAPK have been analyzed. Proteomics profiling of head and neck cancer is being done to explore the possibility of finding diagnostic or prognostic biomarkers.

Research

The research program of the lab encompasses four research projects: (1) Molecular modeling and identification of small-molecule inhibitors for BRCT domains in different proteins involved in the pathways of tumor formation; a bioinformatics approach to predict cancer risk mutations, (2) Structural and functional characterization of RAP80; a novel h-BRCA1 interacting protein involved in the mediations of DNA damage responses, (3) Structural basis of MAPK in association with ribosomal S6 kinases, (4) An exploratory study of a set of predictive and prognostic protein biomarkers in head and neck squamous cell carcinoma treated with radiotherapy.

Education

Varma lab is recognized for Ph.D. (Life Sciences) of the Homi Bhabha National Institute and presently has six graduate students working on their doctoral dissertation : Mr. Dilip Badgujar, Ms. Lumbini Yadav, Mr. Vikrant, Mr. Bhanu Pratap Jagilinki, Mr. Rajan Kumar and Mr. Mohd Quadir. The lab actively participates in the training program of the Centre and had eleven trainees, two for the Master's dissertation and nine for research experience.

Summary

Venu lab was established in August 2013 after Dr. Venugopalaareddy joined ACTREC as a Principal Investigator on a Wellcome Trust-DBT India Alliance Intermediate Fellowship. During 2013, the main focus was on setting up a fly facility for *Drosophila* work and tissue culture facility for both insect cell lines and mammalian cell cultures. Work has now been initiated on the project 'Elucidating the mechanisms underlying Merlin-Hippo signaling regulation in glia development and growth control'.

Research

Neurons and glia are the two important cell types that constitute the Central Nervous System (CNS). Glial cells perform diverse essential functions to support and protect neurons and, to guide and maintain their connections. Despite their fundamental importance, the mechanisms underlying glia growth control are not well understood. Recently the lab members found a role for tumor suppressor- Merlin, in *Drosophila* glia development and growth through Hippo signaling. Hippo signaling is a relatively novel tumor suppressor pathway that controls organ growth and size across species and, Hippo signaling inactivation has been noted in several human cancers. While the core components of the pathway are well understood, knowledge about the upstream



inputs into the pathway is limiting and appears to be incredibly complex. Thus, defining the mechanisms that control Hippo signaling will advance knowledge on growth control under both normal development as well as disease conditions like cancer.

Education

The lab had two trainees during 2013, and members meet regularly for in house journal club.

Dr. BV Venugopalaareddy
Principal Investigator

Waghmare Lab



Dr. Sanjeev Waghmare
Principal Investigator

Summary

The research focus of Waghmare lab is the study of molecular and cellular mechanisms that govern stem cell regulation, and how perturbations in these mechanisms can lead to cancer. Signaling pathways such as Wnt/Notch/Sonic-hedgehog, TGF- β , EGFR, etc. regulate stem cell renewal and, the affected genes in these pathways are associated with cancer. Therefore, it is very crucial to study the genes involved in signaling pathways that control self-renewal of normal stem cells and their malignant counterparts, i.e. cancer stem cells. Using mouse skin as a model, the lab is

focusing on human epithelial cancers (such as head and neck, cervical and breast cancer) to understand the mechanisms that govern adult stem cell regulation and cancer. These studies will aid the identification of genes involved in stem cell regulation and cancer and dissect out how these genes work at the cellular level during normal tissue development and repair injured tissue to maintain homeostasis. These studies will not only elucidate the basic molecular mechanisms but will also be useful in cancer therapeutics.

Research

The lab is engaged in four projects: (1) Role of enhancing factor (EF) in hair follicle stem cells, (2) Molecular dynamics of novel interfollicular epidermal stem cells in mice, (3) Defining the novel tumor-initiating cells from human breast cancer: A preliminary preclinical study and, (4) Sfrp1 (Secreted frizzled-related protein) in hair follicle stem cell regulation and cancer.

Education

Waghmare lab is recognized for the Ph.D. program in Life Sciences of Homi Bhabha National Institute. There are four graduate students – Mr. Rahul Sarate, Mr. Gopal Chovatiya, Ms. Sweta Dash and Mr. Raghava Reddy Sunkara, working on their Ph.D. dissertation. Waghmare lab participates in the training program of the centre and, during 2013, six students worked as short term trainees.

Summary

The focus of research in the lab has been analysis of inflammation related parameters in breast cancer. In premenopausal breast cancer patients, opposing effects of pro and anti-inflammatory cytokine gene polymorphisms on disease risk were noted, which have been published in the Intl J Immunogenetics. Data relating to a polymorphism in the promoter region of IL-6, when analysed in conjunction with that from other cancers, revealed an ethnicity and cancer site dependent influence of this polymorphism in Ancestral North Indians. HLA-B*4006 gene cloning has been successfully accomplished and the analysis of protein expression and isolation is currently in progress. Upgradation of methodology and schedule of analysis of the chimerism status in BMT patients has been planned with implementation of charges for services that are now availed by six other centres.

Clinical Service

This lab is involved in a collaborative clinical project on 'Chimerism analysis using STR

markers to assess donor engraftment and possibility of relapse in patients undergoing allogeneic bone marrow transplants at ACTREC. Over seventy pairs of donors and patients from ACTREC and fifteen pairs from Jaipur, Kolkata, and Mumbai hospitals were recruited for the study and baseline data was analysed. Follow-up quantitative analysis for donor status was done for ~750 specimens. Five patients with changes in donor status were identified and treated appropriately by the BMT unit.

Research

The on-going research projects include: (1) Study of immunological parameters in breast tumors in the context of age at diagnosis, (2) Cytokine gene polymorphisms in breast cancer patients from Maharashtrian community - comparative assessment of allele frequencies in Parsi subjects, and (3) Cloning and expression of HLA-B*4006 allele.

Education

One short term trainee worked in the lab during 2013.



Dr. Narendra Joshi
Scientific Officer

Cancer Research Institute: Support Facilities



1. Anti Cancer Drug Screening (ACDSF)

Dr. Aarti Juvekar
Officer in charge

This facility supports anti cancer drug development in India through its in vitro and in vivo screening program. ACDSF maintains over 45 human tumor cell lines, 10 murine tumor models and 28 xenograft models for screening extracts/drugs. A project entitled 'Affordable cancer therapeutics' was initiated in 2013, in which 181 compounds were screened on 12 cell lines. Of the 1729 compounds received for anticancer activity testing, 1673 (97%) compounds were tested in vitro and 56 (3%) in vivo.

2. Bioinformatics

Dr. Ashok Varma
Coordinator

Mr. Gadewal Nikhil

This dedicated BTIS facility funded by DBT provides infrastructure and computational facilities, freeware/commercially available software support for data analyses as well as training to investigators and students engaged in basic and translational research projects within ACTREC and to other institutions.

3. Biorepository

Dr. Kishore Amin
Officer-in-charge

The Biorepository is responsible for the receipt, processing, safe handling, storage,

inventory control and distribution of biological specimens from cancer patients and, provides cryo-preserved tissues on request to scientists and clinicians with IRB-approved research projects. Majority of samples accrued during 2013 were from head and neck tumors. Fifteen of these tissues were used to generate cell lines. The facility also accepts training requests from students.

4. Common Facilities

Dr. Aarti Juvekar
Officer-in-Charge

Facilities such as dark rooms, cold rooms, ice making machines, X-ray developing machines, Milli Q water plants, a bacteriology laboratory and a radioisotope laboratory are managed by this team. They ensure a safe working environment and maintain critical equipment like steam sterilizers.

5. Common Instrument Room

Mr. Uday Dandekar
Officer in charge

The common instruments room houses 80 major/minor scientific equipment and maintains them in good condition for optimal utilization by all users. This unit also provides technical support to research laboratories in the procurement, commissioning and maintenance of equipment.

6. Comparative Oncology Program and Small Animal Imaging Facility

Dr. Pradip Chaudhari
In charge

Kukkuri Animal Cancer Care Centre was inaugurated on 10th April 2013. Pet animals with spontaneous cancers like tumors of mammary gland, lymphomas etc. are referred to this clinic for diagnosis and further management. Eighty one cases were referred to the animal oncology clinic. Diagnostic CT scans were performed on 28 canine patients, five animals were treated with radiation therapy and 14 using single/combination chemotherapy agent. An animal cancer tissue

repository was commissioned to preserve biological samples for basic cancer research.

A radiological research unit for spontaneous animal cancers has been set up with DAE support. This program focuses on the evaluation of diagnostic radionuclides such as Technetium-99m, Iodine-125 and Fluorine-18 complexes for their utility in cancer diagnosis and treatment and, radioisotopic imaging of rodents using micro PET/SPECT CT. This facility assists in the analysis of data from clinical/preclinical imaging modalities such as PET, MRI, SPECT and CT. There is an ongoing research project on the design, development and evaluation of the novel iodinated contrast media formulation in laboratory animals using microCT and has collaborative studies using CT/micro CT to examine localization and bio-distribution.

7. Digital Imaging

Dr. Dibyendu Bhattacharyya
Officer-in-charge

The Digital Imaging facility houses an Axio ImagerZ1 upright microscope with fluorescence/bright field, phase, and DIC imaging capacity, a Zeiss Axiovert 200 M inverted microscope with fluorescence/phase or DIC imaging capacity, and a Zeiss LSM 510 Meta Confocal fitted to an Axio ObserverZ1 inverted motorized microscope. The facility is open to staff and students of ACTREC, and other institutions.

8. DNA Sequencing

Dr. Pradnya Kowtal
Officer In Charge

The DNA sequencing facility at ACTREC has two state-of-the art automated DNA sequencers for utilization by researchers from ACTREC and other DAE institutes and, colleges in Mumbai for a nominal charge. The average turnaround time from receiving the samples to depositing data on server is 36 hours. Over 10,000 reactions (sequencing, fragment analysis, single nucleotide polymorphisms) were carried out.

9. Electron Microscopy

Mrs. Sharada Sawant
Officer in charge

During 2013, the facility processed 86 samples of monolayer cell cultures/tissue samples for block making and 47 samples for block making and ultrathin sectioning for various in-house projects and scanning and imaging of the sections was performed at the TEM facility in BARC, IIRRH, TIFR and IIT-B. The procurement of a new electron microscope is under process.

10. Flow Cytometry

Dr. S V Chiplunkar
Officer-in-charge

The facility has two Becton Dickinson Flow Cytometers - FACSAria and FACSCalibur. FACSAria is equipped with 3 lasers (633nm, 488nm and 405nm) and can perform 11 color analysis and sorting (2 and 4 way). FACSCalibur is equipped with one 15mW, 488nm laser and can perform 3 color analyses. Demonstration/training in data analysis and interpretation or experimental design is provided. Some of the research applications include live cell sorting, intracellular cytokine detection, stem cell analysis, DNA content and cell cycle analysis, ploidy determination, cell proliferation and apoptosis studies. The facility also renders service to outside users.

11. Gene Expression Profiling

Dr. Rita Mulherkar
Officer-in-charge

The facility is equipped with two real-time PCR machines – SDS Prism 7900HT from and QuantStudio 12K Flex, both from Applied Biosystems. The facility also houses bench top refrigerated centrifuge, spectrophotometer, a vacuum concentrator and a Nanodrop Spectrometer. Real-time PCR is being used for validation of microarray data as well as for quantitative assessment of genes in disseminated cancer cells from the bone marrow. The facility serves several laboratories and scientists.



