

# New Venture Grants

Join a bold new venture to defeat cancer



We invite you to  
consider becoming a  
benefactor of an exciting  
and innovative cancer  
research project

**Professor David Hill**

Director  
Cancer Council Victoria

**Mr Sandy Murdoch**

Chair  
Appeals Advisory Committee  
Cancer Council Victoria

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# The Venture Grants Scheme

## Overview

The lack of resources and funding to investigate highly imaginative research projects is a common problem for researchers.

The Venture Grants Scheme of Cancer Council Victoria is an initiative designed to fund established researchers and their teams to undertake projects that push the conventional boundaries.

The aim of the scheme is to:

- facilitate research breakthroughs by established research teams
- fill a need currently unmet by existing funding schemes in cancer research
- increase the quantum made available for cancer research by Cancer Council Victoria without cannibalising or compromising our other successful fundraising programs and
- appeal to the donor with an appetite for visionary venture capital investment.

The Cancer Council is looking for discerning prospective donors who understand our vision for innovative, adventurous research, building on our strong and enviable capacity for excellence in research funding.

The Venture Grants Scheme seeks to provide opportunities for prospective donors to fund research that has been deemed worthy of support by our research review processes but which cannot be funded unless new benefactors are found.

It is an exciting new concept that will have all the financial and research rigour needed to make it worthwhile for donors who choose to support this important scheme.

## Background

The Cancer Council has a competitive, peer-reviewed system of research grants funded by moneys raised through charitable sources.

The Venture Grants Scheme allows the Cancer Council to maintain its distinctive competence in peer review and research management, while fostering research innovation and supporting donor interests. But we need charitable investors to join us in fulfilling our vision.

## Selection of inaugural research grant recipients

Applications were sought from researchers with a vision that will open the way for significant advances in knowledge, ideas that could revolutionise cancer research and treatment.

A committee of cancer experts drawn from Victoria's major cancer research institutions conducted a three-stage selection process.

Applicants were required to articulate a case to be funded for amounts of up to \$500,000 per annum for one to five years.

They had to convince the committee that the grant would significantly advance their research program and could yield important new knowledge in their field.

Selected applicants have outstanding research track records and are based in institutions conducive to research success in Victoria.

Applicants were advised from the outset that funding is contingent on availability of funds yet to be raised by Cancer Council Victoria. Selected applicants are also aware that they may be asked to meet with prospective donors to assist in articulating the project to them.

## Selection process

**1 Expression of interest:** a basic proposal comprising a two-page expression of interest and budget summary, plus the investigators' curriculum vitae.

**2 Interviews** with selected applicants.

**3 Full application:** short-listed applicants submitted a full application of about 12 pages in length, including a detailed budget and identification of key milestones, i.e. agreed points in the project which have to demonstrate the viability of proceeding before further funds are released.

Each full application was allocated two mentors from the selection committee, whose role was to guide the preparation of the proposal and assist applicants with the critical task of clarifying the key milestones for each stage of the project, in order to ensure the diligent use of funds.

**4 Final portfolio:** a final portfolio of outstanding projects has been chosen for Cancer Council representatives to present to prospective donors.

## Funding and Monitoring of Projects

All funds raised for the scheme are channelled directly into the research projects. The Cancer Council covers all other costs such as administration and promotion of the scheme.

The Cancer Council is proud of this new scheme and the outstanding research projects involved and has therefore provided \$758,250 toward the first milestones.

While work on each project has commenced, additional funds are urgently needed to ensure this important research continues.

Continued funding is also contingent on the achievement of key milestones. All applicants are required to provide progress reports against milestones to allow donors to be informed.

Each project is of the highest quality and has undergone a rigorous peer review process. The Venture Grants Selection Committee, an expert committee of medical scientists, will continue to monitor all work to ensure it is progressing appropriately.

### Contact for further information:

To become a visionary funder of a venture grant, receive further information or arrange a meeting with a researcher, please contact Jenna Mellerick on 9635 5301 or [Jenna.Mellerick@cancervic.org.au](mailto:Jenna.Mellerick@cancervic.org.au)

# The Venture Grants Scheme Projects

The following snapshots are examples of the types of projects which need venture capital. Each one is pushing the boundary, but, if successful, will further enhance the Cancer Council's strategic objective of reducing the impact of cancer on the community.

