HOPE FOR HIGH-RISK LEUKAEMIA PATIENTS

The Ma-Spore ALL 2010 Study
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Happy New Year and welcome to the 6th issue of SPARK! 2018 was a busy year for the National University Cancer Institute, Singapore (NCIS) as we celebrated our 10th anniversary. Read more about our achievements and celebratory events in the Special Feature section of this issue (pages 14 to 16).

To kick off 2019, we feature the outstanding achievement of our paediatric oncology colleagues with the publication of their practice-changing clinical trial, the Ma-Spore ALL 2010 study. The study showed that by intensifying chemotherapy in children with acute lymphoblastic leukemia (ALL), cure rates in high-risk cases are improved. In the Discoveries section, we highlight our various efforts in precision medicine using platforms from tumour genomic profiling to artificial intelligence, to find the right drug for the right cancer patient. We also hear from our surgical oncology colleagues on the new technologies used in prostate cancer care at NCIS and updates from our colleagues at the Cancer Science Institute of Singapore (CSI) in lung cancer research.

At NCIS, clinical trials remain at the forefront of research and with the Yong Siew Yoon (YSY) Fellowship Programme @ NCIS, we are able to train young oncologists in developmental therapeutics (see Education section). Apart from our trainees, a key member of the clinical trials team is the clinical trial coordinator. Our Personality Feature section goes behind the scenes for a day in the life of a clinical trial coordinator and have a glimpse of how critical their role is in ensuring smooth operation of our trials at NCIS, and their tireless efforts in guiding the patient through their journey.

Lastly in this issue, we look at cancer survivorship, an emerging area in oncology in Singapore. By definition, cancer survivorship starts from the time a person is diagnosed with cancer until the end of life. With this in mind, NCIS launched a new cancer survivorship programme in July 2018 where selected breast and colorectal cancer patients can now choose to have their follow-up care with a primary care doctor closer to home. More information about this exciting programme can be obtained in the Breakthroughs section (pages 9 to 10).

I am sure that 2019 will be busier than ever for all of us here at NCIS as we continue to push the boundaries in patient care, research and education. Here’s to good health to all of you and your families!

Dr Chee Cheng Ean
Consultant
Chief Medical Editor
Acute lymphoblastic leukemia (ALL) is the most common form of childhood cancer and in Singapore it affects three out of every 10 children who are diagnosed annually. It is a type of blood cancer which occurs when an abnormal bone marrow cell continues to grow and produce uncontrollably. In Singapore, the current cure rates for children with ALL stands at 88 per cent, while the worldwide figure ranges from 50 to 85 per cent.

With intensified chemotherapy treatment, children with high-risk leukaemia have a higher cure rate and a lower relapse rate.
ALL and the Ikaros gene

The Ikaros gene allows normal cells to mature into functional cells. About 20 per cent of children with ALL lose the Ikaros gene in their leukaemia cells, which do not mature. This development is called the Ikaros deletion and results in leukaemia cells that are stuck in an immature and constantly growing state.

The Ikaros deletion confers a significantly worse outcome for ALL patients. Specifically, children with Ikaros deletion had a 30 per cent chance of relapse compared to 13 per cent for those who did not have Ikaros deletion.

New treatment protocol with latest findings

In a joint eight-year study involving 346 patients across four hospitals, a team of researchers from Singapore and Malaysia has managed to raise cure rates for a subgroup of ALL patients with Ikaros deletion from 70 per cent to more than 91 per cent and reduced relapse rates from 30 per cent to 13 per cent.

Three leading doctors in the team, Associate Professor Allen Yeoh of the Department of Paediatrics at the National University of Singapore Yong Loo Lin School of Medicine, Associate Professor Tan Ah Moy of the KK Women’s and Children’s Hospital and Professor Hany Ariffin, head of the Paediatric Haematology-Oncology and Bone Marrow Transplantation Unit of the University of Malaya, studied the peculiarities of these children’s leukaemia and developed a successful new treatment protocol. The study is the first in the world to show that intensifying therapy for Ikaros gene-deleted children with ALL reduces relapse and improves treatment outcome. It also explored critical treatment issues in cost-effective therapy important in Singapore and Malaysia, including that of Asian sensitivity to chemotherapy drugs. Their findings contribute important knowledge to the field and have made a significant impact on how doctors treat ALL in children.

The study, named the Malaysia-Singapore (Ma-Spore) ALL 2010 is a collaboration between four hospitals in Singapore and Malaysia – the National University Hospital, KK Women’s and Children’s Hospital, University of Malaya Medical Centre and Sime Darby Medical Centre in Subang Jaya. It was actually built on an earlier study in 2003 which revealed that reducing chemotherapy for paediatric ALL patients led to better outcomes. However, the team felt that better solutions were still needed for children with high-risk disease and this resulted in the findings of the current study.

“Ma-Spore success is possible because of our unique collaboration, bringing together the many leaders in childhood ALL therapy in Singapore and Malaysia to focus on unique gaps, funded both by government and charity,” said Associate Professor Yeoh who is also Head and Senior Consultant at the Division of Paediatric Haematology-Oncology at NCIS and the National University Hospital (NUH).

Beyond Ma-Spore ALL 2010

With the success of Ma-Spore ALL 2010, the team has embarked on the design of a new study, Ma-Spore ALL 2020. To optimise treatment outcomes, it will explore further treatment tailoring for children who are predicted to have poorer outcomes and use immunotherapy upfront as they are already at the limits of chemotherapy.

“The ultimate aim is a cure. With better tools to study leukaemia cells and better ways to treat high risk cases, we will be able to identify those who will relapse early, so that we can intervene and cure them.” said Associate Professor Yeoh.
There has been an explosion of new knowledge and technology in the field of prostate cancer diagnostics and therapy. Here we highlight the advances in the field that we have adopted at NCIS.

Challenges of the traditional approach to prostate cancer detection

The current approach to prostate cancer (PCa) detection is based on transrectal ultrasound guided biopsy (TRUSB) after a suspicious prostate examination or raised prostate specific antigen (PSA) levels. This approach unfortunately is fraught with diagnostic uncertainty.

PSA is not prostate cancer specific. It has a poor specificity for detecting PCa as there are other reasons for a high PSA reading. For most men with a high PSA level, a biopsy will detect prostate cancer 25 per cent of the time, for the rest, the biopsy will be negative. This results in unnecessary biopsies in up to 75 per cent of men, with the attendant unnecessary cost, anxiety and possible morbidity. Prostate tumours do not appear on ultrasound. Thus, TRUSB is essentially a “blind” systematic sampling of the prostate, resulting in false negative biopsies (up to 30 per cent) from undersampling or misrepresentation of small low grade lesions as significant cancers. This compounds the problem of the poor specificity of PSA.