12. Histology

Dr. Arvind Ingle
Officer-in-charge

The Histology laboratory provides stained histology sections of animal tissue samples. During 2013, this lab received 7433 tissue samples and supplied 5047 stained and 15589 unstained slides to 21 in-house labs/groups. The lab also provides logistic support for frozen sectioning of human/animal tissue samples, and processed 1557 tissues. .

13. Laboratory Animal Facility (LAF)

Dr. Arvind Ingle
Officer-in-Charge

Dr. Rahul Thorat
Scientific Officer



The main aim of the LAF is to breed, maintain and supply laboratory animals to institutional scientists. Breeding and experimentation of nude and SCID mice is undertaken in individually ventilated cages. In 2013, LAF undertook planned breeding of 22 strains of mice, one rat strain and two strains of hamsters; and supplied 6344 normal mice, 432 nude mice, 299 rats and 157 hamsters to 28 institutional researchers against 91 IAEC sanctioned research proposals. LAF also supplied 10744 rodents either as breeding nuclei or experimental animals to several organizations. Purity of the animals was

checked using skin grafting, biochemical marker tests and PCR based tests for microsatellite markers. Blood samples of nude/SCID and control BALB/c and Swiss mice were tested by flow cytometry to assess the T-and B-cell profile. As a part of genotyping services of Tg and KO mice, LAF carried out genotyping of 93 ptch KO mice. As a part of the embryo freezing program, LAF has collected and frozen in liquid nitrogen a total of 1465, 8-cell to morula stage embryos from 10 mouse strains and one rat strain. The lab also participated in centre's training program.

14. Macromolecular Crystallography

Dr. Ashok Varma
Coordinator

The dedicated facility has a Microstar microfocus rotating anode X-ray (Bruker) with Cu anode, 4 kW model, max. thermal load 2.7 kW on a 100 micron focused generator, and an Integrated Computer controller motorized image plate detector (Mar) having large dynamic range for high speed data collection of protein crystals for macromolecular crystallography and structure biology studies. Remote data collection facility has enabled access to the Synchrotron facility located across the world. The facility has collected diffraction data for several protein complexes for in house students and IIT B users.

15. Mass Spectrometry

Dr. Rukmini Govekar
Officer-in-Charge

Mr. Shashadhar Dolas
Scientific Officer

The Mass Spectrometry facility houses the state-of-the-art MALDI-TOF/TOF (Bruker Ultraflex II), liquid chromatography system (Agilent 1200 series micro LC) and spotter (Bruker Proteineer). Over 1200 samples were analyzed for protein identification by peptide mass fingerprinting, sequencing and molecular weight determination of small molecules. The facility is used by scientists and graduate students from neighboring institutes/colleges.

Administration General

Dr. Venkata V.P.R.P.
Chief Administrative Officer, TMC

Mr. MY Shaikh
Sr. Administrative Officer

Mrs. MA Sharma
Administrative Officer (II)

Mr. Vilas Pimpalkhare
Jr. Administrative Officer

Mrs. P. Kamala
DCA, ACTREC

Mrs. Sandhya Patil
Accounts Officer II

Mr. PB Baburaj
OIC (ES)

Mr. SC. Kirkase
Purchase Officer

Mrs. P. Kotenkar
Stores Officer

Mr. BD Parab
Sr. Security Officer

Mr. RM Chavan
Dy.CSO, ACTREC

Human Resource Development: HRD section handled the appointment of 13 permanent staff members in different grades in the Medical and Technical cadres, and the superannuation of eight staff members. Timely welfare measures and facilities necessary for maintaining excellent work atmosphere were provided. The staff training program was strengthened by deputing 25 staff members for training courses within and outside Mumbai and, convening in-house weekly administrative meeting for streamlining infrastructural and service facilities to cater to the demands of cancer patients at ACTREC. A railway reservation counter was inaugurated.

Administration (Estate Management): This section controlled and managed all the outsourced activities like cafeteria services, transportation, horticulture, pest control patients' hostel, guest house etc.



As part of the green initiative, a special tree plantation drive was undertaken. Several indigenous trees were planted including one thousand saplings of Bamboo. Dr. Prakash Amte and Dr. Mandakini Amte were felicitated with the Science & Society oration and also participated in the drive. A '**Nisarg-Runa Biogas Plant**' is running successfully on the campus and helps in the disposal of organic/kitchen waste in an eco friendly manner. The gas produced from the plant is utilized by the kitchen. **Housekeeping services** maintain cleanliness, sanitation and hygiene on the campus. A number of training sessions were also organized for housekeeping and horticulture workers.

Finance and Accounts: This department manages the flow of funds by prudential and judicious budgetary controls, and review of financial outflow. Procurement of various supplies, material and equipment required for the centre was undertaken by following the relevant codal provisions, viz. General Finance Rules, Purchase Procedure, besides Fundamental Rules and Supplementary Rules in respect of manpower/salary expenditure.

Data updation in the Personnel Information System (PIS) and in the new Payroll System is in progress. In order to ensure more accurate and efficient functioning of the accounts department, Financial Management System (FMS) has been implemented this year.

During the report year, hospital and other income to the extent of Rs.10.00 crore has



been generated. In all, 204 projects were on-going at ACTREC. A sum of Rs. 5.71 crores was received from governmental agencies such as DBT, DST, ICMR, LTMT, etc., to meet the expenditure on 37 of these on-going projects. In addition, 21 new extramurally funded projects to the tune of Rs. 11.97 crores for a three year period were sanctioned by funding agencies, of which Rs. 5.93 crores were received during the calendar year.

Engineering section: This section, comprising of Civil, Electrical, Mechanical and Air conditioning, work to facilitate the requirements of research laboratories and hospital wing of the Centre. The scope of work includes maintenance and operation of 33 KV receiving station, 11 KV substations, transformers, lighting and power distribution, DG sets, central air-conditioning plants, medical gas system, LPG distribution through pipelines, LN2, hospital and lab furniture, pumping stations, low temperature facilities and laboratory equipment. It also covers building maintenance; including, addition, alteration and modification of constructed area of about 4,00,000 sq.ft. area on the 60 acre plot of land. Engineering section also oversees the functioning of the laundry section, medical gas system, LPG network and liquid nitrogen plant of the centre. The department also coordinates with architects/consultants for construction of various buildings such as the Centre for Cancer Epidemiology, Hematolymphoid Block, Archive, Bio-bank, expansion of Radiotherapy, etc.

Purchase: This department is responsible for delivering goods as per the approved quality and minimizing the lead time. During 2013, equipment orders worth around Rs. 7.34 crores, consumables worth around Rs. 7.75 crores and, contract for supply of spares/AMC worth around Rs. 2.88 crores were released.

Stores: This department receives and issues stock and non-stock material. Physical stock verification of material is carried twice a year with asset verification.

The Centre acquired 82 major and 109 minor equipment along with various consumables during 2013. Proper documentation enabled smooth flow of information between Administration, Accounts, Purchase, etc.

New on-line indenting software was adopted in a bid to achieve paperless office and curtail auxiliary costs. The department also ensured safety of material and minimized pilferage.

Security section: The responsibilities of the Security section are manifold and, involve securing and safeguarding the entire 60 acre campus. Physical security measures are in place to prevent unauthorized access of men, material and vehicles, to ensure the safety and security of ACTREC property and personnel, to ensure an atmosphere free from fear. Security staff performed ceremonial parade on Republic and Independence Day. Vigilance awareness week was observed at the Centre as per the guidelines issued by the Vigilance section, Department of Atomic Energy.

Administration: Medical

Dr. Prashant Bhat
Asst. Medical Superintendent

Mrs. Chital Naresh
Quality Manager

Dr. Sumedha Patankar
Asst Manager, Clinical Services

The medical administration is responsible for all the patient care facilities and the provision of quality healthcare services in the outpatient, inpatient, diagnostic and clinical areas. This is achieved through close interaction with the faculty and staff, to ensure smooth, uninterrupted patient care. Patient feedback is encouraged and improvements are continuously pursued. Supervision of patient service billing, research protocols, material procurement, pharmacy major and minor infrastructure development projects are all important functions of this section.

Service

With effect from 15th August 2013, ACTREC hospital services were opened to treat patients from Navi Mumbai and Raigad district, for select specialties and, 57 new cases were registered. The Rajiv Gandhi Jeevandayee Arogya Yojana (RGJAY) was implemented. At present, the insurance policy/coverage under the RGJAY encompasses eligible beneficiary families in eight districts: Gadchiroli, Amravati, Nanded, Sholapur, Dhule, Raigad, Mumbai and its suburbs.

Patient feedback was received from 207 cases. This was analyzed and patient suggestions were addressed. Complaints were circulated to respective departments for

corrective actions. Patient appreciation of the dedicated service of 30 staffers including clinicians, nurses, technicians and front office staff was communicated to respective departments.

A 'Go Green' Committee has been formed to spread awareness about the eco-friendliness of the environment, implement measures to further 'green up' the ACTREC campus, and achieve energy saving through feasible alternate solutions like the biogas plant that generates heat energy from kitchen waste.

Education

A number of training programs were conducted for the hospital staff, including laboratory and nursing staff in the areas of quality management system, infection control and safety practices. Two students of hospital administration completed their dissertations.

Information Technology

Mr. Prasad Kanvinde
IT Coordinator

Mr. Padmakar Nagle

Mr. M. Sriram

Mr. Anand Jadhav

The IT department provides computational facility, infrastructure and support for information access, processing, printing, archiving, dissemination, etc. ACTREC has a campus wide 100 Mbps LAN with copper/fiber cable, embellished with ~600 LAN nodes, eight servers and is equipped with secured wifi network. The campus is connected to the Internet through a 50 Mbps National Knowledge Network (NKN) information gateway, with a redundant 20 Mbps Reliance connectivity. The centre has a live mail server that holds over 300 email accounts of staff and students. Redundant/fail safe configuration on the firewall ensures 99% uptime of internet and mail facilities. A dedicated point to point leased circuit of 12 Mbps between ACTREC and TMH facilitates sharing of patient information, PACS images, etc. Under the NKN project, the centre has successfully established a seamless connectivity to NKN grid at gigabit per second speed. The hospital information system (HIS) is maintained on a newly acquired state of the art IBM power6 - 520 server class machine that runs on 24x7 mode and provides

information processing facility to various user departments.

The department provides day-to-day support, upkeep, administration and maintenance of passive and active network components which constitute vital networking activities. The centre also acquired state of art wireless network devices on new standards with 600 Mbps bandwidth.

Procurement and implementation of a high end data server on VMware virtualization for various logical applications like intranet applications, FTP server applications was achieved. Patient information processing at the centre is online, updates for PABR, DIS, RIS, OT, accounts, pharmacy, purchase and stores modules are available, enabling end users to make seamless transactions on the TMH remote server for patient services. The earlier integrated ROIS module was updated and deployed successfully along with seamless data migration across TMH and ACTREC. Major changes/updates were carried out in web based EMR in tandem with the paperless drive. The Clinical Information System module was also updated with modifications to achieve paperless service.

Library

Mr. Satish Munnolli
Librarian

The Library facilitates the scientific information requirements of students, scientists and clinicians. During 2013, the library subscribed to 92 journals (15 Indian, 77 international) and has a collection of 5847 books, 12,108 bound volumes, 2801 staff publications, 544 theses, 380 annual reports and 19 video cassettes on cancer, clinical research and allied areas, and 72 online journals are enabled. Consortia with DAE and Elsevier provide access to over 2500 journal titles through Science Direct platform with back volumes from 1996. The library has subscribed to 33 'Annual Reviews' and 'Methods in Enzymology' e-resource series, while 13 Nature/Nature Review online series are available through joint subscription with TMH. The online resources - Wiley downloads, LWW oncology books, Lippincotts nursing procedures and skills (LNPS) and the search platform FedGate were made available. The library organized user orientation programs for new entrants with demonstration on use of online resources.





