



National Cancer
Centre Singapore

SingHealth

As a regional and national centre of excellence, the National Cancer Centre Singapore (NCCS) is a one-stop centre offering a holistic range of clinical services to patients. Its inspirational concept of care is patient-focused, with multidisciplinary teams of professionals working together to improve the quality of life for patients and their families. NCCS and its nexus of hospitals treat about 66%¹ of cancer patients in the public sector. The NCCS also conducts clinical and basic research, as well as develops public education programmes wholly directed at the prevention and treatment of cancer.

¹ MOH Annual Statistics Bulletin 2004, Health Information Management Branch, Singapore



Prof Soo Khee Chee
Director, NCCS

In the past year, we have continuously pushed the boundaries of comprehensive cancer care to bring the latest and the best to cancer patients in Singapore and the region. We have managed to achieve this through our staff's indefatigable commitment to clinical research and care as well as partnerships with the community.

Last year, our clinician scientists clinched numerous international and national awards for their research. Moreover, approximately 28,000 students gained cancer awareness through our school outreach programme.

I am confident that if we continue to invest in our staff, marry the best of our research, education and clinical services, we will forge ahead as the premier cancer centre of the region.

CLINICAL EXCELLENCE

New anti-cancer treatments

The Department of Medical Oncology continues to introduce improved anti-cancer treatment to patients. In 2004, there was an increase in the use of targeted therapy, including Gefitinib for lung cancer, Rituximab for lymphoma and Bevacizumab for colorectal cancer. Unlike conventional cytotoxic chemotherapy, these drugs are often associated with improved outcome but minimal adverse effects. The department saw an approximately 20% increase in chemotherapy cases requiring treatment, from 17,500 cases in FY2003 to 21,559 in FY2004.

More major surgeries performed

The Department of Surgical Oncology performed a total of 2,090 operations in 2004, 74% of which were major procedures. The increase in major operations – from 70% in 2003 and 63% in 2002 – testified to the increasingly complex work undertaken by the centre's surgical oncologists.

State-of-the-art equipment

The Department of Radiation Oncology introduced a new linear accelerator that uses respiratory gating to harmonise treatment with the patients' breathing. Tumour movement takes place during breathing. With respiratory gating, the radiation beam is turned off when a tumour in the chest/abdomen moves outside a prescribed target area. Patients undergoing radiotherapy thus benefit from the more accurate delivery of radiation to various organs.

The Department of Oncologic Imaging continues to complement clinical evaluation in the diagnosis staging and follow up of cancer patients with its Picture Archival and Communication system (PACS) and Radiology Information System (RIS). The CT, MRI and Ultrasound equipment assist in the majority of complex imaging cases. To complement the state-of-the-art technology and teleradiology, radiologists are also developing subspecialty expertise in head and neck radiology, breast imaging, hepatobiliary MRI, prostate MRI, multivoxel MR spectroscopy.

Sharing expertise

In 2004, NCCS surgical oncologists continued to provide general surgical services to Singapore General Hospital (SGH), breast service to KK Women's and Children's Hospital (KKH), thoracic service to SGH, Changi General Hospital and KKH, as well as hepatopancreaticobiliary services to KKH.

The Department of Palliative Medicine has also been active in providing consultative palliative care services to inpatients at SGH and KKH, as well as to community care services such as the Assisi Home & Hospice and Bright Vision Hospital.

Advances in research

A. Breast cancers

The Division of Medical Sciences offers a clinical research service to women at high risk of breast and/or ovarian cancer. This comprises genotyping, mutation and genomic rearrangement analysis of breast cancer genes (BRCA1 and BRCA2). In particular, genes on chromosome 11 are being analysed for the identification of possible cancer-related genes, which may be important in the diagnosis, prognosis and treatment of cancer.

B. Brain tumours

Brain tumour research at the Division of Medical Services has identified a novel mechanism of Temozolomide (TMZ) genotoxicity. TMZ is currently the most effective chemotherapeutic agent in treating human gliomas. With greater insight into this agent, doctors will be able to predict whether a patient is likely to respond to TMZ and can tailor their treatment for the patient. Research into brain tumours has also successfully defined how endothelial progenitor cells could be derived from umbilical cord blood and used as a potential cell delivery vehicle for gene therapy, utilising their "homing specificity" for brain tumours. The report was published in Gene Therapy 2004.



In addition, NCCS compiled a brain tumour database and analysed the Singapore experience in treatment responses and toxicity profiles. The report highlighted the toxicity profile of Asian patients and made recommendations for more appropriate chemotherapy dosing regimens for them. The findings were presented at the Asian-Oceanic Congress of Neurology in 2004.

C. Photodynamic Diagnosis and Treatment (PDT)

Pioneered by the Division of Medical Sciences at NCCS, this technique uses fluorescence diagnosis and drug-induced light therapy to diagnose and treat cancer. Using the characteristic light emission signature of cancer cells, these diagnostic methods facilitate the early detection of head and neck, cervix and bladder cancers. They are also fast and less invasive than other diagnostic methods. PDT is suited for some patients who do not respond to other standard treatment options. It not only offers reduced side effects and good cosmetic results, it can also offer palliation for patients in advanced stages of the disease.

