nsw cancer research achievements report 2009

A celebration of the outstanding contributions made to cancer research in New South Wales

The NSW Government agency dedicated to the control and cure of cancer through prevention, detection, innovation, research and information.

NSW Government

cancer institute NSW

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Cancer Institute NSW catalogue number: RR-2009-01

National Library of Australia Cataloguing-in-Publication data:

NSW Cancer Research Achievements Report 2009

State Health Publication Number: (CI) 090048

ISSN: 1836-7321

Key words: Cancer, Research, New South Wales, Australia.

Suggested citation:

Cancer Institute NSW: NSW Cancer Research Achievements Report 2009, Cancer Institute NSW, Sydney, May 2009

Published by the Cancer Institute NSW, May 2009.

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about the cancer institute nsw

The Cancer Institute NSW is Australia's first statewide, government-supported cancer control agency. We were established six years ago by the NSW Government and supported unanimously by the NSW Parliament under the *Cancer Institute (NSW) Act 2003*. We are committed to controlling and curing cancer in NSW through promoting the best cancer research, prevention, early-detection, treatment and education initiatives.

Our vision is to substantially improve cancer control and cure in NSW by:

- reducing the incidence of cancer in the community
- increasing the survival rate of cancer patients
- improving quality of life for cancer patients and their carers
- operating as a source of expertise on cancer control for the government's health service providers, medical researchers and the general community.

Our vision is to control and cure cancer in NSW

The cancer problem

Cancer touches us all. The current lifetime risk of being diagnosed with cancer in NSW is one in two for men and one in three for women.

Cancer is now the largest single cause of disease in Australia, surpassing cardiovascular disease. In 2006, more than 35,000 people were diagnosed with cancer in NSW. Cancer incidence has increased by around 10 per cent in males and seven per cent in females over the past decade.

A cure for cancer has never been more relevant or more important to the people of NSW than it is today.

How we control and cure cancer in NSW

In 2006, the Cancer Institute NSW released the *NSW Cancer Plan 2007–2010*: a blueprint to assist all people who are working to help lift the cancer burden in NSW. From the Cancer Plan, our priorities of cancer control in NSW are:

- preventing cancer
- detecting cancer early
- improving cancer services
- accelerating improvement through cancer research
- providing relevant cancer data and information.

This report highlights some of the achievements and progress of cancer researchers in NSW and our goal to find a cure for the many cancers that affect the NSW community.

foreword from the minister

The NSW Government is committed to the fight against cancer and the Cancer Institute NSW is instrumental in that campaign.

Through the Cancer Institute NSW, the Government has implemented the nation's first ever statewide cancer control plan. The driving force behind the *NSW Cancer Plan* and our Research Program is the knowledge that cancer research saves lives.

The Cancer Institute NSW Research Program affirms the Government's support for the men and women who spend their working lives in pursuit of better cancer treatments, more advanced methods of detection and, above all, the prevention or cure for cancer.

Since 2004, the NSW Government has committed more than $120 million for important cancer research. Breast cancer-related research was funded at approximately $20 million. Funding for skin cancer-related research was approximately $17 million.

In just the past six years, since the Cancer Institute NSW was established, the number of cancer researchers working in NSW has grown by 50 per cent.

More cancer research funding is coming to NSW than ever before. We are attracting 56 per cent more cancer research funding from the National Health and Medical Research Council (NHMRC) and 133 per cent more from the Australian Research Council, compared to 2004.

This publication, *NSW Cancer Research Achievements Report 2009*, celebrates cancer researchers and their work in NSW.

The more we know about cancer in NSW, the more the Government can manage resources to improve patient care and save lives.

The NSW Government has committed a further $119 million over the next four years to expand cancer research capacity and activity here in NSW.

Our goal is for the new drugs, therapies and treatments that NSW researchers develop be fast tracked for hospital use, giving patients new hope in regaining a healthy life.

On behalf of the NSW Government and the entire community, I would like to extend my thanks to all of the men and women in NSW whose dedicated work in cancer research will lead to better treatment, survival and, above all, prevention of cancer.

Jodi McKay

The Hon. Jodi McKay MP

Minister for Tourism
Minister for the Hunter
Minister for Science and Medical Research
Minister Assisting the Minister for Health (Cancer)

chief cancer officer's report

Australians enjoy a long life expectancy, second only to Japan in the world. Improvements in length of life are related to the successful avoidance of disease risk factors and the continuous application of medical research discoveries to public health, diagnosis and treatment.

For cancer, research is the engine room, driving the substantial reduction in cancer deaths seen in the past two decades.

Ongoing commitment to cancer research is needed to continue to reduce cancer death rates over the next 20 years. Some of this investment will provide immediate discoveries that benefit patients this year or the next. However, some of the investment will support research with longer term returns that improve cancer results.

The NSW Government, through the Cancer Institute NSW, has made a considerable investment in cancer research, with $119 million to be invested over the next four years. If this and other funding for cancer research was able to maintain the decline in cancer deaths for a further 10 years, around $200 billion would be returned to the NSW economy.

Past investment by the Cancer Institute NSW in research has funded:

- 95 research fellowships
- 82 PhD student support
- 58 infrastructure grants
- 37 research innovation grants
- 74 (55 FTE) research trial nurses and data managers
- six translational program grants
- three new cancer research academics.

The outcomes from these investments are becoming increasingly obvious. We have documented more leverage of cancer research contributions from other funders than other medical research disciplines in NSW. Our cancer publications are greater than other states; our clinical trails participation has increased to nearly six per cent of incident cancer cases; and the number of talented researchers in cancer has increased by more than 50 per cent since 2004.

This impact provides a base for our vision to better control and cure cancer. It offers the best hope to allow those of us facing cancer now and in the future to be optimistic about our chances of surviving cancer.

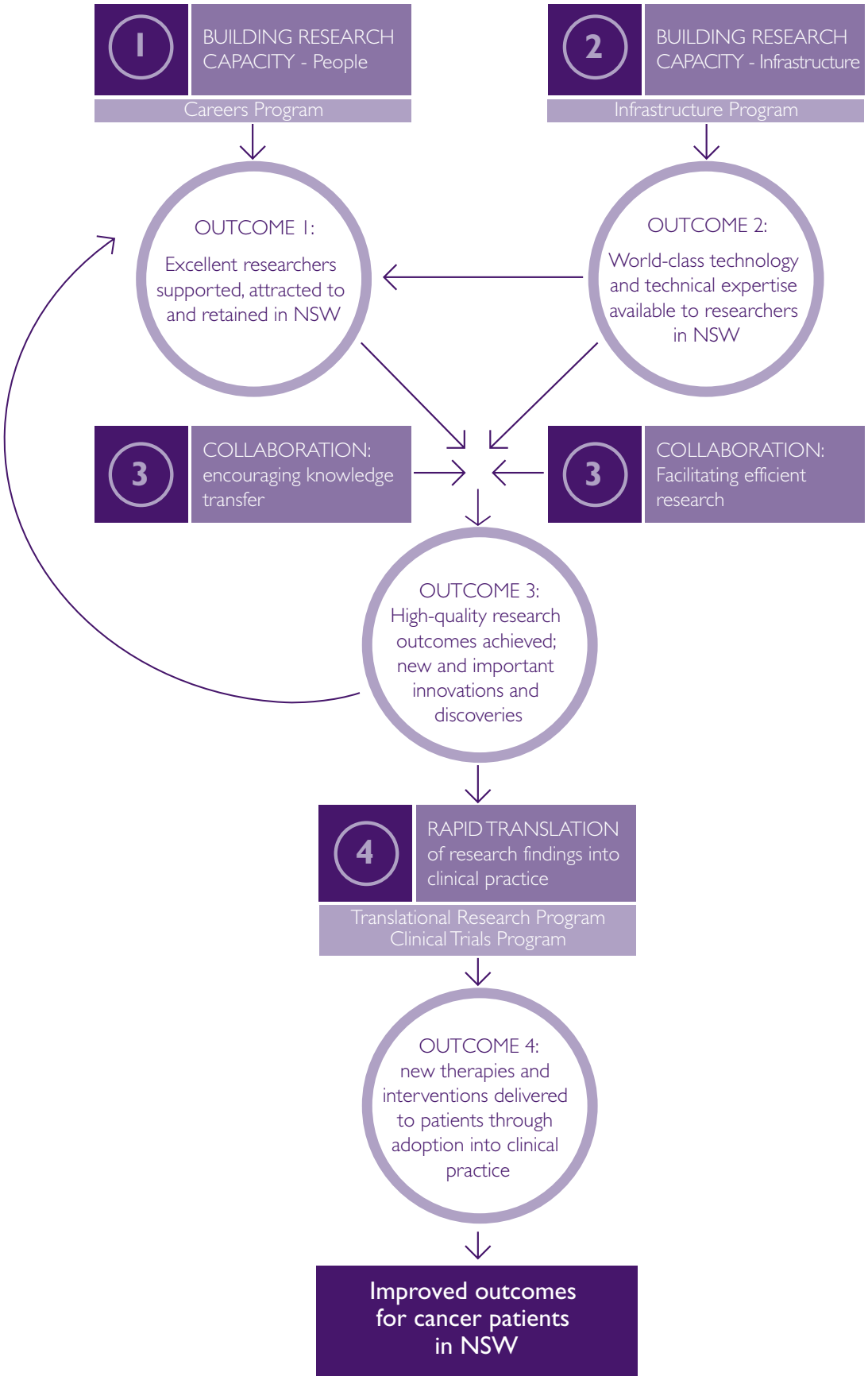
Professor Jim Bishop
AO MD MMed MBBS FRACP FRCPA

Chief Cancer Officer and CEO,
Cancer Institute NSW*

Professor of Cancer Medicine,
University of Sydney

* Professor Bishop's tenure as Chief Cancer Officer and CEO of the Cancer institute NSW finished on 17 April 2009. He is now Chief Medical Officer for the Commonwealth of Australia.

how the programs work together



cancer institute nsw research programs

The aims of the Cancer Research Program are to:

- Support cancer research that can be quickly translated into benefits for cancer patients, for the prevention of cancer or its early detection.
- Recruit and support researchers in NSW to become more skilled and more internationally competitive.
- Provide enabling infrastructure to improve international competitiveness and relevance.