These two issues result in a significant rate of overdiagnosis and consequently overtreatment of indolent cancers, yet frustratingly, on the other hand, the risk of underdiagnosis and undertreatment of clinically significant cancers still persists.

At NCIS, we use advanced PCa diagnostics to minimise these problems of overdetection and overtreatment of insignificant PCa.

Advances in prostate cancer biomarkers – the p2PSA/PHI test

The [-2]proPSA (p2PSA) is the most cancer-specific molecular isoform of free PSA (fPSA). The Prostate Health Index (PHI) is a mathematical formula of three biomarkers – PSA, fPSA and p2PSA. The PHI is used to distinguish PCa from benign prostatic conditions in men aged 50 years and older with a total PSA b2-10 ng/ml, and non-suspicious prostate palpation.

A multi-centre prospective trial with the National University Hospital (NUH) and the Tan Tock Seng Hospital (TTSH) validated the PHI in Singaporean men undergoing their first TRUSB for PSA 4-10ng/ml. At a sensitivity of 90 per cent, the specificity of PHI was 58.3 per cent, more than triple the specificity of total PSA at 15.8 per cent, potentially sparing half the cohort from unnecessary biopsies.

**INTERPRETATION OF PHI**

<table>
<thead>
<tr>
<th>PHI Range</th>
<th>Probability of Cancer</th>
<th>Confidence Interval</th>
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<tbody>
<tr>
<td>&lt;23</td>
<td>8.7%</td>
<td>2.0 - 17.0%</td>
</tr>
<tr>
<td>23-45</td>
<td>20.6%</td>
<td>17.1 - 24.1%</td>
</tr>
<tr>
<td>&gt;45</td>
<td>43.8%</td>
<td>35.8 - 52.2%</td>
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</table>

The PHI allows us to risk-stratify men with a raised PSA level, to better select men who are more likely to have a positive biopsy, reducing unnecessary biopsies. More importantly, a low PHI allows us to reassure men who have had prior negative biopsies but with persistently high PSA, that they are at low risk of harbouring significant prostate cancer.

Another key finding of this study was that the free:total PSA ratio (which is commonly used to determine if men with PSA in the range of 4-10ng/ml should go for a biopsy) had a poor predictive value, and was in reality no better than PSA itself.
Advances in prostate cancer imaging

Previously with 1.5T MRI and T2 weighted imaging, only extracapsular extension of prostate cancer could be detected.

Multiparametric MRI (mpMRI) combines multiple functional MRI parameters to the anatomical T2 weighted sequences, and provides the greatest sensitivity and specificity for cancer detection. Combined with an increase in MRI field strength (3T), we are increasingly able to detect anterior and deep central prostate tumours that were previously missed.

The PRECISION trial showed that the use of mpMRI as a triage tool for men with high PSA resulted in more clinically significant prostate cancer found, with less overdiagnosis of indolent cancers. This signals a potential paradigm change in the selection of men for prostate biopsies, and can potentially spare a large proportion of men with high PSAs from prostate biopsies. However, it is important to note that 15 per cent of clinically significant prostate cancers are invisible on MRI, and thus MRI should be considered an adjunct to diagnosis, and not a screening modality.

Advances in prostate biopsy - Robotic assisted transperineal MRI fusion ultrasound guided biopsy

With better imaging, we now have the option of a targeted approach to biopsy prostate lesions. NUH and NCIS have leveraged off this new approach, using the Mona Lisa® robotic prostate biopsy platform since September 2015.

The prostate MRI performed beforehand is stored in the device, and fused with real-time ultrasound using a digital overlay, allowing the suspicious target lesion[s], previously delineated by a radiologist, to be brought into the aiming mechanism of the ultrasound machine. The fusion results in the creation of a three-dimensional reconstruction of the prostate, allowing the aiming and tracking of biopsy sites, refer to Figures 1 to 3. This is akin to using a GPS to reach your destination instead of driving without directions.

MRI guided biopsies allow us to confidently biopsy suspicious lesions, and reduce unnecessary biopsies. For men with low risk prostate cancer on active surveillance, better sampling with the robotic platform allows urologists to more confidently risk-stratify them into those who can avoid treatment, or those who need immediate treatment. For men with previous negative TRUSB but persistent suspicion for cancer, the thorough nature of saturation biopsy with this platform allows us to confidently reassure our patients that they do not have significant cancer.
**Advanced imaging**

68Ga-PSMA ligand PET/CT for imaging prostate cancer is a novel imaging technique, which is rapidly gaining popularity. It is currently the most sensitive and specific imaging technique for staging newly diagnosed high risk prostate cancer, and restaging men with biochemical recurrence after primary treatment. The increased sensitivity as compared to conventional staging with bone scan is illustrated in Figure 4.

The increased sensitivity for small volume metastases (previously undetectable on conventional CT/MRI or bone scan), has opened up the possibility of metastasis directed therapy for men with small volume metastatic prostate cancer. These men previously would have only received palliative systemic therapy. This is an emerging field of study and has been offered to selected patients in NCIS.

**Robotic surgery**

Minimally invasive radical prostatectomy with the Da Vinci robotic platform is not new, and has been available in NUH since 2008. However, we have further optimised the patient’s experience with the introduction of two key improvements.

**Enhanced Recovery After Surgery (ERAS) Protocol**

The ERAS Protocol is a combination of elements of care for patients who have undergone elective surgery. It aims to:

- Optimise pre-operative preparation for surgery
- Avoid iatrogenic problems such as postoperative ileus
- Minimise the stress response to surgery
- Speed up patient’s recovery and return to normal function

A key element of the protocol is allowing patients to have carbohydrate drinks up to two hours before the surgery.

Reducing the duration patients are required to fast, not only improves patient comfort, it also helps to reduce surgical stress and earlier return of bowel function. Since implementation, most of our patients are ambulating and taking solid diets on the first postoperative day, with many of them returning home the next day.

**Prostate Cancer Specialist Nurse (PCSN)**

With support from the Singapore Cancer Society, we now have a dedicated specialist nurse for prostate cancer, providing personalised care thus supporting our model of holistic care for our prostate cancer patients.

The PCSN is a key member of the ERAS team and performs the following roles:

- Preoperative counselling on what to expect after surgery
- Preoperative pelvic floor exercise training
- Preoperative diet and exercise counselling

Our PCSN is trained to look into the social impact that prostate cancer has on our patients, and help them navigate the resources available to them in their cancer journey.

Men undergoing radical prostatectomy in NUH are able to contact the PCSN directly. This ease of access gives our patients peace of mind, and has prevented unnecessary visits to the Emergency Department for minor post-operative issues.

**Conclusion**

These advancements in prostate cancer diagnostics are now available in NCIS, and hold great promise in maximising diagnosis of significant PCa, while reducing overdiagnosis and overtreatment of incidental cancers.

