Breast Cancer in Queensland

An Overview

2012

Queensland Government

Acknowledgements

The Queensland Breast Cancer Sub-Committee was established in 2011 as a Sub-Committee of The Queensland Cancer Control Safety and Quality Partnership (The Partnership), a declared quality assurance committee under section 32(1) of the Health Services Act 1991, to consider and improve outcomes for women who have been treated with breast cancer across Queensland - an approach which has never before been adopted for breast cancer in Queensland.

The authors acknowledge and appreciate the work of the Breast Cancer Sub-Committee members (listed below) and the Queensland Cancer Control Analysis Team (QCCAT) who contributed to and participated in the activities of the Sub-Committee.

Queensland Breast Cancer Sub-Committee Members

Dr Michelle Cronk
Dr Colin Furnival (Chair)
Dr Ben Green
Dr Tony Green
Dr Margot Lehman
Professor Sunil Lakhani
Marion Strong
Shoni Colquist
Hazel Harden
Julie Moore

The report was prepared by Michael Blake, Shoni Colquist, Hazel Harden, Julie Moore and Dannie Zarate.

We wish to thank Dr Colin Furnival for reviewing the report and providing valuable comments.

For more information:
Queensland Cancer Control Analysis Team
Queensland Health
GPO Box 48 Brisbane, Queensland, 4001 Australia
Ph: +61 (07) 3239 0886
Fax: +61 (07) 3239 0930
Email: qccat@health.qld.gov.au
https://qccat.health.qld.gov.au

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qccat
queensland cancer control analysis team

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Message from the Chair

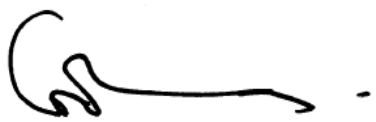
This is the first report of the Breast Cancer Sub-committee of The Partnership. It reflects a new effort in Queensland to provide clinicians with information about the burden of breast cancer across Queensland, patterns of care provided by hospitals treating breast cancer and outcomes of treatment.

When it met for the first time in 2011, the Breast Cancer Sub-Committee agreed that a set of contemporary data would provide an essential reference for understanding current and future issues in quality assurance for breast cancer management in Queensland. In a sense, this would be a snapshot of breast cancer in Queensland, based on reliable data drawn from the Queensland Oncology Repository (QOR) - a statewide database compiled by The Partnership and QCCAT for safety and quality activities. The information presented in this report is not only a useful guide for the future activities of the Sub-Committee, it also offers Hospital and Health Services a local perspective on breast cancer. In particular it provides insights into the incidence, mortality and survival of breast cancer in their resident populations. It paves the way for clinician - led improvements in the safety and quality of breast cancer care in Queensland.

A recent development which has made cancer data more accessible to clinicians is the development of the Oncology Analysis System (OASys). OASys is a comprehensive on-line source of Queensland cancer data which provides the information on breast cancer presented in this report. An innovative feature of this report is the presentation of breast cancer types according to the newly released WHO Classification of Tumours of the Breast published as part of the 4th Edition of the WHO Classification of Tumours series.

The sub-committee hopes that when you read this report you will find these statistics useful in your day to day role as clinician, health manager, Hospital and Health Service executive or board member.

I wish to acknowledge the commitment and work of the members QCCAT in providing the information, analysis and statistics which form the basis of this report.



Colin Furnival
Chair, Breast Cancer Sub-Committee
Queensland Cancer Control Safety and Quality Partnership

Highlights

Breast cancer in Queensland: A Statistical Overview 2012 provides information on **invasive** breast cancer incidence and mortality for females in Queensland and for Queensland Health Hospital and Health Services. This report presents the latest cancer data, projections for 2013 and trends over time.

Estimates for 2013

Breast cancer is expected to continue to be the most common cancer diagnosed in females. The projected incidence for 2013 shows a 12% increase of 372 cases from the 2009 incidence.

Comparison with 2009

The most recent complete statistical data for breast cancer in Queensland is 2009.

In 2009, a total of 2,798 new breast cancers were diagnosed.

Overall, breast cancer accounted for 28% of all reported cancers in females. The majority of cases (70%) were diagnosed in women aged 40-69, the median age is 60.

A total of 426 women died from breast cancer in 2009. The age standardised rate of death due to breast cancer has fallen from 29 deaths per 100,000 females in 1994 to 20 deaths per 100,000 females in 2009, a decrease of 31%. This may be attributable to early diagnosis and increasing use of systemic therapy.

Notably, the report shows that 89% of females diagnosed with breast cancer will survive for at least five years.

Hospital and Health Service

Age-standardised incidence and mortality rates vary by Hospital and Health Services (HHS). Central Queensland has the highest rate of breast cancer incidence and South West, Sunshine Coast has the lowest rate of breast cancer mortality.

The majority of breast cancer patients reside in Metro South and Metro North HHS. These two HHS's contribute to 42% of the total breast cancer incidence.

Part 1

Breast Cancer Projections

The cancer data presented in this report is for female **invasive** breast cancer in Queensland and does not include benign breast tumours or non-invasive tumours such as Ductal Carcinoma In-Situ (DCIS). Women who reside outside Queensland are also excluded.

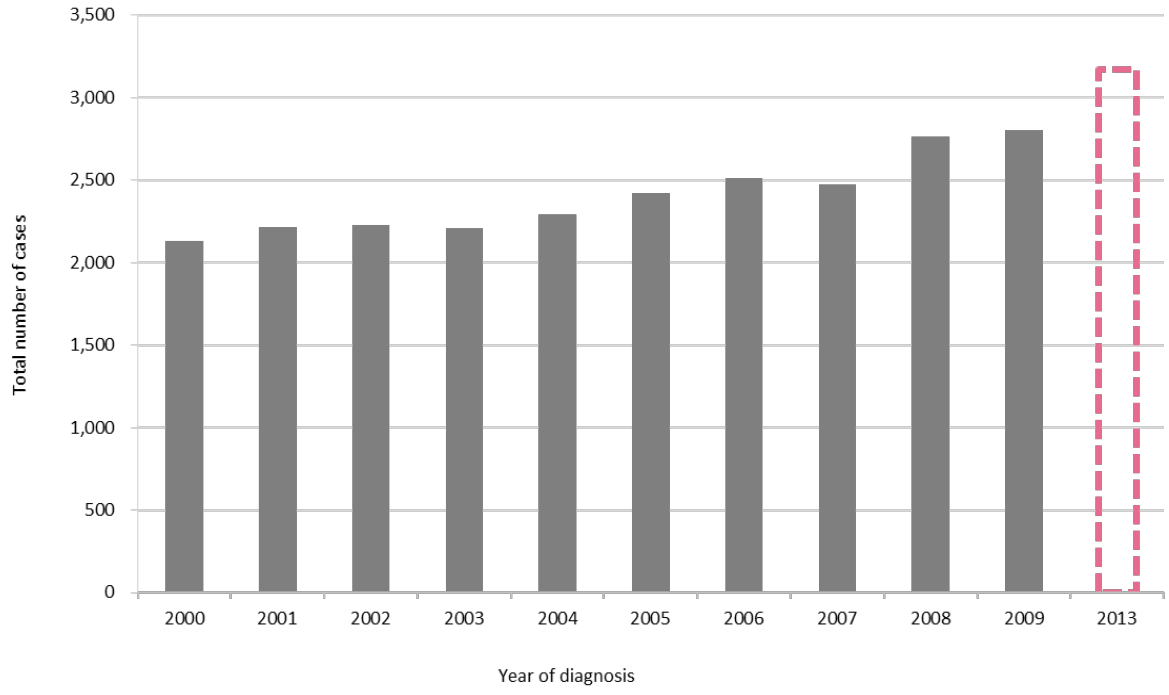
Breast cancer is the most common cancer in Australia women.[8] The projections presented in this report are an indication of the likely burden of breast cancer and the demand for cancer services across Queensland for 2013.

Incidence

In 2013, an estimated 3,170 cases of invasive breast cancer will be diagnosed among women living in Queensland. Breast cancer is expected to continue to be the most common cancer diagnosis for females. Projected incidence for 2013 shows a 12% increase of 372 cases from the 2009 incidence. (Figure 1)

These trends are likely to be in part due to changes in the age distribution of the Queensland population. The number of women aged 65 years and older is expected to grow at a faster rate than the rest of the other age groups.[1]

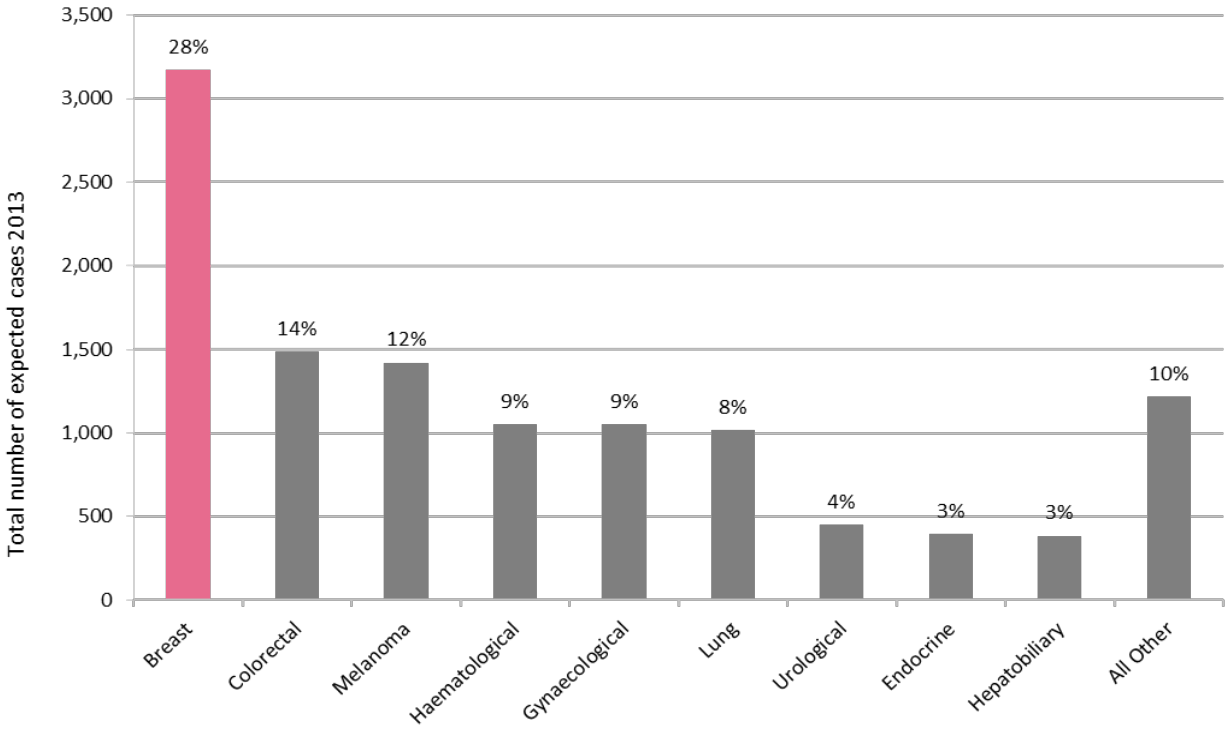
Figure 1: Actual and projected female breast cancer incidence, Queensland, 2000 – 2013



