

# Appendixes

# Appendix A: International Classification of Diseases—Ninth Revision—cancer site—codes and combinations

<b>Buccal cavity</b>		Prostate	185
Lip	140	Testis	186
Tongue	141	Penis and other male genital organs	187
Salivary glands	142	Bladder	188
Gum	143	Kidney, ureter and urethra	189
Floor of mouth	144	Gynaecological cancers	179–180, 182–184
Other and unspecified parts of mouth	145	<b>Other and unspecified organs</b>	
Pharynx		Eye	190
Oropharynx	146	Brain	191
Nasopharynx	147	Other and unspecified parts of the nervous system (NS)	192
Hypopharynx	148	Thyroid gland	193
Other sites within the lip, oral cavity and pharynx	149	Other endocrine glands	194
Head and neck	141–149	Unknown primary site	195–199
<b>Digestive organs and peritoneum</b>		<b>Lymphatic and haematopoietic tissue</b>	
Oesophagus	150	Non-Hodgkin's lymphomas (NHL)	200+202
Stomach	151	Lymphosarcoma and reticulosarcoma	200
Small intestine	152	Hodgkin's disease	201
Colon	153	Other neoplasms of lymphoid and histiocytic tissue	202
Rectum	154	Lymphomas	200–202
Colorectal	153–154	Multiple myeloma and immunoproliferative neoplasms	203
Liver and intrahepatic bile ducts	155	Lymphatic leukaemia	204
Gallbladder and extrahepatic bile ducts	156	Acute lymphatic leukaemia	204.0
Pancreas	157	Chronic lymphatic leukaemia	204.1
Retroperitoneum and peritoneum	158	Myeloid leukaemia	205
Unspecified digestive organs	159	Acute myeloid leukaemia	205.0
<b>Respiratory system</b>		Chronic myeloid leukaemia	205.1
Nasal cavities, middle ear and accessory sinuses	160	Monocytic leukaemia	206
Larynx	161	Other and unspecified leukaemias	207–208
Trachea, bronchus and lung	162	Leukaemias	204–208
Pleura	163		
Respiratory systems, ill-defined and other intrathoracic organs	164–165	Smoking-related cancers	140, 141, 143–151, 154.3–154.4, 157, 161, 162, 180, 179+182, 184.4, 186, 188, 189.0, 189.1
<b>Bone, connective tissue, skin and breast</b>		(Aetiological fractions are applied to the following codes)	
Bone and articular cartilage	170		
Connective and other soft tissue	171		
Melanoma	172		
Non-melanocytic skin cancer (NMSC)	173	Alcohol-related cancers	141, 143–146, 148–149, 150, 155, 161, 174
Breast	174–175	(Aetiological fractions are applied to the following codes)	
<b>Genitourinary organs</b>			
Cervix	180		
Placenta	181		
Corpus uteri	179+182		
Ovary and other uterine adnexae	183		
Other and unspecified female genital organs	184		

*Note:* Abbreviated versions of these names may be used in this report.

*Source:* World Health Organization 1977.

## Appendix B: Methods

This section describes the methods used to calculate the estimates presented in the tables in this report. The calculations in the example below are applicable to both incidence and mortality.

### Example table

Trachea, bronchus and lung cancer incidence (ICD 162) – males

Age group	No. of cases	1996 Aust. population*	Age-specific rate per 100,000	Australian 1991 Population Standard**	Expected number of cases
	column 1	column 2	column 3	column 4	column 5
0–4	0	665,611	0.0	1,271,703	0.0
5–9	0	669,251	0.0	1,272,208	0.0
10–14	0	670,227	0.0	1,241,619	0.0
15–19	0	655,345	0.0	1,364,074	0.0
20–24	1	708,906	0.1	1,396,764	1.4
25–29	3	710,454	0.4	1,399,663	5.6
30–34	3	720,725	0.4	1,425,735	5.7
35–39	16	726,660	2.2	1,328,387	29.2
40–44	45	676,137	6.7	1,294,271	86.7
45–49	136	654,234	20.8	1,029,145	214.1
50–54	276	517,520	53.3	846,934	451.4
55–59	419	419,859	99.8	725,950	724.5
60–64	676	353,827	191.1	736,868	1408.2
65–69	1,013	337,445	300.2	671,390	2015.5
70–74	1,103	276,105	399.5	510,755	2040.5
75–79	816	179,593	454.4	384,495	1747.1
80–84	490	105,855	462.9	229,828	1063.9
85+	231	60,301	383.1	154,247	590.9
<b>Total</b>	<b>5,228</b>	<b>9,108,055</b>	<b>57.4</b>	<b>17,284,036</b>	<b>60.1</b>

\* Australian Bureau of Statistics 1997b.

