1941 - 2016

KNOW CANCER

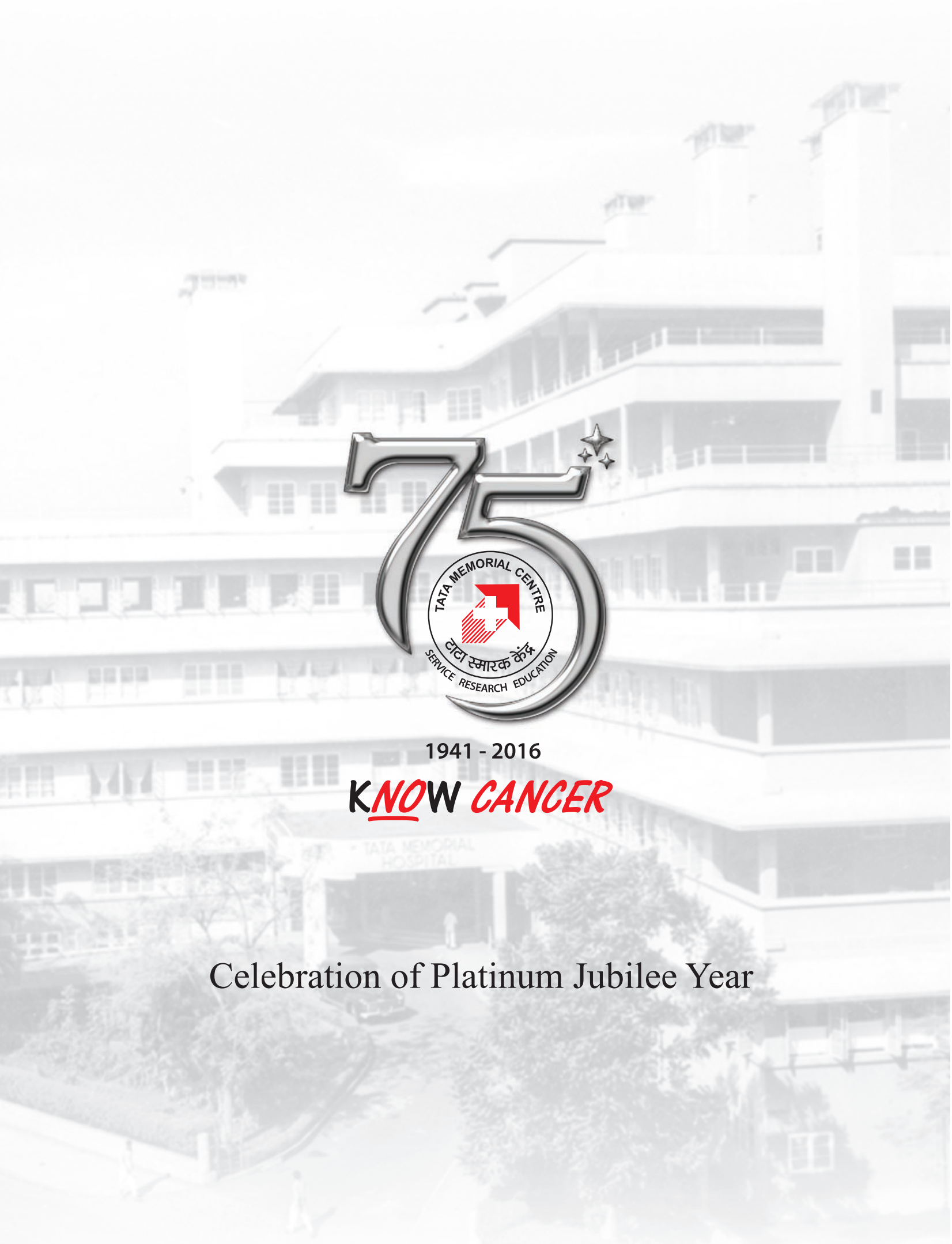
TATA MEMORIAL CENTRE

A Grant-in-Aid Institution of the Department of Atomic Energy, Govt.of India

ACCESS TO QUALITY CARE

ANNUAL REPORT

2015-2016



1941 - 2016

KNOW CANCER

Celebration of Platinum Jubilee Year

TATA MEMORIAL CENTRE

A Grant-in-Aid Institution of the Department of Atomic Energy, Government of India

Tata Memorial Hospital, Mumbai

Advanced Centre for Treatment, Research and Education in Cancer, Navi Mumbai

Centre for Cancer Epidemiology, Mumbai

Homi Bhabha Cancer Hospital and Research Centre, Visakhapatnam

ANNUAL REPORT 2015-16

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 **services** 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".

Temple of Health & Healing

The advent of Tata Memorial Centre (TMC) can be best described as a quantum leap in the medical history of India. It owed its genesis to the philanthropic sentiments of the illustrious Tata family who in 1941 sought to create “a beacon of hope for the hopeless”.

A hospital meant to serve the needs of the unfortunate victims of an abstruse disease which took no prisoners.

In 1962 with the perspicacious efforts of Dr. Homi Bhabha the hospital came under the guardianship of the Department of Atomic Energy which remarkably aided and upheld the spectacular rise of a sterling institution.

Tata Memorial Centre-India’s first dedicated cancer hospital which began its journey as a torchbearer and still maintains pre-eminence as Asia’s leading cancer institute. In the nascent stages of development TMC was an 80 bedded hospital, spread over 15,000 sq. m with an annual budget of Rs 5 lakhs, it stands today as a lofty institution containing over 700+ beds, spreading over 75,000 sq. m and utilizing an annual budget of Rs 300 crores. It indomitably bears the responsibility of cancer care burden not only of India but also of Asia, the Middle East and Africa, catering to an annual footfall of 65,000 new cases and 450,000 follow up cases.

Research and education are inarguably the quintessential arms of a comprehensive cancer care center. TMC since origin has embraced the holistic model of delivering cancer care by augmenting and developing its research and education facilities as it sought to provide treatment which was affordable, innovative and relevant to the needs of the country. The research unit at TMH, India’s flagship for biomedical research, was the brainchild of Dr. V. R. Khanolkar, popularly known as “Father of Pathology and Medical Research in India.” It was first established as ICRC (Indian Cancer Research Centre) under the purview of Ministry of Health. In 1966 when it officially merged with TMH to form the all-encompassing TMC (Tata Memorial Centre), ICRC was formally christened Cancer Research Institute (CRI). CRI continued its effective functioning as an exceptional research wing in the precincts of the hospital till 2002 when it was shifted to Navi Mumbai and expanded as ACTREC a full –fledged state of the art, research and training center. The unique edifice of ACTREC successfully combines the streams of basic and clinical research under one umbrella, thus embodying Dr. Khanolkar’s dream and purpose “to establish an institute dedicated to understanding the mechanism underlying the conversion of a normal cell to a cancer cell with the ultimate goal of translating this understanding to the prevention and cure of cancer”. The research initiatives delve exhaustively into the cause and nature of cancer and also help provide efficacious “Lab to bedside” solutions which distinctly elevate patient care. TMC a deemed university for post graduate and super specialty training in oncology and related fields is academically affiliated to Homi Bhabha National Institute, Mumbai. TMC carries the singular prestige of the highest number churn in the field of oncology. More than 50% of practicing oncologists in India have at some point of their careers been trained at TMC.

The multidisciplinary approach of this specialty center towards cancer ably incorporates all the salient features of a perfect model of care for a cancer patient as expounded by Dr. John Spies to the board of Tata trustees in 1935 - “The best interests of the cancer patient demand that all effective methods of treatment be made available at one place so that a judicious choice of a well-considered combination of methods may give to such a patient his best chance of cure, or failing that, his best chance of life and relief of pain.”

The noble mission of the institute has been to provide comprehensive cancer treatment to one and all. A practice which has been resolutely followed since its inception is that every patient who walks through its doors is attended to and treated irrespective of their ability to pay. Sixty percent of TMC's patients receive free treatment while all are offered subsidized facilities. However the essence of the center lies in its ability to extend compassionate care in the mercantile world. Patients and caregivers frequently refer to the hospital as a "temple" which bespeaks volumes of the diligence and dedication of all those who serve at the center.

Tata Memorial Hospital was inaugurated on 28th February 1941 by His Excellency Sir Roger Lumley, governor of Bombay. As he declared the center open, he prophesized with extraordinary prescience "…the hospital will become the spearhead of attack on cancer in this country, providing not only a center where specialized treatment can be given, but also one from which knowledge of new methods of treatment and diagnosis will go out to doctors and hospitals throughout the country….."

Sir Roger Lumley's prognostication finds realization in a recent peer group review of the hospital which not only accredited TMC as the premier comprehensive cancer center in India, but also ranked it in the top five cancer centers across the globe.

The institution which was conceived as a messiah for the helpless has ever since been a formidable adversary of the dreaded malady called cancer. Its arduous labors executed over time have yielded sweet fruits of success - Cancer is no longer a death sentence!

Paying a heartfelt tribute to this iconic institution we celebrate 75 years of its inception (1941-2016) and mark 2016-2017 as its platinum jubilee year. Our timeless mission of erasing cancer with knowledge is reflected in our platinum jubilee slogan - KNOW CANCER. We stand unrelenting and undeterred in the quest for conquering cancer. This remains our undying promise to humanity.

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Equitable Access to Quality Healthcare

Cancer is a major health problem in India with the overall burden increasing due to improved life expectancy and a growing population. It is estimated that by the year 2030, 70% of the world's cancer burden will be borne by low and middle income countries like India. Currently, the annual incidence of cancer in India is estimated to be 1 million, with a high mortality to incidence ratio of 0.69. These numbers are expected to almost double by 2035 based on GLOBOCAN data (IARC). The absolute numbers of patients with cancer is expected to rise primarily because of an improved lifespan, growing population and changing lifestyles.

Worldwide, inequities on socioeconomic grounds are a major source of concern with significant implications on access and delivery of healthcare.This has been an important problem, with even highly developed countries like the United States having to adopt the Affordable Care Act. This is an even bigger challenge in India with much higher levels of poverty and wide variations in the level of access to healthcare facilities. Geographic, social, and economic inequities contribute towards maintaining these disparities even in a modern world which is shrinking into a global village.

The Tata Memorial Centre has worked towards eliminating disparities in the quality of cancer care in the country right from its inception. With a stated mandate of treating at least 60% of patients at highly subsidized cost (many of them completely free), economic constraints for patients registered at the hospital have to a large extent been removed from an individual's ability to access the highest level of cancer care.

In addition, active tapping of philanthropy enables numerous patients to be treated completely free of cost including resource and cost-intensive treatments like bone marrow transplantation. Incomplete treatment rates in curable cancers like childhood cancers have decreased drastically thanks to generous support from charity.

Recognizing the difficulties faced by patients (and their families) from outside the city and state to live in Mumbai for the duration of their treatment, the hospital has initiated several steps to provide accommodation at highly subsidized cost. In addition, moves are afoot to create even more options for patients and their families to stay in Mumbai during their treatment. Combined with the generous concessions for cancer patients and relatives for rail and air travel provided by the Government of India, these measures make the process of getting quality cancer care more feasible for poor patients from far flung areas in the country.

Tata Memorial Centre has taken several different approaches to make high-quality cancer care uniformly accessible to the Indian population. First, several initiatives have been made towards offering the same levels of cancer care at the patient's doorsteps. There are concrete plans for creating two new state of the art cancer hospitals in Visakhapatnam and Chandigarh. These hospitals will have identical functioning as TMC and follow the same treatment protocols, thereby offering the same treatment to patients in two additional regions in the country.

The Tata Memorial Centre is responsible for training a large number of trained human resource to tackle cancer across the country. With a constantly increasing intake of trainees (residents and fellows) in surgical, radiation and medical oncology, along with broad specialties like pathology, radiology and anesthesiology, and paramedical courses like radiation physics, oncology nursing in addition to several other short and medium term training courses, it provides opportunities for both basic and advanced training in cancer care. Most of these professionals form the workforce of major cancer centres across India.

Research has always been a major focus for the Tata Memorial Centre. Basic, translational and clinical research in cancer aims at addressing common cancers in India and providing cost effective treatment options. In the recent years, there have been important breakthroughs in breast cancer treatment, cervical cancer screening and oral cancers surgery, all of which have had management implications far beyond the four walls of the institute. By virtue of being extremely cost effective, it has improved access to interventions which improve cancer outcomes and have been readily implementable across the country.

A major initiative in the past few years has been the creation of the National Cancer Grid (NSG), a large network of (now) 83 major cancer centres, research institutes, patient advocacy groups and charitable organizations with the stated mandate of having uniform standards of patient care, enhancing trained human resource to treat cancer and the institution of collaborative research projects aimed at improving outcomes of cancer care in cancers which are common or unique to the country.

The mission statement of the National Cancer Grid is as follows:

The National Cancer Grid will create a network of cancer centres across India with the mandate of establishing uniform standards of patient care for prevention, diagnosis, and treatment of cancer, providing specialized training and education in oncology and facilitating collaborative basic, translational and clinical research in cancer.

Funded by the Government of India through the Department of Atomic Energy, the NCG has revolutionized cancer care in India by establishing the largest cancer network in the world. Uniform standards of patient care are likely by reaching consensus on implementation of uniform cancer care to patients from all over the country at their doorsteps by adopting evidence-based guidelines for treatment. Adherence to these consensus guidelines is also being evaluated by conducting institutional peer reviews of the constituent centres. Quality assurance programmes are being planned in surgical pathology and radiation oncology.

Creation of a ready mechanism for exchange of specific expertise and skills are likely to reduce the gap in outcomes between more and less experienced centres. In addition, the NCG has facilitated access to major cancer journals to all member centres thereby giving access to the latest advances and research to these institutes. The NCG also conducted a highly specialized workshop on clinical cancer research methods, training researchers from across the country. Continuing medical education programmes have been conducted in surgical pathology including innovative programmes like the "Traveling school of Pathology" to facilitate training in far flung areas of the country including North East India.

The NCG also facilitates and funds collaborative multicentric research in cancers common or unique to India. By fostering a culture of cooperation and close collaboration between centres, it creates a far more efficient system of conducting clinical trials. The focus of research is on finding cost effective, readily implementable interventions in all levels of cancer care in the country, thereby emphasizing its commitment to provide affordable, equitable cancer care across the country.

These initiatives from the Tata Memorial Centre and the National Cancer Grid have begun to transform cancer care in the country and make it affordable and accessible to all regardless of socio-economic and geographical situation. The dream of providing high quality, affordable cancer care to every single citizen in India will soon become a reality.

Message From Director - TMC

Effective Cancer control in India will be achieved by initiating easy access to low cost treatment, evolving low cost implementable evidence based treatments and public health intervention. National Cancer Grid has evolved well to have over 80 centres across India participating in formulating common protocols for all cancers. Towards uniform care across India three peer reviews have happened and technology transfer for pathology infra-structure to deliver optimum reports has been carried out. Two major multi-centre trials have been initiated.

Cancer education received a major boost with Medical Council of India recognising many centres fulfilling standards to run degree courses in surgical, medical and radiation oncology e.g. Dr. B Borooah Cancer Institute, Guwahati.

In a concentrated effort towards creating specialized cancer hubs meticulously modelled on services available at Tata Memorial Hospital, two major projects (based on the hub and spoke model) were sanctioned. Subsequently, construction activities got well underway in the hubs planned at Visakhapatanam and Chandigarh respectively. As a demonstration of the efficacy of the planned venture, the spoke at Sangrur in Punjab completed one year of consistent functionality treating over 3000 patients. The spoke which was established in the campus of the district general hospital has blossomed into a major education and referral centre for whole of Punjab.

Two Practice changing results originated from Department of Atomic Energy Clinical Trials Centre (DAE CTC) a planned support for clinical research over the last decade. Treatment of neck nodes in oral cancer one of the commonest cancers in India was published in New England Journal Medicine and lack of effect of surgery in advanced metastatic breast cancer in Lancet Oncology.

DAE CTC, a complementary infrastructure for giving impetus to clinical research was initiated a decade ago. This was an expansion of its predecessor Clinical Research Secretariat (CRS). Both these activities have imbibed the importance of clinical research in clinicians of all Disease Management Groups (DMG) and have created an army of clinical trials co-ordinators, data managers and data entry operators who maintain the QA/QC of running this endeavour. A clinical research infra-structure was the first of its kind in India and has resulted in atleast 4-5 major practice changing results and publications. These also constitute the first few major contributions from India towards evidence based management in Oncology.

Public health activity was centralised under one roof with the creation of a Centre for Cancer Epidemiology at ACTREC. This is the first centre for cancer epidemiology in India. Some of the studies run in epidemiology have divulged implementable interventions from geographic variations in breast and gall bladder cancers. The centre has induced some major international collaboration with Harvard School of Public Health, IARC and NCI USA.

Dr. Rajendra Badwe

Message From Director - TMH

Each year, the Annual Report has focused on the augmentation of the infrastructure at the hospital, in addition to highlighting the increasing number of patients that register with us. The last year has been no different. The number of patients seeking care at the hospital continues to rise each year. With regards to the augmentation of our infrastructure and list the advances, all that I can say is that, we have in place an infrastructure at the hospital that compares to the best in the world; thanks to the generous support and funding from our parent organization, the Department of Atomic Energy (DAE). This ensures that our staff have the perfect platform for patient care in their quest for excellence in service, education and research; keeping in mind the mission of our hospital. The details of these are available in the individual departmental reports.

Efforts in recent years have focused on enabling the majority of our patients to complete active treatment and appropriate post treatment rehabilitation for better outcomes and quality of life. Patients lacked reasonable hygienic accommodation, proper nutrition and other such factors during their stay outside the hospital while on treatment resulting in a high dropout rate and increased complications. Costs of these had to be borne by patients, many of whom were unable to do so. Support through the Corporate Social Responsibility (CSR) initiative of various organizations, as well as efforts of individual philanthropic donors, have in the last year been channelized to help overcome this important lacunae in patient care. In addition, some of these donations have also funded rehabilitative prosthesis such as artificial limbs, speaking valves etc., ensuring better quality of life among our cancer survivors. I place on record my appreciation and thanks to each and every one of our donors. Each contribution goes a long way in ensuring better outcomes of our patients. Any donation however small, would have an enormous impact e.g. a few 100 rupees would fund the nutritional supplements or antibiotics of a young child for a week, enabling completion of toxic chemotherapy which would translate to an extra life saved.

Loss of clinical records was another major problem at the hospital. This was largely overcome by the hospital going paperless and meticulous capture of data through our Electronic Medical Records (EMR) since the last couple of years. The EMR being used at the hospital was homegrown and put in place by the Electronic Corporation of India Limited (ECIL) with valuable inputs from our clinicians. It has evolved over the years and I am happy to state that ECIL along with Tata Memorial Hospital as the solution partner was awarded the “Special Mention, CSI IT Excellence Award” under Health Sector Category.

I cannot end my report without placing on record the efforts of our staff in keeping Tata Memorial Hospital as the apex cancer institution in the country. Given the increasing attendance at the hospital each year without a commensurate increase in staff strength every one of our staff, both medical and non medical, have risen to the occasion. I salute their contribution.

Dr. Anil D’Cruz

Message from Director Academics, TMC

Tata Memorial Centre is a stand – alone post graduate and super-specialty centre as one of the constituent Institute of Homi Bhabha National Institute (HBNI) (Deemed University) under Dept. of Atomic Energy, Govt. of India. The Institute is recognized by Medical Council of India, New Delhi for undertaking MD, DM/M.Ch programme in Oncology and other subjects, namely, Anesthesiology, Radiology, Radiotherapy, Nuclear Medicine, Microbiology, Immuno-Hematology & Blood Transfusion Medicine, Pathology and Palliative Medicine. It also conducts postgraduate and doctoral programmes and encourages research in all sub-sets of cancer biology.

During 2015, the intake capacity of post-graduate students increased by threefold to provide specialized and trained human resource in oncology and related subjects in the country. Two year fellowship programmes recognized by HBNI, are conducted by the Centre in various subsets of oncology and other related subjects. Twenty Fellowships are offered every year.

The centre continued to conduct six month training programs for sponsored candidates from State Government Medical colleges, Central Government Hospital, Public Sector Undertaking Hospitals and Regional Cancer Centres across the country. Specialized training programmes in the field of oncology and related subjects were conducted for doctors from South East Asia Region and South African Countries and were appreciated for their applicability by WHO and UICC. Several specialists from developing countries participated as 'Observers' for hands-on training in various aspects of cancer management. The Centre also conducts Post-Doctoral Fellowship programs and Ph.D program at the Advanced Centre for Training, Research and Education in Cancer at Kharghar, Navi Mumbai in Life Sciences and Health Sciences. Specialists from Punjab Government Medical Colleges in Amritsar Patiala, and Sangrur were also trained. DM and M.Ch. Residents have been deputed at the outpatient and day care services at Sangrur, Punjab. Considering the growing needs for professionals for management of clinical trial sites, a post graduate course in Clinical Research that was initiated, received good response from the science and pharma graduates. A summer school in Oncology for Under-Graduate and Post Graduate Students from Medical Colleges across the country was organized in collaboration with Kings Hospital, London, this year from 11th May, 2015 to 22nd May, 2015.

Dr. Kailash Sharma

Message from Director, ACTREC

Over the past few years, ACTREC has evolved as a comprehensive cancer centre in Kharghar, Navi Mumbai. The leadership of ACTREC is showcased through its unwavering commitment to innovative areas of basic and translational research. The translation of laboratory research to the patient's bedside remains our prime mandate.

The 'Clinician Scientists' lab at ACTREC was established to encourage Translational Research and engage clinicians to identify novel clinically relevant questions and develop tools to address them in the lab. The year 2015 saw new facilities established at ACTREC for the management of our patients. A new state-of-the-art linear accelerator was commissioned. MRI and intervention radiology under anesthesia were reinitiated. The indigenously developed multi-leaf collimator system installed on Bhabhatron II was approved for clinical use. Intraoperative neurophysiological monitoring is now an integral part of the neurosurgical procedures carried out at ACTREC for the management of brain tumors.

Inter institutional collaborations have been initiated through MOUs signed with BARC for "Development of new cancer therapeutics' and with the University of Bergen, Norway, for 'Development of a molecular prognostic tool for patient stratification and personalized treatment of oral cancer".

On the Academic front, ACTREC continues to prepare the next generation of cancer researchers through its PhD program in Life Sciences that attracts young talent from across the country. The academic program provides an intellectually rigorous environment that helps in developing their research skills, subject knowledge and analytical ability.

With the realization that cancer affects both the 'mind and the body', ACTREC encourages patient support programs that cater to our patient's special needs. These include cancer awareness programs, dietary and nutritional guidance, Yoga therapy and entertainment programs supported by a number of NGOs who have partnered with us. We remain indebted to these NGOs and various corporate institutions for their support in helping our patients cope with their emotional and financial burden.

Our mission is to provide the best treatment and care to our patients while we continue on the trajectory to maintain our role as the leading cancer research organisation of the country.

(Dr. Shubhada Chilplunkar)

Message from Director, HBCH & RC

Clinical activities at the centre began on 2 June 2014, with make-shift arrangements in a few *porta-cabins*, at the same site as the main hospital building.

The main hospital is under construction. It will consist of 10 buildings – the registration block, the outpatient block, separate for paying and general patients, a dharamshala, hostels for nurses and doctors, pharmacy, radiation therapy, nuclear medicine and blood bank as well in patient services with OTs. The same is expected to be commissioned towards the end of next year.

The vision of Homi Bhabha Cancer Hospital And Research Centre (HBCHRC), is to offer treatment to all cancer patients from the eastern board of the country, mainly consisting of patients from Andhra Pradesh, Telangana, Orissa, Jharkhand and Chattisgarh. A substantial footfall from Orissa is observed.

The following services are presently operational:

A. Consultation and Clinical Services:
    a. Medical Oncology
    b. Gynaecological Oncology
    c. Surgical Oncology
    d. Pain & Palliative Care
    e. Preventive Oncology and Cancer Screening:
        i. Cervical Cancer - PAP smear, Digital colposcopy, Cryotherapy & HPV Vaccination
        ii. Breast Cancer Screening including digital mammography
B. Day care chemotherapy for all solid tumours and haematological cancers
C. Palliative care including narcotic pharmacy services
D. Complete Cancer Pharmacy
E. Laboratory Services:
    a. Digital Radiology, Sonography, Mammography
    b. Hematopathology, Histopathology, Cytopathology
    c. Biochemistry and Tumour Markers
    d. Molecular oncology (PCR based tests)

Presently, all surgeries are performed at the St. Joseph's Hospital in the city. The Hospice and Home Care Team of the hospital, in association with the St. Joseph's Hospital and the *Sneha Sandhya Foundation*, offer care to terminally ill patient, both as in-patient as well as at home.

The cost of drugs and disposable are maintained far below the market price by following the rate contract for drugs as in TMH.

The HBCHRC is functional with help from five administrative staff, five faculty (Medical Oncology, Gynaec-Oncology, Palliative Care, Pathology and Biochemistry),

two post qualification oncologists on rotation from Mumbai (Medical & Surgical), five fully trained nurses, two qualified pharmacists, two lab technicians, two radiographers and a store keeper. A young scientist on a DBT funded project looks after the molecular oncology.

Since June 2013, the hospital registered 2415 new cancer patients till date. Over a thousand chemotherapies were offered to patients and have seen about 5500 review patients.

The community oncology program runs successfully with help from several voluntary organisations like Rotary, Lions, *Manavaseva, Vikasatarangini and Srinivasa Charitable Trust* in the district of Vizianagaram. The screening program focuses on cervical cancer detection using Liquid Based Cytology and high-risk HPV detection, mammography for breast cancer and oral cancer caused by the rather unique social characteristic of *reverse chutta smoking in women*, that is peculiar to the north coastal districts of Andhra Pradesh.

The Vizag District Cancer Registry was initiated. A large team of trained enumerators collect data from various diagnostic centres, nursing homes and hospitals all over the district and physically verify the demography of the patient for accurate data to measure of the quantum of burden, the stage at presentation, the treatment offered and the ultimate outcome. This registry data would enable the state to concentrate on areas of urgent importance through effective population measures.

A full fledged IT department, maintained by the ECIL, who partnered with TMC in the development of unique modules for registration, billing, smart card technology, treatment planning and delivery of care, paperless databases, smart card technology, and online PAX.

A Virtual Private Network with the TMC, Mumbai has been established. All billing, costing, cash and accounting are done using the same software as TMC, Mumbai. The library resources are accessible through the TMC's NCG programme.

We also run the Cancer Out-Patient services and In-Patient Chemotherapy services for the Visakhapatnam Port Trust. In recognition of our services, the VPT Board is pleased to allot floor space to build and operate a city centre, on their premises at the Golden Jubilee Hospital, in the heart of the city. We hope to commission it with OT services, in about 6 months time.

Dr. D. Raghunadharao

Governing Council
Tata Memorial Centre

Chairman	**Dr. Sekhar Basu,** Chairman, AEC & Secretary, Dept. of Atomic Energy (From 23.10.2015). **Dr. R.K. Sinha,** Former Chairman, AEC & Secretary, Dept. of Atomic Energy (Up to 22.10.2015).
Member (Ex-Officio)	**Ms. Chitra Ramachandran** Additional Secretary (R & D), I.C, DAE, Mumbai.
Co-opted Member	**Shri R.A. Rajeev,** Jt. Secretary (Finance), DAE, Mumbai.
Member	**Dr. N. K. Ganguly,** Distinguished Biotechnology Fellow & Advisor, Translational Health Science & Technology Institute, National Institute of Immunology, New Delhi & Former Director General (ICMR).
Member	**Shri Jayant Kumar Banthia,** Ex – Chief Secretary, Govt. of Maharashtra.
Co-opted Member	**Dr. Snehalata S. Deshmukh,** Former Dean, L.T.M.G. Hospital & L.T.M. Medical College, Sion, Mumbai -22 & Ex- Vice Chancellor, University of Mumbai.
Member	**Shri R. Venkataramanan** Sir Dorabji Tata Trust, World Trade Centre-1, 26th Floor, Cuffe Parade, Mumbai - 400 005.
Member	**Smt. R. F. Savaksha,** Sir Dorabji Tata Trust,24, Homi Bhabha Street, Bombay House, Mumbai – 400 001.
Member	**Shri Lakshman Sethuraman,** Jamsetji Tata Trust, World Trade Centre-1,26th Floor, Cuffe Parade, Mumbai - 400 005.
Member (Ex-Officio)	**Dr. R. A. Badwe,** Director, Tata Memorial Centre, Dr. E. Borges Marg, Parel, Mumbai – 400 012.
Permanent Invitees	**Dr. A. K. D'Cruz,** Director, Tata Memorial Hospital, Dr. E. Borges Marg, Parel, Mumbai – 400 012. **Dr. K. S. Sharma,** Director (Academics), Tata Memorial Centre, Dr. E. Borges Marg, Parel, Mumbai –12. **Dr. S. V. Chiplunkar,** Director, Advanced Centre for Treatment Research and Education in Cancer, Kharghar, Navi Mumbai – 410 210 **Dr. D. Raghunadharao,** Director, Homi Bhabha Cancer Hospital & Research Centre, Visakhapattnam.
Secretary	**Dr. Venkata V.P.R.P,** CAO, TMC.

Executive Summary - TMC

TATA MEMORIAL CENTRE

The Tata Memorial Centre (TMC) is a Grant-in-Aid institution of Dept. of Atomic Energy, Govt. of India. It comprises of five centres - the main Tata Memorial Hospital (TMH), the Advanced Centre for Treatment, Research and Education in Cancer (ACTREC) and Centre for Cancer Epidemiology (CCE) at Kharghar, Homi Bhabha Cancer Hospital (HBCH, Sangrur) and Homi Bhabha Cancer Hospital and Research Centre (HBCH&RC, Visakhapatnam). 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

Services

An overall increase of 4.08% in new cases was observed as compared to last year. A total of 39,271 new cases were registered in addition to the 5488 cases registered in Preventive Oncology. About 22,439 referral cards were issued for investigations like mammography, pathology etc. The total bed strength remained the same at 629.

There are 11 Disease Management Groups (DMGs) formed for region specific cancer sites that provide evidence based diagnosis and, decide holistically on the treatment modality viz., surgery, chemotherapy, radiation and palliation as a combination or independent, for every individual patient. This ensured better outcome and quality of life for the cancer patient.

A team of 34 surgeons from surgical oncology department continued to provide state of the art surgical care like minimal access surgeries, skull-base procedures, major vascular replacements, limb salvage, micro vascular surgery and robotic surgeries. The acquisition of Intra-operative neuro-monitoring system further augmented their services. A total of 10913 major procedures were performed at TMH (8367) and ACTREC (2546) in this year. In addition, 35,101 minor procedures were carried out at TMH. The surgical department also extended their services to the instituitional outreach programs at Sangrur and Ratnagiri.

The Department of Anaesthesiology that comprised of the Critical Care division and Pain division, further augmented their services in 2015, by having additional separate divisions for pediatric patients, thoracic cases and those with Hepatopancreaticobiliary diseases. Critical Incident Reporting in OT and ICU were initiated at ACTREC and, anaesthesia services were started at HBCH, Sangrur. During this year, 20488 patients were anaesthetized at TMH and at ACTREC and, 168 at HBCH Sangrur. A total of 3,058 patients were admitted to post-surgical and medical ICUs of which, 1240 were ventilated. The pre-anesthesia checkup clinic at TMH & ACTREC evaluated 20,111 patients. The Pain Services clinics at TMH and ACTREC treated 2395 patients. 4,748 new patients were seen in the Pain Clinic. Regular joint clinics for Thoracic and G.I services were also conducted.

The Medical Oncology treated 24,101 new patients and had 2,76,845 OPD visits in 2015. Apart from chemotherapy, targeted therapies and immune-therapies including monoclonal antibodies and cellular therapies are also offered. The pediatric oncology unit treated 1875 patients and the treatment abandonment rate was <5%. The Bone Marrow Transplant unit regularly conducts the difficult unrelated & haploidentical transplants. The molecular lab developed a sensitive SNaPShot PCR based multiplex genotyping assay to evaluate somatic mutations for routine diagnostic in non-small cell lung cancer. The department also focused on drug repositioning and development of low-dose cost-effective metronomic therapies.

Equipped with state of art infrastructure like external beam therapy, linear accelerators and 4 Telecobalt Units, etc. the Department of Radiotherapy offered optimized and effective treatment like conventional radiotherapy, 3-D Conformal radiotherapy, Intensity Modulated , Stereotactic and Image Guided Radiation Therapy. A Linear Accelerator with facility of image guidance using Cone Beam CT and Mega Voltage CT was commissioned at ACTREC. The radiotherapy facilities at ACTREC are also used for complex treatments like Total Body Irradiation (TBI) for Bone Marrow Transplant using the Bhabhatron II Cobalt 60 Unit.

The Department of Medical Physics was equipped with sophisticated equipment such as Radiation Field Analyzer, ionization chambers, I-matrix for IMRT dose verification electrometer and various types of dosimetry systems like brachytherapy for accurate dose computation and treatment delivery. 6235 patients were offered external beam radiation therapy and 961 patients underwent brachytherapy procedures. A total of 1258 patients were treated using specialized techniques such as 3DCRT, SRT, SRS, TSET, IMRT/ IGRT, SBF and TBI. Significant cost reduction for institute

is expected through indigenization of various aspects of radiation therapy equipment and accessories.

The Department of Pathology provided a wide range of diagnostic services namely, Surgical pathology, Fine Needle Aspiration Cytology, Exfoliative cytology, and Molecular pathology tests on solid tumors and, Biochemistry and Hematopathology to all in-house patients. The department offered diagnostic services to 58,242 histopathology cases (TMH & ACTREC), which includes small biopsy, big specimen and referral material. A total number of 7480 frozen section and 31867 Immunohistochemistry cases were reported. 23,37,437 biochemistry and 24,328 cytopathological investigations were performed. A system wise teaching sets comprising of 7155 glass slides and 1238 gross specimens were generated and lectures were archived in digital format to facilitate self-learning. The Pathology museum had been upgraded. Infectious complications are assisted with an accurate diagnosis by the Department of Microbiology which processed a total number of 187410 samples during the year. All labs are NABL accredited.

The Radiodiagnosis Department procured a new 1.5T MRI machine in 2015 to reduce the wait period for MR imaging. A total of 1,57,081 radiological investigations were conducted during the year. A mobile phone TNM Cancer Staging Application developed by Dr. M.H. Thakur, Dr. Palak Popat and Dr. Nilesh Sable was globally launched at the IAEA General Conference - 2015 (Vienna, Austria); Dr RK Sinha, Ex-Chairman-DAE released the application at the 13th Women's Cancer Initiative conference - 2015 (Mumbai, India). It is a free download on iOS and Android platforms and had more than 5,000 downloads within 2 months.

The Nuclear Medicine Department provided state of the art Isotope based diagnostic and therapeutic services. 13,493 PET/CT, 4,592 planar & SPECT scans and, 50 standalone CT scans on protocol patients were performed during the year. Newer tests included two iodine based, ten 99mTechnetium based, four Fluorine 18 based and two Gallium 68 based radiopharmaceuticals scans. For Bone & Soft Tissue and Uro-oncolgy DMGs', 18 F Fluoride PET/CT with breath-hold CT and 68Ga PSMA-CECT/PET were also added. As a part of therapeutic services, low doses of 153 samarium and 177 Lutetium radiopharmaceuticals were used for bone pains and, Y90 in Trans-Arterial Radio Embolization (TARE).

Following treatment for cancer, patients also receive physical and psychiatry support. The rehabilitation services include occupational therapy, physiotherapy and speech therapy. 9,036 OPD and 2,927 IPD patients availed Occupational Therapy services. 38 prostheses were provided and several kits like Lymphedema and Jaw stretcher keys were developed by department at the Rehabilitation and Research Centre (RRC) Bandra. A total of 11,446 patients were offered Physiotherapy services, helping them to restore highest level of function and independence through individualized therapeutic exercise program and techniques. The department of Speech Therapy works closely with the surgical professionals mainly, the Head & Neck DMG. 5,879 patients received speech therapy services that included pre - & post-operative counseling, deglutition exercises and voice evaluation to maintain good voice quality. The services focus on counteracting the adverse effect of radiation therapy.

The Psychiatric Unit conducted psychological assessment of 3,579 cancer patients including adults and children. These included 1,658 new referrals and 1,921 follow up consultation and liaison inputs. Twelve Mentoring and Capacity Building group sessions were conducted for survivors of childhood cancer. Monthly support group meetings were facilitated by Psychiatric Unit for cancer patients.

The Dental & Prosthetic Surgery unit was involved in maxillofacial prosthetic rehabilitation & dental care for head & neck cancer patients undergoing radiotherapy. Almost 10,500 patients were seen in the outpatient section in 2015. 1,279 patients were treated with prosthetic rehabilitation and 300 patients were treated with maxillary prosthesis, including maxillary obturators & palatal prosthesis. 572 guide plane prosthesis and other services like tongue and palatal augmentation prosthesis, etc. were provided. For those undergoing radiotherapy, dental prophylaxis was offered to 1,154 patients and fluoride gel application done for 3,052 for patients.

The department of Transfusion Medicine continued to maintain high technical standards in providing a wide range of specialized blood components to oncology patients. A total of 179 blood donation camps were organized by the department and 20,141 blood units & 3,886 platelets collected. The department is a recognized centre for training blood bank medical officers, technologists and nurses in India by Ministry of Health and Family Welfare, Government of India.

The General Medicine department advised on management of medical co-morbidities in patients undergoing

surgery, radiotherapy and chemotherapy. The Investigational services included 2D and 3D Echocardiography with Color Doppler for evaluation of cardiac structure and function as well as bedside echocardiography in critically ill patients. A total 10,816 echocardiography tests, 3,792 pulmonary function tests and 32,429 electrocardiograms were performed and, 12,746 consultations were provided during the year. Consultations were also offered in AIDS Malignancy, Cancer Thrombosis and Cardio-oncology clinics.

The Palliative Medicine department registered 3,889 new general adult patients, 993 private adult patients and 301 new pediatric patients. There were 5,573 follow up outpatient visits. Home based palliative care service registered 987 new patients. The team consisting of doctors, nurses and social workers made 2,384 home visits in 247 homecare working days. Palliative care consultation liaison team received 823 new referrals and carried out 2,143 inpatient follow up visits.

The department of Preventive Oncology registered 5488 new patients. It screened 3,901 cases for oral cancer and 6,817 women for breast and cervix cancer under hospital screening program. About 3,602 women were screened for oral, breast and cervical cancers under community screening programme. 1,100 tobacco users were registered for Tobacco Cessation programme. About 5,500 men and women benefited through 41 Cancer Awareness programs conducted across Mumbai region. The department conducted several preventive oncology training programmes covering various aspects of control, early detection and screening of common cancers. A symposium on "Illicit trade of tobacco products" was organized on World No Tobacco Day.

Academic Activities

The academics division of Tata Memorial Centre (TMC) affiliated to Homi Bhabha National Institute (HBNI), Mumbai – a Deemed University, focuses on postgraduate training in oncology and other broad specialties. TMC is also a recognized training center for cancer by several national and international organizations, including WHO, IAEA and INCTR. The education is offered through various postgraduate courses, training through short term observer-ship and other such programs. About 112 Post graduate medical students were registered in 2015 for courses in various disciplines. A one - year diploma in Fusion Technology, a M.Sc. in Clinical Research was initiated in this academic year.

Short term courses in the areas of Radiotherapy Technology, Medical Imaging Technology, Masters in Nursing, Infection Control, Palliative Care, Cyto-technologist and other laboratory technologies were offered. The institute offered training to approximately 500 observers including 38 international specialists and 25 oncology trainees during the year. Within Mumbai, TMC continued with their exchange programs with Seth G.S. Medical College & KEM Hospital, Children Wadia Hospital and Lokmanya Tilak Municipal General Hospital.

The medical and scientific staff members from each department and DMGs were nominated on editorial boards of several prestigious national and international journals, national and international committees and participated in several research activities. They also represent on various national and international committees, to draw treatment and diagnostic guidelines. In all, 293 research papers were published by the TMC staff.

Clinical Research

The Clinical Research Secretariat (CRS) along with Department Of Atomic Energy-Clinical Trials Centre (DAE-CTC) promoted, educated and facilitated research at Tata Memorial Hospital. The clinical researchers were supported in designing of trial, sample size calculation, randomization list generation and analysis. Statistical support was provided to 125 clinical trials and analysis to 89 projects including sample size estimation for 18 projects and, randomization on an ongoing basis for 40 trials. It facilitated translation of consent forms for 34 trials. Eleven trials were supported financially (Rs. 86,06,281) through the DAE / CTC Funds. A detailed SOP was designed to ensure conduct of research in accordance to national and international guidelines. Several workshops and seminars were organized on various aspects of the clinical research covering design, analysis, Good Clinical Practice and protocol writing.

The EBM 2015 meeting held in 27-28 Feb – 1st March 2015 focused on Modern Radiation Oncology Practice, Laboratory testing for myeloid malignancies and Cardio-oncology (A new focus in cancer care). The cardio-oncology section was the first of its kind in India.

The meeting was attended by 780 delegates. A Set of 3 books on this EBM theme were published and released; the same are available on TMC website.

Awards

The 10th issue of the Annual in-house Hindi magazine of Tata Memorial Centre 'Spandan' was awarded the consolation prize for the year 2014-15 during the 17th All India Rajbhasha Sammelan of Department of Atomic Energy.

ACTREC

The Advanced Centre for Treatment, Research and Education in Cancer (ACTREC), the R&D unit of the Tata Memorial Centre, is located in Kharghar, Navi Mumbai. It comprises of the Clinical Research Centre and Research Hospital, and the Cancer Research Institute. Research projects at ACTREC involve active collaborations within the Centre and with national/ international centres from academia and industry. During 2015, 193 on-going projects of the Centre were supported by institutional, intramural or extramural funding. Governmental funding agencies (DBT, DST, ICMR, LTMT, etc) provided Rs. 9.40 crore to meet the expenditure on 82 on-going projects, and sanctioned 18 new projects to the tune of Rs. 11.85 crore for a three year period, of which Rs. 5.52 crore were received during 2015.

The Clinical Research Centre (CRC) and Hospital of the Centre continued to make rapid strides in growth this year evident from an increase in the number of patients referred to and registered at ACTREC. The year saw the restarting of MRI and intervention radiology under anesthesia, introduction of critical incident report form in the ICU and OT, and successful re-accreditation of the diagnostic labs of ACTREC. During 2015, the department of Medical Oncology's adult solid tumour unit handled ~8300 OPD visits and occupation of its five in-patient beds, its bone marrow transplant unit performed 80 bone marrow transplants (39 allogeneic, 41 autologous) and handled ~3600 OPD visits, while its adult hematolymphoid unit handled ~800 in-patients in its 17-bed leukemia/ lymphoma ward, and 6900 OPD visits. The department of Radiation Oncology treated over 700 new patients with external beam radiotherapy and performed over 250 brachytherapy procedures. A new state-of-the-art linear accelerator (Varian TrueBeam) was installed and commissioned for clinical use towards the year-end. The department of Surgical Oncology performed ~2000 major surgical procedures in its four OTs five days a week, provided in-patient care, and conducted pre-surgical evaluation and post-operative follow-up OPDs. Patient services were ably supported by the Centre's NABL accredited Pathology, Microbiology and Composite labs, as also the Molecular Hematopathology lab, departments of Radiodiagnosis, Transfusion Medicine and Nursing. The Clinical Pharmacology lab is involved in preclinical/ clinical drug development, repurposing drugs for cancer, and optimization of existing cancer treatments. The lab's bioanalytical facility saw the installation of a LC-MS/ MS system capable of small molecule quantitation, metabolite identification and quantitative proteomics. The Translational Research lab focussed on studying the biology of circulating nucleic acid fragments, and devised compounds that can degrade circulating NAs, suggesting novel therapeutic possibilities for cancer treatment.

Scientists in the Cancer Research Institute engaged in a wide spectrum of basic and applied research projects, ranging from the study of 14-3-3 proteins regulating cell cycle progression and epithelial to mesenchymal transition (EMT), the role of glycosylation in cancer metastasis, the function of keratin, vimentin and associated proteins in epithelial homeostasis/ cancer, identification of molecular targets in oral and cervical cancers, understanding the molecular basis of disease progression in chronic myeloid leukemia, study of immune dysfunction in cancer patients aimed at developing immunotherapy for cancer, understanding the molecular basis of inherited cancer syndromes, breast and oral cancers, array CGH analysis of tobacco related oral precancer and cancer, integrated somatic mutation analysis and transcriptome profiling of oligodendrogliomas, altered expression of histone variants in liver cancer, and the mechanism of radiation resistance in glioblastoma. Other studies examine perturbations in the molecular and cellular mechanisms governing stem cell regulation that can lead to cancer, unraveling the complexity of drug resistance in ovarian cancer, use of functional imaging in gene targeted radio-iodine therapy for breast cancer, validating housekeeping genes in head and neck cancers, and assessment of minimal residual disease in solid tumours. Structural biology studies examine proteins of the apoptotic pathway to understand the mechanism underlying non-classical programmed cell death, structure and function of proteasomal assembly chaperones involved in EMT, cell morphology, migration and death, structure and function of proteins such as BRCA1 BRCT and design of small molecule inhibitors, and aim to develop Raman

based minimally invasive microspectroscopy and 1H NMR, Raman and infrared spectroscopy methods for screening and diagnosis of cancer.

The Centre also has a strong focus on Academics. Its flagship doctoral program is conducted under the aegis of Homi Bhabha National Institute. During 2015, 123 graduate students worked towards the Ph.D. (Life Sciences) degree at ACTREC. Under the Centre's Short term and Summer Training program, 307 trainees worked under the close supervision of the Centre's faculty. During 2015, the Centre organized 22 local, national or international conferences, symposia, workshops, etc., hosted 26 national/ international experts who delivered research seminars on challenging topics in the life sciences and cancer arena.

TMC Annual Events

The 13th Evidence Based Management conference – EBM 2015 was held from 27th February to 1st March 2015 and was focused on 3 modules viz.- Modern Radiation Oncology Practice, Molecular Haematology: Laboratory Testing for Myeloid Malignancies and Cardio - Oncology: A new focus in cancer care

First symposium - Modern Radiation Oncology Practice symposium by Department of Radiation Oncology was held from 27th February to 1st March 2015. The Modern Radiation Oncology practice mandates the use of newer imaging modalities, powerful treatment planning algorithms and automated treatment delivery systems. The state-of-art radiation technologies namely, Intensity Modulated Radiation Therapy (IMRT), VMAT, Image Based Brachytherapy etc. is being practiced since 10-15 years now. The aim of this meeting was to discuss, debate and formulate evidence based guidelines for the use of newer radiation techniques for better outcomes and minimizing toxicities, and to indicate potential questions which can be a platform for future research. 422 delegates registered for the meeting.

Second symposium - Molecular Haematology: Laboratory Testing for Myeloid Malignancies symposium by Department of Haematology. The goal of this meeting was to review current evidence and formulate guidelines for molecular testing in hematological malignancies with focus on the common myeloid neoplasms such as chronic myeloid leukemia, acute myeloid leukemia and acute promyelocytic leukemia. This meeting was the first of its kind in India to address laboratory issues pertaining to testing and interpretation of molecular knowledge and included national and international experts. It generated evidence-based algorithms for molecular and cytogenetic testing which can be easily applied in Indian setting. They also had a one-day workshop covering basics on assay setup, standardization and validation in molecular (hematology) diagnostics. 238 delegates registered for the symposium.

Third symposium – 1st Conference in India on Cardio - Oncology: A new focus in cancer care by Department of Hematopathology by Department of General Medicine. Developing methods to identify patients at increased risk for cardiac side effects, as well as early markers of cardiac adverse effects and best practices for managing cardiotoxicities, will be critical in moving forward. To address this need, multidisciplinary approach by medical oncologists, cardiologists, radiotherapists and internists, is required to develop strategies, programmes and guidelines to manage cardiovascular events after cancer treatment. The goal of this meeting was to discuss, debate and review the current guidelines to prevent and treat cardiac toxicity in cancer patients. They had several international and national experts to deliberate on these issues. 119 delegates registered for the symposium.

The Hospital Day Oration was held on 28th February, 2015. Oration was delivered by Professor Francesco Lo Coco on "History of Acute Promyelocytic Leukemia: A revolutionary Tale". Professor Francesco Lo Coco is a Hematologist and Head of the Laboratory of Integrated Diagnosis of Oncohematologic Diseases at the Department of Biopathology of the University Tor Vergata of Roma. His main scientific interest and research activities include genetic characterization, monitoring and treatment of hematologic tumors, particularly acute myeloid leukemia and acute promyelocytic leukaemia (APL). He has published over 280 internationally peer-reviewed articles, mainly focusing on molecular diagnosis and follow up of leukemia and lymphoma and treatment of APL. He served as President of the Italian Society of Experimental Hematology (SIE) and also Chairs the APL subcommittee of the Italian National Cooperative Group GIMEMA, and the Education Committee of the European Hematology Association (EHA).

Three EBM books were published:

Part A: Guidelines for Modern Radiation Oncology Practice

Part B: Guideline for Cytogenetic and Molecular Testing in Myeloid Malignancies

Part C: Guidelines for Cardio In Oncology

Augmentation of New Facilities

Working towards complete automation for the serodiagnosis of infectious diseases, department of Microbiology.

Sports art Fitness - T613, Treadmill for Pulmonary Rehabilitation, Department of Physiotherapy.

State of Art Advanced Endoscopy System/unit.

TRUE - BEAM * Advanced Medical Linear Accelerator for Image Guided Radiotherapy.

Histopathology - Tissue Processor (Advanced Model)

Histopathology - Paraffin Section Cutting (Microtomy)

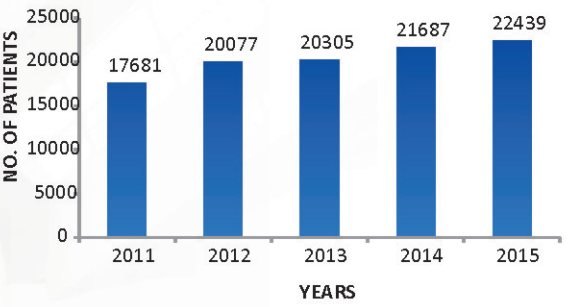
Visitors to TMC

- Mr. Yakiya Amano, Director General IAEA on 26th March, 2015.
- Officials from “Federal Board of Supreme Audit” (FBSA), Republic of Iraq l on 30th April 2015 as a part of their study tour.
- Officials from Pacific Medical College and Hospital, Udaipur on 12th June, 2015.
- Participants of Harvard Advanced leadership initiative on 18th & 19th June, 2015.
- V. Srinivas, Deputy Director (Admin), AIIMS, New Delhi on 22nd July, 2015 for official meeting with Director, TMC.
- MAX CM TSAI (CEO) & team reg (Manufacturing high tech. Medical Surgery equipments for the medical fraternity on 23rd July, 2015.
- Medical Officers from Armed Forces Medical College, Pune on 27th August, 2015 between 1000 hrs to 1230 hrs.
- M.A. II Psychology students (23) and 2 faculty members from Department of Applied Psychology & Counselling Centre, University of Mumbai on 23rd September, 2015 between 1000 hrs to 1200 hrs.
- Team of Cancer Registration & Surveillance division, The National Cancer Centre in Korea on 6th October, 2015 at 1400 hrs.

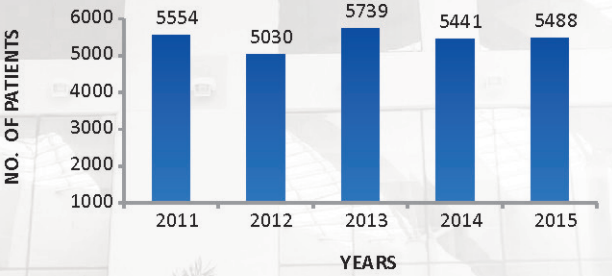
Trends

CASE FILE REGISTRATIONS

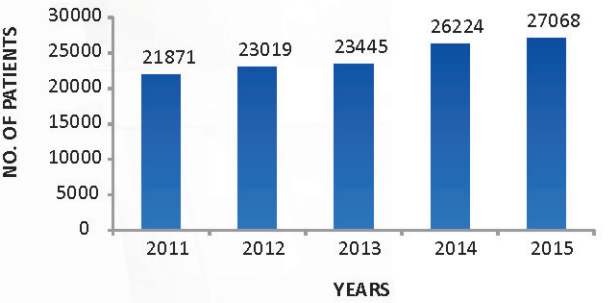
REFERRAL FOR INVESTIGATIONS



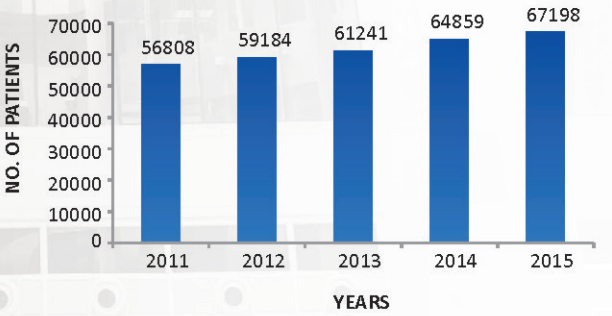
PREVENTIVE ONCOLOGY



NO OF ADMISSION



TOTAL REGISTRATION



Performance Statistics

	2014	2015
Patient Chart Files- General	23639	25195
Patient Chart Files- Private	14092	14076
Patient Chart Files- Total (A)	37731	39271
Referrals for Investigations/ Second Opinion (B)	21687	22439
Preventive Oncology (C)	5441	5488
Total Registrations (A+B+C)	64859	67198
INPATIENT SERVICES		
Admissions		
No. of Admissions	26224	27068
Average Length of stay (Days)	6.3	6.2
Bed Occupancy %	88	95.76
SURGICAL ONCOLOGY		
Major OT Procedures	8107	8367
Minor OT Procedures [33484 Corrected]	34305	35101
MEDICAL ONCOLOGY		
Day Care		
Day Care- General	62674	90438
Day Care- Private	28225	29558
Bone Marrow Transplants at ACTREC	75	80
DIGESTIVE DISEASES AND CLINICAL NUTRITION		
Endoscopies	6149	6311
Nutrition Clinic	14385	11677
ANESTHESIOLOGY, CRITICAL CARE & PAIN		
No. of ICU Admissions	2952	3058
Patients in Recovery Ward	9326	9159
Pain Clinic	3459	4748
RADIATION ONCOLOGY		
External Beam Therapy	5771	6235
Brachytherapy	3204	3590
Treatment Planning / Beam Modification	10999	15281
Special Radiotherapy Techniques (IGRT, IMRT, SRS, SRT, TSET etc.)	4820	2609

Data for January-December

	2014	2015
IMAGING SERVICES		
Radiology		
Conventional Radiography	57556	65590
Ultrasonography / colour Doppler	40403	40466
Mammography	11384	12713
C.T. Scan	23883	28880
M.R.I Scan	4024	6367
Interventional Radiology	3444	3065
NUCLEAR MEDICINE		
PET-CT	13180	13943
SPECT-CT	5204	4592
C.T. Scan	54	50
GENERAL MEDICINE		
ECG	30484	32429
Echo Cardiography	8900	10816
Pulmonary Function Tests	3628	3792
LABORATORY DIAGNOSTICS		
Pathology	141788	161062
Haemato Pathology	429506	453170
Biochemistry	2224118	2337437
Cyto Pathology	24893	24328
Molecular Pathology	2102	2338
Microbiology	190375	179416
TRANSFUSION MEDICINE		
Blood and Platelet Units Collected	22765	24027
Other Services	183015	191829
Cytogenetics	6700	10888
OTHER CLINICAL SERVICES		
Stoma Care	4827	6049
Occupational Therapy	14606	11963
Physiotherapy	8438	11446
Speech Therapy	3499	5879
Psychiatry and Clinical Psychology	3403	3579

Data for January-December

	2014	2015
DENTAL SERVICES		
Prosthetic Services	1273	1279
Other Services	15855	10133
TISSUE BANK		
Allografts Produced	10200	7666
PALLIATIVE MEDICINE		
No. of Patients	9062	10756
Home Care Visits	2765	2384
MEDICAL SOCIAL WORK		
Guidance	23573	25254
Counselling	11313	20367
EDUCATION		
Residents & Others	242	263
Fellows	11	11
Medical Observers	470	463
Nursing Trainees	14	19
Paramedical Students	35	34
RESEARCH PROFILE		
Extramural Projects	10	4
Institutional (Intramural/ No Funding Required)	81	166
Intramural + Extramural Projects	1	12
P.G. Thesis (Dissertation)	98	91
PUBLICATIONS		
International	256	280
National	132	147
Book Chapters	34	41
Conferences / Workshops/ Seminars	50	105

Data for January-December

1941 - 2016

KNOW CANCER

SERVICE

ACCESS TO QUALITY CARE

Convener: **Dr. Navin Khattry**
Secretary: **Dr. Sumeet Gujral**

The Adult Hemato-Lymphoid - DMG

Medical Oncology
Dr. Hari Menon
Dr. Manju Sengar
Dr. Bhausaheb Bagal
Dr. Uma Dangi
Dr. Hasmukh Jain
Dr. Deepa S. Joy Philip

Radiation Oncology
Dr. Siddhartha Laskar
Dr. Nehal Khanna
Dr. Jayant Sastri Goda

Pathology
Dr. Tanuja Shet
Dr. Sridhar Epari

Hemato-Pathology
Dr. P. G. Subramanian
Dr. Prashant Tembhare
Dr. Nikhil Patkar

Scientists
Dr. Narendra Joshi
Dr. Syed Hasan
Dr. Shilpee Dutt

Cytogenetics
Dr. Pratibha Kadam Amare
Ms. Hemani Jain
Dr. Dhanashree

Radio-Diagnosis
Dr. Suyash Kulkarni
Dr. Nitin Shetty
Dr. Ashwin Polnaya
Dr. Nilesh Sable

Nuclear Medicine & Molecular Imaging
Dr. Venkatesh Rangarajan
Dr. Archi Agrawal

Clinical Pharmacology
Dr. Vikram Gota

Psychiatrist
Dr. Jayita Deodhar

The Adult Hematolymphoid Disease Management Group (AHL-DMG) consist of members from the departments of medical oncology, radiology, radiotherapy, pathology, molecular laboratory, cytogenetics and pharmacology along with social worker system and other support staff.

Services

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

This is the one of the largest group dedicated to treating hemato-lymphoid malignancies in the country. It is involved in structured management of hematological malignancies which is based on evidence and protocol, with rapid diagnosis and early institution of therapy to immediately alleviate symptoms and life threatening problems at presentation. The focus on personalized therapy is based on the cytogenetic and molecular profiling of hematolymphoid malignancies. The dedicated hematopathological and molecular hematology laboratory facility provides comprehensive diagnosis.

The DMG runs various assistance programs to ensure that patients with curable hematological malignancies undergo complete treatment.

All registered patients are screened at the Joint clinics (JC) before treatment is instituted. The JCs advice the best treatment options available to the patients and also scrutinizes, approves or modifies planned therapies. The JCs also looks at the feasibility of patients to take treatment as per plan and advices treatment at other places, if they are unable to take treatments at TMH. General information booklet is provided to all patients.

Medical Social Workers facilitate financial and logistic support including stay for patients needing intensive therapy for better outcomes. They adopt patients who are unable to sustain treatment due to financial constraints. All patients with curative intent and who have financial constraints are assisted through funds from various Trusts and through this groups' Lymphoma Leukemia foundation. The DMG members meet weekly to discuss and evaluate the financial support feasibility to patients on case to case basis.

Quality improvement measure

The DMG undertakes quality improvement measures like continuous audits of protocols, chemotherapy regimens, morbidity and mortality, treatment compliance in long-term therapy and implements modifications derived from such audits.

Of the 4,083 new registrations, of which 1,003 were diagnosed with NHL, 235 with HL, 378 with ALL, 394 with AML , 402 CML, and 260 were diagnosed with Multiple myeloma. About 1,747 were treated at TMH.

Key Benchmarks

Volume Indicators:

Table -1

Registration 2015	General	Private	Total
New Case	2,324	1,160 + 599 (referral cards)	4,083
OPD Follow ups	33,104	20,718	53,822

Table 2: Number of patients diagnosed and treated

Diagnosis	Numbers	Rxed at TMH	Rx-Local Place	Observation	Upfront Palliation	Referred Back	LFU
NHL	1003	562	147	100	22	3	161
HL	235	151	55	4	1	0	23
ALL	378	271	33	0	33	2	32
AML	394	179	60	0	64	2	79
APML	41	38	1	0	0	1	1
Acute Leukemia	16	0	0	0	6	2	7
CML	403	348	5	0	3	5	42
CMPD	27	18	0	0	1	1	7
MDS	20	8	4	0	2	1	5
Other Hematological Malignancy	18	3	1	5	4	1	4
Multiple Myeloma	260	156	54	6	0	3	40
Relapsed Leukemia	8	2	0	0	4	0	2
Relapsed Lymphoma	13	9	0	0	1	0	3
Relapsed Multiple Myeloma	2	2	0	0	0	0	0
Total	**2818**	**1747**	**360**	**115**	**141**	**21**	**406**

Table 3: Number of patients registered with AHL-DMG but not treated

Second Opinion	599
Patients Referred To Other DMG	85
No Malignancy	42
Tuberculosis	11
Referred Back Before Diagnosis	57
Palliation Before Diagnosis	56
Expired on Investigation	22
Expired Before Investigation	6
Expired Before Treatment	23
LFU Before Diagnosis	392
Total	**1293**

The AHL–DMG also runs the leukemia/ lymphoma services at ACTREC and Table 4 shows the relevant data.

Table 4: new registrations and follow-ups of patient at ACTREC

ACTREC Registration 2015	
New Case	131
BMT Referrals	198
Heamato-oncology OPD Follow ups	7,056
BMT OPD Follow Up	3.984
Autologous Transplant	41
Allogenic Transplants	39

The number of registrations in the AHL DMG has progressively increased since its inception in 2009. The DMG registered 4,083 patients in 2015 as against 3,909 in 2014. There were 53,822 outpatient visits on follow up in 2015. The lymphoma/myeloma clinic and the leukemia clinic registered 1,247 and 539 patients respectively in 2015 against 1,119 and 357 in 2014.

The outpatient service runs four OPDs, 2 at TMC (General & Private.) and 2 at ACTREC (BMT & Chemotherapy). The OPDs for leukemia, lymphoma and myeloma are run separately. The new CML patients 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 TMC is operational on Thursdays and Fridays by the BMT consultants to counsel potential patient for transplant.

Research:

Total Numbers of Clinical Trials		**Completed Trials**		**Ongoing Trials**		**Overall Patients Accrued**
Investigator Initiated	**Sponsored Trials**	**Investigator Initiated**	**Sponsored Trials**	**Investigator Initiated**	**Sponsored Trials**	
28	9	1	1	27	8	5,919

Education

The DMG continued to impart education and build capacity through various programs like structured training for DM students, Visiting DM and Non-DM trainees and offered Observership for international fellows and trainees. BMT Fellowship for post DM in medical oncology or hematology was also offered. The DMG also organized CME programmes which were nationally webcasted. The DMG members are involved as faculty at various national and international conferences.

Patient Education

Under its Patient Education programme, the patient support groups meets monthly, participated in CML patient advocacy and conducted cancer awareness program at the community level. It also organized Lymphoma Awareness Program on occasion of World Lymphoma Awareness day.

Bone and Soft Tissue - DMG

Convener: **Dr. Bharat Rekhi**
Secretary: **Dr. Ashish Gulia**

Surgical Oncology
Dr. Ajay Puri
Dr. Ashish Gulia

Medical Oncology
Dr. Jyoti Bajpai
Dr. Jaya Ghosh
Dr. Girish Chinnaswamy
Dr. Tushar Vora

Radiation Oncology
Dr. Siddhartha Laskar
Dr. Nehal Khanna

Pathology
Dr. Mukta Ramadwar
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Radiodiagnosis
Dr. Sashikant Juvekar
Dr. Subhash Desai
Dr. Kunal Gala
Dr. Amit Janu

Nuclear Medicine & Molecular Imaging
Dr. Venkatesh Rangarajan
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Physiotherapy
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Palliative Medicine
Dr. Shrenik Ostwal
Dr. Arunangshu Ghoshal

The Bone and Soft Tissue (BST) DMG strives to provide a comprehensive patient care using annually updated, evidence-based guidelines for management of various bone and soft tissue sarcomas. The OPD schedule ensures that patients are attended every day and undergo initial evaluation to avoid delays in the work-up and initiate treatment.

Three types of joint clinics (JC) are conducted viz., mutli-disciplinary JC to plan treatment; clinico-pathological to discuss diagnosis and staging process for challenging cases and the third is conducted to facilitate rehabilitation of patients with for musculoskeletal malignancies.

The first two JCs concluded in to Orth-Radio-Patho meetings during the first IMSOS meeting held in March 2015.

Service

Volume Indicators (In 2015): Total Registrations = 2,063. Of which 33 were lost to follow-up for varying reasons. The interventional radiology section played a significant role in management of bone and soft tissue tumours by way of Angioembolization, Sclerotherapy and Radio Frequency Ablation.

Compliance:

The overall compliance was 88% and it ranged between 83 – 94 % for malignant subtypes.

Outcome Indicators:

Disease Free Survival at 2 years = 77% and Overall Survival was 92%

Research

The primary focus of research is aimed at identifying novel immunohisto-chemical and molecular diagnostic markers; looking at treatment outcomes in terms of disease control, survival outcomes; development and refinement of indigenous prosthesis; evaluate efficacy of non-surgical treatment methods; treatment related complications and functional outcomes. Members are also engaged in Clinicopathological studies have also been accomplished on post-denosumab treated giant cell tumors of bone; newer strategies to optimize

Table 1: Outcome Indicators: Complications and Mortality (2015)

Surgical Oncology	Radiation Oncology	Medical Oncology
Mortality(30 days) = 1	Mortality(30 days) = Nil	Total Mortality(30 days) = 5
Morbidity: Vascular injury=5 Neural Complications=7 Infection requiring wound wash (Bone)=13 Flap related complications (flap failure, flap necrosis) – 10 Wound dehiscence requiring debridement=10	Morbidity: Acute toxicity: Grade I= 92/435 (21%) Grade II=32/439 (7%) Grade III=1/439 (0.2%)	Adult: Mortality(30 days) = 2/362 Febrile Neutropenia= 32% of 362=116 Grade3,4 thrombocytopenia= 23% of 362 = 83 Pediatric: Mortality(30 days) = 3/179 Febrile Neutropenia= 27% of 179=48

chemotherapy for osteosarcomas for example use of non- high dose methotrexate, dose dense regimes as an effective, economic and easy way of treating high-grade osteosarcomas; studies to compare brachytherapy with conformal techniques of radiation therapy, and also a study for certain inoperable musculoskeletal malignant tumors and efficacy of escalated doses of EBRT for certain radio resistant sarcomas.

Clinical outcomes of research related to patient care.

1) The study on **Surgical Treatment and Outcome of Nonmetastatic Extremity Osteosarcoma with Pathological Fractures** indicated that surgically treated patients with pathologic fractures in osteosarcoma have adequate local control and do not have a poorer outcome compared to patients without a fracture. Though osteosarcoma with a pathologic fracture is not a contraindication for limb salvage, appropriate case selection is important when deciding local control options to ensure adequate oncologic clearance.

2) Another project studying **utility of characteristic 'Weak to Absent' INI1/SMARCB1/BAF47 expression in diagnosis of synovial sarcomas** identified a single specific and sensitive immunohistochemical marker expression for diagnosing this tumor.

Monthly DMG meet is held to discuss new projects, thesis and DMG related issues.

Total No. of Clinical Trials		Completed Trials		Ongoing Trials		Overall Patients Accrued	
Investigator Initiated	Sponsored trials	Investigator Initiated	Sponsored trials	Investigator Initiated	Sponsored trials	Investigator Initiated	Sponsored trials
12	3	6	Nil	6	1	1272	129

Breast Oncology - DMG

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Secretary : **Dr. Ashwini Budrukkar**

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Dr. Indraneel Mittra
Dr. Prabha Yadav
Dr. Vani Parmar
Dr. Nita Nair
Dr. Shalaka Joshi

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

Radiation Oncology
Dr. Rajiv Sarin
Dr. Rakesh Jalali
Dr. Tabbasum Wadasadawala
Dr. Santam Chakraborty

Pathology
Dr. Sangeeta Desai
Dr Asawari Patil
Dr. Ayushi Sahay
Dr. Neha Mittal

Radiodiagnosis
Dr. Meenakshi Thakur
Dr. Subhash Ramani
Dr. Seema Kembhavi
Dr Palak Popat

Nuclear Medicine
Dr. Venkatesh Rangarajan
Dr. Sneha Shah

Physiotherapy
Dr. Anuradha Daptardar

ACTREC Scientists
Dr. Ujjwala Warawdekar
Dr. Narendra Joshi
Dr. Abhijit De

TRAC
Ms. Rohini Hawaldar

The breast disease management group is involved in the inpatient and outpatient diagnosis and treatment of breast cancer and breast diseases. The treatment planning is done in multidisciplinary joint clinics and each subspecialty contributes to improving patient diagnosis, management, adjuvant therapy and outcomes.

Specific achievements in 2015

- BCWG caters to large number of patients within the country and adjacent countries too
- M1 trial publication – This randomised control trial of 716 patients concluded that Loco regional treatment has no benefit and if at all there may be a detrimental effect in survival of patients with metastatic breast cancer. The study was presented at Royal College of Glasgow.
- Patient support – patients are counseled by breast care nurses, and are provided with patient information leaflets, financial support to patients especially Her2neu support program at lymphedema clinic. Navya online support, a unique second opinion program was initiated.
- Web CIS – Web –CIS is the first attempt initiated for collection of clinical data for easy retrieval. Phase I is completed and the program is being updated.

Service

Quality Indicators

Table 1a: Volume indicators 2015

2015	Private	General	Total
Female	1939	2056	3995
Male	0030	0044	0074
Total	**1969**	**2100**	**4069**

Table 1b : ACTREC - volume indicators

2015	Private	General	Total
Female	15	140	155
Male	0	0	0
Total	**15**	**140**	**155**

The DMG performed 2143 major surgeries and 3549 minor surgeries during the year. About 1670 and 1318 patients were referred to other hospitals for radiotherapy and chemotherapy respectively on account of patients wish and long waiting period. With help of various NGOs- a total of 402 patients were supported and Rs 89,28,776 were disbursed to patients support and therapy.