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Breast cancer projected incidence is ranked first amongst all female cancers. 28% of all female cancers are predicted to be invasive breast cancer. (Figure 2)

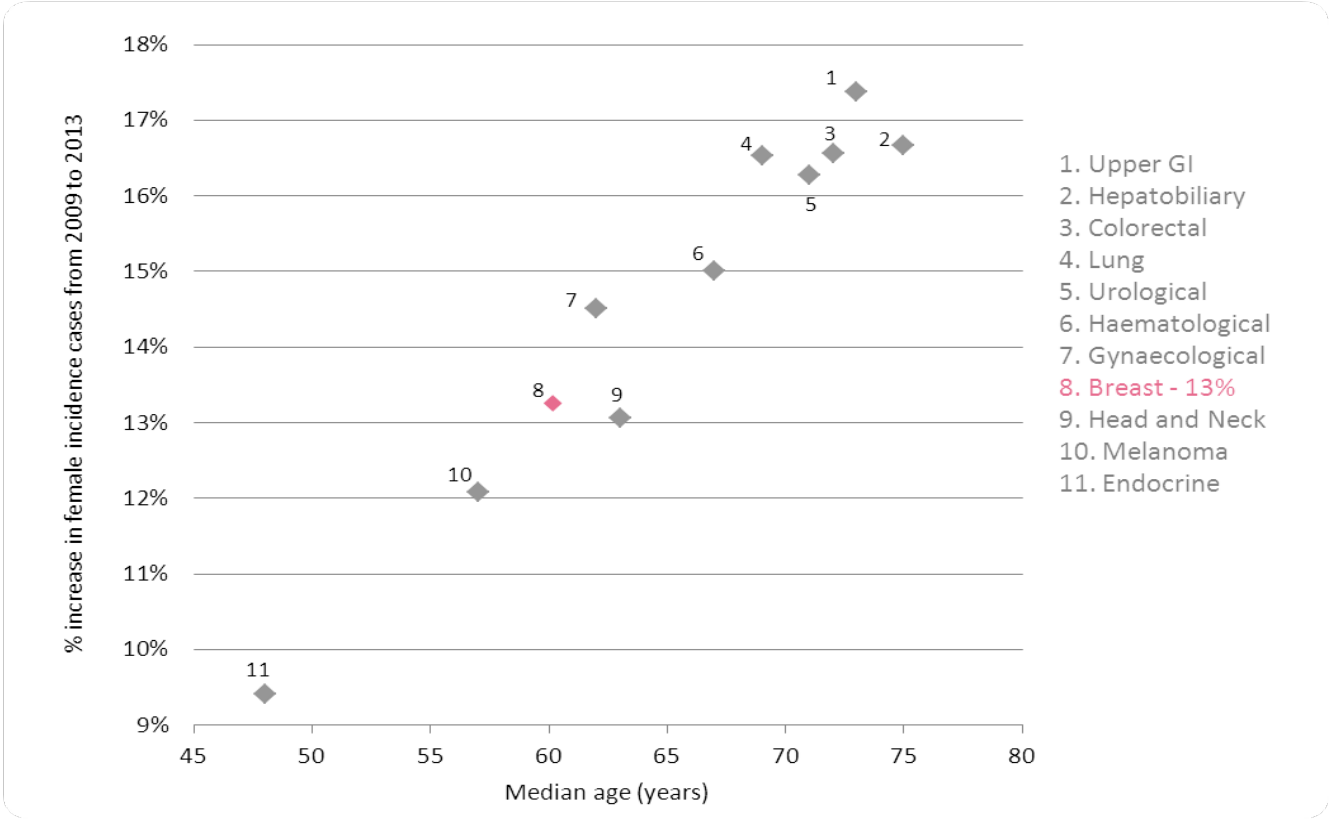
Figure 2: Top 10 most commonly diagnosed cancers in females, Queensland, projected to 2013



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

The percentage change in cancer incidence between 2009 and 2013 is shown in Figure 3. Assuming no change in incidence rates during this period, breast cancer which is common in women aged 40-69 is projected to show a relatively smaller increase (13%) in the number of new cases than other cancers common in older females such as Upper GI, hepatobiliary, colorectal and lung cancers.

Figure 3: Projected percentage change for common cancers in females, by median age of diagnosis, Queensland, 2009 to 2013

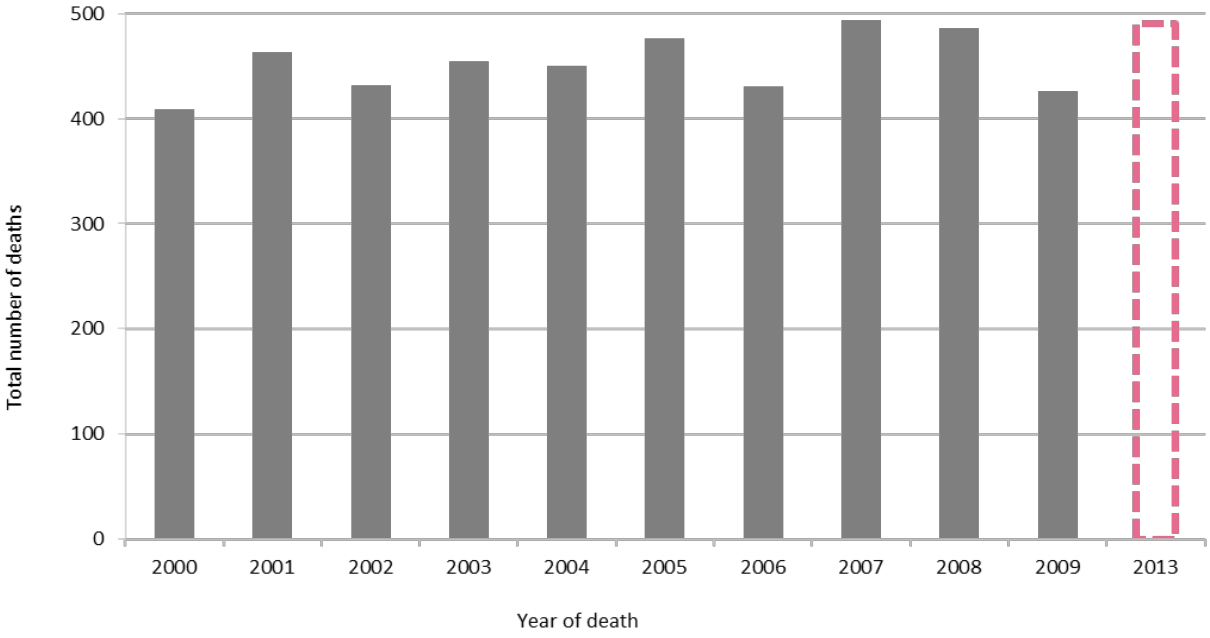


Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Expected mortality

It is likely that 490 women may die of breast cancer in 2013. 426 breast cancer related deaths were recorded in 2009 with an expected increase of 13% for total deaths caused by breast cancer by 2013. (Figure 4)

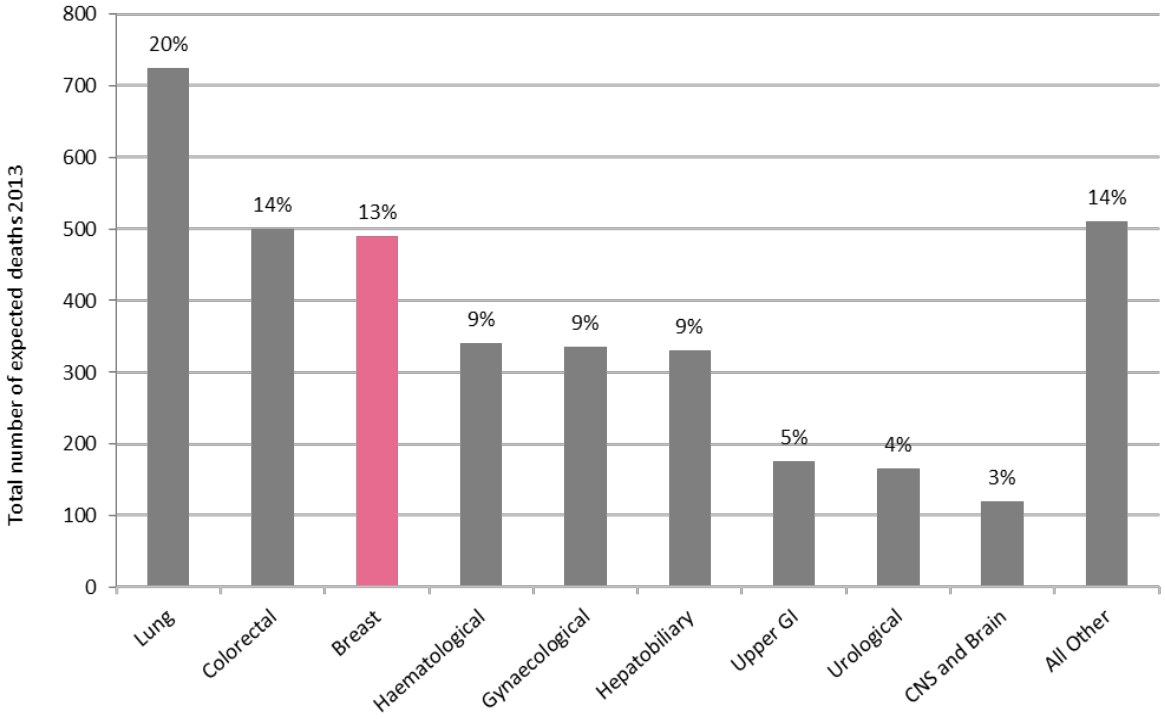
Figure 4: Actual and projected female breast cancer mortality, Queensland, 2000 – 2013



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

13% of all female cancer deaths are caused from breast cancer making it the third most common cause of cancer related death after lung and colorectal cancer. (Figure 5)