There are four core funding support programs of the Cancer Institute NSW Research Division:

Fostering research expertise by supporting careers

The Cancer Research Careers Program increases the cancer research capacity of NSW by supporting talented researchers at all stages of their careers. Future success in cancer research will depend on attracting and retaining talented individuals to choose cancer research as their career.

Building research capacity through key infrastructure

In addition to supporting researchers, the Cancer Research Infrastructure Program encourages the development of world-class research technology and technical expertise within NSW. This includes funding for both physical and non-physical infrastructure, such as support staff. These goals will be achieved through increased collaboration among research groups to increase efficiencies and encourage knowledge transfer.

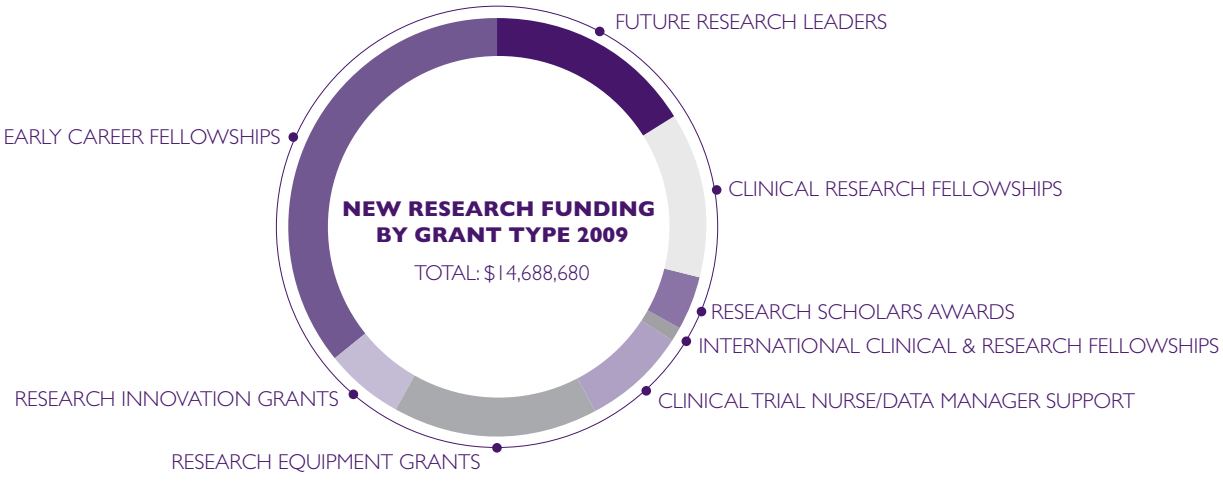
Translating research discoveries into clinical practice

A key goal of the NSW Cancer Plans is to increase the capacity of NSW to quickly translate research discoveries into better treatments and cancer prevention. Six large translational research programs, which bring together experts focused on taking innovative research discoveries into the clinic are being supported within the State.

Developing a world-class clinical trials network

A new clinical trials network has been established to support clinical trials units in the testing of promising new anti-cancer treatments.

This is a significant step forward in bringing a co-ordinated, strategic and collaborative approach to clinical research in NSW. The network sees the consolidation of the funding support programs of the Cancer Institute NSW and The Cancer Council NSW. Already we have seen increases in clinical trial activity in NSW with enrolments to trials within supported units increasing from 2.3 per cent in 2004 to 5.7 per cent in 2006.



The Cancer Institute NSW is now in its sixth year of operation and our expenditure on cancer research has grown significantly over this period.

We focus on supporting research that is closely linked to improving clinical practice and patient health outcomes in the most effective and timely manner. We pursue the development of new funding streams that will bring researchers and clinicians together in collaborative research ventures that are rapidly incorporating evidence-based medicine into practice. In this way, we hope to ensure the highest standard of care for NSW cancer patients.

Contributing to the international fight against cancer

Cancer research has become a truly global enterprise. The complexity of the disease makes it impossible for any single institution, or even country, to succeed on their own in unravelling the still immense obstacles in the fight against cancer.

It is critical for NSW-based researchers to be closely linked to, and cognisant of, the latest developments occurring overseas so that our State can build upon and use these advances in controlling and treating cancer.

Our research grant schemes are designed to enable these vital collaborations so that we ensure our research effort remains world class.

Similarly, it is critically important that our researchers have access to state-of-the-art research infrastructure in order to exploit fully the most recent advances in cancer research. We support research platforms that provide access to vital equipment for a large number of research groups – enabling the pooling of resources and leveraging of other funding sources.

Investing in our researchers

2008–09 was a year of funding consolidation as it saw the peak of recurrent funding from previous years' grant allocations, thus limiting the capacity to launch major new programs. Nonetheless, 67 grants were awarded, covering all four strategic funding areas and a total of $15 million in new funding was committed.

Celebrating the achievements of our researchers

We are proud to be associated with some of the best cancer researchers in Australia. Many of them are featured in this report and celebrated at the Premier's Awards for Outstanding Cancer Research.

Some of the results our researchers have acheived this year include:

- Professor Levon Khachigian (featured on page 19) from the University of New South Wales was recently awarded a prestigious National Health and Medical Research Council (NHMRC) Australia Fellowship. The Fellowship is worth $4 million in support of his work to uncover new processes that govern the expression of disease-causing genes; and to further develop a new class of experimental drug that has the potential to treat a diverse range of health problems, from cancer and inflammation through to eye and heart disease. The Cancer Institute NSW is supporting Professor Khachigian's work through a translational research program grant.

- Previous award winner for Outstanding Cancer Research Fellow of the Year, Associate Professor Andrew Biankin's team at the Garvan Institute for Medical Research received funding from the NHMRC to take part in the International Cancer Genome Consortium project. This is a global project aimed at understanding the genetic changes underpinning the 50 most common cancer types. The Cancer Institute NSW is providing crucial career support funding for A/Prof Biankin and members of his team.

Celebrating outstanding contributions to cancer research in NSW

The NSW Premier's Awards for Outstanding Cancer Research were established in 2006 to acknowledge the achievements and commitment of NSW cancer researchers at all levels. There have been three categories awarded each year:

1. Outstanding Cancer Researcher of the Year.
2. Outstanding Cancer Research Fellow of the Year.
3. Outstanding Cancer Research Scholar of the Year.

The Outstanding Cancer Researcher of the Year honours an individual who has made significant and fundamental contributions to any field of cancer research in NSW. These contributions must have had a lasting impact on the cancer field and must have demonstrated sustained progress against cancer.

The Fellow and Scholar of the Year are awarded to a Cancer Institute NSW-supported Fellow and Scholar who have demonstrated significant achievements and progress in their research over the previous year.

In 2009, we are introducing two new award categories:

Premier's Award for Excellence in Translational Cancer Research

The Cancer Institute NSW currently supports six translational cancer research programs. These programs are focussed on supporting multidisciplinary approaches to cancer research that will rapidly translate research discoveries into clinical programs or policy. The Translational Program Grants were awarded to outstanding research teams to further develop cancer research capacity and competitiveness in translational research. The first three of these programs commenced in 2005 and were reviewed by an external evaluation committee in 2008. The Premier's Award for Excellence in Translational Cancer Research will be awarded to the program that the reviewers considered has made the most significant achievements in its field and was deemed most likely to have a highly significant impact on the outcomes of cancer patients in NSW.

Premier's Award for Innovation in Cancer Clinical Trials

The Cancer Institute NSW funds more than 40 clinical trial units under the umbrella of the NSW Cancer Trials Network. The aim of the Network is to increase the number of high quality trials available to NSW patients thus increase patient enrolment to clinical trials in NSW. The Premier's Award for Innovation in Cancer Clinical Trials will recognise the achievements or activities undertaken by staff within the clinical trial unit which demonstrate innovation in relation to the conduct of clinical trials. Areas of innovation may include: increasing access to clinical trials, strategies to address under-represented groups (tumour groups, populations), promoting a research culture, collaboration, developing training opportunities, and community involvement.