Whilst the Da Vinci robot is the epitome of surgical technological advances, it is our holistic approach to perioperative care for our patients, that truly optimises their cancer care.

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**Fig. 4 - Example of improved sensitivity of 68Ga-PSMA PET vs Bone Scan with respect to affected bone regions. Bone scintigraphy shows only limited bone involvement of the lumbar spine, ribs, pelvis, and right femur, whereas PSMA PET shows extensive osseous metastases in spine, pelvis, shoulder girdle, ribs, and all extremities, as well as lymph node involvement.**
Cancer Patients Can Now Visit Primary Care Doctors for Follow-up Care

There is a common misconception that cancer survivors are patients who are free of cancer (this is untrue). Technically, a cancer survivor is defined as a cancer patient from the time of diagnosis till death. Once they have completed their treatment, “cancer-free” patients continue to undergo regular follow-ups with their cancer doctors to monitor their condition for any abnormalities that may signal a return of the cancer.

Cancer survival in both men and women are on the upward trend due to increased cancer screening efforts and better cancer treatments. Local studies have found that the five-year cancer survival rate for men has jumped more than three-fold from 13.2 per cent in 1993 to 1997, to 48.5 per cent in 2008 to 2012. The five-year cancer survival rates for women also saw similar improvements, to 48.5 per cent in 2008 to 2012. The five-year cancer survival rate for men has jumped and better cancer treatments. Local studies have found an upward trend due to increased cancer screening efforts and better cancer treatments.

“With the rising number of cancer survivors, cancer is moving towards being treated like a chronic disease. In the future, it may well be treated like a chronic condition once the acute phase of treatment is over. Therefore, the engagement of primary care physicians for the future care of cancer patients is important.” said Dr Chan Ching Wan, Senior Consultant, Division of Surgical Oncology (Breast Surgery), NCIS.

<table>
<thead>
<tr>
<th>Type of Cancer</th>
<th>2006-2010 (%)</th>
<th>2011-2015 (%)</th>
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<tbody>
<tr>
<td></td>
<td>5-Year ASOS²</td>
<td>5-Year ASRS³</td>
</tr>
<tr>
<td></td>
<td>(95% CI)</td>
<td>(95% CI)</td>
</tr>
<tr>
<td>Breast</td>
<td>68.66</td>
<td>78.09</td>
</tr>
<tr>
<td>Colon (Males)</td>
<td>46.70</td>
<td>56.58</td>
</tr>
<tr>
<td>Colon (Females)</td>
<td>52.06</td>
<td>59.82</td>
</tr>
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</table>

Source: Singapore Cancer Registry Annual Registry Report 2015 – Note: Calculation of survival above follows methodology in ‘Cancer Survival in Singapore, 1968 – 2007), except the life table used to general expected survival for 2006 – 2014 was obtained from Department of Statistics (DOS).
With the launch of NCIS’ Cancer Survivorship Programme, cancer survivors can now choose to have their follow-up care done at a primary care clinic near their home. In the pilot phase of this initiative, selected breast and colorectal cancer survivors will now be able to visit designated general practitioners (GPs) in the National University Health System’s primary care network, Keat Hong and Frontier Family Medicine Clinics, as well as six polyclinics under the National University Polyclinics for routine cancer care. Cancer survivors will enjoy reduced travelling and waiting times during their regular follow-up checks. As they no longer need to see a specialist, they will also save on medical costs.

“Beyond active treatment, the routine care provided at a cancer centre is no different from a primary care physician’s clinic. For routine health screening and wellness issues, the primary care physician is more equipped to do this as it is done on a routine basis for all patients. This provides added benefit to the patient in addition to saving their time and money.” said Dr Chee Cheng Ean, Consultant, Department of Haematology-Oncology, NCIS.

To ensure that the GPs are well equipped to manage cancer survivors, NCIS will train and accredit them to provide follow-up care for cancer survivors. A fast-track referral system back to the hospital will also be established, so that cancer survivors will have swift access to their oncologists if there are concerns for cancer recurrence.

The Cancer Survivorship Programme is currently available for selected Breast and Colorectal patients who are no longer on active treatment. Moving forward, there are plans to expand this service to other cancer types.

References:
2. ASOS – Age-Standardised Observed Survival (%): Percentage of patients who are still alive after a specified period of time following diagnosis.
3. ASRS – Age-Standardised Relative Survival (%): Obtained by dividing the observed survival of cancer patients by the survival of a presumably cancer-free population, matched by gender and age. This provides an estimate of survival if the risks of death other than the cancer are removed.
Conventionally, doctors treat cancer by administering the same kind of treatment to patients with the same type and stage of cancer. However, different people respond differently to the treatment and a drug that has proven successful with one patient may not work as well with another. Increasingly, doctors find that this one-size-fits-all approach may no longer be the best way to treat cancer.

Enter Precision Medicine – a revolutionary approach at the molecular level that is changing the landscape of cancer treatment. Decades of research have revealed that genetic changes to a patient’s tumour affect the way it responds to treatment. With precision medicine, doctors hope to determine the most effective treatment for a patient based on a genetic understanding of a patient’s tumour.

At NCIS, precision medicine represents hope for patients who have exhausted all conventional means of treatment. With precision medicine, our ultimate goal is to ensure that the right cancer patients receive the right treatment at the right time – all the time.
Matching genetic cancer profiles with early phase clinical drugs

One of the biggest challenges that oncologists currently face is the ability to identify the multiple types of abnormal molecular changes in cancer cells and match patients in a timely fashion to the best available conventional treatments.

A two-year pilot study by NCIS is helping to match cancer patients with certain genetic profiles to early-phase clinical trials of new drugs. More than 200 patients comprising Singapore residents and foreigners have been genetically tested under the expanded Integrated Molecular Analysis of Cancer (IMAC) Programme. The IMAC programme was one of the first molecular screening programmes initiated in Asia, and was conducted to assess the feasibility of performing molecular screening of tumours from Asian patients with advanced cancers before matching them to targeted treatments.

Molecular screening is carried out by a single test that can reveal alterations in DNA that drive cancer growth. Hence, this serves as a “therapeutic match-maker” by helping to identify specific tumour molecular profiles in patients who can then be matched and enrolled into early-phase clinical trials of new drugs that can best target and counteract the molecular abnormalities in tumour cells.

The pilot study which involved 396 patients took place from April 2014 to September 2016. It screened tumour abnormalities in 50 cancer-related genes of each patient. 23 of these patients were matched to a clinical trial and of these, three of them saw their tumours shrink by more than a third, while another six had their cancers stabilised for more than two months.