\*\* Australian Bureau of Statistics 1993.

### Crude rates—all age groups

A crude incidence rate is defined as the number of new cases of cancer divided by the population at risk in a specified time period. A crude mortality rate substitutes deaths for new cases in this calculation. Both are conventionally expressed as annual rates per 100,000 population and may be calculated for males, females or persons, or for subsets of the population (e.g. see age-specific rates). The total rate calculated in this way without adjustment for age or other factors is known as the 'crude rate'.

The crude rate is calculated by dividing the total number of cases across all age groups by the total population e.g.

$$\begin{aligned} \text{Crude incidence rate for lung cancer} &= \frac{\text{Column 1 total}}{\text{Column 2 total}} \times 100,000 \\ &= \frac{5,228}{9,108,055} \times 100,000 \\ &= 57.4 \text{ per } 100,000 \end{aligned}$$

## Age-specific rates

Age-specific rates are calculated by dividing the number of cases occurring in each specified age group by the corresponding population in the same age group expressed as a rate per 100,000 population. This rate may be calculated for particular age and sex groupings, e.g.

$$\begin{aligned} \text{Age-specific lung cancer incidence rates in males aged 75-79} &= \frac{\text{Column 1 for this age}}{\text{Column 2 for this age}} \times 100,000 \\ &= \frac{816}{169,506} \times 100,000 \\ &= 454.4 \text{ per } 100,000 \end{aligned}$$

## Age-standardised rates (AS Rate)

Rates are adjusted for age to facilitate comparisons between populations which have different age structures, e.g. between youthful and ageing communities. There are two different methods commonly used to adjust for age. In this publication we use direct standardisation in which age-specific rates are multiplied against a constant population (the Australian 1991 Population Standard or the World Standard Population). This effectively removes the influence of age structure on the summary rate which is described as the age-standardised rate. The method may be used for both incidence and mortality calculations. The method used for this calculation comprises three steps which can be followed by reference to the example table on the previous page.

- Step 1* Calculate the age-specific rate (as shown above) for each age group (column 3).
- Step 2* Calculate the expected number of cases in each 5-year age group by multiplying the age-specific rates (column 3) by the corresponding standard population (column 4) and dividing by 100,000, giving you the expected number of cases (column 5).
- Step 3* Sum the expected number of cases in each age group to give the age-standardised rate (total column 5). If the standard population is not the World Standard Population then divide this sum by the total of the standard population and multiply by 100,000.

## Confidence intervals (CI)

The age-standardised and crude incidence and mortality rates presented in the body of this report also show 95% confidence intervals. These confidence intervals indicate the variation that might be expected in such estimates purely by chance. The confidence intervals are calculated using the methods presented in Holman et al. (1987).

A relatively simple approximation of the confidence limits that readers might use when examining State and Territory age-standardised rates is as set out below.

$$\text{CI approximation} = \text{AS Rate} \pm 1.96 \times \frac{\text{AS Rate}}{\sqrt{\text{Number of cases}}}$$

## Lifetime risk and cumulative rate

Lifetime risk is a measure which approximates the risk of contracting a particular cancer in a lifetime if the risks at the time of estimation remained throughout life. It is based on a mathematical relationship with the cumulative rate and is calculated in this publication for ages 0-74. Cumulative rate is a directly standardised rate calculated by summing age-specific rates from equal age groups, e.g. 5-9, 10-14 years. An example is provided below.

$$\begin{aligned} \text{Cumulative rate} &= \frac{5 \times (\text{Sum of the age-specific rates}) \times 100}{100,000} \\ &= \frac{5 \times 1074.5 \times 100}{100,000} \\ &= 5.37\% \end{aligned}$$

The factor of 5 is used to indicate the 5 years of life in each age group and the factor of 100 is used to present the result as a percentage. As age-specific rates are presented per 100,000 population (column 3), the result is divided by 100,000 to return the age-specific rates to a division of cases by population. Cumulative risk is related to cumulative rate by the expression:

$$\text{Cumulative risk} = 1 - e^{-\text{rate} \times 100}$$

where rate is expressed as a percentage.