Table 2: Type of surgeries 2015

BCT	947
MRM + SMAC	1159
Oncoplasty type I	50
LD	77
Reduction mammoplasty/ Type II oncoplasty	23
Whole breast reconstructions	49

a) Outcome indicators 30 day mortality and complication rates

a) There was no reported 30-day mortality.

b) Surgical morbidity – 14.2%

c) Positive margin and re-excision rates – 2.7%

d) Average hospital stay - 2.5 days

e) Nodal yield with completion of axilla – median – 17

f) Nodal yield with axillary sampling – median – 6

b) Outcome indicators 5 year survival rates

The previous trials were considered as benchmarks and for OBC the DFS previously documented was 70.2% and OAS was 78.4%. In LABC likewise from a previous publications the 30 month DFS was 68.7% while OAS was 94.6% in these patients. An Audit of 375 patients with follow up were accrued from Jan to March 2013 was done for survival analysis. Data set analyzed was 193 patients with locally advanced patients and the 30 month DFS was 64% and OAS was 97.5%. For the OBC the DFS was 88.7% and OAS was 98% indicating that the benchmarks for DFS/OAS are maintained.

c) Processes indicators – percentage compliance with evidence based guidelines

Overall protocol adherence:

1. Surgical compliance (Planned and completed surgery)- 92.52%
2. RT to all BCT patients: 100 %
3. RT to all post mastectomy pts with nodes > 3 and/or pT > 5 cm: 100%
4. Adjuvant chemo planned for node positive patients: 100%
5. Appropriate hormonal adjuvant tamoxifen /AI to all HR+ pts: 100%

Table 3: Radiotherapy details

Radiation details	2015
Compliance (completed)	100%
Total treated at TMH	1141
Adjuvant RT	571
Palliative RT	570
ACTREC RT	115
Brachytherapy	50

Adverse reactions : grade III/AE = 5%

Table 4: Chemotherapy details

Chemotherapy Type	2014	2015
Adjuvant Chemotherapy	1876	1724
Palliative Chemotherapy	1600	1200
Total	3476	2924

Quality improvement measures:

The DMG maintains ongoing quality improvement measures with continuous audits of specific subtypes and outcome indicators. Additionally, a morbidity database is maintained for peri-operative infections and other service related concerns.

Research

Table 5: Research and clinical trials summary

Total			Completed			Ongoing			Patient accrued
Investigator initiated	Sponsored	Collaborative	Investigator initiated	Sponsored	Collaborative	Investigator initiated	Sponsored	Collaborative	
78	27	06	29	18	04	47	09	02	2437

Besides the M1 trial which was published in 2015 few of the Ongoing trials that seek to make a change are listed below:

a) **Perioperative Herceptin trial** – A study of Transtuzumab in the adjuvant and new adjuvant setting in women with Her2 positive Breast cancer. By administering it in the perioperative window of opportunity, it is hypothesized that a anti her2 soil will reduce nestling of cells disseminated during surgical handling and thus improve disease free survival (DFS).

b) **VGSC study (multicentre trial)** - Events during surgery like dissemination of cells due to surgical handling may impact the survival of patients with cancer. In this trial Lignocaine injection is given perioperatively will block the sodium gated voltage channel of cells and thereby may reduce dissemination.

c) **TNBC study** - A Randomized Controlled Trial of Neo-adjuvant Weekly Paclitaxel versus Weekly Paclitaxel plus Weekly Carboplatin in Women with Large Operable (LOBC) or Locally Advanced Triple Negative Breast Cancer. TNBC patients who achieve pCR have better survival than those who do not. The study aims to improve DFS in LABC and LOBC and TNBC by adding platinum to the NACT.

d) **CONSET trial** - There has always been a debate regarding sequencing of radiation and hormonal therapy especially tamoxifen. The concerns mainly are due to reports of increased lung toxicity with concurrent use of tamoxifen with radiation therapy. CONSET is a randomized trial which compares concurrent vs sequential tamoxifen in premopausal women with large operable and locally advanced breast cancers. The target accrual of the trial is 260 and accrual is near completion. This trial will definitely answer the question of optimal sequencing of tamoxifen with radiotherapy.

e) **Exercise study** : Yoga as a practice has been shown to be knight QOL of women with breast cancer. It is hypothesized that Yoga may impact DFS by impacting weight reduction, improving compliance to treatment, reduction in stress hormones or impact on immunity.

f) **Cost effective short course transtuzumab protocol**:- As stated above there is considerable degree of lack of access to expensive HER2 targeted therapy in Indian patients including those who visit TMC. A study of cost effectiveness of using 12 week course of trastuzumab protocol in patients with early and locally advanced breast cancer patients.

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Gastrointestinal - DMG

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Dr. Ashwin Polnaya

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Dr. Nilendu Purandare
Dr. Archi Agrawal

Digestive Diseases & Clinical Nutrition
Dr. Shaesta Mehta
Dr. Prachi Patil

Epidemiologist
Dr. Chiplunkar
Dr. Rajesh Dikshit

The DMG – Gastrointestinal (GI) delivers comprehensive care to patients with gastrointestinal cancers as a multi disciplinary disease management group (DMG), rather than individual specialties. GI disease management group consists of surgical oncologists, medical oncologists, gastroenterologists, radiation oncologists, diagnostic and conventional and interventional radiologists, pathologists, nuclear medicine consultants, basic scientists, epidemiologist and clinical nutritionists other support services. Such as nutrition clinic, stoma clinic, familial cancer and genetics clinic, catheter clinic and psychiatric services are availed of when required. The group members are geared towards improving the speed and quality of service, alongside education and research. A medical social worker support group monthly meet for re-addressal of patients' socioeconomic and logistic issues has been established.

Service

The GI and HPB Surgical Services of the DMG deals with diverse digestive cancers. These include gastric cancers (including Gastro-oesophageal junction cancers), gall bladder cancers, pancreatic cancers (including periampullary cancers, neuroendocrine tumors, cystic tumors and IPMN's), liver cancers, colo-rectal cancers, retroperitoneal tumors and lesions in the spleen. Over the year 2015, the unit has performed a wider range of complex supra-major surgeries in greater numbers. This has followed a sustained increase in the number of patients being registered and referred to the service. Surgical services are re-organised in the form of two units, I and II respectively. Both units cover all aspects of GI and HPB cancer Surgery with Unit I being focused on Pancreatic, colorectal and Stomach cancers while unit II caters to liver, gall bladder and colorectal cancers. The thrust of surgical GI services has been on following clinical activities:

1. A successful robotic service programme has been set up which was used for colorectal surgeries to begin with and is now also extended to hepatobiliary and pancreatic surgeries. The focus was on improving the variety of complex liver resections (including anterior approach) and pancreatic resections (including borderline resectable tumors and vascular resections). The scope of robotic services was expanded to initiate hepatobiliary surgeries i.e: left lateral hepatectomy and radical cholecystectomy and further develop robotic pancreatic surgery (robotic distal pancreatectomy and robotic whipple resections).
2. The GI and Hepato-Biliary Surgical Service consolidated on the number

Table 1: Trends in the Clinical Service (2010-2015)

Year	Reg.	Adm.	Surgery TMH			Surgery ACTREC	Mortality
			Elective	Emergency	Total		
2014	7461	1590	816	120	936	370	32
2015	6567	1945	945	273	1218	346	30

and range of surgeries at ACTREC over the course of 2015. A total of 346 procedures were performed at ACTREC till 10th December 2015. The entire range of colorectal resections, gastric resections and gall bladder resections were standardized and routinely performed. Facilities for minimal invasive surgeries were also consolidated at ACTREC.

Volume indicators of surgical GI services: The service performed a total of 1564 surgeries during the year

TMH: ACTREC = 1218:346

Elective: Emergency = 945:273

Private: General (%) = 49: 51

Total registrations in the GI Services: 6567

General: Private = 3783: 2784

Total admissions in the GI Services: 1945

Theatre Utilization: TMH: 1.7 and 1.9 at ACTREC

Robotic surgery was introduced last year in TMH. Fifty seven GI related robotic surgeries were performed in 2015, which included pancreato-duodenectomy, distal pancreatectomy, liver resections, cholecystectomies, gastrectomies and proctocolectomies.

Outcome indicators of surgical GI services:

- Overall Mortality in 2015 (till 10th December): 30
- Mortalities in Elective Surgeries: 14/1291 (1.08%)
- Mortalities in Emergency surgery: 16/273 (5.86%)

Medical oncology

Outcome Indicators:

Toxicities:

Grade 1 toxicities 2554 (43%)

Grade 2 toxicities 0924 (16%)

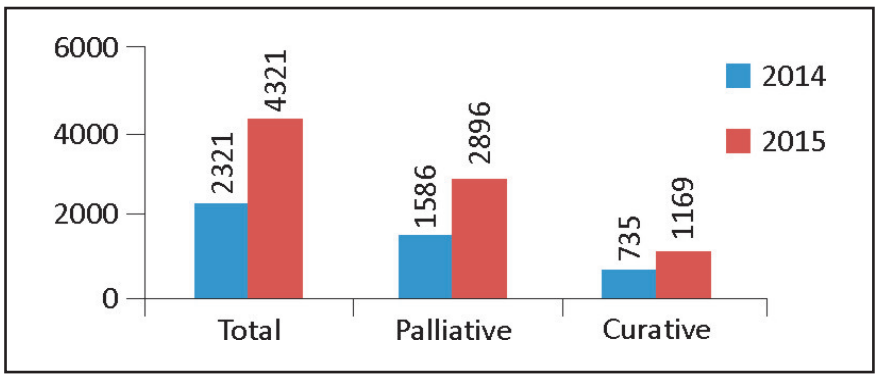
Grade 3 toxicities 0271 (05%)

Grade 4 toxicities 0033 (0.5%)

Radiation Oncology

A total of 821 patients were referred for radiotherapy, of which 511 patients received treatment at TMH and ACTREC, while 310 patients were referred to other centers on account of long waiting period and / or patient preferences. The compliance to radiotherapy was 95% with a turn - around median time of 25 days.

Table 2: Trends in volumes in 2014 and 2015



Acute Radiotherapy Complication rates of patients undergoing radical treatments

- Grade 1 – 151 (43%)
- Grade 2 – 60 (26%)
- Grade 3 – 12 (3%)
- Grade 4 – 0
- Grade 5 – 0

Interventional Radiology:

The establishment of the Interventional radiology OPD in HBB has enabled the department to examine and counsel the patients, give procedural appointments & prescriptions and also to perform post procedure follow up checks. Patients are attended on all the working days in this OPD. Interventional radiology facilities are also available at ACTREC routinely.

Image guided Microwave ablation for liver tumors have been initiated in 2015.

Nuclear Medicine Volume Indicators:

A total of 1664 patients were referred for nuclear imaging procedures. The major procedures performed were 18F FDG PET/CT (1296 patients); 68Ga DOTANOC PET/CT (210 patients) , Bone Scan (54 patients), and 18F fluoride PET/CT (20 patients). Other procedures like 90 Y PET/CT, 99m Tc MAA Lung shunt Analysis, Renal study, and TARE administration 90 Y Sirspheres qwr also performed.

Research

The department has 21 ongoing trials and there have been 29 publications by the staff members.

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Secretary : **Dr. Supriya Chopra**

Gynaecology - DMG

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Dr. Santosh Menon

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Dr. TanujaTeni
Dr. Murali Krishna Chilakapati
Dr. Pritha Ray

Cytology
Mrs. Swati Dighe

Occupational Therapy
Dr. Manjusha Vagal

The Gynaecology Disease Management Group (DMG) caters to patients with gynaecological cancers. It includes members from multiple disciplines like Surgeons, Radiation Oncologists, Medical Oncologists, Pathologists, Radio-diagnosis experts, Cytologists and Scientists. Specific domain experts are invited as and when required to advise the group on specific issues. The voluntary group members also form an inseparable and active contributor to the DMG thus facilitating improved service.

Service

The DMG conducts OPDs on a daily basis both in the Private and General wing. Joint Clinics are conducted twice in a week to review the cases and decide treatment plan. All newly registered cases are attended on the same day of registration and appropriate investigations/treatments are initiated.

After initiating and standardizing Robotic surgeries in 2014, the procedure has been made available for endometrial and cervical cancer patients. In last quarter of 2015 Gynaecologic Oncology support group services were also initiated.

Key Quality Indicators

Volume Indicators – Number of patients treated.

Three thousand four hundred and twenty eight (3428) new patients were registered under Gynaecologic Oncology DMG; 2220 in General category and 1208 in Private Category (ratio 65:35). Table 1 shows the site wise diagnostic break up.

The DMG performed a total of 765 major surgeries (681 at TMH & 84 in ACTREC) and 392 minor surgeries. The General : Private ratio was 45:55. Major surgeries included 103 for cervical cancer, 125 for endometrial cancer, 384 for ovarian cancer, 16 for vulval cancers and 137 miscellaneous surgeries (Table 2). Thirty three percent of patients with endometrial cancer and 20% of cervical cancers underwent surgery by minimal access route.

Overall, 872 cases received radiation. Radical radiotherapy was administered to 597 patients and palliative radiotherapy was delivered to 275 patients. Brachytherapy procedures were performed in 646 patients delivering 2194 Intracavitary & 192 Interstitial brachytherapy procedures. Chemotherapy was administered to 1362 patients with gynaecological malignancies.

Outcome Indicators: 30-day mortality and complication Rates

Surgery:

Post-Surgical 30-day Mortality was 0.4% (3/765).

Major surgical morbidity was 6.4% (49/765) which included 1.6% (12/765) intra-operative and 4.8% (37/765) post-operative complications.

Radiotherapy:

Of 597 patients who received curative radiotherapy, Acute grade II and grade III-IV GU-GI toxicity were observed in 14%, 3% patients, respectively.

Table 1: Diagnosis wise breakup for the Year 2015

Diagnosis	Total	Private	General
Ca Cervix	1316	333	983
Ca Endometrium	308	185	123
Ca Ovary	945	448	497
Ca Vagina	48	19	29
Ca Vulva	38	15	23
Ca Vault	50	12	38
Others	292	89	203
No Malignancy	143	52	91
Unknown	288	55	233
Total	**3428**	**1208**	**2220**

Table 2: Major Surgeries

Disease sites	No of surgeries
Cervix	103
Ovary	384
Uterus	125
Vulva	16
Miscellaneous	137
Total	**765**

Chemotherapy:

Grade III/IV Haematological and neurotoxicity was observed in 17% and 6% respectively of patients receiving Paclitaxel and carboplatin.

Research

DMG members have initiated many clinical trials; some of them having potential to change practice.

During the year 18 scholarly and research publications were contributed in PubMed Indexed Journals by the members of the DMG.

Education

DMG conducts academic meetings on a weekly basis. Teaching programs like journal club presentations, patient case presentations, and in-patient teaching rounds are held regularly in the DMG. Clinico-Pathological correlation (CPC) discussions are held once/twice a month where interesting/controversial cases are discussed. DMG members regularly meet to audit of clinical trial/ projects, to make research policies and to make future plans. Clinical care guidelines are reviewed annually to ensure that practices reflect the latest standard of care.

The DMG organized two very important scientific meeting Women's Cancer Initiative conference on the theme of "Ensuring Quality in Gynaecological Cancer Care" and A National Master Class for Gynaecologic Oncology students.

Total Number of Clinical Trials (N=48)		Completed Trials (N=15)		Ongoing Trials (N=33)		Overall Patients Accrued
Investigator Initiated	Sponsored Trials	Investigator Initiated	Sponsored Trials	Investigator Initiated	Sponsored Trials	
43	05	11	04	32	01	Approx6940 (including 2600 from the patterns of care study)

Convener : **Dr. Prathamesh Pai**
Secretary : **Dr. Kumar Prabhash**

Head and Neck - DMG

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Dr. Sudhir Nair
Dr. Shiva Kumar Thiagarajan

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Dr. Vedang Murthy

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Dr. Abhishek Mahajan

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Dr. Prabha Yadav
Dr. Vinay Shankhadar
Dr. Dushyant Jaiswal
Dr. Rahul Dalal

Dental & Prosthetic Surgery
Dr. Kanchan P. Dholam
Dr. Sandeep Gurav

Speech Therapy
Dr. Gurmit K. Bachher
Mr. Arun Balaji

Nuclear Medicine & Molecular Imaging
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Dr. Nilendu Purandare
Dr. Sneha Shah
Dr. Archi Agrawal

ENT Surgery
Dr. Chris Desouza

Cancer Biology
Dr. Shubhada Chiplunkar
Dr. Murali Chilakapati
Dr. Manoj Mahimkar
Dr. Tanuja Teni
Dr. Milind Vaidya
Dr. Sharada Sawant

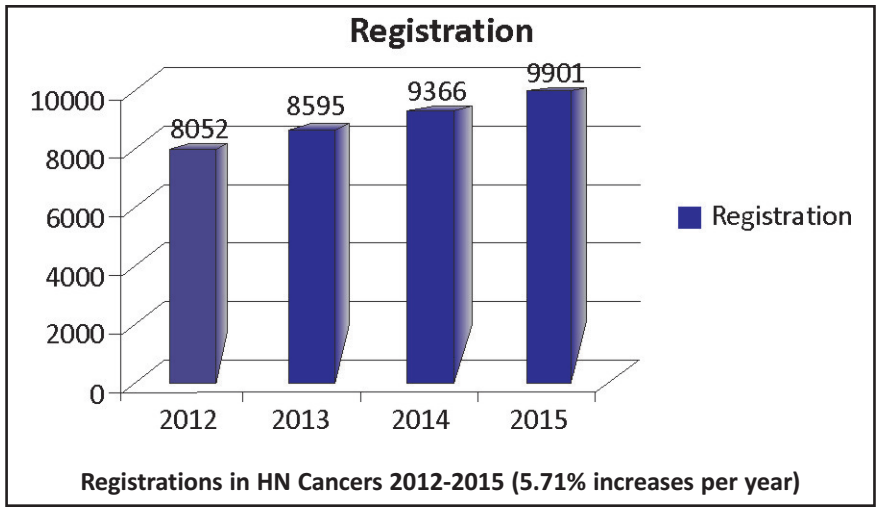
Head & Neck DMG provides state of art care with a multidisciplinary approach to ensure best possible outcomes. It promotes scientific research, responsible medical care and dissemination of knowledge through its members. The group is actively involved in raising the standards of care not only in its centre but also across the country. The members are also instrumental in promoting a healthy environment through public education and anti-tobacco advocacy.

Head and Neck (HN) cancers constitute 25% of the annual registrations at TMC. The DMG comprises of major oncology specialists (surgical, radiation and medical oncology), effectively supported by other ancillary and rehabilitative services, providing effective, evidence based care for HN cancer.

Service

Multi disciplinary Joint Clinic (JC) to suit the individual treatment decision is held daily. All newly diagnosed patients, worked up patients are evaluated in this clinic. The plans are evidence based adhering to Institutes' as well as international guidelines. The DMG has observed an annual increase of 5.71 % in patient registrations, since 2012.

Chart 1: Total Registrations



Registrations in HN Cancers 2012-2015 (5.71% increases per year)

Key quality Indicators:

Table 1: Volume Indicators –No. of patients treated

Modality	Procedures	No of patients
Surgery	Minor	5,922
	Major	2,581
Radiotherapy	Radical (Definitive + Adjuvant)	926
	Palliative	59
Chemotherapy	Radical (NACT + CTRT)	825
	Palliative	539

Table 2: Surgery

	TMH	ACTREC	Total
Total cases	1,966	353	2,319
Oral	1,069	339	1,408
Larynx/Hypopharynx	113	03	116
Thyroid	360	09	369
Salivary gland	83	-	83
Maxilla	33	01	34
Skull base	96	01	97
Misc	122	-	122
Reconstruction -Free, pedicle and local flaps -	873	290	1,161
Laser surgery	262	-	262
Minor Surgery	5,922	-	5,922

Table 3: Radiotherapy

Treatment	No of Patients
Radical: Definitive Adjuvant	519(53%) 401 (41%)
Re Radiotherapy	21 (2%)
Brachytherapy	43 (4%))
Palliative	59 (6%)
ACTREC	180

Table 4: Chemotherapy

Treatment	No of patients
NACT	512
CTRT	313
Palliative CT	539
Total	**1364**

Table 5: Diagnostics

Pathology	Histopathology	13,159
	FNAC	3,289
	Exfoliative	479
	Total	16,927
Radiology	CT Scan	6,601
	MRI	4,261
	USG	5,589
	USG Guided Biopsy/FNAC	1,689

Outcome Indicators-30 Day mortality & complication rates

Surgery at TMH (n=1966)

Morbidity 34.89% (Major-12.00%, Minor-22.88%)
Mortality 0.3%

Radiotherapy **(n=985) 98% completion**
Mortality 0.5%
Dermatitis (Grade 0-2) 98% (Grade 3) 2%
Mucositis (Grade 0-2) 97% (Grade 3) 3%
NGT placement 21%

Chemotherapy
NACT (n= 512) 96.5% completed Mortality 0.4%
CTRT (n=313) 88.17% completed Mortality 0.3%

Outcome Indicators-5 year Survival rates

Surgical Oncology

Oral Cavity (2010-2011) Mean Overall Survival: 63.5 months (0 to 68 months) 91.7%
Parotid (2010-2011) 5yrs Overall survival 73%
Larynx: 5yrs Overall survival 72%

Medical Oncology

Pacli-cetuximab
Median OS: 256 days (199 - 312 days)
2 year survival: 19.5%

NACT (Oral technically unresectable)
Median survival overall 10.7 months (95% CI 9.87-11.5 months)
Median survival (local Rx: surgery): 17.4 months (95% CI 6.0-28.8 months)
Median survival (local Rx: non surgery): 10.2 months (95% CI 8.4-12.0 months)

NACT (Larynx-hypopharynx): Median survival overall 24 months (95% CI 7.31-40.7 months)

Palliative Oral metronomic : Median OS: 249 days (95% CI 222 - 275 days)

Radiation Oncology

1. Early stage Oral cavity treated with surface mould brachytherapy: n=31
   Median FU: 35 months
   3 & 5 year Local control (LC): 78%
   3 & 5 year DFS: 68%
   3 & 5 year OS: 91%
2. Nasopharynx n = 185 (2005-2014)
   Median FU: 26 months (8-44 mths)

Local Control	3yr	89%
Locoregional Control	3 yr	84%
Disease Free Survival	3yr	71%
Overall Survival	3yr	91%

3. Oral cavity: Stage III/ IV – 5 year controls

Adjuvant RT (n=600)	DFS= 54%	OAS= 50%	LC = 64%
CTRT (n= 300)	DFS = 56.7%	OAS= 51.7%	LC = 69.30%

Process Indicator (compliance to EBM)

Stage of treatment	Adherence at our centre (%)
Pre-treatment	99.3
Definitive treatment	90.9
Adjuvant treatment	89.7

Research

Total number of clinical trials		Completed Trials		Ongoing Trials		Overall Patients Accrued
Investigator Initiated	Sponsored Initiated	Investigator Initiated	Sponsored Initiated	Investigator Initiated	Sponsored Initiated	
44	0	14	1	31	6	1964

An important trial was the N0 on Elective versus Therapeutic Neck Dissection in the treatment of early node negative squamous cell carcinoma of the oral cavity. The management of neck in early oral cancers is a contentious issue. The trials had small sample sizes and even the meta-analysis published by Fasunla et al in 2011 failed to impact on clinical practice with the debate still persisting. This randomized controlled trial with large sample size and high statistical power will answer the question for the role of elective neck dissection for oral cavity cancers with N0 neck status to provide level I evidence that will impact clinical practice.

The other studies focused on mandible preservation, Metronomic CT, and 3DCRT vs IMRT. The mandible preservation study indicated that only 40% of mandibles resected in TMH are actually involved by tumour. In most of cases mandible are resectable due to para-mandibular soft tissue disease. This phase II study showed encouraging results with NACT and allowed 48% of the mandibles to be preserved and improved function.

The metronomic CT study showed that chemotherapy can improve Relative Risk (RR), Progression Free Survival (PFS) Quality of life, and Overall Survival. This small randomized trial powered for PFS has lead to a change in practice where significant proportion of patients are now administered oral chemotherapy based on this study as a standard treatment.

It was found that IMRT resulted in significantly lesser incidence and severity of xerostomia (both acute & late) compared to 3D-CRT in definitive (chemo) radiotherapy of HNSCC without detrimental impact upon locoregional control or survival. Two studies focusing on this aspect were parallel conducted at TMH & ACTREC and were designed even before the PARSPORT study (N=84) from UK, which was hailed as a landmark publication (a year earlier to our results).

Education

The DMG continued with Post Graduate education for M.S, M.D., & M.Ch. Other academic activities included seminars, live surgery workshops etc. for in-house and other participants across the country. Training was also imparted to observers & trainees.

Neuro-Oncology - DMG

Convener: **Dr. Tejpal Gupta**
Secretary: **Dr. Epari Sridhar**

Neuro Surgery
Dr. Aliasgar Moiyadi
Dr. Prakash Shetty

Adult Medical Oncology
Dr. Hari Menon
Dr. Vijay Patil

Basic Neuro - Oncology
Dr. Neelam Shirsat

Neuro – Radiology
Dr. Nikhil Merchant
Dr. Supreeta Arya
Dr. Subhash Ramani
Dr. Ashwin Polnaya
Dr. Amit Janu
Dr. Abhishek Mahajan

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

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

Neuro-Pathology
Dr. Ayushi Sahay
Dr. Epari Sridhar
Dr. Shubhada Kane

Nuclear Medicine & Molecular Imaging
Dr. Venkatesh Rangarajan
Dr. Nilendu Purandare

Psychiatry
Dr. Jayita Deodhar

Neuro-Oncology Research Fellow
Dr. Abhishek Puri
Dr Siddharth Pant
Dr. Divya Gupta
Dr. Raees Tonse

Service

Neuro-oncology DMG provides comprehensive care for patients with brain and spine tumors. This includes outpatient as well as inpatient services (both elective and emergency care). The entire clinical team along with the DMG coordinators and other trial staff ensures smooth coordination between the different clinical specialties and supporting departments. The coordinators liaise with other members (pathology, radiology and molecular biology) to expedite diagnostic tests.

In keeping with the theme 'Access to Quality Care', underprivileged and non-affording patients have been provided cutting-edge services through philanthropic funding generated via Brain Tumour Foundation (BTF) and Brain Tumor Poor Patients' Welfare Fund.

Key Quality Indicators

i. Volume indicators

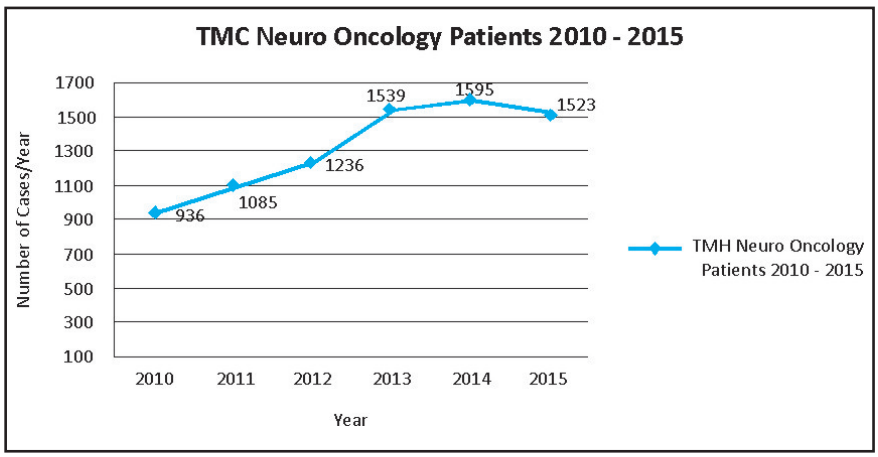
In keeping with the previous year's trend, Tata Memorial Centre saw a steady increase in the patients registered.

New Patient Registrations in 2015 : 1523

This figure reflects both new file registrations as well as second opinions.

New registrations (files): 1389
Second opinions: 134

Chart 1. Details as per the available patients on prospective database:-



Neuro-surgery

Chart 2. Increase in the number of neuro-surgical procedures over the years

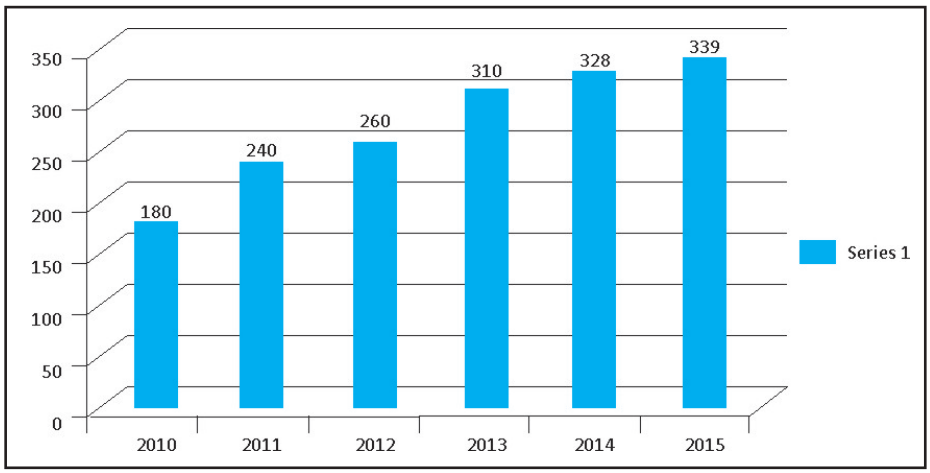


Table1. Surgery types

		TMH	ACTREC	TOTAL
Demographics	Males	72 (58.06%)	119 (58 %)	191 (58.05%)
	Females	52 (41.93%)	86 (42%)	138 (41.9%)
	Adult	97 (78.22%)	172 (83.9%)	269 (79.35%)
	Paediatric	27 (21.78%)	33 (16.1)	60 (17.69%)
Surgery	Elective	95 (76.61%)	200 (97.6%)	295 (87.27%)
	Emergency	29 (23.38%)	5 (2.4%)	34 (10.05%)

Newer techniques/services offered: the Intra-operative neurophysiologic monitoring, helps to perform safer surgeries in patients with tumors in eloquent areas (presently in ACTREC). The service has upgraded the operating microscope with facilities for providing fluorescence guided resections (ALA based) which is offered to appropriate patients as per recommendations. A couple of investigator initiated studies have been started to address various issues around these novel techniques.

Radiation Oncology

Table 2. Radiotherapy Procedures

Radiation Therapy administered within the institute				
Sr. No.	**Technique of RT**	**TMH**	**ACTREC**	**Total**
1	Conventional RT	132	09	141
2	3D-CRT	189	23	212
3	IMRT/IGRT	65	49	114
4	Stereotactic Radiosurgery	04	Nil	04
	Total	**390**	**81**	**471**
Referred outside for radiation therapy				
		296		296
	GRAND TOTAL	**686**	**81**	**767**

Medical Oncology

Chemotherapy was offered to 198 adult patients with brain neoplasm. Of these about 77 % were offered adjuvant Temozolomide; the rest were offered salvage and metronomic therapy.

One hundred and seven children with brain tumour patients received chemotherapy in 2015. 64 of these had embryonal CNS tumors, 44 had Medulloblastoma; 11 had Supratentorial Primitive Neuroectodermal tumour; 6 were diagnosed as Atypical Teratoid Rhabdoid Tumour; two Pinealoblastoma and one with ETANTR and were treated with a combination of chemotherapy and radiotherapy.

Molecular neuro-pathology

Diagnostic, prognostic, and predictive molecular markers offered in service:

- 1p19q deletion: 178
- EGFR amplification & EGFRvIII: 69
- MGMT gene promoter methylation: 356
- IDH1 / IDH2 mutation analysis: 96
- BRAFV600E: 100
- TERT promoter mutation:19

ii. Outcome Indicators

Table 3: 30-day morbidity and mortality (for elective cases)

	Morbidity (Minor)	Morbidity (Major)	Mortality
TMH	16(12.90%)	16(12.90%)	32 (9.43%)
ACTREC	15 (7.3%)	21(10.2%)	36 (10.61%)

Research

The service is also involved with collaborative projects with the Indian Institute of Technology (IIT-Mumbai) for a project on proteomics as well as with the Department of Remote sensing and Robotics, BARC, Mumbai to develop an indigenous robotic stereotactic system. The IIT collaboration has led to important leads on the proteomics aspects of brain tumours which are being pursued in future projects. The project with BARC was part of a PhD program of the HBNI for which Dr Moiyadi is a co-guide, and now has been taken up by the concerned division in BARC as a departmental project after its initial promising results.

A total of Four hundred and fifty four (454) i.e. 32.68% of 1389 patients were accrued in clinical trials in 2015

Table 4: Research Projects

Total number of clinical trials currently ongoing in 2015			Completed trials in 2015			Ongoing trials before 2015		
Investigator initiated	Audits	Sponsored trials	Investigator initiated	Audits	Sponsored trials	Investigator initiated	Audits	Sponsored
16	07	00	00	03	00	13	03	00

The DMG members contributed 25 research publications in national and international journals and two book chapters.

Education

The DMG holds two dedicated multi-disciplinary joint clinics every week - on Tuesdays and Thursdays from 2.00-4.00 pm for consensus therapeutic decision-making. Residents of DM (Medical Oncology) are rotated in the DMG for evaluation, assessment, and therapeutic decision-making pertinent to neuro-oncology.

Convener : **Dr (Surg Cdr) Gaurav Narula**
Secretary : **Dr P.G. Subramanian**

Paediatric Hemato-Lymphoid - DMG

Surgaical Oncology
Dr Sajid Qureshi

Pediatric Medical Oncology
Dr Shripad Banavali
Dr Brijesh Arora
Dr (Surg Cdr) Gaurav Narula

Radiation Oncology
Dr Siddhartha Laskar
Dr Nehal Khanna

Pathology
Dr Tanuja Seth
Dr Sridhar Epari

Hemato-Pathology
Dr P G Subramanian
Dr Sumeet Gujral
Dr Prashant Tembhare

Molecular Hematology
Dr Nikhil Patkar

Nuclear Medicine & Molecular Imaging
Dr Venkatesh Rangarajan
Dr Sneha Shah

Radiodiagnosis
Dr Seema Medhi

Psychiatry
Dr. Jayita Deodhar

Cytogenetics
Dr Pratibha Kadam Amare

Medical Oncology & Transplantation
Dr Navin Khattry

Immunology
Dr Shubhada Chiplunkar

Transfusion Medicine
Dr Anita Tendulkar

Clinical Pharmacology
Dr Vikram Gota

Anesthesiology and Intensive Care
Dr Vijaya Patil

Microbiology
Dr Rohini Kelkar

This DMG provided comprehensive medical diagnostic, counselling, management, follow-up and palliative services to children below 15 years of age suffering from hematolymphoid malignancies. Majority families, of the patients with malignancies of highly curative nature, have severe socio-economic constraints. The group recognized that intervention in these issues would help to save lives, and improve outcomes quantitatively and qualitatively. In order to achieve this, the group developed an extensive support system to provide financial aid, accommodation, nutrition, continued education of children, sporting and fun activities, outings and cultural programs as part of its service program.

Service

The DMG introduced a token and electronic call system so that patients are always aware of their position on the call list. In addition, a staggered appointment system is used.

In the current treatment scenario, various reports and clinical information are gleaned at different time-points for adopting risk-stratified treatment leading to patient confusion about the final status of the disorder and treatment plan to be followed. To address this, a comprehensive diagnostic report had been incorporated into the EMR system for ALL in 2015. Other diseases will be included in future.

To assist the preparation of chemotherapeutic drugs and infusions in the busy day care and pediatric ward units, and also to reduce dosing errors and oversee administration, 2 pharmacists were hired under the ImPaCCT foundation and one stationed at each location.

Steps were taken to create additional accommodation for patient families with the help of St Jude Child Care Centre and an agreement with the hospital. This will be completed in 2016 and provide accommodation to approximately 100 more families.

Education of children is mostly compromised due to the prolonged and intense treatment; the DMG has teamed with different organizations to meet their varied needs. The “Canshala” program in collaboration with an NGO “Cankids” was already ongoing. In addition, a professional group of teachers from “Mindsprings” with expertise in innovative educational solutions were engaged. The program since its initiation in March 2015, has converted the OPD waiting area into “classrooms” where children of different ages, speaking different languages, and from different backgrounds, are engaged in common and smaller group activities with educational lessons incorporated in fun and innovative ways, and even given carry-away as “homework”. Instead of being a place to dread, the OPD has become a happy place that children look forward to attend, and remain inspired to continue their education. The program was funded through ImPaCCT foundation.

All malnourished children get ready to use therapeutic food (RUTF) that was started in collaboration with nutritional research centre at LTMMC, commercial supplements and micronutrient supplements free of charge. A clinical trial to assess efficacy of RUTF was initiated. A new corporate donor and an NGO seamlessly coordinate the various activities.

Key Quality Indicators

Table 1: a. Volume Indicators:

Disease	Disease Burden In 2015			
	General	Private	TOTAL	(%)
ALL	471	64	535	61.5
AML	103	12	115	13
CML	15	4	19	2
NHL	87	8	95	11
HL	82	14	96	11
LCH	8	0	8	1
JMML	2	0	2	0.25
MPD	2	0	2	0.25
Total	**770**	**102**	**872**	**100**

The number of patients registered under the DMG has been steadily rising every year. The DMG oversees one of the largest Pediatric Leukemia programs in the world for a single center.

Table 2: b) Treatment Refusal and Abandonment (TR & A):

Disease	Refused	Abandoned	Total	(%)
ALL	11	4	15	2.8
AML	1	4	5	4.4
CML	1	0	1	5.3
NHL	6	0	6	6.1
HL	1	0	1	1
LCH	0	0	0	0
JMML	0	0	0	0
Total	**20**	**8**	**28**	**3.2**

The extensive social support system for needy patients, who form the bulk of clientele, has brought the TR & A rate to a historic low of 3.2% in 2015. This used to be close to 30% in 2009, reflecting that these interventions alone are helping saving more than 200 lives a year merely by ensuring children complete their treatment.

Table 3: c) Mortality in 2015:

Disease	Total Registered	Total Expired	Mortality In 2015					
			Before Rx		Within 45 Days		After 45 Days	
			No.	(%)	No.	(%)	No.	(%)
ALL	535	40	13	2.4	18	3.4	9	1.7
AML	115	20	6	5.2	6	5.2	8	7
CML	19	1	1	5.3	0	0	0	0
NHL	95	8	1	1	2	2	5	5.3
HL	96	4	0	0	1	1	3	3
LCH	8	2	1	12.5	0	0	1	12.5
JMML	2	1	0	0	1	50	0	0
Total	**870**	**76**	**22**	**2.7**	**28**	**3.2**	**26**	**3**

Mortality in 2015 was marginally lower than the previous year, despite an increase in numbers of patients registered. Disease wise mortality is comparable to most high volume centers internationally.

Outcome Indicators: Survival Rates:

Table 4: Disease wise Overall Survival Rates for Patients initiating treatment in 2010:

Disease (n)	5 yr OS (SE) %	Mean Survival in Months (95% CI)	Median Survival in Months (95% CI)
ALL (330)	67.1 (3.4)	52.5 (48.8-56.1)	Not Reached
AML (89)	49.3 (6.4)	37.6 (29.5-45.8)	27.2
CML (18)	100	68.5 (66.9-70)	Not Reached
HL (73)	90.4 (4.1)	64.5 (59.7-69.4)	Not Reached
NHL (79)	74.2 (5.8)	52 (44.9-59.2)	Not Reached

Research

Table 5: Research Project

Total number of clinical trials		Completed trials		Ongoing trials		Overall patients accrued
Investigator initiated	Sponsored trials	Investigator initiated	Sponsored trials	Investigator initiated	Sponsored trials	
11	–	1	–	8	*2	2368

*for one trial, Investigation product (IP) has to be shipped on site, hence accrual not started

Education

For capacity building in nutrition management, **"1st SIOP-PODC clinical fellowship in Pediatric Onco-nutrition"** under SIOP & NIGCCN was organized to provide hands-on training to nutritionists at TMH over 3 weeks in April 2015; 24 fellows from 10 institutions were trained. A Total of 9 Chapters and 1 Section were contributed by DMG members in two text books.

Paediatric Solid Tumor - DMG

Convener : **Dr. Seema Kembhavi**
Secretary : **Dr. Tushar Vora**

Surgical Oncology
Dr. Sajid Qureshi

Medical Oncology
Dr. Girish Chinnaswamy
Dr. Maya Prasad
Dr. Tushar Vora

Radiation Oncology
Dr. Siddharth Laskar
Dr. Nehal Khanna

Pathology
Dr. Mukta Ramadwar
Dr. Bharat Rekhi

Radio Diagnosis
Dr. Seema Kembhavi
Dr. Rahul Chivte
Dr. Kunal Gala

Nuclear Medicine & Molecular Imaging
Dr. Venkatesh Rangarajan
Dr. Sneha Shah

Palliative Medicine
Dr. Maryann Muckaden
Dr. Naveen Salins

Honorary Ophthalmologist
Dr. Nandan Shetye

DMG members consisting of various expertise meet regularly to discuss patient care, and administrative matters. Social Support Group meetings are attended by medical social workers and volunteers.

Service

An intra-arterial chemotherapy for management of Retinoblastoma (RB) with services from interventional radiology was established and is now a part of routine care for suitable patients, thus helping the child to save the globe and also the vision in some cases. A retinal camera and laser diode was purchased to facilitate therapy of retinoblastoma (RB). During the year about a total of Rs 4.26 crores were mobilized through several trusts and foundations like Tata Trust, Thyssen Crupp, Lebara Foundation, Jiv Daya Foundation, BKT trust and others towards purchase of equipment and patient care.

Key Quality Indicators

The DMG registered a total of 541 patients during the year, of which 443 were from general category and 98 were from private category. The DMG saw the highest number of patients with Soft Tissue Sarcomas (STS) (140), neuroblastoma (89), Renal tumor (63) and Germ cell tumors (GCT) (56). The Table 1 indicates the diagnosis based details of patients seen by DMG during the year.

a) Volume Indicators:

Table 1.

Diagnosis	Total (2015)	Total (2014)
Neuroblastoma	89	77
Renal Tumor	63	54
GCT	56	57
Hepatoblastoma	34	29
Retinoblastoma	56	38
STS	140	115
Misc	53	97
No malignancy	24	19
No investigation	25	27
Total	**540**	**513**

1. Drop out rate : 4.6 % (25 out of 540)
2. Time to first JC: 0-3 days
3. Time for decision making : 7-14 days

Of the total 300 surgeries performed, 158 were major and 65 were minor surgeries. A total of 199 and 101 surgeries were performed at TMH and ACTREC respectively.

Table 2.: Surgeries performed in TMH and ACTREC

	TMH	ACTREC	Total (2015)
Major	119	39	158
Minor	30	35	65
Pediatric vascular access	50	0	50
Adult vascular access	0	27	27
Total	**199**	**101**	**300**

One hundred and thirty two patients received Radiotherapy, of which 70 % were treated with radical intent. 17 % patients received 3D RT/ IMRT while others received conventional therapy.

Table 3: a) After Completion of Therapy (ACT) Clinic for long-term survivors of childhood cancers.

	2015
Follow-up	655
New registration	90
Total	**745**

b) Three hundred and one new patients were registered for Paediatric palliative care inclusive of all DMGs seeing paediatric patients like PHL, BST, etc.

c) Outcome Indicators: Morbidity and mortality

Surgery

Morbidity = 12.1 % (27/ 233)

Mortality = 0.4 % (1/223)

Chemotherapy

Morbidity = Need for admission for Febrile neutropenia 7.2% (32/ 443)

Mortality = 1.8% (8/443)

Radiotherapy

Morbidity = Grade I: 33%

Grade II: 08%

Grade III: 00%

Table 4: e) Outcome Indicators: survival rates

Cancer	Event-free survival (%) TMC	Overall survival (%)TMC	From Published data (%)
Wilms	84	89	90(OS)
Germ cell tumors (extracranial)	81	93	Best – 95 OS
Retinoblastoma	79	81	95 OS
Soft tissue sarcomas (non-rhabdomyosarcoma)	61	77	89 OS
Neuroblastoma (Low/Intermediate)	68	75	54-100 (4 year EFS)
Neuroblastoma (High risk)	22	40	30-50 (3year EFS)
Extraskeletal Ewing's Sarcoma	68	77	69–77 and 58–67 EFS and OS
Hepatoblastoma	70	88	100,83,56 and 46 – stage wise OS

f) Process Indicator

Compliance to time lines: in patients who have completed entire therapy (a range is given as multiple tumor types are considered)

- Date of registration to start of treatment in 14 days : 85-90%
- Getting surgery within expected dates from induction chemotherapy : 65-87%
- Completion of entire therapy at expected time for tumor and stage : 93-94%

Research

International collaborations of the DMG

1. **Pilot and Phase II study of immunotherapy with anti-GD2 antibody in high risk neuroblastoma children.**

   In collaboration with Memorial Sloan Kettering Cancer Centre, New York, a pilot study is being initiated to start anti-GD2 immunotherapy for high risk neuroblastoma children in TMC for first time in India.

2. **AGCT 1531: Reduction in therapy for low and intermediate risk extracranial germ cell tumors (MaGIC consortium study-Malignant Germ Cell Tumors International Consortium)**

This is a collaborative study with the children Oncology group of USA. The study is randomised to compare the efficacy and toxicity of Cisplatin and carboplatin for low and intermediate risk GCTs along with reduction in therapy for the low risk disease.

Research/Clinical Trials

Total number of clinical trials		Completed trials		Ongoing trials		Overall patients accrued	
Investigator initiated	Sponsored trials	Investigator initiated	Sponsored trials			Investigator initiated	Sponsored trials
20	3	9	-	11	3	1396	-

Convener : **Dr Sarbani Ghosh Laskar**
Secretary : **Dr Nilendu Purandare**

Thoracic Oncology - DMG

Surgical Oncology
Dr C S Pramesh
Dr George Karimundackal
Dr Sabita Jiwnani

Medical Oncology
Dr Kumar Prabhash
Dr Vanita Noronha
Dr Amit Joshi
Dr Vijay Patil

Radiation Oncology
Dr Jai Prakash Agarwal
Dr Sarbani Ghosh Laskar

Pulmonary Medicine
Dr Sandeep Tandon

Pathology
Dr Shubhada V Kane
Dr Rajeev Kaushal
Dr Neha Mittal

Nuclear Medicine & Molecular Imaging
Dr Venkatesh Rangarajan
Dr Nilendu Purandare

Radiodiagnosis
Dr Subhash Ramani
Dr Abhishek Mahajan
Dr Amit Kumar Janu

Palliative Medicine
Dr Jayita Deodhar

Physiotherapy
Dr. Anuradha Daptardar

The Thoracic Oncology Disease Management Group (DMG) is a multidisciplinary team comprising of specialized surgeons, medical and radiation oncologists with active support from a pulmonary physician, specialized pathologists, radiologists, palliative care physicians and physiotherapists.

Service

The thoracic oncology DMG is amongst the few specialized multidisciplinary groups in the country treating a wide variety of thoracic neoplasm including lung, esophageal, chest wall and mediastinal tumors.

The initiation of the "high-risk" multidisciplinary meeting with thoracic surgeons, anesthesiologists, critical care specialists and pulmonary physicians, a unique feature of the DMG has led to increasing numbers of high-risk patients being considered for surgery, optimizing the care of patients with multiple comorbidities prior to surgery. Active participation from the physiotherapy department on postoperative rounds ensures individualized attention necessary in the intensive rehabilitation after these complex surgeries.

Newer initiatives in the DMG:

- Robotic surgery for thoracic cancers
- Stereotactic radiotherapy for lung cancers
- Lung and esophagus cancer patient support group
- Pharmacovigilance program for chemotherapy drugs
- Introduced early palliative care for lung cancer patients
- Dedicated counsellor for lung cancer patients
- Alk-1 IHC test for lung was introduced as routine diagnostic test in TMH since Jan 2015
- In June 2015, ALK testing by Ventana D5F3 IHC clone (used in TMH) got US FDA approval as companion diagnostics.

Key benchmarks

Volume & Outcome indicators

The DMG is amongst the highest volume thoracic centres in the world. A total of 3802 new patients, comprising over 10% of the hospital registrations were registered in the DMG in 2015, of which 2263 (59.6%) were general and 1537 (40.4%) were private patients. Lung cancers were the majority, 2374 (62.4%) followed by esophageal cancer 1070 (28.1%).

Surgical services: The thoracic surgical unit is the highest volume thoracic oncology centre in India. A total of 678 surgeries and 2421 minor procedures were performed. Out of the 2421 minor procedures, 1288 were Bronchoscopies.

Table 1: Surgery and Site-wise Mortality

Total=678	Esophagus	Lung	Metastasectomy	Mediastinal mass	Chest wall	Port	Others	Mediastino-scopy
Total number operated	182	122	127	44	28	60	79	105
Mortality	12 (6.59%)	8 (6.55%)	0	1 (2.2%)	0	0	NA	0
Major morbidity	32 (17.58%)	20 (16.26%)	7 (5.51%)	2 (4.5%)	1 (3.5%)	1 (1.67%)	NA	1 (0.9%)
Minimally invasive	51 (28.02%)	30 (24.39%)	48 (37.79%)	20 (45.45%)	1 (3.5%)	NA	NA	NA
Major Pulm complication	41 (22.52%)	20 (16.26%)	6 (4.72%)	2 (4.5%)	1 (3.5%)	0	NA	NA
Inoperable	19 (10.43%)	6 (4.88%)	1 (0.79%)	0	0	NA	NA	NA

Overall mortality (excluding other/emergency procedures) = 25/605 = 4.13%

Research

The thoracic DMG conducts several investigator-initiated and sponsored research studies.

	Investigator initiated	Pharma
Phase II/III Randomized Controlled Trials	13	-
Pharma	1	31
Phase II Prospective Studies	1	-
Outcome Research	24	0
Basic/ Translational	18	0
Technology Evaluation	7	0
Thesis & retrospective Audit	13	0

Members from the DMG have published >20 articles in peer reviewed journals.

Education

The DMG contributes dedicated teaching sessions and on-the job training for the M.Ch (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 program 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. Two comprehensive CMEs were conducted covering the entire spectrum of lung cancer which was attended by postgraduates, residents and fellows from across the country. A lung practicum was conducted in the department of radiation oncology, limited hands on course focusing especially on stereotactic radiotherapy in lung cancers.

The DMG participated in the annual surgical oncology workshop (Oncosurg 2015) for post-graduate students and practicing surgeons, which is a three-day operative workshop attended by more than 300 delegates. The DMG has several trainees - ten thoracic surgical fellows (two 2-year fellowships, two one-year fellowships and six 6-month fellowships); twelve senior M.Ch (Surg Onco) registrars, fifteen junior M.Ch (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.

Convener : **Dr Ganesh Bakshi**
Secretary : **Dr Amit Joshi**

Uro - Oncology - DMG

Surgical Oncology
Dr Ganesh Bakshi
Dr GaganPrakash

Medical Oncology
Dr Kumar Prabhash
Dr Vanita Noronha
Dr Amit Joshi

Radiation Oncology
Dr S K Shrivastava
Dr Umesh Mahanshetty
Dr Vedang Murthy

Pathology
Dr Sangeeta Desai
Dr Santosh Menon

Radio Diagnosis
Dr (Mrs) Meenakshi Thakur
Dr Suyash Kulkarni
Dr S L Juvekar
Dr Nilesh Sable
Dr Palak Popat

Nuclear Medicine & Molecular Imaging
Dr Venkatesh Rangarajan
Dr Archi Agrawal

Cytogenetic
Dr Pratibha Kadam Amare

Basic Sciences
Dr (Mrs) Shubhada Chiplunkar
Dr Kishore Amin
Dr Ashok Verma

Epidemiology & Medical Records
Dr Rajesh Dixit
Dr Ganesh Balasubramaniam

Uro-oncology DMG has Outpatient clinics on Tuesday and Thursday whereas the new files including emergency cases are seen daily.

The Surgical part of DMG has 6 major theatres a week (including ACTREC) and 2 days of minor theatres where annually around 4000 cases are operated. Medical oncology services included day-care and indoor chemotherapy sessions. Radiation oncology gives dedicated service to prostate and bladder cancer patients with IGRT machines and also successfully treats the testicular cancer patients. DMG academic meetings are scheduled on the second and fourth Thursday every month and important scientific literature is discussed in the form of symposia, debates, journal club and invited lectures.

The areas where significant impact on patient care has occurred include the "State-of-the-art" surgical procedures in Uro-oncology; the Minimal Access Surgery (Robotic uro-oncology, laparoscopy and endourology); around 69 robotic urological surgeries have been performed till Dec 2015; and, the use of 68Ga – PSMA – as prostate cancer investigative modality.

Volume Indicators:

Total of 2703 new patients and 16000 patients for follow up were seen at the Uro-oncology DMG.

The ratio of general to private category of patients is 1091:891=61:50=1.22% . The DMG also advised 361 referral patients. Overall 73 % patients compliance for treatment was observed.

Major Surgeries performed - 2015

A total of 713 major surgeries were performed during the year of which 549 were performed at TMH and 164 were performed at ACTREC. Majority of the surgical procedures were performed for urinary bladders, kidney and prostatic neoplasm.

Outcome indicators (30 days mortality and complication rates)

Surgical Oncology:

Indicator	% of patients
Morbidity	20.34% (145/713)
Mortality	Nil

Medical oncology:

Total number of new patients seen: 520
Total number of patients received chemotherapy and other supportive care in day care: 3888

Radiation Oncology Services:

- Total No. of Patients in RT OPD (Private): 1206
- Follow-up: 878; Referrals: 137; Opinion: 93;
- New: 61 pts; 2nd Opinion: 37;
- Approx. No. of Patients in RT OPD (General): 1650
- Total No. of patients treated: 358; (GEN: PVT:: 189:169)
- Referred Outside : 103 pts (GEN: 41; PVT: 62 pts)
- Drop out %: 48 / 406 pts (11%)

Table 2: Uro-Oncology Patients by sub-site and Intent of Treatment (TMH + ACTREC)

Diagnosis	Radical	Post-Op	Palliative	Grand Total
Prostate Cancers	67	10	130	207
Renal Cancers	1	-	45	46
Testicular Cancers	16		10	26
Ureteral Cancers	1	-	-	1
Urethral Cancers	1	-	-	1
Urinary Bladder Cancers	13	4	20	37
Adrenal tumors	1	3	6	10
Penile Cancers	4	10	2	16
Miscellaneous	-	2	12	14
Grand Total	104	29	225	358

Outcome indicators (Survival rates)

Surgical Oncology

Table 3. : Overall five year survival rates:

Organ	Overall Survival		Disease Free Survival	
	Early disease (T1,T2,M0)	Advanced disease (T3,T4,M0)	Early disease	Advanced disease
Cystectomy	77%	55%	72%	46%
Nephrectomy	90%	46%	84%	55%
Testicular	93%	85%	91%	82%

Medical Oncology

Table 4: Survival rates:

Organ	Survival (in months)	
Metastatic Penile cancer patients receiving palliative chemotherapy	Median OS	10.6
Metastatic Renal Cell Cancer patients receiving TKIs	Median OS	22.6

2 year OS for seminoma: 94.9%

2 year OS for Non Seminatous GCT: 95.4%

18 month OS Metastatic castration resistant Prostate cancer patients receiving palliative chemotherapy 57.3

Research

Table 5: Research Activities for 2015

Total Number of Clinical Trials		Completed		Ongoing		Overall Patients Accrued
Investigator Initiated	Sponsored	Investigator Initiated	Sponsored	Investigator Initiated	Sponsored	
24	1	12	0	12	1	3120

Education

DMG takes an intense interest in educative programs for both – the various students posted in DMG and for external medical care givers.

Annual CME of the DMG – Master class on cancer Prostate; held on 5/9/2015 in the "Prostate Cancer month" had been a great success with around 150 registrations. There is a good dissipation of up to date knowledge in the medical fraternity due to this CME.

DMG Support Services

Digestive Diseases and Clinical Nutrition

Dr Shaesta Mehta,
(Professor & Gastroenterologist)
Dr. Prachi S Patil
Dr. Pravir A Gambhire

Overview

The department of Digestive Diseases and Clinical Nutrition at TMC caters to the management of patients with Gastrointestinal cancers and also management of gastrointestinal disorders in all other patients in TMH. The department provides holistic care for GI cancers which includes diagnostic and therapeutic endoscopy, evaluation and endoscopic management of premalignant and malignant lesions of the GI tract, management of familial digestive cancers and clinical nutrition including parenteral nutrition therapy. A detailed report of service education and research conducted in 2015 in the field of digestive oncology is outlined below.

Service

The department is involved in the work-up and management of patients with Gastrointestinal and Hepato-pancreatico-biliary cancers. In addition, services like endoscopic, general gastroenterology and clinical nutrition services for all DMGs and for hospital staff members were provided. 6311 endoscopies of which 1436 therapeutic endoscopies were performed. Commonly performed therapeutic and advanced diagnostic procedures were ERCP (231), luminal stent placements (37), diagnostic and interventional EUS (238) and endoscopic resection of early GI tumors (5).

The department improved upon newer services like Endoscopic resection of early GI tumors (5). It also introduced newer services like double SEMS placement (23), IDUS (intraductal ultrasound) (22), EUS-guided biliary drainage (3) and endoscopic cystogastrostomy (1) in 2015.

The department started a hepatology clinic twice a week from this year for specialized hepatology support wherein 732 patients were seen over a period of 6 months.

Nutrition clinic evaluated and provided nutrition support to 11,677 cancer patients which included various oral diets, enteral (tube feed- Naso-gastric, Naso-jejunal, PEG) as well as Parenteral Nutrition (62 patients).

Research

The department participated in a number of investigator initiated as well as industry sponsored clinical trials. Presently, the department has a total of 13 ongoing projects which include research in endoscopy, phase 2/3 clinical trials and epidemiological studies some of them under the India-Oxford (INDOX) Collaboration Group. Of these 15 are investigator generated and 4 are sponsored.

Education

Since July 2012, the department is running a DM (Gastroenterology) programme under HBNI with an intake of 2 students per year. It also conducts a six month basic endoscopy training program and a one year Fellowship in advanced endoscopy as well as GI oncology. DM (Gastroenterology) students from KEM hospital have a 3 month rotation in digestive oncology. Nutrition and dietetics students from other universities have a clinical rotation in TMH wherein they complete their internship and receive 6-8 weeks training in oncology related clinical nutrition.

Dental and Prosthetic Services

Dr. Kanchan P. Dholam, Head
Dr. Sandeep V. Gurav

Dental and Prosthetic Surgery unit is involved in maxillofacial prosthetic rehabilitation of dental care for head and neck cancer patients undergoing radiotherapy. Maxillofacial Prosthetic care is offered to patient undergoing maxillectomy by fabrication of Obturators. Dental cares like extraction, prophylaxis, fluoride application, restoration of carious teeth are offered to cancer patients. Patient undergoing chemotherapy, bone marrow transplant are also treated for dental problems and oral septic foci. The department also offers reconstruction and correction services for maxillary and mandibular defects and segmental mandibulectomy using prosthesis and auto grafts. Radiation prosthesis like radiation source carrier & radiation protection and various facial prosthesis namely eye, ear, nose (adhesive & Osseo integrated implant retained), finger, are also fabricated.

Service

10,487 patients were seen in the OPD. 1,279 patients were treated with prosthetic rehabilitation following ablative surgery. 300 patients were treated with maxillary prosthesis which included maxillary obturators & palatal prosthesis following maxillectomy. 572 guide plane prosthesis following mandibulectomy. 15 tongue prosthesis following total glossectomy & 18 palatal augmentation prosthesis following partial glossectomy, 49 complete & partial dentures and 13 implant retained intra oral prosthesis. 1,154 patient were treated with Prophylaxis & 3,052 fluoride gel applications for patients undergoing radiotherapy. A total of 4,588 extractions were done. The NOMURA Fund sanctions was used as extramural funding for treating patients with Osseo integrated implants, retained intra oral and extra oral prosthesis, in coordination with Head and Neck DMG.

Research

The department's research activities focuses on quality of life and functions in maxillectomy defects reconstructed or restored with obturators, risk factor and treatment outcome analysis of osteonecrosis of the jaw in cancer patients receiving anti-resorptives and psychosocial perception for extra oral defects of patients before and after facial rehabilitation.

Education

The department has an annual structured teaching programme in the form of lectures on indications and applications of dental treatment for cancer patients to the Oncology trainee nurses and observers from other institutes, and table clinics were conducted for students of physiotherapy, occupational therapy and speech therapy. A course - 'Prosthetic Intervention following mandibulectomy' was conducted at the 17th IPS PG Convention, Nagpur.

Nutrition and Diatetics

Mr. S. Y. Timmanpyati,
Asst. Dietician

The department has seen more than 6500 new cases. Medical Nutrition Therapy is planned after asessing each referred patients for Nutritional Intervention. The nutritional requirements and clinical profiles, ability to consume and digest food, of patients is studied and the therapeutic diet and schedule are accordingly planned. Diet compliance of patients on Medical Nutrition Therapy are regularly monitored and diets are reworked depending on symptoms, investigations / reports and other indications. Special care is provided to the patients on Enteral and Parenteral feeds and are regularly monitored and assessed for compliance with feeds and disease prognosis. Patients undergoing Chemotherapy or Radiotherapy are conseled in detail about the importance of practicing Neutropenic diet and its follow up. Patients and their attendants are counseled, educated and trained to handle the Enteral and Patenteral feeding methods and to manage their associated complications. The department has several programs on nutritional education for patients groups and general masses. Some of these include patient support group for nutrition counseling and community nutrition programme to educate on importance of nutrition in prevention and treatment. Provide guidelines on preparation of therapeutic feeds to kitchen supervisors and kitchen staff.

The nutritionists and dieticians participated in various national and international conferences like IDAs' Annual Conference IDACON-2015 and, 7th Clinical Nutrition update.

Occupational Therapy

Dr. Manjusha Vagal
OIC

Service

The Occupational Therapy is an important branch of rehabilitation. The main function of the department is to assist people manage the limitations caused by cancer to become independent and maximize personal productivity, well being, and quality of life. These include the physical, functional, psychological or emotional difficulties.

The Occupational therapy services are provided on OPD and IPD basis to the patients at TMH. In the year 2015, Occupational Therapy department had 9,036 OPD (new and follow up) patients and 2,927 IPD (new and follow up) patients. Along with this the department prepared 15 temporary prosthesis casting and 19 thermoplastic splints. Overall, 139 orthoses, 38 prostheses, 52 repair work related to orthoses and prostheses, etc. were carried out at Rehabilitation and Research Centre (RRC) at E.Borges Memorial Home (EBMH) Bandra. 1,293 Jaw stretcher keys, 25 Lymphedema kits were prepared at RRC and supplied to TMH dispensary. Occupational Therapist at RRC provided 484 sessions of Occupational Therapy services to the patients at RRC, EBMH, Bandra in the year 2015.

The department also designed and devised two novel forearm based hand splints / orthoses for prevention and correction of radial deviation in patients operated for excision of distal end of radius.

Table1: OPD patients in the year 2015

DMG	Patients
H&N	1,689
Breast	1,212
Lymphedema	2,358
Lympharess	111
Bone & Soft Tissue	1,210
Gynecology	1,405
Thoracic	78
Palliative	315
GU/GI	91
Neuro	36
Haematology	531
Total	**9,036**

Table 2: IPD patients for the year 2015

DMG	Patients
H&N	531
Breast	230
Lymhedema	3
BST	1,587
Gynec	38
Thorasic	47
Pall.	146
GU/GI	110
Neuro	84
Hemat.	151
Total	**2,927**

Education

Lectures for Occupational Therapy students from G S M C & KEM Hospital and T N M C Nair Hospital and L.T.M.N.N.C. & G. H, Sion Hospital on Role of Occupational Therapy in Oncology were organized. The department was also involved in educating the observers from various faculties like Occupational Therapy, Palliative Medicine, Dental, Physiotherapy and Nursing. Interns from Sion Hospital were posted on rotational basis for internship.

Activities at Rehabilitation Research Centre (RRC), Ernest Borges Memorial Home (EBMH), Bandra:

The Occupational Therapy Department at TMH has its extension in the form of RRC at EBMH. The Occupational Therapy services in the form of physical and functional rehabilitation and fabrication of orthosis, prosthesis and adaptive devices for the TMH patients and also for the patients residing at EBMH are carried out at RRC. This centre also organizes leisure and recreational activities like craft and other creative activities for the paediatric patients. Several social events for the patients like sports, celebrating festivals and recreational trips, aiming at holistic rehabilitation of the patients are organized in association with NGOs.

Table 3: RRC Work 2015

Articles and Session	Numbers
No. of sessions	484
No. of prosthesis	38
No. of orthosis	139
Jaw Stretcher Keys	1,293
Miscellaneous	52
Lymphedema kits	25

Physiotherapy

Dr. Anuradha A Daptardar
OIC

Physiotherapy Department is committed to restoring patients to their highest level of function and independence through individualized therapeutic exercise program and a wide range of state of the art techniques.

Service

The Treadmill was procured for improving cardio pulmonary efficiency, for gait training in orthopedic cases and for improving endurance in patients with cancer related fatigue.

The Pediatric Pulmonary Rehabilitation Program was introduced for the children in the pediatric ward. The program was held once every fortnight. The session includes counseling regarding the importance of exercise and respiratory care. The Physiotherapist demonstrated postural drainage positions, percussions and exercises to the children and their parents.

A total of 11,446 patients were offered physiotherapy services in the year 2015.

Research

The research of the department focuses on cancer related fatigue and presently has two ongoing trials viz., Exercise for the management of cancer related fatigue in advanced lung cancer planned for systemic palliative therapy and a randomized controlled trial to evaluate the role of exercise in women undergoing treatment for breast cancer.

Education

Orientation program and training was imparted to the students from various physiotherapy colleges and other professionals.

All therapists in the department are internationally trained and certified Lymphedema Therapists and attended various CME programs to upgrade their knowledge and improve their skills. They also participated as faculty in in-house training programs held during the year.

The 1st International Certified Training Program in Lymphedema Management (FG-MLD) was conducted in two modules, in the months of July and August 2015.

Table1: Number of service offered

Services	No. of patients
Pre operative Pulmonary Rehabilitation program	882
Post operative breast group therapy program	1,692
Respiratory care	4,511
Lymphedema Management	412
Shoulder and Neck Dysfunction	1,984
Mobilization and Ambulation	726
Pain relief	456
Sub mucous fibrosis	127
Cancer Related Fatigue	656
Total	**11,446**

Pulmonary Medical Unit

Dr S Tandon
Head

Service

The Pulmonary Medical Unit was started in March, 2006. The DMG assesses patients referred for respiratory evaluation and management. There has been a progressive increase in referrals for Respiratory consultations over the past 10 years to almost 5000 annually over the past few years. These are seen single handedly by the Consultant. Referrals have been from across all DMGs including the ICU. In 2015 total number of patient consultations including private and general were 4,886. The DMG wise referral pattern was as follows: Thoracic : 30%, Head & Neck : 18.4%, GI : 12.5%, Breast 10.9%, Haemato-oncology 7.8%, Gynae-oncology : 7.4%, and Uro-oncology : 6.6%.

Research

The Unit currently focuses on increasing its contribution to the Thoracic DMG clinical research activities through clinically relevant joint research projects.

Education

The constant efforts of the unit, for awareness about the importance of diagnosing and treating respiratory co-morbidity for pre-existent or post-therapy in cancer patients, has resulted in a steady increase of referrals from all clinicians.

Speech Therapy

Dr. (Mrs.) Gurmit Kaur Bachher
Head
Mr. Arun Balaji K.D.

The department of Speech Therapy deals with issues related to audiology, speech, swallowing and communicative language skills and their management in patients during and after various cancer therapies. The Speech therapists worked closely with caretakers and other professionals, such as ENTs, head & neck surgeons, neurologists, pediatricians, radiation oncologists, reconstructive surgeons, maxillo-facial surgeons, general physicians and nurses to enhance patients' functional abilities.

Service

The speech therapists play a vital role in the assessment and rehabilitation of patients with head and neck cancers. The department deals with the entire speech rehabilitative process of the patient and the process consists of pre - and post-operative counseling. The treatment is based on the degree of communication handicap caused by the disease. Oral and ablative surgeries in head and neck cancer patients with difficulty in swallowing are trained on deglutition exercises. The voice evaluation performed at regular intervals of the head and neck cancers patients undergoing different types of treatment procedures helped to maintain good voice quality, and avoid the adverse effect of radiation therapy (during and after). Other problems ranging from difficulty in speaking to complete loss of voice, difficulty in hearing due to disease or its treatment are also observed and treated through rehabilitation services.

Pure Tone Audiometry was performed to evaluate hearing loss. Otoscopic examination helped to rule out ear discharge and ear perforation and provided information about external ear pathologies such as wax, fungal infection, trauma, position of tympanic membrane etc.

The department provided their various services to a total of 5,879 patients in the year 2015. The new cases doubled from the previous year to 3,385.

Research

The department had initiated a study on the detection of laryngeal cancer from spoken words.

Education

The department continued to conduct two short term courses on rehabilitation after oral cancers and laryngeal cancer.

Anaesthesiology, Critical Care and Pain

Dr Jigeeshu Divatia
Head

Dr Kailash Sharma, Director (Academics)
Dr Parmanand Jain
Dr Raghuveer Singh 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 Sudivya Sharma
Mrs. Manisha Kadam

The Department of Anaesthesiology, Critical Care and Pain incorporates the Anaesthesia service, the Divisions of Critical Care and the Division of Pain. The department consists of faculty, ad-hoc lecturer, senior residents (including fellows) and post-graduate students.

Service

The department created two additional specialty groups within the Anaesthesia division, namely thoracic and hepatobiliary / pancreatic to provide better services to patients, promote professional development and further streamline work patterns, protocols and research. These were in addition to the pre-existing specialty groups for Paediatric Anaesthesia and, Critical Care and Pain.

The department initiated the Critical Incident Reporting in OT and ICU at ACTREC during the year. The anaesthesia services were also initiated at Homi Bhabha Cancer Hospital (HBCH), Sangrur, Punjab during the year.

Anaesthesia services were provided at 24 locations and Private and General Pre-Anaesthesia Check-Up Clinics at TMH and at six locations in ACTREC. Joint clinics for Thoracic and G.I services were conducted where high-risk surgical patients were discussed. The services to 168 patients at HBCH, Sangrur, were provided through two major OTs and one radiotherapy OT.

Critical Care Unit maintains 14 bedded ICU, 23 bedded PACU with CPR team at TMH and 7 bedded ICU cum PACU with CPR team at ACTREC. The pain services were provided through the Acute Pain Services and Private and General Chronic Pain Clinics. The department also provided services to 224 patients through its Acute Pain clinic at ACTREC.

A total of 20111 patients were seen at the pre- anaesthesia check-up clinic at TMH and ACTREC. The Acute pain clinics at TMH and ACTREC treated 2395 patients. Anaesthesia services for radiology (MRI and Interventional Radiology) were provided to 642 patients at TMH and 424 patients at ACTREC, on all days of the week.