What type of research have we funded?

The Common Scientific Outline, or CSO, is a classification system organised around seven broad areas of scientific interest in cancer research. It has been developed collaboratively by cancer research funding organisations within the USA and UK. The development of the CSO aims to lay a framework to improve coordination among research organizations, making it possible to compare and contrast the research portfolios of public, non-profit, and governmental research agencies. Our grant recipients from 2004 to 2007 were asked retrospectively to classify their research using the CSO.

The Cancer Institute NSW research funding has mostly encompassed biological research and treatment research, although all areas of the CSO are covered to some degree. It should be noted that the CSO categories were missing for most clinical trial funding, which could be expected to fall predominantly within the treatment category.

For the purpose of this report, we have focussed on the achievements of the first six categories of the common scientific outlines:

Understanding cancer at a biological and molecular level (page 8).

Unravelling the causes of cancer (page 10).

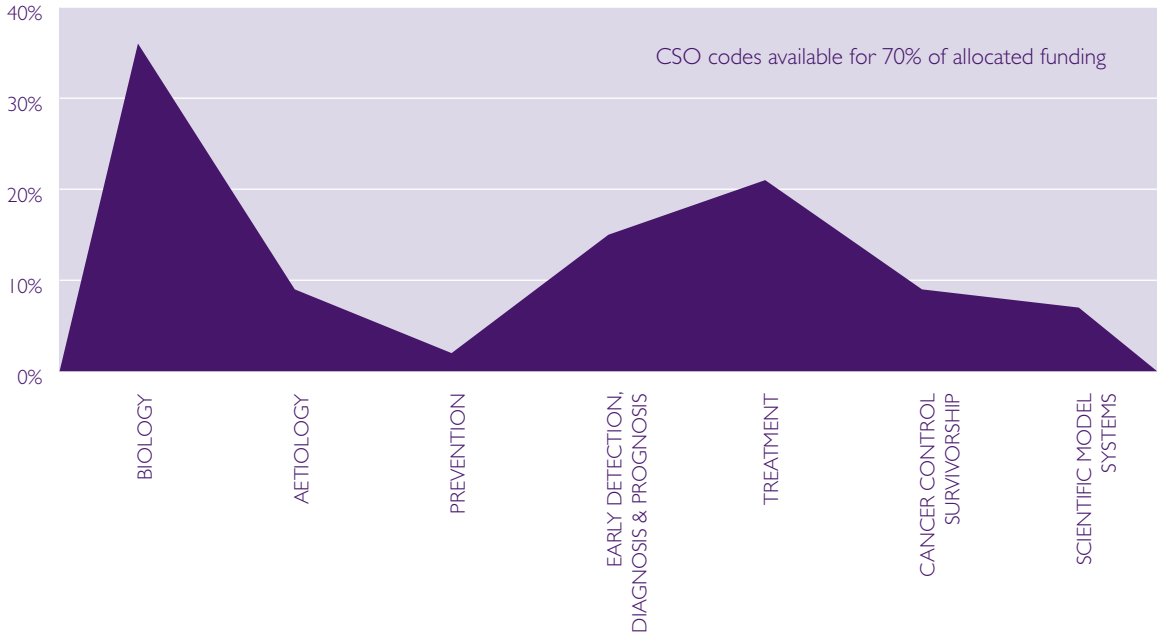
Preventing cancer (page 13).

Early detection, diagnosis and prognosis (page 14).

Developing and testing new treatments (page 18).

Helping cancer patients through treatment and survival (page 21).

Cancer Institute NSW funding awarded 2004–07 by broad categories of the common scientific outline



understanding cancer at a cellular and molecular level

Dr Karen Mackenzie's first experiment was making cosmetics with a friend in a neighbour's garage. From that moment, she caught the science bug and took as many subjects that involved experiments as she could at school. But, it wasn't just the experiments that motivated her. "It was my goal to apply science in a profession that was focussed on human health, so I enrolled in an Applied Science Degree (Biomedical Science) at the University of Technology Sydney," she says.

"I would like to see promising cancer research groups in NSW thrive and grow, so that outcomes can be maximised and NSW may become the premier state for cancer research in the country."

Figuring out the immortal cell
Dr Karen Mackenzie,
Children's Cancer Institute of Australia

After completing her degree, she worked as a research assistant at the Blood Bank in Sydney and then in a neurobiology lab at Columbia University in New York. Her experience in New York further fuelled her passion for science and broadened her horizons, but she soon realised that she needed to go back to her first career goal, human health.

"I was not entirely satisfied with studying the nervous system of the African clawed toad," says Karen. "When I returned to Sydney, I was fortunate to secure a position in a lab that was studying the steps involved in the development of leukaemia. I found the research really compelling. It fit well with my career goals and inspired me to pursue a PhD in the area."

Now, Karen is group leader of the Cancer Cell Development Group at the Children's Cancer Institute of Australia, where her research is focussed on the molecular pathways that regulate cell life span and prevent cancerous growth.

"We are investigating molecular changes that enable normal cells to replicate beyond their normal limits and become immortal," she says. "Therapies that target the molecular changes that promote immortalisation will be suitable for the treatment of diverse cancer types, as immortality is a fundamental property of most cancer cells.

"One project we are currently pursuing aims to demonstrate the functional and molecular consequences of targeting different components of the enzyme telomerase, which is activated in 80–90 per cent of immortal cancer cells," says Karen. "We are also investigating the effects of abolishing telomerase activity in normal human blood stem cells.

"Blood stem cells are adversely affected by standard chemotherapy and are also one of the few normal cell populations that express telomerase. It is crucial to understand how potential cancer treatments affect vulnerable populations of normal cells, such as blood stem cells, so that they can be adequately protected during cancer treatment and toxicity can be minimised."

Karen's research has been well rewarded, with a recent Career Development Award by the National Health and Medical Research Council (NHMRC), a highly competitive and prestigious award. But, the motivation for her work is still the driving passion that inspired her from an early age: that of making a difference in the health of people, particularly people with cancer.

"It is important for me to be doing research that has direct relevance to human health," she says. "Cancer is a horrible disease that affects most of us, either directly or indirectly, at some stage of our lives. Although survival rates have improved, many lives are still lost after long periods of struggle with a debilitating illness.

"Furthermore, chemotherapy is toxic to normal tissue and leaves many cancer survivors with long-term side effects that impact on other aspects of their health and quality of life," says Karen. "We need better treatments for cancer. It is my goal to contribute to the platform of knowledge that is needed to improve cancer treatment."

Anyone who has gone through chemotherapy for the treatment of cancer – or indeed, knows anyone who has gone through it – has seen how the drug ravages the body. The side effects can sometimes seem as harsh as the disease itself: it can, in effect, kill off healthy cells as well as the cancerous ones.

As a student, Professor Des Richardson saw there was an important need for new and effective drugs for cancer treatment and decided to look at the problem from a different angle – that of cancer cell biology.

"Chemotherapy can be effective for a certain time," he says. "But cancer cells can become resistant to standard drugs, so I wanted to find new treatments through a novel understanding of how the cancer cell grows."

Now, as Professor of Cancer, Cell Biology and NHMRC Senior Research Fellow at The University of Sydney, Des is well on his way to solving the problem.

"Our research is based around understanding the role iron plays in the growth of tumour cells," he says. "Particularly its function in cell cycle control and progression.

"We've found that for cancer cells to grow quickly, they need a lot of iron. We have effectively developed new drugs that can block iron and kill the cells quickly at various sites."

Even though this discovery is in the early stages of progression, Des and his team are excited about the potential implications for thousands of cancer patients around the world. Their initial testing has shown that the drug effectively inhibits the growth of human tumours, but doesn't affect the other cells.

"The beauty of attacking the iron is that our research has shown that the drug doesn't hurt the healthy cells," he says. "We have also found that it doesn't inhibit the iron needed for the body to function properly.

"We're at the stage where we're into serious negotiation with industrial partners to take the drugs into clinical trials," says Des. "We are hopeful that this will lead to it being on the market for cancer patients in about five years."

"Cancer can become resistant to standard drugs, so I wanted to find new treatments through a novel understanding of how the cancer cell grows."

Finding new ways to treat cancer
Professor Des Richardson,
The University of Sydney

With these new developments, Des is optimistic about more new research to understand cancer cells coming out of NSW.

"We need to expand infrastructure related to cancer research and also focus on the training of young investigators," he says. "We've come a long way in the past few years, with grants from the Cancer Institute NSW and the National Health and Medical Research Council (NHMRC), but the possibilities are endless and we need to take advantage of the talent pool in our own backyard."

unravelling the causes of cancer

Born and raised in Zambia near the spectacular Victoria Falls, surrounded by nature and African wildlife, Dr Megan Hitchins was also witness to poverty-related disease, especially parasitic infections and malnutrition.

"It was with these influences I felt destined to work in the medical profession," she reflects. "As the fight for independence in Zimbabwe intensified just a few short miles across the border, the region became destabilised and disrupted into conflict. And so at the age of seven I was sent to boarding school in the UK."