Lifetime risk is expressed as a '1 in n' proportion by taking the inverse of the above formula:

$$n = \frac{1}{1 - e^{-\text{rate} \times 100}}$$

For lung cancer in men, the cumulative rate was 5.37% (see previous page), therefore:

$$\begin{aligned}n &= \frac{1}{1 - e^{-0.0537}} \\ &= 19.13\end{aligned}$$

That is, for men, the lifetime risk (0–74 years) of developing lung cancer is 1 in 19, providing they remain at risk for the whole period and the 1996 age-specific rates apply throughout their lives. Note that no account has been taken of specific cancer risk factors, e.g. the risk for men who smoke would be higher than that for those who have never smoked.

## Per cent of all cancers

The ‘per cent of all cancers’ measure is the proportion of all causes accounted for by a particular cancer. The measure may be computed for cancer incidence or mortality. Using an incidence example, the measure is calculated by taking the number of new cases of a particular cancer, e.g. lung cancer, and dividing that by the total number of all new cancer cases and multiplying by 100 to express it as a percentage. This is undertaken for each sex and for total persons. Note that for this publication the incidence and mortality of non-melanocytic skin cancers is not included in total new cancer cases.

## Sex ratio

This measure indicates the relative incidence or mortality between the sexes. It can be calculated on the basis of observed numbers, crude rates, age-standardised rates or cumulative rates per cent. In this publication it is calculated using the age-standardised rates where the male rate is divided by the female rate for each cancer. Ratios greater than 1 indicate an excess in males while ratios less than 1 indicate an excess in females.

It is preferable to use either the age-standardised rates or the cumulative rate as these both adjust for age variations between male and female populations. In addition, the use of cumulative rate per cent discounts the occurrence of cancer in people aged over 75. This gives more emphasis, therefore, to early cancer diagnosis or death, and diminishes the impact of variable diagnostic investigation of the elderly.

## Person-years of life lost

Person-years of life lost is a concept which attempts to measure the number of years of life lost per annum due to death as a result of a specific cause, e.g. lung cancer, given life expectancies at specific ages. Age groups 0–4 up to 70–74 were used for the calculations, as deaths before age 75 are regarded as premature for both men and women. The method used in this publication for the calculation of person-years of life lost is an aggregation of years between age at death and 75 for each person for each cancer, e.g. a person dying at age 50 contributes 25 years to the measure of person-years of life lost.

## Average annual rates of change

To indicate the extent of change in age-standardised rates over time, a linear line of best fit is calculated for the time frame in question. Average annual rates of change are then calculated using the geometric formula:

$$\text{Average rate of change} = \left( P_n / P_o \right)^{1/N} - 1 \times 100$$

where

$$P_n = \text{rate at later year } n$$

$$P_o = \text{rate at earlier year } o$$

$$N = n - o.$$

This process averages out variations in the actual annual changes that may have occurred between the two points in time.

## Mortality to incidence ratio

The mortality to incidence ratio is calculated by dividing the number of deaths for a particular cancer by the number of new cases for that cancer in a specified time period. If registration is complete and the incidence of the cancer in question is not changing rapidly, the mortality to incidence ratio should reflect long-term survival.

## Appendix C: Population data

### Australian resident population 1996

Age	1996		
	Males	Females	Total
0-4	665,611	631,438	1,297,049
5-9	669,251	636,798	1,306,049
10-14	670,227	637,990	1,308,217
15-19	655,345	623,774	1,279,119
20-24	708,906	687,960	1,396,866
25-29	710,454	707,561	1,418,015
30-34	720,725	723,796	1,444,521
35-39	726,660	729,327	1,455,987
40-44	676,137	678,946	1,355,083
45-49	654,234	639,704	1,293,938
50-54	517,520	497,412	1,014,932
55-59	419,859	407,540	827,399
60-64	353,827	356,656	710,483
65-69	337,445	354,740	692,185
70-74	276,105	327,017	603,122
75-79	179,593	243,799	423,392
80-84	105,855	176,603	282,458
85+	60,301	141,598	201,899
<b>Total</b>	<b>9,108,055</b>	<b>9,202,659</b>	<b>18,310,714</b>

Source: Australian Bureau of Statistics 1997b.