“The programme gives patients access to drugs which are not yet on the market, and provides them with targeted treatment,” said Dr David Tan, a consultant at NCIS’ Department of Haematology-Oncology. He attributes the low proportion of matches to two factors – what doctors can identify in the tumour and what clinical trials are available. For this study, only around 8 per cent of patients were matched to clinical trials but this number is likely to rise as the number of identifiable aberrations in tumours and availability of clinical trials increases.

Designing new drug combinations for Multiple Myeloma with the help of artificial intelligence

Conventional treatment for Multiple Myeloma relies on bortezomib-based drug combinations that patients typically develop resistance to over time. This has resulted in a need to develop more effective drug combinations more efficiently. To achieve that, doctors typically test random combinations of common drugs or incorporate new targeted therapies into established drug combinations.

Researchers at the National University of Singapore (NUS) have now found a way to swiftly pinpoint the most suitable drugs for a patient’s personalised treatment. The Quadratic Phenotypic Optimisation Platform (QPOP) is an artificial intelligence-based platform that has helped the team design new drug combinations that have proven effective against bortezomib-resistant multiple myeloma.

“Currently, while many of the newer agents have been shown to be also effective in some patients who are resistant to bortezomib, these are by no means universal. The ability to identify combinations that are effective against different resistance models will be useful in the clinic to further individualised treatment and overcome the issue of heterogeneity,” said co-author Professor Chng Wee Joo, Director of NCIS.

QPOP is able to produce results rapidly, by mapping the quantitative phenotypic effects that a set of drug combinations has on a specific patient sample or
disease model. Based on these results, it then identifies the best drug combinations for that patient sample or disease model.

“QPOP is part of an emerging area of artificial intelligence that looks to maximise small data sets to achieve desired results as efficiently as possible,” said Dr Edward Kai-Hua Chow, corresponding author and a Principal Investigator at the Cancer Science Institute of Singapore, NUS.

“This approach is a paradigm shift in how drug combinations are designed and how patients will be treated with drug combinations, as it solely relies on how a specific patient’s own cells respond to drug combinations and not on complex genetic analysis or how the overall patient population responds,” said co-author Professor Dean Ho, Provost Chair Professor in the Departments of Biomedical Engineering and Pharmacology and Director of the Singapore Institute for Neurotechnology (SINAPSE) at NUS. Prof Ho is also a Principal Investigator at the NUS Bioengineering Institute for Global Health Research and Technology (BIGHEART).

Using genetic profiling to tailor gastric cancer treatment

Gastric cancer patients may soon enjoy the benefits of a personalised cancer treatment plan. A recent research study led by NCIS, in collaboration with several local and overseas healthcare institutions revealed that genetic profiling could be used as a clinical tool to develop more targeted treatment plans.

Genetic profiling usually takes two to three weeks or even longer. However, as part of the research study, the genetic profiling for 111 patients with advanced gastric cancer was completed within a week. The researchers were then able to group similar genetic profiles together and match them to drugs that are commonly used to combat gastric cancer. For the group that was predicted to be more responsive to oxaliplatin, a response rate of 45 per cent was observed. In contrast, a response rate of 8.3 per cent was observed after a group with a similar genetic profile was given cisplatin.

The study is the first to use genetic profiling for disease stratification and treatment assignment in advanced gastric cancer and the results demonstrate the potential of using genetic profiling to personalise individual treatment plans so that more effective outcomes can be achieved.
In 2008, The Cancer Institute (TCI) was formally renamed the National University Cancer Institute, Singapore (NCIS) by the Ministry of Health and assumed the key responsibilities of a national specialist centre for cancer. Prior to that, NCIS had already accumulated 20 years of oncology experience, treating cancer patients since our very first clinic in 1988.

Today, NCIS is a national specialist centre under the National University Health System (NUHS) and the only public cancer centre in Singapore that treats both paediatric and adult cancers in one facility. In celebration of this special milestone, 2018 was an amazing year filled with exciting activities and events. Here is a look back at some of the major events that had happened!

Our 10th anniversary activities kicked off with the NCIS10 Townhall & Staff Celebrations, where staff were presented with a commemorative gift by the Centre Director and Senior Leaders.

In the same month, the NCIS10 Roving Exhibition made its first appearance at the NUHS Tower Block before travelling around the western part of Singapore for the rest of the year. The exhibition showcased informative cancer prevention, detection and screening tips, a trip down memory lane reminiscing our early formative years, inspirational stories from our NCIS cancer warriors who are currently into their 10th year of survivorship and more, as well as heartfelt stories of our staff who have been with NCIS for 10 years and beyond.

NCIS Dream Makers, a new initiative was launched to help our patients with advanced cancers reach their dreams. For their very first cancer warrior, Dream Makers collaborated with Moving Visuals to help fulfil Joseph’s wish of travelling to Hokkaido in honour of his late grandmother. The experience was filmed and broadcast on local television. Catch it on Toggle if you’ve missed it, or visit our website for more information on Dream Makers!

NCIS Ribbon Challenge, our first major celebratory event took place at the Canopy@JLink on 24 March 2018. It was a memorable and meaningful day as we set out to raise awareness of the importance of cancer screening and early detection to the public. This day also marked a new achievement for NCIS as we entered the Singapore Book of Records with 10,125 cancer awareness ribbons collected! These ribbons signify support for those lost to cancer, survived cancer and currently battling with cancer.

In addition, 707 members of the public pledged to screen for cancer, bringing us one step closer to winning against cancer. Highlights of the event included an on-site mammobus for mammogram screening, distribution of FIT kits for colorectal cancer screening and a special performance by the OneHeart Support Group, as well as our doctors who “sacrificed” themselves to get dunked all in the name of a good cause.

A special 50-page bumper edition of SPARK was published. It showcased 30 years’ worth of exciting highlights through NCIS’ past, present and future. SPARK is the official bi-annual publication of NCIS.
We organised the 9th edition of the annual ‘Winning Against Cancer’ public symposium on 15 September 2018 and saw almost 400 participants in attendance. The symposium focused on an in-depth understanding of liver and prostate cancers, management of both conditions and the latest treatments available.

Themed ‘Shine Like A Star’, NCIS Celebrates Life 2018 saw over 200 cancer survivors and patients turn up dressed to the nines like a shining star of hope and courage. Apart from the talent show and fashion runway segments, we invited three “stars” to share their experiences with cancer to help inspire and motivate their fellow cancer warriors.

Over $700,000 was raised at our 10th Anniversary Fundraising Gala Dinner, where President Halimah Yacob was the guest-of-honour. The proceeds went towards the NCIS Cancer Fund which provides financial assistance to more than 100 needy patients, who require critical cancer treatment but unfortunately fall through the cracks of society’s existing safety nets. The fund also supports cancer research, education and training of healthcare professionals.