"The knowledge that my work and expertise will benefit people with cancer, gives me the conviction that I am in the right place doing precisely what I was meant to do."

Inheriting the cancer gene
Dr Megan Hitchins,
University of
New South Wales

When Megan completed school and undertook a year's voluntary service with disabled and elderly people, her desire to follow a medically-related career was consolidated. However, she also encountered some large obstacles. "I was squeamish at the sight of blood, injury and human suffering," says Megan. "So, I chose then to pursue a career in biomedical sciences and research."

Having completed her PhD in London in 1999, Megan emigrated to Australia in 2003 to work with Professor Robyn Ward at St Vincent's Hospital and the University of New South Wales. She now leads the new Medical Epigenetics Laboratory at the UNSW Cancer Research Centre, which focusses on the role of epigenetics in cancer.

Megan's current research involves studying the alternative mechanisms that cause cancer in families. "In individuals who develop cancer at an early age or where cancer runs in the family, there is usually an underlying mutation, or 'spelling mistake', in the genetic code of a cancer-protection gene that is inherited," she says. "These mutations are transmitted faithfully from parent to child, like photocopying a typo in a document.

"Until recently it was assumed that only mutations within the genetic code could be transmitted from parent to child," says Megan. "However, in some patients and families the genetic code is entirely normal. Instead, the affected gene is switched off by the stable attachment of paralysing chemicals such as 'methylation' to the gene's engine. This type of error is termed 'epigenetic' – literally meaning something added onto the gene.

"It's more complex than a genetic mutation in that the chemical attachments can sometimes be removed, such that the gene is able to resume its normal state of activity. Our team's research aims to identify those individuals and families whose cancers are caused by epigenetic errors."

Megan's work ultimately translates to the patient and helps clinicians determine the best treatment for each case.

"Some individuals develop one cancer after another from an early age, but without knowledge of the underlying defect it is more difficult to know how to approach their treatment," she says. "These are the cases referred to our laboratory – individuals and families for whom standard genetic testing failed to reveal the cause of their cancers. Among other things, my contribution to the research involves the molecular analysis of patient samples to unravel the fundamental nature of their disease. The findings are then reported back to the clinical team, to help determine the optimal treatment regime for the patients. This aspect of the research is most satisfying, as the patients can potentially benefit from our findings with immediate effect."

In fact, this research couldn't be done without a multidisciplinary team. "The patients and families are seen by various clinicians before their samples even reach the laboratory," says Megan. "There is feedback to the clinically-based members of the group so that the patients and their families can receive the appropriate clinical management on the basis of our results."

Megan is content to make her contribution from the lab, knowing that her work will substantially help people with hereditary cancer around the world.

"Being actively involved in cancer research gives me a great sense of fulfilment," she says. "Although, in working 'behind the scenes' I may never get to meet the patients, the knowledge that my work and expertise will benefit people with cancer, gives me the conviction that I am in the right place doing precisely what I was meant to do."

Dr Vanessa Hayes knew from a very early age that she wanted to work in the medical profession. What she didn't realise was that it would be a career that would take her around the world. She has travelled from Cape Town in South Africa where she grew up and across to the Netherlands to complete her PhD in cancer genetics. She has finally settled in Sydney, Australia, where she is making a significant contribution to the depth of knowledge in cancer comparative genomic research as part of the Children's Cancer Institute of Australia.

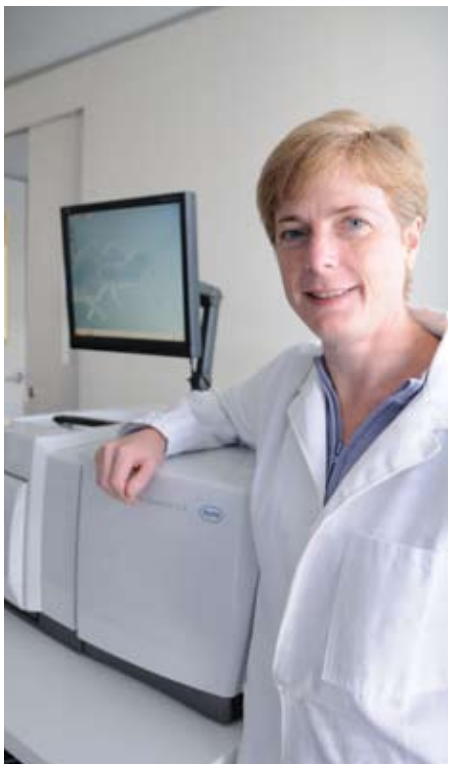
As a recent Australian-American Fulbright Professional Scholar, she has been selected to represent Australia in the United States of America, and is currently collaborating with an international team of clinicians and researchers to unravel the genetic causes of cancer.

Her work, specifically in understanding the genetic causes of prostate cancer – the most common cancer in NSW – has led to new insights into the make up of the disease.

"What has attracted me to study prostate cancer is the lack of knowledge surrounding the causes of this common cancer," says Vanessa. "Unlike breast cancer there is no equivalent BRCA1 or BRCA2 gene identified, although it has a strong genetic component. My interest is in using the strong link between ethnic diversity and prostate cancer risk as a tool to identify new prostate cancer susceptibility candidate genes."

Vanessa hopes that this research will eventually lead to the possibility of genetically testing men for their risk of contracting prostate cancer. A goal she is well on the way to achieving. "I believe that our research effort in prostate cancer holds the potential to identify new candidate genes (or regions of the human genome) responsible for conferring risk to prostate cancer," she says. "For this purpose we have collected a case-control study of men showing three-way ethnical mixture, representing the extremes of prostate cancer incidence and mortality rates. We will test the identified markers on nationally available prostate cancer resources."

While she has made many breakthroughs in her work, Vanessa isn't content to sit back on her laurels. She is currently investigating the genome of the Tasmanian Devil, as well as the facial tumour, which is threatening to destroy this Australian icon.



"Cancer research for me is a minefield. There is so much to discover, there are so many complexities and there are relatively few answers."

The genetics of prostate cancer
Dr Vanessa Hayes,
Children's Cancer Institute of Australia

She also has ambitions to see the field of cancer comparative genomic research becoming a recognised research area in NSW, so the State can play a major role in the worldwide effort to understand tumour genetic variation at the genome level.

"Cancer research for me is a minefield. There is so much to discover, there are so many complexities and there are relatively few answers," she says. "The contributions to be made in this field are endless."

Dr Claire Vajdic and Marina van Leeuwen come from different research backgrounds, but a common program of research and a common goal bonds them – the opportunity to make a contribution.

While organ transplantation is a life-saving procedure, it is associated with an increased risk of cancer due to the life-long need for immunosuppressive medications. It has been established that kidney transplant recipients have three times the excess risk of cancer, but much less is known about the immune-related causes of this excess, and the extent and breadth of cancer risk in other organ transplant recipients. Claire and Marina are passionate about answering these questions. "It is a privilege being a research academic and being entrusted with making observations and discoveries that have the potential to impact on the health of populations," says Claire.

Claire and Marina hope the findings will lead to the development of tailored cancer screening programs.

"This work has demonstrated that immune deficiency is associated with an increased risk of a wide range of cancers. This led to a reappraisal of the risk of cancer in those with long-term immune deficiency, and it has enhanced our understanding of how the body's immune system works in cancer prevention." Claire anticipates this research will lead to answers about cancer risk that will impact cancer prevention in transplant recipients and the wider population.

"One of our biggest challenges is to translate our findings and assist people in making lifestyle choices that reduce their cancer risk."
Dr Claire Vajdic

The link between data and prevention
Marina van Leeuwen and Dr Claire Vajdic
University of New South Wales

Their research involves data linkage between existing population-based registries of transplant recipients, deaths and cancers. The most recent project also includes the collection of enriched risk factor information from hospital transplant unit records. More than 5,000 heart, lung and liver transplantations and more than 10,000 kidney transplantations have been performed in Australia.

Other research underway includes data linkage by the Centre for Health Record Linkage (CHeReL). "New South Wales has a number of high-quality data resources, which through data linkage could facilitate population-based studies of cancer risk," advises Marina.

The idea that linking data can lead to cancer prevention provides Claire and Marina with an interesting challenge – to translate research findings and assist people in making correct choices to prevent cancer.

By studying the incidence and risk factors for cancer in Australians who have had a solid organ transplantation, "The findings from this program of research will advance our understanding of the role of the immune system in carcinogenesis, and may identify modifiable risk factors for cancer, enabling cancer prevention," explains Claire. "If we understand what causes cancer then we can take steps to prevent its development in at least some individuals."

Although Claire and Marina's research work is focussed on cancer risk in immunodeficient populations, it has the potential for use in the broader population. "Being able to contribute to the body of knowledge on cancer causality is something I value greatly," Marina says. "On a personal level, being part of a 'small' team working on 'big' ideas is extremely enriching."