### Australian Standard Population\* and World Standard Population\*\*

Age	Australian Standard Population (1991)		World Standard Population	
		% of total		% of total
0-4	1,271,703	7.4	12,000	12.0
5-9	1,272,208	7.4	10,000	10.0
10-14	1,241,619	7.2	9,000	9.0
15-19	1,364,074	7.9	9,000	9.0
20-24	1,396,764	8.1	8,000	8.0
25-29	1,399,663	8.1	8,000	8.0
30-34	1,425,735	8.2	6,000	6.0
35-39	1,328,387	7.7	6,000	6.0
40-44	1,294,271	7.5	6,000	6.0
45-49	1,029,145	6.0	6,000	6.0
50-54	846,934	4.9	5,000	5.0
55-59	725,950	4.2	4,000	4.0
60-64	736,868	4.3	4,000	4.0
65-69	671,390	3.9	3,000	3.0
70-74	510,755	3.0	2,000	2.0
75-79	384,495	2.2	1,000	1.0
80-84	229,828	1.3	500	0.5
85+	154,247	0.9	500	0.5
<b>Total</b>	<b>17,284,036</b>	<b>100.0</b>	<b>100,000</b>	<b>100.0</b>

\* Australian Bureau of Statistics 1993.

\*\* Doll & Smith 1982.

## Appendix D: Cancer registration in Australia

The table below provides information about cancer registration in Australia. Each State and Territory operates its own registry. Generally, operational guidelines for each of the registries are similar and coincide with the objectives of the International Association of Cancer Registries. Although some registries operate under different coding systems for site, morphology and other variables, the bulk of information is directly comparable and has been reconciled for this publication. The reporting sources of the registries vary according to the local conditions and those bodies named in the legislation. Every attempt is made to report all cancer cases, although not every case will be identified. Cancer registries are dependent upon their reporting sources. Variation in reporting of cancers by age, sex, type, geographical location, country of birth or other variables does occur and may have effects on the final statistics. Occasionally, delays in reporting some case information may extend over several years but this has a minimal effect on the final reported data. In order to minimise the effects on the final reported registration, multiple reporting sources are used to compile case information where possible. Case information is exchanged between registries where there is cause for suspicion of duplicate registration. Further information regarding registry coding practices may be obtained by contacting the Registrar in each State or Territory.

States and Territories	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Total population (1996)	6,204,728	4,560,155	3,338,690	1,765,256	1,474,253	474,443	308,251	181,843
Per cent of Australian population	33.9	24.9	18.2	9.6	8.1	2.6	1.7	1.0
Per cent of population older than age 65	12.6	12.5	11.2	10.4	14.0	12.7	7.3	3.2
No. new cancers (1996)	26,135	19,800	14,631	6,699	6,892	2,200	978	363
First year of population registration	1972	1982	1982	1982	1977	1978	1972	1981
Year of legislation	1972	1982	1982	1981	1977	1992	1994	1991
Funding source	Pvte-Govt	Pvte-Govt	Govt	Govt	Govt	Pvte-Govt	Govt	Govt
ICD site coding	ICD-9	ICD-9	ICD-9	ICD-O-1	ICD-9	ICD-9	ICD-9	ICD-9
Morphology coding	SNOMED-II	ICD-O-2	ICD-O-2	ICD-O-2	SNOMED-II	ICD-O-2	SNOMED-II	SNOMED-II
<b>Reporting sources</b>								
Public hospitals	Yes	Yes	Yes	No*	Yes	Yes	Yes	Yes
Private hospitals	Yes	Yes	Yes	No*	Yes	Yes	Yes	No
Repatriation hospitals	Yes	Yes	Yes	No*	Yes	Yes	Yes	No
Pathology laboratories	Yes							
Radiotherapy units	Yes	No						
Nursing homes	Yes	No	Yes	No	No	No*	Yes	No
Registrar of Births, Deaths and Marriages	Yes							
Doctors	No*							

\* Data are provided on special request only.