Figure 5: Top 10 cancers by expected mortality, females, Queensland, 2013



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Part 2

Breast Cancer in Queensland

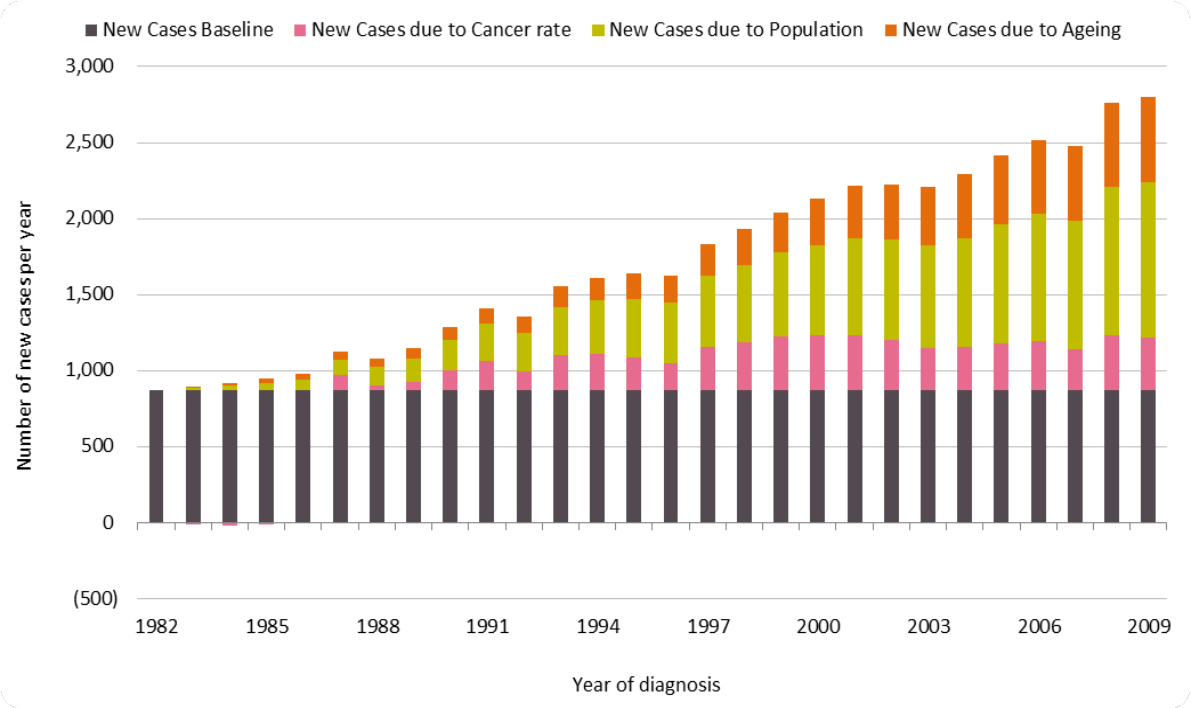
Incidence and mortality

Between 1982 and 2009 the number of women diagnosed with breast cancer among Queensland residents has almost tripled from 869 cases in 1982 increasing to 2,798 cases in 2009. These increases are largely due to population growth and ageing. Changes in the breast cancer incidence rate per 100,000 accounted for only a small proportion of the total increase in the number of cancers.[1] (Figure 6)

The population increased from 2.4 million in 1982 to 4.43 million in 2009, an increase of 78%, showing in the last 3 decades Queensland has had the most rapid population growth in Australia and one of the fastest among developed countries. While the number of females and males are similar, there are proportionally more women than men in the age groups 30-59 years and 70 years and over.[1]

In figure 6 the number of **New Cases due to Cancer Rate** represents the additional number of cases that would have occurred each year if only the rate had changed, but the population*, with its underlying age structure*, remained exactly the same as it was in 1982. For breast cancer the incidence rates increased between 1982 and 1999. This is most likely due to increased breast cancer screening during this period. **New Cases due to Population** is the largest contributor to the increased numbers.

Figure 6: Growth in new cases of female breast cancer, Queensland, 1982 – 2009

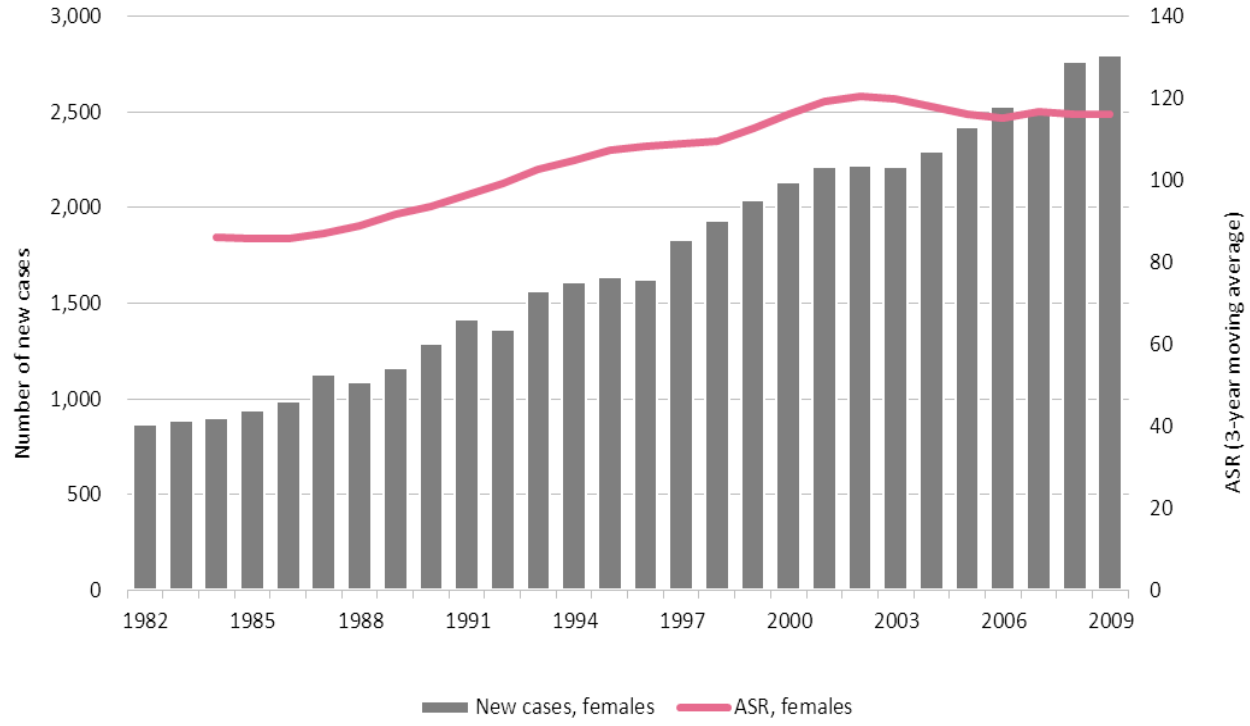


**Growth new cases definitions – see appendix*

Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Trends in incidence in Figure 7, show there was a 27% increase in incidence rate from 1984 (86 cases per 100,000) to 2000 (119 cases per 100,000), after which the rate has been stable. The slight ***decrease*** in age standardised rate beginning in the year 2000 could be attributed to stability in the state wide breast screening program, which was implemented progressively in the previous decade.

Figure 7: Female trends in numbers and rates for breast cancer incidence, Queensland, 1982 - 2009



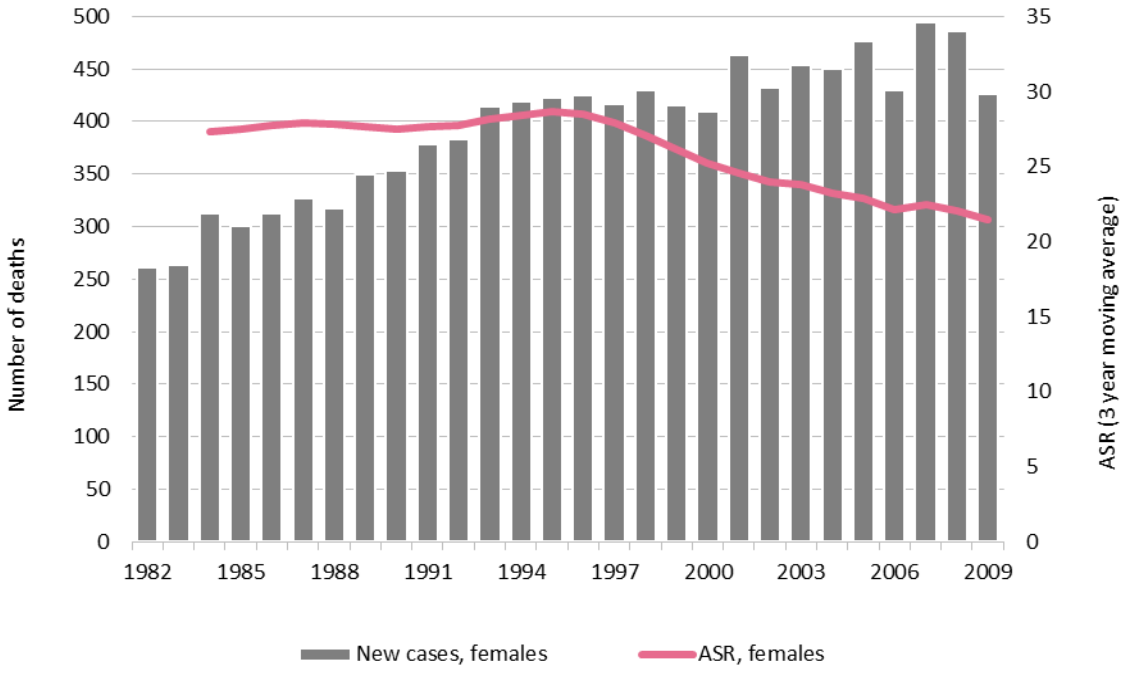
**ASR –Age standardised rate – see appendix*

Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Mortality rates peaked in the early 1990's and rates have declined since 1994. This downward trend has been observed in other states and countries. It is likely to be due to more effective anti-cancer treatments together with the increased participation in population based breast screening.[1]

Trends in mortality indicate that the age-standardised rate has fallen from 29 deaths per 100,000 in 1994 to 20 deaths per 100,000 in 2009. (Figure 8)

Figure 8: Female trends in numbers and rates for breast cancer mortality, Queensland, 1982 – 2009



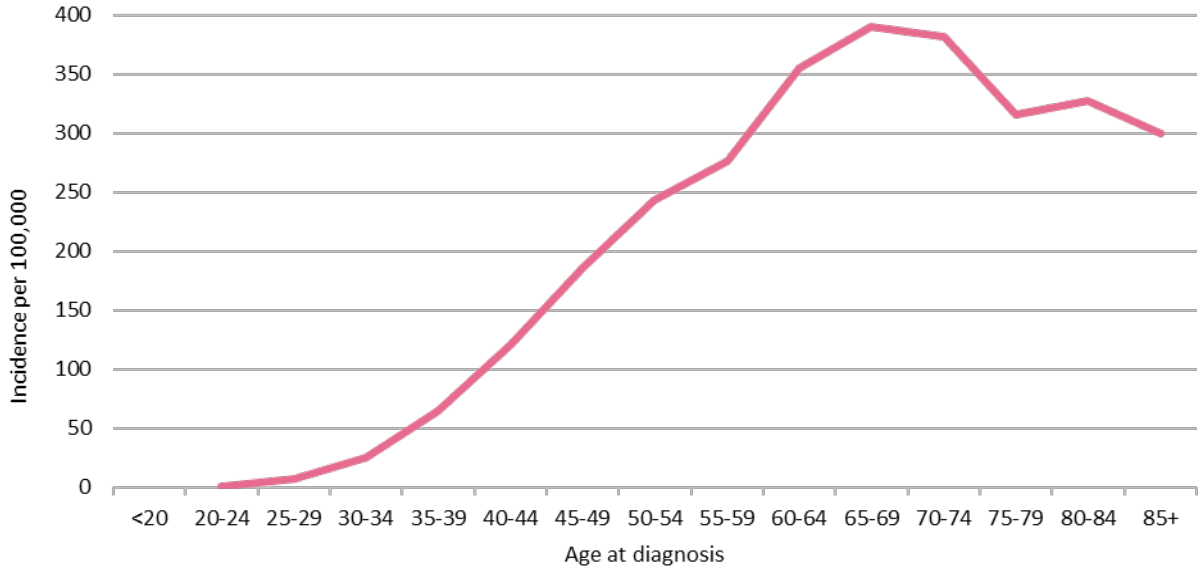
**ASR –Age standardised rate – see appendix*

Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Breast cancer incidence rate per 100,000 increases with age and in 2009 the peak incidence was in women aged 65-69. In all age groups from 70 and over the incidence decreased. The declining incidence from breast cancer in the 7th decade may indicate an effect of mammographic screening, in Queensland the target population for screening is 50 -70 years.