Guests at the event also had a glimpse of our brand new mobile application which will be made available to 200 breast and colorectal cancer patients later this year. With this app, patients can do more than just track their medical appointments. Acting like a ‘buddy’ and powered by artificial intelligence, the app can provide customised advice in real-time, answer cancer-related questions via a chatbot and monitor the patient’s condition.

At NCIS, every person matters and our goal is to provide comprehensive yet personalised care for each and every patient incorporating the full spectrum of care from cancer awareness, prevention and diagnosis to treatment, rehabilitation and palliative care. This is our commitment to you and we will continue to deliver it in many years to come.
SPECIAL FEATURE

**JAN**

Raising Cancer Awareness at 7 Locations
with the NCIS10 Roving Exhibition

**MAR**

Team NCIS walked 125.6KM for Charity at Relay for Life 2018

10,125 Cancer Awareness Ribbons collected and we entered the Singapore Book of Records

707 members of the public Pledged to screen for cancer

**APR**

More than 30 Volunteers joined NCIS Dream Makers to help turn dreams into reality

**SEP**

Shared important cancer knowledge with 400 Participants at our 9th ‘Winning Against Cancer’ Symposium

**NOV**

Over $700,000 raised at our 10TH Anniversary Gala Dinner for needy patients, research and education.

**DEC**

10 Support Groups and Counting providing Invaluable Peer Support to our cancer patients

...AND MORE!

6 New Initiatives launched to provide Holistic Care, Ultimate Comfort and Convenience for our patients

- Acute Cancer Care Clinic
- APN-led Urgent Care Clinic
- Cancer Survivorship in the Community Programme
- Geriatric Oncology Clinic
- Outpatient Stem Cell Transplant with Home Monitoring
- Short Stay Ward SSW@NCIS
Lung cancer remains the deadliest cancer among men and women worldwide, accounting for one in four cancer deaths. Non-small cell lung cancer (NSCLC) accounts for up to 85 per cent of lung cancer diagnoses. More than two-thirds of NSCLC patients are diagnosed at an advanced stage where tumours are detected in more than one site of the body. The overall five-year survival rate of advanced stage NSCLC patients stands at a low 15 per cent. The development of tyrosine kinase inhibitors (TKIs), which targets the epidermal growth factor receptor (EGFR) and the sequential detection of activating EGFR mutations as a molecular marker for tumour sensitivity to these drugs, has greatly impacted lung cancer management in the past decade. Mutations in the EGFR gene are more prevalent in Asian populations, as compared to their Western counterparts (45-55 per cent versus 10-20 per cent). The conventional treatment for EGFR-mutated NSCLC patients is with anti-EGFR tyrosine kinase inhibitors (TKIs) chemotherapeutic agents, which binds specifically to mutated EGFR and inhibits its activity. However, the success of TKI-based treatment has been limited by the development of acquired resistance and the tumours can no longer respond to TKI-treatment.

The focus of my research is to identify new targetable targets for therapeutic intervention in NSCLC, where the lack of treatment options following acquired resistance to EGFR-TKIs indicates that investigation is warranted. Metabolic reprogramming is widely known as a hallmark of cancer cells which allows an adaptation of cells to sustain survival signals. In the past decade, altered lipid metabolism has been recognised to be a property of malignant cells. However, the contributions of altered lipid metabolism signaling to cell transformation, tumour development and progression, as well as their potential roles in metastasis and resistance to treatment have yet to be fully understood.

My research team has recently identified a link between lipid metabolic pathway and TKI-resistance in EGFR mutated NSCLC. We found that mutated-EGFR forms a positive feedback loop with Fatty Acid Synthase (FASN), an enzyme that synthesises fatty acid, to sustain NSCLC tumour survival signals. This positive feedback cycle can be interrupted, by inhibiting FASN with the anti-lipid drug, Orlistat, that attenuates tumour growth.

Through joint collaborations with Professor Daniel Tenen, Director of the Cancer Science Institute of Singapore, and Adjunct Professor Goh Boon Cher, Deputy Director of Research at NCIS, we are uncovering other potential targetable lipid metabolic targets with anti-lipid drugs that offer a promising paradigm on the manipulation of metabolic pathways as a new direction in cancer therapy.

Schematic diagram of the proposed model depicting the functional relationship between EGFR and FASN in TKI resistance within EGFR mutated NSCLC cells

In TKI-naïve EGFR mutant cells, the EGFR-TKI drug, Gefitinib, effectively inhibits growth of lung tumour cells (left panel). However, after developing resistance to Gefitinib, an EGFR-TKI, the drug can no longer impede growth of tumour cells. Resistance to Gefitinib is attributed to the modification of EGFR facilitated by fatty acid synthase (FASN). Palmitoylation is a process where a 16-carbon fatty acid palmitate, synthesized by FASN, is covalently attached to proteins. In this study, EGFR is modified with the addition of palmitate, and this renders it untargetable by Gefitinib, therefore promoting tumour cell growth. In cell culture systems and vivo models, pharmacological inhibition of FASN by Orlistat prevents EGFR palmitoylation and restricts lung tumour survival.
New drug development at the Haematology-Oncology Research Group in NCIS involves a multi-disciplinary group of scientists and clinical staff committed to the preclinical and clinical development of new anti-cancer drugs. Early phase clinical trials in cancer therapeutics are conducted at the Developmental Therapeutics Unit (DTU) at NCIS. Importantly, the establishment of the NCIS DTU has already helped attract interest from drug companies seeking academic partners who have the appropriate infrastructure in place to support early phase trials in Asia. This has in turn benefited our patients by giving them access to cutting-edge anti-cancer drugs.

The Yong Siew Yoon (YSY) NCIS Developmental Therapeutics Fellowship was set up in 2015 to provide fellows with the opportunity to participate in a clinical research fellowship in drug development at NCIS. The fellowship involves active participation in the planning, coordination and implementation of selected trial protocols. Work includes the writing of protocols and letters of intent; analysing trial data; presenting results at local, national and international meetings; and preparing final peer-reviewed manuscripts for publication. In addition, the fellow will have the opportunity to run Phase I clinics - about two half day sessions per week - where they will see patients participating in early phase clinical trials. Work with patients may include such tasks as routine physical examinations and attending to urgent clinical issues. Fellows will also share responsibility for inpatient care of trial patients. Additionally, fellows are also encouraged to actively participate in clinical patient care and research projects in a tumour-specific specialty of their choice.

Our current fellow is Dr Valerie Heong who trained in medical oncology and worked in Melbourne, Australia before deciding to take up the YSY fellowship in drug development at the NCIS in 2015. Her other main subspecialty interest was in gynaecologic medical oncology and she was involved in several research projects with the NCIS gynaecologic cancer group. Dr Heong has done very well during her time with us having presented her work with the DTU and NCIS gynaecologic oncology team at local conferences like the NCIS Annual Research Meeting (NCAM), and the ASCO and ESMO conferences.

