Imagine a World without CANCER

Bringing cancer under control

Research

Advocacy

Knowledge into action

Translate information to knowledge

Health
As a leading role player in cancer research, CANSA is one of the few public-funded organisations in South Africa that has sustainable funding for research. These funds, mainly donated by bequest, have been invested by experts in research within CANSA. The association runs five categories of research, that is, Types A, B, C, D and E, with the core focus areas being epidemiology, early diagnosis and lowering the risk of cancer.

CANSA ensures that the scientific findings and knowledge gained from our research are used to realign our advocacy focus, or our watchdog role, and strengthen our health and service delivery programmes to the greater benefit of the public. Annual research spend is between R6 and R12 million.

**HOW CANSA APPLIES THE RESEARCH FINDINGS**

- Add to global knowledge on cancer.
- Realign our health programmes and service delivery.
- Vitalise our role in education and legislation to lower the cancer risk.
- Inform our advocacy role.
- Strengthen our watchdog role.
- Identify which products qualify for our Seal of Recognition.
FOCUSING ON DETECTION AND REDUCTION

TYPE A PROJECTS
These projects focus on early detection and cancer risk reduction. They are conducted at South African universities and cancer institutions by PhD and MBChB graduates.

The projects are all CANSA-approved and peer-reviewed for three years at a maximum grant of R150 000 a year from CANSA and R50 000 from the institution.

TOTAL SPEND
Researchers are expected to publish their results in peer-reviewed journals. A total of 30 projects were funded in the year in review to the value of R4 854 265. CANSA contributed R3 815 248, with the balance being provided by the various institutions involved.

CANSA also took over the funding of three of the Medical Research Council’s (CARISA) projects from 1 April 2014. This was after the agreement between CANSA and CARISA was concluded on 31 March 2014.
## Type A Projects

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Research Category</th>
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<tr>
<td>Assessment of the impact of hereditary factors on health outcomes in relation to breast cancer risk.</td>
<td>Prevention</td>
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<td>Preventing cervical cancer: Using mobile technology to improve management and follow-up of clients with cervical cancer precursor lesions.</td>
<td>Prevention</td>
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<td>Putative chemo-preventative properties of bio-identical hormones.</td>
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<td>Can melatonin prevent the onset of breast cancer in a mouse xenograft model?</td>
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<td>Investigations into the immuno-enhancing effects of garlic and garlic organosulfur compounds in the prevention of cancer.</td>
<td>Prevention</td>
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<tr>
<td>Can simple dietary modification by restriction of carbohydrate and/or omega-6 fatty acids prevent breast cancer development in the urban South African context?</td>
<td>Prevention</td>
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<tr>
<td>Cancer risk during urbanisation: metabolic syndrome and cancer.</td>
<td>Prevention</td>
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<td>Production of HPV L1/L2 chimaera VLP vaccines in plants and insect cells for broad protection against cervical cancer.</td>
<td>Prevention</td>
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<td>The influence of Rooibos on androgen metabolism in normal and cancer prostate cells.</td>
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<tr>
<td>Chemopreventive potential of Rooibos in skin carcinogenesis.</td>
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<tr>
<td>The preventative abilities of a ketogenic diet and intermittent fasting in relationship to the carcinogenesis of astrocytoma.</td>
<td>Prevention</td>
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<tr>
<td>Biologically relevant genetic markers of prostate cancer risk and aggressive disease within South African men.</td>
<td>Early diagnosis</td>
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<tr>
<td>New clinical markers for prostate cancer.</td>
<td>Early diagnosis</td>
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<tr>
<td>Does a dual-modality imaging system lead to improved detection of breast cancer?</td>
<td>Early diagnosis</td>
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<tr>
<td>Analysis of stem-cell associated genes in breast cancer as biomarkers and predictors of cancer malignancy.</td>
<td>Early diagnosis</td>
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<td>Pathways to breast cancer presentation.</td>
<td>Early diagnosis</td>
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<tr>
<td>The identification of novel biomarkers for prostate cancer.</td>
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<td>Paediatric brain tumours in South Africa.</td>
<td>Epidemiology</td>
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<td>An investigation into genetic variation in South African breast cancer patients using genome sequencing.</td>
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<tr>
<td>Epidemiological evaluation of patients presenting with HIV related lymphomas (HRL) and understanding the relationship of Anti-Retroviral treatment policy and uptake with the incidence of HRL over two consecutive five-year study periods at Tygerberg Hospital, Western Cape, South Africa.</td>
<td>Epidemiology</td>
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<tr>
<td>Prostate cancer in black South African men, extending replication of genome wide association study findings.</td>
<td>Epidemiology</td>
</tr>
<tr>
<td>Functional impact of genetic and epigenetic variants of the vitamin D receptor gene (VDR).</td>
<td>Basic biochemistry</td>
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<td>Investigation of the impact of the vaginal microbiota on human papillomavirus infections.</td>
<td>Basic microbiology</td>
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<td>The impact of inflammation and seminal fluid on cervical cancer progression.</td>
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<td>Breast/ovarian cancer susceptibility in South African women: Role of DNA homologous recombination genes.</td>
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<td>Over expression of the T-box transcription factor, TBX3, as an early marker of sarcomas.</td>
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<td>Detection of Genetic changes in Oral Carcinogenesis by DNA Microarray Analysis.</td>
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<td>Down-staging and improving survival of breast cancer in South Africa.</td>
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<td>Investigation into the antitumor activity of novel in silico-designed estradiol analogues.</td>
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<tr>
<td>Drug-loaded nanomicelles conjugated to mucin antibodies for direct targeting of ovarian cancer cells expressing mucin antigens.</td>
<td>Treatment</td>
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ENCOURAGING HEALTHY CHOICES TO REDUCE CANCER RISK