Women aged 50 - 69 accounted for 42% and women aged 40-49 were 10% of the total incidence rate per 100,000. (Figure 9)

Figure 9: Female breast cancer incidence rate per 100,000, by age at diagnosis, Queensland, 2009

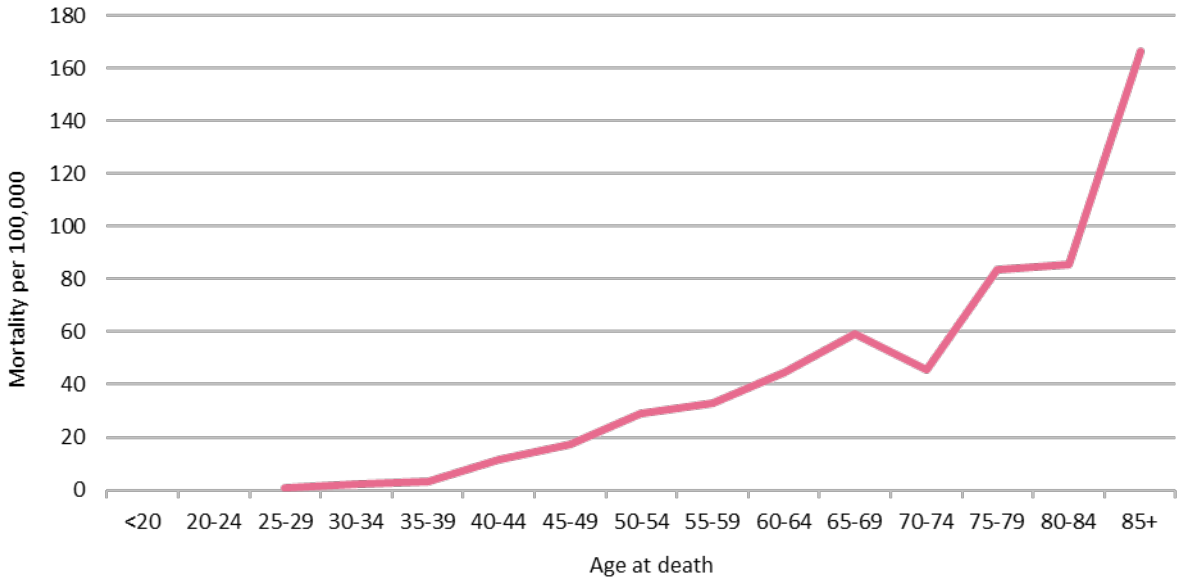


Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Breast cancer mortality rate per 100,000 in 2009, increased with age with the sharpest increase occurring for females aged 75 and over.

57% of deaths due to breast cancer occurred in ages 75 years and over. Deaths are relatively uncommon in women under 50 years of age, accounting for only 6% of all breast cancer deaths. (Figure 10)

Figure 10: Female breast cancer mortality rate per 100,000, by age at death, Queensland, 2009



Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Common types of breast cancer

Breast cancer is not a single disease and comprises of multiple different morphological variants. These morphological variants can be classified according to cell type and tissue architecture, which is referred to as cancer type.

Classifications systems reflecting breast cancer types evolved over many years and had incorporated growth patterns, stromal reactions and even clinical characteristics. The result was a complicated and a confusing list of poorly understood entities. A new and easy to understand WHO Classification of Tumours of the Breast has been released in 2012 and is presented in Table 1. The advantage of using this international consensus on tumour classification is that it allows standardisation of terminology and hence gathering of good epidemiological data relating to tumour incidence as well as the changing trends within and between countries.

In Queensland, the incidence of breast cancer varies by cancer type (Table 1). 99% of diagnosed breast cancers are of epithelial type, this includes Invasive carcinoma - NST (No Special Type), also known as invasive ductal carcinoma which is the most commonly diagnosed type with 78% (9,992 cases) in 2005–2009 followed by invasive lobular carcinoma which accounted for 11% (1,467 cases).

Table 1: Proportion of cancer types of female breast cancer, Queensland, 2005 – 2009

Type of breast cancer	Number of cases	% Epithelial cancers	% All cases
Epithelial Cancers			
Invasive carcinoma - NST	9,992	78	78
Invasive lobular	1,467	11	11
Invasive carcinoma mixed	656	5	5
Tubular and cribriform	177	2	2
Mucinous	215	1.5	1.5
Carcinoma with medullary features	74	0.6	0.6
Carcinoma with apocrine features	16	0.1	0.1
Invasive micropapillary	28	0.2	0.2
Metaplastic	59	0.5	0.5
Carcinoma with neuroendocrine	13	0.1	0.1
Papillary carcinoma (invasive)	41	0.4	0.4
Adenoid cystic carcinoma	9	0.1	0.1
Others/rare types	7	0.1	0.1
Inflammatory carcinoma	10	0.1	0.1
Non Epithelial Malignancy			
Sarcomas (all subtypes)	2		0.1
Phyllodes malignant	20		0.1
Angiosarcoma	7		0.1
Total	**12,793**	**99.7**	**100**

**Caution should be exercised when interpreting these data since changes in morphological variants assessment and coding practices may have affected the above numbers.*

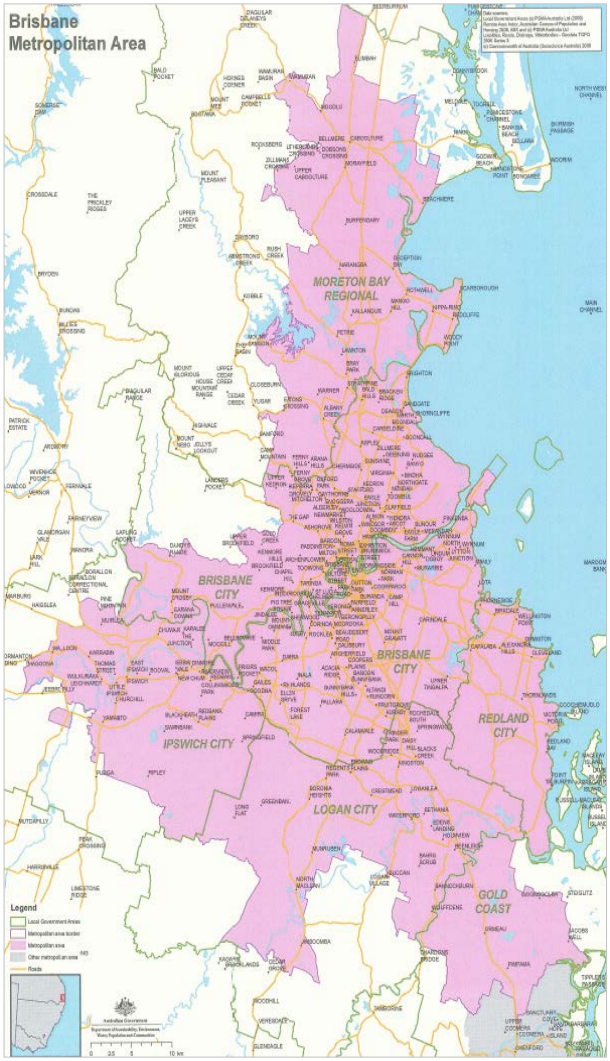
WHO Classification of Tumours of the Breast is the fourth volume to be published as part of the 4th Edition of the WHO Classification of Tumours series. This authoritative, concise reference book provides an international standard for oncologists and pathologists and will serve as an indispensable guide for use in the design of studies monitoring response to therapy and clinical outcome. Lakhani, S.R., Ellis. I.O., Schnitt, S.J., Tan, P.H., van de Vijver, M.J. (Eds). WHO Classification of Tumours of the Breast. IARC, Lyon 2012.

Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Regional, national and international variation in incidence and mortality

In 2012, Queensland had a population of 4,537,721 people of whom 3.6% are indigenous[4]. Queensland encompasses 20% of the national population. About 45% of people live in the Brisbane metropolitan region[6] (Figure 11) and around 66% of the population is located in the South East corner of Queensland which includes Brisbane and Gold Coast.

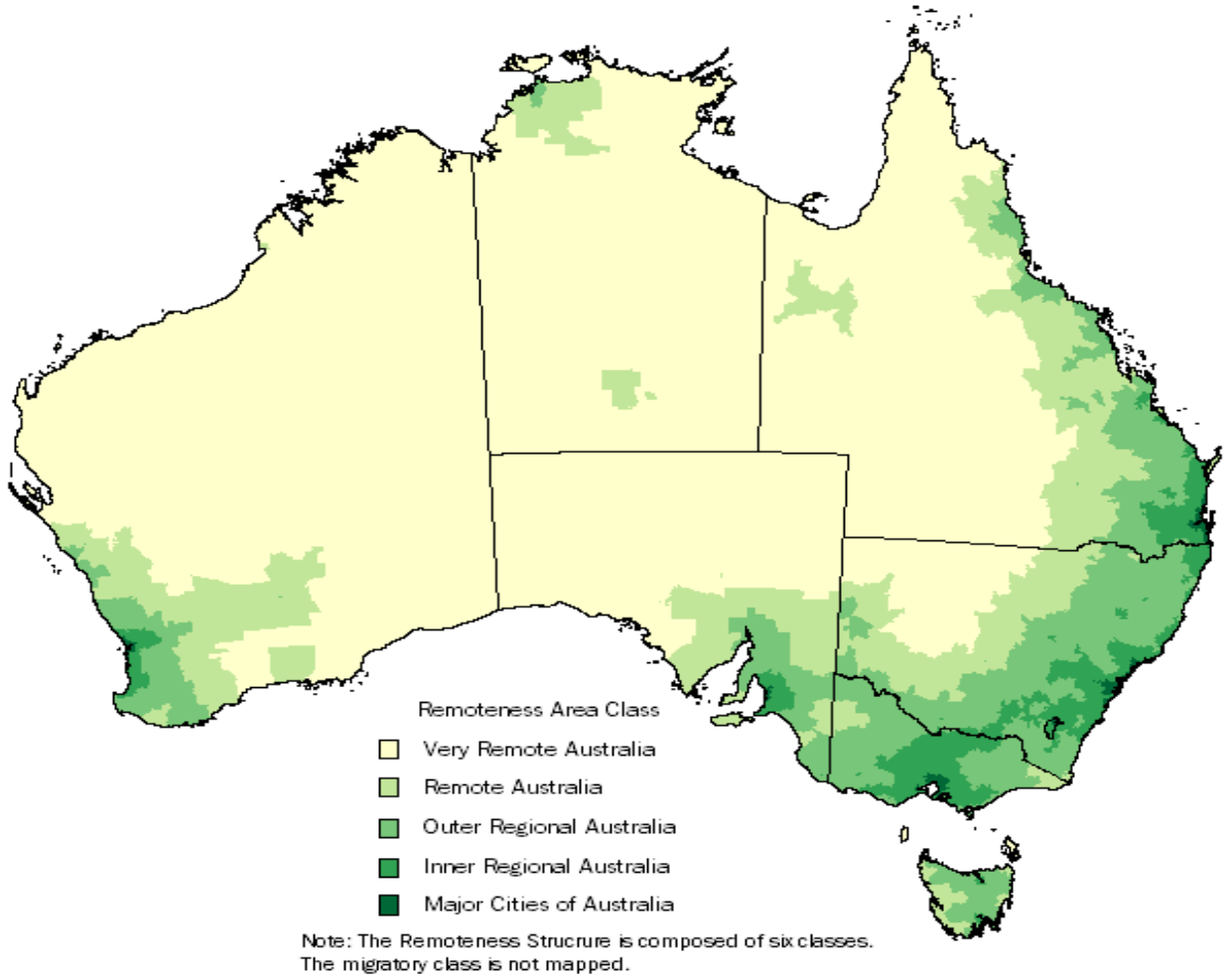
Figure 11: Map of Brisbane Metropolitan area



