

Brain Cancer in Queensland

An Overview – 2012

Published November 2015



the
Partnership
queensland cancer control safety
and quality partnership


qccat
queensland cancer control
analysis team


Queensland
Government

Acknowledgements

This report has been prepared under the auspices of The Queensland Cancer Control Safety and Quality Partnership, a gazetted quality assurance committee under Part 6, Division 1 of the Hospital and Health Boards Act 2011.

The authors acknowledge and appreciate the work of Queensland Health staff who contribute to and participate in the development and maintenance of Queensland Oncology Repository, Queensland Oncology Online and the Oncology Analysis System which supports the collection, analysis and interpretation of cancer information in Queensland.

This report was prepared by Michael Blake, Danica Cossio, Tania Eden, Tracey Guan and Shoni Philpot of the Queensland Cancer Control Analysis Team (QCCAT).

For more information:

Queensland Cancer Control Analysis Team
Queensland Health
GPO Box 48 Brisbane, Queensland, 4001 Australia
Ph: +61 (07) 3840 3200
Fax: +61 (07) 3176 4458
Email: qccat@health.qld.gov.au
<https://qccat.health.qld.gov.au>

Brain Cancer in Queensland: An Overview - 2012

Suggested citation:

Queensland Government. Brain Cancer in Queensland: An Overview - 2012. Queensland Health, Brisbane, 2015

Copyright protects this publication. However, the Queensland Government has no objection to this material being reproduced with acknowledgement, except for commercial purposes.

Permission to reproduce for commercial purposes should be sought from:

The Manager
Queensland Cancer Control Analysis Team
Queensland Health
GPO Box 48 Brisbane, Queensland, 4001 Australia

ISBN: 978-1-925028-04-1

Published by Queensland Health
November 2015

©The State of Queensland,
Queensland Health 2015

Table of Contents

Foreword.....	2
Data sources	2
Highlights	3
Brain Cancer Projections.....	4
Projections Queensland 2021	5
Brain Cancer in Queensland.....	8
Incidence and mortality	9
Regional, national and international variation in incidence and mortality	14
Prevalence	18
Survival.....	19
Brain Cancer by Hospital and Health Service	20
Patient Characteristics	20
Incidence and Mortality	22
Survival.....	25
Appendix.....	26
Data Sources	26
Appendix 2 - Glossary and Common Abbreviations	28

Foreword

Brain cancer in Queensland: An Overview - 2012 provides clinicians, cancer patients and their families with up to date and relevant information on brain cancer in Queensland.

This report presents cancer data for 2012 and projections for 2021. It is one of a series of cancer specific reports and is part of the Oncology Analysis System (OASys) online library.

The report has three parts. Brain cancer projections for 2021 are presented in part one, part two presents brain cancer in Queensland statistics and part three presents brain cancer statistics for Queensland Hospital and Health Services.

For the purposes of this report, brain cancer includes the following cancer sites: brain, meninges, spinal cord, cranial nerves and other parts of central nervous system (see page 5 for ICD-0 classification).

Data sources

Key to QCCAT's program of work is our ability to link population based cancer information on an individual patient basis, using a master linkage key specifically developed by our team. This matched and linked data is housed in the Queensland Oncology Repository (QOR), a resource managed by QCCAT. This centralised repository, QOR, compiles and collates data from a range of source systems including Queensland Cancer Registry, hospital admissions data, death data, treatment systems, public and private pathology, hospital clinical data systems and Queensland Oncology On-Line (QOOL). QOR contains approximately 32 million records between 1982 – 2014. Our matching and linking processes provide the 411,809 matched and linked records of cancer patients between 2000 – 2012, which are the starting point for this analysis.

Highlights

In 2021:

An estimated 400 new cases of brain cancer will be diagnosed among Queensland residents, while it is expected that 330 Queenslanders may die of the disease.

The projected incidence for 2021 shows a 30% increase and the projected mortality shows a 32% increase.

In 2012:

308 new cases of brain cancer were diagnosed in Queensland; of these 159 cases were reported in males and 149 in females. Brain cancer incidence and mortality generally increased with age, with incidence rates dropping slightly for the 85+ age group, particularly females. Very few cases of brain cancer were recorded for persons under the age of 54 (<20 cases per 100,000).

Between 1982 and 2012 the number of new cases of brain cancer among Queensland residents has increased by 123%. These increases were largely due to population growth. Ageing also accounted for a small proportion of the total increase. Mortality age-standardised rates have remained fairly constant from 1982-2012.

There were an estimated 592 people living with a diagnosis of brain cancer in the previous five years.

The average five-year relative survival in 2008 to 2012 for brain cancer was 23.5%, an increase of 3.4% from the 1982 to 1992 5 year relative survival of 20.1%.

Queensland's world age-standardised incidence rate was among the highest in the world with approximately 5 incidences per 100,000. Queensland's world age-standardised mortality rate was also amongst the highest in the world with 3.9 cases per 100,000.

From 2010 to 2012:

Incidence rates for brain cancer varied by remoteness for both males and females. The remote and very remote areas of Queensland demonstrated the lowest brain cancer incidence for both males and females. Mortality rates were highest in major city areas and like incidence lowest in the remote and very remote areas of Queensland for both males and females.

Age-standardised incidence and mortality rates varied by Hospital and Health Service. Central West had the highest age-standardised incidence rates and the Metro North and Metro South shared the highest age-standardised mortality rates. The majority of brain cancer patients resided in the Metro South and Metro North Hospital and Health Services contributing to 44% of the total brain cancer incidence.

Part 1

Brain Cancer Projections



The International Classification of Diseases for Oncology (ICD-O) has defined CNS & brain cancer as those with primary sites of C70, C71 or C72 – meninges, brain or spinal cord, cranial nerves and other parts of central nervous system. Sites that are excluded include peripheral nerves, sympathetic and parasympathetic nerves and ganglia - C47¹. Patients with a diagnosis other than Brain cancer and those patients who reside outside Queensland are not included in this report.

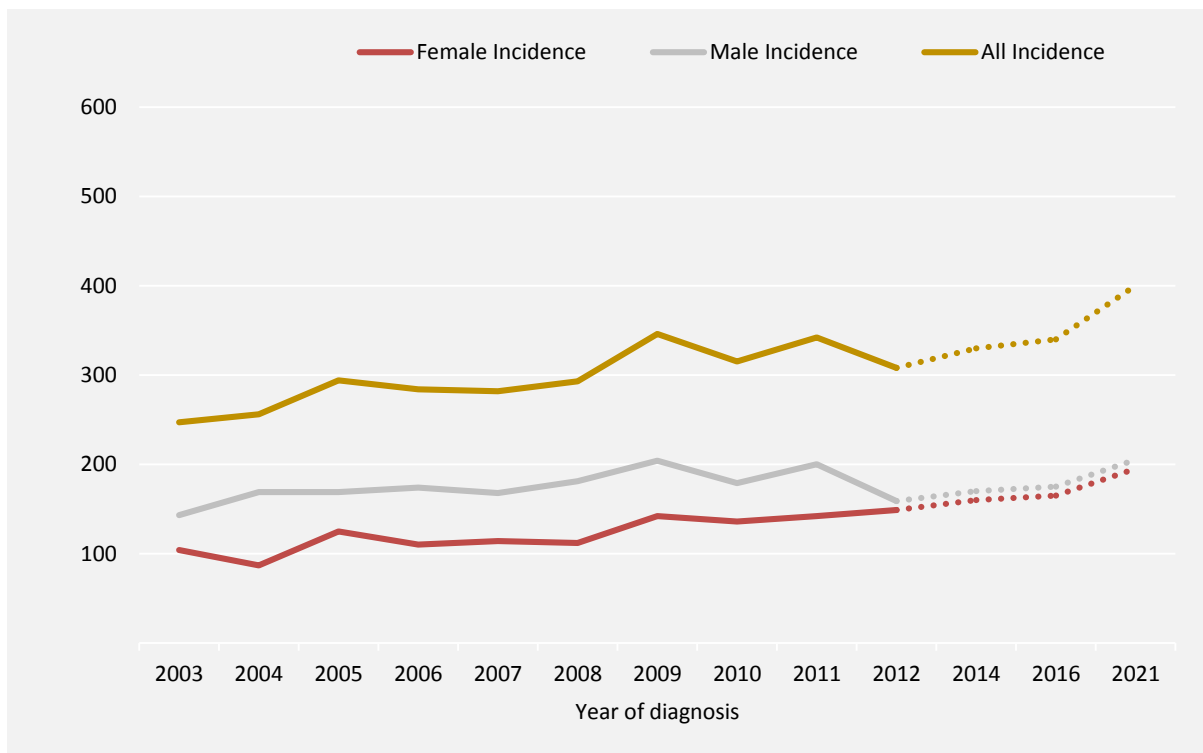
Projections Queensland 2021

It is estimated in 2021 that 400 new cases of brain cancer will be diagnosed among Queensland residents and that 330 Queenslanders will die of the disease.

Brain cancer incidence is expected to continue to be similar in both males (205 new cases) and females (195 new cases). Projected incidence for 2021 shows a 30% increase from the 2012 incidence of 308 cases.

250 brain cancer deaths were recorded in 2012 with an expected increase of 32% for brain cancer by 2021.

