

Atlas of cancer in Queensland

Geographical variation in incidence and survival **1998-2007**



50
YEARS OF
HOPE

FOR A CANCER FREE FUTURE



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Geographical variation in incidence
and survival **1998-2007**

February 2011

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ISBN: 978-1-876360-17-7

Suggested citation:

Cramb SM, Mengersen KL, Baade PD. *Atlas of Cancer in Queensland: geographical variation in incidence and survival, 1998 to 2007*. Viertel Centre for Research in Cancer Control, Cancer Council Queensland. Brisbane, Queensland: 2011.

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Acknowledgements

The work of the staff of Cancer Council Queensland, working in the Queensland Cancer Registry, is acknowledged and appreciated. Without their effort in providing accurate and timely data, this publication would not have been possible.

The statistical and methodological advice received from Prof Toshiro Tango, Lesley Fairley, Assoc Prof Paul Dickman and Dr Paul Lambert is also gratefully acknowledged.

The cover and full report was designed by Mr Matthew Stammers and Ms Soraya Franklin.

In addition to colleagues at the Cancer Council Queensland, Dr Euan Walpole, Prof Bryan Burmeister and Ms Leonie Young who provided advice and feedback on this report, the authors also wish to thank the review panel for their valuable input:

- A/Prof Freddy Sitas, Director, Cancer Research Division, Cancer Epidemiology Research Unit, Cancer Council New South Wales.
- Prof Joanne Aitken, Director of Cancer Registries and Scientific Consultant Epidemiology, Viertel Centre for Research in Cancer Control, Cancer Council Queensland.
- Ms Narelle Mullan, Project Coordinator – Spatial Health Demonstrator Epidemiology Branch, Public Health Division, Department of Health, Western Australia.

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Foreword

50 years of hope

In 1961, a small group of concerned people set forth with a mission to do something about cancer in Queensland, by forming what was originally known as the Queensland Cancer Fund.

Many feared cancer more than any other disease, knowing that the fight for survival could be unpredictable and painful. Many endured their diagnosis alone, afraid to tell loved ones and friends.

We have come a long way since then.

Today, our fight against cancer is one of hope, inspired by the rapid pace of research and compelled by community concern for those affected. Today, cancer patients are much less likely to suffer the indignity, anxiety, and distress of being stigmatized.

I am proud to say that Cancer Council Queensland is with them every step of the way, and has been for 50 years.

Much has changed in that time. In 1961 there were about 1.5 million people living in Queensland, compared to 4.5 million people today. We have no way of knowing how many people were diagnosed with cancer in 1961, but we estimate there may have been about 5,000 Queenslanders newly diagnosed with cancer in 1961.

Since the inception of the Queensland Cancer Registry in 1982, we have vastly improved our capacity to monitor cancer incidence and mortality in Queensland, providing researchers with the data they need to investigate the causes of and possible treatments for cancer. The data also provides a source for comparison of local, national and international cancer trends, informing the development of cancer services. The information collected by the Queensland Cancer Registry is fundamental to understanding the cancer burden in our State and for planning the delivery of comprehensive and integrated cancer services.

And the need has never been so great, with well over 21,000 new diagnoses each year and forecasts that more than 30,000 Queenslanders will be newly diagnosed each year by 2016. Despite this, we can take reassurance from the fact that cancer survival rates have increased, in relative terms, by more than 30 per cent over the past twenty years. With continuing research, awareness and support, we can be confidently optimistic that survival rates will continue to improve.

The publication of the first Atlas of Cancer in Queensland is a historic milestone for cancer control in Queensland. This Atlas is significant for its contribution to our understanding of how cancer incidence and survival affects Queenslanders differently depending on where a person lives. It showcases how far we have come and provides an inspiring reminder that we have more work to do.

The first Atlas of Cancer in Queensland is dedicated to the many thousands of Queenslanders who have been involved in our work over the years and to the estimated 160,000 Queenslanders who are alive today after a cancer diagnosis.

Thank you for being a part of our vision for a cancer free Queensland.