Table1 : Factual data for 2015

	January to December 2015	January to December 2014
Tata Memorial Hospital		
Anaesthesia Services		
Elective Major OT cases (OTs 1 – 12A and HBB OT 22 & 23)	7,448	7,281
Emergency cases	918	826
Minor OT cases	4,012	4,914 (GA cases only)
Bone Marrow OT cases	2,029	1,570
Radiotherapy OT cases	1,515 (GA + local = 1,698)	1,650 (GA + local)
Paediatric radiotherapy cases	418	341
CT scan and Interventional Radiology cases	642	591
GI endoscopy	69	-
Pre-anaesthesia check-up		
General patients	Total: 10,853 8,163 (new) + 2,690 (follow-up)	Total: 10,301 8,372 (new) + 1,929 (follow-up)
Private patients	Total: 8,078 6,174 (new) + 1,904 (follow-up)	Total: 7,990 6,220 (new) + 1,770 (follow-up)
Critical Care services		
ICU admissions		
Total	2,707 (1,140 ventilated)	2,638 (1,046 ventilated)
First Floor ICU	1,001 (634 ventilated)	
Surgical ICU	1,706 (506 ventilated)	
Recovery Room admissions	7,131	7,344
Dialysis	330 sessions (107 patients)	262 sessions (86 patients)
Pain Services		
Patients seen by Acute Pain Services	2,171	2,550
Chronic Pain OPD		
General patients	Total: 6,156 2,959 (new) + 3,197 (follow-up)	Total: 4,486 2,114 (new) + 2,372 (follow-up)
Private patients	Total: 2,991 1,463 (new) + 1,528 (follow-up)	Total: 2,434 1,345 (new) + 1,089 (follow-up)
Interventional procedures for pain	16	10

ACTREC		
Anaesthesia Services		
Major OT	2,578	2,317
Radiotherapy OT	435	195
MRI 141	99	
Interventional Radiology	283	57
Pre-anaesthesia check-up	1,180 (new + follow-up)	-
Critical Care Services		
Recovery Room admissions	2,028	1,982
ICU admissions	351 (100 ventilated)	314 (106 ventilated)
Pain Services		
Acute Pain Services	224	-

Table 2: Summary performance statistics (TMH + ACTREC)

	2015	2014
Patients Given Anaesthesia	20,488	19,841
Patients seen in Pre-Anaesthesia Clinic (new patients)	20,111	18,291
Patients in ICU	3,058	2,952
Patients in Recovery Wards	9,159	9,326
Patients on Ventilator	1,240	1,152
Patients seen in Pain Clinic (new patients)	4,748	3,459
Patients seen by Acute Pain Services	2,395	2,550

Research

The department had more than 40 clinical studies, which were either completed or ongoing in 2015. Prior to the IRB submission, the departments' research projects were discussed regularly in project discussion meetings. Members of the Department served on the Institutional Ethics Committee and the Data and Safety Monitoring Sub-committee.

Education

The department continued to conduct several educational programmes through conferences, courses, seminars and workshops. The annual three days Anaesthesia Review Course (ARC), was attended by more than 300 postgraduate students. The department organized the "National Airway Conference" in December 2015. The Critical Care division held an annual two-day workshop on hemodynamic monitoring (THEMATICC) which was attended by several intensivists from all over India. The Pain division organized an annual two-day conference – "Education in Cancer Pain (ECAP)". The 1-year ICU technicians' course, a hospital CPR Course for nurses and for doctors (at both TMH and ACTREC) were conducted and an orientation lecture series in pain management for hospital nurses was organized. Members of the department were invited as faculty at several national and international conferences in 2015.

The departmental staff had authored and edited many books in varied areas of anesthesia.

Plastic and Reconstructive Surgery

Dr. Prabha Yadav
Head

Dr. Dushyant Jaiswal
Dr. Vinay Kant Shankhdhar
Dr. Rahul Dalal

The Department of Plastic and Reconstructive Surgery provides services to various surgical oncology sub-specialties and DMGs. Primary reconstruction, secondary reconstruction, and several problem solving and salvage surgeries are performed. It continues to maintain the leadership position in training and educating surgeons from across the country.

Service

A total of 1089 major cases and 303 minor cases were operated in 2015. Free micro vascular tissue transfers (Free Flaps) our USP, continues to be the major operative workload. 616 free tissue transfers were performed with a 96% success rate. 50 of these free flaps were for breast reconstruction. Head and Neck reconstruction continues to be the main bulk of our work (85%). These numbers are by far the most for a single centre in the country. The department implemented several qualitative improvements in work flow and processes to provide personalized care. The maximum benefits of personalized care, was observed in breast reconstruction by use of multiple complex and alternative free flaps. The breast reconstruction program is now well established, attracting patients, observers and trainees. The Thoracodorsal artery perforator flap (12 cases) was also added as a soft tissue alternative flap to the department's arsenal during the year. Maxillary defects by bony reconstruction barring few exceptions were reconstructed. 473 pedicle flaps and other major surgeries were also performed during the same time.

Research

The departments research focused on three major areas viz., development of Anatomy Lab for cadaveric dissection, assessment of Quality of Life and multiple surgical audits were conducted.

The setting up of Anatomy Lab for cadaveric dissection at ACTREC with all equipment procurement and permissions has been completed and is now awaiting MCI inspection. The study to assess Quality of Life in head and neck surgery patients with free tissue transfers in collaboration with head and neck DMG is under progress. Multiple surgical audits were undertaken to assess the innovative work being done in the department.

Education

1. ONCORECON 2015 - the department continued to conduct our ONCORECON workshops in two batches during the year, with the aim of training and sensitizing, plastic surgeons and oncosurgeons. A total of 8 delegates from across the country participated. First four days were devoted to observing surgeries in operation theatres along with case capsules and discussion, relevant detailed Powerpoint and edited videos presentation. The 5th Day was devoted to hands on cadaveric dissection on fresh frozen cadavers.
2. APSICON 2015 - the Golden Jubilee Annual Conference of APSI (Association of Plastic Surgeons of India), 50th APSICON, was organized at Renaissance Convention Centre, Mumbai in December 2015. It was attended by 700 delegates from India and SAARC and Gulf nations. A preconference CME on Breast plastic surgery and related topics was organized on 25th -26th December at Tata Memorial Hospital. CR Sunderrajan Video workshop was organized on 27th December which included 3 Cadaveric dissections cum teaching modules on Hair Transplant, Brachial Plexus and Lower Limb Flaps.

Palliative Medicine

Dr. Mary Ann Muckaden
Head

Dr. Jayita Deodhar
Dr. Naveen Salins

A new respite palliative care services was established by the department at Dr. Ernest Borges Memorial Home, Bandra, Mumbai, as joint initiative of Tata Memorial Centre, Tata Trust and Dr. Ernest Borges Memorial Home. Tata trust provided a grant of Rs 4.96 Crore to the Tata Memorial Centre to develop this facility. This project not only supported shelter during the treatment for 1,500 adult patients and their families and 100 children, but also supported education and advocacy initiatives.

Service

Outpatient services of the department registered 3,889 new general adult patients, 993 private adult patients and 301 new pediatric patients. There were 5,573 follow up outpatient visits. Out of the 3,889 newly registered general adult patients, 1,456 were from Mumbai, 605 were from rest of Maharashtra and 1,828 were from other states. One hundred and eleven patients were referred to Shanti Avedana Hospice and 1,960 patients received Morphine supply from the department.

Home based palliative care service registered 987 new patients for palliative home care. The team made 2,384 home visits in 247 homecare working days. Doctors, nurses and social workers go together as a team of two for home care visits.

Palliative care consultation liaison team received 823 new referrals and did 2,143 in-patients follow up visits.

Research

Several new investigator initiated research projects were initiated during the year in addition to the ongoing studies. These are 12 Investigator Initiated Trials and 6 academic studies. The department staff published several scholarly articles during the year.

Education

The department was instrumental in creating 6-week training program, conducted twice a year in collaboration with Indo-American Cancer Association. Doctors and nurses from all over India and neighboring countries received on site palliative care training.

The department continued six weeks certificate courses in the areas of Palliative Care, Volunteers training programs and End of Life Care. The department conducted Advocacy meets with Health Minister, Ministry of Public Health & Family Welfare, Maharashtra, Joint secretary, Ministry of Public Health & Family Welfare, Delhi and Minister for Women & Child Development, Delhi during the year for governmental support for the palliative services and education.

Psychiatric Unit

Dr. Jayita Deodhar
Head

The multidisciplinary mental health professional Psychiatric Unit conducted psychological assessment of cancer patients in wards and outpatient settings for both, adults and children. The service also conducted neuro-cognitive testing both, for clinical purposes and as part of research projects. Psychological support was provided to staff, who access the services or were referred by the hospital Staff Clinic. A liaison input was provided in specialized clinics like Survivors Clinic (After Completion of Therapy) and Palliative Care. Individual and group psychotherapeutic sessions were conducted. The Psychiatric Unit worked for patient's carrier development apart from their regular clinical work, and arranged psycho-educational and support programs for patients, their caregivers and survivors.

Service

A total number of 3,579 patients were seen in 2015 including 1,658 new referrals and 1,921 reviews, seen as part of consultation and liaison inputs of the psycho-oncology service. Twelve Mentoring and Capacity Building group sessions were conducted for survivors of childhood cancer. Monthly support group meetings were facilitated by Psychiatric Unit for brain tumour patients and other cancer patients. The Psychiatric Unit conducted telephonic follow up for patients for reassessment and arranging review consultations for the patients.

Research

The research projects of Psychiatric Unit focused on distress in children and adolescents referred to psycho-oncology service, understanding spiritual / religious well being in cancer patients, psychological interventions for adolescents with cancer, and the role of staff support groups in an oncology setting.

Education

The Psychiatric Unit is associated with the Tata Institute of Social Sciences and Sanjeevani for the training and field placement of students of the Masters in Professional Onco-Care giving course. This training would have a direct impact on quality of patient care in the hospital, with support of the caregivers.

Monthly meetings for Neuro-Oncology Disease Management Group (DMG) patients and Brain Tumour Foundation were conducted by Psychiatric Unit throughout the year. Support group meetings of other Disease Management Groups were facilitated by the Unit.

The unit also participated in educational activities for postgraduate nursing, palliative care, speech therapy, stoma care and rehabilitation services. It is also engaged in academic activity of DMGs, viz. Medical Oncology (Adult and Paediatric) programmes.

Table 1: Number of patients receiving treatment

No. of New referrals	1,658	
No. of reviews	1,921	
Diagnostic breakup (major and approx.)	Adjustment disorder Delirium Depressive andAnxiety disorder Pre-existing major mental illness	27.5% 15.5% 10.5% 9.4%
Interventions	Individual psychotherapy Cognitive behavioural therapy Play therapy Family interventions	

Pathology

Dr. Shubhada Kane
Head (From 1st August 2015).
Dr. Nirmala A. Jambhekar, former
Head (Till 31st July 2015)

Dr. Sangeeta 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. Neha Mittal
Dr. Ayushi Sahay
Dr. Asawari Patil,
(OIC, ACTREC Pathology)
Dr. E. Sridhar
Dr. Swapnil Rane

Dr. P.G. Subramanian,
OIC, Hematology
Dr. Meera Ghadge,
OIC, Biochemistry
Dr. Omshree Shetty
Mrs. Ujjwala Joshi,
(OIC, Anatomic Pathology Laboratory)

Mrs. Manisha Kulkarni,
(OIC, Pathology Academic Program)
Mrs. Neelam Prabhudesai
Mr. Nitin Shinde

Service

The department of pathology provided a wide range of diagnostic services namely, Surgical pathology, Fine needle aspiration cytology, Exfoliative cytology, and Molecular pathology tests of the solid tumors, Biochemistry and Hematopathology to all in-house patients. The expertise was also extended to cancer patients throughout the country. It maintains an ICMR Funded National Tumor Tissue Repository to facilitate tissue samples for research activities.

The department offered diagnostic services to 58,242 histopathology cases (55719 at TMH and 2523 at ACTREC) in 2015, which included small biopsy, big specimen and referral material. Over all there had been a rise in total number of cases by 6% in 2015. The total number of frozen section reported was 7,480 and a rise of 20% was observed. The total number of Immunohisto-chemistry cases reported was 97,863 indicating a rise of 19.7%.

The following new tests were introduced in the molecular pathology lab during the year.

- PDGFRA gene mutation analysis, RAS mutation analysis by Sanger sequencing.
- SYT gene rearrangement by FISH.
- Mycobacterium tuberculosis detection by PCR.

The Laboratory activities of Histopathology and Immunohisto-chemistry labs were automated to speed the process. New software program were implemented for expediting block retrieval and filing. The store inventory program was also implemented. Staggering duty schedule was initiated for technical staff to facilitate prompt fixation of big pathology samples, reducing the TAT by 1 day. A daily check list for work out - put was introduced to improve the total work output of the staff. The department also introduced cost effective tissue marking dyes, NUT, Androgenreceptor, Mammaglobin, IgG4 and CMyC antibodies and initiated immune- staining for ALK D5F3 mutation in lung tumors by amplifying the signal.

Research

The departmental research focused on histopathology and molecular pathology in various system specialty. Several projects were initiated by the department faculty and were also co-investigators in other DMG initiated studies. The department contributed more than 50 publications in medical journals during the year.

Education

A preceptorship program in lung cancer was started during the year. The department also conducted CMEs for head and neck pathology and Uro-Oncopathology.

The department has generated a system wise teaching sets / learning modules comprising of 7155 glass slides and 1238 gross specimens (Mounted and unmounted). Lectures in digital format were also maintained. These learning modules facilitated self-learning amongst students / trainees. The Pathology museum had been upgraded to serve the demands of all Oncology super-specialization. The Departmental staff and residents participated in several national and international conferences and the faculty was invited as speakers and moderators at various conferences and meetings.

Biochemistry

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

Dr. Nitin Inamdar
Dr. Pranab Sadhukhan

Mrs. Purva Naik
Dr. (Mrs.) Geeta Rathnakumar
Dr. Bhoopal Shinde

Mr. Tanaji Matle
Mrs. Madhuri Godambe

The primary goal of the department is to provide patient care services required for diagnosis and clinical management which are reliable, timely, and cost effective, and follows good laboratory practices. The department is engaged in routine biochemistry testing and Tumor Marker Services. The department is accredited by National Accreditation Board of Testing and Calibration Laboratories (NABL), ISO 15189 accredited.

Service

The routine biochemical work includes different types of biochemical investigations on blood samples and body fluids of patients attending the hospital. The investigations carried out routinely are Glucose, Urea, Liver function tests, Renal function tests, Calcium, Phosphorus, Lipid profile, Urinary VMA and 5 HIAA, therapeutic drugs (Methotrexate) etc. Critical values and sample rejection are conveyed to patients through 'sms' services. The total number of investigations carried out during the year is 23,37,437.

The unit has attained the status as national reference center for tumor marker assays. Electrophoresis, Immunofixation and estimation of immnoglobulins and free light chains kappa and lambda is routinely done and this facility was availed by majority of the hospitals in and around T.M.H. Reference Intervals are reviewed and necessary changes are made in consultation with clinicians.

Table 1: Total number of investigations

Investigation	Number of investigations
Biochemical Investigations	21,83,491
Tumor Marker	1,31,289
Serum Protein Electrophoresis	3,204
Immunofixation	703
Immunoglobulin	15,070
Total	**23,37,437**

Research

The departmental research focuses on the prognostic factors in Multiple Myeloma Patients. New diagnostic kits were evaluated for quality control. The department also supports clinical trials.

Education

The Department conducted the Advanced Clinical Biochemistry Technologist Training Course and organized lectures on various topics for the staff. This training program focused on Clinical Biochemistry, Tumor Markers, Serum Protein Electrophoresis and training on Therapeutic Drug Monitoring studies & covers theoretical, technical and practical aspects. It also included hands on training on the state of art analyzers with emphasis on quality control. Professionals from other institutes joined the department as trainees and observers for training on various biochemical and tumor marker techniques. The department inducts students for M.Sc. (by Research) and is affiliated to University of Mumbai. The department facilitated M.D. (Pathology) practical exams.

Cytopathology

Dr. Shubhada Kane
Head

Mrs. Maya Uke
Ms. Swati Dighe
Mrs. Bilkis Patel

The department offers 3 tier cancer screening & diagnostic services with minimal TAT on cytology samples. It continued to offer routine services and specialized services viz., - on-site adequacy testing to improve image guided sample adequacy and immunocytochemistry to enhance diagnostic accuracy. ICU samples and CSF are reported within 4 hours. Synoptic formats are implemented to ensure uniform and unambiguous reporting. Staff undergoes regular technical and diagnostic proficiency tests. The department is also involved in research in the field of technical, diagnostic and quality control aspects of cytopathology. It offers training to postgraduates, pathologists & cytotechnologists and provides National level EQAS cytopathology service for various laboratories in India. The department has been accredited for diagnostic services by IAC and NABL and also for training & examination by IAC.

Service

The workload of the department comprised of 24,328 samples (93,057 smears) as compared to 24,893 samples in the year 2014. These samples consisted of 4,255 exfoliative gynaecological, 12,330 exfoliative non-gynaecological and 7,743 fine needle aspiration cytology samples. A 3% increase was noted in non-gynaecological samples. Immuno-cytochemistry service (with 30 immuno-markers) showed 57% increase (i.e. from 115-180) and EQAS Diagnostic Cytopathology service showed a 63% increase of participants (i.e. from 111-181) compared to the previous year.

Research

The department conducted regular follow up and clinical audit of all reported cytology samples to evaluate the performance characteristics. The diagnostic pitfalls, inadequacy rate, etc. were monitored and appropriate corrective and preventive measures were taken. The fourth edition of Comprehensive Manual of Cytotechniques is under printing process.

Education

Department imparted training in technical, diagnostic and quality control aspects of cytopathology for MD Pathology students, Post MD Pathology observers, MDS students and Cytotechnicians. An interesting cytology case is published on the TMC website in a quiz format every month. The Department also conducted a “Hands on Workshop” in Immunocyto-chemistry at CYTOCON-2015 and 50 participants were imparted hands on training on its technical and diagnostic aspects. Staff participated in departmental academic and DMG meetings, CMEs, Conferences and Workshops held in and outside TMH.

Hematopathology

Dr. P.G. Subramanian
OIC

Dr. Sumeet Gujral
Dr. Nikhil V Patkar
Dr. Prashant R Tembhare

Dr. Ashok Kumar
Mr. Y. Badrinath

Dr. Shruti Chaudhary
Mr. Shashikant Mahadik

The main activity of the Hematopathology Laboratory is diagnosis of hematological malignancies, monitoring of patients while on therapy for all malignancies and for preoperative & postoperative hematological workup of surgical patients. The laboratory continued with the Minimal residual disease testing in B cell Acute Lymphoblastic leukemia in children, T cell Acute Lymphoblastic Leukemia, Acute Myeloid leukemia and Multiple Myeloma, to support tailored treatment for individual patient, avoiding intensive treatment and thereby reducing costs and side effects of the treatment.

Service

The state of the art hematology analysers and coagulation analysers of the laboratory are interfaced with Hospital Information System. In addition, the laboratory conducts quality control in a cost effective manner to provide reliable results in the earliest possible time. The routine hematology laboratory processes more than 1,200 hemograms on average in an 8 hour day time schedule per day.

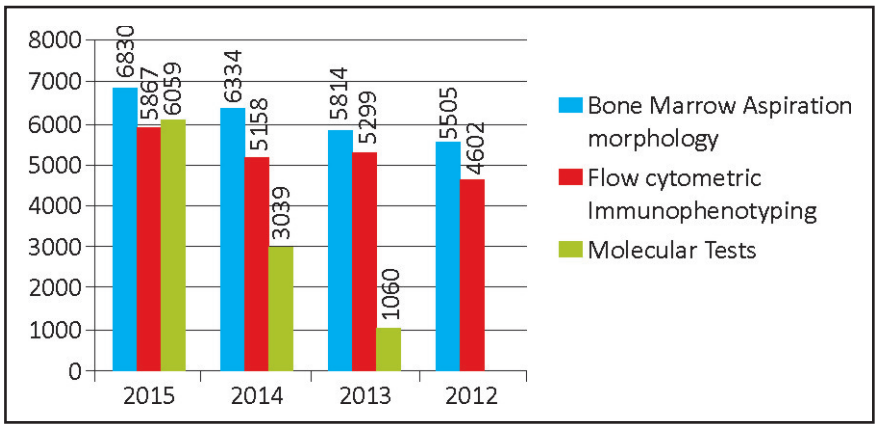
The laboratory examines blood, bone marrow and body fluids for the diagnosis of leukemias and lymphomas. About 5,800 samples were tested for immunophenotyping of blood, bone marrow and body fluids hematolymphoid malignancies using flow cytometric techniques. The laboratory also conducts sensitive investigations like detection of minimal residual disease for Acute Leukemias and Multiple Myelomas and involvement of hematolymphoid malignancies in cerebrospinal fluid and other rare sites.

Molecular tests are conducted for diagnosis, sub typing and monitoring of hematolymphoid malignancies. The molecular diagnostics services were provided to more than 6,000 patients during the year. The department also receives referral samples from all over the country.

Table1: Total number of tests performed in 2015:

Name of the Tests	Total No. of Tests performed
1. Routine Hematology	3,28,816
2. Coagulation studies	99,014
3. Bone Marrow Aspiration Smears	6,830
4. Cytochemistry	4,357
5. Flow cytometric Immunophenotyping	5,867
7. Body Fluids for cell counts & Morphology	2,227
8. Molecular Hematopathology	6,059

Chart 1: Specialized tests for Hematooncology



Research

The laboratory research studies covered areas like predictive value of minimal residual disease testing in acute lymphoblastic leukemia and its clinical management in Indian context. Immunogenetics of chronic lymphocytic leukemia were also studied. The Standardization and evaluation of hemato-lymphoid tumor specific DNA ploidy analysis and T cell receptor (TCR) V-beta usage monitoring for the assessment of T cell clonality in peripheral T cell Lymphoma were also undertaken.

Education

The department continued to train technicians and pathologists in Complete blood count, flow cytometry, Molecular hematology and Immunophenotyping. The laboratory continued with post MD fellowship program in hematopathology. During the year thirty M.D. Pathologists from various parts of the country joined as observers and were trained in morphology, cytochemistry and flow cytometry.

Emergency Laboratory

Mr Deepak Birwatkar
OIC

The laboratory with its state of art equipment, facilitates common diagnostic tests in biochemistry and haematology. The patient needs for these test namely, biochemistry, CBC, and coagulation are performed for patients in the evening and throughout the night. The services are available round the clock on Sundays and all holidays.

Type	No. of Investigations
Biochemistry	5,67,003
CBC	59,136
Coagulation	25,237
Total	**6,51,376**

Molecular Pathology

Dr. Sangeeta Desai
OIC

Dr. Omshree Shetty

The Molecular Pathology laboratory uses various molecular techniques for the diagnosis, prognostication and prediction of solid tumours. Keeping in tune with current trends in the field of molecular diagnostics, the laboratory introduced new and clinically relevant assays such as PDGFRA gene mutation analysis, RAS mutation analysis by Sanger sequencing, SYT gene rearrangement by FISH and Mycobacterium tuberculosis detection by PCR.

Service

Molecular Pathology Laboratory is a recognized referral laboratory for PCR, FISH, Gene sequencing, and Fragment analysis assays. A total of 2,338 requisitions were received in 2015. As compared to the previous two years, there has been a gradual increase in the requisitions for molecular diagnostics tests as summarized in the Figures 1 and 2.

All the molecular diagnostic tests were performed as per the NABL norms. The laboratory also participated in the College of American Pathologists (CAP) Proficiency Testing program and UK NEQUAS proficiency testing. The trend analysis for the routine diagnostic tests was performed on monthly basis.

Figure 1. Total requisitions received during the period 2013 – 2015

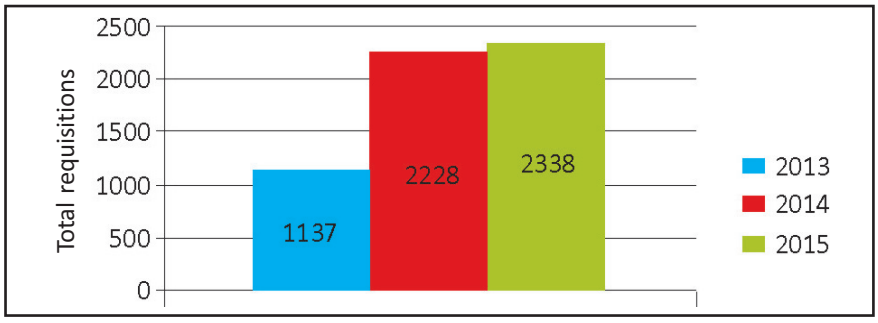
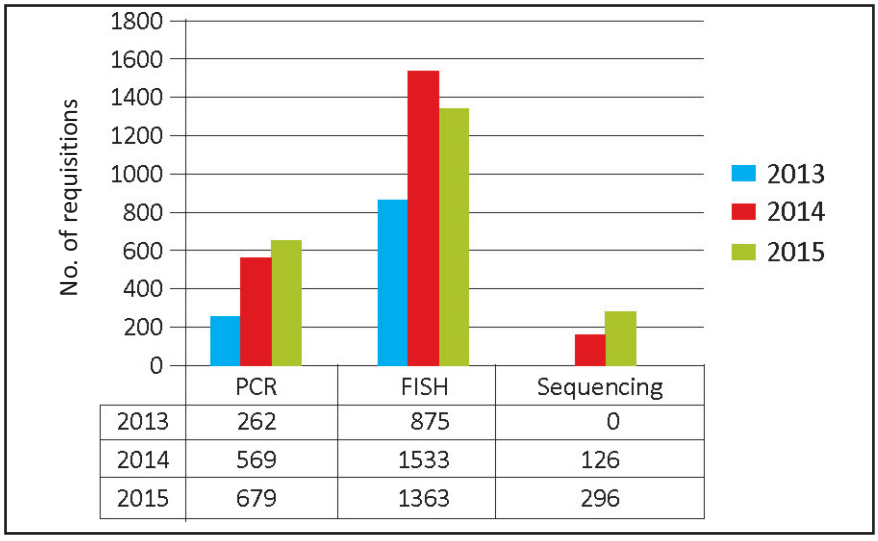


Figure 2. Technique wise requisitions received during the period 2013 - 2015



	PCR	FISH	Sequencing
2013	262	875	0
2014	569	1533	126
2015	679	1363	296

Research

Currently eleven Principal Investigator initiated projects are ongoing in the laboratory with the dedicated project staff working on each one of them. The division also participates in translational research.

Education

Under the Molecular Pathology Academic program, one year fellowship was offered to postdoctoral candidates. Intense training was provided in various techniques viz. PCR, FISH, primer designing, gene sequencing, data analysis and interpretation. Pathology residents were posted every month on rotation basis for training in routine molecular pathology. Weekly CMEs were also conducted.

Cancer Cytogenetics

Dr. Pratibha. S. Kadam Amare
Head

Mrs. Sharayu Kabre
Dr. Dhanlaxmi Shetty
Ms. Hemani Jain

Cancer Cytogenetics Department has provided more than two decades of cancer cytogenetics services in hematolymphoid and solid tumor malignancies since its establishment in 1988 and with its unique cytogenetics testing services has attained recognition as a referral laboratory in molecular cytogenetics and conventional karyotyping. These services are also offered to outside centers, institutes, cancer clinics, cancer hospitals from India. During these years, cytogenetics alterations have remained as an integral part of diagnosis and the most important prognostication of disease and disease management. The Department is NABL accredited.

Service

Laboratory performed a total 10,888 tests in year 2015. Of these, 7,543 test were performed using FISH technique and 3,345 tests were performed using Conventional karyotyping. A total of 5,532 FISH tests were performed for adult patients and 2,011 for pediatric patients. Whereas, 2,035 conventional karyotyping tests and 1,310 karyotyping tests were performed in adults and pediatric patients respectively. The laboratory updated molecular cytogenetics service program in myeloid and lymphoid malignancies as per international standards through development of comprehensive profiles of 8-13 genetic markers such as translocations, genomic deletion, copy number alterations in AML, ALL, CLL, MM, enhancing diagnostic precision and helped in risk stratification of the disease. About 15% increase was observed in the service program of myeloid malignancies AML and lymphoid malignancy ALL during the year under report.

The quality control program is maintained as per NABL guidelines, CAP Proficiency program.

Table 1: Test Performed

Test Modality	No. Test	Turn around time
Fluorescence in situ Hybridization (FISH)	7,543	2-4 days
Conventional karyotyping	3,345	10-12 days

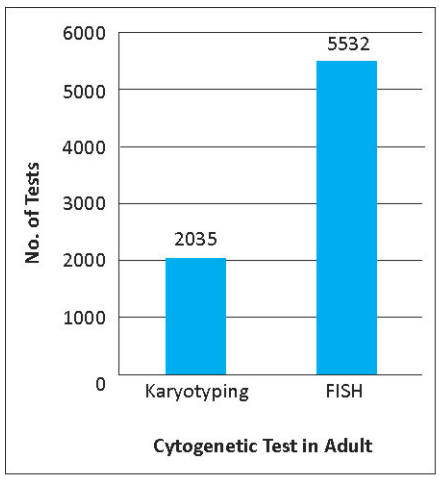


Fig. 1

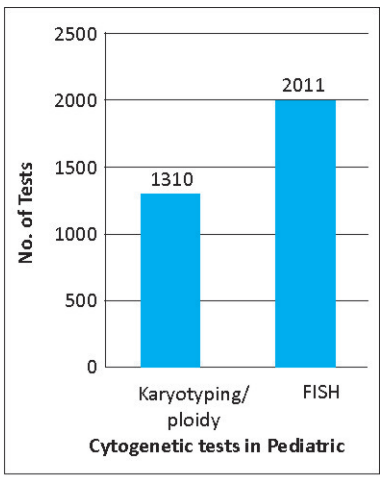


Fig. 2

Research

Presently two translation research projects on Multiple Myeloma namely, circulating tumor microRNA and clonal plasma cells in prediction and evaluation of various molecular prognostic markers and minimal residual disease in AML are ongoing and the department also collaborates with ICICLE-2014 Indian Childhood Collaborative Leukaemia Group. A registry for multiple myeloma with demographic details and cytogenetic profiles is maintained. The department was involved with 8 clinical trial projects.

Education

Laboratory is involved in M.Sc. Biotechnology, "Applied Medical Sciences ,Post-graduate Oncology Nursing program, Cytogenetics in hematolymphoid malignancies as a part of DM Medical Oncology program, Hematopathology Research Fellow training program and orientation program in Cancer Cytogenetics to new consultant, registrars, Fellows from Medical Oncology. A total of 10 personnel from Medical Oncology and Hematopathology Lab were trained in 2014. Laboratory offered training in Cancer Cytogenetics, Molecular Genetics to 22 Lab Scientists, Clinicians, Pathologists and Post graduate students and also conducted one year Advanced Cancer Cytogenetics training program.

Microbiology

Dr. Rohini S. Kelkar
Head

Dr. Sanjay K. Biswas
Dr. Vivek G. Bhat
Mrs. Hema Rajpal
Mrs. Priyanka H. Dixit

Overview

The diagnosis of tuberculosis in cancer is a diagnostic dilemma. The introduction of a molecular test to identify both the DNA of Mycobacterium tuberculosis and the Rifampicin resistance gene has significantly improved the accuracy of results and reduced the turnaround time for reporting results.

The focus of diagnostics continues in the area of critically ill patients. The addition of minimum inhibitory concentrations of antibiotics for pathogenic bacterial isolates has assisted in improved accuracy and quality of results for bacterial infections in patients with sepsis.

The diagnosis of viral infections in patients with Hematolymphoid malignancies undergoing bone marrow transplantation has been strengthened with the introduction of antigen detection tests for enteric viruses (viz. rotavirus, adenovirus, norovirus, astrovirus). The microbiology facilities at ACTREC are being augmented to support the other requirements of Hematolymphoid malignancies.

The department supports the hospital for environmental surveillance, water testing and the prevention and control of healthcare associated infections.

Service

The total number of samples processed in TMH & ACTREC was 1,79,416 and 7,994 respectively. The number of tests has increased in Bacteriology by 4,274 tests (12.5%), Serology i.e. viral marker screening by 3,457(3.2%), Molecular Microbiology by 1,011 (29.9%) and Clinical Microbiology by 918 tests (10.7%).

The turnaround time for Bacteriology improved by 7% in one year. The compliance to turn around time was 86% in 2014 and went up to 93% in 2015.

Research

Focus is on in vitro studies on susceptibility pattern of new antibiotic combinations, microbiology of healthcare associated infections like ventilator associated pneumonias, the role of copper in reducing the microbial bio-burden on touch surfaces in the critical care unit and the molecular epidemiology of mycobacterial infections in cancer.

Other research projects include a study of oral cavity flora including candida spp in post operative Head & Neck cancer patients on chemo radiotherapy; the incidence of Central Venous Catheter associated infection /colonization in hematolymphoid cancer and bone marrow transplant patients and evaluation of in-house real time qPCR for the diagnosis and prognostication of invasive fungal infection.

The department has 8 publications in national and international peer - reviewed journals in the year 2015.

Education

The faculty is involved with the training of postgraduate students of the MD Microbiology program and the MD programs in Pathology, Transfusion Medicine and DM Critical Care Medicine.

The ongoing educational programs include the Certificate Course in Hospital Infection Control (for past 14 years), training technologists in Laboratory Bio-safety and Infection Control, and training for nurses and dialysis technicians. An “Advanced training course in Medical Laboratory Technology” was commenced to provide specialized training to technologists at ACTREC.

The departmental faculty participated in international and national meetings and conferences.

Transfusion Medicine

Dr. S.B. Rajadhyaksha
Head

Dr. Anita A. Tendulkar
Dr. Priti D. Desai
Dr. Meenakshi Singh
Mrs. Shubha K. Jathar

The Department of Transfusion Medicine has established quality systems and continues to maintain high technical standards in providing a wide range of specialized blood components for complex requirements in oncology patients. It also offers assistance to other blood banks in the country for solving technical and administrative problems. Many healthcare institutions in the city avail of specialized modalities and investigations such as Irradiated of blood components and molecular HLA typing. Quality improvement achieved through automation of immune-haematological techniques, with its inherent accuracy and higher throughput, resulted in better delivery of patient care services.

Service

Enhanced availability of blood components to facilitate haemotherapy was the hallmark of 2015. The outdoor voluntary donor blood collections were augmented by more than 35% over the previous year. The number of blood donation camps organized by the department increased to 179 as compared to 123 in 2014. Platelet donation awareness camps doubled and availability of apheresis platelet units enhanced by 25%.

Table 1: Blood Collection 2015

Total no. of donors registered	26,549
Total No. of donors deferred	6,408
Total Donors	20,141
Blood brought from outside blood banks	1,836
Total blood available	21,977

Table 2: No. of service offered

	2014	2015
Blood units collected	19,660	20,141
Blood Grouping	56,901	57,805
Cross Matching	35,371	37,772
Blood Components prepared	60,126	60,933
Plateletpheresis units prepared	3,722	4,575
Irradiation of Blood components	26,882	30,744

Research

Research focused on better selection of platelets for transfusion and identification of matched related donor in patients of haematologic malignancies undergoing haemato-poietic cell transplantation. The department is also engaged in evaluating and ensuring quality of red cell concentrates with respect to haemolysis during transportation.

Education

The department is one of the 15 Training Centres for training blood bank medical officers, technologists and nurses in India by Ministry of Health and Family Welfare (MHFW), Government of India (GoI). It participates in the academic exchange programme with other teaching institutes. The department continued to offer M.D course in Immunohaematology and Blood Transfusion. The faculty participated in national and international meetings and were involved in decision making activities of NACO, MHFW, GoI. They are also part of Expert groups, Advisory Committees or Technical Committees of bodies such as NACO, NBTC, DCGI, NIB, NABH and SBTC. A Wet workshop on “Red Cell Antibody Screening and identification” was conducted during the year. The Department continues to receive observers for training in specialized areas including apheresis and component separation.

Nuclear Medicine & Molecular Imaging

Dr. Venkatesh Rangarajan
Head

Dr. Nilendu Purandare
Dr. Sneha Shah

Dr . Archi Agrawal
Mrs. Bhakti Shetye

Ms. Priya Monteiro
Mr. Ashish Jha

Nuclear Medicine Department is involved in providing state of art Isotope based diagnostic services and Outpatient isotope based therapeutic services.

Service

The department has two PET/CT scanners and one SPECT/CT scanner. In 2015, 13,493 PET/CT and 4,592 planar & SPECT scans were performed. Standalone CT scans were done on 50 Protocol patients. Two iodine based, ten 99mTechnetium based, four fluorine eighteen based and two gallium 68 based Radiopharmaceuticals were also available for service scans in the department. Therapeutic services are offered with low dose 131I,153 samarium and 177Lutetium Radiopharmaceuticals. The department provided comprehensive support to Trans arterial Radio Embolization (TARE) services.

The report templates had been standardized keeping in view of each DMG's requirement. 18 F Fluoride PET/CT with breathhold CT,68Ga PSMA-CECT/PET were new initiatives for Bone and Soft Tissue and Uro-oncology DMGs. These studies were a combination of many individual studies; thereby, decreasing time and cost to the patient and, increasing the diagnostic accuracy.

Research

Radioimmunoscintigraphy and site testing of new generation PET/CT scanner were the two important research programs of the department. Radiolabeled monoclonal antibodies labelled at BARC were imaged and dosimetry estimation was performed in a group of Non-Hodgkin's lymphoma patients; this enabled the center to provide radioimmunotherapy services.

Beta-testing, a first for TMC was carried out on Discovery IQ 5 ring PET/CT, a state of art 5th generation scanner that was completely designed in India. This facilitated most accurate quick quantification with minimum radiopharmaceutical usage.

Education

Besides the HBNI affiliated MD & DFIT courses, the department provided hands-on experience in PET/CT, to physicians from other hospitals like Leelavati and KEM hospital. The department in collaboration with the Atomic Energy Regulatory Board hosted a two day symposium on Radiation safety and regulatory practices and issues (TRASNUM). A pre-examination review course in Nuclear medicine safety and regulations was conducted prior to the annual RSO examination conducted by BARC. Both the courses were attended by more than 100 participants from around the country.

Radiodiagnosis

Dr. Meenakshi H. Thakur
Head

Dr. Supreeta 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. Ashita Rastogi
Dr. Seema Kembhavi
Dr. Ashwin Polnaya
Dr. Amit Janu
Dr. Nikhil Merchant

Mr. Trilokinath Mishra
Mr. Wadiraj Kulkarni
Mr. Pandurang Wagh
Mr. Shripad Kulkarni
Mr. Mahadeo Salunke
Mr. Satish Pandit
Mr. Ajay Girdhar
Mr. Bhausaheb Sangle

Service

A new 1.5T MRI machine was procured in 2015 to reduce the wait period for MR imaging and to benefit the general patients as well.

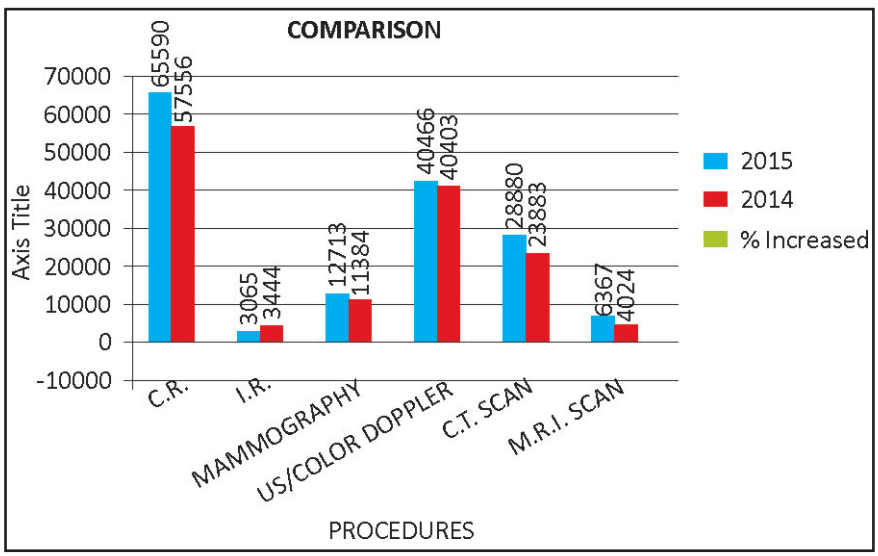
Research

The staff members of the Dept. of Radiodiagnosis have been engaged in 93 research projects during the year.

Education

TNM Cancer Staging App developed by Dr. M.H. Thakur, Dr. Palak Popat and Dr. Nilesh Sable globally launched in Vienna on September 16, 2015 at the IAEA General Conference and at the Women's Cancer Initiative conference on 9th October, 2015 by Dr. R.K. Sinha, Ex-Chairman, DAE. It is available free offline download on iOS and Android platform. It had > 5,000 download in around 2 months.

Volume Comparison:



*Decrease in IR procedure due to non functioning of one machine since 31.05.2015 due to fire incidence.

Medical Physics

Dr. Deepak D. Deshpande
Head

Dr. Rajesh Kinhikar
Ms. S. Jamema

Mrs Ph.Reena Devi
Mrs. Vijaya Somesan

Mr. Rituraj Upreti
Mr. Suresh Chaudhari
Mrs. Kalpana Patil

The Department of Medical Physics works in close association with Department of Radiation Oncology for radiotherapy of cancer patients. There are 6 Linear Accelerators, 4 Telecobalt machines for RT treatment and 2 simulators (conventional and CT simulator) for treatment and planning of teletherapy. Brachytherapy patients are treated with Ir-192 HDR after-loading machine.

Calibrations, Quality Assurance, maintenance of these teletherapy and brachytherapy machines, treatment planning and dosimetry, procurements of radioactive sources, ensuring radiation safety for the staff are some of the important functions of the department.

The department is equipped with many sophisticated equipment like treatment planning systems TPS (Eclipse, Oncentra, i-Plan), dosimeters and calibration instruments DOSE1, Unidos, 3-D Water Phantom (Blue Phantom,3-D scanner), 3D Dosimetry System (Octavius), TLD reader (Rexon), Film Dosimetry System (Omnipro), Gafchromic Film dosimetry system, etc. Two new linear accelerators (True Beam with Flattening Filter Free beam and Unique) were added with complete IGRT capabilities in 2015.

The department is actively involved in dosimetry, data acquisition of various Telecobalt machines, and Linear Accelerators. Planning & dosimetry verification of sophisticated techniques like 3D Conformal treatment with Multi-leaf collimator (MLC), Stereotactic (SRT/SRS), Intensity Modulated Radiotherapy (IMRT), and Image Guided Radiotherapy (IGRT) treatments. International standards of dosimetry are maintained by participating in International IAEA/WHO/BARC dose inter-comparison and many other clinical trial protocols like RTOG / ESTRO etc.

Service

The department planned 4,230 cases of external therapy (3,739 3DCRT, 491 IMRT), 345 Tomotherapy, 1,640 brachytherapy (3,082 applications) in 2015. The medical physicist advised on treatment planning, dose calculations and treatment time for the patients.

The department also advises other departments like Diagnostic Radiology, Transfusion Medicine, Tissue Bank, Bio-imaging and ACTREC on radiation protection, QA, source procurement and disposal as per AERB guidelines.

The department co-ordinates with various divisions of BARC/AERB, on matters like source procurements / disposal, plan approval, instrument calibrations / repairs, education and training, etc.

Research

The department is presently involved in the study of advance techniques of treatment viz., dose accumulation for adaptive therapy and study of dosimetric characteristics of flattening filter free beams from true beam linear accelerator and Hi-ART II tomotherapy.

Education

The Department has six candidates registered under its Ph.D. program affiliated to HBNI. It continued to conduct Radiotherapy Technologists course under MSBTE and also trained Medical Physics students through short term observership programmes and one year internship programmes.

The department organized demonstration of QA for trainees (service engineers) of RP & AD / AMPI training course. The faculty delivered lectures at various institutes. Department staffs were invited to give lectures to medical physicist's course Diploma in Radiological Physics conducted by RP & AD, BARC under HBNI.

General Medicine

Dr. Aruna Alahari
Head

Dr. Sheela Sawant
Dr. Anuprita Daddi
Dr. PTV Nair

Ms. Kalpana Adke
Mrs. Manjiri Mirwankar

The department provides consultation services for management of medical co-morbidities of patients undergoing surgery, radiotherapy and chemotherapy. A portable echocardiography machine is maintained to support management of patients in ICU and the department also provides management of emergencies and medical events during the peri-treatment course in the wards.

Apart from management of common medical conditions like diabetes, hypertension, ischemic heart disease, asthama, etc. the department also treats chemotherapy and radiation induced toxicities, infections in the immuno-compromised patients especially HIV, acute complications like pulmonary complications, cardiovascular disease and metabolic disorders in critically ill oncology patients.

Service

The team provides investigational and specialty clinical services. The Investigational services include 2D and 3D Echocardiography with Color Doppler for evaluation of cardiac structure and function as well as bedside echocardiography in critically ill patients in ICU. Electrocardiography, Pulmonary Function Testing (PFT) with spirometry and DLCO and Cardiopulmonary stress test services were also provided. A dedicated Echo laboratory was started for the general patients during the year.

The department performed a total 10,816 echocardiography tests, 3,792 pulmonary function tests and 32,429 electrocardiograms, and 12,746 consultations were provided during the year.

Specialty clinics

a) AIDS Malignancy clinic enrolls HIV positive cancer patients. Seventy one new patients were registered and follow up consultations were provided to 160 patients. b) Cancer Thrombosis clinic registered 242 new patients with venous thrombo-embolism with 1,221 on follow-up consultations. Cancer thrombosis working group of the hospital meets quarterly. c) Cardio-oncology clinic focuses on prevention, early detection and management of cardiovascular complications associated with cancer therapy. Point of care testing of BNP and Troponin I has been started which is useful in early detection and monitoring of cardiotoxicity. It enrolled 100 new patients and with 350 follow up consultations during the year.

Research

The department actively researches ways and means to detect early signs of cardiotoxicity. There are three ongoing studies, viz. Indo US study on HIV related lymphomas and head and neck cancers, and a study of metabolic syndrome in childhood cancer survivors.

Education

There were interactive educative sessions with visiting foreign dignitaries like Prof Dominique FARGE, Professor and Head of Internal Medicine and Vascular Disease Unit, Hospital St. Louis, Paris; Prof. Susan Dent, Medical Oncologist, The Ottawa Hospital Cancer Centre and Associate Professor in the Department of Medicine at the University of Ottawa.

The department organized the First Conference On Cardio-Oncology In India - 2015 as a part of the 13th Annual EBM meeting of Tata Memorial Hospital. The endeavor was to increase awareness and review existing guidelines and their application in the Indian context.

Nursing

Mrs. Swapna S. Joshi
Nursing Superintendent

Mrs. Sulochana Retnamony
Mrs. Manorama Anilkumar
Mrs. Sindhu Nair

Mrs. Carmine Lasrado
Mrs. Shweta Ghag
Mrs. M. Carvalho
(Prof. & Principal)

Mrs. Anita D'Souza
(Prof. & Vice Principal)
Mrs. Prathepa Jagdish
(Lecturer)

Service

Nursing department plays an important role in providing safe, high – quality and effective nursing care and believes that academic progression is critical to the growth of nursing profession and individual care. Nurse led clinics have shown improved outcomes. Nurses with specialized training like CVAD, Stoma clinic play an educative role to patients by involving them and their relatives in their personal care and performing nursing interventions as and when necessary. The specialized nurses in CVAD clinic inserted a total of 1,025 PICC lines. A team of specialized nurses provided nursing care to 6,047 patients.

Stoma clinic: The various services offered by the department include pre-operative counseling, Stoma marking, Stoma assessment, management and Irrigation procedure, and follow up care. The Enterostomal therapist offers support to patients to resolve physical problems with appropriate containment system, allied products and coping mechanisms to manage psychosocial problems with ostomies, wounds and incontinence. Stoma care services were offered to 6,049 patients.

Research

The department is engaged in studies covering various aspects of care like management of wounds and fistulas and evaluation of wound care products and Ostomy products.

Education

Nursing staff attended regular CMEs, training workshops, presented papers at national and international conferences. Certificate courses on 'Central Venous Access Device' and 'Enterostomal therapy' affiliated to Continued Adult Education and Ext Works, SNDT Women's University, were conducted. An on-the-job training for wound care was organized. Nurses from Homi Bhabha Cancer Hospital (HBCH), Sangrur, Punjab and Homi Bhabha Cancer Hospital and Research Centre (HBCHRC), Visakhapatanam were trained in TMH. TMH nurses also visited Homi Bhabha Cancer Hospital Sangrur, Punjab to impart on- site training.

Staff Clinic

Dr. Sandeep Tandon
Head

Dr. Pankaj Rajput

Along with conducting routine activities of clinical medical as well as Occupational Health related administrative responsibilities, this clinic is also concerned with managing and reporting needle stick Injuries, vaccinating staff against Hepatitis B, conducting pre - employment examination and preparing health-related policies and guidelines. The clinic also promotes positive health by encouraging and conducting check-up for early detection of modifiable and treatable risk factor for lifestyle diseases like Hypertension, Diabetes, and Dyslipidemias.

Service

The Staff Clinic provided medical treatment to 2,097 TMH staff including 1,441 super staff (excluding CHSS dependents) & 656 labour staff (including their dependents) for their day to day ailments. In 2015, the staff clinic had approximately 36,376 consultations 308 pre-employment examinations, 482 Hepatitis B vaccinations (Super Staff 433 & Labour staff 49) and, 112 Needle-stick injuries were treated and reported. The staff clinic also conducted quarterly medical checkup of food handlers and ICU staff.

The computerized clinical notes and the prescriptions were linked with the CC Number on the CIS / EMR, ensuring complete computerized record for TMH staff.

Tissue Bank

Dr. Astrid Lobo Gajiwala
Head

Mrs. Urmila Samant
Mrs. Cynthia D'Lima

The main activity of the department is to bank bones obtained as surgical residues from knee and hip replacement surgeries and amputations, and amniotic membrane donated after deliveries. These tissues are processed, cut into different shapes and sizes, terminally sterilized by gamma radiation and made available as bone allografts and ready-to-use biological wound dressings that are used for the cost effective treatment and rehabilitation of patients with a wide variety of disease conditions. This enables the re-use of routinely discarded tissues. The Bank caters to the needs of patients at TMC and across the country.

The activities of the Tissue Bank span the donation, screening, processing, storage and distribution of tissues. These activities involve liaising with the State Regulatory Authorities, conducting public and professional awareness programmes to promote the donation of tissues and utilization of allografts, networking with donor hospitals and tissue retrieval centres in Mumbai and outside, quality assurance and compliance with national and international standards.

Service

During 2015 the Tissue Bank upgraded its infrastructure to facilitate more efficient functioning. However, since processing had to be partially discontinued from December 2014 to September 2015, the number of grafts produced and utilized was reduced as compared to 2014. Despite this, 1,805 amnion donors, 977 bone donors and 5 tooth donors were motivated to donate tissues which were used to produce 7,666 grafts. These included 4,031 bone grafts, 10 tendons, 2,402 amnion dressings, 1,148 barrier membranes for dental use and 75 vials of tooth granules. 8,347 grafts were used in TMH and 549 hospitals and nursing homes all over India (Table 1).

In TMH 140 bone grafts were used in 51 patients, for biological reconstruction of the defects produced by ablative surgery for cancer. 1,543 amnion dressings were used in 303 patients for the management of radiation ulcers, bedsores and surgical wounds. 3,489 vials of bone granules 542 bone grafts and 10 tendons, 2,077 amnion dressings and 2,000 grafts were provided to patients outside TMH.

Table 1: Number and Type of Allografts

Sr. No.	Grafts	Produced		Utilized	
		2014	2015	2014	2015
1.	Amnion	2,837	2,402	3,076	2,077
2.	Chorion/ Chorion-Amnion	2,604	1,148	1,646	2,000
3.	Bone Granules	1,200	1,146	1,075	1,015
4.	Demineralised Bone Granules	2,395	2,343	3,404	2,090
5.	Freeze-Dried Bone	1,054	420	1,131	1,079
6.	Demineralised Freeze-Dried Bone	48	71	140	26
7.	Frozen Bone	62	51	64	19
8.	Tendon	0	10	02	01
9.	Tooth granules	0	75		40
	Total	**10,200**	**7,666**	**10,538**	**8,347**

Research

The department's research activities focused on Standardizing protocols for processing tooth granules for use as allergenic graft materials in oral surgery and the study of 3D Micro-structure of bone to help develop bone substitute scaffolds. It also is involved in assessing the efficacy of irradiated amnion dressings in the management of moist desquamation following radiotherapy.

Education

During the year, 64 students and medical professionals were introduced to tissue banking, including two who were given hands-on training. Assistance was also provided to seventeen M.D.S. students for research projects using the Tissue Bank's products.

Public and professional awareness programmes were organized at TMH and other venues and articles published in the secular press to promote tissue donation and utilization. The Tissue Bank staff was invited faculty and/or participated in scientific meetings, seminars and conferences. The department also participated in organizing Indian Breast Cancer Survivors Conference, an International Women's Day celebration for TMH patients and their caregivers, and blood donation camps.

Digital Library

Dr. Medha Joshi
Head

Mrs. Mrudula Pusalkar

The Digital Library is the primary centre for scholarly information and focuses on building collection of oncology information and its various specialties to support organizational activities of clinical service, research and education. As medical information resource centre, it continued to offer services to its staff and students and services were also extended to medical and biomedical professionals; hospitals, educational institutes and industry. The library also supported online requests from visitors, staff and attended requirements of walk-in visitors.

The library provides integrated library instructions for effective use of electronic resources. A wide variety of additional services including customized literature searches and full text of request material in electronic format are offered. The facility of Remote Access to Electronic Resource and federated search was established.

The Library Webpage reconstruction on new TMC web portal is in progress, to extend library facilities beyond campus and facilitate quick outreach support like details of collection, search across library resources, request form feeds and access to full text for both subscribed and open access contents on the web.

Service

The library has a collection of over 7,924 printed books and more than 22000 bound journals. It acquired about 86 books and monographs during the academic year, to meet both gaps in research materials and complement the Library's existing collection of books. Subscriptions to 178 specialty journals, which included 135 e-journals and renewed subscription of four full text e-databases like clinical Keys, Up-To-Date and CINHAL facilitated evidence based practice, education and research. More than 700 articles covering staff publications and articles from Indian Journals were indexed. These additions to the collection ranged in wider subject domain to satisfy all specialties in oncology treatment and education. Several requests for newer information resources and e- journals were received and are under consideration. E-resources were generally trialed first, to evaluate their relevance and potential usefulness to the hospital, and efforts were made to acquire perpetual access licenses, where possible, to ensure continued availability and best value for money.

Document supply is the most used service of the library and is availed by TMC members, libraries across country, industry and individual visitors. Seven hundred and thirty two document supply requests for a total of 1844 scholarly articles were received by the library. Of these, 321 requests were received through web-based form feeds. Of the total number of article requests received, the library was able to provide copies of 1433 articles, i.e. 82% of article requests were satisfied as compared to 65% in 2010. Most requests were satisfied by providing soft copies to save on paper and improve the response time.

Research

The usage data of electronic resources for subscribed and on trial access were collected, monitored and analyzed. Usage data is a vital factor in assessing value and directing the digital content management, procurement and renewal decisions. The remote access facility was often used during the year and a total of 1,15,039 numbers of remote logins were registered. Approximately 61000 full-text articles were downloaded from the Library's e-resources. Clinical Key, Up-To-Date and Science Direct were the highly used resources (see fig 1).

Education

An increased demand for information literacy tutorials was observed. These bimonthly tutorials focused on information literacy skills viz., search techniques, database uses, publishers' interfaces and citation management tools. More than 60 end-users benefited from these tutorials. One library trainee was inducted for practical knowledge.

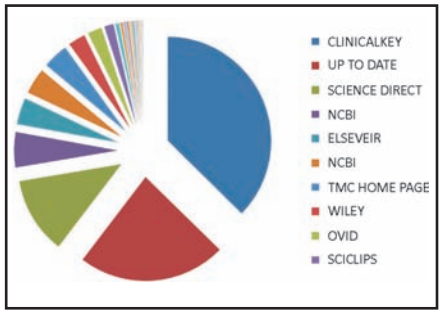


Fig1. Resource-wise Library usage

Information Technology

Mr. Mahesh S. Mangrulkar,
I.T. Manager, TMC

Mr. Vivek Marathe
Mr. Sanjay Sinha
Mrs. Charulata Nimje
Mr. Pravin Kalsekar
Mrs. Sandhya Joshi

The Information Technology (IT) department plays a pivotal role in the day to day functioning of Tata Memorial Hospital in all the three major areas i.e. Service, Research and Education. All activities of the hospital are computerized and new functionalities are added on a continuous basis. Hospital Information System runs 24x7 on a DB2 Database with IBM power Server with High Availability & Disaster Recovery features. A comprehensive integrated HIS to manage clinical, financial and administrative aspects of the hospital was developed. Most of the system modules are web enabled. HIS has been implemented at TMH, ACTREC, Homi Bhabha Cancer Hospitals at Sangrur and Visakhapatanam with the following key features:

- Clinical focus with EMR: The EMR feature together with clinical functionality provides a comprehensive solution for the hospital.
- Fully Integrated solution: Comprehensive coverage of all hospital functions with integration with external systems like PACS Systems, Lab Auto analyzers, Bar Code, Smart Card, Kiosk, Computer on Wheels etc.
- Modular design: Enables modules to be implemented in a phased manner, providing for greater flexibility to meet hospital needs while protecting investment and minimizing the impact of change.

Service

During 2015, many applications were developed, which enabled the department to provide better patient services. Software Development and Maintenance, Hardware Maintenance, Network monitoring & 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. Some of the departmental activities during the year, include Kiosk based services for travel concessions; Web based application for major & minor surgeries; Web based modules were also developed for allotment of guest house rooms, booking of auditorium and Gate Pass. Apart from maintaining the established systems, the Medical Oncology Information System and Diagnostic Information System were updated to satisfy the required changes. The department developed browser based software for radiology appointments, and a Web based Clinical Information System was implemented for Breast DMG along with EMR. A new web site has been developed for Tata Memorial Centre.

Research

Data analysis was regularly done for Clinical Information System, patient administration, billing & receipting system, Diagnostic Information system, Radiology Information system, Operation Theatre module etc.

Education

Nurses were trained on Computer concepts, Hospital Information System and Microsoft office.

Medical Graphics

Mr. Nilesh Ganthade
OIC

The department is fully equipped with state of art digital technologies such as digital cameras, full HD medical purpose surgical video recording system, Live broadcasting facility using HD codec, high resolution film scanner for MRI, and CT film scanner.

The team of photographers also known as medical illustrators are important part of the healthcare team, and are responsible to accurately record images of diseases, pre and post surgery videos, and other medical procedures. These accurate documentations of images assist clinicians to plan treatment. These images are also used for measurement and analysis and also as accompanying material for medical or scientific reports, articles or research publications as well as for educational purposes. It is essential for the department professionals to be aware about sterile procedures and adherence to privacy legislation and policies.

The digital cameras are used to record surgeries. Variety of specialist photo imaging techniques and equipments were employed for more complex situations, including micro and macrography, thermal imaging, time - lapse cinematography, endoscopy (to photograph internal organs), and photography outside the visible spectrum.

The department also supports requirement of photographs and images for website and other commercial use. The department video records CMEs conducted at the centre, graphic designing of brochure, leaflets, banners and posters and other such material required for the events are also prepared.

Table 1: Activity Details

Clinical Photography	1128
Scientific Poster Preparation	95
DTP/ Artwork of Conference, Poster, Banners, Leaflets etc	340
Surgical OT video Recordings	45
Illustration Work for clinical Papers	74
PR photography / Conference photography	6080

Medical Administration

Dr. Sarita Khobrekar
Medical Superintendent

Dr. S. Tandon
Dr. Vinit Samant
Dr. Sumedha Patankar
Dr. Sandeep Sawakare
Mrs. Swapna Joshi
Mr. Rajeev Sawant
Mrs. Neelima Dalvi
Dr. Anuradha Daptardar
Dr. Manjusha Vagal
Mrs. Chitra Hingnekar

The main objective of the medical administration office is to supervise, facilitate and implement effective patient care services. These activities include: registration of patients, evaluation of patients, ambulatory care, wait listed patients and also addresses patient grievances, ensures patient safety and quality assurances.

Medical Social Services

Mrs. Neelima.A.Dalvi

Medical Social Worker

The trained staff of Medical Social Services facilitates social and economic support to cancer patients for alleviation of their suffering and improving quality of life. Counseling about treatment procedures, and financial and accommodation support to out- station patients are offered to socio-economically challenged patients, to ensure complete treatment and minimizing drop outs. The department facilitates support for initial stage of diagnosis and emergency life saving medicines through Seed money and Supplementary fund respectively. This has helped in controlling the dropout rate.

The staff attends various clinics namely Adult Palliative Care, Pediatric Palliative, Pediatric Tumour Clinic, the Lymphoma clinic/ Radiation Oncology, and ACT & HIV clinic to assess patients for Tata Memorial Hospital Sponsorship.

The CSR initiative was established during the year, and a corpus fund of about one crore was collected under this initiative. A total of 45,621 patients were counseled and guided during the year. Eighty-one home visits were made to track defaulting patients. Parichay meetings for patients undergoing radiotherapy were organized. About 5,292 patients were the beneficiaries who preferred nominal charges based on socio economic conditions. The cost of emergency drugs worth Rupees one crore were waived for economically backwards patients.

547 patients were provided accommodation at Dr. Ernest Borges Memorial Home at nominal charges, while 150 patients were accommodated free of cost. Patients were also guided for affordable accommodation available in and around TMH. 685 patients were provided nutritional supplements.

The department received about rupees twenty one crore through donations from philanthropic organizations. The donations from individuals and institutions were also received through the online donations facility.

Fun activities like picnic for adult female patients on women's day, Christmas celebrations, 11th Annual Educational Support programme to mobilize scholarships for patients were organized during the year.

Central Sterile Supplies Department

Mr. Rajeev G. Sawant, Head

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 provided to service the needs of the hospital. Two new steam sterilizers and one Robotic instrument washer disinfector is being procured. All Robotic Surgery Instruments MIS and General surgery instruments are processed and sterilized by C.S.S.D. The Department has total 46 staff working round the clock to give service to all OT, ICU, Wards, OPDs etc.

Pharmacy

Dr. Sumedha Patankar

Asst. Medical Superintendent

The dispensary and pharmacy services at TMH functions 24/7 throughout the year including weekends and holidays catering to a large number of patients that visit the hospital. With three major dispensing outlets located at different areas within the hospital for ease of access, the dispensary catered to 8,76,479 transactions during the year 2015 viz. an average of approximately 2500 transactions per day. The total turnover of the Dispensary for the year 2015-16 was Rs.182 Crore which is an increase of 10 % over the previous year.

The pharmacy at TMH makes high cost medicines available to its patients at highly discounted prices, helping to reduce a large amount of financial burden on them. During the coming year, it proposes to start an additional dispensing outlet in the Golden Jubilee Block to service patients visiting the General OPD. The Introduction of Pharmacy Automation Systems is another initiative in the pipeline with an intent to minimize potential medication errors.

General Administration

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
(Grade-II)

Mr. Raju Kotian,
Administrative Officer

Mrs. Rajlaxmi K. Naik,
OIC House Keeping Department

Mr. A.L. Kuvalekar,
Stores Officer

Mr. R.A. Patil
Jr. Administrative Officer

Administration

Tata Memorial Centre is a Grant-in-Aid Institution of the Department of Atomic Energy, Government of India. The Centre has been constantly upgrading its facilities to bring in the latest technology for diagnosis and treatment. Infrastructure has been augmented. The progress and development of an institution depends to a great extent on the functioning of its personnel. Activities of the Centre involved highly complex administrative machinery.

The **Chief Administrative Officer** is supported by a team of officers such as Chief Engineer, 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. 7 lakhs was disbursed to employees as advance towards housing, motor cycle, motor car, computers, etc. The administration supported and processed 1,424 applications for national deputation and 353 applications for international deputation during the year. The administration added 363 employees as members to Contributory Health Service Scheme (CHSS) and deleted 307 beneficiaries. A total of 5,403 people are beneficiaries of the Contributory Health Service Scheme. Of the total 1,042 claims received, 957 were sanctioned under Contributory Health Service Scheme. Information was provided to eighty four requests which were received under Right to Information Act, 2005. Further, the First Appellate Authority received 15 appeals which were resolved within the stipulated period.

The **Human Resource Development Department (HR)** ensures optimum utilization of manpower by deployment of right person at right place. Recruitment actions for various posts, after following all procedures have been taken and 43 personnel were appointed during the year. HRD also looks after approximately 510 staff working for 323 on-going Extra Mural & Intramural projects. Approximately, 1,350 numbers of Identity Cards were issued to employees during the year.

A total of 25 disabled / handicapped personnel in different categories were employed in TMH as per details given in Table – I.

Table - I

Category	Orthopadically (OH)	Visually (VH)	Hearing (HH)
Group A	1	-	-
Group B	4	1	-
Group C	5	1	2
Group D	8	3	-

Total SC/ST/OBC staff in TMH as on 01.01.2016 is as furnished below :

Table - II

Category	Group A	Group B	Group C	Group D	Sweepers
SC	11	128	66	181	186
ST	01	11	10	03	03
OBC	16	157	78	75	11
Total	28	296	154	259	200

SC/ST/OBC Officers are included in Selection committees. Mr. R.P. Jaiswar, Senior Personnel Officer, TMH is the Liaison Officer for SC/ST/PH and Mr. A.N. Sathe, Senior Administrative Officer, TMH is the Liaison Officer for OBC.

The department conducted staff promotional activities and promoted 77 employees. Thirty Six employees ceased from services during the year. All SC/ST employees are interviewed for merit based review promotion with relaxed norms. HRD facilitates recruitment of trainees for various short term and long term training programmes. These are 26 advanced specialized skilled courses for Doctors, Nurses & Technicians from across the country. 170 trainees benefited during the year.

Skills of in house employees were developed through various training programmes and workshops. Staff members were deputed for training programmes conducted by ATI, DAE and ISTM, New Delhi.

The **Accounts Department** is responsible for patient billing, receipting and settling accounts of different categories of patients i.e. smart card, cash paying, trust and company referred. The Department is also responsible for budgeting, utilization of the plan and non-plan grants, submission of various report to DAE regarding utilization of funds and status of Plan Projects.

During the financial year 2015-16 Non Plan Grant Rs.250 Crore was received which was fully utilized. The Plan grants sanctioned was Rs.275 Crore and targets proposed were met.

Smart Card services have been implemented across the hospital for all categories of patients. This has resulted in ease in transacting services in TMC.

Personnel Department organized training programme for labour staff through Central Board for Worker' s Education, Ministry of Labour and Employment, Govt. of India. About 100 labour staff were benefitted during the year. Fourteen Non SSC labour staffs were imparted Refreshers Training Course for MTS through Institute of Government Accounts and Finance, Regional Training Center, Mumbai during the year. The Centre has the backing of 852 number of labour staff governed under Brihanmumbai Municipal Corporation [BMC] and Central Government (CG) who plays an important role in the areas of Cleanliness, Transport of Specimens, documents etc., which are important support functions in delivery of care. During the year, department conducted staff promotional activities and promoted 9 labour staff and the management has given special increment to 72 labour staffs as a motivation. 25 labour staffs superannuated/voluntarily retired.

All the labour staff were trained on behavioural aspects, communication, family budget, dignity of labour, absenteeism etc. Weekly meetings were conducted with 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. The personnel department continued to provide mediclaim cashless benefit to labour staff. Submission of Identity Card form for labour staff as well as pensioner and festival advance form were made available through online process. The Time Keeper Office, functions 24 X 7 to facilitate deployment of labour staff to various department in the hospital.

The Personnel Department in co-ordination with the selection committee nominated labour staff with good work record for "Best Worker Award" and they were felicitated at Annual Hospital Function.

The **Purchase Department** through its automated systems is involved in the procurement of various consumables, capital equipments, minor equipments, Spare parts, local purchases, etc. Total procurement worth Rs. 100 crores were processed through Import Cell , Rate contract cell and Non rate contract cell of Purchase Department. A purchase order worth Rs. 300 crores for the

supply and installation of Hadron Beam Therapy Facility was finalized for the National Facility for Hadron Beam.

The **Centralized Stores Department** ensured environment friendly disposal method for empty HP Cartridges and is continued throughout the year which is an additional income to TMH. The main function of stores is to stock and support regular requirements of the various Wards/OPD's/Labs/Departments as and when required. The stores stock consumables items such as printing and stationery, Housekeeping, Disinfectant, crockery, Engineering items, Nursing items except drugs and surgical goods. Presently, it holds 351 items. The inventory of the department is computerized supporting timely supply of requested items. The stores also received capital items required by Surgical Oncology, Radiation Oncology, Radio Diagnosis Dept., Labs and other supporting departments and maintaining up to date record. Material like consumable or capital items received free of cost or donation or under project is also recorded in the system.

The annual physical verification and tagging of assets was conducted routinely by Centralized Stores Department. No discrepancy was observed in ledger and physical balance during the annual stock taking. During the year, the stores monitored receipt and issue of consumables worth Rs 417 lacs to cater routine requirements of the various departments.

The **Engineering Department** maintains the Hospital Complex and related MEP Services like Medical Gas, HVAC, Telephone and Pneumatic Chute, Power and Water supply, Elevators and Escalators, etc. Timely maintenance (routine & preventive) ensured avoiding breakdowns. Modification and renovations works as per the hospital requirements were undertaken.

The three storeys of the proposed ground + 7 storey building for Centre for Cancer Epidemiology and the Archive and Record Storage building (ground + 1 storey) was completed in 2015 to satisfy its present scope. The other newer projects viz., Radiological Research Unit (70000 sq.ft) and Hematolymphoid Block (186000 sq ft) have been undertaken.

The upcoming projects at ACTREC, Land allotted adjacent to Haffkine Institute, Mohali in Punjab and Visakhapatanam are being developed to facilitate for better facilities for patient care. The Cancer Hospital at Mullanpur, Dist. Mohali, Punjab (area: 4,33,680 Sq. ft) includes Main hospital block (Ground + 6 upper floors) and other buildings (Ground +2 floors) with all necessary facilities for diagnosis and treatment. Hostels for doctors and nurses, and Dharmashala / dormitories for patients have also been planned.

The **Maintenance and Verification Cell** is mainly responsible for the maintenance, verification and support for repairs and of medical equipments in critical areas like operating theatres, Intensive Care Unit, Recovery Ward, Central Sterile Supplies Department and Laboratories and calibration of all laboratory equipments. It also ensures the continuous supply of medical gas throughout the year and coordinates with IT, Dept., and Fire Dept., for finalizing the AMC and CAMC maintenance contracts. The cell also looks after the disposal of obsolete items. 155 tones (425 k.g X 365 days) routine scrap was disposed off by the Condemnation and Disposal cell during the year.

The main objective of the **Security Department** is to regulate the movement of people, material and vehicles in and out of TMH and ensure safety and custody of the Centre's property. Republic Day and Independence Day celebrations were organized. Vigilance Awareness Week was observed from 26.10.2015 to 31.10.2015. The lecture on "Preventive Vigilance as a Good Governance " delivered by Shri V.V. Lakshmi Narayana, IPS, Jt. Commissioner of Police, Thane City was attended by TMH employees. The oaths during the program in Hindi and English were administered by Dr S K Shrivastava, Chief Vigilance Officer and Dr. Sarita V. Khobrekar, Medical Superintendent respectively. Adequate arrangements in coordination with police and other related agencies were made during the visits of VIPs and VVIPs. Patient inquiries at security counter were answered and attendants were guided from time to time.