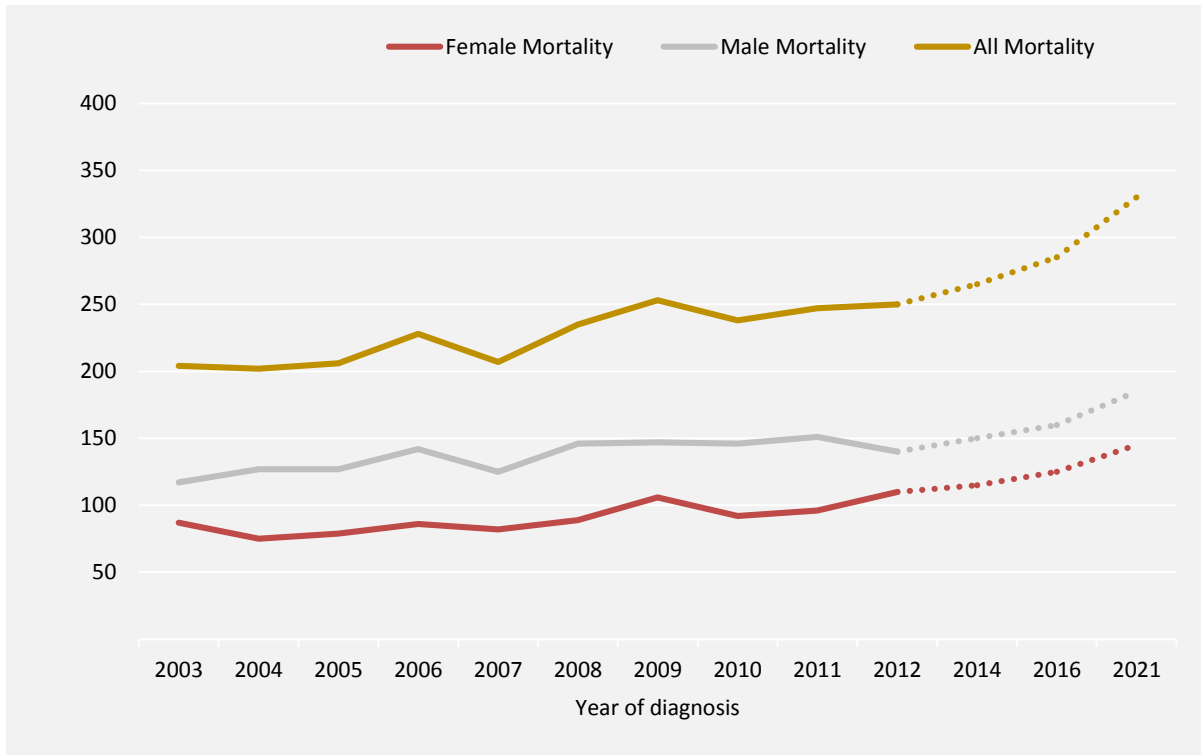
*Brain actual and projected cancer incidence
Year of diagnosis 2003-2012, Projected years 2014, 2016, 2021*



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team.

¹ Fritz A, Percy C, Jack A, Shanmugaratham K, Sobin L, Parkin D, Whelan S (ed.). 2000, *International Classification of Diseases for Oncology, 3rd edition*, World Health Organisation

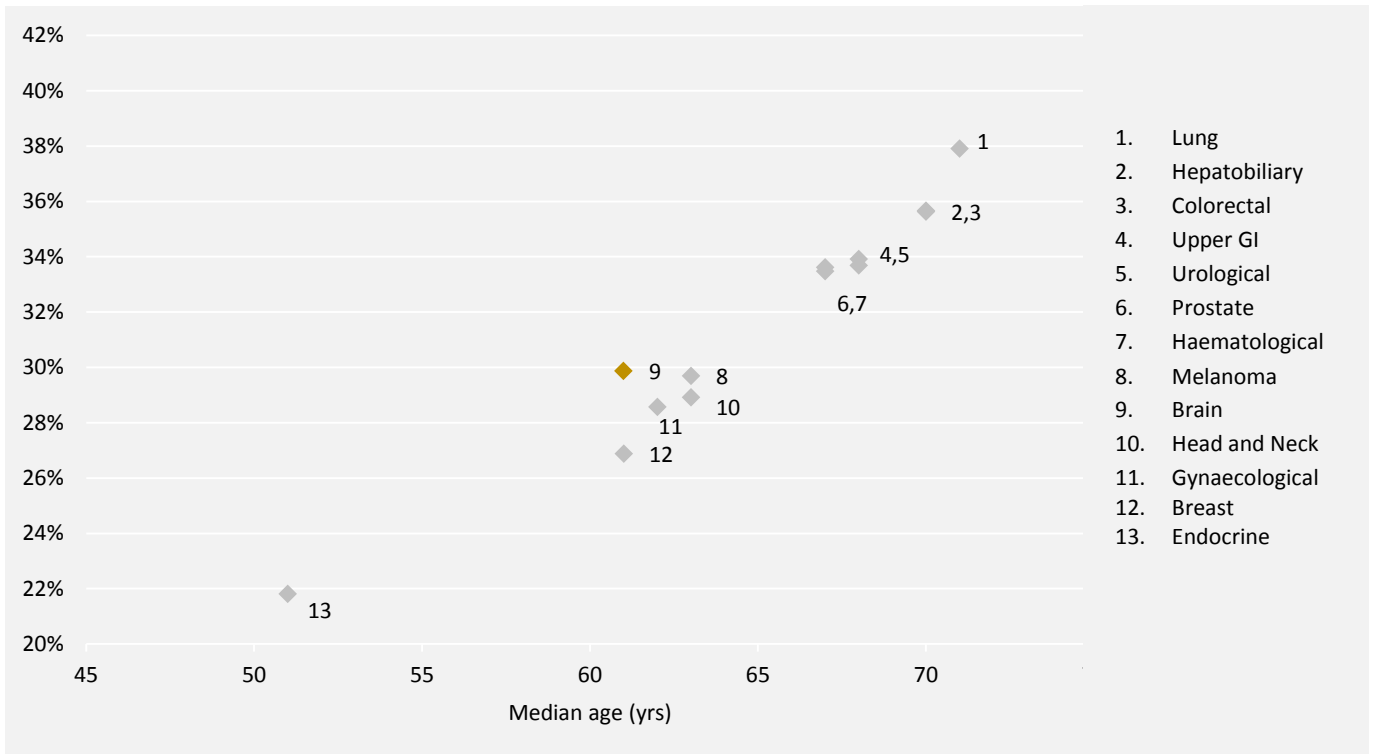
Brain actual and projected cancer mortality
Year of diagnosis 2003-2012, Projected years 2014, 2016, 2021



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team.

The percentage change in cancer incidence between 2012 and 2021 is shown below. Assuming no change in incidence rates during this period brain cancer, with a median age of 61 years, is projected to show a 30% increase in the number of new cases.

Projected percentage change in cancer incidence from 2012 to 2021 for common cancers by median age at diagnosis



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team.

Part 2

Brain Cancer in Queensland

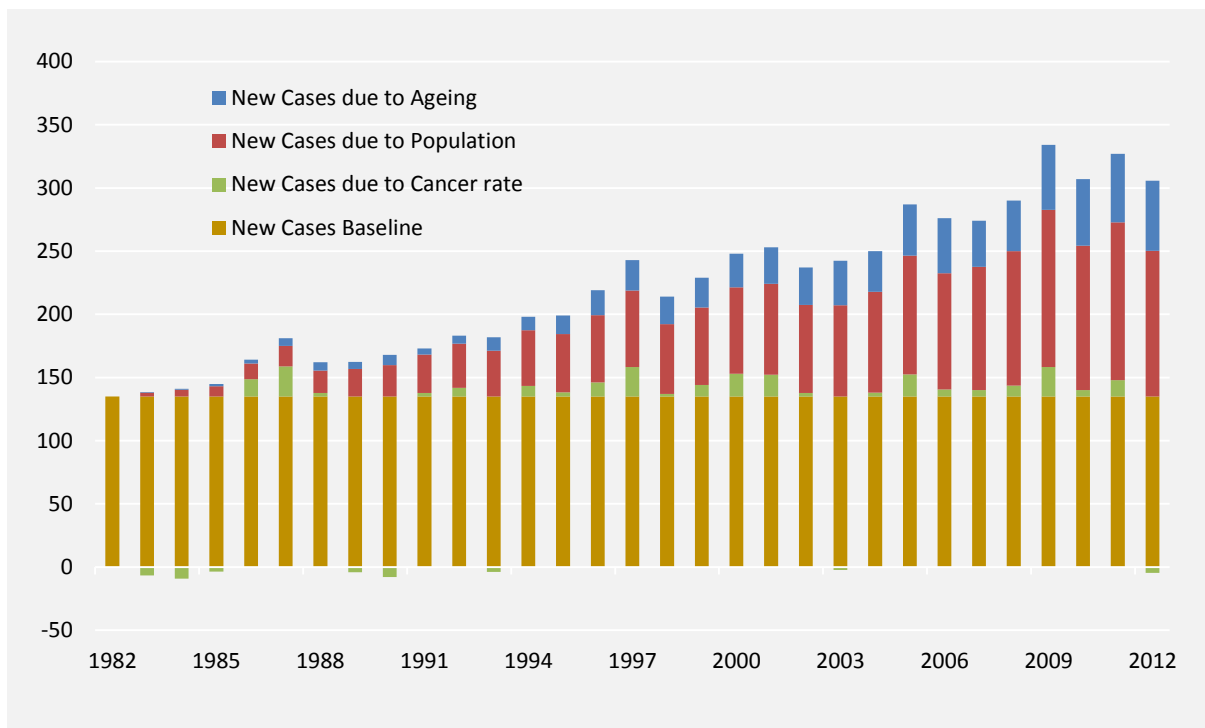


Incidence and mortality

The total number of new cases of brain cancer in Queensland generally increases each year. However when expressed as a proportion of the population and weighted to a fixed age distribution, the incidence, expressed as an age-standardised rate, remains relatively stable. This means that despite the annual increase in the number of new cancer cases, brain cancer is not necessarily becoming more common or more frequent in the population.