During her time with us, she also completed her PhD and published several papers, including the pilot data from our precision therapy programme in the DTU (the Integrated Molecular Analysis of Cancer), and work done in collaboration with Dr Ruby Huang from the Cancer Science Institute and the NCIS gynaecologic oncology team.

We have indeed been very fortunate to have Dr Valerie Heong with us and hope that future fellows will also benefit from the experience of working in the DTU and NCIS.

Dr Valerie Heong (right) receiving the Runner Up award for best oral presentation at the 2nd NCIS Annual Research Meeting in 2015 from Dr Lee Soo Chin (left)

Dr David Tan is a consultant medical oncologist and clinician scientist at NCIS. He is also an Assistant Professor at the Yong Loo Lin School of Medicine, NUS. Dr Tan graduated with an intercalated BSc in Experimental Pathology and MBBS with Distinction from Guy’s, King’s and St Thomas’ School of Medicine, University of London. He undertook training in internal medicine at Hammersmith, Guy’s and St Thomas’ Hospitals in London, and obtained his MRCP (UK) in 2005. He was a Cancer Research UK Clinical Research Fellow at the Institute of Cancer Research, London, where he obtained his PhD, and trained in Medical Oncology at the Royal Marsden Hospital, London. He also completed a fellowship in drug development and gynaecologic oncology at the Princess Margaret Cancer Centre, University of Toronto, before returning to Singapore.

Dr David Tan is a consultant medical oncologist and clinician scientist at NCIS. He is also an Assistant Professor at the Yong Loo Lin School of Medicine, NUS. Dr Tan graduated with an intercalated BSc in Experimental Pathology and MBBS with Distinction from Guy’s, King’s and St Thomas’ School of Medicine, University of London. He undertook training in internal medicine at Hammersmith, Guy’s and St Thomas’ Hospitals in London, and obtained his MRCP (UK) in 2005. He was a Cancer Research UK Clinical Research Fellow at the Institute of Cancer Research, London, where he obtained his PhD, and trained in Medical Oncology at the Royal Marsden Hospital, London. He also completed a fellowship in drug development and gynaecologic oncology at the Princess Margaret Cancer Centre, University of Toronto, before returning to Singapore.
Can you describe a typical day at work?

One of the main roles of a coordinator is to assist the investigator in managing and monitoring patients who are recruited for a research study. So, a typical day always begins just before the patient’s scheduled visit. I will ensure that the blood tests required are ordered, prepare the necessary documents and laboratory kits and schedule the courier service in advance to avoid delay.

After registration, I will interview the patient to understand his/her condition after the last visit and also to ensure compliance of oral drug dosing if any. All information obtained from this session will be shared with the investigator during consultation.

Once the patient is deemed fit for the next treatment, a pharmacist will be notified via the Interactive Web Response System (IWRS) to prepare the drugs. However, if the patient presents with an adverse event (AE), the investigator and I will then refer to the study’s recommended AE management guidelines. This will help to determine the next treatment for the patient.

As a coordinator, I also assume the key responsibility to explain the logistical aspects of the study, such as the schedule and assessments to the patient and his/her family when the investigator identifies a potential patient.

What strategies did you use to overcome multiple tasks and responsibilities?

1. Use of a personal organiser – to help me prioritise tasks and complicated cases, so as to eliminate any risk of mistakes that will jeopardise the patient’s safety.

2. Create a checklist and schedule for each study based on the protocols – so that all appointments can be scheduled without delay and that the patients are informed promptly.

3. Use trackers to keep tabs on the different versions of the documents – ensure a smooth study that is conducted with less or no deviation, such as non-compliance.

How do you feel dealing with different kinds of clinical trial cancer patients?

We meet patients of various conditions who might be suitable for the different trial phases. While some patients have little knowledge or a wrong perception about participating in clinical trials or research, I am always happy to provide them with more information.

I remembered a phase I trial patient who had to give up his job due to his condition, leaving his wife to be the sole breadwinner for the family. As all his savings were spent and there was no more standard treatment available for him, he felt very helpless and depressed. If not for the new trial treatment which enabled him to continue fighting cancer, he would have already given up. The trial gave him new hope and he was immensely grateful for it. As his coordinator, I feel proud that I was able to assist him and journey with him.

This work may be very challenging, but there is a great sense of achievement and satisfaction. Most importantly, I get a chance to help patients from all walks of life.

What are some personal goals and dreams that you hope to achieve?

It has been a fabulous 10 years working in NCIS! Having good health is of utmost importance in order to pursue one’s dream. So, I wish to be always in the pink of health to continue providing good service and care to the people around me. I hope my experience as a clinical research coordinator will inspire the younger generation.

Ms Pang Mei Yan
Senior Clinical Research Coordinator
Haematology-Oncology Research Group (HORG)
MULTIPLE MYELOMA TRAINING FOR PHYSICIANS 2018

Organised by NCIS, the five-day intensive workshop hosted 15 overseas delegates from, to share about the techniques for assessing multiple myeloma, as well as comprehensive insights on the implications, diagnosis, stratification and treatment plans.

LIVING WITH LYMPHOMA 2ND WORLD LYMPHOMA AWARENESS DAY

Jointly organised by the Singapore General Hospital, National Cancer Centre Singapore and NCIS, the symposium was led by a multidisciplinary panel of speakers who covered a wide range of topics including lifestyle, diet, financial and emotional support.

BREAST CANCER AWARENESS MONTH 2018 PINK RIBBON WALK, WORKOUT AND LINE DANCE

October is Breast Cancer Awareness Month (BCAM) and it began with the annual Pink Ribbon Walk which was flagged off from the Singapore Sports Hub by the Guest-of-Honour Ms Indranee Rajah, Minister in Prime Minister’s Office, Second Minister for Finance and Second Minister for Education, alongside Dr Samuel Ow, Dr Lim Siew Eng and Team NCIS. Over 4,000 members of the public walked together dressed in pink to raise awareness for breast cancer.

At NCIS’ Pink Ribbon Workout and Line Dance events, over 50 women learned about breast self-examination while working out!

WORKSHOP & SYMPOSIUM ON PERITONEAL CANCERS 2ND ASIA-PACIFIC PRESSURISED INTRAPERITONEAL AEROSOL CHEMOTHERAPY (PIPAC)

Jointly organised by the National University Hospital (NUH), the National University of Singapore (NUS) and NCIS, the second PIPAC workshop saw pioneers and international experts discussing the latest management of peritoneal metastasis for gastrointestinal and gynaecological cancers.