To compare breast cancer age standardised incidence rates in Queensland according to level of remoteness area of residence at diagnosis, the remoteness is based on the Australian Standard Geographical Classification (ASGC). This classification is used by the Australian Bureau of Statistics (ABS) for the collection and dissemination of geographically classified statistics. (Figure 12)

ASGC methodologies are based on the ARIA+ index (see Appendix). In this report, remoteness is classified into four groups: Major City, Inner Regional, Outer Regional, and Remote & Very Remote. (Remote and Very Remote have been grouped together due to small numbers)

Figure 12: Map of Australia illustrating the 2006 remoteness structure for the ASGC

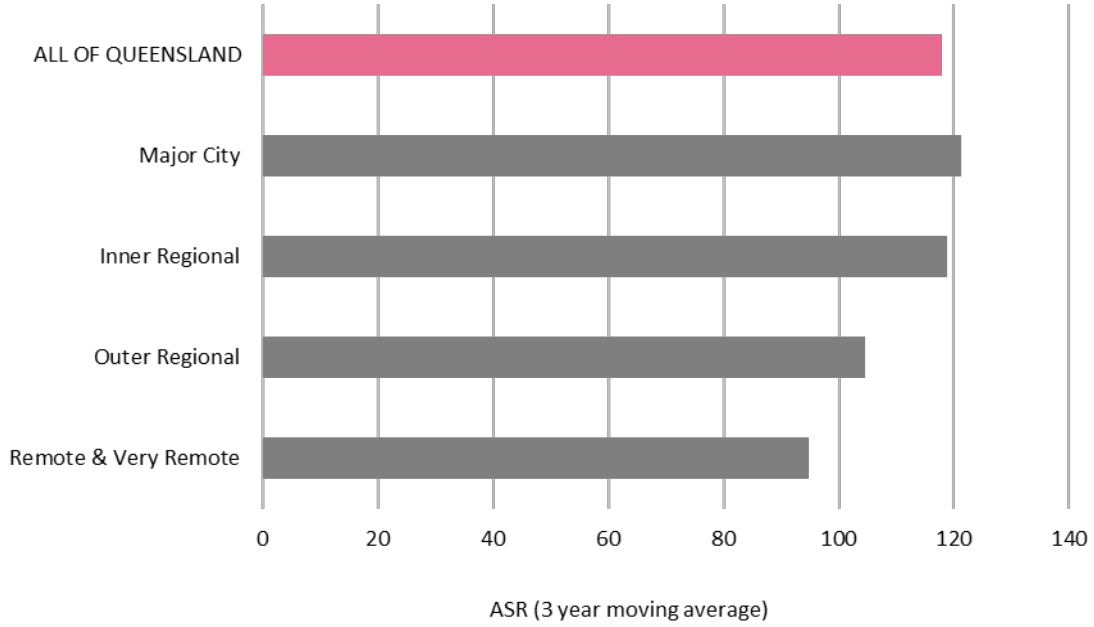


Source: ABS 2011c

Incidence rates for breast cancer tended to decrease with remoteness with 95 cases per 100,000 in remote and very remote areas compared to 121 cases per 100,000 in major cities (Figure 13). The concept of remoteness is not unique to Australia but it does have implications for breast cancer, from early detection in remote communities to the logistics of treatment in these communities. Remoteness is defined as a function of the road distance that people have to travel in order to gain access to services (see Appendix). The further an individual has to travel to access services, the more 'remote' a locality is considered.[9] Such areas typically have a low population density and statistical measures may be unreliable.

Age standardised incidence rates for breast cancer in major cities (121 cases per 100,000) and inner regional areas (118 per 100,000) were not significantly different.

Figure 13: Female breast cancer age-standardised average incidence rates by remoteness of residence, Queensland, 2007-2009



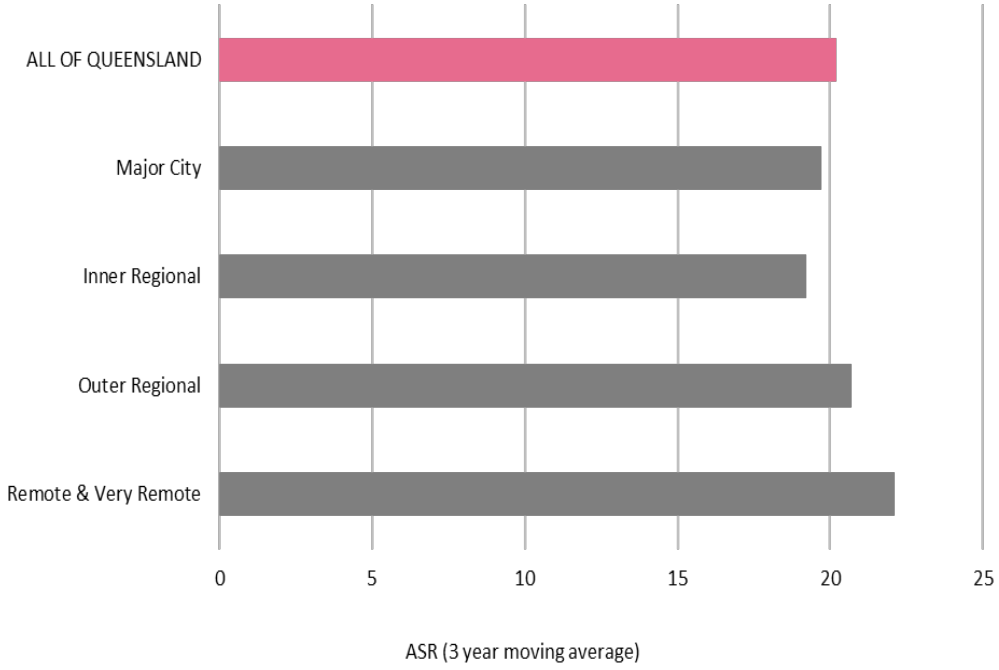
**ASR –age standardised rate – see appendix*

Remoteness: The relative remoteness of residence at time of diagnosis, based on the Australian Standard Geographical Classification (ASGC). This classification is used by the Australian Bureau of Statistics (ABS) for the collection and dissemination of geographically classified statistics.

Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Age standardised mortality rate for breast cancer also varied by remoteness of residence (Figure 14). Inner regional areas had the lowest breast cancer mortality rate (19 deaths per 100,000) and remote and very remote areas had the highest mortality rate overall with 22 deaths per 100,000.

Figure 14: Female breast cancer average age-standardised mortality rates by remoteness of residence, Queensland, 2007-2009



**ASR –age standardised rate – see appendix*

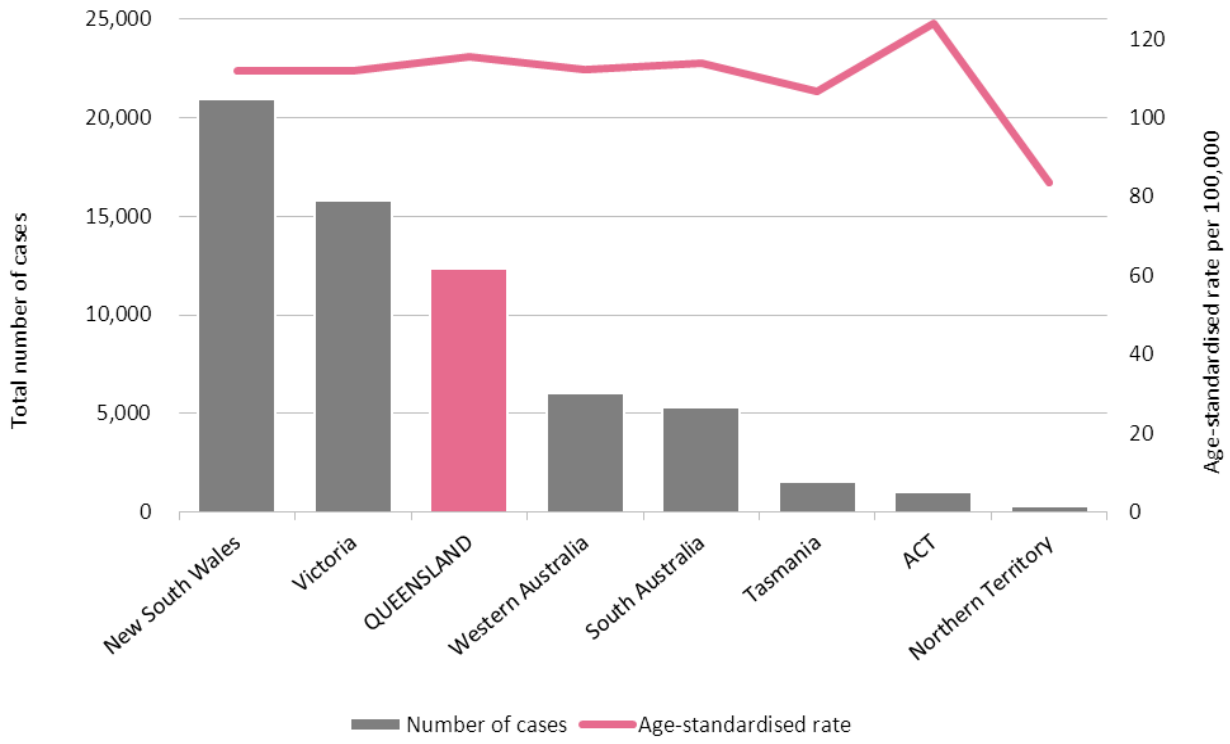
Remoteness: The relative remoteness of residence at time of diagnosis, based on the Australian Standard Geographical Classification (ASGC). This classification is used by the Australian Bureau of Statistics (ABS) for the collection and dissemination of geographically classified statistics.