The number of new cases of brain cancer among Queensland residents has increased by 123% between 1982 to 2012. For males, the number of new cases increased from 74 in 1982 to 157 (112%) in 2012; for females, the number of new cases increased from 61 to 144 (136%). These increases were largely due to population growth. Queensland's population increased from 2.4 million in 1982 to 4.6 million in 2012, an increase of 88%, making Queensland the fastest growing state in Australia and one of the fastest among developed countries. Ageing also accounted for a small proportion of the total increase in the number of brain cancers.

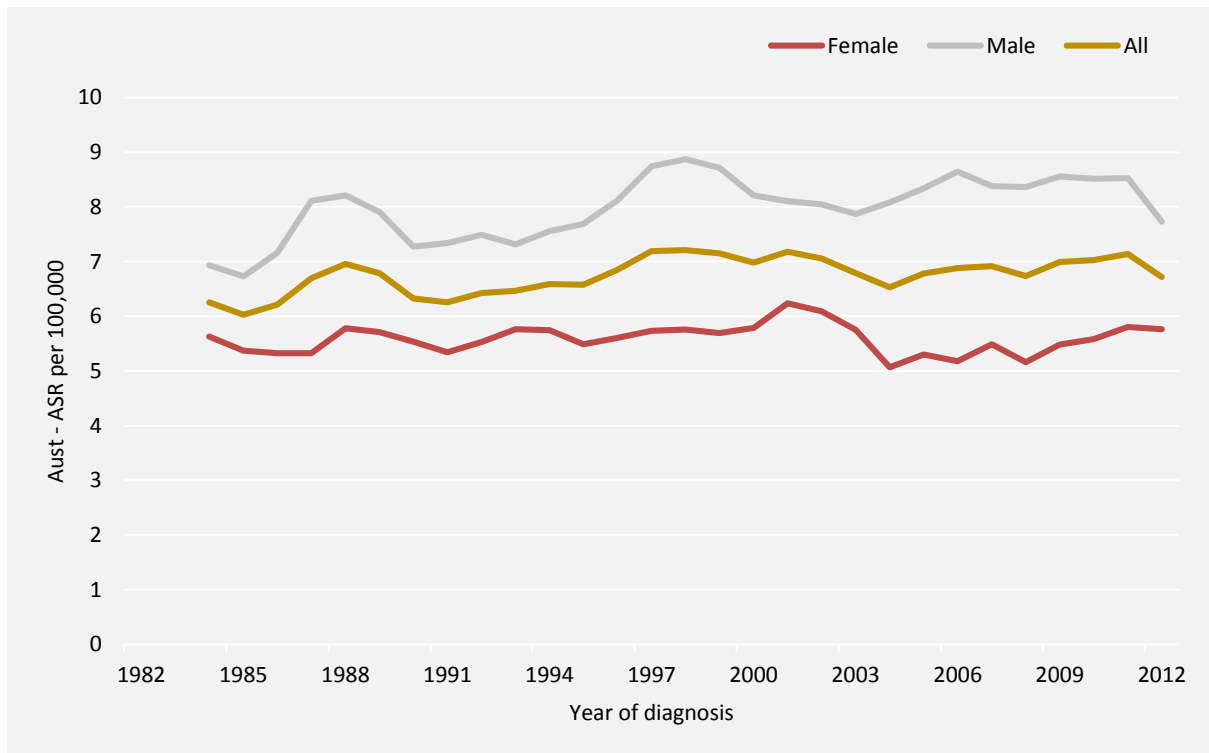
Growth in brain cancer Year of diagnosis 1982-2012



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team.

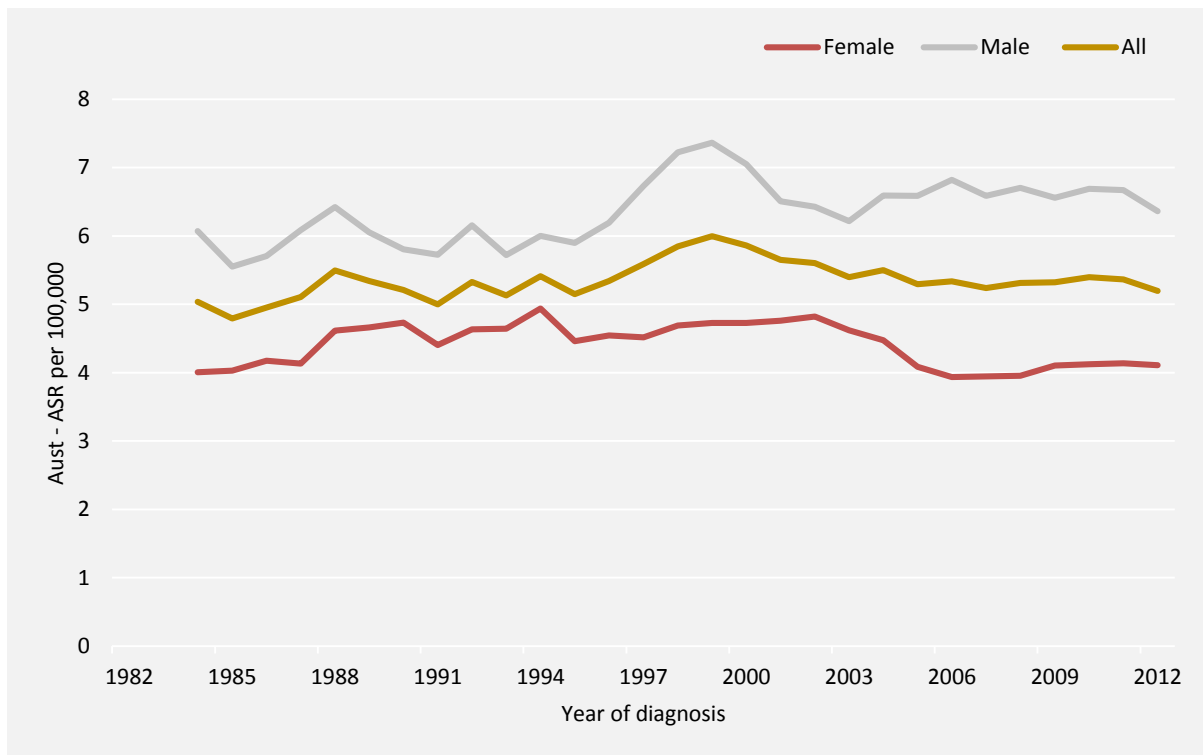
The age-standardised incidence rates of brain cancer have remained relatively stable with rates of around 6 to 7 per 100,000 from 1982 to 2012. Mortality rates also remained stable over time with rates of around 5 to 6 per 100,000 from 1982 to 2012.

*Brain cancer age-standardised incidence rates per 100,000
Year of diagnosis 2003-2012*



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team.

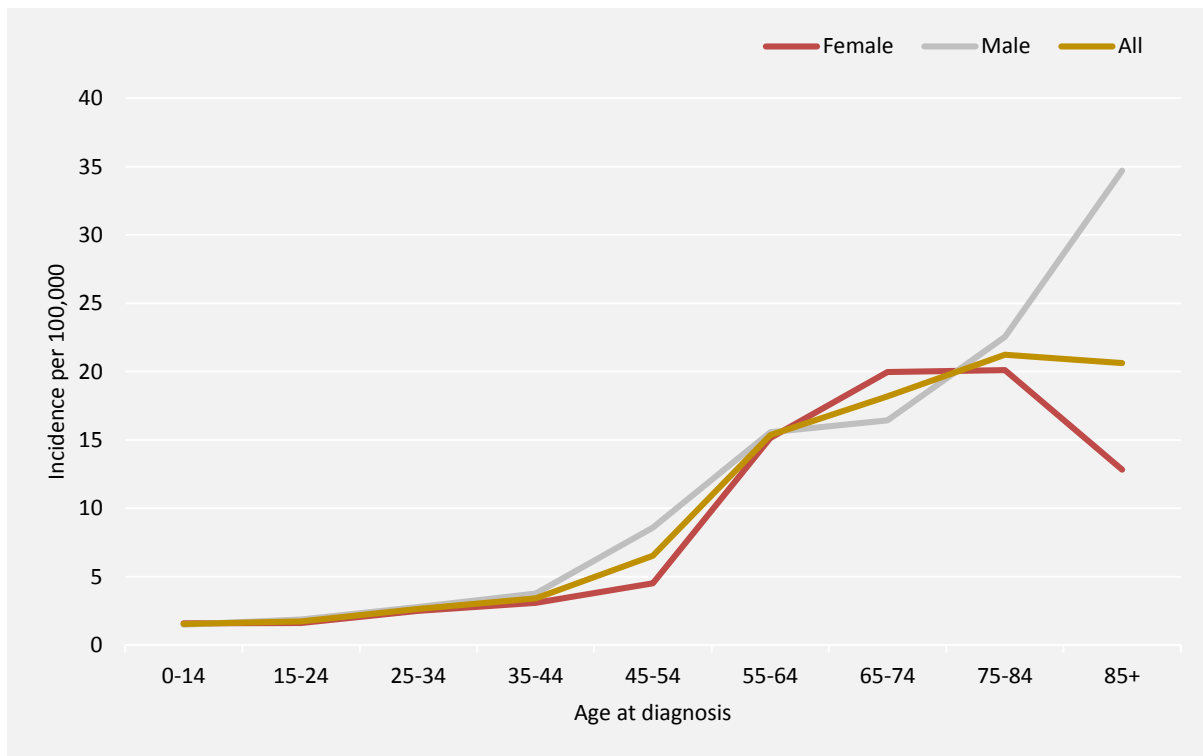
Brain cancer age-standardised mortality rates per 100,000
Year of diagnosis 2003-2012



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team.

