

6 Feature cancer sites

This section sets out some key information about the patterns, risk factors, treatments and trends in thirteen selected cancers. There are two graphs for each cancer site. The first graph showing cancer incidence by age group is for the period 2000-2004, and the second graph of number of new cases and deaths is for the period 1977-2004.

- 6.1 Prostate cancer
- 6.2 Melanoma
- 6.3 Breast cancer
- 6.4 Lung cancer
- 6.5 Colon cancer
- 6.6 Rectum cancer
- 6.7 Cervix cancer
- 6.8 Non-Hodgkin's Lymphoma
- 6.9 Leukaemia
- 6.10 Ovarian cancer
- 6.11 Lip cancer
- 6.12 Brain cancer

6.1 Prostate cancer

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Males	1326	161.4	29.2	1 in 8	218	28.4	12.0

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

Prostate cancer has become the most commonly diagnosed malignancy in males, apart from the common skin cancers. In South Australia, a two-fold increase in incidence rates was observed in 1990-1995 compared with rates in the 1980s. Similar trends have been reported in other countries. Internationally, the highest rates are found in American blacks and the lowest in Japanese and other Asian males.

The rise in incidence during the 1990s has been attributed to the wide-spread use of prostate-specific antigen (PSA) testing, frequently followed by trans-rectal ultrasonography and biopsy (TRUS). For the same period, the death rate for prostate cancer increased only marginally and this may be attributable to a greater awareness reflected on death certification. Because the prevalence of latent disease is very high, affecting about half of men over 60 years of age, increased investigations can lead to substantial increases in numbers of detected cancers of uncertain clinical significance. The management of prostate cancer ranges from radical prostatectomy, radiotherapy, hormonal therapy and chemotherapy, to "watchful waiting", where a case is monitored for any signs of extension of the disease beyond the prostate capsule. Longitudinal studies are underway to determine whether

widespread PSA testing results in reductions in prostate cancer-specific mortality.

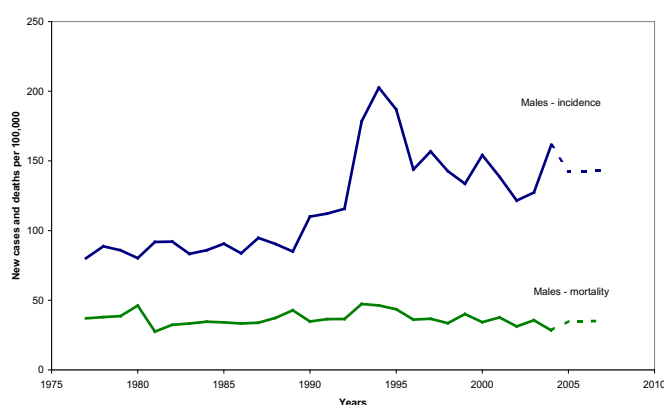
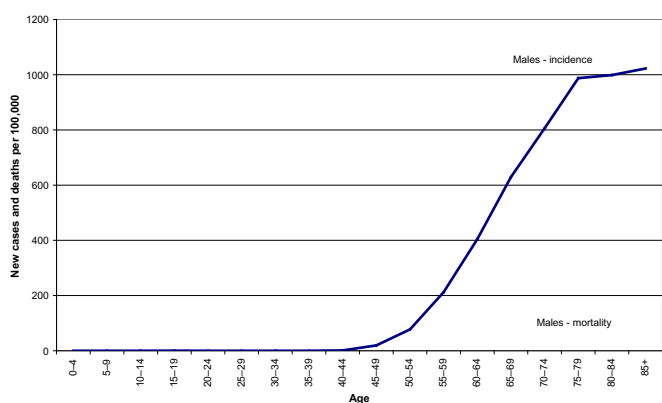
The causes of prostate cancer are uncertain, although western diets high in animal fats and proteins have been implicated. Populations with high intakes of fruit and vegetables have been reported to have lower incidence and mortality rates. More recently, sexual activity has been reported to have a protective effect. As reported for other populations, incidence rates are higher for the upper socio-economic areas which may reflect differences in access to PSA testing and biopsy.

Prostate cancer accounted for 29% of all male cancers in 2004. It is the most common cancer in men.

Recently identified factors that require further investigation, but which may become targets for reducing the risk of prostate cancer, include higher intakes

of selenium, carotenoids (found in tomatoes), and other antioxidants; reduced animal fat and meat intake, which may influence androgens, prostaglandins, or cell membrane receptor activity.

Although cigarette smoking does not appear to increase the risk of a diagnosis of prostate cancer, some studies have noted an association with fatal cases. Increasing physical activity is generally beneficial for good health, but only extreme energy expenditure appears to decrease the risk of prostate cancer.



6.2 Melanoma

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Males	380	47.1	8.4	1 in 28	43	5.4	2.4
Females	291	32.8	8.0	1 in 40	28	2.7	2.0

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

Melanoma is more common in Australia than in any other country in the world. The incidence of melanoma has increased for both sexes in South Australia over the past 20 years with some levelling off in more recent years. The increase has been larger in males, in the older age groups, and in sun-exposed occupations such as farmers and labourers. Excessive exposure to sunlight, particularly during childhood, is considered to be a major risk factor, with intermittent acute exposures to sunlight being a causal factor in the observed high rates amongst some professional and clerical workers. Melanoma has been observed to be more common in general among the Australian-born than among migrant populations in South Australia. It is rarely found in the Aboriginal population or others with pigmented skin such as immigrants from Asia.

Chapter 7 in this report gives more detail about melanoma including time trends on level of invasion, and where on the body melanomas tend to occur.