Cancer news, useful sites, inventions and interesting articles were circulated through email. The library also offered services on Impact factor, Hirsch index, Citations of individual papers, and the Centre's publication list.

Photography

Mr. SM Sawant
Officer-in-charge

This section uses advanced digital cameras, high end computing and desk top publishing equipment and software to maintain a complete photographic record of experimental results and data, campus, departments and infrastructure, carefully archives the images and provides them to officials for the centre's print publications, website and presentations. The facility also looks after the audiovisual presentation equipment installed in the meeting venues on campus and, provides assistance during presentations at major events. During the year the facility supported 32 events, including eight national and two international meetings.

Science Communication and Professional Education (SCOPE) Cell

Dr. Aparna Bagwe
Officer-in-charge

SCOPE Cell ensures the smooth and timely conduct of the science communication and professional education programs. The cell assists with editing services for manuscripts, design of webpages for in-house conferences. The cell also coordinates venue bookings and information dissemination for in-house meetings and seminars through email/print circulars, and regular uploads of website updates and tenders/advertisements.

The doctoral program of the centre is facilitated by the cell. It coordinates the intake of junior research fellows, from application screening (920 applications, 18 JRF projects), conduct of written entrance exam and interviews up to selection of the candidates and, supervises the academic course work and exams. The cell also facilitates the centre's training program by appointing 213 short term trainees during the year, who worked for research experience or to complete their M.Sc. or B.Tech. dissertations. Besides there were 12 summer trainees, 9 observers and 6 research associates. Academic responsibilities include delivery of lectures on 'Laboratory Safety' for new trainees at regular intervals. The cell also organized the centre's exhibits and poster display at the 6th Science Expo held at the Nehru Science Centre, Mumbai, along with Events Committee members and volunteers. The cell co-ordinated the conduct of the centre's Open Day. Over 400 students accompanied by faculty from degree colleges or teaching/research institutions of Mumbai and Navi Mumbai region participated in this popular event. In 2013, there were five educational visits from students or staff of universities/government institutions.

ACTREC Apex Committee for Research and Academics (AACRA)

AACRA, which was established in April 2006, acts as the apex research and academics committee to: Carry out the mandate given to ACTREC by the Scientific Advisory Committee, promote basic, interdisciplinary, translational and disease oriented research, recommend and coordinate measures for achieving excellence in research and academics.

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|----------------|--|
| Chairperson | Dr. Shubhada Chiplunkar (Director, ACTREC) |
| Co-Chairperson | Dr. Sudeep Gupta (Dy. Director, CRC-ACTREC) |
| Members | Dr. Rajiv Sarin Dr. Rita Mulherkar Dr. Neelam Shirsat Dr. Rajiv Kalraiya Dr. Tejpal Gupta Dr. Vikram Gota |

ACTREC Institutional Ethics Committee (IEC-III)

ACTREC IEC, constituted as per the ICMR guidelines for Ethics Committees, has the mandate for combined scientific and ethics review of research projects being conducted at ACTREC. This committee monitors research studies involving human subjects and use of tissues collected/banked during diagnostic or therapeutic procedures.

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| Chairperson | Dr. Tapan Saikia, (Prince Aly Khan Hospital) |
| Co-Chairperson | Dr. M. Seshadri, (Ex BARC) |
| Member-Secretary | Dr. Vikram Gota |
| Members | Dr. Sorab Dalal Dr. Amit Sengupta Dr. Nobhojit Roy Dr. Kumar Prabhash Dr. Asawari Patil Dr. Vedang Murthy Dr. Aliasgar Moiyadi Dr. Sridhar Epari Mrs. Sadhana Kannan Mr. T. B. Sheshshai (Theologian) |

Mrs. Karuna Jaggi
(Lay person)
Dr. B.B. Singh
(Legal expert)

Basic Sciences Research Group

BSRG is a forum of basic scientists at ACTREC where scientific issues related to academic and research programs, infrastructure development, organization of symposia and meetings, updates on research support facilities, opportunities for extramural and intramural funding support and related matters are discussed.

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| Chairperson | Dr. SV Chiplunkar |
| Secretary | Dr. Tanuja Teni |
| Members | All Pls & Co-Is All Officers in-charge, CRI |

Institutional Animal Ethics Committee

IAEC fulfills the requirements of the Committee for the Purpose and Control and Supervision of Experiments on Animals (CPCSEA), Ministry of Environment and Forests, Govt. of India. IAEC was set up in CRI in 1995, and its Animal House was registered with CPCSEA in 1999. IAEC reviews animal study proposals and advises the investigators to ensure optimal use of the animals as per CPCSEA guidelines. The current IAEC is reconstituted as per the endorsement by the CPCSEA.

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|-------------|---|
| Chairperson | Dr. GB Maru |
| Secretary | Dr. AD Ingle |
| Members | Dr. MB Mahimkar Dr. PR Chaudhari Dr. Pritha Ray Dr. Renuka Munshi (Scientist from Outside) Mrs. Ranjana Baburao (Non-scientific socially aware member) Dr. DD Manjramkar (Main Nominee CPCSEA) Dr. HD Sarma (Link Nominee CPCSEA) |





Institutional Biosafety Committee

IBSC serves as the nodal point for implementation of the biosafety guidelines for recombinant DNA research, their production and release into the environment, and setting up containment conditions for certain experiments as set by the Recombinant DNA Advisory Committee of DBT. Research projects involving the use or production of microorganisms or biologically active molecules that might cause a biohazard must be notified to the IBSC in the DBT-prescribed format. The IBSC permits genetic engineering activity on classified organisms only at places where such work should be performed. The committee members are empowered to subject the storage facility, work place, etc. to inspection.

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|----------------------|---|
| Chairperson: | Dr. Rita Mulherkar |
| Member- Secretary | Dr. Manoj Mahimkar |
| DBT-Nominee: | Dr. Shubha Tole (TIFR) |
| Members: | Dr. Sorab Dalal Dr. Sanjeev Waghmare Dr. Neelam Shirsat Dr. Vivek Bhat Dr. Hari Mishra (BARC) |

Institutional Radiation Safety Committee

IRSC is mandated to ensure that the guidelines of the Atomic Energy Regulatory Board for the use, storage, handling and disposal of radioactivity are followed in the respective areas by the designated officers, along with guidelines defined by IRSC. At ACTREC, radioactive sources are used for in-vitro assays, radiation treatment and radiodiagnosis procedures in clinical and preclinical setup. IRSC monitors the safe handling, use and disposal of radioactive sources and, occupation safety aspects while working in the radiation areas.

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| Chairperson | Dr. Shubhada Chiplunkar (Director, ACTREC) |
| Member- Secretary | Dr. Pradip Chaudhari |
| Members | Dr. D.D. Deshpande (TMH) Dr. J.P. Agarwal (TMH) Dr. S.L. Juvekar Dr. Shashank Ojha Ms. Siji Paul Ms. Reena Phurailatpam |

Academic Committee

The Academic committee oversees all matters pertaining to the JRF program and coordinates the academic coursework (core course and electives), JRF entrance exam paper setting, and ensures the smooth conduct of the course exams.

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| Convenor: | Dr. Neelam Shirsat |
| Members: | Dr. Sorab Dalal Dr. Sanjay Gupta Dr. Manoj Mahimkar Dr. Kakoli Bose Dr. M. Chilakapati Dr. Pritha Ray Dr. Sanjeev Waghmare |

Extramural, Intramural or Pharma funded research projects initiated in 2013

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| Principal Investigator | Project Title |
|-------------------------|--|
| Mrs. Meera Achrekar | Facilitating clinical communication skills: Development of a training module and testing its efficacy on selected aspects of clinical communication skills of nurses in their interaction with patients and health care professionals in an oncology unit. |
| Dr. Sudhir Nair | Raman spectroscopy of serum and exfoliated cells for detection of oral cancer. |
| Dr. Supriya Chopra | Randomized controlled trial of drug eluting beads based transarterial chemotherapy (TACE) and Sorafenib with or without stereotactic body radiation therapy (SBRT) in patients with non metastatic unresectable hepatocellular carcinoma (TACS-RT study). |
| Dr. Vikram Gota | A multicentre, randomized, open - label, single dose, two - treatment, two period, two - arm, cross over, pivotal bioequivalence study of test temozolomide 250 mg capsule manufactured by Reliance Life Sciences Pvt. Ltd. , India with reference to temodal 250 mg capsule of Schering - Plough Ltd, UK in adult, male and/or female cancer patients (Glioblastoma multiforme or anaplastic astrocytoma) under fasting conditions. |
| Dr. Amit Sengupta | Study of vascular remodelling during metronomics therapy (MT) in cancer. |
| Dr. Rita Mulherkar | To study the prevalence of neutralizing antibodies to adenovirus serotypes in healthy Indian cohort. |
| Dr. Navin Khattry | A randomized, controlled, double - blind phase III trial to compare the efficacy, safety and pharmacokinetics of GP2013 plus CVP vs. Mabthera® plus CVP, followed by GP2013 or Mabthera® maintenance therapy in patients with previously untreated, advanced stage follicular lymphoma. |
| Dr. Amit Sengupta | Develop label free cancer diagnostic and therapeutic modality by modulating tumor microenvironment. |
| Dr. Jyoti Kode | Understanding the cross talk between mesenchymal stromal cells and leukemic stem cells in acute myeloid leukemia: Implications in disease biology and therapy. |
| Dr. Aliasgar Moiyadi | Role of 3-D navigable ultrasound in resection of intra-axial brain tumors - a randomized controlled study. |
| Dr. Pritha Ray | HOX genes in epithelial ovarian cancer heterogeneity. |
| Dr. Amit Dutt | Characterizing the somatic landscape of genetic alterations in gall bladder cancer genome. |
| Dr. Shubhada Chiplunkar | Understanding immune dysfunction in oral cancer: Role of myeloid derived suppressor cells. |
| Dr. Amit Dutt | Epidemiological study to evaluate the prevalence of epidermal growth factor receptor (EGFR) mutation status in non - small cell lung cancer (NSCLC) in India. |



| Principal Investigator | Project Title |
|---------------------------|---|
| Dr. Amit Dutt | Profiling the incidence of novel alteration discovered in human lung cancer. |
| Dr. Vedang Murthy | Circulating miRNA in diagnosis and progression of prostate cancer. |
| Dr. Manoj Mahimkar | Functional Validation of driver genes on 11q22 amplicon in oral cancer. |
| Dr. Tabassum Wadasadawala | Pulmonary sparing Intensity modulated radiotherapy (IMRT) with image guidance using tomotherapy for patients with synchronous bilateral breast cancer (SBBC): A prospective study. |
| Dr. Basak Ranjan | Non-invasive mutation analysis from circulating tumor DNA in lung cancer cells established from Indian patients. |
| Ms. Siji Nojin | To commission, clinically implement and evaluate the isowedge in Bhabhatron II. |
| Dr. Manju Sengar | Immunohistochemistry and fluorescence in-situ hybridization based evaluation of high grade B-cell non-Hodgkins lymphomas to identify the prevalence and patterns of double-hit lymphomas. |
| Dr. Sorab Dalal | Plakophilin3 functions required for tumor progression and metastasis in colon cancer. |
| Dr. Sorab Dalal | Regulation of the epithelial mesenchymal transition (EMT) by 14-3-3 ζ . |

The Academic & Training Programs Office, chaired by Dr. SV Chiplunkar, oversees the educational program at ACTREC. Education being one of the three mandates of the Centre is given due attention and impetus. It encompasses the Centre's Ph.D. program, short term and summer training program, course on translational research for clinical residents. The educational activities of the centre cover its Open Day, educational visits, Science Expo and outreach programs to create cancer awareness.