D. Clinical trials

The Division of Clinical Trials & Epidemiological Sciences was involved in 40 clinical trials involving more than 700 patients during the year. Besides providing statistics support in clinical trials, the Biostatistics Unit also engaged in applied biostatistics research.

The Clinical Pharmacology Laboratory has also been unstinting in its support of clinical trials both in and outside the NCCS. The lab collaborated with other SingHealth institutions such as Singapore General Hospital and National Heart Centre, as well as with overseas institutions. It was also involved in several research projects, including the pharmacogenetic studies of anti-cancer agents and a study on the influence of functional single nucleotide polymorphisms on the pharmacokinetics and pharmacodynamics of anti-cancer agents.

Accolades in Research

Dr Mac Ho Meng Fatt was awarded a grant from the Muscular Dystrophy Association (US) for a study on identifying biomarkers to detect early gastric cancer using proteomics approaches. Early detection of gastric cancer is the single most important factor influencing the outcome for patients. There is currently no biomarker of acceptable sensitivity and specificity.

Dr Caroline Lee Guat Lay's research received the 2004 AACR-ITO EN Ltd award from the American Association for Cancer Research. Her work provided evidence for differences in the structure of the MDR1 gene among five ethnic groups (Chinese, Malay, Indian, Caucasian and African-American). The MDR1 gene influences a person's response to drugs and is likely to be important in developing tailored drug therapy. Dr Lee and her collaborators have also published results linking variants (single nucleotide polymorphisms) of the MDR1 gene with a protective effect against development of Parkinson's disease.

Mr Tang Kun received the Scholar-in-Training Award at the 95th Annual Meeting of the American Association for Cancer Research in Florida, US. Mr Tang demonstrated a way to identify important single nucleotide polymorphisms that may be associated with diseases by looking for signatures of positive selection in the MDR1 gene.

Dr Karen Yap won a scholarship from National Medical Research Council to pursue a PhD in a NUS-Karolinska Institute programme.

Dr Kon Oi Lian was awarded a grant from the Juvenile Diabetes Research Foundation (US) in association with the Biomedical Research Council in Singapore to conduct a project to develop cell-based diabetes treatment in pre-clinical animal models.

Dr James Khoo's work on computer-aided automated tumour volume measurement won the Best Medical Oral Paper award at the SingHealth Scientific Meeting in October 2004.

Mr Siddique Md Monowarul Mobin's work on selective and differential expression of the P53 Condon 72 Polymorphs in healthy and breast cancer patients in Singapore was awarded the Best Medical Oral Paper award at the SingHealth Scientific Meeting in October 2004.

A/Prof Kanaga Sabapathy was awarded the SingHealth Investigator Excellence Award for his work in molecular oncology. His work has helped fellow researchers decipher the interplay of c-Jun, p53 and p73 gene products in orchestrating cell response to environmental stress signals. His work has also demonstrated the importance of p53 polymorphism in determining breast cancer predisposition.

Dr Patrick Tan also received the SingHealth Investigator Excellence Award for his outstanding cancer research in developing a robust technology platform for analysing gene expression information. Through this platform, molecular signatures of "poor prognosis" subtypes of breast cancer could be obtained. Dr Tan is also the first to demonstrate that fine needle aspirates can be used to generate gene expression profiles of lung tumours.

A Health Management Development Programme award was given to associate consultant in the hepatopancreaticobiliary (HPB) service, Dr Tan Yu Meng. Dr Tan will pursue a year's fellowship in Birmingham, UK, in advanced HPB surgery with a focus on liver transplantation.

Dr Philip Karuman, HPB visiting consultant, was granted a sabbatical to pursue a two-year fellowship in transplantation in Pittsburgh, US.

Mr James Kah, Dr Weber Lau and A/Prof Malini Olivo won the Best Oral Presentation at the 5th Graduate Programme in Bioengineering (GPBE) Biannual Academic Conference Singapore for their work on the image analysis of hypericin-induced fluorescence used in pathological diagnosis of bladder cancer.

Mr Caine Leong Tuck Choy was awarded the 1st Prize for the Best Oral Presentation on molecular cloning, characterisation and isolation of novel spliced variants of the human ortholog of a rat estrogen-regulated membrane associated protein, UO-44. This gene is involved in the progression of ovarian and uterine cancers. The award was presented at the 5th Combined Annual Scientific Meeting – National University of Singapore (NUS).

Mr Ong Choon Kiat received the 3rd Prize for the Best Oral Presentation on structural characterisation of three novel rat OKL38 transcripts, their tissue distributions, and their regulation by human chorionic gonadotropin. This gene is found in breast and kidney cancer cells. The award was presented at the 5th Combined Annual Scientific Meeting – National University of Singapore (NUS).