The **Food Service Department** caters to dietary needs of patients; the cafeteria for staff and students is also maintained. Food quality and standards are maintained and efforts are made to include different cuisines. It caters to about 1500 people per day. Catering services were offered to 67 national and international conferences and meetings during the year.

The role of **Housekeeping Department** (HKD) is critical in providing a peaceful, infection free and pleasant atmosphere for the speedy recovery of the patients.

The HKD ensures cleanliness and hygiene in all departments and doctors quarters using latest equipment, materials and techniques. Pest Control services are scheduled appropriately in consultation with individual departments. The Housekeeping staff

also helps in relocation of equipment and furniture, facade cleaning, flower arrangements, garden maintenance, green waste recycling (organic manure plant), coordinating complaints of electrical, civil, linen and laundry with their respective departments, and foyer & stage arrangements during various events.

Public Relations (PR) plays an important role in promoting a positive image of the organization. The problems faced by the patients / relatives are identified, compiled and presented to the management for considerations/ and solutions are suggested. Media / press conferences are organized to cover latest technological augmentation, implementations / programmes of the hospital for wider awareness among general public. 136 under LIC Policy were processed by the PR dept.

Press Conferences were organized and press notes were released on occasion of all events and initiatives by the centre for wider dissemination of information to general public. Welfare activities for the staff like Annual Hospital Day, Trekking for staff children, and other cultural programmes, etc. for all staff were organized. Group Insurance Medical facility was initiated for 535 staff. Entertainment programme like Orchestra, Magic Show etc. were organized and gifts were distributed on various festival occasions for cancer patients. NGO activities were supported. The department also supports conferences and seminars for transports, kits, etc.

The Hindi cell promoted the use of Hindi language through events like 'Kavi Sammelan' and 'Hindi Fortnight Celebrations'. It continued to publish the in- house magazine "Spandan "and also published Patient hand book. The Magazine was awarded consolation prize (2014-15) during the 17th All India Rajbhasha Sammelan of Department of Atomic Energy.

Patient Support Services

TMC patients receive support from a large number of non-governmental organizations and individuals. This support helps in the delivery of holistic care to patients. The following is a brief account of these organizations.

Shraddha Foundation provides accommodation and financial support to cancer patients. It also offers counseling, arranges entertainment programmes for cancer patients twice a year, arranges awareness & detection camps all over Maharashtra, Gujarat and Orissa.

St. Jude Trust guides cancer patients for ration and other financial help. Provides the children a clean and secure place to stay in, while on treatment at the hospital.

Braj Gauri Trust provides free cloak - room facility for cancer patients.

Indian Cancer Society provides ration and other financial help to patients. It provides nutrition supplement for paediatric patients and also offers counseling services to cancer patients.

V Care Foundation distributes gifts to children at the time of discharge and celebrates Cancer Survivors Day. It provides infection control kits for all general patients in the pediatric ward. It also offers counseling service and distributes cancer informative books.

JASCAP provides financial assistance and maintains a book stall at the hospital in which they provide books on cancer information in various languages. CDs and DVDs are available to cancer patients at a nominal cost. It also helps the patients with emotional counseling.

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.

Vasantha Memorial Trust provides counseling to the families and also provides financial assistance for leukemia patients.

JACAF provides shelter home, arranges detection and cancer awareness camps. It offers counseling and arranges blood and platelets for the patients. It also helps with financial support to paediatric patients.

Cancer Patients Aid Association (CPAA) provides nutritional supplement to the paediatric patients and celebrates "Rose Day".

SSAUT provides voluntary service to cancer patients.

Gunawanti J Kapoor Trust chiefly aims at providing financial help to breast cancer patients in association with JASCAP. It also guides and impart chemotherapy education to all OPD patients, arranges platelets drive for paediatric and adult patients, coordinates for the support group meeting and provides ration facility. It also offers accommodation reimbursement through Indian Cancer Society. It occasionally also support nutrition and diet related research that are beneficial for cancer patients.

Madat Trust offers counseling service and helps patients.

Little More arranges entertainment programme for patients and extends educational support to paediatric patients. It offers counseling service and provides ration to the patients.

Make A Wish Foundation identifies and fulfills the wishes of the paediatric 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.

ImPaCCT Foundation This is an acronym for "Improving Paediatric Cancer Care and Treatment 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.

Activities of ImPaCCT Foundation:

1. Gives holistic support to paediatric patients
2. Provide Midday Meal to Paediatric patients
3. It offers counseling service to the patients
4. The foundation helps to raise funds for the treatment of poor patients without them having to approach multiple organizations
5. Provides bereavement support and thereby assist in holistic care to pediatric patients
6. Provides educational support to paediatric patients.

After Completion of Treatment (ACT) Clinic

Improvements in cancer therapy 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 "CURE" 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 2015, cohort of 1786 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 frequency depending on probability of risk of late effects. During Jan 2015-Dec 2015, 79 survivors were added to this cohort & 413 survivors were followed up in ACT clinic.

UGAM

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.

Ugam survivors perform various activities of cancer awareness, fund raising and promotion of survivorship at many forums through national and international meetings and conferences.

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.

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

Other than NGOs, there are several Individuals who support cancer patients in TMH. Some of them are enlisted below - :

1. Ms. Ameeta Bhatia : Provides counseling, emergency support, arranges and helps birthday celebrations of children, organizes annual event "Hope", outing activities and workshops on personal basis
2. Mr. Thyagrajan P. : Fund support, small software application development and counseling
3. Ms. Niyati S. James : Offers counseling and arranges cash for emergency treatment
4. Mr. Narendra Nadkarni: Medicine compliance and B.P. monitoring
5. Ms. Pooja Bangia: Arranges Art activities in wards
6. Ms. Nandini Save & Mr. Nitin Save: School Programs
7. Ms. Asha Mehta: B.P. Checking and Medicine compliance
8. Ms. Shilpi Mehta: Arranges emergency funds
9. Mr. Aditya Kalyan: Arranges Magic Show & O.P.D. Activity
10. Ms. Payal Sangrajka: Arranges emergency funds and distributes gifts.

1941 - 2016

KNOW CANCER

RESEARCH

ACCESS TO QUALITY CARE

Ms. Rohini Hawaldar
Co-ordinator, TRAC

TMC Research Administrative Council (TRAC)

TRAC was constituted in 2008 with a broad mandate to maintain and improve basic, translational and clinical research in TMC. The main activity of TRAC is to establish Human Research Protection Program and its implementation, set priorities and provide directions for research in thrust areas, as per Institute's mandate. To facilitate the collaborative research, TRAC suggests and reviews pre-proposal for sponsored research, and proposals for collaborations between TMC, with other Indian or International Institutions, Groups, Individuals and / or industry. It often identifies Principal and Co-investigators within TMC for collaborative research. The expenditure and income incurred on hospital services, laboratory and administrative functions for investigator initiated and sponsored research conducted in TMC are reviewed periodically by TRAC.

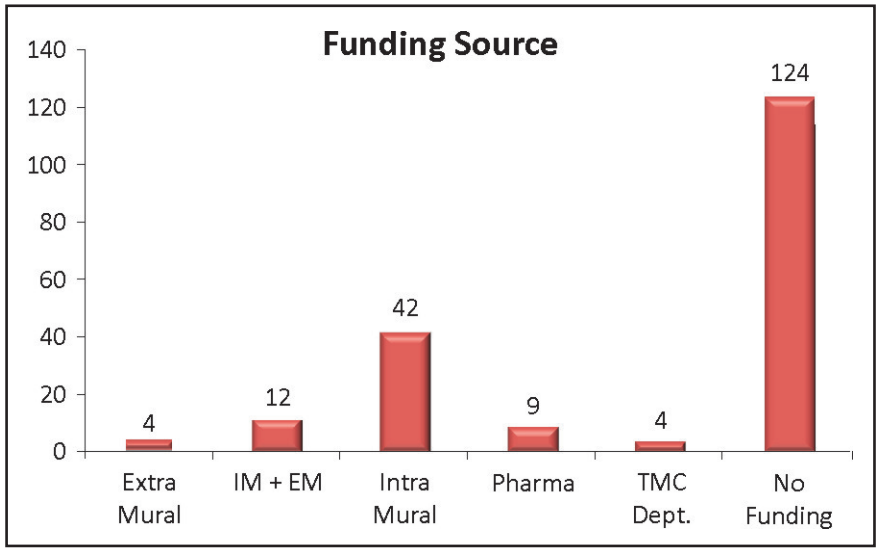
The TRAC committee met once during the year to review Institutional Insurance policy for investigator initiated research studies and revision of IEC processing fees. The TRAC continued with further development and implementation of software for IEC administration at TMH and ACTREC for easy, effective and better functioning. Protection of research participation was ensured through systematically implementation of Human Research Protection Program. Researchers and individuals within the organization were educated about the policies and procedures of the Human Research Protection Program under AAHRPP through several workshops and events.

Audits of IEC-I,II, III functions, and research projects are conducted at regular intervals to ensure quality. Funds for intramural studies were disbursed on competitive basis and accounts department was supported for management of non functional research accounts.

A GCP Workshop for IEC members and staff was organized on 23 January 2015.

The TRAC plans to undertake the following activities in future:

- The quality control program for research projects
- To develop in house program for online project submissions, tracking and review process
- DCGI mandated NABH accreditation.



Clinical Research Secretariat and Department of Atomic Energy - Clinical Trials Centre

Dr. Manju Sengar,
Officer In Charge

Clinical Research Secretariat (CRS) along with Department Of Atomic Energy-Clinical Trials Centre (DAE-CTC) plays a key role in facilitating research at Tata Memorial Hospital. The mandate of CRS is to promote clinical research, train and educate researchers and trial-coordinators on scientific and ethical conduct of clinical trials and propagate the practice of evidence based medicine across the country.

In order to comply with the requirement of increasing research activity, documentation and regulations, the CRS undertook expansion in three major areas. The CRS area was expanded to create a hub for coordinators, a Central pharmacy and storage space for study documents. The hub area has 16 dedicated and fully equipped work stations with internet and printing facility, and a room for statisticians. The Central Pharmacy was created with space for storage of all trial related drugs with controlled access, in compliance with Schedule Y (Investigator Product Management), and ICH-GCP (E6). A dedicated storage area with controlled access was allocated for clinical trial records in compliance with ICH-GCP.

The statisticians at CRS provide support to clinical researchers in designing of trial, sample size calculation, randomization list generation and analysis. During the year, statistical support was provided to 125 clinical trials and projects in the areas of Analysis (89), Sample size (18), Statistical methods (12) and also generated randomization list for 6 studies. In addition, the CRS also supported the process of randomization on an ongoing basis for 40 trials. It also facilitated translation of consent forms for 34 trials during the year. The DAE – CTC provided a total financial grant of Rs 86,06,281/ - to 11 intramural trials.

Standard Operating Procedure: In order to ensure execution of research in accordance with Institutional guidelines, updated applicable national guidelines and regulations (e.g. Schedule Y, Indian GCP, ICMR guidelines, ICH GCP), and maintain uniform standard, a detailed SOP was designed. The key elements of the SOP include Assessing Protocol Feasibility, Clinical trial agreement with sponsors or CRO, Interaction with IEC, Study/Research team responsibilities, Communication with sponsor or CRO, Site Initiation, activation, conduct and close out, Reviewing and obtaining Informed consent form, Recruiting study subjects, Source documentation, Managing Investigational Product, Archival of Essential documents, Safety reporting, Managing biological samples, Reimbursement policies, Study team training and study handover, and Transfer of patients between TMH and ACTREC.

SOP training is mandatory prior to the beginning of the study. All TMC investigators / researchers were trained in the SOP.

Education

Several workshops and seminars were organized / conducted by CRS to train staff and researchers on various aspects of the clinical research and supports other academic activities like conducts exams and interviews, organize lectures, develop study materials and manage external postings. Some of the workshops conducted are:

- Clinical research methodology workshop: to train researchers on various aspects of trial design and analysis was attended by 225 delegates (local and national)
- Good clinical practice workshop: to train TMC Staff on ICH-GCP principles. 113 participated in the advanced course module and the basic course was attended by 155 delegates
- Collaboration for Research methods Development in Oncology (CReDO) workshop: A five day residential workshop (Nov. 2015) organized under the aegis of NCG and TMC, on advanced training in clinical research methods and protocol writing, was attended by 66 delegates.
- M. Sc. Clinical Research: presently a total of 19 students are pursuing the course.

Evidence Based Management (EBM) meetings were initiated about a decade ago to promote practice of EBM in cancer with the objective to identify and address focused questions relevant to oncology practice in India. Around 4-5 oncology experts are invited as national and international faculty members every year to share their experiences and expertise. The plan layout includes talks on a particular topic in context with the Indian scenario, interactive discussion session and panel. The outcomes of these discussions are usually in the form of recommendations and identification of uncertainties. Good ideas emerging from these uncertainties would form a nidus for ideas for multi-institutional randomized studies.

The EBM 2015 meeting focused on Modern Radiation Oncology Practice symposium, organized by Department of Radiation Oncology, Molecular Haematology: Laboratory Testing for Myeloid Malignancies, 1st Conference in India on Cardio - Oncology: A new focus in cancer care. The meeting was attended by 780 delegates. A Set of 3 volumes EBM books were published on the theme of the conference were released and are available on TMC website.

The CRS continued to support several meetings, conferences / seminars / workshops organized by TMH departments, like the 13th Women's Cancer Initiative and International Workshop for Scientific Journalism.

Institutional Ethics Committees (TMC IEC I & II)

Dr. George Karimundackal,
Member Secretary,
Institutional Ethics Committee-I

Dr. Siddhartha Laskar,
Member Secretary,
Institutional Ethics Committee-II

The Institutional Ethics Committees-I, II (IECs) are constituted by the Director, Tata Memorial Centre (TMC) under authority vested by the Governing Council of the TMC. IECs are appointed for duration of 2 years and are constituted as per DGCGI / CDSCO guidelines and schedule Y. The Institutional Ethics Committees are registered with Drug Controller General India and function and follow the common SOPs. Each IEC consists of 15 members including in-house staff and outside experts as members representing wide range of stakeholders. The IEC I & II review and monitor research conducted at Tata Memorial Hospital, while the IEC-III monitors research conducted at ACTREC.

The IECs are registered as per the Rule 122DD of the Drugs & Cosmetic Rules 1945 and have Registration Nos. ECR/170/Inst/MH/2013 and ECR/414/Inst/MH/2013 for IEC–I and IEC–II respectively. IECs are also registered with HHS with IORG Nos. IRB00003414 and IRB00007802, for IEC-I and II respectively. The registrations are renewed regularly.

Institution 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.

The terms of reference and mandates of the IECs are published on TMC website along with the details of committee membership. The IECs endeavors 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. However, they do not address or interfere in matters of administration, nor do they function as a grievance cell for staff members.

The two committees namely TMC - Institutional Ethics Committees- I and II (TMC-IECs) are involved in the review of both industry sponsored & investigator initiated research proposals and student research. The Committees meet once a month to facilitate timely reviews while maintaining high standards of review process and also provide a forum for discussing and analyzing ethical issues related to research activities.

Institutional Ethics Committee-I w.e.f. April 2014

Sr. No.	Names & Position	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. George Karimundackal, Member Secretary	Associate Professor, Dept. of Surgical Oncology, Tata Memorial Hospital	Male	Surgeon
4.	Mrs. Manisha Naikdalal, Member	Member of Ethics Committees at KEM Hospital(ECRHS) & Hinduja Hospital(CREC)	Female	Lay Person
5.	Ms. Sandhya Vora, Member (April 2014-Oct 2015) Dr. Bindhulakshmi P Member (w.e.f. Nov 2015)	Managing Trustee V Care Foundation Associate Professor, Advanced Centre for Women's Studies, School of Development Studies, Tata Institute of Social Sciences	Female Female	Social scientist/ NGO representative Social scientist

Sr. No.	Names & Position	Affiliation	Gender	Expertise
6.	Dr. Pradnya Talawadeker, Member	Country Coordinator for India Association Children Palliative Care Project	Female	Medico-legal expert
7.	Dr. Sanjay Gupta, Member	Scientific Officer, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC)	Male	Basic Scientist
8.	Dr. Sarbani Ghosh Laskar, Member	Professor, Dept. of Radiation Oncology, TMH & Member-Secretary, Data Safety and Monitoring Subcommittee, Tata Memorial Hospital	Female	Radiation Oncologist
9.	Dr. J. V. Divatia, Member	Professor and Head, Department of Anaesthesia, Critical Care & Pain, Tata Memorial Hospital	Male	Anaesthetist
10.	Dr. Vani Parmar, Member	Professor, Dept. of Surgical Oncology Tata Memorial Hospital	Female	Surgeon
11.	Dr. Umesh Mahanshetty, Member	Professor, Dept. of Radiation Oncology, Tata Memorial Hospital	Male	Radiation Oncologist
12.	Dr. Girish Chinnaswamy, Member	Associate Professor, Dept. of Medical Oncology, Tata Memorial Hospital	Male	Medical Oncologist
13.	Dr. Manju Sengar, Member	Professor, Dept. of Medical Oncology, Tata Memorial Hospital	Female	Medical Oncologist
14.	Dr. Mukta Ramadwar, Member	Professor, Dept. of Pathology, Tata Memorial Hospital	Female	Pathologist
15.	Dr. Seema Kembhavi, Member	Associate Professor, Dept of Radiodiagnosis, Tata Memorial Hospital	Female	Radiologist

Institutional Ethics Committee-II w.e.f April 2014

Sr. No.	Name & Position	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.	Mr. P. K. Rao Member (April 2014-Nov 2015) Mr. KV Ganpathy, Member (w.e.f Dec 2015)	Founder/ Trustee of JASCAP, Jeet Association for Support to Cancer Patients since 1996 CEO, JASCAP, Jeet Association for Support to Cancer Patients since 1996	Male Male	Lay person Lay person
5.	Dr. A. Lobo Gajiwala Member	Head, Dept. of Tissue Bank, Tata Memorial Hospital	Female	Theologian

Sr. No.	Names & Position	Affiliation	Gender	Expertise
6.	Dr. Leena V. Gangolli Member Member (w.e.f Nov 2014)	Member, Institutional Ethics Committee, Nirmala Niketan College of Home Science, Consultant, Children's Palliative Care Program, Consultant, Silver Innings Foundation	Female	Medico-legal Expert
7.	Dr. Renuka Munshi Member	Head, Dept. of Clinical Pharmacology, TN Medical College & BYL Nair Hospital.	Female	Clinical Pharmacologist
8.	Dr. Rajiv Kalraiya (April 2014-July 2015) Member Dr. Narendra Joshi Member (w.e.f Aug 2015)	Scientific Officer, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC) Scientific Officer, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC)	Male Male	Basic Scientist Basic Scientist
9.	Dr. Prachi Patil Member	Associate Professor, Dept. of Digestive Diseases and Clinical Nutrition, Jt. Secretary, Data Safety and Monitoring Subcommittee, Tata Memorial Hospital	Female	Gastro-enterologist
10.	Dr. Devendra Chaukar Member	Professor, Dept. of Surgical Oncology, Tata Memorial Hospital	Male	Surgeon
11.	Dr. Hari Menon Member	Professor, Dept of Medical Oncology, Tata Memorial Hospital	Male	Medical Oncologist
12.	Dr. Priya Ranganathan Member	Associate Professor, Dept. of Anaesthesia, Tata Memorial Hospital	Female	Anesthesiologist
13.	Dr. Kedar Deodhar Member	Professor, Dept. of Pathology, Tata Memorial Hospital	Male	Pathologist
14.	Dr. M H Thakur Member	Professor & Head, Dept. of Radio-diagnosis, Tata Memorial Hospital	Female	Radiologist
15.	Ms. Rohini Hawaldar Member	Scientific Officer, Tata Memorial Hospital	Female	Statistician

Project Review Process:

All research projects/clinical trials involving human subjects are reviewed by IEC for scientific and ethical validity of the research and ensure protection of safety, rights and confidentiality of the research subjects. The complete process from submission of research projects to IEC to completion of the research study is followed adhering to the SOP 01/Version 2 with effective date of 5 Sept. 2013 and SOP 01 / version no 3 with effective date of 1 May 2014. The SOPS are periodically revised and are available on TMC website.

During the year, IEC received 195 research projects, of which 179 were discussed. A total of 166 projects received during 2013 to 2015 were approved in 2015. 16 projects received in 2015 are pending for discussions. 108 projects were completed in 2015. The average duration from IEC submission to decision was 12 weeks.

IEC - I

The committee conducted 12 full board committee meetings and 05 subcommittee meetings. A total of 105 research projects were received in 2015 and 100 projects were scrutinized by IEC -I for scientific and ethical issues. Of these, a total of 66 projects were approved, 19 projects were subjected to modifications, 10 projects required resubmission, 01 project was closed by IEC, 01 withdrawn by Principal Investigator, 05 projects are pending for discussion and 03 projects were exempted from review. It also discussed 211 amendments, 137 violations/ waivers/ deviations, 200 status reports, 419 letters.

IEC - II

The committee conducted 12 full board committee meetings and 01 special meeting. A total of 90 research projects were received in 2015 and 79 projects were scrutinized by IEC -II for scientific and ethical issues. Of these, a total of 53 projects were approved, 17 projects were subjected to modifications, 08 projects required resubmission, 01 project withdrawn by Principal Investigator and 11 projects are pending for discussion. The committee also discussed 174 amendments, 49 violations/ waivers/ deviations, 150 status reports, 254 letters.

A Joint meeting of IECs was conducted to discuss about audio video recording CDSCO GSR and waiver of consent.

Table 1 : project reviewed by IEC-I

Projects Received	Approved	Approved with modifications	Resubmit/ Not approved	Pending for meeting	Exempted
105	66	19	12	05	03

Table 2: projects reviewed by IEC- II

Projects Received	Approved	Approved with modifications	Resubmit/ Not approved	Pending for meeting	Exempted
90	53	17	09	11	0

Table 3: Review Type

Review Type	IEC I	IEC II	Total
Exemption	03	0	3
Expedited	24	0	24
Full Board	78	90	168
Total	**105**	**90**	**195**

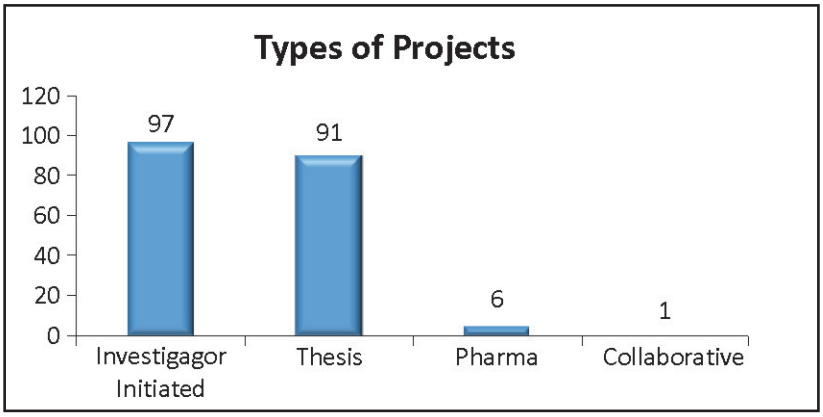


Chart 1: Types of projects reviewed by IEC- I & II

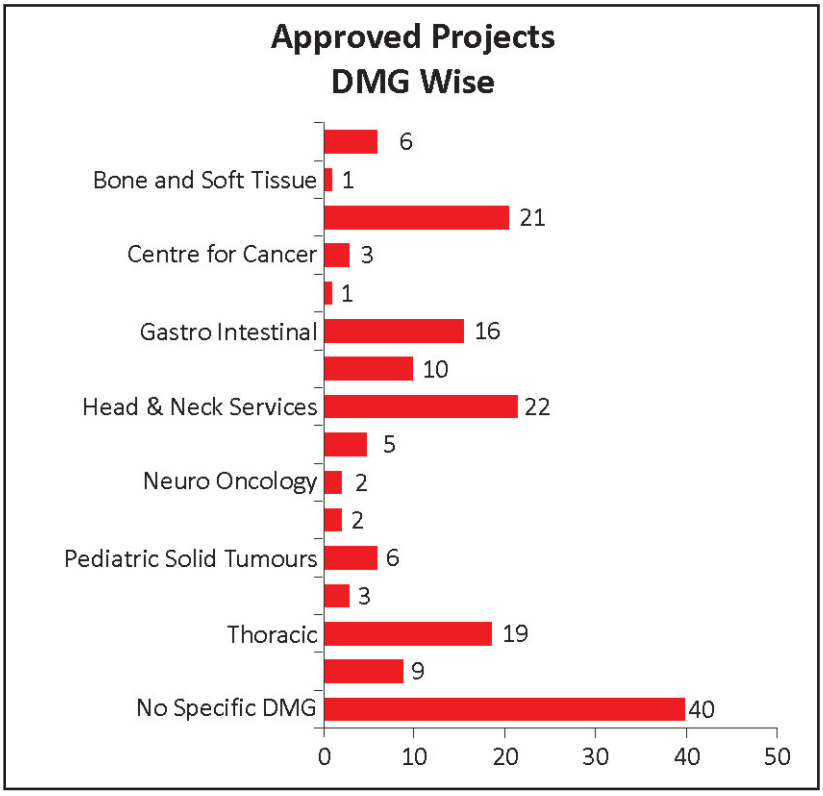


Chart 2: DMG wise approved projects

Institutional Ethics Committee (TMC-IEC III)

Dr. Vedang Murthy
Member Secretary
TMC-IEC-III, ACTREC

The TMC-ACTREC Institutional Ethics Committee (IEC-III) was established in December 2009 as per the ICMR and ICH- GCP guidelines for Ethics Committees, with a mandate for combined scientific and ethics review of research projects being conducted at ACTREC and was reconstituted in January 2012 and 2014.The present committee comprises of 15 members. In addition, the IEC-III seeks the help of domain experts to deliberate on projects where in–house expertise is not available. The committee is well rounded with representation from clinical faculty, basic sciences, lay community and legal profession. The committee has met 50 times in the last 6 years and 194 projects have been discussed so far. The entire spectrum of studies involving human subjects including epidemiological studies, biological studies on human tissues, audits and human clinical trials using drugs or additional invasive intervention have been discussed and approved by the committee.

The IEC-III monitors projects predominantly carried out at ACTREC. The term of the present committee is from 1st April 2014 till 31st March 2016. The Member Secretary of IEC-III is also a member of Tata Memorial Centre Research Administrative Council (TRAC). The committee is registered with Drug Controller General of India (DCGI) and Strategic Initiative for Developing Capacity in Ethical Review (SIDCER).

Institutional Ethics Committee –III (Reg. No. ECR/149/Inst/MH/2013)

Sr. No.	Name & Position	Affiliation	Expertise
1	Dr. Rita Mulherkar Chairperson	Kharghar, Navi Mumbai	Basic Scientist
2	Dr. Nobhojit Roy Co - Chairperson	Dept of Surgery, BARC Hospital, Mumbai	Surgeon
3	Dr. Vedang Murthy Member Secretary	Associate Professor, Dept. of Radiation Oncology, ACTREC	Radiation Oncologist
4	Dr. B. B. Singh Member	Advocate, Mumbai High Court	Legal Expert
5	Mrs. Lakshmi R. Member	Co-ordinator, Sanjeevani - life beyond cancer, Mumbai	Social Scientist
6	Mrs. Deepa Ramani Member	Ex-Play Group Teacher, Store and Purchase in-Charge, Kharghar	Lay Person
7	Dr. Vikram Gota Member	Associate Professor, Dept of Clinical Pharmacology, ACTREC	Clinical Pharmacologist
8	Dr. Aliasgar Moiyadi Member	Professor, Dept of Surgical Oncology, ACTREC	Surgeon
9	Dr. Tejpal Gupta Member	Professor, Dept. of Radiation Oncology, ACTREC	Radiation Oncologist
10	Dr. Kumar Prabhash Member	Professor, Dept of Medical Oncology, TMH	Medical Oncologist
11	Dr. Navin Khattry Member	Professor, Dept of Medical Oncology, ACTREC	Medical Oncologist
12	Dr. Bharat Rekhi Member	Professor, Dept of Pathology, TMH	Pathologist
13	Dr. Prasanna Venkatraman Member	Scientific Officer 'F', ACTREC	Basic Scientist
14	Dr. Manoj Mahimkar Member	Scientific Officer 'F', ACTREC	Basic Scientist
15	Mrs. Sadhana Kannan Member	Scientific Officer 'E', Data Manager, ACTREC	Bio-statistician

IEC-III PERFORMANCE 2015

The committee conducted 12 full board committee meetings in 2015, during which a total of 34 new projects and 9 projects carried forward from 2014 were meticulously scrutinized for their scientific and ethical content.

Table 1 : Review type

Review type	2014	2015
Full Board	22	34
Expedited	00	06
Exempted	02	00
Total	**24**	**40**

Table 2 : IEC decision on new projects (Full board review)

Full board review	2014	2015
Approved	14	23
Approved with modification	03	01
Resubmitted	05	04
Not approved	00	01
Withdrawn by PI	00	02
Deferred	00	01
Under review process	00	02
Review exempted	02	00
Total	**24**	**34**

Table 3 : IEC decision on projects carried forward from previous year/s

Projects carried forward	2014	2015
Approved	11	07
Resubmitted	00	01
Closed by IEC	00	01
Withdrawn by PI	02	00
Deferred due to incomplete submission	01	00
Review exempted	01	00
Total	**15**	**09**

Table 4 : IEC decision on expedited review projects

Expedited projects	2014	2015
Approved	00	06
Total	**00**	**06**

Table 5 : Source of funding

Source of funding	2014	2015
Intramural (IM)	17	18
Extramural (EM)	03	03
IM + EM	01	09
Pharma	01	02
Others	01	01
Non funded project	01	01
Total	**24**	**34**

Data Safety Monitoring Subcommittee

Dr. Sarbani Ghosh Laskar
Secretary, DSMSC

The Data Safety Monitoring Sub-Committee (DSMSC), a subcommittee of the Institutional Ethics Committee (IEC) 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 (SAEs) reported on trials and monitor the overall progress of institutional clinical trials to ensure safety of participants. It also ensures validity of data and accrual goals are maintained. The committee reports to IEC.

The DSMSC meets on the second Tuesday of every month at 8.00 am in the Institutional Ethics Committee meeting room.

Composition of DSMSC w.e.f. April 2014

Sr. No.	Names	Affiliation	Gender	Expertise
1.	Dr. Sarbani Laskar, Secretary, DSMSC, Member, IEC-I	Professor, Dept of Radiation Oncology, Tata Memorial Hospital	Female	Radiation Oncologist
2.	Dr. Prachi Patil, Jt. Secretary, DSMSC, Member, IEC-II	Associate Professor& Assistant Gastroenterologist, Dept of Digestive diseases & Clinical Nutrition, Tata Memorial Hospital	Female	Medical Gastro-enterologist
3.	Dr. Gauravi Mishra, Member	Associate Professor, Dept. of Preventive Oncology, Tata Memorial Hospital	Female	Preventive Oncologist
4.	Dr. Gouri Pantvaidya, Member	Associate Professor, Dept. of Surgery, Tata Memorial Hospital	Female	Surgeon
	Dr. Jaya Ghosh, Member	Associate Professor, Dept of Medical Oncology, Tata Memorial Hospital,	Female	Medical Oncologist
	Dr. Jyoti Bajpai, Member	Associate Professor, Dept of Medical Oncology, Tata Memorial Hospital,	Female	Medical Oncologist
5.	Dr. K Manjunath N, Member	Scientific Officer, Dept of Pharmacology, Advanced Centre for Treatment, Research & Education in cancer (ACTREC)	Male	Pharmacologist
6.	Dr. Madhavi Desai, Member	Associate Professor, Dept of Anesthesia, Tata Memorial Hospital	Female	Anesthetist
7.	Dr. Nita Nair, Member	Assistant Professor, Dept of Surgical Oncology, Tata Memorial Hospital	Female	Surgeon
8.	Dr. Sabita Jiwnani, Member	Assistant Professor , Dept of Surgical Oncology, Tata Memorial Hospital	Female	Surgeon
9.	Mr. Sanjay Talole, Member	Scientific Officer 'D', Dept of Medical Records, Biostatistics & Epidemiology, Tata Memorial Hospital	Male	Statistician
10.	Dr. Santosh Menon, Member	Associate Professor, Dept of Pathology, Tata Memorial Hospital	Male	Pathologist
11.	Dr. Sheela Sawant, Member	Associate Professor, Dept. of General Medicine, Tata Memorial Hospital	Female	Physician
12.	Dr. Sneha Shah, Member	Associate Professor, Dept of Nuclear Medicine, Tata Memorial Hospital	Female	Radiologist
13.	Dr. Sumitra Bakshi, Member	Professor, Dept of Anesthesia, Tata Memorial Hospital	Female	Anesthetist
14.	Dr. Supriya Sastri, Member	Associate Professor,Dept of Radiation Oncology, Advanced Centre for Treatment, Research & Education in cancer (ACTREC)	Female	Radiation Oncologist

Sr. No.	Names	Affiliation	Gender	Expertise
15.	Dr. Tabassum Wadasadawalla, Member	Assistant Professor, Dept of Radiation Oncology, Tata Memorial Hospital	Female	Radiation Oncologist
16.	Dr. Tushar Vora, Member	Associate Professor, Dept of Medical Oncology, Tata Memorial Hospital	Male	Medical Oncologist
17.	Dr. Vanita Noronha, Member	Associate Professor, Dept of Medical Oncology, Tata Memorial Hospital	Female	Medical Oncologist

The primary responsibility of the DSMSC is to review and address SAE and unexpected events involving all trials. It also monitors investigator initiated and other sponsored trials as and when advised by the IECs and reviews annual Continuing Review Applications/ Annual Status Reports for all trials.

The committee conducted 12 meetings during the year. The committee reviews SAEs reported on all the studies including regulatory trials. These are often evaluated on mails to meet the 30 day time line. The SAEs are reviewed by a group of 6 members consisting of the 2 IEC secretaries, 2 lead discussants of each project and 2 DSMSC secretaries.

The committee monitored 18 trials during the year. It receives an average of 40 SAE reports on all types of trials conducted at TMC. A total of 481 SAE reports on 45 clinical trials were received and reviewed by the DSMSC during the year. In addition, the DSMSC also received 238 off site safety reports on multi-centric trials ongoing at Tata Memorial Hospital. A total of 217 Annual Status Reports/ Continuing Review Applications / reports were received and reviewed by the Member Secretary. The comments from the DSMSC were forwarded to the IEC.

During the year the DSMSC undertook the revision of Continuing review form, SAE Reporting form and the Monitoring form to include extensive details with respect to different aspects of the trial. It maintained a database of SAEs reported at TMH to help tracking of follow-up on significant events and plan monitoring of such trials. The DSMSC functioning was automated. The features of this system focused on tracking of SAE reports and generating reminders for Continuing Review Application.

Future plan

- Outsourcing of trial monitoring to external monitors in order to increase the scope of this exercise and improve the coverage.
- Revision and formulation of new/ updated SOPs for DSMSC
- Tagging/Flagging of events in real time
- Reduce the use of paper during the proceedings of the monthly DSMSC meetings from 2016.

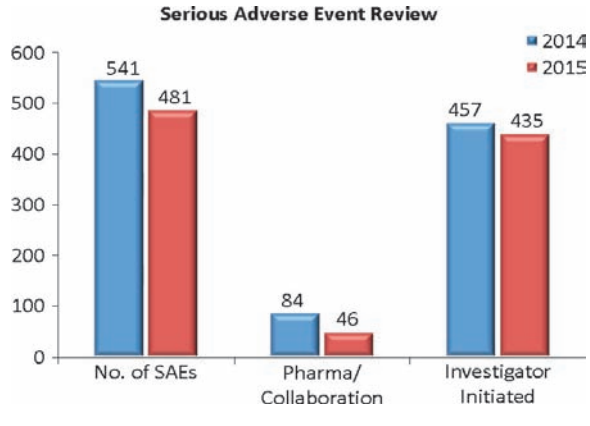


Fig1: Review of Serious Adverse Events

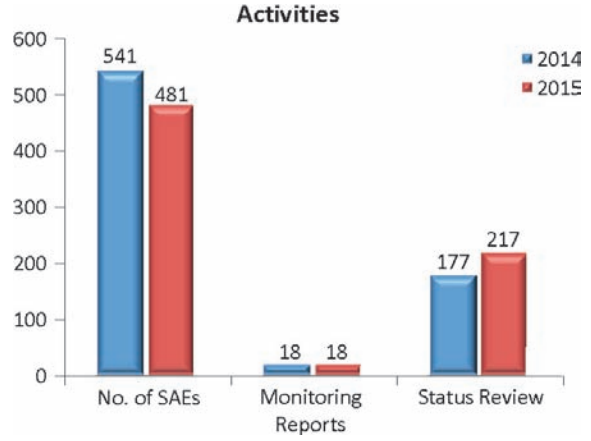


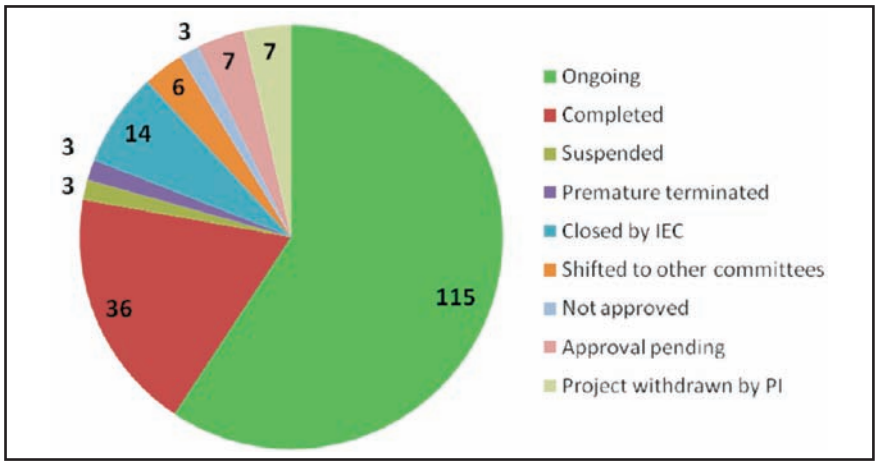
Fig2: DSMSC Total Activites

Data Safety Monitoring Sub Committee

The "Data Safety Monitoring Sub Committee" (DSMSC), a subcommittee of the IEC-III, reviews annual reports and safety issues (SAEs, PSUR, etc) pertaining to the projects approved by IEC-III. The DSMSC comprises of a physician, an intensivist, basic scientists and medical, surgical and radiation oncologists. The members of the DSMSC are trained in causality assessment as per WHO criteria and routinely implement them in assessing the relatedness of adverse events.

Sr. No.	Name & Position	Affiliation	Expertise
1	Dr. Aliasgar Moiyadi Member Secretary	Surgical Oncologist, TMC	Clinician
2	Dr. Supriya Chopra Joint Member Secretary	Radiation Oncologist, TMC	Clinician
3	Dr. Tabassum W Member	Radiation Oncologist, TMC	Clinician
4	Dr. Bhausaheb Bagal Member	Medical Oncologist, TMC	Clinician
5	Dr. Prafulla Parikh Member	Physician, ACTREC	Clinician
6	Dr. Amol Kothekar Member	Intensivist, TMC	Clinician
7	Dr. Sudhir Nair Member	Surgical Oncologist, TMC	Clinician Scientist
8	Dr. Rukmini Govekar Member	Basic Scientist, ACTREC	Scientist
9	Dr. Sanjay Gupta Member	Basic Scientist, ACTREC	Scientist

Overall summary of project status (n=194)



DSMSC activities

The committee conducted 32 site monitoring visits, 28 SAE reviews and sent reminders to PIs for ASR submission as required. The DSMSC conducted 9 meetings and the minutes were forwarded to IEC for further action. At every IEC meeting, DSMSC secretary or representative discussed minutes/activities of DSMSC. Thirty two monitoring reports were discussed in the full boards and, based on IEC comments, recommendation and query letters were issued to PIs. A total of 13 replies were reviewed by DSMSC and their comments were forwarded to IEC.

Education

Five members of IEC-III and its administrative secretary attended a 3-day workshop on 'Capacity Building of Ethics Committees for Clinical Research in India' held at Pondicherry Institute of Medical Sciences (PIMS), Pondicherry from 6-8 April 2015. The Member Secretary and administrative staff of IEC-III were invited to participate in training on EC software at PIMS, Chandigarh on 11th Sept 2015. A training program on 'Logistics Management of Research' for 29 researchers (PIs) was organized at ACTREC on 28th September 2015.

Research Projects approved by IEC I & II

Principal Investigator	Project Title
Mrs. Achrekar, Meera	A study to assess the sexual problems experienced and the coping strategies adopted by women diagnosed with cervical cancer post radiation therapy with or without chemotherapy in a tertiary cancer care centre, Mumbai
Ms. Adarkar, Rajeshri	A study to assess quality of life of patients with continuous infusion of chemotherapy using ambulatory infusion pump in day care of tertiary care centre
Dr. Agarwal, Jai Prakash	Correlation of functional tumour volume of primary lung cancer with histopathological tumour size in early stage NSCLC : Primer to contouring in high dose high precision radiotherapy
Dr. Agarwal, Jai Prakash	Distress screening in Head and Neck Cancer patients undergoing active cancer directed treatment and impact of referral to psycho-oncology and palliative care.
Dr. Agrawal, Archi	Retrospective evaluation of Somatostatin receptor scintigraphy and 18F-FDG PET and correlation with histopathology and tumor markers in initial staging of gastro-entero-pancreatic (GEP) neuroendocrine tumors.
Dr. Ambulkar, Reshma	The WHO surgical safety checklist: Effectiveness and quality of its implementation
Dr. Arora, Brijesh	A prospective open-labeled randomized control trial of ready-to-use therapeutic food with standard therapy in the management of malignancy-related undernutrition in children.
Dr. Arya, Supreeta	A retrospective study to evaluate the accuracy of post neoadjuvant chemoradiotherapy MRI in assessing response to neoadjuvant chemoradiotherapy and predicting extent of surgical resection in low rectal cancer.
	Retrospective study to evaluate cross sectional imaging features of histopathologicaly diagnosed parapharyngeal masses
Dr. Badwe, Rajendra	A prospective study to determine concordance rate between intraoperative clinical assessment of level III axillary lymph node and histo-pathological node status in primary breast cancer
Dr. Badwe, Rajendra	An Audit of HER2 Positive Tumors - Is Hormone Positivity A Potential Differentiating Factor?
Dr. Badwe, Rajendra	Incremental value of PET-CT Scan over Conventional imaging in the Detection of Metastatic disease in Breast Cancer
Dr. Badwe, Rajendra	Identification of molecular subtypes of breast cancer using surrogate immunohistochemical markers and analysing their prognostic relevance.
Dr. Bajpai, Jyoti	Translation of EORTC QLQ-OV28 module into Indian languages (Hindi and Marathi) to study Quality of Life of Ca ovary patients from a tertiary care cancer centre
Dr. Bakshi, Ganesh	Hormone receptor status in adrenocortical carcinoma
Dr. Bakshi, Sumitra	Prevalence of chronic pain following resection of pelvic bone tumors
Dr. Bakshi, Sumitra	Randomized controlled trial to evaluate the peri-operative analgesic effect of intra-operative dexmedetomidine infusion in robotic assisted laparoscopic onco- surgeries.
Dr. Bal, Munita	KIT and PDGFRA mutations in gastrointestinal stromal tumors
Dr. Bal, Munita	Ampullary carcinoma - Subtypes and prognostic factors

Principal Investigator	Project Title
Dr. Banavali, Shripad	Protoccol No. MBT_2015_03- Advancing Cancer-care through CANScriptTM Enabled Personalized Treatment (ACCEPT): A non-randomized, investigator initiated, observational trial to measure predictive power of CANScriptTM for chemotherapeutics and targeted therapy in patients with newly diagnosed, locally advanced head & neck cancer and refractory / relapsed triple negative breast cancer"
Dr. Banavali, Shripad	Metronomic chemotherapy as an option in advanced carcinoma ovary in resource limited setting : A retrospective analysis of consecutive patients undergoing treatment at rural outreach programme of Tata Memorial Centre
Dr. Budrukkar, Ashwini	Objective and subjective assessment of dysphagia and aspiration in patients with non-nasopharyngeal head neck cancer receiving concurrent chemotherapy and dysphagia-aspiration related structures (DARS) sparing Intensity modulated radiation therapy (IMRT)
Dr. Budukh, Atul	Study of cause of death through verbal autopsy in Sangrur and Mansa districts of Punjab state, India
Dr. Chatterjee, Aparna	Pattern of patient referral to the pain clinic of a tertiary cancer centre: a retrospective observational study
Dr. Chatterjee, Aparna	An Audit of Pain Scores during postoperative period in the PACU/Recovery Room
Dr. Chatterjee, Aparna	A prospective observational study to assess the usefulness of gradient of end tidal carbon dioxide between two lungs in supine and lateral position, as a predictor of intraoperative hypoxemia during one lung ventilation in elective thoracic surgeries.
Dr. Chatterjee, Aparna	Efficacy Of Analgesia In The First 48 Hrs Following Thoracic Surgery
Dr. Chaukar, Devendra	Utility of pectoralis major myofascial flap in reducing pharyngocutaneous fistula rates after salvage total laryngectomy.
Dr. Chaukar, Devendra	Role of electrochemotherapy for head and neck and breast cancers in a palliative setting
Dr. Chinnaswamy, Girish	A6181196 "A Phase I/II Study of Sunitinib in Young patients with Advanced Gastrointestinal Stromal Tumor" Study Code - 206424
Dr. Chopra, Supriya	Phase III randomized trial of high dose chemoradiation and systemic chemotherapy vs systemic chemotherapy alone in patients with unresectable nonmetastatic cholangiocarcinoma
Dr. Chougule, Anuradha	Genomic Profiling in Thyroid Carcinoma
Dr. D'Cruz, Anil	Analysis of quality of life in tongue cancer patients
Dr. D'Cruz, Anil	Maxillectomies: a 10 year experience from a single institution
Dr. D'Cruz, Anil	Role Of Computed Tomography In Evaluation Well Differentiated Thyroid Cancer.
Dr. Deodhar, Jayita	Assessment of palliative care needs in geriatric cancer care setting using a comprehensive cancer-specific geriatric assessment tool and evaluation of the feasibility of utilization of the tool
Dr. Deodhar, Jayita	Staff Support Group In An Oncology Setting in a Developing Country - a retrospective analysis of structure, process and impact
Dr. Deodhar, Jayita	Burnout in palliative care professionals in Mumbai - a cross sectional study

Principal Investigator	Project Title
Dr. Deodhar, Kedar	Immunohistochemical evaluation of novel biomarkers in cervix cancer: a tissue microarray based study
Dr. Deodhar, Kedar	Granulosa Cell Tumors of the Ovary: A study of histomorphological spectrum and clinicopathological correlation
Dr. Desai, Madhavi	Audit of current anaesthesia practices and complications during short duration procedures under general anaesthesia in children in TMH
Dr. Desai, Subhash	Audit of CT guided Transthoracic biopsies in Tata Memorial Hospital
Dr. Desai, Subhash	Imaging in lung infections in patient with hemato-lymphoid malignancy : Correlation with bronchoalveolar lavage and clinical outcome: A retrospective study
Dr. Deshpande, Deepak	Dose Accumulation using deformable image registration for Adaptive Radiotherapy (ART).
Dr. Dholam, Kanchan	Evaluation of quality of life and functional outcome in patients with maxillectomy defects either restored with obturators or reconstructed
Dr. Dholam, Kanchan	Analysis of risk factors and treatment outcomes of osteonecrosis of the jaw in cancer patients receiving anti-resorptives: Audit of cases seen in dental services -Tata Memorial Hospital
Dr. Divatia, Jigeeshu	Randomized controlled study for comparison of plasmalyte-A vs lactated ringer's intravenous fluids and their effects on blood lactate and acid base status in cancer patients undergoing major hepatobiliary surgeries.
Mrs. D'Souza, Anita	A study to assess the effect of structured teaching program on knowledge related to radiation therapy among patients planned for radiation therapy for colorectal cancer at tertiary cancer centre
Dr. Epari, Sridhar	Oligodendroglial tumours: IDH1/2 mutations, ATRX protein expression and 1p19q deletion
Dr. Gehdoo, Raghuveersingh	A Retrospective Observational Analysis of Peri-operative Anesthetic Management of Patients with Chest Wall Excisions In a Tertiary Cancer Centre in India
Dr. Gehdoo, Raghuveersingh	Retrospective observational analysis of audit of epidural procedures in perioperative period in pediatric population: in terms of analgesia and complications
Mrs. Ghag, Shweta	A study to explore use of complementary and Alternative medicine (CAM) among children with cancer in tertiary care cancer hospital
Dr. Ghosh-Laskar, Sarbani	A retrospective analysis of adult nasopharyngeal carcinoma treated with Intensity Modulated RadioTherapy (IMRT) at Tata Memorial Hospital (TMH).
Dr. Ghosh-Laskar, Sarbani	A study to evaluate the Plasma EBV DNA titres in consecutive patients of Nasopharyngeal Carcinoma and correlate the same with treatment response and disease related outcomes.
Mrs. Goswami, Savita	Spiritual/Religious beliefs and their impact on coping in cancer patients: an exploratory study in an Indian setting

Principal Investigator	Project Title
Dr. Gota, Vikram	An open label, non-randomized, single dose, parallel, bioequivalence study of two formulations of Erlotinib (Innovator - Tarceva and generic - Tyrokinin) or Gefitinib (Innovator - Iressa and generic - Xefta) in adult non-small cell lung cancer (NSCLC) patients with non-squamous histology, who have undergone atleast one previous chemotherapy
Dr. Gota, Vikram	Protocol No. RLS/0314/020- A two stage, randomized, multicentric, open label, multiple dose, two-treatment, twosequence, two-period, crossover, steady state bioequivalence study of test Nilutamide 150 Mg tablets (from EirGen Pharma Ltd.,Ireland) with reference Nilandron 150 mg tablets of Sanofiaventis U.S. LLC in prostate cancer patients under fasting condition.
Dr. Gulia, Seema	Protocol No. MYL-Her 3001- A Multicenter, Double-Blind, Randomized, Parallel-Group Phase III Studyof the Efficacy and the Safety of Hercules Plus Taxane Versus Herceptin® Plus Taxane as First Line Therapy in Patients With Her2-Positive Metastatic Breast Cancer
Dr. Gulia, Seema	Protocol Number CT-P6 3.2 -"A phase 3,Double-Blind, Randomized, Parallel-Group,Active-Controlled Study to Compare the Efficacy and Safety of CT-P6 and Herceptin as Neo adjuvant and Adjuvant Treatment in Patients with HER2-Positive Early Breast Cancer"
Dr. Gulia, Seema	Protocol No. CLEE011E2301-A Phase III randomized, double-blind, placebo-controlled study of LEE011 or placebo in combination with tamoxifen and goserelin or a non-steroidal aromatase inhibitor (NSAI)and goserelin for the treatment of premenopausal women with hormone receptor positive, HER2-negative, advanced breast cancer. (MONALEESA-7)
Dr. Gupta, Sudeep	A prospective observational study of Chemotherapy Induced Nausea Vomiting (CINV) in patients receiving Anthracycline based chemotherapy for Breast Cancer"
Dr. Gupta, Sudeep	A retrospective audit of clinical characteristics, treatment and outcome of patients with Gestational Trophoblastic neoplasia treated at Tata Memorial Center from Nov 2009 to Dec 2012
Dr. Gupta, Sudeep	MO29587-Retrospective Data Collection: Post study treatment anticancer therapy from all randomized patients involved in IMELDA MO22223
Mrs. Jagdish, Prathepa	A cross sectional study to evaluate the problems and quality of life (QOL) of women's using external breast prosthesis post mastectomy and those who do not
Dr. Jain, Parmanand	A prospective observational study to assess the efficacy of the meniscus test in predicting the correct epidural catheter placement.
Dr. Jain, Parmanand	A randomized control study to evaluate the role of preoperative oral Paracetamol, Etoricoxib, Pregabalin, Dexamethasone on postoperative and persistent pain after mastectomy
Dr. Jalali, Rakesh	Clinical Outcome And Distinct Molecular Characterization Of Pediatric Glioblastoma: A Single Institutional Study Of 66 Children
Dr. Jambhekar, Nirmala	Histological patterns of lung carcinoma with adenocarcinoma component and correlation with EGFR mutation status

Principal Investigator	Project Title
Mr. Jha, Ashish	Estimation of radiation dose from 18F-FDG and CT to the patient undergoing PET/CT Scan.
Dr. Jiwnani, Sabita	Feasibility and implications of thoracoscopic dissection of internal mammary nodes in central and inner quadrant breast cancer
Dr. Joshi, Amit	Longitudinal Assessment of Quality of Life among Stage IV Non Small Cell Lung Cancer Patients in India
Dr. Joshi, Amit	Retrospective analysis of efficacy and toxicity profile of first line Tyrosine kinase inhibitors in the treatment of metastatic Renal cell carcinoma- Experience from a Tertiary Referral centre
Dr. Juvekar, Shashikant	A retrospective audit of normal and variant anatomy of abdominal aorta on CT angiography
Dr. Juvekar, Shashikant	A Retrospective Study To Evaluate Prognostic Factors On Pre Treatment MRI and Their Correlation with Clinical Outcome Assisted By Follow Up PET-CT in Locally Advanced Carcinoma Cervix
Dr. K, Manjunath	Development of a mathematical model to predict the occurrence of recurrent grade 2 or grade 3 Hand Foot Skin Reaction requiring dose modification in patients with either metastatic Renal Cell Carcinoma or unresectable Hepato Cellular Carcinoma receiving standard dose of Sorafenib.
Dr. Kadam Amare, Pratibha	Prevalence of Cytogenetic abnormalities in Chronic Myeloid Leukemia (CML) and its impact on outcomes
Dr. Kane, Shubhada	Comparative histopathology study of thyroidectomy specimens in Hereditary versus Sporadic Medullary Thyroid Carcinoma
Dr. Kane, Shubhada	Follicular variant of Papillary thyroid carcinoma- Correlating histological features with genetic alterations to identify whether any specific alteration can define histologic subtype
Dr. Karimundackal, George	Incidence of MRI detected brain metastases in asymptomatic operable NSCLC
Dr. Karimundackal, George	Pleural lavage cytology as a prognostic marker in patients undergoing pulmonary metastasectomy
Dr. Karimundackal, George	Evaluation of the extent of intramural spread in esophageal cancer following neoadjuvant Chemotherapy / Chemotherapy - Radiation therapy
Dr. Karimundackal, George	Retrospective analysis of intra operative and post operative metrics following thoracoscopic lobectomy for lung cancer
Dr. Kelkar, Rohini	Evaluation of In-house Real-Time quantitative PCR for the diagnosis and prognostication of invasive fungal infections.
Dr. Kembhavi, Seema	Diagnostic accuracy of CT based staging of Wilms' tumor in the era of Multislice CT
Dr. Kerkar, Rajendra	Endometrial Stromal Sarcoma (ESS): A single center experience
Dr. Kulkarni, Atul	Audit on intrahospital transport of ICU patients in a tertiary care cancer hospital.
Dr. Kulkarni, Atul	Complications Of Tracheal Intubation In Critically Ill Pediatric Cancer Patients

Principal Investigator	Project Title
Dr. Kulkarni, Atul	To evaluate the outcomes of paediatric cancer patients admitted to the intensive care unit in a tertiary cancer centre and identify risk factors that predict poor outcomes.
Dr. Kulkarni, Suyash	Retrospective analysis of Safety & Efficacy of Percutaneous radiofrequency ablation in treatment of unresectable colorectal liver metastases.
Dr. Kurkure, Purna	Outcome of childhood acute promyelocytic leukemia treated with sequential arsenic trioxide(ATO), and all trans retinoic acid (ATRA) based therapy: A retrospective study from a tertiary care centre.
Dr. Laskar, Siddhartha	Evaluation of Long Term Clinical Outcomes and Patterns of Failure in patients with Waldeyer's Ring Lymphoma.
Dr. Laskar, Siddhartha	Evaluation of longterm clinical outcomes of radiotherapy in Mediastinal Non-Hodgkin's Lymphoma
Dr. Laskar, Siddhartha	Prospective evaluation of neurocognitive outcomes in paediatric head and neck solid tumours treated with radiation therapy and dosimetric evaluation of different CNS structures
Dr. Madan, Taruna	Elucidating the Role of Surfactant Protein D (SP-D) in Prostate Cancer
Dr. Mahajan, Abhishek	Effects of body composition as measured by CT on clinical outcomes in patients with esophageal and lung cancer
Dr. Menon, Hari	Study of trough plasma imatinib levels and its correlation with early responses in Chronic Myeloid leukemia in chronic phase.
Dr. Menon, Santosh	Validation study of TMPRSS2-ETS molecular translocations in prostate cancer by fluorescence in situ hybridization (FISH) and Real Time PCR and its correlation with clinical and biochemical parameters
Dr. Menon, Santosh	Application of novel tumor grading system for chromophobe renal cell carcinoma
Dr. Mishra, Gauravi	Comparative Evaluation of Efficacy of Different Methods of Tobacco Cessation Interventions among BEST Employees in Mumbai : A Randomized Controlled Trial
Dr. Mishra, Gauravi	A Pilot Study on Comparative Evaluation of Results of Pap Smears and HPV Hybrid Capture 2 performed on Cervical Samples before and after Application of Acetic Acid
Dr. Mittra, Indraneel	Is telomere shortening due to DNA damage inflicted by circulating chromatin fragments? An investigation in vitro and in healthy human volunteers.
Dr. Muckaden, Mary	Role of Megestrol acetate versus Dexamethasone for improvement in appetite in patients with cancer associated anorexia cachexia: A randomized controlled Pilot trial
Dr. Muckaden, Mary	Characterisation and Prognostication of Pain in Advanced Cancer
Dr. Myatra, Sheila	Peri-operative management and airway related complications in Head and Neck Cancer patients undergoing surgery
Dr. Nair, Deepa	Prophylactic antibiotics in operable oral cancer: short course versus prolonged course - a randomized control trial
Dr. Nair, Nita	Prospective validation a clinical informatics based expert system for breast cancer treatment decisions

Principal Investigator	Project Title
Dr. Narula, Gaurav	A Prospective Observational Study of Thrombotic Events Occurring in Pediatric Oncology Patients, and Adolescents and Young Adults with Acute Lymphoblastic Leukemia, and their Causes, Management and Outcomes
Dr. Noronha, Vanita	Retrospective analysis of patients with small cell lung cancer with compromised performance status.
Dr. Noronha, Vanita	Retrospective analysis of patients with locally advanced esophageal cancer with involvement of the tracheobronchial tree who have received neoadjuvant chemotherapy
Dr. Noronha, Vanita	Esophageal cancer registry for collating the data of esophageal cancer patients
Dr. Ostwal, Vikas	Prospective observational cohort study of advanced Gall bladder cancer patients to study the impact of clinical and molecular characteristics and outcome
Dr. Ostwal, Vikas	An EPIDEMIOLOGICAL STUDY TO EVALUATE THE PREVALENCE OF BRAF AND PIK3CA mutation in Indian patients with colorectal cancer
Dr. Pai, Prathamesh	To determine chief patient concerns at outpatient clinics after diagnosis and treatment of their head and neck cancers using Patient Concern Inventory(PCI) questionnaire at Tata Memorial Hospital-Mumbai
Dr. Pai, Prathamesh	A Comparative Study of Functional Outcomes between Primary Closure and Healing by Secondary Intention Following Surgical Treatment of Early Tongue Cancer
Dr. Pai, Prathamesh	Prospective Pilot Study:Oncologic safety and Functional outcome following Neo-adjuvant Chemotherapy in T2-T4a Tongue cancers
Dr. Parmar, Vani	Retrospective review of outcomes of breast cancer patients with oligometastases
Dr. Parmar, Vani	Prospective non-randomized study to compare accuracy of clinical examination under anesthesia, axillary ultrasound and histo-pathological examination for axillary nodal staging in women with clinically N0 early breast cancer.
Dr. Parmar, Vani	Impact of ipsilateral breast tumor recurrence with respect to hormone receptor status in patients undergoing breast conservation surgery
Dr. Parmar, Vani	Prevalence of distant metastases in high risk operable breast cancer stage pT1-2N2a or higher at diagnosis
Dr. Parmar, Vani	A retrospective analysis to find the correlation of modality of diagnostic biopsy and the extent of lymph node positivity in early breast cancer
Dr. Patil, Asawari	Sinonasal Poorly differentiated Malignant Epithelial Tumors: Clinico-pathological and Immunohistochemical Profile.
Dr. Patil, Vijaya	Changes in coagulation profile and epidural catheter safety for liver resection in malignancy.
Dr. Prabhash, Kumar	Protocol No. CABAZL06500- A phase II controlled clinical trial comparing efficacy of Cabazitaxel versus Docetaxel in recurrent head and neck cancer in India
Dr. Prasad, Maya	Pilot and Phase II study of Anti-GD2 Immunotherapy in the treatment of High Risk Neuroblastoma in Paediatric patients
Dr. Purandare, Nilendu	FDG PET/CT evaluation of Thymic epithelial tumors

Principal Investigator	Project Title
Dr. Purandare, Nilendu	Evaluation of pulmonary carcinoid tumors using PET/CT
Dr. Qureshi, Sajid	Malignant salivary gland tumors in Indian pediatric population: clinical experience of a tertiary care cancer hospital
Dr. Qureshi, Sajid	Translation and validation of PedsQL 3.0 Cancer module into Indian language (Marathi & Hindi) to study Quality of Life of pediatric solid tumor patients from a tertiary care cancer centre.
Dr. Qureshi, Sajid	Retrospective study of complications related to totally implantable venous access devices
Dr. Rajadhyaksha, Sunil	A study of hemolysis in red cell concentrates during transportation
Dr. Ramadwar, Mukta	Comparison of incidence of precursor and pre-invasive lesions of the gall bladder in patients operated for chronic cholecystitis and cholelithiasis in endemic and non-endemic regions in India.
Dr. Ramadwar, Mukta	Assessment of microsatellite instability status in colorectal carcinoma by immunohistochemistry and its correlation with histological parameters indicative of microsatellite instability
Dr. Ramani, Subhash	A Retrospective Audit Of Incidence of Internal Mammary Node In Locally Advanced Breast Cancer
Dr. Ranganathan, Priya	Epidural analgesia for lower limb onco-surgical procedures: An audit of efficacy and safety
Dr. Ranganathan, Priya	A randomized evaluation of intercostal block as an adjunct to epidural analgesia for post-thoracotomy pain
Dr. Rangarajan, Venkatesh	Evaluation of radioimmunoconjugate (131I and Rituximab) SPECT imaging for staging of CD-20 positive Non-Hodgkin Lymphomas
Dr. Rangarajan, Venkatesh	Optimization of scan time and injected 18F-FDG dose for PET scan on BGO crystal based 5 ring PET scanner
Dr. Rangarajan, Venkatesh	To evaluate the role of 68Ga-PMSA PET/CT in detection of recurrent disease in prostate cancer.
Dr. Saklani, Avanish	Survivorship programme for colorectal cancers patients- a randomized study
Dr. Salins, Naveen	Effectiveness of Respite Model of Palliative Care In Indian Setting
Dr. Salins, Naveen	Pediatric Palliative Care referral practices in an oncology setting: A retrospective chart review
Dr. Salins, Naveen	Prescribing practices in a Pediatric Palliative Medicine unit of a tertiary cancer care centre: A five year retrospective survey
Dr. Sarin, Rajiv	Development and validation of a Brief Quality of Life assessment tool for use in Routine Oncology Practice
Dr. Sengar, Manju	Therapeutic Drug Monitoring Of Posaconazole In Adult Patients Receiving Posaconzole Prophylaxis During AML Induction: A Feasibility Study.
Dr. Sengar, Manju	A retrospective analysis of prognostic value of interim PET scan in patients with Diffuse Large B-cell-Lymphoma at Tata Memorial Centre.

Principal Investigator	Project Title
Dr. Sengar, Manju	Analysis of treatment outcomes in adolescent and adult Burkitt's lymphoma-Retrospective study.
Dr. Sengar, Manju	A Study to evaluate the prognostic value of biomarkers in patients of Hodgkin's lymphoma treated with a standard regimen
Dr. Shanmugham, Pramesh	Hand sewn versus stapled esophago gastric anastomosis - Does the type of anastomosis influence quality of life in long term survivors?
Dr. Shanmugham, Pramesh	Study of epidemiological trends in upper gastrointestinal malignancies at a referral centre in India
Dr. Shanmugham, Pramesh	Prevalence of malnutrition in patients with lung cancer
Dr. Shanmugham, Pramesh	Outcomes Of Pulmonary Metastasectomy: A Retrospective Analysis
Dr. Sharma, Kailash	A prospective randomised placebo controlled study to analyse effect of constant rate intravenous infusion of lignocaine on peri-operative analgesia verses similar rate normal saline infusion, at Tata Memorial Centre
Dr. Sharma, Kailash	Comparison of palanosetron and dexamethasone with ondansetron and dexamethasone for prevention of post operative nausea and vomiting in post chemotherapy patients undergoing ovarian cancer surgery receiving opioid based intravenous patient controlled analgesia
Dr. Sharma, Kailash	Evaluation and validation of POSSUM and P-POSSUM scores in predicting in hospital morbidity and mortality rate in patient undergoing head and neck surgeries
Dr. Shet, Tanuja	MYD 88 and CARD11 mutations in plasmablastic lymphoma and HIV associated large cell lymphomas
Dr. Shetmahajan, Madhavi	Perioperative Anaesthesia Management And Outcomes Of Patients With Severe Disease For Elective And Emergency Cancer Surgery - A Prospective Observational Study
Dr. Shetty, Omshree	Study of circulating microRNA (miRNA) as a Potential Biomarker in Breast Cancer
Dr. Shetty, Omshree	Association of ANXA1 expression in HPV positive Penile Carcinoma
Dr. Shrikhande, Shailesh	Perihilar and intrahepatic cholangiocarcinoma : surgical trends and outcomes
Dr. Shrikhande, Shailesh	Borderline resectable pancreatic tumors: outcomes of multimodality approach
Dr. Shrikhande, Shailesh	Retrospective analysis of prospectively maintained database of all Gastrointestinal stromal tumors presented at tertiary referral centre during the period of January 2009 to March 2015
Dr. Shrivastava, Shyam Kishore	Evaluation of vaginal radiation doses and correlation with late vaginal morbidity in patients undergone adjuvant radiation for Ca Cervix
Dr. Shrivastava, Shyam Kishore	Outcomes of patients with Locally Advanced Carcinoma Cervix, undergoing Percutaneous Nephrostomy before/during treatment
Dr. Solanki, Sohan	Comparison of actual and ideal body weight on appropriateness of ProSeal laryngeal mask airway in Indian overweight patients - a randomized open label study.
Dr. Thota, Raghu	Postoperative residual curarization and critical respiratory events in post anaesthesia care unit: an observational study
Dr. Wadasadawala, Tabassum	Pattern of Loco-Regional Recurrences in breast cancer, its retreatment and clinical outcomes

Research Projects approved by IEC III

Principal Investigator	Project Title
Dr. Amit Joshi	A prospective randomized study comparing metronomic oral chemotherapy with intravenous chemotherapy, in patients with metastatic, relapsed or inoperable squamous cell carcinoma of head and neck
Dr. Bharat Rekhi	Evaluation of MyoD1 and PIK3CA mutations in sclerosing/ spindle cell rhabdomyosarcomas
Dr. Pritha Ray	Investigating the underlying molecular mechanisms of IGF-1R downregulation in platinum-taxol resistant ovarian cancer cells
Dr. Kakoli Bose	Design and characterization of specific inhibitor for pro-apoptotic serine protease Htr A2/Omi
Dr. Nikhil Patkar	Acute myeloid leukemia and the dynamics of relapse
Dr. Sanjay Gupta	Profiling of histone alterations in human cancers for potential clinical applications - a retrospective study
Dr. Shubhada Chiplunkar	Exploring the potential of gamma-delta T lymphocytes for immunotherapy of cancer
Dr. Ujjwala Warawdekar	Isolation and quantitation of circulating tumour cells and correlation with outcome of therapy in patients with advanced non-small cell lung carcinoma
Dr. Sudeep Gupta	To study the effects of acute, peri-operative hypoxia on breast cancer biology
Dr. Meenakshi Singh	Screening of alloimmunization in partially mismatched/ haploidentical allogeneic hematopoietic stem cell transplantation: donor recipient pairs
Dr. Shilpi Dutt	Targeting residual resistant tumor cells in glioblastoma by identifying their unique surface proteome
Prof. Kumar Prabhash	A randomized study for evaluation of metronomic adjuvant chemotherapy in recurrent head and neck cancers post R0 salvage surgical resection who are ineligible for re-irradiation
Prof. Kumar Prabhash	A randomized trial to compare the efficacy of Docetaxel + Cisplatin (DC) and Docetaxel + Cisplatin + 5 Flurouracil (DCF) in patients as neoadjuvant chemotherapy for oral cavity cancer
Dr. Anuradha Chougule	Role of WNT16B, p53 and telomerase activity in tumorigenesis signaling in head & neck cancer before and after maximum tolerated dose (MTD) based chemotherapy and after metronomic therapy
Prof. Kumar Prabhash	Compliance to NACT in T4 oral cancers: the place, person, socioeconomic status or assistance
Dr. Syed Hasan	To evaluate the biological effects of microRNAs in DNMT3Amut and NPM1c positive acute myeloid leukemia cells
Dr. Milind Vaidya	Use of keratins, vimentin and associated proteins as prognostic markers for human oral cancer
Dr. Vanita Noronha	A randomized clinical trial of best supportive care compared with best supportive care with chemotherapy in advanced unresectable or metastatic esophageal cancer
Dr. Aliasgar Moiyadi	Audit of sononavigation procedures

Principal Investigator	Project Title
Dr. Vijay Patil	A prospective observational study to assess the expectations, preferences, distress and QOL in patients undergoing palliative chemotherapy in head and neck cancers
Dr. Neelam Shirsat	Deep proteome analysis using ribosome profiling technology for identification of miRNA targets
Dr. Aliasgar Moiyadi	Audit of fluorescence guided brain resections
Dr. Amit Joshi	A match pair analysis of Paclitaxel - Cetuximab versus oral metronomic chemotherapy as palliative chemotherapy in head and neck cancers
Dr. Sudeep Gupta	Exploring the utility of circulating tumor DNA in monitoring response to therapy and in aiding follow up of breast cancer patients using the neoadjuvant setting as a model
Mr. Sanjeev Waghmare	Molecular profiling of cancer stem-like cells in oral cancer and its potential clinical implications
Dr. Milind Vaidya	Validation of sequential changes observed in global protein profile in different stages of human tongue cancer using immunohistochemistry
Dr. Vijay Patil	Stage I/II study of oral metronomic methotrexate with celecoxib and erlotinib as palliative chemotherapy in oral cancer patients
Dr. Ashok Varma	Studies of protein-protein interactions to unravel the pathogenicity of mutations discovered in BRCTs domains
Dr. Kakoli Bose	Mechanism of Htr A2 mediated HAX-1 regulation in the intrinsic pathway of apoptosis
Dr. Vedang Murthy	Prospective randomized trial of adjuvant radiotherapy following surgery and chemotherapy in muscle invasive transitional cell carcinoma of urinary bladder
Dr. Sridhar Epari	Oligodendroglial tumors: audit of 1p19q results
Dr. Milind Vaidya	Development of a molecular prognostic tool for patients stratification and personalized treatment of oral cancer
Dr. Neelam Shirsat	Integrated genomic and proteomic analysis of embryonal brain tumors and deciphering functional role of genetic alterations in medulloblastomas, the most common embryonal tumor
Dr. Kakoli Bose	Investigating the molecular basis of CaM/c-FLIP interaction to design specific c-FLIP inhibitor for modulating its anti-apoptotic function

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KNOW CANCER

EDUCATION

ACCESS TO QUALITY CARE

Academics

Dr. Kailash Sharma
Director (Academics)

The Academics division of Tata Memorial Centre (TMC) is affiliated to Homi Bhabha National Institute (HBNI), Mumbai – a Deemed University. It plans educational programmes to impart Postgraduate training in Oncology and other broad specialties. HBNI under the Department of Atomic Energy (DAE) - Government of India, has been granted the status of "Grant-in-Aid" institution of DAE.