## Appendix E: Cancer registries contact list

### Cancer Research and Registers Division

NSW Cancer Council  
Locked Mail Bag No. 1  
KINGS CROSS NSW 2011

Phone: 02 9334 1902

Fax: 02 9368 0843

E-mail: [ccr@nswcc.org.au](mailto:ccr@nswcc.org.au)

Home page: [www.nswcc.org.au](http://www.nswcc.org.au)

Director: Professor Bruce Armstrong

E-mail: [brucea@nswcc.org.au](mailto:brucea@nswcc.org.au)

Phone: 02 9334 1901

Registry Manager: Ms Elizabeth Tracey

E-mail: [etracey@nswcc.org.au](mailto:etracey@nswcc.org.au)

Phone: 02 9334 1974

### Victorian Cancer Registry

Anti-Cancer Council of Victoria  
1 Rathdowne Street  
CARLTON SOUTH VIC 3053

Phone: 03 9635 5000

Fax: 03 9635 5210

Home page: [www.accv.org.au](http://www.accv.org.au)

Director: Professor Graham Giles

E-mail: [ggg@accv.org.au](mailto:ggg@accv.org.au)

Phone: 03 9635 5154

Registrar: Ms Kathryn Whitfield

E-mail: [kathryn@accv.org.au](mailto:kathryn@accv.org.au)

Phone: 03 9635 5160

Statistician: Mrs Vicky Thursfield

E-mail: [vicky@accv.org.au](mailto:vicky@accv.org.au)

Phone: 03 9635 5162

### Queensland Cancer Registry

Queensland Department of Health  
GPO Box 48  
BRISBANE QLD 4001

Phone: 07 3258 2331

Fax: 07 3258 2345

Director: Dr Ian Ring

E-mail: [ian\\_ring@health.qld.gov.au](mailto:ian_ring@health.qld.gov.au)

Phone: 07 3234 0921

Fax: 07 3234 1529

Registrar: Mrs Judy Symmons

E-mail: [judith\\_symmons@health.qld.gov.au](mailto:judith_symmons@health.qld.gov.au)

Phone: 07 3258 2333

Fax: 07 3258 2345

### Western Australian Cancer Registry

Health Information Centre, Health Department  
of Western Australia

PO Box 8172

Stirling St

PERTH WA 6849

Phone: 08 9222 4022/4249

Fax: 08 9222 4236

Home page: [www.health.wa.gov.au](http://www.health.wa.gov.au)

E-mail: [wacanreg@health.wa.gov.au](mailto:wacanreg@health.wa.gov.au)

Director & Registrar: Dr Tim Threlfall

E-mail: [tim.threlfall@health.wa.gov.au](mailto:tim.threlfall@health.wa.gov.au)

### South Australian Cancer Registry

Epidemiology Branch, Public & Environmental  
Health Service, Dept of Human Services

PO Box 6

RUNDLE MALL SA 5000

Phone: 08 8226 6372

Fax: 08 8226 6291

Director: Associate Professor David Roder

Phone: 08 8226 6350

E-mail: [David.Roder@dhs.sa.gov.au](mailto:David.Roder@dhs.sa.gov.au)

Registrar: Ms Lesley Milliken

E-mail: [Lesley.Milliken@dhs.sa.gov.au](mailto:Lesley.Milliken@dhs.sa.gov.au)

Phone: 08 8226 6372

Medical Officer/Epidemiologist: Dr Wayne

Clapton

Phone: 08 8226 6362

E-mail: [Wayne.Clapton@dhs.sa.gov.au](mailto:Wayne.Clapton@dhs.sa.gov.au)

### Tasmanian Cancer Registry

Menzies Centre for Population Health  
Research

GPO Box 252-23

HOBART TAS 7001

Phone: 03 6226 7714

Fax: 03 6226 7704

Director: Professor Terry Dwyer

E-mail: [T.Dwyer@utas.edu.au](mailto:T.Dwyer@utas.edu.au)

Phone: 03 6226 7702

Registrar: Ms Rosie Ashbolt

E-mail: [rosemary.ashbolt@utas.edu.au](mailto:rosemary.ashbolt@utas.edu.au)