COLLABORATION

Cellular and molecular research

The Division of Cellular and Molecular Research is currently studying cervical cancer, nasopharyngeal carcinoma, hepatocellular carcinoma, prostate cancer, breast cancer and gastric cancer. The division's research interests are wide-ranging and include basic mechanistic studies in molecular biology, biochemistry, genetics, cell biology, immunology and other cancer-related fields. The four main specific areas under study are:

1. The application of nanoparticles for gene delivery with Nanyang Technological University (NTU) – funded by National Medical Research Council (NMRC).
2. The development of a prototype machine for the diagnosis of human liver cancer with NTU – funded by Biomedical Research Council (BMRC).
3. The development of a gene expression profiling database for human lung cancer with Singapore General Hospital (SGH) – funded by the Singapore Cancer Syndicate.
4. The development of a gene expression profiling database for human nasopharyngeal carcinoma with SGH – funded by NMRC.

Asia-Pacific Palliative Care Network

NCCS hosts the secretariat of the Asia-Pacific Hospice Palliative Care Network (APHN). In 2004, the number of the network's members increased by about 10% from 125 to 137. Through the network, which reaches out to 715 individuals in 24 countries, NCCS consultants have taught and supported the development of palliative care in many countries in the region. In 2004 alone, they visited Australia, Bangladesh, China, India, Indonesia, Malaysia, Mongolia, Nepal, New Zealand, Philippines, Sri Lanka, Taiwan, Thailand and Vietnam.

Encouraging more self-help groups

To bring support for cancer patients, cancer survivors and care-givers right to their doorstep, the Department of Psychosocial Oncology partnered with community agencies and cancer-related organisations to provide training in the starting and running of self-help groups and befriender programmes.

CancerVive

CancerVive was inaugurated on June 6, 2004, to honour and celebrate the verve and fighting spirit of all cancer survivors, their families and friends, health professionals and benefactors. It was also formed to raise awareness of the issues cancer survivors face. Officiated by the Minister of Health, Mr Khaw Boon Wan, the event was attended by 300 people. The one-day celebration was followed by a three-day exhibition in collaboration with the Singapore Cancer Society, Breast Cancer Foundation, Singapore General Hospital, Children's Cancer Society and FirstLight Singapore.

Raising awareness

The public education schedule was packed in 2004, and included the lung cancer awareness month spearheaded by NCCS in collaboration with Health Promotion Board. The centre also continued to support the Breast Cancer Awareness Month in partnership with the Singapore Cancer Society and Breast Cancer Foundation.

In 2004, the Cancer Education and Information Service conducted more than 10 public forums and CancerWise workshops. In the school outreach programme, a total of 27,617 students from 24 primary, secondary and tertiary institutions attended the talks.

Volunteering

In April 2004, senior nurse manager Flora Yong chaired the organising committee for a charity bazaar to raise funds for the families of needy cancer patients. The bazaar was organised by Hope Foundation and supported by Radin Mas Community Centre. Dr Chong Weng Chiew, MP for Radin Mas, officiated at the event.

COMMITMENT

Patient empowerment

The Department of Psychosocial Oncology spearheaded a new arm, Patient Education, to develop programmes to help cancer patients and their families cope with the disease. These support programmes target newly-diagnosed cancer patients as well as patients with cancer recurrence, and aim to provide help at different phases of a cancer patient's journey. The programmes include therapeutic support groups, psycho-educational talks, retreats for cancer patients, survivors and their families, as well as children's therapy sessions, befriender service and self-help groups.

Cancer Helpline

In 2004, the Cancer Helpline received 6,026 calls, an increase of 8.42% from 5,558 in 2003. The increase was across all

categories of users – including new and repeat users, hospital callers who are non-healthcare professionals and immediate family members.

Accolades in service quality

Senior Staff Nurse, Sequeira Julia Cecilia Mabel and Senior Staff Nurse Ms Tan Tiew Yah were awarded NCCS' C.A.R.E. Award for their outstanding service to patients.

Two NCCS staff won Excellent Service Awards (EXSA) in 2004. Organised by SPRING Singapore, EXSA service awards seek to encourage and motivate all levels of workers in the service industry to deliver quality service and professionalism. Dr Toh Han Chong received the Star Award and Dr Ho Gay Hui received the Gold Award.

Commitment to staff recognised

NCCS recognises that enlightened HR practices keep its employees committed to their work. For its commitment to staff training, healthy lifestyle and family-friendly measures, the centre achieved certification for the People Developer Standard, the Singapore H.E.A.L.T.H. Award (Silver) and the Family Friendly Firm Award respectively.

National Cancer Centre Singapore	FY 04	FY 03
Workload per annum		
Day Surgeries	9,215	7,409
Specialist Outpatient Clinic Attendances	114,021	98,618
Staffing (as at end Mar)		
*Total	389	382
Doctors	71	68
Nurses	64	64
Health Sciences Professionals	87	88
Others	168	163

*This figure excludes the 147 researchers in FY04 and 143 researchers in FY03.