Despite the increasing incidence of melanoma, mortality rates have remained fairly stable, with the exception of elderly males. The latency period for melanoma is very long and the increases in incidence are likely a cohort effect being the result of excessive exposure to sunlight in the 1960s.

Malignant melanoma is a potentially curable cancer when diagnosed and treated early in development. Increased awareness of suspicious skin lesions by both clinicians and the community, and a simple routine skin inspection can change the natural history of this disease. A change in the colour, size and borders of a mole is the most common sign, occurring in over 70% of thin and curable melanomas. Bleeding, ulceration and

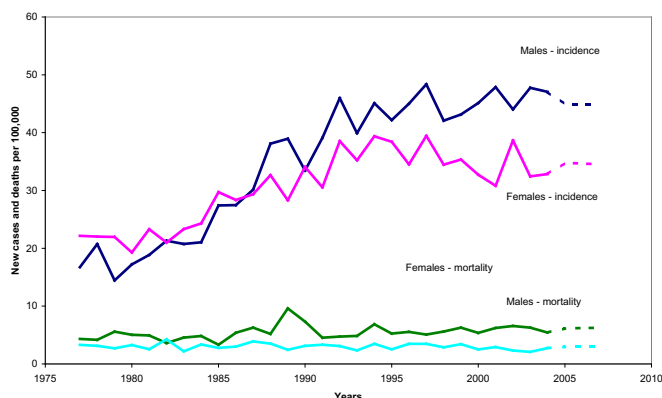
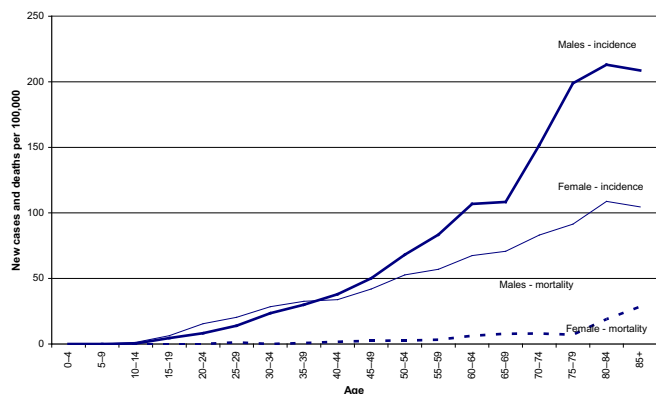
tenderness are usually late changes that indicate more advanced disease.

Preventive measures are promoted by organisations such as the Cancer Council of South Australia and The Health Promotion Branch of the Department of Health. Campaigns are directed at minimising exposure to sunlight by the wearing of suitable clothing including hats, making use of shade, avoiding the sun at high risk times such as noon, and applying effective sun screens.

Management is focussed on early detection of small lesions which can be excised before local spread and metastasis occurs. In early stage

melanoma, tumour thickness is the primary criterion in determining the surgical approach to the primary site and regional lymph nodes. Radiation therapy will reduce bone pain from metastases. Cranial and spinal cord irradiation

combined with dexamethasone therapy effectively palliates central nervous system metastases. Imidazole carboxamide (DTIC) has been used both as a single chemotherapeutic agent and in combination with other agents. The absence of effective chemotherapy for late stage melanoma and the development of recombinant DNA technology have led to the investigation of a variety of immunological and biological agents. Another area of investigation is the development of monoclonal antibodies directed against the antigens expressed on the surface of melanoma cells. As is the case with other cancers, the progress in our understanding of human genome has the potential to increase therapeutic options.



6.3 Breast cancer

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Females	1035	115.2	28.4	1 in 11	219	22.3	15.3

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

The incidence of female breast cancer increased during the late 1990s following the introduction of mammographic screening. This was particularly apparent in the 50-69 year old target group. An effect of screening and allied early detection initiatives was the increasing numbers of small lesions with a diameter of less than 15mm. During the 1980s, and before the advent of screening, the proportion of such small lesions was about 15%. By the year 2000, this corresponding proportion was about 40%. Among the screen-targeted 50-69 year olds, the proportion of small lesions increased from 13% to 44%. Apart from better survival, such tumours are less likely to require radical treatment.

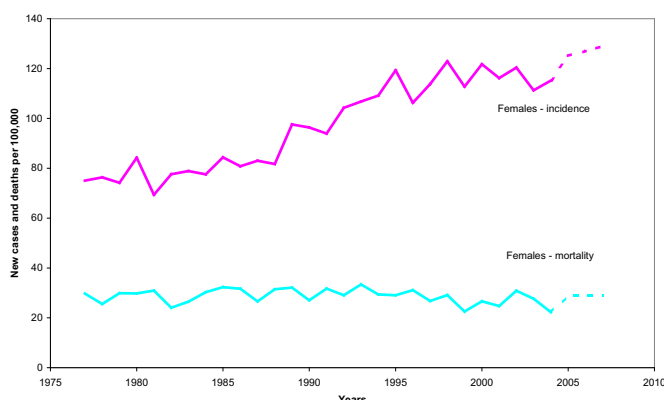
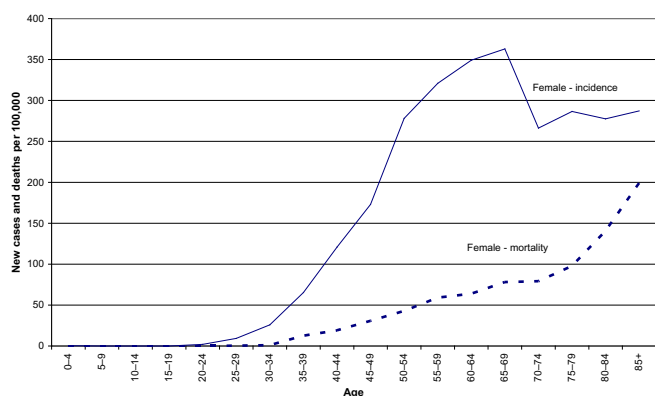
Breast cancer-specific mortality has fallen by over 25% for all ages between 1991-1992 and 2003-2004. The impact of any cancer screening takes many years to show an effect. Screening in SA women was still limited in the early 1990s but is now at levels where it is having an impact. A sustainable reduction in breast cancer specific mortality attributable to mammography can now be demonstrated from these figures.