TYPE B PROJECTS
Type B Projects are conducted in-house in collaboration with established institutions to yield results which then belong entirely to CANSA. This research is used to assist the public in making healthy choices in order to reduce their risk of cancer.

This is achieved through conducting research...

• That provides us with greater understanding of how to encourage positive behaviour change in terms of lifestyle choices, for example, smoking, diet, exercise, sun behaviour and screening attendance.
• On possible environmental carcinogens.
• To screen and evaluate products and, where appropriate, award these products with the CANSA 'Smart Choice' seal. This seal indicates that these products may help to reduce the risk of cancer, in conjunction with other lifestyle choices.

The results of these projects are made available to the public through our website, health campaigns, brochures, online campaigns and fact sheets. They are also used for advocacy activities and to lobby government and industry for change where necessary.

About 10 to 15 Type B Projects are run simultaneously.

OMEGA CARO-E STUDY
CANSA awarded its Seal of Recognition to this South African supplement as it contains the unique combination of fish oil (free of heavy metals) and a palm oil concentrate containing 11 different carotenes and five different forms of Vitamin E.

PILOT STUDY
A small pilot study, conducted from August to end November 2014, analysed the blood of people taking the capsules to determine if the components were absorbed and whether inflammation markers (thought to be involved in cancer) were reduced.

Overall, the results of the study indicate that Omega Caro-E is a safe and effective method to increase blood levels of Omega 3 fatty acids, alpha- and beta-carotenes, as well as to support maintenance of Vitamin E levels.

FRACKING
In the reporting period, CANSA promoted the professional analysis of drinking water in Karoo farms in the Karoo to determine the risk of water and environmental contamination with carcinogens as a result of the fracking process.

South Africa stands on the brink of hydraulic fracturing (fracking) in the Karoo. This is a mining process designed to release vast amounts of natural gas from shale deposits kilometres underground. Large quantities of water — as much as between 20 and 30 million litres — are pumped under high pressure into boreholes to release the gas.

HAZARDOUS SUBSTANCES
Unfortunately potentially hazardous substances are often added to the fracking fluid or are released through the process. Some of these are carcinogens such as benzene, which can cause leukaemia, and formaldehyde have been classified as a Group 1 carcinogen in humans by the International Agency for Research on Cancer (IARC) – the World Health Organisation’s specialised cancer agency.

PARTNERS
On this project, CANSA partnered with two experts — environmental advocate Jonathan Deal, CEO and founder of the Treasure the Karoo Action Group (TKAG) and Professor Eugene Cloete, Vice-Rector Research of Stellenbosch University.

A total of 16 recommendations were formulated concerning chemical and other analyses of borehole baseline water to ensure transparency.