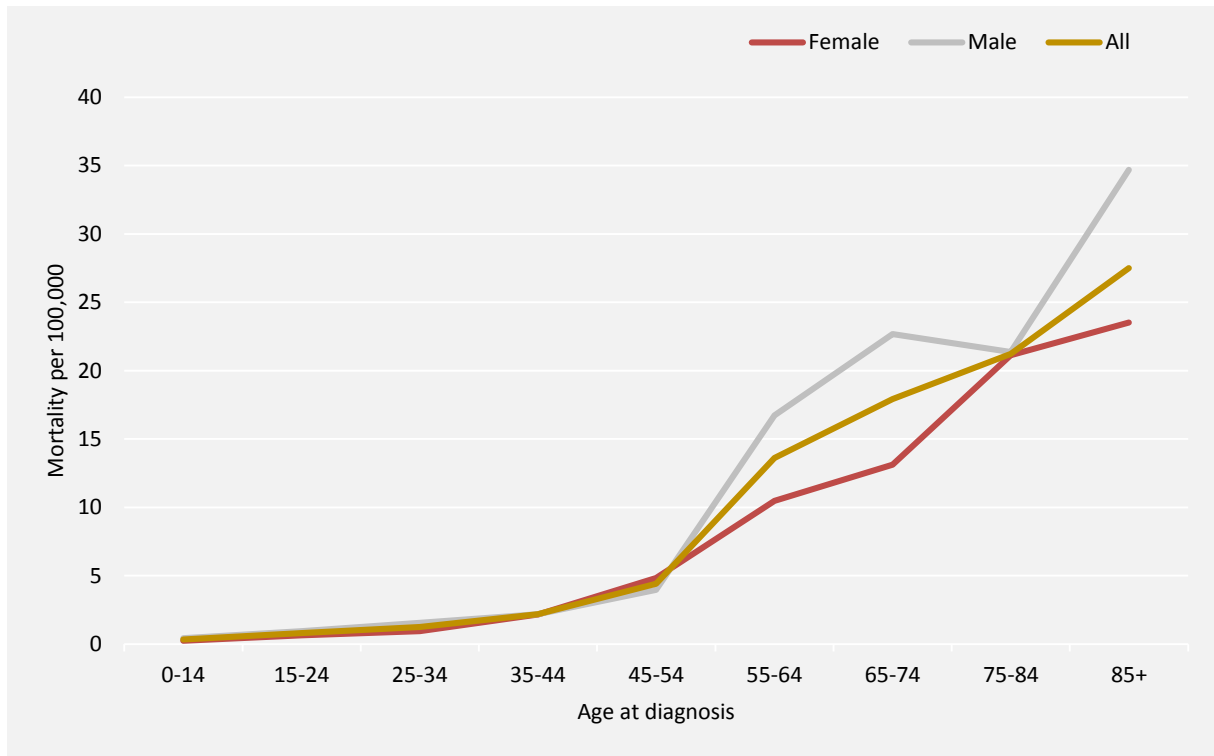
Brain cancer incidence and mortality rates generally increased with age, with incidence rates dropping slightly for the 85+ age group particularly in females. For every 100,000 people aged 55 and older approximately 75 were diagnosed with brain cancer. Very few cases of brain cancer were recorded for persons under the age of 54 (<20 cases per 100,000).

*Brain cancer incidence per 100,000, by age at diagnosis
Year of diagnosis 2012*



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team.

Brain cancer mortality per 100,000, by age at diagnosis
Year of diagnosis 2012



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team.

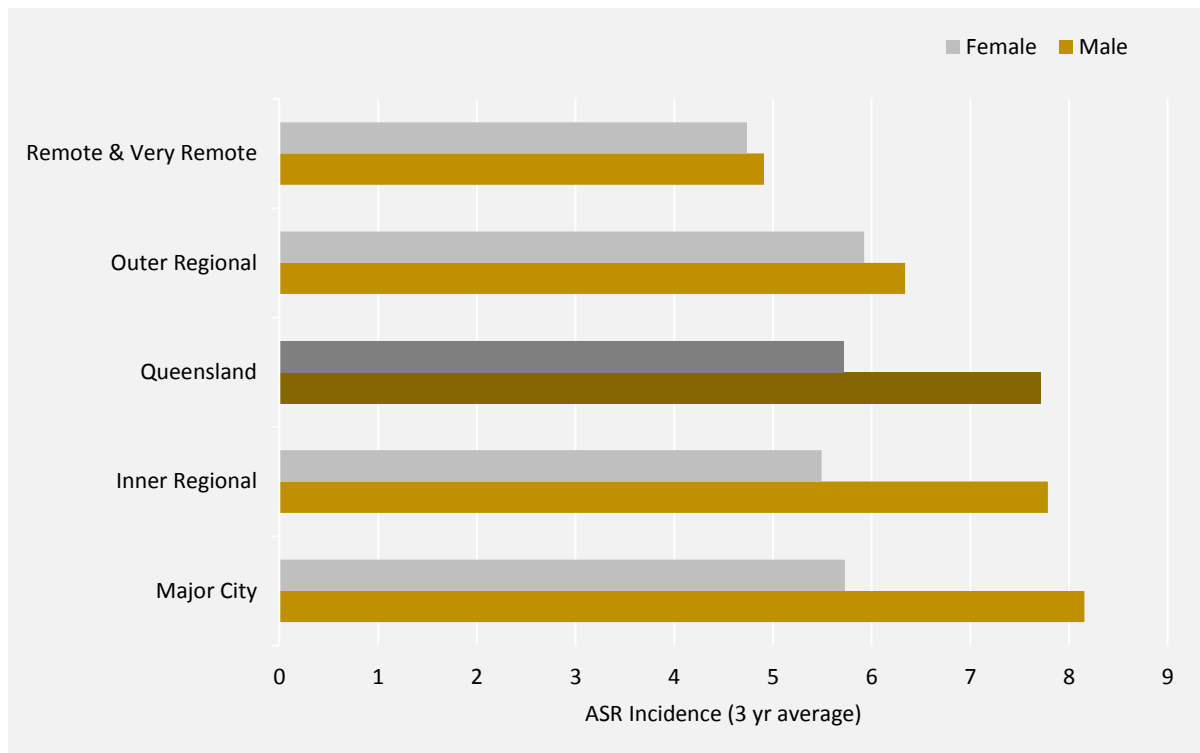
Regional, national and international variation in incidence and mortality

On average, incidence for brain cancer varied by remoteness of residence for both males and females from 2010-2012.

The highest average rate was seen in males who lived in the major city areas of Queensland (8.2 per 100,000), for females the rate was 5.9 per 100,000 in the outer regional areas of Queensland. The remote and very remote areas of Queensland demonstrated the lowest brain cancer incidence for both males and females.

Age-standardised mortality rates for brain cancer were highest in major city areas for both males and females and lowest in the remote and very remote areas of Queensland.