## **Searching for strategies to develop new cancer treatments**

Dr Warren Alexander, Dr Benjamin Kile, Prof Andreas Strasser  
The Walter and Eliza Hall Institute of Medical Research

This project scans the genome for new targets against which anti-cancer drugs may be developed. The results will identify new strategies for cancer therapy which will help to develop more effective drug treatments.

Following the recent mapping of the entire human genetic blueprint (i.e. the DNA sequence called the human genome) scientists have changed their focus from gene discovery to understanding the functions of genes in health and disease.

Since almost all human genes are also present in mice, and many changes that cause human disease, including cancer, also do so in mice, the mouse is an excellent model for disease research and therapeutic target discovery.

This project will search for targets for cancer drugs by using mutagenesis – the creation of random genetic changes – of the mouse genome.

All drugs act by affecting (usually inhibiting) a particular gene product and mutations usually also impair the actions of the genes they affect. Thus, using mutagenesis of the mouse model of cancer, it is possible to scan the genome for new drug targets by identifying the rare mutations that lead to cancer cure or prevention in cancer-prone mice. The products of genes that, when mutated, prevent disease will provide new targets for drug discovery in cancer.

**Cancer Council Funding:** \$244,500 over 18 months  
**Funding Required:** \$684,000 over 2.5 years

## **Identifying new anti-cancer drugs using a fly cancer model**

Dr Anthony Brumby, Dr Patrick Humbert, Dr Helena Richardson,  
Dr Ian Street  
Peter MacCallum Cancer Centre

**This project aims to identify new classes of anti-cancer drugs that are effective at specifically blocking tumour formation without toxic side effects. Ultimately, it is hoped these drugs will be developed to dramatically improve patient treatment options and cancer survival.**

Flies, while obviously very different from humans anatomically, are remarkably similar to humans on a cellular and genetic level. The researchers have exploited this to develop a model of cancer development and metastasis in flies that uses signalling pathways that also promote tumour formation in humans. Therefore, there is good reason to believe that if the researchers can identify drugs that block tumour formation in the fly, these will be directly relevant to human tumours.

The aim is to screen flies which have been engineered to develop tumours against an extensive library of 100,000 different and diverse drugs. The drugs will be administered to the flies during their larval stage of growth by adding the drug to the fly food. Determining the effects of the different drugs on tumour development is very simple because the fly tumour is engineered to express a green fluorescent protein making the tumour clearly visible inside the host organism when illuminated under fluorescent light.

Any compounds that are effective in blocking tumour formation in the fly will then be tested for their effectiveness in a corresponding human cell line system that forms tumours in mice. This approach will validate the effectiveness of the drugs against human cells and pave the way for further development of the compound into effective anti-cancer therapies.

Screening for anti-cancer drugs on such a large scale and economy has not been possible in any other whole organism to date.

**Cancer Council Funding:** \$143,750 over 12 months

**Funding Required:** \$955,250 over 3 years

## **Identification of genes that cause breast cancer and regulate the activity of anti-cancer drugs**

A/Prof Ricky Johnstone, Dr Ross Hannan, A/Prof Grant McArthur,  
Dr Rick Pearson  
Peter MacCallum Cancer Centre

**This project aims to identify genetic abnormalities that are important for the onset and progression of cancer and can inhibit the activity of anti-cancer drugs. Our results will lead to better diagnostic and treatment approaches for cancer.**

The two major aims of this project are to: a) identify genes that normally function inside our cells to prevent breast cancer and b) identify genes that are required for anti-cancer drugs to kill breast cancer cells.

Using a new technology called RNA interference, researchers can decrease the expression of individual genes within a cell of interest. This means they can use human breast cells that are one step removed from becoming cancerous to identify the genes that stop these cells from taking the last step.

This type of screen identifies 'tumour suppressor genes' and provides important information about how normal cells are transformed into cancer cells and, in doing so, identifies targets for the future development of new anti-cancer drugs.