TAKING RESPONSIBILITY
Fracking companies must take responsibility for legal and commercial aspects of water analysis data including payment for all tests. More importantly, the companies must release all analytical data gathered before, during and after fracking to the Department of Water Affairs, as well as independent, non-profit organisations such as CANSA, who will place this information on the CANSA website for all, including farmers and house owners, to scrutinise and use for litigation if necessary.
The fracking companies should also be instructed through legislation to release detailed information of all chemicals added to fracking fluid before authorisation of fracking activities and make this information transparent through posting on the websites of the Department of Water Affairs and CANSA.

The first formal baseline, aquifer sample of drinking water was taken from a borehole 14 km from Cradock on 4 March 2014 and analysed during 2014. Results have shown that aquifer drinking water from a borehole in the Karoo could be harvested professionally and analysed for inorganic and organic molecules which were present in low concentrations, except for uranium and strontium, which were much higher in the borehole water than for example in Bellville tap water. This specific fingerprinting of the chemical composition of the borehole water for the farm involved has been posted on www.cansa.org.za/fracking.

It’s hoped that this initiative will encourage fracking companies to conduct their operations with the greatest of care and protect the Karoo, plants, animals and humans from any carcinogenic harm through any form of contamination of underground, drinking water aquifers. CANSA, as part of our watchdog role to reduce the cancer risk in South Africa, will monitor this situation carefully.

ENHANCING SERVICE DELIVERY

TYPE C PROJECTS

These projects are also conducted in-house and focus on how we can improve the service we deliver to the public. This includes improvements on cancer reduction services as well as treatment and support services.

Projects in the pipeline include:

- A qualitative and quantitative assessment of satisfaction with services provided by CANSA nationally. Results will provide an overview of patient satisfaction and will inform service improvements.
- Determining the needs of men with prostate cancer.
- Determining the needs of women with cervical cancer.
- Enhancing CANSA’s cancer screening service.
- Looking at better ways of monitoring and evaluating the impact that CANSA has on cancer patients’ lives.
COLLABORATING ON NATIONAL ISSUES

TYPE D PROJECTS
These projects are funded by CANSA, with annual budgets of about R1 million.

They are conducted mostly in partnership with one or more research institutions. The objective being to combine resources to achieve a common goal.

An example of a past project is the screening for cervical neoplasia with a combination of HPV testing and cytology in a South African urban community.

VITAMIN D
There is some evidence that Vitamin D deficiency is associated with an increased risk of certain cancers including breast, prostate and colorectal cancer. Exposure to solar radiation is a major source of Vitamin D production. Greater exposure is required by those with darker skin tones in order to produce Vitamin D.

CANSA is preparing for a study to determine Vitamin D levels of individuals with diverse skin tones and from diverse geographic regions in South Africa at two time points (Winter and Summer) in order to establish whether individuals with darker skin tones are at risk for Vitamin D deficiency and, therefore, at increased risk for certain cancers.

If Vitamin D deficiency is established according to skin tone and seasonal variations, we can make recommendations for increasing Vitamin D levels and thus potentially reduce cancer risk.

Different information may be required for people of different skin tones and our risk-reduction messages can be more targeted and appropriate. This may impact our messages relating to sun behaviour.

COLLABORATING ON NATIONAL ISSUES

TYPE E PROJECTS
These projects cover a wide spectrum of activities, including symposia and congresses initiated, funded and co-funded by CANSA, as well as post-graduate cancer bursaries and co-sponsoring of travel grants of researchers presenting at research conferences overseas.

In 2014, CANSA awarded travel grants for Prof Alan Davidson, Head of Clinical Unit, Haematology/Oncology Service, Red Cross Children’s Hospital and Department of Paediatrics and Child Health, University of Cape Town; and Dr Jeannette Parkes who is a Radiation Oncologist and Head of Clinical Unit, Radiation Oncology, Groote Schuur Hospital and runs paediatric neuro-oncology.

They attended the 16th International Symposium on Paediatric Neuro-Oncology in Singapore from 28 June to 2 July 2014 to present a paper titled ‘Low grade gliomas treated in a university-based combined neuro-oncology service in South Africa’.

CUTTING-EDGE THINKING
Says Prof Davidson: “This was a very useful meeting. It was attended by every major role player in modern paediatric neuro-oncology, giving myself and Dr Parkes (and our patients) access to cutting-edge thinking in the field. It enabled us to build bridges which will be indispensable in the future, not only at the clinical coalface but also to develop a research platform to advance the cause of children with brain tumours.”