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

Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Queensland trends for incidence and mortality rates are similar to the national average (Figure 15). In Australia there is a clear relationship between size of the jurisdiction and the number of breast cancers diagnosed.[2] When comparing the number of breast cancer cases diagnosed between 2004-2008, to other States and Territories, Queensland is ranked third with 12,359 cases.

Figure 15: Female breast cancer incidence (total number) and ASR, by State and Territory, 2004-2008



**ASR –Age standardised rate – see appendix*

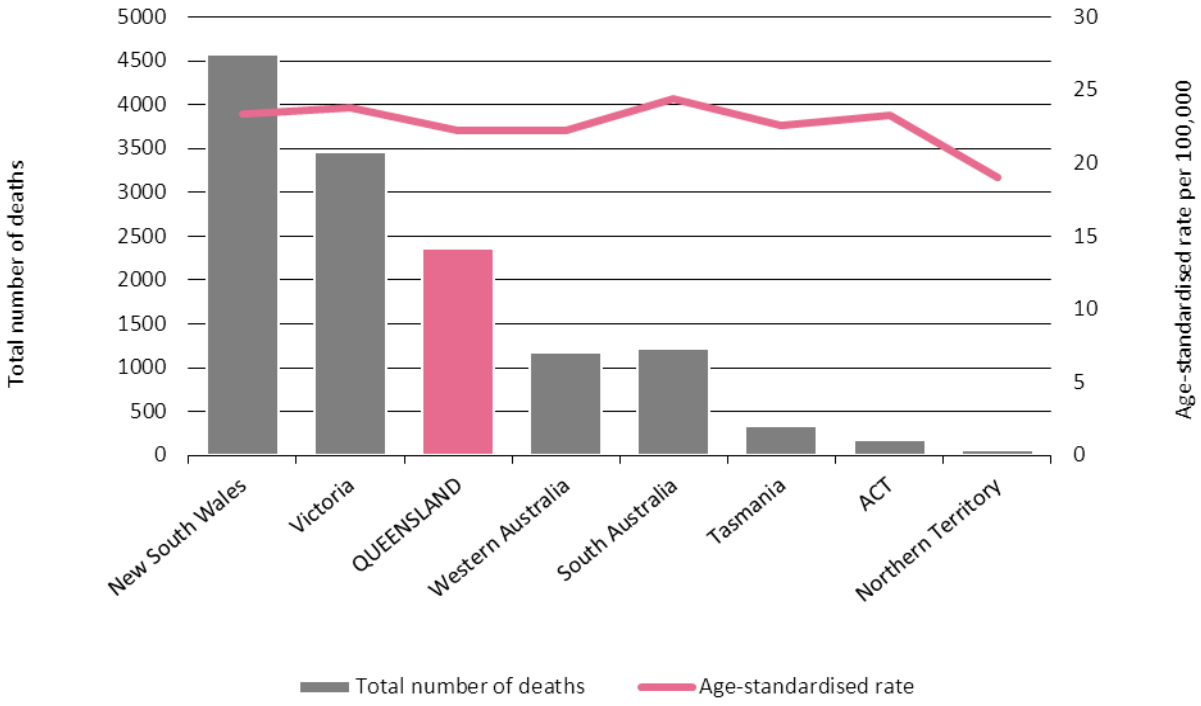
** The lower rate in Northern Territory may be due to the higher proportion of Aboriginal and Torres Strait Islander females residing in the Northern Territory.[2]*

It should be noted that areas with small populations and estimates of rates based on such small numbers may not be as accurate as those for areas with larger populations.

Source: Australian Cancer Database, AIHW 2008. Breast cancer in Australia: an overview, 2012. Cancer series no.71. Cat no. Can 67. Canberra: AIHW

Queensland ranks third when compared to other States and Territories in Australia for total breast cancer mortality. The actual number of deaths between 2003-2007 from breast cancer was 2,367. (Figure 16)

Figure 16: Female breast cancer mortality (total number) and ASR, by State and Territory, 2003-2007



**ASR –Age standardised rate – see appendix*

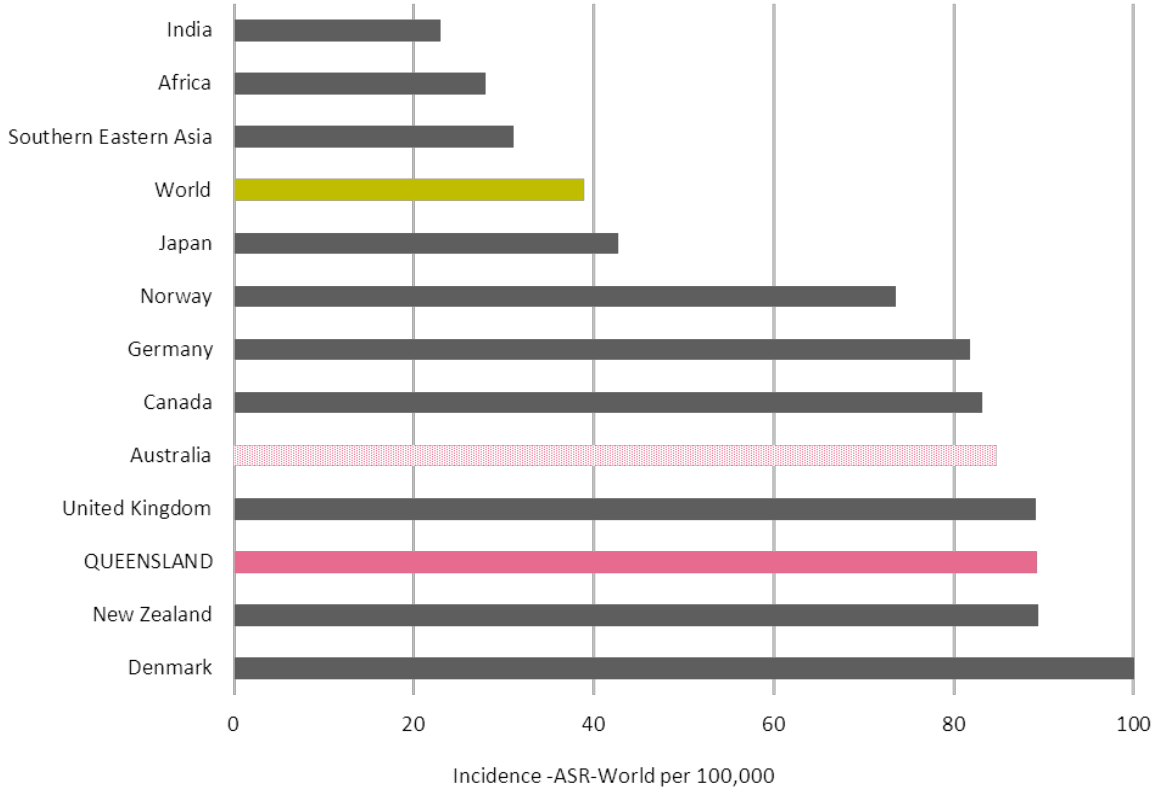
It should be noted that areas with small populations and estimates of rates based on such small numbers may not be as accurate as those for areas with larger populations.

Source: Australian Cancer Database, AIHW 2008. Breast cancer in Australia: an overview, 2012. Cancer series no.71. Cat no. Can 67. Canberra: AIHW

Worldwide, breast cancer is by far the most common cancer among women, with an estimated 1.38 million new cancers diagnosed in 2008 (23% of all cancers).[5]

In this section, the incidence rate of breast cancer is compared with that for other countries with the rates age standardised to the World Standard Population (1966), which is different from the Australian age standardised rate. Figure 17 shows that incidence for the whole of Australia (85 cases per 100,000) is lower than the rate for Denmark, New Zealand and the United Kingdom: however Australian incidence rate is similar to that for Canada and Germany. The Queensland incidence rate is slightly higher than that for Australia as a whole. Large differences in incidence exist internationally: for example Queensland incidence (89 cases per 100,000) is more than twice the incidence compared to the incidence in Japan (43 cases per 100,000).

Figure 17: Female breast cancer incidence age-standardised rate for selected international regions and Queensland, 2008

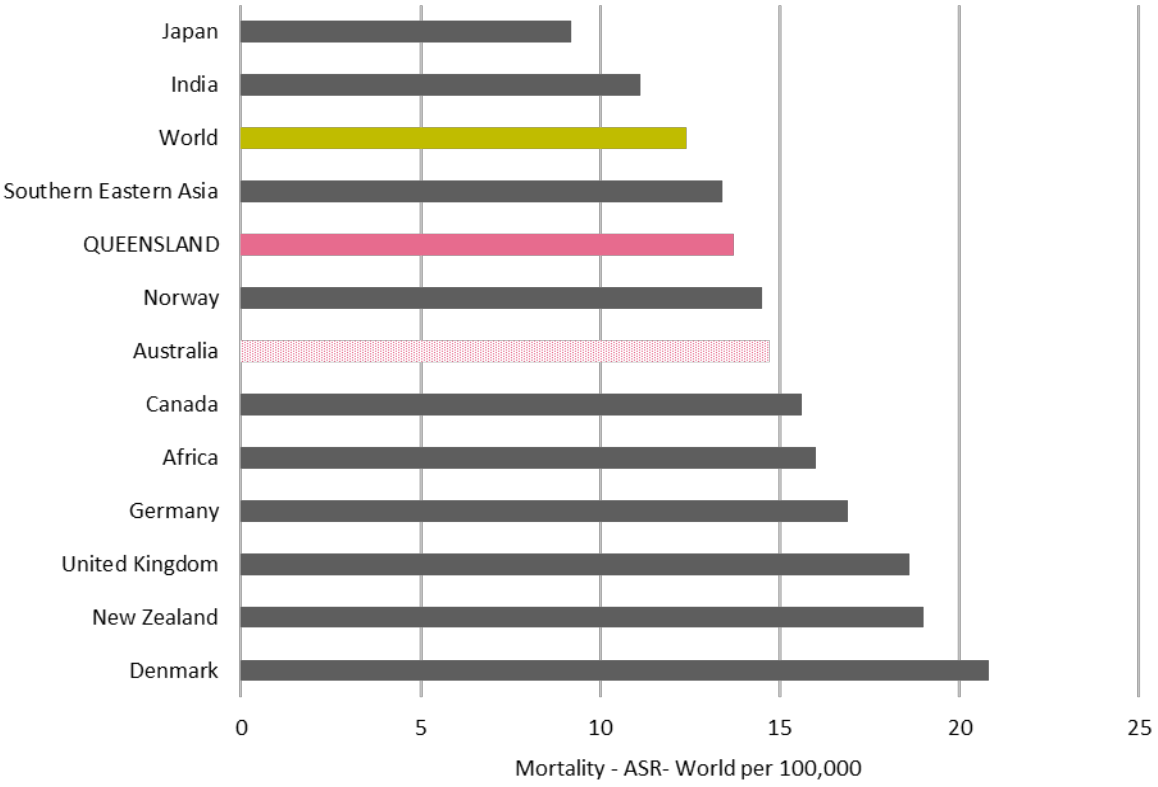


Note: Cancer incidence estimated by the International Agency for Research on Cancer (IARC) for 2008 (GLOBOCAN 2008) except for Queensland which sourced from Oncology Analysis System, Queensland Cancer Control Analysis Team

The mortality rate for breast cancer in Queensland is among the lowest in the western world and substantially lower than the United Kingdom and New Zealand. (Figure 18)

Worldwide variation in mortality rates is much less (approximately 9 - 21 per 100,000) than for incidence (Figure 17) possibly reflecting the universal benefit of treatment in detected cases. In Australia breast cancer ranks as the fifth cause of all deaths (458,000 deaths) but it is still the most frequent cause of cancer death in women.[5] The age-standardised mortality rate for breast cancer in Queensland is low with 14 cases per 100,000 and is similar to rates for Norway. Compared to Queensland mortality rates are higher in New Zealand and Denmark and lower in Asian countries with 9 in every 100,000 dying from the disease in Japan (Figure 18).