Claire agrees. "Population health and the ultimate goal of cancer prevention benefits both individuals and communities. For individuals it means a better quality of life and longer life expectancy and for communities it means lower health care costs. Reducing the incidence of cancer has an inarguable and tangible impact on cancer control."

preventing cancer

Having cared for end-stage cancer patients as a GP, Dr Lyndal Trevena found it difficult to find good quality information about cancer risks for the general community. So, she decided to do something about it.

Tell us a bit about yourself

I grew up in Sydney and studied Medicine at the University of Sydney in the 1980s. I worked exclusively in general practice for about 15 years before pursuing a desire to answer some of the 'bigger questions' that used to arise daily in my clinical practice. In 1998, I received a small seeding grant and started my first research project: a cross-sectional study on the health status of homeless people attending a soup kitchen in urban Sydney. This became a Masters project and I then enrolled in a PhD, having been 'bitten' by the research bug. During this period, I obtained a full-time academic appointment in the School of Public Health at the University of Sydney and enjoy working with a wonderful group of researchers there.

How did you come to work in the area of cancer research?

As a GP, I had spent many years taking Pap smears, arranging mammograms etc., and I had noticed an ever-increasing list of dos and don'ts for patients to reduce their risk of cancer. It was often difficult to make sense of this, yet cancer was something many people especially feared.

I found it hard to get hold of good quality information about cancer risks for individual patients. We just seemed to be doing more and more tests, yet at the same time, patients were becoming more outspoken and asking more questions.

Why is cancer research important to you?

Having cared for patients with end-stage cancer left me with a desire to prevent what can be an incredibly painful and debilitating illness. I believe we need to be honest with people about their cancer risk, the efficacy of cancer prevention strategies and to minimise harm to people through invasive testing. The challenge is getting that balance right.

What are you are working on at the moment?

One project is a trial of colorectal cancer screening information for people with low levels of literacy. It extends earlier work on a decision tool for people of average risk in the community and aims to improve health literacy, particularly in the context of the National Bowel Cancer Screening Program.

The second trial is a cervical cancer prevention web-based toolkit for young women. At a time when there are new technologies such as HPV vaccination, HPV testing and liquid-based cytology, it's increasingly difficult for women to be informed about their options. Young women are prompted to look at the website before their Pap visit and we measure whether they are more informed without increasing the length of their consultation.

The third project is called 'My Health Check' and uses a web-based decision analysis program to prioritise preventive health activities for the individual patient. The risk information for the individual is then personalised and takes into account what is most important for them.

"Caring for patients with end-stage cancer left me with a desire to prevent what can be an incredibly painful and debilitating illness."

Educating about cancer risks
Dr Lyndal Trevena,
The University of Sydney

What are the achievements of your career?

With my colleagues in the School of Public Health at the University of Sydney, we now have a suite of evidence-based cancer risk and prevention tools available on our website. I am particularly pleased that the important role of primary care in cancer prevention and treatment has been recognised by the formation of a new Cancer Australia BOOST Clinical Trials Collaboration and we have a strong team based in NSW within that group.

Our research now extends to collaborations with the Universities of Oxford, London, Edinburgh and Cardiff in the UK and with the University of North Carolina and Weill Cornell Medical College in the USA. Our health literacy work will soon be applied in rural India where cervical cancer remains a major cause of death.

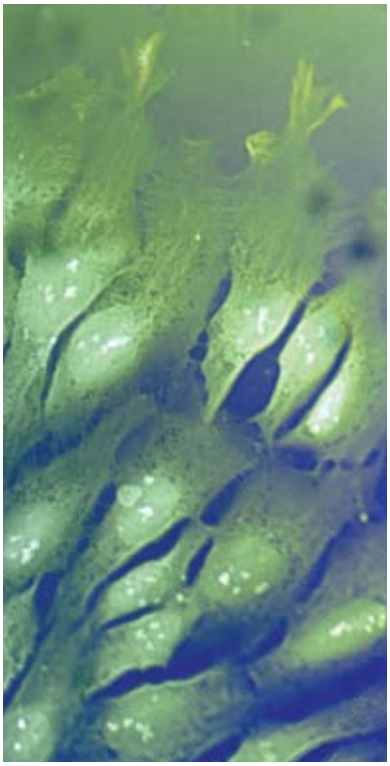
early detection, diagnosis and prognosis

When Professor Rob Sutherland first started out in cancer research, he was motivated by the heavy burden of breast cancer on women and the radical surgical approaches of the day to do something about it.

"There had to be a better way of managing the disease!" he says.

One answer was tamoxifen: an antagonist of the oestrogen receptor in breast tissue used in the treatment of breast cancer.

"Our studies provide a deeper understanding of how oestrogen affects gene expression and normal cellular physiology," he says. "Also, how these mechanisms are subverted in endocrine resistant disease, and can aid in the development of new biomarkers and therapeutic targets for the better management of breast cancer."



"Now our vision of being able to conduct multidisciplinary cancer research in NSW at the highest international standards and have it translated into real benefit for cancer patients may be a reality rather than fiction."

Developing better treatment for breast cancer **Professor Liz Musgrove and Professor Rob Sutherland,** The Garvan Institute of Medical Research

"Tamoxifen was the first anti-cancer agent that targetted a biological mechanism, i.e. oestrogen-induced cell proliferation, and provided a paradigm for less aggressive approaches to the management of cancer," Rob says. "With the subsequent success of tamoxifen, and more recently other therapies that target oestrogen action, such as aromatase inhibitors, our focus has been on better understanding the molecular basis of cancer and there are now many examples of this more targetted approach to therapy leading to successful new treatments with reduced side effects."

Together with his long-standing colleague, Professor Liz Musgrove, at the Garvan Institute of Medical Research, Professor Sutherland's team has continued to make major advances in this area.

Liz Musgrove is currently leading the research and is heading towards new breakthroughs about understanding the role oestrogen plays in breast cancer. "We wanted to know how, at a molecular level, the female hormone oestrogen regulates cell division, growth and survival," she says. "Because oestrogen not only drives cell proliferation in the normal breast, but also promotes the development and progression of breast cancer, another question is whether deregulation of the processes that oestrogen controls may make drugs that interfere with oestrogen action, for example the antiestrogen tamoxifen, less effective in the clinic.

"We have approached these questions by undertaking a genome-scale investigation of the genes that are regulated by oestrogen as it promotes cell division, and then classifying these oestrogen-regulated genes on the basis of the cellular process they are involved in," says Liz. "By drawing on databases of information from other experimental models we identified networks of functionally-connected genes that will help us to select those most likely to play a major role in cell division, growth and survival, and further study their precise role in the cell."

In collaboration with colleagues at the Peter MacCallum Cancer Centre in Melbourne, Professor Musgrove's team also showed that the expression of these networks of genes could be used to predict which women would have better outcomes when treated with tamoxifen.

"Importantly, this analysis suggested that two of the gene networks independently predicted outcome, meaning that they identified subsets of women who responded poorly, but did so for different reasons," she explains. "We are now extending this work by using newly developed technology for experimentally screening large numbers of genes to find those oestrogen-regulated genes that are likely to be central drivers of cell cycle progression and cell survival."

As many as three-quarters of women with breast cancer are potentially treatable with drugs such as tamoxifen. However, even though these drugs are effective and well-tolerated, not all women respond. Unfortunately, many women who do respond initially will also eventually relapse with a recurrence of their breast cancer. This is a fact that drives the research into early detection and prognosis.

"Identifying women who may benefit from early treatment with additional chemotherapy is a pressing clinical need," says Liz. "An equally large challenge is to identify new therapeutic targets and develop novel therapies for treating breast cancer that is resistant to the currently-available therapies."

The breakthroughs in understanding the genes that are altered during the development of breast cancer have also enabled Professor Sutherland's team at the Garvan Institute to translate their research into findings for other cancers. "In recent years the experience in the breast cancer area facilitated new programs in prostate, pancreatic, ovarian and other cancers where we have employed contemporary gene discovery tools in genomics and gene expression analysis to identify new biomarkers of diagnosis, disease progression, disease outcome and therapeutic responsiveness," he says.

With these exciting discoveries that have been recognised on the world stage, Professor Sutherland is optimistic about the future of cancer research in NSW.

"Until the advent of the Cancer Institute NSW, NSW had been the 'poor relative' in cancer research in Australia with many impediments, not the least of which were funding and infrastructure, to conducting world-class cancer research," says Professor Sutherland. "But, now our vision of being able to conduct multidisciplinary cancer research in NSW at the highest international standards and have it translated into real benefit for cancer patients may be a reality rather than fiction."

Professor Musgrove agrees, but stresses that for this to happen, researchers shouldn't be afraid to think outside the square.

"To capitalise on this opportunity we need to embrace diversity in experimental models and approaches, in the aspects of cancer research that we study and in the career paths of the people we support."

Associate Professors Graham Mann and Scott Menzies both graduated with medical degrees from the University of Sydney, but then Graham branched out into medical oncology and Scott, dermatology. However, they found a common goal in the fight against Australia's national disease: melanoma. Now, they are working together as part of a team of researchers leading a high-risk clinic for melanoma in Sydney.

The high-risk clinic was created in February 2006 to follow patients who are at high risk for developing melanoma, using technologies to detect melanoma very early on the skin.