**Northern Territory Cancer Registry**

Epidemiology & Statistics Branch Territory  
Health Services  
PO Box 40596  
CASUARINA NT 0811

Phone: 08 8999 2977

Fax: 08 8999 2618

Director & Registrar: Mr Edouard D'Espaignet

E-mail:

edouard.despaignet@dwnhhse.health.nt.gov.au

Phone: 08 8999 2933

Fax: 08 8999 2700

Epidemiologist: Mr Michael Pearce E-mail:

michael.pearce@dwnhhse.health.nt.gov.au

Phone: 08 8999 2540

**Australian Capital Territory Cancer Registry**

Clinical Epidemiology & Health Outcomes  
Centre

Level 2, Building 6 The Canberra Hospital  
PO Box 11

WODEN ACT 2606

Phone: 02 6244 4276

Fax: 02 6244 4138

Director: Dr Bruce Shadbolt

E-mail: bruce\_shadbolt@dpa.act.gov.au

Phone: 02 6244 4288

Fax: 02 6244 4138

Registrar: Ms Barbara Stuart-Harris

E-mail: barbara\_stuartharris@dpa.act.gov.au

Phone: 02 6244 4285

# Glossary

**AACR:** Australasian Association of Cancer Registries

**ABS:** Australian Bureau of Statistics

**ACT:** Australian Capital Territory – a land-locked Territory of Australia situated within the State of New South Wales on the eastern seaboard with a population of 308,251 (1996). Its capital city is Canberra, which is also Australia's capital city.

**AIHW:** Australian Institute of Health and Welfare

**AS Rate:** age-standardised rate

**Cancer (malignant neoplasm):** a term used to describe one of several diseases which result when the process of cell division, by which tissues normally grow and renew themselves, becomes uncontrolled and leads to the development of malignant cells. These cancer cells multiply in an uncoordinated way, independently of normal growth control mechanisms, to form a tumour. This tumour may expand locally by invasion or systemically by metastasis via the lymphatic or vascular systems. If left untreated most malignant tumours will eventually result in death. (*See* What is cancer? page 1.)

**Cancer death:** a death for which the underlying cause is indicated as cancer. Persons with cancer who die of other causes are not counted in the death statistics in this publication.

**CI:** Confidence interval.

**CNS:** Central nervous system.

**Epidemiology:** the quantitative study of the distribution and determinants of health-related states and events in populations, and the application of this study to the control of health problems.

**IACR:** International Association of Cancer Registries

**ICD-9:** International Classification of Disease – a coding system used to identify the primary site of the malignancy. This classification is in its ninth revision.

**Incidence:** see **new cancer case**

**MIR:** Mortality to incidence ratio

**Mortality:** see **cancer death**

**NCSC:** National Cancer Statistics Clearing House

**New cancer case:** a person who has a new cancer diagnosed for the first time. One person may have more than one cancer and therefore may be counted twice in incidence statistics if it is decided that the two cancers are not of the same origin. This decision is based on a series of principles set out in more detail in a publication by Jensen et al. (1991).

**NSW:** New South Wales – a State of Australia on the eastern seaboard which has the largest capital city in Australia, Sydney, and a population of 6,204,728 (1996).

**NHL:** Non-Hodgkin's lymphoma.

**NMSC:** Non-melanocytic skin cancers.

**NT:** Northern Territory – a Territory in the north of Australia with a population of 181,843 (1996) and Darwin as its capital city.

**PSA:** prostate-specific antigen

**PYLL:** person-years of life lost

**Qld:** Queensland – a State in the north-east of Australia with a population of 3,338,690 (1996) and Brisbane as its capital city.

**SA:** South Australia – a State in the southern part of Australia with a population of 1,474,253 (1996) and Adelaide as its capital city.

**SNOMED:** Systematised Nomenclature of Medicine

**Tas:** Tasmania – an island State in the south-east of Australia with a population of 474,443 (1996) and Hobart as its capital city.

**Vic:** Victoria – a State in the south-east of Australia with a population of 4,560,155 (1996) and Melbourne as its capital city.

**WA:** Western Australia – the largest State in Australia, located in the west with a population of 1,765,256 (1996) and Perth as its capital city.

**WHO:** World Health Organization

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