Breast cancer mortality has been decreasing since 1990 despite increases in incidence.

A review of trial data by IARC (International Association of Cancer Registries), released in 2002, concluded that a 25% reduction in breast cancer mortality was achieved in women offered mammographic screening compared with those who were not.

Risk factors for breast cancer include a family history, increased body size, a history of benign breast disease, and nulliparity or late age at the first full-term pregnancy. Less well established risk factors include high fat and alcohol intake and exposure to ionising radiation.

Management is determined by disease stage, age and patient general condition. The increasingly diagnosed small lesions may be treated by simple lumpectomy with or without radiotherapy. Larger lesions, and those with lymph node involvement, require more extensive surgery, usually with radiotherapy and chemotherapy. Tamoxifen and similar medications have become valuable chemotherapeutic assets for many cases of invasive breast cancer.



6.4 Lung cancer

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Males	488	60.3	10.7	1 in 23	404	50.1	22.2
Females	292	30.1	8.0	1 in 42	238	23.9	16.6

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

The incidence of lung cancer has fallen by about 25% in males over the past 25 years with an equivalent reduction taking place in mortality. Most of this reduction occurred in younger age groups. By comparison, females showed a 65% increase in incidence for the same period. Most of this increase occurred before the early 1990s with smaller increases occurring thereafter. Female lung cancer mortality showed a similar pattern with a 50% increase in mortality occurring up to 1991.

Higher incidence rates are typically found in the lower socioeconomic areas of Adelaide. Aboriginal women have particularly high rates of this disease. Overseas-born males have a higher incidence of lung cancer than Australian-born males, with immigrants from the UK and Southern Europe being at an elevated risk. Asian-born males have a lower risk of lung cancer than Australian-born males.

It is accepted that the smoking is the most powerful risk factor, although lung cancer can be caused by exposure to some occupational carcinogens including ionising radiation (especially radon gas), asbestos, petroleum, chromates, nickel and arsenic. Smoking is considered to be more strongly associated with small-cell and squamous-cell lesions, than with adenocarcinomas. It is accepted that most of the decreased incidence in South Australian males has been due to reduced tobacco smoking from

the 1970s. This is confirmed by Registry data which shows a decreasing ratio of small-cell or squamous-cell to adenocarcinoma cell lesions in males over the past 25 years.

Preventive measures include anti-smoking campaigns, and air filtration and the wearing of personal protective equipment in occupational settings.

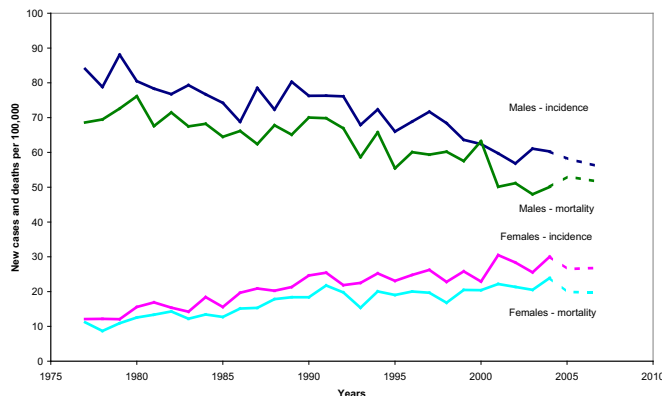
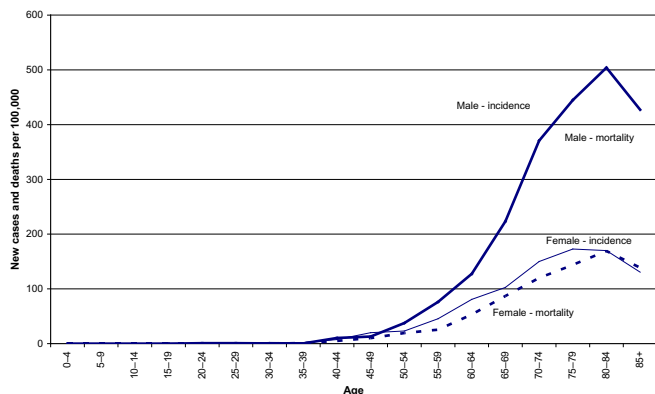
The majority of patients with lung cancer have symptoms related to the primary tumour such as a persistent cough, haemoptysis, and unilateral wheezing. The latter is pathognomonic of partial bronchial obstruction.

Diagnosis is usually made by a plain chest X-ray, followed by other imaging to determine the extent of the disease and treatment

options. Laboratory diagnosis by positive cytology occurs in about 70% of cases. A complete and careful examination of the entire bronchial tree is achieved by bronchoscopy. Biopsy of the suspicious lesion confirms the diagnosis.

Surgical resection is the treatment of choice for early stage lung cancer. Radiation therapy can be an effective form of primary treatment, in pre-surgical debulking, and is of benefit in the palliation of haemoptysis, bronchial obstruction and bone pain in metastatic disease. Chemotherapy may be used in the primary treatment of small cell cancers and as palliation in the later stages of this disease.