Figure 18: Female breast cancer mortality age-standardised rate for selected international regions and Queensland, 2008



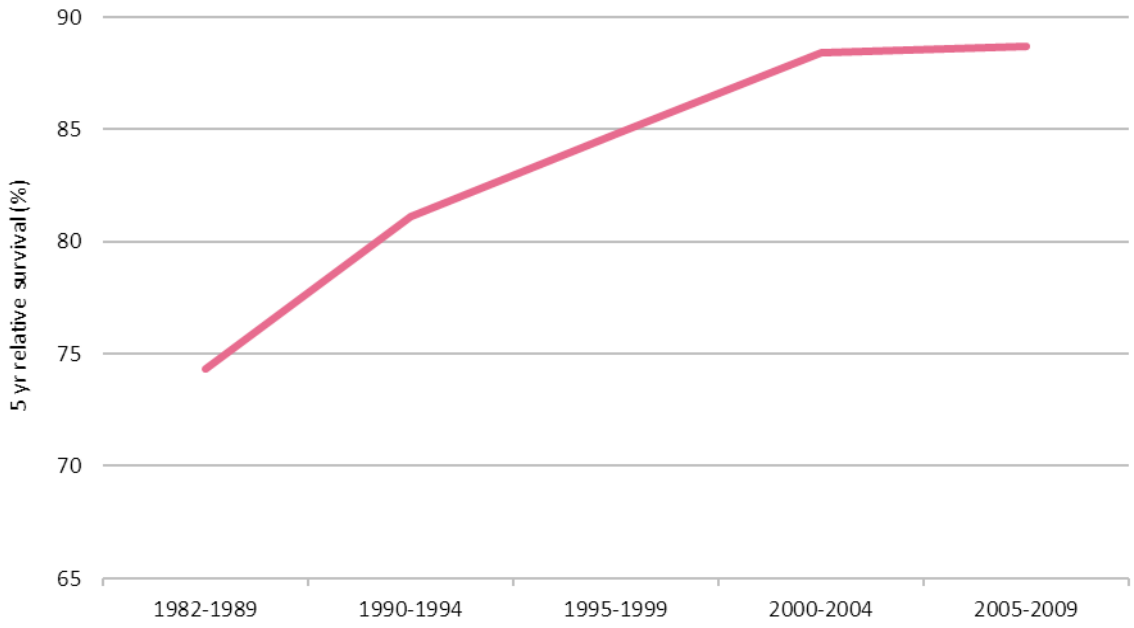
Note: Cancer incidence estimated by the International Agency for Research on Cancer (IARC) for 2008 (GLOBOCAN 2008) except for Queensland which sourced from Oncology Analysis System, Queensland Cancer Control Analysis Team

Relative 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. Five-year relative survival represents the proportion of patients alive five years after diagnosis, taking into account age, gender and year of diagnosis.[1]

In Queensland about 89% of females diagnosed with breast cancer will now survive for at least five years. Relative survival has improved from 74% in 1982 to 89% in 2009. (Figure 19)

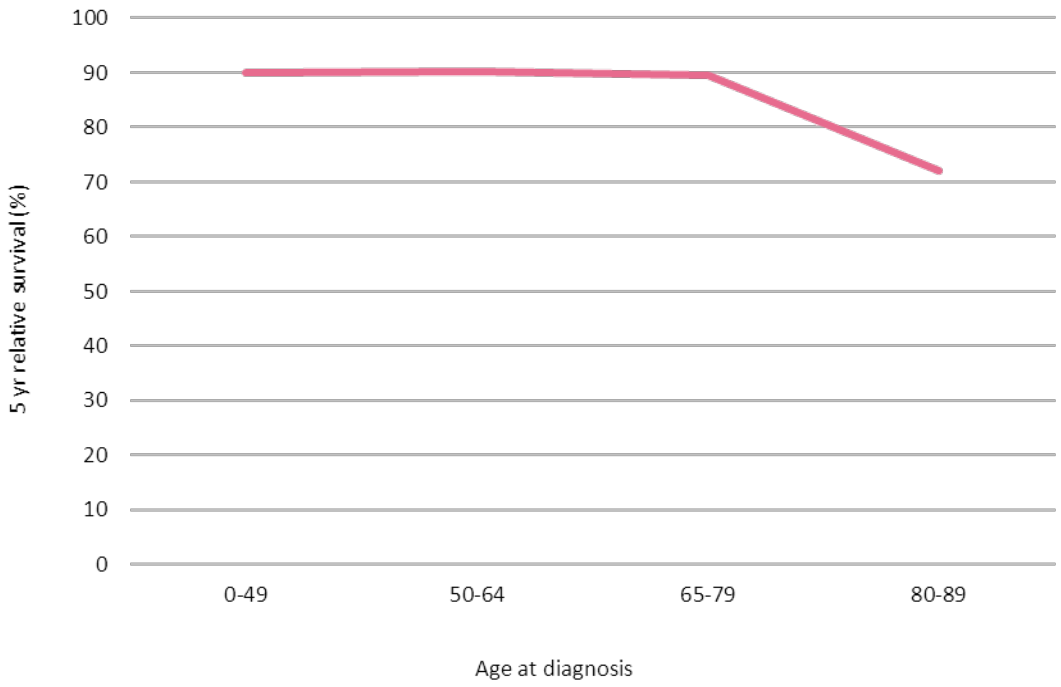
Figure 19: Five-year relative survival, Female breast cancer, Queensland, 1982 - 2009



Source: Queensland Cancer Statistics On-Line, 2012. Viertel Centre for Research in Cancer Control, Cancer Council Queensland (www.cancerqld.org.au/research/qcsol). Based on data released by the Queensland Cancer Registry (1982-2009; released July 2012)

The 5-year relative survival rate in Queensland is highest among women diagnosed with breast cancer in aged 50-64 (90.2%). For those women aged 70 and over, 5-year survival is significantly lower than the middle aged. (Figure 20)

Figure 20: Five-year relative survival, Female breast cancer, age at diagnosis, Queensland, 2005 - 2009



Source: Queensland Cancer Statistics On-Line, 2012. Viertel Centre for Research in Cancer Control, Cancer Council Queensland (www.cancerqld.org.au/research/qcsol). Based on data released by the Queensland Cancer Registry (1982-2009; released July 2012)

Part 3

Breast Cancer by Hospital and Health Service

In this section an overview of incidence and mortality for women diagnosed with breast cancer is presented for each of the sixteen Hospital and Health Services. (Figure 21)

Figure 21: Hospital and Health Services by Queensland Health Hospitals, June 2012

Patient characteristics

The median age for breast cancer patients is 59, ranging from 53 - 61 years across the Hospital and Health Services (HHS's) (Table 2).

The majority of breast cancer patients reside in Metro South and Metro North (Brisbane metropolitan districts see Figure 11). These two HHS's contribute 42% of the total breast cancer incidence. Gold Coast and Sunshine Coast account for a further 23% of the total breast cancer incidence.

Approximately 3.6% of Queensland females self-identify as Indigenous.[3] 1% of all women diagnosed with breast cancer is Indigenous. Cape York and Torres Strait-Northern Peninsula HHS districts contribute the highest percent of indigenous females diagnosed with breast cancer. More than half of the resident population of these HHS districts are Indigenous Australians.

The socioeconomic status data presented in Table 2 pertains to the area in which breast cancer patients lived. 71% of cases diagnosed with breast cancer fall within the middle status group. Queensland follows trends in research that has shown breast cancer incidence was likely to be high in areas within major cities, except those that were most disadvantaged and inner regional areas that were most advantaged were also likely to have high incidence.[7]

Table 2: Queensland female breast cancer patients by Hospital and Health Service district, 2007 – 2009

HHS	Incidence Annual Avg.	Median Age	% Indigenous	Socioeconomic Status		
				% Affluent	% Middle	% Disadvantaged
Major City						
Metro South	584	58	0.9	30	60	10
Metro North	557	59	0.3	41	54	5
Outer Regional						
Cairns and Hinterland	136	58	4		86	15
Mackay	68	59	0.5		92	8
Townsville	119	58	4	13	72	15
Darling Downs	170	61	2	5	75	20
Central Queensland	126	58	2		96	4
Wide Bay	143	61	1		39	61
Inner Regional						
Sunshine Coast	270	61	0.1		94	6
Gold Coast	333	60	0.1	11	89	
West Moreton	123	61	0.8	4	89	7
Remote & Very Remote						
Cape York	2	53	57		50	50
Torres Strait-Northern Peninsula	2	53	66			100
South West	13	60	5		85	15
Central West	8	54	0		75	25
North West	11	58	16		82	8
Queensland	**2,679**	**59**	**1**	**18**	**71**	**11**

**Shading indicates HHS which have more than 20% disadvantaged individuals (Australian standard).*

It should be noted that remote Hospital and Health Services have small populations and estimates of rates based on such small numbers may not be as accurate as those for areas with larger populations.