Dr. K.S Sharma is the Director of the Academic division and conducts educational programmes in TMC.

Academic Activities

Tata Memorial Centre is a recognized training center in cancer education and research by several National and International organizations, including WHO, IAEA and INCTR. The Centre offers education through various activities like PG courses, and training through short term observer-ship and various other training programs. About 112 Post graduate medical students were registered in 2015 for PG courses in various disciplines. A one - year diploma in Fusion Technology, and M.Sc. in Clinical Research, approved by HBNI was initiated in this academic year.

The Institution also offers the following short term training programmes –

1. **Six months training program -** trains various specialists on sponsorship basis in oncology and other supportive branches
2. **Observer-ship program -** approximately 500 specialist including dental surgeons visited Tata Memorial Centre under Observer ship programme, from all over India during the year. About 38 overseas specialists were trained as observers and 25 oncology trainees were trained at TMC during the year. These were chiefly from Sri Lanka, Maldives, Myanmar, Bangladesh, Nepal, Pakistan, Kingdom of Saudi Arabia, Oman, Yemen, Iraq, Kenya, Republic of South Africa, Germany, United Kingdom, Canada, United States of America, West Indies, Korea, and Malaysia.
3. **Collaborative Exchange Program –** the Centre continued its exchanges program with Sheth G.S. Medical College & KEM Hospital, Children Wadia Hospital and Lokmanya Tilak Municipal General Hospital.

Superspeciality Courses, Broad Speciality & Other Technical Courses

Sr.No	Name of the Postgraduate Course	Approved by	Affiliated To	Duration in Years	No. of intake capacity Year 2014
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	02
3	M.Ch (Plastic & Reconstructive Surgery)			3	02
4	M.Ch. (Head & Neck Oncology)			3	02
5	D.M.(Medical Oncology)			3	14
6	D.M. (Critical Care)			3	02
7	D.M. (Paediatric Oncology			3	02
8	D.M. (Gastroenterology)			3	02
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	01
14	MD (Immuno Hematology & Blood Transfusion)			3	03
15	MD (Nuclear Medicine)			3	04
16	MD (Palliative Medicine)			3	02
17	P.hD (Health Sciences)	HBNI		3	04
18	02 Yrs Certified Fellowship			2	11
19	M.Sc. Nursing (Oncology)		Maharashtra Nursing Council & Indian Nursing Council	2	05
20	Advance Diploma in Radiotherapy Technology	DTE & MSBTE, Mumbai	Maharashtra State Board of Technical Education (MSBTE)	2	07
21	Advance Diploma in Medical Imaging Technology			2	18
22	PG Diploma in Fusion Imaging Technology	HBNI			10
23	M.Sc. Clinhical Research			2	10
	Total				175

Training Programme
From January 2015 To December, 2015

SR. NO.	NAME OF THE TRAINING PROGRAMME	DEPARTMENT	No. of Trainees
1	Certificate course in Hospital Infection control	Nursing Department	13
2	Certificate course in Preventive Oncology	Preventive Oncology	12
3	Cyto- Pathology Technicians Training Course	Cyto - Pathology	2
4	Six months Advanced Hematology Training Course for Technologists	Haematology	4
5	Six Months Molecular Haematology Training Course for Technologists		4
6	Six months training course in Flow Cytometry		4
7	Advanced Clinical Biochemistry Technologist Training Course	Biochemistry	4
8	Advanced Cancer Cytogenetic Training Course	Cancer cytogenetics	4
9	Advanced MRI Imaging Training Course for Technologists	Radiodiagnosis	3
10	Train the Trainers Program in Palliative Care	Palliative Medicine	20
11	Certified Training in Oncology for Doctors	-	22
12	Oncology Speech Rehabilitation for Graduate Speech Therapists	Head & Neck Oncology	1
13	Post Basic Diploma in Oncology Nursing	Nursing Department	16
14	Certificate Course for Medical Secretary	M.S. Office	2
15	Library Trainees	Library Sciences, TMH	1
16	Certificate course in Intensive Care Nursing	Nursing Department	36
17	Certificate Course in Enterostomal Therapy	Nursing Department	4
18	Certificate course for CVAD	Nursing Department	7
19	Apprenticeship Trg. Programme for PET/CT	Nuclear Medicine	3
20	Apprenticeship Training (BOAT)	Pathology, Cytology	5
21	Oncology Training (Defence Doctor)	Anaesthesiology	3
	Total		170

Conferences/Workshops/Seminars in the year 2015

Name of Conference	Date	Department
	January	
ONCORECON Workshop	5th to 9th	Plastic & Reconstructive Surgery
Epidemiology Workshop	6th to 8th	Centre for Cancer Epidemiology
ARIA Training	12th, 13th, 14th & 16th	Medical Physics
IAEA Training	14th	Radiation Oncology
Mortality Workshop	17th to 23rd	Centre for Cancer Epidemiology
Good Clinical Practice (GCP) Workshop	23rd	CRS
ACS Workshop	24th & 25th	Medical Oncology
	February	
Training of Punjab National Registry	2nd, 3rd, 4th, 5th ,9th, 10th, 11th & 12th	Punjab National Registry
Uropathology CME 2015	3rd	Pathology
Certificate Course in Preventive Oncology	4th	Preventive Oncology
International Code for Diseases (ICD) Training Program	5th & 6th	Centre for Cancer Epidemiology
Cancer Registry Workshop CPC	5th & 6th	Centre for Cancer Epidemiology
International Myeloma Update	6th & 7th	Medical Oncology
Case Presentation Nuclear Medicine	9th & 11th	Nuc.Medi & Molecular Imaging
Continued Medical Education(CME) in H & N oncology	14th & 15th	Pathology
Choosen's Palliative Care(CPC)	16th to 21st	Palliative Medicine
7th Global Post Laryngectomy Rehabilitation Academy	21st & 22nd	Head & Neck Surgery
EBM 2015	27th -28th	CRS
	March	
EBM 2015	1st	CRS
6 weeks Certificate Course in Hospital Infection Control	2nd to 6th, 9th to 13th, 18th, 23rd to 27th, 30th & 31st	HRD
Anaesthesia Review Course (ARC) Conference	3rd to 5th	Anaesthesiology, Criti. Care & Pain
Choosen's Palliative Care (CPC) Project Evaluation	9th to 13th	Palliative Medicine
ONCORECON Workshop	23rd to 27th	Plastic & Reconstructive Surgery
Continued Medical Education (CME) on Radition Safety	28th & 29th	Nuc. Med.& Molecular Imaging

Name of Conference	Date	Department
	April	
Anaesthesia Review Course	3rd to 5th	Anaesthesiology, Criti, Care & Pain
Oncology Nurses Association Programme	10th	Nursing
Covocation Ceremony	11th	Academics Office
Seminar to Radiographers	11th	Radiodiagnosis
Scientific COMM of APSICON	12th	Plastic & Reconstructive Surgery
Teaching Pathologists Conference	18th	Pathology
Anaesthesia Review Course (ARC) Conference	18th & 19th	Dept of Anae,Criti Care & Pain
ONCORECON Workshop	20th to 24th	Plastic & Reconstructive Surgery
Cardio Pulmonary Resuccitation(CPR) Training for Nurses	21st	Nursing
	May	
3rd National Conference on tobacco or health	6th	Preventive Oncology
Scientific COMM of APSICON	12th	Plastic & Reconstructive Surgery
5th National Cancer Grid Meeting	21st & 22nd	Thoracic Unit
Good Clinical Practice - GCP 2015	23rd	CRS
Good Clinical Practice - GCP 2015	23rd & 30th	CRS
CME Meeting & Tobacco Workshop	26th, 27th & 28th	Preventive Oncology
World No Tobacco Day - Press Conference	28th	Preventive Oncology
ARIA Training	28th	Medical Physics
Good Clinical Practice - GCP 2015	30th	CRS
	June	
Narrative Medicine Workshop	3rd, 15th, 22nd, & 29th	Palliative Medicine
Narrative Medicine Workshop	5th, 8th, 12th & 19th	Psychiatric Unit
Preventive Oncology Certificate Course	11th	Preventive Oncology
5th Basic Haemotogy Course	26th & 27th	Pathology
Mid- Term CME & 2nd Annual Practicum- Pediatric Hemotology	27th & 28th	Pediatric Oncology
	July	
Bio Stat Workshop	4th	Medical oncology
Continued Medical Education (CME) Meeting	8th to 10th	Preventive Oncology
Education in Cancer Pain ECAP 2015	11th & 12th	Anaesthesiology ,criti. Care & Pain
1st International Certified Training Program in Lymphedema	15th to 19th	Physiotherapy

Name of Conference	Date	Department
IHC Interpretation	23rd	Medical oncology
IHC Workshop	23rd	Pathology
Histopath CEME	24th	Pathology
Continued Medical Education (CME) on Oral Cancer	25th & 26th	Head & Neck Surgical Oncology
WHO Workshop	27th to 29th	Preventive Oncology
	August	
Volunteers training	3rd to 13th	Palliative Medicine
Seminar on (Oral Cavity & its Diseases)	4th	Radiodiagnosis
Seminar on (Oral Cavity & its Diseases)	5th	Surgical Oncology
Continued Medical Education (CME) on Fungal Infections	7th	Anaesthesiology, Criti. Care & Pain
1st International Certified Training Program in Lymphedema	15th to 19th	Physiotherapy
Insurance seminar	24th	Public Relations Office
Apsicon 15 committee Meeting	26th	Plastic Surgery
	September	
6 Weeks Certificate Course in Palliative Care	1st to 4th	Palliative Medicine
Choosen's Palliative Care (CPC) Training Programme	2nd & 3rd	Palliative Medicine
Annual Urology CME 2015	5th	Uro-Oncology
4C Programme	5th & 6th	Anaesthesiology, Crit. Care & Pain
Training Program for Phlebotomists & Nurses	9th	MS Office
Regional Staff Workshop(Jivdaya Foundation)	19th & 20th	Medical Oncology
International Pediatric Oncology Day Celebration	23rd	Nursing
Master of Professionakl Care Giving Course	24th & 30th	Psychiatric Unit
	October	
Ultra Sound Guided (USG) Workshop	2nd	Radiodiagnosis
NCRP- Annual Review Meeting & Workshop	5th, 6th & 7th	Medical Records
Master of Professional Care Giving Course	6th, 9th,14th, 21st & 30th	Psychiatric Unit
6 weeks certificate course in palliative Care	5to to 10th	Palliative Medicine
IARC Conference	7th to 10th	CCE,TMH
Women's Cancer Initiative (WCI) Conference 2015	9th to 11th	Radiation Oncology
World Hospice & Palliative Care Day	10th	Palliative Medicine
HOPE:Workshop	13th, 14th, 21st & 23rd	Medical Oncology
Basic Stomacare Workshop	15th & 16th	Enterostomal Therapy
THEMATIC 2015	17th & 18th	Anaesthesiology, Crit. Care & Pain

Name of Conference	Date	Department
ISMPO, ISO Conference	21st	Medical Oncology
Laser Workshop	24th & 30th	Head & Neck Oncology
8th TCS Meeting & 16th Indo-US Workshop	24th to 28th	Pathology
Training Programme Transfusion Medicine	26th to 27th	DTM
16th Indo US Workshop	28th	Pathology
Annual Meet Festival	29th	Neuro oncology
	November	
HOPE:Workshop	3rd, 4th, 17th, 18th & 30th	Medical Oncology
TYACON Workshop	5th	Medical Oncology
ISMPO Workshop	5th	Medical Oncology
IAEA Meeting	23rd to 27th	Radiation Oncology
TMC National Conference, Anaesthesia	27th	Anaesthesiology, Crit. Care & Pain
ONCOSURG Conference 2015	27th to 29th	H & N Oncology
IAEA/RTC programme on H & N and Brain Tumour	30th	Radiation Oncology
	December	
HOPE:Workshop	1st, 2nd, 3rd, 7th, 10th & 14th	Medical Oncology
IAEA/RTC programme on H & N and Brain Tumour	1st to 3rd	Radiation Oncology
TMC-DAC 2015	3rd to 6th	Anaesthesiology, Crit. Care & Pain
CPC Hands on training	7th to 11th	Palliative Medicine
Master of Professional Care Giving Course	9th	Psychiatric Unit
Cancer Rehabilitation	11th & 12th	Physiotherapy
HOPE	11th, 12th & 13th	Medical Oncology
Mortality Workshop	14th to 17th	Centre for Cancer Epidemiology
TB Workshop by Nursing education & M.Sc Student	16th	Nursing
5th CME for medical laboratory Technologist	19th & 20th	Pathology
APSICON 2015	25th to 27th	Surgical Oncology

Staff Achievements 2015

Dr. Vandana Agarwal	Secretary, Indian Society of Critical Care Medicine (National body) Feb 2015- 2016
Dr. J P Agarwal	Oration "Perspectives on Improving Outcomes in Locally Advanced Head and Neck Cancer Patients", at Sri Venkateswara Institute of Medical Sciences (SVIMS), Triupati
Ms. Manjishtha Ahooja	Awarded International Trainee Travel grant, Annual Meeting of Association for Molecular Pathology 2015, Austin, Texas, USA.
Dr. Reshma Ambulkar	Secretary, Indian Society of Critical Care Medicine (Mumbai branch) 2014 – 2015
Dr. Iteeka Arora	Second prize, Poster entitled "*MGMT* gene methylation and its correlation with clinico-pathological parameters in Glioblastomas", Annual Conference of the Indian Society of Neuro-Oncology 2015, Kochi, India.
Dr. S. Arya	Guest Editor, Indian Journal of radiology & Imaging, "Imaging in Oncology: Recent advances." Apr-May 2015
Dr. RA Badwe	Delivered, AMOGS – Dr. B. N. Purandare Oration, Cancer in Women of India, Solapur, 7 Feb. 2015
	Delivered, Cameron Pinto Oration, Bombay, Medical Congress, INHS, Asvini Mumbai, 8th Feb 2015
	AIIMS – M G Deo Oration Award at IACR, "When does Metastasis set in?" Jaipur, 21st Feb. 2015
Dr. Ganesh Bakshi	Secretary, Urological Society Mumbai .
Dr. A Budrukkar	Member, Editorial Board, Journal of Cancer Research Therapeutics, Clinical Oncology and Radiotherapy & Oncology
Dr. Pankaj Chaturvedi	Sushruta Award 2015, Oral Cancer Foundation, IDA.
	Chair, International Liaison, International Academy of Oral Oncology
Dr. Sheetal Chavan	Sushil Malhotra National Award, National examination for Cytotechnicians/ Cytotechnologists 2015 conducted by IAC.
Dr. S Chopra	Young Investigator Award(Best publication), British Journal of Radiology
Dr. A.K.D'Cruz	Award for Excellence(Oncology), Cancer Aid & Research Foundation, Mumbai, 28th Feb 2015
	Board of Director 2014-2016, Union for International Cancer Control (UICC)
	Dr D.K. Gosavi Memorial Oration Award, Shri Siddhivinayak Ganapati Cancer Hospital, Miraj, 3rd May 2015
	Delivered, 34th H.J. Mehta Memorial Oration, St. John's Medical College Alumni Association, Bangalore, 7th Aug. 2015
	Delivered, 7th East Zonal Oncology CME 2015 and Henry Shaw Oration, Saroj Gupta Cancer Centre and Research Institute, Thakurpukur Kolkata, 21st – 22nd Nov 2015
	Delivered, AOI Oration, 36th Annual Conference, RAJSCONAOI 2015, Association of Otolaryngologists of Rajasthan, Jodhpur, 5th Dec 2015
	Delivered, Dr. Urmil B.K. Kapoor Oration, All India Institute of Medical Sciences, New Delhi, 5th May 2015
Dr. Jayita Deodhar	Common Wealth Scholarship, Palliative Medicine Training, Cardiff University UK.
	Awarded Commonwealth Scholarship, Diploma in Palliative Medicine, Cardiff University UK.

Dr. Sangeeta Desai	Chair, G S Medical College and KEM Hospital, Institutional Ethics Committee II, since January 2015
	Chair, Solid Tumours Committee, Molecular Pathology Association of India, in November 2015.
Dr. K.P. Dholam	'Best Paper' award, Indian Prosthodontics Conference, Hyderabad 4th December 2015 to 6th December 2015 "Quality of life and functional outcome after maxilectomy: A comparison between prosthetic obturator and free FLAP"
	3rd prize poster presentation at Enhance Head & Neck Rehabilitation Anaplastology Unlimited held at Pune, on 1st and 2nd August 2015, "Prosthetic Rehabilitation of Nasal Defect in xeroderma pigmentosom – A case seies"
Dr. JV Divatia	Past-President's Oration - Sepsis in India; Criticare 2015-Annual Conference of the Indian Society of Critical Care Medicine, Bangalore, March 5-8, 2015
	President, All-India Difficult Airway Association
	Chairman, Credentials Committee, Indian Society of Critical Care Medicine
Dr. Jeson Doctor	Treasurer and National Executive committee member of All India Difficult Airway Association (AIDAA) 2015-2016
Dr. R Engineer	Member Editorial board, Scientific report - Nature
Dr. R P Gehdoo	Dr Subhash Jain Oration Lecture on 'Chronic Post-surgical Pain' in the Global Update on Pain (VI) Conference, organized by Lilawati Hospital and Research Center, Mumbai, 19th – 22nd Nov. 2015
Dr. Sumeet Gujral	Member, drafting committee for NABL 112 standards document in hematology
	Committee for ICMR Standard Operating Procedures (SOP's) on "Immunophenotyping of Hematolymphoid Neoplasms"
Dr. T Gupta	Joint Secretary, Indian Society of Neuro-Oncology (ISNO)
Dr. R Jalali	President Elect, Indian Society of Neuro Oncology
Ms. Swapna Joshi	Vice President, AONS (Asian Oncology Nursing Society)
Dr. Medha Joshi	Lead Surveyor SIDCER-FERCAP, IRB Evaluating, IRB faculty of Medicine, Vajira Hospital, Bangkok, Jun 2015
Dr. P. S. Kadam Amare	Chairperson, Chromosomal diseases in 40th Ann conference, Indian Society for Human Genetics, 2015.
Dr. S.S. Kulkarni	Secretary General, Indian Society of Vascular and Interventional Radiology (ISVIR), Mar. 2015 – Feb. 2016
	Secretary General, Society of Interventional Onco-Radiology of India (SIO), Oct. 2015-Sept. 2016
Dr. Atul Kulkarni	Member Executive Comittee, Association Of SAARC Critical Care Societies (ASAARCCS)
Dr S Laskar	Vice President (Junior), Association of Radiation Oncologists of India (AROI) President, Forum for Young Radiation Oncologists of India Member ICMR Committee Expert, formulation of Guidelines in Pediatric Tumors InPOG Chair for Sarcomas Member ICMR Committee Expert, Review of Ethical Guidelines for Biomedical Research
Mr. Trilokinath Mishra	President, Society of Indian Radiographers (Regd)-(A National Association of Radiographers)

Dr Aliasgar Moiyadi	Outstanding Researcher Award, DAE-Scientific Resreach Council
	Indian Society of Neuro-oncology President's Award for the Best Clinical Researcher.
Dr Mary Ann Muckaden	President (Elect), Indian Association of Palliative Care
	Chair, International Children's Palliative Care Network, Lead in Indo-American Cancer Association for Palliative Care.
	Awarded MSc. Palliative Medicine, Cardiff University, UK.
	Member Executive Board member, Asian Pacific Hospice Network.
Dr Sheila Myatra	Awarded Fellowship, Critical Care Medicine (FCCM)from the American College of Critical Care Medicine at Phoenix, Arizona, Jan. 2015
	General Secretary, All India Difficult Airway Association (AIDAA) 2015-2016
	Member, expert committee, end of life care guidelines for NABH (2015)
	Scientific Deputy Chairman of Respiratory and Airway Section for the 16th World Congress of Anesthesiologists to be held in Hongkong,2016
Dr Anisha Navkudkar	First prize, oral presentation, National CME organized by P.D.Hinduja Hospital, Mumbai, January 2015. "Management of transfusion needs in a case of cold agglutinins and hyperglobulinaemia in a patient of peripheral T-Cell Lymphoma"
Dr Prathmesh Pai	Prof. Khaja Krishnamurthy Oration (2015) AP Asscn of Otolaryngologists of India.
Dr C S Pramesh	Distinguished faculty award, Homi Bhabha National Institute.
Dr Ajay Puri	SN Buxi Best Published Paper Award, Indian Ortho Association.
	Saibal Ghosh Oration, Indian Ortho Assoc. National Meeting
	President (Elect), Asia Pacific Musculo Skeletal Tumour Society
	President, Indian Muskulo Skeletal Oncology Society
Dr Sajid Qureshi	K.M. Yusuf Memorial Oration, Tamil Nadu & Pondicherry Paediatric Surgeons Association, Annual Conference, Chennai.
Dr Seema Rao	Common Wealth Scholarship, Palliative Medicine Training, Cardiff University UK.
Mr. Saleem Pathuthara	Jwala Devi National Award, best innovative technical paper at CYTOCON 2015.
Dr Naveen Salins	Editor, Indian Journal of Palliative Care
	Visiting Associate Professor of Northern Adelaide Palliative Services, Modbury Hospital.
Dr Rajiv Sarin	Acting Chairperson, DAE Specialist Group in Medicine & Biology (SG16) for XII plan mid term project proposals
	Expert member, National Apex Committee on Stem Cell Research (ICMR)
	Expert member, Prime Minister Office / DHR meeting of Indo-US CEO forum
	Expert member, Scientific Advisory Committee, National Centre for Cell Science (NCCS), Pune
	Expert member, AERB, Committee for Safety & Radiation Protection
Dr J Goda Sastri	Young Investigators award, Japanese society of Hematology Congress
Dr Nidhi Sharma	First prize for best poster presentation at TRANSCON 2015, organized by State ISBTI Chapter at Jaipur, October 2015. "ABO Chimerism in a case of Hematopoetic Stem Cell Transplant Recipient".

Dr S S Shastri	Invited at the United Nations and Albert Einstein College of Medicine (AECOM) , New York. lectures on "Innovative Strategies for Cervical Cancer Prevention and Screening and Cervical Cancer Control in Low Resource Countries: Results of Randomized Controlled Trials in India."
	'Visiting Scholarship' as a faculty in World Congress on Larynx Cancer, 26th July to 30th July, 2015, Cairns, Australia.
Dr Shrikhande	Best Doctor Award, Governor of Maharashtra.
Dr SK Shrivastava	Expert member, Technical Evaluation for procurement of Equipments, by Govt. of Tripura, Agartala and AIIMS, Delhi
	Chairman, committee to evaluate preparedness for safety around nuclear installations as per DAE Order for NDMA Guidelines
Dr Pankaj Singhai	Bruce Davis Gold Medal, Palliative Care for the year 2015.
Dr Sohan Lal Solanki	National Award, "KPR Young Anaesthesiologist of India Award-2015"
Dr P. G. Subramanian	Lead assessor, NABL and member of Technical committee in hematology.
Ms. Manisha Tambe	Technologist Award, Indian Society of Transfusion Medicine oral presentation at TRANSMEDCON 2015, Kolkata. "Probability of identifying a matched related donor at HLA loci within a family for patients with various haematological malignancies".
Dr M.H. Thakur	Office-bearer: Vice President Breast Imaging Society of India (BISI), Elected in Nov. 2015 for 2 years organized by Breast Imaging Society of India
Dr Prabha Yadav	President- Association of Plastic Surgeons of India.

CENTRE FOR CANCER EPIDEMIOLOGY

ACCESS TO QUALITY CARE

Cancer Epidemiology

Dr. Rajesh Dikshit
Head

Dr. Atul Budukh
Dr. Rajini Nagrani
Miss Sharayu Mhatre

The Centre for Cancer Epidemiology (CCE) was established with the broad vision of conducting Epidemiological Research and Education. The centre is now functional from its new building on ACTREC campus Kharghar.

Service

The major goals of the centre are to build a program to identify Cancer Burden, Cancer Causation and cancer prevention strategies; build a platform to conduct large scale edge Epidemiological studies with accurate exposure measurement; build capabilities to conduct population based genetic studies; develop manpower for cancer surveillance, epidemiology and molecular epidemiological studies and partner with universities and other organizations with complementary capabilities for research and education. During the year, the activities of the centre covered descriptive epidemiology, analytical epidemiology and education and training.

Research

The centre continued to support Cancer Registries in India and South Asian countries and released the report of the Population based Cancer Registries at Punjab. The case control study on breast cancer was completed. The other studies related to gall bladder, lung cancer (non- smokers) and impact of use of mobile phone and brain tumours; develop low cost and feasible technology to detect HPV from menstrual pad and a cohort study at Barshi continued.

Education

The educational and training programme consists of short term and long term training programme and Ph.D in Epidemiology. During the year under report, meetings for International Association of Cancer Registry and Annual Review meeting of National Cancer Registry programme were organised. Seven students enrolled for Ph.D programme and two fellows from CDC USA visited the centre to work on various epidemiological projects.

Preventive Oncology

Dr Surendra Shastri
Head

Dr Sharmila A. Pimple
Dr Gauravi A. Mishra

The Department of Preventive Oncology's main objective is screening for common cancers, public education on health especially cancer, deliver pre-cancer management, conduct tobacco cessation programmes, counseling and research in related aspects. The Screening clinic of the department continue to screen public for Oral, Breast, Cervical cancers and other high risk cancers. The cervical pre - cancer management is offered through hospital and community based screening clinics. Transfer of technology and dissemination training workshops were organized for medical and para-medical personnel in government and non-government organizations for cancer control, prevention and early detection. This programme also included Tobacco Control and Cessation sessions which benefitted 375 participants across India. The department continued with its training and educations programs in Community Based Common Cancer Control and Early Detection for Cancer through observer-ship and other training programs. National and World cancer days were celebrated by organizing special awareness drives and free cancer screening clinics. Tobacco cessation services were offered to tobacco users through Hospital and Workplace based cessation clinics. Fellowships program for post M.D candidates was continued.

Services

The services were offered through several programmes. The Hospital Cancer Screening clinic screened 3,901 cases for Oral cancer and 6,817 women for Breast and cervix cancer. Under the Community Cancer Screening Programs for urban population, 3,602 women were screened for Oral, Breast and Cervical cancers. The tobacco cessation clinic saw a total of 1,100 tobacco users registered for Tobacco Cessation programme.

About 5,500 men and women benefited through 41 Cancer Awareness programs conducted across Mumbai region. The department conducted several preventive oncology training programmes covering various aspects of control, early detection and screening of common cancers.

Research

A total of ten ongoing Investigator initiated research projects focus on investigating effective strategies for cervix cancer screening and tobacco control and cessation. It also conducts HPV vaccination study in collaboration with IARC, France. Two projects received research funds from Department of Biotechnology (DBT) and Biotechnology Industry Research Assistance council", (BIRAC).

Department staff contributed a total of total eight (3 national and 5 International) research publications and two book chapters.

Education

The departments' educational and academic activities included participation in the World Health Organization International Expert Group Consultation on Smokeless Tobacco (SLT) use and Public Health in South East Asia Region (SEAR) Countries. Four workshops on Preventive Oncology and Tobacco Control & Cessation for medical and paramedical personnel and three CME programmes on "Tobacco Control and Cessation and Oral Cancer Screening" were organized for Medical Officers of Maharashtra State Health Services Public-Health Department, BEST undertaking and Jagjivan Ram Hospital. A symposium on "Illicit trade of tobacco products" was organized on World No Tobacco Day.

Dr. Ganesh B
Head

Medical Records, Biostatistics and Epidemiology

Mr. Sanjay D. Talole
Mrs. Sapana H. Kothare

The Department of Medical Record has been functioning for more than six decades and with primary function of maintaining medical records of TMC patients, hospital cancer registry, biostatistical consultancy for researchers and conduct epidemiology survey and studies to facilitate organizations policy decisions. Of these functions, the Hospital Based Cancer Registry is one of the major activities of the Department. The department was relocated in CCE building, ACTREC, Kharghar in December, 2015. The Cancer Registry collects demography and clinical data of the patients registered in TMH. The data for 2012 was abstracted from the hospital cancer registry during the year. Of the 33,916 case file registrations, 25,577 cases were registered as cancer cases. The abstracted data indicated that Buccal mucosa in males and Breast cancer in females were leading cancers.

The data for 8,800 Breast cancer cases, 3,200 Cervix cancer cases and 11,000 Head and Neck cancer cases till date was collected under the department's project - "Patterns of Care & Survival Studies" (POCSS): Project for Cancer Breast, Cancer Cervix and Head and Neck Cancers. The registry operations at six Population Based Cancer Registry under DAE (DAE- PCBR) namely, Ratnagiri, Sindhudurgh, Tarapur, Karwar, Rawatbhata and Kakrapar continued.

Health Checkup activities continued at Kaiga and Rawatbhata under the department's supervision and guidance. The first report of Kaiga Health Check up was submitted to Director, TMC, and has been forwarded to DAE. 12,481 individuals have been screened at the Kaiga Health Checkup and this project has been closed. Of the 13,768 individuals enumerated, more than 10,845 have been screened under the Rawatbhata Health Survey programme.

The department continued operations for PBCR at Kalpakkam and Kudankullam setup in collaboration with WIA Cancer Institute, Adyar Institute, Chennai in 2013. The department setup a PBCR at Visakhapatnam in August 2014 which continued its activities during the year. The department established use of tablets for capturing data at real time at various PCBRs. Digitalization of medical records has been undertaken. An annual review meeting of the NCRP was hosted in October, 2015 was attended by registry experts from different parts of the country.

Services

A total of 90,000 case files were issued for follow-up patients, and approximately 7,000 case files were issued for studies and other academic activities.

The retention and scanning of case files are in progress and old records are weeded out. The department also provides necessary information for RTI, Insurance, and Parliament queries etc., when required. The researchers were supported with designing, analysis and interpretation of clinical data.

Education

Medical Transcriptionists were trained from time to time. Training programs in Biostatistics and Epidemiology were also organized for Nurses, Infection Control unit, Ph. D. and Research Students.

Cancer Registry personnel were trained in abstraction, ICD Coding of diseases and operations for setting up newer registries like Kolhapur, and other places. Three Ph.D. (Doctoral) students were registered under HBNI.

The staff of the department participated in International Association of Cancer Registries (IACR) conference, Mumbai.

Fig1: Tata Memorial Hospital - Trends of Patient Registration and Cancer Cases 1941-2010

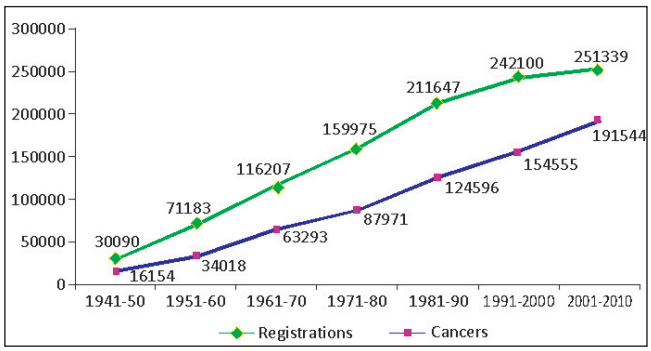


Fig2 : Trend of Patient Registration and Cancer Cases (2011-2015)

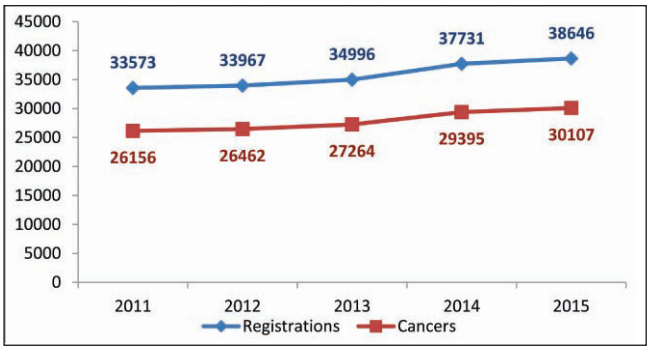


Fig3: common cancer cases 1941 -2010

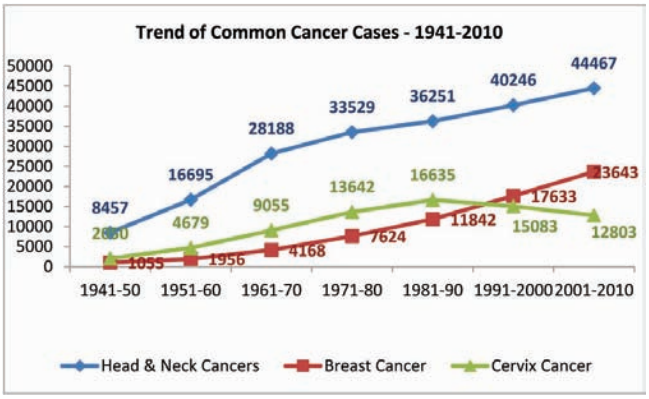


Fig 4: Common Cancers - 2010-2015

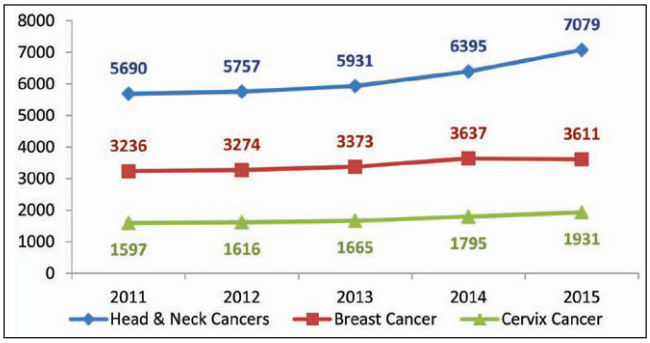


Fig 5: Cancer Trend (Leading cancers) seen in Tata Memorial Hospital

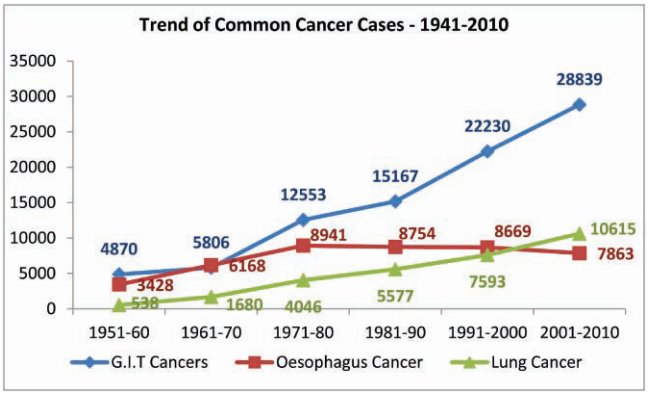
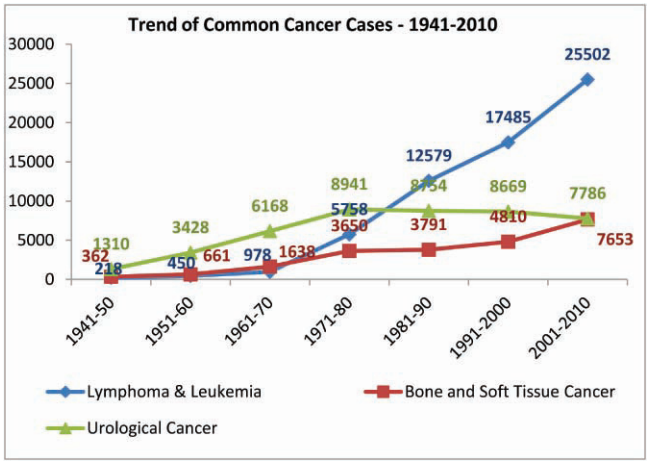


Fig 6 : Trends in leukemia and Lymphoma, bone & soft tissue and urologic cancers



DAE-TMH NETWORK OF CANCER REGISTRIES IN INDIA

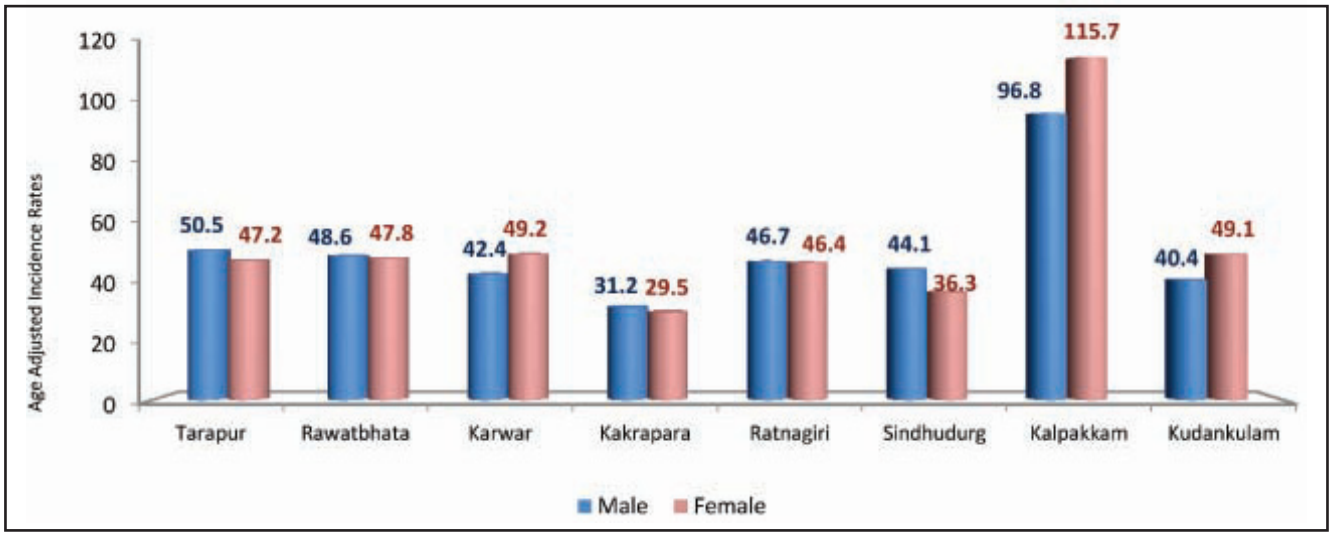


Fig 7: Age Adjusted Incidence Rates (AAR) per 100,000 in all DAE Registries.

Visakhapatnam cancer registry set up in August 2014 and data is being compiled.

Tables : Cancer Screening Programme

Tarapur Cancer Registry, Maharashtra

Leading Cancer Sites					
	Male			Female	
Site	Nos	AAR*	Site	Nos	AAR*
Mouth	31	6.4	Breast	49	10.6
Tongue	21	4.7	Cervix	24	5.4
Oesophagus	20	5.1	Ovary	20	4.5
All cases	216	50.5		206	47.2

Karwar Cancer Registry, Karnataka

Leading Cancer Sites					
	Male			Female	
Site	No	AAR*	Site	No	AAR
Mouth	7	8.7	Breast	12	15.1
Tongue	4	4.8	Oesophagus	5	6.1
Lung	4	5.4	Ovary	4	4.8
All cases	33	42.4	All cases	38	49.2

Rawatbhata Cancer Registry, Rajasthan

Leading Cancer Sites					
	Male			Female	
Site	Nos.	AAR*	Site	Nos.	AAR
Mouth	3	4.7	Breast	6	9.4
Oesophagus	3	5.1	Ovary	4	6.2
Tongue	2	3.1	Cervix	3	5.3
All cases	30	48.6	All cases		47.8

Kakrapar Cancer Registry, Gujarat

Leading Cancer Sites					
	Male			Female	
Site	Nos.	AAR*	Site	Nos.	AAR*
Tongue	16	6.5	Breast	17	7.3
Mouth	8	4.1	Cervix	15	6.6
Larynx	6	3.6	Tongue	5	2.2
All cases	62	31.2	All cases	66	29.5

Ratnagiri Cancer Registry, Maharashtra

Leading Cancer Sites					
	Male			Female	
Site	Nos.	AAR*	Site	Nos.	AAR*
Mouth	134	9.6	Breast	227	13.4
Tongue	56	4	Cervix	99	5.6
Larynx	46	3.2	Mouth	86	4.7
All cases	672	46.7	All cases	811	46.4

Kalpakkam Cancer Registry, Tamil Nadu

Leading Cancer Sites					
	Male			Female	
Site	Nos.	AAR*	Site	Nos.	AAR*
Stomach	216	11	Breast	607	31.2
Lung	173	9	Cervix	421	22
Mouth	136	6.8	Ovary	153	7.6
All cases	1883	96.8	All cases	2226	115.7

Sindhudurg Cancer Registry, Maharashtra

Leading Cancer Sites					
	Male			Female	
Site	Nos.	AAR*	Site	Nos.	AAR*
Mouth	79	9.5	Breast	106	11.4
Tongue	37	4.5	Mouth	36	3.6
Lung	25	3.1	Cervix	32	3.4
All cases	375	44.1	All cases	348	36.3

Kundankulam Cancer Registry, Tamil Nadu

Leading Cancer Sites					
	Male			Female	
Site	Nos	AAR*	Site	Nos	AAR*
Stomach	101	6	Breast	257	15.3
Lung	60	3.6	Cervix	160	9.6
Mouth	37	2.3	Stomach	56	3.3
All cases	660	40.4	All cases	825	49.1

Tata Memorial Hospital – Hospital Based Cancer Registry

Fig 8: Leading Sites of Cancer - 2012

Males		
Site	Total	%
Buccal Mucosa	1302	9.0
Lung	1148	7.9
Leukemia	1116	7.7
Non-Hogdkin's Lymphoma	768	5.3
Anterior Tongue	626	4.3
Oesophagus	528	3.6
Stomach	518	3.6
Prostate	447	3.1
Brain & Nervous System	411	2.8
Rectum	382	2.6
All Cancers	**14515**	

Females		
Site	Total	%
Female Breast	3043	27.6
Cervix	1236	11.2
Ovary	611	5.5
Gall Bladder	511	4.6
Leukemia	508	4.6
Thyroid	395	3.6
Lung	337	3.1
Non-Hogdkin's Lymphoma	312	2.8
Buccal Mucosa	298	2.7
Oesophagus	285	2.6
All Cancers	**11018**	

ACTREC

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

Overview of ACTREC

The Advanced Centre for Treatment, Research and Education in Cancer (ACTREC), the R&D unit of the Tata Memorial Centre, is located in Kharghar, Navi Mumbai. It comprises of two sub-units: the Clinical Research Centre (CRC) and Research Hospital that focus on clinical and translational research and treatment of cancer patients respectively, and the Cancer Research Institute (CRI) that focuses on basic and applied research on cancer. Scientific and clinical faculty members of ACTREC are engaged in basic, applied, translational and clinical research projects that involve collaborations within the Centre and with national/ international centres from academia and industry.

In 2015, 193 projects were on-going at the Centre, supported by institutional, intramural or extramural funding. Governmental funding agencies (DBT, DST, ICMR, LTMT, etc) provided Rs. 9.40 crore to meet the expenditure on 82 on-going projects, and sanctioned 18 new projects to the tune of Rs. 11.85 crore for a three year period, of which Rs. 5.52 crore were received during 2015. Research carried out by faculty of the Centre resulted in 120 indexed publications during 2015, of which 65 articles accrued from basic/ applied research studies and 55 from clinical/ translational research or medical technology. In 2015, 16 regular staff members were appointed at ACTREC in the medical, scientific, nursing, technical and auxiliary cadres, while three employees superannuated, four resigned and one expired.

The Clinical Research Centre (CRC) and Hospital of the Centre continued to make rapid strides in growth this year. Highlights of this year included an increase in the number of patients referred to and registered at ACTREC, restarting of MRI and intervention radiology under anesthesia, introduction of critical incident report form in the ICU and OT, and successful re-accreditation of the diagnostic labs of ACTREC in May 2015. The 112 bed hospital in ACTREC includes 80 ward beds, 10 in ICU and recovery, 6 in the bone marrow transplant (BMT) unit, and 16 in day care.

The department of Medical Oncology administers chemotherapy in neoadjuvant, adjuvant and palliative setting to patients with solid tumours. During 2015, ~8300 OPD visits took place in the adult solid tumor unit, and the unit's five in-patient beds were always occupied. Eighty bone marrow transplants (39 allogeneic, 41 autologous) were performed in the BMT unit and ~3600 OPD visits took place this year. Adult patients with hematolymphoid neoplasms not undergoing transplant are being treated in ACTREC since 2011 through a 17-bed leukemia/ lymphoma ward and adult hematolymphoid OPD. During 2015, the unit handled ~800 in-patients, and 6900 OPD visits. The department of Radiation Oncology treated over 700 new patients with external beam radiotherapy and performed over 250 brachytherapy procedures in 2015. A new state-of-the-art linear accelerator (Varian TrueBeam) was installed and commissioned for clinical use towards the year-end. The indigenously developed multi-leaf collimator system installed on the Bhabhatron-II telecobalt unit received regulatory approval for clinical use. The department of Surgical Oncology ran four operating theatres five days a week, provided in-patient care, and conducted OPDs for pre-surgical evaluation and post-operative follow-up. Surgical services included intra-operative image-guided neurosurgery using navigable 3D ultrasound, fluorescence guided-resections of malignant gliomas, and minimally invasive laparoscopic gastrointestinal surgery. In 2015, ~2000 major surgical procedures were performed at ACTREC.

The Pathology laboratory provides diagnostic services for histopathology, frozen section, immunohistochemistry, and cytology for cancer patients. The lab is accredited by NABL for all services except cytology. In 2015, the lab processed ~2740 histopathology specimens, 2320 frozen sections and 360 cytopathology specimens. Installation of an automated immunohistochemistry (IHC) machine for diagnostic IHC provided a major boost to the lab which has over 35 antibodies standardized for IHC; it performed ~3500 IHC tests in 2015. The Molecular Hematopathology laboratory, established in August 2013 as a referral diagnostic lab for molecular testing of hematolymphoid neoplasms, provides patient services and is also a translational research lab. On offer are the somatic hypermutation in lymphoma and CCAT/ enhancer binding protein alpha gene mutation (CEBPA) tests that are not available elsewhere in India. The lab also conducts an Advanced Molecular Hematology Training Course every year.

The department of Radiodiagnosis provides diagnostic imaging services for conventional radiology; interventional radiological procedures like image-guided FNACs, biopsy, embolization and drainage procedures; ultrasonography (transabdominal, endocavitary and small parts) including color doppler; diagnostic/ planning computed tomography and MRI scanning with/

without intravenous contrast. The Microbiology laboratory is NABL accredited and, during 2015, processed ~9074 samples for bacteriology, susceptibility testing, serology, clinical microbiology, sterility testing and environmental surveillance. Mycology services were introduced into the lab's repertoire this year. The Composite lab is also NABL accredited and provides services for routine biochemistry and hematology, immunoassays for TFT, vitamin assays, drug assay, and tumor markers. An advanced training course in medical laboratory technology was initiated this year.

The department of Transfusion Medicine provides round the clock, safe and adequate supply of blood/ blood components to cancer patients, and also offers blood donation services including outdoor blood donation camps, apheresis, component preparation, cryopreservation, component storage (including stem cells), and blood/ component issue. It also conducts peripheral blood stem cell harvest, assists in bone marrow harvest, bone marrow processing, cryopreservation and storage; leukodepletion and gamma irradiation of blood for BMT patients. The Nursing department provides comprehensive, quality nursing care to cancer patients. A patient safety campaign covering hand hygiene, prevention of nosocomial infections, prevention and management of falls and pressure ulcers, surgical safety and patient identification was initiated this year and SBAR form for patient hand over during nurses' shift change, red identification tags for patients allergic to food/ drugs, and bundles for VAP/ CAUTI maintenance/ peripheral vascular catheter were also introduced.

The Clinical Pharmacology lab is engaged in preclinical/ clinical drug development, repurposing drugs for cancer, and optimization of existing cancer treatments. The year 2015 brought out encouraging preclinical findings of chlorophyllin as a radioprotective agent, and its technology transfer to an industry partner. The lab's bioanalytical facility received a boost with the installation of an LC-MS/ MS system capable of small molecule quantitation, metabolite identification and quantitative proteomics. The lab's progress in PK/PD modeling enabled recommendation of appropriate doses of meropenam for ICU patients. The Translational Research lab focussed on studying the biology of extracellular nucleic acids (NAs). Research from the lab showed for the first time that circulating fragmented nucleic acids emerging from dead cells can freely enter into healthy cells and damage their DNA by integrating into their genomes. Extracellular NAs from cancer patients can cause oncogenic transformation of NIH3T3 cells, which then become tumorigenic in immune-deficient mice. Compounds that can degrade circulating NAs have been devised in this lab, suggesting novel therapeutic possibilities especially for cancer treatment.

During 2015, the Cancer Research Institute's 20 Principal Investigator led laboratories engaged in a wide spectrum of basic and applied research projects. Basic research is being carried out on vital proteins regulating cell cycle progression and the epithelial mesenchymal transition that could serve as therapeutic targets. The role of glycosylation in cancer metastasis is under investigation. The functions of keratin, vimentin and their associated proteins in epithelial homeostasis/ cancer are being worked out with the aim of using them as biomarkers of oral cancer. Identification of molecular targets in oral and cervical cancers is receiving due attention. Understanding the molecular basis of disease progression is being attempted in chronic myeloid leukemia, with the view to identify therapeutic targets during blast crisis. On-going studies investigate immune dysfunction in cancer patients with the aim of developing immunotherapy for cancer.

Genetic studies aim at understanding the molecular basis of inherited/ somatic cancers including inherited cancer syndromes, breast cancer and oral cancer, the latter as a part of the International Cancer Genome Consortium. Understanding the genetic basis of tobacco related cancers is being attempted using array CGH analysis of oral pre cancer and cancer. Integrated somatic mutation analysis and transcriptome profiling is being carried out in histopathologically diagnosed oligodendrogliomas. Altered expression of histone variants noted in liver cancer has been found to affect chromatin organization and transcription. The mechanism of radiation resistance is being worked out in glioblastoma cells.

The mechanism underlying non-classical programmed cell death is being examined by studying proteins of the apoptotic pathway such as the protease HtrA2. The structure and function of proteasomal assembly chaperones involved in cell morphology, epithelial to mesenchymal transition, cell migration and cell death is being elucidated. Studies are also attempting to unravel the structure and function of proteins such as BRCA1 BRCT, and design small molecule inhibitors.

Development of Raman based minimally invasive microspectroscopy and 1H NMR, Raman and infrared spectroscopy methods is being actively pursued for routine screening and diagnosis of cancer.

Molecular and cellular mechanisms governing stem cell regulation are being examined to find out how perturbations in these mechanisms could lead to cancer. Progress is being made towards deciphering the complexity of drug resistance using ovarian cancer as a model system. Functional imaging is being used to develop strategies to improve human sodium iodide symporter (hNIS) gene targeted radio-iodine therapy for breast cancer, in a bid to translate the findings of cancer research to the cancer clinic. Other research projects involve validation of housekeeping genes in head and neck cancers, and study of immunomodulatory effects of vitamin D3 and progesterone in receptor negative breast cancer cell lines. Assessment of minimal residual disease in solid tumours is being done to evaluate the efficacy of therapy and outcome of the disease. The impact of administering pre-operative depot progesterone on the levels of circulating tumour cells in the blood of patients with malignant breast lesions is also being examined.

The Centre also has a strong focus on Academics. Its doctoral program is conducted under the aegis of Homi Bhabha National Institute. During 2015, 123 graduate students worked towards the Ph.D. (Life Sciences) degree at ACTREC. Under the Centre's Short term and Summer Training program, 307 trainees worked under the supervision of the Centre's faculty. During the year 2015, 21 local, national or international conferences, symposia, workshops, etc. were organized at the Centre, including the International Conference on 'Molecular pathways to therapeutics: paradigms and challenges in oncology' in February, and the 11th International Cancer Genome Consortium (ICGC) Scientific Workshop in December. The Centre also hosted 26 national/ international experts who delivered research seminars on challenging topics in the life sciences and cancer.

ACTREC Annual Events

5th international conference of the Carcinogenesis Foundation (USA)

Carcinogenesis 2015: 'Molecular pathways to therapeutics: paradigms and challenges in oncology' (February 11-13, 2015): The 5th international conference of the Carcinogenesis Foundation (USA) was organized in collaboration with ACTREC-TMC. This widely attended meeting had three plenary lectures, 19 talks by invited speakers, 19 oral presentations and 72 poster presentations by students and young scientists. The discussions focused on advances made in carcinogenesis and carcinoprevention research in the first decade of the 21st century. As a part of this conference, a series of lectures on 'Pathways to Cancer' by experts from USA, France and India were arranged at Haffkine's Institute on 14th February 2015, for UG/ PG/ PhD students in the life sciences and residents/ fellows of medical, dental, and nursing colleges.

6th International Conference on 'Promotion of animal research, welfare and harmonization of laboratory animal science' (October 15-16, 2015): This Conference was organized jointly with the Laboratory Animal Scientists Association India, and was preceded by a workshop organized by AAALAC International, USA on October 14, 2015. The conference focused on advances in laboratory animal science. The technical program included two keynote addresses, 20 invited talks spread over six scientific sessions, 9 technical presentations in oral sessions, and 21 poster presentations. The conference saw participation by 163 delegates from India and two from Malaysia.

16th Indo-US Cytometry Workshop (October 27-28, 2015): The workshop 'Flow cytometry: translating laboratory discoveries to clinics' was organized jointly with the International Society for Advancement of Cytometry. Besides lectures on basics and applications of flow cytometry, the workshop program ensured wet lab exposure to DNA content and cell cycle analysis; apoptosis and proliferation; basics of cell sorting; multicolor flow and compensation; lymphocyte subset analysis; cytokine bead assays; stem cell analysis. Eleven renowned scientists and nine industry representatives served as faculty; workshop participants were 36.

Indo French Seminar on 'Application of structural biology in translational research and structure guided drug design' (November 19-20, 2015): This international conference was organized jointly by the Centre National de Recherche Scientifique (CNRS) and ACTREC-TMC. Prof. Anil Kakodkar, Chairman, Technology Information, Forecasting and Assessment Council (TIFAC), India inaugurated the seminar. Renowned scientists from India and France marked their presence by delivering keynote address, informative lectures and presentations. Each day ended with panel discussions between clinicians and basic scientists.

16th Indo-US Cytometry Workshop (October 27-28, 2015)

Distinguished Visitors

Visit of NAAC team to assess ACTREC's PhD (Life Sciences) program under the Homi Bhabha National Institute

On 5th January 2015, a US delegation comprising of senior members of the faculty of the departments of Otolaryngology and Cancer Biology, The Kansas University Medical Center, USA visited ACTREC. The delegation included Dr. Tomoo Iwakuma, Dr. Michael Henry, Dr. Sufi Thomas, Dr. Shrikant Anant and Dr. Animesh Dhar.

On April 30, 2015, a team from the National Assessment and Accreditation Council (NAAC) visited ACTREC to assess ACTREC's Ph.D. Life Sciences program of the Homi Bhabha National Institute (HBNI). The team was led by Prof. RC Sobti and included Prof. Gauri Dutta Sharma, Dr. Subodh Kumar Bhatnagar, Dr. K. Lalitha, Dr. V. Ipe Varghese and Prof. Dinesh Kumar Singh.

Visit of Dr. Sanjay Deshmukh, Hon. Vice Chancellor of Mumbai University

Visit of Prof. Mark S. Baker, President, Human Proteome Organization

On 16th October 2015, Dr. Sanjay Deshmukh, Hon'ble Vice Chancellor, University of Mumbai graced the valedictory function of the 6th international LASA conference.

On **11th December 2015,** Prof. Mark S. Baker, President, Human Proteome Organization; Head, Cancer Biology & Human Proteomics Research Group, *Macquarie* University, Sydney, Australia visited the Centre and gave an illuminating talk about 'The HPP missing proteins'.

Vital Observances

The ACTREC campus is geographically isolated from the hubbub of the main city and, in order to engage its staff, students, patients and their caregivers, the Centre proactively observes important days and events at the Kharghar campus. Vital events celebrated conducted during 2015 en-compassed Republic day (26th January), Birth anniversary of Chhatrapati Shivaji Maharaj and Dr. Babasaheb Ambedkar (20th April), Independence day (15th August), Sadbhavana Diwas (20th August), Swachha Bharat Abhiyaan (1st October), Vigilance awareness week (26th October) and Rashtriya Ekta Diwas (2nd November).

Patient Support Programs

During the year, the Centre in concert with NGOs and CSR initiative of industry partners also organized patient support and entertainment programs on 4th September, 21st September (Rose day), 7th October, 15th December, and 24th December (Christmas eve).

AUGMENTATION OF RESOURCES AT CRC, ACTREC DURING 2015

Linear Accelerator with image guided radiotherapy and Rapid Arc

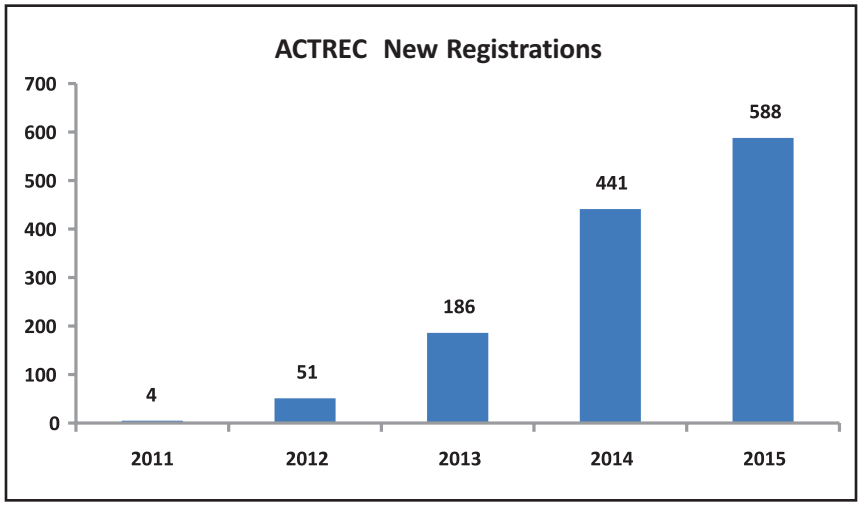
Neurophysiological monitoring system

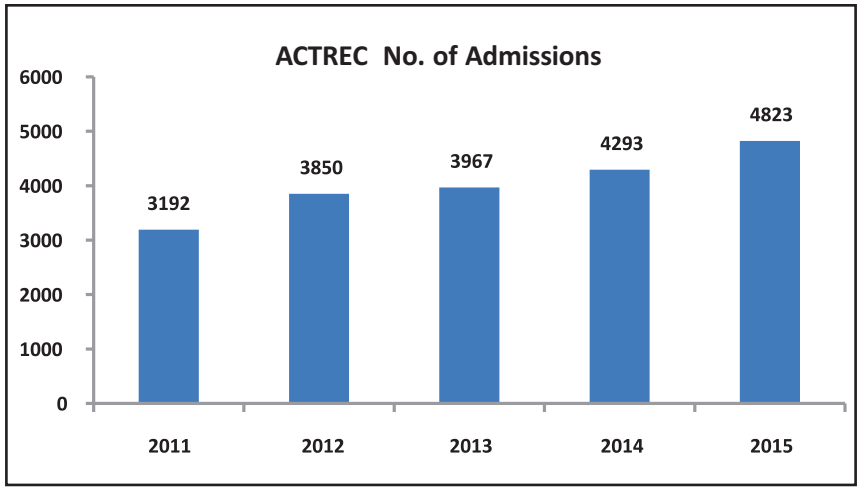
Highly sensitive LC-MS/MS system (Qtrap 4500, ABSciex, USA)

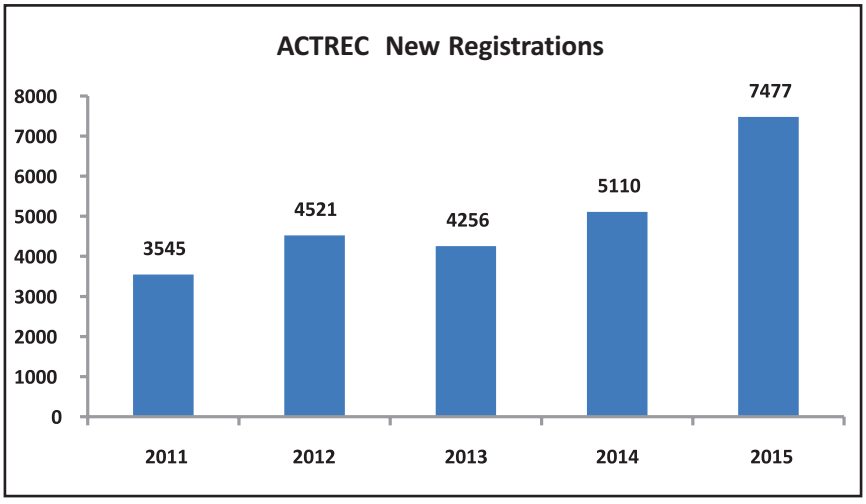
Digital Mammography with Tomosynthesis system

PET CT system

ACTREC: TRENDS







Performance Statistics - ACTREC

	2014	2015
Patient Chart Files- General	3864	6101
Patient Chart Files- Private	990	1395
Patient Chart Files- Total (A)	4854	7496
Referrals for Investigations/Second Opinion (B)	123	202
Total Registrations (A+B)	4977	7698
INPATIENT SERVICES		
No. of Admissions	4293	4823
Average Length of stay (Days)	5.58	5.21
Bed Occupancy %	72	76
SURGICAL ONCOLOGY		
Major OT Procedures	2317	2546
Minor OT Procedures	960	1195
MEDICAL ONCOLOGY		
Day Care- General	11346	14328
Day Care- Private	1702	2070
Bone Marrow Transplants at ACTREC	75	80
No. of ICU Admissions	314	351
Patients in Recovery Ward	1982	2028
Pain Clinic	*DNA*	224
RADIATION ONCOLOGY		
External Beam Therapy	436	696
Brachytherapy	318	626
Treatment Planning / Beam Modification	711	1571
Special Radiotherapy Techniques (IGRT, IMRT, SRS, SRT, TSET etc.)	279	301
IMAGING SERVICES		
Conventional Radiography	1614	1905
Ultrasonography / colour Doppler	505	845
Mammography	*SNA*	*SNA*
C.T. Scan	1644	2999
M.R.I Scan	1342	1930
Interventional Radiology	752	1379
NUCLEAR MEDICINE		
PET-CT	*SNA*	626
GENERAL MEDICINE		
ECG	696	1411
Echo Cardiography	52	543

	2014	2015
LABORATORY DIAGNOSTICS		
Pathology	7384	8617
Haemato Pathology	34567	41222
Biochemistry	33712	41050
Cyto Pathology	284	367
Microbiology	6553	7951
TRANSFUSION MEDICINE		
Blood and Platelet Units Collected	2854	3036
Other Services	15849	22228
OTHER CLINICAL SERVICES		
Physiotherapy	5153	4992
DENTAL SERVICES		
Prosthetics Services	*SNA*	*SNA*
Other Services	662	1373
MEDICAL SOCIAL WORK		
Guidance	2382	*DNA*
Counselling	1845	*DNA*
EDUCATION		
Residents & Others	30	40
Fellows	2	1
Medical Observers	16	20
Nursing Trainees	2	6
Paramedical Students	2	2
RESEARCH PROFILE		
Extramural Projects	95	99
Institutional(Intramural/No Funding Required)	86	92
Intramural + Extramural Projects	1	2
P.G. Thesis (Dissertation)	13	13
PUBLICATIONS		
International	117	123
National	25	28
Book Chapters	9	12
CONFERENCES / WORKSHOPS	21	22
Research Seminars	14	26
SNA = Service Not Available; DNA = Data Not Available; Pathology = IHC, Frozen, Main lab		
Patient Chart Files- General (TMH New Transfer)	3491	5578
Patient Chart Files- Private (TMH New Transfer)	922	1329
Patient Chart Files- General (ACTREC New Registrations)	373	523
Patient Chart Files- Private (ACTREC New Registrations)	68	66

CLINICAL RESEARCH CENTRE

Dr. Shubhada Chiplunkar (Director, ACTREC)

Dr. H. K. V. Narayan (Dy. Director, ACTREC)

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

Anaesthesiology, Critical Care & Pain

Dr. Reshma Ambulkar *(OIC)*
Dr. Bhakti Trivedi
Dr. Amol Kothekar
Dr. Malini Joshi
Dr. Raghu Thota

Biomedical Engineering

Dr. Amit Sengupta *(Technical Consultant)*

Cancer Genetics

Dr. Rajiv Sarin

Clinical Pharmacology

Dr. Vikram Gota
Dr. NK Manjunath

Clinical Research Secretariat, ACTREC

Dr. Tejpal Gupta
Mrs. Sadhana Kannan

General Medicine

Dr. Prafulla Parikh

Hematopathology - Molecular

Dr. Nikhil Patkar *(Clinician Scientist)*
Dr. Prashant Tembhare *(Clinician Scientist)*

Medical Administration

Dr. Prashant Bhat *(Asst. Med. Suptdt)*
Mrs. Chital Naresh

Medical Oncology

Dr. Sudeep Gupta
Dr. Navin Khattry *(OIC)*
Dr. Manju Sengar
Dr. Amit Joshi
Dr. Jaya Ghosh
Dr. Sameer Rastogi[@]
Dr. Tushar Vora
Dr. Hasmukh Jain

Medical Physics

Ms. Jamema SV
Ms. Reena Phurailatpam

Microbiology & Composite Lab

Dr. Vivek Bhat *(OIC)*
Dr. Preeti Chavan *(OIC)*

Nursing

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

Pathology

Dr. Asawari Patil *(OIC)*
Dr. Epari Sridhar
Dr. Swapnil Rane

Radiation Oncology

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

Radiodiagnosis

Dr. Seema Kembhavi
Dr. Ashwin Polnaya
Dr. Amit Kumar Janu

Surgical Oncology

Dr. MS Qureshi
Dr. Aliasgar Moiyadi *(OIC)*
Dr. Vinayak Shankhdhar
Dr. Sudhir Nair *(Clinician Scientist)*
Dr. Deepa Nair
Dr. Prakash Shetty

Transfusion Medicine

Dr. Shashank Ojha *(OIC)*
Dr. Minal Poojary
Mrs. Manda Kamble

Translational Research

Dr. Indraneel Mittra *(Dr. Ernest Borges Chair)*
Dr. Ranjan Basak
Dr. Kavita Pal

[@] Resigned during 2015

Medical Administration

Dr. Prashant Bhat
Asst. Medical Superintendent

Quality Manager
Ms. Chital Naresh

Overview

Medical Administration looks after all the patient-centered services at ACTREC, ensuring a smooth, all-round, high-quality, multidisciplinary environment for the management of cancer patients and clinical research. Under its roof come the Clinical services (out-patient, in-patient and diagnostic services), Support services (CSSD, Pharmacy, Linen, etc) and Quality. The AMS office coordinates with faculty and staff of CRC to ensure smooth and uninterrupted patient care, and also coordinates the Centre's quality improvement program. It also facilitates material management, by co-ordinating material procurement including capital equipment, medicines and surgical items for the Pharmacy; coordinates large turnkey projects for installation of equipment, evaluation of contracts for outsourced services, and major/ minor projects being undertaken for infrastructure development. Through the Infection Control Committee, it also oversees compliance of Biomedical Waste Management as per regional requirements, and monitors infection control.

Clinical Services

The current strength of the CRC hospital is 112 beds which includes 80 functional ward beds, 10 ICU and recovery beds, 6 bone marrow transplant beds and 16 day care beds. During 2015, a total of 7477 cases were registered at the hospital, showing an increase of 54% over the previous year's figures. Of these, 588 new cases were direct registrations at ACTREC, an increase of 33%. The total number of admissions increased by 10% with 2546 major surgeries and 80 bone marrow transplants conducted this year. The overall in-patient bed occupancy at this Centre was 75.57%, with the average length of stay being 5.21 days. ACTREC diagnostic services - viz. Clinical Biochemistry, Hematopathology, Microbiology, Surgical Pathology and Hematology – Molecular Division underwent evaluation for re-accreditation in March 2015 and were granted accreditation by NABL in May 2015 which is recognition from the Quality Council of India for the technical competence and quality of testing in the diagnostic laboratories. Medical Administration played a major role in this endeavor. A new state of the art Linear Accelerator with IGRT/ IMRT was commissioned through a turnkey project in 2015 and is now being used for patient treatment and research. A new Mammography system and PET CT system is under installation and will be ready for commissioning shortly. MRI under anesthesia for pediatric patients requiring MRI and Intervention Radiology under anesthesia were started at ACTREC.