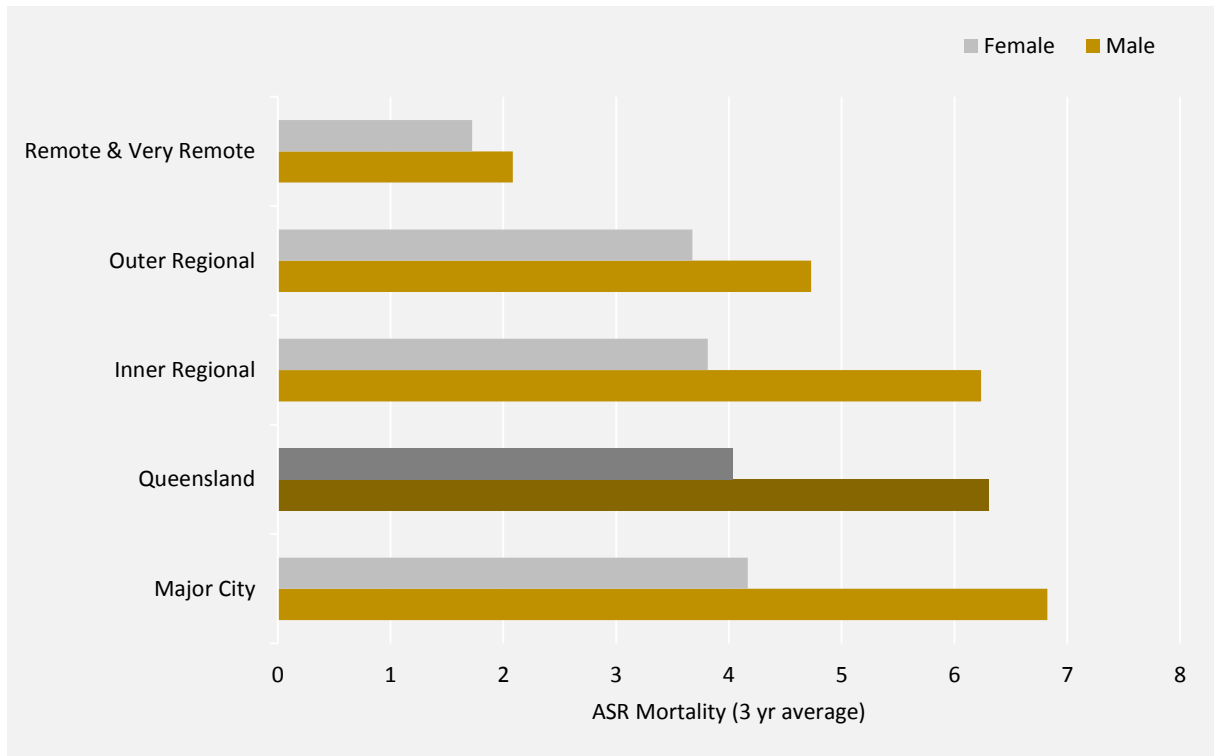
*Brain cancer age-standardised incidence rates by remoteness of residence
Year of diagnosis 2010-2012*



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team.

In the interest of completeness, incidence and mortality rates have been included for all Hospital and Health Services including those with fewer than 16 cases. Incidence and mortality rates based on small numbers of cases should be interpreted with caution due to the poor reliability of rate calculations based on small numbers. For example, the relative standard error (RSE) will be equal or greater than 25% when incidence rates are based on fewer than 16 cases. For more information, refer to the technical notes available at: http://www.cdc.gov/cancer/npcr/uscs/2007/technical_notes/stat_methods/suppression.htm

*Brain cancer age-standardised mortality rates by remoteness of residence
Year of diagnosis 2010-2012*

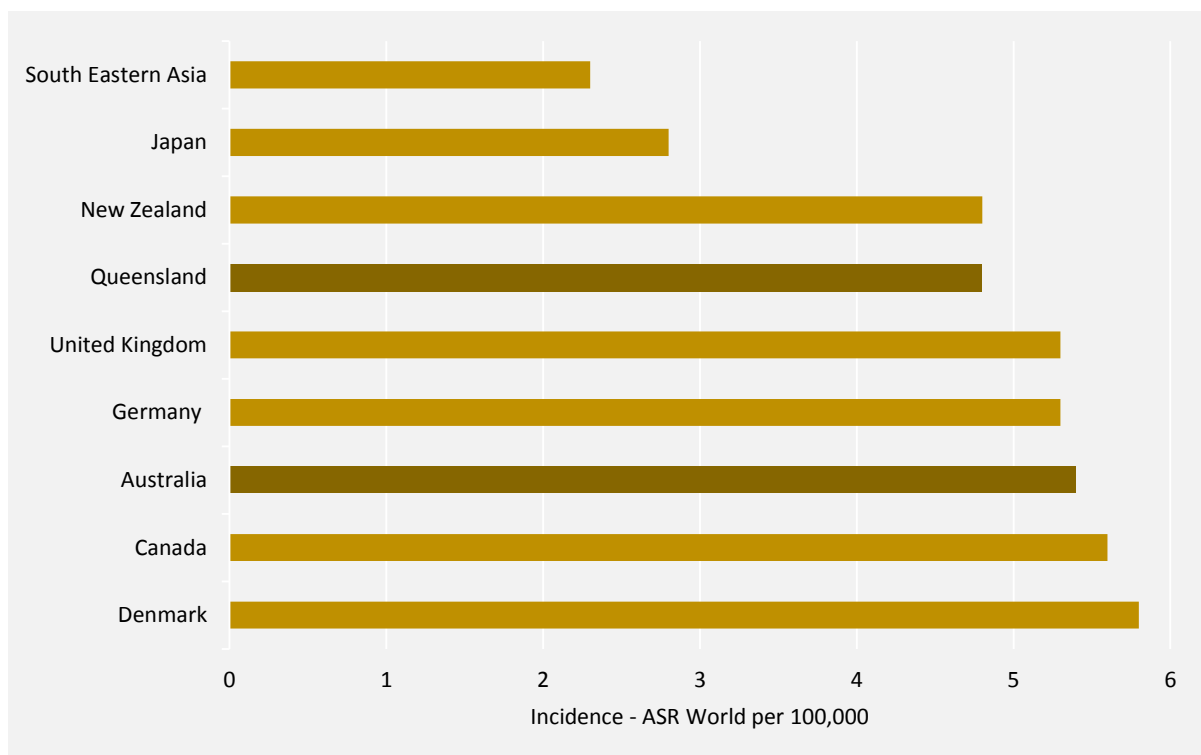


Source: Oncology Analysis System, Queensland Cancer Control Analysis Team
Note: Mortality rates with fewer than 16 cases should be treated with caution

Large differences in brain cancer incidence existed internationally based on the most recent data available at the International Agency for Research on Cancer (IARC).² Denmark recorded the highest incidence (5.8 cases per 100,000) and South Eastern Asia and Japan were the lowest incidence regions with 2-3 cases per 100,000. Australia and Queensland recorded around 5 cases per 100,000.

Mortality rates also varied internationally with Australian rates of 3.9 cases per 100,000 among the highest 2nd to Denmark with 4.3 cases per 100,000. Similar to incidence South Eastern Asia and Japan were the lowest mortality regions with 1-2 cases per 100,000. Queensland demonstrated mortality rates of 3.6 per 100,000.

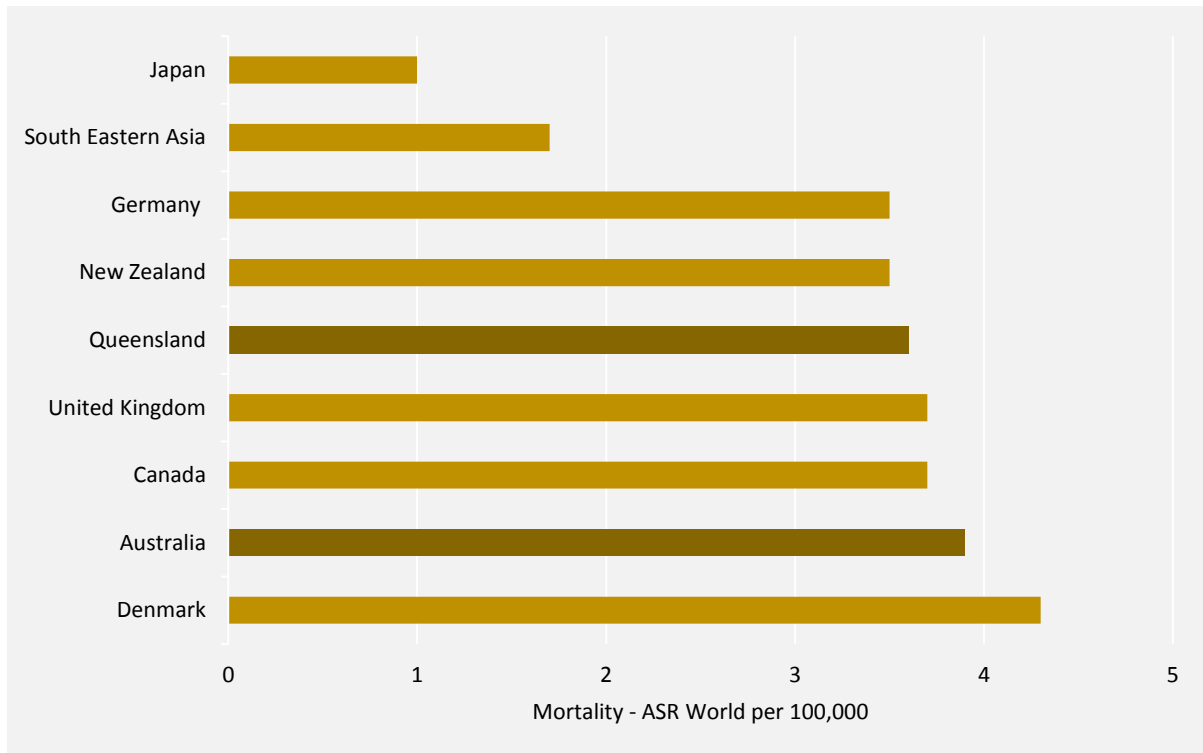
*Brain incidence age-standardised rates for selected international regions and Queensland
Year of diagnosis 2012*



Note: Cancer incidence estimated by the International Agency for Research on Cancer (IARC) for 2012 (GLOBOCAN 2012) except for Queensland which is sourced from Oncology Analysis System, Queensland Cancer Control Analysis Team.

² Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, Rebelo M, Parkin DM, Forman D and Bray F, GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer; 2013. Available from: <http://globocan.iarc.fr>, accessed 29 June 2015

*Brain mortality age-standardised rates for selected international regions and Queensland
Year of diagnosis 2012*



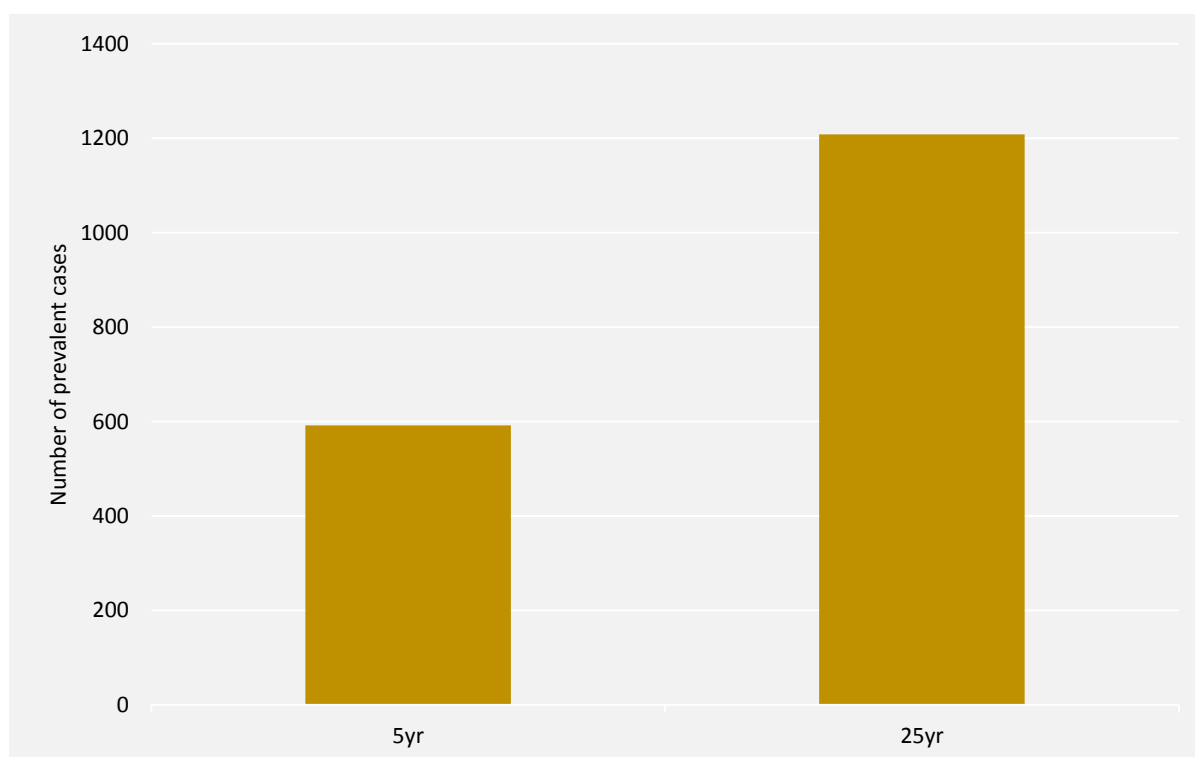
Note: Cancer mortality estimated by the International Agency for Research on Cancer (IARC) for 2012 (GLOBOCAN 2012) except for Queensland which is sourced from Oncology Analysis System, Queensland Cancer Control Analysis Team.

Prevalence

Prevalence represents the number of people living with a cancer and is a measure of the burden of the disease for the individual, families and society. Brain cancer prevalence is increasing as more people are diagnosed and survival improves.

At the end of 2012, 592 people were living with a diagnosis of brain cancer in the previous five years and 1,208 people were living with a diagnosis of brain cancer in the last 25 years.

Prevalence of brain cancer, by time since diagnosis, as at 31st December, 2012



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Prevalence of brain cancer, by time since diagnosis, as at 31st December, 2012

	Male	Female
5 year	328	264
25 year	672	536

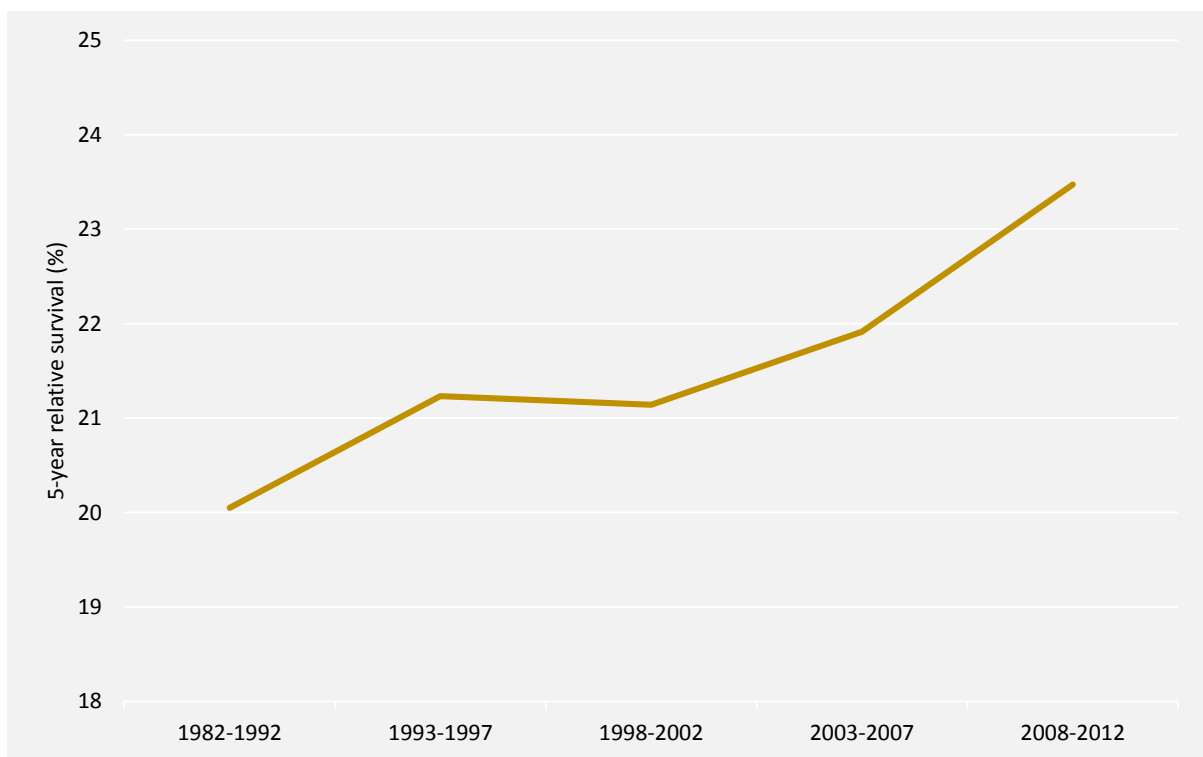
Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Survival

Relative survival is a measure of the survival of a group of persons with a condition, such as cancer, relative to a comparable group from the general population without the condition. For cancer, five-year relative survival represents the proportion of patients alive five years after diagnosis, taking into account age, gender and year of diagnosis.

The average 5-year survival in 2008 to 2012 for brain cancer was 23.5%, an increase of 3.4% from the 1982 to 1992 5 year relative survival of 20.1%.

5 year relative survival trend of brain cancer Year of diagnosis 1982-2012



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Part 3

Brain Cancer by Hospital and Health Service



Patient Characteristics

In this section an overview of incidence and mortality is presented for the fifteen Hospital and Health Services (HHS) in Queensland for the time period 2010-2012.

The median age for brain cancer patients in Queensland was 60 with a range of 39-64 years across HHS. Brain cancer was generally more common in males representing between 33-100% of incidence across the state. The majority of brain cancer patients resided in Metro South and Metro North. These two HHS contributed 45% of the total incidence.

Socioeconomic status varied across Queensland with 67% of cases falling within the middle status group. Approximately 1% of all people diagnosed with brain cancer are indigenous.