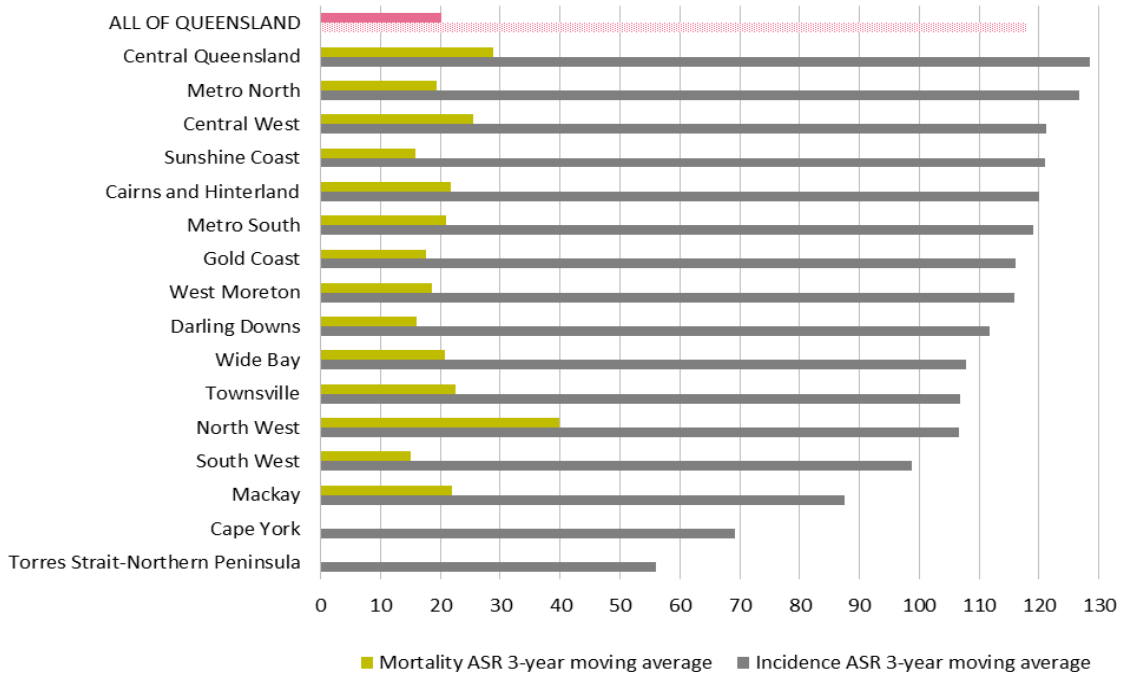
Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Incidence and mortality

Breast cancer age standardised 3 year moving average incidence rates are highest in the Central Queensland and Metro North HHS and the lowest in the Cape York and Torres Strait-Northern Peninsula where there is a high indigenous population.(Figure 22).

Hospital and Health Services age standardised 3 year moving average mortality rates vary across the state. The rate is highest in the outer regional and remote Hospital and Health Services, accounting for 49% of the state's mortality (Figure 22). Reasons for the variations are diverse and complex and include exposure to environmental factors, socioeconomic status, and access to health services.

Figure 22: Breast cancer ASR 3-yr moving average incidence and mortality by Hospital and Health Services, Queensland, 2007-2009



**ASR –Age standardised rate – see appendix*

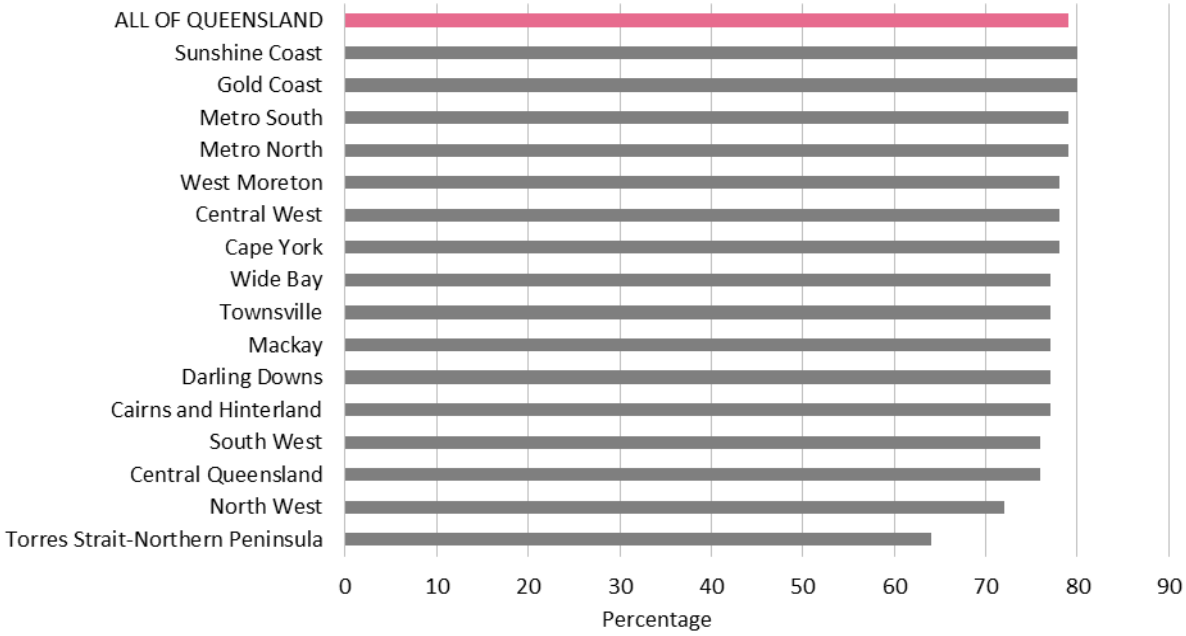
It should be noted that remote Hospital and Health Services have small populations and estimates of mortality rates based on such small numbers may not be as accurate as those for areas with larger populations.

Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Survival

Crude survival (all cause deaths) is the lowest in the remote HHS's of Torres Strait - Northern Peninsula (64%) and North West (72%). Throughout the other HHS's ***crude survival*** ranged from 76% to 80% for women 5 years after diagnosis with cancer, Sunshine Coast and Gold Coast having the highest survival rate (80%).

Figure 23: Breast cancer crude survival by Hospital and Health Services, Queensland, 1982 – 2009



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.

Source: Oncology Analysis System, Queensland Cancer Control Analysis Team

Appendix

Sources of data

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 2009. The database includes inpatient data for public and private admissions and information systems for radiation oncology, pharmacy and pathology. 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

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 resulting in rates which differ from those of Australian ASR's.

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.

All-cause crude survival

All-cause crude survival: the percentage of cancer cases still alive after a specified period of time from diagnosis.

Growth in new cases

The four components of the incidence are calculated as follows:

1. The number of **New Cases Baseline** is simply the raw number of new cancer cases in 1982.

2. The number of **New Cases due to Population** represents the additional number of cases that would have occurred each year if the population grew larger but *did not grow older* relative to the 1982 age distribution.

   To calculate this number for 2009, the age distribution of the 1982 population is first applied to the total 2009 population to get the hypothetical age-specific populations in 2009 if only the total population, but not the age structure, had changed. This hypothetical population is then multiplied by the actual age-specific rates in 2009 and summed over all age groups. The number of New Cases Due to Population is the difference between this sum and the New Cases Baseline from 1982.

3. The number of **New Cases due to Cancer Rate** represents the additional number of cases that would have occurred each year if only the rates changed, but the population*, with its underlying age structure*, remained exactly the same as it was in 1982.

   To calculate this hypothetical figure for 2009, the age-specific rates from 2009 are first multiplied by the corresponding age-specific population from 1982 (e.g. the 2009 rate for 50-54 year-olds is multiplied by the 50-54 year-old population in 1982) The products are then summed over all age groups and the difference between this sum and the total 1982 incidence (New Cases Baseline) is calculated.

4. The number of **New Cases due to Ageing** is simply the difference between the total actual incidence for a given year and the sum of the three numbers above.

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 districts.

Incidence (new cases)

The number of new cases of cancer diagnosed in a defined population during a specified time period. For example, 2009 incidence is the number of cancers which were first diagnosed between 1 January 2009 and 31 December 2009.

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.

Relative 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.

Remoteness

The relative remoteness of residence at time of diagnosis, based on the Australian Standard Geographical Classification (ASGC). This classification is used by the Australian Bureau of Statistics (ABS).

Accessibility/ Remoteness Index of Australia (ARIA)

ARIA is an index developed by the National Centre for Social Applications of Geographical Information Systems (GISCA) for the Australian Government. The ARIA index and its variants (ARIA, ARIA+ and ARIA++ and the state based ARIAs) make operational the concept of 'remoteness' in a purely geographical sense. Remoteness is defined as a function of the road distance that people have to travel in order to gain access to services. The further an individual has to travel to access services, the more 'remote' a locality is considered.

Distances are defined in terms of distances from all the relevant geographic locations in the state/country to 'services centres'. Services centres of different sizes are defined and the distance a particular geographic location is to the nearest service centres of each size is calculated. The ARIA service centre categories are described in the table below. The classification of service centres in this way reflects the first assumption adopted in constructing the ARIA indices, that the population size of a locality is a proxy for service availability.[9]

ARIA services centres

Category	Population size	ARIA index	Average distance (km)
A	250,000 persons or more	ARIA, ARIA+ & ARIA++	275.7
B	48,000 – 249,999 persons	ARIA, ARIA+ & ARIA++	213.6
C	18,000 – 47,999 persons	ARIA, ARIA+ & ARIA ++	82.7
D	5,000 – 17,999 persons	ARIA, ARIA+ & ARIA++	45.5
E	1,000 – 4,999 persons	ARIA+ & ARIA++	24.1
F	200 – 999 Persons	ARIA++	16.5

Source: GISCA 2008

Relevant data are assembled giving the road distance from each geographic location and each service centre. The distance between a locality and each type of service centre is expressed as a ratio. For example, if the distance from a particular locality and the nearest category A service centre is 300 km, and the average distance between localities and that category A service centres is 280 km, then a ratio of 300/280 or 1.07 would be calculated. These ratios are trimmed at 3.00. One assumption applied is that access to larger service centres 'dominates' access to smaller service centres. For example, if the road distance from a particular locality to a category B service centre is greater than the distance to a category A service centre, the distance to the Category A service centre is applied to both category A and B.[9]

For the ARIA+ index ratios for distances to the six service centre types are then summed (which gives equal weight for distances to each service centre category), to give a score that ranges from 0 to 18. (The original ARIA index had a range of 0-12.) This approach reflects the second main assumption used in constructing the ARIA indices, that road distance (or its equivalent weighted measure for islands) is a measure of access. The resulting ARIA scores are assigned to relevant localities, specifically collection districts (CDs). The CD is the smallest spatial unit in the ASGC, traditionally representing the area that one census data collector could cover. For the 2006 Census, 38,704 CDs were defined throughout Australia.[9]

A remoteness classification based on the original ARIA index identified five remoteness groups.

Structure of ARIA+ classification

Grouping	Code	ARIA range
Highly accessible	HA	0–1.84
Accessible	A	>1.84–3.51
Moderately accessible	MA	>3.51–5.80
Remote	R	>5.80–9.08
Very remote	VR	>9.08

Source: AIHW 2004

ASGC Remoteness Areas

Since 2001, the Australian Bureau of Statistics (ABS) has used the ARIA index (initially ARIA+) to classify ABS CDs into Remoteness Areas (RAs) under the ASGC. ASGC-RAs also use ARIA+ index (rather than ARIA), but uses alternative cut off points.[9]

Structure of ASGC Remoteness Areas (RA) classification

Grouping	Code	ARIA+ range
Major cities	RA1	0–0.2
Inner regional	RA2	> 0.2 - 2.4
Outer regional	RA3	>2.4–5.92
Remote	RA4	>5.92–10.53
Very remote	RA5	>10.53

Source: AIHW 2004

Socioeconomic Status

The 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).

More on the QCCAT website

Go to https://qccat.health.qld.gov.au

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Use the Full Citation in journal articles or reports with a separate Reference section. Use the Abbreviated Citation at the bottom of graphs or tables in slides or reports where a separate Reference section is not provided.

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