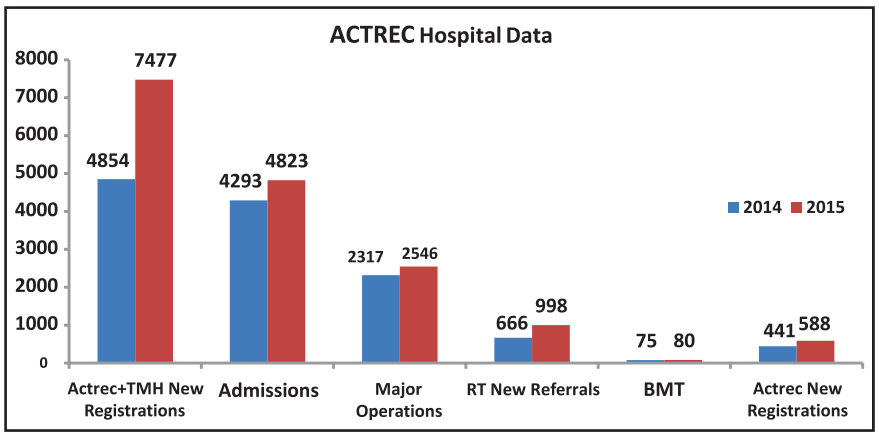
Quality

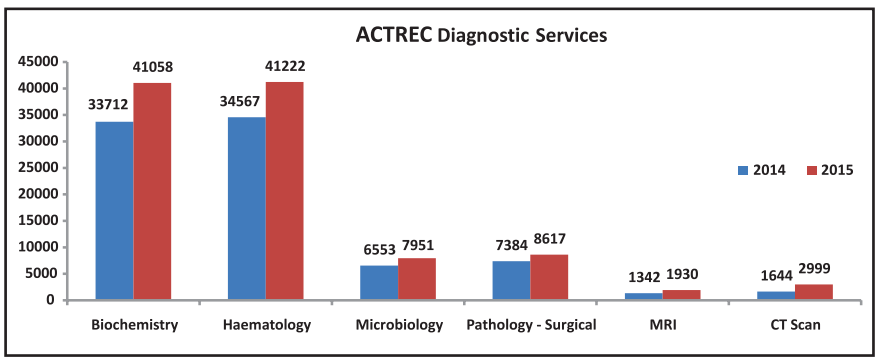
During the year 2015, the office of the Medical Superintendent oversaw various programs and activities catering to the growing needs of services and facilities for the increasing number of patients being referred to and registering at ACTREC, paying due attention to providing 'quality patient care'. In response to the increased patient load, improved patient management measures were put into place in the OPDs, Radiotherapy, Day care, Interventional Radiology and Pharmacy. The Office ensured a proactive and effective 'Patient Feedback Redressal' system with feedback collection boxes placed at strategic locations throughout the ACTREC campus that are easily accessible to the patients. During 2015, 183 patients' feedback was obtained and appropriately redressed. The Centre's Critical Incident Reporting system ensures prompt reporting of adverse events, conduct of root cause analysis, and initiation of corrective/ preventive action. During 2015, the Office received 54 reported incidents, root cause analysis was conducted, and preventive measures were initiated as deemed appropriate. On behalf of the National Accreditation Board for Hospitals & Healthcare Organizations (NABH), departmental faculty actively participated as assessors during the assessment of various hospitals in the country.

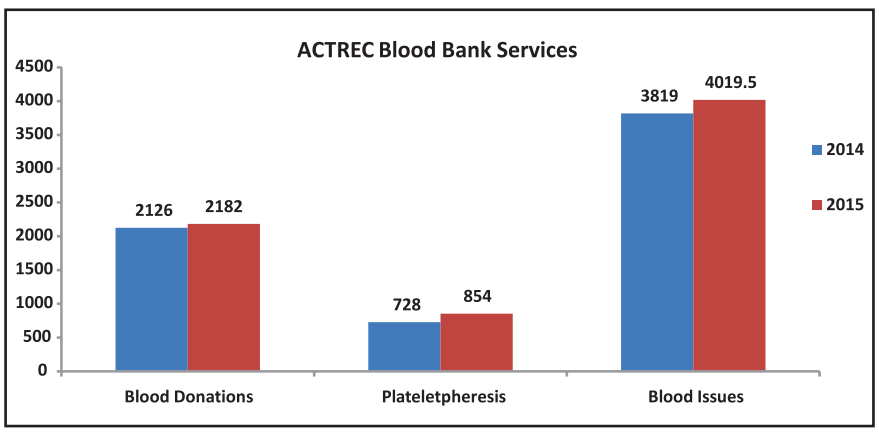
Education

The AMS is a visiting faculty for the MHA and Executive PGDHA program of TISS, Mumbai, and is the supervisor for MHA students' internship and a project guide for two student dissertations. During 2015, he delivered an oral presentation on 'ACTREC's patient SMS alert system' at the International Convention on 'Improving Healthcare' at Melbourne, Australia from 16th-18th November 2015. Departmental staff also participated in two national CMEs as

panelists/ speaker. As per the calendar plan for 2015, several training programs were conducted for the entire hospital staff or for laboratory/ nursing staff. The areas covered included Basic safety in laboratories, Orientation on the revised quality management system, Infection control and safety practices, Pre-analytical errors and trouble shooting, Waste management and Spill management. The department also supported the 2nd National CME on 'Quality conclave of laboratory and transfusion services' held at ACTREC in February 2015.







Department of Medical Oncology

Dr. Navin Khattry
Officer-in-Charge

Medical Oncologists
Dr. Sudeep Gupta
Dr. Kumar Prabhash
Dr. Manju Sengar
Dr. Amit Joshi
Dr. Jaya Ghosh
Dr. Bhausaheb Bagal
Dr. Tushar Vora
Dr. Hasmukh Jain

Overview

The Department of Medical Oncology started its services in ACTREC in 2006. Initially it was restricted to administering concomitant chemotherapy with radiotherapy for head and neck cancers and cancer of the cervix. Since the past four years, chemotherapy is also being administered in neoadjuvant, adjuvant and palliative setting for solid tumours. The Bone Marrow Transplant unit shifted to ACTREC in November 2007 due to the rising incidence of life threatening infections in the unit at Tata Memorial Hospital, Mumbai. Since then, ~500 autologous/ allogeneic transplants have been performed with overall transplant related mortality of 8% (2% in autologous, 14% in allogeneic). Since October 2011, adult patients with hematolymphoid neoplasms not undergoing transplant are also being treated in ACTREC.

Service

Bone Marrow Transplantation Unit: In 2015, 80 transplants were performed in ACTREC, 39 allogeneic and 41 autologous. Approximately 3600 out-patient visits occurred this year with ~330 out-patient visits per month. The unit routinely performs matched unrelated donor transplant using HLA matched stem cells from international unrelated donor registries, unrelated cord transplants, and the most challenging haplo-identical transplants for patients who do not have a fully matched related/ unrelated donor. In fact, this hospital is one of the largest Centres doing these transplants, with ~30 transplants having been performed over the past three years, with overall survival of about 55%. Since 2009, a funding mechanism has been in place to offer free or greatly subsidized BMT as a life saving measure for deserving poor patients. Under this scheme, over 90 autologous/ allogeneic transplants have been performed.

Adult Hematolymphoid Unit: A 17-bed leukemia/ lymphoma ward and adult hematolymphoid OPD was set up in 2011. Around 800 in-patients and ~6900 out-patient visits took place during 2015.

Adult Solid Tumor Unit: In the year 2015, around 8300 out-patient visits occurred. Tumors of the head and neck region, breast, ovary, cervix and gastrointestinal region comprise the bulk of cancers treated by the department at ACTREC. The five in-patient beds dedicated to solid tumors, in the second floor ward in Paymaster Shodhika, are always occupied.

Clinical Research

Faculty members of the department are involved in several investigator initiated and sponsored clinical trials and various collaborative research projects, both in the hematolymphoid and the solid tumor units. A phase I trial unit with two beds commissioned a few years ago have patients from the department at all times.

Education

The Department of Medical Oncology at ACTREC has an active educational program, which encompasses daily academic sessions pertaining to transplantation and hematolymphoid neoplasms for the DM students posted in ACTREC, and a fortnightly Journal Club that includes faculty and students from the departments of medical, radiation and surgical oncology. During 2015, both consultants and students from the hematolymphoid and solid tumor units presented their research at various major national and international meetings.

Department of Radiation Oncology

Dr. Tejpal Gupta
Officer-in-Charge

Radiation Oncologists
Dr. Vedang Murthy
Dr. Supriya Sastri
Dr. Goda Jayant Sastri
Dr. Tabassum Wadasadawala

Medical Physicists
Ms. SV Jamema
Ms. Reena Phurailatpam

Overview

The department of Radiation Oncology provides service, education, and research in all aspects of oncology, in close cooperation and collaboration with colleagues from the Tata Memorial Hospital. The group's research focus is on generating high-quality evidence for the use of advanced radiotherapy technology. In keeping with an emphasis on technology development, a new state-of-the-art linear accelerator (Varian TrueBeam) was installed and commissioned for clinical use towards the year-end. The indigenously developed multi-leaf collimator system installed on the Bhabhatron-II telecobalt unit also received regulatory approval for clinical use. The Radiation Oncology Information System is now an integral component of the day to day clinical work in the department. This versatile system has proven to be useful in patient appointments, radiotherapy treatment information archival and departmental audit. It has not only helped streamline the process of billing for radiotherapy procedures but has also helped patients through the automated patient information via SMS.

Service

In the year 2015, 713 patients underwent fractionated external beam radiotherapy at ACTREC on various investigator-initiated protocols, sponsored studies, as well as a part of services to patients registered primarily at ACTREC (Navi Mumbai residents). The infrastructure available for external beam therapy includes a Linear Accelerator (Varian TrueBeam) with multiple photon/electron energies, an indigenously developed telecobalt (Bhabhatron-II), and a Helical Tomotherapy unit. scanner for CT-simulation, and several contemporary treatment planning systems (Eclipse, Oncentra, BrainSCAN). Besides conventional radiotherapy, state-of-the-art treatments like 3-D conformal radiotherapy, intensity modulated radiation therapy and radiosurgery, stereotactic radiotherapy, image guided radiation therapy, and total body irradiation are routinely practiced at ACTREC. Brachytherapy infrastructure includes a remote afterloading HDR machine within the integrated brachytherapy unit. A total of 197 patients underwent 508 brachytherapy procedures (intracavitary applications and interstitial implants) in 2015 at ACTREC, mainly for gynecological and breast cancers.

Research

Faculty members of this department are involved, as Principal/ Co-Principal Investigators or Co-investigators, in a large number of on-going and newly-initiated research projects in collaboration with their colleagues in ACTREC, TMH and other institutions. The interim analysis of one such randomized trial comparing image-guided intensity modulated radiation therapy versus conventional radiotherapy in patients with carcinoma cervix in the post-operative adjuvant setting was presented by Dr. Supriya Sastri in the plenary session of the annual conference of the American Society of Therapeutic Radiology. At its annual meeting, the Society of Neuro-Oncology also allocated a special luncheon symposium to the Indian Society of Neuro-Oncology that was led by Dr. Rakesh Jalali and Dr. Tejpal Gupta.

Education

Faculty members attended fourteen international conferences/ meetings during 2015 and presented their data there as invited faculty, or in oral/ poster presentations. Members of the department were also helped organize six conferences at TMC. These included Evidence Based Medicine Meeting on Advanced Radiation Technology in Clinical Practice, at TMC, Mumbai from 27 Feb to 1 Mar 2015; XIIIth Annual TMH Radiotherapy Practicum: Teaching Course and Workshop on Brachytherapy in Head & Neck Cancers at TMC, Mumbai on 30-31 Oct 2015; and IAEA Training Course in IMRT for Head Neck Cancers and Brain Tumors at TMC, Mumbai from 30 Nov to 4 Dec 2015. As a part of the Centre's training project, Dr. Goda accepted one trainee on a collaborative project in 2015.

Department of Surgical Oncology

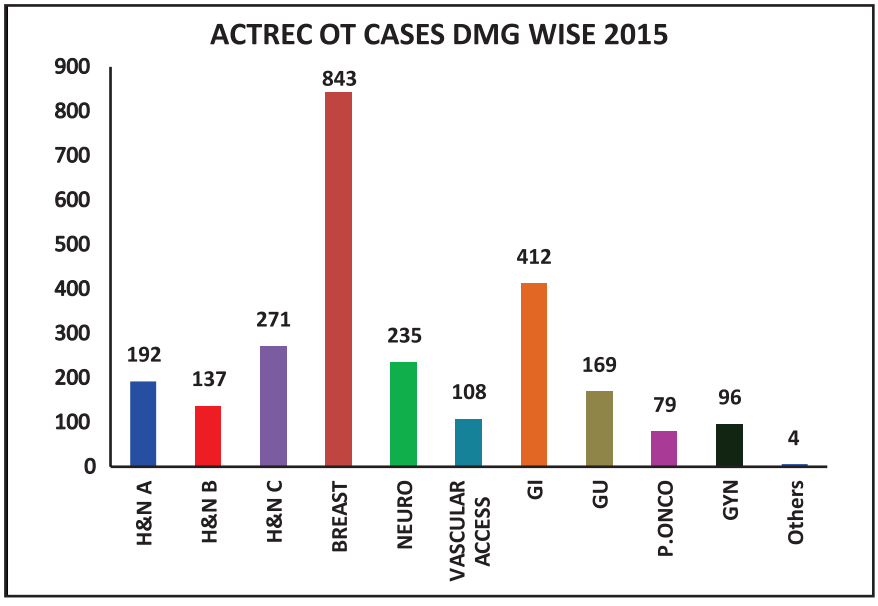
Dr. Aliasgar Moiyadi
Officer-in-Charge

Surgical Oncologists
Dr. MS Qureshi
Dr. Vinay Shankhdhar
Dr. Deepa Nair
Dr. Sudhir Nair
Dr. Prakash Shetty

Overview

The department of Surgery at ACTREC has been providing continued in-patient care as well as regular outpatient follow-up clinics to a wide range of cancer patients, and is fully supported by staff of the Dept. of Surgical Oncology, TMH. The service runs four regular operating theatres, five days a week. Almost 2500 major procedures have been performed in 2015. This includes major surgeries in pediatrics, head-neck, breast, gastro-intestinal, gynecology, urology and neurosurgery (see figure).

The department also conducts regular OPDs (for newly registered as well as follow-up cases). In order to streamline pre- and postoperative care, new OPDs (postoperative follow-up OPD, and presurgical evaluation OPD) have been started since late 2014. The department has introduced several new services at ACTREC during the year. The neurosurgical services offer intra-operative neurophysiologic monitoring, which helps to perform safer surgeries in patients with tumors in eloquent areas. Minimally invasive laparoscopic GI surgery has been consolidated during the year and is being implemented regularly with plans for further expansion.



Research

Faculty members of the department at ACTREC are involved in several DMG coordinated research projects alongside their counterparts at TMH and with collaborators in other institutes such as IIT and BARC.

Education

The department at TMH, jointly with scientists at ACTREC, run an annual teaching program for residents (integrated MCh program) posted at the Centre. Departmental faculty members are actively involved in various capacities in national and international bodies/associations, and presented their clinical research findings at over 25 national and international conferences and workshops during the year.

Department of Anaesthesiology, Critical Care and Pain

Dr. Reshma Ambulkar
Officer-in-Charge

Anesthesiologists & Intensivist
Dr. Raghu Thota
Dr. Bhakti Trivedi
Dr. Amol Kothekar
Dr. Malini Joshi

Overview

Anaesthesia, Critical Care and Pain management services are provided by the departments at TMH and ACTREC. Besides the five permanent medical staff and eight senior residents appointed at ACTREC, the full-time consultants and residents at TMH also are engaged in provision of these services at ACTREC. In July 2015, two additional speciality groups (thoracic, hepatobiliary/pancreatic) were created within the Anaesthesia division in order to provide better service to patients, promote professional development, and further streamline work patterns, protocols and research. These are in addition to the pre-existing specialty groups for paediatric anaesthesia, critical care and pain. The year also saw the introduction of the following services at ACTREC: Pre-anaesthesia Check-Up Clinic, Acute Pain Services, and Anaesthesia services for radiology (MRI and Interventional Radiology), extended to all the days of the week. Critical Incident Reporting was initiated in the OT and ICU at ACTREC.

Service

The department provides the following vital services to the hospital at ACTREC: (1) Anaesthesia – at six locations + Pre-Anaesthesia Check-up Clinic; (2) Critical Care - 7 bedded ICU plus 3 bedded PACU + CPR team; (3) Pain - Acute Pain Services. During the period January to December 2015, Anaesthesia services supported 2578 surgical procedures in the Major OT and 435 in the Radiotherapy OT, 141 MRI, 283 Interventional Radiology and 1180 (new + follow up) pre-anaesthesia check-ups. Critical Care services were provided for 2028 Recovery Room admissions and 351 (100 ventilated) ICU admissions. Acute pain services were provided for 224 patients.

Research

The department participated in many on-going/ completed clinical research and audit studies in 2015. These include the following six projects in which faculty serve as principal investigators (PI): (1) A randomized trial comparing the McGrath videolaryngoscope with the Macintosh laryngoscope for nasotracheal intubation in patients undergoing surgery for head and neck malignancies (PI: Dr. Ambulkar); (2) The WHO surgical safety checklist: Effectiveness and quality of its implementation (PI: Dr. Ambulkar); (3) Postoperative residual curarization and critical respiratory events in post anaesthesia care unit: an observational study (PI: Dr. Thota); (4) A survey on approach to anticipated difficult airway management among anaesthesiologists with a focused interest in airway management (PI: Dr. Thota); (5) Effect of prophylactic dexmedetomidine on haemodynamic response to double lumen tube intubation under general anaesthesia (PI: Dr. Joshi); (6) Acute kidney injury in post hepatectomy patients in tertiary cancer hospital (PI: Dr. Joshi).

Education

The departments at TMH and ACTREC function jointly in all their educational initiatives. They conducted the annual Anaesthesia Review Course (ARC) from April 3-5, 2015, in which over 300 postgraduate students participated, and organized the National Airway Conference from December 4-6, 2015. The Critical Care division held an annual two-day workshop on Hemodynamic Monitoring (THEMATICC) on October 17-18, 2015, which was attended by intensivists from all over India. The Pain division organized an annual two-day conference – Education in Cancer Pain (ECAP). The departments also conducted a 1-year ICU technicians' course, a hospital CPR Course for nurses and doctors, and an orientation lecture series in pain management for nurses. Members of the department were invited as faculty to several national and international conferences during 2015.

Department of Radiodiagnosis

Radiologists
Dr. Shashikant Juvekar
Dr. Seema Kembhavi
Dr. Ashwin Polnaya
Dr. Amit Kumar Janu

Overview

The department of Radiodiagnosis at ACTREC works in close conjunction with its TMH counterpart. Besides the staff radiologists, two senior and one junior registrar from TMH are posted at ACTREC on monthly rotation; the senior registrar works as a resident. The department provides services for conventional radiology, interventional radiology (image-guided FNACs, biopsy, embolization and drainage); ultrasonography (transabdominal, endocavitary and small parts) including color Doppler; diagnostic/ planning computed tomography (CT) and magnetic resonance imaging (MRI) scanning with/ without intravenous contrast. The department carries out CT scans of the brain and peripheral nervous system, neck, thorax, abdomen, pelvis and extremities; CT angiography; CT scans for radiotherapy planning; routine MRI scans of the brain, paranasal sinuses, neck, whole spine, abdomen, pelvis and joints/ extremities; and advanced MR imaging (perfusion imaging, diffusion weighted imaging, MR angiography, diffusion tractography/ tensor imaging and functional MR imaging). CT and MRI are also performed on animals under animal research projects. Emergency services (urgent X-rays, sonography, doppler studies, CT and MRI scans) are provided round the clock, including on weekends/ holidays. The old PET-CT scan machine was decommissioned in September 2015.

Service

During 2015, 1905 conventional radiological investigations (average 158 X-rays/ month) were performed (1721chest, 126 bone, and 58 abdomen and pelvis). In all, 845 USG/ color Doppler (average 70 scans/ month) were performed. A total of 2280 patients underwent diagnostic CT scans (average 253 patients/ month). Region wise breakup of 4531 scans was: 304 neck, 252 PNS, 136 brain, 1342 thorax, 1379 abdomen, 1041 pelvis, 69 angio, 2 extremities, 1 spine and 5 CT guided biopsies. A total of 719 radiotherapy planning CT scans were performed (average 80 patients/ month). In all, 1930 patients underwent MRI scans (average 160 patients/ month). Region wise breakup of MRI scans was: 895 brain, 179 spine, 275 neck and PNS, 125 extremities, 113 abdomen, 160 pelvis, 14 breast, 3 whole body and 33 for RT planning. In all, 1379 interventional radiology procedures (average 115 patients/ month) were performed in 2015.

Research

Dr. Kembhavi's research project on imaging spectrum of liver tumors was completed this year. In 2015, 22 publications accrued from the department.

Education

Faculty of the department actively participated as faculty/ invited speakers or delegates at national conferences/ CMEs/ training courses, and 13 international conferences and presented their findings as oral/ poster presentations or scientific/ educational exhibits.

Initiating innovative activity impacting patient care

The department initiated and streamlined various interventional radiology (vascular/ non vascular) procedures at ACTREC in 2015, enabling it to cope with the steady increase in the spectrum/ number of cancer cases and reduce the waiting list at TMH.

Department of Transfusion Medicine

Dr. Shashank Ojha
Officer-in-Charge

Blood Bank Officer
Dr. Minal Poojary

Scientific Officer
Mrs. Manda Kamble

Overview

The department of Transfusion Medicine (DTM) works diligently towards ensuring the provision of safe and adequate supply of blood/ blood components round the clock, by routinely carrying out plateletpheresis and leukapheresis. DTM runs the following donation and laboratory services: blood donation and apheresis including outdoor blood donation camps, red cell serology, component preparation, cryopreservation, component storage (including stem cells), transfusion transmitted infection testing, and blood/ component issue. Specialized services include peripheral blood stem cell (PBSC) harvest, assistance during bone marrow harvest, bone marrow processing, cryopreservation and storage; leukodepletion and gamma irradiation of blood for BMT patients. The department has been a primary support to the Bone Marrow Transplant unit. DTM also caters to the blood and blood component requirements of patients admitted in other hospitals and nursing homes in Navi Mumbai. Successful conduct of FDA inspection for license renewal and AERB annual safety status report has further helped DTM in enhancing its overall quality and service.

Service

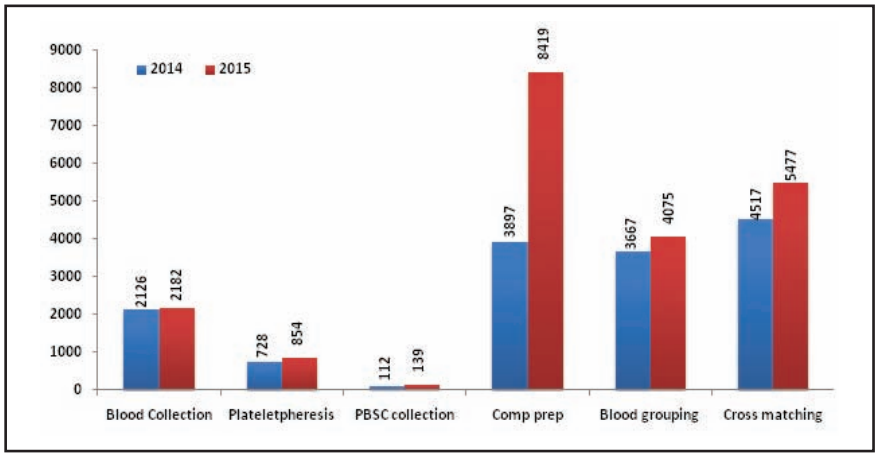
During the year 2015, DTM collected a total of 2182 blood units, prepared 8419 components, and issued 4019.5 blood components (figure). The department performed 854 plateletpheresis procedures and processed samples to obtain 1580 leucodepleted products, 13 required granuloctye concentrates and 2525 irradiated products. In all, 139 peripheral blood stem cell collections were also achieved. Blood grouping was performed on 4075 samples and cross-matching on 5477. DTM participates in EQAS programs conducted by Red Cross Mumbai and BEQAS, Jaipur. The department organized 34 outside blood donation camps during the report year. A total of 1108 platelet donors were registered for platelet donation. With 100% switch over to voluntary blood donation, the same is being replicated for apheresis platelet donation by conducting platelet donation awareness camps.

Research

The departmental faculty members are involved in three on-going research projects: (1) Determination of select biochemical reference intervals in Indian voluntary blood donors, (2) Flow cytometric platelet cross-matching approach for selection of platelets in hematopoietic stem cell transplant patients, and (3) A study of hemolysis in red cell concentrates during transportation.

Education

DTM, jointly with the diagnostic laboratories of ACTREC, organized a CME on 'IInd Quality Conclave of Laboratory and Transfusion Services' on 21st February 2015. The department imparted training in PBSC harvest and other transplant-related activities to MD students from three centres as a part of their curriculum. Eight medicos and five technologists from other hospitals underwent training in plateletpheresis/ leukapheresis, while one student worked on Master's dissertation. Faculty and staff members presented scientific papers in ten national/ international conferences/ scientific meetings and also underwent training to keep abreast with the latest developments in the field.



Department of Nursing

Dr. Meera Achrekar
Asstt. Nursing Superintendent

Overview

The Nursing department of ACTREC provides comprehensive, quality nursing care to all the patients and also gives due attention to implementation of patient safety goals, continuing education, and research. The department took up several new initiatives during 2015. These included (a) the conduct of a patient safety campaign in March 2015, covering hand hygiene, prevention of nosocomial infections, fall prevention and management, pressure ulcer prevention and management, surgical safety and patient identification; (b) implementation of the Situation Background Assessment Recommendation (SBAR) form across all wards for patient hand over between nurses during shift change; (c) red identification tags were implemented for patients allergic to food/ drugs; and (d) introduction of ventilator associated pneumonia (VAP) bundle, catheter associated urinary tract infection (CAUTI) maintenance bundle and peripheral vascular catheter bundle.

Service

ACTREC saw a rising trend in new admissions, with 4823 admissions in the year 2015. The Nursing department provided pre-operative and post operative care to 2546 patients operated at ACTREC for cancers of breast, cervix, gastrointestinal, neurological, etc. In all, 16384 patients attended the day care ward for chemotherapy infusion, hydration, or blood transfusion. From March 2, 2015, peripherally inserted central catheter (PICC) clinic became functional. Nurses provided pre-counselling, demonstrated flushing and dressing of PICC, and port flushing to these patients. PICC fractures are being repaired by specialized CVAD trained nurses. The department also provided specialized nursing support to the recipients of 80 transplants at the BMT unit.

Education

The ANS was involved in the organization of a half day Continuing Nursing Education program on 'Nursing quality indicators' at MGM College of Nursing, Navi Mumbai, on September 4, 2015, and Organizer of a one day Workshop on 'Essence of critical care nursing: a skill based approach' at ACTREC on October 16, 2015 and a Certification program on 'Pressure area management' at ACTREC on December 18, 2015. She participated in and made an oral presentation at the AONS 2015 Conference in Seoul, South Korea, during November 19-21, 2015, and delivered invited talks at five local and one national conferences/ workshop. The department also accepted six trainees to learn nursing practices as carried out in ACTREC. The department runs an active in-house weekly teaching and case presentation program. Departmental staff members made several oral and poster presentations at local and national conferences; two of them won first/ second prizes.

Pathology Laboratory

Dr. Asawari Patil
Officer-in-Charge

Pathologists
Dr. Epari Sridhar
Dr. Swapnil Rane

Overview

The Pathology laboratory at ACTREC is a part of the Department of Pathology, TMC, whose head is Dr. Shubhada Kane. All the pathology consultants and resident doctors of TMC work on rotation at TMH as well as ACTREC. At any given time, the ACTREC lab has one pathology consultant, two senior residents and one junior resident (by rotation), six technicians (permanent staff) and three technicians (on contract). The lab is accredited by NABL for all services except cytology and participates in EQAS (External Quality Assessment Scheme) offered by national and international agencies. The lab provides diagnostic services for histopathology, frozen section, immunohistochemistry, cytology for patients treated at ACTREC as well as outside referral cases.

Service

During the year 2015, the lab processed around 2740 histopathology specimens, 2320 frozen sections and 360 cytopathology specimens. One of the major achievements for this lab during 2015 was the installation of an automated immunohistochemistry (IHC) machine for diagnostic IHC. The lab has over 35 antibodies standardized for IHC and performed around 3500 IHC tests in 2015. The lab archives all the slides and blocks and, when required, retrieves and issues them for approved projects of pathologists, clinicians, and scientists.

Research

The pathologists are involved as principal or co-investigators in many IEC approved DMG projects and junior resident's thesis projects, and in collaborations with scientists in ACTREC.

Education

The pathologists participate in national/ international conferences as faculty as well as for oral or poster presentations. Resident doctors and technical staff are encouraged to participate in conferences and continuing medical education (CME) programs.

Hematopathology Laboratory – Molecular Division

Hematopathologists
Dr. Sumeet Gujral
Dr. PG Subramanian
Dr. Nikhil Patkar
Dr. Prashant Tembhare

Overview

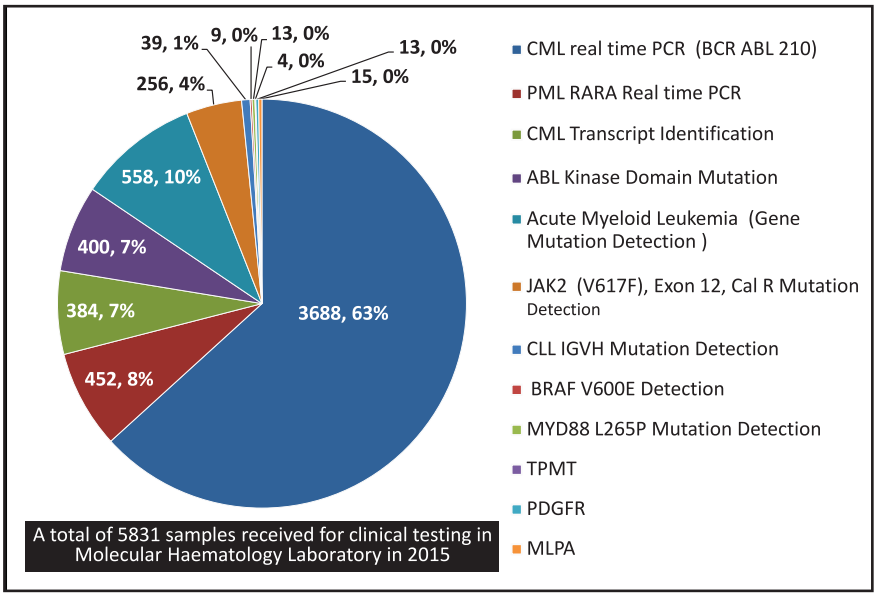
The Molecular Hematopathology Laboratory is a referral diagnostic lab for molecular testing of hematolymphoid neoplasms, that was established formally in August 2013 as a patient service and translational research lab for the Tata Memorial Centre (TMC). Since then, the lab has witnessed an exponential growth in samples received for molecular testing. This lab probably has the highest workload for molecular hemato-oncology in India; it is very quality conscious and participates in EQAS programs of the College of American Pathologists as well as UK NEQAS. The lab is poised to start next generation sequencing based molecular diagnostics, as the process of acquiring a desktop NGS machine is underway.

Service

The laboratory performs molecular testing for a wide range of hematological malignancies. Some of the tests are not available in India - such as testing for somatic hypermutations in lymphomas as well as CCAT/ enhancer binding protein alpha gene mutations (CEBPA).

Research

A project titled 'Acute myeloid leukemia and the dynamics of relapse' was funded Rs 3.66 crore by the Wellcome-DBT through an intermediate fellowship awarded to Dr. Nikhil Patkar. From all over India, only four research projects were funded in 2015 in a fellowship aimed specifically at clinicians and public health researchers, and this was the only clinical research project awarded. Through this grant, it is proposed to introduce next generation sequencing for diagnostic workup, prognostication and monitoring of hematolymphoid neoplasms, which will be of use to patients at the Centre.



A total of 5831 samples received for clinical testing in Molecular Haematology Laboratory in 2015

Education

The laboratory conducts an Advanced Molecular Hematology Training Course every year, in which four technologists are provided the requisite training. The lab also participates in the training program of the Centre, wherein twelve trainees worked in the lab during 2015 – 9 on dissertation projects, two for research experience and one as observer. Faculty of the lab attended local and national meetings as invited speakers, and both faculty and technical staff presented their research findings at three international meetings (20th European Haematology Association Congress, 57th American Society of Hematology meeting, Association for Molecular Pathology 2015 meeting).

Microbiology Laboratory

Dr. Vivek Bhat
Officer-in-Charge

Overview

The Microbiology laboratory at ACTREC is an NABL accredited laboratory that provides patient related and hospital services of bacteriology culture and susceptibility testing, serology, mycology, clinical microbiology, sterility testing for the Blood Bank and environmental surveillance at ACTREC. The lab is also actively engaged in research and educational activities. Six publications (national/ international) accrued from the lab in the year 2015 that were authored/co-authored by the lab faculty.

Service

During the year 2015, a total of 7951 samples were processed in the lab. These included: (a) a total of 5241 bacteriology cultures - blood (2995), other body fluids (146), pus (41), urine (548), feces (534), swabs (656) and others (321); (b) serology - 1540; (c) mycobacteriology - 87; (d) clinical microbiology - 1063. Mycology services for the identification of fungi in clinical material and susceptibility testing have been introduced recently. Sterility testing services are provided to various hospital areas including operation theatres, ICUs, blood bank, etc. Infection control services and waste management support is also provided by the lab.

Research

The faculty is involved as PI/Co-PI in six on-going research projects, three of which are IEC approved. One is a prospective observational study of oral cavity flora in patients receiving chemoradiotherapy for head and neck cancers that aims to identify Candida and bacteria responsible for mucositis in these patients. Salivary samples are also being analysed for proteins and immunoglobulins. Another prospective observational study is being conducted to evaluate tumor associated hydroxyl phenylalanine (tyrosine) in the urine of cancer patients, which examines a new cancer detection kit for its potential as a cancer screen. The third study aims to establish reference intervals for biochemical parameters such as serum proteins, albumin, creatinine, immunoglobulins, thyroid hormones, etc in the Indian population, using healthy Indian voluntary blood donors. Central venous catheter associated infection/ colonization in hematolymphoid cancer and bone marrow transplant patients is under study for a comparative evaluation of Hickman, and peripheral blood cultures. The bacteriological profile and antibiotic resistance of blood culture isolates is also being studied in cancer patients. Another study involves isolation and identification of microorganisms contaminating blood/ blood products administered to patients at this Centre.

Education

The department conducts regular academic sessions and training (theory and practical) for MD students, weekly discussions, presentations and lectures for Medical Oncology and BMT registrars, and in-house training sessions for laboratory staff, nurses, housekeeping and other technical staff. The OIC also is a teaching faculty at colleges outside TMC and, during 2015, supervised the dissertation project of one student trainee, and accepted one summer trainee and one observer in the lab. Faculty and staff participate and make presentations at international/ national conferences.

Achievement deserving special mention

The department has introduced on a trial basis, new diagnostic services helping patient care such as starting mycology culture and susceptibility testing services and introduction of rapid antigen testing for diarrheal pathogens.

Composite Lab

Dr. Preeti Chavan
Officer-in-Charge

Overview

The Composite Lab is NABL accredited and provides 24 hours services to the hospital. The laboratory consists of four sections: sample collection area, hematology, biochemistry (routine biochemistry and immunoassay) and cytology (slide preparation and staining). The lab also processes murine and canine blood samples for research purposes. The laboratory has been carrying out four IEC approved projects and three audits. Four research papers were published by the lab this year. An advanced training course for MLT students has been initiated this year.

Service

The Composite Lab provides the following patient related and hospital services at ACTREC: routine hematology (CBC, coagulation and peripheral blood smear examination) and biochemistry (LFT, RFT, electrolytes, cardiac enzymes, osmolality, immunoglobulins, ferritin, tumor markers; assays for vitamin B12, D and folate; thyroid function tests, drug assays for cyclosporine and methotrexate; immunoassay for TFT). The lab performed 41058 tests for routine biochemistry, 4189 immunoassays, 41222 tests for hematology, 219 for cytology and 148 for FNAC during the report year 2015.

Research

Four IEC approved research studies are presently on-going in the lab. (1) Determination of select biochemical reference intervals in Indian voluntary blood donors, (2) Oral cavity flora in patients receiving chemo-radiotherapy for head and neck cancer, (3) A prospective observational study to evaluate tumor associated substance hydroxyphenylalanine (tyrosine) in the urine of cancer patients, and (4) A study of hemolysis in red cell concentrate during transportation. The lab is also involved in three audits. (1) Evaluation of hematological and biochemical parameters in post-transplant patients revealed lower incidence of hyponatremia and syndrome of inappropriate antidiuretic hormone secretion (*SIADH)* post- hematopoietic stem cell transplantation (HSCT) in the patient group, as compared to published studies. Both these conditions were more commonly seen in allogeneic rather than autologous transplant setting. (2) Evaluation of quality indicators in hematology and biochemistry is an on-going study that will help formulate ways to improve quality in lab. (3) A review of critical alert messages sent to the patients revealed that, out of 75 patients, 70 patients received the SMS, of which 26 read it and only 14 took the action of informing the doctor/ nurse. Various means of improving this scenario are being examined.

Education

The lab, jointly with DTM, organized a CME '2nd Quality Conclave of Laboratory and Transfusion Services' on 21st February 2015. This lab was also instrumental in the initiation of a one year advanced training course in Medical Laboratory Technology in November 2015, jointly with the Microbiology lab. Training sessions on sample collection and interpretation of laboratory values were conducted for ACTREC nurses. The lab also participated in the training program of the Centre and accepted four students as trainees in the lab - two M.Sc. students for dissertation projects and two B.Tech. students as summer trainees.

Clinical Pharmacology Laboratory

Clinical Pharmacologists
Dr. Vikram Gota
Dr. Manjunath NK

Overview

The primary focus of this laboratory is drug development - both preclinical and clinical phases, repurposing drugs for cancer, and optimization of existing cancer treatments. Strategic collaborations with BARC, IIT-B and ICT have yielded new drug candidates. Notable achievements during 2015 include encouraging preclinical finding of chlorophyllin as a radioprotective agent, and the technology transfer to an industry partner for developing a suitable clinical formulation. The lab conducted preclinical biodistribution and evaluated safety aspects for an indigenous radioimmunotherapy modality for non-Hodgkin's lymphoma. The lab's bioanalytical facility received a boost with the installation of a LC-MS/MS system capable of small molecule quantitation, metabolite identification and quantitative proteomics. The lab's progress in PK/PD modeling and simulation has enabled recommendation of appropriate doses of Meropenam to be used in ICU patients.

Service

The lab offers therapeutic drug monitoring (TDM) services to the Adult and Pediatric Haematolymphoid units, which includes the Bone Marrow Transplant unit at ACTREC. TDM encompassed analysis of ~ 1500 samples of Voriconazole and 1000 samples of Posaconazole.

Research

Research programs include on-going phase I clinical trial sponsored by Natco Pharma Ltd., several clinical pharmacokinetic studies funded intramurally, and development of radioprotective agents in collaboration with BARC. The lab also conducted practice changing studies of Meropenem in severe sepsis, and dosing recommendations of Voriconazole in pediatric patients. The lab was instrumental in technology transfer of chlorophyllin - developed as a radioprotective agent, to an industry partner for formulation development and subsequent clinical trials. In addition, a pharmacokinetic study of Isotretinoin has underlined the need for liquid formulations of the drug in the pediatric population, and a pharmaceutical company has been approached for development and commercialization of the formulation.

Education

The lab organized a three-day workshop on 'Application of PK/PD modeling in clinical research' under the 3rd ACTREC Symposium of Clinical Pharmacology. Two lab members were deputed for Observership/ Training in the USA. Lab members presented their work at national/ international meetings through invited talks or oral/ poster presentations. The lab also participated in the Centre's training program and, in 2015, hosted one collaborative trainee, three and nine trainees respectively worked for their M.Pharm. /M.Sc. clinical research dissertation, while one student from Nigeria trained for six months under the Research Training Fellowship for Developing Country Scientists 2014-15.

Translational Research Laboratory

Dr. Ernest Borges Chair
Prof. Indraneel Mittra

Scientific Officers
Dr. Ranjan Basak
Dr. Kavita Pal

Overview

The lab activities relate to making basic discoveries and translating them into clinical practice in patients with cancer. The research focus is on examining the role of circulating chromatin in cancer and chronic degenerative diseases. In this regard, a novel observation has been made that chromatin fragments that emerge from dead cells can cause damage to surrounding cells while chromatin that circulates in blood can act as a systemic DNA damaging agent. It follows, therefore, that if extracellular chromatin from dead cells could be inactivated/ degraded, this could prevent its damaging effects. To this end, two agents with therapeutic promise have been developed. The first is anti-histone antibody complexed nanoparticles, and the second is a combination of the plant polyphenol Resveratrol and copper. Both these agents have shown promise in preventing cancer initiation and metastasis in animal models. All being well, clinical trials in cancer patients are expected to commence in 2016.

Research

Several hundred billion to a trillion cells die in the adult human body daily, and much of the fragmented nucleic acids (NAs) that emerge from dead cells are released into the circulation. Elevated levels of circulating NAs have been reported in a multitude of human disorders, as well as in ageing and cancer. Research from this lab shows for the first time that circulating NAs can freely enter into healthy cells and damage their DNA by integrating into their genomes. Extracellular NAs from cancer patients can cause oncogenic transformation of NIH3T3 cells which are tumorigenic in immune-deficient mice. Results thus indicate that extracellular NAs may be the key agents that underlie ageing, ageing-related disorders, inflammation as well as initiation, progression and metastatic spread of cancer.

Education

The lab participated in the Centre's training program wherein, during 2015, three budding scientists received training in the lab.

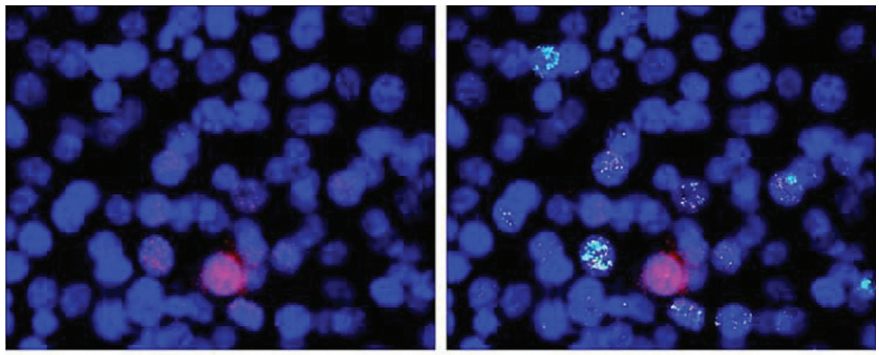


Figure: Chromatin fragments from BrdU labeled dead cancer cells can enter into surrounding non- cancerous cells (left) to induce DNA damage in the form of phosphorylation of H2AX.

Biomedical Engineering Laboratory

Technical Consultant
Dr. Amit Sengupta

Overview

The thrust area of this lab is Cancer Theranostics with a focus on the tumor microenvironment and vascular remodeling.

Clinical Research

The lab is engaged in three research projects. In the first project, a new clinical protocol and an advanced signal processing tool were developed, and a new mapping technique was established to classify Raman spectra of malignant cells from breast axillary metastatic lymph nodes. Another project explored the possibility of developing a light and very low voltage electrical current (bio-impedance) based cancer theranostics tool, using a small animal tumor bearing model to understand the biophysical and bio-molecular effects. The third project examined vascular remodeling and tumor dormancy following low dose chronic metronomic chemotherapy in terminally ill cancer patients, in a bid to understand the mechanism underlying drug action and to remove ambiguities in dosage/ regimen, while improving the quality of life of cancer patients.

Service

The lab also provides service by way of follow up of terminally ill cancer patients undergoing metronomic therapy, and conducts laser Doppler and bio-rheological blood studies for cancer patients.

Education

The lab participates in the Centre's training program and, during 2015, four trainees worked in the lab on varied aspects of interdisciplinary research - one of them for the Master's dissertation project.

Clinician Scientists' Laboratory

Clinician Scientists
Dr. Rajendra Badwe
Dr. Sudeep Gupta
Dr. Kumar Prabhash
Dr. Anuradha Chougule
Dr. Shalaka Joshi

Overview

The theme of the lab is 'Translational research- turning discoveries into practice'. Basic science is advancing in complexity and clinical science in evidence base. Technology advancement has led to rapid developments in decoding cancer biology. The Clinician Scientists lab is a translational research set up with the objective of converting basic science discoveries into clinical practice. The primary research objective of the lab is to identify key biological phenomena driving tumorigenesis in breast cancer, with a specific focus on hypoxia, epithelial-to-mesenchymal transition (EMT), stemness and tumour dormancy. The lab also works in the field of lung and head & neck cancers; the primary research objective in this area is to identify key biological phenomena driving tumorigenesis and also emerging patterns of somatic mutations in cancer using high throughput technology. The lab is equipped with facilities for basic tissue culture, molecular biology experiments, as well as state of the art molecular diagnostic equipment like Sequenom DNA sequencer and real time PCR. High end equipment for next generation sequencing to unravel the complexities of cancer at the gene level and a hypoxia workstation for studying the role of subtypes of hypoxia in tumour biology will soon be procured. The lab has clinicians and scientists working together hoping to solve mysteries of cancer for benefits to the millions who suffer from this dreaded disease.

Research

The lab is presently engaged in two research projects, one that examines the effect of acute, peri-operative hypoxia on breast cancer biology (IRB approved), and another project that studies surgery induced changes in breast cancer biology- as evaluated with transcriptomic analysis in collaboration with NIBMG, Kolkata.

Education

Dr Sudeep Gupta is a recognized guide for Ph.D. in Health Sciences under the Homi Bhabha National Institute. This lab provides opportunity for post-MBBS, post-MD/MS students to come and work as research fellows, to get a flavour of basic research as well as for post-graduates/graduates in life sciences/other scientific areas. At present, the lab has four research fellows - Dr. Akshita Singh, Ms. Vaishakhi Trivedi, Mr. Rohan Chaubal and Mr. Nilesh Gardi, working towards the Ph.D. degree.

CANCER RESEARCH INSTITUTE

Dr. Shubhada Chiplunkar (Director, ACTREC)

Basic Research Team

- Dr. Kishore Amin*
- **Dr. Dibyendu Bhattacharyya**
- **Dr. Kakoli Bose**
- Dr. Pradip Chaudhari
- **Dr. Murali Krishna Chilakapati**
- **Dr. Shubhada Chiplunkar**
- **Dr. Sorab Dalal**
- **Dr. Abhijit De**
- **Dr. Amit Dutt**
- **Dr. Shilpee Dutt**
- Mr. Nikhil Gadewal
- Dr. Poonam Gera
- **Dr. Rukmini Govekar**
- **Dr. Sanjay Gupta**
- Dr. Syed Hasan
- Dr. Arvind Ingle
- Dr. Narendra Joshi
- **Dr. Rajiv Kalraiya#**
- Dr. Jyoti Kode
- Dr. Pradnya Kowtal
- **Dr. Manoj Mahimkar**
- **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. BV Venugopalareddy@**
- **Dr. Sanjeev Waghmare**
- Dr. Ujjwala Warawdekar

Principal Investigators (PIs) are shown in bold

** Retired,* @ Resigned, # Expired *in 2015*

Bhattacharyya Lab

Dr. Dibyendu Bhattacharyya
Principal Investigator

Overview

The focus of research in Bhattacharyya lab is on intracellular organelle biogenesis and dynamics, primarily on the size control mechanism of such compartments. Organelle size and shape are greatly altered in cancer; such alterations are a hallmark of cancerous cells. Using basic cell biological approach along with advanced microscopic techniques, attempts are being made to understand the underlying mechanisms that govern the size control mechanism of Golgi and nucleus. Yeast, cell lines and cultured neurons are being used as model systems. The lab also aims to develop novel tools for different forms of microscopy.

Research

At present the lab is investigating the organelles Golgi, ER, nucleus, nucleolus, mitochondria. Previous findings indicate that the GTPase ARFI is capable of controlling Golgi size by altering cisternal maturation kinetics. Recently several other factors including the oncogene homolog VPs74 also have been implicated in regulation. The lab also uses computational method for simulation of Golgi size regulation. The vital role of nuclear import in size control of nucleus and nucleolus of human cells has also been discovered. The lab also works on exosome uptake in human cells, organelle dynamics, and inter-organelle contact sites in neurons. Photo-changeable fluorescent proteins such as mEOS3, which are essential for super resolution microscopy, are also being optimized.

Education

The Principal Investigator is a recognized Ph.D. (Life Sciences) guide of Homi Bhabha National Institute. Presently, six Ph.D. students (Ms. Abira Ganguly, Ms. Prasanna Iyer, Mr. Bhawik Kumar Jain, Mr. Praveen Marathe, Ms. Sudeshna Roychowdhury, Ms. Naini Chakraborty) are working under his guidance. One post doc Dr. Chumki Bhattacharjee and one trainee worked in the lab this year. Lab members participated in weekly data presentation and presented their work findings at local/ national conferences.

Bose Lab

Dr. Kakoli Bose
Principal Investigator

Overview

The long-term objective of Bose 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 utilizing multidisciplinary approach. The lab currently focuses 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 the mechanisms of which still remain elusive. It is also associated with several critical diseases such as cancer and neurodegenerative disorders, making it an important therapeutic target. Therefore, intricate dissection of its structure and dynamics is being performed using structural tools and identification of its novel partners is being attempted, which will shed light on its biological role and thus provide a means to manipulate it with desired characteristics. Other members of this protease family (HtrA1, A3 and A4) are also being studied. This research also aims to understand 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 understanding of papillomavirus E2 protein in general.

Research

Highlights of the research findings of this lab include establishment of the model of HtrA2 activation via its N-terminal domain. The dual regulatory switch for HtrA2 activation has also been identified. Crystals at 2.0 Å resolution of a pathological mutant of HtrA2 have been obtained and currently the structure is being solved. The interaction of HtrA2 with two of its known binding partners has been characterized and its interaction with a putative ligand has been established. Hax-1 has been established as an activator of HtrA2 - *not a* substrate, which is contrary to the available information in the literature. DUSP-9 has been identified and characterized as an HtrA2 binding partner. The mechanism of human papillomavirus E2 mediated activation of the extrinsic apoptotic pathway has been established and compared with the classical pathway of cell death.

Education

The lab is recognized for the Ph.D. (Life Sciences) degree of the Homi Bhabha National Institute. Currently seven graduate students (Mr. Lalith K. Chaganti, Mr. Raja Reddy Kuppili, Ms. Saujanya Acharya, Mr. Ajay Wagh, Mr. K. Raghupati, Ms. Rashmi Puja, Ms. Aasna Parui) are working on their doctoral dissertation. The lab also has one post-doctoral fellow Ms. Nitu Singh who graduated in June 2015. Thirteen trainees worked in the lab during 2015 – five for Master's dissertation, seven for research experience, and one as a summer trainee. Lab members meet regularly for data presentation and journal club. Faculty and students of the lab presented their research findings in poster/ oral presentations at local/ national/international conferences and workshops.

Chilakapati Lab

Dr. Murali Krishna Chilakapati
Principal Investigator

Overview

Cancer is a leading cause of death worldwide and, as per predictions, by the end of 2020 >10 million people per year would die from cancer globally, with 70% deaths in the developing countries. Screening for early detection of cancer would go a long way towards decreasing morbidity and increasing disease free-survival. Optical spectroscopic methods like infra red absorption, Raman and fluorescence spectroscopy are being investigated as adjunct/ alternative approaches cancer diagnosis. Of these, Raman is more suited for non-invasive, online clinical applications. Chilakapati lab is actively pursuing the development of Raman based methods in the following focus areas: (a) in vivo/ in situ methods for routine screening and diagnosis, (b) minimally invasive microspectroscopy methods using body fluids and cell smears, (c) synthesis, optical and photothermal characterization of metallic nanoparticles for biomedical applications, and (d) 1H NMR, Raman and infrared spectroscopy for oral cancer diagnosis using saliva. The lab is also engaged in investigations on experimental carcinogenesis using animal models.

Research

Chilakapati lab has been actively pursuing application of Raman spectroscopy in cancer, especially towards early diagnosis.

In vivo applications: In vivo studies carried out on ~340 subjects indicated feasibility in differentiating normal, pre-malignant and malignant conditions in oral cancers (lip, tongue), besides buccal mucosa where pathological, age-related and earliest changes like cancer-field-effect were demonstrated earlier.

Minimally-invasive applications: Serum-based classification of healthy, premalignant, oral cancers and disease control groups have been done in 330 subjects. Post-surgery recurrence has also been predicted. Studies on exfoliated cells of healthy, habitual tobacco users - premalignant and malignant groups, indicated possibility of classification using brush-biopsy approach.

Animal studies: Oral cancer progression in hamster buccal pouch model correlated with histopathology/ immunohistochemistry demonstrated sequential cancer progression, and also abnormal changes in control tissues. In experimental breast cancer studies, fibroadenoma in vivo, and adenocarcinoma using urine samples in rat model could be distinguished. Metastatic breast lesions in lungs could also be distinguished from lung primary tumors.

Education

The lab is recognized for the Ph.D. program of Homi Bhabha National Institute. One of the doctoral students Mr. Tanmay Bhattacharjee was awarded the degree this year and three students – Ms. Rubina Shaikh, Mr. Piyush Kumar and Ms. Aditi Sahu are pursuing research for this degree. This year, 14 students received training in this lab in 2015 – three worked towards their Master's dissertation, three for experience and five were Ph.D. students/ staff of collaborators, while three spent a brief time in the lab as observers. Lab members presented their research findings at national/ international conferences.

Chiplunkar Lab

Dr. Shubhada Chiplunkar
Principal Investigator

Co-Investigator
Dr. Jyoti Kode

Overview

The focus of research in Chiplunkar lab is on understanding the immune scenario and reasons for immune dysfunction in cancer patients, with the long term goal of developing cell based immunotherapy approaches for cancer treatment. Basic areas focus on understanding the cross talk between bisphosphonate-stimulated tumor cells/γδ T cells and osteoclasts, role of Notch in regulation of γδ T cells and regulatory T cells, and epigenetic regulation and anti-tumor effector functions of γδ T cells. Work on cancer includes understanding of the role of Th17 and regulatory T cells in gall bladder cancer, and genomic and functional studies in TCR γδ T-ALL patients. Other projects study the role of galectin-3 in modulating tumor-specific immunity and lung metastasis in mice, and understanding the crosstalk of tumor-derived mesenchymal stem cells and immune cells in oral and pancreatic tumor microenvironment. Another project involves the study of interaction of leukemic stem cells with mesenchymal stem cells in acute myeloid leukemia.

Research

Various research projects investigate the molecular mechanisms underlying the killing of bisphosphonate-treated breast/ oral tumor cells and leukemic blasts by γδT cells, and understanding the cross-talk between bisphosphonate-stimulated tumor cells/ γδT cells and osteoclasts. Activation status of γδT cells dictates their role in osteoclastogenesis. Studies demonstrate that Notch plays a key role in regulation of effector functions of γδT cells. HDAC inhibitors augment cytotoxic potential of γδT cells through H_3K_9-acetylation in the promoter regions of perforin and granzymes. In gall bladder cancer patients, Tγδ17 has been identified as a new subtype of γδT cells that contributes to angiogenesis and is associated with poor survival. Increased frequency of myeloid-derived suppressor cells and T-regulatory cells observed in the tumor microenvironment contribute to T-cell tolerance and chronic inflammation in oral cancer patients facilitating tumor growth. These could be explored further as potential targets for modulating antitumor immunity. Galectin-3 was found to regulate host tumor immunity in B16F10 lung metastasis mouse model through decreased NK cytotoxicity, disturbed serum cytokine milieu, and attenuated IFN-γ signalling in Gal-$3^{-/-}$ mice. Mesenchymal stem cells were successfully isolated from oral tumor microenvironment, characterized for surface markers and lineage differentiation, and were found to contribute to immune evasion.

Education

The Principal Investigator is a recognized Ph.D. (Life Sciences) guide under the Homi Bhabha National Institute. During 2015, seven students – Ms. Swati Phalke, Ms. Aparna Chaudhari, Mr. Asif Amin Dar, Mr. Rushikesh Patil, Ms. Gauri Mirji, Mr. Sajad Bhat and Ms. Shalini KS worked on their Ph.D. dissertation under her guidance. The lab also actively participated in the Centre's training program and accepted four trainees for Master's dissertation, one for experience, two international observers, and a group of six observers from Yenepoya Dental College. Weekly data presentation and journal club forms a part of the in-house academic activity of the lab. Lab members participated in six international and nine national conferences this year. The lab organized the 16th Indo-US Flow Cytometry Workshop on 'Flow cytometry: translating laboratory discoveries to clinics' in October 2015.

De Lab

Dr. Abhijit De
Principal Investigator

Overview

This lab focuses on molecular functional imaging, utilizing preclinical medical imaging technologies to guide multiple facets of experimental medicine and concept therapeutics in live cell and small animal models. The lab's mandate is to translate diverse experimental therapeutics and cancer diagnostics developed through basic research for patient benefit. A major focus is to understand the therapeutic potential of human sodium iodide symporter (hNIS) gene mediated radio-iodine therapy in breast cancer. Several novel findings on devising clinically relevant protocols for hNIS application in the breast cancer have been devised, and a phase I trial to evaluate radio-iodine uptake in breast cancer patients has been initiated. In another promising line, collaborative research towards developing synthetic organo-metallic nano-scale translational medicine is on-going. Further, imaging sensors have been developed for monitoring STAT3 phosphorylation as a target for cancer onset. An international collaboration has also set for investigating the role of EpCAM target in radioresistant breast cancer cells developed in the lab.

Research

Cancer gene therapy using hNIS for breast cancer: The project aims to understand the basic biology of hNIS gene function in non-thyroidal cell/ tissue environment such as breast cancer. Endogenously over-expressed hNIS gene mediated targeted radio-iodine therapy and diagnosis is being explored actively. New research initiatives include demonstration of 2DG and metformin combination as radiosensitizer against hNIS mediated radio-iodine therapy in breast cancer cells; regulatory role of transcription factors - p53 and CREB; epigenetic modulators such as HDACi on hNIS gene expression and function.

Cancer nano-therapeutics program: Optimization of gold nanosphere based photo-thermal therapy of cancer was initiated as a part of a project aimed at developing a synthetic organo-metallic gold nanosphere mediated photothermal therapy as translational medicine for solid tumors. The promising findings have been published, and a provisional patent application has been filed this year.

Imaging-guided cancer drug screening for STAT3: Bioluminescence resonance energy transfer (BRET) based sensor strategy is being developed for studying protein-protein interaction in vivo. Using multiplexed BRET systems, the role of STAT3 non-canonical post-translational modifications in breast cancer is being examined.

Breast cancer radioresistance and EpCAM: Fractionated ionizing radiation is a major treatment modality in metastatic breast cancer. Tumors subjected to sub-lethal dose of fractionated radiation often gradually acquire resistance. Dynamic changes in EpCAM protein have been identified, and studies are on to understand this vital molecular change.

Anti-cancer potential of deuterium depleted water: This exploratory project was conducted to verify the anti-cancer potential of deuterium depleted water (DDW) against a cancer cell line panel. DDW - a by-product of heavy water plants operated by the Heavy Water Board, DAE, can be marketed as bottled drinking water for medicinal use if proven beneficial.

Education

The PI is a recognized guide for Ph.D. in Life Sciences under the Homi Bhabha National Institute. Presently, he has five doctoral students – Ms. Sushmita Chatterjee (submitted thesis in 2015), Ms. Madhura Kelkar, Ms. Shalini Dimri, Mr. Arijit Mal and Ms. Maitreyi Rathod. During 2015, the lab accepted three trainees - two for dissertation and one for experience.

Dutt Lab

Dr. Amit Dutt
Principal Investigator

Overview

Dutt lab aims to develop effective targeted next generation cancer therapies. Efforts involve genomic approaches (microarrays and advanced sequencing methodologies) to interrogate somatic alterations in clinical cancer specimens, with an emphasis on breast, lung, and head and neck cancers. Research studies involve: (a) Cancer genomics: Computational genomic approaches are used to uncover somatic genetic alterations in cancer, especially lung cancer, pioneering many experimental/ computational methods in cancer genomics; (b) Functional genomics: Using tumor derived cell lines and transgenic mouse models, the group examines key biochemical and molecular pathways viz. *FGFR3* and *ERBB2* pathways that are subject to genomic alteration in lung cancer and gall bladder cancer respectively; and, those via the lineage specific oncogene *NOTCH1* in head and neck cancer; (c) Pathogen discovery: The group has developed a computational pipeline - HPV Detector, to detect non-human DNA sequences in human clinical cancer samples, and is also exploring other possibly pathogenic sequences in the human cancer genome by developing Cancer Pathogen Detector. The lab has recently discovered the presence of non-typhoidal *Salmonella* in gall bladder cancer.

Research

Lung cancer: A novel, cost effective single multiplex-PCR based method, CRE has been developed for co-amplification of five *KRAS* and *EGFR* exons, followed by concatenation of the PCR product as a single fragment - an improvised protocol for direct sequencing. CRE is a robust methodology requiring minimal amount of template DNA extracted from FFPE or fresh frozen tumor samples that has potential use in routine clinical diagnostics with reduced variability, cost and turnaround time.

Head and neck cancer: Alterations in four HNSCC-derived cells lines established from Indian head and neck cancer patients were characterized using advanced genomic technologies, identifying major HNSCC hallmark genes. Functional analysis of mutant *NRBP1* revealed that NIH3T3 cells expressing mutant *NRBP1* show enhanced survival and anchorage independence.

Gall bladder cancer: The presence of 143 HPV types along with 6 common *Salmonella* serotypes was probed in 26 primary gall bladder tumour and paired normal samples, using a computational subtraction pipeline based on the HPVDetector, unravelling the first direct association of typhoidal/ non-typhoidal *Salmonella* species with gall bladder cancer.

HPVDetector: The lab has developed a freely-distributable computational tool 'HPVDetector' (http://www.actrec.gov.in/piwebpages/AmitDutt/HPVdetector/HPVDetector.html). This user-friendly tool uses graphical user interface requiring minimal third party tools and permits analysis of paired end whole exome, whole genome or whole transcriptome dataset to detect all 143 known HPV types along with their sites of integration in the host genome. Over 46 registered users across the globe have downloaded the tool.

Education

The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute. Presently seven research scholars – Mr. Pratik Chandrani, Mr. Pawan Upadhyay, Mr. Prajish Iyer, Mr. Mukul Godbole, Ms. Trupti Togar, Mr. Sanket Desai and Mr. Asim Joshi are working towards their doctoral thesis. The lab accepted three trainees in 2015 – two for experience and one as summer trainee. Lab members presented their research findings as oral/ poster presentations at national/ international conferences.

Gupta Lab

Dr. Sanjay Gupta
Principal Investigator

Overview

The complex epigenetic regulatory mechanisms in the cell are now well recognized to be key players in governing gene expression. The research focus of this lab is epigenetics and chromatin biology, with an emphasis on the examination of global alterations in the epigenetic profile in various patho-physiological processes, and their functional significance. The lab has three major research programs: histone isoforms and variants in cancer, histone post-translational modifications and their clinical importance, and importance of chromatin modifiers in DNA damage response. The present focus of the lab is to unravel the differential expression and transcriptional regulation of histone isoforms and variants, and the role of histone H3 serine 10 phosphorylation in different physiological contexts.

Research

Histone isoform H2A.1 exhibits drastically altered expression pattern in various normal and cancer tissues and also in human cancer cell lines (H2A1C in humans), and promotes cell proliferation in a context dependent manner. Molecular dynamic simulation suggests that the three amino acid difference between H2A.1 and H2A.2 leads to increased number of hydrogen bonds and hydrophobic interactions, enabling H2A.1 to form more stable nucleosomes compared to H2A.2. Interestingly, the same substitutions have a very prominent effect on cell proliferation, suggesting that nucleosome stability is intimately linked with the observed physiological effects. Further, the H3 variants - H3.2 and H3.3 also show differential expression in rat liver and human liver cell lines, compared to cancer. The presence of histone variant H3.2 disrupts epigenetic post-translational modifications and favours the condensed nucleosome organization with a decrease in transcriptional activity in cancer. Data from this lab has shown that histone H3 serine10 phosphorylation (H3Ser10P) in human gastric cancer helps in defining distance-dependent prognostic value of negative resection margin, and also that sequence-specific dose of histone deacetylase inhibitors and chemotherapeutic drugs enhances the efficacy of treatment in gastric cancer cells. The blockage of H3Ser10P and H3-acetylation during DNA damage response of G1 cells (intrinsically less sensitive to radiation) leads to enhanced sensitivity to radiation in presence of epi-drugs. Finally, these studies not only suggest an involvement of nucleosome reorganization and dynamics in altering the epigenetic landscape of the genome with disruption of gene transcription in cancer, but also provide novel insights into cancer biology for their potential translation to clinics.

Education

The Principal Investigator is a guide for Ph.D. in Life Sciences of the Homi Bhabha National Institute. Two of his students, Ms. Monica Tyagi and Mr. Shafqat Khan were awarded Ph.D. degree in 2015, and six students – Mr. Saikat Bhattacharya, Ms. Divya Reddy, Ms. Asmita Sharda, Mr. Ramchandra Amnekar, Mr. Sanket Shah and Mr. Mudasir Rashid are working on their doctoral theses. In 2015, the lab accepted five trainees for their Master's dissertation, four for experience, and one research scholar from another institution as a collaborative trainee. The lab members meet twice a week for in house data presentation, abstract and journal club, and participate in national/ international conferences to present their research findings through invited, oral or poster presentations.

Kalraiya Lab

Dr. Rajiv Kalraiya*
Principal Investigator
(*expired in July 2015)

Overview

The research focus of Kalraiya Lab is on understanding the role of altered glycosylation on cell surface proteins in cancer invasion and metastasis. The lab has demonstrated how the highly branched N-oligosaccharides expressed on cancer cells alter the properties and localization of integrin receptors into specialized membrane microdomains, facilitating invasion. Terminal poly N-acetyl lactosamine (polyLacNAc) substitutions have been shown to serve as anchors for circulating melanoma cells to get arrested on the lung vascular endothelium expressing galectin-3 constitutively on its surface. The mechanism and modes to inhibit these interactions and thus metastasis are being explored. The role of a novel type of glycosylation (O-glcNAcylation) of nuclear and cytoplasmic proteins in regulating the properties of keratin 8/18, and its impact on cellular properties critical for malignant progression is also being investigated. The mechanism by which a single depot injection of progesterone provides survival advantage to breast cancer patients - especially receptor negative breast cancer, is being explored using an animal model.

Research

The role of galectin-3/ polyLacNAc interaction in lung specific metastasis was proven using competitive and dominant negative inhibitors, modified citrus pectin and truncated galectin-3 respectively. Using galectin-$3^{+/-}$ transgenic mice, it was established that this interaction is critical for lung specific metastasis. The surprisingly similar extent of metastasis in galectin-$3^{-/-}$ and galectin-$3^{+/+}$ mice may be attributed to compromised host anti-tumor immunity in the former. In the study examining the role of novel O-glcNAcylation in the regulation of keratin 8/18 function, the lab demonstrated for the first time that glycosylation at serine-30 (S30) on K18 positively regulates phosphorylation at an adjacent S33A. Mutation at S30 and S33 had the same effect on solubility and stability of K18 and on filament architecture. Data suggest that positive correlation between O-GlcNAcylation at S30 and phosphorylation at S33 are vital in regulation of cellular spreading and migration on fibronectin. The findings of the Progesterone (PG) study revealed that PG affected adhesion, movement and secretion of MMPs in receptor negative breast cancer (4T1) cells. A single depot injection of PG at half the dose used for humans prevented lung metastasis significantly. Possibly, PG might drive its effects through membrane progesterone receptor alpha (mPRalpha) on PR negative breast cancer cell lines. shRNA against mPRalpha was successfully cloned into the lentiviral vectors to test this hypothesis.

Education

The lab is recognized for the Ph.D. degree in Life Sciences by the Homi Bhabha National Institute. During 2015, two students – Mr. Akhil Kumar Agarwal and Mr. Manohar Dange were awarded the Ph.D. degree, while two students - Mr. Shyam More and Ms. Poonam Kakade are in the final stages of their doctoral research. Seven students received training in the lab – five for Master's dissertation, one for research experience, and one on a collaborative project. Lab members presented their findings in poster/ oral presentation at international conferences this year.

Mahimkar Lab

Dr. Manoj Mahimkar
Principal Investigator

Overview

The research program of this lab focuses on understanding the genetic basis of tobacco related cancers. Current efforts are directed towards the identification of genomic biomarkers of oral carcinogenesis such as genomic alterations at the level of copy number across the genome, and identification of genes/ gene clusters at the altered genomic loci. Array comparative genomic hybridization (CGH) analysis is being undertaken in oral cancer and oral precancerous lesions, and these observations are being validated by FISH. Chemoprevention using phytochemicals is emerging as a promising approach in the management of lung cancer - one of the leading causes of death in smokers. The chemopreventive efficacy of polymeric black tea polyphenols (PBPs) in inhibiting tobacco-derived carcinogen-induced lung adenomas in A/J mice is also being examined.

Research

Chromosomal alterations and gene expression changes are reported to be better predictors of clinical outcome. Recent findings of this lab have demonstrated that divergent genetic pathways are associated with poor prognosis in advanced stage oral cancer patients. This group is using microarray to identify and delineate the genes/ gene clusters altered in early stage oral squamous cell carcinoma and oral precancerous lesions (OPLs). Array CGH analysis of oral cancer revealed that chromosomal gain at locus 11q22 was associated with loco-regional recurrence and shorter survival; these observations are being validated by fluorescence in situ hybridization. Amplification of this locus also seemed to be associated with nodal metastasis. Genomic analysis of OPLs revealed 8q24.3 gain as an early event in oral carcinogenesis. Another study examined the chemopreventive efficacy of polymeric black tea polyphenols (PBPs) in inhibiting lung adenomas induced by treating A/J mice with the tobacco-derived carcinogens - benzo(a)pyrene (B(a)P) and 4-(methylnitro-samino)-1-(3-pyridyl)-1-butanone (NNK). Pretreatment with PBPs led to a significant down-regulation in B(a)P and NNK-induced expression and activity of CYP1A1 and CYP1A2 isoforms of phase I enzymes and up-regulation in GST mu, pi and alpha isoforms of phase II enzymes, accompanied by a decrease in benzo(a)pyrenediol-epoxide (BPDE)-DNA adducts. The lab for the first time demonstrated that administration of PBPs in drinking water throughout the treatment period significantly decreased the multiplicity of surface tumors and microscopic lung lesions including adenomas. PBP treatment also caused protein alterations such as reduced Cox-2, diminished PCNA and Bcl-2, and increased Bax, suggesting that PBPs exhibit their chemopreventive effect by inhibiting inflammation and cellular proliferation and inducing apoptosis possibly by modulating signaling kinases.

Education

The lab is recognized for the Ph.D. program of Homi Bhabha National Institute. Four research scholars – Ms. Priyanka Bhosale, Ms. Rasika Hudlikar, Ms. Usha Patel and Ms. Mayuri Inchanalkar, are presently working on their doctoral thesis. The lab participates in the Centre's training program and, during 2015, eight trainees worked on their Master's dissertation, two for experience, one on a collaborative project, while six observers from the Yenepoya Dental College did an observership in the lab.