Lung cancer mortality is decreasing in men and increasing in women



6.5 Colon cancer

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Males	394	49.0	8.7	1 in 28	157	19.8	8.6
Females	380	37.4	10.4	1 in 39	156	14.5	10.9

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

Cancers of the colon are mainly adenocarcinomas. There has been an increase in incidence of about 20% in males and 6% in females over the past 25 years. Mortality rates have decreased by 25% in females and by 14% in males in more recent years.

Suggested risk factors include diets high in processed foods, fat and animal protein, but low in fibre, fresh fruit and vegetables. Other probable contributors include more sedentary life styles, and in females, older age at first birth and lower parity.

Incidence rates may have increased artificially through an increased detection by faecal occult blood testing and more frequent use of colonoscopy. A number of predisposing conditions for colon cancer have been identified. These include familial polyposis, an inherited condition. The adenomatous polyps have a tendency to undergo malignant change when the subject is relatively young, probably because the polyps develop early. Regular colonoscopy has the potential to remove such lesions before malignant change occurs. Patients who have pancolonic involvement with chronic ulcerative colitis are at an increased risk of developing colon cancer, with the risk rising steadily after ten years of disease.

For both males and females colon cancer is increasing in incidence yet decreasing in mortality

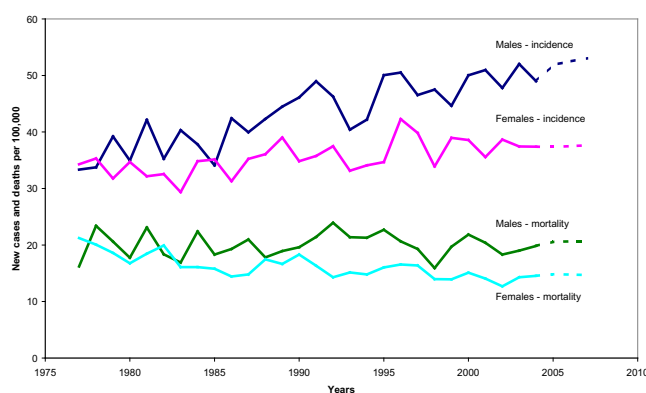
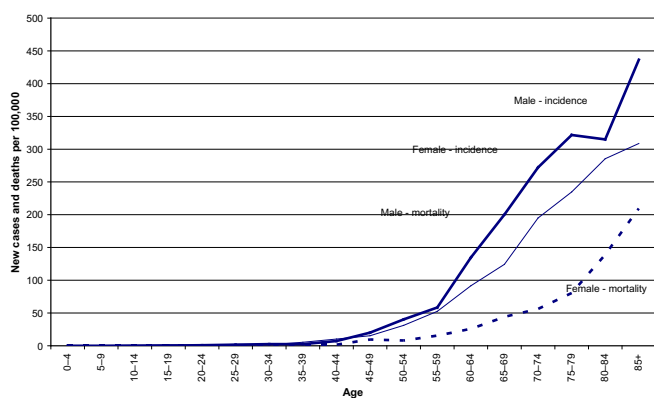
The risk is dramatically reduced when there is less extensive colitis. Family cancer syndrome refers to those with a familial tendency to develop uterine, breast, or colon cancer and should also be screened by colonoscopy on a regular basis.

South Australian data have shown an increased incidence in upper socioeconomic areas. Aboriginal residents have a comparatively low incidence of colon cancer. Those born in Australia appear to be at higher risk than the overseas-

born, with migrants from Southern Europe having a particularly low incidence. By occupation, higher rates have been observed in white collar workers including managers,

medical practitioners, pharmacists, optometrists, physiotherapists, and teachers.

Cancers of the colon are removed by wide surgical resection of the primary lesion together with all mesentery that contains lymph nodes to which the malignancy is likely to spread. Post-operative radiotherapy is used for tumours dissecting the bowel wall or with cancer positive lymph nodes. Advances in case survival, after stage adjustment, reflect improved surgical management and more recently, gains in adjuvant chemotherapy.



6.6 Rectum cancer

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Males	236	28.9	5.2	1 in 40	97	11.8	5.3
Females	164	16.9	4.5	1 in 73	64	6.0	4.5

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

Cancers of the rectum have shown an increased incidence of about 30% in males and 25% in females over the past 25 years. The increase was most evident at the rectosigmoid junction. Mortality rates have remained fairly stable over this time in both sexes, with some improvement in the most recent years.

Like colon cancers, cancers of the rectum have a higher incidence in Adelaide than in country areas, with higher socioeconomic areas having elevated rates. Australian-born residents have a higher incidence than those born overseas.

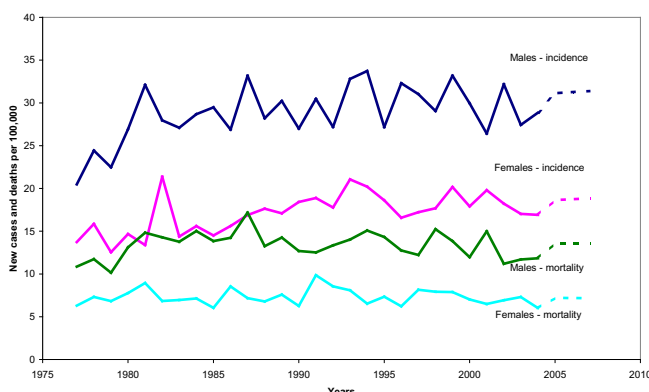
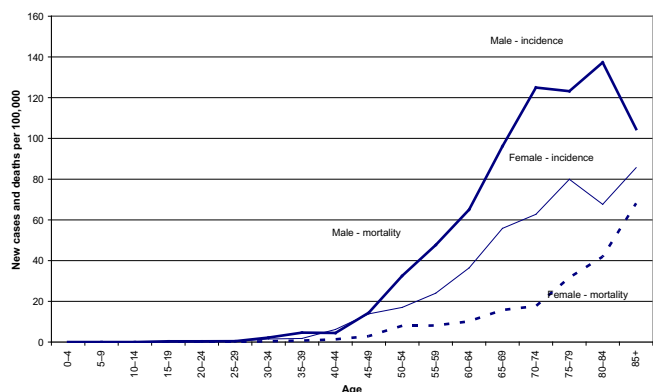
There is a increased incidence of cancers of the rectum in higher socioeconomic status areas