MEDIA SUPPORT
The Research Department regularly disseminates information on topics related to cancer research to the media and other national stakeholders. The former Head of Research, Dr Carl Albrecht, participated in broadcast and printed media interviews. He also delivered a presentation on preventing cancer in the kitchen to selected women leaders of the Cape Women’s Agriculture Association (CWAA) in Upington, on 21 August 2014.
This year, the AG Oettlé Memorial Award was presented to Professor Patrick Brian Arbuthnot, Director: Antiviral Gene Therapy Research Unit, Department of Molecular Medicine and Haematology, University of the Witwatersrand.

Professor Arbuthnot established the Antiviral Gene Therapy Research Unit. His main research focus is HBV infection and liver cancer. The award recognises his unabated search over 16 years to find a cure for the carrier status of Hepatitis B.

The Hepatitis B virus (HBV) was one of the first viruses linked causally to a human tumour. Together with tobacco, it is now thought to be the most important environmental carcinogen to which human beings are exposed. Current treatment has had variable efficacy and there is a great need for effective and reliable treatment that could eradicate the virus from carriers.

**SOLUTION**

Professor Arbuthnot, found a solution by developing a nucleic-acid based therapy for HBV infection and developing an understanding of the role of HBV X protein (HBx) in causing hepatocellular carcinoma (liver cancer). Recent research by the professor and his colleagues has shown that it is possible, using synthesised nanoparticles and engineered adenoviral carriers, to silence the HBV in a stringent mouse model.

CANSA sees this work as a significant contribution in lowering the risk of cancer in Africa and the rest of the world.

**ABOUT THE AWARD**

The AG Oettlé Memorial Award is presented in remembrance of the late Dr AG Oettlé, a full-time and highly esteemed cancer researcher who was financed by CANSA and worked at the South African Institute for Medical Research in the sixties.

He discovered that there was an epidemic of oesophageal cancer in Africa and especially the East Coast of South Africa.

It’s the highest prize awarded to South Africans who have made valuable contributions in the field of cancer research or rendered cancer service of outstanding value to the public and CANSA. So far there have been more than 25 recipients.
In July 2015 we said farewell to our Head of Research, Dr Carl Albrecht, after 30 years of significant contributions in cancer research. We welcomed the new Head of Research, Dr Melissa Wallace, in May 2015.

Carl Albrecht embarked on a quest to help eradicate cancer 45 years ago when he read a PhD at Wits University on the mechanism of carcinogenesis using a man-made chemical known as butter yellow. This work was taken further in the Molecular Anatomy Laboratories in Oak Ridge, Tennessee, US, and by the National Chemistry Laboratory of the CSIR in Pretoria.

A FIRST
In 1976, he was invited to join the Department of Pharmacology at Stellenbosch Medical School where he studied dormancy of melanoma cells and tested the indigenous medicinal plant, Hypoxis sp., for anti-cancer properties in human lung cancer patients. This was the first registered clinical trial using an indigenous plant extract in the history of South Africa.

He was also a senior lecturer and taught chemotherapy to about 2 000 medical students in their third year over a period of 21 years. In addition, he wrote a textbook on chemotherapy, published 45 peer-reviewed articles and was a co-inventor of three US patents.

FULL-TIME
In 2007, he became a free-lance medical research consultant, mainly for CANSA, and was appointed full-time by CANSA as the Head of Research in 2007. He has also served as a member of the CANSA Research Committee (RESCOM) since 1982 and was Chairman of the Western Cape Regional Council of CANSA from 1992 to 1996.

THANK YOU
We thank Carl for his commitment and support during his time with CANSA. He played a major role in helping CANSA become a trusted brand, respected partner and recognised leader within the cancer arena.

GOING FORWARD WITH RESEARCH
• Continuing the focus on epidemiology, early diagnosis and lowering cancer risk, as well as some attention to the needs of cancer patients in terms of rehabilitation and palliation.
• Prioritising high incidence cancers in South Africa with Type A grant holders (cervical, prostate, lung, oesophagus, colorectal, liver, and stomach cancer).
• Increasing public health-related research.
• Developing capacity of new and emerging researchers.
• Facilitating a collaborative approach with other cancer-funding bodies in South Africa to coordinate funding.