

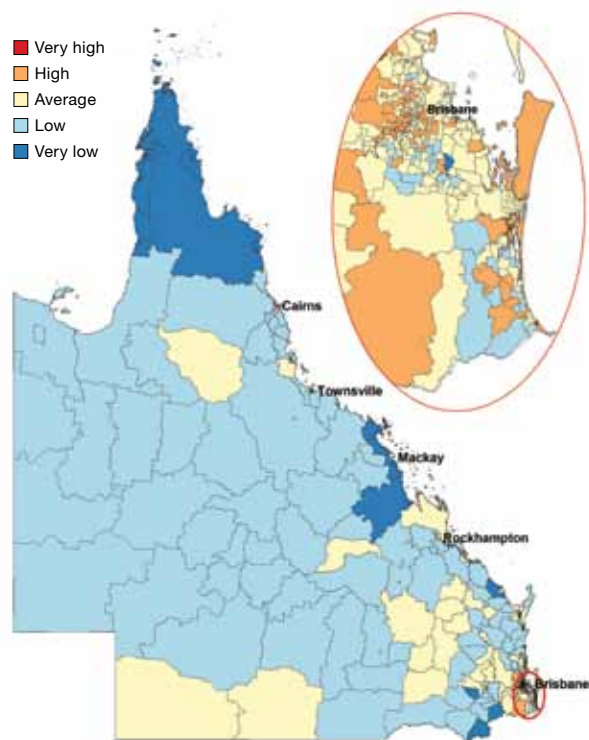
While there have been many improvements in health during the 20th century, these improvements have not been shared equally, and some population groups continue to have poorer health.

One key step towards reducing these differences is to better understand where the disparities are. The recently released report *Atlas of Cancer in Queensland: geographical variation in incidence and survival, 1998 to 2007*, provides a comprehensive picture of how cancer incidence and survival varies across the 478 statistical local areas in Queensland, based on the latest available data released by the Queensland Cancer Registry. To provide reliable estimates, data were modelled using what is

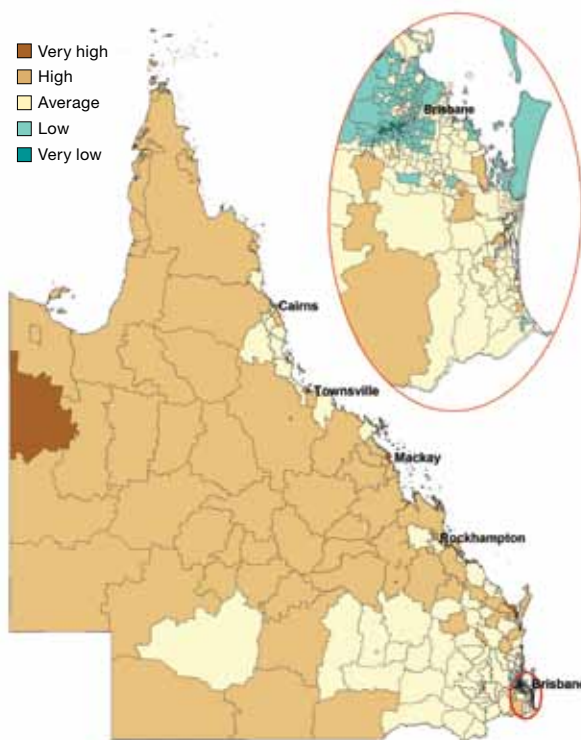
known as Bayesian hierarchical methods, which adjust estimates for specific areas based on the number of cases and the estimates for surrounding areas. Thematic maps for incidence and survival are provided for males and females separately across a range of common cancers, including all invasive cancers combined. An example of the maps is shown in Figure 1, which demonstrates the variation in incidence and survival for breast cancer among females.