Risk factors are very similar to those for colon cancer. However, studies have found a link with excessive alcohol consumption, with HIV infection, and other sexually transmitted infections for cancers of the rectum and anal canal. Individuals who are not at obvious risk and who have no symptoms should be screened annually beginning at age 40. This should consist of an annual digital rectal examination and inflexible sigmoidoscopy. For those over 50 years, additional screening procedures by means of an annual faecal occult

blood testing and flexible sigmoidoscopy to access the colon should be performed every three to five years.

The only curative therapy is surgical resection of the primary tumour and the regional mesenteric lymph nodes. Local excision of rectal cancers helps to avoid a colostomy for well differentiated lesions less than three centimetres in diameter. Lesions that do not meet these criteria are best removed with more extensive procedures, including a total anterior-posterior resection. Patients with favourable lesions at the

time of surgery should have annual follow-up for a minimum of five years for the primary tumour, and then be assessed every two to three years thereafter. Additional therapy may include trans-anal radiation and, increasingly, adjuvant chemotherapy. Adjuvant therapy for rectal cancers centres on radiation therapy, together with the use of various radiation sensitisers and the sequencing of the sensitisers and radiation therapy. New chemotherapeutic agents have resulted in significant gains in survival for advanced colorectal cancer.



6.7 Cervix cancer

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Females	46	5.6	1.3	1 in 260	10	1.0	0.7

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

The genital organs are among the most common sites of cancer in women. Due to widespread screening programs, more than 70% of cervical cancers in Australia are now detected in the eminently curable in situ stage.

In South Australia, the incidence of cervix cancer has fallen by about 40% over the past 25 years. This is attributed to the detection and early treatment of precursor lesions through the cervical screening program.

South Australian mortality rates have reduced by over 69% for the same period.

Overall, the proportional reduction in mortality has been greater than

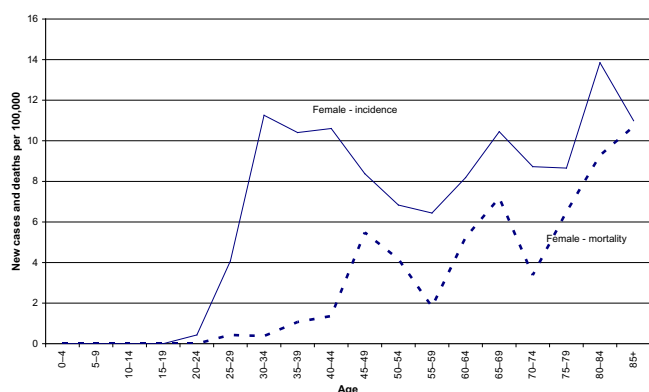
the corresponding decline in incidence. This is attributed to earlier intervention following detection through Pap smear screening, in addition to disease prevention initiatives. Increased cervical cancer incidence is found in the lower socioeconomic areas of Adelaide, in keeping with socioeconomic trends in other populations. Aboriginal women have been found to have 5-6 times higher incidence rates than other South Australians. There is an urgent need to address this discrepancy.

The incidence of cervix cancer has fallen by 40% in South Australia over the last 25 years.

Management ranges from a simple cone biopsy wherein the affected part of the cervix is removed, to more radical surgery followed by radiotherapy and chemotherapy.

Risk factors include an early age at first sexual intercourse and multiple male sex partners. Barrier contraception appears to reduce the risk of cervical cancer. These associations support the hypothesis that strains of human papilloma virus (HPV) are involved in human cervical cancer biology. DNA sequences of HPV have been found with greater frequency in cervical cancer cells than in normal cervical cells. HPV infection

of the cervix has been shown to be closely related to cervical intraepithelial neoplasia (CIN), which is in turn related to cancer of the cervix. The extensive epidemiological data pointing towards an HPV aetiology suggests that antiviral strategies, such as vaccination against HPV at about 12 years of age have great potential. Such strategies may circumvent some of the cultural factors that diminish acceptance of traditional screening in some cultures.



6.8 Non-Hodgkin's Lymphoma

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Males	186	23.1	4.1	1 in 64	68	8.8	3.7
Females	171	17.6	4.7	1 in 78	61	5.5	4.3

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

An increased incidence of non-Hodgkin's lymphomas of 35% in males and 45% in females has been recorded in South Australia over the past 25 years, with most applying to persons over 50 years of age. Most of the increase was attributable to increasing rates of diffuse non-Hodgkin's lymphomas. Mortality rates have remained stable apart from an increase in females aged 70 years and over.

Risk factors for diffuse non-Hodgkin's lymphoma (NHL) include HIV and other viral infections, hair dyes, immunosuppressive states, and exposure to biocides and other environmental carcinogens. A viral aetiology has been implicated in specific types of NHL. Burkitt's lymphoma, Mediterranean lymphoma, and T-cell lymphoma have been shown by epidemiologic, electron microscopy, cell culture, and immunologic studies to have features implicating viral aetiologies. Serologic studies have demonstrated an association between HTLV-I infection and T-cell lymphoma, the virus having been isolated from T lymphocytes. NHL is seen more frequently in those with acquired immune deficiency syndrome, and in patients who have undergone immunosuppression following kidney and heart transplantation.