Doctoral Program: The centre, through its affiliation to the University of Mumbai (MU), used to accept students for the Ph.D. degree in Applied Biology and Biochemistry. Since 2006, it offers the Ph.D. degree in Life Sciences through its affiliation to the Homi Bhabha National Institute (HBNI), a deemed university under the UGC which encompasses all the DAE units in the country. In August 2013, a new batch of 19 students joined the centre and started their one year HBNI academic coursework, successful completion of which is mandatory for registration. In 2013, a total of 99 graduate students were enrolled in the Centre's Ph.D. program. Ten students were awarded the Ph.D. degree (MU-3, HBNI-7). The details are given below:

Ph.D. in Applied Biology (University of Mumbai)

- **Ms. Asha Thomas:** Gene expression profiling of cervical cancers to delineate prognostic molecular markers (Guide Dr. Rita Mulherkar)
- **Ms. Cheryl Travasso:** Role of human papilloma virus (HPV) oncogenes on target cells and use of HPV virus-like particles for gene delivery/integration in nanoparticle (Guide: Dr. Robin Mukhopadhyaya)
- **Mrs. Nirmala Shanoj:** Role of alkylamines in priming gamma delta T lymphocytes for anti tumor effector functions (Guide: Dr. Shubhada Chiplunkar).

Ph.D. in Life Sciences (Homi Bhabha National Institute)

- **Mr. Amitkumar Singh Gautam:** Biochemical and biophysical analysis of substrate recognition, global unfolding and protein degradation by eukaryotic proteasomes (Guide: Dr. Prasanna Venkatraman)
- **Mr. Amitkumar Fulzele:** Keratin profile in oral cancer (Guide: Dr. Surekha Zingde)
- **Mr. Atul Pranay:** Profiling of autoantibodies to tumour antigens from cancer of the gingivobuccal complex using immunoproteomics (Guide: Dr. Surekha Zingde)
- **Mr. Gaurav Kumar:** Effect of curcumin and black tea polyphenols on carcinogen-induced cell proliferation and apoptosis in experimental models (Guide: Dr. Girish Maru)
- **Ms. Poulami Das:** Identification of specific genetic alterations in cervical cancer by genome wide LOH and copy number analysis (Guide: Dr. Rita Mulherkar)
- **Ms. Sapna Iyer:** Role of cytokeratins 8 and 18 in differentiation and transformation of epithelial cells (Guide: Dr. Milind Vaidya)
- **Mr. Vinayak Palve:** Role of anti-apoptotic Mcl-1 gene in human oral cancers and premalignant lesions (Guide: Dr. Tanuja Teni).

Training Program: ACTREC has an active short term and summer training program that accepts (a) staff or students who wish to just the conduct of a specific technique (observers), (b) undergraduate students seeking research exposure during the college's summer break (summer trainees), (c) graduate students seeking to work on their Master's dissertation or individuals who have completed academic study/staff of academic/research institutions who wish to gain research experience or those who have a doctoral/medical degree and seek exposure to the cancer research milieu (short term trainees). During 2012, a total of 243 trainees (short term trainees for dissertation were





103, for experience 113; summer trainees 12, observers 9 and research associates 6) were assigned to scientists and clinicians of the centre.

Basic Program in Translational Research: This program is coordinated by Dr. Rukmini Govekar of ACTREC and Dr. Gouri Pantvaidya of TMH and, is conducted at ACTREC at regular intervals. This comprehensive three month program provides M.Ch. students with basic training in concepts through lectures and procedures through demonstrations. These teaching sessions are covered on alternate Saturdays every month during their rotation at ACTREC. The topics covered include DNA extraction, amplification, electrophoresis, CGH, IHC, western blotting, immune dysfunction, etc. At the end of each

session, the surgical residents present papers on translational research topics covered in the previous session. This well structured educational program also provides a platform for active interaction between clinicians and scientists.

Educational visits, Open Day and Science

Expo: The centre proactively participates in exhibitions and public lecture series in a bid to spread awareness about the centre amidst the general public. In February 2013, the centre participated in the 6th Science Expo held at the Nehru Science Centre, Mumbai. In November 2013, Open Day 2013 was held at ACTREC for students from science and medical colleges. In all, there were five educational visits to the centre from students of universities and institutions across the country.

| | |
|------------|---|
| 22.1.2013 | Gene regulatory networks orchestrating B cell fate commitment of hematopoietic multipotent progenitors. Prof. Jagan Pongubala, University of Hyderabad, Hyderabad. |
| 6.2.2013 | Taking aim at the moving targets: Curing cancer by targeting the cellular nano-wires. Dr. Manu Lopus, Neuroscience Research Institute, Santa Barbara, USA. |
| 6.2.2013 | Applications of magnetic resonance spectroscopy (MRS) in cancer management. Dr. Rama Jayasundar, All India Institute of Medical Sciences, New Delhi |
| 22.2.2013 | The RAGE axis: Novel molecular and structural insights and Key regulations in diseases: Inflammation to cancer. Dr. Vivek Rai, New York University School of Medicine, New York, USA. |
| 1.3.2013 | Immunological bases of dendritic cell vaccines in cancer. Prof. Wolf-Hervé Fridman, Cordeliers Research Center, Paris, France. |
| 6.3.2013 | cAMP dependent protein kinase A (PKA): New insights from an old kinase. Dr. Malik Keshwani, University of California, San Diego, USA. |
| 15.3.2013 | Network models in systems biology: A critical look. Dr. Supratik Chakraborty, IIT – B, Mumbai. |
| 18.3.2013 | Epithelial mesenchymal interactions in oral cancer. Dr. Daniela Costae, University of Bergen, Norway |
| 12.4.2013 | HIV-1 and influenza immunogen design. Prof. Raghavan Varadarajan, Indian Institute of Science, Bangalore |
| 30.4.2013 | Notch antibodies: Potent cancer immunotherapeutics. Prof. Rajan Dighe, Indian Institute of Science, Bangalore. |
| 12.6.2013 | Basics of chromatography: HPLC. Prof. N.N. Inamdar, Allana College of Pharmacy, Pune |
| 20.6.2013 | Modelling cancer in the fruit fly, Drosophila Dr. Pradip Sinha, IIT-Kanpur, Kanpur |
| 16.8.2013 | CA125 (MUC16) and NK cell responses: Immunosuppressive role of a prominent cancer biomarker. Dr. Manish S. Patankar, University of Wisconsin, Madison, USA |
| 13.9.2013 | Oxide and nanohybrids for cancer theranostics. Dr. D. Bahadur, IIT-B, Mumbai |
| 18.10.2013 | Cellular flexibility regulates normal development and cancer. Dr. Sadhan Majumder, MD Anderson Cancer Center, Houston, USA |
| 14.11.2013 | AD-sensing, nuclear transcription and mitochondrial functions: Cell autonomous and non-autonomous roles of sirtuins in regulating cellular /organismal physiology. Dr. Ullas Kolthur, Tata Institute of Fundamental Research, Mumbai |
| 18.11.2013 | Mechanisms by which Bloom helicase, the tumor suppressor mutated in Bloom's syndrome, affects neoplastic transformation. Dr. Sagar Sengupta, National Institute of Immunology, New Delhi |
| 12.12.2013 | Analysis of tumor - stroma crosstalk in lung cancer to identify targets for therapy. Dr. Vivek Mittal, Neuberger Berman Foundation Lung Cancer Laboratory, New York, USA |





Scientific Meetings & Conferences

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|----------------------------|---|
| 12.01.2013 | Workshop on CPR training Convenor: Mrs. Meera Achrekar |
| 20.01.2013 – 23.01.2013 | 6 th Science Expo, Nehru Science Centre (NSC), Mumbai Coordinator: Dr. Aparna Bagwe |
| 23.01.2013 – 25.01.2013 | Indian Cancer Genetics Conference 2013 Organizer: Dr. Rajiv Sarin |
| 28.01.2013 – 30.01.2013 | Cancer Informatics Workshop on Next Generation Data Analysis Organizer: Dr. Amit Dutt |
| 08.02.2013 | Indian Women Scientists' Association-organized Workshop Coordinator: Dr. Surekha Zingde |
| 21.02.2013 – 22.02.2013 | TNAI Conference on Ensuring Quality Care: A competency based Approach Jt. Organizer: Mrs. Meera Achrekar |
| 21.02.2013 – 22.02.2013 | DBT sponsored Workshop on 'Applications in Bioinformatics' Convenor: Dr. Ashok Varma |
| 08.04.2013 | Science & Society Oration - Dr. Mandakini & Dr. Prakash Amte Organizer: Dr. Rajiv Sarin |
| 16.04.2013 – 18.04.2013 | Hands-on Training on Basics, Fluorescence and Digital Imaging Convenor: Dr. Dibyendu Bhattacharyya |
| 19.04.2013 – 20.04.2013 | 1 st ACTREC symposium on Clinical Pharmacology in Cancer Therapeutics & Second Contact Session on "Research Methodology Workshop & Training in Pharmacokinetics & Pharmacodynamics (PK/PD) Organizer: Dr. Vikram Gota |
| 13.06.2013 – 14.06.2013 | Structural Bioinformatics Workshop Convenor: Dr. Kakoli Bose |
| 03.08.2013 | 6 th ACTREC Monsoon Retreat Coordinator: Dr. Tanuja Teni |
| 21.09.2013 | Workshop - Western Chapter of Association of Medical Physicists of India Convenor: Mrs. Reena Devi |
| 26.10.2013 | Dr. Borges Oration – 11th TMH – WCI (Women's Cancer Initiative) Organizer: Dr. Sudeep Gupta, Dy. Director |
| 8.11.2013 | The Society of Biological Chemists (India) Meet & One day seminar on Macromolecular chemistry and translational research Jt. Organizer: Dr. Ashok Varma |
| 28.11.2013 – 29.11.2013 | Open Day 2013 Coordinator: Dr. Aparna Bagwe |
| 02.12.2013 – 24.12.2013 | Certificate Course in Laboratory Animal Science (CCLAS) Dr. Arvind Ingle |
| 03.12.2013 – 06.12.2013 | International Symposium on conceptual advances in cellular homeostasis regulated by proteases and chaperones Organizer: Dr. Prasanna Venkatraman |
| 14.12.2013 | Workshop on motivation for nurses Organizer: Mrs. Meera Achrekar |
| 20.12.2013 – 21.12.2013 | 9 th National Research Scholars Meet in Life Sciences 2013 Organizers: ACTREC Research Scholars |
| 20.12.2013 | Good Clinical Practice (GCP) Training Workshop, IRB Organizer: Dr. Vikram Gota |
| 20.12.2013 | Association for the Accreditation of Human Research Protection Program Organizer: Dr. Sudeep Gupta |

Dr. Amit Sengupta

- Member, Expert Committee on setting up of 'Diagnostic domes' across India, Office of Principal Scientific Advisor to PM, DOPAR/PMO-GOI.
- Member, Expert Committee on 'Evaluation of diagnostics and clinical protocols for introduction into national health policy' under MOHFW, GOI and BIS.
- Member: Indo-US Program on 'Medical technology and health', DST.

Mr. Amol Tirlotkar

- 1st Prize in the Transfusion Medicine Quiz: 38th annual National Conference of Indian Society of Blood Transfusion & Immunohematology, Surat: October 2013.