Total body digital photography and individual mole imaging is used to give the patient a complete digital record of their entire skin on CD which enables accurate follow-up of their skin.

"Melanoma is a significant cause of death in Australia. There is a lack of curative therapies, so we need to catch signs of melanoma early so that patients have a greater chance of survival."

Increasing survival from melanoma
Associate Professors Graham Mann and Scott Menzies, Westmead Millennium Institute of Medical Research and the Sydney Melanoma Diagnostic Centre and Discipline of Dermatology, The University of Sydney

There are specific criteria for patients to be referred to the high-risk clinic:

- People who have melanoma and dysplastic nevus syndrome (both multiple irregular and normal moles).
- People who have more than one melanoma.
- When there is a known mutation (the patient attended family cancer clinic, genetic counsellor and been clinically tested).
- People who come from a melanoma-prone family with four or more relatives who have had been diagnosed with melanoma.

"We're trying to find out, from this clinic, what determines who is at risk of melanoma," explains Graham. "We're also questioning what makes melanoma different from each other. Two people can have the same melanoma and it will react differently in each of those people, potentially causing death in one and not the other; it may also spread in one person and not another. Obviously, it is very important that we find out why that is the case."

Although they are also looking into the treatment of melanoma, Scott maintains that it is early detection that is the key for people who are at high risk of the disease. "The problem is that there is basically no effective treatment once melanoma has spread to other areas of the body," he says. "That is why we set up this clinic: to catch signs of melanoma early so that patients have a greater chance of survival."

So far, they are achieving their goals, with more than 300 people currently enrolled in the clinic for surveillance. "We examine the participants every six months using a number of techniques to see if there is any change," says Scott. "We are picking up new cases of melanoma within the clinic through the digital photography and therefore we can make sure it is treated promptly."

"We also show the participants how to look at their own skin and compare it to the photos," adds Graham. "This gives them the power to be able to pick up if there is a change that could be a melanoma."

The clinic is also looking at the psychological impacts of being at high risk of melanoma to be able to increase the care and treatment of patients.

"Because this is a targeted study, we are able to take a more personalised approach to early detection and risk management," says Graham. "There is not currently a program for screening in Australia, and indeed, there are doubts about how efficient that would be.

"By monitoring some of the highest risk patients in the world, we can start to understand which genes create melanoma, whether gene damage makes a difference and also what makes melanoma respond to treatment.

"By providing answers to these questions, we have the potential to find out which melanomas are likely to metastasise and therefore make treatment more effective."

Even though there have been recent media campaigns by both the Commonwealth and NSW Governments to raise awareness of how to prevent skin cancer within the community, Scott and Graham believe there is more that we could do.

"The key is for people to know when they should see their doctor," says Scott. "Unfortunately, most people don't know what to look for, so it is left undetected in a large number of cases, until it is too late. We are particularly seeing a greater incidence in men over 50 years of age.

"What I would like to see is more money spent educating school children, so that every child knows what to look for. Then, future generations will have a greater chance of controlling skin cancer and reducing the threat of disease."

For many people, an anatomical pathologist researching cancer would not be the most obvious link. However, for Dr Rosemary Balleine, one discipline goes hand-in-hand with the other.

"Anatomical pathology is very much focussed on the diagnosis of cancer and while it has a reputation for being a fairly static form of medical practice, the pathologist is uniquely placed to examine all forms of cancer and the full spectrum of disease from premalignant changes to very advanced lesions," she says.

"Moreover, the pathologist can put these observations into context with other forms of change in the human body such as inflammation, healing, degenerative change or hormonal effects. So conceptually, it is an easy leap for a pathologist, whose job it is to look at a human tissue specimen and answer the question 'what is it?', to become engaged in thinking more deeply about what cancer actually is, how it grows and how you could stop it.

"Working in pathology led me to view cancer as both terrible and fascinating, and this in turn led me to a career in cancer research," she says.

Rosemary has used her experience in pathology to research improvements in breast cancer diagnosis and treatment, and to ultimately add to the understanding of different stages of breast cancer and the genes that cause the disease.

"Breast cancer pathology is the particular focus of our research group," she says. "Our overall aim is to refine the routine assessment of breast tissue removed in the course of investigation or treatment for breast cancer, so that as much information as possible is available to guide the patient and her clinicians.

"For example, we recently reported a study using detailed molecular analysis to subdivide a very early form of breast cancer called ductal carcinoma in situ (DCIS) into two categories based on intrinsic aggressiveness (molecular grade) and further described an approach to apply this classification in a routine diagnostic setting.

"In other ongoing work we are systematically examining the pathology of breast cancer in multiple members of families with a high breast cancer incidence to determine whether this can provide information on the underlying genetic basis of disease," says Rosemary.

Rosemary sees the major challenge in managing cancer as matching the risk from the disease to the potential risks and benefits of treatment. Something she believes tissue pathology can play a major role in.

"The intrinsic aggressiveness of breast cancer is quite variable and an insightful assessment of each case has potential to quite directly inform management decisions," she says.

"Rapid progress is being made in this area but there remains an urgent need for further improvements. For example, it is currently fairly straight-forward to identify a form of cancer that has potential to behave aggressively, but it is more difficult to confidently identify a cancer or premalignant change in the breast that poses only a low risk. This is an important area to keep working on."

Even though this is an issue Rosemary is confident will be solved through research, she is also aware that other factors will become important for prevention, diagnosis and treatment of breast cancer in the future.

"The exciting thing about cancer research is that it is working – every year new things are learned, new progress is made and gradually we come to understand aspects of cancer that we could only guess at in the past."

Personalising cancer treatment by analysing tissue
Dr Rosemary Balleine,
Westmead Millennium Institute for Medical Research

"Incremental improvements will come from continuing research in this area and I am sure that some of the particular challenges we currently face, such as identification of low risk lesions, will be solved," she says. "However, it is also certain that new issues will emerge from changes to practice or population cancer risks that we will need to respond to. For example, the introduction of breast cancer screening and widespread use of hormone replacement therapy have had an impact on breast cancer research priorities in recent years.

"Other issues are likely to arise over time so our approach to cancer research needs to be sufficiently flexible to respond to the big questions of the day."

developing and testing new treatments

As a 26-year-old surgical oncologist in China, Dr Xu Dong Zhang was confronted by a high-school classmate's death from melanoma. He was determined to do something about the disease, so he came to where melanoma is most rampant – Australia. His current project will garner new insights into the resistance of melanoma to treatment and point to new treatments.

What is your background?

I grew up in a rural community, and attended a medical University in Taiyuan in Northern China. After graduating with a degree in medicine, I trained and practiced as a surgical oncologist for 10 years. At the end of 1995, I came to Australia, joined a research team in the Royal Adelaide Hospital and trained as a tumour biologist and immunologist. I received my PhD in June 2001 from the University of Sydney.

"Very often, I was faced with patients with advanced cancers, longing that 'if only effective systemic treatments were available!'"

Targeting melanoma one cell at a time
Dr Xu Dong Zhang,
University of Newcastle

How did you come to work in the area of cancer research?

My experience as a surgical oncologist in China provided me with extensive knowledge about the treatment of cancer. Very often, I was faced with patients with advanced cancers, longing that 'if only effective systemic treatments were available!' I came to Australia hoping to learn more about cancer biology and immunology, and to pursue a better way in treating late-stage cancers. After I completed my PhD, I redirected my career path and continued working on melanoma research.

Why is cancer research important to you?

Despite considerable efforts, there has been little progress in the treatment of metastatic melanoma because of the absence of effective therapies. I can never forget when one of my high school classmates died of melanoma at age of 26.

I set my career objective to understand more fully the basis for resistance of metastatic melanoma to treatment, and thereby identifying new molecular targets for overcoming resistance and discovering new treatments.

What are you working on at the moment?

My research team is studying the response of melanoma cells to stress conditions in determining the sensitivity to cell death induced by therapeutic drugs. If successful, this study will provide much needed new insights into the resistance of melanoma to treatment and point to new treatment approaches against the disease.

We are testing the hypotheses that adaptation of melanoma cells to endoplasmic reticulum (ER) stress can determine resistance of melanoma to chemotherapeutic drugs. By targeting key components of the unfolded protein response (UPR) melanoma cells become sensitive to chemotherapy-induced cell death. The objective of this project is to understand mechanisms by which melanoma cells adapt to ER stress, and to identify new therapeutic targets for overcoming resistance of melanoma to treatment.

What attracts you to research in developing and testing new cancer treatments?

Melanoma is largely unresponsive to available chemotherapy and shows low response rates to a number of different biological agents. This is believed to be largely due to resistance of melanoma cells to induction of a form of cell death. Our past studies have indicated that inappropriate activation of survival mechanisms in melanoma cells plays a central role in resistance of melanoma to chemotherapy. Selectively targeting these survival mechanisms therefore appears promising in development of effective therapeutic approaches against melanoma.

What do you see as the future of research in developing new treatments?