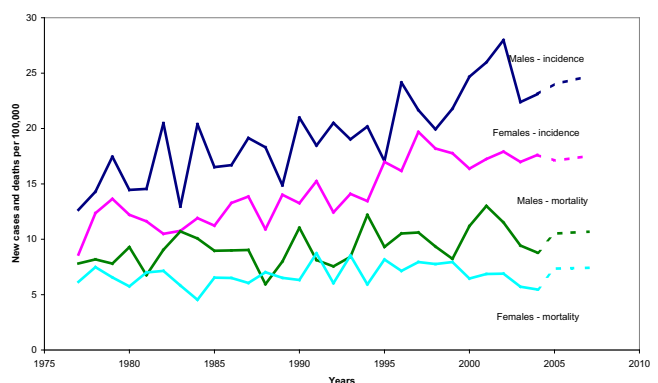
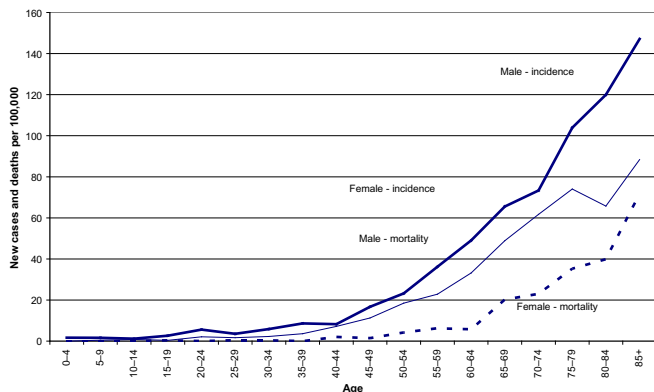
Overseas-born South Australians tend to have lower incidence rates than the Australian-born. For non-Hodgkin's lymphomas, Adelaide residents have higher rates than those who live in country areas.

The primary role of surgery is in the diagnosis and anatomic staging of lymphoma with the exception of splenectomy and gastro-intestinal disease where other therapies have a significant risk of fatal perforation or haemorrhage. Radiotherapy is confined to areas of clinically evident disease.

Mortality rates for NHL have remained stable despite increasing incidence rates.

The prime means of treatment is chemotherapy with a variety of programs, including single agents and combinations such as "CHOP"

(cyclophosphamide, doxorubicin, vincristine and prednisolone). As the results of chemotherapy continue to improve, there is a tendency to use chemotherapy alone and to reserve radiation therapy for those who have localised lesions or who have incomplete responses. This category of malignant disease has shown the way for advances in chemotherapy, and combined chemotherapy and radiotherapy. Because of the marked differences in age, performance status, and the ability to tolerate therapy, protocols must be individualised.



6.9 Leukaemia

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Males	179	22.4	3.9	1 in 73	87	11.0	4.8
Females	112	11.8	3.1	1 in 120	53	5.1	3.7

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

The incidence of leukaemia has risen by about 30% in both males and females over the past 25 years, largely due to increases in diagnosed chronic lymphatic leukaemia and acute myeloid leukaemia. Mortality rates have remained stable over this period, although some reduction was evident for chronic myeloid leukaemia, possibly reflecting advances in chemotherapy. The overall increase in incidence may be secondary to increased diagnostic sensitivity with more blood and other hemopoietic tissue analyses being performed on older people.

Acute Lymphoblastic Leukaemia (ALL) is the commonest cancer in childhood with peak incidence occurring between two and four years of age.

ALL is a heterogeneous disorder, whose classification rests on both morphologic and immunologic criteria. Exposure to ionising radiation and cytogenic abnormalities are associated with this tumour. Aggressive multi-chemotherapeutic regimes are used to eradicate the tumour and prevent recurrence.

Chronic Lymphocytic Leukaemia (CLL) is usually an indolent disease with no effective treatment. CLL is characterised by lymphocytosis, lymphadenopathy, and splenomegaly. Nearly all cases of CLL are B-cell disorders, with T-cell CLL representing a more unfavourable condition with unique clinical and laboratory features. The cause of CLL is largely unknown and it is the only

form of leukaemia not associated with radiation exposure. The complications of CLL cause most of the morbidity and mortality.

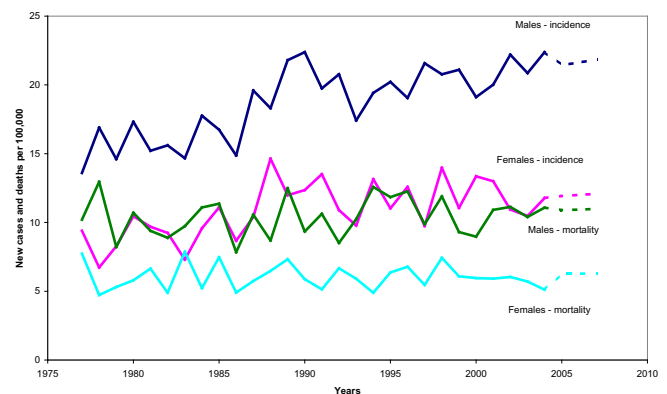
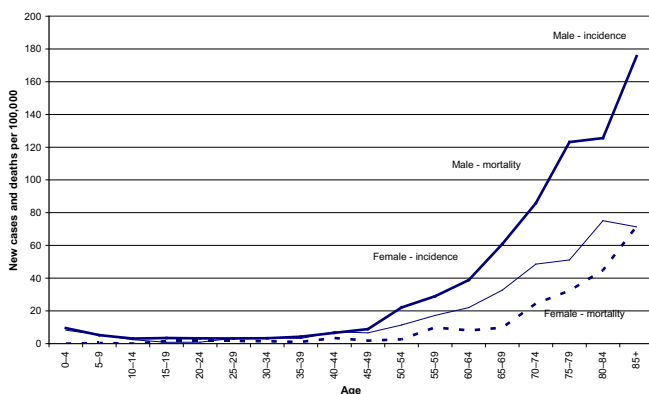
Acute Myeloid Leukaemia (AML) is a group of tumours where cells of bone marrow origin predominate. Risk factors include Down's syndrome, ionising radiation, benzene, chloramphenicol, and phenylbutazone. Peak incidence occurs at about 60 years of age. Treatment involves intensive chemotherapy and bone marrow transplantation, following ablative therapy. The survival rate at five years is about