Ms. Aparna Chaudhari

- Rajnikant Baxi Award for Best Poster Presentation by Young Scientists: '32nd annual IACR Convention & International Symposium on 'Infection and Cancer', University of Delhi - North Campus, New Delhi: February 2013.

Mr. N Arunkumar

- 2nd Prize for Poster Presentation: 9th Meeting of the South Asian Association of Transfusion Medicine, Gurgaon: October 2013.

Dr. Arvind Ingle

- Fellow, National Academy of Veterinary Sciences: October 2013.
- IAVP Achievement Award 2013 for Best Laboratory Animal Pathologist: November 2013.
- President, Laboratory Animal Scientists Association of India: 2013-2016.

Dr. Dibyendu Bhattacharyya

- DBT CREST Award, 2013.

Ms. Ekjot Kaur

- Best Poster Award: 32nd Annual Convention of the Indian Association of Cancer Research - & International Symposium on 'Infection and Cancer', - New Delhi: February 2013.

Dr. Girish Maru

- President, Environmental Mutagen Society of India,

Mr. Kalpesh Chawan

- 1st Prize for poster presentation: 2nd National Conference of the Indian Society of Transfusion Medicine, Bengaluru.

Dr. Kuldeep Patel

- ACBR Young Scientist Award: 32nd Annual Convention of the Indian Association of Cancer Research - & International Symposium on 'Infection and Cancer', New Delhi.

Mr. Lalith Chaganti

- Prof. KS Korgaonkar Award for Best Poster Presentation: **37th Annual Meeting of Indian Biophysical Society & National Symposium on frontiers of Biophysics, Biotechnology and Bioinformatics, Mumbai:**

Mrs. Meera Achrekar

- First Prize for Paper Presentation: National Nursing Conference on 'Theory development and application in nursing successes and challenges', Vellore.

Dr. Milind Vaidya

- Executive Committee Member: Indian Society of Cell Biology.



**Dr. Minal Poojary**

- 1st Prize for Poster Presentation: 38th Annual National Conference of Indian Society of Blood Transfusion & Immunohematology, Surat: October 2013.

Ms. Poonam Kakade

- Best Poster Award: National Conference on 'Glycobiology of cancer; lectins as tools and targets', Dharwad

Dr. Pradip Chaudhari

- Secretary: Laboratory Animal Scientist Association of India.

Dr. Pritha Ray

- Executive Committee Member: Indian Society for Cell Biology, 2013-15.

Mr. Raja Reddy Kuppili

- Second Prize for Poster & Oral Presentation: Symposium on 'Accelerating biology 2013: the next wave', C-DAC, Pune: February 2013.

Dr. Rajiv Sarin

- Indian Association for Cancer Research Oration:, 2013.

Mrs. Rekha Gour

- Executive Committee Member: The Cytometry Society, 2013-15.

Ms. Tiwari Richa

- Award for Poster Presentation: XXXVII All India Cell Biology Conference on 'Cell dynamics and cell fate', IISc, Bangalore: December 2013.

Dr. Rita Mulherkar

- Member, Academic Council and Board of Studies in Life Sciences, HBNI.
- Member, Working Group on 'Gene therapy': ICMR & DBT.
- Member, Expert Group on 'Immunotherapy': ICMR.
- Member, Project Review Committee, 'Non-Communicable Disease – Oncology': ICMR.
- Member, Wos-A Life Sciences, DST.
- Member, Technical Screening Committee, *Biotechnology Industry Research Assistance Council*, DBT, 2010-14.

Dr. Sanjay Gupta

- Associate Editor: Journal of Integrated – Omics (a methodological journal).

Dr. Shubhada Chiplunkar

- President: Indian Association for Cancer Research: 2012-2014.
- Member, Academic Council and Board of Studies in Life Sciences, HBNI.
- Member, Expert Group on Cancer Biology under Chronic Disease Biology, DBT.
- Member: Review Committee on Genetic Manipulation, DBT.
- Member: Project Review Committee for Division of Non-communicable Diseases (Oncology), ICMR.

Dr. Sorab Dalal

- Secretary: Indian Association for Cancer Research: 2012-14.
- Editor: J. Biosciences; ISRN Cell Biology.

Dr. Sudhir Nair

- Deputy Editor, South Asian Journal of Cancer, 2013.

International Publications

- 1 Ajit D, Gavas S, Joseph S, Rekhi B, Deodhar K, Kane S (2013) - Identification of atypical glandular cells in pap smears: Is it a hit and miss scenario? *Acta Cytologica*. Dec; 57(1):45-53. PMID:23221274.
- 2 Alahari Dhir A, Sawant S, Daddi A, Engineer R, Deodhar K (2013) - Anal cancer in HIV infected patients. *International Journal of Antimicrobial Agents*. 4252:s127.
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**ACTION TAKEN REPORT ON AUDITOR'S OBSERVATIONS
ON
ANNUAL STATEMENT OF ACCOUNTS FOR 2013-14**

**NAME OF INSTITUTION : TATA MEMORIAL CENTRE
Parel, Mumbai 400 012**

| Paragraph No. of Auditors Report | Auditors Comments (to be reproduced in full) | Action Taken | Expected month and year for completion of Action |
|----------------------------------|--|---|--|
| (1) | (3) | (4) | (5) |
| 1. | We have audited financial statements of Tata Memorial Centre (the Centre) which comprises Balance Sheet as at 31 st March, 2014 and the Statement of Income and Expenditure Account for the year ended on that date, as required by the Bombay Public Trusts Act, 1950 (the Act), and a summary of significant accounting policies and other explanatory information. | This is a statement of fact. No action. | |
| 2 | The Management of the Centre is responsible for the preparation of these financial statements that give a true and fair view of the financial position, financial performance and receipts and payments of the Centre in accordance with the Accounting principles and Accounting Standards generally accepted in India. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error. | This is a statement of fact. No action. | |
| 3. | Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those standards require that we comply with the ethical requirements plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of any material misstatement. | | |





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|----|--|--|--|
| | <p>An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Centre's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Centre's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management as well as evaluating the overall presentation of the financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.</p> | <p>This is a statement of fact. No action.</p> | |
| 4. | <p>In our opinion and to the best of our information and according to the explanations given to us, the financial statements give the information required by the Act in the manner so required, we report that :</p> <p>(a) In the case of the Balance Sheet, of the state of affairs of the Centre as at 31st March, 2014.</p> <p>(b) In the case of income and Expenditure Account of the Excess of income over expenditure of the Centre for the year ended on that date.</p> | <p>This is a statement of fact. No action.</p> | |

INDEPENDENT AUDITOR'S REPORT

The Chairman,
Governing Council of Tata Memorial Centre,

Report on Financial Statements

We have audited the attached financial statements of **Tata Memorial Centre (the Centre)** which comprises Balance Sheet as at 31st March, 2014 and the Statement of Income and Expenditure Account for the year ended on that date, as required by the Bombay Public Trusts Act, 1950 (the Act), and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

The Management of the Centre is responsible for the preparation of these financial statements that give a true and fair view of the financial position, financial performance and receipts and payments of the Centre in accordance with the Accounting principles and Accounting Standards generally accepted in India. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those standards require that we comply with the ethical requirements plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of any material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Centre's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Centre's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.



Pune Office: GDA House, Plot No. 85, Bhusari Colony (Right), Paud Road, Pune - 411 038, Phone 020 - 25280081, Fax - 020 - 25280275
Email - audit@gdaca.com

Mumbai Office: Office No. 1,2,& 3, 4th Floor, Rahimtoola House, 7th Hornji Street, Off P.M.Road, Fort Mumbai - 400 001, Phone - 022 - 4922 0555, Fax - 022 - 4922 0504
Email - chetan.sapre@gdaca.com



Opinion

In our opinion and to the best of our information and according to the explanations given to us, the financial statements give the information required by the Act in the manner so required, we report that:

- In the case of the Balance Sheet, of the state of affairs of the Centre as at 31st March, 2014.
- In the case of Income and Expenditure Account of the Excess of Income over Expenditure of the Centre for the year ended on that date.

For G.D.Apte & Co

Chartered Accountants

(Firm Registration No. 100515W)



Chetan R. Sapre

Partner

(Membership No. 116952)

Date: 10-09-2014

Place: Mumbai

Pune Office: GDA House, Plot No. 85, Bhusari Colony (Right), Paud Road, Pune - 411 038, Phone - 020 - 25280081, Fax - 020 - 25280275
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Email - chetan.sapre@gdaca.com



| TATA MEMORIAL CENTRE | | | |
|---|----------|------------------------|------------------------|
| TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER. | | | |
| BALANCE SHEET AS AT 31 ST MARCH, 2014 | | | |
| in Rs. | | | |
| PARTICULARS | Schedule | As at 31.03.2014 | As at 31.3.2013 |
| SOURCES OF FUND | | | |
| CAPITAL FUND AND LIABILITIES | | | |
| Earmarked/Endowment Funds | 1 | 6,218,004,484 | 5,009,719,512 |
| Academic Fund | 2 | 61,874,750 | 64,063,937 |
| Secured Loans | 3 | 342,235 | 987,559 |
| TOTAL | | 6,280,221,469 | 5,074,771,008 |
| APPLICATION OF FUND | | | |
| ASSETS | | | |
| Fixed Assets | | | |
| Gross Block | 4 | 5,741,021,221 | 5,457,939,157 |
| Less: Provision for Depreciation | | 2,281,540,823 | 2,001,778,380 |
| Net Block | | 3,459,480,398 | 3,456,160,777 |
| Capital Work - in - Progress | | 915,698,057 | 195,715,290 |
| TOTAL | | 4,375,178,455 | 3,651,876,067 |
| Current Assets, Loans and Advances | 5 | 3,852,645,834 | 3,294,836,250 |
| Less: Current Liabilities and Provisions | 6 | 9,031,117,481 | 8,956,318,988 |
| NET CURRENT ASSETS | | (5,178,471,648) | (5,661,482,738) |
| Losses carried forward from previous year | | 7,084,377,680 | 5,321,185,945 |
| Add: Excess of Expenses over Income during the year | | (863,018) | 1,763,191,735 |
| Deficit In Income and Expenditure account | | 7,083,514,662 | 7,084,377,680 |
| TOTAL | | 6,280,221,469 | 5,074,771,008 |
| Significant Accounting Policies | A | | |
| Notes on Accounts | B | | |

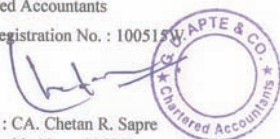
| TATA MEMORIAL CENTRE | | | | |
|---|----------|-------------|-----------------------|------------------------|
| TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER. | | | | |
| INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH 2014 | | | | |
| in Rs. | | | | |
| | Schedule | | Year Ended 31.03.2014 | Year Ended 31.3.2013 |
| A) INCOME | | | | |
| Recurring Government Grants | | | 2,009,300,000 | 1,829,100,000 |
| Hospital Income | | | 1,475,447,300 | 1,240,768,410 |
| Sale of Drugs and Surgical Goods | | | 1,616,057,707 | 1,426,941,908 |
| Interest Income | 7 | | 276,943,474 | 214,536,832 |
| Other Income | 8 | | 63,488,743 | 45,761,909 |
| TOTAL (A) | | | 5,441,237,224 | 4,757,109,058 |
| B) EXPENDITURE | | | | |
| Academic Fund | | | 35,739,790 | 30,806,225 |
| Consumption of drugs and Surgical Goods | 9 | | 1,543,275,810 | 1,374,720,533 |
| Consumables | | | 584,243,329 | 491,746,141 |
| Staff Cost / Salaries | 10 | | 2,501,272,241 | 2,208,079,649 |
| Other Administrative Expenses | 11 | | 679,411,320 | 671,379,139 |
| Interest on HDFC Loan | | | 128,388 | 202,620 |
| Depreciation | 4 | 301,454,275 | | 302,738,534 |
| Less: Adjusted against Non recurring Grants | | 301,454,275 | | 302,738,534 |
| TOTAL (B) | | | 5,344,070,878 | 4,776,934,306 |
| Excess of Income over Expenditure Before Provisions on retirement benefits of employees (A-B) | | | 97,166,347 | (19,825,249) |
| Less : Provision for Retirement Benefits | | | | |
| Gratuity | | 615,269 | | (57,763,122) |
| Pension | | 32,485,081 | | (1,558,940,449) |
| Leave Encashment | | 63,202,979 | 96,303,329 | (126,662,915) |
| Balance being surplus / (deficit) for the year trf to Balance Sheet | | | 863,018 | (1,763,191,735) |