An essential part of developing new treatments is to understand more fully the biological properties of melanoma cells. Due to wide variations in characteristics of melanoma cells from different patients, future research will aim to develop personalised targeted therapy, which will apply different treatments that target different resistance mechanisms to individual patients.

A self-confessed card-carrying vascular biologist, Professor Levon Khachigian has spent his working life studying how blood vessels – and the cells that run through them – control normal bodily function and disease.

These interests have led him, through curiosity-driven research, to diverse areas such as atherosclerosis, ocular neovascularisation, rheumatoid arthritis and tumor growth, as these illnesses are linked together mechanistically by vascular biology.

"A tumour can't grow beyond a few millimetres unless it has an active blood supply," the new NHMRC Australia Fellow says. "For many years now I've been interested in the mechanisms controlling the complex process of angiogenesis, and ways we can circumvent tumor growth by blocking neovascularisation in a growing tumour."

Levon's fascination has paid off, with many achievements in health that have furthered our understanding of heart attacks and solid tumour growth. Now, he has turned his attention on skin cancer, Australia's national cancer, with some impressive results.

"The Cancer Institute NSW Translational Program Grant has allowed us to carry one of our home-grown and unique gene-targeting agents from the bench to the bedside," he says. "In animal models our candidate drugs block the growth and even cause regression of three of the most prevalent skin cancer types: basal cell carcinoma, squamous cell carcinoma and malignant melanoma.

"Moreover, these agents prevent the metastatic spread of squamous cell carcinoma and malignant melanoma."

With his colleagues, Professors Gary Halliday, Ross Barnetson and Colin Chesterman, Levon is about to start human Phase I/IIA clinical trials at Sydney's Royal Prince Alfred Hospital in a few months.

"Safety trials are almost complete, and we've just engaged a clinical trials coordinator to assist us in our journey during this exciting time," he says.

The development of these new drugs may even see a cure for this disease in the not too distant future.

"Effective alternative treatments for melanoma and non-melanoma tumours beyond existing chemotherapeutic, immunotherapeutic, photodynamic and surgical options are needed," says Levon. "Our drugs may offer new alternative cancer treatments with potency, low cost and specificity."

Levon hopes that his new discoveries will also help improve our basic understanding about cancer.

"Cancer is complex and our inability to control this disease at the present time is a symptom of our incomplete understanding of the underlying genetic, epigenetic, biochemical and cell biological basis of cancer initiation and progression," he says. "A deeper appreciation of mechanisms of disease and the availability of new treatments will only come about with further seminal research and translation.

"Australia is the skin cancer capital of the world. Through the outcomes of our research we can add to the much-needed array of therapeutic tools, which are sorely lacking at the present time."

Fighting Australia's national cancer
Professor Levon Khachigian,
University of New South Wales

"Cancer Institute NSW support for research and public awareness is the envy of all other states and territories in Australia," says Levon, a recent President of the Australian Society for Medical Research. "It has also allowed NSW to retain and attract our nation's best cancer researchers and provides a shining beacon of what health and medical research can do."

Professor John Simes faced a difficult decision when choosing which career to follow when he left school. As the first in the State in maths for his year, most people thought the outcome was obvious. But, John also had a keen interest in caring for and dealing with people, so he opted instead for studying medicine at the University of Sydney. However, he hasn't left his first love behind. Rather, it has helped shape his career in clinical trials research as he went on to study a Masters of Science in Biostatistics at Harvard University.

"Working with Professor Martin Tattersall at Royal Prince Alfred Hospital as a medical registrar sparked my interest in cancer and clinical research," he says. "He and the biostatistician, Professor Marvin Zelen, at the Harvard School of Public Health, had a huge influence in shaping my career path and research."

"While we are constantly learning more about causes of cancer and potential ways to prevent or treat it, sorting out which interventions really make a difference is key."

Optimising patient care through clinical trials
Dr Corona Gainford and Professor John Simes,
National Health and Medical Research Council (NHMRC) Clinical Trials Centre

During his career, John developed an interest in clinical trials and saw it as a significant way to develop and test new treatments.

"The clinical trial (especially controlled trials) remains the best way of distinguishing treatments that are real advances from those that are not," he explains. "Sometimes I have been involved in clinical trials where we have witnessed significant improvements in cancer outcomes. For example, better survival for patients with testicular cancer; better quality of life and improvements in survival with chemotherapy for breast cancer; better quality of life with more targeted cancer surgery; and better survival with new agents for colon cancer.

"However, there are many other situations where there was no improvement with the new treatment, despite data suggesting such treatment might work. For example, a vaccine to treat melanoma was unsuccessful when put to the test in a large randomised trial. These examples are just as important in that they serve to remind us that the trials are essential before adopting potentially valuable treatments in routine care."

John's passion for clinical trials research continued and he went on to become the director of the NHMRC Clinical Trials Centre at the University of Sydney.

"The NHMRC Clinical Trials Centre was established over 20 years ago, initially with a unit grant from the NHMRC," he says. "It has grown to a staff of over 140 people working in collaboration with investigators and other health professionals at more than 80 sites around Australia and many more internationally.

"We are engaged in developing better methods for clinical trials, incorporating outcomes relevant to patients and policy makers, and undertaking systematic reviews of trial evidence to better inform clinical guidelines.

"A recent area of particular interest concerns how we can better determine optimal care for individual patients, based on patient and biological factors which might predict greater benefit of particular treatments, but also incorporating patient preferences when there are possible trade-offs in benefits and harms," says John. "The work related to individualising care has focussed on developing better biostatistical methods for interpreting the data emerging from new trials incorporating biomarkers in clinical trials."

The work of the centre and its collaborators is well known for outstanding research in the field of clinical trials. This has attracted researchers from across the globe, such as Corona Gainford, an oncologist specialising in breast cancer. Her interest in clinical trials was sparked during her speciality training in Dublin and then in further study in epidemiology at University of Toronto. She came from Canada in 2005 on a one-year contract. She was so impressed, she stayed on and is still working as the clinical research fellow for the Australasian Gastrointestinal Trials Group (AGITG) and the Australia New Zealand Gynaecology Oncology Group (ANZGOG).

"There is a clear need to develop new approaches to cancer treatment and prevention," she says. "The best evidence of whether medical treatments and other health care interventions are effective, safe and cost-effective comes from clinical trials research. Evidence from randomised controlled clinical trials is the foundation of modern clinical practice."

"We'd like to promote cancer clinical trials as part of the culture of hospital practice and part of accreditation of providing high-quality care," John says. "In this way, there can be continued growth in clinical practice guidelines and protocols on clinical trial practice.

"Through clinical trials, we can provide greater individualised care based on targeting novel therapies. I'd like to see NSW continuing to take a lead in these efforts, nationally and internationally."

helping cancer patients through treatment and survival

After starting out as a music teacher, a career in cancer research wasn't the most obvious next choice for Dr Janette Vardy. Luckily, the chance to work with Professor Ian Tannock in Canada steered her onto the path of quality of life research, and today her study into decreasing the side effects of treatment and improving quality of life for survivors is making a real difference in the lives of cancer patients in NSW.

Tell us a bit about yourself.

My initial degree was in music at the University of Melbourne. After teaching music for a few years I spent two years working on an outer island of the Cook Islands with Australian Volunteers Abroad. Upon returning to Australia I commenced a medical degree at the University of Newcastle. My internship and residency was at Concord Hospital and my advanced training in medical oncology at the Sydney Cancer Centre. In 2003 I went to Canada to do a fellowship and PhD with Prof Ian Tannock at the Princess Margaret Hospital, University of Toronto.

How did you come to work in the area of cancer research?

When I went to Canada, I had the expectation of returning to Australia to take up a full time clinical position in medical oncology. I had a fantastic mentor in Toronto – Prof Ian Tannock – and he nurtured my interest in quality of life research. I soon realised that I had found my niche and that I wanted to find a position in which I could make psycho-oncology research a major component of my job, as well as continuing clinical work. I seriously considered staying in North America to be able to pursue a research career but I was fortunate to receive a Cancer Institute NSW Clinical Research Fellowship. This fellowship enabled me to come back to Australia and set up my own psycho-oncology/survivorship research group here.

Why is cancer research important to you?

Cancer will affect everybody at some stage of their life: either as a cancer survivor or as a family or friend of a cancer survivor. With advancements in cancer treatments more people are surviving for longer with cancer, however many continue to have long-term effects from their disease and/or the treatment. I believe that I can make a difference to the cancer journey for survivors by focusing on ways to decrease the side effects of treatment, and to improve quality of life of cancer survivors.

What projects are you working on at the moment?

Since returning to Australia in 2007 I have established a multidisciplinary research group in psycho-oncology, with a particular interest in cognitive function, fatigue and exercise in cancer survivors. Most of my research is done in collaboration with Haryana Dhillon, a behavioural scientist at the University of Sydney. Our cognitive studies include a longitudinal study in colorectal cancer patients in which we have tested over 330 patients; one in breast cancer survivors, which includes functional MRI scans; an intervention study using ginkgo biloba; two cognitive rehabilitation studies; and a number of sub studies investigating the mechanisms underlying the cognitive impairment and fatigue. This work has been important in determining the incidence and types of cognitive impairment, evaluating the underlying mechanisms, as well as developing intervention studies, one evaluating a preventative agent and two studies assessing treatment.