12%. Allogenic bone marrow transplantation has been performed both in remission and during relapse. The best results are obtained in young patients with identical matches during first

remission. Overall, two to five year disease-free survival has been known to approach 50%.

Chronic Myeloid Leukaemia (CML) is a chronic myeloproliferative disorder characterised by excessive growth and expansion of differentiated cells. CML is associated with myeloid hyperplasia, splenomegaly, and eventual transformation into acute leukaemia – called a blast crisis. Incidence peaks at about 60 years. Risk factors include radiation and benzene exposure. Recent advances in chemotherapy induce transient responses. The agent imatinib is undergoing promising trials in South Australia. Bone marrow transplantation is compromised by the usual complications.

Lymphoid leukaemias rank in the top ten most common cancers for men in 2004.



6.10 Ovarian cancer

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Females	93	9.8	2.5	1 in 120	63	6.2	4.4

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

Among gynaecological cancers, ovarian tumours have proven to be the most difficult to prevent or cure because they remain clinically silent for a considerable time and are frequently diagnosed at a late stage. It is a heterogeneous group comprising mainly epithelial tumours (80% to 90% of all ovarian cancers) of which most are serous or mucinous cystadenomas. It is among the ten most common cancers in women, and one of the most lethal. In South Australia, only about 38% of these cases survive beyond five years, with age at diagnosis being an important predictor of survival.

The low survival rates from ovarian cancer mean that better early detection methods are required for this cancer.

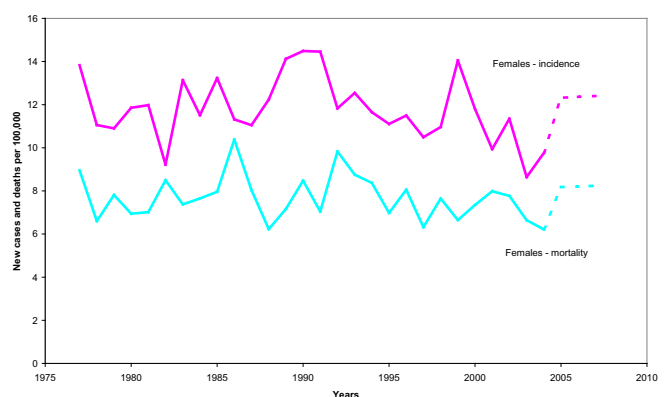
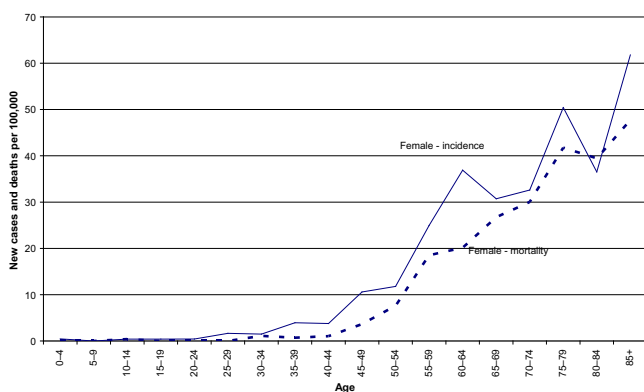
This cancer is more prevalent in lower socioeconomic areas, and more common in Australian-born women than in female immigrants.

Risk factors include nulliparity, low parity, and older age at first birth. Use of combined oral contraceptives appears to reduce the risk of ovarian cancer.

To detect ovarian cancer while it is still localised and curable, skilled clinicians would need to conduct regular and thorough abdominal-pelvic examination of women at high risk. Pelvic ultrasonography, especially by vaginal probe, may be useful together with other imaging techniques. Elevated serum markers CEA and CA 125 may also signal a developing ovarian cancer.

Treatment is dependent on the tumour biology and extent of local spread and overall stage, assessed on a case by case basis. Surgery aims to remove as much of the tumour as possible

leaving masses no larger than 2cms in diameter or none at all. Surgery is followed by chemotherapy and / or radiotherapy. Advances in combination chemotherapy, including platinum-related drugs, together with whole abdominal external beam radiotherapy to reach all peritoneal surfaces, has become a favoured management for ovarian cancer after surgery. In patients with early stage disease, the five year survival is about 70%, while for metastatic disease it stands at approximately 4%.



6.11 Lip cancer

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Males	76	9.5	1.7	1 in 154	1	0.1	0.1
Females	24	5.9	0.7	1 in 938	0	0.0	0.0

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

Cancer of the lip is the most common cancer of the head and neck region. The majority of lesions occur on the lower lip and in males. Sun exposure is an established risk factor in the Australian population and is associated with an increased incidence of skin cancers. Another principal etiologic factor is tobacco use, including cigarettes, pipes and cigars. Viral infections have also been linked to lip cancers. The location of so many lesions on the outer vermilion border of the lower lip suggests that a major factor is the ultraviolet component of solar radiation.