Similarly, by taking breast cancer cells that are sensitive to different chemotherapy drugs and using the RNA interference technology to decrease the expression of individual genes, the researchers can select cells that have become drug resistant to identify genes that are necessary for the anti-cancer activity of existing and new drugs.

**Cancer Council Funding:** \$105,500 over 6 months

**Funding Required:** \$1,160,500 over 2.5 years

## **Studies on the use of x-rays generated by a synchrotron for radiotherapy treatment of cancers**

Prof Peter Rogers, Prof Rob Lewis, Dr Imants Svalbe,  
Prof Bryan Williams, Dr David Blakey  
Monash University

**This project will use the Australian synchrotron to investigate the interaction between micro x-ray beams and tumour tissues. The results will help to develop more effective cancer radiotherapy treatments.**

The aim of the project is to develop more effective radiotherapy treatments for cancer by harnessing the intense beams of x-rays that can be produced by the new Australian synchrotron.

Radiotherapy is a frontline treatment of most cancers. The major limitation to effectively treating cancer with radiotherapy is devising ways to deliver enough radiation to kill the tumour without destroying the normal surrounding tissues. At present, beams of x-rays are delivered from different directions through the normal tissues so they only converge at the tumour. Spreading treatment over many days allows normal tissues to recover between treatments.

The Australian synchrotron, located next to Monash University, will be able to generate x-ray beams that are approximately 10 billion times more intense than those produced by conventional radiotherapy machines. This has the potential to revolutionise the way cancer radiotherapy is performed. American and European animal studies have shown that if the synchrotron beams are split into a series of extremely narrow, intense, parallel beamlets, the effects on normal and tumour tissues change dramatically. This method is known as microbeam radiation therapy (MRT). It appears normal tissues are able to tolerate MRT exposures of up to 100 times greater than conventional x-ray therapy.

The Australian synchrotron will allow researchers to confirm and extend the American and European animal studies. They will undertake a series of detailed studies to define normal and tumour tissue responses to MRT, and the optimal MRT beam configuration for effective tumour treatment.

**Cancer Council Funding:** \$123,750 over 12 months

**Funding Required:** \$1,987,750 over 4 years

## **Developing a new drug target against breast cancer**

Dr Jane Visvader, Dr Ian Street, A/Prof Geoffrey Lindeman,  
Dr Keith Watson, Dr Marie-Liesse Asselin-Labat  
The Walter and Eliza Hall Institute of Medical Research

**This project explores the role of a key regulatory molecule in cancer tissue. The results will lead to better prognostic and treatment approaches for cancer.**

The researchers have identified a molecule called LMO4, which has been shown to be overproduced in more than 50% of breast cancers. Several key findings suggest LMO4 is involved in the causation and progression of breast cancer, and that reducing LMO4 levels could be an effective way of targeting breast cancer cells.

Research has revealed LMO4 levels are elevated in breast tumours due to abnormal 'switching on' of the gene in tumour cells. The aim of this project is to identify small molecules that inhibit, or 'switch off' the LMO4 gene. Using high throughput robotics and an automated reader, more than 100,000 compounds will be screened for their ability to turn off the LMO4 gene. Promising compounds could potentially be developed into anti-cancer drugs.

**Cancer Council Funding:** \$140,750 over 12 months

**Further Funding Required:** \$537,000 over 2 years

# Snapshot

of Cancer Council Victoria

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The core business of Cancer Council Victoria is to *create and apply knowledge to fight cancer*.

Cancer Council Victoria is the trading name of the Anti-Cancer Council of Victoria, which was formed by an Act of Parliament in 1936. It has functioned as a successful health charity since that time. The Executive Committee functions as a Board and has a mix of skills including medicine, research, public health, nursing, business, accounting, law, fundraising and communications.

Our vision is to be:

- a source of insight and inspiration for solutions in the fight against cancer
- an authoritative voice sought out and listened to by stakeholders
- a major national and international player in cancer control led by cancer control experts of international repute
- in strong relationships and partnerships
- accessible to all Victorians
- a benchmark for stewardship in a charity.