As per our report of even date attached

For G. D. Apte & Co.
Chartered Accountants

ICAI Registration No. : 100515

Partner : CA. Chetan R. Sapre
Membership No. : 116952
Mumbai



For and on behalf of the Governing Council

Indira Pasupathy
Jt. Controller (Finance & Accounts)

Dr. Venkata V.P.R.P.
Chief Administrative Officer

| TATA MEMORIAL CENTRE TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER. | | | |
|---|----------------------|----------------------|----------------------|
| SCHEDULE 1 - EARMARKED / ENDOWMENT FUNDS | | | |
| PARTICULARS | As at 31.03.2014 | As at 31.3.2013 | in Rs. |
| a) Non-Recurring Grants | | | |
| Opening Balance | 4,278,718,868 | 4,352,644,747 | |
| Add: Received during the year | 1,460,000,000 | 296,000,000 | |
| Less: | | | |
| Depreciation for the current year | 301,454,275 | 302,738,534 | |
| Expenditure on Cancer Registries, outreach programme & Plan Expenditure | 76,778,230 | 67,187,345 | |
| Non recurring grant carried to Balance sheet | 5,360,486,363 | 4,278,718,868 | 4,278,718,868 |
| b) Donations | | | |
| Opening Balance | 255,865,077 | 203,958,976 | |
| Additions during the year | 71,737,766 | 77,454,855 | |
| Deduction during the year | 23,797,066 | 25,548,754 | |
| Closing Balance | 303,805,777 | 255,865,077 | 255,865,077 |
| c) Unspent Balance of Workshops / Projects | | | |
| | | 553,712,344 | 475,135,567 |
| Total | 6,218,004,484 | | 5,009,719,512 |

Note :

Earmarked/Endowment Funds comprise of Non-Recurring grants received from Government of India and Donations received from external agencies/ individuals.



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| TATA MEMORIAL CENTRE | | |
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| TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER. | | |
| SCHEDULE 2 - ACADEMIC FUND | | |
| | in Rs. | |
| PARTICULARS | As at 31.03.2014 | As at 31.3.2013 |
| Opening Balance | 64,063,937 | 58,022,807 |
| Add :- Addition During the year | 35,739,790 | 30,806,224 |
| | 99,803,727 | 88,829,031 |
| Less : Deduction During the year | 37,928,977 | 24,765,094 |
| Total | 61,874,750 | 64,063,937 |

| TATA MEMORIAL CENTRE | | |
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| TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER. | | |
| SCHEDULE 3 - SECURED LOANS | | |
| | in Rs. | |
| PARTICULARS | As at 31.3.2014 | As at 31.3.2013 |
| Loan from Housing Development Finance Corporation Limited (HDFC) (Secured by mortgage of dwelling units of the TMC's employees) | 342,235 | 987,559 |
| TOTAL | 342,235 | 987,559 |



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TATA MEMORIAL CENTRE
TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

Schedule 4 - FIXED ASSETS

| in Rs. | | | | | | | | | | | | |
|--|--|---|-------------------------|---|---------------------------------|-------------------------------------|---|------------------------------------|--------------------------|-------------------------|------------------------------|-------------------------------|
| DESCRIPTION | GROSS BLOCK | | | DEPRECIATION | | | | | NET BLOCK | | | |
| | Cost / Valuation as at the beginning of the year | Total Additions / adjustments during the year | Deletions / Adjustments | Cost / Valuation at the end of the year | As at the beginning of the year | Depreciation on the opening balance | Depreciation on Additions during the year | Total Depreciation during the year | On Deletion / Adjustment | Total upto the year end | As at the Current year-Ended | As at the Previous year-Ended |
| | (31/03/2013) | | | (31/03/2014) | (01/04/2013) | | | | | (31/03/2014) | 31/03/2014 | 31/03/2013 |
| A. FIXED ASSETS : | | | | | | | | | | | | |
| 1. LAND: | | | | | | | | | | | | |
| a) Freehold | 197,608 | - | - | 197,608 | - | - | - | - | - | - | 197,608 | 197,608 |
| 2. BUILDINGS : | | | | | | | | | | | | |
| a) On Freehold Land | 1,426,129,727 | 69,871,628 | 4,939,006 | 1,491,062,349 | 128,814,505 | 23,245,914 | 94,965 | 23,340,879 | - | 152,155,384 | 1,338,906,965 | 1,297,315,222 |
| | 3,522,811,239 | 233,105,341 | 60,526,264 | 3,695,390,316 | 1,494,572,974 | 245,093,247 | 4,787,700 | 249,880,947 | 16,394,470 | 1,728,059,451 | 1,967,330,866 | 2,028,238,266 |
| 3. PLANT MACHINERY & EQUIPMENT | | | | | | | | | | | | |
| 4. VEHICLES | 28,363,493 | 2,503,764 | 148,932 | 30,718,325 | 12,830,859 | 2,855,026 | 14,771 | 2,869,797 | - | 15,700,656 | 15,017,669 | 15,532,034 |
| 5. FURNITURE, FIXTURES | 141,495,792 | 5,520,499 | 980,309 | 146,035,982 | 103,356,505 | 7,788,269 | 191,279 | 7,979,548 | 656,367 | 110,679,686 | 35,356,296 | 38,139,287 |
| 6. OFFICE EQUIPMENT | 41,444,076 | 1,867,654 | 595,239 | 42,716,491 | 7,828,262 | 1,947,178 | 45,126 | 1,992,305 | 175,129 | 9,645,438 | 33,071,053 | 33,615,814 |
| 7. COMPUTER/ PERIPHERALS | 297,497,222 | 41,868,928 | 4,466,000 | 334,900,150 | 254,375,275 | 8,960,760 | 6,430,040 | 15,390,799 | 4,465,867 | 265,300,207 | 69,599,943 | 43,121,947 |
| TOTAL (A) | 5,457,939,157 | 354,737,814 | 71,655,750 | 5,741,021,221 | 2,001,778,380 | 289,890,394 | 11,563,880 | 301,454,275 | 21,691,833 | 2,281,540,823 | 3,459,480,399 | 3,456,160,778 |
| CWIP | 196,517,660 | 909,427,459 | 189,444,692 | 916,500,427 | | | | | | | 916,500,427 | 196,517,660 |
| LESS: PROVISION FOR DOUBTFUL CAPITAL ADV (LAND) | 802,370 | | | 802,370 | | | | | | | 802,370 | 802,370 |
| NET CAPITAL WIP (B) | 195,715,290 | 909,427,459 | 189,444,692 | 915,698,057 | | | | | | | 915,698,057 | 195,715,290 |
| TOTAL (A + B) | 5,653,654,447 | 1,264,165,273 | 261,100,442 | 6,656,719,278 | 2,001,778,380 | 289,890,394 | 11,563,880 | 301,454,275 | 21,691,833 | 2,281,540,823 | 4,375,178,455 | 3,651,876,068 |
| PREVIOUS YEAR (TMC) | 5,232,068,131 | 819,063,484 | 397,477,168 | 5,653,654,447 | 1,701,610,989 | 284,506,173 | 18,345,271 | 302,851,443 | 2,684,051 | 2,001,778,380 | 3,651,876,068 | 3,530,457,144 |

1) Capital Work in Progress also includes freehold land amounting to Rs. 802,370 (previous year Rs. 802,370) which is disputed and hence provided for as doubtful in the financial year 2009-2010



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| TATA MEMORIAL CENTRE | | | | |
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| TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER | | | | |
| SCHEDULE 5 - CURRENT ASSETS, LOANS AND ADVANCES | | | | |
| in Rs. | | | | |
| PARTICULARS | As at 31.3.2014 | | As at 31.3.2013 | |
| A. CURRENT ASSETS | | | | |
| 1. Inventories | | | | |
| Stock of Drugs, Medical and Surgical Goods | | 150,957,010 | | 144,062,810 |
| 2. Sundry Debtors | | | | |
| a) Outstanding more than six months | | | | |
| Considered Good | 34,333,003 | | 37,546,774 | |
| Considered Doubtful | 39,092,555 | | 38,650,062 | |
| | 73,425,558 | | 76,196,836 | |
| Outstanding less than six months | | | | |
| Considered Good | 310,325,780 | | 281,848,998 | |
| Considered Doubtful | - | | - | |
| | 383,751,338 | | 358,045,834 | |
| b) Less: Provision for Doubtful Debts | 39,092,555 | 344,658,783 | 38,650,062 | 319,395,772 |
| 3. Cash on hand (Franking Machine) | | 5,951,424 | | 29,837 |
| 4. Bank Balances | | | | |
| With Scheduled Banks : | | | | |
| - On Current Accounts | 52,603,507 | | 176,299,588 | |
| - On Fixed / Margin money Deposit Accounts | 3,107,588,874 | | 2,451,882,171 | |
| - On Savings Accounts | 10,243,985 | 3,170,436,366 | 1,701,894 | 2,629,883,653 |
| TOTAL (A) | | 3,672,003,583 | | 3,093,372,073 |

| TATA MEMORIAL CENTRE | | | | |
|---|-----------------|---------------|-----------------|---------------|
| TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER | | | | |
| SCHEDULE 5 - CURRENT ASSETS, LOANS AND ADVANCES | | | | |
| in Rs. | | | | |
| PARTICULARS | As at 31.3.2014 | | As at 31.3.2013 | |
| B. LOANS AND ADVANCES | | | | |
| 1. Advances recoverable in cash or in kind or for value to be received (unsecured, considered good) | | | | |
| Considered Good | 2,110,295 | | 1,831,220 | |
| Considered Doubtful | - | | - | |
| | 2,110,295 | | 1,831,220 | |
| Less: Provision for Doubtful Advances | - | 2,110,295 | - | 1,831,220 |
| b) Prepaid expenses | | 18,807,262 | | 17,507,263 |
| c) Other Deposits | | 9,261,513 | | 10,368,440 |
| 2. Loans & Advances to staff | | 26,356,690 | | 35,598,703 |
| 3. Interest accrued on fixed deposits | | 103,018,795 | | 120,609,777 |
| 4. Tax Deducted at Source | | 21,087,696 | | 15,548,775 |
| TOTAL (B) | | 180,642,251 | | 201,464,177 |
| TOTAL (A+B) | | 3,852,645,834 | | 3,294,836,250 |



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TATA MEMORIAL CENTRE
TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND
EDUCATION IN CANCER

SCHEDULE 6 - CURRENT LIABILITIES AND PROVISIONS

in Rs.