Prasanna Lab

Dr. Prasanna Venkatraman
Principal Investigator

Overview

Prasanna lab addresses several fundamental, unanswered queries about the structure, mechanism and cell biology of select biologically important enzymes in health and disease. Substantial progress has been made towards eliciting the structure and function of proteasomal assembly chaperones PSMD9 and PSMD10. PDZ, a critical functional domain in PSMD9 is now amenable for structure determination. PSMD10 (gankyrin)-driven oncogenesis contributes strongly to cell death resistance, a key and perhaps an early hallmark of cancer. Structure based drug design to exploit this potential and vulnerable Achille's heel of cancer is underway. Compelling preliminary evidence from the lab suggests that surface expression levels of matriptase II - a transmembrane serine protease, may serve as a biomarker to predict disease relapse in patients with invasive breast carcinoma.

Research

Efforts to dissect the fine structure and specificity of PSMD9 domains using high resolution biophysical techniques and structure determination at atomic resolution have led to the expression in isolation of the PDZ domain; it is functional, monodisperse and forms needle-like aggregates. Conditions are being optimized to obtain diffraction quality crystals. Insights from these studies will bring precision into the design of small molecule inhibitors of NFkB activity. Examination of the role of PSMD9-RPS14 interaction in p53 regulation during ribosomal stress has provided clues about the role of autophagy in the steady state turnover of the proteasome. Expanding the discovery of putative interacting partners of the oncogenic hub gankyin via a common hot spot region, functional screens using gene silencing have been designed to recognize bottle necks in cell growth, viability and invasive capacity of cancer cells. Early results are very promising, with genes grouping with PSMD10 or BCL2. Using a skin squamous cell carcinoma model of A431 (easy to transfect) in which gankyrin is over expressed and its normal counterpart HaCaT (difficult to transfect), a stable clone in which gankyrin is silenced has been developed. Gankyrin silenced A431 cancer cells show reduced fillopodia and slower migration in wound scratch assays. An integrated experimental and computational approach is being used to understand the role of PSMD10 in pro-survival mechanism in the absence of an active NFkB (PSMD10 inhibits NFkB) upon apoptotic stimuli; in situ mapping of the protein interactions involved is underway. Stoichiometry of proteasome composition in the presence of varying levels of assembly chaperones and under different stress conditions is being studied to map changes in the protein profile. A novel ATPase activity has been assigned to phosphor peptide binding 14-3-3 chaperones, and the physiological relevance of this function is under study.

Education

The PI is a recognized guide for Ph.D. in Life Sciences of the Homi Bhabha National Institute. In 2015, her doctoral student Mr. Nikhil Sangith was awarded the degree and Mr. Indrajit Sahu submitted the thesis; presently Ms. Mahalakshmi Ramachandran, Mr. Sheikh Burhanuddin Farooqee, Mr. Saim Mulla, Mr Mukund Sudharsan and Mr Joel Christie are working on their dissertation. The lab also has four postdoctoral fellows. In 2015, four trainees worked for their Master's dissertation, three for research experience and one as a summer trainee. The lab conducts in-house data presentation and journal club. Lab members participated in workshops and/or presented their research findings as posters at national/ international conferences.

Ray Lab

Dr. Pritha Ray
Principal Investigator

Overview

Research in Ray lab has progressed significantly towards deciphering the complexity of drug resistance using ovarian cancer as the model system. Among several on-going projects, two salient findings are described here. Firstly, post-translational modifications in p53 protein are found to regulate the affinity and binding to PIK3CA promoter, and thereby promote a pro-survival fate in chemo resistant cells. Also, p53 activation by chemotherapeutic drugs has been successfully monitored in live mouse using optical imaging. In another project, cancer stem cells isolated from chemoresistant cells have been shown to possess differential tumorigenic ability that depends upon the presence of active IGF-1R signaling. Several gene signatures responsible for cell survival, drug resistance and apoptosis are being assessed in samples collected from a small cohort of ovarian cancer patients, pre and post-surgical procedure. The lab is also engaged in collaborative projects involving BARC, BHU and IIT-B.

Research

The salient features of the lab's recently published work include: (1) Cisplatin and paclitaxel exert differential effect on NF-κB activation in MyD88 deficient EOC cells and combinatorial treatment (the standard therapy for EOC) follows the trend exhibited by cisplatin treatment; (2) Cisplatin resistant $MyD88^{negative}$ EOC cells exhibit NF-κB and Bcl-2 activation; and (3) Real time imaging of NF-κB activation in cisplatin resistant tumors in live mice. In addition, novel insight has been obtained about how post translational modification on p53 critically alters regulation of PIK3CA expression in chemoresistant cells. Data from the lab indicate, for the first time, that cancer stem cells isolated from two different stages of resistance could have differential tumorigenic potential depending upon presence of an active IGF-1R signaling. A pilot study to identify gene signatures responsible for cell survival, drug resistance and apoptosis is currently being pursued by assessing samples collected from a small cohort of ovarian cancer patients pre and post-surgical procedure. Other on-going projects include study of p53 associated synthetic lethality, understanding role of Notch 3 in chemoresistance, identifying peptide biomarkers associated with resistance and other aspects of drug resistant ovarian cancer.

Education

The Principal Investigator is a recognized Ph.D. (Life Sciences) guide. In 2015, Ms. Snehal Gaikwad, the first graduate student of the lab, successfully defended her thesis; five other doctoral students – Mr. Ram Singh, Mr. Bhushan Thakur, Mr. Ajit Dhadve, Mr. Aniketh Bishnu and Mr. Abhilash Deo are presently working towards the Ph.D. degree. During the year, seven trainees worked in the lab – one for dissertation, five for experience and one on a collaborative project. The lab has an active in-house data presentation program, and lab members also attended national conferences to present their research findings.

Rukmini Lab

Dr. Rukmini Govekar
Principal Investigator

Overview

The focus of Rukmini Lab is to understand the molecular basis of disease progression in chronic myeloid leukemia (CML), and identification of therapeutic targets in the blast crisis stage of CML. In order to identify therapeutic targets, differential quantitative proteomic profiling of imatinib (IM)-responsive cell lines (blast crisis stage of CML) and their IM-nonresponsive variants was initiated by mass spectrometry. Further, like several leukemias and lymphomas, CML is associated with a recurrent chromosomal translocation. A study was initiated to determine whether additional chromosomal aberrations are responsible for disease progression in CML. Other than CML disease progression the lab is interested in investigating the role of proteases released by tumor infiltrating neutrophils on behavior of tumor cells.

Research

CML is a triphasic disease which progresses from a chronic phase (CP) to an acute stage termed as blast crisis (BC). All the stages of CML are marked by the presence of a fusion gene BCR/ABL which is a product of an unequal reciprocal translocation t (9;22)(q34;q11). Causal role of tyrosine kinase activity of BCR/ABL in genesis of CML is established in experimental systems and inhibition of the activity by tyrosine kinase inhibitor (TKI) imatinib (IM) has proved to be a successful targeted therapy for CML-CP. However, a small number of CML-CP patients who fail to respond to imatinib as well as to the second generation TKIs can progress to BC. Their prognosis is poor because of a higher risk of disease progression. CML-BC thus remains a challenge to CML therapy in the era of TKIs and the search for therapeutic strategies persists.

While designing the new therapeutic strategy, consideration should be given to the fact that in BC, although the tyrosine kinase activity due to BCR-ABL is higher compared to CP, response to TKIs is dismal in BC patients. This suggests that the previously BCR-ABL1 dependent pathways probably become autonomous. Molecules besides BCR/ABL therefore need to be explored either as alternate or supplementary therapeutic targets in CML-BC patients. Search for the novel therapeutic targets requires molecular dissection of progressive phases of CML, identification of the distinct lesions recurrently detected in CML-BC and subsequently exploring their therapeutic potential. Towards identification of molecular lesions associated with CML-BC we would investigate proteomic and genomic profile of CML cell lines and patient samples. In the proteomics approach, we have generated protein profile of K562 cell line by ESI-LC-MS and identified more than 2500 proteins. We have analyzed IC50 of the cell line for imatinib, expression of BCR/ABL by western blotting, activity of BCR/ABL by densitometric ratio of western blotted crkl, substrate of BCR/ABL and phospho-crkl. In genomic analysis we have identified the strategy which we propose to use for detection of chromosomal aberrations mediated mainly by double strand breaks (DSBs). Status of proteins mediating repair of DSBs has been checked in K562 cells by western blotting.

In another set of studies, to understand the effect of proteases secreted by tumorinfiltrating neutrophils, we have investigated the role of neutrophilic cathepsin G on the membrane proteome and behavior of MCF7 breast cancer cell line. We observe that cathepsin G induces proliferation of these cells. It also mediates cleavage of a component of tight junctions in breast cancer cells as demonstrated by two dimensional gel electrophoresis-mass spectrometry. In accordance with this observation, reduction in cell-cell contact due to wide gap junctions was observed by electron microscopy. Cleavage of gap junction protein by neutrophilic protease, subsequent widening of gap junctions, reduction in cell-cell contact and increased proliferation of breast cancer cell line suggests a novel mechanism in tumor progression.

Education

The lab has two JRFs, Ms Mythreyi Narasimhan and Mr Rahul Mojidra working towards their doctoral degree. In all, 14 trainees worked in the lab during 2015 – nine on dissertation , four for experience, and one MCh student from TMH as an observer. One of the students, presented data at an international conference.

Sarin Lab

Dr. Rajiv Sarin
Principal Investigator

Co-Investigator
Dr. Pradnya Kowtal

Overview

The focus of Sarin Lab is on understanding the molecular basis of inherited and somatic cancers, and developing translational algorithms through molecular biology and functional genomics. The lab is addressing these questions through: a) large cohort of 3000 families with various inherited cancer syndromes along with their DNA/ EBV-lymphoblastoid cell line bank; b) BRCAGEL case-control study of 2800 breast cancer cases/ matched healthy controls; c) Oral cancer patients with full clinical and pathological annotation, follow-up and somatic/ germline NGS analysis as part of the International Cancer Genome Consortium (ICGC) project (collaborator NIBMG, Kolkata). The lab conducted a one-day hands-on workshop on Genetic Counselling and Genetic Testing at ACTREC for the Indian Society for Medical and Paediatric Oncology on 5th November 2015, and the 11th ICGC scientific workshop from 2nd to 4th December 2015 in Mumbai, in which 200 leading international genomic scientists participated.

Service

During 2015, the Genetics Counselling Centre run by Sarin Lab provided genetic counselling, genetic testing and risk management guidance as appropriate for 696 new hereditary cancer families and follow up counselling and risk management for 1530 individuals. Registration of the Genetic Counselling Centre and Genetics Lab was renewed under the PNDT act. The first prenatal diagnostic test (PNDT) for hereditary retinoblastoma was successfully done and used for counselling a family with hereditary retinoblastoma.

Research

In 2015, the lab enrolled 696 new hereditary cancer families for counselling, DNA banking, molecular genetic analysis, and risk management of mutation carriers. Founder effect of 8 recurrent mutations in BRCA1/2 gene and 1 novel mutation in MLH1 gene was confirmed on an extended cohort of syndrome affected families and healthy controls by haplotyping studies. Novel BRCA1 missense and splice site mutations were characterized using comprehensive *in-silico* and functional studies. In the BRCAGEL case control study, we have completed accrual of the planned 2600 subjects and molecular genetic analysis of 28 SNPs is underway to understand their role in breast cancer risk. Analysis of exome sequencing correlation in 131 gingivo-buccal cancers of the lab's ICGC cohort revealed the association of mutations in double strand DNA repair genes and post radiation loco-regional recurrence and the set of genetic alterations predicting nodal failure. These results were presented in the 11th ICGC scientific workshop in Mumbai.

Education

The Principal Investigator is a recognized guide for Ph.D. in Life Sciences under the Homi Bhabha National Institute. During 2015, four graduate students - Ms. Nikhat Khan, Mr. Moquital Haque, Ms. Vasudha Mishra, Ms. Anuja Lipsa, were working in Sarin Lab on their doctoral theses. The lab also actively participated in the Centre's training program and accepted 21 trainees – 13 for their Master's dissertation, five for experience, two as summer trainees and one as observer. The lab also conducts an active weekly academic program. Lab members presented their findings at local and national conferences. The PI was invited to participate in the NDTV 'Cancer Telethon' Live National Telecast on Cancer Genetics on 8th February 2015.

Shilpee Lab

Dr. Shilpee Dutt
Principal Investigator

Overview

The long term goal of Shilpee lab is to gain insights into the molecular basis of radiation and chemo resistance in cancer using glioblastoma and leukemia as model systems. For systematic identification of signals/ pathways relevant to therapy resistance, *in vitro* cellular models from primary patient samples and *in vivo* pre-clinical orthotopic mouse models have been generated for glioma and leukemia studies. The signaling pathways are being investigated using cell biology, molecular biology, biochemistry and microscopy based approaches. Additionally, global approaches like genomics and proteomics are being taken for a comprehensive understanding of different intracellular signaling pathways, crosstalk between them and their contribution towards conferring therapeutic resistance. The group hopes to identify key signaling pathways that could provide novel targets for therapeutic interventions. The group is also collaborating with clinicians at ACTREC and TMH to extend the lab's findings from *in vitro* and *in vivo* model systems to the patients for possible translational benefits.

Research

The clinical scenario of glioma resistance has been recapitulated in patient derived primary cultures and orthotopic mouse models. Using this system, the group has shown that innately resistant glioblastoma cells survive radiation by forming multinucleated giant cells (MNGCs) through a non genetic route of homotypic cell fusion. MNGCs become senescent, up-regulate survival genes, repair DNA via H3K36me2 mediated NHEJ, and eventually overcome senescence to relapse with heightened metastatic potential. Importantly, the group has also shown that mitotic inducer and NHEJ inhibitor selectively ablate residual cells and prevent relapse.

The group has also shown that the parent and recurrent gliomas have different spectral features and identification of these features can help in prediction of therapy response in glioblastoma.

In another study using the *in vitro* model system of acquired resistance to leukemia (that has been developed in house), the group has identified high expression of GCN5 at the onset of acquired resistance leading to enhanced DNA repair and survival of early drug resistant cells via H3K16acetylation mediated over activation of ATM. It has been demonstrated that GCN5 expression during induction therapy could be used as marker to detect onset of acquired resistance; accordingly, intervention with ATM inhibitor during this stage could eliminate the formation of MRD and prevent relapse in leukemia.

Education

The lab is recognized for Ph.D. degree in Life Sciences of the Homi Bhabha National Institute. Presently five research scholars – Ms. Ekjot Kaur, Mr. Sameer Salunkhe, Ms. Jacinth Rajendra, Ms. Jyothi Nair and Ms. Anagha Acharekar, are working towards their doctoral thesis. The lab participates in the Centre's training program, wherein nine students worked on their Master's dissertation and two for research experience in 2015. The lab regularly conducts in-house data presentation and journal club. During 2015, students in the lab presented their research findings as oral/ poster presentations at national/ international conferences.

Shirsat Lab

Dr. Neelam Shirsat
Principal Investigator

Overview

The research focus of Shirsat Lab is tumours of neurological origin. Integrated somatic mutation analysis and transcriptome profiling of histopathologically diagnosed oligodendrogliomas from ACTREC and those from the TCGA cohort was done to identify major molecular types of these adult low grade gliomas and to detect genetic alterations characteristic of oligodendrogliomas. *ETV* genes of the ETS transcription factor family were found to be significantly upregulated in the *CIC*-mutant oligodendroglial tumours, a fact that is likely to make these tumors more aggressive than the *CIC* wild type oligodendrogliomas. The WNT subgroup specific miRNA - miR-148a, was found to bring about reduction in tumorigenicity and invasion potential of medulloblastoma cells by targeting neuropilin 1 (NRP1), a co-receptor for multiple growth factors and a novel miR-148a target. Circulating NRP1, contributed by soluble NRP1, is abundantly found in human plasma. Anti-NRP1 antibody is in clinical trial for the treatment of advanced solid tumors. Since miR-148a targets only full length NRP1 mRNA and not the soluble antagonist isoforms, it may serve as a more effective strategy for targeting NRP1.

Research

The oligodendroglioma study identified three major types of gliomas - *IDH1/IDH2*-mutant chromosome 1p/19q co-deleted oligodendrogliomas, *IDH1/IDH2*-mutant *ATRX/TP53*-mutant astrocytomas, and *IDH1/IDH2*-wild type GBM-like tumours. Recurrent somatic mutations were also identified in the Notch signaling pathway genes - *NOTCH1*, *MAML3* and chromatin modifying gene *ARID1A,* besides the *KRAS* oncogene, *CIC* and *FUBP1* genes. RNA-seq analysis revealed higher expression of oncogenic ETV transcription factors in the *CIC*-mutant oligodendrogliomas that may make these tumours more aggressive than the wild type. The lab had earlier reported distinctive miRNA profile of WNT subgroup medulloblastomas. MiR-148a expression inhibited tumorigenic and invasive potential of several medulloblastoma cell lines. NRP1 was identified as a novel miR-148a target. NRP1 is known to play role in multiple signaling pathways that promote tumour growth, invasion and metastasis, and act as a co-receptor of the growth factors VEGF, TGF-beta, HGF, EGF and PDGF. Kaplan-Meier survival analysis of 62 medulloblastomas showed that tumors with moderate or high NRP1 expression had significantly poorer overall survival ($p = 0.0349$; hazard ratio 6.06) than those showing no detectable or low NRP1 expression. The tumour suppressive effect of miR-148a expression in medulloblastoma cells accompanied by down-regulation of NRP1, ROCK1 and DNMT1 expression makes miR-148a an attractive therapeutic agent for the treatment of non-WNT medulloblastomas and other cancers showing NRP1 over-expression.

Education

The PI is a recognized guide for the Ph.D. degree in Life Sciences under the Homi Bhabha National Institute. In 2015, one of her doctoral students - Ms. Pooja Panwalkar was awarded the Ph.D. degree, and another Mr. Kedar Yogi submitted the thesis; Mr. Satishkumar Singh, Mr. Vijay Padul, Ms. Shalaka Masurkar, Ms. Raikamal Paul, Mr. Harish Bharambe, Ms. Purna Bapat and Ms. Shweta Gopalakrishnan worked on their dissertation. The lab accepted one trainee for Master's dissertation and two for experience. The PI organized a hands-on workshop on 'Development of pre-clinical orthotopic xenograft mouse model and *in vivo* Imaging' at ACTREC from April 1-3, 2015.

Sorab Lab

Dr. Sorab Dalal
Principal Investigator

Overview

The laboratory has two specific goals. The first is to understand the mechanisms by which 14-3-3 proteins regulate cell cycle progression and the epithelial mesenchymal transition (EMT). Loss of two 14-3-3 proteins results in a decrease in tumor progression, and efforts are underway to establish this pathway as a potential therapeutic target. Loss of 14-3-3σ leads to the induction of EMT due an increase in the levels of c-Jun leading to an increase in the levels of the EMT promoting factor, slug. The second goal is to understand the biogenesis of the cell-cell adhesion junction - the desmosome, and determine the consequences of desmosome dysfunction to development, tumor progression and metastasis. Loss of plakophilin3 (PKP3) leads to increased expression of LCN2 and MMP7 and both genes are required for invasion, tumor progression and metastasis. These molecules could be further developed as prognostic markers or as targets for therapeutic intervention.

Research

The work in this laboratory has demonstrated that two different genetic alterations - loss of 14-3-3σ or loss of PKP3, lead to an increase in migration and invasion. However, tumor formation and metastasis are decreased in cells lacking 14-3-3σ, while cells with low levels of PKP3 show increased transformation and metastatic progression. This group has identified mechanisms that are altered upon loss of 14-3-3σ and PKP3 that are required for the increased invasion and migration. Attempts are now being made to understand the differences between these two mechanisms and how comparing the changes that occur in the modified cells allow tumor cells to acquire the metastatic phenotype. The group is currently in the process of building mouse models to mimic PKP3 loss in the colon, in a bid to determine if this is sufficient to induce metastasis in colon tumors. Experiments have been initiated to understand how another 14-3-3 isoform, 14-3-3γ, and PKP3 regulate desmosome formation. The role of 14-3-3γ in regulating centrosome duplication continues to be explored and models that will permit screening for drugs that disrupt the cdc25C-14-3-3 complex are being constructed, since there is proof of principle that disrupting this complex can lead to tumor killing *in vivo*.

Education

The Principal Investigator is a recognized guide for Ph.D. in Life Sciences under the Homi Bhabha National Institute and, during 2015, eight students (Mansa Gurjar, Srikanta Basu, Kumarkrishna Raychaudhari Sonali Vishal, Arunabha Bose, Akash Dubey, Sarika Tilwani, Nazia Chaudhary) worked in this lab on their doctoral thesis. Thirteen trainees worked in the lab this year, 10 for Master's dissertation, two for experience and one on a collaborative project. Lab members participated in weekly in-house seminars and journal club, and presented their research findings at several conferences/ meetings during 2015.

Teni Lab

Dr. Tanuja Teni
Principal Investigator

Overview

On-going research programs of this lab focus on gaining insights into the molecular basis of oral and cervical tumorigenesis, in a bid to identify molecular targets. In oral cancer, the current emphasis is on identifying stability conferring binding partners of the anti-apoptotic protein Mcl-1 and its targeting by a BH3 mimetic, Obatoclax. Regulation of survivin isoforms and activin A by ΔNp63, and their association with the migratory phenotype are also being explored. The functional relevance of down-regulated secretory clusterin, and the prevalence of HPV in head and neck cancers treated with radiotherapy with/ without chemotherapy are under study. Established radioresistant oral cancer cell lines are being assessed for the expression of known stem cell markers and tumor forming ability in nude mice. The association of high risk HPV viral load with radiation response and post-treatment surveillance is being evaluated in cervical cancer. In a population based screening for cervical cancer, the HPV E6/E7 mRNA assay is being evaluated as a secondary screening test.

Research

Pharmacological inhibition of ubiquitin specific peptidase 9, X-linked (USP9X) by the deubiquitinase inhibitor WP1130 induced rapid down regulation of MCL-1 expression followed by cell death in oral cancer cells. Therapeutic targeting of MCL-1 with the pan-BCL-2 BH3-mimetic Obatoclax in oral cancer cell lines led to potent induction of autophagy. An observed late-stage block in the terminal degradation phase of autophagy led to necroptosis - a non-canonical, caspase-independent, non-apoptotic cell death. Altered expression of survivin isoforms and activin A was noted post-p63 knockdown, and was associated with decreased migratory phenotype. The predominant form of clusterin in oral cancers - sCLU, was down regulated in oral tumors suggestive of a tumor suppressor function. Upregulation of several stem cell markers in radioresistant oral cell lines and increased tumor formation capability in Nude mice pointed to their stem cell-like characteristics. In cervical cancer patients, a significant reduction in HPV viral load was noted two/ five months post treatment in complete responders ($p<0.05$), whereas persistence of HPV 16 and 18 was seen in patients with residual/recurrent local disease. The E6/E7 mRNA detection test used for cervical cancer screening exhibited 94% specificity and 48% positive predictive value, as compared to 87% specificity and 40% positive predictive value of HPV DNA detection by HCII.

Education

Teni lab is recognized for the Ph.D. degree in Life Sciences of the Homi Bhabha National Institute. Seven doctoral students are presently working on their doctoral thesis - Ms. Rupa Vishwanathraman, Mr. Mohd. Yasser (both submitted their thesis in 2015), Mr. Prasad Sulkshane, Ms. Rajashree Kadam, Ms. Dhanashree Mundhe, Mr. Abhay Uthale and Ms. Dipti Sharma. In 2015, the lab accepted three trainees for Master's dissertation, six for experience, andsix observers from Yenepoya Dental College. Lab members participate in an in-house weekly program of data presentation and journal club. Faculty and students of the lab visited a number of conferences/ workshops to present their research findings as oral/ poster presentations.

Vaidya Lab

Dr. Milind Vaidya
Principal Investigator

Co-Investigator
Mrs. Sharada Sawant

Overview

The research focus of Vaidya Lab is to investigate the functions of keratin, vimentin and their associated proteins in epithelial homeostasis/ cancer, and further to use them as biomarkers of oral cancer. Recent data reveals that down regulated vimentin and upregulated beta4 integrin expression together correlate inversely with survival in OSCC patients, corroborating *in vitro* findings of this lab. Vimentin also regulates keratin5/ 14 expression by modulating the expression of P63. Knock down of BP230 and plectin, both singly and in combination, led to down regulation of cell motility, invasion and changes in actin polymerization in SCC derived cells. Screening of transgenic mice for keratin8, serine 73 and serine 433 phosphomutants is in progress. 3-D co-cultures of keratinocytes and fibroblasts were grown from normal, dysplasia and tumour tissues of the tongue. Results showed that stromal fibroblasts play a role in regulation of epithelial thickness, cell proliferation, differentiation and epithelial integrity. Proteomic analysis of human SCC of tongue (stage I to IV) revealed sequential alterations in some proteins.

Research

Vimentin regulates cell motility by modulating beta 4 integrin adhesion functions. High vimentin and low beta 4 integrin expression in human OSCC inversely correlated with patient's survival. Further, vimentin regulates differentiation switch in OSCC cells by regulating K5/14 expression through notch/p63 pathway. Keratin 8 knocked down in A431 resulted in decreased tumorigenic potential. iTRAQ analysis revealed differential expression of apoptosis and cell cycle related molecules. Keratin 8 phospho-dead and mimic mutants were shown to be less tumorigenic than wild type clones. BPAG1e, Plectin and BPAG1e-Plectin double knockdown in OSCC derived cells resulted in-decreased cell motility and in-vitro invasion, reduction in soft agar colony size/ number, and alterations in actin organization. Knocked down of TAp63 on K14 null background led to decrease in Notch-1 protein and differentiation markers like K1, Filagrin. Our 3-D co-culture results showed that the major steps of tongue carcinogenesis can be reproduced *in-vitro*. Further our results showed that, stromal fibroblasts play a role in regulation of epithelial thickness, cell proliferation, differentiation and maintenance of desmosomal adherence junctions. Keratinocytes cell line was developed from human tongue SCC. Cancer stem cell markers-Oct4, CD44 and c-Myc in different permutations and combinations significantly correlated with overall survival and disease free survival of OSCC patients. Our data showed that the immunoreactivity of desmoplakin, plakoglobin and desmoglein proteins gradually decreased in progressive steps of oral tumorigensis as compared to normal oral epithelium. Desmosome number and their length significantly reduced while intercellular spaces significantly increased from low to high grade of disease.

Education

The lab is recognized for Ph.D. in Life Sciences of the Homi Bhabha National Institute. Four graduate students – Ms. Crismita Demello, Ms Richa Tiwari, Mr. Pratik Chaudhari and Poonam Kakde are working on their doctoral thesis. One student obtained his PhD degree. Fourteen students underwent training under Dr. Vaidya in 2015 (seven for dissertation, seven for experience); six observers from Yenepoya Dental College also visited the lab. Eight trainees worked under Mrs. Sawant – two for dissertation and six for experience. Lab members meet regularly for data presentation and journal club. Lab members attended national/ international conferences and workshops and, presented their findings through oral/ poster presentations.

Varma Lab

Dr. Ashok Varma
Principal Investigator

Overview

Multidisciplinary approaches of genomics, proteomics, structure biology, bioinformatics and biophysics are integrated in Varma Lab, to unravel the structure and function of cancer associated proteins. This group is analyzing the alterations in structure and functions caused by inherited germ line mutations in BRCA1 gene, and further categorizing their pathogenicity for translational research. The genetic variants discovered from a larger cohort of patients will help in identifying someone predisposed to or at a risk of cancer. The group is also focusing on protein-protein interactions to unravel the bioactive interface for small molecule inhibitor design. Further, targeting to identify predictive and prognostic protein biomarkers squamous cell carcinoma of the head and neck, treated with radiotherapy. The PI organized an Indo French Seminar on 'Application of structural biology in translational research and structure guided drug design' during November 19-20, 2015.

Research

The complex crystal structure of BRCA1 BRCT with small molecule inhibitors has been determined. Different domains of BRCA1/ MAPK/ FANCI have been purified and characterized for their folding pattern. BRCA1, along with its cellular partners like MERIT -40, RAP80, and its mutant protein have been evaluated for pathogenicity of mutants discovered from cancer patients. Furthermore, protein-protein interactions of various cellular proteins like BARD1, CsTF, ZBRK1, FANCI and FANCD2 have been established in a bid to understand the genomic integrity of complex molecules.

Education

The PI is a recognized guide for Ph.D. in the Life Sciences under the Homi Bhabha National Institute. During 2015, one of his graduate students Mr. Vikrant was awarded the Ph.D. degree and two students – Ms. Lumbini Yadav and Mr. Bhanu Prakash Jagilinki submitted their synopsis; while five students – Mr. Rajan Kumar Choudhary, Mr. Mohd. Quadir Siddiqui, Mr. Pankaj Thapa, Ms. Suchita Dubey and Ms. Lipi Das, are presently working on their doctoral dissertation. The lab accepted 16 trainees during the year - eight for Master's dissertation, six for research experience, and two were students of the PI's collaborators.

Waghmare Lab

Dr. Sanjeev Waghmare
Principal Investigator

Overview

The primary goal of this lab is to study the molecular and cellular mechanisms that govern stem cell regulation, and how perturbations in these mechanisms lead to cancer. Signaling pathways such as Wnt/ Notch/ Sonic hedgehog, TGF-β, EGFR, etc. regulate stem cell renewal, and genes affected in these pathways are associated with cancer. Therefore, it is crucial to study the genes involved in signaling pathways that control self renewal of normal stem cells and their malignant counterparts - cancer stem cells. The lab uses mouse skin and human epithelial cancers (such as head and neck cancer) as models to unravel the mechanisms that govern adult stem cell regulation and cancer. The findings will enable the identification of genes involved in stem cell regulation and cancer. Importantly, they will elucidate how these genes work at the cellular level to develop normal tissue and repair injured tissue to maintain homeostasis. These studies will not only elucidate the basic molecular mechanism that maintains tissue homeostasis, but may also have implications in cancer therapeutics.

Research

The lab is involved in five on-going research projects: (1) Role of enhancing factor/ secretory phospholipaseA2-IIA in hair follicle stem cells and cancer, (2) Dissecting the role of Sfrp1 (secreted frizzled-related protein) in hair follicle stem cell regulation and cancer, (3) Molecular signaling in human oral cancer stem cell regulation for potential cancer therapeutics, and (4) Investigating the role of disabled-2 (Dab2) in epidermal stem cell regulation and cancer.

Serum secretory phospholipase A2-IIa ($sPLA_2$-IIA) is deregulated in lung, head and neck, prostrate and esophageal cancers; however, its role in stem cell regulation is obscure. Findings of this lab indicated that a transgenic mice over-expressing $sPLA_2$-IIA (K14-$sPLA_2$-IIA) showed thickening of interfollicular epidermis and enlargement of sebaceous gland, infundibulum and junctional zone. Increased proliferation of stem cells was accompanied with depletion of hair follicle stem cells. The epidermis showed enhanced activation of EGFR and JNK1/2, that led to c-Jun activation. These findings for the first time uncovered that over-expression of $sPLA_2$-IIA leads to depletion of hair follicle stem cells, proliferation and differentiation. Sfrp1, a Wnt inhibitor, acts as a tumor suppressor gene and is down regulated in breast, cervical and hepatocellular cancer. Lab findings revealed an expansion of hair follicle stem cell pool in homozygous *Sfrp1* (-/-) knockout mice. Also, topical application of DMBA-TPA on *Sfrp1* (-/-) skin caused increased sensitivity to chemical carcinogenesis. In another study, cancer stem cells (CD44+/ALDH+) were isolated from oral cancer cell lines. Studies revealed deregulation in the Wnt signalling pathway; â-catenin was down-regulated while *Sfrp1* and *Axin2* were not.

Education

The PI is a recognised guide for Ph.D. in Life Sciences of the Homi Bhabha National Institute. Four graduate students – Mr. Rahul Sarate, Mr. Gopal Chovatiya, Ms. Sweta Dash and Mr. Raghava Reddy Sunkara are presently working on their doctoral theses. The lab participates in the training program of the Centre and, in 2015, two trainees joined the lab to gain research experience. Lab members engage in weekly in-house data presentation and journal club. Group members presented posters at national conferences.

Other Projects

Dr. Narendra Joshi
Scientific Officer 'F'

Overview

A new project to validate housekeeping genes in head and neck cancers was initiated in the lab this year, and the project on immunomodulatory effects of vitamin D3 and progesterone was extended. As a service component, the lab now serves as a referral centre for chimerism analysis for bone marrow transplant (BMT) patients throughout western India as almost 25% analysis is performed for patients treated at other Centres in the city/ other states.

Service

Chimerism analysis for BMT patients was performed on a weekly basis; close to 800 tests were performed this year. Improvements in DNA preparation methods and improved strategy in analysis of the nine STR markers has helped in maintenance of cost without compromising on the efficiency and quality of the results.

Research

The work related to study of immunomodulatory effects of vitamin D3 and progesterone was extended to examine the influence of continuous exposure to progesterone on receptor negative cell lines. The findings were presented in a poster at a national conference, and a manuscript describing the impact of intra-tumoral expression of IL17A and IL32 on the outcome in breast cancer patients was prepared for communication.

Education

Group discussions and journal club are conducted regularly in the lab. During 2015, two trainees worked under Dr. Joshi's supervision on their Master's dissertation, two for research experience, and one as an observer.

Other Projects

Dr. Ujjwala Warawdekar
Scientific Officer 'E'

Overview

Dissemination of cancer cells into the general circulation during tumour handling is an accepted phenomenon, although it is not known whether it is these disseminated cells that go on to form a metastasis. This lab focuses on assessing minimal residual disease in solid tumours to evaluate the efficacy of therapy and outcome of the disease.

Research

An on-going study designed to examine the impact of administering pre-operative depot progesterone and the levels of circulating tumour cells (CTCs) in the blood of patients with malignant breast lesions is nearing completion, and data analysis is now underway. Another study aiming to delineate the characteristics of tumour cells in circulation from metastatic breast cancer patients has been initiated; it will address tumour heterogeneity by establishing and characterizing cell cultures of tumour cells isolated from the circulation. Chemotherapeutic regimens often give dissimilar outcomes, especially in patients with non-small cell lung carcinoma. Yet another study, that has obtained IEC approval in July 2015, will evaluate CTCs at the start of the chemotherapy regimen and 21 days after the first cycle, and will correlate the findings with the outcome in patients with NSCLC.

Education

The lab participates in the Centre's training program and, during 2015, accepted two trainees during 2015 - one for Master's dissertation and another for research experience.

Anti-Cancer Drug Screening Facility

Officer-in-Charge
Dr. Jyoti Kode

The Anti-Cancer Drug Screening facility (ACDSF) at ACTREC supports anti-cancer drug development in India, in terms of in vitro and advanced in vivo drug screening against available cancer cell lines (53 human) and tumor models (10 murine; 36 human xenografts). During the report year, 2307 compounds were screened - 2228 in vitro and 79 in vivo in normal or immunodeficient NOD-SCID mice for 250 clients (six corporate R&D) across India. Under the CSIR-funded project entitled 'Affordable cancer therapeutics', five compounds were evaluated in in vivo animal model and 300 compounds are undergoing in vitro screening in 10 cancer cell lines. For this project, the facility also standardized flow cytometry-based detection of extrinsic/ intrinsic apoptosis, DNA ploidy and cell cycle analysis. The facility has also developed two human xenografts (endometrial adenocarcinoma-Ishikawa and liver cancer-PLC/PRF/5) and used them in efficacy assays.

Bioinformatics

Dr. Ashok Varma
Officer-in-Charge

Scientific Officer
Mr. Nikhil Gadewal

The Bioinformatics Facility (BTIS) at ACTREC, funded under the Department of Biotechnology's sub-DIC scheme, is a well equipped high end computational facility whose staff trains scientists, clinicians and doctoral students in the use of freeware for molecular modeling, microarray expression analysis, Next Gen sequencing, and structure guided inhibitor design. Some of the projects utilizing this facility involve the study of protein-protein interaction, molecular docking for BRCA1, BARD1, WNT signaling pathways. An in silico approach is being used to categorize the pathogenicity of mutations discovered in cancer associated proteins. The facility organizes two-day Workshops on Bioinformatics every year; this year's workshop was held during April 23-24, 2015. Two rounds of Biotechnology/ Bioinformatics Training for teachers and research scholars from the North-East and other regions of India were also conducted during the period June 29 to July 10, 2015 and from July 13 to 24, 2015. The facility has its own dedicated website: http://www.actrec.gov.in/bioinformatics/index.htm.

Biorepository

Scientific Officers
Dr. Kishore Amin
Dr. Poonam Gera

The ACTREC Biorepository is the custodian of biological samples for use under a specified mechanism by researchers on duly approved research projects, to address queries about the biology of cancer or to find biomarkers for more refined molecular classification and/or for targeted therapy. Of the 645 tissue samples accrued in the Biorepository during 2015, the majority of the samples were head and neck tumours, followed by breast tumours. Other tumour types included neurological, gastrointestinal, genitourinary, gynecological, etc. Cryopreserved tissue samples were provided to seven Principal Investigators having approved projects depending on various protocols at the Tata Memorial Centre. In the International Cancer Genome Consortium (ICGC) project, 20 patients were accrued this year and tumour/ blood samples of gingivo buccal mucosa were collected from them. Genomic DNA samples have been sent to NIBMG, Kolkata for whole genome scan and sequence capture-based flow cell sequencing.

Common Facilities

Dr. Sanjay Gupta
Officer-in-Charge

The Common Facilities of the Cancer Research Institute encompass radioactivity handling room for ^{32}P and ^{125}I, bacterial culture hoods, X-ray developing machine, ultra-pure water purification system, ice making machines and cold rooms located on different floors and wings of Khanolkar Shodhika for the use of in house researchers. The radioactivity handling and culture rooms have state-of-art equipment like biohazard hoods, radioactivity monitors, incubators, centrifuges, and gamma/ beta counters. Major CF equipments are covered under annual maintenance contract, while autoclaves and ovens in the KS research labs are maintained by the CF staff.

Common Instrument Room

Mr. Uday Dandekar
Officer-in-Charge

Over the past 38 years, the Institute has maintained a Common Instrument Room (CIR) as a facility that houses vital, routinely required scientific equipments, to optimize their utilization and to make them available to staff and students, round the clock on working days and holidays. The CIR also provides technical support to research labs in the procurement and maintenance of capital equipment. Qualified technical staff members of the CIR look after routine maintenance of the equipments and guide the end users about proper usage. Spares for centrifuges, low temperature freezers, CO_2 incubators, etc, as well as routinely required consumables (centrifuge tubes, thermal paper rolls, etc) are procured on a regular basis and kept in stock in the CIR, to reduce breakdown and subsequent downtime of the instruments. The CIR presently houses 88 equipment; a new gel documentation system and three ultra low temperature freezers were procured and installed during 2015.

Digital Imaging

Dr. Dibyendu Bhattacharyya
Officer-in-Charge

ACTREC's Digital Imaging facility (ADIF) houses several advanced imaging instruments including LSM510 confocal microscope, multiphoton confocal LSM780 microscope, 3i Mariana spinning disk confocal microscope, Leica SP8 confocal microscope with STED super resolution system, Leica DMI600B microscope (Bhattacharyya lab), Axio Imager .Z1, and Axio Vert 200M. The facility provides microscopic acquisition and analysis services for wide-field and confocal platforms to users in ACTREC and outside.

DNA Sequencing

Dr. Pradnya Kowtal
Officer-in-Charge

The DNA sequencing facility at ACTREC was used by researchers from ACTREC as well as from institutes like BARC, IIT and AIIMS, during 2015. Investigators used the facility to analyze sequences of genes implicated in sporadic and inherited cancers, either for research or diagnosis. The facility has two automated DNA sequencers, an eight capillary 3500 and a 48 capillary Genetic analyzer 3730 from Applied Biosystems. Both the sequencers are used for DNA sequencing, fragment analysis and single nucleotide polymorphism analysis. The machines are operated by two scientific assistants, six days a week. The average turnaround time to give out data is one working day after receiving samples. The facility carried out 24,864 sequencing and fragment analysis reactions this year.

Electron Microscopy

Mrs. Sharada Sawant
Officer-in-Charge

The Electron Microscopy (EM) facility at ACTREC promotes, supports and initiates research and training in the applications of Transmission Electron Microscopy (TEM). The facility has a JEOL JEM 1400Plus transmission electron microscope (TEM) that works at 80-120KV with 0.2 nm resolution and magnification up to x12,00,000, and is suitable for biological, polymer, nano-gold and material science applications. The system has been commissioned along with Energy Dispersive X-ray Spectroscopy (EDS) and Scanning Transmission Electron Microscopy (STEM). The facility undertakes all the steps required for TEM sample preparation including fixation, araldite/epon block making (solid tissues, monolayer cell cultures, single cell suspension etc), semi-thin sectioning followed by ultrathin sectioning, grid scanning and imaging. During the report period, the facility processed 264 samples for 13 working groups of ACTREC.

Flow Cytometry

Dr. Shubhada V. Chiplunkar
Officer-in-Charge

Flow Cytometry (FCM) is a centralized facility having two flow cytometers, and is used by scientists and clinicians of ACTREC. The FACSAria, equipped with three lasers, can perform 11-color analysis and 4-way sorting, while FACSCalibur is equipped with a 488 nm laser and can perform 3-color analysis. The software used include FACSDiva, CellQuest Pro, FlowJo, FCAP Array and Modfit. The facility provides technical expertise for data analysis by training and demonstration to users. The facility also renders service to users from other organizations on payment basis. The research applications include immunophenotyping, DNA content and cell cycle analysis, apoptosis and proliferation studies, stem cell analysis, detection of circulating tumor cells, various functional assays, cytometric bead array (CBA) and 4-way live cell sorting. The facility's FACSCalibur was utilized by 75 users and FACSAria by 49 users during 2015. The facility conducted the 16th Indo-US Cytometry Workshop during 26-28 October 2015, which was attended by 38 participants.

Histology

Dr. Arvind Ingle
Officer-in-Charge

Histology is a service facility that provides (a) slides of unstained/ haematoxylin and eosin (H&E) stained histology sections of animal tissues including bone/ tumour samples, (b) logistic support for frozen sectioning of human/ animal tissues, and (c) blocks of multiple tissues by pecking method using a microarray machine. During 2015, the facility received 4519 tissue samples in fixative and, after processing 3469 tissues, supplied 3017 stained and 12239 unstained slides to 24 research labs. Besides this, 752 tissues were processed for cryo-sectioning and 207 H&E stained and 2430 unstained slides were supplied to six research labs.

Laboratory Animal Facility

Dr. Arvind Ingle
Officer-in-Charge

Scientific Officer
Dr. Rahul Thorat

The main objective of the Laboratory Animal Facility (LAF) is to breed, maintain and supply laboratory animals to the institutional scientists. During the year 2015, LAF undertook planned breeding of 25 different strains of mice and two strains each of rats and hamsters, and supplied 3368 normal mice, 281 Nude mice, 740 NOD SCID mice, 101 rats, and 52 hamsters to 25 institutional researchers against 82 IAEC sanctioned research proposals. Towards quality control, LAF examined 107 stool/ animal samples and 234 food, water, bedding material and room air samples for routine microbiological testing, 372 hair/ stool/ cellophane samples for clinico-pathology, 32 samples for serological detection of five rodent pathogens from 16 strains, and carried out PCR based tests for 13 infectious agents using 32 random samples from 16 strains. For checking genetic purity, LAF undertook skin grafting of 36 mice and biochemical marker testing of 28 mice from seven strains, and PCR based tests for 14 microsatellite markers on 26 DNA samples from 13 mouse strains. LAF examined the genotypes of 103 ptch KO mice, and used flow cytometry to assess the T- and B-cell profile in 16 blood samples of Nude/ SCID mice and control BALB/c and Swiss mice. As a part of its embryo freezing program, LAF collected 828 embryos at the 8-cell to morula stage from 173 mice of nine strains and froze the embryos in 45 cryo-vials under liquid nitrogen. During the report period, LAF also supplied 7370 normal mice, 40 nude mice and 30 rats as breeding nuclei/ experimental animals to 17 CPCSEA registered Indian organizations, and provided genetic and microbiological status testing services to outside organizations.LAF organized the sixth International Conference of LASA India on 'Promotion of Animal Research, Welfare and Harmonization of Laboratory Animal Science', and a preconference Workshop on 'IACUC/ IAEC Training: the AAALAC perspective', at ACTREC from October 14-16, 2015. The senior faculty also participated in local and national conferences/ meetings to deliver invited talks in their area of expertise. The facility accepted eight trainees during the year to learn various techniques including embryo preservation.

Macromolecular Crystallography and X-Ray Diffraction

Dr. Ashok Varma
Officer-in-Charge

This facility was established in 2012 to enable protein crystallization, structure determination and refinement for in house scientists and students. The dedicated facility has a crystallization unit, a microscope to visualize the crystals, a Microstar microfocus rotating anode, an integrated computer controller motorized image plate detector, and computers to process the data and determine the crystal structure of proteins. The facility also has remote access to the Synchrotron facility located across the world. So far, x-ray diffraction data has been examined in a total of 37 crystals both by groups in ACTREC, as well as those from IIT-B and NCCS. The facility also provides training to faculty from several universities and colleges to help them understand the structure of biological molecules. Prof. MV Hosur, Raja Ramanna Fellow helps in the smooth functioning of the facility.

Mass Spectrometry

Dr. Rukmini Govekar
Officer-in-Charge

The Mass Spectrometry facility houses state-of-the-art instrumentation including mass spectrometer [MALDI-TOF/TOF (Bruker Ultraflex II)] and liquid chromatography system (Agilent 1200 series micro LC) coupled to a robotic MALDI plate spotter (Bruker Proteineer). During 2015, the facility was used extensively by in-house users to analyze over 300 samples for identification, sequencing and molecular weight determination of proteins. The facility was also used by scientists from institutes of repute in and around Mumbai, such as BARC, NMIMS, CBS-DAE, NIRRH, MGM Institute of Health Science, Modern College Pune, Savitribai Phule University Pune, TGS Kolkata, and by graduate students from colleges in Mumbai and other parts of Maharashtra. The new Nano-LC-MS-MS platform, Triple TOF 5600 Plus (ABSCIEX, USA), that had been installed at the Centre in August 2014, was successfully put into use this year for various applications such as identifications of proteins, generation of protein profiles of whole cell lysates, and detection of post-translational modification of proteins. Differential quantification of labeled proteins in cell lysates is presently being standardized.

Molecular Imaging

Dr. Abhijit De
Officer-in-Charge

This facility was established in 2013 to promote preclinical molecular imaging research on the ACTREC campus. Molecular imaging provides real-time visualization and quantitative measurement ability of cellular processes at the molecular or genetic level. The facility started with IVIS Lumina II which, in 2014, was supplemented with IVIS Spectrum imaging system (Perkin Elmer, USA) with greater functionality. In 2015, a data back-up storage server was added to the facility for back up and access of data for analysis at off-site data work stations. The installed systems offer planner scanning of multiple mice, rats and other small animals for optical signatures such as bioluminescence, fluorescence as well as Cerenkov luminescence signal. The facility received AERB approval during 2015 and was made functional for radioactive based Cerenkov luminescence imaging. Several PI labs on campus and neighboring institutions are using these imagers. Five Ph.D. students have enriched their theses, six high impact peer-reviewed publications have accrued, and one patent has been filed so far using the data generated in this facility.

Small Animal Imaging

Scientific Officer 'F'
Dr. Pradip Chaudhari

The major research focus of the facility is preclinical animal imaging and research on radiopharmaceuticals. Various diagnostic radionuclides such as Technetium-99m, Iodine-125 and Fluorine-18 complexes are being evaluated for their utility in cancer diagnosis and treatment. Several PET, SPECT and CT studies involving rodents are performed for projects from ACTREC, other DAE units and various academic institutes. The facility is also involved in diagnosis and treatment of pet animals suffering from spontaneous cancer (mast cell tumor, mammary gland carcinoma, canine transvenereal tumor, lymphoma, soft tissue sarcoma and osteosarcoma) that are referred to the animal oncology clinic. During 2015, 95 referral cases underwent major or minor surgeries, single/ combination agent chemotherapy and radiation therapy or a combination, as per clinical requirement. Their biological specimens were preserved in the animal cancer biorepository for comparative research.

General Administration

Mr. UV Mote
Sr. Administrative Officer

Administration
Mr. MY Shaikh
Admin. Officer-II
Mrs. MA Sharma
Jr. Admin. Officer
Mr. Vilas Pimpalkhare
Jr. Admin. Officer

Accounts
Mrs. P Kamala
DCA, ACTREC
Mrs. Sandhya Patil
Accounts Officer II

Engineering
Mr. PB Baburaj
OIC (ES)

Purchase
Mr. SC Kirkase
Purchase Officer

Stores
Ms. P Kotenkar
Jr. Stores Officer

Security
Mr. RM Chavan
Dy.CSO Gr. I, ACTREC

Administration

Within the Administrative group, the Human Resource Development section carries out the functions of manpower planning, performance management, recruitment of staff (regular as well as temporary) in the institute, training and development of employees, maintenance of discipline, etc. During the year 2015, 16 regular staff members were appointed in different grades in the medical, scientific, technical and administrative cadres, adhering to recruitment rules of the Centre and the reservation policies of the Government of India. The flow of cancer patients at the Centre is increasing at a rapid pace and, to serve them in a better manner, it is vital for HRD to provide skilled manpower in time. Around 63 temporary staff and 11 temporary security staff were deployed during the year. The Centre also recruited 115 staff on various projects for assisting in research work. Every year in August, a fresh batch of Junior Research Fellows joins the Centre after successfully clearing an entrance exam and interviews. Anti-ragging affidavits were administered to the new JRFs at ACTREC.

HRD section also takes care of Career Planning through merit based review and promotions of employees by holding yearly DPC in respect of all the employees. Day to day establishment functions encompassed e-attendance control, maintenance of leave records, updation of staff records with regard to pay fixation/ re-fixation matters, settlement of personal claims, release of retirement/ terminal benefits becoming due on superannuation/ death, timely payment of staff, time to time performance appraisal/ monthly attendance reports, proper follow-up of matters/ decisions taken during various meetings, diplomatic and amicable handling and settling of inquiry matters, etc. The section has provided timely welfare measures and facilities necessary for maintaining an excellent work atmosphere, imparted training by deputing 11 staff within and outside Mumbai, and convened in-house weekly administration lectures to update the knowledge of the staff. Periodical training in the use of various HRD softwares was provided for facilitation of staff members.

Timely payment of PRIS, update allowance to eligible employees, providing duplicate Service Book to staff, service verification of staff who have completed 18 years of service, etc were other activities carried out by HRD. Implementation of the Reservation Policy of the Government of India duly adopted by TMC in respect of SC/ ST/ OBC/ PWD/ Ex-Serviceman is done regularly and systematically, and all efforts have been made to ensure and achieve the prescribed percentage of reserved posts. TMC merit scholarships were awarded to seven children of ACTREC staff members. During 2015, three staff members achieved superannuation.

Administration (Estate Management) section controls and manages all the outsourced activities aimed at effective functioning of various systems, viz., Hostels, Guest House and Faculty Club, Staff and Patient Canteens, Retreat Cafeteria, Transportation, Horticulture, Pest Control services, Photocopier machines, Courier/ Post and Telegraph services, Dak receipt and dispatch, clearing of service bills, as well as refilling of gas cylinders in laboratories/ BMT/ Patients Hostel and Guest House at Faculty Club. Disposal of biodegradable/ bio-medical waste is done in compliance with the highest standards set as per the government norms. Arrangement of accommodation for resident doctors, nurses etc. at Lords & Melbourne Hostel and effective functioning of the Railway Reservation system are effectively handled by the section.

The Centre takes pride in the large variety of flora on its campus. A garden covering an area of ~1500 sq. mtrs, a plant nursery for in-house needs, and

lawns at different locations in the campus are well maintained by a professionally trained horticulturist and team of gardeners. A separate garden was developed at the newly constructed Centre for Cancer Epidemiology (CCE). Around 2400 trees were numbered in the campus. The '*Nisarg-Runa'* Biogas Plant is running successfully on the campus, and ensures the disposal of organic/ kitchen waste in an eco-friendly manner.

Housekeeping services maintain cleanliness, good sanitation and hygienic conditions on the campus. During the year, a number of training sessions were organized for housekeeping and horticulture workers. ACTREC received a Garbage Tipper Vehicle under donation in the month of February 2015 to carry garbage from dirty areas to garbage yard at ACTREC. Through consistent follow-up with concerned departments in CIDCO, collection of dry waste from the campus has now been organized more effectively, thereby maintaining a pollution free atmosphere on the campus. During the extraordinary situation of acute water shortage on the campus from 29th May to 4th June 2015, the fire and housekeeping departments jointly provided immense help in supplying mineral water and water for general use in wards, ICU and OT areas.

On 21st May 2015, a pledge taking ceremony was held to mark 'Anti-Terrorism Day'. Administration coordinated and facilitated the UGC's NAAC visit on 30th April 2015 for assessment of the HBNI-affiliated doctoral program at ACTREC. On 21st June 2015, on the occasion of 'International Yoga Day', a special yoga camp for cancer patients was organized in the Vasundhara Patients Hostel at ACTREC. 'Sadbhavna Diwas' was observed on 20th August 2015 and a pledge was administered to the staff and students. On 1st October 2015, Swachh Bharat Abhiyaan was conducted on the ACTREC campus. Thorough cleaning of the campus was conducted by the Administrative and Security staff, with campus cleaners from Housekeeping section and Horticulture department participating actively (Photographs enclosed). On 31st October 2015, ACTREC organized a program to commemorate the Birth Anniversary of Sardar Vallabhbhai Patel as 'Rashtriya Ekta Diwas'.

During the year, one more vehicle was procured from the funds received from M/s. CEIL (a Govt. of India Undertaking) under their CSR initiative for transport of cancer patients from ACTREC, Kharghar to TMH, Parel and *vice versa*. The bus was inaugurated on 20th April 2015 at ACTREC by Shri Sanjay Bhatia, IAS, Managing Director of CIDCO Ltd. in the presence of the Director, ACTREC and Chief Executive Officer of M/s. CEIL. Through a donation from M/s. V Care Foundation Ltd, ACTREC Administration arranged for the repairs of two golf carts as well as wheelchairs, refrigerator, etc.

E-Tendering of various work orders for services to be rendered at ACTREC was followed by Engineering, Purchase, Administration, etc, and these tenders were displayed on the ACTREC website.

Finance and Accounts Department

The focus of the Finance and Accounts department has been effective management of funds, judicious budgetary controls, and review of financial outflow. Maintenance of requisite documents and other relevant records was done in conformity with the instructions issued by the Department of Atomic Energy, Govt. of India from time to time. Procurement of various supplies, material and equipment required for the Centre was undertaken by following the relevant financial provisions, viz. General Financial Rules and Purchase procedure. Smart card system for cash paying category patients has now been introduced. Hospital and other income to the extent of Rs. 13.58 crore was generated from cash paying, trust aided, company referred patients and other facilities of the Centre. Plan and Non-Plan grant sanctioned by DAE was fully utilized. In all, there were a total of 193 on-going projects at ACTREC during the year 2015. A sum of Rs. 9.40 crore was received from Governmental agencies such as DBT, DST, ICMR, LTMT, etc., to meet the expenditure on 82 of these on-going projects. In addition, 18 new extramurally funded projects to the extent of Rs. 11.85 crore for a three year period were sanctioned by the above mentioned funding agencies, out of which Rs. 5.52 crore was received during the calendar year 2015.

Engineering Services

Engineering services comprising of Civil, Electrical, Mechanical and Air Conditioning, facilitate the vital, basic requirements of the entire campus and specifically of the research laboratories and hospital wing of the Centre. The scope of work includes operation and maintenance of the 33 KV receiving station, 11 KV substations, transformers, lighting and power distribution, DG sets, central air-conditioning plants, medical gas system, LPG distribution system through pipelines, supply of liquid nitrogen, hospital and lab furniture, pumping stations, low temperature facilities as well as laboratory equipment. Engineering also handles building maintenance including additions, alterations and modifications in a constructed area of ~5,00,000 sq. ft. on the 60 acre plot. Engineering also looks after water management at the campus, sewer waste management, water distribution system for horticulture, storm water drain of campus, liaison with local authorities, etc. The Centre is expanding rapidly. Construction work of the Centre for Cancer Epidemiology Building was completed during this year. This department routinely coordinates with Architects/ Consultants involved in designing the buildings on campus, by providing inputs about all the

requirements through regular meetings. Construction is in progress for the Archives building, and the design of the Hematolymphoid Block has been frozen for inviting tender along with a few more projects in the pipeline.

Purchase Department

The Purchase department aims to provide efficient services to the entire Centre by way of arranging and delivering goods as per the approved quality and minimizing the supply time. Processing indents, enquiries, comparative statements, purchase orders and reminders are executed through the Material Management System (MMS) developed in-house by the Information Technology department. Implementation of MMS has been of great help in the efficient functioning of procurement activities and has enabled obtaining material with ease. During the report year, Purchase department floated 25 e-tenders with the help of tenderwizards.com/dae and the response from vendors was satisfactory. This is an important and requisite protocol as per DAE and CVC norms. During 2014-15, goods and equipment worth value of Rs. 11.60 crore, consumables worth Rs. 18.60 crore and contract for the supply of spares/AMC worth Rs. 18.00 crore were delivered by the section.

Stores Department

The main function of the Stores department is to receive stock and non-stock material such as chemicals/ reagents, consumables, surgical items, printing/ stationery items, miscellaneous items, engineering items, cash purchase and imprest items, major and minor equipment, refilled CO_2 and N_2 cylinders, as well as all the consignments arriving after office hours and on holidays, and issue these to the end users at the Centre in fulfillment of the indents received. Stores also checks and follows up on the installation of equipment, computer peripherals and furniture. An Asset Register is maintained and updated regularly to record asset numbers and ensure physical asset verification for audit inspection/ insurance purpose, etc. Equipment details are fed into the newly developed Equipment Program. In all, 823 major/ minor equipment, laptops, computers, printers, ACs, office equipment, furniture, etc were acquired during the period April to December 2015. Coding of items is done regularly. Physical stock verification was done by internal and external committees in September and March; physical verification of assets was also done. Online PSNs for non-stock material are placed for approval before the MMC every week. Non-stock material is received after thorough checking, follow up is done with the vendor, and a discrepancy register is maintained. A total of 8436 GRINs pertaining to complete/ partial supply of stock, non-stock, cash and imprest purchases, equipment and cylinders were generated during 2015. GRINs were immediately prepared on receipt of the material, inspected, listed and sent within a week to vendors to avoid hardship in payment matters. All GRINs were properly documented and filed for future reference. Other departmental activities included replying to audit queries, ensuring safety of the material in storage, return/ rejection of pharmacy items that are replaced/ written off/ transferred to TMH and *vice versa*.

Security Department

Security department maintains strict access control and regulation of men, material and vehicles on the ACTREC campus, as its prime responsibility is ensuring the safety and security of ACTREC property, personnel, students and patients, round the clock. The department also works towards enhancing and improving the periphery security measures and imparting on-the-job training to the Security staff, so as to combat any unforeseen situations/ threat perceptions. During the year, the department also worked on the proposed induction of an improved surveillance system on the perimeter, buildings/ facilities, vital areas and Main Gate, to prevent and detect objectionable activities in the campus as well as on the proposed induction/ revamping of improved fire alarm and detection system to tackle any kind of fire exigencies.

Ceremonial parades were performed by the Security Staff of ACTREC on the occasion of Republic Day and Independence Day. Proper liaison was maintained with the local Police, RTO, CIDCO, Municipal authorities, and other outside agencies. Security section also efficiently managed the Centre's transport activities, viz. efficient running of the staff shuttle bus services, vehicles for Doctors, patient transport facilities, condemnation of old vehicles, obtaining RTO permits/ licenses for newly procured vehicles, etc. Tendering for CCTV camera tenders was initiated in 2015 with the aim of achieving better security at ACTREC. A new Porta Cabin was purchased for security personnel.

Proper and co-ordinated efforts were delivered from the security point of view during the following major events - UGC NAAC visit in April 2015, and the TMC Governing Council meeting at ACTREC in August 2015. Vigilance Awareness Week was observed at ACTREC between 26th and 31st October 2015. Shri Prabhat Ranjan, IPS, Commissioner of Police, Navi Mumbai, was the Chief Guest at the function organized on the first day of Vigilance Week.

Swachh Bharat Abhiyaan 2015

Information Technology

Mr. Prasad Kanvinde
IT Co-ordinator

Officers
Mr. Padmakar Nagle
Mr. M. Sriram
Mr. Anand Jadhav

In fulfillment of its mandate, IT department provides computational facility, infrastructure and support for information access, processing, printing, archiving and dissemination. ACTREC has a campus wide 1 Gbps LAN with copper/ fiber cable, embellished with ~600 LAN nodes, eight servers and is equipped with a secured wifi network. The campus is connected to the Internet through a 50 Mbps NKN information gateway with a redundant 20 Mbps Reliance connectivity. The Centre has a live mail server that holds over 350 email accounts of staff and students. The ACTREC website is also hosted on an in-house server. 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 the sharing of patient information, PACS images, etc. Under the National Knowledge Network (NKN) project, the Centre has successfully established a seamless connectivity to the NKN grid at gigabit per second speed. Under ANUNET network, the Centre has established successful voice connectivity with TMH and other DAE units. The ANUNET network is also used to access UTKARSH a high end cluster of servers for bioinformatics data processing. The hospital information system (HIS) is maintained on an enterprise class state of the art IBM power6 - 520 server class machine that runs on 24x7 mode and provides information processing facility to various user departments.

A summation of the activities of IT department during 2015 is provided below.

Networking: Day-to-day support, upkeep, administration and maintenance of passive and active network components constitute vital networking activities. The Centre has scaled up its network backbone connectivity on 10 Gbps and accordingly upgraded various networking devices including firewall, switches and routers. The Centre has also acquired latest state of the art wireless network devices on new standards with 600 Mbps bandwidth with high availability configuration of wireless controller ensuring 99.9% uptime of the network. The department has extended gigabit wired network connectivity and wireless network to the newly constructed CCE building.

Hardware: The major activity during 2015 was procurement of around 75 PCs, 10 laptops, 25 multi function devices/ printers, Smart card system for patients, information/ application kiosks, etc, The department is in the process of finalizing latest Power 7 AS400 server for high availability purpose and is also exploring to have high end HPC server for computing needs. The department is also planning to upgrade its email server set up on the domino platform.

Software: Patient information processing at the Centre is essentially online, multi-location and round-the-clock. In 2015, updates for PABR, DIS, RIS, ROIS, OT, Accounts, Pharmacy, Purchase and Stores modules were made available, which enabled end users to make seamless transactions on the remote server of TMH for patient services. The newly developed assets management system working on the trial basis is now regularized and released to end users. Major changes/ updates were carried out in web based EMR in tandem with the paperless drive. The web based clinical information system module for Breast DMG was also made available to ACTREC clinicians. Seamless Smart card system has been established for patients across ACTREC-TMH.

Library

Dr. Satish Munnolli
Librarian

The ACTREC library proactively engages itself in acquiring and delivering scientific and clinical information services to its users to support research, quality patient care and on-going educational activities of the Centre. The library has subscribed to over 90 journals in the cancer domain and allied areas, to augment user needs. The library has a collection of 5868 books, 12595 bound volumes of journals, 573 theses, 3039 staff publications, 391 reports and 20 videos. Unlimited access to ScienceDirect under the DAE - Elsevier consortium covers over 2350 scientific, technical and medical journals. Clinical Key and UpToDate - two clinical resources activated through the cancer grid of TMC cover clinical information needs such as clinical trials, drug monographs, guidelines, patient education material, multimedia, etc. Subscriptions to many print journals have been converted to online versions to provide seamless access to online sources. The library home page facilitates quick access to the entire library collection through links and search options on a single platform. Bibliographic management software EndNote X7 has been updated and access to users extended till December 2015. MedicineComplete, MIT CogNET, Wiley Online Library and BioOne are a few online sources enabled on trial basis during the reporting year. The library continued to maintain the staff publications record and circulate weekly publications of the institute through 'Science Sparks @ ACTREC'. In-anticipation and on demand services such as publication statistics, citations to papers, h-index, impact factor, authenticity of journals, bibliographic services were provided throughout the year. The library also provided 990 articles against 1190 requests (83% success rate) during 2015.

The ACTREC library also gives due attention to upgradation of its equipment and infrastructure. To accommodate the new software - KOHA (Library Management System) and DSpace (Institutional Repository), the library has upgraded its server with Intel R Core i7 processor with an enhanced capacity of 8 GB RAM and 1 TB memory space on the Ubantu platform. Data migration and validation of the data on the system has been completed, and soon the new software would be up on the new server. Visualizing the increased digital content and to accommodate future needs, CD Mirror image server (NAS Server 12600U) has been upgraded to Intel Xeon processor with 16 GB RAM and 48 TB hard disc space. For optimum utilization of the storage device, the library server has been strategically placed in the IT department to accommodate data of other departments too on the same server. To enhance user experience, library internet connected nodes and staff PCs have been upgraded to 4th generation i7 Intel R core processors with 916 GB hard disc space and 19" screen Lenovo machines. Remote access system - EzProxy has been revamped with more features and would be up shortly.

Photography

Mr. SM Sawant
Officer-in-Charge

The Photography section supports scientists, clinicians and students of the Centre in photo-recording their experimental results including gels, animal experiments, patients, etc, and in preparing posters/ slide presentations using specialized software. The facility also undertakes design and printing of announcements, brochures, banners, posters, abstract books, program schedules, workshop protocols, letterheads, certificates, badges, invitation cards and envelopes for conferences, meetings and workshops organized at ACTREC, using advanced computing/ desktop publishing equipment and software. The facility also takes photographs of the campus, staff members, infrastructure and events, carefully archives the images and provides them for use in the Centre's print publications, website, and slide presentations. The facility also provides services of artwork and drawings, document scans, and B&W/ colour laser prints to in-house users. The facility also prints identity cards on the data card printer for Administration and Security. The facility also looks after presentation equipment housed in all the meeting venues, and assists users during their presentations. During the year 2015, this facility provided support for 25 events held at ACTREC, which included 17 national and five international meetings.

Science Communication and Professional Education (SCOPE) Cell

Dr. Aparna Bagwe
Officer-in-Charge

SCOPE Cell, set up in 2008, has been mandated to oversee two vital programs of the Centre, namely, science communication and professional education.

Science Communication: The OIC of the Cell responsibly handled editing and compilation of ACTREC's 2014 annual report, other reports to governmental and other agencies, abstract books for two international conferences, and editing of three manuscripts. The Cell handled maintenance and updates of PI webpages, conference/ workshop webpages, and routine uploads of tenders/ advertisements on to the Centre's website. Other responsibilities included close liaison with the core infrastructure support groups of the Centre towards arrangements for major conferences and meetings at ACTREC, as well as venue bookings and dissemination of information about lectures, seminars, conferences and meetings through emails/ printed circulars supported by the Steno Pool. The Cell also facilitated conduct of the Centre's Cancer Awareness Programs.

Professional Education: The Cell handled the intake of JRF2015 doctoral students, including drafting of the advertisement and call for projects, pre-screening applications (948 applications against 22 projects), conduct of written entrance exam and interviews, up to JRF selection. The Cell also oversaw the year long academic coursework for new JRFs, including preparation of schedule, orientation, lab visits, elective choices, core course and elective lectures and exams, DC formation, correcting papers, collating marks and preparing transcripts. The Cell responsibly provided data support for the NAAC visit to examine HBNI's PhD program at ACTREC. In support of the Centre's Training program, the Cell handled intake and follow up of 307 trainees allocated to senior faculty of the Centre in 2015. The OIC delivered lectures on 'Laboratory Safety at ACTREC' to new trainees. The Cell provided logistic support for five educational visits from schools and institutions, coordinated ACTREC's participation in the 7th Science Expo at Nehru Centre, Mumbai from 4th to 7th February 2015, and conduct of the Centre's Open Day on 3rd and 4th December 2015 in which 34 academic/ research institutions from Mumbai and Navi Mumbai participated.

Core Committees in ACTREC

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.

Chairperson	Dr. SV Chiplunkar, Director, ACTREC
Members	Dr. HKV Narayan, Dy. Director, ACTREC
	Dr. Sudeep Gupta, Dy. Director, CRC-ACTREC
	Dr. Rajiv Sarin, SO 'H'
	Dr. Neelam Shirsat, SO 'G'

Basic Sciences Research Group (BSRG)

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.

Chairperson	Dr. SV Chiplunkar, Director, ACTREC
Co-Chairperson	Dr. Sudeep Gupta, Dy Director, CRC - ACTREC
Member Secretary	Dr. Tanuja Teni
Members	All Principal Investigators & Co-Investigators
	In-Charges of Facilities in CRI

Institutional Animal Ethics Committee (IAEC)

IAEC reviews the maintenance of the ACTREC laboratory animal facility as well as animal study proposals, and also advises the investigators to ensure optimal use of the animals as per the guidelines laid down by the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Ministry of Environment, Forests and Climate Change, Govt. of India. As per guidelines, both CPCSEA registration and IAEC is to be renewed and reconstituted every three years, and accordingly the IAEC of ACTREC has been reconstituted in 2015. The Laboratory Animal Facility of ACTREC itself is registered with the CPCSEA for breeding and conducting experiments on small laboratory animals, vide registration no. 65/GO/ReBi/S/1999/CPCSEA.

Chairperson	Dr. SV Chiplunkar, Director, ACTREC
Member Secretary	Dr. Arvind Ingle
Members	Dr. Sorab Dalal
	Dr. Sanjay Gupta
	Dr. Rahul Thorat
	Dr. Haladhar Dev Sarma Main Nominee (CPCSEA)
	Dr. Vikas Karande Link Nominee (CPCSEA)
	Dr. Madhumanjiri Gatne Scientist from Outside the Institute
	Mr. Dharmesh Solanki Socially Aware Nominee

Institutional Biosafety Committee (IBSC)

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.

Chairperson	Dr. SV Chiplunkar, Director, ACTREC
Member Secretary	Dr. Manoj Mahimkar, Basic Scientist
Members	Dr. Sanjay Gupta, Internal Expert
	Dr. Pritha Ray, Internal Expert
	Dr. Sanjeev Waghmare, Internal Expert
	Dr. Shashank Ojha, Biosafety Officer
	Dr. Shubha Tole, TIFR - DBT Nominee
	Dr. Geetanjali Sachdeva, NIRRH - Outside Expert

Institutional Radiation Safety Committee (IRSC)

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.

Chairperson	Dr. Shubhada Chiplunkar, Director, ACTREC
Member Secretary	Dr. Pradip Chaudhari, Radiation Safety Officer, CRI
Members	Dr. DD Deshpande, Head, Medical Physics Div., TMH
	Dr. JP Agarwal Dept of Radiation Oncology, TMH
	Dr. SL Juvekar, Dept. of Radiodiagnosis, ACTREC
	Dr. Shashank Ojha, Dept of Transfusion Medicine, ACTREC
	Ms. Reena Devi, CRC, ACTREC
	Ms. Siji Nojin Paul, CRC, ACTREC

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.