38 participants of the two-day workshop also benefitted from the dry lab simulated session as well as the live demonstration of the procedure in an operating theatre.
Congratulations to all our award winners!
Thank you for lifting the standards of healthcare and going above and beyond our patients at NCIS!

Dr Keith Lim
Senior Consultant, Department of Radiation Oncology
National Clinical Excellence Team Award

Dr Michelle Tseng
Registrar, Department of Radiation Oncology
Royal Australian and New Zealand College of Radiologists (RANZCR) Faculty of Radiation Oncology Bourne and Langlands Research Prize

Dr Lee Yee Mei
Head, Division of Oncology Nursing
MOH Appreciation and Awards 2018 – Minister for Health Award

Ms Goh Li Li
Senior Principal Radiation Therapist, Department of Radiation Oncology
2018 National Day Award – The Commendation Medal
Singapore Society of Radiographers Silver Medal

Ms Mary Chong
Nurse Clinician
2018 National Day Award – The Efficiency Medal

Ms Chua Chue Teng
Nurse Clinician
2018 Ministry of Health – Nurses’ Merit Award
Congratulations to our newly promoted doctors!

1. **DR LEE SHIR YING**
   Senior Consultant
   Department of Haematology-Oncology

2. **ASST PROF NGIAM KEE YUAN**
   Senior Consultant
   Division of Surgical Oncology
   (Thyroid and Endocrine Surgery)

3. **DR ANAND D JEYASEKHARAN**
   Consultant
   Department of Haematology-Oncology

4. **DR SOUMEN DAS DE**
   Consultant
   Division of Surgical Oncology
   (Hand & Reconstructive Microsurgery)

5. **DR LEE HANJING**
   Consultant
   Division of Surgical Oncology
   (Plastic, Reconstructive & Aesthetic Surgery)

6. **DR OOI KIAT HUAT**
   Consultant
   Department of Radiation Oncology

7. **DR KIM GUOWEI**
   Consultant
   Division of Surgical Oncology
   (Upper Gastrointestinal Surgery)

8. **DR FIONA WU**
   Consultant
   Division of Surgical Oncology
   (Urology)
SPECIALIST AND TUMOUR GROUP LISTING

**BLOOD CANCERS AND BLOOD DISORDERS**

**Bone Marrow and Stem Cell Transplant Programme**

- **Haematology-Oncology**
  - A/Prof Koh Liang Piu (Lead)
  - Dr Joanne Lee
  - Dr Michelle Poon
  - Dr Tan Lip Kun