*Brain cancer patient characteristics, by Hospital and Health Service
Year of diagnosis annual average 2010-2012*

	Incidence annual average 2010-2012	Median age	% Male	Socioeconomic Status			
				% Indigenous	% Affluent	% Middle	% Disadvantaged
Metro South	72	59 yrs	61%	1%	27%	63%	11%
Metro North	67	60 yrs	55%		41%	50%	10%
Gold Coast	37	63 yrs	56%		3%	96%	2%
Sunshine Coast	29	64 yrs	56%			86%	14%
Darling Downs	21	59 yrs	48%	2%	5%	53%	42%
Cairns and Hinterland	16	58 yrs	61%	4%		73%	27%
Wide Bay	16	63 yrs	51%			4%	96%
Townsville	13	47 yrs	48%	3%	13%	78%	10%
West Moreton	13	58 yrs	44%		5%	85%	10%
Central Queensland	11	59 yrs	63%		3%	97%	
Mackay	11	54 yrs	66%			94%	6%
South West	2	61 yrs	100%	17%		67%	33%
Central West	1	62 yrs	33%	33%		67%	33%
Torres and Cape	1	42 yrs					100%
North West	1	39 yrs	50%	50%		50%	50%
Queensland	310	60 yrs	56%	1%	17%	67%	17%

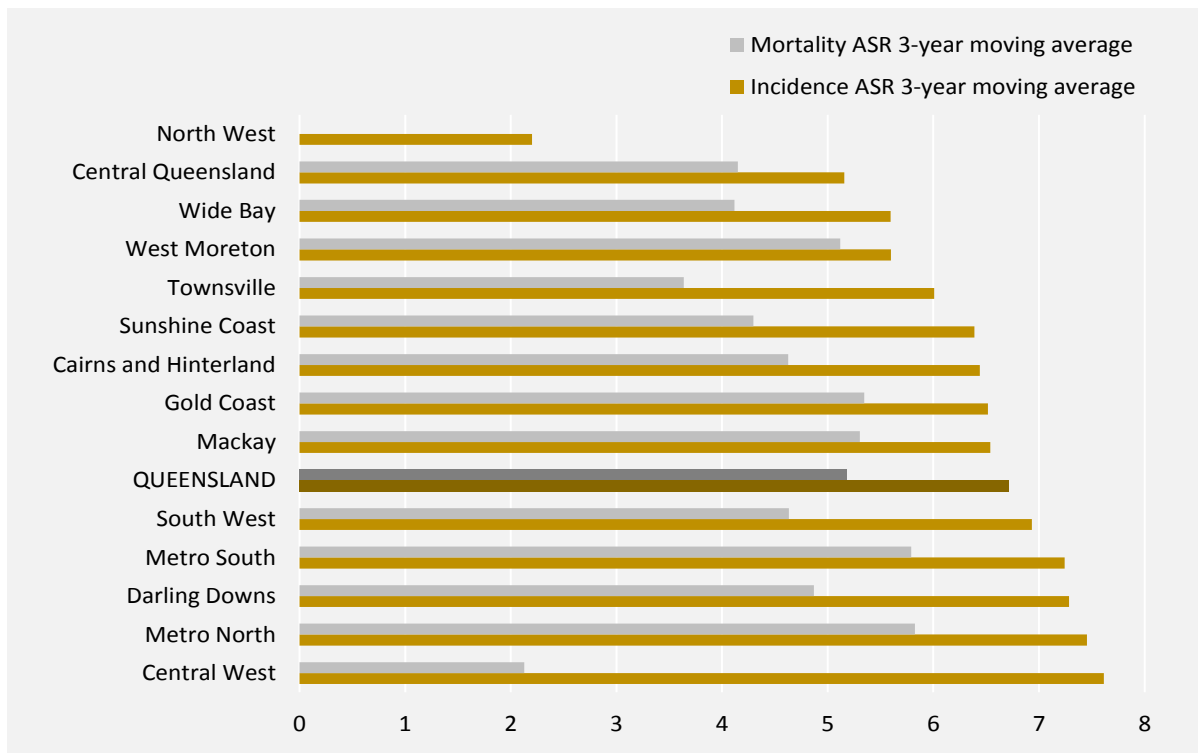
Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Incidence and Mortality

At the Hospital and Health Service level age-standardised incidence and mortality rates vary across the state. Reasons for the variations are diverse and complex and include exposure to environmental factors, socioeconomic status, access to health services and chance. It should be noted that remote Hospital and Health Services have small populations and estimates of mortality rates based on such small numbers may not be as accurate as those for areas with larger populations.

Brain cancer age-standardised incidence rates are highest in the Central West Hospital and Health Services with 7.6 per 100,000 diagnosed, while mortality rates are highest in the Metro South and Metro North with 5.8 per 100,000 deaths. The North West Hospital and Health Services experienced the lowest age-standardised incidence rates in the state while Central West experienced the lowest mortality rates (apart from the North West which had no mortality).

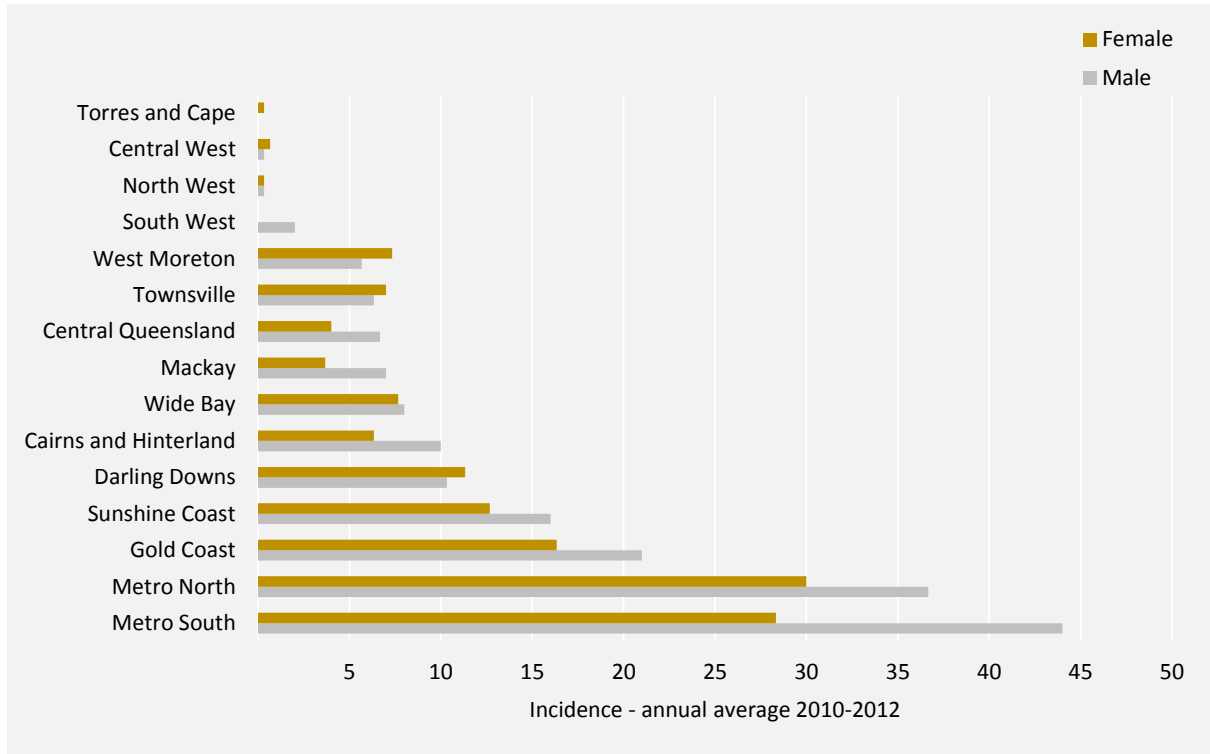
*Brain cancer age standardised rate 3-year moving average by HHS
Year of diagnosis 2010-2012*



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Brain cancer annual incidence (2010-2012) is highest in Metro South and Metro North Hospital and Health Services accounting for 23% and 21% for the state’s incidence respectively.

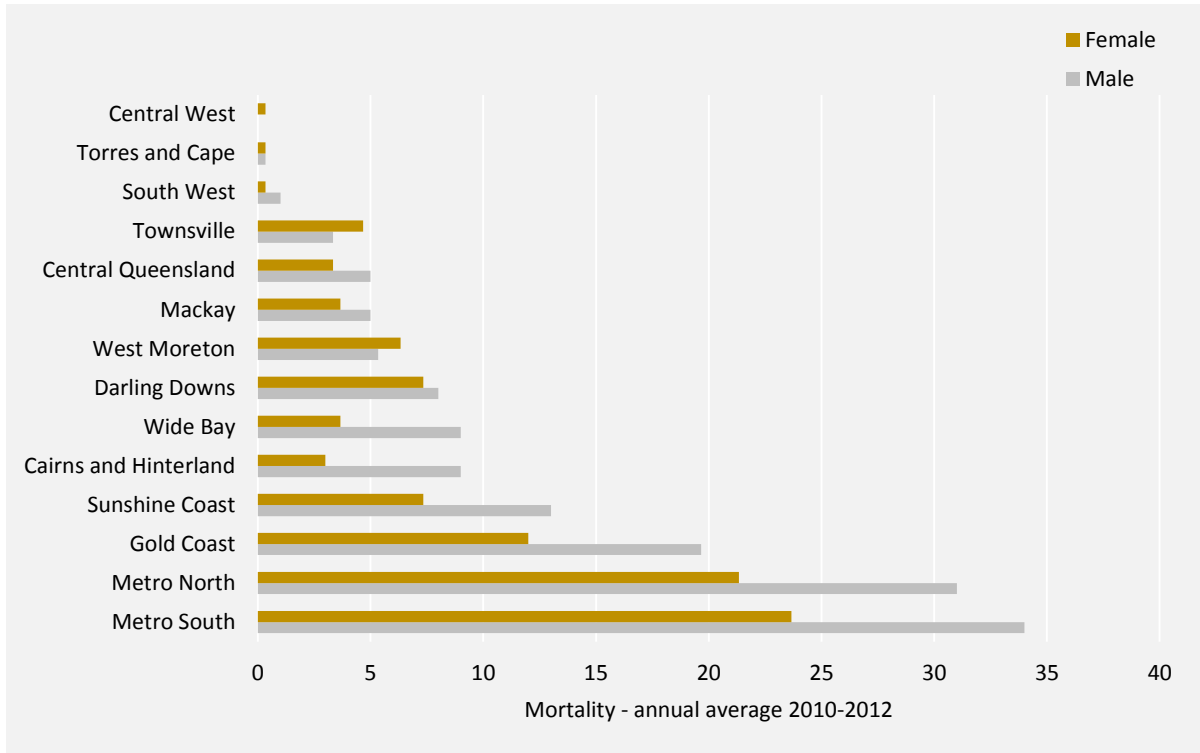
*Brain cancer annual average incidence by HHS
Year of diagnosis 2010-2012*



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

The average annual mortality (2010-2012) is highest in Metro South and Metro North Hospital and Health Services accounting for 24% and 22% of the state’s mortality respectively.