Convenor	Dr. Neelam Shirsat
Members	Dr. Manoj Mahimkar
	Dr. Sanjay Gupta
	Dr. Kakoli Bose
	Dr. C. Muralikrishna
	Dr. Pritha Ray
	Dr. Sanjeev Waghmare

Internal Complaints Committee (ICC)

In pursuance of section 4 read with its applicable sub-clauses of the aforesaid act, the ICC at TMC-ACTREC is empowered to enquire into complaints related to the sexual harassment of women at the workplace.

Chairperson	Dr. Tanuja Teni
Members	Mrs. Meera Achrekar Prof. & Asst. Nursing Supdt, ACTREC
	Mrs. Bhagyashree Tillu Asst. Med. Social Worker, ACTREC
	Mr. Mushtaq Shaikh Admin Officer – II, ACTREC
	Mrs. Usha Banerji CEO, St. Jude India Childcare Centre, Mumbai - Outside expert

Anti-Ragging Committee

In May 2014, an Anti-Ragging Committee was constituted at ACTREC in terms of the decision taken by the Government of India, duly notified through the Homi Bhabha National Institute (HBNI) under whose affiliation the Centre conducts its Ph.D. program in Life Sciences. This committee looks into the matter of complaints of ragging at ACTREC.

Chairperson	Dr. Sanjay Gupta
Members	Dr. Prasanna Venkatraman
	Dr. Rukmini Govekar
	Dr. Sanjeev Waghmare
Student Members	Ms. Abira Ganguly
	Mr. Raja Reddy Kuppili

Grievance Committees

Grievance Committees have been constituted to redress the grievances of all regular staff as well as of temporary staff, registrars and students working at ACTREC, TMC.

Regular Staff

Dr. Ashok Varma, PI & Sc. Officer 'F'

Dr. Sorab Dalal, PI & Sc. Officer 'G'

Mr. MY Shaikh, Admin Officer –II

Dr. AD Ingle, OIC, LAF & Sc. Officer 'F'
(Representative of SC/ST)

Dr. Rukmini Govekar, PI & Sc. Officer 'F'

Dr. Vikram Gota, Assoc. Prof. & Clin. Pharmacol 'F'

Mr. SG Dakave, Technician 'G' & Representative,TMH Workers Union, ACTREC

Temporary Staff, Students, Registrars, etc

Dr. PC Bhat, Asst. Medical Superintendent

Dr. Sanjay Gupta, PI & Sc. Officer 'F'

Mr. Anand Jadhav, Sc. Officer 'D', IT Dept
(Representative of SC/ST)

Mrs. Shilpa Sardesai, Asst. Admin. Officer (Est)

Mr. JK Rane, Technician 'G' & Representative,
TMH Workers Union, ACTREC

Mr. Md. Moquitul Haque, Student (SRF), Sarin Lab, CRI

Ms. Arunabha Bose, Student (SRF), Sorab Lab, CRI

Students' Council of ACTREC (SCA)

In July 2013, the Centre constituted SCA for the PhD research scholars of ACTREC enrolled under HBNI. SCA organizes various student welfare and recreation (academic, sports and cultural) activities, and also acts as a 'liaison' between students and ACTREC faculty/ management for academic and non-academic issues - including grievances. The core committee consists of five members with no hierarchy. The committee includes one student from each batch up to the 5th year, which includes at least one hostel resident and one female candidate. Core committee members are selected on the basis of nominations from each batch and membership is for one year. SCA meetings are held twice a month, and whenever needed.

Academics at ACTREC

Academics are given a lot of emphasis at ACTREC. The formal academic programs of the Centre encompass an active doctoral program, short term training and observership, CMEs and advanced training courses, educational visits, Open Day, National Research Scholars meet, and outreach programs to create cancer awareness. The Principal Investigators' laboratories and clinical departments meet regularly for journal club, data/ clinical presentation. Programs of the Centre are enriched academically through the seminars delivered by visiting national and international scientists and clinicians of repute.

JRF 2015 batch

Doctoral Program

The Academic and Training Programs Office, chaired by Dr. SV Chiplunkar, oversees the Ph.D. (Life Sciences) program at ACTREC. This program is affiliated to the Homi Bhabha National Institute (HBNI), a deemed university established in 2006 under the aegis of the University Grants Commission and which encompasses all the constituent units of the Department of Atomic Energy, Government of India. Intake of Junior Research Fellows and the year-long formal academic coursework is handled by the SCOPE Cell; registration and further matters are handled by ACTREC Administration and Programs Office. During 2015, 123 graduate students were enrolled into the Centre's Ph.D. program; these included the new batch of 22 JRF 2015 students. During the year, 13 students completed work towards their doctoral dissertation and were awarded the Ph.D. degree. The details are given below.

Award of the Ph.D. Degree in Life Sciences (HBNI)

Mr. Akhil Kumar Agarwal
(Guide: Dr. Rajiv Kalraiya)

Mechanisms involved in regulation of processes critical for cancer metastasis by β1,6 branched N-oligosaccharides.

Mr. Manohar Dange
(Guide: Dr. Rajiv Kalraiya)

Role of β1,6 branched N-oligosaccharides and associated terminal substitutions on tumour cells and their possible receptors on lungs in organ specific metastasis.

Mr. Biharilal Soni
(Guide: Dr. Milind Vaidya)

Global protein profiling during rat lingual carcinogenesis and validation of differentiator proteins in human tongue.

Mr. Nikhil Sangith
(Guide: Dr. Prasanna Venkatraman)
Elucidating the structural basis of substrate recognition by the proteasomes: a global approach.

Ms. Nitu Singh
(Guide: Dr. Kakoli Bose)

Structural and functional characterization of proapoptotic proteins: human papillomavirus E2 and serine protease HtrA2.

Ms. Madhura Bhave
(Guide: Dr. Dibyendu Bhattacharyya)
Role of homotypic membrane fusions in the size control mechanism of Golgi apparatus.

Mr. Vikrant
(Guide: Dr. Ashok Varma)

Role of RAP80-ABRAXAS-BRCA1 complex in the DNA damage repair: structural investigations to reveal the molecular complexity.

Ms. Monica Tyagi
(Guide: Dr. Sanjay Gupta)
Transcriptional regulation of histone H2A variants in liver cancer.

Ms. Snehal Gaikwad
(Guide: Dr. Pritha Ray)
Monitoring the molecular dynamics of acquired chemoresistance in ovarian carcinoma by non-invasive molecular imaging.

Mr. Tanmoy Bhattacharjee
(Guide: Dr. Murali Chilakapati)
A study of breast cancer progression in rodent models using Raman spectroscopy.

Mr. Shafqat Ali Khan
(Guide: Dr. Sanjay Gupta)
Epigenetics in gastric cancer: analysis of histone modifications and histone modifying enzymes.

Ms. Mansa Gurjar
(Guide: Dr. Sorab Dalal)
The role of plakophilin3 in regulating cell adhesion, cell migration and epithelial mesenchymal transition (EMT).

Ms. Pooja Panwalkar
(Guide: Dr. Neelam Shirsat)
Pathogenesis of non-WNT, non-SHH type medulloblastoma.

Short Term and Summer Training Program

ACTREC conducts an active Short term and Summer Training program that accepts (a) graduate students seeking to work on their Master's dissertation; (b) individuals who have completed academic studies who wish to gain research experience; (c) staff or students of collaborators who wish to learn specific techniques; (d) undergraduate students seeking research exposure during the college's summer break; and (e) students or staff of academic/ research institutions or hospitals who pay short visits to observe techniques or departments. During 2015, a total of 307 trainees (140 for dissertation, 96 for experience, 15 on collaborative projects, 8 summer trainees and 48 observers) were assigned to scientists and clinicians of the Centre.

DBT Biotechnology/ Bioinformatics Training for Teachers & Research Scholars from the North-East and other regions of India

The Department of Biotechnology, Government of India, has granted recognition and provided funding to the Bioinformatics facility at ACTREC to serve as a Training Centre for the North East Region of India. The first training module focussed on 'Gene cloning, protein biochemistry, structural biology & bioinformatics' - batch one (29 June to 10 July 2015) was conducted for faculty & and batch two (13-24 July 2015) for research scholars. In all, 42 faculty and research scholars from these regions took part in the modules to learn modern research techniques. The program has provided a novel platform particularly for scientists of the NER region to discuss their projects and seek inter-institutional collaborations.

Advanced Training Course in Medical Laboratory Technology

This one year course, conducted jointly by the diagnostic labs of ACTREC from September 2015 onwards, is designed to provide theoretical knowledge and hands on training on state of the art analyzers with an emphasis on quality control. At the end of the course, the students should be able to work as technologists in accredited laboratories attached to hospitals or seek employment in small laboratories, and personally carry out advanced tests under the supervision of haematologists, biochemists, microbiologists or pathologists with effective quality control and provide reliable reports.

Science Expo 2015

ACTREC participated in this Expo under the banner of the Tata Memorial Centre. This expo that primarily targets school children is conducted by the Nehru Science Centre, and leading research institutions in Maharashtra participate in it with a view to highlight their work and draw bright young minds

DBT Biotechnology/ Bioinformatics Training for Teachers and Research Scholars from the North East and other regions of India. Dr. Anil Kakodkar, Chairman, TIFAC, was the Chief Guest.

towards a career in research. The Expo was held from 4th to 7th February 2015. Teams of volunteers from ACTREC manned the exhibit each day; on display were posters highlighting the research and clinical aspects of cancer, cartoons and animations about cancer, cell division, etc. A large number of school children, their teachers and/or parents visited the ACTREC exhibit and appreciated it.

Open Day

ACTREC's Open Day 2015 was conducted on the 3rd and 4th of December 2015. Around 480 students and 40 faculty from science, medical, and allied colleges/ institutions from Mumbai and Navi Mumbai participated in this much awaited event. Batches of twelve students and one faculty member from 10 colleges visited ACTREC in the morning/ afternoon session each day. The program included a poster session, introductory talk about ACTREC, and visits to ten demonstrating labs where varied aspects of cancer research/ diagnosis or treatment were highlighted. Positive feedback was obtained from all the colleges for this year's Open Day.

Educational Visits

ACTREC accepts educational visits from students of colleges and universities from across the country. Six educational visits to ACTREC took place during 2015: MSc Pharmaceutical Medicine students of Seth GS Medical College on 8th January; Atomic Energy Central School students of Uranium Corporation of India Ltd, Jadugada on 16th January; MSc Applied Microbiology students from Yeshwantrao Chavan Institute of Science, Satara on 20th January; MSc Molecular Biology students from Mysore University on 23rd February; MPharm Pharmacology students of Oriental College of Pharmacy, Navi Mumbai on 5th March; and participants of DAE's All India Essay Contest on 26th October 2015.

Cancer Awareness Programs

ACTREC has been conducting outreach programs for the general public and focused groups like school or college students, neighborhoods, parishes, etc in a bid to create awareness about cancer since 2012. During 2015, five CAP lecture series were conducted for special focus groups: 'Head and neck cancers' for traffic policemen of the Mahape Traffic Police Unit, Navi Mumbai on 14th January; 'Tobacco and cancer' for St. Joseph School students, Panvel on 18th February; 'Breast cancer' for staff and students of ACTREC on 9th March; 'Common cancers in women' for Bokadveera villagers on 23rd March; and 'Oral cancer' for Deepak Fertilizers and Petrochemicals employees, Taloja on 15th May 2015.

Scientific Meetings & Seminars

Conferences, Symposia & Workshops

4-7 February	Science Expo 2015 at Nehru Science Centre, Mumbai Coordinator: Dr. Aparna Bagwe, ACTREC
11-13 February	International Conference on 'Molecular pathways to therapeutics: paradigms and challenges in oncology' Organizers: Dr. Sorab Dalal, ACTREC & Carcinogenesis Foundation, USA
21 February	CME - '2nd Quality Conclave of Laboratory and Transfusion Services' Organizers: Dr. Preeti Chavan & Dr. Shashank Ojha, ACTREC
1-3 April	Workshop on 'Development of pre-clinical orthotopic tumor xenograft mouse model and *in vivo* imaging' Organizer: Dr. Neelam Shirsat, ACTREC & Indian Society of Neurooncology
23-24 April	DBT/ BTIS Workshop on 'Applications in Bioinformatics' Coordinator: Dr. Ashok Varma, ACTREC
29 June-10 July (Batch 1) & 13-24 July (Batch 2)	DBT Biotechnology/ Bioinformatics training for teachers and research scholars from the north-eastern region and other regions of India Coordinator : Dr. Ashok Varma, ACTREC
10 August	CME on 'Preclinical imaging and drug discovery' Coordinator: Dr. Pradip Chaudhari, ACTREC & Dr. Baljinder Singh, ICNM
11 September	ACTREC Monsoon Retreat Coordinator: Dr. Tanuja Teni, ACTREC
8-10 October	3rd ACTREC Symposium in Clinical Pharmacology - Workshop on 'Application of PK-PD modeling in clinical research' Organizer: Dr. Vikram Gota, ACTREC
14-16 October	International Symposium on 'Promotion of animal research, welfare and harmonization of laboratory animal science' and pre conference Workshop Organizers: Dr. Arvind Ingle & Dr. Pradip Chaudhari, ACTREC & Laboratory Animal Scientists' Association
16 October	One day Workshop on 'Essence of critical care nursing: a skill based approach' Organizer: Mrs. Meera Achrekar, ACTREC
27-28 October	16th Indo-US Cytometry Workshop and 8th Annual Meeting of the Cytometry Society Chairpersons: Prof. S.V. Chiplunkar, ACTREC & Prof. Awtar Krishan, USA
November 2015 onwards	One year Advanced Training Course in Medical Laboratory Technology Jt. Organizers: Dr. Preeti Chavan & Dr. Vivek Bhat, ACTREC
5 November	One day Hands on Workshop on 'Genetic counselling and genetic testing in cancer' as a part of the ISMPO-ISO 2015 Conference Organizer: Dr. Rajiv Sarin, ACTREC

19-20 November	Indo French Seminar on 'Application of Structural Biology in Translational Research and Structure Guided Drug Design' Organizers: Dr. Ashok Varma, ACTREC & Dr. François Ferron, AFMB- France
1 December	ICGC Conference Mini Symposium at ACTREC Coordinator: Dr. Rajiv Sarin, ACTREC
2-4 December	11th International Cancer Genome Consortium (ICGC) Scientific Workshop Organizers: Dr. Rajiv Sarin, ACTREC & ICGC
3-4 December	Open Day 2015 Coordinator: Dr. Aparna Bagwe, ACTREC
4 December	IAEA TMC Training Course on IMRT Coordinator: Dr. Tejpal Gupta, ACTREC
17-18 December	11th National Research Scholars Meet in Life Sciences 2015 Organizers: Ph.D. students of ACTREC
18 December	Certification program on 'Pressure area management' Coordinator: Dr. Meera Achrekar, ACTREC

Guest Seminars

8 January	Neuronal intermediate filaments and neurodegeneration Dr. Harish C. Pant, National Institute of Neurological Disorders & Stroke, NIH, Bethesda, USA
9 February	Development of genetically modified T cells to treat cancer Dr. Swati Pendharkar, Memorial Sloan-Kettering Cancer Center, New York, USA
24 February	Mouse models of lung adenocarcinoma: steps towards personalized treatment of cancer Dr. Narayana Yeddula, The Salk Institute for Biological Studies, La Jolla, USA
26 February	Highly adaptable breast cancer cells as a functional model for testing anticancer agents Dr. Balraj Singh, MD Anderson Cancer Center, Houston, USA
4 March	Tumour reverse cholesterol transport drives treatment resistance in prostate cancer Dr. Rachana Patel, Cancer Research UK – Beatson Institute, Glasgow, UK.
12 March	Osteosarcoma: biology and laboratory approaches to identifying new therapy Dr. Richard Gorlick, The Albert Einstein College of Medicine of Yeshiva University; The Children's Hospital at Montefiore, Bronx, New York, USA
16 March	Peptide aptamers: precision tools for dissecting signalling pathways and for early development of novel therapeutic compounds Dr. Brian B. Rudkin, Research Director, CNRS; Laboratoire de Biologie Moleculaire de la Cellule, Lyon, France
1 April	Cell polarity and organoids: new pathways and models for controlling cancer Dr. Senthil Muthuswamy, UHN Princess Margaret Cancer Centre, Toronto, Canada

19 May	Sensitive detection of somatic mutations in class I HLA genes reveals enrichment for functional events in cancer Dr. Sachet Shukla, Dana-Farber Cancer Institute, Boston, USA
8 July	Education for translational drug development – molecules to medicine model Dr. Warwick Tong, CEO, Therapeutics CRC [CTx], Melbourne, Australia
17 July	To start or not to start: understanding how the songbird brain initiates learned movement sequences Dr. Raghav Rajan, Ramalingaswami Fellow, Division of Biology, IISER, Pune
20 July	The role of chromatin remodeling and homologous recombination mediated DNA repair in prevention of replication stress Dr. Sonam Mehrotra, Center of Excellence in Epigenetics, IISER, Pune
31 July	Histone interacting proteins in the regulation of chromatin dynamics and transcription regulation: implications in disease and differentiation Prof. Tapas K. Kundu, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore
15 September	Mechanistic role of cytochromes P4501A1 and 1A2 in polycyclic aromatic hydrocarbon (PAH) – mediated pulmonary carcinogenesis in mice: implications for lung cancer in humans Dr. Bhagavatula Moorthy, Baylor College of Medicine, Houston, USA
18 September	ACTREC Biology Seminar: Lessons from heterogeneity in the immune system Dr. Satyajit Rath, National Institute of Immunology, New Delhi
7 October	Regulated intra-membrane proteolysis – role in cytokine and growth factor signaling Dr. Justin V. McCarthy, University College Cork, Ireland
13 October	Proteolytic regulatory mechanisms of epigenetic modulator polycomb group (PcG) proteins Dr. Anagh Sahasrabuddhe, Pt. Ravishankar Shukla University, Raipur
20 October	High throughput data analytics method to drive precision medicine Dr. Ken Buetow, School of Life Sciences, Arizona State University, USA
27 October	Special Lecture on 'Basics of Flow Cytometry': 16th Indo-US Cytometry Workshop Dr. H. Krishnamurthy, National Centre for Biological Sciences, Bengaluru
28 October	Nanomedicine for targeted tumor therapy Dr. Ashish Ranjan, Center for Veterinary and Health Sciences, Oklahoma State University, Stillwater, USA
2 November	Biological and biomedical applications using laser sources and mid-IR conventional and Synchrotron light Prof. G.D. Sockalingum, Universite de Reims Champagne-Ardenne, Reims, France
4 November	Targeting inflammatory pathways by agents designed by mother nature for prevention and treatment of cancer Dr. Bharat B. Aggarwal, The University of Texas M.D. Anderson Cancer Center, Houston, USA
18 November	Biomakers: differences between prognostic and predictive biomarkers Dr. Gary M. Clark, Array BioPharma Inc., Boulder, USA

3 December	Three stories about the cancer genome Dr. Rameen Beroukhim, Harvard Medical School; Board Institute of Harvard and MIT; Dana Farber Cancer Institute, Boston, USA
11 December	The HPP missing proteins Prof. Mark S. Baker, President, Human Proteome Organization; Head, Cancer Biology & Human Proteomics Research Group, *Macquarie* University, Sydney, Australia
15 December	Regulation of Hox genes and body axis formation in animals Prof. Rakesh Mishra, Centre for Cellular and Molecular Biology, Hyderabad

General Seminars

2 January	Creating a harassment free workplace Ms. Poornima Batish, HR leadership professional, Pune
13 March	The journey of womanhood (Lecture in Marathi organized by the ACTREC Employees Co-op. Credit Society Ltd. on International Women's Day) Mrs. Alaknanda Padhye, Activist, Mumbai

Staff Achievements

Dr. Ambulkar Reshma

- Award: ICU information booklet selected as 'Ideal patient information booklet' by Indian Society of Critical Care Medicine.
- Secretary, Mumbai branch of Indian Society of Critical Care Medicine: 2014-15.

Dr. Achrekar Meera

- External Secretary: Asia Oncology Nursing Society: 2015-2017.
- Organizer: One day Workshop on 'Essence of critical care nursing: a skill based approach', ACTREC, Navi Mumbai: October 16, 2015.
- Coordinator: Certification program on 'Pressure area management', ACTREC, Navi Mumbai: December 18, 2015.

Dr. Bagwe Aparna

- Coordinator: Science Expo 2015, Nehru Science Centre, Mumbai: February 4-7, 2015.
- Coordinator: Open Day 2015, ACTREC, Navi Mumbai: December 3-4, 2015.

Dr. Bhat Vivek

- Jt. Organizer: One year Advanced Training Course in Medical Laboratory Technology, ACTREC, Navi Mumbai: November 2015 onwards.

Dr. Chaudhari Pradip

- Coordinator: CME on 'Preclinical imaging and drug discovery', ACTREC, Navi Mumbai: August 10, 2015.
- Jt. Organizer: International Symposium on 'Promotion of animal research, welfare and harmonization of laboratory animal science' and pre conference Workshop, ACTREC, Navi Mumbai: October 14-16, 2015.

Dr. Chavan Preeti

- Jt. Organizer: CME - '2nd Quality Conclave of Laboratory and Transfusion Services', ACTREC, Navi Mumbai: February 21, 2015.
- Jt. Organizer: One year Advanced Training Course in Medical Laboratory Technology, ACTREC, Navi Mumbai: November 2015 onwards.

Dr. Chiplunkar SV

- Chairperson, Ad-hoc Board of Studies in Applied Biology, University of Mumbai, Mumbai 2015-18.
- Chairperson, Institutional Committee for Stem Cell Research, National Institute for Research in Reproductive Health, Mumbai, 2015.
- Chairperson, Scientific Advisory Committee and Member, Research & Recognition Committee, MGM Institute of Health Sciences, Navi Mumbai.
- Chairperson: International Symposium on 'Molecular pathways to therapeutics: paradigms and challenges in oncology' (Carcinogenesis Meeting 2015), ACTREC, Navi Mumbai: February 11-13, 2015.
- Chairperson: Laboratory Animal Scientist's Association (LASA) Conference on 'Promotion of animal research, welfare and harmonization of laboratory animal sciences', ACTREC, Navi Mumbai: October 15-16, 2015.
- Chairperson: 16th Indo US Cytometry Workshop on 'Flow cytometry: translating laboratory discoveries to clinics', ACTREC, Navi Mumbai: October 27-28, 2015.
- Member: International Union of Immunological Societies (IUIS) Education Committee.

Dr. Dalal Sorab

- DAE-SRC Outstanding Investigator Award 2015.
- Organizing Secretary: International Conference on 'Molecular pathways to therapeutics: paradigms and challenges in oncology', ACTREC, Navi Mumbai: February 11-13, 2015.

Mr. Dar Asif Amin (Ph.D. student)

- Dr. GP Talwar Young Scientist Award for the year 2015: 'Cross talk of myeloid derived suppressor cells and regulatory T cells in oral cancer' (Oral presentation), 42nd annual conference of the Indian Immunology Society–Immunocon-2015, Rajendra Memorial Research Institute of Medical Sciences, Patna: October 9-11, 2015.

Dr. De Abhijit

- Patent Application: 'Photo-disintegrable, near-infrared responsive gold coated poly-(lactic-Co-glycolic acid) nanostructures and a process for its preparation'; Inventors: R. Srivastava, D.S. Chauhan, R. Poojari, A.K. Rengan (IIT-B); A. De, A. Bukhari (ACTREC); A. Shanavas (INST): Indian Patent No. 4082/MUM/2015.

Ms. Dimri Shalini (Ph.D. student)

- Best Poster Award: 'Monitoring Stat3 Dimerization Dynamics in Live Cells Using Novel BRET Platform', National Research Scholars meet 2015, ACTREC, Navi Mumbai: 17-18 December, 2015.

Dr. Dutta Shruti (Research Associate)

- Awarded DST Woman Scientist project investigator: 2015-18.

Dr. Gota Vikram

- Technology Transfer: Chlorophyllin, a drug being developed in collaboration with BARC as a radioprotective agent, was successfully transferred to IDRS labs Pvt. Ltd., Bangalore, under the 'Incubation Technology' scheme of BARC for formulation development and subsequent clinical trials: July 13, 2015.
- Group Award: DAE Excellence in Science, Engineering and Technology Group Achievement Award 2014 for 'Preparation of indigenous ^{131}I-Rituximab for use as radiopharmaceuticals in cancer patients', awarded at BARC Founder's Day, October 30, 2015.
- Organizer: 3rd ACTREC Symposium in Clinical Pharmacology - Workshop on 'Application of PK-PD modeling in clinical research', ACTREC, Navi Mumbai: October 8-10, 2015.

Dr. Gupta Tejpal

- Jt. Secretary: Indian Society of Neuro-Oncology (ISNO): 2015 onwards.
- Coordinator: IAEA TMC Training Course on IMRT, ACTREC, Navi Mumbai: December 4, 2015.

Ms. Hudlikar Rasika (Ph.D. student)

- Award for Best Oral Presentation: 'Evaluation of chemopreventive efficacy of Polymeric Black tea Polyphenols (PBPs) in carcinogens induced A/J mice model during sequential lung carcinogenesis' (Oral presentation) International Conference on 'Promotion of Animal Research, Welfare and Harmonization of Laboratory Animal Science', ACTREC, Navi Mumbai: October 15-16, 2015.

Dr. Ingle Arvind

- Dr. S Damodaran Memorial Award 2014 for Best Case Report on Oncology: 'Immunohistochemical study of a rare case of bovine ameloblastoma', 32nd Annual Conference of Indian Association of Veterinary Pathologists, December 2015.
- President: Laboratory Animal Scientists Association (LASA) of India, 2015.
- Jt. Organizer: International Symposium on 'Promotion of animal research, welfare and harmonization of laboratory animal science' and pre conference Workshop, ACTREC, Navi Mumbai: October 14-16, 2015.

Ms. Khan Nikhat (Ph.D. student)

- Best Poster Award: 'A novel recurrent Lynch syndrome associated Indian founder mutation in Mismatch Repair (MMR) gene MLH1', International Symposium on Genomics in Health and Disease & 40th Annual Conference of Indian Society of Human Genetics, Mumbai: January 28-30 2015.

Dr. Mittra Indraneel

- Award of U.S. Patent: Method for in-vivo binding of chromatin fragments; Inventors: Mittra I, Ramesan RM, Sharma CP, Bhuvaneshwar GS, Pal K. Application No: 13/575,756, 4 August 2015.

Dr. Moiyadi Aliasgar

- DAE-SRC Outstanding Researcher Award, 2015.
- The Indian Society of Neuro-oncology President's Award for the Best Clinical Researcher, 2015.

Ms. Munde Komal & Ms. Kubal Suman

- First Prize: Effect of pressure ulcer prevention strategies in a tertiary care cancer hospital (Poster presentation) 17th National Nursing Conference - Exploring and expanding the new dimensions, AIIMS, New Delhi: November 5-7, 2015.

Dr. Munshi Manasi (MD Student)

- Best Paper Session I Prize: '3-dimensional conformal adjuvant whole breast radiotherapy delivered with static angle tomotherapy (TomoDirectTM): a prospective feasibility study', KAMA Chapter AROI 2015, Mangalore: August 15-16, 2015.

Dr. Ojha Shashank

- Jt. Organizer: CME - '2nd Quality Conclave of Laboratory and Transfusion Services', ACTREC, Navi Mumbai: February 21, 2015.

Dr. Patkar Nikhil

- Wellcome DBT India Alliance Intermediate Fellowship for 2015.

Mr. Pawar Sagar

- Shri Rajnikant Baxi Award for Best Poster Presentation: 'High risk HPV transcripts versus DNA: analysis of specificity in triage setting in primary cervical cancer screening', 34th Annual Convention of IACR, Jaipur: February 19-21, 2015.

Mr. Pillai GS Babu

- Best Poster Award: Incidence of syndrome of inappropriate anti-diuretic hormone secretion in hematolymphoid cancer, Fifth CME for Medical Laboratory Technologists, TMH, Mumbai: December 19-20, 2015.

Dr. Ray Pritha

- Treasurer: All India Society for Cell Biology. 2015-17.

Mr. Salunkhe Sameer (Ph.D. student)

- Dr. JC Patel Best Paper Award for the year 2014-15: Hyperphosphorylation of ATM kinase is responsible for the early onset and acquired drug resistance in leukemia (oral presentation), 38th Annual Conference of the Mumbai Hematology Group, Hotel ITC Grand, Mumbai: March 14-15, 2015.

Ms. Sam Shyla

- Second Prize: Compliance to ventilator associated pneumonia (VAP) prevention bundle in an intensive care unit – a prospective study (Oral presentation) 17th National Nursing Conference - Exploring and expanding the new dimensions, AIIMS, New Delhi: November 5-7, 2015.

Dr. Sarin Rajiv

- Organizer: One-day hands-on ISMPO Workshop on Genetic Counselling and Genetic Testing, ACTREC, Navi Mumbai: November 5, 2015.
- Organizer: 11th International Cancer Genome Consortium Scientific workshop, Mumbai: December 2-4, 2015

Dr. Sastri Goda Jayant

- Young Investigators Award: 77th annual meeting of the Japanese Society of Hematology, Japan: October 17-20, 2015.

Dr. Sastri Supriya

- Secretary: ISNO, Mumbai: 2015 onwards.
- British Journal of Radiology Young Investigator Award for best publication age<40: November 5, 2015.

Dr. Shirsat Neelam

- Organizer: Hands-on workshop on 'Development of pre-clinical orthotopic xenograft mouse model and *in vivo* imaging', ACTREC, Navi Mumbai: April 1-3, 2015.

Dr. Teni Tanuja

- Co-ordinator: ACTREC Monsoon Retreat, ACTREC, Navi Mumbai: September 11, 2015.

Dr. Vadgaonkar Rohit (MD Student)

- Best Paper Session III Prize: 'Multicatheter interstitial breast brachytherapy: an audit of implant quality based on standard dosimetric indices', IBSCON 2015, Kolkata: August 28-30, 2015.

Dr. Varma Ashok

- Co-ordinator: Workshop on 'Application in Bioinformatics', ACTREC, Navi Mumbai: April 23-24, 2015.
- Co-ordinator: Training program for North-East region faculty/research scholars, ACTREC, Navi Mumbai: June 29–July 10, 2015 & July 13–July 24, 2015.
- Organizer: Indo French Seminar on 'Application of structural biology in translational research and structure guided drug-design', ACTREC, Navi Mumbai: November 19-20, 2015.

Ms. Venkatraman Janani (Trainee)

- Best Master's Thesis Award: 'Molecular biology probes for monitoring functioning of PSMD9 in real-time', Nagpur University, 2015.

Ms. Vishal Sonali (Ph.D. student)

- Prof. BR Seshachar Memorial Prize for the best paper presentation by young scientist in poster session: Poster entitled 'Plakoglobin localization to the cell border rescues desmosome assembly in cells lacking 14-3-3γ, XXXIX All India Cell Biology Conference, Indian Institute of Science Education and Research, Thiruvananthapuram: December 6-8, 2015.

Homi Bhabha Cancer Hospital, Sangrur (Satellite Cancer Centre At Sangrur)

The cancer facility at Sangrur named as Homi Bhabha Cancer Hospital, Sangrur has been established by TMC. The scope of this hospital is to set up a Cancer Care facility in District Civil Hospital, Sangrur to cater to the population of the Sangrur and adjacent districts. This facility is joint project of Punjab Government and Central Government under directions from government of Punjab and DAE. The construction activities taken care by Punjab Government whereas equipment, manpower and other operations by Central Government. This facility will function as an outreach centre for the main hospital HBCH & RC being established at Mullanpur Village, Mohali District.

This Centre is 25 bedded and extending the service for Radiology, Radiotherapy, Chemotherapy, Laboratory including immunohistochemistry (IHC) and Surgical. The laboratory facility is well equipped with automated analysers for Bio, Haematology, tumour marker, liquid based cytology, Histopathology & Immunohistochemistry (IHC). The radiology department is having CT Simulator, Digital X-Ray, High end ultrasound, digital mammography.

Services

Since its initiation a total of 2400 new patients including the patients from other states were registered.

Table 1: Details of patients registered during the year

No. of new patients registered	1745
Major surgeries performed	155
Minor surgeries performed	160
No. of patients treated with External Radiotherapy	294
No. of patients treated with Brachytherapy	120

Table 2: Adhoc manpower

Categories	Numbers
Medical	10
Technical	16
Nurses	18
Support staff	04
Contractual	17

The Mukh Mantri Punjab Cancer Raahat Kosh Scheme (MMPCKRKS) has been extended by Govt of Punjab to support cancer patients from Punjab.

Education

The hospital initiated short term training and degree courses, namely, the Six month Training course for clinical laboratory services, and B.Sc. Radiotherapy Technology and B.Sc. Laboratory Technology degree courses was initiated affiliated to Baba Farid University of Health Sciences. The hospital also organized a one day CPR course on March 13, 2016.

Homi Bhabha Cancer Hosptial & Research Centre, Punjab

(A unit of Tata Memorial Centre)

Tata Memorial Centre has initiated construction and establishement of the Homi Bhabha Cancer Hospital & Research Centre at Mullanpur Village, Mohali District Punjab. This project has been undertaken as per the directives from the Office of Prime Minister, India & Department of Atomic Energy. The hospital is situated on a 50 acre land provided free of cost by Government of Punjab and the land is registered in the name of President of India.

All the necessary approvals and statutory clearances from Ministries like - Finance, Health and Family Welfare, Environment & Ministry of Forest and, Planning Commission have been obtained in 2013.

This hospital will serve as nodal centre for cancer treatment network with the objectvie of providing comprehensive cancer care envisioned for northern part of country. The mandate of the hospital is to provide treatment, training, education and research in cancer similar to Tata Memorial Centre, Mumbai.

The hospital at Sangrur will function as satellite facility for this centre. In the first phase, it proposed to set up a 100-bedded hospital, which will offer a complete range of services to cancer patients. After commissioning of the Hospital, higher education in Cancer will be initiated with the approval of Medical Council of India (MCI).

The hospital will be constructed on EPC (Engineering, Procurement and Construction) module. M/s. DDF Consultants Private Limited has been appointed as EPC Consultant through the tendering process.

The following milestones are accomplished:

- The design and conceptual plan / master plans were prepared by EPC Consultant in consultation with user department.
- The appointment of EPC Developer through open tender by EPC Consultant is in process.
- Consultant for getting approval of Environment clearance is appointed.
- The Master plan and Conceptual plans as per Zoning Compliance are submitted to GMADA by EPC Consultant for getting approval.
- The compound wall construction by GMADA (Greater Mohali Area Development Authority) is nearing completion. The tree plantation around the boundary wall by Forest Department of Punjab has been completed.

Homi Bhabha Cancer Hospital and Research Centre, Visakhapatnam

Tata Memorial Centre at the behest of state of Andhra Pradesh took up a 77.12 acre land near Aganampudi for the establishment of Homi Bhabha Cancer Hospital and Research Centre (HBCH&RC), with a mandate for Service, Education and Research at Visakhapatnam, on similar lines of Tata Memorial Centre, Mumbai. HBCH & RC is a 100 bedded cancer hospital at Visakhapatnam.

The 1st phase construction began from August 2015 and the expected date of completion is February 2018. In this phase, the construction was planned for a built up area of 38,000 sqm. The hospital will offer all facilities required for diagnosis, inpatient and out outpatient facilities, therapeutic facilities – operation theatres, day care wards, etc. and rehabilitation services. The hospital development plan also included academic and research facilities. On campus residential accommodation for doctors and nurses, and motels for patients and their attendants are planned.

The hospital management systems (patient administration, billing and receipts; store modules; pharmacy; Diagnosis information system; Radiology Information system; medical oncology information system; and clinical information systems) have been deployed with the help from IT dept TMC and ECIL during the year.

Services

Several patients services for diagnosis and treatment were initiated in stages. The Outpatient services including chemotherapy were started on site in porta cabins on 2 July 2014. The hospital also initiated opportunistic screening and systematic population screening for gynaecological cancers and HPV vaccination on the same day. The OPD and Laboratory services were inaugurated on 1 Feb 2015.

The present consultation services offered include Medical Oncology, Gynaecological Oncology, Surgical Oncology, Pain and Palliative Care and, Preventive Oncology. The day care chemotherapy services for solid tumours and haematological cancers are operational. During the year 2015, several laboratory services were initiated. These include – Radiology (digital Radiology, mammography, sonography); Pathology (hemato-pathology, Histopathology), and Cytopathology; Biochemistry and Tumour Markers; and Molecular Oncology Lab . BCR =ABL1 , Imatinib resistant mutation tests and HPV DNA test are some of the PCR based tests that would be performed at the medical oncology lab.

Charitable trusts like Manavaseva, Vikasa Tarangini, Lions and Rotary Clubs collaborate for the fixed population screening for oral, cervical and breast cancer.

There were 1394 registrations of new patients during the year.

Research

Two major research projects are under progress in molecular oncology lab, viz. – quantification of BCR-ABL levels and detection of TK domain mutations in chronic myeloid leukaemia patients and assessment and monitoring of tyrosine kinase resistance mechanisms in chronic myeloid leukaemia patients.

TMC Staff Publications

National Publications 2015

1 Agarkar S, Chatterjee AS (2015) - Comparison of ramosetron with ondansetron for the prevention of post-operative nausea and vomiting in high-risk patients. Indian Journal of Anaesthesia. Apr; 59(4):222-227. PMID:25937648

2 Agarwal MB, Malhotra H, Chakrabarti P, Varma N, Mathews V, Bhattacharyya J, Seth T, Gayathri K, Menon H, Subramanian PG, Sharma A, Bhattacharyya M, Mehta J, Vaid AK, Shah S, Aggarwal S, Gogoi PK, Nair R, Agarwal U, Varma S, Prasad SVSS, Manipadam MT (2015) - Myeloproliferative neoplasms working group consensus recommendations for diagnosis and management of primary myelofibrosis, polycythemia vera, and essential thrombocythemia. Indian Journal of Medical and Paediatric Oncology.36(1):3-16. PMID: 25810569

3 Agrawal A, Rangarajan V (2015) - Appropriateness criteria of FDG PET/CT in oncology . Indian Journal of Radiology and Imaging. Apr-Jun; 25(2):88-101. PMID:25969632

4 Arora B, Ladas EJ (2015) - International nutrition capacity building - A global SIOP-PODC model from India. Indian Journal of Cancer. Apr-Jun;52(2):163-6. PMID: 26853386

5 Arya S (2015) - Imaging in oncology: Recent advances. Indian Journal of Radiology and Imaging. Apr-Jun; 25(2):87.

6 Arya S, Das D, Engineer R (2015) - Imaging in rectal cancer with emphasis on local staging with MRI. Indian Journal of Radiology and Imaging. Apr-Jun; 25(2):148-161.

7 Badwe RA, Kataria K, Srivastava A (2015) - Surgical resection of phyllodes tumour: a radical approach as a safeguard against local recurrence. Indian Journal of Surgery. Apr; 77(2):161-163. PMID:26139976

8 Bakshi S, Mapari A, Paliwal R (2015) - Ultrasound-guided rectus sheath catheters: A feasible and effective, opioid-sparing, post-operative pain management technique: a case series. Indian Journal of Anaesthesia. Feb; 59(2):118-120. PMID:25788745

9 Bakshi SG, Vanjari VS, Divatia JV (2015) - A prospective, randomised, clinical study to compare the use of McGrathÂ®, TruviewÂ® and Macintosh laryngoscopes for endotracheal intubation by novice and experienced Anaesthesiologists. Indian Journal of Anaesthesia. 59(7):421-427. PMID:26257415

10 Banavali SD (2015) - Delivery of cancer care in rural India: Experiences of establishing a rural comprehensive cancer care facility. Indian Journal of Medical and Paediatric Oncology. Apr-Jun; 36(2):128-131. PMID: 26157291

11 Bankar SS, Bakshi GK, Prakash G, Sable NP (2015) - Delayed complication of pelvic lymphocele: Ileal conduit obstruction. Indian Jornal of Urology. Jul-Sep; 31(3):254-255. PMID: 26166973

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ACTION TAKEN REPORT ON AUDITOR'S OBSERVATIONS
ON
ANNUAL STATEMENT OF ACCOUNTS FOR 2015-16

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 the attached financial statements of Tata Memorial Centre (the Centre) which comprises Balance Sheet as at 31st March, 2016 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 trustees are 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 fee 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 trustees 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.	This is a statement of fact. No action.	

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)
4.	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 : (a) In the case of the Balance Sheet, of the state of affairs of the Centre as at 31st March, 2016. (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.	This is a statement of fact. No action.	

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, 2016 and the Statement of Income and Expenditure Account, the Statement of Receipts and Payments 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 trustees are responsible for the preparation of these financial statements that give a true and fair view of the financial position, financial performance 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

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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 trustees 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.

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:

(a) In the case of the Balance Sheet, of the state of affairs of the Centre as at 31st March, 2016.

(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.

For G.D.Apte & Co
Chartered Accountants
(Firm Regn No. 100515W)

Chetan R. Sapre
(Partner)
Membership No. 116952

Date:

Place: Mumbai

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TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

BALANCE SHEEET AS AT 31 MARCH, 2016

in ₹

PARTICULARS	Schedule	As at 31.03.2016	As at 31.03.2015
CAPITAL FUND AND LIABILITIES			
Capital Fund	1	-	-
Earmarked / Endowment Fund	2	1,55,10,35,150	1,23,42,50,542
Academic Fund	3	7,31,33,253	5,90,21,160
Current Liabilities & Provisions	4	13,36,92,24,303	11,61,23,94,702
TOTAL		**14,99,33,92,706**	**12,90,56,66,404**
ASSETS			
Fixed Assets	5		
Gross Block		7,70,12,44,326	6,55,39,94,046
Less:Provision for Depreciation		3,00,49,96,690	2,56,20,81,863
Net Block		4,69,62,47,636	3,99,19,12,183
Capital Work - in - Progress		2,00,80,98,409	1,72,38,38,526
Total		**6,70,43,46,045**	**5,71,57,50,709**
Current Assets, Loans and Advances	6	6,50,19,89,777	4,33,78,07,632
Capital Fund	1	1,78,70,56,884	2,85,21,08,063
TOTAL		**14,99,33,92,706**	**12,90,56,66,404**
Significant Accounting Policies	**13**		
Notes on Accounts	**14**		

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
Mumbai

G. D. APTE & CO. Chartered Accountants

For and on behalf of the Governing Council

23/8/2016

Indira Pasupathy
Jt. Controller (F & A)

Dr. A.K. D'Cruz
Director, TMH

Dr. R.A. Badwe
Director, TMC

TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 MARCH 2016

in ₹

PARTICULARS	Schedule		Year Ended 31.03.2016	Year Ended 31.03.2015
A) INCOME				
Grant in Aid - Govt of India	7		2,49,66,76,923	2,16,42,91,633
Hospital Income			2,09,84,06,930	1,61,03,40,343
Sale of Drugs and Surgical Goods			2,06,96,05,819	1,87,97,68,418
Interest Income	8		29,18,94,736	24,51,17,737
Other Income	9		4,97,86,173	5,99,43,671
TOTAL (A)			**7,00,63,70,581**	**5,95,94,61,802**
B) EXPENDITURE				
Academic Expenses			5,32,58,617	4,06,66,979
Consumption of drugs and Surgical Goods	10		1,99,38,73,090	1,79,24,65,928
Consumables			81,64,96,398	66,43,42,965
Staff Cost / Salaries	11		3,30,12,59,463	2,85,30,57,540
Other Administrative Expenses	12		82,09,15,894	74,89,96,187
Interest on HDFC Loan			-	64,620
TOTAL (B)			**6,98,58,03,462**	**6,09,95,94,219**
Excess of Income over expenditure before Depreciation and Provisions on retirement benefits of employees (A-B)			2,05,67,119	(14,01,32,417)
Less : Depreciation	5		45,91,13,405	31,60,91,213
Less : Provision for Retirement Benefits				
Gratuity		4,91,47,160		7,35,08,684
Pension		1,15,57,70,113		1,84,79,42,207
Leave Encashment		(2,40,31,166)	1,18,08,86,107	14,62,67,627
Balance being deficit / (surplus) for the year trf to Balance Sheet			**1,61,94,32,393**	**2,52,39,42,148**

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
Mumbai

G.D. APTE & CO. Chartered Accountants

For and on behalf of the Governing Council

23/8/2016

Indira Pasupathy
Jt. Controller (F & A)

Dr. A.K. D'Cruz
Director, TMH

Dr. R.A. Badwe
Director, TMC

TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 1 - CAPITAL FUND

in ₹

PARTICULARS	As at 31.03.2016		As at 31.03.2015	
CAPITAL FUND				
Balance at the beginning of the Year	(2,85,21,08,063)		(2,08,77,01,300)	
Add: Non Recurring Grant Utilised during the year	2,66,42,73,349		1,74,52,67,000	
Add: Recurring Grant utilised for Capital Expenditure	11,26,077		50,58,368	
Add: Assets purchased from Donation	88,35,791		75,16,954	
Add: Assets purchased out of Sponsored Project Fund	1,02,48,355		16,93,062	
Add : Others				
	(16,76,24,491)		**(32,81,65,915)**	-
Less: Deficit/ (surplus) Transferred from the Income & Expenditure Account	1,61,94,32,393		2,52,39,42,147	
Total		**(1,78,70,56,884)**		**(2,85,21,08,063)**

TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 1-A - NON RECURRING GRANT

in ₹

PARTICULARS	As at 31.03.2016		As at 31.03.2015	
Balance at the beginning of the Year	37,58,49,000		36,51,16,000	
Add: Interest	27,76,028		-	
Add: Grant Received During the year	2,88,00,00,000		1,75,60,00,000	
Total	3,25,86,25,028		2,12,11,16,000	
Less: Grant Utilised for Captial Expenditure	2,50,66,84,771		1,68,08,86,821	
Balance	75,19,40,257		44,02,29,179	
Less: Grant Utilised for Revenue Expenditure- Cancer Registry, outreach, Plan Projects	15,75,88,578		6,43,80,179	
Total		**59,43,51,679**		**37,58,49,000**

Note :

Interest includes the interest received on Margin Money Deposited with the bank for the Letter of Credit opened for the Hadron Therapy equipment

23/8/2016

G. D. APTE & CO. ★ Chartered Accountants ★

TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 2- EARMARKED / ENDOWMENT FUND

in ₹

PARTICULARS	As at 31.03.2016						As at 31.03.2015					
EARMARKED / ENDOWMENT FUND	SCIENCE & RESEARCH FUND	SAMJAL MISTRY FUND	DONATION	PROJECTS	WORKSHOP	TOTAL	SCIENCE & RESEARCH FUND	SAMJAL MISTRY FUND	DONATION	PROJECTS	WORKSHOP	TOTAL
A.												
Balance at the beginning of the Year	18,29,98,083	1,84,06,082	55,51,23,888	43,52,62,800	4,24,59,689	**1,23,42,50,542**	16,82,41,282	1,88,82,445	37,94,32,106	43,88,12,136	3,92,73,879	**1,04,46,41,848**
Addition during the year			54,26,28,957	38,54,85,665	6,57,43,689	**99,38,58,310**			28,46,09,067	19,31,81,743	3,72,72,094	**51,50,62,904**
Re-grouping				1,49,363		**1,49,363**						
Interest on Saving / Bank FD received	1,62,46,022	15,21,425		31854094		**4,96,21,541**	1,53,88,801	10,57,802				**1,64,46,603**
Dividend		3,069				**3,069**		2,059				**2,059**
TDS Projects				2423155		**24,23,155**				14,56,460		**14,56,460**
Interest on FD						-						-
Total (A)	**19,92,44,105**	**1,99,30,576**	**1,09,77,52,845**	**85,51,75,077**	**10,82,03,378**	**2,28,03,05,980**	**18,36,30,083**	**1,99,42,306**	**66,40,41,173**	**63,34,50,339**	**7,65,45,973**	**1,57,76,09,874**
B. Utilisation / Expenditure towards objective of fund												
Revenue Expenditure	2,32,000	1,240	30,71,22,458	33,43,85,163	7,14,26,887	**71,31,67,748**	6,32,000	81	10,14,00,331	19,81,87,539	3,40,86,284	**33,43,06,235**
Capital Expenditure			50,42,791	93,86,434		**1,44,29,225**			**75,16,954**			**75,16,954**
Re-grouping					1,49,363	**1,49,363**						
Transfer to Samjal Scholarship Account		7,62,247				**7,62,247**		7,68,072				**7,68,072**
Transfer to Samjal Partient welfare		7,62,247				**7,62,247**		7,68,071				**7,68,071**
Total (B)	**2,32,000**	**15,25,734**	**31,21,65,249**	**34,37,71,597**	**7,15,76,250**	**72,92,70,830**	**6,32,000**	**15,36,224**	**10,89,17,285**	**19,81,87,539**	**3,40,86,284**	**34,33,59,332**
Closing Balance at the end of the year (A-B)	**19,90,12,105**	**1,84,04,842**	**78,55,87,596**	**51,14,03,480**	**3,66,27,128**	**1,55,10,35,150**	**18,29,98,083**	**1,84,06,082**	**55,51,23,888**	**43,52,62,800**	**4,24,59,689**	**1,23,42,50,542**

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TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 3 - ACADEMIC FUND

in ₹

PARTICULARS	As at 31.03.2016	As at 31.03.2015
Opening Balance	5,90,21,160	6,18,74,750
Add :- Addition During the year	5,32,58,618	4,06,66,979
	11,22,79,778	**10,25,41,729**
Less : Deduction During the year	3,91,46,525	4,35,20,569
Total	**7,31,33,253**	**5,90,21,160**

TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 4 - CURRENT LIABILITIES AND PROVISIONS

in ₹

PARTICULARS		As at 31.03.2016		As at 31.03.2015
A) CURRENT LIABILITES & DEPOSITS				
Deposits				
- From Student	2,11,91,542		2,55,43,852	
- From Patient	1,15,15,88,771		90,85,77,138	
- From Suppliers & Contract	14,03,61,068	1,31,31,41,381	8,83,61,338	1,02,24,82,328
Other Current Liabilities				
Undisbursed and Unclaimed Salaries		24,99,716		21,36,446
New pension scheme liability		52,00,512		95,81,648
Sundry Creditors-Capital		1,37,10,821		2,42,23,152
Other Liabilities		15,76,12,498		6,39,58,430
Outstanding Expenses		70,57,26,466		72,02,65,575
Unutilised Grant from Govt of India c/f*		59,67,55,679		37,60,56,000
TOTAL (A)		**2,79,46,47,073**		2,21,87,03,579
B) PROVISIONS(for retirement benefits of employee)				
Gratuity		72,61,80,542		67,70,33,382
Leave Encashment		85,12,44,418		87,52,75,584
Pension		8,99,71,52,270		7,84,13,82,157
TOTAL (B)		**10,57,45,77,230**		**9,39,36,91,123**
TOTAL (A+B)		**13,36,92,24,303**		**11,61,23,94,702**

* Unutilised Grant from Govt. of India Includes Rs13 Crores received from BARC towards deposit works for construction of Radiological Research Unit.

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TATA MEMORIAL CENTRE
TATA MEMORIAL HOSPITAL

Schedule 5 - FIXED ASSETS

(In Rupees)

DESCRIPTION	GROSS BLOCK				DEPRECIATION						NET BLOCK	
	Cost / Valuation as at the beginning of the year (01/04/2015)	Total Additions / adjustments during the year	Deletions / Ajustment	Cost / Valuation at the end of the year (31/03/2016)	As at the beginning of the year (01/04/2015)	Depreciation on the opening balance	Depreciation on Additions during the year	Total Depreciation during the year	On Deletion / Adjustment	Total up to the year end (31/03/2016)	As at the Current year-Ended 31/03/2016	As at the Previous year-Ended 31/03/2015
A. FIXED ASSETS :												
1. LAND:												
a) Freehold	1,97,608	-	-	1,97,608				-		-	1,97,608	1,97,608
2. BUILDINGS :												
a) On Freehold Land	1,45,85,67,031	24,39,92,546	-	1,70,25,59,577	17,22,28,301	2,37,74,642	34,53,918	2,72,28,560	-	19,94,56,861	1,50,31,02,716	1,28,63,38,730
3. PLANT MACHINERY & EQUIPMENT	4,46,61,96,105	86,23,01,489	2,60,00,637	5,30,24,96,957	1,96,46,56,488	32,18,79,112	6,26,93,725	38,45,72,837	1,52,49,191	2,33,39,80,134	2,96,85,16,823	2,50,15,39,619
4. VEHICLES	3,10,71,121	16,83,312	-	3,27,54,433	1,64,92,544	33,07,154	1,90,382	34,97,536	-	1,99,90,080	1,27,64,353	1,45,78,577
5. FURNITURE, FIXTURES	15,48,48,329	2,45,85,605	3,39,700	17,90,94,234	11,49,46,052	52,29,578	16,55,079	68,84,657	3,39,581	12,14,91,128	5,76,03,106	3,99,02,277
6. OFFICE EQUIPMENT	4,55,17,403	10,37,771	1,99,000	4,63,56,174	1,28,91,625	32,29,608	33,972	32,63,580	73,825	1,60,81,380	3,02,74,794	3,26,25,778
7. COMPUTER/ PERIPHERALS	39,75,96,449	4,07,24,894	5,36,000	43,77,85,343	28,08,66,854	2,91,73,858	44,92,377	3,36,66,235	5,35,981	31,39,97,107	12,37,88,236	11,67,29,595
TOTAL (A)	6,55,39,94,046	1,17,43,25,618	2,70,75,337	7,70,12,44,326	2,56,20,81,864	38,65,93,952	7,25,19,453	45,91,13,404	1,61,98,578	3,00,49,96,690	4,69,62,47,635	3,99,19,12,184
CWIP	1,72,46,40,896	2,30,37,48,718	2,01,94,88,835	2,00,89,00,779	2,00,89,00,779						2,00,89,00,779	1,72,46,40,896
LESS: PROVISION FOR DOUBTFUL CAPITAL ADV (LAND)	8,02,370			8,02,370							8,02,370	8,02,370
NET CAPITAL WIP (B)	1,72,38,38,526	2,30,37,48,718	2,01,94,88,835	2,00,80,98,409							2,00,80,98,409	1,72,38,38,526
TOTAL (A + B)	**8,27,78,32,572**	**3,47,80,74,336**	**2,04,65,64,172**	**9,70,93,42,735**	**2,56,20,81,864**	**38,65,93,952**	**7,25,19,453**	**45,91,13,404**	**1,61,98,578**	**3,00,49,96,690**	**6,70,43,46,044**	**5,71,57,50,710**
PREVIOUS YEAR (TMC)	6,65,67,19,278	2,91,82,45,361	1,29,71,32,067	8,27,78,32,572	2,28,15,40,823	18,67,59,371	12,93,31,842	31,60,91,213	3,55,50,173	2,56,20,81,863	5,71,57,50,709	4,37,51,78,456

1) Captial 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

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 6 - CURRENT ASSETS, LOANS AND ADVANCES

in ₹

PARTICULARS	As at 31.03.2016		As at 31.03.2015	
A. CURRENT ASSETS				
1. Inventories				
Stock of Drugs, Medical and Surgical Goods	23,49,75,810		19,16,89,298	
Stores & stationery	63,98,047	**24,13,73,857**	41,21,628	**19,58,10,926**
2. Sundry Debtors				
a) Outstanding more than six months				
Considered Good	6,47,99,394		4,67,51,081	
Considered Doubtful	2,58,68,303		3,30,07,425	
	9,06,67,697		7,97,58,506	
Outstanding less than six months				
Considered Good	20,55,77,039		19,29,08,706	
Considered Doubtful	-		-	
	29,62,44,736		27,26,67,211	
b) Less: Provision for Doubtful Debts	2,58,68,303	**27,03,76,433**	3,30,07,425	**23,96,59,786**
3. Cash Balances				
Cash in Hand	59,05,760		36,58,105	
Cheques on Hand	2,52,61,001		1,97,85,672	
Franking Balance	96,690	**3,12,63,451**	25,005	**2,34,68,782**
4. Bank Balances				
With Scheduled Banks :				
- Current Accounts	66,29,75,725		53,29,21,718	
- Fixed Deposit Accounts	3,16,70,97,096		2,33,34,83,066	
- Margin Money Deposit Accounts	1,41,50,00,000		36,66,04,000	
- Fixed Deposits Projects	46,18,94,943		43,05,28,903	
- On Savings Accounts	81,08,620	**5,71,50,76,384**	56,38,115	**3,66,91,75,801**
TOTAL (A)		**6,25,80,90,125**		**4,12,81,15,296**

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TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 6 - CURRENT ASSETS, LOANS AND ADVANCES

in ₹

PARTICULARS	As at 31.03.2016		As at 31.3.2015	
B. LOANS AND ADVANCES				
1. Advances recoverable in cash or in kind or for value to be received (unsecured, considered good)				
Considered Good	19,48,349		13,74,063	
Considered Doubtful	-		-	
	19,48,349		13,74,063	
Less: Provision for Doubtful Advances	-	**19,48,349**	-	**13,74,063**
b) Prepaid expenses		**2,73,03,757**		**1,84,54,922**
c) Other Deposits		**3,01,40,475**		**2,85,86,791**
c) Receivable from Govt of India				
2. Loans & Advances to staff				
Interest Bearing Advances	**96,24,966**		1,26,20,757	
Non Interest Bearing Advances	**44,78,210**	**1,41,03,176**	42,49,949	**1,68,70,706**
3. Interest Accured				
Interest Accured on Fixed Deposits	**12,52,12,913**		**9,66,68,827**	
Interest Accured on Corpus Deposits	**62,29,795**		**60,70,484**	
Interest Accured on Sam Jal Deposits	**8,63,037**	**13,23,05,745**	**9,44,537**	**10,36,83,848**
4. Interest Accured but not due		**1,31,57,131**		**1,34,77,769**
5. Tax Deducted at Source		**2,49,41,019**		**2,72,44,237**
TOTAL (B)		**24,38,99,652**		**20,96,92,336**
TOTAL (A+B)		**6,50,19,89,777**		**4,33,78,07,632**

TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER.

SCHEDULE 7 - RECURRING GRANT

in ₹

PARTICULARS	As at 31.03.2016		As at 31.03.2015	
Balance at the beginning of the Year	2,07,000		**(4,43,000)**	
Add: Grant Received During the year	2,50,00,00,000		2,17,00,00,000	
Total	**2,50,02,07,000**		**2,16,95,57,000**	
Less: Grant Utilised for Captial Expenditure (A)	11,26,077		50,58,367	
Balance	**2,49,90,80,923**		**2,16,44,98,633**	
Less: Grant Utilised for Revenue Expenditure (B)	2,49,66,76,923		2,16,42,91,633	
Unspent Balance c/f		**24,04,000**		**2,07,000**

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G. D. APTE & CO. Chartered Accountants

TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 8 - INTEREST INCOME

in ₹

PARTICULARS		Year Ended 31.03.2016		Year Ended 31.03.2015
Interest : (gross)				
(includes tax deducted at source)				
from banks :				
on fixed deposits/ margin money deposits	28,59,67,017		22,71,25,501	
on saving accounts	91,780		1,31,088	
		28,60,58,797		**22,72,56,589**
from others :				
On mobilisation advance	-		4,69,521	
on Vehicle Advances	2,34,338		1,59,082	
on House Building Advances	28,29,217		34,82,402	
on Computer Advances	1,95,767		2,72,374	
		32,59,322		**43,83,379**
Interest accrued but not Due on staff Advances		**16,14,083**		**1,34,77,769**
Interest on Income Tax Refund		**9,62,534**		**-**
Total		**29,18,94,736**		**24,51,17,737**

TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER.

SCHEDULE 9 - OTHER INCOME

in ₹

PARTICULARS	Year Ended 31.03.2016	Year Ended 31.03.2015
Miscellaneous Receipts	3,60,77,886	4,73,12,327
Animal House Receipts	70,59,652	48,15,592
Project Overheads	67,22,003	74,02,483
Effect of exchange fluctuation (net)	(73,368)	(56,253)
Mobilisation Interest	0	4,69,521
TOTAL	**4,97,86,173**	**5,99,43,671**

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TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 10 - CONSUMPTION OF DRUGS & SURGICAL GOODS

in ₹

PARTICULARS	Year Ended 31.03.2016	Year Ended 31.03.2015
Opening stock of Drugs / Surgical goods	19,16,89,298	15,09,57,010
Add: Purchases	2,04,40,53,740	1,84,39,75,489
Less: Closing stock of Drugs / Surgical goods	23,49,75,810	19,16,89,298
Less: Return/ Rejected / Expired Drugs / Surgical goods	68,94,138	1,07,77,273
TOTAL	**1,99,38,73,090**	**1,79,24,65,928**

TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 11 - STAFF COST / SALARIES

in ₹

PARTICULARS	Year Ended 31.03.2016	Year Ended 31.03.2015
a) Salaries and Wages	97,39,44,579	89,93,18,203
b) Allowances and Bonus	1,64,64,55,362	1,39,91,42,174
c) Expenses on Employee's Retirement and Terminal Benefits	7,64,10,402	6,29,29,753
d) Pension scheme	28,83,65,855	24,68,97,767
e) Fellowships	31,60,83,265	24,47,69,643
TOTAL	**3,30,12,59,463**	**2,85,30,57,540**

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TATA MEMORIAL CENTRE

TATA MEMORIAL HOSPITAL AND ADVANCED CENTRE FOR TREATMENT, RESEARCH AND EDUCATION IN CANCER

SCHEDULE 12 - OTHER ADMINISTRATIVE EXPENSES

in ₹

PARTICULARS	Year Ended 31.03.2016	Year Ended 31.03.2015
a) Linen and Laundry	3,89,26,835	4,11,93,420
b) Library Expenses	5,09,94,225	2,89,71,470
c) Electricity	30,21,12,473	29,03,96,705
d) Water Charges	1,49,45,870	1,47,15,135
e) Repairs and Maintenance	23,44,92,930	23,16,21,083
f) Animal House Expenses	38,58,110	26,90,194
g) Rates, Taxes and Insurance	72,43,885	39,48,907
h) Minor Equipments and Replacement of Capital Equipments	15,07,775	5,06,799
i) Postage, Telephone and Communication Charges	63,29,222	64,95,785
j) Printing and Stationery	2,12,83,115	1,63,12,177
k) Travelling and Conveyance Expenses	1,92,51,641	2,07,93,775
l) Intra Mural Research Expenses	2,12,52,631	1,31,02,999
m) Cancer Registry Program Expenses	93,11,079	29,30,443
n) Auditors Remuneration		
Audit fees		
Service tax	4,75,000	3,56,000
o) Symposium and Training	41,96,631	22,29,137
p) Professional Charges	60,75,702	33,68,771
q) Advertisement Expenses	1,74,74,675	1,42,92,374
r) Provision for Doubtful Debts	(71,39,122)	(60,85,130)
s) Hostel maintenance expenses	2,45,08,858	1,25,11,644
t) Miscellaneous Expenses	4,36,38,866	4,86,44,499
u) Bad debts written off	1,75,492	
TOTAL	**82,09,15,894**	**74,89,96,187**

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G. D. APTE & CO. ★ Chartered Accountants ★

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. Two new hospitals in Vizag, Andhra Pradesh and Mullanpur District Punjab and one satellite centre in Sangrur District Punjab are being established. It is registered under the Societies Registration Act (1860) and the Bombay Public Trust Act (1950).

SCHEDULE 13 : SIGNIFICANT ACCOUNTING POLICIES

1. Basis of Preparation of Financial Statements

The financial statements are prepared on historical cost convention, unless otherwise specifically stated, on the accrual basis of accounting and comply with the framework and format laid down by the Controller General of Accounts, Government of India and applicable accounting standards issued by the Institute of Chartered Accountants of India (ICAI) to the extent applicable and in the manner so required.

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. Use of Estimates

The preparation of the financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amount of assets and liabilities as of the Balance Sheet, reported amounts of revenues and expenses for the year ended and disclosure of contingent liabilities as of the balance sheet date. The estimates and assumptions used in these financial statements are based upon management's evaluation of the relevant facts and circumstances as on the date of the financial statements. Actual results may differ from those estimates. Any revision to accounting estimates is recognized prospectively.

3. 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 employee advances are recognized in the year of its receipt where principal has been recovered. In respect of other cases they are recognized on accrual basis

iv) Other Revenue items are recognized only when it is reasonably certain that the ultimate collection will be made.

4. Fixed Assets and Depreciation

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 stated at cost less accumulated depreciation.

iv) Fixed assets purchased on Non government funded projects and from donations are transferred to the assets of the centre at purchase price.

v) Fixed assets are eliminated from financial statements only on disposal.

Depreciation on fixed assets is provided under straight line method based on useful life of the asset determined by the management at the following rates :

Asset	Rate of depreciation
Buildings	1.63%
Electrical & Gas Installation	4.75%
Plant & Machinery	7.07%
Furniture and Fixtures	9.50%
Office Equipment	4.75%
Computers and peripherals	16.21%
Vehicles - Buses	11.31%
Car, Jeep	9.50%

i) Depreciation on assets purchased during the year is provided from the date of its purchase / installation

iii) 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 consumables, stationery are valued at cost

ii) Stock of linen, laundry, cutlery and crockery, are treated as consumed as and when purchased

6. Government Grant

i) Recurring and Non-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 grant to the extent utilised for capital expenditure are transferred to Capital Fund. Unutilised grants are carried forward as Current Liabilities in the Balance Sheet.

7. Donation

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. Donations are received for patient care and cancer research. Assets purchased on donations are treated as assets of the Centre and capitalised accordingly. Donation includes amount received as Corporate Social Responsibility (CSR).

8. Foreign Exchange 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.

G. D. APTE & CO. Chartered Accountants

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. Provision, Contingent Liabilities and Contingent Assets

a. Provisions are recognized for liabilities that can be measured only by using a substantial degree of estimation, if
   1. The Centre has a present obligation as a result of past event.
   2. A probable outflow of resources is expected to settle the obligation.
   3. The amount of obligation can be reliably estimated.

b. Contingent liability is disclosed in the case of :
   1. A present obligation arising from past event, when it is not probable that an outflow of resources will be required to settle the obligation.
   2. A possible obligation, unless the probability of outflow of resources is remote.

c. Provisions, Contingent Liabilities are reviewed at each Balance Sheet date.

11. 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.

12. 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.

13. Science & Research Fund

The Science & Research Fund / Corpus is created in 2000 with the purpose of utilising the interest in the Fund for (i) Support of preventive oncology activities in the country (ii) Support for attending international conferences and training programmes on cancer related topics and (iii) Any other purpose with the approval of the Committee.

14. Sam Mistry Fund

The fund is created as per the will of Late Sam Jal Mistry and Late Alice Sam Mistry in 1999. As per the will, the interest and dividend on shares generated from the fund will be utilised equally for treatment to poor cancer patients and scholarship to PG students.

SCHEDULES FORMING PART OF ACCOUNTS

SCHEDULE 14: 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.1,32,18,821/- (Previous year Rs. 2,42,23,152/-)
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 14,150 Lakhs which represents Earmarked Funds kept aside for the capital commitments.
5. During the year, an arbitration case was filed on TMC for forfeiture of Earnest Money Deposit (encashment of bank guarantee of Rs.22, 00,000/- and fixed deposit of Rs.20, 00,000/-) of M/s B. K. Consortium Engineers Pvt. Ltd. The whole amount including the interest of fixed deposit amounting to Rs 42, 64,658/-was included under current liabilities. The status of the case is pending.
6. Expenditure incurred for the projects under construction are as follows

(Rs. In Lakhs)

Name of Centre	Total capital expenditure incurred upto 31.03.2016	Total Revenue Expenditure during the year	Total Income booked during the year
Homi Bhabha Cancer Hospital & Res. Centre, Vizag	15,713.12	85.07	17.38
Homi Bhabha Cancer Hospital & Res. Centre, Punjab	55.60	Nil	Nil
Homi Bhabha Cancer Hospital, Sangrur	2,692.42	311.83	51.33

7. Due to heavy rains on 19th June 2015 the stock of drugs and surgical goods amounting to Rs 1, 78, 23,571/- was damaged. The hospital has received Rs. 54,57,243/- and the balance 1,23,66,328/- included in consumption of drugs schedule.
8. One equipment was lost by fire WDV amounting to Rs 2,57,89,355/- as on 31st May, 2015, the hospital filled insurance claim which is yet to be received.
9. Prior Period Income of Rs.3,22,39,349/- included in Income & Expenditure account during the financial year
10. Order No 38/37/08 –P&W (A) dt 6th April, 2016 has been issued by Government for revision of pension of pre 2006 pensioners- delinking of revised pension from qualifying service of 33 years. Impact of this order has not been provided in the accounts as the exact liability is not ascertained.
11. The Centre is covered by a system of internal audit conducted by the Department of Atomic Energy and Indian Audit and Accounts Department.
12. 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.51,64,433/- respectively which is disclosed under current liabilities in the financial statement. The centre has also kept as deposit Rs.5, 50,000/- with Hon'ble Bombay High Court.
13. 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 12 in the Income and Expenditure Account are as under : - Employers contribution to Provident Fund – Rs.22,37,149/- - Employer's Contribution to New Pension Scheme – Rs.4,29,83,515/-

			Gratuity	
			31-3-2016	31-3-2015
I	**Change in obligation during the year**			
	1	Liability at the beginning of the year	67,70,33,382	60,35,24,698
	2	Interest Cost	5,08,77,165	5,18,24,006
	3	Current Service Cost	1,25,11,992	1,25,66,990
	4	Past Service Cost	0	0
	5	Benefit Paid	(4,58,97,075)	(4,24,66,194)
	6	Actuarial (Gain)/Loss	3,16,55,078	5,15,83,882
	7	Liability at the end of the year	72,61,80,542	67,70,33,382
II	**Net asset / (liability) recognised in the Balance Sheet**			
	1	Liability at the end of the year	726,180,542	67,70,33,382
	2	Plan assets at the end of the year	0	0
	3	Liability recognised in the Balance sheet	726,180,542	67,70,33,382
III	**Expenses recognized in the Income and Expenditure account**			
	1	Current Service Cost	1,25,11,992	1,25,66,990
	2	Interest Cost	50,88,71,65	5,18,24,006
	3	Expected Return on Plan Assets	0	0
	4	Actuarial (Gain)/Loss	3,16,55,078	5,15,83,882
	5	Past service cost	0	0
	6	Total expenses recognised in the Income and Expenditure Account	9,50,54,235	11,59,74,878
IV	**Principal actuarial assumptions at the Balance Sheet date:**			
	1	Discount rate at	7.85%	7.95%
	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 31st March, 2016works out to Rs. 85,12,44,418/-.

3 The Centre operates a Pension scheme which is an unfunded scheme for employees, who have joined prior to 1st 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 31st March, 2016 works out to Rs. 899,71,52,270/-.

14. Figures for the previous year have been regrouped / reclassified wherever necessary to make them comparable with those of the present year.

For G.D Apte & Co
Chartered Accountants
ICAI Registration No. : 100515W

Chetan Sapre
Partner
Membership No.116952
Date:
Place

For Tata Memorial Centre

Indira Pasupathy
Jt. Controller (F & A)

Dr. A. K. D'cruz
Director

Dr. R.A. Badwe
Director

ACCESS TO QUALITY CARE

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