- **Diagnostic Imaging**
  - Dr Loi Hoi Yin

- **Radiation Oncology**
  - A/Prof Jeremy Tey

- **Coagulation**

- **Haematology-Oncology**
  - Dr Lee Shir Ying (Lead)
  - Dr Michelle Poon

- **Diagnostic Imaging**
  - Dr Loi Hoi Yin

- **Lymphoma**

- **Haematology-Oncology**
  - Dr Ng Siok Bian

- **Pathology**
  - Dr Tan Lip Kun

- **Radiation Oncology**
  - A/Prof Koh Wee Yao

**BRAIN CANCER**

- **Neurosurgery**
  - Dr Chin Chuan

- **Haematology-Oncology**
  - Dr Tan Lip Kun

- **Pathology**
  - Dr Loi Hoi Yin

- **Radiation Oncology**
  - Dr Leong Yiat Horng

**COLONIC CANCERS**

- **Surgical Oncology**
  - Dr Chong Wan Qin

- **Haematology-Oncology**
  - Dr Tan Lip Kun

- **Pathology**
  - Dr Loi Hoi Yin

- **Radiation Oncology**
  - Dr Leong Yiat Horng

**GYNAECOLOGIC CANCER**

- **Surgical Oncology**
  - Dr Chong Wan Qin

- **Haematology-Oncology**
  - Dr Tan Lip Kun

- **Pathology**
  - Dr Loi Hoi Yin

- **Radiation Oncology**
  - Dr Leong Yiat Horng

**HEAD & NECK CANCER**

- **Surgical Oncology**
  - Dr Chong Wan Qin

- **Haematology-Oncology**
  - Dr Tan Lip Kun

- **Pathology**
  - Dr Loi Hoi Yin

- **Radiation Oncology**
  - Dr Leong Yiat Horng

**LIVER, PANCREATIC AND BILARY (HPB) CANCER**

- **Surgical Oncology**
  - Dr Chong Wan Qin
Dr Alfred Kow
Diagnostic Imaging
Dr Stanley Loh
Dr Prapul Rajendran
Dr Mangat Kamarjit Singh
Dr Pavel Singh
Haematology-Oncology
Dr Chee Chong Ean
Dr Ho Jingshan
Dr Raghav Sundar
Dr Tan Hon Lyn
Dr Yong Wei Peng
Gastroenterology & Hepatology
Prof Lawrence Ho
Prof Lim Seng Gee
A/Prof Dan Yock Young
Dr Bhavesh Doshi
Dr Kristie Fan
Dr Michelle Angela Gowans
Dr Daniel Huang
Dr Calvin Koh
Dr Lee Guan Huei
Dr Lee Yit Horng
Dr See Kay Choong
MUSCULOSKELETAL CANCER/SARCOMA
Hand & Reconstructive Microsurgery
Dr Mark Puhaindran (Lead)
E/Prof Robert Pho
Orthopaedic Surgery
Asst Prof Gurpal Singh
Diagnostic Imaging
A/Prof Quek Swee Tian
Asst Prof Arvind Kumar Sinha
Dr Sachin Agrawal
Dr Louise Gartner
Dr James Hallinan
Dr David Sia
Dr Sall Singbal
Pathology
A/Prof Victor Lee
Dr Susan Hue
Haematology-Oncology
Dr Angela Pang
Radiation Oncology
Asst Prof Timothy Cheo
Asst Prof Wong Lea Choung
Dra Ooi Kiat Huat
Paediatric Haematology-Oncology
A/Prof Quah Thuan Chong
Dr Miriam Kimpo
Dr Bernice Oh
PAEDIATRIC HAEMATOLOGICAL MALIGNANCIES
Paediatric Haematology-Oncology
A/Prof Allen Yeoh (Lead)
Prof Dario Campagna
A/Prof Quah Thuan Chong
A/Prof Tan Poh Lin
Dr Elaine Coustan-Smith
Dr Krista Francisco
Dr Miriam Kimpo
Dr Koh Pei Lin
Dr Shawn Lee
Dr Bernice Oh
Dr Mariflor S Villegas
Dr Frances Yap
Diagnostic Imaging
Dr Jeewesh Kapur
Pathology
A/Prof Tan Soo Yong
A/Prof Ng Siok Choo
Surgical Oncology
A/Prof Edmund Chong (Lead)
Prof Kesavan Esuvanathan
A/Prof Trong Ho Yee
Dr Chua Wei Jin
Dr David T Consigliere
Dr Joe Lee
Dr Lincoln Tan
Dr Fiona Wu
Dr Wu Qinghui
Diagnostic Imaging
Dr Bertrand Ang
Dr Wynne Chua
Dr Stanley Loh
Dr Edwin Siew
Haematology Oncology
Prof John Eu-Li Wong
Dr Alvin Seng
Pathology
Dr Thomas Paulraj
Thamboo
Radiation Oncology
A/Prof Keith Lim
Asst Prof Jeremy Tey
SKIN CANCER
Dermatology
Dr Sue-Ann Ho (Lead)
Dr Nisha Suyien Chandran
Haematology Oncology
Dr Chong Wan Qin
Hand & Reconstructive Microsurgery
Dr Soumen Das De
Dr Mark Puhaindran
Pathology
A/Prof Tan Kong Bing
Dr Huang Jingxiang
Plastic, Reconstructive & Aesthetic Surgery
Dr Lee Hanjing
Dr Yap Yan Lin
Radiation Oncology
Dr Timothy Cheo
Dr Leong Yat Horng
Surgical Oncology
A/Prof Thomas Loh
Dr Ng Li Shia
THYROID CANCER
Surgical Oncology
A/Prof Thomas Loh (Lead)
Asst Prof Ngiam Kee Yuan
Dr Donovan Eu
Dr Lim Chwee Ming
Dr Rajeev Parameswaran
Dr Tan Wei Boon
Diagnostic Imaging
Dr Loi Hoi Yin
Dr Peh Wei Ming
Dr Arvind Sinha
Endocrinology
Dr Chin Siok Bee
Dr Samantha Yang
Dr Kathleen Sek
Haematology Oncology
Adjunct Prof Goh Boon Cher
Pathology
A/Prof Nga Min En
A/Prof Fredrik Petersson
UPPER GASTROINTESTINAL CANCER
Surgical Oncology
Prof Jimmy So (Lead)
E/Prof Ti Thoiw Kong
Dr Kim Guo Wei
Dr Asim Shabbir
Diagnostic Imaging
Dr Sheldon Ng
Dr Prapul Rajendran
Dr Pavel Singh
Dr Yang Cunli
Gastroenterology & Hepatology
Prof Lawrence Ho
A/Prof Yeoh Khay Guan
Dr Bhavesh Kishor Doshi
Dr Calvin Koh
Dr Jonathan Lee Wei Jie
Dr Lim Li Lin
Dr Low How Cheng
Dr Mark Dhinesh Muthiah
Haematology Oncology
Dr Chee Cheng Ean
Dr Ho Jingshan
Dr Angela Pang
Dr Raghav Sundar
Dr Tan Hon Lyn
Dr Yong Wei Peng
Pathology
A/Prof Nga Min En
Dr Jeffrey Lum
Dr Teh Ming
Dr Benjamin Wong
Radiation Oncology
Asst Prof Bala Vellayappan
Asst Prof Leong Cheng Nang
Asst Prof Jeremy Tey
Asst Prof Francis Ho
Dr Leong Yat Horng


SEPTEMBER


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NCIS EVENTS & PROGRAMMES (JAN - JUN 2019)

UPCOMING EVENTS

JANUARY
- 1st Singapore Geriatric Cancer Symposium
  For Healthcare Professionals / Allied Health Professionals / Researchers
- Caregiver Workshops
  For NCIS Caregivers
- Chinese New Year Craft Workshop
  For NCIS Patients / Caregivers
- GP CME Talk - NCIS Cancer Updates for GP: Prostate Cancer Screening, Cervical Cancer Screening and Cancer Prevention: Obesity Management
  For GPs / Family Physicians
- January Oncology Grand Rounds – Genes, Genomics and Immunology: Cancer Medicine Transformed
  For Healthcare Professionals
- January Oncology Grand Rounds – Polypharmacy and Drug Interactions in Cancer Patients
  For Healthcare Professionals
- January Oncology Grand Rounds - Optimization of Care of Geriatric Oncology Patients with the 65+ Programme in MSKCC
  For Healthcare Professionals
- Relax your Mind Yoga Class
  For NCIS Patients / Caregivers

FEBRUARY
- Chinese New Year Craft Workshop
  For NCIS Patients and Caregivers
- February Oncology Grand Rounds - Esophageal Cancer in 2019: A Surgeon’s Vantage Point
  For Healthcare Professionals
- February Oncology Grand Rounds – Rehabilitation in Chemo Induced Peripheral Neuropathy
  For Healthcare Professionals
- Look Good Feel Better Workshop
  For NCIS Patients only
- MindCAN Research Programme
  For NCIS Patients only
- Relax Your Mind Yoga class
  For NCIS Patients / Caregivers

MARCH
- 9th National Myeloma Forum
  For the Public
- Colorectal Cancer Awareness
  For the Public
- Living Well with Cancer Education Series
  For NCIS Patients only
- March Oncology Grand Rounds
  For Healthcare Professionals

APRIL
- April Oncology Grand Rounds – Discussing Do Not Resuscitate Status, Discussing Hospice Care
  For Healthcare Professionals
- GP CME Talk
  For GPs / Family Physicians
- Living Well with Cancer Education Series
  For NCIS Patients only
- Look Good Feel Better Workshop
  For NCIS Patients only
- MindCAN Research Programme
  For NCIS Patients only
- Relax Your Mind Yoga class
  For NCIS Patients / Caregivers

MAY
- Living Well with Cancer Education Series
  For NCIS Patients only
- May Oncology Grand Rounds – Volume Care, Value Care and Patient Centered Care
  For Healthcare Professionals
- Relax Your Mind Yoga class
  For NCIS Patients only
- Skin Cancer Public Forum
  For the Public
- Women’s Gynaecological Cancer Awareness Activities
  For the Public

JUNE
- June Oncology Grand Rounds
  For Healthcare Professionals
- Living Well with Cancer Education Series
  For NCIS Patients only
- Look Good Feel Better Workshop
  For NCIS Patients only
- Relax Your Mind Yoga class
  For NCIS Patients / Caregivers
- Women’s Gynaecological Cancer Awareness Activities
  For the Public

The events and programmes listed above are subject to change, please check our website at www.ncis.com.sg for the most updated information.
YOUR GIFT BRINGS HOPE TO MANY

Every year, the NCIS Cancer Fund provides financial assistance to more than 100 needy cancer patients. Your generous gift will also help us develop better methods to diagnose and treat the disease, improving the survival rates of cancer patients.

For further enquiries on making a donation, please call (65) 6773 7888 or email ncis@nuhs.edu.sg.

As a registered charity organisation that has Institute of Public Character status, all donations to the NCIS Cancer Fund qualify for tax deduction.