(Strategic Plan, 2004–2007)

Cancer Council Victoria is housed in two buildings in Carlton South (1 Rathdowne St and 100 Drummond St), where a staff of approximately 350 work (including part-time and casual staff). The headquarters staff comprise behavioural and population scientists, clinical scientists, health promotion and communication specialists, counsellors, fundraisers, finance and support staff. No medical treatments for cancer take place at the Cancer Council.

Cancer Council Victoria generates income from public donations, community events (Daffodil Day, Relay for Life, Australia's Biggest Morning Tea), retail sales (mostly SunSmart products), corporate and trust support, bequests, intellectual property, as well as a substantial proportion from successful competitive grant applications and contracts awarded by both federal and state governments. Victorian people donate on average \$4–5 per head per annum to the Cancer Council, but little of this yet comes from corporations, trusts or wealthy individuals.

Cancer Council Victoria not only attracts funding from external research granting agencies in Australia and the USA, it also awards competitive grants to basic biomedical and clinical researchers at other institutions in Victoria. There are regular open competitions for these grants, which are awarded to scientists following a rigorous peer review process.

Following a strategic analysis in the 1980s of areas of need and opportunity in cancer research, two 'in-house' research groups – the Cancer Epidemiology Centre and the Centre for Behavioural Research in Cancer – were set up. Together with the more recent VicHealth Centre for Tobacco Control and the Centre for Clinical Research in Cancer, the in-house groups undertake studies of particular relevance to the Cancer Council's mission to apply cancer control knowledge at a population level.

Cancer Council Victoria is affiliated with The University of Melbourne and affiliation with Monash University is in process. Such affiliations assist in cementing academic links that enhance research collaborations and cancer research training.

Knowledge created through our own and others' research is of little value unless applied. Hence, the Cancer Council has major programs that reach out to the community to reduce major 'risk factors' for cancer: tobacco use (Quit Victoria), excess sun exposure (SunSmart), and more recently obesity/overweight (partnering with Diabetes Australia). We play a key role in promoting participation in public cancer screening programs: PapScreen, BreastScreen and bowel cancer screening (forthcoming). The network of cancer clinicians the Cancer Council has auspiced for 30 years – the Victorian Cooperative Oncology Group – is a vehicle not only for clinical research, but also for continuous updating and professional development that flows through into improved care of patients. Finally, we conduct a world-leading Cancer Information and Support Service which provides telephone contact with trained oncology nurses for any patient or family member or friend who wishes to access it.

## More about Cancer Council Victoria

For 70 years, Cancer Council Victoria (as it is now named) has been at the forefront of cancer control: collecting and sharing knowledge about how the public can reduce their cancer risk, supporting people affected by cancer, and collaborating with Victorian medical and research institutions to implement research programs. Since this time, we have seen male smoking rates drop from 72% in 1945 to 17.4% in 2005. Sixty years ago, only 25% of people diagnosed with a serious cancer survived. Now, more than 50% of people diagnosed with a serious cancer will be cured. Childhood leukaemia, a virtual death sentence in the 1950s (average life expectancy was approximately six weeks) is now curable in over 60% of cases.

Following are some highlights of the history of the Cancer Council:

- 1936 The Cancer Council raises the equivalent of \$6 million in today's dollars in its first public fundraising appeal
- 1939 The Victorian Cancer Registry is established at the Cancer Council and is responsible for collecting records of diagnosed cases of cancer in Victoria
- 1959 A pilot project begins at the Royal Women's Hospital to screen for cancer of the cervix
- 1967 Average survival from childhood leukaemia rises to between three and seven years (from approximately six weeks in the 1950s)
- 1976 Public education programs grow; the Slip! Slop! Slap! program is launched to educate about the risks of sun exposure
- 1985 The Quit campaign is established, leading to an immediate drop of 2.6% in overall adult smoking rates and a continued 1.5% decline annually among men  
  