*Brain cancer annual average mortality by HHS
Year of diagnosis 2010-2012*

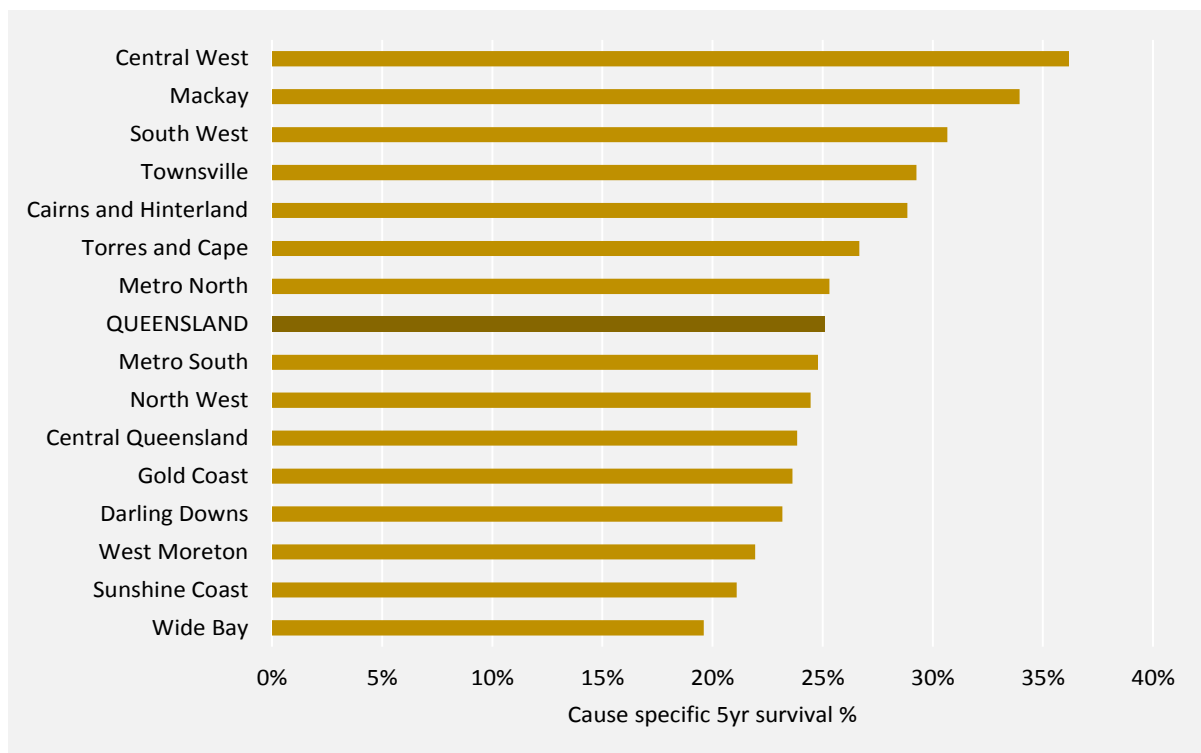


Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Survival

There is regional variation in cause specific survival of Queensland brain cancer across the state. The Wide Bay Hospital and Health Service represented the lowest 5 year survival percentage of 19.6% and the Central West had the highest at just over 36%. 5 year survival for brain cancer in Queensland was just over 25% from 1982 to 2012.

*Brain cancer cause specific survival by HHS
Year of diagnosis 1982-2012*



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Appendix



Data Sources

Oncology Analysis System

Oncology Analysis System (OASys) is a state-wide clinical cancer database with diagnostic, treatment, and outcome data on registry-notifiable invasive cancers diagnosed among Queensland residents of all ages (including children) from 1982 to 2012. The database includes inpatient data for public and private admissions and information systems for radiation oncology, pharmacy and pathology. Benign (non-invasive) cancers are excluded. New cancer cases are counted following the rules for counting multiple primary cancers as defined by the International Association for Research on Cancer (IARC).

The data collection, linking and reporting of OASys data is performed under the auspices of Queensland Cancer Control Safety and Quality Partnership, a Quality Assurance Committee gazetted under Section 31, The Health Services Act 1991.

Queensland Oncology Repository

The Queensland Oncology Repository (QOR) is a cancer patient database developed and maintained by the Queensland Cancer Control Analysis Team (QCCAT; Queensland Health) to support Queensland's cancer control, safety, and quality assurance initiatives. QOR consolidates cancer patient information for the state and contains data on cancer diagnoses and deaths, surgery, chemotherapy, and radiotherapy. QOR also includes data collected by clinicians at multidisciplinary team (MDT) meetings across the state. For more information, visit <https://qccat.health.qld.gov.au/QOR>

Appendix 2 - Glossary and Common Abbreviations

Age-standardised incidence/mortality rate (ASR)

The number of new cases or deaths per 100,000 that would have occurred in a given population if the age distribution of that population was the same as that of the Australian population in 2001 and if the age-specific rates observed in the population of interest had prevailed. In international comparisons, the World Standard Population was used as the reference population.

Age-standardised rates are independent of the age-structure of the population of interest and are therefore useful in making comparisons between different populations and time periods.

Except where noted, incidence and mortality rates are standardised to the Australian age-specific population in 2001.

Annual average

Annual average refers to the sum of numbers divided by the number of years being reported. In this report annual average numbers have been rounded up to the nearest whole number for those with less than 1.

Cause specific survival

Cause specific survival: the percentage of cancer cases attributed to a specific cancer still alive after a specified period of time from diagnosis.

Hospital and Health Services (HHS)

For residence considerations, a Hospital and Health Service is a geographic area defined by a collection of Statistical Local Areas (SLA). For public hospitals and health service facilities, the term Hospital and Health Service is synonymous with a group of Queensland Health facilities and staff responsible for providing and delivering health resources and services to an area which may consist of one or more residential areas.

Incidence (new cases)

The number of new cases of cancer diagnosed in a defined population during a specified time period. For example, 2012 incidence is the number of cancers which were first diagnosed between 1 January 2012 and 31 December 2012.

Indigenous Status

A measure of whether a person identifies as being of Aboriginal or Torres Strait Islander origin.

Median age

The age that divides a population into halves: one older than the median, the other younger than the median.

Mortality (deaths)

The number of deaths attributed to cancer in a defined population during a specified time period regardless of when the diagnosis of cancer was made.

Prevalence

The number of Queenslanders with a diagnosis of cancer who were alive on 31 December 2012.

Relative Survival

The rate of survival of persons diagnosed with cancer relative to the expected survival rate of the general population. Five-year relative survival represents the proportion of patients alive five years after diagnosis, taking into account age, gender and year of diagnosis.

Remoteness

The relative remoteness of residence at time of diagnosis, based on the Australian Standard Geographical Classification (ASGC). In this report, remoteness is classified into four groups: Major City, Inner Regional, Outer Regional, and Remote & Very Remote.

Sex

Refers to the biological and physiological characteristics that define males and females.

Socioeconomic status

Socioeconomic classification is based on the Socio-Economic Indexes for Areas (SEIFA), a census-based measure of social and economic well-being developed by the Australian Bureau of Statistics (ABS) and aggregated at the level of Statistical Local Areas (SLA).

The ABS uses SEIFA scores to rank regions into ten groups or deciles numbered 1 to 10, with 1 being the most disadvantaged group and 10 being the most affluent group. This ranking is useful at the national level, but the number of people in each decile often becomes too small for meaningful comparisons when applied to a subset of the population. For this reason, this document further aggregates SEIFA deciles into 3 socioeconomic groups:

SEIFA Group	Decile	Percentage of population (approximate)
Affluent	1-2	20%
Middle	3-8	60%
Disadvantaged	9-10	20%

The proportion of cases in each group will vary depending on the subset of the population being examined. For example, the proportion in the Disadvantaged group may be higher than 20% when the data is limited to cancers that are more common in poor compared to rich people.

For more information:

Queensland Cancer Control Analysis Team
Queensland Health
GPO Box 48 Brisbane, Queensland, 4001 Australia
Ph: +61 (07) 3840 3200
Fax: +61 (07) 3176 4458
Email: qccat@health.qld.gov.au
<https://qccat.health.qld.gov.au>

Although care has been taken to ensure the accuracy, completeness and reliability of the information provided these data are released for purposes of quality assurance and are to be used with appropriate caution. Be aware that data can be altered subsequent to original distribution and that the information is therefore subject to change without notice. Data can also quickly become out-of-date. It is recommended that careful attention be paid to the contents of any data and if required QCCAT can be contacted with any questions regarding its use. If you find any errors or omissions, please report them to qccat@health.qld.gov.au