| PARTICULARS | Year Ended 31.3.2014 | Year Ended 31.3.2013 |
|--|----------------------|----------------------|
| A) CURRENT LIABILITIES | | |
| Current Liabilities | | |
| Undisbursed and Unclaimed Salaries | 3,784,455 | 7,376,035 |
| Miscellaneous Liabilities | 36,862,634 | 23,958,084 |
| Patients Deposits and Other Deposit | 925,202,316 | 698,063,712 |
| New pension scheme liability | 15,594,849 | 12,109,449 |
| Sundry Creditors-Capital | 169,705,167 | 226,187,725 |
| Other Liabilities | 8,221,364 | 8,738,299 |
| Provision for Salary | 282,570,710 | 283,679,431 |
| Provision for expenses | 263,203,381 | 466,536,977 |
| TOTAL (A) | 1,705,144,876 | 1,726,649,712 |
| B) PROVISIONS(for retirement benefits of employee) | | |
| Gratuity | 603,524,698 | 602,909,429 |
| Leave Encashment | 729,007,957 | 665,804,978 |
| Pension | 5,993,439,950 | 5,960,954,869 |
| TOTAL (B) | 7,325,972,605 | 7,229,669,276 |
| TOTAL (A+B) | 9,031,117,481 | 8,956,318,988 |

TATA MEMORIAL CENTRE
TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 7 - INTEREST INCOME

in Rs.

| PARTICULARS | | Year Ended 31.3.2014 | | Year Ended 31.3.2013 |
|--|-------------|----------------------|-------------|----------------------|
| Interest : (gross) (includes tax deducted at source) | | | | |
| from banks : | | | | |
| on fixed deposits/ margin money deposits | 272,313,458 | | 209,272,942 | |
| on saving accounts | 90,059 | | 71,910 | |
| | | 272,403,517 | | 209,344,852 |
| from others : | | | | |
| On mobilisation advance | 521,096 | | | |
| on Vehicle Advances | 136,219 | | 104,868 | |
| on House Building Advances | 3,658,665 | | 4,452,788 | |
| on Computer Advances | 223,977 | | 192,744 | |
| | | 4,539,957 | | 4,750,400 |
| Income Tax Refund | | - | | 441,580 |
| Total | | 276,943,474 | | 214,536,832 |



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| TATA MEMORIAL CENTRE TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER. | | |
|--|----------------------|----------------------|
| SCHEDULE 8 - OTHER INCOME | | |
| | in Rs. | |
| PARTICULARS | Year Ended 31.3.2014 | Year Ended 31.3.2013 |
| Miscellaneous Receipts | 51,640,358 | 33,927,207 |
| Animal House Receipts | 6,743,047 | 6,002,328 |
| Project Overheads | 5,112,904 | 6,242,634 |
| Sundry balances written back(net) | - | - |
| Effect of exchange fluctuation (net) | (7,566) | (410,260) |
| TOTAL | 63,488,743 | 45,761,909 |

| TATA MEMORIAL CENTRE TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER | | |
|---|----------------------|----------------------|
| SCHEDULE 9 - Consumption of Drugs and Surgical Goods | | |
| | in Rs. | |
| PARTICULARS | Year Ended 31.3.2014 | Year Ended 31.3.2013 |
| Opening stock of Drugs / Surgical goods | 144,062,810 | 151,888,520 |
| Add: Purchases | 1,558,562,328 | 1,376,289,363 |
| Less: Closing stock of Drugs / Surgical goods | 150,957,010 | 144,062,810 |
| Less: Return/ Rejected / Expired Drugs / Surgical goods | 8,392,318 | 9,394,540 |
| TOTAL | 1,543,275,810 | 1,374,720,533 |

| TATA MEMORIAL CENTRE TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER. | | |
|--|----------------------|----------------------|
| SCHEDULE 10 - STAFF COST / SALARIES | | |
| | in Rs. | |
| PARTICULARS | Year Ended 31.3.2014 | Year Ended 31.3.2013 |
| a) Salaries and Wages | 795,022,234 | 712,494,238 |
| b) Allowances and Bonus | 1,278,744,589 | 1,088,946,652 |
| c) Expenses on Employee's Retirement and Terminal Benefits | 62,185,751 | 63,527,690 |
| d) Pension scheme | 208,648,855 | 208,450,806 |
| e) Fellowships | 156,670,812 | 134,660,263 |
| TOTAL | 2,501,272,241 | 2,208,079,649 |



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TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER SCHEDULE 11 - OTHER ADMINISTRATIVE EXPENSES

in Rs.

| PARTICULARS | | Year Ended 31.3.2014 | | Year Ended 31.3.2013 |
|---|---------|-------------------------|---------|-------------------------|
| a) Linen and Laundry | | 34,340,254 | | 31,053,637 |
| b) Library Expenses | | 26,569,924 | | 15,839,000 |
| c) Electricity | | 245,859,031 | | 253,885,811 |
| d) Water Charges | | 12,888,114 | | 15,044,874 |
| e) Repairs and Maintenance | | 209,653,839 | | 243,488,261 |
| f) Animal House Expenses | | 2,995,966 | | 3,448,330 |
| g) Rates and Taxes | | 2,222,026 | | 6,504,614 |
| h) Minor Equipments and Replacement of Capital Equipments | | 1,632,446 | | 273,458 |
| i) Postage, Telephone and Communication Charges | | 6,219,399 | | 7,639,044 |
| j) Printing and Stationery | | 14,504,412 | | 16,322,255 |
| k) Travelling and Conveyance Expenses | | 17,089,054 | | 11,457,926 |
| l) Intra Mural Research Expenses | | 41,814,239 | | 21,242,607 |
| m) Other Plan / Research Expenses * | | 3,058,314 | | 3,261,374 |
| n) Auditors Remuneration | | | | |
| Audit fees | 300,000 | | 438,061 | |
| Service tax | 49,440 | 349,440 | 49,440 | 487,501 |
| o) Symposium and Training | | 3,012,930 | | 6,118,282 |
| p) Professional Charges | | 2,496,749 | | 2,366,673 |
| q) Advertisement Expenses | | 15,878,571 | | 11,871,258 |
| r) Provision for Doubtful Debts | | 442,493 | | 3,959,402 |
| s) Hostel maintenance expenses | | 10,192,837 | | 8,684,069 |
| t) Miscellaneous Expenses | | 27,447,450 | | 8,403,339 |
| u) Bad debts written off | | 743,831 | | 27,424 |
| TOTAL | | 679,411,320 | | 671,379,139 |

TATA MEMORIAL CENTRE

SCIENCE AND RESEARCH FUND

INCOME & EXPENDITURE ACCOUNTS

FOR THE YEAR ENDED 31 ST MARCH, 2014

in Rs.

| 2012-13 | EXPENDITURE | 2013-14 | 2012-13 | INCOME | 2013-14 |
|-------------------|--------------------------------------|-------------------|-------------------|--------------------|-------------------|
| 154 | To Bank charges | 158 | | | |
| 870000 | To Transfer to Research Project | - | | | |
| 12,220,789 | To Excess of Income over Expenditure | 14,160,481 | 13,090,943 | By Interest Income | 14,160,639 |
| 13,090,943 | TOTAL | 14,160,639 | 13,090,943 | TOTAL | 14,160,639 |

As per our report of even date attached

For G. D. Apte & Co.

Chartered Accountants

ICAI Registration No : 100515W



Partner : CA Chetan R Sapre

Membership No. : 116952

For and on behalf of the Governing Council

Indira Pasupathy

Jt. Controller (Finance & Accounts)

Dr. Venkata V.P.R.P.

Chief Administrative Officer

| Tata Memorial Centre Science and Research Fund | | | in Rs. |
|--|--------------------|---------------|--------------------|
| Balance Sheet as at 31st March, 2014 | | | |
| Particulars | As at 2014-13 | As at 2012-13 | |
| Sources of Fund | | | |
| Corpus Fund And Liabilities | | | |
| Corpus Fund | 168,241,282 | | 154,080,801 |
| Total | 168,241,282 | | 154,080,801 |
| Application of Fund | | | |
| Current Assets, Loan And Advances | | | |
| Receivable from TMH | - | | 81,894 |
| Fixed Deposit with Bank | 146,612,151 | | 147,726,830 |
| Bank Balance | 17,326,491 | | 7,266 |
| Interest accrued on Fixed Deposit | 4,302,640 | | 6,264,811 |
| Total | 168,241,282 | | 154,080,801 |

Note :

This Fund has been created based on the approval of the Director of Tata Memorial Centre dated 24th March 2004, which amount has been transferred to a separate Bank Account in order to ensure that the objectives of the Fund are fulfilled.

As per our report of even date attached

For G. D. Apte & Co.

Chartered Accountants

ICAI Registration No: 100545W



Partner : CA Chetan R. Sapre
Membership No. : 116952

For and on behalf of the Governing Council

Indira Pasupathy
Jt. Controller (Finance & Accounts)

Dr. Venkata V.P.R.P.
Chief Administrative Officer



| TATA MEMORIAL CENTRE SAM JAL MISTRY DONATION INCOME & EXPENDITURE A/C FOR THE YEAR ENDED 31 ST MARCH, 2014 | | | | | in Rs. |
|---|---|------------------|------------------|--------------------|------------------|
| 2012-13 | EXPENDITURE | 2013-14 | 2012-13 | INCOME | 2013-14 |
| 1,583,831 | To Expenses | 999,087 | 1,525,123 | By Interest Income | 1,775,659 |
| 551 | To Bank Charges | 2,019 | 2,183 | By Dividend | 2,150 |
| (57,076) | To Excess of Income over Expenditure | 776,703 | | | |
| 1,527,306 | TOTAL | 1,777,809 | 1,527,306 | TOTAL | 1,777,809 |

As per our report of even date attached
For G. D. Apte & Co.
Chartered Accountants

ICAI Registration No: 100515W



Partner : CA Chetan R. Sapre
Membership No. : 116952

For and on behalf of the Governing Council



Indira Pasupathy
Jt. Controller (Finance & Accounts)



Dr. Venkata V.P.R.P.
Chief Administrative Officer

| TATA MEMORIAL CENTRE DONATION FROM SAM JAL MISTRY DONATION FUND BALANCE SHEET AS AT 31st MARCH, 2014 | | | in Rs. |
|--|-------------------|-------------------|--------|
| PARTICULARS | AS AT 2013-14 | AS AT 2012-13 | |
| SOURCES OF FUND | | | |
| Donation | 26,437,184 | 25,660,481 | |
| TOTAL | 26,437,184 | 25,660,481 | |
| APPLICATION OF FUND | | | |
| Current Assets, Loan and Advances | 17,220,363 | 17,220,363 | |
| Fixed Deposit with Bank | 439 | 2,458 | |
| Bank Balance | 7,554,739 | 5,953,366 | |
| Amount receivable from TMC | | | |
| Accrued Interest on FDR | 1,661,643 | 2,484,294 | |
| TOTAL | 26,437,184 | 25,660,481 | |

As per our report of even date attached

For G. D. Apte & Co.

Chartered Accountants

ICAI Registration No: 100515W



Partner : CA Chetan R. Sapre

Membership No. : 1169529

For and on behalf of Governing Council

Indira Pasupathy

Jt. Controller (Finance & Accounts)

Dr. Venkata V.P.R.P.

Chief Administrative Officer





TATA MEMORIAL CENTRE

[TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER]

The Tata Memorial Centre (TMC) Comprising of the Tata Memorial Hospital (TMH) and the Advance Centre for Treatment, Research & Education in Cancer (ACTREC) functions as a grant-in-aid Institute under the administrative control of the Department of Atomic Energy, Government of India and recognized as the national cancer centre with a mandate for Service, Education and Research in Cancer. It is registered under the Societies Registration Act (1860) and the Bombay Public Trust Act (1950).