Mortality from cervical cancer reduces by 50% after nearly 30 years of screening
- 1988 The Cancer Information Service (a telephone information service) is launched as a three-year trial program. It averages 20,000 calls annually on a wide variety of cancer related topics
- 1991 Professor Donald Metcalf's work at the Walter and Eliza Hall Institute (funded by the Cancer Council) on colony stimulating factors sees the first of these growth factors being manufactured for introduction worldwide. By 2005, this advancement had been used in the treatment of over four million cancer patients across the world
- 1997 We distribute a record 382,000 publications to people needing information about cancer
- 1999 The Cancer Control Research Institute (located at 100 Drummond Street, Carlton), which houses our cancer research and prevention programs, is officially opened in February by the Honourable Rob Knowles, Minister for Health
- 2000 The Cancer Council launches a \$1.5 million appeal for ovarian cancer research

- 2001 The Cancer Council launches the Multilingual Cancer Information Service
- 2002 The Cancer Council launches a new cancer support program, Cancer Connect, to link people who have cancer with someone who has been through the experience and survived  
  
The Cancer Council announces an initiative to increase participation in cancer clinical trials, including grants of over \$700,000 to 17 hospitals around Victoria and a new booklet to help patients find out more about clinical trials
- 2004 By the end of the year, 81% of Victorian primary schools and 59% of early childhood services had joined the SunSmart program
- 2005 An Internet listing of clinical trials in Victoria is introduced, enabling people to search for trials for which they may be eligible
- 2006 The Cancer Council announces it has supported \$150 million of research in its 70-year history

Today, Cancer Council Victoria's core business is cancer control. We conduct and support research, as well as delivering statewide support and prevention programs and advocacy to reduce the physical and emotional burden of cancer. Our leaders are of international standing and we are significantly and positively influencing the cancer agenda in Victoria and beyond.

## Our activities:

### **We work for all Victorians: helping people affected by cancer and preventing cancer**

Our work is for the benefit of all Victorians. This means supporting people with and at high risk of cancer. We also educate children and adults so they know how to reduce their risk of cancer. Wherever possible, we aim to prevent the occurrence of cancer, its spread and avoidable distress associated with it.

Our research contributes to cancer knowledge, so that the burden of cancer will not be as great for future generations.

### **We link with the best while remaining independent**

We maintain valued partnerships with government, business and professional groups.

We work closely with cancer clinicians and researchers, nurture a strong public profile and preserve our independence from government and corporations to maximise our capacity to influence the public agenda on cancer.

Our dedicated volunteers significantly contribute to our work at all levels of the organisation.

### **We run effective programs**

Our range of influential and highly regarded programs includes:

- prevention and early detection programs
- policy research
- basic and clinical research funding
- professional development for cancer professionals
- information and support for people affected by cancer
- epidemiological and behavioural research.

### **We apply research**

Our research builds new knowledge, which is critically reviewed, communicated through professional networks, and provided directly so people may take action against cancer.

### **We work to prevent cancer**

We build on our record of leadership, collaboration and coordination, and on our strengths in behavioural science and education to emphasise prevention in the broadest sense – prevention of the occurrence of cancer, prevention of its spread, and prevention of avoidable distress associated with it.

# Our structure and governance

Cancer Council Victoria is governed by a Council, with delegated authority to an Executive Committee (Board) and several other sub-committees. Our Director is a public health research scientist. We employ about 350 people.

We are centrally located and close to many of Melbourne's major public teaching hospitals, universities and renowned medical research institutes.

We house three research centres (epidemiology, tobacco control and behavioural science), the Victorian Cancer Registry, public education programs, information and support (including the Cancer Council Helpline), Quit, publications, fundraising (including a retail operation), informatics and logistics, finance and human resources.

We auspice and fund the activities of the Victorian Cooperative Oncology Group: 18 committees and 380 cancer specialists. Our Medical and Scientific Committee dispenses competitive research grants to medical research institutions in Victoria and coordinates the peer review process on behalf of cancer organisations in other states. We auspice and administer the Victorian Breast Cancer Research Consortium.

We are a member of The Cancer Council Australia, which undertakes national advocacy, and belong to the International Union Against Cancer.