> "With advancements in cancer treatments more people are surviving for longer with cancer, however many continue to have long-term effects from their disease and/or the treatment."
>
> Improving quality of life for cancer patients
> **Dr Janette Vardy,**
> Sydney Cancer Centre, The University of Sydney

What are the achievements of your career?

One of the main achievements of my career has been to establish a survivorship research team. Haryana and I have brought together a group of people that are really interested in cancer research, enjoy working with people, and work very well together as a group. I believe that our studies are addressing concerns of quality of life and psycho-oncology and obtaining high-quality evidence through trials.

What is your vision for cancer research in NSW?

I believe we need to nurture and develop our research culture, supporting research in our hospitals and universities, to ensure research is a feasible career option for clinicians and scientists who are interested in cancer.

Dr Ilona Jurásková's career path was transformed by an opportunity to migrate to Australia. Fascinated by psychology and passionate about the psychological effects of a cancer diagnosis and treatment she chose it over primary school teaching and hasn't looked back.

"A diagnosis of cancer can have a devastating effect on the patient and their whole family. This is a time when serious decisions have to be made and it is probably the hardest time emotionally to have to make them," says Ilona.

One of Ilona's research interests is in doctor-patient communication; and she has taken a leading role in the area of evaluating the impact of decision aids in clinical practice. Decision aids present evidence-based information using graphs and diagrams to assist understanding, and include exercises to help people weigh up their options and come to the best decision for them. Ilona's psychological background has allowed her to develop aids which are easy to understand and target issues of importance to patients.

"Unfortunately, depending on the cancer diagnosed, decision-making resources to help the patient and their family may be scarce," Ilona says. "The information that is available may not address all of the issues or have a strong evidence-base."

As part of her Cancer Institute NSW Fellowship, Ilona is leading a research program focussing on improving the quality of informed consent of women considering treatment options for ovarian cancer via the use of decision aids.

"It is important that women consider all options and make decisions which best suit their lives and values. Being informed and involved in decision-making plays a key role in helping people cope with the cancer diagnosis and its aftermath, and complete their treatment."

On the other hand, patients can also be inundated with information following a cancer diagnosis. "Most people find it hard to absorb the large amount of information they are presented with. It is therefore important that we strive for effective patient-health professional communication, so patients are able to receive and understand medical information and feel comfortable to express their needs and preferences during medical consultations," says Ilona.

"These projects are clinically relevant, addressing areas of need, and will result in resources that can be implemented in clinical practice. We are hoping to improve the acceptance and use of shared decision-making resources such as decision aids as part of routine clinical care.

"To know that small differences in clinical care at the beginning of cancer treatment, such as the way information is communicated, can result in significant improvements throughout the recovery process, reminds me how important and worthwhile this research is."

"Any understanding we can get and resources we can offer to help make this time easier for the patient, their family and for the health professionals are extremely valuable."

Helping patients make decisions
Dr Ilona Jurásková,
Centre for Medical Psychology and Evidence-based Decision-making (CeMPED), The University of Sydney

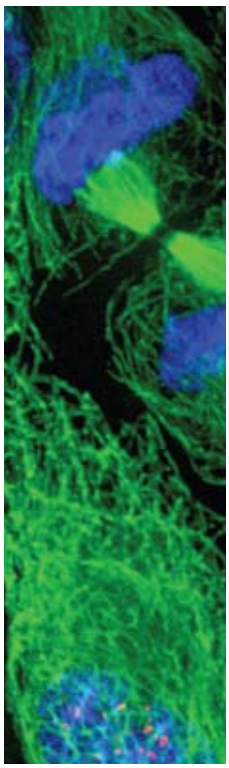
For Dr Peter Grimison, working as a medical oncologist ticked a lot of the boxes for what he wanted in a career. It involved day-to-day interaction with patients, opportunities for collaboration with other medical professionals, and above all, it brought him into daily contact with the incredible advances in cancer treatments that have occurred over the past few decades.

But, it was the ambition to make a contribution to these advances himself that led him to branch out into cancer research.

"Cancer research was a natural progression from medical oncology that has given me the opportunity to contribute to further improvements in the management of cancer," he says. "Doing cancer research also makes an exciting and diverse career that incorporates clinical research, patient care and education."

Peter's work in treatment for metastatic testicular cancer is also attracting attention on an international scale.

"I am leading a trial for patients with metastatic testicular cancer that is testing giving full-dose chemotherapy over a shorter period, called 'Accelerated BEP'," he says. "This treatment could cause more side effects, but could also increase the chance of cure. So far we have recruited 15 of 25 patients across Australia to this trial.



"Research in supportive care can lead to better identification and management of problems that cause a significant burden on patients."

Reducing the burden on cancer patients
Dr Peter Grimison,
The University of Sydney

Coming from the background of a practitioner, it is perhaps not surprising that his research focus is on improving the quality of life for cancer patients and survivors.

"My PhD aimed to better integrate quality of life data with traditional outcome measures such as survival in the evaluation of clinical trials of cancer treatments," says Peter. "The method developed was applied to evaluate clinical trials of chemotherapy for breast and colorectal cancer, and found that patients with cancer attach very high value to remaining alive, and are willing to put up with side effects of treatments and symptoms from cancer.

"I am also involved in a range of projects at the moment with a focus on treatment for testicular cancer, through my involvement in the Germ Cell sub-committee of the Australia New Zealand Urogenital and Prostate Cancer Trials Group (ANZUP)," he says. "This is a fascinating area to work in, because it affects young men in the prime of their life, and the treatments have very good cure rates."

"We will be meeting with European clinical trialists at the upcoming American Society of Clinical Oncology Meeting in Orlando in June 2009, to propose a randomised trial that compares 'Accelerated BEP' to standard chemotherapy. This would be a fantastic opportunity for Australian researchers to lead an international study."

This is an area close to Peter's heart as he has seen the effects of cancer first-hand through his treatment of patients.

"Sadly most patients with metastatic cancer cannot be cured, and many patients with early-stage cancer that have been cured suffer long-term side effects and difficulty in psychological adjustment, so it is very important that we pay attention to these problems," he says. "Research in supportive care can lead to better identification and management of problems that cause a significant burden on patients. Another advantage of research in this area is that it can often be done with relatively small patient numbers and at relatively low cost, which allows smaller Australian research groups to make a big difference in this area."

2008 winners of the premier's awards for outstanding cancer research

Outstanding cancer researcher of the year:

Professor Simon Chapman, University of Sydney

Simon Chapman is a Professor in Public Health at the University of Sydney. He is a sociologist with a PhD on the semiotics of cigarette advertising, author of 11 books and major government reports and 192 papers in peer-reviewed journals.

Simon's main research interests are in tobacco control, media discourses on health and illness and risk communication. From 1984–2002, he was a member of the World Health Organization's Expert Advisory Panel on Tobacco and Health. In 1997 Simon won the World Health Organization's 'World No Tobacco Day' medal, and in 2003 his international peers voted him to receive the Terry Luther medal for outstanding individual leadership in tobacco control.

Simon's achievement as Outstanding Cancer Researcher for 2008 was an acknowledgment of his internationally recognised research and advocacy of tobacco control; and the subsequent inroads into smoking rates.

Outstanding cancer research fellow of the year:

Dr Linda Bendall, Westmead Millennium Institute

Dr Linda Bendall, a haematologist from the University of Sydney's Faculty of Medicine, was awarded the Premier's Award for Outstanding Cancer Research Fellow for her work at the Westmead Millennium Institute into leukaemia.

Linda's laboratory has led research into the ways cells interact to cause acute lymphoblastic leukaemia (ALL), which occurs most commonly in children. Her research uncovered new information about factors which may slow or prevent" the growth of leukaemia. In the coming year, this research will very likely be taken into new clinical trials testing these promising new treatments.

Outstanding research scholar of the year:

Ms Katie Dixon, University of Sydney

Ms Katie Dixon completed her doctorate at the School of Medical Sciences on research on ultraviolet radiation-induced skin cancer. Her study was the first to demonstrate a role for vitamin D compounds in reducing tumour formation and skin cancer progression.

The studies carried out in this project helped to unravel the mechanisms underlying photoprotection by vitamin D compounds. A preliminary study carried out in human subjects showed a reduction in some of the early events that lead to skin cancer development; in particular the reduction of sunburn cells and DNA damage.

and

Ms Rebecca Hinshelwood, Garvan Institute of Medical Research

Ms Rebecca Hinshelwood is recognised for her cancer research on epigenetic changes in breast cancer. Epigenetic modification, such as environmental factors, alters the expression of genes without a change in the DNA sequence.

Rebecca's studies acknowledged that many factors involved in triggering cancer are still unknown but that there is increasing evidence that one of the critical steps is 'epigenetic' modification of DNA in the pre-cancer cell. By finding tumour suppressor genes that undergo epigenetic inactivation in early pre-cancer breast cells, early markers for detection and breast cancer therapy can be identified.

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