Patients with a genetic predisposition to skin cancers such as xeroderma pigmentosum, are likewise susceptible to lip cancers further emphasising the role of ultraviolet light. Transplant patients are more susceptible to lip cancer implicating immunosuppressant agents as etiological factors.

The incidence for country regions in South Australia has approximately twice that for Adelaide, presumably due to greater sun exposure. Those engaged in outdoor occupations are at increased risk. Specific occupations include farming, fruit growing, fishing, and truck driving. Preventive measures include the wearing of protective hats, clothing and sun screens. Lip cancer presents a marked variation in incidence by

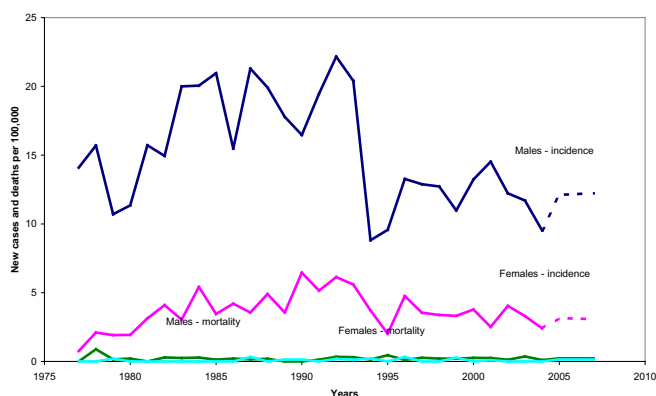
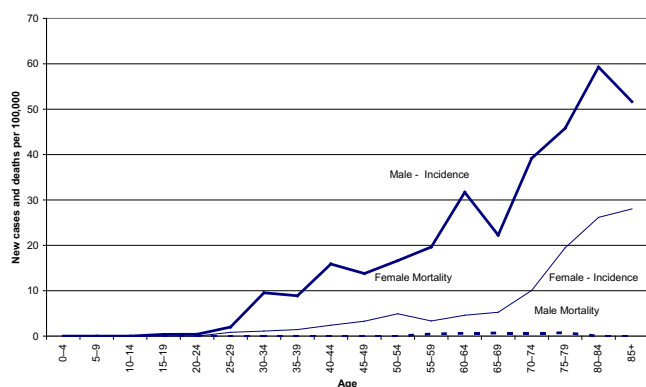
race, with Aboriginal South Australians seldom presenting with this cancer. Persons born in Australia have incidence rates about twice that of the overseas-born.

Males experienced a significant increase in lip cancer incidence in the 1980s, with little increase occurring thereafter, except in those over 70 years of age. Females have experienced a progressive increase in incidence which applies to a broad cross-section of ages.

Surgery and radiotherapy are the mainstays of therapy. Those lesions that involve less than 30% of the lip can be resected with a V excision with primary closure of resulting defects.

For larger lesions, transposition flaps are required to achieve reconstruction and oral competence. The choice of surgery or radiotherapy depends on the locations and size of the cancer. Lesions involving the commissures can be irradiated without the functional sequelae of surgery. Brachytherapy alone can be used for early stage disease. Temporary implants of radioactive iridium or localised electron-beam irradiation can be used. More advanced disease is usually treated with combination surgery and radiation therapy, followed by reconstructive surgery.

Mortality from lip cancer is extremely low.



6.12 Brain cancer

	New cases	Incidence Rate	% cancers	Risk	Deaths	Mortality Rate	% cancer deaths
Males	60	7.6	1.3	1 in 178	67	8.3	3.7
Females	49	5.8	1.3	1 in 216	38	4.2	2.7

Incidence and mortality rates per 100,000. Rates age standardised to the Australian 2001 population.

The most common central nervous system (CNS) tumours are those that are derived from the glial cell precursors, namely astrocytes, ependymocytes, and oligodendrocytes. The existence of mixed tumours such as astrocytoma-oligodendroglioma implies that many of these tumours arise from common stem cells. Because these tumours arise at different locations within the central nervous system, different types of tumour dominate at certain ages, suggesting that a range of genetic and molecular mechanisms underlie their formation at different periods of the life span.

CNS tumours are the most common solid neoplasm in childhood, the second leading cause of cancer-death in those under 15 years of age, and the third leading cause of cancer-related death in adolescents and adults between the ages of 15 and 45 years. There is a dramatic increase in incidence of CNS tumours, such as glioblastoma multiforme and malignant astrocytomas, in persons over the age of 45 years. This may be due to poorer ascertainment preceding the widespread availability of diagnostic techniques such as magnetic resonance imaging.

Benign and malignant cancers of the brain exert pressure effects on surrounding tissues within the confines of the cranium, which can be fatal if

left untreated. Malignant tumours also have the capacity to spread through vital areas resulting in loss of specific functions depending on the regions invaded.

Increases in incidence and mortality rates have been reported for brain cancers among the older sectors of many populations. In South Australia, the incidence and mortality rates for all ages combined have showed little change during 1977-2004, apart from an increase in males over 70 years of age in the early 1980s. Again, this may be related

to improving imaging techniques, although it is notable that a similar increase was not observed in females.

Etiologic factors include ionising radiation, chemical

carcinogens and viruses. Recently, there have been concerns that non-ionising radiation such as that from radio transmitters and cellular phones may be implicated but there have been no convincing studies that support this. Such radiation is at the low frequency and low energy level end of the electromagnetic spectrum and an influence on tumour genesis would seem biologically unlikely.

Treatment may involve surgery, radiotherapy and chemotherapy, all focussed on the location and histopathology of the cancer.

Brain cancer is an important cancer for children, and an important cause of mortality in adults.