## International advisory role for Cancer Council Director

Cancer Council Director Professor David Hill was recently voted President Elect of the International Union Against Cancer (UICC).

The UICC is a non-government, independent association of more than 270 member organisations in over 80 countries. Its objectives are to advance scientific and medical knowledge in research, diagnosis, treatment and prevention of cancer, and to promote all other aspects of the campaign against cancer throughout the world. With a small secretariat based in Geneva, the conduct of the UICC's programs depends largely upon the voluntary involvement of experts worldwide.

The UICC has an important role in reducing the global burden of cancer, and Professor Hill's appointment reflects the achievements of Australia's cancer control program, and the ways that these can inform cancer control in the developing world. He will take up his two-year term as President in 2008 and will undertake the duties associated with this role in addition to his duties as Director of Cancer Council Victoria.

# Cancer Council Victoria –

providing cancer information,  
education and access to services

# Cancer Council Victoria – providing cancer information, education and access to services

As well as its cancer research programs, Cancer Council Victoria is at the forefront of coordinating information and support services for people who receive a cancer diagnosis.

Such programs help to satisfy the greatest unmet need that people with cancer express: information about their medical condition.

At the time of receiving a cancer diagnosis, people are understandably shocked and may not take full notice of the information that their doctor is providing. Days or weeks later, the person with cancer may start to think of questions that they wish they'd asked, or paid closer attention to: *What are the side effects of radiotherapy? What does a CT scan involve? Should I be eating a special diet now that I have cancer?* Over time and as treatment progresses, new issues or questions arise.

Cancer Council Victoria has implemented a range of services that help address the questions that people with cancer want answered.

## Cancer Council Helpline (tel: 13 11 20)

This service is confidential, staffed by oncology nurses and information officers and can be accessed at the cost of a local call. Around 50,000 calls per year are answered. For many people, the helpline is a gateway to a number of other services that the Cancer Council provides or can refer to.

## Cancer education booklets and literature

Cancer Council Victoria develops a range of cancer information booklets on site-specific cancer topics (e.g. Melanoma, Breast, Prostate, Lung, Bowel Cancer), on cancer treatment topics (e.g. Radiotherapy, Chemotherapy) and on related topics (e.g. Eating Well, When Cancer Won't Go Away). These booklets are requested by medical centres across Victoria and are placed in patient waiting rooms or distributed by medical staff. As a follow up to a person calling our Cancer Council Helpline, we also often send literature that provides information about a person's specific interest area. This allows individuals to digest information at a pace that suits them and allows them to revisit an accurate source of information in situations where they may have forgotten a detail.

## Cancer Connect

This program connects volunteer cancer survivors with newly diagnosed cancer patients. Cancer survivors are trained and supported by Cancer Council staff to provide telephone support to a person who has been referred to them by our Cancer Council Helpline. Survivors and the newly diagnosed patients are connected by the Cancer Council and we match pairs so that the survivor has a good fit with the patient (i.e. both individuals have had the same diagnosis, treatment and are of the same sex or age group). In late 2003, we extended this program to include the capacity to link the parents of children with cancer.

## Cancer support groups

The Cancer Council accredits and supports around 120 cancer support groups across Victoria each year. Ongoing skills development seminars are provided to these groups so that they can remain up-to-date with knowledge about cancer and the services of Cancer Council Victoria.

## Community seminars and workshops

There are a variety of seminars and workshops held throughout the year that provide information on various cancer topics; the Living Well Forum for people with advanced cancer, Survivorship Workshops and Men's Health Evenings are just a few of the seminars and workshops provided.

## Multilingual cancer information

A Multilingual Information Line provides cancer information via interpreter link with our Cancer Council Helpline oncology nurses. We have also developed a range of cancer information pamphlets that address cancer topics in nine major languages. We continue to expand the services that we provide to Victorians who speak a language other than English.

**What is cancer?**

# What is cancer?

Cancer is a disease of the body's cells. Our bodies are always making new cells: so that we can grow, to replace worn-out cells, or to heal damaged cells after an injury. This process is controlled by certain genes. All cancers are caused by changes to these genes. Changes usually happen during our lifetime, although a small number of people inherit a changed gene from a parent.