SCHEDULE A: SIGNIFICANT ACCOUNTING POLICIES

1. BASIS OF PRESENTATION

The financial statements are prepared on historical cost convention and on an accrual basis. Revenues and costs are accrued, that is, recognized as they are earned or incurred and recorded in the financial statements of the periods to which they relate. The Centre follows accrual basis of accounting, except for Grants, Donations, Workshops / Projects and Commuted Pensions (in case of existing pensioners), which are accounted for on cash basis

2. REVENUE RECOGNITION

- i) Hospital income from services rendered to patients is recognized as and when the bills for the services are generated.
- ii) Interest income is recognized on a time proportion basis taking into account the amount invested and the rate of interest.
- iii) Interest on advances given to staff are recognized in the year of receipt / recovery.
- iv) Other Revenue items are recognized only when it is reasonably certain that the ultimate collection will be made.

3. FIXED ASSETS

- i) Fixed assets are capitalized at acquisition cost (net of duty / tax credits availed, if any), including directly attributable costs such as freight, insurance and specific installation charges for bringing the assets to working condition for use.



- ii) Expenditure relating to existing fixed assets is added to the cost of the assets, where it increases the performance / life of the asset as assessed earlier.
- iii) Fixed assets are eliminated from financial statements only on disposal.

4. DEPRECIATION

- i) Depreciation on tangible fixed assets is provided at the rates and in the manner specified in Schedule XIV of the Companies Act, 1956, on straight-line method.
- ii) Individual assets costing less than Rs.5,000/- are expensed out in the year of purchase / WDV.
- iii) Where any asset has been sold, the depreciation on such asset is calculated on pro-rata basis up to the date, on which such asset has been sold.

5. INVENTORIES

- i) Inventories consist of Drugs and Surgical meant for sale purpose are valued at lower of cost or Net Realisable Value. Cost is determined on first-in-first-out basis.
- ii) Stock of linen, laundry, cutlery and crockery, consumables, surgical and allied stores meant for consumption purpose and spares are treated as consumed as and when purchased

6. GOVERNMENT GRANTS

- i) Recurring grant related to the revenue are recognized on systematic basis in the income and expenditure account over the period, necessary to match them with the related costs which they are intended to compensate.
- ii) Non recurring grants related to depreciable fixed assets are treated as deferred income, which is recognized in the income and expenditure account on systematic and rational basis over the useful life of the asset, i.e. such grants are allocated to income and expenditure over the periods and in the proportions in which depreciation on those asset is charged.

7. DONATIONS

Donations in kind received prior to 1st April, 2003 are included under 'Earmarked / Endowment Funds' at comparable purchase price. With effect from 1st April, 2003 Donations received in kind are being recorded in the books at nominal value.



8. FOREIGN CURRENCY TRANSACTIONS

- a. Transactions in foreign currencies are recorded at the exchange rates prevailing on the transaction dates.
- b. Monetary items denominated in foreign currencies remaining unsettled at the year end are translated at the year end exchange rates.
- c. All exchange gains / losses on settlement / translation, are recognized in the Profit and Loss account

9. EMPLOYEE BENEFITS

Short Term Employee Benefits:

All employee benefits wholly payable within twelve months of rendering the service are classified as short term employee benefits. Benefits such as salaries, wages, bonus, etc are recognized in the period in which the employee renders the related service.

Post Employment Benefits:

i) Defined Contribution Plans:

Employee benefits in the form of Contributory Provident Fund and New Pension Scheme (for employees joined from 1st January, 2004) are considered as defined contribution plans. The contribution paid / payable under the scheme is recognized in the period in which the employee renders the related service.

ii) Defined Benefit Plans:

Retirement benefits in the form of gratuity to eligible employees, leave encashment and pension scheme (other than employees covered in (i) above) are considered as defined benefit plans. The present value of the obligation under such defined benefit plans is determined based on actuarial valuation using the Projected Unit Credit Method, which recognizes each period of service as giving rise to additional unit of employee benefit entitlement and measures each unit separately to build up the final obligation.

The obligation is measured using at the present value of the estimated future cash flows. The discount rates used for determining the present value of the obligation under defined benefit plans, is based on the market yields on Government



securities as at the Balance Sheet date, having maturity periods approximating to the terms of related obligations.

10. INVESTMENTS

Investments classified as 'Long Term Investments' are carried at cost. Provision for decline, other than temporary, is made in carrying cost of such investment.

11. PROVISIONS, CONTINGENT LIABILITIES AND CONTINGENT ASSETS

a. Provisions are recognized for liabilities that can be measured only by using a substantial degree of estimation, if

- i. The Centre has a present obligation as a result of past event
- ii. A probable outflow of resources is expected to settle the obligation
- iii. The amount of obligation can be reliably estimated.

b. Contingent liability is disclosed in the case of :

- i. A present obligation arising from past event, when it is not probable that an outflow of resources will be required to settle the obligation.
- ii. A possible obligation, unless the probability of outflow of resources is remote.

c. Provisions, Contingent Liabilities are reviewed at each Balance Sheet date.

12. EVENTS OCCURRING AFTER THE BALANCE SHEET DATE

Where material, events occurring after the date of the Balance Sheet are considered upto the date of approval of accounts by the members of the Governing Council.

13. ACADEMIC FUND

A percentage as prescribed by the Governing Council of Tata Memorial Centre is transferred from the Hospital Income to a separate fund named as the "Academic Fund". The expenditure incurred towards fulfillment of the objectives is debited to the said fund.



SCHEDULES FORMING PART OF ACCOUNTS

SCHEDULE B : NOTES ON ACCOUNTS

1. Contingent liabilities not provided for in respect of :
Claims against the hospital made by patients are not acknowledged as debts, since the same are not quantifiable.
2. Estimated amount of contracts remaining to be executed on capital account and not provided for (net of advances) Rs.16,97,05,167/- (Previous year Rs. 22,61,87,725/-)
3. Sundry debtors, and creditors balances, and balances of certain liabilities are subject to confirmation, reconciliation and consequent adjustments, if any.
4. Fixed Deposits of the Centre includes an amount of Rs. 4720.94 Lacs, which represents Earmarked Funds kept aside for the immediate commitments for the next financial year.
5. Up to financial year 2006-07 the Centre has accounted all its fixed assets acquired at its original costs and depreciation thereon is charged to income and expenditure accounts. The non-recurring grants received for acquisition of such fixed assets is disclosed under earmarked funds.

With effect from April 1, 2007 the Centre has decided to account the Non-recurring grants as per Accounting Standard 12 on Accounting for Government Grants. As per the said standard, non-recurring grants related to depreciable fixed assets are treated as deferred income, which is recognized in the income and expenditure account on systematic and rational basis over the useful life of the asset, i.e. such grants are allocated to income and expenditure account over the periods in the proportion in which depreciation on those asset is charged.

6. The Centre is covered by a system of internal audit conducted by the Department of Atomic Energy and Indian Audit and Accounts Department.
7. The Centre has filed a writ petition in the Honorable High Court Bombay for non-applicability of Bombay Labour Fund Act, 1956 in the year 2001-02, the final verdict for which is still pending. Each year the centre recovers the LWF amount from employees and also contributes towards the said liability amounting to Rs.45,08,642/- respectively which is disclosed under current liabilities in the financial statement. The centre has also kept as deposit Rs.5,50,000/- each with Maharashtra Labour Welfare Board and Hon'ble Bombay High Court.



8. The disclosures pursuant to Accounting Standard 15 (Revised) on "Employee Benefits" are as follows :

| (in Rs.) | |
|--|--|
| Defined Contribution Plan : | |
| Contribution to Defined Contribution Plan, recognised as an expense and included in "Staff and Welfare" – Schedule 10 in the Income and Expenditure Account are as under : | |
| - Employers contribution to Provident Fund – Rs.31,14,228/- | |
| - Employer's Contribution to New Pension Scheme – Rs.2,98,73,144/- | |

| | | Gratuity | |
|------------|---|--------------|--------------|
| | | 31-3-2014 | 31-3-2013 |
| I | Change in obligation during the year | | |
| 1 | Liability at the beginning of the year | 602,909,429 | 545,146,307 |
| 2 | Interest Cost | 46,052,070 | 44,624,404 |
| 3 | Current Service Cost | 14,800,969 | 15,081,022 |
| 4 | Past Service Cost | 0 | 0 |
| 5 | Benefit Paid | (42,556,724) | (32,236,572) |
| 6 | Actuarial (Gain)/Loss | (17,681,046) | 30,294,268 |
| 7 | Liability at the end of the year | 603,524,698 | 602,909,429 |
| II | Net asset / (liability) recognised in the Balance Sheet | | |
| 1 | Liability at the end of the year | 603,524,698 | 602,909,429 |
| 2 | Plan assets at the end of the year | 0 | 0 |
| 3 | Liability recognised in the Balance sheet | 603,524,698 | 602,909,429 |
| III | Expenses recognized in the Income and Expenditure account | | |
| 1 | Current Service Cost | 14,800,969 | 15,081,022 |
| 2 | Interest Cost | 46,052,070 | 44,624,404 |
| 3 | Expected Return on Plan Assets | 0 | 0 |
| 4 | Actuarial (Gain)/Loss | (17,681,046) | 30,294,268 |
| 5 | Past service cost | 0 | 0 |
| 6 | Total expenses recognised in the Income and Expenditure Account | 43,171,993 | 89,999,694 |
| IV | Principal actuarial assumptions at the Balance Sheet date: | | |
| 1 | Discount rate at | 9.05% | 8.00% |
| 2 | Expected return on plan assets | 0.00% | 0.00% |
| 3 | Salary escalation | 7.00% | 7.00% |



General description of the defined benefit plan :

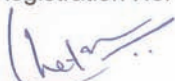
| | |
|---|---|
| 1 | The Centre operates a gratuity scheme, which is a unfunded scheme for qualifying employees. The Scheme provides for lump sum payment to employees on retirement, death while in employment or termination of employment of an amount equivalent to 15 days salary for every completed year of service or part thereof in excess of six months, provided the employee has completed five years in service. |
| 2 | The Centre operates a leave encashment scheme, which is an unfunded scheme. The present value of obligation under this scheme is based on an actuarial valuation, using the Projected Unit Credit Method, which recognizes each period of service as giving rise to additional unit of employee benefit entitlement and measures each unit separately to build up the final obligation. Based on the actuarial valuation, the liability as at 31 st March, 2014 works out to Rs. 72,90,07,957/-. |
| 3 | The Centre operates a Pension scheme which is an unfunded scheme for employees, who have joined prior to 1 st January, 2004. The benefit is payable at the time of superannuation or voluntary retirement after completion of minimum of 20 years service. Based on the actuarial valuation, the liability as at 31 st March, 2014 works out to Rs. 599,34,39,950/-. |

9. Figures for the previous year have been regrouped / reclassified wherever necessary to make them comparable with those of the present year.

Mumbai,

As per our report attached

G.D Apte & Co
Chartered Accountants
ICAI Registration No. : 100515W



Chetan Sapre
Partner
Membership No.116952





Foundation Stone Laying Ceremony of National Hadron Beam Facility & Cancer Centre for Women & Children

Caring with Quality



TATA MEMORIAL HOSPITAL

E. Borges Marg, Parel, Mumbai - 400012, INDIA
Tel: 91-22-24177000, 24177300, **Fax:** 91-22- 24146937

Email: msoffice@tmc.gov.in

Website : <https://tmc.gov.in>

ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

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Tel: 91-22-27405000, **Fax:** 91-22- 27405085

Email: mail@actrec.gov.in

Website : <http://www.actrec.gov.in>