**Figure 1: Variation in breast cancer outcomes among females**

### Risk of diagnosis



### Risk of death within five years of diagnosis



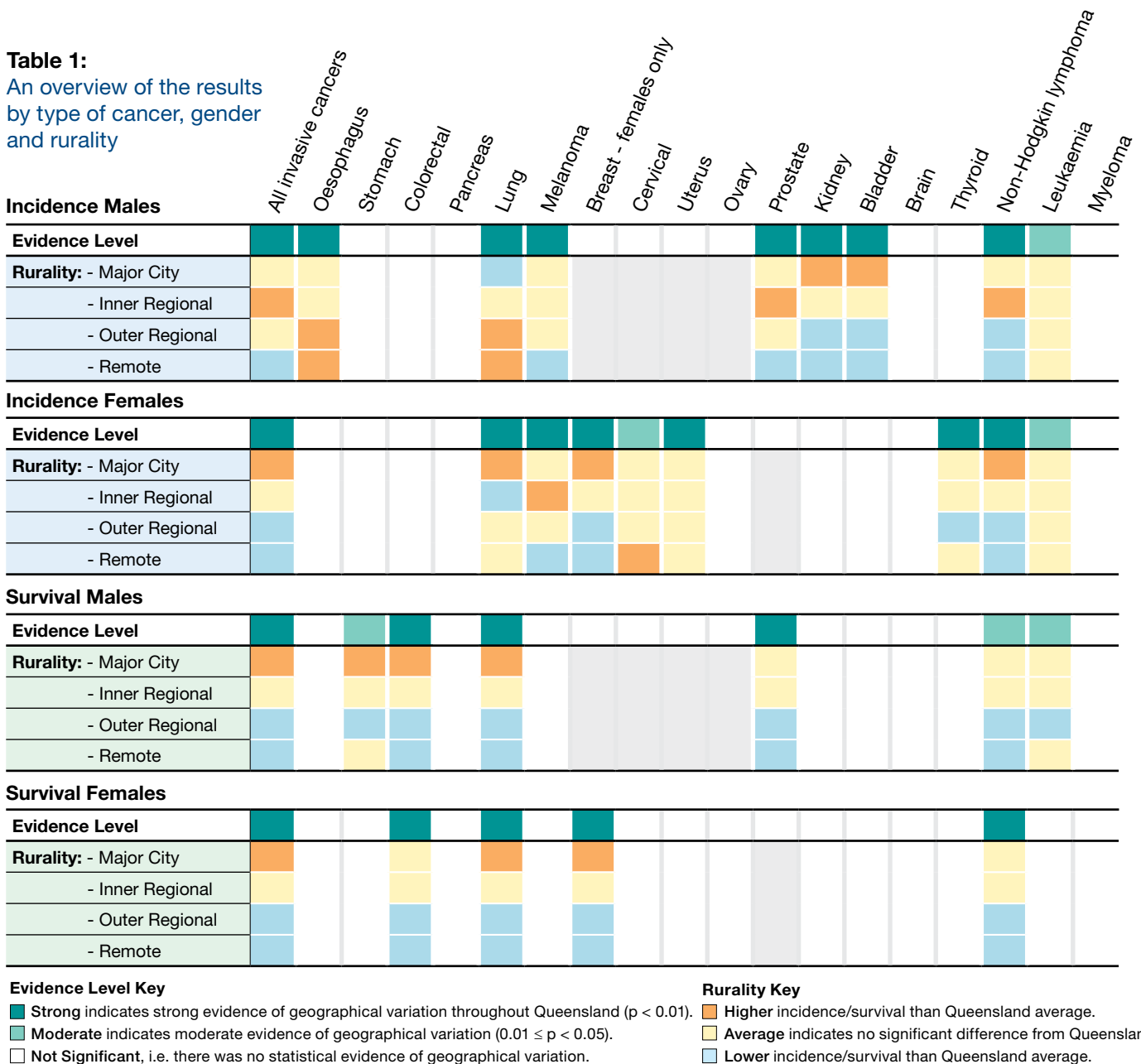
### Incidence

Variation in incidence was observed for many cancers (Table 1). For most of these cancers, the difference was due to higher incidence in more urban areas and/or lower incidence in more remote areas. These cancers included all invasive cancers combined (males and females), melanoma (males and females), breast (females), prostate, kidney (males), bladder (males), thyroid (females) and non-Hodgkin lymphoma (males and females). Leukaemia tended to have lower incidence in remote areas among males and females, but this was not a clear pattern. In contrast, there were some cancers that had a higher incidence in more remote areas; these included cervical cancer

among females and oesophageal and lung cancer among males. Despite there being significant evidence of geographic variation in lung and uterine cancer incidence among females, there was no clear pattern by remoteness.

There was also variation by socioeconomic status. The predominant pattern was that cancers with higher incidence in more urban areas tended to also have high incidence in more affluent areas. In contrast, those cancers that were more common in more remote areas tended to have higher incidence in more disadvantaged areas.

**Table 1:**  
An overview of the results  
by type of cancer, gender  
and rurality



## Survival

There was a consistent pattern that when survival varied across Queensland, cancer patients living in more rural or disadvantaged areas had lower survival compared to the Queensland average. If survival outcomes in these rural areas were improved to the current Queensland average survival, an estimated 1,223 cancer-related deaths within 5 years of diagnosis (795 males, 428 females) could have been prevented. This represents 9% of cancer related deaths during this period (Table 2).

## Interpretation

Variations in cancer incidence and survival may be caused by a range of factors, including, but not restricted to, environmental factors, access to screening and diagnostic services, stage at diagnosis, access to effective treatment and care, migration of cancer patients, the mix of cancer types present in that region, or even chance. Since detailed information on many of these factors is not currently available, it was not possible to provide definitive reasons for any observed geographical variation.

It is hoped that this report will provide increased motivation to investigate why these differences exist, and encourage appropriate allocation of financial and other types of assistance to improve detection and survival outcomes for cancer patients across the whole of Queensland.

**Table 2: Number of deaths within 5 years of diagnosis that could have been prevented in remote and outer regional areas if the risk of dying was the same as the Queensland average, 1998-2007**

Cancer site	Number of deaths (%)	
	Males	Females
All invasive cancers	795 (9%)	428 (9%)
Stomach	25 (8%)	
Colorectal	134 (11%)	71 (9%)
Lung	200 (9%)	80 (9%)
Breast		73 (10%)
Prostate	94 (7%)	
Non-Hodgkin lymphoma	29 (11%)	29 (16%)
Leukaemia	28 (9%)	

Notes: 1. Numbers are only shown for cancers which had significant variation in survival throughout Queensland.  
2. Data are for cases 'at risk' during the period 1998 to 2007.

The full report is available at:  
[www.cancerqld.org.au/cancer\\_atlas](http://www.cancerqld.org.au/cancer_atlas)