Normally, cells grow and multiply in an orderly way. However, changed genes can cause them to behave abnormally. They may grow into a lump. These lumps can be benign (not cancerous) or malignant (cancerous).

Benign lumps do not spread to other parts of the body.

A malignant lump (more commonly called a malignant tumour) is made up of cancer cells. When it first develops, this malignant tumour may be confined to its original site. If these cells are not treated they may spread into surrounding tissue and to other parts of the body. When these cells reach a new site they may continue to grow and form another tumour at that site. This is called a secondary cancer or metastasis.

For a cancer to grow bigger than the head of a pin, it must grow its own blood vessels.

There are several different types of cancer. Human cancers are usually one of three main types:

- Carcinomas (approximately 90% of cancers) begin in the skin, the tissues lining the internal organs (for example, lungs, stomach, intestine) or those which form the glands (for example, prostate, breast).
- Leukaemias/lymphomas (approximately 8% of cancers) arise from the blood-forming cells or cells of the lymphatic system.
- Sarcomas (rare in humans) are cancer of the connective tissue (for example, bone, muscle).

Cancer tends to be a disease that develops later in life. The process usually occurs over a long period, involving several stages:

- Initiation – a mutation (damage to or a change in the DNA of one cell) which results in uncontrolled division to form a mass of abnormal cells. Sometimes the damage to the DNA can be repaired and the cells can return to normal.

- Progression – further division and growth of abnormal cells to form a tumour. The cancer cells divide faster than normal cells, and do not arrange themselves in an orderly, regular way as normal cells do. Cancer cells are also able to stimulate the development of new blood vessels that can supply the nutrients needed for growth of the tumour.
- Cancer – cells from the tumour break off and travel via the blood or lymphatic systems to other parts of the body (often the closest organ) in the process as metastasis. The new tumours formed from cells that have travelled from the original (primary) tumour are referred to as secondary tumours or metastases.

For metastasis to occur, the cells that travel must:

- survive the journey in the blood or lymphatic system
- attach to and penetrate blood vessels at the new site
- evade the immune system.

A rapidly growing tumour can release millions of cells each day, so it is likely that metastasis will occur eventually unless the primary tumour is treated.

## About cancer in Australia

Excluding non-melanoma skin cancers, there were 88,398 new cancer cases and 36,319 deaths from cancer in Australia in 2001 (the most recent national figures available). This compares with 65,966 new cases and 30,928 deaths in 1991.

Based on 2001 incidence rates, it would be expected that one in three men and one in four women will be diagnosed with cancer in the first 75 years of life. Further, an estimated 257,458 potential years of life would be lost to the community each year as a result of people dying of cancer before the age of 75. Cancer currently accounts for 31% of male deaths and 26% of female deaths.

Death from non-melanoma skin cancer is very rare, so it is not registered with potentially fatal cancers. However, the prevalence of non-melanoma skin cancer (around 370,000 new cases annually) makes it the most expensive to treat, costing the nation's health system an estimated \$430 million each year.

### **Most common potentially fatal cancers**

Among all persons, the combination of cancers of the colon and rectum (12,844 new cases), often referred to as bowel or colorectal cancer, is the most common registrable cancer in Australia. Colorectal cancer, breast cancer (11,886), prostate cancer (11,191), melanoma (8,885) and lung cancer (8,275) together account for 60% of all registrable cancers in 2001.

### **Males**

In males, the most common registrable cancers after prostate cancer are colorectal cancer (6,961 new cases in 2001), lung cancer (5,384) and melanoma (5,024). These four cancers account for 60% of all registrable cancers in males.

### **Females**

In females, breast cancer (11,791) is the most common registrable cancer, followed by colorectal cancer (5,883), melanoma (3,861) and lung cancer (2,891) which in total, account for 60% of all registrable cancers in females.

### **Cancers causing death**

The cancers most commonly causing death are lung (4,657), prostate (2,718) and colorectal (2,601) in males, and breast (2,594), lung (2,382) and colorectal (2,153) in females.



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