Warm regards,



Professor Jeff Dunn

List of Abbreviations

ABS	Australian Bureau of Statistics
ARIA	Accessibility / Remoteness Index of Australia
ASGC	Australian Standard Geographical Classification
BYM	Besag, York and Mollié
CAR	Conditional AutoRegressive
CCQ	Cancer Council Queensland
CI	Credible Interval
DIC	Deviance Information Criterion
ICD-O3	International Classification of Diseases for Oncology, 3rd edition
IQR	Interquartile Range
IRSAD	Index of Relative Socioeconomic Advantage and Disadvantage
LGA	Local Government Area
MCMC	Markov Chain Monte Carlo
MEET	Maximised Excess Events Test
NSW	New South Wales
PSA	Prostate-Specific Antigen
QCR	Queensland Cancer Registry
RER	Relative Excess Risk of death
SEIFA	Socioeconomic Indexes for Areas
SES	Socioeconomic Status
SIR	Standardised Incidence Ratio
SLA	Statistical Local Area

Executive Summary

An understanding of spatial patterns of cancer helps health planners, service providers, other health professionals and the general public to assess current needs and understand the relative health burdens caused by each type of cancer. While there were many advances in health care during the 20th century, these benefits have not been shared equally across all population subgroups, particularly for people living in rural and disadvantaged areas.

This report describes the variation in cancer incidence and survival across small geographical areas (defined by Statistical Local Areas) in Queensland. Maps for incidence and survival are provided separately for males and females for all invasive cancers combined and the 18 most common cancers. This is an update and extension to an earlier Cancer Council Queensland publication examining geographic differentials in cancer incidence and survival in Queensland.¹

Two important considerations when dealing with data from small geographical areas are confidentiality and possible spurious fluctuations due to small numbers. Bayesian hierarchical models were used to assess variation across areas; these models are specifically designed to produce more robust and reliable estimates by “borrowing” information from surrounding geographical areas. In addition, to preserve confidentiality, no information about the number of cancer cases in each geographical area is provided in this report; instead emphasis is placed on the overall patterns of variation across the State. Cancer data were obtained from the Queensland Cancer Registry following specific approval from Queensland Health.

Variations in cancer incidence and survival may be caused by a range of factors, including environmental factors, access to screening and diagnostic services, access to effective treatment and care, migration of cancer patients, the mix of cancer types present in that region, or even chance. This *Atlas of Cancer in Queensland* focuses specifically on describing the variation in incidence and survival; identifying the causes behind any variation is beyond the scope of this report, but remains the focus of other current and planned research efforts.

Strong evidence of geographical variation was found in the incidence of all invasive cancers (males and females), specifically oesophageal cancer (males), lung cancer (males and females), melanoma (males and females), breast cancer (females), uterine cancer (females), prostate cancer (males), kidney cancer

(males), bladder cancer (males), thyroid cancer (females), and non-Hodgkin lymphoma (males and females). In addition there was moderate evidence of geographical variation across Queensland for the incidence of leukaemia (males and females) and cervical cancer (females).

The direction of the variation in incidence rates across socioeconomic and rurality categories differed by type of cancer. For some cancers, such as prostate and breast, the incidence was higher than the Queensland average in urban or affluent areas, while for others, such as lung, oesophageal and cervical cancers, incidence was higher in more remote or disadvantaged areas compared to the State average.

There was also strong evidence for geographical variation across Queensland in survival for all invasive cancers (males and females), in particular for colorectal cancer (males and females), lung cancer (males and females), breast cancer (females), prostate cancer (males) and non-Hodgkin lymphoma (females). In addition there was moderate evidence of geographical variation among males for stomach cancer, non-Hodgkin lymphoma and leukaemia.

The typical pattern was for there to be lower survival among cancer patients living in more rural or disadvantaged areas compared to the Queensland average. If survival outcomes in these areas were raised to the current Queensland average, an estimated 1,223 cancer-related deaths within five years of diagnosis (795 males, 428 females) could have been prevented. This represents 9% of cancer related deaths during this period (similar for males and females).

This *Atlas of Cancer in Queensland* is the first to systematically present cancer incidence and survival maps for Queensland at such a comprehensive level. It is hoped that this report will stimulate the generation of further research hypotheses about the possible causes of these variations in cancer outcomes and enable targeted resource allocation to improve detection and survival outcomes for cancer patients in this State.